

2007-2009



**HONDA**

**SERVICE MANUAL**

**CRF150R/RB**





## HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CRF150R/ RB.

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

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

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

Section 4 through 15 describe parts of the motorcycle, grouped according to location.

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


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

If you don't know the source of the trouble, go to section 17 Troubleshooting.

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

You must use your own good judgement.

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

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

### DANGER

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


### WARNING

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

### CAUTION

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

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








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

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## SYMBOLS

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

	Replace the part(s) with new one(s) before assembly.
	Use the recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® G-n Paste manufactured by Dow Corning U.S.A. Honda Moly 60 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use fork or suspension fluid.

# 1. GENERAL INFORMATION

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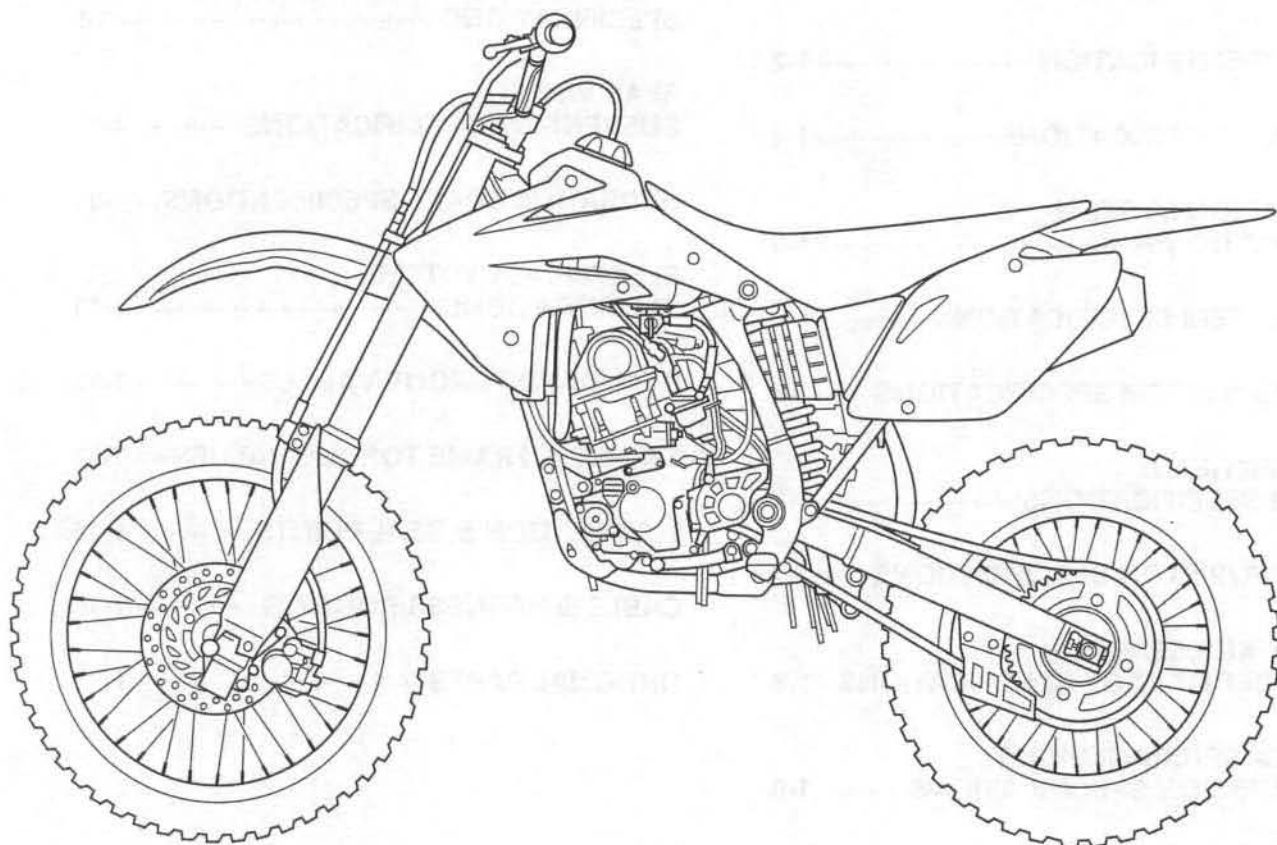
## GENERAL INFORMATION

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### SERVICE RULES

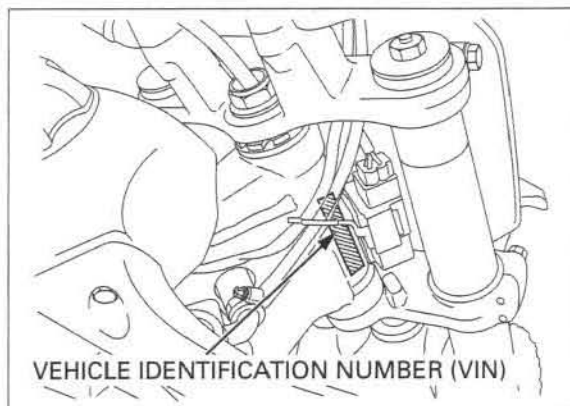
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English 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 1-18).

### MODEL IDENTIFICATION

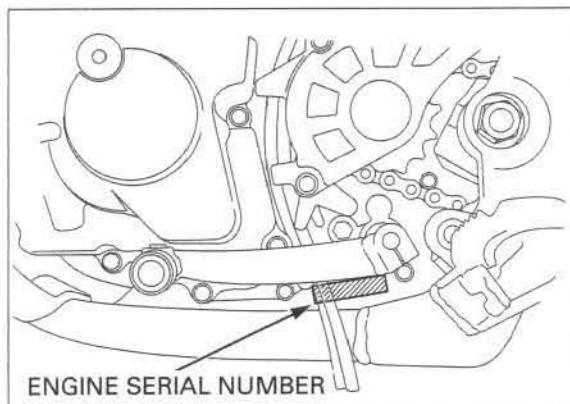


## GENERAL INFORMATION

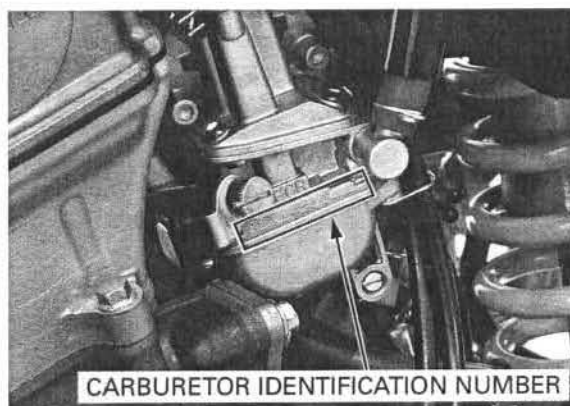
The Vehicle Identification Number (VIN) is stamped on the right side of the steering head.



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



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



## GENERAL INFORMATION

## GENERAL SPECIFICATIONS

### CRF150R:

	ITEM	SPECIFICATION
DIMENSIONS	Overall length	1,832 mm (72.1 in)
	Overall width	770 mm (30.3 in)
	Overall height	1,133 mm (44.6 in)
	Wheelbase	1,260 mm (49.6 in)
	Seat height	832 mm (32.8 in)
	Footpeg height	379 mm (14.9 in)
	Ground clearance	301 mm (11.9 in)
FRAME	Frame type	Semi double cradle
	Front suspension	Telescopic fork
	Front suspension axle travel	241.3 mm (9.50 in)
	Front suspension cushion stroke	275 mm (10.83 in)
	Rear suspension	Pro-Link
	Rear wheel travel	272.4 mm (10.72 in)
	Rear damper	Decarbon type with nitrogen gas filled damper
	Front tire size	70/100-17 40M
	Rear tire size	90/100-14 49M
	Tire brand	DUNLOP Front: K490G /Rear: K695
	Front brake	Hydraulic single disc
	Front brake swept area	358.1 cm <sup>2</sup> (55.5 in <sup>2</sup> )
	Rear brake	Hydraulic single disc
	Rear brake swept area	300.7 cm <sup>2</sup> (46.6 in <sup>2</sup> )
	Caster angle	27°02'
	Trail length	78 mm (3.07 in)
	Fuel tank capacity	4.3 liter (1.14 US gal, 0.95 Imp gal)
ENGINE	Bore and stroke	66.0 x 43.7 mm (2.60 x 1.72 in)
	Displacement	149.7 cm <sup>3</sup> (9.13 cu-in)
	Compression ratio	11.7 : 1
	Valve train	Chain drive and OHC with rocker arm
	Intake valve	opens at 1 mm (0.04 in) lift
		closes at 1 mm (0.04 in) lift
	Exhaust valve	opens at 1 mm (0.04 in) lift
		closes at 1 mm (0.04 in) lift
	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	20.2 kg (44.5 lbs)
	Cylinder arrangement	Single cylinder, inclined 19° from vertical
CARBURETOR	Carburetor type	Piston valve type
	Venturi diameter	32 mm (1.3 in)
DRIVE TRAIN	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operated
	Transmission	Constant mesh, 5-speed
	Primary reduction	4.117 (70/17)
	Final reduction	3.333 (50/15)
	Gear ratio	2.214 (31/14)
		1.647 (28/17)
		1.318 (29/22)
		1.105 (21/19)
		0.956 (22/23)
	Gearshift pattern	Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system	CDI (Capacitive Discharged Ignition)



## CRF150RB:

ITEM		SPECIFICATION
DIMENSIONS	Overall length	1,900 mm (74.8 in)
	Overall width	770 mm (30.3 in)
	Overall height	1,171 mm (46.1 in)
	Wheelbase	1,285 mm (50.6 in)
	Seat height	866 mm (34.1 in)
	Footpeg height	413 mm (16.3 in)
	Ground clearance	336 mm (13.2 in)
FRAME	Frame type	Semi double cradle
	Front suspension	Telescopic fork
	Front suspension axle travel	241.3 mm (9.50 in)
	Front suspension cushion stroke	275 mm (10.83 in)
	Rear suspension	Pro-Link
	Rear wheel travel	282.1 mm (11.11 in)
	Rear damper	Decarbon type with nitrogen gas filled damper
	Front tire size	70/100-19 42M
	Rear tire size	90/100-16 52M
	Tire brand	DUNLOP Front: K490 /Rear: K695
	Front brake	Hydraulic single disc
	Front brake swept area	358.1 cm <sup>2</sup> (55.5 in <sup>2</sup> )
	Rear brake	Hydraulic single disc
	Rear brake swept area	300.7 cm <sup>2</sup> (46.6 in <sup>2</sup> )
	Caster angle	27°48'
	Trail length	96 mm (3.78 in)
ENGINE	Fuel tank capacity	4.3 liter (1.14 US gal, 0.95 Imp gal)
	Bore and stroke	66.0 x 43.7 mm (2.60 x 1.72 in)
	Displacement	149.7 cm <sup>3</sup> (9.13 cu-in)
	Compression ratio	11.7 : 1
	Valve train	Chain drive and OHC with rocker arm
	Intake valve	opens at 1 mm (0.04 in) lift
		closes at 1 mm (0.04 in) lift
	Exhaust valve	opens at 1 mm (0.04 in) lift
		closes at 1 mm (0.04 in) lift
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Oiled polyurethane foam
	Crankshaft type	Assembled type
CARBURETOR	Engine dry weight	20.2 kg (44.5 lbs)
	Cylinder arrangement	Single cylinder, inclined 19° from vertical
DRIVE TRAIN	Carburetor type	Piston valve type
	Venturi diameter	32 mm (1.3 in)
	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operated
	Transmission	Constant mesh, 5-speed
	Primary reduction	4.117 (70/17)
	Final reduction	3.733 (56/15)
	Gear ratio	2.214 (31/14)
		1.647 (28/17)
		1.318 (29/22)
ELECTRICAL		1.105 (21/19)
		0.956 (22/23)
	Gearshift pattern	Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system	CDI (Capacitive Discharged Ignition)



## GENERAL INFORMATION

# LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.56 liter (0.59 US qt, 0.49 Imp qt)	—
	At oil and filter change	0.59 liter (0.62 US qt, 0.52 Imp qt)	—
	At disassembly	0.70 liter (0.74 US qt, 0.62 Imp qt)	—
Transmission oil capacity	At draining	0.57 liter (0.61 US qt, 0.51 Imp qt)	—
	At disassembly	0.65 liter (0.69 US qt, 0.57 Imp qt)	—
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-30	—
Recommended transmission oil		Pro Honda HP trans oil, Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an 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 – 0.20 (0.006 – 0.008)	—
	Side clearance	0.05 – 0.12 (0.002 – 0.005)	—

## FUEL SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Fuel tank capacity	4.3 liters (1.10 US gal, 0.95 Imp gal)
Carburetor identification number	FCR08A
Main jet	#135
Slow jet	#40
Jet needle	NHNT
Jet needle clip position (Standard)	3rd from top
Pilot screw initial opening	2-1/4 turns out
Float level	7.0 mm (0.28 in)
Idle speed	2,100 ± 100 rpm
Throttle grip free play	3 – 5 mm (1/8 – 3/16 in)
Hot start lever free play	2 – 3 mm (1/16 – 1/8 in)
Throttle position sensor resistance (at 20°C/68°F)	4 – 6 kΩ

## COOLING SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Coolant capacity	0.76 liter (0.81 US qt, 0.67 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.
Standard coolant concentration	1 : 1 mixture with distilled water

## CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			500 kPa (5.1 kgf/cm <sup>2</sup> , 73 psi) at 600 rpm	—
Cylinder head warpage			—	0.05 (0.002)
Valve and valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.26 ± 0.03 (0.010 ± 0.001)	—
	Valve stem O.D.	IN	4.470 – 4.495 (0.1760 – 0.1770)	4.46 (0.176)
		EX	4.460 – 4.485 (0.1756 – 0.1766)	4.45 (0.175)
	Valve guide I.D.	IN/EX	4.500 – 4.512 (0.1772 – 0.1776)	4.552 (0.1792)
	Stem-to-guide clear- ance	IN	0.005 – 0.042 (0.0002 – 0.0016)	—
		EX	0.015 – 0.052 (0.0006 – 0.0020)	—
	Valve guide projection above cylinder head	IN	14.4 – 14.6 (0.56 – 0.57)	—
		EX	19.8– 20.0 (0.78 –0.79)	—
Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.7 (0.07)	
Valve spring free length		IN	38.16 (1.502)	37.4 (1.47)
		EX	44.88 (1.767)	44.0 (1.73)
Rocker arm	Rocker arm I.D.		10.000 – 10.015 (0.3937 – 0.3943)	10.07 (0.396)
	Rocker arm shaft O.D.		9.977 – 9.985 (0.3928 – 0.3931)	9.93 (0.391)
	Rocker arm-to-shaft clearance		0.015 – 0.038 (0.0006 – 0.0015)	0.11 (0.004)
Camshaft	Cam lobe height	IN	34.160 – 34.200 (1.3449 – 1.3465)	33.98 (1.338)
		EX	29.820 – 29.860 (1.1740 – 1.1756)	29.68 (1.169)
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.		66.000 – 66.015 (2.5984 – 2.5990)	66.04 (2.600)
	Out of round		–	0.010 (0.0004)
	Taper		–	0.010 (0.0004)
	Warpage		–	0.05 (0.002)
Piston, piston ring	Piston mark direction		IN mark toward the intake side	–
	Piston O.D.		65.975 – 65.985 (2.5974 – 2.5978)	65.895 (2.5978)
	Piston O.D. measurement point		5.0 mm (0.20 in) from the bottom of skirt	–
	Piston pin bore I.D.		14.002 – 14.008 (0.5513 – 0.5515)	14.03 (0.552)
	Piston pin O.D.		13.994 – 14.000 (0.5510 – 0.5512)	13.98 (0.550)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Top ring mark		R mark side facing up	–
	Piston ring-to-ring groove clearance	Top	0.02 – 0.05 (0.0008 – 0.0020)	0.20 (0.008)
	Piston ring end gap	Top ring	0.10 – 0.20 (0.003 – 0.007)	0.34 (0.013)
Oil ring (side rail)		0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)	
Cylinder-to-piston clearance			0.015 – 0.040 (0.0006 – 0.0015)	0.07(0.003)
Connecting rod small end I.D.			14.016 – 14.034 (0.5518 – 0.5525)	14.04 (0.553)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)



## GENERAL INFORMATION

# CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	–
Clutch spring free length		40.95 (1.612)	39.95 (1.57)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
Clutch plate warpage		–	0.10 (0.004)
Clutch outer I.D.		22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
Clutch outer collar	I.D.	17.000 – 17.018 (0.6693 – 0.6700)	17.03 (0.671)
	O.D.	21.959 – 21.980 (0.8645 – 0.8654)	21.94 (0.864)
Mainshaft O.D. at clutch outer collar		16.966 – 16.984 (0.6680 – 0.6687)	16.95 (0.667)
Kickstarter pinion gear I.D.		22.007 – 22.028 (0.8664 – 0.8672)	22.05 (0.868)
Kickstarter pinion gear bushing	I.D.	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
	O.D.	21.979 – 22.000 (0.8653 – 0.8661)	21.96 (0.865)
Kickstarter spindle O.D.		19.980 – 19.993 (0.7866 – 0.7871)	19.97 (0.786)
Kickstarter idle gear I.D.		18.016 – 18.034 (0.7093 – 0.7100)	18.06 (0.711)
Kickstarter idle gear bushing	I.D.	15.000 – 15.018 (0.5906 – 0.5913)	15.04 (0.592)
	O.D.	17.982 – 18.000 (0.7080 – 0.7086)	17.96 (0.707)
Countershaft O.D. at kickstarter idle gear		14.966 – 14.984 (0.5892 – 0.5899)	14.95 (0.589)

# CRANKCASE/CRANKSHAFT/TRANSMISSION 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	R	–	0.03 (0.001)
		L	–	0.05 (0.002)
Transmission	Gear I.D.	M4	21.020 – 21.041 (0.8276 – 0.8284)	21.07 (0.830)
		M5	21.020 – 21.041 (0.8276 – 0.8284)	21.07 (0.830)
		C1	19.520 – 19.542 (0.7685 – 0.7693)	19.57 (0.770)
		C2,C3	23.020 – 23.041 (0.9063 – 0.9071)	23.07 (0.908)
	Bushing O.D.	M4	20.959 – 20.980 (0.8252 – 0.8260)	19.95 (0.785)
		M5	20.979 – 21.000 (0.8259 – 0.8268)	19.95 (0.785)
		C1	19.479 – 19.500 (0.7689 – 0.7677)	19.45 (0.766)
		C2,3	22.979 – 23.000 (0.9047 – 0.9055)	22.95 (0.904)
	Bushing I.D.	M5	18.020 – 18.041 (0.7094 – 0.7103)	18.06 (0.711)
		C1	16.500 – 16.518 (0.6496 – 0.6503)	16.54 (0.651)
		C2,3	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
	Gear-to-bushing clearance	M4	0.040 – 0.082 (0.0015 – 0.0032)	0.12 (0.005)
		M5	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
		C1	0.020 – 0.063 (0.0008 – 0.0024)	0.12 (0.005)
		C2,3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	17.966 – 17.984 (0.7073 – 0.7080)	17.94 (0.706)
	Countershaft O.D.	C1	16.466 – 16.484 (0.6483 – 0.6490)	16.45 (0.648)
		C2,3	19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)
	Bushing-to-shaft clearance	M5	0.036 – 0.075 (0.0014 – 0.0030)	0.12 (0.005)
		C1	0.016 – 0.052 (0.0006 – 0.0020)	0.12 (0.005)
		C2,3	0.040 – 0.082 (0.0016 – 0.0032)	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.	C	10.989 – 11.011 (0.4236 – 0.4335)	11.04 (0.435)
		R	11.035 – 11.056 (0.4344 – 0.4353)	11.07 (0.436)
		L	11.035 – 11.056 (0.4344 – 0.4353)	11.07 (0.436)
	Fork shaft O.D.	C	10.966 – 10.984 (0.4317 – 0.4324)	10.95 (0.431)
		R	10.969 – 10.980 (0.4319 – 0.4323)	10.95 (0.431)
		L	10.969 – 10.980 (0.4319 – 0.4323)	10.95 (0.431)

## FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

## CRF150R:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		20.0 ± 1.0 (0.79 ± 0.04)	—
Fork	Spring free length	447.6 (17.6)	441 (17.4)
	Tube runout	—	0.2 (0.01)
	Recommended fork oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Oil level	123 (4.84)	—
	Oil capacity	357 cm <sup>3</sup> (12.1 US oz, 12.6 Imp oz)	—
Compression damping adjuster standard position		7 clicks out from full in <b>NEW</b>	—
Rebound damping adjuster standard position		1 ± 1/4 turns out from full in <b>NEW</b>	—

## CRF150RB:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		20.2 ± 1.0 (0.80 ± 0.04)	—
Fork	Spring free length	447.6 (17.6)	441 (17.4)
	Tube runout	—	0.2 (0.01)
	Recommended fork oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Oil level	141 mm (5.55)	—
	Oil capacity	342 cm <sup>3</sup> (11.6 US oz, 12.0 Imp oz)	—
Compression damping adjuster standard position		7 clicks out from full in <b>NEW</b>	—
Rebound damping adjuster standard position		1 ± 1/4 turns out from full in <b>NEW</b>	—



## GENERAL INFORMATION

# REAR WHEEL/SUSPENSION SPECIFICATIONS

### CRF150R:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		36.0 ± 1.0 (1.42 ± 0.04)	—
Drive chain slack		35 – 45 (1.4 – 1.8)	—
Drive chain size/link	DID	420DS3/120RB	—
Drive chain slider thickness		—	5 (0.2)
Drive chain tensioner roller O.D.		—	18 (0.71)
Shock absorber	Damper gas pressure	980 kPa (10.0 kg/cm <sup>2</sup> , 142 psi)	—
	Damper compressed gas	Nitrogen gas	—
	Recommended shock oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Spring free length	241 (9.49)	236.2 (9.30)
	Spring installed length (standard)	233.8 (9.20)	—
	Oil capacity	191 cm <sup>3</sup> (6.5 US oz, 6.7 Imp oz)	—
Compression damping adjuster standard position		1-1/8 – 1- 1/2 turns out from full in	—
Rebound damping adjuster standard position		3/8 – 5/8 turns out from full in	—

### CRF150RB:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		31.7 ± 1.0 (1.25 ± 0.04)	—
Drive chain slack		35 – 45 (1.4 – 1.8)	—
Drive chain size/link	DID	420DS3/126RB	—
Drive chain slider thickness		—	5 (0.2)
Drive chain tensioner roller O.D.		—	18 (0.71)
Shock absorber	Damper gas pressure	980 kPa (10.0 kg/cm <sup>2</sup> , 142 psi)	—
	Damper compressed gas	Nitrogen gas	—
	Recommended shock oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Spring free length	241 (9.49)	236.2 (9.30)
	Spring installed length (standard)	234.0 (9.21)	—
	Oil capacity	191 cm <sup>3</sup> (6.5 US oz, 6.7 Imp oz)	—
Compression damping adjuster standard position		1-1/8 – 1- 1/2 turns out from full in	—
Rebound damping adjuster standard position		3/8 – 5/8 turns 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	3.0 (0.12)	2.5 (0.10)
	Brake disc warpage	—	0.15 (0.006)
	Master cylinder I.D.	11.000 (0.4331)	11.055 (0.4352)
	Master piston O.D.	10.957 (0.4314)	10.840 (0.4268)
	Caliper cylinder I.D.	30.230 (1.190)	30.29 (1.193)
	Caliper piston O.D.	30.148 (1.1869)	30.14 (1.187)
Rear	Brake fluid	DOT 4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	3.5 ± 0.2	3.0 (0.12)
	Brake disc warpage	—	0.15 (0.006)
	Master cylinder I.D.	11.000 (0.4331)	11.055 (0.4352)
	Master piston O.D.	10.957 (0.4314)	10.840 (0.4268)
	Caliper cylinder I.D.	22.650 (0.8917)	22.712 (0.8942)
	Caliper piston O.D.	22.620 (0.8905)	22.573 (0.8887)

## ELECTRICAL SYSTEM SPECIFICATIONS

ITEM			SPECIFICATION
Spark plug	Standard	(NGK)	CR8EH9
		(DENSO)	U24FER9
	Optional	(NGK)	CR9EH9
		(DENSO)	U27FER9
Spark plug gap			0.8 – 0.9 mm (0.031 – 0.035 in)
Direct ignition coil resistance (at 20 °C/68 °F)		Primary	0.07 – 0.10 Ω
		Secondary	4.6 – 6.8 kΩ
Ignition coil peak voltage			100 V minimum
Ignition pulse generator resistance (at 20°C/68°F)			180 – 280 Ω
Ignition pulse generator peak voltage			0.7 V minimum
Exciter coil resistance (at 20°C/68°F)			9 – 25 Ω
Exciter coil peak voltage			50 V minimum
Ignition timing ("F" mark)			8° BTDC/2,100 rpm
Throttle position sensor resistance (at 20 °C/68 °F)			4 – 6 kΩ

## GENERAL INFORMATION

### STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5.2 (0.5, 3.8)	5 mm screw	4.2 (0.4, 3.1)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.6)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt	9 (0.9, 6.6)
10 mm hex bolt and nut	34 (3.5, 25)	(8 mm head, small flange)	
12 mm hex bolt and nut	55 (5.6, 41)	6 mm flange bolt	12 (1.2, 9)
		(8 mm head, large flange)	
		6 mm flange bolt	12 (1.2, 9)
		(10 mm head) and nut	
		8 mm flange bolt and nut	27 (2.8, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

### ENGINE & FRAME TORQUE VALUES

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

#### ENGINE

##### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine oil drain bolt	1	8	22 (2.2, 16)	Apply grease to the threads.
Transmission oil drain bolt	1	8	22 (2.2, 16)	
Crankshaft hole cap	1	30	15 (1.5, 11)	
Spark plug	1	10	16 (1.6, 12)	

##### FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Throttle drum cover bolt	1	5	3.4 (0.3, 2.5)	Apply locking agent to the threads.
Needle jet	1	7	1.8 (0.2, 1.3)	
Main jet	1	5	1.5 (0.2, 1.1)	
Slow jet	1	10	1.5 (0.2, 1.1)	
Slow air jet	1	5	0.9 (0.1, 0.7)	
Starter jet	1	5	1.5 (0.2, 1.1)	
Acc pump bypass	1	4	0.3 (0.03, 0.22)	
Carburetor top cover bolt	2	4	2.1 (0.2, 1.5)	
Throttle shaft torx screw	1	4	2.1 (0.2, 1.5)	
Float chamber screw	4	4	2.1 (0.2, 1.5)	
Accelerator pump cover screw	3	4	2.1 (0.2, 1.5)	Apply locking agent to the threads.
Carburetor drain plug	1	18	4.9 (0.5, 3.6)	
Choke valve lock nut	1	12	2.1 (0.2, 1.5)	
Hot start valve lock nut	1	12	2.1 (0.2, 1.5)	
Jet needle holder	1	8	2.1 (0.2, 1.5)	
Throttle position sensor torx 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



## CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	2	6	10 (1.0, 7)	Apply engine oil to the threads and seating surface. Apply engine oil to the threads and seating surface. Apply locking agent to the threads.
Camshaft holder mounting bolt	4	6	13 (1.3, 10)	
Cylinder head nut	4	8	31 (3.2, 23)	
Cam sprocket bolt	2	7	20 (2.0, 15)	

## 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.
Gearshift drum stopper arm bolt	1	6	10 (1.0, 7)	
Clutch center lock nut	1	14	73 (7.4, 54)	Apply engine oil to the threads and seating surface.
Clutch spring bolt	4	6	10 (1.0, 7)	
Gearshift return spring bolt	1	8	22 (2.2, 16)	
Kickstarter pedal bolt	1	8	38 (3.9, 28)	

## 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	20 (2.0, 15)	ALOC bolt: replace with a new one.
Gearshift drum bearing set plate bolt	2	6	10 (1.0, 7)	
Ratchet guide plate bolt	1	8	26 (2.7, 19)	Apply locking agent to the threads.
Mainshaft bearing set plate bolt	2	6	10 (1.0, 7)	
Balancer shaft bearing set plate bolt	2	6	10 (1.0, 7)	Apply locking agent to the threads.
Drive sprocket bolt	1	8	13 (1.3, 10)	
Primary drive gear bolt	1	10	64 (6.5, 47)	Apply engine oil to the threads and seating surface.
Balancer shaft nut	1	12	34 (3.5, 25)	
Oil jet	1	5	2.1 (0.2, 1.6)	ALOC bolt: replace with a new one.
Cam chain tensioner bolt	2	6	12 (1.2, 9)	
Shift lever pinch bolt	1	6	16 (1.6, 12)	Apply locking agent to the threads.

## ELECTRICAL SYSTEM

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 surface.
Timing hole cap	1	14	10 (1.0, 7)	
Ignition pulse generator mounting bolt	2	5	5.2 (0.5, 3.8)	Apply locking agent to the threads.
Stator mounting screw	3	4	2.6 (0.3, 1.9)	

## GENERAL INFORMATION

### FRAME

#### 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)	
Sub-frame mounting bolt (upper)	2	8	30 (3.1, 22)	
Sub-frame mounting bolt (lower)	2	8	30 (3.1, 22)	
Muffler joint band bolt	1	8	21 (2.1, 15)	
Muffler mounting bolt	2	8	32 (3.3, 24)	
Exhaust pipe joint nut	2	7	11 (1.1, 8)	
Exhaust pipe protector	2	6	12 (1.2, 9)	
Rear fender mounting bolt	2	6	13 (1.3, 10)	

#### ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine mounting nut (front)	1	10	64 (6.5, 47)	
(lower)	1	10	64 (6.5, 47)	
Engine hanger plate bolt	1	8	34 (3.5, 25)	
	1	10	64 (6.5, 47)	

#### FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front axle nut	1	14	69 (7.0, 51)	U-nut.
Front spoke	28	BC3.2	3.7 (0.4, 2.7)	
Front rim lock	1	8	12.4 (1.3, 9.1)	
Front brake disc bolt	4	6	20 (2.0, 15)	ALOC bolt: replace with a new one.
Steering stem nut	1	24	128 (13.1, 94.4)	
Steering adjusting nut	1	26	(page 12-28)	
Fork top bridge pinch bolt	2	8	22 (2.2, 16)	
Fork bottom bridge pinch bolt	4	8	22 (2.2, 16)	
Fork cap	2	41	34 (3.5, 25)	
Fork center bolt	2	22	54 (5.4, 40)	
Fork center bolt lock nut	2	10	19.7 (2.0, 15)	
Front fork air pressure release screw	2	5	1.3 (0.1, 1)	
Fork protector mounting bolt	6	6	7.0 (0.7, 5.2)	ALOC bolt: replace with a new one.
Handlebar upper holder bolt	4	8	22 (2.2, 16)	
Clutch lever pivot bolt	1	6	2.0 (0.2, 1.5)	
Clutch lever pivot nut	1	6	9 (0.9, 7)	U-nut.
Engine stop button screw	1	4	1.5 (0.2, 1.1)	

## REAR WHEEL/BRAKE/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	16	88 (9.0, 65)	U-nut.
Rear spoke	32	BC3.2	3.7 (0.4, 2.7)	
Rear rim lock	1	8	12.4 (1.3, 9.1)	
Rear brake disc bolt	4	6	20 (2.0, 15)	ALOC bolt: replace with a new one.
Driven sprocket nut	4	8	32 (3.3, 24)	U-nut.
Swingarm pivot nut	1	12	83 (8.5, 61)	U-nut.
Shock arm nut (swingarm side)	1	10	44 (4.5, 33)	Apply engine oil to the threads and seating surface., U-nut.
(shock link side)	1	10	44 (4.5, 33)	Apply engine oil to the threads and seating surface., U-nut.
Shock link nut (frame side)	1	10	44 (4.5, 33)	Apply engine oil to the threads and seating surface., U-nut.
Shock upper;	1	10	44 (4.5, 33)	U-nut.
absorber lower;	1	10	44 (4.5, 33)	U-nut.
mounting nut				
Shock absorber spring lock nut	1	50	88 (9.0, 65)	
Drive chain adjusting nut	2	8	27 (2.8, 20)	UBS-nut
Shock absorber damper rod end nut	1	12	34 (3.5, 21)	Stake.
Shock absorber damping adjuster	1	18	17.2 (1.8, 13)	

## HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake hose oil bolt	2	10	34 (3.5, 25)	
Brake lever adjuster lock nut	1	5	5.9 (0.6, 4.4)	
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Front brake hose guide bolt	4	6	5.2 (0.5, 3.8)	
Rear brake hose guide screw	6	5	1.2 (0.1, 0.9)	
Front master cylinder holder bolt	2	6	9.8 (1.0, 7)	
Front master cylinder reservoir cover screw	2	4	1.5 (0.2, 1.1)	
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt: replace with a new one.
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	5	1.5 (0.2, 1.1)	
Front caliper pin bolt	1	8	17.2 (1.8, 13)	Apply locking agent to the threads.
Rear caliper bracket side: pin bolt	1	8	12 (1.2, 9)	Apply locking agent to the threads.
caliper side:	1	8	22 (2.2, 16)	Apply locking agent to the threads.
Brake caliper pad pin	3	10	17.2 (1.8, 13)	
Brake pedal pivot bolt	1	8	32 (3.3, 24)	
Rear brake pedal adjusting bolt lock nut	1	6	5.9 (0.6, 4.4)	



## 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 journal and lobes Rocker arm slipper surfaces Valve stem (valve guide sliding surfaces) Valve stem end sliding surface Valve lifter outer surface Clutch outer collar lining surfaces Clutch lifter lever cam area Kickstarter spindle spline area and gear rolling area Connecting rod big end side surface Connecting rod small end inner surface Mainshaft spline area and gear rolling area Countershaft spline area and gear rolling area Transmission gear and sliding surfaces Shift fork claws and guide pin area Shift fork shafts outer surface	
Engine oil	Camshaft holder mounting bolt threads Cylinder head nut threads and seating surfaces Crankshaft outer surfaces and oil seal area Crankcase drain bolt seating threads and surfaces Balancer driven gear nut seating surface Piston outer surface and piston pin hole Piston pin outer surface Piston rings Cylinder bore Clutch outer sliding area Cylinder head cover seal ring circumference Clutch lifter piece and needle bearing Clutch disc linings and plates Clutch center lock nut threads and seating surfaces Kickstarter spindle journal Primary drive gear bolt threads Flywheel bolt threads and seating surfaces Shift drum guide grooves Shift spindle serration area Oil pump rotors sliding area Bearings O-rings	
Multi-purpose grease	Crankshaft hole cap threads Timing hole cap thread Oil seal lips	
Locking agent	Shift drum center pin bolt threads Stator screw threads Pulse generator mount bolt Mainshaft bearing set plate bolt threads Shift drum bearing set plate bolt threads Balancer bearing set plate screw threads Cam chain tensioner bolt threads Cam sprocket bolt threads Decompressor weight set plate bolt threads	Coating width: 6.5 mm (0.26 in) from tip Coating width: 6.5 mm (0.26 in) from tip Coating width: 6.5 mm (0.26 in) from tip Coating width: 6.5 mm (0.26 in) from tip
Liquid sealant	Alternator wire grommet sealing surface Air cleaner housing connecting surface	

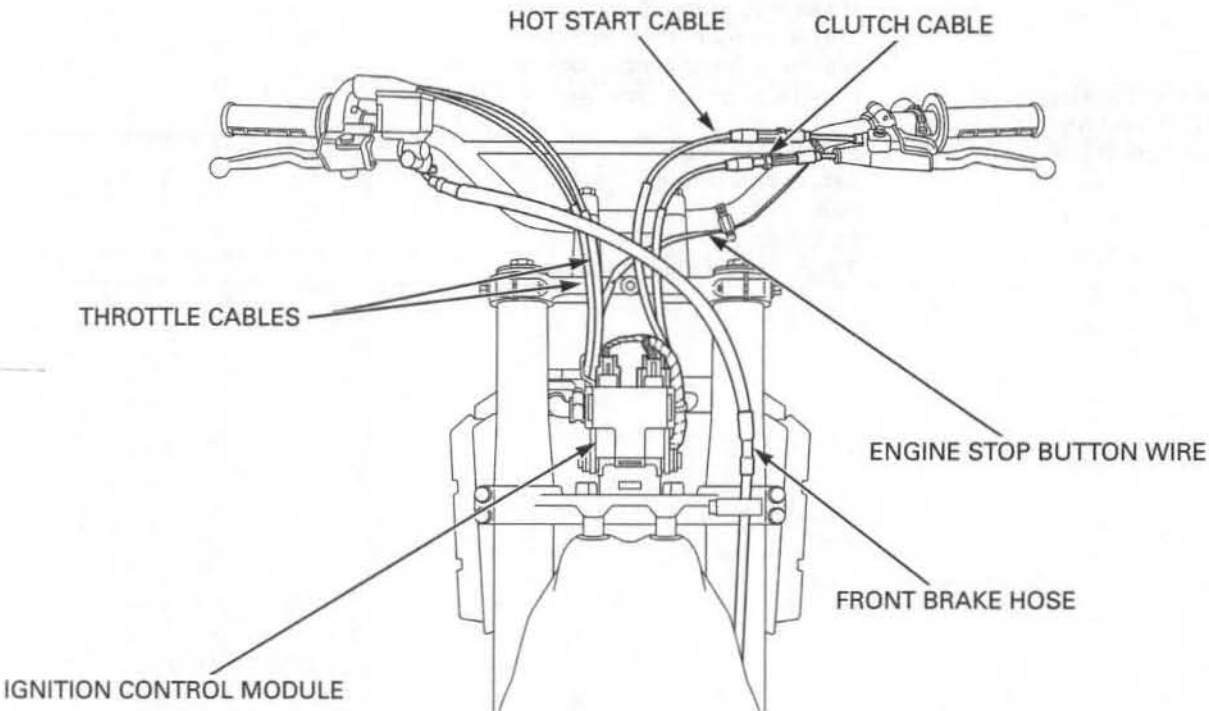
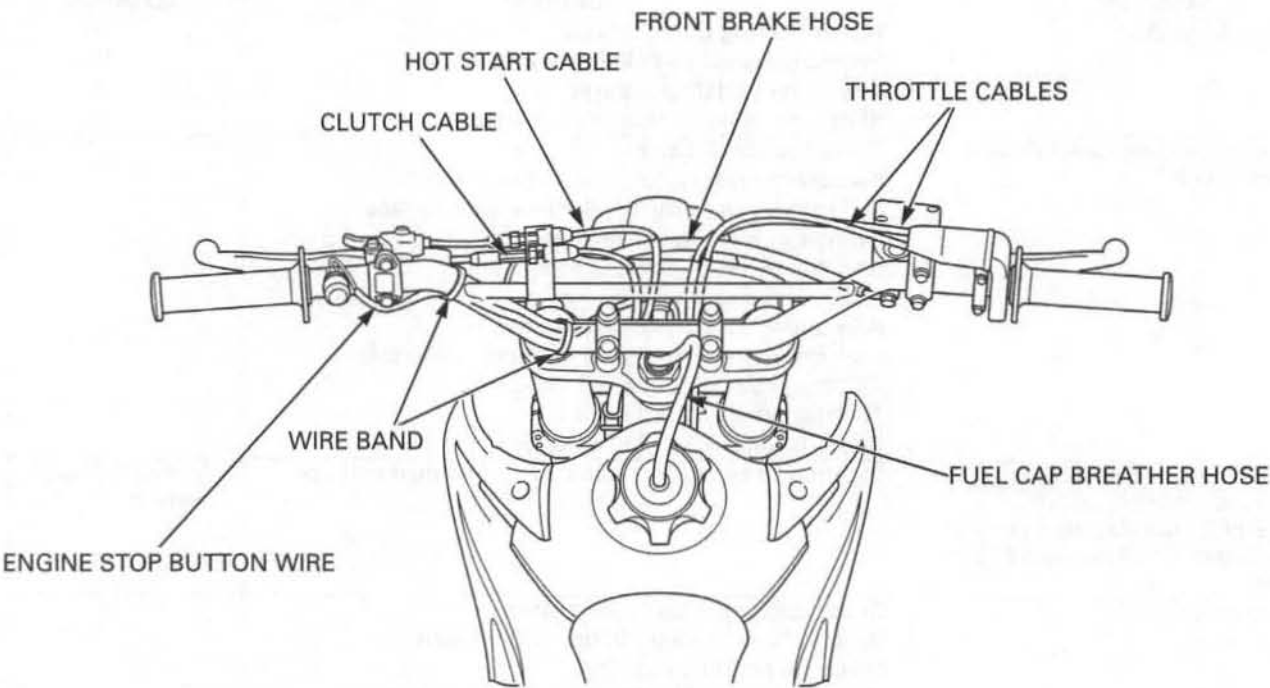
## FRAME

MATERIAL	LOCATION	REMARKS
Multi-purpose grease	Wheel bearing dust seal lips Swingarm pivot bolt sliding surface Kickstarter pedal spline area Shift change pedal sliding area of pin	
Multi-purpose grease (Shell Alvania EP2 or equivalent)	Brake pedal pivot shaft sliding area Swingarm pivot needle bearing rolling area Swingarm pivot thrust collar bearing end face Swingarm pivot dust seal lips Shock arm needle bearing rolling area Shock arm dust seal lips Rear shock absorber dust seal lips Rear shock absorber upper bearing rolling area Throttle slider sliding area Throttle cable grip side end Clutch lever pivot bolt sliding area	
Urea based multi-purpose grease with extreme pressure (example: EXCELITE EP2 manufactured by KYO-DOYUSI, Japan, Shell stamina EP2 or equivalent)	Steering head bearing rolling area and dust seal lips	Apply 3 for each bearing
Silicone grease	Brake caliper pin bolt sliding area Brake caliper bracket pin bolt sliding area Brake caliper dust seal lips Brake caliper and brake pin boots inside surface Brake lever pivot bolt sliding surface Brake lever adjust bolt tip Rear master cylinder push rod rounded surface Rear master cylinder boot fitting area	
Locking agent	Drive chain slider mounting screw threads Front brake caliper mounting bolt Caliper slide pins thread	
DOT4 brake fluid	Brake caliper piston seal lips Brake caliper piston outer surface Master cylinder inner surface Master cylinder piston outer surface	
Honda Bond A or Pro Honda Hand Grip Cement (U.S.A only)	Handlebar grip rubber inner surface	
Pro-Honda HP Fork Oil 5W	Fork bolt O-rings Center bolt O-rings Fork oil seal Fork dust seal	
Engine oil	Throttle cable sliding surface	

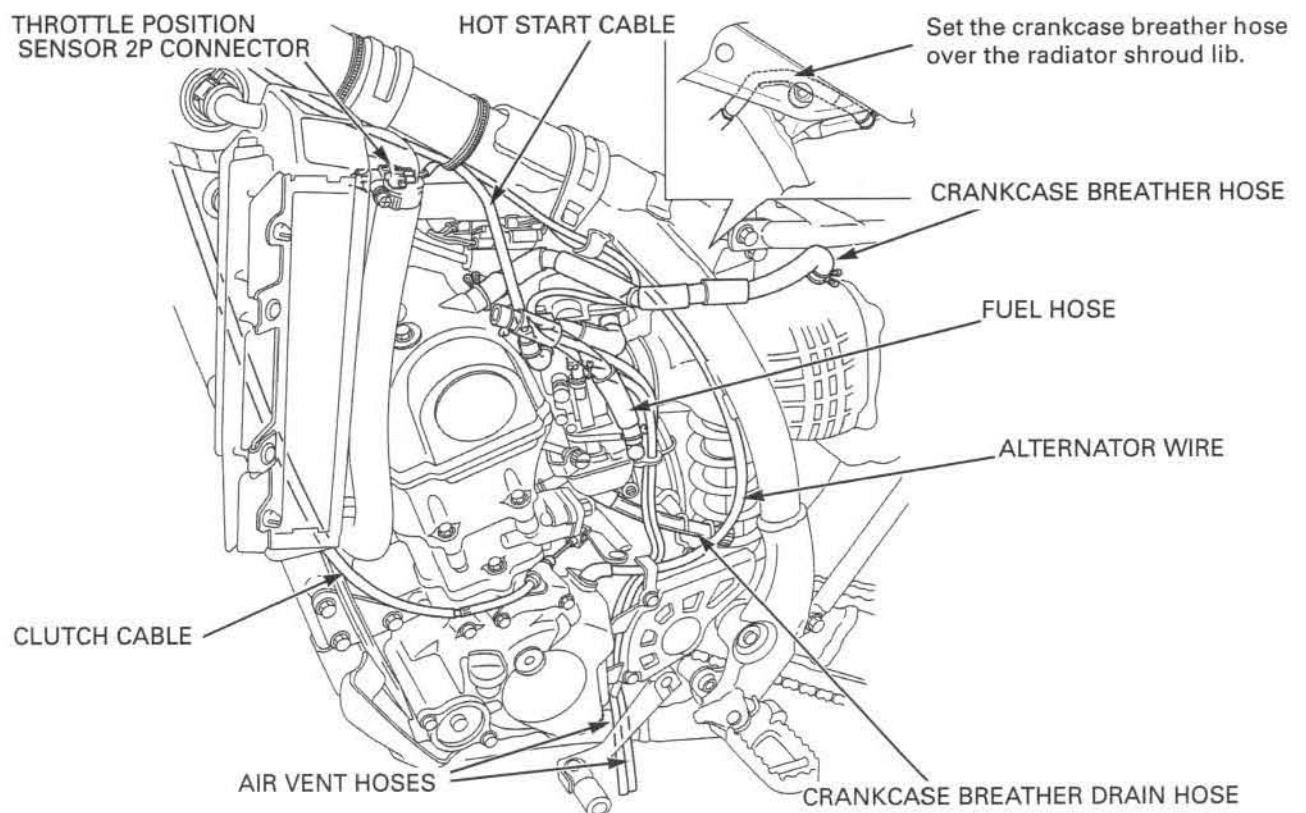
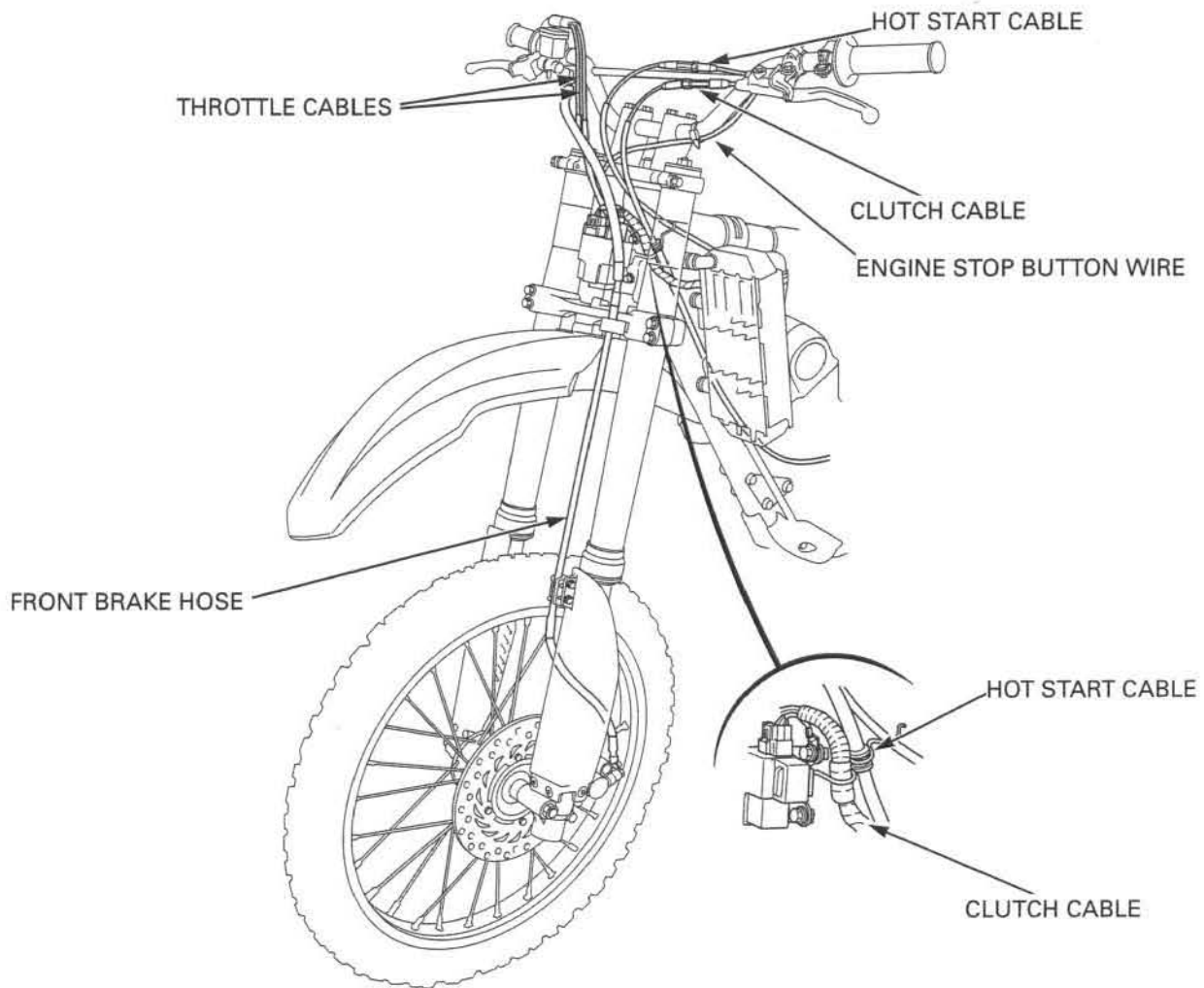
GENERAL INFORMATION

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CABLE & HARNESS ROUTING









## GENERAL INFORMATION

IGNITION PULSE  
GENERATOR  
2P (BLACK)  
CONNECTOR

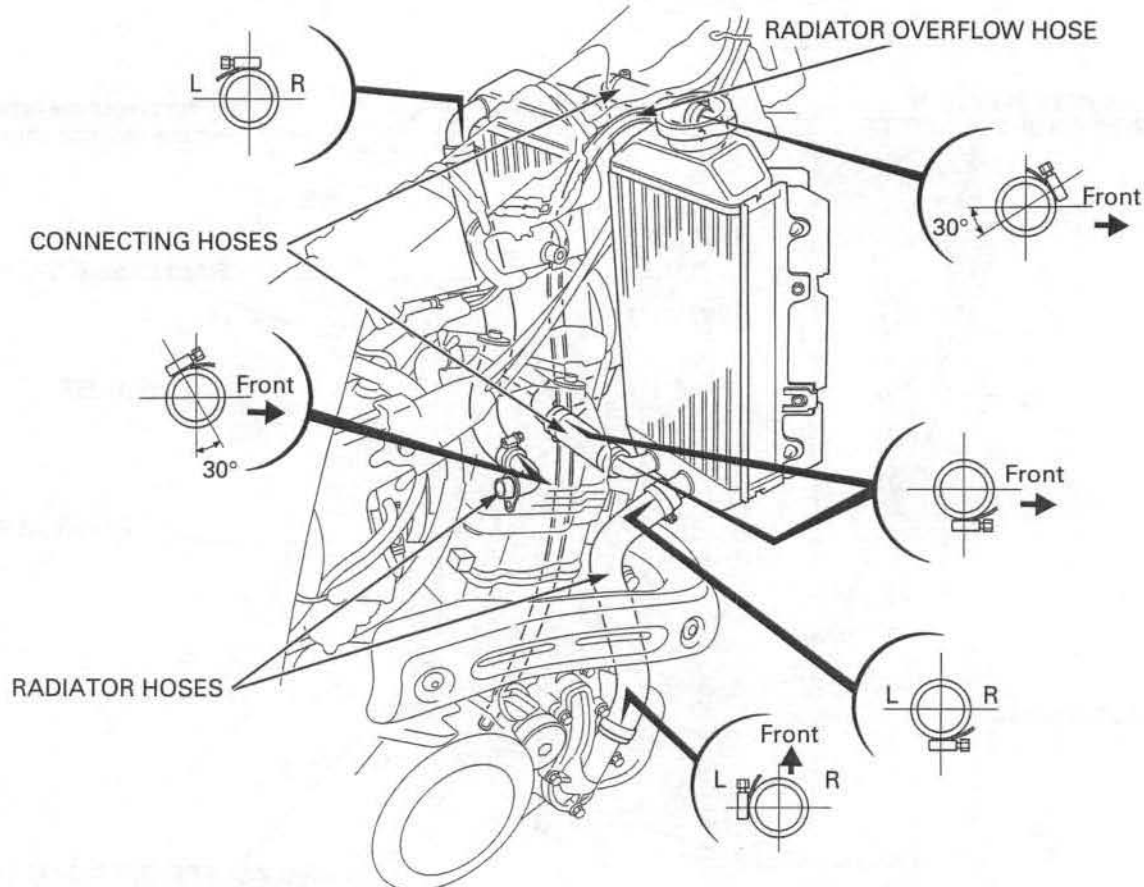
ENGINE STOP BUTTON CONNECTORS

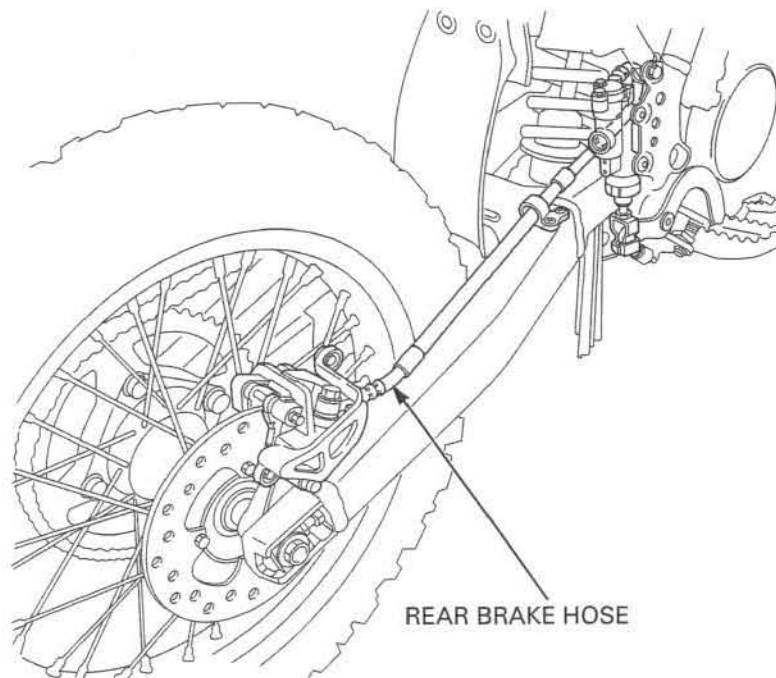
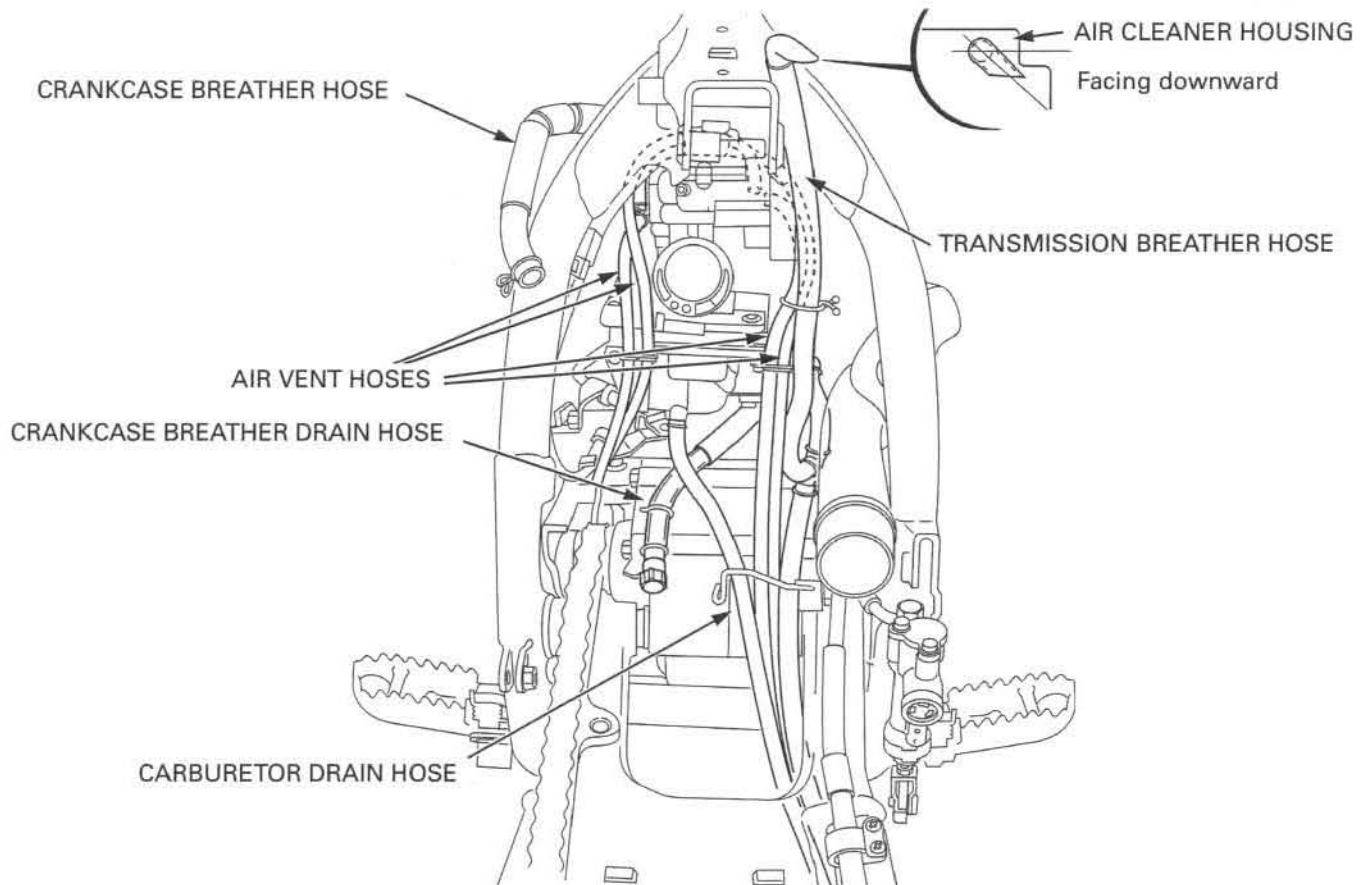
EXCITER COIL  
2P (NATURAL)  
CONNECTOR

TRANSMISSION  
BREATHER HOSE

DIRECT IGNITION COIL

CRANKCASE BREATHER DRAIN HOSE

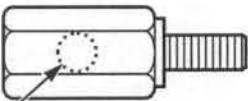
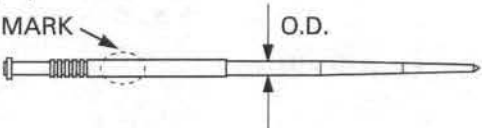




## GENERAL INFORMATION

## OPTIONAL PARTS

### ENGINE

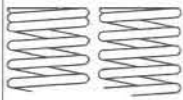
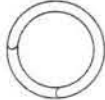

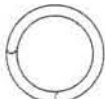
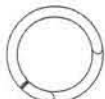


ITEM			REMARKS	
<b>CARBURETOR:</b>				
Main jet	Standard		#135	
	Optional		#125 – 145 (increments of 2 or 3)	
				
Jet needle	Standard		NHNT (φ2.775 mm)	
	Specific flow characteristics at 1/6 to 1/4 throttle		Jet needle number (Standard series)	Jet needle number (1/2 clip position leaner than standard series)
	Rich		NHNR (φ2.755 mm)	NJAR (φ2.755 mm)
	General flow characteristics (at 1/16 to 1/4 throttle)		NHNS (φ2.765 mm)	NJAS (φ2.765 mm)
			NHNT (φ2.775 mm) (Standard needle)	NJAT (φ2.775 mm)
			NHNU (φ2.785 mm)	NJAU (φ2.785 mm)
	Lean		NHNV (φ2.795 mm)	NJAV (φ2.795 mm)
			Explanation of the jet needle numbers (Example) 	
Slow jet	Standard		#40	
	Optional		#35 – 45 (increments of 2 or 3)	
Acc pump bypass	Standard		#60	
	Optional		#50, #55	
Accelerator pump diaphragm	Standard		#25	
	Optional		#20	

### FRAME







ITEM			REMARKS	
<b>DRIVE CHAIN &amp; SPROCKET:</b>				
Driven sprocket /chain link	CRF150R:	Standard	50T (Steel)/120	
		Optional	49T (Aluminum)/120	
			50T (Aluminum)/120	
			51T (Aluminum)/120	
	CRF150RB:	Standard	56T (Steel)/126	
		Optional	55T (Aluminum)/126	
			56T (Aluminum)/126	
			57T (Aluminum)/126	



# GENERAL INFORMATION

ITEM		REMARKS		
<b>FORK:</b> Spring CRF150R:	<b>TYPE</b> Light  2-coils at one end 1-coil at other end	<b>SPRING RATE</b> 0.32 kgf/mm (27.76 lbf/in)	<b>OIL CAPACITY</b> Standard 353 cm <sup>3</sup> (11.9 US oz)	<b>OIL LEVEL</b> 128 mm (5.0 in)
	<b>Standard</b> No mark 	0.34 kgf/mm (29.51 lbf/in)	Maximum 353 cm <sup>3</sup> (11.9 US oz)	128 mm (5.0 in)
			Minimum 300 cm <sup>3</sup> (10.1 US oz)	194 mm (7.6 in)
			Standard 357 cm <sup>3</sup> (12.1 US oz)	123 mm (4.8 in)
	<b>Heavy</b> 1 scribe mark 	0.36 kgf/mm (31.25 lbf/in)	Maximum 353 cm <sup>3</sup> (11.9 US oz)	123 mm (4.8 in)
			Minimum 299 cm <sup>3</sup> (10.1 US oz)	189 mm (7.4 in)
			Standard 353 cm <sup>3</sup> (11.9 US oz)	128 mm (5.0 in)
	<b>TYPE</b> Light  No mark	<b>SPRING RATE</b> 0.34 kgf/mm (29.51 lbf/in)	<b>OIL CAPACITY</b> Standard 346 cm <sup>3</sup> (11.7 US oz)	<b>OIL LEVEL</b> 136 mm (5.4 in)
	<b>Standard</b> 1 scribe mark 	0.36 kgf/mm (31.25 lbf/in)	Maximum 354 cm <sup>3</sup> (12.0 US oz)	126 mm (5.0 in)
			Minimum 304 cm <sup>3</sup> (10.3 US oz)	188 mm (7.4 in)
			Standard 342 cm <sup>3</sup> (11.6 US oz)	141 mm (5.6 in)
	<b>Heavy</b> 2 scribes mark 	0.38 kgf/mm (32.98 lbf/in)	Maximum 350 cm <sup>3</sup> (11.8 US oz)	131 mm (5.2 in)
			Minimum 299 cm <sup>3</sup> (10.1 US oz)	194 mm (7.6 in)
			Standard 345 cm <sup>3</sup> (11.7 US oz)	138 mm (5.4 in)
	<b>CRF150RB:</b> Light  No mark	0.34 kgf/mm (29.51 lbf/in)	Maximum 353 cm <sup>3</sup> (11.9 US oz)	128 mm (5.0 in)
			Minimum 302 cm <sup>3</sup> (10.2 US oz)	191 mm (7.5 in)
			Standard 346 cm <sup>3</sup> (11.7 US oz)	136 mm (5.4 in)

## GENERAL INFORMATION

ITEM		REMARKS	
<b>SHOCK ABSORBER:</b>			
Spring CRF150R:	<b>TYPE</b>	<b>SPRING RATE</b>	<b>IDENTIFICATION MARK</b>
	Light 	4.80kgf/mm (416.6 lbf/in)	Red paint
	Standard 	5.00 kgf/mm (434.0 lbf/in)	White paint *NOTE
	Heavy 	5.20 kgf/mm (451.4 lbf/in)	No mark
	<b>TYPE</b>	<b>SPRING RATE</b>	<b>IDENTIFICATION MARK</b>
	Light 	4.80kgf/mm (416.6 lbf/in)	Red paint
CRF150RB:		5.00 kgf/mm (434.0 lbf/in)	White paint
	Standard 	5.20 kgf/mm (451.4 lbf/in)	No mark
	Heavy 	5.40 kgf/mm (468.7 lbf/in)	Black paint

### NOTE:

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	ENGINE GUARD .....	2-4
TROUBLESHOOTING .....	2-2	NUMBER PLATE .....	2-5
SIDE COVER .....	2-3	SUB-FRAME .....	2-5
SEAT .....	2-3	FUEL TANK .....	2-7
RADIATOR SHROUD .....	2-4	EXHAUST SYSTEM .....	2-8

### SERVICE INFORMATION

#### GENERAL

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

#### TORQUE VALUES

Seat mounting bolt		26 N·m (2.7 kgf·m, 19 lbf·ft)
Sub-frame mounting bolt	(upper)	30 N·m (3.1 kgf·m, 22 lbf·ft)
	(lower)	30 N·m (3.1 kgf·m, 22 lbf·ft)
Exhaust pipe joint nut		11 N·m (1.1 kgf·m, 8 lbf·ft)
Muffler joint band bolt		21 N·m (2.1 kgf·m, 15 lbf·ft)
Muffler mounting bolt		32 N·m (3.3 kgf·m, 24 lbf·ft)

### TROUBLESHOOTING

#### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

#### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler



## SIDE COVER

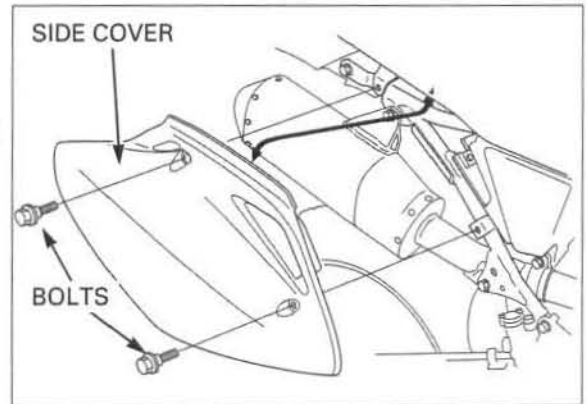
### REMOVAL

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

### INSTALLATION

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

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



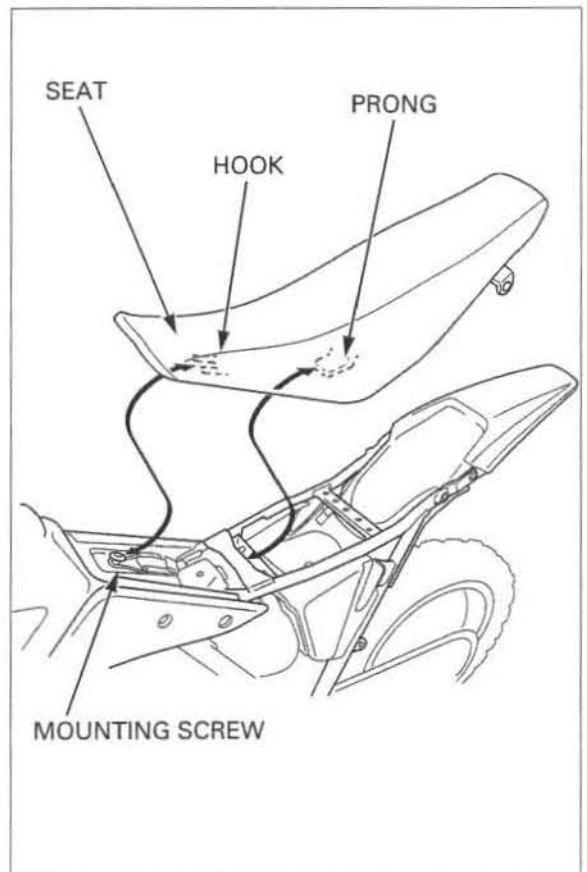
## SEAT

### REMOVAL

Remove the side cover and seat.

### INSTALLATION

Align the seat hook with the mounting screw on the fuel tank and the seat prong with the sub-frame tab.  
Install the side cover.



## RADIATOR SHROUD

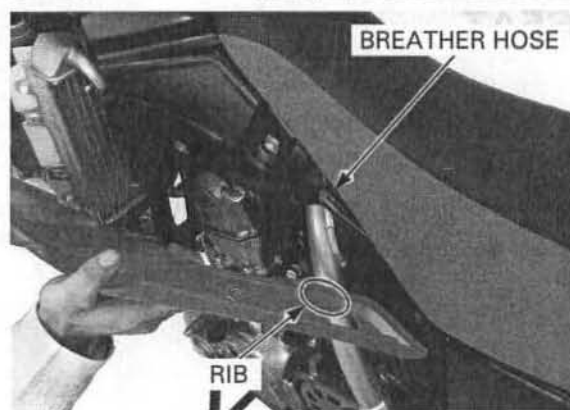
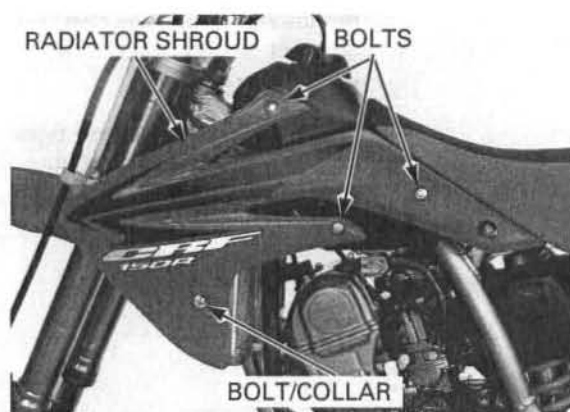
### REMOVAL/INSTALLATION

Remove the seat (page 2-3).

Remove the bolts, collar and radiator shroud.

Install the radiator shroud, bolts and collar.

- Route the breather hose over the radiator shroud rib (page 1-18).



## ENGINE GUARD

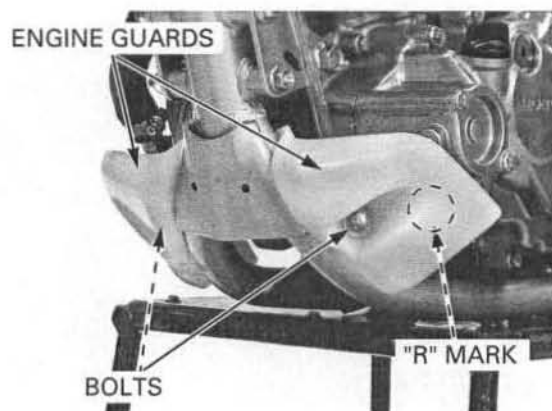
### REMOVAL/INSTALLATION

Remove the bolts and engine guards.

Installation is in the reverse order of removal.

#### NOTE:

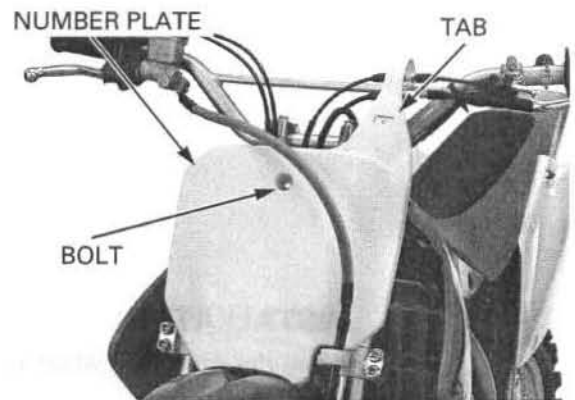
Make sure to install the engine guard with "R" mark to the left side.



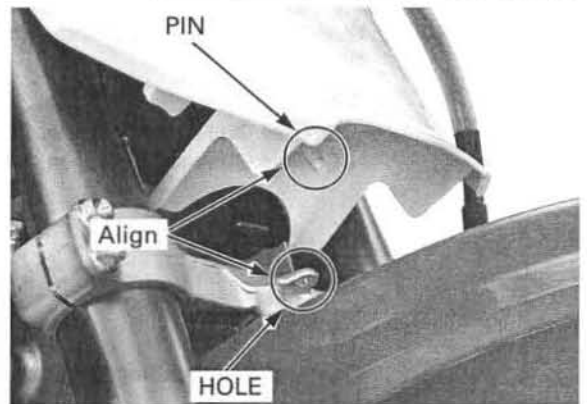
## NUMBER PLATE

### REMOVAL/INSTALLATION

Remove the number plate tab from the handlebar crossbar.  
Remove the bolt and number plate.



Install the number plate by aligning its pin with the hole on the steering stem.  
Install and tighten the bolt securely.



## SUB-FRAME

### REMOVAL

Remove the following:

- Seat (page 2-3)
- Muffler (page 2-8)

Loosen the air cleaner connecting boot band screw.



Disconnect the breather hoses from the air cleaner housing.



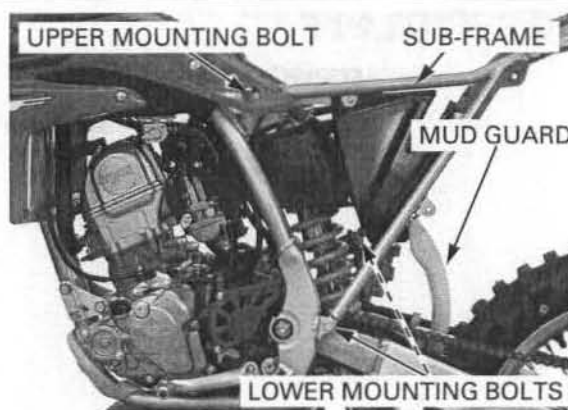


## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the three sub-frame mounting bolts.

*Be careful not to damage the mud guard.*

Remove the sub-frame.



### INSTALLATION

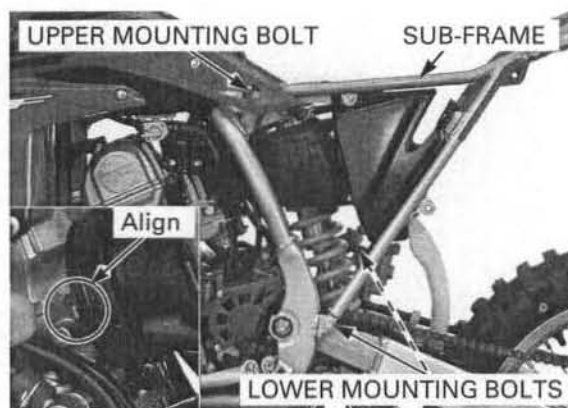
Install the sub-frame while aligning the connecting boot and carburetor.

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

#### TORQUE:

Upper: 30 N·m (3.1 kgf-m, 22 lbf-ft)

Lower: 30 N·m (3.1 kgf-m, 22 lbf-ft)



Connect the breather hoses to the air cleaner housing.



Tighten the air cleaner connecting boot band screw.

Install the following:

- Muffler (page 2-10)
- Seat (page 2-3)



## FUEL TANK

### REMOVAL/INSTALLATION

Remove the following:

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

Turn the fuel valve to OFF, and disconnect the fuel hose from the fuel valve.

Remove the fuel tank breather hose from the steering stem.

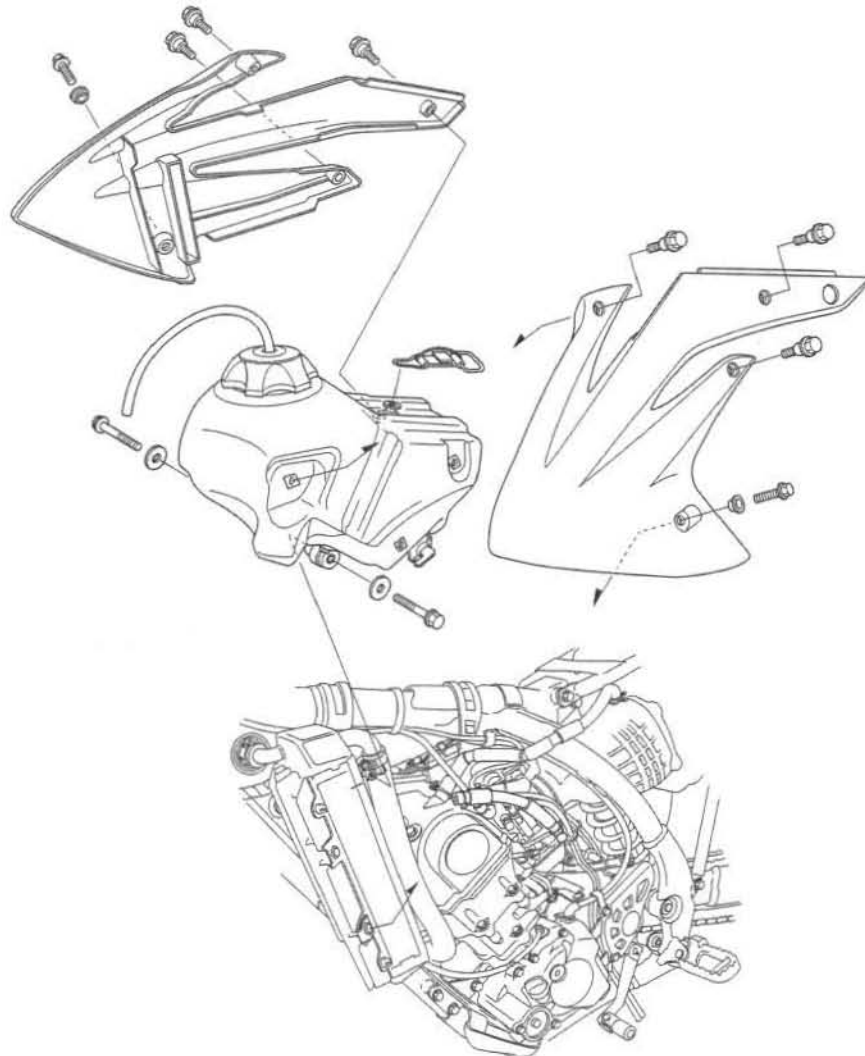
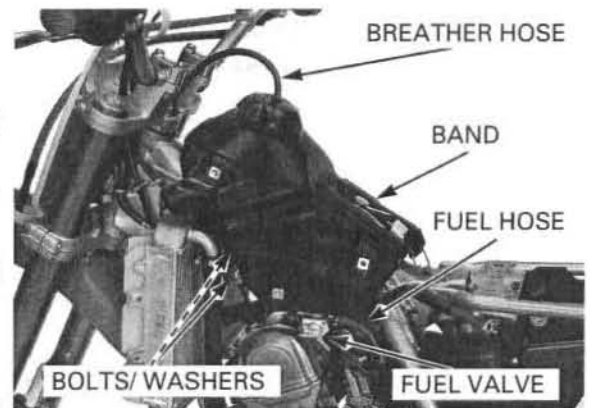
Unhook the band from the fuel tank.

Remove the fuel tank mounting bolts, washers and fuel tank.

Installation is in the reverse order of removal.

#### NOTE:

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



## FRAME/BODY PANELS/EXHAUST SYSTEM

### FUEL FILTER CLEANING

Remove the fuel tank (page 2-7).

Drain the fuel from the fuel tank into an approved gasoline container.

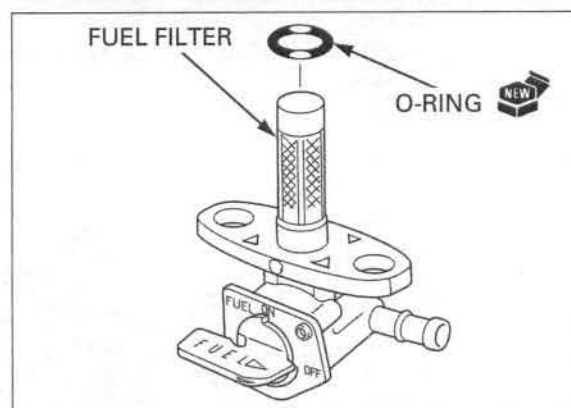
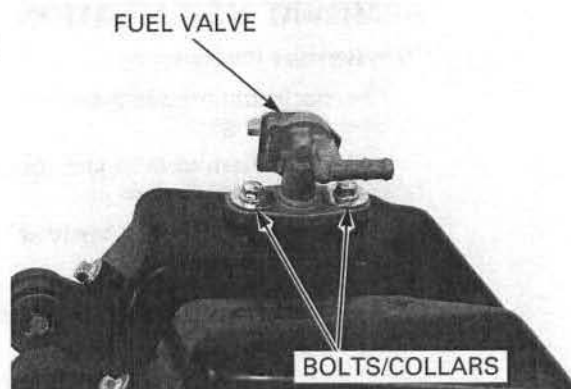
Remove the bolts, collars and fuel valve.

Wash the fuel filter in high flash-point cleaning solvent.

Install the new O-ring onto the fuel valve.

Installation is in the reverse order of removal.

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



## EXHAUST SYSTEM

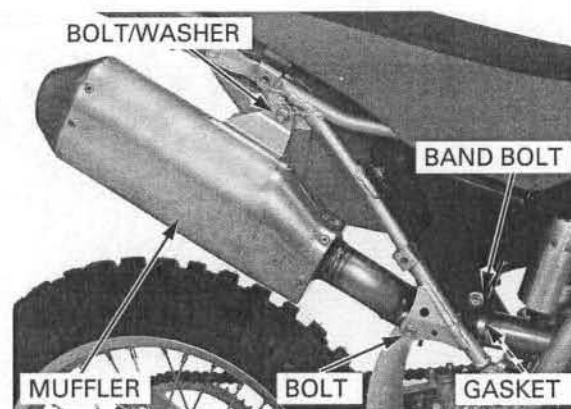
### REMOVAL

#### MUFFLER

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

Loosen the muffler joint band bolt.

Remove the muffler mounting bolts, washer, muffler and gasket.

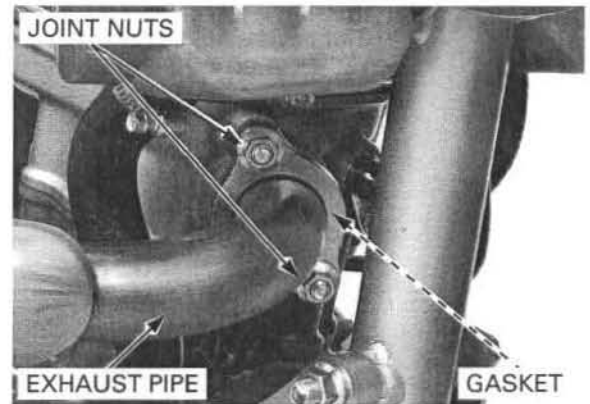




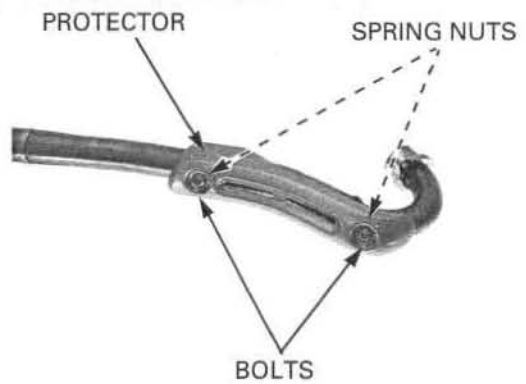
## EXHAUST PIPE

Remove the muffler (page 2-8).

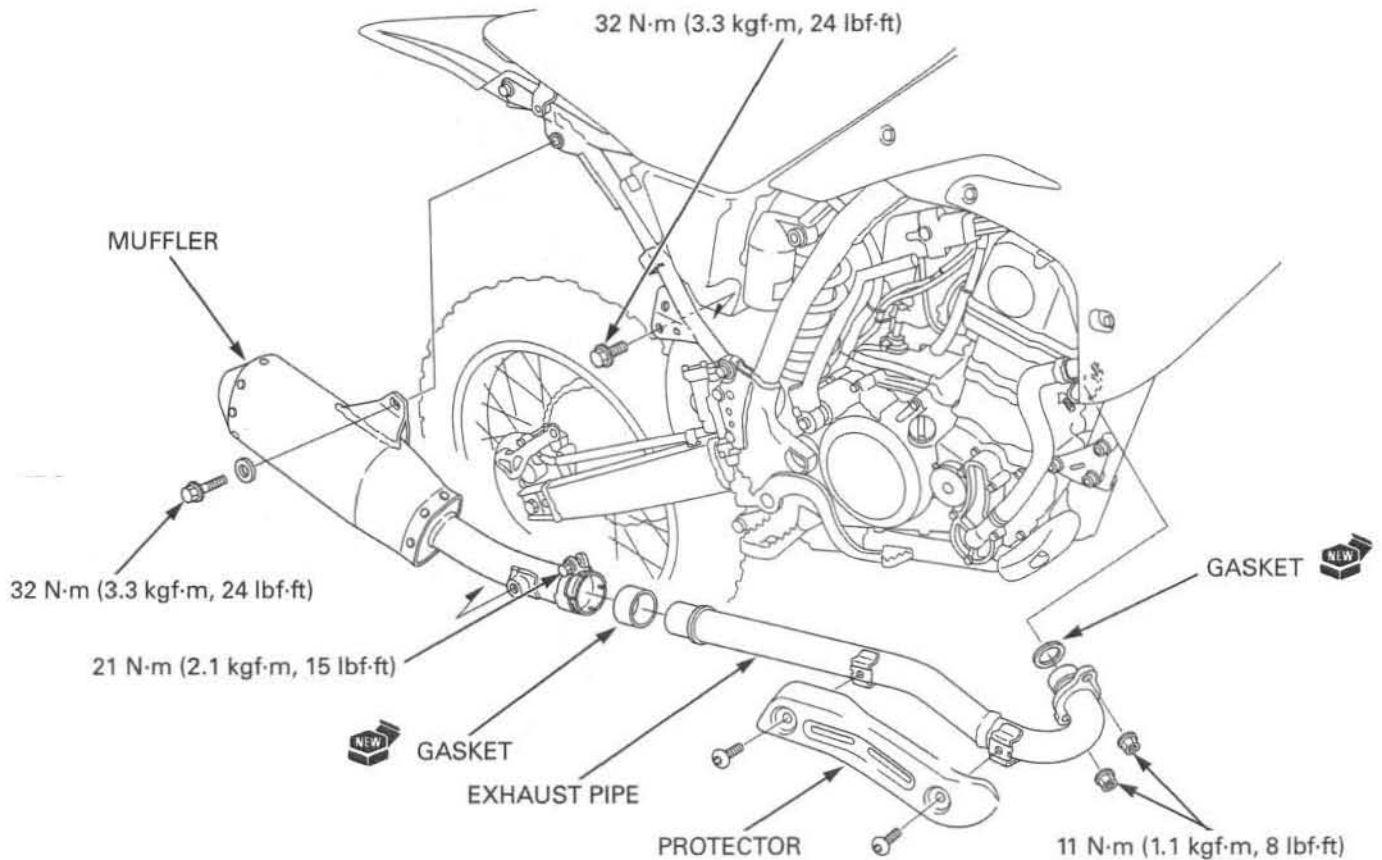
Remove the exhaust pipe joint nuts, exhaust pipe and gasket.



Remove the bolts, spring nuts and protector from the exhaust pipe.



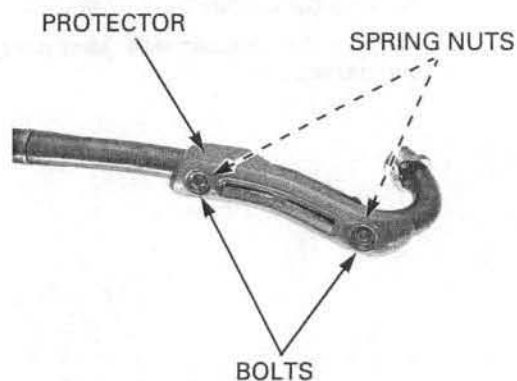
## INSTALLATION



## FRAME/BODY PANELS/EXHAUST SYSTEM

### EXHAUST PIPE

Install the protector, spring nuts and bolts.  
Tighten the bolts securely.



Install a new gasket to the cylinder head.

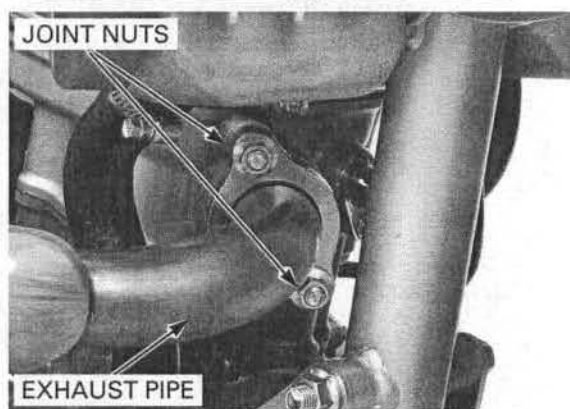


Install the exhaust pipe and joint nuts.

Tighten the exhaust pipe joint nuts to the specified torque.

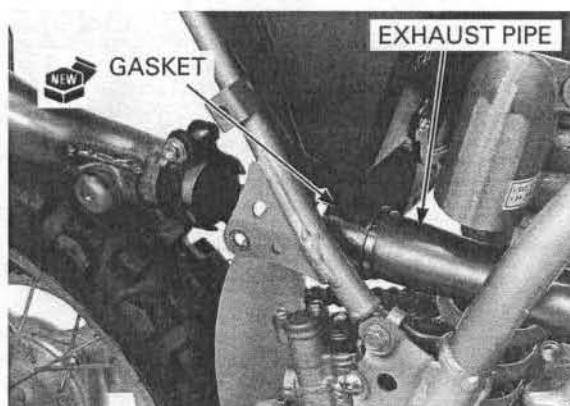
**TORQUE: 11 N·m (1.1 kgf·m, 8 lbf·ft)**

Install the muffler.



### MUFFLER

Install a new gasket to the exhaust pipe, then install the muffler to the exhaust pipe.



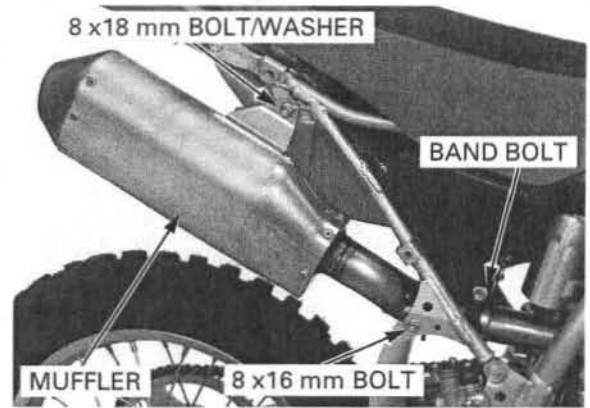
Install the washer and muffler mounting bolts.

Tighten the muffler mounting bolts to the specified torque.

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

Tighten the muffler joint band bolt to the specified torque.

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





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## MEMO

# 3. MAINTENANCE

SERVICE INFORMATION .....	3-2	DRIVE CHAIN.....	3-17
MAINTENANCE SCHEDULE .....	3-4	DRIVE CHAIN SLIDER .....	3-19
ADDITIONAL ITEMS REQUIRING FREQUENT REPLACEMENT .....	3-5	DRIVE CHAIN ROLLER .....	3-20
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SPARK PLUG .....	3-8	CLUTCH SYSTEM .....	3-23
RADIATOR COOLANT .....	3-9	CONTROL CABLES .....	3-23
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TRANSMISSION OIL .....	3-16	NUTS, BOLTS, FASTENERS.....	3-26
COOLING SYSTEM.....	3-17	WHEELS/TIRES .....	3-26
		STEERING HEAD BEARINGS .....	3-27

# SERVICE INFORMATION

## GENERAL

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

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle grip free play		3 – 5 mm (1/8 – 3/16 in)
Hot start lever free play		2 – 3 mm (1/16 – 1/8 in)
Spark plug		NGK
	Standard	CR8EH9
	Optional	CR9EH9
		DENSO
		U24FER9
		U27FER9
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)
Valve clearance	IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)
	EX	0.26 ± 0.03 mm (0.010 ± 0.001 in)
Engine oil capacity	At draining	0.56 liter (0.59 US qt, 0.49 Imp qt)
	At oil and filter change	0.59 liter (0.62 US qt, 0.52 Imp qt)
	At disassembly	0.70 liter (0.74 US qt, 0.62 Imp qt)
Transmission oil capacity	At draining	0.57 liter (0.61 US qt, 0.51 Imp qt)
	At disassembly	0.65 liter (0.69 US qt, 0.57 Imp qt)
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Recommended transmission oil		Pro Honda HP trans oil, Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Engine idle speed		2,100 ± 100 rpm
Drive chain size/link	CRF150R:	DID420DS3/120RB
	CRF150RB:	DID420DS3/126RB
Drive chain slack		35 – 45 mm (1.4 – 1.8 in)
Drive chain length at 21 pins (20 pitches)		259 mm (10.2 in)
Drive chain slider thickness		5 mm (0.2 in)
Drive chain roller O.D.		18 mm (0.7 in)
Clutch lever free play		10 – 20 mm (3/8 – 13/16 in)
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)



# TOOLS

Spoke wrench, 5.8 mm  
07701-0020300



or equivalent commercially available in U.S.A.

# TORQUE VALUES

Engine oil drain bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply oil to the threads
Transmission oil drain bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply oil to the threads
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Brake lever adjuster lock nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Brake pedal adjuster lock nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive sprocket bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Driven sprocket nut	32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Front master cylinder reservoir cover screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Rear master cylinder reservoir cover bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Exhaust pipe joint nut	11 N·m (1.1 kgf·m, 18 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	12.4 N·m (1.3 kgf·m, 9.1 lbf·ft)	
Front fork air pressure release screw	1.3 N·m (0.1 kgf·m, 1 lbf·ft)	
Drive chain adjusting bolt lock nut	27 N·m (2.8 kgf·m, 20 lbf·ft)	

## 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.

ITEMS	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	Refer to page
THROTTLE OPERATION			I				3-6
HOT START			I				3-6
AIR CLEANER	(NOTE 1)		C				3-7
CRANKCASE BREATHER			I				3-8
SPARK PLUG			I				3-8
VALVE CLEARANCE/ DECOMPRESSOR SYSTEM	(NOTE 4)				I		3-10
ENGINE OIL	(NOTE 3)				R		3-13
ENGINE OIL FILTER	(NOTE 3)				R		3-13
ENGINE IDLE SPEED			I				3-15
PISTON AND PISTON RINGS					R		9-6
PISTON PIN					R		9-6
TRANSMISSION OIL	(NOTE 5)		I		R		3-16
RADIATOR COOLANT	(NOTE 2)		I				3-9
COOLING SYSTEM			I				3-17
DRIVE CHAIN			I, L	R			3-17
DRIVE CHAIN SLIDER			I				3-19
DRIVE CHAIN ROLLER			I				3-20
DRIVE SPROCKET			I				3-20
DRIVEN SPROCKET			I				3-20
BRAKE FLUID	(NOTE 2)		I				3-21
BRAKE PAD WEAR			I				3-22
BRAKE SYSTEM			I				3-22
CLUTCH SYSTEM	(NOTE 5)		I				3-23
CONTROL CABLES			I, L				3-23
EXHAUST PIPE/MUFFLER			I				3-24
SUSPENSION			I				3-25
SWINGARM/SHOCK LINKAGE				L			3-26
FORK OIL	(NOTE 3)			R			12-19
NUTS, BOLTS, FASTENERS			I				3-26
WHEELS/TIRES			I				3-26
STEERING HEAD BEARINGS						I	3-27

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

#### NOTES:

1. Clean after every moto for dusty riding conditions.
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.

# ADDITIONAL ITEMS REQUIRING FREQUENT REPLACEMENT

## ENGINE

Item	Cause	Remark
Cylinder head gasket	Compression leak	Replace whenever disassembled
Clutch disc/plate	Wear or discoloration	
Cylinder base gasket	Leakage	Replace whenever disassembled
Right crankcase cover gasket	Damage	Replace whenever disassembled

## FRAME

Item	Cause	Remark
Front/rear tire	Wear	Minimum thickness: 1.0 mm (0.04in)
Front/rear brake pad	Wear	
Sub-frame mounting bolts	Fatigue or damage	
Chain guide	Wear or damage	
Side cover	Damage	
Front number plate	Damage	
Front/rear fender	Damage	
Clutch lever/holder	Free play or damage	
Brake lever	Free play or damage	
Hot start lever	Free play or damage	
Handlebar	Bends or cracks	
Throttle housing	Damage	
Grip rubber	Damage	
Shift lever	Damage	
Brake pedal	Damage	
Chain adjuster/bolt	Damage	
Air cleaner	Damage	

### NOTE:

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



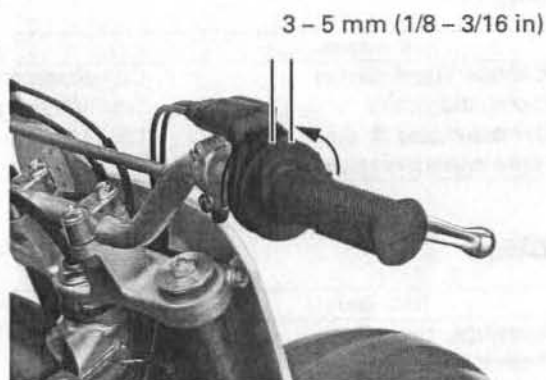
## MAINTENANCE

### THROTTLE OPERATION

Check for smooth throttle operation opening and automatic full closing in all steering positions. Check the throttle cables and replace them if they are deteriorated, kinked or damaged. Lubricate the throttle cables if throttle operation is not smooth.

Measure the free play at the throttle grip flange.

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



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

Minor adjustment is made with the throttle grip side adjuster.

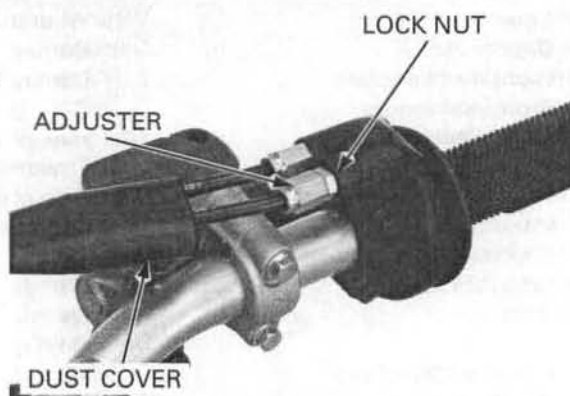
Remove the dust cover from the adjuster.

Adjust the free play by loosening the lock nut and turning the adjuster.

Tighten the lock nut after making the adjustment.

Reinstall the dust cover.

Recheck the throttle operation.

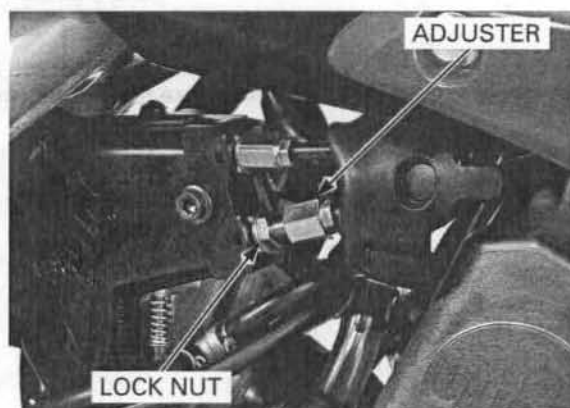


Major adjustment is made with the carburetor end of the cable.

Adjust the free play by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut securely.

Recheck the throttle operation.



### HOT START

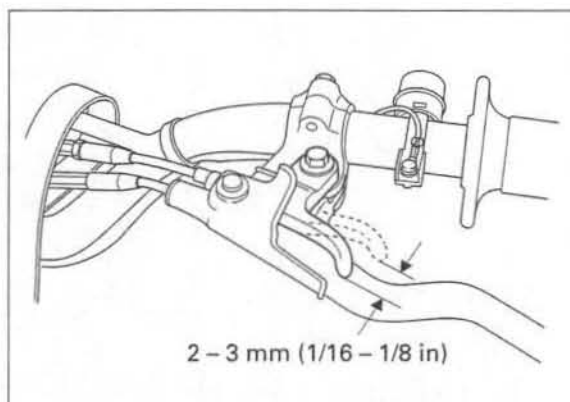
Check for smooth hot start lever operation and lubricate the cable if required.

Inspect the cable for cracks which could allow moisture to enter.

Replace the cable if necessary.

Measure the hot start lever free play at the lever end.

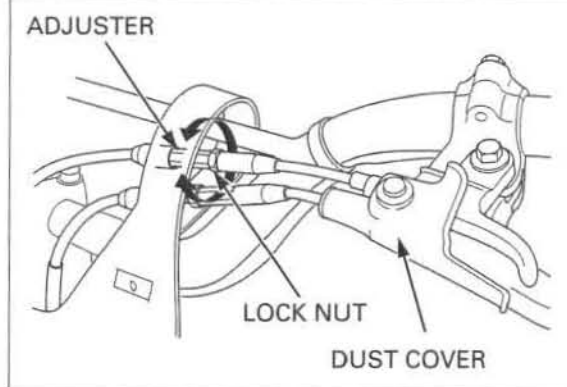
**FREE PLAY: 2 – 3 mm (1/16 – 1/8 in)**



Hot start lever free play can be adjusted at the hot start cable.

Remove the dust cover from the adjuster.  
Adjust the free play by loosening the lock nut and turning the adjuster.  
Tighten the lock nut.  
Reinstall the dust cover.

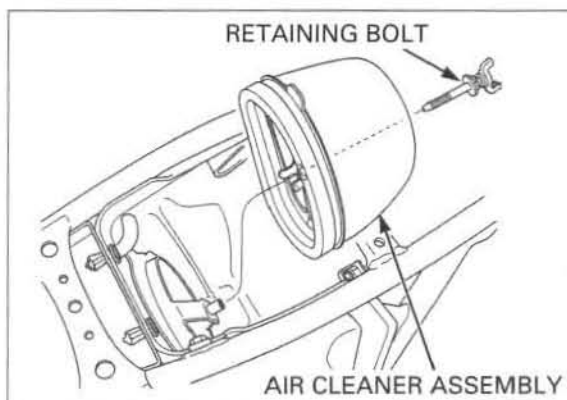
Recheck the free play at the lever.



## AIR CLEANER

Remove the seat (page 2-3).

Remove the air cleaner assembly with the retaining bolt.



Remove the air cleaner element and retaining bolt from the element holder.

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

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

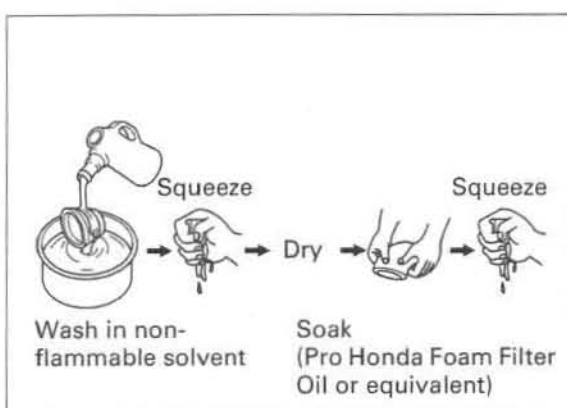
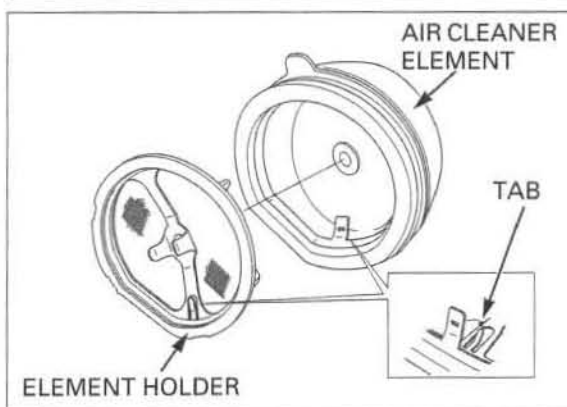
Wash again if necessary.

Allow the air cleaner to dry thoroughly.

After drying, soak the air cleaner in clean Pro Honda Foam Filter Oil or an equivalent.

Apply air filter oil to the entire surface of the air cleaner and rub it with both hands to saturate the element with oil.

Gently squeeze out excess oil. It is important not to over-oil, or under-oil the element.

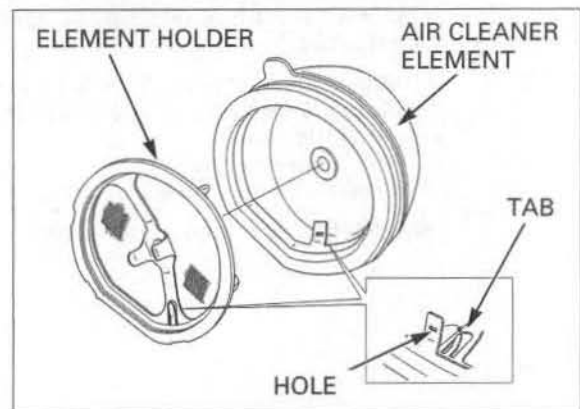


## MAINTENANCE

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

Assemble the air cleaner element and element holder.

Hook the element hole onto the holder tab.  
Install the retaining bolt to the air cleaner element assembly.

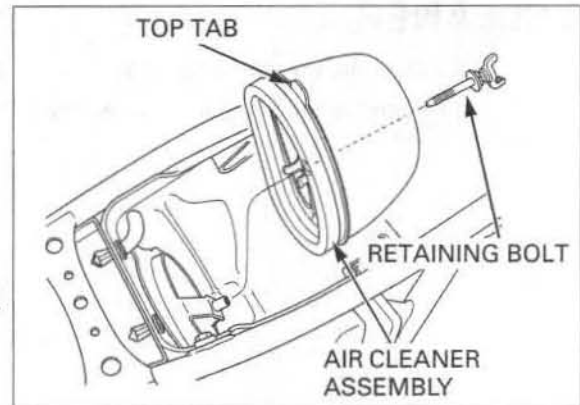


Install the air cleaner assembly into the air cleaner housing with the top tab facing up.  
Carefully position the sealing flange of the element to prevent dirt intrusion.  
Align the air cleaner set top tab.  
Tighten the retaining bolt securely.

Install the seat (page 2-3).

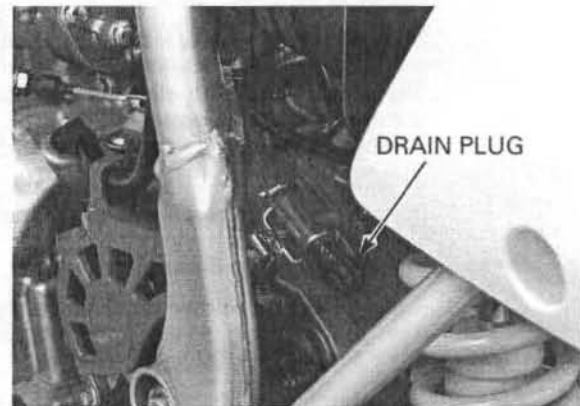
### NOTICE

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



## CRANKCASE BREATHER

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



## SPARK PLUG

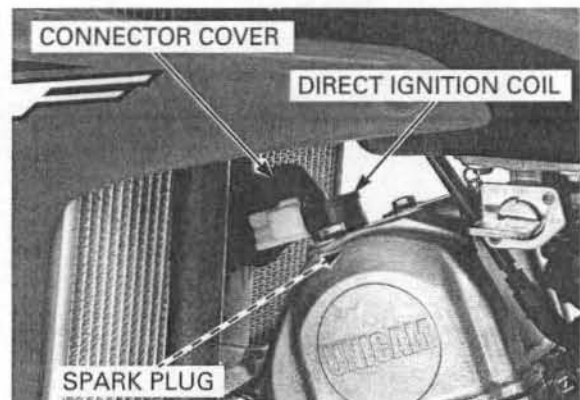
### REMOVAL

Remove the connector cover and disconnect the direct ignition coil 2P connector.

Remove the direct ignition coil and spark plug.

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

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





## INSPECTION

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

### RECOMMENDED SPARK PLUG:

**Standard:**

CR8EH9 (NGK), U24FER9 (DENSO)

**Optional:**

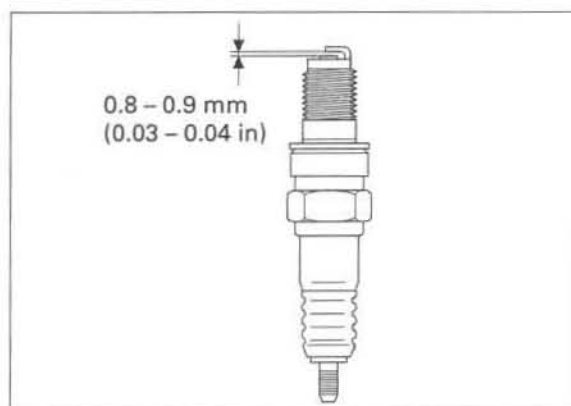
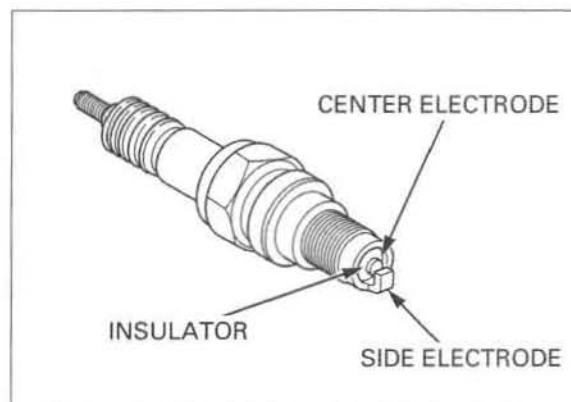
CR9EH9 (NGK), U27FER9 (DENSO)

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

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

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

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



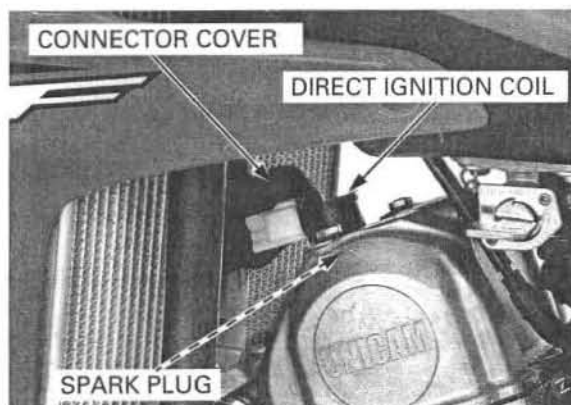
## INSTALLATION

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

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

Install the direct ignition coil and connect the 2P connector.

Install the connector cover.

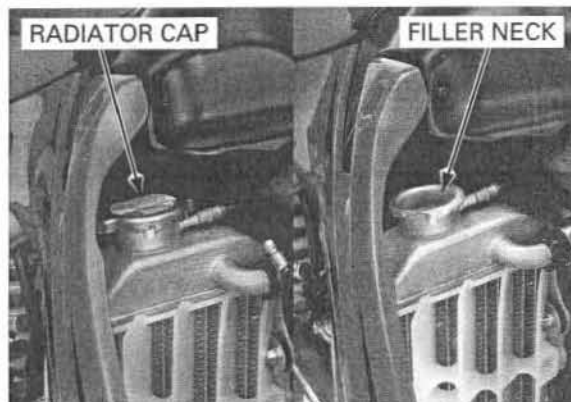


## RADIATOR COOLANT

Remove the radiator cap.

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

Add the coolant as required (page 6-7).



## VALVE CLEARANCE/DECOMPRESSOR SYSTEM

### VALVE CLEARANCE INSPECTION

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

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

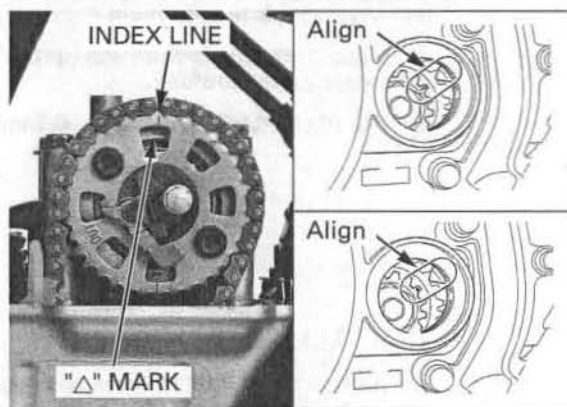
Remove the crankshaft hole cap and O-ring.



Turn the crankshaft clockwise to align the punch mark (or index line) of the primary drive gear with the index mark on the right crankcase cover.

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

Check that the index line on the cam sprocket aligns with the "△" mark on the camshaft holder.



#### Intake side:

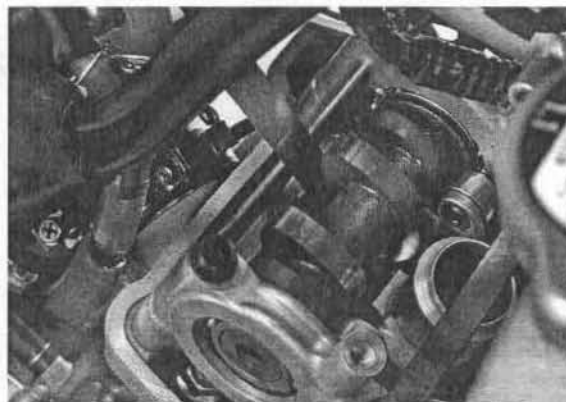
Insert the feeler gauge between the valve lifter and the cam lobe.

Check the intake valve clearance using a feeler gauge.

#### VALVE CLEARANCE:

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)

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



### Exhaust side:

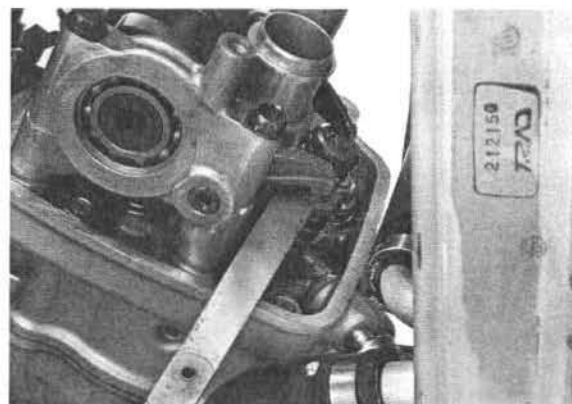
Insert the feeler gauge between the rocker arm and shim.

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

Check the exhaust valve clearance using a feeler gauge.

### VALVE CLEARANCE:

**EX:**  $0.26 \pm 0.03$  mm ( $0.010 \pm 0.001$  in)



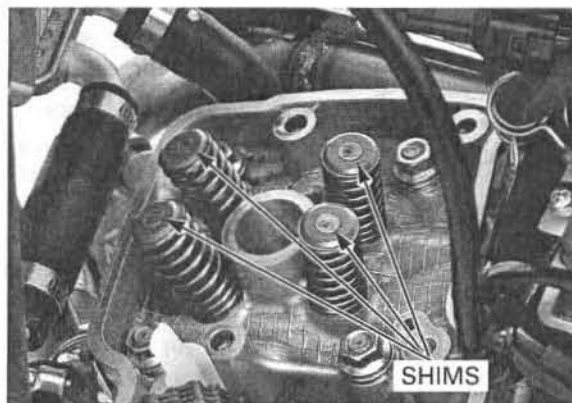
## VALVE CLEARANCE ADJUSTMENT

Remove the camshaft holder assembly (page 8-8).

- The shims may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.

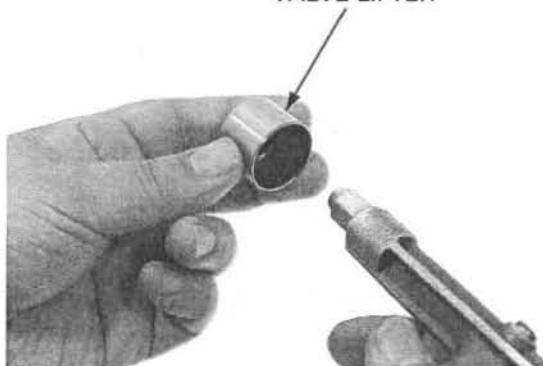
Remove the shims.

- Mark all valve shims to ensure correct reassembly in their original locations.
- The shims can be easily removed with tweezers or a magnet.



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

VALVE LIFTER



*Sixty-nine different thickness shims are available from 1.200 mm to 2.900 mm in increments of 0.025 mm.*

Measure the shim thickness and record it.

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

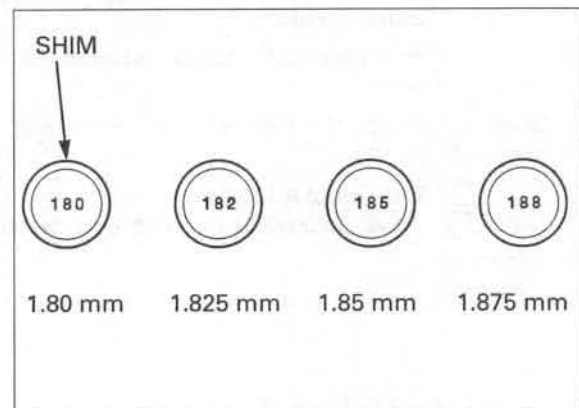
D: Old shim thickness





## MAINTENANCE

- Make sure of the correct shim thickness by measuring the shim using a micrometer.
- Reface the intake valve seat if carbon deposits result in a calculated dimension of over 2.450 mm.
- 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.*

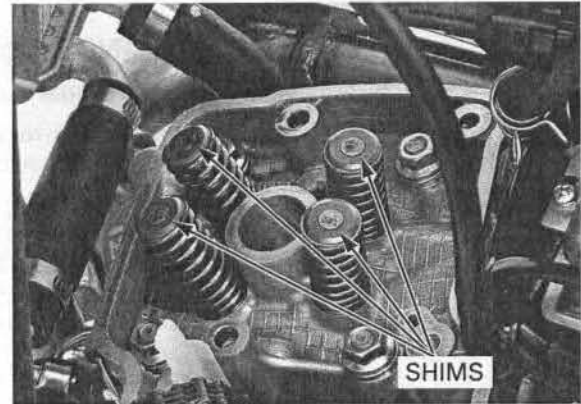
Install the newly selected shims on the valve spring retainers.

Install the camshaft holder assembly (page 8-26).

Rotate the camshaft by rotating the crankshaft clockwise several times.

Recheck the valve clearance.

If the exhaust valve clearance adjusted, check and adjust the decompressor clearance (page 3-12).



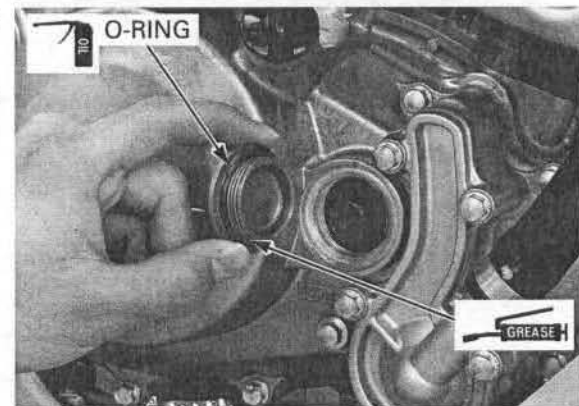
*Check that the O-ring is in good condition, replace it if necessary.*

Apply engine oil to the O-ring and install it onto 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 8-29).



## DECOMPRESSOR SYSTEM INSPECTION

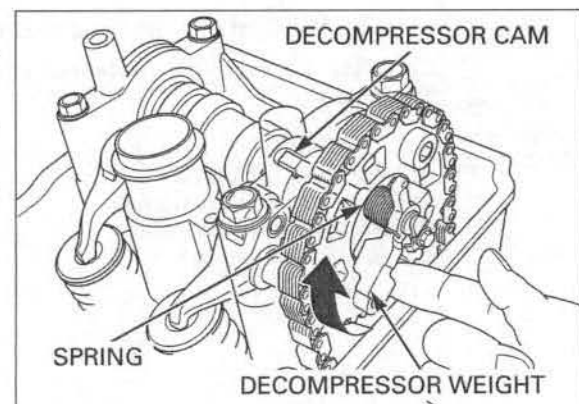
Remove the cylinder head cover (page 8-7).

Check the decompressor weight cam area for wear or damage.

Check the decompressor system for smooth operation.

Check the decompressor cam spring for damage or fatigue.

Install the cylinder head cover (page 8-29).



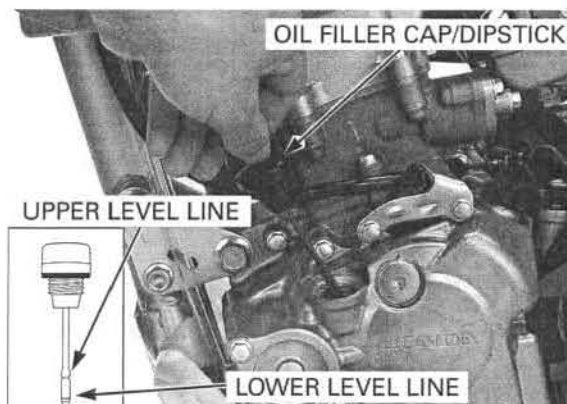
# ENGINE OIL/OIL FILTER

## 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 dipstick without screwing it in, remove it and check the oil level.

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



Add the recommended engine oil to the upper level line.

## RECOMMENDED ENGINE OIL:

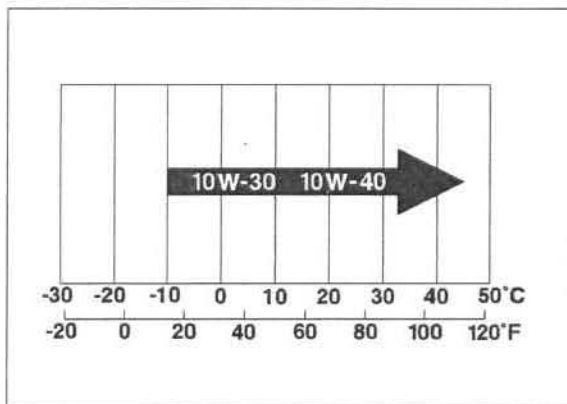
**Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil**  
**API service classification: SG or higher**  
**JASO T 903 standard: MA**  
**Viscosity: SAE 10W - 30**

## OIL CAPACITY:

**0.56 liter (0.59 US qt, 0.49 Imp qt) at draining**  
**0.59 liter (0.62 US qt, 0.52 Imp qt) at oil filter change**

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

Reinstall the oil filler cap/dipstick.

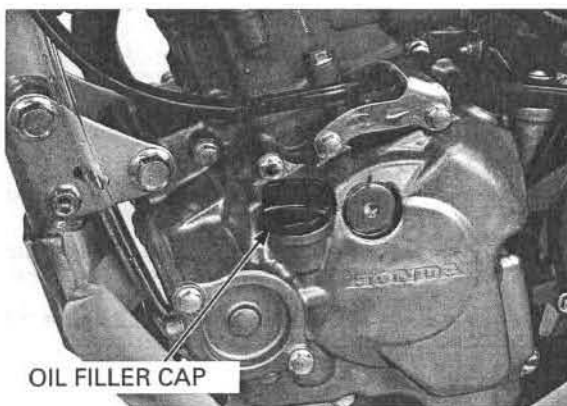


## ENGINE OIL & FILTER CHANGE

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

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

Remove the oil filler cap.



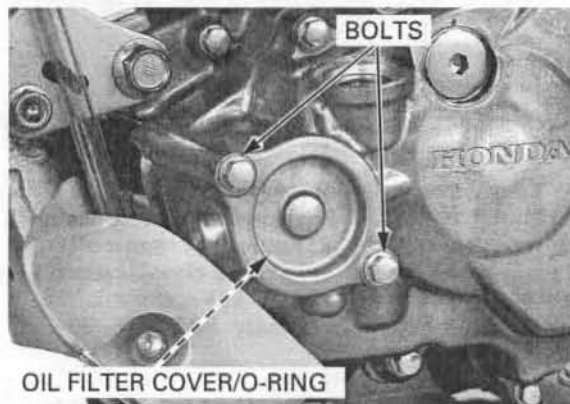


## MAINTENANCE

Remove the engine oil drain bolt and sealing washer.  
Drain the engine oil.



Remove the bolts, O-ring and oil filter cover.



Remove the oil filter and spring.



Install the engine oil drain bolt with a new sealing washer.

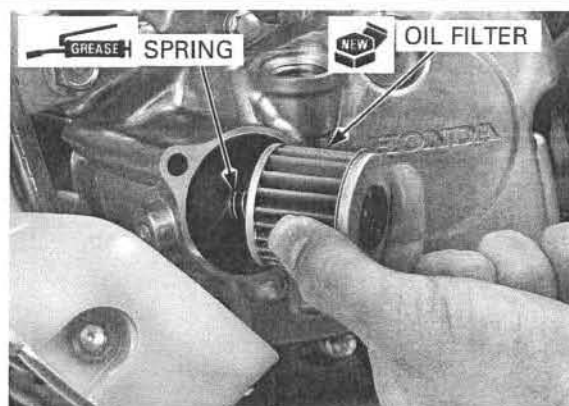
Apply engine oil to the engine oil drain bolt and tighten it to the specified torque.

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





Apply grease to the filter side of the spring end.  
Install the spring into the new oil filter.



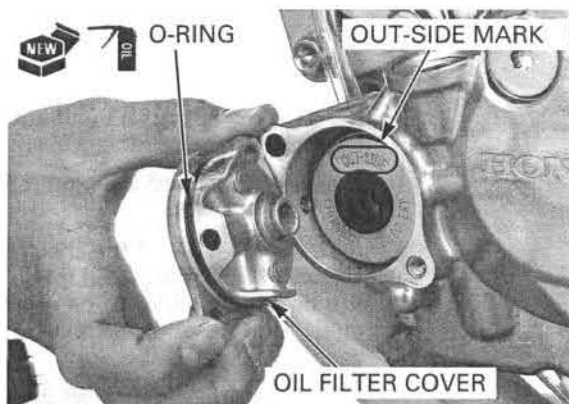
Install the oil filter with the "OUT-SIDE" mark facing out.

**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 tighten the bolts.



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

**OIL CAPACITY:**

**0.56 liter (0.59 US qt, 0.49 Imp qt) at draining**

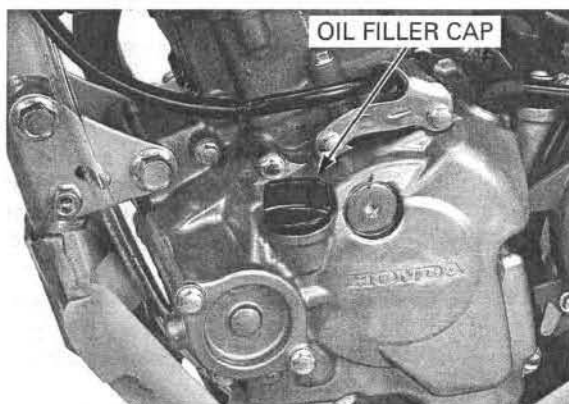
**0.59 liter (0.62 US qt, 0.52 Imp qt) at oil filter change**

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

Install the oil filler cap.

Recheck the oil level (page 3-13).

Make sure there are no oil leaks.



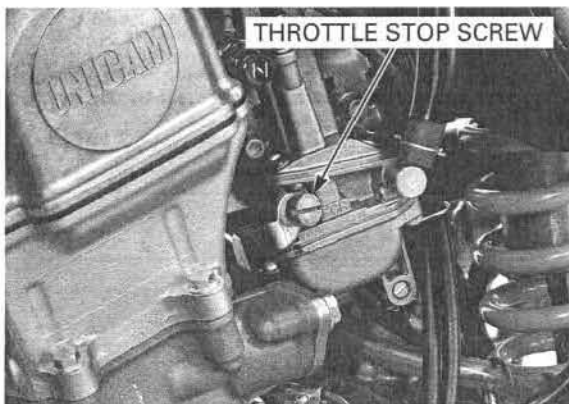
## ENGINE IDLE SPEED

Inspect and adjust the idle speed after all other engine adjustments are within specifications. The engine must be warm for an accurate idle inspection and adjustment. Ten minutes of stop and go riding is sufficient.

Warm up the engine, shift the transmission into neutral and hold the motorcycle upright. Connect a tachometer according to its manufacturer's instructions.

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

**IDLE SPEED: 2,100 ± 100 rpm**



**TRANSMISSION OIL****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.



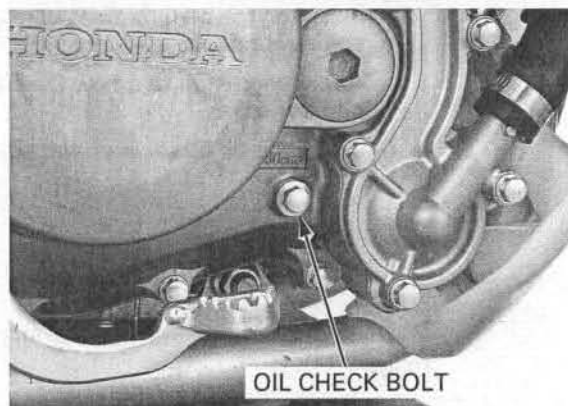
Remove the check bolt and sealing washer from the right crankcase cover.

A small amount of oil should flow out of the check bolt hole.

If no oil flows out of the check bolt hole, add recommended transmission oil (page 3-16) slowly through the oil filler hole until oil starts to flow out of the check bolt hole. Install the oil check bolt and filler cap.

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

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.

Warm up the engine and support the motorcycle in upright position on level surface.

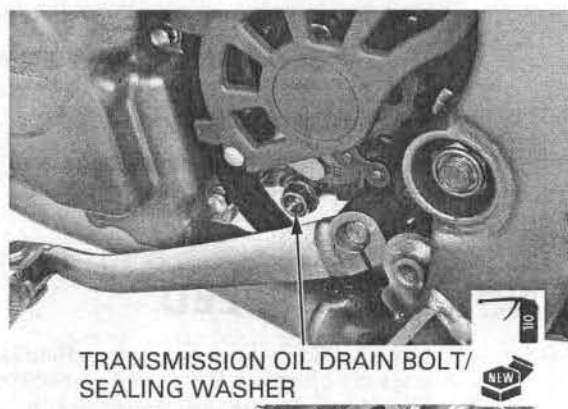
Remove the oil filler cap from the right crankcase cover.

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

After the oil has drained completely.

Install the engine oil drain bolt with a new sealing washer.

Apply transmission oil to the transmission oil drain bolt and tighten it to the specified torque.



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



Add the recommended oil.

#### RECOMMENDED TRANSMISSION OIL:

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

#### OIL CAPACITY:

0.57 liter (0.61 US qt, 0.51 Imp qt) at draining  
0.65 liter (0.69 US qt, 0.57 Imp qt) at disassembly

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



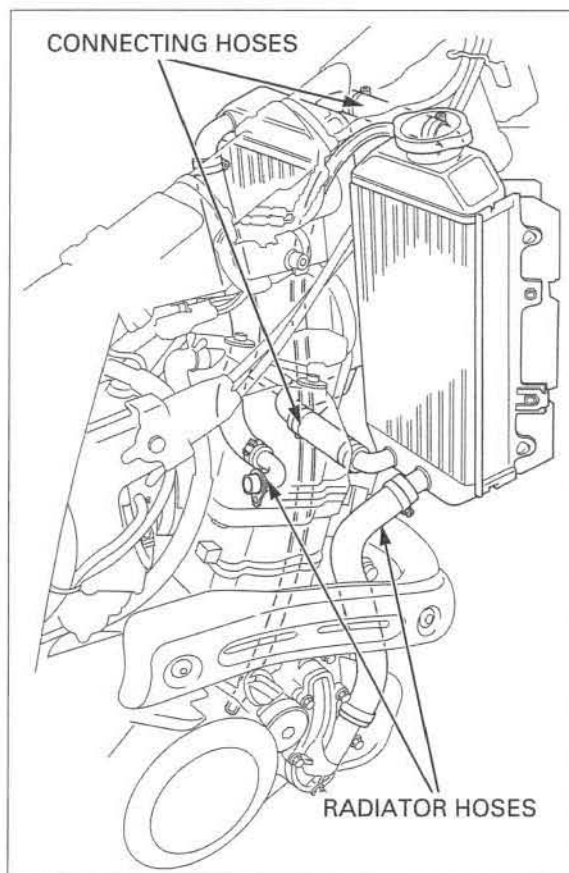
## COOLING SYSTEM

Remove the radiator shrouds (page 2-4).

Remove the two radiator grill.

Check the radiator air passage for clogs or damage. Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

Inspect the hoses for cracks and deterioration. Check the tightness of all hose clamps and fasteners.



## DRIVE CHAIN

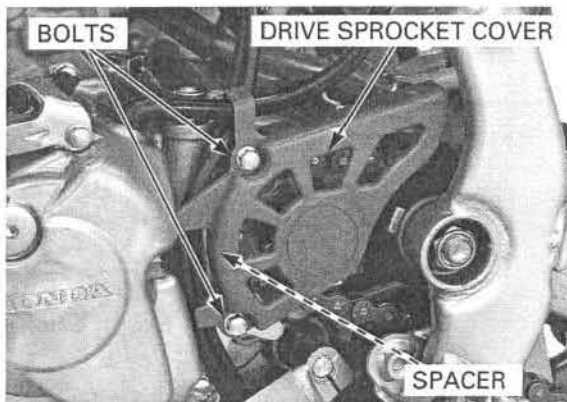
### CLEANING AND LUBRICATION

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

Perform the following service with the engine stopped and the transmission in neutral.

Place a workstand or equivalent under the engine.

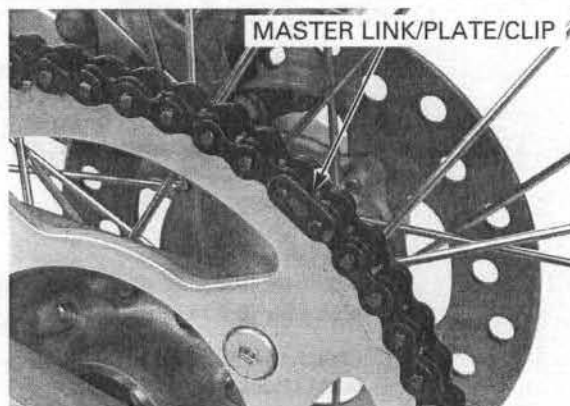
Remove the bolts, spacer and drive sprocket cover.



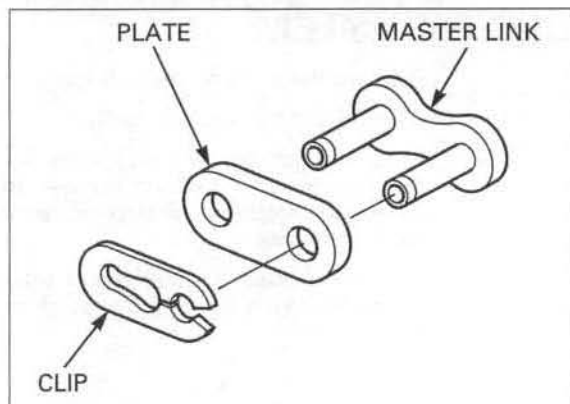


## MAINTENANCE

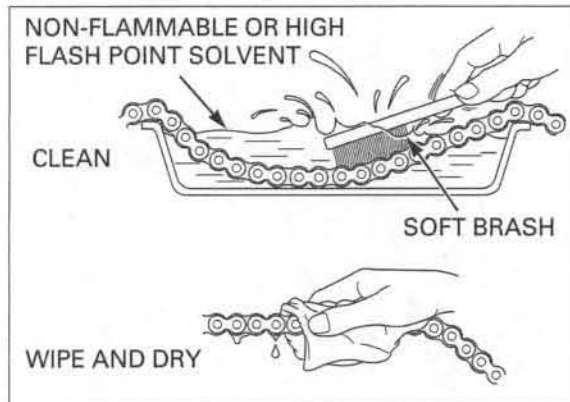
Carefully remove the master link clip with pliers.



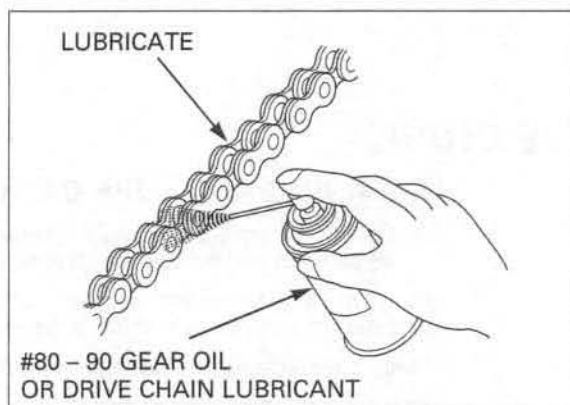
Remove the master link, plate and disconnect the drive chain.  
Remove the drive chain.



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 the new chain to wear quickly.  
Inspect and replace sprocket as necessary.



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



Measure the distance between a span of 21 pins (20 pitches) from pin center to pin center.

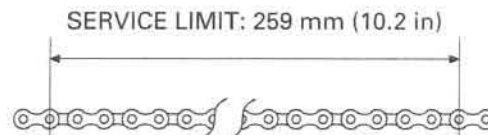
**SERVICE LIMIT: 259 mm (10.2 in)**

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

**REPLACEMENT CHAIN: CRF150R: DID420DS3/120RB  
CRF150RB: DID420DS3/126RB**

Reinstall the drive chain and lubricate it with Pro Honda Chain Lube or equivalent.

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



## DRIVE CHAIN SLACK INSPECTION

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

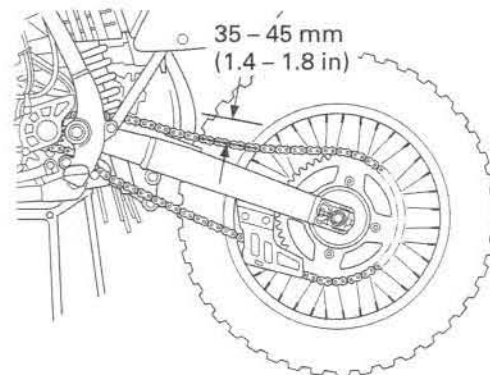
Raise the rear wheel off the ground by placing a workstand under the engine.

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

**CHAIN SLACK: 35 – 45 mm (1.4 – 1.8 in)**

### NOTICE

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



## ADJUSTMENT

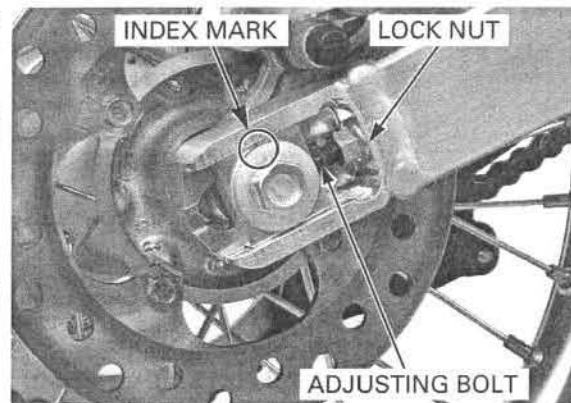
If the chain needs adjustment, loosen the rear axle nut and adjusting bolt lock nuts, and turn the adjusting bolts.

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

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

After torquing the axle nut, seat the adjusting bolts snugly against the axle adjustment plates and tighten the adjusting bolt lock nut to the specified torque.

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



## DRIVE CHAIN SLIDER

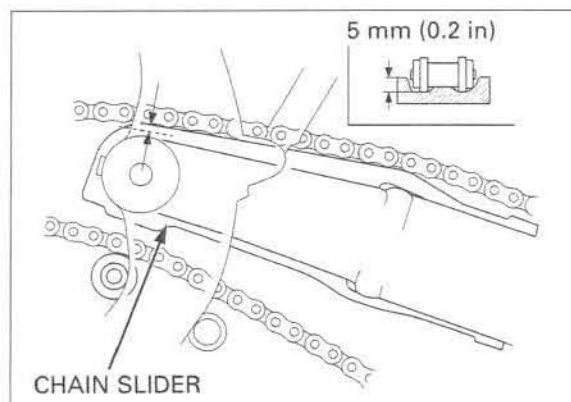
### CHAIN SLIDER

Inspect the drive chain sliders for excessive wear.

**SERVICE LIMIT: 5 mm (0.2 in) from upper surface**

### NOTICE

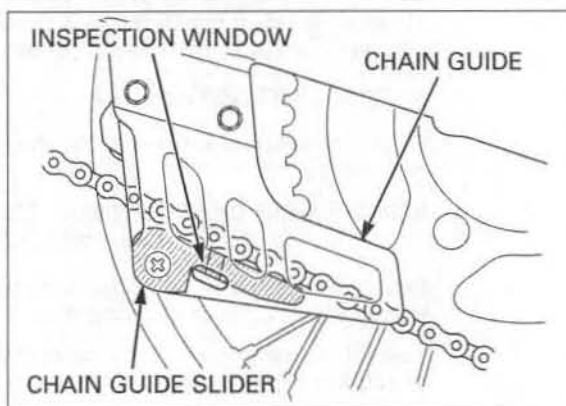
*If the chain slider becomes worn through to the swingarm, the chain will wear against the swingarm, damaging the chain and swingarm.*



## MAINTENANCE

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

If the drive chain is visible through the chain guide slider inspection window, replace the chain guide slider.



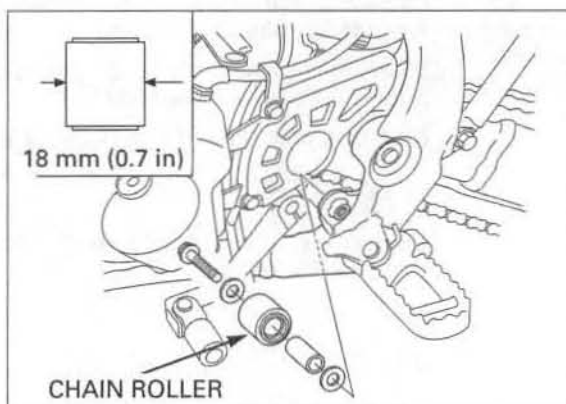
## DRIVE CHAIN ROLLER

Inspect the drive chain roller for excessive wear or binding.

Measure the drive chain roller O.D.

**SERVICE LIMIT: 18 mm (0.7 in)**

Replace the drive chain roller if necessary, and tighten the roller bolt.



## 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 bolt and nuts on the drive and driven sprockets.

If any are loose, torque them.

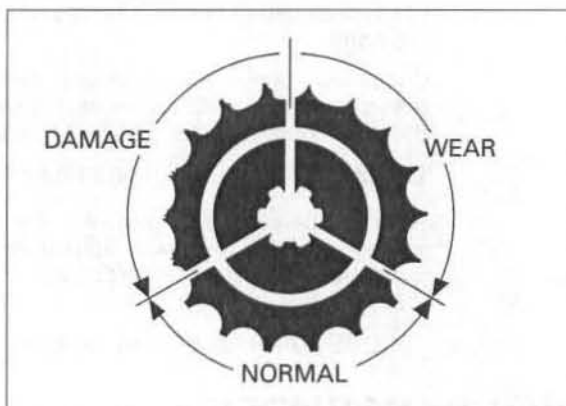
### TORQUE:

**Drive sprocket bolt:**

**13 N·m (1.3 kgf·m, 9 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 3-22). 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 3-21).

### FRONT BRAKE:

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

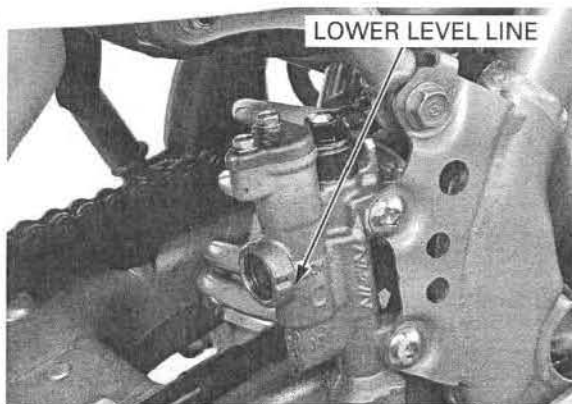
If the level is near the lower level line, check the brake pad wear (page 3-22).



### REAR BRAKE:

Support the motorcycle in an upright position on level surface.

If the level is near the lower level line, check the brake pad wear (page 3-22).



## FLUID FILLING

### FRONT:

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

Install the diaphragm and cover.

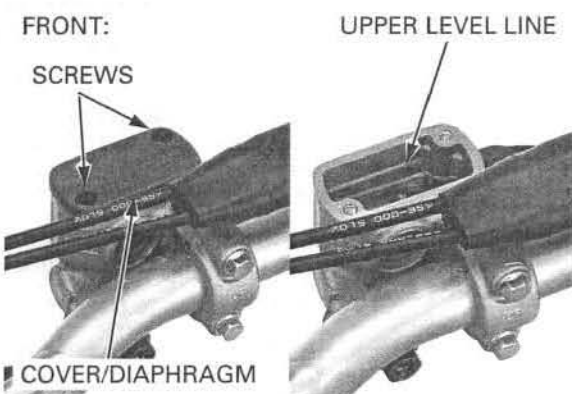
Tighten the screws to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 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.



## MAINTENANCE

### REAR:

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

*Do not bend the diaphragm during installation.*

Install the diaphragm, plate and cover.

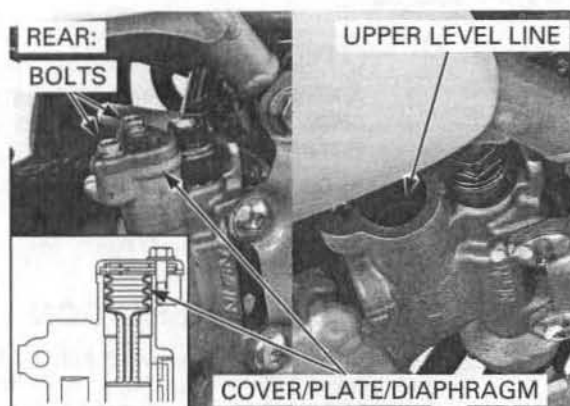
Tighten the bolts to the specified torque.

**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.

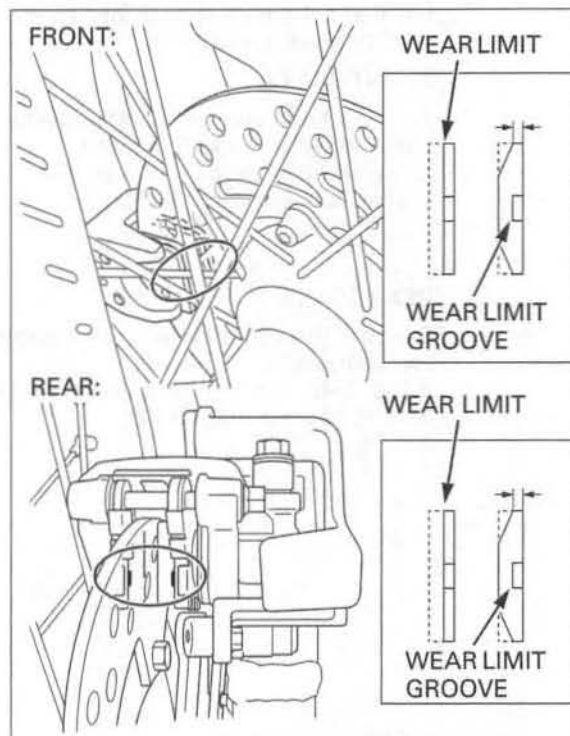


## BRAKE PAD WEAR

Check the brake pads for wear.

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

Refer to page 14-10 for brake pad replacement.



## BRAKE SYSTEM

### LEVER POSITION INSPECTION

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

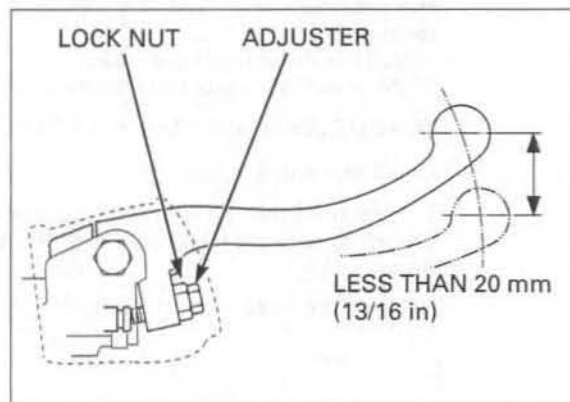
Turning the adjuster clockwise moves the brake lever farther away from the grip; turning the adjuster counterclockwise moves the brake lever closer to the grip.

*Apply grease to the contact faces of the adjuster bolt and piston.*

After adjustment, hold the adjuster and tighten the lock nut to the specified torque.

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

If the brake lever free play exceeds 20 mm (13/16 in), there is air in the system that must be bled. Refer to page 14-7 for brake system air bleeding.





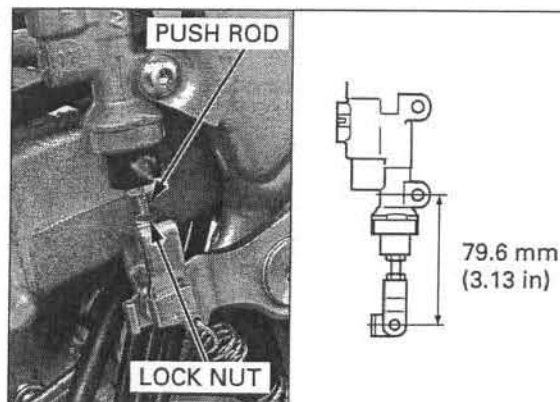
## BRAKE PEDAL HEIGHT

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

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

Tighten the lock nut to the specified torque.

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



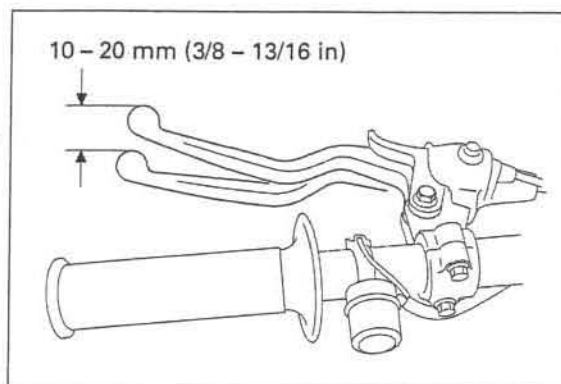
## CLUTCH SYSTEM

### CLUTCH LEVER FREEPLAY

Measure the clutch lever freeplay at the lever end.

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

If the clutch lever freeplay is out of the specification, adjust the cable end adjuster and in-line cable adjuster.



NEW

### MINOR ADJUSTMENT

Minor adjustments can be made at the cable end adjuster.

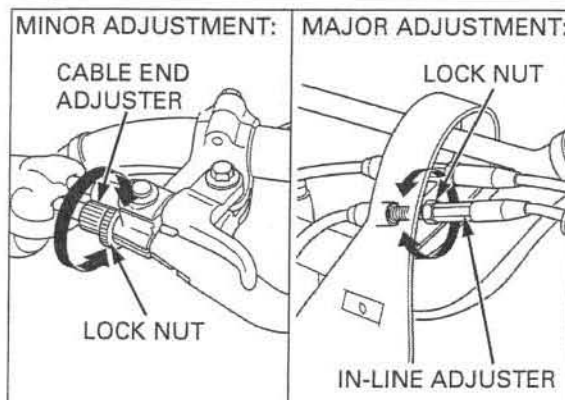
Remove the dust cover, loosen the lock nut and turn the cable end adjuster.

### MAJOR ADJUSTMENT

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

Loosen the lock nut and turn the cable adjuster. Tighten the lock nut.

If proper freeplay cannot be obtained or the clutch slips during the test ride, disassemble and inspect the clutch (page 10-7).



## CONTROL CABLES

Remove the throttle housing bolts. Disconnect the throttle cable ends from the throttle pipe and remove the throttle housing.

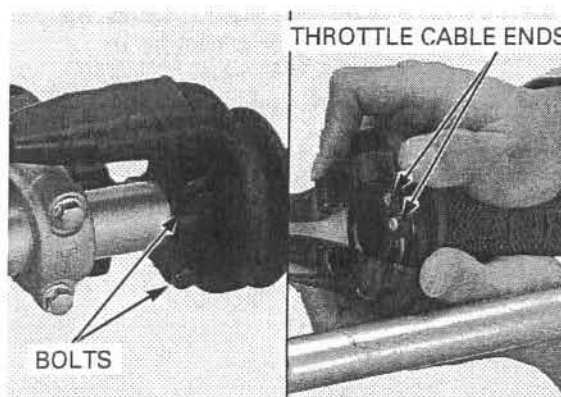
Disconnect the clutch cable upper end and the hot start cable upper end from the levers.

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

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

If the clutch lever, hot start lever and 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.





# EXHAUST PIPE/MUFFLER

## EXHAUST SYSTEM INSPECTION

Check the joint band bolt and joint nut for looseness and exhaust gas leaks.  
Tighten each bolt and nut of the exhaust system to the specified torque.

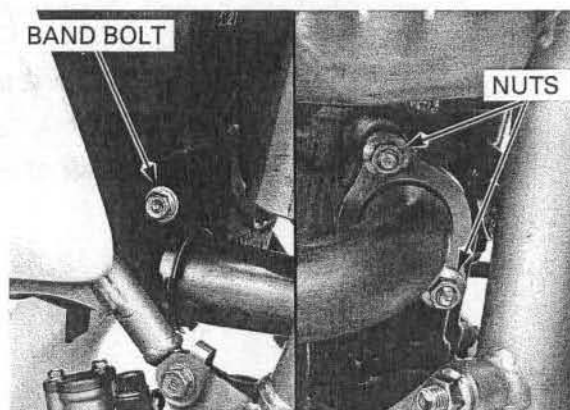
### TORQUE:

Exhaust pipe joint nut:

11 N·m (1.1 kgf·m, 8 lbf·ft)

Muffler joint band bolt:

21 N·m (2.1 kgf·m, 15 lbf·ft)



## GLASS WOOL REPLACEMENT

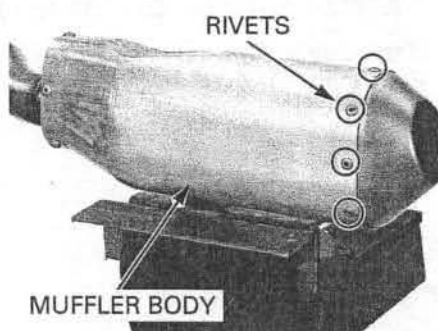
Remove the muffler (page 2-8).

*Do not overtighten the vise and distort the muffler mounting tab.*

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

Remove the eight rivets using a 5 mm drill. Pull out the inner pipe assembly from the muffler body.

- Be careful not to damage the rivet holes, muffler body and inner pipe assembly.



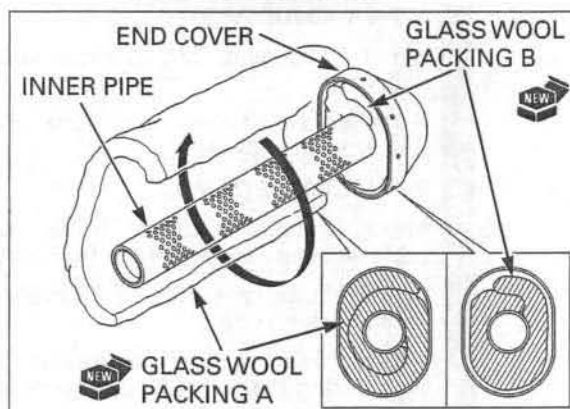
Remove the glass wool packing from the inner pipe assembly.

Remove the carbon deposit from the inner pipe using the wire brush.

*Be careful not to damage the glass wool.*

Install new glass wool packing B into the inner pipe and end cover as shown.

Install a new glass wool packing A onto the inner pipe as shown.

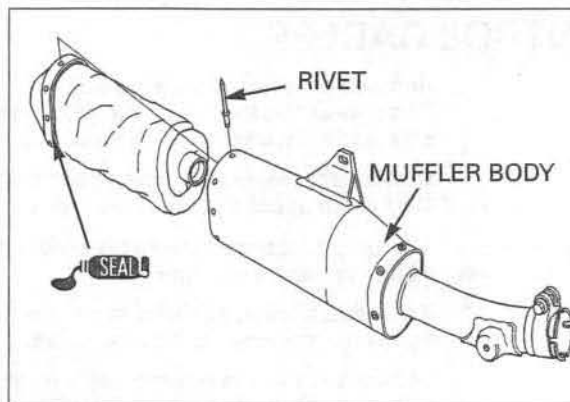


Apply muffler sealant (high-temperature silicone) to the inner pipe assembly as shown.

Install the inner pipe assembly into the muffler body and align the rivet holes.

Install the rivets.

Install the muffler (page 2-10).



# SUSPENSION

## FRONT SUSPENSION INSPECTION

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

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

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.

Refer to page 12-11 for fork service.



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 heats.

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

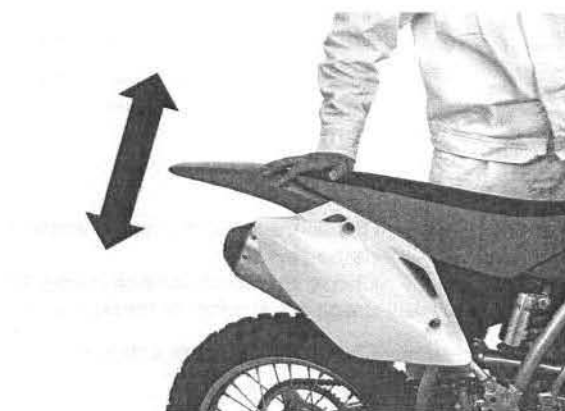
Loosen the air pressure release screw fully, then tighten them.

**TORQUE: 1.3 N·m (0.1 kgf·m, 1 lbf·ft)**



## REAR SUSPENSION INSPECTION

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

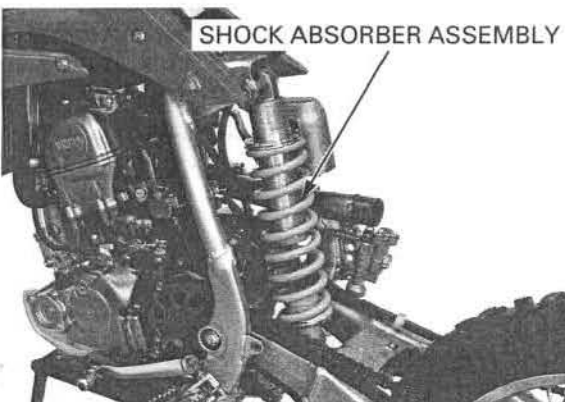


Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to page 13-14 for shock absorber service.





### 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 13-33).

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 13-29)

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

#### FRONT

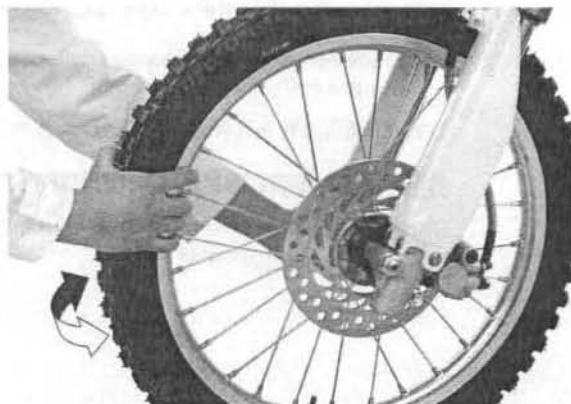
Raise the front wheel off the ground by placing a work stand or equivalent under the engine.

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

#### REAR

Raise the rear wheel off the ground by placing a work stand 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 12-3) and rear wheel (page 13-3) wheels for trueness.

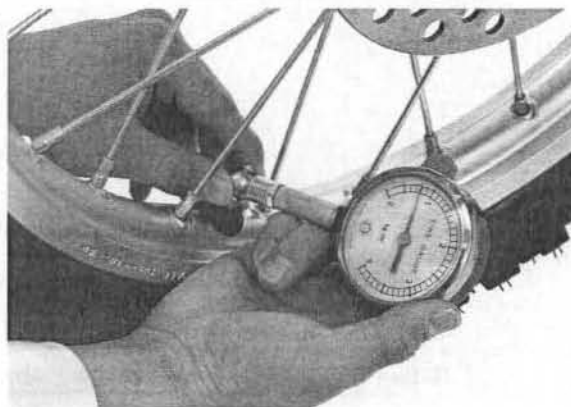
Check the cold tire pressure.

#### 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)

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





Inspect the wheel rims and spokes for damage. Tighten any loose spokes and rim locks to the specified torque using the special tool.

**TOOLS:**

Spoke wrench, 5.8 mm

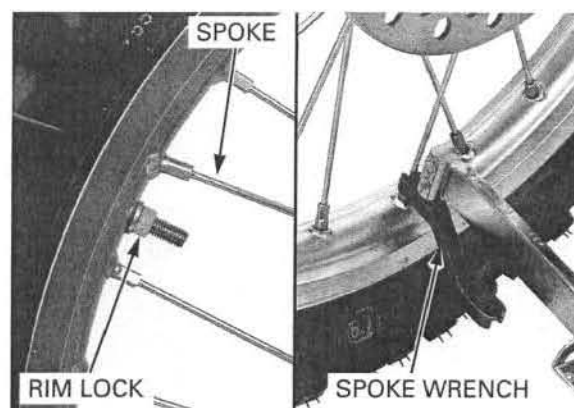
07701-0020300 or equivalent commercially available in U.S.A.

**TORQUE:**

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: 12.4 N·m (1.3 kgf·m, 9.1 lbf·ft)



## STEERING HEAD BEARINGS

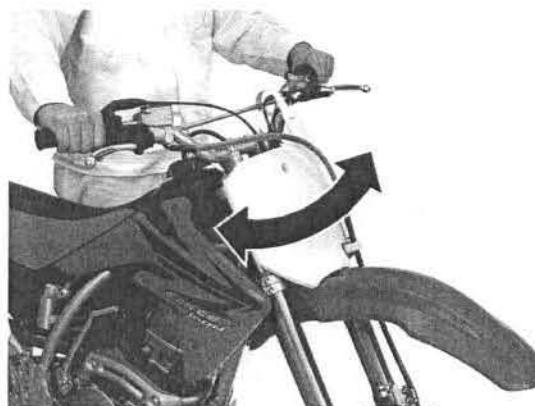
Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

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

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

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 12-27).

If excessive play has developed, check the steering stem for cracks.



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# MEMO

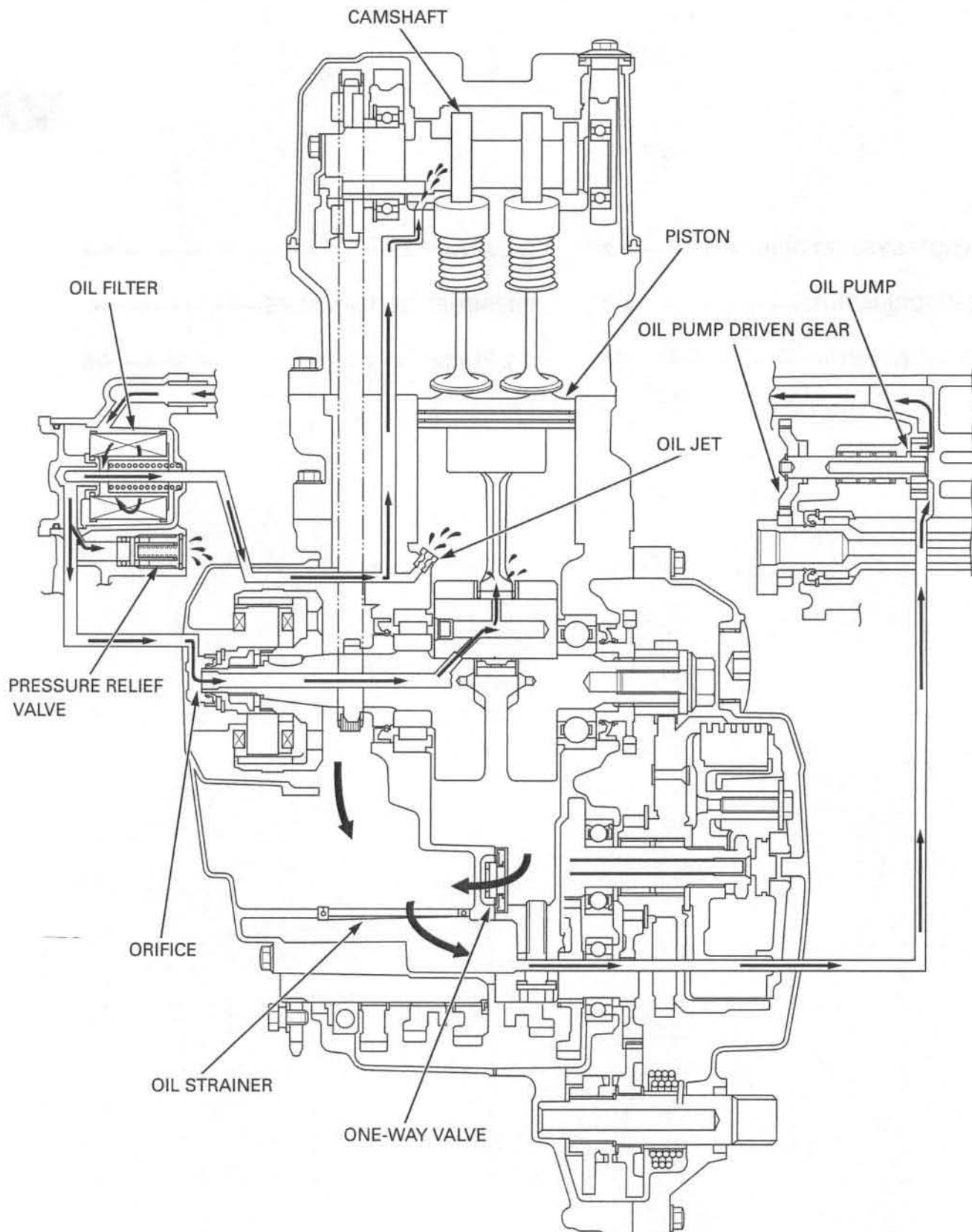
## 4. LUBRICATION SYSTEM

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LUBRICATION SYSTEM DIAGRAM .....	4-2	OIL STRAINER .....	4-4
SERVICE INFORMATION .....	4-3	PRESSURE RELIEF VALVE .....	4-5
TROUBLESHOOTING .....	4-3	OIL PUMP .....	4-6



# 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 service requires crankcase separation.
- The service procedures in this section must be performed with the engine 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 can be serviced with the engine installed in the frame.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.56 liter (0.59 US qt, 0.49 Imp qt)	—
	At oil and filter change	0.59 liter (0.62 US qt, 0.52 Imp qt)	—
	At disassembly	0.70 liter (0.74 US qt, 0.62 Imp qt)	—
Transmission oil capacity	At draining	0.57 liter (0.61 US qt, 0.51 Imp qt)	—
	At disassembly	0.65 liter (0.69 US qt, 0.57 Imp qt)	—
Recommended engine oil		Pro Honda, GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-30	—
Recommended transmission oil		Pro Honda HP trans oil, Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an 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 – 0.20 (0.006 – 0.008)	—
	Side clearance	0.05 – 0.12 (0.002 – 0.005)	—

## TROUBLESHOOTING

### Oil level too low- high oil consumption

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

### Oil contamination

- Oil not changed often enough
- Worn piston rings or incorrect piston ring installation
- Worn valve guide or seal
- From coolant mixing with oil
  - Faulty water seal
  - Faulty head gasket
  - Water leak in crankcase

### OIL STRAINER

#### REMOVAL/INSPECTION

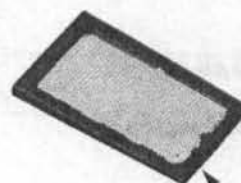
Drain the engine oil (page 3-13).

Remove the left crankcase cover and gasket (page 15-9).

Remove the oil strainer screen and clean it.



Check the oil strainer screen for damage or clogs.



OIL STRAINER SCREEN

#### INSTALLATION

Install the oil strainer screen to the crankcase.

Install the left crankcase cover (page 15-9).

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



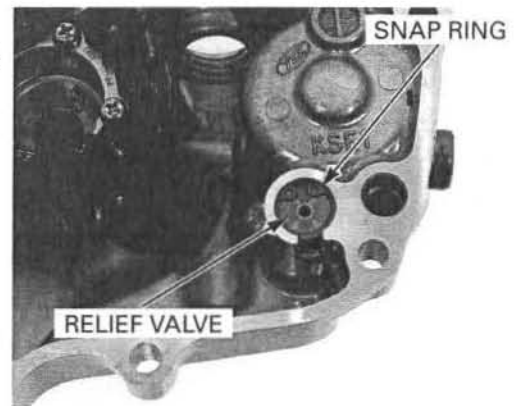


## PRESSURE RELIEF VALVE

### REMOVAL/INSPECTION

Remove the left crankcase cover (page 15-9).

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



Check the pressure relief valve for damage or clogs.

RELIEF VALVE



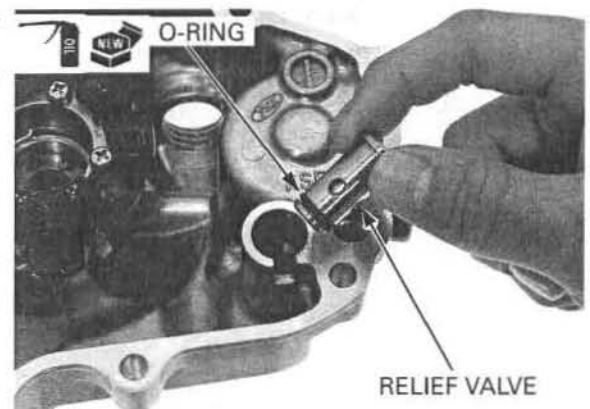
### INSTALLATION

Apply oil to a new O-ring and install it onto 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 15-9).



### OIL PUMP

#### DISASSEMBLY

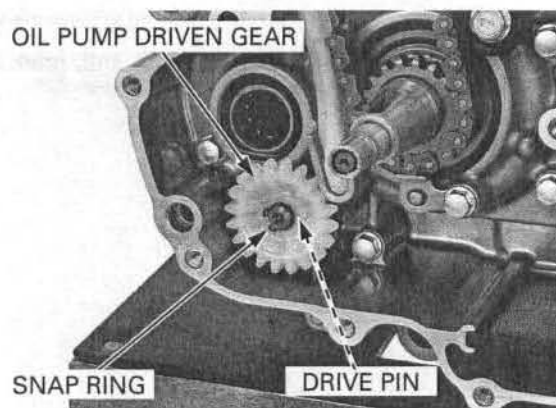
Remove the engine from the frame (page 7-4).

Remove the following:

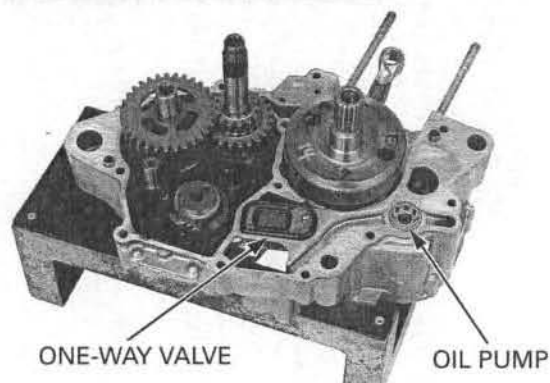
- Left crankcase cover (page 15-9)
- Flywheel (page 15-10).
- Balancer (page 11-7).

Remove the snap ring, oil pump driven gear and drive pin.

Disassemble the left crankcase (page 11-10).



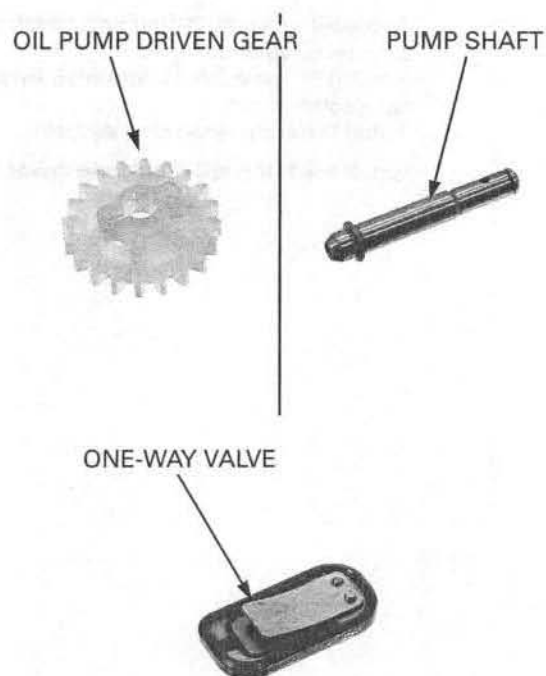
Remove the oil pump inner/outer rotor and shaft.  
Remove the one-way valve.



#### INSPECTION

Check the oil pump driven gear for wear or damage.

Check the oil pump shaft for wear or damage.



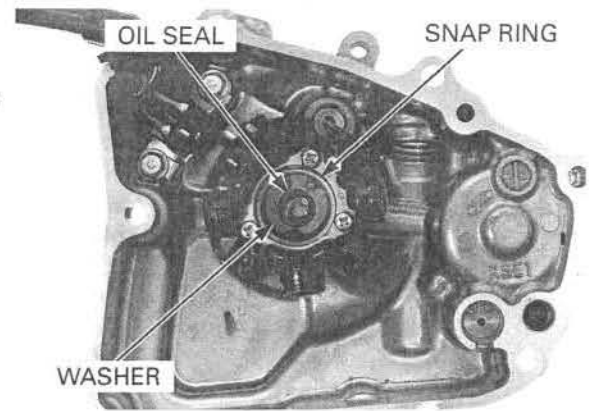
Check the one-way valve for wear or damage,  
replace if necessary.

Check the oil seal for damage or deterioration.

Replace the oil seal if necessary.

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

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

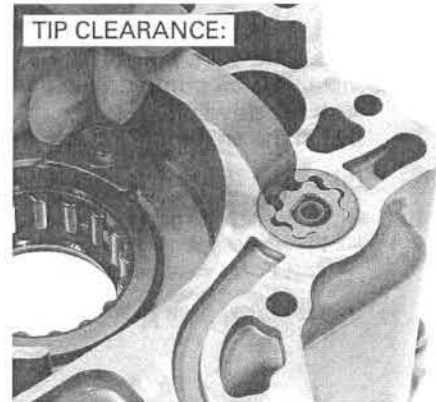


Temporarily install the oil pump shaft.

Install the outer and inner rotors into the crankcase.

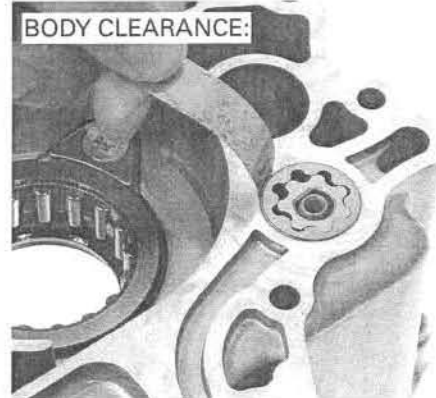
Measure the tip clearance.

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



Measure the body clearance.

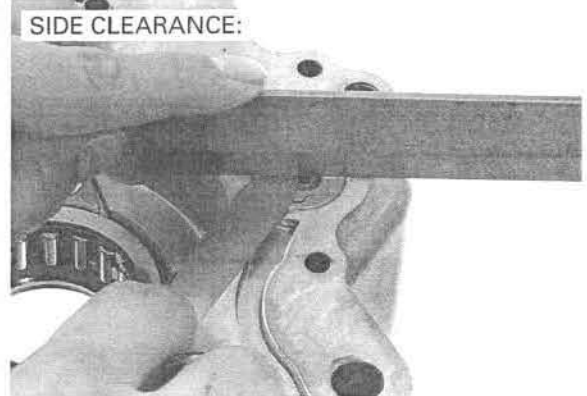
**STANDARD: 0.15 – 0.20 mm (0.006 – 0.008 in)**



*Measure the clearance with the gasket installed.*

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

**STANDARD: 0.05 – 0.12 mm (0.002 – 0.005 in)**



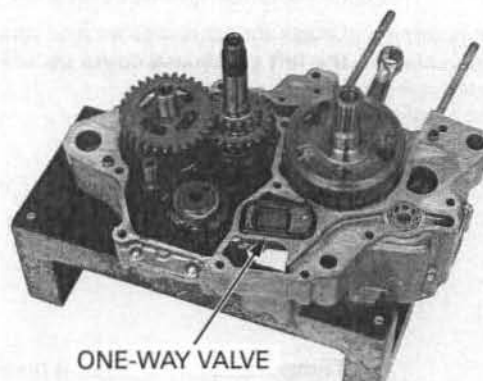


### ASSEMBLY

Install the outer rotor and oil pump shaft into left crankcase.

Install the inner rotor aligning the cut-out of the inner rotor with the cut-out of the oil pump shaft. Install the one-way valve onto the left crankcase as shown.

Assemble the left crankcase (page 11-24).

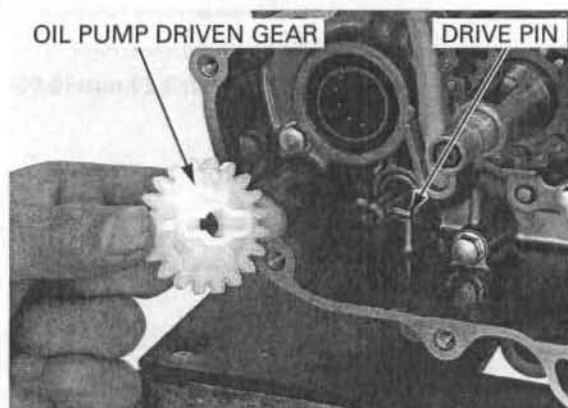


Install the drive pin into the oil pump shaft. Install the oil pump driven gear aligning its cut-outs with the drive pin. Install the snap ring.

Install the following:

- Balancer (page 11-8).
- Flywheel (page 15-11).
- Left crankcase cover (page 15-9)

Install the engine to the frame (page 7-5).



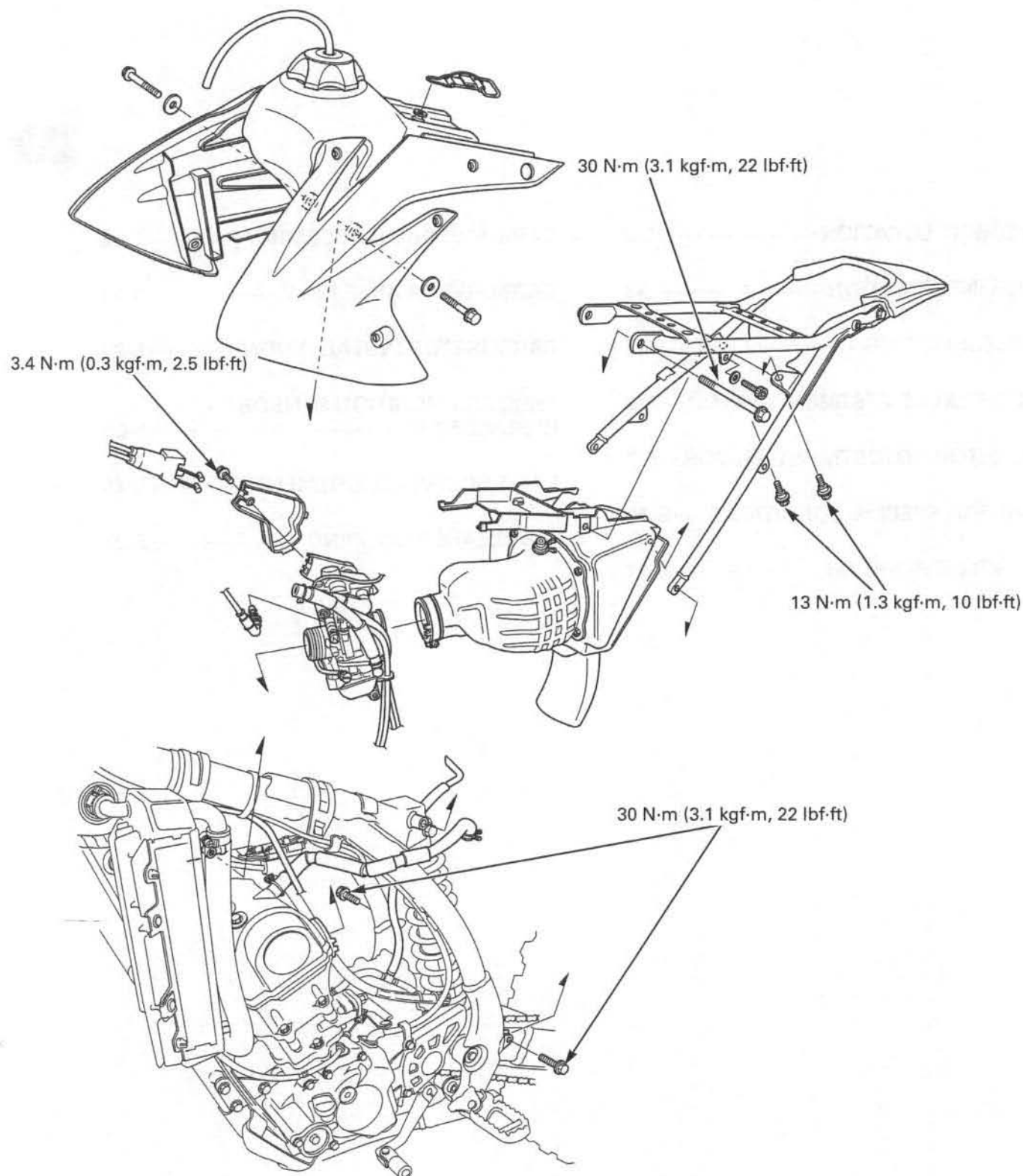
# 5. FUEL SYSTEM

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5

COMPONENT LOCATION .....	5-2	CARBURETOR DISASSEMBLY .....	5-12
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COMPONENT LOCATION





## SERVICE INFORMATION

### GENERAL

- Bending or twisting the control cables will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.
- Refer to the fuel tank (page 2-7), sub-frame (page 2-5) removal and installation.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Before disassembling the carburetor, place an approved gasoline container under the carburetor drain plug, loosen the screw and drain the carburetor.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- After removing the carburetor, wrap the intake port of the engine with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine. Be sure to remove the cover when reinstalling the carburetor.
- If the vehicle is to be stored for more than one month, drain the float chamber. Fuel left in the float chamber may cause clogged jets resulting in hard starting or poor driveability.

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Fuel tank capacity	4.3 liters (1.14 US gal, 0.95 Imp gal)
Carburetor identification number	FCR08A
Main jet	#135
Slow jet	#40
Jet needle	NHNT
Jet needle clip position (Standard)	3rd from top
Pilot screw initial opening	2 -1/4 turns out
Float level	7.0 mm (0.28 in)
Idle speed	2,100 ± 100 rpm
Throttle grip free play	3 – 5 mm (1/8 – 3/16 in)
Hot start lever free play	2 – 3 mm (1/16 – 1/8 in)
Throttle position sensor resistance (at 20°C/68°F)	4 – 6 kΩ

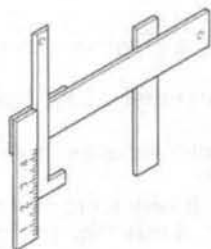
### TORQUE VALUES

Rear fender mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Sub-frame mounting bolt (upper)	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Sub-frame mounting bolt (lower)	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Throttle drum cover bolt	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Needle jet	1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)	
Main jet	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Slow jet	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Acc pump bypass	0.3 N·m (0.03 kgf·m, 0.22 lbf·ft)	
Carburetor top cover bolt	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Float chamber screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Carburetor drain plug	4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Choke valve lock nut	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Throttle shaft screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	Apply locking agent to the threads
Jet needle holder	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Accelerator pump cover screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Hot start valve lock nut	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Throttle position sensor torx screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	Apply locking agent to the threads
Starter jet	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Slow air jet	0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)	

## FUEL SYSTEM

### TOOL

Carburetor float level gauge  
07401-0010000



## TROUBLESHOOTING

### Engine will not start

- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated/deteriorated
- No fuel to carburetor
  - Fuel filter clogged
  - Fuel line clogged
  - Fuel valve stuck
  - Float level misadjusted
  - Fuel tank breather hose clogged
- Slow circuit clogged
- No spark at plug (faulty spark plug or ignition system malfunction)

### Lean mixture

- Fuel jets clogged
- Fuel tank breather hose clogged
- Fuel filter clogged
- Fuel line restricted
- Float valve faulty
- Float level too low
- Air vent hose clogged
- Intake air leak
- Jetting incorrect for altitude/temperature conditions

### Misfiring during acceleration

- Ignition system faulty
- Lean mixture

### Afterburn during acceleration

- Ignition system faulty
- Lean mixture
- Accelerator pump faulty

### Rich mixture

- Choke valve in the ON position
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner element contaminated
- Flooded carburetor
- Jetting incorrect for altitude/temperature conditions

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

- Fuel line restricted
- Ignition system malfunction
- Low cylinder compression
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
- Intake air leak
- Float level misadjusted
- Fuel tank breather hose clogged
- Pilot screw misadjusted
- Slow circuit or starting enrichment circuit clogged
- Idle speed misadjusted
- Air cleaner clogged

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

- Fuel system clogged
- Ignition system faulty
- Air cleaner clogged

### Afterfiring

- Ignition system malfunction
- Lean mixture



## CARBURETOR ADJUSTMENT, MINOR

### IDLE MIXTURE AND IDLE SPEED

The standard carburetor settings are ideal for the following conditions: sea level altitude, and 20°C (68°F) air temperature. If your conditions are different, you may need to adjust the carburetor setting using the tuning information chart (page 5-10).

1. Adjust the carburetor setting using the tuning information chart (page 5-10).

#### STANDARD SETTING:

FLOAT LEVEL:	7.0 mm (0.28 in)
PILOT SCREW INITIAL OPENING:	2-1/4 turns out
SLOW JET:	#40
MAIN JET:	#135
JET NEEDLE:	NHNT
JET NEEDLE CLIP POSITION:	3rd from top

2. When the engine is warm enough to run without the choke, push the choke knob into its off position.



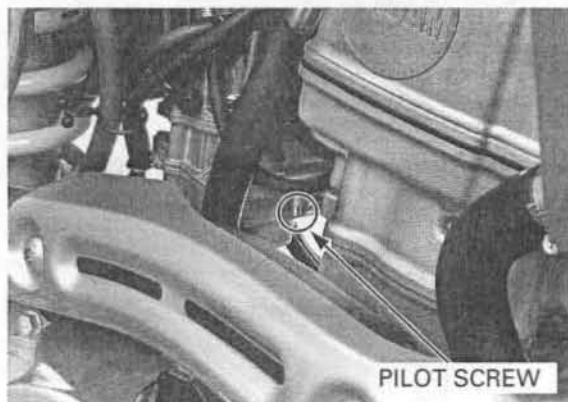
3. Turn the throttle stop screw to obtain the smoothest idle:

- To decrease idle speed, turn the throttle stop screw counterclockwise.
- To increase idle speed, turn the throttle stop screw clockwise.



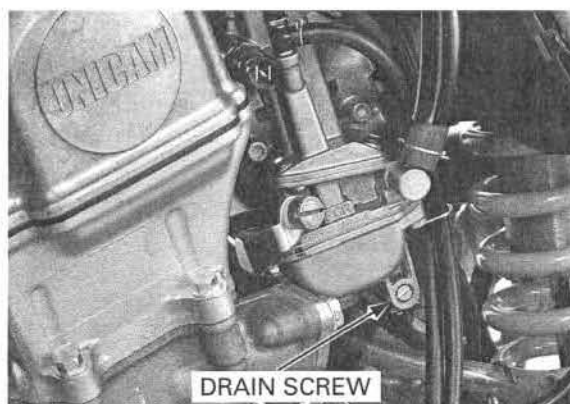
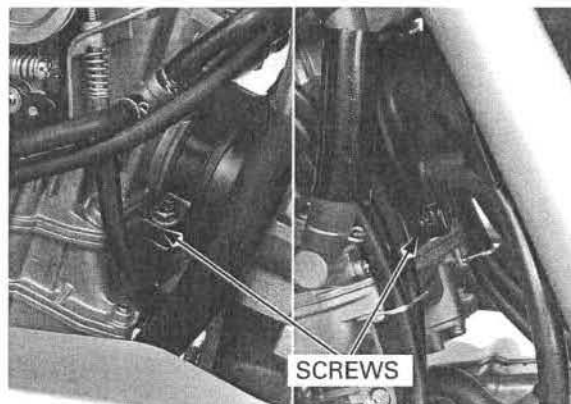
4. Adjust the pilot screw to obtain the best off-idle performance.

- If the engine runs rich exiting a corner, turn the pilot screw clockwise to lean the mixture.
- If the engine runs lean exiting a corner, turn the pilot screw counterclockwise to richen the mixture.



## CARBURETOR ADJUSTMENT, MAJOR FOR TEMPERATURE AND ALTITUDE

1. Warm up the engine.
2. Make two or three laps on a course with the standard setting. Note engine acceleration and other engine conditions in relation to throttle opening.  
Verify the mixture by removing the spark plug (page 3-8) and reading the firing end.
3. Change the carburetor settings or select suitable carburetor jets, taking into consideration the engine conditions and tuning information chart for temperature and altitude (page 5-10).
4. Turn the fuel valve to "OFF".
5. Loosen the carburetor insulator and connecting boot band screws and rotate the carburetor body to the right.
6. Loosen the carburetor drain screw and drain the gasoline from the carburetor into an approved gasoline container.



7. Remove the carburetor drain plug.

### TORQUE:

#### Main jet:

1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

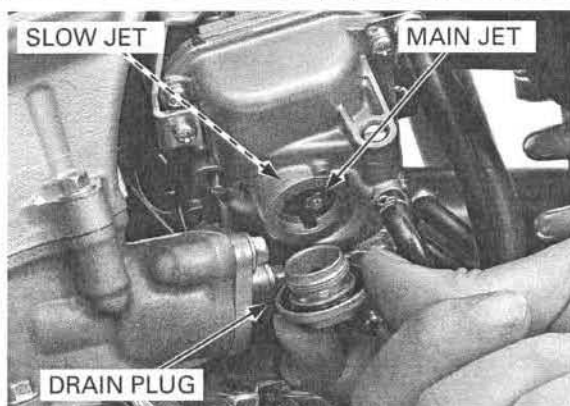
#### Slow jet:

1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

#### Carburetor drain plug:

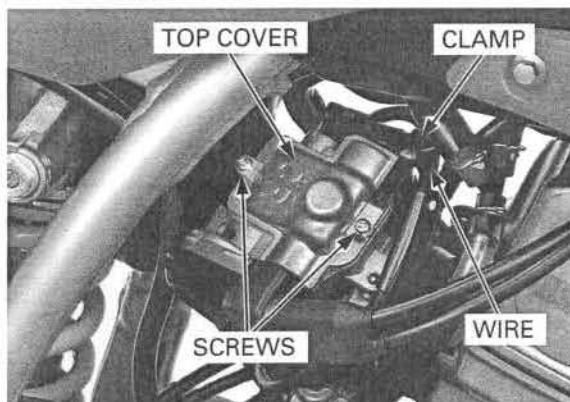
4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

Change the jets as required and reinstall the carburetor drain plug.



8. Release the throttle position sensor wire from the clamp.

Remove the bolts, clamp and carburetor top cover.



## FUEL SYSTEM

9. Remove the jet needle holder.

Remove the jet needle (page 5-13).

Change the jet needle clip position as required.

Reinstall and tighten the jet needle holder to the specified torque.

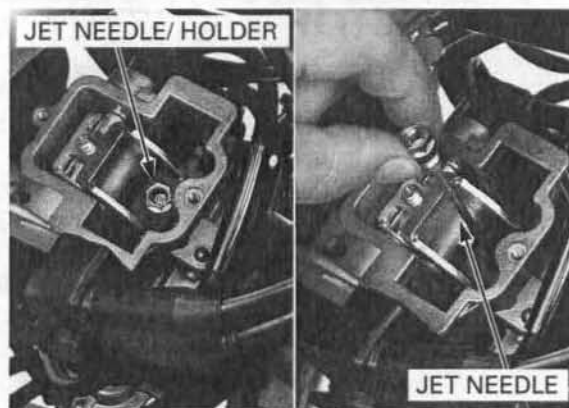
**TORQUE:** 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

10. Install the top cover, clamp and tighten the screws to the specified torque.

**TORQUE:** 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

11. Tighten the carburetor insulator and connecting boot band screws.

12. Adjust the pilot screw opening as required.





## TUNING INFORMATION CHART

		Temperature							
		Cent.	-30°~-17°	-18°~-6°	-7°~5°	-4°~16°	15°~27°	26°~38°	37°~49°
		Fahr.	-21°~0°	-1°~20°	19°~40°	39°~60°	59°~80°	79°~100°	99°~120°
Altitude	3,050 m (10,000 ft)	PS:	2-1/4	2-1/4	2-1/4	2	2	1-3/4	1-3/4
		SJ:	40	40	40	40	40	40	40
	2,300 m (7,500 ft)	JN CLIP:	3 rd	3 rd	3 rd	3 rd	3 rd	2 nd	2 nd
		JN:	NHNT	NHNT	NHNT	NJAT	NJAT	NHNT	NHNT
		MJ:	135	132	132	132	132	130	130
	2,299 m (7,499 ft)	PS:	2-1/4	2-1/4	2-1/4	2-1/4	2	2	1-3/4
		SJ:	40	40	40	40	40	40	40
	1,500 m (5,000 ft)	JN CLIP:	3 rd	3 rd	3 rd	3 rd	3 rd	3 rd	2 nd
		JN:	NHNT	NHNT	NHNT	NHNT	NJAT	NJAT	NHNT
		MJ:	135	135	132	132	132	132	130
	1,499 m (4,999 ft)	PS:	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	2	2
		SJ:	40	40	40	40	40	40	40
	750 m (2,500 ft)	JN CLIP:	3 rd	3 rd	3 rd	3 rd	3 rd	3 rd	3 rd
		JN:	NHNT	NHNT	NHNT	NHNT	NHNT	NJAT	NJAT
		MJ:	138	135	135	132	132	132	132
	749 m (2,499 ft)	PS:	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	2
		SJ:	40	40	40	40	40	40	40
	300 m (1,000 ft)	JN CLIP:	3 rd	3 rd	3 rd	3 rd	3 rd	3 rd	3 rd
		JN:	NHNT	NHNT	NHNT	NHNT	NHNT	NHNT	NJAT
		MJ:	138	138	135	135	132	132	132
	299 m (999 ft)	PS:	2-1/2	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4
		SJ:	40	40	40	40	40	40	40
	0 m Sea level	JN CLIP:	4 th	3 rd	3 rd	3 rd	3 rd	3 rd	3 rd
		JN:	NJAT	NHNT	NHNT	NHNT	NHNT	NHNT	NHNT
		MJ:	138	138	138	135	135 (STD setting)	132	132

PS: Pilot screw opening from fully seated

SJ: Slow jet

JN CLIP: Needle clip position

JN: Jet needle

MJ: Main jet

- If you use the chart correctly, it should not be necessary to adjust more than one jet size richer or leaner to fine tune this motorcycle. If a very large adjustment is required, there may be something wrong elsewhere. Check for air leaks, blocked exhaust or fuel system, or dirty air cleaner element.
- The tuning information chart will get you very close to the ideal setting. However, because of differences in pressure and humidity, you may need to fine tune the carburetor for race day conditions.

Just off idle:

- Engine stumbles/hesitates (rich): turn in the pilot screw 1/4 turn.
- Engine surges (lean): turn out the pilot screw 1/4 turn.

The minimum to maximum range of pilot screw adjustment is 1-3/4 to 2-1/2 turns out from the lightly seated position.

If you exceed three turns out, the next larger slow jet is needed.

If you are under one turn out, the next smaller slow jet is needed.

- On the top end:  
Engine stumbles/hesitates (rich): go to next smaller main jet.  
Engine surges (lean): go to next larger main jet.
- To prevent engine damage, always adjust the main jet (top end) before adjusting the jet needle (mid-range).
- In the mid-range:  
Engine stumbles/hesitates (rich): lower the jet needle by raising the needle clip one position.  
Engine surges (lean): raise the jet needle by lowering the needle clip one position.

### TUNING FOR SPECIAL CONDITIONS

Once you have adjusted the carburetor for temperature and altitude, it should not need major readjustment unless the race conditions change drastically. Exclusive of the tuning information chart, there are some unique atmospheric conditions that may require additional adjustments. See below:

#### Main jet:

- Go richer on the main jet, by one number, when the track has a very long straightaway, steep climbs, a high percentage of sand, or the track is muddy.
- Go leaner on the main jet, by one number, when it is very humid or raining, or if it is hotter than 45 °C (113 °F).

#### Jet needles:

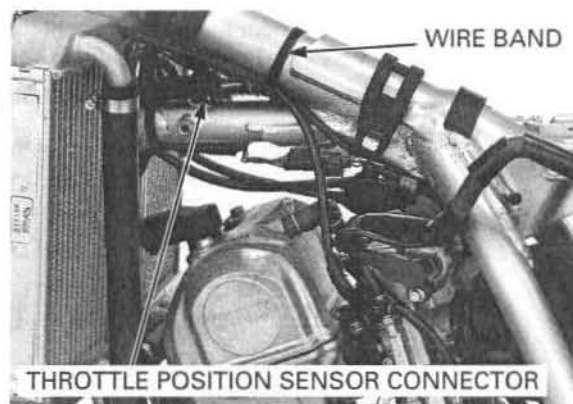
- Under normal circumstances, the standard jet needle can be adjusted to suit most situations. However, a peculiar condition may require replacement of the standard jet needle. But before replacing the standard needle, complete all the carburetor adjustments (page 5-6). If mid-range performance is still not satisfactory, try one of the optional jet needles (page 1-22).

## CARBURETOR REMOVAL

Remove the fuel tank (page 2-7).

Disconnect the throttle position sensor connector.

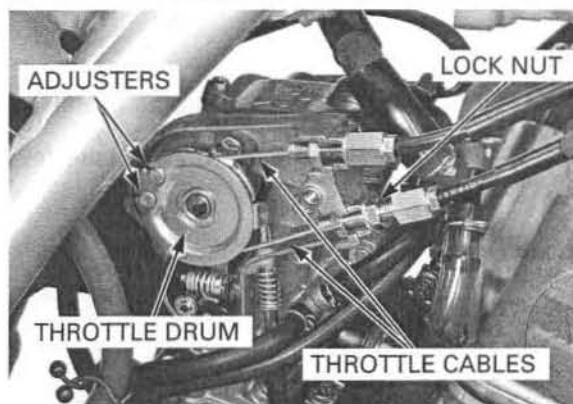
Release the throttle position sensor wire from the wire band.



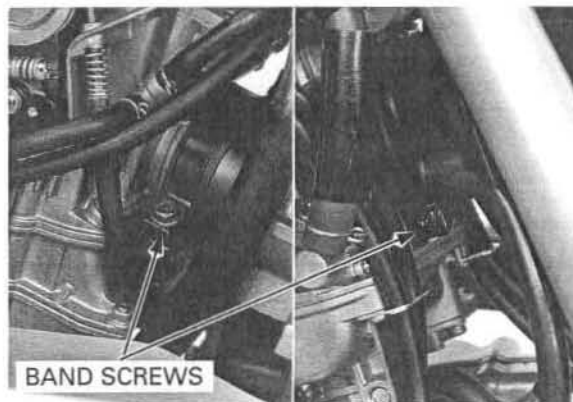
Remove the bolt and throttle drum cover.



Loosen the lock nut, adjusters and disconnect the throttle cables from the throttle drum.



Loosen the carburetor insulator band screws.  
Remove the carburetor.





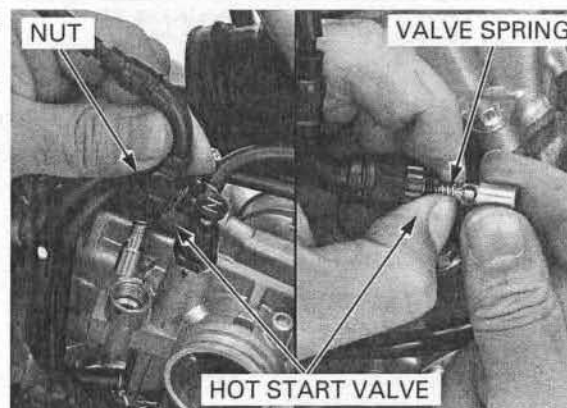
## FUEL SYSTEM

Loosen the hot start valve nut and remove the hot start valve from the carburetor.

Disconnect the hot start cable end from the hot start valve and remove the valve spring.

Check the hot start valve for nicks, grooves or other damage.

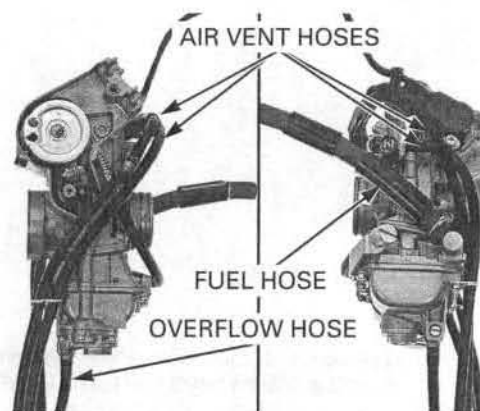
Check the hot start valve seat for wear.



## CARBURETOR DISASSEMBLY

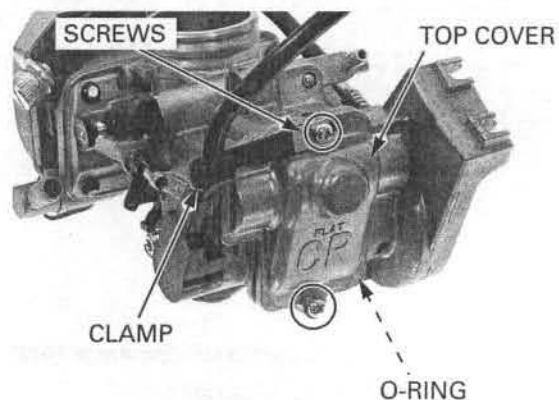
### JET NEEDLE/THROTTLE VALVE

Remove the fuel hose, air vent hoses and overflow hose.

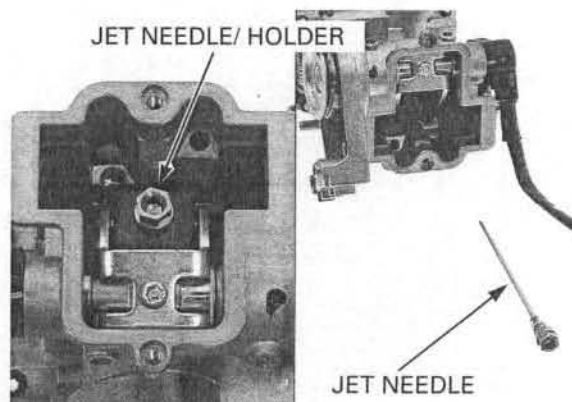


Release the throttle position sensor wire from the clamp.

Remove the screws, clamp, top cover and O-ring.

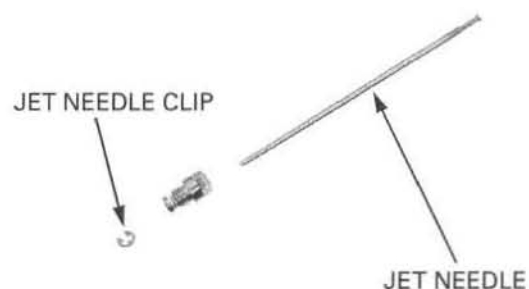


Remove the jet needle holder with the jet needle.



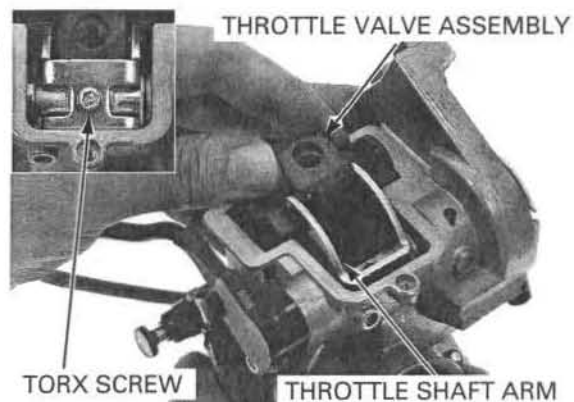
Remove the jet needle clip and jet needle.

Check the jet needle for wear, nicks or other damage.



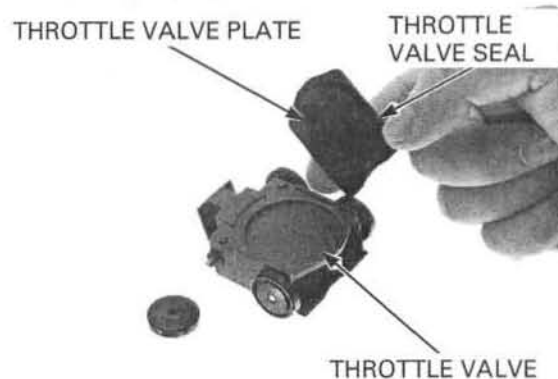
Remove the throttle shaft torx screw.

Lift up the throttle shaft arm and remove the throttle valve assembly.



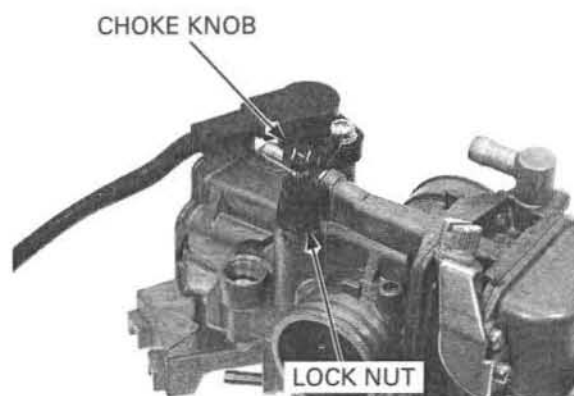
Remove the throttle valve plate from the throttle valve.

Check the throttle valve, throttle valve seal and throttle valve plate for scratches, wear or damage. Replace them if necessary.



## CHOKE KNOB/THROTTLE POSITION SENSOR

Loosen the lock nut and remove the choke knob.



## FUEL SYSTEM

Check the valve for damage or stepped wear.



VALVE

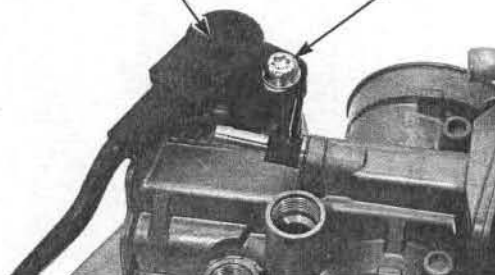
*When removing the throttle position sensor, mark the sensor position ensure that it is reinstalled in the original location.*

Remove the torx screw and throttle position sensor.

- Do not remove the throttle position sensor unless it is necessary to replace it or disassemble the carburetor. For sensor inspection (page 15-13) and replacement (page 5-25).

THROTTLE POSITION SENSOR

TORX SCREW

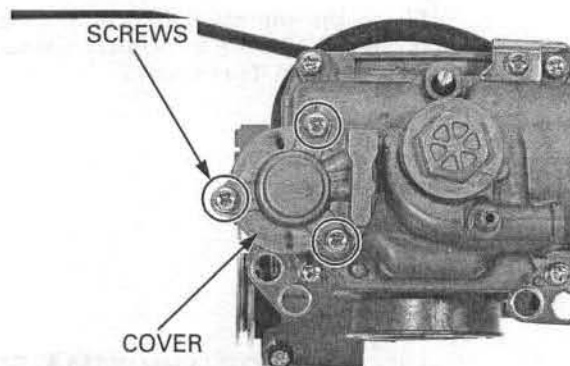


### ACCELERATOR (ACC) PUMP/FLOAT/ JETS

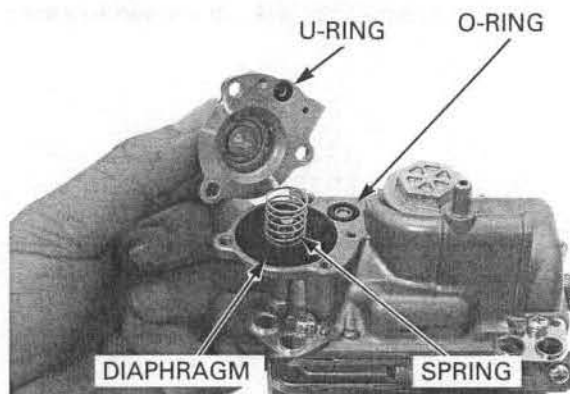
Remove the screws and accelerator pump cover.

SCREWS

COVER

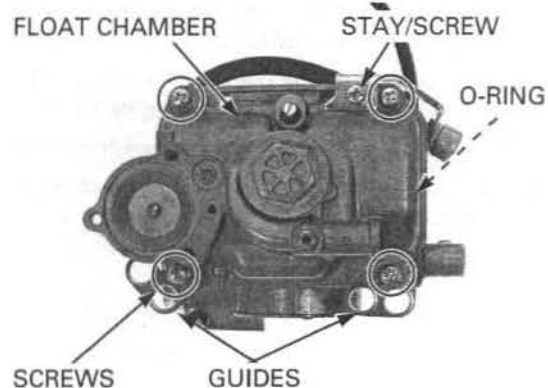


Remove the spring, diaphragm, O-ring and U-ring.



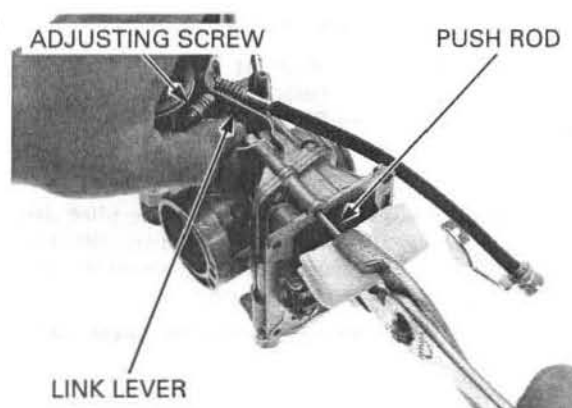


Remove the screw and throttle stop screw stay.  
Remove the four screws, hose guides and float chamber.  
Remove the O-ring from the float chamber.

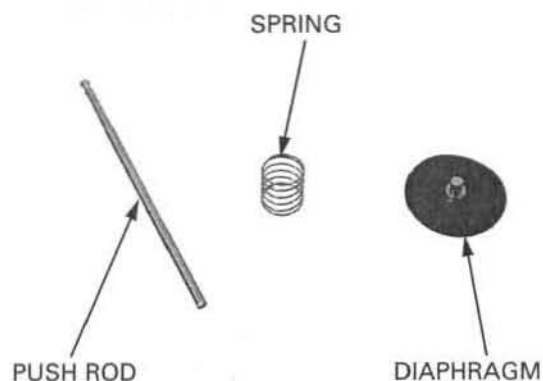


*The push rod link lever adjusting screw is factory pre-set. Adjustment and disassembly are not necessary.*

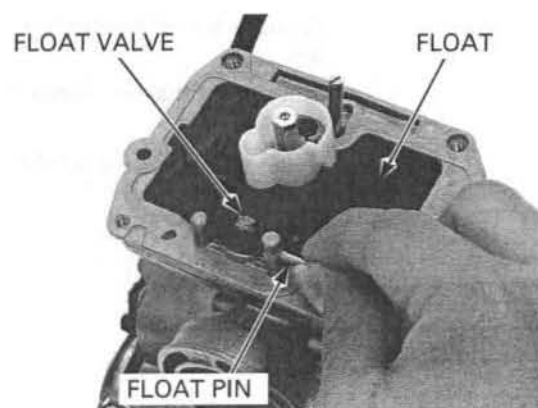
Use pliers to pull out the push rod while pushing the push rod link lever.



Check the push rod for wear, bent or damage.  
Check the spring for damage or fatigue.  
Check the diaphragm for deterioration or pin hole.



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



## FUEL SYSTEM

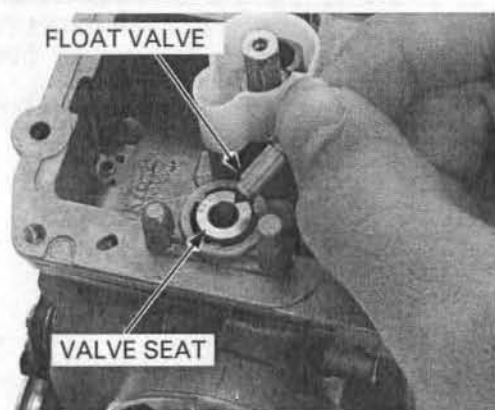
Check the float valve and valve seat for scoring, scratches, clogs or damage.

*A worn or contaminated float valve will not seat properly and will eventually flood the carburetor.*

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

Check the valve seat for wear or damage.

Replace or clean them if necessary.



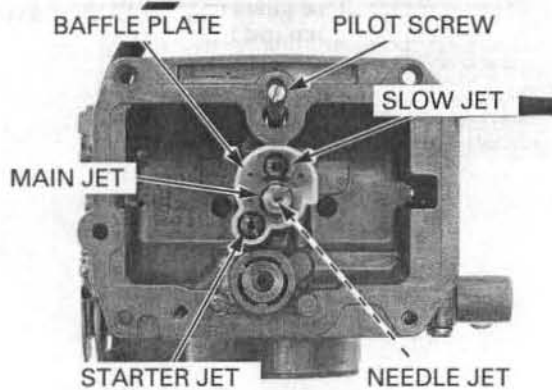
Remove the following:

- Main jet
- Needle jet
- Baffle plate
- Starter jet
- Slow jet

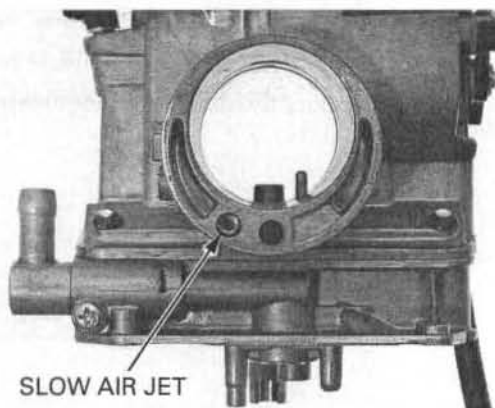
*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Before removing the pilot screw, turn it in, counting the number of turns until it seats lightly so you can return the pilot screw to its original position when reassembling.

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



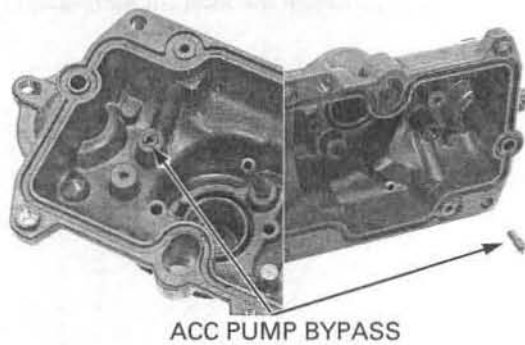
Remove the slow air jet.



Remove the acc pump bypass from the float chamber.

Blow open the acc pump bypass with compressed air.

Check the acc pump bypass for clogs or damage.



Blow open all jets with compressed air.

Inspect each jet for clogs, wear or damage and replace them if necessary.

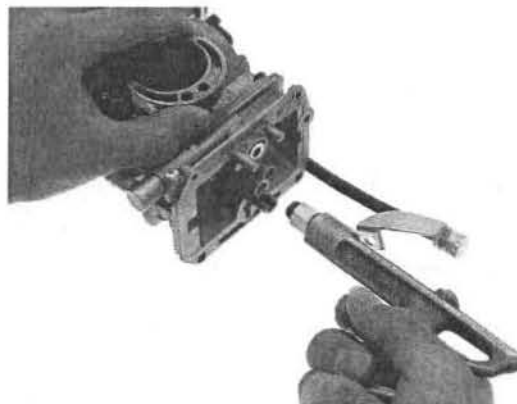
Check the pilot screw for stepped wear or damage.

Check the spring for fatigue or damage.

Replace them if necessary.

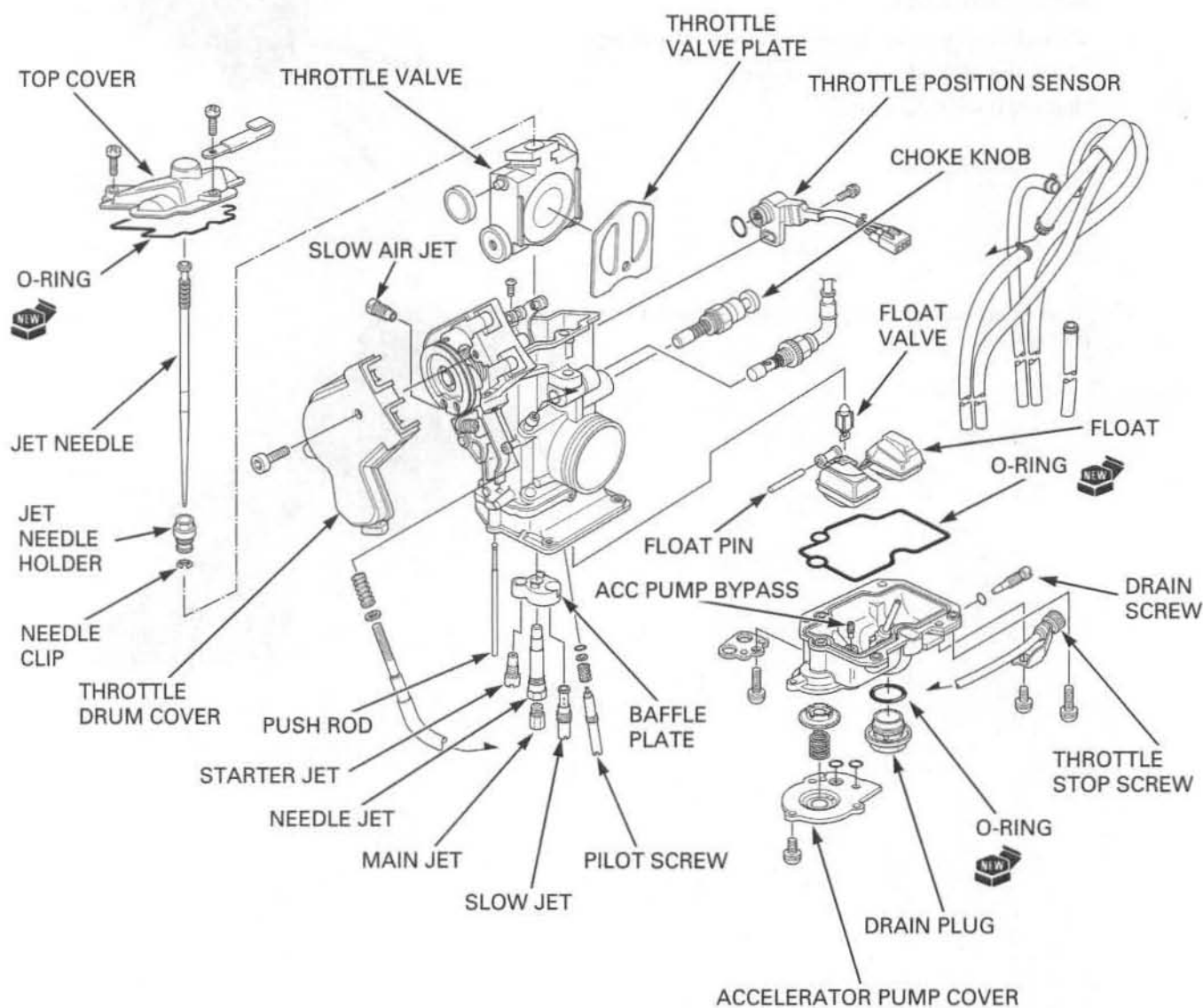


Blow open all carburetor body openings with compressed air.





# CARBURETOR ASSEMBLY



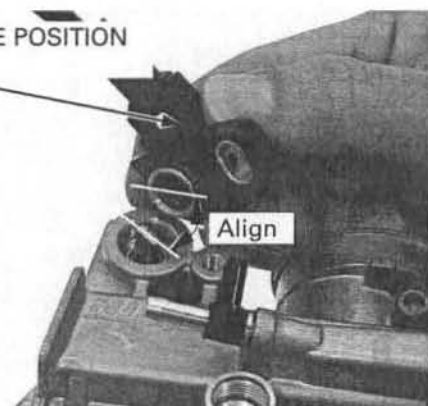
Install the throttle position sensor to its original position as marked during removal.

Set the throttle position sensor and install it (page 5-25).

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

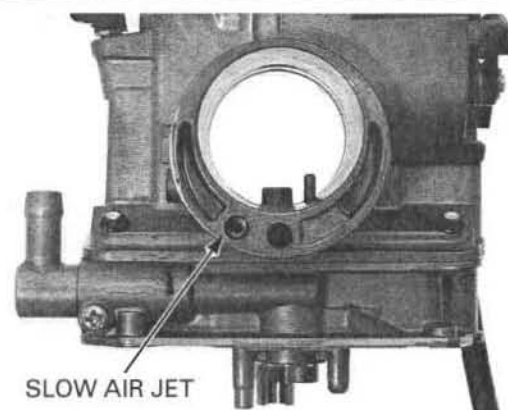
- For sensor inspection (page 15-13).

THROTTLE POSITION SENSOR



Install and tighten the slow air jet to the specified torque.

**TORQUE: 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)**



Install the O-ring, washer, spring and pilot screw.

Perform pilot screw adjustment if a new pilot screw is installed (page 5-26).

- Install the pilot screw and return it to its original position as noted during removal.

Install the slow jet, starter jet, baffle plate, needle jet and main jet.

## TORQUE:

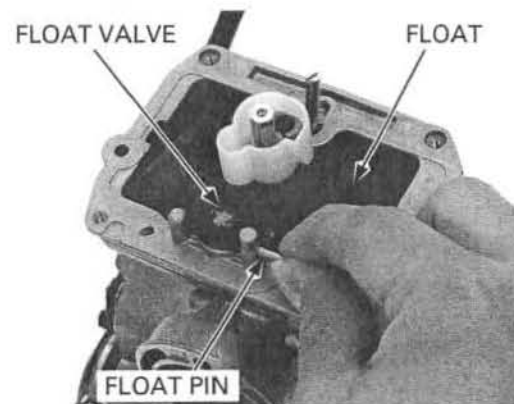
**Slow jet: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**

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

**Needle jet: 1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)**

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

Install the float valve, float and float pin.



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

Set the carburetor so the float valve just contacts the float arm lip. Make sure the float valve tip is securely in contact with the valve seat.

Make sure the float is level with the float level gauge.

## TOOL:

**Carburetor float level gauge 07401-0010000**

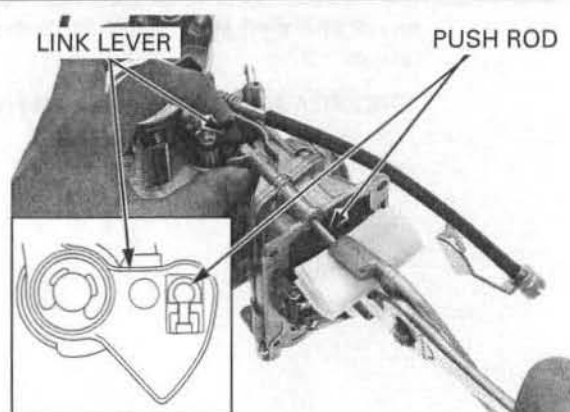
**FLOAT LEVEL: 7.0 mm (0.28 in)**

If the float level is out of specification, adjust it by bending the lip.



## FUEL SYSTEM

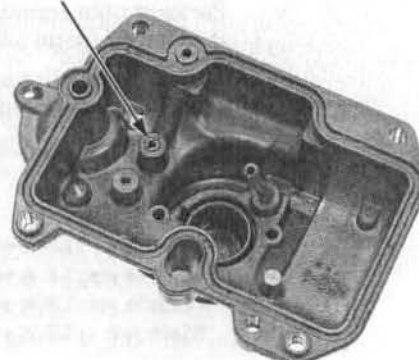
Use pliers to install the push rod while pushing the push rod link lever.



Install and tighten the acc pump bypass to the specified torque.

**TORQUE: 0.3 N·m (0.03 kgf·m, 0.22 lbf·ft)**

ACC PUMP BYPASS



Install a new O-ring to the float chamber.  
Install the float chamber to the carburetor.

FLOAT CHAMBER



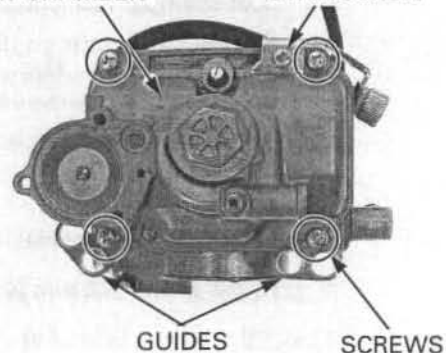
Install the hose guides and four float chamber screws.

Tighten the screws to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

Install the throttle stop screw stay and tighten the screw securely.

FLOAT CHAMBER STAY/SCREW



GUIDES

SCREWS

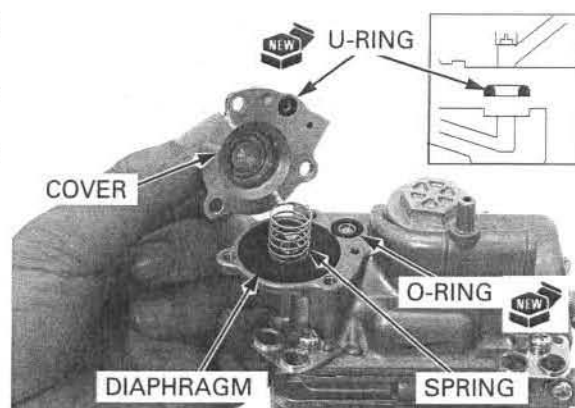


Install the diaphragm, spring, new O-ring, U-ring and accelerator pump cover.

Make sure the seal flat side facing the accelerator pump cover side.

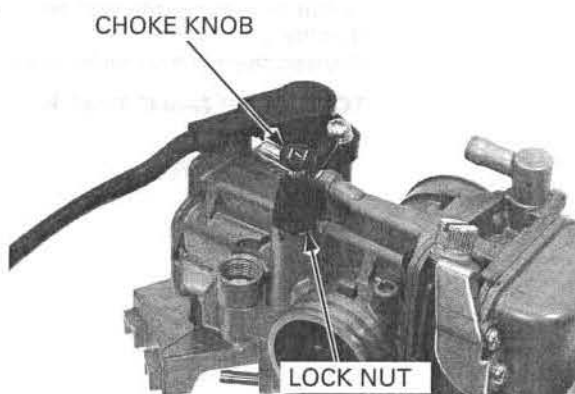
Install and tighten the screws to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**



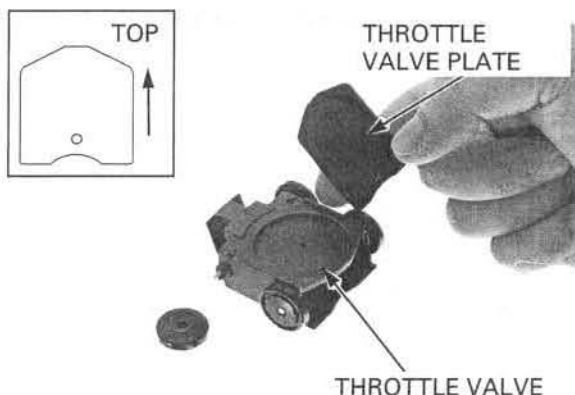
Install the choke knob and tighten the lock nut to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**



*Note the installation direction of the throttle valve plate.*

Assemble the throttle valve plate on the throttle valve.



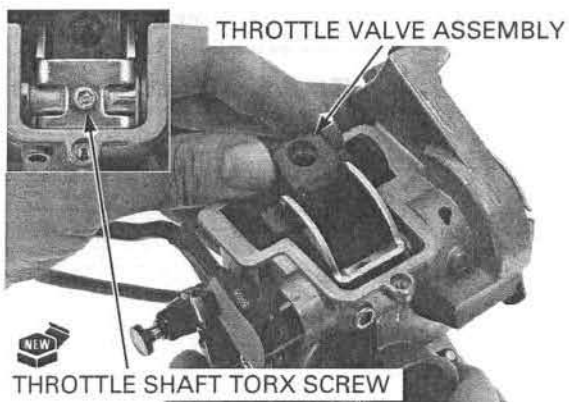
Install the throttle valve assembly into the carburetor with the valve plate facing towards the engine side.

- Make sure the throttle valve moves smoothly.

Align the holes in the throttle shaft arm and throttle shaft.

Install and tighten a new throttle shaft torx screw to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

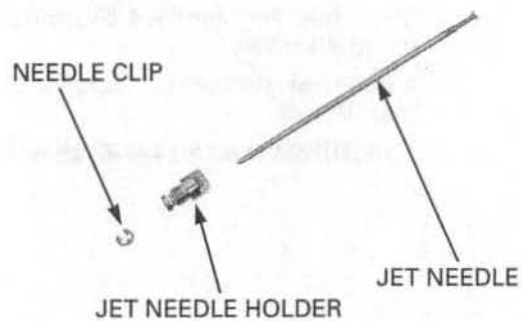


## FUEL SYSTEM

Install the jet needle into the jet needle holder.

Install the jet needle clip to the jet needle.

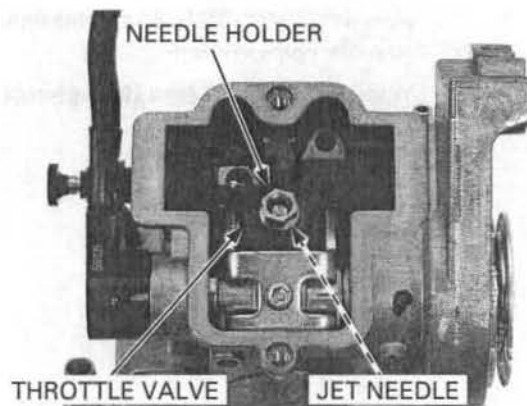
**STANDARD CLIP POSITION:** 3rd from top



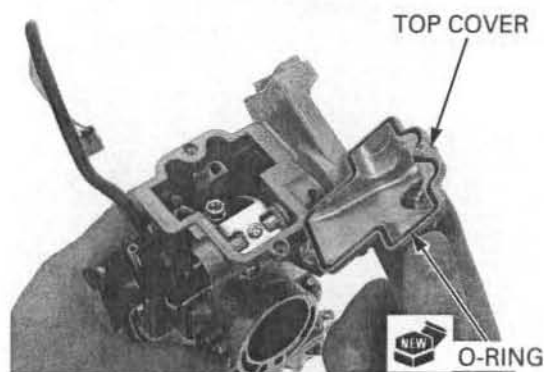
Install the jet needle and jet needle holder into the throttle valve.

Tighten the needle holder to the specified torque.

**TORQUE:** 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)



Install a new O-ring and top cover.

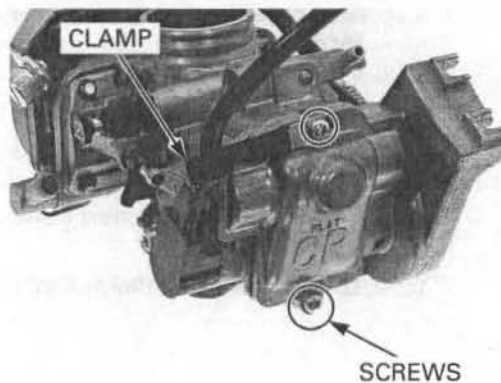


Install the clamp and screws.

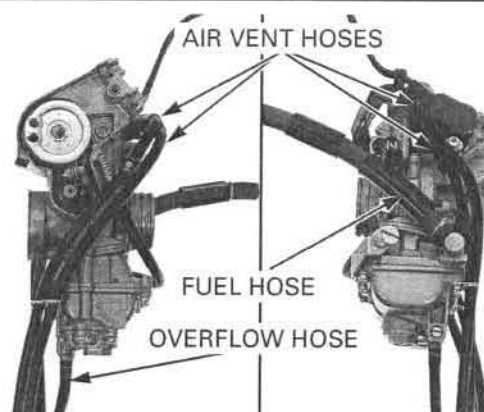
Tighten the screws to the specified torque.

**TORQUE:** 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

Install the throttle position sensor wire to the clamp.



Route the hoses properly (page 1-18). Install the overflow hose, air vent hoses and fuel hose.

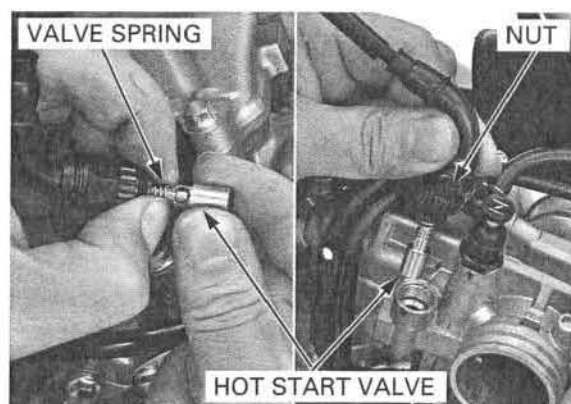


## CARBURETOR INSTALLATION

Install the valve spring over the starter cable and connect the cable end to the hot start valve.

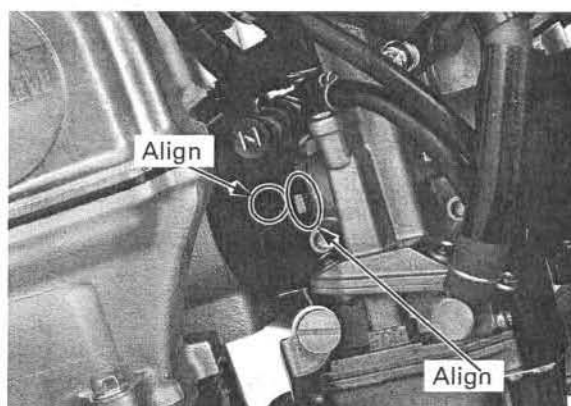
Install the hot start valve to the carburetor body, and tighten the nut to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

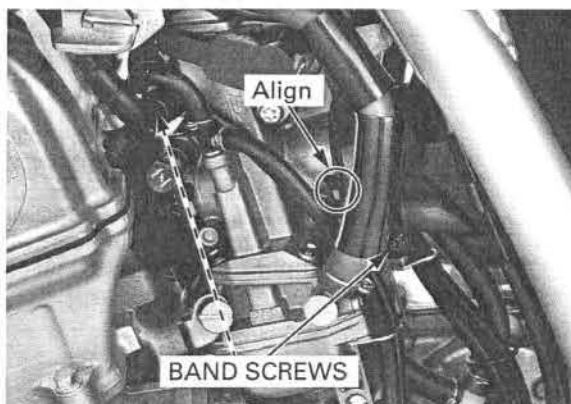


Align the insulator tab and the insulator band hole.

Install the carburetor to the insulator by aligning the lug on the carburetor with the groove of the insulator.



Set the connecting boot by aligning the lug on the carburetor with the groove of the connecting boot.



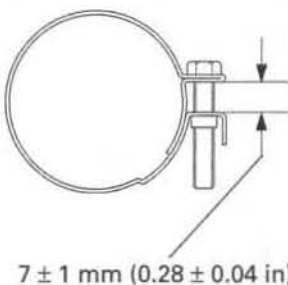


## FUEL SYSTEM

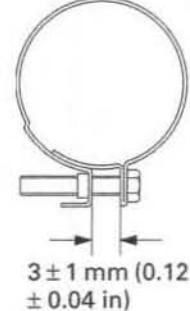
Tighten the carburetor insulator band screw (carburetor side) so the distance between the band ends is  $7.0 \pm 1.0$  mm ( $0.28 \pm 0.04$  in).

Tighten the connecting boot band screw so the distance between the band ends is  $3.0 \pm 1.0$  mm ( $0.12 \pm 0.04$  in).

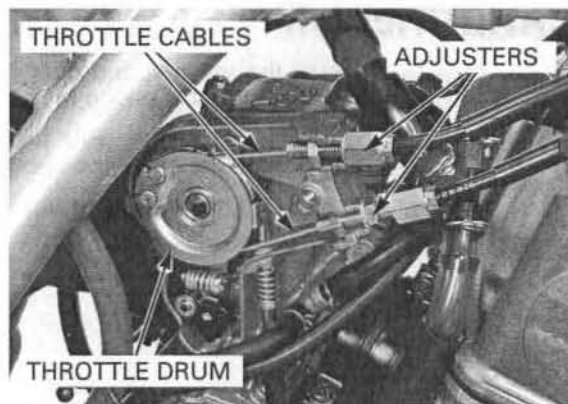
INSULATOR  
(CARBURETOR SIDE) :



CONNECTING  
BOOT BAND :



Connect the throttle cables to the throttle drum.  
Adjust the throttle cable (page 3-6).



Install the throttle drum cover and bolt.  
Tighten the bolt to the specified torque.  
**TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)**



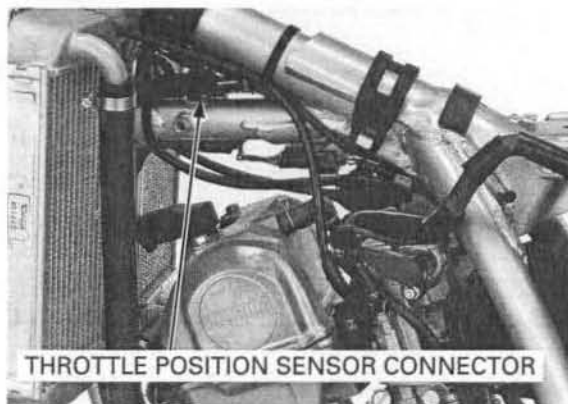
Connect the throttle position sensor connector.  
Perform the following inspections and adjustments:

- Throttle operation (page 3-6)
- Hot start lever (page 3-6)

Install the fuel tank (page 2-7).

After installation check the following:

- Secondary air leak around the insulator and connecting boot
- Fuel leaks around the fuel hose and carburetor
- Route the overflow hose, air vent hoses and fuel hose properly (page 1-18)
- Pilot screw (page 5-26)

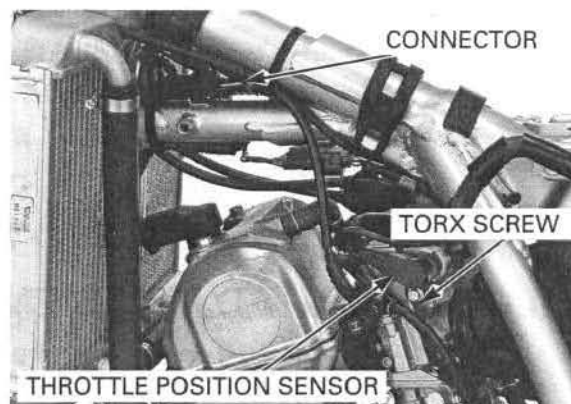


## THROTTLE POSITION SENSOR REPLACEMENT

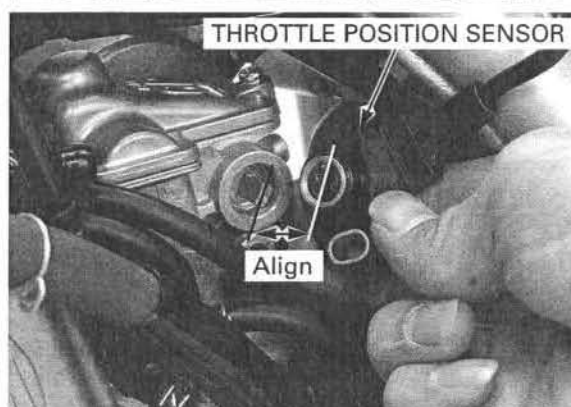
Remove the fuel tank (page 2-7).

Disconnect the throttle position sensor connector.

Remove the torx screw and throttle position sensor.



Install the throttle position sensor by aligning the tabs of the throttle position sensor with the flat side of the shaft as shown.



Apply locking agent to the torx screw threads and loosely install the torx screw.



Measure the resistance between the Blue and Black wire terminals of the sensor side connector.

**STANDARD:** 4 – 6 k $\Omega$  (20°C/68°F)

Calculate the throttle position sensor resistance at idle speed using the equation below.

$$A \times (0.13 - 0.15) = B$$

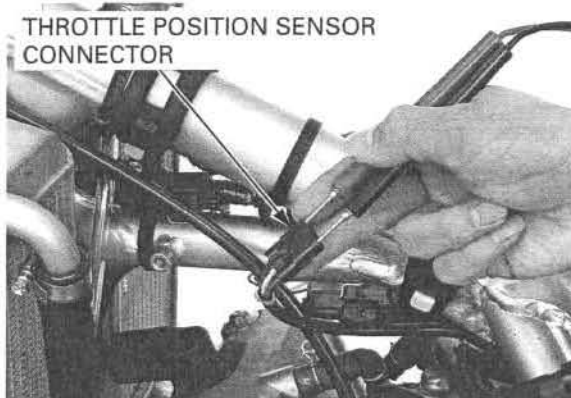
A: Blue and Black wire terminals resistance

B: Throttle position sensor (Yellow – Black) resistance with throttle closed.

(Example)

If the Blue and Black wire terminals resistance is 5k $\Omega$ , then the throttle position sensor (Yellow – Black) resistance at idle speed is:

$$5 \text{ k}\Omega \times (0.13 - 0.15) = 650 - 750 \Omega$$





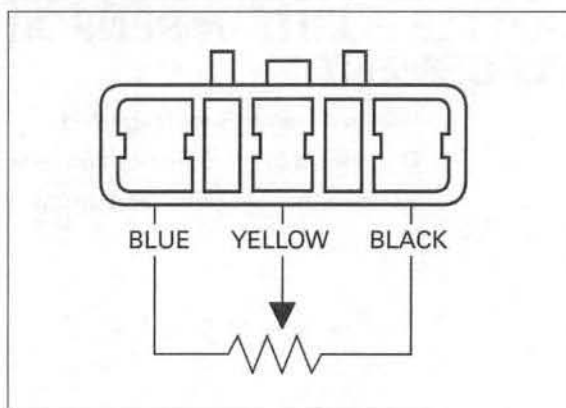
## FUEL SYSTEM

Adjust the throttle position sensor position so the resistance between the terminals (Yellow and Black) is as calculated, and tighten the torx screw to the specified torque.

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

Connect the throttle position sensor connector.

Install the removed parts in the reverse order of removal.



## PILOT SCREW ADJUSTMENT

The pilot screw is factory pre-set, if adjustment is necessary, refer to the turning information chart (page 5-10).

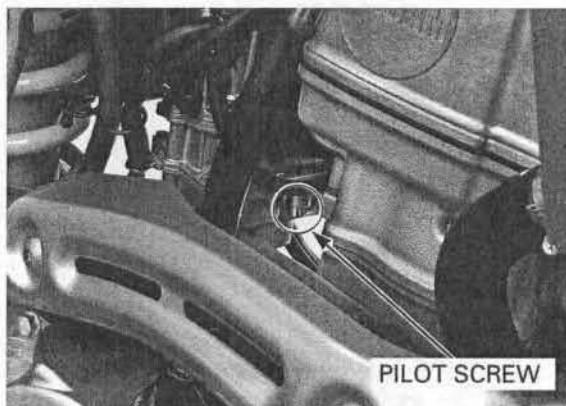
Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

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

1. Turn the pilot screw clockwise until it seats lightly, then back it out the specified number of turns.

**STANDARD OPENING: 2-1/4 turns out**

2. Warm up the engine to operating temperature. Ride the motorcycle for approximately 10 minutes.
3. Stop the engine and attach a tachometer according to its manufacturer's instruction.



4. Start the engine and adjust the engine idle speed to the specified rpm with the throttle stop screw.

**IDLE SPEED: 2,100 ± 100 rpm**

If your conditions are different, you may need to adjust the carburetor setting using the tuning information chart (page 5-10).





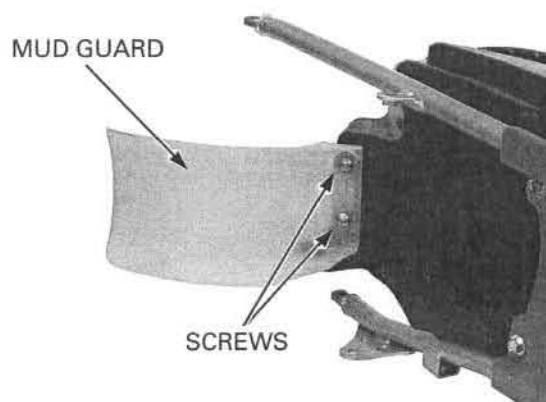
## AIR CLEANER HOUSING

### REMOVAL/ INSTALLATION

Remove the following:

- Sub-frame (page 2-5)
- Air cleaner element (page 3-7)

Remove the screws and mud guard.



Remove the rear fender bolts.

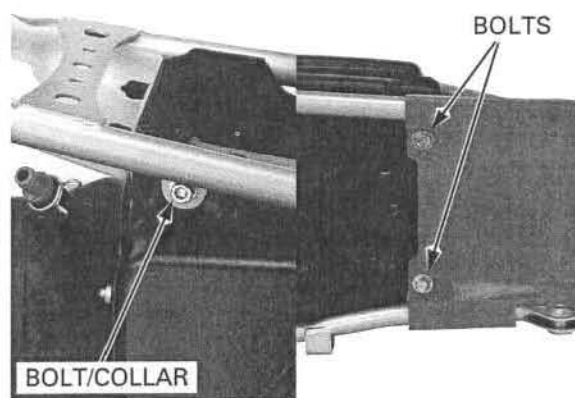
Remove the bolt, collar and air cleaner housing from the sub-frame.

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

Check the air cleaner housing for damage.

Remove the carburetor connecting boot from the air cleaner housing and seal thoroughly if any sign of inadequate sealing is detected.

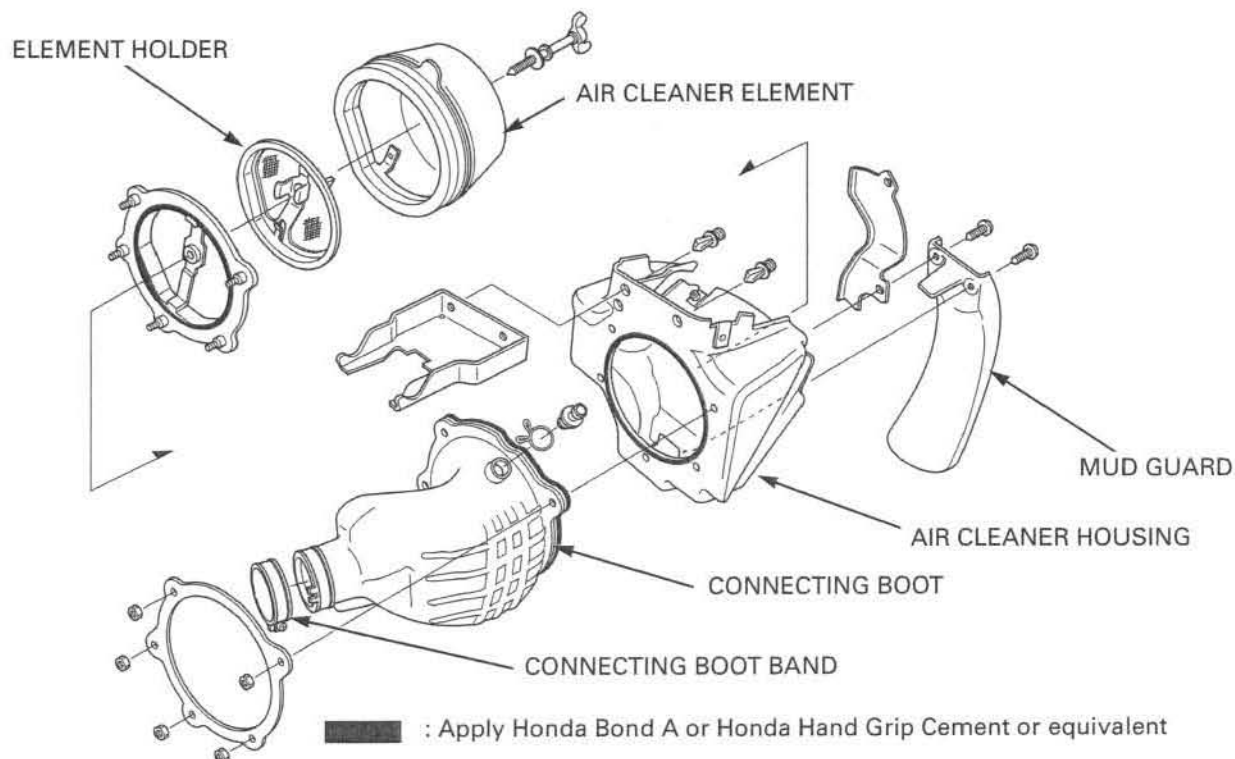
Install the removed parts in the reverse order of removal.



#### TORQUE:

Rear fender mounting bolt:

13 N·m (1.3 kgf·m, 10 lbf·ft)



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MEMO

## 6. COOLING SYSTEM

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SYSTEM FLOW PATTERN ..... 6-2

SERVICE INFORMATION ..... 6-3

TROUBLESHOOTING ..... 6-4

SYSTEM TESTING..... 6-5

COOLANT REPLACEMENT..... 6-6

RADIATOR ..... 6-7

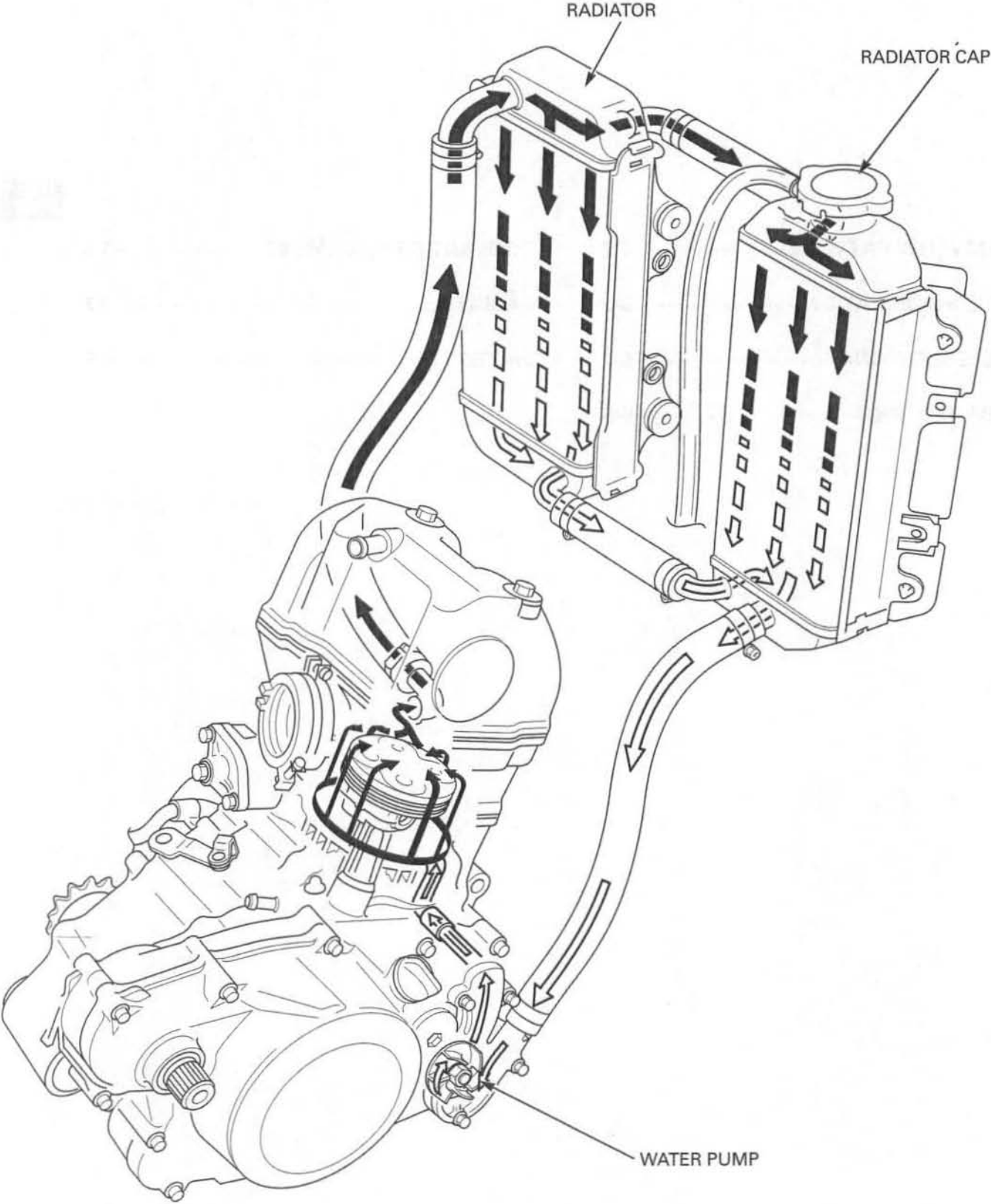
WATER PUMP ..... 6-9



COOLING SYSTEM

---

SYSTEM FLOW PATTERN



## SERVICE INFORMATION

### GENERAL

#### **⚠ WARNING**

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

#### **NOTICE**

*Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.*

- Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine installed in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Coolant capacity	0.76 liter (0.81 US qt, 0.67 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.
Standard coolant concentration	1 : 1 mixture with distilled water

### TORQUE VALUES

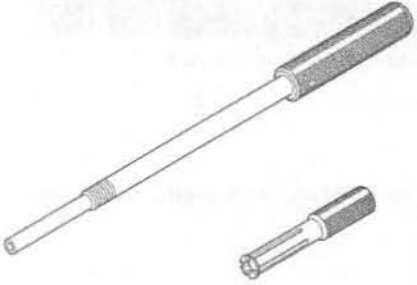
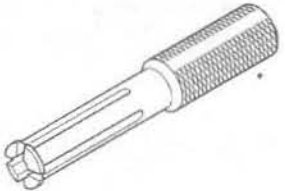
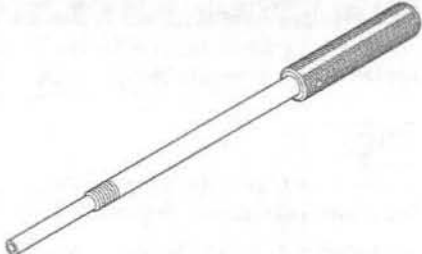
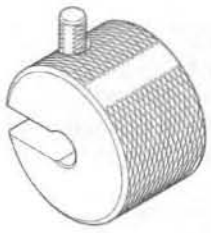
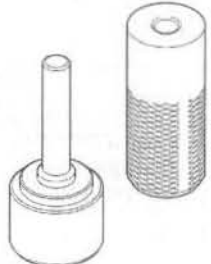
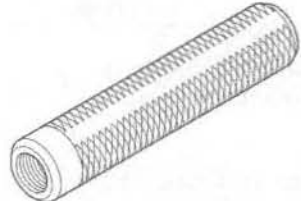
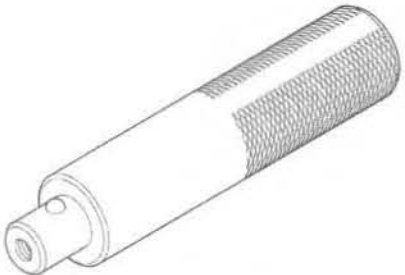


Water pump impeller

12 N·m (1.2 kgf·m, 9 lbf·ft)

Left hand threads

## COOLING SYSTEM

### TOOLS

<p>Bearing remover set, 12 mm 07936-1660101</p>  <p>not available in U.S.A.</p>	<p>Remover head, 12 mm 07936-1660110</p>  <p>07936-166010A (U.S.A. only)</p>	<p>Remover shaft 07936-1660120</p>  <p>not available in U.S.A.</p>
<p>Remover weight 07741-0010201</p>  <p>or 07936-3710200 or 07936-371020A (U.S.A. only)</p>	<p>Water seal driver 07945-KA30000 or</p>  <p>07965-415000A (U.S.A. only)</p>	<p>Remover handle 07936-3710100 (U.S.A. only)</p> 
<p>Driver 07749-0010000</p> 	<p>Attachment, 28 x 30 mm 07946-1870100</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

### Coolant leak

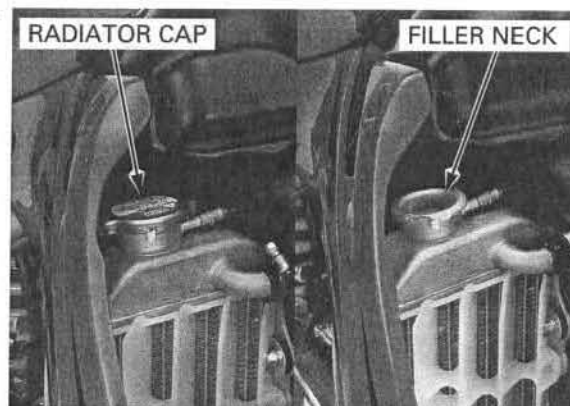
- Faulty water pump oil seal and water seal
- Deteriorated water pump oil and water seal
- Damaged or deteriorated O-ring
- Loose hose connection or clamp
- Damaged or deteriorated hose
- Faulty radiator cap
- Damaged radiator



## SYSTEM TESTING

### COOLANT (HYDROMETER TEST)

Make sure the engine is cool, remove the radiator cap.



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).

Look for contamination and replace the coolant if necessary.



### 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 right radiator shroud (page 2-4).

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:

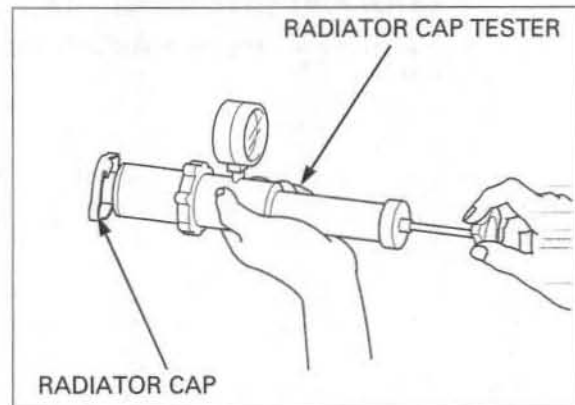
108 – 137 kPa (1.1 – 1.4 kgf/cm<sup>2</sup>, 16 – 20 psi)

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.



## COOLANT REPLACEMENT

### PREPARATION

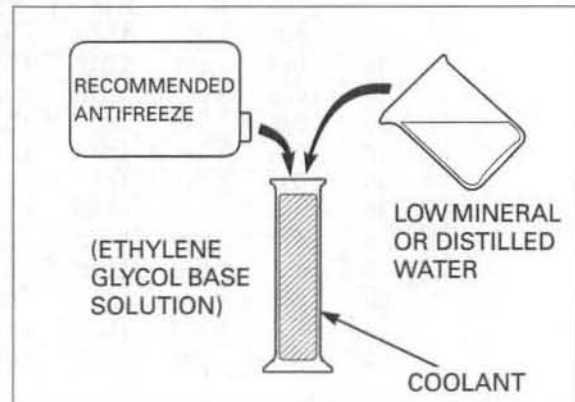
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance, change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

#### RECOMMENDED ANTIFREEZE:

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

#### RECOMMENDED MIXTURE:

1 : 1 (distilled water and recommended antifreeze)

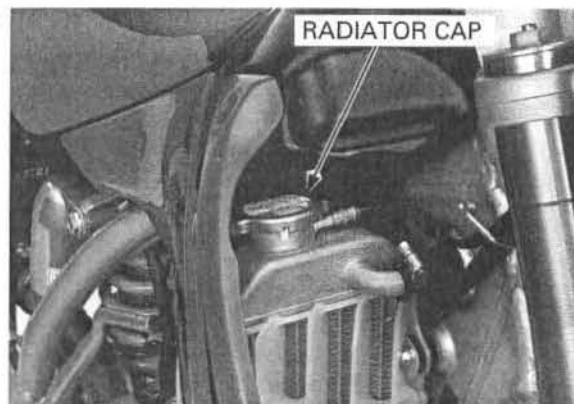


## REPLACEMENT/AIR BLEEDING

When filling the system, place the motorcycle in a vertical position on a flat, level surface.

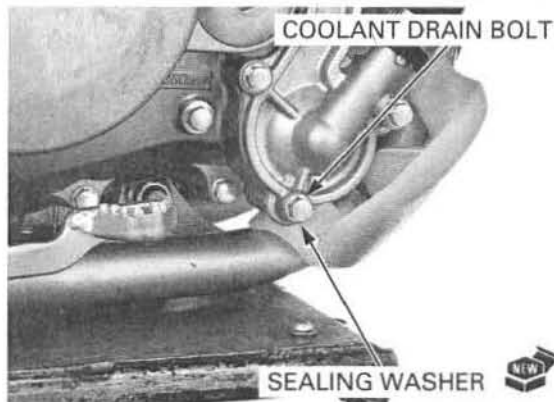
*The engine must be cool before removing the radiator cap, or severe scalding may result.*

Remove the radiator cap.



Drain the coolant from the system, removing the coolant drain bolt and sealing washer on the water pump cover.

Reinstall the drain bolt with a new sealing washer. Tighten the drain bolt securely.



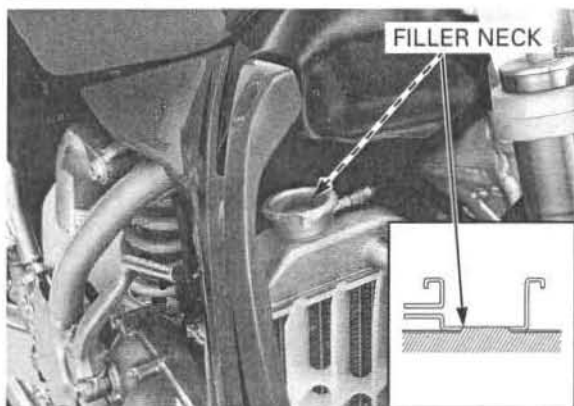
Fill the system with the recommended coolant through the filler opening up to the filler neck.

### CAPACITY:

**0.76 liter (0.81 US qt, 0.67 Imp qt)**

Lean the machine approximately 20° to the right and left 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.

Install the right engine guard (page 2-4).



## RADIATOR

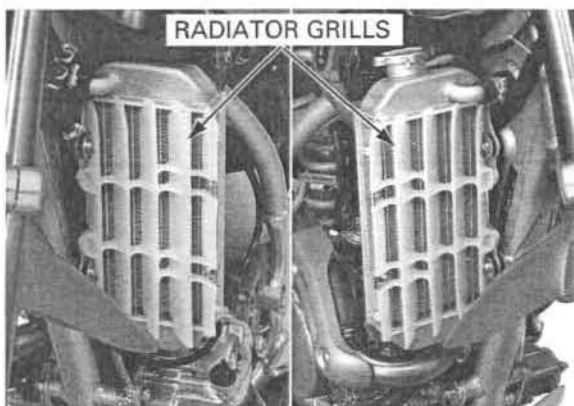
### REMOVAL

Drain the coolant (page 6-7).

Remove the radiator shrouds (page 2-4).

Remove the radiator grills.

*Be careful not to damage the radiator core.*



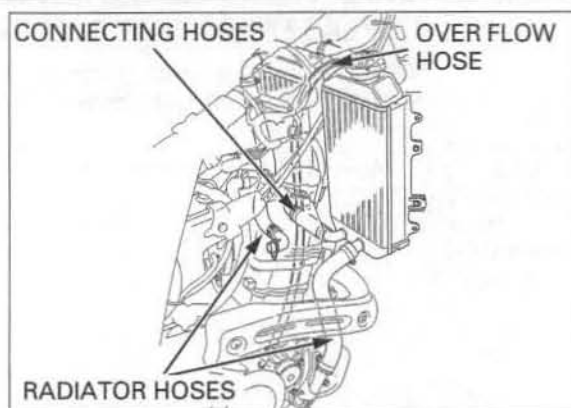


## COOLING SYSTEM

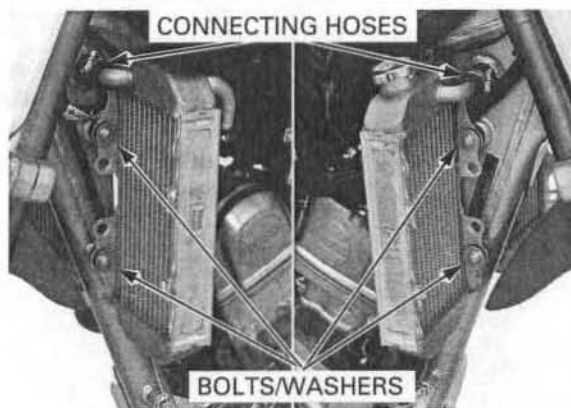
*Note the direction of the hose clamp. Be careful not to damage the radiator core.*

Disconnect the following:

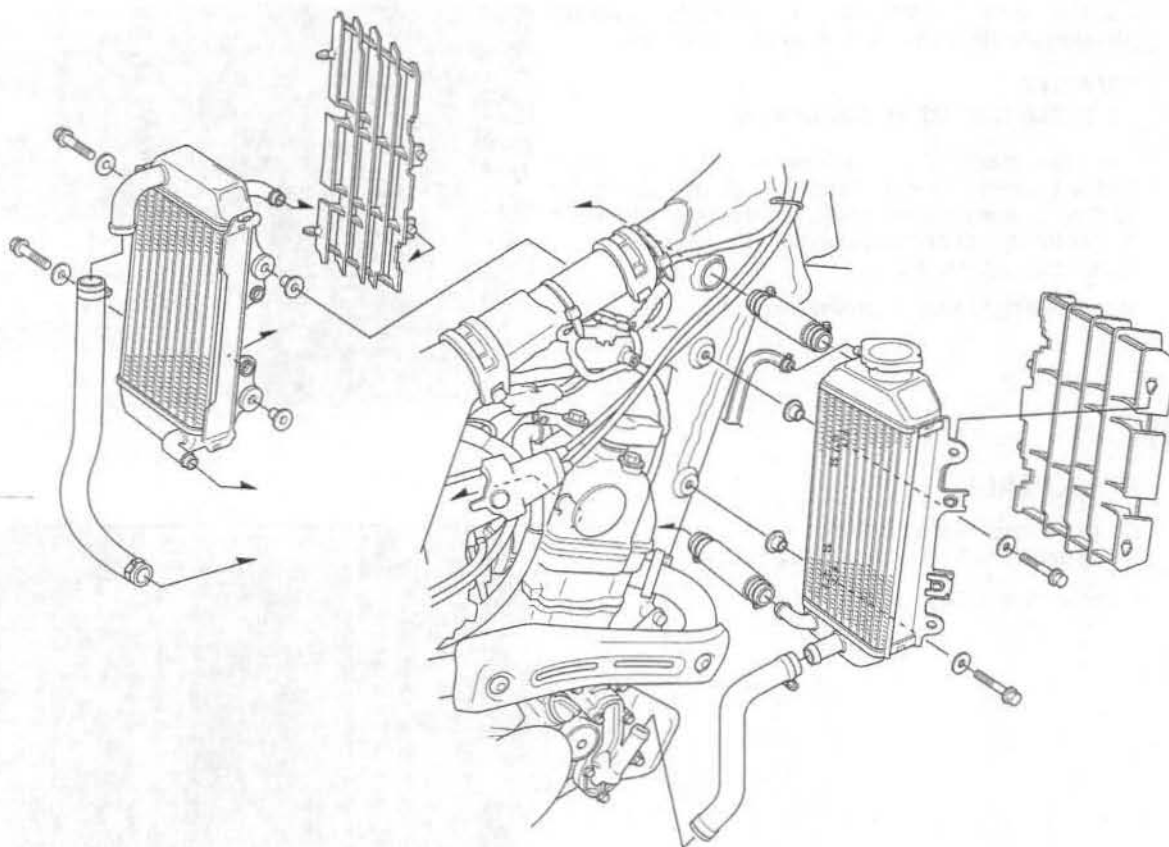
- Coolant overflow hose
- Connecting hoses
- Upper and lower radiator hoses



Remove the bolts/washers and disconnect the connecting hose, then remove the radiator.



## INSTALLATION



Connect the following:

- Coolant overflow hose
- Connecting hoses
- Upper and lower radiator hoses

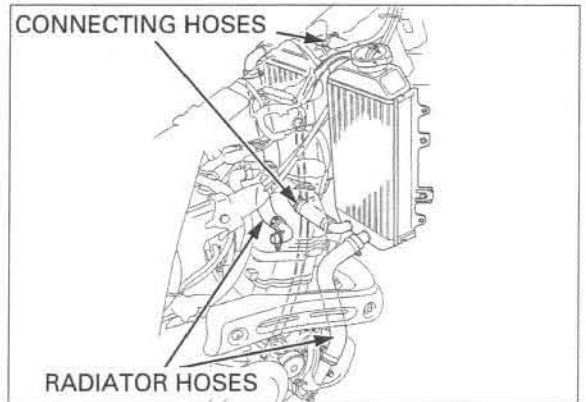
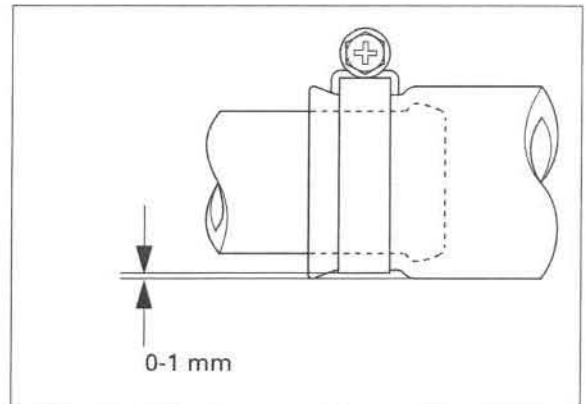
Tighten the radiator hose band screw.

*Be careful not to damage the radiator core.*

Installation is in the reverse order of removal.

Add the recommended coolant mixture to the filler neck and bleed the air (page 6-7).

After installation, check the radiator, radiator hoses and connecting hoses for leaks.



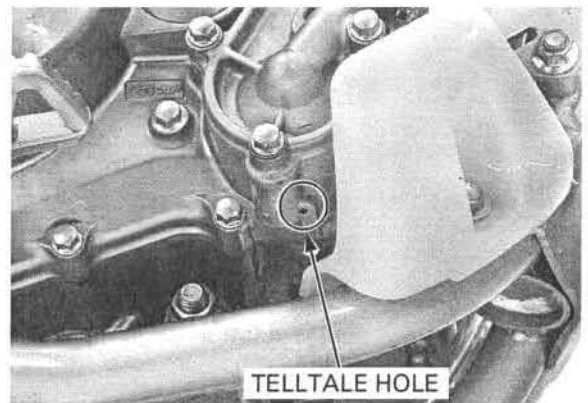
## WATER PUMP

### WATER SEAL INSPECTION

Inspect the telltale hole for signs of coolant leakage.

If water leaks through the telltale hole, replace the water seal (page 6-11).

If oil leaks through the telltale hole, replace the oil seal (page 6-11).

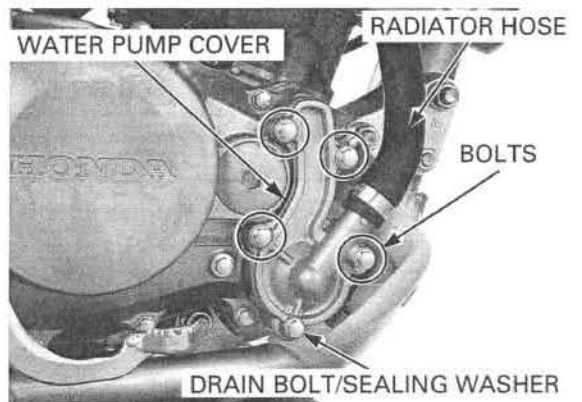


### REMOVAL

Drain the coolant (page 6-6).

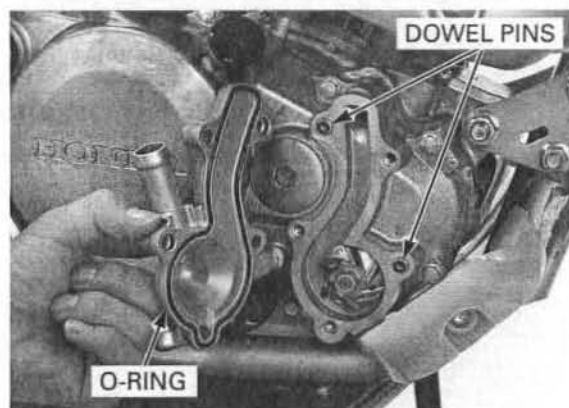
Remove the drain bolt, sealing washer and loosen the hose band screw and disconnect the radiator hose.

Remove the four bolts and water pump cover.



## COOLING SYSTEM

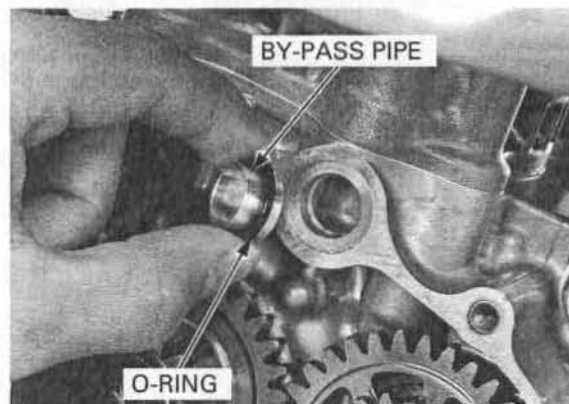
Remove the O-ring and dowel pins.



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

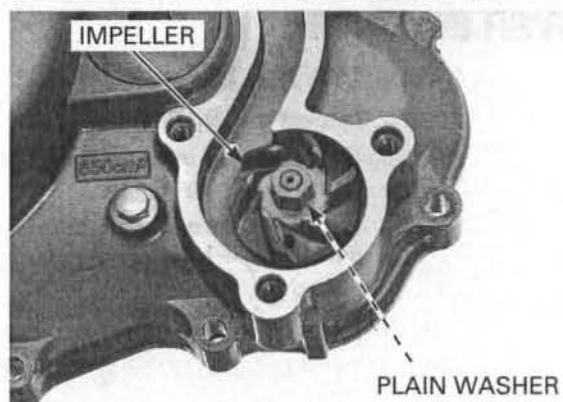
Remove the by-pass pipe and O-ring from the crankcase.

Check the by-pass pipe for wear or damage.

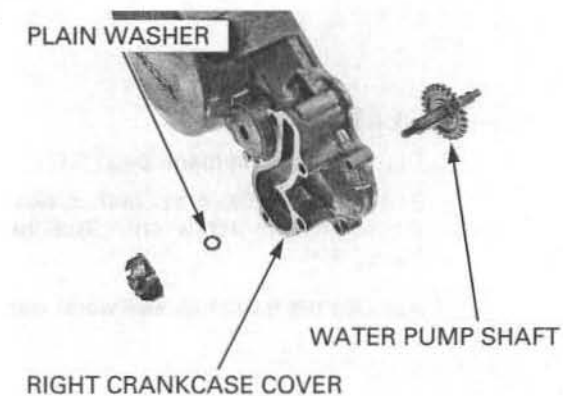


*The impeller has left hand threads.*

Remove the impeller and plain washer.



Remove the water pump shaft from the right crankcase cover.





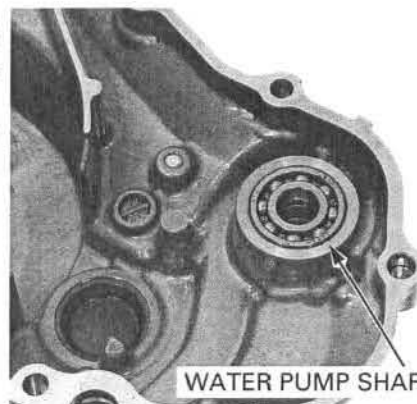
Check the water pump shaft for bend or damage.

WATER PUMP SHAFT



Turn the inner race of the water pump shaft bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the right crankcase cover.

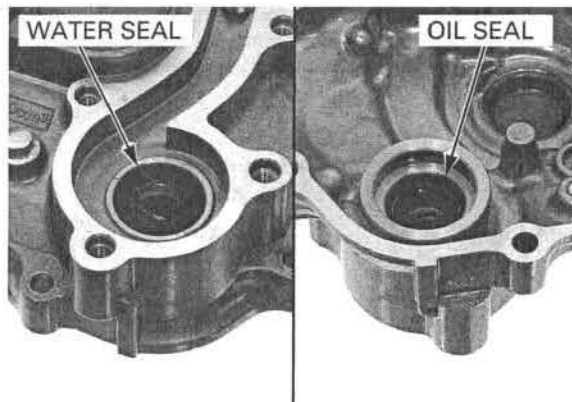
Replace the water pump shaft bearing if necessary (page 6-11).



WATER PUMP SHAFT BEARING

Check the water seal and oil seal for damage or deterioration.

Replace the water seal and oil seal if necessary (page 6-11).



## BEARING/WATER SEAL/OIL SEAL REPLACEMENT

Remove the water pump shaft bearing using the special tools.

### TOOLS:

Bearing remover set, 12 mm 07936-1660101

– Remover weight 07741-0010201

– Remover head, 12 mm 07936-1660110

– Remover shaft 07936-1660120

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

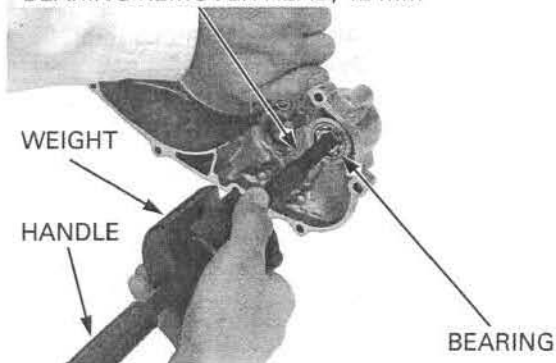
Bearing remover, 12 mm 07936-166010A

Remover handle 07936-3710100

Remover weight 07936-3710200 or

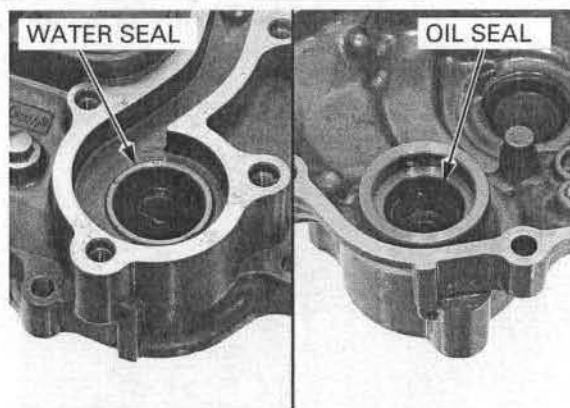
07936-371020A

BEARING REMOVER HEAD, 12 mm

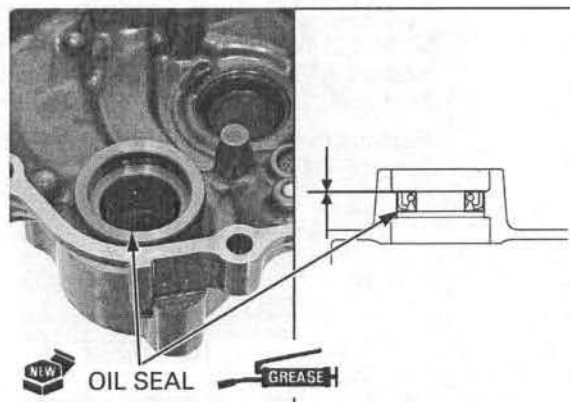


## COOLING SYSTEM

Remove the water seal and oil seal from the right crankcase cover.



Install a new oil seal into the right crankcase as shown.

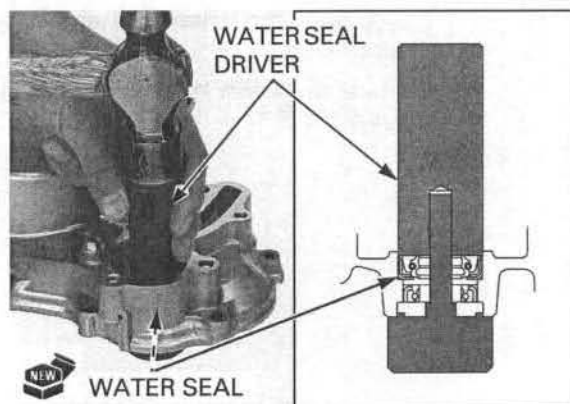


*Be careful not to damage the water seal lips.*

Install the water seal driver into the right crankcase cover as shown. Drive in a new water seal using the special tool as shown.

**TOOL:**  
**Water seal driver**

07945-KA30000 or  
07965-415000A  
(U.S.A. only)

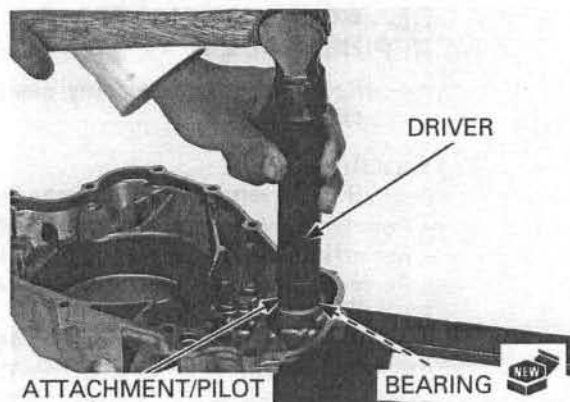


*Drive in a new bearing squarely with the marking side facing up.*

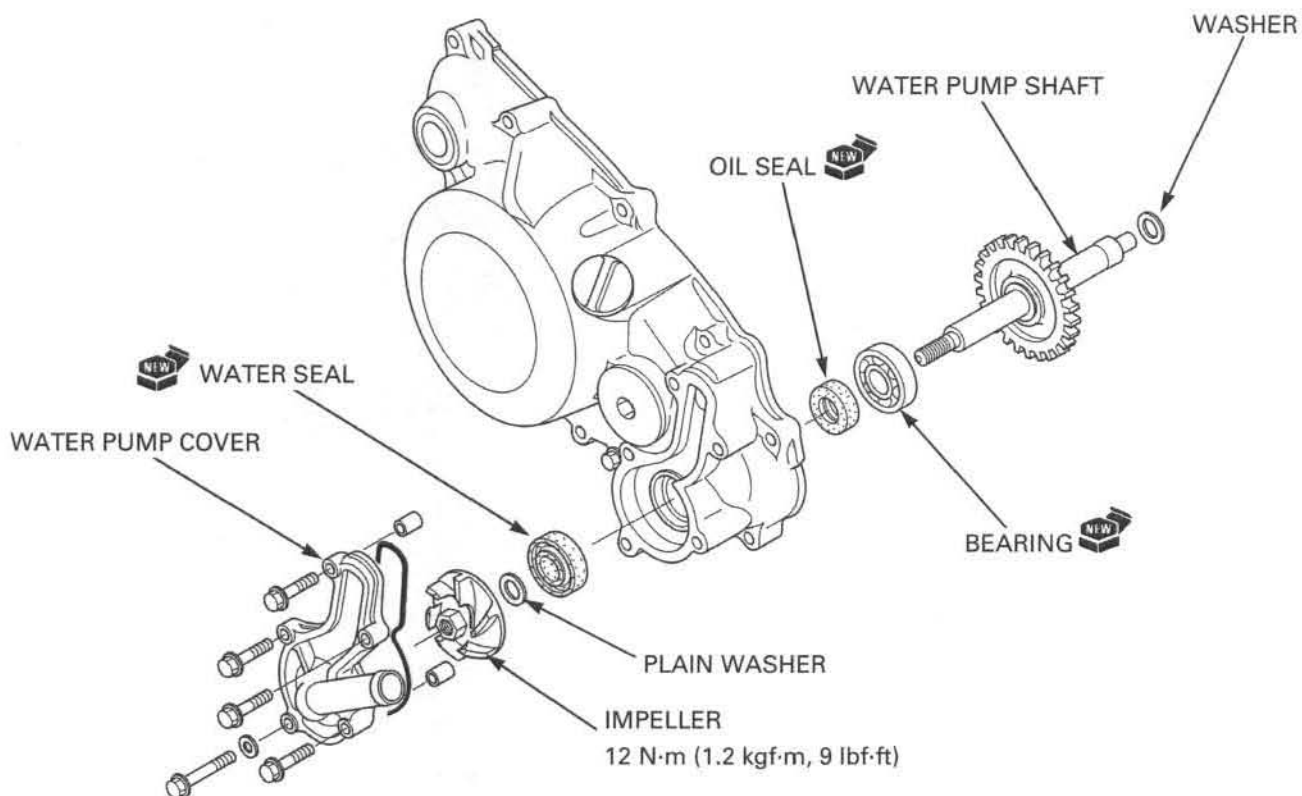
Drive in a new bearing into the right crankcase cover using the special tools as shown.

**TOOLS:**  
**Driver**  
**Attachment, 28 x 30 mm**  
**Pilot, 12mm**

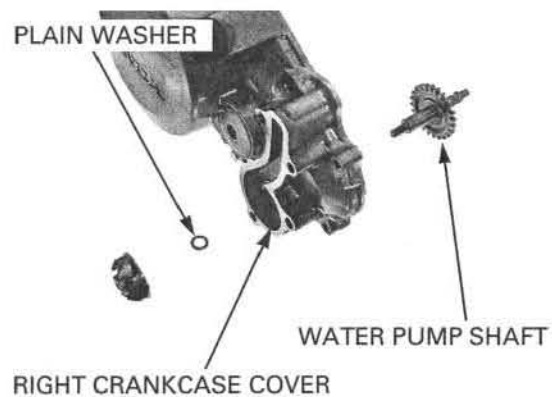
07749-0010000  
07946-1870100  
07746-0040200



## INSTALLATION



Install the water pump shaft into the right crankcase cover.

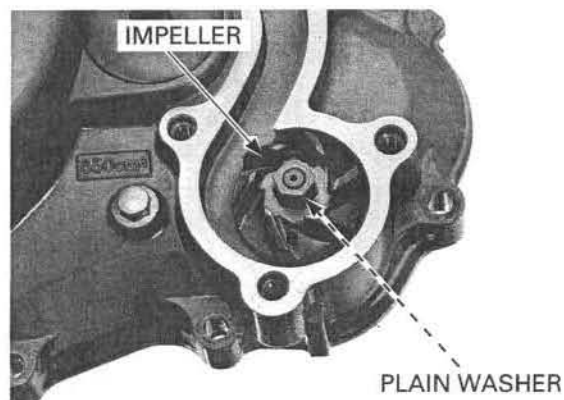


The impeller has left hand threads.

Install the plain washer and impeller onto the water pump shaft.

Make sure the water pump shaft thrust washer is on the crankcase.

Install the right crankcase cover (page 10-6).





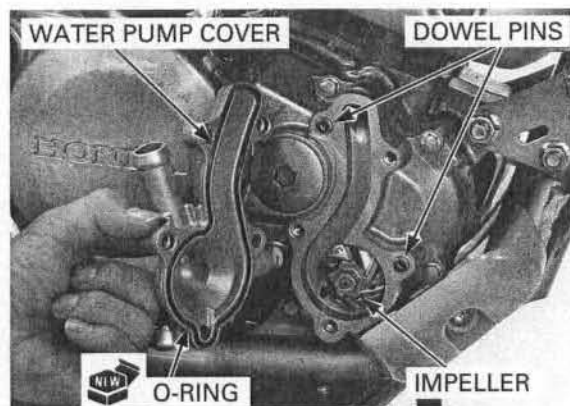
## COOLING SYSTEM

*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 a new O- ring onto the water pump cover.  
Install the dowel pins.



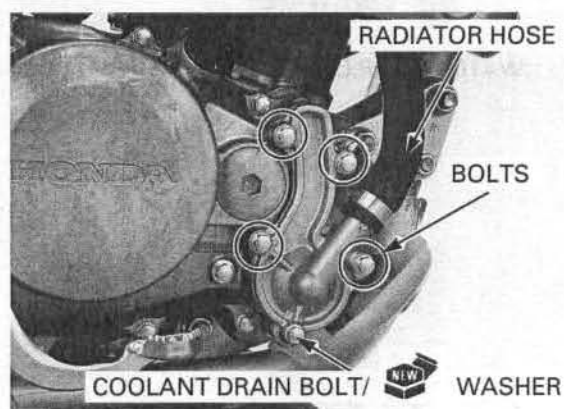
Install the water pump cover and tighten the four bolts securely.

Install the coolant drain bolt with a new sealing washer.

Tighten the coolant drain bolt securely.

Connect the radiator hose and tighten the band screw (page 6-9).

Add the recommended coolant mixture to the filler neck and bleed the air (page 6-7).



# 7. ENGINE REMOVAL/INSTALLATION

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COMPONENT LOCATION ..... 7-2

SERVICE INFORMATION ..... 7-3

ENGINE REMOVAL ..... 7-4

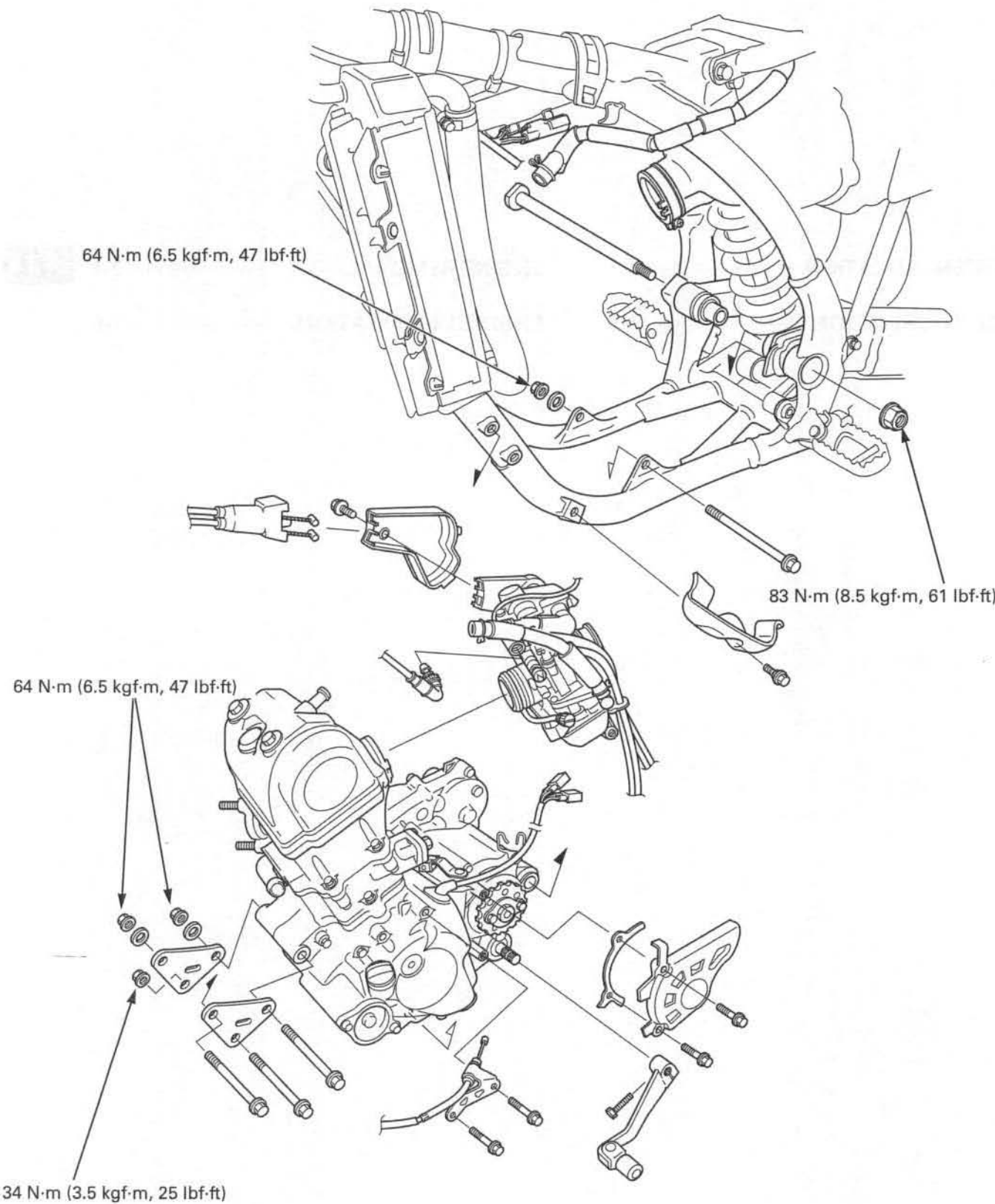
ENGINE INSTALLATION..... 7-5

**7**

**ENGINE REMOVAL/INSTALLATION**

---

**COMPONENT LOCATION**





## 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 11-10)/Crankshaft (page 11-14)/Transmission (page 11-11)
  - Oil pump (page 4-6)
- The following components can be serviced with the engine installed in the frame.
  - Cylinder head/valves (page 8-14)
  - Cylinder/piston (page 9-4)
  - Clutch (page 10-7)/Kickstarter (page 10-14)/Gearshift linkage (page 10-17)
  - Carburetor (page 5-11)
  - Flywheel (page 15-10)
  - Water pump (page 6-9)
  - Balancer (page 11-7)

### SPECIFICATION

ITEM		SPECIFICATIONS
Engine weight		20.2 kg (44.5lbs)
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Recommended transmission oil		Pro Honda HP trans oil, Pro Honda GN4 4-stroke oil (U.S.A and Canada) or an equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Engine oil capacity	At draining	0.56 liter (0.59 US qt, 0.49 Imp qt)
	At oil and filter change	0.59 liter (0.62 US qt, 0.52 Imp qt)
	At disassembly	0.70 liter (0.74 US qt, 0.62 Imp qt)
Transmission oil capacity	At draining	0.57 liter (0.61 US qt, 0.51 Imp qt)
	At disassembly	0.65 liter (0.69 US qt, 0.57 Imp qt)
Coolant capacity		0.76 liter (0.81 US qt, 0.67 Imp qt)

### TORQUE VALUES

Engine mounting nut	(front)	64 N·m (6.5 kgf·m, 47 lbf·ft)
	(lower)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Engine hanger plate bolt	(8 mm)	34 N·m (3.5 kgf·m, 25 lbf·ft)
	(10 mm)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Swingarm pivot nut		83 N·m (8.5 kgf·m, 61 lbf·ft)

### ENGINE REMOVAL

Drain the engine oil (page 3-13).  
Drain the transmission oil (page 3-16).  
Drain the coolant (page 6-7).

Remove the following:

- Engine guards (page 2-4)
- Fuel tank (page 2-7)
- Exhaust pipe (page 2-8)
- Carburetor (page 5-11)
- Direct ignition coil (page 3-8)

Disconnect the breather hose.

Disconnect the exciter coil 2P (Natural) and ignition pulse generator 2P (Black) connectors.

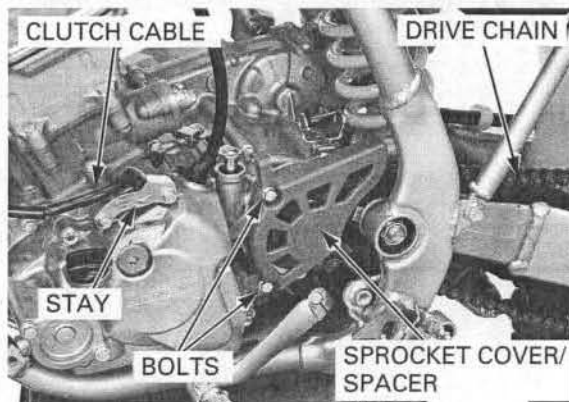
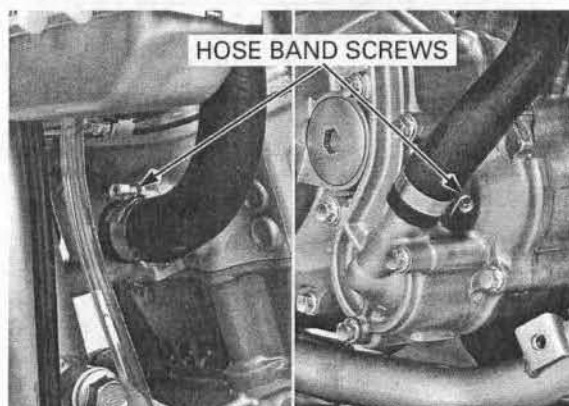
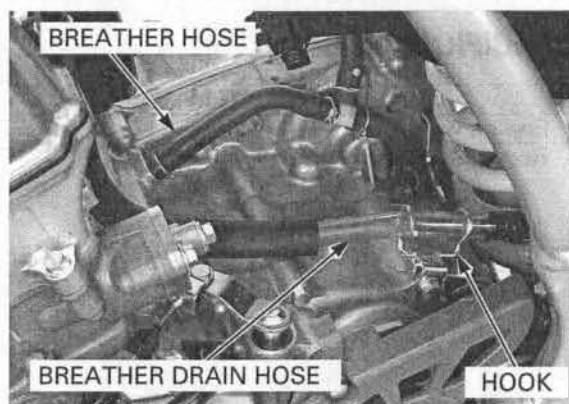
Remove the breather drain hose from the hook.

Remove the transmission breather hose from the engine.

Loosen the hose band screws and disconnect the radiator hoses.

Remove the bolts, drive sprocket cover and spacer.  
Remove the drive chain (page 3-17).

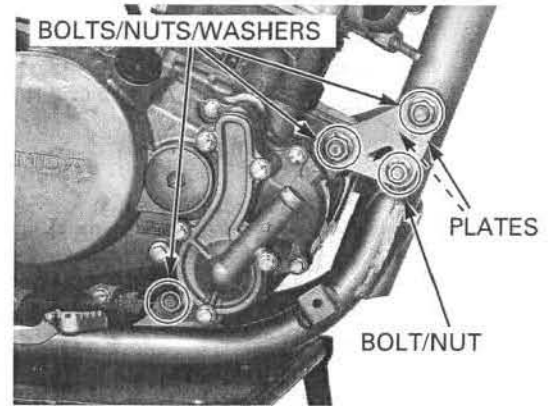
Remove the bolts and clutch cable stay.  
Disconnect the clutch cable from the lifter lever.





Loosen the parts as follow:

- Swingarm pivot nut
- Engine hanger mounting bolt/nuts
- Engine mounting bolt/washer/nuts

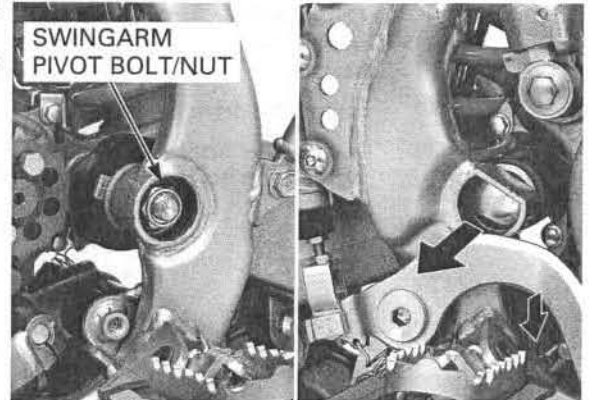


*Depress the brake pedal to remove the swingarm pivot bolt.*

Remove the swingarm pivot nut and draw out the swingarm pivot bolt.

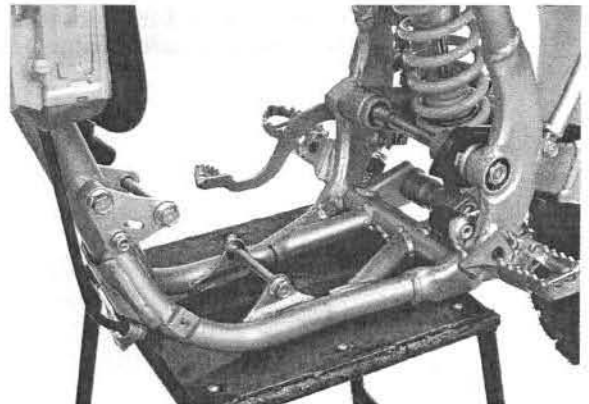
Remove the engine mounting nuts, bolts, washers and engine hanger plates.

Remove the engine from the left side of the frame.



Note the direction of the engine hanger plates and mounting bolts.

Temporarily install the swingarm pivot bolt so the chassis can be moved and stored safely.



## ENGINE INSTALLATION

*Before engine installation, tape the corners of the cylinder head cover to protect it from damage.*

Set the engine into the frame in the reverse order of removal.

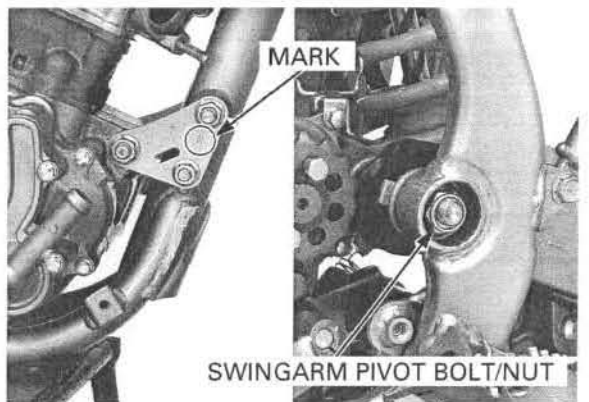
Loosely install the swingarm pivot bolt and nut.

Install the right engine hanger plate, which has "R" mark, with its mark facing out side.

Install the left engine hanger plate, which has "L" mark, with its mark facing out side.

Loosely install the parts as follow:

- Engine hanger plate
- Engine hanger mounting bolt/nuts
- Engine mounting bolt/washer/nuts





## ENGINE REMOVAL/INSTALLATION

Tighten each engine mounting nuts, engine hanger plate bolts and swingarm pivot nut to the specified torque.

### TORQUE:

#### Swingarm pivot nut:

83 N·m (8.5 kgf·m, 61 lbf·ft)

#### Engine mounting nut:

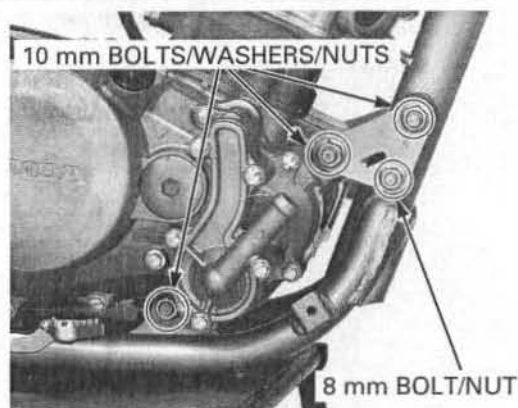
Front: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Lower: 64 N·m (6.5 kgf·m, 47 lbf·ft)

#### Engine hanger plate nut:

8 mm 34 N·m (3.5 kgf·m, 25 lbf·ft)

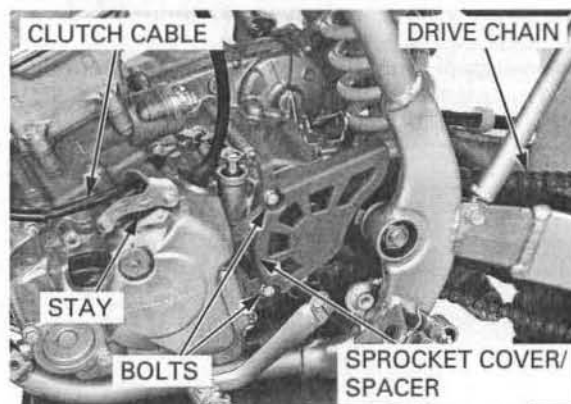
10 mm 64 N·m (6.5 kgf·m, 47 lbf·ft)



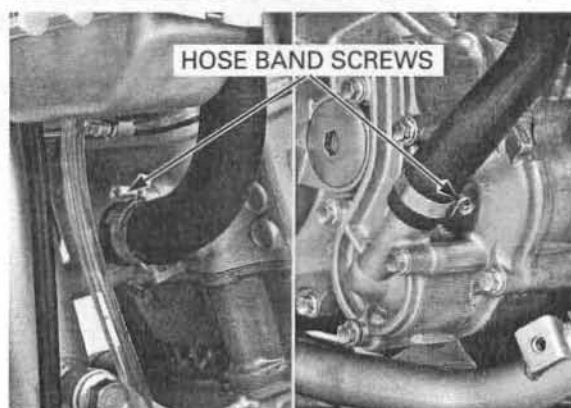
Connect the clutch cable to the clutch lifter lever. Install the clutch cable stay and tighten the bolts securely.

Install the drive chain (page 3-17).

Install the spacer and drive sprocket cover and tighten the bolts securely.

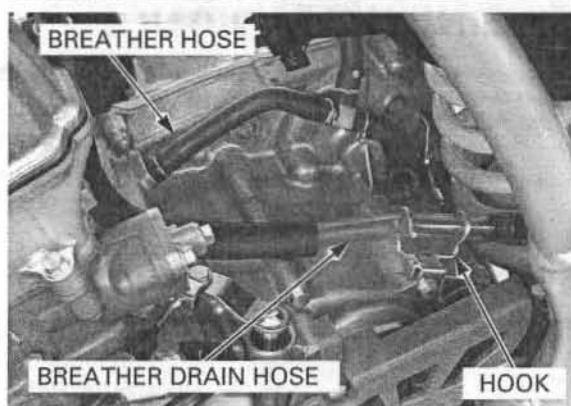


Connect the radiator hoses and tighten the hose band screws securely (page 6-9).



Set the breather drain hose into the hook.

Install the transmission breather hose to the engine.



*Route the wire harness properly (page 1-18).*

Connect the exciter coil 2P (Natural) and ignition pulse generator 2P (Black) connectors.

Connect the breather hose.

Install the following:

- Direct ignition coil (page 3-8)
- Carburetor (page 5-23)
- Exhaust pipe (page 2-9)
- Fuel tank (page 2-7)
- Engine guards (page 2-4)

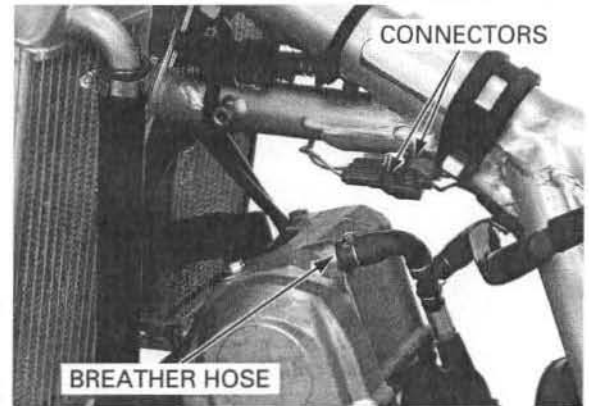
Add the recommended coolant mixture to the filler neck and bleed the air (page 6-7).

Fill the engine with the recommended oil (page 3-13).  
Fill the transmission with the recommended oil (page 3-16).

After installing the engine, perform the following inspections and adjustments:

- Throttle grip free play (page 3-6)
- Rear brake pedal height (page 3-23)
- Drive chain slack (page 3-19)
- Clutch lever free play (page 3-23)

Check the exhaust system for leaks.



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# MEMO

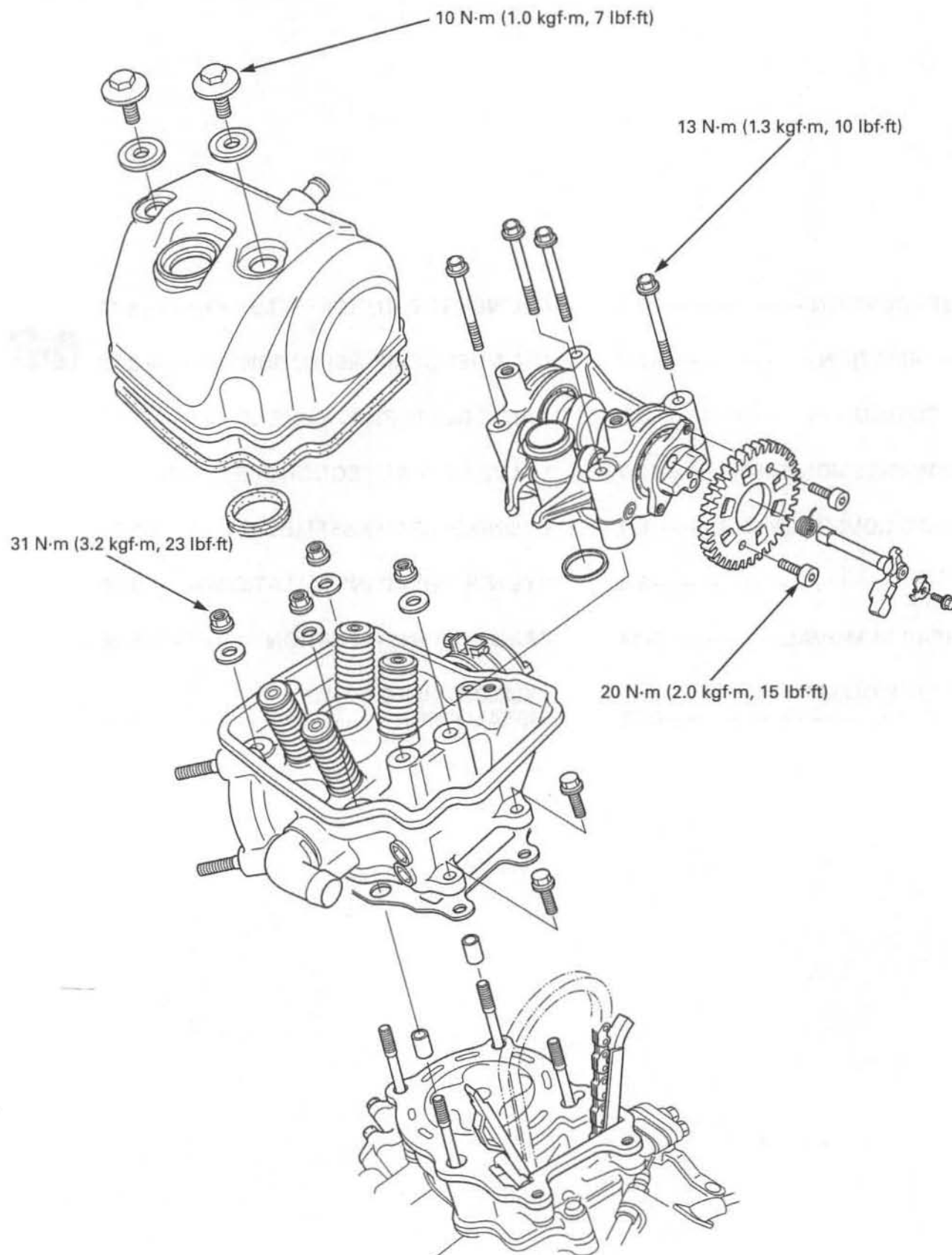


## 8. CYLINDER HEAD/VALVES

---

COMPONENT LOCATION .....	8-2	CYLINDER HEAD DISASSEMBLY .....	8-16
SERVICE INFORMATION .....	8-3	CYLINDER HEAD INSPECTION .....	8-17
TROUBLESHOOTING .....	8-6	VALVE GUIDE REPLACEMENT .....	8-19
CYLINDER COMPRESSION TEST .....	8-7	VALVE SEAT INSPECTION/REFACING ..	8-20
CYLINDER HEAD COVER REMOVAL .....	8-7	CYLINDER HEAD ASSEMBLY .....	8-23
CAMSHAFT .....	8-8	CYLINDER HEAD INSTALLATION .....	8-25
CYLINDER HEAD REMOVAL .....	8-14	CAMSHAFT INSTALLATION .....	8-26
CAM CHAIN TENSIONER/ CAM CHAIN GUIDE .....	8-15	CYLINDER HEAD COVER INSTALLATION .....	8-29

## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers service of the camshaft, cylinder head and valves. 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. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			500 kPa (5.1 kgf/cm <sup>2</sup> , 73 psi) at 600 rpm	—
Cylinder head warpage			—	0.05 (0.002)
Valve and valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.26 ± 0.03 (0.010 ± 0.001)	—
	Valve stem O.D.	IN	4.470 – 4.495 (0.1760 – 0.1770)	4.46 (0.176)
		EX	4.460 – 4.485 (0.1756 – 0.1766)	4.45 (0.175)
	Valve guide I.D.	IN/EX	4.500 – 4.512 (0.1772 – 0.1776)	4.552 (0.1792)
	Stem-to-guide clear- ance	IN	0.005 – 0.042 (0.0002 – 0.0016)	—
		EX	0.015 – 0.052 (0.0006 – 0.0020)	—
	Valve guide projection above cylinder head	IN	14.4 – 14.6 (0.56 – 0.57)	—
		EX	19.8– 20.0 (0.78 – 0.79)	—
Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.7 (0.07)	
Valve spring free length		IN	38.16 (1.502)	37.4 (1.47)
		EX	44.88 (1.767)	44.0 (1.73)
Rocker arm	Rocker arm I.D.		10.000 – 10.015 (0.3937 – 0.3943)	10.07 (0.396)
	Rocker arm shaft O.D.		9.977 – 9.985 (0.3928 – 0.3931)	9.93 (0.391)
	Rocker arm-to-shaft clearance		0.015 – 0.038 (0.0006 – 0.0015)	0.11 (0.004)
Camshaft	Cam lobe height	IN	34.160 – 34.200 (1.3449 – 1.3465)	33.98 (1.338)
		EX	29.820 – 29.860 (1.1740 – 1.1756)	29.68 (1.169)
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)

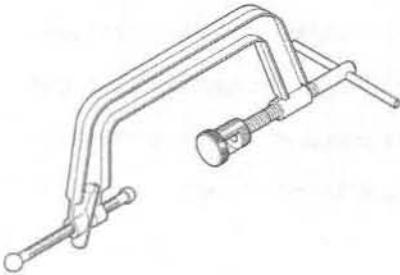

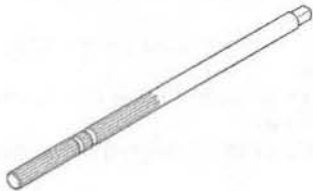
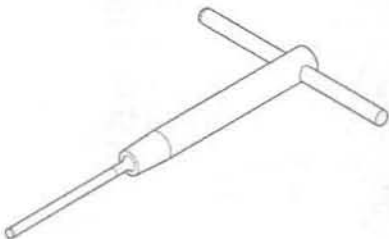








### TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	Apply oil to the threads
Cam sprocket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads
Cylinder head nut	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply oil to the seating surface
Cam chain tensioner bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	



# CYLINDER HEAD/VALVES

## TOOLS

<p>Valve spring compressor 07757-0010000</p> 	<p>Valve spring compressor attachment 07JME-KY20100</p> 	<p>Valve guide reamer, 4.508 mm 07HMH-ML00101</p>  <p>or 07HMH-ML0010B (U.S.A. only)</p>
<p>Cutter holder, 4.5 mm 07781-0010600</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Valve guide driver, 4.3 mm 07HMD-ML00101</p> 	<p>Valve guide driver 07743-0020000</p>  <p>not available in U.S.A.</p>
<p>Flat cutter, 27 mm (32°, IN) 07780-0013300</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Flat cutter, 24 mm (32°, EX) 07780-0012000</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Valve seat cutter, 27.5 mm (45°, IN) 07780-0010200</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Valve seat cutter, 24 mm (45°, EX) 07780-0010600</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Interior cutter, 26 mm (60°, IN) 07780-0014500</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Interior cutter, 22 mm (60°, EX) 07780-0014202</p>  <p>or equivalent commercially available in U.S.A.</p>

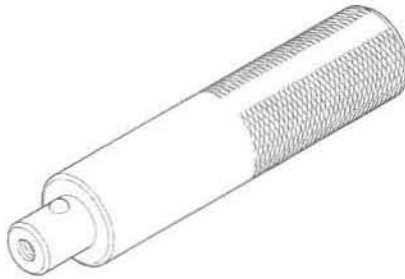
## CYLINDER HEAD/VALVES

Tensioner stopper  
070MG-0010100



or 07AMG-001A100 (U.S.A. only)

Driver  
07749-0010000



Pilot, 20 mm  
07746-0040500



Attachment, 32 x 35 mm  
07746-0010100



### 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 a seized piston ring.

#### **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

#### **Compression too high**

- Excessive carbon build-up in cylinder head or piston rings on top of piston
- Faulty decompressor cam

#### **Excessive smoke**

- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder, piston or piston rings

#### **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

#### **Rough idle**

- Low cylinder compression



## CYLINDER COMPRESSION TEST

Warm up the engine.  
Stop the engine and remove the spark plug  
(page 3-8).  
Connect a compression gauge.

Open the throttle fully.

Operate the kickstarter pedal forcefully several times until the gauge needle stops moving.

**COMPRESSION:** 500 kPa (5.1 kg/cm<sup>2</sup>, 73 psi)  
at 600 rpm

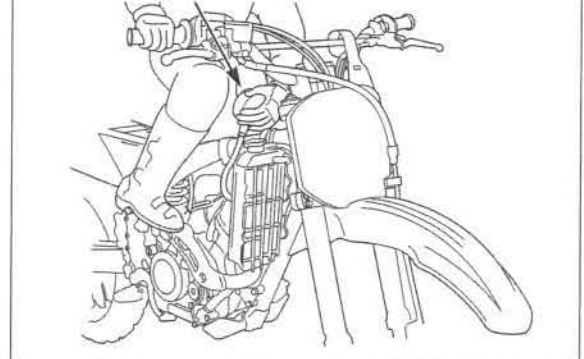
**Low compression can be caused by:**

- Improper valve adjustment
- Valve leakage
- Blown cylinder head gasket
- Worn piston ring or cylinder (page 9-5)

**High compression can be caused by:**

- Carbon deposits in combustion chamber or on piston head
- Faulty decompressor cam

COMPRESSION GAUGE

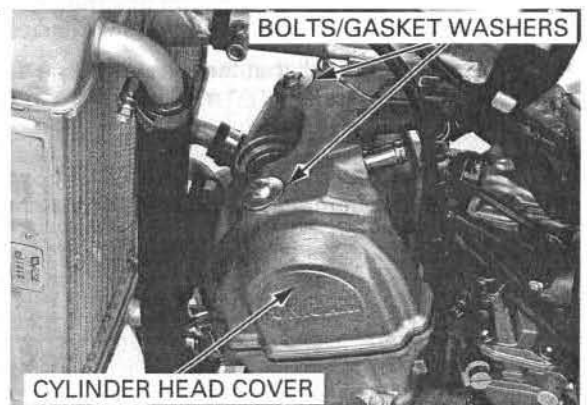


## CYLINDER HEAD COVER REMOVAL

Remove the following:

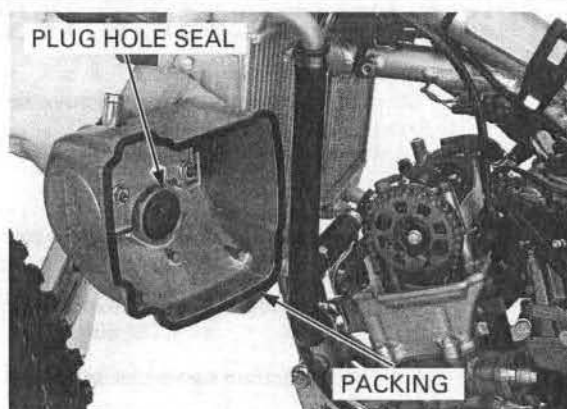
- Fuel tank (page 2-7)
- Direct ignition coil (page 3-8)
- Breather hose

Remove the bolts, gasket washers and cylinder head cover.



## CYLINDER HEAD/VALVES

Remove the plug hole seal and packing.

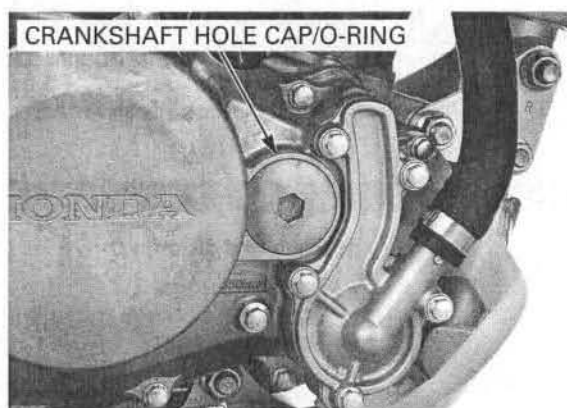


## CAMSHAFT

### REMOVAL

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

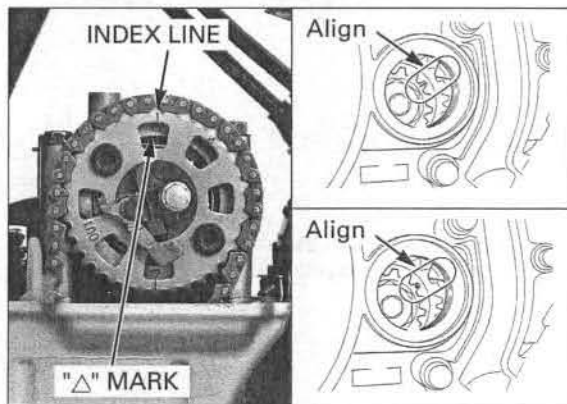
Remove the crankshaft hole cap and O-ring.



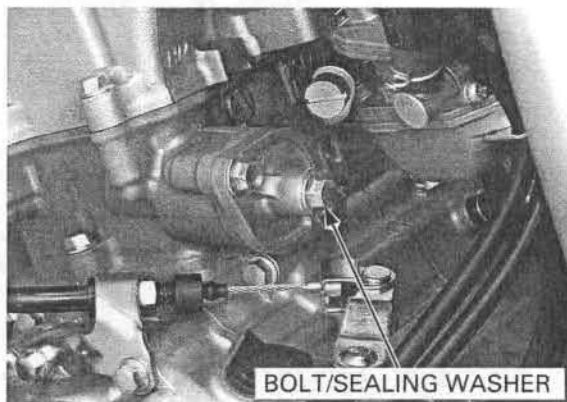
Turn the crankshaft clockwise to align the punch mark (or index line) on the primary drive gear with the index mark on the right crankcase cover. Make sure the piston is at T.D.C. (Top Dead Center) on the compression stroke.

This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft clockwise one full turn and align the punch mark on the primary drive gear with index mark on the right crankcase cover again.

Check that the index lines on the cam sprocket align with the "△" marks on the camshaft holder.



Remove the cam chain tensioner lifter bolt and sealing washer.



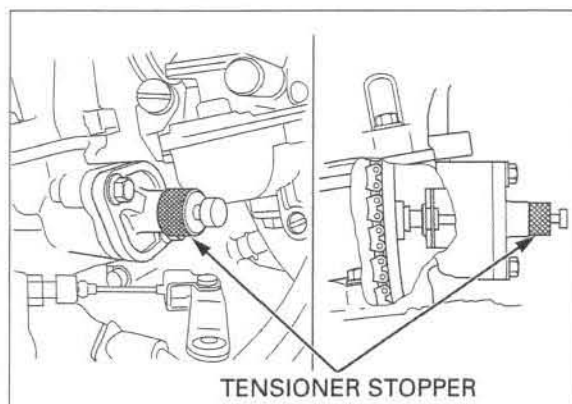


Turn the cam chain tensioner lifter shaft clockwise fully and secure it with the special tool.

**TOOL:**

**Tensioner stopper**

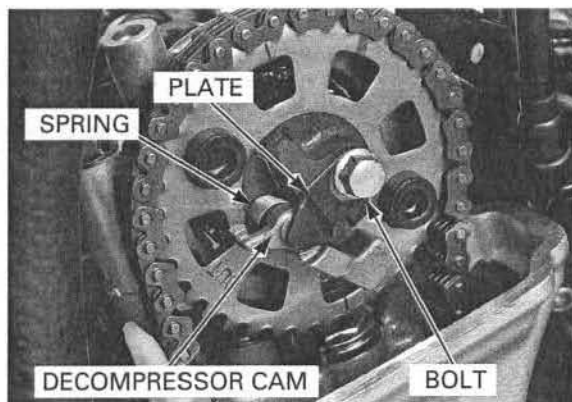
**070MG-0010100 or  
07AMG-001A100  
(U.S.A. only)**



*Be careful not to  
drop the bolt and  
plate into the  
crankcase*

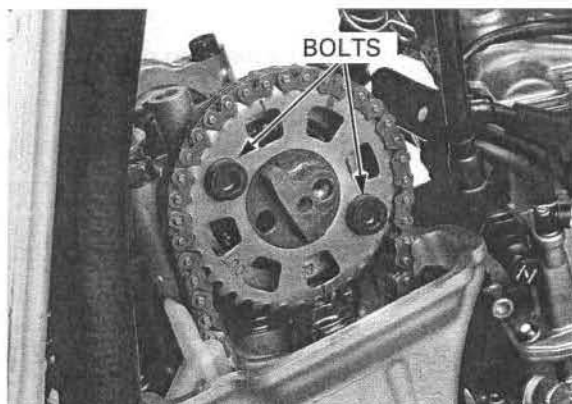
Remove the decompressor shaft stopper bolt, plate and decompressor cam assembly.

Check the decompressor assembly for wear or damage.  
Check the balancer weight and spring for damage or fatigue.



Remove the cam sprocket bolts.

Remove the cam sprocket from the camshaft, and suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.

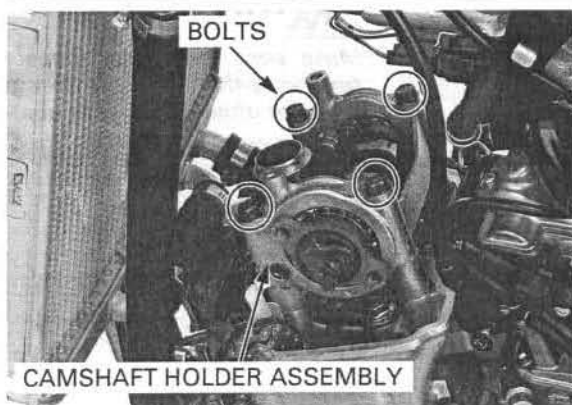


Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

Loosen the camshaft holder mounting bolts in a crisscross pattern in two or three steps.

Remove the camshaft holder assembly.

- Valve lifters are installed into the camshaft holder assembly.
- The shims may stick to the inside of the valve lifters. Do not allow the shims to fall into the crankcase.



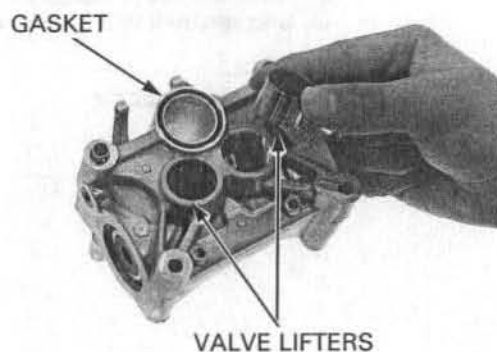


## CYLINDER HEAD/VALVES

Be sure to mark the valve lifters so they can be installed in their original positions.

Remove the valve lifters from the camshaft holder.

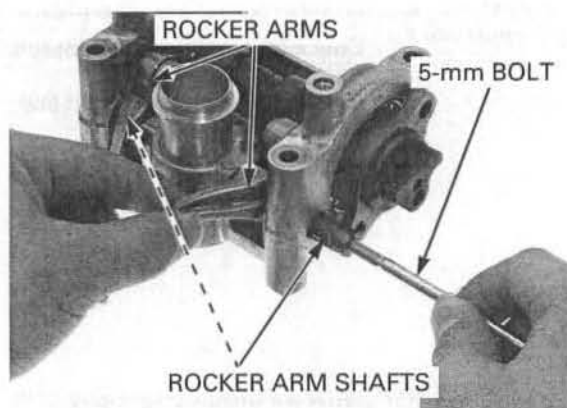
Remove the plug hole gasket.



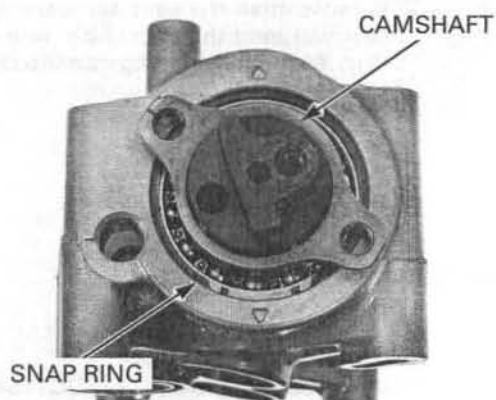
### DISASSEMBLY

Thread a 5-mm bolt into the rocker arm shaft and pull the rocker arm shafts out of the camshaft holder.

Remove the rocker arms from the camshaft holder.



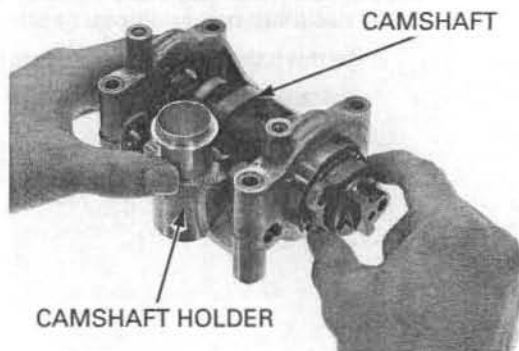
Remove the snap ring.



### NOTICE

Make sure the intake lobes are facing up when removing the camshaft from the holder to prevent damaging the intake lifter bores.

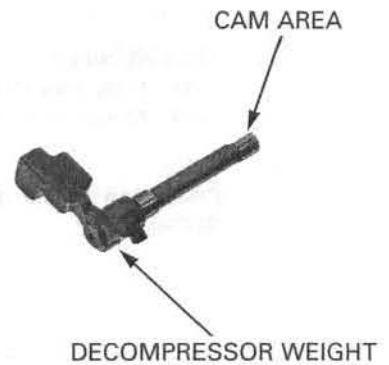
Remove the camshaft from the camshaft holder.



**INSPECTION**

Check the decompressor weight for bend or damage.

Check the decompressor weight cam area for wear or damage.

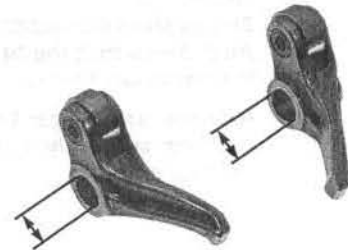


*If the camshaft contact surface of the rocker arm is damaged or abnormally worn, check the cam lobes for damage (page 8-12).*

Inspect the camshaft contact surface of the rocker arm for wear or damage.

Measure the rocker arm I.D.

**SERVICE LIMIT: 10.07 mm (0.396 in)**



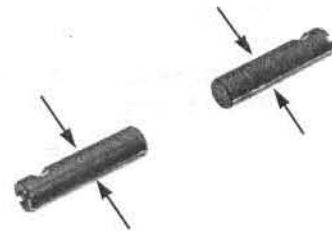
Inspect the rocker arm shaft for wear or damage.

Measure the rocker arm shaft O.D.

**SERVICE LIMIT: 9.93 mm (0.391 in)**

Calculate the rocker arm-to-shaft clearance.

**SERVICE LIMIT: 0.11 mm (0.004 in)**



Turn the outer race of the camshaft bearing with your finger.

The bearing should turn smoothly and quietly. Also check that the bearing inner races fit tightly in the camshaft.

Replace the camshaft if the bearing does not turn smoothly, quietly, or if it fits loosely on the camshaft.



## CYLINDER HEAD/VALVES

Check the cam lobe surfaces for scoring or evidence of insufficient lubricant.

Measure the height of each cam lobe.

### SERVICE LIMITS:

IN: 33.98 mm (1.338 in)

EX: 29.68 mm (1.169 in)

### NOTE:

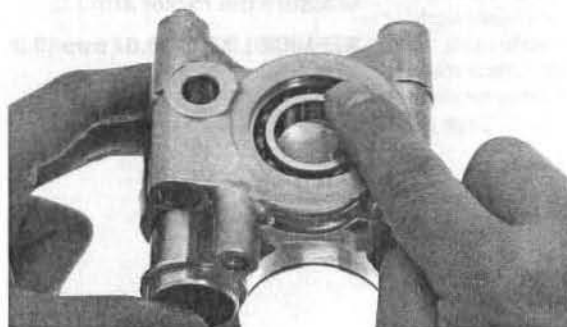
Check the rocker arm if the cam lobe is worn or damaged.



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

The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the camshaft holder.

Remove and discard the bearings if the race does not turn smoothly, quietly, or if it fits loosely in the camshaft holder.



Apply grease to a new bearing.

Install a new bearing into the cam shaft holder using the special tools.

### TOOLS:

Driver

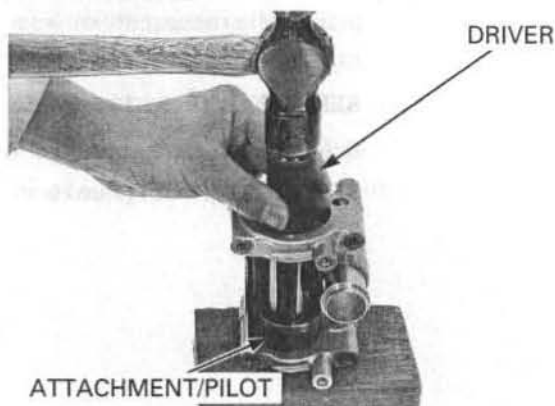
07749-0010000

Attachment, 32 x 35 mm

07746-0010100

Pilot, 20 mm

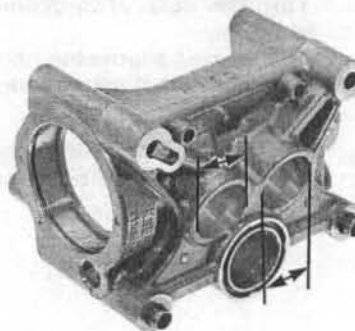
07746-0040500



Check the valve lifter bore for scoring, scratches or damage.

Measure the each valve lifter bore I.D.

**SERVICE LIMIT: 22.54 mm (0.887 in)**

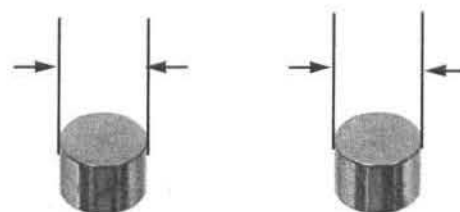




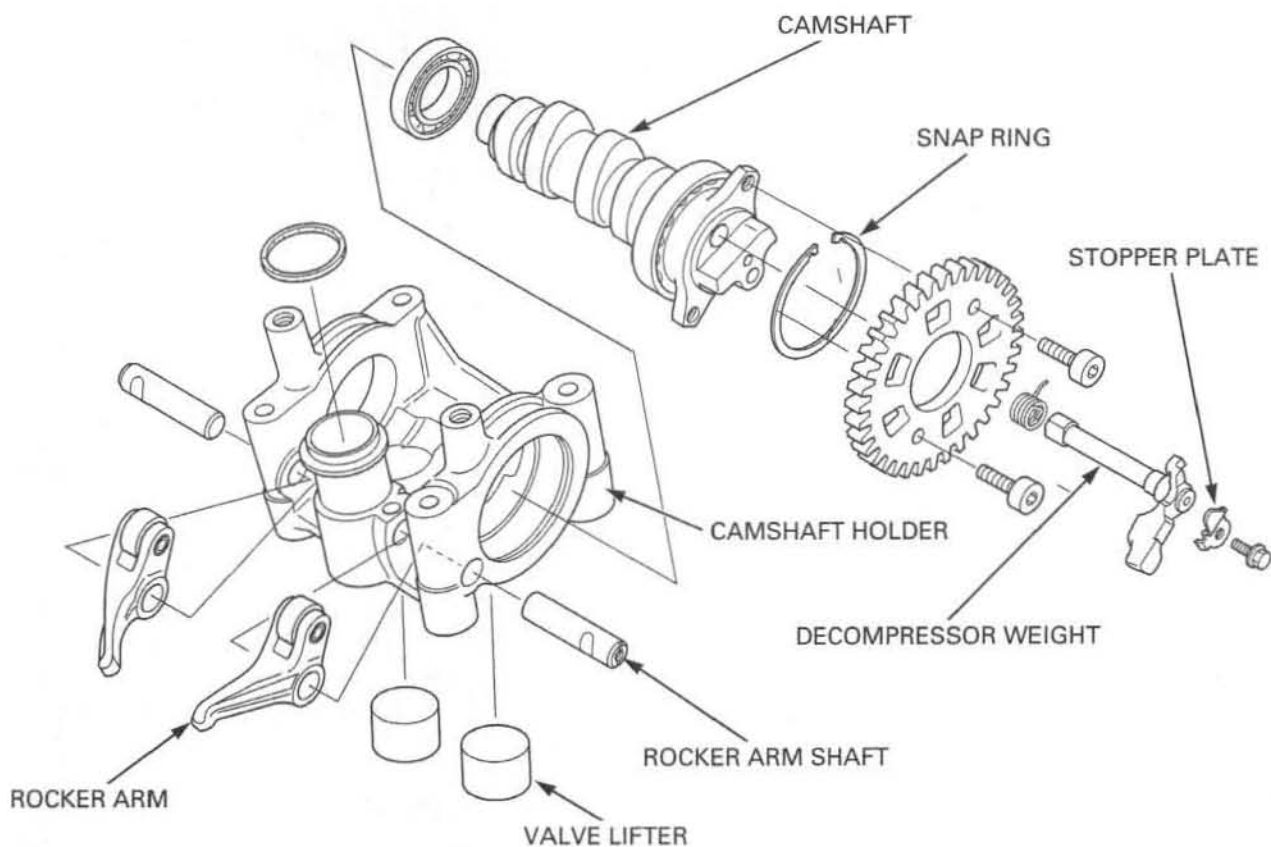
Check the valve lifter for scoring, scratches or damage.

Measure each valve lifter O.D.

**SERVICE LIMIT: 22.47 mm (0.885 in)**



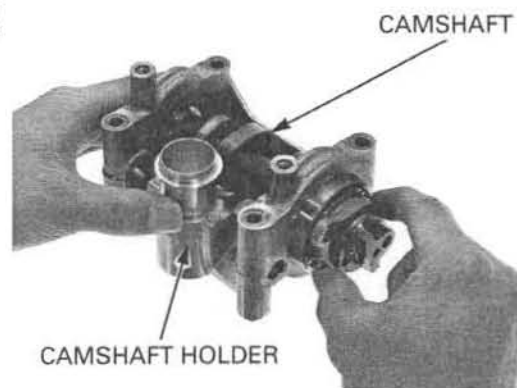
## ASSEMBLY



### NOTICE

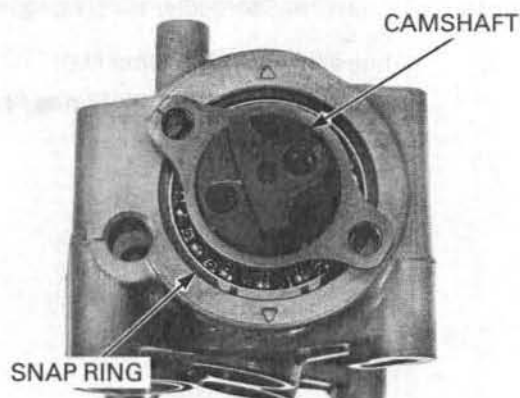
*Make sure the intake lobes are facing up when the camshaft the holder to prevent damaging the intake lifter bores.*

Install the camshaft.



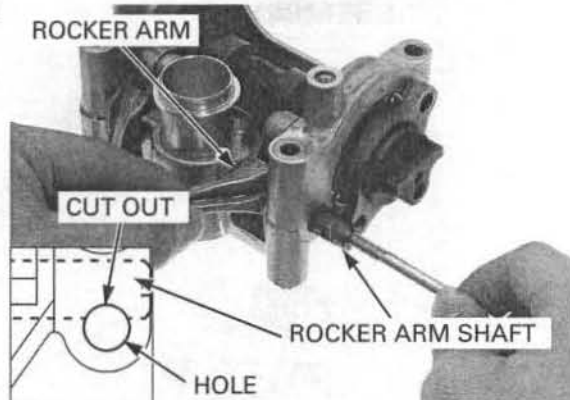
## CYLINDER HEAD/VALVES

Fit the snap ring into the groove in the camshaft holder.



Install the rocker arm and rocker arm shaft into the camshaft holder.

Align the cut out of the rocker arm shaft and cam shaft holder hole.



## CYLINDER HEAD REMOVAL

Drain the coolant (page 6-7).

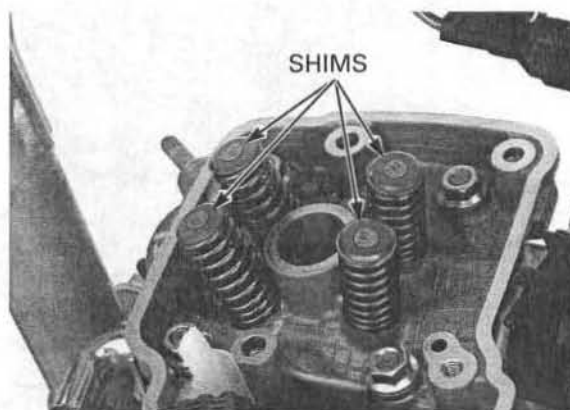
Remove the following:

- Fuel tank (page 2-7)
- Exhaust pipe (page 2-8)
- Radiator (page 6-7)
- Spark plug (page 3-8)
- Carburetor (page 5-11)
- Camshaft holder assembly (page 8-8)

*Be careful not to let the shims fall into the cylinder or crankcase.*

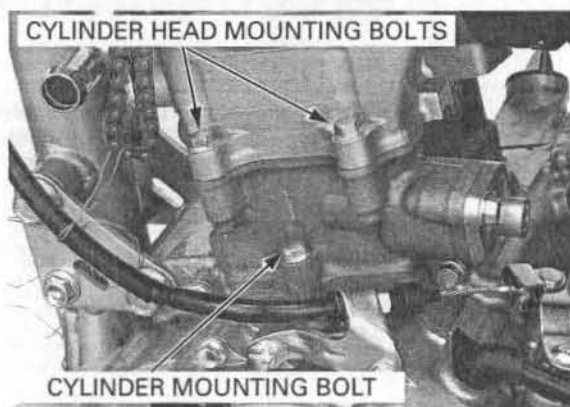
Remove the shims.

- The shims can be easily removed with tweezers or a magnet.



Remove the cylinder head mounting bolts.

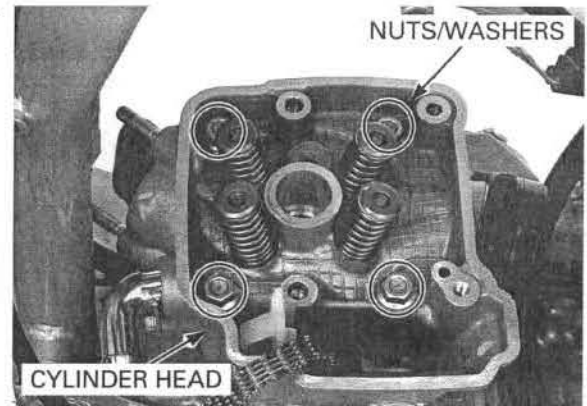
Loosen the cylinder mounting bolt.



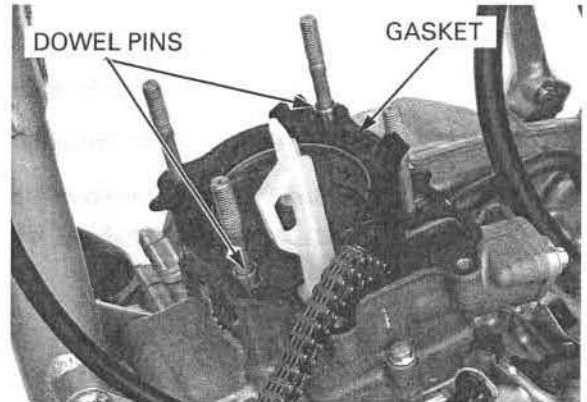
Loosen the cylinder head nuts in a crisscross pattern in two or three steps.

*Be careful not to let the nuts and washers fall into the left crankcase.*

Remove the nuts, washers and cylinder head.



Remove the gasket and dowel pins.



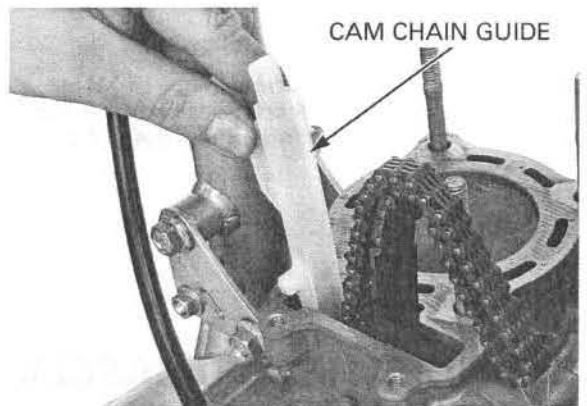
## CAM CHAIN TENSIONER/CAM CHAIN GUIDE

### REMOVAL

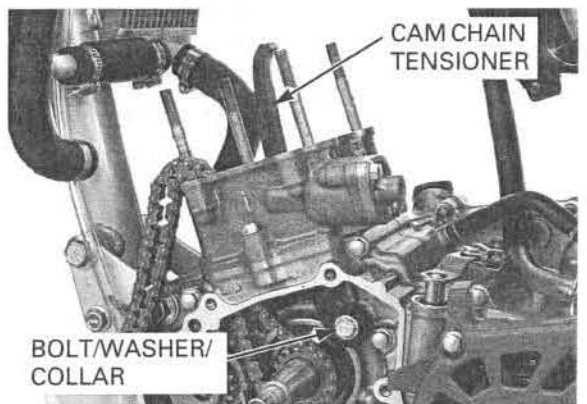
Remove the following:

- Cylinder head (page 8-14)
- Left crankcase cover (page 15-9)
- Flywheel (page 15-10)

Remove the cam chain guide.



Remove the bolt, washer, collar and cam chain tensioner.



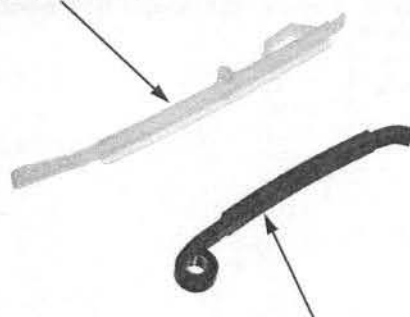


## CYLINDER HEAD/VALVES

### INSPECTION

Inspect the cam chain tensioner and cam chain guide for excessive wear or damage, replace them if necessary.

CAM CHAIN GUIDE



CAM CHAIN TENSIONER

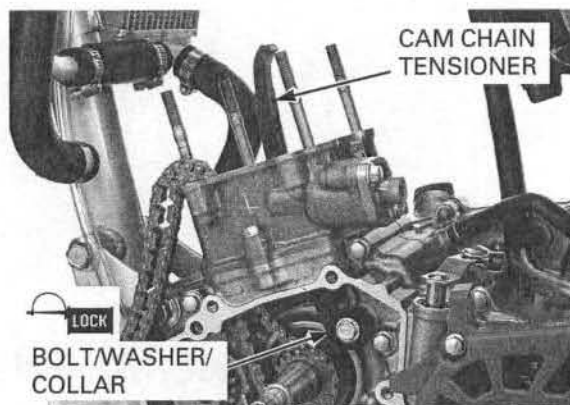
### INSTALLATION

Apply locking agent to the cam chain tensioner bolt threads.

Install the cam chain tensioner, collar, washer and bolt.

Tighten the bolt to the specified torque.

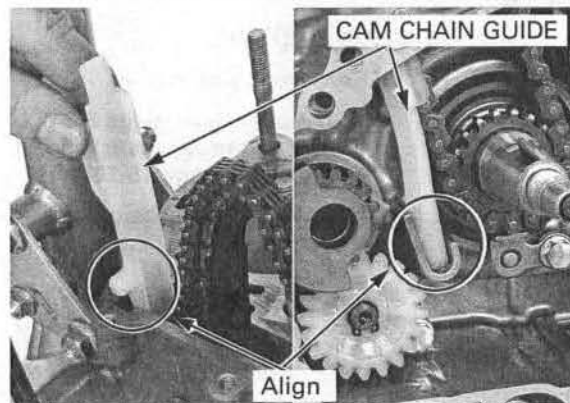
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



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

Install the following:

- Flywheel (page 15-11)
- Left crankcase cover (page 15-9)
- Cylinder head (page 8-25)

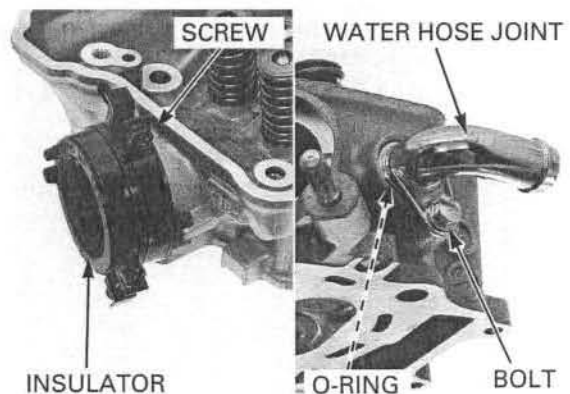


## CYLINDER HEAD DISASSEMBLY

Remove the cylinder head (page 8-14).

Loosen the insulator band screw and remove the insulator from the cylinder head.

Remove the bolt, water hose joint and O-ring.



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.

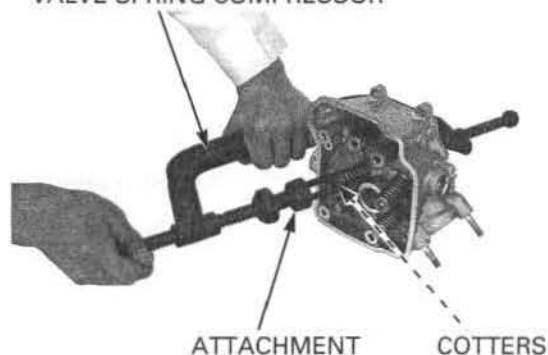
## TOOLS:

Valve spring compressor  
Valve spring compressor attachment

07757-0010000

07JME-KY20100

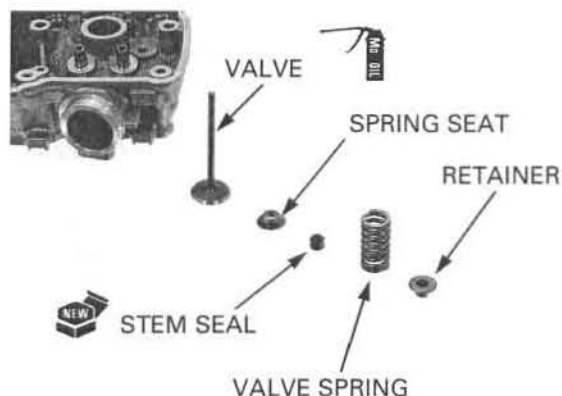
## VALVE SPRING COMPRESSOR



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

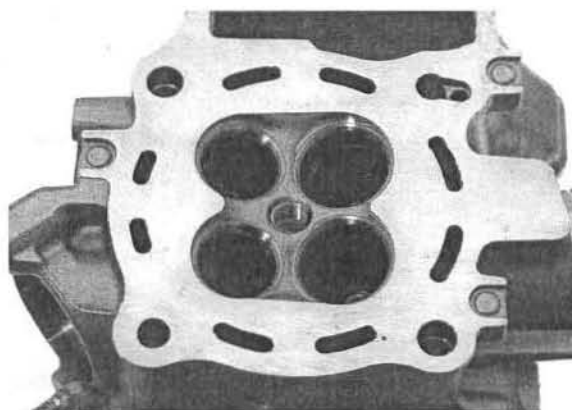
### CYLINDER HEAD

Disassemble the cylinder head (page 8-16).

Use care not to scratch the combustion chamber or head gasket surface.

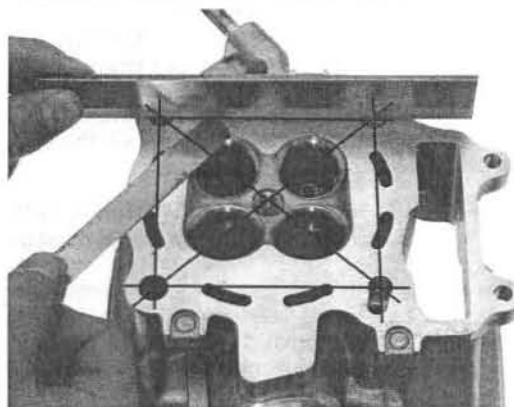
Remove the carbon deposits from the combustion chamber or exhaust port.

Check the spark plug hole and valve area for cracks.



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

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



### VALVE SPRING

Check the valve springs for fatigue or damage. Measure the free length of the intake and exhaust valve springs.

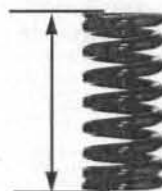
#### SERVICE LIMITS:

IN: 37.4 mm (1.47 in)

EX: 44.0 mm (1.73 in)

Replace the springs if they are shorter than the service limits.

INTAKE VALVE SPRING



EXHAUST VALVE SPRING



### 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:

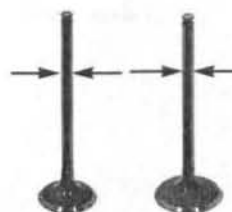
IN: 4.470 – 4.495 mm (0.1760 – 0.1770 in)

EX: 4.460 – 4.485 mm (0.1756 – 0.1766 in)

#### SERVICE LIMIT:

IN: 4.46 mm (0.176 in)

EX: 4.45 mm (0.175 in)



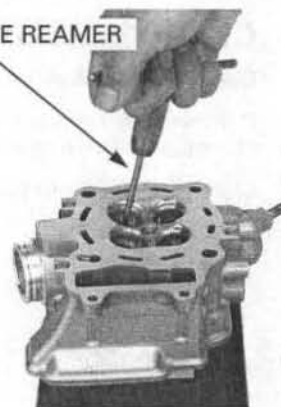
*Take care not to tilt or lean the reamer in the guide while reaming.*

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 head and always rotate the reamer clockwise.

#### TOOLS:

Valve guide reamer, 4.508 mm 07HMH-ML00101  
or  
07HMH-ML00140B  
(U.S.A. only)

VALVE GUIDE REAMER



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

#### SERVICE LIMITS:

IN: 4.552 mm (0.1792 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.

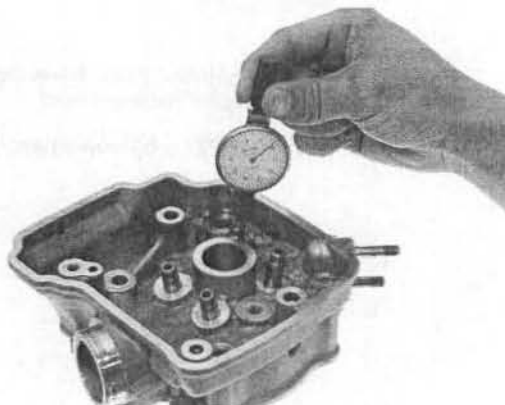
#### STANDARD:

IN: 0.005 – 0.042 mm (0.0002 – 0.0017 in)

EX: 0.015 – 0.052 mm (0.0006 – 0.0020 in)

*Reface the valve seats whenever the valve guides are replaced (page 8-19).*

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 8-19) using a marker. Chill the 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 – 300 °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:

Valve guide driver

07HMD-ML00101

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: 14.4 – 14.6 mm (0.56 – 0.57 in)

EX: 19.8 – 20.0 mm (0.78 – 0.79 in)

### TOOL:

Valve guide driver

07743-0020000  
not available in  
U.S.A.

Let the cylinder head cool to room temperature.

Ream the new valve guides.

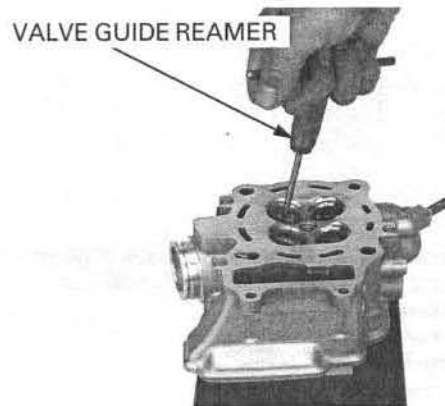
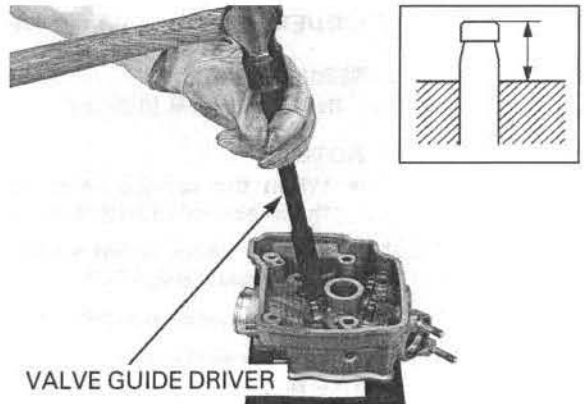
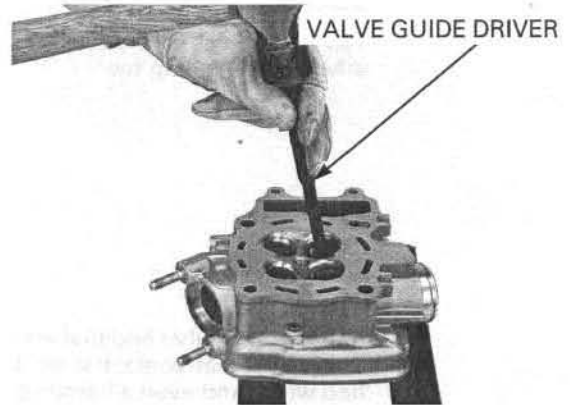
Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.

### TOOLS:

Valve guide reamer, 4.508 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 8-20).



## 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)

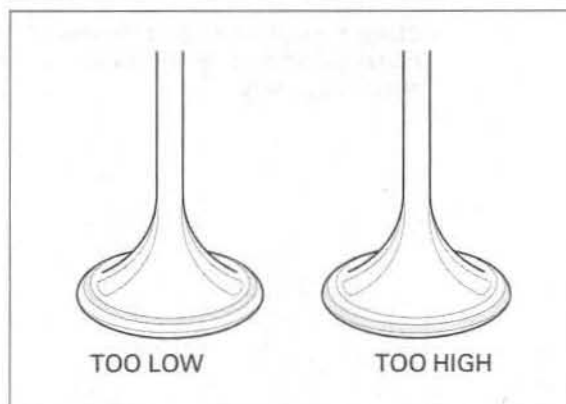
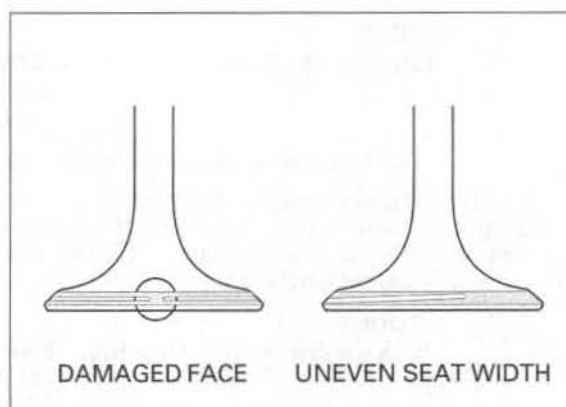
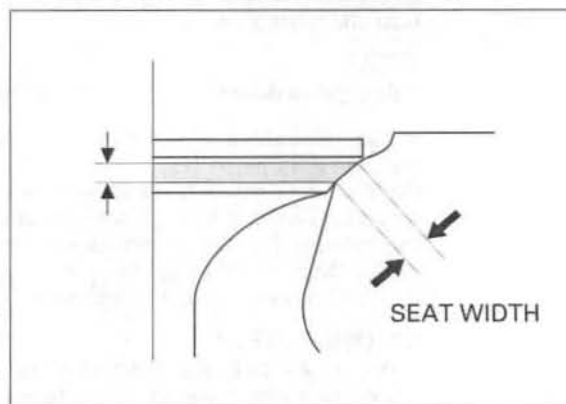
**NOTE:**

- 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 8-21).

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.



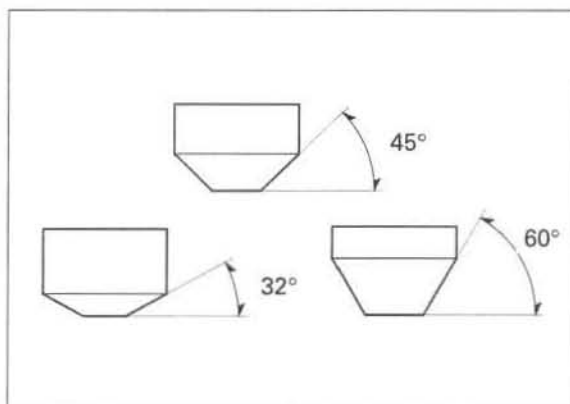
*The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.*

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

## VALVE SEAT REFACING

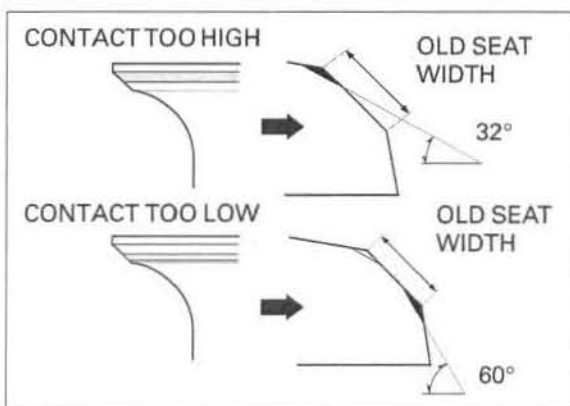
Follow the refacing manufacturer's operating instructions.

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.



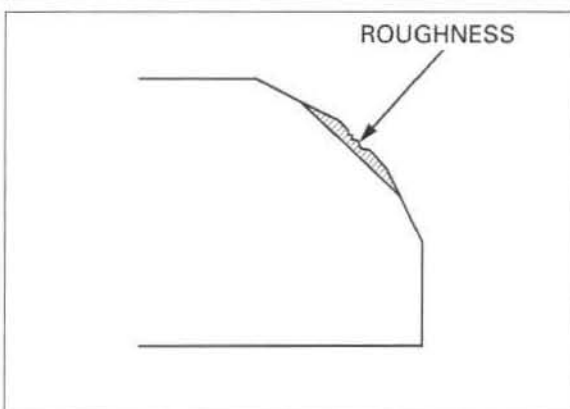
Reface the seat with a 45° cutter whenever a valve guide is replaced.

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

### TOOLS:

Seat cutter, 27.5 mm (IN)	07780-0010200
Seat cutter, 24 mm (EX)	07780-0010600
Cutter holder, 4.5 mm	07781-0010600

or equivalent commercially available in U.S.A.

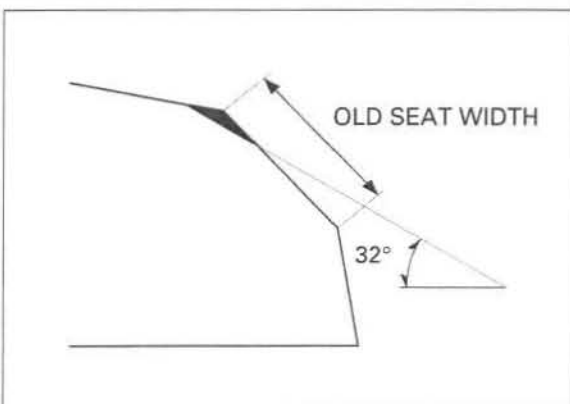


Use a 32° flat cutter, remove 1/4 of the existing valve seat material.

### TOOLS:

Flat cutter, 27 mm (IN)	07780-0013300
Flat cutter, 24 mm (EX)	07780-0012500
Cutter holder, 4.5 mm	07781-0010600

or equivalent commercially available in U.S.A.





## CYLINDER HEAD/VALVES

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

### TOOLS:

Interior cutter, 26 mm (IN)

07780-0014500

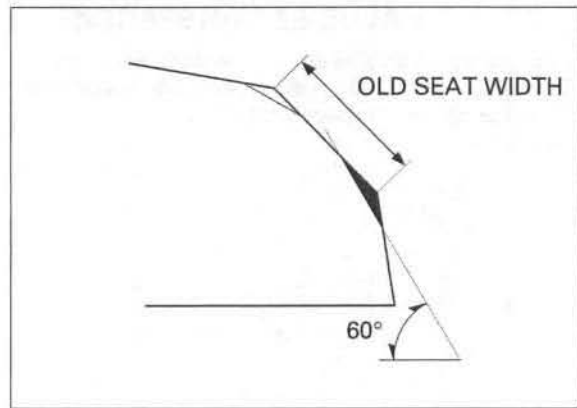
Interior cutter, 22 mm (EX)

07780-0014202

Cutter holder, 4.5 mm

07781-0010600

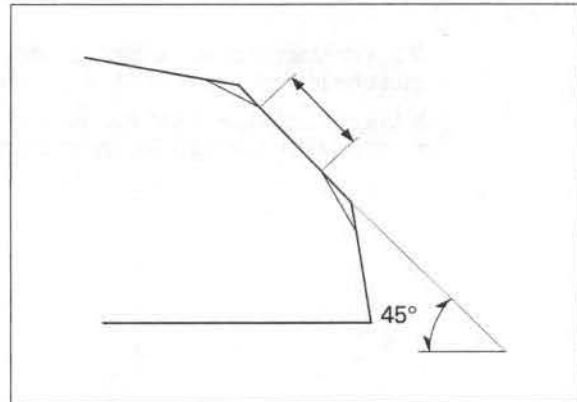
or equivalent commercially available in U.S.A.



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)



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

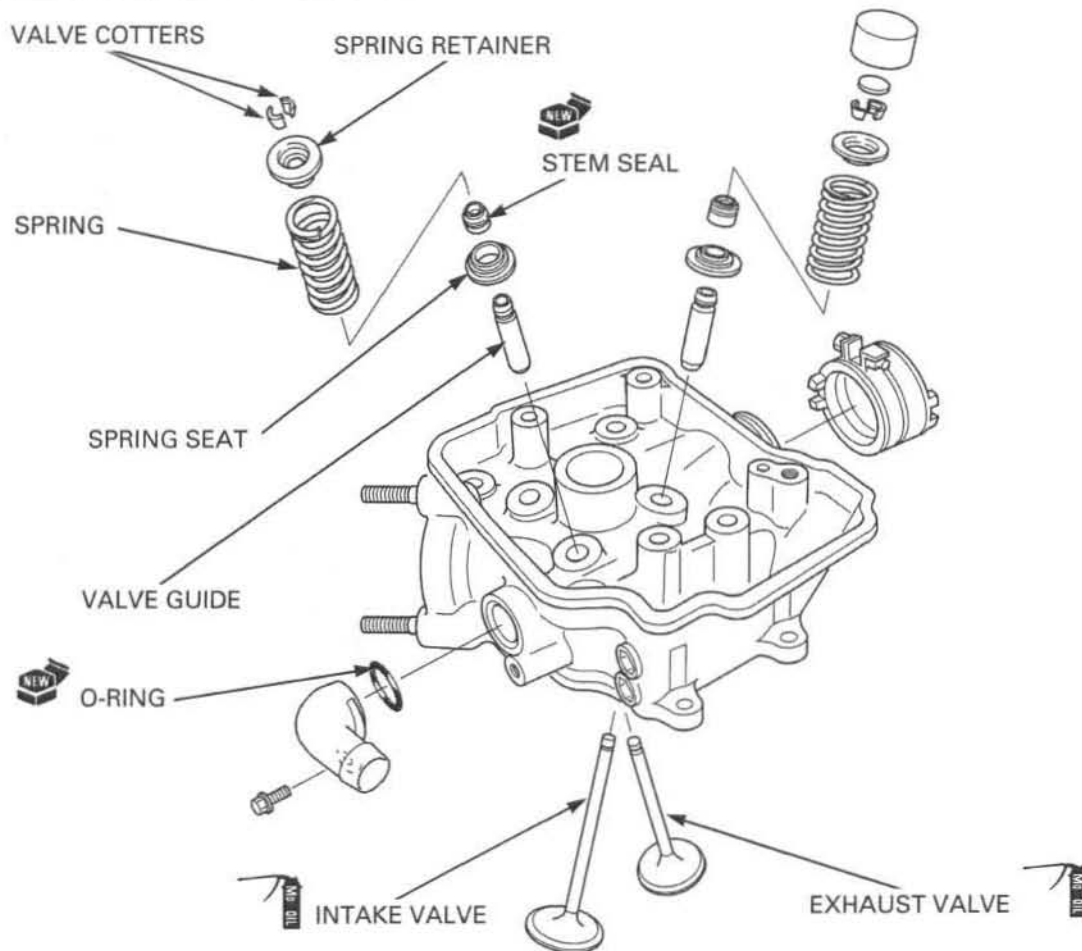
After lapping, wash any residual compound off the cylinder head and valve.

### NOTICE

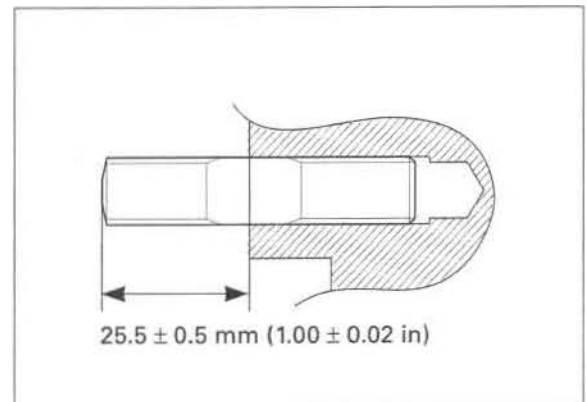
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of the lapping tool frequently to prevent uneven seat wear.
- Do not allow any lapping compound to enter the guides.



## CYLINDER HEAD ASSEMBLY



Install the exhaust pipe stud bolt as shown.

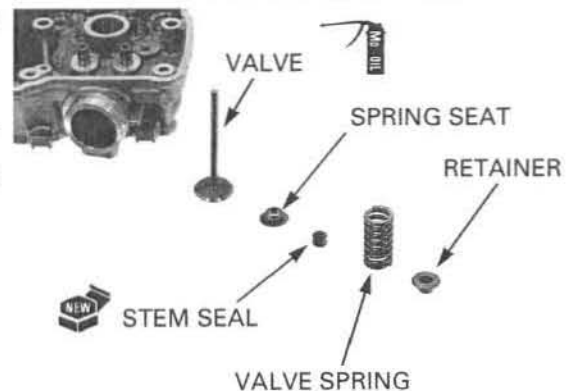


Blow out all oil passages in the cylinder head with compressed air.

Install the spring seat and new stem seal.

Lubricate the valve stem sliding surface with molybdenum oil solution.

Insert the valves into the guide while turning it slowly to avoid damage to the stem seal.



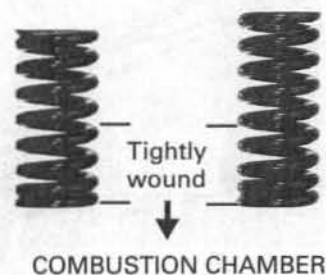
## CYLINDER HEAD/VALVES

Install the valve springs with the tightly wound coils facing the combustion chamber.

Install the spring retainer.

INTAKE VALVE  
SPRING

EXHAUST  
VALVE SPRING



*Grease the cotters to ease installation.*

Install the valve cotters using the special tools as shown.

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

### TOOLS:

Valve spring compressor

07757-0010000

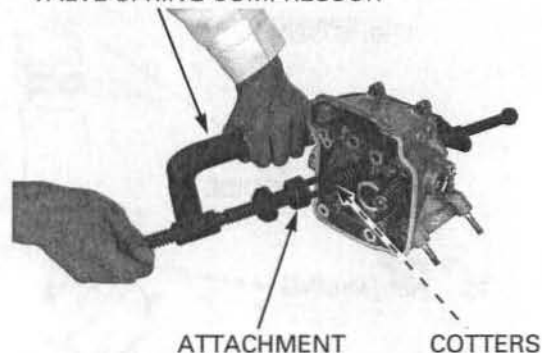
Valve spring compressor attachment

07JME-KY20100

### NOTE:

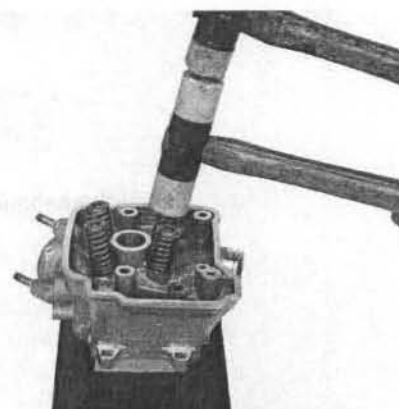
Do not confuse the intake cotters and exhaust cotters.

VALVE SPRING COMPRESSOR

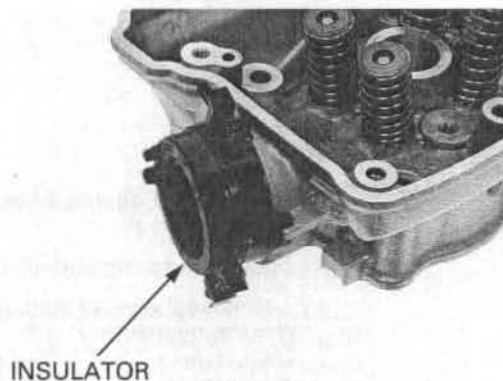


*Support the cylinder head so the valve heads do not contact anything that may damage them.*

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



Install the carburetor insulator.

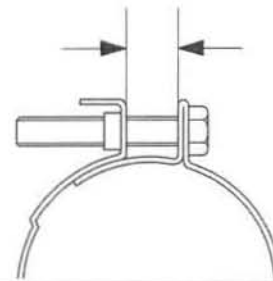




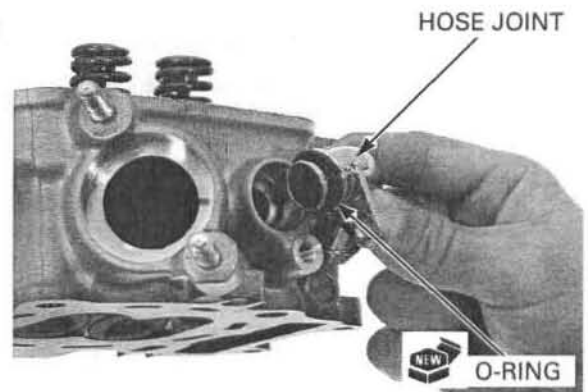
Tighten the carburetor insulator band screw (cylinder head side) so the distance between the band ends is  $10.0 \pm 1.0$  mm ( $0.39 \pm 0.04$  in).

CYLINDER HEAD SIDE:

$10 \pm 1$  mm ( $0.39 \pm 0.04$  in)

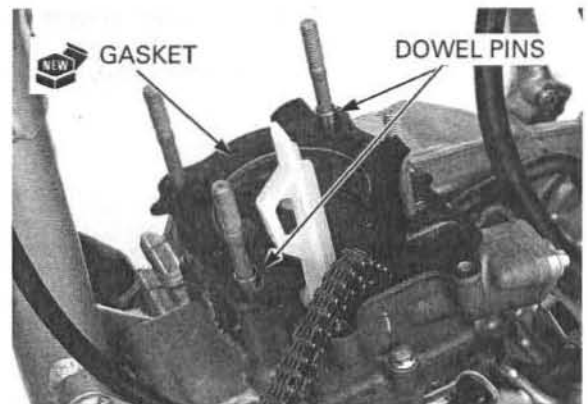


Install a new o-ring onto the water hose joint. Install the water hose joint aligning the bolt holes of the water hose joint and cylinder head. Install and tighten the bolt securely.



## CYLINDER HEAD INSTALLATION

Install the dowel pins and a new gasket.



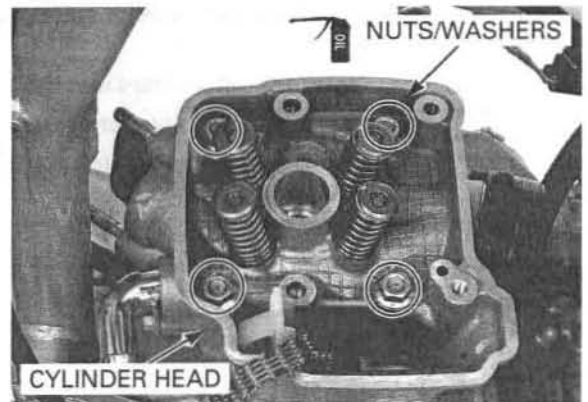
Apply engine oil to the cylinder head nut seating surface.

Install the cylinder head onto the cylinder.

*Be careful not to let the nuts and washers fall into the left crankcase*

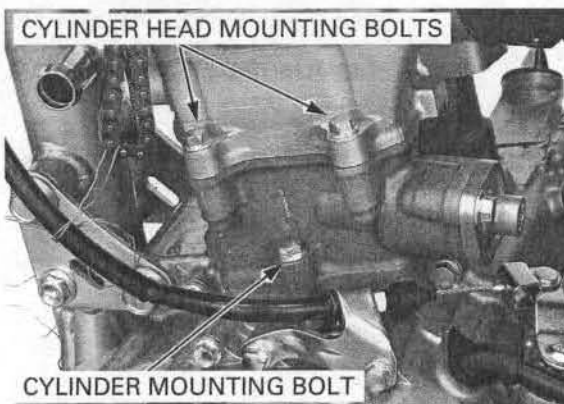
Install the washers and cylinder head nuts. Tighten the nuts in a crisscross pattern in two or three steps to the specified torque.

**TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)**



## CYLINDER HEAD/VALVES

Install the cylinder head mounting bolts. Tighten the cylinder mounting bolt and cylinder head mounting bolts securely.



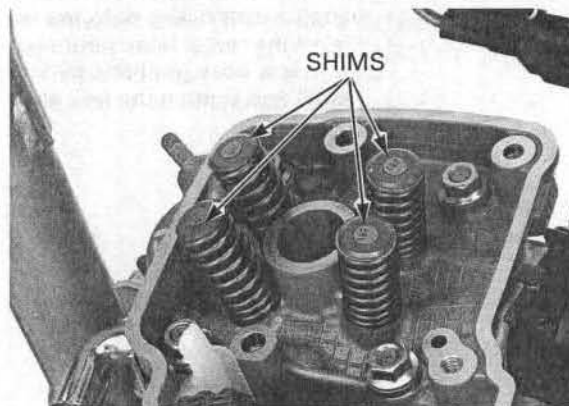
*Be careful not to let the shims fall into the left crankcase. Install the shims in their original location.*

Install the shims.

Install the following:

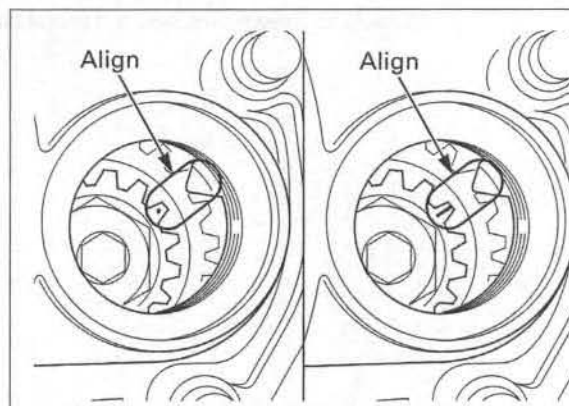
- Spark plug (page 3-9)
- Camshaft holder assembly (page 8-26)
- Carburetor (page 5-23)
- Exhaust pipe (page 2-9)

Add the recommended coolant mixture to the filler neck and bleed the air (page 6-7).



## CAMSHAFT INSTALLATION

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



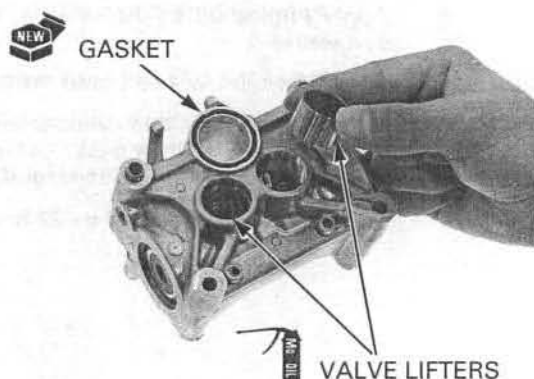
Apply molybdenum oil solution to the outer surface of each valve lifter.

*Install the valve lifters in their original location.*

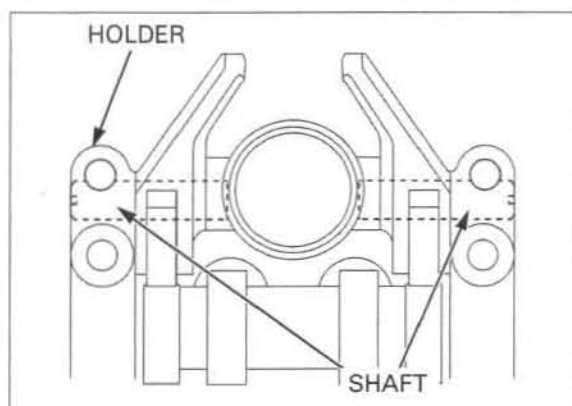
Install the valve lifters into the camshaft holder.

Install the new plug hole gasket.

Make sure the dowel pins are installed into the camshaft holder.



Recheck the alignment of the cut out in the rocker arm shaft and cam shaft holder hole.



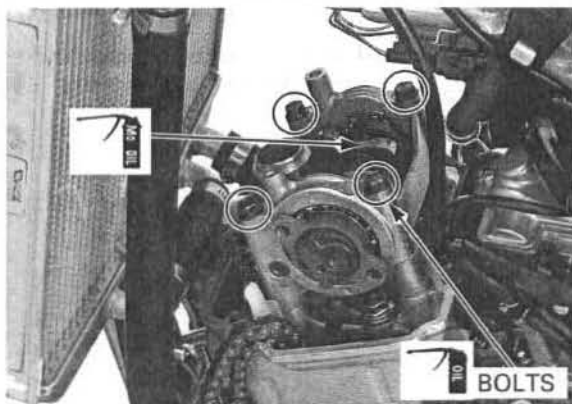
Apply molybdenum oil solution to the cam lobes and camshaft journal.

Install the camshaft holder assembly with the intake cam lobes facing up.

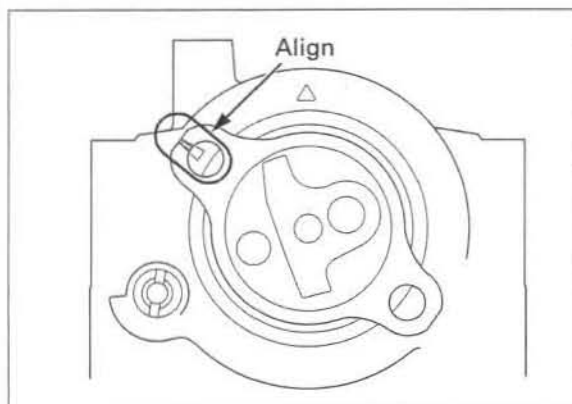
Apply oil to the camshaft holder mounting bolt threads.

Install the camshaft holder mounting bolts. Tighten the bolts in a crisscross pattern in two or three steps to the specified torque.

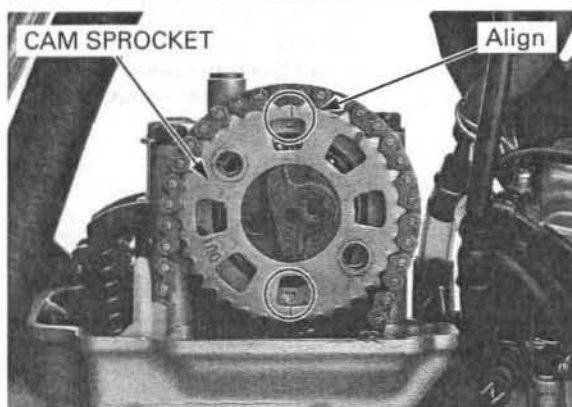
**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**



Align the index line on the cam shaft with the "△" mark on the cam shaft holder.



Install the cam chain onto the cam sprocket. Install the cam sprocket while aligning the index line on the cam sprocket with the "△" mark on the camshaft holder.



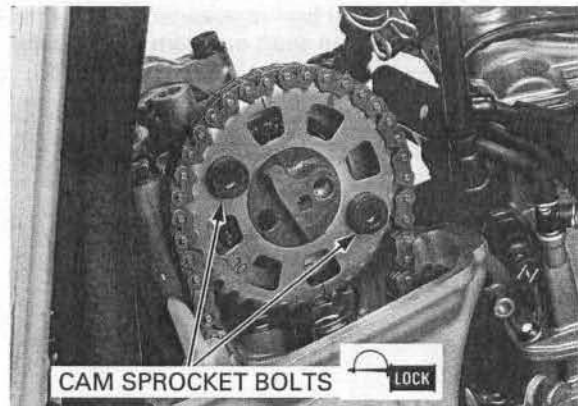


## CYLINDER HEAD/VALVES

Clean and apply a locking agent to the cam sprocket bolt threads.

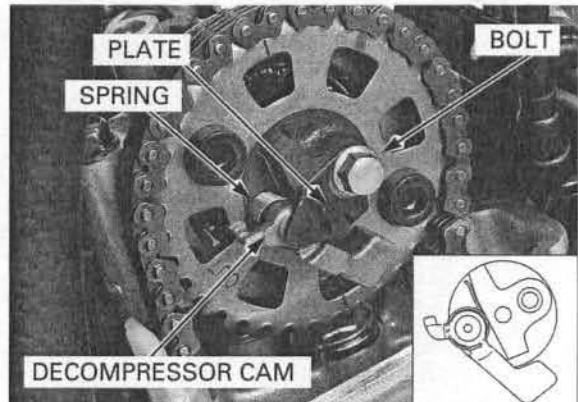
Align the cam sprocket bolt holes with the cam sprocket and camshaft.  
Tighten the sprocket bolt to the specified torque.

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

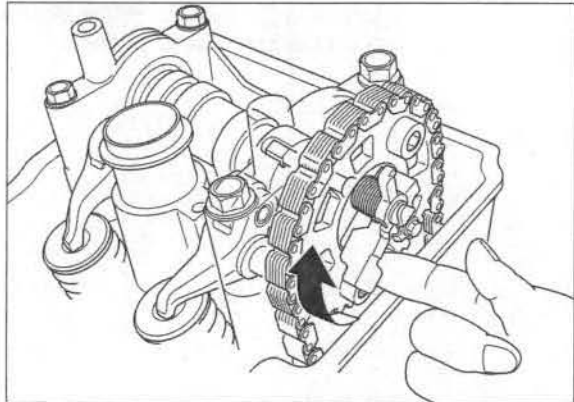


Install the decompressor shaft and set the spring.

Install the stopper plate and tighten decompressor shaft stopper bolt securely.



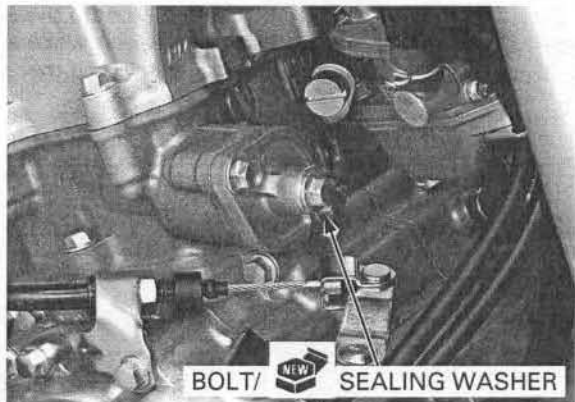
Check the decompressor system for smooth operation, replace if necessary.



Remove the stopper tool from the cam chain tensioner lifter.

Install the bolt with a new sealing washer.

Tighten the cam chain tensioner lifter bolt securely.



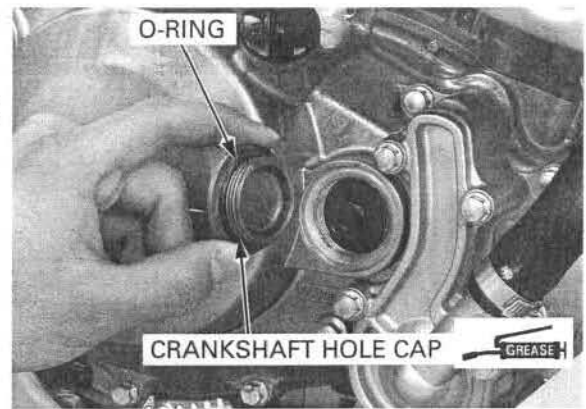
Check the O-ring is in good condition, replace if necessary.

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)**

Install the cylinder head cover (page 8-29).

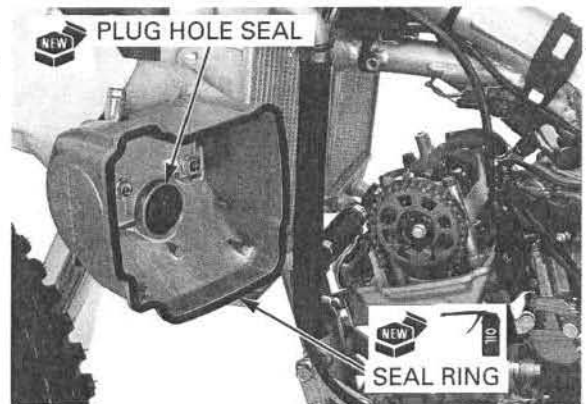


## CYLINDER HEAD COVER INSTALLATION

Install a new plug hole seal.

Apply engine oil to the new seal ring circumference.

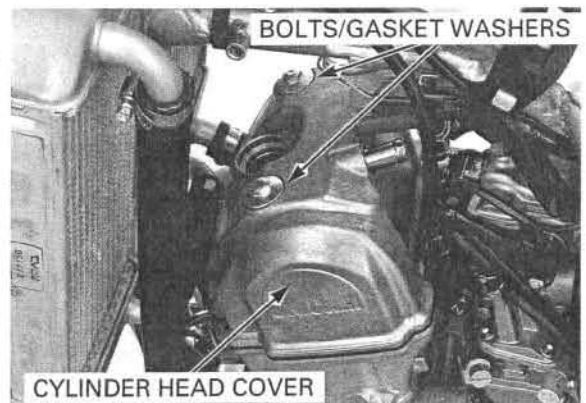
Install a new cylinder head cover packing to the cylinder head cover.



Install the cylinder head cover.

Install the gasket washers and bolts, then tighten the bolts to the specified torque.

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



Connect breather hose.

Install the following:

- Direct ignition coil
- Install the fuel tank (page 2-7)



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MEMO

STANDARD FORM NO. 64  
MAY 1962 EDITION  
GSA FPMR (41 CFR) 101-11.6

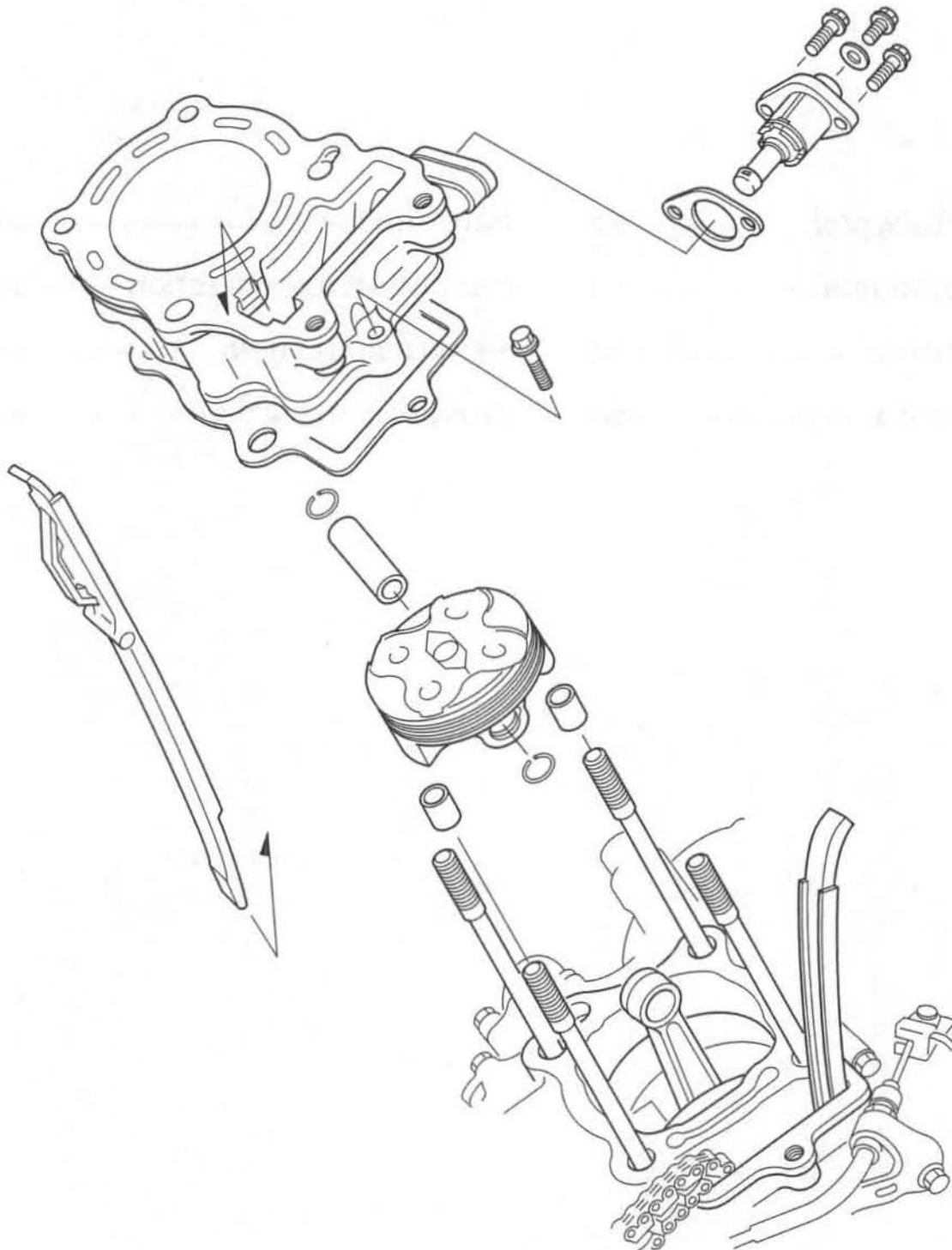


## 9. CYLINDER/PISTON

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COMPONENT LOCATION .....	9-2	PISTON REMOVAL .....	9-4
SERVICE INFORMATION .....	9-3	CYLINDER/PISTON INSPECTION .....	9-5
TROUBLESHOOTING .....	9-3	PISTON INSTALLATION .....	9-8
CYLINDER REMOVAL .....	9-4	CYLINDER INSTALLATION .....	9-9

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 clean solvent before inspection, use compressed air to dry the parts.
- Under racing conditions, the piston and piston rings should be replaced after 15 hours of operation. Replace the piston pin after 30 hours of operation.

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		66.000 – 66.015 (2.5984 – 2.5990)	66.04 (2.600)
	Out of round		–	0.010 (0.0004)
	Taper		–	0.010 (0.0004)
	Warpage		–	0.05 (0.002)
Piston, piston ring	Piston mark direction		IN mark toward the intake side	–
	Piston O.D.		65.975 – 65.985 (2.5974 – 2.5978)	65.895 (2.5978)
	Piston O.D. measurement point		5.0 mm (0.20 in) from the bottom of skirt	–
	Piston pin bore I.D.		14.002 – 14.008 (0.5513 – 0.5515)	14.03 (0.552)
	Piston pin O.D.		13.994 – 14.000 (0.5510 – 0.5512)	13.98 (0.550)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Top ring mark		R mark side facing up	–
	Piston ring-to-ring groove clearance	Top	0.02 – 0.05 (0.0008 – 0.0020)	0.20 (0.008)
	Piston ring end gap	Top ring	0.10 – 0.20 (0.003 – 0.007)	0.34 (0.013)
		Oil ring (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
Cylinder-to-piston clearance			0.015 – 0.040 (0.0006 – 0.0015)	0.07 (0.003)
Connecting rod small end I.D.			14.016 – 14.034 (0.5518 – 0.5525)	14.04 (0.553)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	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 ring.

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

- Leaking 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 in cylinder head or on top of piston

#### Abnormal noise

- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn connecting rod big end bearing

#### Excessive smoke

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

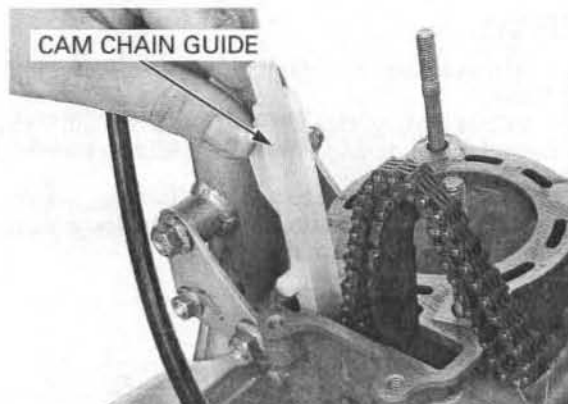


## CYLINDER/PISTON

### CYLINDER REMOVAL

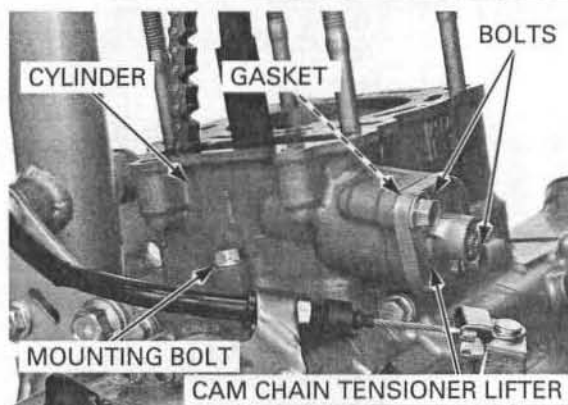
Remove the cylinder head (page 8-14).

Remove the cam chain guide.

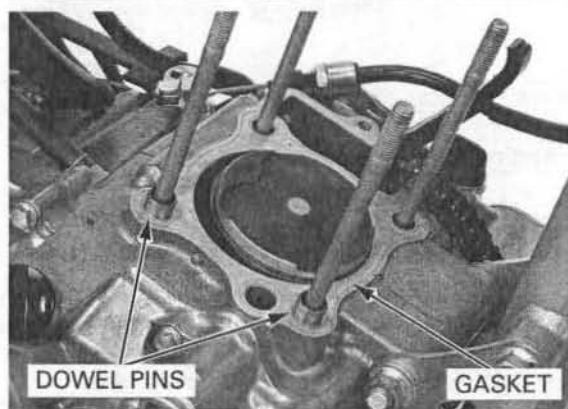


Remove the bolts, cam chain tensioner lifter and gasket.

Remove the cylinder mounting bolt and cylinder.



Remove the dowel pins and gasket.



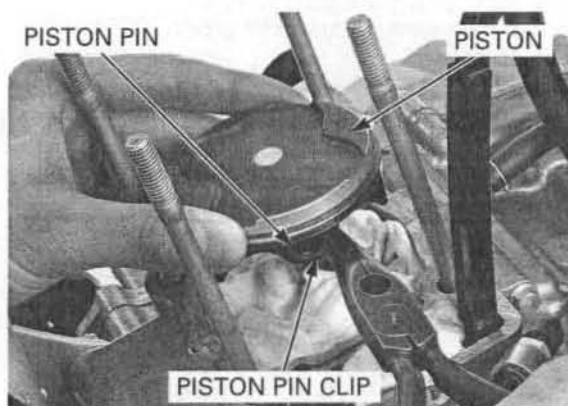
### PISTON REMOVAL

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

Remove the piston pin clips with pliers.

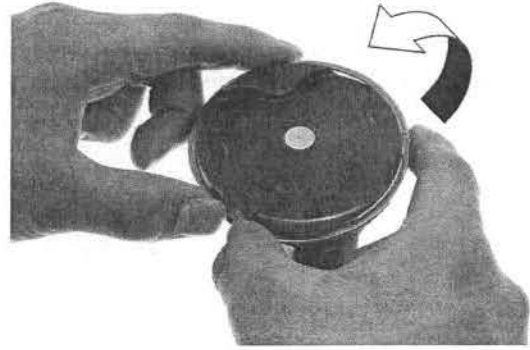
Press the piston pin out of the piston and remove the piston.

- Under racing conditions, the piston 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: 66.04 mm (2.600in)**

Calculate the cylinder-to-piston clearance. Take a maximum reading to determine the clearance.

Refer to page 9-6 for piston O.D.

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

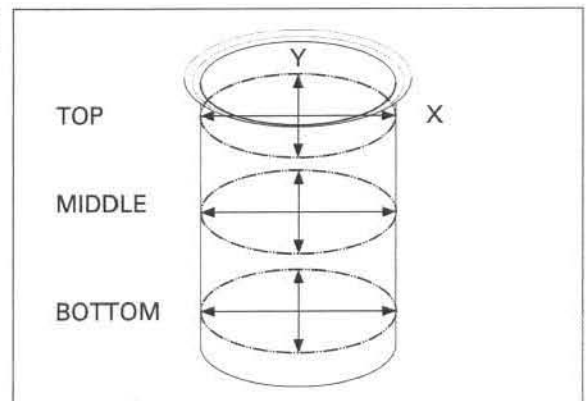


Calculate the taper and out-of-round at three levels in the X and Y axis. Take the maximum reading to determine the cylinder condition.

#### SERVICE LIMITS:

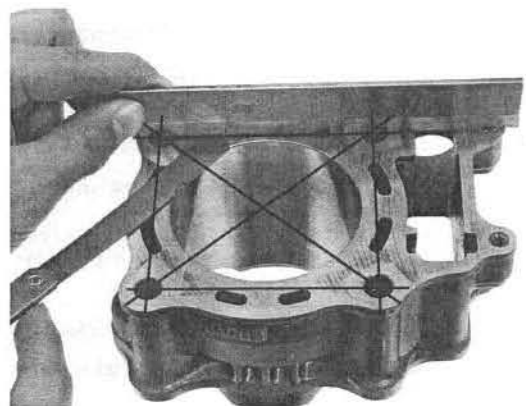
**Taper: 0.010 mm (0.0004 in)**

**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)**

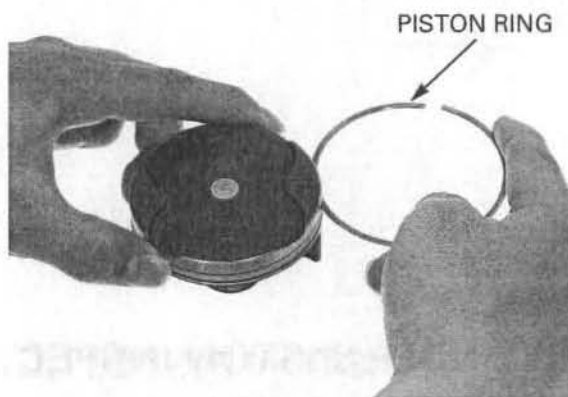


## CYLINDER/PISTON

### PISTON/PISTON PIN/PISTON RING INSPECTION

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

Remove the carbon deposits from the piston head and piston ring grooves with the used ring. Inspect the piston for damage and the ring grooves for wear.



Temporarily install the piston ring to its proper position with the mark facing up. Measure the piston ring-to-groove clearance with the rings pushed into the grooves.

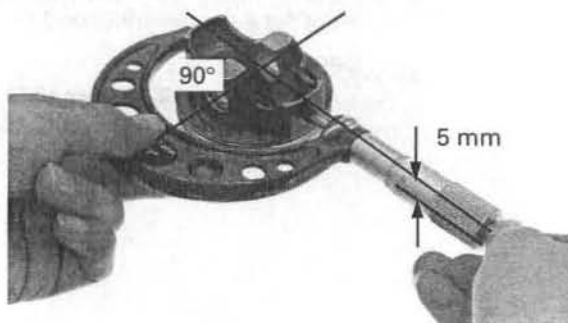
**SERVICE LIMIT: 0.20 mm (0.008 in)**



Measure the diameter of the piston at 5.0 mm (0.20 in) from the bottom and 90 degrees to the piston pin hole.

**SERVICE LIMIT: 65.895 mm (2.5978 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: 14.03 mm (0.552 in)**

Check the piston pin for wear and excessive discoloration.

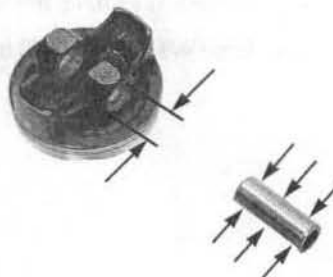
Measure the piston pin O.D.

**SERVICE LIMIT: 13.98 mm (0.550 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 squarely in the cylinder.

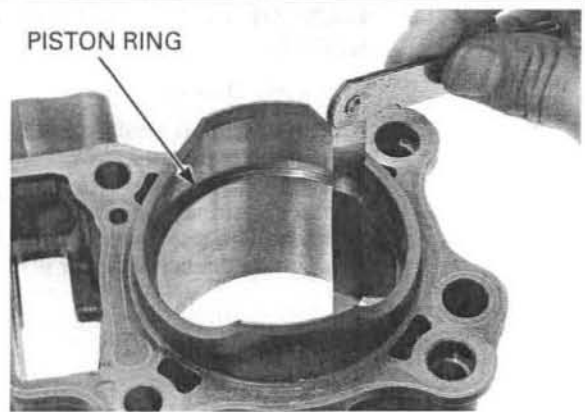
Insert each piston ring into the cylinder and measure the ring end gap.

#### SERVICE LIMITS:

**Top:** 0.34 mm (0.013 in)

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

If the ring end gap under the service limit or nearly 15.0 hours of running time have elapsed, replace the piston ring with a new one.

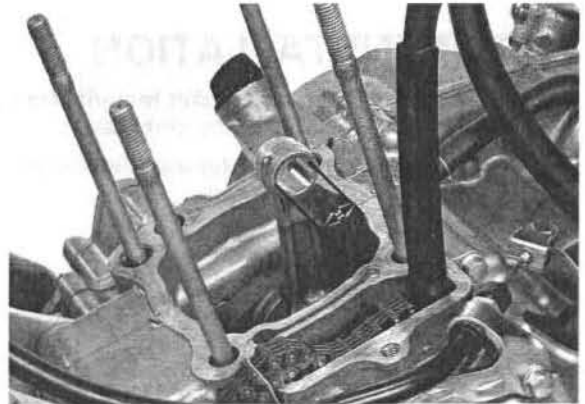


### CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

**SERVICE LIMIT:** 14.04 mm (0.553 in)

If the I.D. is over the service limit, replace the crankshaft (page 11-14).



### PISTON RING INSTALLATION

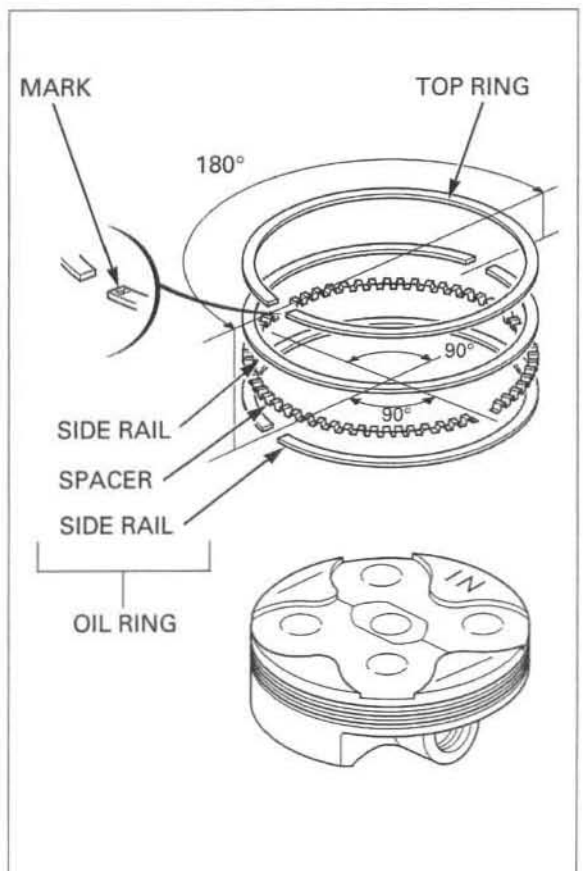
Clean the piston grooves thoroughly.

Install the top ring on the piston with the marked side facing up.

Apply engine oil to the piston rings and install the piston rings.

- 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 degrees apart.

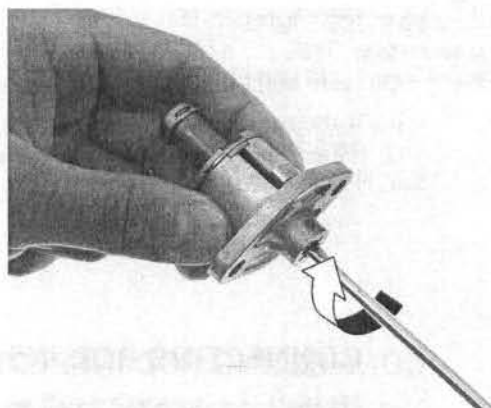
After installation, the rings should rotate freely in the ring grooves.



### CAM CHAIN TENSIONER LIFTER INSPECTION

Check the lifter operation:

- The tensioner shaft should not go into the body when it is pushed.
- When it is turned clockwise with a screwdriver, the tensioner shaft should be pulled into the body. The shaft should spring out of the body as soon as the screwdriver is released.

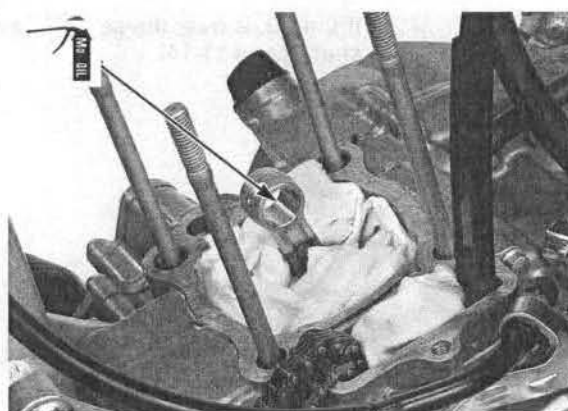


### PISTON INSTALLATION

*When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt from entering the engine.*

Clean any gasket material from the cylinder mating surfaces of the crankcase.

Apply molybdenum oil solution to the connecting rod small end.

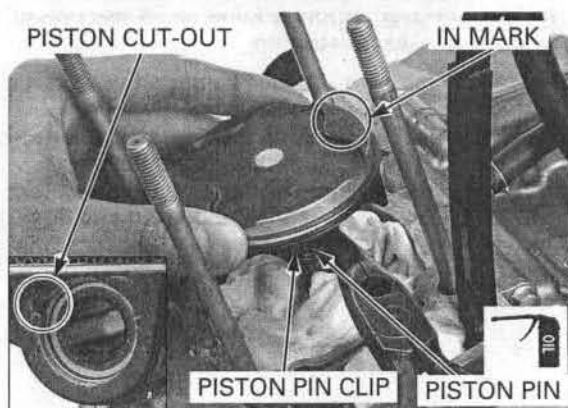


Apply engine oil to the piston pin outer surface and piston hole of the piston.

Install the piston with the IN mark facing intake side.

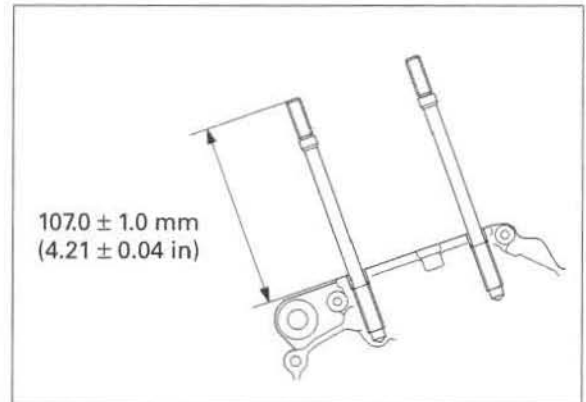
Install the piston pin and new piston pin clips.

- 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.



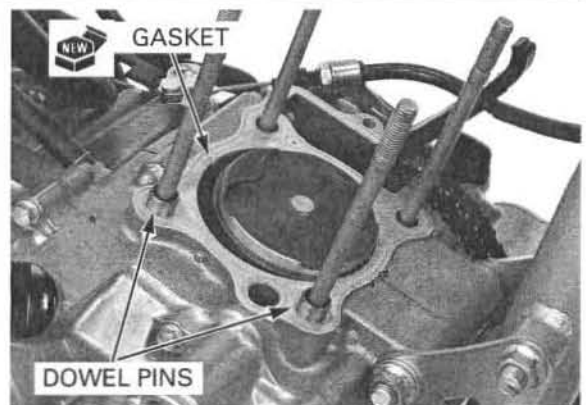
## CYLINDER INSTALLATION

Install the cylinder stud bolt as shown.



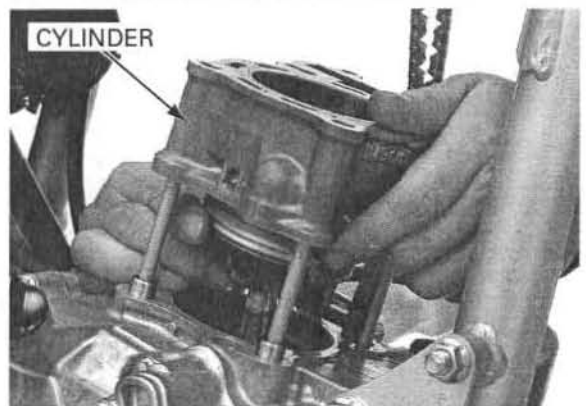
Install the dowel pins.

Install a new cylinder base gasket on the crankcase.



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

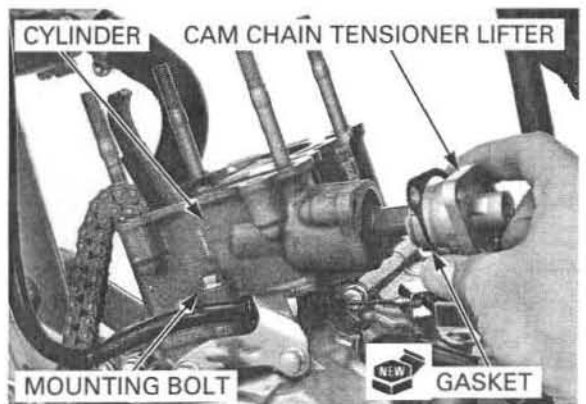
Coat the cylinder bore, piston and piston rings with engine oil and install the cylinder while compressing the piston rings.



Install the cylinder mounting bolt.

Install a new gasket, cam chain tensioner lifter.

Tighten the cam chain tensioner lifter mounting bolts securely.

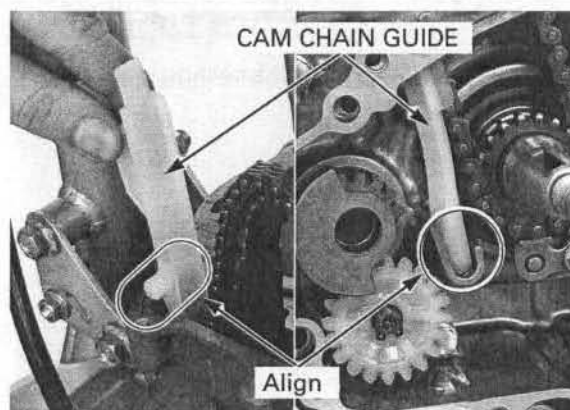




## CYLINDER/PISTON

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

Install the cylinder head (page 8-25).

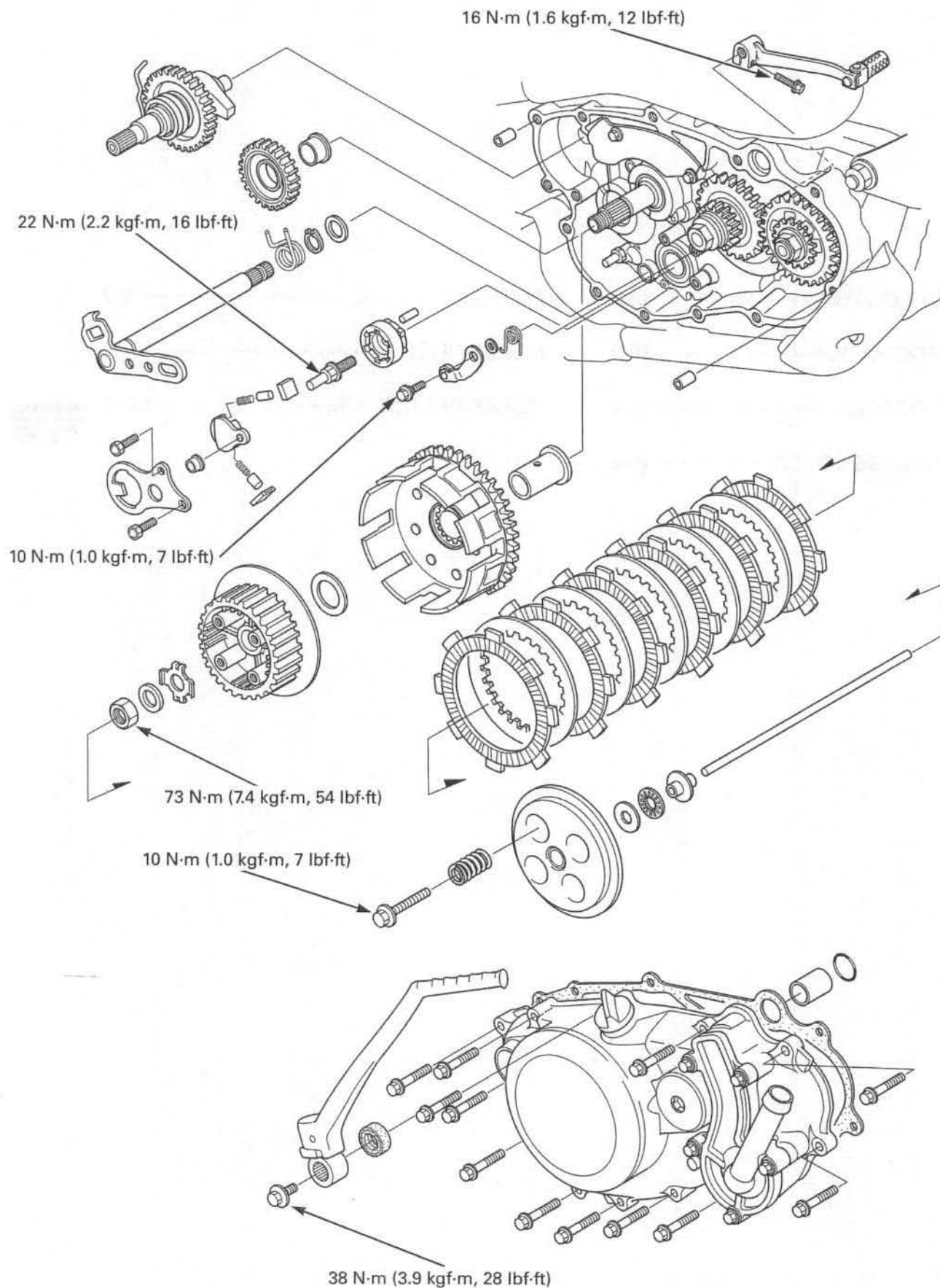


## 10. CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

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COMPONENT LOCATION .....	10-2	CLUTCH .....	10-7
SERVICE INFORMATION .....	10-3	KICKSTARTER .....	10-14
TROUBLESHOOTING .....	10-4	GEARSHIFT LINKAGE .....	10-17
RIGHT CRANKCASE COVER .....	10-5		

## COMPONENT LOCATION





## 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

Unit: mm (in)

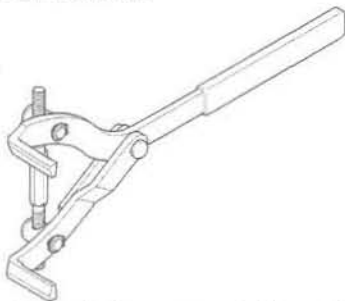
ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	–
Clutch spring free length		40.95 (1.612)	39.95 (1.57)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
Clutch plate warpage		–	0.10 (0.004)
Clutch outer I.D.		22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
Clutch outer collar	I.D.	17.000 – 17.018 (0.6693 – 0.6700)	17.03 (0.671)
	O.D.	21.959 – 21.980 (0.8645 – 0.8654)	21.94 (0.864)
Mainshaft O.D. at clutch outer collar		16.966 – 16.984 (0.6680 – 0.6687)	16.95 (0.667)
Kickstarter pinion gear I.D.		22.007 – 22.028 (0.8664 – 0.8672)	22.05 (0.868)
Kickstarter pinion gear bushing	I.D.	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
	O.D.	21.979 – 22.000 (0.8653 – 0.8661)	21.96 (0.865)
Kickstarter spindle O.D.		19.980 – 19.993 (0.7866 – 0.7871)	19.97 (0.786)
Kickstarter idle gear I.D.		18.016 – 18.034 (0.7093 – 0.7100)	18.06 (0.711)
Kickstarter idle gear bushing	I.D.	15.000 – 15.018 (0.5906 – 0.5913)	15.04 (0.592)
	O.D.	17.982 – 18.000 (0.7080 – 0.7086)	17.96 (0.707)
Countershaft O.D. at kickstarter idle gear		14.966 – 14.984 (0.5892 – 0.5899)	14.95 (0.589)

### TORQUE VALUES

Clutch center lock nut	73 N·m (7.4 kgf·m, 54 lbf·ft)	Apply oil to the threads and seating surface
Clutch spring bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Gearshift drum center pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads
Gearshift drum stopper arm bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Kickstarter pedal bolt	38 N·m (3.9 kgf·m, 28 lbf·ft)	
Shift lever pinch bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	

### TOOLS

Clutch center holder  
07724-0050002



or equivalent commercially available in U.S.A.

### TROUBLESHOOTING

#### Hard to shift

- Incorrect clutch cable free play adjustment
- Loose stopper arm bolt
- Damaged stopper arm and pin
- Damaged gearshift spindle

#### Transmission jumps out of gear

- Worn gearshift drum stopper arm
- Weak or broken gearshift arm return spring
- Loose stopper arm bolt

#### Shift lever 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

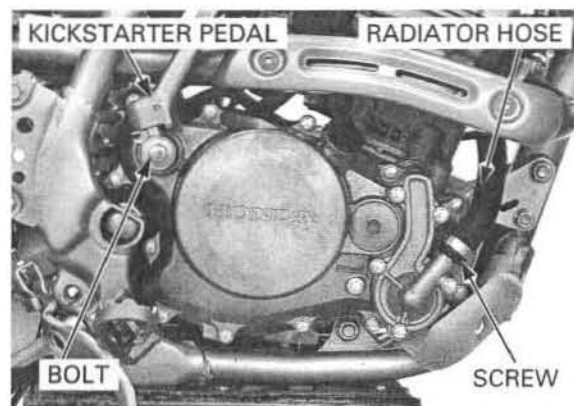
Drain the coolant (page 6-7).

Drain the transmission oil (page 3-16).

Remove the Brake pedal (page 14-22).

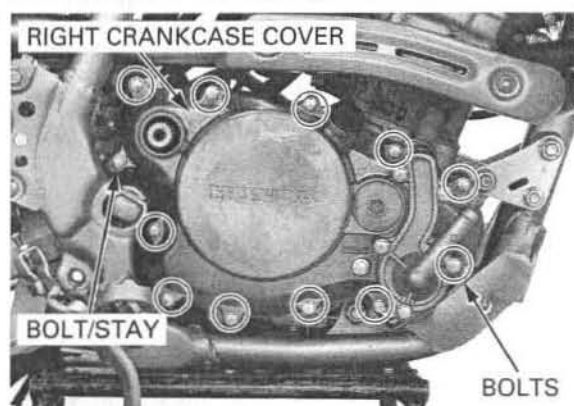
Remove the kickstarter pedal bolt and kickstarter pedal.

Loosen the band screw and disconnect the lower radiator hose from the right crankcase cover.



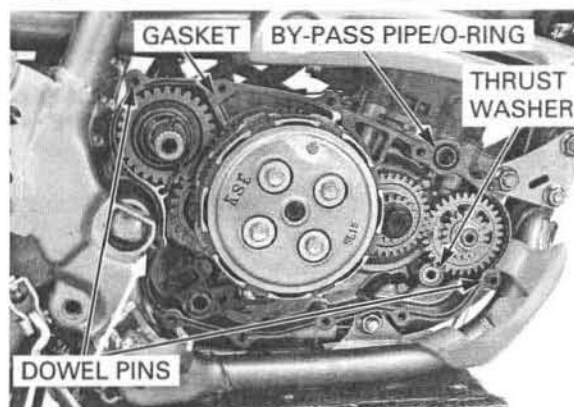
Loosen the right crankcase cover bolts in a criss-cross pattern in two or three steps.

Remove the crankcase cover bolts, stay and right crankcase cover.

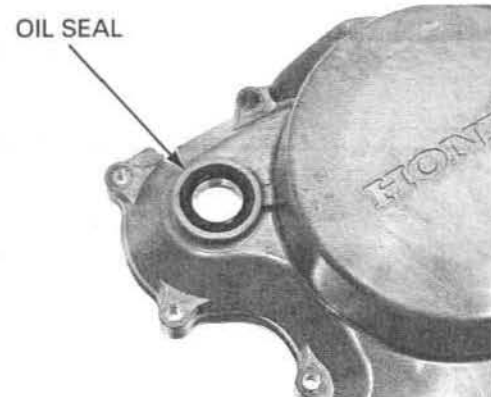


Remove the by-pass pipe and O-ring.  
Remove the gasket and dowel pins.

- Note that the water pump shaft thrust washer is on the right crankcase.



Check the kickstarter spindle oil seal for deterioration or damage.

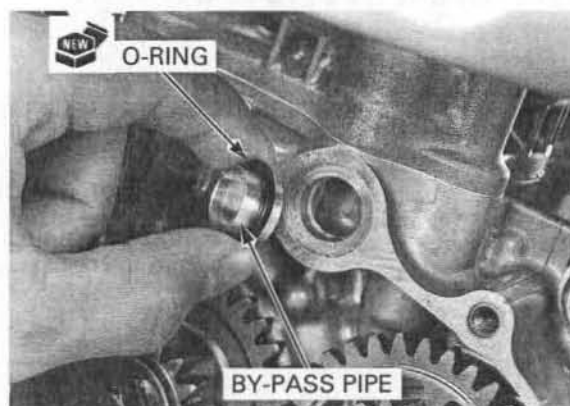




## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

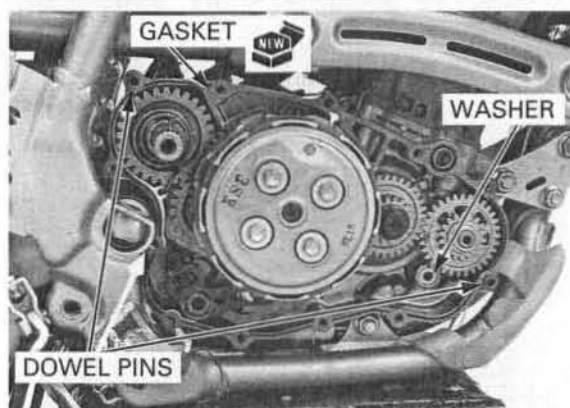
### INSTALLATION

Install a new O-ring onto the by-pass pipe.  
Install the by-pass pipe into the crankcase.



Install the dowel pins and new gasket.

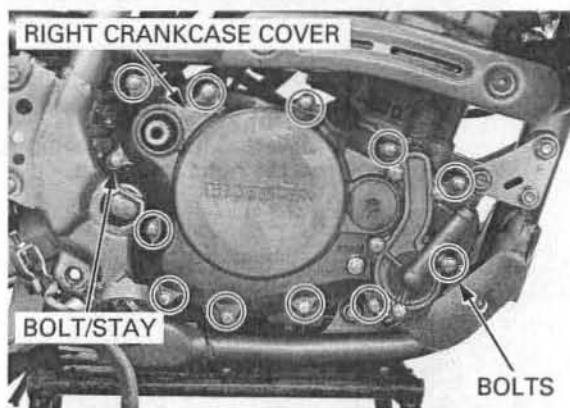
Make sure that the water pump shaft thrust washer is on the right crankcase.



Install the right crankcase cover while engaging the water pump driven gear with the water pump drive gear.

Install the stay and right crankcase cover bolts.

Tighten the right crankcase cover bolts in a criss-cross pattern in two or three steps.



Connect the lower radiator hose to the right crankcase cover and tighten the band screw securely.

Apply grease to the kickstarter pedal spline area.

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)**

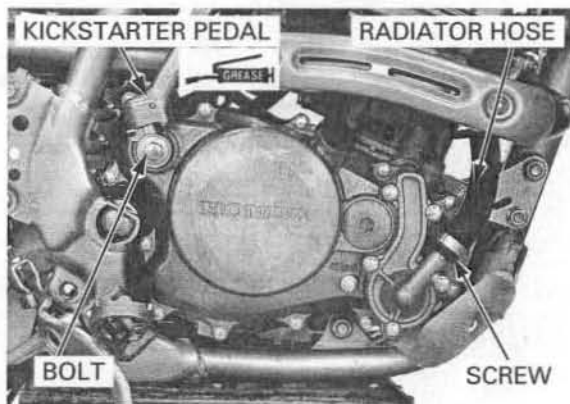
Install the brake pedal (page 14-22).

Add the recommended coolant mixture to the filler neck and bleed the air (page 6-7).

Fill the transmission with the recommended oil (page 3-16).

Check and adjust the rear brake pedal height (page 3-23).

Start the engine and check for oil leaks.



## CLUTCH

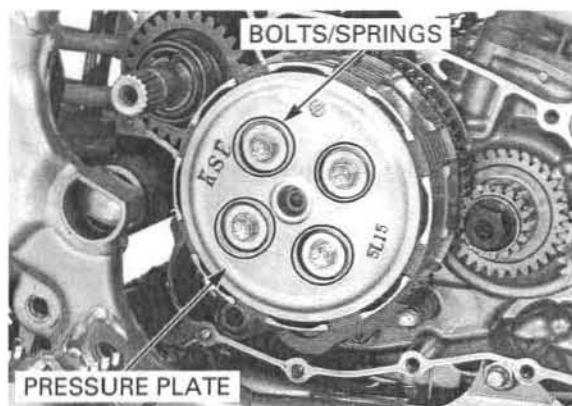
### REMOVAL

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

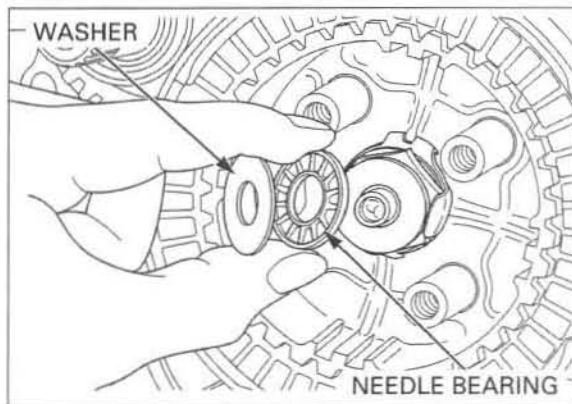
Remove the clutch spring bolts in a crisscross pattern in two or three steps.

Remove the clutch springs.

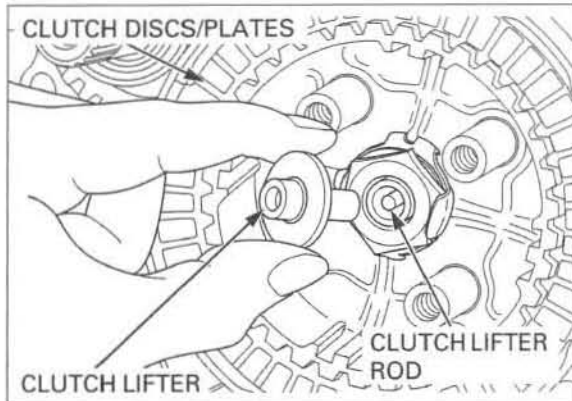
Remove the clutch pressure plate.



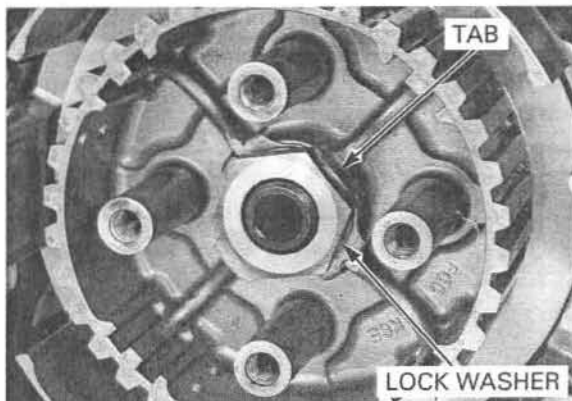
Remove the thrust washer and needle bearing.



Remove the clutch lifter and clutch lifter rod.  
Remove the six clutch discs and five clutch plates.



Bend the tab of the lock washer away from the lock nut.





## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Remove the clutch center lock nut while holding the clutch center using the special tool.

**TOOL:**

**Clutch center holder**

**07724-0050002 or  
equivalent com-  
mercially avail-  
able in U.S.A.**

Remove the thrust washer and lock washer.  
Remove the special tool and clutch center.

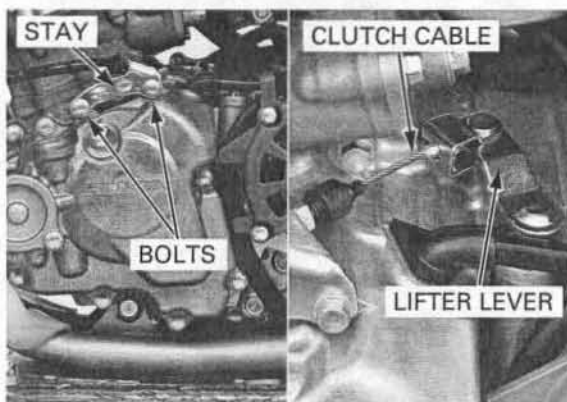
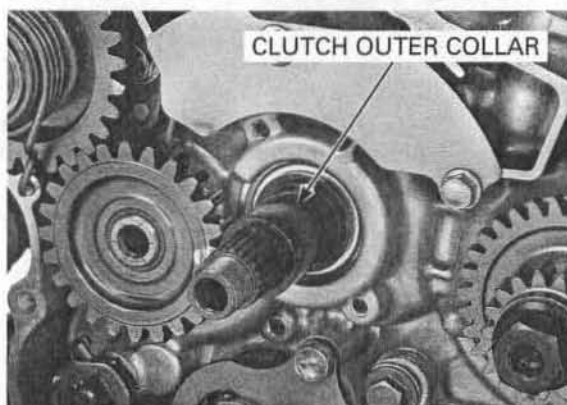
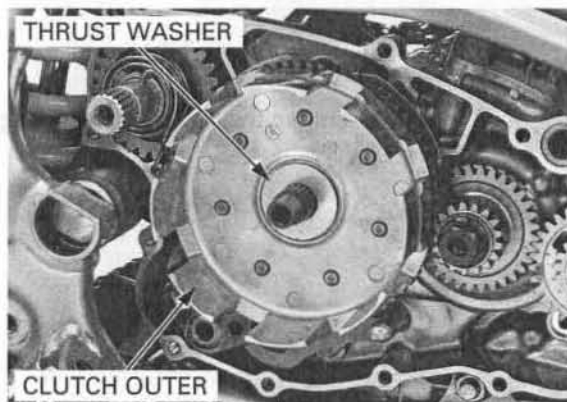
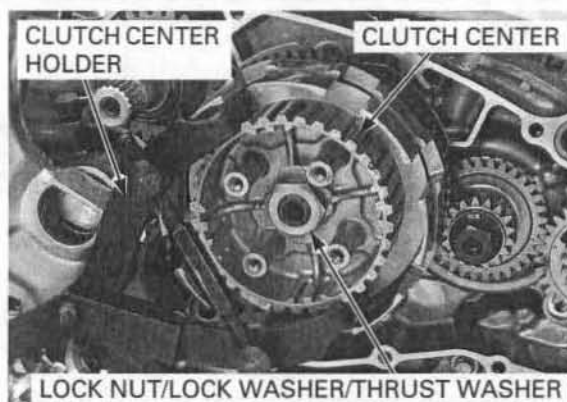
Remove the thrust washer and clutch outer.

Remove the clutch outer collar.

Remove the bolts and clutch cable stay.

Disconnect the clutch cable from the clutch lifter lever.

Remove the clutch lifter lever from the left crankcase.





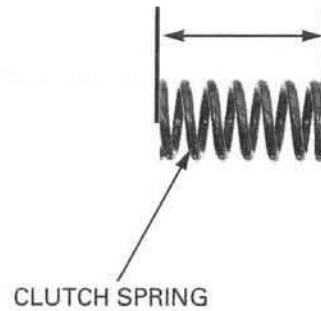
## INSPECTION

### CLUTCH SPRING

*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: 39.95 mm (1.57 in)**



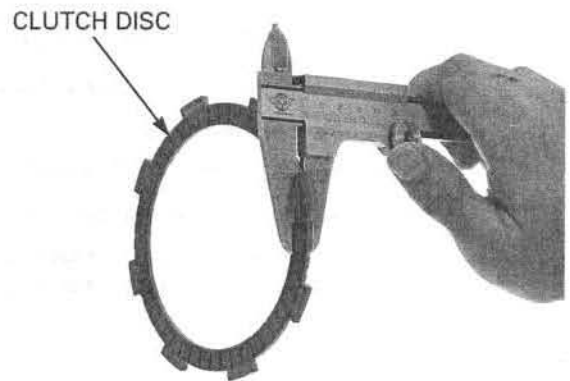
### CLUTCH DISCS

Check the clutch discs for signs of scoring or discoloration.

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

Measure the thickness of each disc.

**SERVICE LIMIT: 2.85 mm (0.112 in)**



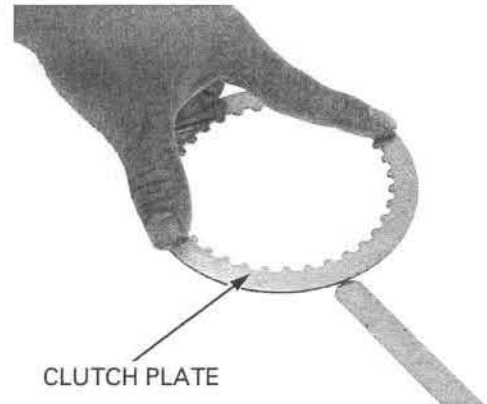
### CLUTCH PLATES

Check the plates for excessive warpage or discoloration.

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

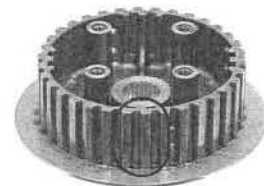
Measure the warpage of the plates.

**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

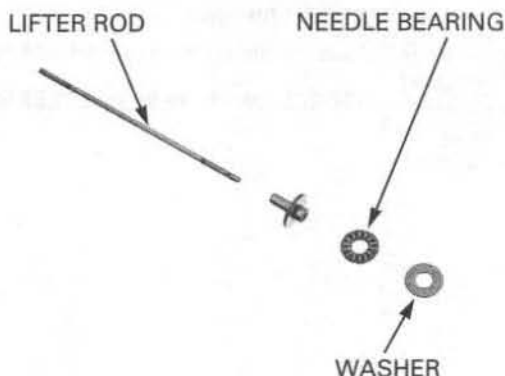
### CLUTCH LIFTER/NEEDLE BEARING

Assemble the lifter, needle bearing and washer.

Turn the clutch lifter with your finger and make sure the needle bearing turns smoothly.  
Replace the needle bearing and washer as a set if necessary.

### CLUTCH LIFTER ROD

Check the clutch lifter rod for damage and straightness.



### CLUTCH OUTER, COLLAR

Check the following:

- Clutch outer for nicks, indentations or abnormal wear made by the clutch discs
- Serrated teeth of the primary driven gear for wear or damage
- Clutch outer collar for abnormal wear or damage

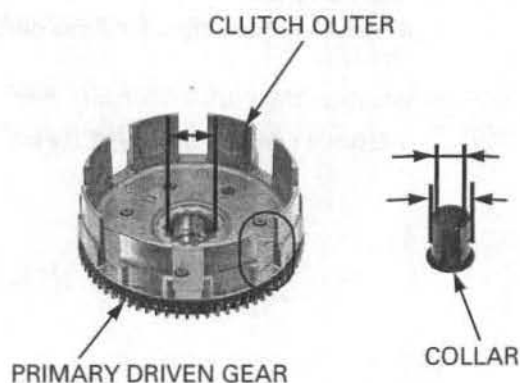
Measure the clutch outer I.D.

**SERVICE LIMIT: I.D. : 22.04 mm (0.868 in)**

Measure the clutch outer collar I.D. and O.D.

**SERVICE LIMIT: I.D. : 17.03 mm (0.671 in)**

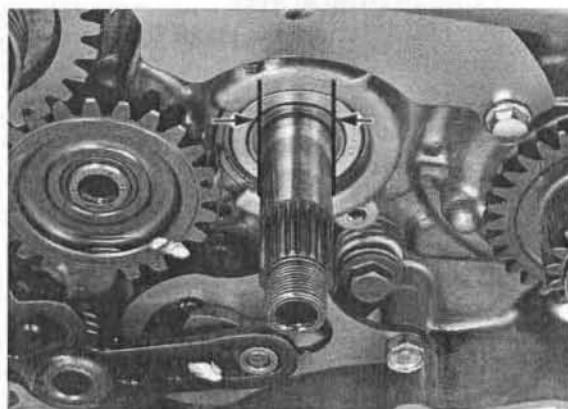
**O.D. : 21.94 mm (0.864 in)**



### MAINSHAFT

Measure the mainshaft O.D. at the idle gear bushing sliding surface.

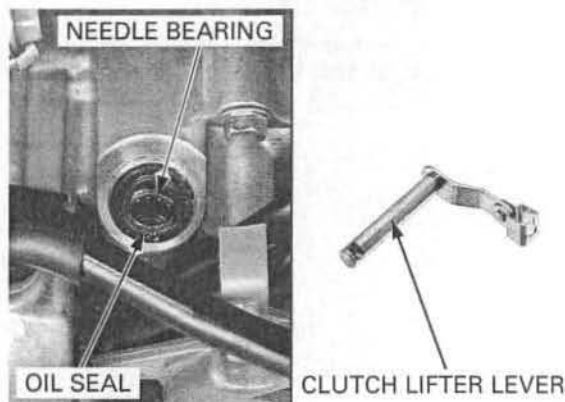
**SERVICE LIMIT: O.D. : 16.95 mm (0.667 in)**



### CLUTCH LIFTER LEVER

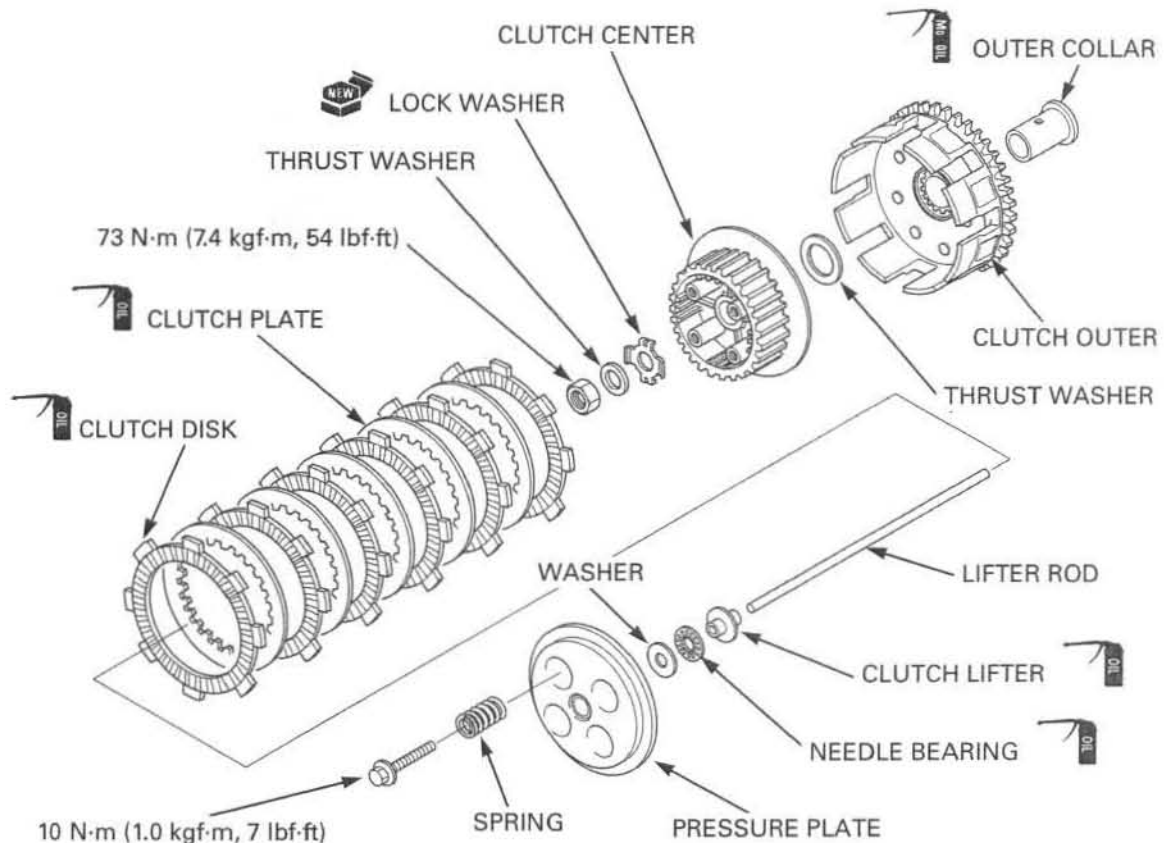
Check the clutch lifter lever for bend or damage.

Check the oil seal and needle bearing for wear or damage.



## INSTALLATION

Make sure the kick starter gear and gearshift linkage are installed before clutch installation

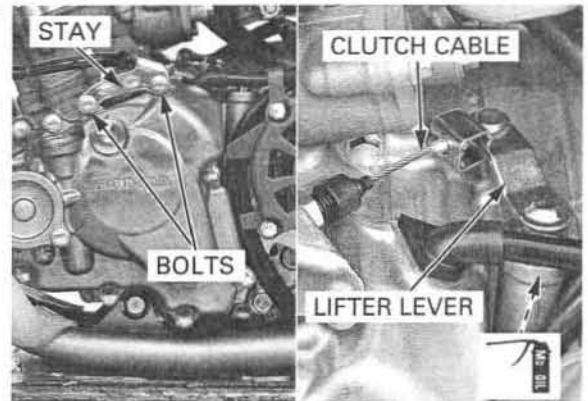


Apply molybdenum oil solution to the clutch lifter lever cam area.

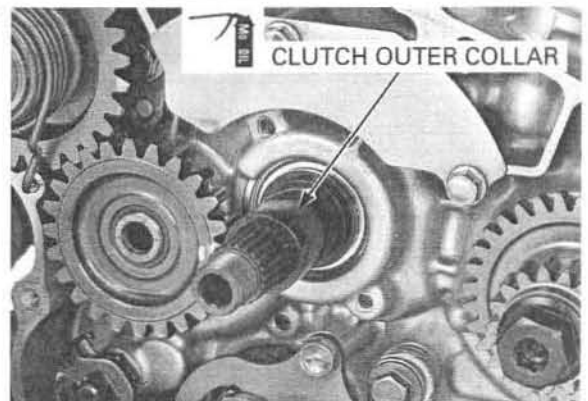
Install the clutch lifter lever into the left crankcase.

Connect the clutch cable end to the clutch lifter lever.

Install the clutch lifter lever stay and tighten the bolts securely.



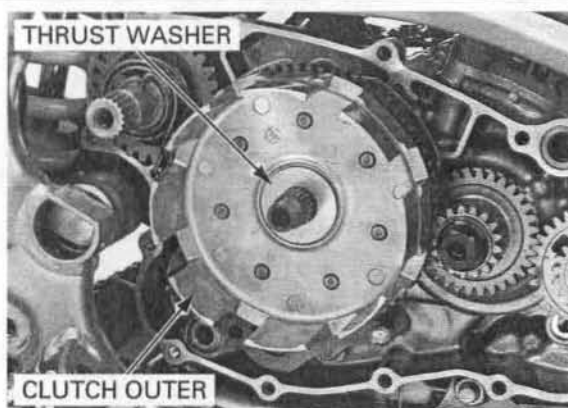
Apply molybdenum oil solution to the clutch outer collar sliding surface.  
Install the clutch outer collar.



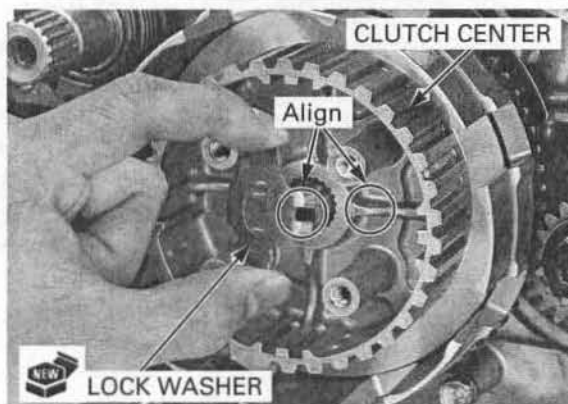


## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Install the clutch outer and thrust washer.



Install the clutch center onto the mainshaft.  
Install a new lock washer by aligning its groove with the clutch center rib.



Install the thrust washer.  
Apply oil to the threads and seating surface of the clutch center lock nut, then install it onto the main shaft.

Tighten the lock nut to the specified torque while holding the clutch center using the special tool.

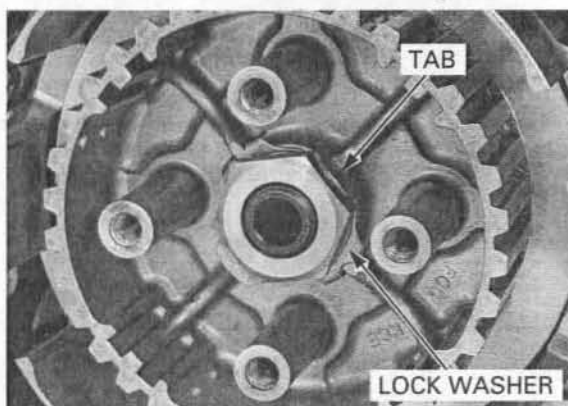
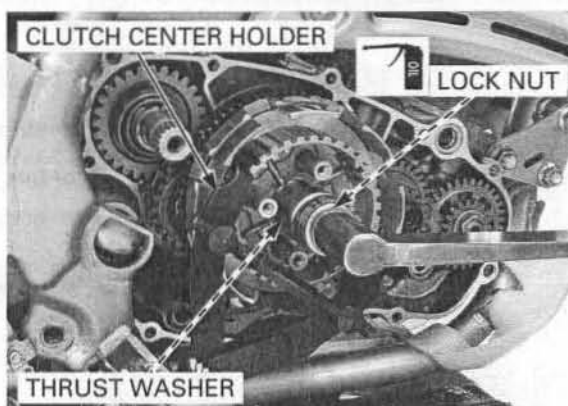
### TOOL:

Clutch center holder

07724-0050002 or  
equivalent com-  
mercially avail-  
able in U.S.A.

**TORQUE: 73 N·m (7.4 kgf·m, 54 lbf·ft)**

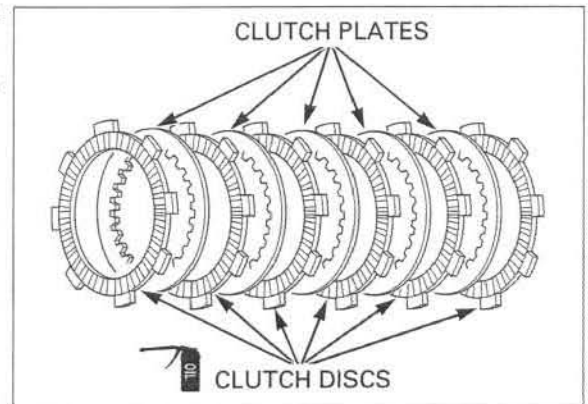
Bend the tabs of the lock washer up against the clutch center lock nut.



## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

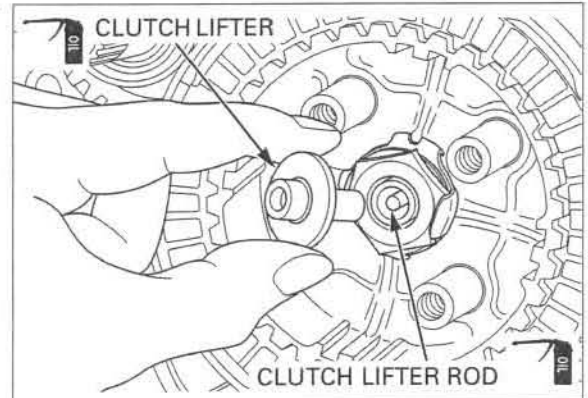
Coat the clutch plates and discs with clean engine oil.

Install the six clutch discs and five clutch plates alternately, starting with a disc.



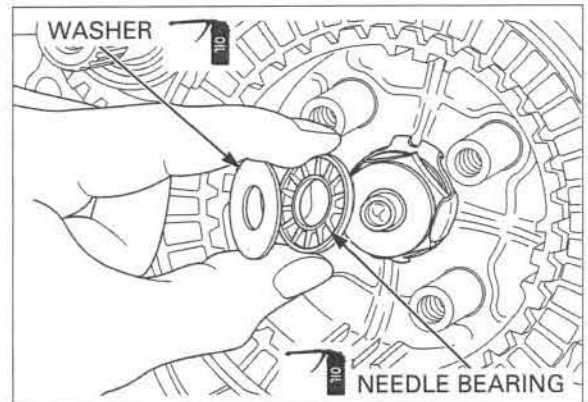
Apply engine oil to the clutch lifter and clutch lifter rod contact surface.

Insert the clutch lifter rod into the mainshaft.  
Install the clutch lifter.



Apply engine oil to the washer and needle bearing.

Install the needle bearing and washer to the clutch lifter.



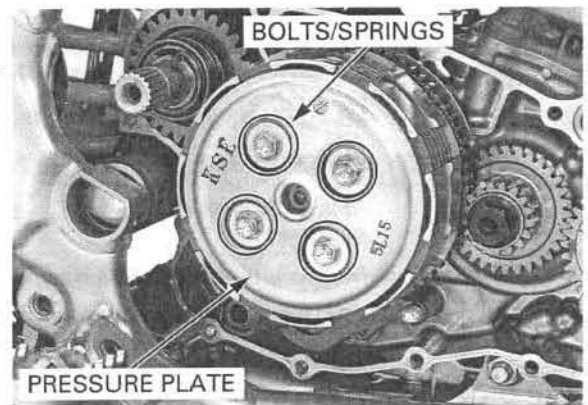
Install the clutch pressure plate.

Install the springs and spring bolts.

Tighten the bolts to the specified torque in a criss-cross pattern in two or three steps.

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

Install the right crankcase cover (page 10-6).





## KICKSTARTER

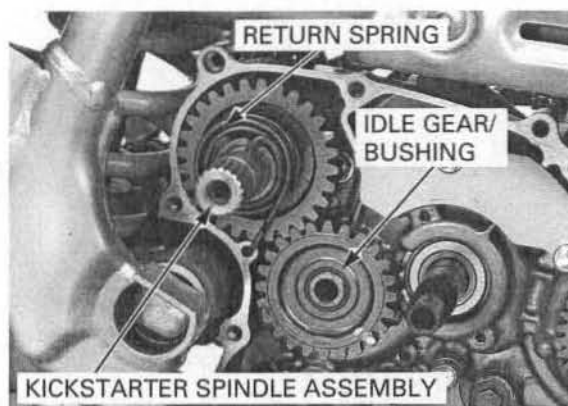
## REMOVAL

Remove the following:

- Right crankcase cover (page 10-5).
- Clutch (page 10-7).

Remove the idle gear and bushing.

Unhook the kickstarter return spring end from the crankcase, and remove the kickstarter spindle assembly out.



## DISASSEMBLY

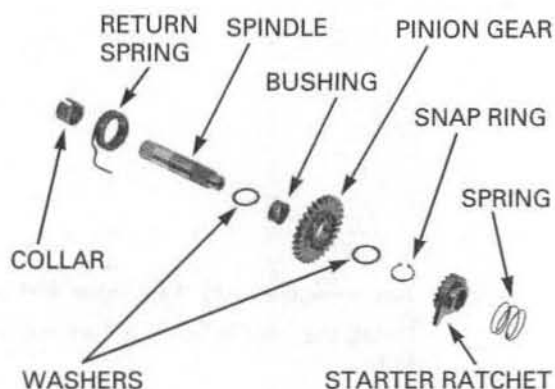
Disassemble the kickstarter spindle by removing the following:

- Return spring and collar
- Ratchet spring and starter ratchet
- Snap ring, thrust washers and pinion gear
- Pinion gear bushing

## INSPECTION

Check the return spring and ratchet spring for fatigue or damage.

Check the starter ratchet for wear or damage.



Check these parts as follows:

- Kickstarter pinion gear for wear or damage
- Kickstarter spindle for bend, wear or damage
- Kickstarter pinion gear bushing for damage or excessive wear

Measure the kickstarter pinion gear I.D.

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

Measure the kickstarter pinion gear bushing I.D. and O.D.

**SERVICE LIMIT: I.D. : 20.04 mm (0.789 in)**

**O.D. : 21.96 mm (0.865 in)**

Measure the kickstarter spindle O.D.

**SERVICE LIMIT: 19.97 mm (0.786 in)**

Check the starter idle gear and bushing for wear or damage.

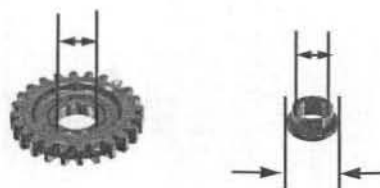
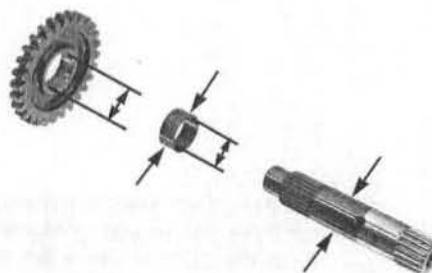
Measure the starter idle gear I.D.

**SERVICE LIMIT: 18.06 mm (0.711 in)**

Measure the starter idle gear bushing I.D. and O.D.

**SERVICE LIMIT: I.D. : 15.04 mm (0.592 in)**

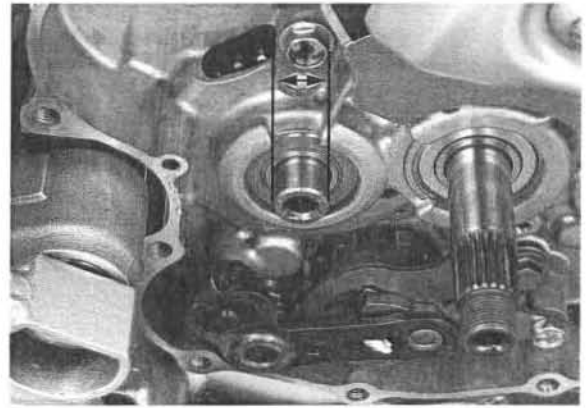
**O.D. : 17.96 mm (0.707 in)**



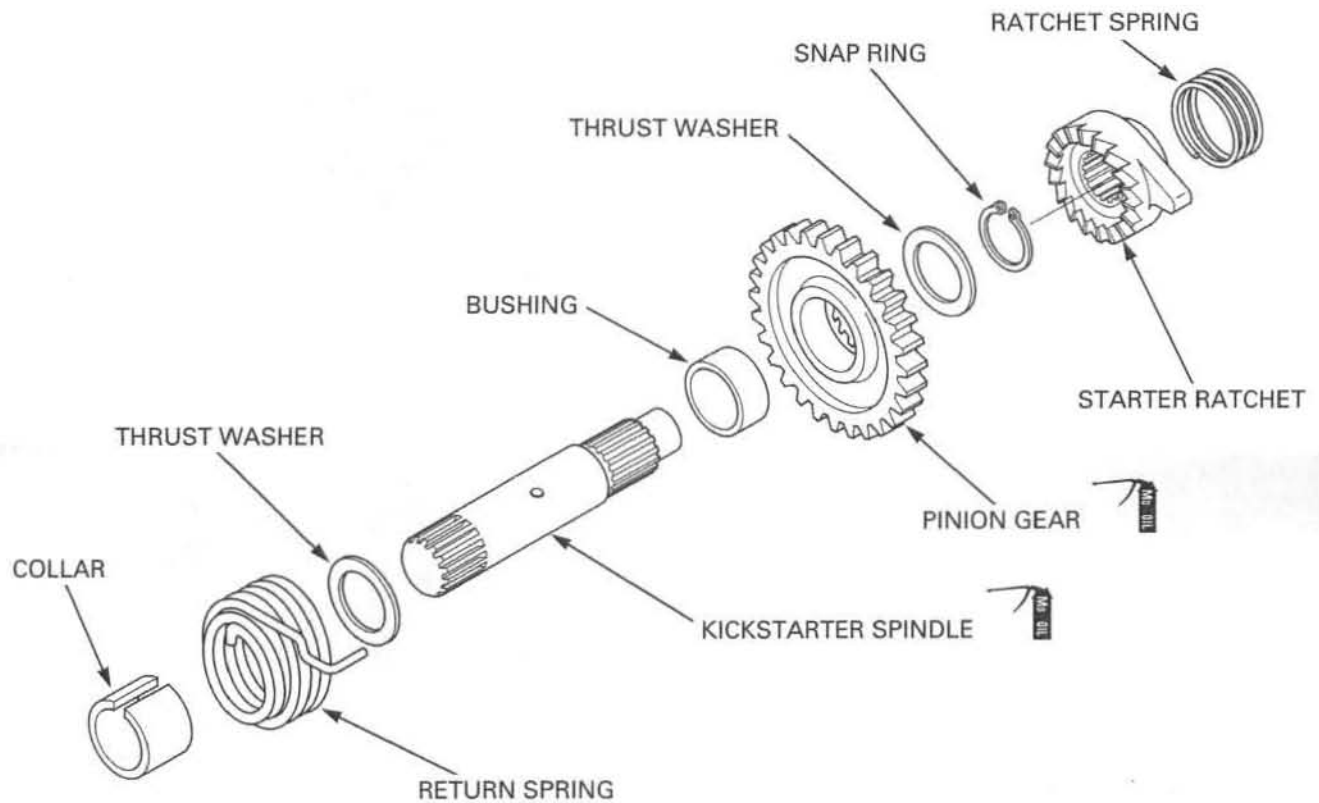


Measure the countershaft O.D. at the idle gear bushing sliding surface.

**SERVICE LIMIT:** 14.95 mm (0.589 in)

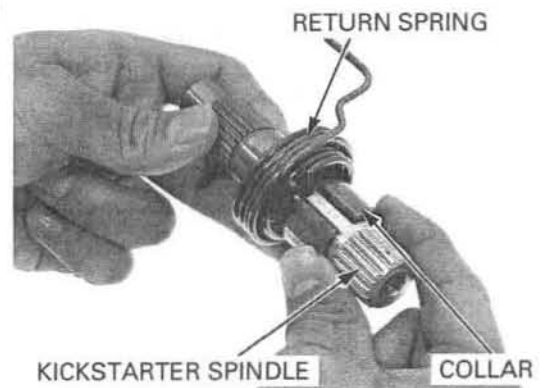


### ASSEMBLY



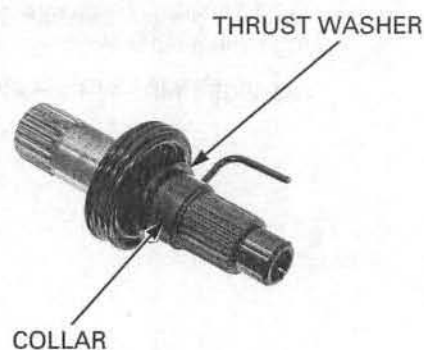
Insert the return spring into the hole on the kickstarter spindle.

Install the collar aligning the gap of the collar with the spring.



## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Install the thrust washers and pinion gear bushing onto the kickstarter spindle.

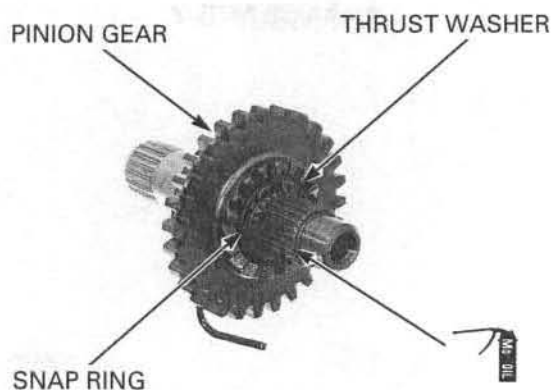


Apply molybdenum oil solution to the pinion gear inner surface.

Install the pinion gear and thrust washer.

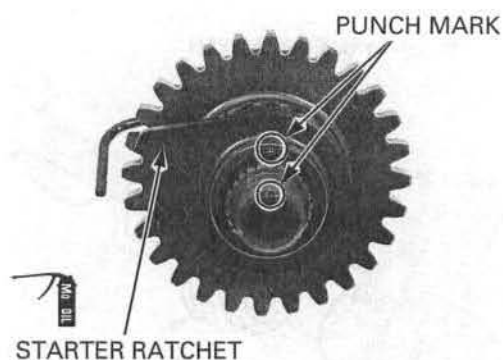
Install the snap ring in the groove of the spindle.

*Set the sharp edge of the snap ring facing out. Check that the snap ring is seated in the groove.*



Apply molybdenum oil solution to the starter ratchet inner surface.

Align the punch marks and install the starter ratchet.

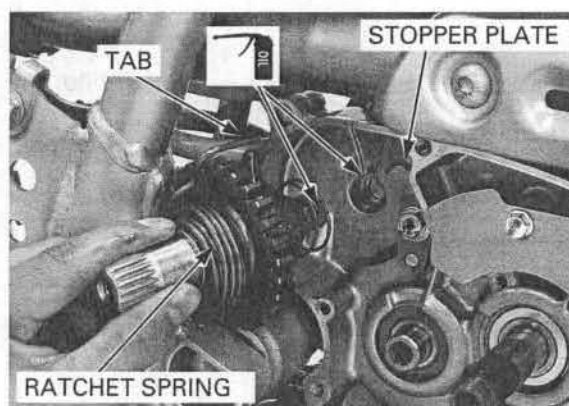


## INSTALLATION

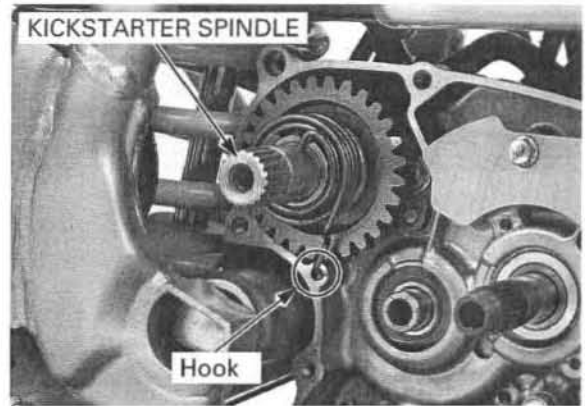
Install the ratchet spring.

Apply engine oil solution to the kickstarter spindle journal.

Install the kickstarter assembly to the crankcase and rotate the spindle counterclockwise until the ratchet tab is clear of the stopper plate.



Hook the return spring end into the hole in the crankcase.

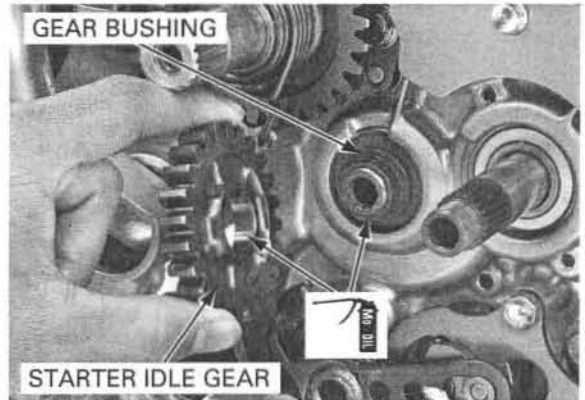


Apply molybdenum oil solution to the kickstarter idle gear bushing and starter idle gear inner surface.

Install the kickstarter idle gear bushing inner surface and starter idle gear onto the countershaft.

Install the clutch (page 10-11).

Install the right crankcase cover (page 10-6).



## GEARSHIFT LINKAGE

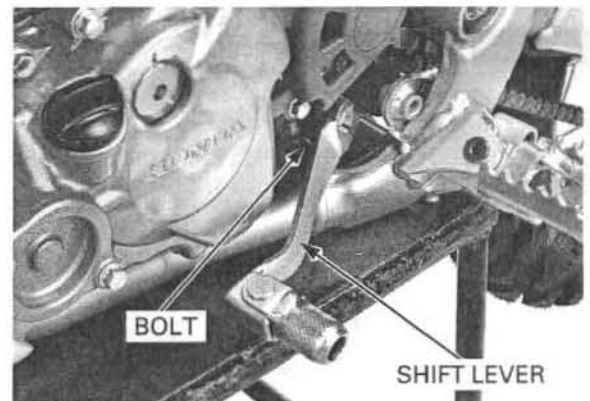
### REMOVAL

Remove the following:

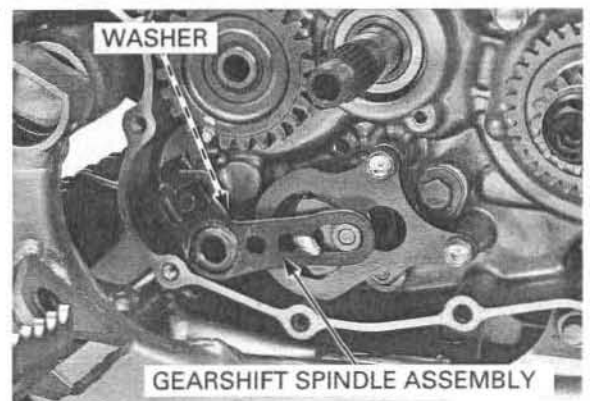
- Right crankcase cover (page 10-5).
- Clutch (page 10-7).

*When removing the shift lever, mark the pedal position to ensure correct reassembly in its original location.*

Remove the bolt and shift lever.



Remove the gearshift spindle assembly and washer from the crankcase.



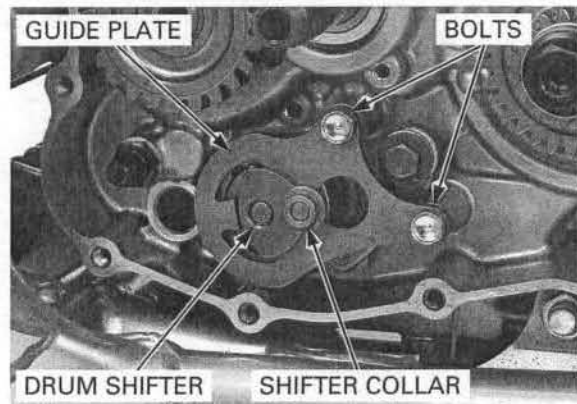


## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

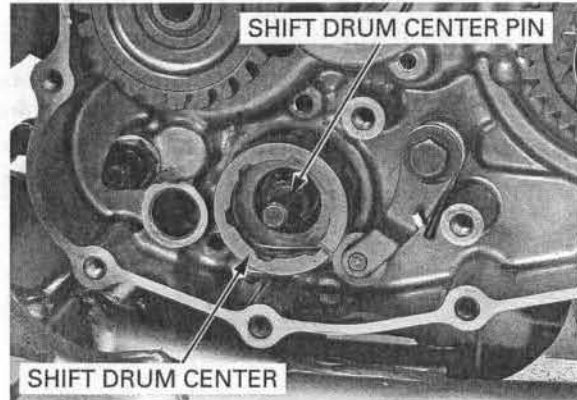
Remove the shifter collar.

*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.

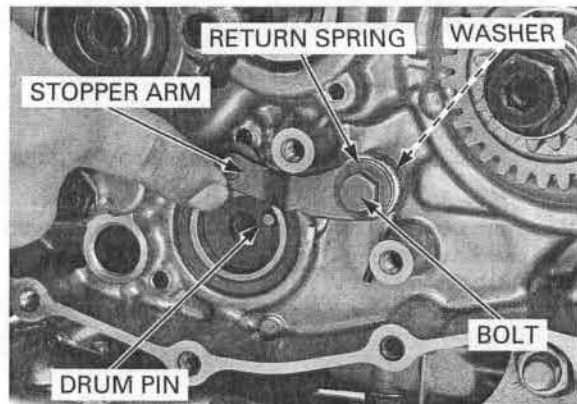


Remove the shift drum center pin and shift drum center.



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

Remove the drum pin from the shift drum.

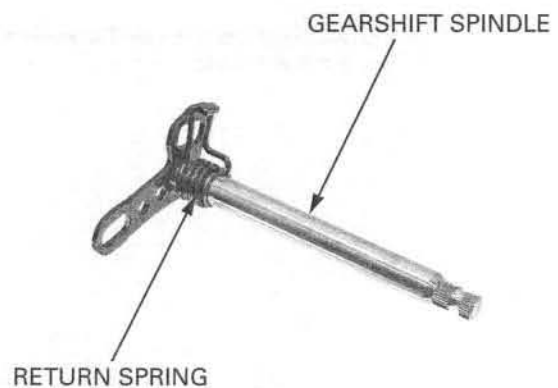


### INSPECTION

#### GEARSHIFT SPINDLE

Check the gearshift spindle for bend, wear or damage.

Check the return spring for fatigue or damage.



**RATCHET PAWL**

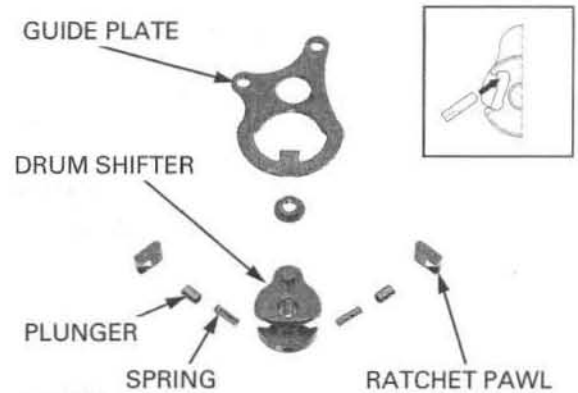
Remove the following:

- Guide plate
- Drum shifter
- Ratchet pawls
- Plungers
- Springs

Clean the ratchet pawls, plungers, springs and drum shifter with clean transmission oil.

Check each part for wear or damage.

Assemble the drum shifter, springs, plungers and ratchet pawls in the guide plate as shown.

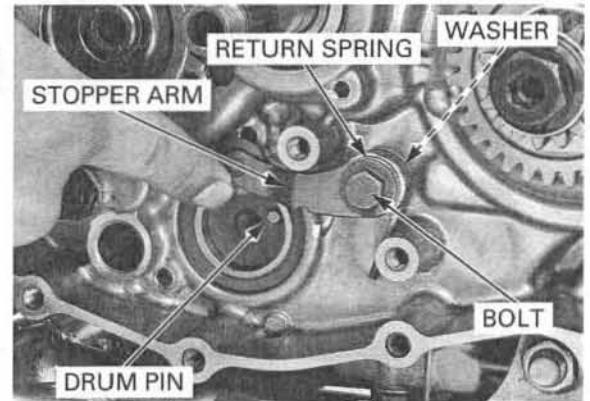
**INSTALLATION**

Install the drum pin into the hole on the shift drum.

Install the return spring, washer and stopper arm and tighten the stopper arm bolt to the specified torque.

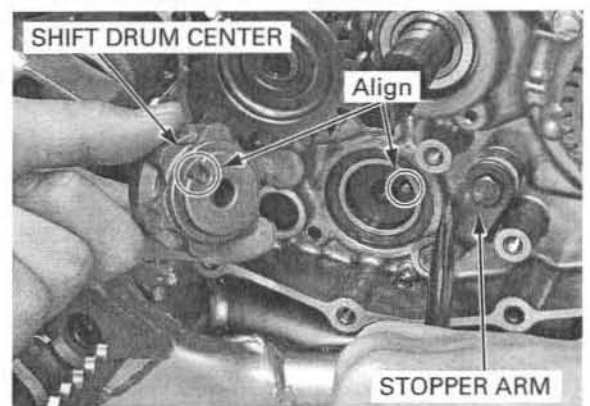
**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Check the stopper arm for proper operation.



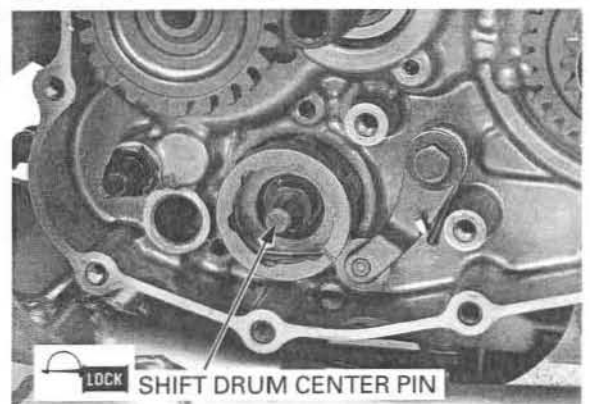
Move the stopper arm out of the way using a screwdriver.

Align the shift drum center groove with the drum pin.



Apply a locking agent to the gear shift drum center pin threads and then 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

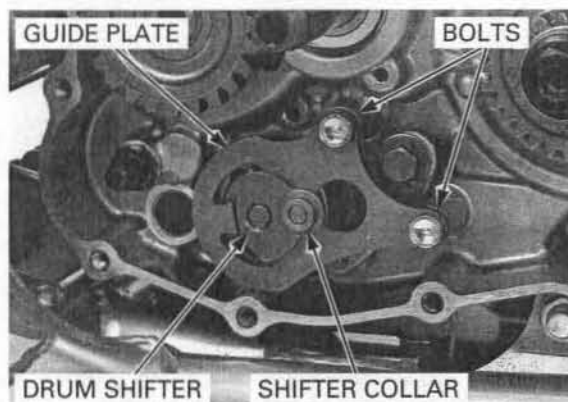
Set the shift drum center in a position other than neutral.

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.

Install and tighten the guide plate bolts securely.

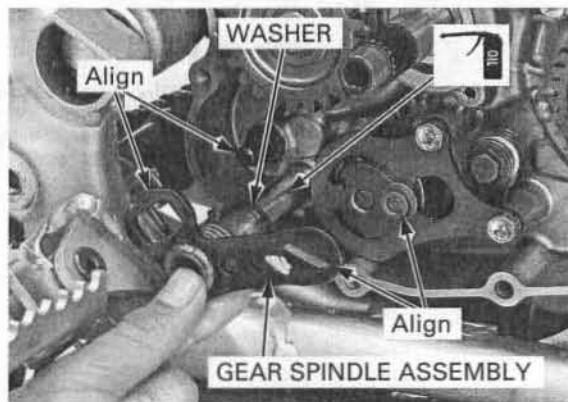
Install the shifter collar onto the drum shifter.



Apply engine oil to the gear shift spindle.

*Make sure to install the washer onto the gearshift spindle.*

Install the washer and gear shift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin and gearshift spindle end with the shifter collar.



Install the shift lever on its original position as marked during removal.

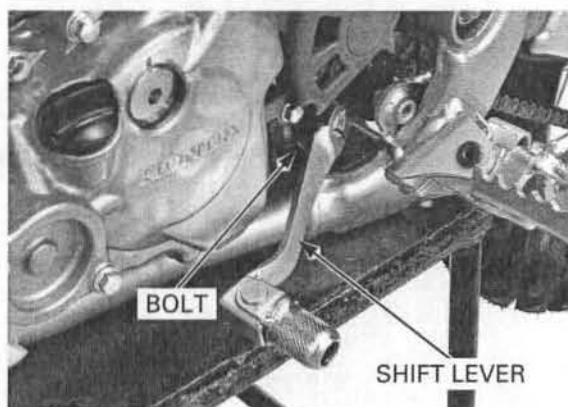
Tighten the bolt to the specified torque.

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

Move the shift lever and check the shift mechanism for smooth operation.

Install the clutch (page 10-11).

Install the right crankcase cover (page 10-6).



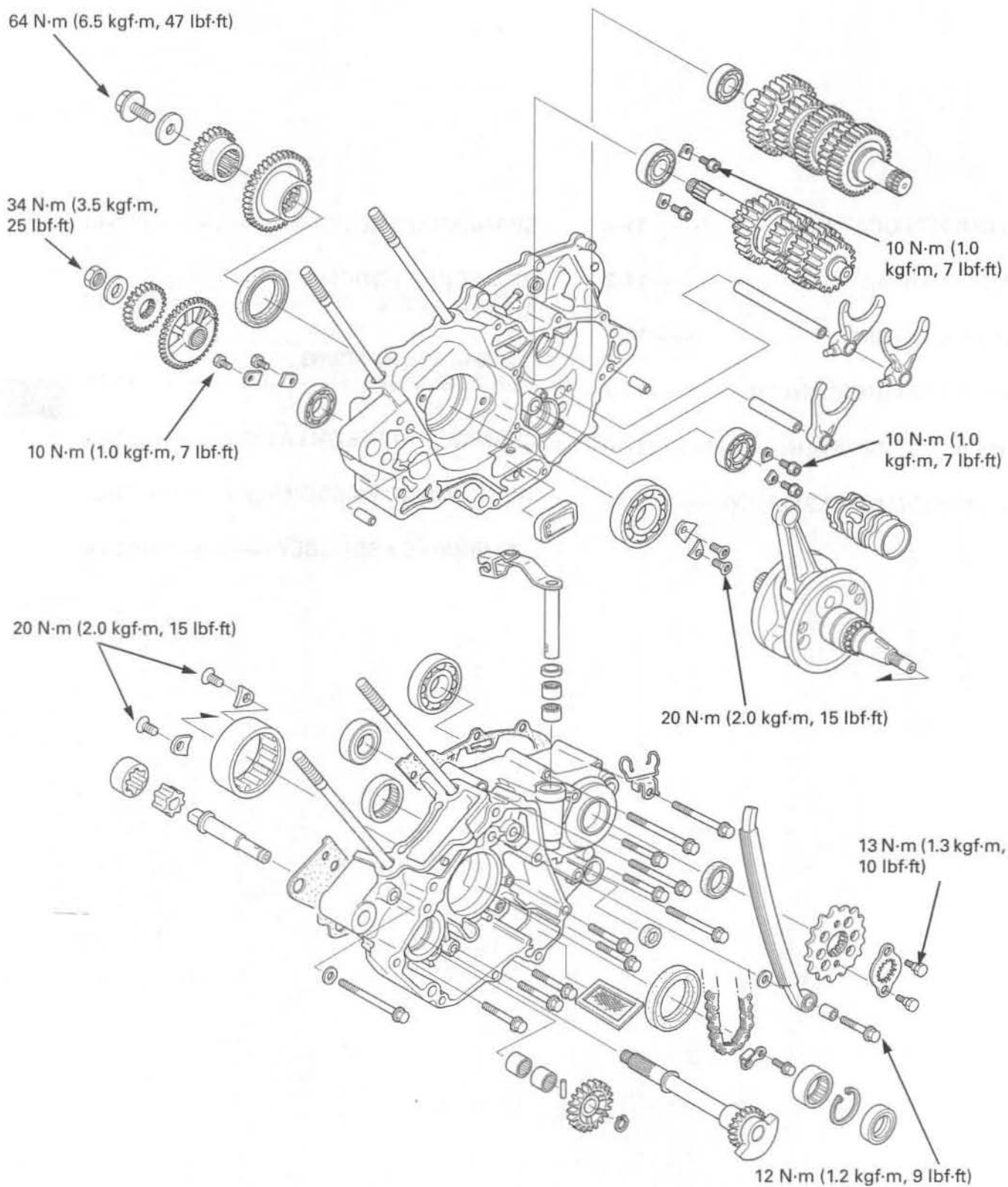


## 11. CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

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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.
- The engine must be out of the frame for this service.
- The following parts must be removed before separating the crankcase.
  - Engine (page 7-4)
  - Clutch (page 10-7)/kickstarter (page 10-14)/gearshift linkage (page 10-17)
  - Cylinder head (page 8-14)
  - Cylinder (page 9-4)/piston (page 9-4)
  - Flywheel (page 15-10)
  - Oil pump driven gear/oil strainer (page 4-4)

## 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	R	–	0.03 (0.001)
		L	–	0.05 (0.002)
Transmission	Gear I.D.	M4	21.020 – 21.041 (0.8276 – 0.8284)	21.07 (0.830)
		M5	21.020 – 21.041 (0.8276 – 0.8284)	21.07 (0.830)
		C1	19.520 – 19.542 (0.7685 – 0.7693)	19.57 (0.770)
		C2,C3	23.020 – 23.041 (0.9063 – 0.9071)	23.07 (0.908)
	Bushing O.D.	M4	20.959 – 20.980 (0.8252 – 0.8260)	19.95 (0.785)
		M5	20.979 – 21.000 (0.8259 – 0.8268)	19.95 (0.785)
		C1	19.479 – 19.500 (0.7689 – 0.7677)	19.45 (0.766)
		C2,3	22.979 – 23.000 (0.9047 – 0.9055)	22.95 (0.904)
	Bushing I.D.	M5	18.020 – 18.041 (0.7094 – 0.7103)	18.06 (0.711)
		C1	16.500 – 16.518 (0.6496 – 0.6503)	16.54 (0.651)
		C2,3	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
	Gear-to-bushing clearance	M4	0.040 – 0.082 (0.0015 – 0.0032)	0.12 (0.005)
		M5	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
		C1	0.020 – 0.063 (0.0008 – 0.0024)	0.12 (0.005)
		C2,3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	17.966 – 17.984 (0.7073 – 0.7080)	17.94 (0.706)
	Countershaft O.D.	C1	16.466 – 16.484 (0.6483 – 0.6490)	16.45 (0.648)
		C2,3	19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)
	Bushing-to-shaft clearance	M5	0.036 – 0.075 (0.0014 – 0.0030)	0.12 (0.005)
		C1	0.016 – 0.052 (0.0006 – 0.0020)	0.12 (0.005)
		C2,3	0.040 – 0.082 (0.0016 – 0.0032)	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.	C	10.989 – 11.011 (0.4236 – 0.4335)	11.04 (0.435)
		R	11.035 – 11.056 (0.4344 – 0.4353)	11.07 (0.436)
		L	11.035 – 11.056 (0.4344 – 0.4353)	11.07 (0.436)
	Fork shaft O.D.	C	10.966 – 10.984 (0.4317 – 0.4324)	10.95 (0.431)
		R	10.969 – 10.980 (0.4319 – 0.4323)	10.95 (0.431)
		L	10.969 – 10.980 (0.4319 – 0.4323)	10.95 (0.431)



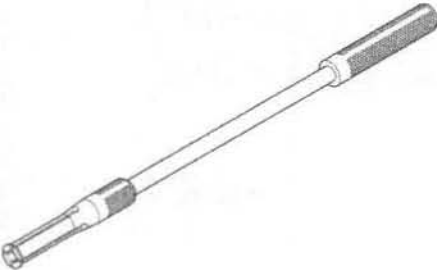
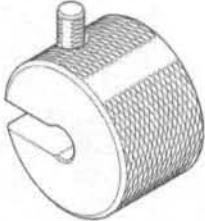
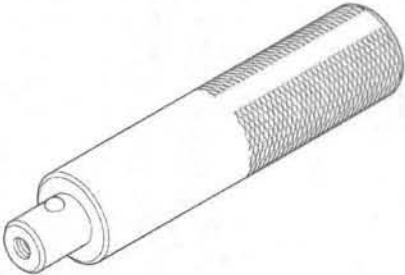






# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

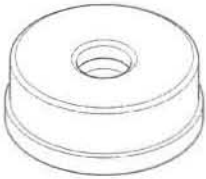
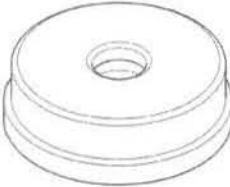






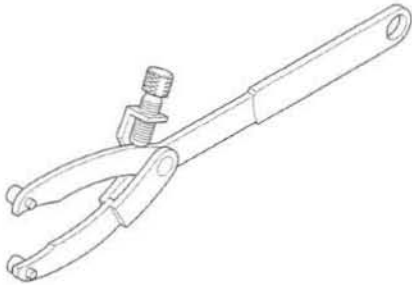
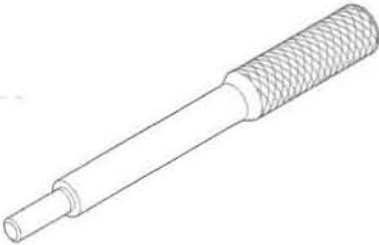
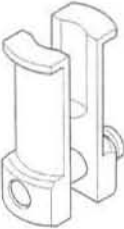
## TORQUE VALUE

Balancer shaft bearing set plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Crankshaft bearing set plate torx screw	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads
Shift drum bearing set plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Mainshaft bearing set plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Ratchet guide plate bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)	Apply locking agent to the threads
Drive sprocket bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Primary drive gear bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply oil to the threads
Balancer shaft nut	34 N·m (3.5 kgf·m, 25 lbf·ft)	Apply oil to the seating surface
Cam chain tensioner bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Transmission oil drain bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Oil jet	2.1 N·m (0.2 kgf·m, 1.6 lbf·ft)	ALOC bolt: replace with a new one.

## TOOLS

<p>Bearing remover shaft, 10 mm 07936-GE00100</p> 	<p>Bearing remover head, 10mm 07936-GE00200</p> 	<p>Bearing remover set, 15 mm 07936-KC10500</p> 
<p>Remover weight 07741-0010201</p>  <p>or 07936-3710200 or 07936-371020A (U.S.A.only)</p>	<p>Driver 07749-0010000</p> 	<p>Attachment, 28 x 30 mm 07946-1870100</p> 
<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 

# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

<p>Attachment, 52 x 55 mm 07746-0010400</p> 	<p>Attachment, 62 x 68 mm 07746-0010500</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, 25 mm 07746-0040600</p> 	<p>Gear holder, M1.5 07724-0010200</p>  <p>or 07724-001A200 (U.S.A. only)</p>	<p>Universal holder 07725-0030000</p> 
<p>Valve guide driver 07ZMD-MCH0100</p> 	<p>Needle bearing remover 24 mm 07LMC-KV30200</p>  <p>or equivalent commercially 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
- Worn balancer shaft bearings
- Improper balancer installation
- Worn, seized or chipped transmission gear
- Worn or damaged transmission bearing

#### Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Broken shift drum stopper arm spring
- Worn or bent shift forks
- Broken gearshift spindle return spring

#### Hard to shift

- Improper clutch operation
- Incorrect transmission oil weight
- Incorrect clutch adjustment
- Bent shift fork
- Bent fork shaft
- Bent fork claw
- Damaged shift drum guide grooves
- Bent shift spindle

#### Engine vibration

- Excessive crankshaft runout
- Improper balancer timing



**BALANCER GEAR/BALANCER****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)
- Flywheel (page 15-10)

Temporarily install the clutch outer collar, and clutch outer onto the mainshaft.

Insert the gear holder between the primary drive and driven gears.

**TOOL:**

**Gear holder, M1.5**

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

Remove the primary drive gear bolt, then remove the washer and drive gear.

Remove the gear holder, clutch outer and outer collar.

Insert the gear holder between the balancer drive and driven gears.

**TOOL:**

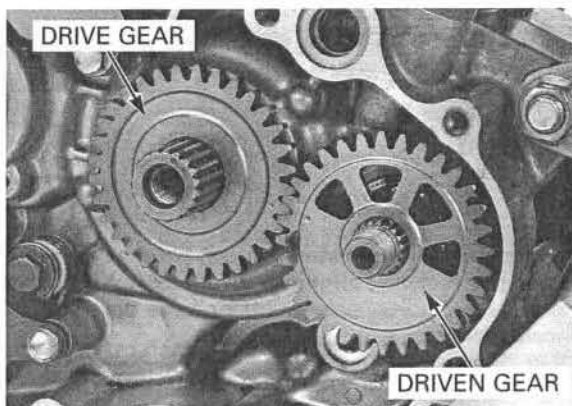
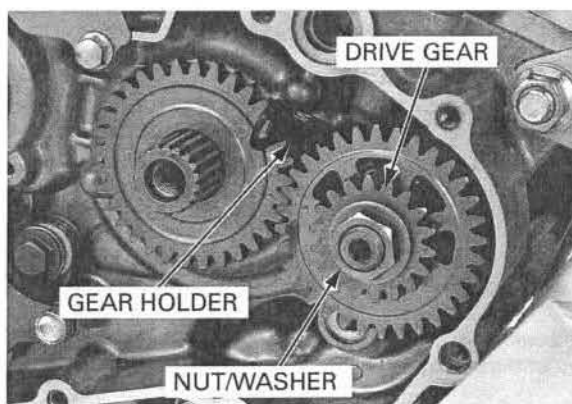
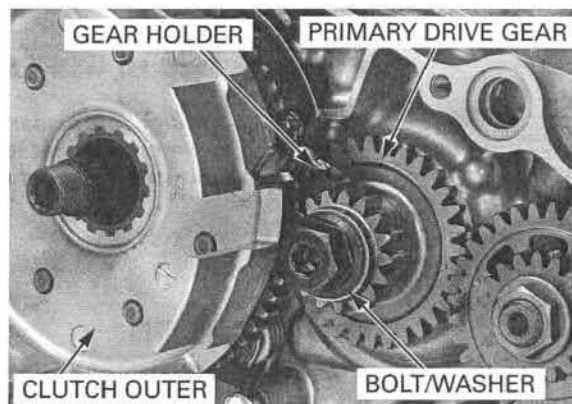
**Gear holder, M1.5**

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

Remove the balancer shaft nut and washer and water pump drive gear.

Remove the gear holder.

Remove the driven gear and drive gear.



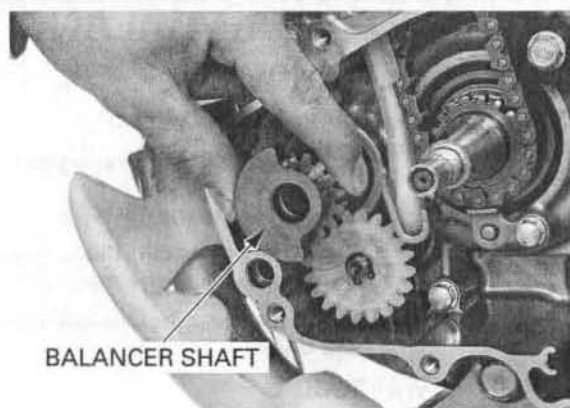
## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Turn the balancer shaft as shown and remove it.

### INSPECTION

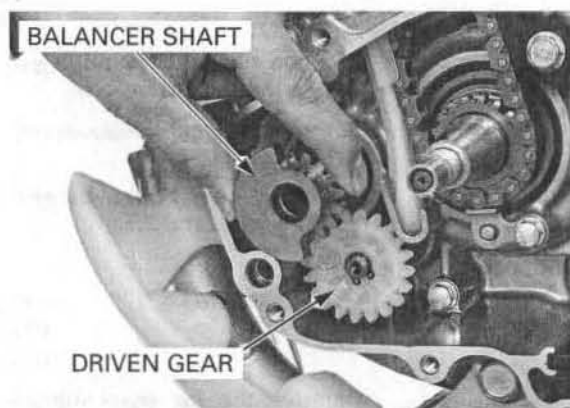
Check the following:

- Balancer shaft for wear, damage or excessive scratches
- Balancer shaft gear for wear or damage
- Balancer drive/driven gear for wear or damage
- Primary drive gear for wear or damage

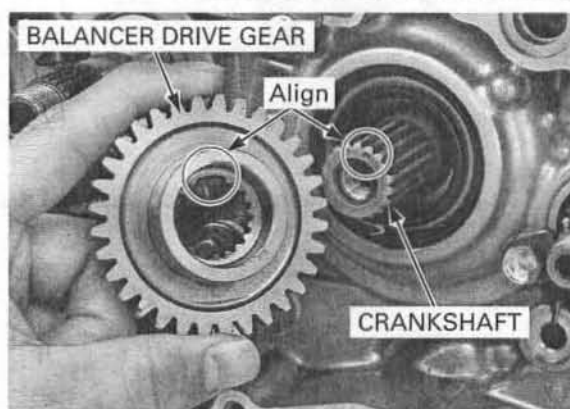


### INSTALLATION

*Engage the balancer shaft gear portion with oil pump driven gear.* Install the balancer shaft into the crankcase as shown.

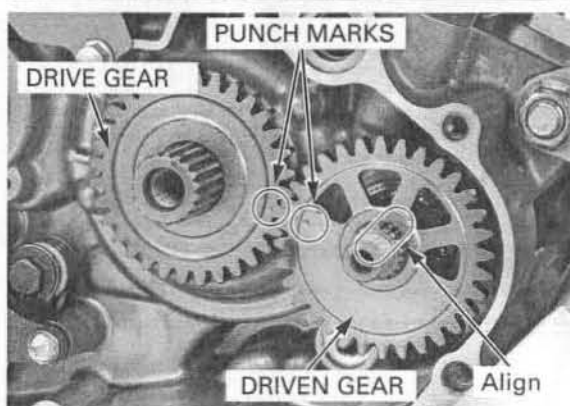


*Install the balancer drive gear with the flat side facing toward the outside of the crankcase.* Install the balancer drive gear while aligning its wide cut-out in the splines with the punch mark on the crankshaft.



*Install the balancer driven gear with the flat side facing toward the outside of the crankcase.* Install the driven gear into the balancer shaft while aligning its wide cut-out in the splines with the punch mark on the balancer shaft.

- Align the punch mark of the driven gear with the punch mark of the drive gear.

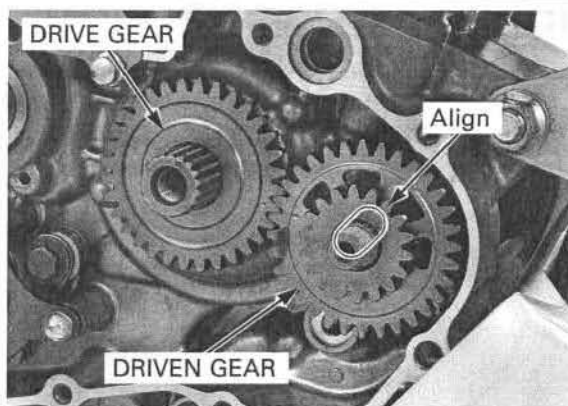




Install the water pump drive gear into the balancer shaft while aligning its wide cut-out in the splines with the punch mark on the balancer shaft.

Apply oil to the balancer shaft nut seating surface.

- Align the punch mark of the driven gear with the punch mark of the drive gear.



Insert the gear holder between the balancer drive and driven gears.

**TOOL:**

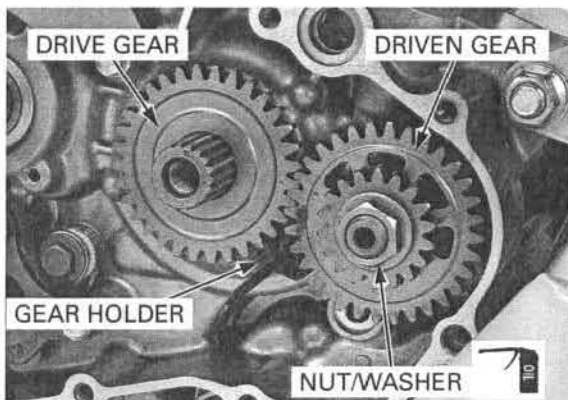
**Gear holder, M1.5**

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

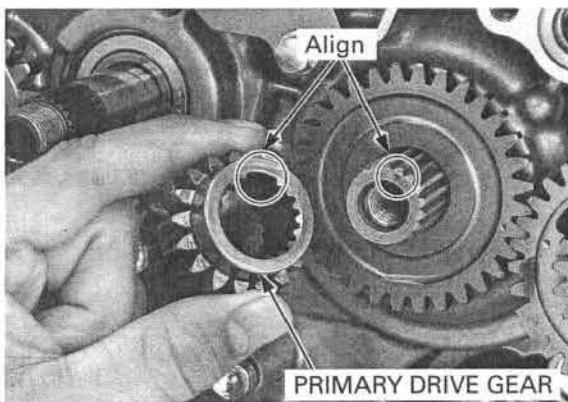
Apply oil to the balancer shaft nut seating surface.

Install and tighten the balancer shaft nut to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**



Install the primary drive gear aligning its wide cut-out in the splines with the punch mark on the crankshaft.



Temporarily install the clutch outer collar, and clutch outer onto the mainshaft.

Insert the gear holder between the primary drive and driven gears.

**TOOL:**

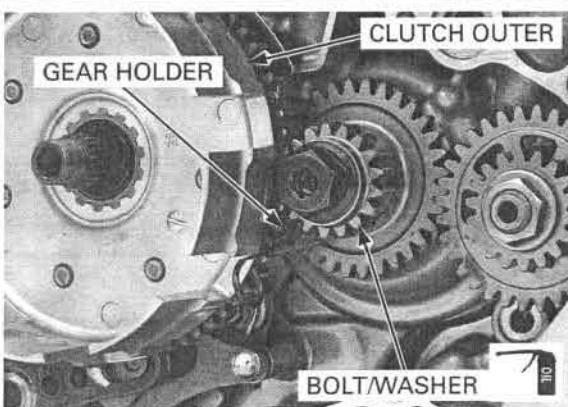
**Gear holder, M1.5**

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

Apply oil to the primary drive gear bolt threads.

Install the washer and bolt, and tighten the bolt to the specified torque.

**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**



Remove the gear holder.

Install the following:

- Flywheel (page 15-11)
- Clutch (page 10-11)
- Right crankcase cover (page 10-6)



## CRANKCASE SEPARATION

Refer to service information (page 11-3) for removal of necessary parts before separating the crankcase.

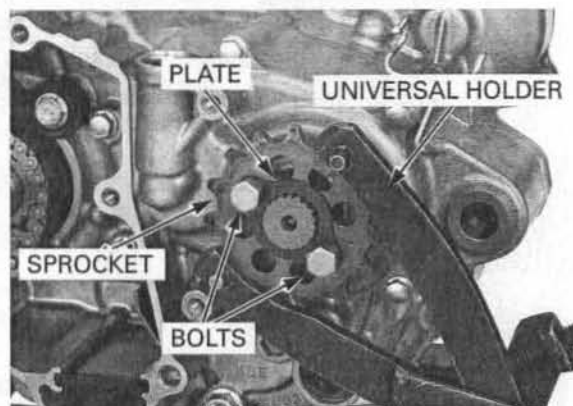
Loosen the drive sprocket bolts while holding the sprocket with the special tool as shown.

**TOOL:**

**Universal holder**

**07725-0030000**

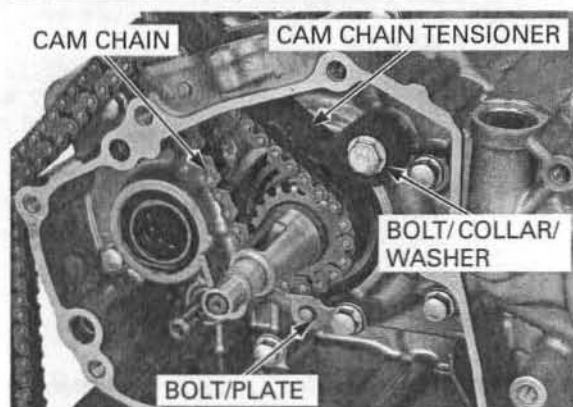
Remove the drive sprocket bolts, fixing plate and drive sprocket.



Remove the bolt, washer, collar and cam chain tensioner.

Remove the bolt and cam chain guide plate.

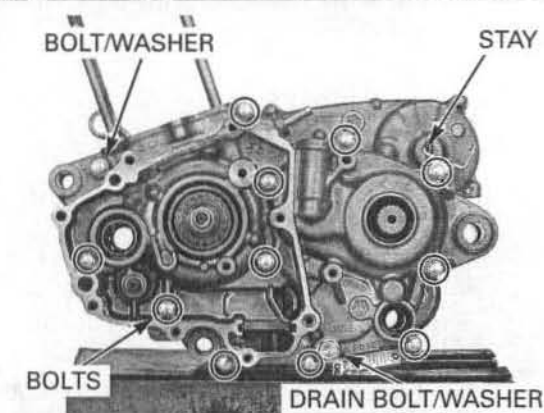
Remove the cam chain from the timing sprocket.



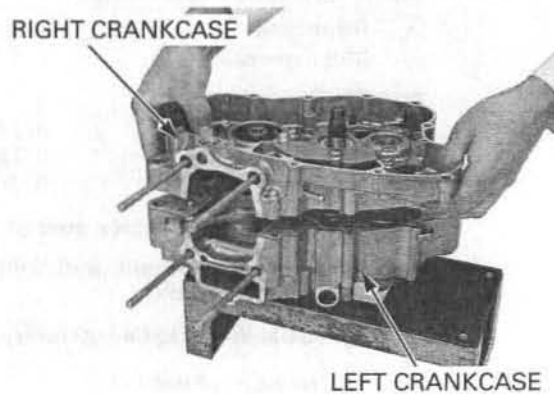
Remove the transmission oil drain bolt and washer.

Loosen the crankcase bolts in a crisscross pattern in two or three steps.

Remove the crankcase bolts, washer and stay.

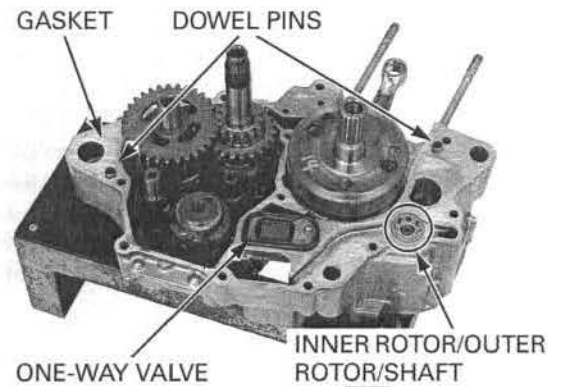


Place the left crankcase facing down and remove the right crankcase.



Remove the following:

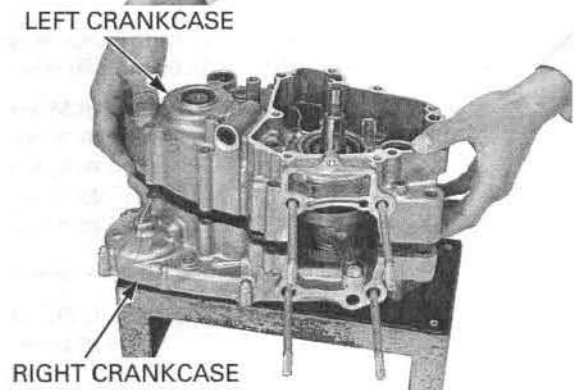
- oil pump inner/outer rotors and shaft
- one-way valve
- dowel pins
- gasket



## TRANSMISSION DISASSEMBLY

Temporarily install the right crankcase.

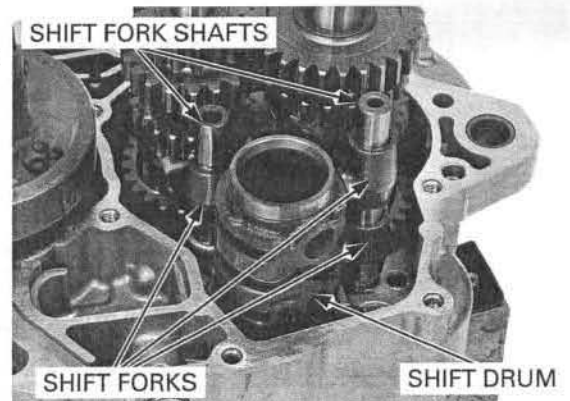
Place the right crankcase facing down and remove the left crankcase.



Remove the shift fork shafts.

Remove the shift fork guide pins from the shift drum grooves and remove the shift drum.

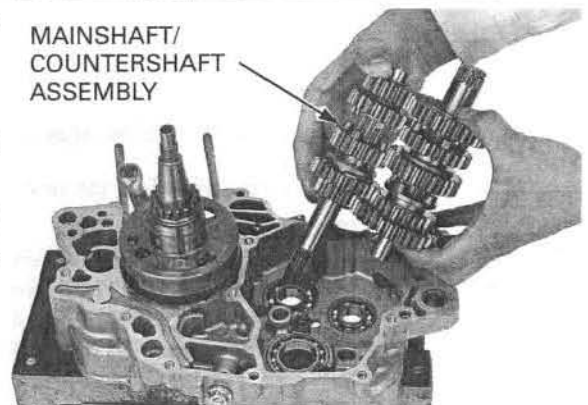
Remove the shift forks.



Remove the mainshaft and countershaft as an assembly from the right crankcase.

### Disassemble the transmission:

- Keep track of the disassembled parts (gears, bushings, 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****GEAR**

Check the gear dogs, dog holders and teeth for damage or excessive wear.  
Measure the I.D. of each gear.

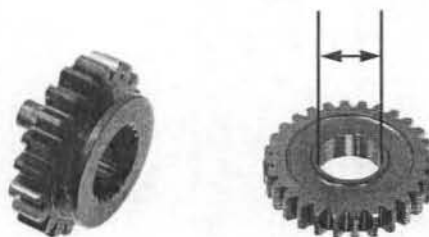
**SERVICE LIMITS:** M4: 21.07 mm (0.830 in)

M5: 21.07 mm (0.830 in)

C1: 19.57 mm (0.770 in)

C2: 23.07 mm (0.908 in)

C3: 23.07 mm (0.908 in)

**BUSHING**

Check the bushings for damage or excessive wear.  
Measure the O.D. of each bushing.

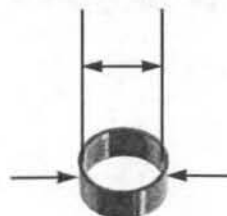
**SERVICE LIMITS:** M4: 19.95 mm (0.785 in)

M5: 19.95 mm (0.785 in)

C1: 19.45 mm (0.766 in)

C2: 22.95 mm (0.904 in)

C3: 22.95 mm (0.904 in)



Measure the I.D. of countershaft bushing.

**SERVICE LIMITS:** M5: 18.06 mm (0.711 in)

C1: 16.54 mm (0.651 in)

C2: 20.06 mm (0.790 in)

C3: 20.06 mm (0.790 in)

**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 gear and bushing sliding areas.

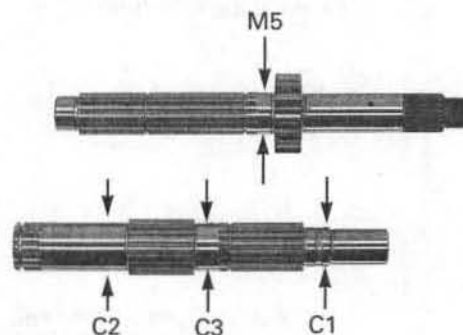
**SERVICE LIMITS:**

Mainshaft: M5: 17.94 mm (0.706 in)

Countershaft: C1: 16.45 mm (0.648 in)

C2: 19.94 mm (0.785 in)

C3: 19.94 mm (0.785 in)

**SHIFT FORK**

Check the shift fork 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: 11.07 mm (0.436 in)

Left: 11.07 mm (0.436 in)

Claw thickness: 4.8 mm (0.19 in)





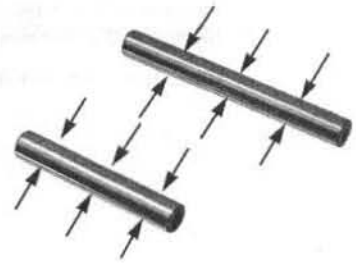
**SHIFT FORK SHAFT**

Check the shift fork shaft for abnormal wear or deformation.

Measure the shift fork shaft O.D.

**SERVICE LIMITS:**

Center:	10.95 mm (0.431 in)
Right:	10.95 mm (0.431 in)
left:	10.95 mm (0.431 in)

**SHIFT DRUM**

Inspect the shift drum for scoring, scratches or evidence of insufficient lubrication.

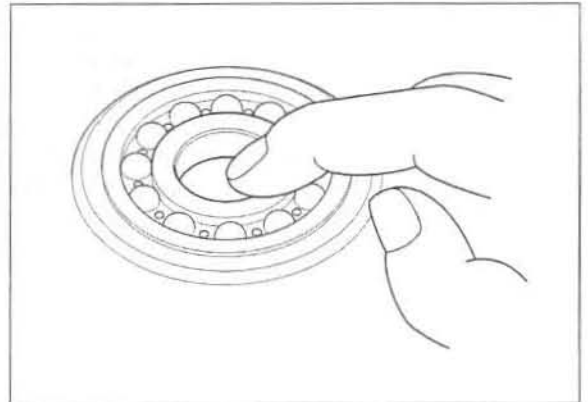
Check the shift drum grooves for abnormal wear or damage.

SHIFT DRUM

**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 fits tightly in the crankcase.

Replace any bearing if the race does not turn smoothly and quietly, or if the bearing fits loosely in the crankcase (page 11-16).



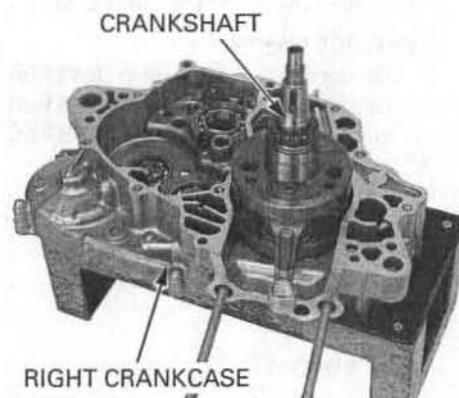
## CRANKSHAFT REMOVAL

### REMOVAL

Separate the crankcase halves (page 11-10).

Remove the transmission (page 11-11).

Remove the crankshaft from the right crankcase.



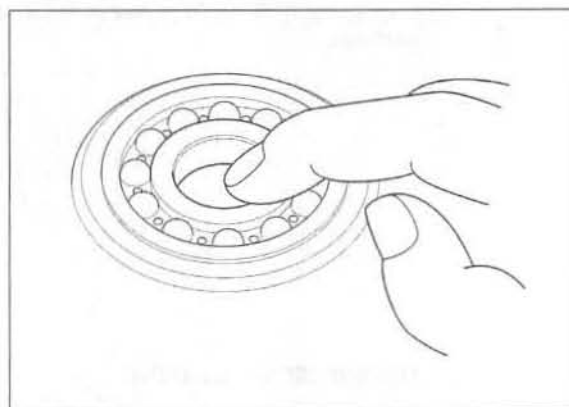
### INSPECTION

Turn the inner race of crankshaft bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the crankcase.

Replace any bearing if the race does not turn smoothly and quietly, or if the bearing fits loosely in the crankcase (page 11-16).



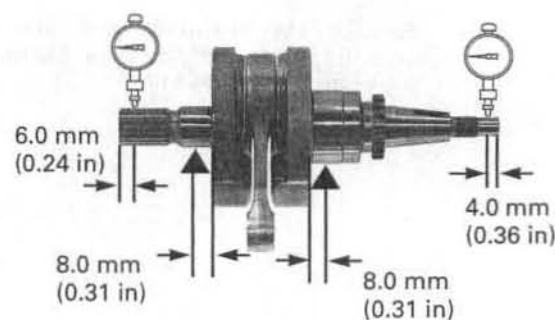
Place the crankshaft on a stand or V-blocks.

Set the dial indicator as shown.

Rotate the crankshaft two revolutions (720°) and read the runout.

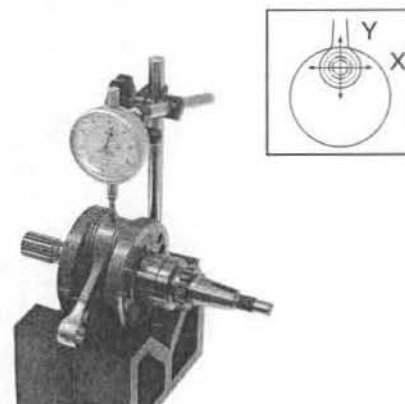
**SERVICE LIMITS:** R: 0.03 mm (0.001 in)

L: 0.05 mm (0.002 in)



Measure the connecting rod big end radial clearance in both X and Y directions.

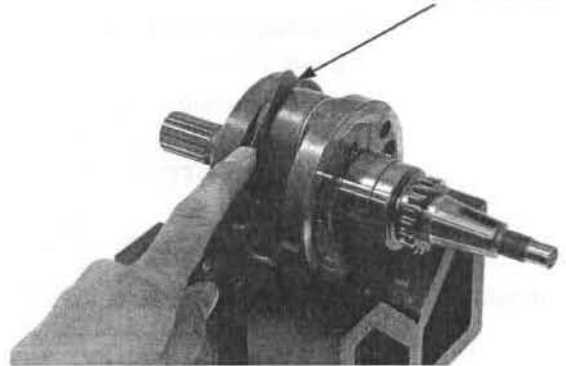
**SERVICE LIMIT:** 0.05 mm (0.002 in)



Measure the connecting rod big end side clearance.

**SERVICE LIMIT: 0.8 mm (0.03 in)**

FEELER GAUGE



### OIL JET INSPECTION/ INSTALLATION

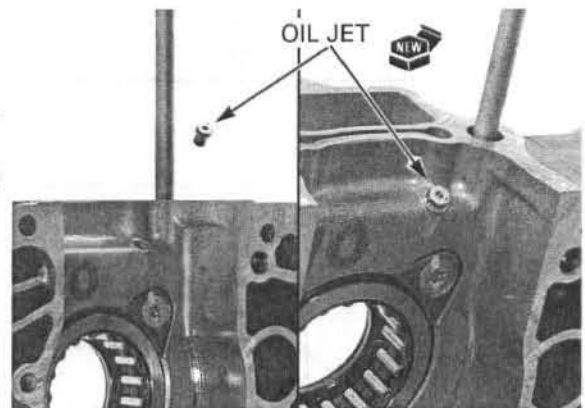
Check the left crankcase oil passage for clogging.  
Clean the oil passage.

Check the oil jet for damage or clogging.  
Blow open the oil passage in the oil jet with compressed air.

If there any damage or clogging replace the oil jet new one.

Tighten the oil jet to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.6 lbf·ft)**



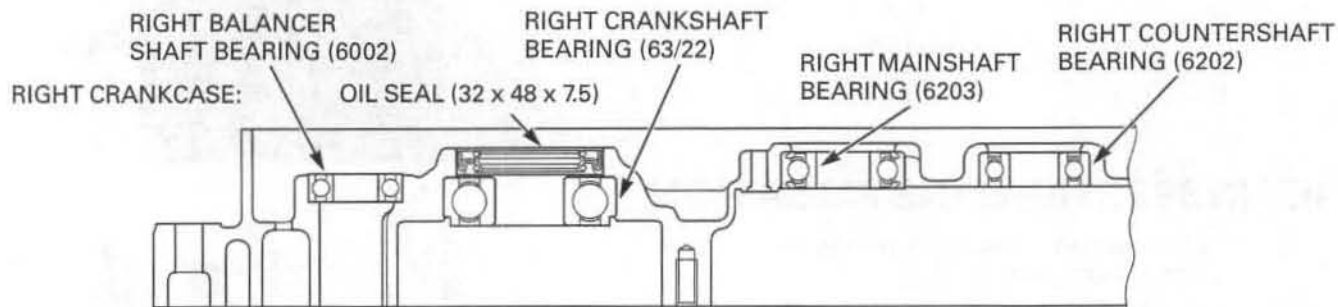


## CRANKCASE BEARING REPLACEMENT

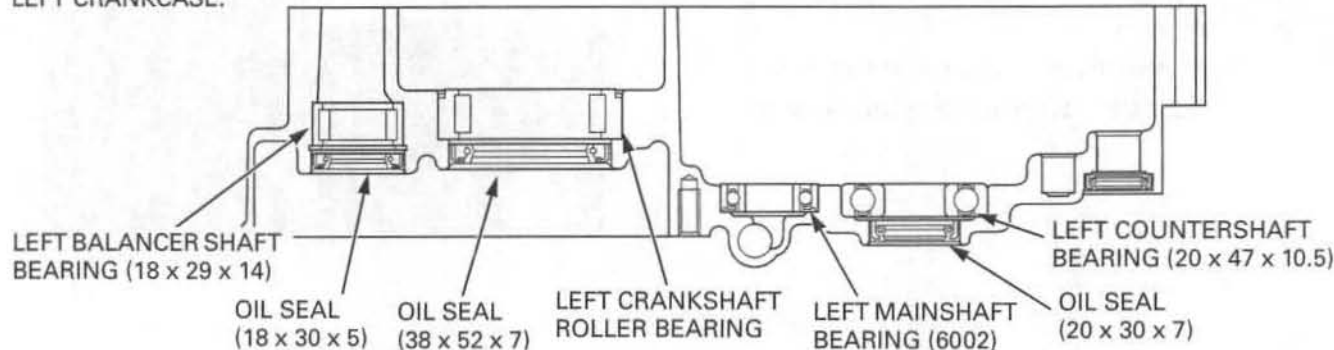
### CRANKCASE BEARING/OIL SEAL LOCATION

Remove the following:

- Transmission (page 11-11)
- Crankshaft (page 11-14)



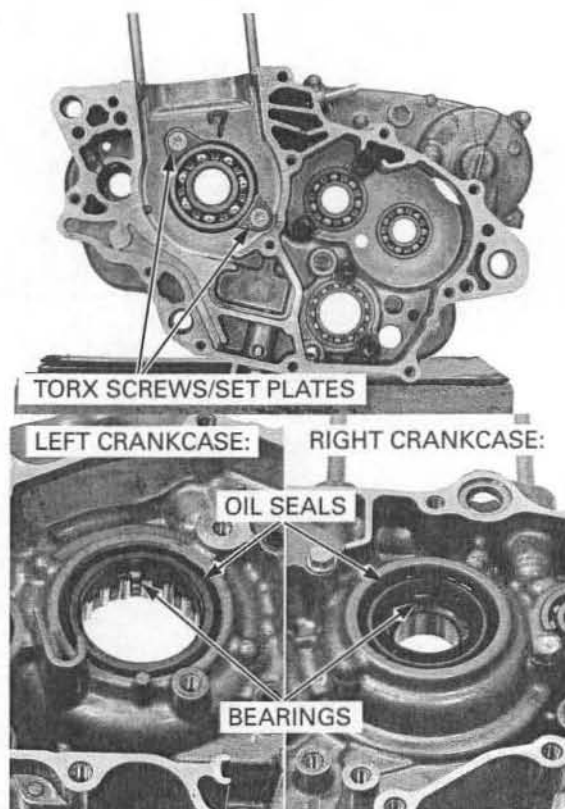
LEFT CRANKCASE:



### 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 new crankshaft bearings into both crankcase halves using the special tools.

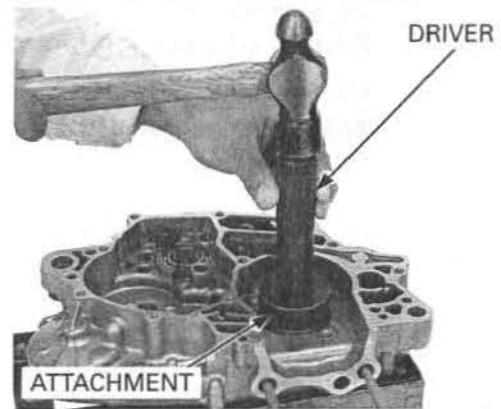
## TOOLS:

### Right crankshaft bearing:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000

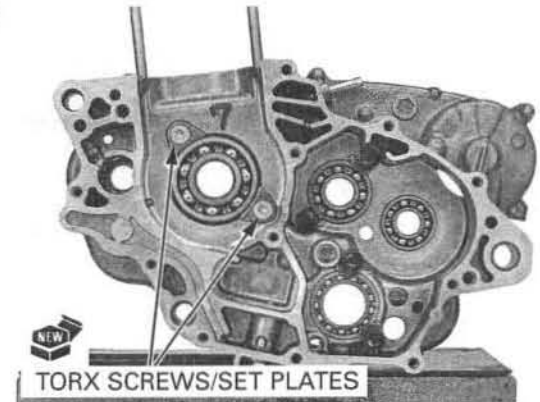
### Left crankshaft bearing:

Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500



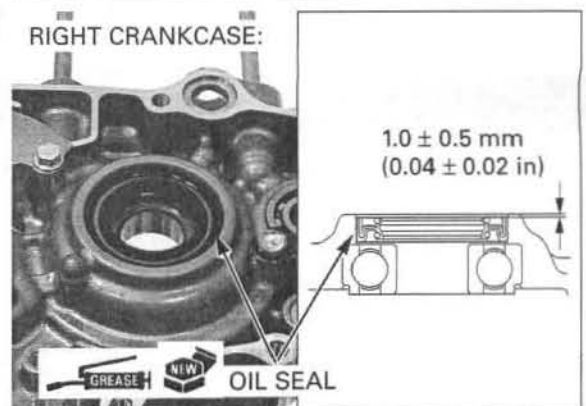
Install new torx screws with the set plates and tighten the torx screws to the specified torque.

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



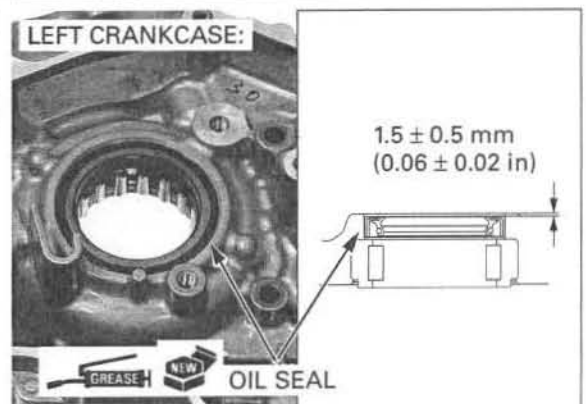
Apply grease to a new right crankshaft bearing oil seal lips.

Install a new right crankshaft bearing oil seal to the specified depth below the crankcase surface as shown.



Apply grease to a new left crankshaft bearing oil seal lips.

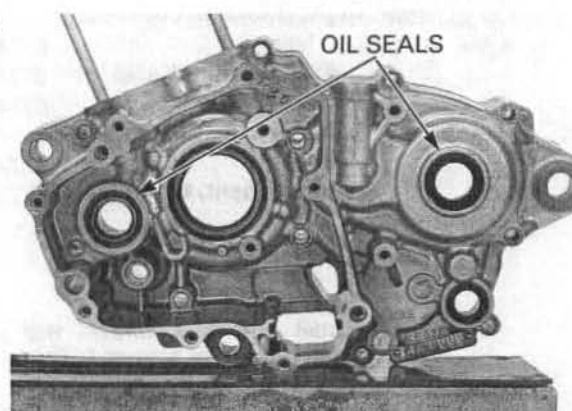
Install a new left crankshaft bearing oil seal to the specified depth below the crankcase surface as shown.



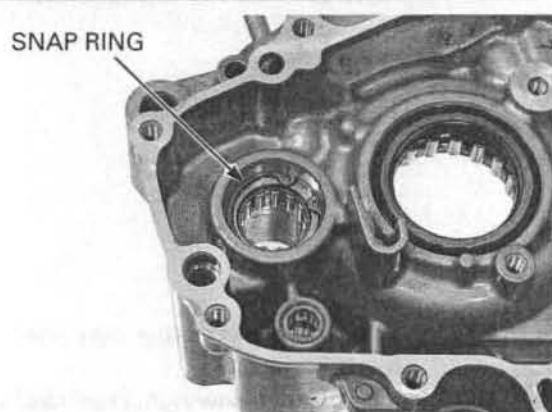
### TRANSMISSION/BALANCER/SHIFT DRUM BEARINGS

#### LEFT CRANKCASE

Remove the countershaft oil seal and balancer shaft oil seal.



Remove the snap ring from left crankcase.



Remove the shift drum bearing and counter shaft bearing.

Remove the mainshaft bearing and lifter lever bearing from the left crankcase using the special tools.

#### TOOLS:

##### Mainshaft bearing:

Bearing remover set, 15 mm	07936-KC10500
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-3710200 or 07936-371020A (U.S.A. only)

##### Lifter lever bearing:

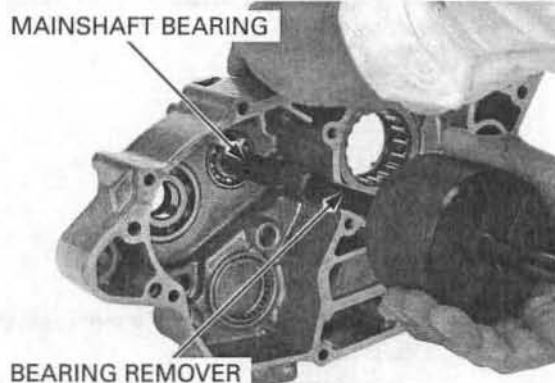
Bearing remover shaft, 10 mm	07936-GE00100
Bearing remover head, 10 mm	07936-GE00200
Remover weight	07741-0010201 or 07936-3710200 or 07936-371020A (U.S.A. only)

Remove the oil pump shaft bearing retainer and needles out from the bearing case.

Set the special tools inside of the oil pump shaft bearing and remove it.

#### TOOLS:

Bearing remover shaft, 10 mm	07936-GE00100
Bearing remover head, 10 mm	07936-GE00200
Remover weight	07741-0010201 or 07936-3710200 or 07936-371020A (U.S.A. only)



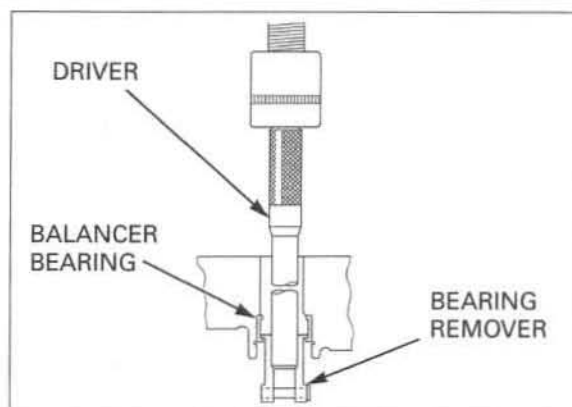


Remove the balancer bearing retainer and needles out from the bearing case.

Set the special tools inside of the balancer shaft bearing and press it out from the crankcase.

## TOOLS:

Needle bearing remover, 24 mm 07LMC-KV30200  
Driver, 8 mm 07ZMD-MCH0100



*Drive in a new bearing squarely with the sealed side facing toward the crankcase.*

Drive a new mainshaft bearing, balancer shaft bearing, shift drum needle bearing and countershaft bearing into the left crankcase using the special tools.

## TOOLS:

### Mainshaft bearing:

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

### Balancer shaft bearing:

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

### Shift drum needle bearing:

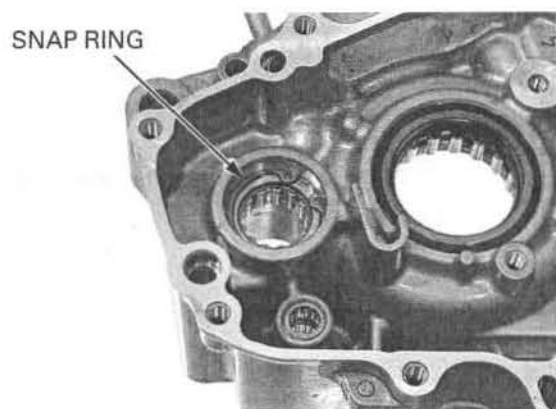
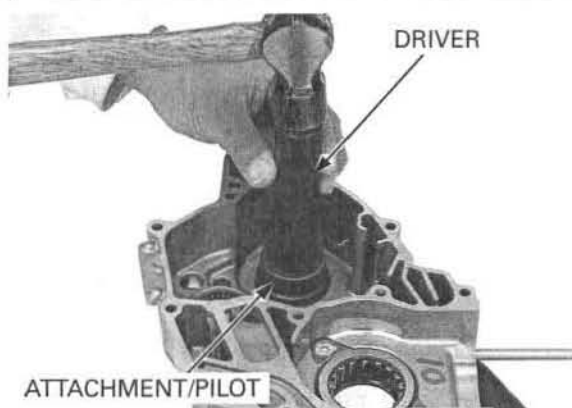
Driver 07749-0010000  
Attachment, 37 x 40 mm 07746-0010200

### Countershaft bearing:

Driver 07749-0010000  
Attachment, 42 x 47 mm 07746-0010300  
Pilot, 20 mm 07746-0040500

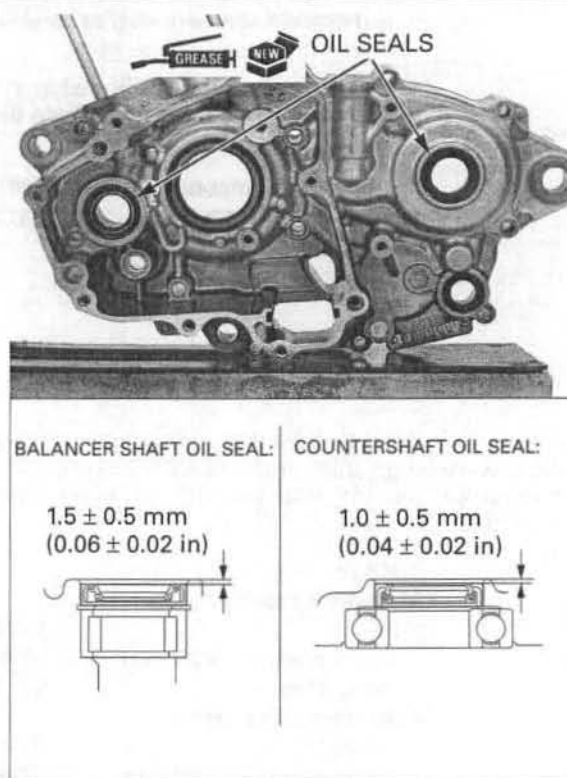
Drive a new oil pump shaft bearing and lifter lever bearing into the left crankcase.

Install the snap ring into the groove of the left crankcase securely.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

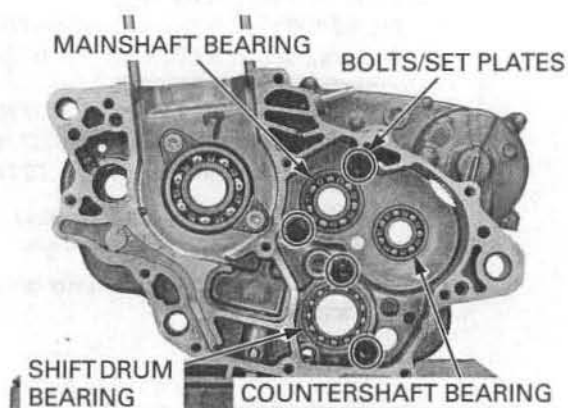
Apply grease to the countershaft oil seal lips and balancer shaft oil seal lips.  
Install the countershaft oil seal to the specified depth from the crankcase surface.  
Install the balancer shaft oil seal to the crankcase until it is flush with the crankcase surface.



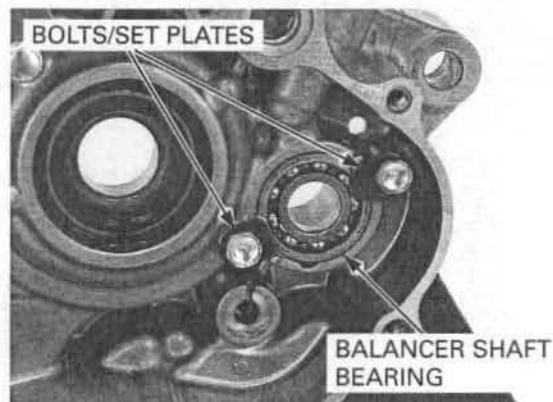
### RIGHT CRANKCASE

Remove the socket bolts and set plates.

Remove the countershaft bearing, mainshaft bearing and shift drum bearing.



Remove the bolts, set plates and balancer shaft bearing.



Drive in new bearings squarely with the sealed side facing toward the outside of the crankcase.

Drive in new mainshaft and countershaft bearings into the right crankcase using the special tools.

## TOOLS:

### Mainshaft bearing:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400

### Countershaft bearing:

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

Drive in new bearings squarely with the marked side facing toward the outside of the crankcase.

Drive in new shift drum and balancer shaft bearings into the right crankcase using the special tools.

## TOOLS:

### Shift drum bearing:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 25 mm	07746-0040600

### Balancer shaft bearing:

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

Clean and apply a locking agent to the set plate socket bolts threads.

Install the socket bolts with the set plates and tighten the socket bolts to the specified torque.

## TORQUE:

### Shift drum bearing set plate bolts:

10 N·m (1.0 kgf·m, 7 lbf·ft)

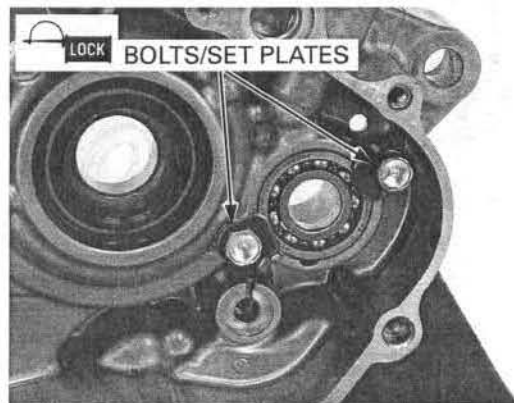
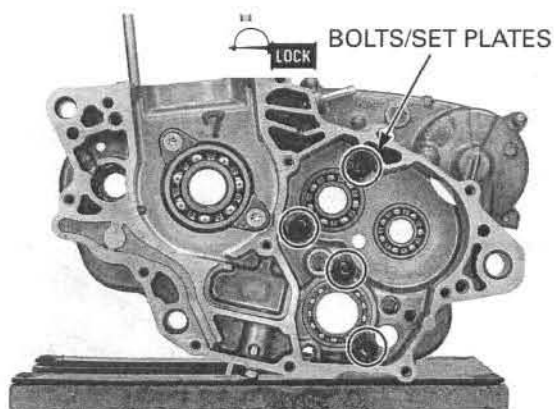
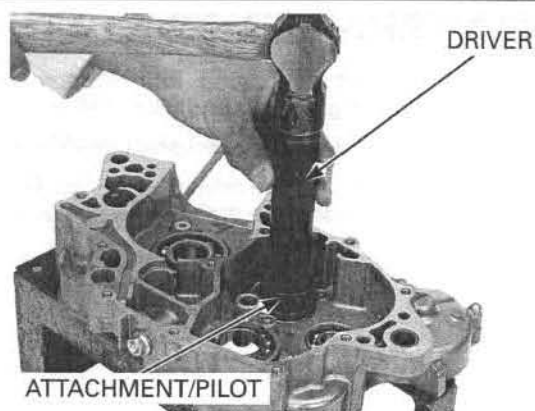
### Mainshaft bearing set plate bolts:

10 N·m (1.0 kgf·m, 7 lbf·ft)

Clean and apply a locking agent to the balancer shaft bearing set plate bolts.

Install the bolts with the set plates and tighten the screws to the specified torque.

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





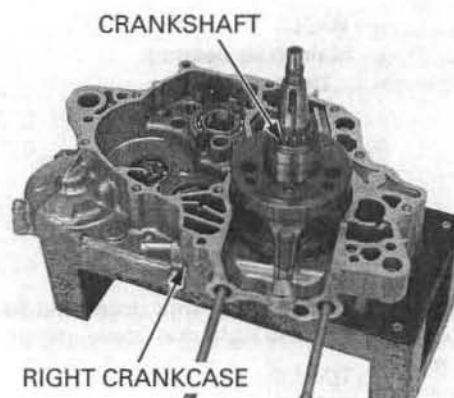
## CRANKSHAFT INSTALLATION

After cleaning, lubricate the bearings and connecting rod big end with molybdenum oil solution.

Install the crankshaft into the right crankcase.

Install the transmission (page 11-23).

Assemble the crankcase halves (page 11-24).



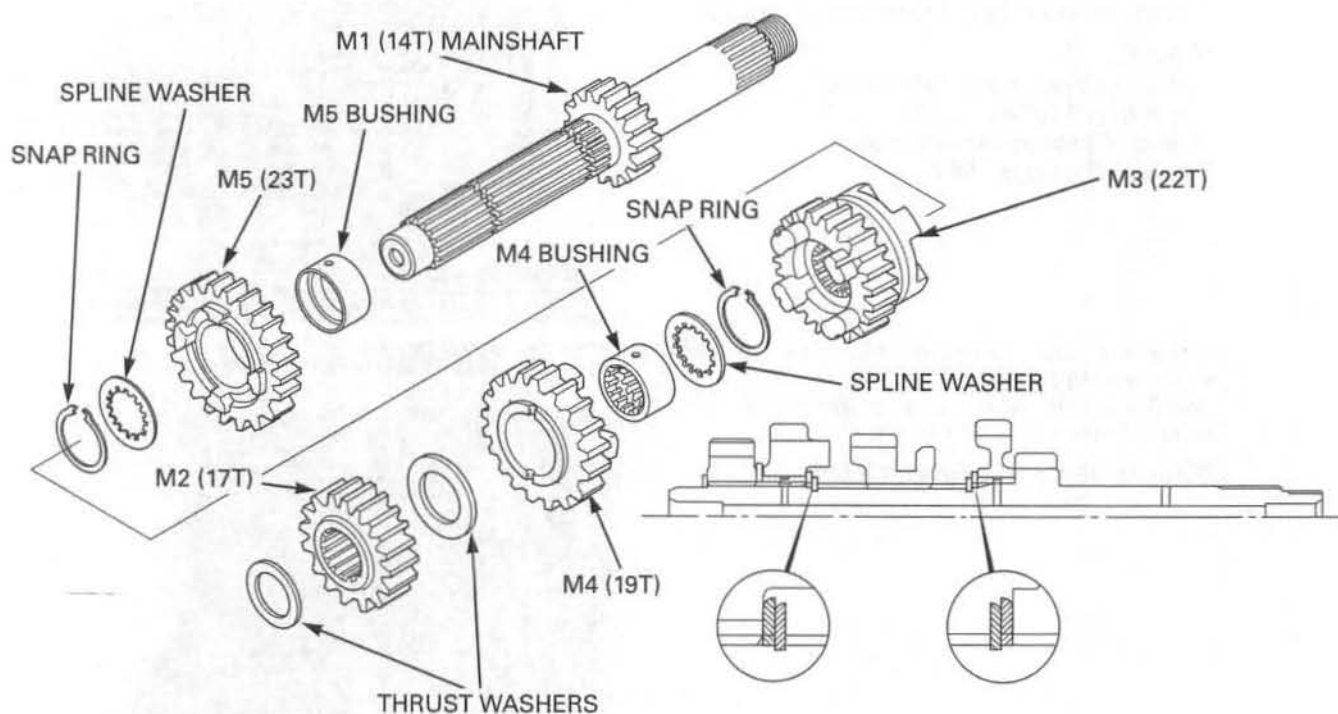
## TRANSMISSION ASSEMBLY

Coat the spline area, rolling and sliding area of each gear with molybdenum oil solution.

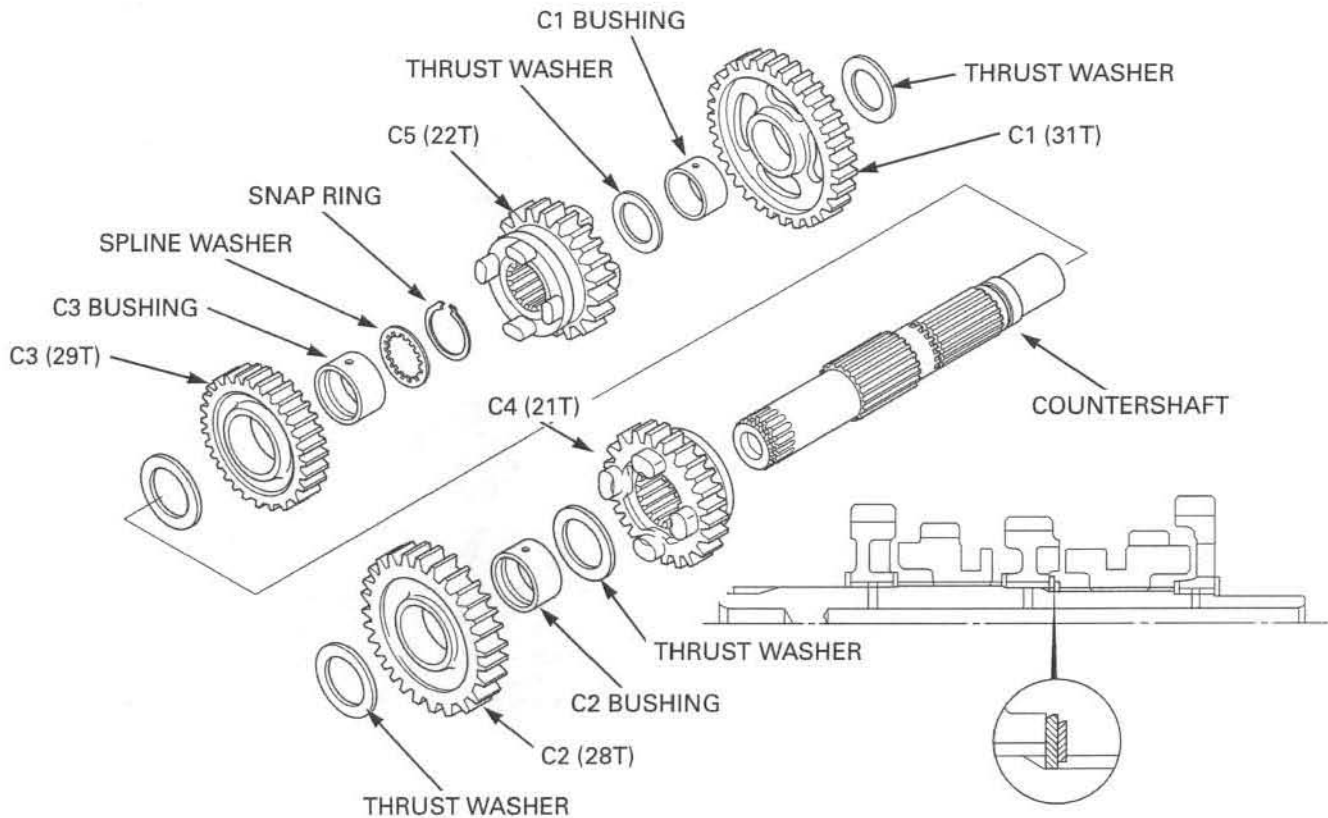
Apply transmission oil to the gear teeth of the each gears.

Assemble the mainshaft and countershaft.

### MAINSHAFT:



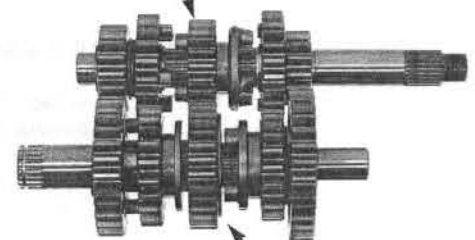
## COUNTERSHAFT:



## INSTALLATION

- Check the gear movement and rotation on the shaft.
- Install the washers and snap rings with the chamfered edge facing the thrust load side.
- Do not reuse worn snap rings which could easily spin in the grooves.
- Check that the snap rings are seated in the grooves. Align their end gaps with the grooves in the spline.

### MAINSHAFT ASSEMBLY



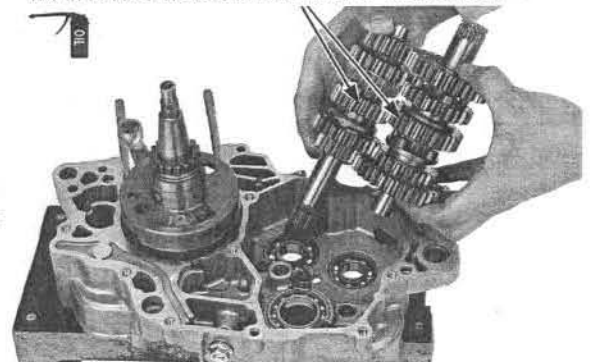
### COUNTERSHAFT ASSEMBLY

Apply transmission oil to the following parts:

- Mainshaft
- Countershaft
- Each gear
- Mainshaft bearing
- Countershaft bearing
- Shift drum bearing

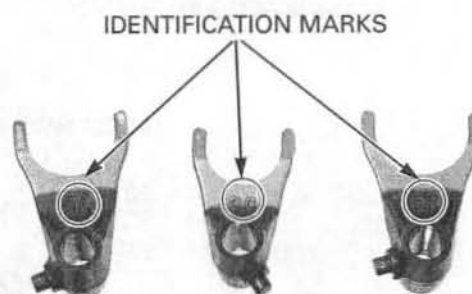
Engage the mainshaft and countershaft gears and place the transmission assembly into the right crankcase.

### MAINSHAFT/COUNTERSHAFT ASSEMBLY



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

- Each shift fork has an identification mark, "R" is for the right shift fork, "L" is the left shift fork and "C" is for the center shift fork.
- Face the shift fork marks to the left crankcase.



Apply engine oil to the shift drum guide grooves.

Apply molybdenum oil solution to the following parts:

- Shift fork claws and guide pins
- Shift fork sliding surfaces
- Shift fork shaft outer surface

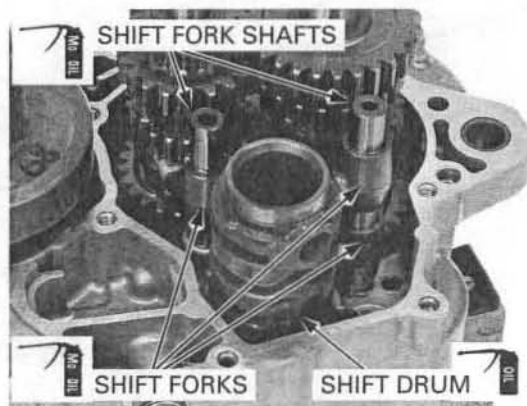
Install the shift forks to the shift fork grooves.

Install the shift drum by aligning the guide pins on the shift forks with the guide grooves in the shift drum.

Slide the shift fork shafts through the shift forks, and into the crankcase.

Temporarily install the one-way valve.

Assemble crankcase halves (page 11-24).



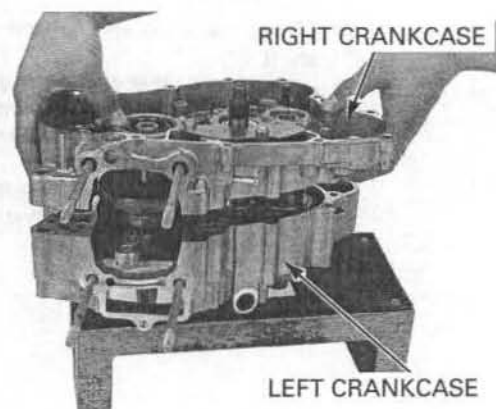
## CRANKCASE ASSEMBLY

Clean both crankcase mating surfaces before assembling and check for wear or damage.

If there is minor roughness or irregularities on the crankcase mating surfaces, dress them with an oil stone.

Temporarily install the left crankcase on the right crankcase.

Place the left crankcase facing down and separate the left and right crankcase halves.



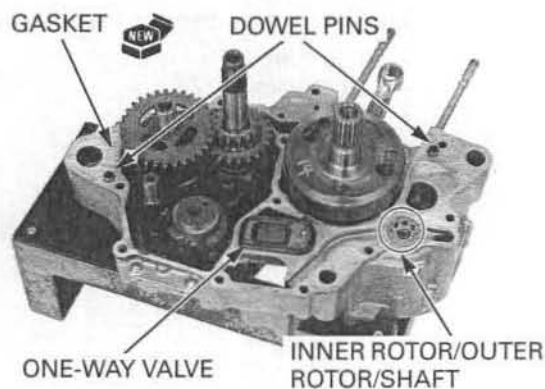
Apply engine oil to the oil pump inner and outer rotor sliding surface.

Install the oil pump inner, outer rotor and shaft in the left crankcase.

Install the one-way valve, dowel pins and a new gasket.

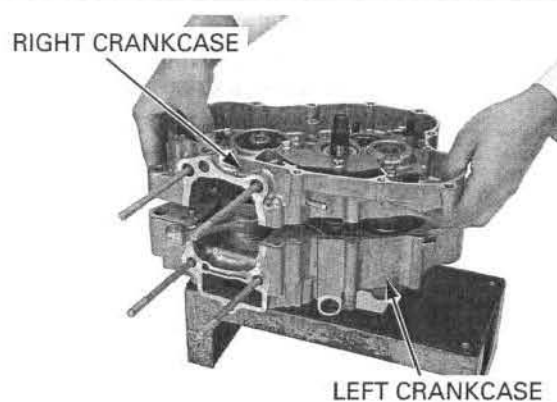
### NOTE:

Make sure that the one-way valve is located correctly against the right crankcase.





Place the right crankcase onto the left crankcase.



Install the stay, washers and crankcase bolts. Tighten the crankcase bolts in a crisscross pattern in two or three progressive steps.

Install a new washer and tighten the transmission oil drain bolt to the specified torque.

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

Carefully trim the protruding gasket material from the cylinder base gasket surface.

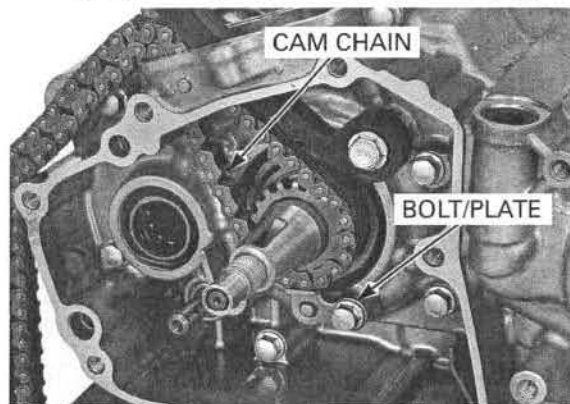
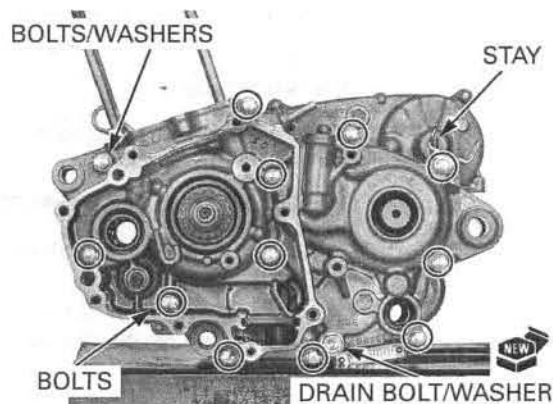
**NOTE:**

- Do not let gasket material fall into the crankcase.
- Do not damage the base gasket surface.

Check that the crankshaft turns smoothly.

Install the cam chain to the crankshaft.

Install the bolt and cam chain guide plate.

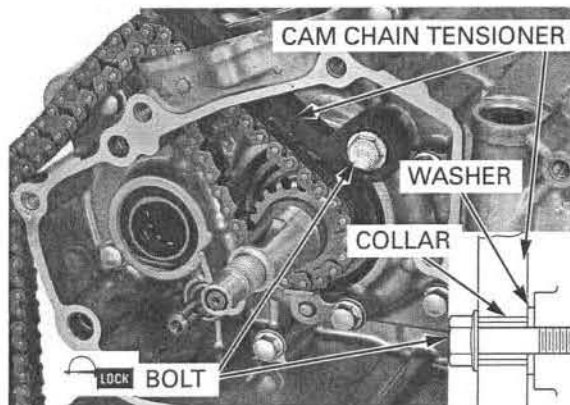


Clean and apply locking agent to the cam chain tensioner bolt.

Install the cam chain tensioner, collar, washer and bolt.

Tighten the cam chain tensioner bolt to the specified torque.

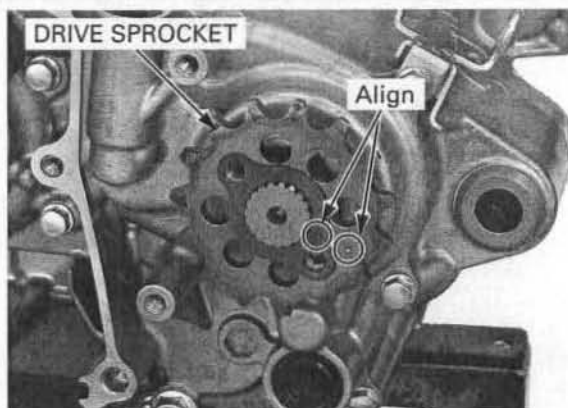
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Install the drive sprocket onto the countershaft.

Install the fixing plate and turn it so to align its punch mark with the drive gear punch mark.



Hold the drive sprocket using the special tool.

### TOOL:

Universal holder

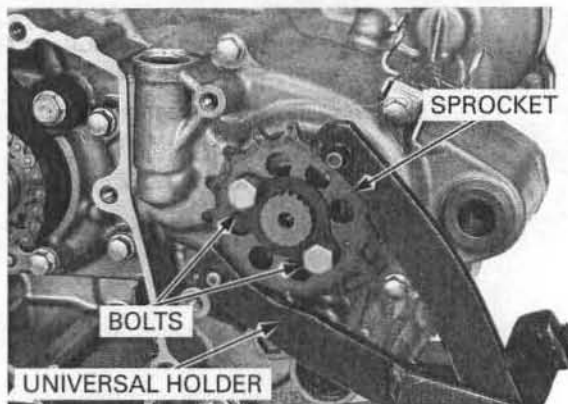
07725-0030000

Tighten the drive sprocket bolt to the specified torque.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Install the remaining parts in the reverse order of removal.

- Refer to Service Information (page 11-3) for installation of the removed parts for crankcase service.



## **12. FRONT WHEEL/SUSPENSION/STEERING**

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COMPONENT LOCATION ..... 12-2

SERVICE INFORMATION ..... 12-3

TROUBLESHOOTING ..... 12-6

FRONT WHEEL ..... 12-7

FORK ..... 12-11

HANDLEBAR..... 12-23

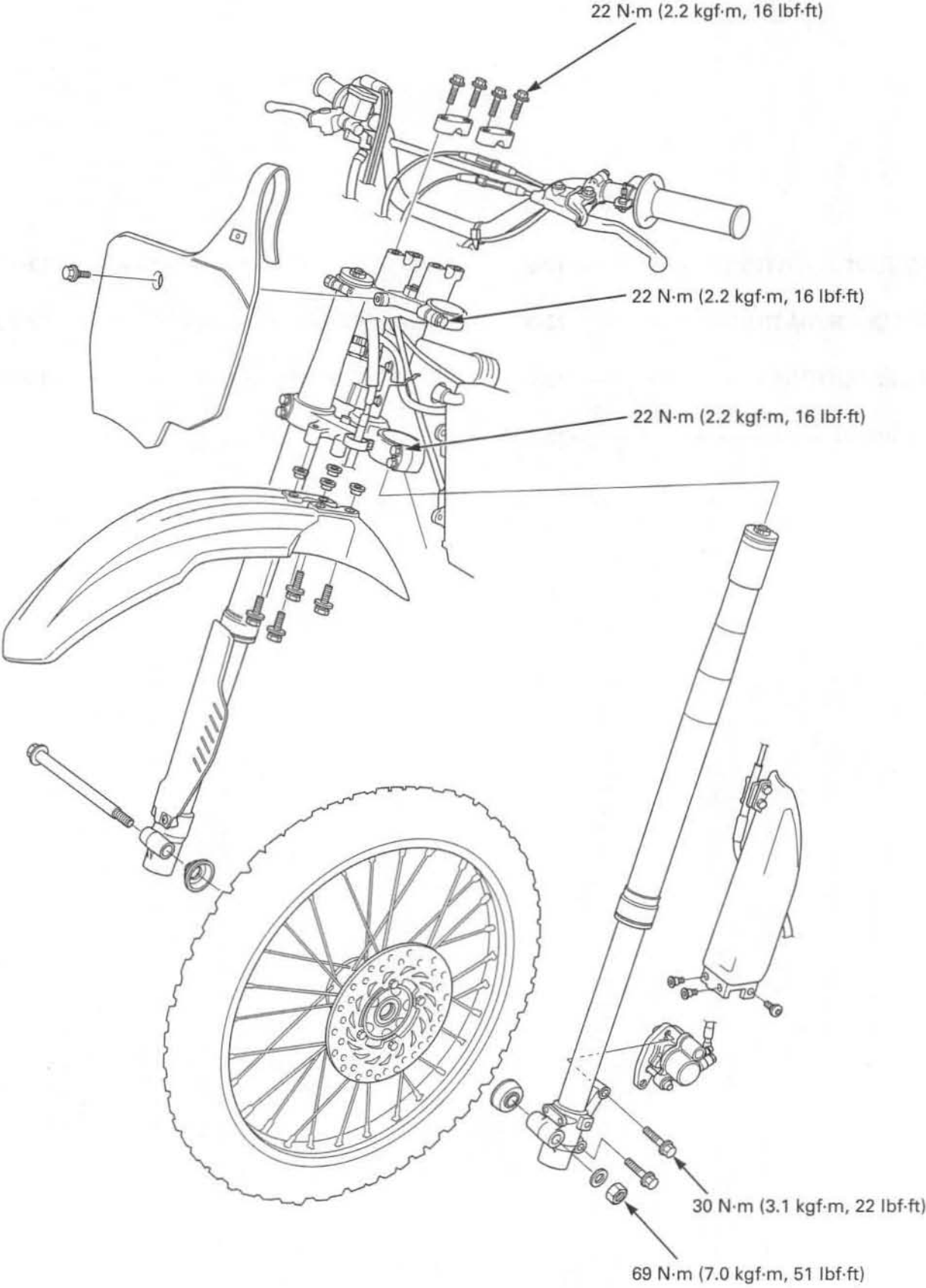
STEERING STEM..... 12-26



**FRONT WHEEL/SUSPENSION/STEERING**

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**COMPONENT LOCATION**



## 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.
- Refer to the brake system information (page 14-3).

## SPECIFICATIONS: CRF150R

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		20.0 ± 1.0 (0.79 ± 0.04)	—
Fork	Spring free length	447.6 (17.6)	441 (17.4)
	Tube runout	—	0.2 (0.01)
	Recommended fork oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Oil level	123 (4.84)	—
	Oil capacity	357 cm <sup>3</sup> (12.1 US oz, 12.6 Imp oz)	—
Compression damping adjuster standard position		7 clicks out from full in <b>NEW</b>	—
Rebound damping adjuster standard position		1 ± 1/4 turns out from full in <b>NEW</b>	—

## SPECIFICATIONS: CRF150RB

Unit: mm (in)

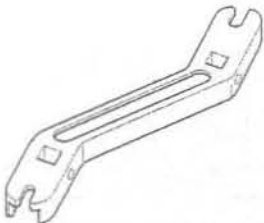
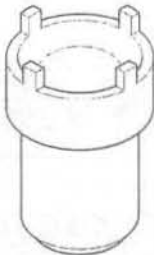
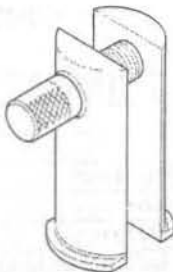

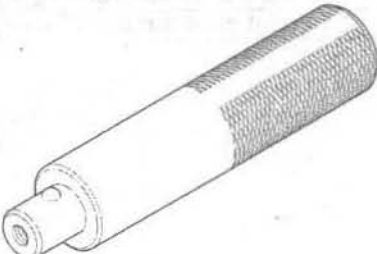
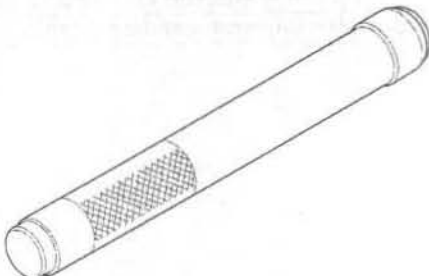
ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		20.2 ± 1.0 (0.80 ± 0.04)	—
Fork	Spring free length	447.6 (17.6)	441 (17.4)
	Tube runout	—	0.2 (0.01)
	Recommended fork oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Oil level	141 mm (5.55)	—
	Oil capacity	342 cm <sup>3</sup> (11.6 US oz, 12.0 Imp oz)	—
Compression damping adjuster standard position		7 clicks out from full in <b>NEW</b>	—
Rebound damping adjuster standard position		1 ± 1/4 turns out from full in <b>NEW</b>	—

## FRONT WHEEL/SUSPENSION/STEERING

### TORQUE VALUES





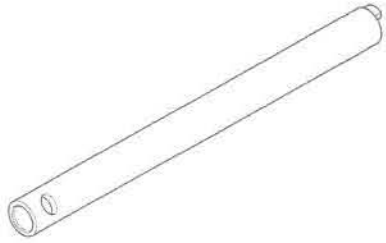

Front axle nut	69 N·m (7.0 kgf·m, 51 lbf·ft)	U-nut
Front brake disc bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	ALOC bolt: replace with a new one
Front spoke	3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Front rim lock	12.4 N·m (1.3 kgf·m, 9.1 lbf·ft)	
Handlebar holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front master cylinder holder bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Clutch lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	U-nut
Clutch lever pivot bolt	2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Engine stop button screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one
Fork bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Fork center bolt	54 N·m (5.4 kgf·m, 40 lbf·ft)	Apply locking agent to the threads
Fork lock nut	19.7 N·m (2.0 kgf·m, 16 lbf·ft)	
Front fork air pressure release screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Fork protector mounting bolt	7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)	ALOC bolt: replace with a new one
Fork top bridge pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork bottom bridge pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Steering stem nut	128 N·m (13.0 kgf·m, 94.4 lbf·ft)	
Steering stem adjusting nut	See page 12-28	

### TOOLS

<p>Spoke wrench 5.8mm 07701-0020300</p> 	<p>Steering stem socket 07916-KA50100</p> 	<p>Ball race remover 07948-4630100</p> 
<p>Fork seal driver 38mm 07TMD-GBF0100</p>  <p>or 07TMD-GBF010A (U.S.A. only)</p>	<p>Driver 07749-0010000</p> 	<p>Steering stem driver 07946-4300101</p> 



## FRONT WHEEL/SUSPENSION/STEERING

<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Pilot, 15 mm 07746-0040300</p> 	<p>Bearing remover head, 15 mm 07746-0050400</p> 
<p>Bearing remover shaft 07746-0050100</p> 	<p>Fork rod holder 07TMB-GBF0100</p>  <p>or Fork rod holder attachment 2pin (U.S.A only) 07TMB-GBF010A and Fork rod holder handle 07TMB- 001010A</p>	<p>Attachment 42 x 47 07746-0010300</p> 

### TROUBLESHOOTING

#### Hard steering

- Steering stem adjusting nut too tight
- Faulty or damaged steering head bearings
- Insufficient tire pressure

#### Steers to one side or does not track straight

- Bent fork tube
- Bent axle
- Wheel installed incorrectly
- Unequal 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 front wheel bearings
- Bent spokes
- Faulty tire
- Axle not tightened properly
- Unbalanced tire and wheel

#### Wheel hard to turn

- Faulty wheel bearings
- Bent front axle
- Brake drag

#### Soft suspension

- Weak fork springs
- Insufficient fluid in fork
- Incorrect fork fluid weight
- Insufficient tire pressure

#### Stiff suspension

- Fork oil quantity too much
- Fork oil viscosity too thick
- Bent or damaged fork tubes
- Clogged fork fluid passage

#### Front suspension noisy

- Insufficient fluid in fork
- Loose fork fastener

## FRONT WHEEL

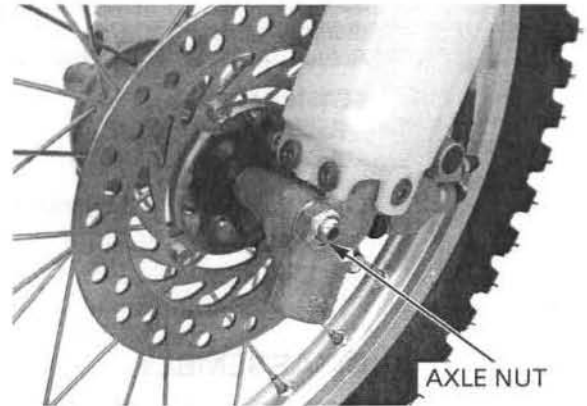
### REMOVAL

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

Remove the front axle nut.

*Do not squeeze the front brake lever after the front wheel is removed.*

Remove the front axle and the front wheel.



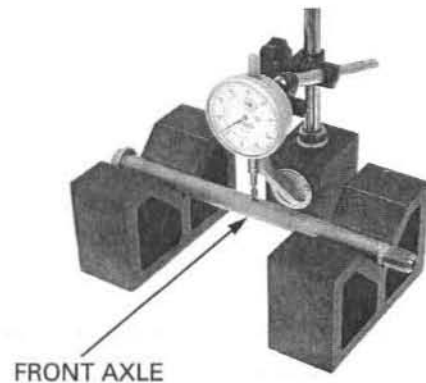
### INSPECTION

#### AXLE

Set the axle on V-blocks and measure the runout. Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**

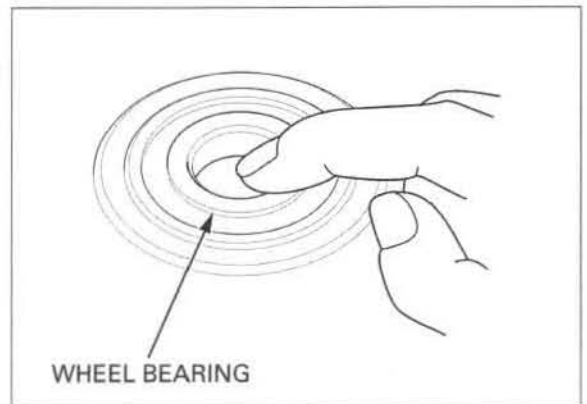


#### WHEEL BEARING

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

*Replace the bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.





## FRONT WHEEL/SUSPENSION/STEERING

### WHEEL RIM

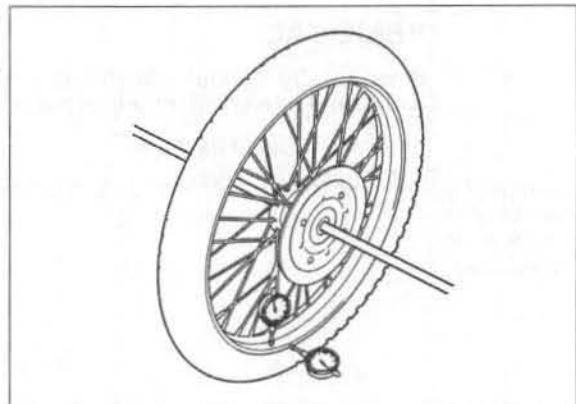
Check the rim runout by placing the wheel on a turning stand.  
Spin the wheel by hand, and read the runout using a dial indicator.  
Actual runout is 1/2 the total indicator reading.

### SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

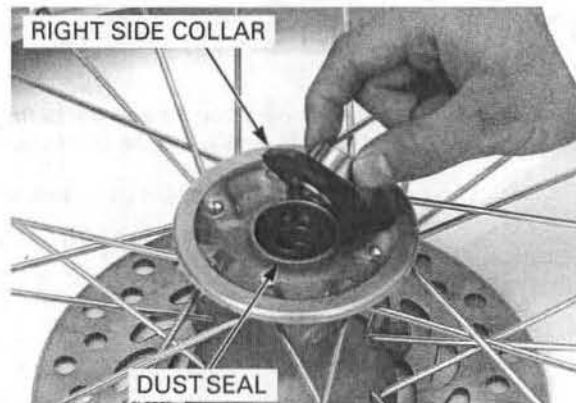
Axial: 2.0 mm (0.08 in)

Check the spokes and tighten any that are loose.



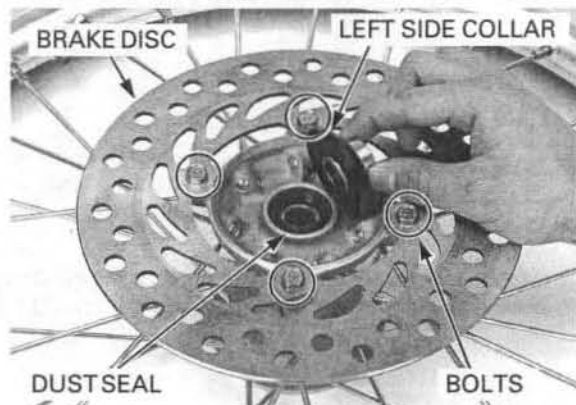
### DISASSEMBLY

Remove the right side collar and dust seal.



Remove the left side collar and dust seal.

Remove the brake disc bolts.  
Remove the brake disc.

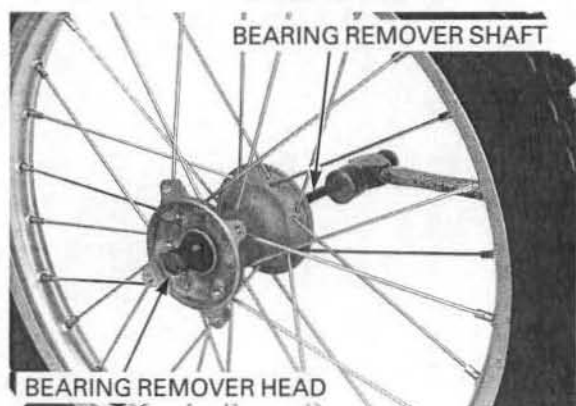


*Replace the wheel bearings in pairs.  
Do not reuse old bearings.*

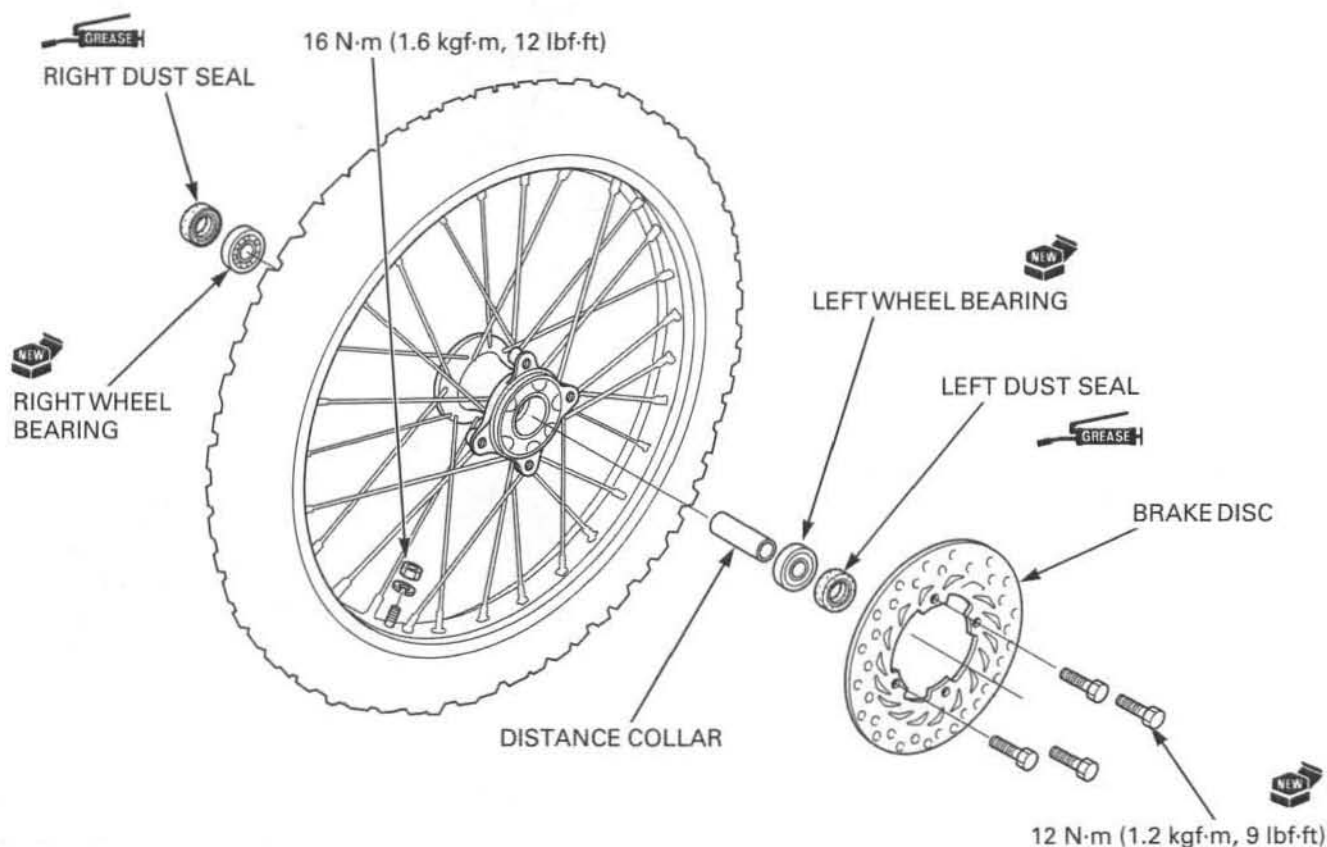
Install the remover head into the bearing.  
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.  
Remove the distance collar and drive out the bearing.

### TOOLS:

Bearing remover head, 15 mm 07746-0050400  
Bearing remover shaft 07746-0050100



## ASSEMBLY



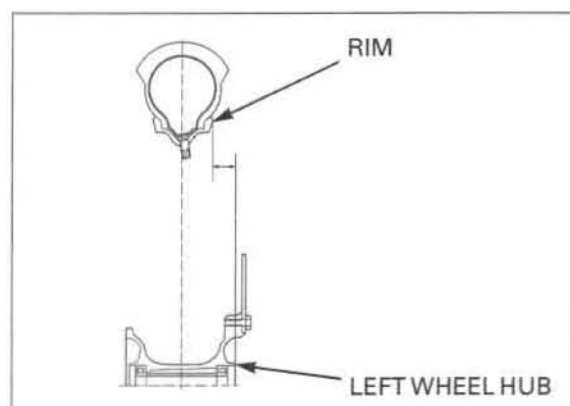
Place the rim on a work bench.  
Place the hub in the center of the rim and begin the lacing with new spokes.

Adjust the hub position so the distance from the hub left end surface to the side of the rim is as shown.

**HUB POSITION:**

CRF150R:  $20.0 \pm 1$  mm ( $0.79 \pm 0.04$  in)

CRF150RB:  $20.2 \pm 1$  mm ( $0.80 \pm 0.04$  in)



Torque the spokes in two or three progressive steps.

**TOOL:**

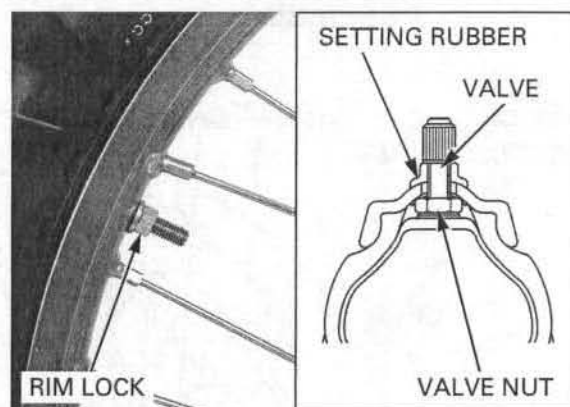
Spoke wrench, 5.8 mm 07701-0020300  
equivalent commercially  
available in U.S.A.

**TORQUE:** 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)



## FRONT WHEEL/SUSPENSION/STEERING

Install the rim lock, rim band, tube and tire.  
Tighten the rim lock to the specified torque.  
**TORQUE: 12.4 N·m (1.3 kgf·m, 9.1 lbf·ft)**



*Replace the wheel bearings in pairs. Do not reuse old bearings.*

Pack all new bearing cavities with grease.

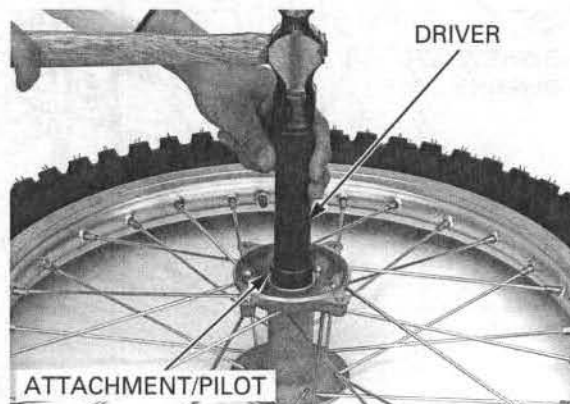
Drive the left wheel bearing in the wheel hub until it is fully seated using special tools.

- Install the wheel bearings with the sealed ends toward the outside.

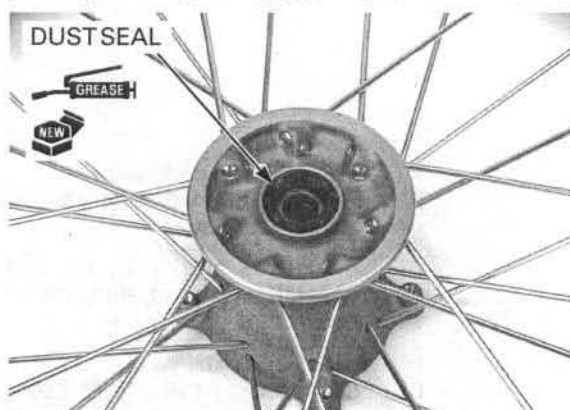
### TOOLS:

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

Install the distance collar into place, then drive the right wheel bearing using the same special tools.



Pack the right dust seal lip with grease and install a new right dust seal.



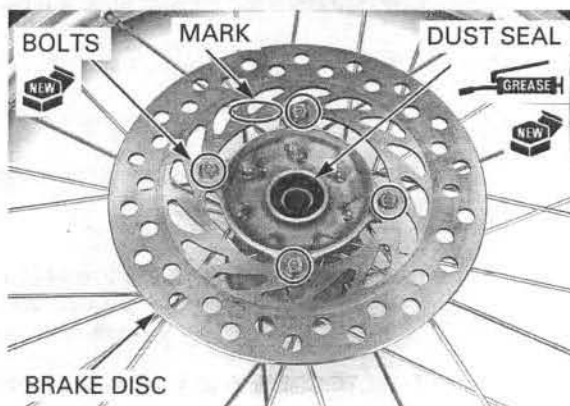
*Do not get grease on the brake discs or stopping power will be reduced.*

Install the brake disc onto the wheel hub with the drive mark facing out.

Install new brake disc bolts.  
Tighten the nuts to the specified torque.

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

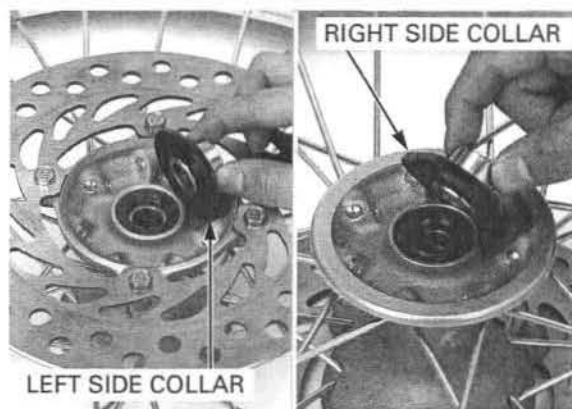
Pack the dust seal lip with grease and install a new left dust seal.





Check the right and left side collars for wear or damage.

Install the right and left side collars to the wheel.

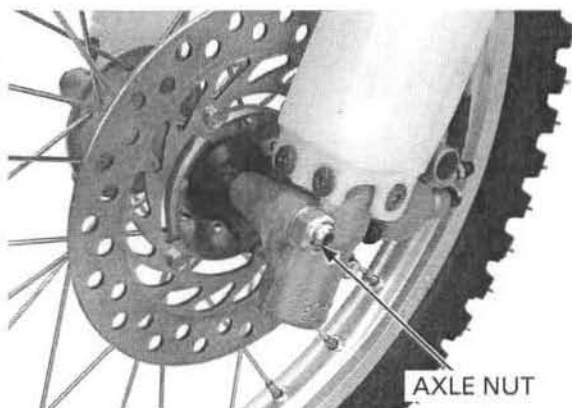


## INSTALLATION

Clean the clamping surface of the front axle.

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.

Insert the axle from the right side and install the axle nut.



With the front brake applied, pump the front suspension up and down several times to seat the axle and check the front brake operation.

Tighten the axle nut to the specified torque.

**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**



## FORK

### REMOVAL

Remove the front wheel (page 12-7).

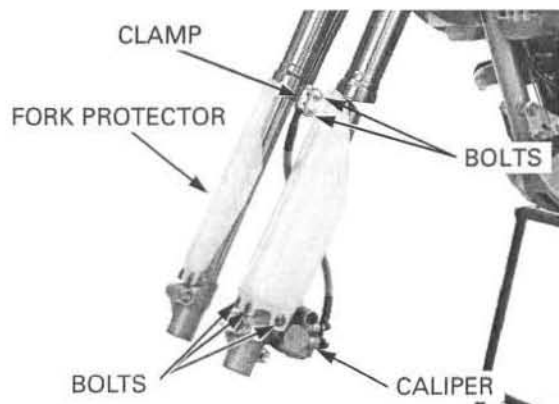
Remove the bolts and brake hose clamp.

Remove the mounting bolts and front brake caliper.

Do not operate the brake lever after removing the caliper and front wheel. To do so will cause difficulty in fitting the brake disc between the brake pad.

Remove the bolts and fork protector.

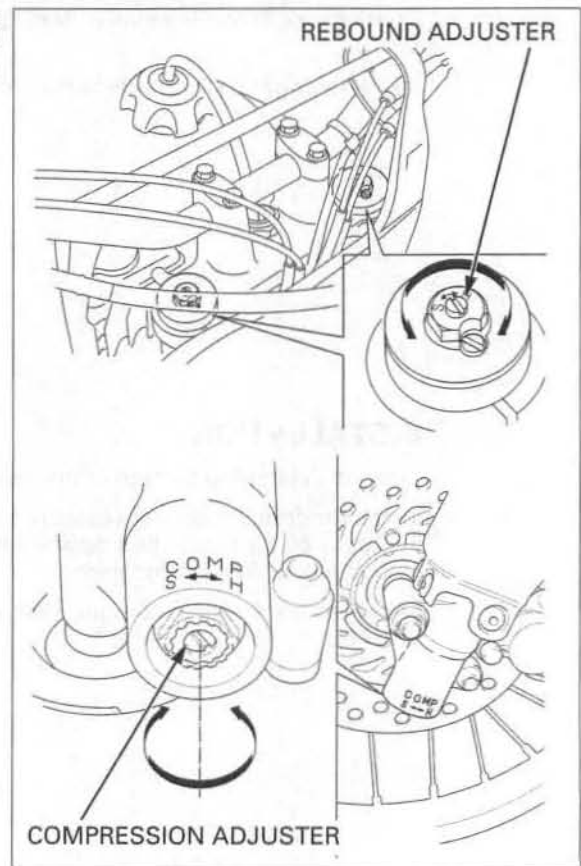
*Do not suspend the brake caliper from the brake hose.  
Do not twist the brake hose.*



## FRONT WHEEL/SUSPENSION/STEERING

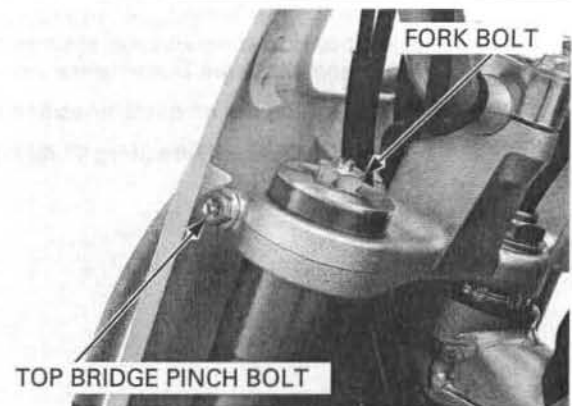
*Record the setting position of the adjusters.*

In case of the fork being disassembled, turn the rebound adjuster and compression adjuster to the softest position to prevent the adjusters from damage.

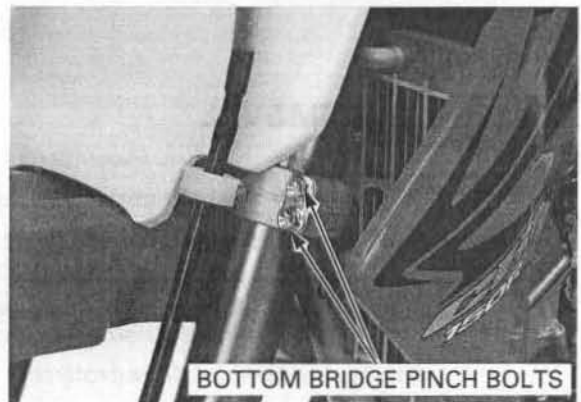


Loosen the fork top bridge pinch bolt.

When the fork is ready to be disassembled, loosen the fork bolt.



Loosen the fork bottom bridge pinch bolts and pull the fork leg down and out.



## DISASSEMBLY

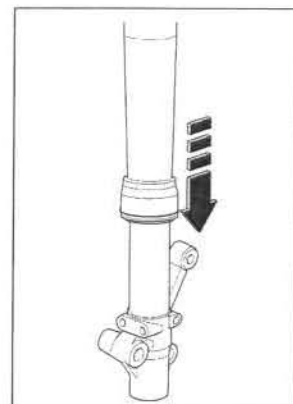
*Be careful not to scratch the slider and not to damage the dust seal.*

Clean the fork assembly, the sliding surface of the fork slider and the bottom of the slider around the center bolt before disassembling the fork.

Hold the outer tube and remove the fork bolt from the outer tube and slowly slide the outer tube down onto the axle holder.

FORK BOLT

OUTER TUBE



Loosen the lock nut while holding the fork bolt.

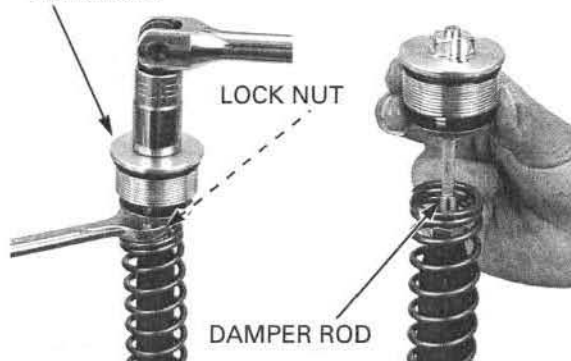
*Be careful not to damage the adjuster rod and needle on the rod end.*

Pull the fork bolt up slowly and remove the fork bolt assembly from the damper rod.

FORK BOLT

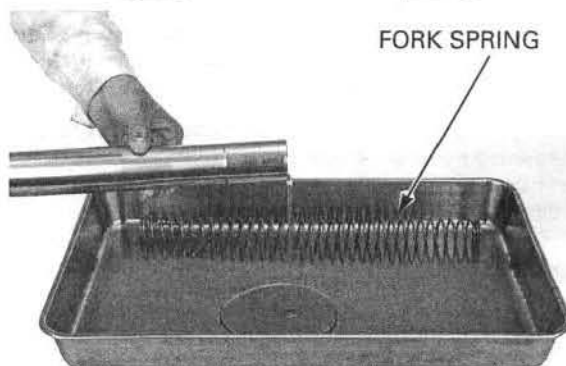
LOCK NUT

DAMPER ROD



Remove the fork spring from the fork assembly. Pour out the fork fluid by pumping the outer tube and damper rod.

FORK SPRING



*Do not over-tighten the vise on the axle holder.*

Set the axle holder in a vise with a piece of wood or soft jaws to prevent damage.

Assemble the fork rod holder attachment onto the holder handle.

Insert the fork rod holder assembly into the outer tube and hold the fork damper aligning the projections of the holder with the hole in the damper.

### TOOLS:

Fork rod holder 07TMB-GBF0100

U.S.A. only:

Fork rod holder attachment 2pin 07TMB-GBF010A 24 mm

Fork rod holder handle 07TMB-001010A

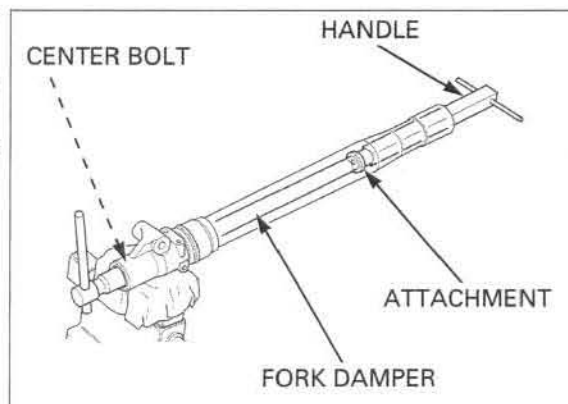
Slowly loosen and remove the center bolt.

CENTER BOLT

HANDLE

ATTACHMENT

FORK DAMPER

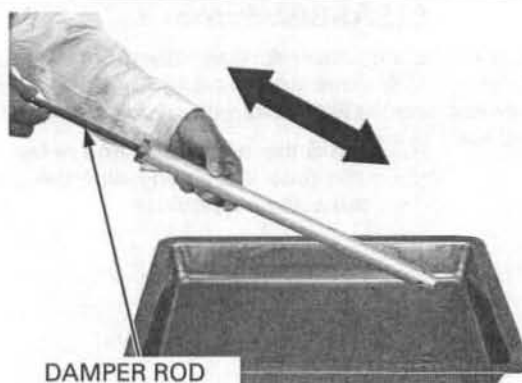




## FRONT WHEEL/SUSPENSION/STEERING

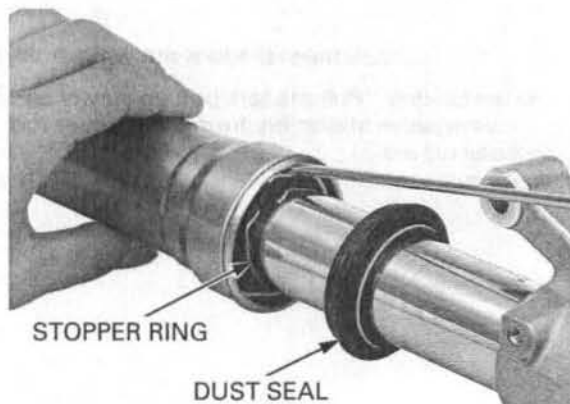
Remove the fork damper from the slider.

Drain the fork fluid from damper by pumping the damper rod eight to ten times.



*Be careful not to scratch the slider surface.*

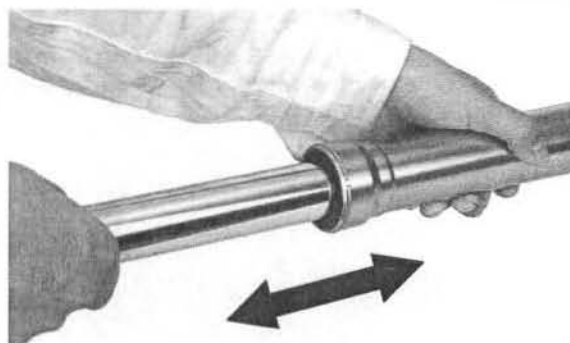
Remove the dust seal and stopper ring.



Check that the slider moves smoothly in the outer tube. If it does not, check the slider and outer tube for bending or damage and the bushings for wear or damage (page 12-15).

*The guide bushing is pressed into the outer tube, and must be forced out.*

In quick successive strokes, pull the slider out of the outer tube.

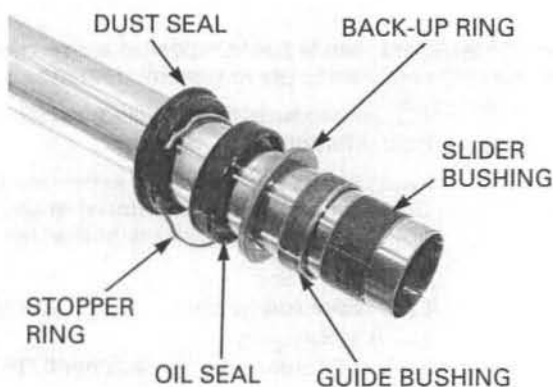


*Be careful not to damage the slider bushing, especially the sliding surface. To prevent loss of tension, do not open the bushing more than necessary.*

Carefully remove the slider bushing by prying the bushing ends with a screwdriver until the bushing can be pulled off by hand.

Remove the following:

- Guide bushing
- Back-up ring
- Oil seal
- Stopper ring
- Dust seal

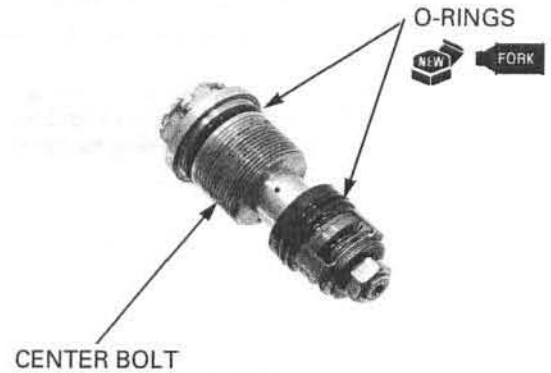


## INSPECTION

### FORK CENTER BOLT

Check the fork center bolt assembly for damage. Replace the fork center bolt as an assembly if necessary.

Apply fork oil to a new O-rings and install them.

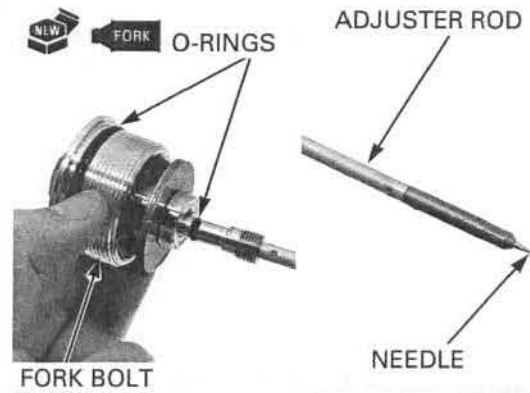


### ADJUSTER ROD/ NEEDLE

Turn the adjuster rod counterclockwise and remove it from the fork bolt.

Check the adjuster rod and needle for bend or damage.

Apply fork oil to the new O-rings and install them.

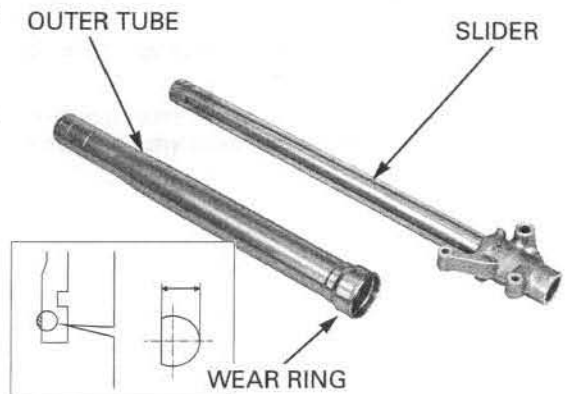


### SLIDER/OUTER TUBE/WEAR RING

Check the outer tube and slider for score marks, scratches and excessive or abnormal wear.

Check the outer tube for bend or damage.

Replace the wear ring if it is equal height with the outer tube surface.

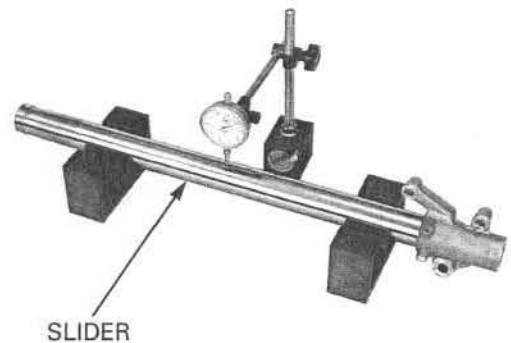


Set the slider on V-blocks and measure the runout. Turn the slider and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**

Replace it if the service limit is exceeded, or there are scratches or nicks that will allow fork oil to leak past the seals.



## FRONT WHEEL/SUSPENSION/STEERING

### FORK DAMPER

Remove the lock nut and spring guide.

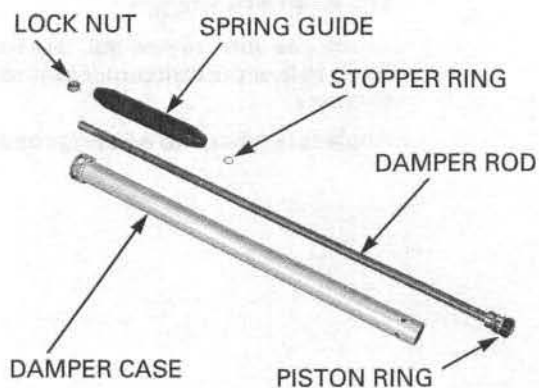
Remove the stopper ring and the damper rod.

Check the damper case for abnormal wear or damage.

Check the spring guide for damage.

Check the damper rod for bend or damage.

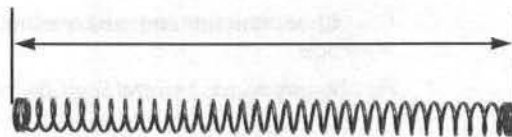
Check the piston ring for wear or damage.



### FORK SPRING

Measure the fork spring free length by placing it on a flat surface.

**SERVICE LIMIT: 447.6 mm (17.6 in)**

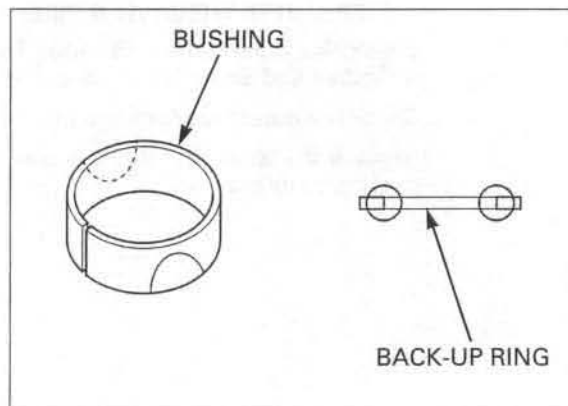


### BUSHING/BACK-UP RING

Check the bushing for excessive wear or scratches. If copper appears on the surface, replace the bushing.

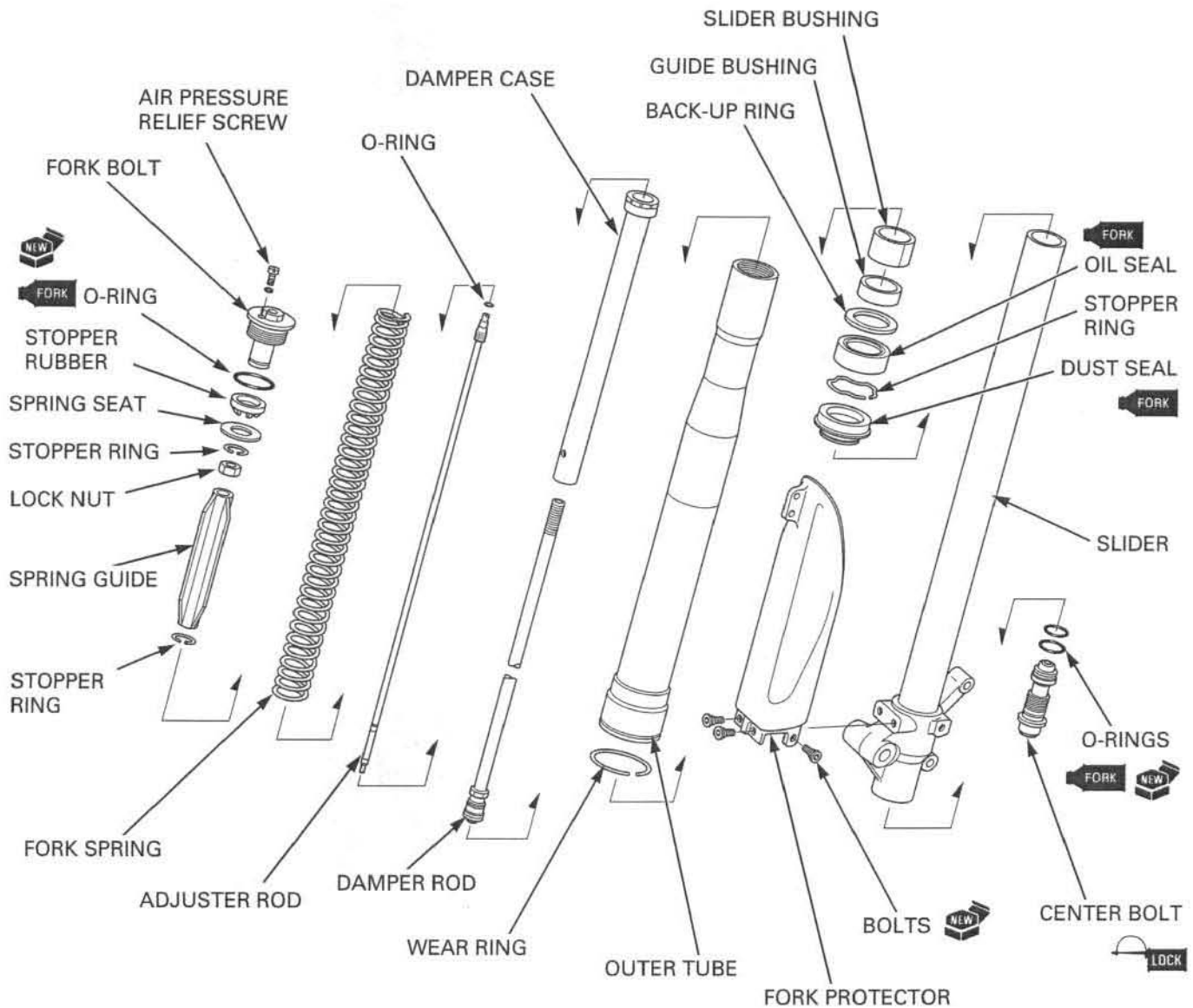
Replace the back-up ring if there is distortion at the points shown.

Remove any metal powder from the slider and guide bushings with a nylon brush and fork oil.





ASSEMBLY

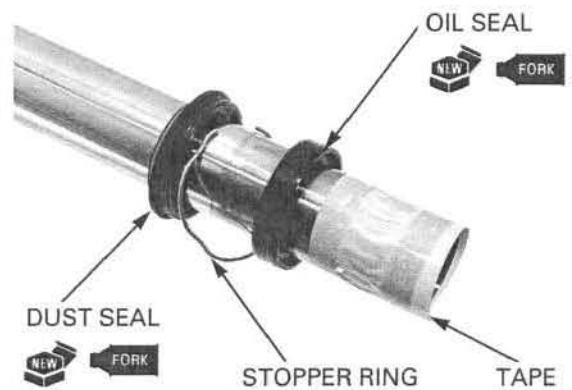


Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them dry.

**OUTER TUBE AND SLIDER ASSEMBLY**

Wrap the end of the slider with tape.  
Coat a new oil seal and dust seal lips with fork oil.

Install the dust seal and stopper ring onto the slider.  
Install the oil seal onto the slider with its marked side facing the dust seal.



## FRONT WHEEL/SUSPENSION/STEERING

*Be careful not to damage the slider bushing coating. Do not open the slider bushing more than necessary.*

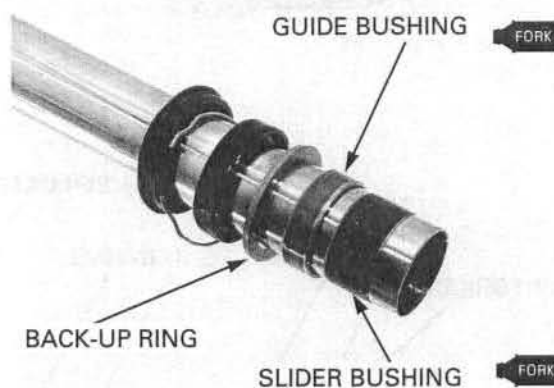
Install the back-up ring and guide bushing.

Remove the tape and install the slider bushing.

### NOTE:

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Coat the slider and guide bushings with fork oil and install the slider into the outer tube.

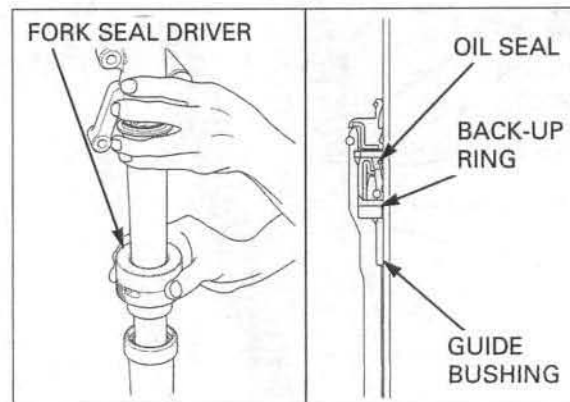


Drive in the guide bushing together with the back-up ring into the outer tube by using the special tool. Drive the oil seal into the outer tube by using the special tool.

### TOOL:

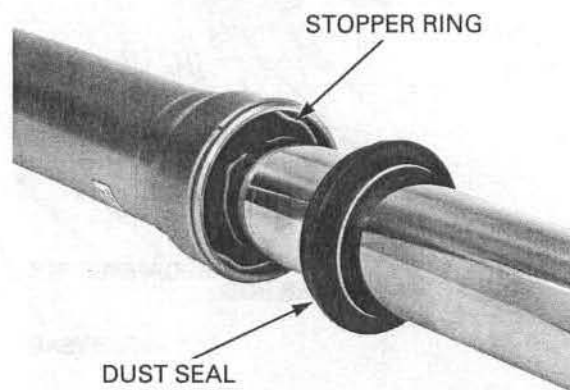
Fork seal driver, 38mm

07TMD-GBF0100 or  
07TMD-GBF010B  
(U.S.A. only)



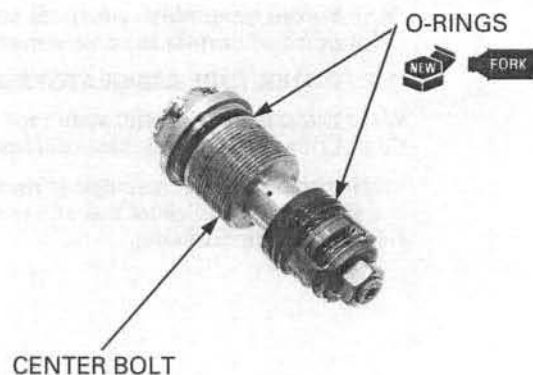
Install the stopper ring into the groove in the outer tube.

Install the dust seal.



### FORK DAMPER INSTALLATION

Coat new O-rings with fork oil and install them into the center bolt grooves.



Assemble the fork damper and install the assembly into the slider.

Hold the axle holder of the slider in a vise with a shop towel or soft jaws.

Apply locking agent to the center bolt threads and install it into the slider.

Tighten the center bolt by using the fork rod holder as shown.

Be sure to tighten the set screw on the fork rod holder handle before using the tool.

## TOOLS:

Fork rod holder 07TMB-GBF0100

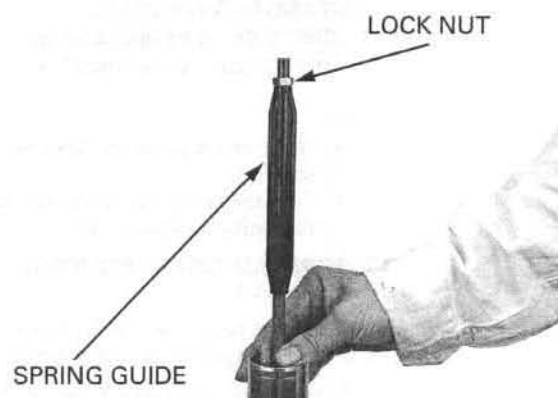
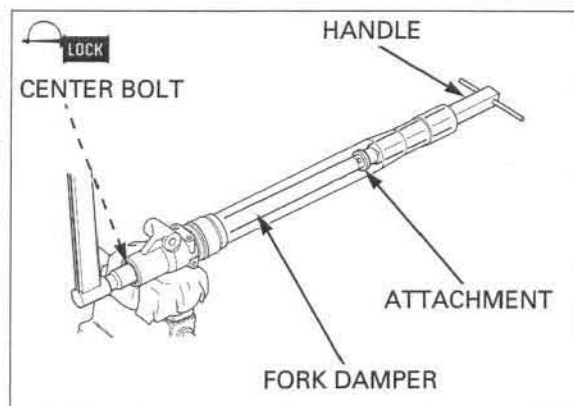
U.S.A. only:

Fork rod holder attachment 2pin 07TMB-GBF010A  
24 mm

Fork rod holder handle 07TMB-001010A

**TORQUE:** 54N·m (5.4 kgf·m, 40 lbf·ft)

Install the spring guide to the damper rod and install the lock nut.



## OIL CAPACITY ADJUSTMENT

Compress the fork leg and damper rod fully.

Pour the recommended fork oil into the fork leg.

## RECOMMENDED OIL:

**Pro-Honda HP Fork Oil 5W or equivalent**

## STANDARD OIL CAPACITY:

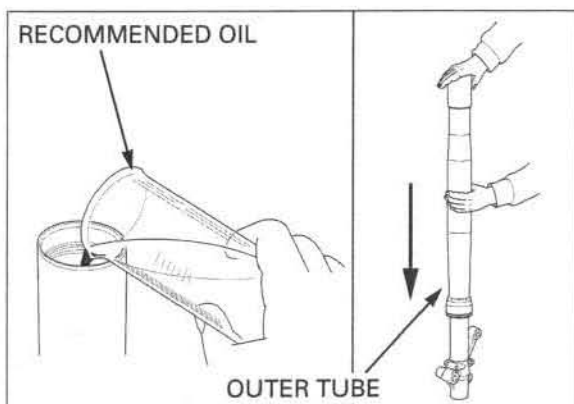
**CRF150R:** 357cm<sup>3</sup> (12.1 US oz, 12.6 Imp oz)

**CRF150RB:** 342cm<sup>3</sup> (11.6 US oz, 12.0 Imp oz)

- For the oil capacity for the optional spring and oil capacity range (page 1-22).

Bleed the air from the fork leg as follows:

- Extend the fork, cover the top of the outer tube with your hand and compress the fork leg slowly.
  - Remove your hand and extend the fork slowly.
- Repeat above procedure 2 - 3 times.

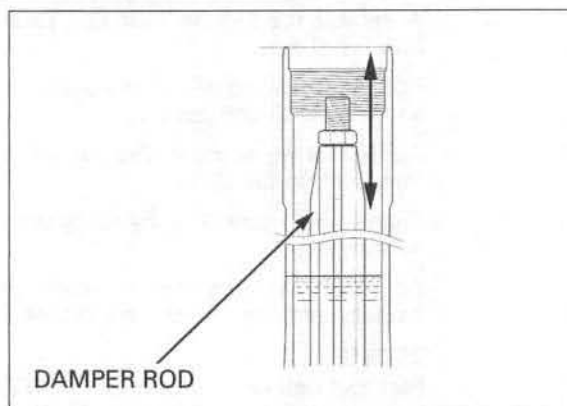


*Be sure the oil capacity is the same in both fork legs.*



## FRONT WHEEL/SUSPENSION/STEERING

3. Pump the damper rod slowly 8 - 10 times to bleed air.
4. Compress the outer tube and damper rod fully.



After the fork oil level stabilizes, adjust the oil level as required using a syringe.

Measure the oil level from the top of the outer tube with the damper rod and outer tube fully compressed.

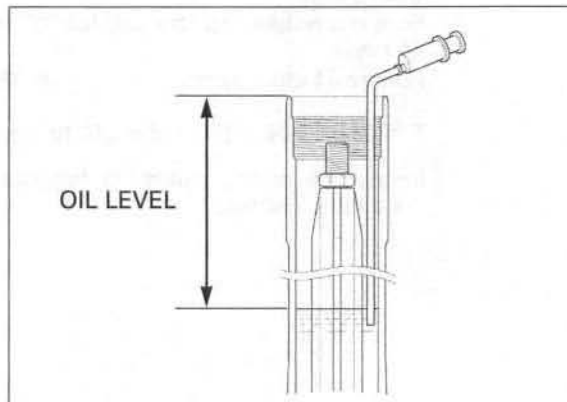
### STANDARD OIL LEVEL:

CRF150R: 123 mm(4.84 in)

CRF150RB: 141 mm(5.55 in)

### NOTE:

- Be sure an amount of oil level is the same in both fork legs.
- For the oil capacity for the optional spring and oil capacity range (page 1-22).

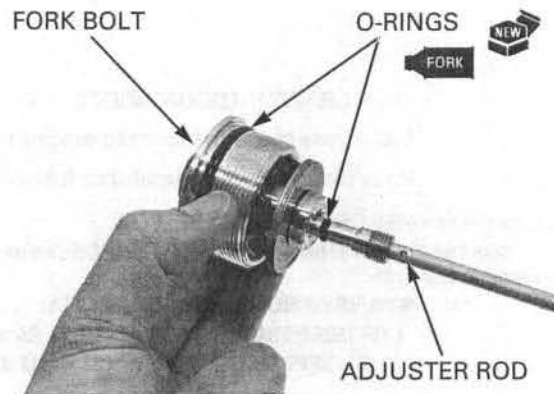


### FORK BOLT/ADJUSTER ROD/SPRING INSTALLATION

If the adjuster rod was removed, apply fork oil to a new O-ring and install it onto the adjuster rod.

Install the adjuster rod by turning it clockwise fully to the softest position.

Apply fork oil to a new O-ring and install it onto the fork bolt.

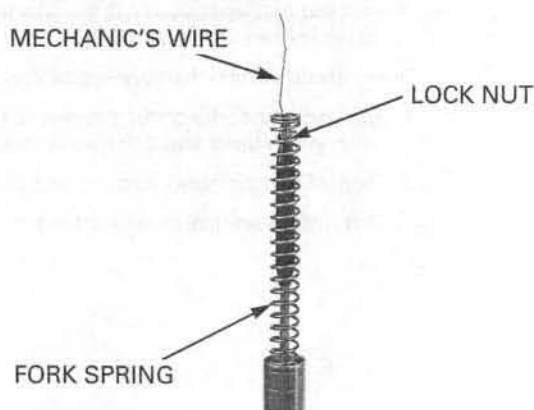


Attach a 60cm (24 in) length of the mechanic's wire to the lock nut in order to pull up the damper rod.

Wipe off any excess oil from the fork spring and install it over wire into the fork.

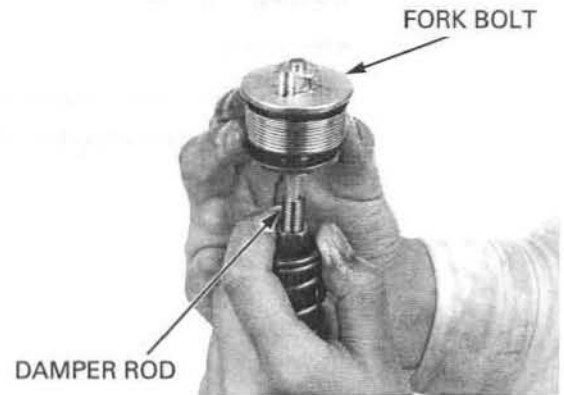
Pull the damper rod up through the fork spring with the mechanics wire.

Remove the mechanics wire while holding the damper rod up.



Handle the fork bolt carefully to prevent the adjuster rod and the needle from being damaged or bent.

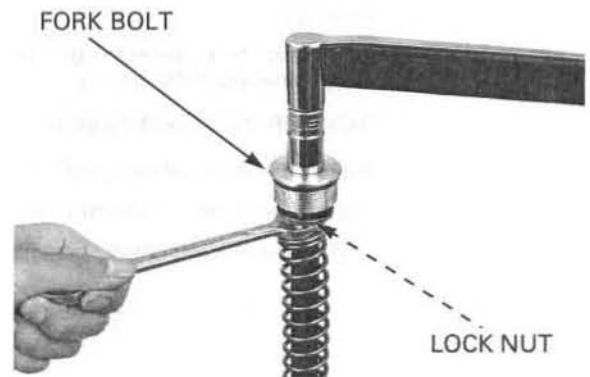
Install the fork bolt assembly into the damper rod, keeping damper rod and screw the fork bolt onto the damper rod.



Tighten the lock nut while holding the fork bolt.

**TORQUE: 19.7 N·m (2.0 kgf·m, 15 lbf·ft)**

Temporarily install the fork bolt into the outer tube.

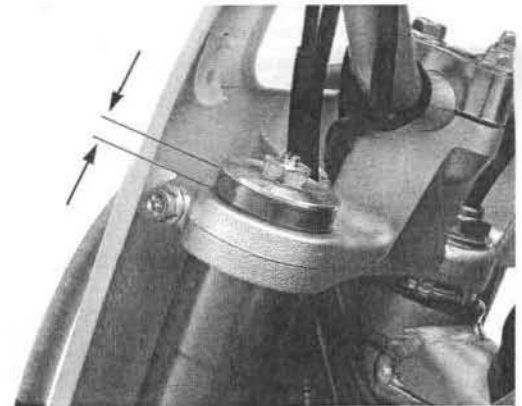


## INSTALLATION

Install the fork leg into the fork bridges and set the outer tube surface above the top bridge upper surface the specified length.

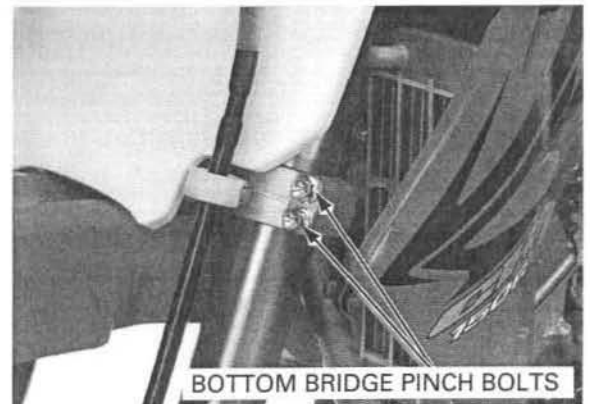
**CRF150R:** 28 mm (1.1 in) from the top end of the outer tube

**CRF150RB:** 8 mm (0.3 in) from the top end of the outer tube



Tighten the bottom bridge pinch bolts to the specified torque.

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



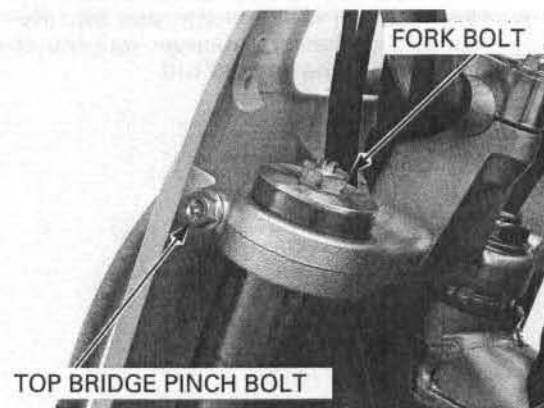
## FRONT WHEEL/SUSPENSION/STEERING

If the fork bolt was removed, tighten the fork bolt.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Tighten the fork top bridge bolt.

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



Make sure the wear rings with their end gaps facing rearward.

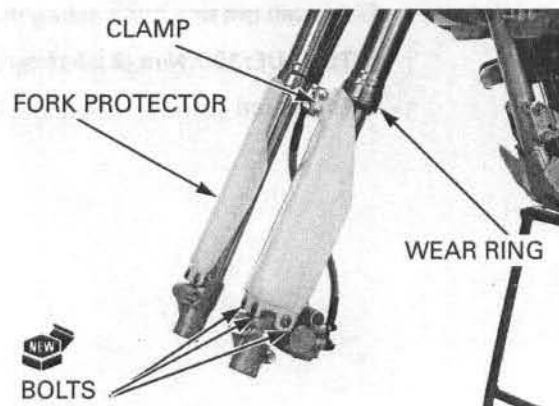
Install the fork protector and tighten new mounting bolts to the specified torque.

**TORQUE: 7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)**

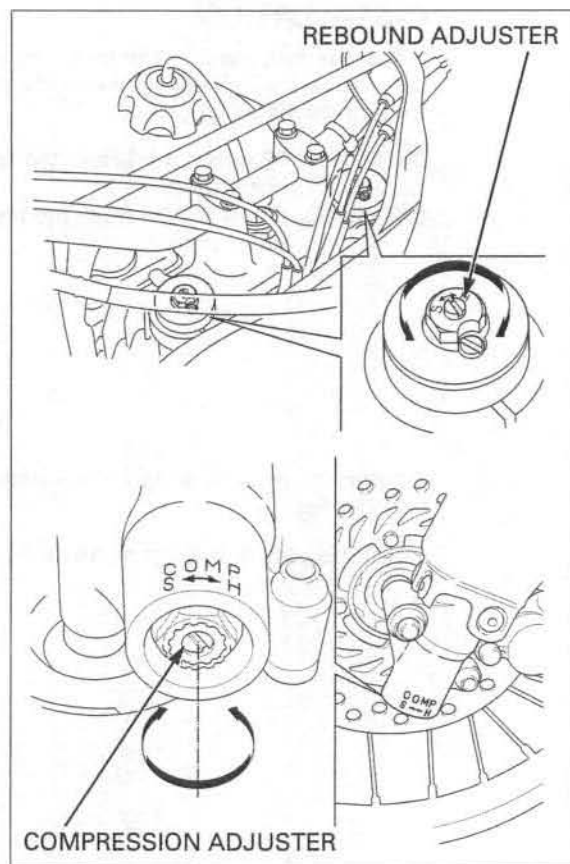
Install the front wheel (page 12-7).

Install the brake hose clamp and bolts.

Install the brake caliper (page 14-17).



Return the rebound adjuster and compression adjuster to the original positions as noted during removal.





## HANDLEBAR

## REMOVAL

Unlock the number plate tab.

Remove the wire bands.

Remove the screw and engine stop button.

Remove the bolts and clutch lever holder.

*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.

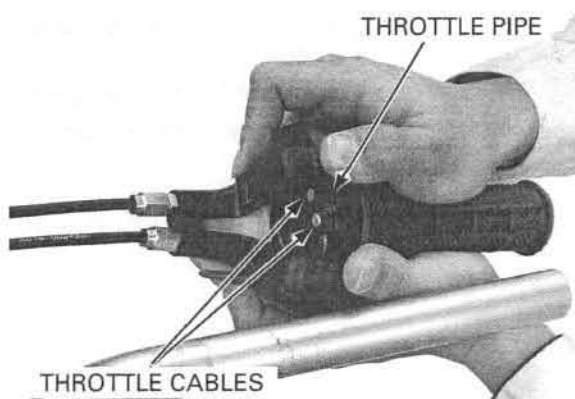
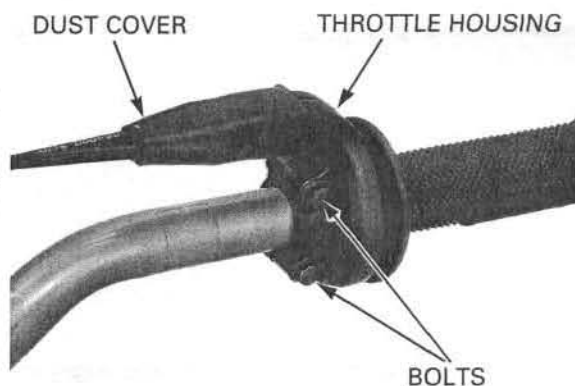
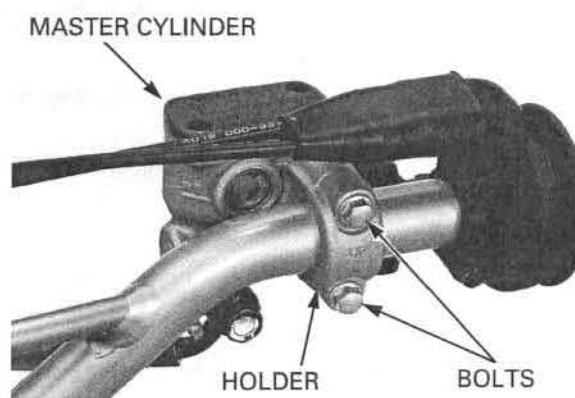
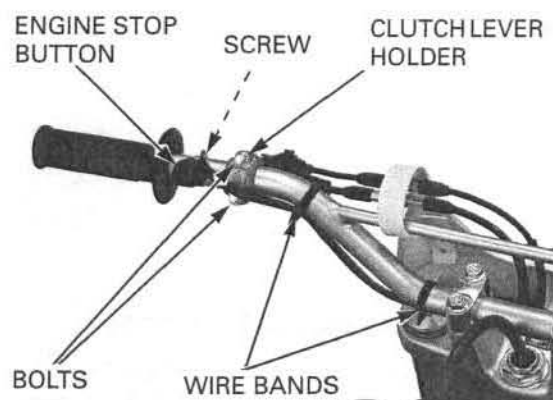
Remove the dust cover and bolts.

## NOTE:

If you will not disassemble the throttle housing, remove the throttle housing as an assembly as follows.

Loosen the throttle housing bolts, turn the handlebar to the right fully, release the throttle cables from their guide, then remove the throttle housing.

Remove the throttle housing from the handlebar. Disconnect the throttle cables from the throttle pipe.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the bolts, upper holders and handlebar.

### INSTALLATION

Place the handlebar on the lower holders while aligning the punch mark of the handlebar with the top surface of the lower holders. Install the upper holders with their punch marks facing forward.

Tighten the front bolts first, then the rear bolts to the specified torque.

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

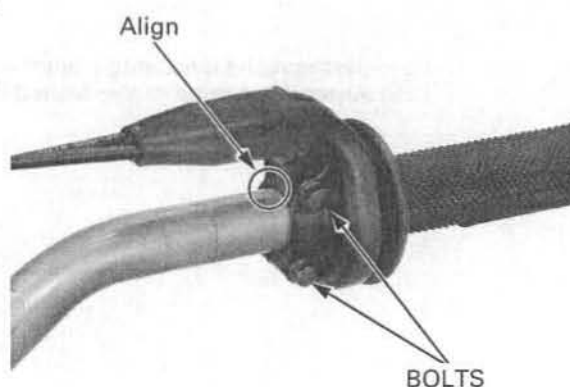
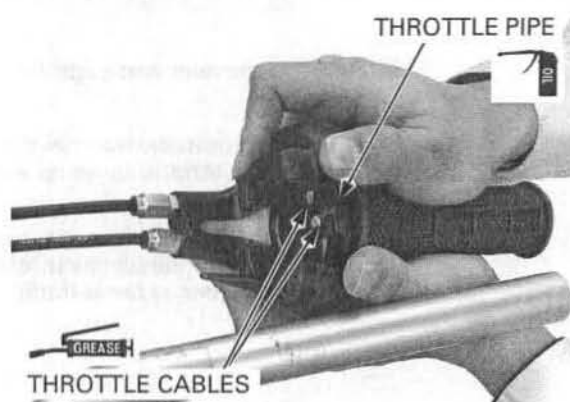
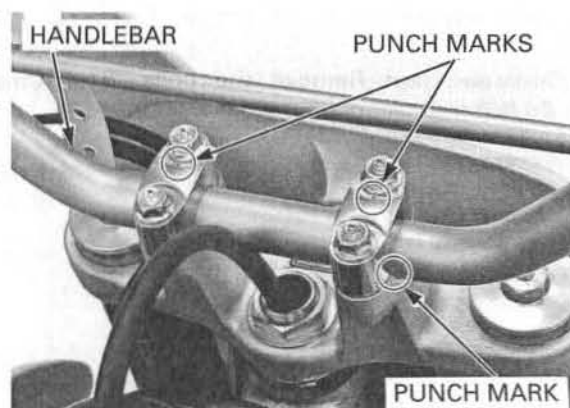
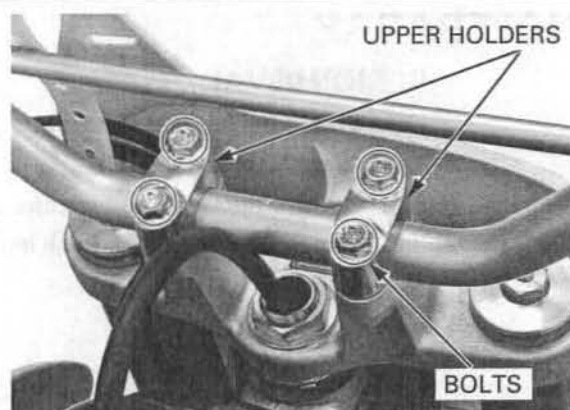
Apply engine oil to the throttle pipe sliding surface.  
Connect the throttle cables to the throttle pipe.  
Apply grease to the throttle cable and its end.

Install the throttle housing aligning the end of the housing with the punch mark on the handlebar.

Tighten the throttle housing upper bolt first, then the lower bolt.

Place the throttle cables inside their guide.

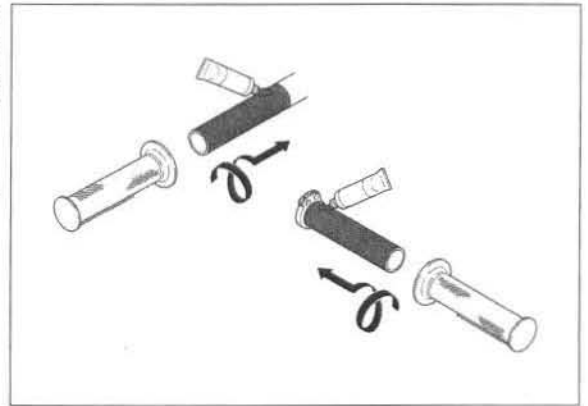
Adjust the throttle grip free play (page 3-6).



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

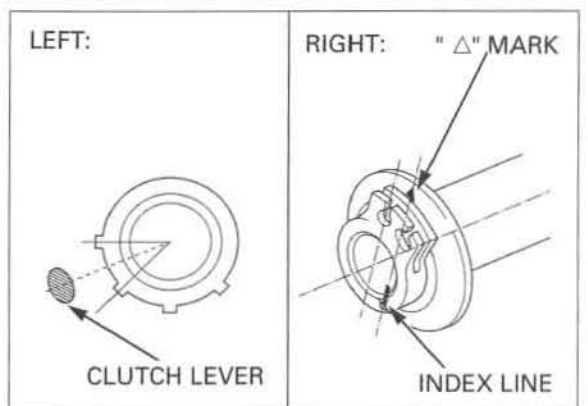
*Allow the adhesive to dry for approximately an hour before riding.*

Wait 3 – 5 minutes and install the grip. Rotate the grips for even application of the adhesive.



Align the "△" mark on the right grip with the index line on the throttle pipe.

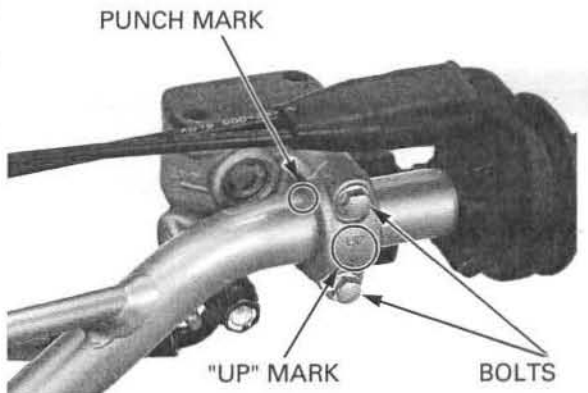
Set the left grip as shown when the handle bar and clutch lever are installed temporarily.



Install the brake master cylinder and holder with the "UP" mark on the holder facing up. Align the end of the holder with the punch mark on the handlebar.

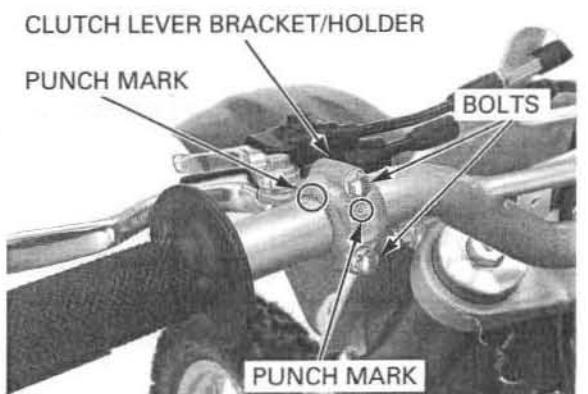
Tighten the upper master cylinder holder bolt first, then the lower bolt to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7 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 punch mark on the handlebar.

Tighten the clutch lever bracket holder upper bolt first, then the lower bolt.





## FRONT WHEEL/SUSPENSION/STEERING

Install the engine stop button on the handlebar.

Tighten the engine stop button screw to the specified torque.

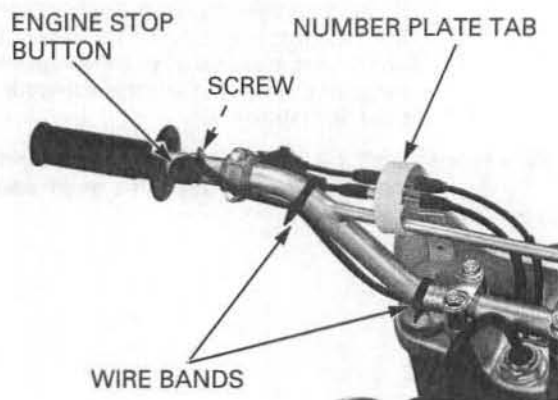
**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**

Clamp the engine stop button wire with wire band.

Route the number plate tab around the crossbar as shown.

Adjust the following:

- Clutch lever free play (page 3-23)
- Hot start lever free play (page 3-6)



## STEERING STEM

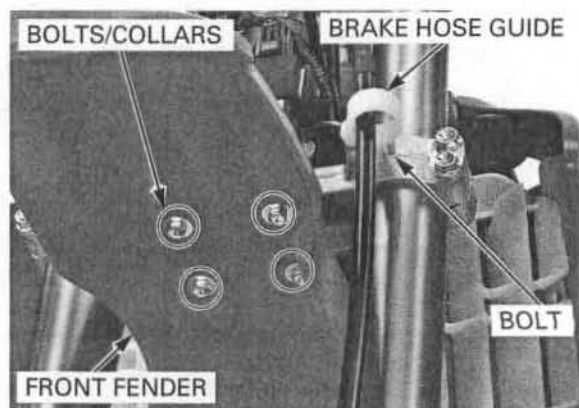
### REMOVAL

Remove the following:

- Number plate (page 2-5)
- Handlebar (page 12-23)
- Front wheel (page 12-7)

Remove the bolts, collars and front fender.

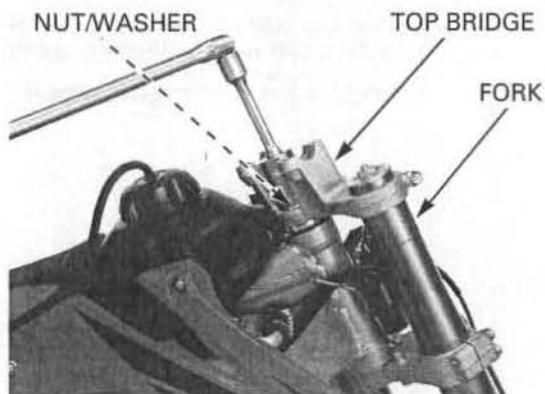
Remove the bolt and brake hose guide.



Remove the steering stem nut and washer.

Remove the forks (page 12-11).

Remove the fork top bridge.



Remove the steering stem adjusting nut using the special tool.

### TOOL:

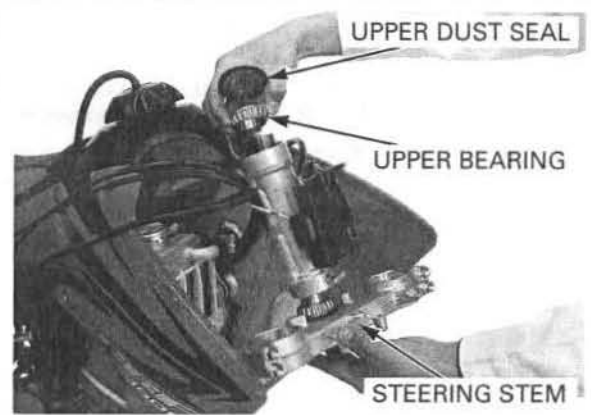
Steering stem socket

07916-KA50100



Remove the upper dust seal, upper tapered roller bearing and steering stem.

Check the bearings and outer races for wear or damage.



## BEARING REPLACEMENT

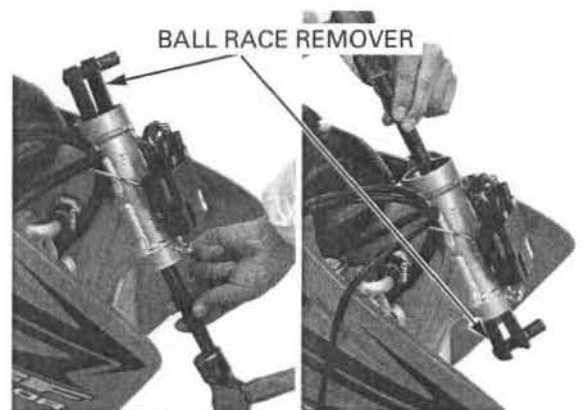
*Always replace the bearings and races as a set.*

Remove the upper and lower bearing outer races from the head pipe using the special tools.

### TOOL:

Ball race remover

07948-4630100



Drive new upper and lower bearing races into the steering head pipe squarely.

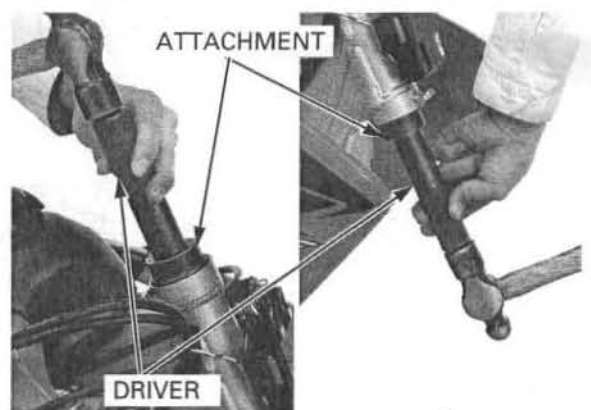
### TOOL:

Driver

Attachment 42 x 47

07749-0010000

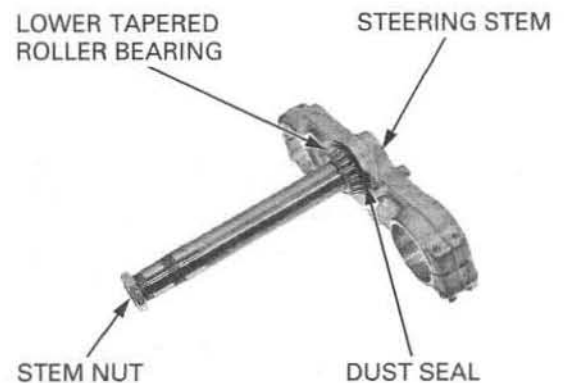
07946-0010300



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 stem.

Remove the lower tapered roller bearing with a chisel or equivalent tools, being careful not to damage the stem.

Remove the dust seal.



## FRONT WHEEL/SUSPENSION/STEERING

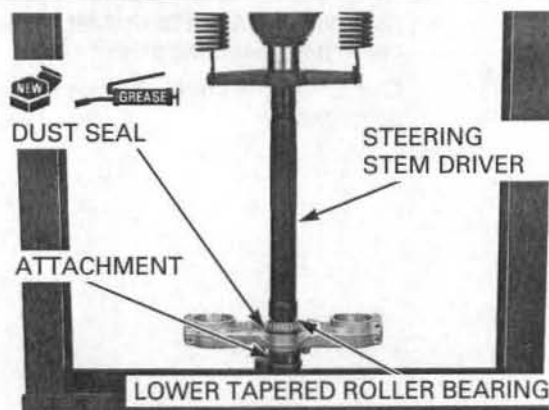
Apply grease to a new dust seal lips and install it over the steering stem.

Install the lower tapered roller bearing using a hydraulic press and the special tool as shown.

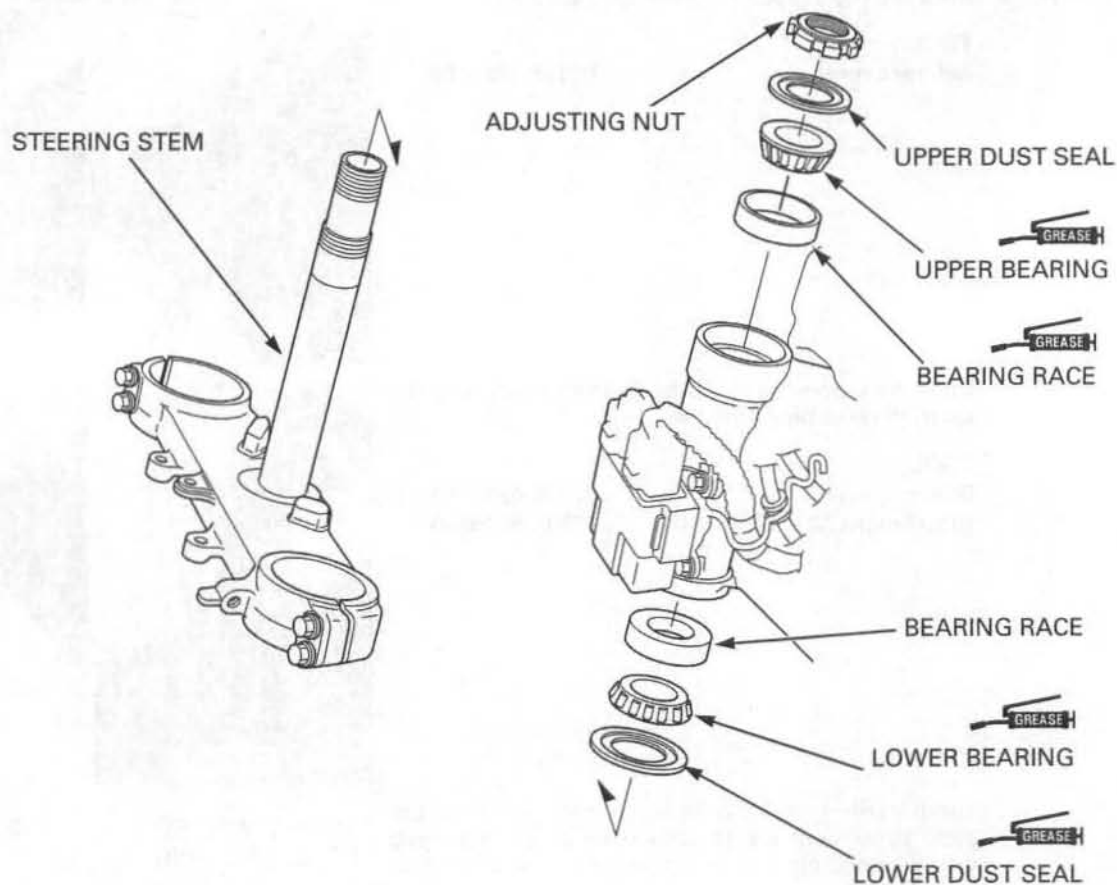
### TOOL:

Steering stem driver

07746-4300101



## INSTALLATION



### NOTE:

Use the specified grease (urea based multi-purpose grease with extreme pressure agent) for the tapered roller bearings and dust seals:

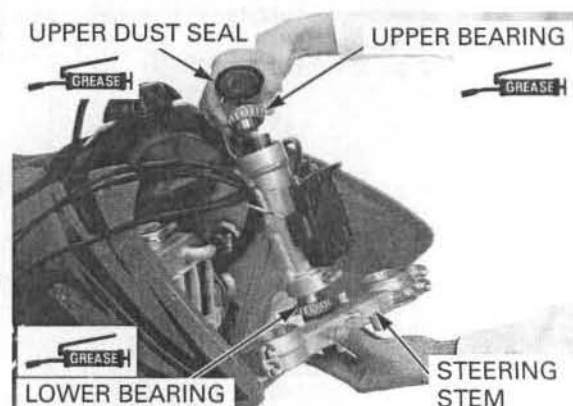
- Excelite EP2 (Kyodo Yushi) or equivalent
- Stamina EP2 (Shell) or equivalent

Apply 3 - 5 g (0.1 - 0.2 oz) of grease to each new tapered roller bearing and fill it up.

Apply grease to a new upper dust seal lip.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

- Upper tapered roller bearing
- Upper dust seal





Install the steering head adjusting nut.

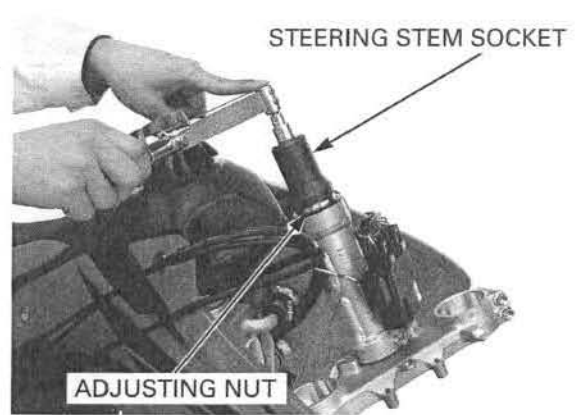
Tighten the steering head adjusting nut to the specified torque using the special tool.

**TORQUE: 29.5 N·m (3.0 kgf·m, 22 lbf·ft)**

**TOOL:**

Steering stem socket

07916-KA50100



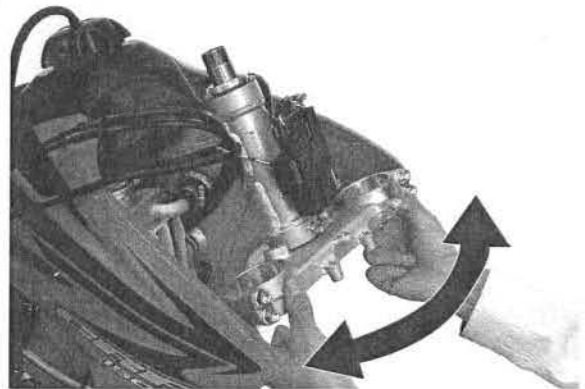
Move the steering stem lock-to-lock several times to seat the bearings.

Loosen the steering head adjusting nut.

Retighten the steering stem adjusting nut to the specified torque.

**TORQUE: 5.9 N·m (0.65 kgf·m, 4.4 lbf·ft)**

Recheck that the steering stem moves smoothly without play or binding.



Install the fork legs temporarily.

Install the following:

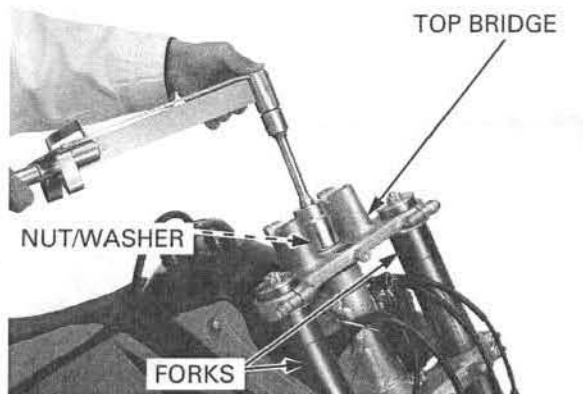
- Top bridge
- Washer onto the top bridge

Install and tighten the stem nut to the specified torque.

**TORQUE: 128 N·m (13.0 kgf·m, 94.4 lbf·ft)**

Install the fork legs (page 12-21) in their proper position.

Recheck the steering stem adjustment before installing the removed parts.

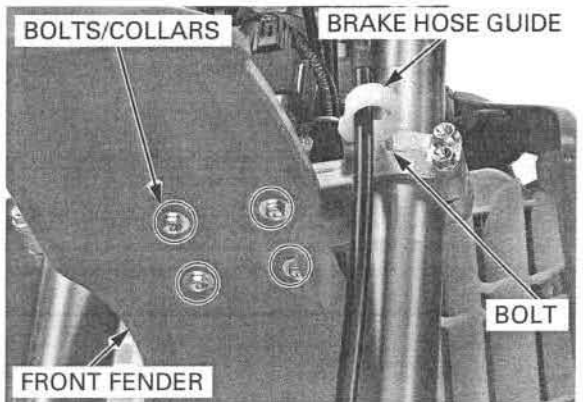


Install the bolt and brake hose guide.

Install the bolts, collars and front fender.

Install the following:

- Number plate (page 2-5)
- Handlebar (page 12-23)
- Front wheel (page 12-7)



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# MEMO

# 13. REAR WHEEL/SUSPENSION

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COMPONENT LOCATION .....	13-2	SHOCK ABSORBER.....	13-14
SERVICE INFORMATION .....	13-3	SHOCK LINKAGE .....	13-29
TROUBLESHOOTING .....	13-7	SWINGARM.....	13-33
REAR WHEEL .....	13-8		



## COMPONENT LOCATION



# **SERVICE INFORMATION**

## **GENERAL**

- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- 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 additive) every three races or 7.5 hours of operation.
- Optional rear wheel sprockets, drive chain, shock springs and spring preload pin spanners are available. Refer to page 1-22 for optional parts.
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

## **SPECIFICATIONS: CRF150R**

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		36.0 ± 1.0 (1.42 ± 0.04)	—
Drive chain slack		35 – 45 (1.4 – 1.8)	—
Drive chain size/link	DID	420DS3/120RB	—
Drive chain slider thickness		—	5 (0.2)
Drive chain tensioner roller O.D.		—	18 (0.71)
Shock absorber	Damper gas pressure	980 kPa (10.0 kg/cm <sup>2</sup> , 142 psi)	—
	Damper compressed gas	Nitrogen gas	—
	Recommended shock oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Spring free length	241 (9.49)	236.2 (9.30)
	Spring installed length (standard)	233.8 (9.20)	—
	Oil capacity	191 cm <sup>3</sup> (6.5 US oz, 6.7 Imp oz)	—
Compression damping adjuster standard position		1-1/8 – 1- 1/2 turns out from full in	—
Rebound damping adjuster standard position		3/8 – 5/8 turns out from full in	—

## **SPECIFICATIONS: CRF150RB**

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		31.7 ± 1.0 (1.25 ± 0.04)	—
Drive chain slack		35 – 45 (1.4 – 1.8)	—
Drive chain size/link	DID	420DS3/126RB	—
Drive chain slider thickness		—	5 (0.2)
Drive chain tensioner roller O.D.		—	18 (0.71)
Shock absorber	Damper gas pressure	980 kPa (10.0 kg/cm <sup>2</sup> , 142 psi)	—
	Damper compressed gas	Nitrogen gas	—
	Recommended shock oil	Pro-Honda HP Fork Oil 5W or equivalent	—
	Spring free length	241 (9.49)	236.2 (9.30)
	Spring installed length (standard)	234.0 (9.21)	—
	Oil capacity	191 cm <sup>3</sup> (6.5 US oz, 6.7 Imp oz)	—
Compression damping adjuster standard position		1-1/8 – 1- 1/2 turns out from full in	—
Rebound damping adjuster standard position		3/8 – 5/8 turns out from full in	—


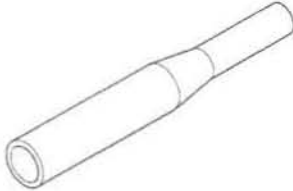
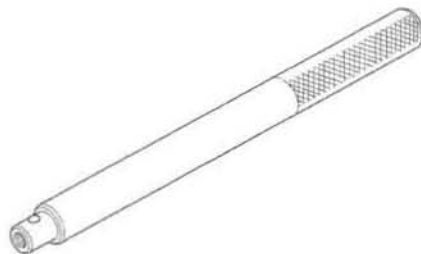
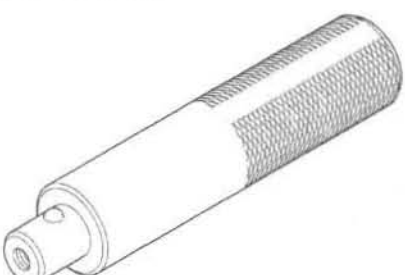







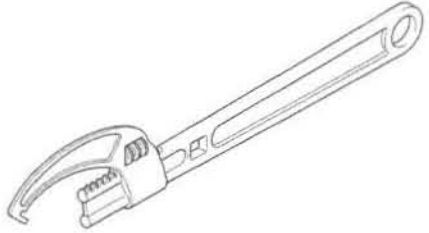
## REAR WHEEL/SUSPENSION

### TORQUE VALUES





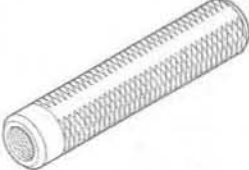
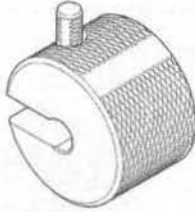
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Rear spoke	3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Rear rim lock	12.4 N·m (1.3 kgf·m, 9.1 lbf·ft)	
Driven sprocket nut	32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Rear brake disc bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	ALOC bolt: replace with a new one.
Shock absorber upper mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock absorber damper rod end nut	34 N·m (3.5 kgf·m, 21 lbf·ft)	Stake
Shock absorber damping adjuster	17.2 N·m (1.8 kgf·m, 13 lbf·ft)	Stake
Shock absorber spring lock nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	
Shock arm nut (swingarm side)	44 N·m (4.5 kgf·m, 33 lbf·ft)	Apply oil to the threads and flange surface, U-nut
(shock link side)	44 N·m (4.5 kgf·m, 33 lbf·ft)	Apply oil to the threads and flange surface, U-nut
Shock link nut (frame side)	44 N·m (4.5 kgf·m, 33 lbf·ft)	Apply oil to the threads and flange surface, U-nut
Swingarm pivot nut	83 N·m (8.5 kgf·m, 61 lbf·ft)	U-nut
Rear brake hose guide screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Drive chain adjusting bolt lock nut	27 N·m (2.8 kgf·m, 20 lbf·ft)	



TOOLS

<p>Spoke wrench, 5.8 mm 07701-0020300</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Slider guide, 14 mm 07974-KA40001</p>  <p>not available in U.S.A.</p>	<p>Driver 07949-3710001</p> 
<p>Driver 07749-0010000</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Attachment, 24 x 26 mm 07746-0010700</p> 
<p>Attachment, 22 x 24 mm 07746-0010800</p>  <p>not available in U.S.A.</p>	<p>Attachment, 22 x 25 mm 07946-KM40701</p>  <p>not available in U.S.A.</p>	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Pilot, 19 mm 07746-0041400</p> 	<p>Pilot, 17 mm 07746-0040400</p> 	<p>Pin spanner (2 required) 07702-0020001</p>  <p>or Pin spanner A 89201-KA4-811 and Pin spanner B 89202-KA4-811</p>

REAR WHEEL/SUSPENSION

<p>Bearing remover head, 17 mm 07746-0050500</p> 	<p>Bearing remover shaft 07746-0050100</p> 	<p>Piston ring guide attachment 070MG-KZ30100</p>  <p>not available in U.S.A.</p>
<p>Bearing remover set, 17 mm 07936-3710300</p> 	<p>Bearing remover handle 07936-3710100</p> 	<p>Remover weight 07741-0010201</p>  <p>or 07936-3710200 or 07936-371020A (U.S.A.only)</p>

## TROUBLESHOOTING

### Soft suspension

- Weak shock absorber springs
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Tire pressure too low

### 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 rear axle
- Axle alignment/chain adjustment not equal on both sides

### Rear wheel wobbles

- Bent rim
- Worn rear wheel bearings
- Faulty tire
- Tire pressure too low
- Faulty swingarm pivot bearings

### Rear wheel hard to turn

- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

### Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners



## REAR WHEEL/SUSPENSION

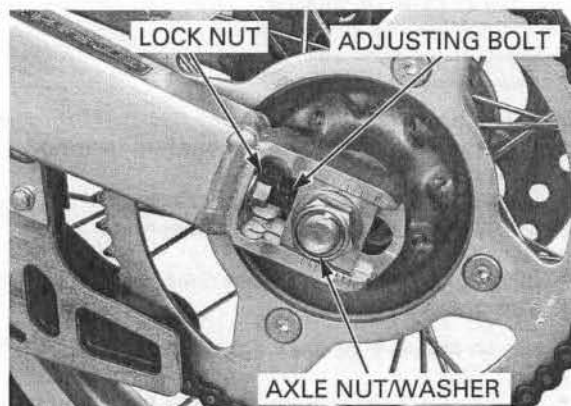
### REAR WHEEL

#### REMOVAL

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

Loosen the axle nut.

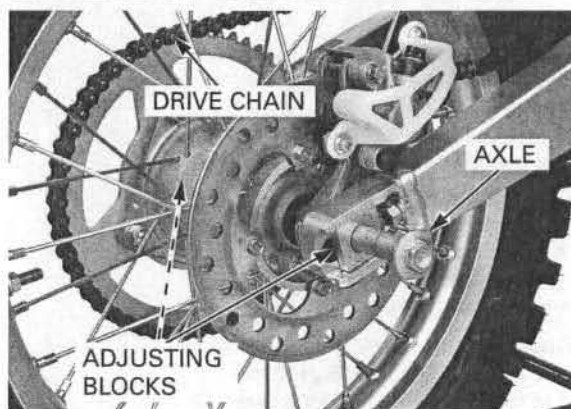
Loosen the drive chain adjuster lock nuts and turn the adjusting bolts clockwise fully.  
Remove the axle nut and washer.



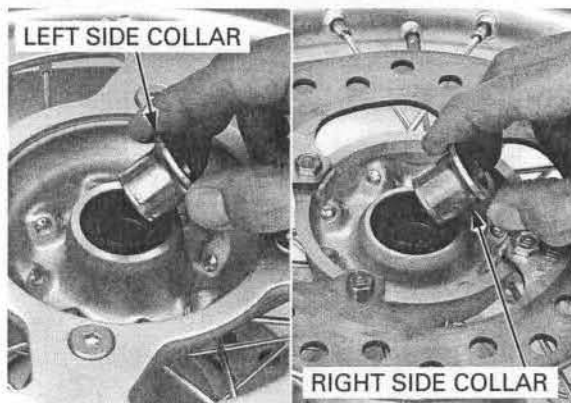
Push the rear wheel forward to derail the drive chain from the driven sprocket.

Remove the axle, adjusting blocks and rear wheel.

*Do not operate the brake pedal after removing the rear wheel.*



Remove the right and left side collars.



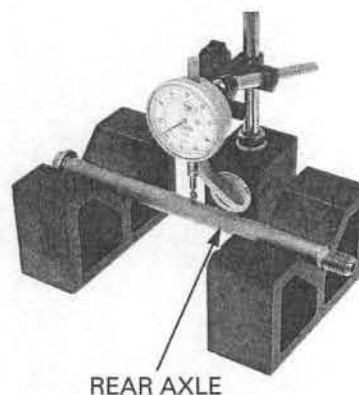
#### INSPECTION

##### AXLE

Set the axle on V-blocks and measure the runout. Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**

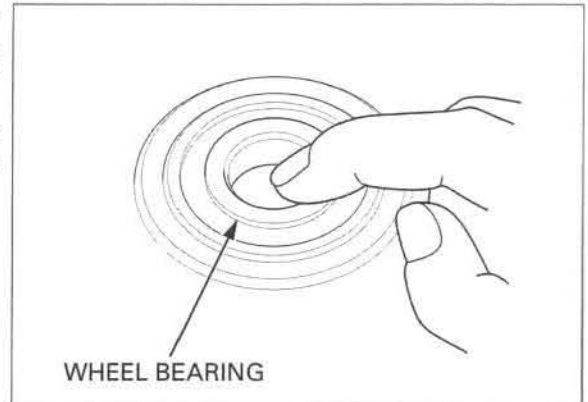


## WHEEL BEARING

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

*Replace the wheel bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.



## WHEEL RIM RUNOUT

Check the rim runout by placing the wheel in a turning stand.

Spin the wheel by hand, and read the runout using a dial indicator.

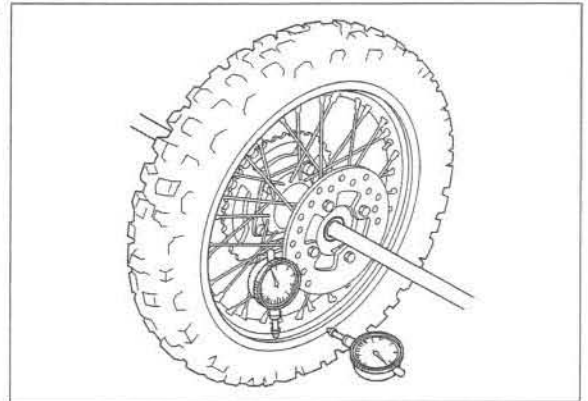
Actual runout is 1/2 of the indicator reading.

### 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.

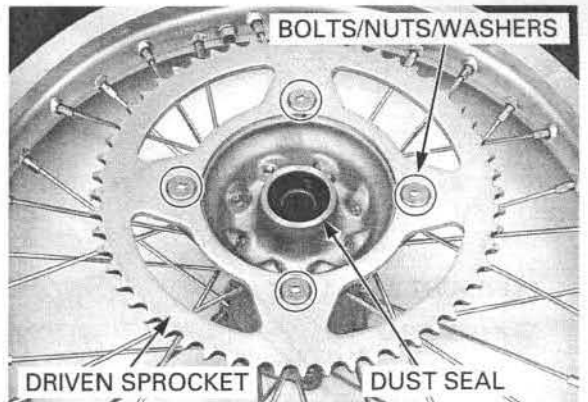


## DISASSEMBLY

Remove the driven sprocket bolts, nuts and washers.

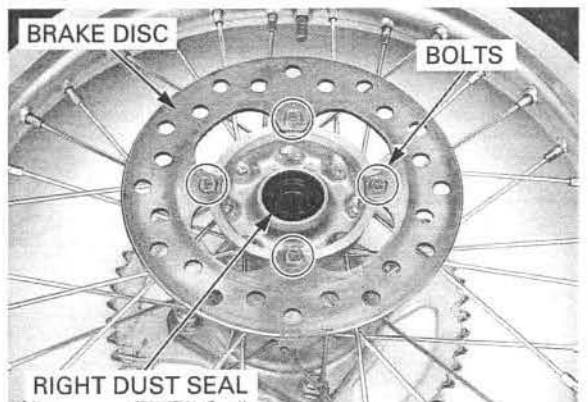
Remove the driven sprocket.

Remove the left dust seal.



Remove the bolts and brake disc.

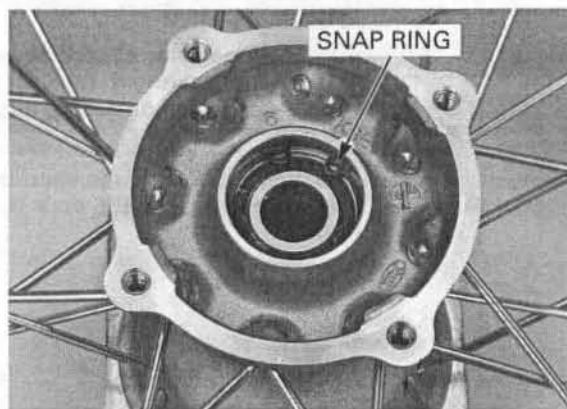
Remove the right dust seal.





## REAR WHEEL/SUSPENSION

Remove the right side snap ring.



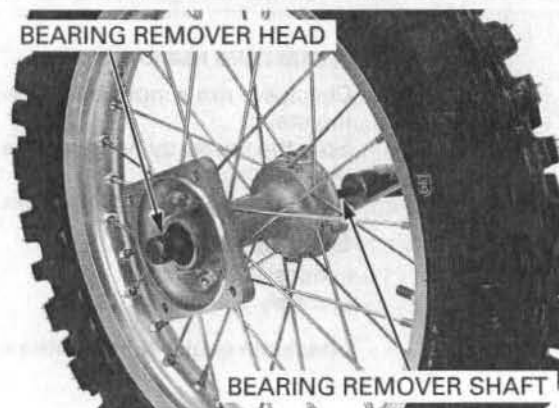
*Replace the wheel bearings in pairs. Do not reuse old bearing.*

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 bearings.

### TOOLS:

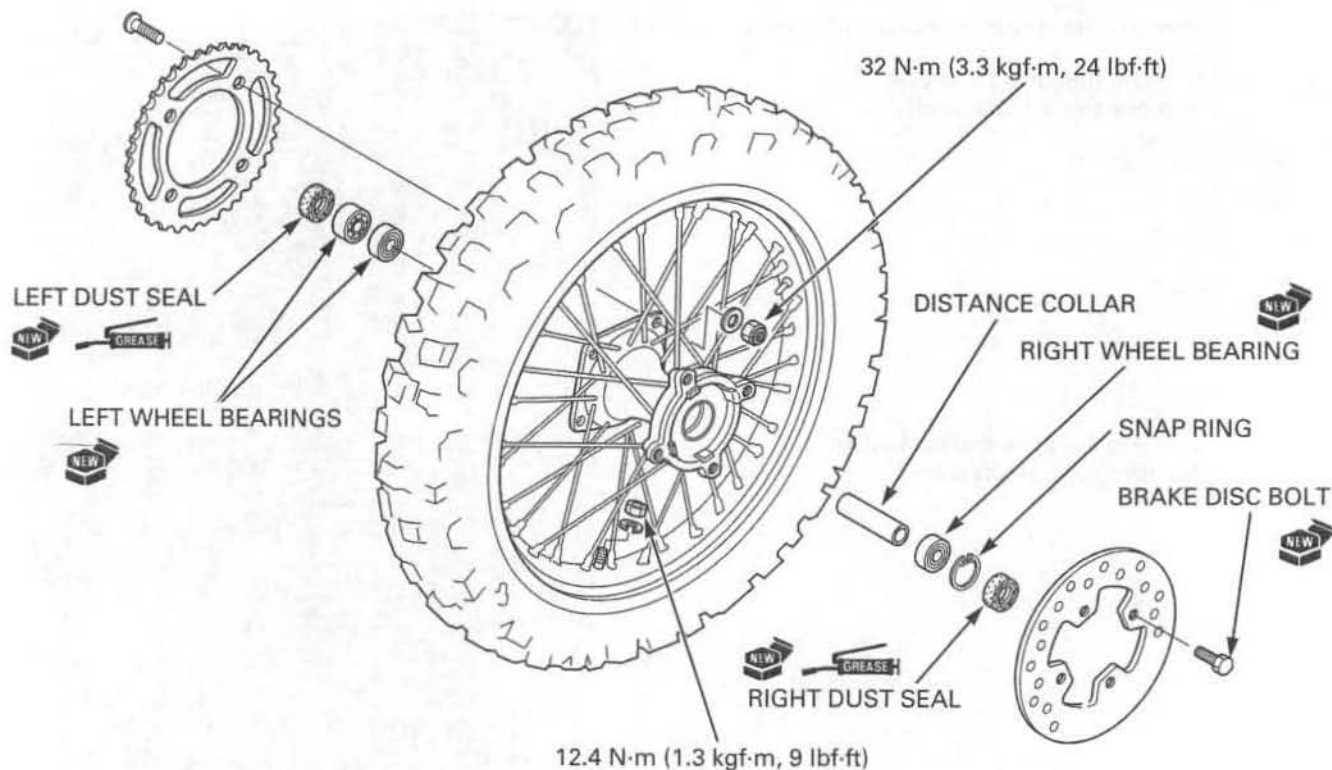
Bearing remover head, 17 mm 07746-0050500  
Bearing remover shaft 07746-0050100

BEARING REMOVER HEAD



BEARING REMOVER SHAFT

## ASSEMBLY





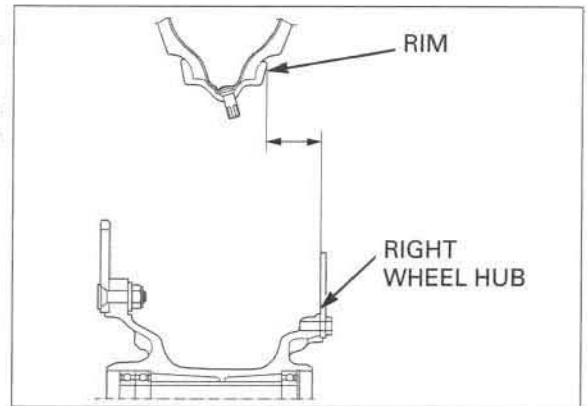
Place the rim on a work bench.  
Place the hub in the center of the rim, and begin lacing with new spokes.

Adjust the hub position so the distance from the hub right end surface to the side of the rim is as shown.

## HUB POSITION:

**CRF150R:**  $36.0 \pm 1 \text{ mm}$  ( $1.42 \pm 0.04 \text{ in}$ )

**CRF150RB:**  $31.7 \pm 1 \text{ mm}$  ( $1.25 \pm 0.04 \text{ in}$ )



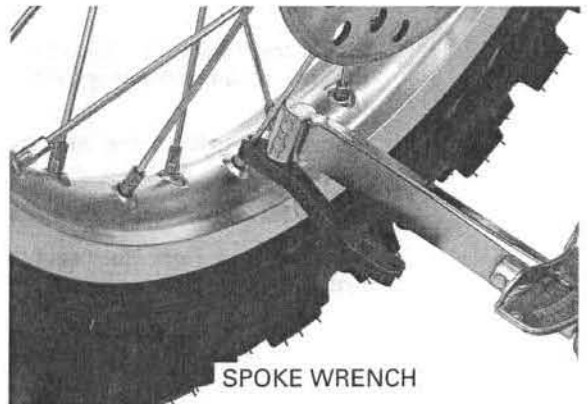
Torque the spoke in two or three progressive steps.

## TOOL:

**Spoke wrench, 5.8 mm**

**07701-0020300 or equivalent commercially available in U.S.A.**

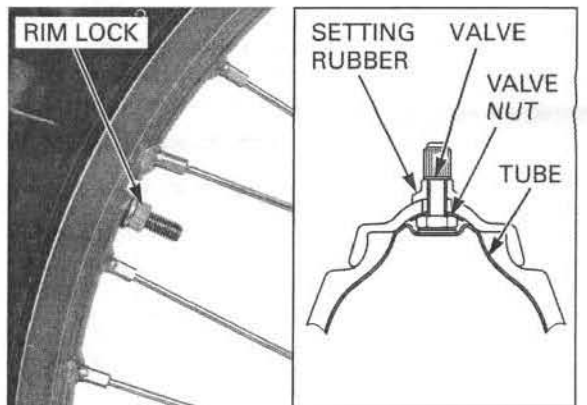
**TORQUE:** 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)



Install the rim lock, rim band, tube and tire.

Tighten the rim lock to the specified torque.

**TORQUE:** 12.4 N·m (1.3 kgf·m, 9.1 lbf·ft)



*Replace the wheel bearings in pairs. Do not reused old bearing.*

Pack new bearing cavities 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, 32 x 35 mm**

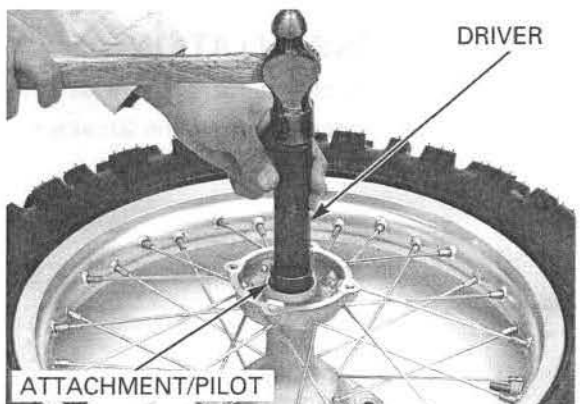
**07746-0010100**

**Pilot, 17 mm**

**07746-0040400**

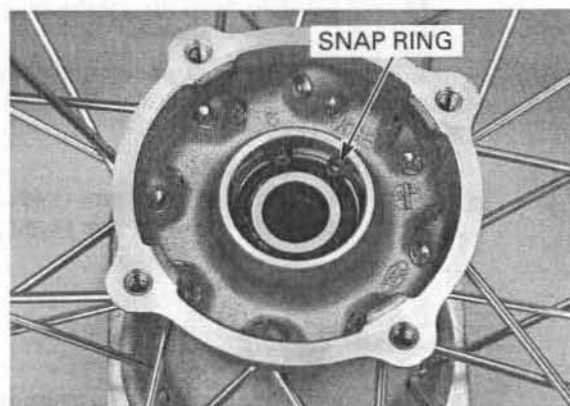
Install the distance collar into place, then drive new left wheel bearings using the same tools.

- Drive the inside left wheel bearing with the marked side facing up.
- Drive the outside left wheel bearing with the sealed side facing up.



## REAR WHEEL/SUSPENSION

Install the right side snap ring.

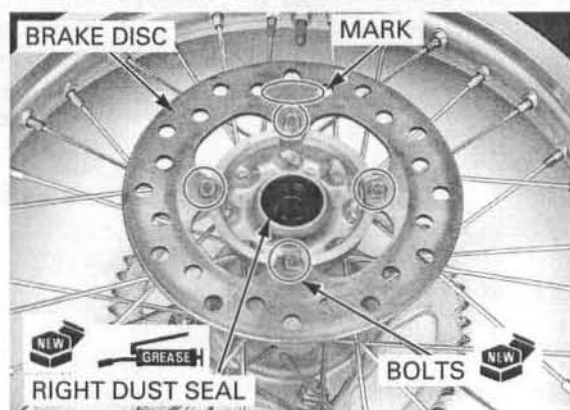


Install the brake disc onto the wheel hub with the minimum thickness mark (MIN TH 3.0 mm) facing out.

Install and tighten the new bolts to the specified torque.

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

Pack the new right dust seal lips with grease, then install the seal.



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)**

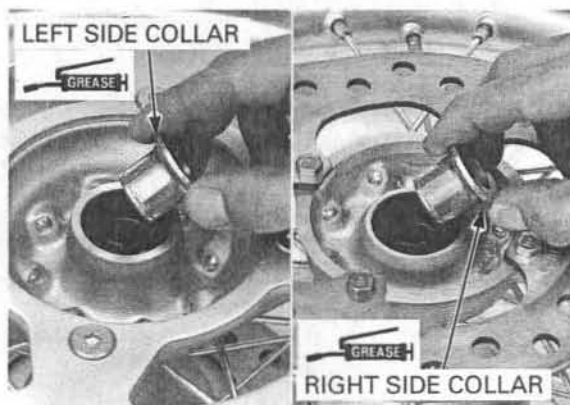
Pack the new left dust seal lips with grease, then install the seal.



## INSTALLATION

Apply grease to the inside of the collars.

Install the right and left side collars.

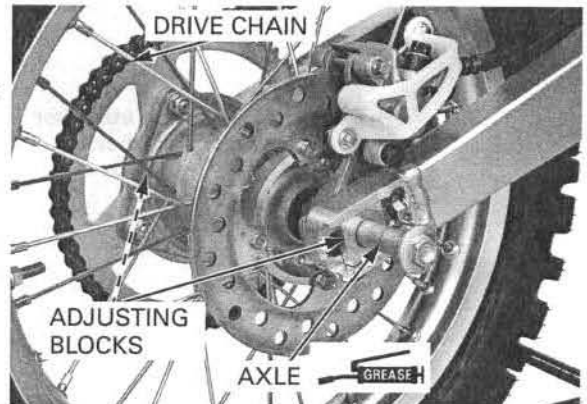
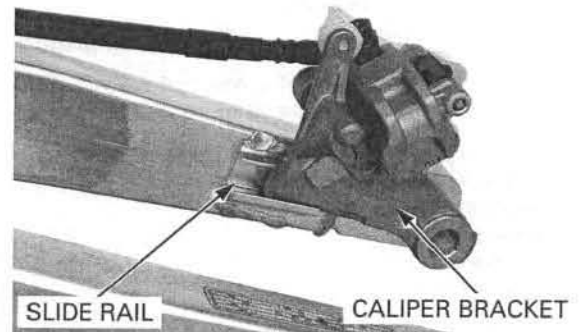




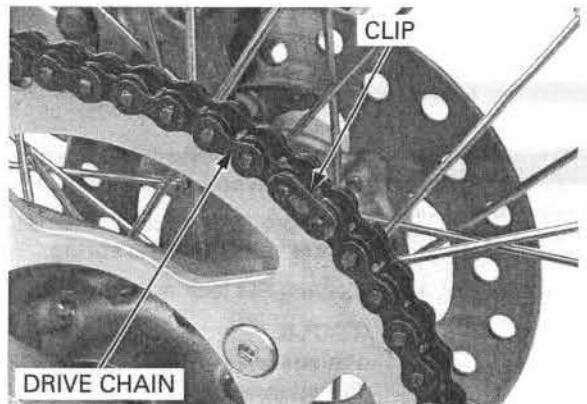
Install the rear brake caliper bracket onto the slide rail of the swingarm.

*Be careful not to damage the brake pads.*

Place the rear wheel into the swingarm.  
Apply a thin coat of grease to the axle.  
Install the drive chain over the driven sprocket.  
Install the adjusting blocks and axle from the right side.



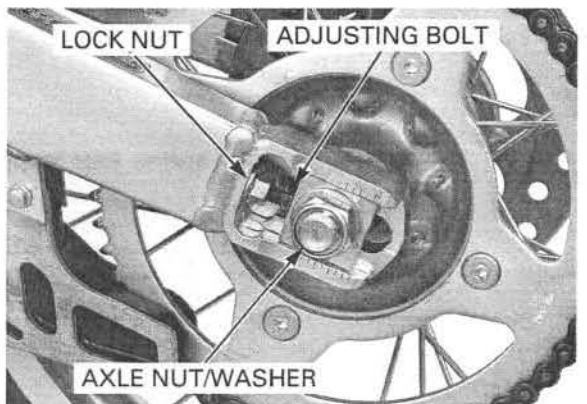
If the master link retaining clip is removed, install it on the drive chain with the closed end of the clip in the direction of wheel rotation.



Install the washer and axle nut.  
Adjust the drive chain slack (page 3-17).  
Tighten the axle nut to the specified torque.

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

Snug the adjusting bolts against the chain adjusters and tighten the lock nuts.





## SHOCK ABSORBER

### REMOVAL

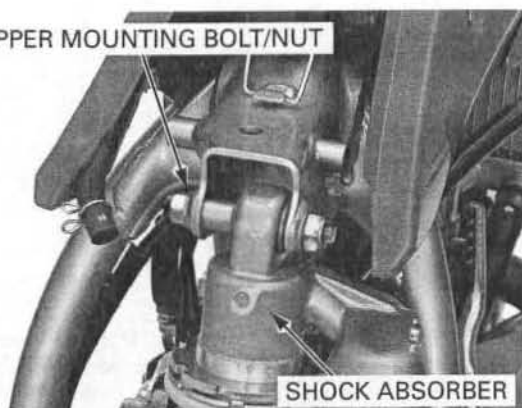
Remove the sub-frame (page 2-5).

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

Remove the upper mounting bolt/nut.

*If you plan to disassemble the shock absorber, loosen the spring lock nut and adjusting nut.*

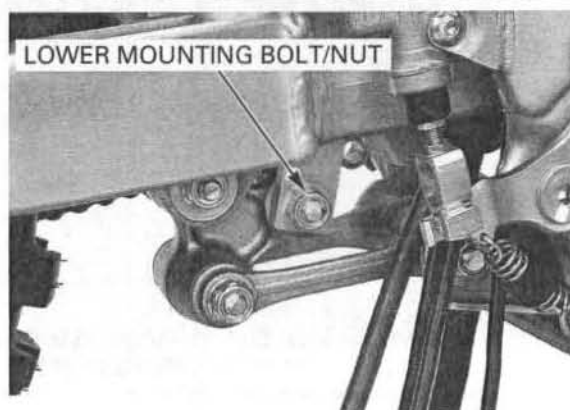
UPPER MOUNTING BOLT/NUT



SHOCK ABSORBER

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

LOWER MOUNTING BOLT/NUT



### DISASSEMBLY

*Do not over tighten the vise and distort the damper case. 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.

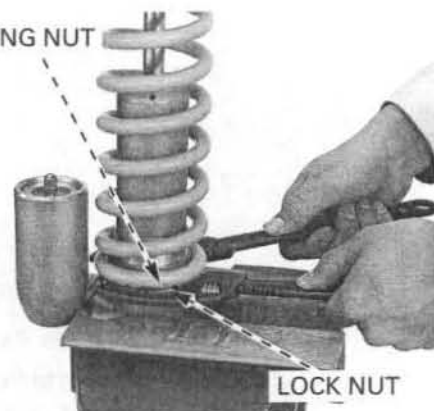
Measure and record the installed spring length before removing the spring.

Loosen the lock nut and adjusting nut.

#### TOOLS:

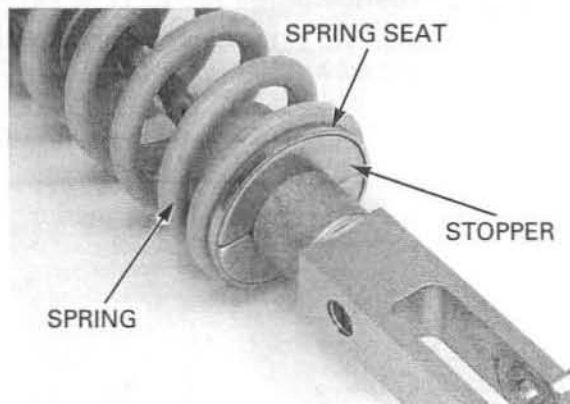
Pin spanner 07702-0020001 (2 required) or  
Pin spanner A and B 89201-KA4-811 and 89202-KA4-811

ADJUSTING NUT



LOCK NUT

Remove the spring seat stopper, spring seat and spring.



SPRING SEAT

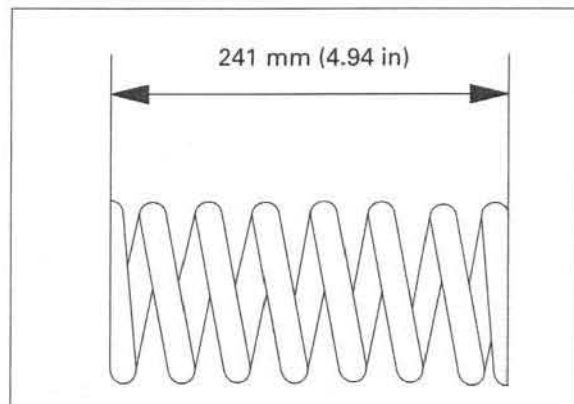
STOPPER

SPRING

## SPRING INSPECTION

Measure the spring free length.

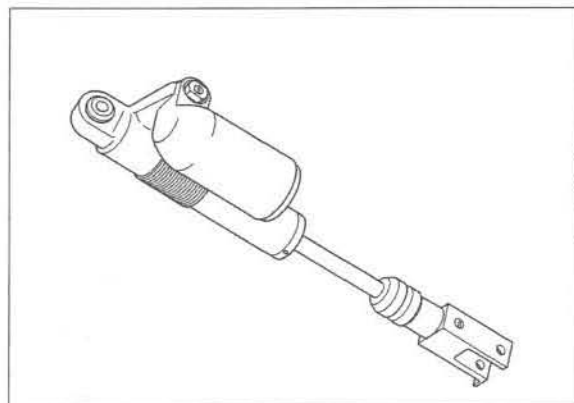
**SERVICE LIMIT: 241 mm (4.94 in)**



## DAMPER INSPECTION

Check the following:

- Damper unit for oil leaks or damage
- Damper rod for bend or damage
- Stopper rubber for fatigue or damage
- Upper mount bearing for loose or damage



## 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.

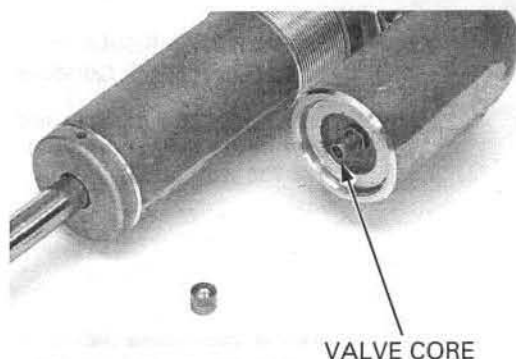
*Point the valve away from you to prevent debris getting in your eyes.*

Depress the valve core to release the nitrogen from the reservoir.

Remove the valve core from the chamber cap.

### ⚠ 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.



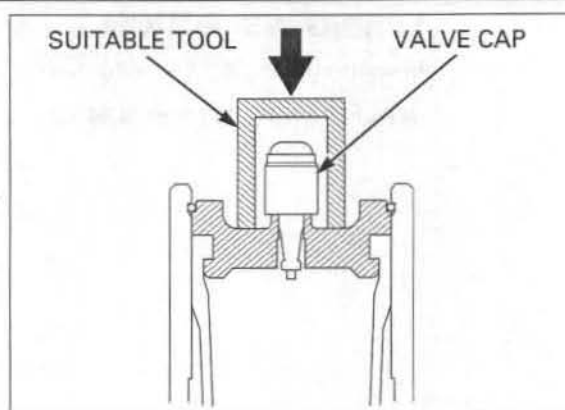
## REAR WHEEL/SUSPENSION

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.

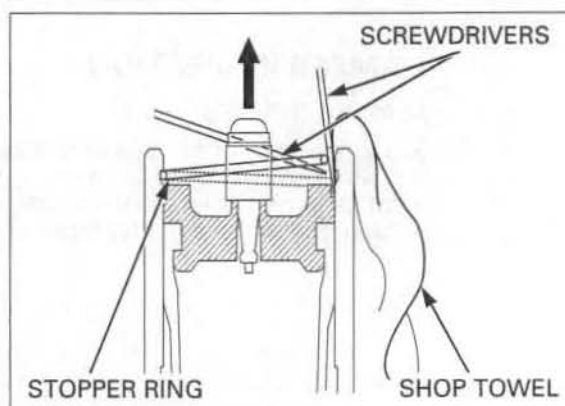
Two small screwdrivers and a shop towel are required to remove the stopper ring.

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 the 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 pulling the damper rod out of the case.

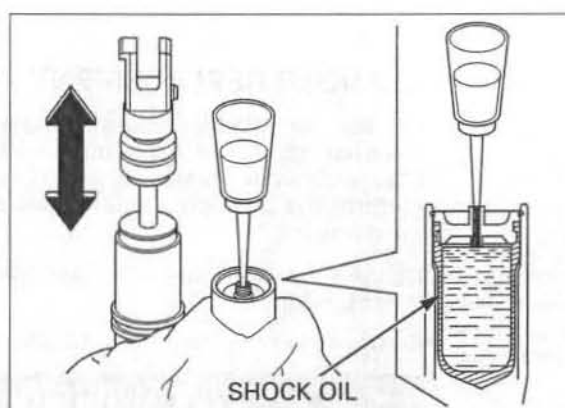


Set the shock absorber in a vise with a piece of wood or soft jaws to avoid damage. Using a suitable squeeze bottle, fill the reservoir with the recommended shock oil.

### RECOMMENDED SHOCK OIL:

**Pro-Honda HP Fork Oil 5W or equivalent**

Slowly pump the damper rod until no air bubbles appear in the valve core hole, then pull the damper rod all the way out.

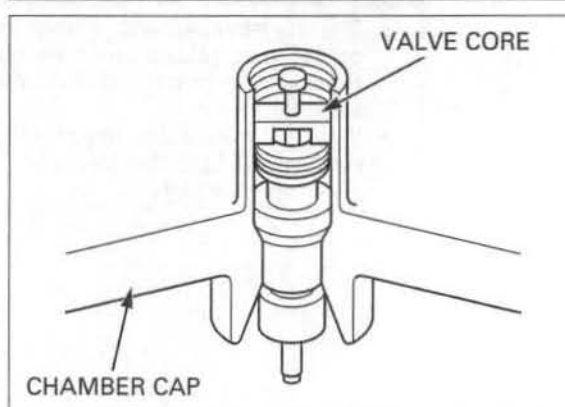


Install the valve core securely.

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.





*Do not over tighten the vise and distort the damper case.*

- Set the damper in a vise with a piece of wood or soft jaws with the damping adjuster facing up, being careful not to distort the damper body. Remove the damping adjuster and O-ring.

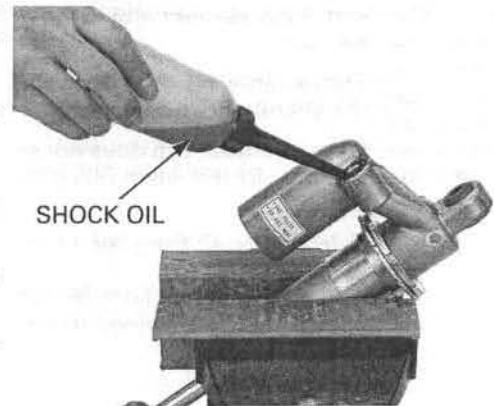


- Fill the damper with Pro-Honda HP Fork Oil 5W through the damping adjuster hole, while slowly pulling the damper rod out.
- Reinstall the damping adjuster after filling the damper.

**NOTE:**

The damper must be kept upright to prevent oil from leaking out.

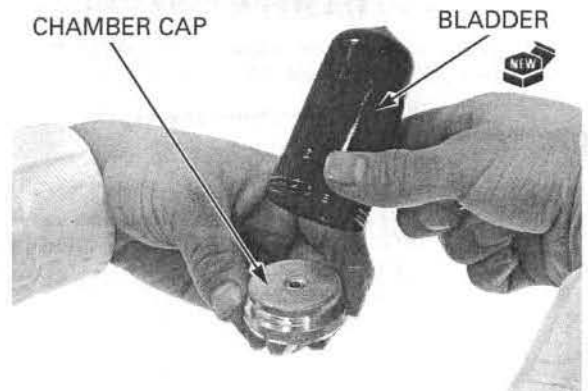
- Place the damper with the reservoir chamber cap facing up.
- Repeat steps 1 to 5 until the chamber cap is removed from the reservoir.



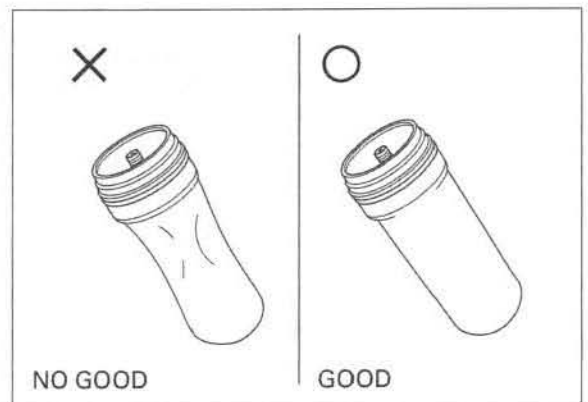
*Do not use any sort of tool to remove the bladder, because it may damage the chamber cap. Replace the bladder with a new one. Do not reuse the removed one.*

Remove the bladder from the chamber cap.

Attach a new bladder to the chamber cap.



If the bladder becomes distorted during installation, depress the valve core to reform it.



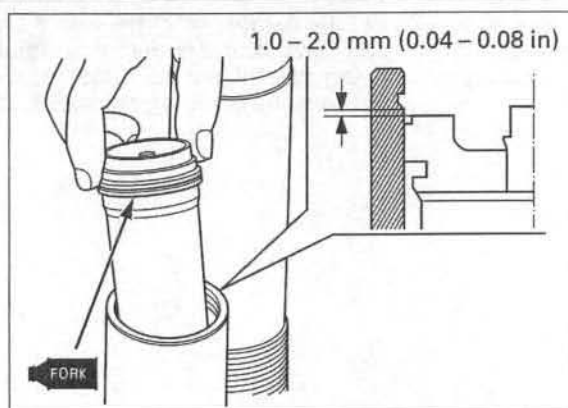
## REAR WHEEL/SUSPENSION

Clean the inside of the reservoir and fill it with Pro-Honda HP Fork Oil 5W.

### RECOMMENDED SHOCK OIL:

**Pro-Honda HP Fork Oil 5W or equivalent**

Apply a light coat of shock oil to the lip 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.



*Be sure the stopper ring is seated in the ring groove all the way around or the chamber cap can come apart when riding the motorcycle.*

Install the stopper ring in the groove of the reservoir securely.

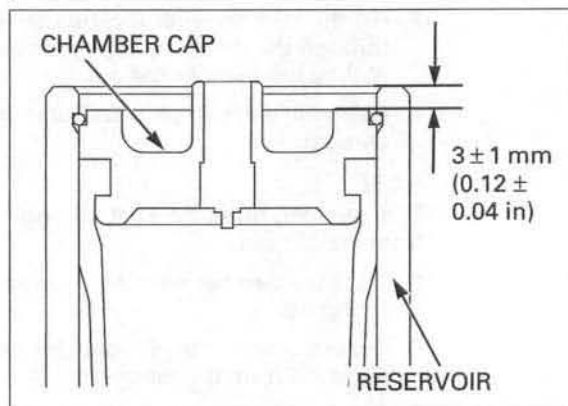
Temporarily fill the reservoir with air slowly until the chamber cap seats against the stopper ring.

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 13-26).

Fill the reservoir with nitrogen to the specified pressure (page 13-26).



### DAMPER DISASSEMBLY

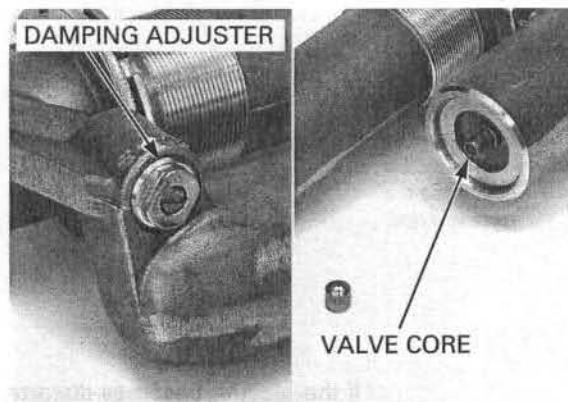
*Point the valve away from you to prevent debris getting in your eyes.*

Depress the valve core to release the nitrogen from the reservoir (page 13-15).

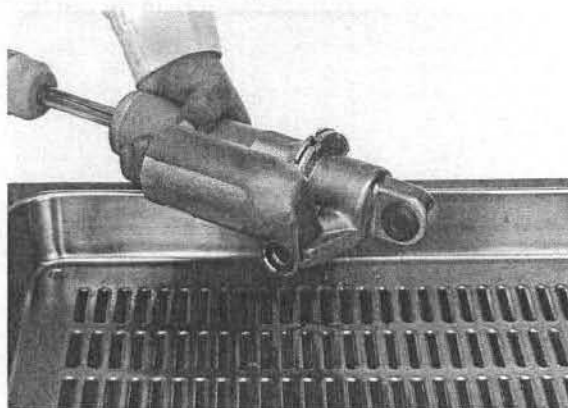
Remove the damping adjuster.

#### NOTE:

Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve core from the shock absorber.



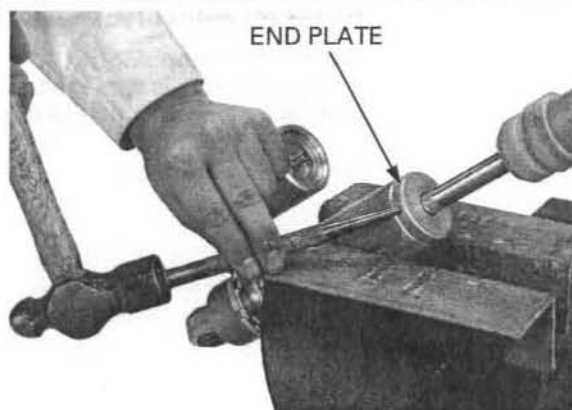
Drain most of the shock oil from the damper and reservoir, by pumping the damper rod in and out several times.



*Do not over tighten the vise and distort the damper case.*

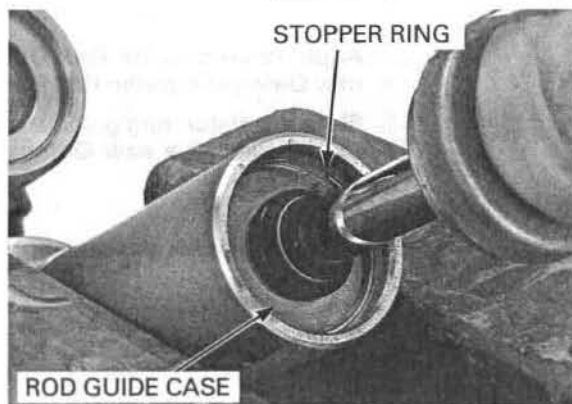
Set the shock absorber in a vise with a piece of wood or soft jaws to avoid damage.

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 towards the inside to give the stopper ring a square shoulder on which to seat securely.

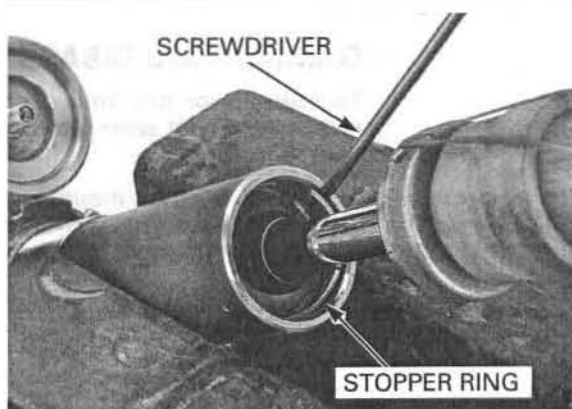


To remove the stopper ring, first push one end of the stopper ring out of its groove, then slip the second screwdriver between the stopper ring and the damper case to act as a ramp. Now, use the other screwdriver to pull the stopper ring completely out.

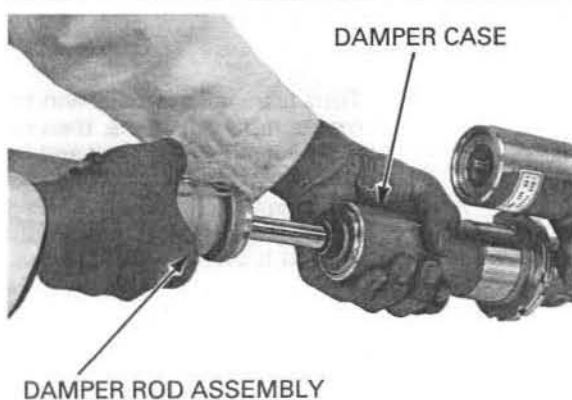
Check the stopper ring groove for burrs.

*Burrs will damage the damper rod piston ring.*

Remove any burrs with fine emery cloth before pulling the damper rod out of the case.



Carefully pull the damper rod assembly out of the damper case.

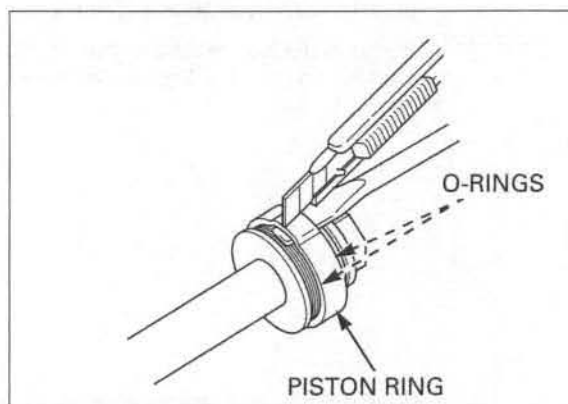




### PISTON RING REPLACEMENT

Inspect the piston ring.

If the piston ring is damaged, cut the piston ring and replace it along with new O-rings.



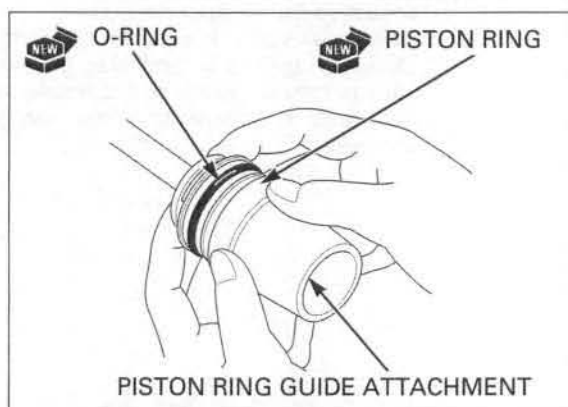
Apply Pro-Honda HP Fork Oil 5W or equivalent to new O-ring and piston ring inner surface.

Place the piston ring guide attachment over the piston and install a new O-ring 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.



### DAMPER ROD DISASSEMBLY

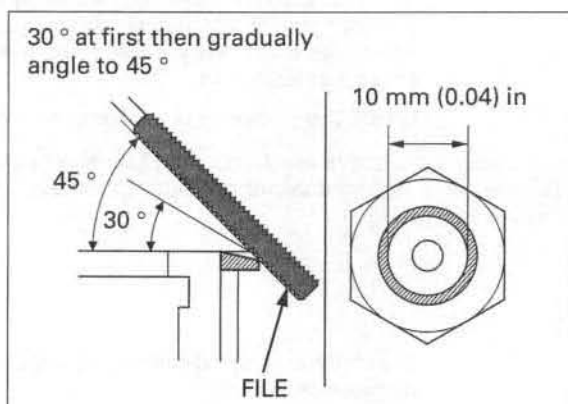
To keep lint or dirt from getting onto the damper rod parts, do not wear gloves while working on the damper rod.

*Do not over tighten the vise and distort the shock mount.*

Set the lower shock mount in a vise with a piece of wood or soft jaws to avoid damage.

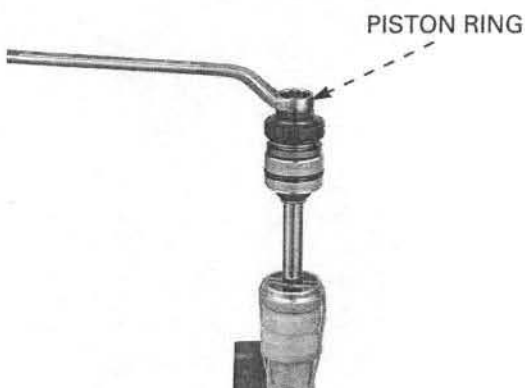
Unstake the damper rod end nut with a file as shown.

Be careful to file the 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 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 nut loosens completely.

If the damper rod is cracked or damaged when removing the end nut, replace the damper rod assembly with a new one.

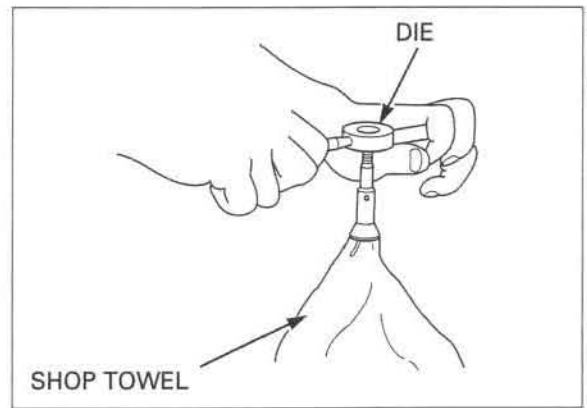


*Make sure that filings are not stuck in the damper rod.*

Remove the burrs from the damper rod end with a file and correct the threads with a die.

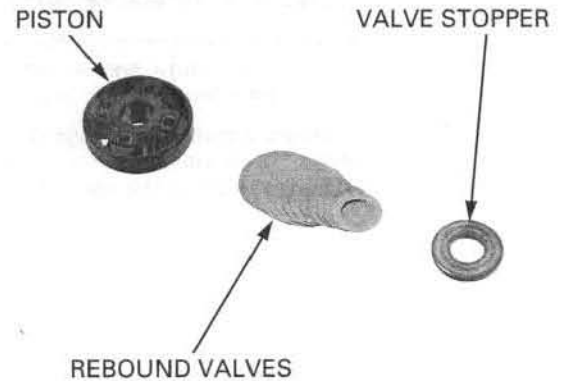
**DIE: 12 x 1.25 mm**

Clean the damper rod with solvent after correcting the threads.

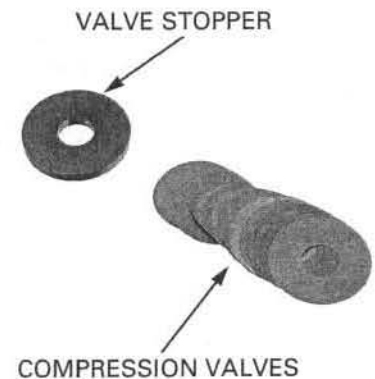


Remove the valve stopper, rebound valves and piston from the damper rod.

- 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-ring and piston ring.
- The valve arrangement and number of valves shown is typical but may not represent this model exactly.



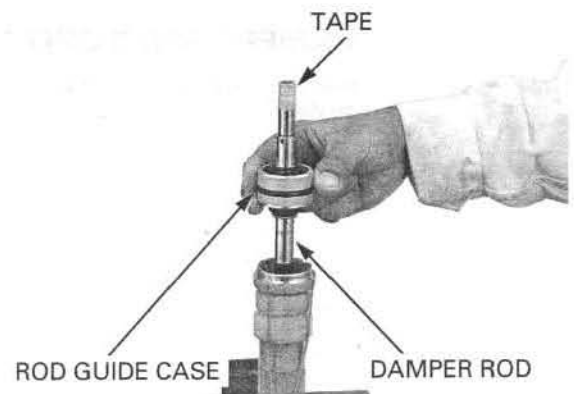
Remove the compression valves and valve stopper.



Chase the threads with a die and clean with oil. Back out the rebound adjuster and back flush with solvent. Reinstall the rebound adjuster.

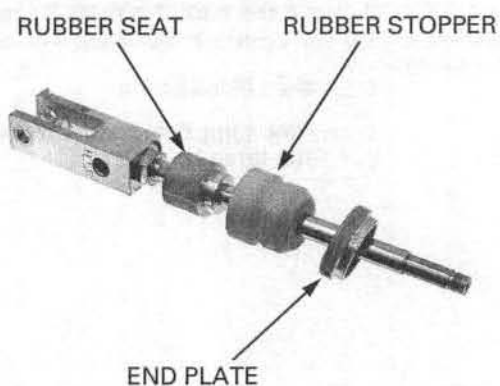
Wrap the top threads of the damper rod with tape.

Remove the rod guide case from the damper rod.



## REAR WHEEL/SUSPENSION

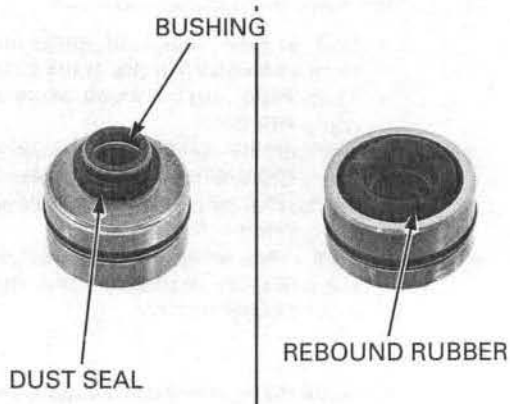
Remove the end plate, rubber stopper and rubber seat from the damper rod.



### ROD GUIDE CASE INSPECTION

Inspect the rebound rubber and dust seal lips for wear or damage and replace the rod guide case with a new one if necessary.

Visually inspect the rod guide case bushing. If the bushing is worn so that the copper surface appears, replace the rod guide case with a new one.

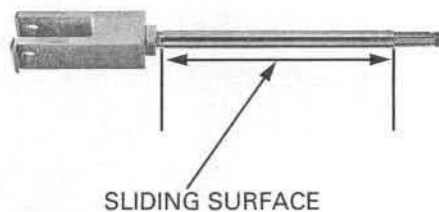


Remove the O-ring from the rod guide case and replace it with a new one.



### DAMPER ROD INSPECTION

Inspect the damper rod sliding surface for damage or distortion.



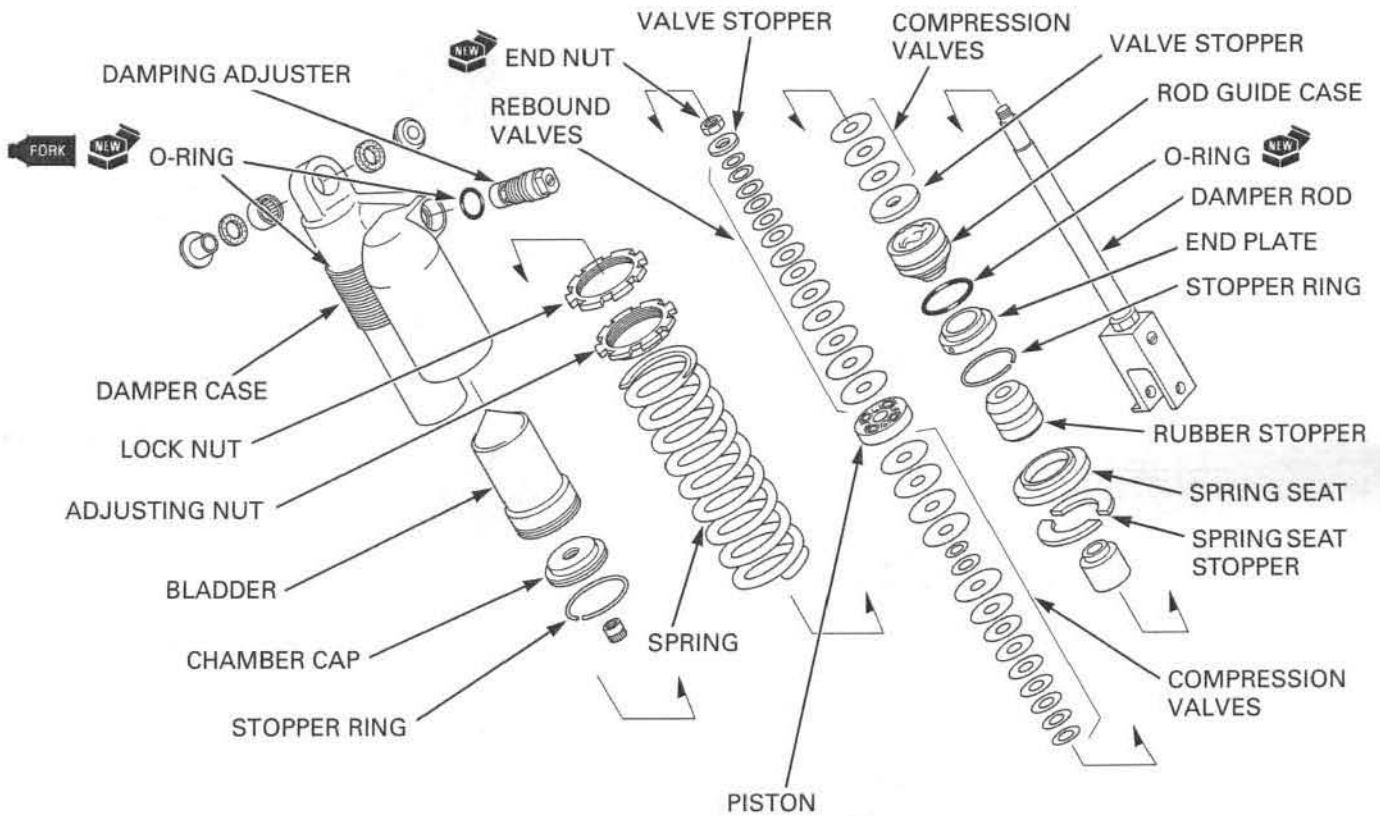
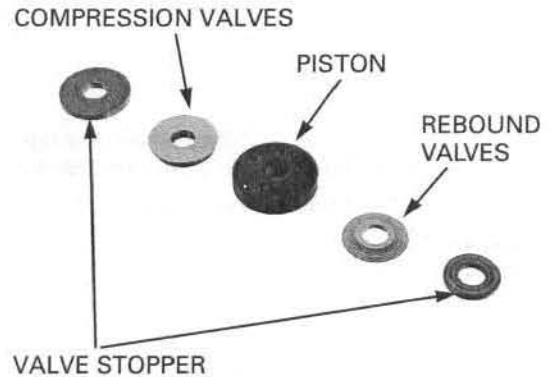


## DAMPER ASSEMBLY

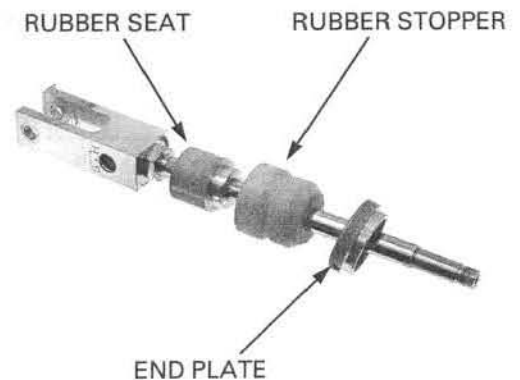
Before assembly, wash all parts with solvent and blow them dry with compressed air. Make sure there is no dust or lint on any of the parts.

### 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-ring.
- The valve arrangement and number of valves may differ from those shown.



Install the rubber seat, rubber stopper and end plate.



## REAR WHEEL/SUSPENSION

Install the special tool onto the damper rod.

### TOOL:

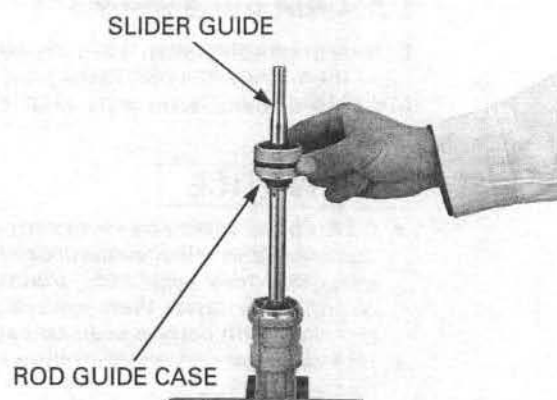
Slider guide, 14 mm

07974-KA40001  
not available in  
U.S.A.

*Be careful not to remove grease from the seal. Be careful not to damage the dust seal lip or turn it inside out.*

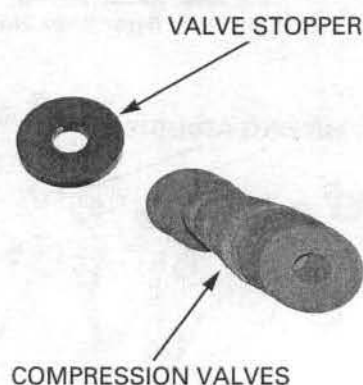
Carefully install the rod guide case with the rebound spring facing up, over the damper rod.

Remove the special tool.



*The valve arrangement and number of valves may vary from those shown.*

Install the valve stopper and compression valves onto the damper rod.



*Note the installation direction of the piston valves.*

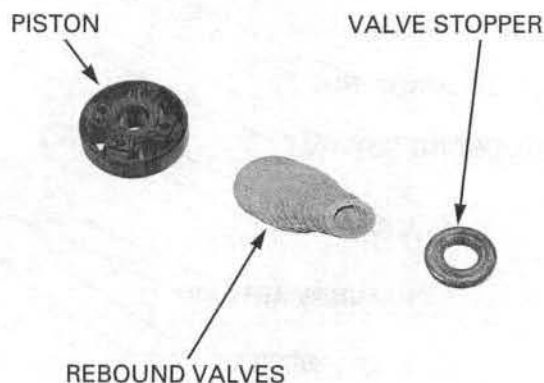
Install the piston onto the damper rod.

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.

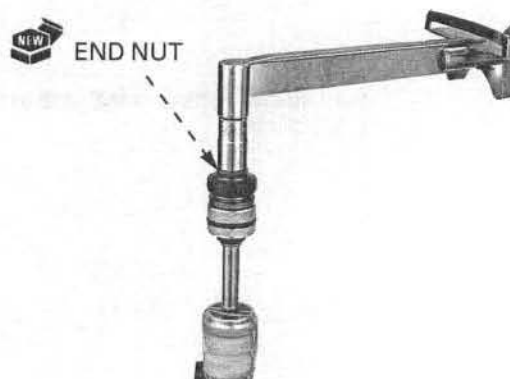


*Do not over tighten the vise and distort the shock mount.*

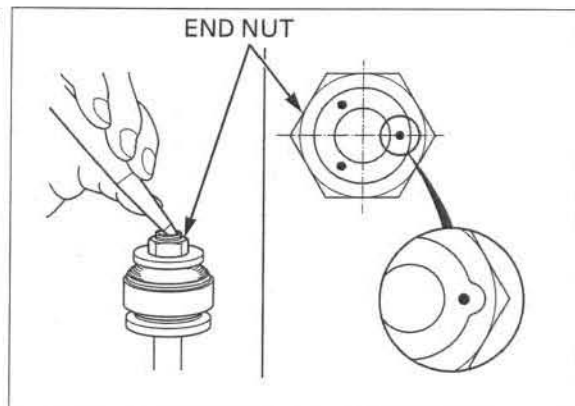
Set the lower shock mount in a vise with a piece of wood or soft jaws to avoid damage.

Install and tighten a new end nut to the specified torque.

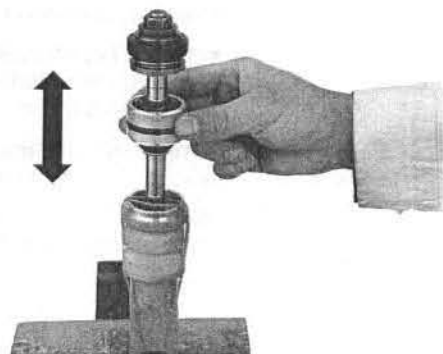
**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**



Stake the end of the damper rod in three places as shown, to the end nut.

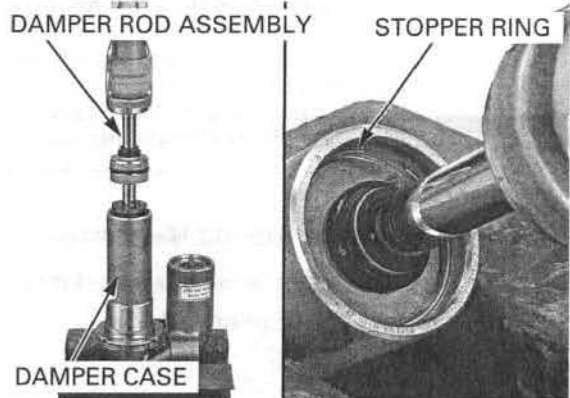


Coat the damper rod with Pro-Honda HP Fork Oil 5W or equivalent. Check the rod guide case by sliding it up and down fully to be sure there is no restriction.



Coat the damper case inner surface, piston ring and O-ring with Pro-Honda HP Fork Oil 5W or equivalent, and insert the damper rod assembly carefully. Install the stopper ring into the groove in the damper case.

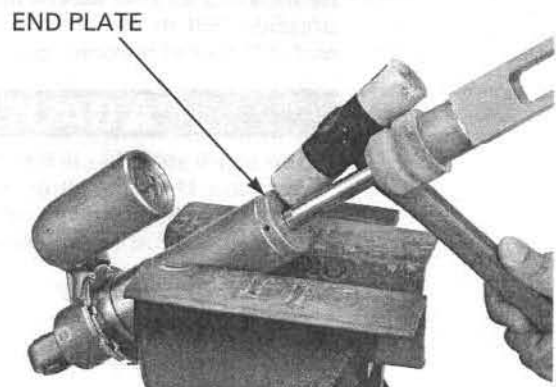
After assembling, check that the stopper ring is seated in the groove of the damper case completely. You should not be able to pull the damper rod out of the damper case.



*Do not overtighten the vise and distort the damper case.*

Set the shock absorber in a vise with a piece of wood or soft jaws to avoid damage.

Drive the end plate squarely and evenly into the damper case with a plastic hammer.





## REAR WHEEL/SUSPENSION

Fill the damper case and reservoir with Pro-Honda HP Fork Oil 5W or equivalent through the damping adjuster hole.

### RECOMMENDED SHOCK OIL:

Pro-Honda HP Fork Oil 5W or equivalent

### STANDARD OIL CAPACITY:

191 cm<sup>3</sup> (6.46 US oz, 6.72 Imp oz)

*Make sure the rod guide case is seated against the stopper ring by pulling the damper rod all the way out.*

Slowly pump the damper rod until there are no bubbles in the oil that overflows from the damper case.

Remove the damper unit from the vise.

*Do not let oil flow out of the reservoir.*

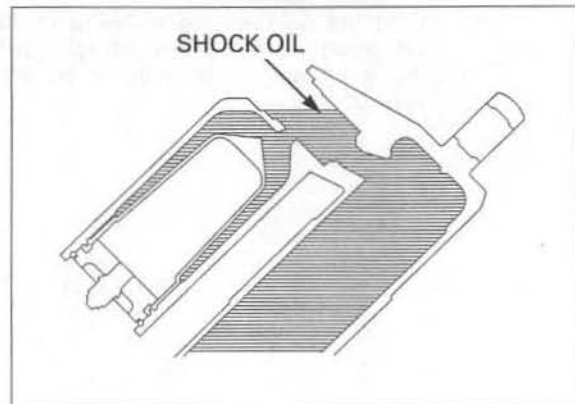
Position the damper unit so the damping adjuster hole faces up. Turn the damper unit as shown to bleed any air from the reservoir completely.

- 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 oil that may leak out of the valve while pressurizing. Replenish oil as necessary.



Fill the damper with Pro-Honda HP Fork Oil 5W to the damping adjuster hole neck.

Apply fork oil to a new O-ring and install it to the damping adjuster.

Dip the damping adjuster in clean shock oil.

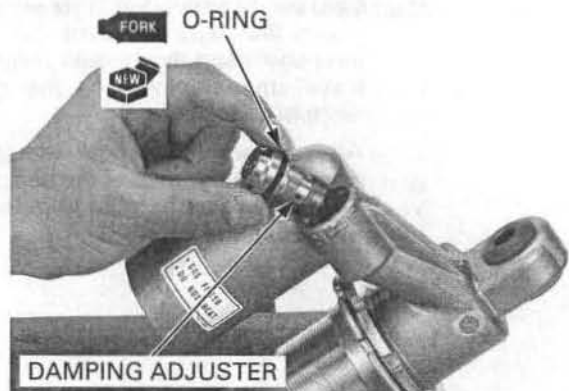
Slowly install the damping adjuster.

Tighten the damping adjuster to the specified torque.

**TORQUE: 17.2 N·m (1.8 kgf·m, 13 lbf·ft)**

Do not let oil flow out of the reservoir.

Check for oil leaks.

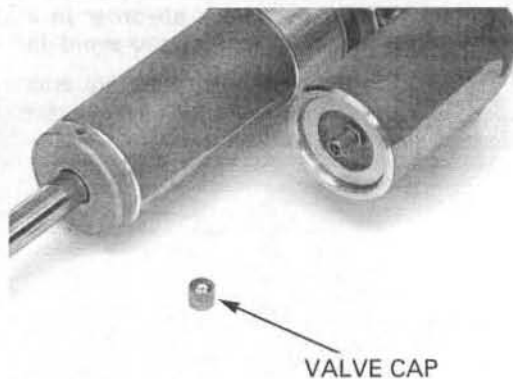


Release the air that was in the reservoir at precompression. Fill the reservoir with 980 kPa (10.0 kgf/cm<sup>2</sup>, 142 psi) of nitrogen gas.

### ⚠ CAUTION

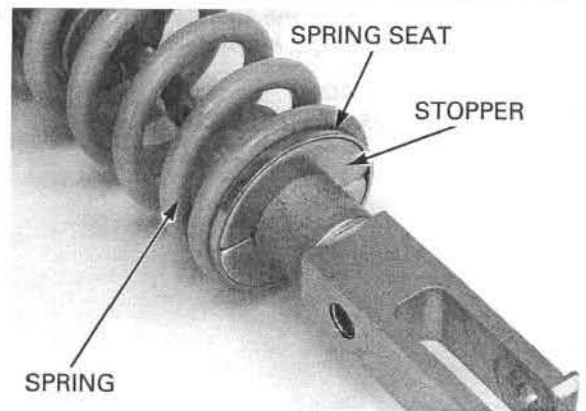
The shock absorber is fitted with a gas-filled reservoir. Use only nitrogen gas to pressurize the shock absorber. The use of an unstable gas can cause a fire or explosion resulting in serious injury.

Install the valve cap.

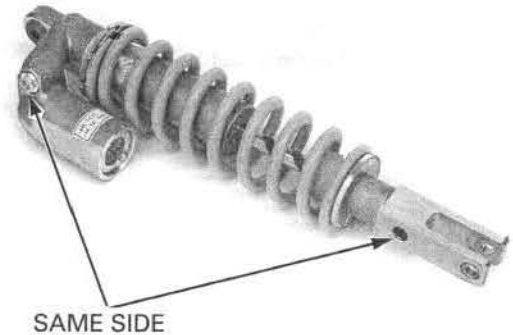


Install the spring, spring seat and spring seat stopper.

Loosely tighten the adjusting nut and lock nut.



Turn the shock absorber lower mount so the rebound 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:

**CRF150R:** 233.8 mm (9.20 in)

**CRF150RB:** 234.0 mm (9.21 in)

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

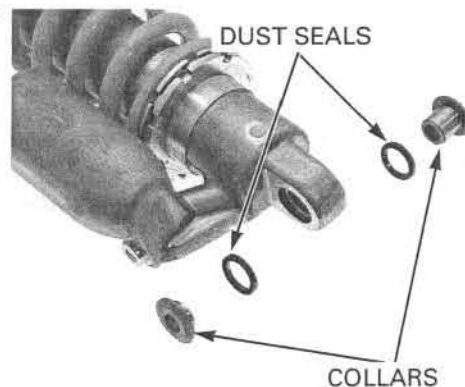
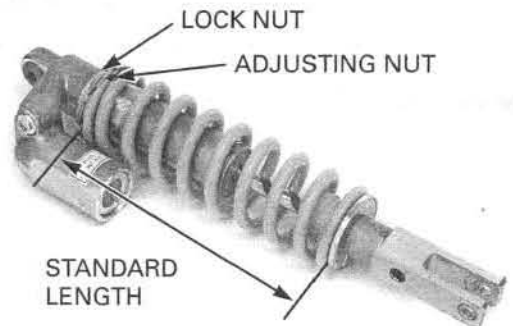
**TORQUE:** 88 N·m (9.0 kgf·m, 65 lbf·ft)

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.

### UPPER BEARING REPLACEMENT

Remove the collars and dust seals from the upper mount.

Check the needle bearing for wear or damage. If it is worn or damaged, it must be replaced.



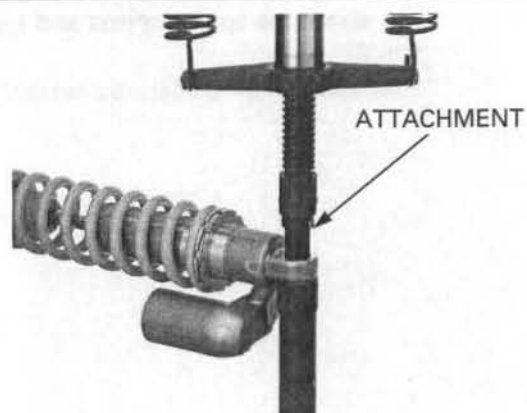
## REAR WHEEL/SUSPENSION

Press the needle bearing out of the upper mount using the special tool.

### TOOL:

Attachment, 22 x 25 mm

07946-KM40701  
not available in  
U.S.A



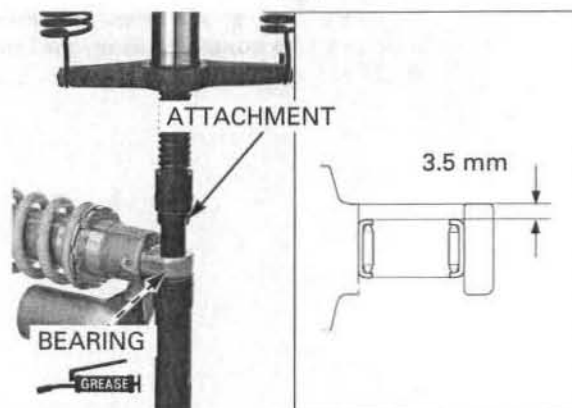
*Drive the bearing in evenly; do not allow it to tilt.*

Apply grease to a new needle bearing.  
Press the needle bearing into the upper mount.

### TOOL:

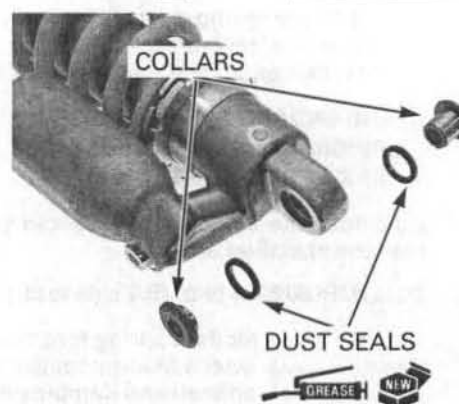
Attachment, 22 x 25 mm

07946-KM40701  
not available in  
U.S.A



*Be sure to install the correct dust seal in each side.*

Apply grease to new dust seal lips.  
Install the dust seals with the lip facing out.  
Install the mount collars.

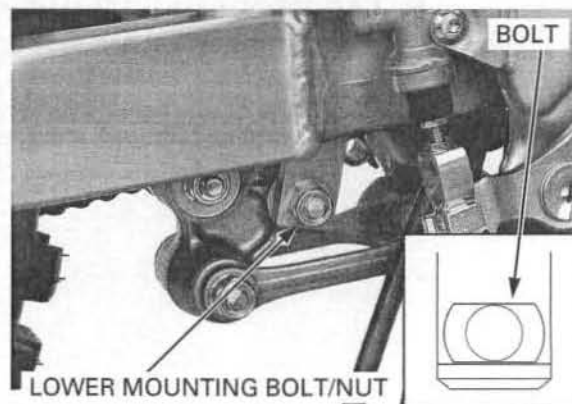


## INSTALLATION

Set the shock absorber onto the shock arm with the rebound adjuster facing the 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, 33 lbf·ft)**





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

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

Install the sub-frame (page 2-5).



## SHOCK LINKAGE

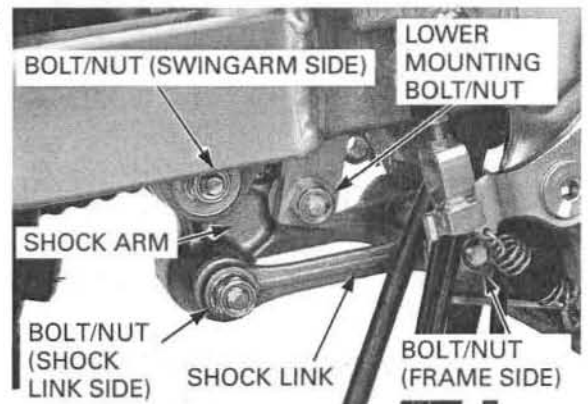
### REMOVAL

Raise the rear wheel off the ground with a work stand.

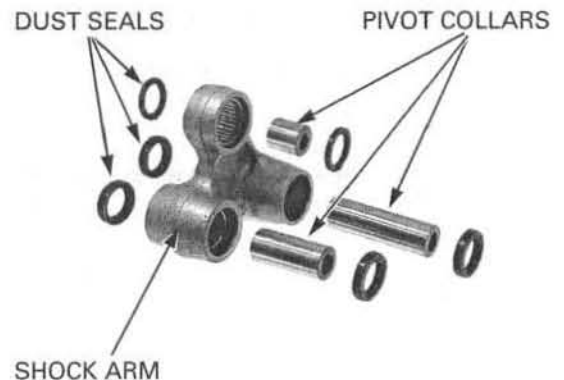
Remove the following:

- Shock arm bolt/nut (shock link side)
- Shock absorber lower mounting bolt/nut
- Shock arm bolt/nut (swingarm side)
- Shock arm
- Shock link bolt/nut (frame side)
- Shock link

*Remove the brake pedal return spring to improve access to the shock link bolt/nut (frame side)*



Remove the pivot collars and dust seals from the shock arm.



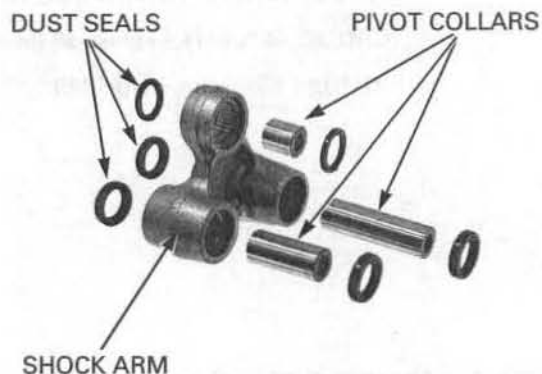
Remove the pivot collar and dust seals from the shock link.



### INSPECTION

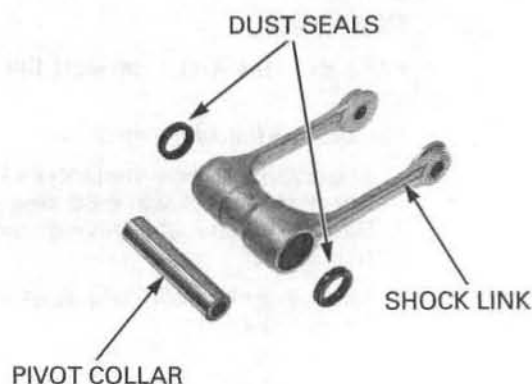
Check the dust seals for wear, damage or fatigue.  
Check the needle bearings for damage or loose fit.  
Check the shock arm for cracks or damage.

If the needle bearings are damaged, replace them (page 13-30).



Check the dust seals for wear, damage or fatigue.  
Check the needle bearings for damage or loose fit.  
Check the shock link for cracks or damage.

If the needle bearings are damaged, replace them (page 13-31).



### BEARING REPLACEMENT

#### SHOCK ARM NEEDLE BEARING

Press the needle bearings (shock link side, swing-arm side) out of the shock arm using the special tools and a hydraulic press.

#### TOOLS:

Driver

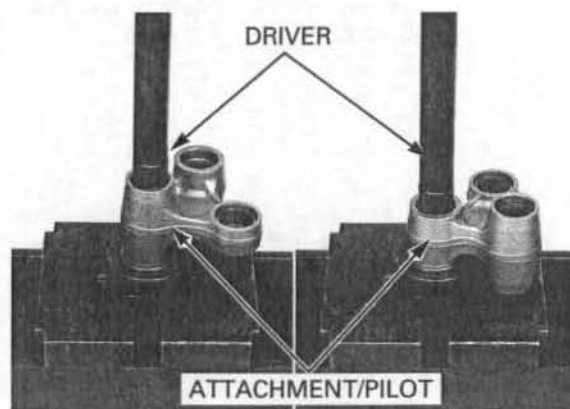
07949-3710001

Attachment, 22 x 24 mm

07746-0010800

Pilot, 17 mm

07746-0040400



Press the needle bearing (shock absorber side) out of the shock link using special tools and a hydraulic press.

#### TOOLS:

Driver

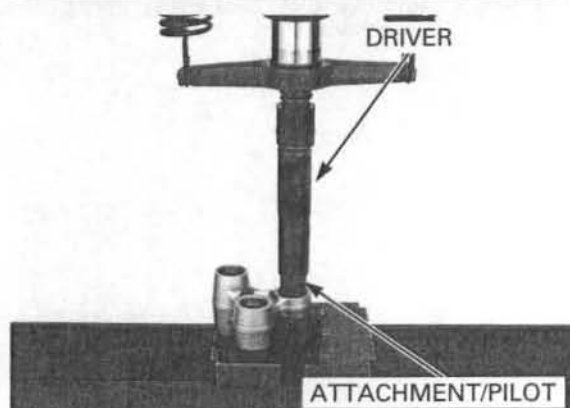
07749-0010000

Attachment, 24 x 26 mm

07746-0010700

Pilot, 19 mm

07746-0041400

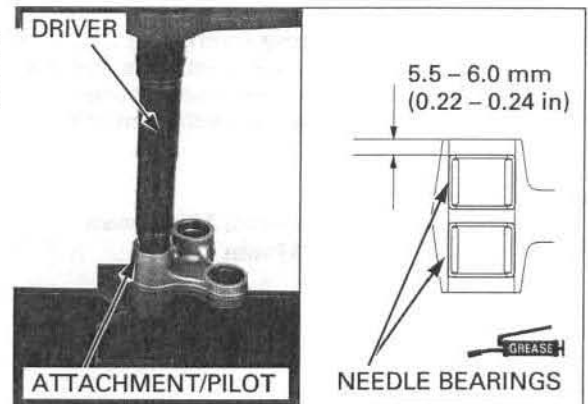


Press the needle bearing into the shock arm with the marked side facing out.

Apply grease to new needle bearings. 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 5.5 – 6.0 mm (0.22 – 0.24 in) below the end of the shock arm surface.

## TOOLS:

Driver	07749-0010000
Attachment, 22 x 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

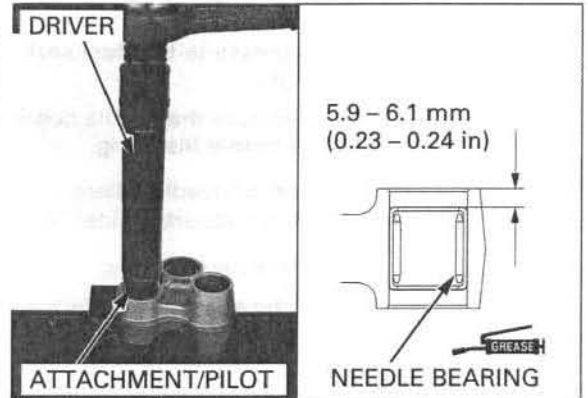


Press the needle bearing into the shock arm with the marked side facing out.

Apply grease to new needle bearings. Press the needle bearings into the swingarm side pivot with the special tools and a hydraulic press so that the needle bearing surface is 5.9 – 6.1 mm (0.23 – 0.24 in) below the end of the shock arm surface.

## TOOLS:

Driver	07749-0010000
Attachment, 22 x 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

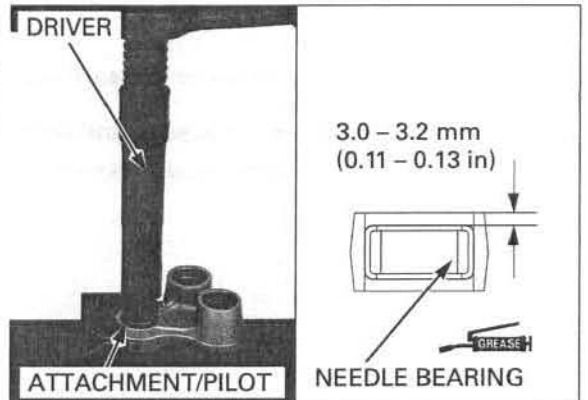


Press the needle bearing into the shock arm with the marked side facing out.

Apply grease to new needle bearing. 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 (0.11 – 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

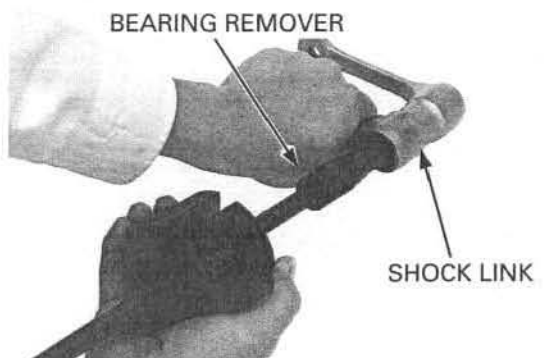


## SHOCK LINK NEEDLE BEARING

Remove the needle bearings from the shock link using the special tools as shown.

## TOOLS:

Bearing remover set, 17 mm	07936-3710300
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-3710200 or 07936-371020A (U.S.A. only)





## REAR WHEEL/SUSPENSION

*Press the needle bearing into the shock arm with the marked side facing out.*

Apply grease to new needle bearings. Press the needle bearings into the frame side pivot with the special tools and a hydraulic press so that the needle bearing surface is 6.0 – 6.3 mm (0.24 – 0.25 in) below the end of the shock arm surface.

### TOOLS:

Driver

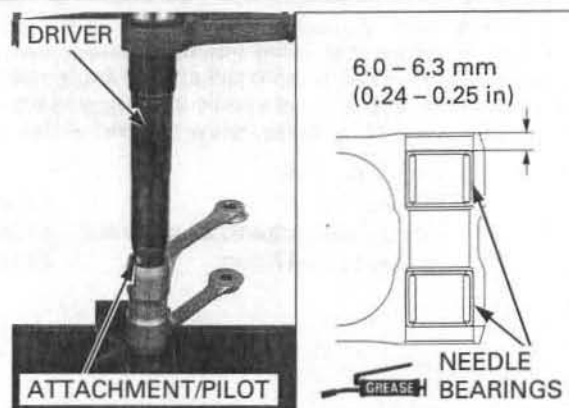
07749-0010000

Attachment, 24 x 26 mm

07746-0010700

Pilot, 17 mm

07746-0040400



## INSTALLATION

Apply grease to the dust seal lips, pivot collars and bearings.

- Make sure the needle bearing rollers are in position before installing.

Number of needle rollers:

Shock absorber side: 27

Install the pivot collars.

Install the dust seals as follow:

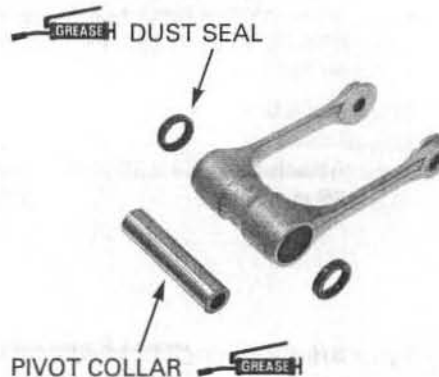
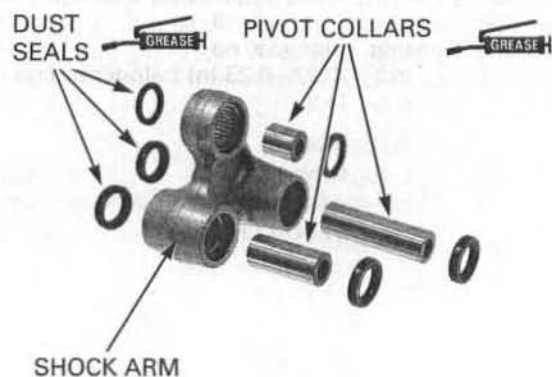
- Swingarm side
- Shock link side
- shock absorber side

- Install the dust seals with the marking side facing out.

Apply grease to the dust seal lips, pivot collar and bearings.

Install the dust seals and pivot collar.

- Install the dust seals with the marking side facing out.



Loosely install the following:

*Reinstall the brake pedal return spring if it was removed earlier.*

- Shock link
- Shock link bolt/nut (frame side)
- Shock arm
- Shock arm bolt/nut (swingarm side)
- Shock absorber lower mounting bolt (page 13-28)

Tighten the all nuts to the specified torque.

## TORQUE:

**Shock link nut:**

**44 N·m (4.5 kgf·m, 33 lbf·ft)**

**Shock arm nut (swingarm side):**

**44 N·m (4.5 kgf·m, 33 lbf·ft)**

**Shock absorber lower mounting nut:**

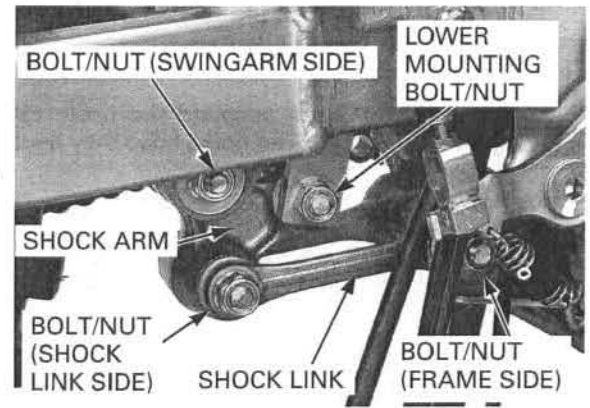
**44 N·m (4.5 kgf·m, 33 lbf·ft)**

- Shock arm bolt/nut (shock link side)

## TORQUE:

**Shock arm nut (shock link side):**

**44 N·m (4.5 kgf·m, 33 lbf·ft)**



## SWINGARM

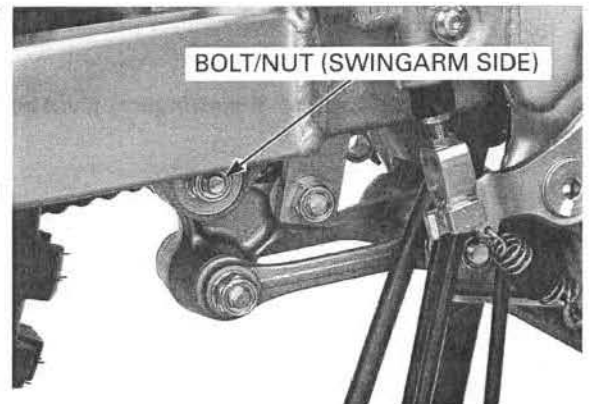
### REMOVAL

Raise the rear wheel off the ground by placing a work stand or equivalent under the frame.

Remove the following:

- Rear wheel (page 13-8)
- Drive chain (page 3-17)

Remove the shock arm nut and bolt (swingarm side).



Remove the screws and brake hose guide.



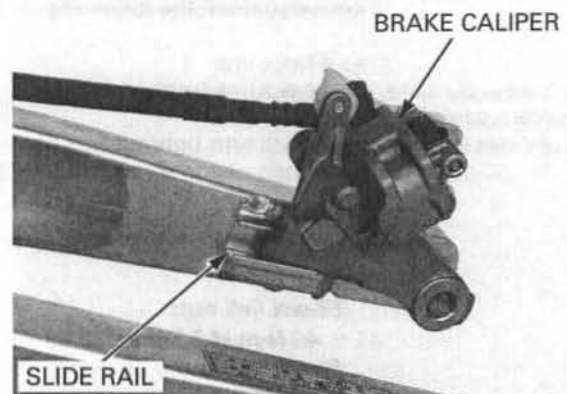
## REAR WHEEL/SUSPENSION

*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.*

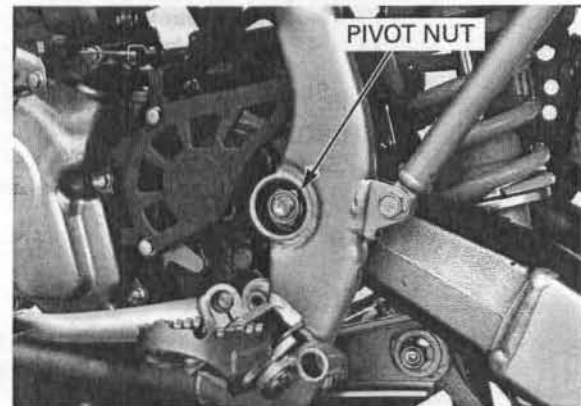
Remove the rear brake caliper from the slide rail on the swingarm.

### NOTE:

Do not suspend the brake caliper from the brake hose. The brake hose may be damaged.

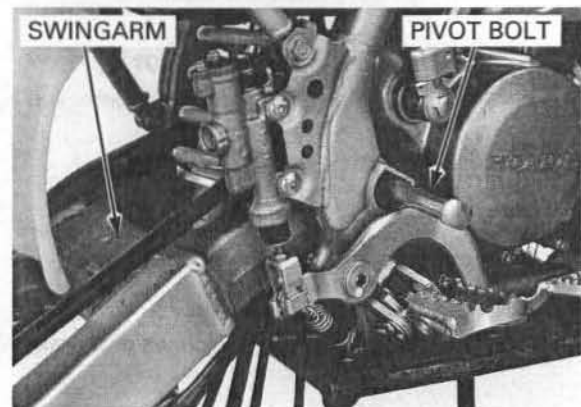


Remove the swingarm pivot nut.



*Depress the brake pedal so to pull out the pivot bolt.*

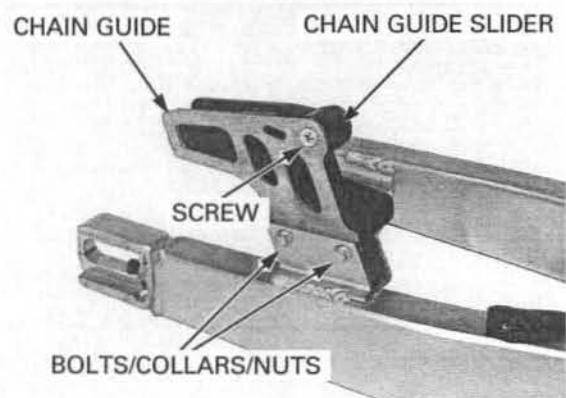
Remove the swingarm pivot bolt and swingarm.



Check the chain guide slider and chain guide for wear or damage (page 3-19).

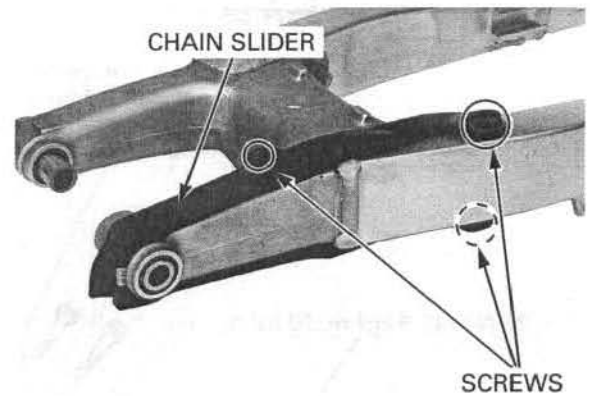
## DISASSEMBLY

Remove the bolts, collars, nuts, screw, chain guide and chain guide slider.





Remove the screws and chain slider.



Remove the following:

- Side collars
- Dust seals
- Pivot collars

Check the dust seals and collars for wear, damage or fatigue.

Check the needle bearings for damage or loose fit.

Check the swingarm for cracks or damage.

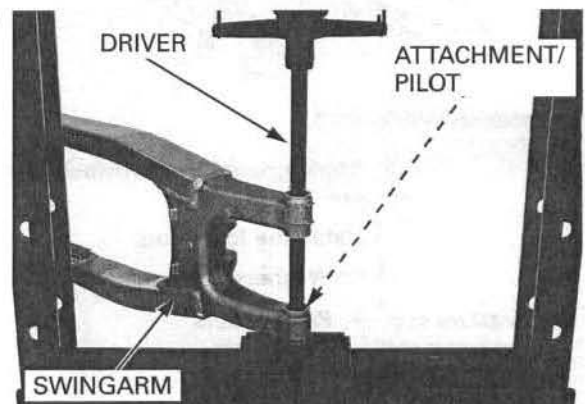
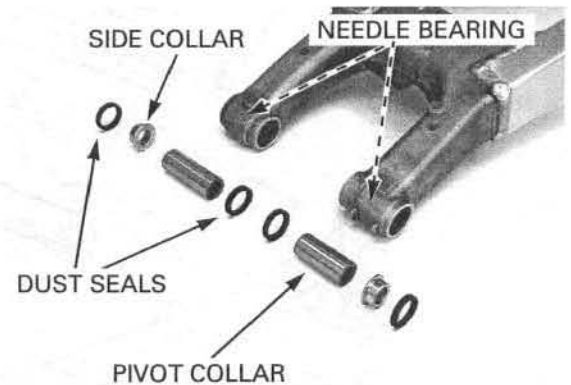
Replace any damaged parts, if necessary.

## 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, 20 mm	07746-0040500



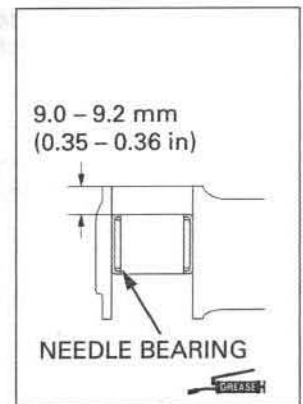
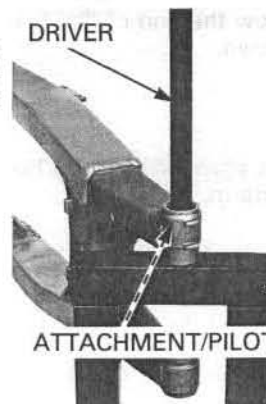
Press the needle bearing into the shock link with the marked side facing out.

Apply grease to a new needle bearing.

Press the needle bearing into the swingarm using the special tools and a hydraulic press so that the needle bearing surface is 9.0 – 9.2 mm (0.35 – 0.36 in) below the end of the swingarm surface.

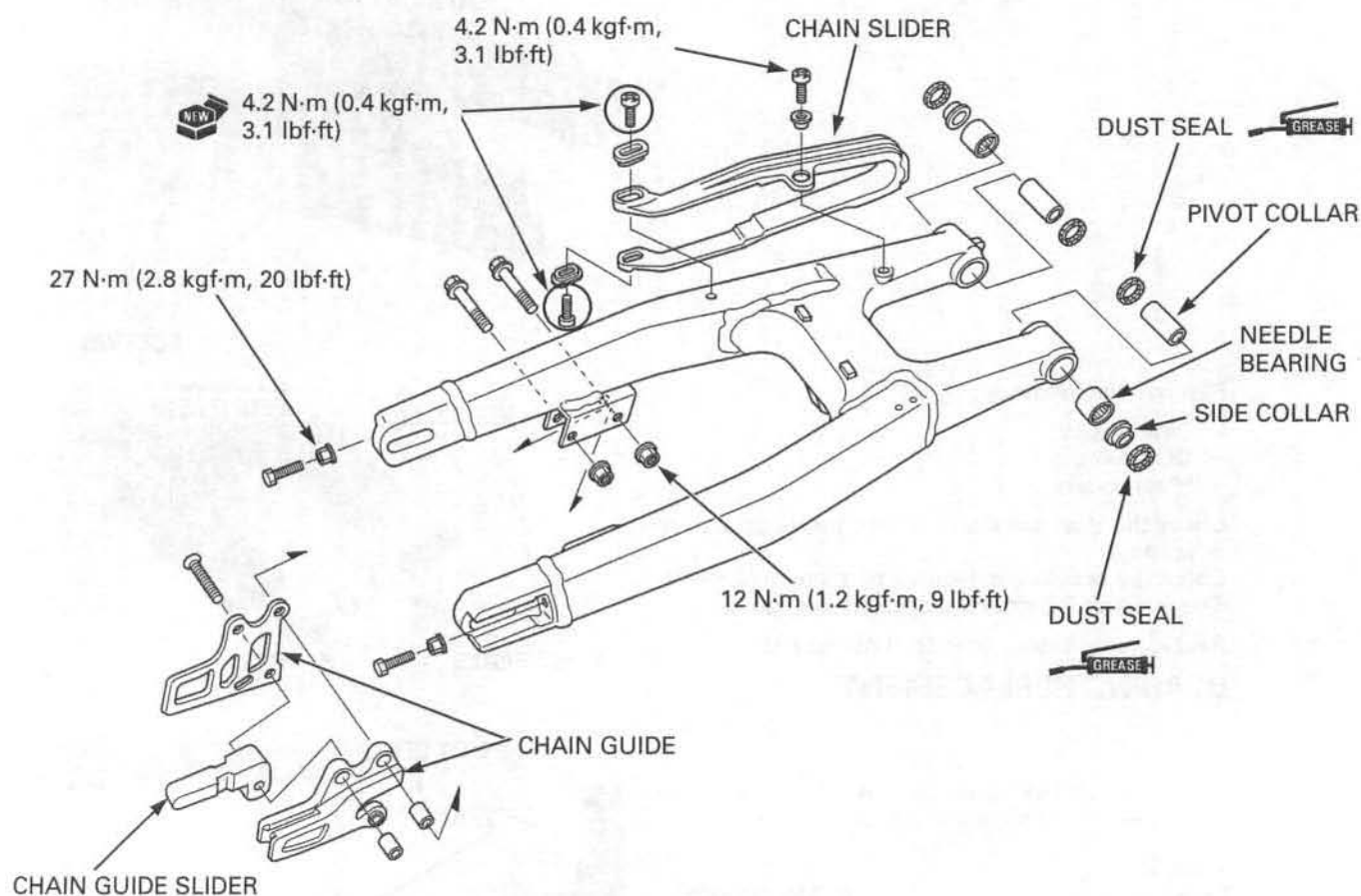
### TOOLS:

Driver	07949-3710001
Attachment, 24 x 26 mm	07746-0010700
Pilot, 20 mm	07746-0040500



# REAR WHEEL/SUSPENSION

## ASSEMBLY



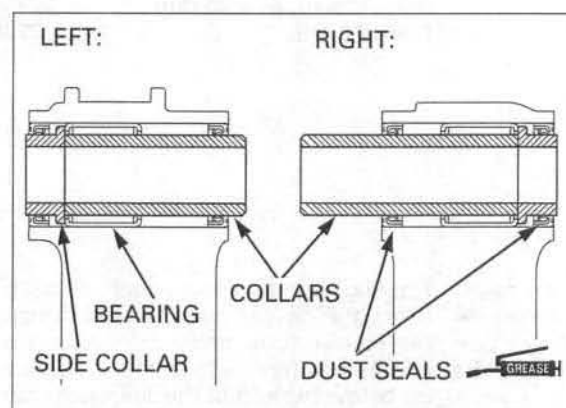
Apply grease to the thrust needle bearing and dust seal lips.

Install the following:

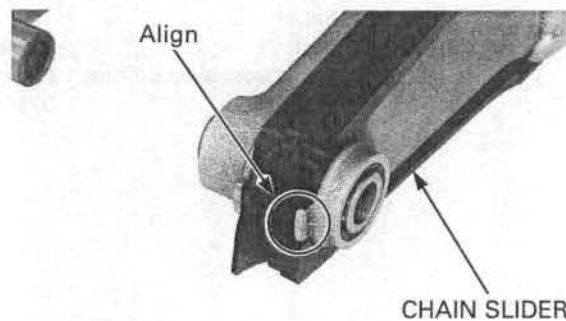
- Washers
- Pivot collars
- Dust seals
- Side collars

*Install the long pivot collar into the right pivot bearing*

- Install the dust seal so that the dust seal surface is below the end of the swing arm pivot surface as shown.



Install the chain slider so its hole fits over the tab on the swingarm.

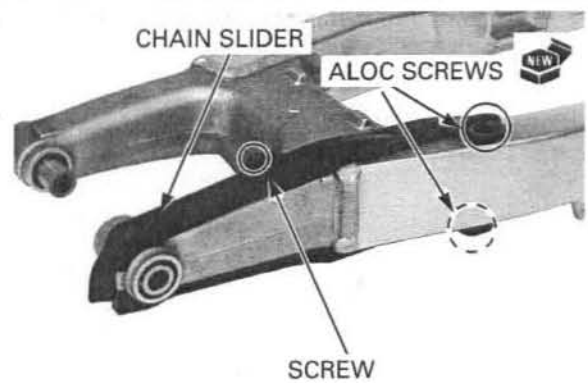


Install and tighten the screw to the specified torque.

**TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**

Install a new ALOC screws and tighten it to the specified torque.

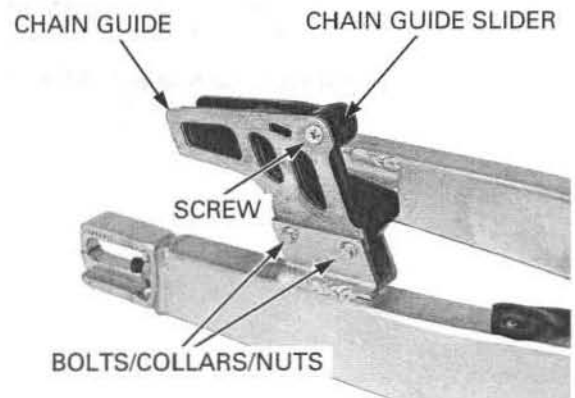
**TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**



Install the chain guide slider, collars and chain guide.

Install the bolts, collars and nuts.

Tighten the nuts.

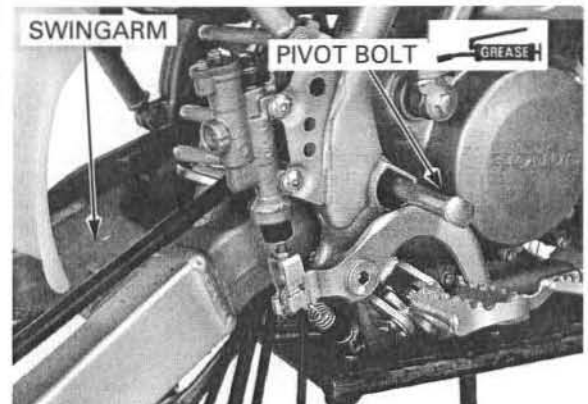


## INSTALLATION

Apply a thin coat of grease to the swingarm pivot bolt sliding surface.

Install the swingarm between the engine and frame.

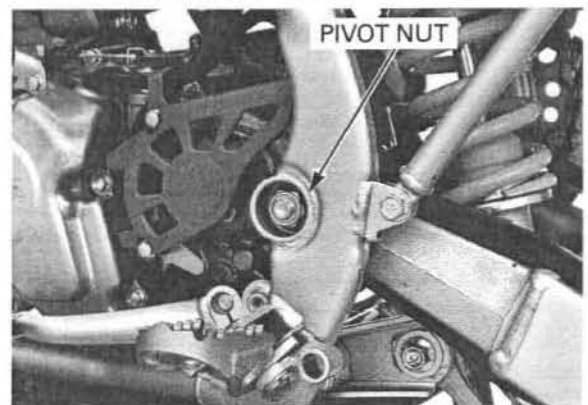
Install the swingarm pivot bolt from the right side through the frame, swingarm pivot and engine.



Install the swingarm pivot nut.

Tighten the swingarm pivot nut to the specified torque.

**TORQUE: 83 N·m (8.5 kgf·m, 61 lbf·ft)**

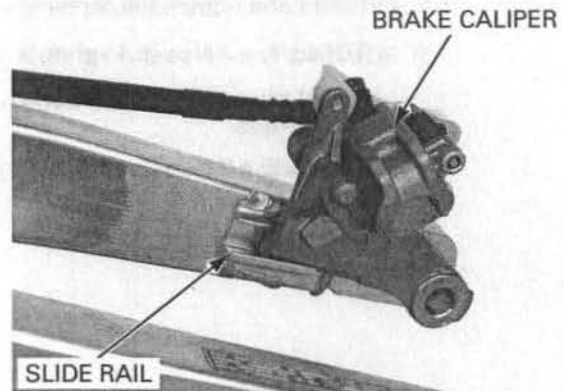




## REAR WHEEL/SUSPENSION

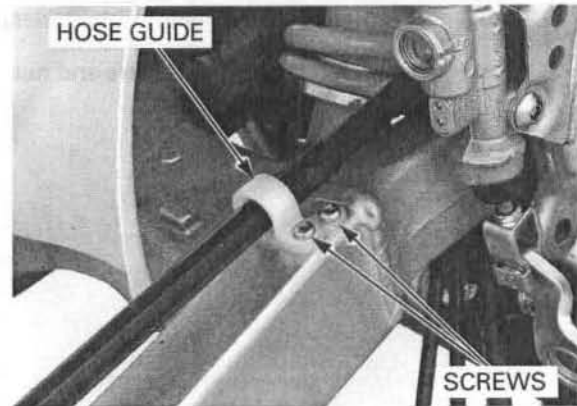
*Do not twist the  
brake hose.*

Install the rear brake caliper to the slide rail on the swingarm.



Install the brake hose guide and tighten the screws to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**

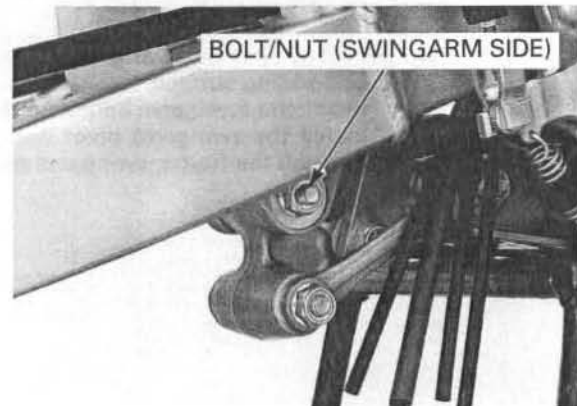


Install the shock arm bolt and nut (swingarm side). Tighten the nut to the specified torque.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

Install the following:

- Drive chain (page 3-17)
- Rear wheel (page 13-12)



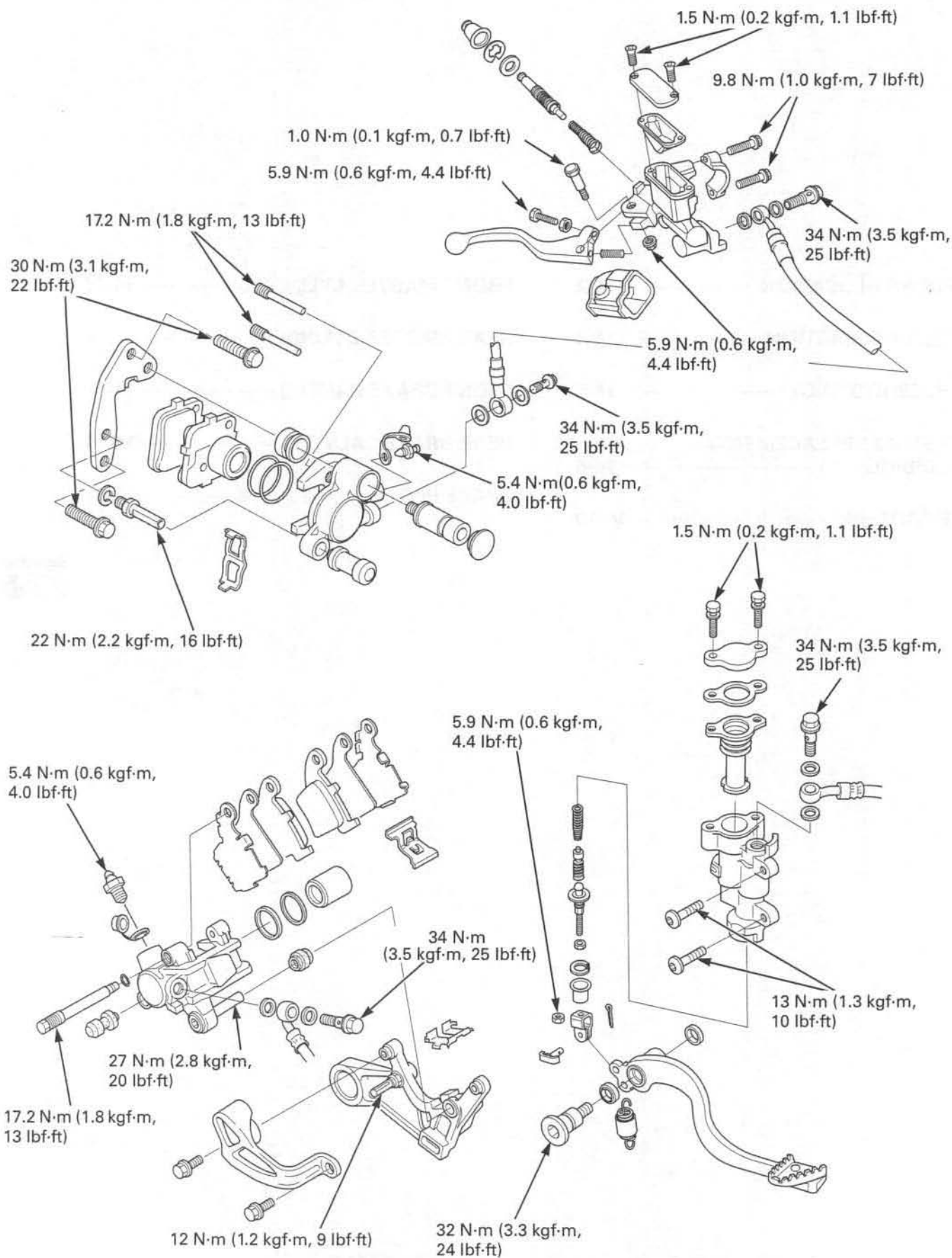
# 14. HYDRAULIC BRAKE

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BRAKE PEDAL .....	14-22

## COMPONENT LOCATION





## SERVICE INFORMATION

### GENERAL

#### ⚠ CAUTION

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

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

#### NOTICE

*Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.*

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with high quality brake degreasing agent.
- Check the brake system by applying the brake lever or pedal after 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	3.0 (0.12)	2.5 (0.10)
	Brake disc warpage	—	0.15 (0.006)
	Master cylinder I.D.	11.000 (0.4331)	11.055 (0.4352)
	Master piston O.D.	10.957 (0.4314)	10.840 (0.4268)
	Caliper cylinder I.D.	30.230 (1.190)	30.29 (1.193)
	Caliper piston O.D.	30.148 (1.1869)	30.14 (1.187)
Rear	Brake fluid	DOT 4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	3.5 ± 0.2	3.0 (0.12)
	Brake disc warpage	—	0.15 (0.006)
	Master cylinder I.D.	11.000 (0.4331)	11.055 (0.4352)
	Master piston O.D.	10.957 (0.4314)	10.840 (0.4268)
	Caliper cylinder I.D.	22.650 (0.8917)	22.712 (0.8942)
	Caliper piston O.D.	22.620 (0.8905)	22.573 (0.8887)

## HYDRAULIC BRAKE

### TORQUE VALUES

Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Brake lever adjuster lock 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 pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Front brake hose guide bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)
Rear brake hose guide screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)
Front master cylinder reservoir cover screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Front master cylinder holder bolt	9.8 N·m (1.0 kgf·m, 7 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)
Rear master cylinder mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Rear master cylinder reservoir cover bolt	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Front caliper pin bolt	17.2 N·m (1.8 kgf·m, 13 lbf·ft)
Rear caliper pin bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Brake caliper pad pin	17.2 N·m (1.8 kgf·m, 13 lbf·ft)
Front caliper bracket pin slide	22 N·m (2.2 kgf·m, 16 lbf·ft)
Rear caliper bracket pin bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Brake pedal pivot bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)
Brake pedal adjuster lock nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Rear master cylinder joint nut	17.2 N·m (1.8 kgf·m, 13 lbf·ft)

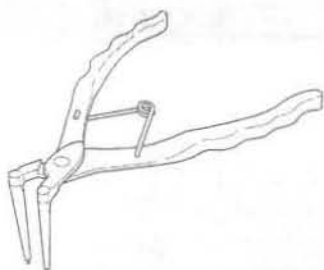
ALOC bolt: replace with a new one.

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 grease to the sliding surface

### TOOL

Snap ring pliers  
07914-SA50001



## TROUBLESHOOTING

### Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pads/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pads/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper 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 not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

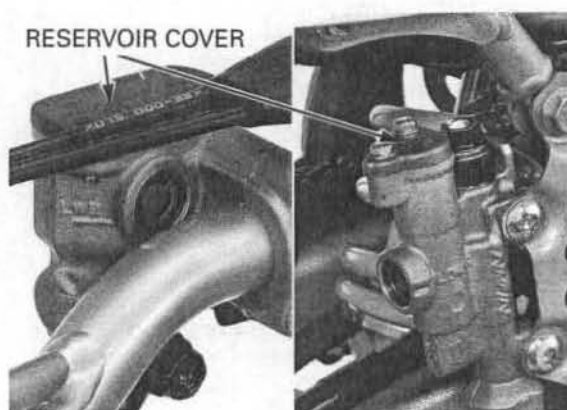
### Brake drags

- Contaminated brake pads/disc
- Misaligned wheel
- Clogged/restricted brake hose joint bolt and eyelet
- Warped/deformed brake disc
- Caliper not sliding properly
- 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 a 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.

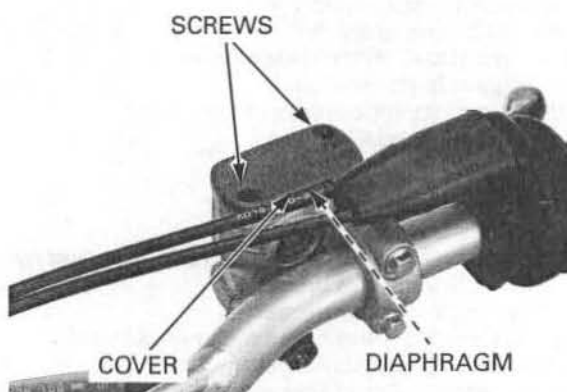


### BRAKE FLUID DRAINING

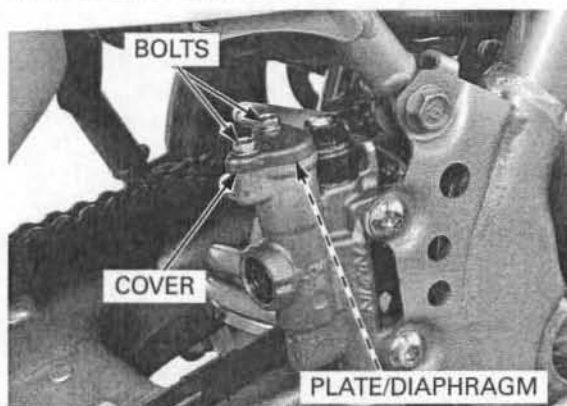
*Do not allow foreign material to enter the system when filling the reservoir. Avoid spilling fluid on plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

Check that the master cylinder parallel to the ground, before removing the reservoir cover.

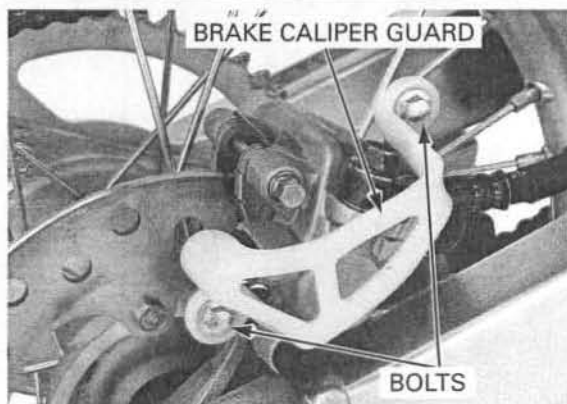
For the front brake, remove the screws, reservoir cover and diaphragm.



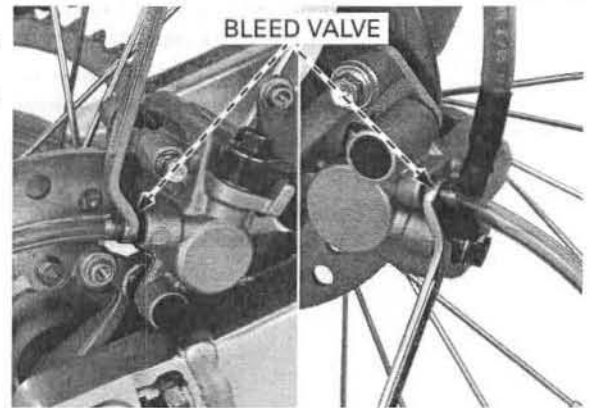
For the rear brake, remove the bolts, reservoir cover, set plate and diaphragm.



For the rear brake, remove the bolts and rear brake caliper guard.



Connect a bleed hose to the bleed valve.  
Loosen the bleed valve and pump the brake lever (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.

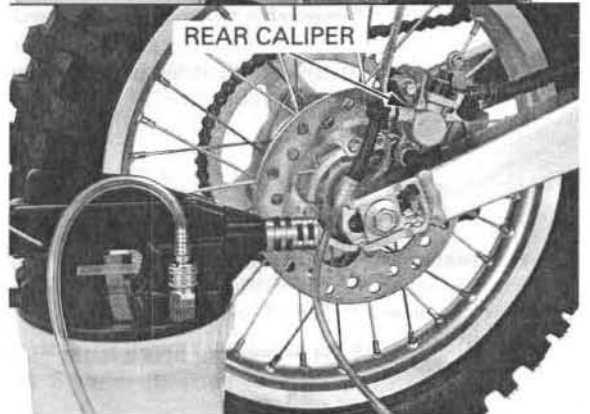
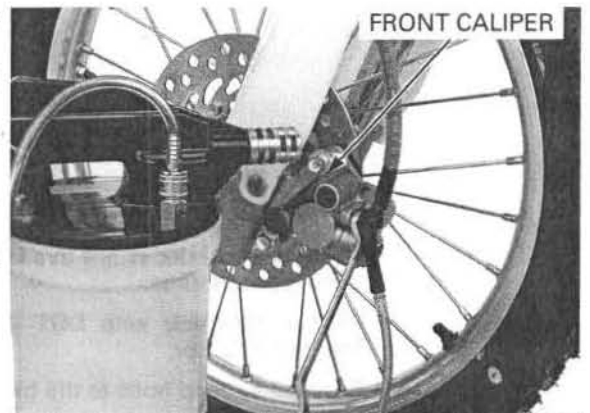
Fill the master cylinder with DOT 4 brake fluid from a sealed container.

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.



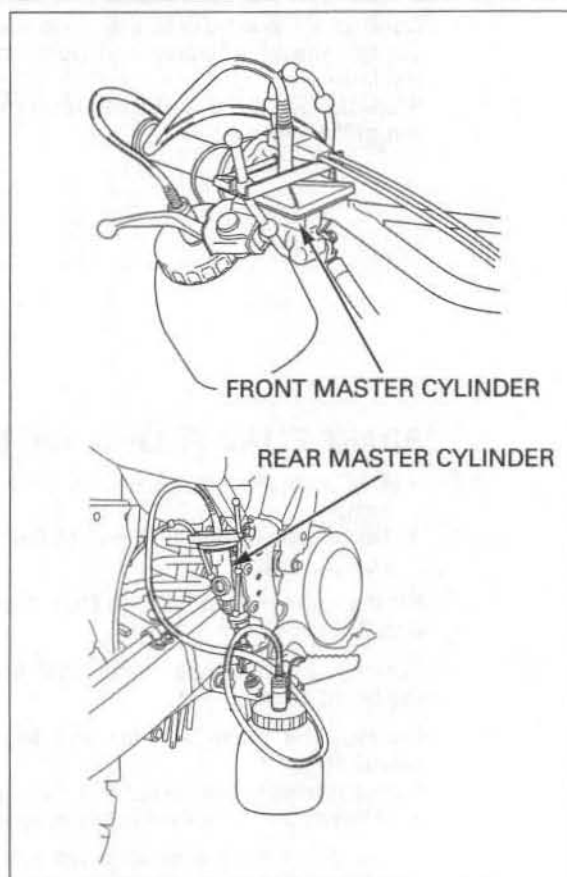
## HYDRAULIC BRAKE

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. 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 fluid flowing out of the small hole in the reservoir and lever resistance is felt.

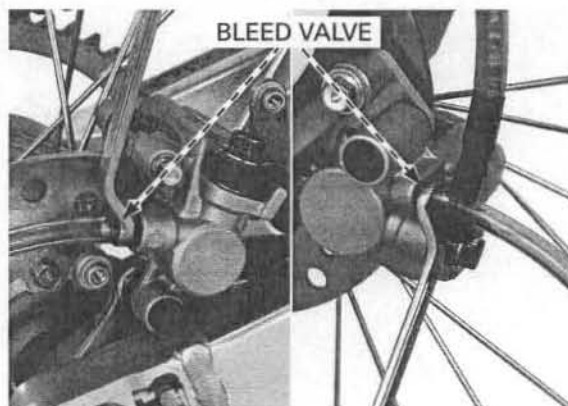


*Do not release the brake lever or pedal until the bleed valve has been closed.*

1. Squeeze the brake lever or push the brake pedal, open the bleed valve 1/2 turn and then close the bleed valve.
2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat steps 1-2 until there are no air bubbles in the bleed hose.

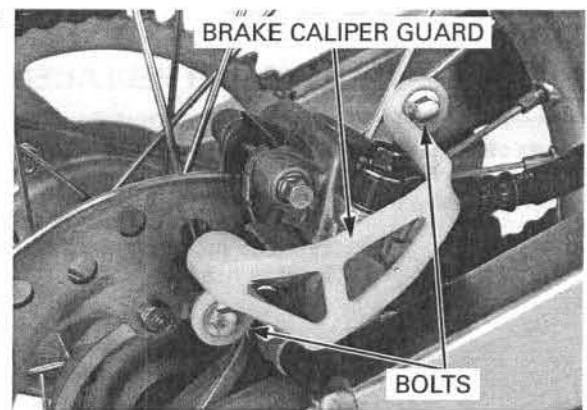
After bleeding air completely, tighten the bleed valves to the specified torque.

**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

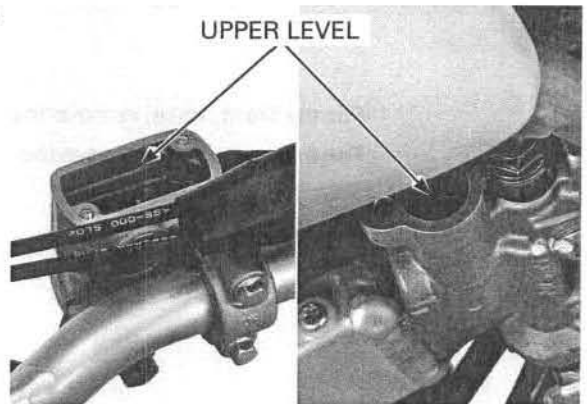




For the rear brake, install the brake caliper guard and tighten the bolts securely.

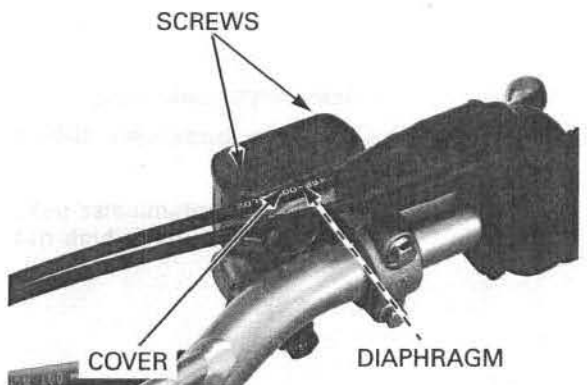


Fill each reservoir with DOT 4 brake fluid to the top of the upper level.



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

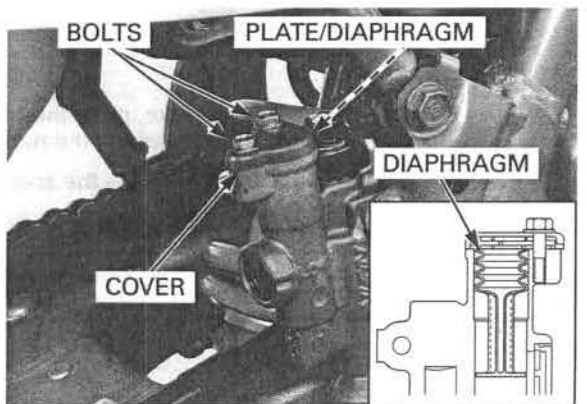
**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



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: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



### BRAKE PAD/DISC

#### BRAKE PAD REPLACEMENT

*Always replace the brake pads in pairs to assure even disc pressure.*

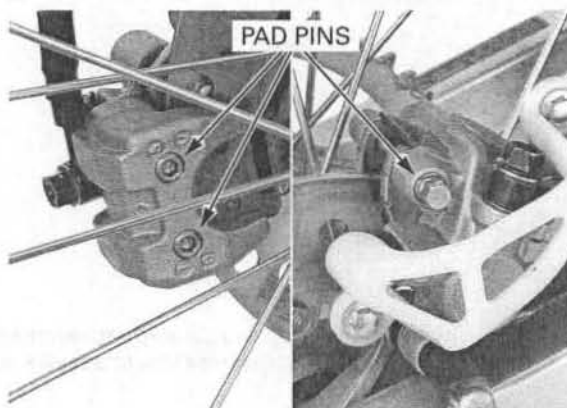
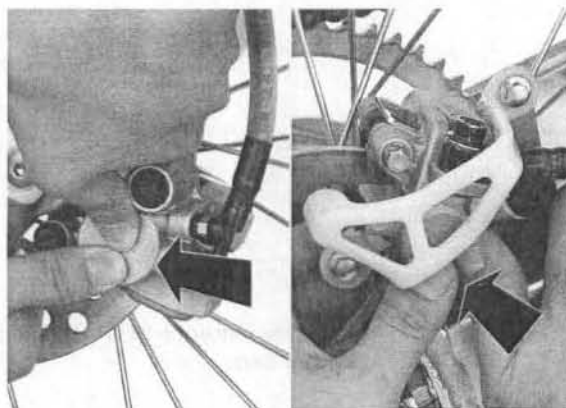
Push the caliper pistons all the way in to allow installation of new brake pads.

**NOTE:**

- Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

For the front brake, remove the pad pins.

For the rear brake, remove the pad pin.

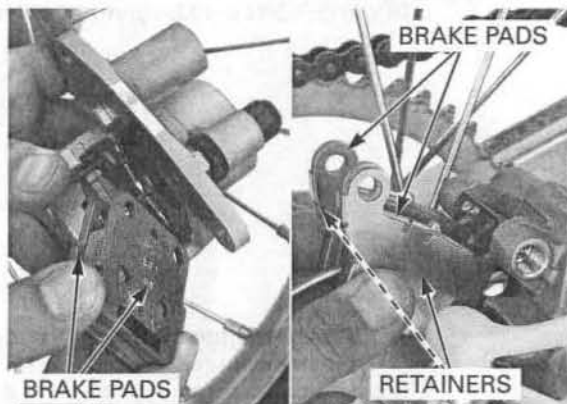


Remove the brake pads.

Install new brake pads to the pad retainer securely.

**NOTE:**

- Discard contaminated pads and clean a contaminated disc with a high quality brake decreasing agent.

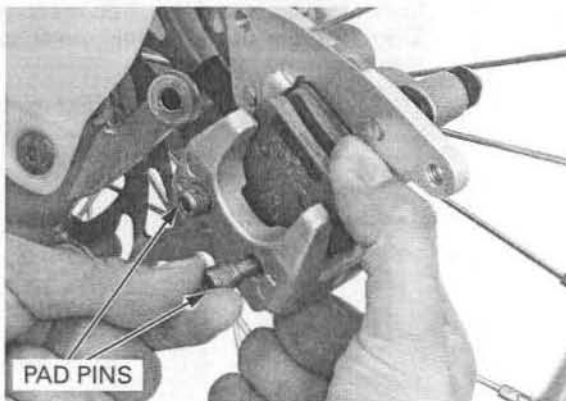


For the front brake, push the brake pads against the pad spring, then install the pad pin.

Tighten the pad pin to the specified torque.

**TORQUE: 17.2 N·m (1.8 kgf·m, 13 lbf·ft)**

Operate the brake lever to seat the caliper piston against the pads.

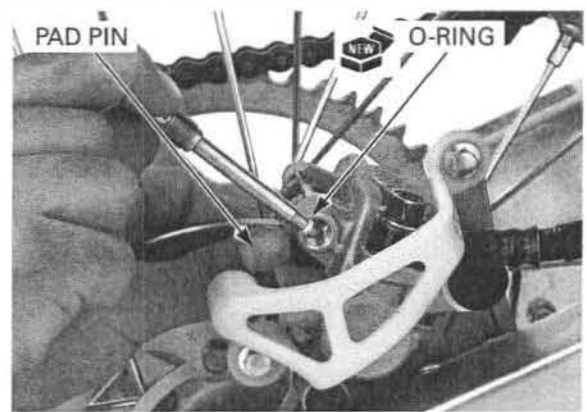




For the rear brake, install a new O-ring into the pad pin groove. Install and tighten the pad pin to the specified torque.

**TORQUE: 17.2 N·m (1.8 kgf·m, 13 lbf·ft)**

Operate the brake pedal to seat the caliper piston against the pads.



## BRAKE DISC INSPECTION

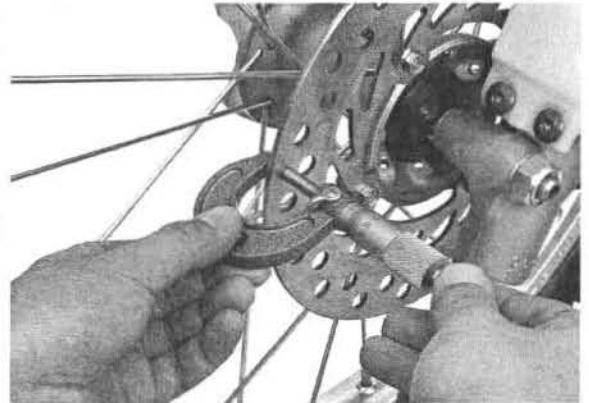
Visually inspect the brake disc for damage or cracks. Measure the brake disc thickness with a micrometer.

### SERVICE LIMITS:

**FRONT: 2.5 mm (0.10 in)**

**REAR: 3.0 mm (0.12 in)**

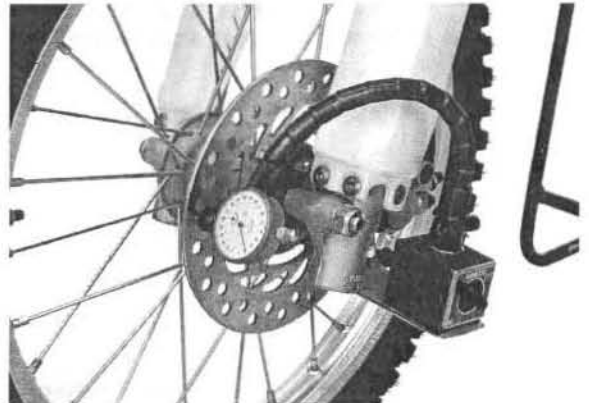
Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warpage with a dial indicator.

**SERVICE LIMIT: 0.15 mm (0.006 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.



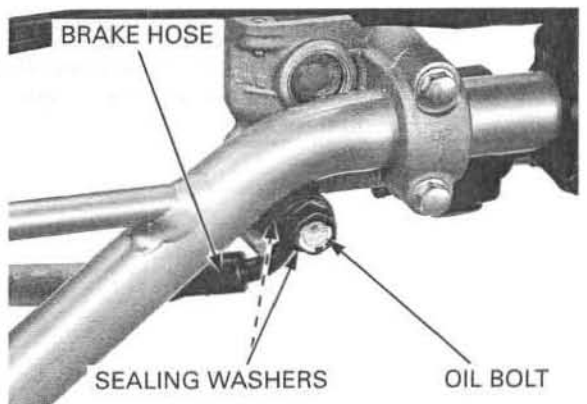
## FRONT MASTER CYLINDER

### REMOVAL

Drain the front brake hydraulic system (page 14-6).

*When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.*

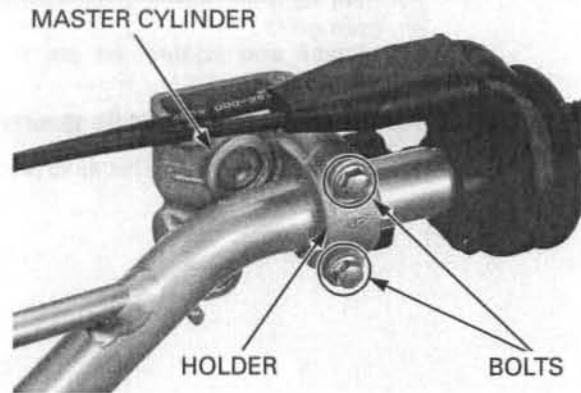
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.





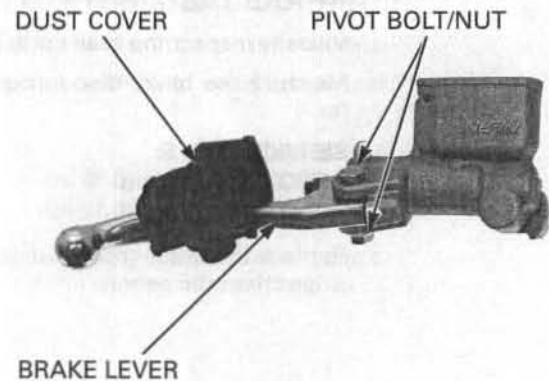
## HYDRAULIC BRAKE

Remove the bolts, holder and master cylinder assembly.



### DISASSEMBLY

Remove the dust cover.  
Remove the pivot bolt, nut and brake lever assembly.



*Be careful not to damage the boot.*

Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

**TOOL:**

Snap ring pliers

07914-SA50001



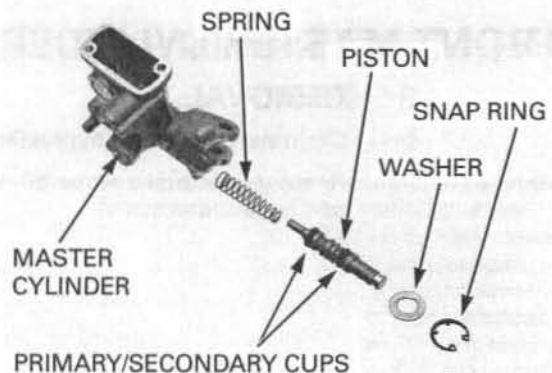
Remove the washer, master piston and spring.

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 piston boot, primary cup and secondary cup for fatigue or damage.



Measure the master cylinder I.D.

**SERVICE LIMIT: 11.055 mm (0.4352 in)**



Measure the master piston O.D.

**SERVICE LIMIT: 10.840 mm (0.4268 in)**



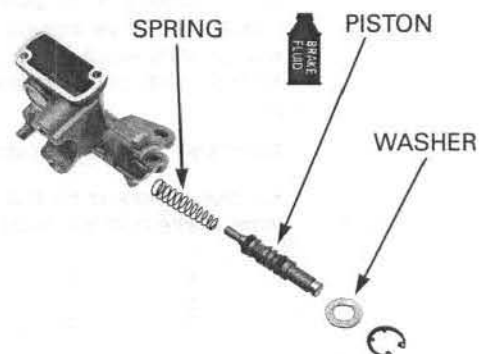
## ASSEMBLY

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

Coat all the parts with clean brake fluid before assembly.

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

Dip the master piston in brake fluid.  
Install the spring to the master piston.  
Install the master piston assembly into the master cylinder.



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

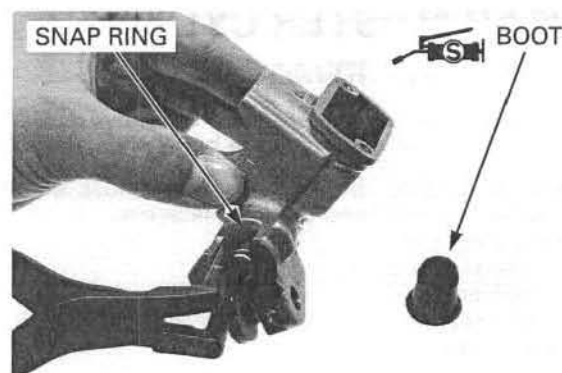
Install the snap ring using the special tool.

### TOOL:

Snap ring pliers

07914-SA50001

Apply silicone grease to the inside of the boot.  
Install the boot to the master cylinder.



## HYDRAULIC BRAKE

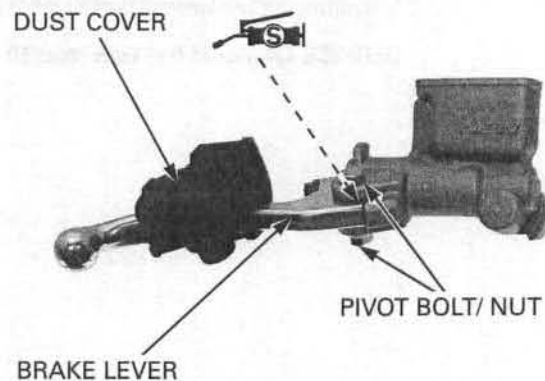
Apply silicone grease to the contact surface of the brake lever and piston tip.  
Install the brake lever.  
Install and tighten the pivot bolt to the specified torque.

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

Tighten the pivot nut to the specified torque.

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

Install the dust cover.



## INSTALLATION

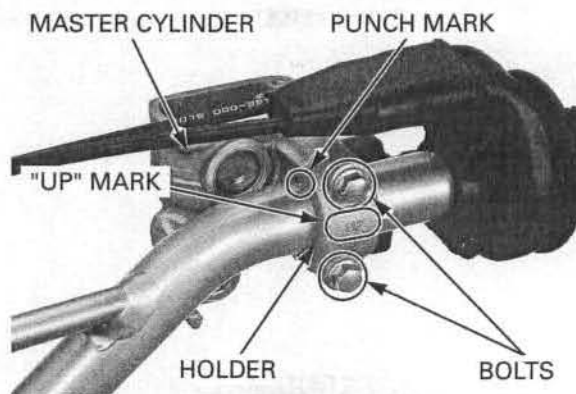
Place the master cylinder assembly on the handlebar.

Align the end of the master cylinder with the punch mark on the handlebar.

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

Tighten the upper bolt first, then the lower bolt to the specified torque.

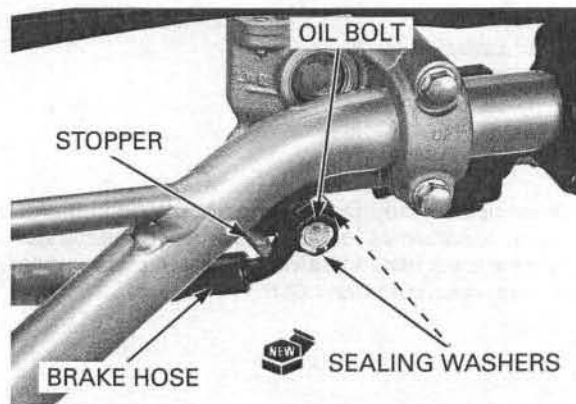
**TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)**



Align the brake hose eyelet the stopper.  
Install the brake hose eyelet with the oil bolt and new sealing washers.  
Tighten the brake hose oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill the reservoir to the upper level and bleed the front brake system (page 14-7).



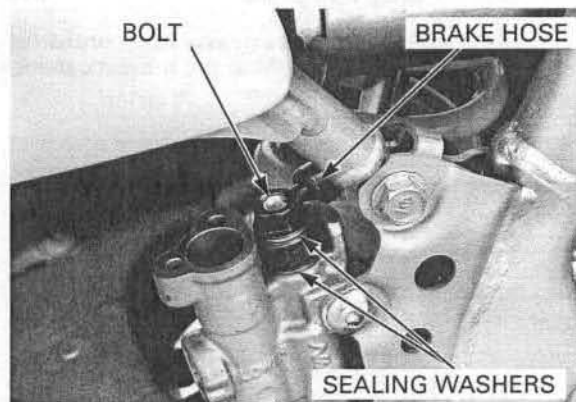
## REAR MASTER CYLINDER

### REMOVAL

Drain the rear brake hydraulic system (page 14-6).  
Remove the break pedal (page 14-22).

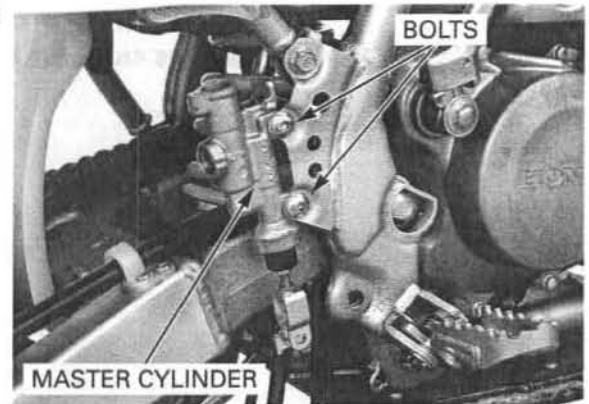
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

*When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.*





Remove the master cylinder mounting bolts and rear master cylinder.



## DISASSEMBLY

*Be careful not to damage the boot.*

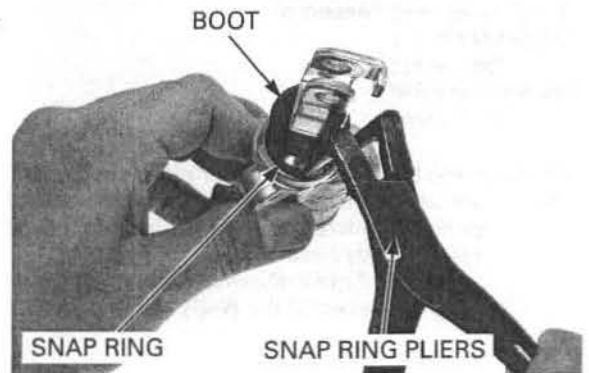
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

**TOOL:**

Snap ring pliers

07914-SA50001



Remove the push rod, master piston and spring.

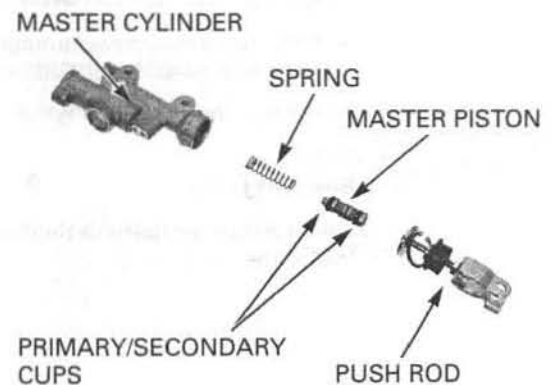
Clean the inside of the master cylinder with brake fluid.

## 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.



Measure the master cylinder I.D.

**SERVICE LIMIT:** 11.055 mm (0.4352 in)



## HYDRAULIC BRAKE

Measure the master piston O.D.

**SERVICE LIMIT: 10.840 mm (0.4268 in)**

### ASSEMBLY

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

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

Coat all the parts with clean brake fluid before assembly.

Dip the master piston in brake fluid.  
Install the spring to the master piston.  
Install the master piston assembly into the master cylinder.  
Apply silicone grease to the master piston contact area of the push rod.

Install the push rod into the master cylinder.

- If the push rod disassembled, refer to (page 3-23) for brake pedal height adjustment.

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

Install the snap ring using the special tool.

#### TOOL:

**Snap ring pliers**

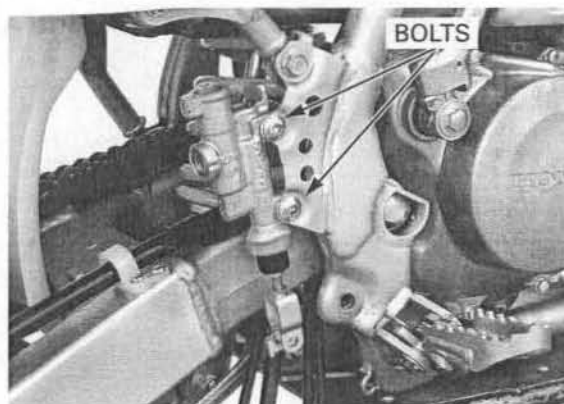
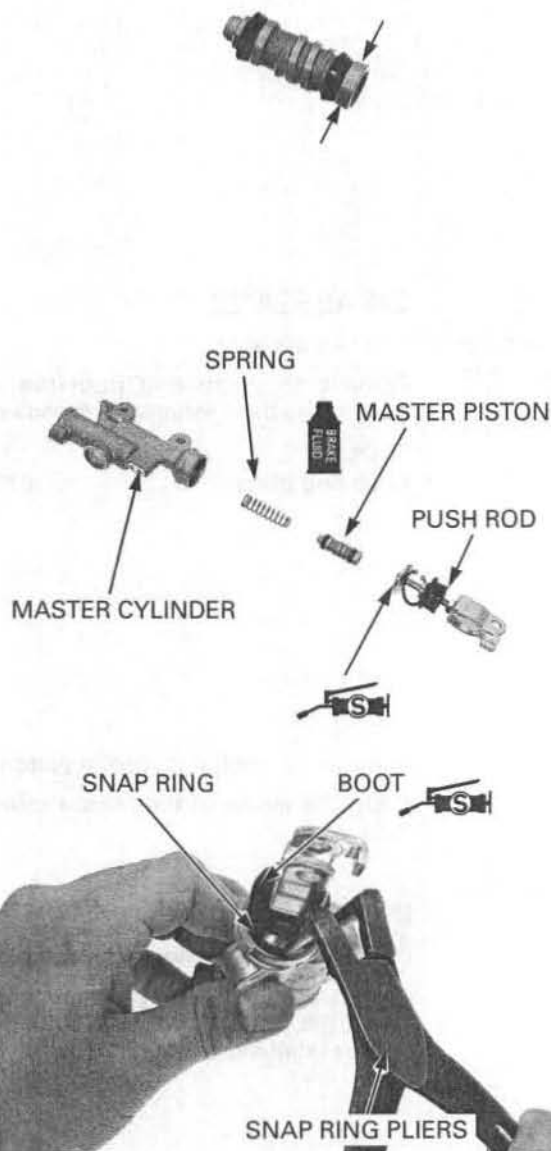
**07914-SA50001**

Apply silicone grease to the boot inside surface.  
Install the boot.

### INSTALLATION

Install the master cylinder and tighten the mounting bolts to the specified torque.

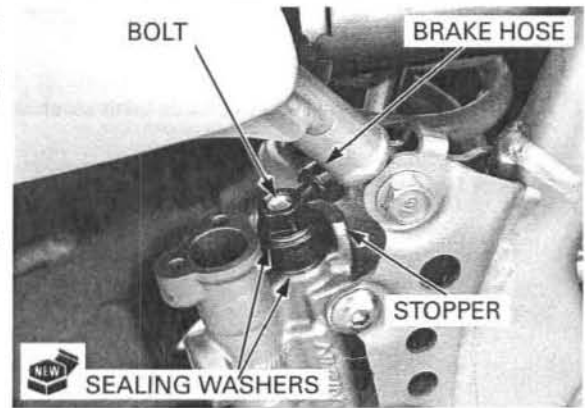
**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**



Install the brake hose with the oil bolt and new sealing washers. Push the 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 14-22). Fill the reservoir to the upper level and bleed the brake system (page 14-7).



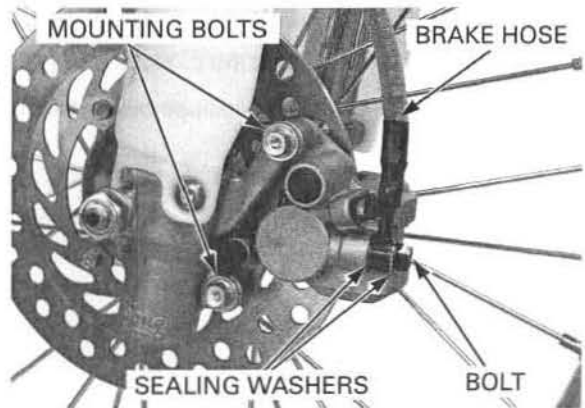
## FRONT BRAKE CALIPER

### REMOVAL

Drain the front brake hydraulic system (page 14-6). Remove the brake pads (page 14-10).

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

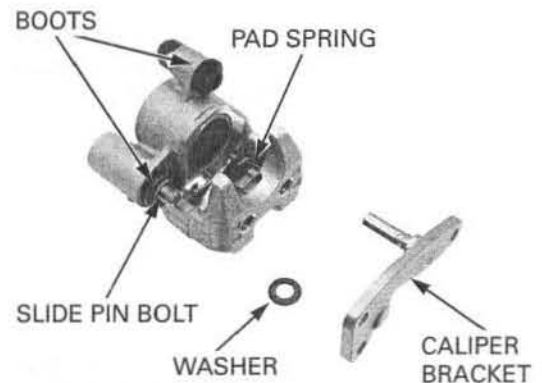
Remove the caliper mounting bolts and then remove the caliper and bracket as an assembly.



### DISASSEMBLY

Remove the caliper bracket and brake pad spring from the caliper body.

Remove the washer, slide pin bolt, caliper pin boot and bracket pin boot.



If necessary, lightly apply compressed air to the caliper fluid inlet to get the piston out.

Place a shop rag under the caliper to cushion the piston when it is expelled.

Use the air in short spurts.

*Do not bring the air nozzle too close to the inlet or the pistons may be forced out with excessive force that could cause injury.*



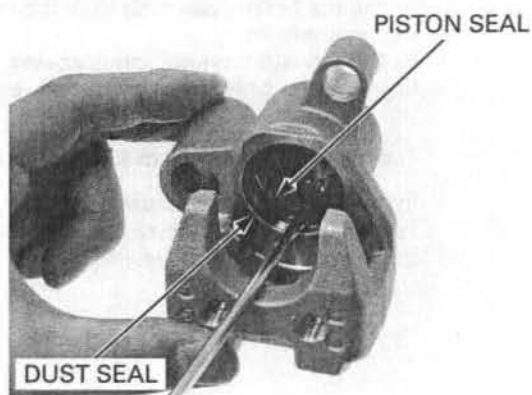


## HYDRAULIC BRAKE

*Be careful not to damage the piston sliding surface.*

Push the dust seal and piston seal in and lift them out.

Clean the seal groove, 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: 30.29 mm (1.192 in)**

Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

**SERVICE LIMIT: 30.14 mm (1.187 in)**



### ASSEMBLY

Coat new piston seal with clean brake fluid.

Coat new dust seal with silicone grease.

*Install each piston seal, dust seal and caliper piston in their proper locations.*

Install the piston and dust seal into the groove in the caliper body.

Coat the caliper piston with clean brake fluid and install them into the caliper cylinder with their open end facing the pad.



Install the pad spring into the caliper body.

*Note the installation direction of the pad spring.*

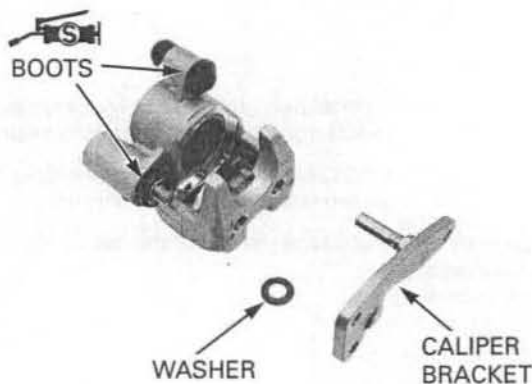
Replace the caliper and bracket pin boots if there is wear, deterioration or damage.

Apply silicone grease to the inside of the boots then install them.

Install the slide pin bolt and washer.

Assemble the caliper and bracket.

*When assembling the caliper and bracket, set the boot into the slide pin groove.*



**INSTALLATION**

Install the caliper/bracket assembly to the fork leg. Install and tighten the new mounting bolts to the specified torque.

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

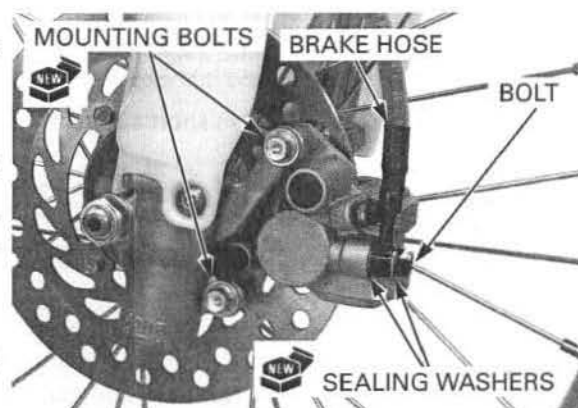
Install the brake hose eyelet to the caliper body with new sealing washers and oil bolt.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Install the brake pads (page 14-10).

Fill the reservoir to the upper level and bleed the hydraulic system (page 14-7).

**REAR BRAKE CALIPER****REMOVAL**

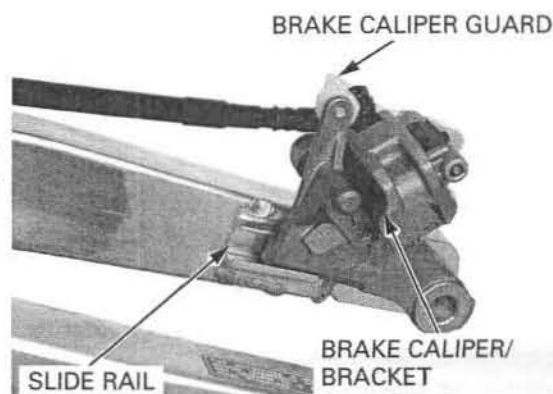
Drain the rear brake hydraulic system (page 14-6).

Remove the brake pads (page 14-10).

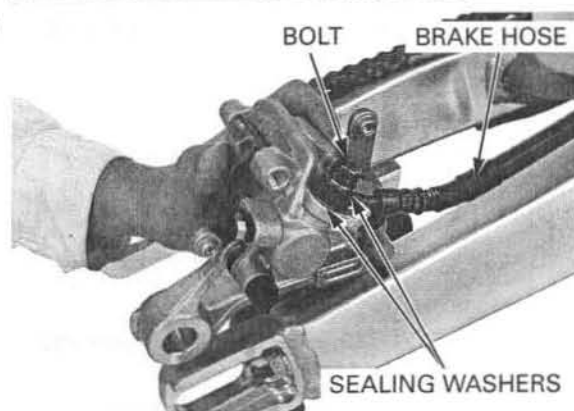
Remove the rear wheel (page 13-8).

Remove the brake caliper guard.

Slide the brake caliper and bracket assembly backward and pull it off of the slide rail on the swingarm.



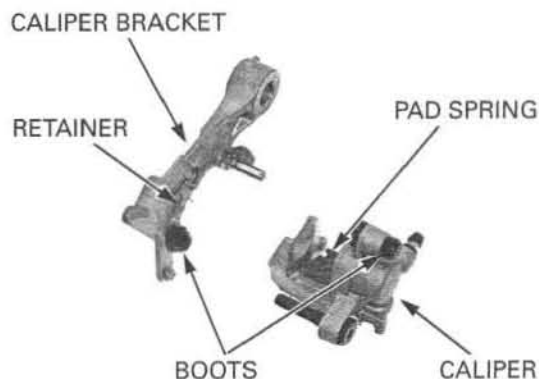
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

**DISASSEMBLY**

Remove the caliper bracket and brake pad spring from the caliper body.

Remove the brake pad retainer from the caliper bracket.

Remove the caliper pin boot and bracket pin boot.



## HYDRAULIC BRAKE

If necessary, lightly apply compressed air to the caliper fluid inlet to get piston out.

Place a shop rag under the caliper to cushion the piston when it is expelled.

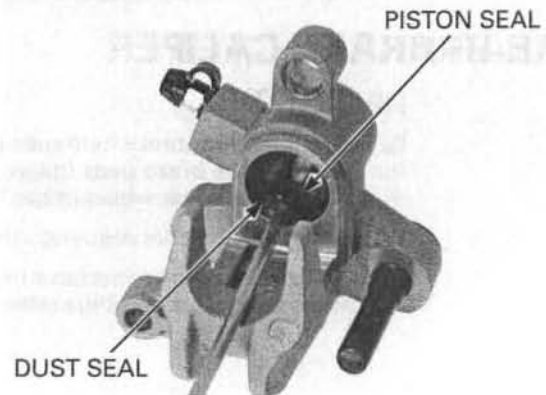
Use the air in short spurts.

*Do not bring the air nozzle too close to the inlet or the pistons may be forced out with excessive force that could cause injury.*

*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.

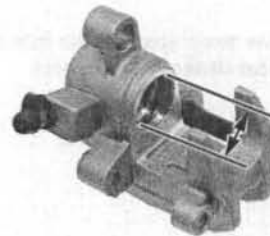


### INSPECTION

Check the caliper cylinder for scoring, scratches or damage.

Measure the caliper cylinder I.D.

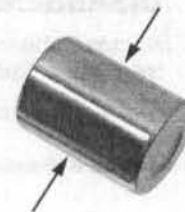
**SERVICE LIMIT: 22.712 mm (0.8942 in)**



Check the caliper piston for scoring, scratches or damage.

Measure the caliper piston O.D.

**SERVICE LIMIT: 22.573 mm (0.8887 in)**





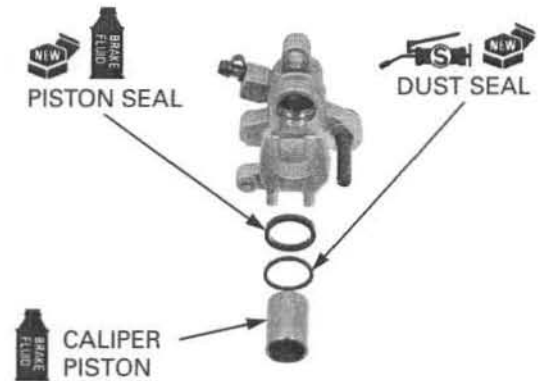
## ASSEMBLY

Coat a new piston seal with clean brake fluid.  
Coat a new dust seal 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 body.

Coat the caliper piston 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.

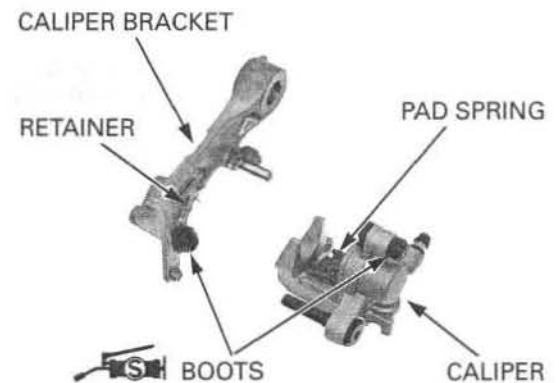
*Note the installation direction of the pad spring.*

Install the pad spring into the caliper body.

Replace the caliper and bracket pin boots if there is wear, deterioration or damage.  
Apply silicone grease to the inside of the boots then install them.

*When assembling the caliper and bracket, set the boot into the slide pin groove.*

Assemble the caliper and bracket.

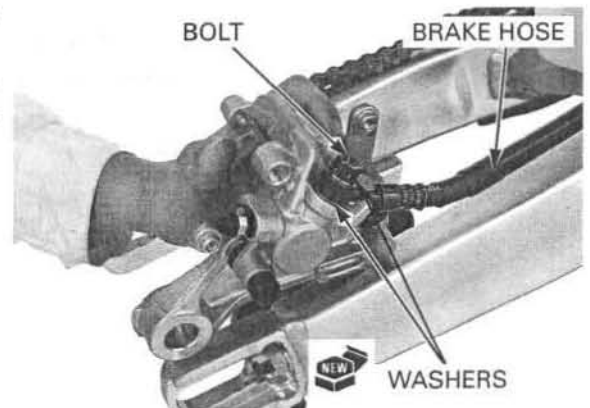


## INSTALLATION

Install the brake hose eyelets to the caliper body with new sealing washers and oil bolt.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**



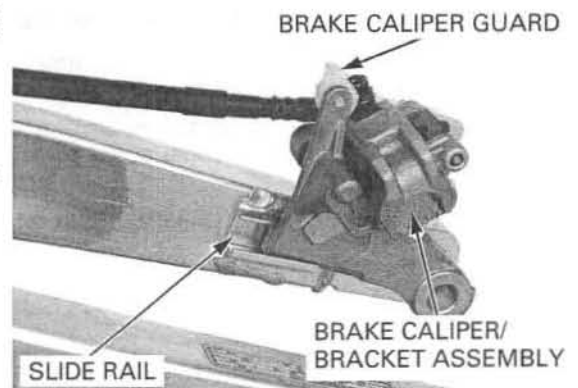
Install the brake caliper/bracket assembly onto the swingarm by aligning the bracket tab with the slide rail on the swingarm.

Install the brake caliper guard.

Install the rear wheel (page 13-12).

Install the brake pads (page 14-10).

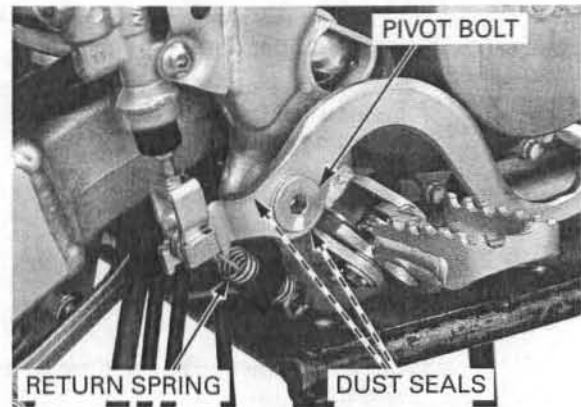
Fill the reservoir to the upper level and bleed the hydraulic system (page 14-7).



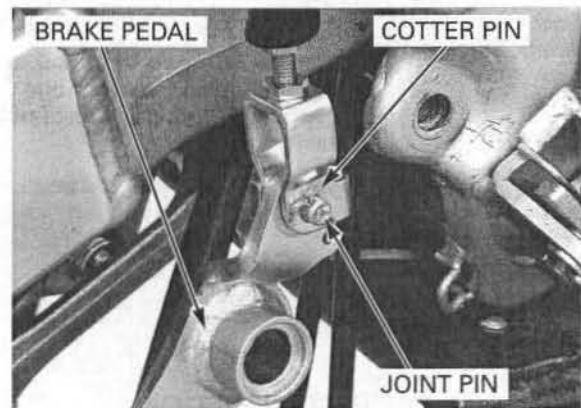
### BRAKE PEDAL

#### REMOVAL

Remove the brake pedal pivot bolt and dust seals.  
Remove the return spring.

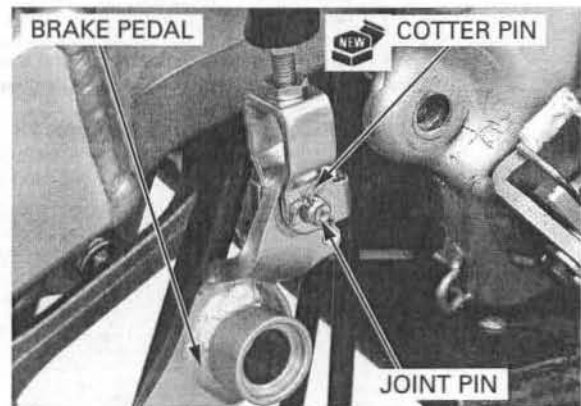


Remove and discard the cotter pin.  
Remove the joint pin and brake pedal.



#### INSTALLATION

Connect the brake pedal to the push rod.  
Install the joint pin and a new cotter pin.



Install the dust seals to the brake pedal.

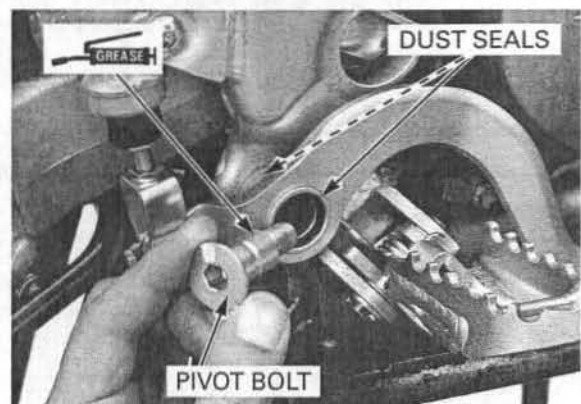
Apply grease to the sliding surface of the brake pedal and pivot bolt.

Install the washer and pivot bolt.

Tighten the brake pedal pivot bolt to the specified torque.

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

Install the return spring.



# 15. ELECTRICAL SYSTEM

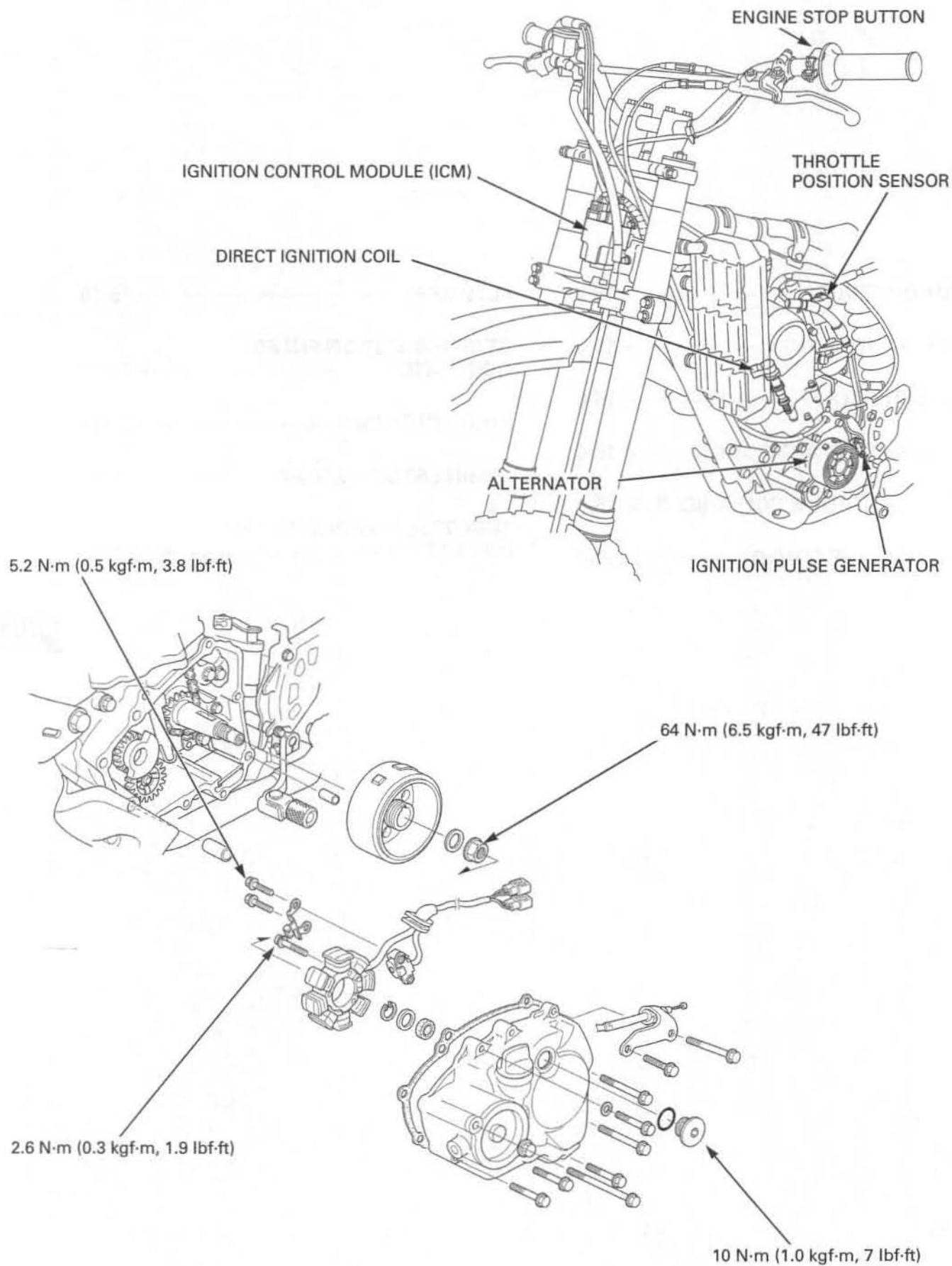
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SYSTEM DIAGRAM.....	15-2	FLYWHEEL.....	15-10
SERVICE INFORMATION .....	15-3	STATOR/IGNITION PULSE GENERATOR .....	15-11
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IGNITION SYSTEM INSPECTION .....	15-6	ENGINE STOP BUTTON .....	15-13
IGNITION CONTROL MODULE (ICM) .....	15-8	THROTTLE POSITION SENSOR INSPECTION .....	15-13
LEFT CRANKCASE COVER .....	15-9		



## ELECTRICAL SYSTEM

### SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 15-5).
- The ignition timing cannot be adjusted since the Ignition Control Module (ICM) is factory preset.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the module.
- A faulty ignition system is often related to poor connections. Check connections before proceeding.
- Use a spark plug of the correct heat range. Using a spark plug with an incorrect heat range can damage the engine.

### SPECIFICATION

ITEM			SPECIFICATION
Spark plug	Standard	(NGK)	CR8EH9
		(DENSO)	U24FER9
	Optional	(NGK)	CR9EH9
		(DENSO)	U27FER9
Spark plug gap			0.8 – 0.9 mm (0.031 – 0.035 in)
Direct ignition coil resistance (at 20 °C/68 °F)		Primary	0.07 – 0.10 Ω
		Secondary	4.6 – 6.8 kΩ
Ignition coil peak voltage			100 V minimum
Ignition pulse generator resistance (at 20°C/68°F)			180 – 280 Ω
Ignition pulse generator peak voltage			0.7 V minimum
Exciter coil resistance (at 20°C/68°F)			9 – 25 Ω
Exciter coil peak voltage			50 V minimum
Ignition timing ("F" mark)			8° BTDC/2,100 rpm
Throttle position sensor resistance (at 20 °C/68 °F)			4 – 6 kΩ

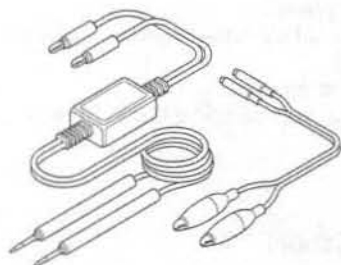
### TORQUE VALUES

Flywheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply oil to the threads and seating surface
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Left crankcase cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Ignition pulse generator mounting bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	Apply locking agent to the threads
Stator mounting screw	2.6 N·m (0.3 kgf·m, 1.9 lbf·ft)	Apply locking agent to the threads
Engine oil drain bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	

## ELECTRICAL SYSTEM

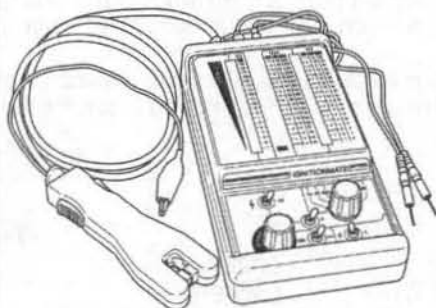
### TOOLS

Peak voltage adaptor  
07HGJ-0020100

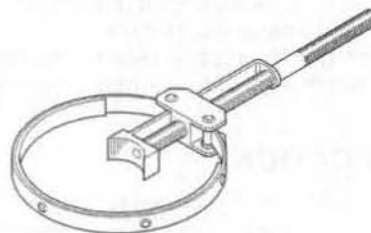


with commercially available digital  
multimeter (impedance 10 M $\Omega$ /DCV  
minimum)  
not available in U.S.A.

IgnitionMate peak voltage tester  
MTP07-0286 (U.S.A. only)

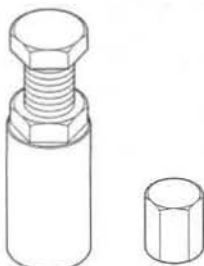


Flywheel holder  
07725-0040001



or equivalent commercially avail-  
able in U.S.A.

Flywheel puller  
07AMC-MEBA100(U.S.A.only)



07933-1480000 and 070MG-  
KSE0100



## TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose direct ignition or direct ignition connection
  - Water got into the direct ignition coil (affecting the direct ignition coil secondary voltage)
- If there is no spark at cylinder, temporarily exchange the direct ignition coil with a known good one and perform the spark test. If there is spark, the original direct ignition coil is faulty.

### No spark at plug

Unusual condition		Probable cause (check in numerical order)
Ignition coil primary (peak) voltage	Low or No peak voltage.	1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connection). 2. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 3. Cranking speed too slow. – Kickstarter is weak 4. The sample timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once). 5. Poorly connected connectors or an open circuit in the ignition system. 6. Faulty engine stop switch. 7. Faulty ignition pulse generator 8. Faulty exciter coil (measure the exciter coil peak voltage). 9. Faulty ICM (When above No. 1 – 7 are normal).
	Peak voltage is normal, but no spark jumps at the plug.	1. Faulty spark plug or leaking direct ignition coil secondary current ampere. 2. Faulty direct ignition coil.
Exciter coil	Low peak voltage.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too low. – Kickstarter is weak 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once). 4. Faulty exciter coil.
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty exciter coil.
Ignition pulse generator	Low peak voltage.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too low. – Kickstarter is weak 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once). 4. Faulty ignition pulse generator.
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

### 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.*

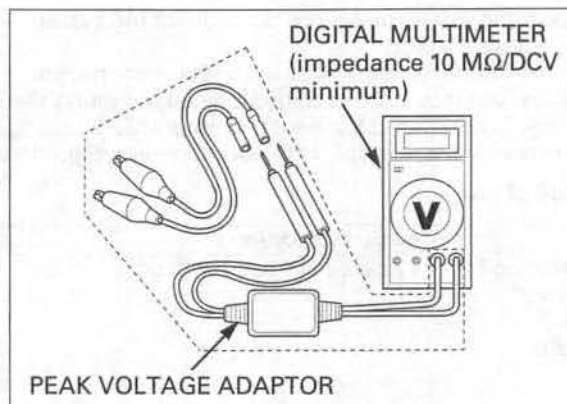
Connect the peak voltage tester (Ignition Mate, U.S.A. only) or peak voltage adaptor to the digital multimeter.

#### TOOLS:

**IgnitionMate peak voltage tester MTP07-0286 (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.

Check cylinder compression and check that the spark plug is installed correctly.

Shift the transmission into neutral.

Disconnect the direct ignition coil 2P connector and connect the peak voltage adaptor test probes to the terminals.

#### TOOLS:

**IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)**

**Peak voltage adaptor**

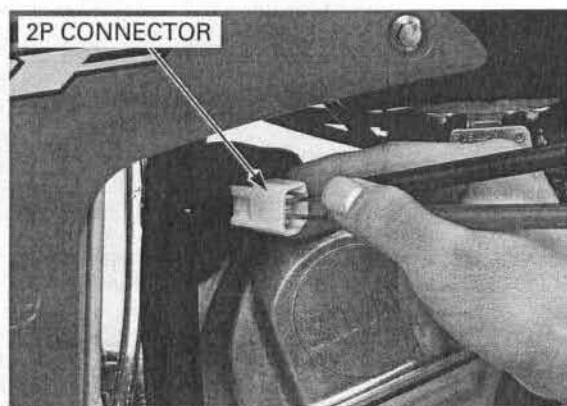
**with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)**

**CONNECTION: Green (+) – Black/yellow (–)**

Crank the engine with the kickstarter and read the voltage.

**STANDARD: 100 V minimum**

If the voltage cannot be measured, follow the checks described in the troubleshooting chart on page 15-5.



**DIRECT IGNITION COIL INSPECTION**

Remove the direct ignition coil from the cylinder head.

Measure the direct ignition coil resistance between the connector terminals.

**CONNECTION: A – B**

**STANDARD: 0.07 – 0.10  $\Omega$  (20°C/68°F)**

If resistance is out of specification, replace the direct ignition coil.

Measure the direct ignition coil secondary coil resistance between the primary terminal and spark plug terminal.

**CONNECTION: A – C**

**STANDARD: 4.6 – 6.8 k $\Omega$  (20°C/68°F)**

If resistance is out of specification, replace the direct ignition coil.

**EXCITER COIL PEAK VOLTAGE**

Remove the number plate (page 2-5).

Disconnect the ICM 4P connector.

Connect the peak voltage adaptor probes to the wire harness side connector terminals.

**TOOLS:**

**IgnitionMate peak voltage tester MTP07-0286**  
(U.S.A. only) or  
**Peak voltage adaptor 07HGJ-0020100**  
(not available in U.S.A.)

**with commercially available digital multimeter**  
(impedance 10 M $\Omega$ /DCV minimum)

**CONNECTION: Blue (+) – White (–)**

Shift the transmission into neutral.

Crank the engine with the kickstarter and read the peak voltage.

**PEAK VOLTAGE: 50 V minimum**

If the peak voltage is abnormal, recheck the peak voltage at the exciter coil 2P connector as following:

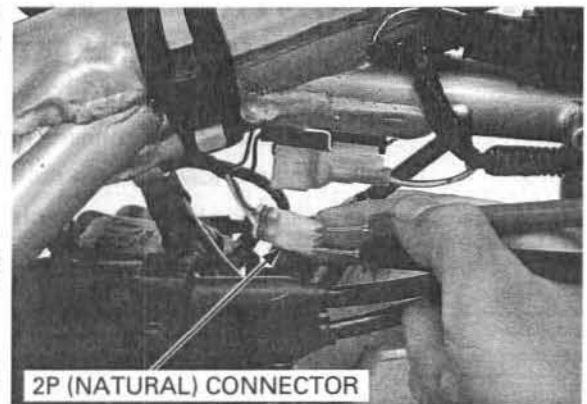
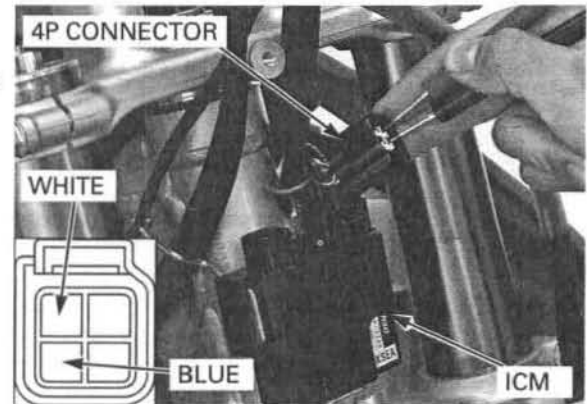
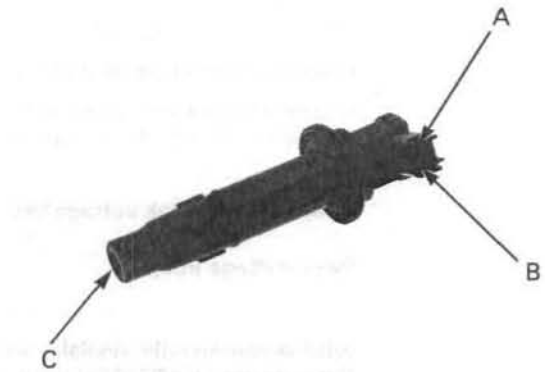
Remove the fuel tank (page 2-7).

Disconnect the exciter coil 2P (Natural) connector.

Connect the peak voltage adapter to the connector terminals of exciter coil side, recheck the peak voltage.

If the peak voltage at the ICM connector is abnormal and peak voltage at the exciter coil connector is normal, check for poorly connected connectors or a broken wire harness.

If the peak voltage is abnormal at both connectors, follow the checks described in the troubleshooting chart on page 15-5.





### IGNITION PULSE GENERATOR PEAK VOLTAGE

Remove the number plate (page 2-5).

Disconnect the ICM 6P connector.

Connect the peak voltage adaptor probes to the connector terminals of the wire harness side.

#### TOOLS:

IgnitionMate peak voltage tester MTP07-0286  
(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:** Blue/yellow (+) – Green/white (–)

Crank the engine with the kickstarter and read the peak voltage.

**PEAK VOLTAGE:** 0.7 V minimum

If the peak voltage is abnormal, recheck the peak voltage at the pulse generator 2P connector as following:

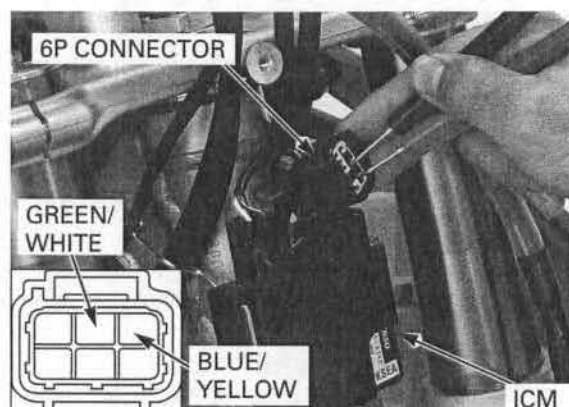
Remove the fuel tank.(page 2-7)

Disconnect the ignition pulse generator 2P (Black) connector.

Connect the peak voltage adapter to the connector terminals of the ignition pulse generator side and recheck the peak voltage.

If the peak voltage at the ICM connector is abnormal and peak voltage at the ignition pulse generator connector is normal, check for poorly connected connectors or a broken wire harness.

If the peak voltage is abnormal at both connectors, follow the checks described in the troubleshooting chart on page 15-5.



## IGNITION CONTROL MODULE (ICM)

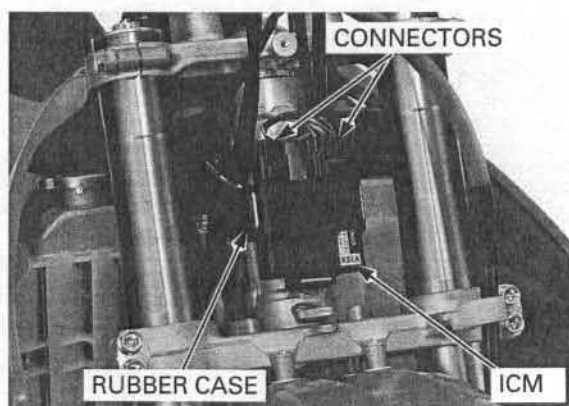
### REMOVAL/INSTALLATION

Remove the number plate (page 2-5).

Disconnect the ICM connectors.

Remove the ICM from the rubber case.

Installation is in the reverse order of removal.



## LEFT CRANKCASE COVER

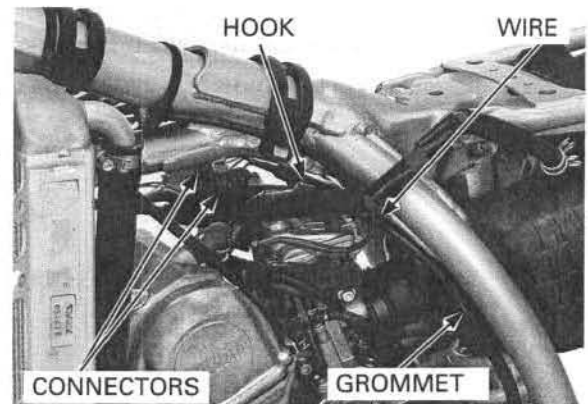
### REMOVAL

Remove the fuel tank (page 2-7).

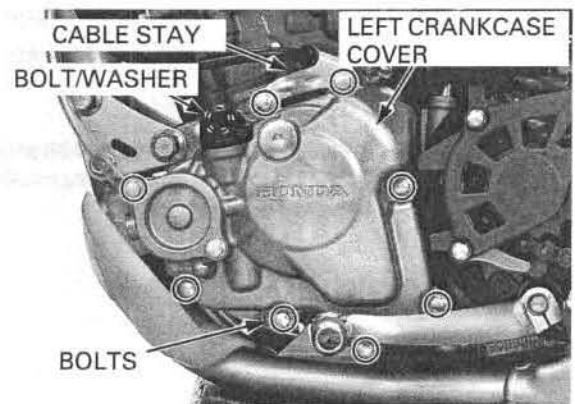
Drain the engine oil (page 3-13).

Disconnect the exciter coil 2P (Natural) and ignition pulse generator 2P (Black) connectors.

Remove the wire from the hook and wire's grommet from the frame.



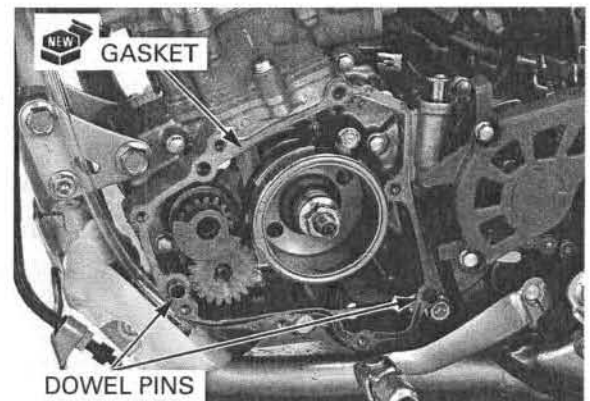
Remove the left crankcase cover bolts, clutch cable stay and left crankcase cover.



Remove the gasket and dowel pins.

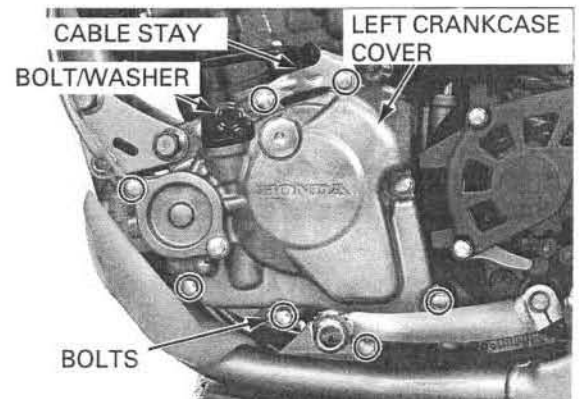
### INSTALLATION

Install a new gasket and dowel pins on the crankcase.



Install the left crankcase cover, clutch cable stay and left crankcase cover bolts.

Tighten the left crankcase cover bolts.





## ELECTRICAL SYSTEM

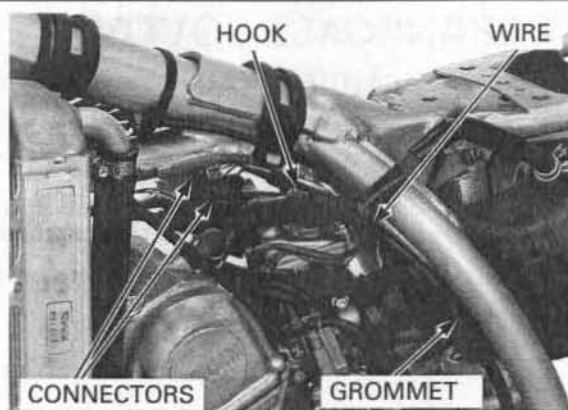
Route the wire properly (page 1-18).

Connect the exciter coil 2P (Natural) and ignition pulse generator 2P (Black) connectors.

Set the wire with the hook and set the wire's grommet to the frame.

Install the fuel tank (page 2-7).

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



## FLYWHEEL

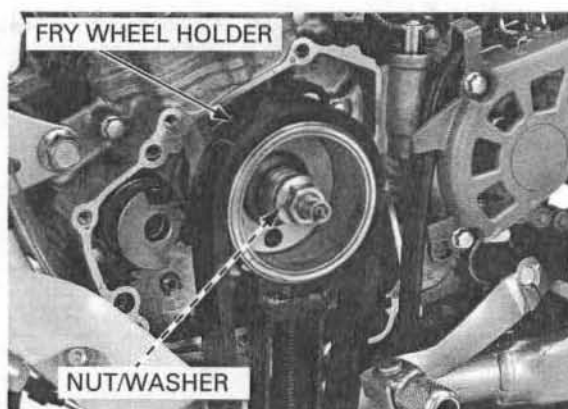
### REMOVAL

Remove the left crankcase cover (page 15-9).

Hold the flywheel with the special tool and remove the nut and washer.

#### TOOL:

Flywheel holder 07725-0040001 or equivalent commercially available in U.S.A.



Be careful not to bottom the adaptor against crankshaft left end, or it may damage the oil control orifice.

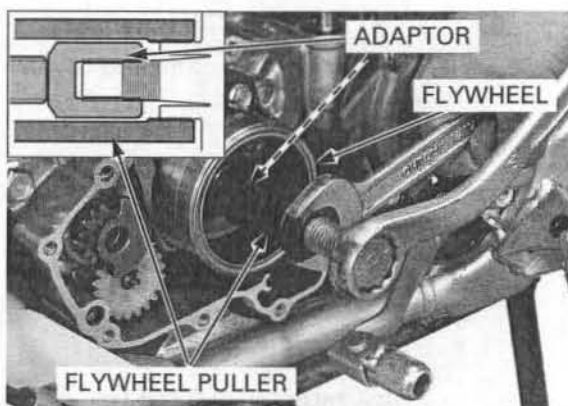
Screw the special top adaptor onto the crankshaft.

#### TOOLS:

Flywheel puller

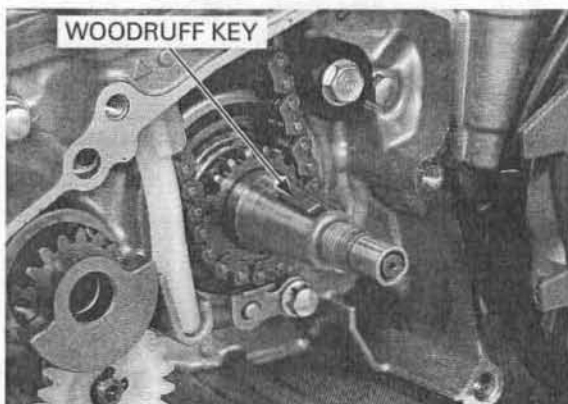
07AMC-MEBA100 (U.S.A. only) or 07933-1480000 and 070MG-KSE0100

Attach the special tool on the flywheel, then remove it.



Be careful not to damage the crankshaft.

Remove the woodruff key.



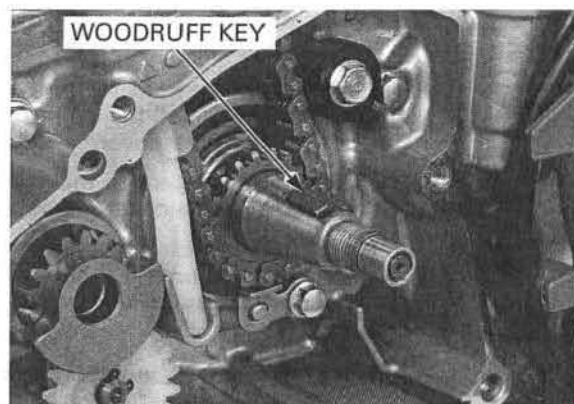


## INSTALLATION

*Be careful not to damage the crankshaft.*

Clean any oil from the tapered portion of the crankshaft and flywheel.

Install the woodruff key in the groove in the crankshaft.



Install the flywheel to the crankshaft by aligning the groove in the flywheel with the woodruff key.

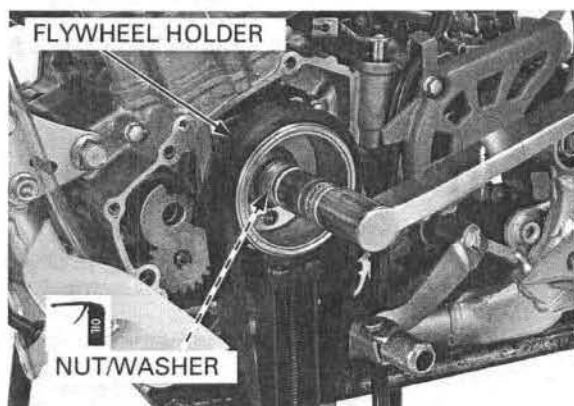
Apply oil to the flywheel nut threads and seating surface.

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 equivalent commercially available in U.S.A.



**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**

Install the left crankcase cover (page 15-9).

## STATOR/IGNITION PULSE GENERATOR

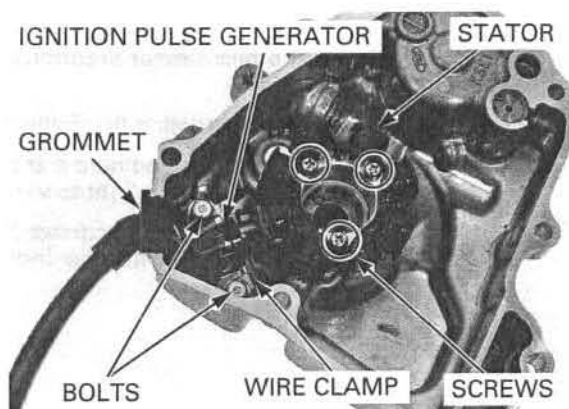
### REMOVAL

Remove the left crankcase cover (page 15-9).

Remove the bolts and wire clamp.

Remove the ignition pulse generator and grommet from the left crankcase cover.

Remove the screws and stator.



### INSTALLATION

Place the stator/ignition pulse generator into the left crankcase cover.

Apply liquid sealant to the wire grommet seating surface and install the grommet into the groove in the left crankcase cover.

Apply locking agent to the ignition pulse generator mounting bolt and stator mounting screw threads.

Install the wire clamp and tighten the ignition pulse generator mounting bolts and stator mounting screws to the specified torque.

#### TORQUE:

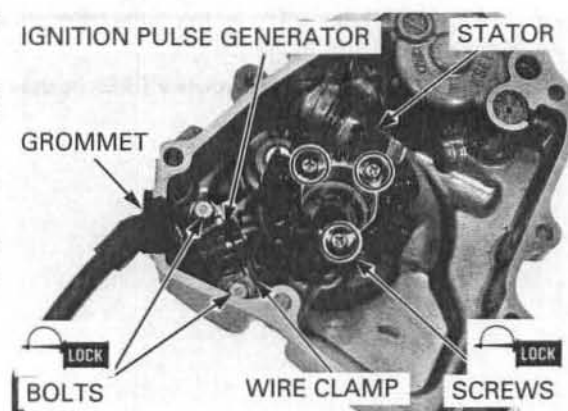
**Ignition pulse generator mounting bolt:**

5.2 N·m (0.5 kgf-m, 3.8 lbf-ft)

**Stator mounting screw:**

2.6 N·m (0.3 kgf-m, 1.9 lbf-ft)

Install the left crankcase cover (page 15-9).



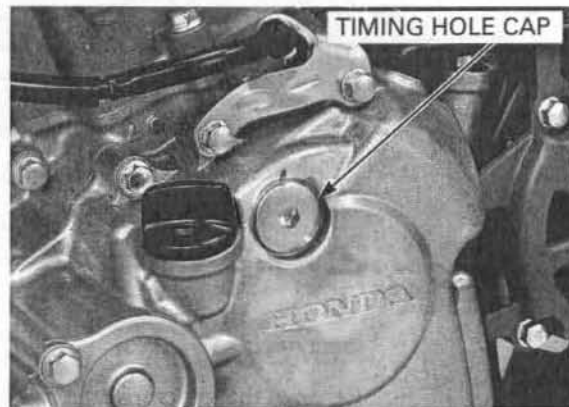
### IGNITION TIMING

#### NOTE:

- The ignition timing is preset at factory, check it only 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. Connect the timing light to the direct ignition wire.

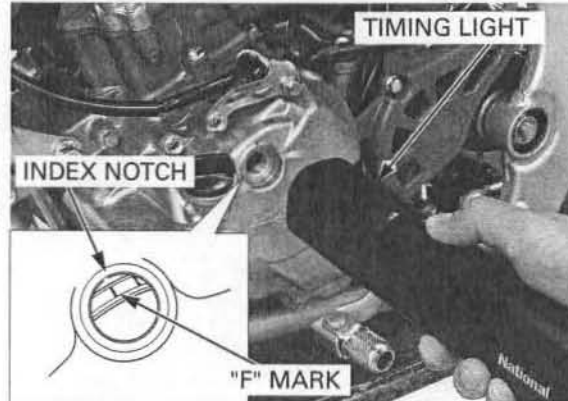


Attach a tachometer according to its manufacture's instructions.

Read the instruction for timing light operation.

Start the engine and hold it at  $2,100 \pm 100$  rpm while pointing 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.





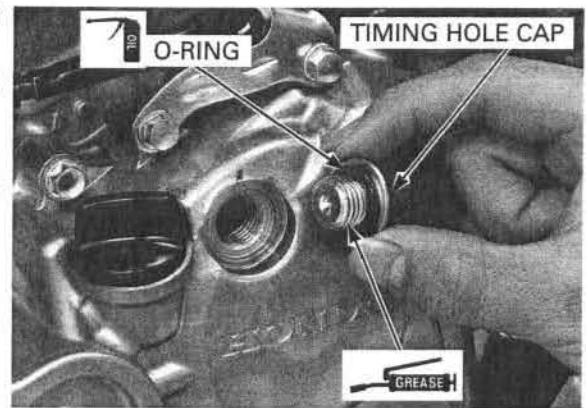
Check that the O-ring is in good condition, replace if necessary.

Apply oil to the O-ring and install it onto 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: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



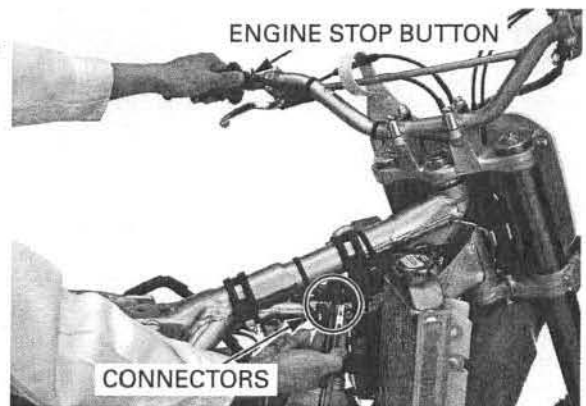
## ENGINE STOP BUTTON

### INSPECTION

Disconnect the engine stop button connectors.

Check for the continuity between the connectors of engine stop button.

There should be continuity with the engine stop button pushed, and no continuity with the button released.



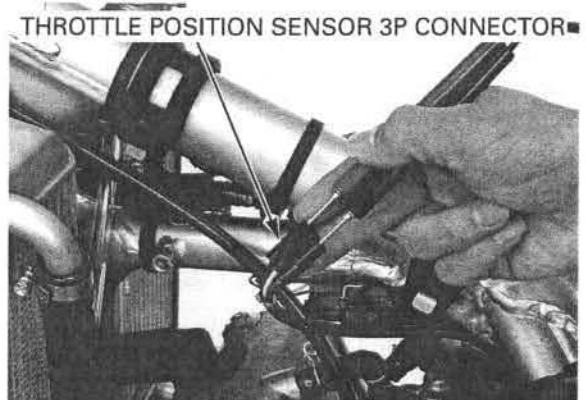
## THROTTLE POSITION SENSOR INSPECTION

Remove the fuel tank (page 2-7).

Disconnect the throttle position sensor 3P connector.

Measure the resistance between the Blue and Black wire terminals of the sensor side connector.

**STANDARD: 4 – 6 kΩ (20 °C/68 °F)**



Check that the resistance between the Yellow and Black wire terminals varies with the throttle position while operating the throttle grip.

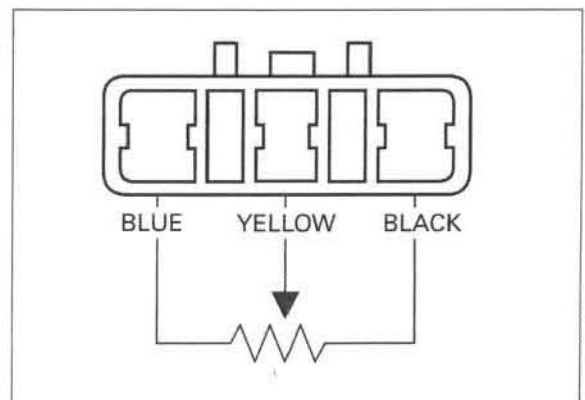
**Fully closed-Fully open position:**

**Resistance increases**

**Fully open-Fully closed position:**

**Resistance decreases**

If both measurements are abnormal, replace the throttle position sensor (page 5-25).





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MEMO

# 16. WIRING DIAGRAM

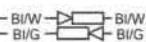
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WIRING DIAGRAM ..... 16-2

# WIRING DIAGRAM

## WIRING DIAGRAM

ENGINE STOP BUTTON



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

COLOR COMB : GROUND/MARKING

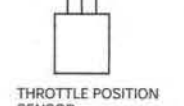
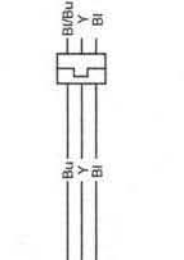
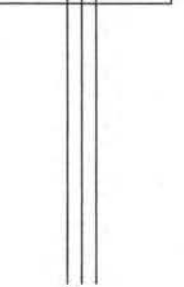
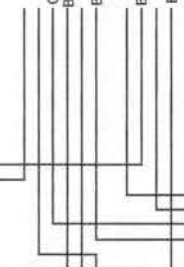
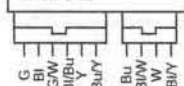
ENGINE STOP BUTTON CONTINUITY	
FREE	E IG
PUSH	○ ○
COLOR	Bl/G Bi/W

SPARK PLUG



DIRECT  
IGNITION COIL

IGNITION CONTROL  
MODULE



THROTTLE POSITION  
SENSOR

IGNITION PULSE  
GENERATOR

EXCITER COIL



# 17. TROUBLESHOOTING

---

ENGINE DOES NOT START  
OR IS HARD TO START ..... 17-2

ENGINE LACKS POWER ..... 17-3

POOR PERFORMANCE AT LOW  
AND IDLE SPEED ..... 17-5

POOR PERFORMANCE AT  
HIGH SPEED ..... 17-6

POOR HANDLING ..... 17-7

# ENGINE DOES NOT START OR IS HARD TO START

### 1. Fuel Line Inspection

Check fuel flow to carburetor.

***Does fuel reach the carburetor?***

- NO** – • Clogged fuel hose or fuel strainer  
• Clogged fuel valve  
• Clogged fuel cap breather hose  
• Sticking float valve

**YES** – GO TO STEP 2.

### 2. Spark Plug Inspection

Remove and inspect spark plug.

***Is the spark plug wet?***

- YES** – • Flooded carburetor  
• Throttle valve open  
• Dirty air cleaner  
• Improperly adjusted pilot screw

**NO** – GO TO STEP 3.

### 3. Spark Test

Perform spark test.

***Is there weak or no spark?***

- YES** – • Faulty spark plug  
• Fouled spark plug  
• Loose or disconnected ignition system wires  
• Broken or shorted spark plug wire  
• Broken or shorted ignition coil  
• Faulty igniting pulse generator  
• Faulty exciter coil  
• Faulty engine stop button  
• Faulty ignition control module (ICM)

**NO** – GO TO STEP 4.

### 4. Engine Starting Condition

Start engine by normal procedure.

***Does the engine start then stops?***

- YES** – • Improper choke operation  
• Incorrectly adjusted carburetor  
• Leaking carburetor insulator  
• Improper ignition timing (Faulty ICM or ignition pulse generator)  
• Contaminated fuel  
• Improper hot start operation

**NO** – GO TO STEP 5.

### 5. Cylinder Compression

Test cylinder compression.

***Is the compression low?***

- YES** – • Valve clearance too small  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing  
• Faulty decompressor cam

## ENGINE LACKS POWER

### 1. Drive Train Inspection

Raise wheel off the ground and spin by hand.

*Did the wheel spin freely?*

- NO** - • Brake dragging  
• Worn or damaged wheel bearings  
• Bent axle  
• Drive chain too tight

**YES** - GO TO STEP 2.

### 2. Tire Pressure Inspection

Check tire pressure.

*Is the tire pressures low?*

- YES** - • Faulty tire valve  
• Punctured tire

**NO** - GO TO STEP 3.

### 3. Clutch Inspection

Accelerate rapidly from low to second.

*Did the engine speed change accordingly when clutch is engaged?*

- NO** - • Clutch slipping  
• Worn clutch discs/plates  
• Warped clutch discs/plates  
• Weak clutch spring  
• Sticking clutch lifter  
• Additive in engine oil

**YES** - GO TO STEP 4.

### 4. Engine Condition Inspection

Accelerate lightly.

*Did the engine speed increase?*

- NO** - • Fuel/air mixture too rich or lean  
• Clogged air cleaner  
• Restricted fuel flow  
• Clogged muffler  
• Clogged fuel cap breather hose  
• Carburetor choke is on  
• Excessive carbon build-up in combustion chamber

**YES** - GO TO STEP 5.

### 5. Engine Condition Inspection

Accelerate or run at high speed.

*Is there knocking?*

- YES** - • Worn piston and cylinder  
• Use of poor quality fuel  
• Excessive carbon build-up in combustion chamber  
• Ignition timing too advanced (Faulty ICM)  
• Lean fuel mixture

**NO** - GO TO STEP 6.

### 6. Ignition Timing Inspection

Check ignition timing.

*Is the ignition timing correct?*

- NO** - • Faulty ignition control module (ICM)  
• Faulty ignition pulse generator

**YES** - GO TO STEP 7.



## TROUBLESHOOTING

---

### 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 cam

**NO** - GO TO STEP 8.

### 8. Carburetor inspection

Check carburetor for clogs.

*Is the carburetor clogged?*

- YES** -
- Carburetor not serviced frequently enough
  - Carburetor dirty
  - Dirt getting past air cleaner

**NO** - GO TO STEP 9.

### 9. Spark Plug inspection

Remove and inspect spark plug.

*Is the spark plug fouled or discolored?*

- NO** -
- Plug not serviced frequently enough
  - Incorrect spark plug used

**YES** - GO TO STEP 10.

### 10. Engine Oil inspection

Check oil level and condition.

*Is there correct level and good condition?*

- NO** -
- Oil level too high
  - Oil level too low
  - Contaminated oil

**YES** - GO TO STEP 11.

### 11. Lubrication inspection

Remove cylinder head cover and inspect lubrication.

*Is the valve train lubricated properly?*

- NO** -
- Faulty oil pump
  - Faulty pressure regulator valve
  - Clogged oil passage
  - Clogged oil strainer filter

---

## POOR PERFORMANCE AT LOW AND IDLE SPEED

### 1. Pilot Screw Inspection

Check carburetor pilot screw adjustment.

*Is the adjustment correct?*

**NO** – See page 5-26

**YES** – GO TO STEP 2.

### 2. Accelerator Pump Inspection

Check accelerator pump for clogs.

*Is the accelerator pump clogged?*

**YES** – • Accelerator not serviced frequently enough

**NO** – GO TO STEP 3.

### 3. Intake Air Leak Inspection

Check for leaking carburetor insulator.

*Is there leaking?*

**YES** – • Loose carburetor insulator bands  
• Damaged insulator

**NO** – GO TO STEP 4.

### 4. 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 ignition pulse generator  
• Faulty exciter coil  
• Faulty engine stop button  
• Faulty ignition control module (ICM)

**NO** – GO TO STEP 5.

### 5. Ignition Timing Inspection

Check ignition timing.

*Is the ignition timing correct?*

**NO** – • Faulty ignition control module (ICM)  
• Faulty ignition pulse generator

### POOR PERFORMANCE AT HIGH SPEED

#### 1. Fuel Line Inspection

Disconnect fuel line at carburetor.

*Does fuel flow freely?*

- NO – • Clogged fuel line  
• Clogged fuel cap breather  
• Faulty fuel valve  
• Clogged the fuel strainer screen

YES – GO TO STEP 2.

#### 2. Carburetor Inspection

Check carburetor for clogs.

*Is the carburetor clogged?*

- YES – • Carburetor not serviced frequently enough

NO – GO TO STEP 3.

#### 3. Ignition Timing Inspection

Check ignition timing.

*Is the ignition timing correct?*

- NO – • Faulty ignition control module (ICM)  
• Faulty ignition pulse generator

YES – GO TO STEP 4.

#### 4. Valve Timing Inspection

Check valve timing.

*Is the valve timing correct?*

- NO – Cam chain not installed properly

YES – GO TO STEP 5.

#### 5. Valve Spring Inspection

Check valve springs.

*Are the valve springs weak?*

- YES – • Faulty valve spring



## POOR HANDLING

### Steering is heavy

- Steering stem adjusting nut too tight
- Damaged steering head bearings

### 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
- Bent frame

### NOTE:

- For the following recommendations 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 (10.0 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 in the preferred sequence of adjustment

### 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 pre load

### Front End Shakes Under Heavy Braking

- Decrease shock preload
- Increase shock rebound damping
- Increase the fork oil capacity

### Front End Hops Over Bumps In Smooth Turns

- Change to lighter fork oil
- Decrease the fork oil capacity
- Decrease fork compression damping
- Use softer fork spring

### Rear End Hops Over Bumps While Accelerating

- Decrease shock pre load
- Decrease shock compression damping

### Rear End Gets Poor Traction While Accelerating Away From A Corner

- Decrease shock preload
- Decrease shock compression damping

---

# MEMO

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