

2005-2012



**SERVICE MANUAL**

**CRF450X**





# HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CRF450X.

Follow the Maintenance Schedule (Section 4) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB).

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

Sections 1 and 4 apply to the whole motorcycle. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Section 5 through 20 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 are not familiar with this motorcycle, read Technical Feature in Section 2.

If you don't know the source of the trouble, go to section 22 Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgement. You will find important safety information in a variety of forms including:

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

These signal words mean:

- ▲ DANGER** You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.
- ▲ WARNING** You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.
- ▲ CAUTION** You CAN be HURT if you don't follow instructions.

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












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

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# SYMBOLS

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

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

# 1. GENERAL INFORMATION

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## GENERAL INFORMATION

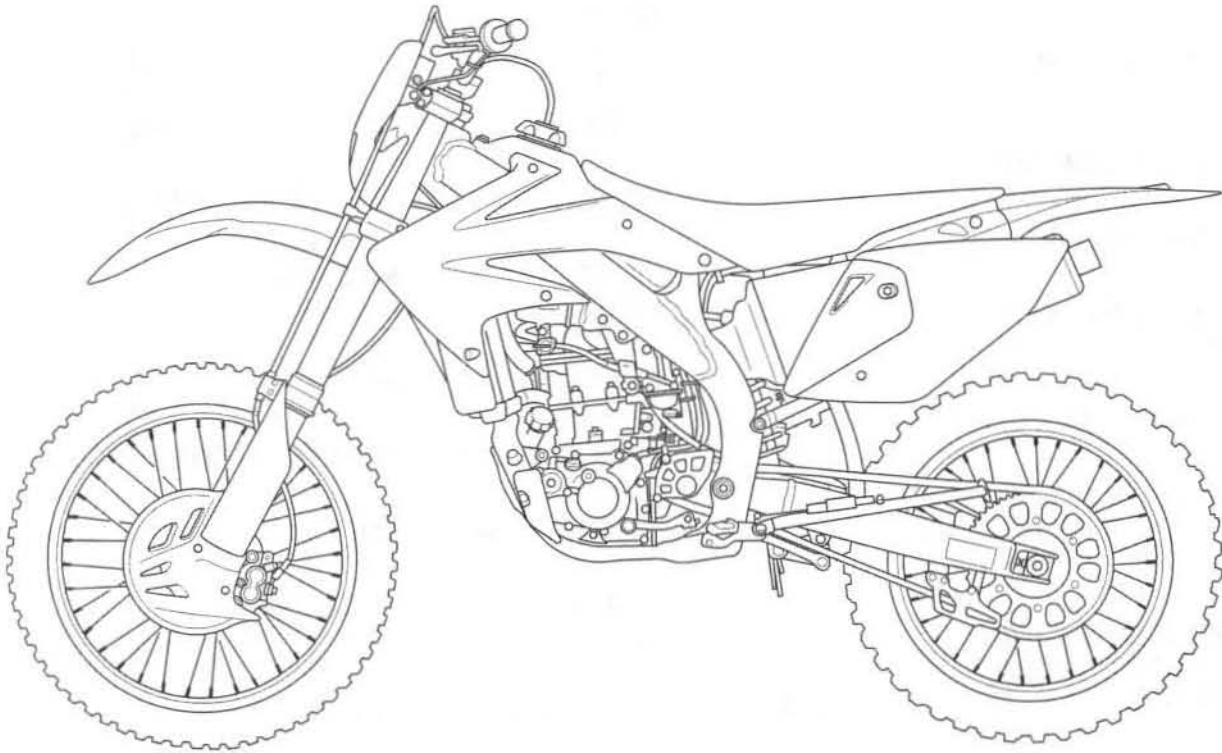
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### SERVICE RULES

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.
  - '05 - '07: (page 1-25)
  - After '07: (page 1-32)

### MODEL IDENTIFICATION

'05 - '07 shown:

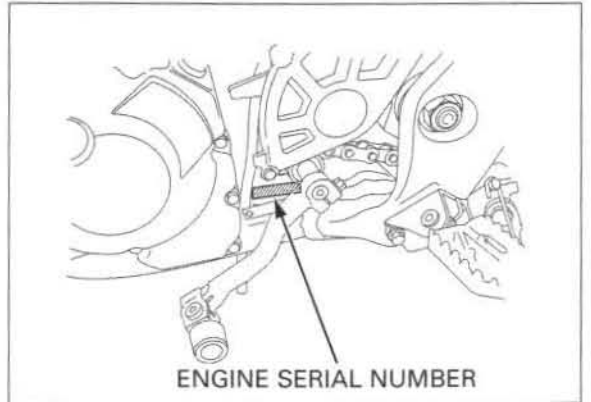


## GENERAL INFORMATION

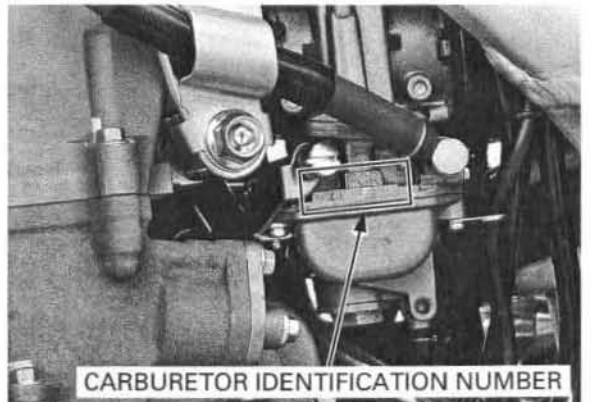
The Vehicle Identification Number (V.I.N.) is stamped on the right side of the steering head.



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



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



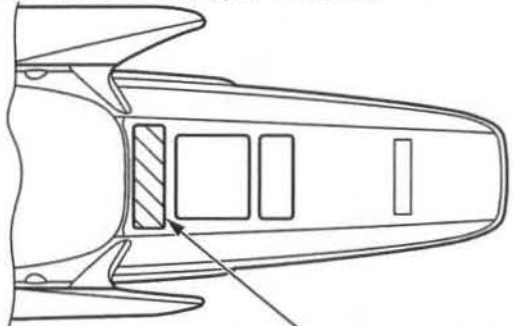
The name plate (U.S.A.) or Safety Certification Label (Canada) is attached on the right side of the frame.



## GENERAL INFORMATION

The Vehicle Emission Control Information Label is attached on the rear fender ('05 - '06 California type, '07 U.S.A.).

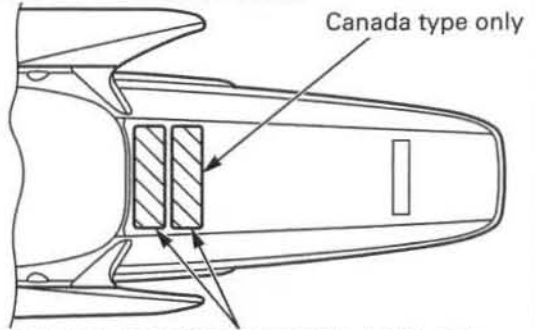
'05 - '06 California type, '07 U.S.A.:



EMISSION CONTROL INFORMATION LABEL

The Vehicle Emission Control Information Label is attached on the rear fender (After '07 U.S.A. and Canada).

After '07 U.S.A. and Canada:



EMISSION CONTROL INFORMATION LABEL

## GENERAL SPECIFICATIONS

	ITEM	SPECIFICATION
DIMENSIONS	Overall length	( '05 - '07 ) 2,180 mm (85.8 in)
		(After '07) 2,179 mm (85.8 in)
	Overall width	821 mm (32.3 in)
	Overall height	1,273 mm (50.1 in)
	Wheelbase	( '05 - '07 ) 1,483 mm (58.4 in)
		(After '07) 1,480 mm (58.3 in)
	Seat height	963 mm (37.9 in)
	Footpeg height	431 mm (17.0 in)
	Ground clearance	345 mm (13.6 in)
FRAME	Frame type	Twin tube
	Front suspension	Telescopic fork
	Front suspension axle travel	279 mm (11.0 in)
	Front suspension cushion stroke	315 mm (12.4 in)
	Rear suspension	Pro-Link
	Rear wheel travel	313 mm (12.3 in)
	Rear damper	Decarbon type with nitrogen gas filled damper
	Front tire size	80/100-21 51M
	Rear tire size	110/100-18 64M
	Tire brand (Dunlop)	( '05 - '07 ) Front: D742F
		(After '07) Front: D742FA
		Rear: D756
	Front brake	Hydraulic single disc
	Front brake swept area	334.5 cm <sup>2</sup> (51.8 in <sup>2</sup> )
	Rear brake	Hydraulic single disc
	Rear brake swept area	391.1 cm <sup>2</sup> (60.6 in <sup>2</sup> )
	Caster angle	( '05 - '07 ) 27°10'
	(After '07) 27°03'	
Trail length	( '05 - '07 ) 110 mm (4.3 in)	
	(After '07) 114.7 mm (4.52 in)	
Fuel tank capacity	( '05 - '07 ) 8.6 liter (2.27 US gal, 1.89 Imp gal)	
	(After '07) 7.2 liter (1.90 US gal, 1.58 Imp gal)	
Fuel tank reserve capacity	( '05 - '07 ) 1.4 liter (0.37 US gal, 0.31 Imp gal)	
	(After '07) 1.6 liter (0.42 US gal, 0.35 Imp gal)	
ENGINE	Bore and stroke	96.0 x 62.1 mm (3.78 x 2.44 in)
	Displacement	449 cm <sup>3</sup> (27.4 cu-in)
	Compression ratio	12.0 : 1
	Valve train	Chain drive and OHC with rocker arm
	Intake valve	opens at 1.0 mm (0.04 in) lift closes at 1.0 mm (0.04 in) lift
		10° BTDC 45° ABDC
	Exhaust valve	opens at 1.0 mm (0.04 in) lift closes at 1.0 mm (0.04 in) lift
		50° BBDC 15° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
Air filtration	Oiled polyurethane foam	
Crankshaft type	Assembled type	
Engine dry weight	32.3 kg (71.2 lbs)	
Cylinder arrangement	Single cylinder, inclined 6° from vertical	
CARBURETOR	Carburetor type	Piston valve type
	Venturi diameter	40 mm (1.6 in)

## GENERAL INFORMATION

ITEM		SPECIFICATION
DRIVE TRAIN	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operated
	Transmission	Constant mesh, 5-speed
	Primary reduction	2.739 (63/23)
	Final reduction	3.923 (51/13)
	Gear ratio	1st 2.230 (29/13)
		2nd 1.625 (26/16)
	3rd 1.235 (21/17)	
	4th 1.000 (19/19)	
	5th 0.826 (19/23)	
	Gearshift pattern	Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system	ICM (Ignition Control Module)
	Starting system	Electric starter motor and kickstarter
	Charging system	Single phase output alternator
	Regulator/rectifier	SCR shorted/Single phase, half wave rectification
	Lighting system	Alternator



## LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.67 liter (0.71 US qt, 0.59 Imp qt)	-
	At filter change	0.70 liter (0.74 US qt, 0.62 Imp qt)	-
	At disassembly	0.87 liter (0.92 US qt, 0.77 Imp qt)	-
Transmission oil capacity	At draining	0.65 liter (0.69 US qt, 0.57 Imp qt)	-
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)	-
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	-
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	-
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 - 0.21 (0.006 - 0.008)	-
	Side clearance	0.05 - 0.13 (0.002 - 0.005)	-

## FUEL SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Fuel tank capacity	'05 - '07	8.6 liter (2.27 US gal, 1.89 Imp gal)
	After '07	7.2 liter (1.90 US gal, 1.58 Imp gal)
Carburetor identification number	'05, '06	FCR04A
	'07	FCR13A
	After '07	FCR13B
Main jet	'05 - '07	#142
	After '07	#145
Slow jet		#45
Jet needle	'05, '06	NCVU
	'07	NHTU
	After '07	NNEU
Jet needle clip position (Standard)	'05, '06	2nd position from the top
	After '06	Fixed position
Pilot screw initial opening	'05 - '07	1-1/4 turns out
	After '07	1-1/8 turns out
Float level		8.0 mm (0.31 in)
Idle speed		1,700 ± 100 rpm
Throttle grip freeplay		3 - 5 mm (1/8 - 3/16 in)
Hot starter lever freeplay		2 - 3 mm (1/16 - 1/8 in)
PAIR control valve specified vacuum ('05 and '06 California type, After '06)		56 kPa (420 mmHg)
Throttle position sensor (Blue - Black) resistance (at 20°C/68°F)		4 - 6 kΩ

## COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	At change	1.21 liter (1.28 US qt, 1.06 Imp qt)
	At disassembly	1.45 liter (1.53 US qt, 1.28 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

## GENERAL INFORMATION

# CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder compression		402 kPa (4.1 kgf/cm <sup>2</sup> , 58 psi) at 360 rpm	-
Cylinder head warpage		-	0.05 (0.002)
Decompressor clearance		'05 - '07 Ex valve clearance + 0.35 mm (0.014)	-
Valve and valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)
		EX	0.28 ± 0.03 (0.011 ± 0.001)
	Valve stem O.D.	IN	5.475 - 5.490 (0.2156 - 0.2161)
		EX	4.965 - 4.980 (0.1955 - 0.1961)
	Valve guide I.D.	IN	5.500 - 5.512 (0.2165 - 0.2170)
		EX	5.000 - 5.012 (0.1969 - 0.1973)
	Stem-to-guide clearance	IN	0.010 - 0.037 (0.0004 - 0.0015)
		EX	0.020 - 0.047 (0.0008 - 0.0019)
	Valve guide projection above cylinder head	IN	16.1 - 16.3 (0.63 - 0.64)
		EX	17.9 - 18.1 (0.70 - 0.71)
Valve seat width	IN	1.1 - 1.3 (0.04 - 0.05)	
	EX	1.3 - 1.5 (0.05 - 0.06)	
Valve spring free length	IN	40.68 (1.602)	
	EX	42.82 (1.686)	
Rocker arm	Rocker arm I.D.	12.000 - 12.018 (0.4724 - 0.4731)	
	Rocker arm shaft O.D.	11.967 - 11.975 (0.4711 - 0.4715)	
	Rocker arm-to-shaft clearance	0.025 - 0.051 (0.0010 - 0.0020)	
Camshaft	Cam lobe height	IN	36.890 - 37.130 (1.4524 - 1.4618)
		EX	35.063 - 35.303 (1.3804 - 1.3899)
Valve lifter O.D.		25.978 - 25.993 (1.0228 - 1.0233)	25.97 (1.022)
Valve lifter bore I.D.		26.010 - 26.026 (1.0240 - 1.0246)	26.04 (1.025)

# CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.	96.000 - 96.015 (3.7795 - 3.7801)	96.025 (3.7805)
	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 facing toward the intake side
	Piston O.D.		95.970 - 95.980 (3.7783 - 3.7787)
	Piston O.D. measurement point		5.0 mm (0.20 in) from the bottom of skirt
	Piston pin bore I.D.		19.002 - 19.008 (0.7481 - 0.7483)
	Piston pin O.D.		18.994 - 19.000 (0.7478 - 0.7480)
	Piston-to-piston pin clearance		0.002 - 0.014 (0.0001 - 0.0006)
	Top ring mark		"R" mark side facing up
	Piston ring-to-ring groove clearance	Top	0.065 - 0.100 (0.0026 - 0.0039)
	Piston ring end gap	Top ring	0.25 - 0.31 (0.010 - 0.012)
Oil ring (side rail)		0.20 - 0.70 (0.008 - 0.028)	
Cylinder-to-piston clearance		0.020 - 0.045 (0.0008 - 0.0018)	0.085 (0.0033)
Connecting rod small end I.D.	'05 - '07	19.016 - 19.034 (0.7487 - 0.7494)	
	After '07	19.016 - 19.038 (0.7487 - 0.7495)	
Connecting rod-to-piston pin clearance	'05 - '07	0.016 - 0.040 (0.0006 - 0.0016)	
	After '07	0.016 - 0.044 (0.0006 - 0.0017)	

## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 – 13/16)	–
Clutch spring free length		44.7 (1.76)	43.7 (1.72)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
Clutch plate warpage		–	0.15 (0.006)
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.		20.020 – 20.041 (0.7882 – 0.7890)	20.07 (0.790)
Kickstarter idle gear bushing	I.D.	17.000 – 17.018 (0.6693 – 0.6700)	17.04 (0.671)
	O.D.	19.979 – 20.000 (0.7866 – 0.7874)	19.96 (0.786)
Countershaft O.D. at kickstarter idle gear		16.966 – 16.984 (0.6680 – 0.6687)	16.95 (0.667)
Starter driven gear boss	I.D.	36.009 – 36.034 (1.4177 – 1.4187)	36.034 (1.4187)
	O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.660 (1.7976)
Reduction gear A I.D.		12.010 – 12.050 (0.4728 – 0.4744)	12.050 (0.4744)
Reduction gear B I.D.		10.045 – 10.085 (0.3955 – 0.3970)	10.085 (0.3970)
Idle gear I.D.		12.010 – 12.050 (0.4728 – 0.4744)	12.050 (0.4744)
Gear holder shafts O.D.		11.989 – 12.000 (0.4720 – 0.4724)	11.989 (0.4720)
Reduction gear shaft O.D.		9.980 – 9.995 (0.3929 – 0.3935)	9.980 (0.3929)

## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER SPECIFICATIONS ('05 – '07)

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Side clearance	0.30 – 0.75 (0.012 – 0.030)	0.75 (0.030)	
	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	28.007 – 28.028 (1.1026 – 1.1035)	28.05 (1.104)
		M5	25.020 – 25.041 (0.9850 – 0.9859)	25.07 (0.987)
		C1	22.007 – 22.028 (0.8664 – 0.8672)	22.04 (0.868)
		C2	30.020 – 30.041 (1.1819 – 1.1827)	30.07 (1.184)
		C3	25.020 – 25.041 (0.9850 – 0.9859)	25.07 (0.987)
	Bushing O.D.	M4	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	29.979 – 30.000 (1.1803 – 1.1811)	29.95 (1.179)
	Bushing I.D.	C2	27.000 – 27.021 (1.0630 – 1.0638)	27.04 (1.065)
	Gear-to-bushing clearance	M4	0.027 – 0.069 (0.0011 – 0.0027)	0.11 (0.004)
		C2	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	C1 bearing	18.987 – 19.000 (0.7475 – 0.7480)	18.94 (0.746)
		C2 bushing	26.959 – 26.980 (1.0614 – 1.0622)	26.94 (1.061)
		C3	24.959 – 24.980 (0.9826 – 0.9835)	24.96 (0.983)
Gear-to-shaft clearance	M5	0.040 – 0.082 (0.0016 – 0.0032)	0.13 (0.005)	
	C3	0.040 – 0.082 (0.0016 – 0.0032)	0.082 (0.0032)	
Bushing-to-shaft clearance	C2	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)	
Shift fork, shift fork shaft	Fork claw thickness		4.93 – 5.00 (0.194 – 0.197)	4.8 (0.19)
	Shift fork I.D.	C	10.989 – 11.011 (0.4326 – 0.4335)	11.011 (0.4335)
		R, L	12.035 – 12.056 (0.4738 – 0.4746)	12.070 (0.4752)
	Fork shaft O.D.	C	10.969 – 10.980 (0.4319 – 0.4323)	10.969 (0.4318)
R, L		11.966 – 11.984 (0.4711 – 0.4718)	11.950 (0.4705)	

**GENERAL INFORMATION**

**CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER  
SPECIFICATIONS (After '07)**

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Side clearance	0.30 – 0.75 (0.012 – 0.030)	0.75 (0.030)	
	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	28.007 – 28.028 (1.1026 – 1.1035)	28.05 (1.104)
		M5	28.020 – 28.033 (1.1031 – 1.1037)	28.07 (1.105)
		C1	22.007 – 22.028 (0.8664 – 0.8672)	22.04 (0.868)
		C2	30.020 – 30.041 (1.1819 – 1.1827)	30.07 (1.184)
		C3	28.020 – 28.041 (1.1031 – 1.1040)	28.07 (1.105)
	Bushing O.D.	M4	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	29.979 – 30.000 (1.1803 – 1.1811)	29.95 (1.179)
		C3	27.979 – 28.000 (1.1015 – 1.1024)	27.95 (1.100)
	Bushing I.D.	M5	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.9858)
		C2	27.000 – 27.021 (1.0630 – 1.0638)	27.04 (1.065)
		C3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.9858)
	Gear-to-bushing clearance	M4	0.027 – 0.069 (0.0011 – 0.0027)	0.11 (0.004)
		M5	0.040 – 0.074 (0.0016 – 0.0029)	0.12 (0.005)
		C3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
		C2	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	C1 bearing	18.987 – 19.000 (0.7475 – 0.7480)	18.94 (0.746)
		C2 bushing	26.959 – 26.980 (1.0614 – 1.0622)	26.94 (1.061)
		C3 bushing	24.959 – 24.980 (0.9826 – 0.9835)	24.96 (0.983)
	Bushing-to-shaft clearance	M5, C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
Shift fork, shift fork shaft	Fork claw thickness	4.93 – 5.00 (0.194 – 0.197)	4.8 (0.19)	
	Shift fork I.D.	C	10.989 – 11.011 (0.4326 – 0.4335)	11.011 (0.4335)
		R, L	12.035 – 12.056 (0.4738 – 0.4746)	12.070 (0.4752)
	Fork shaft O.D.	C	10.969 – 10.980 (0.4319 – 0.4323)	10.969 (0.4318)
		R, L	11.966 – 11.984 (0.4711 – 0.4718)	11.950 (0.4705)

## FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cold tire pressure		98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	-	
Axle runout		-	0.20 (0.008)	
Wheel rim runout	Radial	-	2.0 (0.08)	
	Axial	-	2.0 (0.08)	
Wheel hub-to-rim distance		See page 14-10	-	
Fork	Spring free length	500 (19.7)	493 (19.4)	
	Slider runout	-	0.20 (0.008)	
	Recommended fork oil	Pro Honda HP Fork Oil 5W or equivalent	-	
	Oil level	42 - 47 (1.65 - 1.85)	-	
	Fluid capacity ('05 - '07)	Outer tube	332 cm <sup>3</sup> (11.2 US oz, 11.7 Imp oz)	-
		Fork damper	192 cm <sup>3</sup> (6.5 US oz, 6.8 Imp oz)	-
	Fluid capacity (After '07)	Outer tube	324 cm <sup>3</sup> (11.0 US oz, 11.4 Imp oz)	-
Fork damper		192 cm <sup>3</sup> (6.5 US oz, 6.8 Imp oz)	-	
Compression damping adjuster standard position	'05 - '07	14 clicks out from full in	-	
	After '07	11 clicks out from full in	-	
Rebound damping adjuster standard position	'05 - '07	7 clicks out from full in	-	
	After '07	6 clicks out from full in	-	
Steering damper (After '07)	Recommended damper oil	Pro Honda HP Fork Oil 5W or equivalent	-	
	Free piston depth at 20°C (68°F)	27.3 - 27.9 (1.07 - 1.10)	-	
	Damping force adjuster standard position	9 clicks out from full in	-	

## REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	-
Axle runout		-	0.20 (0.008)
Wheel rim runout	Radial	-	2.0 (0.08)
	Axial	-	2.0 (0.08)
Wheel hub-to-rim distance		See page 15-11	-
Drive chain slack		25 - 35 (1.0 - 1.4)	60 (2.4)
Drive chain width		-	13.4 (0.53)
Drive chain size/link	DID	520MXV/114	-
Drive chain slider thickness		-	5.0 (0.20)
Drive chain roller O.D.	Upper	-	39 (1.5)
	Lower	-	35 (1.4)
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	-
	Damper rod compressed force at 12 mm compressed	20.0 - 24.0 kgf (44.1 - 52.9 lbf)	-
	Standard oil capacity	395 cm <sup>3</sup> (13.4 US oz, 13.9 Imp oz)	-
	Spring installed length (standard)	'05 - '07	258.5 (10.18)
After '07		258.0 (10.16)	-
High speed side compression damping adjuster standard position	'05 - '07	3/4 - 1-1/4 turns out from full in	-
	After '07	7/12 - 1-1/12 turns out from full in	-
Low speed side compression damping adjuster standard position		10 clicks out from full in	-
Rebound damping adjuster standard position	'05 - '07	11 - 14 clicks out from full in	-
	After '07	10 - 13 clicks out from full in	-



## GENERAL INFORMATION

### HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Brake fluid	DOT 4	-
	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)	11.050 (0.4350)
	Master piston O.D.	10.971 (0.4319)	10.840 (0.4268)
	Caliper cylinder I.D.	27.025 (1.0640)	27.060 (1.0654)
	Caliper piston O.D.	26.968 (1.0617)	26.853 (1.0572)
Rear	Brake fluid	DOT 4	-
	Brake disc thickness	4.0 (0.16)	3.5 (0.14)
	Brake disc warpage	-	0.15 (0.006)
	Master cylinder I.D.	9.547 (0.3759)	9.575 (0.3770)
	Master piston O.D.	9.491 (0.3737)	9.465 (0.3726)
	Caliper cylinder I.D.	22.650 (0.8917)	22.712 (0.8942)
	Caliper piston O.D.	22.620 (0.8905)	22.573 (0.8887)
	Brake pedal push rod standard length	79.6 mm (3.13 in)	-

### BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12 V - 6 Ah	
	Current leakage	0.1 mA max.	
	Voltage (20°C/68°F)	Fully charged	13.0 - 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	0.6 A/5 - 10 h
Quick		3.0 A/1.0h	
Alternator	Capacity	78 W/5,000 rpm	

### IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATION	
Spark plug	Standard	(NGK)	IFR8H11
		(DENSO)	VK24PRZ11
	Optional	(NGK)	IFR9H11
		(DENSO)	VK27PRZ11
Spark plug gap		1.0 - 1.1 mm (0.039 - 0.043 in)	
Ignition coil resistance (at 20°C/68°F)	Primary	0.1 - 0.3 Ω	
	Secondary with plug cap	9 - 16 kΩ	
	Secondary without plug cap	4 - 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	
Alternator exciter coil resistance (at 20°C/68°F)		9 - 28 Ω	
Ignition timing ("F" mark)		8° BTDC/1,800 rpm	
Throttle position sensor (Blue - Black) resistance (at 20°C/68°F)		4 - 6 kΩ	

**ELECTRIC STARTER SPECIFICATION**

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.25 (0.404)	6.75 (0.266)

**LIGHTS/METER/SWITCHES SPECIFICATIONS**

ITEM	SPECIFICATIONS
Headlight	12 V – 35 W
Tail light	LED
Fuse	15 A

## 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 (0.9, 6.6)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head)	9.0 (0.9, 6.6)
10 mm hex bolt and nut	34 (3.5, 25)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
12 mm hex bolt and nut	54 (5.5, 40)	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.

#### NOTE:

1. Apply oil to the threads and seating surface.
2. Apply locking agent to the threads.
3. Stake.
4. U-nut
5. ALOC bolt/screw; replace with new one.
6. Loosen the bolt 1/8 to 1/4 turns after tightening it to the specified torque, then tighten the pivot nut.
7. Apply grease to the threads.
8. UBS nut
9. After '07: Apply molybdenum disulfide grease (TB1901 or equivalent) to the threads.
10. Apply Honda Hondalock 3 or equivalent high strength locking agent to the threads.

## ENGINE

### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine oil drain bolt	1	8	16 (1.6, 12)	NOTE 1
Transmission oil drain bolt	1	8	16 (1.6, 12)	NOTE 1
Transmission oil check bolt	1	6	10 (1.0, 7)	
Crankshaft hole cap	1	30	15 (1.5, 11)	NOTE 7
Decompressor adjuster lock nut ('05 - '07)	1	5	10 (1.0, 7)	NOTE 1
Spark plug	1	14	22 (2.2, 16)	

### LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil jet mounting bolt	1	6	10 (1.0, 7)	NOTE 2



## GENERAL INFORMATION

### 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)	
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, 0.2)	
Carburetor top cover bolt	2	4	2.1 (0.2, 1.5)	
Throttle shaft screw	1	4	2.1 (0.2, 1.5)	NOTE 2
Throttle shaft torx screw	1	4	2.1 (0.2, 1.5)	NOTE 2
Float chamber screw	4	4	2.1 (0.2, 1.5)	
Accelerator pump cover screw	3	4	2.1 (0.2, 1.5)	
Carburetor drain plug	1	18	4.9 (0.5, 3.6)	
Carburetor drain screw	1	6	1.5 (0.2, 1.1)	
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)	
Needle holder	1	8	2.1 (0.2, 1.5)	
Throttle position sensor torx screw	1	5	3.4 (0.3, 2.5)	
Throttle position sensor bolt	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)	

### ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Drive sprocket bolt	1	8	31 (3.2, 23)	

### CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	3	6	10 (1.0, 7)	
Camshaft holder mounting bolt	4	6	14 (1.4, 10)	NOTE 1
Decompressor lifter arm mounting nut	1	8	22 (2.2, 16)	NOTE 1
Decompressor cam mounting bolt	1	8	24 (2.4, 18)	NOTE 1
Cylinder head nut	4	10	66 (6.7, 49)	NOTE 1
Cam sprocket bolt	2	7	20 (2.0, 15)	NOTE 2

### CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cam chain tensioner lifter mounting bolt	2	6	12 (1.2, 9)	
Cylinder stud bolt	4	-	-	See page 1-17

### CLUTCH/STARTER 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)	NOTE 2
Gearshift drum stopper arm bolt	1	6	12 (1.2, 9)	
Clutch center lock nut	1	18	80 (8.2, 59)	NOTE 1
Clutch spring bolt	6	6	12 (1.2, 9)	
Gearshift return spring pin	1	8	22 (2.2, 16)	
Gearshift pedal pinch bolt	1	6	12 (1.2, 9)	
Kickstarter pedal bolt	1	8	38 (3.9, 28)	
Primary drive gear bolt	1	12	108 (11.0, 80)	NOTE 1
Starter gear holder mounting bolt	3	7	18 (1.8, 13)	NOTE 1

## GENERAL INFORMATION

### ALTERNATOR

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel nut	1	12	64 (6.5, 47)	NOTE 1
Ignition pulse generator mounting bolt	2	5	5.2 (0.5, 3.8)	NOTE 2
Stator mounting bolt	3	5	4.7 (0.5, 3.5)	NOTE 2

### 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	10 (1.0, 7)	NOTE 10
	(After '07)	6	20 (2.0, 15)	NOTE 10
Countershaft bearing set plate screw	2	6	10 (1.0, 7)	NOTE 2
Gearshift drum bearing set plate bolt	2	6	10 (1.0, 7)	NOTE 2
Mainshaft bearing set plate bolt	2	6	10 (1.0, 7)	NOTE 2
Balancer shaft bearing set plate bolt	2	6	10 (1.0, 7)	NOTE 2
Balancer shaft nut	1	14	44 (4.5, 32)	NOTE 1
Cam chain tensioner bolt	1	6	12 (1.2, 9)	NOTE 2

### IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Timing hole cap	1	14	10 (1.0, 7)	NOTE 7

### ELECTRIC STARTER

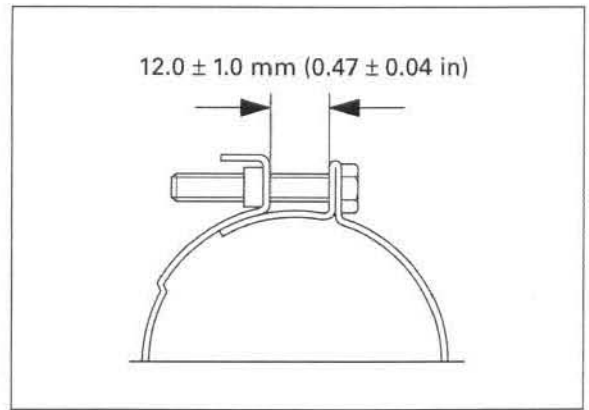
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor case bolt	2	4	3.4 (0.3, 2.5)	

## GENERAL INFORMATION

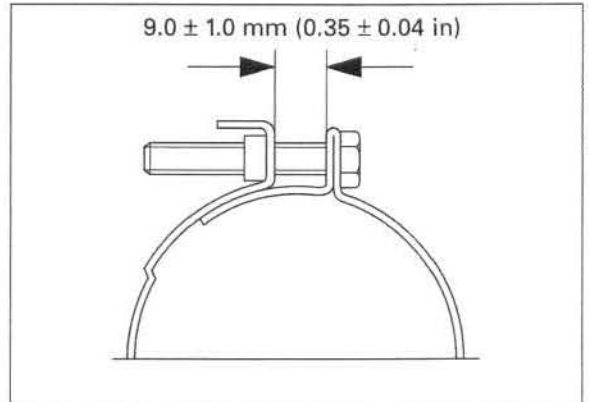
### Insulator band:

'05 - '07: Cylinder head and carburetor side.

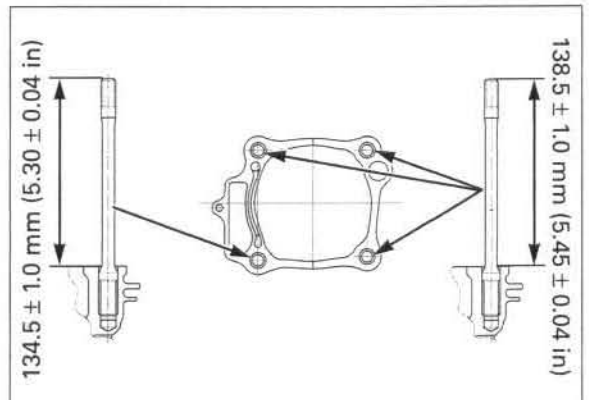
After '07: Carburetor side.



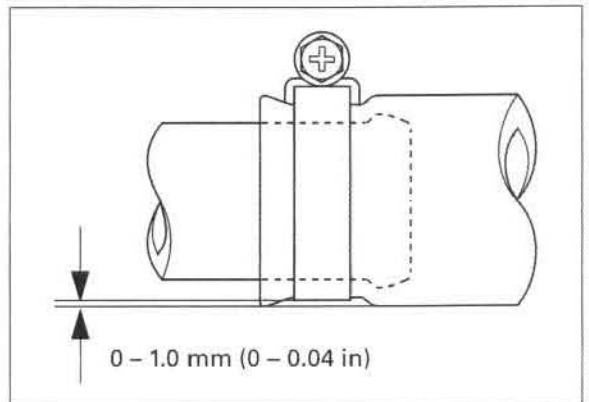
### Cylinder head side insulator band (After '07):



### Cylinder stud bolt:



### Water hose clamp:



## 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 upper mounting bolt ('05 - '07)	2	8	30 (3.1, 22)	
Sub-frame lower mounting bolt ('05 - '07)	2	10	49 (5.0, 36)	
Sub-frame upper/lower mounting bolt (After '07)	4	10	49 (5.0, 36)	
Seat bracket screw	1	5	4 (0.4, 3.0)	
Tank band hook screw	1	5	4 (0.4, 3.0)	
Muffler joint band bolt	1	8	21 (2.1, 15)	
Muffler mounting bolt	2	8	26 (2.7, 19)	
Exhaust pipe joint nut	2	8	21 (2.1, 15)	
Heat shield bolt	2	6	12 (1.2, 9)	
Exhaust pipe protector bolt	2	6	12 (1.2, 9)	
Diffuser mounting torx screw ('05 - '07)	1	5	11 (1.1, 8)	
Radiator shroud upper mounting bolt	4	5	5 (0.5, 3.7)	
Rear fender mounting bolt	4	6	13 (1.3, 10)	

### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Sidestand pivot bolt	1	10	See page 4-34	NOTE 6
Sidestand pivot nut	1	10	39 (4.0, 29)	NOTE 4
Throttle cable adjuster lock nut (throttle side)	1	7	4 (0.4, 3.0)	
(carburetor side)	1	6	4 (0.4, 3.0)	
Spark arrester mounting bolt ('05 - '07)	4	6	12 (1.2, 9)	
(After '07)	4	6	6 (0.6, 4.4)	NOTE 9

### FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Throttle bolt (carburetor side)	1	6	4 (0.4, 3.0)	
PAIR control valve mounting nut	2	6	13 (1.3, 10)	

### ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine hanger plate bolt	4	8	26 (2.7, 19)	
Engine mounting nut (front)	1	10	54 (5.5, 40)	
(upper)	1	10	54 (5.5, 40)	
(lower)	1	10	54 (5.5, 40)	

## GENERAL INFORMATION

### FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Front axle nut	1	16	88 (9.0, 65)	
Front axle holder bolt	4	8	20 (2.0, 15)	
Front spoke	36	BC3.5	3.68 (0.4, 2.7)	
Front rim lock	1	8	12 (1.2, 9)	
Front brake disc nut	6	6	16 (1.6, 12)	NOTE 4
Steering stem nut	1	26	108 (11.0, 80)	
Steering stem adjusting nut	1	30	See page 14-51	
Fork top bridge pinch bolt	4	8	22 (2.2, 16)	
Fork bottom bridge pinch bolt	4	8	20 (2.0, 15)	
Fork cap	2	39	30 (3.1, 22)	
Fork center bolt	2	22	69 (7.0, 51)	
Fork center bolt lock nut	2	12	22 (2.2, 16)	
Pressure release screw	2	5	1.2 (0.1, 0.9)	
Fork damper	2	50	34 (3.5, 25)	
Fork protector mounting bolt	6	6	7 (0.7, 5.2)	NOTE 2
Front brake disc cover bolt	2	6	13 (1.3, 10)	
Handlebar upper holder bolt	4	8	22 (2.2, 16)	
Handlebar lower holder nut	2	10	44 (4.5, 32)	NOTE 4
Clutch lever pivot bolt	1	6	See page 14-52	NOTE 6
Clutch lever pivot nut	1	6	10 (1.0, 7)	NOTE 4
Engine stop button screw	1	4	1.5 (0.2, 1.1)	
Engine starter switch housing screw	2	4	1.15 (0.1, 0.8)	
Throttle bolt (throttle side)	1	6	4 (0.4, 3.0)	
Tripmeter cable clamp screw	2	4	0.7 (0.1, 0.5)	
Steering damper mounting bolt (After '07)	2	7	20 (2.0, 15)	NOTE 2

### REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Rear axle nut	1	22	128 (13.1, 94)	NOTE 4
Rear spoke	32	4.5	3.7 (0.4, 2.7)	
Rear rim lock	1	8	12 (1.2, 9)	
Rear brake disc nut	6	6	16 (1.6, 12)	NOTE 4
Driven sprocket nut	6	8	32 (3.3, 24)	NOTE 4
Rear wheel bearing retainer	1	50	44 (4.5, 32)	
Swingarm pivot nut	1	14	88 (9.0, 65)	NOTE 4
Shock arm nut (swingarm side)	1	12	53 (5.4, 39)	NOTE 1, 4
(shock link side)	1	12	53 (5.4, 39)	NOTE 1, 4
Shock link nut (frame side)	1	12	53 (5.4, 39)	NOTE 1, 4
Shock absorber upper mounting nut	1	10	44 (4.5, 32)	NOTE 4
Shock absorber lower mounting nut	1	10	44 (4.5, 32)	NOTE 4
Shock absorber spring lock nut	1	60	44 (4.5, 32)	
Drive chain slider screw	3	5	4.2 (0.4, 3.1)	NOTE 2
Drive chain roller bolt	1	8	12 (1.2, 9)	
Drive chain roller nut	1	6	12 (1.2, 9)	NOTE 4
Drive chain guide mounting bolt/nut	2	6	12 (1.2, 9)	NOTE 4
Drive chain adjuster lock nut	2	8	27 (2.8, 20)	NOTE 8
Shock absorber damper rod end nut	1	12	37 (3.8, 27)	NOTE 3
Shock absorber compression damping adjuster	1	27	29 (3.0, 21)	NOTE 3
Left step bracket mounting (upper)	1	12	55 (5.6, 41)	
bolt (lower)	1	8	30 (3.1, 22)	

## GENERAL INFORMATION

### HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake hose oil bolt	4	10	34 (3.5, 25)	
Brake lever adjuster lock nut	1	5	5.9 (0.6, 4.4)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Front brake hose guide bolt	2	6	5.2 (0.5, 3.8)	
Rear brake hose guide screw	6	5	1.2 (0.1, 0.9)	
Front master cylinder reservoir cover screw	2	4	1.0 (0.1, 0.7)	
Front master cylinder holder bolt	2	6	9.9 (1.0, 7.3)	
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	NOTE 2
Front/rear caliper bleed valve	2	8	5.4 (0.6, 4.0)	
Rear master cylinder mounting bolt	2	6	13 (1.3, 10)	
Rear master cylinder reservoir cover bolt	2	4	1.0 (0.1, 0.7)	
Front caliper pin bolt	1	8	22 (2.2, 16)	NOTE 2
Rear caliper pin bolt	1	12	27 (2.8, 20)	
Brake caliper pad pin	2	10	18 (1.8, 13)	
Front brake caliper pad pin plug	1	10	2 (0.2, 1.5)	
Front caliper bracket pin bolt	1	8	22 (2.2, 16)	NOTE 2
Rear caliper bracket pin bolt	1	8	12 (1.2, 9)	NOTE 2
Brake pedal pivot bolt	1	10	36 (3.7, 27)	NOTE 7
Brake pedal adjuster lock nut	1	6	5.9 (0.6, 4.4)	

### LIGHTS/METER/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Headlight mounting screw	2	5	0.7 (0.1, 0.5)	
Tail light mounting screw	2	5	4.2 (0.4, 3.1)	
Tail light wire clamp screw	2	4	0.7 (0.1, 0.5)	

### OTHERS

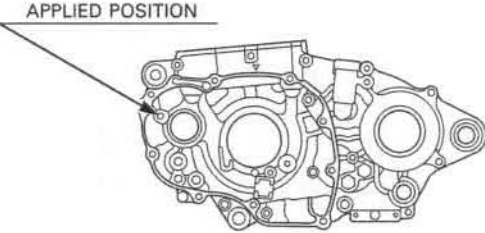
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Right step bracket mounting (upper)	1	12	55 (5.6, 41)	
bolt (lower)	1	8	30 (3.1, 22)	

## LUBRICATION &amp; SEAL POINTS

## ENGINE

LOCATION	MATERIAL	REMARKS
Decompressor shaft 20.9 mm and 14 mm O.D. areas (After '07) Decompressor plunger sliding area (After '07) Camshaft journal and lobes Rocker arm bore and valve slipper surfaces Valve stem (valve guide sliding surface) Valve stem end sliding surface Valve lifter outer surface Clutch outer guide inner surface Clutch outer needle bearing rolling area Clutch lifter lever cam area Kickstarter pinion gear inner surface Kickstarter spindle spline area and gear rolling area Starter gear holder gear rolling surface Connecting rod big end sliding area Connecting rod small end inner surface Transmission gear spline area, rolling area and sliding surface Shift fork gear guide area and guide pin area Shift fork sliding surface Shift fork shaft outer surface Each gear sliding surface	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 100g : 70 cc)	
Mainshaft spline area and sliding surface Countershaft spline area and sliding surface	Use molybdenum oil solution (mixture of the engine oil and molybdenum paste with the ratio 1 : 1)	
Camshaft holder mounting bolt threads Cylinder head nut threads and seating surface Balancer shaft nut threads Piston outer surface and piston pin hole Piston pin outer surface Piston rings Cylinder bore Decompressor cam mounting bolt threads ('05 - '07) Decompressor lifter arm mounting nut threads and seating surface ('05 - '07) Decompressor adjuster lock nut threads ('05 - '07) Clutch lifter and lifter rod sliding area Clutch lifter piece needle bearing Clutch disc linings and plates Clutch center lock nut threads and seating surface Clutch outer sliding surfaces Engine oil drain bolt threads and seating surface Plug hole seal circumference Primary drive gear bolt threads One-way clutch outer surface Starter clutch outer sliding surface Starter driven gear sliding surface Starter gear holder mounting bolt threads Flywheel nut threads and seating surface Transmission gear teeth Transmission oil drain bolt threads and seating surface Shift drum guide grooves Gearshift spindle serration area Oil pump rotors sliding area Kickstarter spindle journal (15 mm O.D.) Crankshaft oil seal outer surface Each bearing Each O-ring	Engine oil	

## GENERAL INFORMATION

LOCATION	MATERIAL	REMARKS
Crankshaft hole cap threads Timing hole cap threads Countershaft collar O-ring Armature shaft end Each oil seal lips Dust seal lips Oil filter spring contact area Mechanical seal lips	Multi-purpose grease	
Gearshift drum center pin bolt threads Stator mounting bolt threads  Ignition pulse generator mounting bolt threads  Cam sprocket bolt threads  Balancer shaft bearing set plate bolt threads  Mainshaft bearing set plate bolt threads Gearshift drum bearing set plate bolt threads Countershaft bearing set plate screw threads  Cam chain tensioner bolt threads  Throttle shaft screw threads ('05, '06) Throttle shaft torx screw threads (After '06) Oil jet mounting bolt threads  Crankcase tightening bolt threads	Locking agent	Coating width: $4.5 \pm 1.0$ mm ( $0.18 \pm 0.04$ in) from tip Coating width: $4.5 \pm 1.0$ mm ( $0.18 \pm 0.04$ in) from tip Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip  Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip  Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip
		
Crankshaft bearing set plate torx screw threads	Locking agent (Pro Honda Hondalock 3 or equivalent high strength locking agent)	Coating width: $6.5 \pm 1.0$ mm ( $0.26 \pm 0.04$ in) from tip
Alternator wire grommet sealing surface	Liquid sealant	



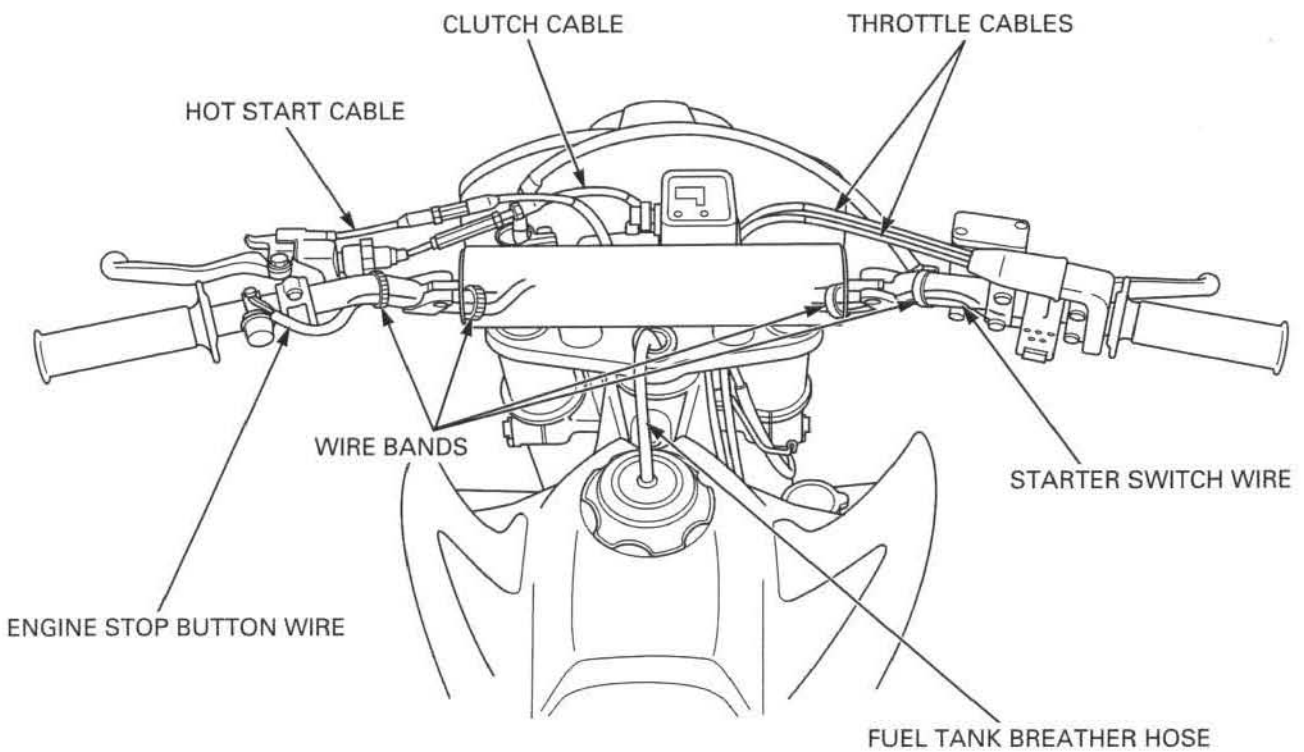
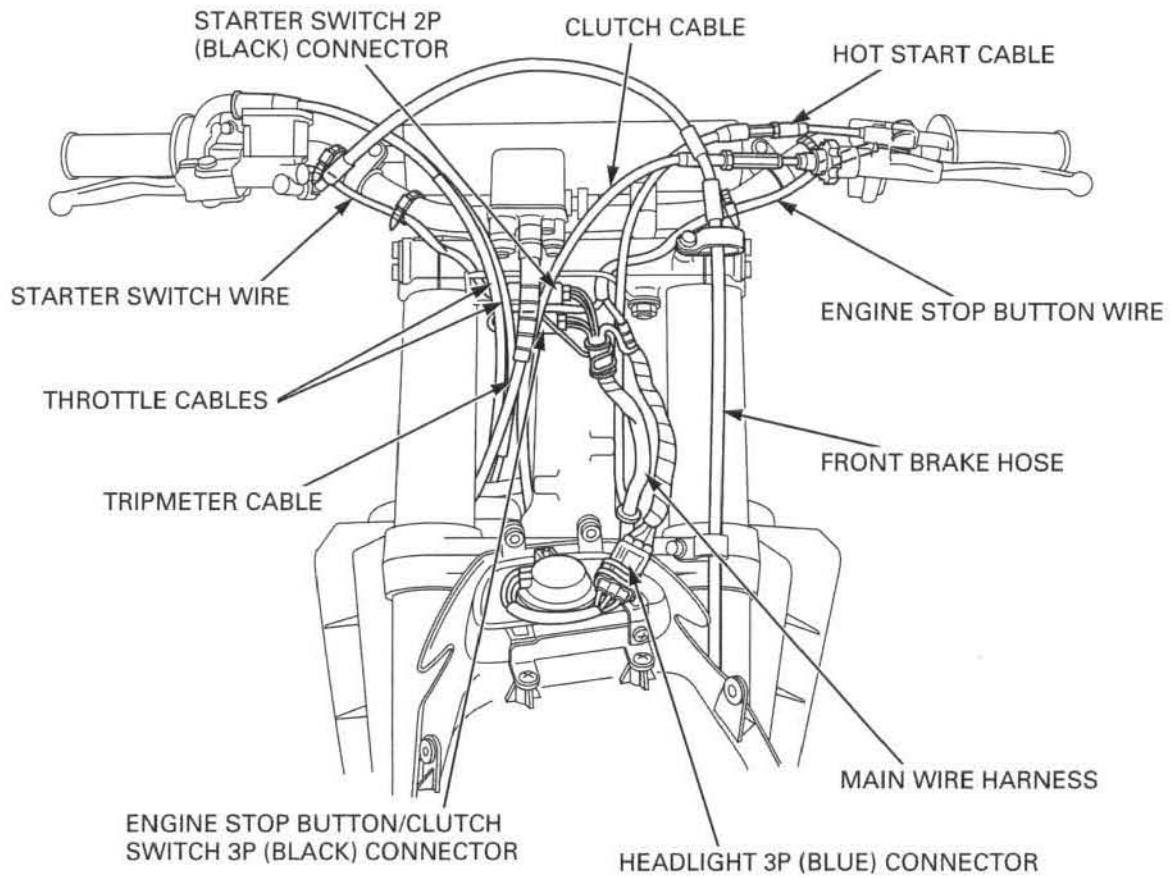
## FRAME

LOCATION	MATERIAL	REMARKS
Steering head bearing rolling area and dust seal lips	Urea based multi-purpose grease with extreme pressure (example: Kyodo Yushi EXCELITE EP2, Shell stamina EP2 or equivalent)	Apply 3 – 5 g for each bearing
Wheel bearing dust seal lips Wheel bearing rolling area Kickstarter arm joint Swingarm pivot bolt sliding surface Swingarm pivot needle bearing rolling area Swingarm pivot thrust bearing rolling area Swingarm pivot dust seal lips Shock arm needle bearing rolling area Shock arm dust seal lips Shock linkage side collars Shock linkage needle bearing sliding area Rear shock absorber spherical bearing rolling area Rear shock absorber dust seal lips Brake pedal pivot bolt sliding surface Gearshift change pedal sliding area of pin Throttle cable end and sliding area Clutch cable end adjuster inside surface Clutch lever pivot bolt sliding surface Sidestand pivot bolt sliding surface Air cleaner element-to-air cleaner housing contacting area (After '07)	Multi-purpose grease	Apply 3.5 ± 2 g
Brake caliper pin bolt sliding area Brake caliper bracket pin bolt sliding area Brake caliper dust seal lips Brake caliper and bracket pin boots inside surface Brake lever pivot bolt sliding surface Brake lever adjuster tip Rear master cylinder push rod rounded surface Rear master cylinder boot fitting area	Silicone grease	
Drive chain slider screw threads Fork protector mounting bolt threads Front brake caliper mounting bolt threads Front caliper pin bolt threads Front caliper bracket pin bolt threads Rear caliper bracket pin bolt threads Steering damper mounting bolt threads (After '07)	Locking agent	
Brake caliper piston seal lips Brake caliper piston outer surface Master cylinder inner surface Master cylinder piston outer surface	DOT4 brake fluid	
Handlebar grip rubber inner surface Air cleaner housing connecting surface	Honda Bond A or Pro Honda Handgrip Cement (U.S.A. only)	
Fork cap O-rings Center bolt O-rings Fork bushing Fork oil seal Fork dust seal Steering damper plug bolt O-ring (After '07) Steering damper end cap O-ring (After '07) Steering damper free piston O-ring (After '07) Steering damper rod O-ring (After '07)	Pro Honda HP Fork Oil 5W	
Shock arm nut threads and flange surface Shock link nut threads and flange surface Throttle grip sliding area	Engine oil	

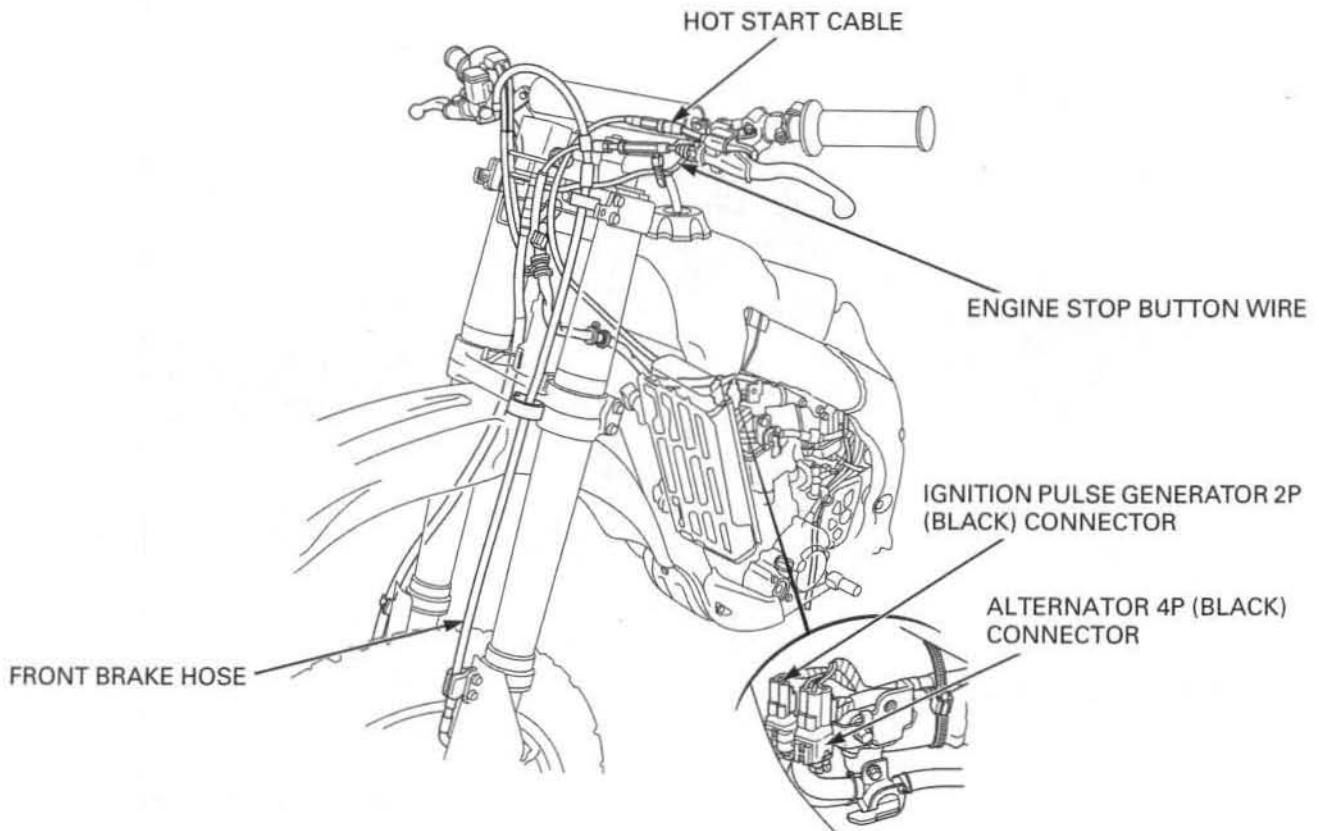
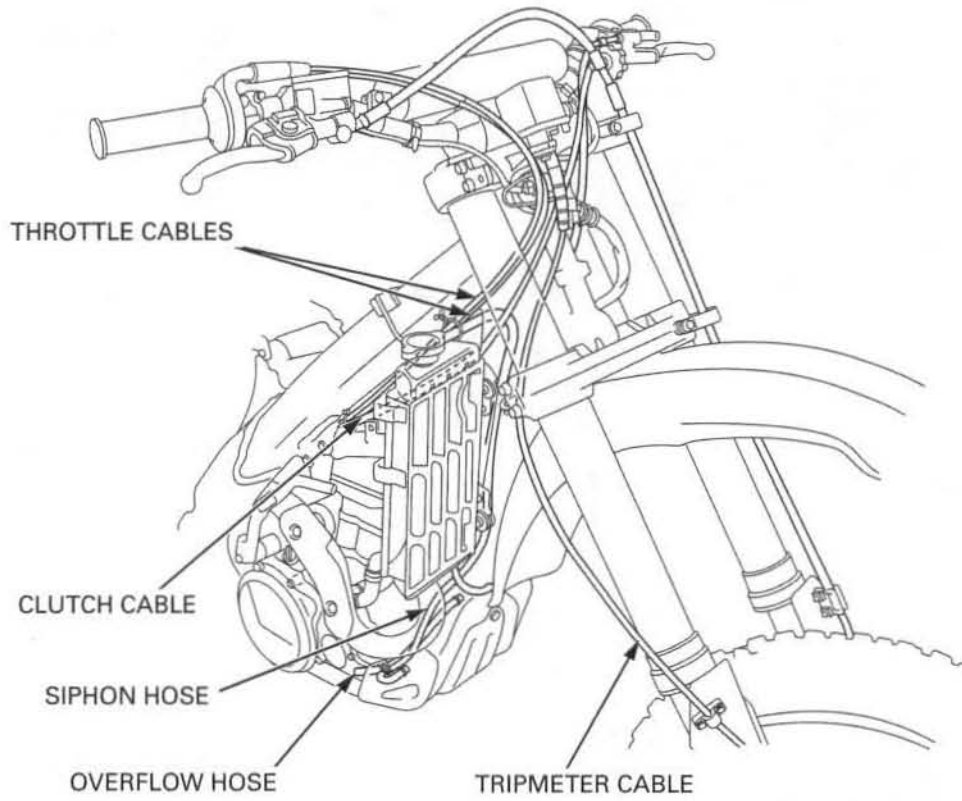
## GENERAL INFORMATION

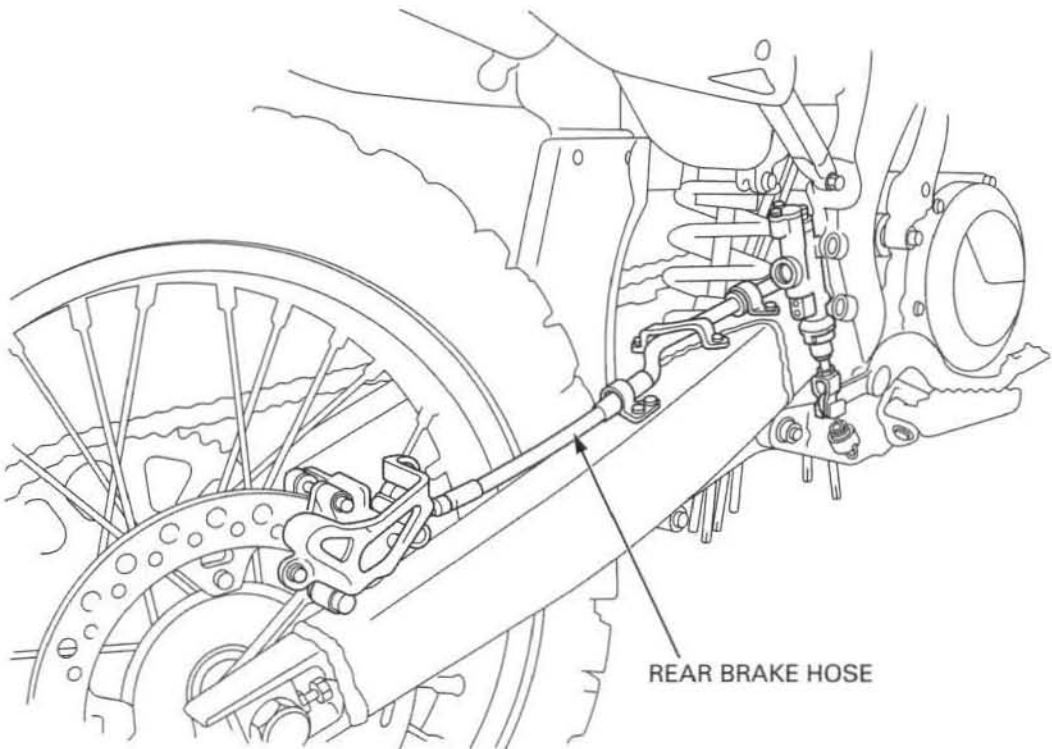
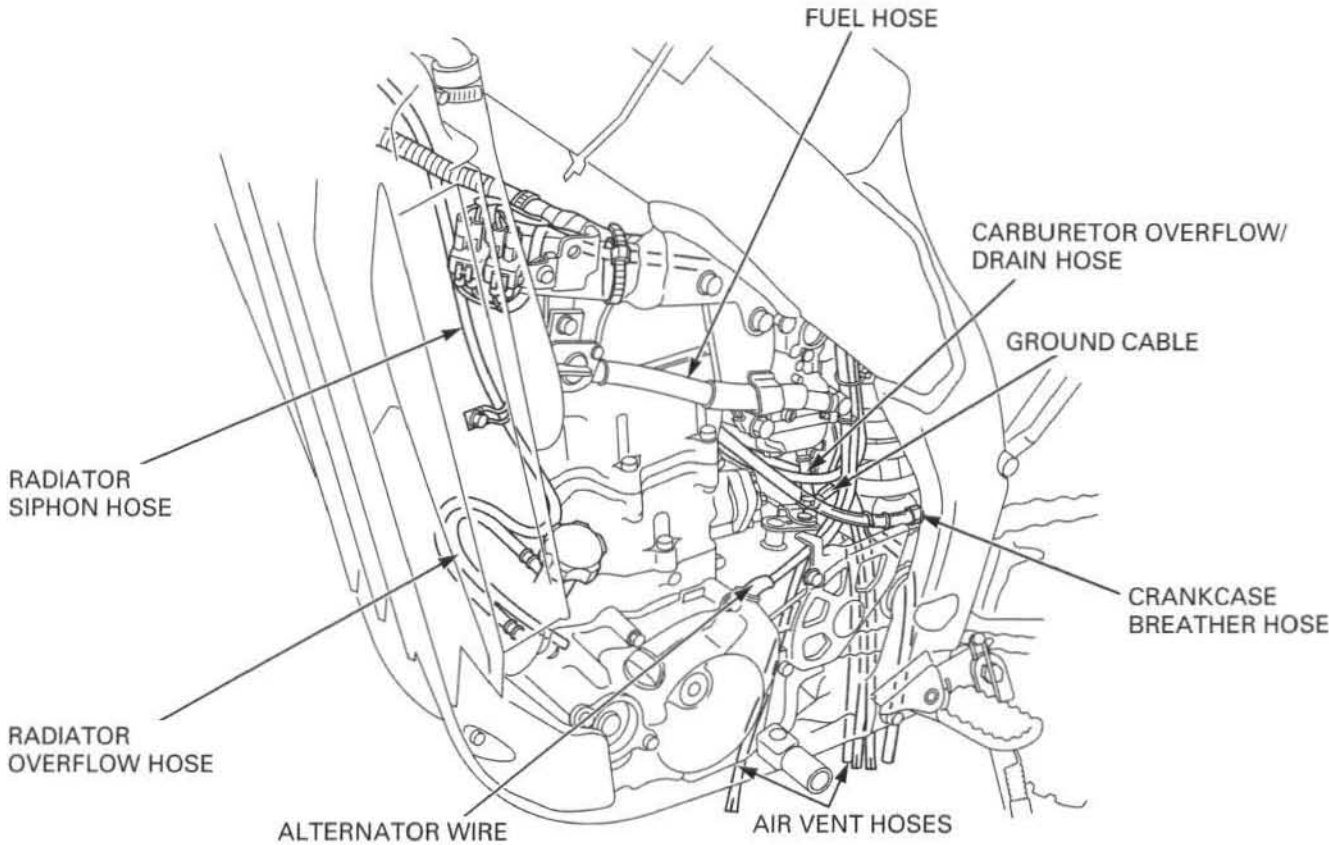
LOCATION	MATERIAL	REMARKS
Front engine hanger-to-engine contacting area	Molybdenum disulfide paste (Dow Corning® 321 or equivalent)	
Diffuser ('05 - '07)	Sealant	
Spark arrester mounting bolt threads (After '07)	Molybdenum disulfide grease (TB1901 or equivalent)	

CABLE & HARNESS ROUTING ('05 - '07)



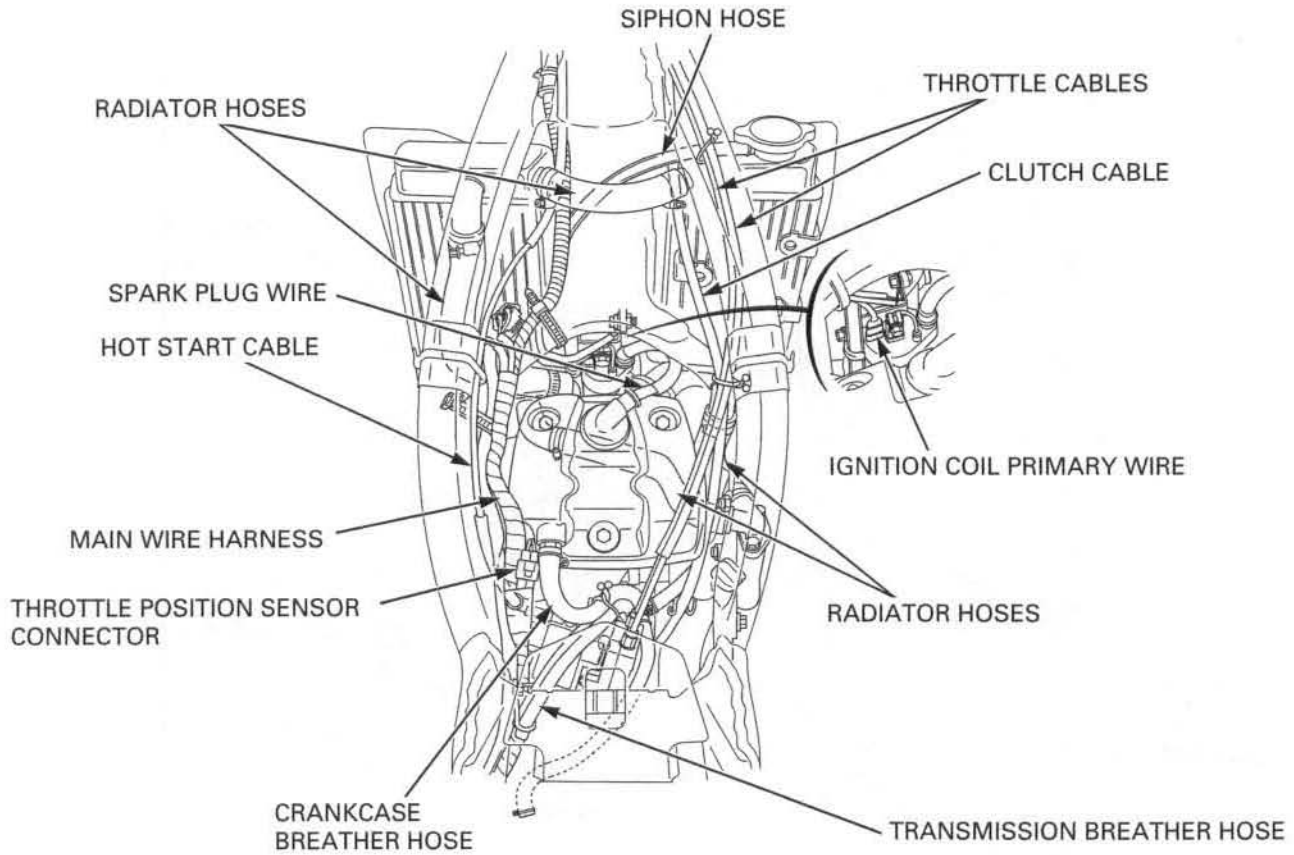
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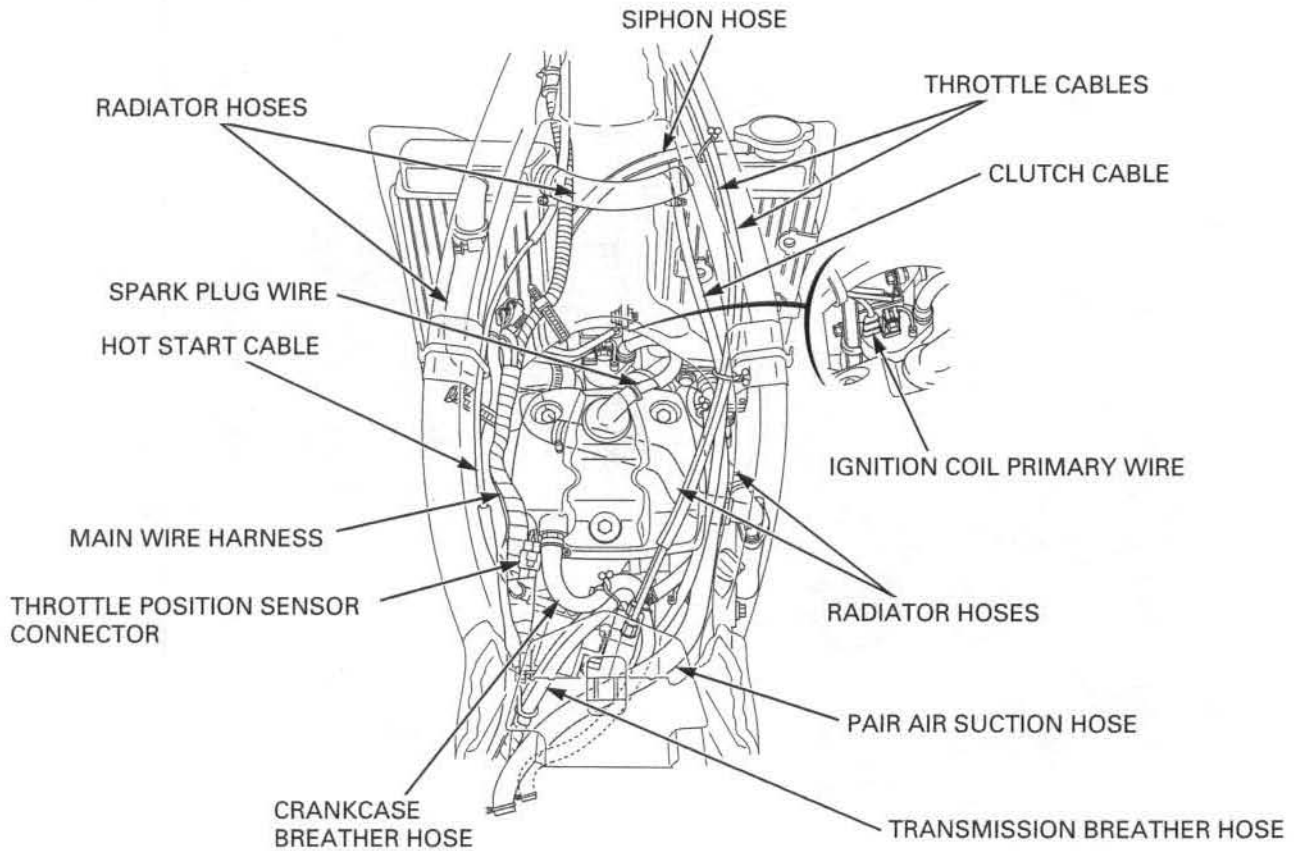


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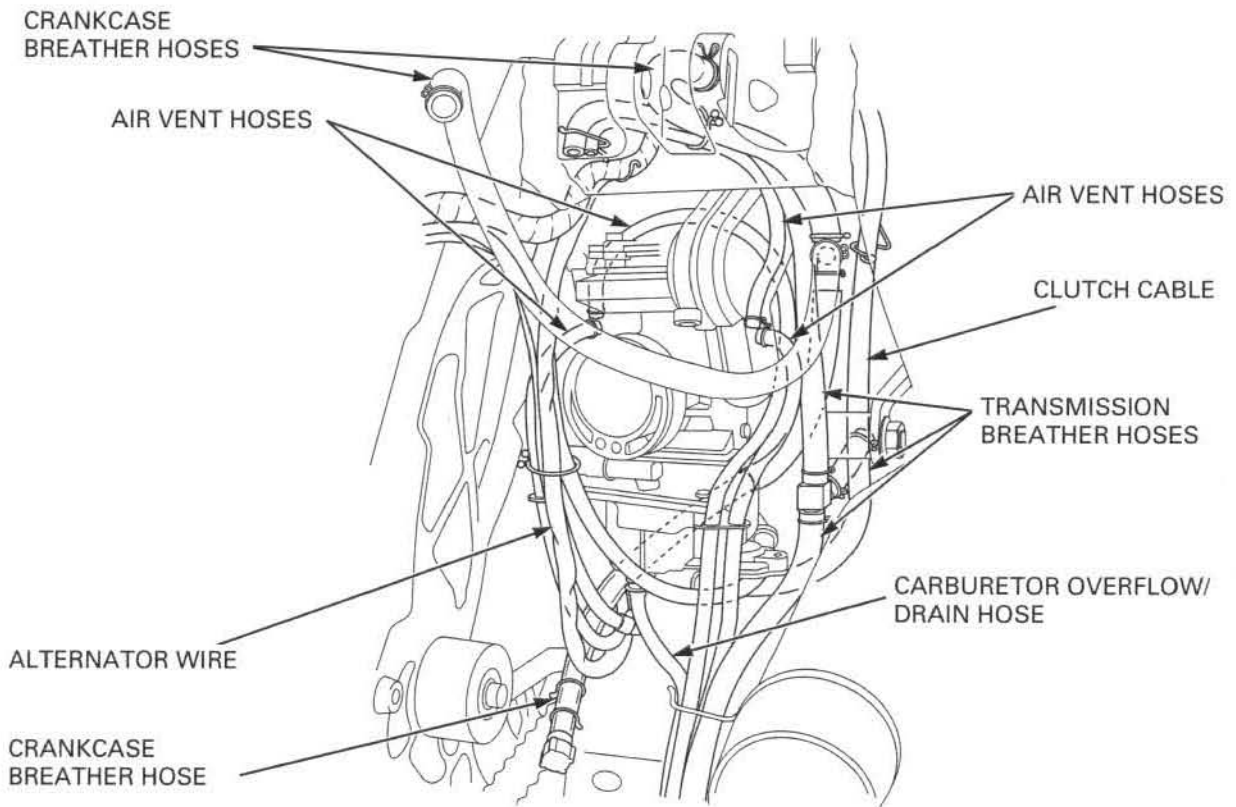
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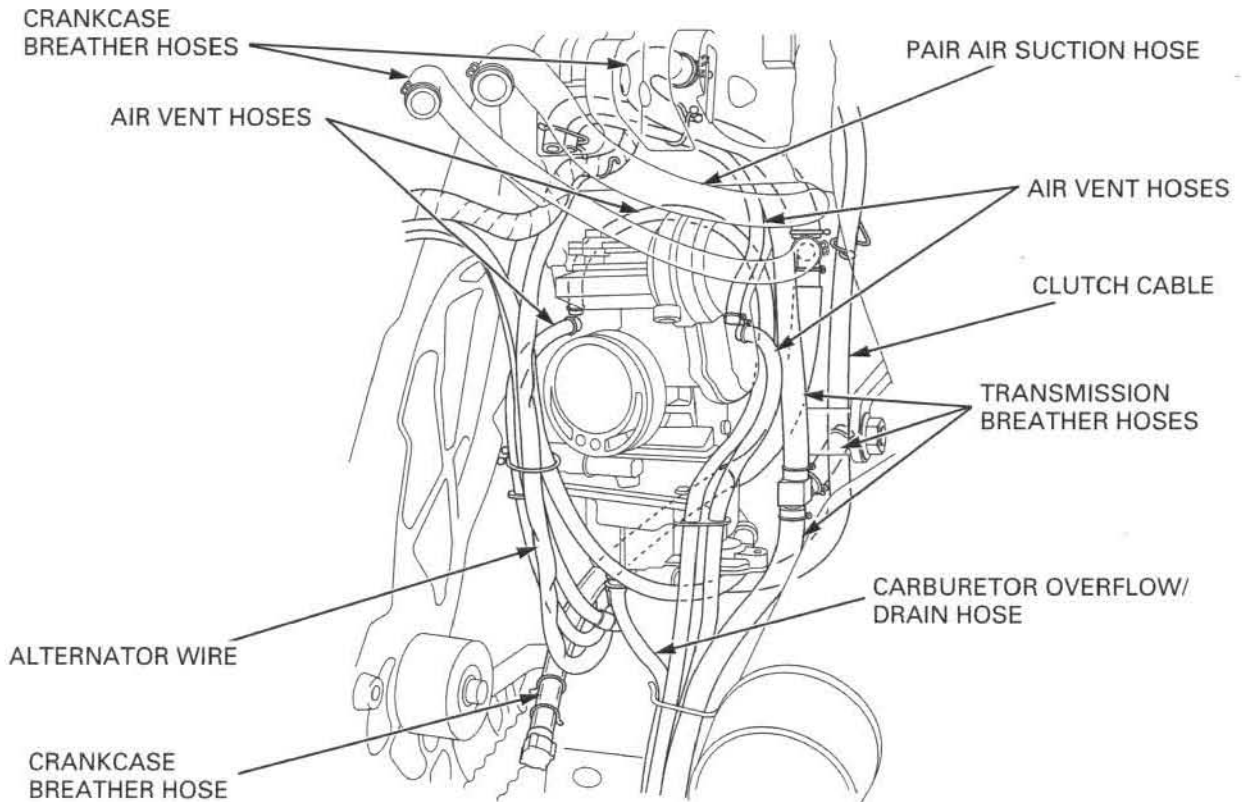
'05 and '06 California type, '07:



'05, '06:

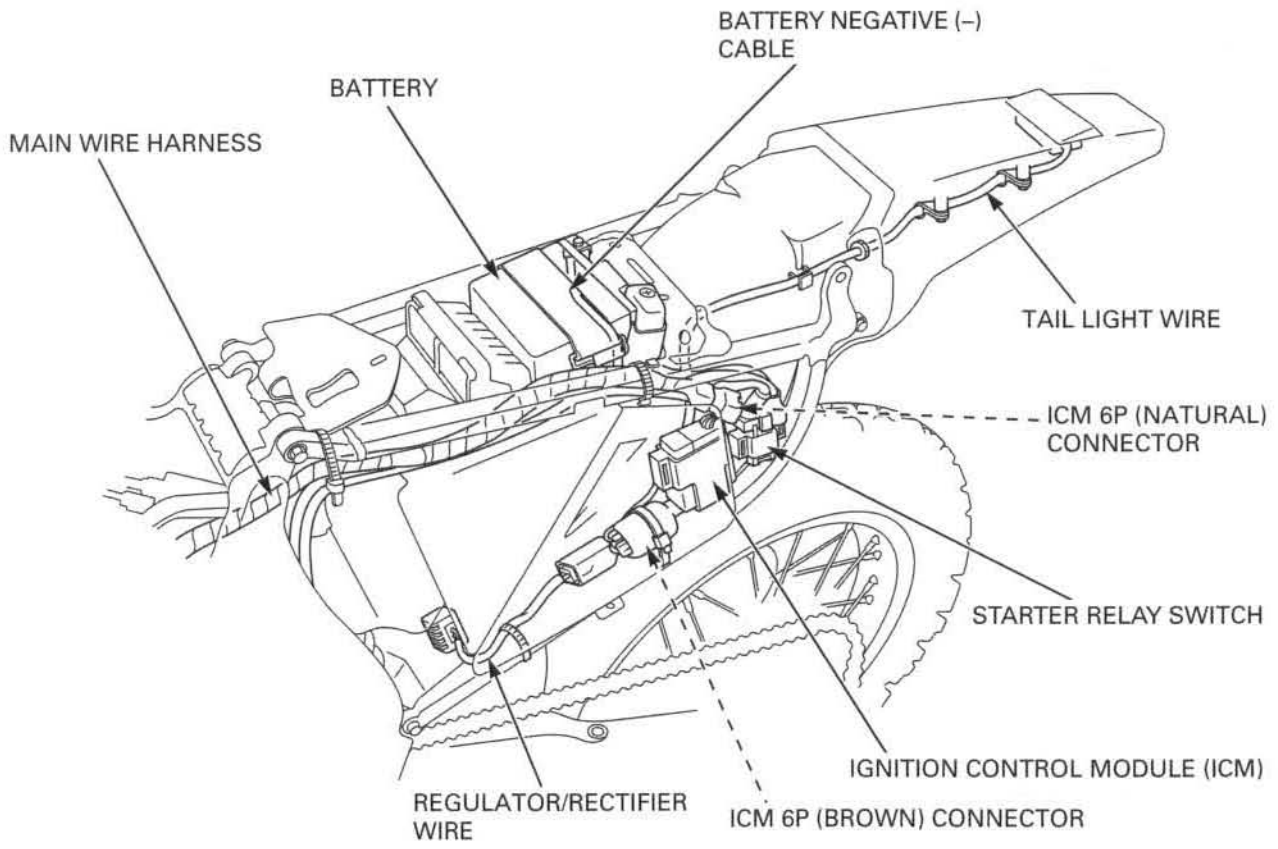


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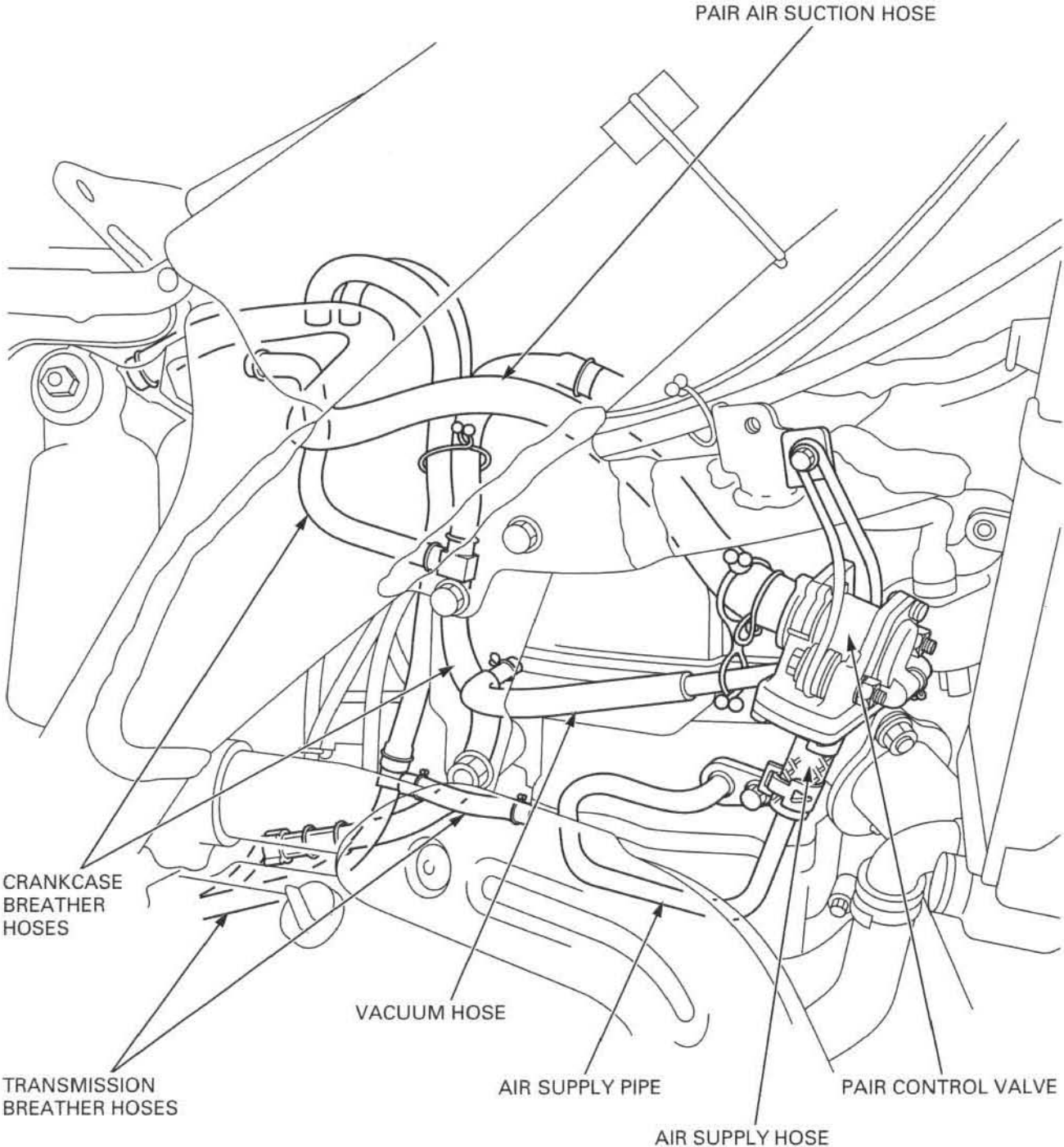
# GENERAL INFORMATION

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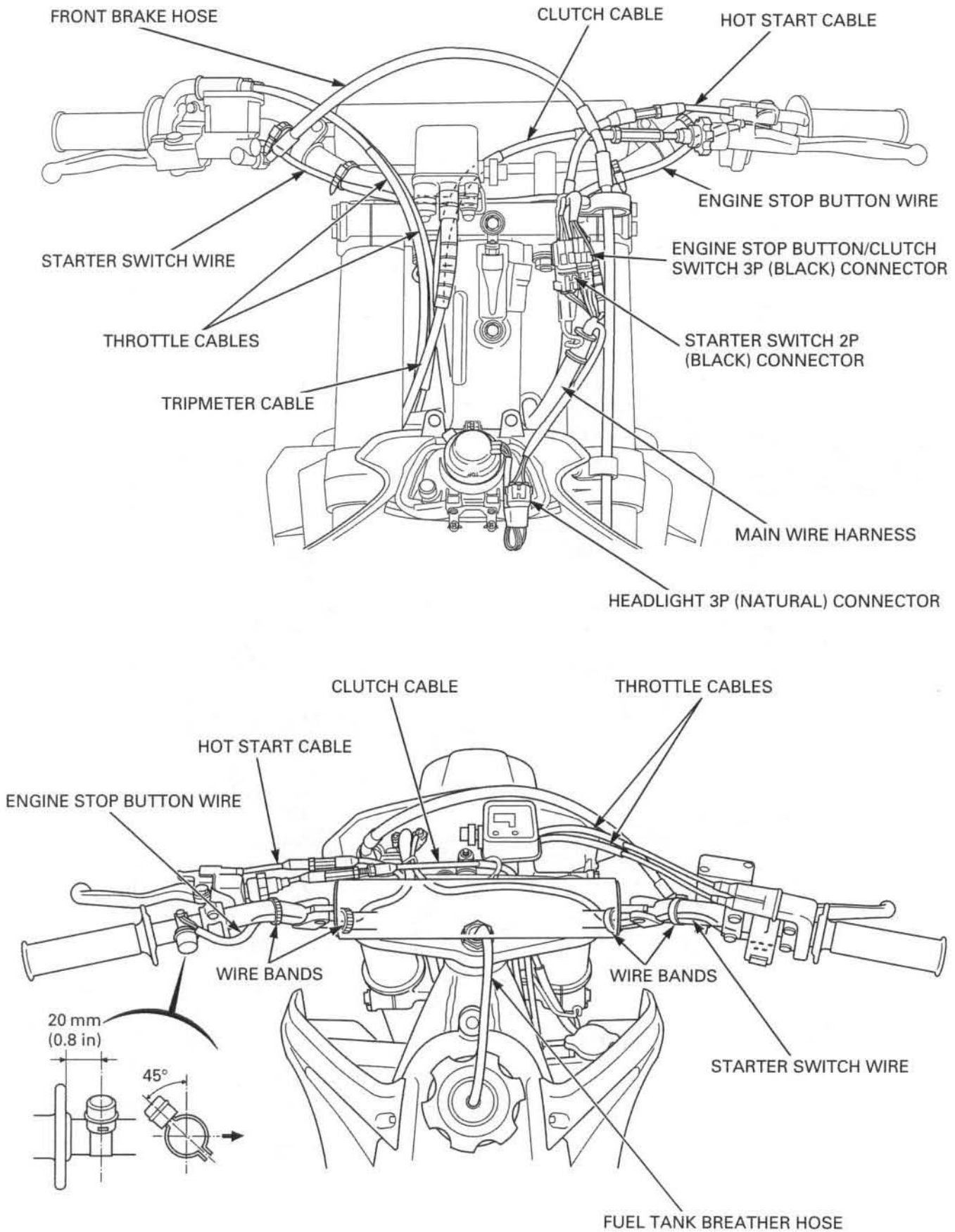


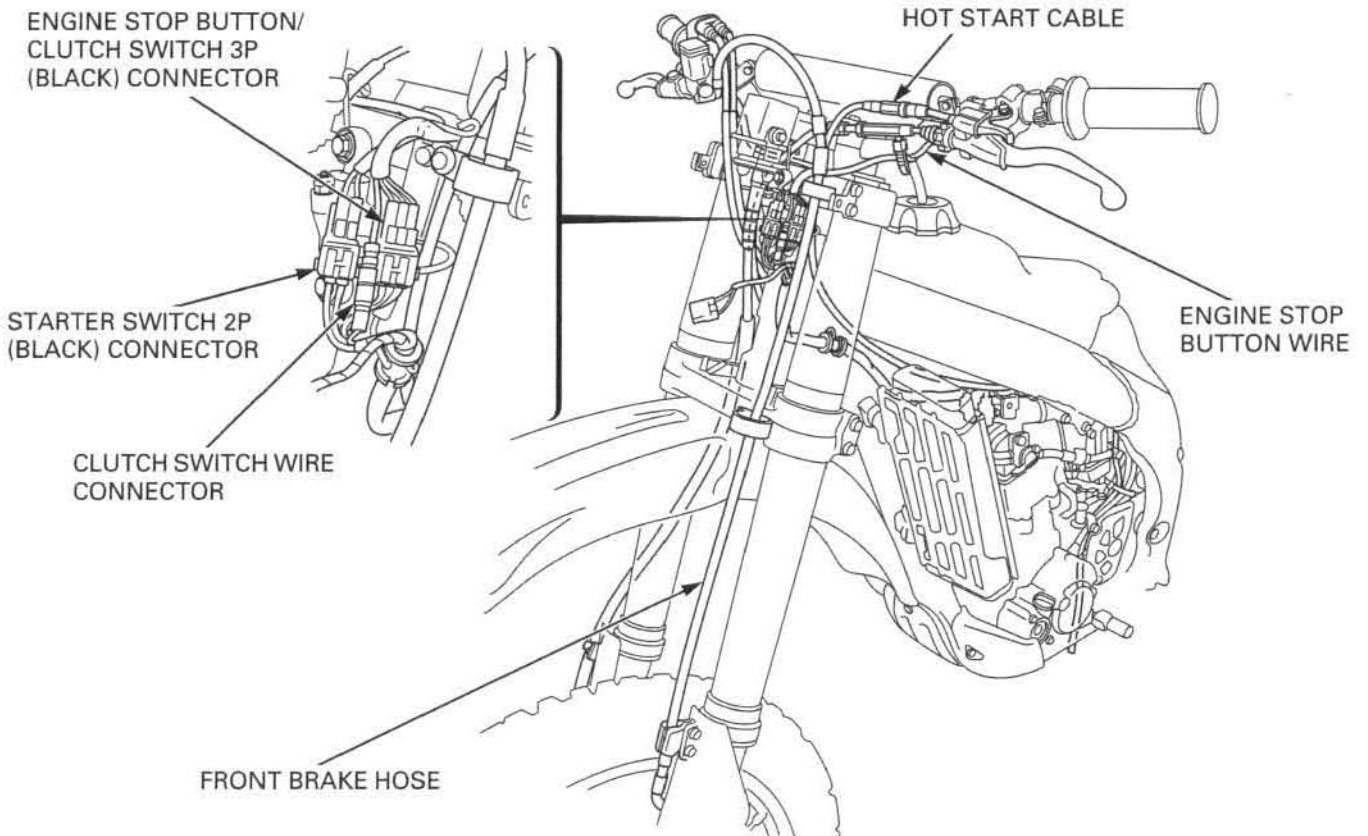
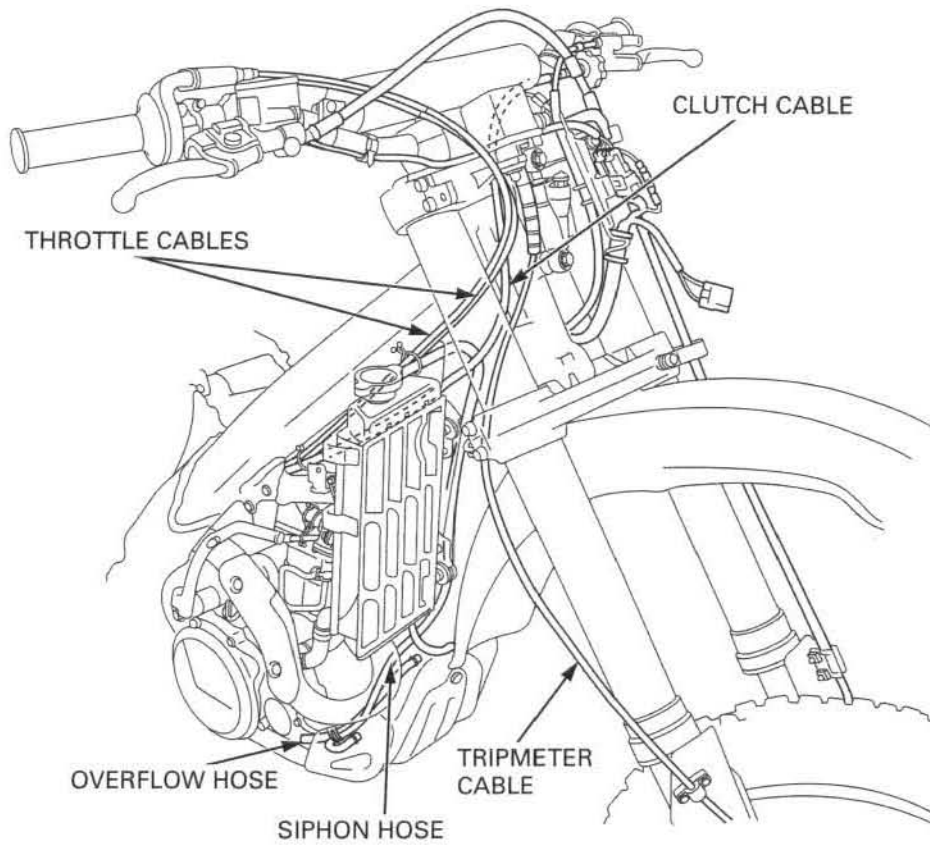
SECONDARY AIR SUPPLY SYSTEM ('05 and '06 California type, '07)



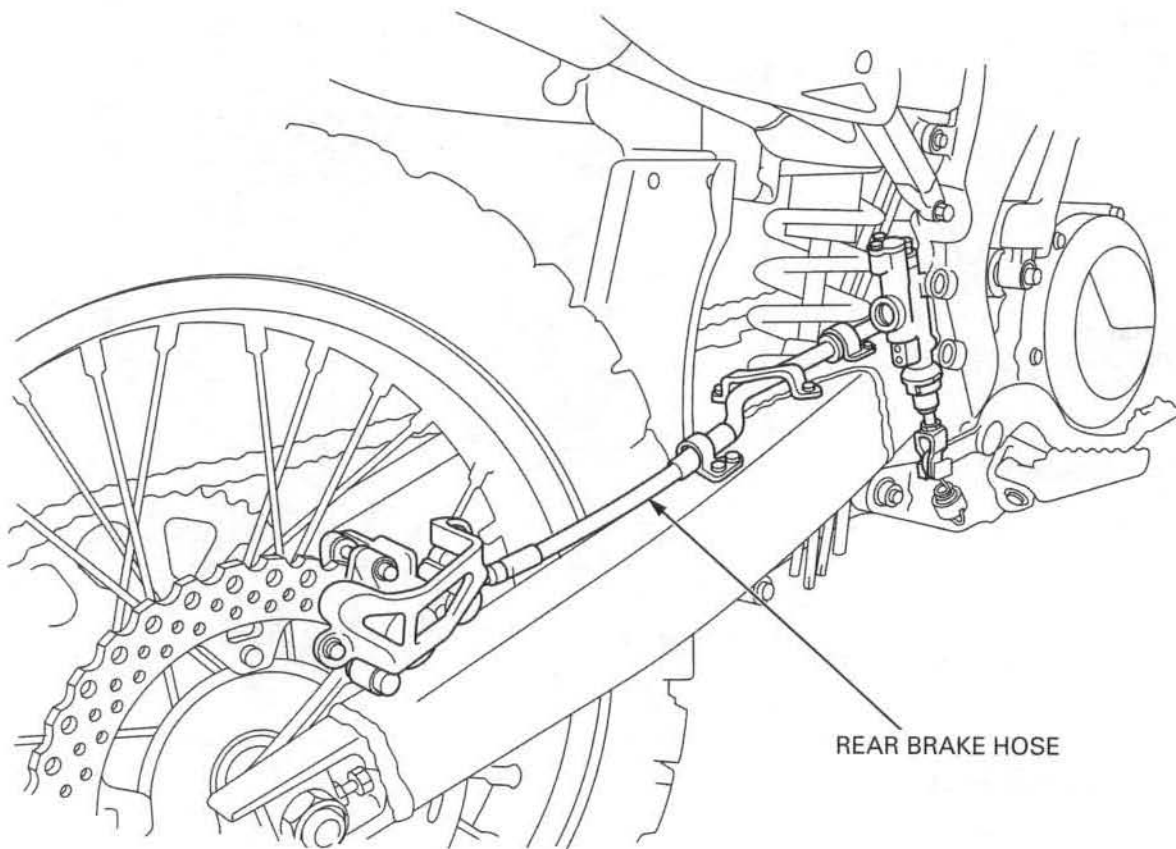
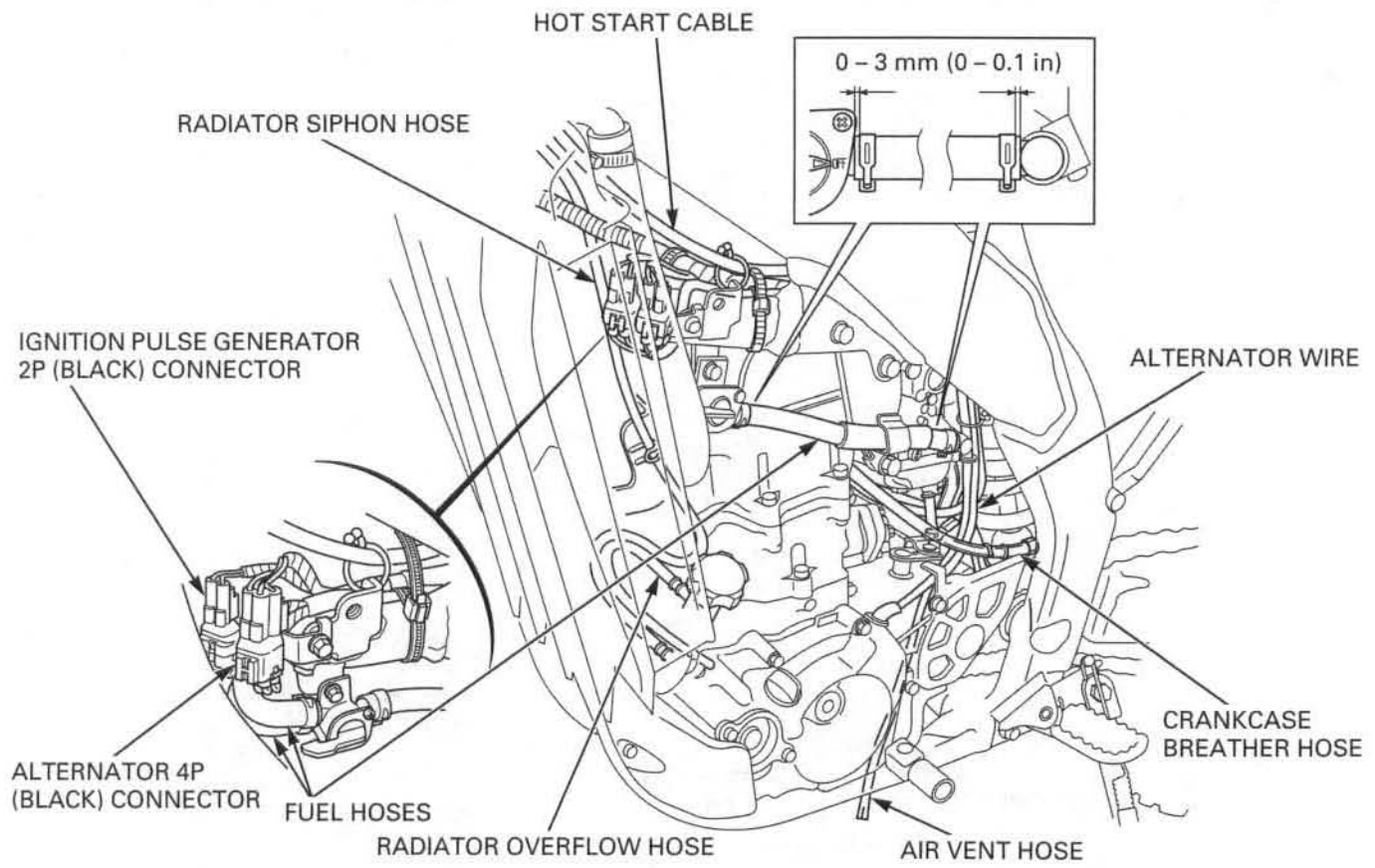
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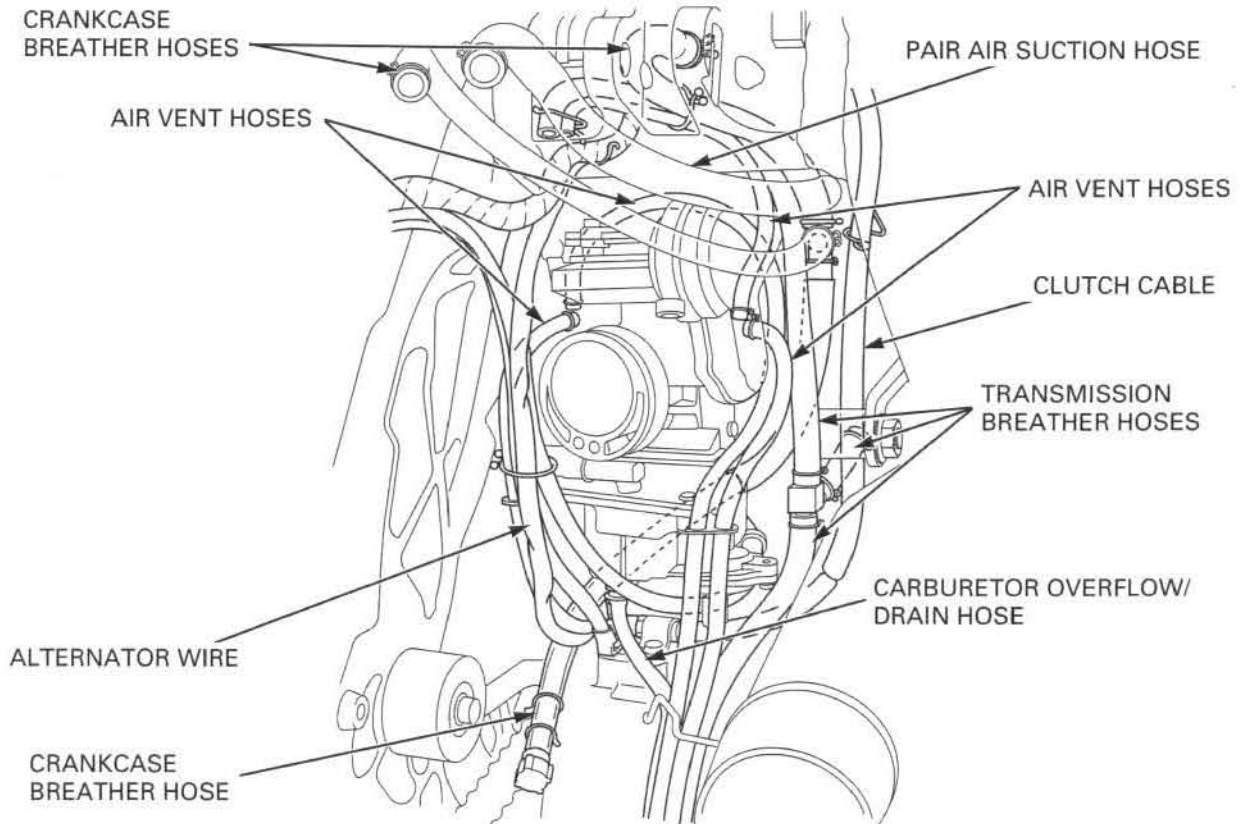
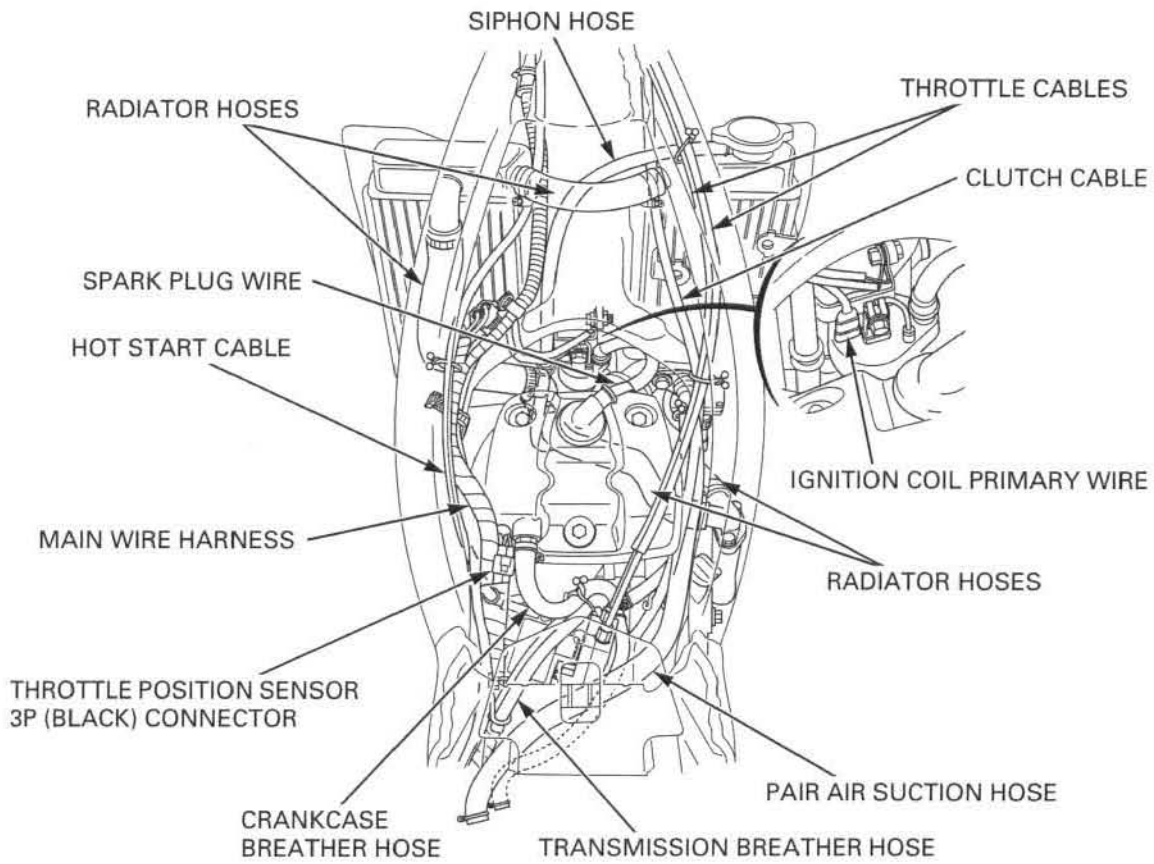
**CABLE & HARNESS ROUTING (After '07)**



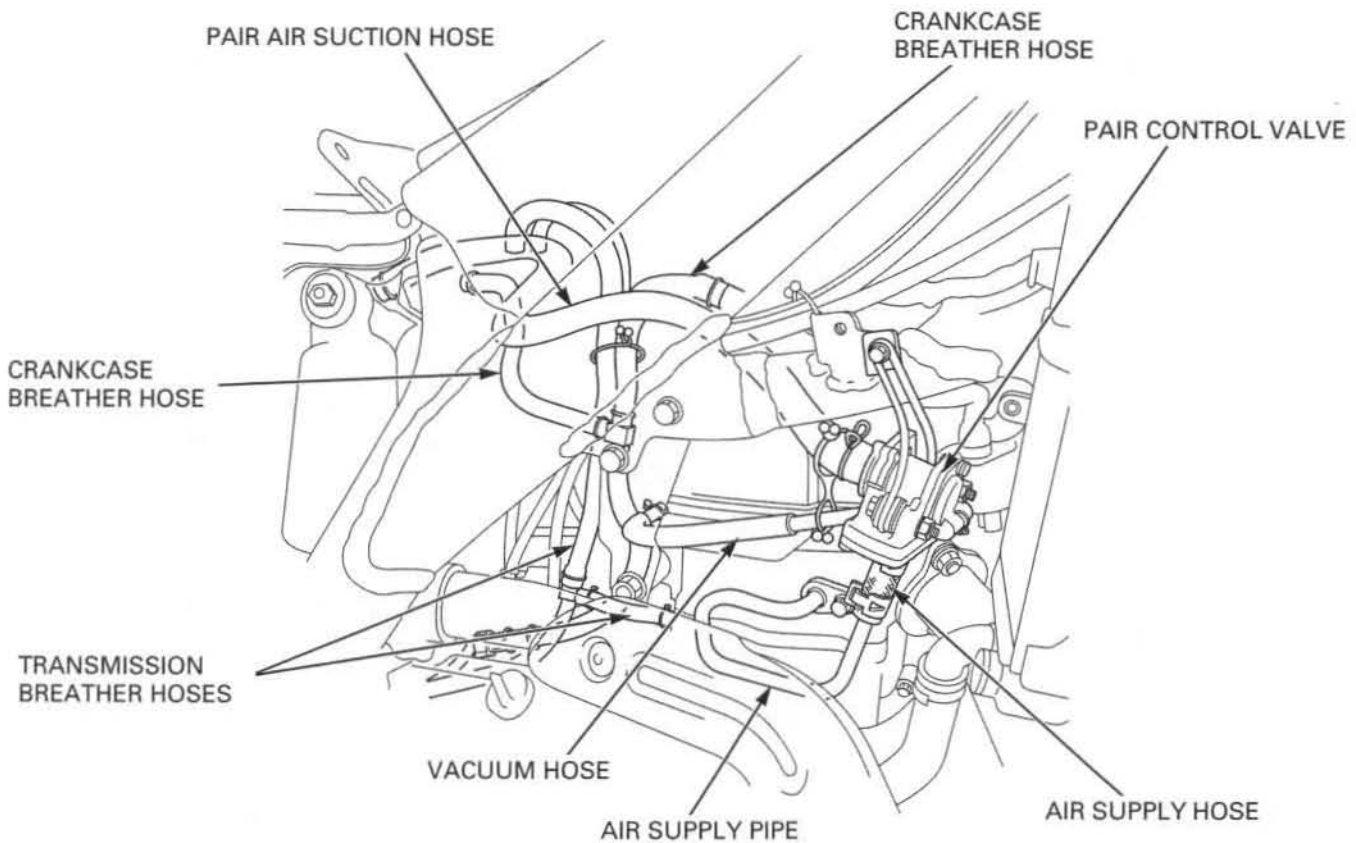
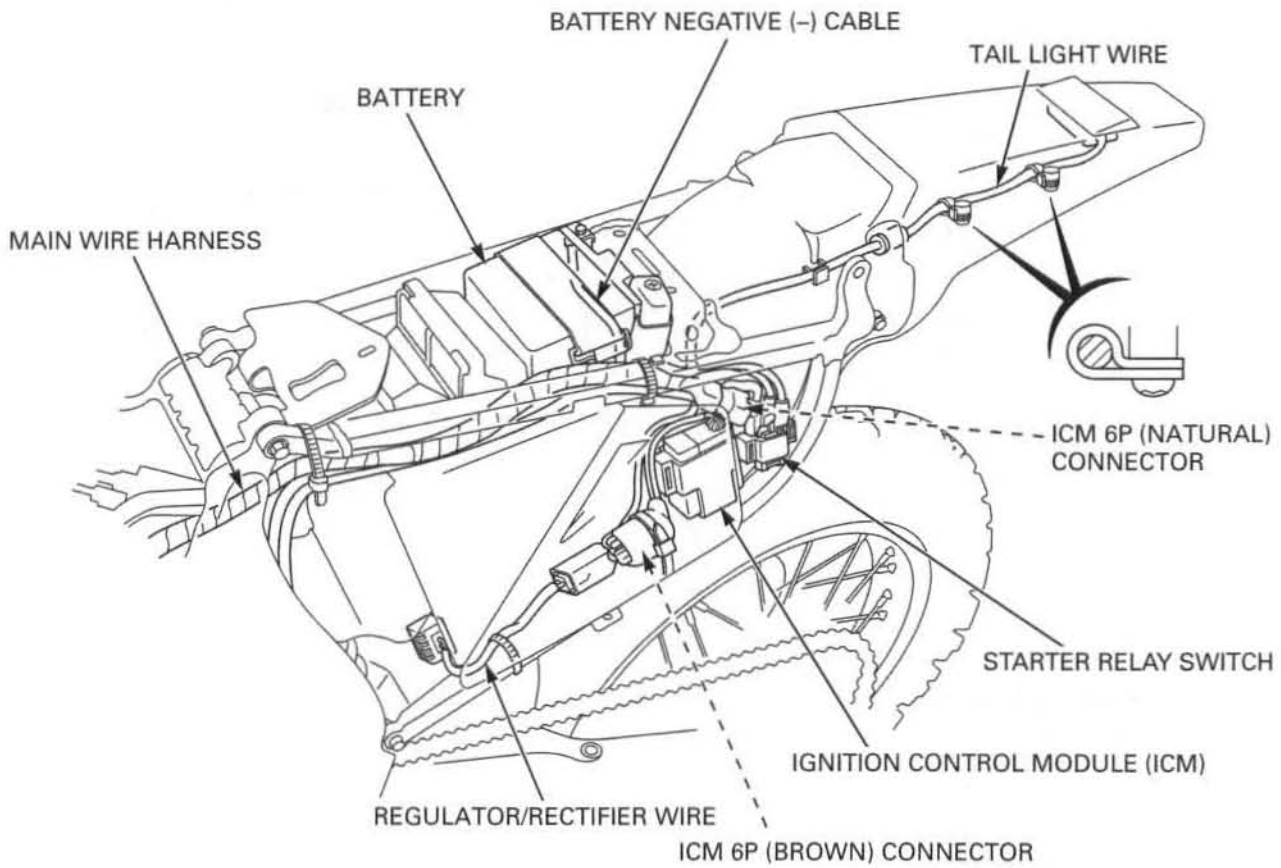


# GENERAL INFORMATION






# GENERAL INFORMATION

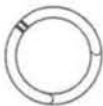




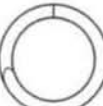

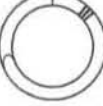


**OPTIONAL PARTS**

ITEM	REMARKS
<b>MAINTENANCE:</b> Work stand	For maintenance
	
Pin spanner	Pin spanner A x 2 For shock absorber spring installed length (preload) adjustment (two required)
Air gauge	
<b>DRIVE CHAIN &amp; SPROCKET:</b>	
Driven sprocket /chain link	Standard Optional
51T (Aluminum)/114	
50T (Aluminum)/114	
52T (Aluminum)/116	
<b>HANDLEBAR LOWER HOLDER:</b>	
Standard	3 mm offset
Optional	no offset






## GENERAL INFORMATION

ITEM		REMARKS	
<b>FORK ('05 - '07):</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>OIL CAPACITY</b>
Light 2 scribe marks 		0.45 kgf/mm (25.20 lbf/in)	Standard 338 cm <sup>3</sup> (11.4 US oz, 11.9 Imp oz) Maximum 407 cm <sup>3</sup> (13.8 US oz, 14.3 Imp oz) Minimum 311 cm <sup>3</sup> (10.5 US oz, 10.9 Imp oz)
Standard No mark (factory products) or 1 scribe mark (after market parts)  or 		0.47 kgf/mm (26.32 lbf/in)	Standard 332 cm <sup>3</sup> (11.2 US oz, 11.7 Imp oz) Maximum 402 cm <sup>3</sup> (13.6 US oz, 14.2 Imp oz) Minimum 306 cm <sup>3</sup> (10.3 US oz, 10.8 Imp oz)
Heavy 3 scribe marks 		0.49 kgf/mm (27.44 lbf/in)	Standard 335 cm <sup>3</sup> (11.3 US oz, 11.8 Imp oz) Maximum 405 cm <sup>3</sup> (13.7 US oz, 14.3 Imp oz) Minimum 309 cm <sup>3</sup> (10.5 US oz, 10.9 Imp oz)
<b>FORK (After '07):</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>OIL CAPACITY</b>
Light 2 scribe marks 		0.45 kgf/mm (25.20 lbf/in)	Standard 330 cm <sup>3</sup> (11.2 US oz, 11.6 Imp oz) Maximum 407 cm <sup>3</sup> (13.8 US oz, 14.3 Imp oz) Minimum 311 cm <sup>3</sup> (10.5 US oz, 10.9 Imp oz)
Standard No mark (factory products) or 1 scribe mark (after market parts)  or 		0.47 kgf/mm (26.32 lbf/in)	Standard 324 cm <sup>3</sup> (11.0 US oz, 11.4 Imp oz) Maximum 402 cm <sup>3</sup> (13.6 US oz, 14.2 Imp oz) Minimum 306 cm <sup>3</sup> (10.3 US oz, 10.8 Imp oz)
Heavy 3 scribe marks 		0.49 kgf/mm (27.44 lbf/in)	Standard 327 cm <sup>3</sup> (11.1 US oz, 11.5 Imp oz) Maximum 405 cm <sup>3</sup> (13.7 US oz, 14.3 Imp oz) Minimum 309 cm <sup>3</sup> (10.5 US oz, 10.9 Imp oz)

The standard fork 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.

## GENERAL INFORMATION

ITEM		REMARKS	
<b>SHOCK ABSORBER:</b>			
Spring	<b>TYPE</b>	<b>SPRING RATE</b>	<b>IDENTIFICATION MARK</b>
	Light 	5.30 kgf/mm (296.8 lbf/in)	Blue paint
	Standard 	5.50 kgf/mm (308.0 lbf/in)	No mark (factory products) or Red paint (after market parts)
Heavy 	5.70 kgf/mm (319.2 lbf/in) 5.90 kgf/mm (330.4 lbf/in)	Pink paint  Silver paint	

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

## GENERAL INFORMATION

# EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency (EPA), and the California Air Resources Board (CARB) require that off-road motorcycle comply with applicable exhaust emissions standards during its useful life, when operated and maintained according to the instructions provided.

## SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but is toxic.

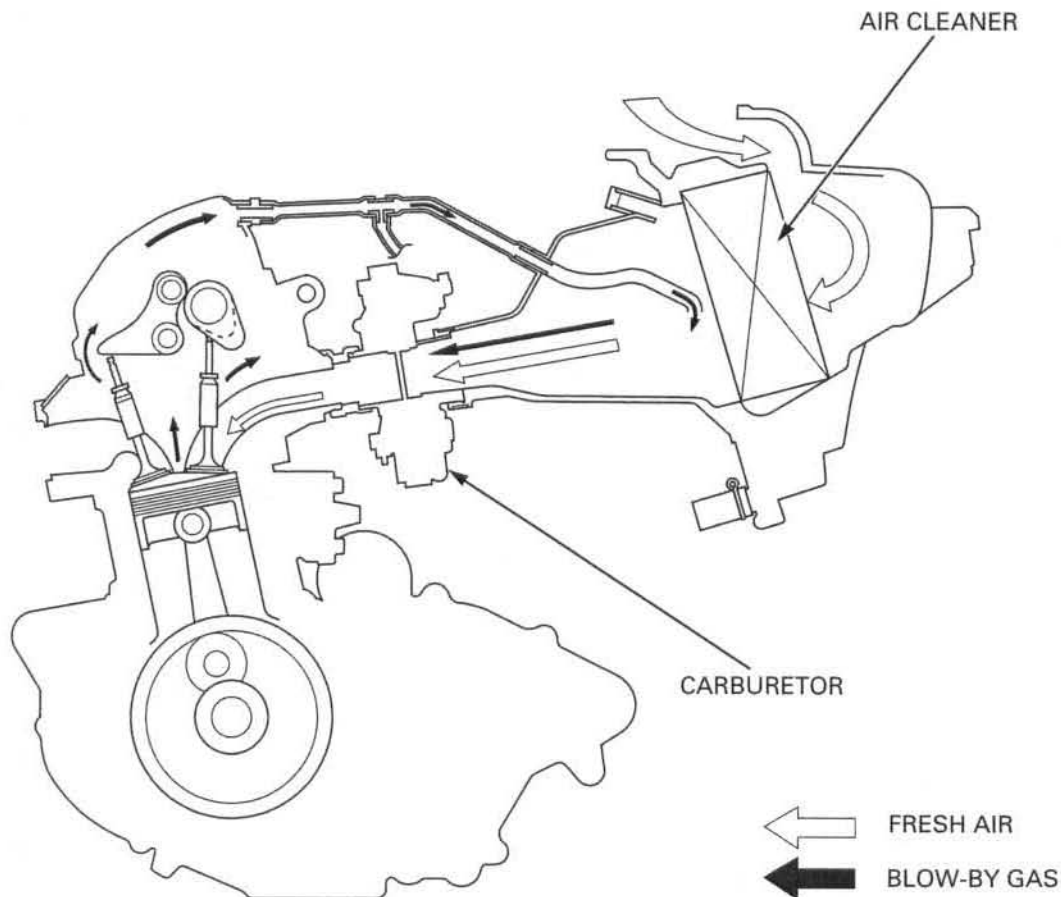
Honda Motor Co., Ltd. utilizes appropriate carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

## EXHAUST EMISSION CONTROL SYSTEM

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

## CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and carburetor.

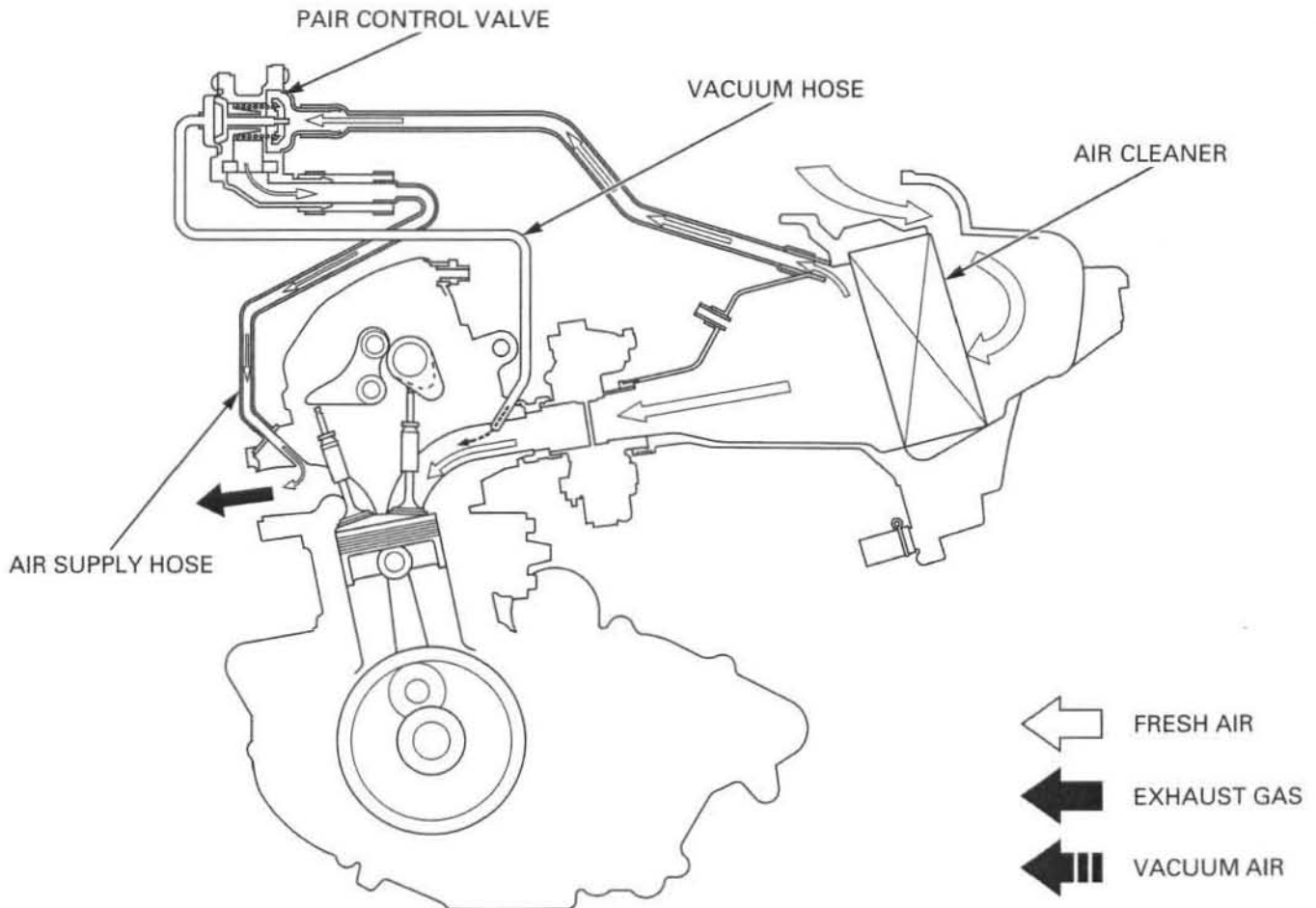


**EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM):  
'05 and '06 California type, After '06**

The exhaust emission control system includes a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port whenever there is a negative pressure pulse in the exhaust system. This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

This model has a pulse secondary air injection (PAIR) control valve. A PAIR check valve prevents reverse air flow through the system. The PAIR control valve reacts to high intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

No adjustment to the PAIR system should be made, although periodic inspection of the components is recommended.



**SERVICING THE HONDA**

U.S.A. Only

Maintenance, replacement or repair of the emission control devices and systems may be performed by any motorcycle repair establishment or individual using parts that are "certified" to EPA standards.

**PROHIBITED ACTIONS**

The following prohibitions apply to everyone with respect to the engine's emission control system.

You may not remove or disable any device or element of design that may affect an engine's emission levels. This restriction applies before and after the engine is placed in service.

Vehicles that are used only for competition are exempt from this prohibition.

## **GENERAL INFORMATION**

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### **NOISE EMISSION CONTROL SYSTEM**

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

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

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

### **FUEL PERMEATION EMISSION CONTROL SYSTEM (After '07)**

This motorcycle complies with the Fuel Permeation Emission Control regulations of the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and Environment Canada. The fuel tank, fuel hoses, and fuel vapor charge hoses used on this motorcycle incorporate fuel permeation control technologies. Tampering with the fuel tank, fuel hoses, or fuel vapor charge hoses to reduce or defeat the effectiveness of the fuel permeation technologies is prohibited by federal regulations.

### **REBUILT ENGINE**

When you rebuild your engine including a major overhaul in which you replace the engine's pistons or power assemblies or make other changes that significantly increase the service life of the engine, your Honda will continue to comply with all emissions regulations if you:

- Make sure you are technically qualified to rebuild the engine and have the proper tools
- Use only Genuine Honda parts or equivalents
- Make sure to maintain all specifications as described in this Service Manual

# 2. TECHNICAL FEATURE

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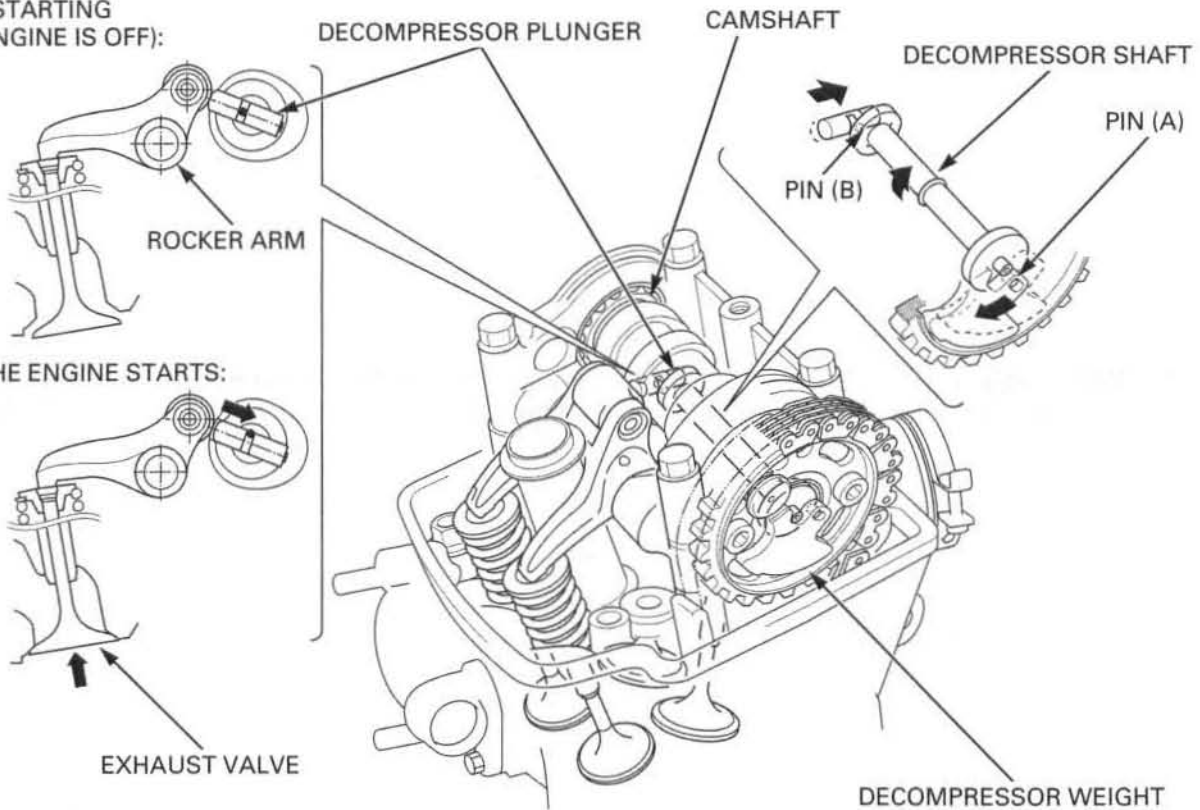
**AUTO-DECOMPRESSION SYSTEM**  
(After '07) ..... 2-2

**HPSD (Honda Progressive Steering Damper):**  
After '07 ..... 2-3

## TECHNICAL FEATURE

# AUTO-DECOMPRESSION SYSTEM (After '07)

DURING STARTING  
(WHEN ENGINE IS OFF):



### DURING STARTING (WHEN ENGINE IS OFF)

The decompressor plunger protrudes from the exhaust cam lobe, and depresses the exhaust valve via the rocker arm. The exhaust valve is slightly opened, and releases some cylinder compression for easy starting.

### AFTER THE ENGINE STARTS

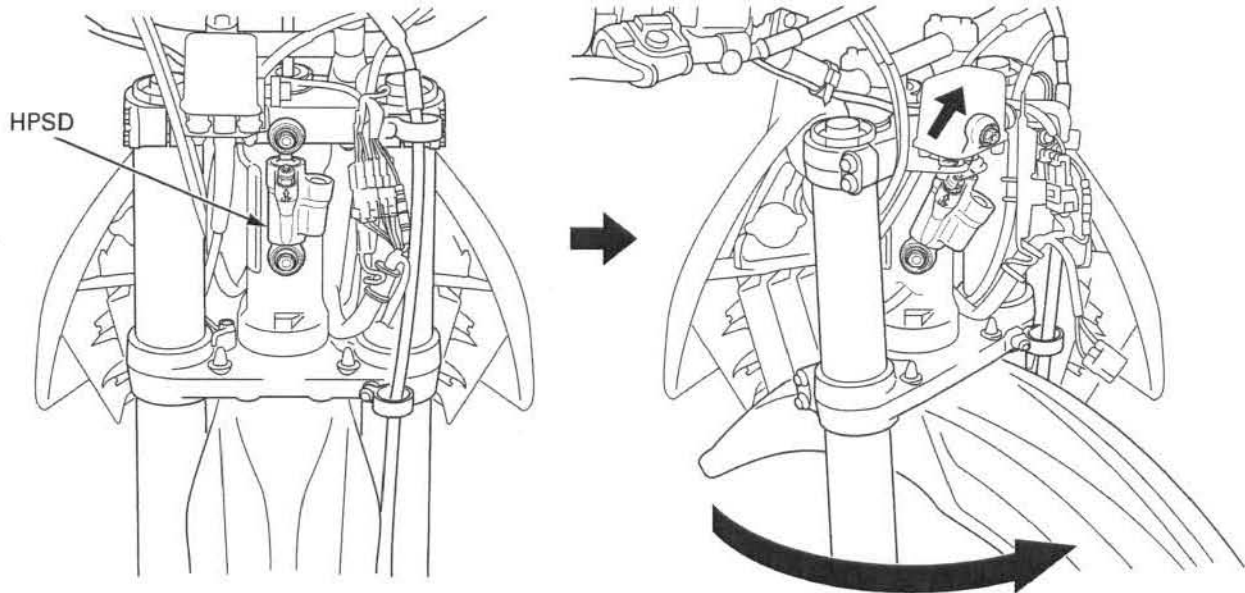
After the engine starts, the decompressor weight moves outward by centrifugal force. The decompressor weight turns pin (A) on the decompressor shaft.

Pin (B) on the decompressor shaft turns with the decompressor shaft, and pulls the decompressor plunger into the exhaust cam lobe.



## HPSD (Honda Progressive Steering Damper): After '07

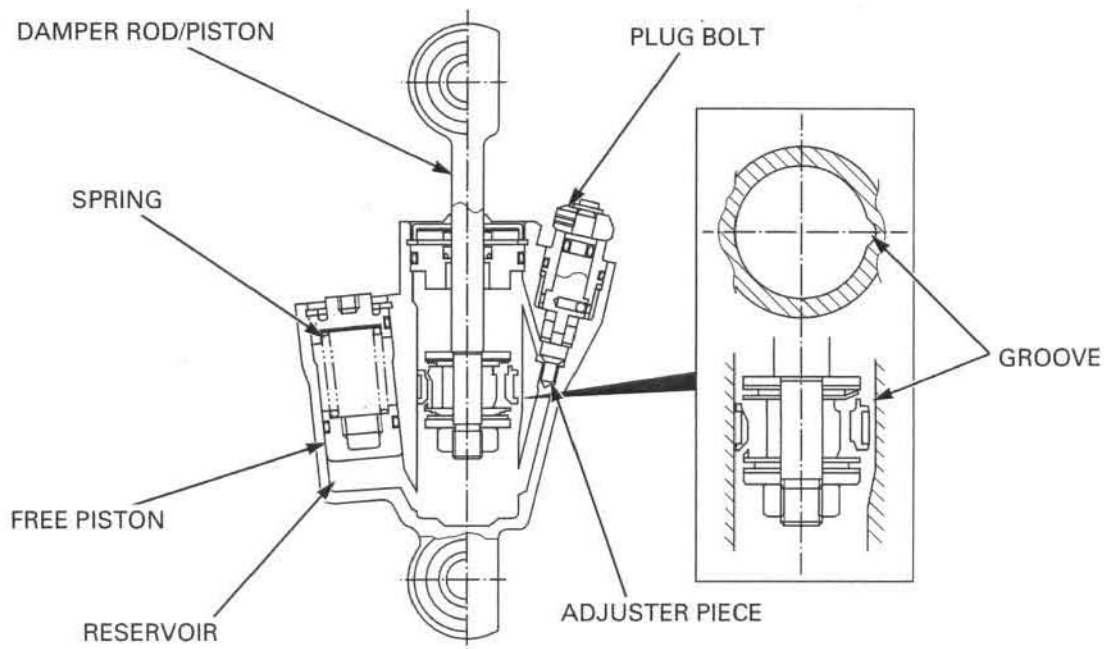
The steering damper is installed on the steering head pipe and the top bridge. HPSD utilizes the angle change of the top bridge relative to the steering head pipe to compress or extend the damper rod.



The steering damper can be serviced, however the damper rod/piston is not serviceable.

Each component of HPSD functions as follows:

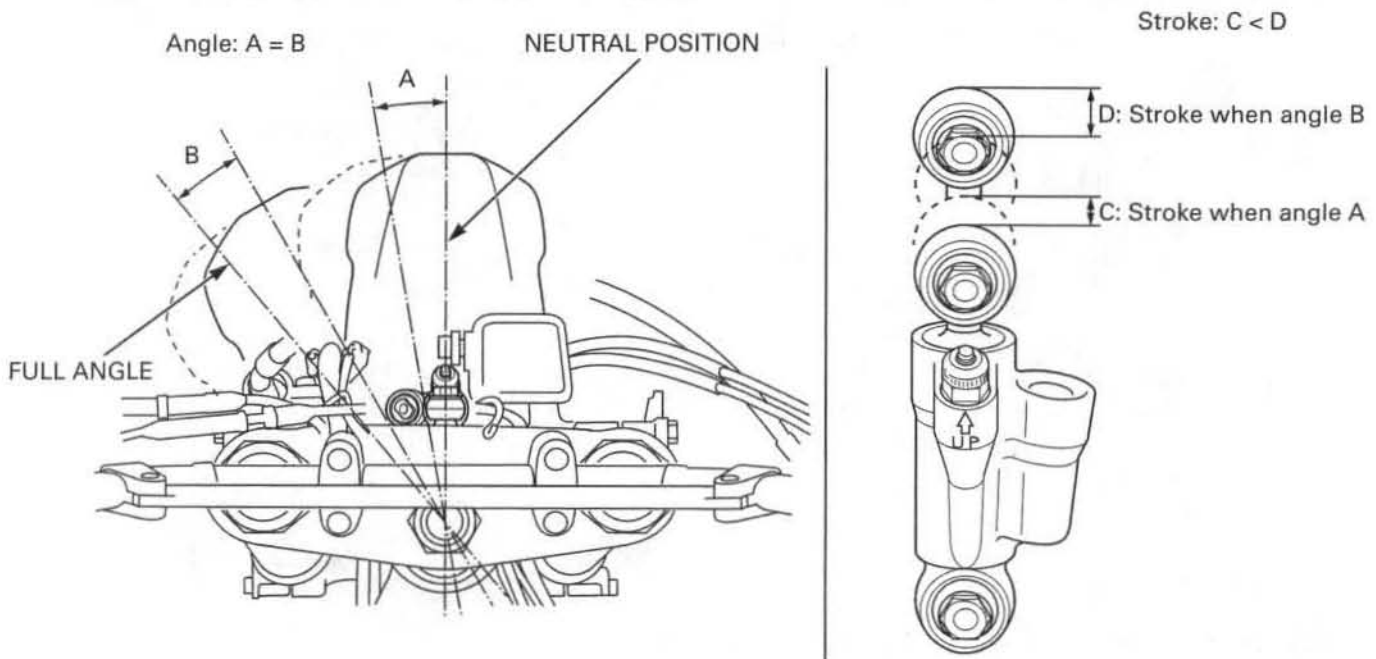
- **Damper rod/piston**  
The damping force is generated by the extension or the compression of the damper rod.
- **Adjuster piece/Plug bolt**  
The damping force can be adjusted with the adjuster piece by turning the plug bolt. The adjuster piece adjusts the damping force of both compression and extension. Turning the plug bolt clockwise will increase damping force and turning it counterclockwise will decrease damping force.
- **Free piston/Reservoir/Spring**  
When compressing the damper rod, damper oil moves temporarily into the reservoir. The damper oil stored in the reservoir is pushed back by the free piston. The free piston is moved by the spring tension and damper oil pressure.
- **Damper case**  
There is a groove inside the damper case. Progressive damping force is controlled by the configuration of the groove within the damper case.



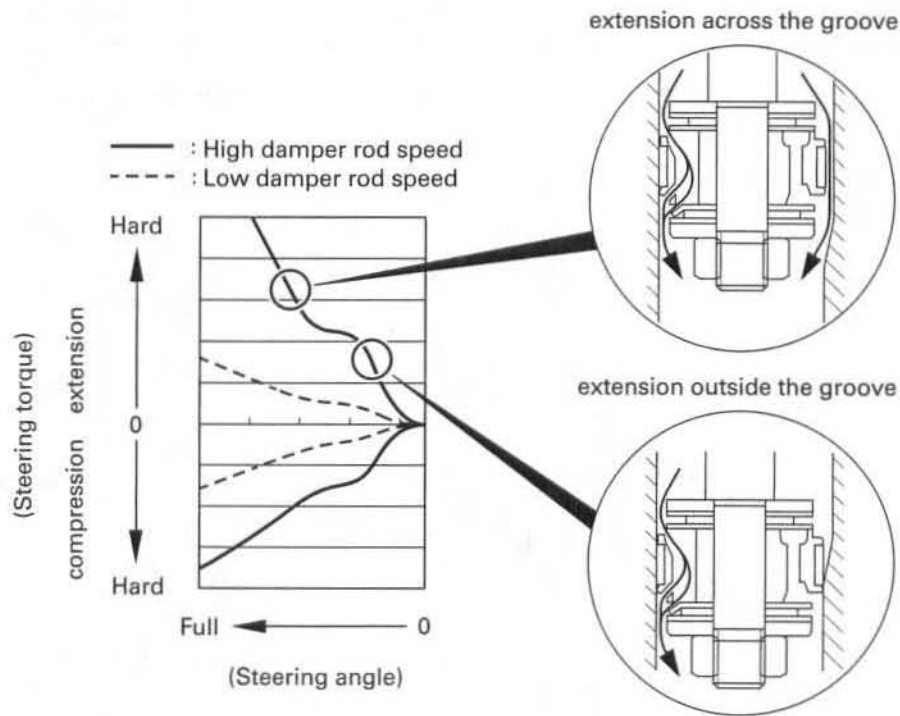
## TECHNICAL FEATURE

### HPSD CHARACTERISTICS

- The required steering torque when turning the handlebar fully (within angle B) is greater than the required steering torque when turning the handlebar slightly (within angle A).



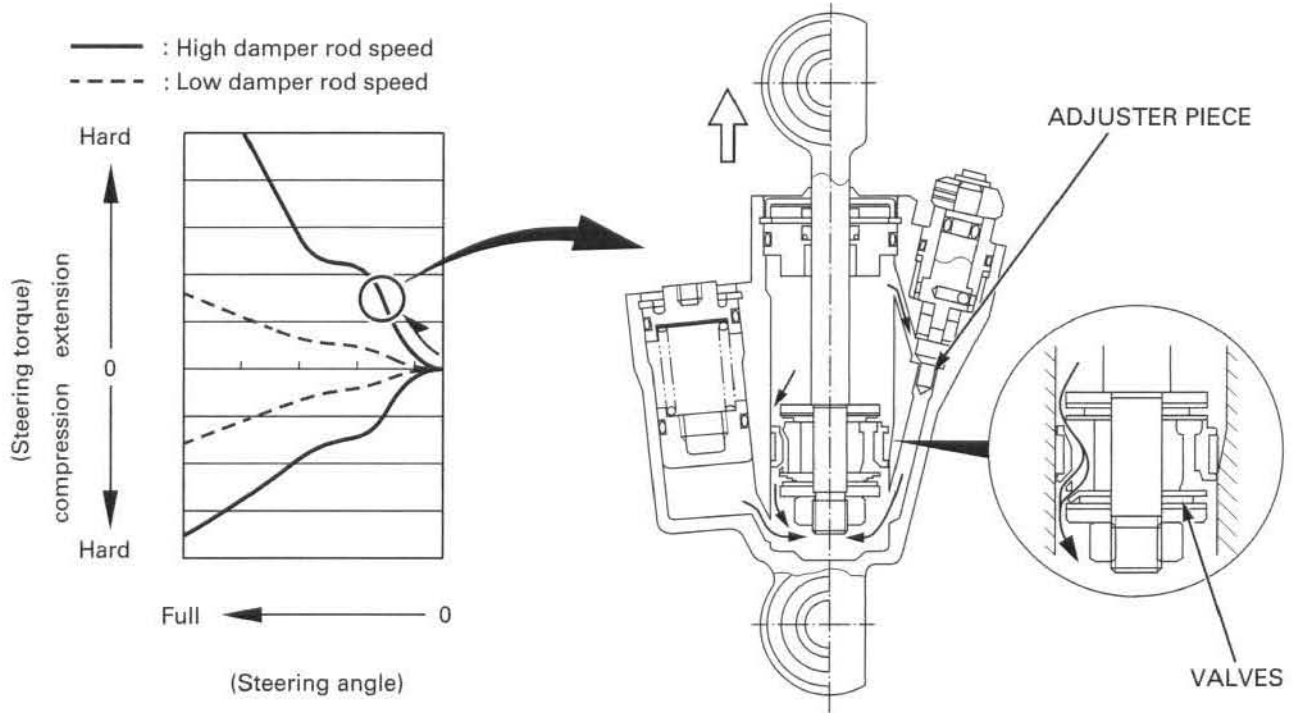
- When the steering is in the neutral position, HPSD generates no damping force and has no effect on steering torque.
- The steering torque differs between the extension and compression of the damper rod.
- The required damping force is controlled when the damper piston travels across the groove in the damper case.
- The required steering torque differs between high and low damper rod speed.



**Turning the handlebar from neutral position to full angle (extension).**

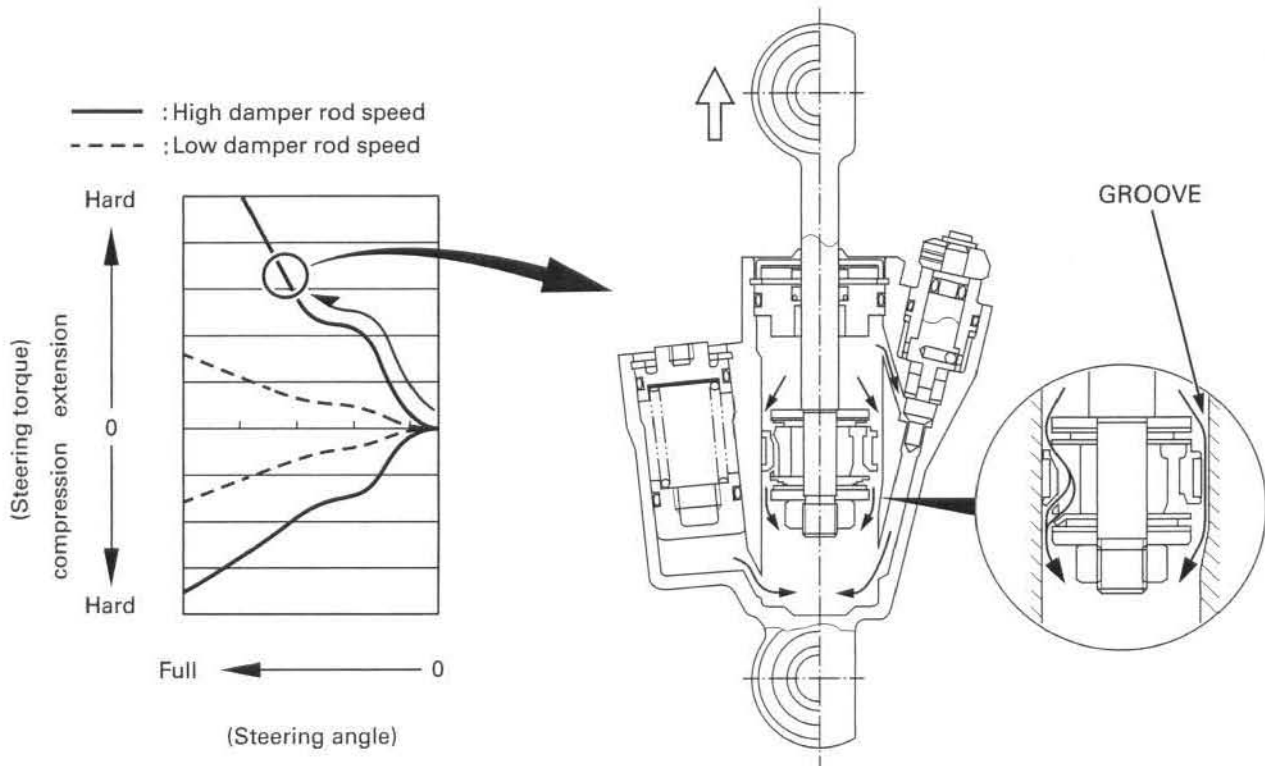
When the damper rod is extended outside of the groove:

Damping force is generated when the oil flows through the valves and adjuster piece in the damper case.



When the damper rod is extended across the groove:

Damping force is controlled when the oil flows through the groove in the damper case.

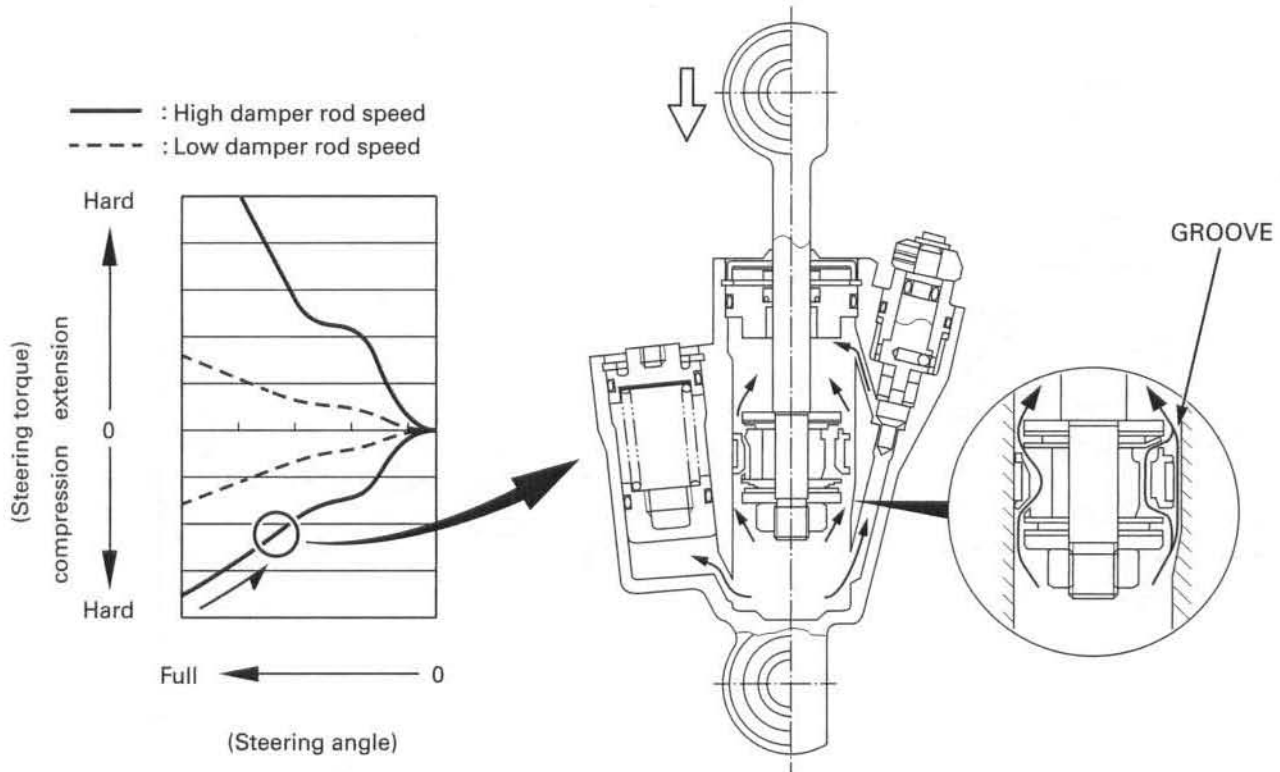


## TECHNICAL FEATURE

### Turning the handlebar from full angle to neutral position (compression).

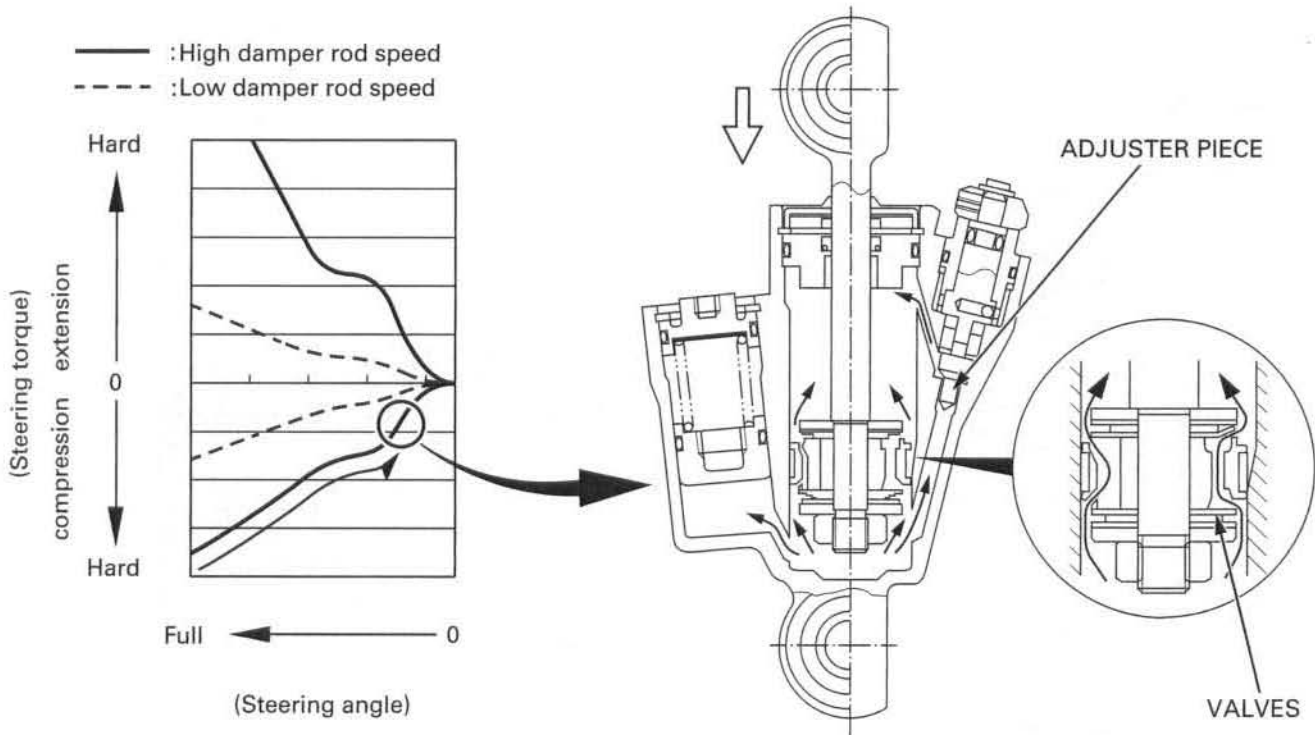
When the damper rod is compressed across the groove:

Damping force is controlled when the oil flows through the groove in the damper case.



When the damper rod is compressed outside of the groove:

Damping force is generated when the oil flows through the valves and adjuster piece in the damper case.



# 3. FRAME/BODY PANELS/EXHAUST SYSTEM

---

SERVICE INFORMATION .....	3-2	ENGINE GUARD .....	3-5
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### 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.
- When installing the exhaust system, loosely install all of the exhaust system fasteners. Always tighten the exhaust pipe joint nuts, then tighten the mounting fasteners.
- Always inspect the exhaust system for leaks after installation.

#### TORQUE VALUES

Seat mounting bolt		26 N·m (2.7 kgf·m, 19 lbf·ft)
Sub-frame upper mounting bolt	('05 - '07)	30 N·m (3.1 kgf·m, 22 lbf·ft)
Sub-frame lower mounting bolt	('05 - '07)	49 N·m (5.0 kgf·m, 36 lbf·ft)
Sub-frame upper/lower mounting bolt	(After '07)	49 N·m (5.0 kgf·m, 36 lbf·ft)
Exhaust pipe joint nut		21 N·m (2.1 kgf·m, 15 lbf·ft)
Muffler joint band bolt		21 N·m (2.1 kgf·m, 15 lbf·ft)
Muffler mounting bolt		26 N·m (2.7 kgf·m, 19 lbf·ft)
Heat shield bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)
Exhaust pipe protector bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)
Diffuser mounting torx screw	('05 - '07)	11 N·m (1.1 kgf·m, 8 lbf·ft)
Rear fender mounting bolt		13 N·m (1.3 kgf·m, 10 lbf·ft)
Radiator shroud upper mounting bolt		5 N·m (0.5 kgf·m, 3.7 lbf·ft)

#### TROUBLESHOOTING

##### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

##### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## SEAT

### REMOVAL

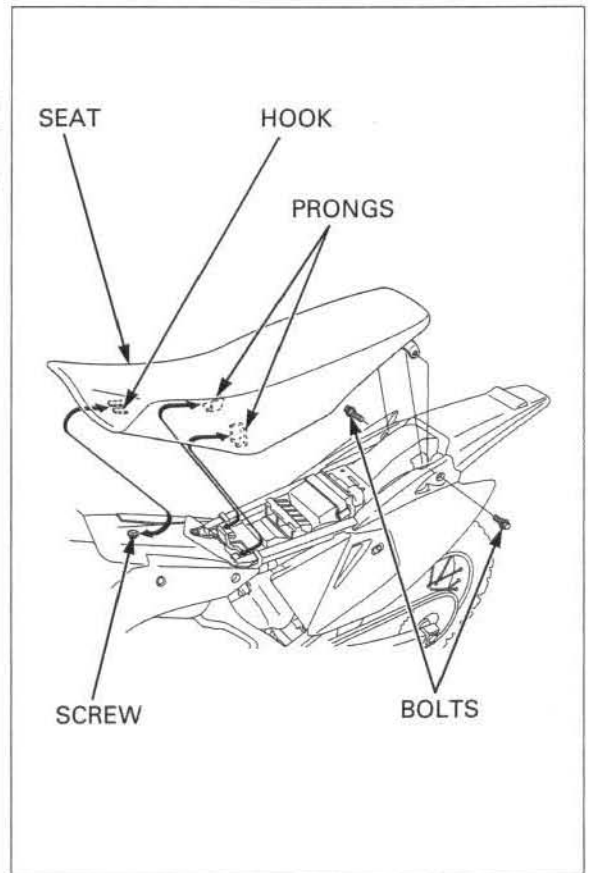
Remove the bolts and seat.

### INSTALLATION

Align the seat hook with the seat bracket screw on the fuel tank and the seat prongs with the sub-frame.

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

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

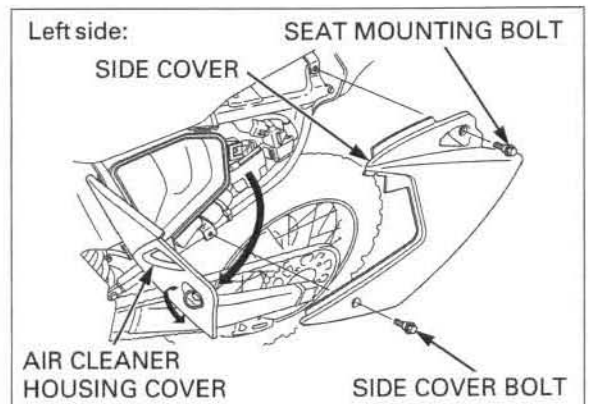


## SIDE COVER

### REMOVAL/INSTALLATION

*Left side only:* Open the air cleaner housing cover.

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





## FRAME/BODY PANELS/EXHAUST SYSTEM

*Be careful not to damage the tabs.*

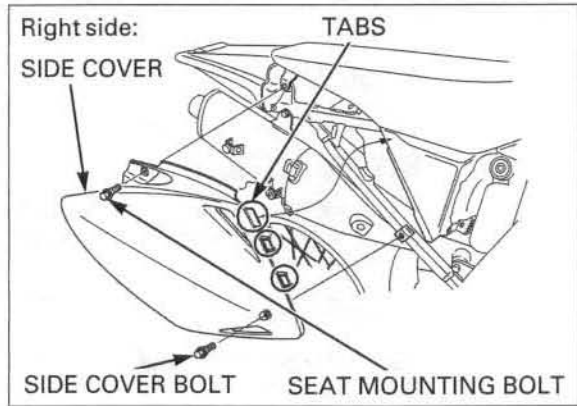
Install the side cover by inserting its tabs into the air cleaner housing slits.

Tighten the side cover bolt securely.

Tighten the seat mounting bolt to the specified torque.

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

*Left side only:* Close the air cleaner housing cover.

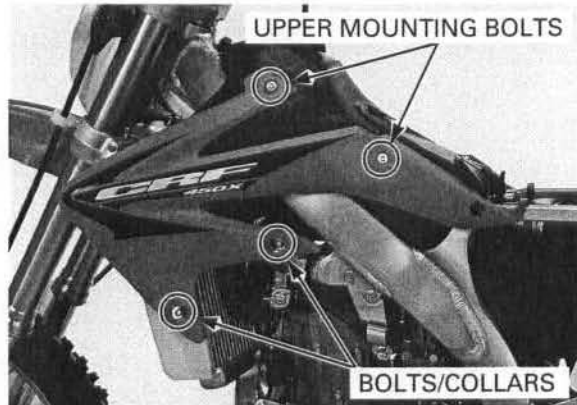


## RADIATOR SHROUD

### REMOVAL/INSTALLATION

Remove the seat (page 3-3).

Remove the bolts, collars and radiator shroud.

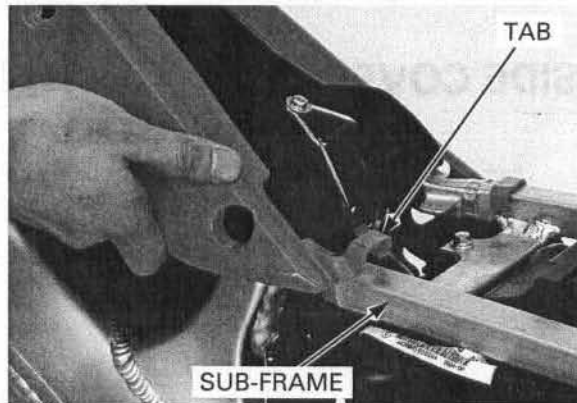


*Install the radiator shroud tab onto the sub-frame.*

Installation is in the reverse order of removal.

### TORQUE:

**Radiator shroud upper mounting bolt:  
5 N·m (0.5 kgf·m, 3.7 lbf·ft)**

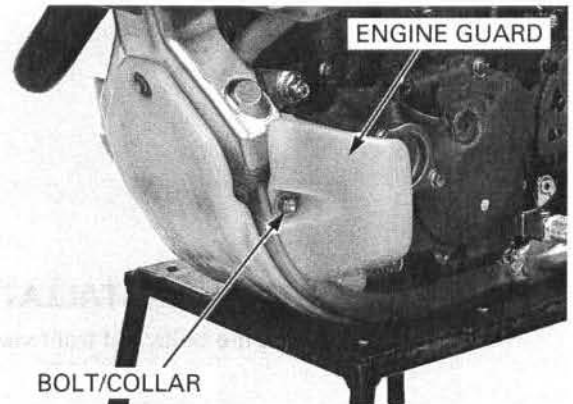


## ENGINE GUARD

### LEFT/RIGHT ENGINE GUARD REMOVAL/INSTALLATION

Remove the bolt, collar and engine guard.

Install the engine guard, collar and tighten the bolt securely.



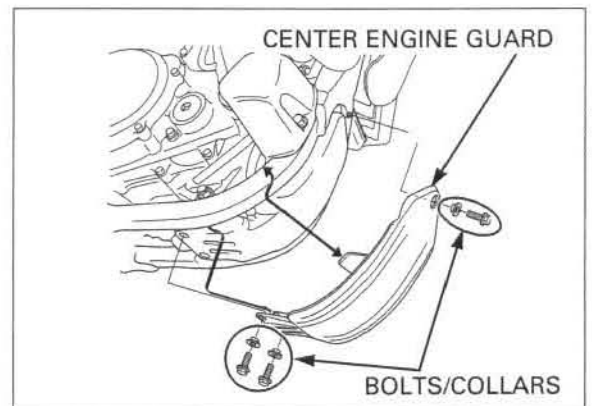
### CENTER ENGINE GUARD REMOVAL/INSTALLATION

Remove the bolts and collars.

Remove the center engine guard from the reserve tank.

Install the center engine guard by aligning its tabs with the reserve tank groove. Install the collars and bolts.

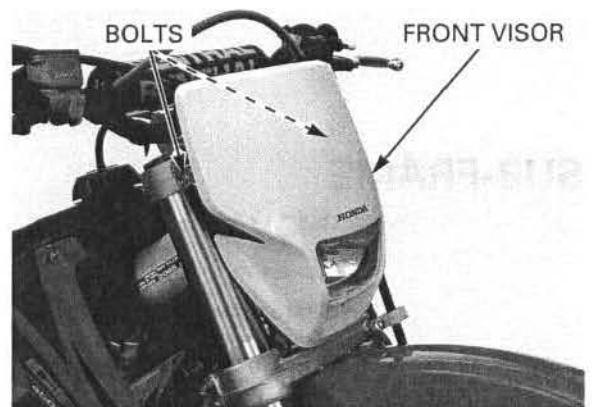
Tighten the bolts securely.



## FRONT VISOR

### REMOVAL/INSTALLATION ('05 - '07)

Remove the bolts and front visor.

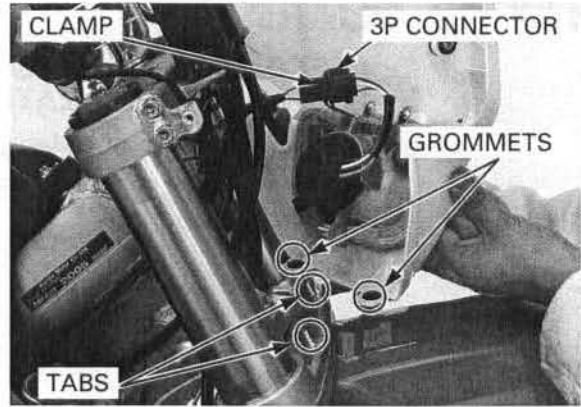


## FRAME/BODY PANELS/EXHAUST SYSTEM

Release the headlight 3P connector from the wire clamp and disconnect it.

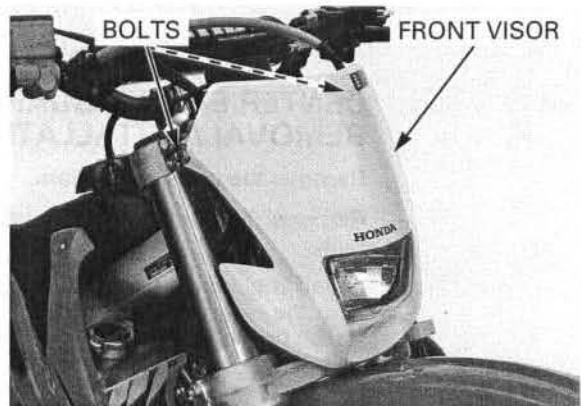
*Install the front visor by aligning its grommets with the tabs on the steering stem.*

Installation is in the reverse order of removal.



### REMOVAL/INSTALLATION (After '07)

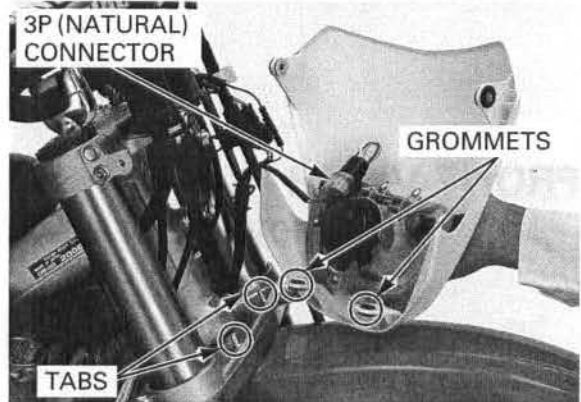
Remove the bolts and front visor.



Disconnect the headlight 3P (Natural) connector.

*Install the front visor by aligning its grommets with the tabs on the steering stem.*

Installation is in the reverse order of removal.



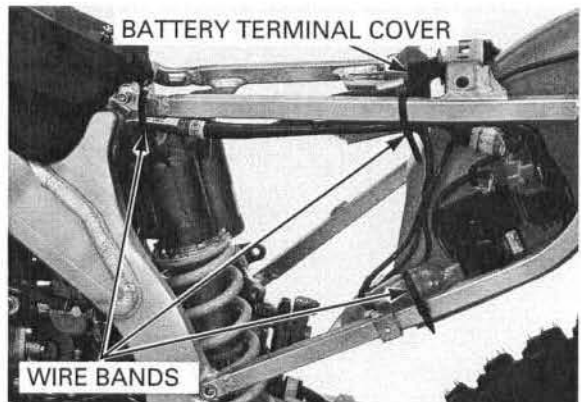
## SUB-FRAME

### REMOVAL

Remove the following:

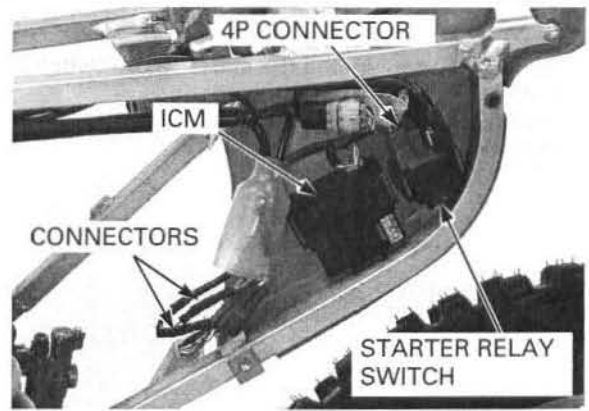
- Seat (page 3-3)
- Side covers (page 3-3)
- Muffler ('05 - '07: page 3-9, After '07: page 3-11)
- Battery (page 17-6)
- Air cleaner housing (page 6-7)

Remove the wire bands and battery terminal cover.

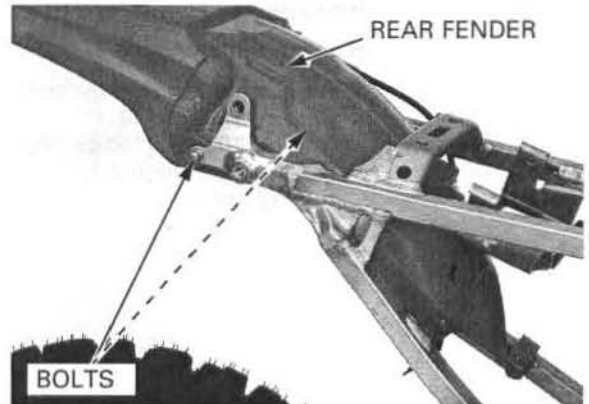


Disconnect the tail light connectors and starter relay switch 4P connector.

Remove the starter relay switch and ignition control module (ICM) from the rear fender.



Remove the bolts and rear fender.

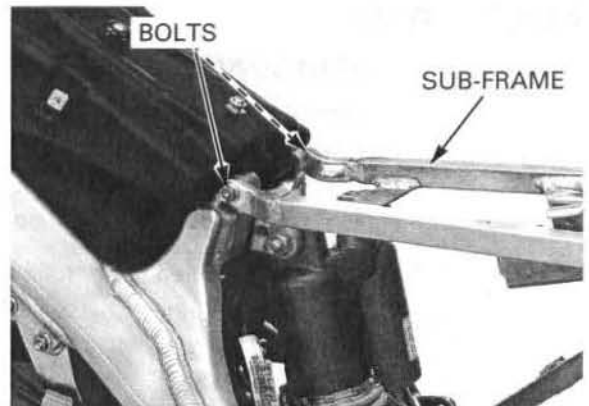


Remove the sub-frame upper mounting bolts and sub-frame.

## INSTALLATION

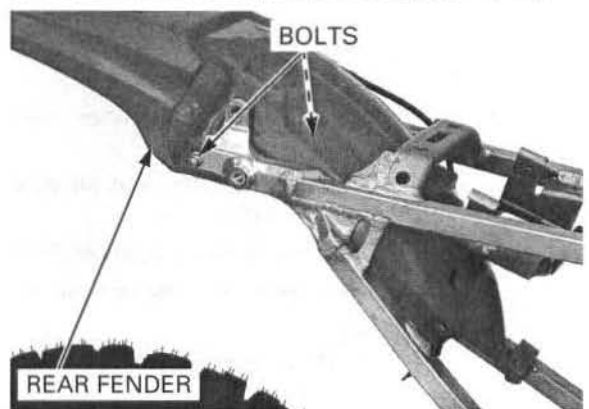
*Do not tighten the sub-frame upper mounting bolts yet.*

Install the sub-frame and upper mounting bolts.



Install the rear fender and bolts.  
Tighten the bolts to the specified torque.

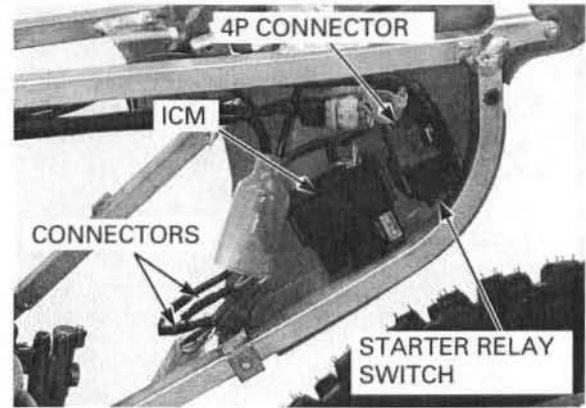
**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**



## FRAME/BODY PANELS/EXHAUST SYSTEM

Route the wire harnesses properly ('05 - '07: page 1-25, After '07: page 1-32). Be careful not to damage the wires.

Connect the tail light connectors and starter relay switch 4P connector. Install the starter relay switch and ICM onto the rear fender.



Install the wire bands and battery terminal cover.

Install the following:

- Air cleaner housing (page 6-9)
- Battery (page 17-6)
- Muffler ('05 - '07: page 3-9, After '07: page 3-11)
- Side covers (page 3-3)
- Seat (page 3-3)



## FUEL TANK

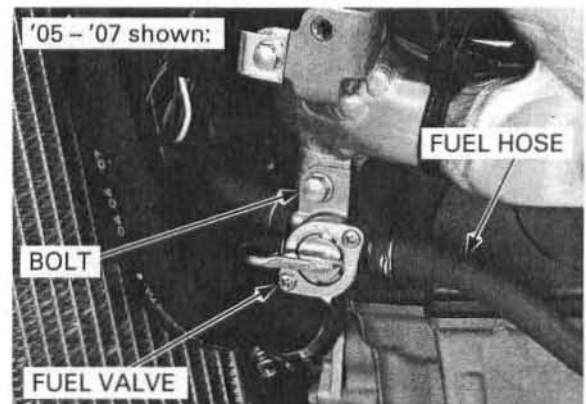
### REMOVAL/INSTALLATION

Remove the radiator shrouds (page 3-4).

Turn the fuel valve to "OFF" and disconnect the fuel valve side of the fuel hose.

- Place an approved gasoline container and catch the gasoline.
- Wipe off spilled out gasoline.

Remove the bolt and fuel valve.



Disconnect the breather hose from the steering stem.

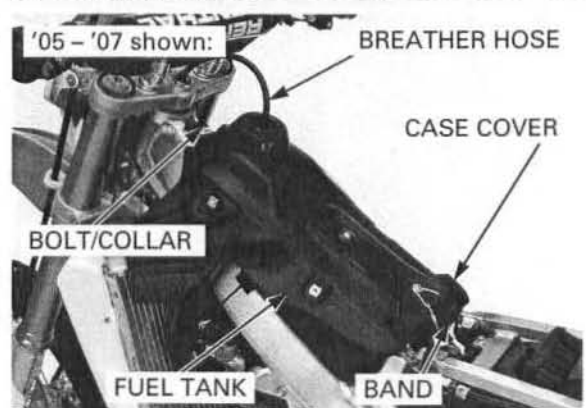
Unhook the band and air cleaner case cover from the fuel tank.

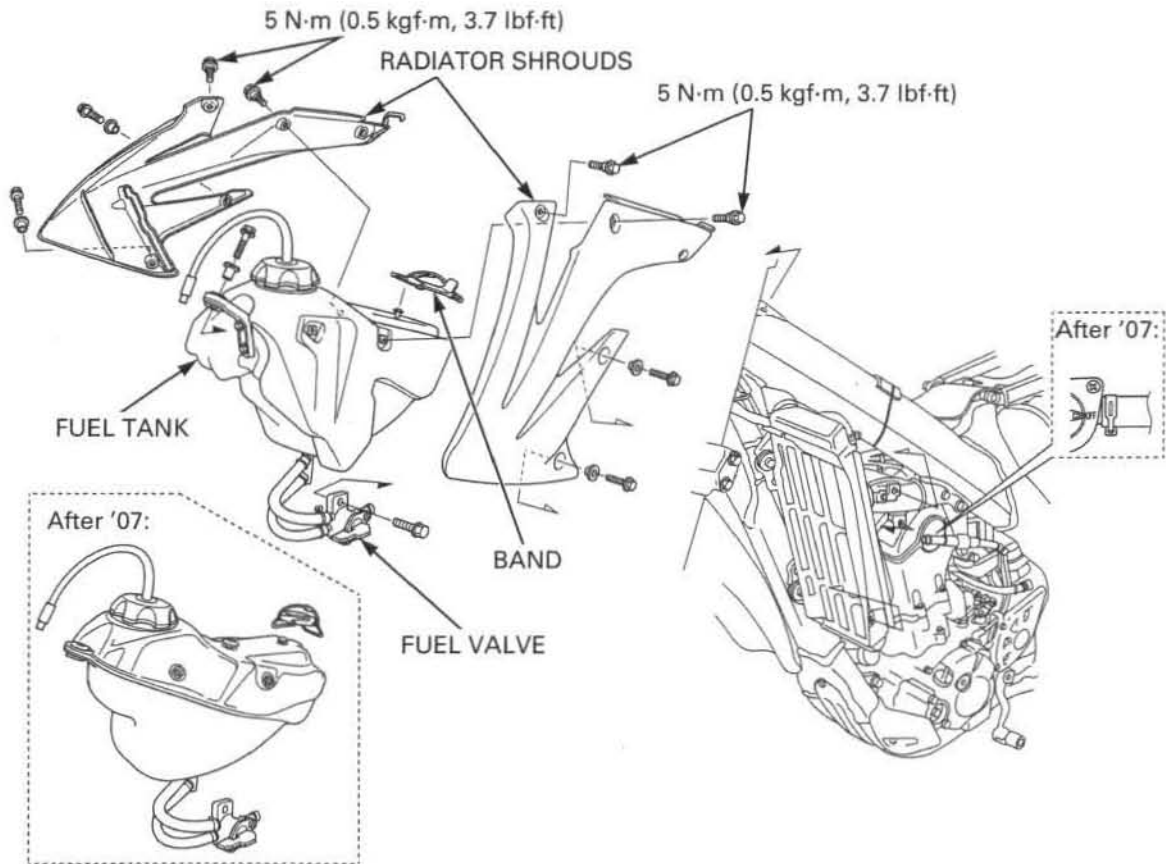
Remove the bolt, collar and fuel tank.

Installation is in the reverse order of removal.

#### NOTE:

- Insert the breather hose into the steering stem as shown.
- After installation, make sure there are no fuel leaks.
- Route the wire harnesses properly.
  - '05 - '07: (page 1-25)
  - After '07: (page 1-32)

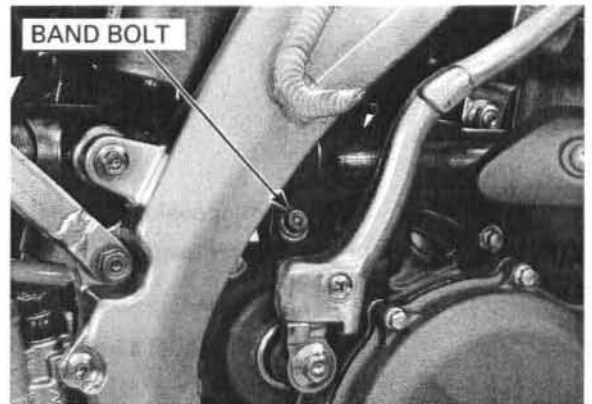




## EXHAUST SYSTEM

### MUFFLER REMOVAL/INSTALLATION ('05 - '07)

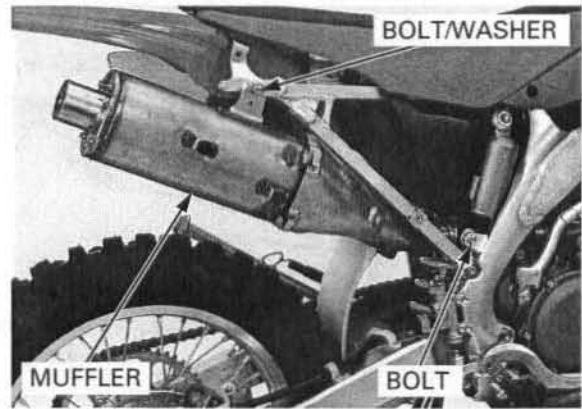
Remove the right side cover (page 3-3).  
Loosen the muffler joint band bolt.



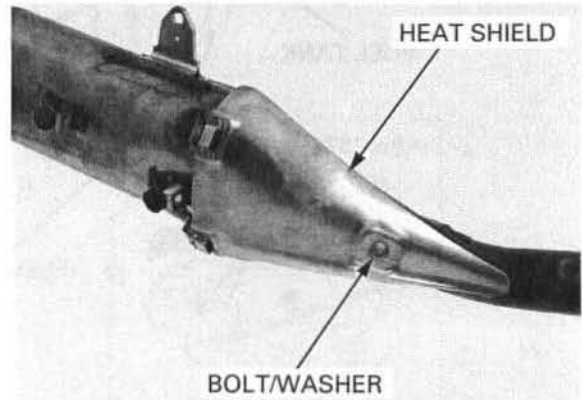


## FRAME/BODY PANELS/EXHAUST SYSTEM

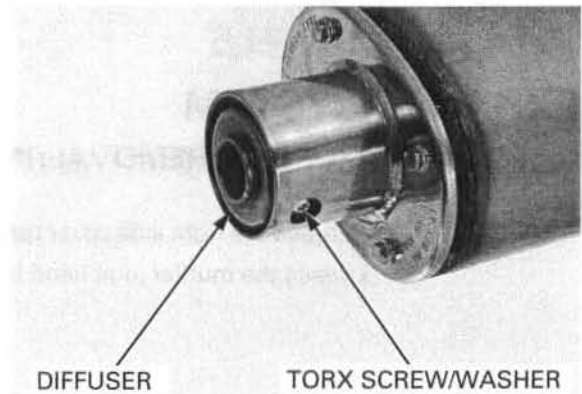
Remove the muffler mounting bolts, washer and muffler.



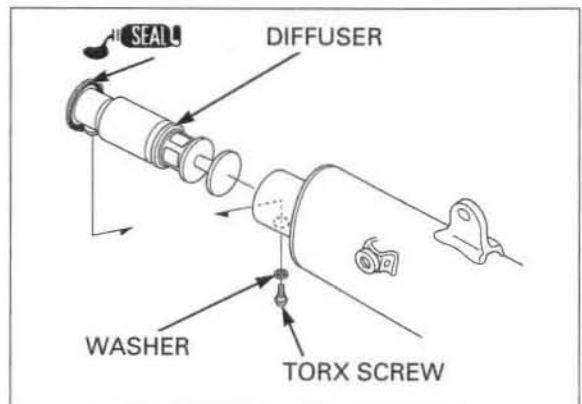
Remove the bolt, washer and heat shield from the muffler.



Remove the torx screw, washer and diffuser from the muffler.



Apply muffler sealant to the diffuser as shown.  
Install the diffuser, washer and torx screw to the muffler.  
Tighten the torx screw to the specified torque.  
**TORQUE: 11 N·m (1.1 kgf·m, 8 lbf·ft)**

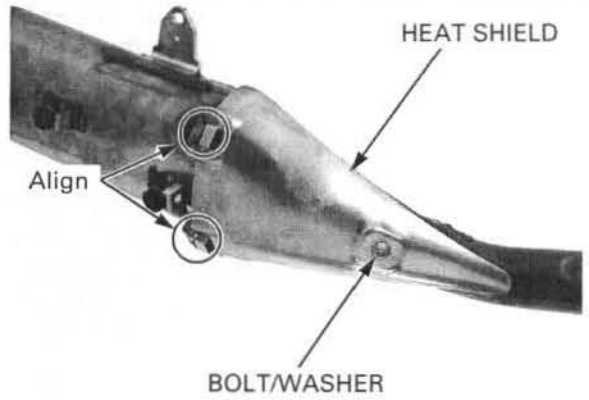




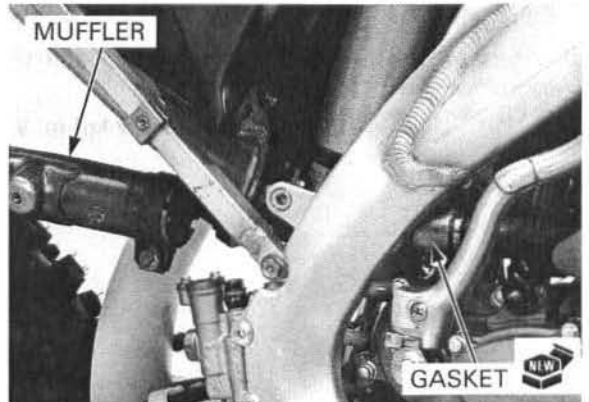
*Align the muffler tabs and heat shield grommets.*

Install the heat shield and washer, tighten the bolt to the specified torque.

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



Install a new gasket onto the exhaust pipe.  
Install the muffler to the exhaust pipe.



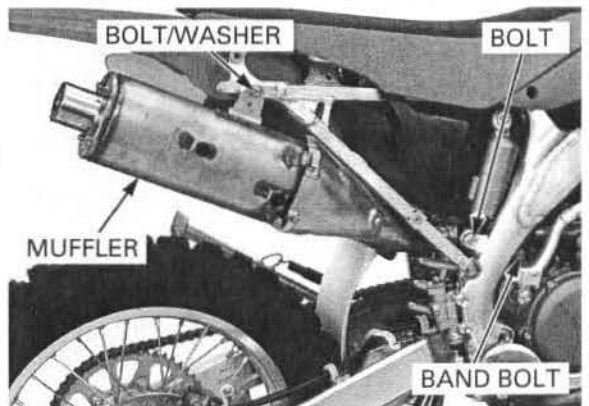
Install the washer and muffler mounting bolts. Tighten the muffler joint band bolt to the specified torque.

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

Tighten the muffler mounting bolts to the specified torque.

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

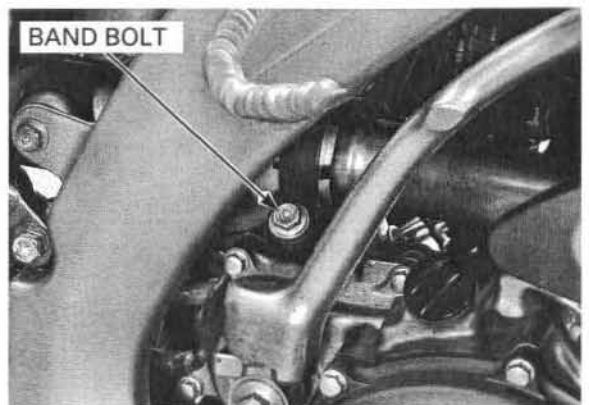
Install the right side cover (page 3-3).



**MUFFLER REMOVAL/INSTALLATION (After '07)**

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

Loosen the muffler joint band bolt.

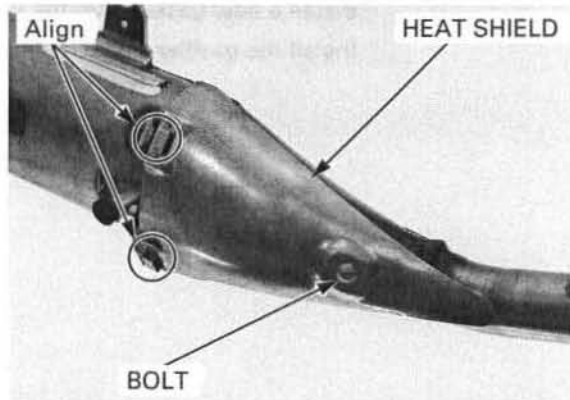


## FRAME/BODY PANELS/EXHAUST SYSTEM

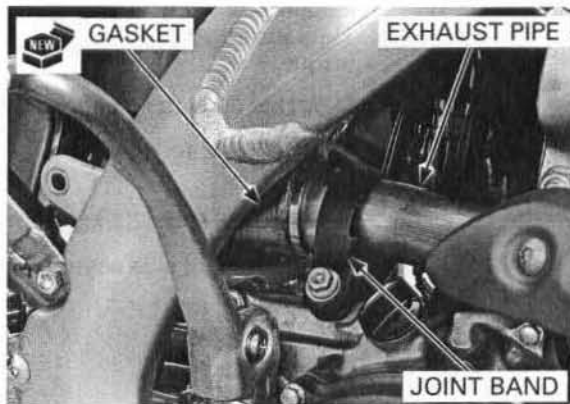
Remove the muffler mounting bolts, washer, muffler, gasket and muffler joint band.



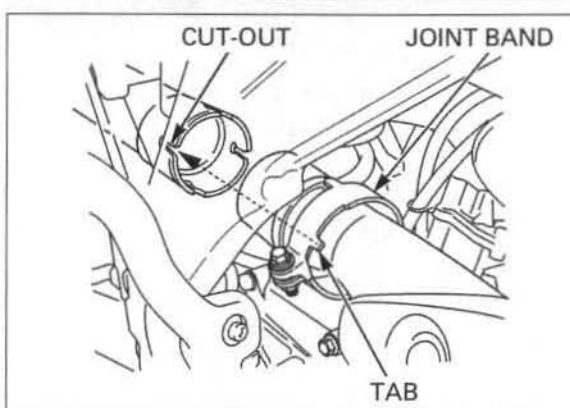
Remove the bolt and heat shield from the muffler.  
Align the muffler tabs and heat shield grommets.  
Install the heat shield and tighten the bolt to the specified torque.  
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the muffler joint band and new gasket onto the exhaust pipe.



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



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

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

Tighten the muffler joint band bolt to the specified torque.

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

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

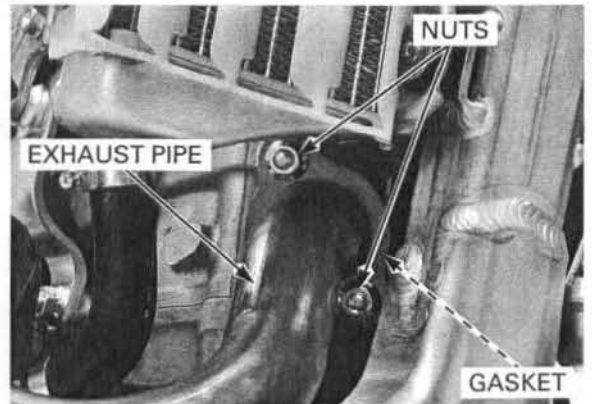


### EXHAUST PIPE REMOVAL

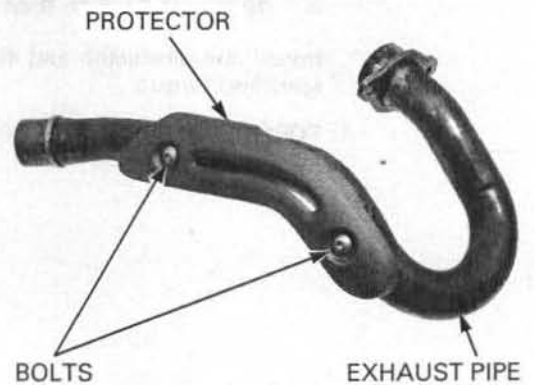
Remove the muffler.

- '05 - '07: (page 3-9)
- After '07: (page 3-11)

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

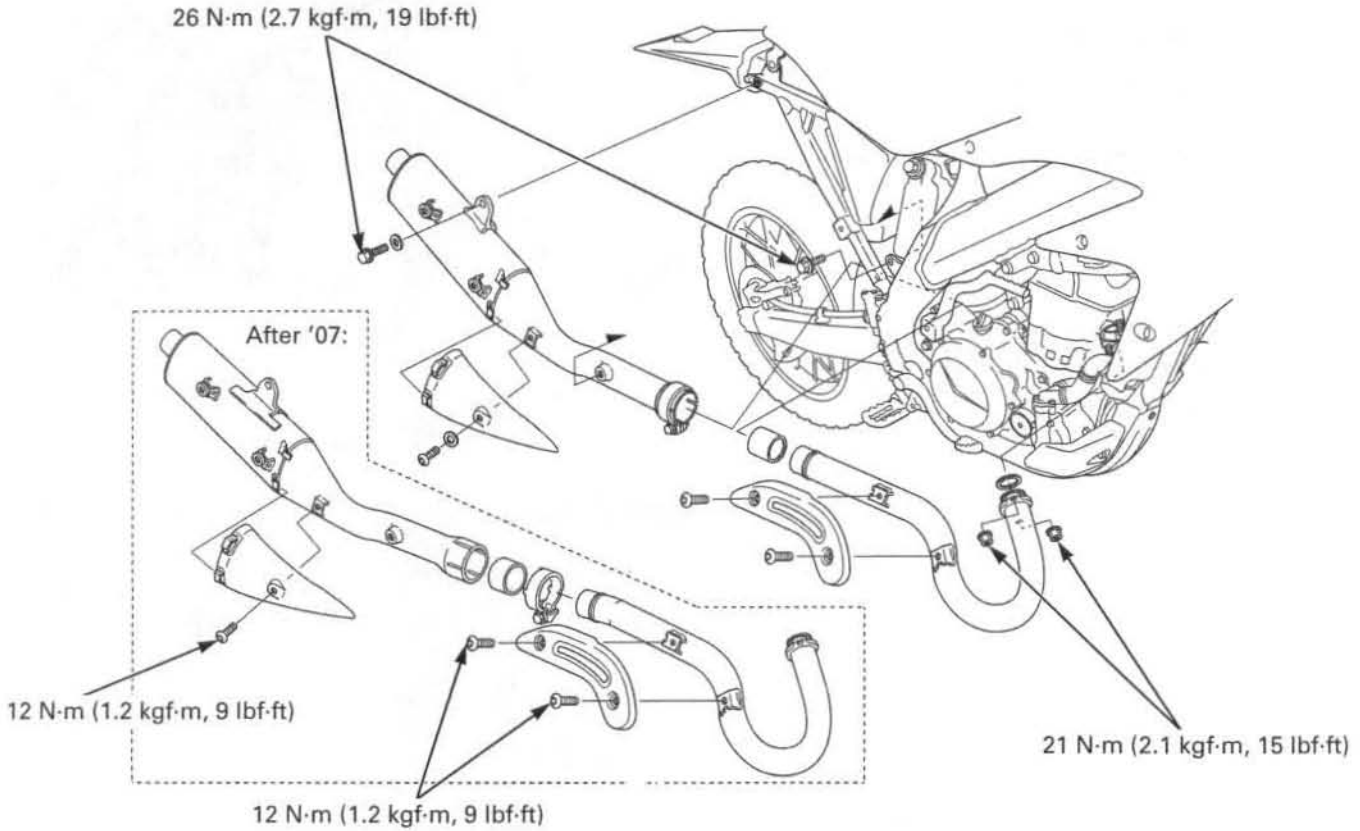


Remove the bolts and protector from the exhaust pipe.



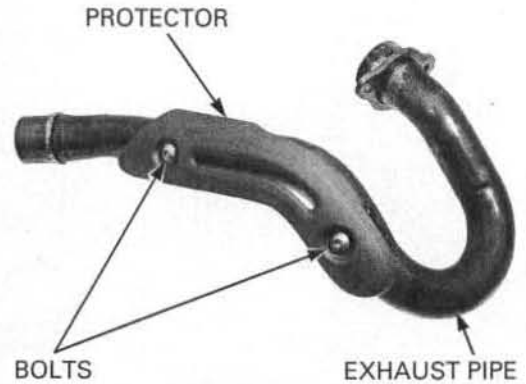
# FRAME/BODY PANELS/EXHAUST SYSTEM

## INSTALLATION



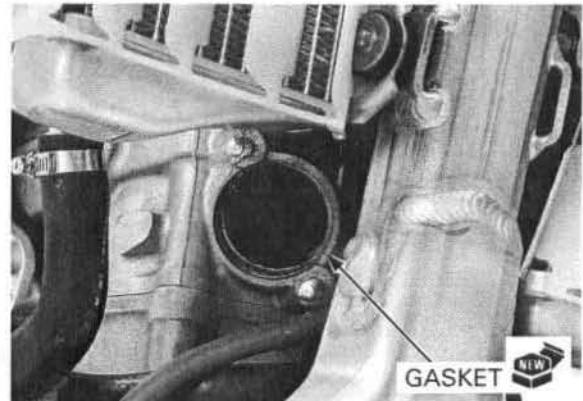
Install the protector and tighten the bolts to the specified torque.

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



Install a new gasket to the cylinder head.

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



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

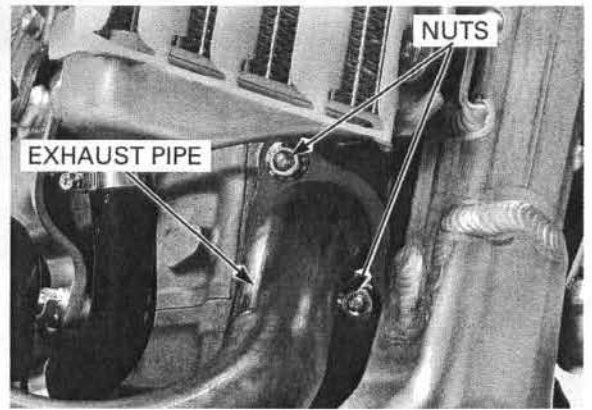
Install the muffler ('05 - '07: page 3-9, After '07: page 3-11) but do not tighten the bolts yet.

Tighten the exhaust pipe joint nuts to the specified torque.

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

Tighten the muffler fasteners.

- '05 - '07: (page 3-9)
- After '07: (page 3-11)



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MEMO

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# 4. MAINTENANCE

---

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## MAINTENANCE

# SERVICE INFORMATION

## GENERAL

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

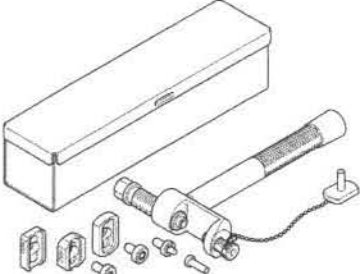
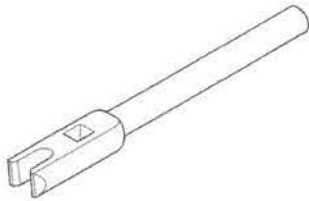
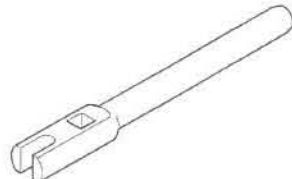
## SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle grip freeplay		3 – 5 mm (1/8 – 3/16 in)	
Hot start lever freeplay		2 – 3 mm (1/16 – 1/8 in)	
Spark plug	Standard	NGK IFR8H11	DENSO VK24PRZ11
	Option	IFR9H11	VK27PRZ11
Spark plug gap		1.0 – 1.1 mm (0.039 – 0.043 in)	
Valve clearance	IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)	
	EX	0.28 ± 0.03 mm (0.011 ± 0.001 in)	
Decompressor clearance ('05 – '07)		EX valve clearance + 0.35 mm (0.014 in)	
Engine oil capacity	At draining	0.67 liter (0.71 US qt, 0.59 Imp qt)	
	At oil filter change	0.70 liter (0.74 US qt, 0.62 Imp qt)	
	At disassembly	0.87 liter (0.92 US qt, 0.77 Imp qt)	
Transmission oil capacity	At draining	0.65 liter (0.69 US qt, 0.57 Imp qt)	
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)	
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	
Recommended antifreeze		Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors.	
Engine idle speed		1,700 ± 100 rpm	
Drive chain size/link	DID	520MXV/114	
Drive chain slack		25 – 35 mm (1.0 – 1.4 in)	
Drive chain width		13.4 mm (0.53 in)	
Drive chain slider thickness		5.0 mm (0.20 in)	
Drive chain roller O.D.	Upper	39 mm (1.5 in)	
	Lower	35 mm (1.4 in)	
Clutch lever freeplay		10 – 20 mm (3/8 – 13/16 in)	
Tire size	Front	80/100-21 51M	
	Rear	110/100-18 64M	
Cold tire pressure	Front	98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	
	Rear	98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	
Brake pedal push rod standard length		79.6 mm (3.13 in)	

**TORQUE VALUES**

Engine oil drain bolt		16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply oil to the threads and seating surface
Transmission oil drain bolt		16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply oil to the threads and seating surface
Transmission oil check bolt		10 N·m (1.0 kgf·m, 7 lbf·ft)	
Crankshaft hole cap		15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads
Spark plug		22 N·m (2.2 kgf·m, 16 lbf·ft)	
Throttle cable adjuster lock nut	(throttle side)	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
	(carburetor side)	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Brake lever adjuster lock nut		5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Rear axle nut		128 N·m (13.1 kgf·m, 94 lbf·ft)	U-nut
Drive chain roller bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Drive chain roller nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Drive sprocket bolt		31 N·m (3.2 kgf·m, 23 lbf·ft)	
Driven sprocket nut		32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Front master cylinder reservoir cover screw		1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Rear master cylinder reservoir cover bolt		1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Exhaust pipe joint nut		21 N·m (2.1 kgf·m, 15 lbf·ft)	
Muffler joint band bolt		21 N·m (2.1 kgf·m, 15 lbf·ft)	
Spark arrester mounting bolt	('05 - '07)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
	(After '07)	6 N·m (0.6 kgf·m, 4.4 lbf·ft)	Apply molybdenum disulfide grease (TB1901 or equivalent) to the threads
Front spoke		3.68 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Rear spoke		3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Front/rear rim lock		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Pressure release screw		1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Sidestand pivot bolt		See page 4-34	
Sidestand pivot nut		39 N·m (4.0 kgf·m, 29 lbf·ft)	U-nut
Brake pedal adjuster lock nut		5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Drive chain adjuster lock nut		27 N·m (2.8 kgf·m, 20 lbf·ft)	
Decompressor adjuster lock nut	('05 - '07)	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply oil to the threads

**TOOLS**

<p>Drive chain tool set 07HMH-MR10103</p>  <p>or 7HMH-MR1010C (U.S.A. only)</p>	<p>Spoke wrench, 6.1 mm 07JMA-MR60100</p>  <p>or 07701-0020300 (6.1 mm)</p>	<p>Spoke wrench, 6.6 mm 070MA-KZ30100</p> 
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# MAINTENANCE

## MAINTENANCE SCHEDULE ('05, '06)

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

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

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ➔	REGULAR MAINTENANCE INTERVAL					REFER TO PAGE	
			mi	100	600	1,200	1,800		2,400
			km	150	1,000	2,000	3,000		4,000
		NOTE	MONTH	1	6	12	18	24	
EMISSION RELATED ITEMS	* FUEL LINE					I		I	4-8
	** FUEL STRAINER SCREEN					C		C	4-8
	* THROTTLE OPERATION					I		I	4-9
	AIR CLEANER	(NOTE 1)			C	C	C	C	4-10
	CRANKCASE BREATHER				I	I	I	I	4-11
	SPARK PLUG				I	I	I	I	4-12
	* VALVE CLEARANCE			I	I	I	I	I	4-15
	ENGINE OIL			R	R	R	R	R	4-19
	ENGINE OIL FILTER			R	R	R	R	R	4-19
	* DECOMPRESSOR SYSTEM			I	I	I	I	I	4-18
	** ENGINE IDLE SPEED			I	I	I	I	I	4-22
	RADIATOR COOLANT	(NOTE 3)				I		R	4-13
	* COOLING SYSTEM			I	I	I	I	I	4-14
	* SECONDARY AIR SUPPLY SYSTEM	(NOTE 2)				I		I	4-14
NON-EMISSION RELATED ITEMS	TRANSMISSION OIL			R	R	R	R	R	4-22
	DRIVE CHAIN	(NOTE 1)		I, L	I, L: Every 300 mi (500 km) or 3 month				4-24
	DRIVE CHAIN SLIDER	(NOTE 1)		I	I, L: Every 300 mi (500 km) or 3 month				4-27
	BRAKE FLUID	(NOTE 3)			I	I	I	I	4-29
	BRAKE PAD WEAR				I	I	I	I	4-30
	BRAKE SYSTEM			I	I	I	I	I	4-30
	* HEADLIGHT AIM					I		I	4-31
	CLUTCH SYSTEM			I	I	I	I	I	4-31
	SIDESTAND					I		I	4-34
	* SUSPENSION					I		I	4-34
	* SPARK ARRESTER				C: Every 1,000 mi (1,600 km) or every 100 operating hours				4-33
	* NUTS, BOLTS, FASTENERS			I		I		I	4-36
	** WHEELS/TIRES			I	I	I	I	I	4-36
** STEERING HEAD BEARINGS			I		I		I	4-37	

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

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

### NOTES:

1. Service more frequently when ridden in wet or dusty conditions.
2. California type only.
3. Replace every 2 years. Replacement requires mechanical skill.

# MAINTENANCE SCHEDULE (After '06)

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

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

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ➔ NOTE	INITIAL MAINTENANCE		REGULAR MAINTENANCE INTERVAL					REFER TO PAGE
			mi	100	600	1,200	1,800	2,400		
			km	150	1,000	2,000	3,000	4,000		
		MONTH	1	6	12	18	24			
* FUEL LINE					I			I	4-8	
** FUEL STRAINER SCREEN					C			C	4-8	
* THROTTLE OPERATION					I			I	4-9	
AIR CLEANER	(NOTE 1)			C	C	C	C	C	4-10	
CRANKCASE BREATHER				I	I	I	I	I	4-11	
SPARK PLUG				I	I	I	I	I	4-12	
* VALVE CLEARANCE			I	I	I	I	I	I	4-15	
ENGINE OIL			R	R	R	R	R	R	4-19	
ENGINE OIL FILTER			R	R	R	R	R	R	4-19	
* DECOMPRESSOR SYSTEM			I	I	I	I	I	I	'07: 4-18 After '07: 4-19	
** ENGINE IDLE SPEED			I	I	I	I	I	I	4-22	
RADIATOR COOLANT	(NOTE 3)				I			R	4-13	
* COOLING SYSTEM			I	I	I	I	I	I	4-14	
* SECONDARY AIR SUPPLY SYSTEM	(NOTE 2)				I			I	4-14	
TRANSMISSION OIL			R	R	R	R	R	R	4-22	
DRIVE CHAIN	(NOTE 1)		I, L	I, L: Every 300 mi (500 km) or 3 month					4-24	
DRIVE CHAIN SLIDER				I	I	I	I	I	4-27	
BRAKE FLUID	(NOTE 3)			I	I	I	I	I	4-29	
BRAKE PADS WEAR				I	I	I	I	I	4-30	
BRAKE SYSTEM			I	I	I	I	I	I	4-30	
* HEADLIGHT AIM					I			I	4-31	
CLUTCH SYSTEM			I	I	I	I	I	I	4-31	
SIDESTAND					I			I	4-34	
* SUSPENSION					I			I	4-34	
* SPARK ARRESTER			C: Every 1,000 mi (1,600 km) or every 100 operating hours						4-33	
* NUTS, BOLTS, FASTENERS			I		I			I	4-36	
** WHEELS/TIRES			I	I	I	I	I	I	4-36	
** STEERING HEAD BEARINGS			I		I			I	4-37	

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

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

**NOTES:**

1. Service more frequently when ridden in wet or dusty conditions.
2. U.S.A. and California type only.
3. Replace every 2 years. Replacement requires mechanical skill.

## MAINTENANCE

# COMPETITION MAINTENANCE SCHEDULE

Check all items before each race.

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	about 2.5 hours	about 7.5 hours	about 15.0 hours	about 22.5 hours	about 30.0 hours	Refer to page
THROTTLE OPERATION			I					4-9
HOT STARTER			I					4-10
AIR CLEANER		(NOTE 1)	C					4-10
CRANKCASE BREATHER			I					4-11
SPARK PLUG			I					4-12
RADIATOR COOLANT		(NOTE 2)	I					4-13
VALVE CLEARANCE/ DECOMPRESSOR SYSTEM		(NOTE 4)			I			4-15
ENGINE OIL		(NOTE 3)	I		R			4-19
ENGINE OIL FILTER		(NOTE 3)			R			4-19
ENGINE IDLE SPEED			I					4-22
PISTON AND PISTON RINGS					R			10-6
PISTON PIN							R	10-6
TRANSMISSION OIL		(NOTE 5)	I		R			4-22
COOLING SYSTEM			I					4-14
DRIVE CHAIN			I, L	R				4-24
DRIVE CHAIN SLIDER			I					4-27
DRIVE CHAIN ROLLER			I					4-28
DRIVE/DRIVEN SPROCKET			I					4-28
BRAKE FLUID		(NOTE 2)	I					4-29
BRAKE PADS WEAR			I					4-30
BRAKE SYSTEM			I					4-30
CLUTCH SYSTEM		(NOTE 5)	I					4-31
CONTROL CABLES			I, L					4-32
EXHAUST PIPE/MUFFLER			I					4-33
SUSPENSION			I					4-34
SWINGARM/SHOCK LINKAGE				L				4-35
FORK OIL	FORK TUBE/SLIDER	(NOTE 3)		R				14-30
	DAMPER					R		14-22
NUTS, BOLTS, FASTENERS			I					4-36
WHEELS/TIRES			I					4-36
STEERING HEAD BEARINGS						I		4-37

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	Wear or discoloration	
Cylinder gasket	Leakage	Replace whenever disassembled
Right crankcase cover gasket	Damage	Replace whenever disassembled

### FRAME

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

**NOTE:**

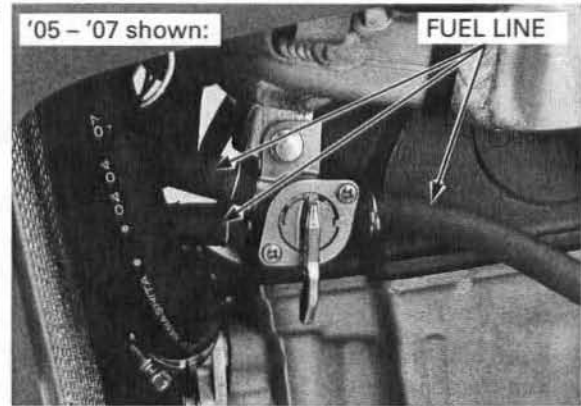
- These parts and their possible replacement schedule are based upon average riding conditions.
- Machines subjected to severe use require more frequent servicing.

## MAINTENANCE

### FUEL LINE

Check the fuel line for deterioration, damage or leakage.

Replace the fuel line if necessary.



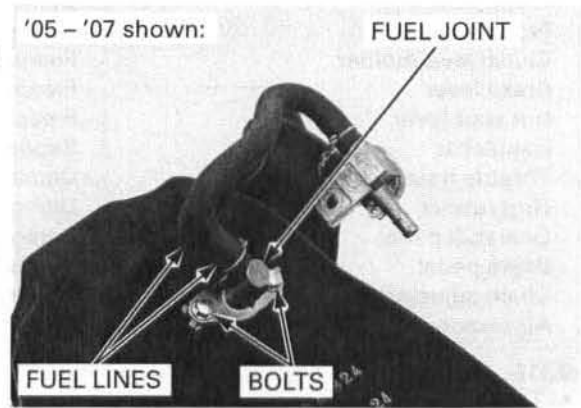
### FUEL STRAINER SCREEN

Remove the fuel tank (page 3-8).

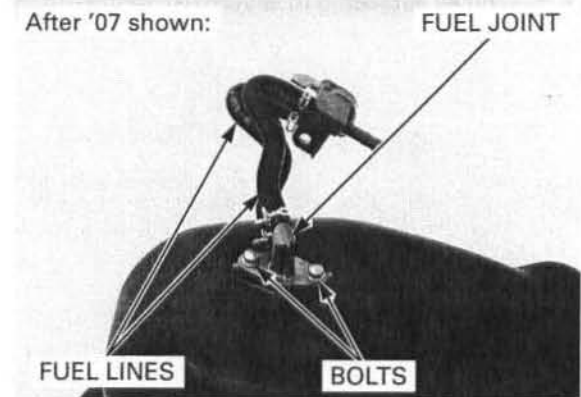
Drain the fuel from the fuel tank into an approved gasoline container.

Disconnect the fuel lines from the fuel joint.

Remove the bolts and fuel joint.



After '07 shown:



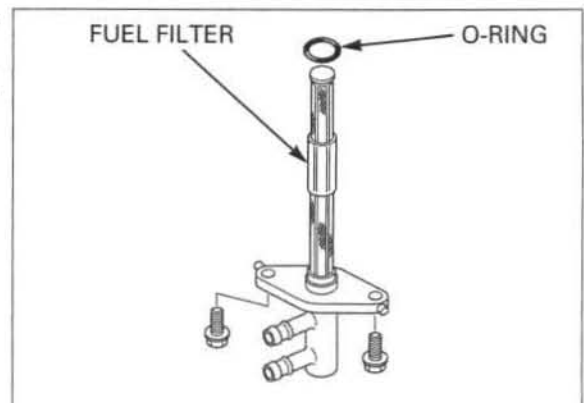
Wash the fuel filter in high flash-point cleaning solvent.

Check that the O-ring is in good condition and install it onto the fuel valve.

Install the fuel joint in the reverse order of removal.

Install the fuel tank (page 3-8).

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



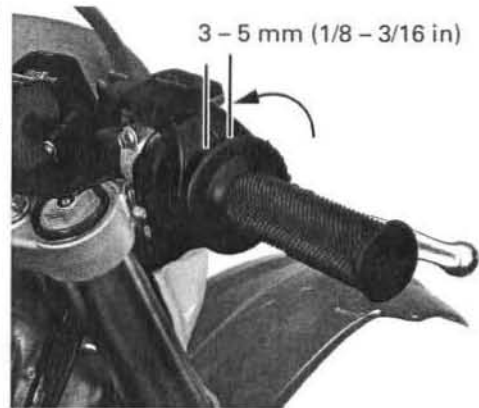


## THROTTLE OPERATION

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

Measure the freeplay at the throttle grip flange.

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



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

Minor adjustments are made with the throttle side of the adjuster.

Remove the dust cover from the adjuster.

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

After adjustment, tighten the lock nut to the specified torque.

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

Install the dust cover.

Recheck the throttle operation.

If the adjuster cannot reach the correct free play, turn the adjuster all the way in and then turn it out one turn.

Make the major adjustment with the carburetor side of the adjuster.

Major adjustments are made with the carburetor side of the throttle cable.

Remove the fuel tank (page 3-8).

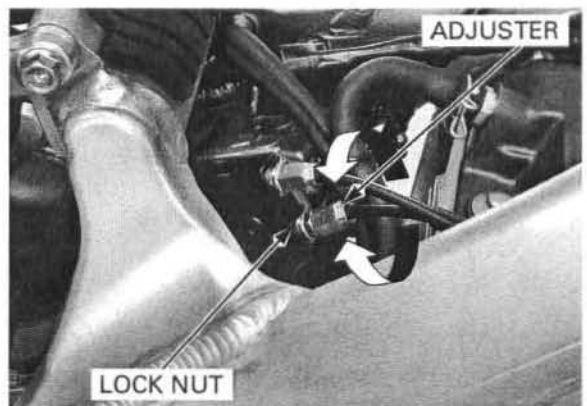
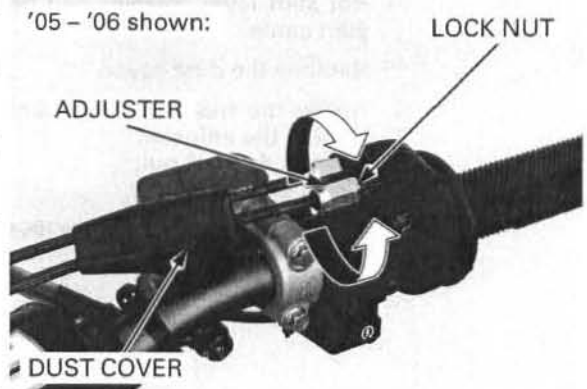
Adjust the freeplay by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut to the specified torque.

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

Recheck the throttle operation.

Install the fuel tank (page 3-8).



## MAINTENANCE

### HOT START

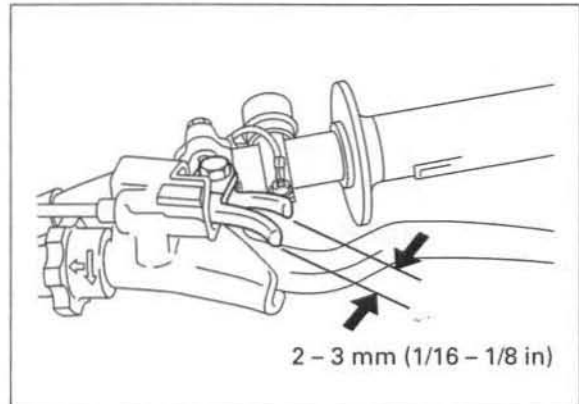
Check for smooth hot start lever operation and lubricate the cable if necessary.

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

Replace the hot start cable if necessary.

Measure the hot start lever freeplay at the lever end.

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



Hot start lever freeplay can be adjusted at the hot start cable.

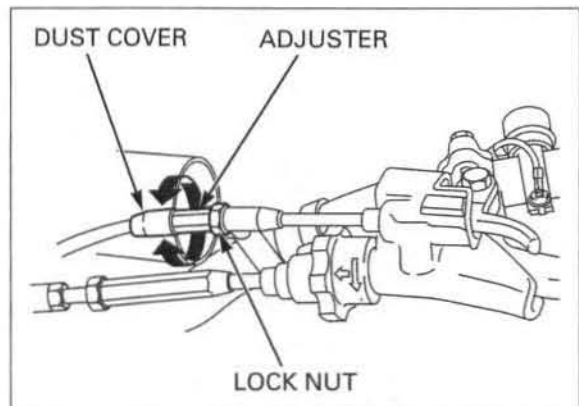
Remove the dust cover.

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

Tighten the lock nut.

Install the dust cover.

Recheck the freeplay at the lever end.

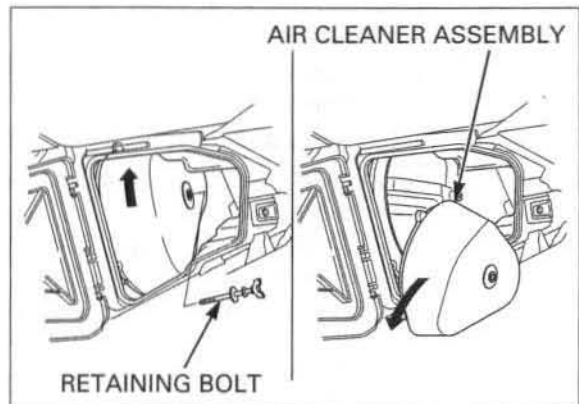


### AIR CLEANER

Open the air cleaner housing cover.

Remove the air cleaner retaining bolt.

Remove the air cleaner assembly while turning it as shown.



Remove the air cleaner element 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.

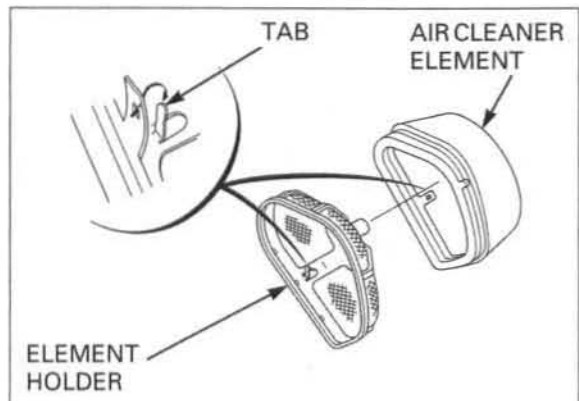
Clean the inside of the air cleaner housing.

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

Wash again if necessary.

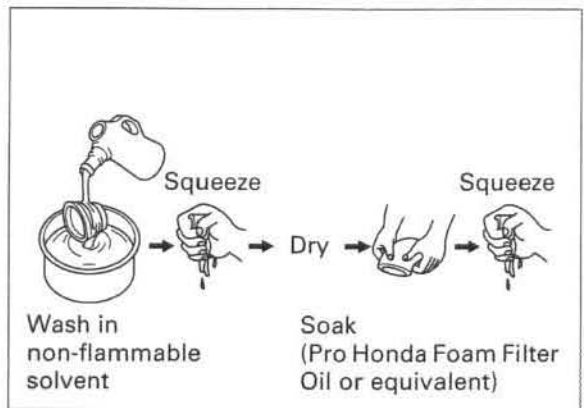
Allow the air cleaner to dry thoroughly.

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.

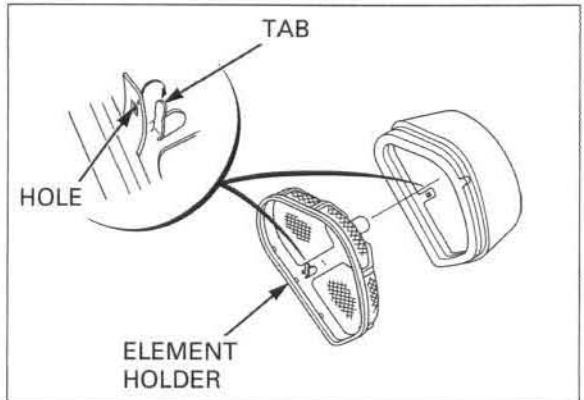
Gently squeeze out excess oil. It is important not to over-oil, or under-oil the element.



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.



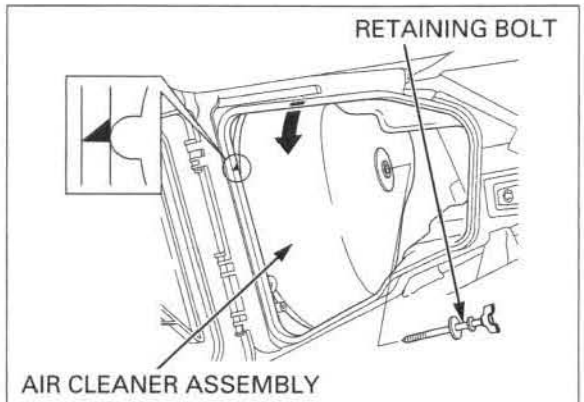
After '07: Apply  $3.5 \pm 2$  g grease to the air cleaner assembly contacting area of the air cleaner housing.

Install the air cleaner assembly into the air cleaner housing.

Carefully position the sealing flange of the element to prevent dirt intrusion.

Align the air cleaner tab with the "△" mark of the air cleaner housing by rotating the air cleaner counter-clockwise.

Install and tighten the retaining bolt securely.



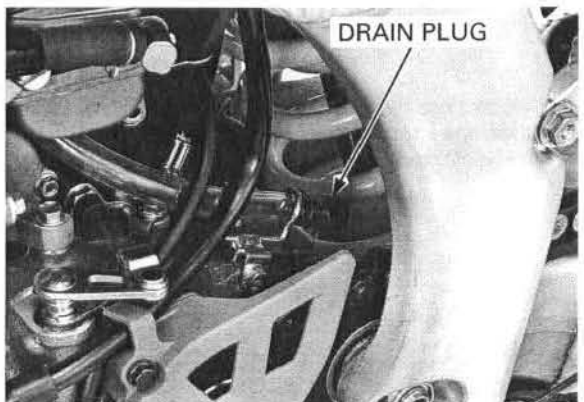
**NOTICE**

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

**CRANKCASE BREATHER**

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

Reinstall the drain plug.

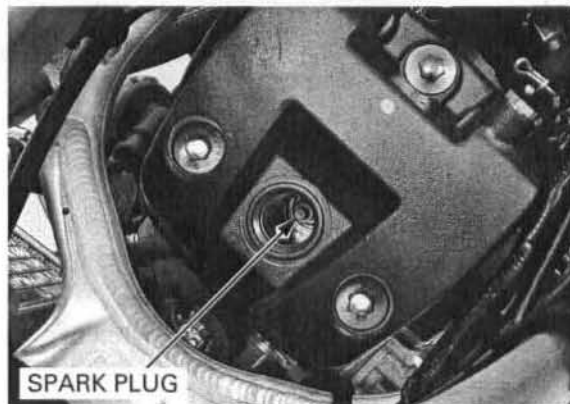
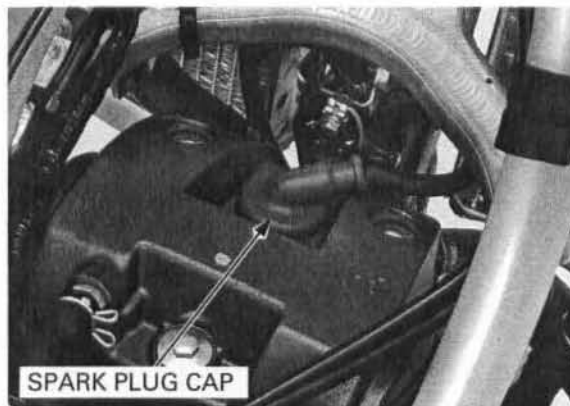


# SPARK PLUG

## REMOVAL

Remove the fuel tank (page 3-8).

Disconnect the spark plug cap from the cylinder head.



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

Remove the spark plug and inspect it for damage.

Inspect or replace as described in the maintenance schedule.

- '05, '06: (page 4-4)
- After '06: (page 4-5)

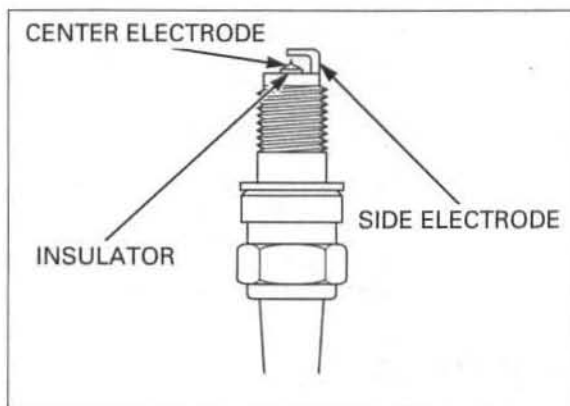
## INSPECTION

Check the following and replace if necessary

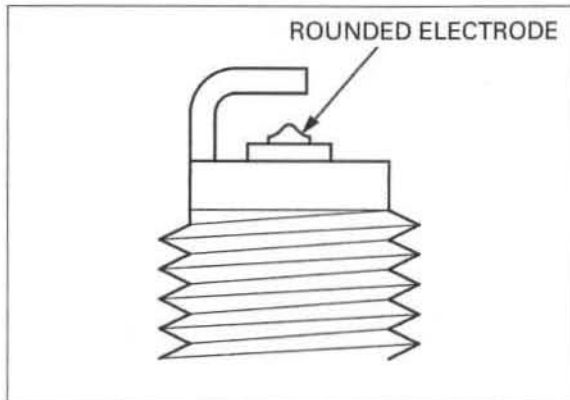
- Insulator for damage
- Electrodes for wear
- Burning condition, coloration;

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

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



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



## RECOMMENDED SPARK PLUG (OR EQUIVALENT)

- Standard** NGK: IFR8H11  
DENSO: VK24PRZ11
- Optional** NGK: IFR9H11  
DENSO: VK27PRZ11

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

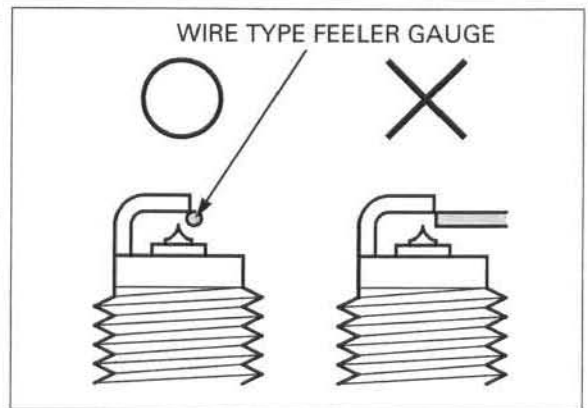
*To prevent damaging the iridium center electrode, use a wire type feeler gauge to check the spark plug gap.*

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

**SPARK PLUG GAP: 1.0 – 1.1 mm (0.039 – 0.043 in)**

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

Make sure that the 1.2 mm (0.05 in) diameter feeler gauge does not insert between the gap. If the gauge can be inserted into the gap, replace the plug with a new one.



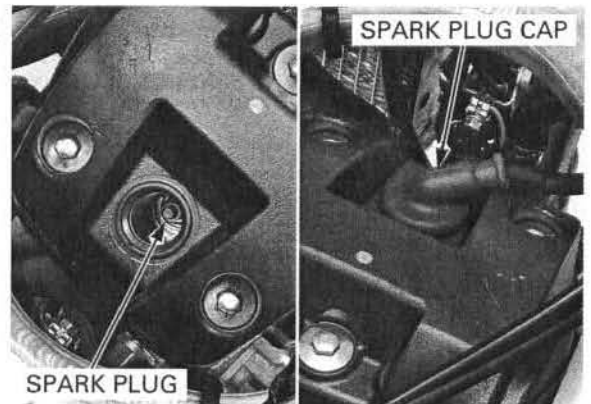
**INSTALLATION**

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

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

Connect the spark plug cap securely.

Install the fuel tank (page 3-8).



**RADIATOR COOLANT**

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

The level should be between the "UPPER" and "LOWER" level lines.

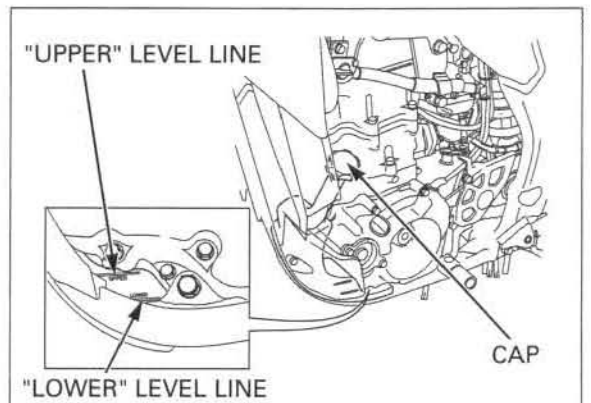
If necessary, add recommended coolant.

**RECOMMENDED ANTIFREEZE:**

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

Remove the filler cap and fill the "UPPER" level line with 1 : 1 mixture of distilled water and antifreeze.

Install the filler cap.



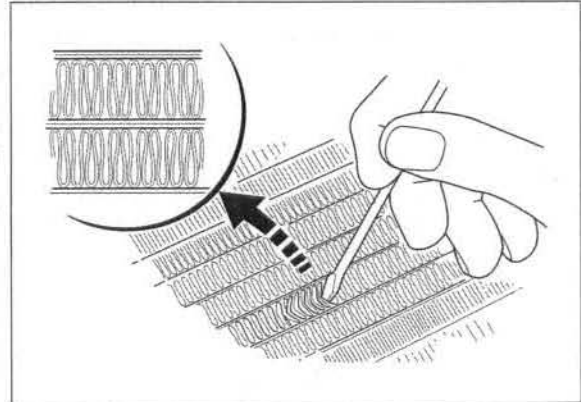
## COOLING SYSTEM

Remove the fuel tank (page 3-8).  
Remove the radiator grill (page 7-8).

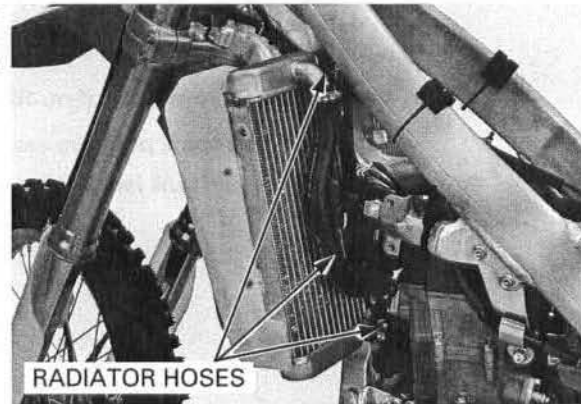
Check the radiator air passages for clogging or damage.

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

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



Inspect the radiator hoses for cracks or deterioration, and replace them if necessary.  
Check the tightness of all water hose clamps (page 1-17).



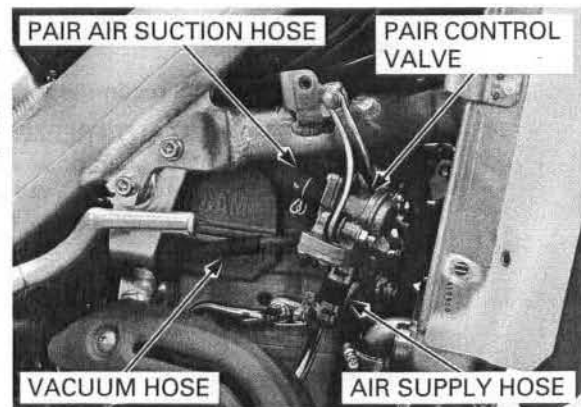
## SECONDARY AIR SUPPLY SYSTEM ('05 and '06 California type, After '06)

Remove the right radiator shroud (page 3-4).

Check the air supply and PAIR air suction hoses for damage or loose connector.

Check the vacuum hose between the cylinder head vacuum joint and PAIR control valve for deterioration, damage or loose connection.

Also check that the hose is not kinked or pinched.



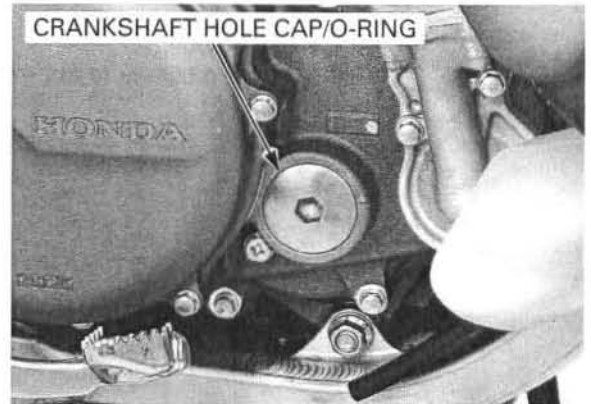


# VALVE CLEARANCE/DECOMPRESSOR SYSTEM

## 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 9-7).
- Remove the crankshaft hole cap and O-ring.

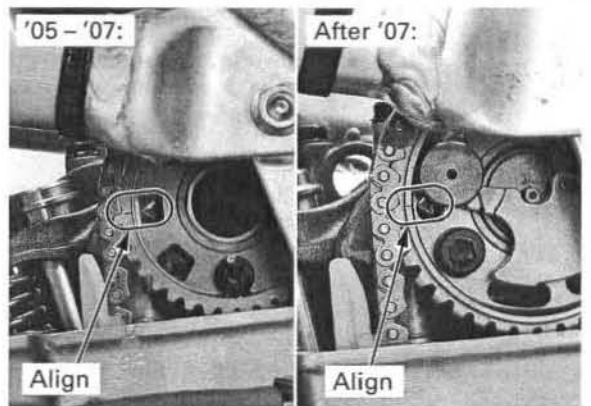
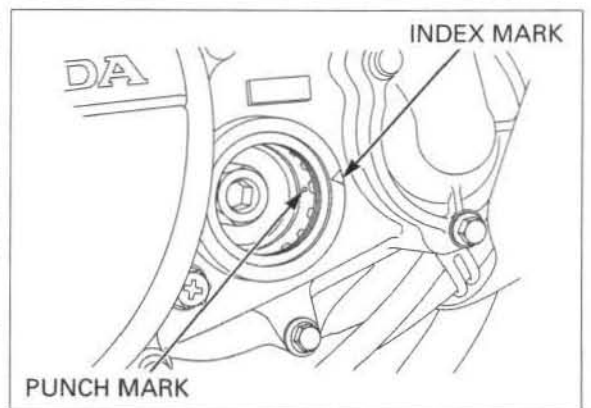


Turn the crankshaft clockwise to align the punch mark with the index mark on the right crankcase cover.

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

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

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



### Intake side:

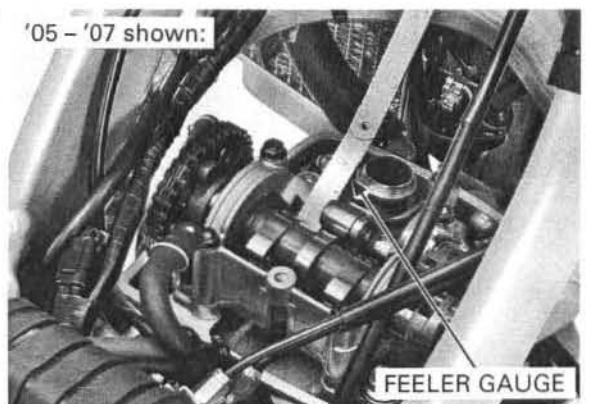
Insert a feeler gauge between the valve lifter and cam lobe.

Check the valve clearance for the intake valves 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 in shim selection if adjustment is required.*





## MAINTENANCE

### Exhaust side:

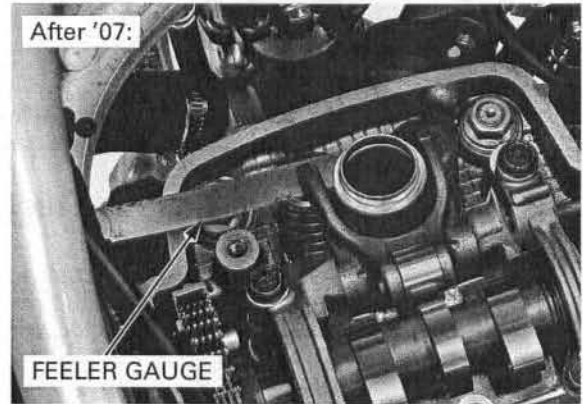
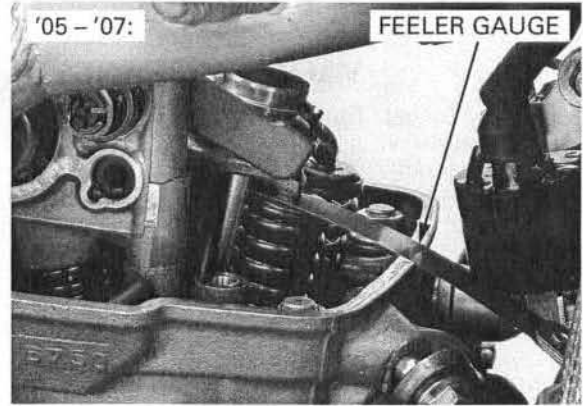
Insert a feeler gauge between the rocker arm and shim.

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

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

### VALVE CLEARANCE:

**EX:**  $0.28 \pm 0.03$  mm ( $0.011 \pm 0.001$  in)



## VALVE CLEARANCE ADJUSTMENT

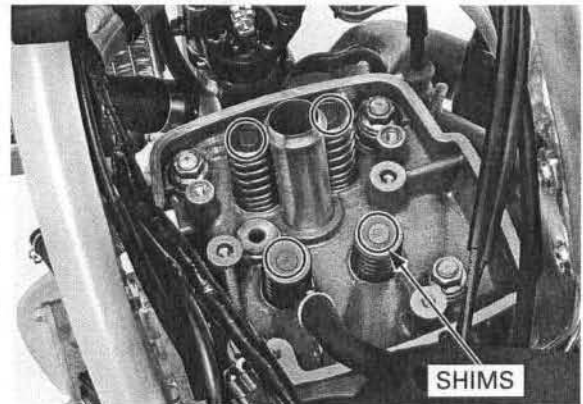
Remove the camshaft holder assembly.

- '05 - '07: (page 9-8)
- After '07: (page 9-16)

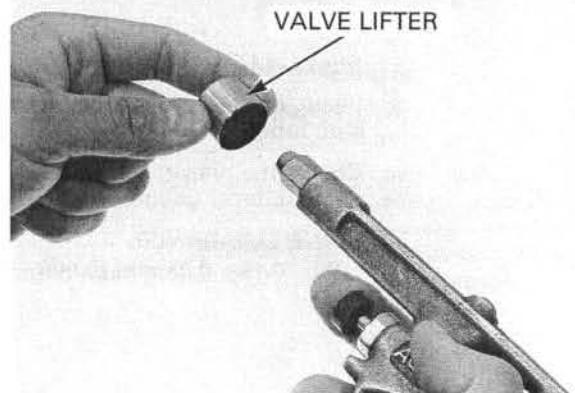
- The shims may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.

Remove the shims.

- Mark all valve lifters and 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.



Measure the shim thickness and record it.

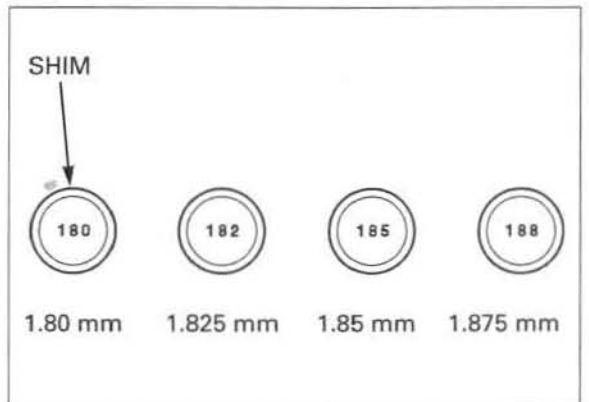
Seventy-three different thickness shims are available from 1.200 mm to 3.000 mm in increments of 0.025 mm.

Calculate the new shim thickness using the equation below.

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

- A: New shim thickness
- B: Recorded valve clearance
- C: Specified valve clearance
- D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim using a micrometer.
- Reface the 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 3.000 mm.



Install the shims in their original locations.

Install the newly selected shims on the valve spring retainers.

Install the camshaft holder assembly.

- '05 - '07: (page 9-37)
- After '07: (page 9-39)

Rotate the camshaft by rotating the crankshaft clockwise several times.

Recheck the valve clearance.



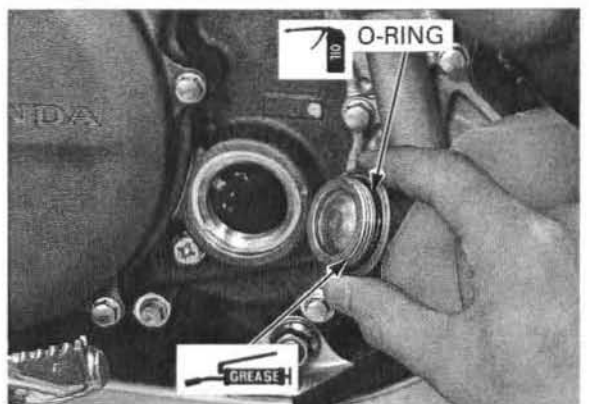
Check that the O-ring is in good condition, replace it if necessary.

Apply 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 9-42).



**DECOMPRESSOR CLEARANCE  
INSPECTION/ADJUSTMENT ('05 – '07)**

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

Always inspect and adjust the decompressor clearance after adjusting the right exhaust valve clearance.

Remove the following:

- Cylinder head cover (page 9-7)
- Crankshaft hole cap (page 9-8)

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

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

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

Measure the decompressor arm clearance by inserting a feeler gauge between the decompressor lifter arm adjuster and right side rocker arm.

**DECOMPRESSOR CLEARANCE:  
RIGHT SIDE EXHAUST VALVE CLEARANCE**  
+  
**0.35 mm (0.014 in)**

**EXAMPLE:**

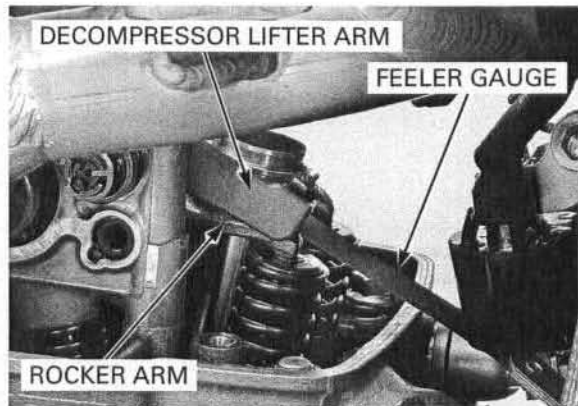
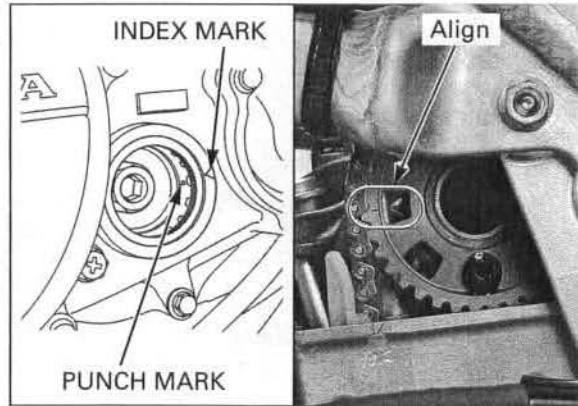
If measured right exhaust valve clearance is 0.28 mm (0.011 in), decompressor clearance is;  
0.28 mm (0.011 in) + 0.35 mm (0.014 in) = 0.63 mm (0.025 in)

If decompressor clearance needs adjustment, see following procedure.

Measure the right exhaust valve clearance by inserting a feeler gauge between the right side rocker arm and shim.

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

Pull out the feeler gauge between the rocker arm and shim.



Insert a feeler gauge (right exhaust valve clearance + 0.35 mm (0.014 in)) between the adjuster and right side rocker arm.  
Loosen the lock nut and turn the adjuster until there is a slight drag on the feeler gauge.

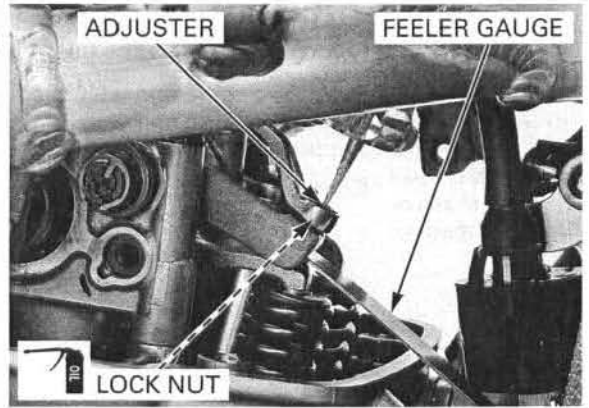
Hold the adjuster and tighten the lock nut.

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

Recheck the decompressor clearance.

Install the following:

- Crankshaft hole cap (page 9-39)
- Cylinder head cover (page 9-42)

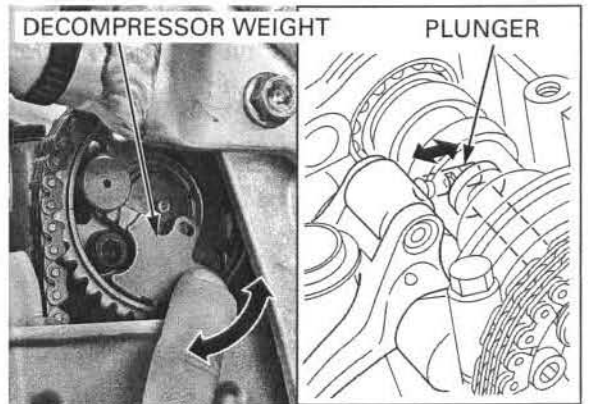


**DECOMPRESSOR SYSTEM (After '07)**

Remove the cylinder head cover (page 9-7).

Make sure of the plunger operation using the following procedure:

1. Move the decompressor weight outward with your finger.
  - The plunger operation is normal if it is retracted.
2. Release the decompressor weight.
  - The decompressor weight should move inward automatically.
  - The plunger operation is normal if it is protruded.



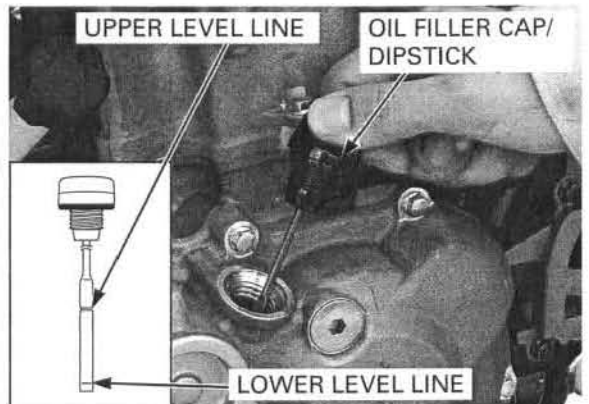
**ENGINE OIL/OIL FILTER**

**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:**

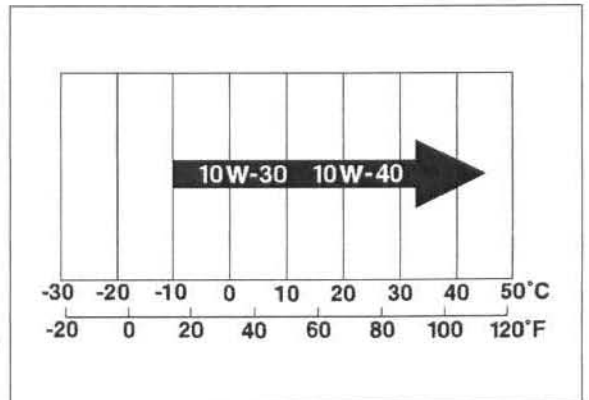
**Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil**  
**API service classification: SG or Higher**  
**JASO T 903 standard: MA**  
**Viscosity: SAE 10W-30**

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

**OIL CAPACITY:**

**0.67 liter (0.71 US qt, 0.59 Imp qt) at draining**  
**0.70 liter (0.74 US qt, 0.62 Imp qt) at oil filter change**

Install the oil filler cap/dipstick.



## MAINTENANCE

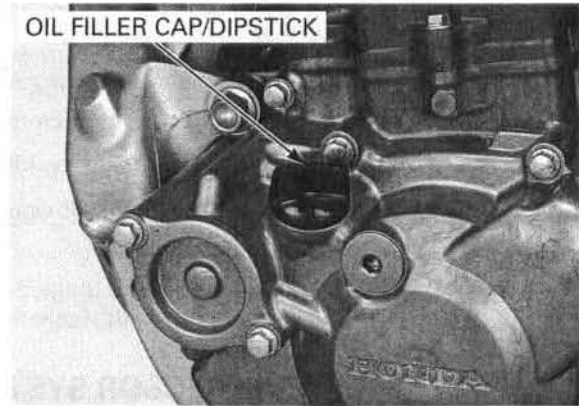
### ENGINE OIL & FILTER CHANGE

Remove the left engine guard (page 3-5).

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

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.

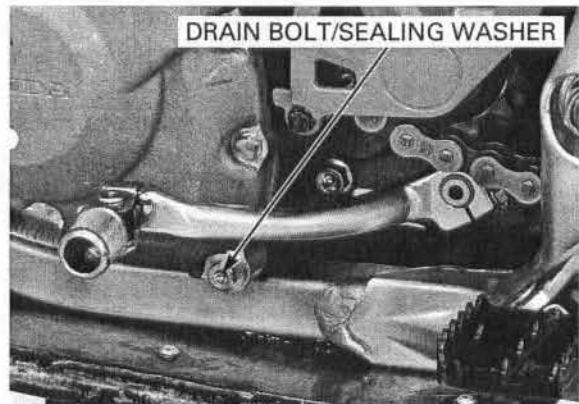


Place an oil pan under the engine to catch the oil.

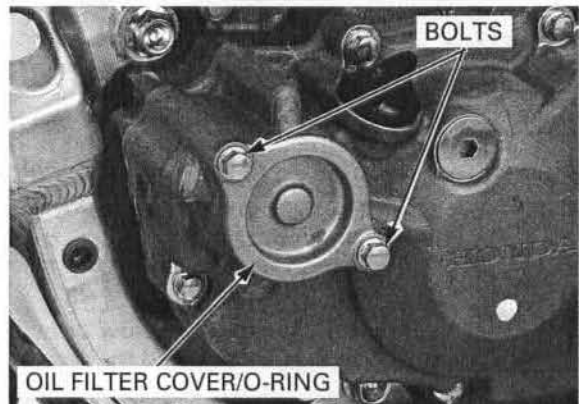
Remove the engine oil drain bolt and sealing washer.

Drain the engine oil.

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



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



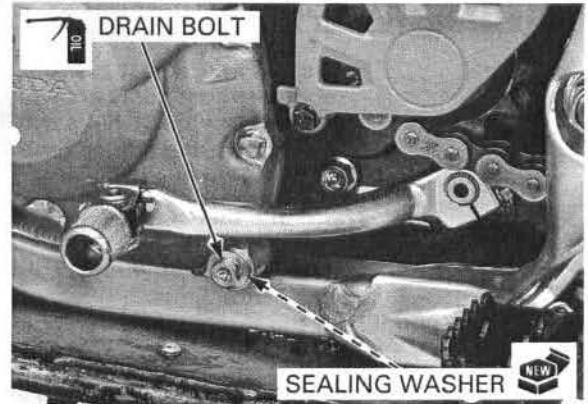
Remove the oil filter and spring.





Apply oil to the engine oil drain bolt threads and seating surface.  
 Install the engine oil drain bolt with a new sealing washer.  
 Tighten the engine oil drain bolt to the specified torque.

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



Apply grease to the oil filter spring contact area.  
 Install the spring into a new oil filter.



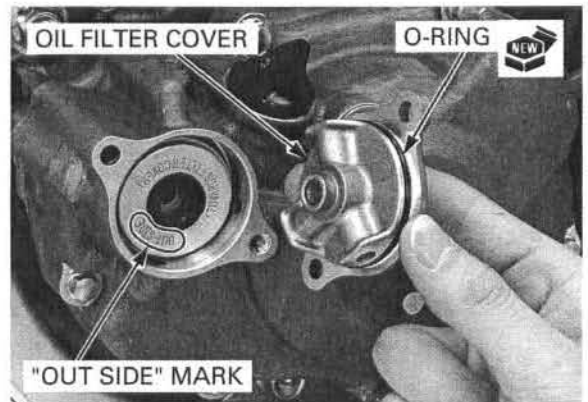
Install the oil filter with the "OUT SIDE" mark facing out.

**NOTICE**

*Installing the oil filter reverse side 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 securely.



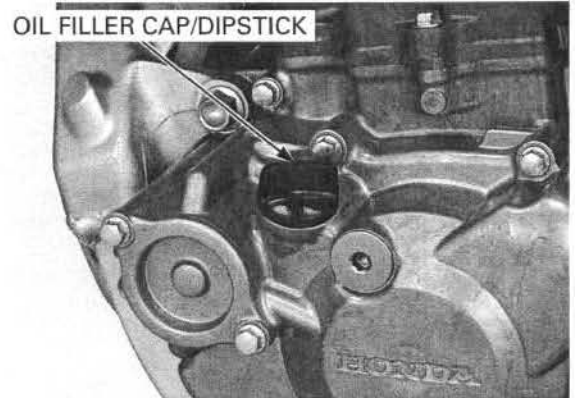
Fill the engine with the recommended oil.

**OIL CAPACITY:**  
**0.67 liter (0.71 US qt, 0.59 Imp qt) at draining**  
**0.70 liter (0.74 US qt, 0.62 Imp qt) at oil filter change**

Install the oil filler cap/dipstick.

Recheck the oil level (page 4-19).  
 Make sure there are no oil leaks.

Install the left engine guard (page 3-5).



## ENGINE IDLE SPEED

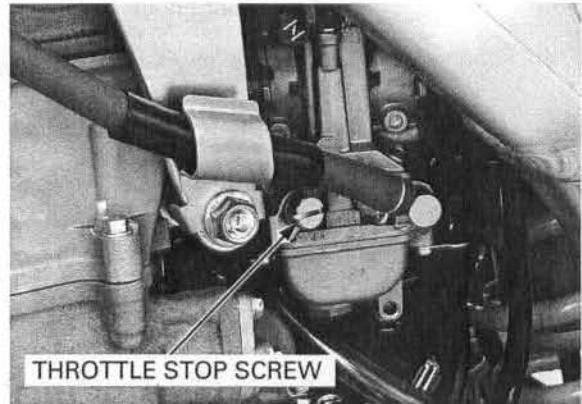
- Inspect and adjust the idle speed after all other engine adjustments are within specifications.
- The engine must be warm for an accurate idle inspection and adjustment. Ten minutes of stop and go riding is sufficient.

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: 1,700 ± 100 rpm**



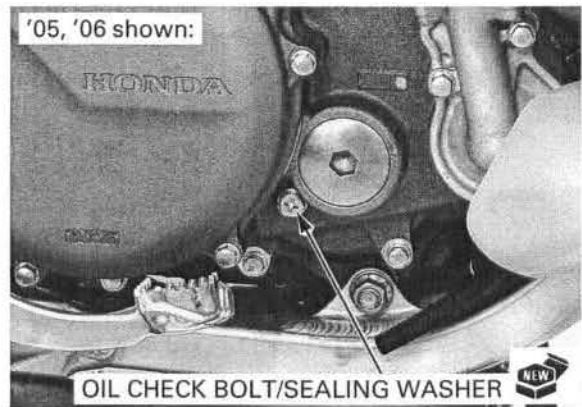
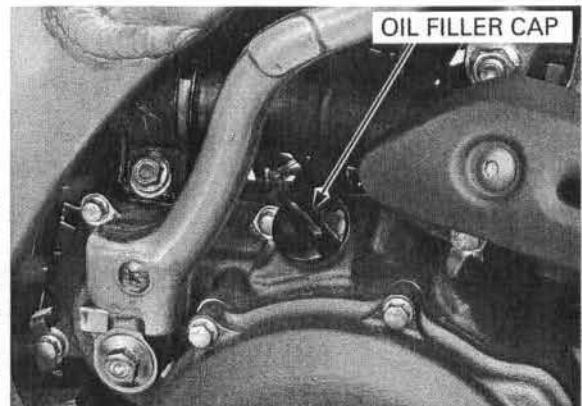
## TRANSMISSION OIL

### OIL LEVEL INSPECTION

1. Start the engine and let it idle for 3 minutes.
2. Stop the engine and wait 3 minutes.
3. Support the motorcycle upright on a level surface.
4. Remove the oil filler cap, oil check bolt and sealing washer from the right crankcase cover. A small amount of oil should flow out of the check bolt hole.
5. If no oil flows out of the check bolt hole, add recommended transmission oil slowly through the oil filler hole until oil starts to flow out of the check bolt hole. Install the oil check bolt with the sealing washer and filler cap.
6. Repeat steps 1 – 5.
7. After checking the oil level or adding oil, install the oil check bolt with a new sealing washer. Tighten the oil check bolt to the specified torque.

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

Install and tighten the oil filler cap securely.





## TRANSMISSION OIL CHANGE

- Transmission oil should be changed at least every 15.0 hours of operation to ensure consistent performance and maximum service life of both transmission and clutch components.
  - Warm-up the engine before draining the oil. This will ensure complete and rapid draining.
1. Support the motorcycle in an upright position on a level surface.
  2. Remove the oil filler cap from the right crankcase cover.
  3. Place an oil pan under the engine to catch the oil, then remove the transmission oil drain bolt and sealing washer.
  4. After the oil has drained completely, apply transmission oil to the transmission oil drain bolt threads and seating surface, then install the drain bolt with a new sealing washer. Tighten the transmission oil drain bolt to the specified torque.

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

5. Fill the engine with the recommended transmission oil.

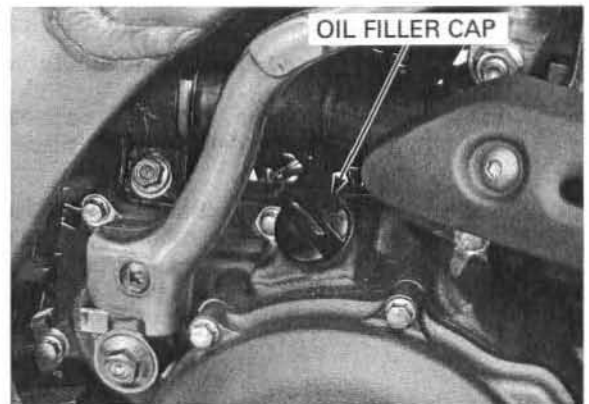
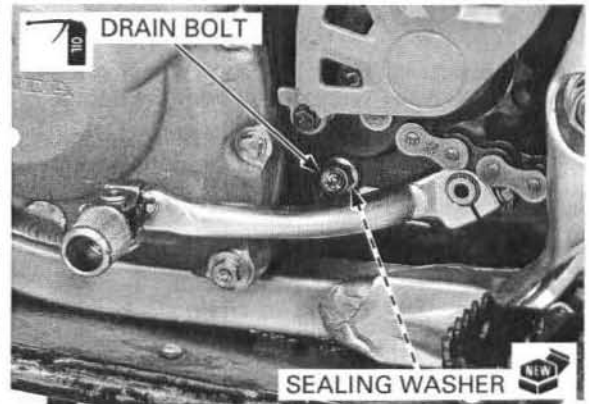
### RECOMMENDED TRANSMISSION OIL:

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

### OIL CAPACITY:

**0.65 liter (0.69 US qt, 0.57 Imp qt) at draining**  
**0.75 liter (0.79 US qt, 0.66 Imp qt) at disassembly**

Check the oil level by following steps 1 – 4 in the oil level check procedure (page 4-22).



**DRIVE CHAIN**

**DRIVE CHAIN SLACK INSPECTION**

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

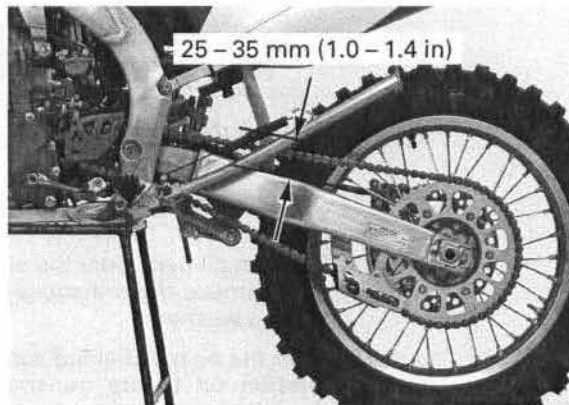
Raise the rear wheel off the ground by placing a workstand under the engine.

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

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

**NOTICE**

*Excessive chain slack, 60 mm (2.4 in) or more, may damage the frame.*



**ADJUSTMENT**

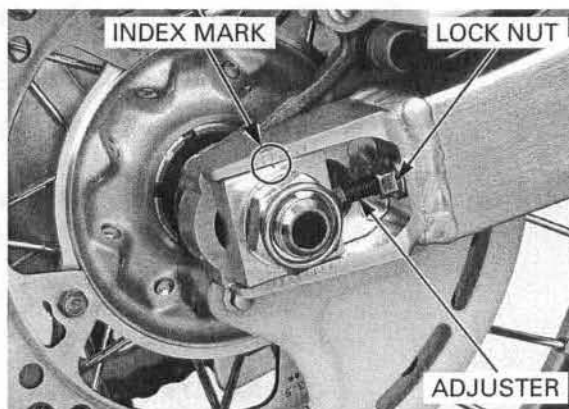
If the chain needs adjustment, loosen the axle nut and adjuster lock nuts, and turn the adjusters.

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

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

After torquing the axle nut, seat the adjusters snugly against the adjusting blocks and tighten the adjuster lock nuts to the specified torque.

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



**CLEANING AND LUBRICATION**

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

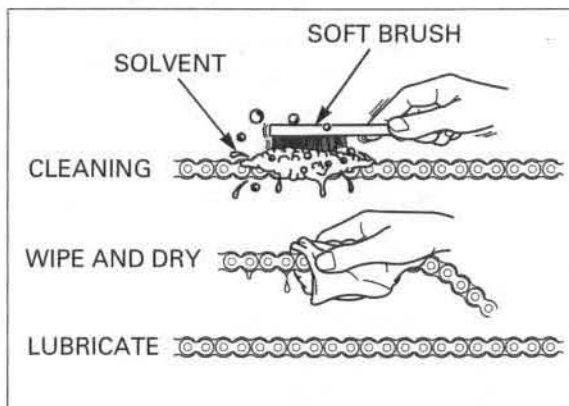
Be sure the chain has dried completely before lubricating.

Inspect the chain for possible wear or damage; replace any chain that has damaged rollers or loose fitting links.

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.

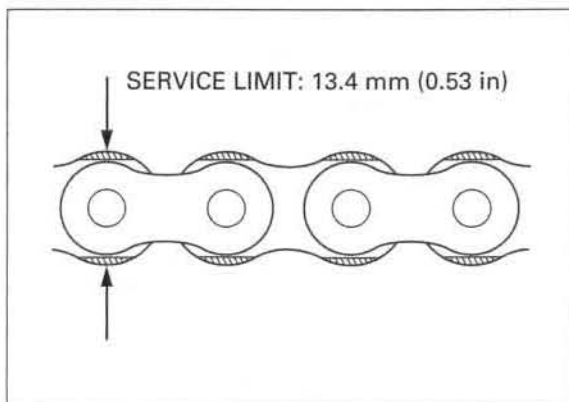
Inspect and replace sprocket as necessary.



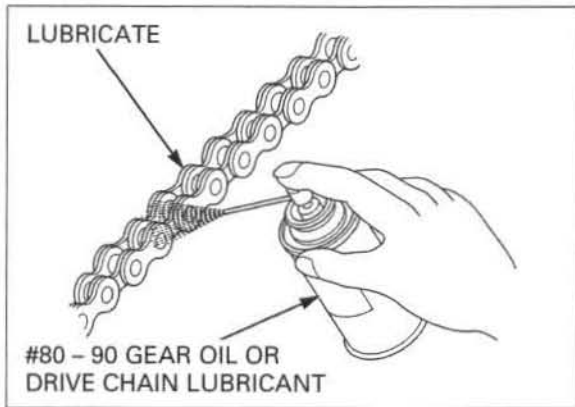
Measure the drive chain inner plate width.

**SERVICE LIMIT: 13.4 mm (0.53 in)**

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



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



**REPLACEMENT**

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

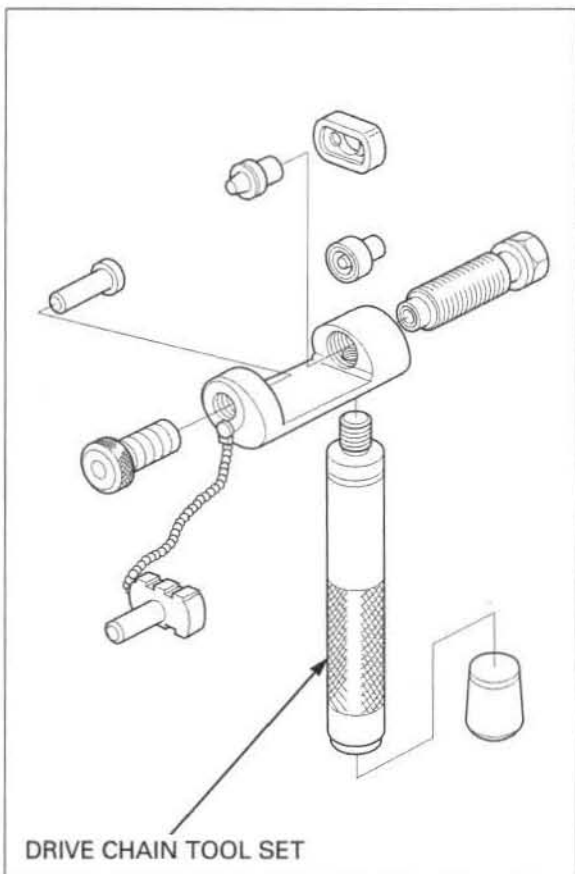
Loosen the drive chain (page 4-24).

Assemble the special tool as shown.

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

**TOOL:**  
**Drive chain tool set**

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

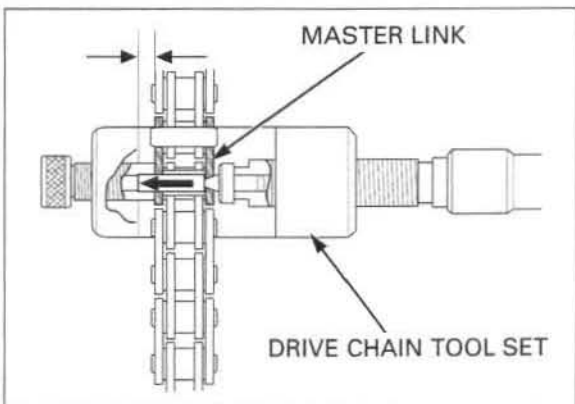


Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

**TOOL:**  
**Drive chain tool set**

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

Remove the drive chain.



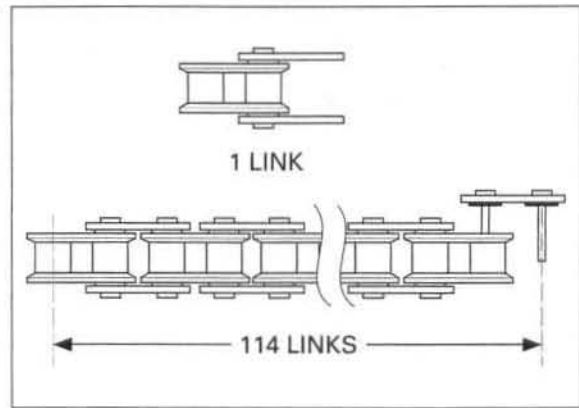
## MAINTENANCE

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

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

**STANDARD LINKS: 114 LINKS**

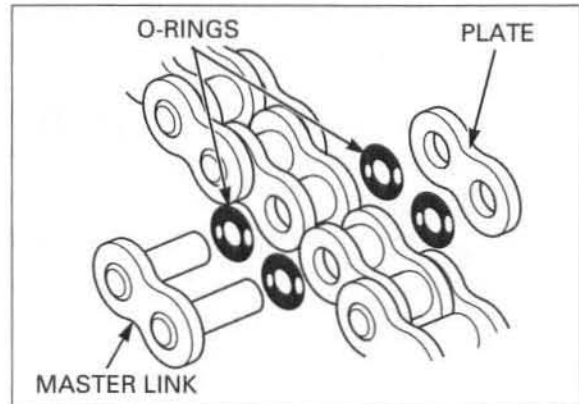
**REPLACEMENT CHAIN: DID520MXV**



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

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

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

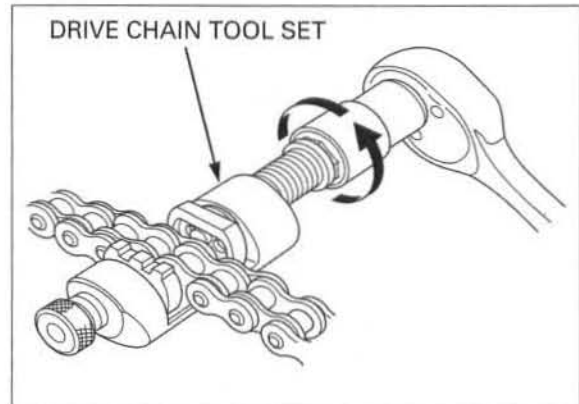


Assemble and set the drive chain tool set.

**TOOL:**

**Drive chain tool set**

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



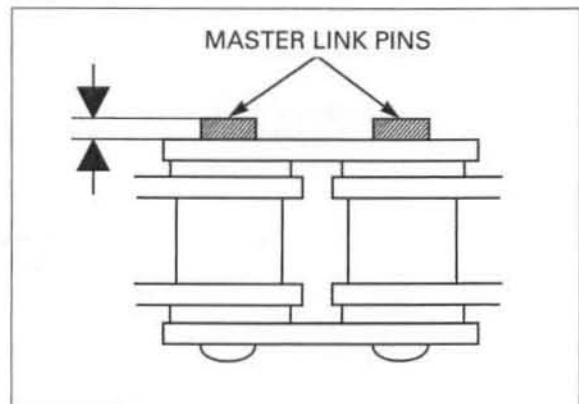
Make sure that the master link pins are installed properly.

Measure the master link pin length projected from the plate.

**STANDARD LENGTH:**

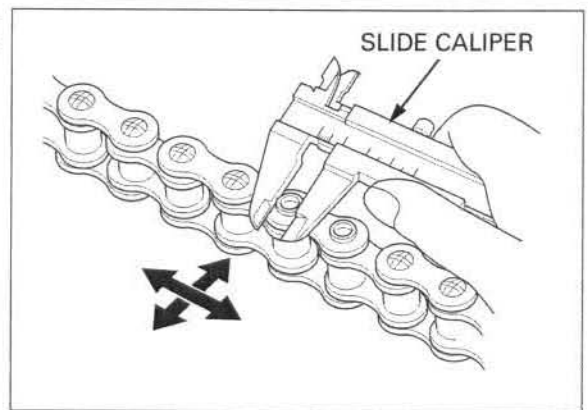
**1.15 – 1.55 mm (0.045 – 0.061 in)**

Stake the master link pins.



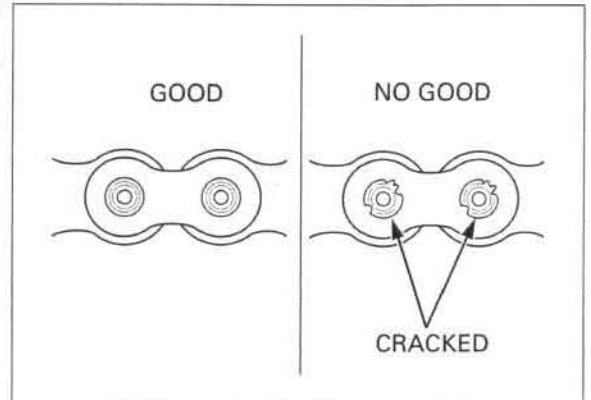
Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

**DIAMETER OF THE STAKED AREA:**  
5.50 – 5.80 mm (0.217 – 0.228 in)



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

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



## DRIVE CHAIN SLIDER

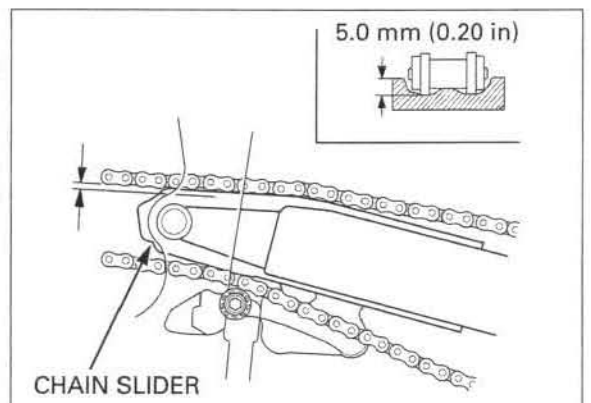
### CHAIN SLIDER

Inspect the drive chain slider for excessive wear.

**SERVICE LIMIT:** 5.0 mm (0.20 in) from upper surface

#### NOTICE

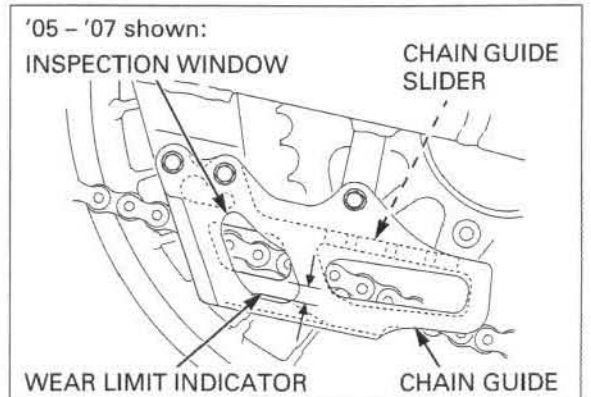
*If the chain slider becomes worn through to the swingarm, the chain will wear against the swingarm, damaging the chain and swingarm.*



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

Replace the chain guide if it is damaged or worn.

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



## MAINTENANCE

### DRIVE CHAIN ROLLER

Remove the left step bracket (page 15-30).

Inspect the drive chain rollers for excessive wear or binding.

#### SERVICE LIMIT:

Minimum roller O.D.: Upper: 39 mm (1.5 in)

Lower: 35 mm (1.4 in)

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

Replace the rollers if necessary, and tighten the roller bolt and nut to the specified torque.

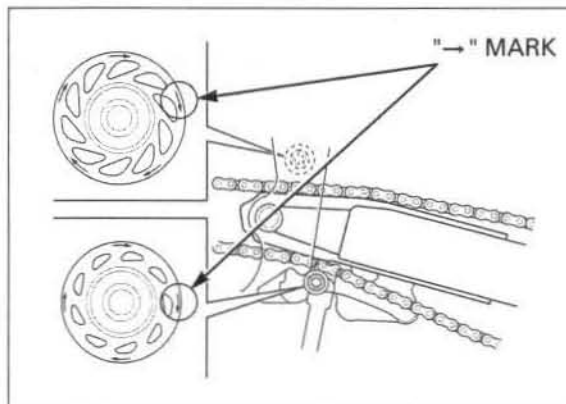
#### TORQUE:

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

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

#### NOTE:

- Upper roller: Green
- Lower roller: Black

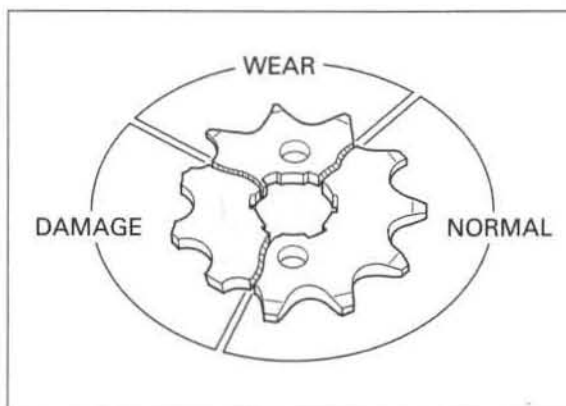


### DRIVE/DRIVEN SPROCKET

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

Never use a new drive chain on worn sprockets.

Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



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

If any are loose, torque them.

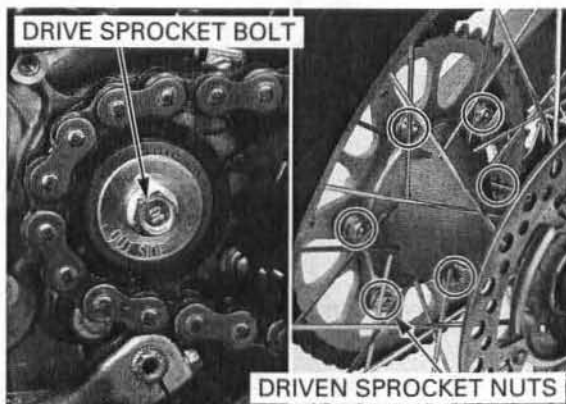
#### TORQUE:

Drive sprocket bolt:

31 N·m (3.2 kgf·m, 23 lbf·ft)

Driven sprocket nut:

32 N·m (3.3 kgf·m, 24 lbf·ft)



# BRAKE FLUID

## NOTICE

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

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

## FLUID LEVEL INSPECTION

When the fluid level is low, check the brake pads for wear (page 4-30). 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 4-29).

### 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 4-30).



### REAR BRAKE:

Support the motorcycle in an upright position on a level surface.

If the level is near the lower level line, check the brake pad wear (page 4-30).



## FLUID FILLING

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

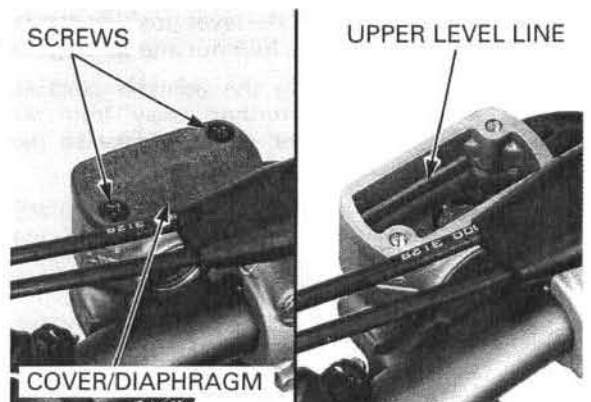
### FRONT:

Remove the screws, cover and diaphragm. 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: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Check the entire system for leaks.





## MAINTENANCE

### REAR:

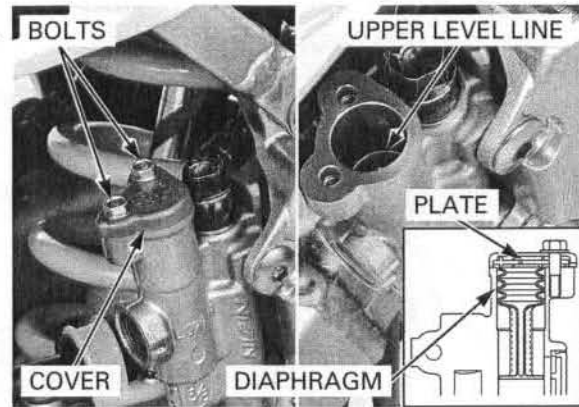
Remove the bolts, cover, plate and diaphragm.  
Fill the reservoir with DOT 4 brake fluid to the upper level line.

*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.

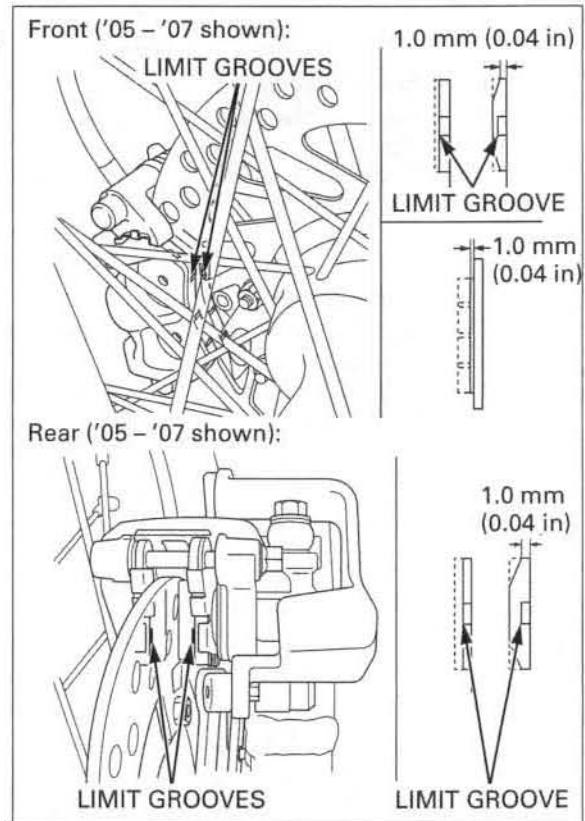


## BRAKE PAD WEAR

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

**SERVICE LIMIT: 1.0 mm (0.04 in)**

For brake pad replacement (page 16-10).



## BRAKE SYSTEM

### LEVER POSITION INSPECTION

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

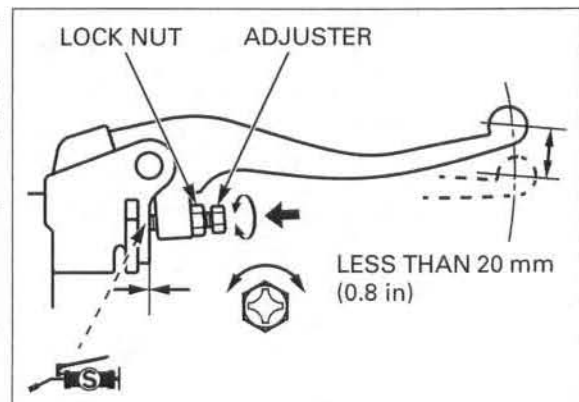
Turning the adjuster clockwise moves the brake lever farther away from the grip; turning the adjuster counterclockwise moves the brake lever closer to the grip.

*Apply grease to the contact faces of the adjuster 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 freeplay exceeds 20 mm (0.8 in), there is air in the system that must be bled.  
For brake system bleeding (page 16-7).



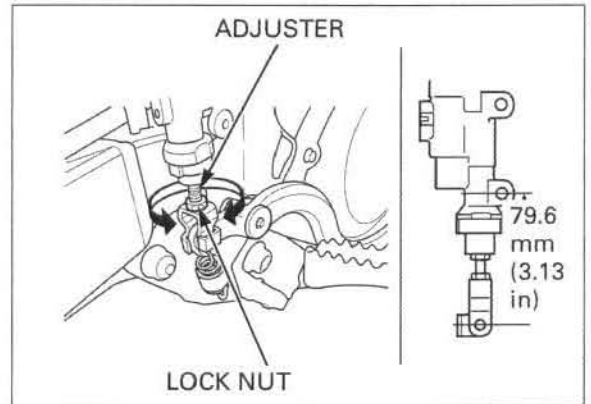
### BRAKE PEDAL HEIGHT

Adjust the brake pedal to the desired height by loosening the lock nut and turning the brake pedal adjuster.

**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)**



### HEADLIGHT AIM

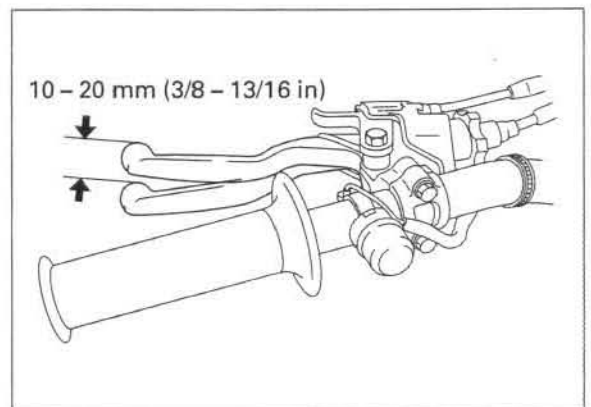
Adjust the headlight beam vertically by turning the adjusting screw on the front visor.



### CLUTCH SYSTEM

Measure the clutch lever freeplay at the lever end.

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

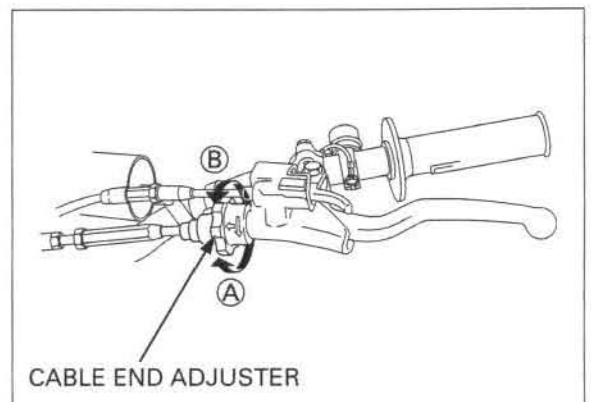


Minor adjustments can be made with the cable end adjuster.

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

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

Make the major adjustment with the in-line cable adjuster.

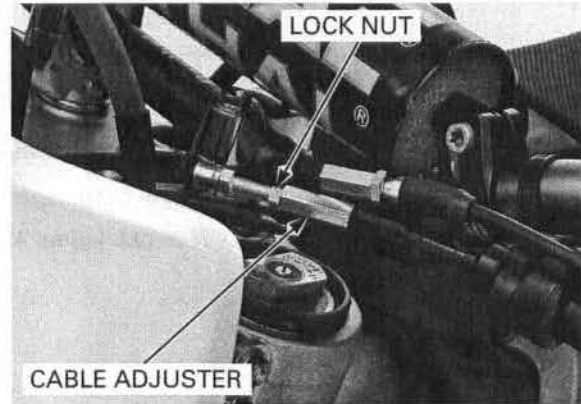


## MAINTENANCE

Major adjustments can be made with the in-line cable adjuster.

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

If proper freeplay cannot be obtained using both procedures or the clutch slips during the test ride, disassemble and inspect the clutch (page 11-9).



## CONTROL CABLES

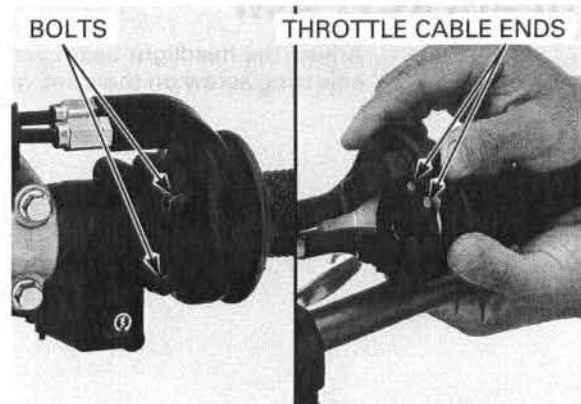
Remove the dust cover and throttle housing bolts. Turn the handlebar to the right fully and remove the throttle housing from the handlebar. Disconnect the throttle cable end from the throttle pipe.

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

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

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

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

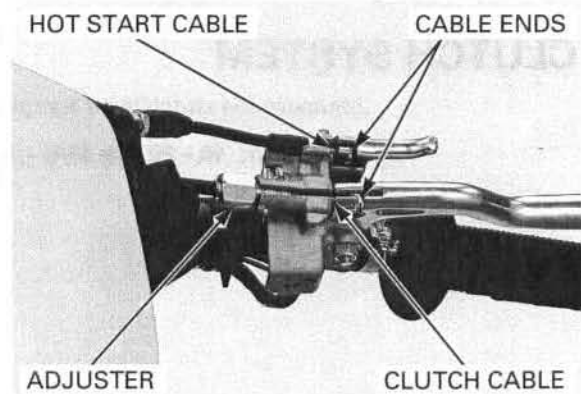


Turn the adjuster and remove the clutch cable. Disconnect the clutch cable upper end and hot start cable upper end from the levers.

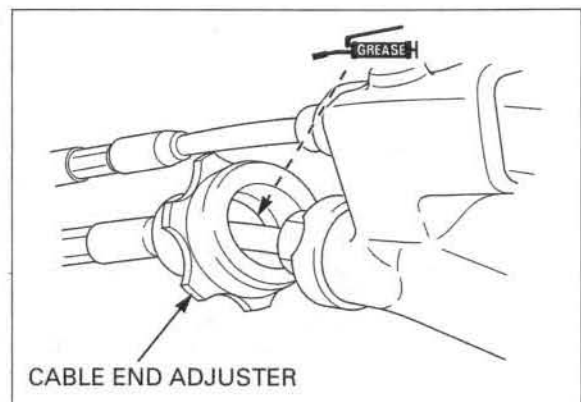
*It is not necessary to lubricate the entire cable.*

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

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



Apply grease to the clutch cable end adjuster inside surface.



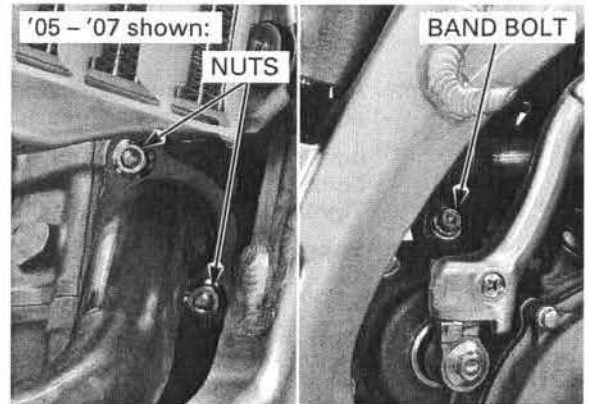
## EXHAUST PIPE/MUFFLER

### EXHAUST SYSTEM INSPECTION

Check the muffler joint band bolt and exhaust pipe joint nuts for looseness and exhaust gas leaks. Tighten the bolt and nuts of the exhaust system to the specified torque.

#### TORQUE:

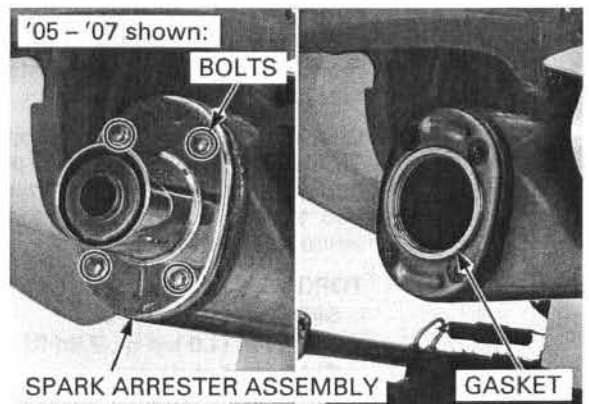
- Exhaust pipe joint nut:  
21 N·m (2.1 kgf·m, 15 lbf·ft)
- Muffler joint band bolt:  
21 N·m (2.1 kgf·m, 15 lbf·ft)



## SPARK ARRESTER

### REMOVAL

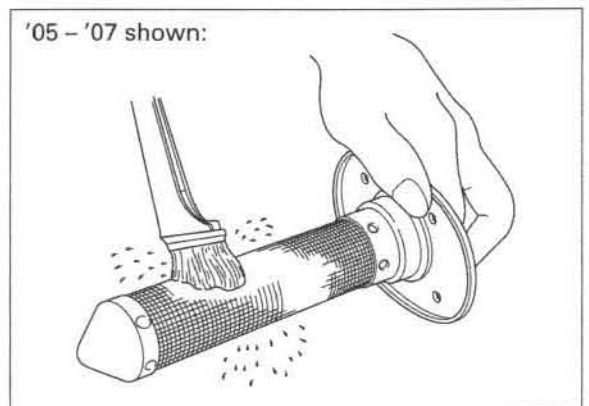
Remove the bolts, spark arrester assembly and gasket.



### INSPECTION/CLEANING

Check the mesh screen is in good condition.

Use a soft brush to remove carbon deposits from the spark arrester screen. Be careful to avoid damaging the spark arrester screen. The spark arrester must be free of breaks and holes, replace it if necessary.



## MAINTENANCE

### INSTALLATION

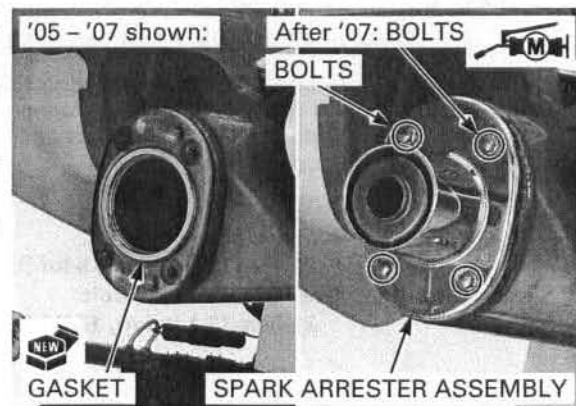
'05 - '07: Install a new gasket, spark arrester assembly and bolts.  
Tighten the bolts to the specified torque.

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

After '07: Apply molybdenum disulfide grease (TB1901 or equivalent) to the bolt threads.

Install a new gasket, spark arrester assembly and bolts.  
Tighten the bolts to the specified torque.

**TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)**



## SIDESTAND

### INSPECTION

Support the motorcycle upright on a level surface.

Check the sidestand spring for damage or loss of tension.

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

Check the pivot bolt and nut on the sidestand.  
Tighten the pivot bolt to the specified torque.  
Loosen the pivot bolt counterclockwise 45° - 90°, and tighten the pivot nut to the specified torque while holding the pivot bolt.

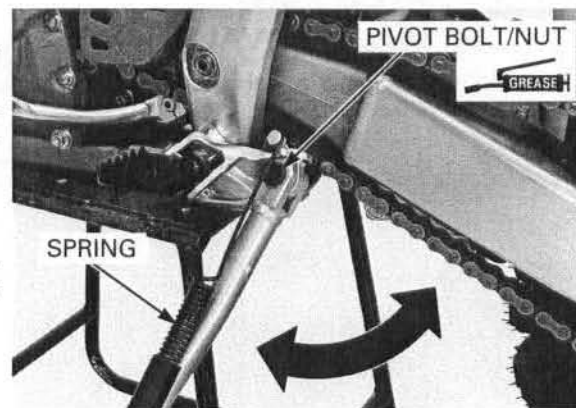
#### TORQUE:

**Sidestand pivot bolt:**

**10 N·m (1.0 kgf·m, 7 lbf·ft) - 45° to 90°**

**Sidestand pivot nut:**

**39 N·m (4.0 kgf·m, 29 lbf·ft)**



## SUSPENSION

### FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes 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.

For fork service (page 14-13).





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

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

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

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

Loosen the pressure release screws fully, then tighten them.

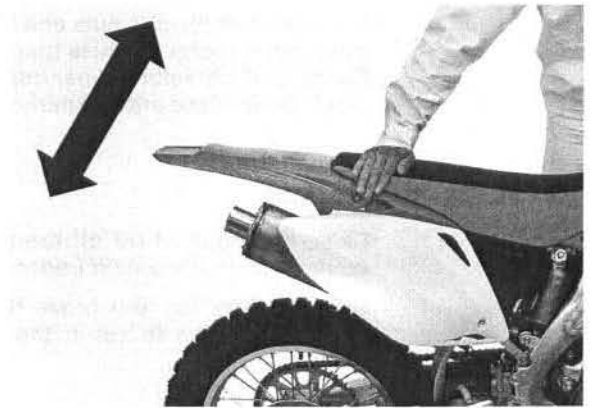
**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**



PRESSURE RELEASE SCREW

## REAR SUSPENSION INSPECTION

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



SHOCK ABSORBER ASSEMBLY

Lift the sub-frame (page 6-11).

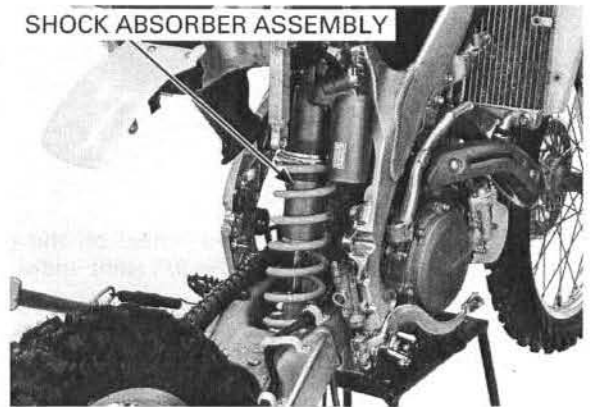
Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

For shock absorber service (page 15-14).

Lower the sub-frame (page 6-25).



## 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 swingarm and attempting to move the swingarm side-to-side.

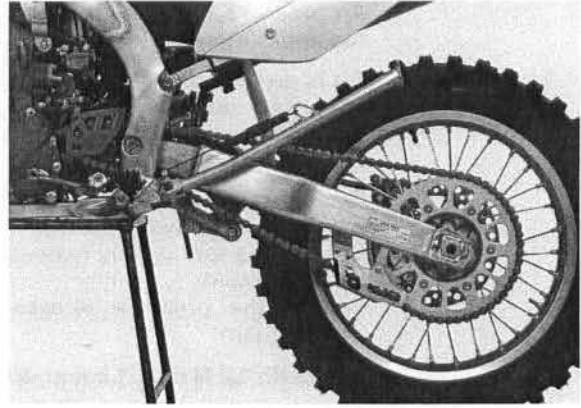
Replace the bearings if excessively worn (page 15-39).

Check the shock linkage and replace any damaged needle bearings.



## MAINTENANCE

Disassemble, clean, inspect the swingarm and shock linkage pivot bearings and related seals about 7.5 hours of operation (page 15-32). Lubricate and reassemble.



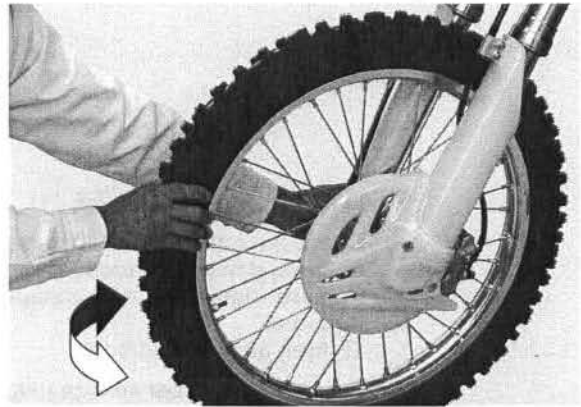
## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-14).  
Check that all safety clips, hose clamps and cable stays are in place and properly secured.

## WHEELS/TIRES

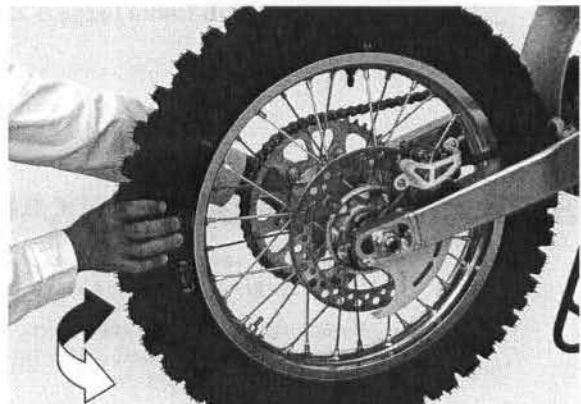
Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

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



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

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





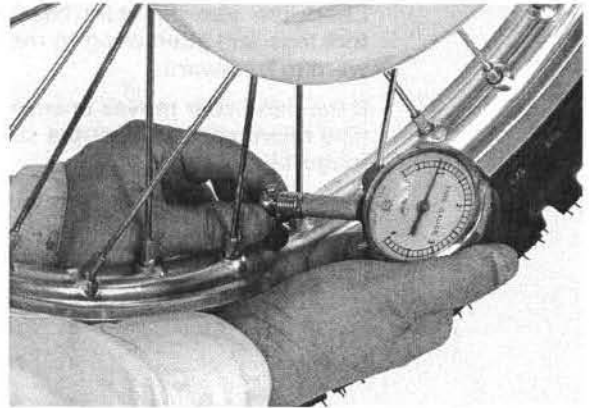
Check the tires for cuts, embedded nails, or other damage.  
 Check the front (page 14-9) and rear (page 15-9) wheels for trueness.

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

Check the cold tire pressure.

**TIRE PRESSURE:**

**FRONT:** 98 kPa (1.0 kgf/cm<sup>2</sup>, 14 psi)  
**REAR:** 98 kPa (1.0 kgf/cm<sup>2</sup>, 14 psi)



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

**TOOLS:**

**FRONT:**

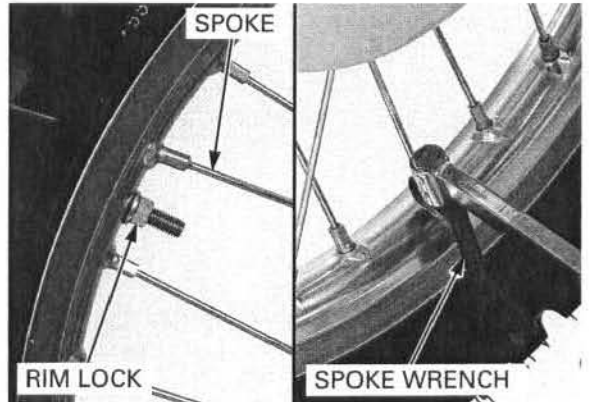
Spoke wrench, 6.1 mm      07JMA-MR60100 or 07701-0020300 (6.1 mm)

**REAR:**

Spoke wrench, 6.6 mm      070MA-KZ30100

**TORQUE:**

**Front spoke:**  
 3.68 N·m (0.4 kgf·m, 2.7 lbf·ft)  
**Rear spoke:**  
 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)  
**Front/rear rim Lock:**  
 12 N·m (1.2 kgf·m, 9 lbf·ft)



**STEERING HEAD BEARINGS**

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

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

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



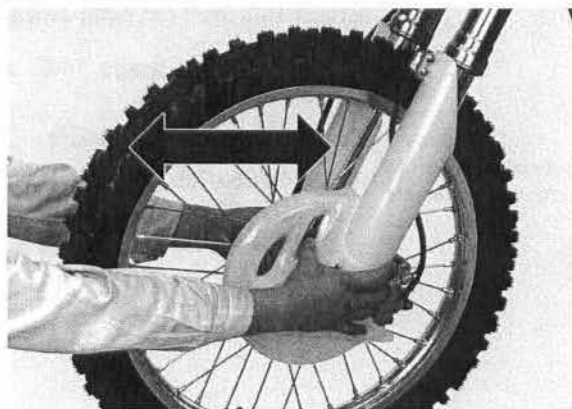
## MAINTENANCE

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

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 14-48).

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



# 5. LUBRICATION SYSTEM

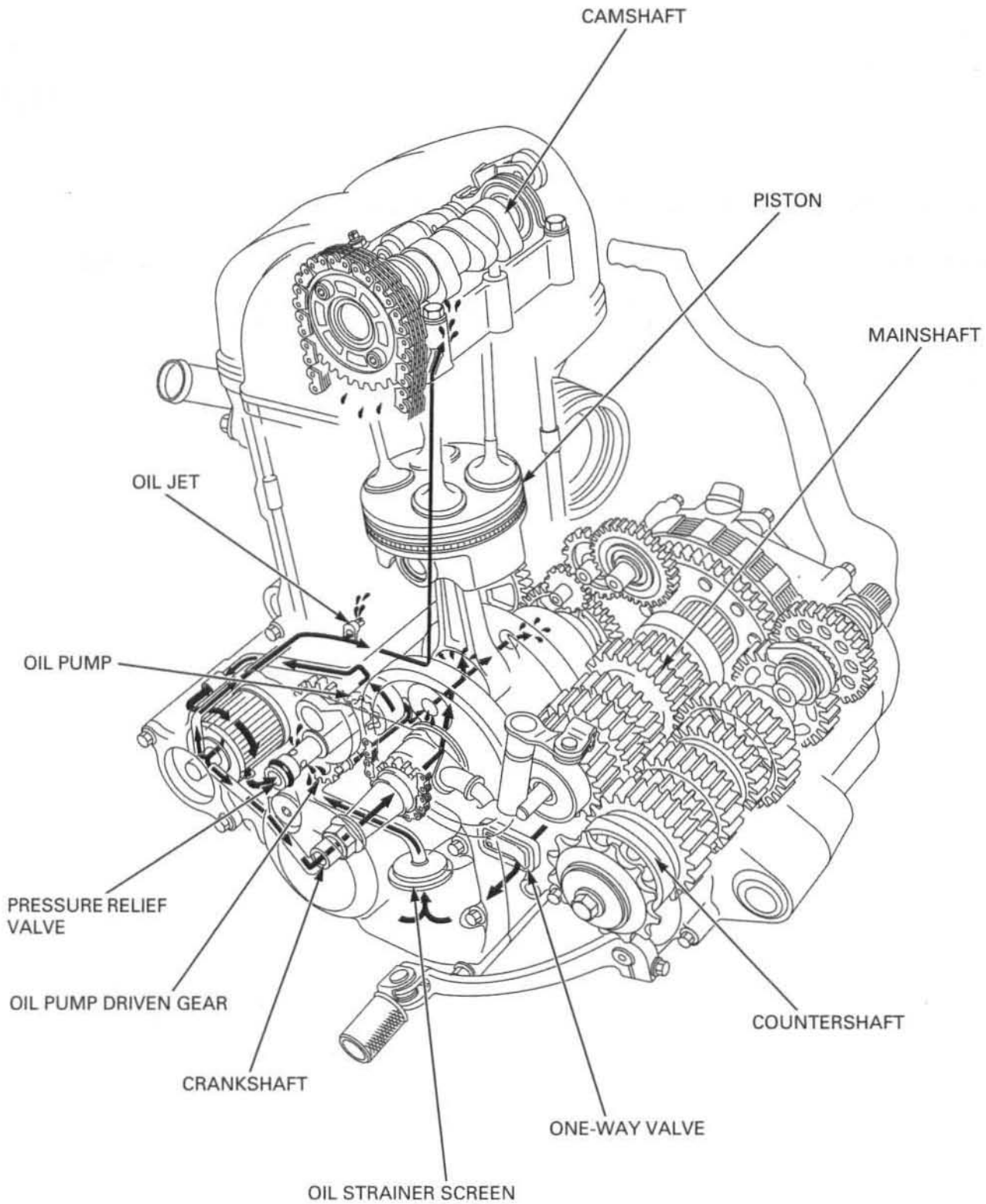
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LUBRICATION SYSTEM DIAGRAM .....	5-2	PRESSURE RELIEF VALVE .....	5-5
SERVICE INFORMATION .....	5-3	OIL JET .....	5-6
TROUBLESHOOTING .....	5-3	OIL PUMP .....	5-7
OIL STRAINER .....	5-4		

# LUBRICATION SYSTEM

## LUBRICATION SYSTEM DIAGRAM

'05 - '07 shown:



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

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.67 liter (0.71 US qt, 0.59 Imp qt)	–
	At filter change	0.70 liter (0.74 US qt, 0.62 Imp qt)	–
	At disassembly	0.87 liter (0.92 US qt, 0.77 Imp qt)	–
Transmission oil capacity	At draining	0.65 liter (0.69 US qt, 0.57 Imp qt)	–
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)	–
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	–
	Side clearance	0.05 – 0.13 (0.002 – 0.005)	–

### TORQUE VALUE

Oil jet mounting bolt

10 N·m (1.0 kgf·m, 7 lbf·ft)

Apply locking agent to the threads

## 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 mechanical seal
  - Faulty head gasket
  - Water leak in crankcase

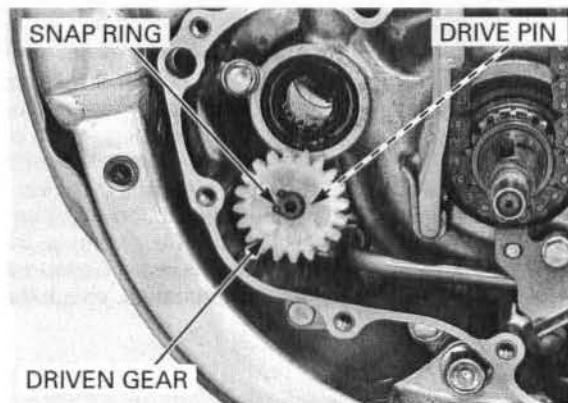
# OIL STRAINER

## REMOVAL/INSPECTION

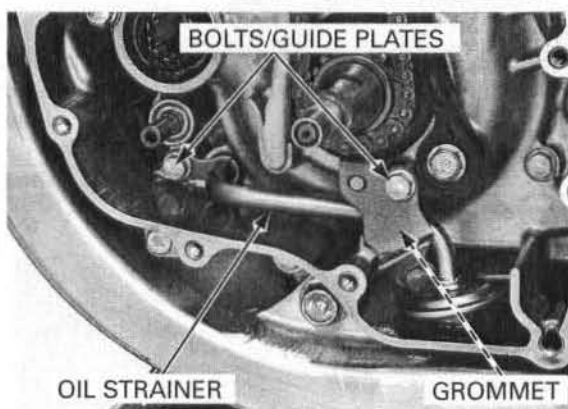
Remove the following:

- Left crankcase cover (page 12-4)
- Flywheel (page 12-5)
- Balancer (page 13-8)

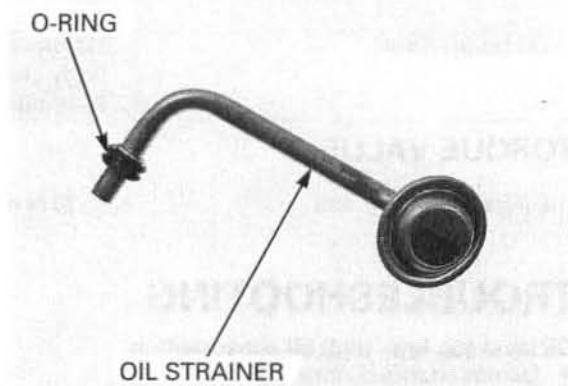
Remove the snap ring and oil pump driven gear.  
Remove the drive pin.



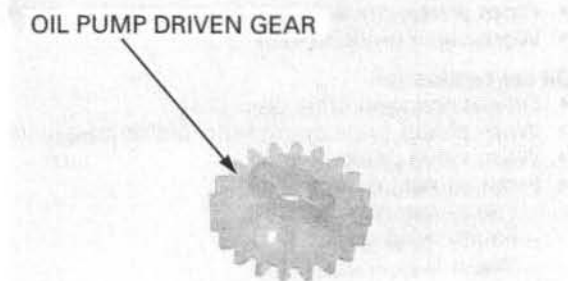
Remove the bolts, guide plates, oil strainer and grommet.



Remove the O-ring from the oil strainer.  
Check the oil strainer for damage or clogs.  
Clean the oil strainer screen.



Check the oil pump driven gear for wear or damage.

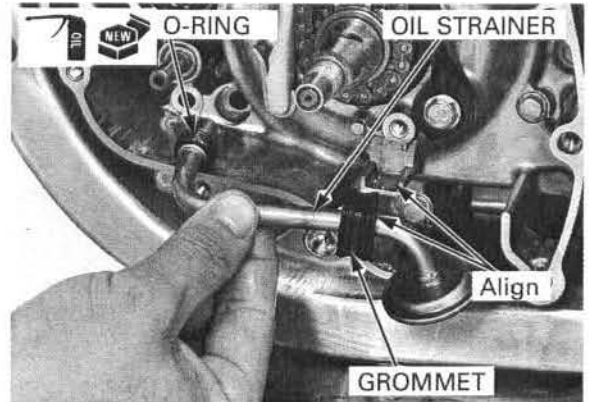


**INSTALLATION**

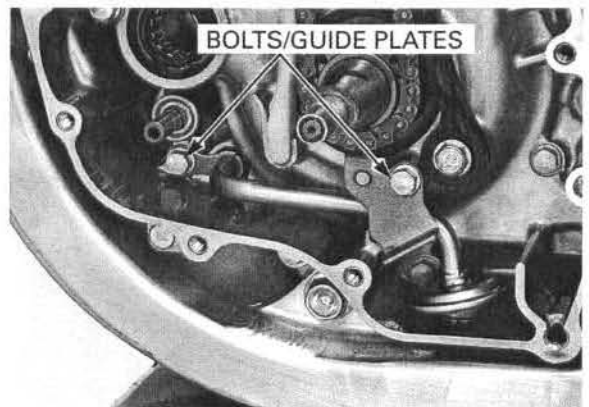
Apply oil to a new O-ring and install it onto the oil strainer.

Install the grommet onto the oil strainer.

Install the oil strainer to the crankcase.



Install the guide plates and tighten the bolts securely.

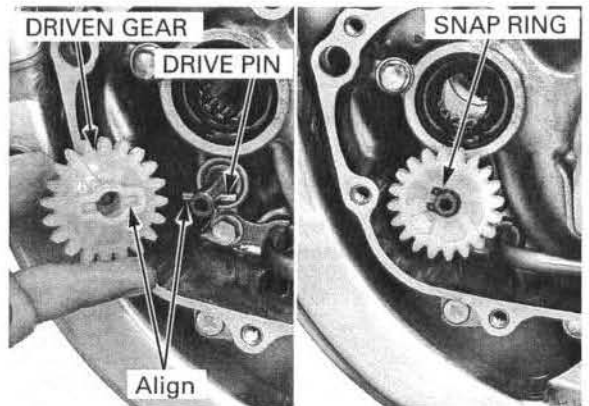


Install the drive pin into the oil pump shaft.  
Install the oil pump driven gear aligning its cut-outs with the drive pin.

Install the snap ring securely.

Install the following:

- Balancer (page 13-8)
- Flywheel (page 12-6)
- Left crankcase cover (page 12-6)

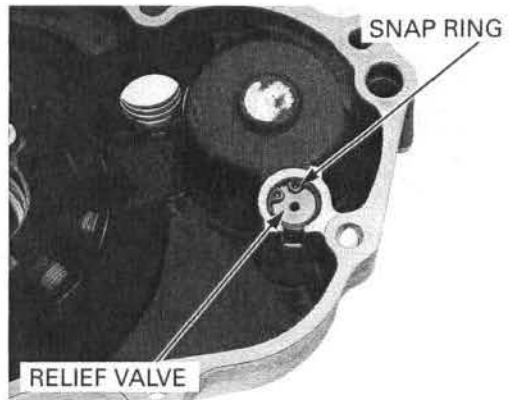


**PRESSURE RELIEF VALVE**

**REMOVAL/INSPECTION**

Remove the left crankcase cover (page 12-4).

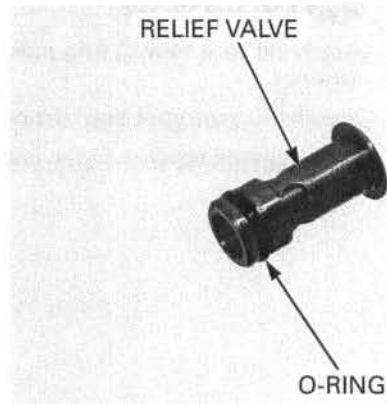
Remove the snap ring and pressure relief valve from the left crankcase cover.





## LUBRICATION SYSTEM

Check the pressure relief valve for damage or clogs.  
Remove the O-ring from the pressure relief valve.

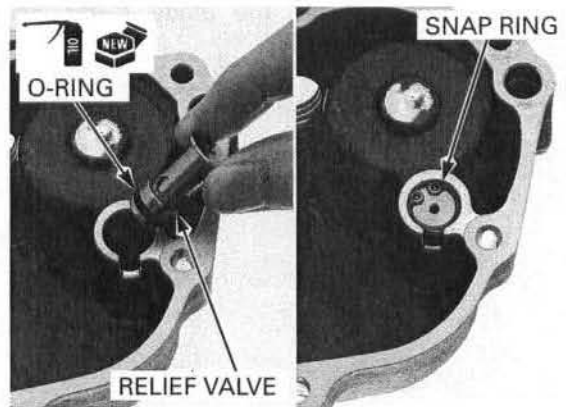


### INSTALLATION

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.

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

Install the snap ring securely.  
Install the left crankcase cover (page 12-6).



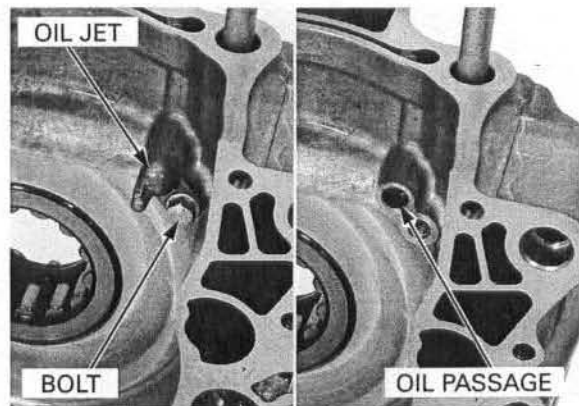
## OIL JET

### REMOVAL/INSPECTION

Separate the left and right crankcase halves (page 13-10).

Remove the bolt and oil jet from the left crankcase.

Check the left crankcase oil passage for clogging.  
Clean the oil passage.



Check the oil jet for damage or clogging.  
Blow the oil passage in the oil jet with compressed air.



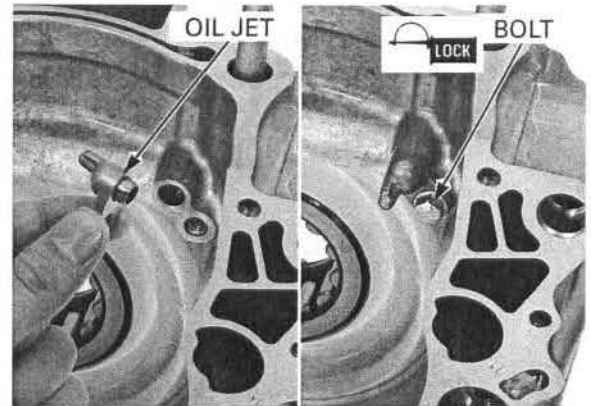
### INSTALLATION

Install the oil jet onto the left crankcase.

Apply locking agent to the oil jet mounting bolt and tighten it to the specified torque.

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

Assemble the left and right crankcase halves (page 13-25).



## OIL PUMP

### DISASSEMBLY

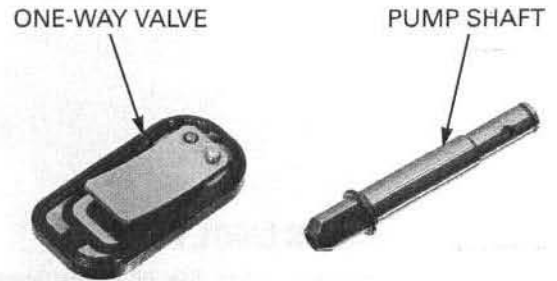
Remove the engine from the frame (page 8-5).  
Separate the left and right crankcase halves (page 13-10).

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



### INSPECTION

Check the one-way valve for wear or damage.  
Check the oil pump shaft for wear or damage.

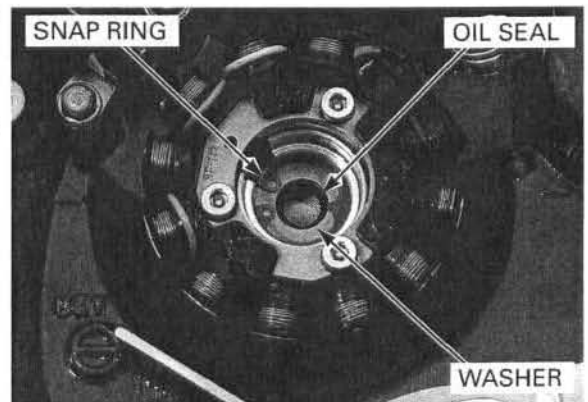


Check the left crankcase cover oil seal for damage or deterioration.

Replace the oil seal if necessary.

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

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

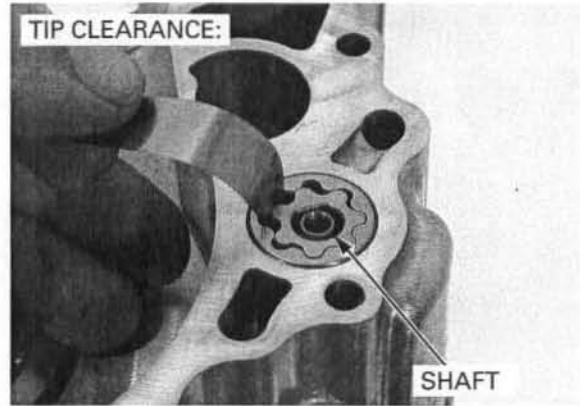


## LUBRICATION SYSTEM

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

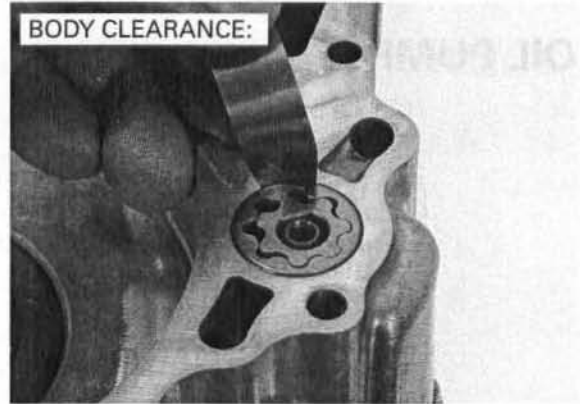
Measure the tip clearance.

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



Measure the body clearance.

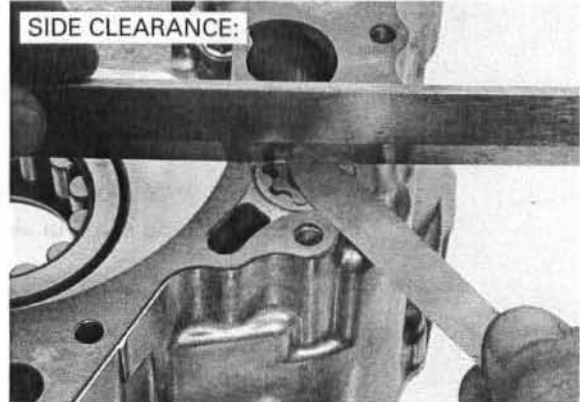
**STANDARD: 0.15 – 0.21 mm (0.006 – 0.008 in)**



*Measure the clearance with the gasket installed.*

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

**STANDARD: 0.05 – 0.13 mm (0.002 – 0.005 in)**



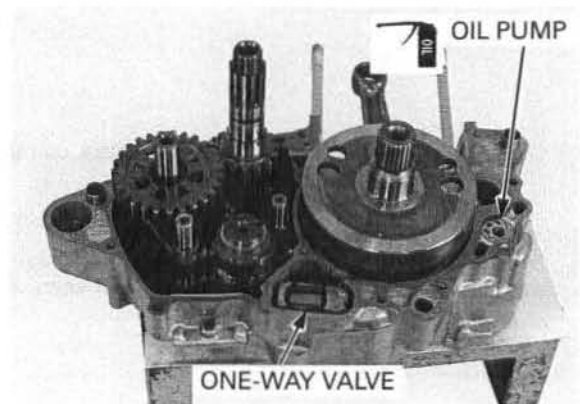
### ASSEMBLY

Apply oil to the oil pump inner/outer rotors sliding surfaces.

Install the oil pump inner/outer rotors and shaft.  
Install the one-way valve onto the left crankcase as shown.

Assemble the left and right crankcase halves (page 13-25).

Install the engine to the frame (page 8-8).



# 6. FUEL SYSTEM

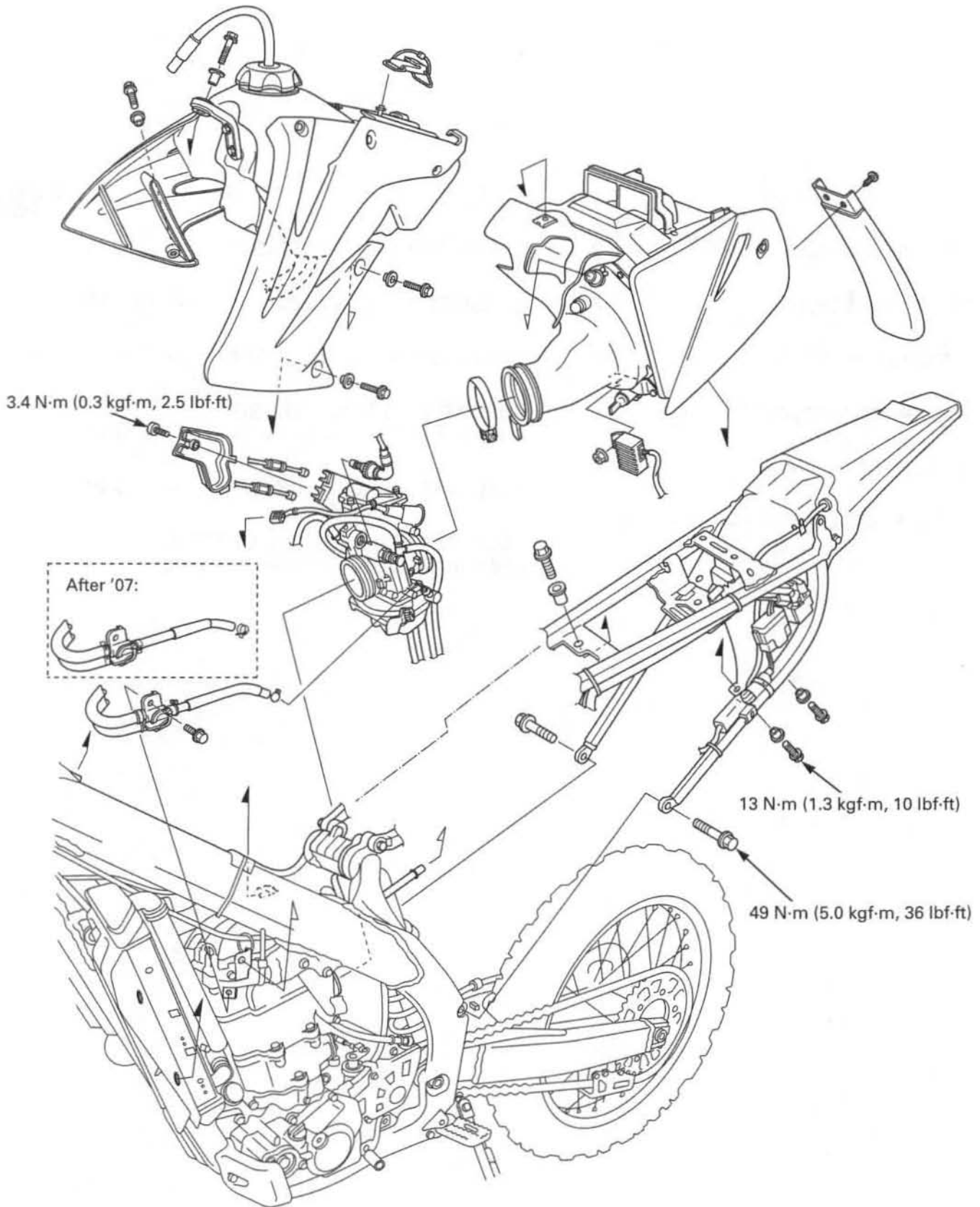
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COMPONENT LOCATION .....	6-2	CARBURETOR DISASSEMBLY .....	6-13
SERVICE INFORMATION .....	6-3	CARBURETOR ASSEMBLY .....	6-18
TROUBLESHOOTING .....	6-5	CARBURETOR INSTALLATION .....	6-24
CARBURETOR ADJUSTMENT .....	6-6	THROTTLE POSITION SENSOR REPLACEMENT .....	6-26
AIR CLEANER HOUSING .....	6-7	PILOT SCREW ADJUSTMENT .....	6-27
CARBURETOR REMOVAL.....	6-11	SECONDARY AIR SUPPLY SYSTEM ( '05 and '06 California type, After '06)....	6-29

# FUEL SYSTEM

## COMPONENT LOCATION

'05 - '07 shown:



## 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.
- 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, remove the drain plug 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

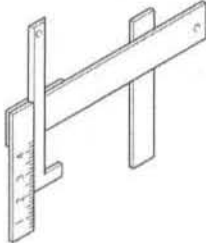


ITEM		SPECIFICATIONS
Fuel tank capacity	'05 - '07	8.6 liter (2.27 US gal, 1.89 Imp gal)
	After '07	7.2 liter (1.90 US gal, 1.58 Imp gal)
Carburetor identification number	'05, '06	FCR04A
	'07	FCR13A
	After '07	FCR13B
Main jet	'05 - '07	#142
	After '07	#145
Slow jet		#45
Jet needle	'05, '06	NCVU
	'07	NHTU
	After '07	NNEU
Jet needle clip position (Standard)	'05, '06	2nd position from the top
	After '06	Fixed position
Pilot screw initial opening	'05 - '07	1-1/4 turns out
	After '07	1-1/8 turns out
Float level		8.0 mm (0.31 in)
Idle speed		1,700 ± 100 rpm
Throttle grip freeplay		3 - 5 mm (1/8 - 3/16 in)
Hot starter lever freeplay		2 - 3 mm (1/16 - 1/8 in)
PAIR control valve specified vacuum ('05 and '06 California type, After '06)		56 kPa (420 mmHg)
Throttle position sensor (Blue - Black) resistance (at 20°C/68°F)		4 - 6 kΩ

## FUEL SYSTEM

### TORQUE VALUES

Rear fender mounting bolt		13 N·m (1.3 kgf·m, 10 lbf·ft)	
Sub-frame upper mounting bolt	('05 - '07)	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Sub-frame lower mounting bolt	('05 - '07)	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Sub-frame upper/lower mounting bolt	(After '07)	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Shock absorber upper mounting nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
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 air jet	('05 - '07)	0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Starter 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, 0.2 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)	
Carburetor drain screw	(After '05)	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Choke valve lock nut		2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Throttle bolt (carburetor side)		4 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Throttle shaft screw	('05, '06)	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	Apply locking agent to the threads
Throttle shaft torx screw	(After '06)	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	Apply locking agent to the threads
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	('05, '06)	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Throttle position sensor bolt	(After '06)	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
PAIR control valve mounting nut		13 N·m (1.3 kgf·m, 10 lbf·ft)	

### TOOLS

<p>Carburetor float level gauge 07401-0010000</p> 	<p>Pilot screw wrench ('05, '06) 07908-4730002</p> 	<p>Pilot screw wrench (After '06) 07KMA-MS60102</p> 
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## 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) (page 4-12)

### Lean mixture

- Fuel jets clogged
- Fuel tank breather hose clogged
- Fuel filter clogged
- Fuel hose restricted
- Float valve faulty
- Float level too low
- Air vent hose clogged
- Intake air leak

### Misfiring during acceleration

- Ignition system faulty (page 18-5)
- Lean mixture

### Afterburn during acceleration

- Ignition system faulty (page 18-5)
- 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

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

- Fuel line restricted
- Ignition system malfunction (page 18-5)
- 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 (page 18-5)
- Air cleaner clogged

### Afterfiring

- Ignition system malfunction (page 18-5)
- Carburetor malfunction
- Lean mixture
- Rich mixture

## CARBURETOR ADJUSTMENT

### IDLE MIXTURE AND IDLE SPEED

**STANDARD SETTING:**

FLOAT LEVEL: 8.0 mm (0.31 in)

**PILOT SCREW INITIAL OPENING:**

'05 - '07: 1-1/4 turns out

After '07: 1-1/8 turns out

**SLOW JET: #45**

**MAIN JET:**

'05 - '07: #142

After '07: #145

**JET NEEDLE:**

'05, '06: NCVU

'07: NHTU

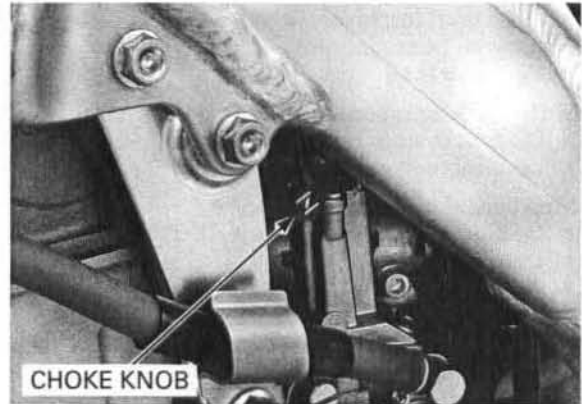
After '07: NNEU

**JET NEEDLE CLIP POSITION:**

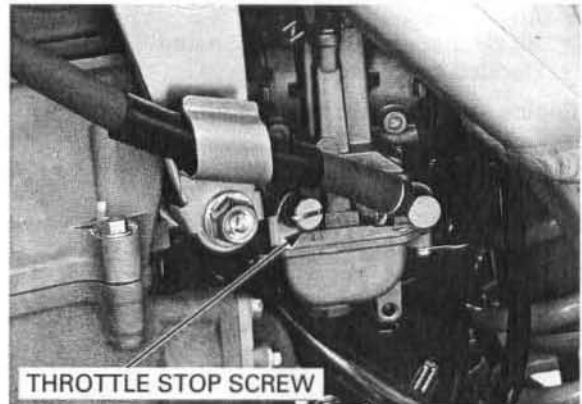
'05, '06: 2nd position from the top

After '06: Fixed position

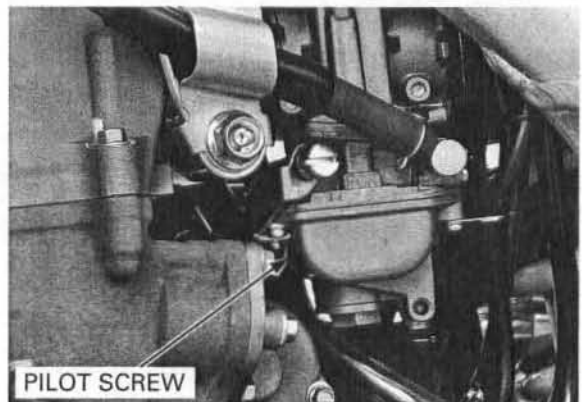
1. When the engine is warm enough to run without the choke, push the choke knob in to its off position.



2. 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.



3. 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.



# AIR CLEANER HOUSING

## REMOVAL

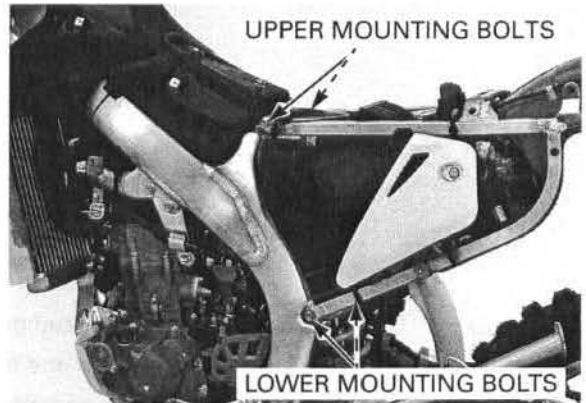
Remove the following:

- Seat (page 3-3)
- Side covers (page 3-3)
- Radiator shrouds (page 3-4)
- Muffler ('05 - '07: page 3-9, After '07: page 3-11)
- Regulator/rectifier (page 17-8)
- Battery (page 17-6)

Loosen the air cleaner connecting boot band screw. Unhook the band and air cleaner case cover from the fuel tank.



Remove the sub-frame lower mounting bolts and loosen the upper mounting bolts.



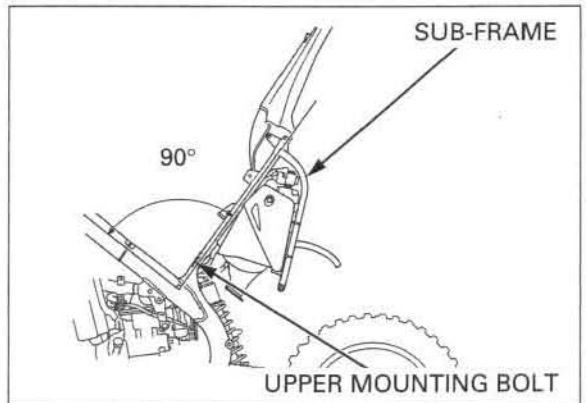
*Do not make less than 90°. Be careful not to damage the wires and cables.*

Lift the sub-frame as shown.

Tighten the sub-frame upper mounting bolts to the specified torque.

**TORQUE:**

- '05 - '07: 30 N-m (3.1 kgf-m, 22 lbf-ft)
- After '07: 49 N-m (5.0 kgf-m, 36 lbf-ft)



*Except '05 and '06 California type, After '06:*

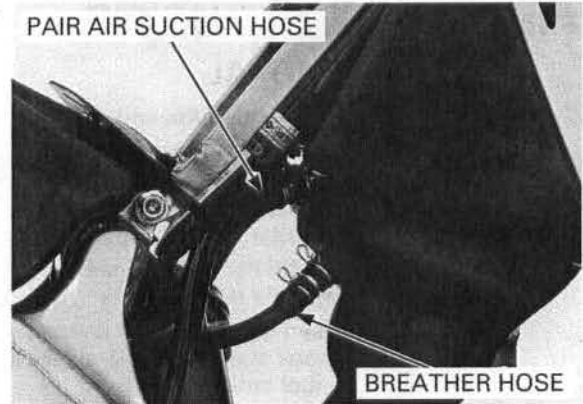
Disconnect the crankcase breather hose.



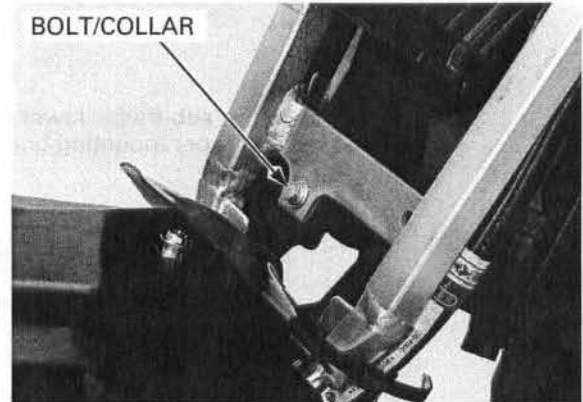
## FUEL SYSTEM

'05 and '06 California type,  
After '06:

Disconnect the breather hose and PAIR air suction hose.



Remove the bolt and collar.



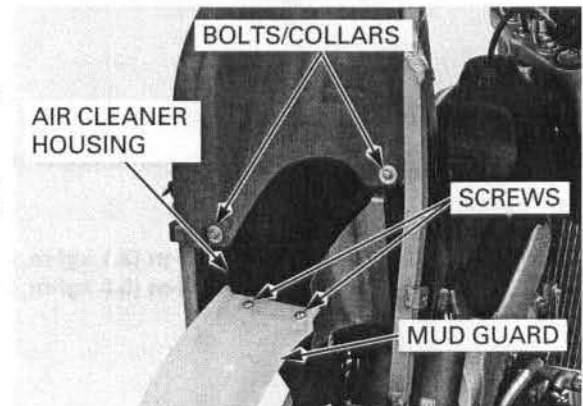
Remove the screws and mud guard.

Remove the bolts, collars and air cleaner housing.

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

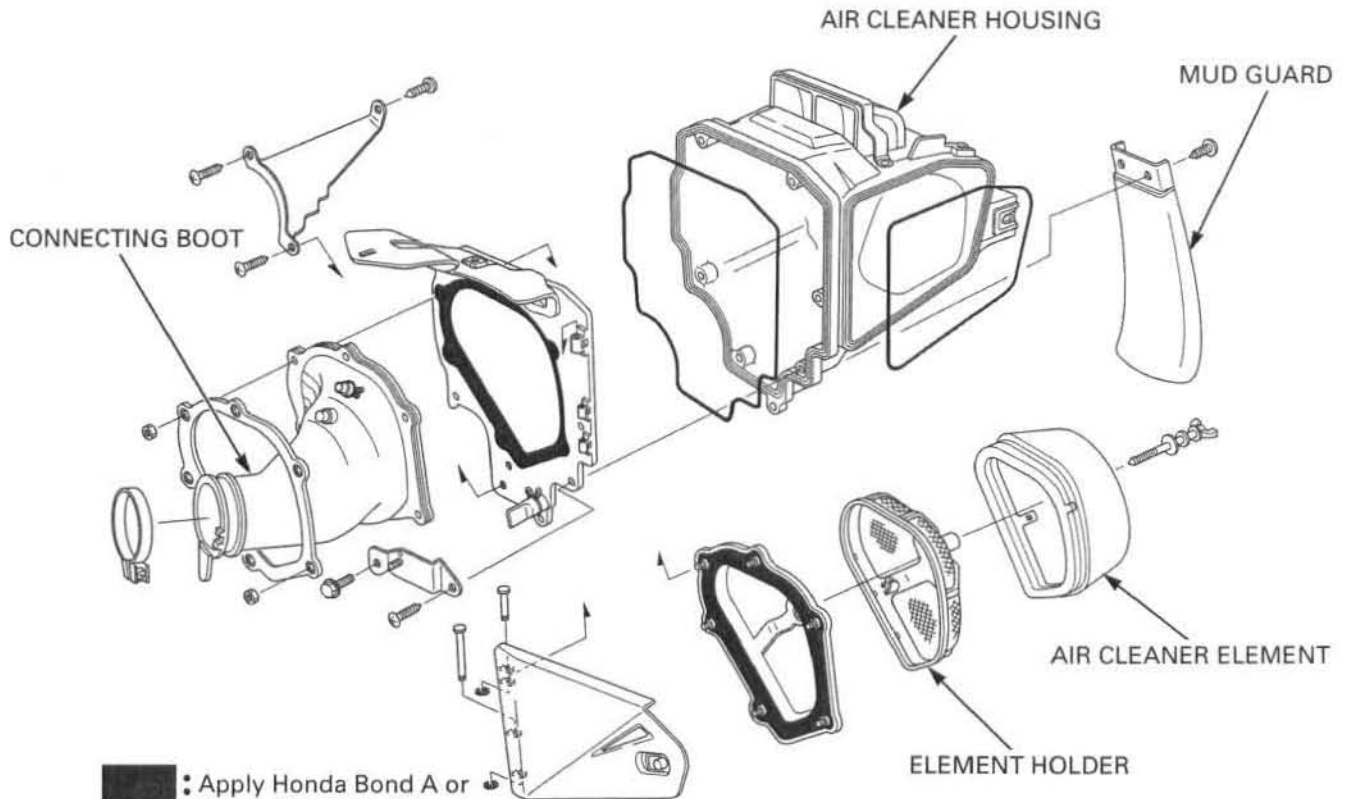
Check the air cleaner housing for damage.

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



**INSTALLATION**

Install the removed parts in the reverse order of removal.



 : Apply Honda Bond A or Honda Handgrip Cement or equivalent

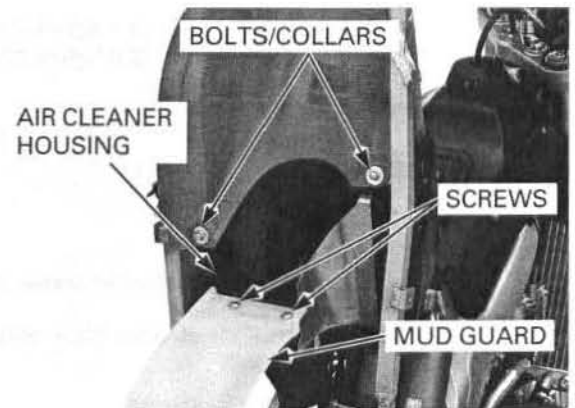
*Route the wires and hoses properly ('05 - '07: page 1-25, After '07: page 1-32). Be careful not to damage the wires and hoses.*

Install the air cleaner housing, collars and bolts.

Tighten the rear fender mounting bolts to the specified torque.

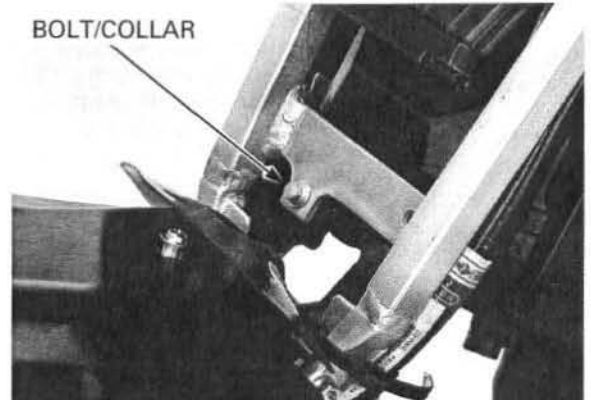
**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Install the mud guard and tighten the screws securely.



Install the collar and bolt.

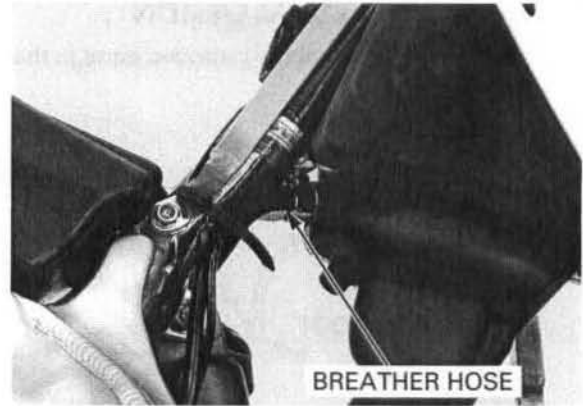
Tighten the bolt securely.



## FUEL SYSTEM

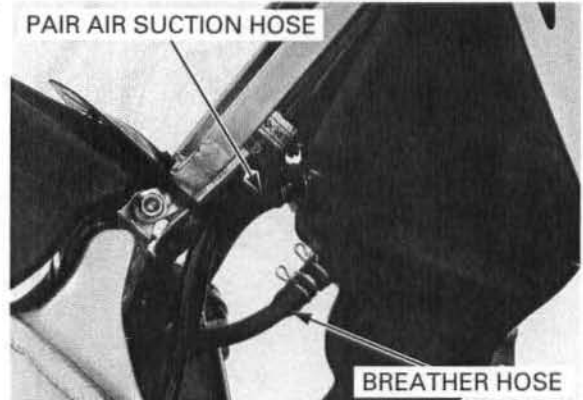
Except '05 and '06 California type,  
After '06:

Connect the crankcase breather hose.



'05 and '06 California type,  
After '06:

Connect the crankcase breather hose and PAIR air suction hose.



Lower the sub-frame and connect the air cleaner connecting boot securely.

Tighten the sub-frame mounting bolts to the specified torque.

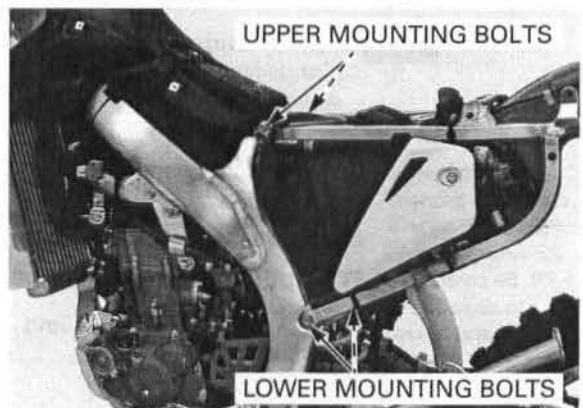
### TORQUE ('05 - '07):

Upper: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Lower: 49 N·m (5.0 kgf·m, 36 lbf·ft)

### TORQUE (After '07):

Upper/lower: 49 N·m (5.0 kgf·m, 36 lbf·ft)

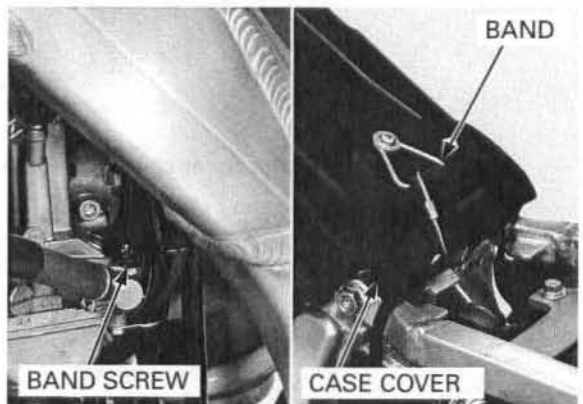


Tighten the air cleaner connecting boot band screw securely.

Hook the air cleaner case cover and band securely to the fuel tank.

Install the following:

- Battery (page 17-6)
- Regulator/rectifier (page 17-8)
- Muffler ('05 - '07: page 3-9, After '07: page 3-11)
- Radiator shrouds (page 3-4)
- Side covers (page 3-3)
- Seat (page 3-3)





# CARBURETOR REMOVAL

Remove the following:

- Seat (page 3-3)
- Muffler ('05 - '07: page 3-9, After '07: page 3-11)
- Fuel tank (page 3-8)

Support the motorcycle using a workstand or equivalent under the engine.

Loosen the air cleaner connecting boot band screw.



Remove the sub-frame lower mounting bolts and loosen the upper mounting bolts.

Lift the sub-frame as shown.

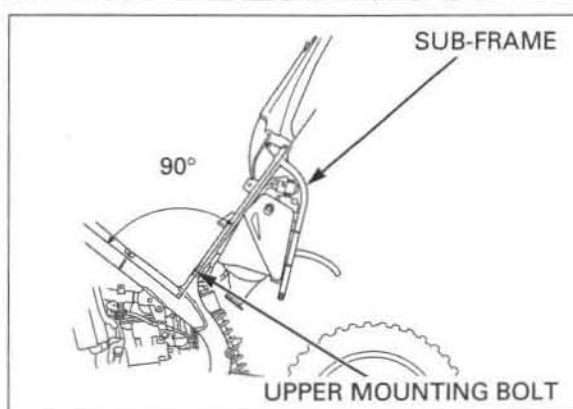
Tighten the sub-frame upper mounting bolts to the specified torque.

**TORQUE:**

'05 - '07: 30 N·m (3.1 kgf·m, 22 lbf·ft)

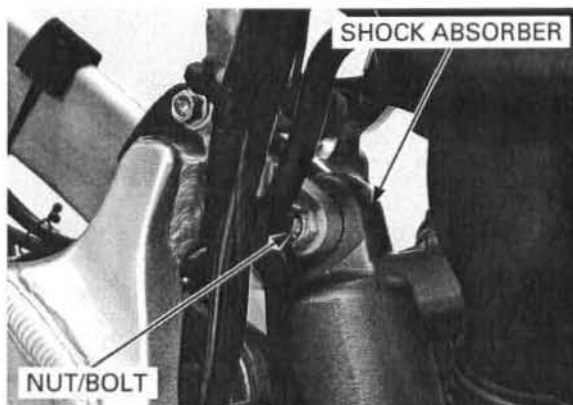
After '07: 49 N·m (5.0 kgf·m, 36 lbf·ft)

*Do not lift past 90°. Be careful not to damage the wires and cables.*

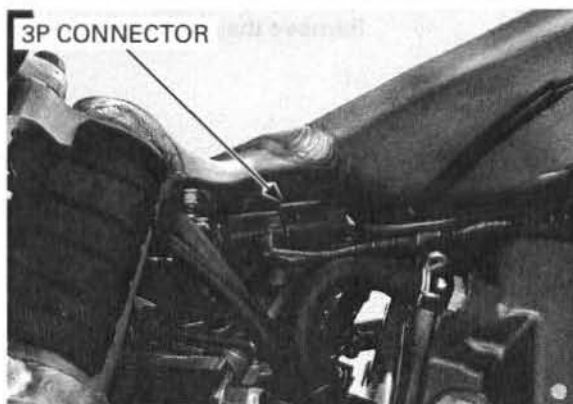


Remove the shock absorber upper mounting nut and bolt.

Pull back the shock absorber.



Disconnect the throttle position sensor 3P (Black) connector.

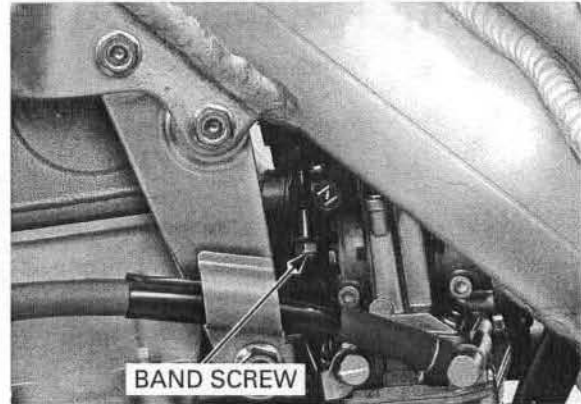




## FUEL SYSTEM

Turn the handlebar to the right fully.

Loosen the carburetor insulator band screw and remove the carburetor from the insulator.

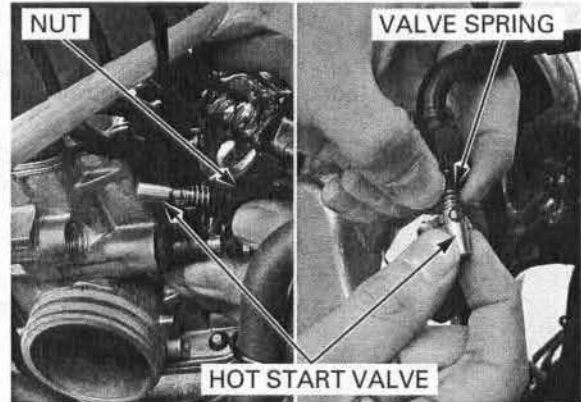


Loosen the hot start valve lock nut and remove the hot start valve from the carburetor.

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.

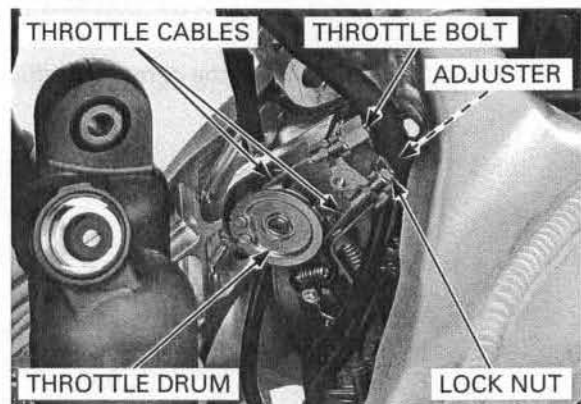


Remove the bolt and throttle drum cover.



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

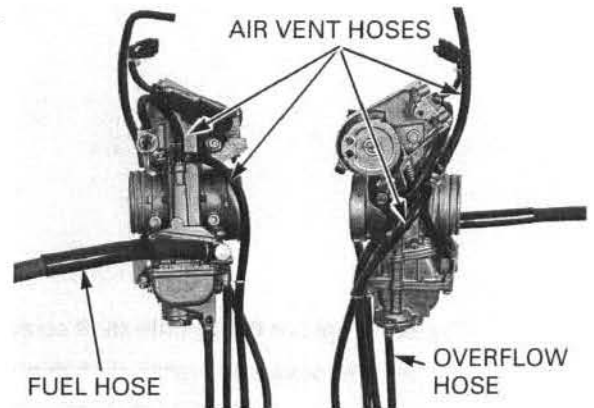
Remove the carburetor to the rear.



# CARBURETOR DISASSEMBLY

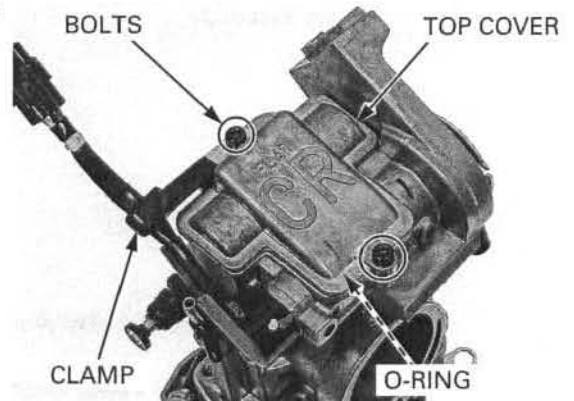
## JET NEEDLE/THROTTLE VALVE

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



Release the throttle position sensor wire from the clamp.

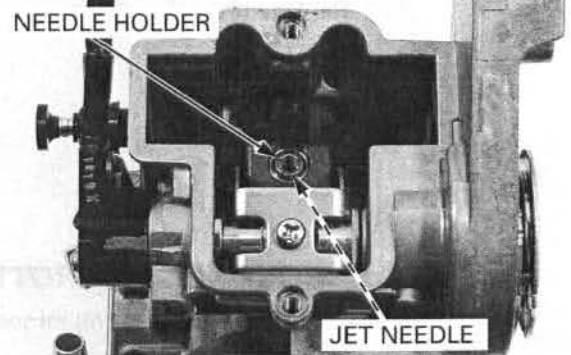
Remove the bolts, clamp, top cover and O-ring.



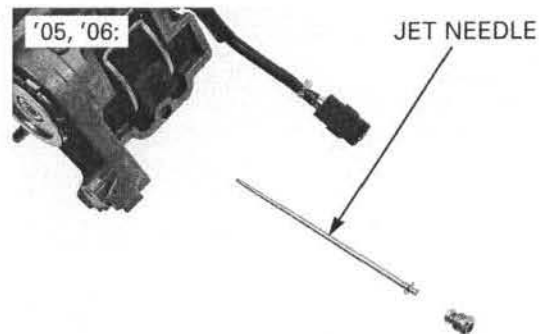
'05, '06: Remove the needle holder and jet needle.

After '06: Remove the jet needle/holder assembly.

'05, '06 shown:

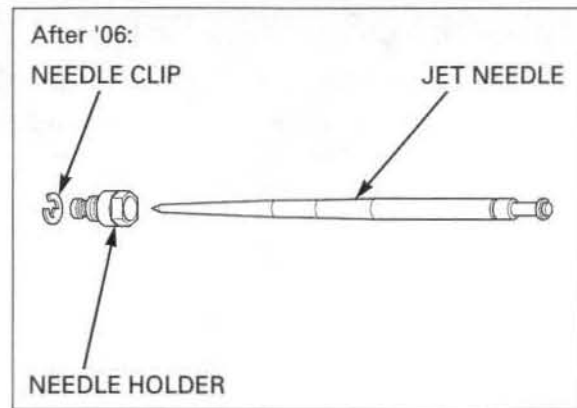


'05, '06: Check the jet needle for wear, nicks or other damage.



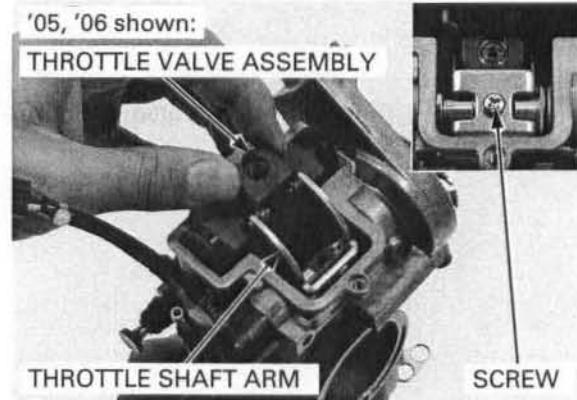
## FUEL SYSTEM

After '06: Check the jet needle for wear, nicks or other damage.  
If necessary, remove the jet needle from the needle holder by removing the needle clip.



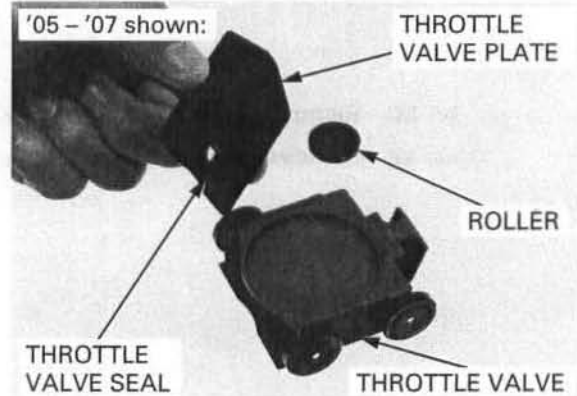
'05, '06: Remove the throttle shaft screw.

After '06: Remove the throttle shaft torx screw.  
Lift up the throttle shaft arm and remove the throttle valve assembly.



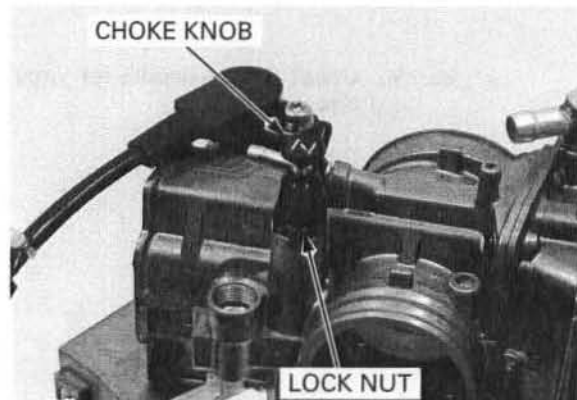
Remove the throttle valve plate and roller from the throttle valve.

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

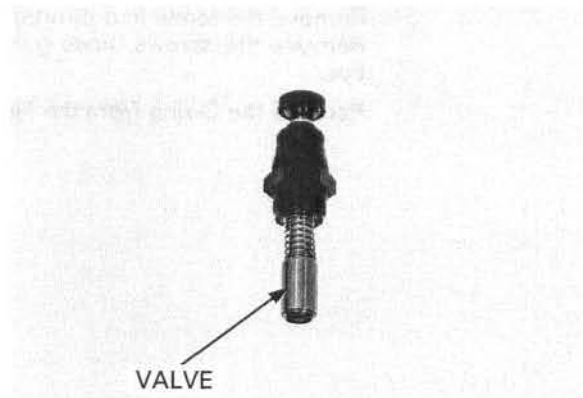


### CHOKE KNOB/THROTTLE SENSOR

Loosen the lock nut and remove the choke knob.



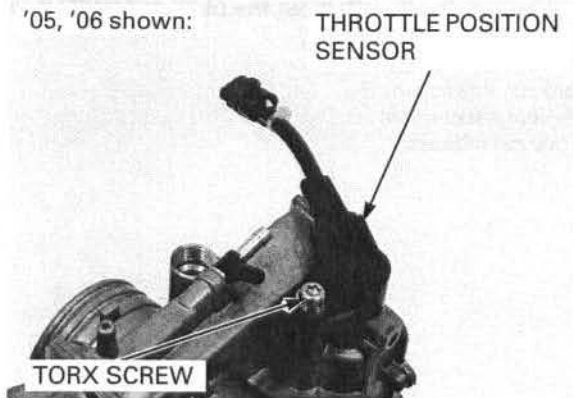
Check the valve for damage or stepped wear.



**'05, '06:**  
Remove the torx screw and throttle position sensor.

**After '06:**  
Remove the bolt and throttle position sensor.

- When removing the throttle position sensor, mark the sensor position ensure that it is reinstalled in the original location.
- The throttle position sensor is factory pre-set and no adjustment is necessary unless the throttle position sensor is replaced.  
For sensor inspection (page 18-9) and replacement (page 6-26).

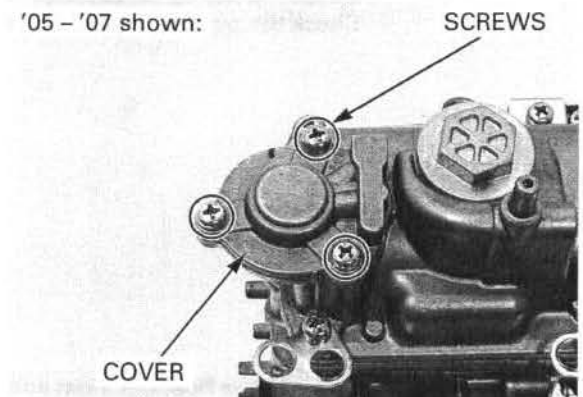


**ACCELERATOR PUMP/FLOAT/JETS**

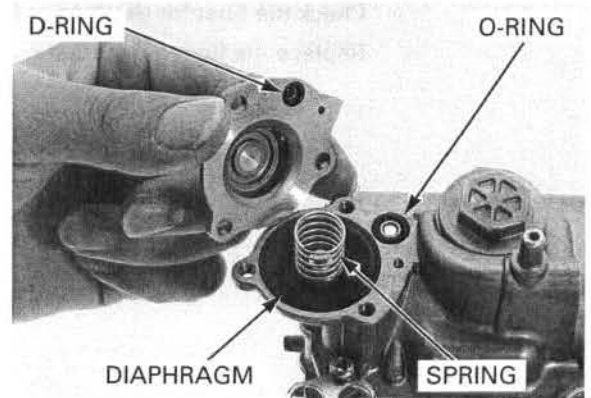
Remove the screws and accelerator pump cover.

**NOTE:**

- The accelerator pump cover is under spring pressure.
- Do not lose the screws and O-ring.



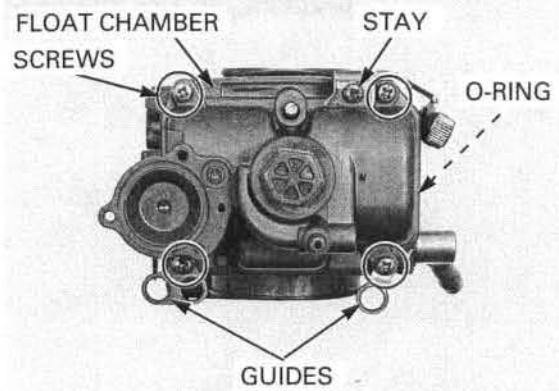
Remove the spring, diaphragm, D-ring and O-ring.



## FUEL SYSTEM

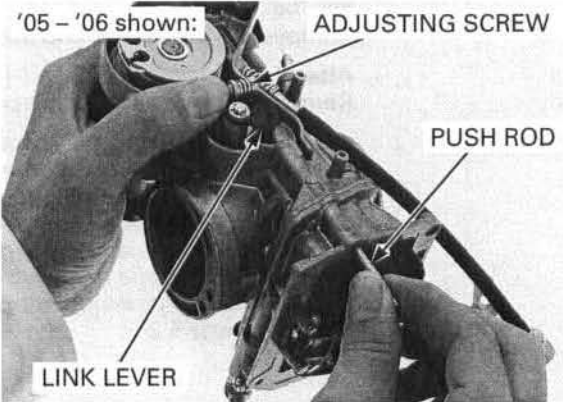
Remove the screw and throttle stop screw stay.  
Remove the screws, hose guides, and float chamber.

Remove the O-ring from the float chamber.

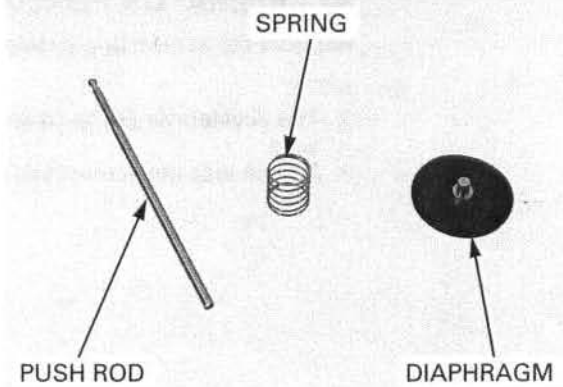


*The push rod link lever adjusting screw is factory pre-set. Adjustment and disassembly are not necessary.*

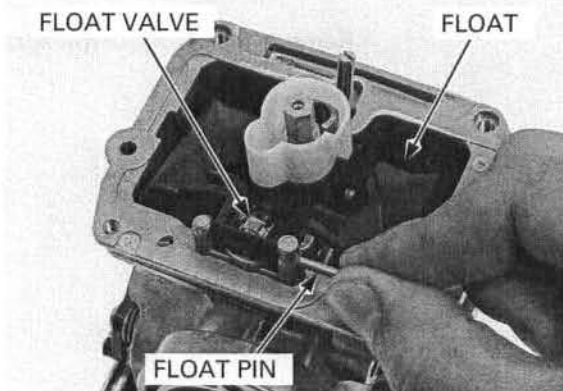
Pull out the push rod while holding the push rod link lever.



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



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



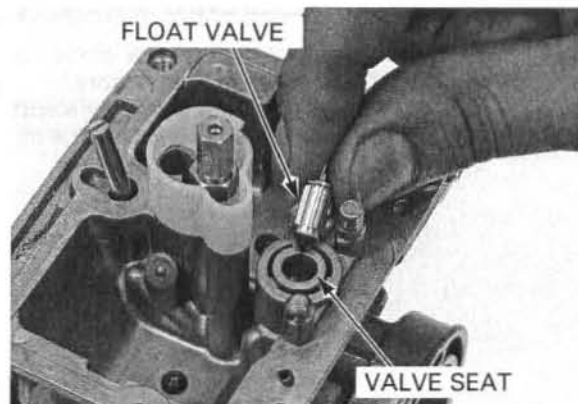
Check the float valve and valve seat for scoring, scratches, clogs or damage.

*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.

Clean or replace them if necessary.



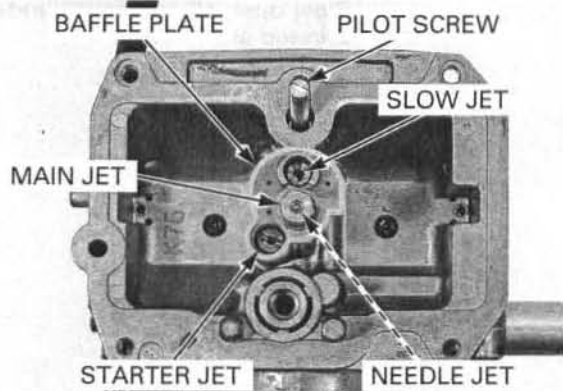
Remove the following:

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

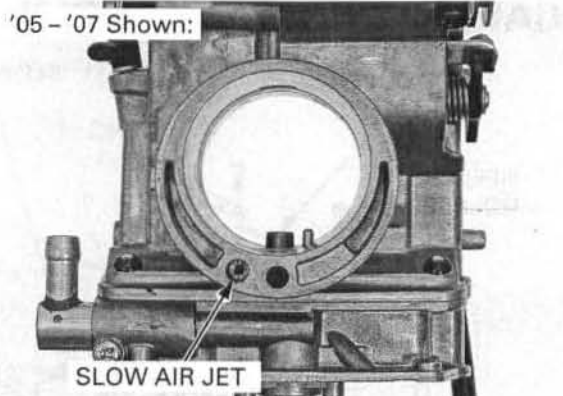
*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

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.



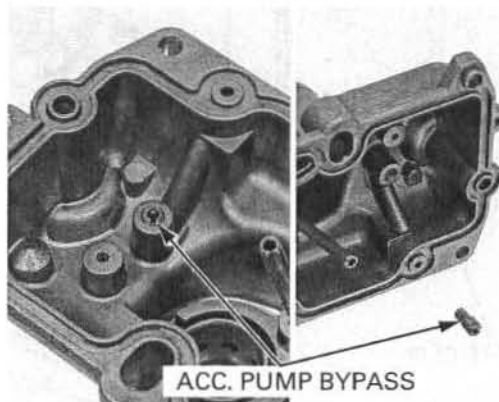
'05 - '07: Remove the slow air jet.



Remove the acc. pump bypass from the float chamber.

Blow open the acc. pump bypass and fuel passage with compressed air.

Check the acc. pump bypass for clogs or damage.

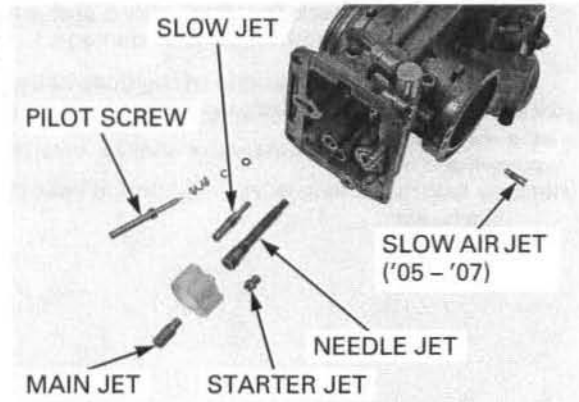




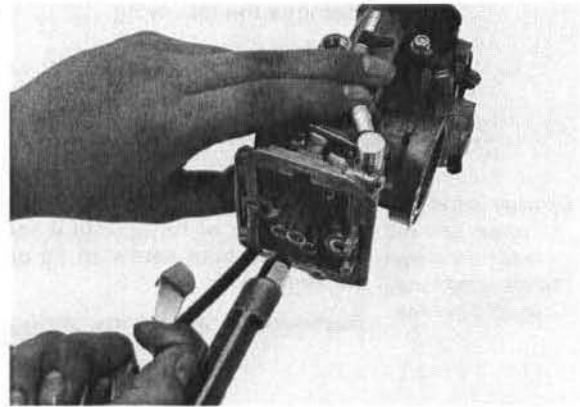
## FUEL SYSTEM

Blow open all jets with compressed air.

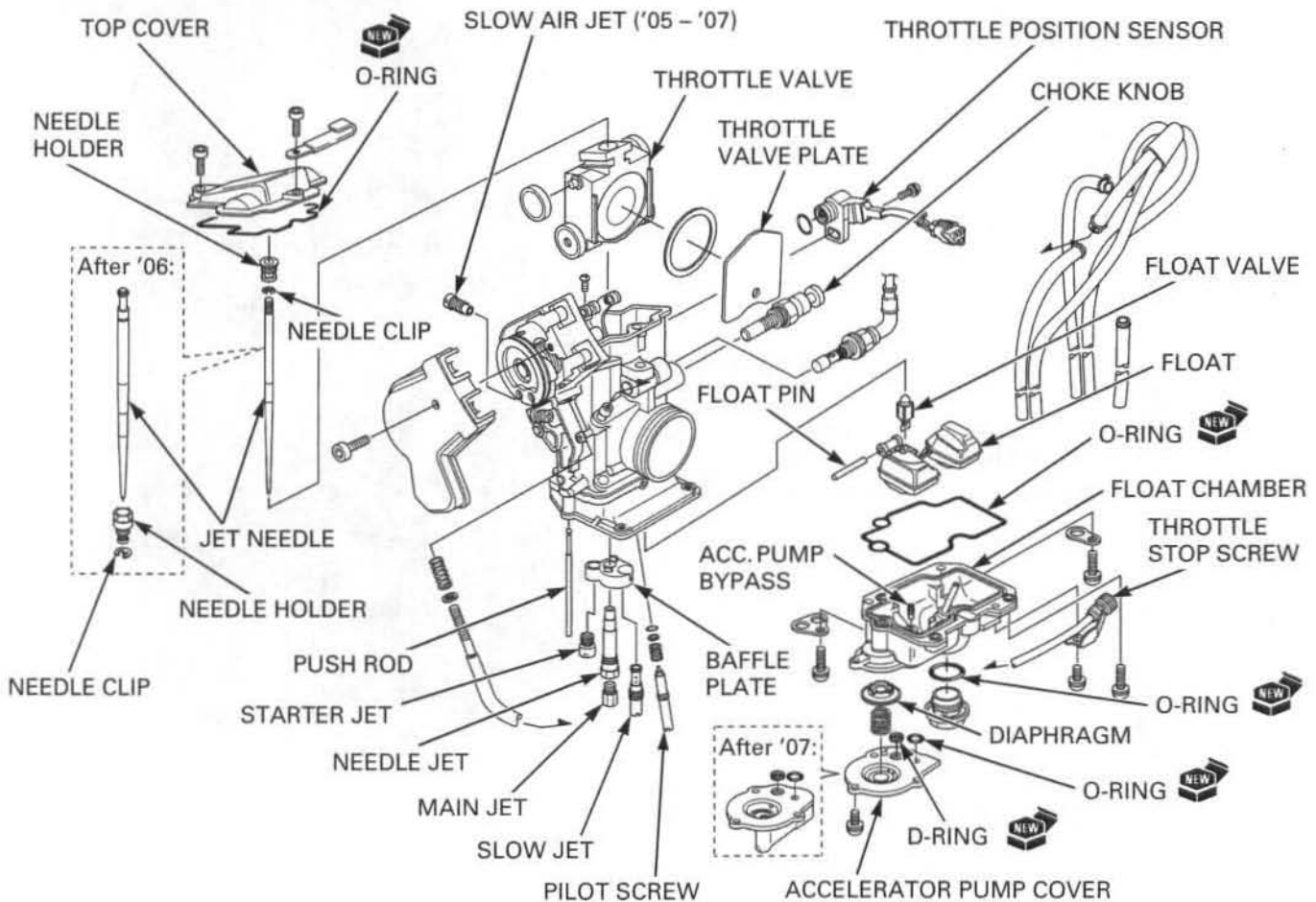
Inspect each jet for clogs, wear or damage and replace them if necessary.  
Check the pilot screw for stepped wear or damage.  
Check the spring for fatigue or damage.  
Replace them if necessary.



Blow open all carburetor body openings with compressed air.



## CARBURETOR ASSEMBLY





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

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

**'05, '06:**  
Tighten the torx screw to the specified torque.

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

After tightening the bolt to the specified torque, break the bolt head.

**After '06:**  
Tighten the bolt to the specified torque.

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

- The throttle position sensor is factory pre-set and no adjustment is necessary unless the throttle position sensor is replaced.
- For sensor inspection (page 18-9) and replacement (page 6-26).

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

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

Perform pilot screw adjustment if a new pilot screw is installed (page 6-27).

- 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)

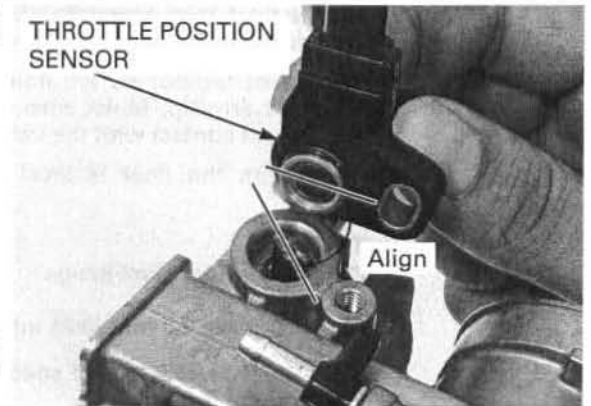
Main jet: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

**'05 - '07:** Install and tighten the slow air jet to the specified torque.

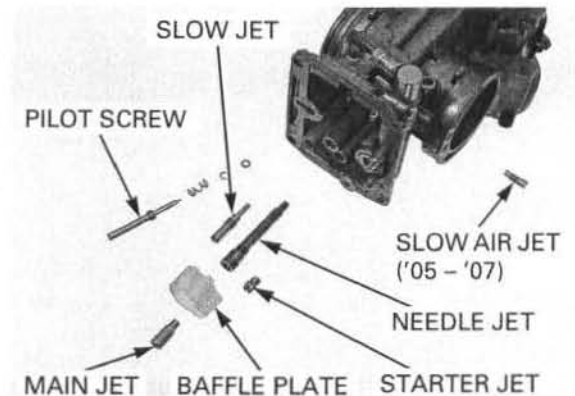
**TORQUE: 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Install the float valve, float and float pin.

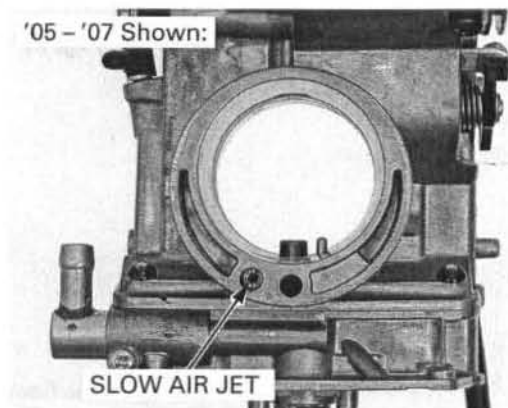
THROTTLE POSITION SENSOR



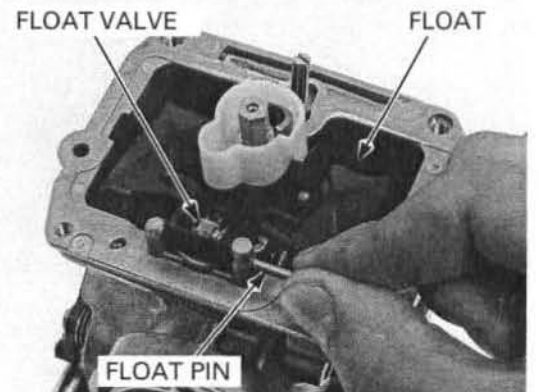
SLOW JET  
PILOT SCREW  
SLOW AIR JET ('05 - '07)  
NEEDLE JET  
MAIN JET  
BAFFLE PLATE  
STARTER JET



'05 - '07 Shown:



FLOAT VALVE  
FLOAT



## FUEL SYSTEM

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.

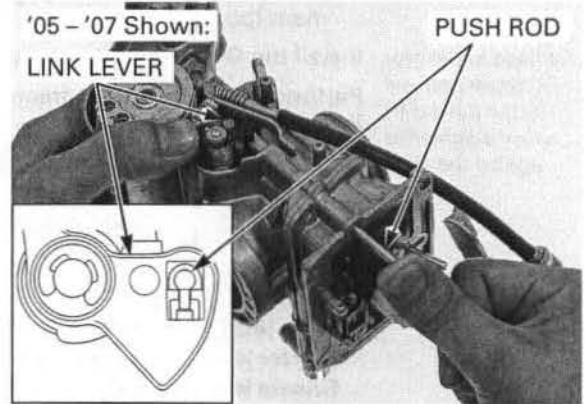
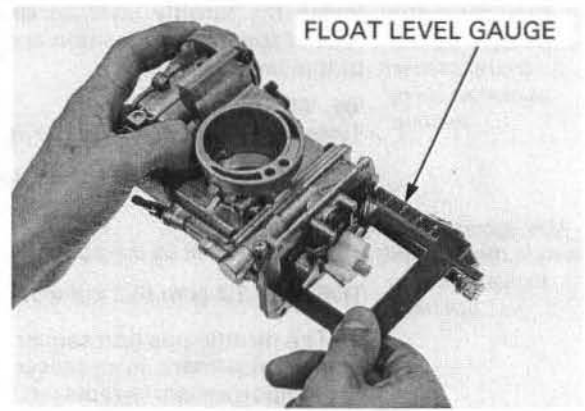
### TOOL:

Carburetor float level gauge 07401-0010000

**FLOAT LEVEL: 8.0 mm (0.31 in)**

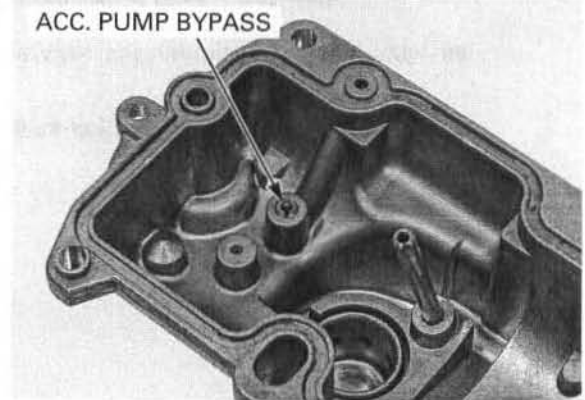
If the float level is out of specification, adjust it by bending the lip.

Install the push rod while holding the push rod link lever.

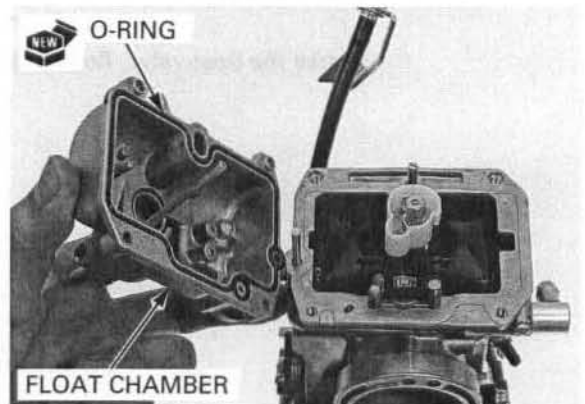


Install the acc. pump bypass into the float chamber and tighten it to the specified torque.

**TORQUE: 0.3 N·m (0.03 kgf·m, 0.2 lbf·ft)**



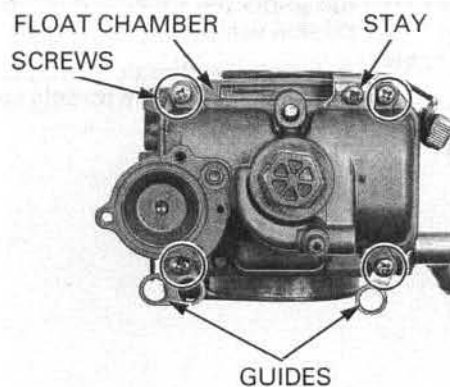
Install a new O-ring to the float chamber.  
Install the float chamber to the carburetor.



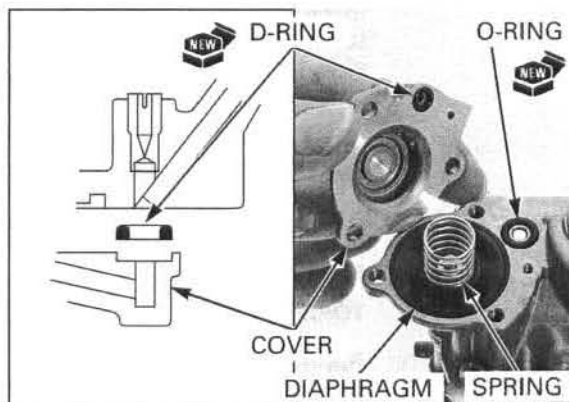
Install the hose guides and float chamber screws. Tighten the screws to the specified torque.

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

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

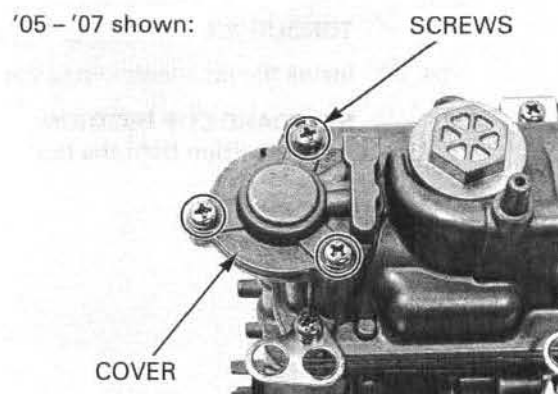


Install a new D-ring with its flat side facing forward on the accelerator pump cover. Install the diaphragm, spring, new O-rings and accelerator pump cover.



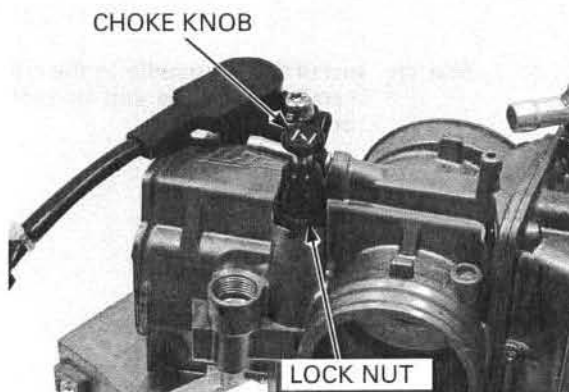
Install and tighten the screws to the specified torque.

**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)**

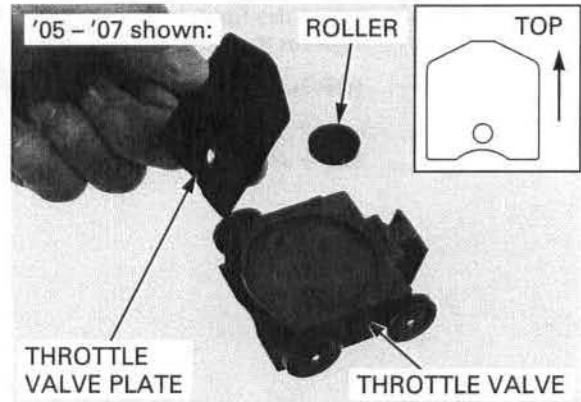


## FUEL SYSTEM

Note the installation direction of the throttle valve plate.

Assemble the roller and throttle valve plate on the throttle valve.

- Install the throttle valve plate with the seal side facing toward 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.

'05, '06: Apply locking agent to the screw threads. Install and tighten the throttle shaft screw to the specified torque.

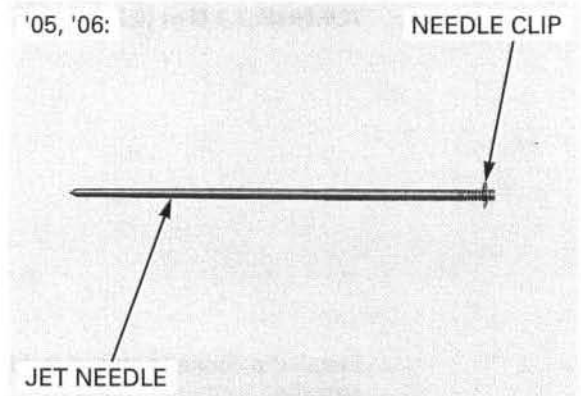
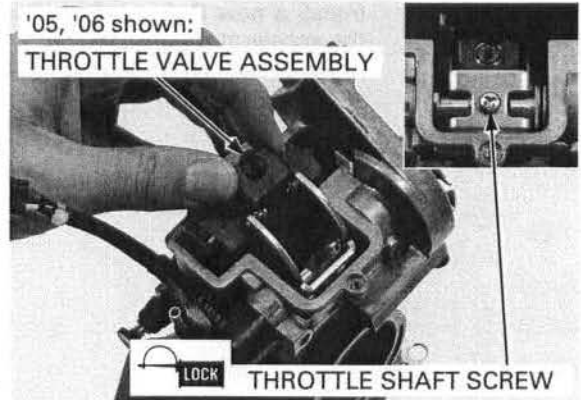
**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

After '06: Apply locking agent to the torx screw threads. Install and tighten the throttle shaft torx screw to the specified torque.

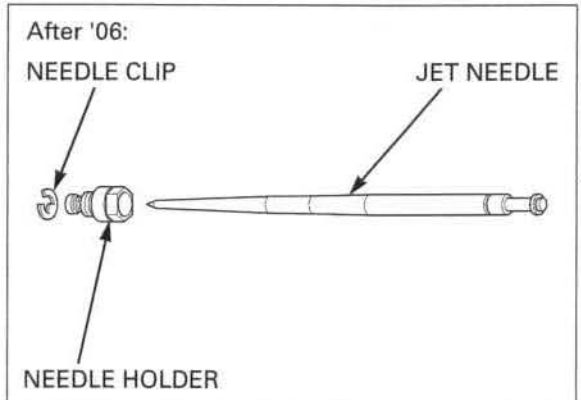
**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

'05, '06: Install the jet needle clip to the jet needle.

**STANDARD CLIP POSITION:  
2nd position from the top**



After '06: Install the jet needle to the needle holder and then install the needle clip to the jet needle, if it was removed.



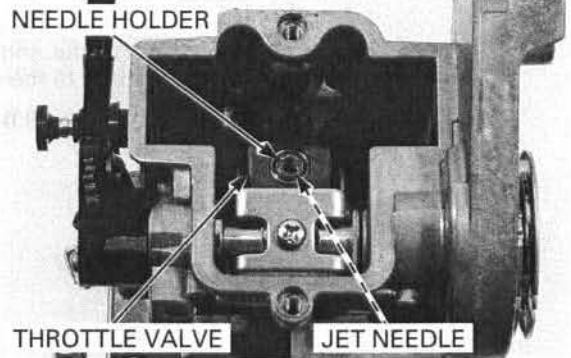
'05, '06: Install the jet needle and needle holder into the throttle valve.  
Tighten the needle holder to the specified torque.

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

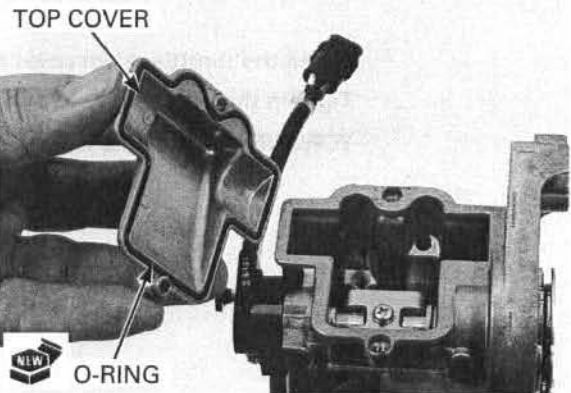
After '06: Install the jet needle/holder assembly into the throttle valve.  
Tighten the jet needle/holder assembly to the specified torque.

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

'05, '06 shown:



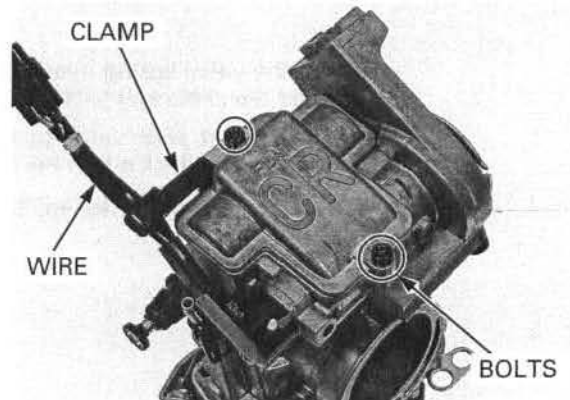
Install a new O-ring and top cover.



Install the clamp and bolts.  
Tighten the bolts to the specified torque.

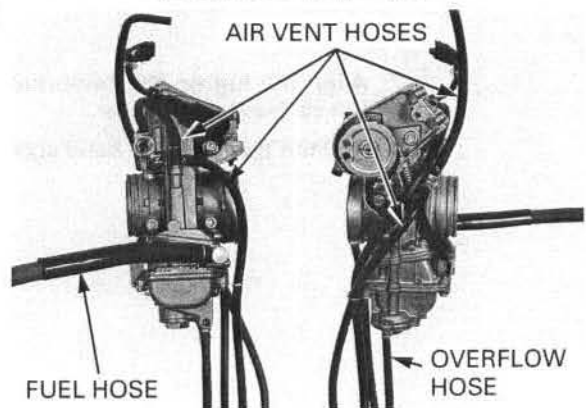
**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

Clamp the throttle position sensor wire as shown.



Route the hoses properly ('05 - '07: page 1-25, After '07: page 1-32).

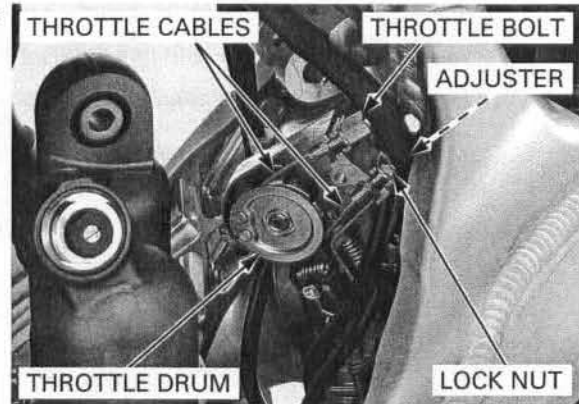
Connect the overflow hose, air vent hoses and fuel hose.



## CARBURETOR INSTALLATION

Connect the throttle cables to the throttle drum but do not tighten the adjuster and lock nut yet. Tighten the throttle bolt to the specified torque.

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



Install the throttle drum cover and bolt. Tighten the bolt to the specified torque.

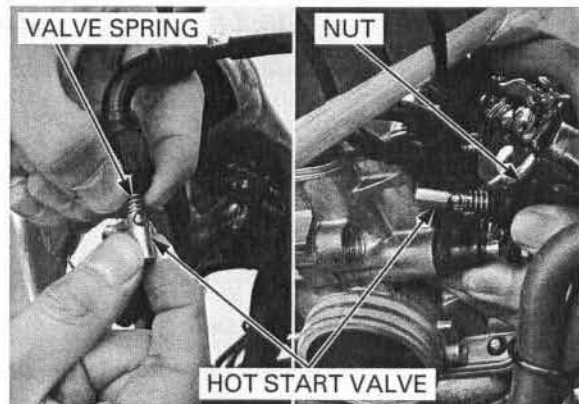
**TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)**



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

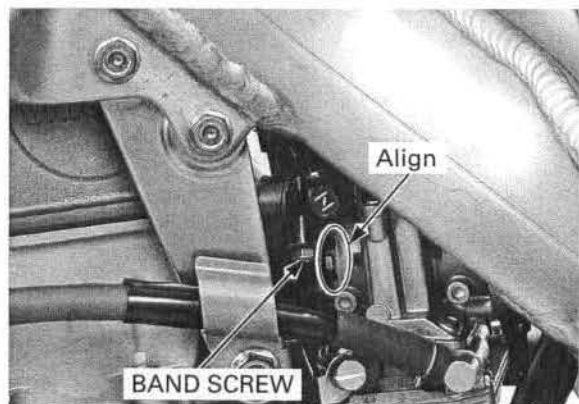
Install the hot start valve to the carburetor body, and tighten the lock nut to the specified torque.

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



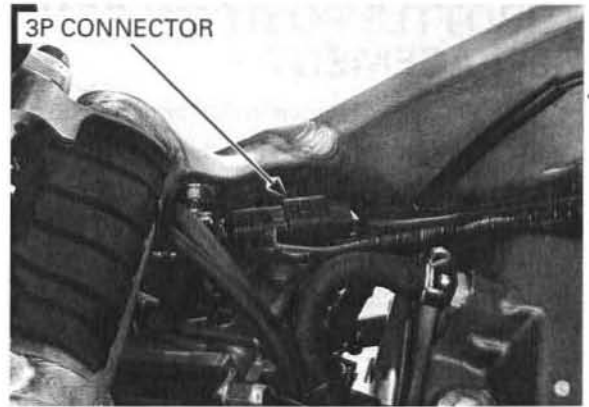
Align the lug on the carburetor with the groove in the carburetor insulator.

Tighten the insulator band screw (page 1-17).



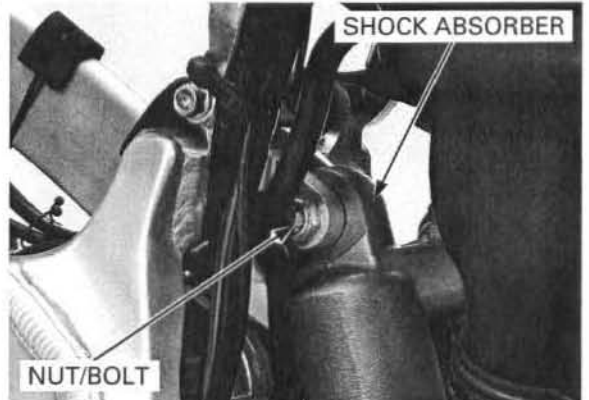


Connect the throttle position sensor 3P (Black) connector.



Install the shock absorber upper mounting bolt and nut.  
Tighten the upper mounting nut to the specified torque.

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



Lower the sub-frame and connect the air cleaner connecting boot securely.  
Tighten the sub-frame mounting bolts to the specified torque.

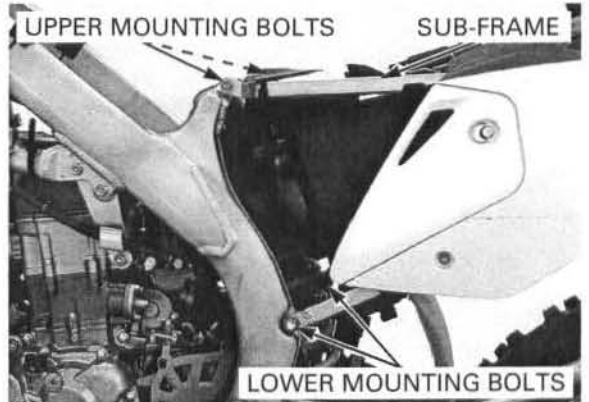
**TORQUE ('05 - '07):**

Upper: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Lower: 49 N·m (5.0 kgf·m, 36 lbf·ft)

**TORQUE (After '07):**

Upper/lower: 49 N·m (5.0 kgf·m, 36 lbf·ft)



Tighten the air cleaner connecting boot band screw securely.

Install the following:

- Muffler ('05 - '07: page 3-9, After '07: page 3-11)
- Fuel tank (page 3-8)
- Seat (page 3-3)

After installation, check the following:

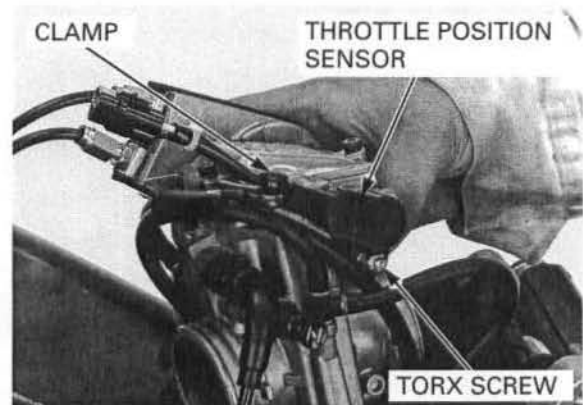
- Secondary air leak around the insulator and connecting boot
- Fuel leaks around the fuel hose and carburetor
- Route the overflow hose, air vent hoses and fuel hose properly ('05 - '07: page 1-25, After '07: page 1-32).
- Throttle operation (page 4-9)
- Hot start lever (page 4-10)



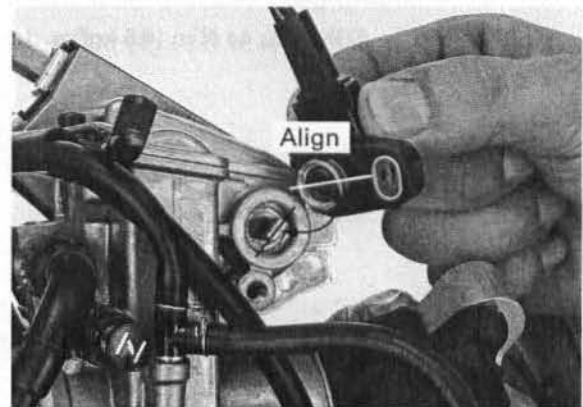


# THROTTLE POSITION SENSOR REPLACEMENT

Remove the carburetor from the engine (page 6-11).  
Remove the clamp, 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.



'05, '06: Loosely install the screw.  
After '06: Loosely install the bolt.



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

**STANDARD: 4 – 6 kΩ (20°C/68°F)**

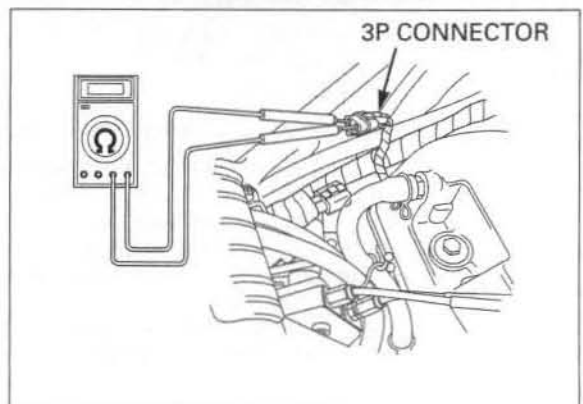
Calculate the throttle position sensor resistance at idle speed using the equation below.  
 $A \times (0.13 - 0.15) = B$

A: Blue and Black wire terminals resistance  
B: Throttle position sensor resistance at idle speed

(Ex.)

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

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



Adjust the throttle position sensor position so the resistance between terminals Yellow and Black is resistance calculated.

'05, '06:

Tighten the torx screw to the specified torque.

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

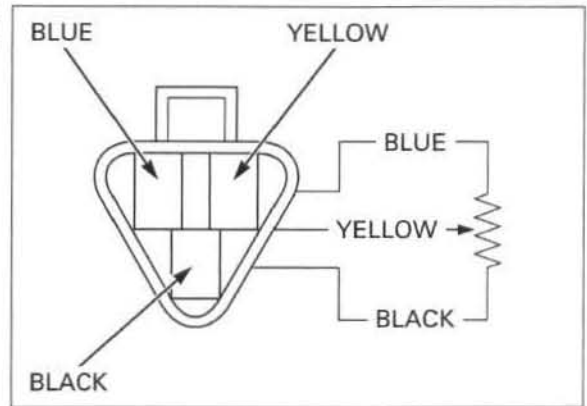
After '06:

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.

Install the carburetor (page 6-24).



*After tightening the bolt to the specified torque, break the bolt head.*

## PILOT SCREW ADJUSTMENT

NOTE:

- The pilot screw is factory pre-set and no adjustment is necessary unless the pilot screw is replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

### BEST IDLE ('05, '06: 49 States and Canada type only)

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

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

**TOOL:**

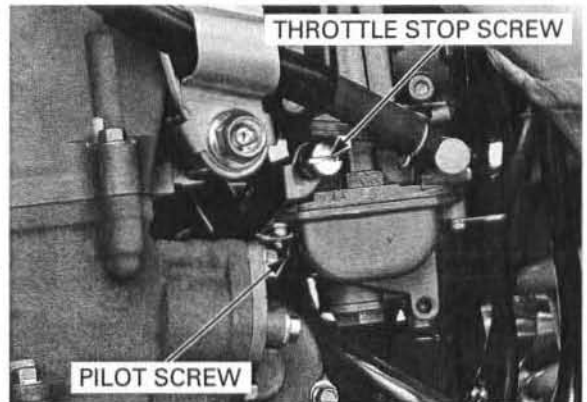
**Pilot screw wrench                      07908-4730002**

**STANDARD OPENING: 1-1/4 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: 1,700 ± 100 rpm**

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Readjust the idle speed to the specified rpm with the throttle stop screw.



## FUEL SYSTEM

### IDLE DROP PROCEDURE ('05 and '06 California type, '07, After '07)

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

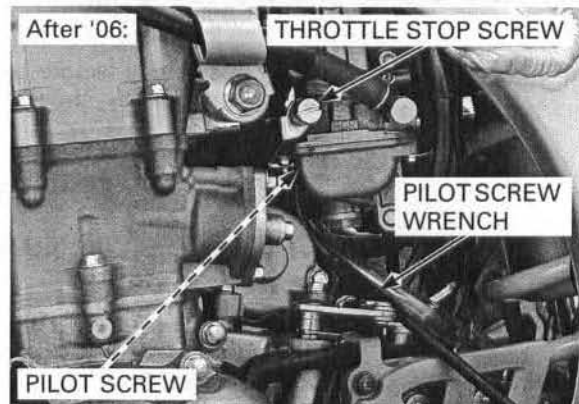
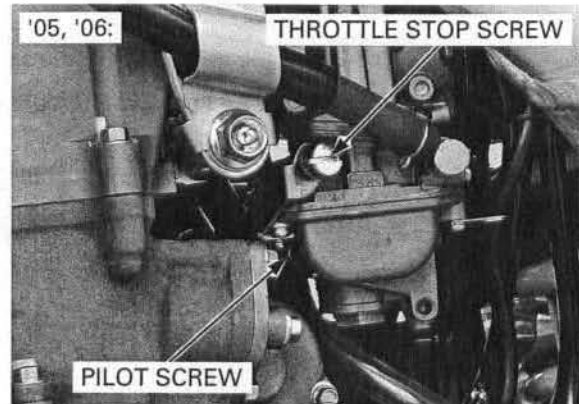
1. Turn the pilot screw clockwise until it seats lightly, and then back it out to the specification given.

**TOOL:**

**Pilot screw wrench ('05, '06) 07908-4730002  
(After '06) 07KMA-MS60102**

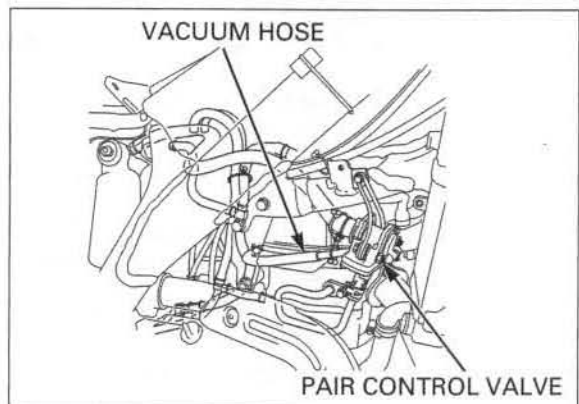
**INITIAL OPENING:**

**'05 and '06 California type, '07: 1-1/4 turns out  
After '07: 1-1/8 turns out**



2. Warm the engine up to operating temperature. Stop and go riding for 10 minutes is sufficient.
3. Stop the engine and connect a tachometer according to its manufacturer's instruction.
4. Disconnect the PAIR control valve vacuum hose and plug it to keep air from entering, then connect the vacuum pump to the PAIR control valve vacuum hose joint.
5. Apply the specified vacuum to the PAIR control valve vacuum hose more than 56 kPa (420 mmHg).
6. Start the engine and adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,700 ± 100 rpm**



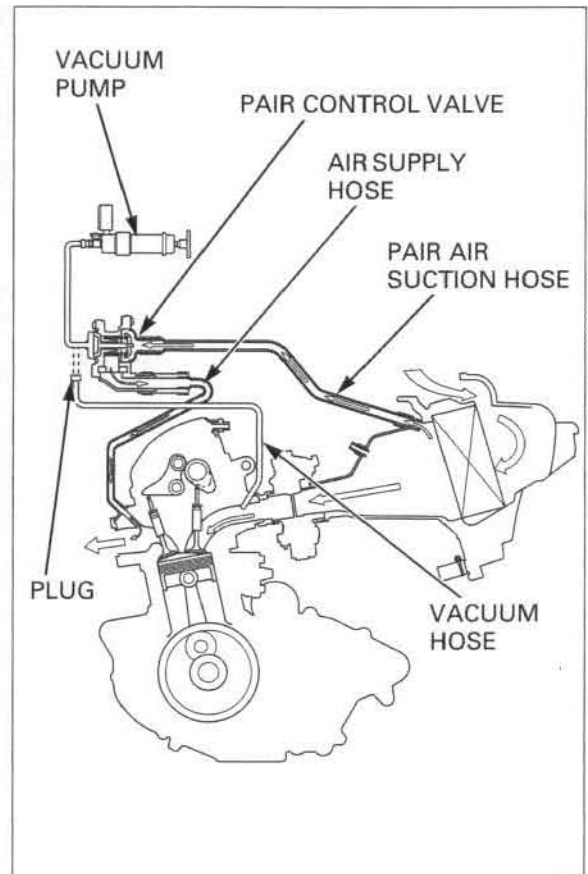
7. Turn the pilot screw in or out slowly to obtain the highest engine speed.
8. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw.
9. Turn the pilot screw in until the engine speed drops by 50 rpm.
10. Turn the pilot screw counterclockwise to the final opening from the position obtained in step 9.

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

11. Remove the plug from the vacuum hose, then disconnect the vacuum pump and connect the vacuum hose to the PAIR control valve.
12. Readjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,700 ± 100 rpm**

Disconnect the tachometer.



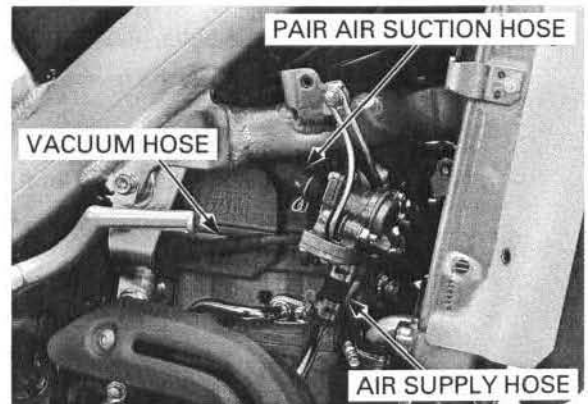
## SECONDARY AIR SUPPLY SYSTEM ('05 and '06 California type, After '06)

### SYSTEM INSPECTION

Warm up the engine to normal operating temperature.

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

Check the pulse secondary air injection (PAIR) control valve.



## FUEL SYSTEM

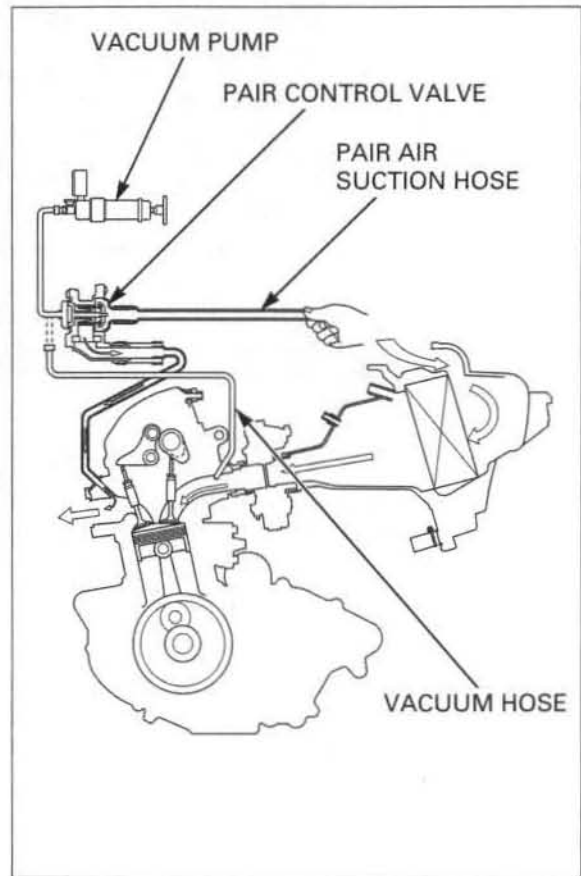
Disconnect the PAIR air suction hose from the air cleaner housing.  
Disconnect the PAIR control valve vacuum hose and plug the vacuum hose.  
Connect a vacuum pump to the PAIR control valve.

Start the engine and open the throttle slightly to be certain that air is sucked in through the PAIR air suction hose.  
If the air is not drawn in, check the PAIR air suction hose for clogs.

With the engine running, gradually apply vacuum to the PAIR control valve.  
Check that the PAIR air suction hose stops drawing air, and that the vacuum does not bleed.

**SPECIFIED VACUUM: 56 kPa (420 mmHg)**

If the air is drawn in, or if the specified vacuum is not maintained, install a new PAIR control valve.



### PAIR CONTROL VALVE REMOVAL/INSTALLATION

Remove the right radiator shroud (page 3-4).

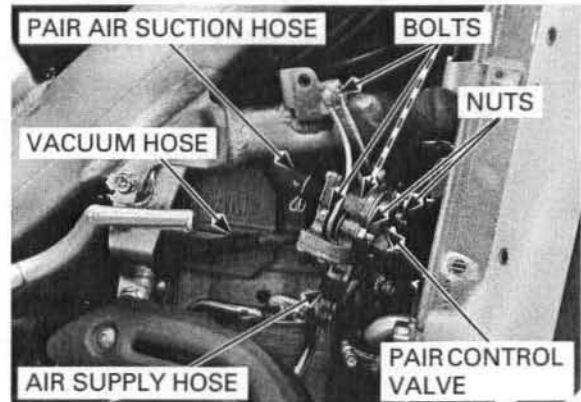
Disconnect the vacuum, air supply and PAIR air suction hoses.

Remove the bolts, nuts, stay and PAIR control valve.

Installation is in the reverse order of removal.

#### TORQUE:

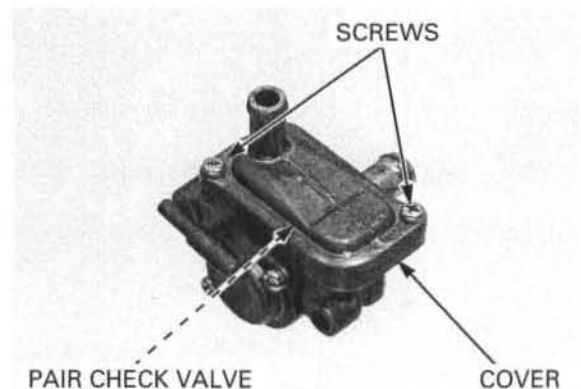
**PAIR control valve mounting nut:**  
13 N·m (1.3 kgf·m, 10 lbf·ft)



### PAIR CHECK VALVE INSPECTION

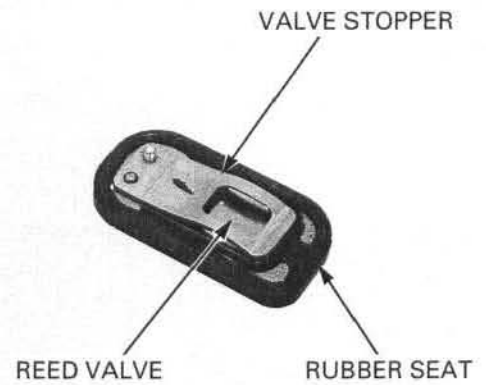
Remove the PAIR control valve (page 6-30).

Remove the screws, PAIR check valve cover and PAIR check valve.



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

Installation is in the reverse order of removal.



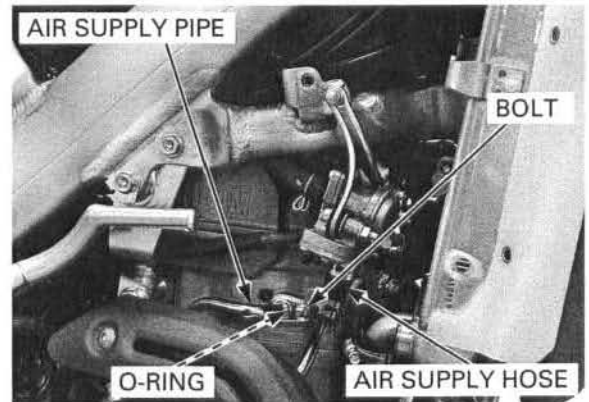
**AIR SUPPLY PIPE REMOVAL/  
 INSTALLATION**

Remove the radiator shroud (page 3-4).

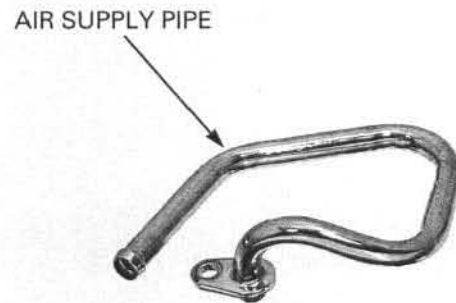
Remove the bolt.

Disconnect the air supply hose.

Remove the air supply pipe and O-ring.

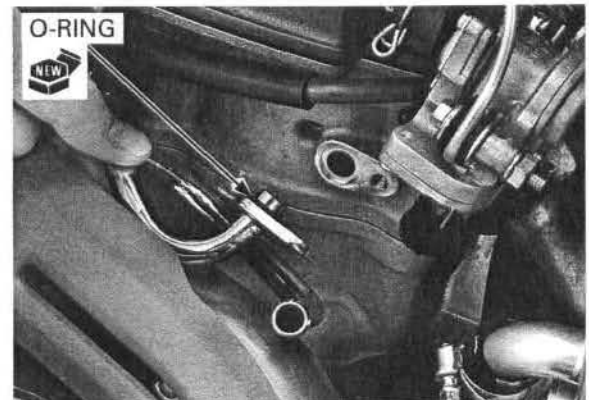


Check the air supply pipe for damage or deformation.



Install a new O-ring onto the air supply pipe.

Installation is in the reverse order of removal.



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**MEMO**

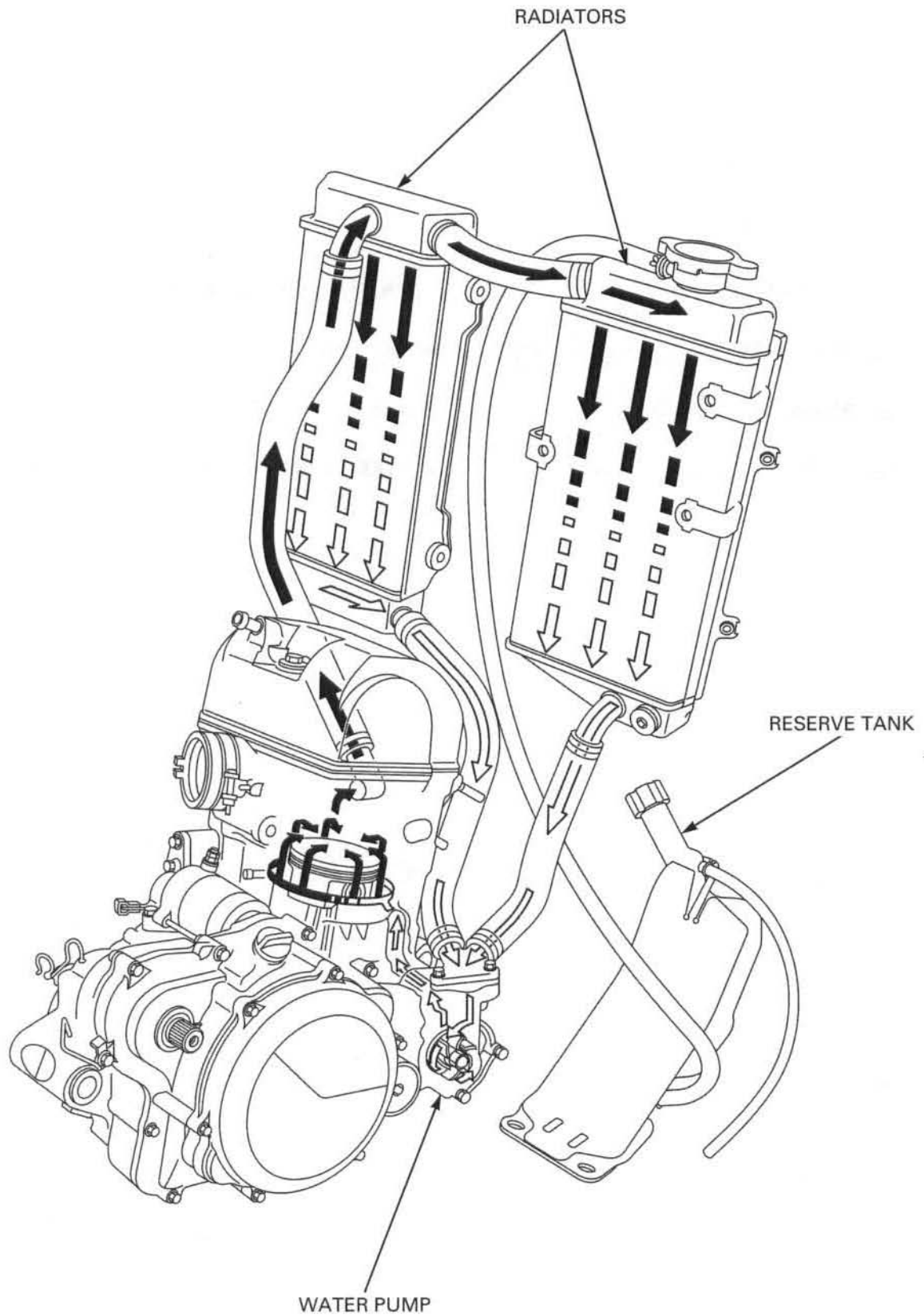


# 7. COOLING SYSTEM

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SYSTEM FLOW PATTERN .....	7-2	COOLANT REPLACEMENT .....	7-6
SERVICE INFORMATION .....	7-3	RADIATOR .....	7-8
TROUBLESHOOTING .....	7-4	RADIATOR RESERVE TANK .....	7-9
SYSTEM TESTING .....	7-5	WATER PUMP .....	7-9

SYSTEM FLOW PATTERN



# SERVICE INFORMATION

## GENERAL

### ⚠ WARNING

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

### NOTICE

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine 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	At change	1.21 liter (1.28 US qt, 1.06 Imp qt)
	At disassembly	1.45 liter (1.53 US qt, 1.28 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

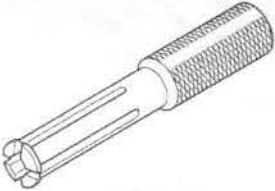
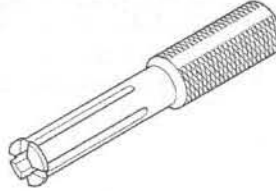
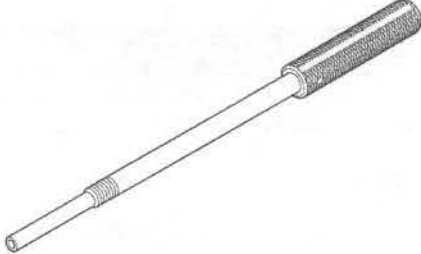
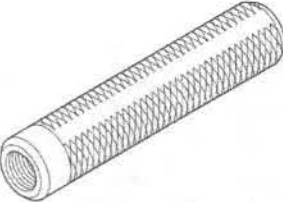
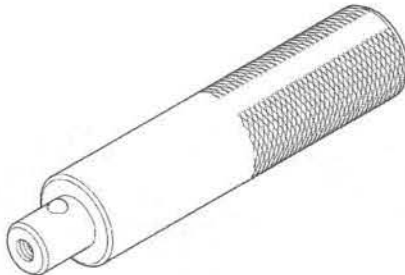


## TORQUE VALUE

Water pump impeller 12 N·m (1.2 kgf·m, 9 lbf·ft)

## TOOLS

<p>Mechanical seal driver 07945-4150400</p> 	<p>Bearing remover set, 12 mm 07936-1660101</p>  <p>not available in U.S.A.</p>	<p>Remover weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only)</p>
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## COOLING SYSTEM

<p>Remover head, 12 mm 07936-1660110</p>  <p>not available in U.S.A.</p>	<p>Bearing remover, 12 mm 07936-166010A (U.S.A. only)</p> 	<p>Remover shaft 07936-1660120</p>  <p>not available in U.S.A.</p>
<p>Remover handle 07936-3710100 (U.S.A. only)</p> 	<p>Driver 07749-0010000</p> 	<p>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 mechanical seal
- Deteriorated water pump oil seal and mechanical seal
- Damaged or deteriorated O-ring
- Loose hose connection or clamp
- Damaged or deteriorated hose
- Faulty radiator cap
- Damaged radiator
- Passage blocked in radiator siphon hose

# SYSTEM TESTING

## COOLANT (HYDROMETER TEST)

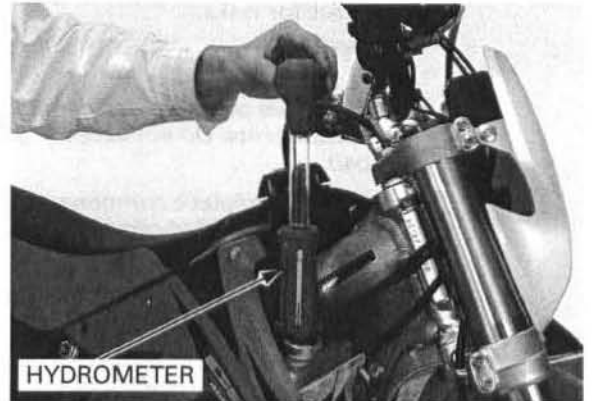
Make sure the engine is cool, remove the radiator cap.



Test the coolant specific gravity using a hydrometer.

### STANDARD COOLANT CONCENTRATION: 1 : 1

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	1.047	1.046	1.045	1.043	1.041	1.038	1.035	1.032
	35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
	40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
	45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
	50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
	55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
	60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

## COOLING SYSTEM

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap.

*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)

Pressure test the radiator, engine and hoses, and check for leaks.

#### NOTICE

*Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm<sup>2</sup>, 20 psi).*

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

After checking the pressure, install the radiator cap securely.



## COOLANT REPLACEMENT

### PREPARATION

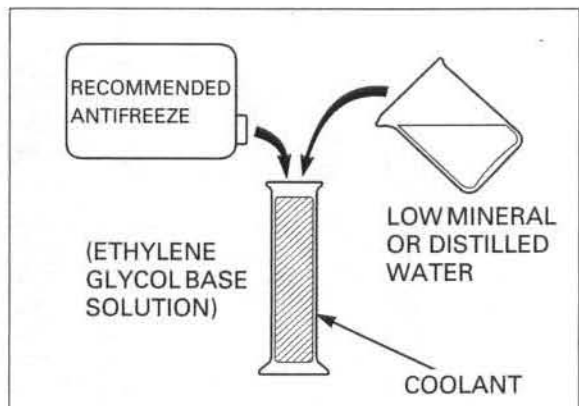
- If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.
- The effectiveness of coolant 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

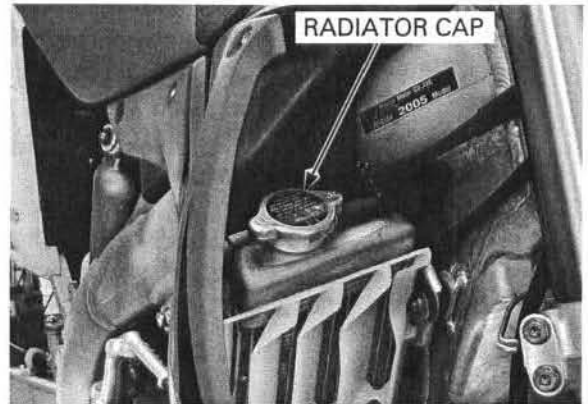
#### RECOMMENDED MIXTURE:

1 : 1 (distilled water and recommended antifreeze)



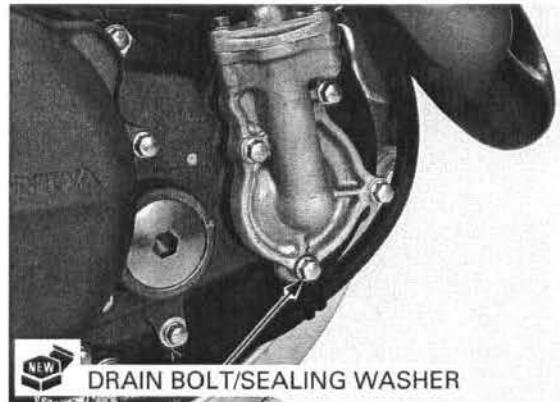
**REPLACEMENT/AIR BLEEDING**

Remove the right and center engine guard (page 3-5).  
Remove the radiator cap.



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

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

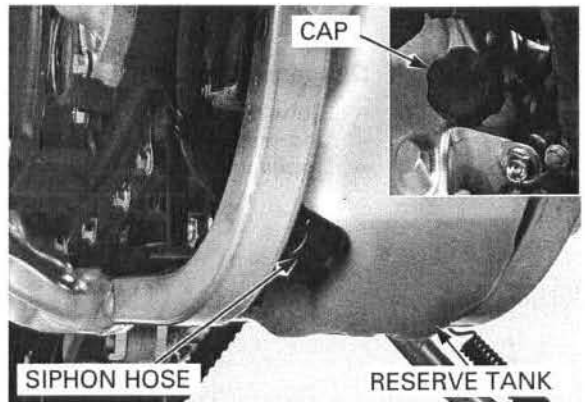


Disconnect the siphon hose from the reserve tank.  
Remove the reserve tank cap and reserve tank.

Drain the reserve tank coolant.  
Empty the coolant and rinse the inside of the reserve tank with water.

Reinstall the reserve tank and connect the radiator siphon hose.

Install the right and center engine guard (page 3-5).



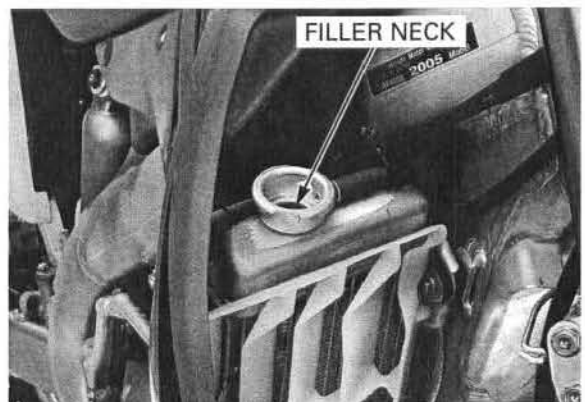
*Route the hoses properly ('05 - '07: page 1-25, After '07: page 1-32).*

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

**CAPACITY:**

**1.21 liter (1.28 US qt, 1.06 Imp qt) at change**

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.





## COOLING SYSTEM

Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follow:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 - 3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant up to proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the "UPPER" level line if it is low.

"UPPER" LEVEL LINE

CAP



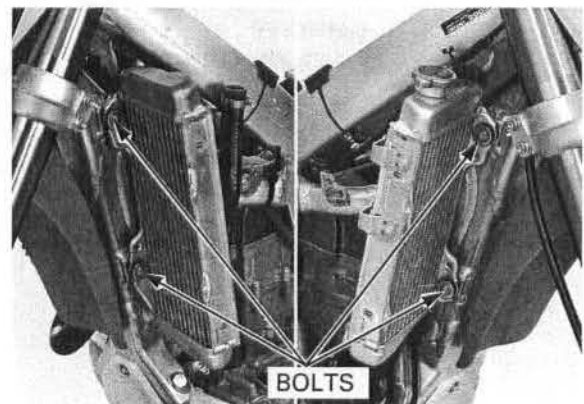
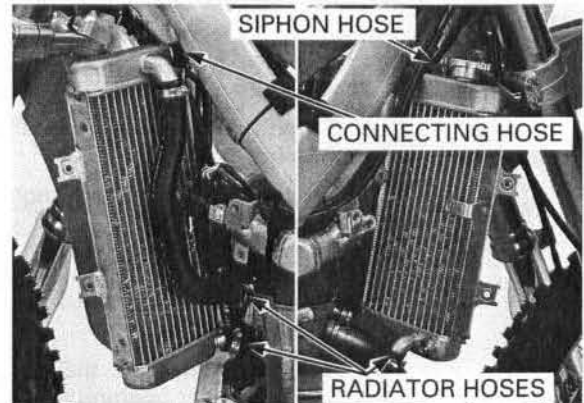
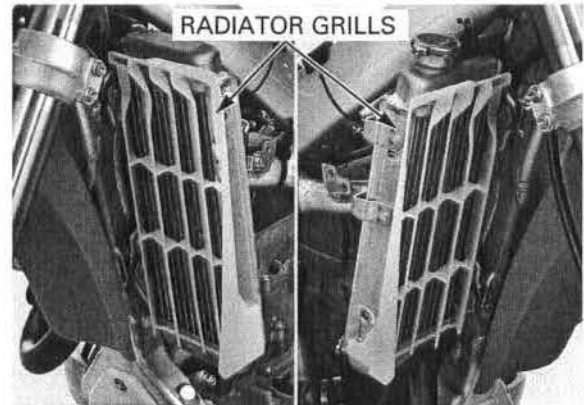
## RADIATOR

### REMOVAL/INSTALLATION

Drain the coolant (page 7-7).

Remove the fuel tank (page 3-8).

Remove the radiator grills.



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

Disconnect the following:

- Siphon hose
- Connecting hose
- Upper and lower radiator hoses

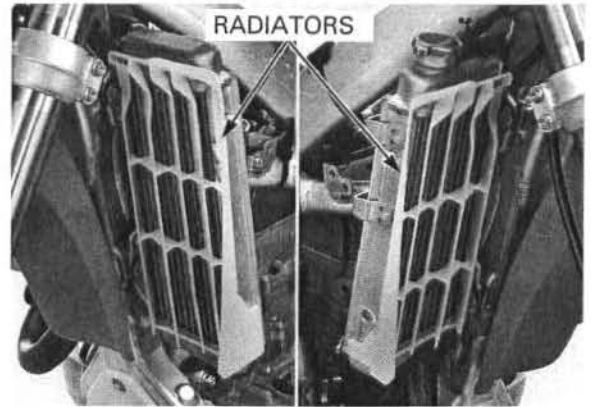
Remove the upper and lower mounting bolts.  
Remove the radiator from the frame.

*Be careful not to damage the radiator core.*

Installation is in the reverse order of removal.

Fill the system with the recommended coolant and bleed the air (page 7-7).

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



## RADIATOR RESERVE TANK

### REMOVAL/INSTALLATION

Remove the right and center engine guard (page 3-5).

Remove the reserve tank cap and reserve tank.

Disconnect the radiator siphon and reserve tank overflow hoses from radiator reserve tank.

Drain the reserve tank coolant.

Installation is in the reverse order of removal.

*Route the hoses properly ('05 - '07: page 1-25, After '07: page 1-32).*



## WATER PUMP

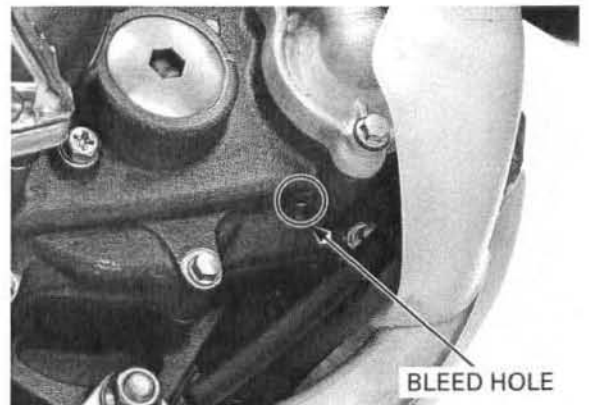
### MECHANICAL/OIL SEAL INSPECTION

Check for signs of seal leakage.

If water leaks through the bleed hole, replace the mechanical seal (page 7-12).

If oil leaks through the bleed hole, replace the oil seal (page 7-12).

A small amount of "weeping" from the bleed hole is normal.

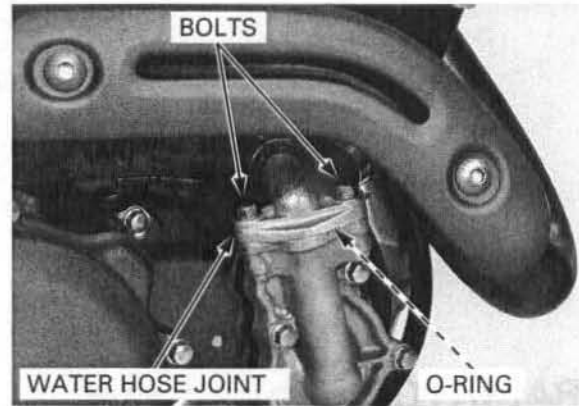


## COOLING SYSTEM

### REMOVAL

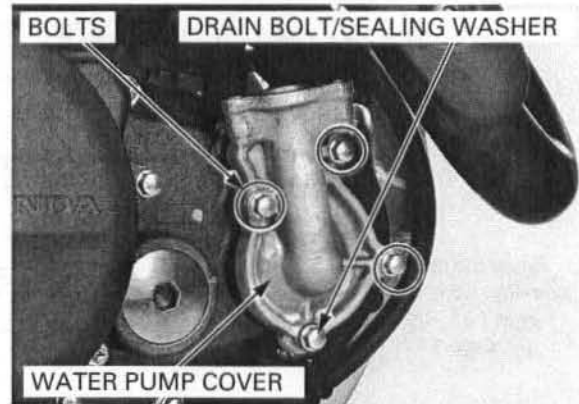
Drain the coolant (page 7-7).

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

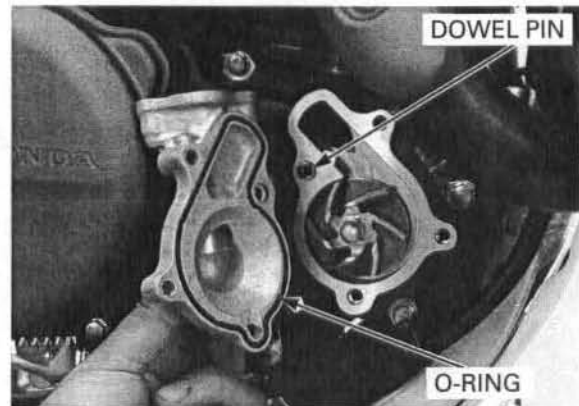


Remove the drain bolt and sealing washer.

Remove the bolts and water pump cover.

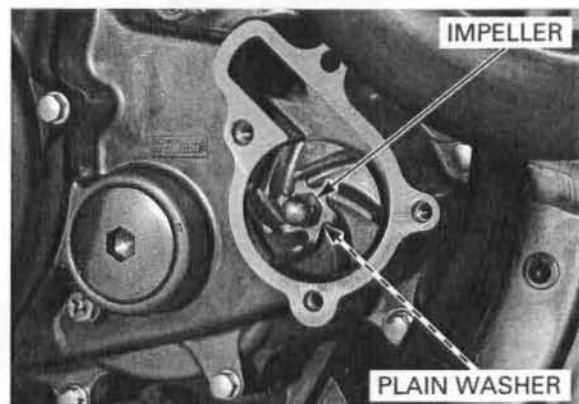


Remove the O-ring and dowel pin.

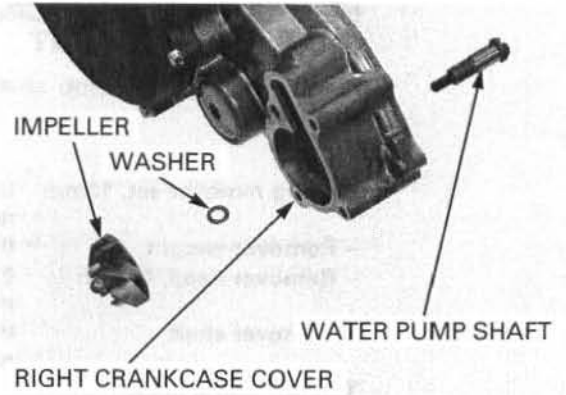


Loosen the impeller.

Remove the right crankcase cover (page 11-5).



Remove the impeller, washer and water pump shaft from the right crankcase cover.

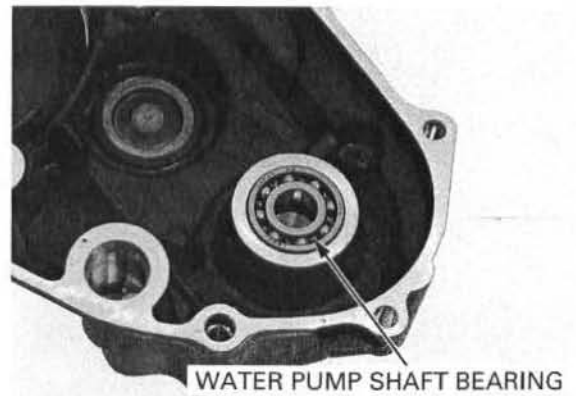


Check the water pump shaft for wear or damage.



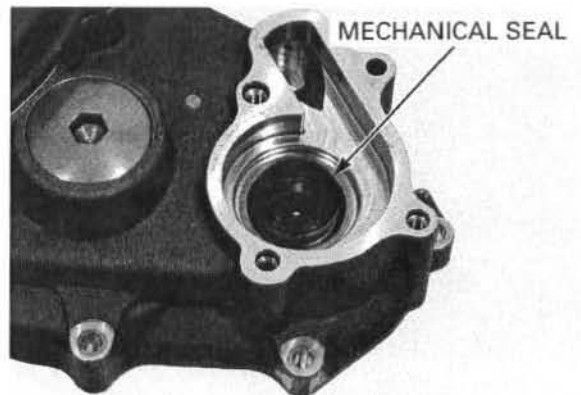
Turn the inner race of the water pump shaft bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that the bearing outer race fits tightly in the right crankcase cover.

Replace the water pump shaft bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the right crankcase cover.



Check the mechanical seal for damage or deterioration.

Replace the mechanical seal if necessary (page 7-12).



## COOLING SYSTEM

### BEARING/MECHANICAL SEAL/OIL SEAL REPLACEMENT

Remove the water pump shaft bearing using the special tools.

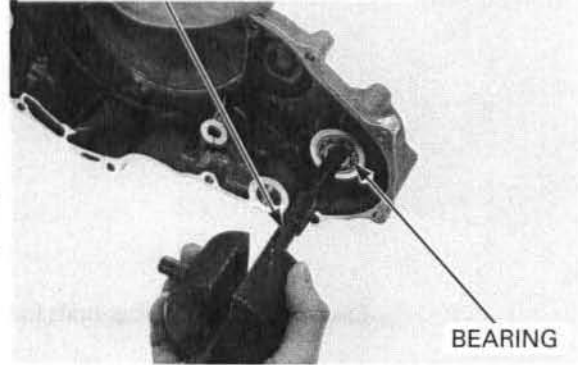
#### TOOLS:

Bearing remover set, 12mm 07936-1660101  
not available in U.S.A.  
- Remover weight 07741-0010201  
- Remover head, 12 mm 07936-1660110  
not available in U.S.A.  
- Remover shaft 07936-1660120  
not available in U.S.A.

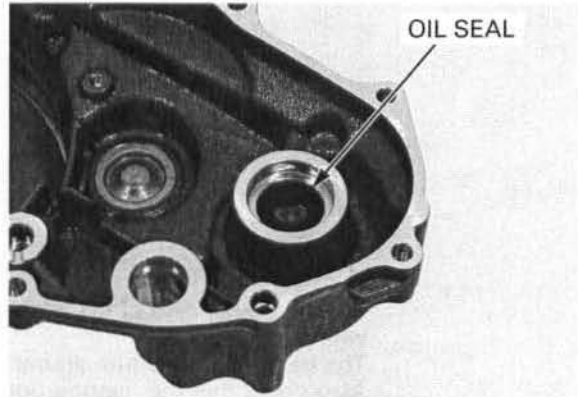
#### TOOLS, U.S.A. only:

Bearing remover, 12 mm 07936-166010A  
Remover handle 07936-3710100  
Remover weight 07741-0010201 or  
07936-371020A

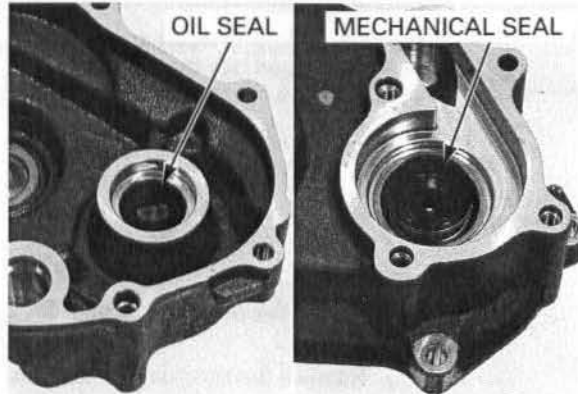
BEARING REMOVER SET, 12 mm



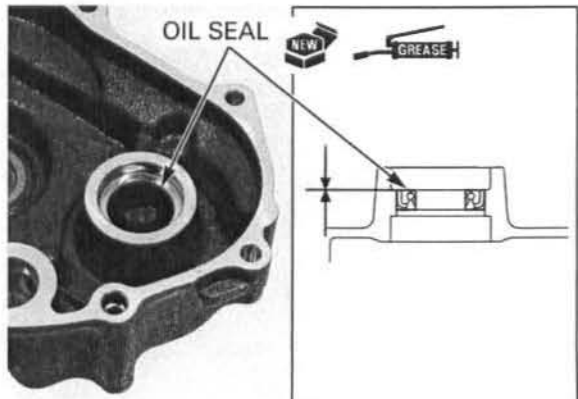
Check the oil seal for damage or deterioration, replace it if necessary (page 7-12).



Remove the mechanical and oil seals from the right crankcase cover.



Apply grease to the oil seal lips.  
Install a new oil seal into the right crankcase as shown.

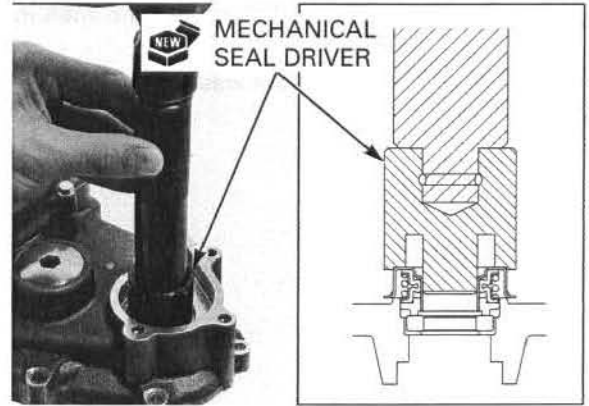


Be careful not to damage the mechanical seal lips.

Drive in a new mechanical seal using the special tools as shown.

- TOOLS:**  
**Driver** 07749-0010000  
**Mechanical seal driver** 07945-4150400

Apply grease to new mechanical seal lips.

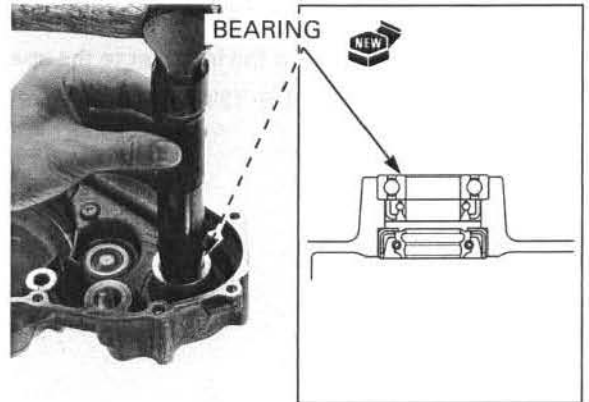


Drive in a new bearing squarely with the marking side facing toward the inside of the right crankcase cover.

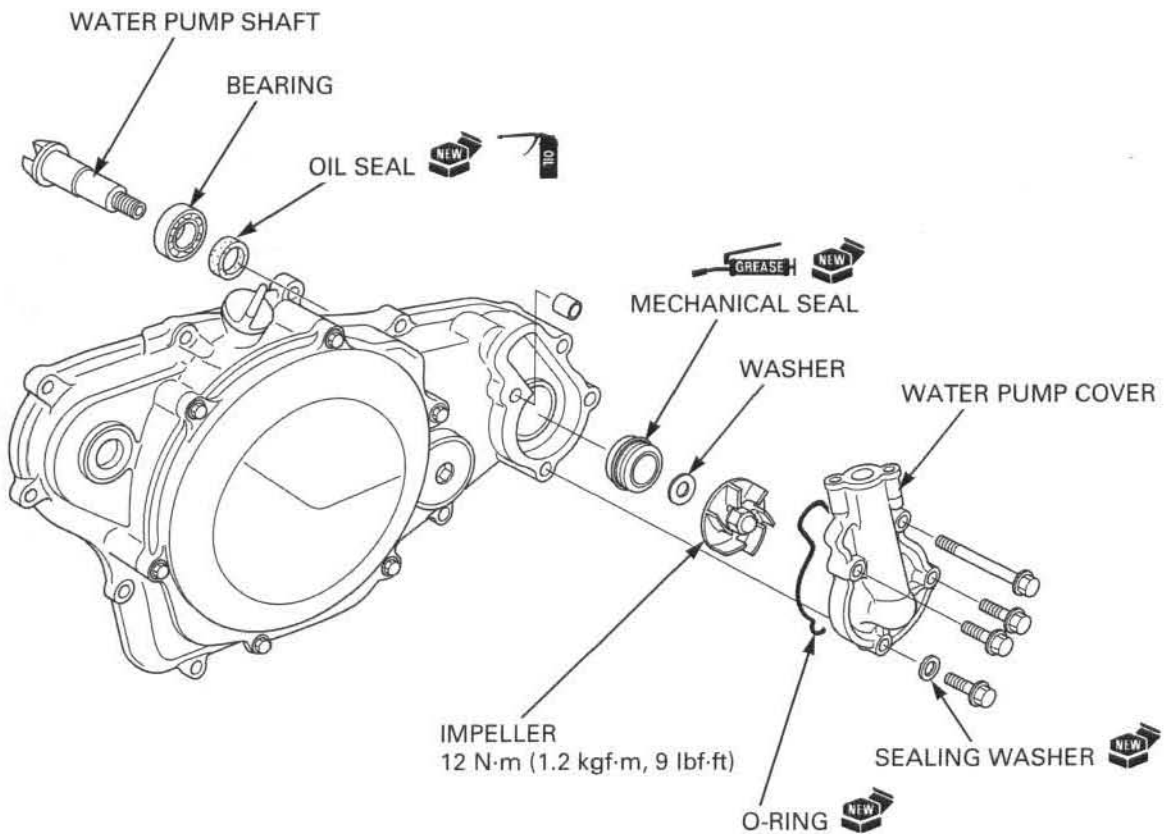
Drive in a new bearing into the right crankcase cover using the special tools as shown.

- TOOLS:**  
**Driver** 07749-0010000  
**Attachment, 28 x 30 mm** 07946-1870100  
**Pilot, 12mm** 07746-0040200

Apply oil to new oil seal lips.



**INSTALLATION**

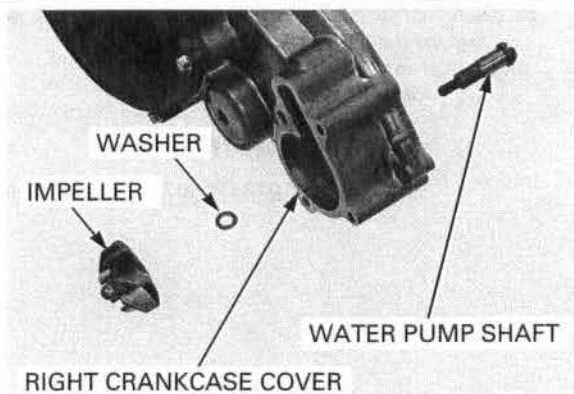




## COOLING SYSTEM

Install the water pump shaft into the right crankcase cover.

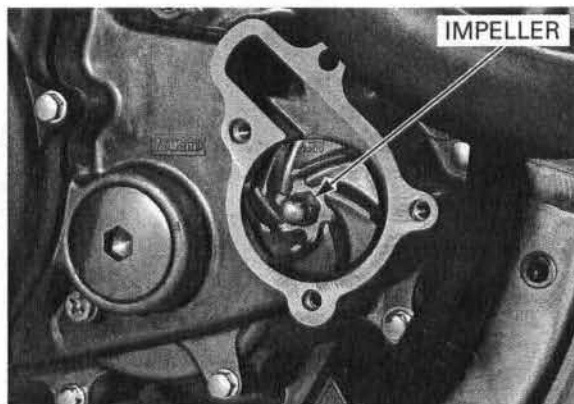
Install the washer and impeller onto the water pump shaft.



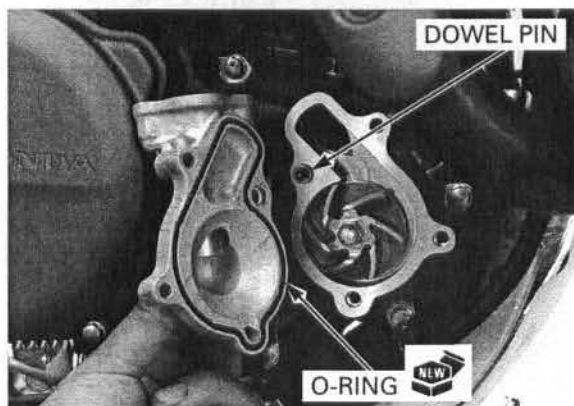
Install the right crankcase cover (page 11-6).

Tighten the impeller to the specified torque.

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

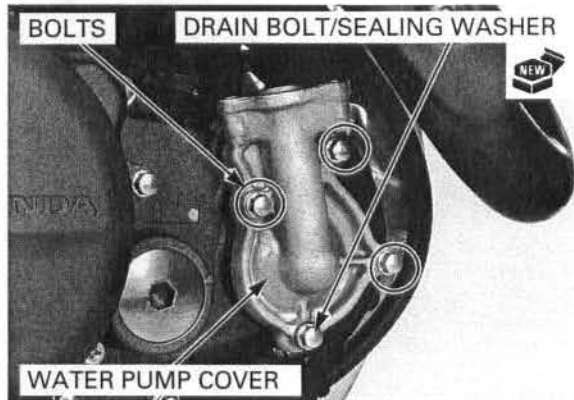


Install a new O-ring onto the water pump cover.  
Install the dowel pin.



Install the water pump cover and tighten the bolts securely.

Install the drain bolt and a new sealing washer.  
Tighten the drain bolt securely.

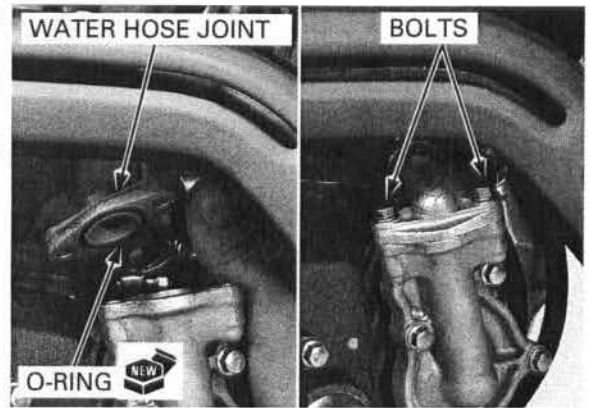




Install a new O-ring into the water hose joint groove.

Install the water hose joint onto the water pump cover and tighten the bolts securely.

Fill the system with the recommended coolant and bleed the air (page 7-7).



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**MEMO**

# 8. ENGINE REMOVAL/INSTALLATION

---

COMPONENT LOCATION ..... 8-2

SERVICE INFORMATION ..... 8-3

DRIVE SPROCKET ..... 8-4

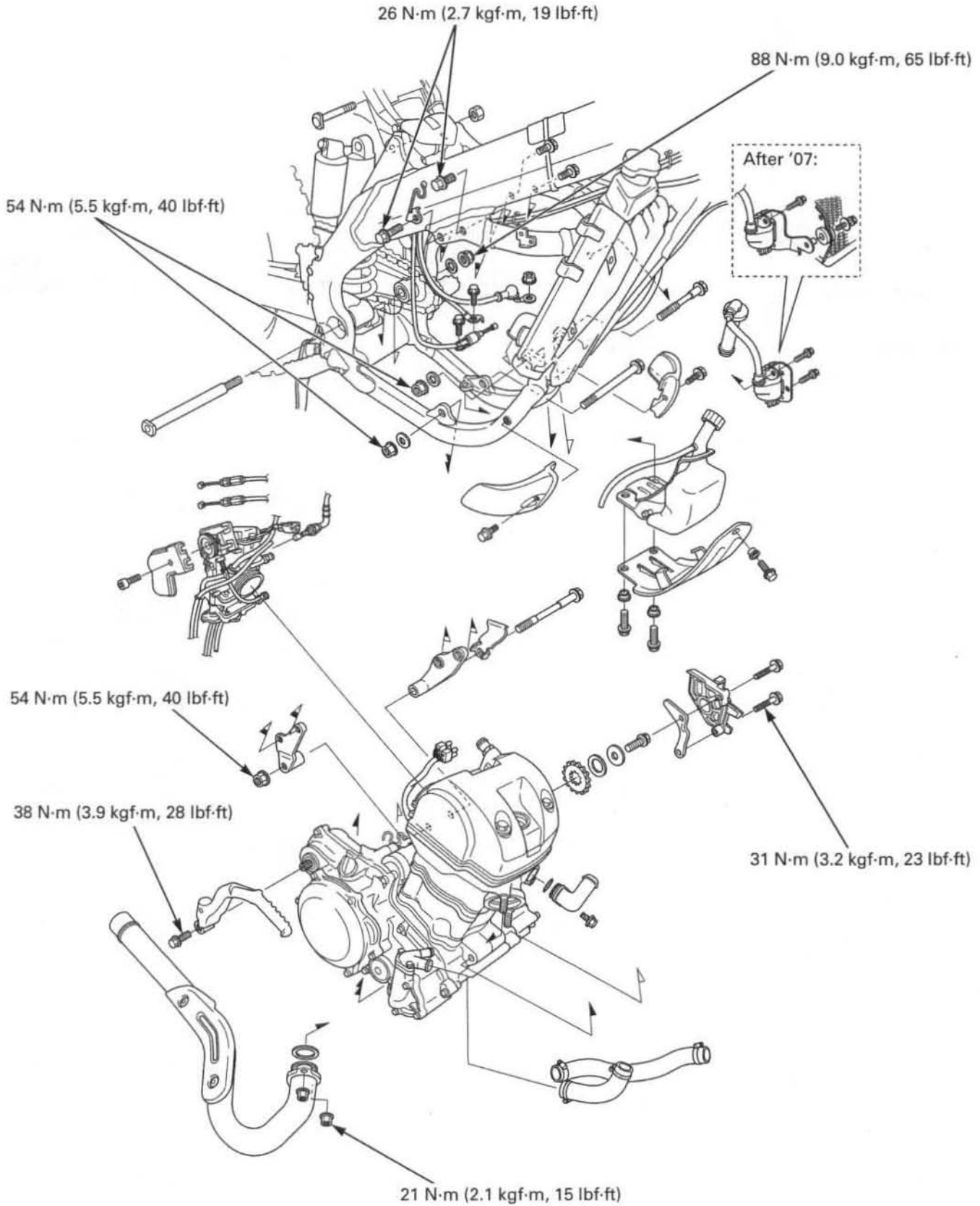
ENGINE REMOVAL ..... 8-5

ENGINE INSTALLATION ..... 8-8

# ENGINE REMOVAL/INSTALLATION

## COMPONENT LOCATION

'05 - '07 shown:



## SERVICE INFORMATION

### GENERAL

- During engine removal and installation, support the motorcycle using a workstand or equivalent.
- The following components require engine removal for service.
  - Crankcase (page 13-10)/Crankshaft (page 13-14)/Transmission (page 13-11)
  - Oil pump (page 5-7)
- The following components can be serviced with the engine installed in the frame.
  - Cylinder head (page 9-24)/Valves (page 9-27)
  - Cylinder (page 10-5)/Piston (page 10-6)
  - Clutch (page 11-7)/Kickstarter (page 11-15)/Gearshift linkage (page 11-24)
  - Carburetor (page 6-11)
  - Secondary air supply system ('05 and '06 California type, After '06: page 6-31)
  - Flywheel (page 12-5)
  - Water pump (page 7-9)
  - Balancer (page 13-8)
  - Starter clutch (page 11-19)
  - Starter motor (page 19-6)

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine weight		32.3 kg (71.2 lbs)
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T903 standard: MA Viscosity: SAE 10W-30
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T903 standard: MA Viscosity: SAE 10W-30
Engine oil capacity	At draining	0.67 liter (0.71 US qt, 0.59 Imp qt)
	At filter change	0.70 liter (0.74 US qt, 0.62 Imp qt)
	At disassembly	0.87 liter (0.92 US qt, 0.77 Imp qt)
Transmission oil capacity	At draining	0.65 liter (0.69 US qt, 0.57 Imp qt)
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)
Coolant capacity	At change	1.21 liter (1.28 US qt, 1.06 Imp qt)
	At disassembly	1.45 liter (1.53 US qt, 1.28 Imp qt)

### TORQUE VALUES

Engine hanger plate bolt		26 N·m (2.7 kgf·m, 19 lbf·ft)	
Engine mounting nut	(front)	54 N·m (5.5 kgf·m, 40 lbf·ft)	
	(upper)	54 N·m (5.5 kgf·m, 40 lbf·ft)	
	(lower)	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Drive sprocket bolt		31 N·m (3.2 kgf·m, 23 lbf·ft)	
Kickstarter pedal bolt		38 N·m (3.9 kgf·m, 28 lbf·ft)	
Swingarm pivot nut		88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Exhaust pipe joint nut		21 N·m (2.1 kgf·m, 15 lbf·ft)	

## ENGINE REMOVAL/INSTALLATION

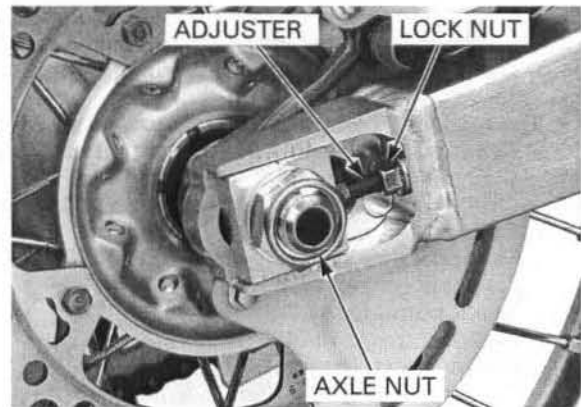
### DRIVE SPROCKET

#### REMOVAL

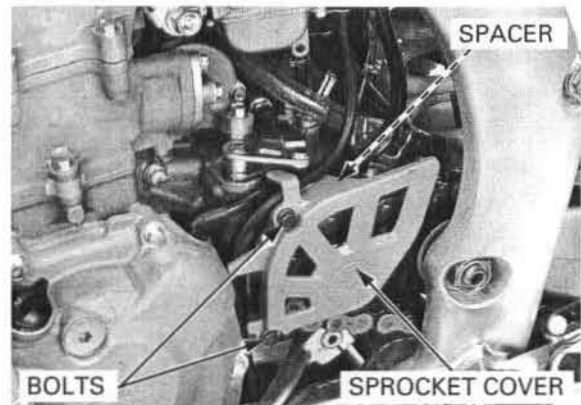
Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

Loosen the axle nut.

Loosen the drive chain adjuster lock nuts and turn the adjusters clockwise fully.

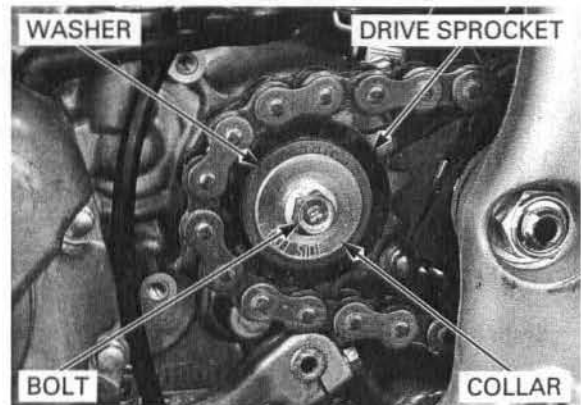


Remove the bolts, sprocket cover and spacer.



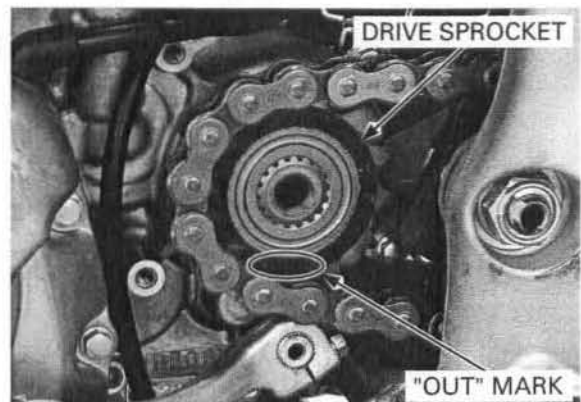
Shift the transmission other than neutral position.

Remove the bolt, collar, washer and drive sprocket.



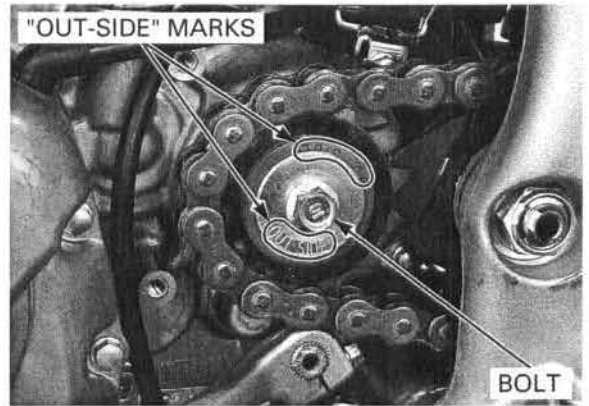
#### INSTALLATION

Install the drive chain to the drive sprocket.  
Install the drive sprocket onto the countershaft with the "OUT" mark facing out.



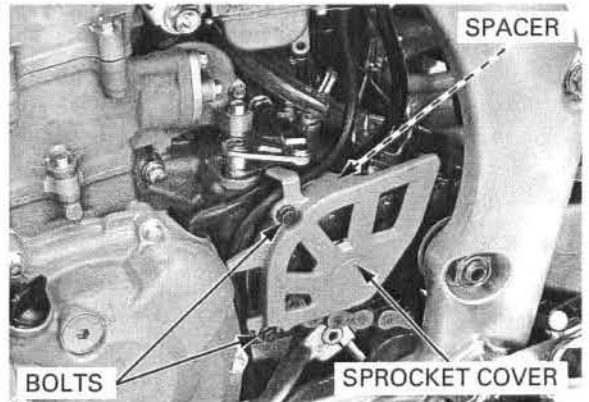
Install the washer and collar with their "OUT-SIDE" marks facing out.  
Tighten the drive sprocket bolt to the specified torque.

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



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

Adjust drive chain slack (page 4-24).

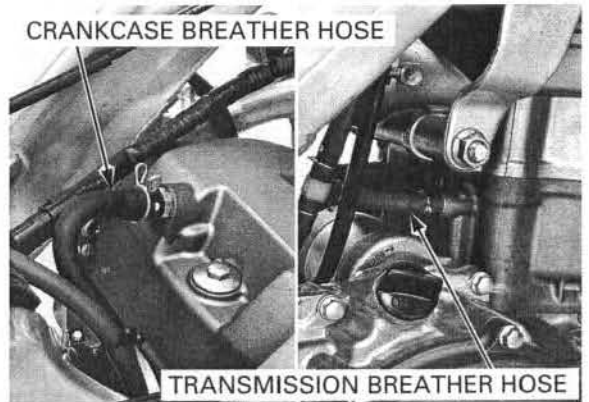


## ENGINE REMOVAL

Drain the engine oil (page 4-20).  
Drain the transmission oil (page 4-23).  
Drain the coolant (page 7-7).

Remove the following:

- Seat (page 3-3)
- Left/right/center engine guards (page 3-5)
- Fuel tank (page 3-8)
- Spark plug cap (page 4-12)
- Ignition coil (page 18-8)
- Exhaust system (page 3-13)
- Carburetor (page 6-11)
- Drive sprocket (page 8-4)
- Kickstarter pedal (page 11-5)
- Gearshift pedal (page 11-24)
- Brake pedal (page 16-24)
- Radiator reserve tank (page 7-9)



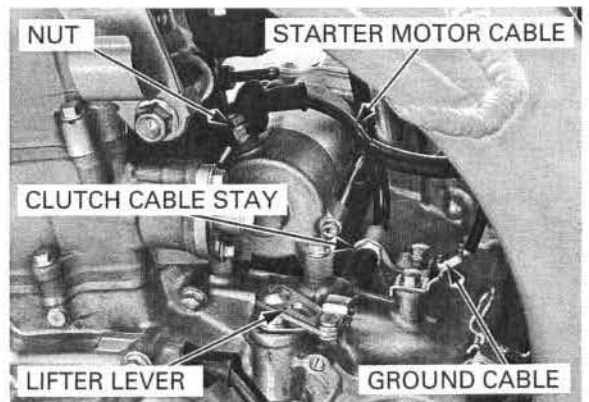
*'05 and '06  
California type,  
After '06:*

Remove the PAIR control valve (page 6-30).

Disconnect the breather hoses.

Remove the bolt and ground cable.  
Remove the nut and starter motor cable.

Remove the bolt and clutch cable stay, then disconnect the clutch cable from the clutch lifter lever.

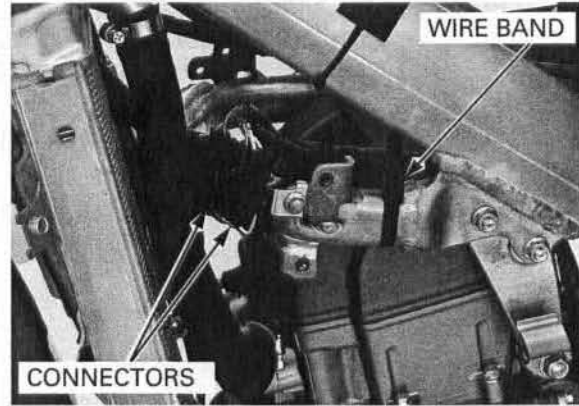




## ENGINE REMOVAL/INSTALLATION

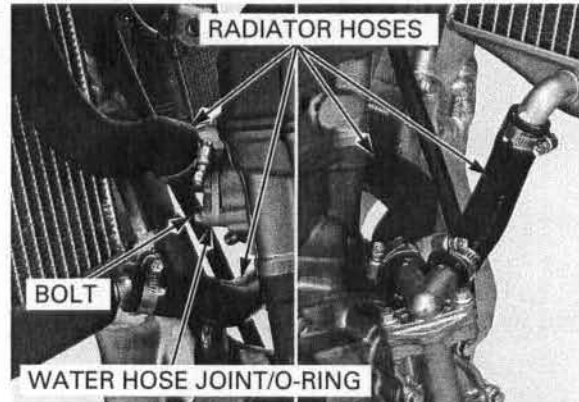
Remove the wire band.

Disconnect the alternator 4P (Black) and ignition pulse generator 2P (Black) connectors.

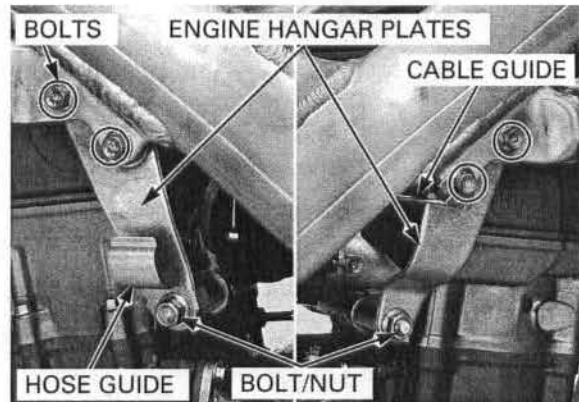


Loosen the hose band screws and disconnect the radiator hoses.

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



Remove the nut, bolts, fuel hose guide, clutch cable guide and engine hanger plates.



Loosen the swingarm pivot nut.

Loosen the engine front and lower mounting nuts.

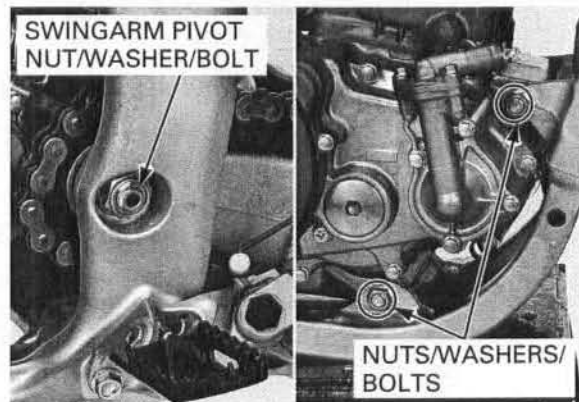
Remove the swingarm pivot nut, washer and bolt.

Remove the engine front and lower mounting nuts, washers and bolts.

Remove the engine.

- A workstand or equivalent is need to support the swingarm when removing the engine.

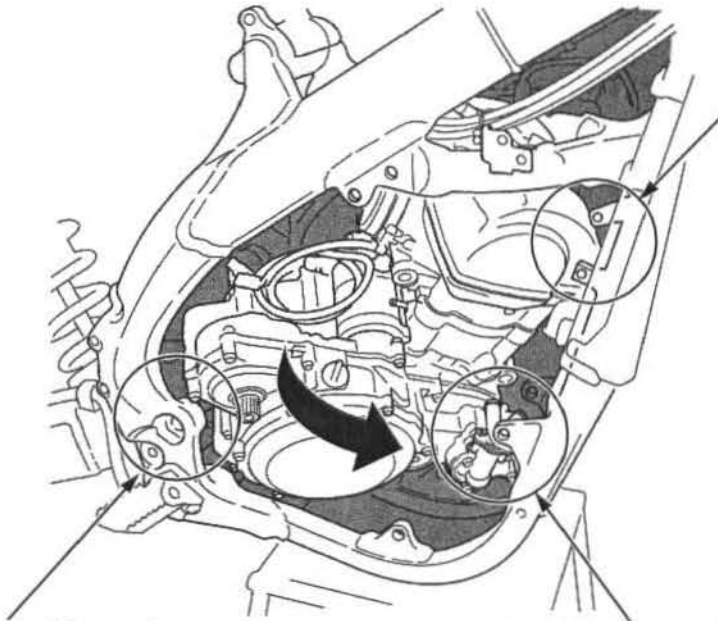
*During engine removal, hold the engine securely and be careful not to damage the frame and engine.*



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

Turn the engine 90 degrees in the frame so that the left crankcase cover is facing rearward using the following procedures:

**'05 - '07 shown:**



**NOTE ('05 - '07):**  
Be careful not to damage the cylinder head cover with the ignition coil stays.

**NOTE (After '07):**  
Be careful not to damage the cylinder head cover with the ignition coil stay (upper only).

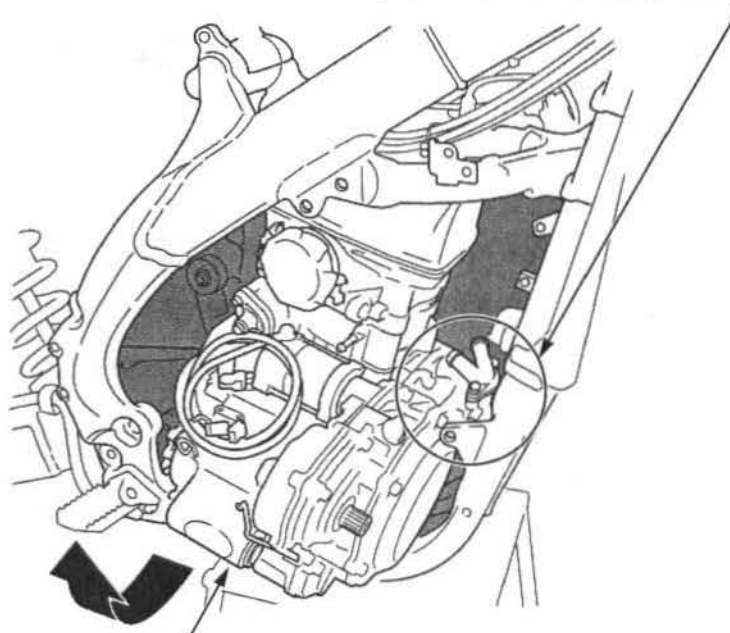
2. Move the rear end of the engine over the swingarm pivot of the frame.

1. Position the water hose joint inside of the front engine hanger.

Remove the engine from the right side of the frame using the following procedures:

**'05 - '07 shown:**

1. Lift the bottom of the engine and pass the water hose joint under the front engine hanger.

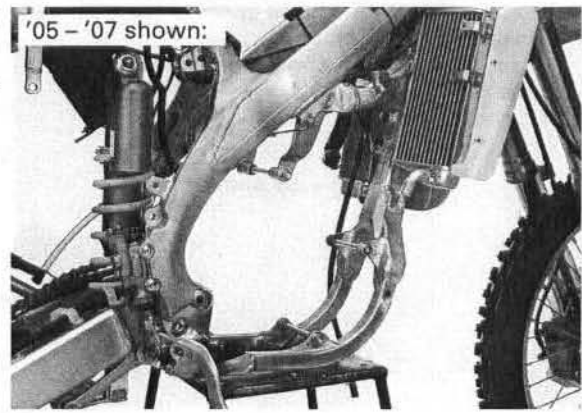


2. Pass the engine rear end over the right side of the frame, and then remove the engine.

## ENGINE REMOVAL/INSTALLATION

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

Apply molybdenum disulfide paste to the engine contact area of the front engine hanger.

*Carefully align the mounting points to prevent damage to engine, frame, wire and cables.*

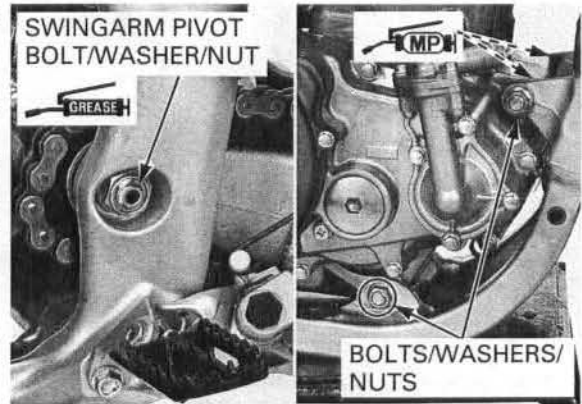
Install the engine in the frame.

Apply thin coat of grease to the swingarm pivot bolt sliding surface.

Loosely install the swingarm pivot bolt, washer and nut.

Loosely install the engine mounting bolts, washers and nuts.

- Route the wires and cables properly ('05 - '07: page 1-25, After '07: page 1-32).
- Do not tighten the swingarm pivot nut and engine mounting nuts yet.



Install the engine hanger plates, fuel hose guide, clutch cable guide, upper engine mounting bolt, washer, nut and engine hanger plate bolts.

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

### TORQUE:

Swingarm pivot nut: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Engine hanger plate bolt:

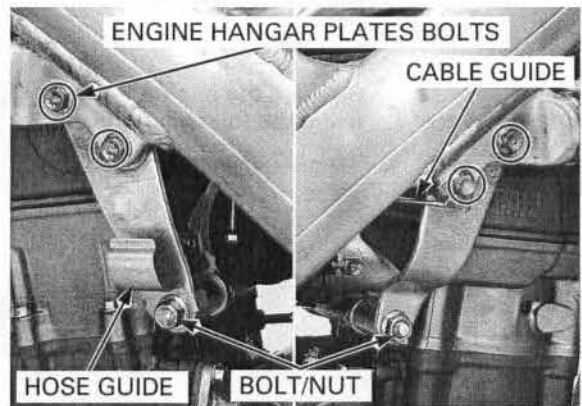
26 N·m (2.7 kgf·m, 19 lbf·ft)

Engine mounting nut:

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

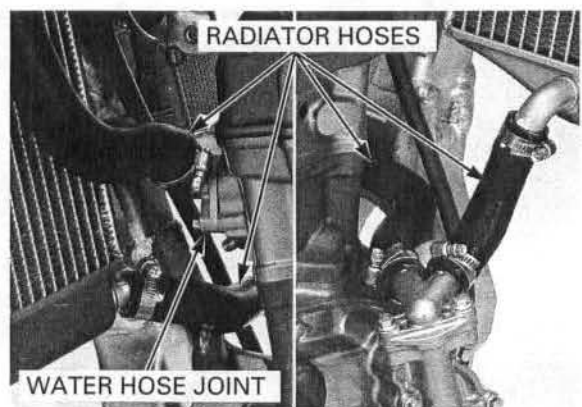
(upper): 54 N·m (5.5 kgf·m, 40 lbf·ft)

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



Install the water hose joint to the cylinder head.

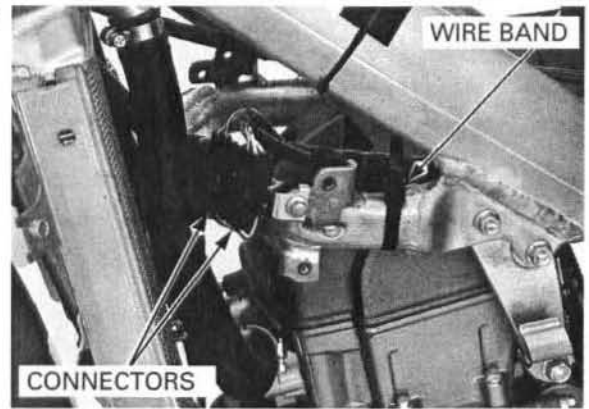
Connect the radiator hoses and tighten the band screws securely.



Route the wire harness properly ('05 - '07: page 1-25, After '07: page 1-32).

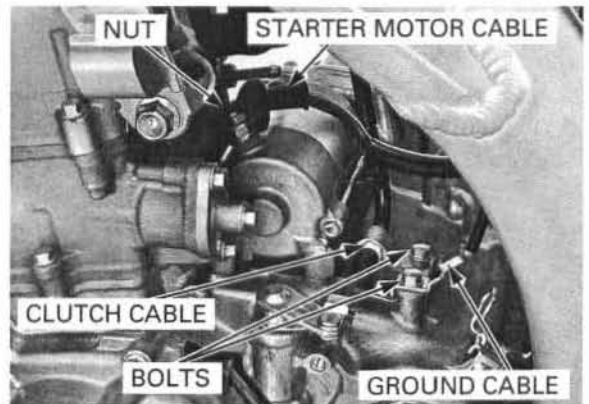
Connect the alternator 4P (Black) and ignition pulse generator 2P (Black) connectors.

Install the wire band.



Connect the starter motor cable and tighten the nut securely.

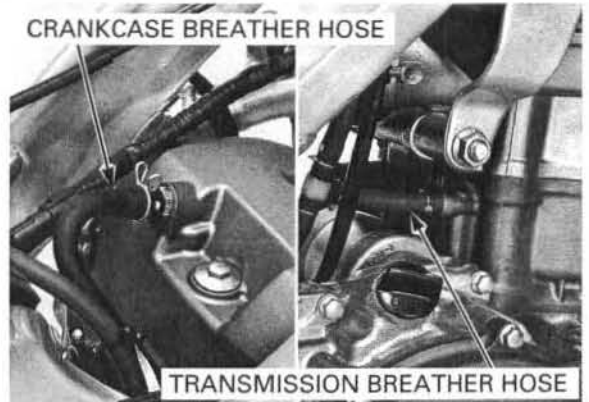
Connect the clutch cable to the clutch lifter lever. Install the clutch cable stay and ground cable and tighten the bolts securely.



Connect the breather hoses.

Install the following:

- Ignition coil (page 18-8)
- Radiator reserve tank (page 7-9)
- Brake pedal (page 16-24)
- Gearshift pedal (page 11-27)
- Kickstarter pedal (page 11-7)
- Drive sprocket (page 8-4)
- Carburetor (page 6-24)
- Exhaust system (page 3-14)
- Spark plug cap (page 4-12)
- Fuel tank (page 3-8)
- Left/right/center engine guards (page 3-5)
- Seat (page 3-3)



'05 and '06  
California type,  
After '06:

Install the PAIR control valve (page 6-30).

Fill the system with the recommended coolant and bleed the air (page 7-7).

Fill the engine with the recommended engine oil (page 4-19).

Fill the transmission with the recommended transmission oil (page 4-23).

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

- Throttle grip freeplay (page 4-9)
- Drive chain slack (page 4-24)
- Clutch lever freeplay (page 4-31)

Check the exhaust system for leaks.

---

MEMO

# 9. CYLINDER HEAD/VALVES

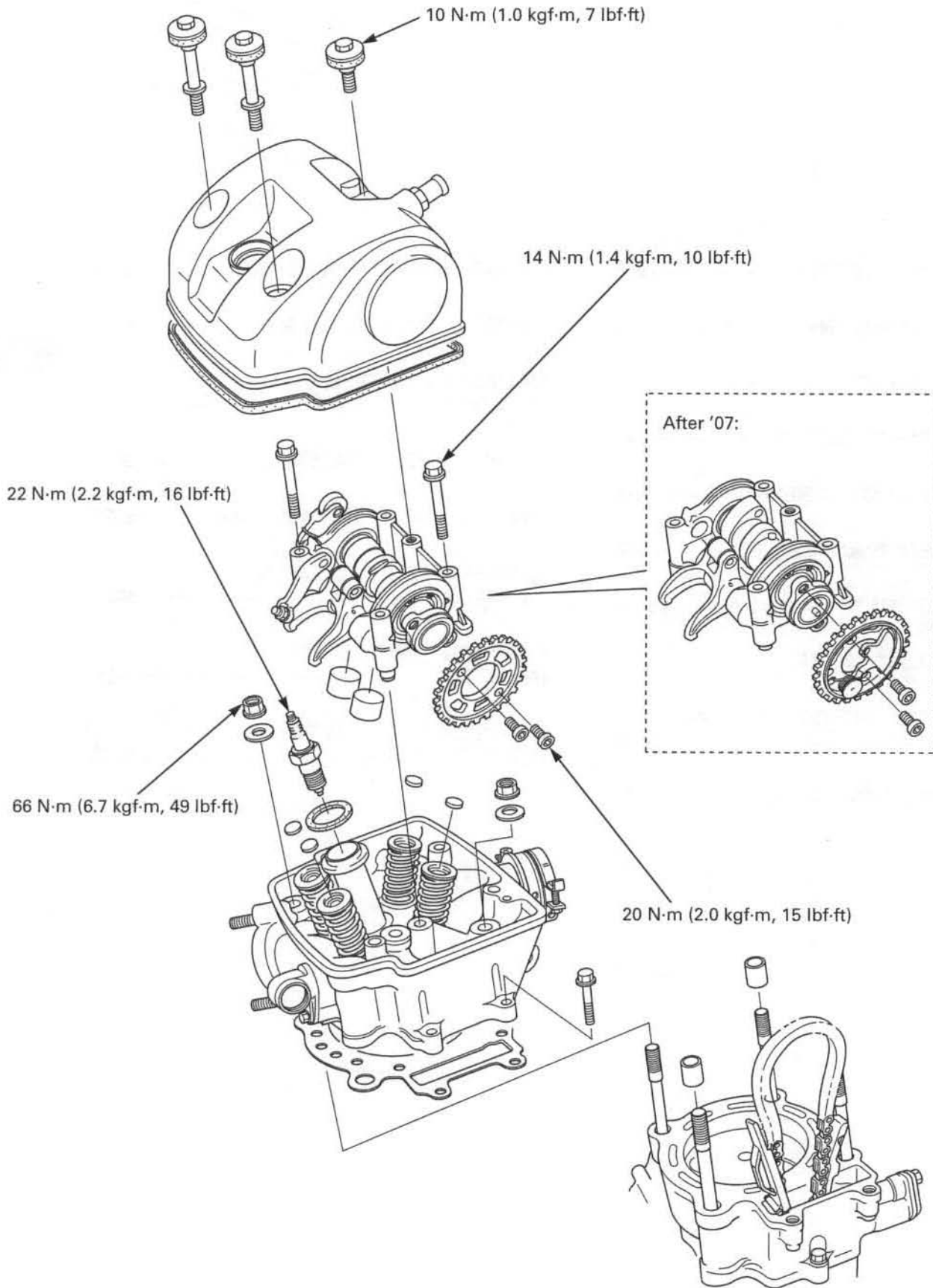
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# CYLINDER HEAD/VALVES

## COMPONENT LOCATION

'05 - '07 shown:





# 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

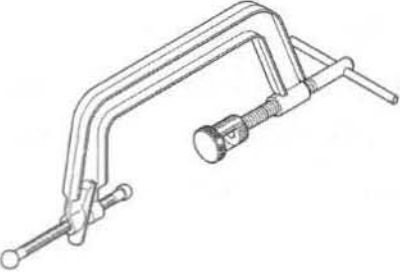
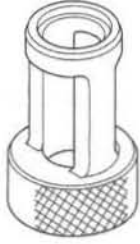
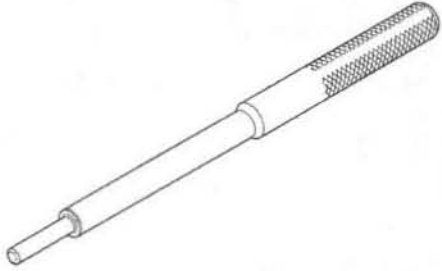
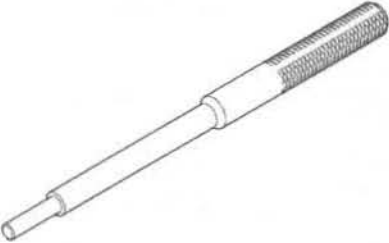
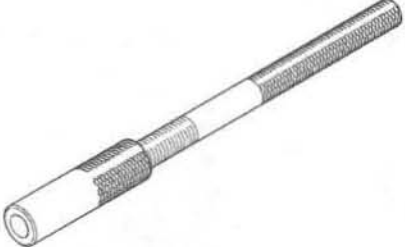

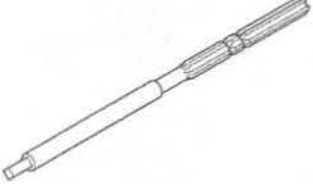
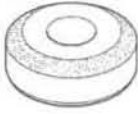



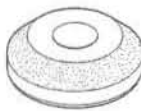
ITEM		STANDARD		SERVICE LIMIT
Cylinder compression		402 kPa (4.1 kgf/cm <sup>2</sup> , 58 psi) at 360 rpm		-
Cylinder head warpage		-		0.05 (0.002)
Decompressor clearance		'05 - '07	Ex valve clearance + 0.35 mm (0.014)	-
Valve and valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	-
		EX	0.28 ± 0.03 (0.011 ± 0.001)	-
	Valve stem O.D.	IN	5.475 - 5.490 (0.2156 - 0.2161)	-
		EX	4.965 - 4.980 (0.1955 - 0.1961)	4.96 (0.195)
	Valve guide I.D.	IN	5.500 - 5.512 (0.2165 - 0.2170)	5.552 (0.2186)
		EX	5.000 - 5.012 (0.1969 - 0.1973)	5.052 (0.1989)
	Stem-to-guide clearance	IN	0.010 - 0.037 (0.0004 - 0.0015)	-
		EX	0.020 - 0.047 (0.0008 - 0.0019)	-
	Valve guide projection above cylinder head	IN	16.1 - 16.3 (0.63 - 0.64)	-
		EX	17.9 - 18.1 (0.70 - 0.71)	-
Valve seat width	IN	1.1 - 1.3 (0.04 - 0.05)	2.0 (0.08)	
	EX	1.3 - 1.5 (0.05 - 0.06)	2.0 (0.08)	
Valve spring free length	IN	40.68 (1.602)	39.7 (1.56)	
	EX	42.82 (1.686)	41.9 (1.65)	
Rocker arm	Rocker arm I.D.		12.000 - 12.018 (0.4724 - 0.4731)	12.05 (0.474)
	Rocker arm shaft O.D.		11.967 - 11.975 (0.4711 - 0.4715)	11.92 (0.469)
	Rocker arm-to-shaft clearance		0.025 - 0.051 (0.0010 - 0.0020)	0.10 (0.004)
Camshaft	Cam lobe height	IN	36.890 - 37.130 (1.4524 - 1.4618)	36.890 (1.4524)
		EX	35.063 - 35.303 (1.3804 - 1.3899)	35.063 (1.3804)
Valve lifter O.D.		25.978 - 25.993 (1.0228 - 1.0233)		25.97 (1.022)
Valve lifter bore I.D.		26.010 - 26.026 (1.0240 - 1.0246)		26.04 (1.025)

## TORQUE VALUES

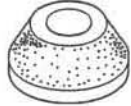
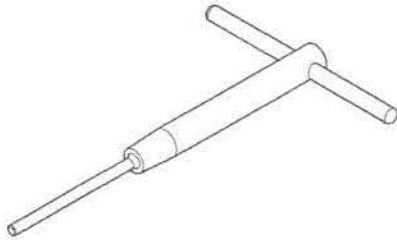
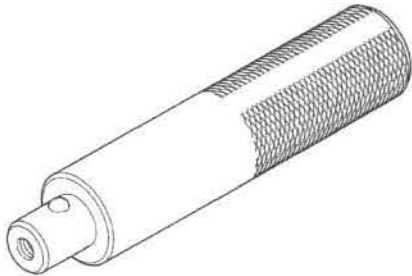


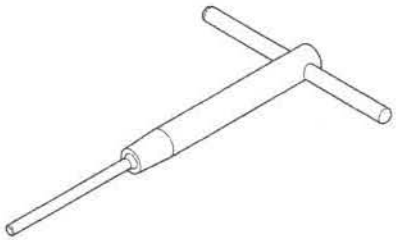
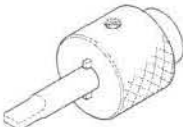

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder mounting bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply oil to the threads
Decompressor cam mounting bolt ('05 - '07)	24 N·m (2.4 kgf·m, 18 lbf·ft)	Apply oil to the threads
Cam sprocket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads
Decompressor lifter arm mounting nut ('05 - '07)	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply oil to the threads and seating surface
Cylinder head nut	66 N·m (6.7 kgf·m, 49 lbf·ft)	Apply oil to the threads and seating surface
Cam chain tensioner bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads
Engine mounting nut (upper)	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Engine hanger plate bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)	
Spark plug	22 N·m (2.2 kgf·m, 16 lbf·ft)	

# CYLINDER HEAD/VALVES

## TOOLS

<p>Valve spring compressor 07757-0010000</p> 	<p>Valve spring compressor attachment 07959-KM30101</p> 	<p>Valve guide remover, 5.0 mm 07942-MA60000</p> 
<p>Valve guide remover, 5.5 mm 07742-0010100</p> 	<p>Valve guide driver 07743-0020000</p>  <p>not available in U.S.A.</p>	<p>Valve guide reamer, 5.5 mm 07984-2000001 or</p>  <p>07984-200000D (U.S.A. only)</p>
<p>Valve guide reamer, 5.0 mm 07984-MA60001 or</p>  <p>07984-MA6000D (U.S.A. only)</p>	<p>Valve seat cutter, 35 mm (45°, IN) 07780-0010400</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Valve seat cutter, 33 mm (45°, EX) 07780-0010800</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Flat cutter, 33 mm (32°, EX) 07780-0012900</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Flat cutter, 36 mm (32°, IN) 07780-0013500</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Interior cutter, 37.5 mm (60°, IN) 07780-0014100</p>  <p>or equivalent commercially available in U.S.A.</p>

# CYLINDER HEAD/VALVES

<p>Interior cutter, 34 mm (60°, EX) 07780-0014700</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Cutter holder, 5.0 mm 07781-0010400</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Driver 07749-0010000</p> 
<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Pilot, 20 mm 07746-0040500</p> 	<p>Cutter holder, 5.5 mm 07781-0010101</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Tensioner stopper 070MG-0010100</p>  <p>or 07AMG-001A100 (U.S.A. only)</p>	<p>Cam sprocket holder ('05 - '07) 07AMB-MEBA100 (U.S.A. only)</p> 	

## CYLINDER HEAD/VALVES

---

### TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test or by tracing top-end noise with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for 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
  - Weak valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
- Loose spark plug
- Faulty cylinder, piston or piston rings
- Faulty decompressor system

#### Compression too high

- Excessive carbon build-up in cylinder head or top of piston

#### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder, piston or piston rings problem

#### 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
- Cylinder, piston or piston rings problem

#### Rough idle

- Low cylinder compression

## CYLINDER COMPRESSION TEST

- Warm up the engine.
- Stop the engine and remove the spark plug (page 4-12).
- Connect a compression gauge.
- Open the throttle fully.

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

- Crank the engine with the electric starter or kickstarter until the gauge needle stops moving.
- The maximum reading is usually reached within 4-7 seconds when using electric starter.

**COMPRESSION:** 402 kPa (4.1 kg/cm<sup>2</sup>, 58 psi)  
at 360 rpm

### Low compression can be caused by:

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

### High compression can be caused by:

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

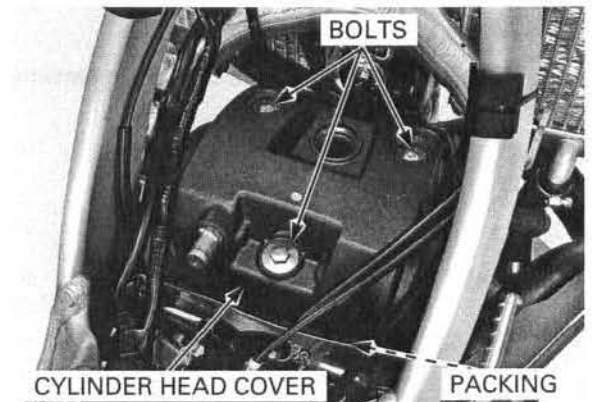


## CYLINDER HEAD COVER REMOVAL

- Remove the fuel tank (page 3-8).
- Disconnect the spark plug cap and crankcase breather hose.

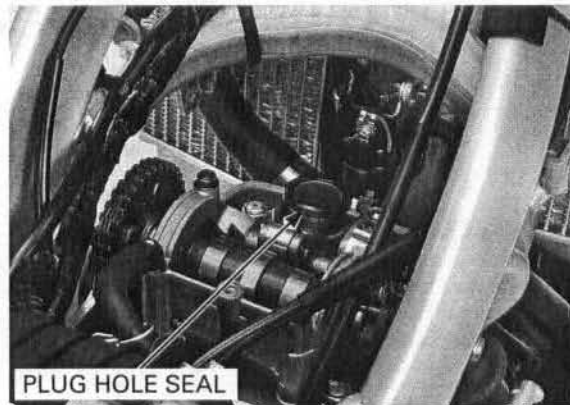


- Remove the bolts, cylinder head cover and packing.



## CYLINDER HEAD/VALVES

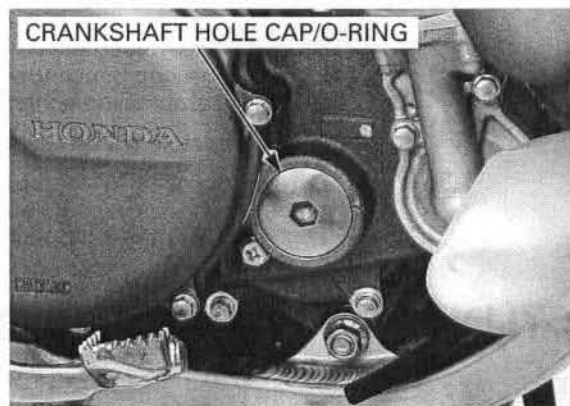
Remove the plug hole seal.



## CAMSHAFT REMOVAL ('05 – '07)

Remove the cylinder head cover (page 9-7).

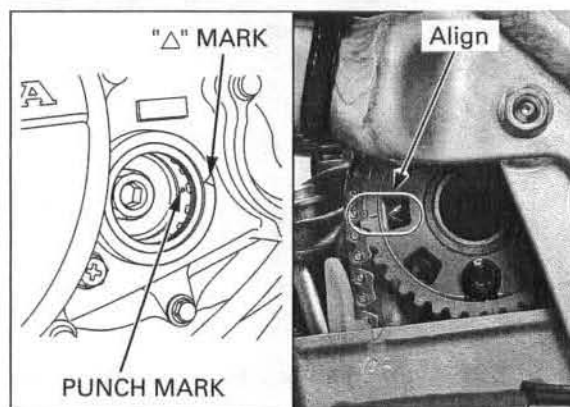
Remove the crankshaft hole cap and O-ring.



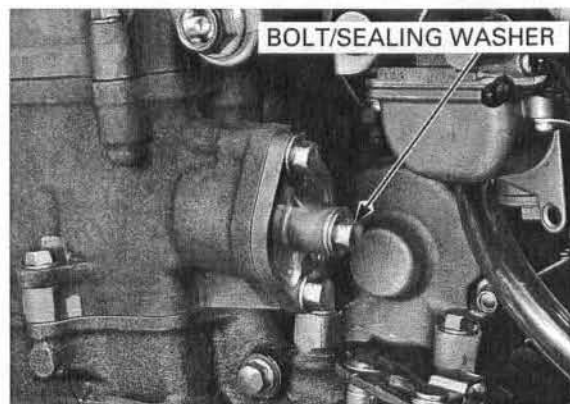
Turn the crankshaft clockwise to align the punch mark on the primary drive gear with the "△" mark on the right crankcase cover. Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

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

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



Remove the cam chain tensioner lifter bolt and sealing washer.



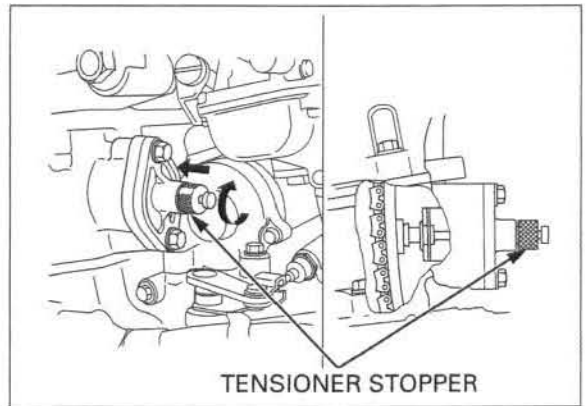
Insert the stopper tool into the cam chain tensioner lifter.

Turn the stopper tool clockwise fully and lock the cam chain tensioner lifter by pushing the handle.

**TOOL:**

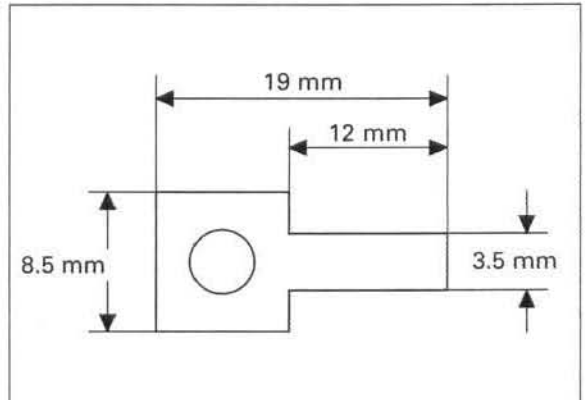
**Tensioner stopper**

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



TENSIONER STOPPER

A tool can easily be made from a thin (1 mm thick) piece of steel as shown.

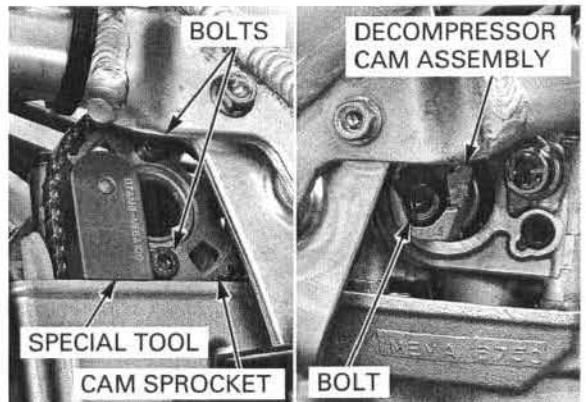


Insert the special tool into the sprocket, over the gasket surface and loosen the one cam sprocket bolt.

- When the decompressor cam assembly will be disassembled, loosen the mounting bolt, but do not remove it yet.

**TOOL:**

**Cam sprocket holder 07AMB-MEBA100 (U.S.A. only)**



*Be careful not to drop the bolts into the crankcase.*

Remove the special tool, turn the crankshaft clockwise one turn and reinsert the special tool into the sprocket. Remove the other cam sprocket bolt. Then remove the another cam sprocket bolt using the same procedure as removal of the other cam sprocket bolt.

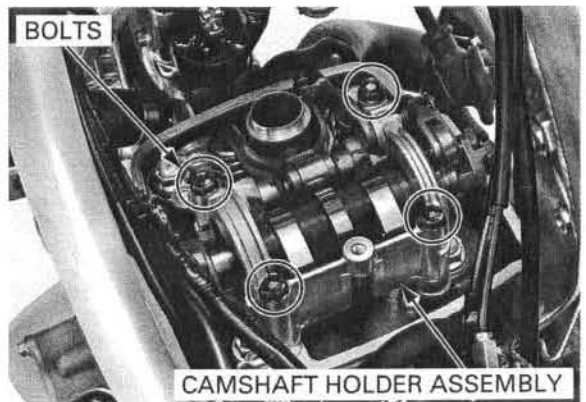
Remove the cam sprocket from the camshaft, and suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.

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

Loosen the camshaft holder 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.

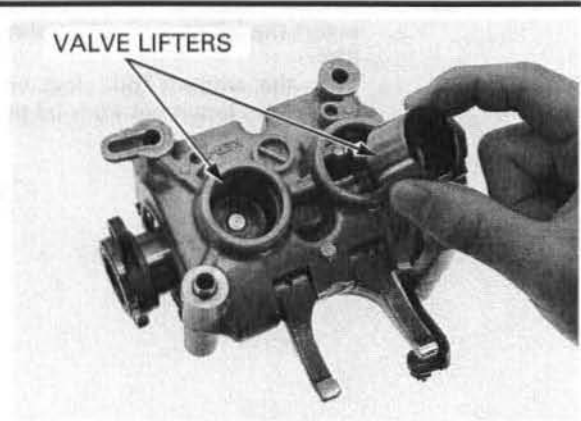




## CYLINDER HEAD/VALVES

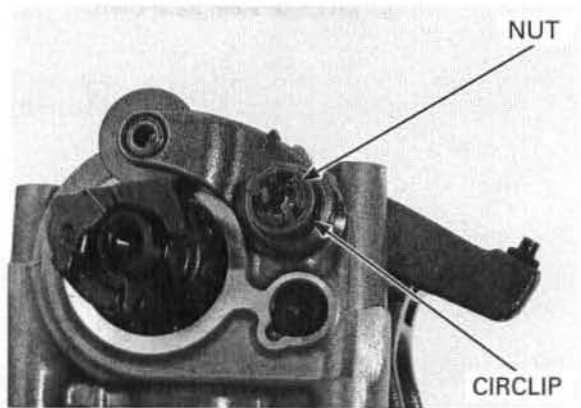
Be sure to mark the valve lifters so they can be installed in their original positions.

Remove the valve lifters from the camshaft holder assembly.

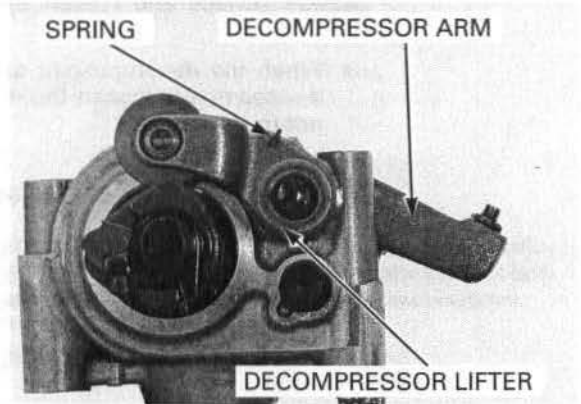


### DISASSEMBLY

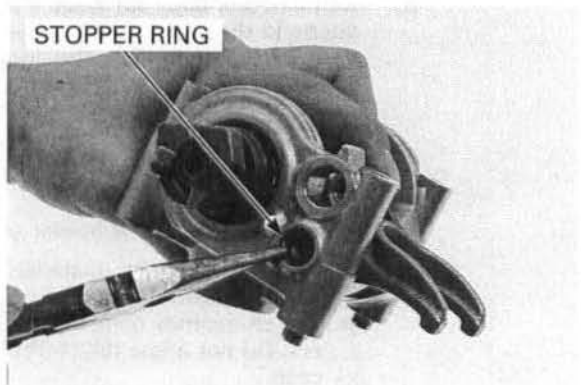
Remove the circlip and nut.



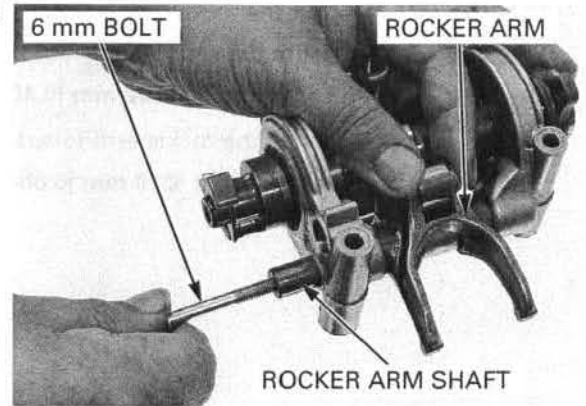
Remove the decompressor lifter, spring and decompressor arm.



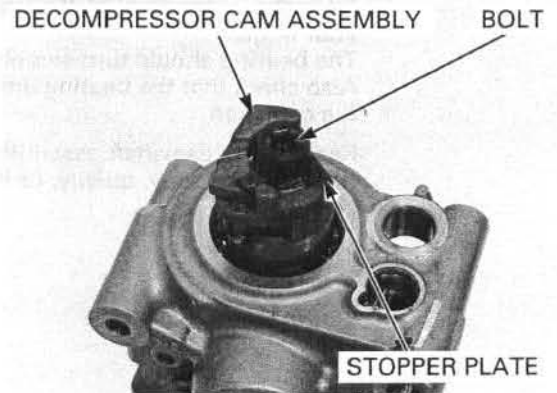
Remove the stopper ring.



Thread a 6 mm bolt into the rocker arm shaft, and pull the rocker arm shaft from the camshaft holder. Remove the rocker arm.



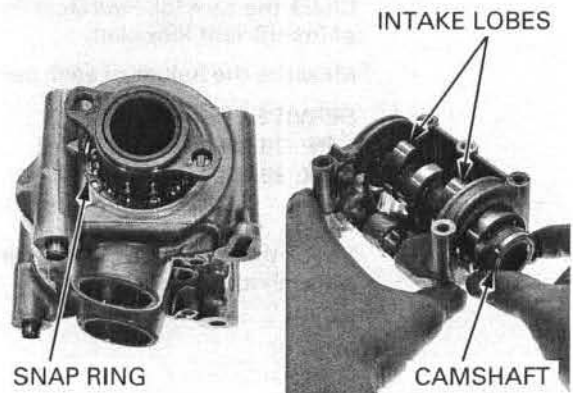
Remove the bolt, stopper plate and decompressor cam assembly.



Remove the snap ring and camshaft from the camshaft holder.

**NOTICE**

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



**INSPECTION**

*If the camshaft contact surface of the rocker arm is damaged or abnormally worn, check the cam lobes for damage (page 9-12).*

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

Measure the rocker arm I.D.

**SERVICE LIMIT: 12.05 mm (0.474 in)**



## CYLINDER HEAD/VALVES

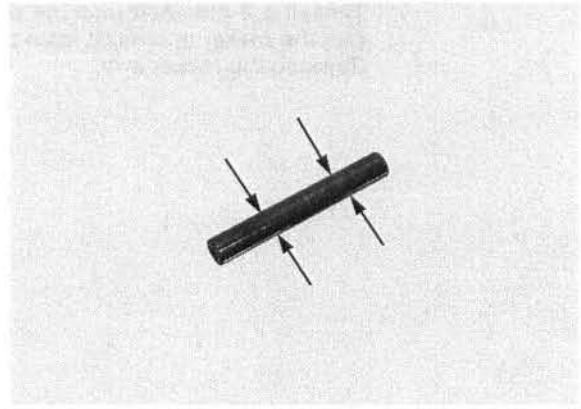
Inspect the rocker arm shaft for wear or damage.

Measure the rocker arm shaft O.D.

**SERVICE LIMIT: 11.92 mm (0.469 in)**

Calculate the rocker arm-to-shaft clearance.

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

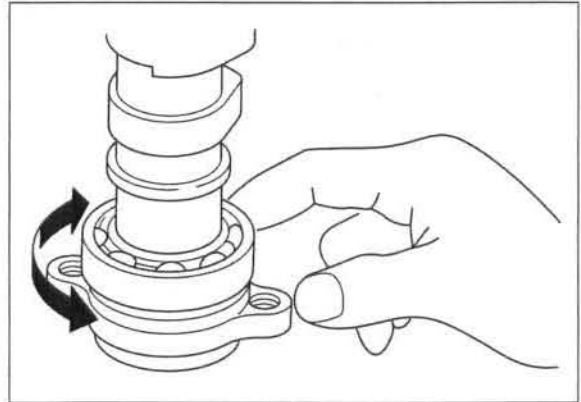


Turn the outer race of the camshaft bearing with your finger.

The bearing should turn smoothly and quietly.

Also check that the bearing inner race fits tightly on the camshaft.

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



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

Measure the height of each cam lobe.

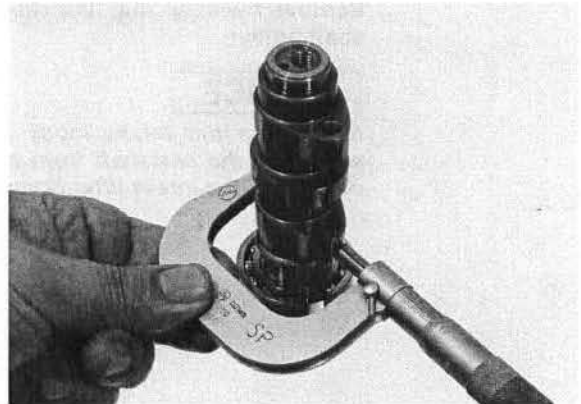
**SERVICE LIMITS:**

**IN: 36.890 mm (1.4524 in)**

**EX: 35.063 mm (1.3804 in)**

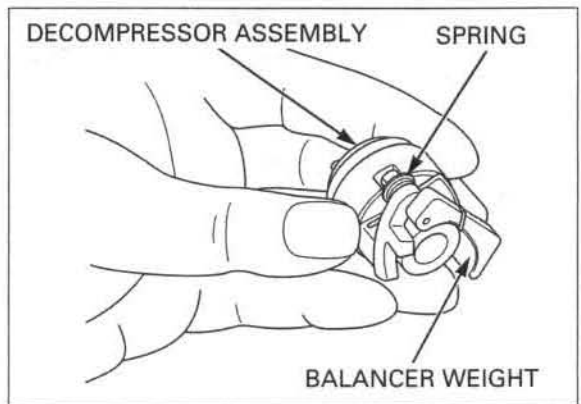
**NOTE:**

Check the rocker arm if the cam lobe and valve lifters are worn or damaged.



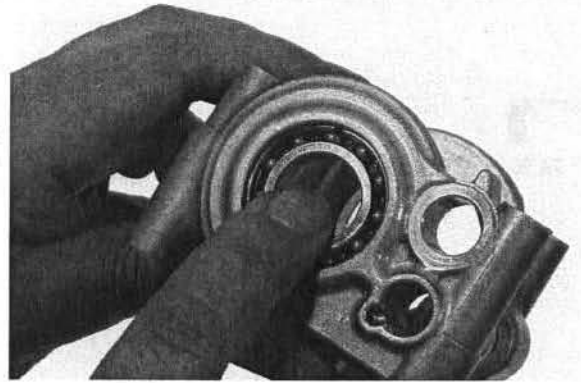
Check the decompressor assembly for wear or damage.

Check the balancer weight and spring for damage or fatigue.



Turn the inner race of the camshaft 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 bearing if the race does not turn smoothly, quietly, or if it fits loosely in the camshaft holder.



Apply oil to a new bearing.

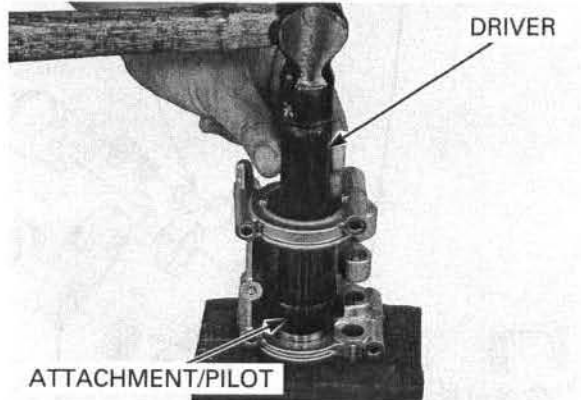
Install a new bearing into the hub using the special tools.

**TOOLS:**

**Driver**  
**Attachment, 37 x 40 mm**  
**Pilot, 20 mm**

**07749-0010000**  
**07746-0010200**  
**07746-0040500**

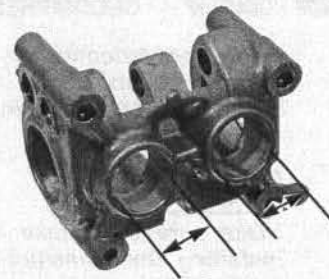
*Drive in a new bearing squarely with the marking side facing toward the inside of the camshaft holder.*



Check the valve lifter bore scoring, scratches or damage.

Measure each valve lifter bore I.D.

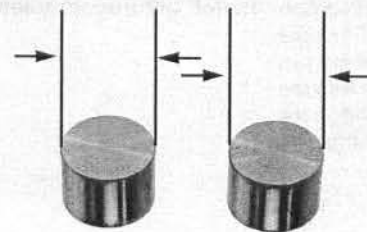
**SERVICE LIMIT: 26.04 mm (1.025 in)**



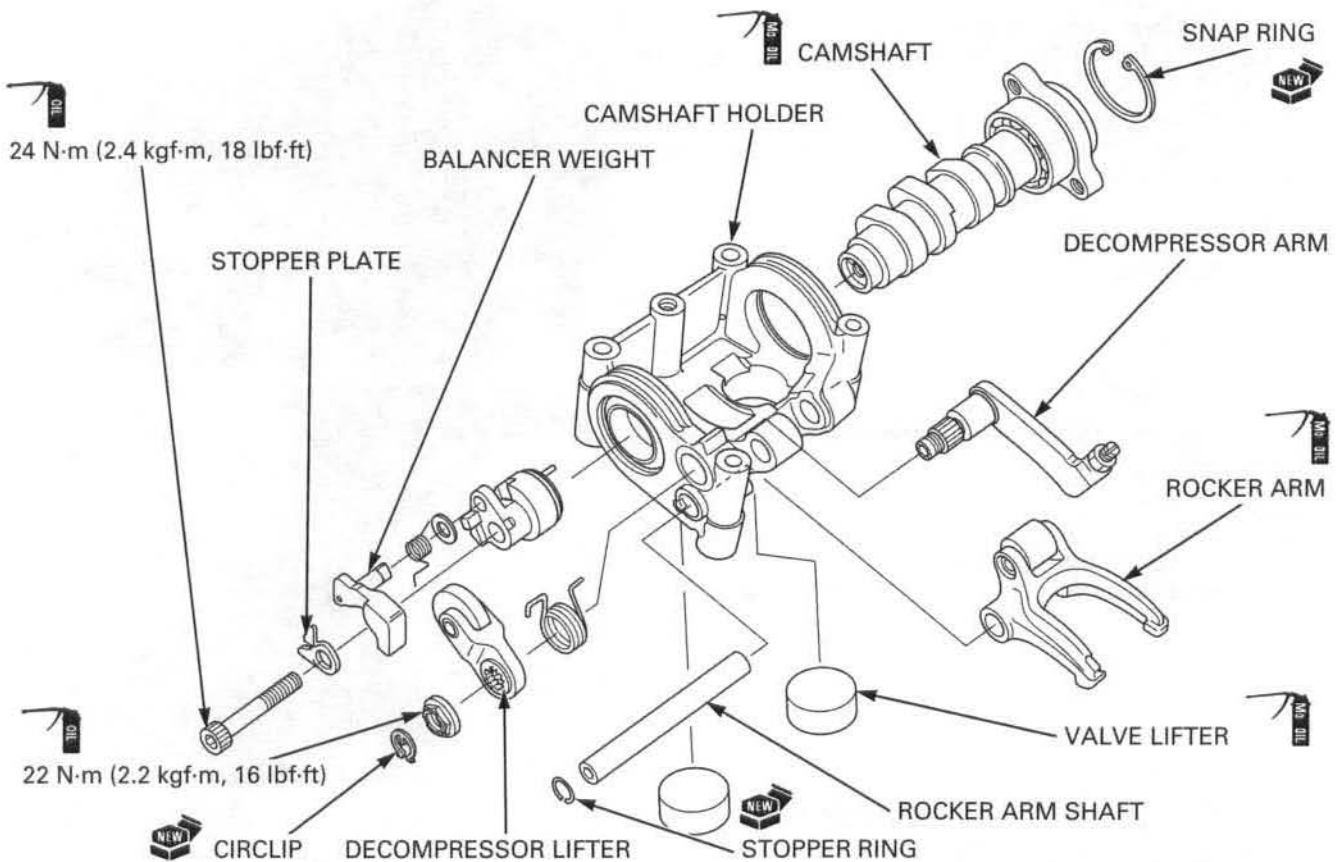
Check the valve lifter for scoring, scratches or damage.

Measure each valve lifter O.D.

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



# CYLINDER HEAD/VALVES ASSEMBLY



Apply molybdenum oil solution to the camshaft journal and lobes.  
Install the camshaft in the camshaft holder as shown.

### NOTICE

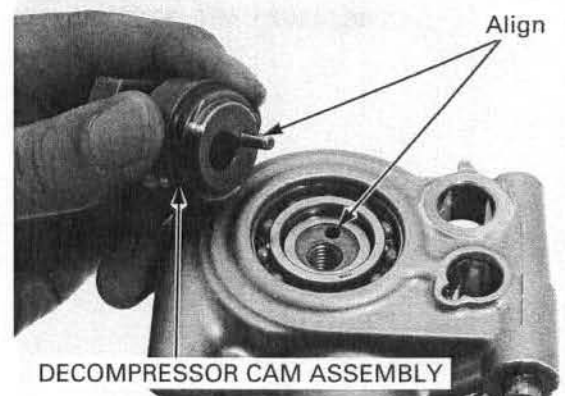
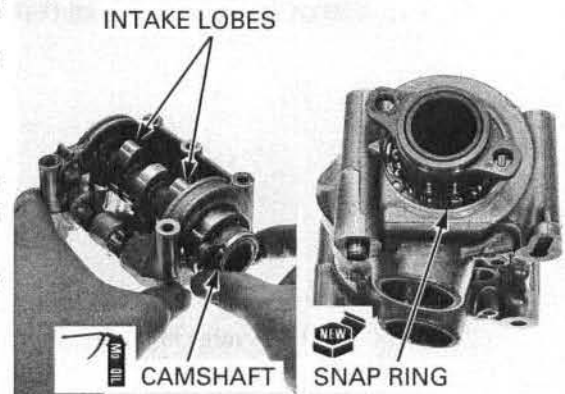
*Make sure the intake lobes are facing up when installing the camshaft to prevent damaging the intake lifter bores.*

*Make sure the snap ring is firmly seated in the groove.*

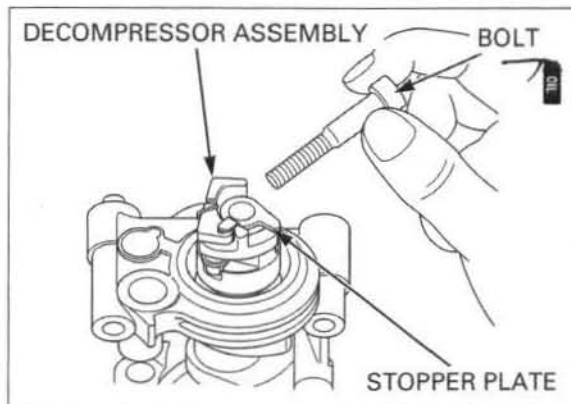
Install the snap ring into the groove in the camshaft holder.

*Align the dowel pin on the decompressor cam assembly with the pin hole in the camshaft.*

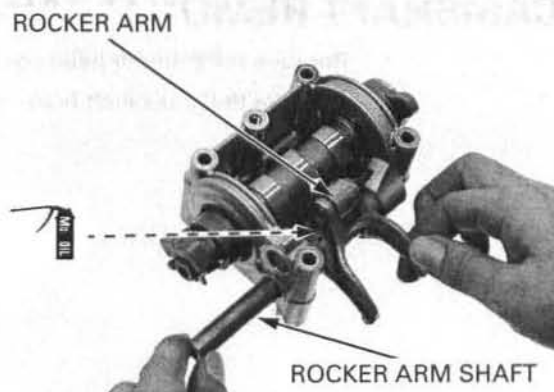
Install the decompressor cam assembly.



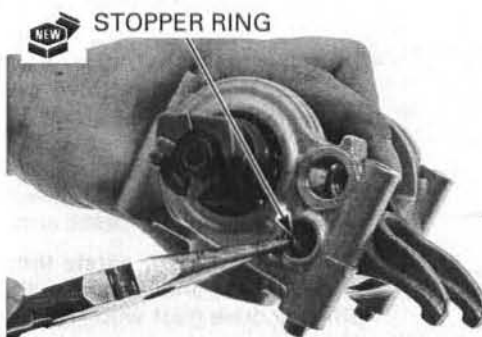
Adjust the stopper plate angle as shown.  
 Apply oil to the decompressor cam mounting bolt threads.  
 Install the decompressor cam mounting bolt.



Apply molybdenum oil solution to the rocker arm bore and valve slipper surfaces.  
 Install the rocker arm and rocker arm shaft into the camshaft holder.

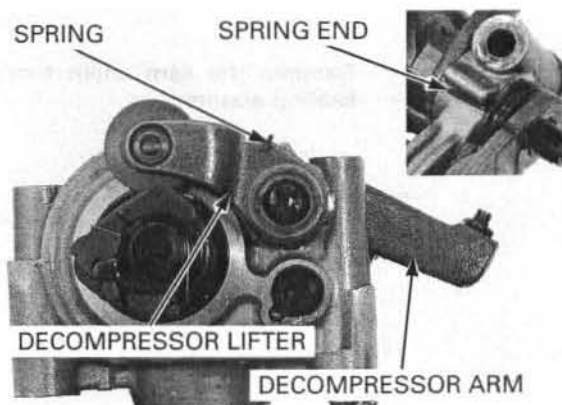


Install a new stopper ring into the groove in the camshaft holder.



Install the decompressor arm, decompressor lifter and spring.

- Align the decompressor arm and decompressor lifter as shown.
- Align the spring end and camshaft holder tab as shown.



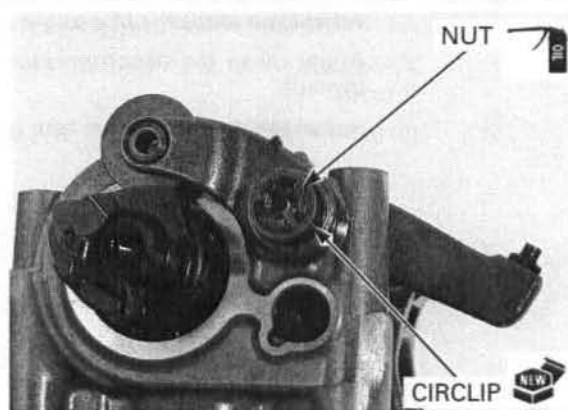


## CYLINDER HEAD/VALVES

Apply oil to the nut threads and seating surface, then tighten it to the specified torque.

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

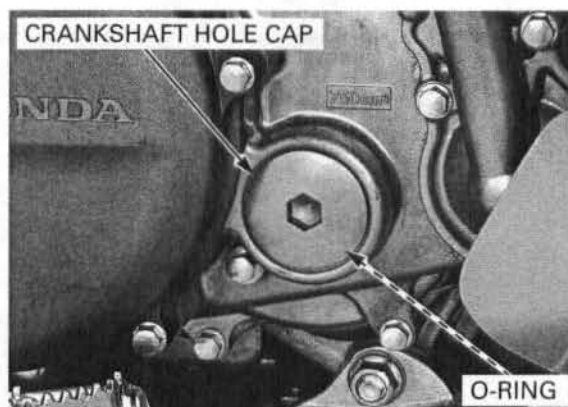
Install a new circlip.



## CAMSHAFT REMOVAL (After '07)

Remove the cylinder head cover (page 9-7).

Remove the crankshaft hole cap and O-ring.



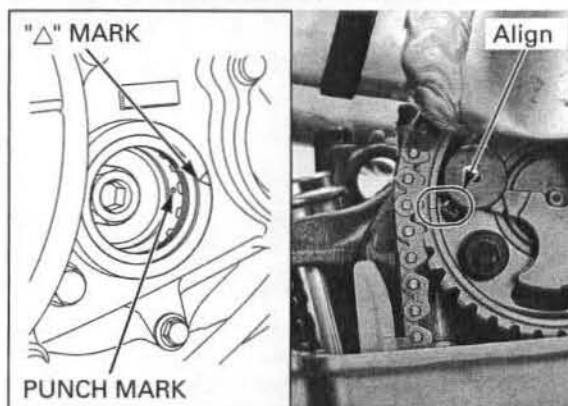
Turn the crankshaft clockwise to align the punch mark on the primary drive gear with the "△" mark on the right crankcase cover.

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

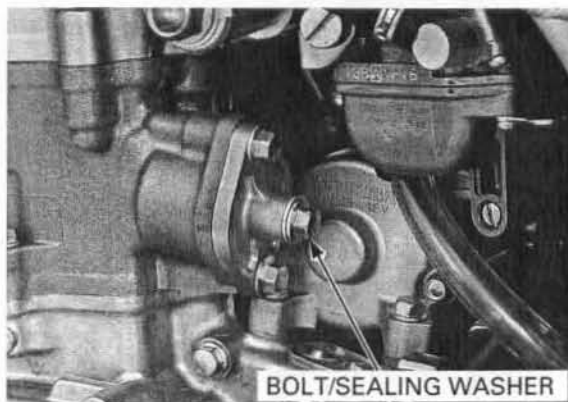
This position can be obtained by confirming that there is slack in the rocker arm.

If there is no slack, rotate the crankshaft clockwise one full turn, and match up the punch mark on the primary drive gear with "△" mark on the right crankcase cover again.

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



Remove the cam chain tensioner lifter bolt and sealing washer.





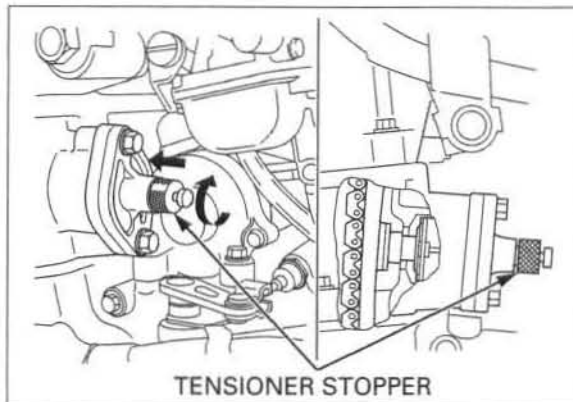
Insert the stopper tool into the cam chain tensioner lifter.

Turn the stopper tool clockwise fully and lock the cam chain tensioner lifter by pushing the handle.

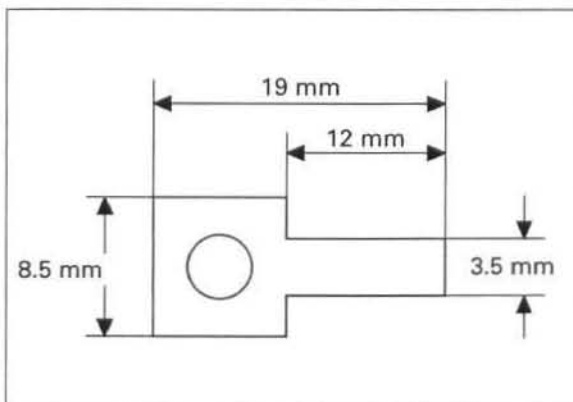
**TOOL:**

**Tensioner stopper**

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



A tool can easily be made from a thin (1 mm thick) piece of steel as shown.



Loosen the one cam sprocket bolt.

*Be careful not to drop the bolts into the crankcase.*

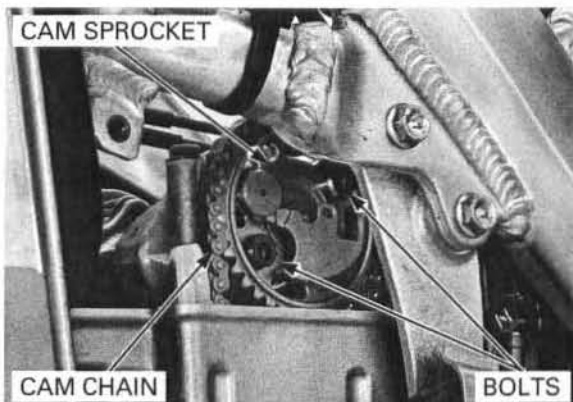
Turn the crankshaft clockwise one turn, and remove the other cam sprocket bolt.

Turn the crankshaft clockwise one turn again, and remove the remaining cam sprocket bolt.

*Be careful not to drop the decompressor shaft and decompressor plunger.*

Remove the cam sprocket from the camshaft and cam chain.

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 drop into the crankcase.
- Be careful not to drop the decompressor shaft and decompressor plunger.

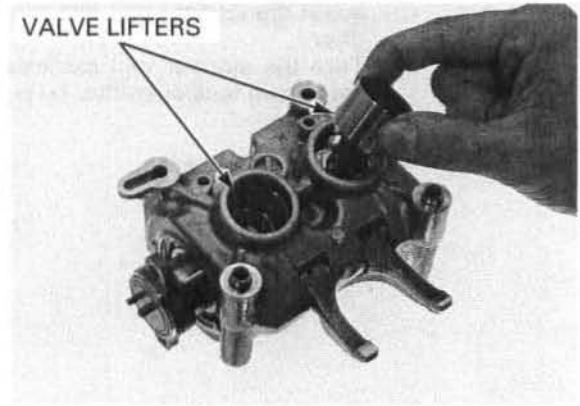


## CYLINDER HEAD/VALVES

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

Remove the valve lifters from the camshaft holder assembly.

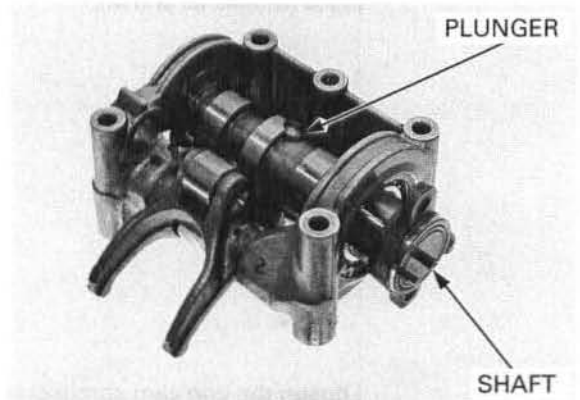
VALVE LIFTERS



### DISASSEMBLY

Remove the decompressor shaft and decompressor plunger.

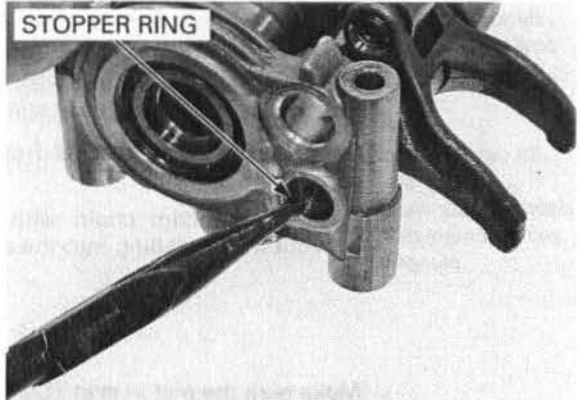
PLUNGER



SHAFT

Remove the stopper ring.

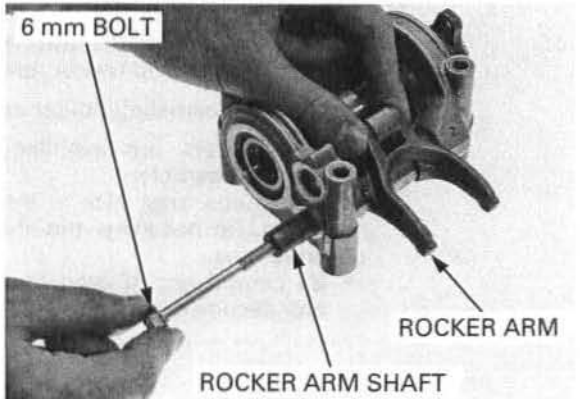
STOPPER RING



Thread a 6 mm bolt into the rocker arm shaft, and pull out the rocker arm shaft from the camshaft holder.

Remove the rocker arm.

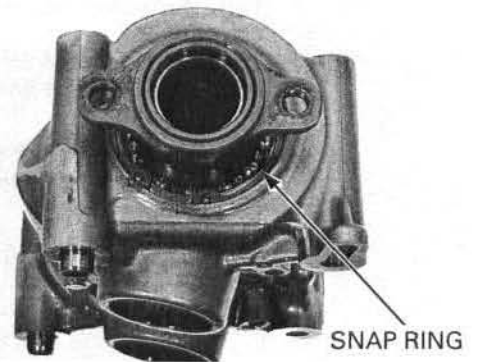
6 mm BOLT



ROCKER ARM

ROCKER ARM SHAFT

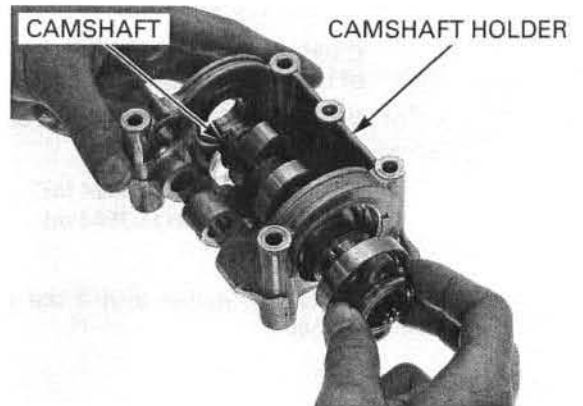
Remove the snap ring.



Remove the camshaft from the camshaft holder.

**NOTICE**

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



**INSPECTION**

**ROCKER ARM**

*If the camshaft contact surface of the rocker arm is damaged or abnormally worn, check the cam lobes for damage (page 9-20).*

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

Measure the rocker arm I.D.

**SERVICE LIMIT: 12.05 mm (0.474 in)**



**ROCKER ARM SHAFT**

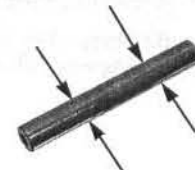
Inspect the rocker arm shaft for wear or damage.

Measure the rocker arm shaft O.D.

**SERVICE LIMIT: 11.92 mm (0.469 in)**

Calculate the rocker arm-to-shaft clearance.

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



## CYLINDER HEAD/VALVES

### CAMSHAFT

Turn the outer race of the camshaft bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that the bearing inner race fits tightly on the camshaft.

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

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

Measure the height of each cam lobe.

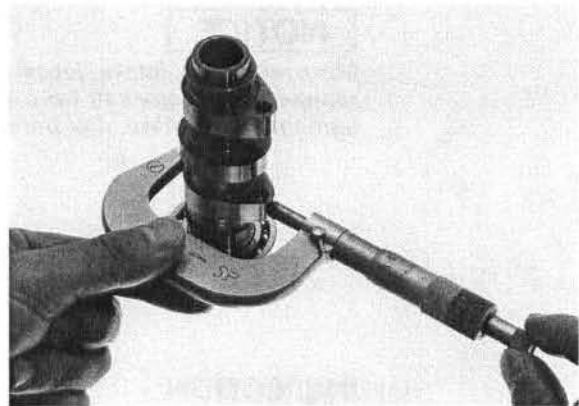
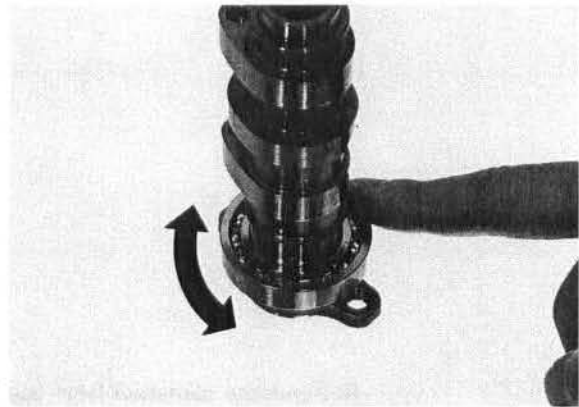
#### SERVICE LIMITS:

**IN:** 36.890 mm (1.4524 in)

**EX:** 35.063 mm (1.3804 in)

#### NOTE:

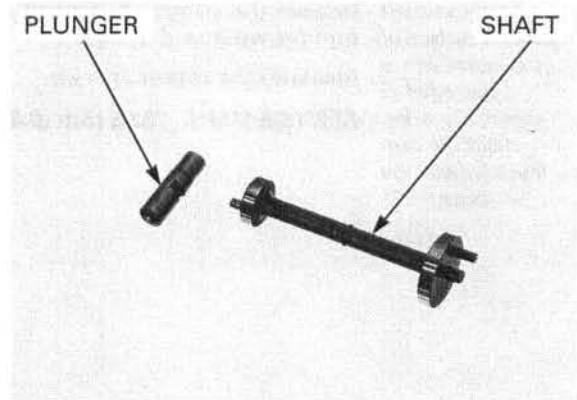
Check the rocker arm if the cam lobe is worn or damaged.



### DECOMPRESSOR SHAFT/PLUNGER

Check the decompressor shaft for bend or damage.  
Check the decompressor plunger for wear or damage.

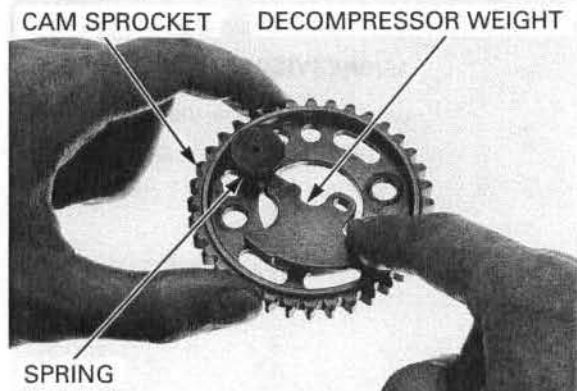
Replace them if necessary.



### CAM SPROCKET/DECOMPRESSOR WEIGHT/SPRING

Check the cam sprocket teeth for wear or damage.  
Check the decompressor weight for damage.  
Check the spring for fatigue by moving the decompressor weight with your finger.

Replace the cam sprocket, decompressor weight and spring as an assembly if necessary.



**CAMSHAFT HOLDER**

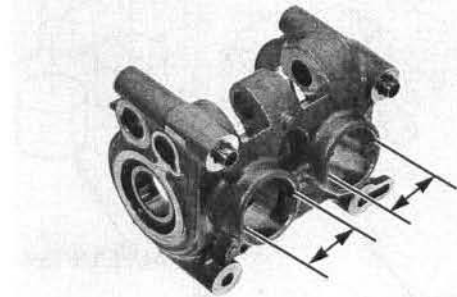
Turn the inner race of the camshaft bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that the bearing outer race fits tightly in the camshaft holder.

Remove and discard the bearing if the race does not turn smoothly, quietly, or if it fits loosely in the camshaft holder (page 9-21).



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

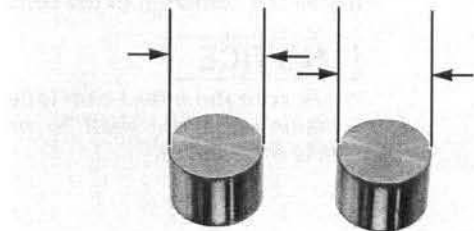
**SERVICE LIMIT: 26.04 mm (1.025 in)**



**VALVE LIFTER**

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

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



**CAMSHAFT HOLDER BEARING REPLACEMENT**

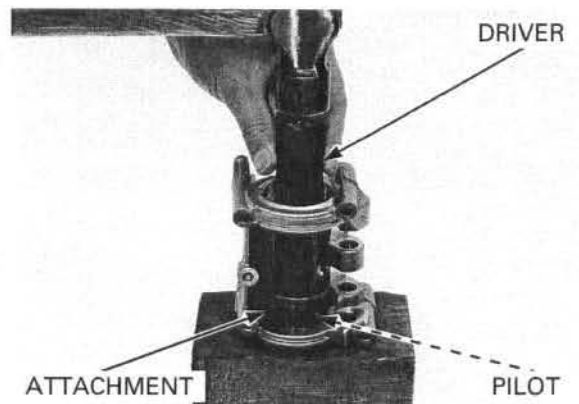
Drive out the bearing.

Install a new bearing into the camshaft holder using the special tools.

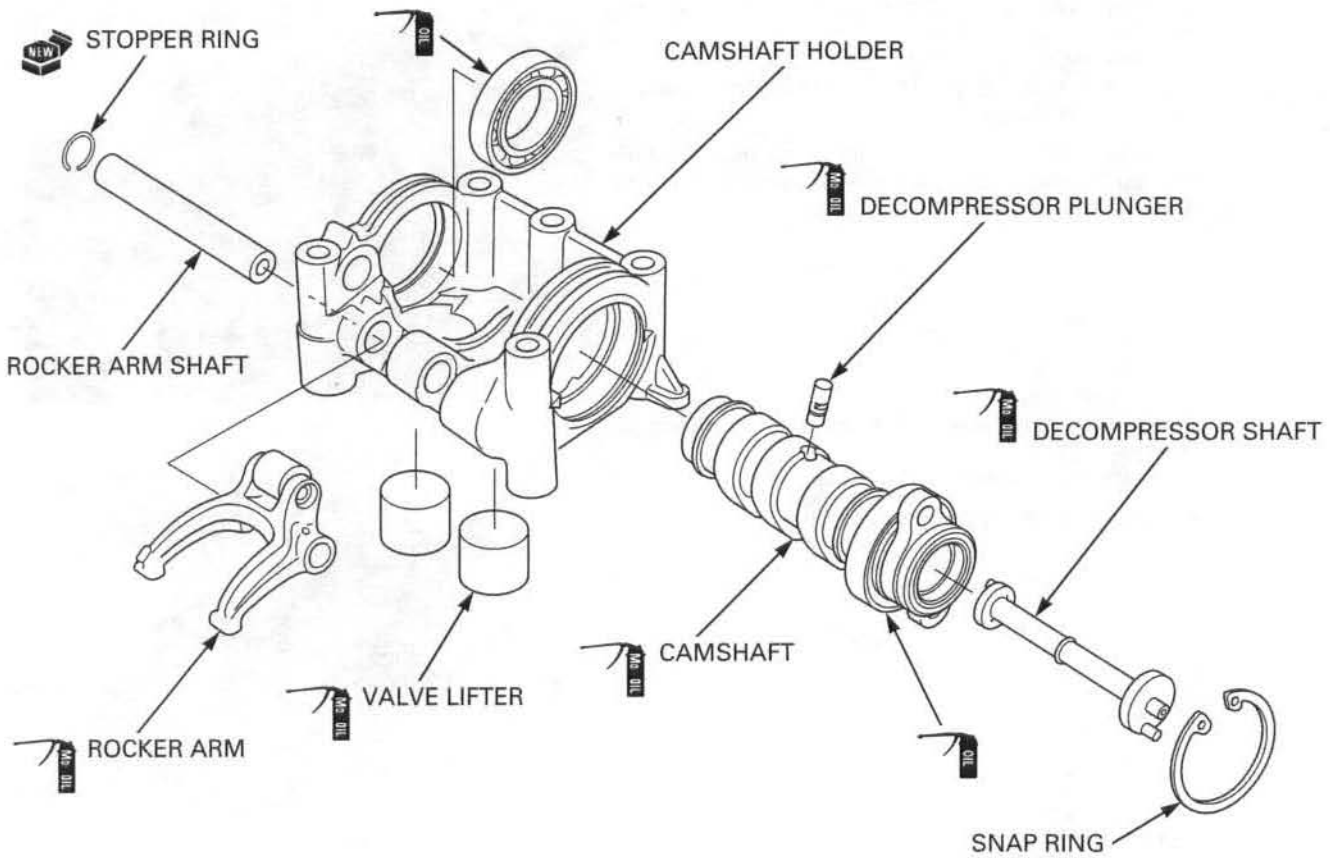
**TOOLS:**

- |                               |               |
|-------------------------------|---------------|
| <b>Driver</b>                 | 07749-0010000 |
| <b>Attachment, 37 x 40 mm</b> | 07746-0010200 |
| <b>Pilot, 20 mm</b>           | 07746-0040500 |

After installing the bearing, lubricate it with engine oil.



# CYLINDER HEAD/VALVES ASSEMBLY



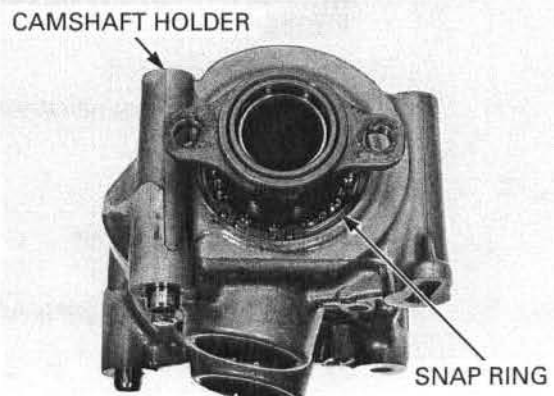
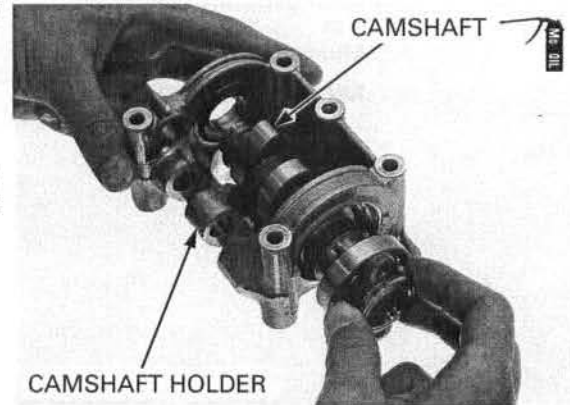
Apply molybdenum oil solution to the camshaft journal and lobes.

Install the camshaft to the camshaft holder.

### NOTICE

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

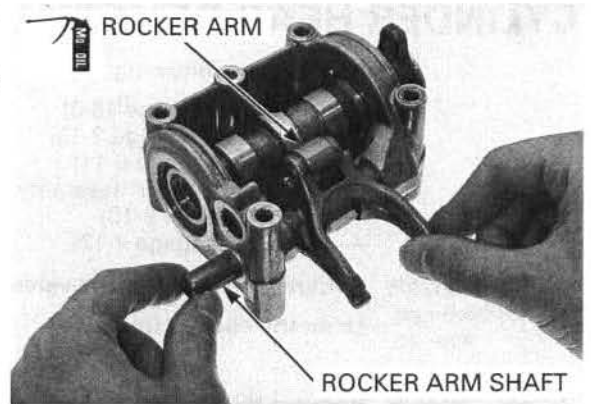
*Make sure the snap ring is firmly seated in the groove.* Install the snap ring into the groove of the camshaft holder.



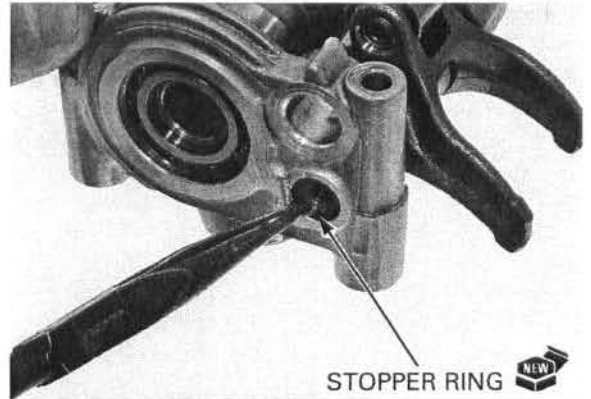


Apply molybdenum oil solution to the rocker arm bore and valve slipper surfaces.

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

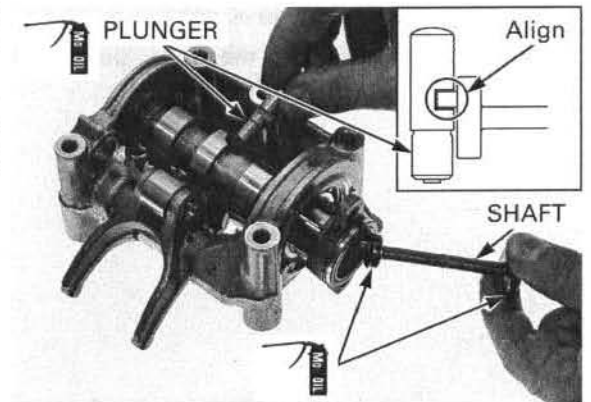


Install a new stopper ring into the groove of the camshaft holder.



Apply molybdenum oil solution to the decompressor plunger sliding surface and decompressor shaft 20.9 mm, 14 mm O.D. areas.

Install the decompressor plunger and decompressor shaft into the camshaft by aligning the groove on the plunger and pin on the shaft as shown.





### CYLINDER HEAD REMOVAL

Remove the following:

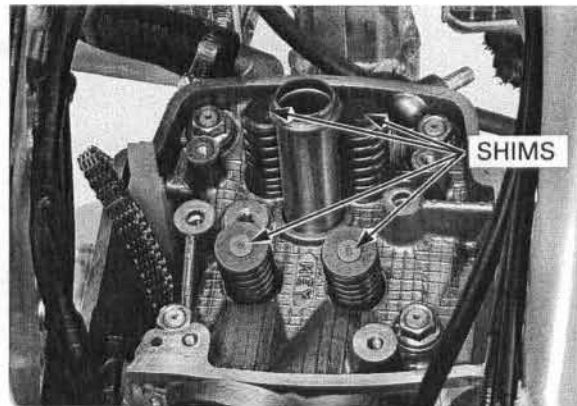
- Ignition coil (page 18-8)
- Exhaust pipe (page 3-13)
- Carburetor (page 6-11)
- Camshaft holder assembly ('05 - '07: page 9-8, After '07: page 9-16)
- Spark plug (page 4-12)

'05 and '06 California type,  
After '06: Remove the PAIR control valve (page 6-30).  
Drain the coolant (page 7-7).

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

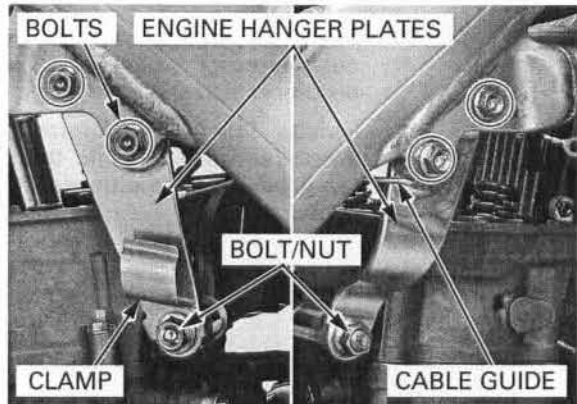
Remove the shims.

- The shims can be easily removed with tweezers or a magnet.
- Mark all valve shims so they can be installed in their original position.

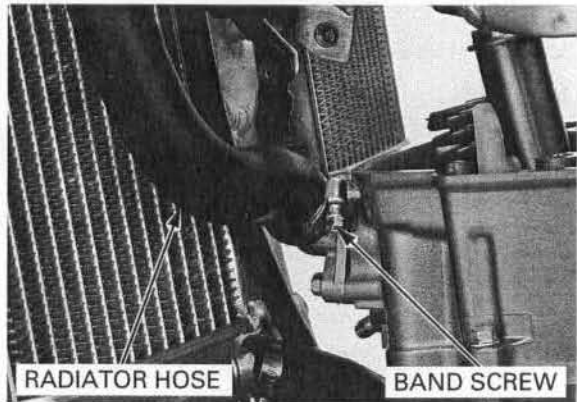


Remove the upper engine mounting nut, bolt and fuel hose clamp.

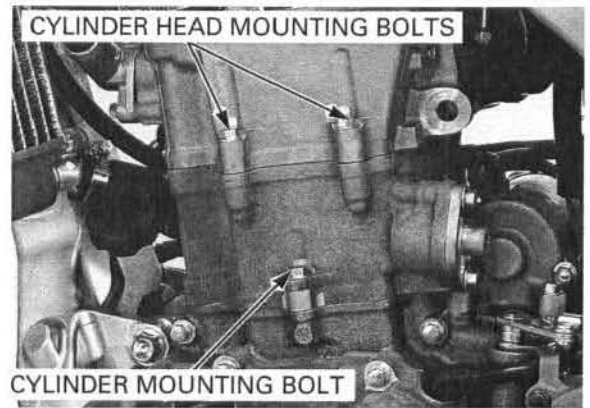
Remove the bolts, clutch cable guide and engine hanger plates.



Loosen the hose band screw and disconnect the upper radiator hose.



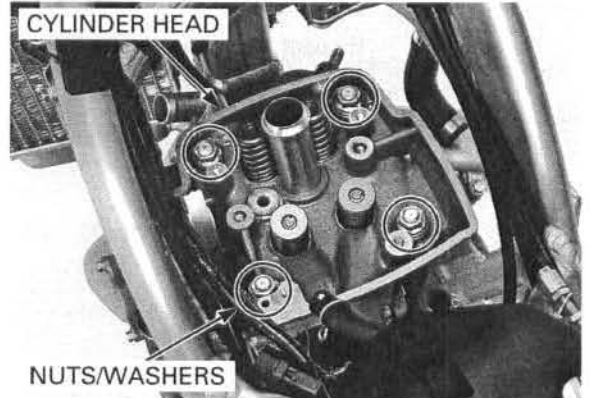
Remove the cylinder head mounting bolts.  
Loosen the cylinder mounting bolt.



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:

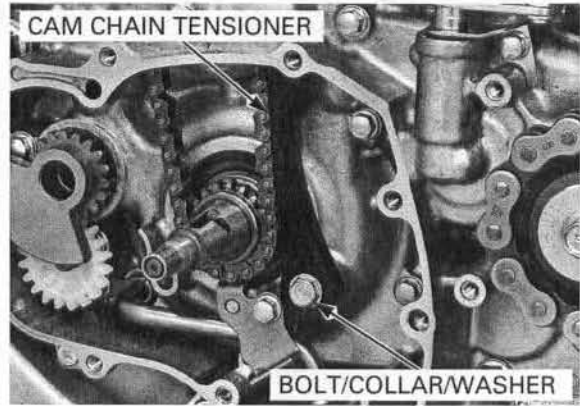
- Cylinder head (page 9-24)
- Left crankcase cover (page 12-4)
- Flywheel (page 12-5)

Remove the cam chain guide.



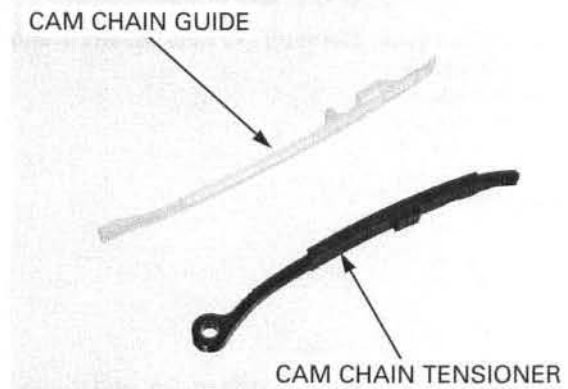
## CYLINDER HEAD/VALVES

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



### INSPECTION

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



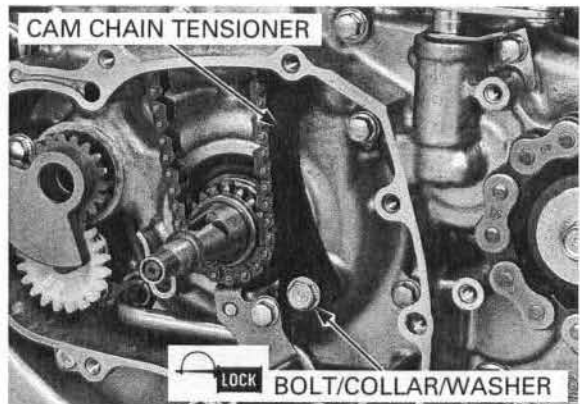
### INSTALLATION

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.

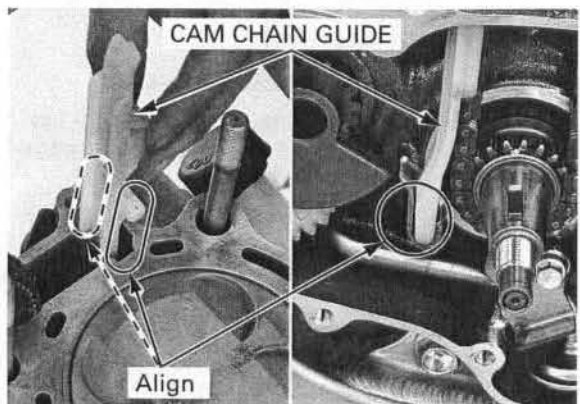
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



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

Install the following:

- Flywheel (page 12-6)
- Left crankcase cover (page 12-6)
- Cylinder head (page 9-36)

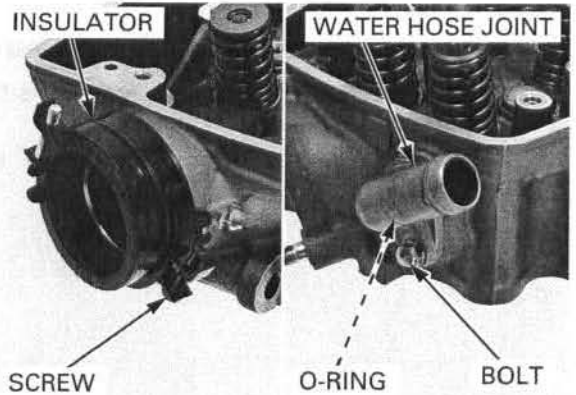


# CYLINDER HEAD DISASSEMBLY

Remove the cylinder head (page 9-24).

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 spring more than necessary to remove the cotters.*

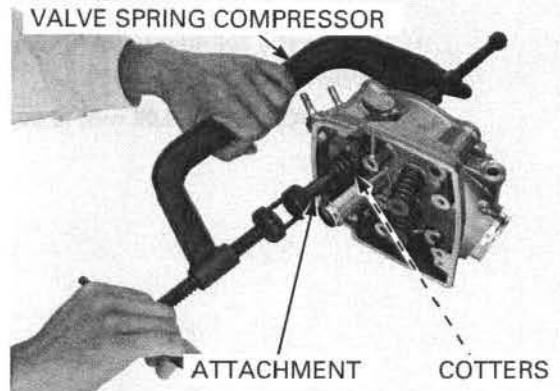
Remove the valve spring cotters using the special tools.

**TOOLS:**

- Valve spring compressor**
- Valve spring compressor attachment**

07757-0010000

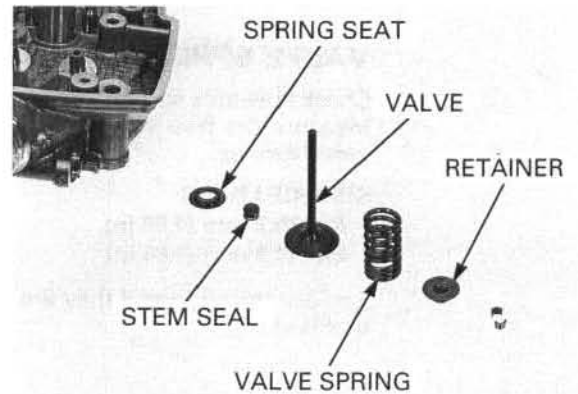
07959-KM30101



*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

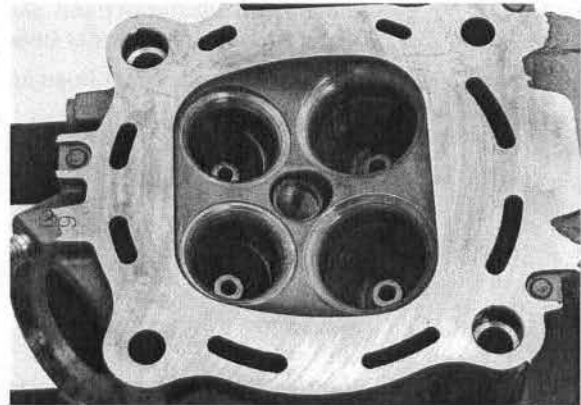
### CYLINDER HEAD

Disassemble the cylinder head (page 9-27).

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

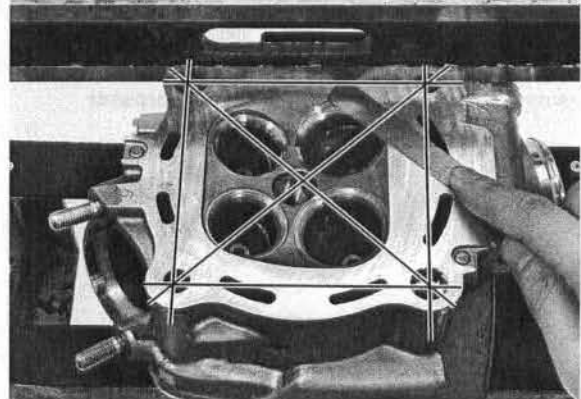
Remove the carbon deposits from the combustion chamber and exhaust port.

Check the spark plug hole and valve areas for cracks.



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

**SERVICE LIMIT: 0.05 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.

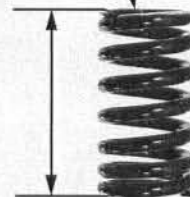
**SERVICE LIMITS:**

**IN: 39.7 mm (1.56 in)**

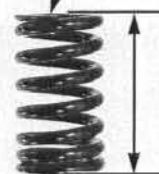
**EX: 41.9 mm (1.65 in)**

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

EXHAUST VALVE SPRING



INTAKE 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.

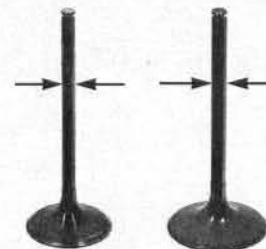
**STANDARD:**

**IN: 5.475 – 5.490 mm (0.2156 – 0.2161 in)**

**EX: 4.965 – 4.980 mm (0.1955 – 0.1961 in)**

**SERVICE LIMIT:**

**EX: 4.96 mm (0.195 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:**

**IN:** Valve guide reamer, 5.5 mm 07984-2000001 or 07984-200000D (U.S.A. only)

**EX:** Valve guide reamer, 5.0 mm 07984-MA60001 or 07984-MA6000D (U.S.A. only)

VALVE GUIDE REAMER



Measure and record each valve guide I.D.

**STANDARD:**

**IN:** 5.552 mm (0.2186 in)

**EX:** 5.052 mm (0.1989 in)

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

**STANDARD:**

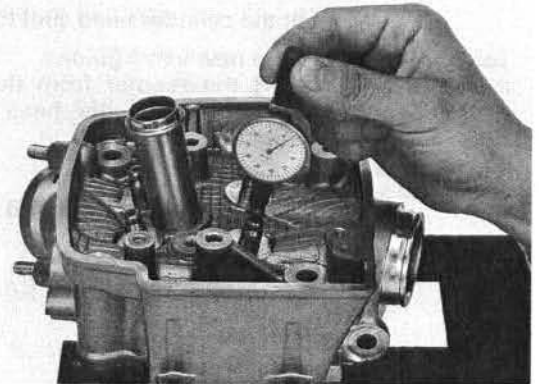
**IN:** 0.010 – 0.037 mm (0.0004 – 0.0015 in)

**EX:** 0.020 – 0.047 mm (0.0008 – 0.0019 in)

Reface the valve seats whenever the valve guides are replaced (page 9-29).

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 9-30) using a marker. Chill the new valve guides in a freezer for about 1 hour.

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.

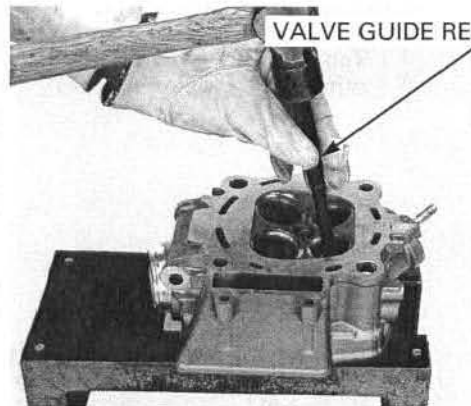
Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

**TOOLS:**

**IN:** Valve guide remover, 5.5 mm 07742-0010100

**EX:** Valve guide remover, 5.0 mm 07942-MA60000

VALVE GUIDE REMOVER



## CYLINDER HEAD/VALVES

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:

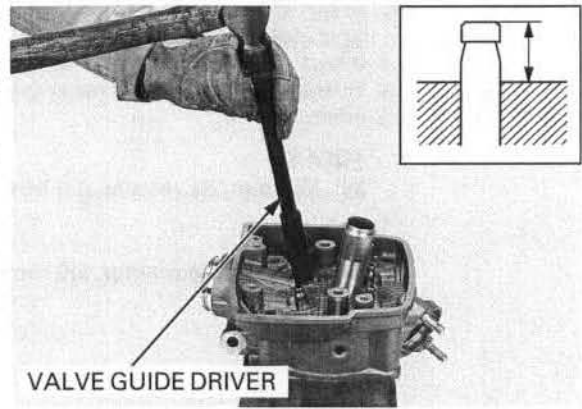
**IN:** 16.1 – 16.3 mm (0.63 – 0.64 in)

**EX:** 17.9 – 18.1 mm (0.70 – 0.71 in)

### TOOL:

Valve guide driver

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



Let the cylinder head cool to room temperature.

Ream new valve guides.

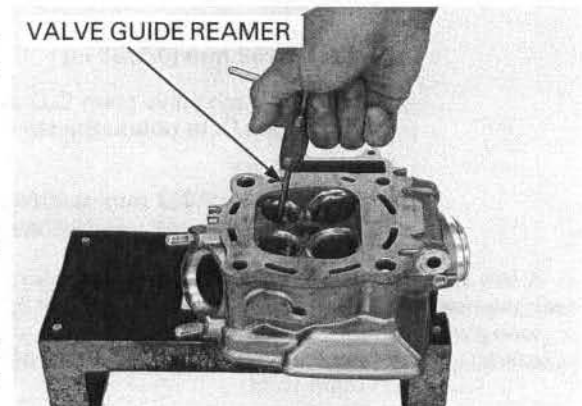
Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.

### TOOLS:

**IN:** Valve guide reamer, 5.5 mm 07984-2000001 or 07984-200000D (U.S.A. only)

**EX:** Valve guide reamer, 5.0 mm 07984-MA60001 or 07984-MA6000D (U.S.A. only)

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seats (page 9-30).



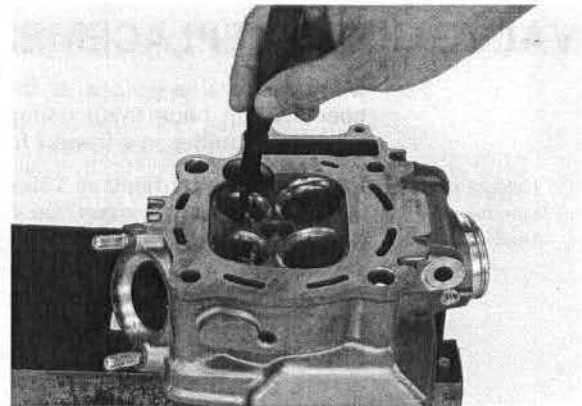
*Use cutting oil on the reamer during this operation. Take care not to tilt or lean the reamer in the guide while reaming.*

## VALVE SEAT INSPECTION/REFACING

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

Apply 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:

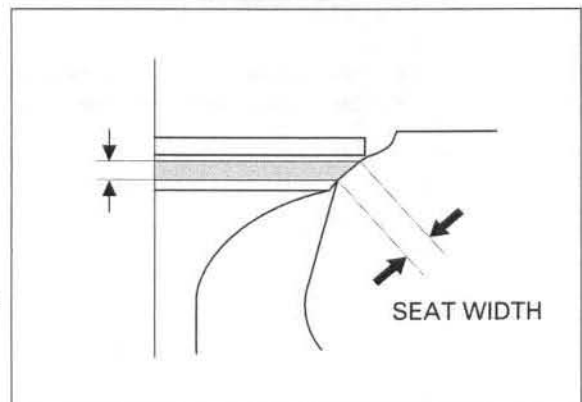
**IN:** 1.1 – 1.3 mm (0.04 – 0.05 in)

**EX:** 1.3 – 1.5 mm (0.05 – 0.06 in)

### SERVICE LIMIT:

**IN/EX:** 2.0 mm (0.08 in)

If the seat width is not within specification, reface the valve seat (page 9-31).



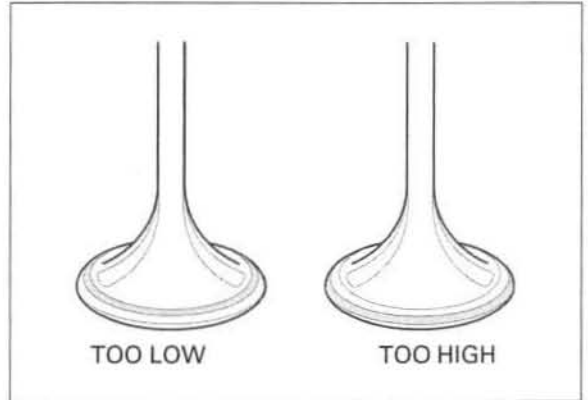
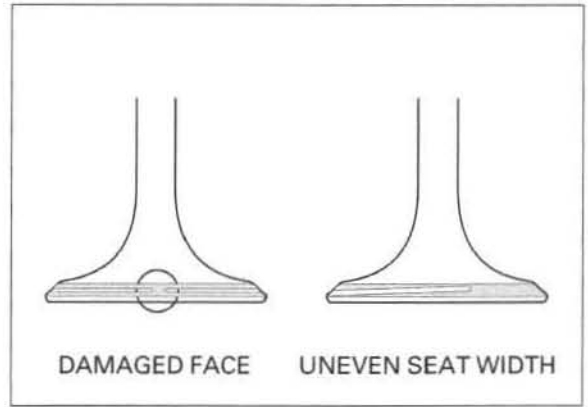


Inspect the valve seat face for:

- 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.*

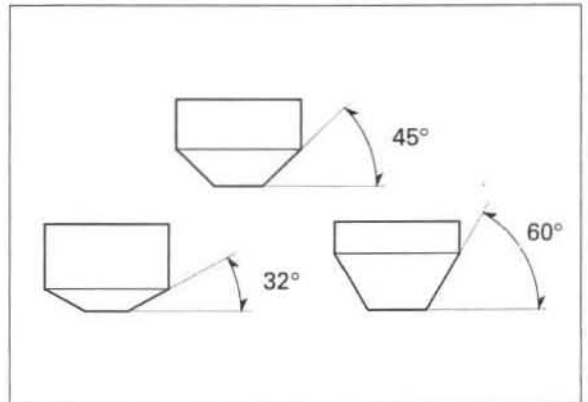
- Contact area (too high or too low)
  - Reface the valve seat.



**VALVE SEAT REFACING**

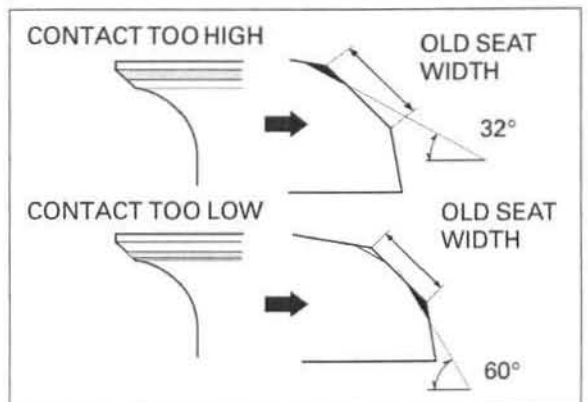
*Follow the refacing manufacturer's operating instructions.*

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.



## CYLINDER HEAD/VALVES

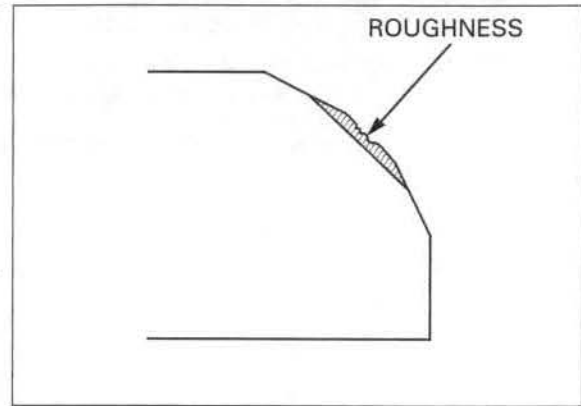
Reface the seat with a 45° cutter whenever a valve guide is replaced.

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

### TOOLS:

Seat cutter, 35 mm (IN)	07780-0010400
Seat cutter, 33 mm (EX)	07780-0010800
Cutter holder, 5.5 mm (IN)	07781-0010101
Cutter holder, 5.0 mm (EX)	07781-0010400

or equivalent commercially available in U.S.A.

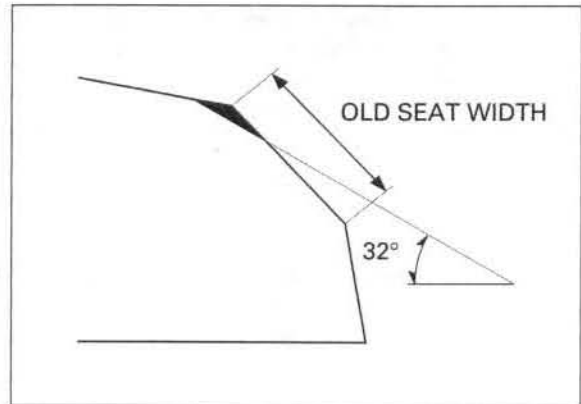


Use a 32° flat cutter, remove 1/4 of the existing valve seat material.

### TOOLS:

Flat cutter, 36 mm (IN)	07780-0013500
Flat cutter, 33 mm (EX)	07780-0012900
Cutter holder, 5.5 mm (IN)	07781-0010101
Cutter holder, 5.0 mm (EX)	07781-0010400

or equivalent commercially available in U.S.A.

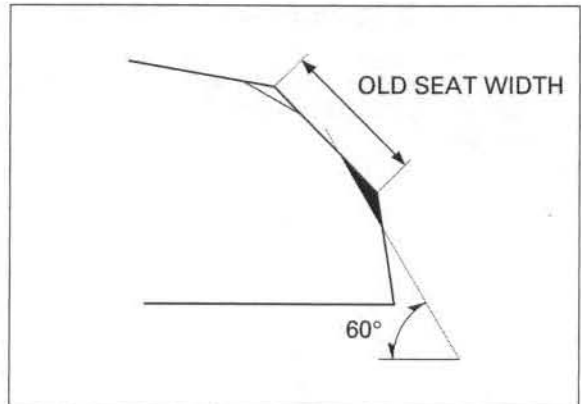


Use a 60° interior cutter, remove 1/4 of the existing valve seat material.

### TOOLS:

Interior cutter, 37.5 mm (IN)	07780-0014100
Interior cutter, 34 mm (EX)	07780-0014700
Cutter holder, 5.5 mm (IN)	07781-0010101
Cutter holder, 5.0 mm (EX)	07781-0010400

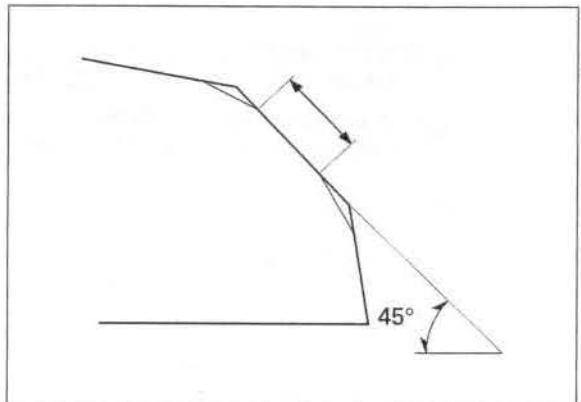
or equivalent commercially available in U.S.A.



Using a 45° seat cutter, cut the seat to proper width. Make sure all pitting and irregularities are removed. Refinish if necessary.

### STANDARD:

IN: 1.1 – 1.3 mm (0.04 – 0.05 in)
EX: 1.3 – 1.5 mm (0.05 – 0.06 in)



**INTAKE SIDE:**

After refacing, wash the cylinder head and valve.

**NOTICE**

- Do not lap the intake valves. They are titanium and have a thin oxide coating. Lapping will damage this coating.
- Use only new intake valves.

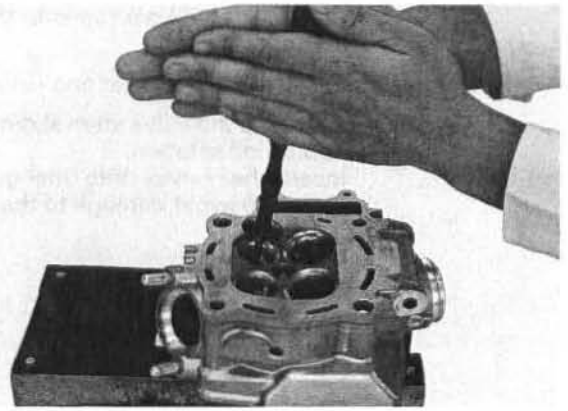
**EXHAUST SIDE:**

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

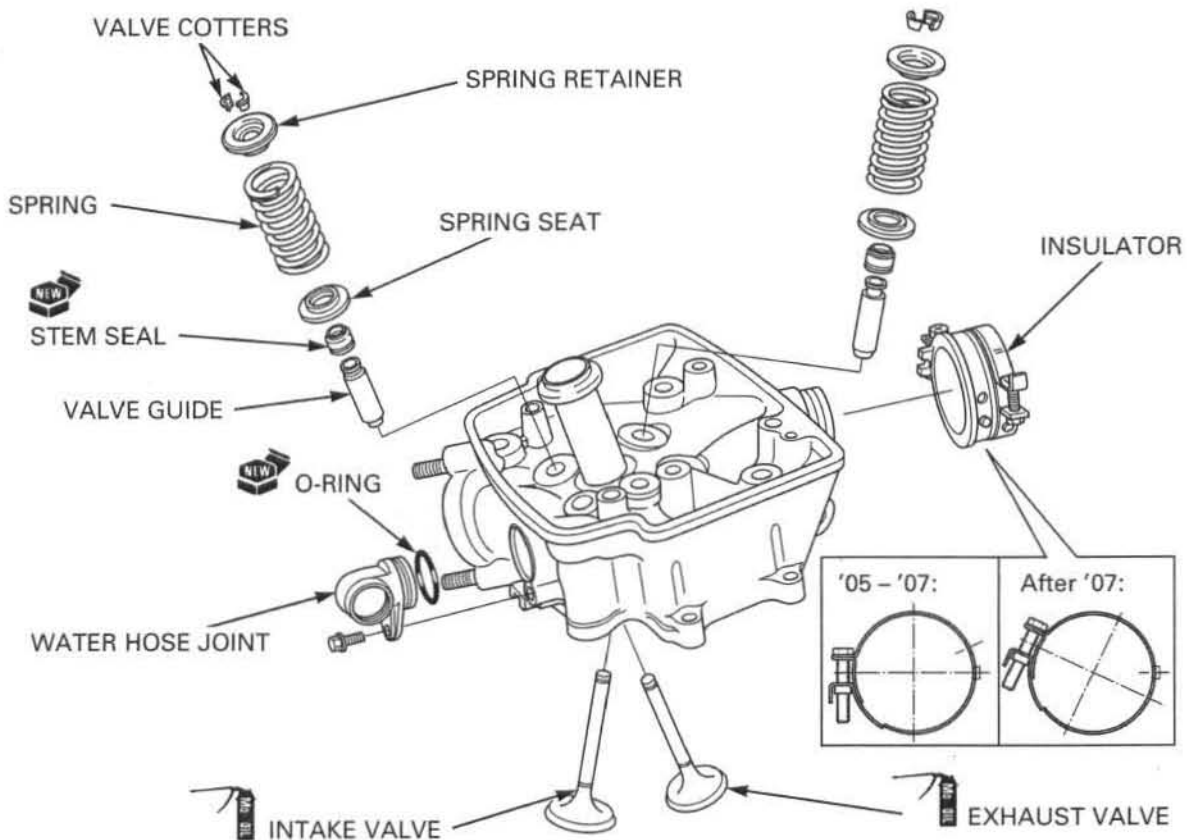
After lapping, wash any residual compound off the cylinder head and valve.

**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**



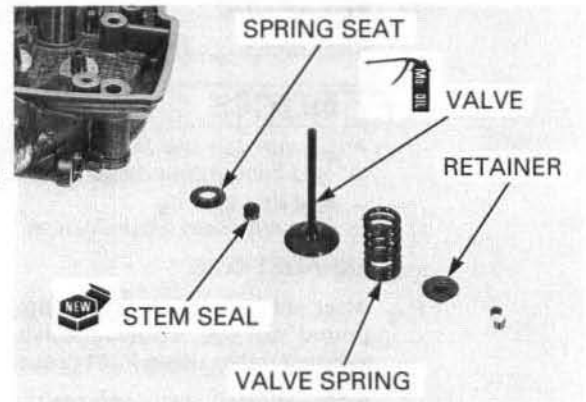
## CYLINDER HEAD/VALVES

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

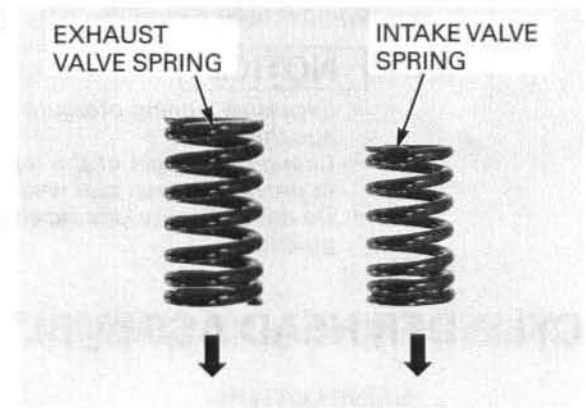
Install the spring seat and new stem seal.

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.



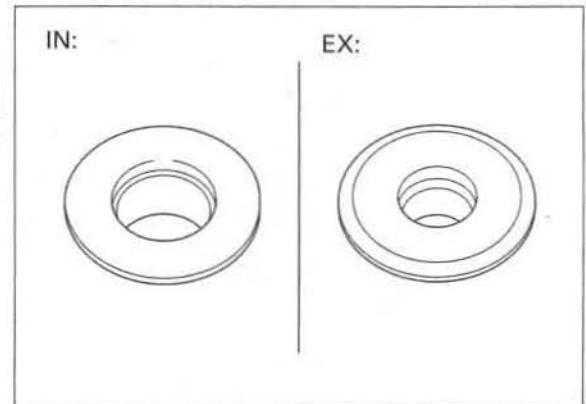
Install the valve springs with the tightly wound coils facing the combustion chamber.



Install the spring retainer.

**NOTE:**

Do not confuse the intake spring retainers and exhaust spring retainers. The intake spring retainer has a flat surface and the exhaust spring retainer has a chamfered edge.



*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:**

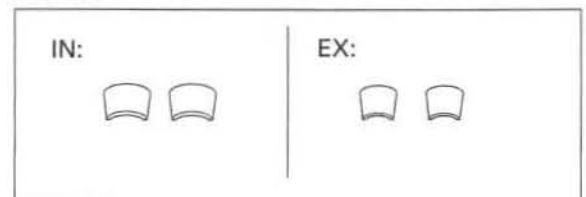
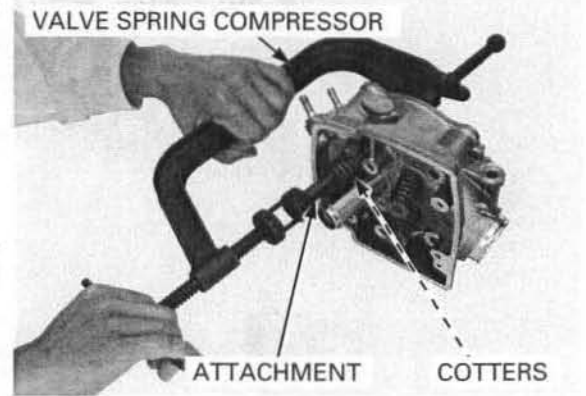
**Valve spring compressor**  
**Valve spring compressor attachment**

07757-001000

07959-KM30101

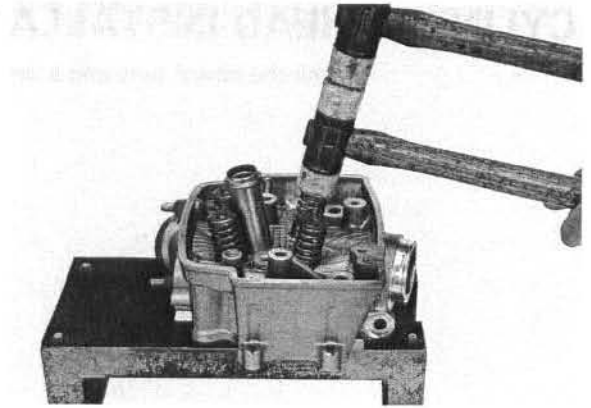
**NOTE:**

Do not confuse the intake cotters and exhaust cotters. The intake cotters are long and exhaust cotters are short.



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

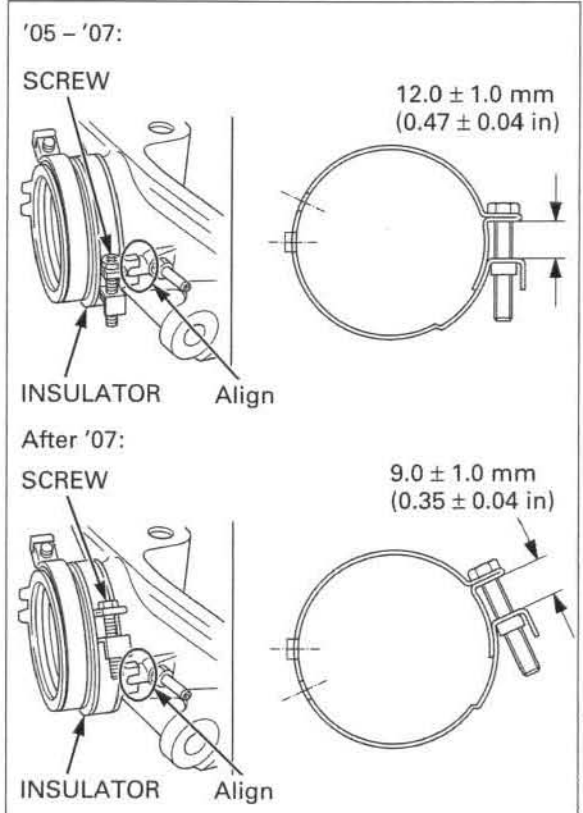
Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.



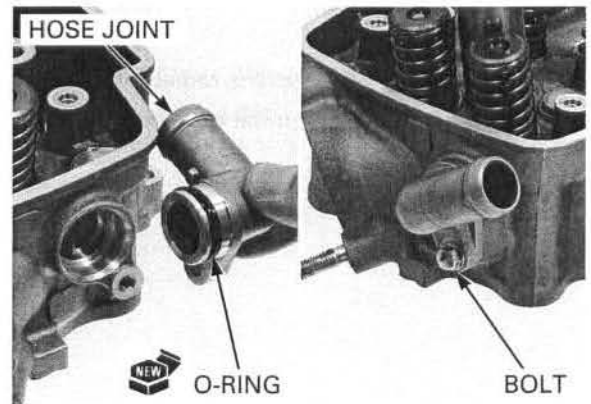
Install the carburetor insulator to the cylinder head by aligning the groove of the carburetor insulator with the tab of the cylinder head.

Tighten the carburetor insulator band screw so the distance between the band ends is follow:

- '05 - '07: 12.0 ± 1.0 mm (0.47 ± 0.04 in)
- After '07: 9.0 ± 1.0 mm (0.35 ± 0.04 in)



Install a new O-ring to the water hose joint.  
Install the water hose joint to the cylinder head.  
Install and tighten the bolt securely.



## CYLINDER HEAD/VALVES

# CYLINDER HEAD INSTALLATION

Install the dowel pins and a new gasket.



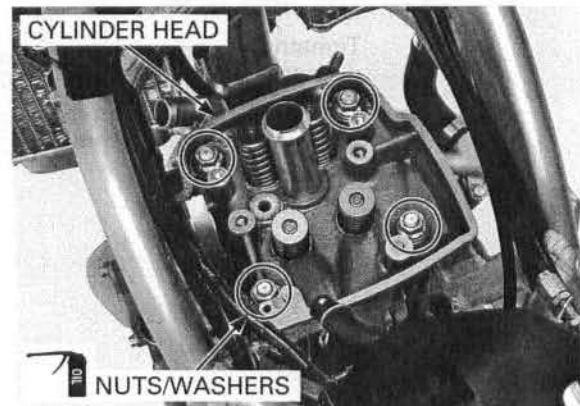
Install the cylinder head onto the cylinder.

Apply oil to the cylinder head nut threads and seating surface.

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

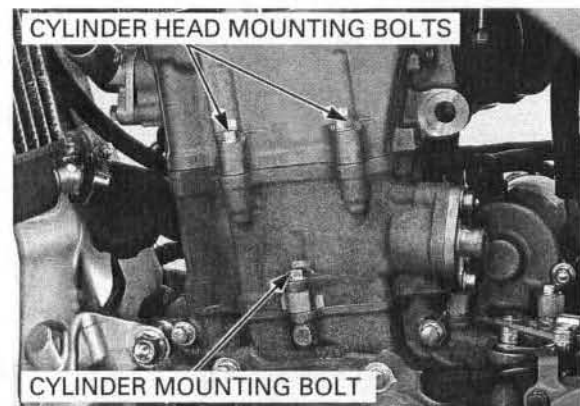
Install the washers and cylinder head nuts. Tighten the nuts to the specified torque in a criss-cross pattern in two or three steps.

**TORQUE: 66 N·m (6.7 kgf·m, 49 lbf·ft)**



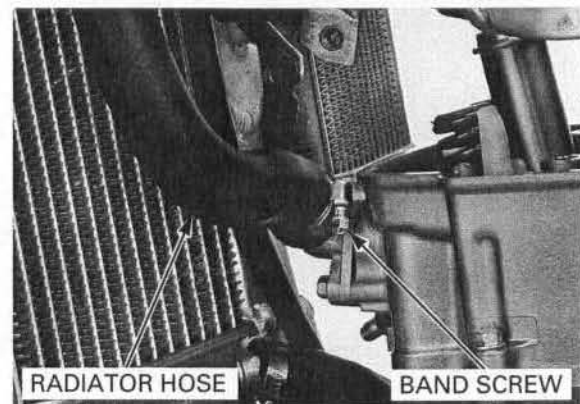
Install the cylinder head mounting bolts.

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



Connect the radiator hose to the water hose joint.

Tighten the hose band screw securely.





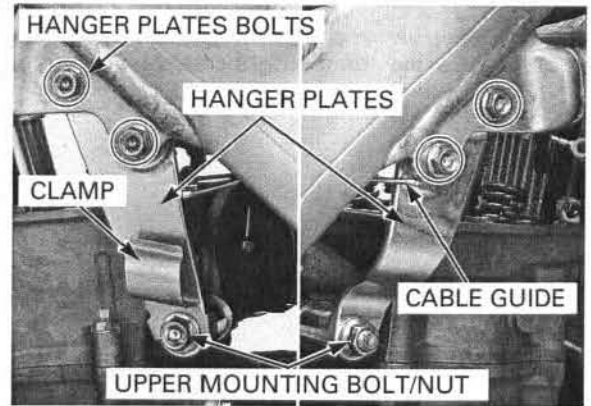
Install the upper engine hanger plates, bolts, fuel hose clamp, clutch cable guide and nut.

Tighten the engine hanger plate bolts to the specified torque.

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

Tighten the upper engine mounting nut to the specified torque.

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

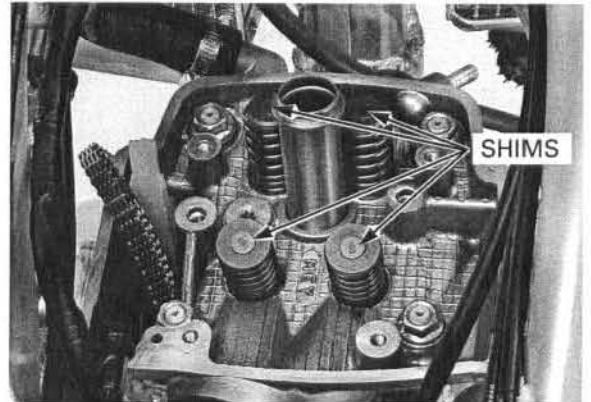


*Be careful not to let the shims fall into the left crankcase. Install the shims in their original location.*

Install the shims.

Install the following:

- Spark plug (page 4-13)
- Camshaft holder assembly ('05 - '07: page 9-8, After '07: page 9-16)
- Carburetor (page 6-24)
- Exhaust pipe (page 3-14)
- Ignition coil (page 18-8)



*'05 and '06 California type, After '06:*

Install the PAIR control valve (page 6-30).

Fill the cooling system with recommended coolant mixture (page 7-7).

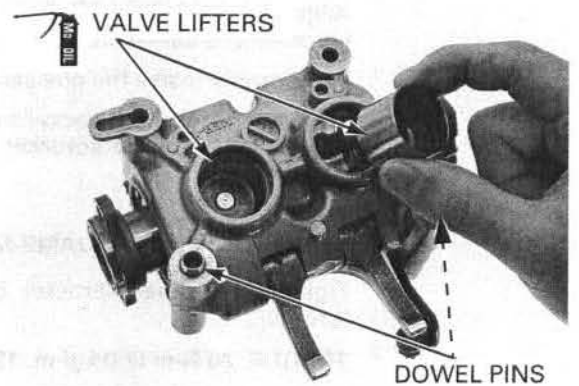
## CAMSHAFT INSTALLATION ('05 - '07)

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.

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



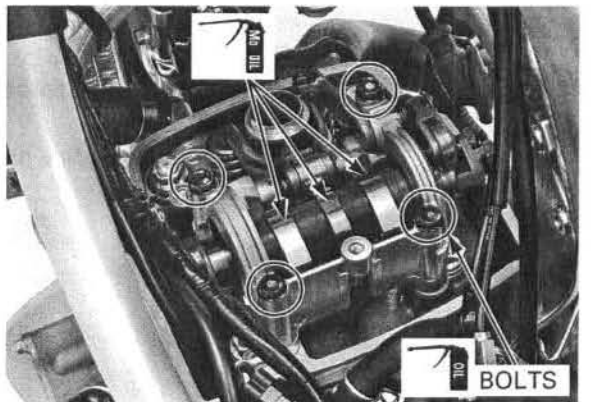
Apply molybdenum oil solution to the cam lobes and camshaft bearings.

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: 14 N·m (1.4 kgf·m, 10 lbf·ft)**

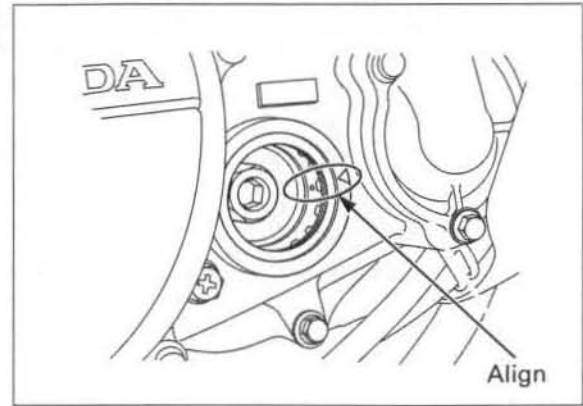




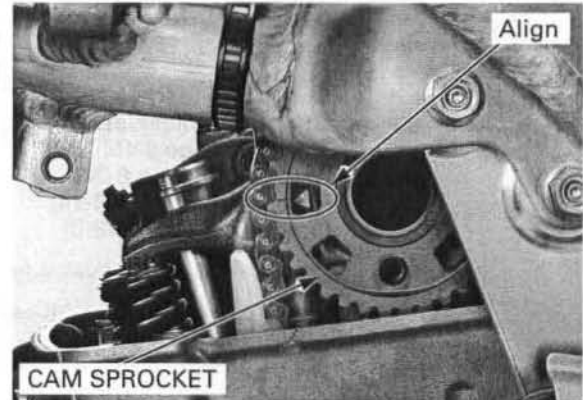
## CYLINDER HEAD/VALVES

Be careful not to jam the cam chain against the crankcase.

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



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 cam holder.



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

Align the cam sprocket bolt holes with the cam sprocket and camshaft.

Temporarily install the one cam sprocket bolt.

Turn the crankshaft clockwise 360° and insert the special tool into the sprocket over the gasket surface.

### TOOL:

Cam sprocket holder 07AMB-MEBA100 (U.S.A. only)

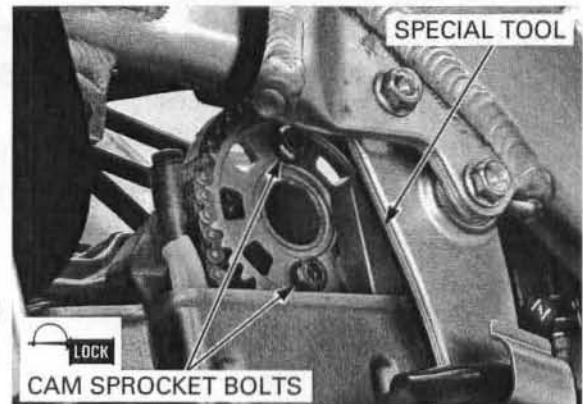
Tighten the other sprocket bolt to the specified torque.

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

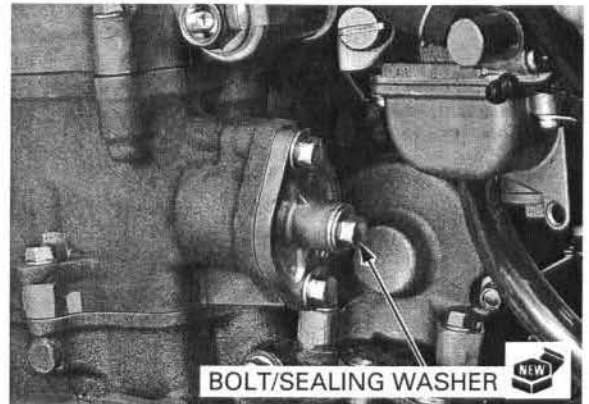
Remove the special tool, turn the crankshaft clockwise one turn and reinsert the special tool into the sprocket.

Tighten the another cam sprocket bolt to the specified torque.

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

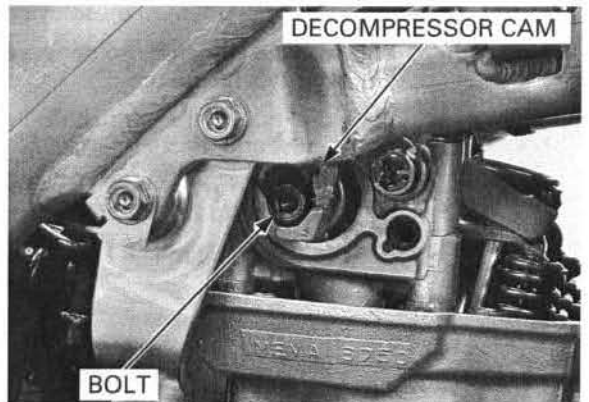


Remove the stopper tool from the cam chain tensioner lifter.  
Install the bolt with a new sealing washer.  
Tighten the cam chain tensioner lifter bolt securely.



If decompressor cam assembly was disassembled, tighten it to the specified torque while holding the crankshaft.

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



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

Apply oil to the O-ring.

Apply grease to the crankshaft hole cap threads.  
Install the crankshaft hole cap and tighten it to the specified torque.

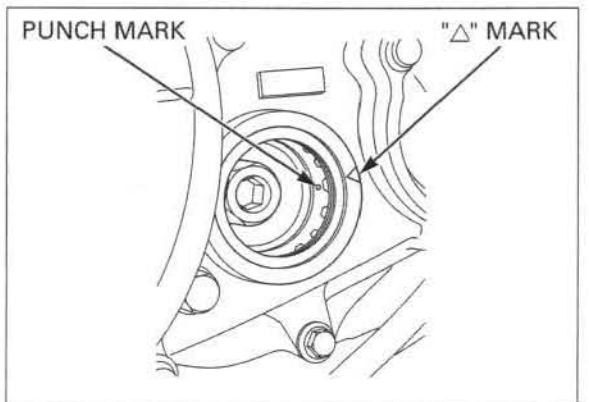
**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**

Install the cylinder head cover (page 9-42).



## CAMSHAFT INSTALLATION (After '07)

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



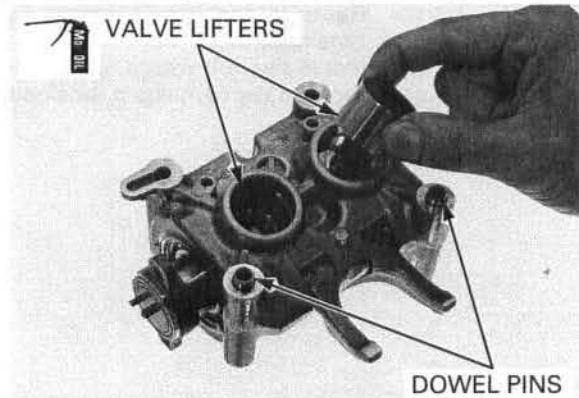
## CYLINDER HEAD/VALVES

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.

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



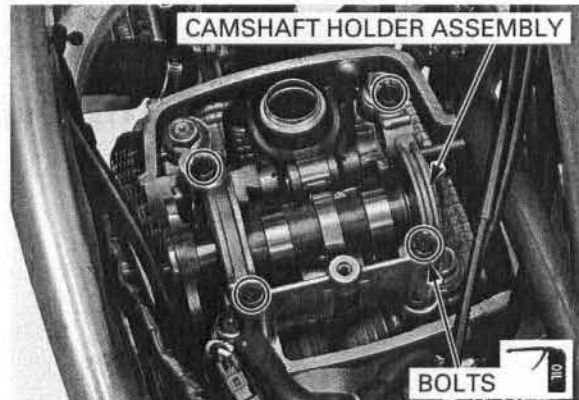
Apply molybdenum oil solution to the cam lobes.

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

Apply oil to the camshaft holder mounting bolt threads, and install them.

Tighten the bolts in a crisscross pattern in two or three steps to the specified torque.

**TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)**

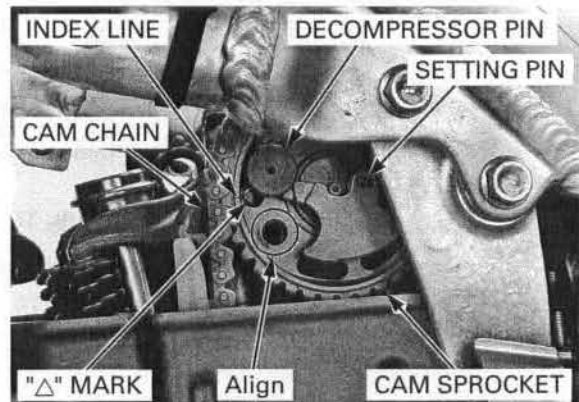


Install the cam chain onto the cam sprocket.

*When installing the cam sprocket, face the decompressor pin to the front side.*

When installing the cam sprocket, align the following:

- Decompressor weight hole with the setting pin of the decompressor shaft
- Bolt hole of the cam sprocket with the camshaft
- Index line on the cam sprocket with the "△" mark of the camshaft holder



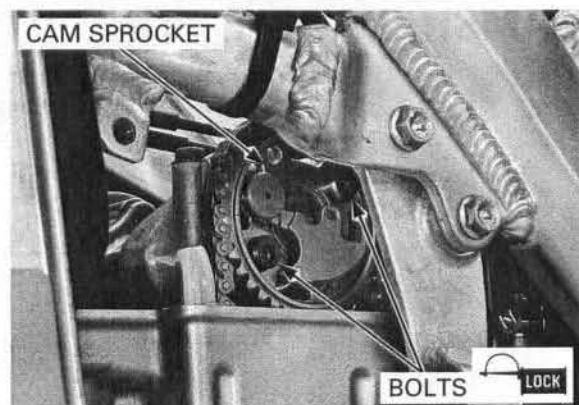
Clean and apply locking agent to the cam sprocket bolt threads.

Temporarily install the one cam sprocket bolt.

Turn the crankshaft clockwise one turn, then install and tighten the other cam sprocket bolt to the specified torque.

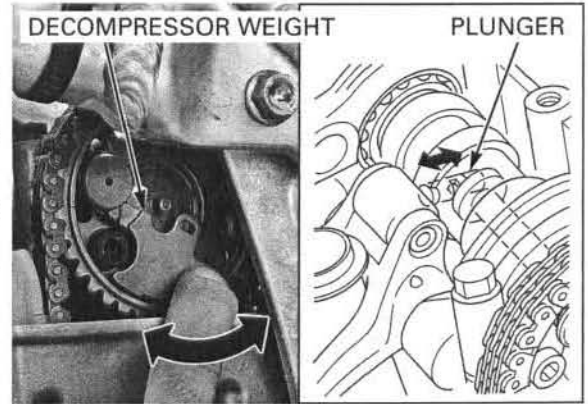
**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

Turn the crankshaft clockwise one turn again, and tighten the remaining cam sprocket bolt to the specified torque.

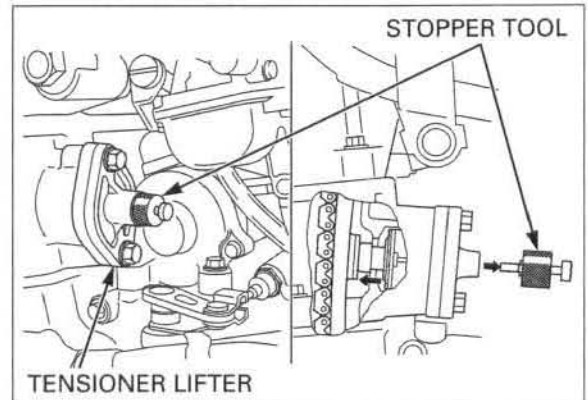


Make sure of the plunger operation using the following procedure:

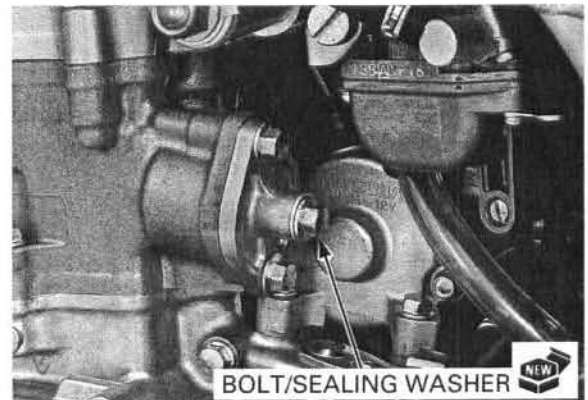
1. Move the decompressor weight outside with your finger.
  - The plunger operation is normal if it is retracted.
2. Release the decompressor weight.
  - The decompressor weight should move inside automatically.
  - The plunger operation is normal if it is protruded.



Remove the stopper tool from the cam chain tensioner lifter.



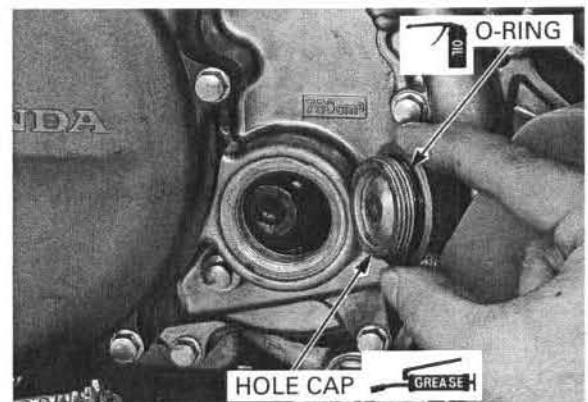
Install the cam chain tensioner lifter bolt with a new sealing washer. Tighten the cam chain tensioner lifter bolt securely.



Check the O-ring is in good condition, replace it if necessary.  
 Apply oil to the O-ring.  
 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 9-42).

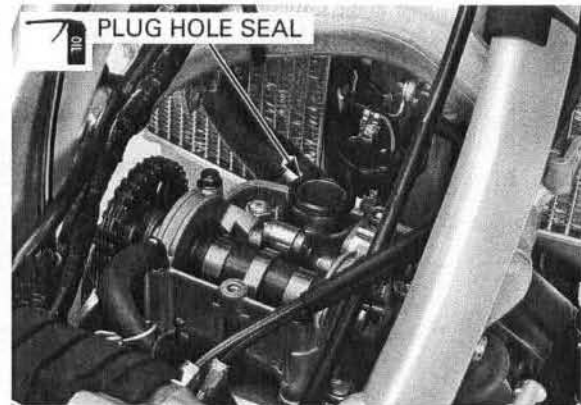


## CYLINDER HEAD/VALVES

# CYLINDER HEAD COVER INSTALLATION

Check the plug hole seal is in good condition, replace it if necessary.

Apply oil to the circumference of the plug hole seal. Install the plug hole seal.

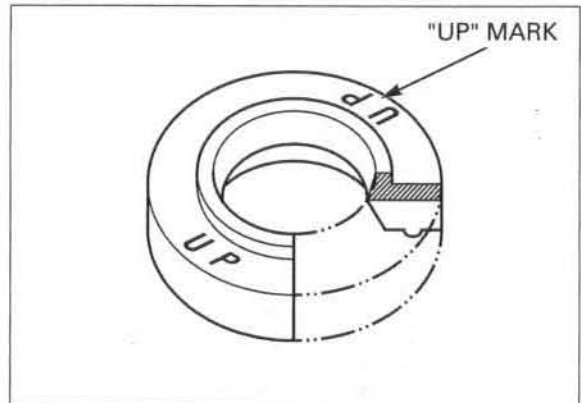


Inspect the cylinder head cover packing for damage or deterioration and replace it with a new one if necessary.

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

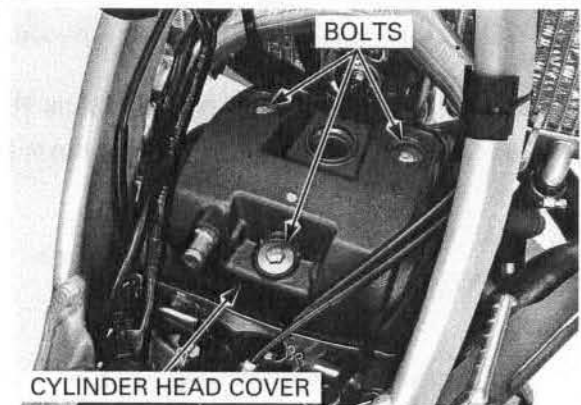


Install the washers to the cylinder head cover with their "UP" mark facing up.



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

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



Connect the spark plug cap and breather hose.  
Install the fuel tank (page 3-8).



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**MEMO**

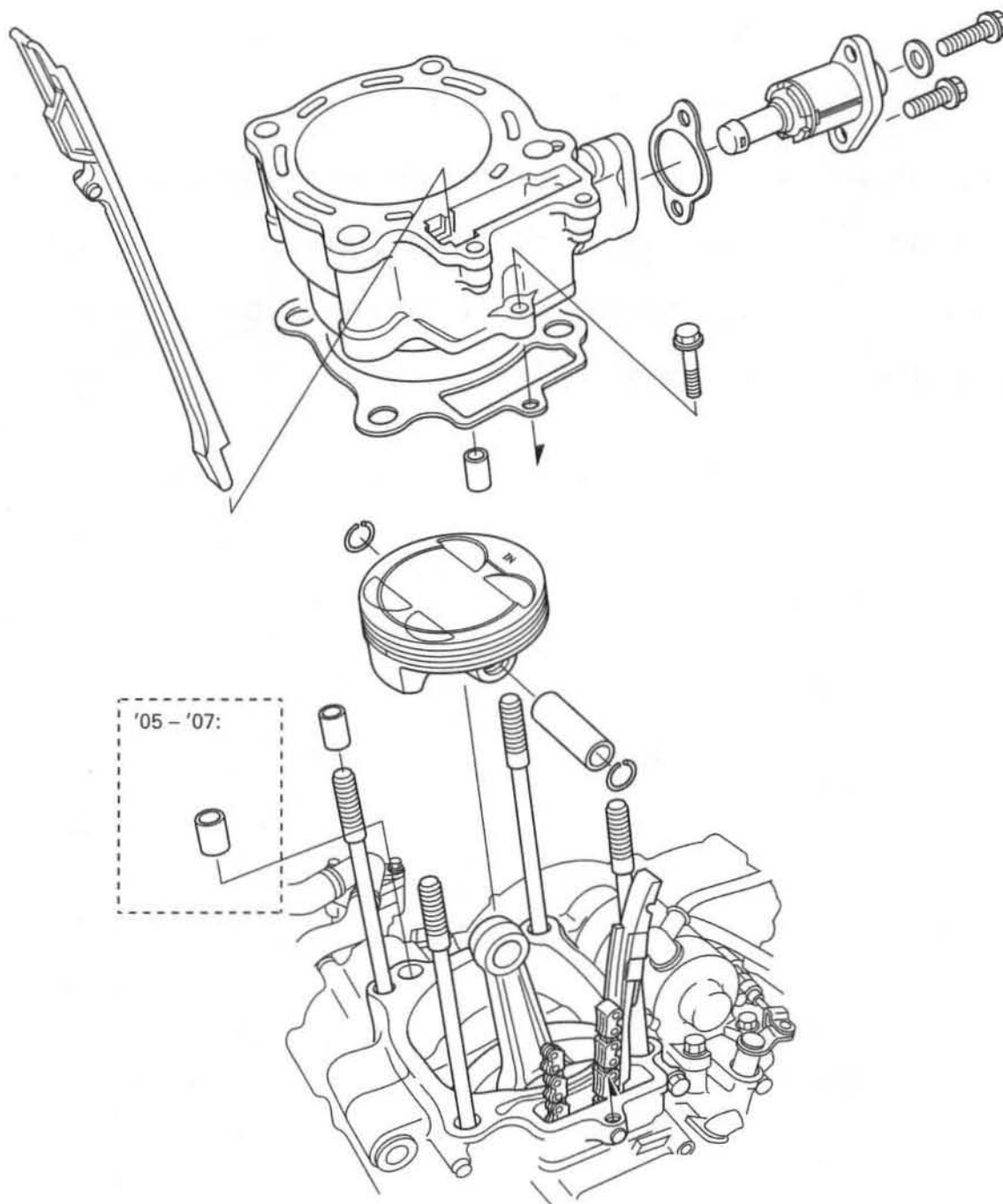


# 10. CYLINDER/PISTON

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COMPONENT LOCATION .....	10-2	PISTON REMOVAL .....	10-6
SERVICE INFORMATION .....	10-3	PISTON INSTALLATION .....	10-9
TROUBLESHOOTING .....	10-4	CYLINDER INSTALLATION.....	10-10
CYLINDER REMOVAL .....	10-5		

COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers maintenance of the cylinder and piston. These procedures can be done with the engine installed in the frame.
- Before disassembly, clean the engine thoroughly to prevent dirt from entering it.
- Be careful not to damage the mating surfaces when removing the cylinder. For example, do not use a screwdriver to pry the cylinder.
- Clean all disassembled parts with cleaning solvent before inspection, use compressed air to dry the parts.
- Under racing conditions, the piston and piston rings should be replaced after 15.0 hours of operation. Replace the piston pin after 30.0 hours of operation.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	96.000 – 96.015 (3.7795 – 3.7801)	96.025 (3.7805)	
	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 facing toward the intake side	–	
	Piston O.D.	95.970 – 95.980 (3.7783 – 3.7787)	95.94 (3.777)	
	Piston O.D. measurement point	5.0 mm (0.20 in) from the bottom of skirt	–	
	Piston pin bore I.D.	19.002 – 19.008 (0.7481 – 0.7483)	19.03 (0.749)	
	Piston pin O.D.	18.994 – 19.000 (0.7478 – 0.7480)	18.98 (0.747)	
	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	0.065 – 0.100 (0.0026 – 0.0039)	0.115 (0.0045)
	Piston ring end gap	Top ring	0.25 – 0.31 (0.010 – 0.012)	0.45 (0.018)
		Oil ring (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
Cylinder-to-piston clearance		0.020 – 0.045 (0.0008 – 0.0018)	0.085 (0.0033)	
Connecting rod small end I.D.	'05 – '07	19.016 – 19.034 (0.7487 – 0.7494)	19.04 (0.750)	
	After '07	19.016 – 19.038 (0.7487 – 0.7495)	19.04 (0.750)	
Connecting rod-to-piston pin clearance	'05 – '07	0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)	
	After '07	0.016 – 0.044 (0.0006 – 0.0017)	0.06 (0.002)	

### TORQUE VALUE

Cam chain tensioner lifter mounting bolt      12 N·m (1.2 kgf·m, 9 lbf·ft)

### 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 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**

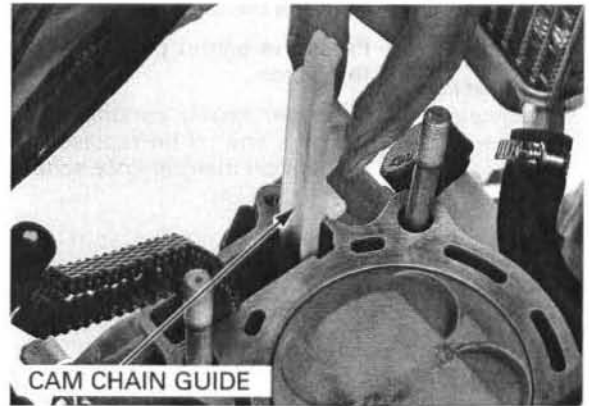
- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn connecting rod big end

#### **Excessive smoke**

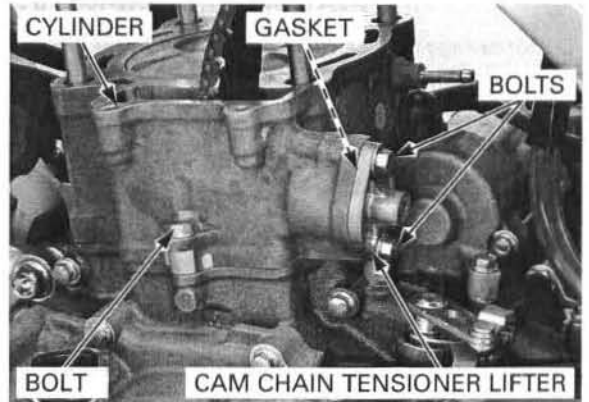
- Worn cylinder, piston and piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

# CYLINDER REMOVAL

Remove the cylinder head (page 9-24).  
 Remove the cam chain guide.

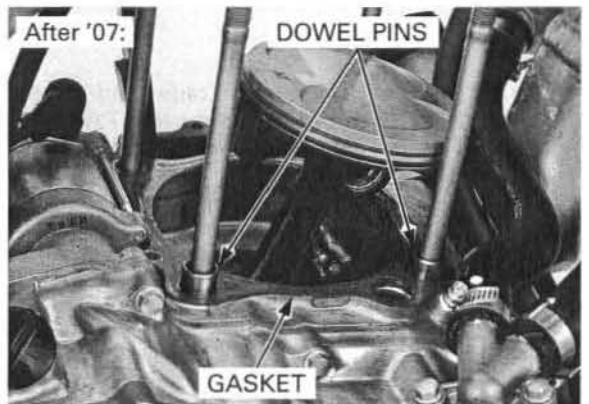
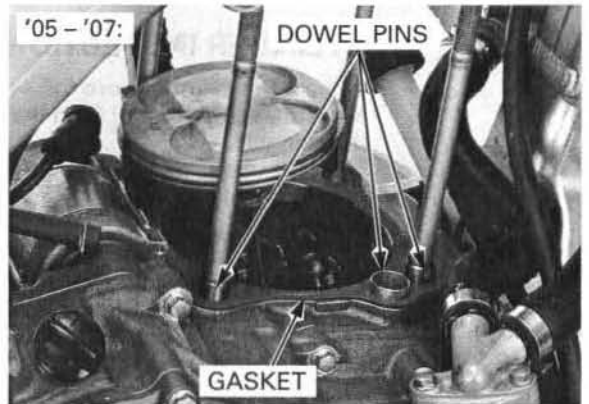


Remove the bolts, cam chain tensioner lifter and gasket.  
 Remove the bolt and cylinder.



*Prevent the cam chain from falling into the crankcase.*

Remove the dowel pins and gasket.



## CYLINDER/PISTON

### 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.

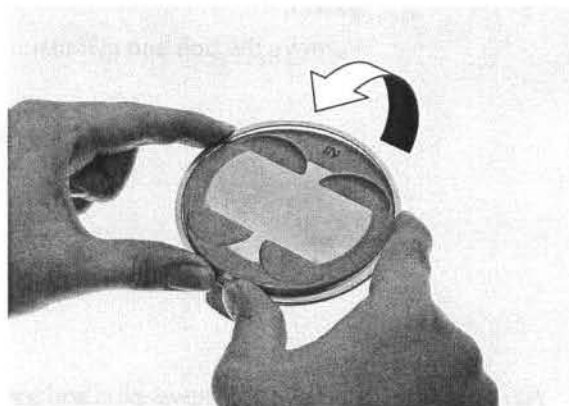
- Under racing conditions, the piston and piston rings should be replaced according to the competition maintenance schedule (page 4-6).



### PISTON RING REMOVAL

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

Spread the piston rings and remove them by lifting up at a point just opposite the gap.



### CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage. Measure the cylinder I.D. in the X and Y axes at three levels.

Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 96.025 mm (3.7805 in)**

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

For piston O.D. (page 10-7).

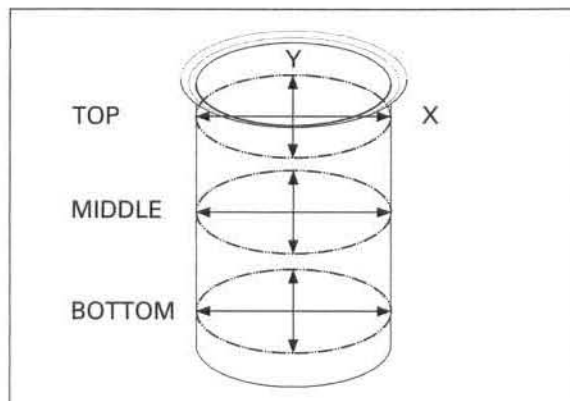
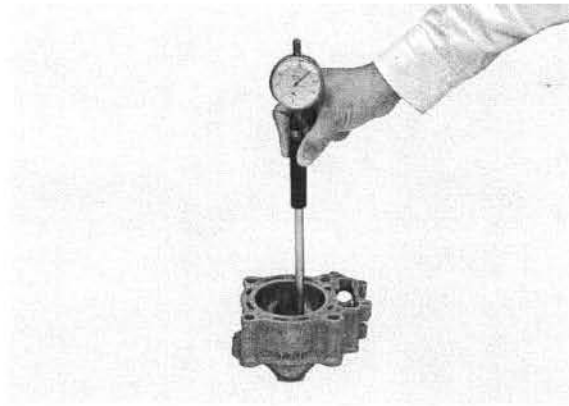
**SERVICE LIMIT: 0.085 mm (0.0033 in)**

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

**SERVICE LIMITS:**

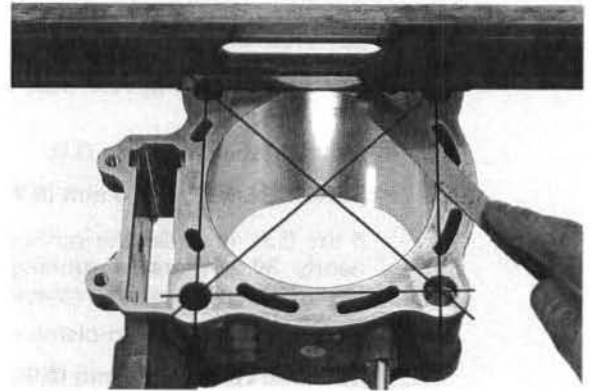
**Taper: 0.010 mm (0.0004 in)**

**Out-of-round: 0.010 mm (0.0004 in)**



Inspect the top of the cylinder for warpage.

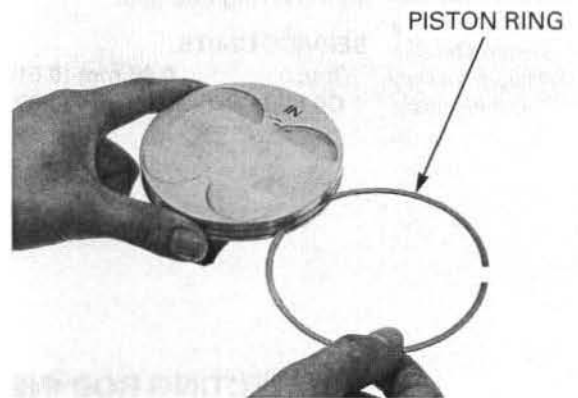
**SERVICE LIMIT: 0.05 mm (0.002 in)**



**PISTON/PISTON RING INSPECTION**

*Never use a wire brush. It will scratch the grooves.*

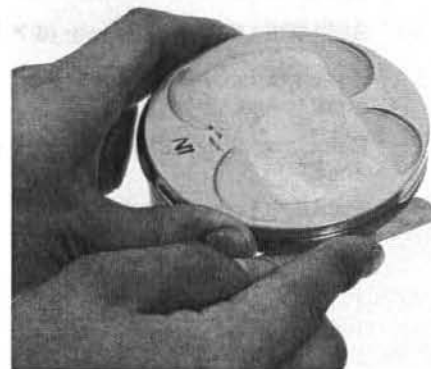
Remove the carbon deposits from the piston head or piston ring grooves. Inspect the piston for damage and the ring grooves for wear.



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

**SERVICE LIMIT: 0.115 mm (0.0045 in)**

Inspect the piston ring grooves for wear or damage.



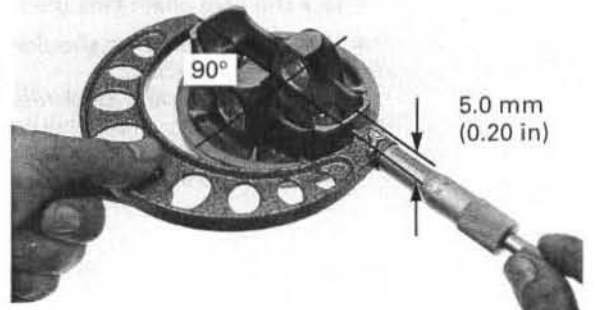
Measure the diameter of the piston at 5.0 mm (0.20 in) from the bottom and 90 degrees to the piston pin hole.

**SERVICE LIMIT: 95.94 mm (3.777 in)**

If the O.D. is under the service limit or nearly 15.0 hours of running time have elapsed (competition use only), replace the piston with a new one.

Calculate the cylinder-to-piston clearance.

**SERVICE LIMIT: 0.085 mm (0.0033 in)**





## CYLINDER/PISTON

Measure the piston pin bore I.D.

**SERVICE LIMIT: 19.03 mm (0.749 in)**

Check the piston pin for wear and excessive discoloration.

Measure the piston pin O.D.

**SERVICE LIMIT: 18.98 mm (0.747 in)**

If the O.D. is under the service limit, discolored, or nearly 30.0 hours of running time have elapsed (competition use only), replace the piston pin.

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.04 mm (0.002 in)**

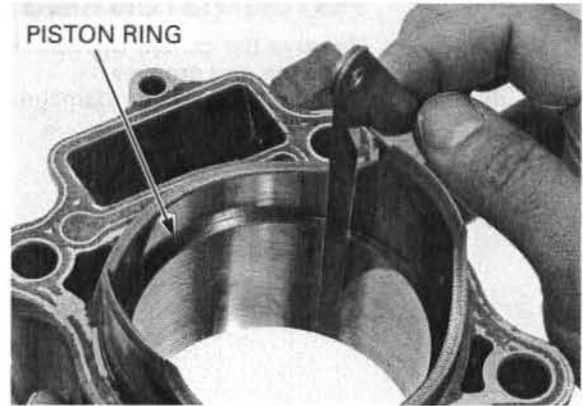
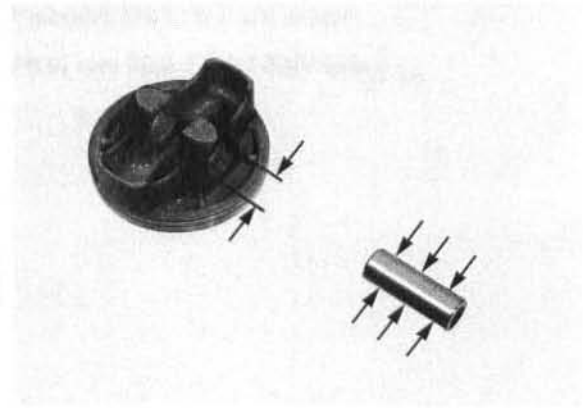
*Push the ring into the cylinder with the top of the piston to be sure the ring is squarely in the cylinder.*

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

**SERVICE LIMITS:**

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

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



## CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 19.04 mm (0.750 in)**

If the I.D. is over the service limit, replace the crankshaft (page 13-14).

Calculate the connecting rod-to-piston pin clearance.

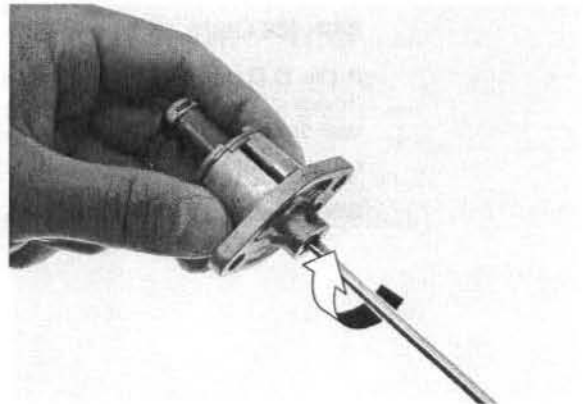
**SERVICE LIMIT: 0.06 mm (0.002 in)**



## CAM CHAIN TENSIONER LIFTER INSPECTION

Check the cam chain tensioner 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 RING INSTALLATION

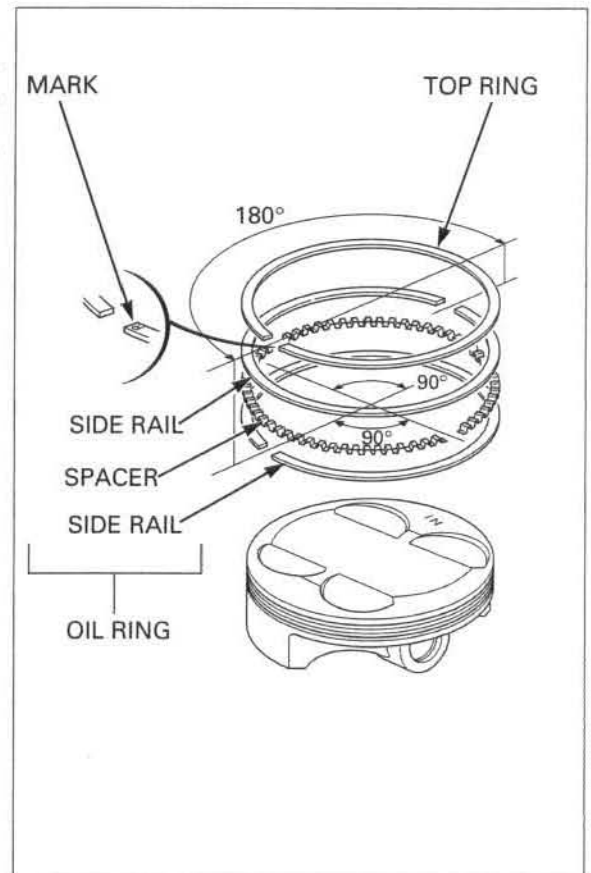
Clean the piston grooves thoroughly.

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

Apply engine oil to the piston rings and install them.

- 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 piston ring end as shown.

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

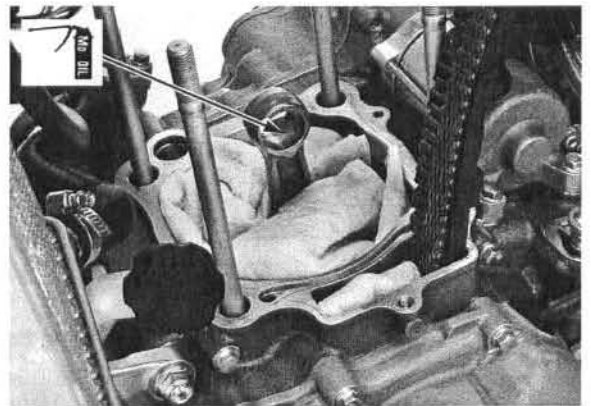


## PISTON INSTALLATION

*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 solution oil to the connecting rod small end.



Place a shop towel around the piston skirt and in the crankcase to prevent the piston pin clips from falling into the crankcase.

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

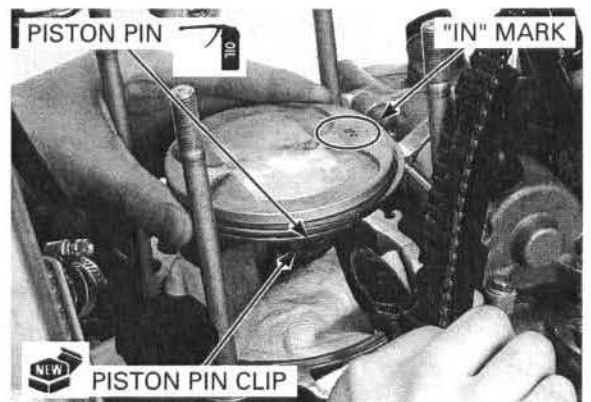
Install the piston with the "IN" mark facing intake side.

Install the piston pin and new piston pin clips.

- Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.

Do not align the piston pin clip end gap with the piston cut-out.

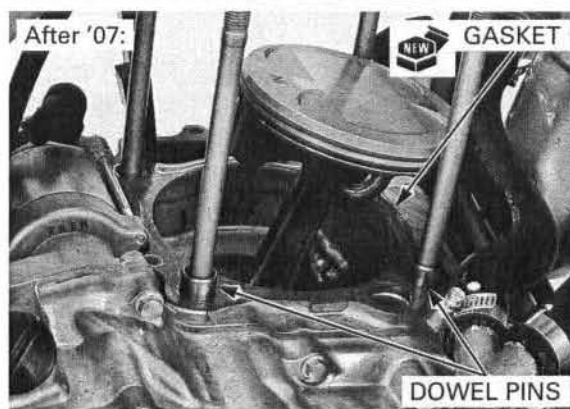
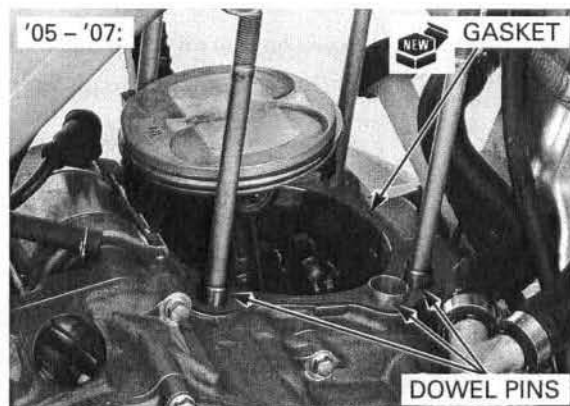
*Be careful not to drop the piston pin clip into the crankcase.*



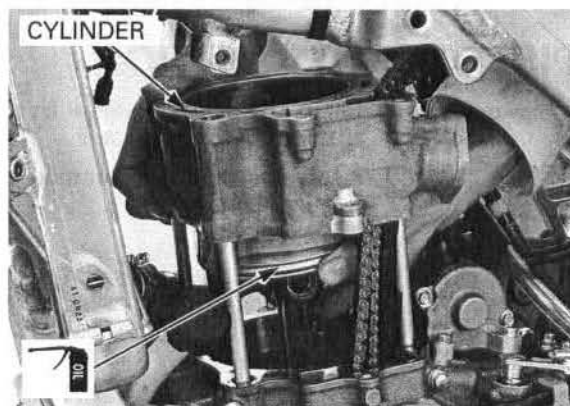
## CYLINDER/PISTON

### CYLINDER INSTALLATION

Install the dowel pins.  
Install a new cylinder base gasket on the crankcase.



*Avoid piston ring damage during installation.* Coat the cylinder bore, piston and piston rings with engine oil and install the cylinder while compressing the piston rings.



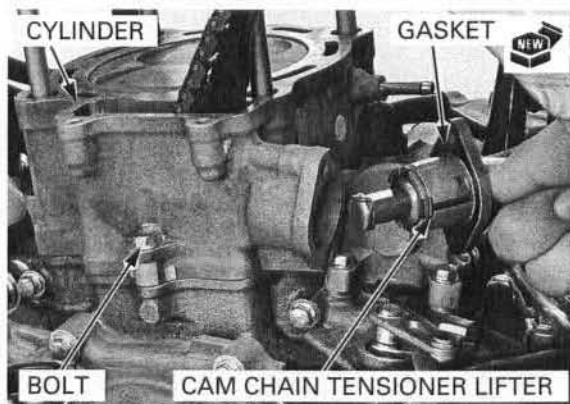
Install the cylinder mounting bolt.

- After tightening the cylinder head mounting nut, tighten the cylinder mounting bolt securely.

Install a new gasket, cam chain tensioner lifter and bolts.

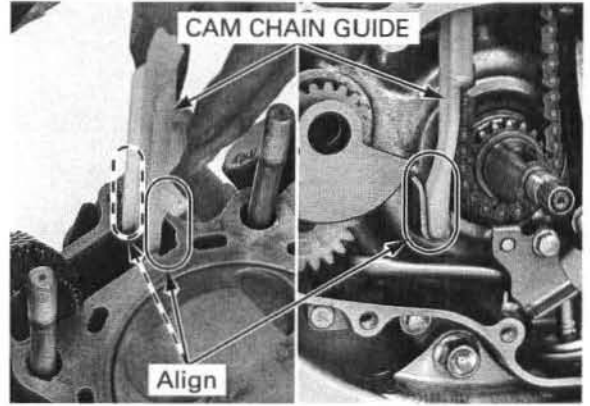
Tighten the bolts to the specified torque.

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



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 9-36).



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MEMO

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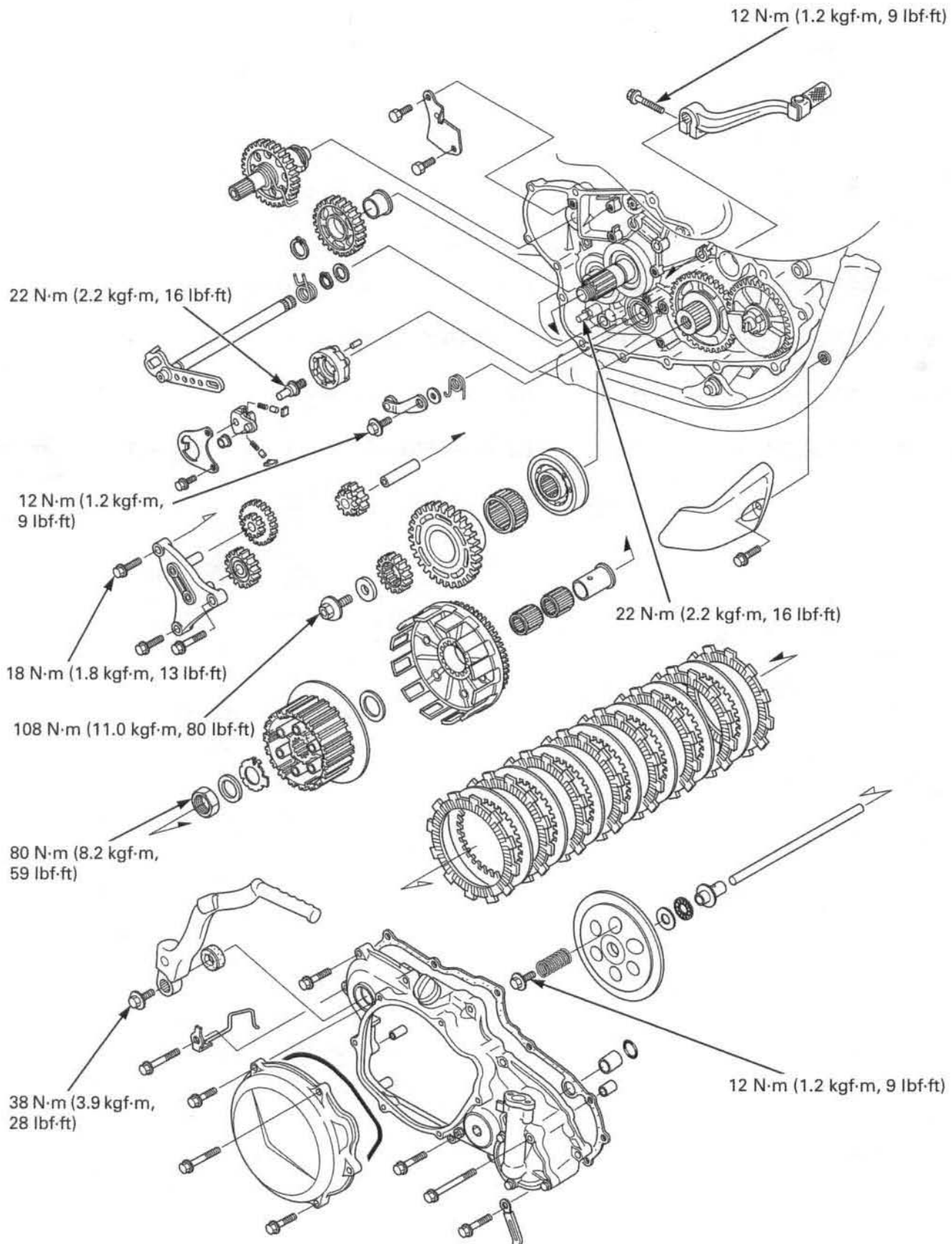
# 11. CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

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COMPONENT LOCATION .....	11-2	CLUTCH .....	11-7
SERVICE INFORMATION .....	11-3	KICKSTARTER .....	11-15
TROUBLESHOOTING .....	11-4	STARTER CLUTCH .....	11-19
RIGHT CRANKCASE COVER.....	11-5	GEARSHIFT LINKAGE .....	11-24

# CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

## COMPONENT LOCATION





## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch, starter 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 freeplay		10 – 20 (3/8 – 13/16)	–
Clutch spring free length		44.7 (1.76)	43.7 (1.72)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
Clutch plate warpage		–	0.15 (0.006)
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.		20.020 – 20.041 (0.7882 – 0.7890)	20.07 (0.790)
Kickstarter idle gear bushing	I.D.	17.000 – 17.018 (0.6693 – 0.6700)	17.04 (0.671)
	O.D.	19.979 – 20.000 (0.7866 – 0.7874)	19.96 (0.786)
Countershaft O.D. at kickstarter idle gear		16.966 – 16.984 (0.6680 – 0.6687)	16.95 (0.667)
Starter driven gear boss	I.D.	36.009 – 36.034 (1.4177 – 1.4187)	36.034 (1.4187)
	O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.660 (1.7976)
Reduction gear A I.D.		12.010 – 12.050 (0.4728 – 0.4744)	12.050 (0.4744)
Reduction gear B I.D.		10.045 – 10.085 (0.3955 – 0.3970)	10.085 (0.3970)
Idle gear I.D.		12.010 – 12.050 (0.4728 – 0.4744)	12.050 (0.4744)
Gear holder shafts O.D.		11.989 – 12.000 (0.4720 – 0.4724)	11.989 (0.4720)
Reduction gear shaft O.D.		9.980 – 9.995 (0.3929 – 0.3935)	9.980 (0.3929)

### TORQUE VALUES

Clutch center lock nut	80 N·m (8.2 kgf·m, 59 lbf·ft)	Apply oil to the threads and seating surface
Clutch spring bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift drum center pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads
Gearshift drum stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Kickstarter pedal bolt	38 N·m (3.9 kgf·m, 28 lbf·ft)	
Gearshift pedal pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift return spring pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Primary drive gear bolt	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply oil to the threads
Starter gear holder mounting bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply oil to the threads

### TOOLS

<p>Clutch center holder 07724-0050002</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Gear holder, M2.5 07724-0010100</p>  <p>or 07724-001A100 (U.S.A. only)</p>
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### TROUBLESHOOTING

#### Hard to shift

- Improper clutch operation
- Improper oil viscosity
- Incorrect clutch adjustment
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle
- Bent shift fork (page 13-13)
- Bent shift fork shaft (page 13-13)
- Bent fork claw (page 13-13)

#### Transmission jumps out of gear

- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft (page 13-13)
- Damaged or bent shift fork (page 13-13)
- Damaged shift drum center groove
- Faulty ratchet pawl
- Worn gear engagement dogs or slot (page 13-12)

#### Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

#### Clutch slips when accelerating

- Incorrect clutch adjustment
- Worn clutch discs
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additives

#### Motorcycle creeps with the engine idling

- Incorrect clutch adjustment
- Clutch plate warped
- Faulty clutch lifter
- Incorrect transmission oil

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

- Faulty starter clutch
- Damaged or faulty starter motor pinion gear, reduction gears, idle gear or starter driven gear.

## RIGHT CRANKCASE COVER

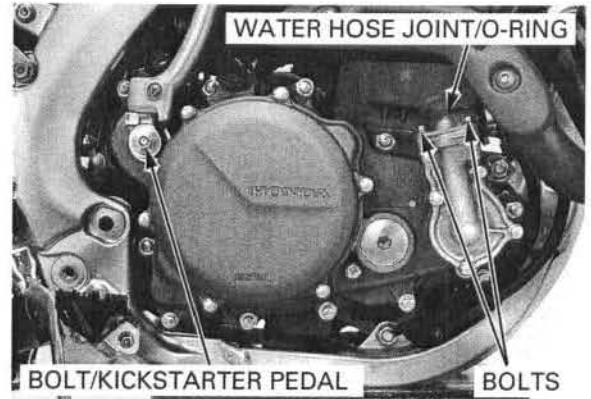
### REMOVAL

Remove the following:

- Brake pedal (page 16-24)
- Right engine guard (page 3-5)

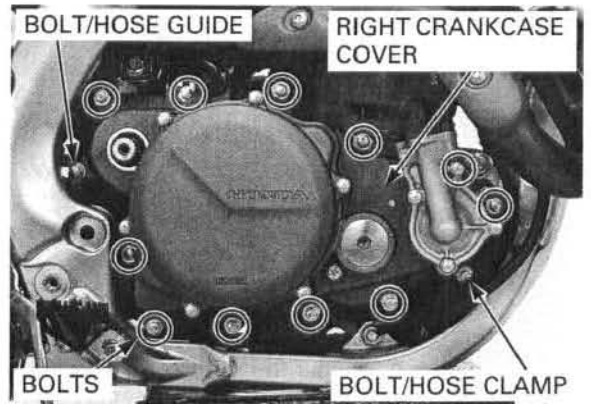
Drain the transmission oil (page 4-23).  
Drain the coolant (page 7-7).

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

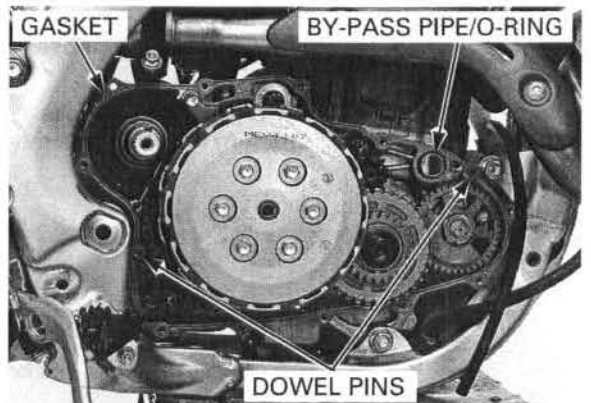


Loosen the right crankcase cover bolts in a criss-cross pattern in two or three steps.

Remove the bolts, hose guide, hose clamp and right crankcase cover.

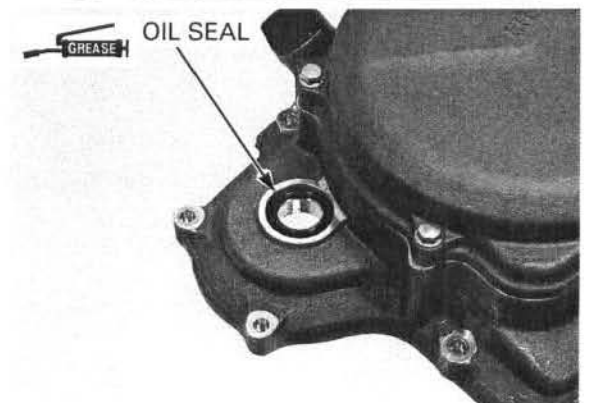


Remove the water by-pass pipe and O-ring.  
Remove the gasket and dowel pins.



Check the kickstarter spindle oil seal for deterioration or damage.

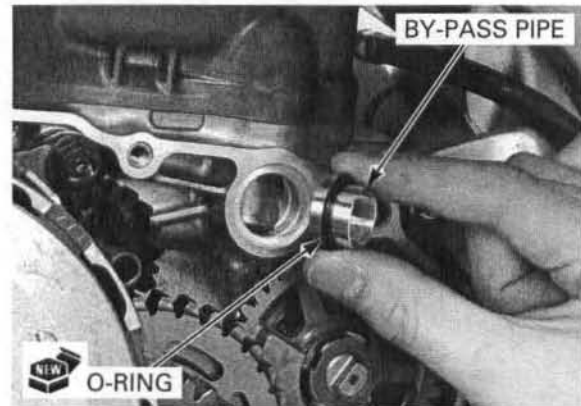
Apply grease to the kickstarter spindle oil seal lips.



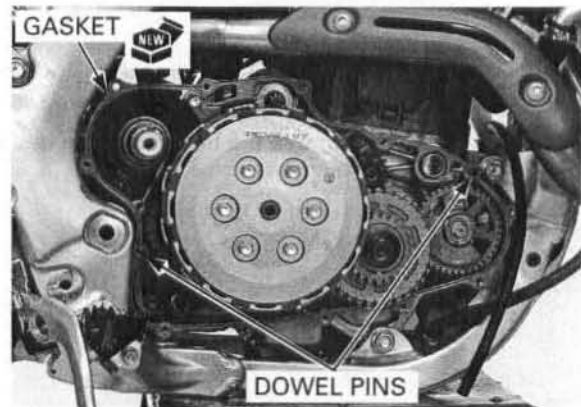
## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

### INSTALLATION

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



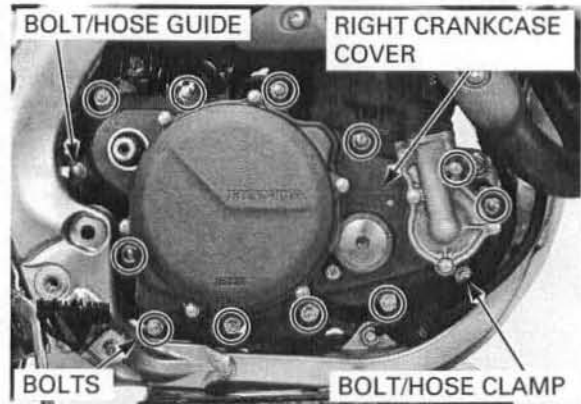
Install the dowel pins and new gasket.



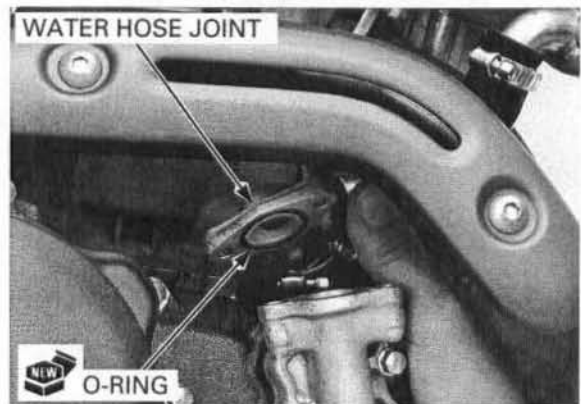
Install the right crankcase cover while engaging the water pump shaft securely with the balancer shaft tab.

Install the hose clamp, hose guide and right crankcase cover bolts.

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



Install a new O-ring onto the water hose joint.



## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Install the water hose joint to the water pump cover and tighten the bolts securely.

Install the kickstarter pedal and tighten the bolt to the specified torque.

**TORQUE: 38 N·m (3.9 kgf·m, 28 lbf·ft)**

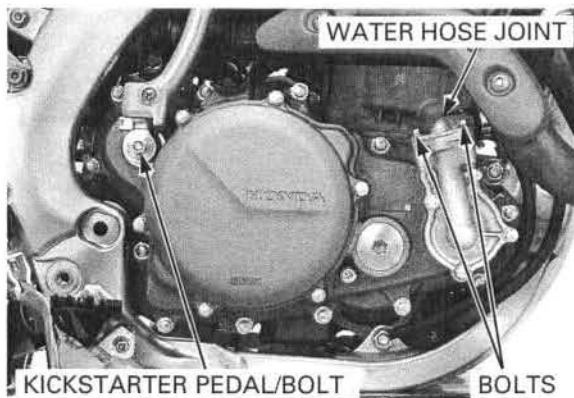
Install the following:

- Right engine guard (page 3-5)
- Brake pedal (page 16-24)

Fill the system with the recommended coolant and bleed the air (page 7-7).

Fill the transmission with the recommended transmission oil (page 4-22).

Start the engine and check for oil and coolant leaks.

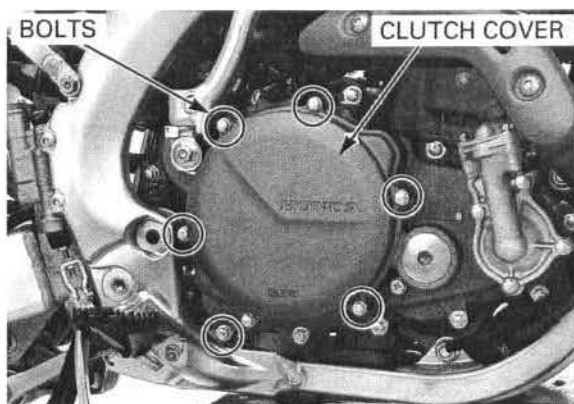


## CLUTCH

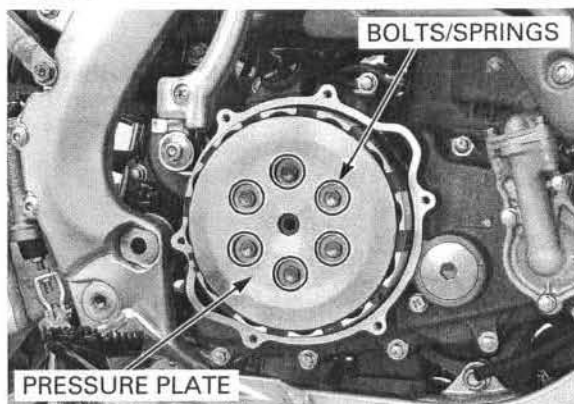
### CLUTCH REMOVAL

Remove the brake pedal (page 16-24).

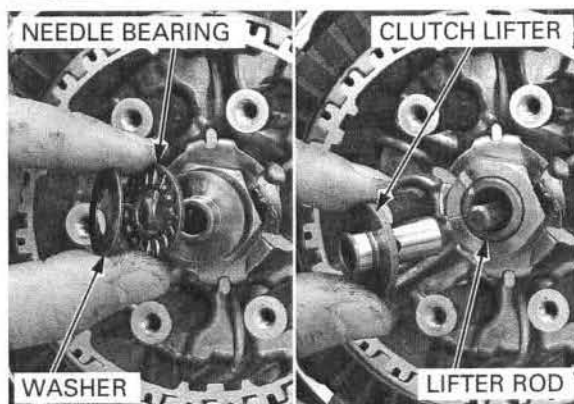
Remove the bolts, clutch cover and O-ring.



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



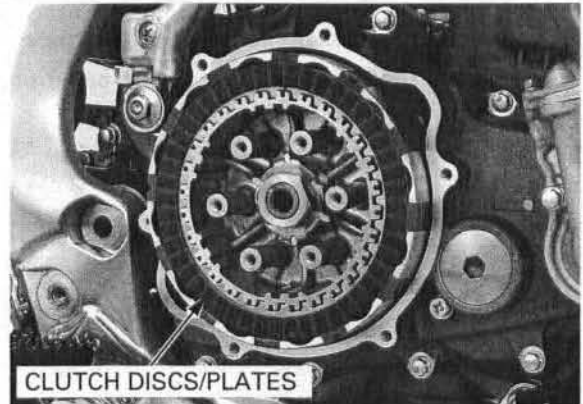
Remove the washer, needle bearing, clutch lifter and lifter rod.



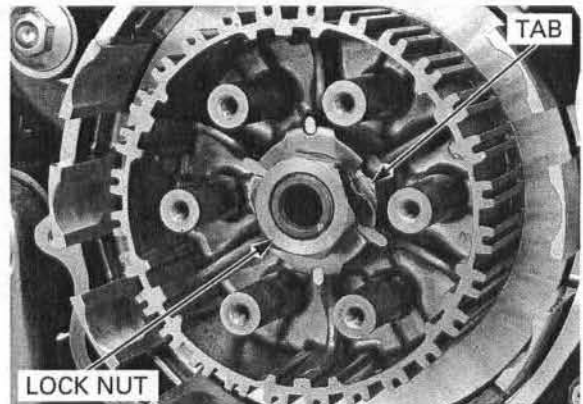


## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Remove the eight clutch discs and seven clutch plates.



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

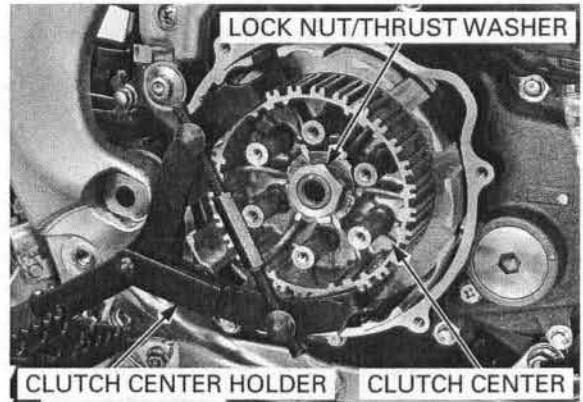


Remove the clutch center lock nut using the special tool.

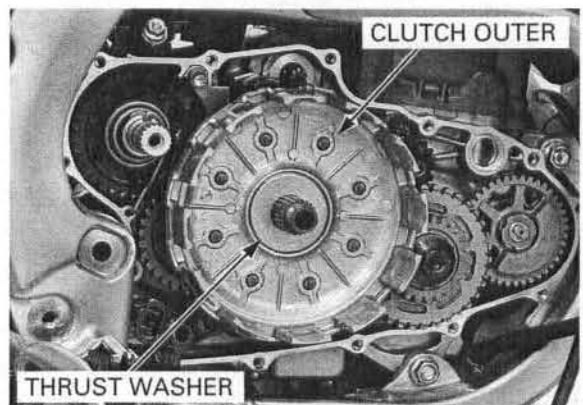
**TOOL:**  
Clutch center holder

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

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

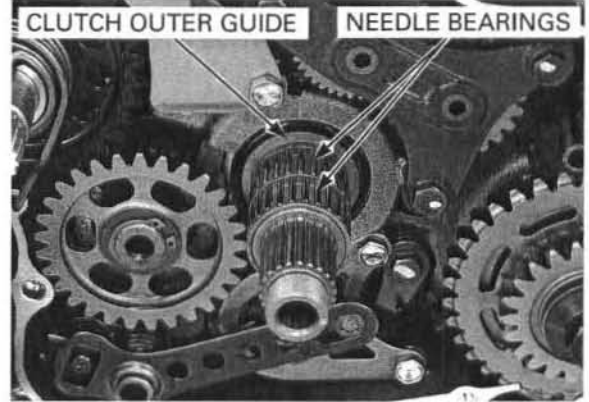


Remove the right crankcase cover (page 11-5).  
Remove the thrust washer and clutch outer.

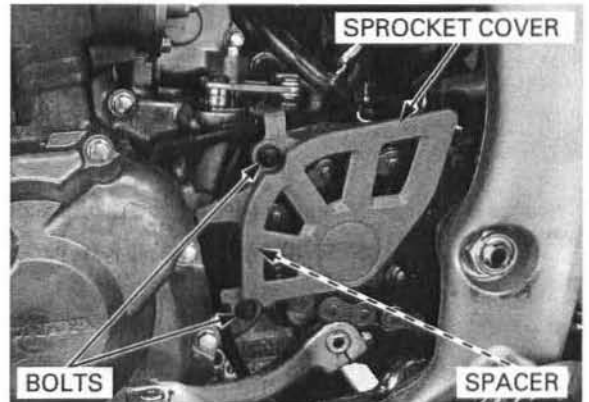


# CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Remove the needle bearings and clutch outer guide.

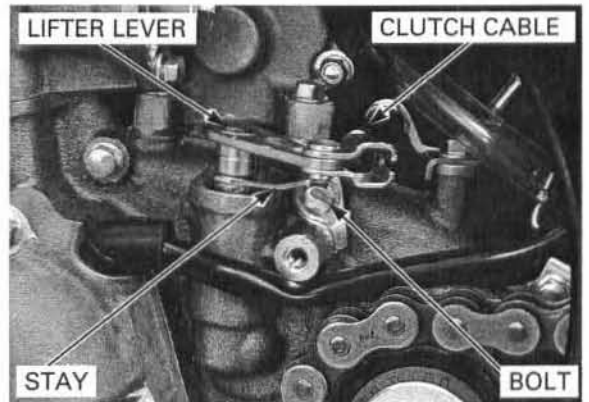


Remove the bolts, drive sprocket cover and spacer.



Disconnect the clutch cable from the clutch lifter lever.

Remove the bolt, stay and clutch lifter lever from the left crankcase.



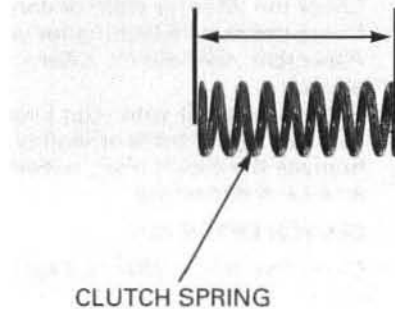
## INSPECTION

### 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: 43.7 mm (1.72 in)**





## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

### CLUTCH DISCS

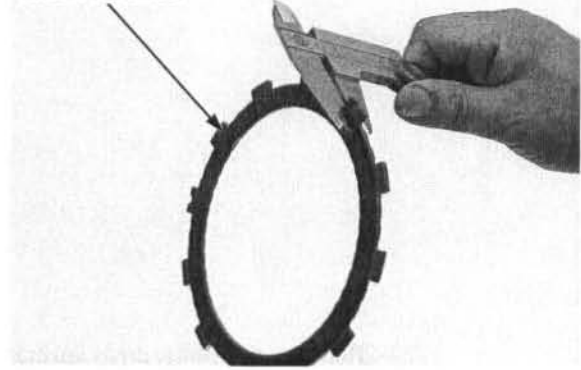
Check the clutch discs for signs of scoring or discoloration.

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

Measure the thickness of each disc.

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

CLUTCH DISC



### CLUTCH PLATES

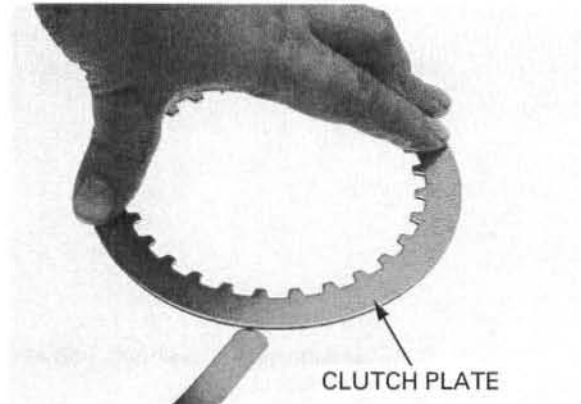
Check the plates for excessive warpage or discoloration.

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

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

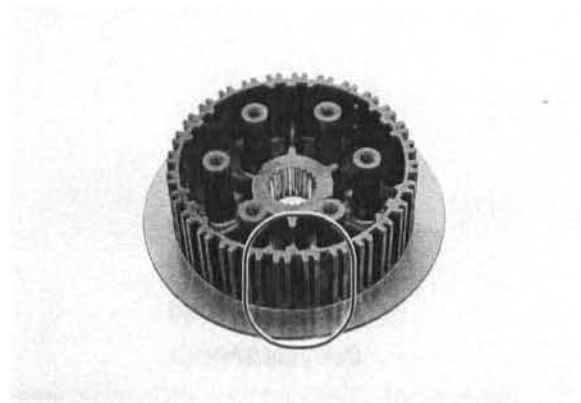
Measure the thickness of the plates.

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



### CLUTCH CENTER

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



### CLUTCH LIFTER/NEEDLE BEARING

Check the lifter for wear or damage.

Check the needle bearing for wear or damage.

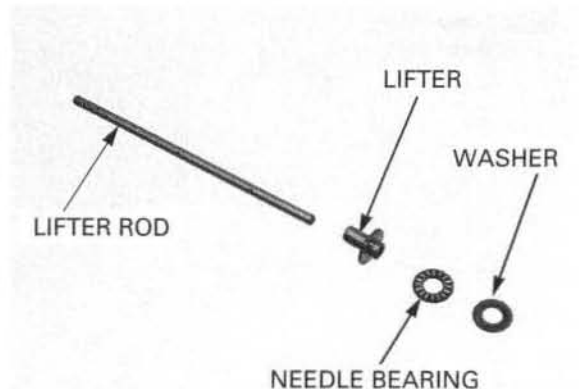
Assemble the clutch lifter, needle bearing and washer.

Turn the washer with your finger and make sure the needle bearing turns smoothly.

Replace the clutch lifter, needle bearing and washer as a set if necessary.

### CLUTCH LIFTER ROD

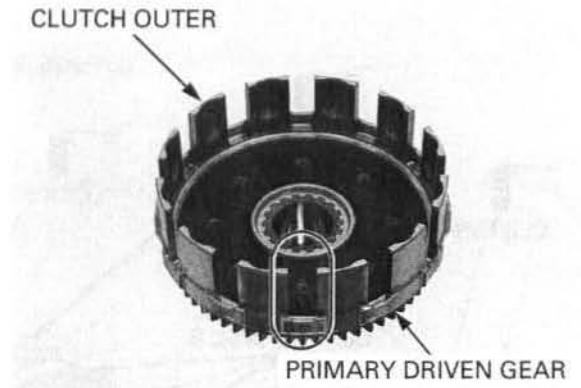
Check the clutch lifter rod for damage and straightness.



# CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

## CLUTCH OUTER

Check the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.  
Check the serrated teeth of the primary driven gear for wear or damage.



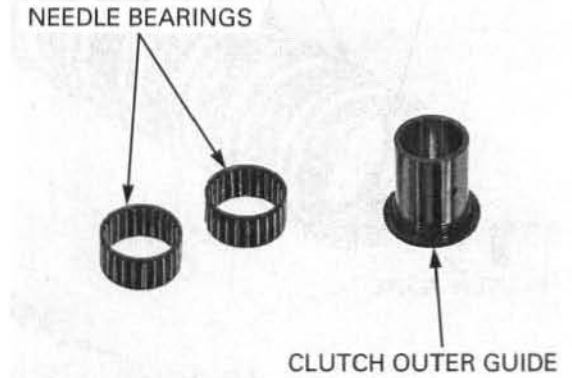
## CLUTCH OUTER GUIDE

Check the clutch outer guide for abnormal wear or damage.

## NEEDLE BEARING

Check the needle bearing for wear or damage.

Check the mainshaft for wear or damage at the sliding surface of the clutch outer guide.

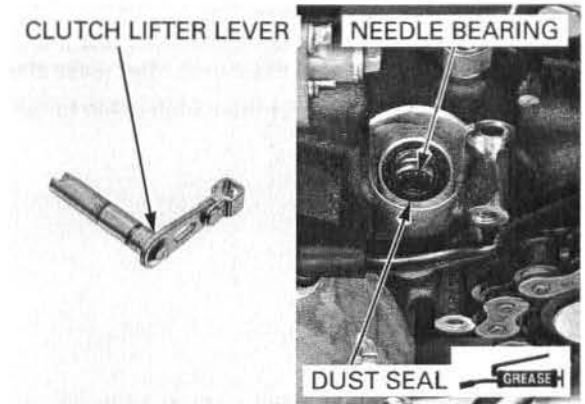


## CLUTCH LIFTER LEVER

Check the clutch lifter lever for damage.

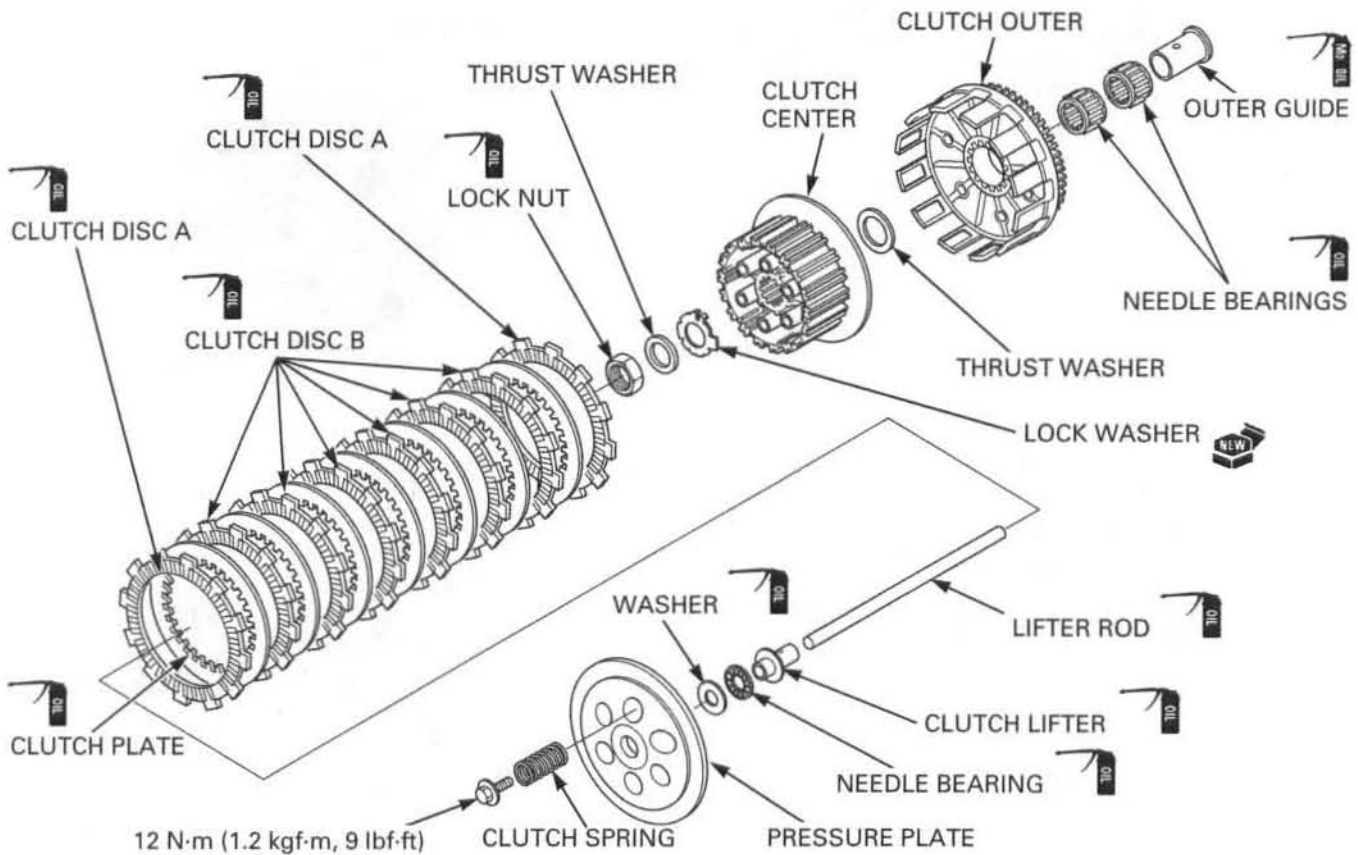
Check the dust seal and needle bearing for wear or damage.

Apply grease to the oil seal lips.

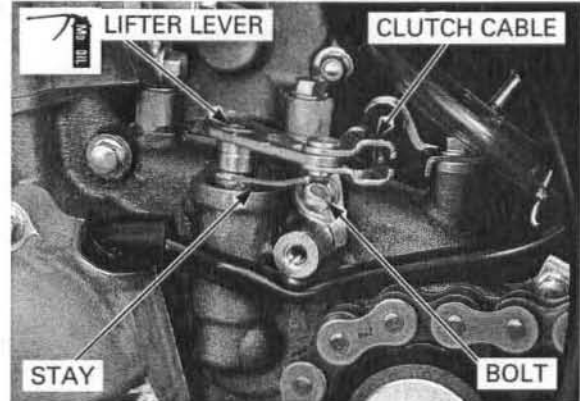


# CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

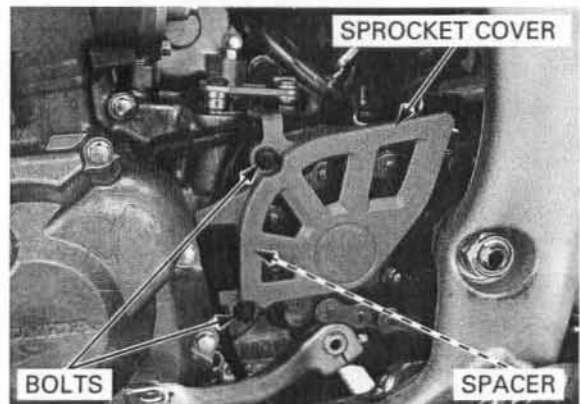
## INSTALLATION



Apply molybdenum oil solution to the clutch lifter lever cam area.  
Install the clutch lifter lever into the left crankcase.  
Install the clutch lifter lever stay and bolt.  
Connect the clutch cable to the clutch lifter lever.



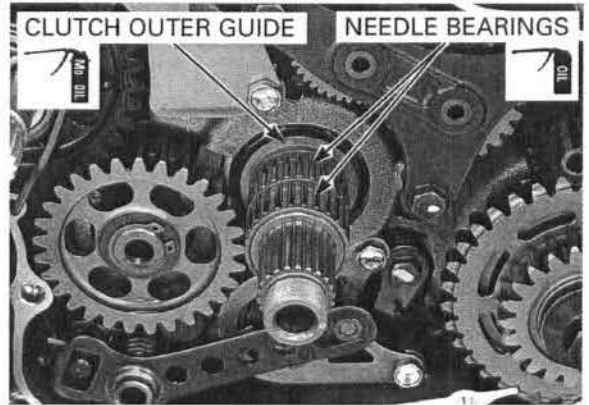
Install the spacer, drive sprocket cover, and bolts.



## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

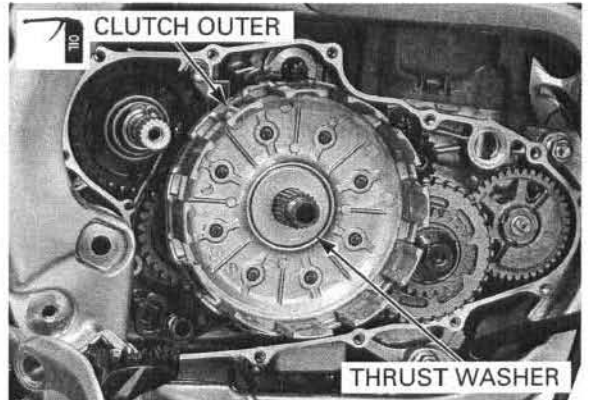
Apply molybdenum oil solution to the clutch outer guide inner surface and clutch outer needle bearing rolling area.

Apply transmission oil to the needle bearing.  
Install the clutch outer guide and needle bearings onto the mainshaft.



Apply oil to the clutch outer sliding surface.  
Install the clutch outer and thrust washer.

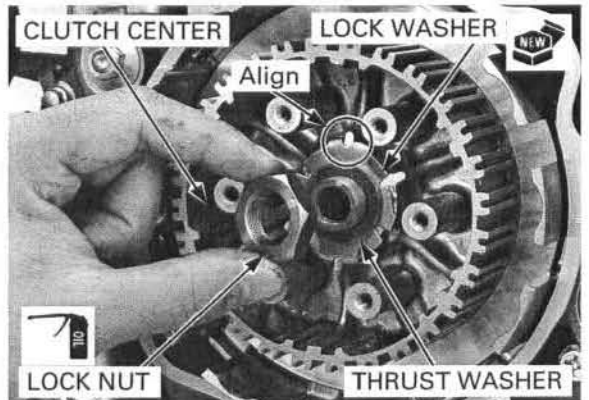
Install the right crankcase cover (page 11-6).



Install the clutch center onto the mainshaft.  
Install a new lock washer by aligning its grooves with the clutch center ribs.

Apply transmission oil to the threads and seating surface of the clutch center lock nut.

Install the thrust washer and lock nut.



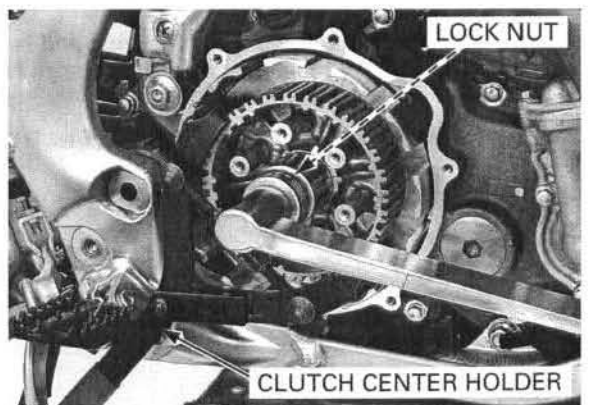
Tighten the lock nut to the specified torque using the special tool.

### TOOL:

Clutch center holder

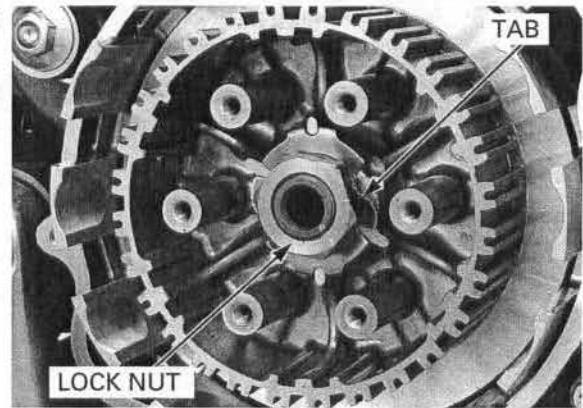
07724-0050002 or  
equivalent com-  
mercially avail-  
able in U.S.A.

TORQUE: 80 N·m (8.2 kgf·m, 59 lbf·ft)



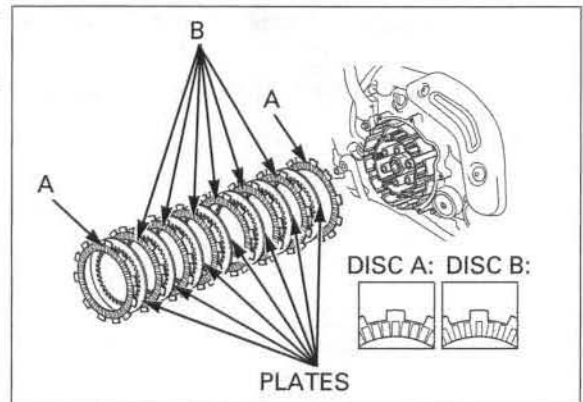
## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

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



Coat the clutch plates and discs with clean transmission oil.

Install the clutch disc A at first, then install the seven clutch plates and six clutch discs B alternately. Install the clutch disc A at the end.

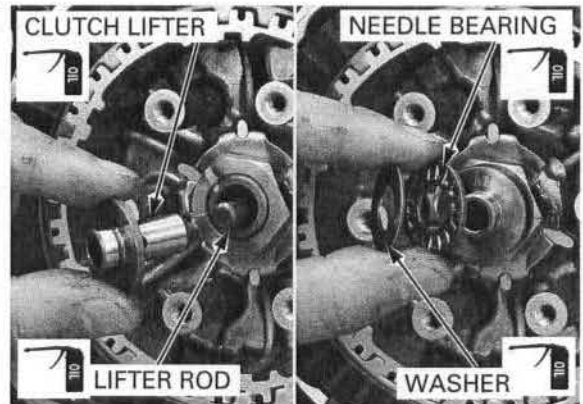


Apply transmission oil to the clutch lifter and lifter rod contact surface.

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

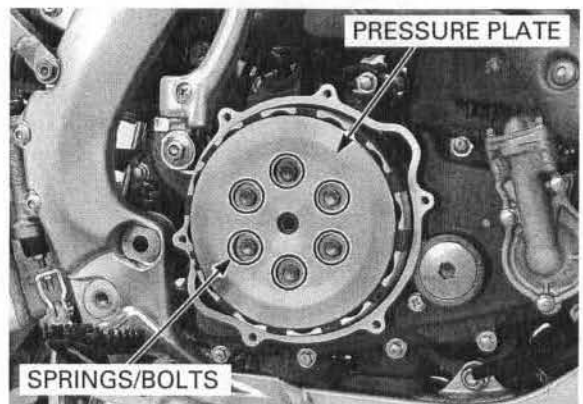
Apply transmission oil to the needle bearing and washer.

Install the needle bearing and washer to the clutch lifter.



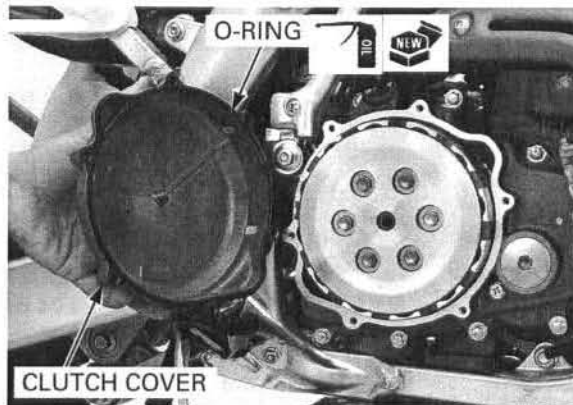
Install the pressure plate.  
Install the clutch springs and bolts.  
Tighten the bolts to the specified torque in a criss-cross pattern in two or three steps.

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





Apply oil to a new O-ring and install the clutch cover.

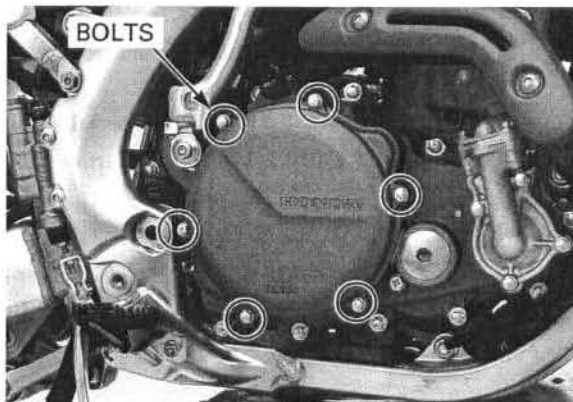


Tighten the cover bolts in a crisscross pattern in two or three steps.

Install the brake pedal (page 16-24).  
Adjust the clutch lever freeplay (page 4-31).

Fill the cooling system with the recommended coolant and bleed the air (page 7-7).  
Fill the engine with the recommended transmission oil (page 4-23).

Start the engine and check for oil leaks.



## KICKSTARTER

### REMOVAL

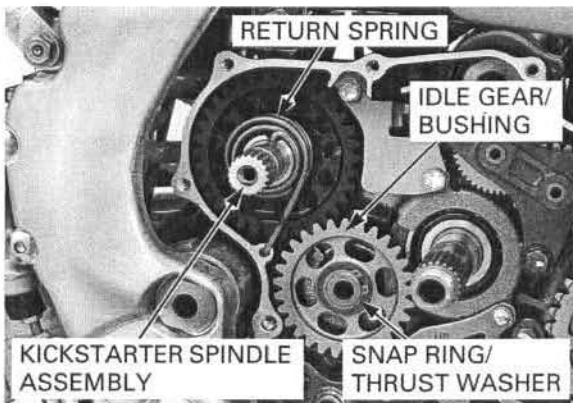
Remove the following:

- Right crankcase cover (page 11-5)
- Clutch (page 11-7)

Remove the snap ring, thrust washer, starter idle gear and bushing.

Unhook the kickstarter return spring from the crankcase.

Remove the kickstarter spindle assembly.



### DISASSEMBLY

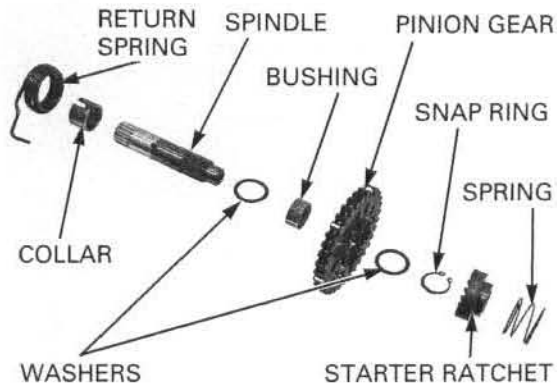
Disassemble the kickstarter spindle by removing the following:

- 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.



## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Check the kickstarter pinion for wear or damage.  
Check the kickstarter spindle for bend, wear or damage.  
Check the 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.

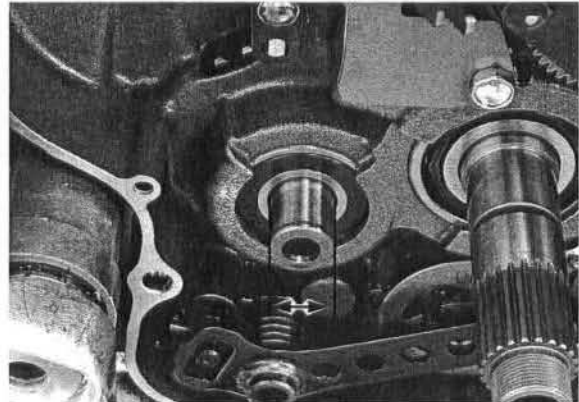
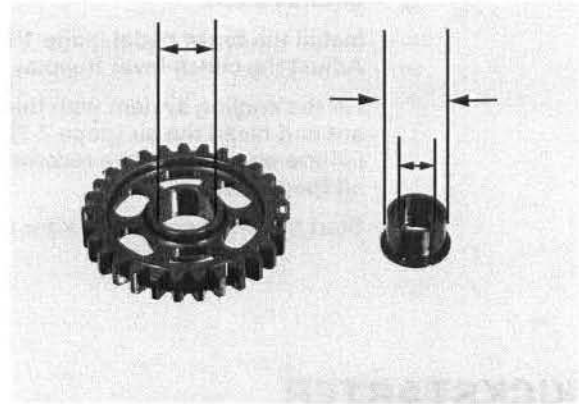
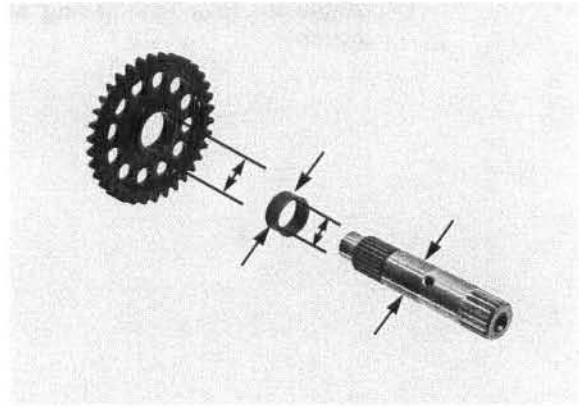
**SERVICE LIMIT: 20.07 mm (0.790 in)**

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

**SERVICE LIMIT: I.D. : 17.04 mm (0.671 in)**  
**O.D. : 19.96 mm (0.786 in)**

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

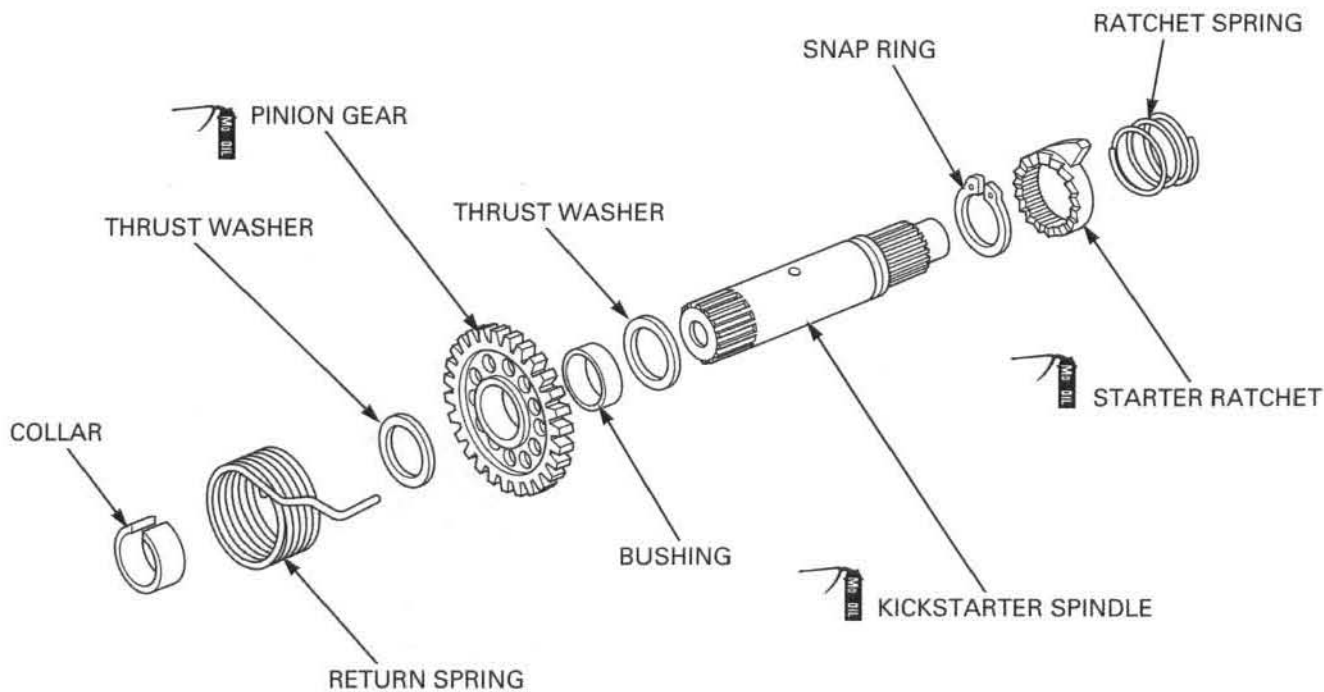
**SERVICE LIMIT: 16.95 mm (0.667 in)**





# CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

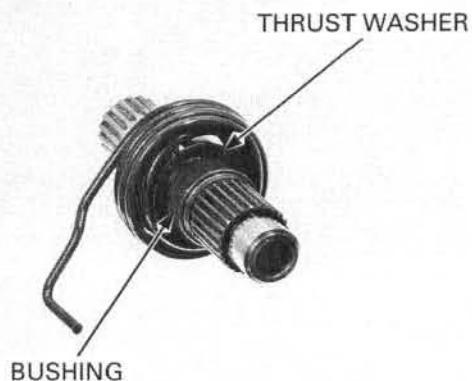
## ASSEMBLY



Apply molybdenum oil solution to the kickstarter spindle spline area and gear rolling surface.  
Install the collar aligning its gap with the spring.



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



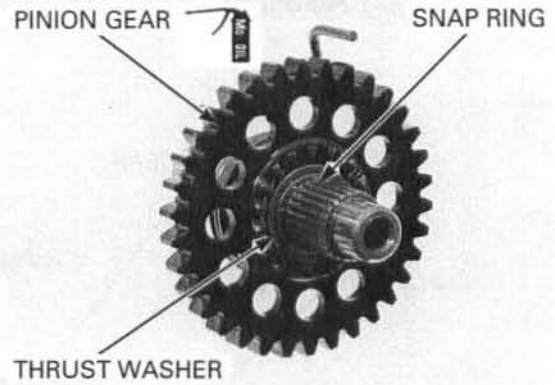
## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Apply molybdenum oil solution to the pinion gear inner surface.

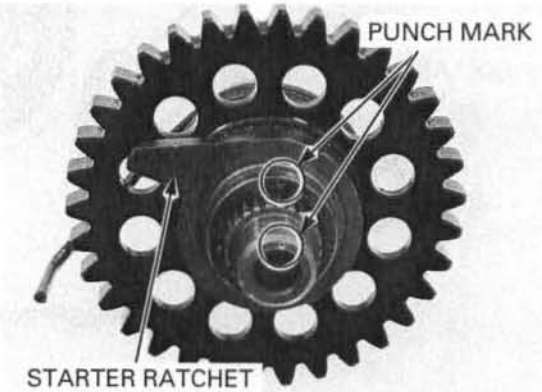
Install the pinion gear and thrust washer.

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

Install the snap ring in the groove of the spindle.



Align the punch marks and install the starter ratchet.



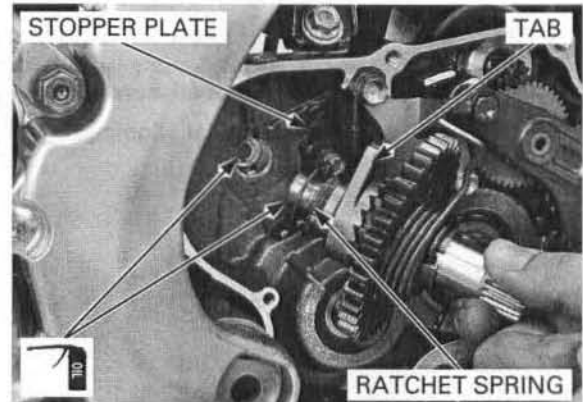
### INSTALLATION

Install the ratchet spring.

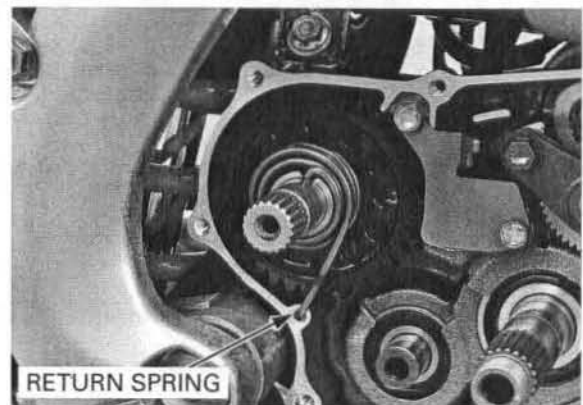
Apply transmission oil to the kickstarter spindle journal.

*Be sure the ratchet spring did not fall off the spindle during installation.*

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



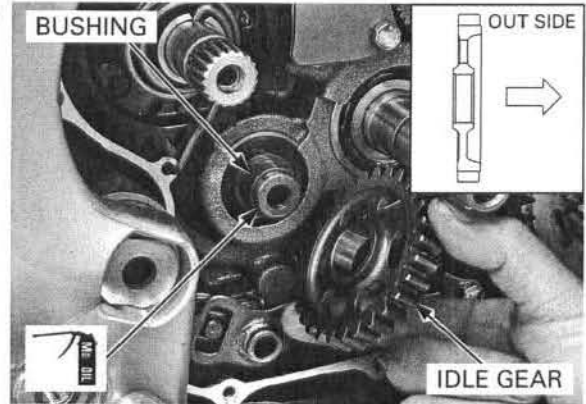
Hook the return spring end into the hole in the crankcase.



## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Apply molybdenum oil solution to the countershaft sliding surface.

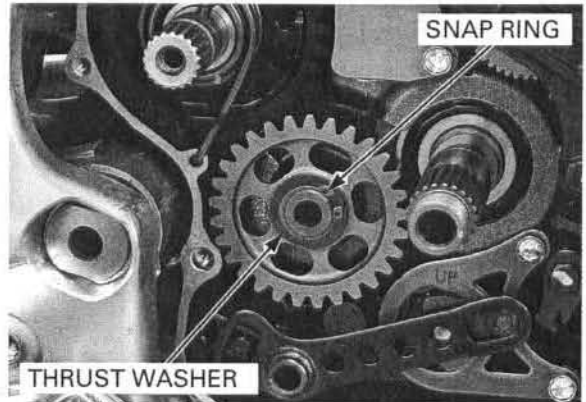
Install the bushing and starter idle gear onto the countershaft.



Install the thrust washer and snap ring.

Install the following:

- Clutch (page 11-12)
- Right crankcase cover (page 11-6)



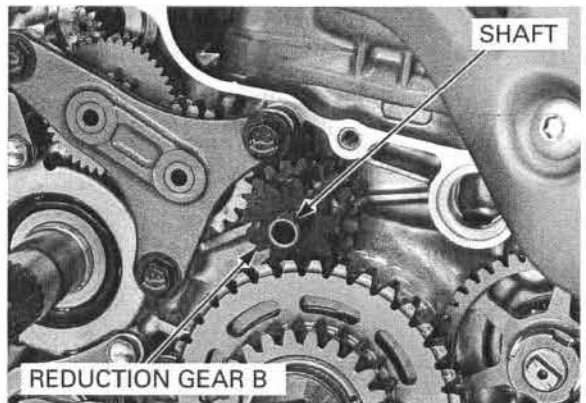
## STARTER CLUTCH

### REMOVAL

Remove the following:

- Right crankcase cover (page 11-5)
- Clutch (page 11-7)

Remove the reduction gear shaft and reduction gear B.



Temporarily install the clutch outer guide, needle bearings and clutch outer.

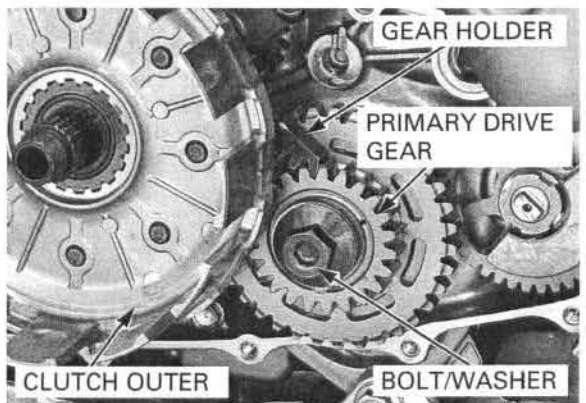
Install the gear holder between the primary drive and driven gears.

### TOOL:

**Gear holder, M2.5**

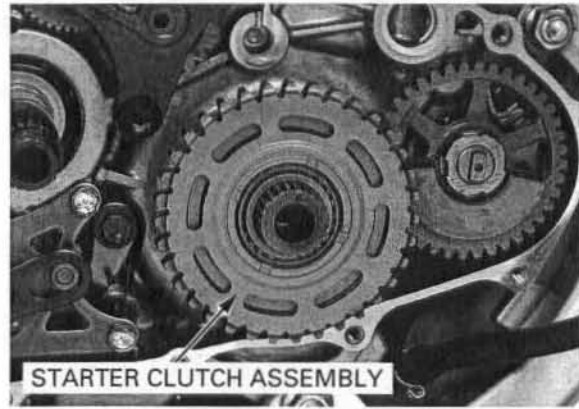
07724-0010100 or  
07724-001A100  
(U.S.A. only)

Remove the primary drive gear bolt, washer, clutch outer, needle bearings, clutch outer guide and primary drive gear.

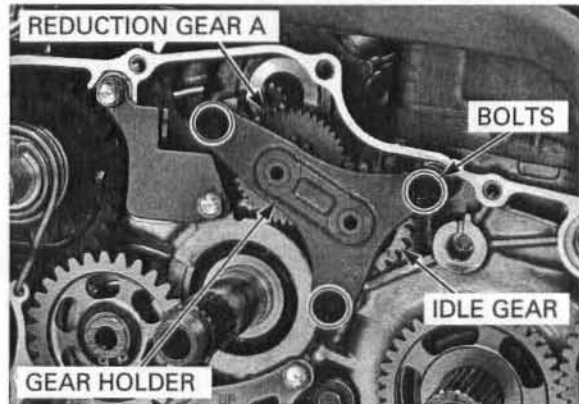


## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Remove the starter clutch assembly.



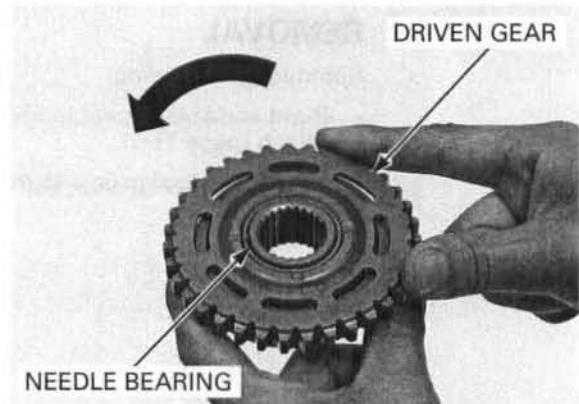
Remove the bolts, gear holder, reduction gear A and idle gear.



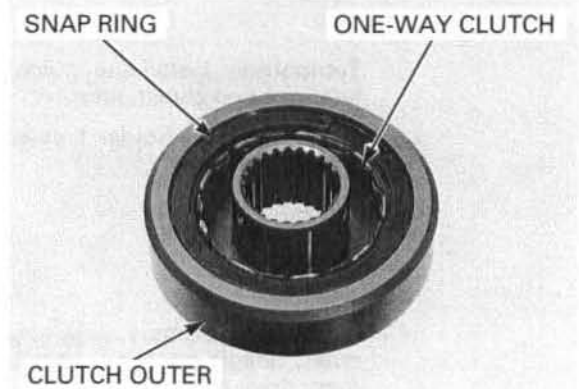
### DISASSEMBLY/INSPECTION

Check that the starter driven gear turns counter-clockwise smoothly and does not turn clockwise.

Remove the driven gear and needle bearing from starter clutch outer.



Remove the snap ring and one-way clutch from clutch outer.



## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Check the needle bearing for abnormal wear or damage.

NEEDLE BEARING



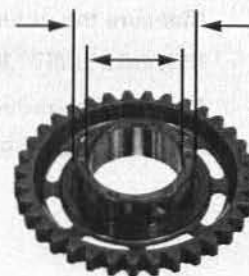
Check the starter driven gear for abnormal wear or damage.

Measure the driven gear boss O.D.

**SERVICE LIMIT: 45.660 mm (1.7976 in)**

Measure the driven gear boss I.D.

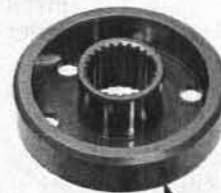
**SERVICE LIMIT: 36.034 mm (1.4187 in)**



Check the one-way clutch sprag for abnormal wear or damage.

Check the starter clutch outer sliding surface for wear or damage.

ONE-WAY CLUTCH



CLUTCH OUTER

Check the reduction gear A and idle gear for wear or damage.

Measure the reduction gear A I.D.

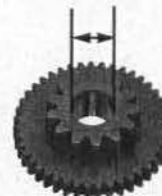
**SERVICE LIMIT: 12.050 mm (0.4744 in)**

Measure the idle gear I.D.

**SERVICE LIMIT: 12.050 mm (0.4744 in)**



IDLE GEAR



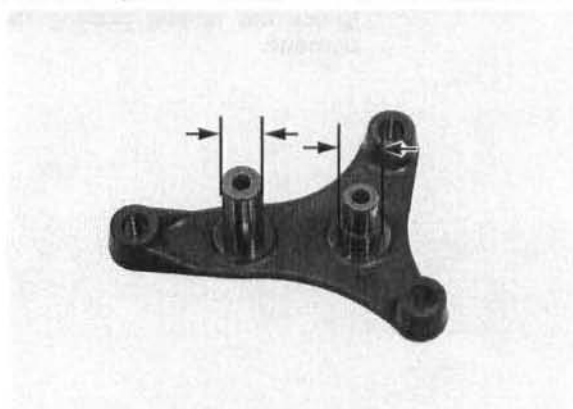
REDUCTION GEAR A

## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Check the gear holder shafts sliding surface for wear or damage.

Measure the gear holder shafts O.D.

**SERVICE LIMIT: 11.989 mm (0.4720 in)**



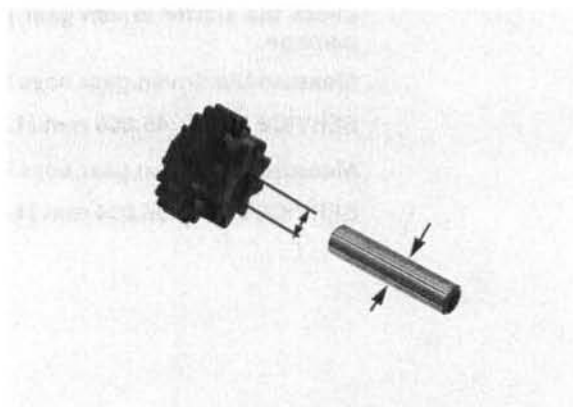
Check the starter reduction gear B and reduction gear shaft for wear or damage.

Measure the reduction gear B I.D.

**SERVICE LIMIT: 10.085 mm (0.3970 in)**

Measure the reduction gear shaft O.D.

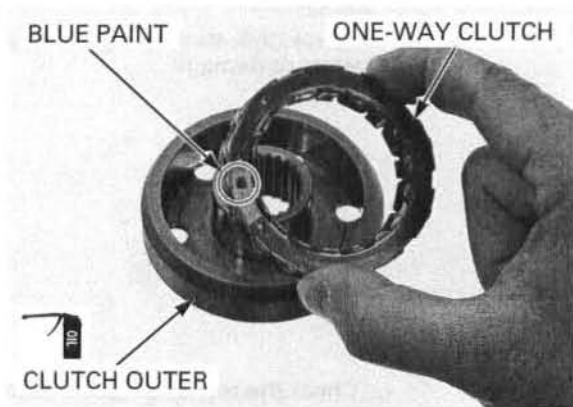
**SERVICE LIMIT: 9.980 mm (0.3929 in)**



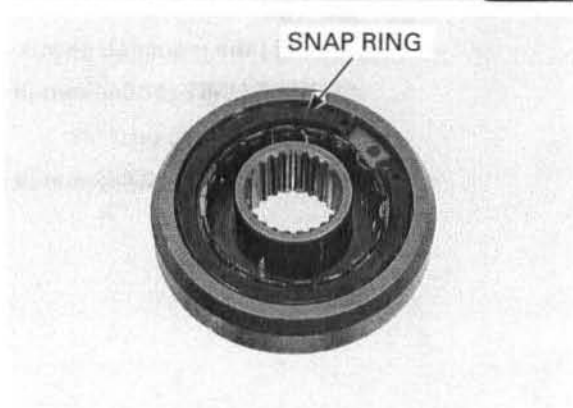
### ASSEMBLY

Apply transmission oil to the clutch outer sliding surface.

Install the one-way clutch into the starter clutch outer with the blue paint facing out.



Install the snap ring securely.





## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Apply transmission oil to the starter driven gear sliding surface.

Install the needle bearing and starter driven gear.

Check that the starter driven gear turns counter-clockwise smoothly and does not turn clockwise.



### INSTALLATION

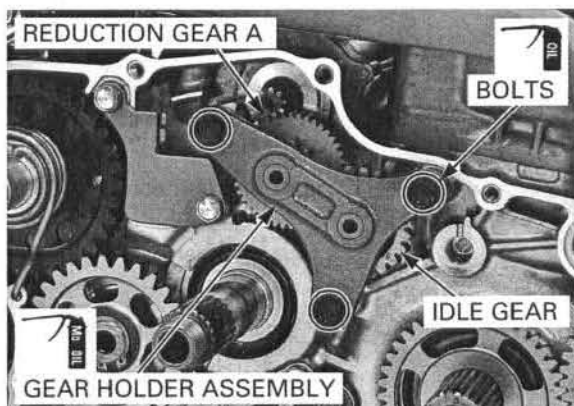
Apply molybdenum oil solution to the starter gear holder gear rolling surface.

Install the idle gear and reduction gear A onto the gear holder.

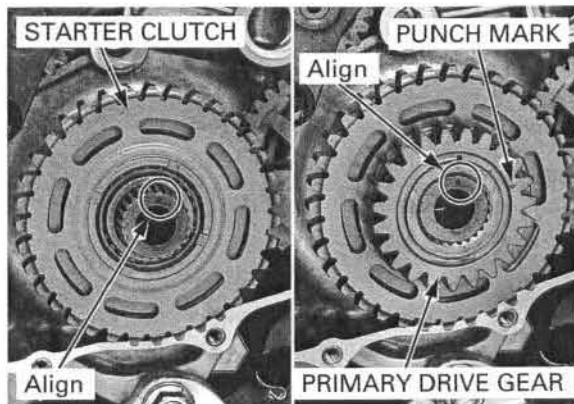
Apply transmission oil to the gear holder bolt threads.

Install the gear holder assembly and bolts. Tighten the bolts to the specified torque.

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



Install the starter clutch while aligning its wide cut-out in the splines with the punch mark on the crankshaft.



*Install the primary drive gear with the punch mark facing out.*

Install the primary drive gear while aligning its wide cut-out in the splines with the punch mark on the crankshaft.

Temporarily install the clutch outer guide, needle bearings and clutch outer.

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

#### TOOL:

**Gear holder, M2.5**

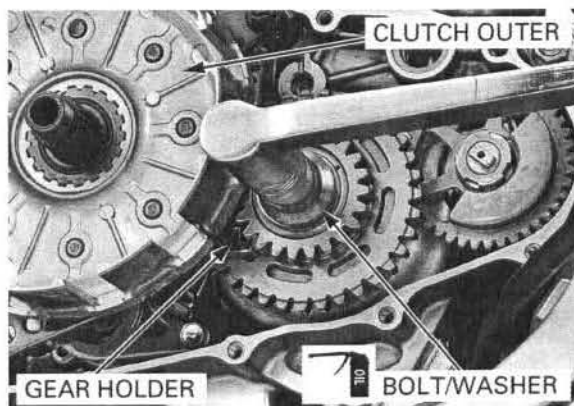
**07724-0010100 or  
07724-001A100  
(U.S.A. only)**

Apply transmission oil to the primary drive gear bolt threads.

Install the washer and tighten the primary drive gear bolt to the specified torque.

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

Remove the clutch outer, needle bearings and clutch outer guide.



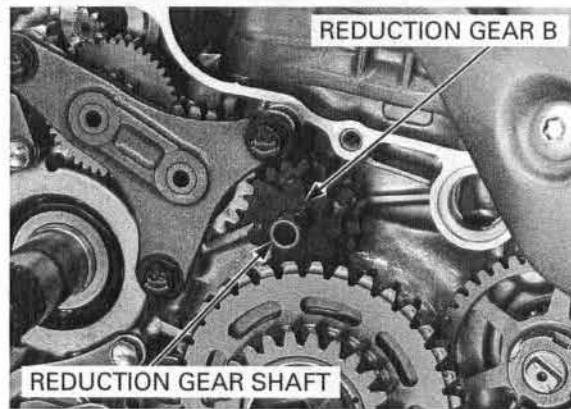


## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Install the reduction gear B and reduction gear shaft securely.

Install the following:

- Clutch (page 11-12)
- Right crankcase cover (page 11-6)



## GEARSHIFT LINKAGE

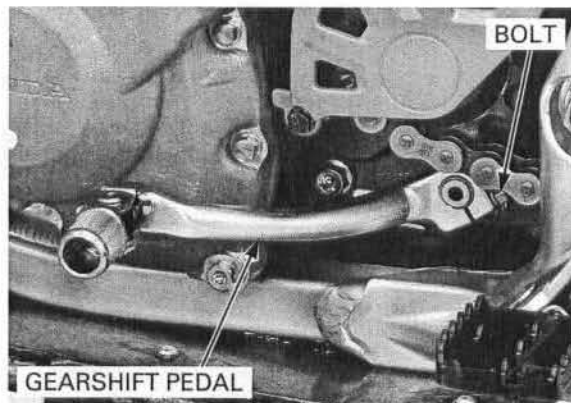
### REMOVAL

Remove the following:

- Right crankcase cover (page 11-5)
- Clutch (page 11-7)

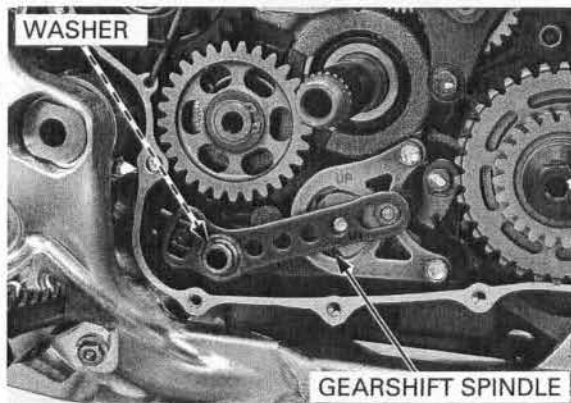
*When removing the gearshift pedal, mark the pedal position to ensure correct reassembly in its original location.*

Remove the bolt and gearshift pedal.



*Before removing the gearshift spindle, clean the gearshift spindle splines at gearshift pedal.*

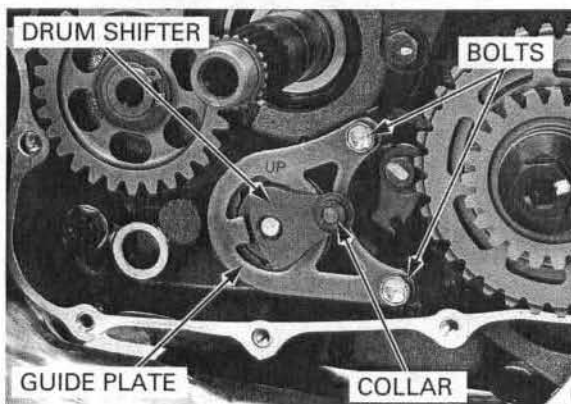
Remove the gearshift spindle and washer from the crankcase.



Remove the shifter collar.

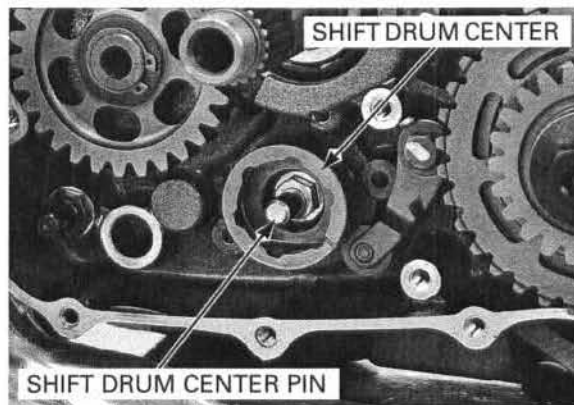
*Do not let the ratchet pawls fall when removing the guide plate and drum shifter.*

Remove the bolts, guide plate and drum shifter as an assembly.



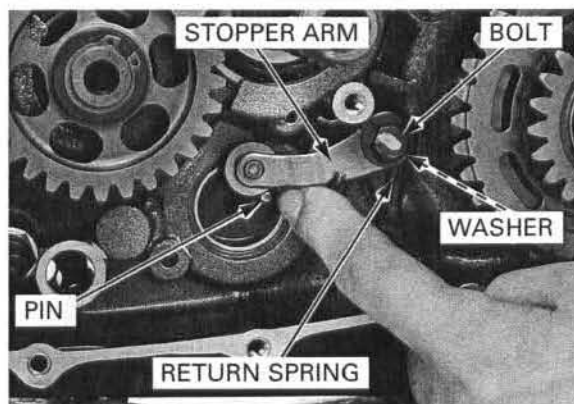
## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Remove the shift drum center pin and shift drum center.



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

Remove the drum pin from the shift drum.

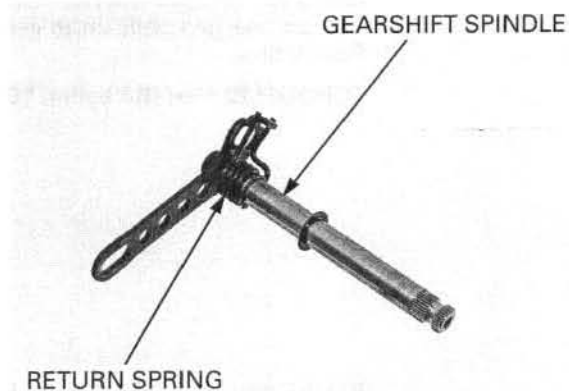


### INSPECTION

#### GEARSHIFT SPINDLE

Check the gearshift spindle for bend, wear or damage.

Check the return spring for fatigue or damage.



#### RATCHET PAWL

Remove the following:

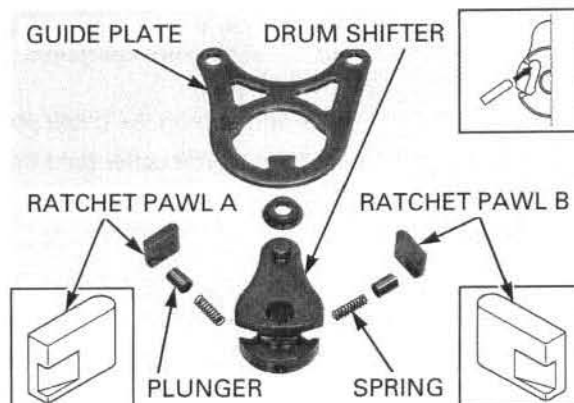
- Guide plate
- Drum shifter
- Ratchet pawls
- Plungers
- Springs

Clean the ratchet pawl A, ratchet pawl B, plungers, springs and drum shifter with clean transmission oil.

Check each part for wear or damage.

Apply clean transmission oil to each parts.

Assemble the drum shifter, springs, plungers, ratchet pawl A and ratchet pawl B in the guide plate as shown.



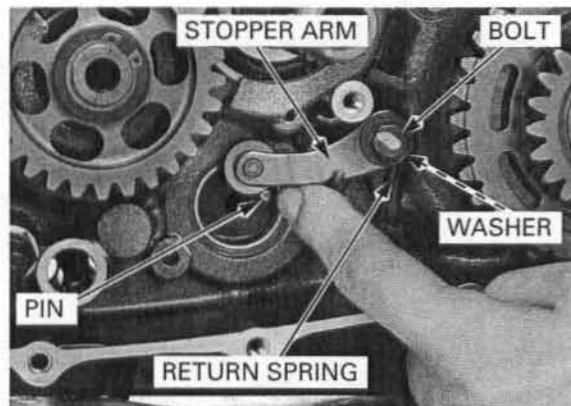
## INSTALLATION

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

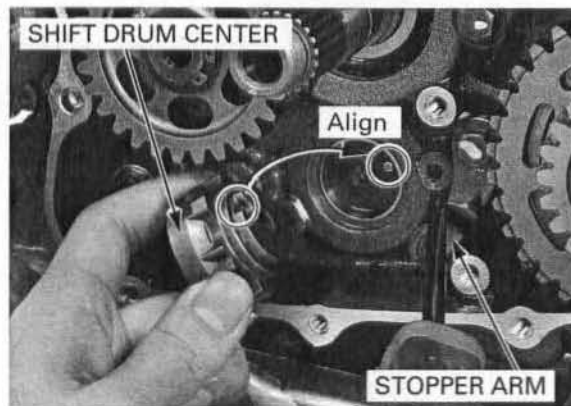
Install the return spring, washer and stopper arm and tighten the gearshift stopper arm bolt to the specified torque.

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

Check the gearshift stopper arm for proper operation.

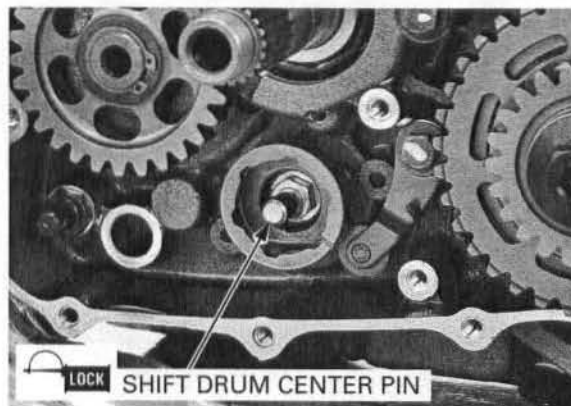


Move the stopper arm out of the way using a screwdriver. Align the shift drum center groove with the drum pin.



Clean and apply locking agent to the gearshift drum center pin threads and then install it. Tighten the gearshift drum center pin to the specified torque.

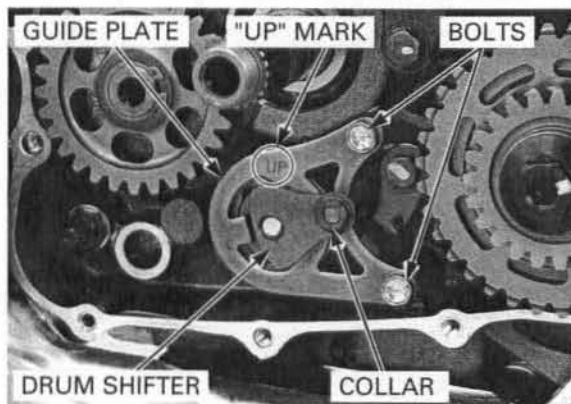
**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Set the drum center in a position other than neutral. While holding the ratchet pawls in place in the guide plate and drum shifter, install the drum shifter assembly by aligning the hole of the drum shifter with the shift drum center pin, and guide plate "UP" mark facing up.

Install and tighten the guide plate bolts.

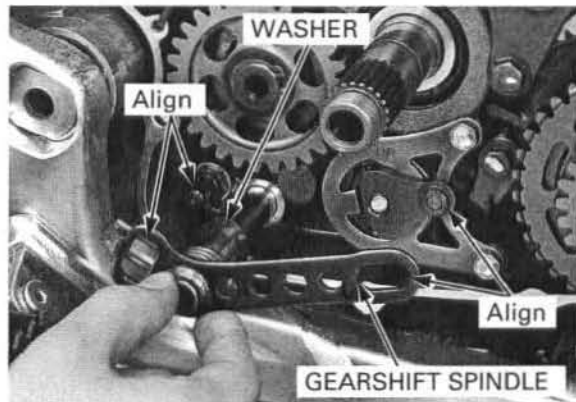
Install the shifter collar onto the drum shifter.



## CLUTCH/STARTER CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

*Do not forget to install the washer onto the gearshift spindle.*

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



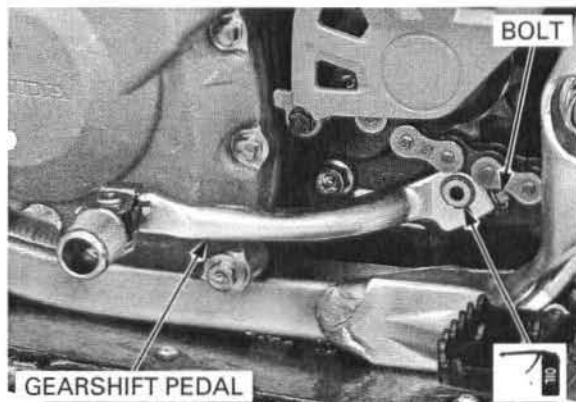
Apply oil to the gearshift spindle serration area. Install the gearshift pedal on its original position as marked during removal. Tighten the bolt to the specified torque.

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

Move the gearshift pedal and check the shift mechanism for smooth operation.

Install the following:

- Clutch (page 11-12)
- Right crankcase cover (page 11-6)



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MEMO

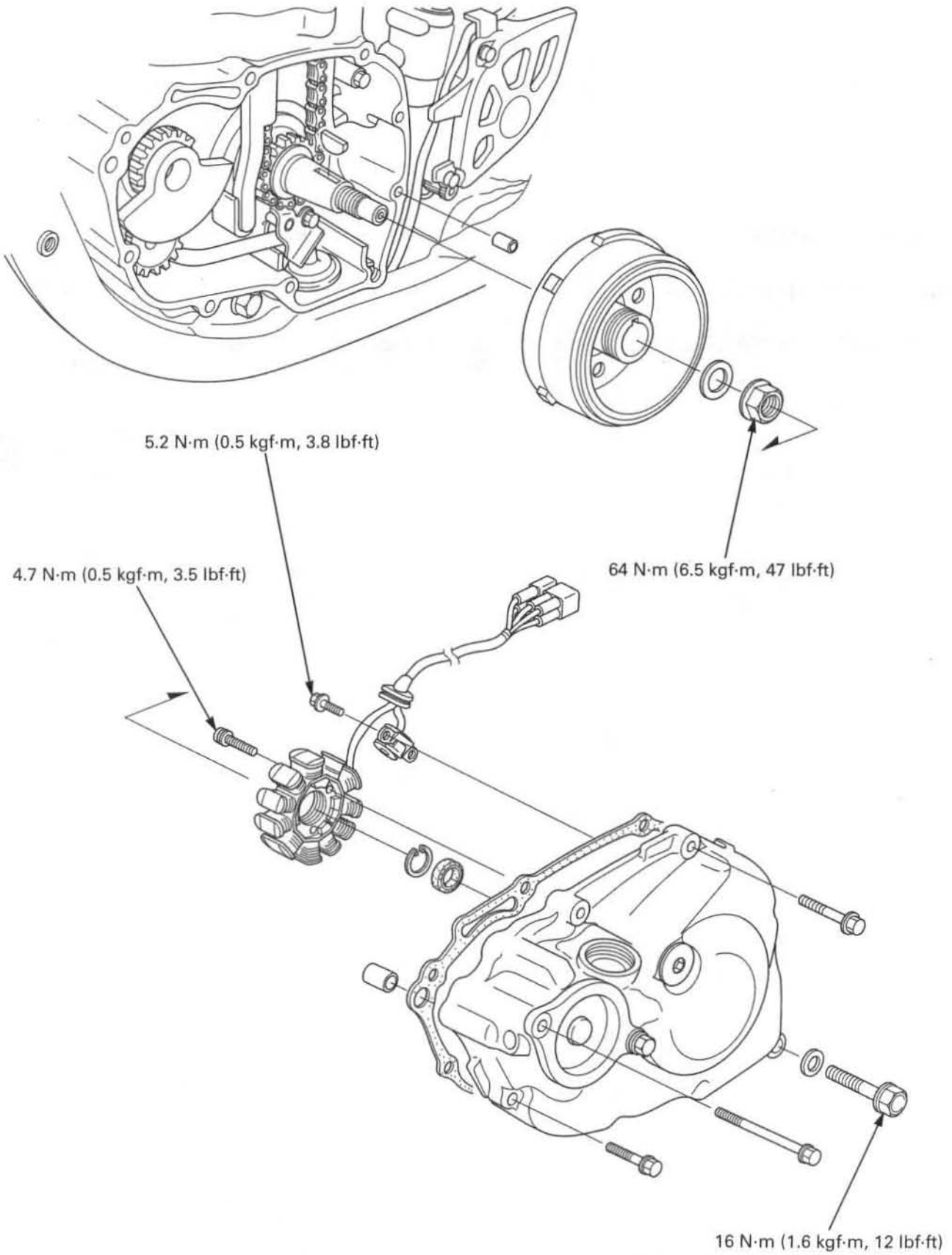
# 12. ALTERNATOR

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COMPONENT LOCATION .....	12-2	STATOR .....	12-5
SERVICE INFORMATION .....	12-3	FLYWHEEL .....	12-5
LEFT CRANKCASE COVER REMOVAL ...	12-4	LEFT CRANKCASE COVER INSTALLATION .....	12-6

# ALTERNATOR

## COMPONENT LOCATION





## SERVICE INFORMATION

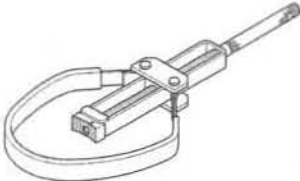
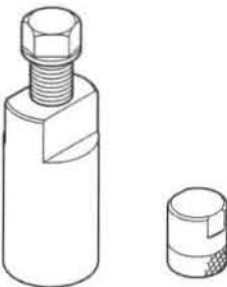
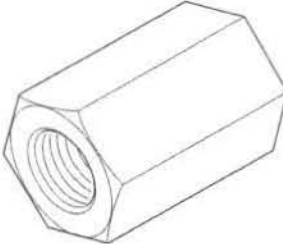

### GENERAL

- This section covers the removal and installation of the alternator stator and flywheel. These services can be done with the engine installed in the frame.
- For alternator stator inspection (page 17-8).

### TORQUE VALUES

Engine oil drain bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply oil to the threads and seating surface
Flywheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply oil to the threads and seating surface
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 bolt	4.7 N·m (0.5 kgf·m, 3.5 lbf·ft)	Apply locking agent to the threads

### TOOLS

<p>Flywheel holder 07725-0040001</p>  <p>or 07AMB-KRNA100</p>	<p>Flywheel puller 070MC-HP10100</p>  <p>or 070MC-HP1A100 (U.S.A. only)</p>	<p>Flywheel puller adaptor 070MG-KSE0100</p> 
<p>Adapter 12 x 1.25 mm 07AMC-MEBA110 (U.S.A. only)</p> 		

## LEFT CRANKCASE COVER REMOVAL

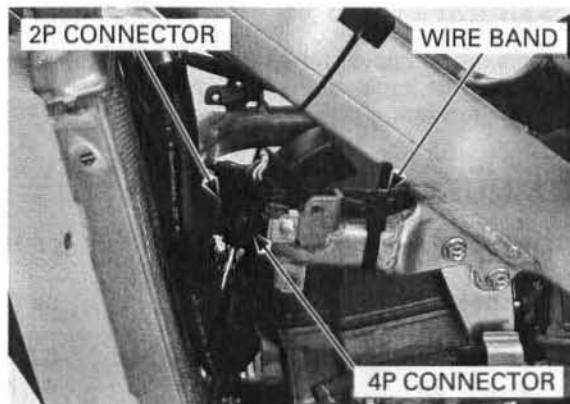
Remove the following:

- Fuel tank (page 3-8)
- Left engine guard (page 3-5)
- Gearshift pedal (page 11-24)

Drain the engine oil (page 4-20).

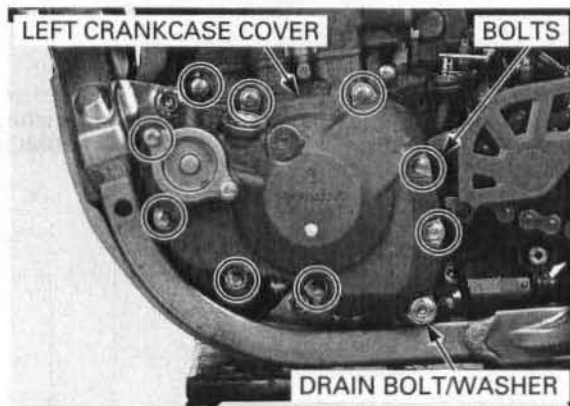
Remove the wire band.

Disconnect the alternator 4P (Black) and ignition pulse generator 2P (Black) connectors.



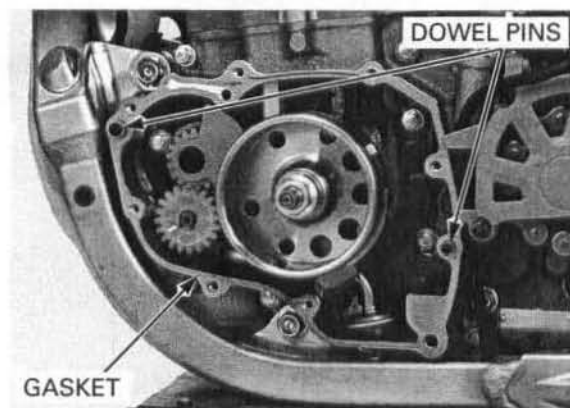
Loosen the engine oil drain bolt and left crankcase cover bolts in a crisscross pattern in two or three steps.

Remove the engine oil drain bolt, sealing washer, left crankcase cover bolts and left crankcase cover.



Remove the gasket and dowel pins.

For left crankcase cover oil seal inspection (page 5-7).



## STATOR

### REMOVAL

Remove the left crankcase cover (page 12-4).

Remove the bolts, ignition pulse generator and grommet from the left crankcase cover.

Remove the bolts 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 and stator mounting bolt threads.

Tighten the ignition pulse generator and stator mounting bolts to the specified torque.

### TORQUE:

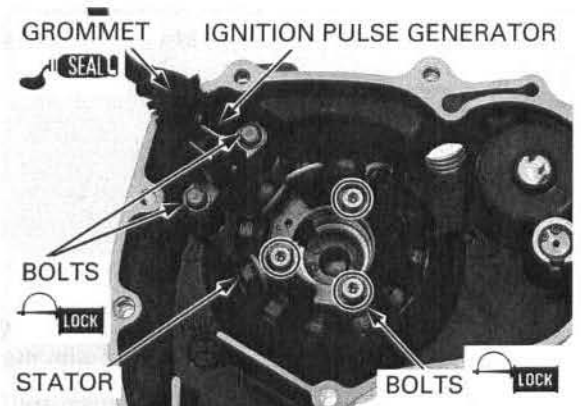
**Ignition pulse generator mounting bolt:**

5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)

**Stator mounting bolt:**

4.7 N·m (0.5 kgf·m, 3.5 lbf·ft)

Install the left crankcase cover (page 12-6).



## FLYWHEEL

### REMOVAL

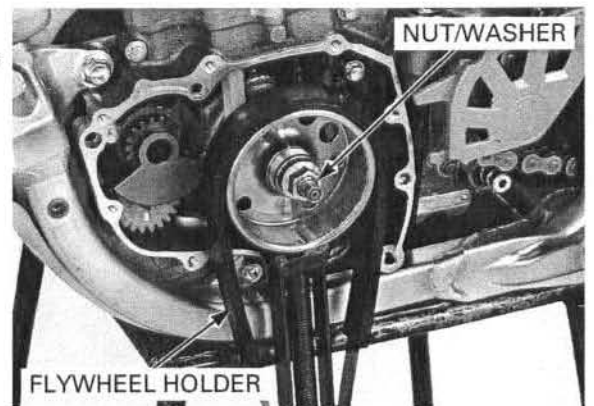
Remove the left crankcase cover (page 12-4).

Hold the flywheel with the special tool and remove the nut and washer.

### TOOL:

Flywheel holder

07725-0040001 or  
07AMB-KRNA100



Remove the flywheel using the special tools.

### TOOLS:

Flywheel puller

070MC-HP10100 and  
070MG-KSE0100

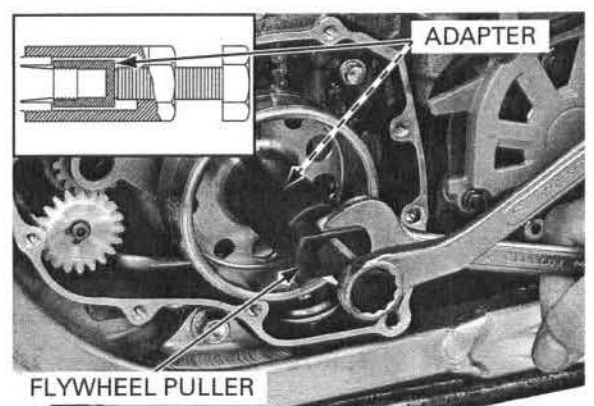
Flywheel puller adapter

### U.S.A. TOOLS:

Flywheel puller

070MC-HP1A100 and  
07AMC-MEBA110

Adapter 12 x 1.25 mm

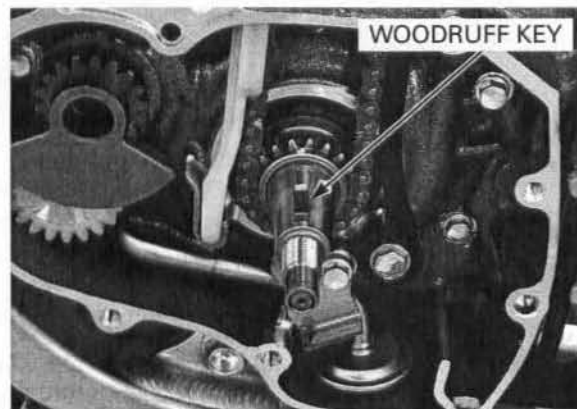


## ALTERNATOR

Remove the woodruff key.

### INSTALLATION

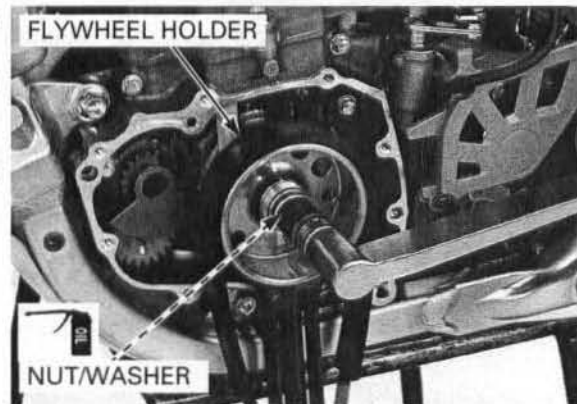
Wipe any oil off the mating surface of the flywheel.  
Install the woodruff key into the crankshaft groove.



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:

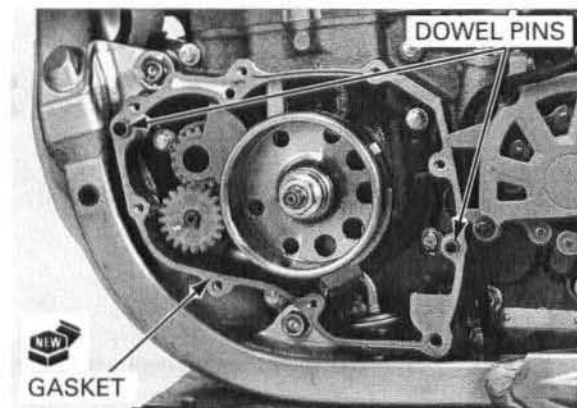
Flywheel holder                      07725-0040001 or  
    07AMB-KRNA100

**TORQUE:** 64 N·m (6.5 kgf·m, 47 lbf·ft)

Install the left crankcase cover (page 12-6).

## LEFT CRANKCASE COVER INSTALLATION

Install a new gasket and dowel pins.

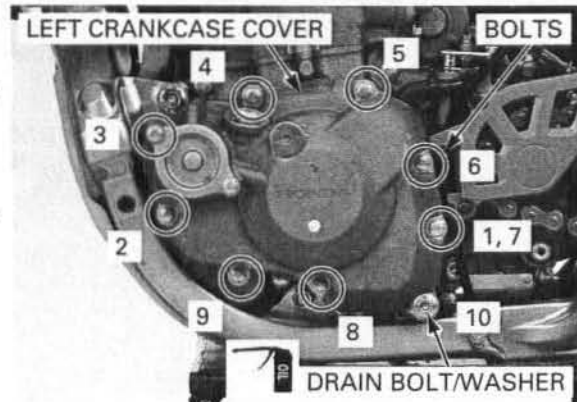


Apply oil to the engine oil drain bolt threads and seating surface.

Install the left crankcase cover and bolts.  
Tighten the left crankcase cover bolts in the order as shown in the illustration.

- First tighten the No.1 bolt temporarily.
- Tighten the No.2 – No.9 bolts securely.
- Tighten the engine oil drain bolt (No.10) to the specified torque with a new sealing washer.

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



Connect the ignition pulse generator 2P (Black) and alternator 4P (Black) connectors.

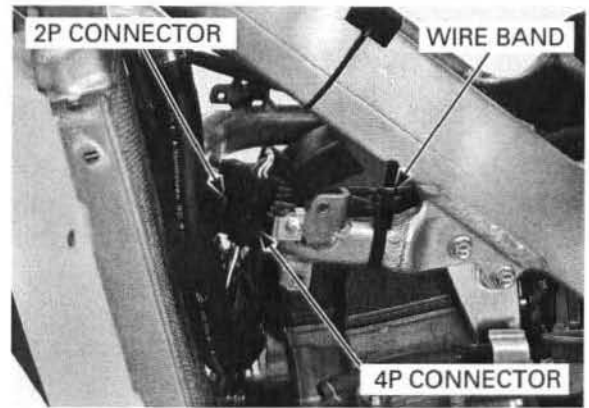
*Route the wires properly ('05 - '07: page 1-25, After '07: page 1-32).*

Install the wire band.

Install the following:

- Gearshift pedal (page 11-27)
- Left engine guard (page 3-5)
- Fuel tank (page 3-8)

Fill the engine with the recommended engine oil (page 4-20).



---

**MEMO**

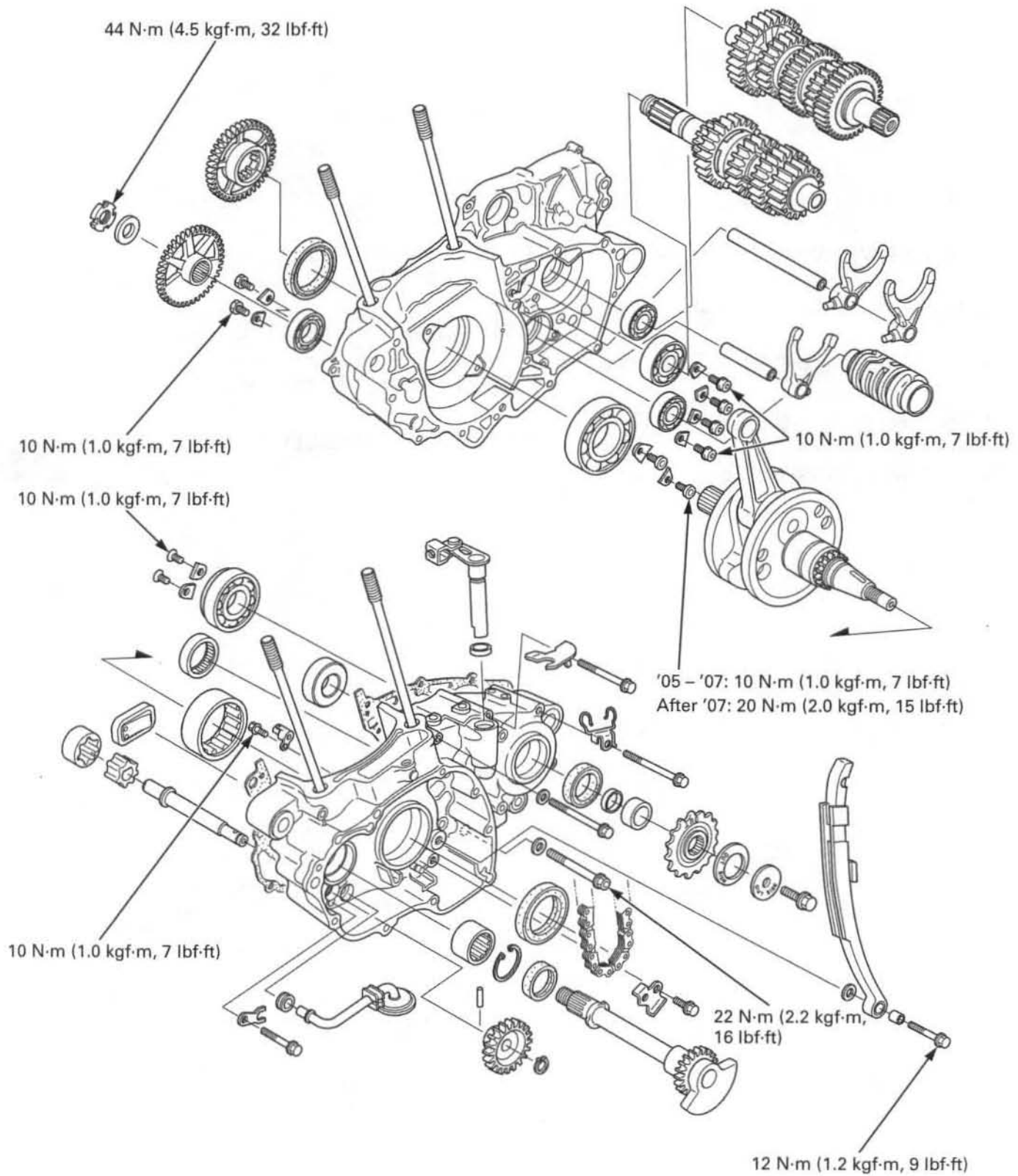
# 13. CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

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COMPONENT LOCATION .....	13-2	CRANKSHAFT REMOVAL .....	13-14
SERVICE INFORMATION .....	13-3	CRANKCASE BEARING REPLACEMENT .....	13-16
TROUBLESHOOTING .....	13-7	CRANKSHAFT INSTALLATION .....	13-21
BALANCER GEAR/BALANCER.....	13-8	TRANSMISSION ASSEMBLY .....	13-22
CRANKCASE SEPARATION.....	13-10	CRANKCASE ASSEMBLY.....	13-25
TRANSMISSION DISASSEMBLY .....	13-11		



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.
  - Clutch (page 11-7)/stator clutch(page 11-19)/kickstarter (page 11-15)/gearshift linkage (page 11-24)
  - Cylinder head (page 9-24)
  - Cylinder (page 10-5)/piston (page 10-6)
  - Engine (page 8-5)
  - Flywheel (page 12-5)
  - Oil pump drive gear/drive pin (page 5-7)
  - Starter motor (page 19-6)
  - Drive sprocket (page 8-4)

## SPECIFICATIONS ('05 - '07)

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Side clearance	0.30 - 0.75 (0.012 - 0.030)	0.75 (0.030)	
	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	28.007 - 28.028 (1.1026 - 1.1035)	28.05 (1.104)
		M5	25.020 - 25.041 (0.9850 - 0.9859)	25.07 (0.987)
		C1	22.007 - 22.028 (0.8664 - 0.8672)	22.04 (0.868)
		C2	30.020 - 30.041 (1.1819 - 1.1827)	30.07 (1.184)
		C3	25.020 - 25.041 (0.9850 - 0.9859)	25.07 (0.987)
	Bushing O.D.	M4	27.959 - 27.980 (1.1007 - 1.1016)	27.94 (1.100)
		C2	29.979 - 30.000 (1.1803 - 1.1811)	29.95 (1.179)
	Bushing I.D.	C2	27.000 - 27.021 (1.0630 - 1.0638)	27.04 (1.065)
	Gear-to-bushing clearance	M4	0.027 - 0.069 (0.0011 - 0.0027)	0.11 (0.004)
		C2	0.020 - 0.062 (0.0008 - 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	24.959 - 24.980 (0.9826 - 0.9835)	24.94 (0.982)
	Countershaft O.D.	C1 bearing	18.987 - 19.000 (0.7475 - 0.7480)	18.94 (0.746)
		C2 bushing	26.959 - 26.980 (1.0614 - 1.0622)	26.94 (1.061)
		C3	24.959 - 24.980 (0.9826 - 0.9835)	24.96 (0.983)
	Gear-to-shaft clearance	M5	0.040 - 0.082 (0.0016 - 0.0032)	0.13 (0.005)
C3		0.040 - 0.082 (0.0016 - 0.0032)	0.082 (0.0032)	
Bushing-to-shaft clearance	C2	0.020 - 0.062 (0.0008 - 0.0024)	0.12 (0.005)	
Shift fork, shift fork shaft	Fork claw thickness	4.93 - 5.00 (0.194 - 0.197)	4.8 (0.19)	
	Shift fork I.D.	C	10.989 - 11.011 (0.4326 - 0.4335)	11.011 (0.4335)
		R, L	12.035 - 12.056 (0.4738 - 0.4746)	12.070 (0.4752)
	Fork shaft O.D.	C	10.969 - 10.980 (0.4319 - 0.4323)	10.969 (0.4318)
R, L		11.966 - 11.984 (0.4711 - 0.4718)	11.950 (0.4705)	

# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

## SPECIFICATIONS (After '07)


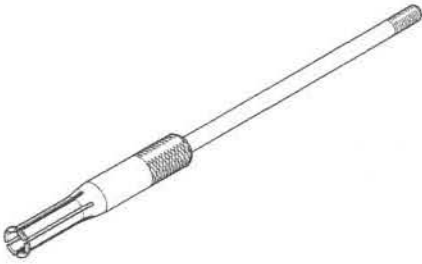
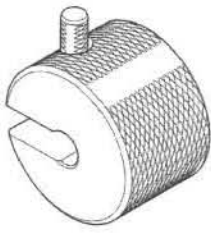
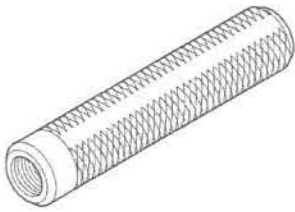
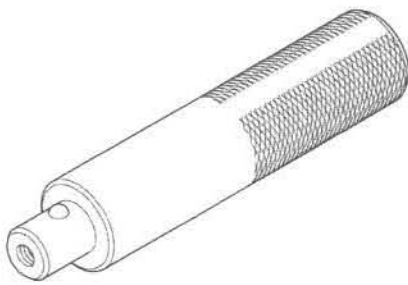
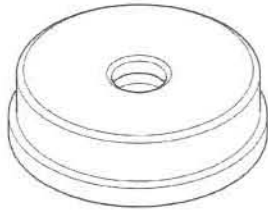
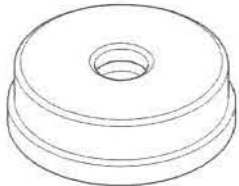
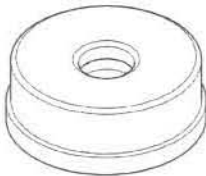

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Side clearance	0.30 – 0.75 (0.012 – 0.030)	0.75 (0.030)	
	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	28.007 – 28.028 (1.1026 – 1.1035)	28.05 (1.104)
		M5	28.020 – 28.033 (1.1031 – 1.1037)	28.07 (1.105)
		C1	22.007 – 22.028 (0.8664 – 0.8672)	22.04 (0.868)
		C2	30.020 – 30.041 (1.1819 – 1.1827)	30.07 (1.184)
		C3	28.020 – 28.041 (1.1031 – 1.1040)	28.07 (1.105)
	Bushing O.D.	M4	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	29.979 – 30.000 (1.1803 – 1.1811)	29.95 (1.179)
		C3	27.979 – 28.000 (1.1015 – 1.1024)	27.95 (1.100)
	Bushing I.D.	M5	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.9858)
		C2	27.000 – 27.021 (1.0630 – 1.0638)	27.04 (1.065)
		C3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.9858)
	Gear-to-bushing clearance	M4	0.027 – 0.069 (0.0011 – 0.0027)	0.11 (0.004)
		M5	0.040 – 0.074 (0.0016 – 0.0029)	0.12 (0.005)
		C3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
		C2	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	C1 bearing	18.987 – 19.000 (0.7475 – 0.7480)	18.94 (0.746)
		C2 bushing	26.959 – 26.980 (1.0614 – 1.0622)	26.94 (1.061)
C3 bushing		24.959 – 24.980 (0.9826 – 0.9835)	24.96 (0.983)	
Bushing-to-shaft clearance	M5, C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)	
Shift fork, shift fork shaft	Fork claw thickness	4.93 – 5.00 (0.194 – 0.197)	4.8 (0.19)	
	Shift fork I.D.	C	10.989 – 11.011 (0.4326 – 0.4335)	11.011 (0.4335)
		R, L	12.035 – 12.056 (0.4738 – 0.4746)	12.070 (0.4752)
	Fork shaft O.D.	C	10.969 – 10.980 (0.4319 – 0.4323)	10.969 (0.4318)
		R, L	11.966 – 11.984 (0.4711 – 0.4718)	11.950 (0.4705)







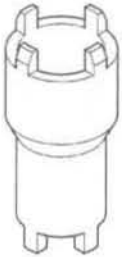
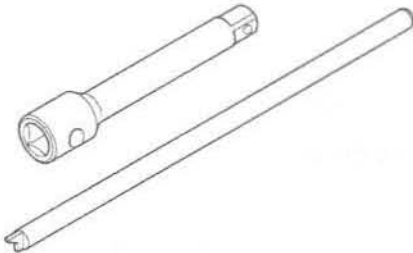
**TORQUE VALUES**

Crankshaft bearing set plate torx screw			
	('05 - '07)	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads (Pro Honda Hondalock 3 or equivalent high strength locking agent)
	(After '07)	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads (Pro Honda Hondalock 3 or equivalent high strength locking agent)
Balancer shaft bearing set plate bolt		10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Countershaft bearing set plate screw		10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Gearshift 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
Balancer shaft nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	Apply oil to the threads
Cam chain tensioner bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Transmission oil drain bolt		16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply oil to the threads and seating surface

**TOOLS**

<p>Bearing remover set, 17 mm 07936-3710300</p> 	<p>Bearing remover set, 20 mm 07936-3710600</p> 	<p>Remover weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only)</p>
<p>Bearing remover handle 07936-3710100</p> 	<p>Driver 07749-0010000</p> 	<p>Attachment, 72 x 75 mm 07746-0010600</p> 
<p>Attachment, 62 x 68 mm 07746-0010500</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 	<p>Attachment, 37 x 40 mm 07746-0010200</p> 

# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Pilot, 20 mm 07746-0040500</p> 	<p>Pilot, 30 mm 07746-0040700</p> 
<p>Pilot, 17 mm 07746-0040400</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>Lock nut wrench, 20 x 24 mm 07716-0020100</p> 	<p>Extension bar 07716-0020500</p>  <p>or equivalent commercially available in U.S.A.</p>	

## TROUBLESHOOTING

### Excessive noise

- Worn crankshaft bearings
- Worn or damaged connecting rod big end
- Worn or damaged 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

Remove the following:

- Right crankcase cover (page 11-5)
- Left crankcase cover (page 12-4)
- Clutch (page 11-7)
- Starter clutch (page 11-19)

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 using the special tools.

#### TOOLS:

**Lock nut wrench, 20 x 24 mm 07716-0020100**

**Extension bar**

**07716-0020500 or  
commercially available equivalent  
(U.S.A. only)**

Remove the balancer drive and driven gears.

Turn the balancer shaft as shown and remove it.

### INSPECTION

Check the balancer shaft for wear, damage or excessive scratches.

Check the balancer shaft gear for wear or damage.

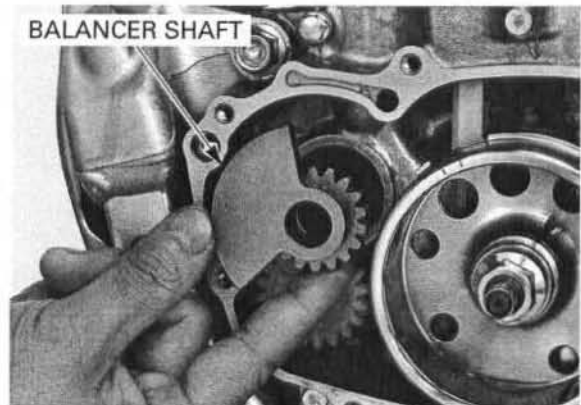
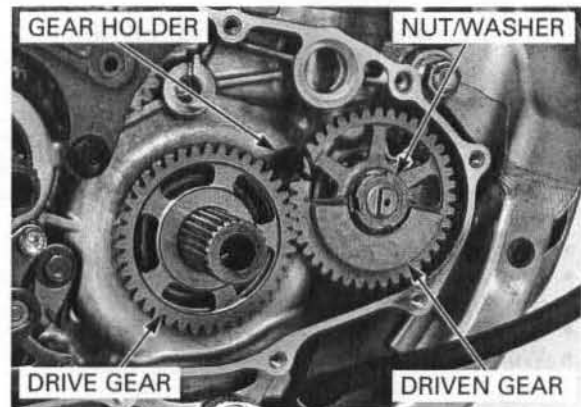
Check the balancer drive/driven gear for wear or damage.

### INSTALLATION

*Engage the balancer shaft gear portion with the oil pump driven gear.*

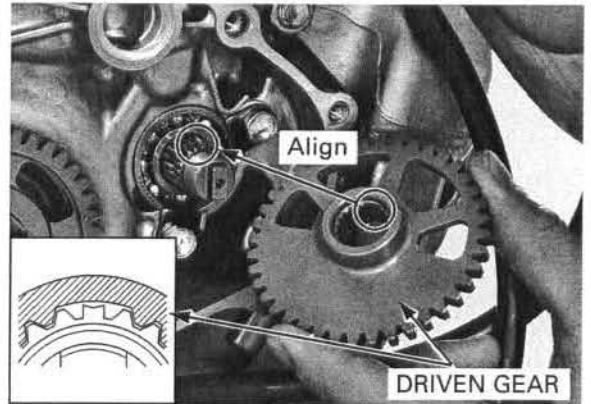
Install the balancer shaft into the crankcase as shown.

Install the balancer drive gear while aligning its wide cut-out in the splines with the punch mark on the crankshaft.

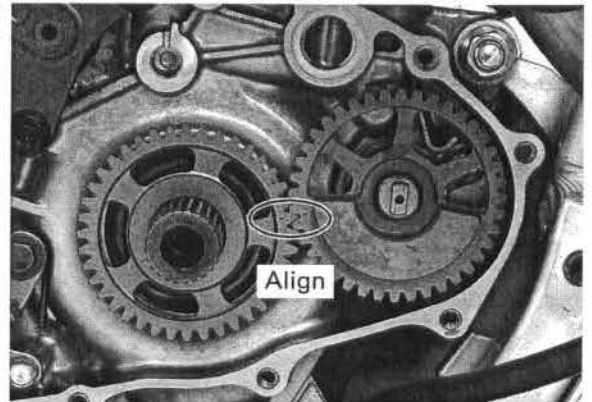




Install the balancer driven gear to the balancer shaft while aligning its wide cut-out with the clinched tooth of the balancer shaft.



Align the punch mark of the driven gear with the punch mark of the drive gear by turning the balancer shaft.



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

**TOOL:**

**Gear holder, M1.5**

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

Apply transmission oil to the balancer shaft nut threads.

Install the washer and balancer shaft nut. Tighten the balancer shaft nut to the specified torque using the special tools.

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

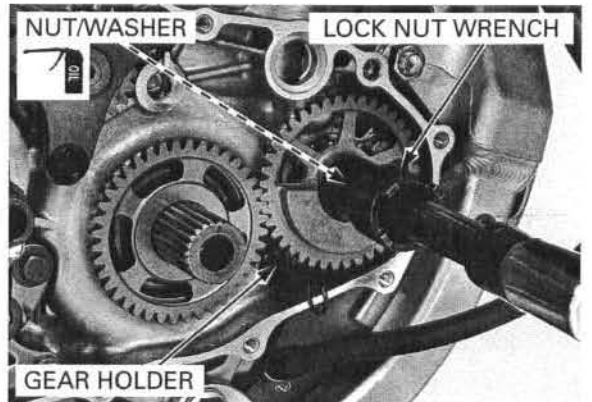
**TOOLS:**

**Lock nut wrench, 20 x 24 mm**    **07716-0020100**

**Extension bar**    **07716-0020500**

Install the following:

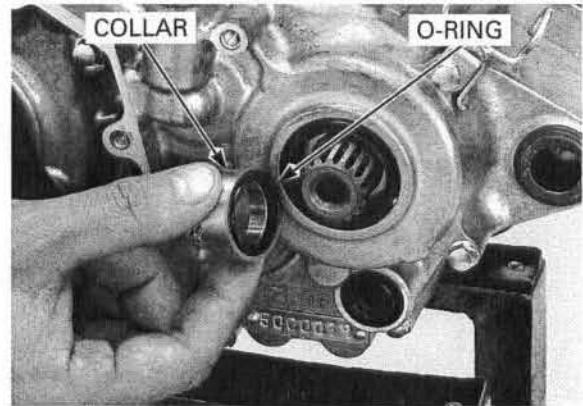
- Starter clutch (page 11-23)
- Clutch (page 11-12)
- Left crankcase cover (page 12-6)
- Right crankcase cover (page 11-6)



## CRANKCASE SEPARATION

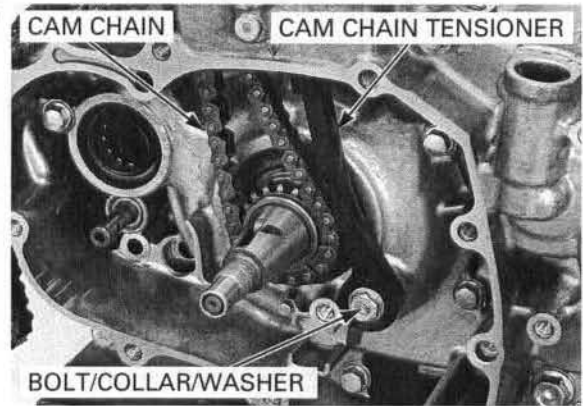
Refer to service information (page 13-3) for removal of necessary parts before separating the crankcase.

Remove the collar and O-ring.



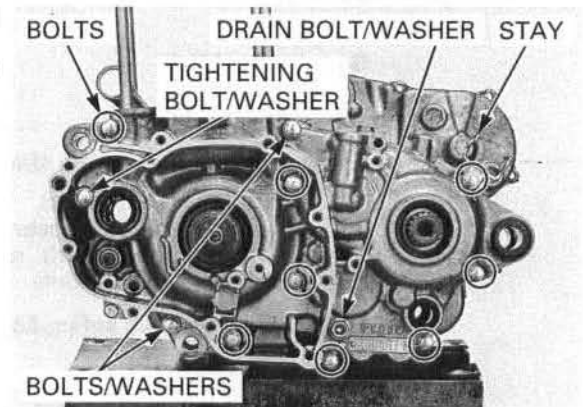
Remove the bolt, collar, washer and cam chain tensioner.

Remove the cam chain from the crankshaft.

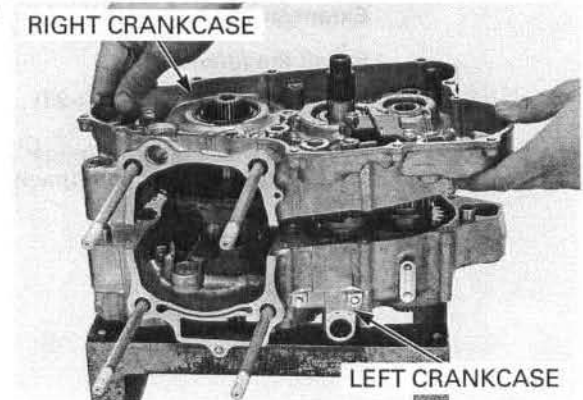


Remove the transmission oil drain bolt and sealing washer.

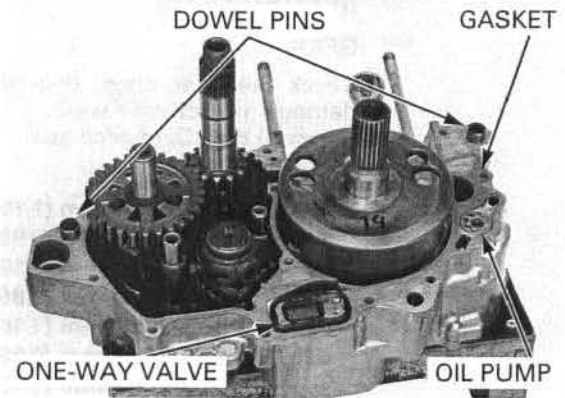
Loosen the crankcase bolts and tightening bolt in a crisscross pattern in two or three steps.  
Remove the crankcase bolts, washers and stay.



Place the left crankcase facing down and separate the left and right crankcase halves.

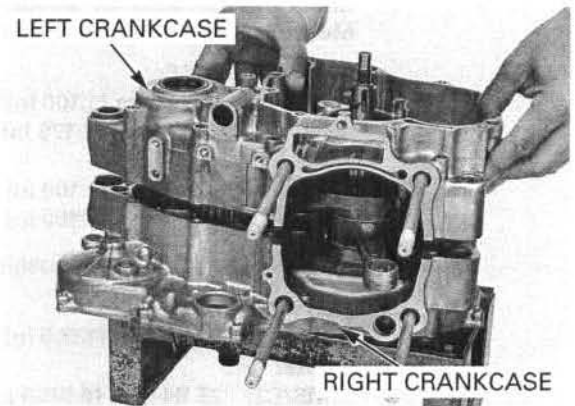


Remove the oil pump inner/outer rotors and shaft.  
Remove the one-way valve.  
Remove the dowel pins and gasket.

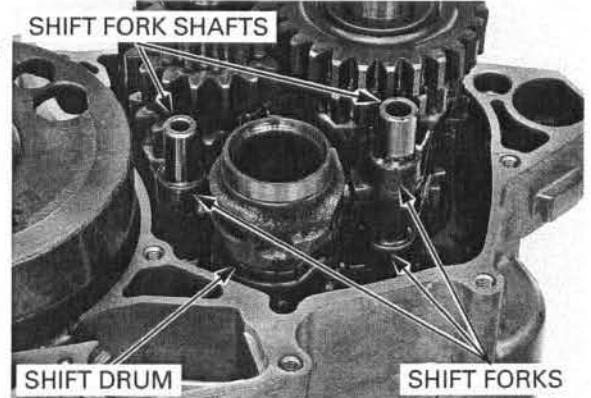


## TRANSMISSION DISASSEMBLY

Separate the crankcase halves (page 13-10).  
Temporarily install the right crankcase.  
Place the right crankcase facing down and separate the right and left crankcase halves.



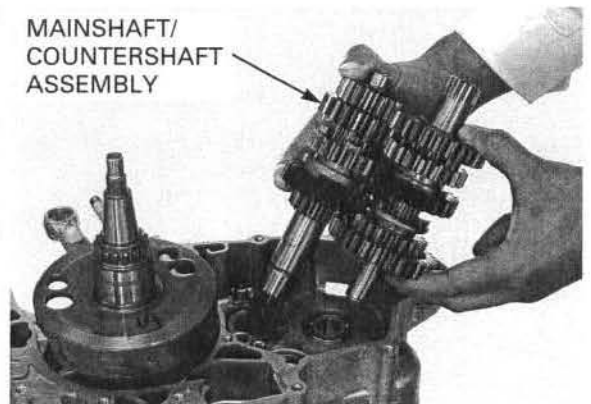
Remove the shift fork shafts.  
Remove the shift fork guide pins from the shift drum grooves and remove the shift drum.  
Remove the shift forks.



Remove the mainshaft and countershaft as an assembly from the right crankcase.

### Disassemble the transmission:

- Keep track of the disassembled parts (gears, bushings, washers, and rings) by sliding them onto a tool or a piece of wire.
- Do not remove the snap rings over the shafts. Expand the snap ring ends and slide the snap ring off the shaft, along with the gear behind it.



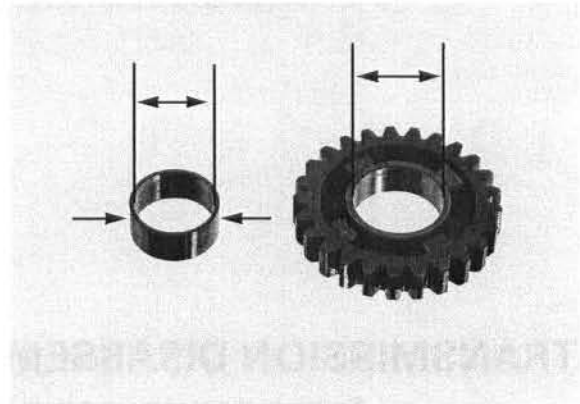
## INSPECTION

### GEAR

Check the gear dogs, dog holders and teeth for damage or excessive wear.  
Measure the I.D. of each gear.

#### SERVICE LIMITS:

M4:	28.05 mm (1.104 in)
M5: '05 - '07:	25.07 mm (0.987 in)
After '07:	28.07 mm (1.105 in)
C1:	22.04 mm (0.868 in)
C2:	30.07 mm (1.184 in)
C3: '05 - '07:	25.07 mm (0.987 in)
After '07:	28.07 mm (1.105 in)



### BUSHING

Check the bushings for damage or excessive wear.  
Measure the O.D. of each bushing.

#### SERVICE LIMITS:

M4:	27.94 mm (1.100 in)
C2:	29.95 mm (1.179 in)
After '07:	
M5:	27.94 mm (1.100 in)
C3:	27.95 mm (1.100 in)

Measure the I.D. of each bushing.

#### SERVICE LIMITS:

C2:	27.04 mm (1.065 in)
After '07:	
M5/C3:	25.04 mm (0.9858 in)

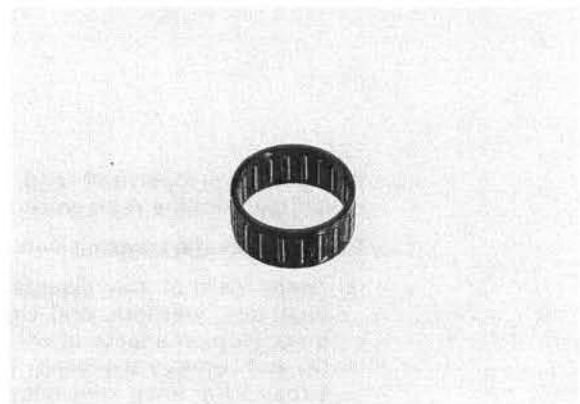
Measure the gear to bushing clearance.

#### SERVICE LIMITS:

M4:	0.11 mm (0.004 in)
C2:	0.12 mm (0.005 in)
After '07:	
M5/C3:	0.12 mm (0.005 in)

### NEEDLE BEARING

Check the C1 gear needle bearing for damage.  
Replace it if necessary.



**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:**

<b>Mainshaft:</b>	<b>M5:</b>	<b>24.94 mm (0.982 in)</b>
<b>Countershaft:</b>	<b>C1 bearing:</b>	<b>18.94 mm (0.746 in)</b>
	<b>C2 bushing:</b>	<b>26.94 mm (1.061 in)</b>
	<b>C3:</b>	<b>24.96 mm (0.983 in)</b>

'05 - '07: Measure the gear to shaft clearance.

**SERVICE LIMITS:**

<b>M5:</b>	<b>0.13 mm (0.005 in)</b>
<b>C3:</b>	<b>0.082 mm (0.0032 in)</b>

Measure the bushing to shaft clearance.

**SERVICE LIMITS:**

<b>C2:</b>	<b>0.12 mm (0.005 in)</b>
<b>After '07:</b>	
<b>M5/C3:</b>	<b>0.12 mm (0.005 in)</b>

**SHIFT FORK**

Check the shift fork for abnormal wear or deformation.

Measure the shift fork I.D. and claw thickness.

**SERVICE LIMITS:**

<b>I.D.: Center:</b>	<b>11.011 mm (0.4335 in)</b>
<b>Right and left:</b>	<b>12.070 mm (0.4752 in)</b>
<b>Claw thickness:</b>	<b>4.8 mm (0.19 in)</b>

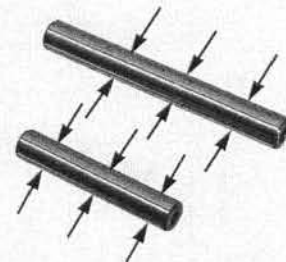
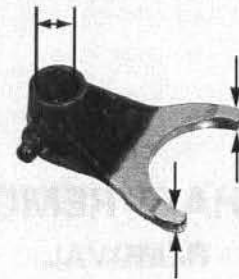
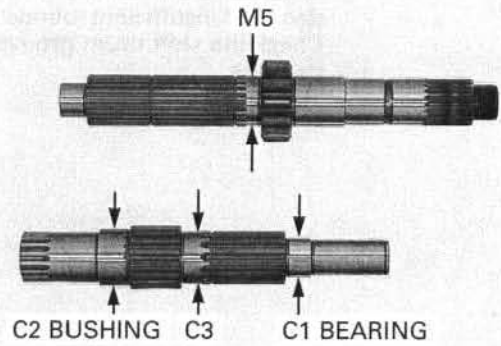
**SHIFT FORK SHAFT**

Check the shift fork shaft for abnormal wear or deformation.

Measure the shift fork shaft O.D.

**SERVICE LIMITS:**

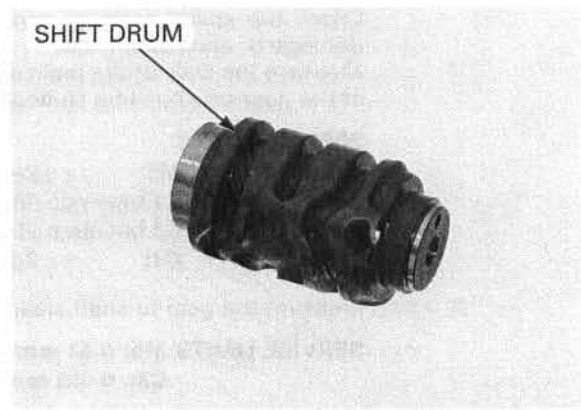
<b>Center:</b>	<b>10.969 mm (0.4318 in)</b>
<b>Right and left:</b>	<b>11.950 mm (0.4705 in)</b>



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

### SHIFT DRUM

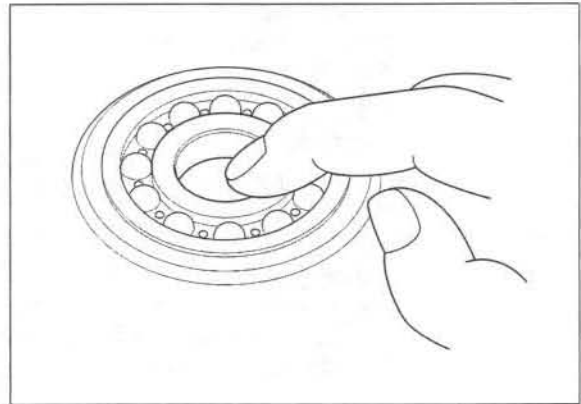
Inspect the shift drum for scoring, scratches or evidence of insufficient lubrication. Check the shift drum grooves for abnormal wear or damage.



### 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 inner race does not turn smoothly and quietly, or if the outer race fits loosely in the crankcase (page 13-18).



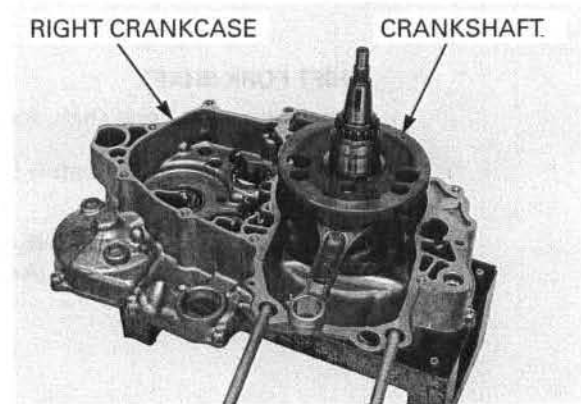
## CRANKSHAFT REMOVAL

### REMOVAL

Separate the crankcase (page 13-10).  
Remove the transmission (page 13-11).

*The crankshaft can be removed with the transmission installed.*

Remove the crankshaft from the right crankcase.

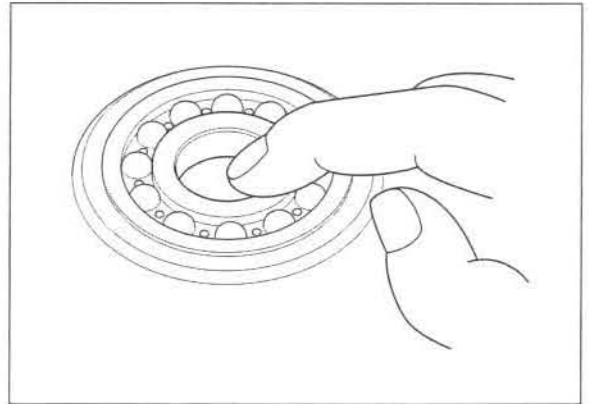




## INSPECTION

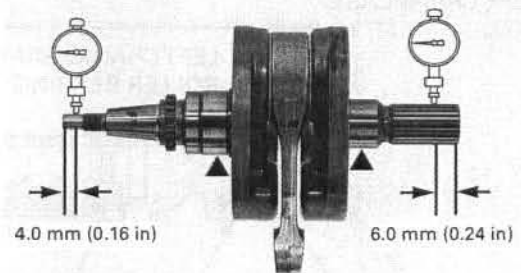
Turn the inner race of the crankshaft bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that the bearing outer race fits tightly in the crankcase.

Replace any bearing if the race does not turn smoothly, quietly, or if the outer race fits loosely in the crankcase (page 13-16).



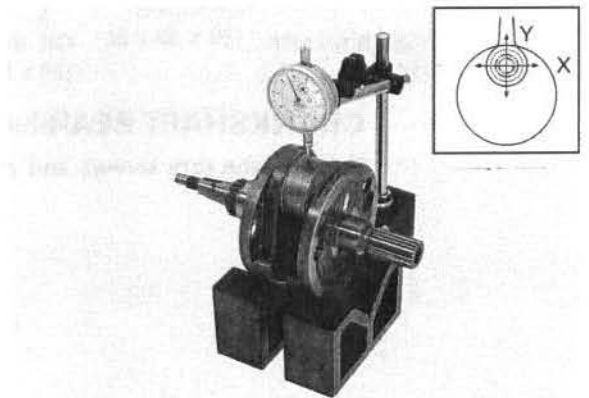
Place the crankshaft on a stand or V-blocks.  
Set the dial indicator on the main journal as shown.  
Rotate the crankshaft two revolutions (720°) and read the runout.

**SERVICE LIMITS: L: 0.05 mm (0.002 in)**  
**R: 0.03 mm (0.001 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.

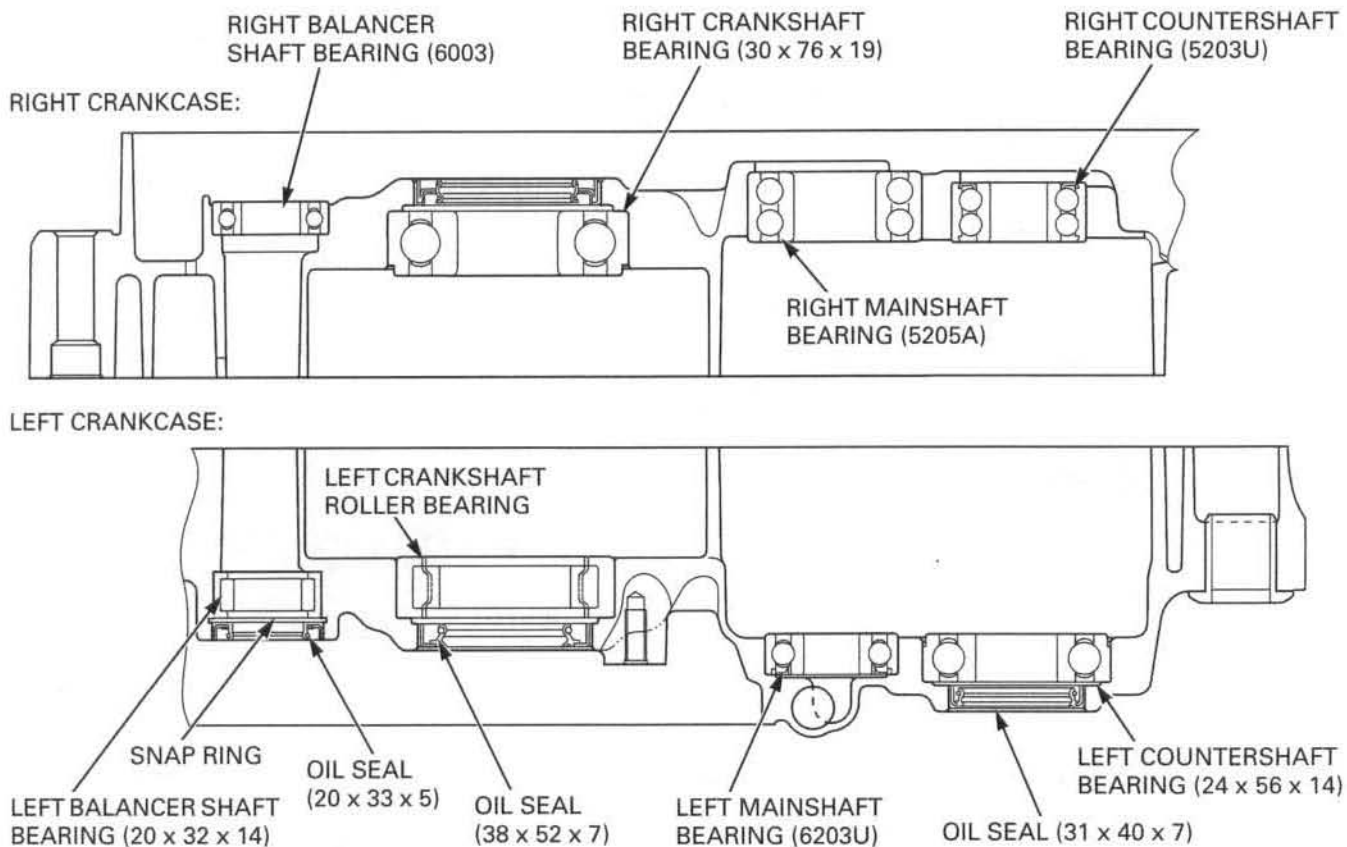
**SERVICE LIMIT: 0.75 mm (0.030 in)**





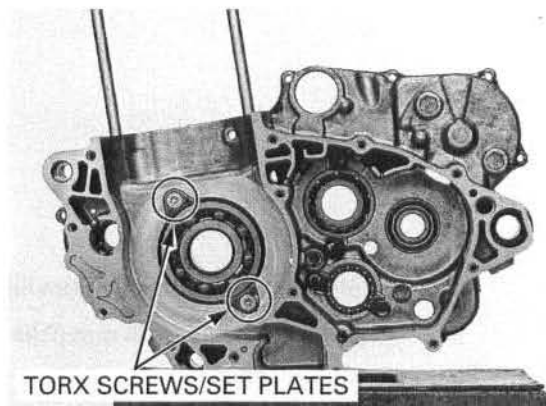
# CRANKCASE BEARING REPLACEMENT

## CRANKCASE BEARING/OIL SEAL LOCATION

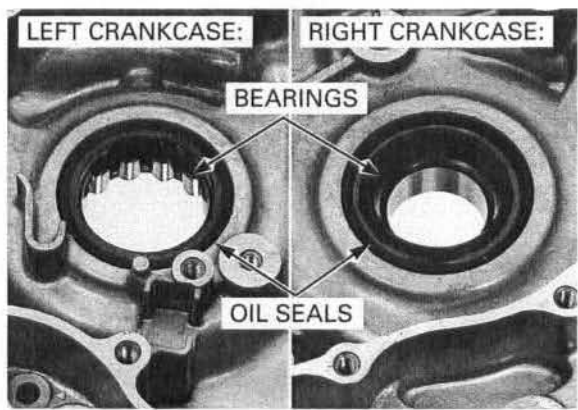


## CRANKSHAFT BEARING

Remove the torx screws and right crankshaft bearing set plates.



Remove the crankshaft oil seals and bearings from both crankcase halves.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

*Drive in new bearings squarely with the marking side facing toward the inside of the crankcase.*

Drive new crankshaft bearings into both crankcase halves using the special tools.

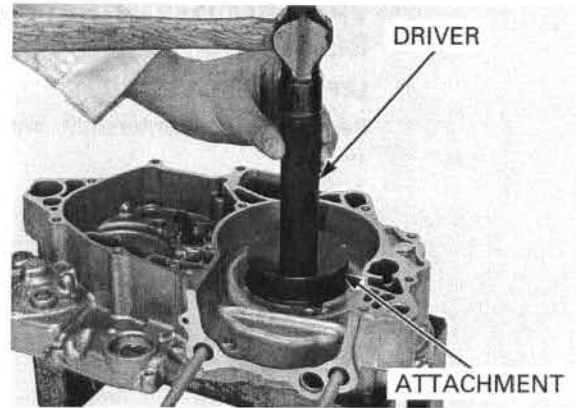
**TOOLS:**

**Left crankshaft bearing:**

**Driver** 07749-0010000  
**Attachment, 62 x 68 mm** 07746-0010500

**Right crankshaft bearing:**

**Driver** 07749-0010000  
**Attachment, 72 x 75 mm** 07746-0010600  
**Pilot, 30 mm** 07746-0040700



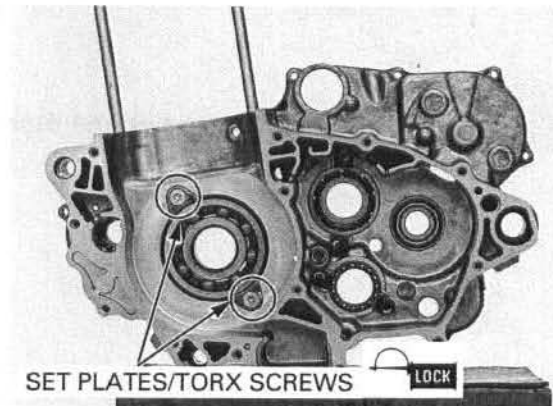
Clean and apply locking agent to the set plate torx screws.

**NOTE:**

Use Pro Honda Hondalock 3 or equivalent high strength locking agent.

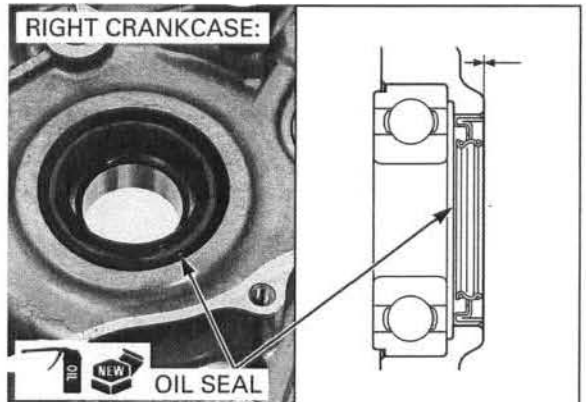
Install the torx screws with the set plates and tighten to the specified torque.

**TORQUE: '05 - '07: 10 N·m (1.0 kgf·m, 7 lbf·ft)**  
**After '07: 20 N·m (2.0 kgf·m, 15 lbf·ft)**



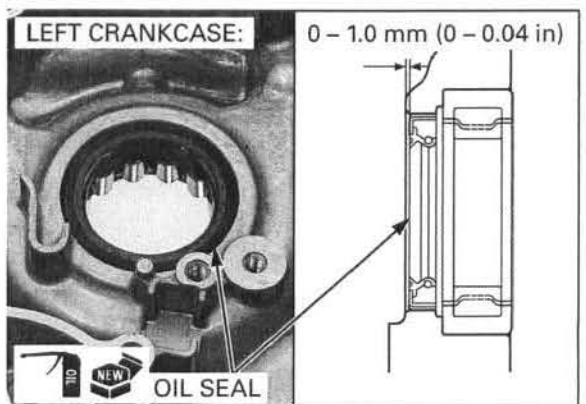
Apply transmission oil to a new right crankshaft oil seal outer surface.

Install a new right crankshaft oil seal to the crankcase until it is flush with the crankcase surface.



Apply transmission oil to a new left crankshaft oil seal outer surface.

Install a new left crankshaft oil seal to the specified depth below the crankcase surface as shown.

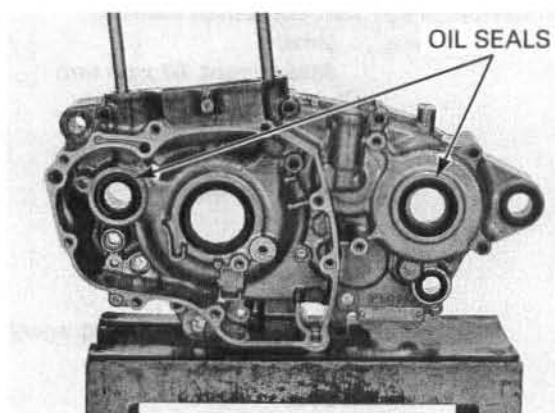


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

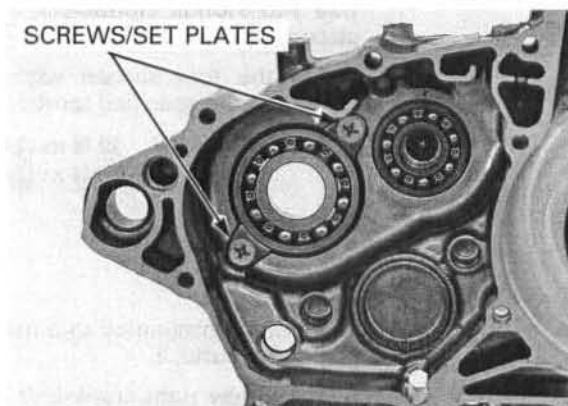
### TRANSMISSION/BALANCER BEARINGS

#### LEFT CRANKCASE

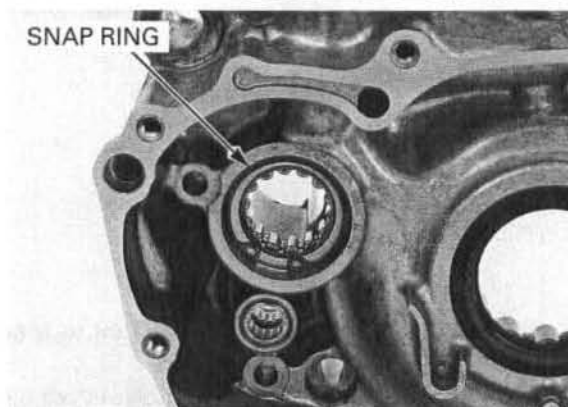
Remove the countershaft and balancer shaft oil seals.



Remove the screws and countershaft bearing set plates.



Remove the snap ring from left crankcase.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Remove the mainshaft bearing, and balancer shaft bearing using the special tools as shown.

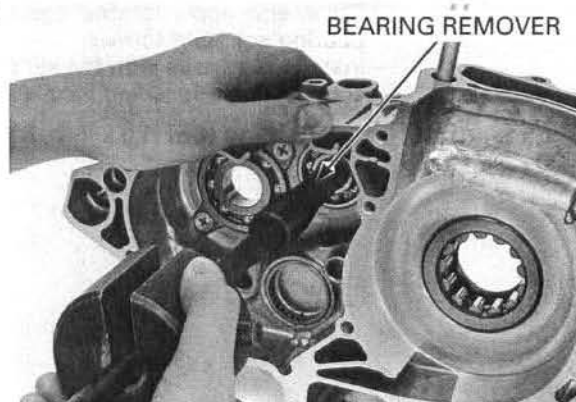
### TOOLS:

#### Mainshaft bearing:

Bearing remover set 17 mm	07936-3710300
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-371020A (U.S.A. only)

#### Balancer shaft bearing:

Bearing remover set 20 mm	07936-3710600
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-371020A (U.S.A. only)



Remove the countershaft bearing and shift drum bearing.

*Drive in new bearings squarely with the marking side facing toward the inside of the crankcase.*

Drive new bearings into the left crankcase using the special tools.

### TOOLS:

#### Countershaft bearing:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400

#### Mainshaft bearing:

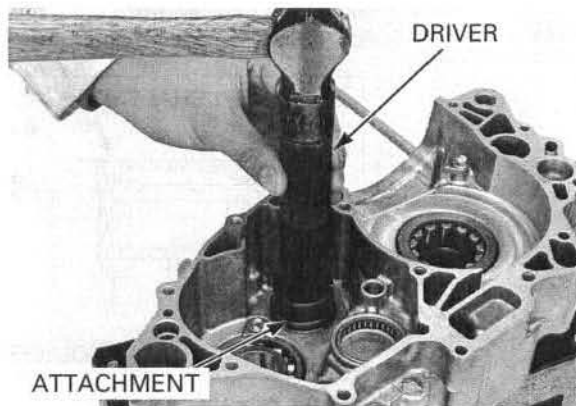
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400

#### Balancer shaft bearing:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 20 mm	07746-0040500

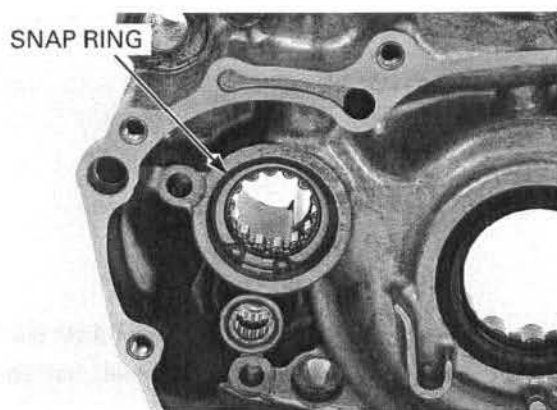
#### Shift drum bearing:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200



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

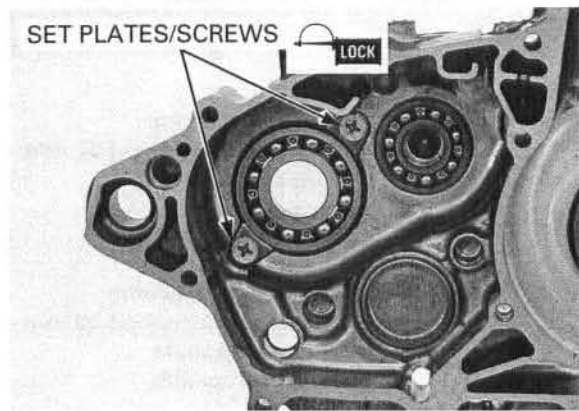
Install the snap ring into the left crankcase securely.



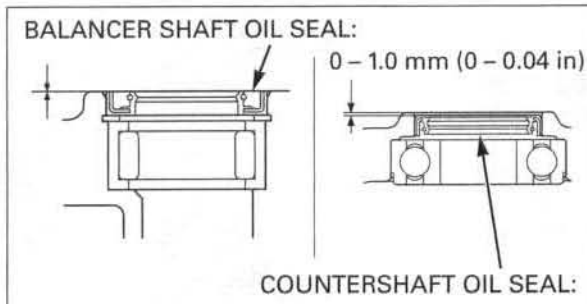
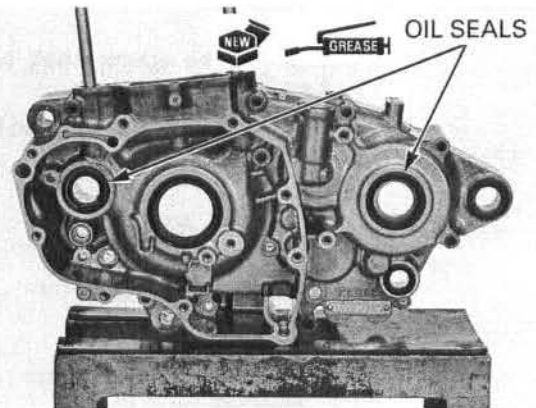
## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Clean and apply locking agent to the countershaft bearing set plate screws.  
Install the screws with the set plates and tighten the screws to the specified torque.

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



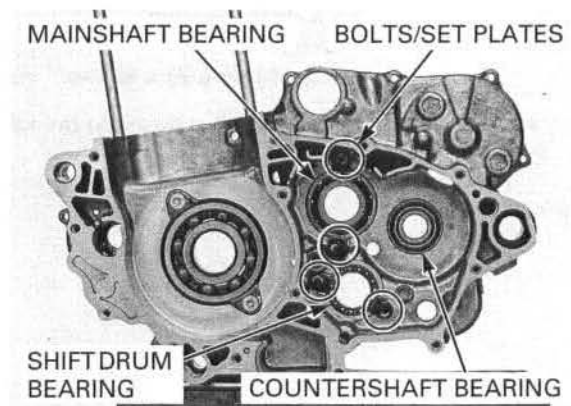
Apply grease to new countershaft and balancer shaft oil seal lips.  
Install a new balancer shaft oil seal to the crankcase until it is flush with the crankcase surface.  
Install a new countershaft oil seal to the specified depth below the crankcase surface as shown.



### RIGHT CRANKCASE

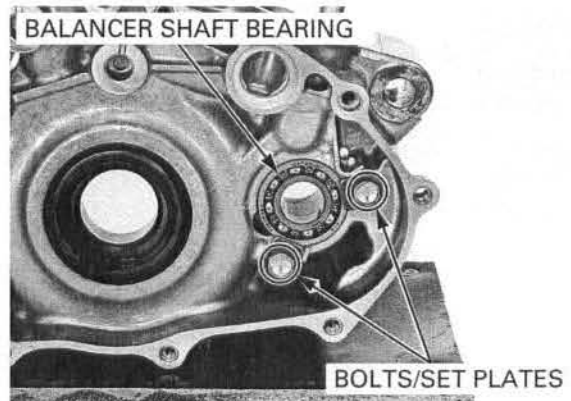
Remove the socket bolts and set plates.

Remove the countershaft bearing, mainshaft bearing and shift drum bearing.



Remove the bolts and set plates.

Remove the balancer shaft bearing.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Drive in new bearings squarely with the marked side facing toward the inside of the crankcase.

Drive in new bearings into the right crankcase using the special tools.

### TOOLS:

#### Shift drum bearing:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 25 mm	07746-0040600

#### Mainshaft bearing:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 25 mm	07746-0040600

#### Countershaft bearing:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400

#### Balancer shaft bearing:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400

Clean and apply locking agent to the set plate bolts. Install the bolts with the set plates and tighten the bolts to the specified torque.

### TORQUE:

#### Gearshift drum bearing set plate bolts:

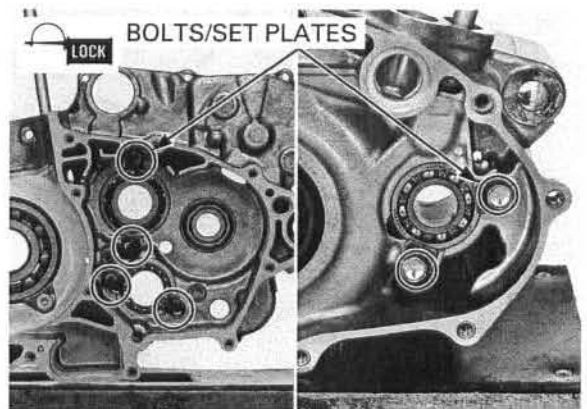
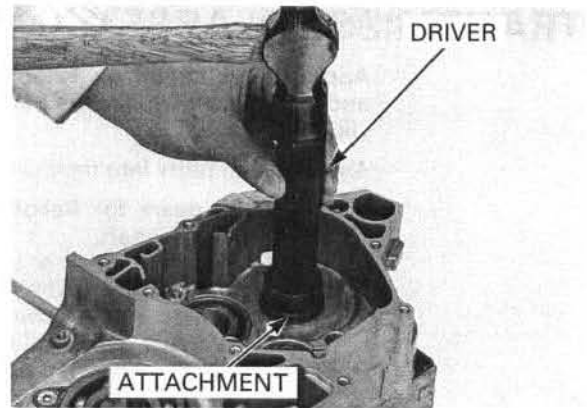
10 N·m (1.0 kgf·m, 7 lbf·ft)

#### Mainshaft bearing set plate bolts:

10 N·m (1.0 kgf·m, 7 lbf·ft)

#### Balancer shaft bearing set plate bolts:

10 N·m (1.0 kgf·m, 7 lbf·ft)



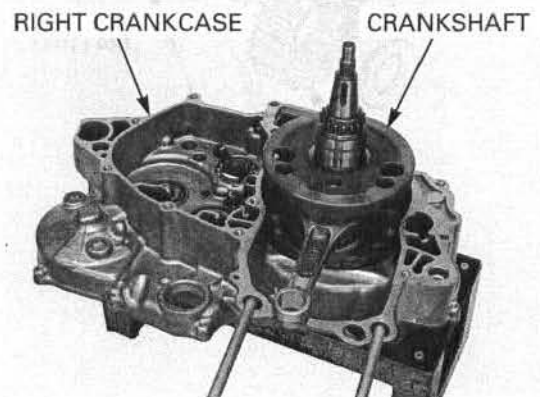
## CRANKSHAFT INSTALLATION

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.

After cleaning, lubricate the bearings and connecting rod big end with clean engine oil.

Install the crankshaft into the right crankcase.



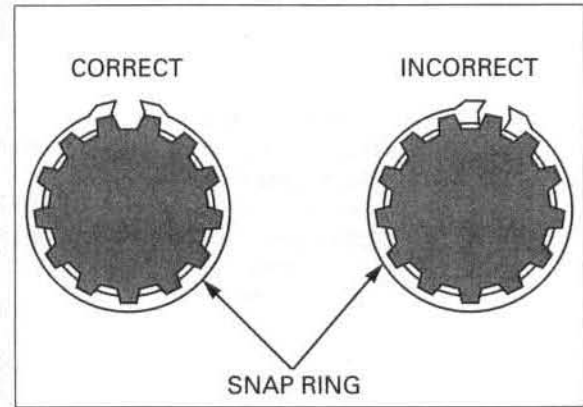


**TRANSMISSION ASSEMBLY**

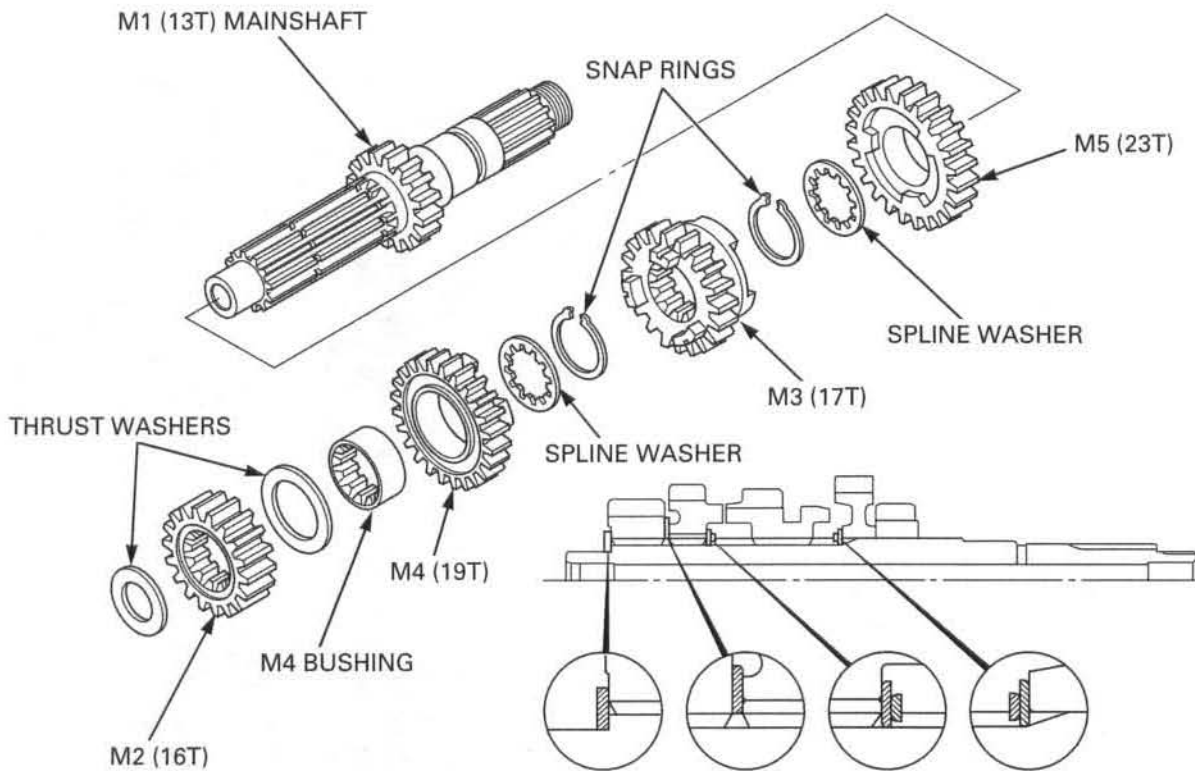
Apply molybdenum oil solution to the mainshaft and countershaft spline area and transmission gear sliding surface.

Assemble all parts into their original positions.

- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edge facing the thrust load side. Confirm the inner side of snap rings and washer when you detect the chamfered side.
- Do not reuse a worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the shaft grooves, and align their end gaps with the grooves of the spline.

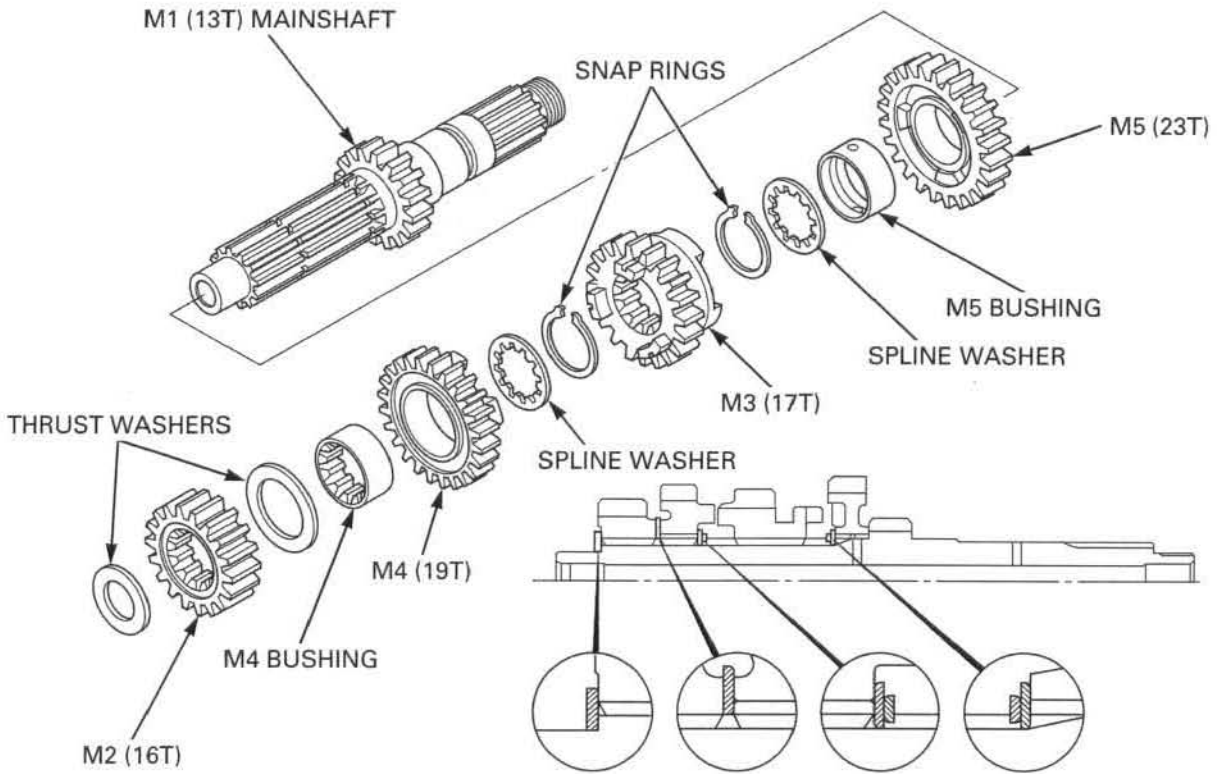


**MAINSHAFT ('05 - '07):**

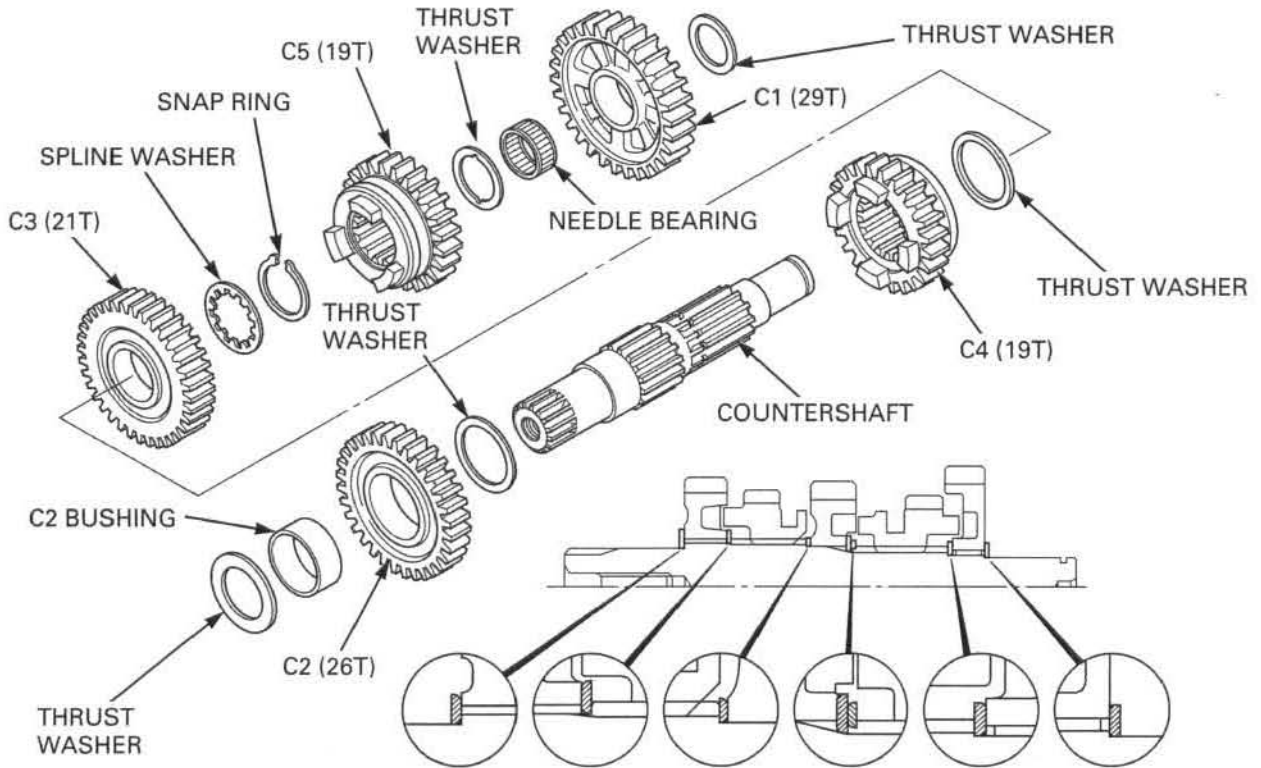




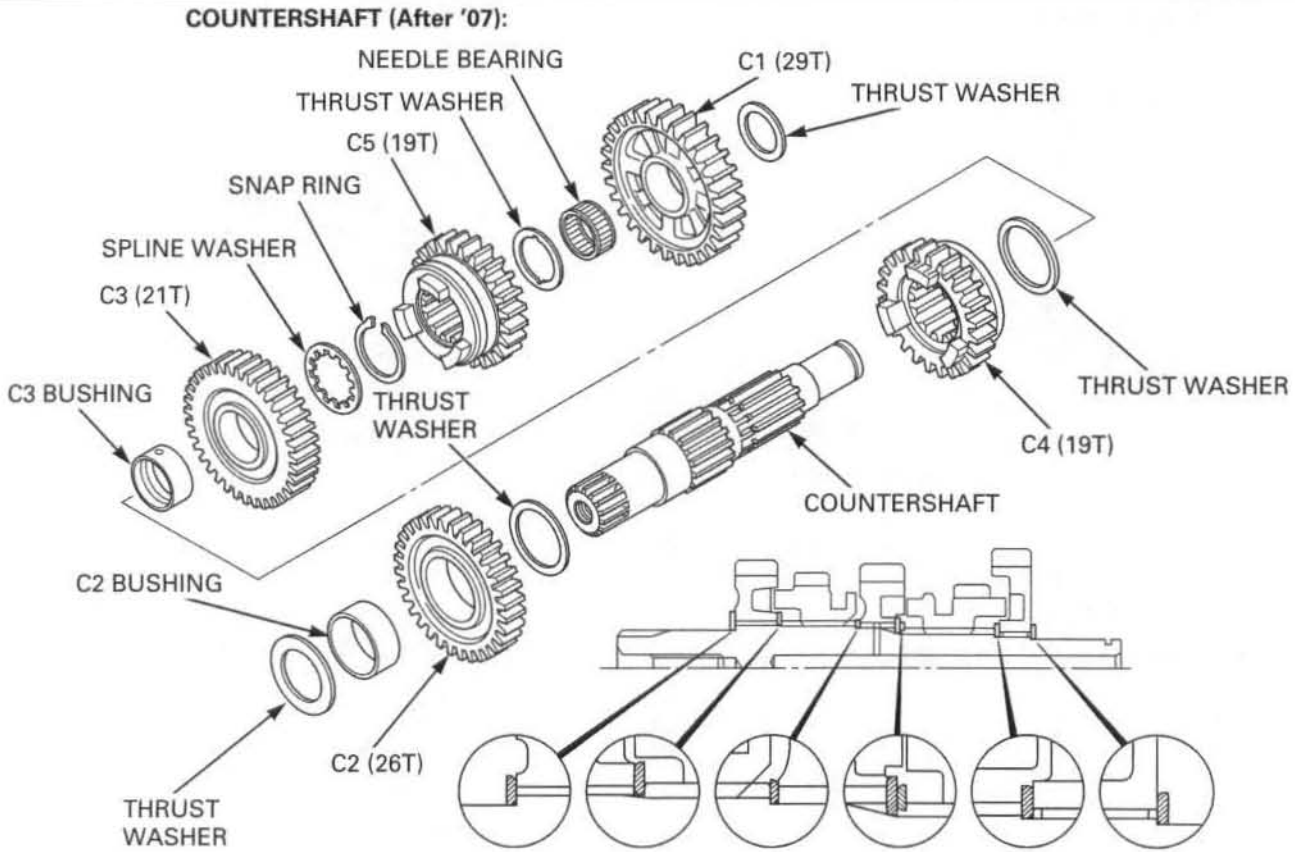
MAINSHAFT (After '07):



COUNTERSHAFT ('05 - '07):



# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER



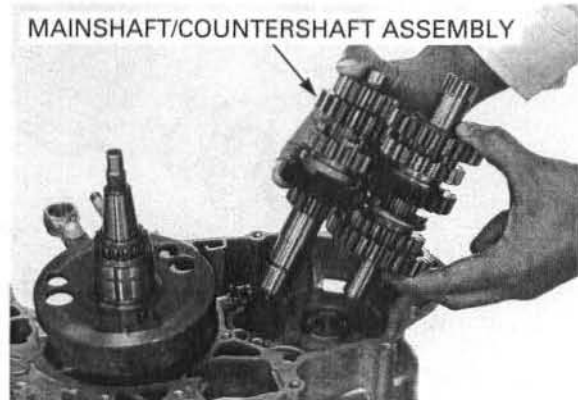
## INSTALLATION

Apply transmission oil to all transmission gear teeth.

Engage the mainshaft and countershaft gears.

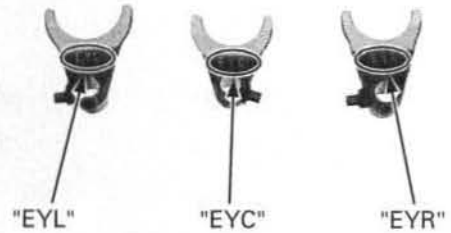
Install the mainshaft and countershaft assembly into the right crankcase.

Make sure the three thrust washers are installed (mainshaft; left only/countershaft; both ends).



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Each shift fork has an identification mark, "EYR" is for the right shift fork, "EYL" is the left shift fork and "EYC" is for the center shift fork.



Apply transmission oil to the shift drum guide grooves.

Apply molybdenum oil solution to the following parts:

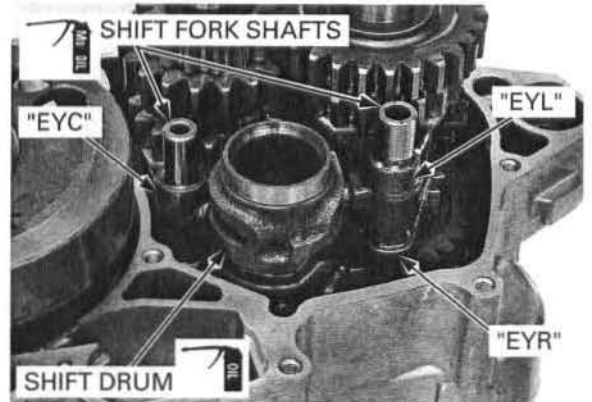
- Shift fork claws and guide pins
- Shift fork sliding surfaces
- Shift fork shaft

Install the shift forks to the grooves in the sliding gears.

- Face all shift fork marks to the left crankcase.

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.

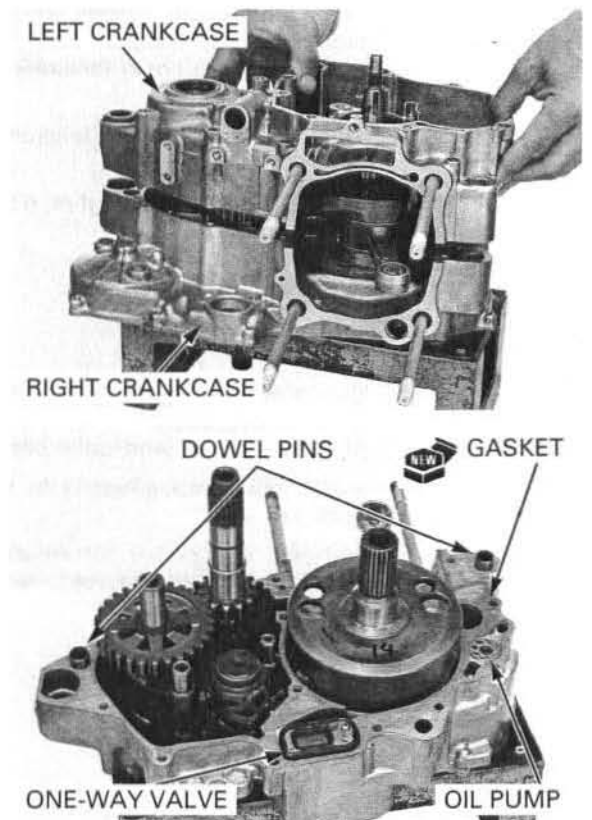


## CRANKCASE ASSEMBLY

Temporarily install the left crankcase. Place the left crankcase facing down and separate the left and right crankcase halves.

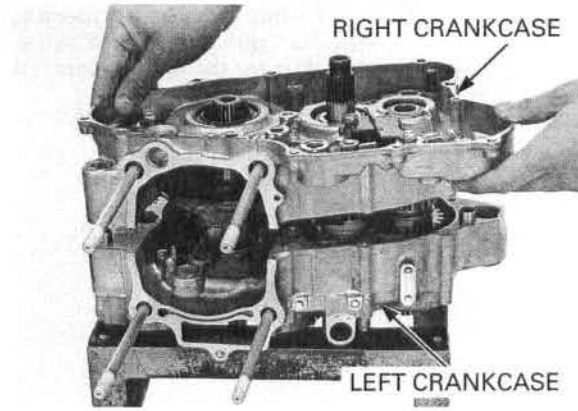
Install the oil pump inner/outer rotor and shaft in the left crankcase.

Install the one-way valve, dowel pins and a new gasket.

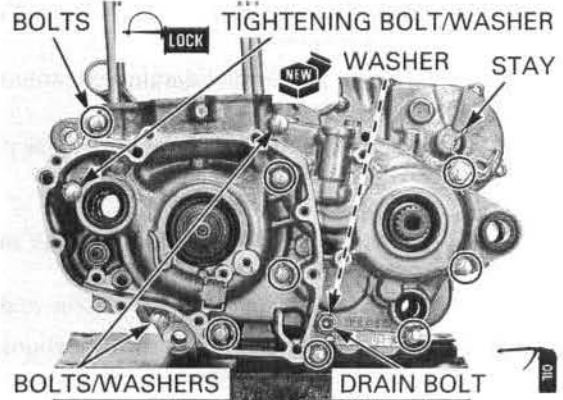


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Before assembly, lubricate the transmission bearings with clean transmission oil. Place the right crankcase onto the left crankcase.



Apply locking agent to the crankcase tightening bolt threads. Install the crankcase tightening bolt and washer. Tighten the crankcase bolts in a crisscross pattern in two or three progressive steps.



Apply transmission oil to the transmission oil drain bolt threads and seating surface. Install a new washer and tighten the drain bolt to the specified torque.

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

Carefully trim the protruding gasket material from the cylinder base gasket surface.

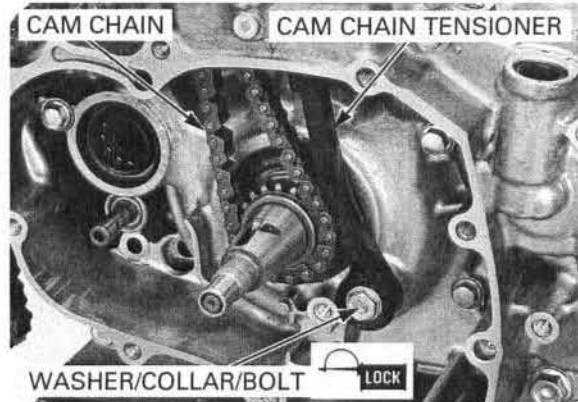
### NOTE:

- 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.

Clean and apply locking agent to the cam chain tensioner bolt threads. Install the cam chain tensioner, collar, washer and bolt.



Tighten the cam chain tensioner bolt to the specified torque.

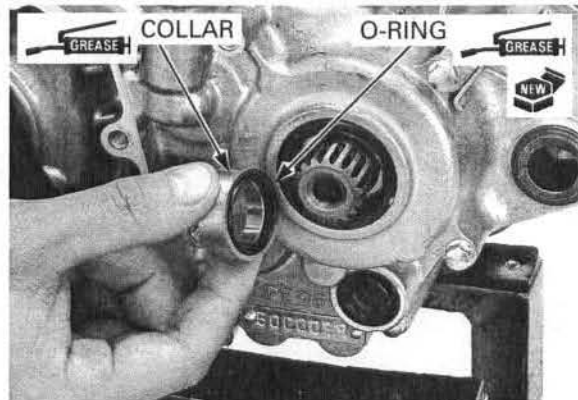
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Coat a new O-ring and the inside of the countershaft collar with grease.

Install the O-ring and collar onto the countershaft.

Install the removed parts in the reverse order of removal.

- Refer to service information (page 13-3) for installation of the removed parts after assembling the crankcase.



# 14. FRONT WHEEL/SUSPENSION/STEERING

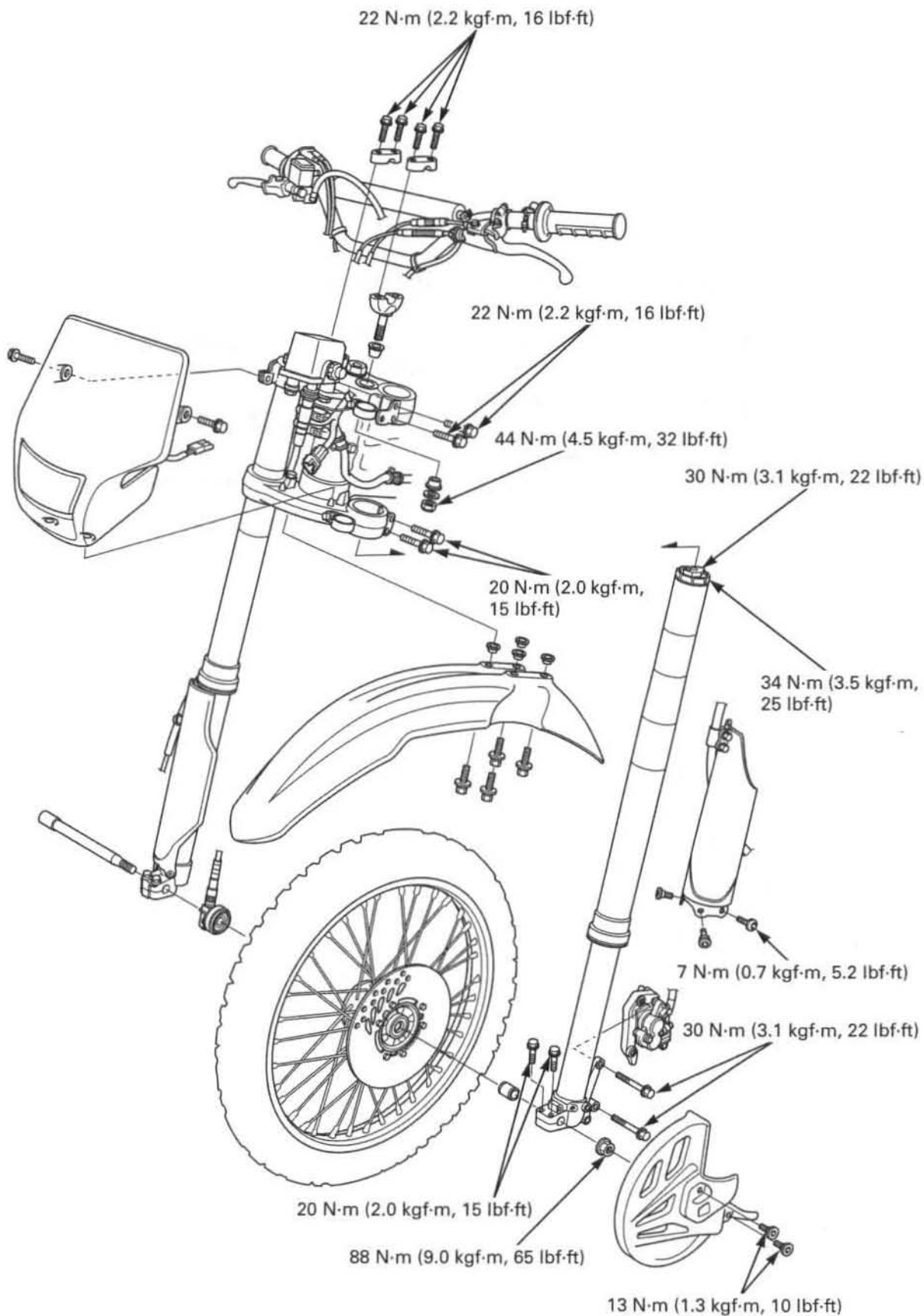
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COMPONENT LOCATION .....	14-2	HANDLEBAR.....	14-33
SERVICE INFORMATION .....	14-4	HPSD (Honda Progressive Steering Damper): After '07 .....	14-38
TROUBLESHOOTING .....	14-7	STEERING STEM.....	14-47
FRONT WHEEL .....	14-8	CLUTCH LEVER .....	14-52
FORK.....	14-13		

# FRONT WHEEL/SUSPENSION/STEERING

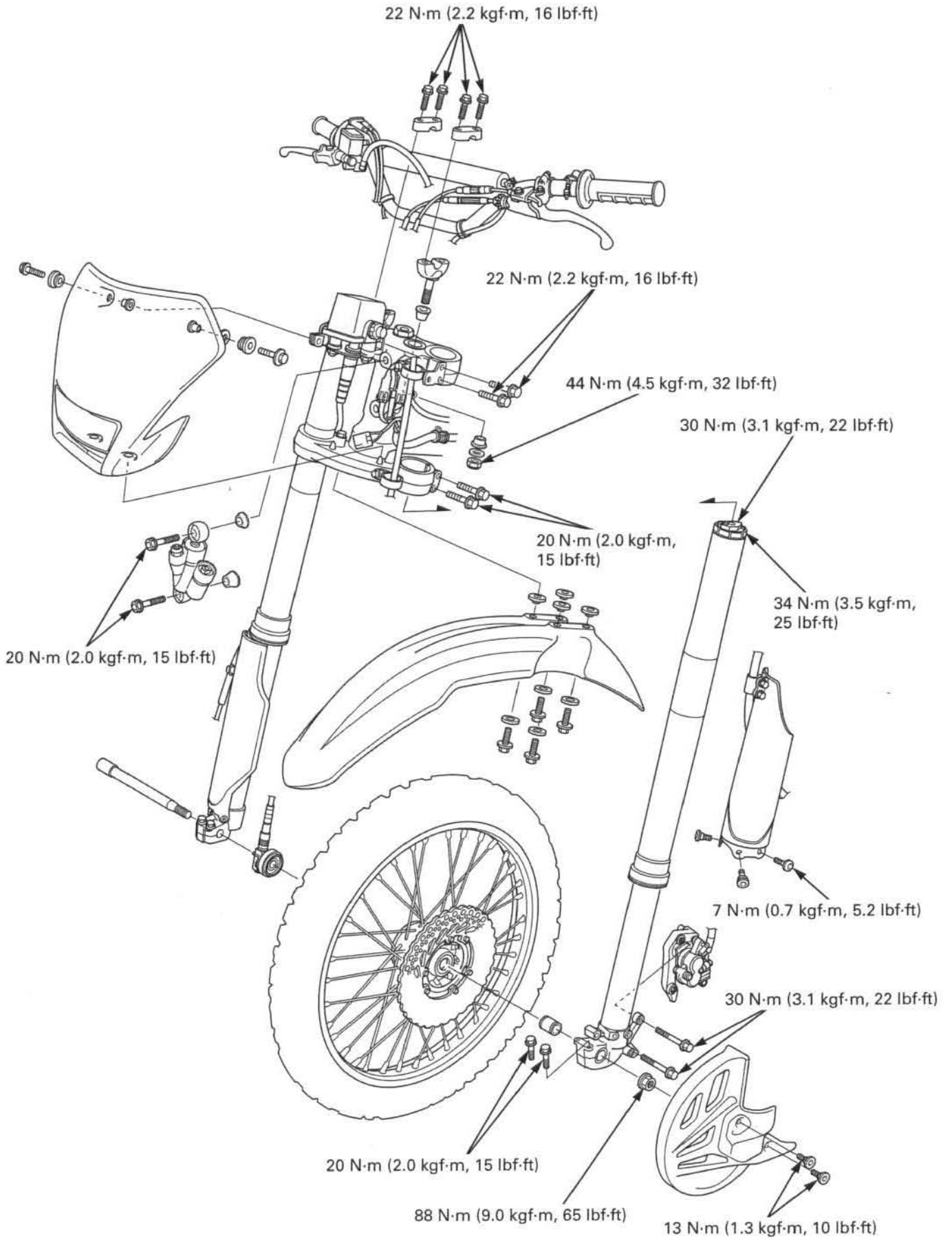
## COMPONENT LOCATION

'05 - '07:



# FRONT WHEEL/SUSPENSION/STEERING

After '07:





**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 work stand or equivalent under the engine.
- After front wheel installation, check the brake operation by applying the brake lever.
- Refer to the brake system information (page 16-3).
- When using the lock nut wrench, use a 20-inch long deflecting beam type torque wrench. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the fork damper. The specification given on this page is actual torque applied to the fork damper, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives the actual and indicated torque.

**SPECIFICATIONS**

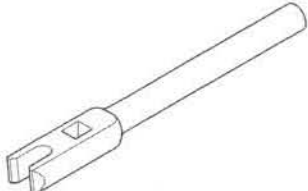
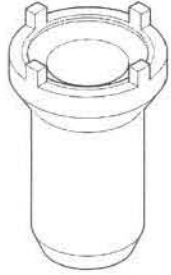
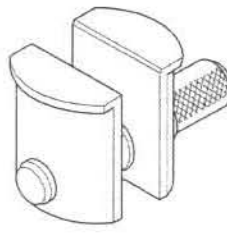
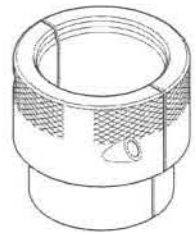
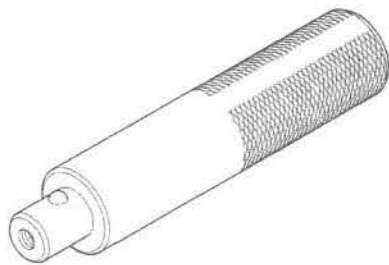

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cold tire pressure		98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	-	
Axle runout		-	0.20 (0.008)	
Wheel rim runout	Radial	-	2.0 (0.08)	
	Axial	-	2.0 (0.08)	
Wheel hub-to-rim distance		See page 14-10	-	
Fork	Spring free length	500 (19.7)	493 (19.4)	
	Slider runout	-	0.20 (0.008)	
	Recommended fork oil	Pro Honda HP Fork Oil 5W or equivalent	-	
	Oil level	42 - 47 (1.65 - 1.85)	-	
	Fluid capacity ('05 - '07)	Outer tube	332 cm <sup>3</sup> (11.2 US oz, 11.7 Imp oz)	-
		Fork damper	192 cm <sup>3</sup> (6.5 US oz, 6.8 Imp oz)	-
Fluid capacity (After '07)	Outer tube	324 cm <sup>3</sup> (11.0 US oz, 11.4 Imp oz)	-	
	Fork damper	192 cm <sup>3</sup> (6.5 US oz, 6.8 Imp oz)	-	
Compression damping adjuster standard position	'05 - '07	14 clicks out from full in	-	
	After '07	11 clicks out from full in	-	
Rebound damping adjuster standard position	'05 - '07	7 clicks out from full in	-	
	After '07	6 clicks out from full in	-	
Steering damper (After '07)	Recommended damper oil	Pro Honda HP Fork Oil 5W or equivalent	-	
	Free piston depth at 20°C (68°F)	27.3 - 27.9 (1.07 - 1.10)	-	
	Damping force adjuster standard position	9 clicks out from full in	-	





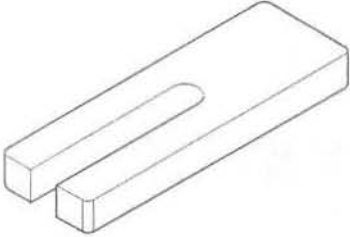


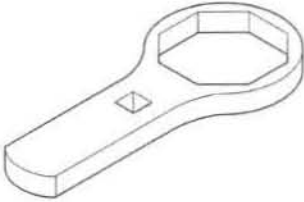

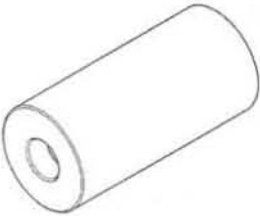
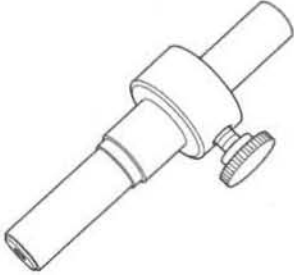
**TORQUE VALUES**

Front axle holder bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	
Front axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	
Front brake disc nut	16 N·m (1.6 kgf·m, 12 lbf·ft)	U-nut
Front spoke	3.68 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Front rim lock	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Handlebar upper holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Handlebar lower holder nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Front master cylinder holder bolt	9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)	
Clutch lever pivot bolt	See page 14-52	
Clutch lever pivot nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	U-nut
Engine starter switch housing screw	1.15 N·m (0.1 kgf·m, 0.8 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)	Apply locking agent to the threads
Fork cap	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Fork center bolt	69 N·m (7.0 kgf·m, 51 lbf·ft)	
Fork center bolt lock nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Pressure release screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Fork damper	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Fork protector mounting bolt	7 N·m (0.7 kgf·m, 5.2 lbf·ft)	Apply locking agent to the threads
Front brake disc cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Front brake hose guide bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Fork top bridge pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork bottom bridge pinch bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	
Steering stem nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Steering stem adjusting nut	See page 14-51	
Tripmeter cable clamp screw	0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)	
Steering damper mounting bolt (After '07)	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads
Throttle bolt (throttle side)	4 N·m (0.4 kgf·m, 3.0 lbf·ft)	

**TOOLS**

<p>Spoke wrench, 6.1 mm 07JMA-MR60100</p>  <p>or 07701-0020300 (6.1 mm) or equivalent commercially available in U.S.A.</p>	<p>Steering stem socket 07916-3710101</p>  <p>or 07702-0020001 (U.S.A. only)</p>	<p>Ball race remover 07946-3710500</p> 
<p>Fork seal driver, 47 mm 07VMD-KZ30100</p>  <p>or 07VMD-KZ3010A (U.S.A. only)</p>	<p>Driver 07749-0010000</p> 	<p>Attachment, 30 mm I.D. 07746-0030300</p> 

# FRONT WHEEL/SUSPENSION/STEERING

<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Pilot, 20 mm 07746-0040500</p> 	<p>Bearing remover head, 20 mm 07746-0050600</p> 
<p>Bearing remover shaft 07GGD-0010100</p> 	<p>Piston base 07958-2500001</p> 	<p>Bearing race installer (2 required) 07VMF-KZ30100</p> 
<p>Installer shaft 07VMF-KZ30200</p> 	<p>Lock nut wrench, 50 mm 07WMA-KZ30100</p> 	<p>Fork rod stopper 07AMB-KZ3A100 (U.S.A. only)</p> 
<p>Collar (After '07) 07KPF-VD60100</p> 	<p>Depth gauge (After '07) 07AMJ-MENA100</p> 	

## TROUBLESHOOTING

### Hard steering

- Steering stem adjusting nut too tight
- Faulty or damaged steering head bearings
- Insufficient tire pressure
- Faulty steering damper (After '07)

### 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 bearing
- Bent front axle
- Brake drag

### Soft suspension

- Weak springs
- Low fork fluid level
- Low tire pressure
- Incorrect fork fluid weight

### Stiff suspension

- Fork oil quantity too much
- Incorrect fork fluid weight
- Bent or damaged fork tubes
- Clogged fork fluid passage

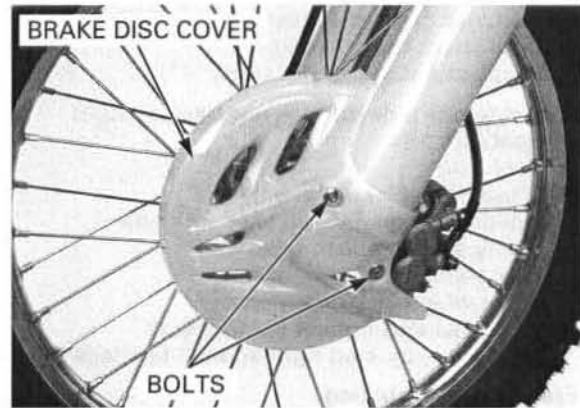
### Front suspension noisy

- Insufficient fluid in fork
- Loose fork fastener

## FRONT WHEEL

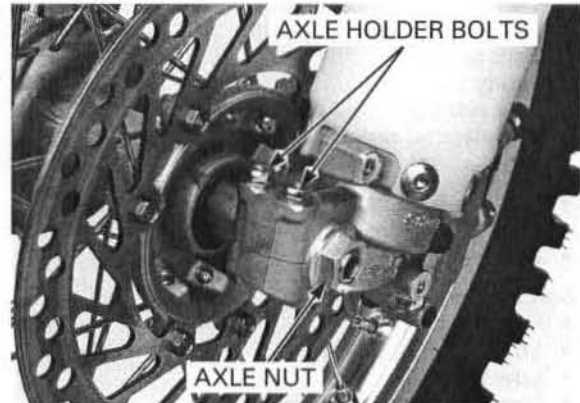
### REMOVAL

Remove the bolts and brake disc cover.



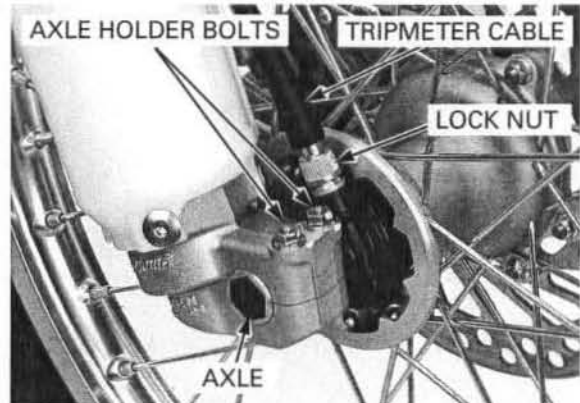
Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

Remove the axle nut and loosen the left axle holder bolts.



Loosen the lock nut and disconnect the tripmeter cable.

Loosen the right axle holder bolts.



Remove the axle and front wheel.

- Do not operate the brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the pads.

*Be careful not to damage the brake pads with the disc.*

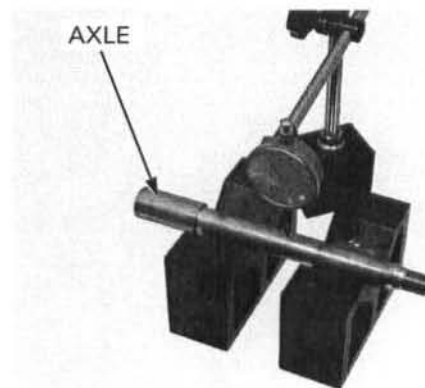
### INSPECTION

#### 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: 0.20 mm (0.008 in)**

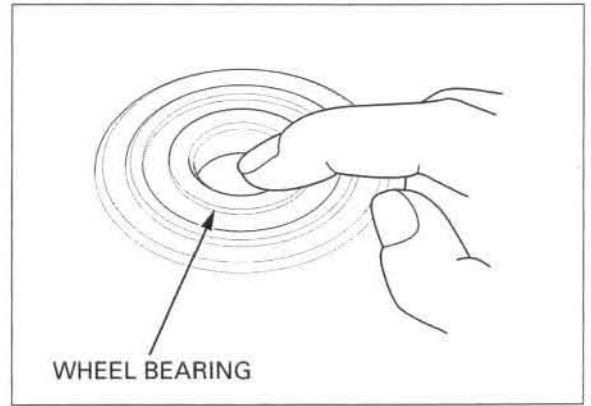


**WHEEL BEARING**

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.*

Replace the bearings if the inner race does not turn smoothly, quietly, or if outer race fits loosely in the hub.



**WHEEL RIM**

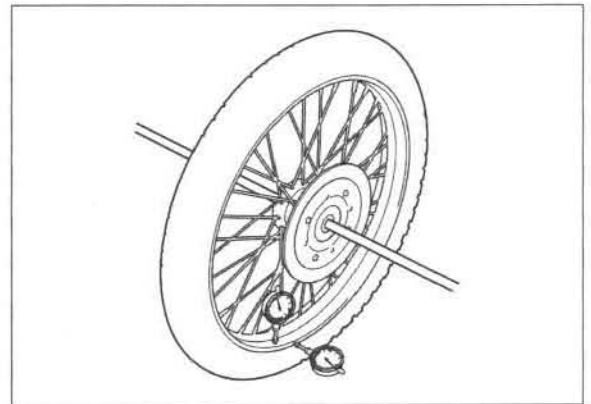
Check the rim runout by placing the wheel in a truing stand. Spin the wheel by hand, and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS:**

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

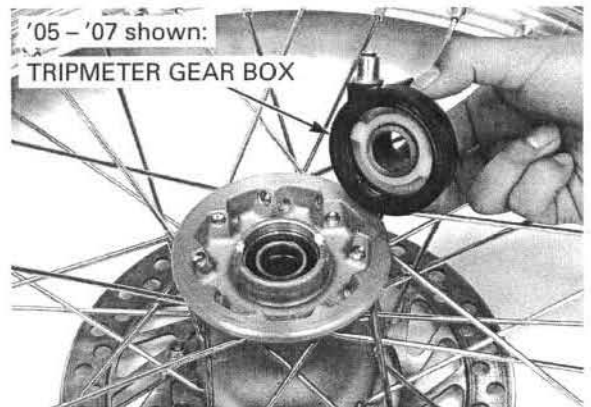
**Axial: 2.0 mm (0.08 in)**

Check the spokes and tighten any that are loose.



**DISASSEMBLY**

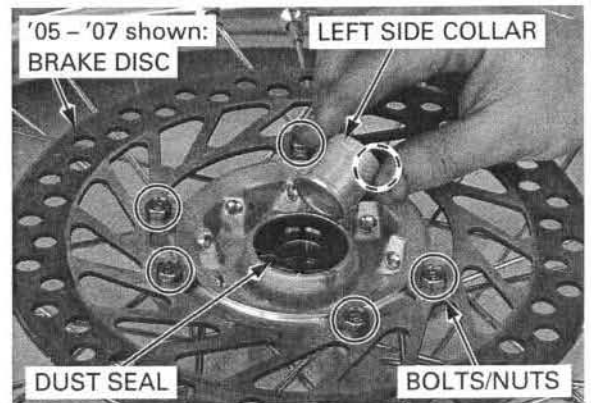
Remove the tripmeter gear box.



Remove the left side collar and dust seal.

Remove the brake disc bolts and nuts.

Remove the brake disc.



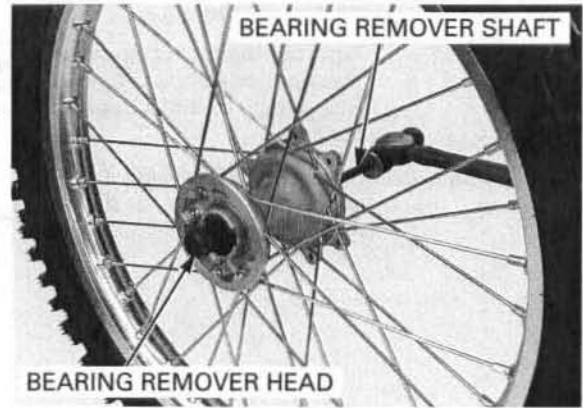
# FRONT WHEEL/SUSPENSION/STEERING

Replace the wheel bearings in pairs. Do not reuse old bearings.

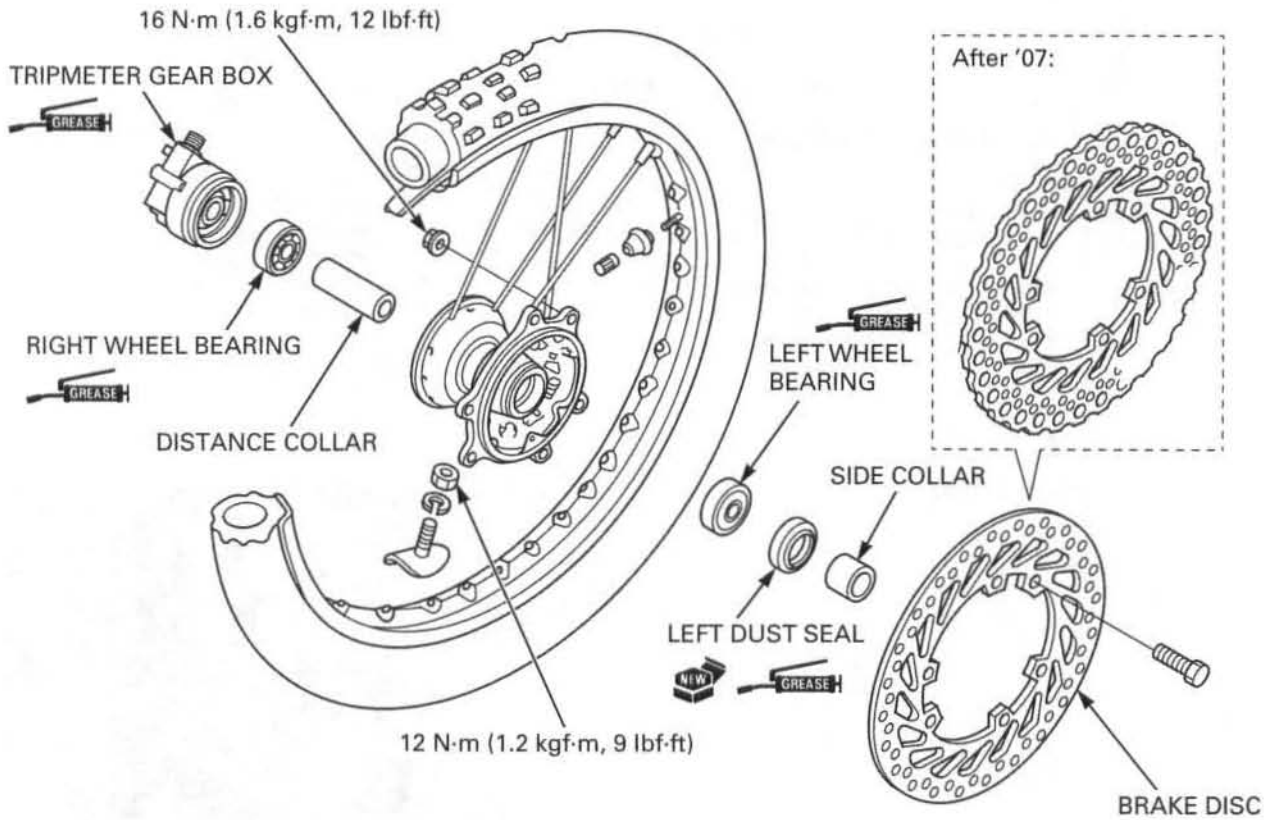
Install the remover head into the bearing. From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

**TOOLS:**

- Bearing remover head, 20 mm    07746-0050600
- Bearing remover shaft            07GGD-0010100

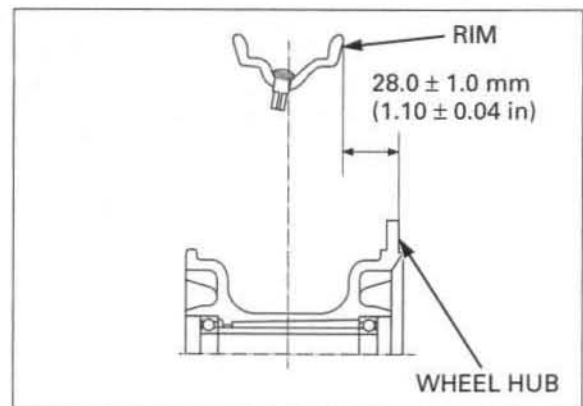


## ASSEMBLY



Place the hub in the center of the rim, and begin the lacing with new spokes.

Adjust the hub position so the distance from the hub left end surface to the side of the rim is  $28.0 \pm 1.0$  mm ( $1.10 \pm 0.04$  in) as shown.





## FRONT WHEEL/SUSPENSION/STEERING

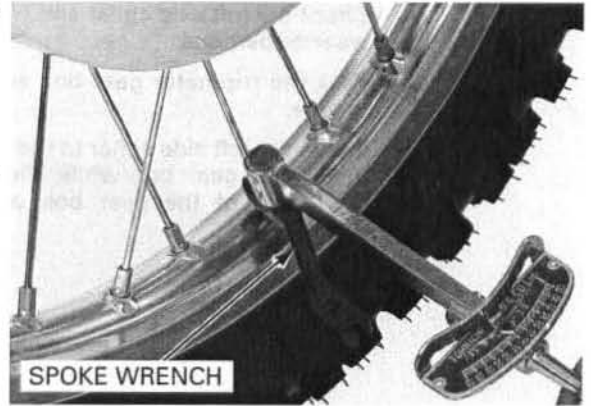
Torque the front spokes in two or three progressive steps

**TOOL:**

Spoke wrench, 6.1 mm

07JMA-MR60100  
or 07701-0020300  
(6.1 mm) or equivalent commercially available in U.S.A.

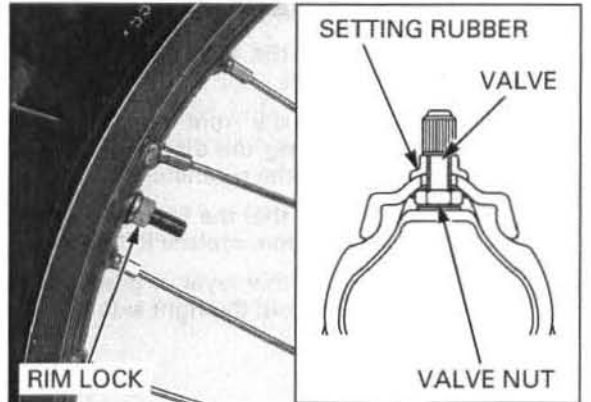
**TORQUE:** 3.68 N·m (0.4 kgf·m, 2.7 lbf·ft)



Install the front rim lock, setting rubber, tube and tire.

Tighten the front rim lock to the specified torque.

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



Pack all bearing cavities with grease.

Drive the left wheel bearing in the wheel hub until it is fully seated using special tools.

*Replace the wheel bearings in pairs. Do not reuse old bearings.*

- Install the wheel bearings with the sealed sides toward the outside.

**TOOLS:**

Driver

07749-0010000

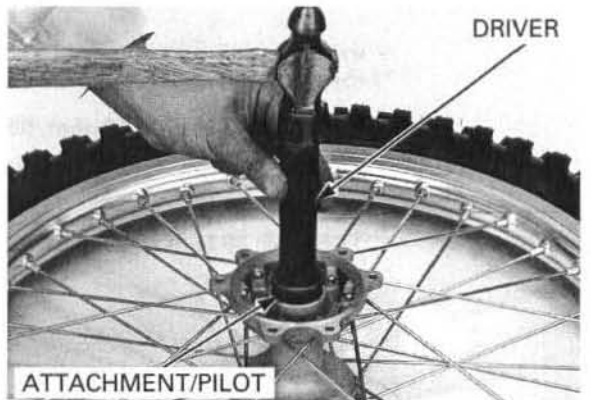
Attachment, 37 x 40 mm

07746-0010200

Pilot, 20 mm

07746-0040500

Install the distance collar into place, then drive the right wheel bearing using the same special tools.



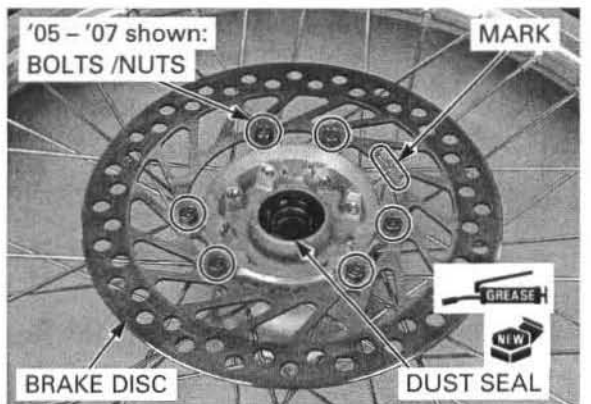
Install the brake disc onto the wheel hub with the drive mark facing out.

Install the brake disc bolts and nuts.

Tighten the nuts to the specified torque.

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

Pack a new left dust seal lip with grease and install it into the hub.

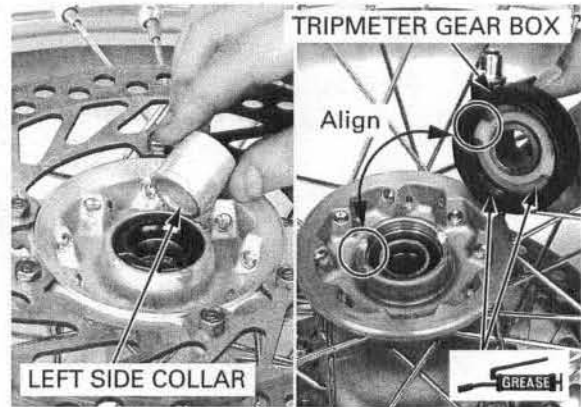


## FRONT WHEEL/SUSPENSION/STEERING

Check the left side collar and tripmeter gear box for wear or damage.

Pack the tripmeter gear box and dust seal lip with grease.

Install the left side collar to the wheel.  
Install the gear box while aligning the trip meter gear tabs of the gear box with the grooves on wheel.



### INSTALLATION

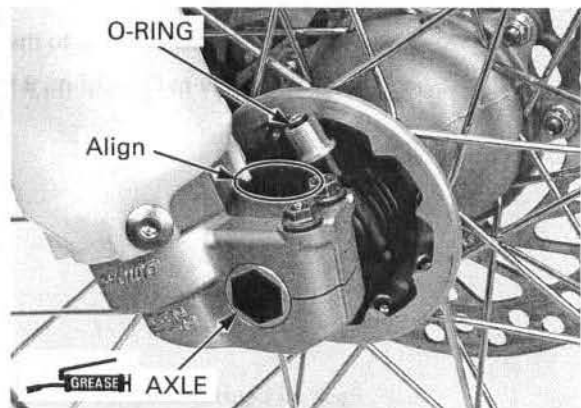
Clean the clamping surface of the axle and axle holders.

*Be careful not to damage the brake pads with the disc.*

Install the front wheel between the fork legs while inserting the disc between the pads, and align the tab of the tripmeter gear as shown.

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

Apply thin layer of grease to the axle and insert the axle from the right side.

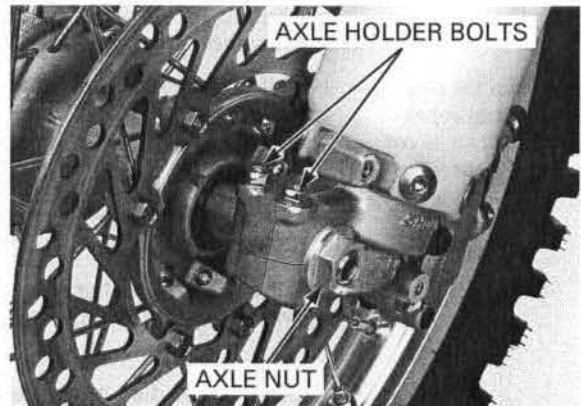


Install and tighten the front axle nut to the specified torque.

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

Tighten the left axle holder bolts to the specified torque.

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



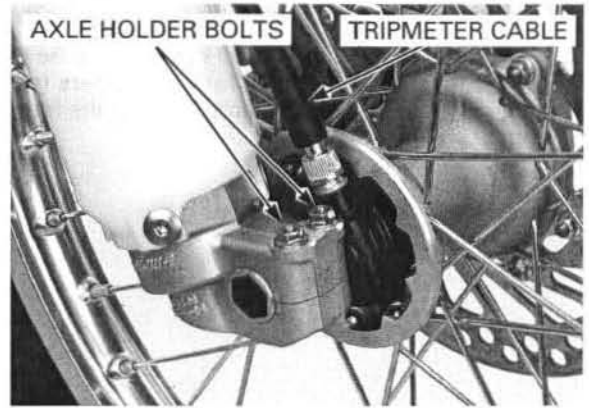
With the front brake applied, pump the front suspension up and down several times to seat the axle and check the front brake operation.



Be sure the fork legs are parallel, then tighten the right axle holder bolts to the specified torque.

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

Connect the tripmeter cable and tighten the lock nut securely.



Install the brake disc cover and bolts. Tighten the bolts to the specified torque.

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



## **FORK**

### **REMOVAL**

**NOTE:**

*After '07:* When removing the both fork legs, remove the steering damper to prevent damaging it (page 14-38).

Remove the following:

- Front visor ('05 - '07: page 3-5, After '07: page 3-6)
- Front wheel (page 14-8)

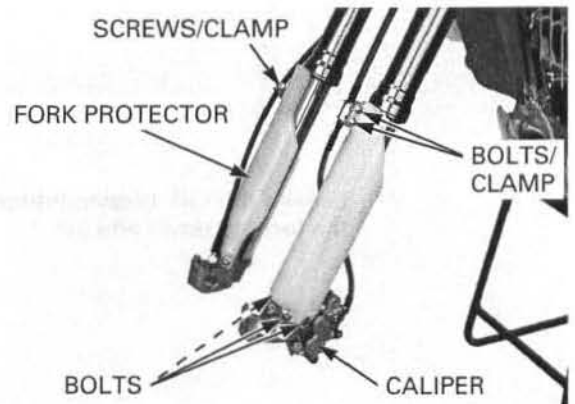
*Do not suspend the brake caliper from the brake hose.  
Do not twist the brake hose.*

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 brake hose clamp.

Remove the screws and tripmeter cable clamp.

Remove the bolts and fork protector.



## FRONT WHEEL/SUSPENSION/STEERING

Loosen the fork top bridge pinch bolts.

When the fork is ready to be disassembled, remove the handlebar and holders (page 14-32) and loosen the fork damper using the following procedure.

When disassembling the fork leg, turn the rebound and compression adjusters counterclockwise to the softest position to prevent damaging the adjustment needle (be sure to record the number of turns from the starting position).

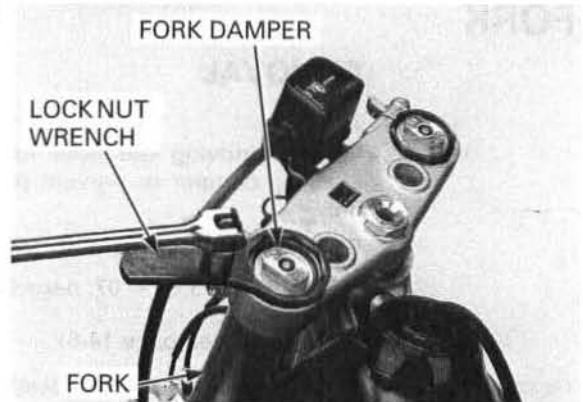
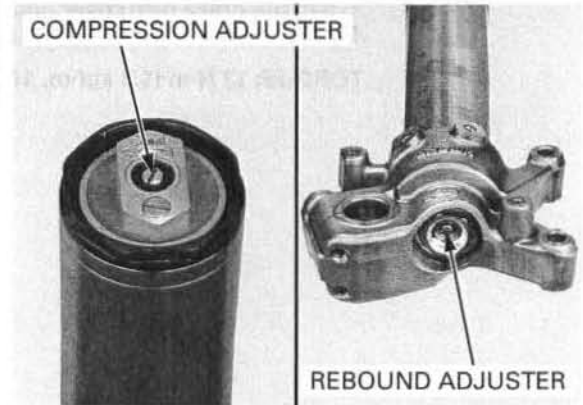
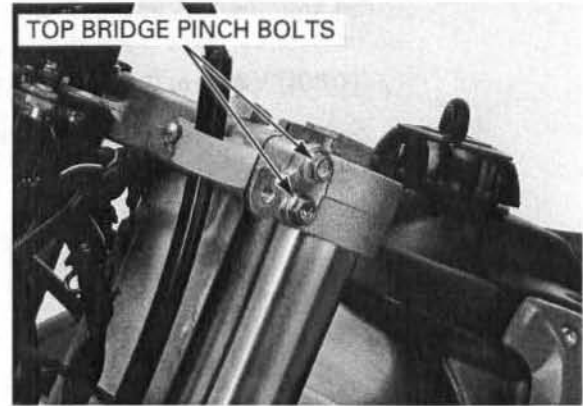
*Do not use a crescent or adjustable wrench to loosen the fork damper; it could be damaged.*

Loosen the fork damper using the special tool, but do not remove it yet.

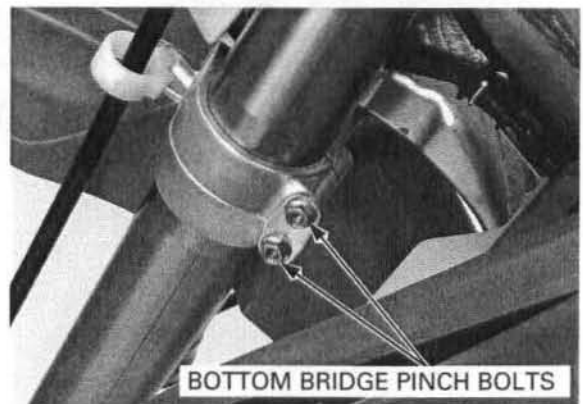
**TOOL:**

**Lock nut wrench, 50 mm**

**07WMA-KZ30100**



Loosen the fork bottom bridge pinch bolts and pull the fork leg down and out.

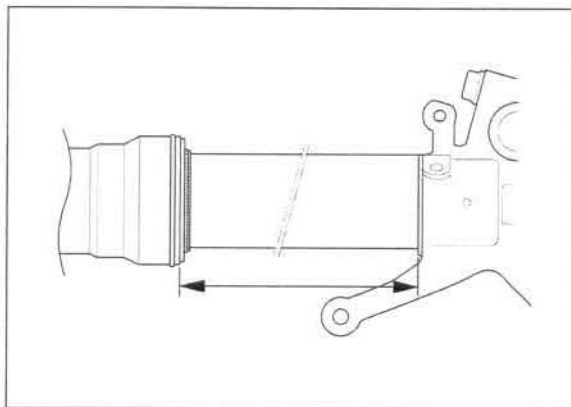


**DISASSEMBLY**

*Be careful not to scratch the 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.

Measure the length between the axle holder and outer tube, and record it before disassembling the fork.

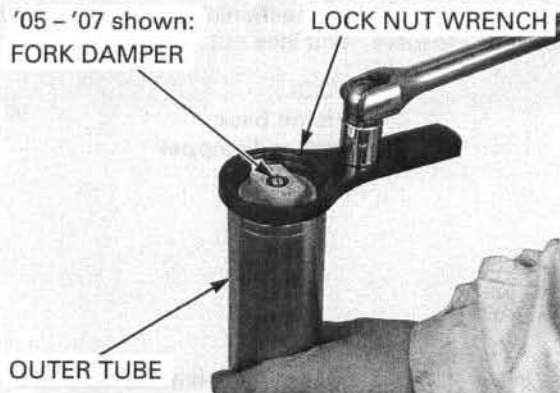


Hold the outer tube and remove the fork damper using the special tool.

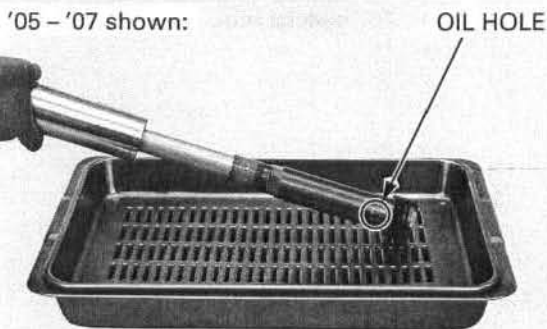
**TOOL:**

**Lock nut wrench, 50 mm      07WMA-KZ30100**

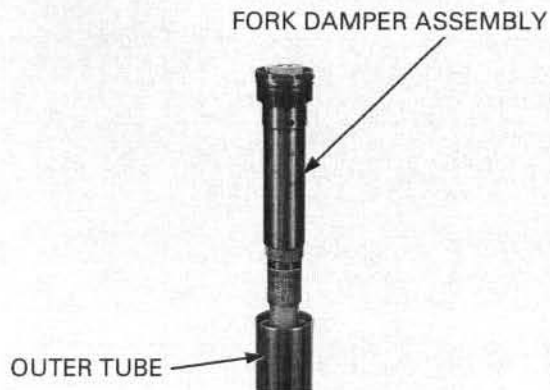
Slide the outer tube down onto the axle holder.



Drain the fork oil from the fork leg.  
Drain the fork oil from the oil hole (After '07: oil holes) in the fork damper.



Temporarily install the fork damper assembly into the outer tube.

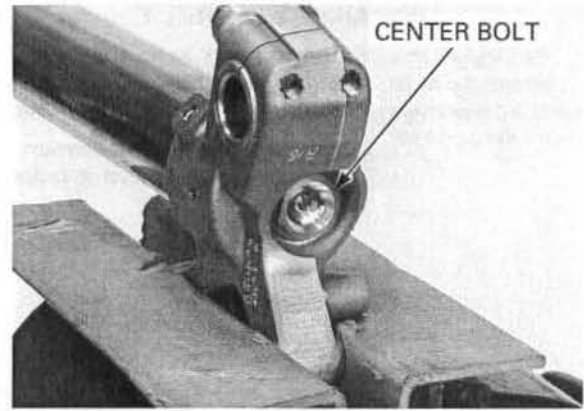


## FRONT WHEEL/SUSPENSION/STEERING

*Do not over-tighten the vise on the axle holder.*

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

Loosen the center bolt.

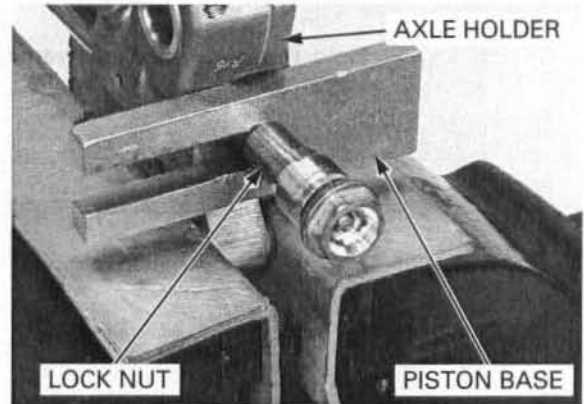


*If a piston base is not available, refer to the next step to make an alternative tool.*

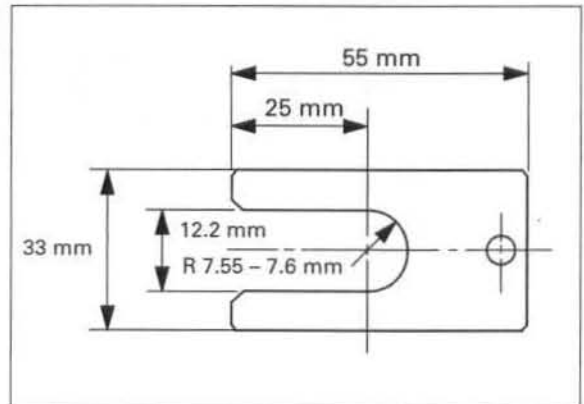
Push the fork damper out from the slider until the lock nut is fully exposed and install the piston base or mechanic's stopper tool between the axle holder and lock nut.

**TOOL:**  
Piston base  
Fork rod stopper

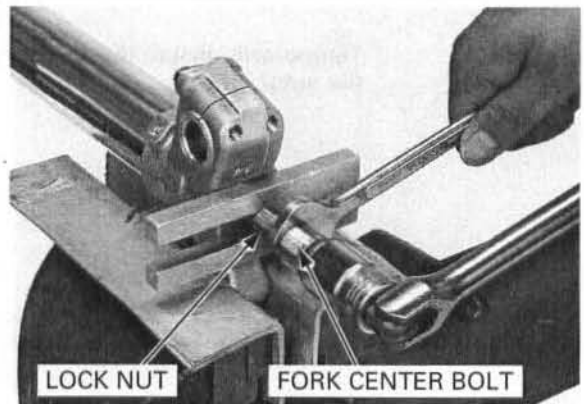
07958-2500001 or  
07AMB-KZ3A100  
(U.S.A. only)



Make the mechanic's stopper tool from a thin piece of steel (1.0 mm thick) as shown if you do not have a special tool.

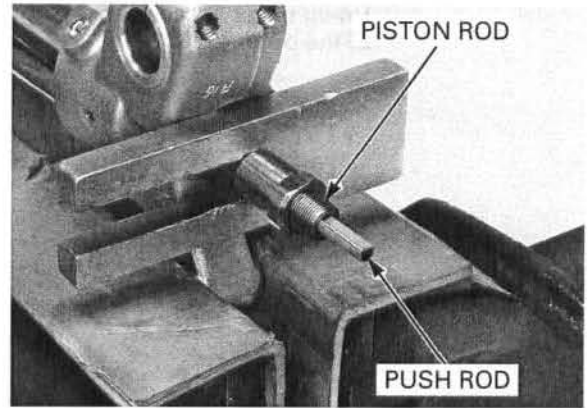


Hold the lock nut and remove the fork center bolt from the fork damper.

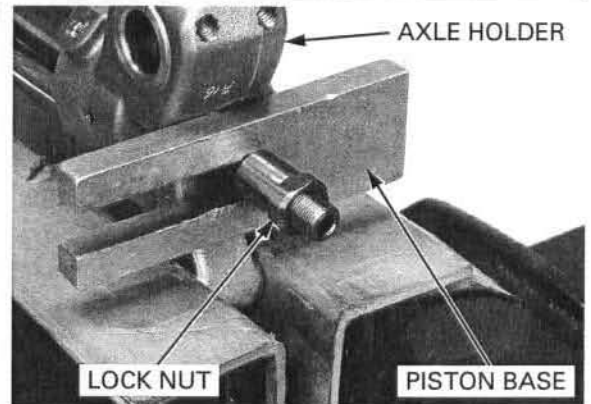




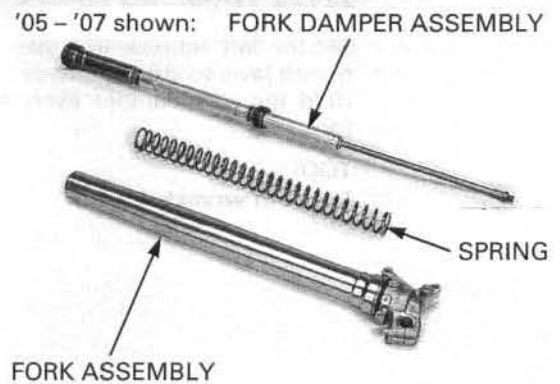
Remove the push rod from the piston rod.



*Be careful not to damage the lock nut and fork center bolt hole.* Remove the piston base or mechanic's stopper tool while pushing the fork cap.

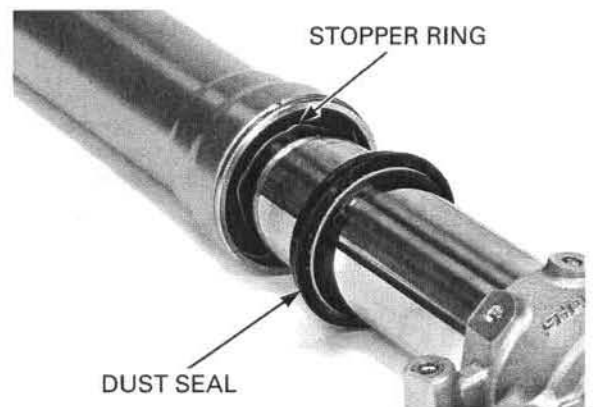


Remove the fork damper assembly from the fork assembly.  
Remove the fork assembly from the vise.  
Remove the fork spring from the fork assembly.



**OUTER TUBE AND SLIDER DISASSEMBLY**

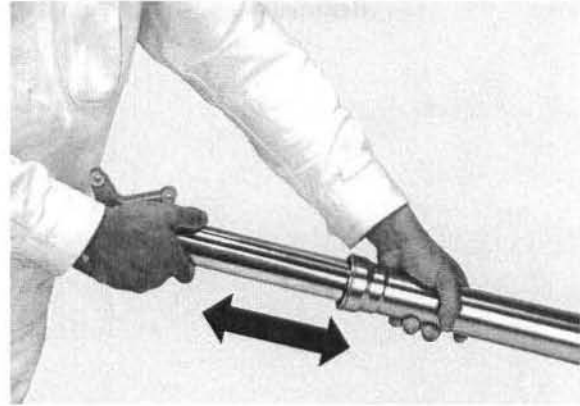
*Be careful not to scratch the slider.* Remove the dust seal and stopper ring. Check that the slider moves smoothly in the outer tube. If it does not, check the slider for bends or damage, and the bushings for wear or damage (page 14-19).





## FRONT WHEEL/SUSPENSION/STEERING

Using quick successive motions, pull the slider out of the outer tube.

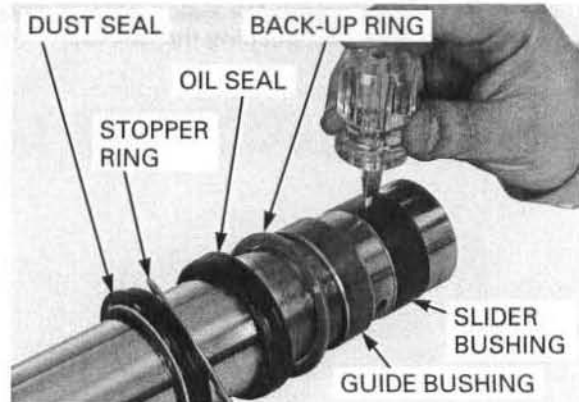


*Do not damage the slider bushing, especially the sliding surface. To prevent loss of tension, do not open the bushing more than necessary.*

Carefully remove the slider bushing by prying the slot 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

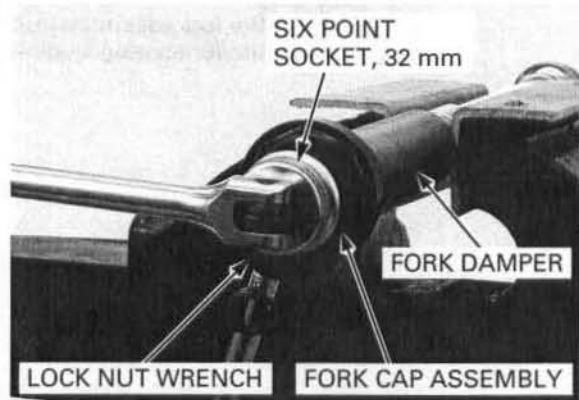


### FORK DAMPER DISASSEMBLY

Set the fork damper in a vise with a piece of wood or soft jaws to avoid damage. Hold the fork damper assembly using the special tool.

#### TOOL:

Lock nut wrench, 50 mm      07WMA-KZ30100



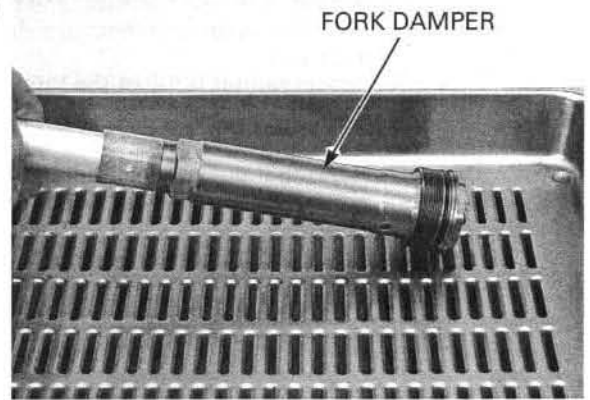
Remove the fork cap assembly from the fork damper.

#### NOTE:

- Be careful not to damage the fork cap bushing.
- Do not disassemble the fork cap assembly.
- Replace the fork cap as an assembly if it is damaged.



Empty the fork oil from the fork damper by pumping the damper rod several times.



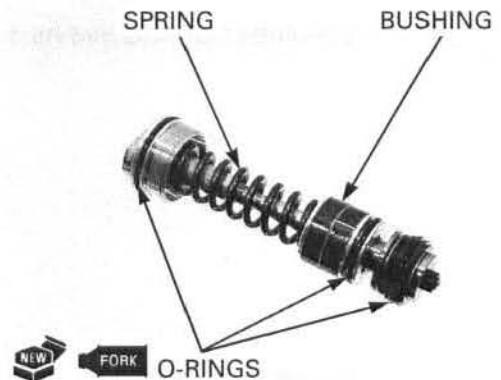
## INSPECTION

### FORK CAP

Check the fork cap assembly for damage.  
Check the bushing for excessive wear or scratches.  
Check the spring for fatigue or damage.  
Check the compression adjuster for clicks.

Replace the fork cap as an assembly if necessary.

Apply fork oil to new O-rings and install them.

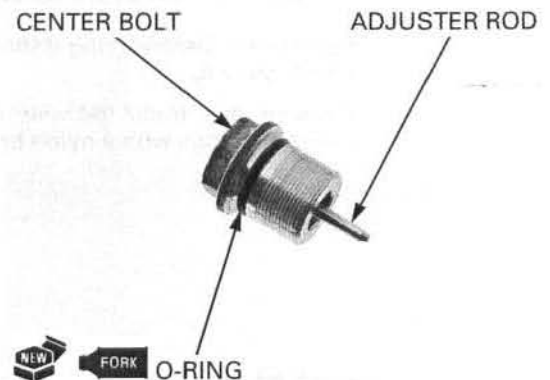


### FORK CENTER BOLT

Check the fork center bolt for damage.  
Check the adjuster rod for stepped wear or damage.  
Check the rebound adjuster for clicks.

Replace the fork center bolt as an assembly if necessary.

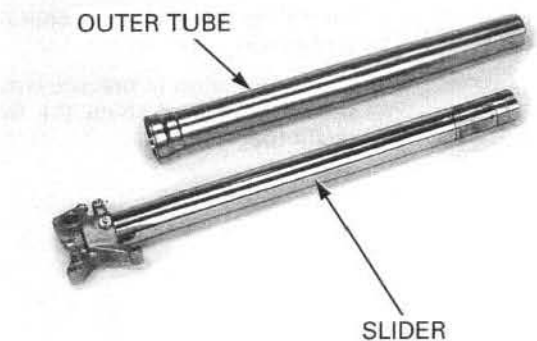
Apply fork oil to a new O-ring and install it.



### SLIDER/OUTER TUBE

Check the outer tube and slider for score marks, scratches and excessive or abnormal wear.  
Check the outer tube for damage or bend.

'05 - '07 shown:



## FRONT WHEEL/SUSPENSION/STEERING

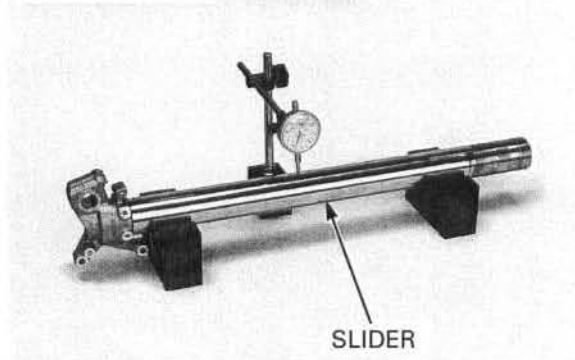
Set the slider on V-blocks and measure the runout. Turn the slider and measure the runout using a dial indicator. Actual runout is 1/2 of the total indicator reading.

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

*Do not reuse the slider if it is bent.*

Replace if the service limit is exceeded, or there are scratches or nicks that will allow fork oil to leak past the seals.

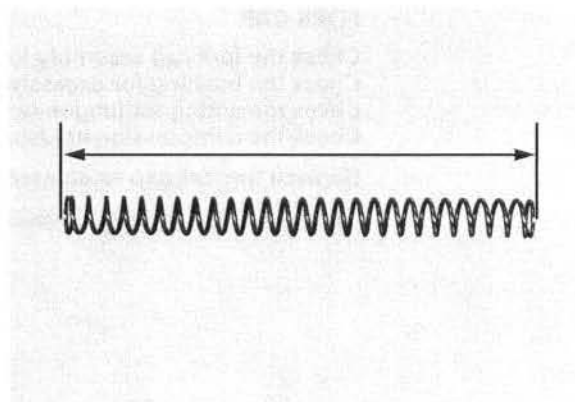
'05 - '07 shown:



### FORK SPRING

Measure the fork spring free length by placing it on a flat surface.

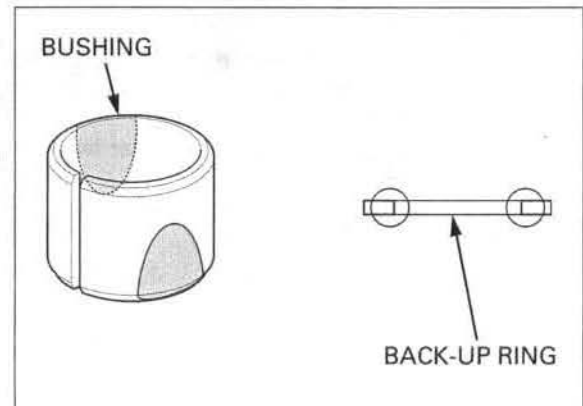
**SERVICE LIMIT: 493 mm (19.4 in)**



### 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.

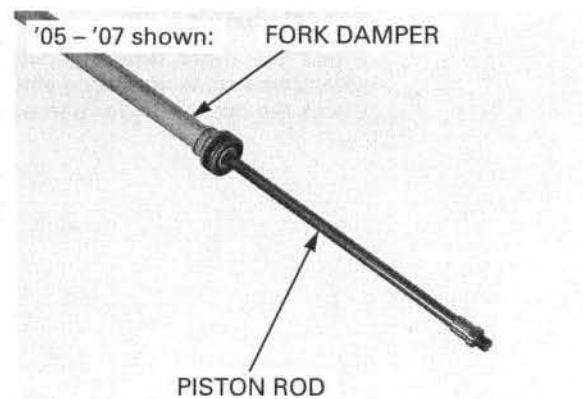


### FORK DAMPER

Check the fork damper for bends or damage. Check the fork damper piston rod for bends, wear or damage.

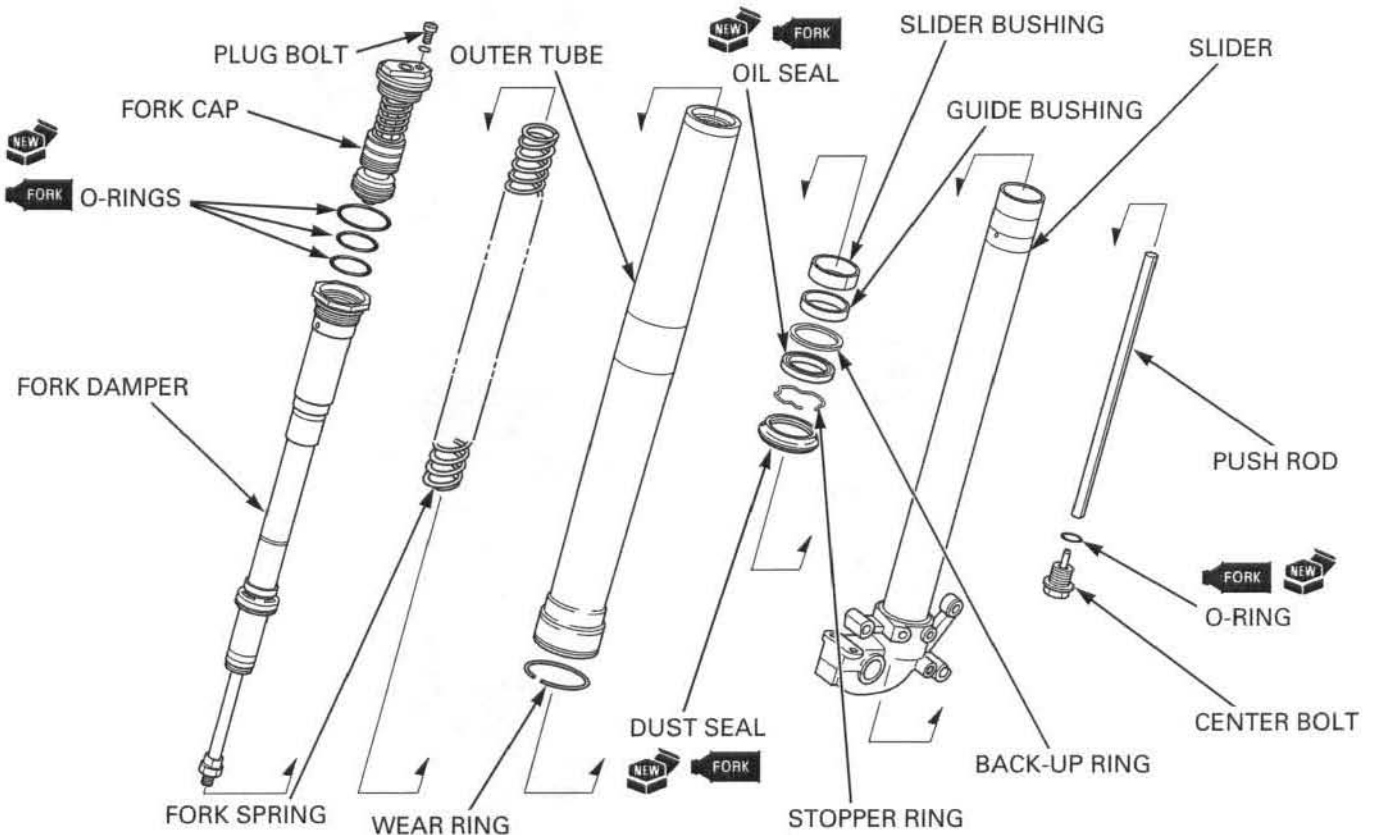
Check the fork damper operation by pumping the piston rod.

If the operation is not smooth, fill the fork damper with fork oil and check the fork damper operation again (page 14-25).



**ASSEMBLY**

'05 - '07 shown:



Before assembly, wash all parts with a high flash-point or non-flammable solvent and wipe them dry.

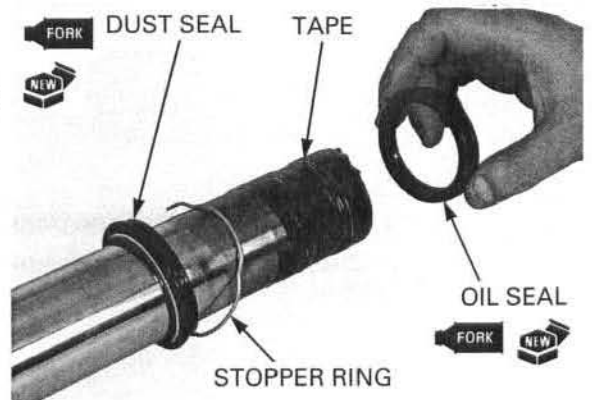
**OUTER TUBE AND SLIDER ASSEMBLY**

Wrap the end of the slider with tape.

Coat new 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.

Remove the tape from the end of the slider.

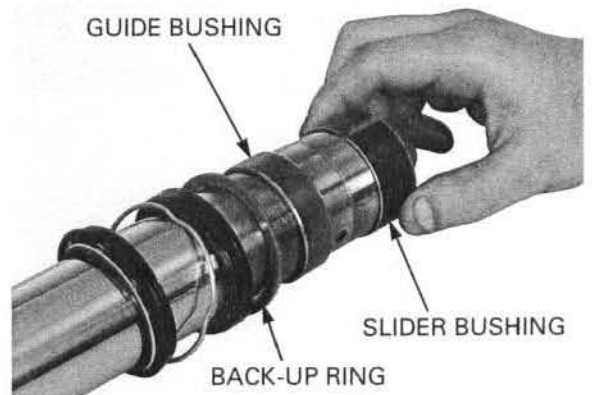


*Be careful not to damage the slider bushing coating. Do not open the slider bushing more than necessary.*

Install the back-up ring, guide bushing and slider bushing.

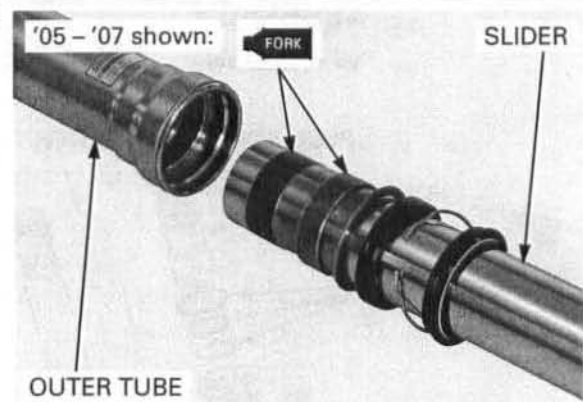
**NOTE:**

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.



## FRONT WHEEL/SUSPENSION/STEERING

Coat the slider and guide bushings with fork oil and install the slider into the outer tube.

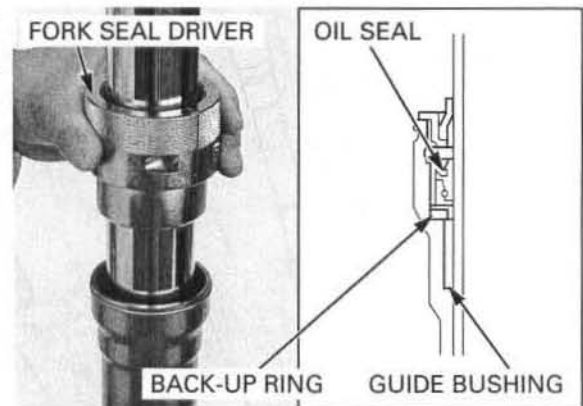


Drive in the guide bushing together with the back-up ring into the outer tube using the special tool. Drive the oil seal into the outer tube using the special tool.

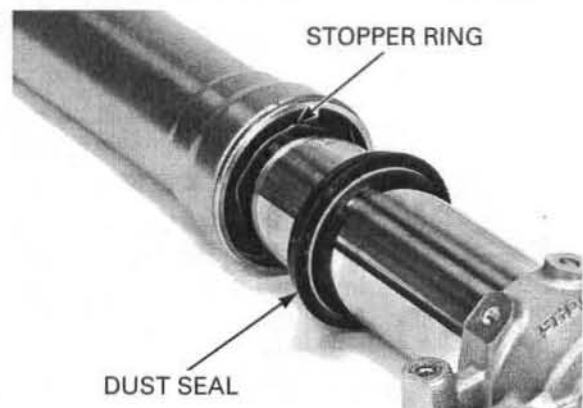
### TOOL:

Fork seal driver, 47 mm

07VMD-KZ30100 or  
07VMD-KZ3010A  
(U.S.A. only)

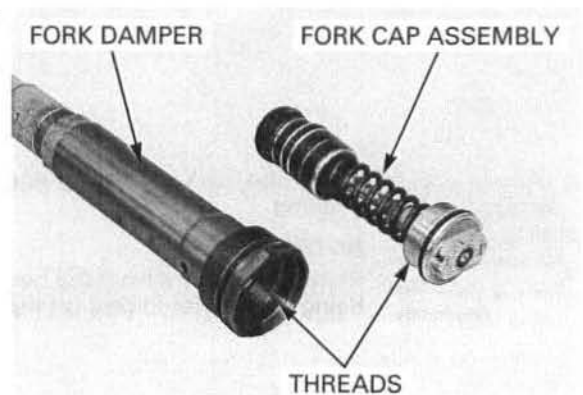


Install the stopper ring into the groove in the outer tube. Install the dust seal.



### FORK DAMPER REFILLING/ASSEMBLY

Clean the fork cap assembly and fork damper threads.



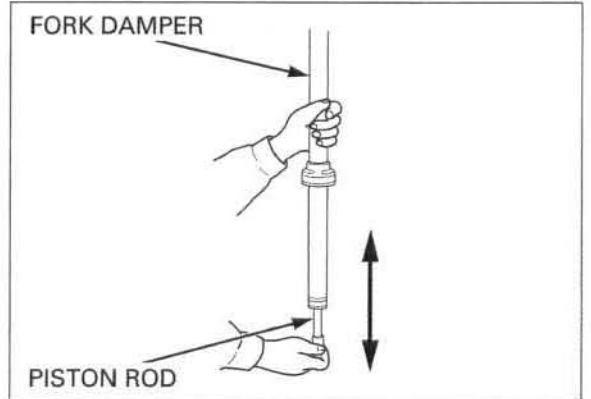
Extend the fork damper piston rod to its maximum length.  
 Pour the recommended fork oil into the fork damper.

**RECOMMENDED FORK OIL:**  
 Pro Honda HP Fork Oil 5W or equivalent

**STANDARD CAPACITY:**  
 192 cm<sup>3</sup> (6.5 US oz, 6.8 Imp oz)

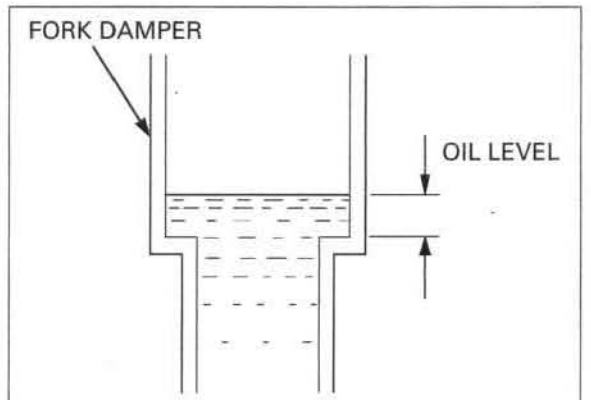


Pump the fork damper piston rod slowly several times and bleed any air from the fork damper.



Extend the fork damper piston rod to its maximum length.  
 Adjust the oil level of the fork damper as shown.

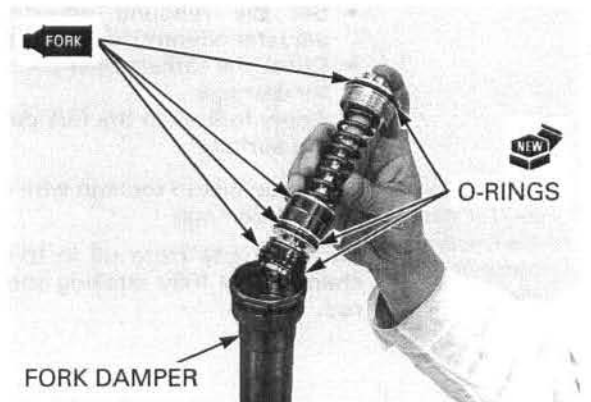
**OIL LEVEL: 42 – 47 mm (1.65 – 1.85 in)**



*Be careful not to damage the fork cap bushing.*

Apply fork oil to the bushing and new O-rings on the fork cap assembly.  
 Extend the fork damper piston rod to maximum. Hold the rod end, install the fork cap assembly into the fork damper.

If it is difficult to install the fork cap assembly, the fork damper oil level might be higher than standard. Inspect the fork damper oil level again.



## FRONT WHEEL/SUSPENSION/STEERING

*Do not over-tighten the vise.*

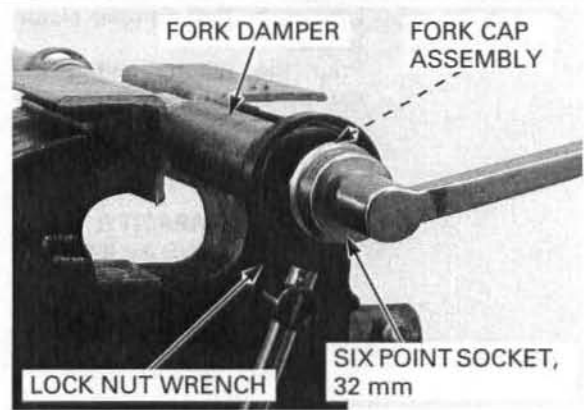
Set the fork damper in a vise with a piece of wood or soft jaws to avoid damage.

Tighten the fork cap assembly to the specified torque by holding the fork damper using the special tool.

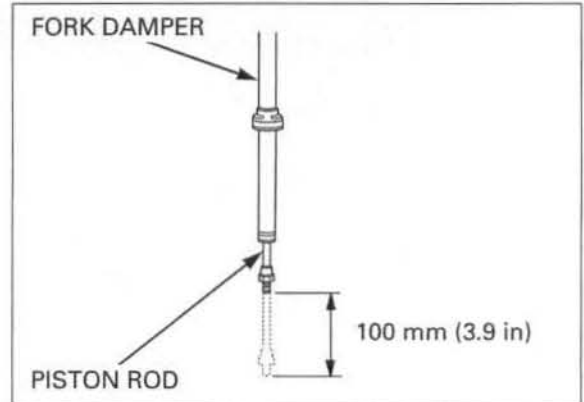
**TOOL:**

Lock nut wrench, 50 mm      07WMA-KZ30100

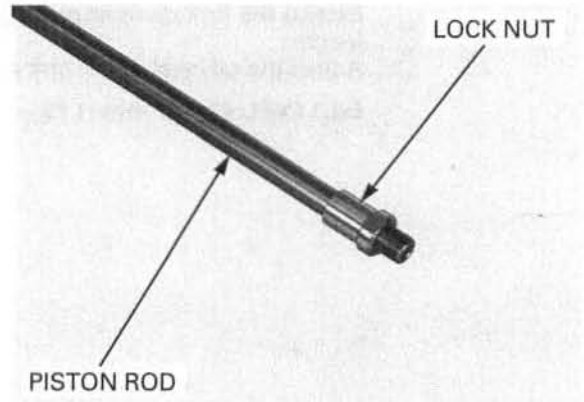
**TORQUE:** 30 N·m (3.1 kgf·m, 22 lbf·ft)



Hold the fork damper in an upright position and pump the fork piston rod 100 mm (3.9 in) slowly, several times.

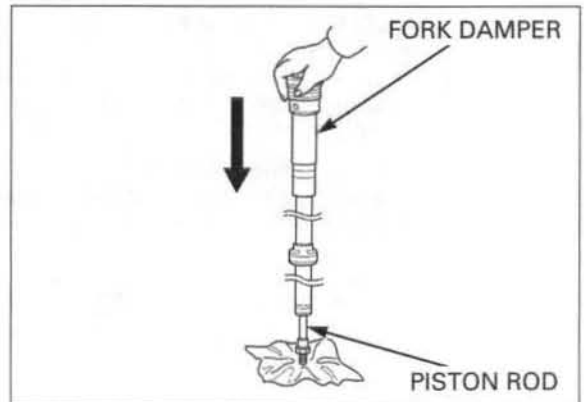


Turn the lock nut clockwise until it is lightly seated.



**NOTE:**

- Set the rebound adjuster and compression adjuster counterclockwise to the softest position.
- Check the fork damper piston rod sliding surface for damage.
- Apply fork oil to the fork damper piston rod sliding surface.



*Be careful not to bend or damage the fork damper piston rod when the piston rod is stroked.*

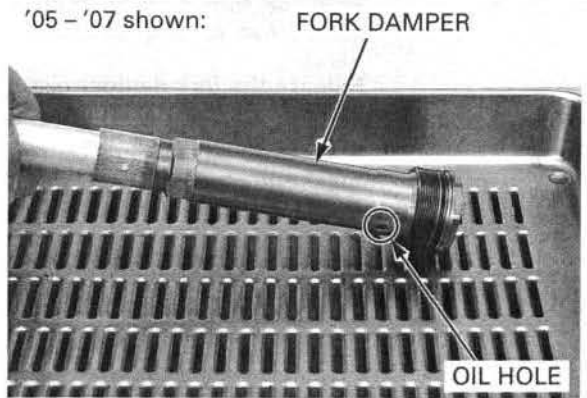
Cover the piston rod end with a clean shop towel to prevent damage.

Blow out any extra oil in the fork damper spring chamber by fully stroking the fork damper piston rod.



By doing this procedure, about 17 cm<sup>3</sup> of fork fluid will be drained from the damper spring chamber through the oil hole (After '07: oil holes). This will cause 175 cm<sup>3</sup> of fork fluid to be left in the chamber.

Drain the extra oil from the oil hole (After '07: oil holes) of the fork damper.



Blow out any oil from the oil hole (After '07: oil holes) of the fork damper using compressed air.

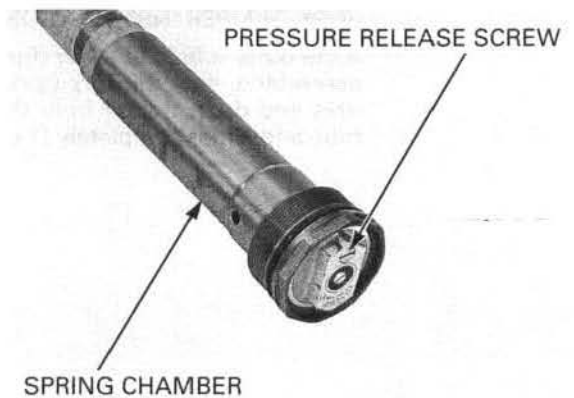
Wipe off the oil completely from the fork damper.



If you cannot use compressed air, remove the pressure release screw on the fork cap. Hold the fork damper upside down for 10 minutes and drain the oil from the fork damper spring chamber.

Tighten the pressure release screw to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**



## FORK DAMPER OPERATION INSPECTION

- Turn the compression adjuster counterclockwise to the softest position.
- Check the fork damper piston rod sliding surface for damage.
- Apply fork oil to the fork damper piston rod sliding surface.

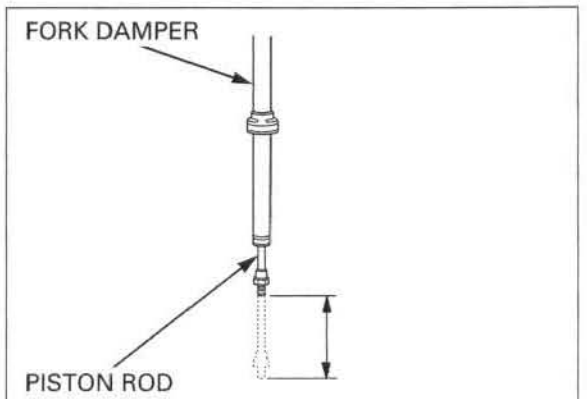
*Be careful not to bend or damage the fork damper piston rod when the piston rod is stroked.*

Inspect the fork damper operation after air bleeding (page 14-23).

Cover the piston rod end to prevent damage.

Fully stroke the fork damper piston rod by pushing down the fork damper. Check the fork damper piston rod for smooth operation.

If the fork damper piston rod operation is not smooth, check the piston rod for bends or damage.

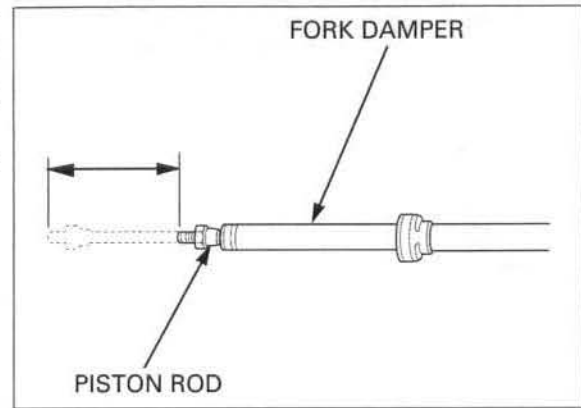


## FRONT WHEEL/SUSPENSION/STEERING

Hold the fork damper level while the fork damper piston rod is fully extended and compressed by hand.

Release the fork damper piston rod then check that it extends to its maximum length.

If the fork damper piston rod does not extend to maximum, bleed the fork damper again.

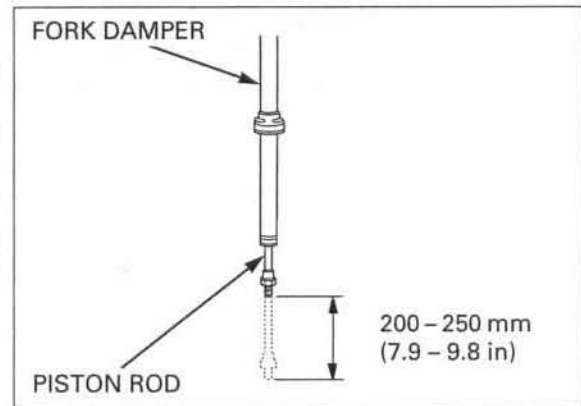


Wipe the oil completely off from the fork damper. Compress the fork piston rod 200 – 250 mm (7.9 – 9.8 in) from fully extended and hold the fork damper in an upright position for 10 minutes.

There should be no oil leaking from the fork damper spring chamber and piston rod.

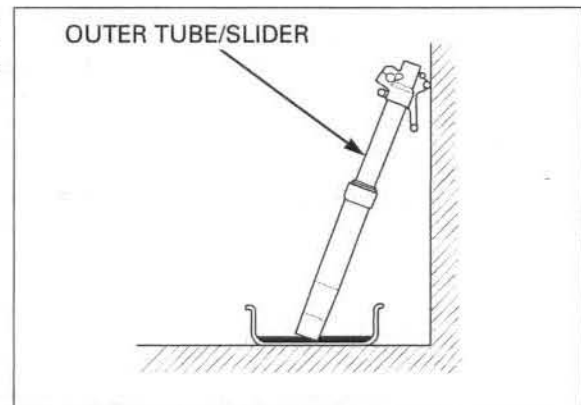
If oil leaks from the spring chamber or piston rod, replace the fork damper assembly.

Hold the fork damper on level ground and release the fork damper piston rod, then check that the piston rod extends to its maximum length.



### FORK DAMPER INSTALLATION/PREPARATION

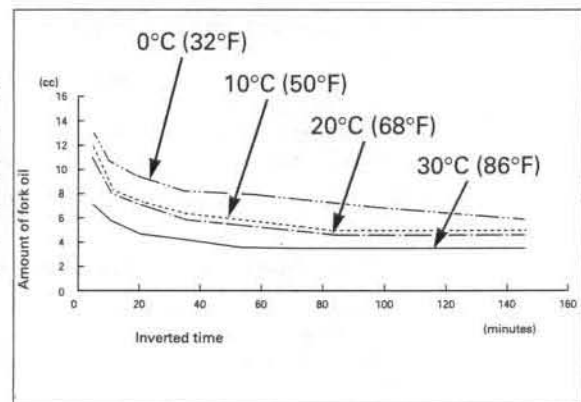
If the outer tube and slider (fork) have not been disassembled, turn the fork upside down for 20 minutes and drain the oil from the inside of the outer tube and slider completely (7 cc at 20°C/ 68°F).



Amount of fork oil left in the fork (without damper and spring)

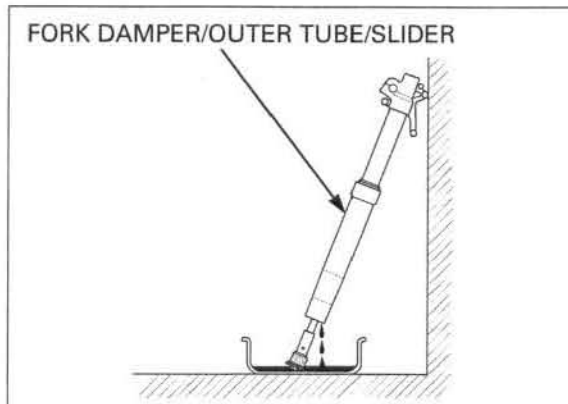
unit: cc

		minute							
		5	10	20	35	55	85	145	
°C/°F	30/86	7.1	5.9	4.7	4.2	3.5	3.5	3.5	
	20/68	10.6	8.2	7.1	5.9	5.6	4.7	4.7	
	10/50	11.8	8.3	7.2	6.2	5.8	4.9	4.8	
	0/32	12.9	10.6	9.4	8.2	7.9	7.1	5.9	



## FRONT WHEEL/SUSPENSION/STEERING

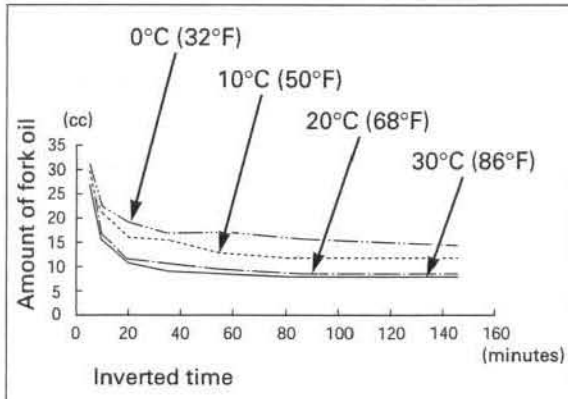
If the fork damper has not been disassembled from the outer tube/slider, turn it upside down for 20 minutes and drain the oil from the inside of the outer tube and slider completely (12 cc at 20°C/ 68°F).



Amount of fork oil left in the fork (within damper and spring)

unit: cc

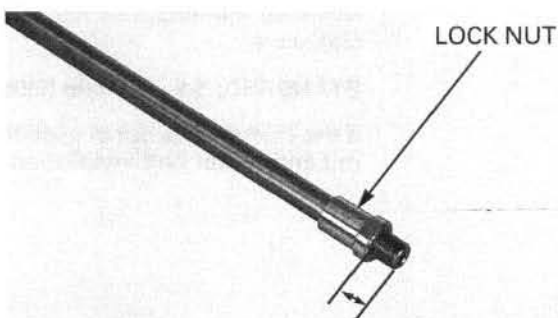
°C/F	minute							
	5	10	20	35	55	85	145	
30/86	27	15.3	10.6	9.4	8.3	7.9	7.9	
20/68	29.4	16.5	11.8	10.6	9.4	8.2	8.2	
10/50	28.2	21.4	16.5	15.3	12.9	11.8	11.8	
0/32	30.6	22.4	18.8	16.5	16.5	15.3	14.1	



Tighten the lock nut fully and measure the length as shown.

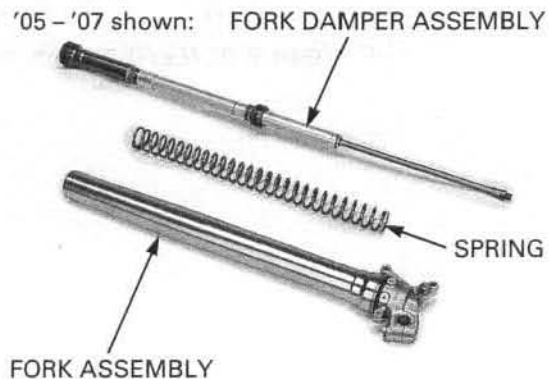
**STANDARD: 11 – 13 mm (0.43 – 0.51 in)**

Wipe the oil completely off the fork damper.



### FORK DAMPER INSTALLATION

Wipe the oil completely off the fork spring. Install the fork spring into the fork assembly. Temporarily install the fork damper assembly into the fork assembly.



## FRONT WHEEL/SUSPENSION/STEERING

*Do not over-tighten the vise on the axle holder.*

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

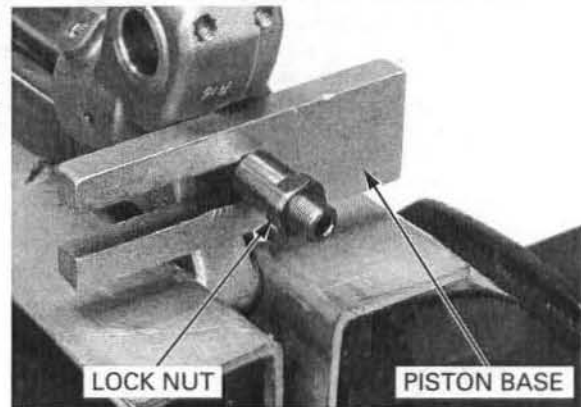
Push the fork damper out of the lock nut from slider, while install the piston base or mechanic's stopper tool between the axle holder and lock nut.

### TOOL:

Piston base

Fork rod stopper

07958-2500001 or  
07AMB-KZ3A100  
(U.S.A. only)



Measure the combined length of the lock nut and piston rod end again.

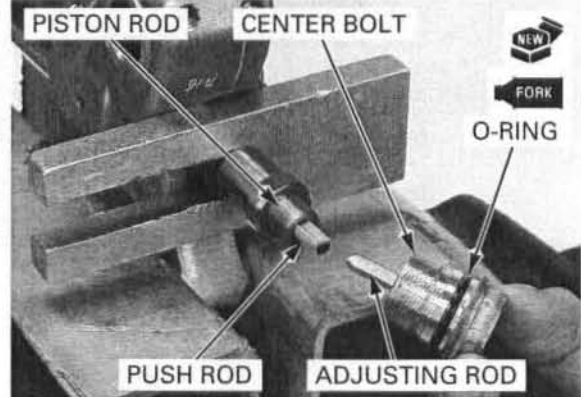
**STANDARD: 11 – 13 mm (0.43 – 0.51 in)**

*Check the push rod installation by turning the push rod right and left.*

Install the push rod into the piston rod until it stops.

Apply fork oil to new O-ring and install it.

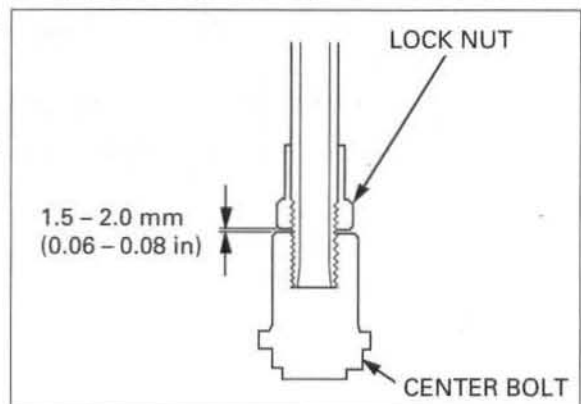
Install the fork center bolt to the fork damper piston rod by aligning the flat-side of the center bolt adjusting rod with the flat-side of the push rod. Tighten the center bolt fully by hand.



Measure the length of the lock nut and center bolt clearance.

**STANDARD: 1.5 – 2.0 mm (0.06 – 0.08 in)**

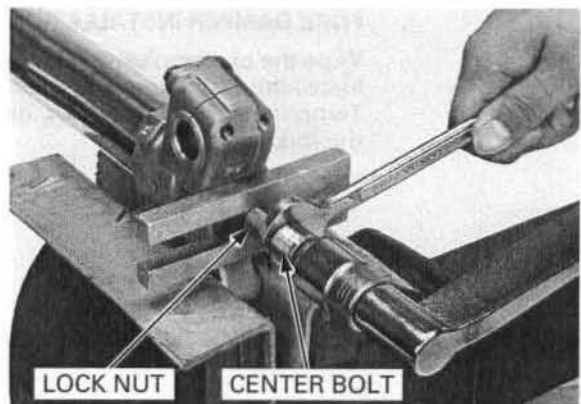
If the clearance is out of specification, check the lock nut and center bolt installation.



Tighten the lock nut to the center bolt by hand until they touch.

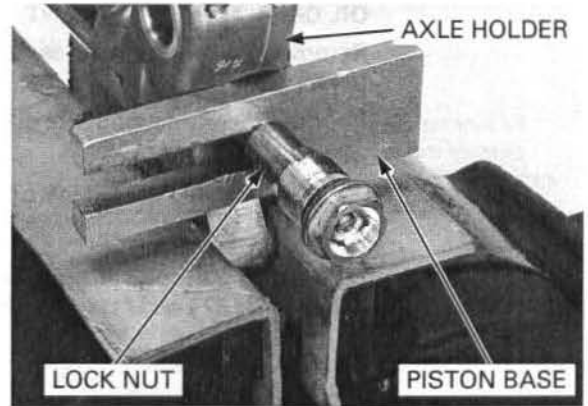
Tighten the lock nut to the specified torque.

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



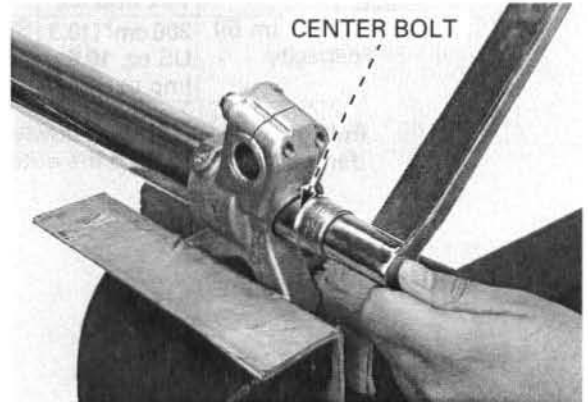
*Be careful not to damage the lock nut and fork center bolt hole.*

Remove the piston base or mechanic's stopper tool between the axle holder and lock nut while pushing the fork damper.



Install the fork center bolt into the axle holder and tighten it to the specified torque.

**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**

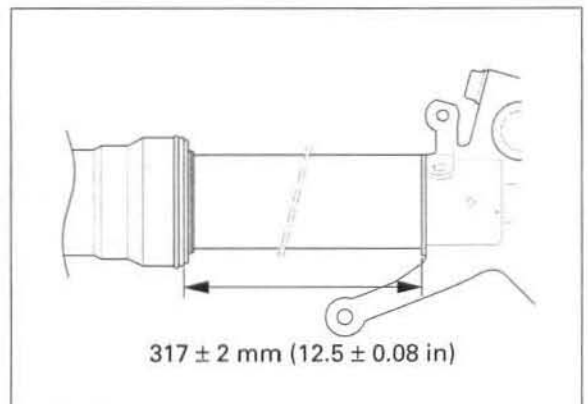


Measure the length between the axle holder and outer tube.

Compare the length at assembly and disassembly; they should be same length.

**STANDARD: 317 ± 2 mm (12.5 ± 0.08 in)**

If the length at assembly is longer than at disassembly, check the center bolt and lock nut installation.



## FRONT WHEEL/SUSPENSION/STEERING

### OIL CAPACITY ADJUSTMENT

Remove the fork damper assembly from the outer tube.

Pour the recommended fork oil into the fork leg.

#### RECOMMENDED OIL:

**Pro Honda HP Fork Oil 5W or equivalent**

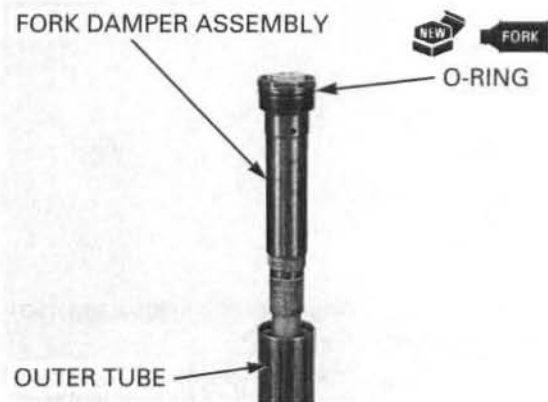
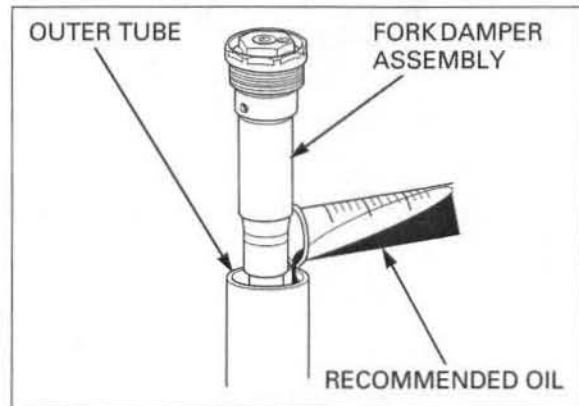
#### STANDARD OIL CAPACITY:

'05 - '07: 332 cm<sup>3</sup> (11.2 oz, 11.7 Imp oz)

After '07: 324 cm<sup>3</sup> (11.0 US oz, 11.4 Imp oz)

Maximum oil capacity	402 cm <sup>3</sup> (13.6 US oz, 14.2 Imp oz)	Slightly stiffer near full compression.
Minimum oil capacity	306 cm <sup>3</sup> (10.3 US oz, 10.8 Imp oz)	Slightly softer near full compression.

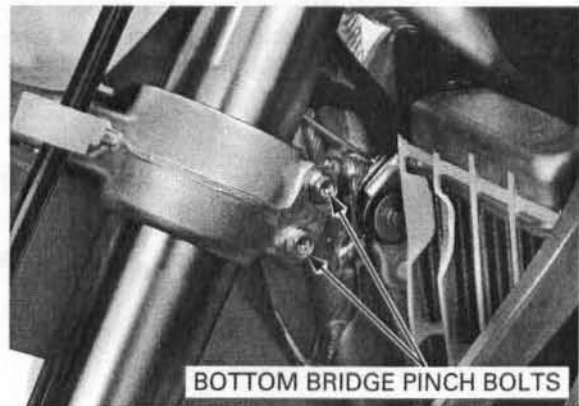
Pull up the outer tube slowly and install the fork damper assembly into the outer tube.



### INSTALLATION

Install the fork leg and tighten the fork bottom bridge pinch bolts to the specified torque.

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



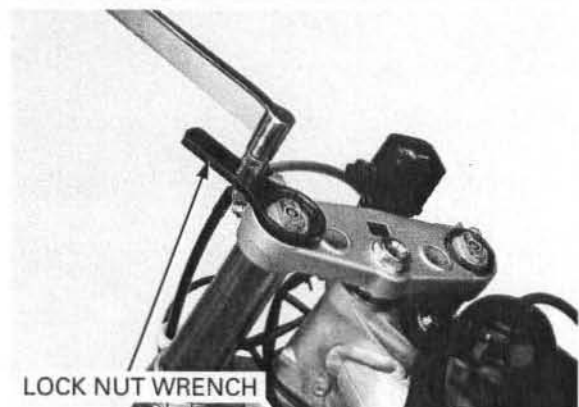
Tighten the fork damper to the specified torque using the special tool.

#### TOOL:

**Lock nut wrench, 50 mm      07WMA-KZ30100**

**TORQUE: Actual: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

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



*Be sure the oil capacity is the same in both fork legs.*

*Refer to torque wrench reading information, on (page 14-5) service information.*

## STANDARD POSITION

Loosen the bottom bridge pinch bolts.

For ease when releasing the air pressure after the forks are installed, position the fork outer tubes so the pressure release screws are in front of the compression adjusters.

Align the top surface of the top bridge with the outer tube upper surface as shown.



Tighten the fork bottom bridge pinch bolts to the specified torque.

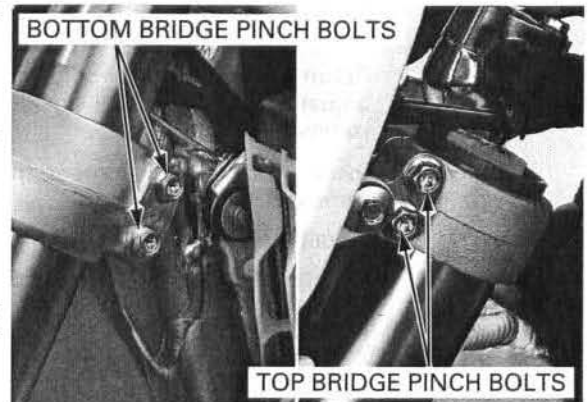
**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

Tighten the fork top bridge pinch bolts to the specified torque.

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

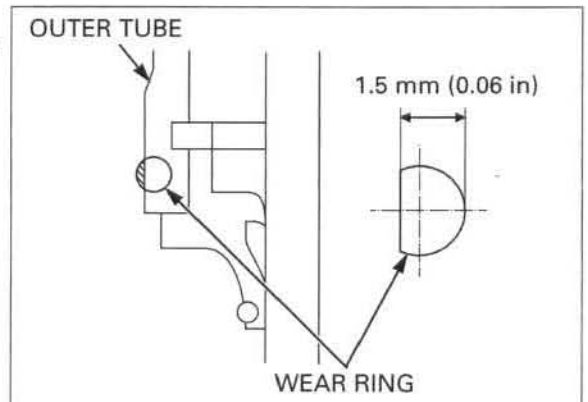
### NOTICE

*Over-tightening the pinch bolts can deform the outer tube. A deformed outer tube must be replaced.*



Inspect the wear rings for wear or damage.

Replace the wear ring, if it is 1.5 mm (0.06 in) or flat with the outer tube.



Make sure the wear rings with their end gaps facing rearward.





## FRONT WHEEL/SUSPENSION/STEERING

Clean and apply locking agent to the fork protector mounting bolt threads.  
Install the fork protector and tighten the mounting bolts to the specified torque.

**TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)**

Clean and apply locking agent to the front brake caliper mounting bolt threads.  
Install the front brake caliper and tighten the mounting bolts to the specified torque.

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

Install the tripmeter cable clamp and screws.  
Tighten the tripmeter cable clamp screws to the specified torque.

**TORQUE: 0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)**

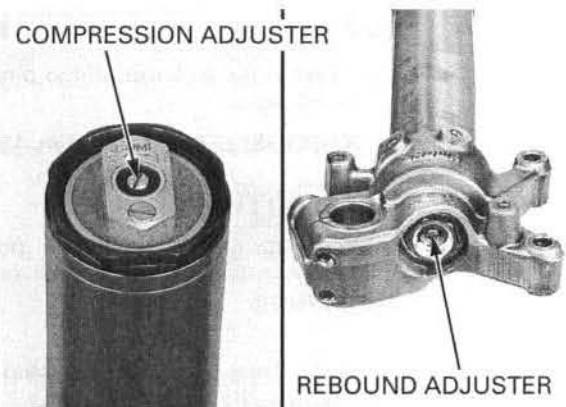
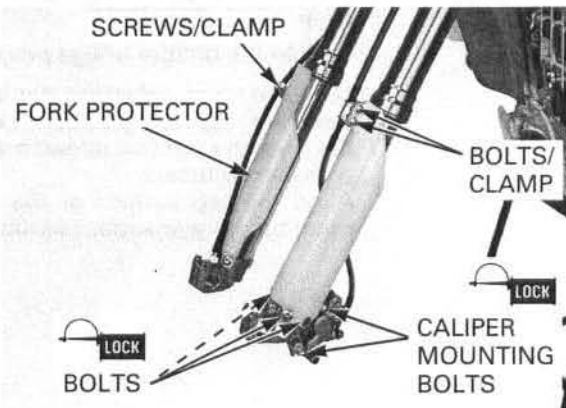
Install the brake hose clamp and bolts.

Return the rebound adjuster and compression adjuster to the original positions as noted during removal.

*After '07:* Install the steering damper (page 14-38) if it was removed.

Install the following:

- Front visor ('05 - '07: page 3-5, After '07: page 3-6)
- Front wheel (page 14-12)



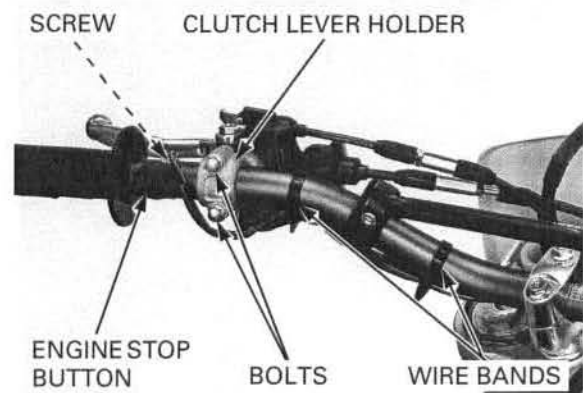
## HANDLEBAR

### REMOVAL

Remove the handlebar pad from the handlebar.

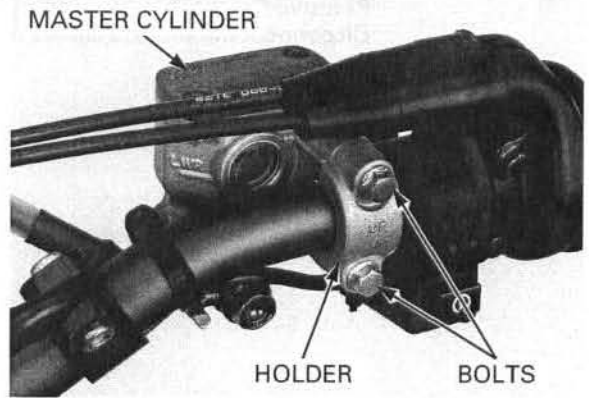


Remove the wire bands.  
Remove the screw and engine stop button.  
Remove the bolts and clutch lever holder.

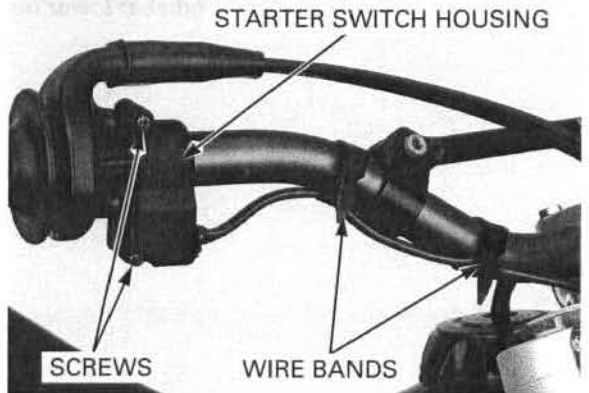


*Do not disconnect the hydraulic line. Keep the brake master cylinder upright to prevent air from entering the hydraulic system.*

Remove the bolts and front brake master cylinder holder.



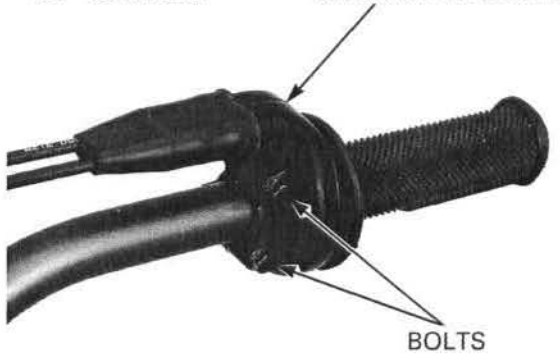
Remove the wire bands. Remove the screws and engine starter switch housing.



If you will not disassemble the throttle housing, remove the throttle housing as an assembly as follows.

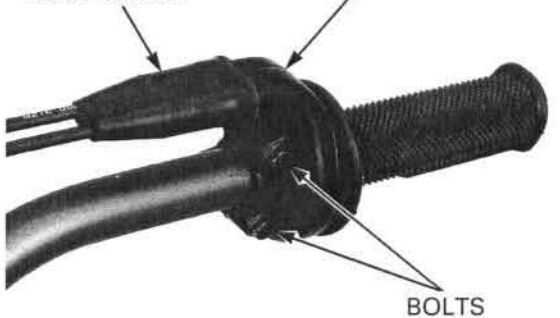
Loosen the throttle housing bolts, turn the handlebar to the right fully, then remove the throttle housing.

'05 - '06 shown: THROTTLE HOUSING



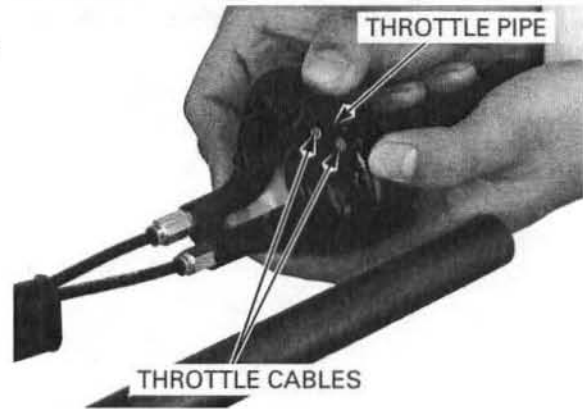
If you will disassemble the throttle housing, remove the dust cover and bolts.

'05 - '06 shown: DUST COVER THROTTLE HOUSING

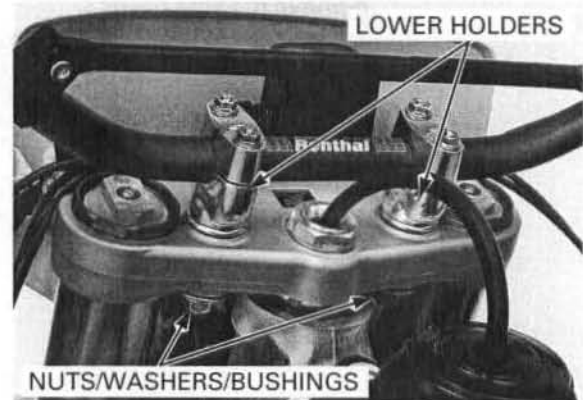


## FRONT WHEEL/SUSPENSION/STEERING

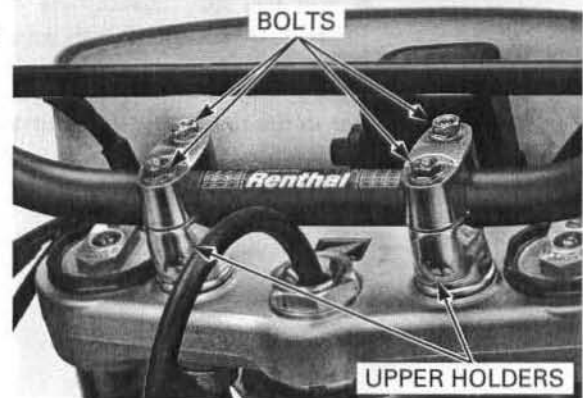
Remove the throttle housing from handlebar.  
Disconnect the throttle cables from the throttle pipe.



Loosen the handlebar lower holder nuts.



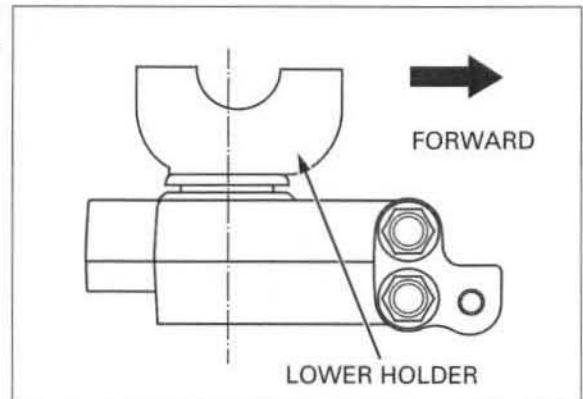
Remove the bolts, upper holders and handlebar.  
Remove the nuts, washers, bushings and lower holders.



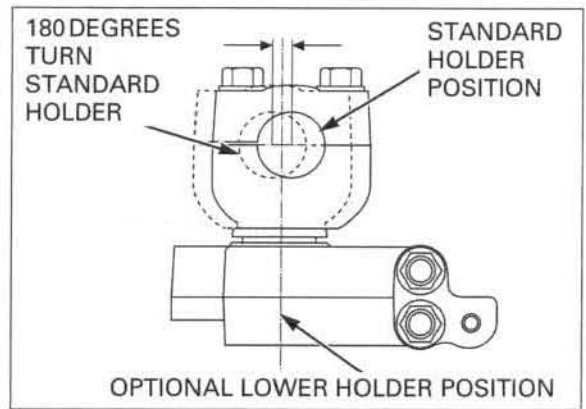
### INSTALLATION

Install the bushings, lower holders, washers and handlebar holder nuts as shown (standard position).

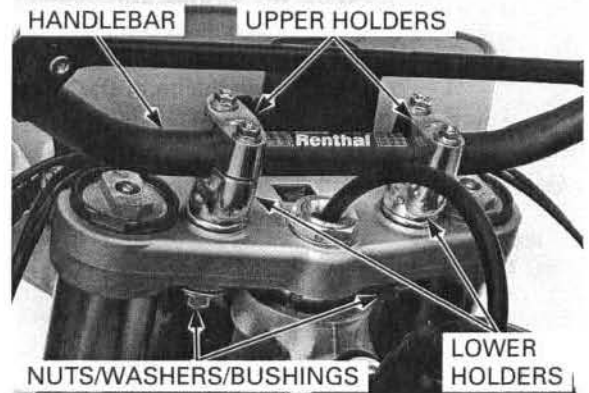
The lower holder standard position as shown.



- By turning the lower holder 180 degrees, you can install it 6 mm (0.24 in) rearward of the standard position. By installing the optional lower holder, you can set it 3 mm (0.12 in) rearward of the standard position.
  - Standard: 3 mm (0.12 in) offset to forward
  - Standard 180 degrees turn: 3 mm (0.12 in) offset to rearward
  - Optional: No offset



Loosely install the handlebar and upper holders.



Align the paint mark on the handlebar with the top of the lower holder.

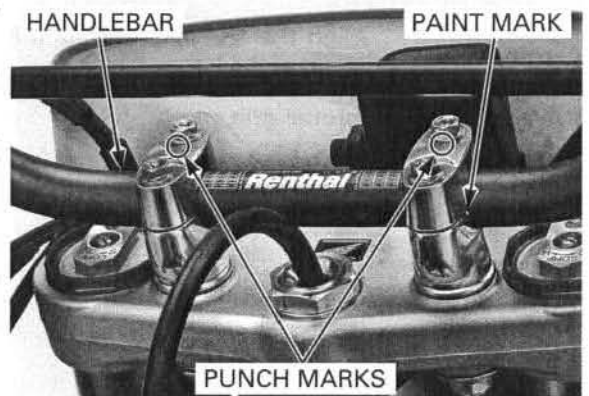
Place the upper holder on the handlebar with the punch marks facing forward.

Install and tighten the front handlebar upper holder bolts first, then tighten the rear bolts to the specified torque.

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

Tighten the handlebar lower holder nuts to the specified torque.

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

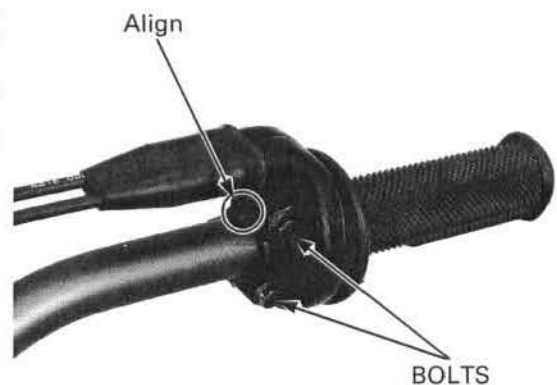


If you did not disassemble the throttle housing, apply grease to the sliding surface of the throttle pipe.

Install the throttle housing, aligning the end of the housing with the paint mark on the handlebar.

Tighten the throttle housing upper bolt first, then the lower bolt.

Adjust the throttle grip freeplay (page 4-9).



## FRONT WHEEL/SUSPENSION/STEERING

If you disassemble the throttle housing, install it as follows:

Apply oil to the throttle pipe sliding surface.

Apply grease to the throttle cable end and sliding area.

Connect the throttle cables to the throttle pipe.

Install the throttle housing, aligning the end of the housing with the paint mark on the handlebar.

Tighten the throttle housing upper bolt first, then the lower bolt.

Tighten the throttle bolt to the specified torque.

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

Install the throttle housing dust cover.

Adjust the throttle grip freeplay (page 4-9).

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 throttle pipe and the left end of the handlebar.

Wait 3 – 5 minutes and install the grip.

Rotate the grips for even application of the adhesive.

*Allow the adhesive to dry for approximately 1 hour before using.*

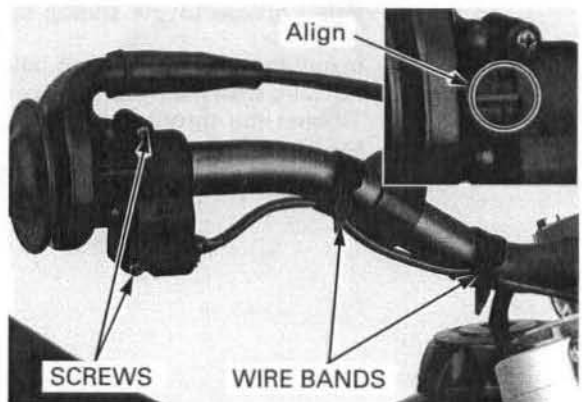
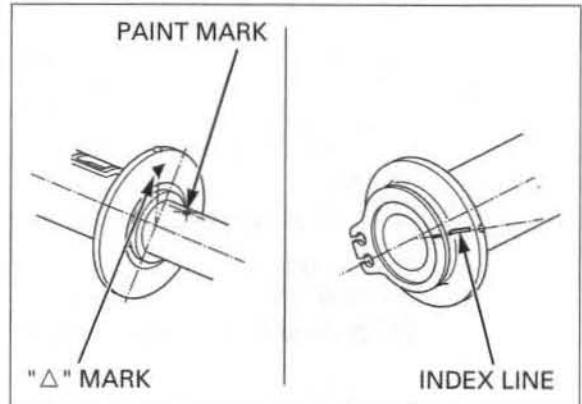
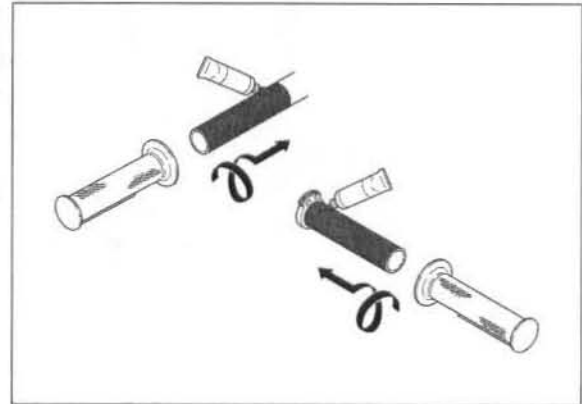
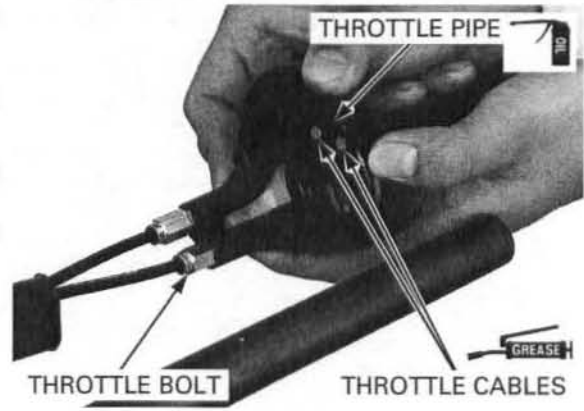
Align the "△" mark on the left grip with the paint mark on the handlebar.

Align the mark on the right grip with the edge of the throttle grip end.

Align the engine start switch housing as shown. Install and tighten the screws to the specified torque.

**TORQUE: 1.15 N·m (0.1 kgf·m, 0.8 lbf·ft)**

Install the wire bands.

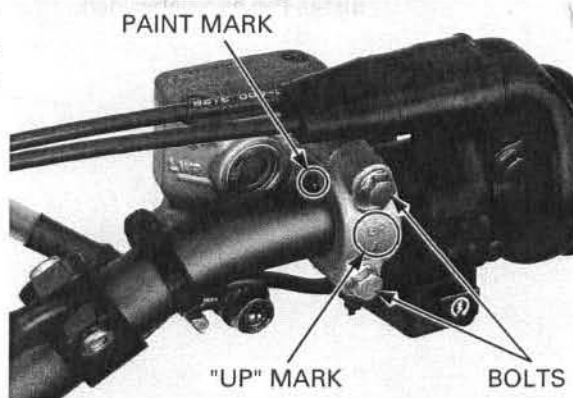


Position the brake master cylinder on the handlebar.

Install the master cylinder holder with its "UP" mark facing up and align the end of the holder with the paint mark on the handlebar.

Tighten the upper master cylinder holder bolt first, then tighten the lower bolt.

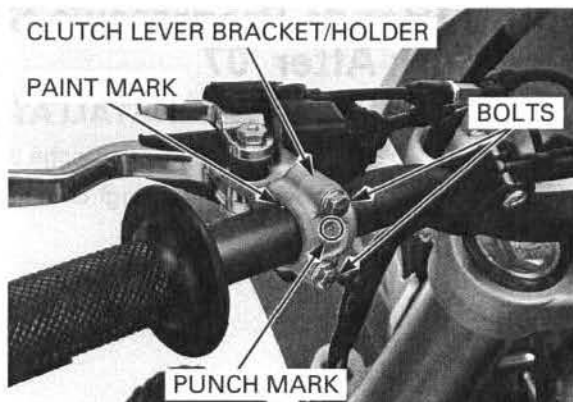
**TORQUE: 9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)**



Install the clutch lever bracket and holder with the punch mark on the holder facing up.

Align the end of the holder with the paint mark on the handlebar.

Tighten the upper bolt first, then the lower bolt securely.

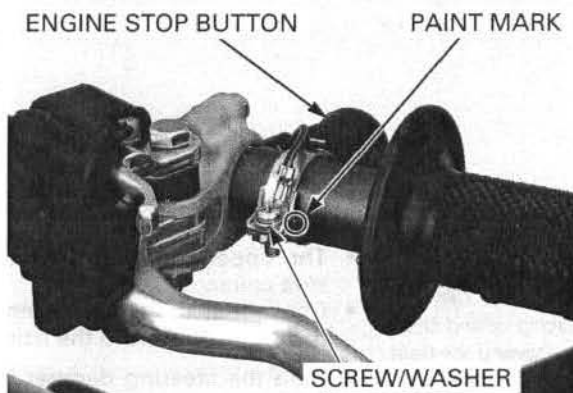


Install the engine stop button on the handlebar. Align the end of the holder with the paint mark on the handlebar.

Install the engine stop button screw with the washer and engine stop button wire terminal.

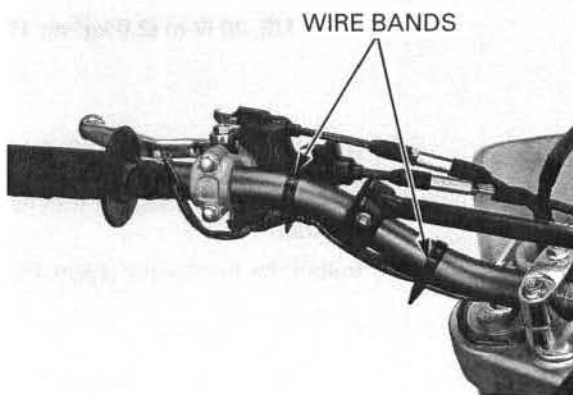
Tighten the engine stop button screw to the specified torque.

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



*Route the wire properly ('05 - '07: page 1-25, After '07: page 1-32).*

Clamp the engine stop button/clutch switch wire with wire bands.





## FRONT WHEEL/SUSPENSION/STEERING

Install the handlebar pad.

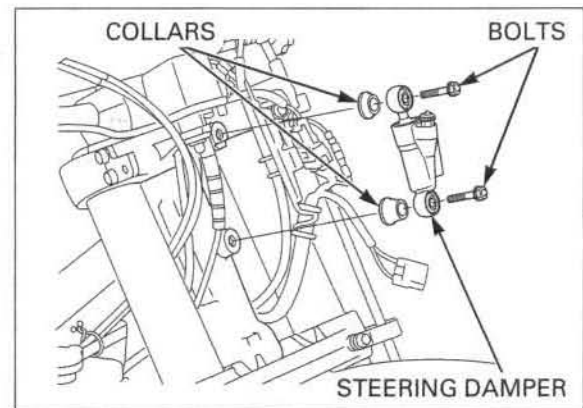


## HPSD (Honda Progressive Steering Damper): After '07

### REMOVAL/INSTALLATION

Remove the front visor (page 3-5).

Remove the steering damper bolts, collars and steering damper.



Clean and apply a locking agent to the steering damper mounting bolts.

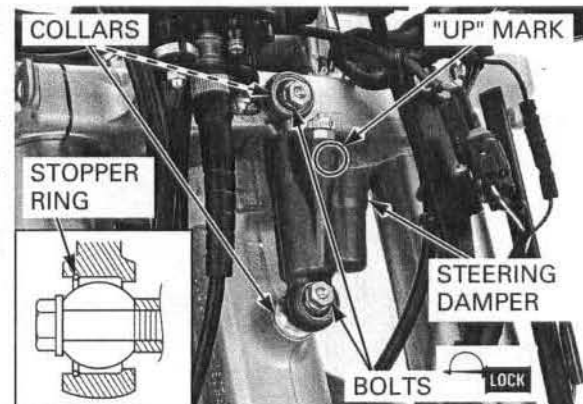
*Install the steering damper onto the steering head pipe with its "UP" mark facing up and facing toward the front.*

Install the steering damper, collars and bolts.

- The upper side collar is shorter than the lower side collar.
- Check that the stopper ring side of the damper rod is facing toward the front.

Tighten the steering damper bolts to the specified torque.

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



Raise the front wheel off the ground by placing a workstand or equivalent under the engine. Check that the steering moves smoothly from side-to-side.

Install the front visor (page 3-5).





**INSPECTION**

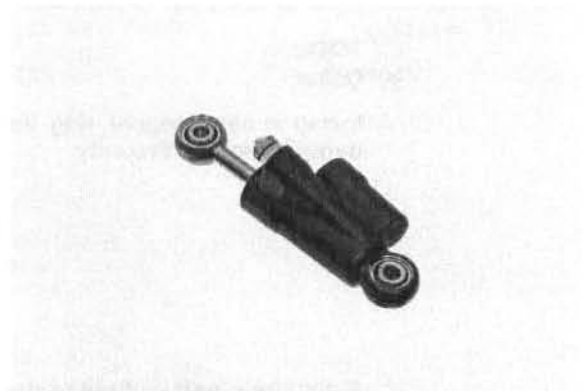
Remove the steering damper (page 14-38).

Visually inspect the steering damper for wear or damage.

Check the following:

- Damper case for deformation or oil leakage
- Damper rod for bending or damage

Replace the damper case or damper rod if necessary.



*Measure the damper rod length with the "inside" jaws of a vernier caliper.*

Fully extend and compress the damper rod by hand. Release the damper rod then check that it extends to its maximum length.

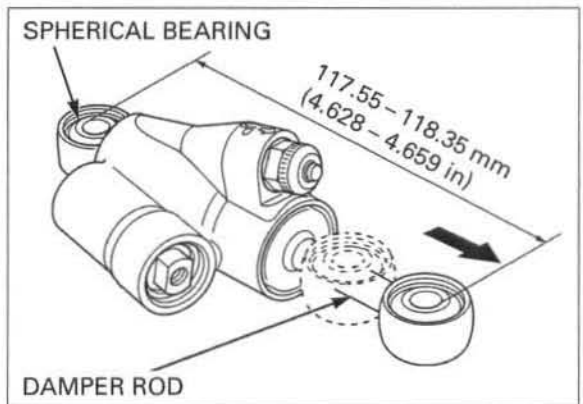
**STANDARD (maximum length):**  
**117.55 – 118.35 mm (4.628 – 4.659 in)**

Check the damper rod for smooth operation. If the damper rod operation is not smooth, check the damper rod for bends or damage. If the damper rod does not extend to maximum, disassemble the steering damper (page 14-40).

Check the spherical bearings for wear or damage. Move the spherical bearing with your finger. The spherical bearing should move smoothly and quietly.

Replace the spherical bearing if it does not move smoothly or quietly.

Install the steering damper (page 14-38).

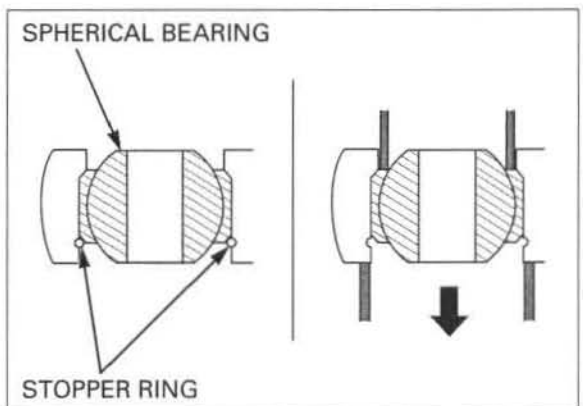


**SPHERICAL BEARING REPLACEMENT**

Remove the steering damper (page 14-38).

Remove the stopper ring.

Press the spherical bearing out of the damper mounts.



## FRONT WHEEL/SUSPENSION/STEERING

Drive the bearing in evenly; do not allow it to tilt.

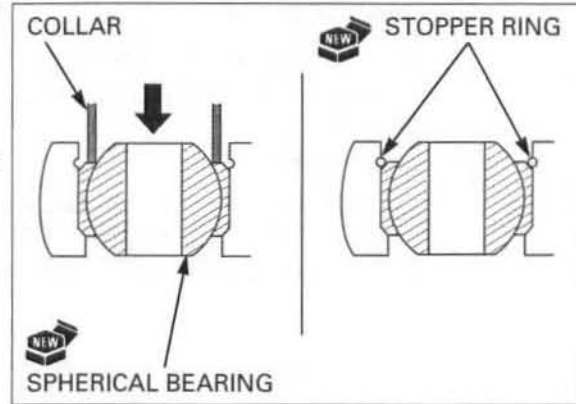
Press a new spherical bearing into the damper mounts using the special tool.

### TOOL:

Collar

07KPF-VD60100

Install a new stopper ring into the groove of the damper mounts securely.

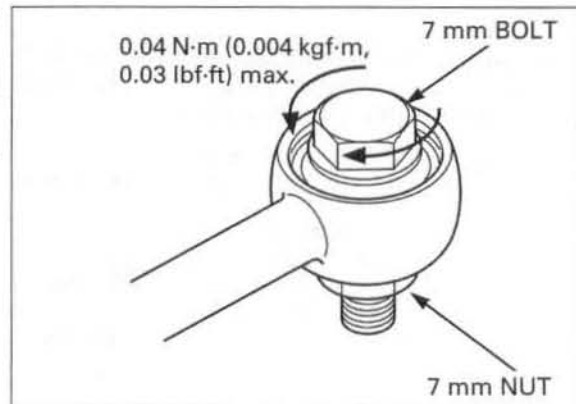


Set a 7 mm bolt and nut to the spherical bearing as shown.

Measure the stabled rotation torque of the spherical bearing inner by rotating the bolt.

**STANDARD: 0.04 N·m (0.004 kgf·m, 0.03 lbf·ft) max.**

Install the steering damper (page 14-38).



## DISASSEMBLY

Record the damping force adjuster position.

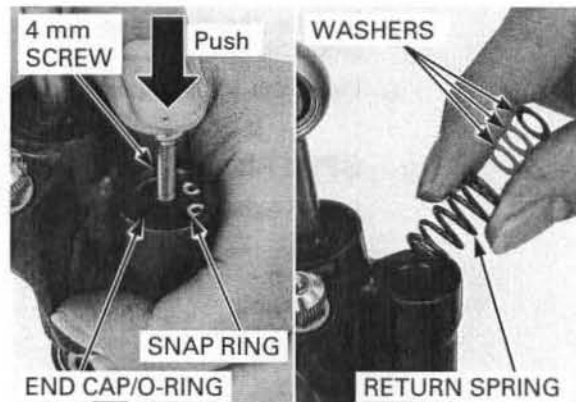
Remove the steering damper (page 14-38).

Clean the damper assembly thoroughly.

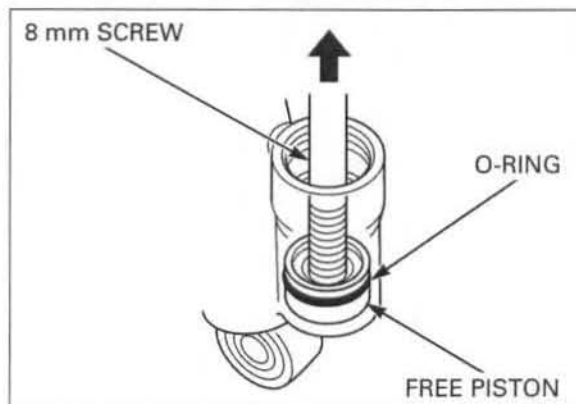
Install a 4 mm screw to the end cap.

Remove the snap ring while pushing the end cap, and then remove the end cap and O-ring.

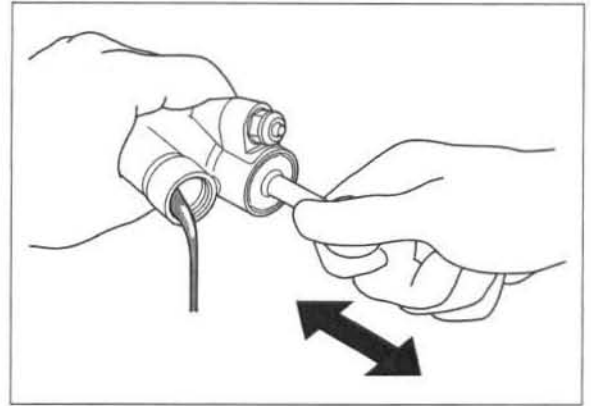
Remove the washers and return spring from the damper case.



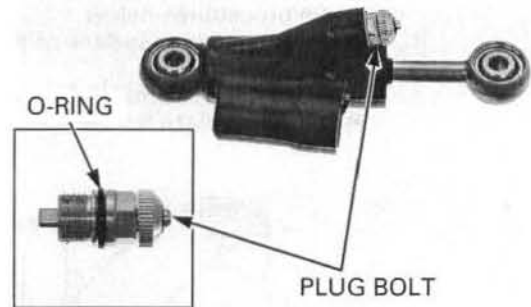
Install a 8 mm screw to the free piston, then remove the free piston and O-ring.



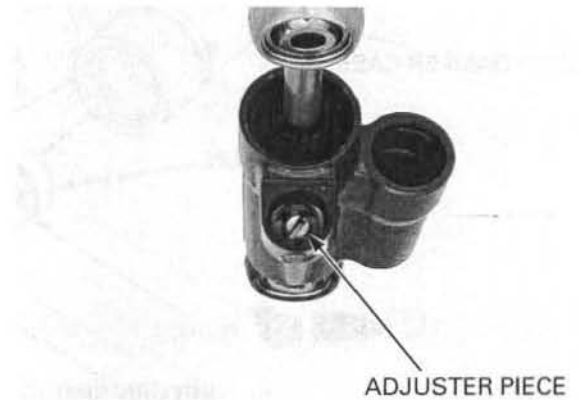
Drain the damper oil from the damper case.



Remove the plug bolt and O-ring.



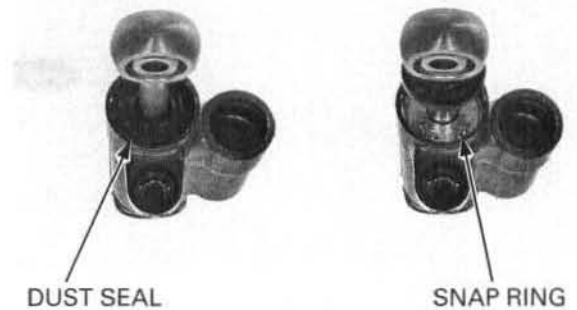
Remove the adjuster piece from the damper case.



*Always replace the damper rod assembly with a new one.*

Remove the dust seal.

Remove the snap ring from the damper case groove.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the damper rod assembly out of the damper case.

Check the damper case inner surface for abnormal scratches.

Replace the damper case if necessary.

DAMPER CASE

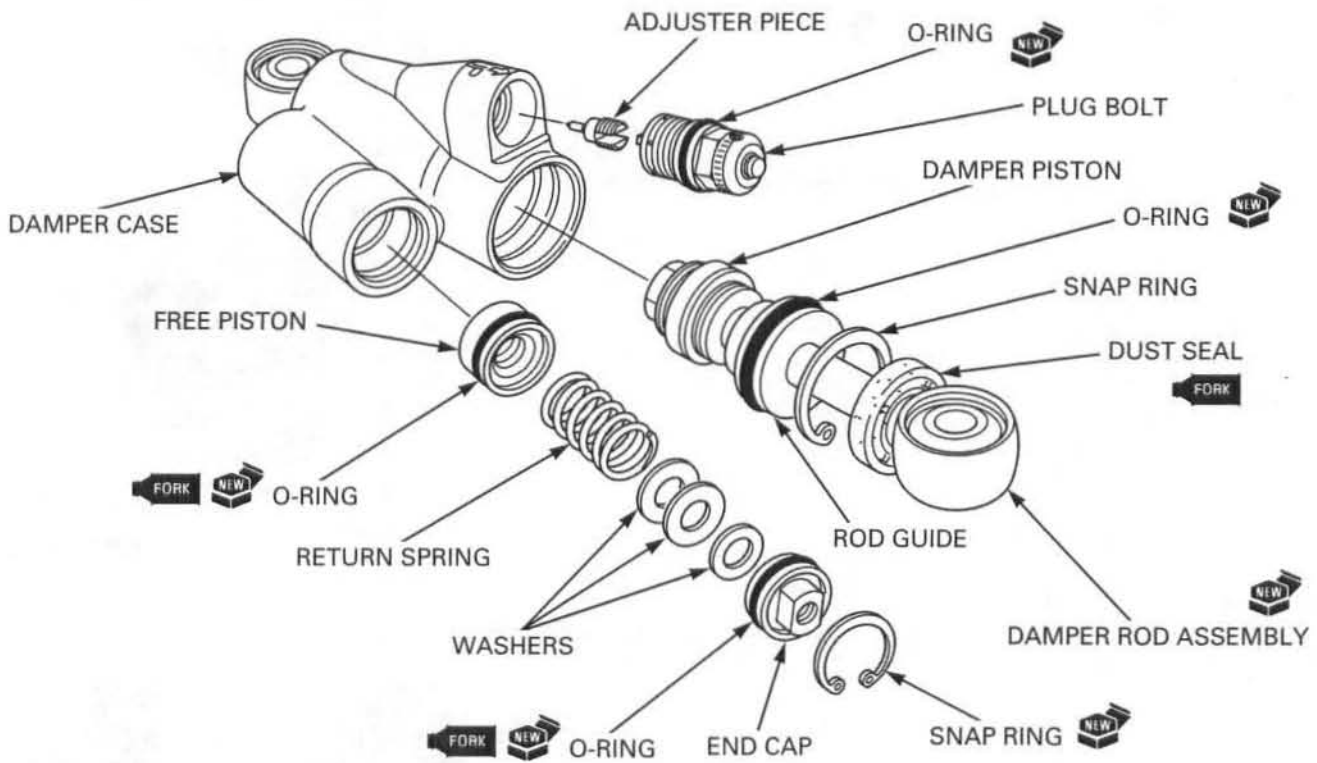


DAMPER ROD ASSEMBLY

### HPSD ASSEMBLY

**NOTE:**

- When assembling the steering damper, follow the procedures below.
- Clean the inner surface of the damper case thoroughly.
- Bleed the air completely in oil.
- Always replace the damper rod as an assembly with a new one.



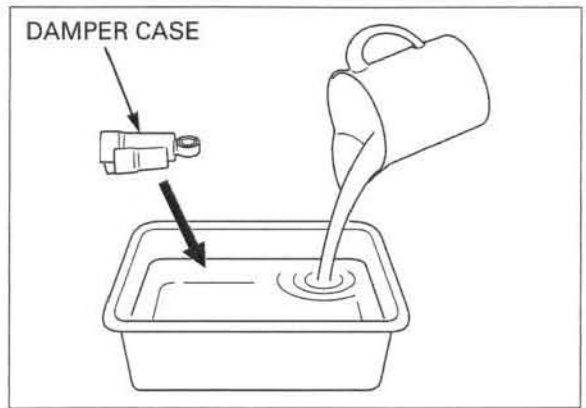
Check that the damper oil temperature is 20°C (68°F).

Pour recommended damper oil into a suitable container until the steering damper is fully submerged.

**RECOMMENDED DAMPER OIL:**  
**Pro-Honda HP Fork Oil 5W or equivalent**

- Check the damper oil for contamination.
- Do not allow foreign materials to enter the damper oil.

Submerge the damper case into the oil.

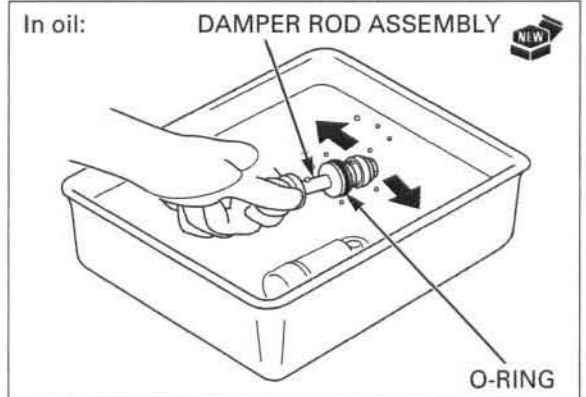


Submerge the damper rod into the oil.

Bleed any trapped air at the O-ring seating surface by turning the O-ring.

Shake a new damper rod assembly until there are no air bubbles.

- Be careful not to damage the damper rod and damper piston, especially around the damper rod sliding surface.



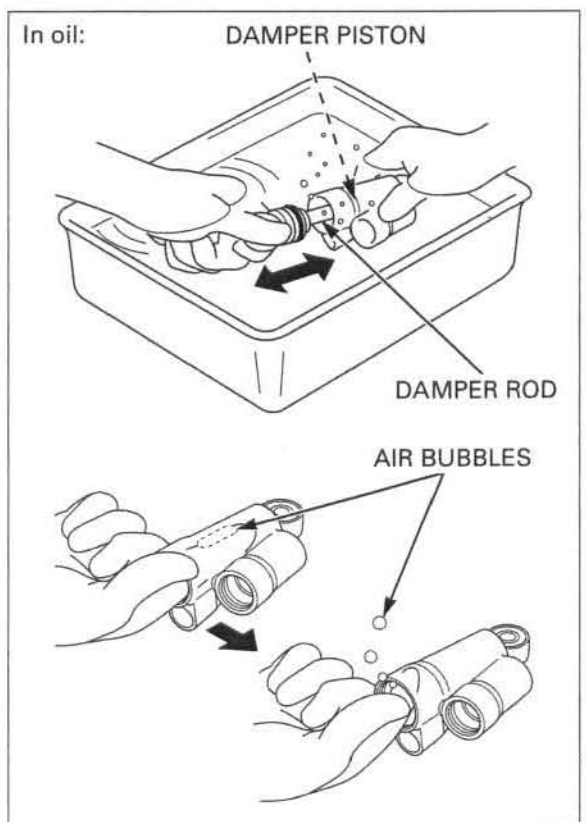
Bleed any air out from the damper case and damper piston following the procedure below:

1. Install the damper piston into the damper case, pump the damper rod quickly.

**NOTE:**

- To open the piston valve, pump the piston rod quickly.
2. Remove the damper piston from the damper case.
  3. Bring any air out from the damper case by using your finger as shown.
  4. Repeat steps 1 to 3 until there are no air bubbles in the damper case and damper piston 3 times for complete air bleeding.

Install the damper rod into the damper case carefully.



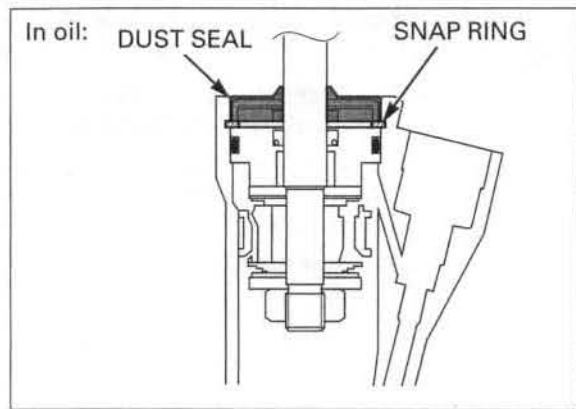
## FRONT WHEEL/SUSPENSION/STEERING

Keep the damper case submerged in oil.

Install the snap ring to the damper case groove.

- Be careful not to damage or deform the snap ring.
- Be certain the snap ring is firmly seated in the groove.

Install the dust seal to the damper case until it is flush with the damper case surface.



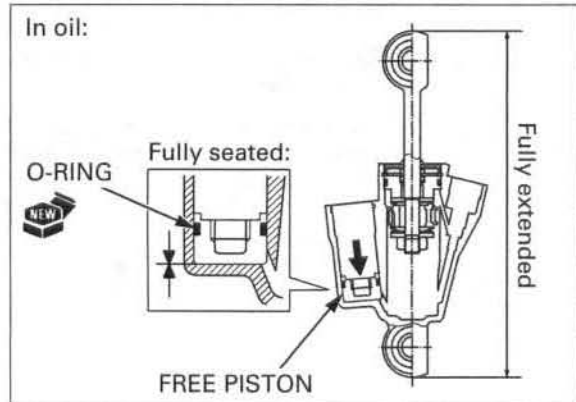
Fully extend the damper rod.

Bleed any trapped air at the O-ring seating surface by turning the O-ring.

Install a new O-ring to the free piston.

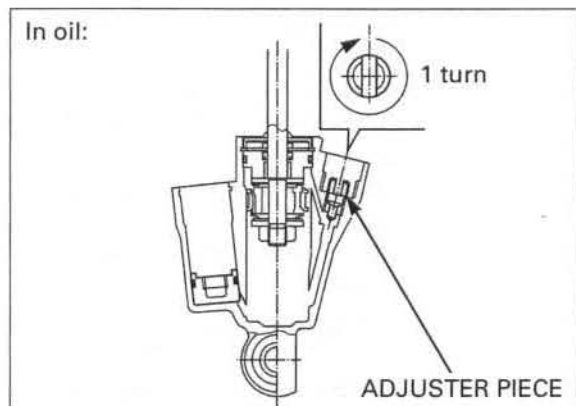
Install and push the free piston fully into the damper case while holding the damper rod at maximum length.

- Check that the free piston is fully seated to the damper case.



Keep the damper assembly submerged in oil.

Install the adjuster piece into the threads of the damper case and thread it one turn.



Check that the damper rod is fully extended to its maximum length.

Bleed any trapped air at the O-ring seating surface by turning the O-ring.

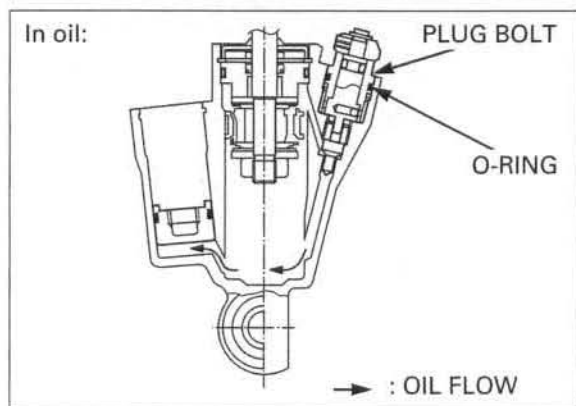
Install a new O-ring to the plug bolt.

Make sure the adjuster knob moves freely before tightening the plug bolt.

Install and tighten the plug bolt securely.

### NOTE:

Oil is displaced as the adjuster piece and plug bolt are installed into the damper case. The displaced oil causes the free piston to move slightly as shown in the illustration.



NEW

Remove the steering damper from the oil.  
Drain the damper oil from the sub tank.

Gauge the depth between the spring seating surface of the free piston and surface of the damper case using the special tool as shown.

**TOOL:**  
**Depth gauge 07AMJ-MENA100**

Before using the tool, make sure that the shouldered end of the probe is extending from the collar side of the depth gauge.

Insert the collar of the depth gauge into the sub tank. Loosen the thumb screw and lower the shouldered end of the probe until it stops. Tighten the thumb screw and remove the tool.

Measure the depth of the free piston with a caliper by measuring the distance between the end of the probe and the collar.

**STANDARD:**  
**27.3 – 27.9 mm (1.07 – 1.10 in)**  
**at oil temperature 20°C (68°F)**

Measure the oil temperature.

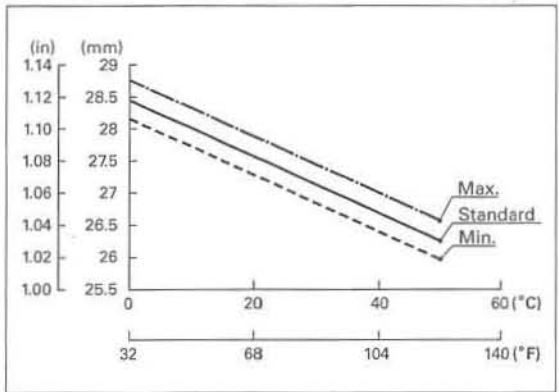
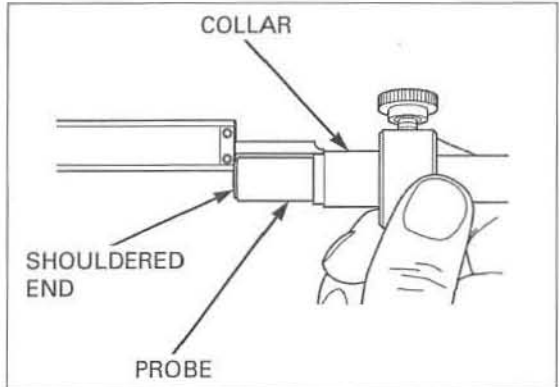
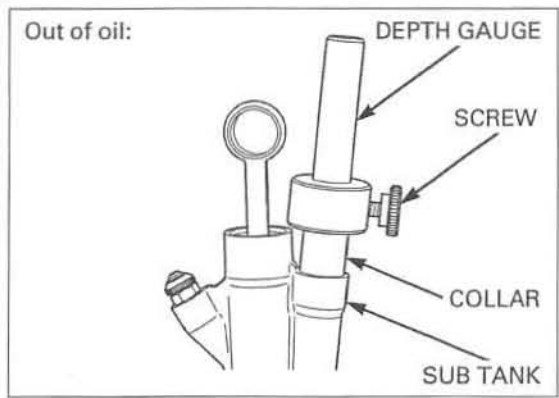
If measured temperature is other than 20°C (68°F), refer to the oil chart (page 14-45).

If the measured depth is other than the standard length, disassemble the steering damper and start over.

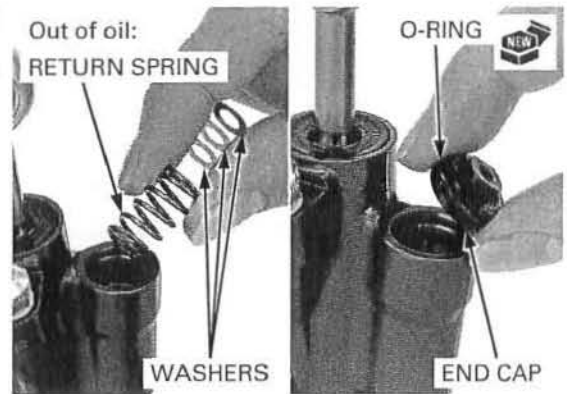
The depth of the free piston will change according to the oil temperature as shown.

unit: mm (in)

		Depth		
		Max.	Standard	Min.
OIL	0/32	28.8 (1.13)	28.5 (1.12)	28.2 (1.11)
	10/50	28.3 (1.11)	28.0 (1.10)	27.7 (1.09)
	20/68	27.9 (1.10)	27.6 (1.09)	27.3 (1.07)
	30/86	27.5 (1.08)	27.2 (1.07)	26.9 (1.06)
	40/104	27.0 (1.06)	26.7 (1.05)	26.4 (1.04)
	50/122	26.6 (1.05)	26.3 (1.04)	26.0 (1.02)



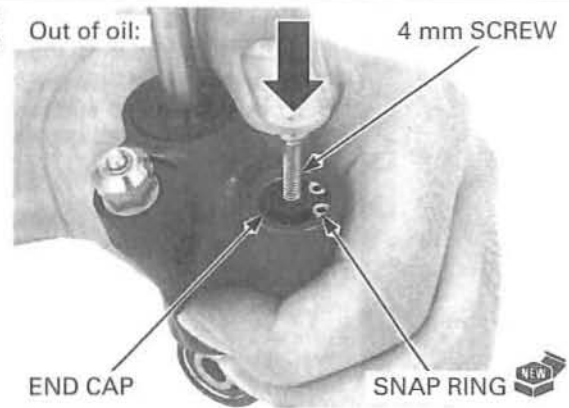
Install the return spring and washers into the damper case.  
Apply damper oil to a new O-ring and install it to the end cap groove.  
Install the end cap.





## FRONT WHEEL/SUSPENSION/STEERING

*Be certain the snap ring is firmly seated in the groove.* Thread a 4 mm screw to the end cap and install a new snap ring to the damper case while pushing the end cap until the snap ring groove appears.

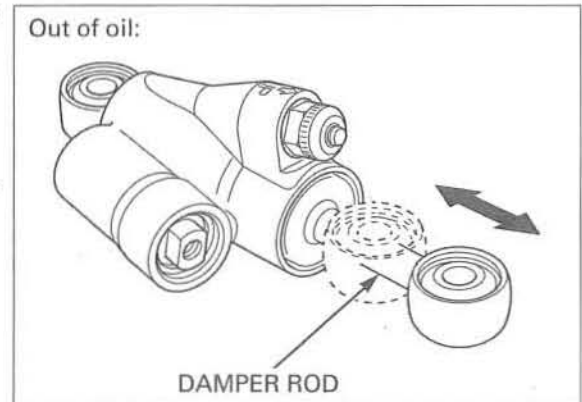


Check the operation of the damper rod, pump it slowly, extend or compressed by hand.

Check the following:

- Oil leakage
- Abnormal noise by trapped air

If you hear abnormal noise by trapped air, reassemble the steering damper.



*Measure the damper rod length with the "inside" jaws of a vernier caliper.*

Measure the length between the spherical bearings as shown:

### STANDARD:

**Fully compressed damper rod length:**  
93.55 – 94.35 mm (3.683 – 3.715 in)

**Fully extended damper rod length:**  
117.55 – 118.35 mm (4.628 – 4.659 in)

If the measured lengths are outside the standard length, disassemble the steering damper and start over.

### NOTE:

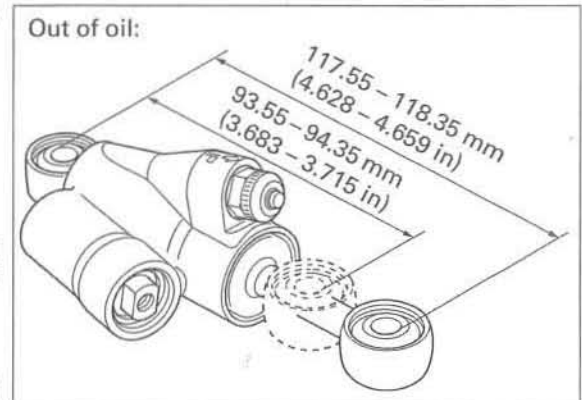
The normal operation of the HPSD can not be secured when the fully compressed damper rod length is more than standard.

Return the damping force adjuster to its original position.

### STANDARD POSITION:

**9 clicks out from full in**

Install the steering damper (page 14-38).



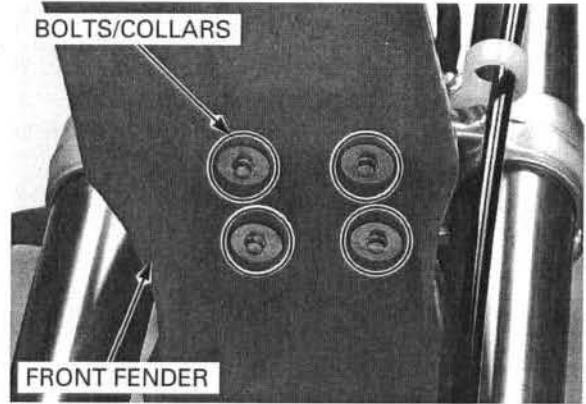
# STEERING STEM

## REMOVAL

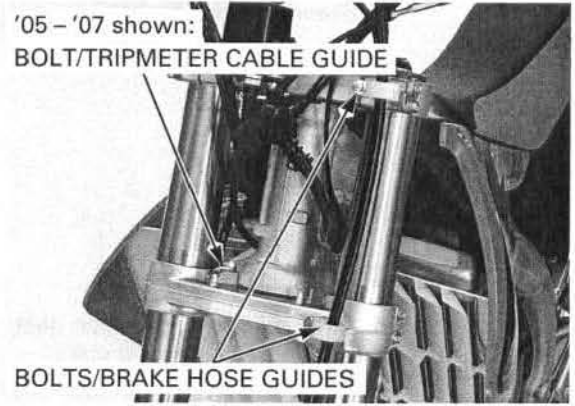
Remove the following:

- Front visor ('05 - '07: page 3-5, After '07: page 3-6)
- Handlebar (page 14-32)
- Front wheel (page 14-8)

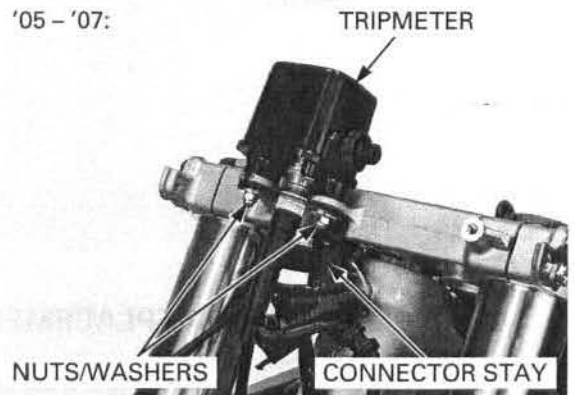
*After '07:* Remove the steering damper (page 14-38).  
Remove the bolts, collars and front fender.



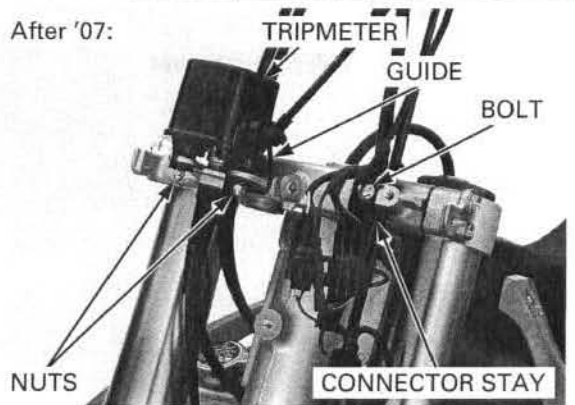
Remove the bolts and brake hose guides.  
Remove the bolt and tripmeter cable guide.



*'05 - '07:* Remove the nuts, washers, tripmeter and connector stay.



*After '07:* Remove the nuts, cable guide and tripmeter.  
Remove the bolt and connector stay.

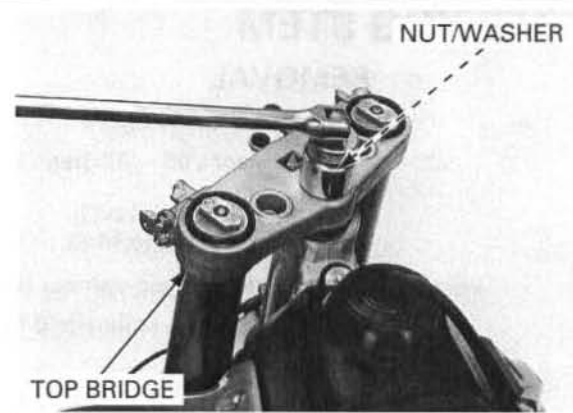


## FRONT WHEEL/SUSPENSION/STEERING

Remove the steering stem nut and washer.

Remove the forks (page 14-13).

Remove the fork top bridge.

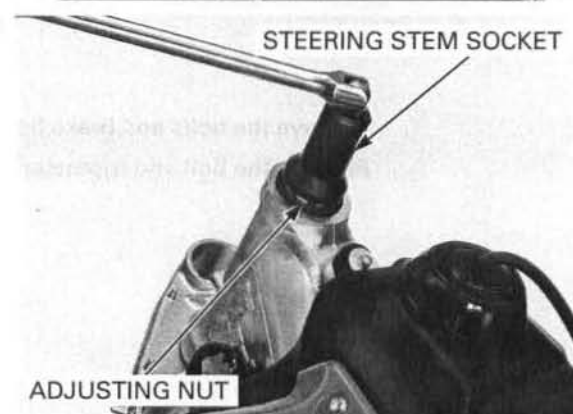


Remove the steering stem adjusting nut using the special tool.

**TOOL:**

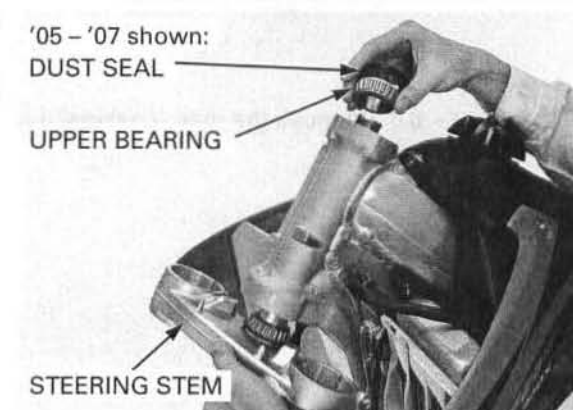
**Steering stem socket**

**07916-3710101 or  
07702-0020001  
(U.S.A. only)**



Remove the upper dust seal, upper tapered roller bearing and steering stem.

Check the bearings and outer races for wear or damage.



### BEARING REPLACEMENT

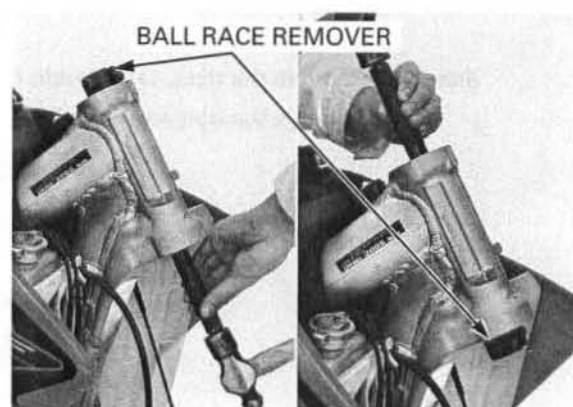
*Always replace the bearings and races as a set.*

Remove the upper and lower bearing outer races from the head pipe using the special tools.

**TOOL:**

**Ball race remover**

**07946-3710500**



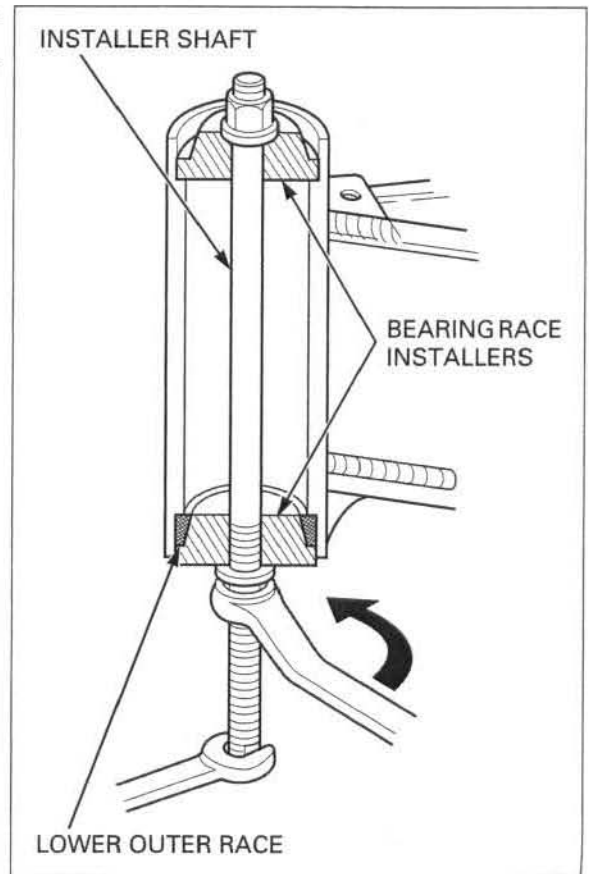
## FRONT WHEEL/SUSPENSION/STEERING

Install a new lower outer race, bearing race installers and installer shaft as shown. Hold the shaft with a wrench and turn the installer to install the lower outer race.

### TOOLS:

Bearing race installer  
(2 required)  
Installer shaft

07VMF-KZ30100  
07VMF-KZ30200

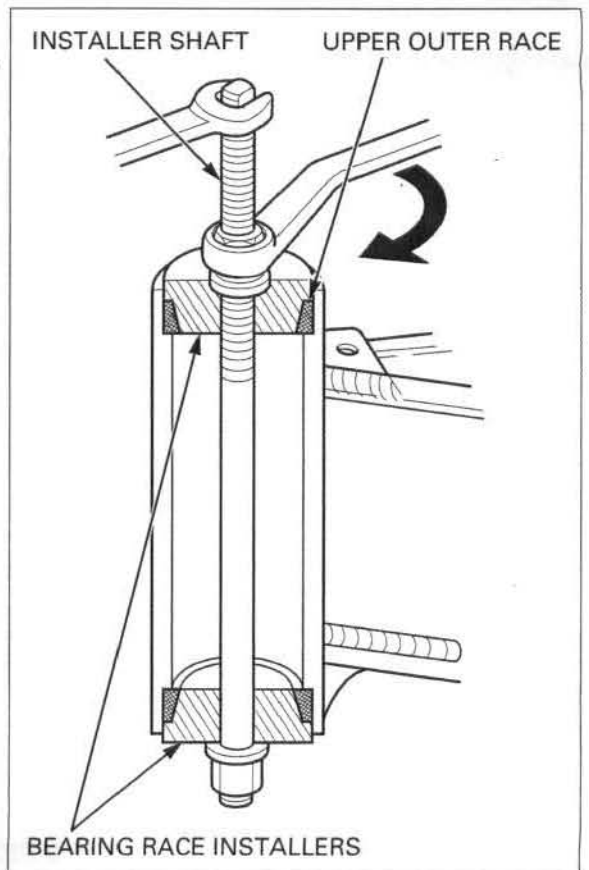


Install a new upper outer race, bearing race installers and installer shaft as shown. Hold the shaft with a wrench and turn the installer to install the upper outer race.

### TOOLS:

Bearing race installer  
(2 required)  
Installer shaft

07VMF-KZ30100  
07VMF-KZ30200



## FRONT WHEEL/SUSPENSION/STEERING

Temporarily install the stem nut to avoid damaging the steering stem threads.

Remove the lower tapered roller bearing and dust seal from the steering stem.

Apply urea based multi-purpose grease with extreme pressure to the dust seal lips. Install a new dust seal.

Install the lower bearing using a hydraulic press and the special tool as shown.

### TOOL:

Attachment, 30 mm I.D.

07746-0030300

## INSTALLATION

### NOTE:

- Use water resistant grease #2 (urea based multi-purpose grease) for the steering bearings and dust seals:
  - Excelite EP2 (Kyodo Yushi)
  - Stamina EP2 (Shell) or equivalent

Pack the upper and lower tapered roller bearings with grease.

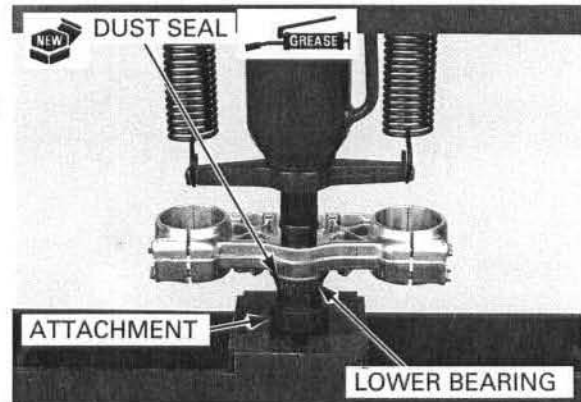
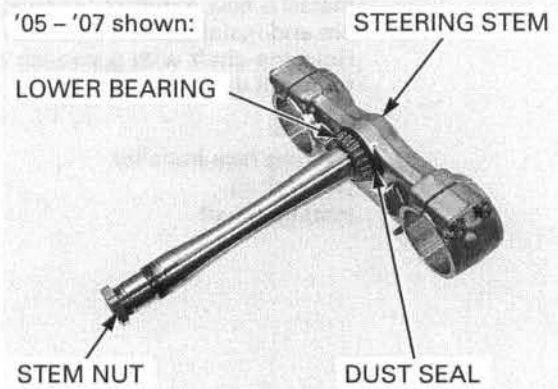
Apply grease to all of the bearing surfaces.

Install the upper tapered roller bearing in the steering head.

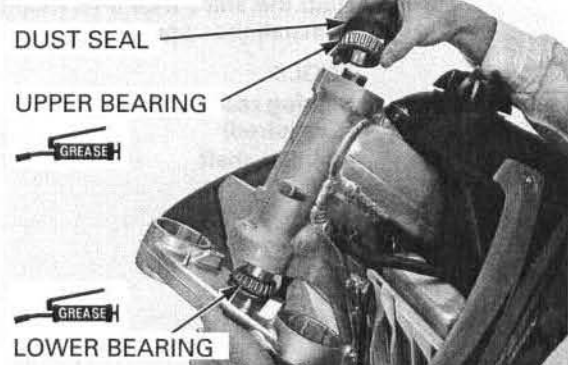
Slide the steering stem into the steering head from the bottom.

Install the upper dust seal.

'05 - '07 shown:



'05 - '07 shown:



## FRONT WHEEL/SUSPENSION/STEERING

Install the steering stem adjusting nut.

Tighten the steering stem adjusting nut to the specified torque using the special tool.

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

**TOOL:**

**Steering stem socket**

**07916-3710101 or  
07702-0020001  
(U.S.A. only)**

Move the steering stem lock-to-lock several times to seat the bearings.

Loosen the adjusting nut to torque of 0 N·m (0 kgf·m, 0 lbf·ft), and retighten to the specified torque.

**TORQUE: 7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)**

Recheck that the steering stem moves smoothly without play or binding.

Install the top bridge and washer.  
Loosely install the stem nut.

Insert the forks (page 14-30).

Tighten the stem nut to the specified torque.

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

Recheck the steering stem adjustment by turning the top bridge lock-to-lock and checking for smoothness.

There should be no binding.

'05 - '07: Install the connector stay, tripmeter, washers and tighten the nuts securely.

After '07: Install the tripmeter, cable guide, nuts and tighten the nuts securely.

Install the connector stay, bolt and tighten the bolt securely.

STEERING STEM SOCKET



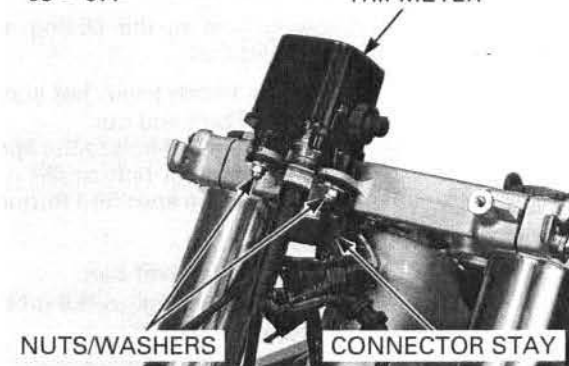
'05 - '07 shown:

TOP BRIDGE



'05 - '07:

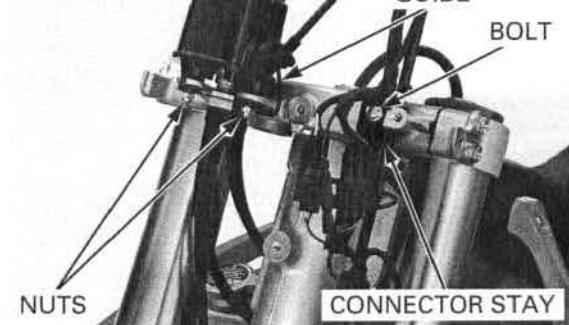
TRIPMETER



After '07:

TRIPMETER  
GUIDE

BOLT



## FRONT WHEEL/SUSPENSION/STEERING

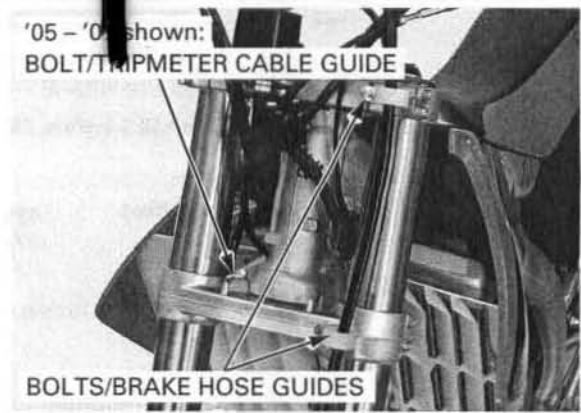
Install the tripmeter cable guide and tighten the bolt securely.

Install the front brake hose guides and tighten the bolts to the specified torque.

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

'05 - '07 shown:

**BOLT/TRIPMETER CABLE GUIDE**



**BOLTS/BRAKE HOSE GUIDES**

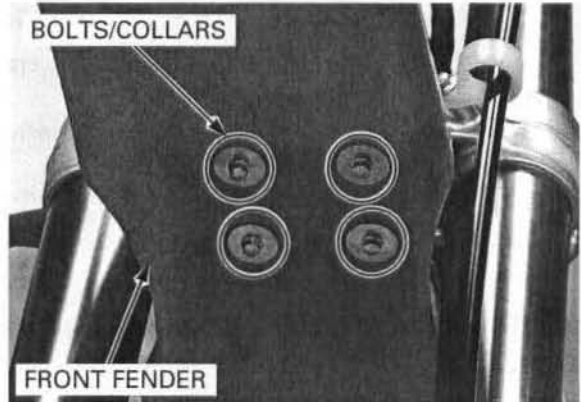
Install the front fender, collars and tighten the bolts securely.

After '07: Install the steering damper (page 14-38).

Install the following:

- Front wheel (page 14-12)
- Handlebar (page 14-34)
- Front visor ('05 - '07: page 3-5, After '07: page 3-6)

**BOLTS/COLLARS**



**FRONT FENDER**

## CLUTCH LEVER

### REMOVAL/INSTALLATION

Remove the clutch lever pivot nut, bolt, collar, clutch lever and hot start lever.

Apply grease to the sliding surface of the clutch lever pivot bolt.

Install the clutch lever, hot start lever, collar, clutch lever pivot bolt and nut.

Tighten the pivot bolt to the specified torque.

Loosen the pivot bolt to 45° - 90°, and tighten the pivot nut to the specified torque.

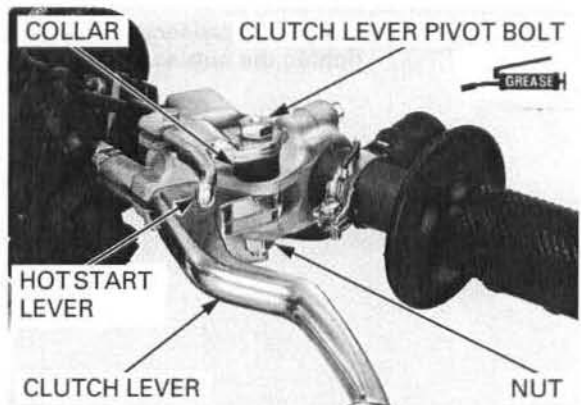
#### TORQUE:

**Clutch lever pivot bolt:**

**2.0 N·m (0.2 kgf·m, 1.5 lbf·ft) - 45° to 90°**

**Clutch lever pivot nut:**

**10 N·m (1.0 kgf·m, 7 lbf·ft)**





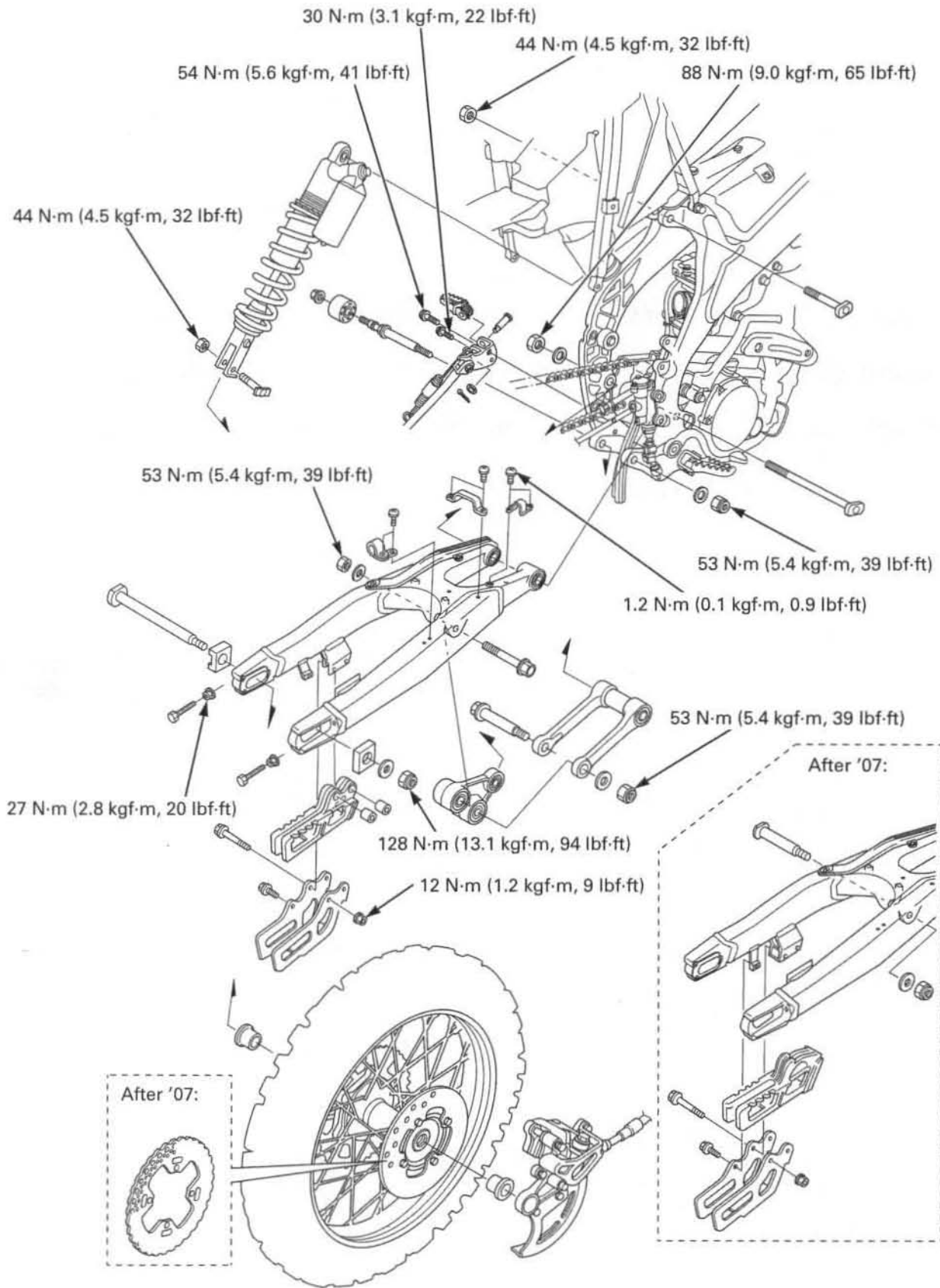
# 15. REAR WHEEL/SUSPENSION

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COMPONENT LOCATION .....	15-2	SHOCK ABSORBER.....	15-14
SERVICE INFORMATION .....	15-3	SHOCK LINKAGE .....	15-30
TROUBLESHOOTING .....	15-7	SWINGARM.....	15-36
REAR WHEEL .....	15-8		

# REAR WHEEL/SUSPENSION

## COMPONENT LOCATION



# SERVICE INFORMATION

## GENERAL

### ▲WARNING

- Use only nitrogen to pressurize the shock absorber. The use of an unstable gas can cause a fire or explosion resulting in serious injury.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber.
- Keep grease off of 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 rear wheel or suspension support the motorcycle using a workstand or equivalent under the engine.
- 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 7.5 hours of operation (competition use only).
- Optional rear wheel sprockets, drive chain, shock springs and spring preload pin spanners are available. For optional parts (page 1-37).
- For brake system information (page 16-3).
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

## SPECIFICATIONS

Unit: mm (in)

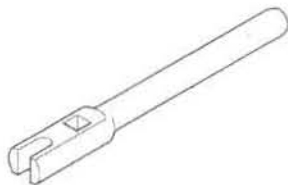

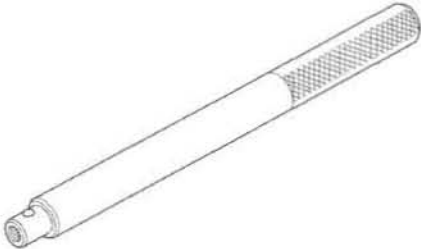
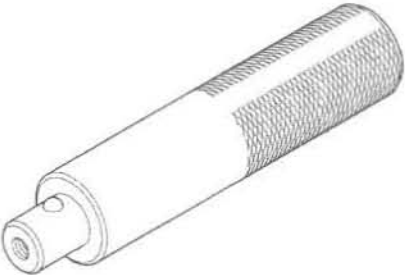

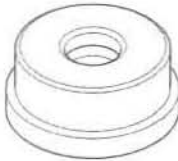

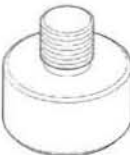




ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure		98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	-
Axle runout		-	0.20 (0.008)
Wheel rim runout	Radial	-	2.0 (0.08)
	Axial	-	2.0 (0.08)
Wheel hub-to-rim distance		See page 15-11	-
Drive chain slack		25 - 35 (1.0 - 1.4)	60 (2.4)
Drive chain width		-	13.4 (0.53)
Drive chain size/link	DID	520MXV/114	-
Drive chain slider thickness		-	5.0 (0.20)
Drive chain roller O.D.	Upper	-	39 (1.5)
	Lower	-	35 (1.4)
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
	Damper rod compressed force at 12 mm compressed		20.0 - 24.0 kgf (44.1 - 52.9 lbf)
	Standard oil capacity		395 cm <sup>3</sup> (13.4 US oz, 13.9 Imp oz)
	Spring installed length (standard)		'05 - '07 258.5 (10.18) After '07 258.0 (10.16)
High speed side compression damping adjuster standard position	'05 - '07	3/4 - 1-1/4 turns out from full in	-
	After '07	7/12 - 1-1/12 turns out from full in	-
Low speed side compression damping adjuster standard position		10 clicks out from full in	-
Rebound damping adjuster standard position	'05 - '07	11 - 14 clicks out from full in	-
	After '07	10 - 13 clicks out from full in	-

## REAR WHEEL/SUSPENSION


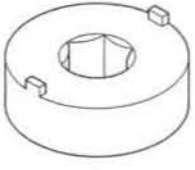
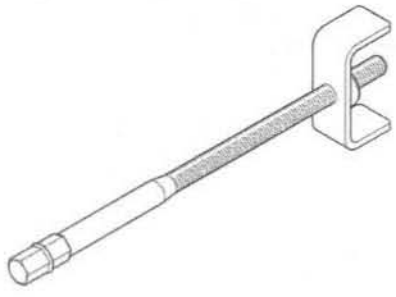
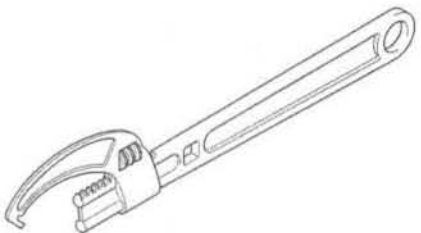

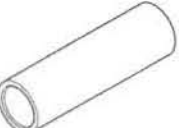

### TORQUE VALUES

Rear axle nut		128 N·m (13.1 kgf·m, 94 lbf·ft)	U-nut
Rear spoke		3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Rear rim lock		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Driven sprocket nut		32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Rear brake disc nut		16 N·m (1.6 kgf·m, 12 lbf·ft)	U-nut
Rear wheel bearing retainer		44 N·m (4.5 kgf·m, 32 lbf·ft)	
Shock absorber upper mounting nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock absorber lower mounting nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock absorber damper rod end nut		37 N·m (3.8 kgf·m, 27 lbf·ft)	Stake
Shock absorber compression damping adjuster		29 N·m (3.0 kgf·m, 21 lbf·ft)	Stake
Shock absorber spring lock nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	
Drive chain roller bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Drive chain roller nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Shock arm nut	(swingarm side)	53 N·m (5.4 kgf·m, 39 lbf·ft)	Apply oil to the threads and flange surface, U-nut
	(shock link side)	53 N·m (5.4 kgf·m, 39 lbf·ft)	Apply oil to the threads and flange surface, U-nut
Shock link nut	(frame side)	53 N·m (5.4 kgf·m, 39 lbf·ft)	Apply oil to the threads and flange surface, U-nut
Swingarm pivot nut		88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive chain guide mounting bolt/nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Drive chain slider screw		4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	Apply locking agent to the threads
Rear brake hose guide screw		1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Drive chain adjuster lock nut		27 N·m (2.8 kgf·m, 20 lbf·ft)	
Sub-frame upper mounting bolt	('05 - '07)	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Sub-frame lower mounting bolt	('05 - '07)	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Sub-frame upper/lower mounting bolt	(After '07)	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Left step bracket mounting bolt	(upper)	55 N·m (5.6 kgf·m, 41 lbf·ft)	
	(lower)	30 N·m (3.1 kgf·m, 22 lbf·ft)	

TOOLS

<p>Spoke wrench, 6.6 mm 070MA-KZ30100</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Slider guide, 16 mm 07PMG-KZ40100</p>  <p>not available in U.S.A.</p>	<p>Driver 07949-3710001</p> 
<p>Driver 07749-0010000</p> 	<p>Attachment, 28 x 30 mm 07946-1870100</p> 	<p>Attachment, 40 x 42 mm 07746-0010900</p> 
<p>Attachment, 24 x 26 mm 07746-0010700</p> 	<p>Pilot, 19 mm 07746-0041400</p> 	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Pilot, 22 mm 07746-0041000</p> 	<p>Pilot, 25 mm 07746-0040600</p> 	<p>Bearing remover head, 25 mm 07746-0050800</p> 

## REAR WHEEL/SUSPENSION

<p>Bearing remover shaft 07GGD-0010100</p> 	<p>Retainer wrench, 48 mm 07YMA-KZ40100</p>  <p>or 07HMA-KS70100 (U.S.A. only)</p>	<p>Retainer wrench body 07710-0010401</p> 
<p>Pin spanner (2 required) 07702-0020001</p>  <p>or Pin spanner A 89201-KS6-810 (2 required)</p>	<p>Piston ring guide 070MG-KZ30100</p>  <p>not available in U.S.A.</p>	<p>Collar, 23 x 17 mm 07GMD-KT8A110</p> 
<p>Attachment, 30 mm I.D. 07746-0030300</p> 		

## TROUBLESHOOTING

### Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Tire pressure too low
- Nitrogen gas leakage from the reservoir

### Stiff suspension

- Damaged shock absorber spherical 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 turns hard

- 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

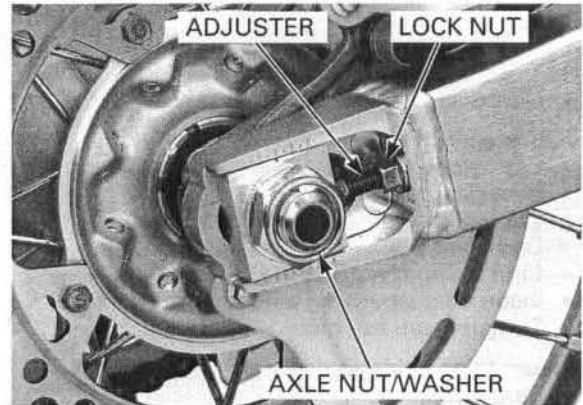
#### REMOVAL

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 adjusters clockwise fully.

Remove the axle nut and washer.

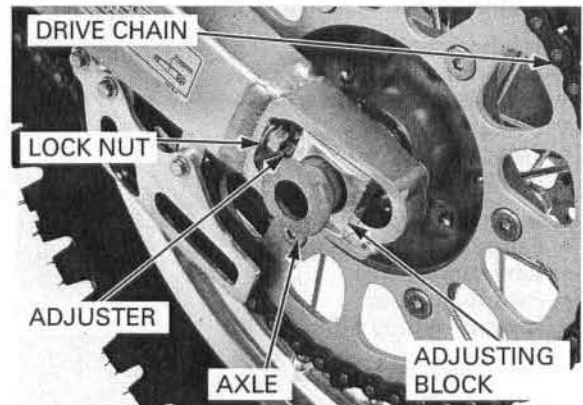


Push the rear wheel forward to derail the drive chain from the driven sprocket.

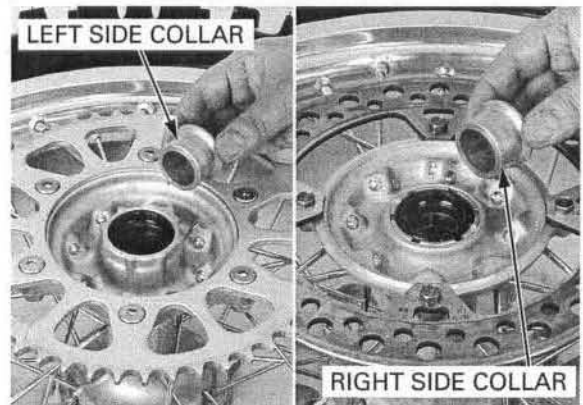
Remove the axle, adjusting blocks and rear wheel.

- Do not operate the brake pedal after removing the rear wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

*Be careful not to damage the brake pads with the disc.*



Remove the right and left side collars.



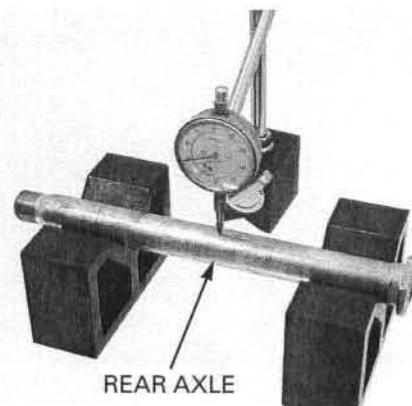
#### INSPECTION

##### 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: 0.20 mm (0.008 in)**

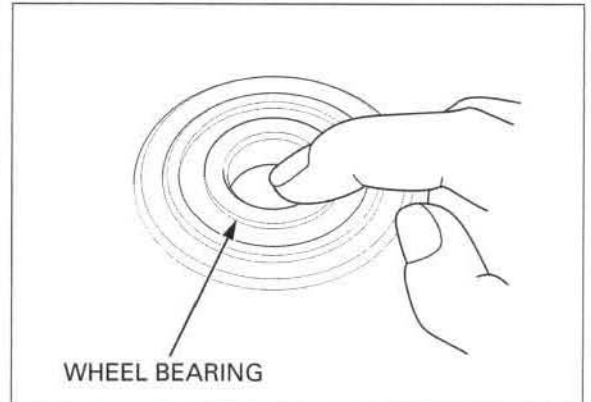


**WHEEL BEARING**

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.*

Replace the bearings if the inner race does not turn smoothly, quietly, or if outer race fits loosely in the hub.



**WHEEL RIM**

Check the rim runout by placing the wheel in a truing stand.

Spin the wheel by hand, and read the runout using a dial indicator.

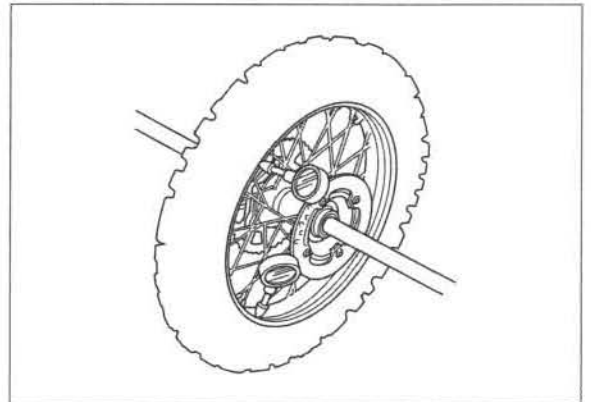
Actual runout is 1/2 the indicator reading.

**SERVICE LIMITS:**

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

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

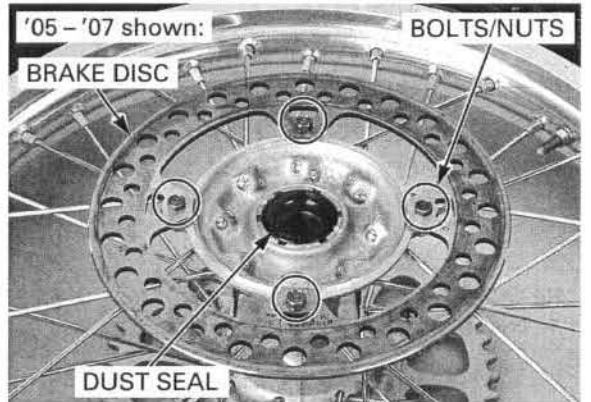
Check the spokes and tighten any that are loose.



**DISASSEMBLY**

Remove the bolts, nuts and brake disc.

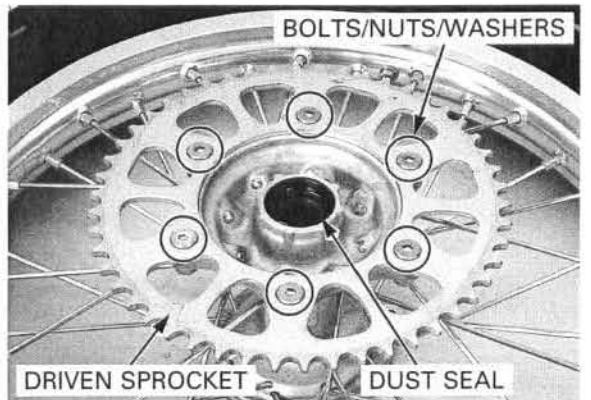
Remove the right dust seal.



Remove the driven sprocket bolts, nuts and washers.

Remove the driven sprocket.

Remove the left dust seal.



## REAR WHEEL/SUSPENSION

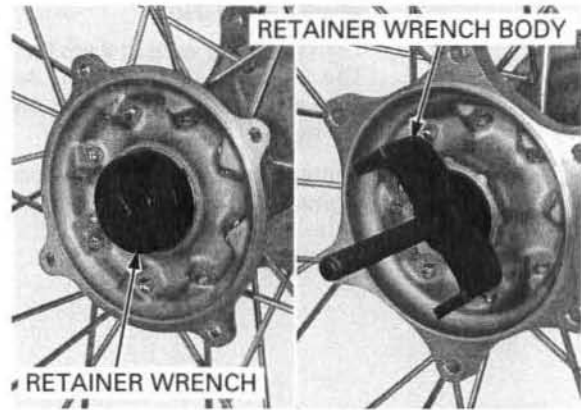
Remove the bearing retainer using the special tools.

### TOOLS:

Retainer wrench, 48 mm

07YMA-KZ40100 or  
07HMA-KS70100  
(U.S.A. only)  
07710-0010401

Retainer wrench body



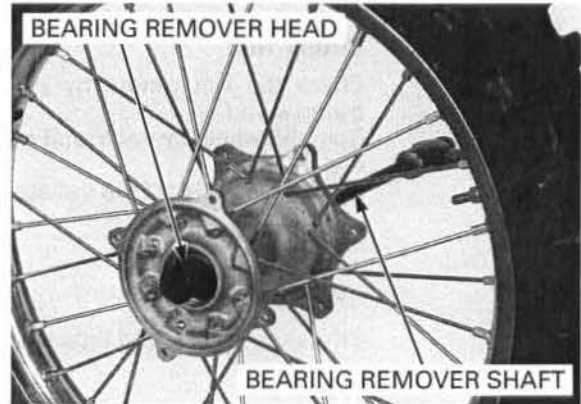
Replace the wheel bearings in pairs. Do not reuse the old bearings.

Install the remover head into the bearing. From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the bearings.

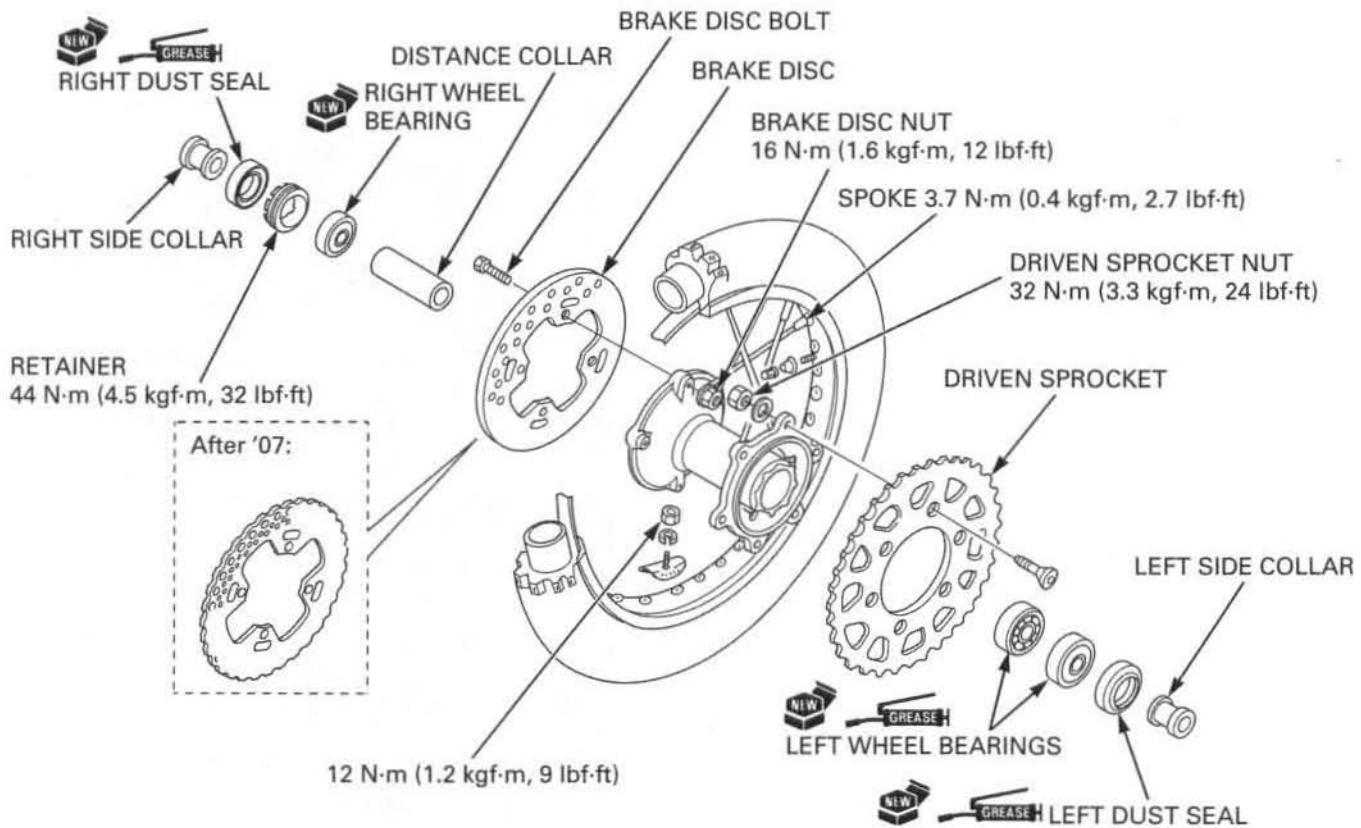
### TOOLS:

Bearing remover head, 25 mm  
Bearing remover shaft

07746-0050800  
07GGD-0010100



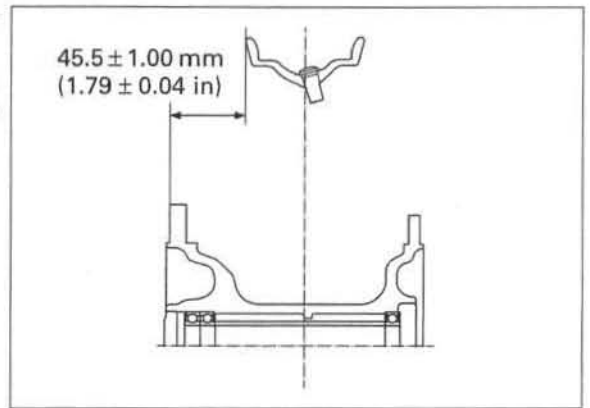
## ASSEMBLY



## REAR WHEEL/SUSPENSION

Place the hub in the center of the rim, and begin lacing with new spokes.

Adjust the hub position so the distance from the hub left end surface to the side of the rim is  $45.5 \pm 1.00$  mm ( $1.79 \pm 0.04$  in) as shown.



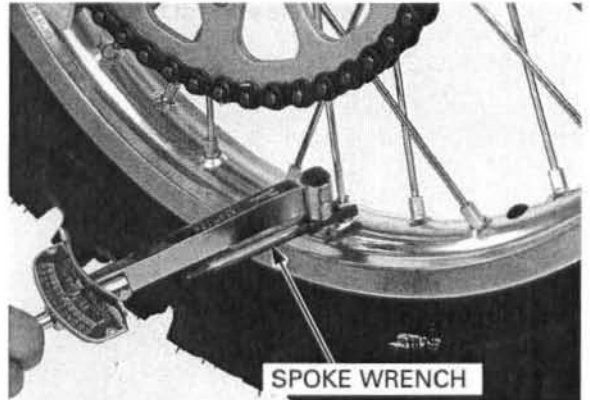
Torque the rear spoke in two or three progressive steps.

**TOOL:**

**Spoke wrench, 6.6 mm**

**070MA-KZ30100 or equivalent commercially available in U.S.A.**

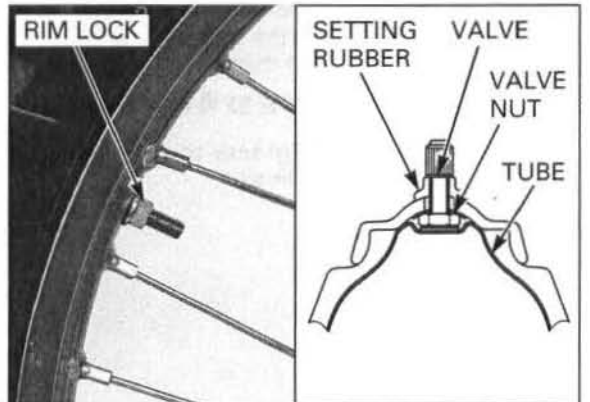
**TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)**



Install the rear rim lock, setting rubber, tube and tire.

Tighten the rear rim lock to the specified torque.

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



Pack all bearing cavities with grease.

Drive in a new right bearing using the special tools.

**TOOLS:**

**Driver**

**07749-0010000**

**Attachment, 40 x 42 mm**

**07746-0010900**

**Pilot, 25 mm**

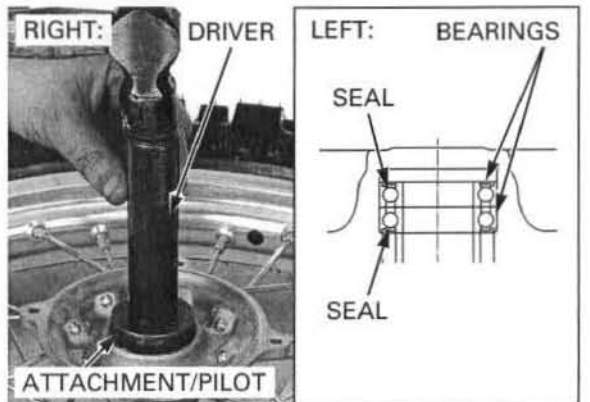
**07746-0040600**

- Drive the right bearing in the wheel hub until it is fully seated with the marking side facing up.

Install the distance collar into place, then drive the left inner and outer bearings using the same tools as shown.

- Drive the left inner bearing in the wheel hub until it is fully seated with the sealed side facing down.
- Drive the left outer bearing in the wheel hub until it is fully seated with the sealed side facing up.

*Never install the old bearings; once the bearings have been removed, they must be replaced with new ones.*



## REAR WHEEL/SUSPENSION

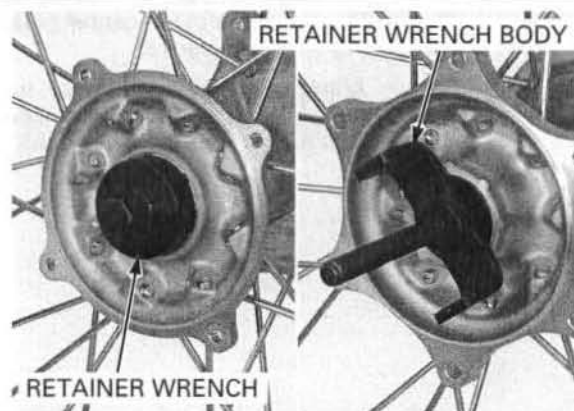
Apply grease to new bearing retainer threads. Install and tighten the bearing retainer to the specified torque using the special tools.

### TOOLS:

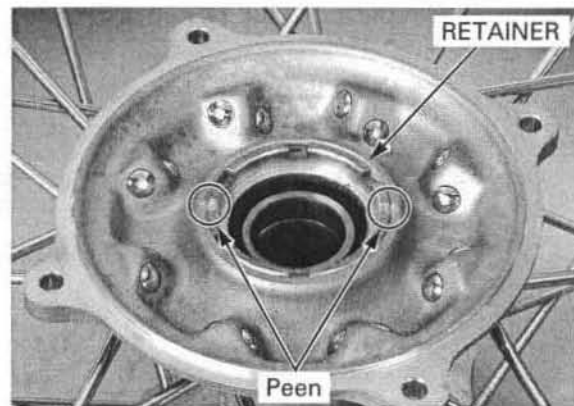
Retainer wrench, 48 mm      07YMA-KZ40100 or  
07HMA-KS70100  
(U.S.A. only)

Retainer wrench body      07710-0010401

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



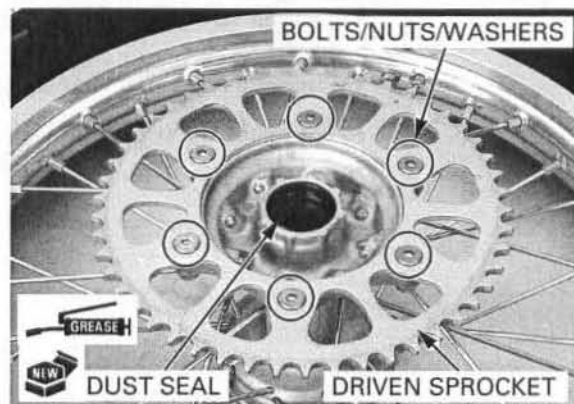
Peen the edge of the retainer.



Install the driven sprocket. Install the bolts, washers and nuts, and tighten the nuts to the specified torque.

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

Apply grease to new left dust seal lips, then install the dust seal.

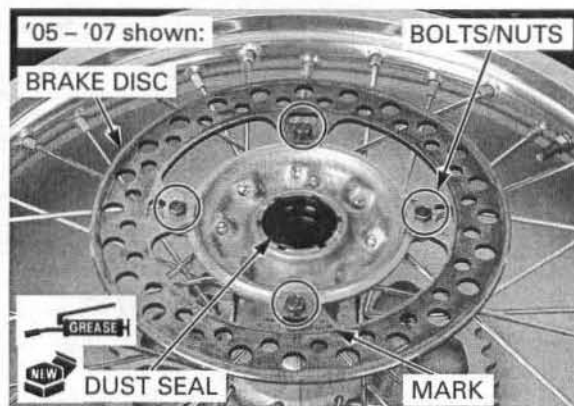


Install the brake disc onto the wheel hub with the minimum thickness mark (MIN TH 3.5 mm) facing out.

Install the bolts/nuts. Tighten the nuts to the specified torque.

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

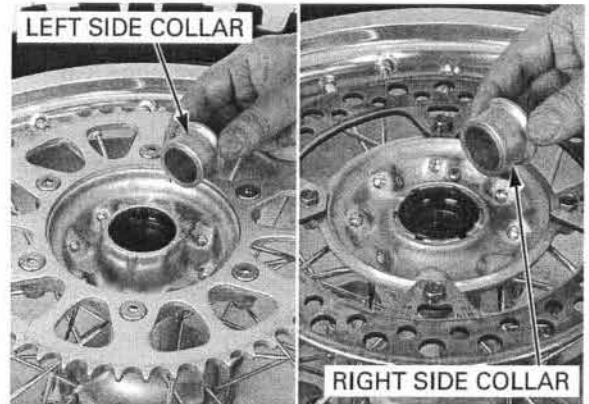
Apply grease to new right dust seal lips, then install the dust seal.



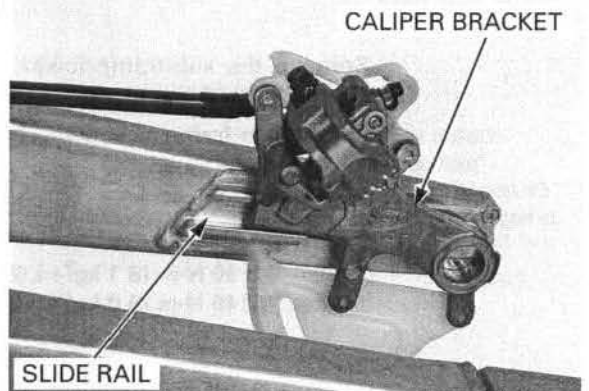


**INSTALLATION**

Install the right and left side collars.

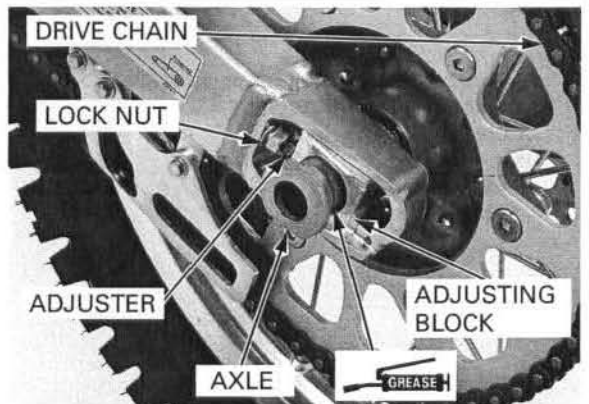


If the rear brake caliper bracket is removed, install it onto the slide rail of the swingarm.



*Be careful not to damage the brake pads with the disc.*

Place the rear wheel into the swingarm. Apply thin coat of grease to the axle. Install the drive chain over the driven sprocket. Install the adjusting block and axle from the left side.

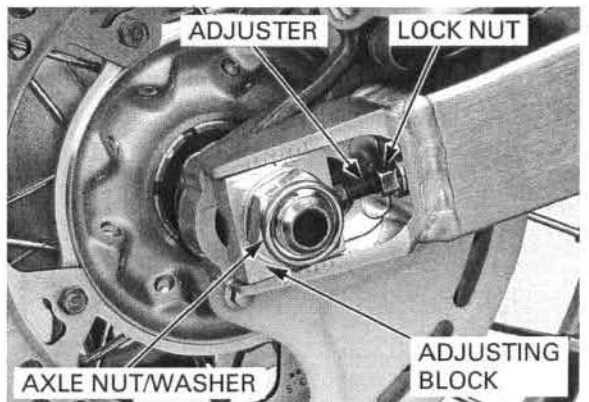


Install the adjusting block, washer and axle nut. Adjust the drive chain slack (page 4-24). Tighten the axle nut to the specified torque.

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

Snug the adjusters against the adjusting blocks and tighten the lock nuts to the specified torque.

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



# SHOCK ABSORBER

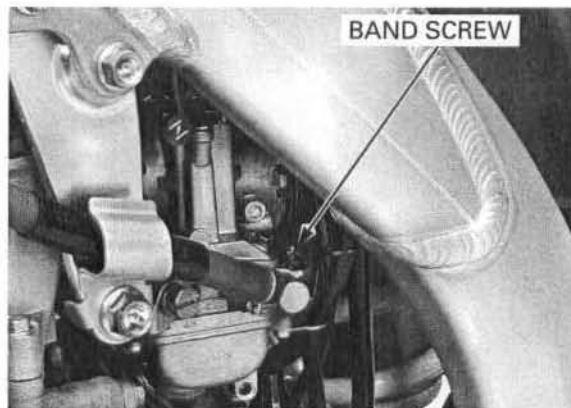
## REMOVAL

Remove the seat (page 3-3).

Remove the fuel tank (page 3-8).

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

Loosen the air cleaner connecting boot band screw.



Remove the sub-frame lower mounting bolts and loosen the upper mounting bolt.

Lift the sub-frame as shown.

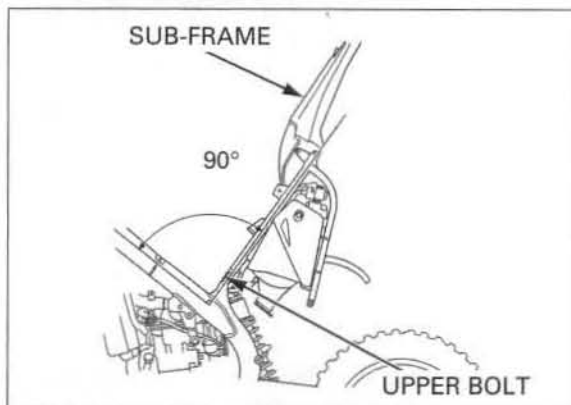
Tighten the sub-frame upper mounting bolt to the specified torque.

*Do not lift past 90°  
Be careful not to damage the wires and cables.*

### TORQUE:

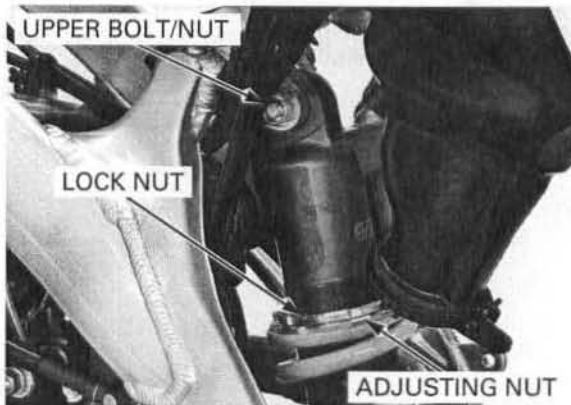
'05 - '07: 30 N·m (3.1 kgf·m, 22 lbf·ft)

After '07: 49 N·m (5.0 kgf·m, 36 lbf·ft)

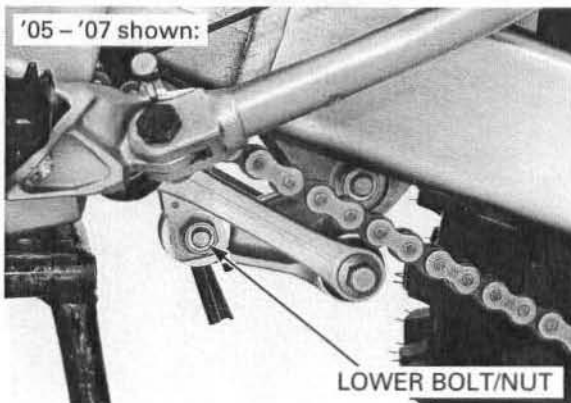


Remove the shock absorber upper mounting bolt and nut.

*If you plan to disassemble the shock absorber, loosen the spring lock nut and adjusting nut.*



Remove the shock absorber lower mounting bolt, nut and shock absorber.





**DISASSEMBLY**

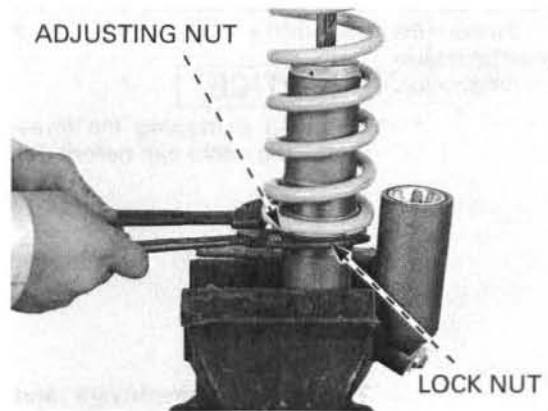
Measure the spring length for reinstallation later.

Set the shock absorber upper mount in a vise with a piece of wood or soft jaws to avoid damage.

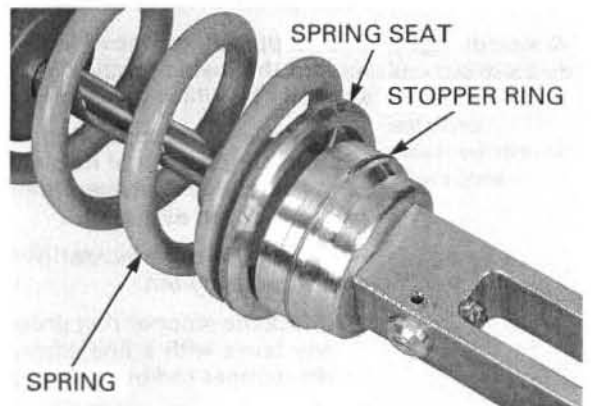
Loosen the lock nut and adjusting nut.

**TOOLS:**

- Pin spanner 07702-0020001 (2 required) or
- Pin spanner A 89201-KS6-810 (2 required)



Remove the stopper ring, spring seat and spring.

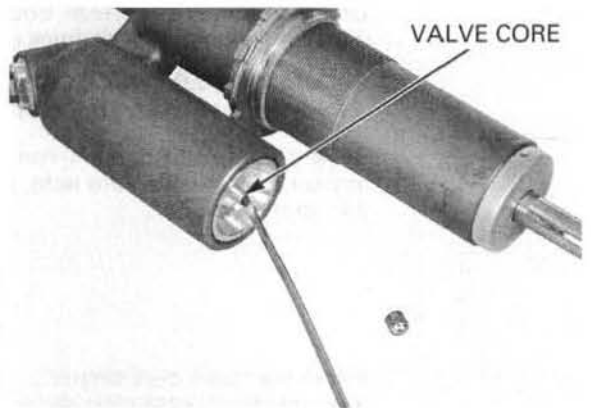


**BLADDER REPLACEMENT**

- Set the rebound adjuster and compression adjuster counterclockwise to the softest position.
- Replace the bladder when oil leaks around the chamber cap or oil spills out when releasing the nitrogen from the reservoir.
- Perform this procedure before draining the oil from the damper.

Point the valve away from you to prevent debris getting in your eyes.

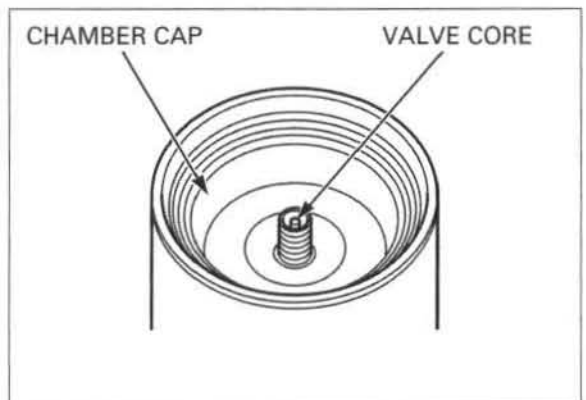
Depress the valve core to release the nitrogen from the reservoir.



**⚠ WARNING**

- The chamber cap will be under significant pressure and could cause serious injury.
- Release all nitrogen pressure before disassembly.
- Wear protective clothing and adequate eye protection to prevent injury and debris entering your eyes.

Remove the valve core.



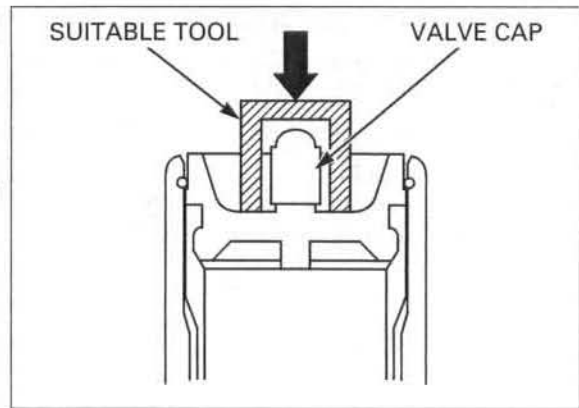
## REAR WHEEL/SUSPENSION

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.



Two small screwdrivers and a shop towel are required to remove the stopper ring.

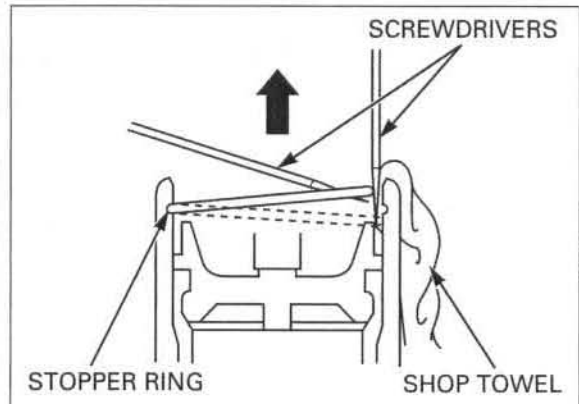
To avoid damaging the inside surfaces of the reservoir, cover the screwdriver with a shop towel.

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.



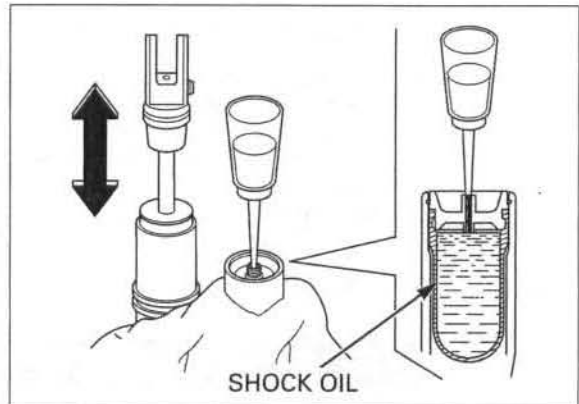
Set the shock absorber in a vise with a piece of wood or soft jaws to avoid damage.

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.



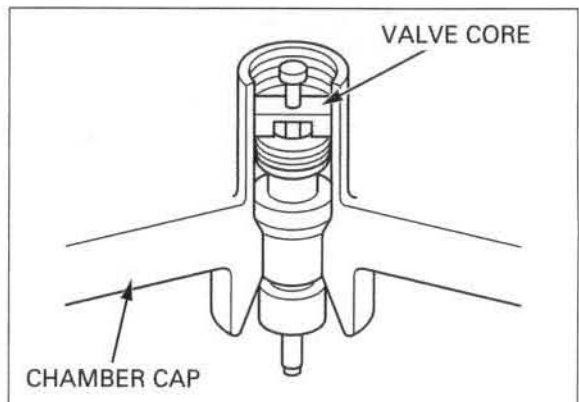
Install the valve core securely.

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:

### NOTE:

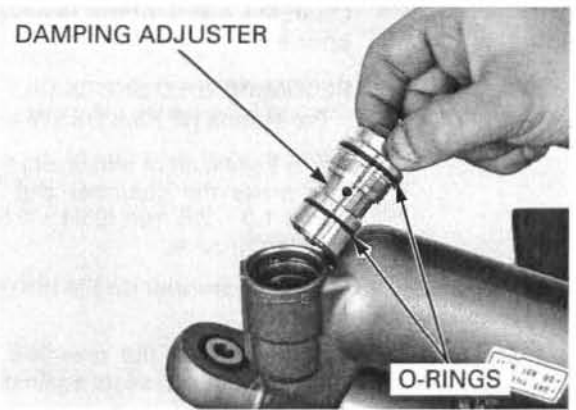
- The chamber cap will be removed with hydraulic pressure so its force can be significant considering the air in the bladder.
1. Wrap the shop towel around the chamber cap. Compress the damper rod slowly, to force the chamber cap out.



- Set the damper in a vise with soft jaws with the damping adjuster facing up, being careful not to distort the damper body. Remove the damping adjuster and O-rings.

## NOTICE

*Do not over-tighten the vise. Damage to the damper case will result.*



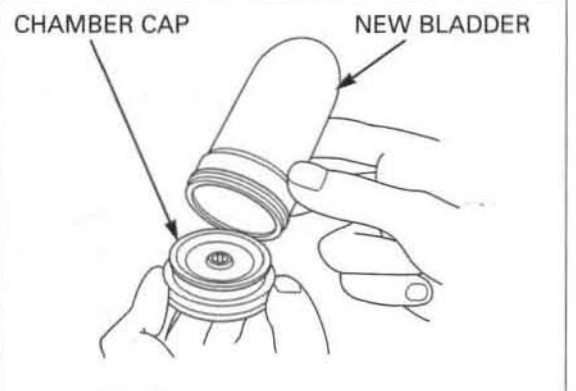
- Fill the damper with Pro Honda HP Fork Oil 5W or equivalent through the damping adjuster hole, while slowly pulling the damper rod out.
- Reinstall the damping adjuster after filling the damper.
  - The damper must be kept upright to prevent oil from leaking out.
- Place the damper with the reservoir chamber cap facing up.



- Repeat steps 1 to 5 until the chamber cap is removed from the reservoir.

Remove the bladder from the chamber cap.

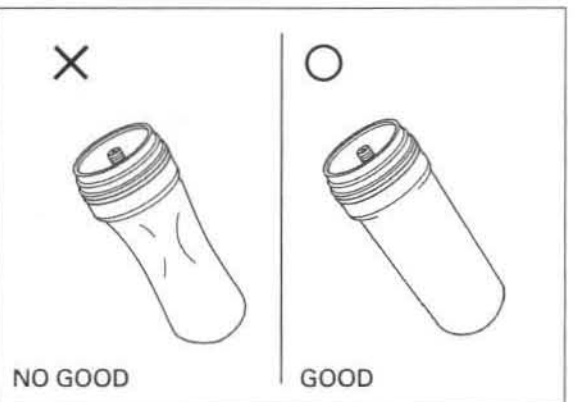
*Do not use any sort of tool to remove the bladder, because it may damage the chamber cap.*



Attach a new bladder to the chamber cap.

*Do not reuse the bladder.*

If the bladder becomes distorted during installation, depress the valve core to reform it.



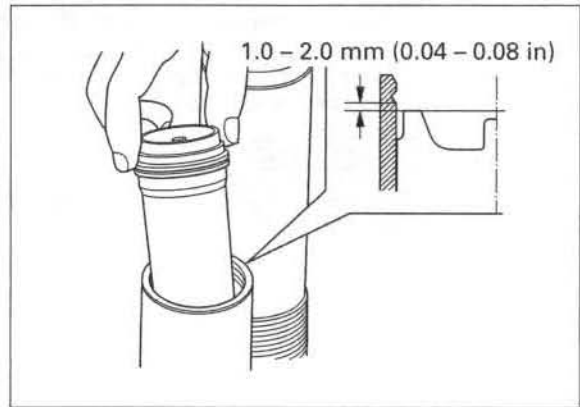
## REAR WHEEL/SUSPENSION

Clean the inside of the reservoir and fill it with recommended shock oil.

### RECOMMENDED SHOCK OIL:

**Pro Honda HP Fork Oil 5W or equivalent**

Apply 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 stop ring.

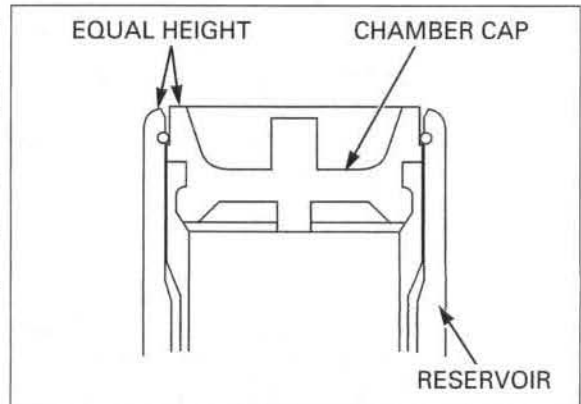
Make sure the chamber cap face is level with the reservoir face.

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 reservoir by depressing the valve core.

Bleed the air from the shock absorber bladder (page 15-26).

Fill the reservoir with nitrogen to the specified pressure (page 15-27).



## DAMPER DISASSEMBLY

*Point the valve away from you to prevent debris getting in your eyes.*

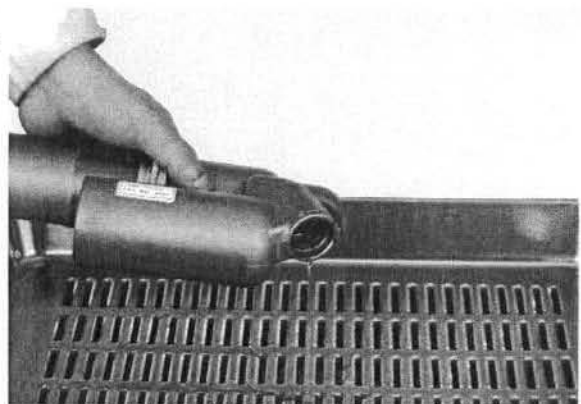
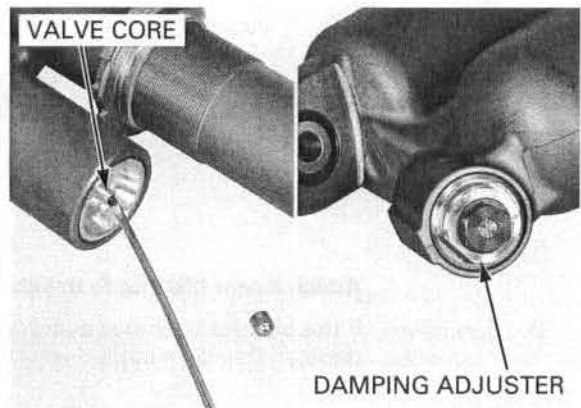
Depress the valve core to release the nitrogen from the reservoir (page 15-15).

### ⚠ 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.

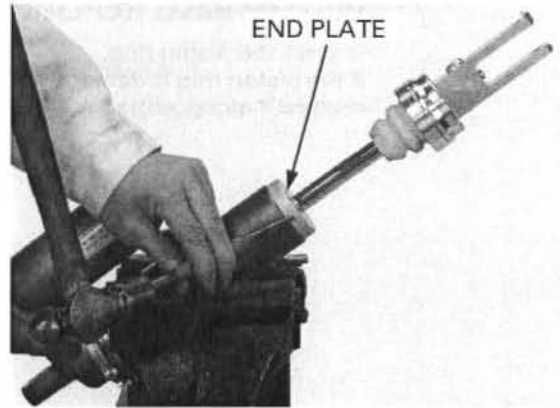
Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber. Remove the damping adjuster.

Drain most of the shock oil from the damper and reservoir, by pumping the damper rod in and out several times.



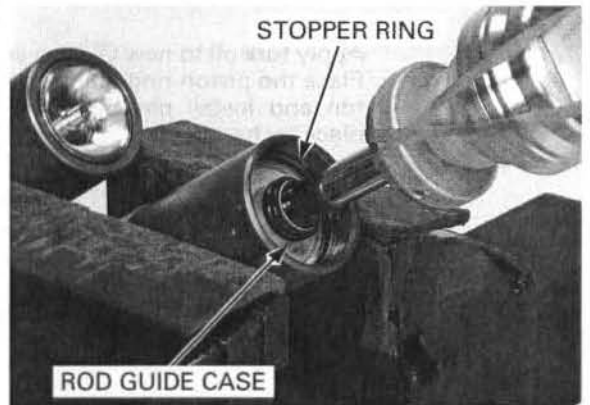
Set the shock absorber in a vise with a piece of wood or soft jaws to avoid damage.

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.

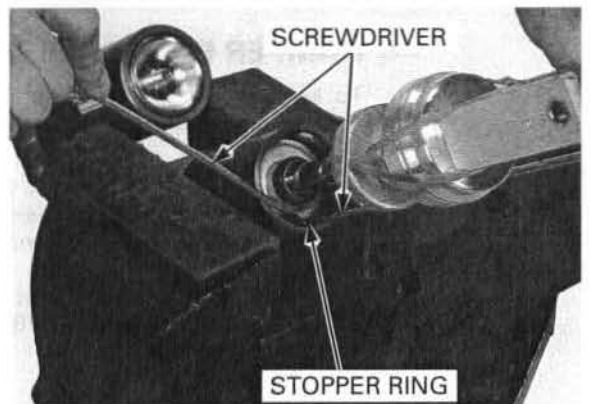


To remove the stopper ring, first push one end of the stopper ring out of its groove, then slip the second screwdriver between the stopper ring and the damper case to act as a ramp. Now, use the other screwdriver to pull the stopper ring completely out.

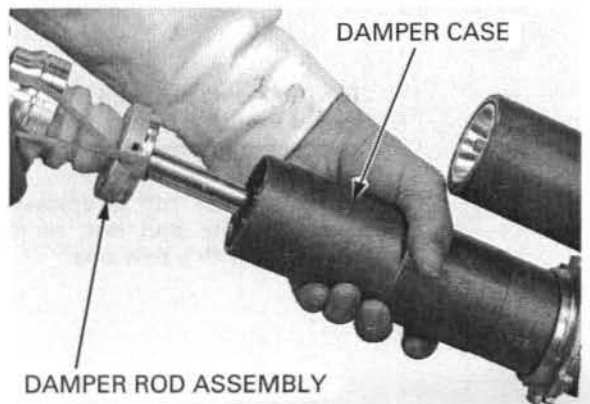
Check the stopper ring groove for burrs.

*Burrs will damage the damper rod piston ring.*

Remove any burrs with fine emery cloth pulling the damper rod out of the case.



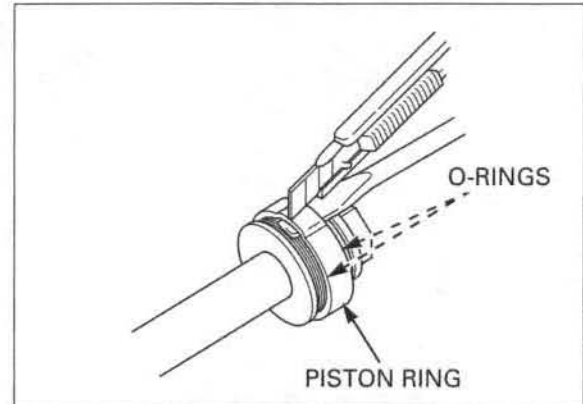
Carefully pull the damper rod assembly out of the damper case.



## REAR WHEEL/SUSPENSION

### 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.



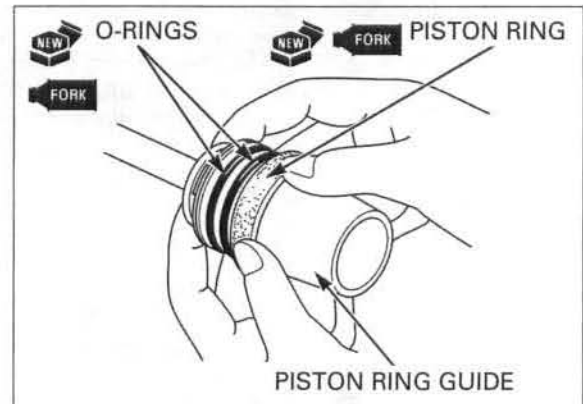
Apply fork oil to new O-rings and piston ring.  
Place the piston ring guide attachment over the piston and install new O-rings and piston ring into place by hand.

#### TOOL:

Piston ring guide

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.



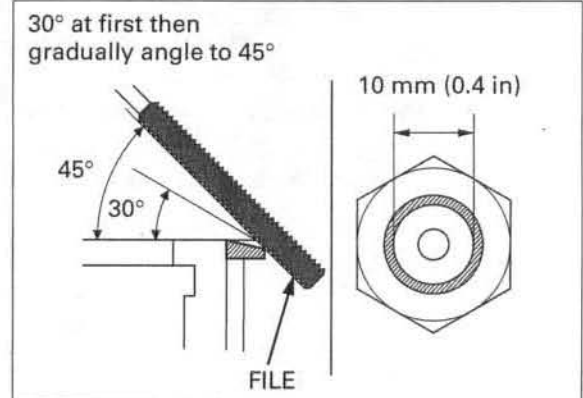
### DAMPER ROD DISASSEMBLY

To keep lint or dirt from getting onto the damper rod parts, do not wear gloves while working on the damper rod.

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

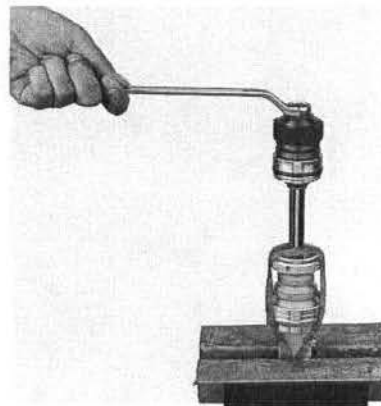
Unstake the damper rod end nut with a file as shown.

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.





## REAR WHEEL/SUSPENSION

*Make sure that filings are not stuck in the damper rod.*

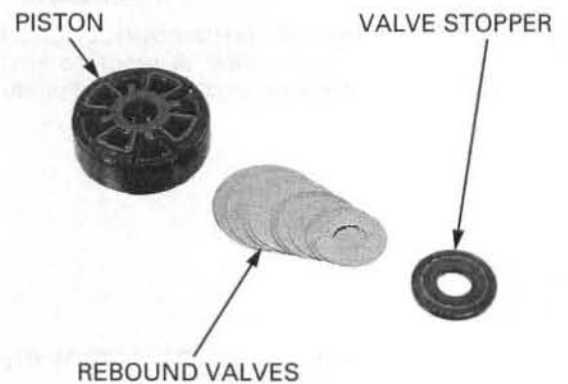
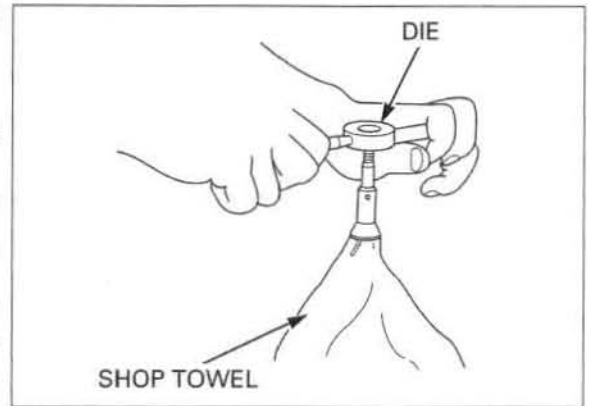
Remove the burrs from the damper rod end with a file and chase the threads with a die.

**DIE: 12 x 1.25 mm**

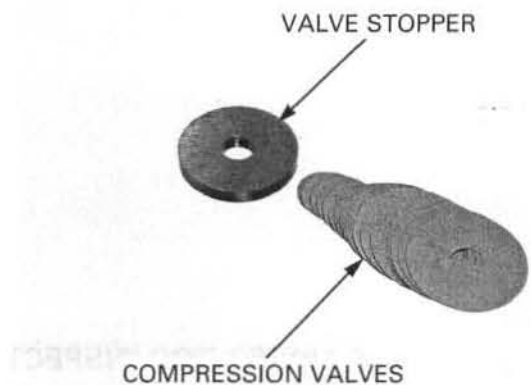
Clean the damper rod with solvent after chasing the threads.

- 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 if they have been disassembled and separated.
- Be careful not to get solvent on the O-ring and piston ring.
- The valve arrangement and number of valves shown is typical and may not represent this model exactly.

Remove the valve stopper, rebound valves and piston from the damper rod.



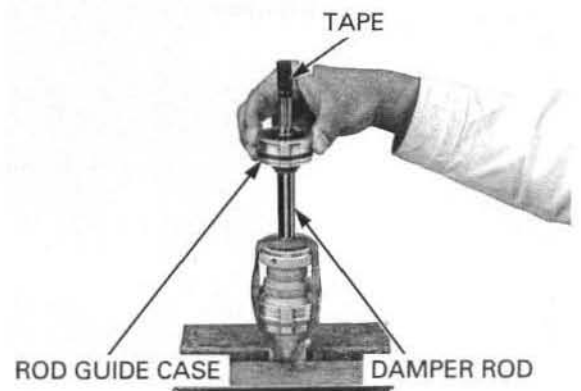
Remove the compression valves and valve stopper.



Chase the threads with a die and clean with oil. Back out the damping adjuster.

Wrap the threads of the damper rod with tape.

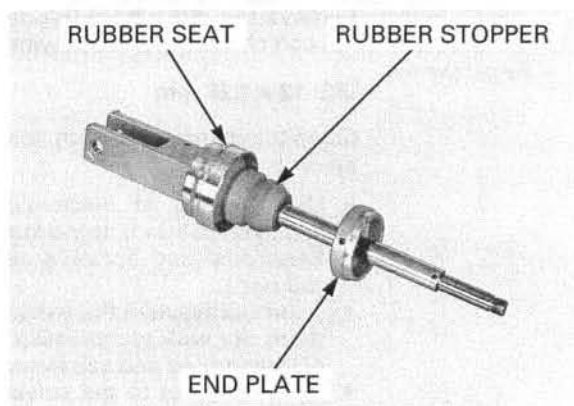
Remove the rod guide case from the damper rod.





## REAR WHEEL/SUSPENSION

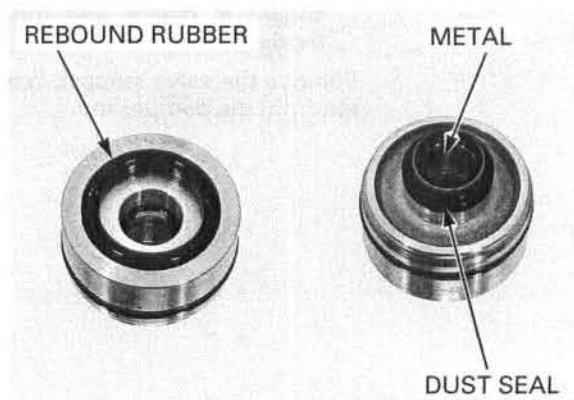
Remove the end plate, rubber stopper and rubber seat from the damper rod.



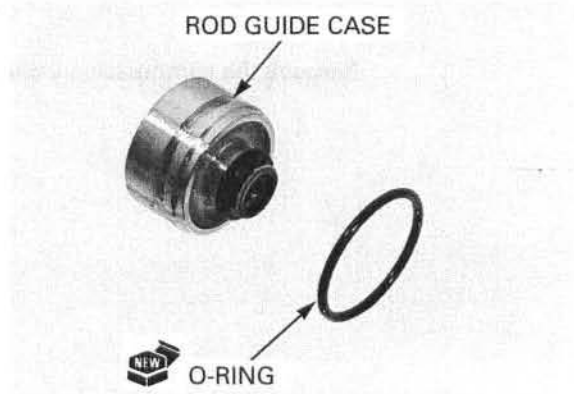
### ROD GUIDE CASE INSPECTION

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 metal. If the metal is worn so that the copper surface appears, replace the rod guide case with a new one.

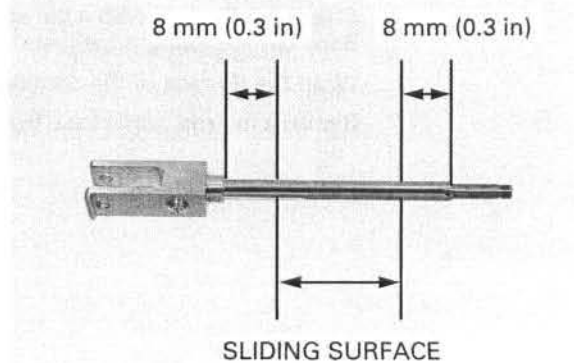


Remove the O-ring from the rod guide case and replace it with a new one.



### DAMPER ROD INSPECTION

Inspect the damper rod sliding surface for damage or distortion.

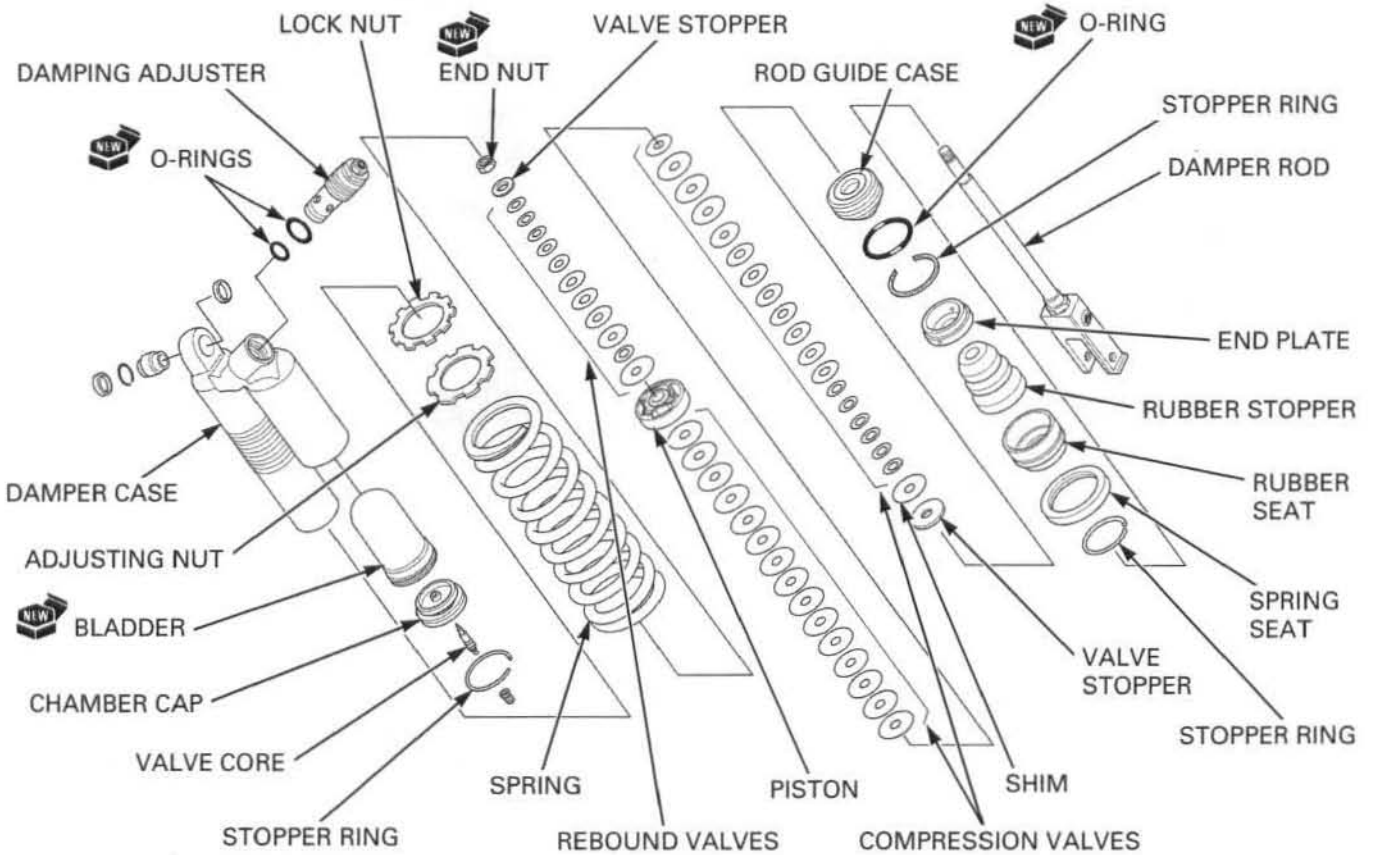
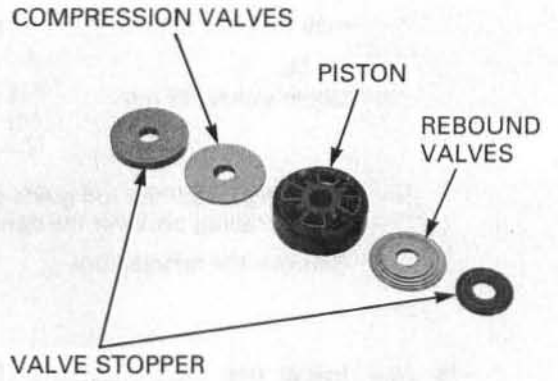


**DAMPER ASSEMBLY**

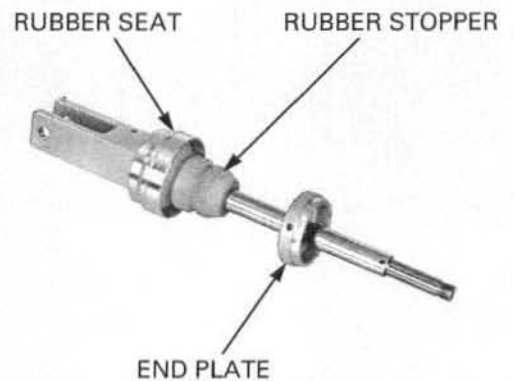
Before assembly, wash all parts with solvent and blow them dry with compressed air. Make sure there is no dust or lint on any of the parts.

**NOTICE**

- Set the rebound adjuster and compression adjuster counterclockwise to the softest position.
- 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

Apply shock oil to a new O-ring, and install it to the rod guide case.

Install the special tool onto the damper rod.

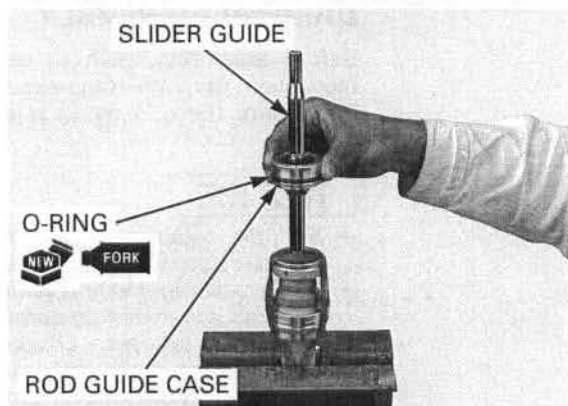
### TOOL:

Slider guide, 16 mm

07PMG-KZ40100  
not available in  
U.S.A.

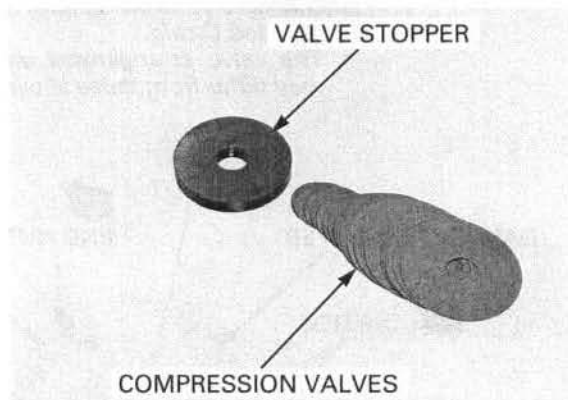
Carefully install the rod guide case with the rebound rubber facing up, over the damper rod.

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.



Install the piston onto the damper rod.

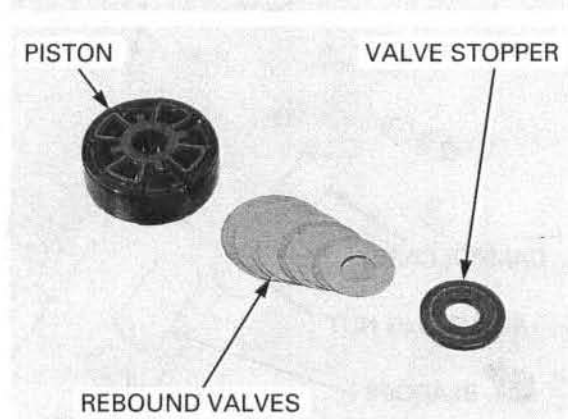
*Note the installation direction of the piston valves.*

Install the rebound valves with their polished surfaces facing down.

### NOTICE

*Be careful not to bind the valves when installing the piston onto the damper rod. Also, check that they are concentric with the damper rod.*

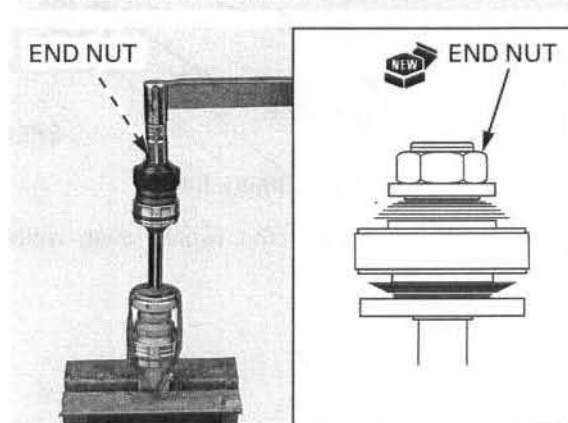
Install the valve stopper.



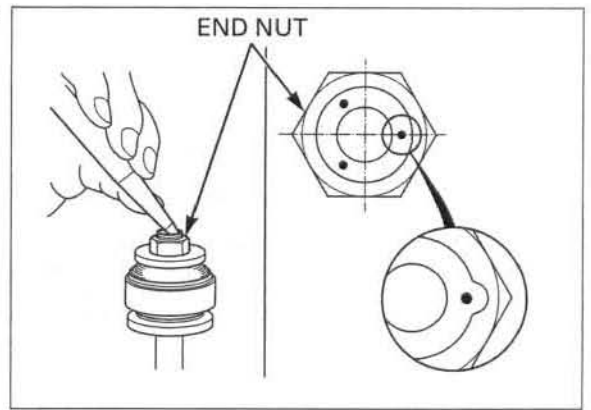
Set the lower shock mount in a vise with a piece of wood or soft jaws to avoid damage.

Install and tighten a new damper rod end nut to the specified torque.

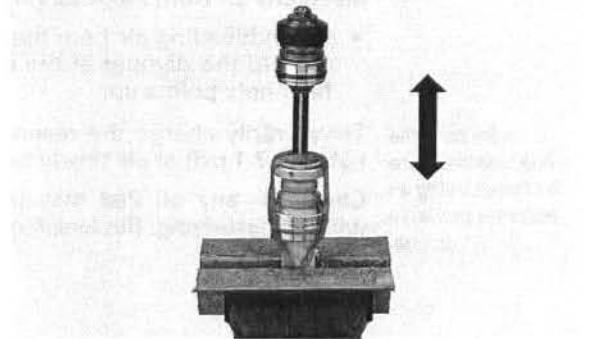
**TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)**



Stake the end of the damper rod in three places as shown, to the end nut.

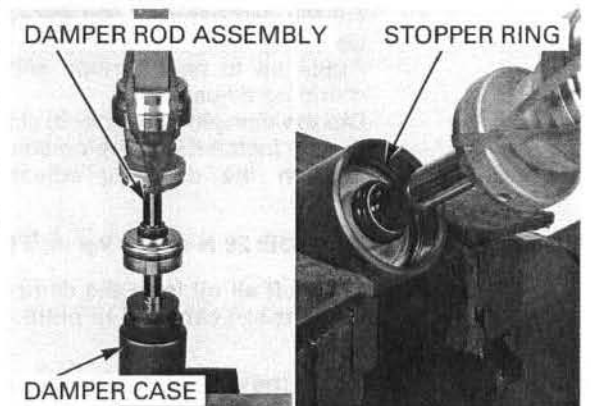


Coat the damper rod with Pro Honda HP Fork Oil 5W or equivalent. Check the rod guide case by sliding it up and down fully to be sure there is no restriction.



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.

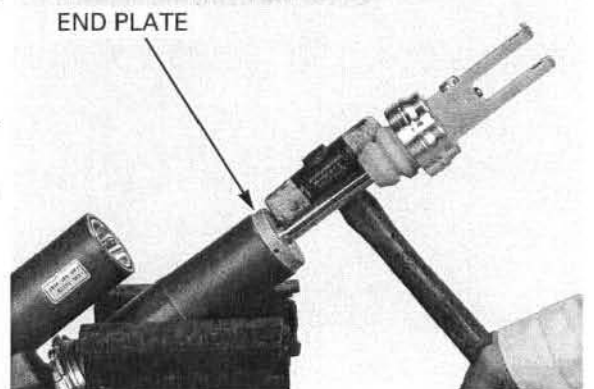


Set the shock absorber in a vise with a piece of wood or soft jaws to avoid damage.

### NOTICE

*Do not over-tighten the vise and distort the damper case.*

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 recommended shock oil through the damping adjuster hole.

### RECOMMENDED SHOCK OIL:

Pro Honda HP Fork Oil 5W or equivalent

### STANDARD OIL CAPACITY:

395 cm<sup>3</sup> (13.4 US oz, 13.9 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 recommended shock oil to the damping adjuster hole neck.

Apply oil to new O-rings and install them to the damping adjuster.

Dip the damping adjuster in clean shock oil.

Slowly install the damping adjuster.

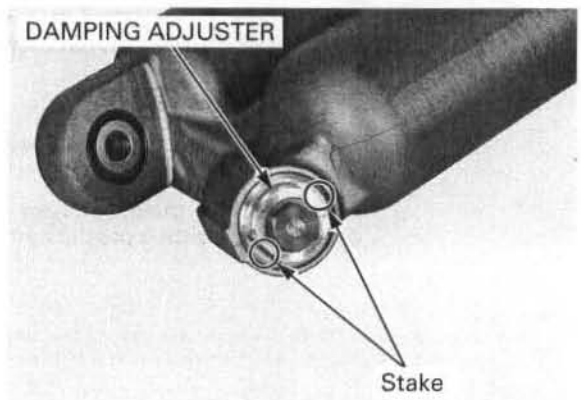
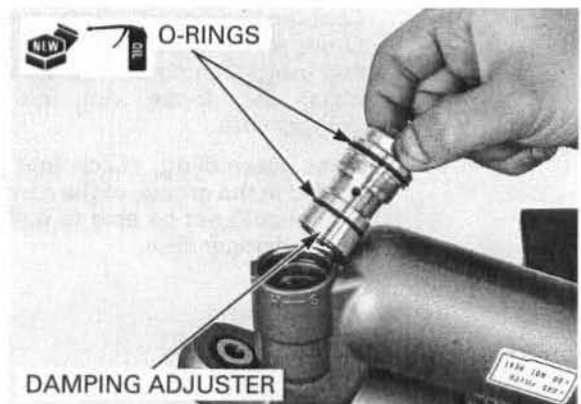
Tighten the damping adjuster to the specified torque.

**TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)**

Wipe off all oil from the damper rod; oil left on the damper rod can lead to premature failure of the oil seal.

Check the oil leaks.

Stake the damping adjuster as shown.

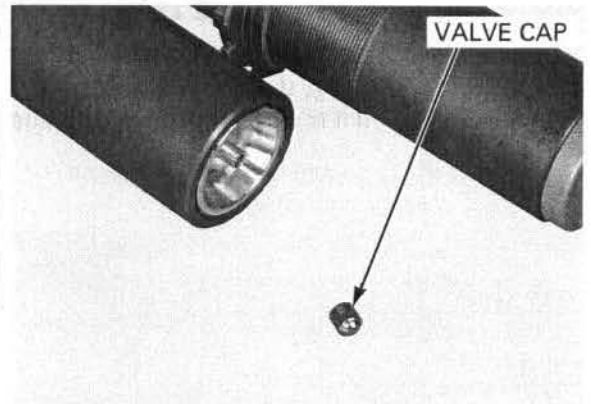


Release the air that was in the reservoir at precompression. Fill the reservoir with 980 kpa (10.0 kgf/cm<sup>2</sup>, 142 psi) of nitrogen gas.

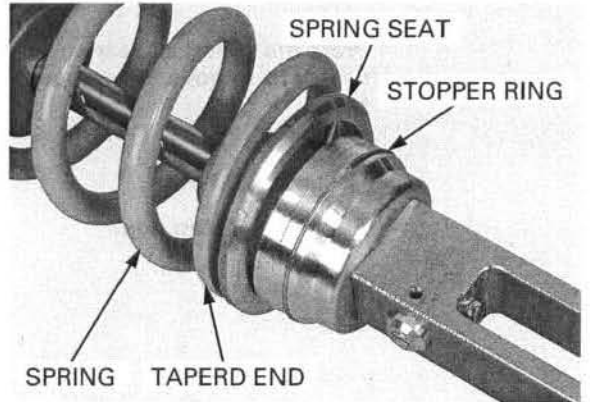
**CAUTION**

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.

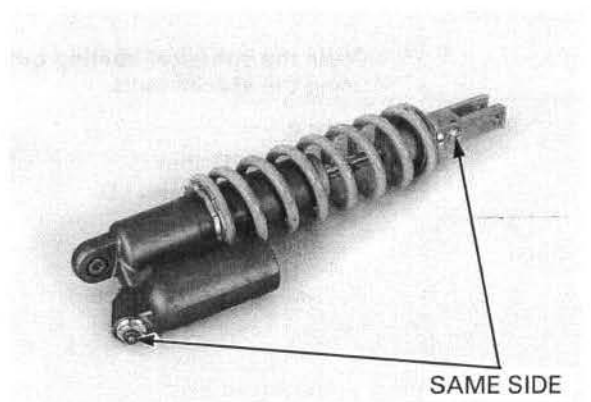
Install the valve cap.



Install the spring with its tapered end facing down. Install the spring seat and stopper ring. 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).*

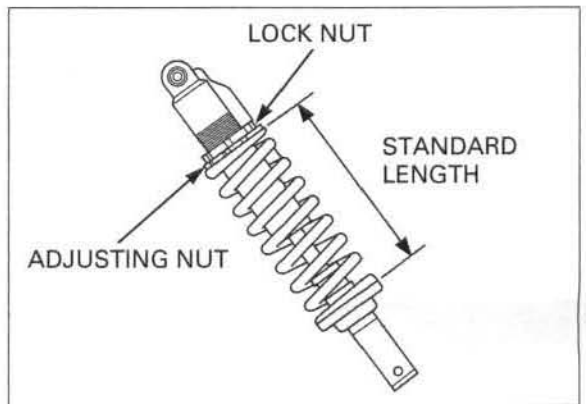
Turn the spring adjusting nut until the spring length measurement recorded at disassembly is reached or until the spring length is as specified below.

**STANDARD SPRING LENGTH:**  
 '05 - '07: 258.5 mm (10.18 in)  
 After '07: 258.0 mm (10.16 in)

Hold the adjusting nut and tighten the lock nut.

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

Use this standard spring length as the baseline. See the Owner's Manual for detailed instructions on adjusting preload and damping for riding conditions and rider skill.



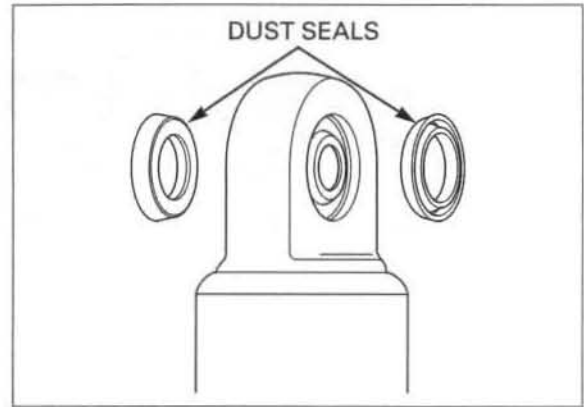


## REAR WHEEL/SUSPENSION

### SPHERICAL BEARING REPLACEMENT

Remove the dust seals.

Check the spherical bearing for wear or damage.  
If it is worn or damaged, it must be replaced.



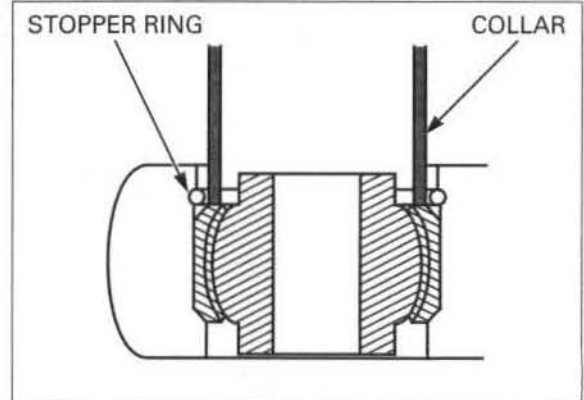
Press the spherical bearing to get the clearance necessary to remove the stopper ring using the special tool.

**TOOL:**

Collar, 23 x 17 mm

07GMD-KT8A110

Remove the stop ring.



Press the spherical bearing out of the upper mount using the special tools.

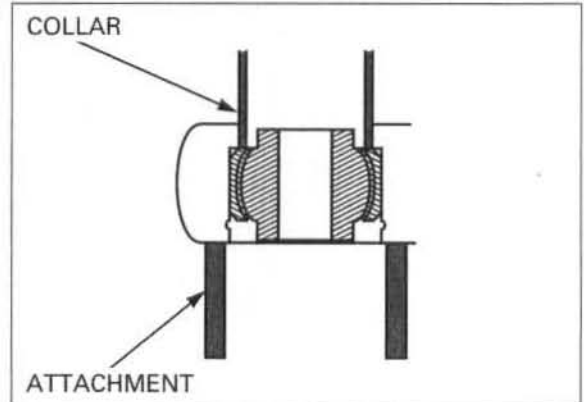
**TOOLS:**

Collar, 23 x 17 mm

07GMD-KT8A110

Attachment, 30 mm I.D.

07746-0030300



Apply multi-purpose grease NLGI No.2 (molybdenum disulfide MoS2 additive) to the new spherical bearing.

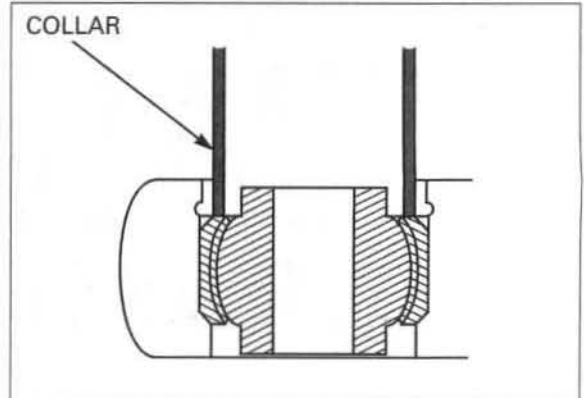
Press a new spherical bearing into the upper mount.

**TOOL:**

Collar, 23 x 17 mm

07GMD-KT8A110

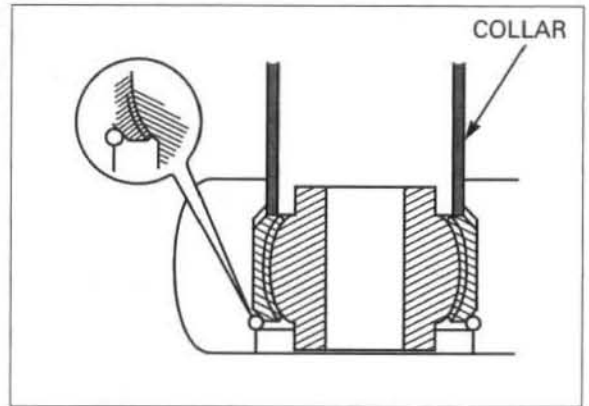
*Drive the bearing in evenly; do not allow it to tilt.*



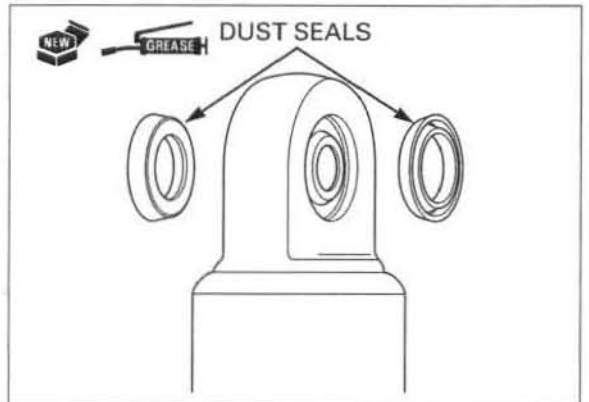


Install a new stopper ring into the groove of the upper mount securely.  
 Press the spherical bearing into the upper mount using the special tool, until it seats against the stopper ring.

**TOOL:**  
 Collar, 23 x 17 mm                      07GMD-KT8A110



*Be sure to install the correct dust seal in each side.*      Apply grease to new dust seal lips and install them.

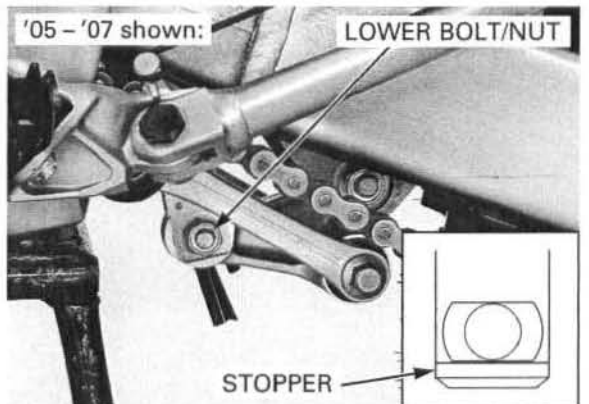


**INSTALLATION**

Set the shock absorber onto the shock arm with the rebound adjuster facing right side.  
 Install the lower mounting bolt by aligning the flat side of the bolt with the stopper on the shock absorber.

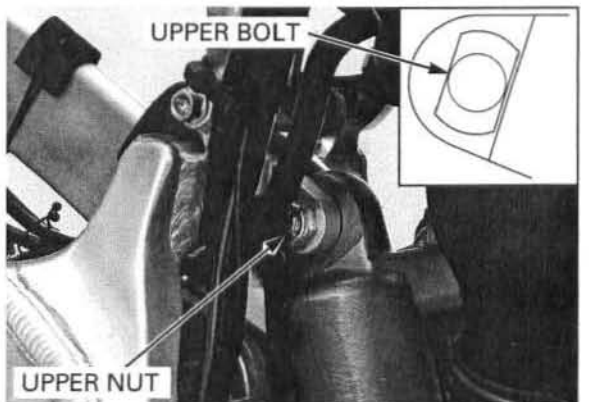
Install and tighten the lower mounting nut to the specified torque.

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



Install the upper mounting bolt by aligning the flat side of the bolt with the groove of the frame.  
 Install and tighten the shock absorber upper mounting nut to the specified torque.

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



## REAR WHEEL/SUSPENSION

Loosen the sub-frame upper mounting bolt and connect the air cleaner connecting boot securely.

Tighten the sub-frame mounting bolts to the specified torque.

### TORQUE ('05 - '07):

Upper: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Lower: 49 N·m (5.0 kgf·m, 36 lbf·ft)

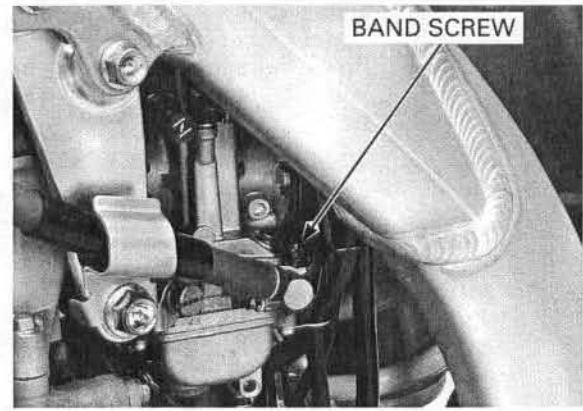
### TORQUE (After '07):

Upper/lower: 49 N·m (5.0 kgf·m, 36 lbf·ft)

Tighten the air cleaner connecting boot band screw securely.

Install the fuel tank (page 3-8).

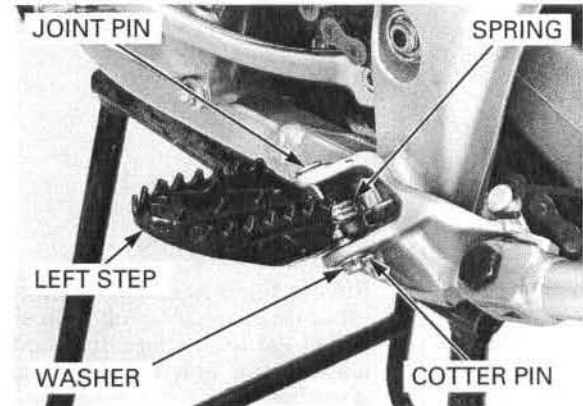
Install the seat (page 3-3).



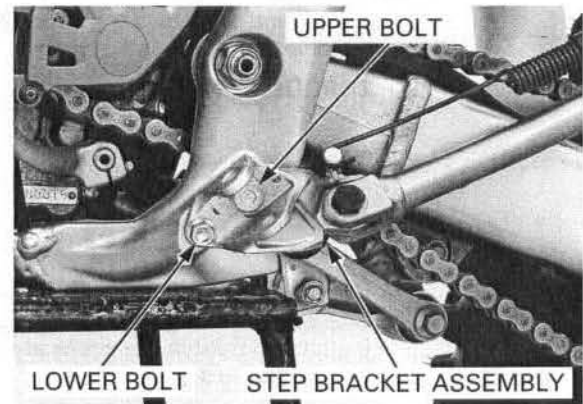
## SHOCK LINKAGE

### REMOVAL

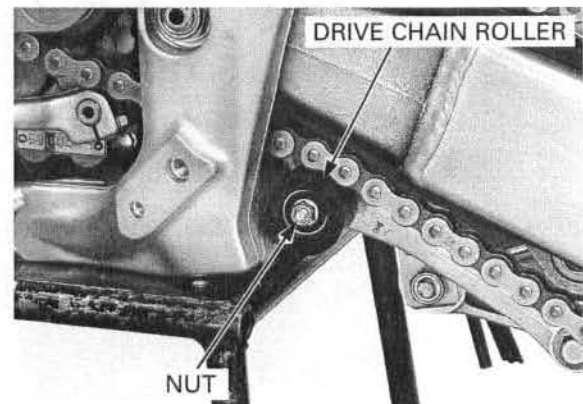
Remove the cotter pin, washer, joint pin, spring and left step.



Remove the step bracket mounting bolts and step bracket assembly.

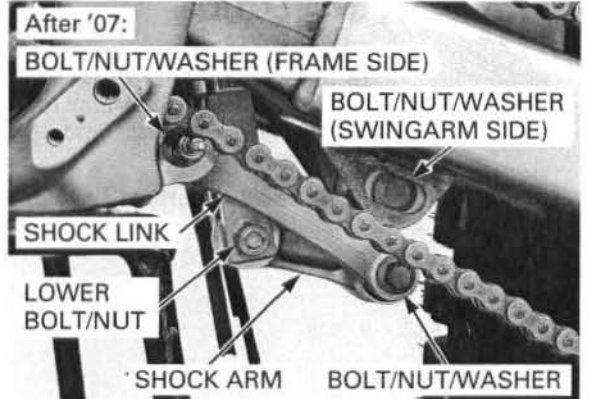
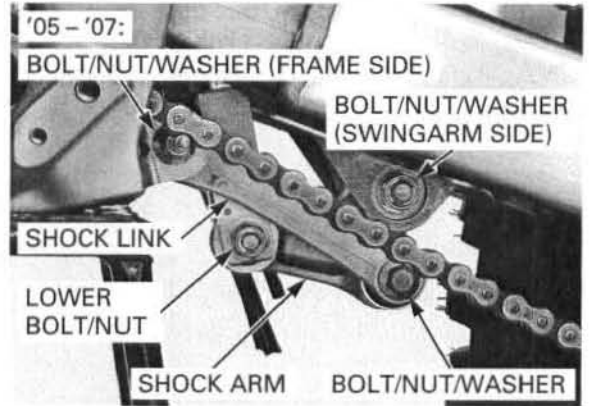


Remove the nut and drive chain roller.

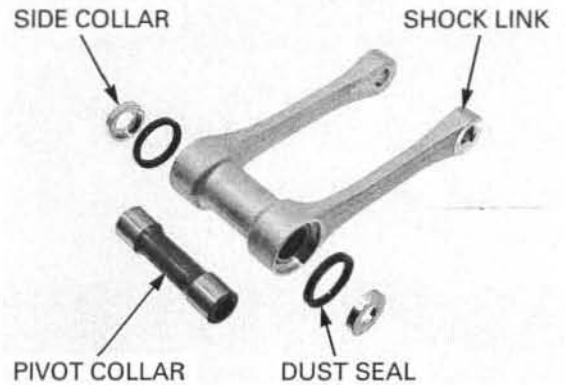


Remove the following:

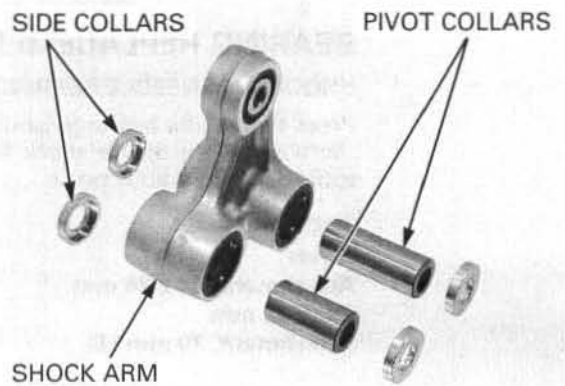
- Shock absorber lower mounting bolt/nut
- Shock arm bolt/nut/washer (shock link side)
- Shock arm bolt/nut/washer (swingarm side)
- Shock arm
- Shock link bolt/nut/washer (frame side)
- Shock link



Remove the side collars, pivot collar and dust seals from the shock link.



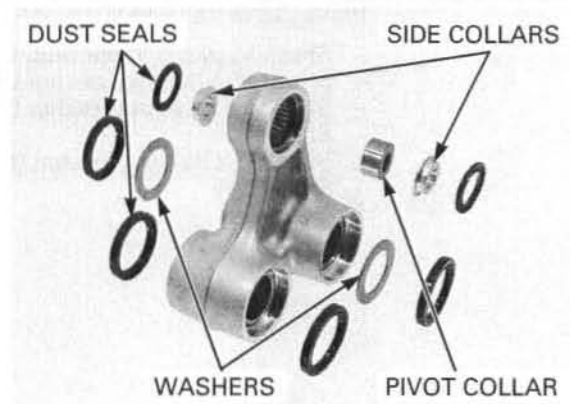
Remove the side collars and pivot collars from the shock arm (swingarm side, shock link side).



## REAR WHEEL/SUSPENSION

Remove the dust seals and washers (swingarm side, shock link side).

Remove the dust seals, side collars and pivot collar (shock absorber side).

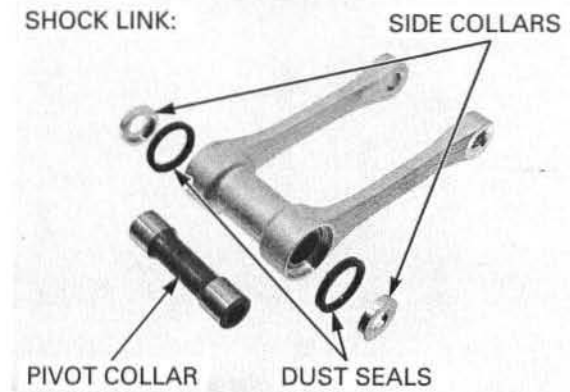
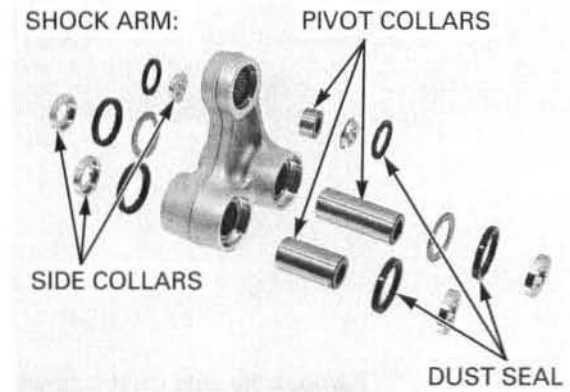


### INSPECTION

Check the dust seals and collars for wear, damage or fatigue.

Check the needle bearings for damage or loose fit.  
Check the shock arm and shock link for cracks or damage.

If the needle bearings are damaged, replace them.



### BEARING REPLACEMENT

#### SHOCK ARM NEEDLE BEARING

Press the needle bearings (shock link side and swingarm side) out of the shock link using the special tools and a hydraulic press.

#### TOOLS:

Driver

Attachment, 24 x 26 mm

Pilot, 20 mm

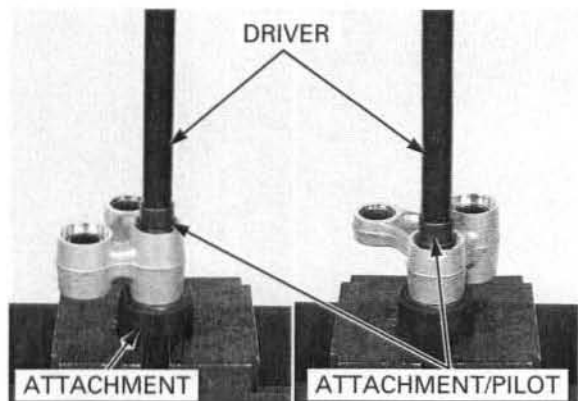
Attachment, 30 mm I.D.

07949-3710001

07746-0010700

07746-0040500

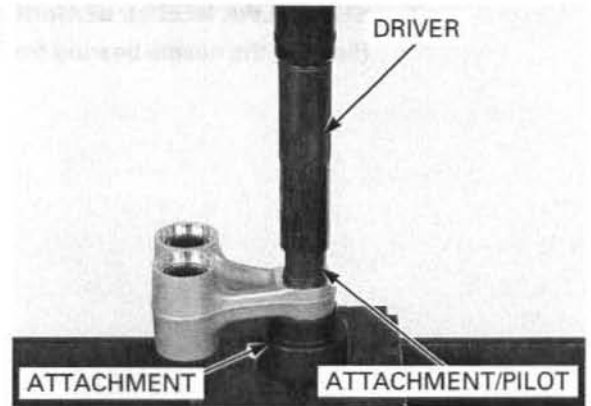
07746-0030300



Press the needle bearings (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
Attachment, 30 mm I.D.	07746-0030300



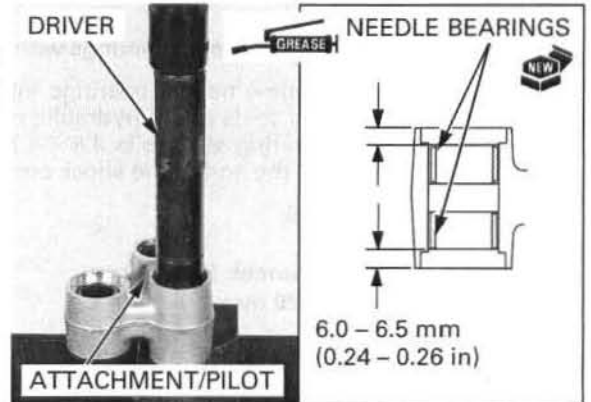
Pack new needle bearings with grease.

*Press the needle bearing into the shock arm with the marked side facing out.*

Press new needle bearings into the shock link side pivot with the special tools and a hydraulic press so that the needle bearing surface is 6.0 – 6.5 mm (0.24 – 0.26 in) below the end of the shock arm surface.

**TOOLS:**

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 20 mm	07746-0040500



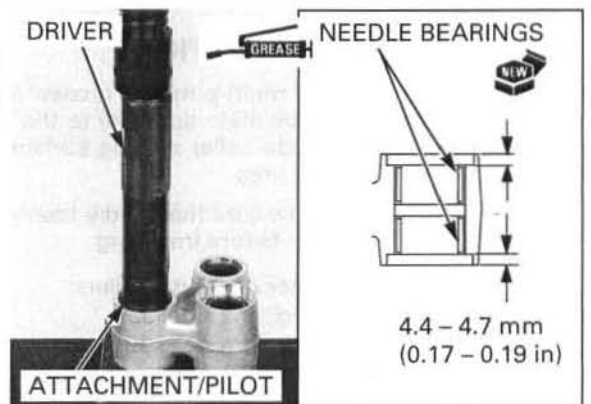
Pack new needle bearings with grease.

*Press the needle bearing into the swingarm side pivot with the marked side facing out.*

Press new needle bearings into the swingarm side pivot with the special tools and a hydraulic press so that the needle bearing surface is 4.4 – 4.7 mm (0.17 – 0.19 in) below the end of the shock arm surface.

**TOOLS:**

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 20 mm	07746-0040500



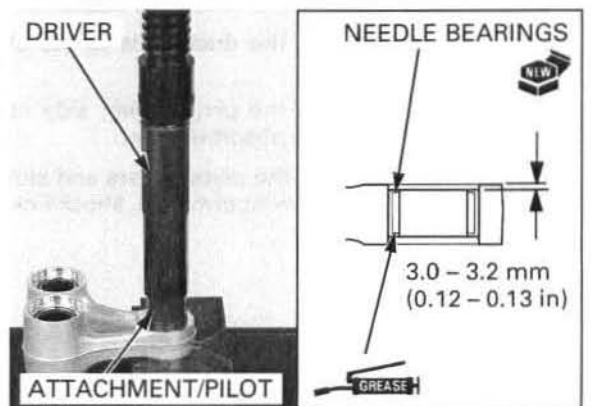
Pack a new needle bearing with grease.

*Press the needle bearing into the shock absorber side pivot with the marked side facing out.*

Press a new needle bearing into the shock absorber side pivot with the special tools and a hydraulic press so that the needle bearing surface is 3.0 – 3.2 mm (0.12 – 0.13 in) below the end of the shock arm surface.

**TOOLS:**

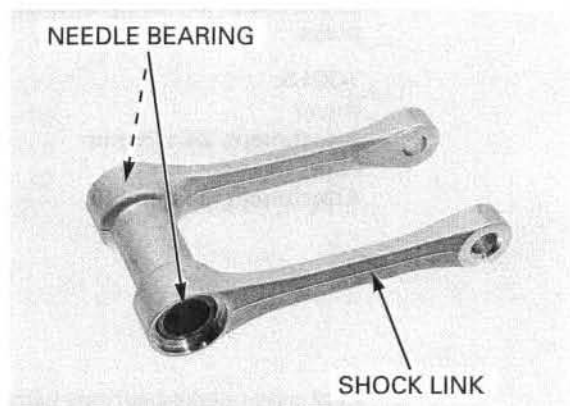
Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 19 mm	07746-0041400



## REAR WHEEL/SUSPENSION

### SHOCK LINK NEEDLE BEARING

Remove the needle bearing from the shock link.



Pack new needle bearings with grease.

*Press the needle bearing into the shock link with the marked side facing out.*

Press new needle bearings into the pivot with the special tools and a hydraulic press so that the needle bearing surface is 4.4 – 4.7 mm (0.17 – 0.19 in) below the end of the shock arm surface.

#### TOOLS:

**Driver**

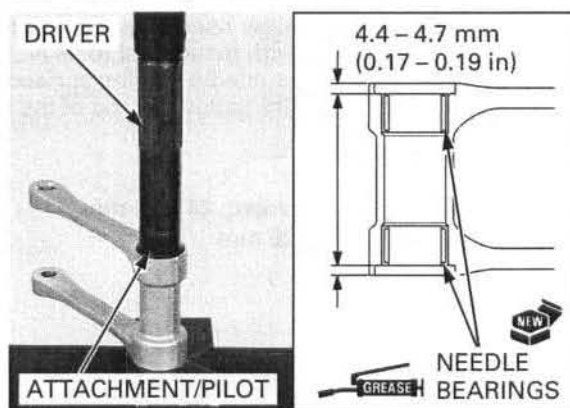
**07749-0010000**

**Attachment, 24 x 26 mm**

**07746-0010700**

**Pilot, 20 mm**

**07746-0040500**



### INSTALLATION

Apply multi-purpose grease NLGI No.2 (molybdenum disulfide additive) to the shock arm, dust seal lips, side collar seating surface and needle bearing rolling area.

- Make sure the needle bearing rollers are in position before installing.

Number of needle rollers:

Shock link side: 32

Swingarm side: 32

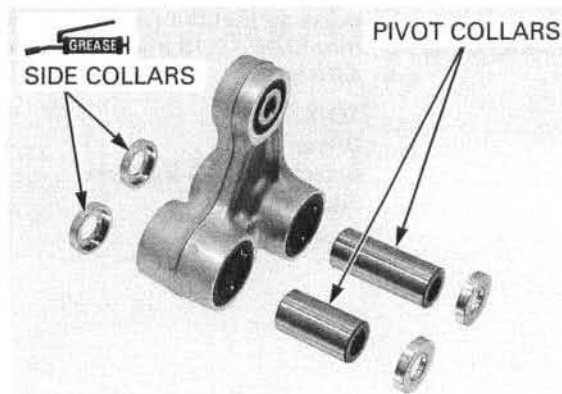
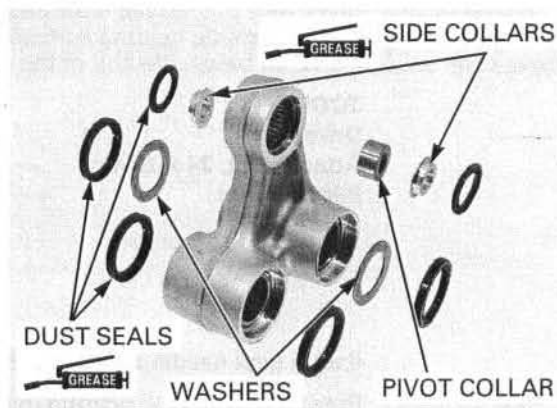
Shock absorber side: 27

Install the dust seals and washers (shock link side).

Install the dust seals to the shock arm (swingarm side).

Install the pivot collar, side collars and dust seals (shock absorber side).

Install the pivot collars and side collars to the shock arm (swingarm side, shock link side).



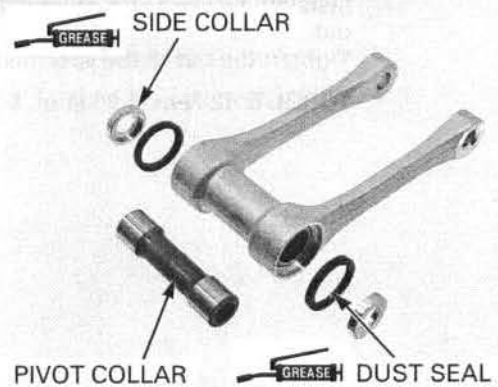


Apply multi-purpose grease NLGI No.2 (molybdenum disulfide additive) to the dust seal lips, side collar seating surface and needle bearing rolling area.

Install the dust seals, pivot collar and side collars.

- Make sure the needle bearing rollers are in position before installing.

Number of needle rollers: 32



Apply oil to the shock arm and shock link nut threads and flange surface.

Loosely install the following:

- Shock link
- Shock link bolt/nut/washer (frame side)
- Shock arm
- Shock arm bolt/nut/washer (swingarm side)

**NOTE:**

After '07: Align the flat surfaces of the shock arm bolt and swingarm.

- Shock arm bolt/nut/washer (shock link side)

Install the shock absorber lower mounting bolt aligning the flat side of the bolt with the stopper on the shock absorber.

Tighten all nuts to the specified torque.

**TORQUE:**

**Shock link nut (frame side):**

53 N·m (5.4 kgf·m, 39 lbf·ft)

**Shock arm nut (swingarm side):**

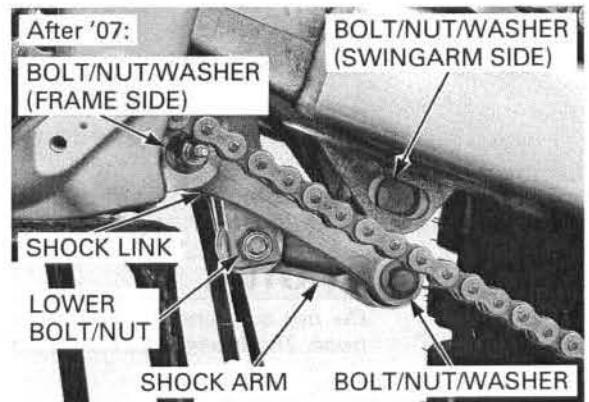
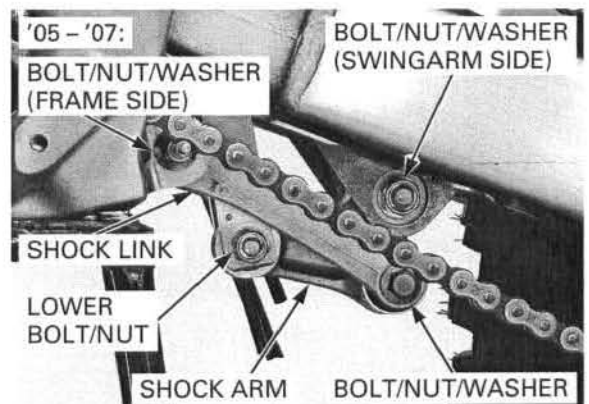
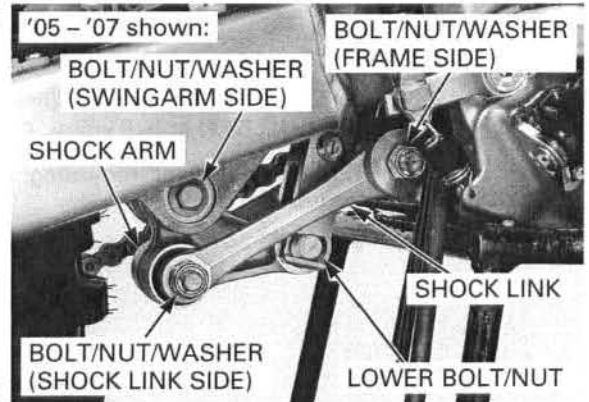
53 N·m (5.4 kgf·m, 39 lbf·ft)

**Shock arm nut (shock link side):**

53 N·m (5.4 kgf·m, 39 lbf·ft)

**Shock absorber lower mounting nut:**

44 N·m (4.5 kgf·m, 32 lbf·ft)



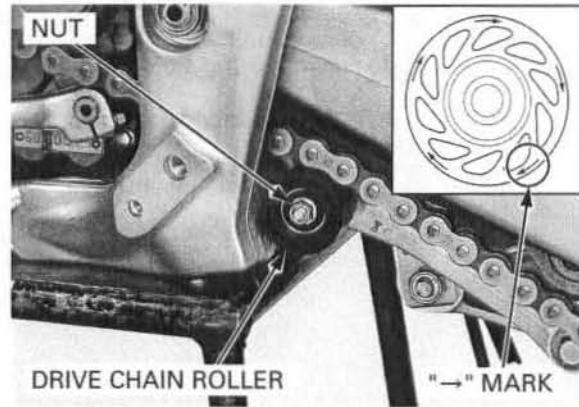


## REAR WHEEL/SUSPENSION

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

Tighten the nut to the specified torque.

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



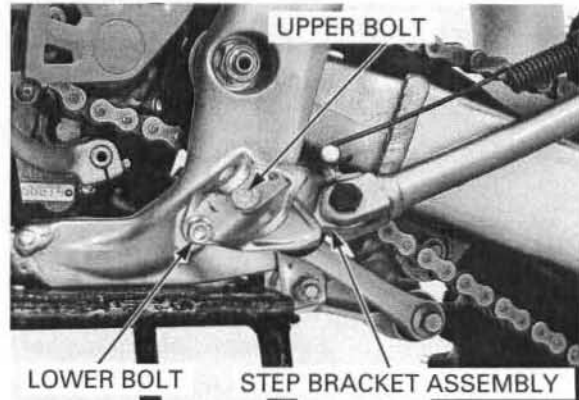
Install the step bracket assembly and mounting bolts.

Tighten the upper mounting bolt to the specified torque.

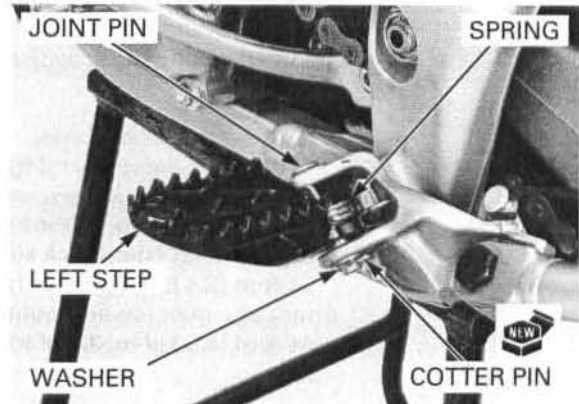
**TORQUE: 55 N·m (5.6 kgf·m, 41 lbf·ft)**

Tighten the lower mounting bolt to the specified torque.

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



Install the left step, spring, joint pin, washer and new cotter pin securely as shown.



## SWINGARM

### REMOVAL

Remove the following:

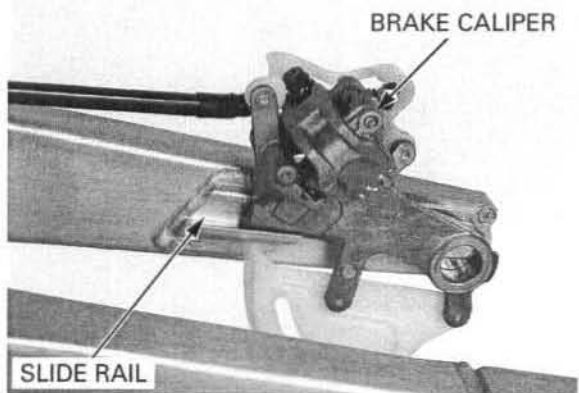
- Rear wheel (page 15-8)
- Brake pedal (page 16-24)

*Do not disconnect the hydraulic line.*

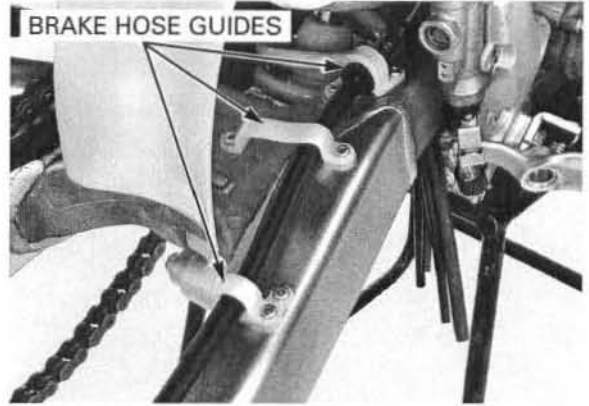
Remove the rear brake caliper from the slide rail on the swingarm.

### NOTICE

*Do not suspend the brake caliper from the brake hose. The brake hose may be damaged.*



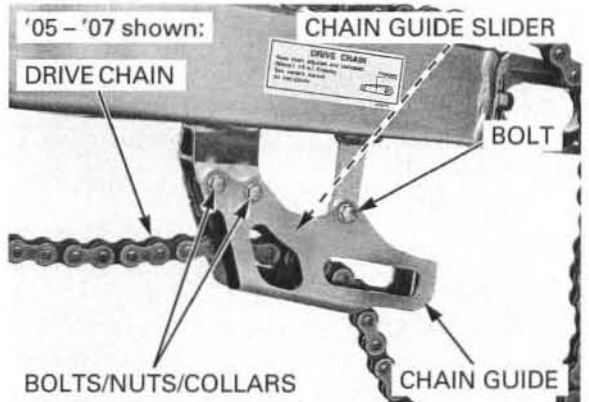
Remove the screws and brake hose guides.



Check the chain guide slider for wear or damage.

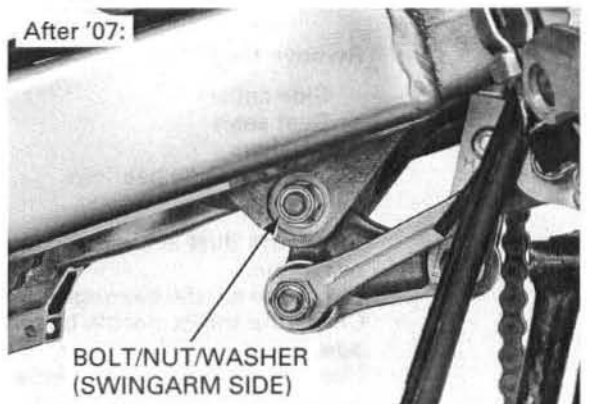
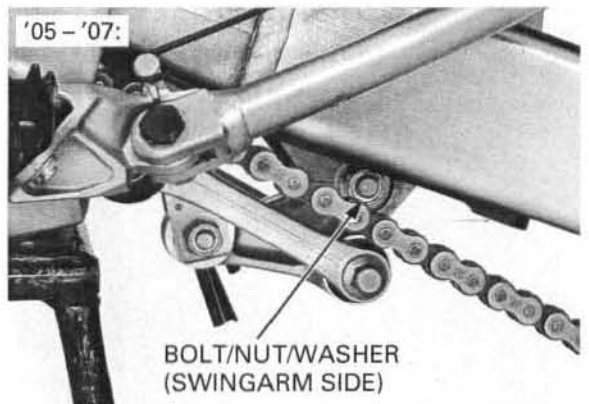
Remove the following:

- Bolts
- Nuts
- Chain guide
- Chain guide slider
- Collars ('05 - '07)
- Drive chain (page 4-25)



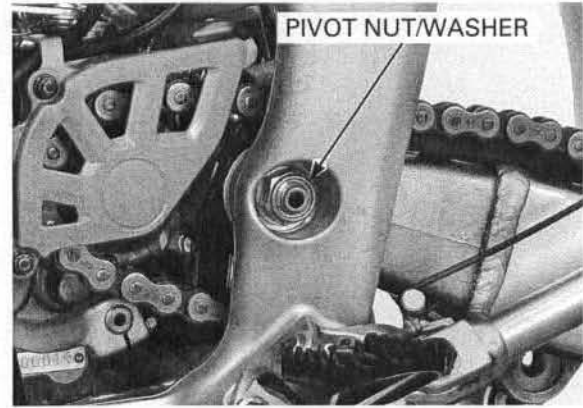
Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

Remove the shock arm bolt, nut and washer (swing-arm side).

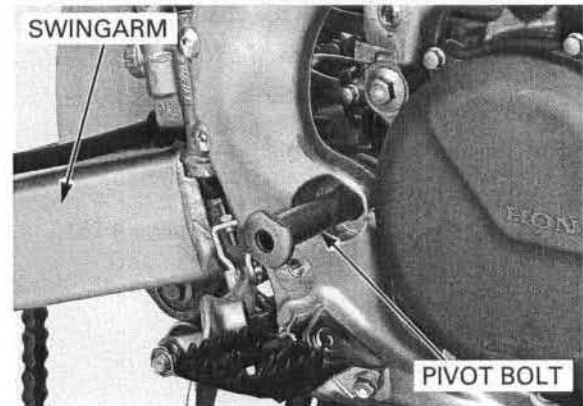


## REAR WHEEL/SUSPENSION

Remove the pivot nut and washer.



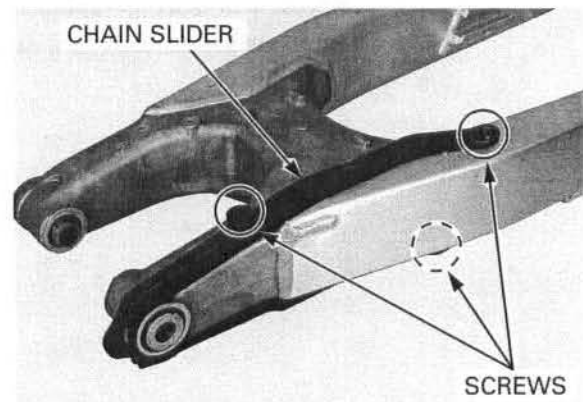
Remove the pivot bolt and swingarm.



### DISASSEMBLY

Check the chain slider for wear or damage.

Remove the screws and chain slider.



Remove the following:

- Side collars
- Dust seals
- Washers
- Thrust needle bearings
- Pivot collars

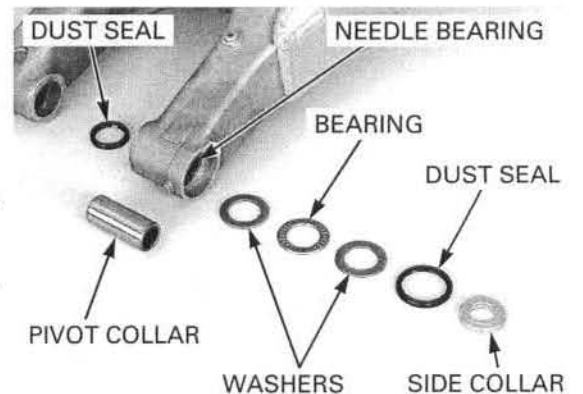
Check the dust seals and collars for wear, damage or fatigue.

Check the needle bearings for damage or loose fit.

Check the thrust needle bearings for wear or damage, replace it if necessary.

Check the swingarm for cracks or damage.

Replace any damaged parts, if necessary.

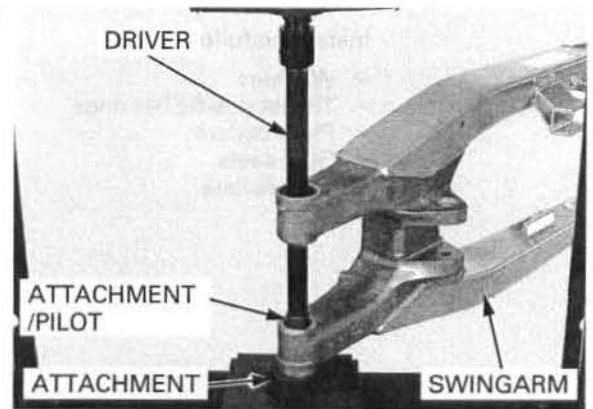


**BEARING REPLACEMENT**

Press the needle bearings out of the swingarm using the special tools and a hydraulic press.

**TOOLS:**

- |                        |               |
|------------------------|---------------|
| Driver                 | 07949-3710001 |
| Attachment, 24 x 26 mm | 07746-0010700 |
| Pilot, 22 mm           | 07746-0041000 |
| Attachment, 30 mm I.D. | 07746-0030300 |

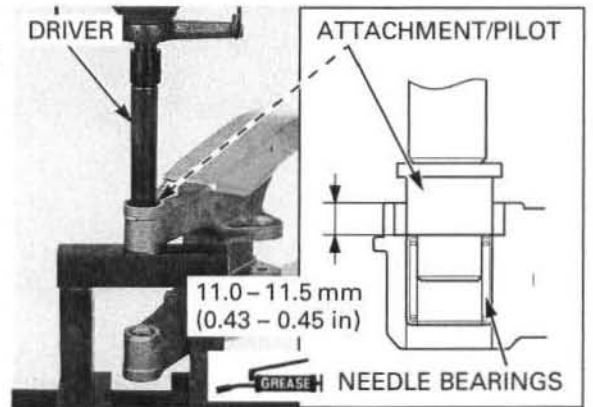


Pack new needle bearings with grease.

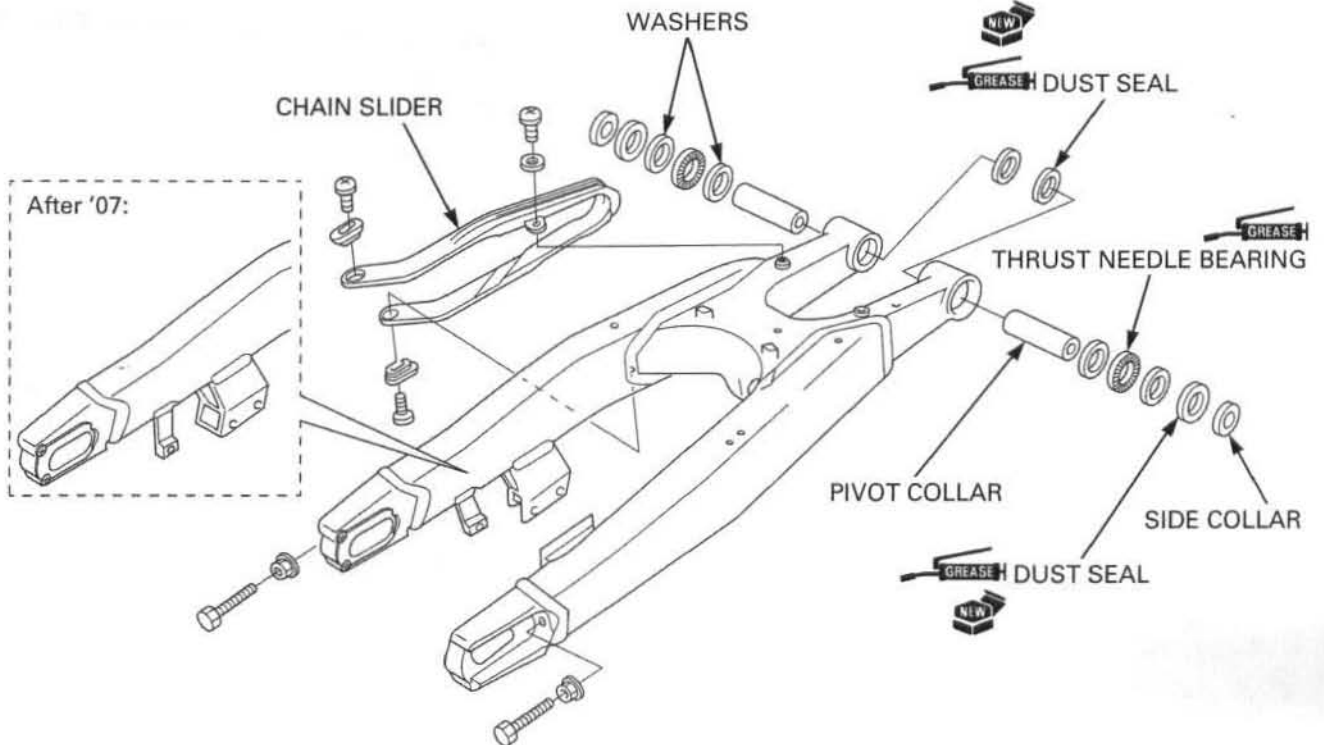
Press a new needle bearing into the swingarm using the special tools and a hydraulic press as shown.

**TOOLS:**

- |                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 28 x 30 mm | 07946-1870100 |
| Pilot, 22 mm           | 07746-0041000 |



**ASSEMBLY**

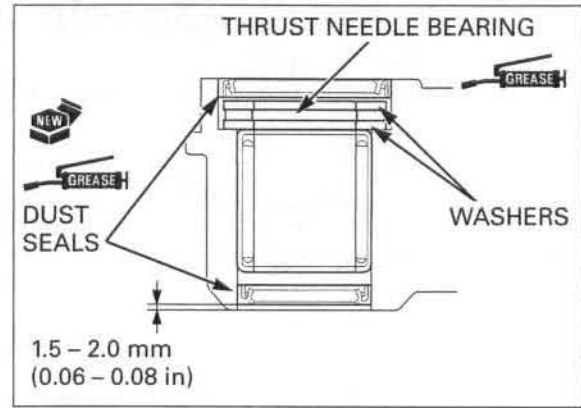


## REAR WHEEL/SUSPENSION

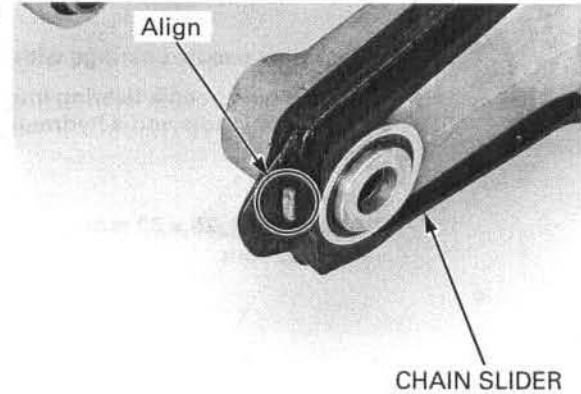
Apply grease to the thrust needle bearing rolling area and dust seal lips.

Install the following:

- Washers
- Thrust needle bearings
- Pivot collars
- Dust seals
- Side collars

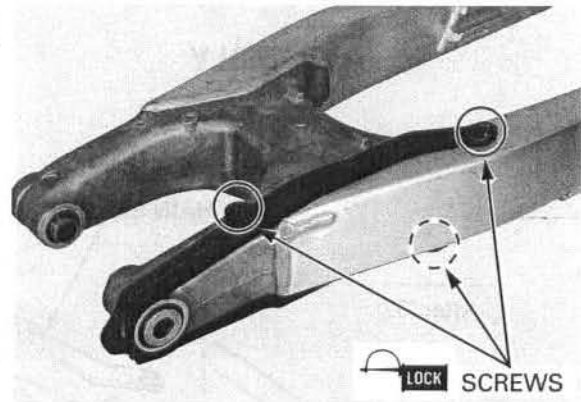


Install the chain slider so its hole fits over the tab on the swingarm.



Clean and apply locking agent to the screw threads. Install and tighten the screws to the specified torque.

**TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**

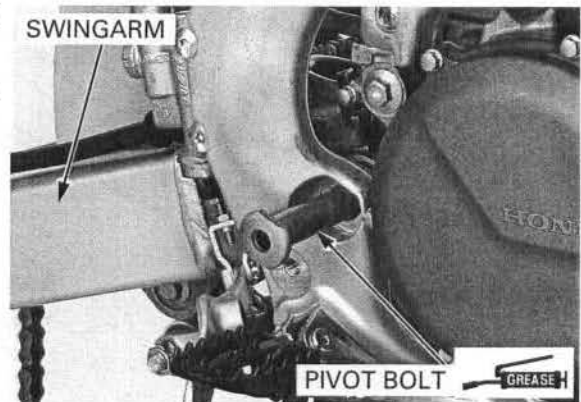


## INSTALLATION

Apply thin coat of grease to the swingarm pivot bolt sliding surface.

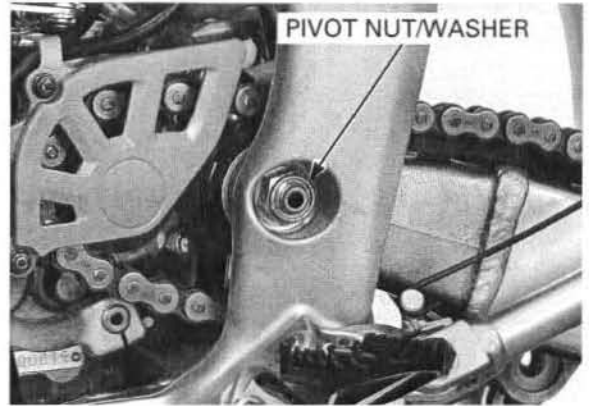
Install the swingarm onto the frame.

Install the swingarm pivot bolt through the frame and swingarm pivot.



Install the washer and swingarm pivot nut.  
Tighten the swingarm pivot nut to the specified torque.

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



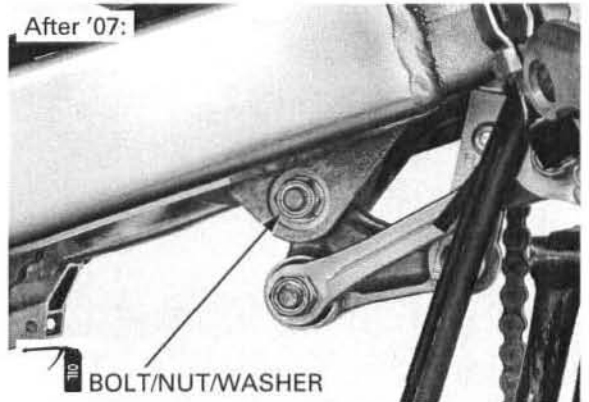
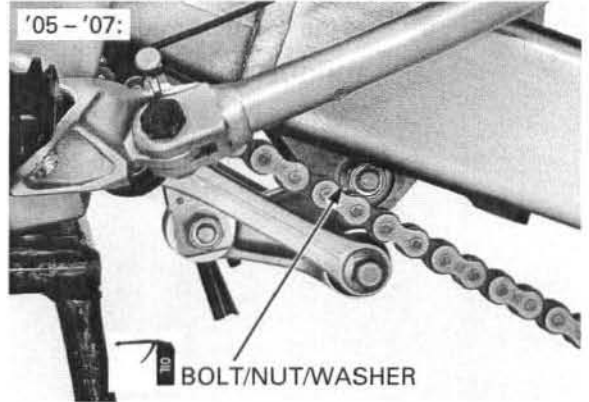
Apply oil to the shock arm nut threads and seating surface.

'05 - '07: Install the shock arm bolt, nut and washer.

After '07: Install the shock arm bolt by aligning flat surfaces of the shock arm bolt and swingarm.

Tighten the nut to the specified torque.

**TORQUE: 53 N·m (5.4 kgf·m, 39 lbf·ft)**

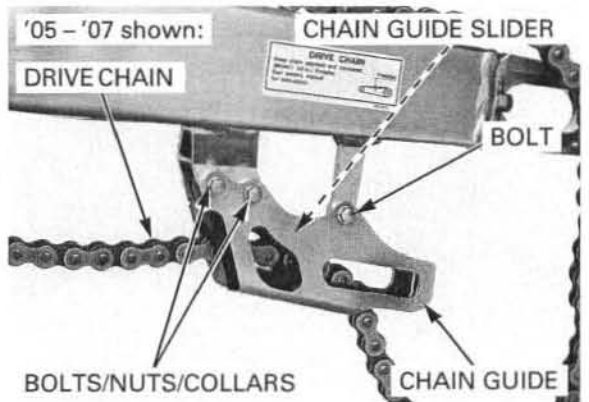


Install the following:

- Drive chain (page 4-25)
- Collars ('05 - '07)
- Chain guide slider
- Chain guide

Install and tighten the bolts and nuts to the specified torque.

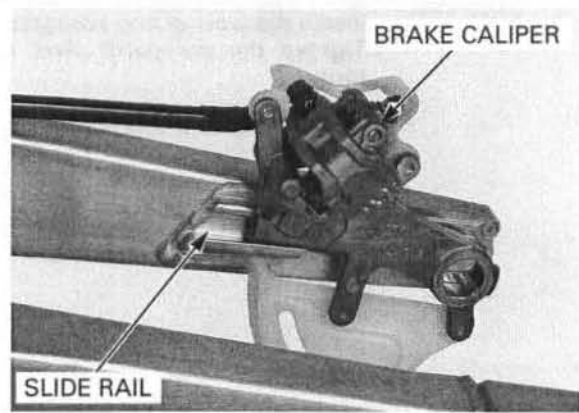
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**





## REAR WHEEL/SUSPENSION

*Do not twist the brake hose.* Install the rear brake caliper to the slide rail on the swingarm.

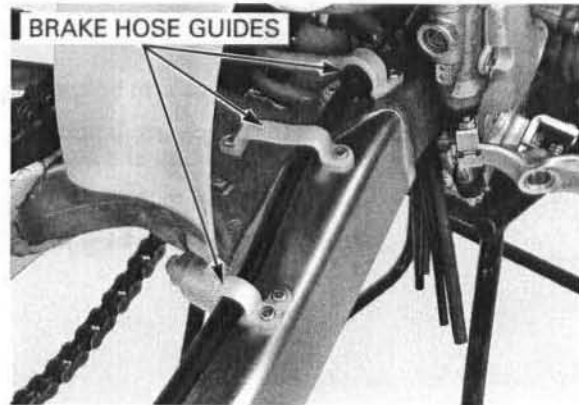


Install the brake hose guides and tighten the screws to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**

Install the following:

- Brake pedal (page 16-24)
- Rear wheel (page 15-13)



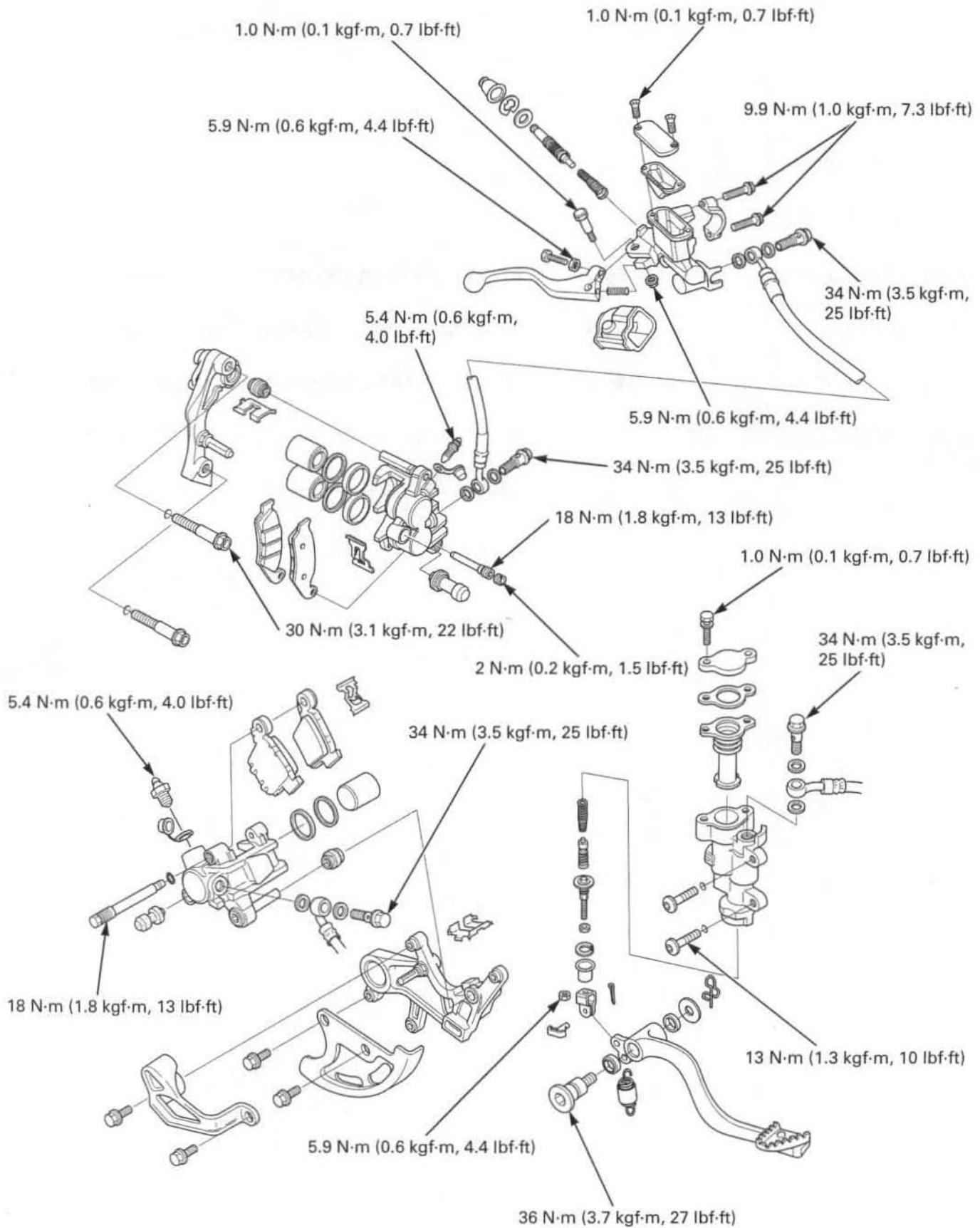


# 16. HYDRAULIC BRAKE

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COMPONENT LOCATION .....	16-2	FRONT MASTER CYLINDER.....	16-12
SERVICE INFORMATION .....	16-3	REAR MASTER CYLINDER .....	16-15
TROUBLESHOOTING .....	16-5	FRONT BRAKE CALIPER.....	16-18
BRAKE FLUID REPLACEMENT/AIR BLEEDING .....	16-6	REAR BRAKE CALIPER .....	16-20
BRAKE PAD/DISC.....	16-10	BRAKE PEDAL .....	16-24

COMPONENT LOCATION



**SERVICE INFORMATION****GENERAL****▲ WARNING**

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 the air bleeding.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid, they may not be compatible.
- Always check brake operation before riding the motorcycle.

**SPECIFICATIONS**

Unit: mm (in)

	ITEM	STANDARD	SERVICE LIMIT
Front	Brake fluid	DOT 4	–
	Brake 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)	11.050 (0.4350)
	Master piston O.D.	10.971 (0.4319)	10.840 (0.4268)
	Caliper cylinder I.D.	27.025 (1.0640)	27.060 (1.0654)
	Caliper piston O.D.	26.968 (1.0617)	26.853 (1.0572)
Rear	Brake fluid	DOT 4	–
	Brake disc thickness	4.0 (0.16)	3.5 (0.14)
	Brake disc warpage	–	0.15 (0.006)
	Master cylinder I.D.	9.547 (0.3759)	9.575 (0.3770)
	Master piston O.D.	9.491 (0.3737)	9.465 (0.3726)
	Caliper cylinder I.D.	22.650 (0.8917)	22.712 (0.8942)
	Caliper piston O.D.	22.620 (0.8905)	22.573 (0.8887)
	Brake pedal push rod standard length	79.6 mm (3.13 in)	–

## HYDRAULIC BRAKE

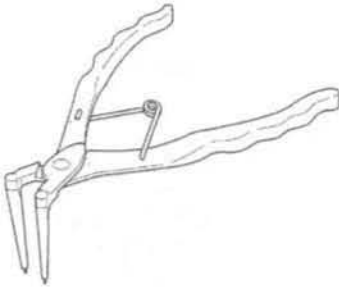
### TORQUE VALUES

Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Brake lever adjuster lock nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Front master cylinder reservoir cover screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front master cylinder holder bolt	9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)
Front/rear caliper bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)
Rear master cylinder reservoir cover bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Rear master cylinder mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Brake caliper pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)
Front brake caliper pad pin plug	2 N·m (0.2 kgf·m, 1.5 lbf·ft)
Brake pedal pivot bolt	36 N·m (3.7 kgf·m, 27 lbf·ft)
Brake pedal adjuster lock nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Front brake disc cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)

Apply locking agent to the threads

### TOOL

Snap ring pliers  
07914-SA50001



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## 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
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

## HYDRAULIC BRAKE

# BRAKE FLUID REPLACEMENT/AIR BLEEDING

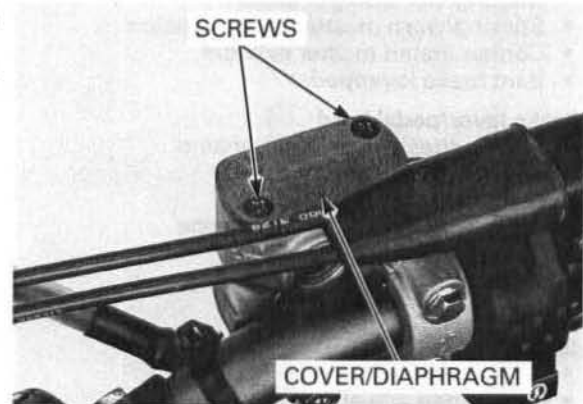
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Once the hydraulic system has been opened, or if the brake feels spongy the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instruction.

### BRAKE FLUID DRAINING

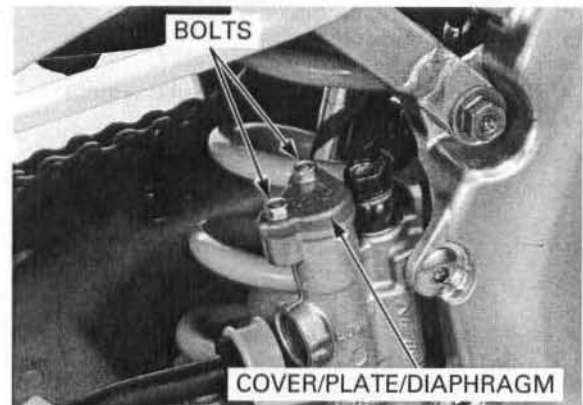
*Do not allow foreign material to enter the system. Avoid spilling fluid on plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

Check the master cylinder parallel to the ground, before removing the reservoir cover.

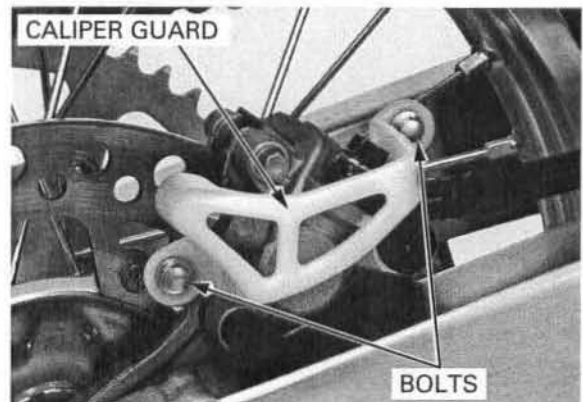
For the front brake, remove the screws, reservoir cover and diaphragm.



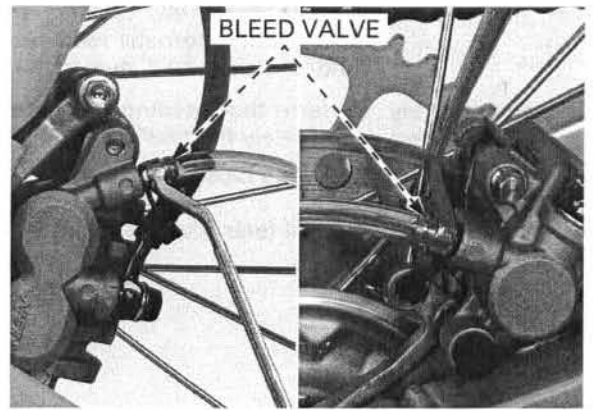
For the rear brake, remove the bolts, reservoir cover, set plate and diaphragm.



For the rear brake, remove the bolts and rear brake caliper guard.



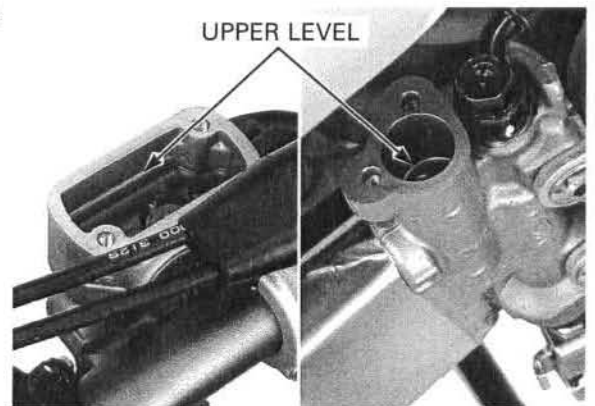
Connect a bleed hose to the bleed valve.  
Loosen the bleed valve and pump the brake lever (pedal).  
Stop operating the brake when no more fluid flows out of the bleed valve.



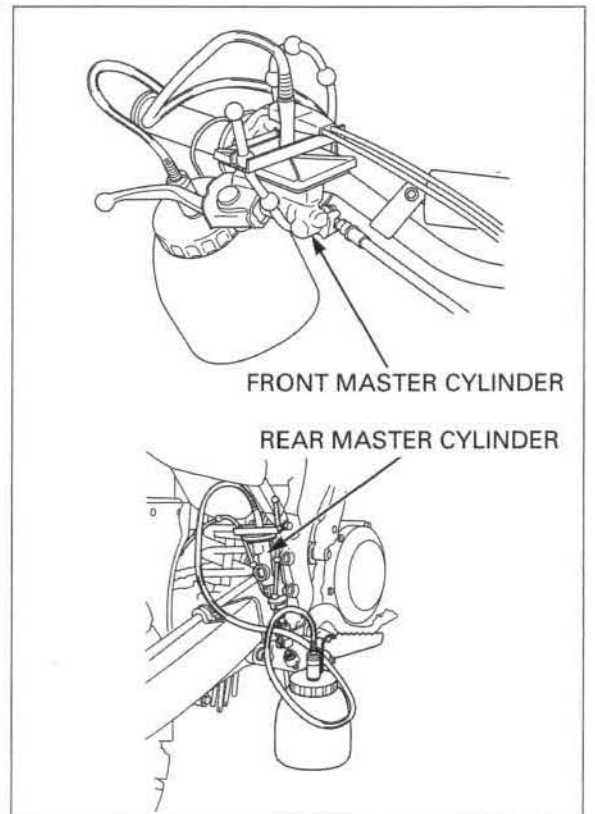
## BRAKE FLUID FILLING/AIR BLEEDING

*Do not mix different types of fluid since they are not compatible.  
Do not allow foreign material to enter the system.*

Fill the master cylinder with DOT 4 brake fluid to the upper level.



Connect a commercially available brake bleeder to the bleed valve.





## HYDRAULIC BRAKE

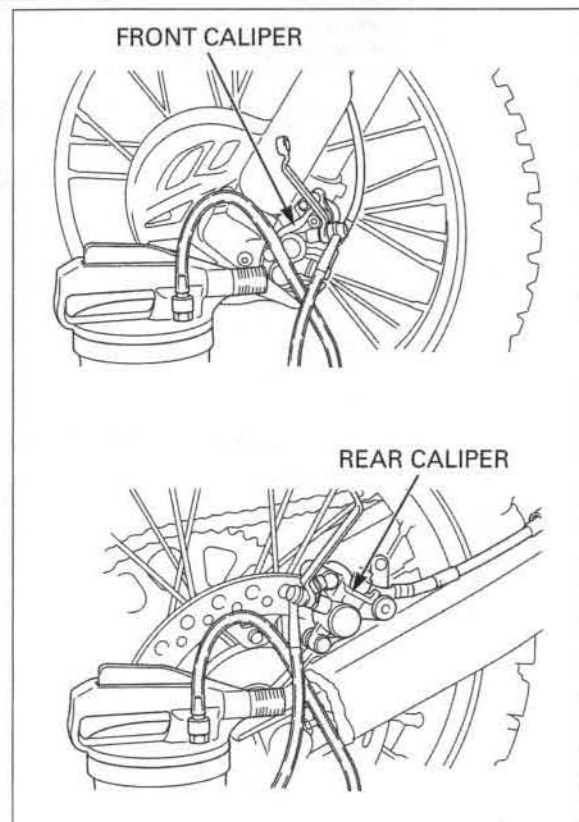
Operate the brake bleeder and loosen the bleed valve. If an automatic refill system is not used, add fluid when the fluid level in the reservoir is low.

*If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.*

Perform the bleeding procedure until the system is completely flushed/bled.

Close the bleed valve and 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 procedure.

Connect a clear bleed hose to the bleed valve. Pressurize the system with the lever or pedal until there are no air bubbles in the fluid flowing out of the small hole in the reservoir and lever or pedal resistance is felt.

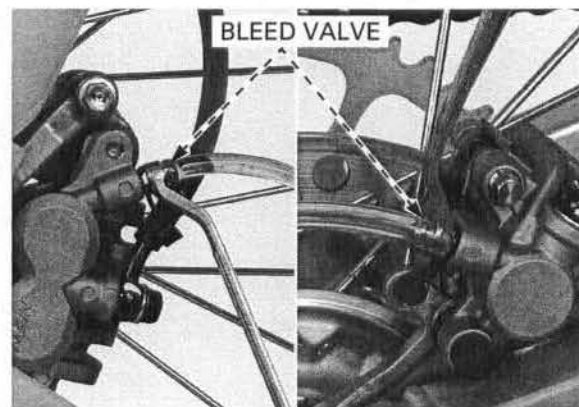


*Do not release the lever or pedal until the bleed valve has been closed.*

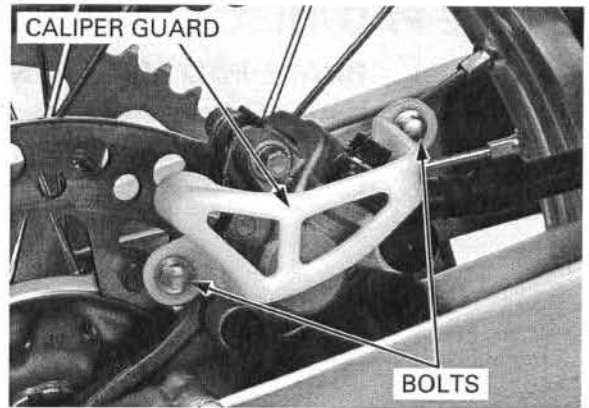
1. Pump the brake lever or pedal several times, then squeeze the brake lever or pedal all the way and loosen the bleed valve 1/2 of a turn. Wait several seconds and close the bleed valve.
2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat 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.

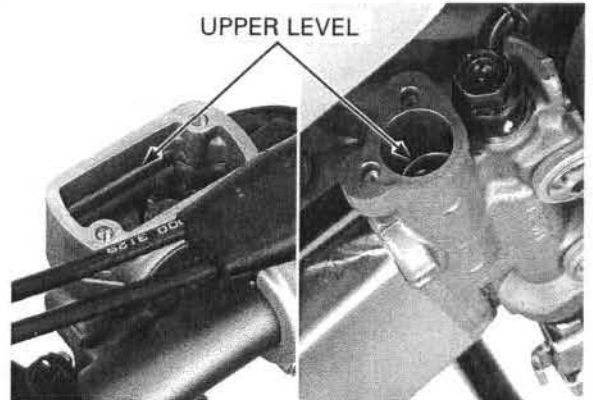
**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**



For the rear brake, install the brake caliper guard and tighten the bolts securely.



Fill the reservoir with DOT 4 brake fluid to the top of the upper level.



### FRONT:

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

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

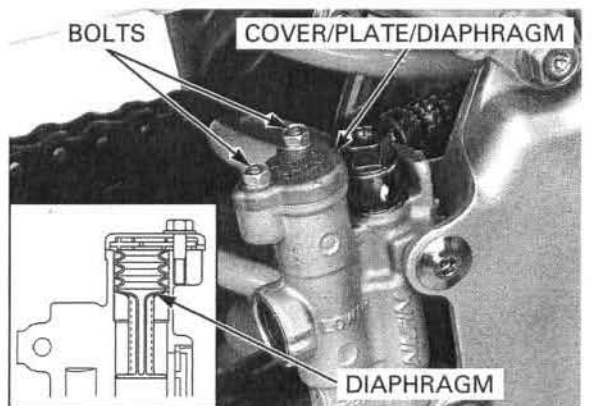


### REAR:

Straighten the diaphragm and install it to the rear master cylinder. Check the diaphragm installation as shown.

Install the set plate and reservoir cover. Tighten the reservoir cover bolts to the specified torque.

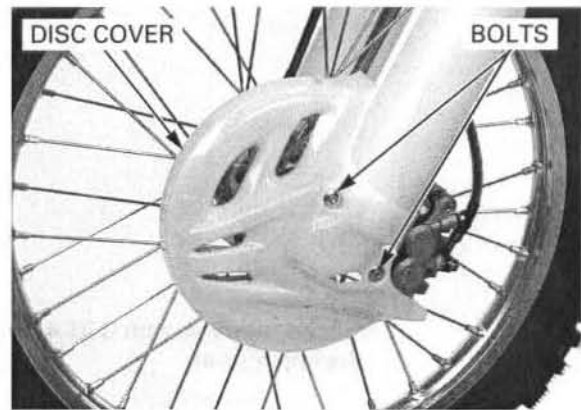
**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



## BRAKE PAD/DISC

### BRAKE PAD REPLACEMENT

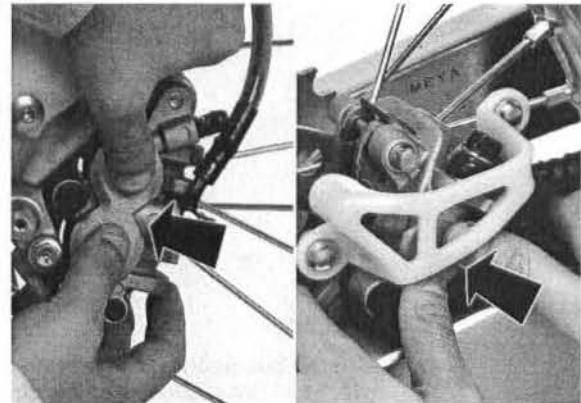
For front brake, remove the bolts and brake disc cover.



Push the caliper pistons all the way in to allow installation of new brake pads.

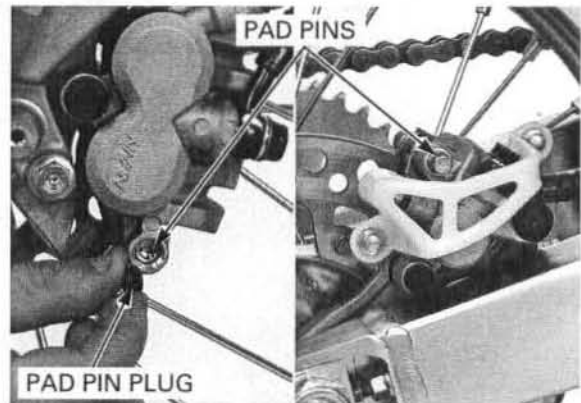
**NOTE:**

- 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 pin plug and pad pin.

For the rear brake, remove the pad pin.

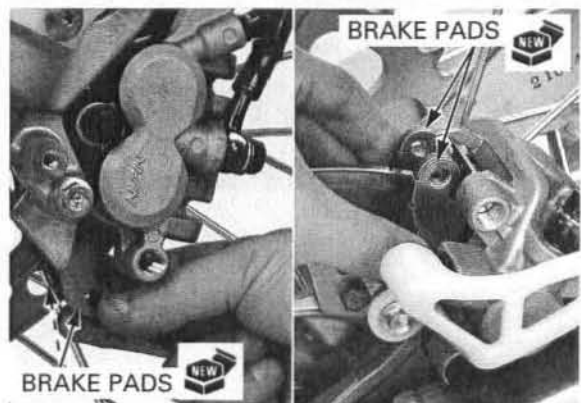


Remove the brake pads.

Install new brake pads to the pad retainer securely.

**NOTE:**

- Always replace the brake pads in pairs to assure even disc pressure.
- A contaminated brake disc or pad reduces stopping power.
- Discard contaminated pads and clean a contaminated disc with a high quality brake decreasing agent.



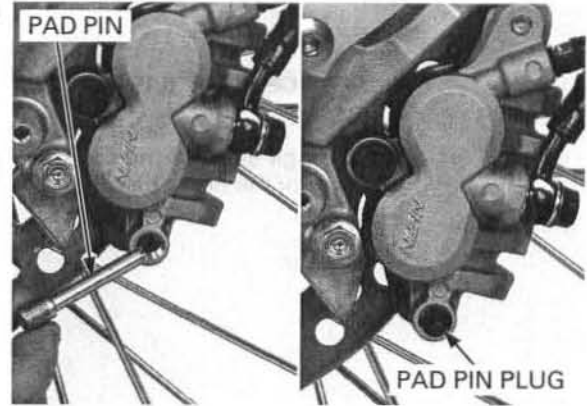
For the front brake, push the brake pads against the pad spring, then install the pad pin.

Tighten the pad pin to the specified torque.

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

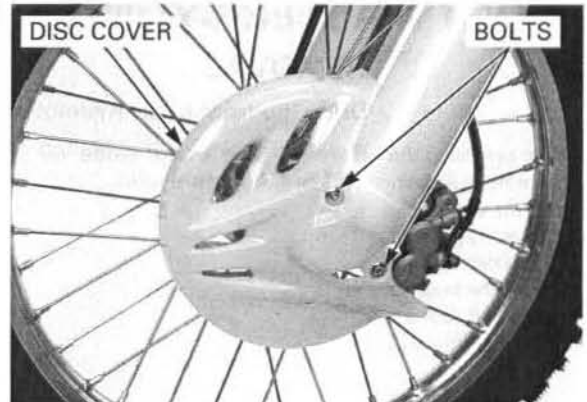
Install and tighten the pad pin plug to the specified torque.

**TORQUE: 2 N·m (0.2 kgf·m, 1.5 lbf·ft)**



Install the front brake disc cover and tighten the bolts specified torque.

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

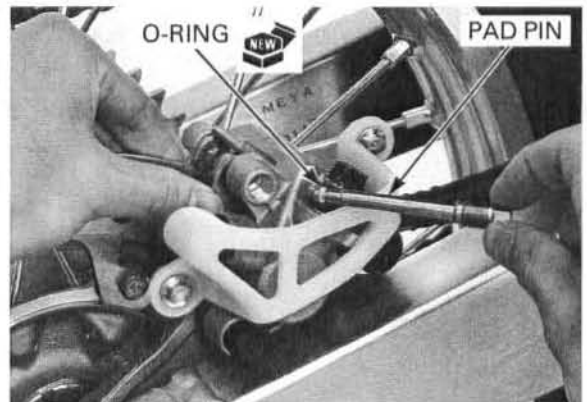


For the rear brake, install a new O-ring into the pad pin groove.

Install and tighten the pad pin to the specified torque.

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

Operate the brake lever or pedal to seat the caliper piston against the pads.



## BRAKE DISC INSPECTION

Remove the front brake disc cover (page 16-10).

Visually inspect the brake disc for damage or cracks.

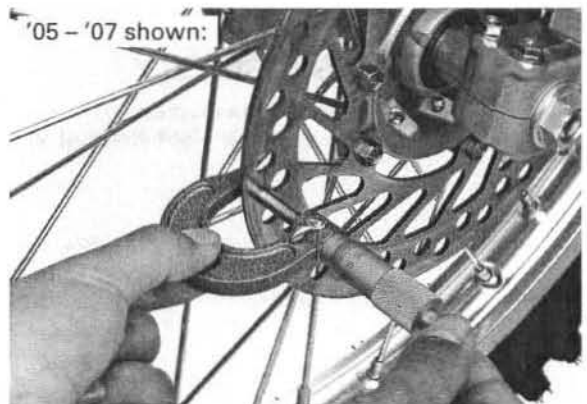
Measure the brake disc thickness with a micrometer.

### SERVICE LIMITS:

**FRONT: 2.5 mm (0.10 in)**

**REAR: 3.5 mm (0.14 in)**

Replace the brake disc if the smallest measurement is less than the service limit.

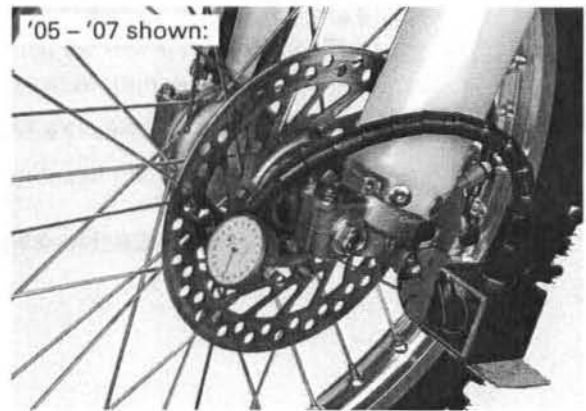


## HYDRAULIC BRAKE

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.



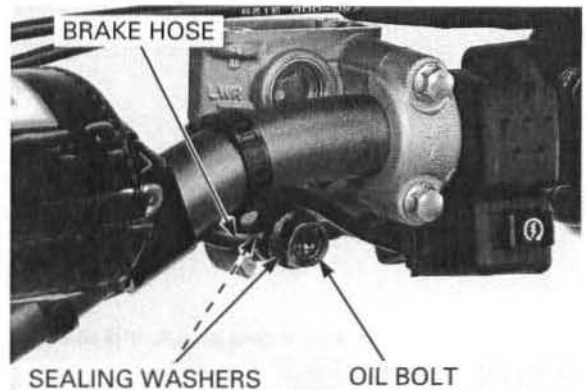
## FRONT MASTER CYLINDER

### REMOVAL

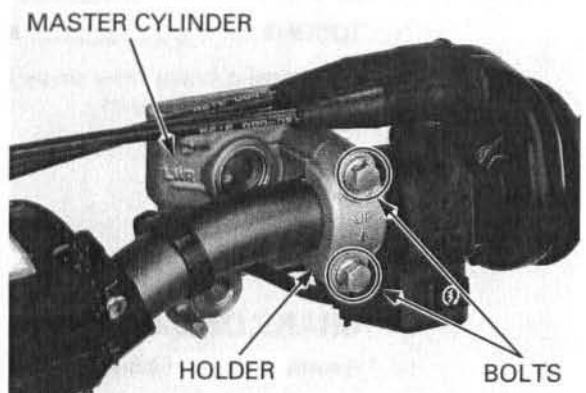
Drain the front brake hydraulic system (page 16-6).

*When removing the brake hose oil 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.

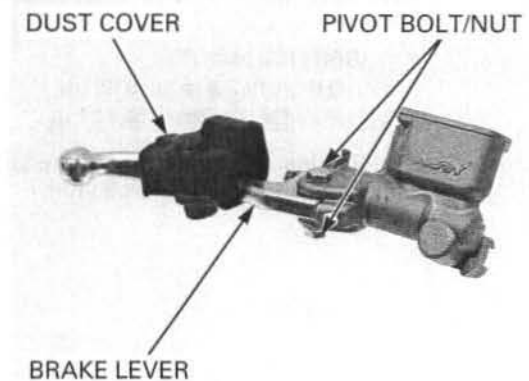


Remove the bolts, holder and master cylinder assembly.



### DISASSEMBLY

Remove the dust cover.  
Remove the pivot bolt/nut and brake lever assembly.



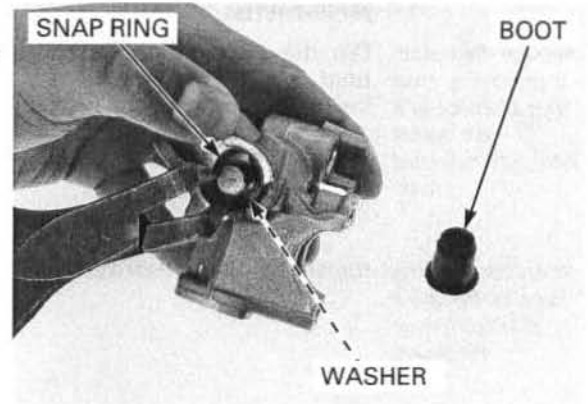
Remove the boot.

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.

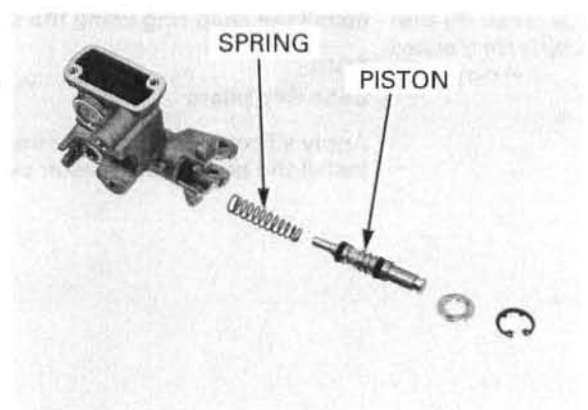


## INSPECTION

Clean the inside of the cylinder and reservoir with brake fluid.

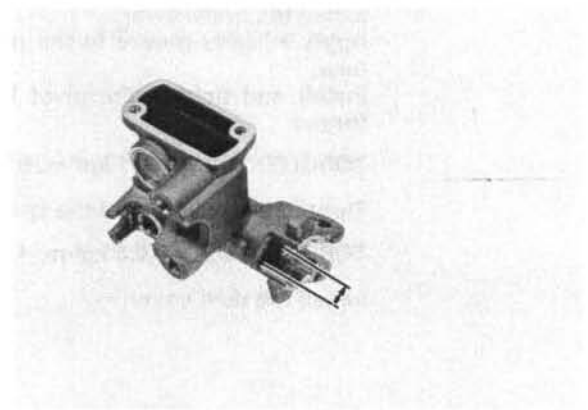
Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.



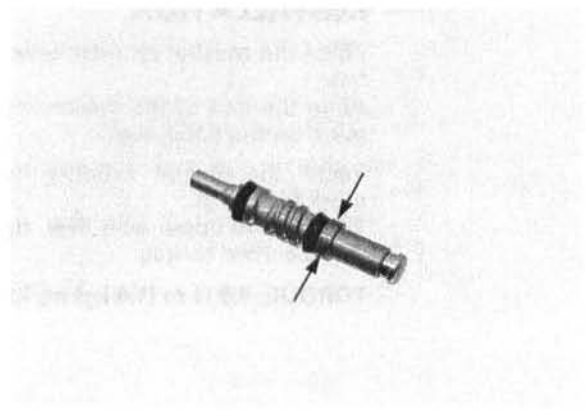
Measure the master cylinder I.D.

**SERVICE LIMIT: 11.050 mm (0.4350 in)**



Measure the master piston O.D.

**SERVICE LIMIT: 10.840 mm (0.4268 in)**



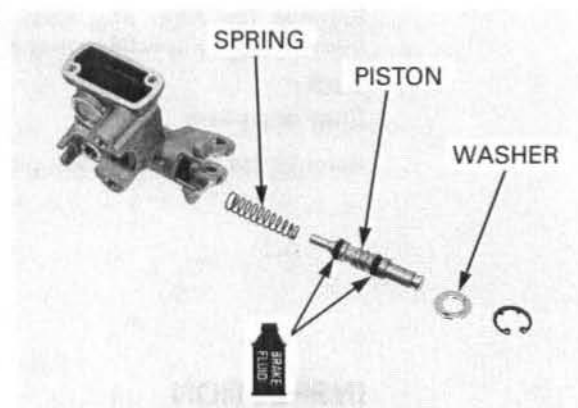


# HYDRAULIC BRAKE

## ASSEMBLY

Replace the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Dip the piston and master cylinder I.D. in brake fluid. Install the spring to the piston.



When installing the cups, do not allow the lips to turn inside out.

Install the piston assembly into the master cylinder.

Be certain the snap ring is firmly seated in the groove.

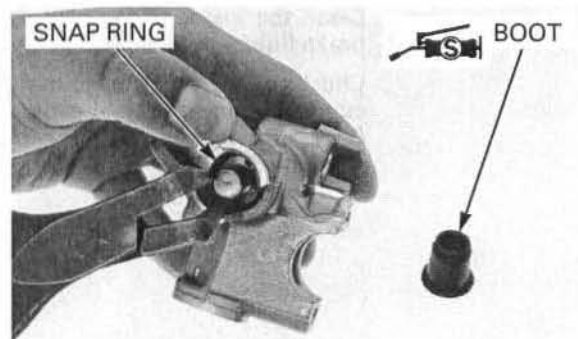
Install the snap ring using the special tool.

### TOOL:

Snap ring pliers

07914-SA50001

Apply silicone grease to the inside of the boot. Install the boot to the master cylinder.



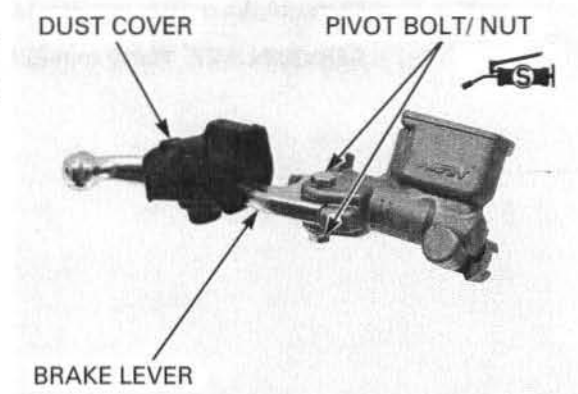
Install the brake lever. Apply silicone grease to the pivot bolt sliding surface. Install and tighten the pivot bolt to the specified torque.

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

Tighten the pivot nut to the specified torque.

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

Install the dust cover.

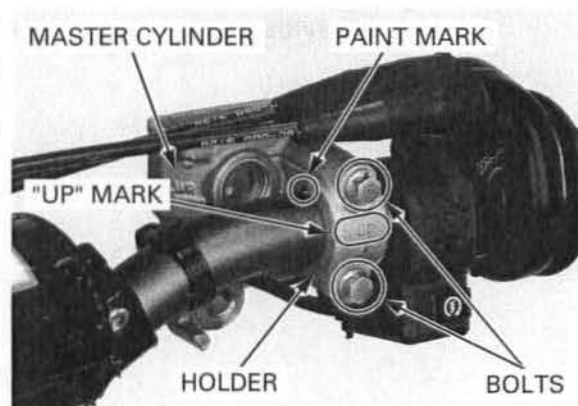


## INSTALLATION

Place the master cylinder assembly on the handlebar. Align the end of the master cylinder with the paint mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up. Tighten the upper bolt first, then the lower bolt to the specified torque.

**TORQUE: 9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)**

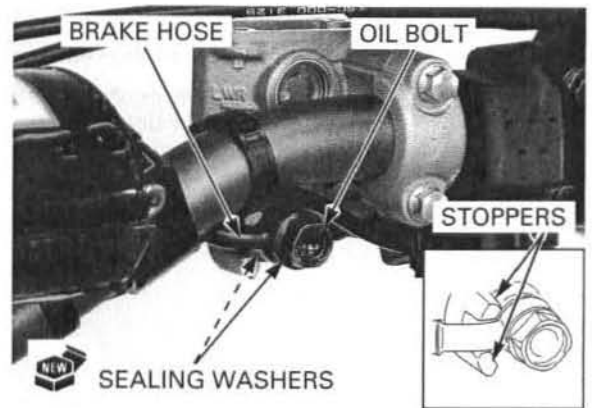




Align the brake hose eyelet between the stoppers. Install the brake hose eyelet with the oil bolt and new sealing washers. Tighten the brake hose oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill and bleed the front brake hydraulic system (page 16-7).



## REAR MASTER CYLINDER

### REMOVAL

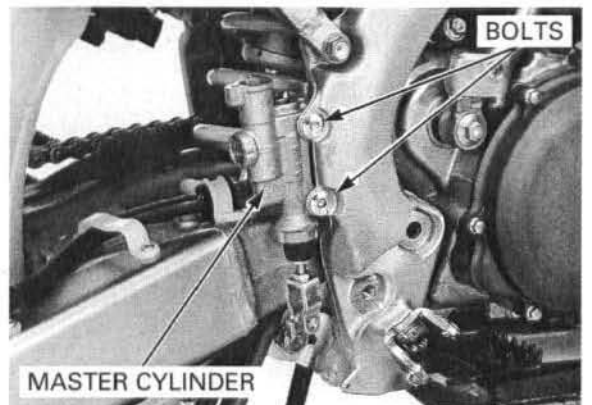
Drain the rear brake hydraulic system (page 16-6). Remove the brake pedal (page 16-24).

*When removing the brake hose oil 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.



Remove the master cylinder mounting bolts and rear master cylinder.



### DISASSEMBLY

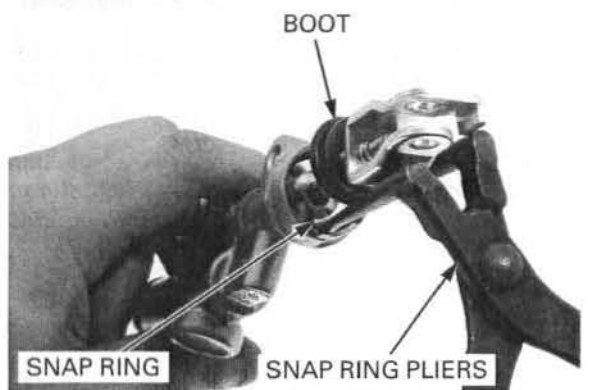
Remove the boot.

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.



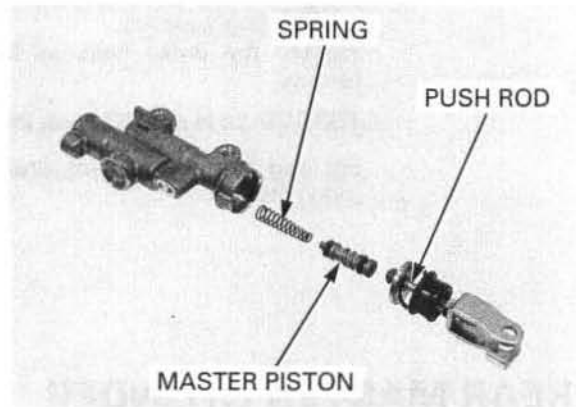
# HYDRAULIC BRAKE

## INSPECTION

Clean the inside of the cylinder with brake fluid.

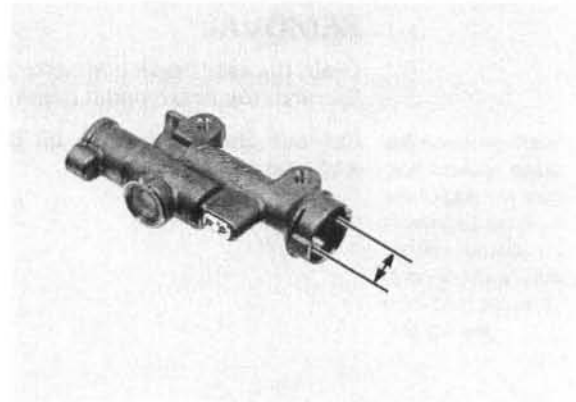
Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.



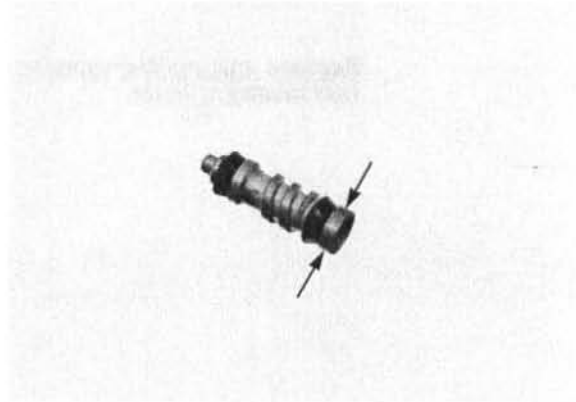
Measure the master cylinder I.D.

**SERVICE LIMIT: 9.575 mm (0.3770 in)**



Measure the master piston O.D.

**SERVICE LIMIT: 9.465 mm (0.3726 in)**



## ASSEMBLY

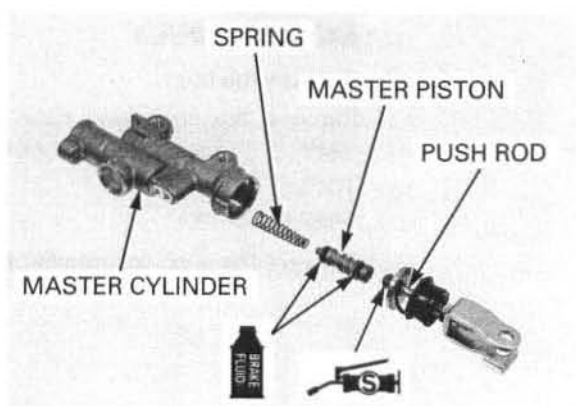
*Replace the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.*

Dip the piston and master cylinder I.D. in brake fluid.

Install the spring to the piston.

*When installing the cups, do not allow the lips to turn inside out.*

Install the piston assembly into the master cylinder. Apply silicone grease to the rounded surface of the push rod.



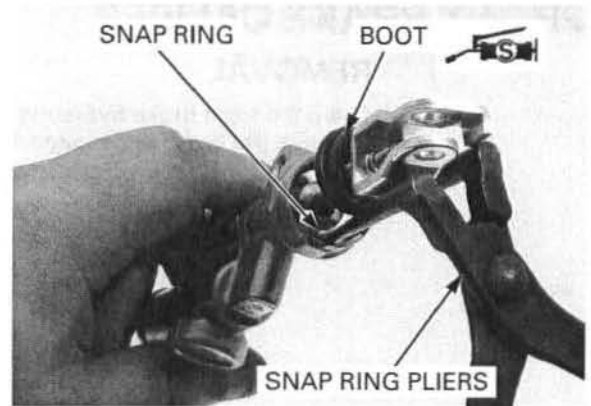
*Be certain the snap ring is firmly seated in the groove.*

Install the push rod into the master cylinder.

Install the snap ring using the special tool.

**TOOL:**  
**Snap ring plier** 07914-SA50001

Apply silicone grease to the boot fitting area.  
Install the boot.

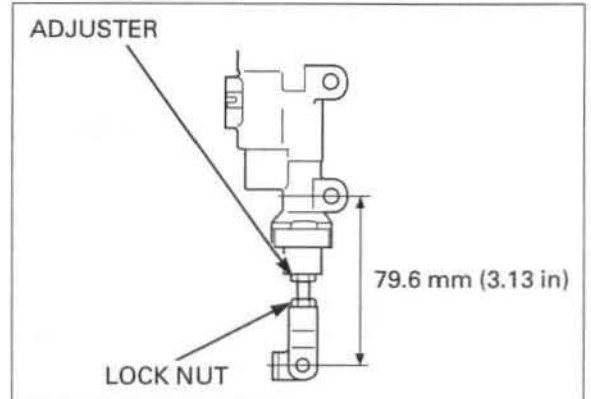


Adjust the brake pedal to the desired height by loosening the lock nut and turning the adjuster.

**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)**



## 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)**

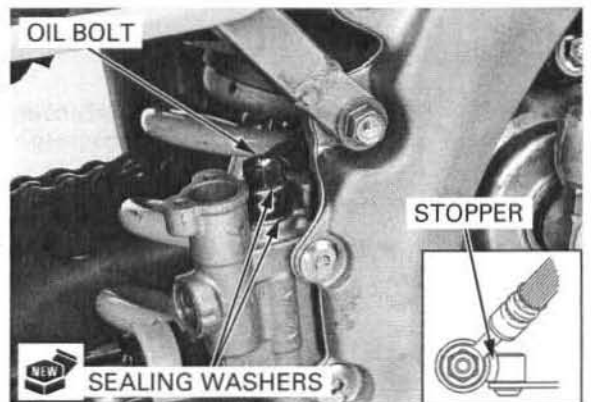


Install the brake hose with the oil bolt and new sealing washers.

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 16-24).  
Fill and bleed the rear brake hydraulic system (page 16-7).

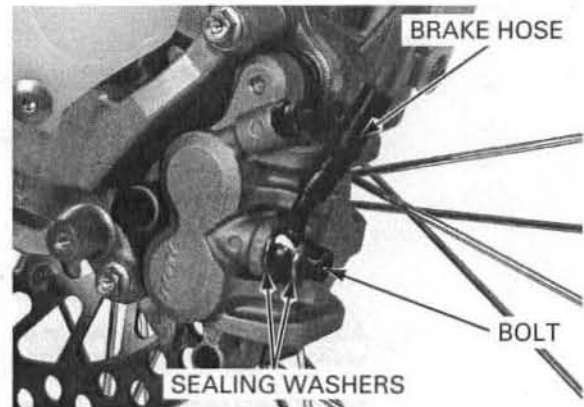


## FRONT BRAKE CALIPER

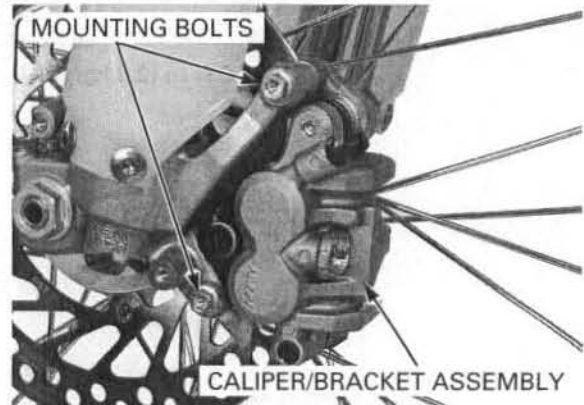
### REMOVAL

Drain the front brake hydraulic system (page 16-6).  
Remove the brake pads (page 16-10).

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

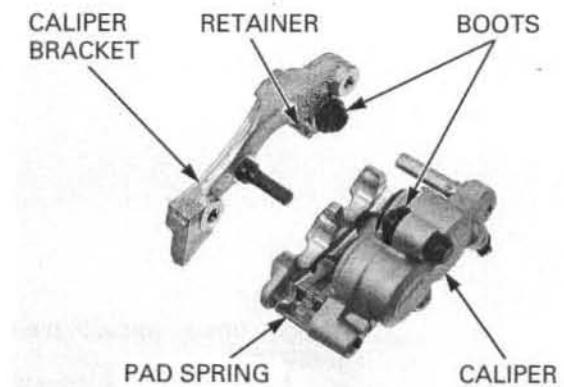


Remove the caliper mounting bolts and then remove the caliper and bracket as an assembly.



### DISASSEMBLY

Remove the caliper bracket from the caliper body.  
Remove the 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.

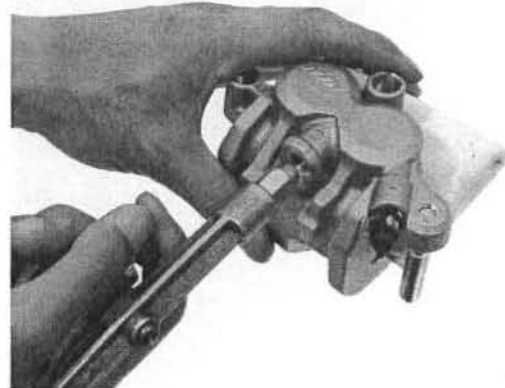


If necessary, lightly apply compressed air to the caliper fluid inlet to get the piston out.

Place a shop rag under the caliper to cushion the piston when it is expelled.

Use the air in short spurts.

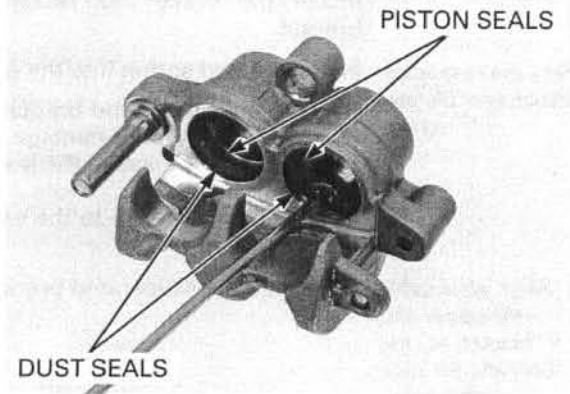
*Do not bring the air nozzle too close to the inlet or the pistons may be forced out with excessive force that could cause injury.*



*Be careful not to damage the piston sliding surface.*

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves, caliper pistons and caliper piston sliding surfaces with clean brake fluid.

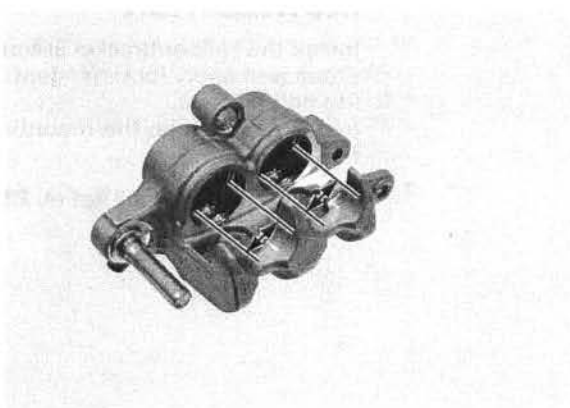


**INSPECTION**

Check the caliper cylinder and pistons for scoring, scratches or damage.

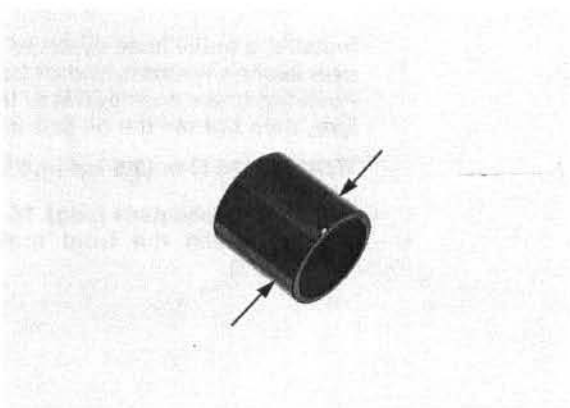
Measure the caliper cylinder I.D.

**SERVICE LIMIT: 27.060 mm (1.0654 in)**



Measure the caliper piston O.D.

**SERVICE LIMIT: 26.853 mm (1.0572 in)**



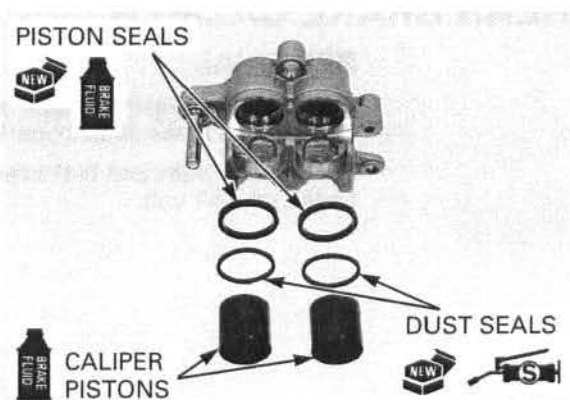
**ASSEMBLY**

Coat new piston seals with clean brake fluid.  
Coat new dust seals with silicon grease.

*Install each piston seal, dust seal and caliper piston in their proper locations.*

Install the piston and dust seals into the grooves in the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends facing the pad.



## HYDRAULIC BRAKE

Install the brake pad retainer onto the caliper bracket.

*Note the installation direction of the pad spring.*

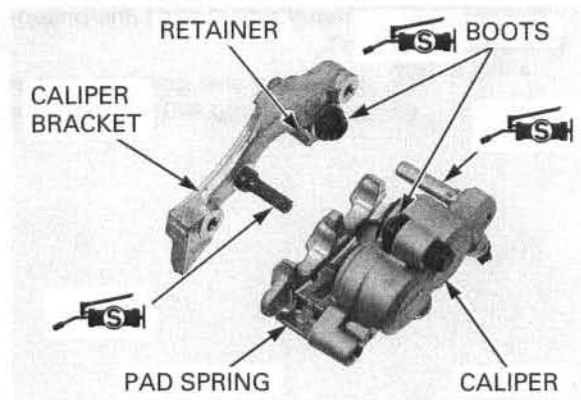
Install the pad spring into the caliper body.

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.

Apply silicone grease to the caliper pin bolt sliding area.

*When assembling the caliper and bracket, set the boot into the slide pin groove.*

Assemble the caliper and bracket.

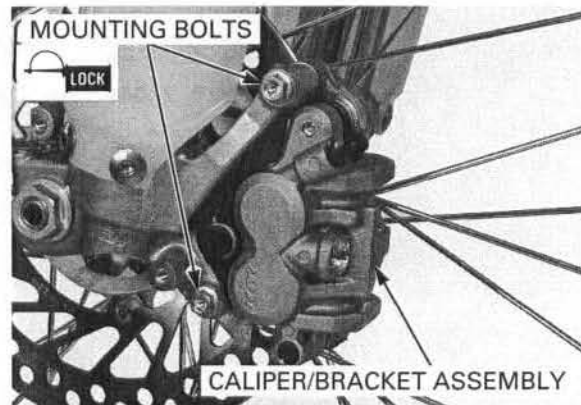


### INSTALLATION

Install the caliper/bracket assembly to the fork leg. Clean and apply locking agent to the caliper mounting bolt threads.

Install and tighten the mounting bolts to the specified torque.

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



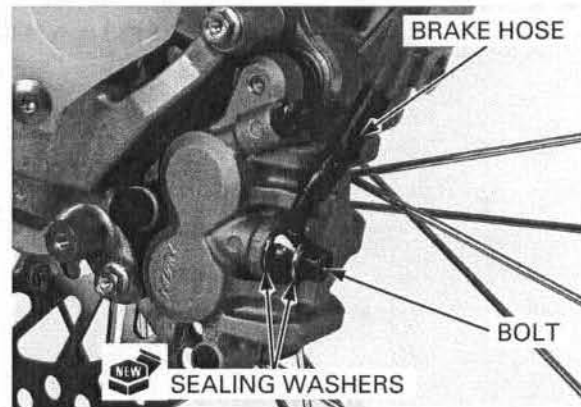
Install the brake hose eyelet to the caliper body with new sealing washers and oil bolt.

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 16-10).

Fill and bleed the front brake hydraulic system (page 16-7).



## REAR BRAKE CALIPER

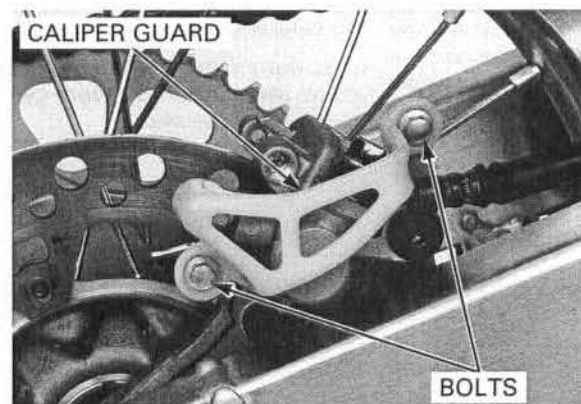
### REMOVAL

Drain the rear brake hydraulic system (page 16-6).

Remove the brake pads (page 16-10).

Remove the bolts and brake caliper guard.

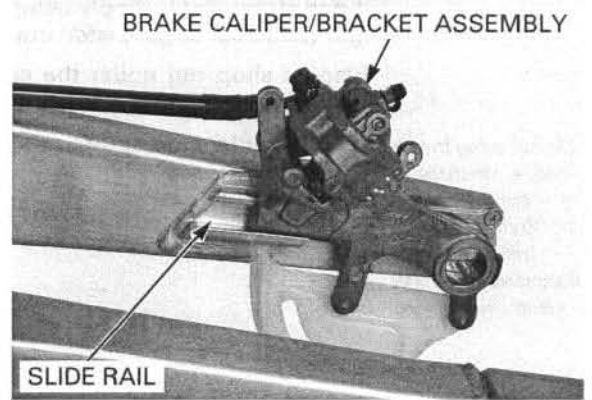
Loosen the oil bolt.



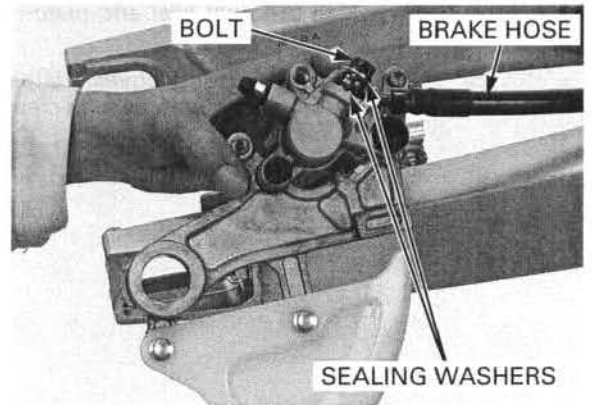


Remove the rear wheel (page 15-8).

Slide the brake caliper and bracket assembly backward and pull it off of the slide rail on the swingarm.

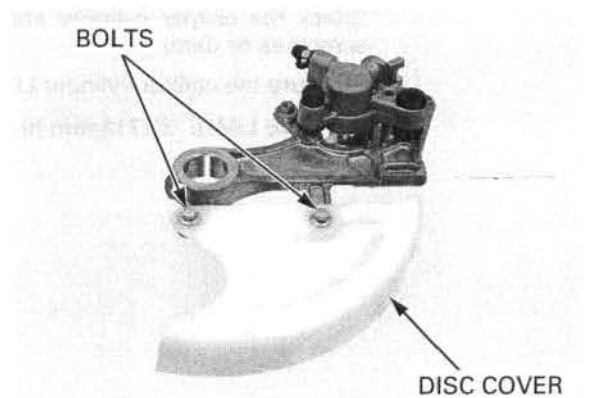


Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

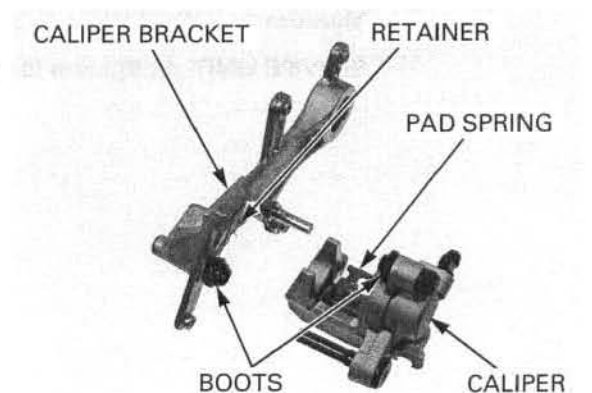


## DISASSEMBLY

Remove the bolts and brake disc cover.



Remove the caliper bracket from the caliper body.  
Remove the 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.

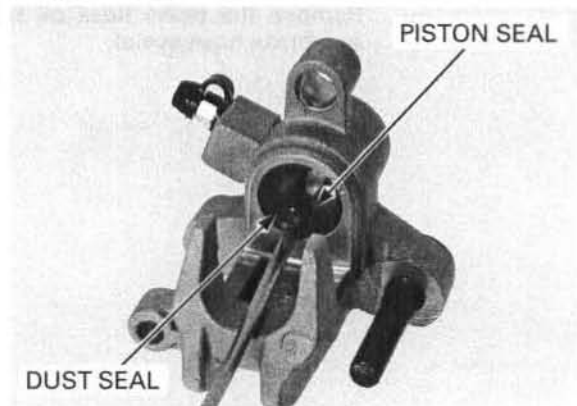
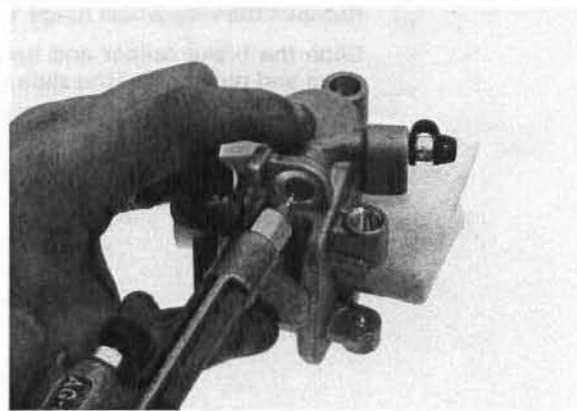
Use the air in short spurts.

*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.

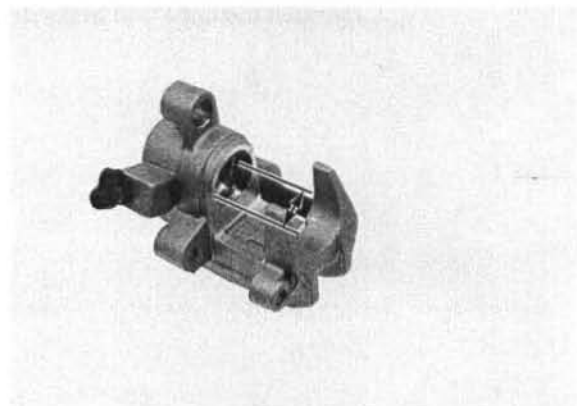


### INSPECTION

Check the caliper cylinder and piston for scoring, scratches or damage.

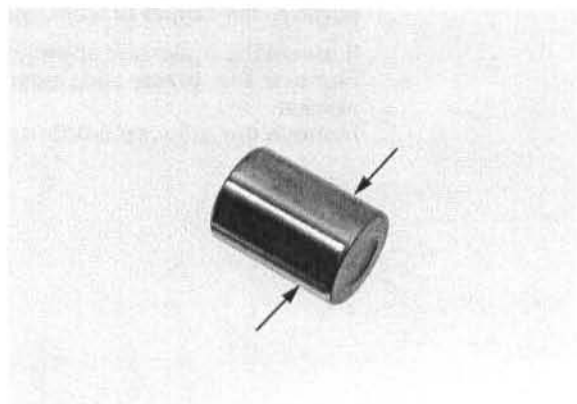
Measure the caliper cylinder I.D.

**SERVICE LIMIT: 22.712 mm (0.8942 in)**



Measure the caliper piston O.D.

**SERVICE LIMIT: 22.573 mm (0.8887 in)**



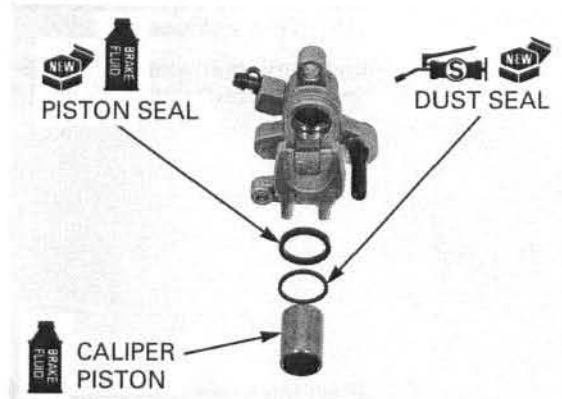
**ASSEMBLY**

Coat new piston seal with clean brake fluid.  
Coat 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.



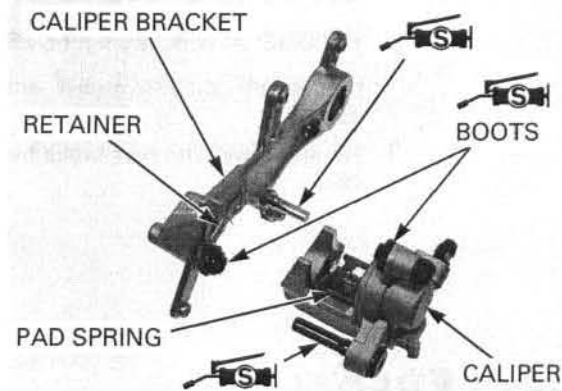
Install the brake pad retainer onto the caliper bracket.

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.

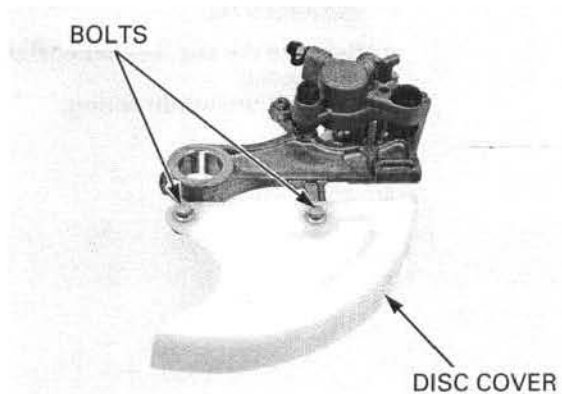
Apply silicone grease to the caliper pin bolt sliding area.



*When assembling the caliper and bracket, set the boot into the slide pin groove.*

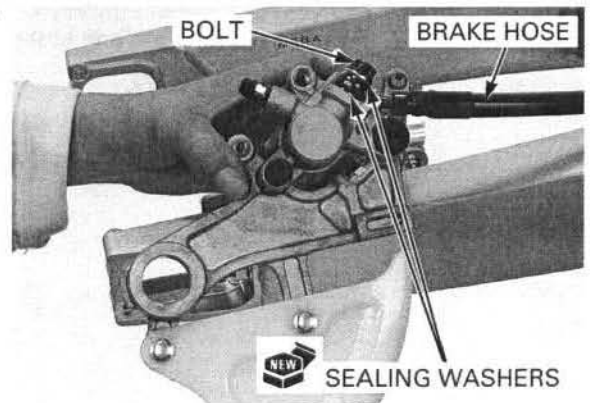
Assemble the caliper and bracket.

Install the brake disc cover and tighten the bolts securely.



**INSTALLATION**

Install the brake hose eyelets to the caliper body with new sealing washers and oil bolt.



## HYDRAULIC BRAKE

Install the brake caliper/bracket assembly onto the swingarm by aligning the bracket tab with the slide rail on the swingarm.

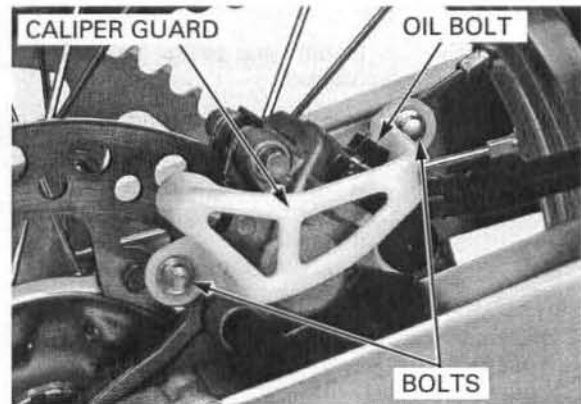
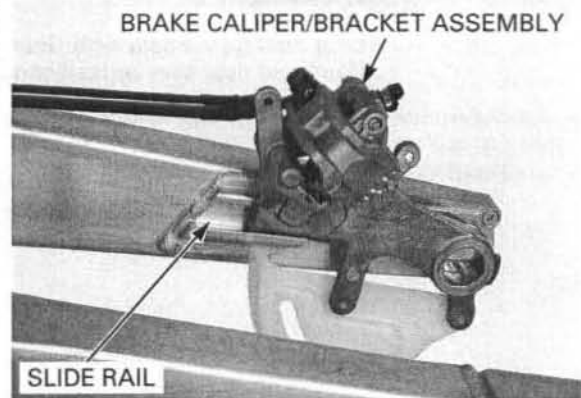
Install the rear wheel (page 15-13).  
Install the brake pad (page 16-10).

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 caliper guard and tighten the bolts securely.

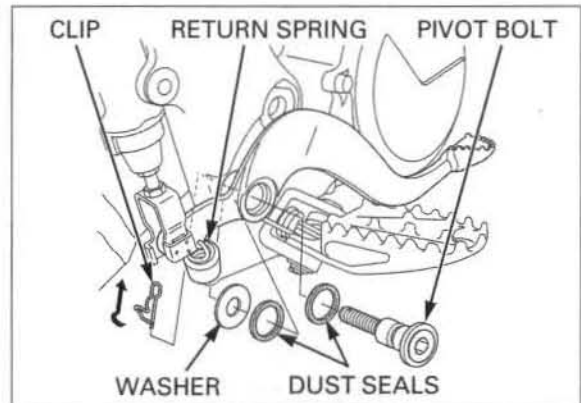
Fill and bleed the rear brake hydraulic system (page 16-7).



## BRAKE PEDAL

### REMOVAL

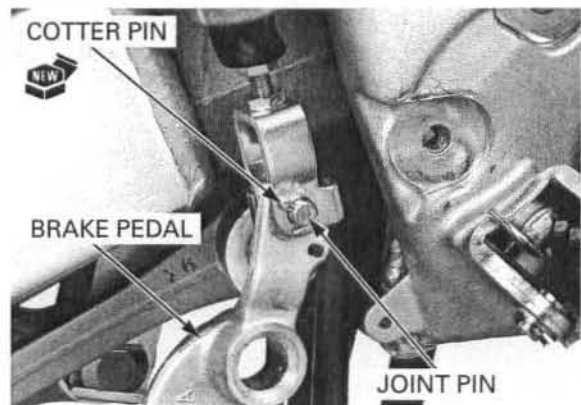
Remove the clip, brake pedal pivot bolt, washer and dust seals.  
Remove the return spring.



Remove and discard the cotter pin.  
Remove the joint pin and brake pedal.

### INSTALLATION

Connect the brake pedal to the push rod.  
Install the joint pin and a new cotter pin.



Install the dust seals with their lip side facing out to the brake pedal.

Apply grease to the sliding surface of the brake pedal and pivot bolt.

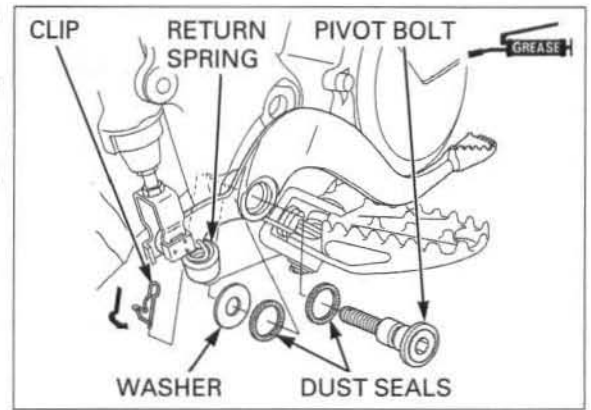
Install the washer and pivot bolt.

Tighten the brake pedal pivot bolt to the specified torque.

**TORQUE: 36 N·m (3.7 kgf·m, 27 lbf·ft)**

Install the brake pedal clip securely.

Install the return spring.



---

**MEMO**

# 17. BATTERY/CHARGING SYSTEM

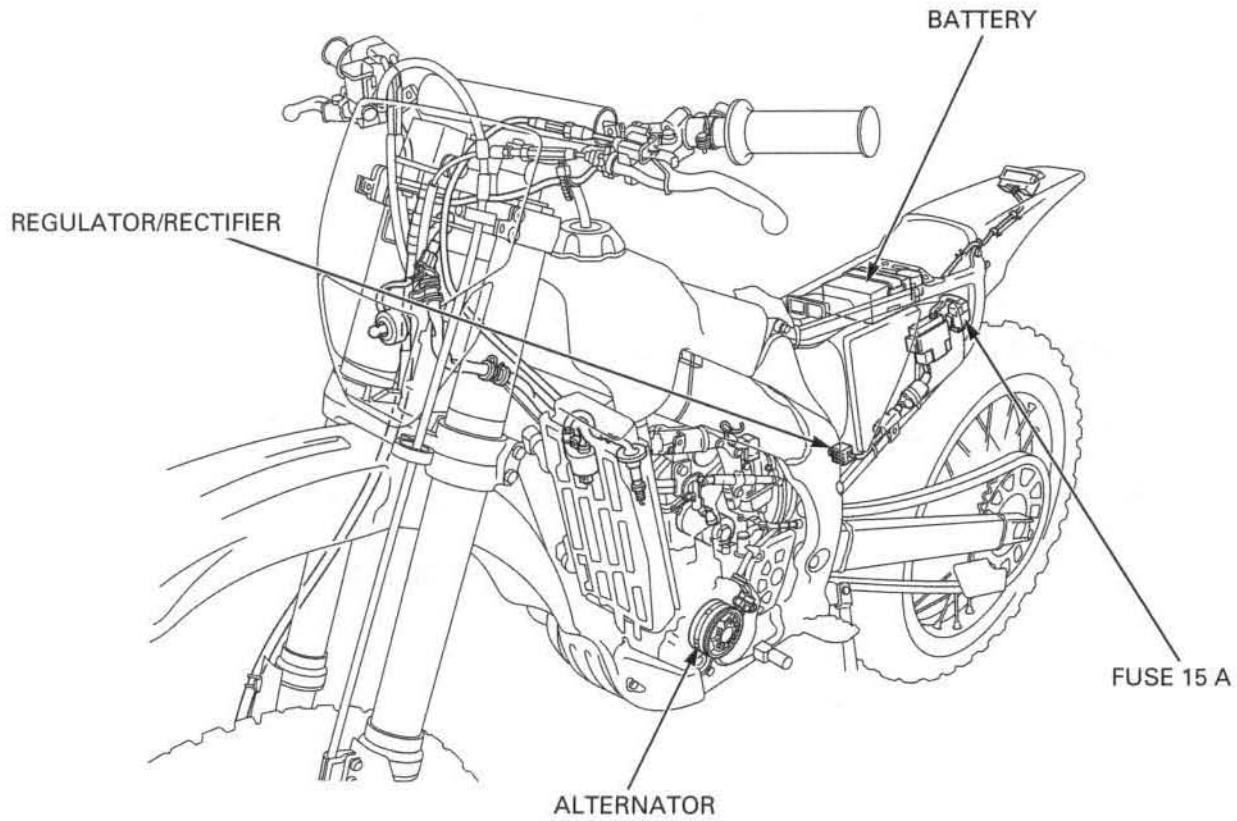
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COMPONENT LOCATION .....	17-2	BATTERY .....	17-6
SYSTEM DIAGRAM .....	17-2	CHARGING SYSTEM INSPECTION.....	17-7
SERVICE INFORMATION .....	17-3	REGULATOR/RECTIFIER .....	17-8
TROUBLESHOOTING .....	17-5	ALTERNATOR CHARGING COIL .....	17-8

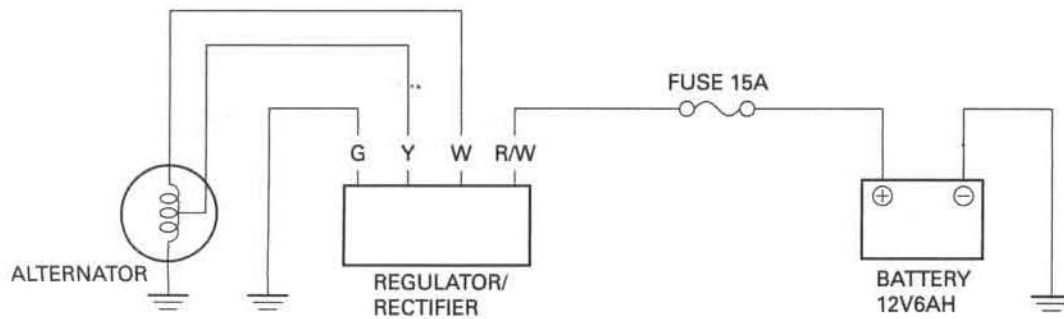
# BATTERY/CHARGING SYSTEM

## COMPONENT LOCATION

'05 - '07 shown:



## SYSTEM DIAGRAM



G : Green  
R : Red  
W : White  
Y : Yellow



# SERVICE INFORMATION

## GENERAL

### ⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
  - The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
    - If electrolyte gets on your skin, flush with water.
    - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
  - Electrolyte is poisonous.
    - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a physician immediately.
- 
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space.
  - For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
  - The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
  - The maintenance free battery must be replaced when it reaches the end of its service life.
  - The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the life span of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
  - Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
  - Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load.
  - The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
  - Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
  - When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-5).
  - For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

### BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

**Recommended Battery Tester: Micro 404XL (U.S.A. only), BM-210 or equivalent**

### SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12 V – 6 Ah	
	Current leakage	0.1 mA max.	
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	0.6 A/5 – 10 h
Quick		3.0 A/1.0h	
Alternator	Capacity	78 W/5,000 rpm	

# BATTERY/CHARGING SYSTEM

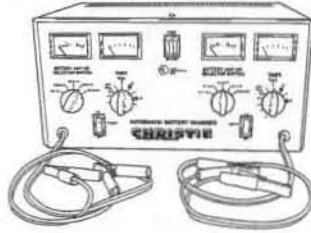
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## TOOLS

Motorcycle battery analyzer  
Micro 404XL (U.S.A. only)



Christie battery charger  
MC1012/2T (U.S.A. only)



## TROUBLESHOOTING

### BATTERY IS DAMAGED OR WEAK

#### 1. BATTERY TEST

Remove the battery (page 17-6).

Check the battery condition using the recommended battery tester.

#### RECOMMENDED BATTERY TESTER:

Micro 404XL (U.S.A. only), BM-210 or equivalent

*Is the battery in good condition?*

**NO** – Faulty battery.

**YES** – GO TO STEP 2.

#### 2. CURRENT LEAKAGE TEST

Install the battery (page 17-6).

Check the battery current leakage test (Leak test; page 17-7).

*Is the current leakage below 0.1 mA?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.

#### 3. CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER CONNECTED

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

*Is the current leakage below 0.1 mA?*

**YES** – Faulty regulator/rectifier.

**NO** – Shorted wire harness.

#### 4. ALTERNATOR CHARGING COIL INSPECTION

Check the alternator charging coil (page 17-8).

Check for continuity between Yellow terminal and Ground, White terminal and Ground.

*Is there continuity?*

**NO** – Faulty charging coil.

**YES** – GO TO STEP 5.

#### 5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 17-6).

Start the engine.

Measure the charging voltage (page 17-7).

Compare the measurements to the results of the following calculation.

#### STANDARD:

Measured BV < Measured CV < 15.5 V

- BV = Battery Voltage
- CV = Charging Voltage

*Is the measured charging voltage within the standard voltage?*

**YES** – Faulty battery.

**NO** – GO TO STEP 6.

#### 6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connector (page 17-8).

*Are the result of checked voltage and resistance correct?*

**YES** – Faulty regulator/rectifier.

**NO** –

- Open circuit in related wire
- Loose or poor contacts of related terminal
- Shorted wire harness

### BATTERY

#### REMOVAL/INSTALLATION

Remove the seat (page 3-3).

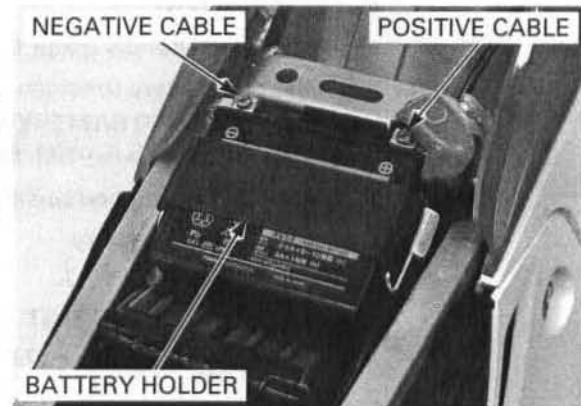
Remove the battery holder.

Disconnect the negative (-) cable and then the positive (+) cable, and remove the battery.

*Connect the positive terminal first and then the negative cable.*

Installation is in the reverse order of removal.

After installing the battery, coat the terminals with clean dielectric grease.



#### VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

#### VOLTAGE:

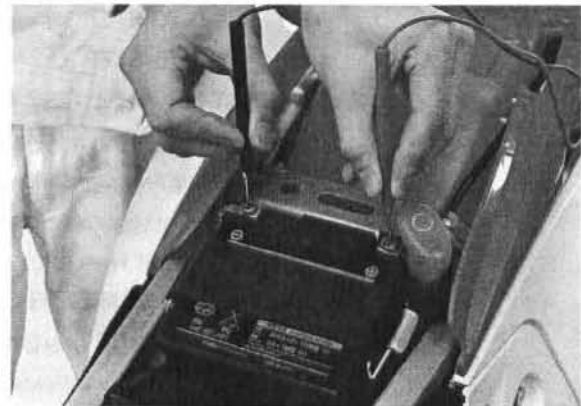
Fully charged: 13.0 – 13.2 V

Under charged: Below 12.4 V

#### TOOL:

Digital multimeter

Commercially available in U.S.A.



#### BATTERY TESTING

Remove the battery (page 17-6).

Refer to the instructions that are appropriate to the battery testing equipment available to you.

#### TOOL:

Battery tester

Micro 404XL (U.S.A. only),  
BM-210 or equivalent

#### BATTERY CHARGING (U.S.A. only)

Remove the battery (page 17-6).

Refer to the instructions that are appropriate to the battery charging equipment available to you.

#### TOOL:

Christie battery charger MC1012/2T (U.S.A. only)

## CHARGING SYSTEM INSPECTION

### CURRENT LEAKAGE INSPECTION

Remove the seat (page 3-3).

Disconnect the negative (-) cable from the battery. Connect the ammeter (+) probe to the negative (-) cable and ammeter (-) probe to the battery (-) terminal.

Check for current leakage.

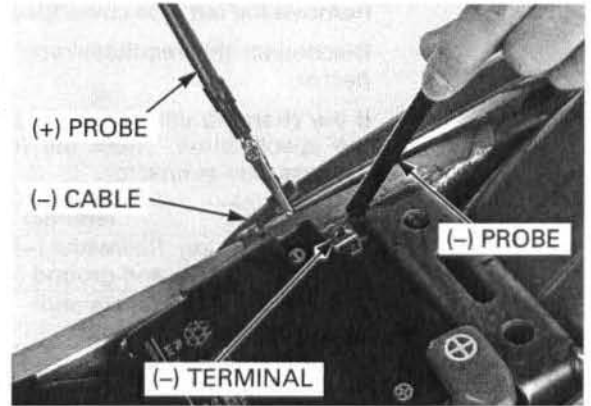
#### NOTE:

When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.

**SPECIFIED CURRENT LEAKAGE: 0.1 mA max.**

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



### CHARGING VOLTAGE INSPECTION

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

Connect the multimeter between the battery positive (+) and negative (-) terminals.

#### NOTE:

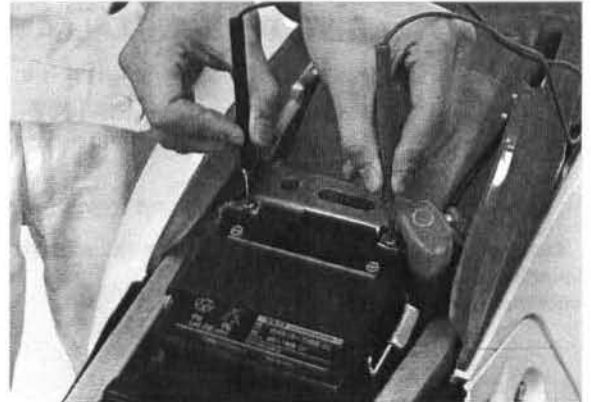
To prevent a short, make absolutely certain which are the positive (+) and negative (-) terminals or cables.

Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

#### Standard:

**Measured BV < Measured CV < 15.5 V**

- BV = Battery Voltage
- CV = Charging Voltage



## REGULATOR/RECTIFIER

### SYSTEM INSPECTION

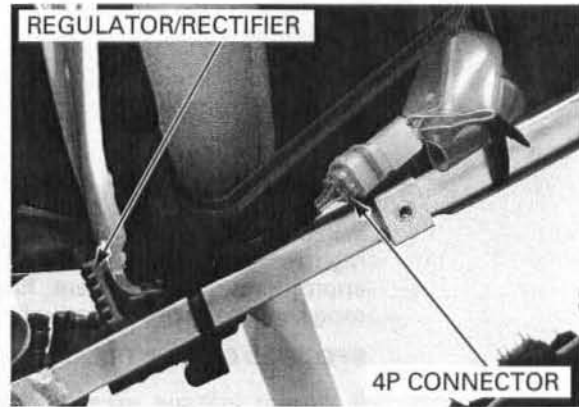
Remove the left side cover (page 3-3).

Disconnect the regulator/rectifier 4P (Natural) connector.

If the charging voltage reading (page 17-7) is out of the specification, check the following at the wire harness side connector:

Item	Terminal	Specification
Battery charging line	Red/white (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and ground	Continuity should exist
	White and ground	Continuity should exist
Ground line	Green and ground	Continuity should exist

If all lines are normal and there are no loose connections at the regulator/rectifier connector, replace the regulator/rectifier unit.



### REMOVAL/INSTALLATION

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

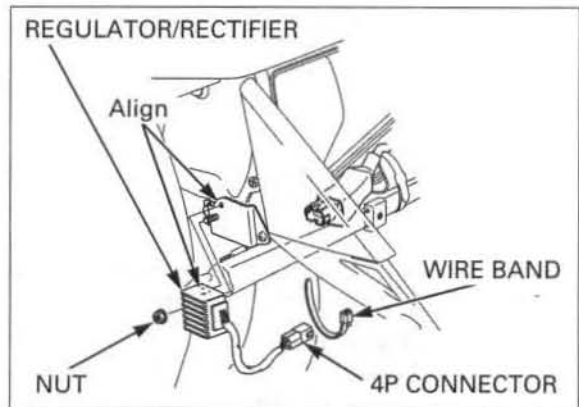
Remove the wire band.

Disconnect the regulator/rectifier 4P (Natural) connector.

Remove the nut and regulator/rectifier.

Installation is in the reverse order of removal.

*Align the regulator/rectifier locating pin with the hole on the bracket.*



## ALTERNATOR CHARGING COIL

### INSPECTION

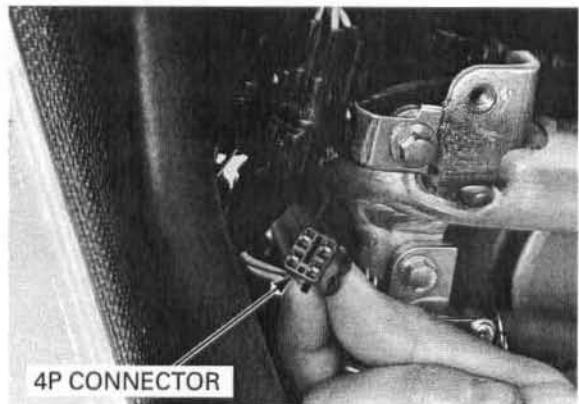
Remove the left radiator shroud (page 3-4).

Disconnect the alternator 4P (Black) connector. Check for continuity between the terminal of the alternator side connector and ground.

**CONNECTION: Yellow terminal – Body ground  
White terminal – Body ground**

If any wire has no continuity to ground, replace the alternator stator.

For stator removal (page 12-5).



# 18. IGNITION SYSTEM

---

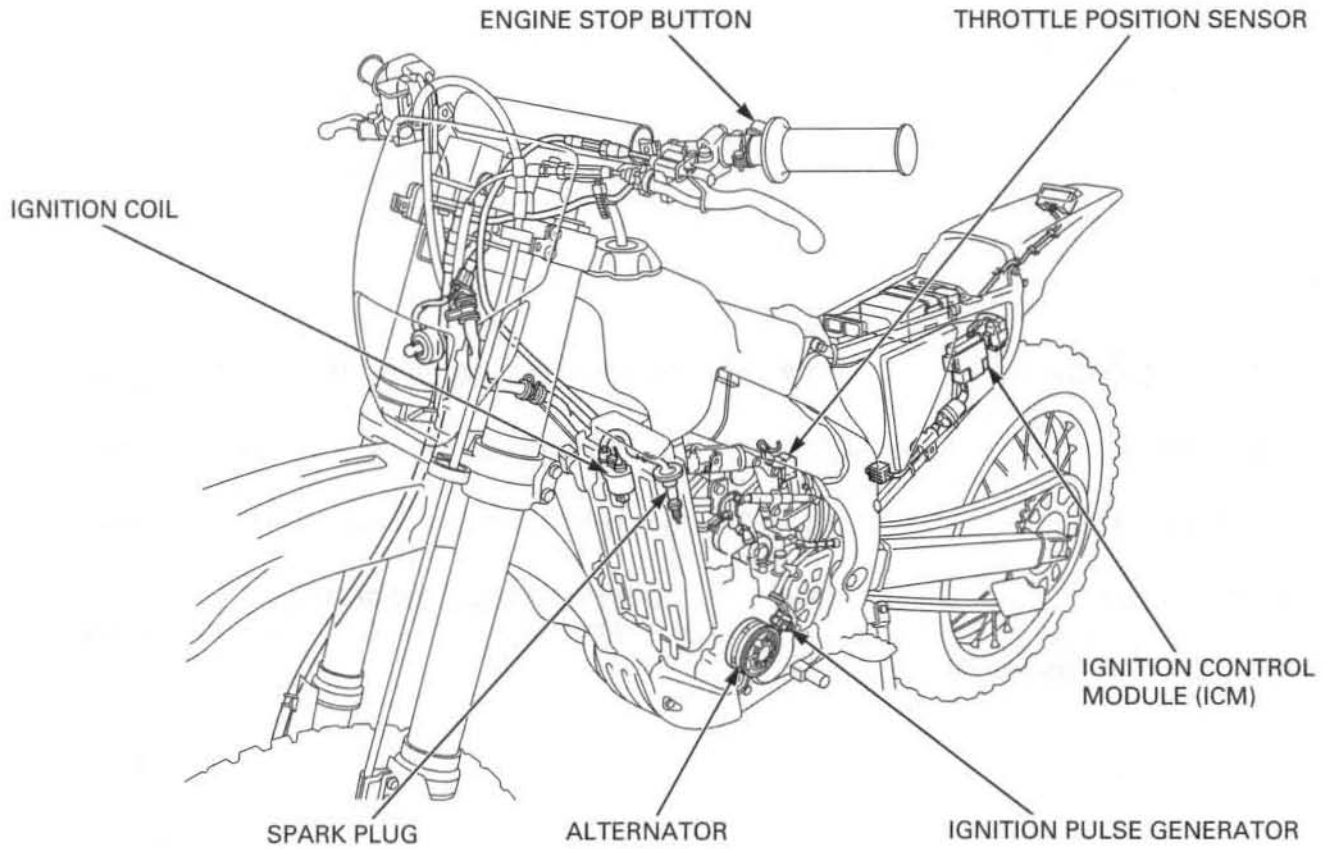
COMPONENT LOCATION .....	18-2	IGNITION CONTROL MODULE (ICM) .....	18-7
SYSTEM DIAGRAM .....	18-2	IGNITION COIL .....	18-7
SERVICE INFORMATION .....	18-3	IGNITION TIMING .....	18-8
TROUBLESHOOTING .....	18-4	THROTTLE POSITION SENSOR INSPECTION .....	18-9
IGNITION SYSTEM INSPECTION .....	18-5		



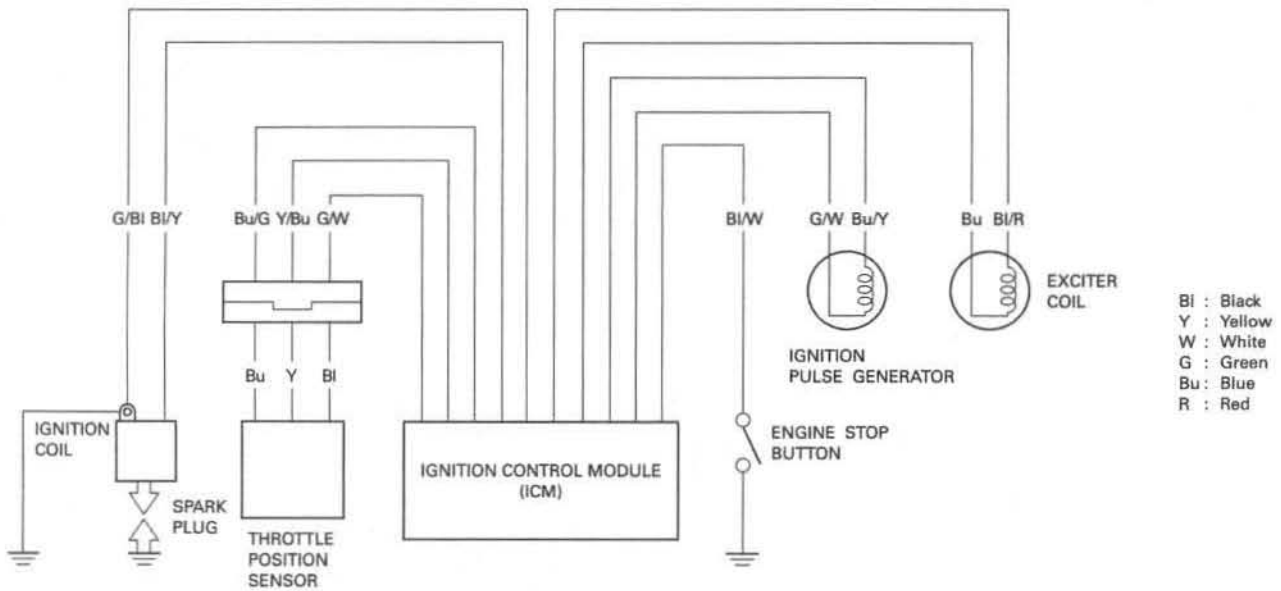
# IGNITION SYSTEM

## COMPONENT LOCATION

'05 - '07 shown:



## SYSTEM DIAGRAM



# SERVICE INFORMATION

## GENERAL

### NOTICE

- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the module.
- Use a spark plug of the correct heat range. Using a spark plug with an incorrect heat range can damage the engine.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 18-4.
- The ignition timing cannot be adjusted since the Ignition Control Module (ICM) is factory preset.
- A faulty ignition system is often related to poor connections. Check connections before proceeding.

## SPECIFICATIONS

ITEM		SPECIFICATION
Spark plug	Standard	(NGK)
		(DENSO)
	Optional	(NGK)
		(DENSO)
Spark plug gap		1.0 – 1.1 mm (0.039 – 0.043 in)
Ignition coil resistance (at 20°C/68°F)	Primary	0.1 – 0.3 Ω
	Secondary with plug cap	9 – 16 kΩ
	Secondary without plug cap	4 – 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
Alternator exciter coil resistance (at 20°C/68°F)		9 – 28 Ω
Ignition timing ("F" mark)		8° ± 2° BTDC/1,800 rpm
Throttle position sensor (Blue – Black) resistance (at 20°C/68°F)		4 – 6 kΩ

## TORQUE VALUE

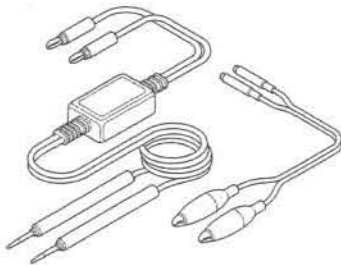
Timing hole cap

10 N·m (1.0 kgf·m, 7 lbf·ft)

Apply grease to the threads

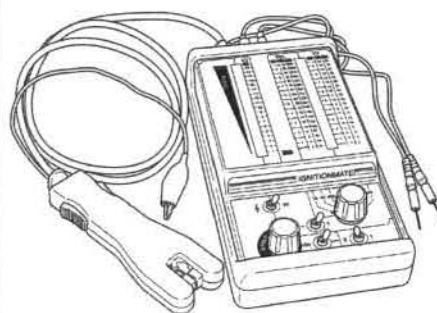
## TOOLS

Peak voltage adaptor  
07HGJ-0020100



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

IgnitionMate peak voltage tester  
MTP07-0286 (U.S.A. only)



## IGNITION SYSTEM

### TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (affecting the ignition coil secondary voltage)
- If there is no spark at cylinder, temporarily exchange the ignition coil with a known good one and perform the spark test. If there is spark, the original ignition coil is faulty.

#### No spark at plug

	Unusual condition	Probable cause (check in numerical order)
Ignition coil primary voltage	Low peak voltage.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connection).</li> <li>2. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>3. Cranking speed too slow.                             <ul style="list-style-type: none"> <li>– Kickstarter is weak</li> <li>– Battery is undercharged</li> </ul> </li> <li>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).</li> <li>5. Poorly connected connectors or an open circuit in the ignition system.</li> <li>6. Faulty exciter coil (measure the resistance).</li> <li>7. Faulty ignition coil (measure the resistance).</li> <li>8. Faulty ICM (When above No. 1 – 7 are normal).</li> </ol>
	No peak voltage.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connection).</li> <li>2. Short circuit in engine stop button wire.</li> <li>3. Faulty engine stop button.</li> <li>4. Loose or poorly connected ICM connectors.</li> <li>5. An open circuit or loose ignition coil wire.</li> <li>6. Faulty exciter coil (measure the resistance).</li> <li>7. Faulty ignition pulse generator (measure the peak voltage).</li> <li>8. Faulty ICM (When above No. 1 – 7 are normal).</li> </ol>
	Peak voltage is normal, but no spark jumps at the plug.	<ol style="list-style-type: none"> <li>1. Faulty spark plug or leaking ignition coil secondary current ampere.</li> <li>2. Faulty ignition coil.</li> </ol>
Ignition pulse generator	Low peak voltage.	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too low.                             <ul style="list-style-type: none"> <li>– Kickstarter is weak</li> <li>– Battery is undercharged</li> </ul> </li> <li>3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once).</li> <li>4. Faulty ICM (when above No. 1 – 3 are normal).</li> </ol>
	No peak voltage.	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor.</li> <li>2. Faulty ignition pulse generator.</li> </ol>

## IGNITION SYSTEM INSPECTION

- 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.

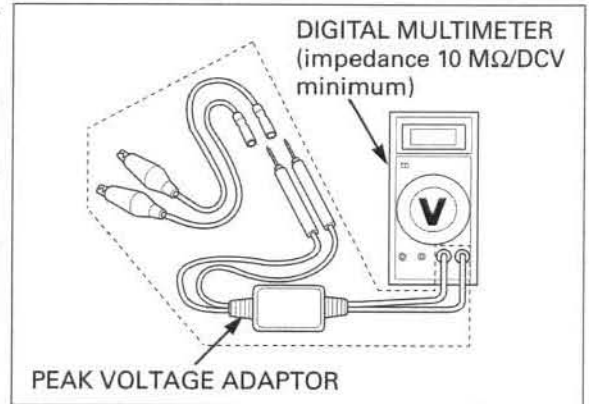
Connect the peak voltage tester (IgnitionMate, U.S.A. only) or peak voltage adaptor to the digital multimeter.

**TOOLS:**

**IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)**

**Peak voltage adaptor 07HGJ-0020100 (not available in U.S.A.)**

**with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)**



### IGNITION COIL PRIMARY PEAK VOLTAGE

Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.

Check cylinder compression and check that the spark plug is installed correctly.

Remove the fuel tank (page 3-8).

Shift the transmission into neutral.

Connect a known-good spark plug to the spark plug cap and ground the spark plug to the cylinder as done in a spark test.



With the ignition coil primary wire connected, connect the peak voltage adaptor to the ignition coil.

**TOOLS:**

**IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)**

**Peak voltage adaptor 07HGJ-0020100 (not available in U.S.A.)**

**with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)**

**CONNECTION: Body ground (+) – Black/yellow (–)**

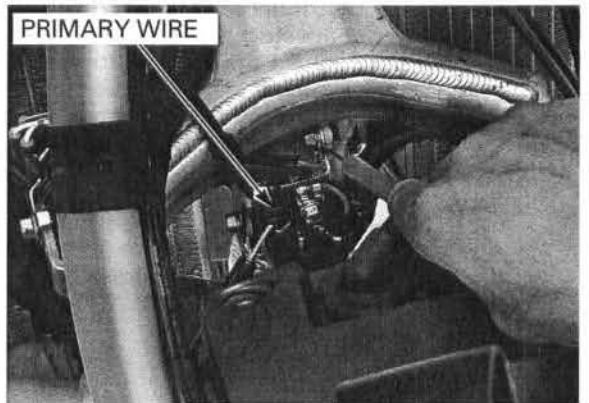
Shift the transmission into neutral.

Crank the engine and read the ignition coil primary peak voltage.

**STANDARD: 100 V minimum**

If there is no voltage, check the continuity in Black/yellow and Green/black wires between the ignition coil and ICM.

If the wires are good, follow the checks described in the troubleshooting chart on page 18-4.



## IGNITION SYSTEM

### EXCITER COIL RESISTANCE

Remove the radiator shroud (page 3-4).

Disconnect the alternator 4P (Black) connector.

Measure the exciter coil resistance between the connector terminals.

**CONNECTION:** Black/red – Blue

**STANDARD:** 9 – 28  $\Omega$  (20°C/68°F)

If resistance is out of specification, replace the alternator.



### IGNITION PULSE GENERATOR PEAK VOLTAGE

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

Disconnect the ICM 6P (Natural) 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  
**Peak voltage adaptor** 07HGJ-0020100  
(not available in  
U.S.A.)

with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)

**CONNECTION:** Blue/yellow (+) – Green/white (–)

Crank the engine and read the peak voltage.

**PEAK VOLTAGE:** 0.7 V minimum

If the peak voltage measured is abnormal, recheck the following:

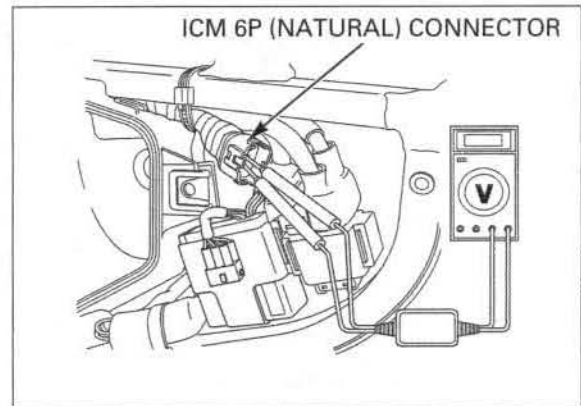
Remove the left side radiator shroud (page 3-4).

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.

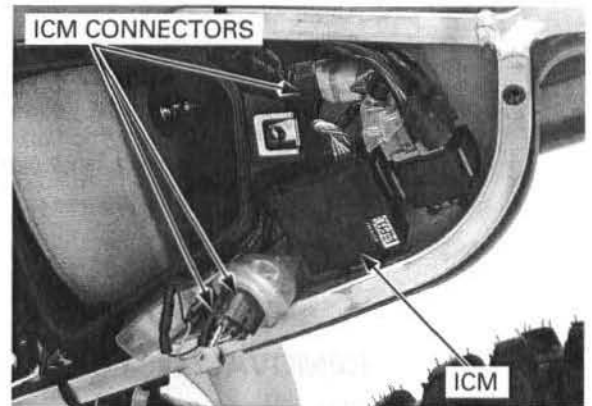
If the peak voltage is abnormal at both connectors, follow the checks described in the troubleshooting chart on (page 18-4).



## IGNITION CONTROL MODULE (ICM)

### REMOVAL/INSTALLATION

Remove the left side cover (page 3-3).  
 Disconnect the ICM connectors.  
 Remove the ICM from the rear fender.  
 Installation is in the reverse order of removal.



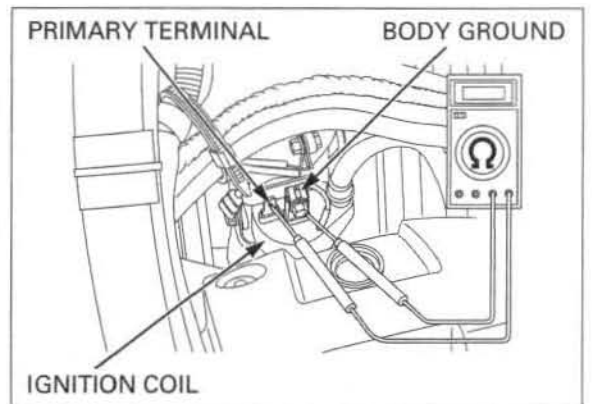
## IGNITION COIL

### INSPECTION

Remove the fuel tank (page 3-8).  
 Remove the spark plug cap.  
 Disconnect the ignition coil primary wire.  
 Measure the ignition coil resistance between the primary terminal and body ground.

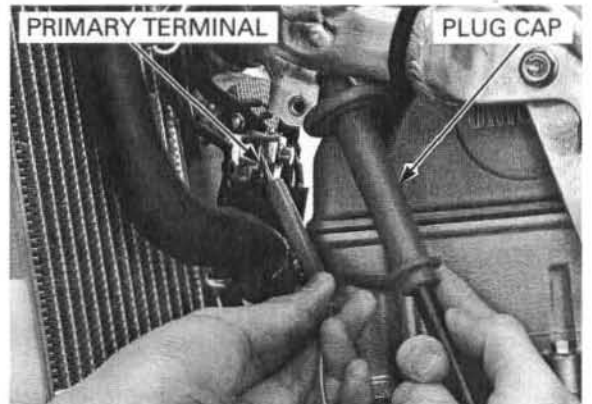
**STANDARD: 0.1 – 0.3  $\Omega$  (20°C/68°F)**

If the resistance is out of specification, replace the ignition coil.



Measure the ignition secondary coil resistance between the primary terminal and plug cap.

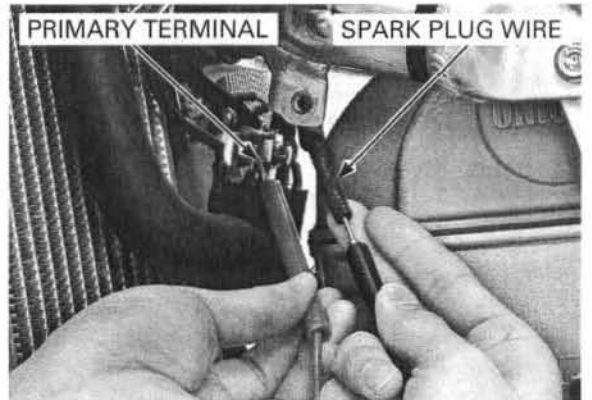
**STANDARD: 9 – 16 k $\Omega$  (20°C/68°F)**



If resistance is out of range, remove the spark plug cap and measure the ignition secondary coil resistance between the primary terminal and spark plug wire.

**STANDARD: 4 – 8 k $\Omega$  (20°C/68°F)**

If the resistance is out of specification, replace the ignition coil.





## IGNITION SYSTEM

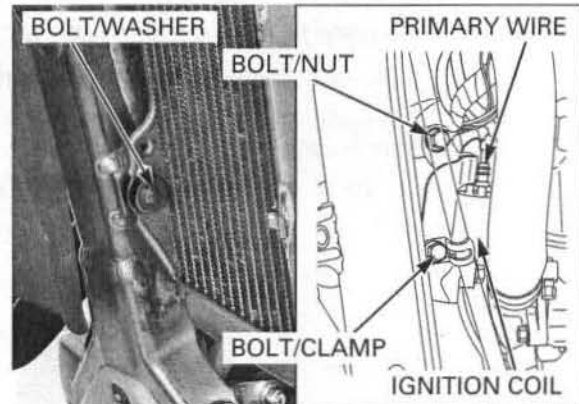
### REMOVAL/INSTALLATION ('05 - '07)

Remove the following:

- Fuel tank (page 3-8)
- Left radiator grill (page 7-8)
- Spark plug cap (page 4-12)

Remove the left radiator lower mounting bolt, washer and slide the left radiator forward. Disconnect the ignition coil primary wire. Remove the bolts, nut, hose clamp and ignition coil.

Installation is in the reverse order of removal.

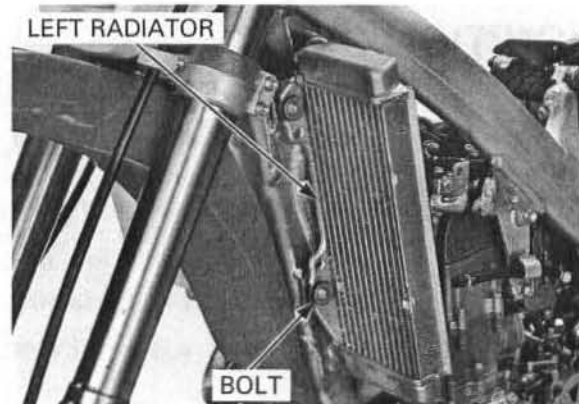


### REMOVAL/INSTALLATION (After '07)

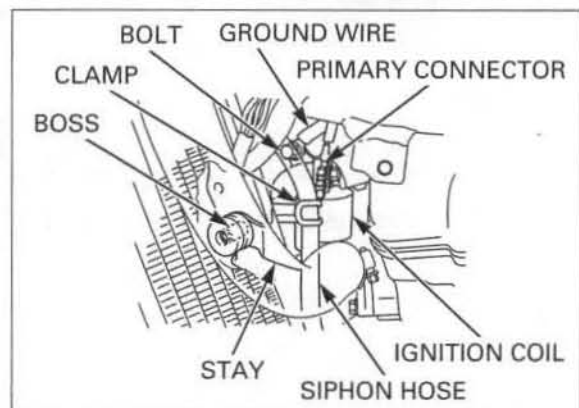
Remove the following:

- Fuel tank (page 3-8)
- Left radiator grill (page 7-8)
- Spark plug cap (page 4-12)

Remove the left radiator lower mounting bolt and slide the left radiator forward.



Release the siphon hose from the ignition coil stay clamp. Disconnect the ignition coil primary wire connector. Remove the bolt and ground wire. Remove the ignition coil/stay by unhooking the ignition coil stay boss from the left radiator lower mount.



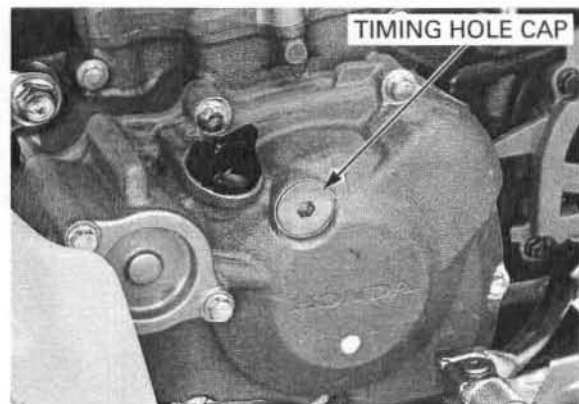
## IGNITION TIMING

NOTE:

- The ignition timing is factory preset and only needs to be checked when an electrical system component is replaced.

Warm up the engine to normal operating temperature.

Stop the engine and remove the timing hole cap. Connect the timing light to the spark plug wire.

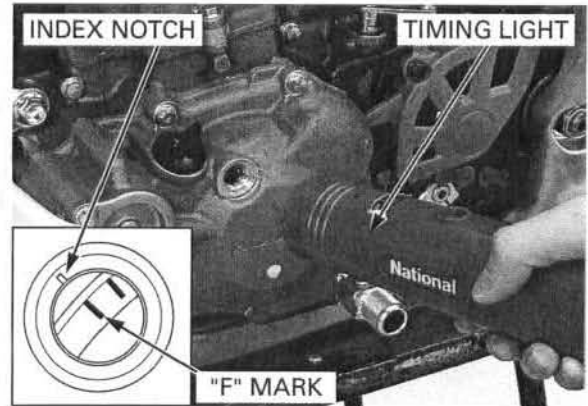




Attach a tachometer according to its manufacturer's instructions.

Read the instruction for timing light operation. Start the engine and hold it at  $1,800 \pm 100$  rpm while pointing the timing light towards the index notch.

The ignition timing is correct if the "F" mark on the flywheel aligns with the index notch in the left crankcase cover.

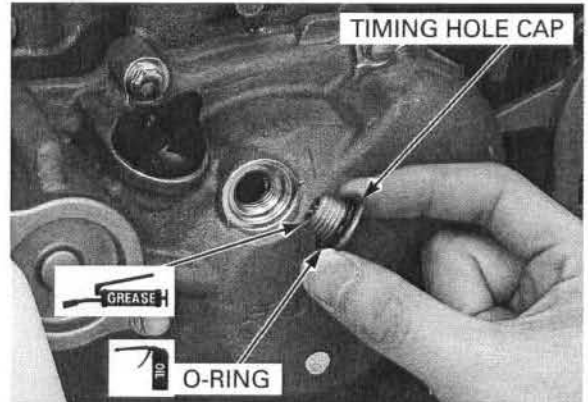


Check that the O-ring is in good condition, replace it if necessary.

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)**



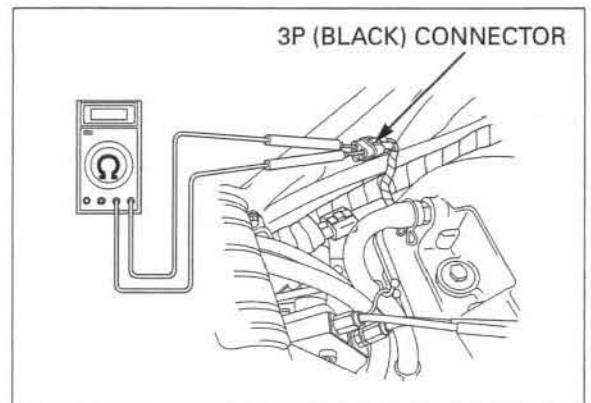
## THROTTLE POSITION SENSOR INSPECTION

Remove the fuel tank (page 3-8).

Disconnect the throttle position sensor 3P (Black) 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.

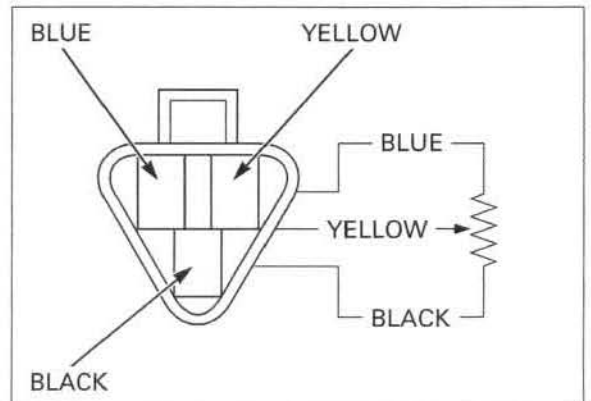
**Fully closed-Fully open position:**

**Resistance increases**

**Fully open-Fully closed position:**

**Resistance decreases**

If both measurements are abnormal, replace the throttle position sensor (page 6-26).



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**MEMO**

---

# 19. ELECTRIC STARTER

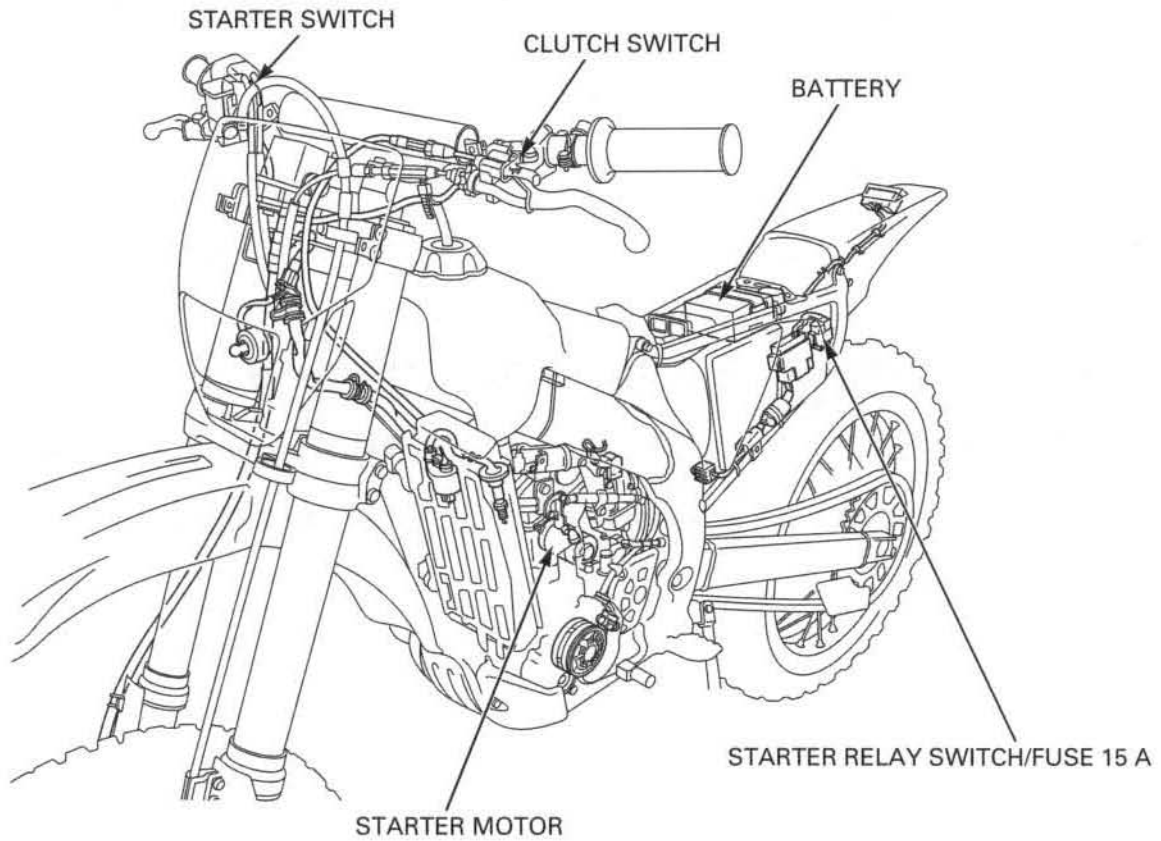
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COMPONENT LOCATION .....	19-2	TROUBLESHOOTING .....	19-4
SYSTEM DIAGRAM .....	19-2	STARTER MOTOR .....	19-6
SERVICE INFORMATION .....	19-3	STARTER RELAY SWITCH .....	19-13

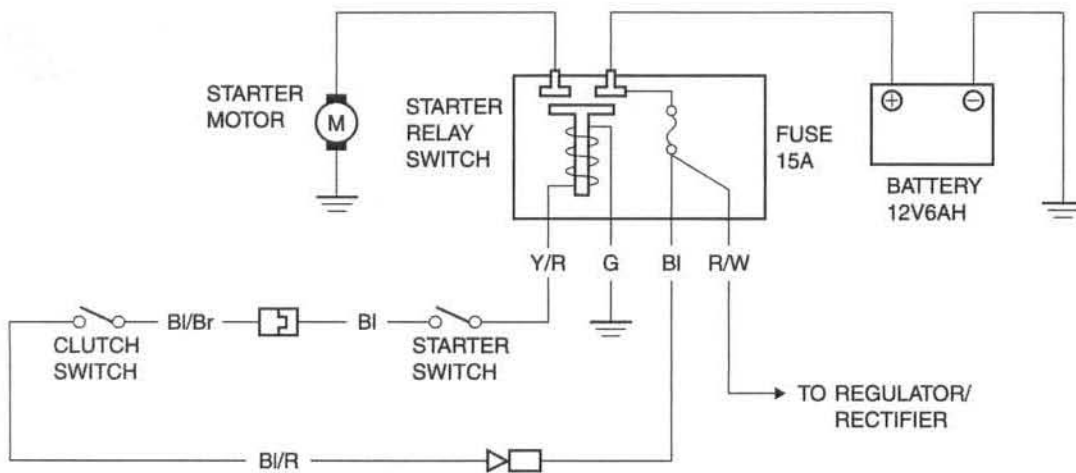
# ELECTRIC STARTER

## COMPONENT LOCATION

'05 - '07 shown:



## SYSTEM DIAGRAM



BI : Black  
Y : Yellow  
G : Green  
R : Red  
Br : Brown  
W : White

## SERVICE INFORMATION

### GENERAL

#### NOTICE

If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

- The starter motor can be serviced with the engine in the frame.
- When checking the electric starter system, always follow the steps in the troubleshooting (page 19-4).
- Always disconnect the negative cable at the battery before servicing the starter motor. The motor could suddenly start, causing serious injury.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.

Refer to the following components information.

- Engine stop button (page 20-7)
- Starter switch (page 20-9)
- Clutch switch (page 20-8)
- Starter clutch (page 11-19)

### SPECIFICATION

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.25 (0.404)	6.75 (0.266)

### TORQUE VALUE

Starter motor case bolt 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)

**TROUBLESHOOTING**

**Starter motor does not turn**

**1. Fuse Inspection**

Check for blown fuse (15 A).

*Is the fuse blown?*

**YES** - Replace the fuse.

**NO** - GO TO STEP 2.

**2. Battery Inspection**

Make sure the battery is fully charged and in good condition.

*Is the battery in good condition?*

**YES** - GO TO STEP 3.

**NO** - Charge or replace the battery (page 17-6).

**3. Starter Relay Switch Operation**

Check the starter relay switch operation.

You should hear the relay "CLICK" when the starter switch is depressed and pull the clutch lever.

*Is there a "CLICK"?*

**YES** - GO TO STEP 4.

**NO** - GO TO STEP 5.

**4. Starter Motor Inspection**

Apply battery voltage directly to the starter motor and check the operation.

*Does the starter motor turn?*

**YES** -

- Poorly connected starter motor cable
- Faulty starter relay switch

**NO** - Faulty starter motor.

**5. Relay Coil Ground Line Inspection**

Disconnect the starter relay switch connector, then check for continuity between the green wire terminal of the wire harness side and body ground.

*Is there continuity?*

**NO** -

- Open circuit in wire harness
- Loose or poor contact connector

**YES** - GO TO STEP 6.

**6. Starter Relay Switch Input Line Inspection**

Connect the starter relay switch connector.

Pull the clutch lever and engine starter switch is pushed, measure the voltage at the starter relay switch connector (between Yellow/red (+) and body ground (-)).

*Is the input line normal?*

**YES** - GO TO STEP 7.

**NO** -

- Faulty clutch switch (page 20-8)
- Faulty engine starter switch (page 20-9)
- Loose or poor contact of the related connector terminal
- Open circuit in the wire harness

**7. Starter Relay Switch Continuity Inspection**

Connect the starter relay switch connector.

Pull the clutch lever and engine starter switch is pushed, check for continuity at the starter relay switch.

**Is there continuity?**

**YES** – Loose or poor contact of the starter relay switch connector.

**NO** – Faulty starter relay switch.

**Starter motor turns engine slowly**

- Low battery voltage
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected ground cable terminal

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

- Starter motor is running backwards
  - Case assembled improperly
- Faulty starter clutch
- Damaged starter gear train

**Starter relay switch clicks, but engine does not turn over**

- Crankshaft does not turn due to engine problems



# STARTER MOTOR

## REMOVAL

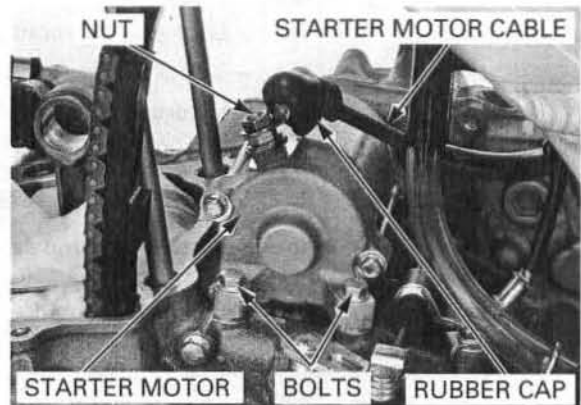
- Remove the negative cable at the battery before servicing the starter motor.

Remove the cylinder (page 10-5).

Remove the rubber cap from the starter motor terminal.

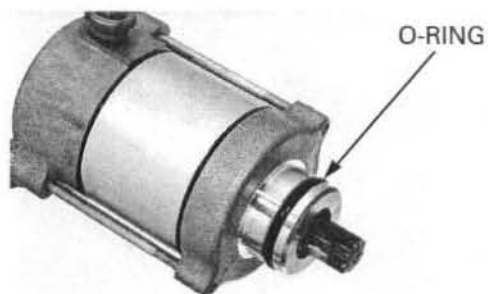
Remove the nut and disconnect the starter motor cable.

Remove the mounting bolts, and starter motor from the crankcase.

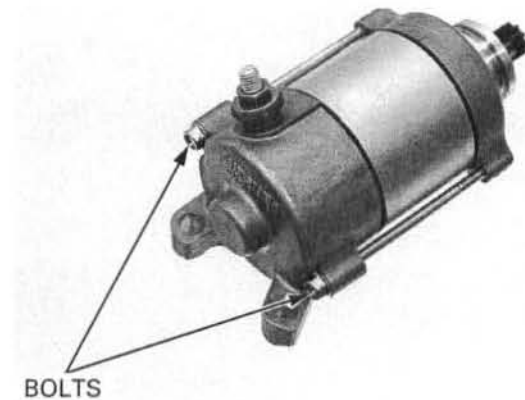


## DISASSEMBLY/INSPECTION

Remove the O-ring.



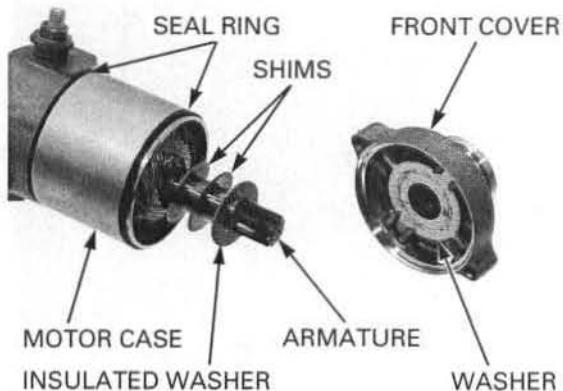
Remove the motor case bolts.



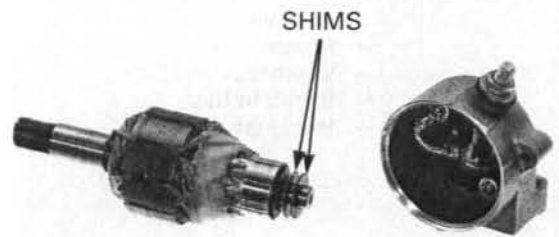
*Record the location and number of shims.*

Remove the following:

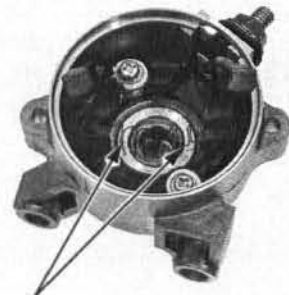
- Front cover
- Insulated washer
- Shims
- Seal rings
- Washer
- Motor case
- Armature



Record the location and number of shims. Remove the shims.



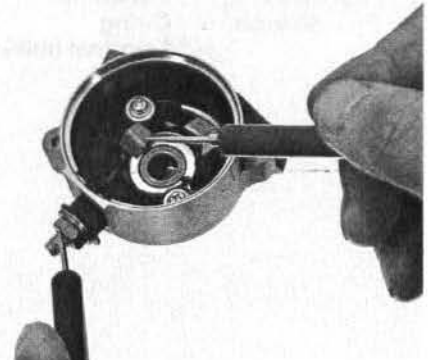
Remove the brush springs.



**BRUSH SPRINGS**

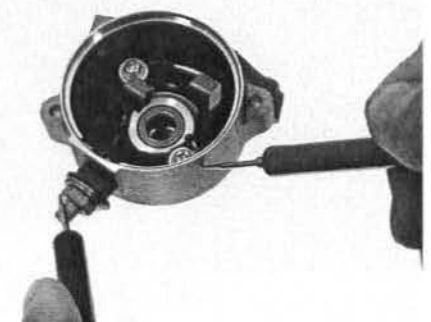
Check for continuity between the cable terminal and insulated brush. There should be continuity.

Continuity:



Check for continuity between the cable terminal and rear cover. There should be no continuity.

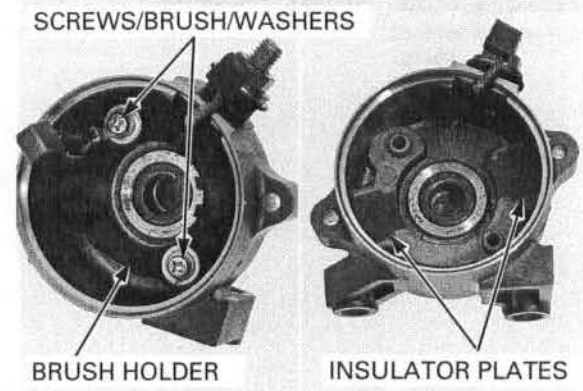
No Continuity:



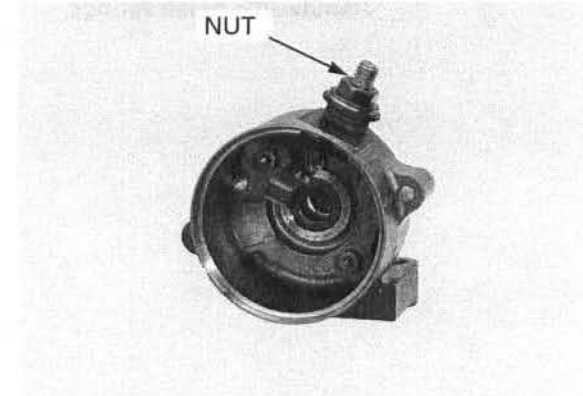
## ELECTRIC STARTER

Remove the following:

- Screws
- Brush
- Washers
- Brush holder
- Insulator plates

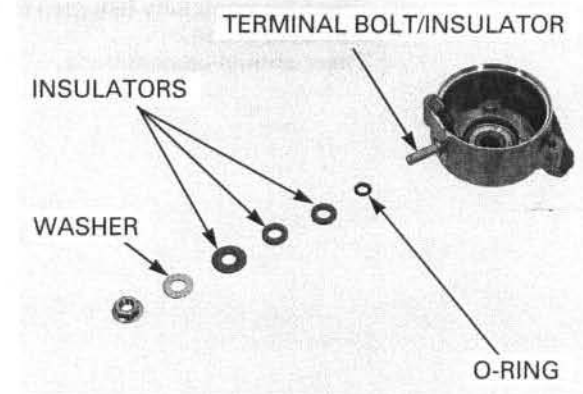


- Nut



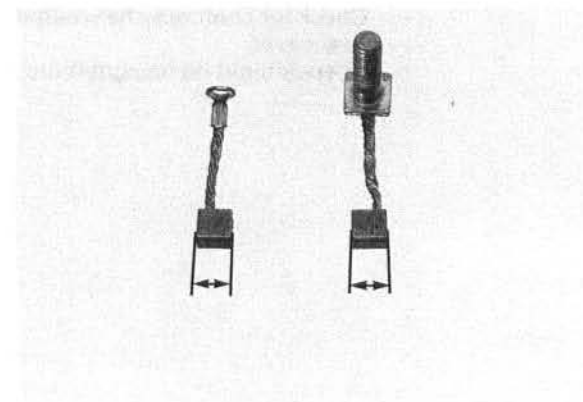
*Record the location and number of insulators.*

- Washer
- Insulators
- O-ring
- Terminal bolt/insulator



Measure the brush length.

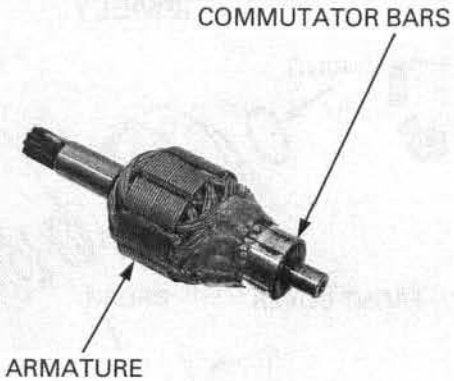
**SERVICE LIMIT: 6.75 mm (0.266 in)**



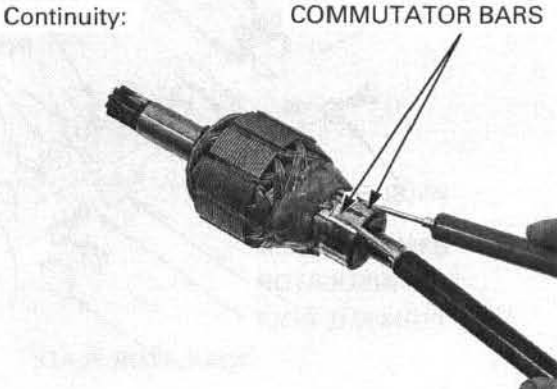
# ELECTRIC STARTER

*Do not use emery or sand paper on the commutator.*

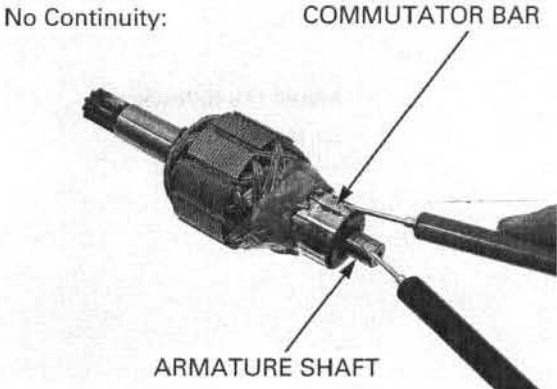
Inspect the commutator bars of the armature for discoloration.



Check for continuity between pairs of commutator bars. There should be continuity.

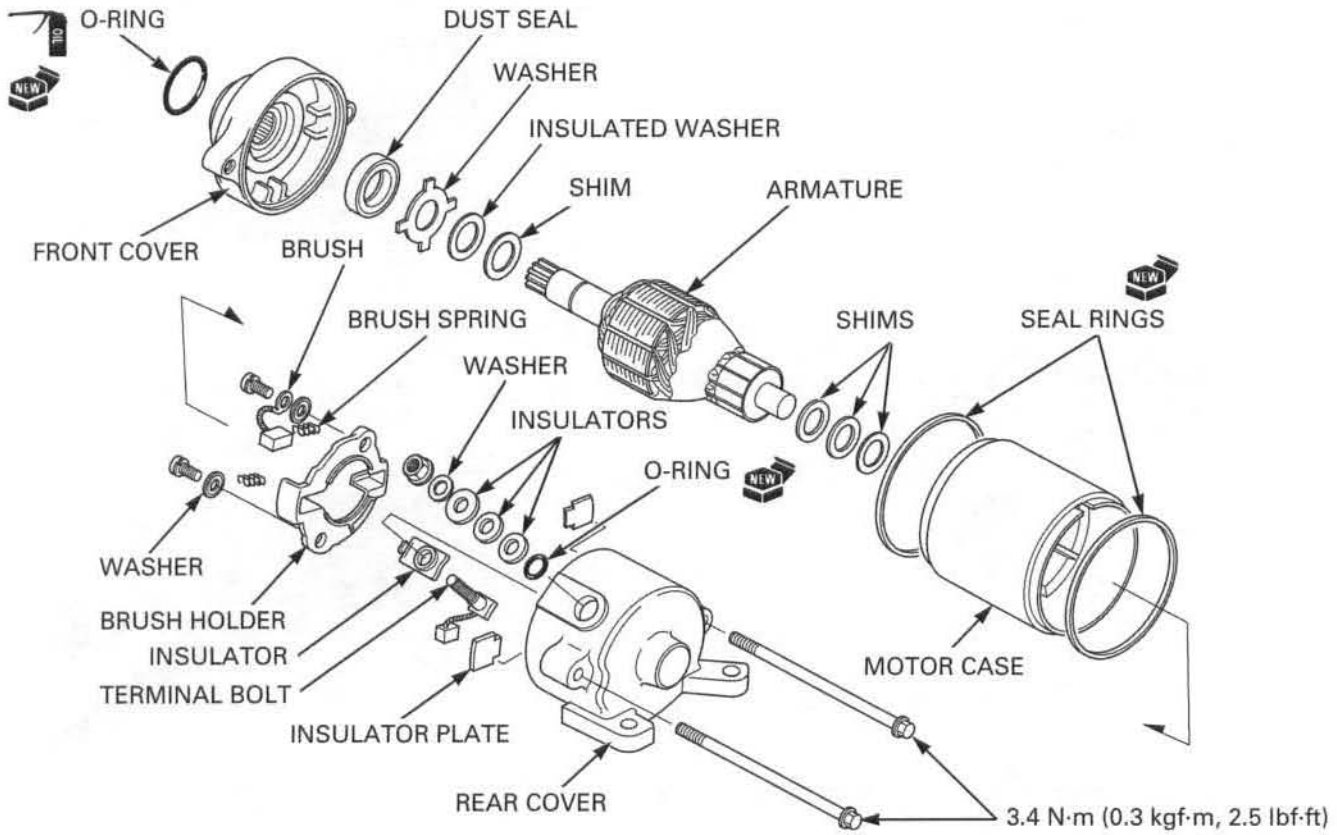


Check for continuity between each commutator bar and armature shaft. There should be no continuity.



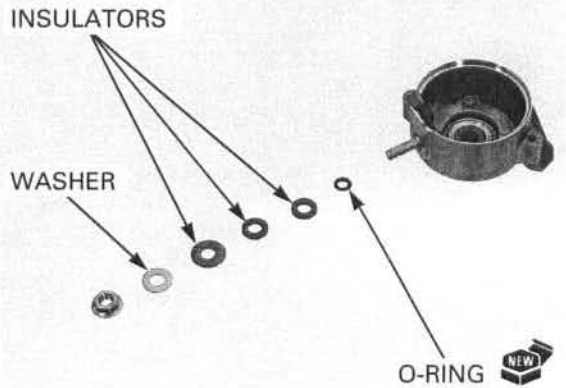
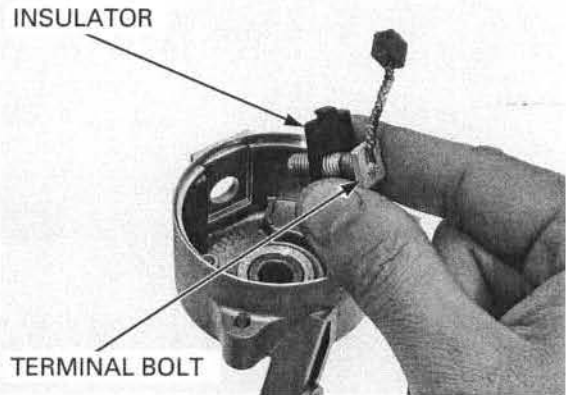
# ELECTRIC STARTER

## ASSEMBLY



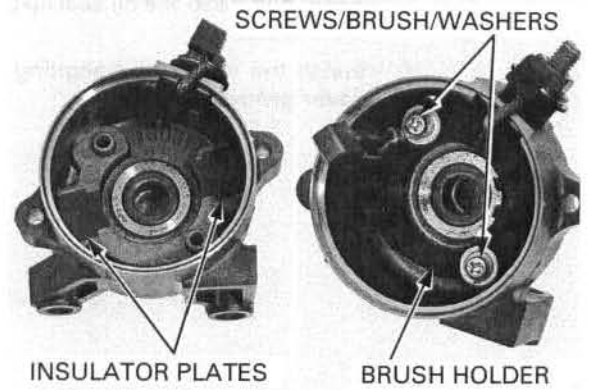
Install the following:

- Insulator
- Terminal bolt

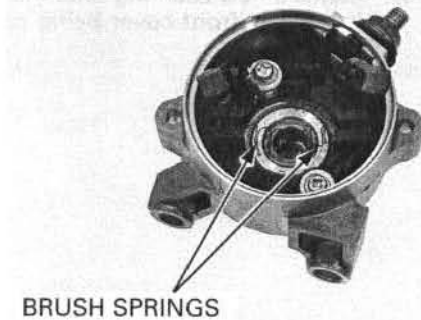


- New O-ring
- Insulators
- Washer
- Nut

- Insulator plates
- Brush holder
- Washers
- Brush
- Screws



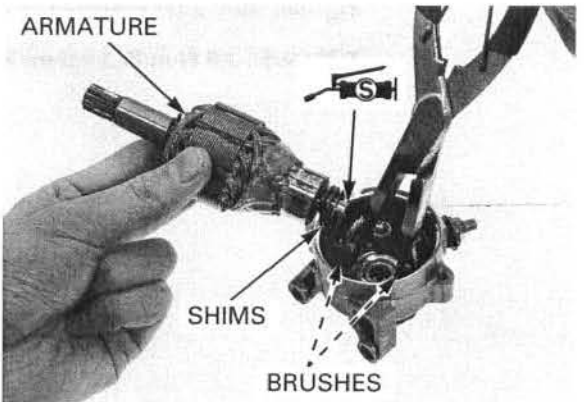
- Brush springs



Apply grease to the armature shaft end.

*Install the shims properly as noted during removal.*

Install the shims onto the armature shaft. Install the armature onto the rear cover while pushing the brushes into the brush holder.

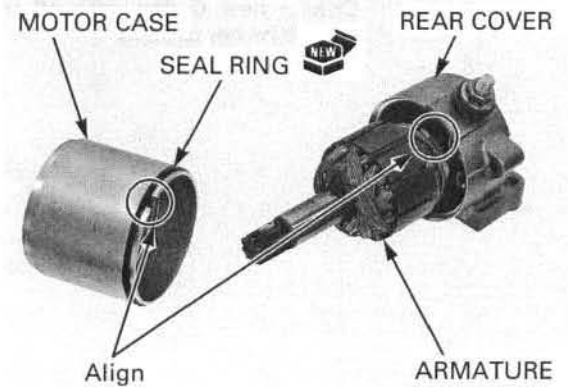


*Align the motor case groove to the insulator tab.*

Install a new seal ring and motor case to the rear cover while holding the armature tightly to keep the magnet of the case from pulling the armature against it.

**NOTICE**

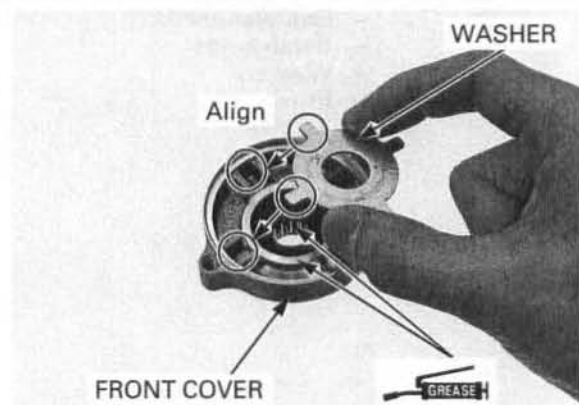
*The coil may be damaged if the magnet pulls the armature against the case.*



## ELECTRIC STARTER

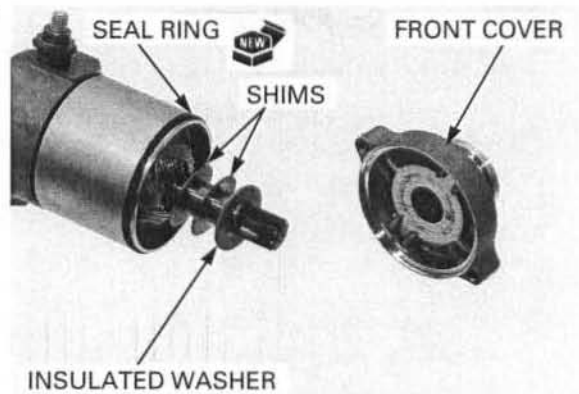
Apply grease to the oil seal lip and needle bearing in the front cover.

Install the washer by aligning its tabs to the front cover grooves.



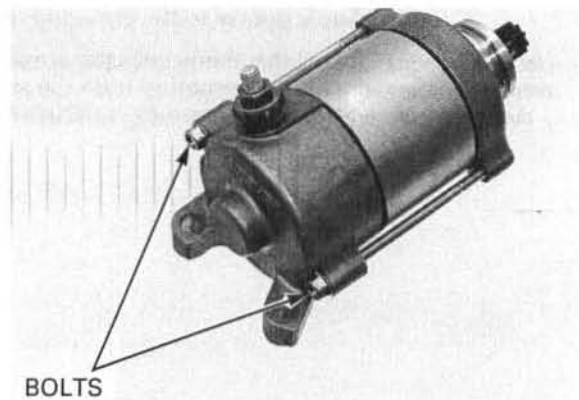
*Install the shims properly as noted during removal.*

Install the shims and insulated washer onto the armature shaft. Install a new seal ring onto the motor case. Install the front cover being careful not to damage the oil seal lip.

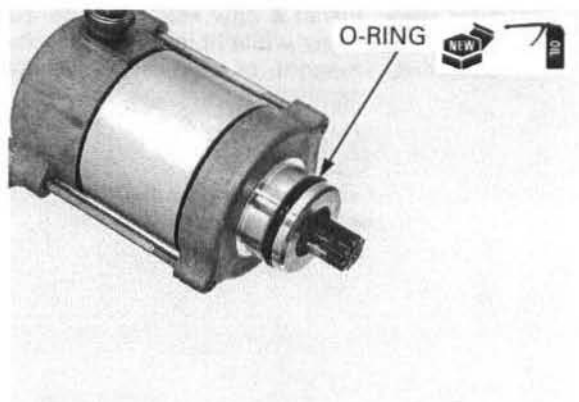


Tighten the motor case bolts to the specified torque.

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



Coat a new O-ring with oil and install it into the starter motor groove.

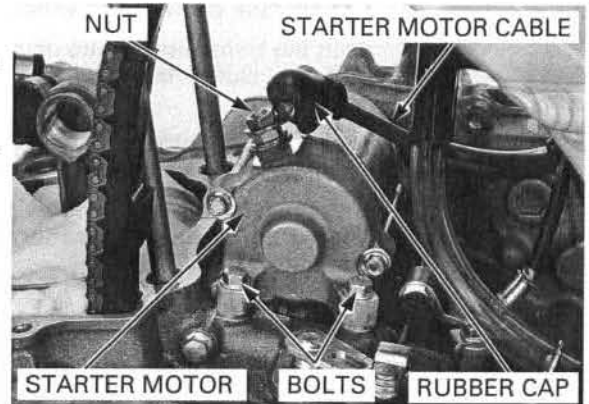




**INSTALLATION**

Install the starter motor onto the crankcase.  
Install and tighten the starter motor mounting bolt.  
Install the starter motor cable and terminal nut onto the motor terminal.  
Tighten the nut securely.  
Install the rubber cap over the motor terminal properly.

Install the cylinder (page 10-10).

**STARTER RELAY SWITCH****INSPECTION**

Remove the left side cover (page 3-3).  
Shift the transmission into neutral.  
Pull the clutch lever fully, and push the engine starter switch.

If the starter relay switch "CLICK", the coil is normal.

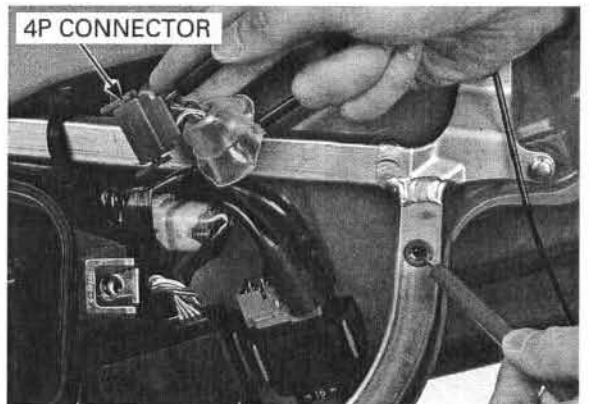
If you don't hear the switch "CLICK", inspect the starter relay switch using the procedure below.

**GROUND LINE**

Disconnect the starter relay switch 4P connector.

Check for continuity between the Green wire terminal of the wire harness side connector and ground.

If there is continuity, the ground circuit is normal.



## ELECTRIC STARTER

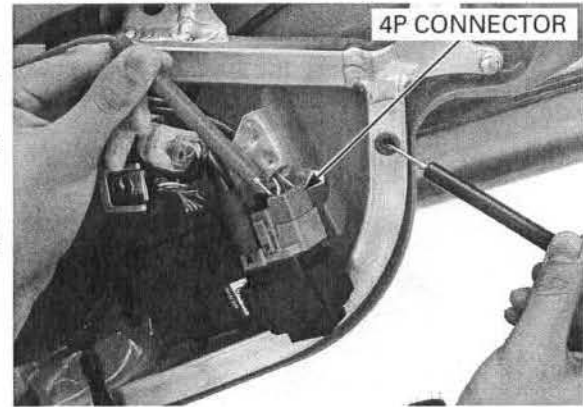
### POWER INPUT LINE

Connect the starter relay switch 4P connector.

Shift the transmission into neutral.  
Pull the clutch lever fully, and push the starter switch.

Measure the voltage between the Yellow/red wire terminal (+) and ground (-).

If the battery voltage appears only when the clutch lever is pulled fully and starter switch is pushed, the circuit is normal.

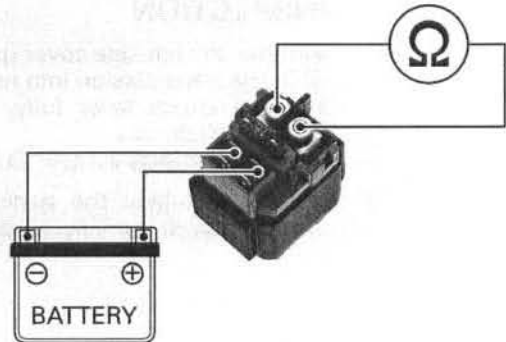


### OPERATION CHECK

Remove the starter relay switch (page 19-14).

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/red wire terminal and the negative wire to the Green wire terminal.

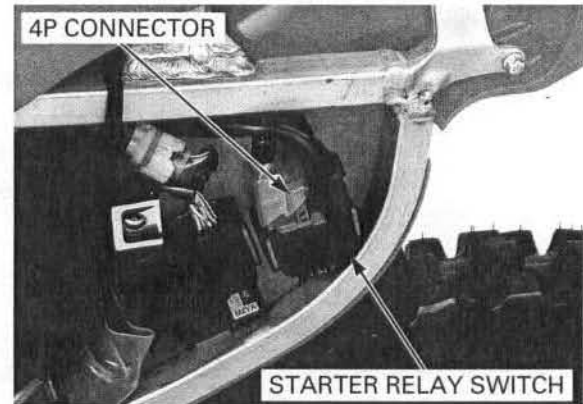
There should be continuity between the cable terminals when the battery is connected, and not continuity when the battery is disconnected.



### REMOVAL/INSTALLATION

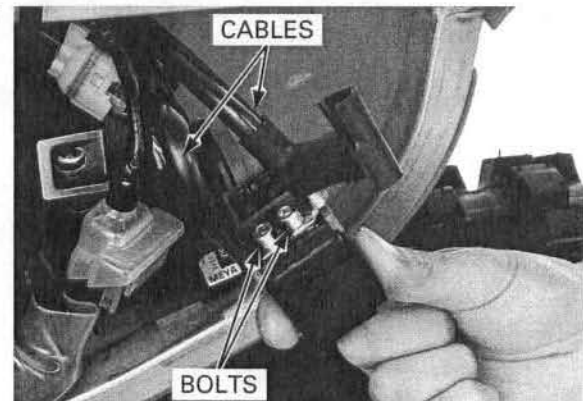
Remove the left side cover (page 3-3).

Disconnect the starter relay switch 4P connector.  
Pull out the starter relay switch from the rear fender.



Remove the bolts and disconnect the starter motor and battery positive (+) cables.

Installation is in the reverse order of removal.



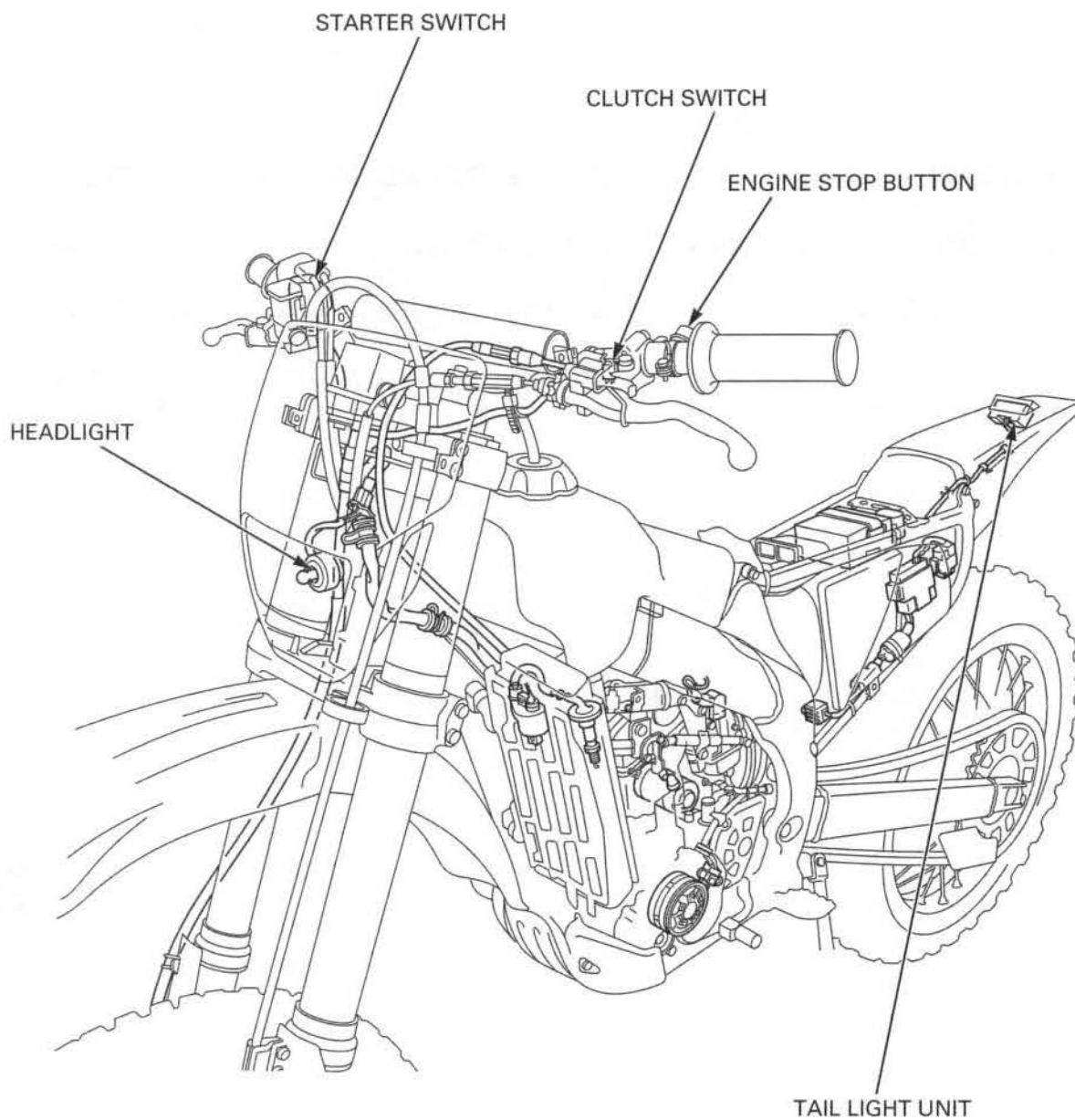
# 20. LIGHTS/METER/SWITCHES

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COMPONENT LOCATION .....	20-2	ENGINE STOP BUTTON .....	20-7
SERVICE INFORMATION .....	20-3	CLUTCH SWITCH .....	20-8
HEADLIGHT.....	20-4	STARTER SWITCH .....	20-9
TAIL LIGHT.....	20-6	TRIPMETER.....	20-10

COMPONENT LOCATION

'05 - '07 shown:



## SERVICE INFORMATION

### GENERAL

#### NOTICE

- A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.
- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Headlight	12 V – 35 W
Tail light	LED
Fuse	15 A

### TORQUE VALUES

Headlight mounting screw	0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)
Tail light mounting screw	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)
Tail light wire clamp screw	0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)

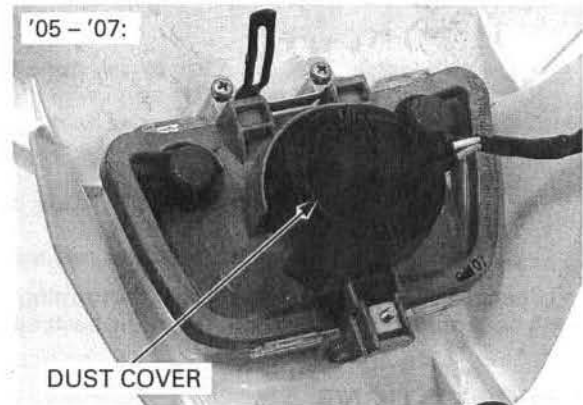
# HEADLIGHT

## BULB REPLACEMENT

Remove the front visor.

- '05 - '07: (page 3-5)
- After '07: (page 3-6)

Remove the dust cover.

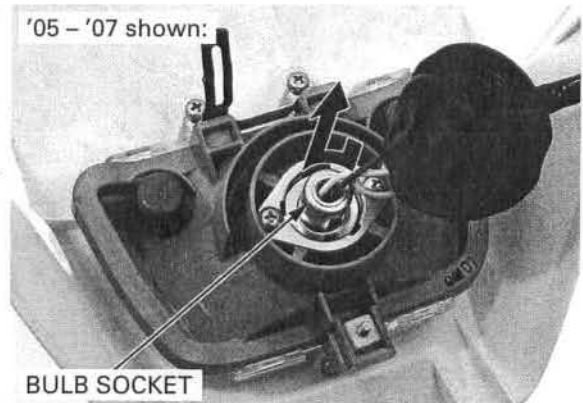


While pushing the bulb socket, turn it counterclockwise and remove the bulb socket.

Remove the bulb.

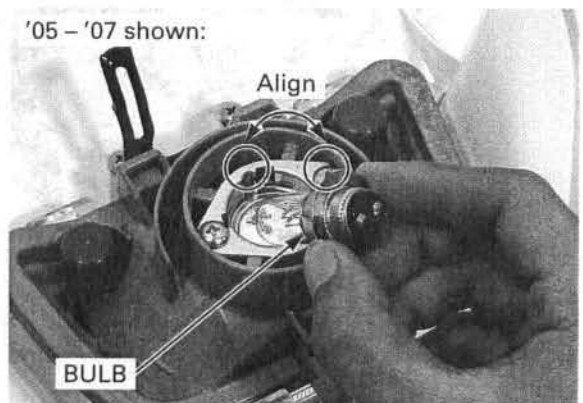
### NOTICE

*Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.*

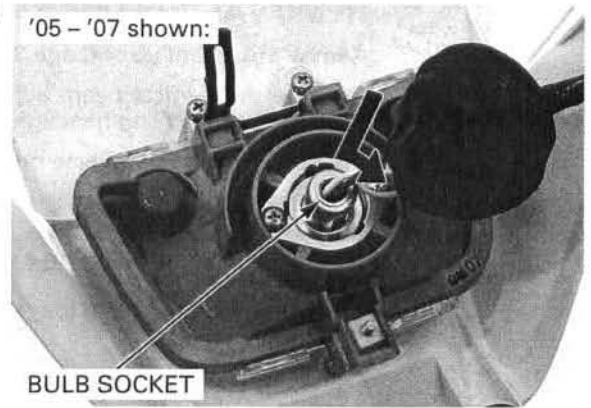


Install a new bulb into the headlight unit while aligning the tab with the groove of the headlight unit.

If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent early bulb failure.



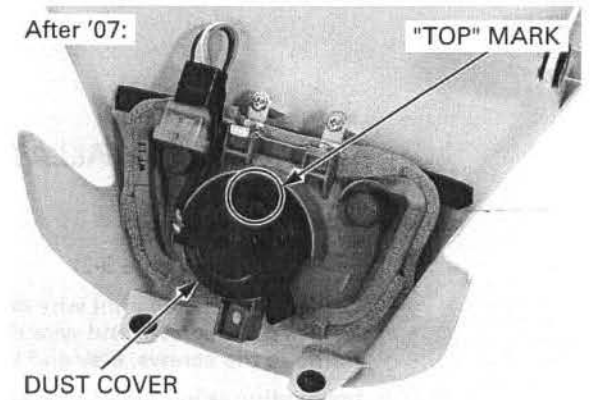
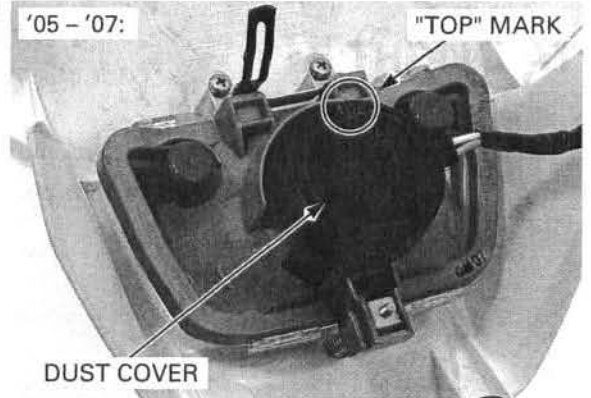
While pushing the bulb socket, turn it clockwise and install the bulb socket.



Install the dust cover tightly against the headlight unit with its "TOP" mark facing up.

Install the front visor.

- '05 - '07: (page 3-5)
- After '07: (page 3-6)



**REMOVAL/INSTALLATION ('05 - '07)**

Remove the front visor (page 3-5).

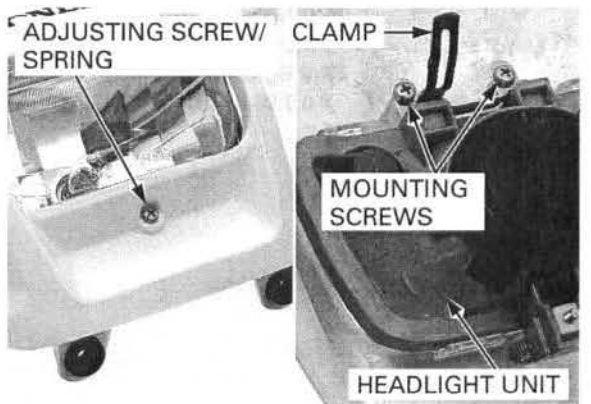
Remove the vertical beam adjusting screw, spring, mounting screws, clamp and headlight unit.

Installation is in the reverse order of removal.

**TORQUE:**

**Headlight mounting screw:**  
 0.7 N-m (0.1 kgf-m, 0.5 lbf-ft)

Adjust the headlight aim (page 4-31).





## LIGHTS/METER/SWITCHES

### REMOVAL/INSTALLATION (After '07)

Remove the front visor (page 3-6).

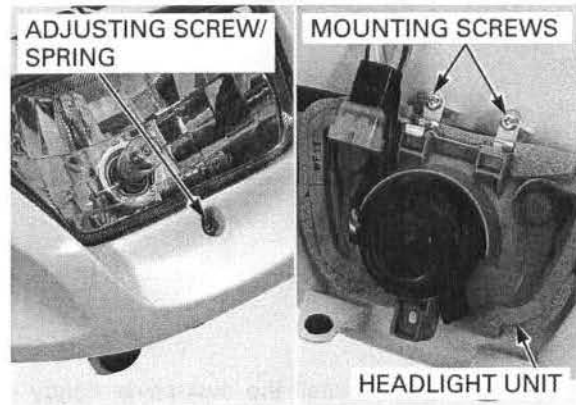
Remove the vertical beam adjusting screw, spring, mounting screws and headlight unit.

Installation is in the reverse order of removal.

#### TORQUE:

**Headlight mounting screw:**  
0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)

Adjust the headlight aim (page 4-31).

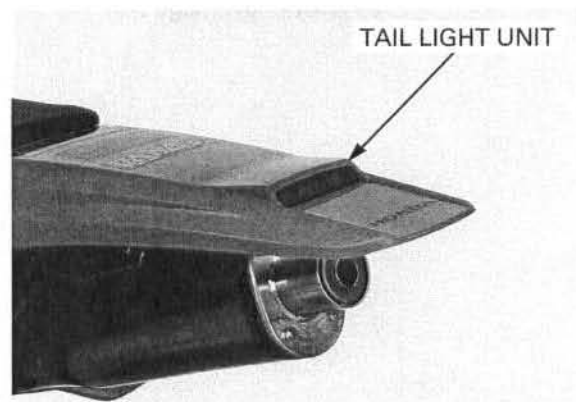


## TAIL LIGHT

### INSPECTION

Start the engine and check the tail light illumination.

If any LED does not turn on, replace the tail light unit.



### REMOVAL/INSTALLATION

Remove the following:

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

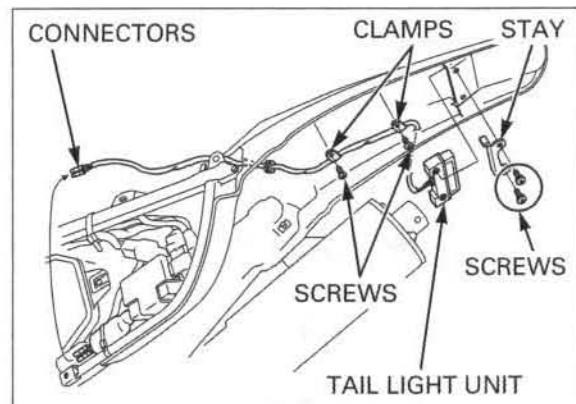
Disconnect the tail light wire connectors.  
Remove the screws and wire clamps.  
Remove the screws, stay and tail light unit.

Installation is in the reverse order of removal.

#### TORQUE:

**Tail light mounting screw:**  
4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)

**Tail light wire clamp screw:**  
0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)



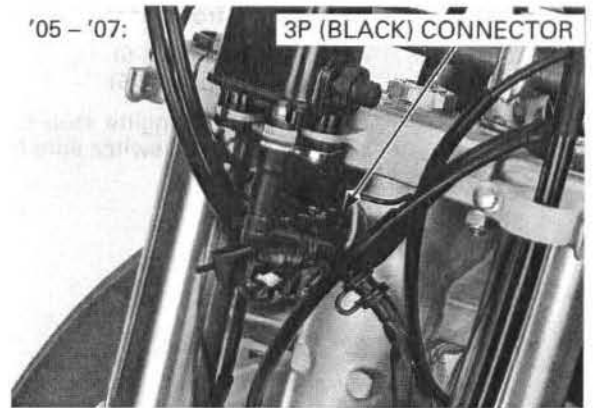
**ENGINE STOP BUTTON****INSPECTION**

Remove the front visor.

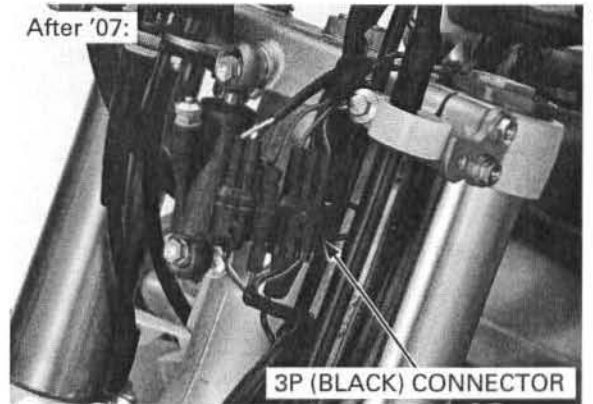
- '05 - '07: (page 3-5)
- After '07: (page 3-6)

Disconnect the engine stop button 3P (Black) connector.

'05 - '07:



After '07:



Check for continuity between the Black/white terminal and Black/green terminal.

There should be continuity with the engine stop button depressed, and no continuity with the button released.

'05 - '07 shown:



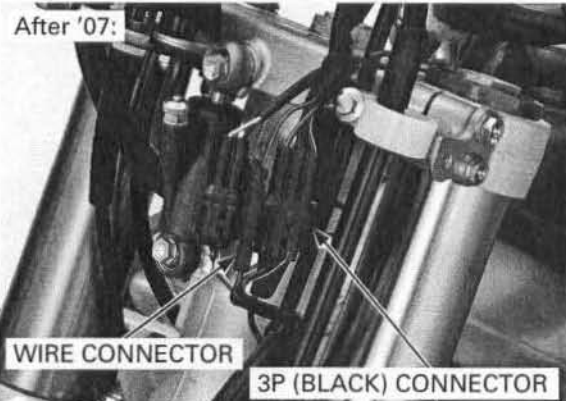
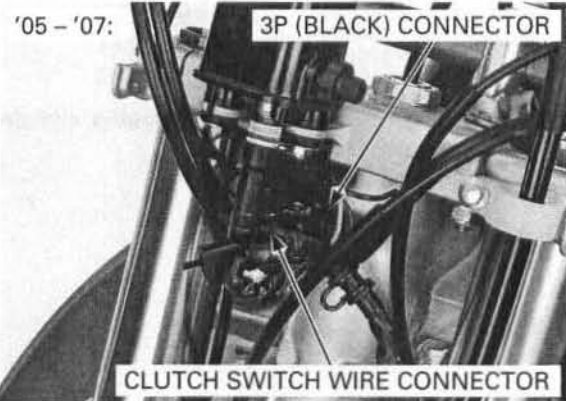
## CLUTCH SWITCH

### INSPECTION

Remove the front visor.

- '05 - '07: (page 3-5)
- After '07: (page 3-6)

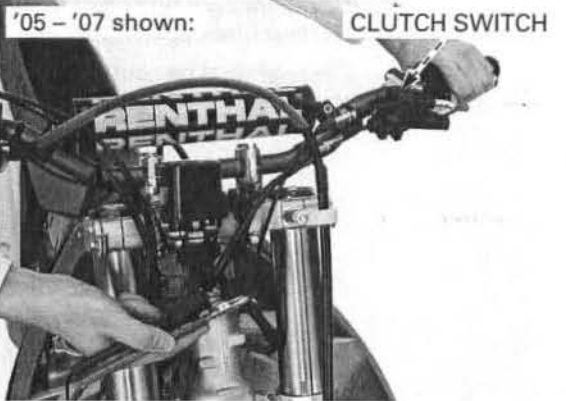
Disconnect the engine stop button 3P (Black) connector and clutch switch wire (Black/red) connector.



Check for continuity between the Black/brown terminal and Black/red wire connector.

There should be continuity with the clutch lever squeezed, and no continuity with the clutch lever released.

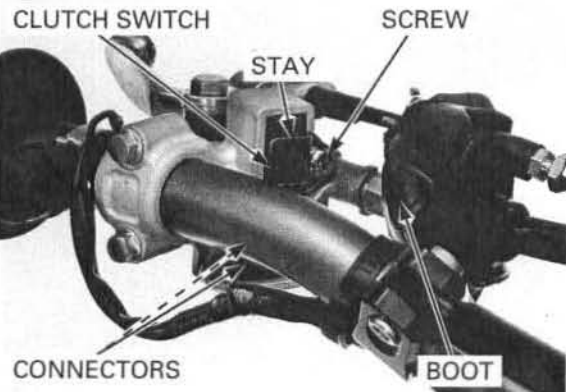
If the continuity is abnormal, remove the clutch switch (page 20-8).



### REMOVAL/INSTALLATION

Remove the boot.

Remove the screw, stay, clutch switch and disconnect the connectors.



Check for continuity between the clutch switch terminals.

There should be no continuity with the switch pushed, and there should be continuity with the switch is released.

If the continuity at the connectors is abnormal and the continuity at the clutch switch terminal is normal, check the connectors for loose connection and the wire harness for an open circuit or loose connection.

CLUTCH SWITCH



## STARTER SWITCH

### INSPECTION

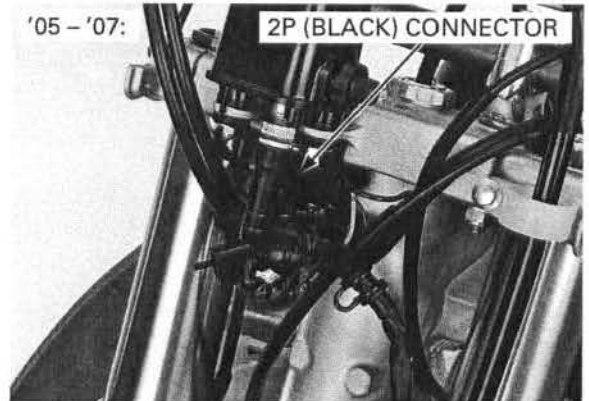
Remove the front visor.

- '05 - '07: (page 3-5)
- After '07: (page 3-6)

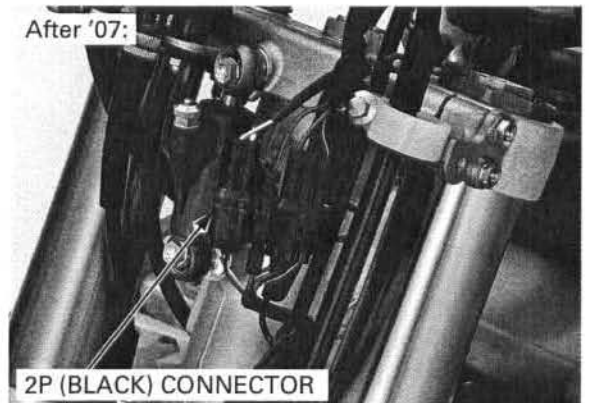
Disconnect the starter switch 2P (Black) connector.

'05 - '07:

2P (BLACK) CONNECTOR



After '07:



Check for continuity between the starter switch connector terminals (Yellow/red and Black).

There should be continuity with the starter switch pushed and no continuity with the switch released.



STARTER SWITCH

## TRIPMETER

### REMOVAL/INSTALLATION

Remove the front visor.

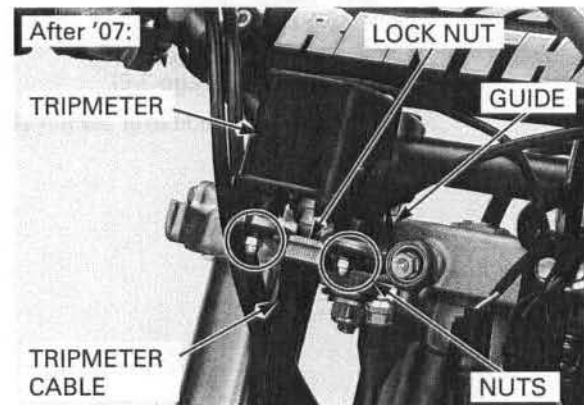
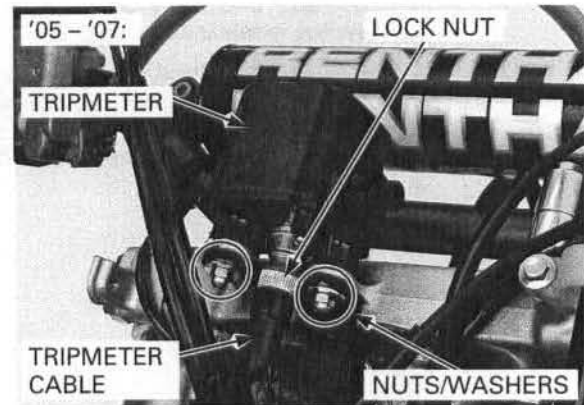
- '05 - '07: (page 3-5)
- After '07: (page 3-6)

Loosen the lock nut and disconnect the tripmeter cable.

'05 - '07: Remove the nuts, washers and tripmeter.

After '07: Remove the nuts, cable guide and tripmeter.

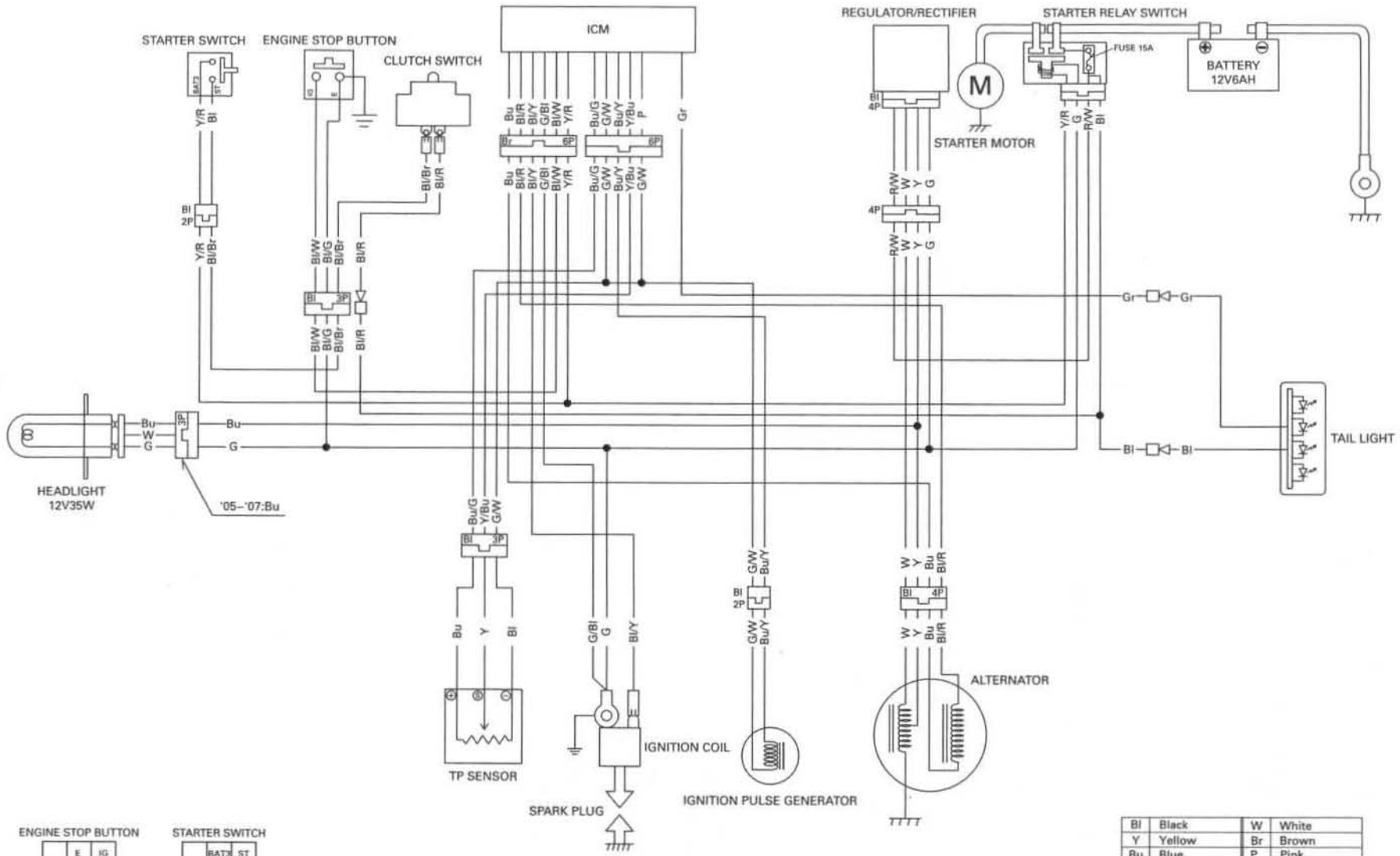
Installation is in the reverse order of removal.



# 21. WIRING DIAGRAM

---

WIRING DIAGRAM ..... 21-2



ENGINE STOP BUTTON

	E	IG
PUSH	○	○
FREE		
CORD COLOR	Bu/G	Bi/W

STARTER SWITCH

	BAT	ST
PUSH	○	○
FREE		
CORD COLOR	Y/R	Bu/Br

Bl	Black	W	White
Y	Yellow	Br	Brown
Bu	Blue	P	Pink
G	Green	Gr	Gray
R	Red		



# 22. TROUBLESHOOTING

---

ENGINE DOES NOT START OR IS HARD  
TO START ..... 22-2

ENGINE LACKS POWER ..... 22-3

POOR PERFORMANCE AT LOW AND IDLE  
SPEED..... 22-5

POOR PERFORMANCE AT HIGH  
SPEED ..... 22-6

POOR HANDLING ..... 22-7

## **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 tank breather hose

**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 ignition coil wire  
• Faulty 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 Inspection**

Test cylinder compression.

***Is the compression low?***

- YES** – • Valve clearance too small  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing  
• '05 – '07: Faulty decompressor cam  
• After '07: Faulty decompressor shaft

## 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 transmission 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 tank breather hose
  - Carburetor choke is on
  - Excessive carbon build-up in combustion chamber

**YES** - GO TO STEP 5.

### 5. Engine Knocking Inspection

Accelerate or run at high speed.

*Is there knocking?*

- YES** -
- Worn piston and cylinder
  - Use of poor quality fuel
  - Excessive carbon build-up in combustion chamber
  - Ignition timing too advance (Faulty 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.

### 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 cylinder head gasket
  - Improper valve timing
  - Faulty decompressor system
  - '05 - '07: Faulty decompressor cam
  - After '07: Faulty decompressor shaft

**NO** - GO TO STEP 8.

### 8. Carburetor Inspection

Check carburetor for clogs.

#### *Is the carburetor for 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?*

- YES** -
- Plug not serviced frequently enough
  - Incorrect spark plug heat range
  - Incorrect spark plug gap

**NO** - GO TO STEP 10.

### 10. Engine Oil Inspection

Check oil level and condition.

#### *Is the level correct and good condition?*

- NO** -
- Oil level too high
  - Oil level too low
  - Contaminated oil

**YES** - GO TO STEP 11.

### 11. Over Heating Inspection

Check engine overheating.

#### *Is the engine overheating?*

- YES** -
- Coolant level too low
  - Excessive carbon build-up in combustion chamber
  - Use of poor quality fuse
  - Clutch slipping

**NO** - GO TO STEP 12.

### 12. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

#### *Is the valve train lubricated properly?*

- NO** -
- Faulty oil pump
  - Faulty pressure relief valve
  - Clogged oil passage
  - Clogged oil strainer

**YES** - Valve train lubrication is normal.

---

**POOR PERFORMANCE AT LOW AND IDLE SPEED****1. Pilot Screw Inspection**

Check carburetor pilot screw adjustment.

*Is the adjustment correct?*

**NO** - See page 6-27.

**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
- Loose or disconnected ignition system wires
- Broken or shorted ignition coil wire
- Faulty ignition coil
- 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?*

**YES** - Ignition timing is normal.

**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 tank 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.

**NO** - Not weak.

## POOR HANDLING

### **Steering is heavy**

- Steering stem adjusting nut adjusted too tight
- Damaged steering head bearings
- Low tire pressure
- After '07: Faulty steering damper

### **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 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 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
- The following recommendations are given 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 preload

### **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 preload
- 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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SHOCK LINKAGE .....	15-30	POOR PERFORMANCE AT LOW AND IDLE SPEED .....	22-5
SIDE COVER .....	3-3	REAR WHEEL/SUSPENSION .....	15-7
SIDESTAND .....	4-34	VALVE CLEARANCE/DECOMPRESSOR SYSTEM .....	4-15
SPARK ARRESTER .....	4-33	VALVE GUIDE REPLACEMENT .....	9-29
SPARK PLUG .....	4-12	VALVE SEAT INSPECTION/REFACING .....	9-30
STANDARD TORQUE VALUES .....	1-14	WATER PUMP .....	7-9
STARTER CLUTCH .....	11-19	WHEELS/TIRES .....	4-36
STARTER MOTOR .....	19-6	WIRING DIAGRAM .....	21-2
STARTER RELAY SWITCH .....	19-13		
STARTER SWITCH .....	20-9		
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