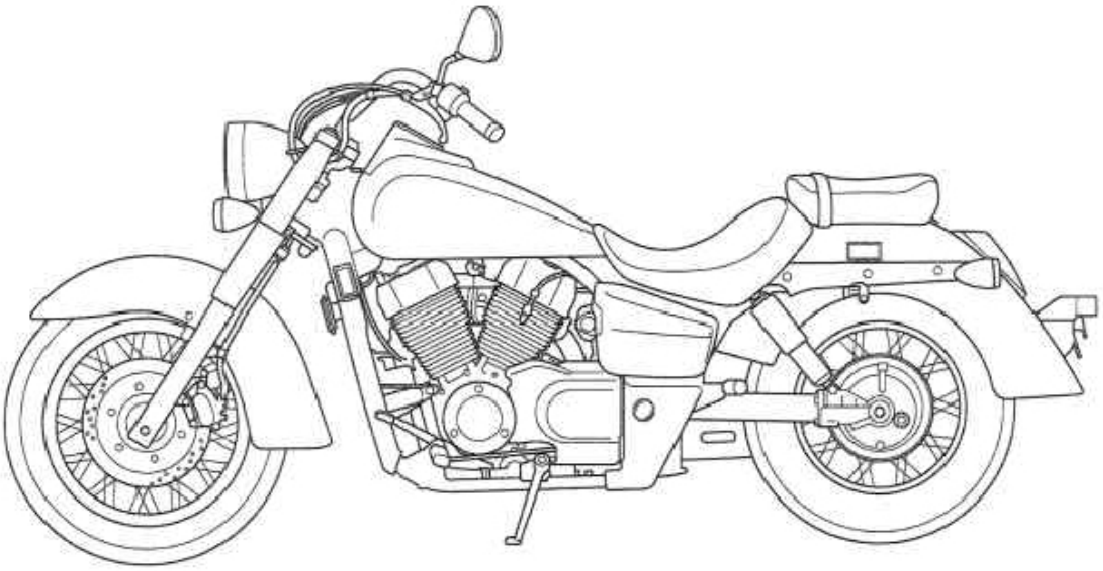
THE 2005 HONDA SHADOW AERO

(THE AERO CONSORTIUM)



HOW TO USE THIS MANUAL

This service manual describes the service procedures for the VT750C/CA.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are with the standards set by the U.S. Environmental Protection Agency, California Air Resources Board (CARB) and Transport Canada.

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 4 through 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 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.

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

Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

CONTENTS

Date of Issue: November, 2003

SYMBOLS

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

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

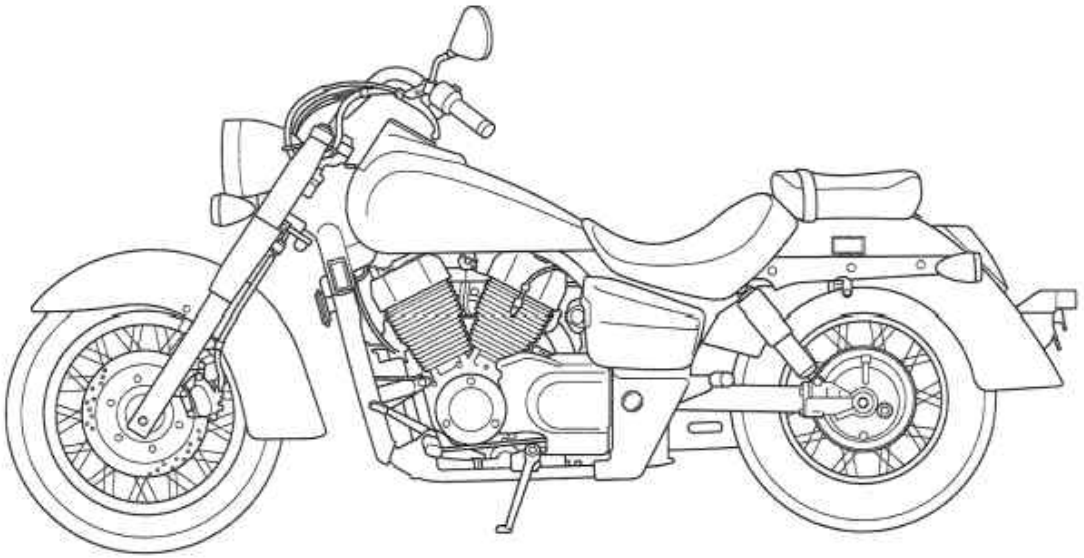
1. GENERAL INFORMATION

1

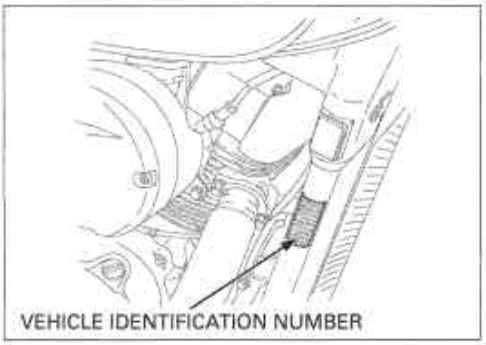
SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-24).

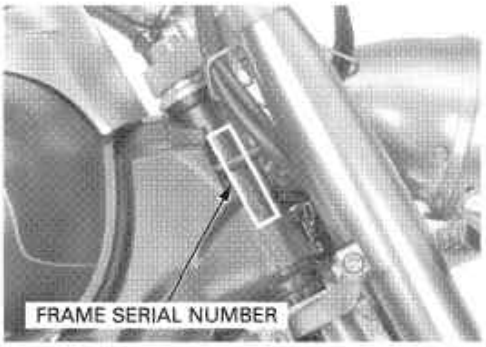
MODEL IDENTIFICATION



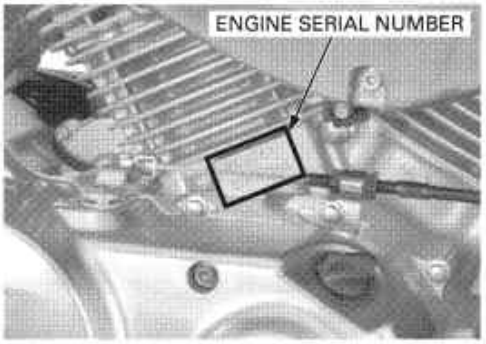
The vehicle identification number (VIN) is attached on the right side of the frame down tube.



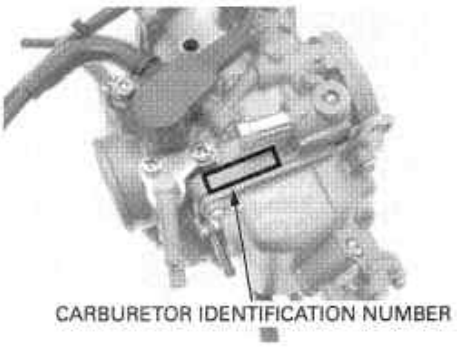
The frame serial number is stamped on the right side of the steering head.



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

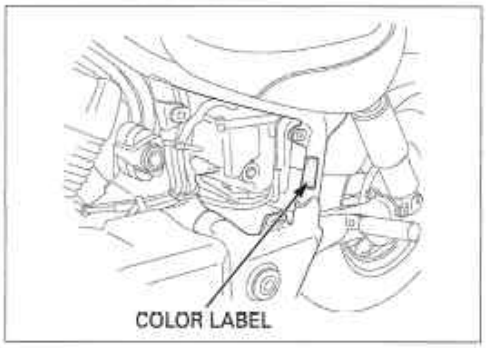


The carburetor identification number is stamped on the throttle position sensor side of the carburetor body.



GENERAL INFORMATION

The color label is attached on the behind of the left side cpver. When ordering color-coded parts, always specify the designated color code.



GENERAL SPECIFICATIONS

ITEM			SPECIFICATIONS
DIMENSION	Overall length		2,510 mm (98.8 in)
	Overall width		940 mm (37.0 in)
	Overall height		1,090 mm (42.9 in)
	Wheelbase		1,640 mm (64.6 in)
	Seat height		660 mm (26.0 in)
	Footpeg height		277 mm (11.0 in)
	Ground clearance		130 mm (5.1 in)
	Dry weight	(49 state/Canada type)	236 kg (520 lbs)
		(California type)	237 kg (522 lbs)
	Curb weight	(49 state/Canada type)	252 kg (556 lbs)
		(California type)	253 kg (558 lbs)
	Maximum weight capacity	(49 state/California type)	182 kg (401 lbs)
		(Canada type)	186 kg (410 lbs)
FRAME	Frame type		Double cradle
	Front suspension		Telescopic fork
	Front axle travel		117 mm (4.6 in)
	Rear suspension		Swingarm
	Rear axle travel		90 mm (3.5 in)
	Front tire size		120/90-17M/C 64S
	Rear tire size		160/80-15M/C 74S
	Tire brand	Bridgestone	Front: G701/Rear: G702
		Dunlop	Front: D404FG/Rear: D404
		Cheng shin	Front: M6002/Rear: M6011R
	Front brake		Hydraulic single disc
	Rear brake		Internal expanding shoe
	Caster angle		34° 00'
	Trail length		161 mm (6.3 in)
	Fuel tank capacity		14 liters (3.7 US gal, 3.1 Imp gal)
ENGINE	Cylinder arrangement		2 cylinders 52° V transverse
	Bore and stroke		79 x 76 mm (3.1 x 3.0 in)
	Displacement		745 cm^3 (45.4 cu-in)
	Compression ratio		9.6 : 1
	Valve train		Silent cam chain driven, OHC
	Intake valve	opens	Front: 0° BTDC (at 1 mm lift) Rear: 5° ATDC (at 1 mm lift)
		closes	25° ABDC (at 1 mm lift)
	Exhaust valve	opens	35° BBDC (at 1 mm lift)
		closes	Front: 0° ATDC (at 1 mm lift) Rear: 5° BTDC (at 1 mm lift)
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Viscous paper element
	Engine dry weight		72.3 kg (159.4 lbs)
	Firing order		Front - 308° - Rear - 412° - Front
	Cylinder number		Front: #2/Rear: #1
CARBURETOR	Type		Constant velocity (CV)
	Throttle bore		34 mm (1.3 in)

GENERAL INFORMATION

ITEM			SPECIFICATIONS
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Cable operating
	Transmission		Constant mesh, 5-speeds
	Primary reduction		1.763 (67/38)
	Secondary reduction		0.892 (33/37)
	Third reduction (Output drive reduction)		1.059 (18/17)
	Final reduction		3.091 (34/11)
	Gear ratio	1st	2.400 (36/15)
		2nd	1.550 (31/20)
		3rd	1.174 (27/23)
		4th	0.960 (24/25)
		5th	0.852 (23/27)
	Gearshift pattern		Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system		Full transistorized ignition
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		SCR shorted/triple phase full-wave rectification
	Lighting system		Battery

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.5 liters (2.64 US qt, 2.20 Imp qt)	–
	After draining/filter change	2.6 liters (2.75 US qt, 2.29 Imp qt)	–
	After disassembly	3.2 liters (3.38 US qt, 2.82 Imp qt)	–
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	–
Oil pressure at oil pressure switch		530 kPa (5.4 kgf/cm², 77 psi) at 5,000 rpm/(80°C/176°F)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.08 (0.001 – 0.003)	0.10 (0.004)

FUEL SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	49 State and Canada type	VE5BA
	California type	VE5BB
Main jet	Standard	#125
	High altitude	#122
Slow jet		#50
Pilot screw	Initial/final opening	page 5-25
	High altitude adjustment	page 5-26
Float level		18.5 mm (0.73 in)
Idle speed		1,200 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.58 liters (1.67 US qt, 1.39 Imp qt)
	Reserve tank	0.38 liter(0.40 US qt, 0.33 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum at 95 °C (203 °F)
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		1:1 mixture with distilled water

CYLINDER HEAD/VALVE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 rpm			1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Camshaft	Cam lobe height	IN	37.188 – 37.348 (1.4641 – 1.4704)	37.16 (1.463)
		EX	37.605 – 37.765 (1.4805 – 1.4868)	37.58 (1.480)
	Runout		–	0.05 (0.002)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
	Oil clearance		0.020 – 0.141 (0.0008 – 0.0055)	0.16 (0.006)
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.83 (0.466)
	Rocker arm I.D.	IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
	Rocker arm-to-shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.07 (0.003)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.45 (0.215)
		EX	5.455 – 5.470 (0.2148 – 0.2154)	5.41 (0.213)
	Valve guide I.D.	IN	5.500 – 5.510 (0.2165 – 0.2169)	5.56 (0.219)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
	Stem-to-guide clearance	IN	0.010 – 0.035 (0.0004 – 0.0014)	0.10 (0.004)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	17.2 – 17.4 (0.677 – 0.685)	–
		EX	18.7 – 18.9 (0.736 – 0.744)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring	Free length	IN	42.14 (1.659)	40.58 (1.598)
		EX	46.11 (1.815)	44.72 (1.761)
Cylinder head warpage			–	0.10 (0.004)

CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out of round		–	0.06 (0.002)
	Taper		–	0.06 (0.002)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston rings	Piston O.D. at 17 mm (0.7 in) from bottom		78.97 – 78.99 (3.109 – 3.110)	78.90 (3.106)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.15 – 0.25 (0.006 – 0.010)	0.4 (0.02)
		Second	0.25 – 0.40 (0.010 – 0.016)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.80 (0.008 – 0.031)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.07 (0.003)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.034 (0.7093 – 0.7100)	18.07 (0.711)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever free play			10 – 20 (3/8 – 3/4)	–
Clutch	Spring free length		45.3 (1.78)	43.9 (1.73)
	Disc thickness	Disc A	2.62 – 2.78 (0.103 – 0.107)	2.3 (0.09)
		Disc B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide		I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
		O.D.	31.959 – 31.975 (1.2582 – 1.2588)	31.92 (1.257)
Mainshaft O.D. at clutch outer guide			21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)
Clutch outer guide-to-mainshaft clearance			0.011 – 0.049 (0.0004 – 0.0019)	0.08 (0.003)
Clutch outer I.D.			32.000 – 32.025 (1.2598 – 1.2608)	32.09 (1.263)
Clutch outer-to-outer guide clearance			0.025 – 0.066 (0.0010 – 0.0026)	0.18 (0.007)
Oil pump drive sprocket I.D.			32.145 – 32.025 (1.2655 – 1.2608)	32.16 (1.266)
Oil pump drive sprocket-to-clutch outer guide clearance			0.066 – 0.17 (0.0026 – 0.0067)	0.23 (0.009)

ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.414 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)

CRANKSHAFT/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)
	Crankshaft runout		–	0.03 (0.001)
	Main journal O.D.		52.982 – 53.000 (2.0859 – 2.0866)	52.976 (2.0857)
Main journal I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)
Shift fork, fork shaft	I.D.		13.000 – 13.018 (0.5118 – 0.5125)	13.03 (0.513)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D.			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)
Shift drum journal I.D.			12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Shift drum-to-shift drum journal clearance			0.016 – 0.042 (0.0006 – 0.0017)	0.09 (0.035)
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C4	31.000 – 31.025 (1.2204 – 1.2215)	31.05 (1.222)
		C2	24.000 – 24.021 (0.9449 – 0.9458)	24.04 (0.946)
	Gear busing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C1, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C2	23.959 – 23.980 (0.9433 – 0.9441)	23.94 (0.943)
	Gear-to-bushing clearance	M3, M5, C2	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C1, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
		C2	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
	Mainshaft O.D.	at M3	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	at C2	19.980 – 19.993 (0.7866 – 0.7871)	19.96 (0.786)
	Bushing-to-shaft clearance	M3	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.007 – 0.041 (0.0003 – 0.0016)	0.07 (0.003)
Output drive train	Output gear I.D.		24.000 – 24.021 (0.9449 – 0.9457)	24.04 (0.946)
	Output gear bushing	O.D.	23.959 – 23.980 (0.9433 – 0.9441)	23.70 (0.933)
		I.D.	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
	Output drive gear shaft O.D.		19.979 – 20.000 (0.7866 – 0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020 – 0.042 (0.0008 – 0.0016)	0.08 (0.003)
	Output gear damper spring free length		62.3 (2.45)	59 (2.32)
	Output drive gear backlash		0.08 – 0.23 (0.003 – 0.009)	0.40 (0.016)
	Backlash difference between measurements		–	0.10 (0.004)

FINAL DRIVE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	After draining	160 cm^3 (5.4 US oz, 5.6 Imp oz)	–
	After disassembly	170 cm^3 (5.7 US oz, 6.0 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurements		–	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–
Final drive gear assembly preload		0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·ft)	–

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm², 29 psi)	–
	Up to maximum weight capacity	200 kPa (2.00 kgf/cm², 29 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	367.8 (14.48)	360.4 (14.19)
	Tube runout	–	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	–
	Fluid level	105 (4.1)	–
	Fluid capacity	469 ± 2.5 cm³ (15.9 ± 0.08 US oz, 16.5 ± 0.09 Imp oz)	–
Steering head bearing preload		8.8 – 12.7 N (0.9 – 1.3 kgf, 6.5 – 9.4 lbf)	–

REAR WHEEL/BRAKE/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm², 29 psi)	–
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm², 36 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	70 g (2.5 oz) max.
Rear brake	Drum I.D.	180.0 – 180.3 (7.09 –7.10)	181 (7.13)
	Lining thickness	4.4 – 4.7 (0.17 – 0.19)	2.1 (0.08)
Brake pedal height		75 mm (3.0 in) above the top of the footpeg	–
Brake pedal free play		20 – 30 (3/4 – 1-1/4)	–
Shock absorber spring preload adjuster setting		2nd position	–

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Specified brake fluid		DOT 4	–
Front	Brake disc thickness	5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc wrapage	–	0.30 (0.012)
	Master cylinder I.D.	11.000 – 11.043 (0.4331 – 0.4348)	11.05 (0.435)
	Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0023)
	Caliper piston O.D.	25.335 – 25.368 (0.9974 – 0.9987)	25.320 (0.9968)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 10Ah or 12V – 11Ah
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		346 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	DPR6EA-9 (NGK), X20EPR-U9 (DENSO)
	For extended high speed riding	DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F"mark)		13° BTDC at idle
Throttle position sensor	Resistance (20 °C/68 °F)	4 – 6 kΩ
	Input voltage	5 V

ELECTRIC STARTER/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	6.5 (0.26)

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight	12 V – 60/55 W
	Brake/taillight	12 V – 21/5 W
	License light	12 V – 5 W
	Front turn signal/position light	12 V – 21/5 W x 2
	Rear turn signal light	12V – 21 W x 2
	Instrument light	LED x 5
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	Coolant temperature indicator	LED
Fuse	Main fuse	30 A
	Sub fuse	10 A x 5, 5 A x 1
Thermostatic switch	Start to close (ON)	112 – 118°C (234 – 244°F)
	Stop to open (OFF)	108°C (226°F) minimum
Fan motor switch	Start to close (ON)	98 – 102°C (208 – 216°F)
	Stop to open (OFF)	93 – 97°C (199 – 207°F)

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	4.9 (0.5, 3.6)	5 mm screw	3.9 (0.4, 2.9)
6 mm bolt and nut	9.8 (1.0, 7)	6 mm screw	8.8 (0.9, 6.5)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	9.8 (1.0, 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

ENGINE & FRAME TORQUE VALUES

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

NOTE:

1. Apply oil to the threads and seating surface.
2. Apply grease to the threads.
3. Apply locking agent to the threads.
4. Apply sealant to the threads.
5. Lock nut: replace with a new one and stake it.
6. ALOC bolt or screw: replace with a new one.
7. U-nut.
8. Left hand threads

ENGINE

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Left crankcase rear cover socket bolt	1	6	9.8 (1.0, 7)	
Exhaust pipe joint stud bolt	4	8	–	page 1-16

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	12	16 (1.6, 12)	
Timing hole cap	1	14	9.8 (1.0, 7)	NOTE 2
Crankshaft hole cap	1	30	15 (1.5, 11)	NOTE 2
Valve adjusting screw lock nut	6	7	23 (2.3, 17)	NOTE 1
Engine oil filter cartridge	1	20	26 (2.7, 20)	
Oil filter boss (stud side)	1	20	18 (1.8, 13)	NOTE 3
Engine oil drain bolt	1	14	29 (3.0, 22)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 4
Oil pressure switch terminal screw	1	4	2.0 (0.2, 1.4)	
Oil pump assembly bolt	3	6	13 (1.3, 9)	

GENERAL INFORMATION

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
PAIR check valve cover bolt	4	5	6.9 (0.7, 5.1)	
Carburetor insulator band screw	2	5	–	page 1-16

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump cover bolt	5	6	13 (1.3, 9)	

CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	4	6	9.8 (1.0, 7)	
Cylinder head bolt	2	6	12 (1.2, 9)	NOTE 1
Cylinder head bolt	4	8	23 (2.3, 17)	NOTE 1
Cylinder head nut	8	10	47 (4.8, 35)	NOTE 1
Cam sprocket bolt	4	7	23 (2.3, 17)	NOTE 3
Cam chain tensioner bolt	4	6	9.8 (1.0, 7)	
Camshaft holder bolt	6	8	23 (2.3, 17)	
Camshaft holder nut	4	8	23 (2.3, 17)	
Over head cover socket bolt	8	6	9.8 (1.0, 7)	
Alternator cover socket bolt	3	6	9.8 (1.0, 7)	

CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder stud bolt	2	8	–	page 1-16
Cylinder stud bolt	8	10	–	page 1-16

CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lifter plate bolt	4	6	12 (1.2, 9)	
Clutch center lock nut	1	18	127 (13.0, 94)	NOTE 1, 5
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 3
Clutch cover socket bolt	5	6	9.8 (1.0, 7)	
Primary drive gear bolt	1	12	88 (9.0, 65)	NOTE 1
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel bolt	1	12	127 (13.0, 94)	NOTE 8
Stator socket bolt	3	6	12 (1.2, 9)	NOTE 3
Starter one-way clutch outer socket bolt	6	8	29 (3.0, 22)	NOTE 3
Stator wire holder socket bolt	1	6	12 (1.2, 9)	NOTE 3

CRANKSHAFT/TRANSMISSION

ITEM		Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankcase bolt		15	8	23 (2.3, 17)	
Shift drum cam plate bolt		1	6	12 (1.2, 9)	NOTE 3
Crank pin bearing cap nut		4	4	33 (3.4, 25)	NOTE 1
Output gear case mounting bolt		3	8	31 (3.2, 23)	NOTE 4
Output drive gear bearing holder bolt		2	8	31 (3.2, 23)	NOTE 1
Output driven gear bearing holder socket bolt		4	8	31 (3.2, 23)	NOTE 1
Output drive gear bearing lock nut	(inner)	1	30	74 (7.5, 54)	NOTE 1, 5
	(outer)	1	64	98 (10.0, 72)	NOTE 1, 5
Output driven gear bearing lock nut	(inner)	1	30	74 (7.5, 54)	NOTE 1, 5
	(outer)	1	64	98 (10.0, 72)	NOTE 1, 5
Output drive gear shaft bolt		1	10	49 (5.0, 36)	NOTE 1

ELECTRIC STARTER/STARTER CLUTCH

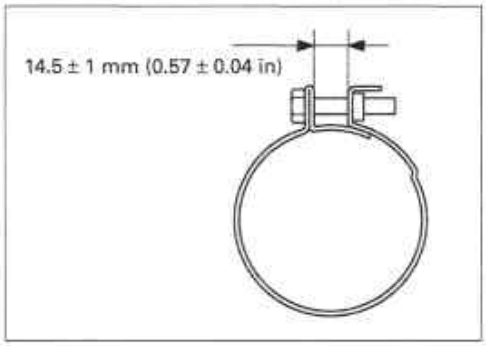
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor cable terminal nut	1	6	9.8 (1.0, 7)	

LIGHTS/METERS/SWITCHES

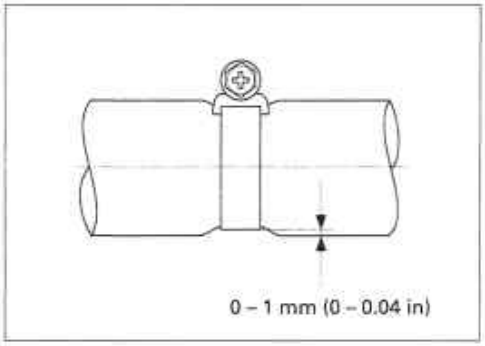
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Neutral switch	1	10	12 (1.2, 9)	

GENERAL INFORMATION

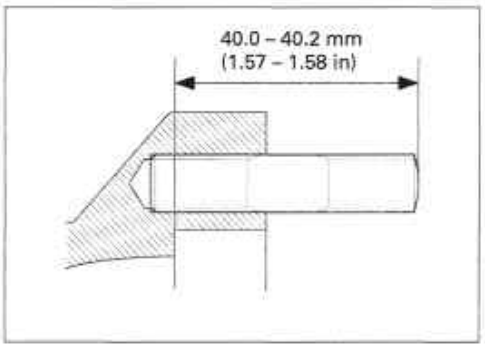
Insulator clamp:



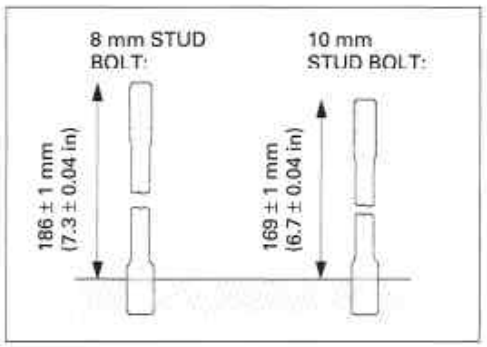
Water hose clamp:



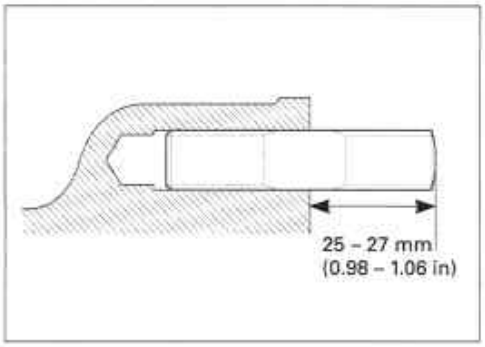
Exhaust pipe joint stud bolt:



Cylinder stud bolt:



Final gear case stud bolt:



GENERAL INFORMATION

FRAME

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Main seat mounting socket bolt	2	8	26 (2.7, 20)	
Rear seat mounting socket bolt	1	6	12 (1.2, 9)	NOTE 6
Grab rail mounting bolt	6	10	64 (6.5, 47)	
Fuel tank mounting bolt	1	8	26 (2.7, 20)	
Fuel valve nut	1	22	34 (3.5, 25)	
Fuel valve lever screw	1	5	0.6 (0.06, 0.4)	NOTE 6
Exhaust pipe joint nut	4	8	25 (2.5, 18)	
Muffler mounting bolt	2	8	26 (2.7, 20)	
Muffler bracket bolt	2	10	44 (4.5, 33)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Air cleaner cover socket bolt	5	5	2.0 (0.2, 1.4)	
Final drive oil filler cap	1	30	12 (1.2, 9)	
Final drive oil drain bolt	1	8	12 (1.2, 9)	

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Air cleaner chamber stay mounting screw	1	5	1.0 (0.1, 0.7)	
Air cleaner housing connecting tube band screw	1	4	1.0 (0.1, 0.7)	
Air cleaner chamber connecting tube band screw	1	4	1.0 (0.1, 0.7)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fan motor mounting bolt	1	5	4.9 (0.5, 3.6)	
Cooling fan mounting nut	1	5	2.9 (0.3, 2.2)	NOTE 3
Radiator filler mounting bolt	2	6	9.8 (1.0, 7)	
Thermostat housing cover bolt	2	6	9.8 (1.0, 7)	
Water hose band screw	6	–	–	page 1-16
Fan motor shroud mounting bolt	3	6	8.8 (0.9, 6.5)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine mounting nut	4	10	54 (5.5, 40)	
Engine hanger plate bolt	8	8	26 (2.7, 20)	
Main footpeg bracket mounting bolt	3	10	39 (4.0 29)	
Main footpeg bracket mounting nut	1	10	39 (4.0 29)	
Gearshift arm pinch bolt	1	6	12 (1.2 9)	

CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Gearshift pedal pivot bolt	1	10	39 (4.0, 29)	

FINAL DRIVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Pinion retainer	1	64	108 (11.0, 80)	
Pinion retainer lock tab bolt	1	6	9.8 (1.0, 7)	
Pinion joint nut	1	16	108 (11.0, 80)	NOTE 3
Dust guard plate bolt	1	6	9.8 (1.0, 7)	
Gear case cover bolt	2	10	47 (4.8, 35)	NOTE 3
Gear case cover bolt	6	8	25 (2.6, 19)	
Final gear case assembly mounting nut	4	10	64 (6.5, 47)	
Final gear case stud bolt	4	10	–	page 1-17
Rear shock absorber lower mounting bolt (left side)	1	8	23 (2.3, 17)	

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lever bracket holder bolt	2	6	12 (1.2, 9)	page 14-10
Clutch lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Clutch lever pivot nut	1	6	5.9 (0.6, 4.3)	
Handlebar mounting nut	2	12	54 (5.5, 40)	
Front brake disc bolt	6	8	42 (4.3, 31)	NOTE 6
Spoke	52	BC4	3.9 (0.4, 2.9)	
Front axle	1	18	74 (7.5, 54)	
Front axle pinch bolt	2	8	22 (2.2, 16)	
Fork center socket bolt	2	10	29 (3.0, 22)	NOTE 3
Fork cap	2	38	22 (2.2, 16)	
Fork cover bolt	2	6	12 (1.2, 9)	
Fork cover bolt	2	8	26 (2.7, 20)	
Fork top bridge pinch bolt	2	8	26 (2.7, 20)	
Fork bottom bridge pinch bolt	2	10	49 (5.0, 36)	
Steering top thread	1	26	–	page 14-28
Steering top thread lock nut	1	26	–	page 14-28
Steering stem nut	1	24	103 (10.5, 76)	

REAR WHEEL/BRAKE/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spoke	52	BC4	3.9 (0.4, 2.9)	
Rear axle nut	1	18	88 (9.0, 65)	NOTE 7
Rear axle pinch bolt	1	8	26 (2.7, 20)	
Rear brake stopper arm nut	1	8	22 (2.2, 16)	
Rear brake arm pinch bolt	1	8	28 (2.9, 21)	
Rear shock absorber upper mounting bolt	2	8	26 (2.7, 20)	
Rear shock absorber lower mounting bolt (right side)	1	10	34 (3.5, 25)	
Stopper plate bolt	5	6	20 (2.0, 14)	NOTE 6
Swingarm left pivot bolt	1	30	103 (10.5, 76)	
Swingarm right pivot bolt	1	30	–	page 15-26
Swingarm right pivot bolt lock nut	1	30	103 (10.5, 76)	

GENERAL INFORMATION

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake caliper bleed valve	1	8	5.9 (0.6, 4.3)	
Front master cylinder reservoir cap screw	2	4	2.0 (0.2, 1.4)	
Brake pad pin	1	10	18 (1.8, 13)	
Brake pad pin plug	1	10	2.9 (0.3, 2.2)	
Brake hose oil bolt	2	10	34 (3.5, 25)	
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.3)	
Front brake light switch screw	1	4	1.0 (0.1, 0.7)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	page 16-13
Front brake caliper bracket pin	1	8	13 (1.3, 9)	NOTE 3
Front brake caliper pin	1	8	23 (2.3, 17)	NOTE 3
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	NOTE 6

BATTERY/CHARGING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Battery box cover screw	1	6	1.0 (0.1, 0.7)	

LIGHTS/METERS/SWITCHES

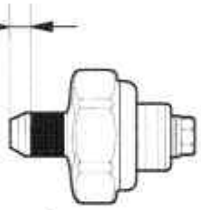
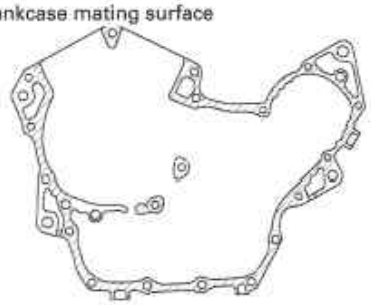
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Headlight unit mounting bolt	2	5	3.9 (0.4, 2.9)	
Brake/tail light mounting nut	3	6	5.9 (0.6, 4.3)	
Speedometer mounting socket bolt	2	6	9.8 (1.0, 7)	
Vehicle speed sensor mounting bolt	1	6	9.8 (1.0, 7)	
Ignition switch mounting bolt	2	6	12 (1.2, 9)	
Ignition switch cover screw	1	4	2.0 (0.2, 1.4)	
Fan motor switch	1	16	18 (1.8, 13)	
Side stand switch bolt	1	6	9.8 (1.0, 7)	
Thermostatic switch	1	PT 1/8	7.8 (0.8, 5.8)	
Horn mounting bolt	1	8	21 (2.1, 15)	

OTHERS

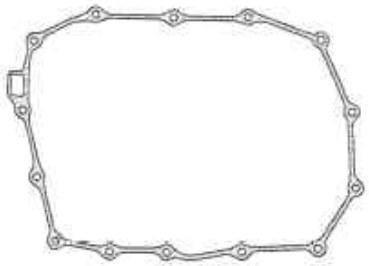
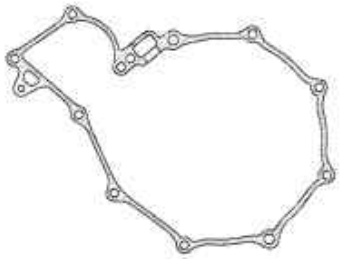
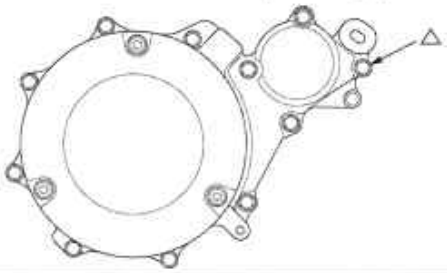
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Side stand pivot bolt	1	10	9.8 (1.0, 7)	
Side stand pivot lock nut	1	10	29 (3.0, 22)	
Side stand bracket bolt	2	10	49 (5.0, 36)	
Tool box screw	2	6	2.0 (0.2, 1.4)	

LUBRICATION & SEAL POINTS

ENGINE

LOCATION	MATERIAL	REMARKS
Camshaft lobes/journals Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Crankpin bearing surface Crankshaft journals Clutch outer guide outer surface Transmission gear shift fork groove Transmission bushing inner and outer surface Transmission spline bushing outer surface Connecting rod small end inner surface	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Piston outer surface Piston ring outer surface Piston pin outer surface Primary drive gear bolt threads and seating surface Flywheel bolt threads and seating surface Starter one-way clutch sprag Starter idle and reduction gear shaft outer surface Clutch center lock nut threads Clutch lifer arm-to-right crankcase cover sliding surface Clutch lifer piece-to-right crankcase cover sliding surface Clutch disc outer surface Cylinder stud bolt threads Valve stem seal Cylinder head 8 mm bolt threads and seating surface Valve adjusting screw lock nut threads and seating surface Connecting rod bolt/nut threads and seating surface Cylinder head mounting bolt and nut seating surface Transmission gear tooth Oil filter cartridge threads and O-ring Each bearings rotating area Each O-rings	Engine oil	
Crankshaft hole cap threads Timing hole cap threads Each oil seal lips	Multi-purpose grease	
Oil pressure switch threads 3 – 4 mm (0.1 – 0.2 in)  Right and left crankcase mating surface  Fan motor switch threads	Sealant	Do not apply to the sealant to the head 3 – 4 mm (0.1 – 0.2 in).

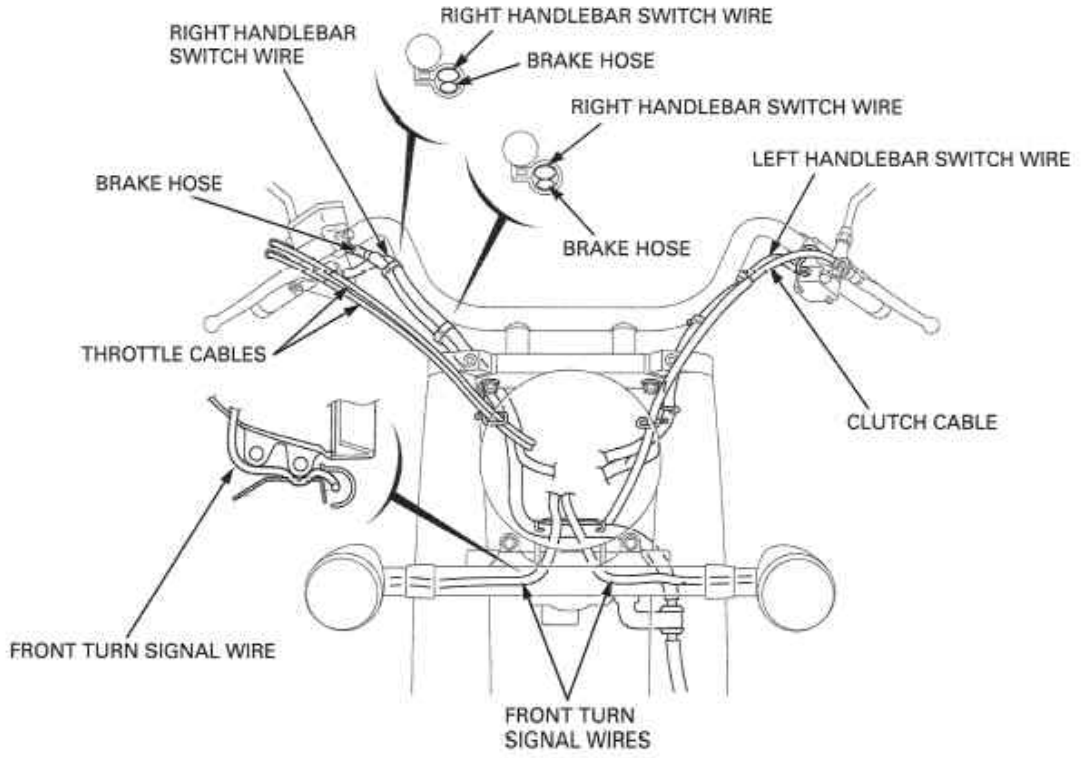
GENERAL INFORMATION

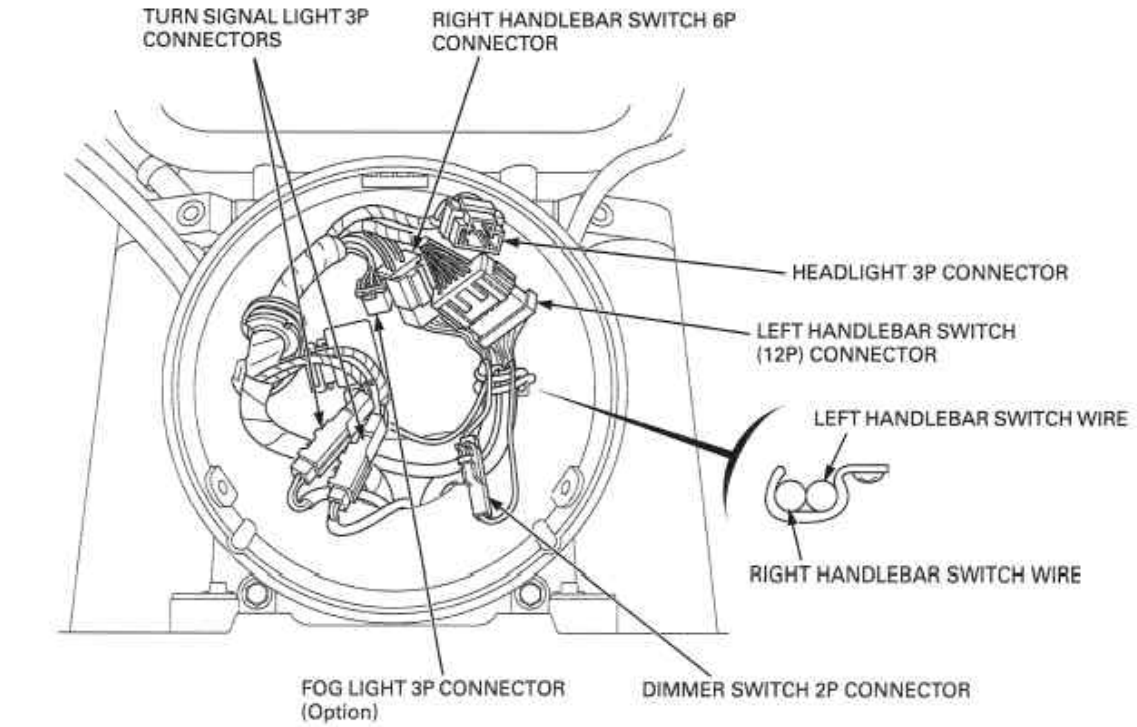
LOCATION	MATERIAL	REMARKS
Right crankcase cover mating surface  Left crankcase cover mating surface  Output gear case mounting bolt threads	Sealant	
Cam sprocket bolt threads Starter one-way clutch outer bolt threads Oil pump driven sprocket bolt threads Final gear case stud bolt threads (gear case side) Stator wire holder socket bolt threads Gearshift cam plate bolt threads Transmission bearing setting plate bolt threads Cam chain tensioner setting plate bolt threads Stator mounting bolt threads Oil filter boss crankcase side threads Ignition pulse generator bolt threads Left crankcase cover bolt threads (marked "△") 	Locking agent	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 mm
Cylinder head cover-to-gasket groove 	Pro Honda Hondabond HT or equivalent	

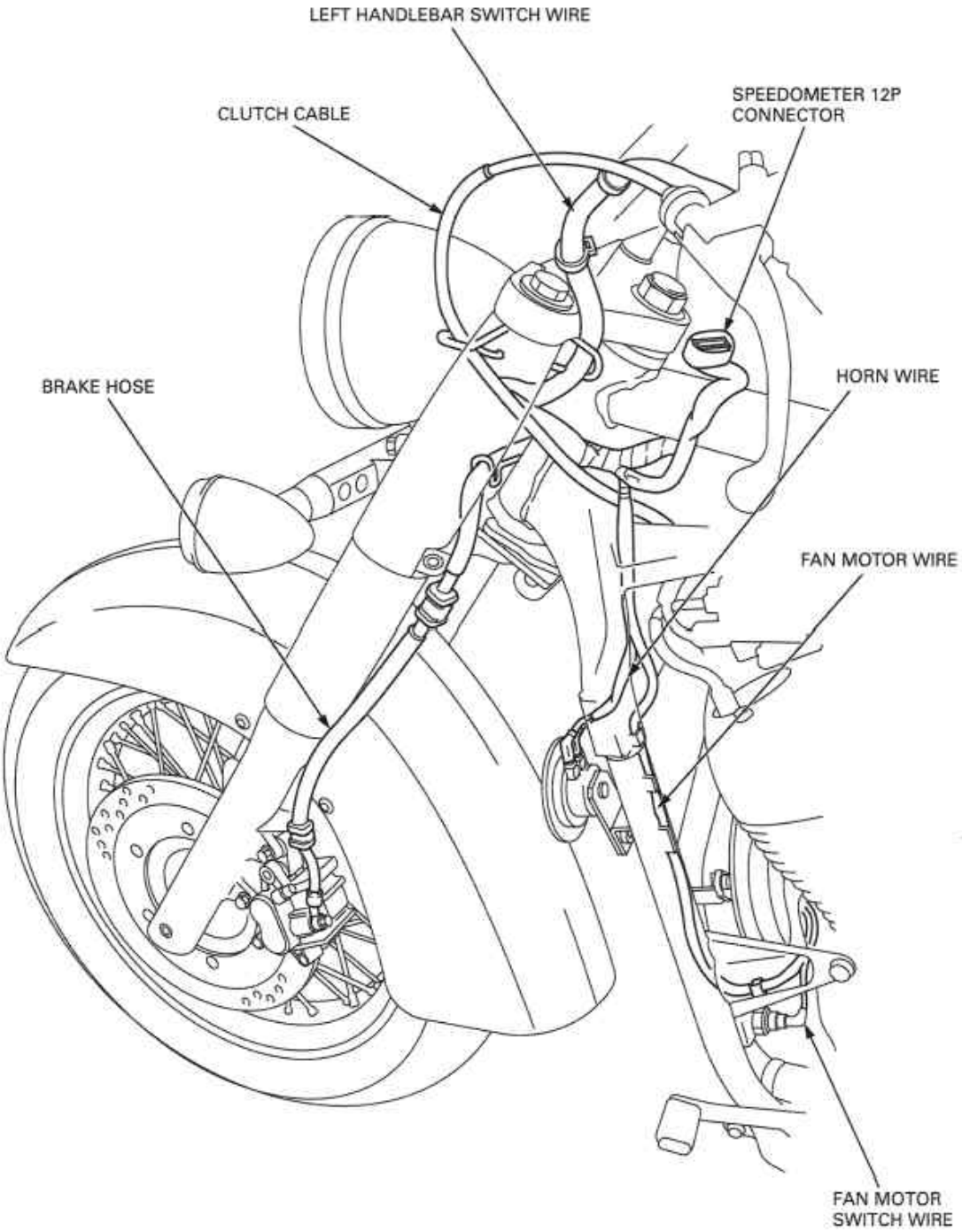
FRAME

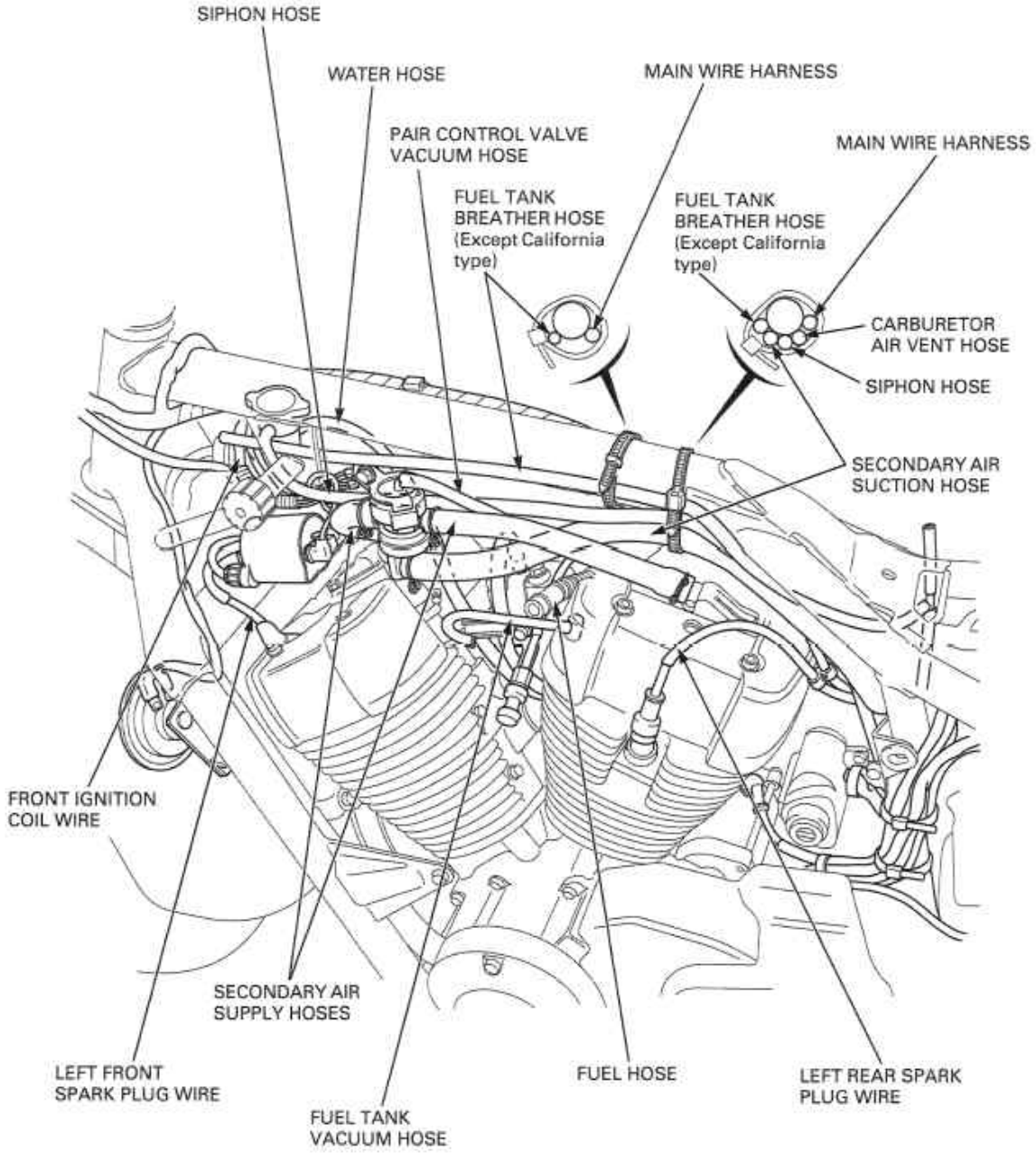
LOCATION	MATERIAL	REMARKS
Final gear case cover mating surface Thermostatic switch threads	Sealant	 Do not apply to the thread head.
Side stand pivot Main step sliding area Pillion step sliding area Throttle pipe flange and sliding surface Clutch lever pivot Gearshift pedal pivot Shock absorber mount inner surface Rear brake middle rod joint pivot Rear brake cam sliding surface Rear brake anchor pin sliding surface Brake pedal pivot sliding surface Front wheel dust seal lips Final gear case O-ring Final gear case oil seal lips	Multi-purpose grease	Apply 1 g Spreading 0.2 – 0.3 g Spreading 0.5 – 1.0 g Spreading 0.5 – 1.0 g
Steering head bearings Steering head bearing dust seal lips Swingarm pivot bearings Swingarm pivot dust seal lips	Urea based multi-purpose grease with extreme pressure (example: EXCELIGHT EP2 manufactured by KYODO YUSHI, Japan), Shell stamina EP2 or equivalent	Apply 3 – 5 g for each bearing Apply 1.0 – 1.5 g for each bearing
Universal joint bearings Drive shaft oil seal lip Drive shaft splines (universal joint side) Final drive pinion joint splines	Molybdenum disulfide grease	 Apply 0.5 g Apply 1 g Apply 2 g
Output shaft splines (universal joint side) Final driven flange-to-rear wheel hub mating surface Final driven flange O-ring Rear wheel hub O-ring groove Ring gear O-ring groove and spline Final driven flange sliding portion	Molybdenum disulfide paste	Apply 1 g Apply 0.5 – 1.0 g Apply 4 – 5 g Apply 2 – 3 g
Throttle cable outer inside Clutch cable outer inside Choke cable outer inside	Cable lubricant	
Handlebar grip rubber inside	Pro Honda Handgrip Cement or equivalent	
Steering bearing top threads Rear brake cam felt seal	Engine oil	
Brake lever pivot Brake lever-to-master piston contacting area Brake caliper slide pin sliding surface Brake caliper bracket pin sliding surface Brake caliper and bracket pin boot inside	Silicone grease	Apply 0.1 g Apply 0.1 g
Brake master piston and cups Brake caliper piston and piston seals	DOT 4 brake fluid	
Fork dust seal and oil seal lips Fork cap O-ring	Pro Honda Suspension Fluid SS-8	
Pinion joint nut threads Final gear case cover 10 mm bolt threads Fork center socket bolt threads Brake caliper bracket pin threads Brake caliper slide pin threads Final gear case stud bolt threads Steering stem cover bolt threads	Locking agent	

CABLE & HARNESS ROUTING

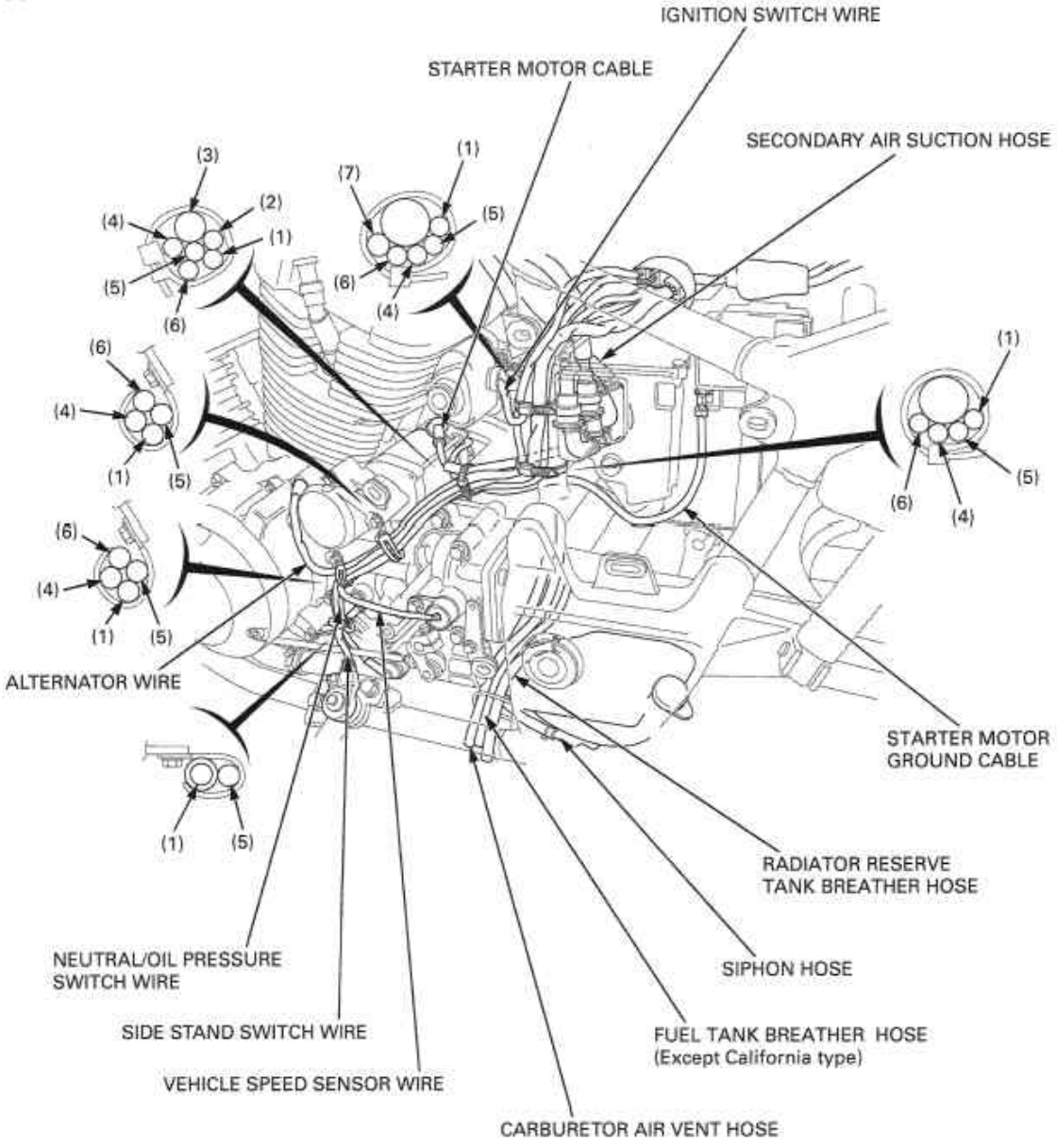


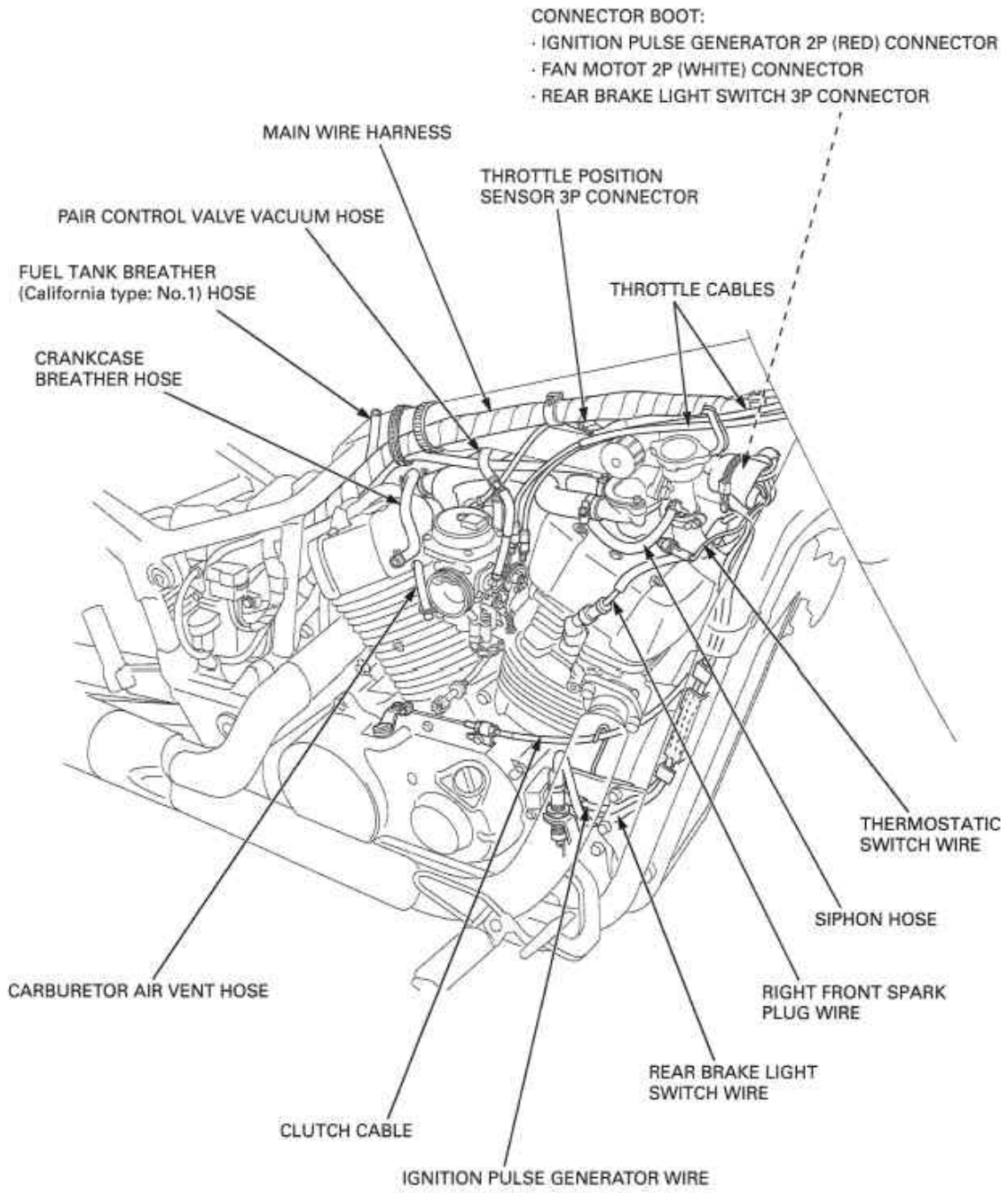


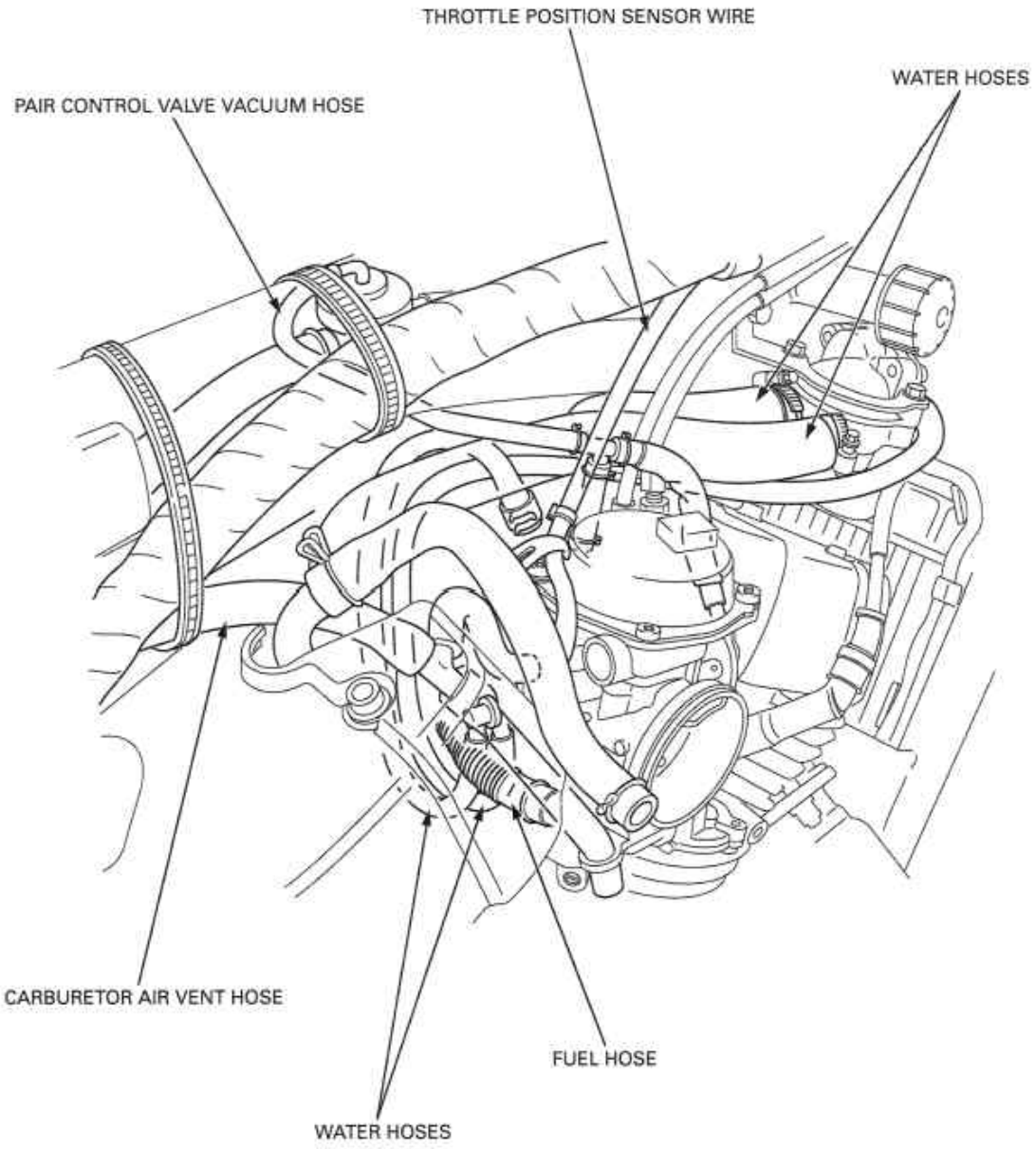

LEFT HANDLEBAR SWITCH WIRE
CLUTCH CABLE
SPEEDOMETER 12P CONNECTOR
BRAKE HOSE
HORN WIRE
FAN MOTOR WIRE
FAN MOTOR SWITCH WIRE

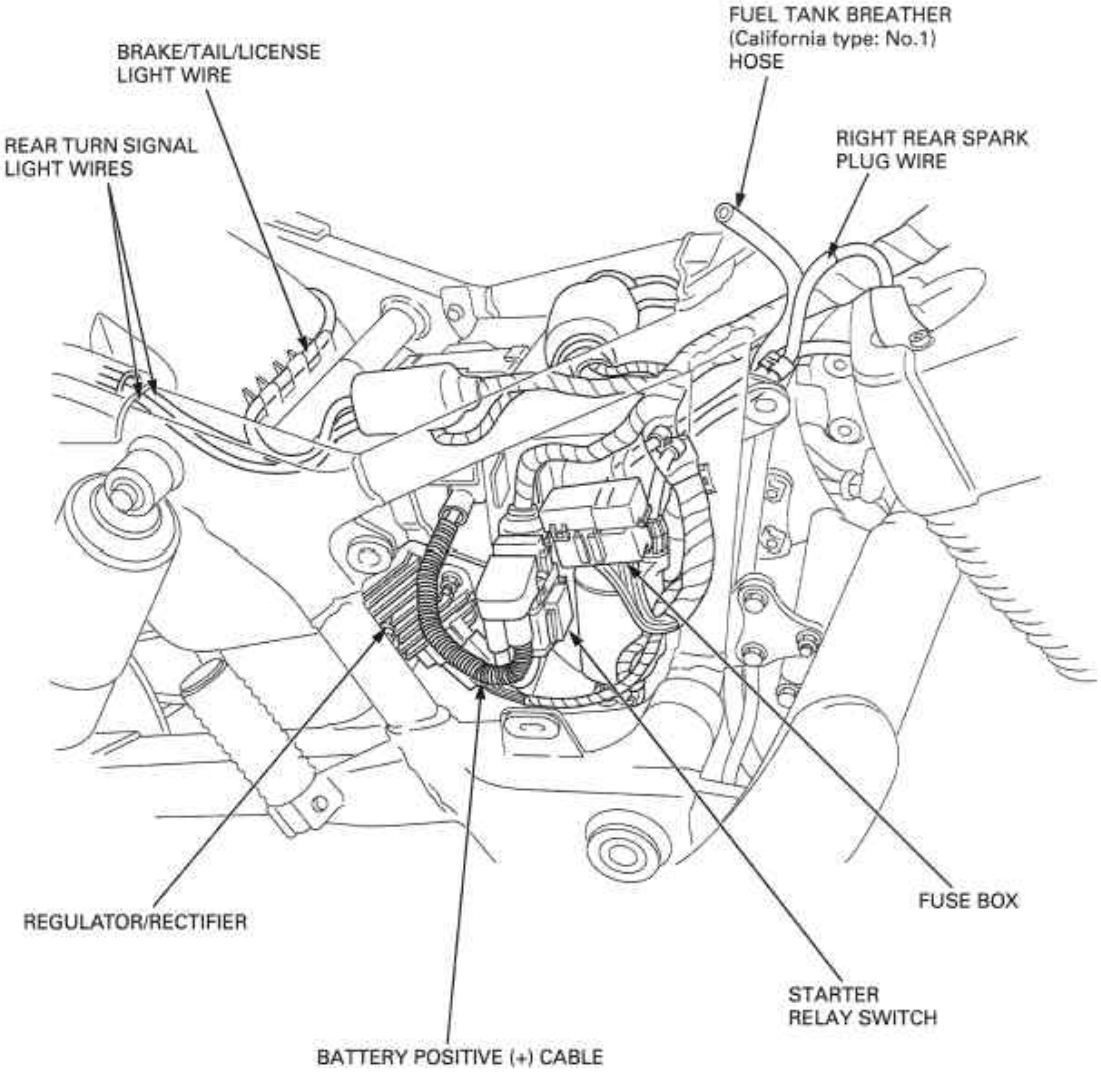

SIPHON HOSE
WATER HOSE
MAIN WIRE HARNESS
PAIR CONTROL VALVE VACUUM HOSE
MAIN WIRE HARNESS
FUEL TANK BREATHER HOSE (Except California type)
FUEL TANK BREATHER HOSE (Except California type)
CARBURETOR AIR VENT HOSE
SIPHON HOSE
SECONDARY AIR SUCTION HOSE
FRONT IGNITION COIL WIRE
SECONDARY AIR SUPPLY HOSES
LEFT FRONT SPARK PLUG WIRE
FUEL TANK VACUUM HOSE
FUEL HOSE
LEFT REAR SPARK PLUG WIRE

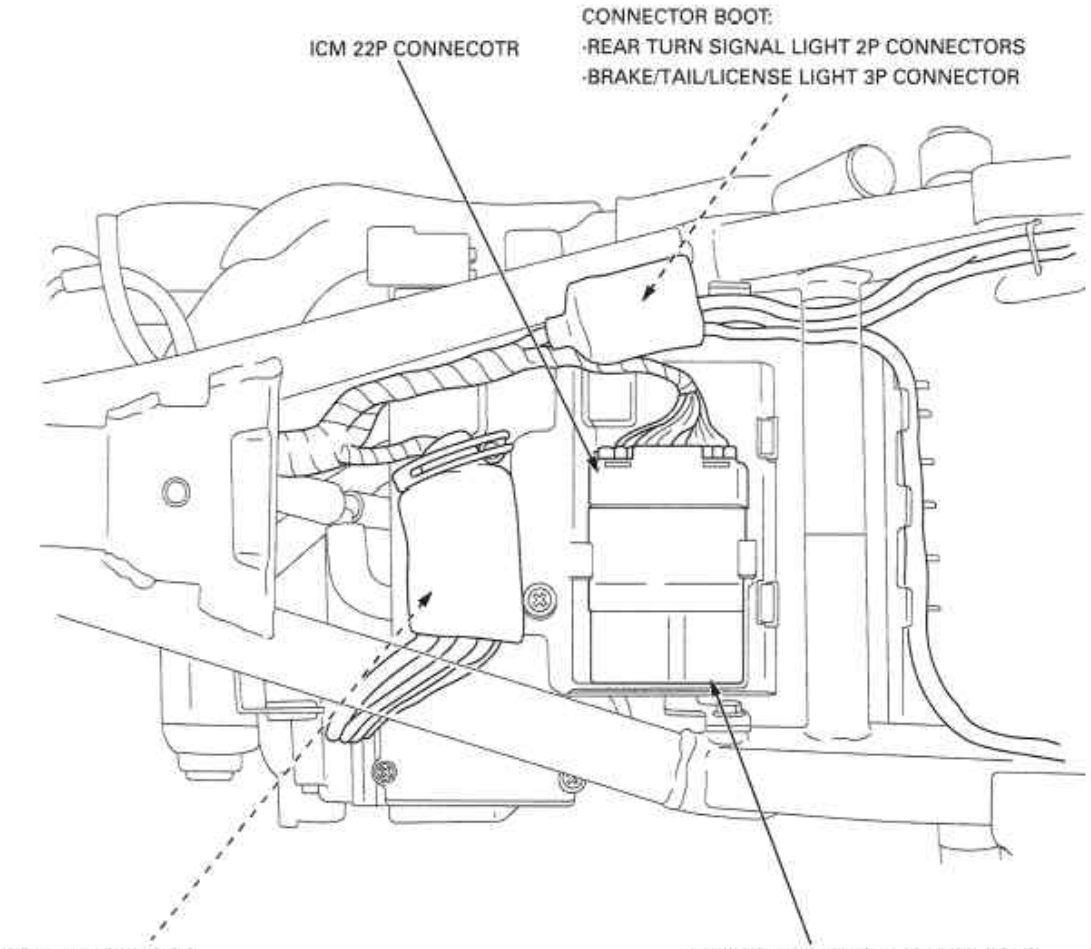
(1) SIDE STAND SWITCH WIRE
(2) GROUND CABLE
(3) STARTER MOTOR CABLE
(4) ALTERNATOR WIRE
(5) NEUTRAL/OIL PRESSURE SWITCH WIRE
(6) VEHICLE SPEED SENSOR WIRE
(7) IGNITION SWITCH WIRE

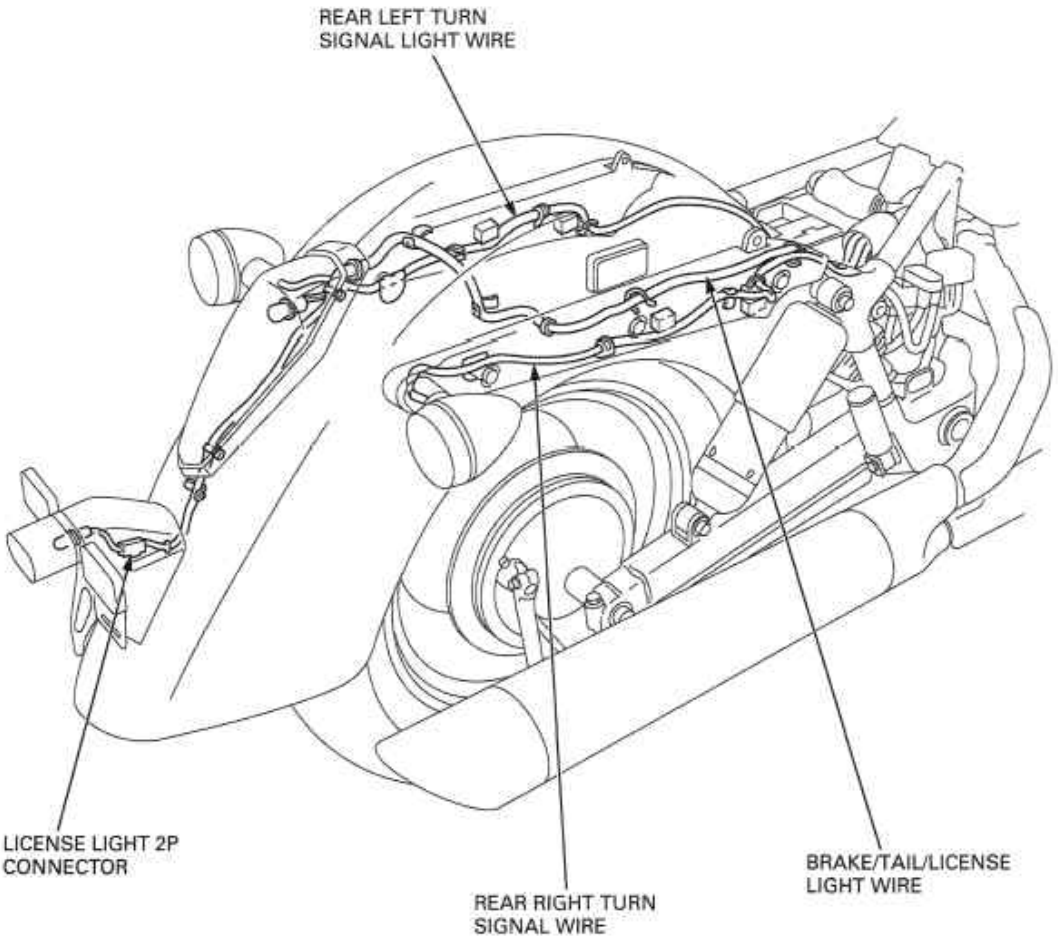



CONNECTOR BOOT:
· IGNITION PULSE GENERATOR 2P (RED) CONNECTOR
· FAN MOTOT 2P (WHITE) CONNECTOR
· REAR BRAKE LIGHT SWITCH 3P CONNECTOR
MAIN WIRE HARNESS
THROTTLE POSITION SENSOR 3P CONNECTOR
PAIR CONTROL VALVE VACUUM HOSE
FUEL TANK BREATHER (California type: No.1) HOSE
THROTTLE CABLES
CRANKCASE BREATHER HOSE
THERMOSTATIC SWITCH WIRE
SIPHON HOSE
CARBURETOR AIR VENT HOSE
RIGHT FRONT SPARK PLUG WIRE
REAR BRAKE LIGHT SWITCH WIRE
CLUTCH CABLE
IGNITION PULSE GENERATOR WIRE

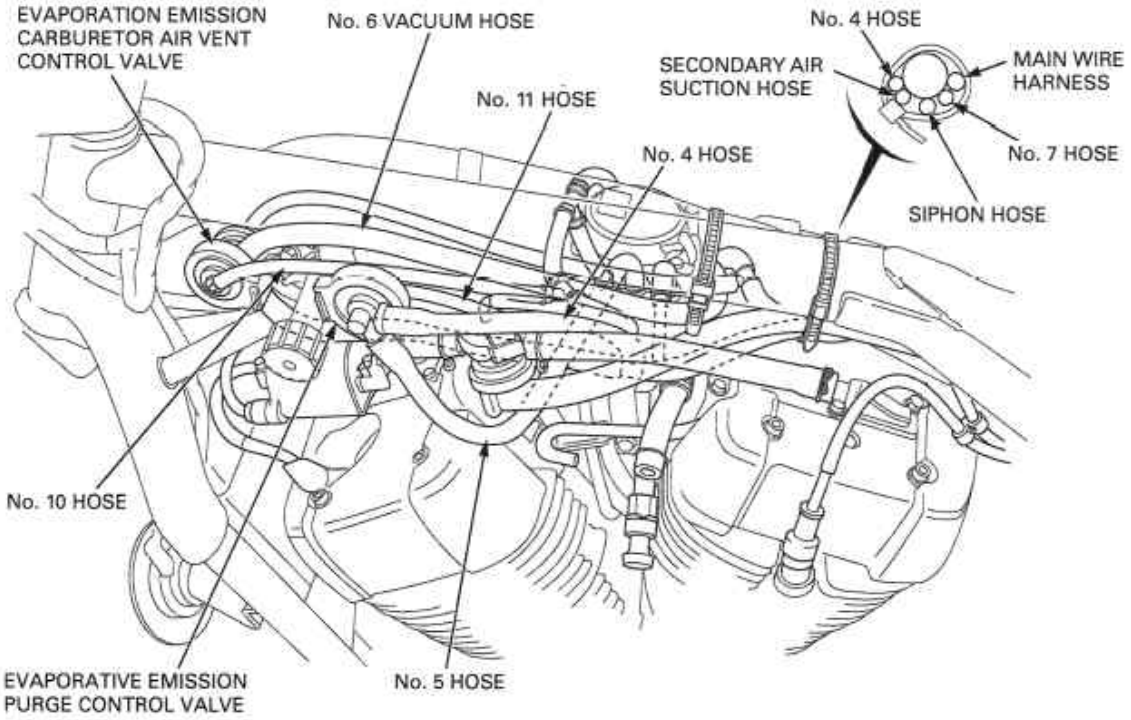

THROTTLE POSITION SENSOR WIRE
WATER HOSES
PAIR CONTROL VALVE VACUUM HOSE
CARBURETOR AIR VENT HOSE
FUEL HOSE
WATER HOSES

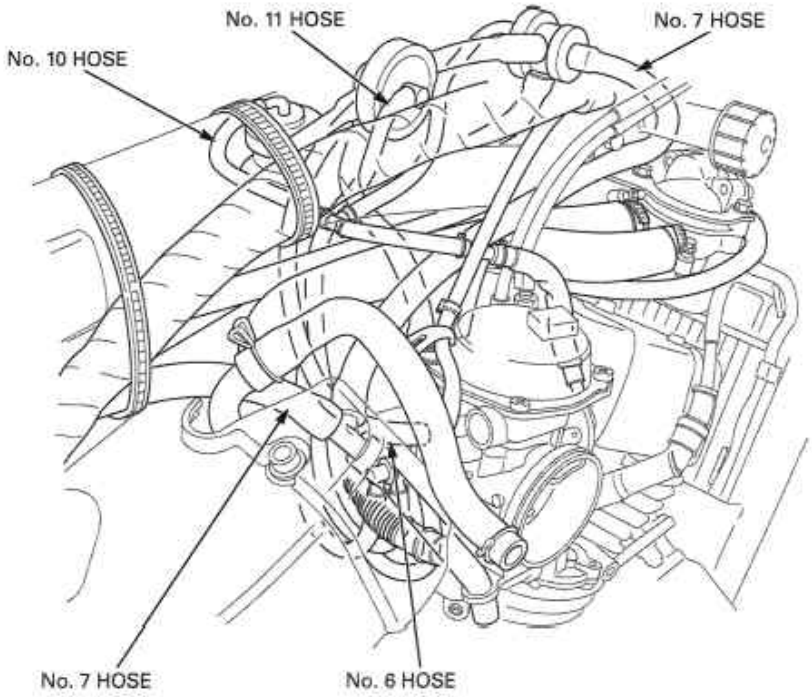

FUEL TANK BREATHER
(California type: No.1)
HOSE
BRAKE/TAIL/LICENSE
LIGHT WIRE
REAR TURN SIGNAL
LIGHT WIRES
RIGHT REAR SPARK
PLUG WIRE
REGULATOR/RECTIFIER
FUSE BOX
STARTER
RELAY SWITCH
BATTERY POSITIVE (+) CABLE

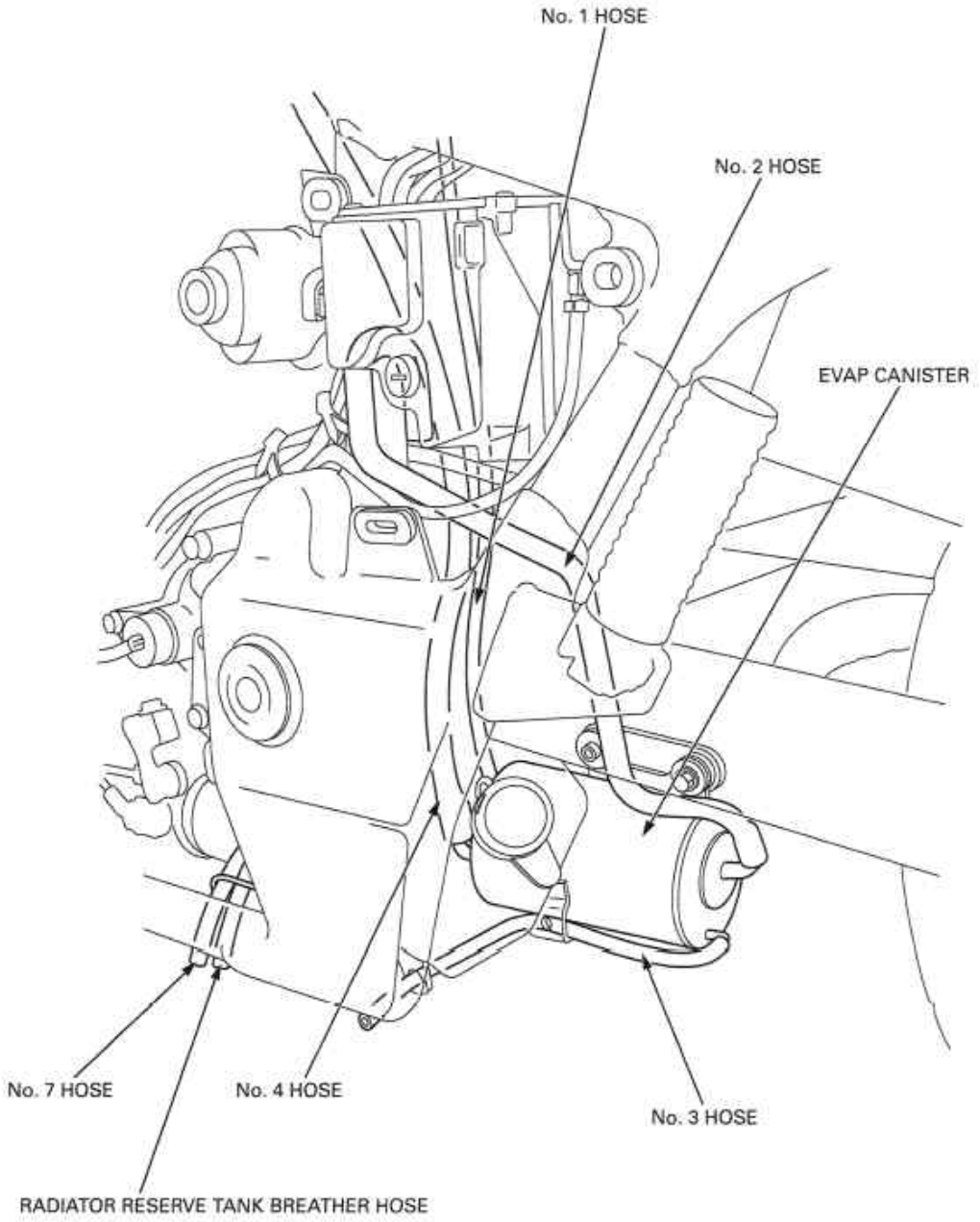

ICM 22P CONNECOTR
CONNECTOR BOOT:
·REAR TURN SIGNAL LIGHT 2P CONNECTORS
·BRAKE/TAIL/LICENSE LIGHT 3P CONNECTOR
CONNECTOR BOOT:
· IGNITION SWITCH 3P (BLACK) CONNECTOR
· SIDE STAND SWITCH 2P (GREEN) CONNECTOR
· SPEED SENSOR 3P (WHITE) CONNECTOR
· ALTERNATOR 3P (WHITE) CONNECTOR
· NEUTRAL/OIL PRESSURE SWITCH 2P (BLACK) CONNECTOR
IGNITION CONTROL MODULE (ICM)


REAR LEFT TURN
SIGNAL LIGHT WIRE
LICENSE LIGHT 2P
CONNECTOR
REAR RIGHT TURN
SIGNAL WIRE
BRAKE/TAIL/LICENSE
LIGHT WIRE

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (California type only)






No. 1 HOSE
No. 2 HOSE
EVAP CANISTER
No. 7 HOSE
No. 4 HOSE
No. 3 HOSE
RADIATOR RESERVE TANK BREATHER HOSE

EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency, Transport Canada and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

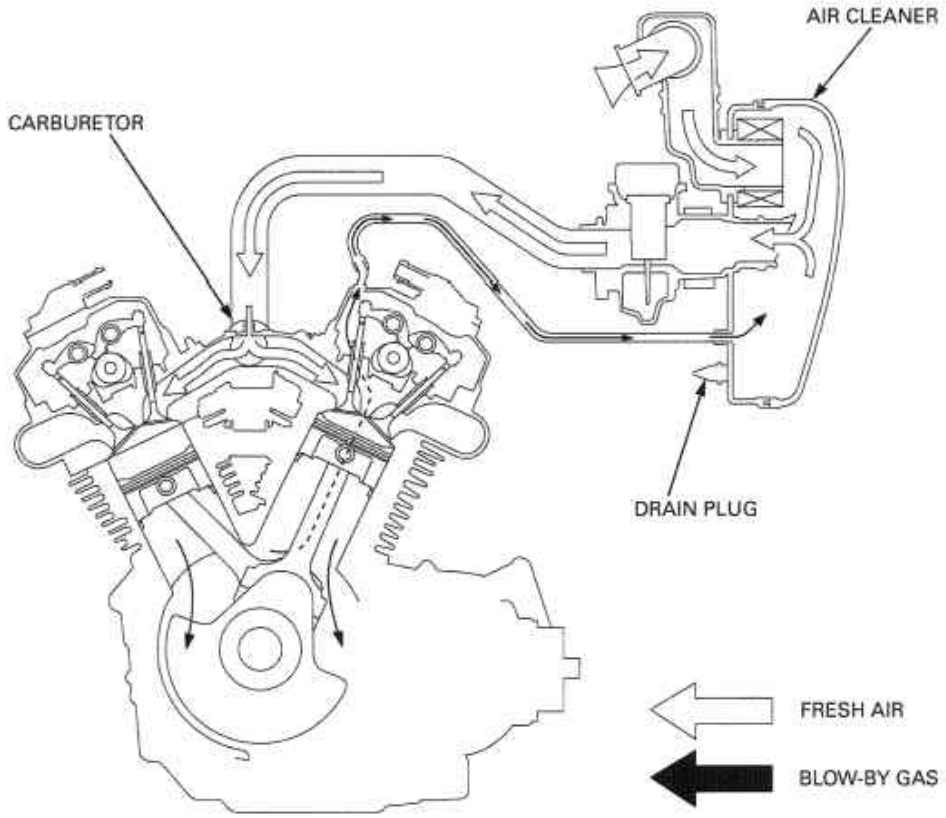
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, 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 lean carburetor settings as well as other systems, to reduce carbon monoxide, oxides of nitrogen and hydrocarbons.

CRANKCASE EMISSION CONTROL SYSTEM

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



GENERAL INFORMATION

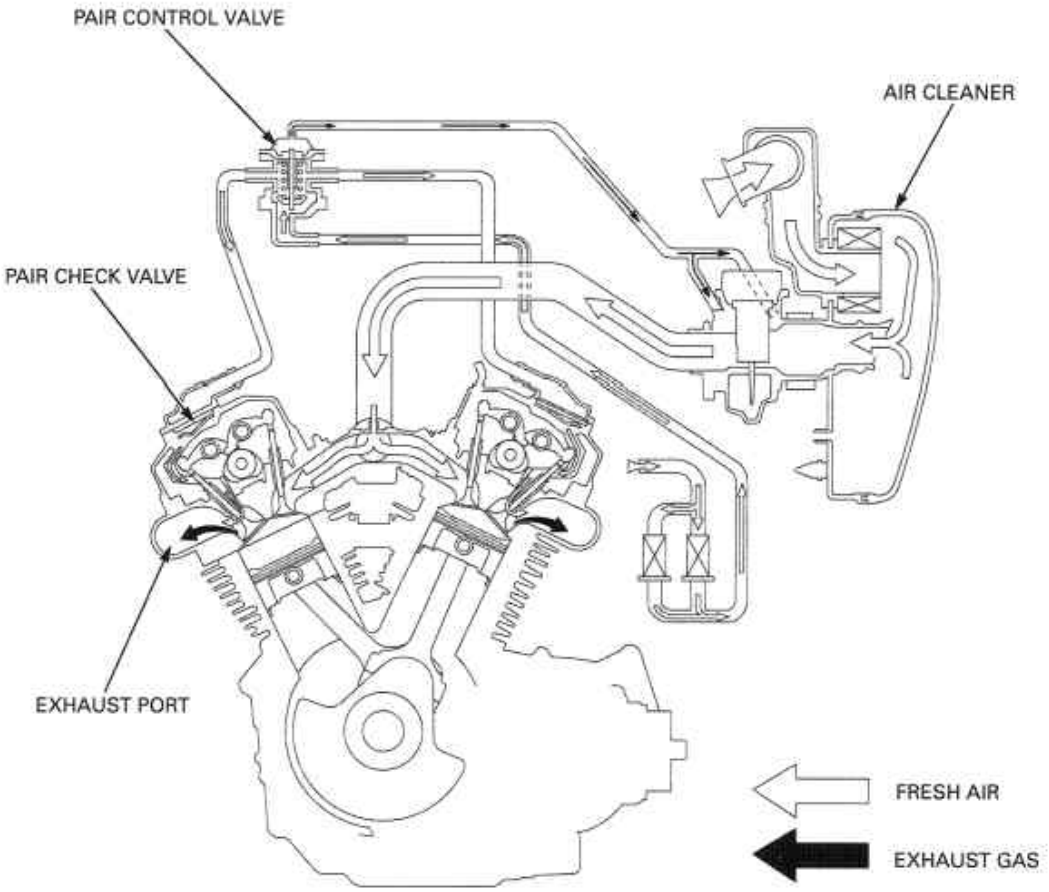
EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

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

The exhaust emission control system 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 by the function of the Pulse Secondary Air Injection (PAIR) control valve.
This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

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

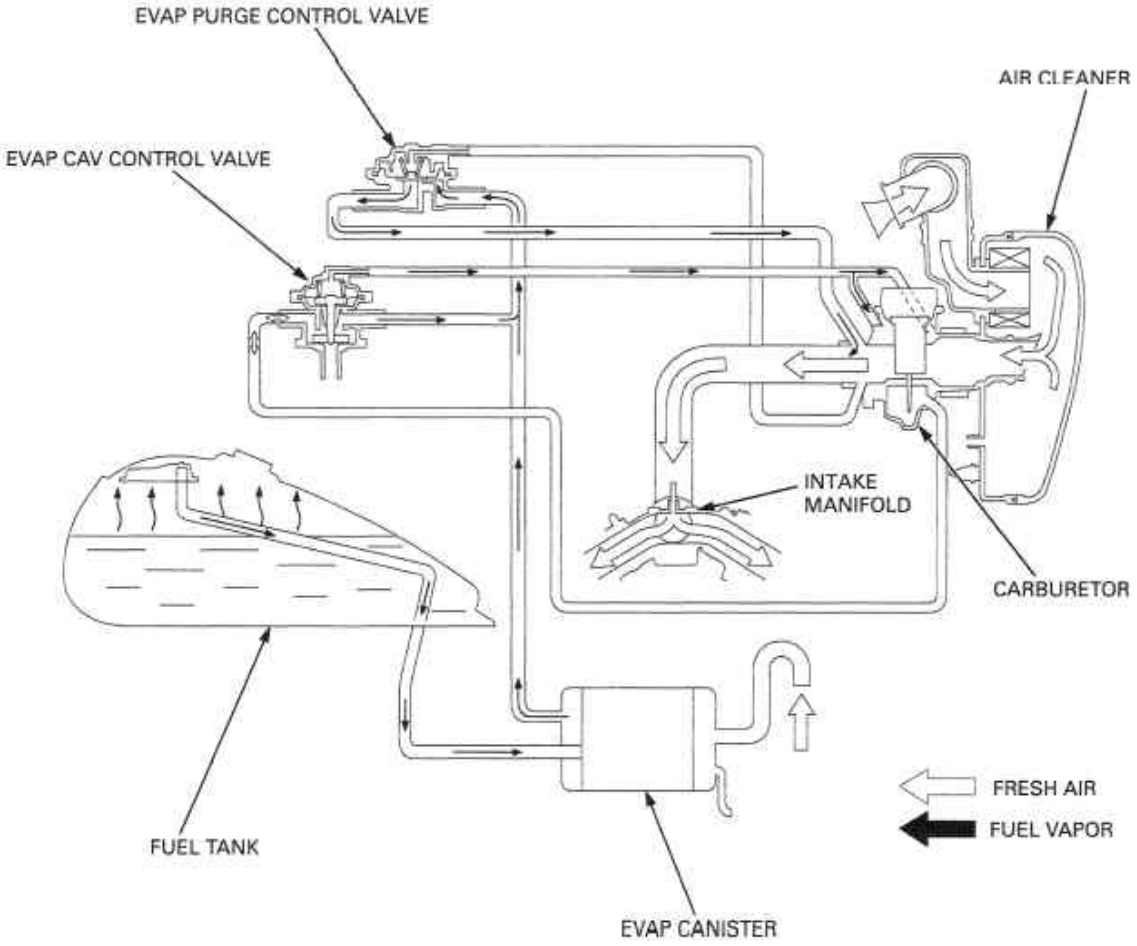
No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.



EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

This model complies with California Air Resources Board (CARB) evaporative emission requirements.

Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the EVAP purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the engine through the carburetor. At the same time, the EVAP carburetor air vent (CAV) control valve is open and air is drawn into the carburetor through the valve.



NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: U.S. Federal law prohibits, or Canadian provincial law may prohibit the following acts or the causing 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; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

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

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

EMISSION CONTROL INFORMATION LABELS

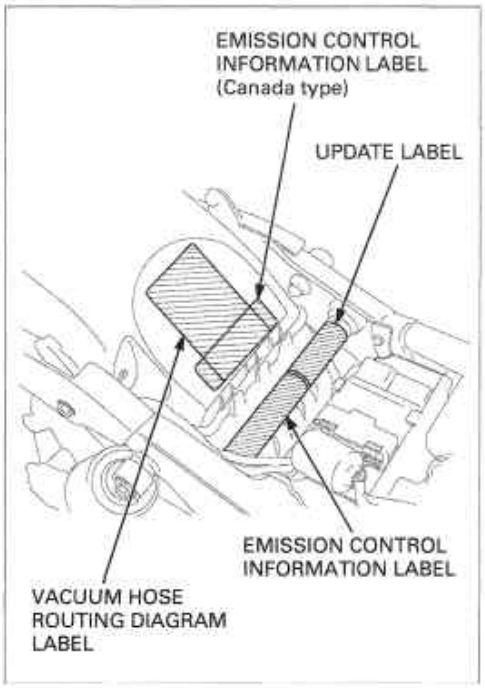
An Emission Control Information Label is located on the rear fender and frame cross pipe as shown.
It gives basic tune-up specifications.

VEHICLE EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment, attach an update label on the rear fender near the frame cross pipe as shown.

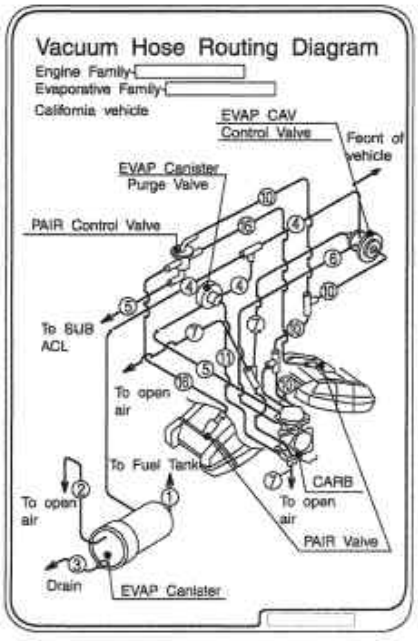
Instructions for obtaining the update label are given in Service Letter No. 132.

When readjusting the carburetor back to the low altitude specifications, be sure to remove this update label.



VACUUM HOSE ROUTING DIAGRAM LABEL (California type only)

The Vacuum Hose Routing Diagram Label is located on the rear fender near the frame cross pipe.



2. FRAME/BODY PANELS/EXHAUST SYSTEM

FRAME/BODY PANELS/EXHAUST SYSTEM

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 with new ones after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Main seat mounting socket bolt (8 mm)	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Rear seat mounting socket bolt (6 mm)	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt: replace with a new one
Grab rail mounting bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Fuel tank mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Fuel valve nut	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Left crankcase rear cover socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Exhaust pipe joint nut	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Muffler mounting nut	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Muffler bracket bolt	44 N·m (4.5 kgf·m, 33 lbf·ft)	
Exhaust pipe joint stud bolt	See page 2-10	

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

Poor performance
- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

SEAT

REMOVAL

Remove the 8 mm bolts, 6 mm bolt and seat assembly by moving it rearward.

INSTALLATION

Install the seat assembly by inserting its prong under the raised lip of the frame properly.

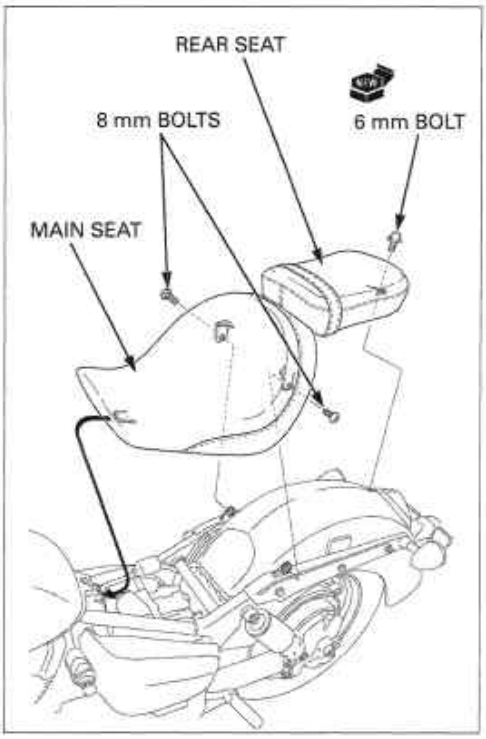
Do not reuse the rear seat mounting bolt.

Tighten the main and rear seat mounting bolts to the specified torque.

TORQUE:

Main seat mounting bolt (8 mm):
26 N·m (2.7 kgf·m, 20 lbf·ft)

Rear seat mounting bolt (6 mm):
12 N·m (1.2 kgf·m, 9 lbf·ft)



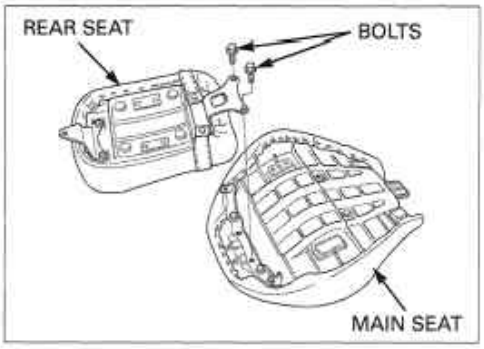
DISASSEMBLY/ASSEMBLY

Remove the seat assembly (page 2-3).

Remove the bolts and rear seat from the main seat.

Install the rear seat and tighten the bolts.

Install the seat assembly (page 2-3).



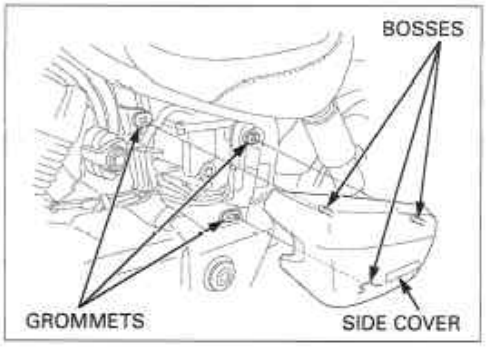
SIDE COVER

REMOVAL/INSTALLATION

Be careful not to damage the side cover bosses.

Remove the side cover by releasing its bosses from the frame grommets.

Install the side cover by inserting its bosses into the frame grommets.



FUEL TANK

REMOVAL

Remove the following:

- Speedometer assembly (page 20-10)
- Seat (page 2-3)

Turn the fuel valve to "OFF".
Disconnect the fuel and vacuum hoses from the fuel valve.
Disconnect the breather hose (California type: No.1 hose) from the fuel tank.

Remove the bolt, washer and collar.

Remove the fuel tank by moving it rearward.

INSTALLATION

Install the fuel tank by inserting its grooves over the mounting rubbers.

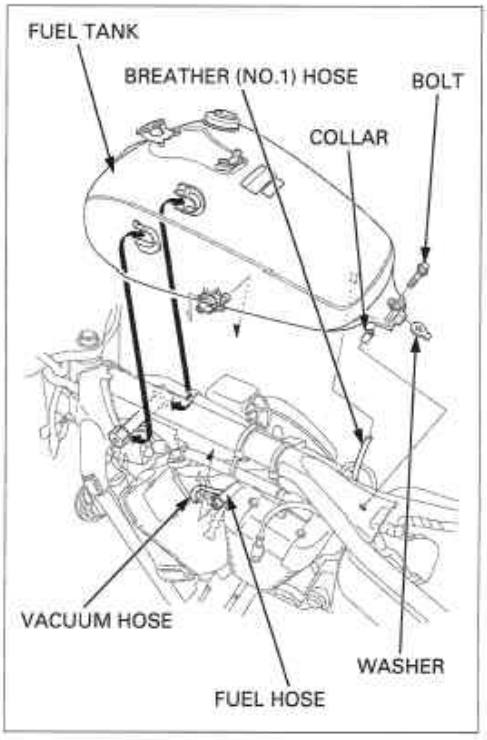
Install the collar and washer with the flat of the washer facing rearward.

Install and tighten the bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Route the hoses properly (page 1-24).

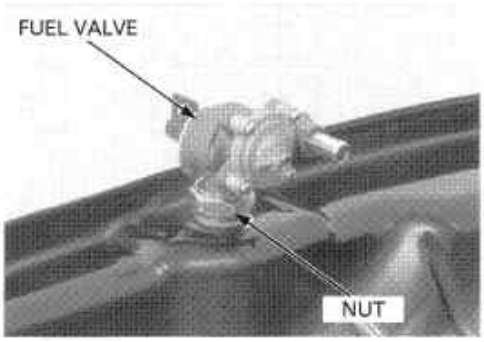
Install the removed parts in the reverse order of removal.



DISASSEMBLY

Remove the fuel tank (page 2-4).

Drain the fuel from the fuel tank into an approved gasoline container.
Loosen the nut and remove the fuel valve.

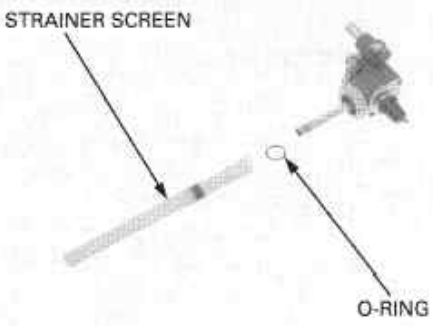


Remove the fuel strainer screen and O-ring.

Check the fuel strainer screen for clog or damage.

ASSEMBLY

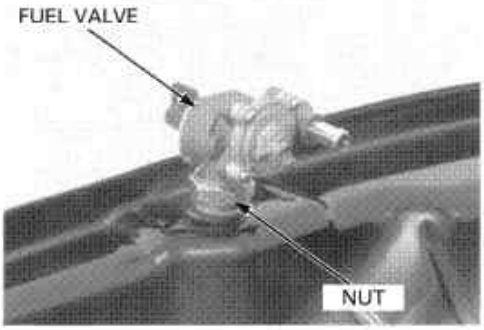
Install a new O-ring and fuel strainer screen to the fuel valve.



Install the fuel valve into the fuel tank.
Tighten the nut to the specified torque while holding the valve.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the fuel tank (page 2-4).



STEERING SIDE COVER

REMOVAL/INSTALLATION

Remove the speedometer assembly (page 20-10).

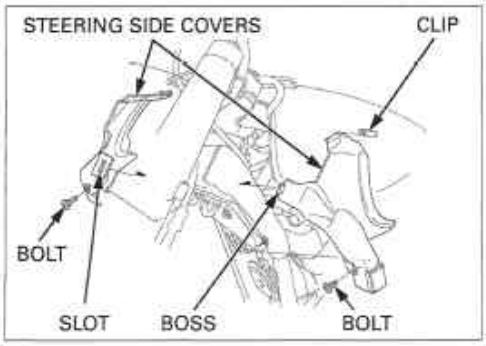
Remove the bolts.
Remove the retaining clip by sliding it rearward.

Be careful not to damage the boss and slot.

Remove the steering side covers by releasing the left cover boss from the right cover slot.

Installation is in the reverse order of removal.

NOTE:
After installation, check that the wire harness and cables do not interfere with handlebar rotation.



LEFT CRANKCASE REAR COVER

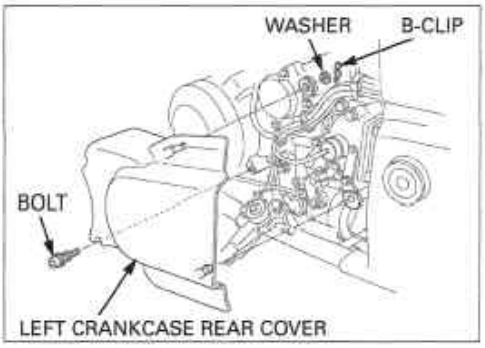
REMOVAL/INSTALLATION

Remove the B-clip and washer.

Remove the bolt and left crankcase rear cover by releasing its bosses from the grommets.

Installation is in the reverse order of removal.

TORQUE:
Left crankcase rear cover socket bolt:
9.8 N·m (1.0 kgf·m, 7 lbf·ft)

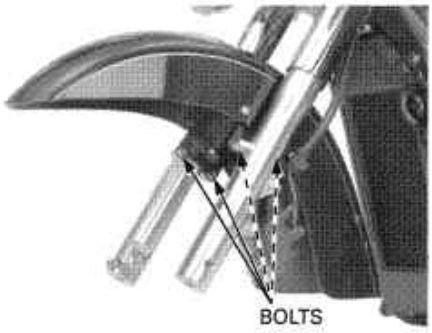


FRONT FENDER

REMOVAL/INSTALLATION

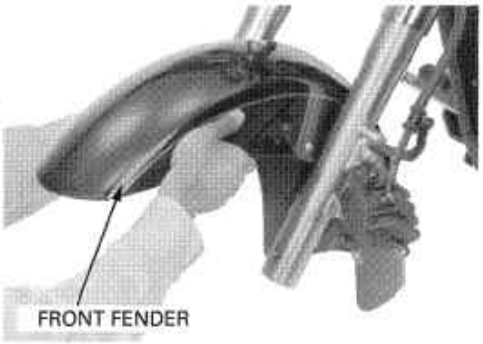
Remove the front wheel (page 14-11).

Remove the bolts and lift the front fender up.



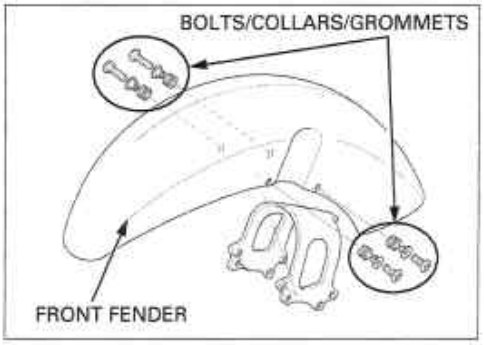
Rotate the fork legs and remove the front fender downward.

NOTE:
To prevent twisting the brake hose, do not rotate the fork legs more than necessary to remove the front fender.



Remove the bolts, collars, grommets and front fender brace from the front fender.

Installation is in the reverse order of removal.

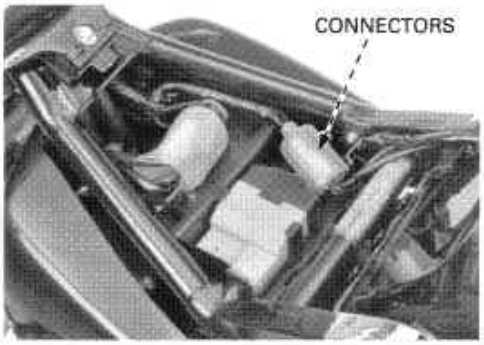


REAR FENDER

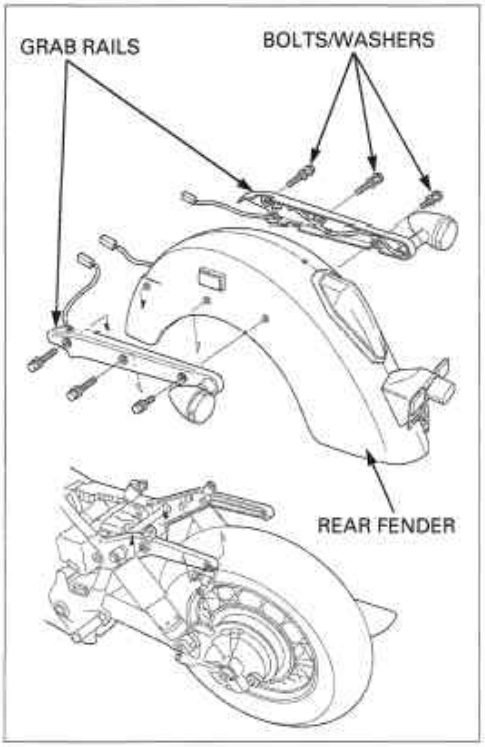
REMOVAL

Remove the seat (page 2-3).

Disconnect the brake/tail light 3P and rear turn signal light 2P connectors.



Remove the bolts, washers, grab rails and rear fender from the frame.



INSTALLATION

Route the wires properly (page 1-24).

Install the rear fender, grab rail and bolts with the washers.

Tighten the bolts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Connect the brake/tail light 3P and rear turn signal light 2P connectors.

Install the seat (page 2-3).

DISASSEMBLY/ASSEMBLY

Remove the following:

- Rear fender (page 2-7)
- Brake/tail light (page 20-7)
- License light (page 20-7)

Remove the screw and clamp.

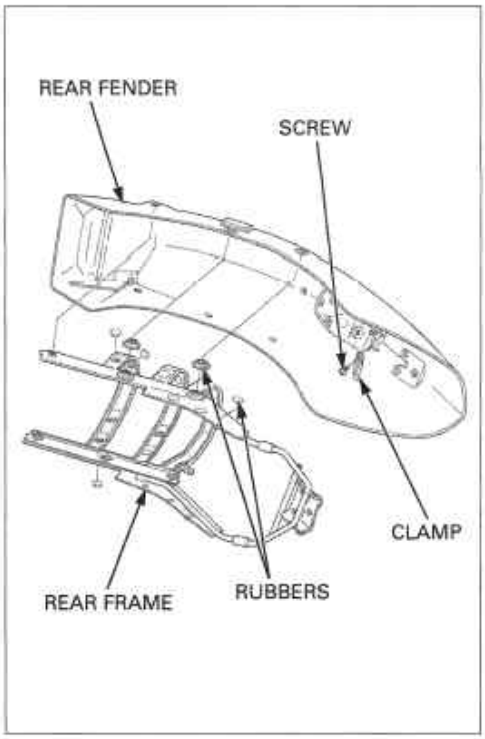
Be careful not to damage the rear fender.

Remove the rear frame and rubbers from the rear fender.

Install the rubbers onto the rear frame.
Install the rear frame, inserting its bosses into the fender holes.

Route the wires properly (page 1-24).

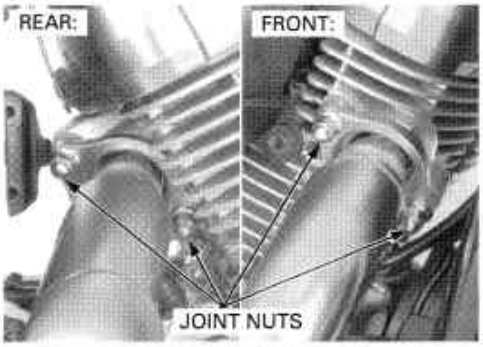
Install the removed parts in the reverse order of removal.



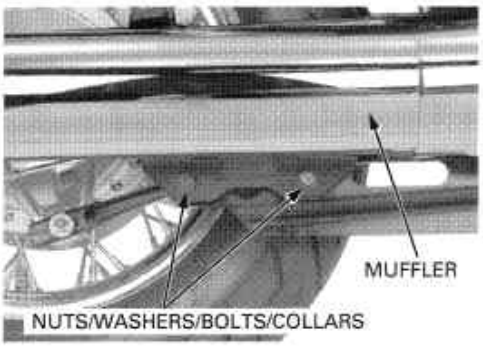
EXHAUST SYSTEM

REMOVAL

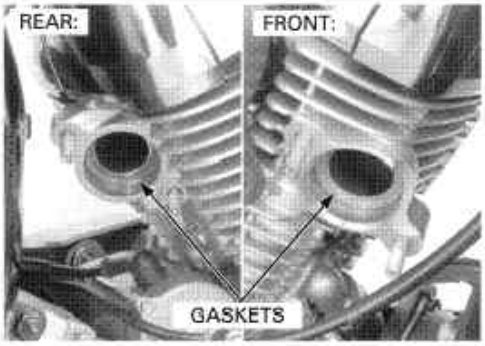
Remove the exhaust pipe joint nuts.



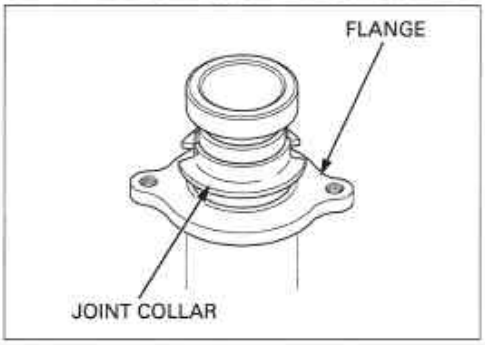
Remove the nuts, washers, bolts, collars and muffler.



Remove the front and rear gaskets.



Remove the exhaust pipe joint collars and flanges.

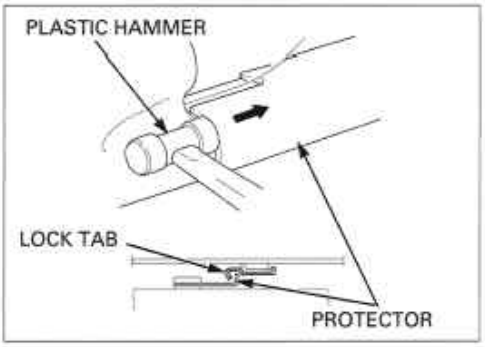


DISASSEMBLY

The exhaust pipe protectors can be removed without removing the exhaust system from the engine.

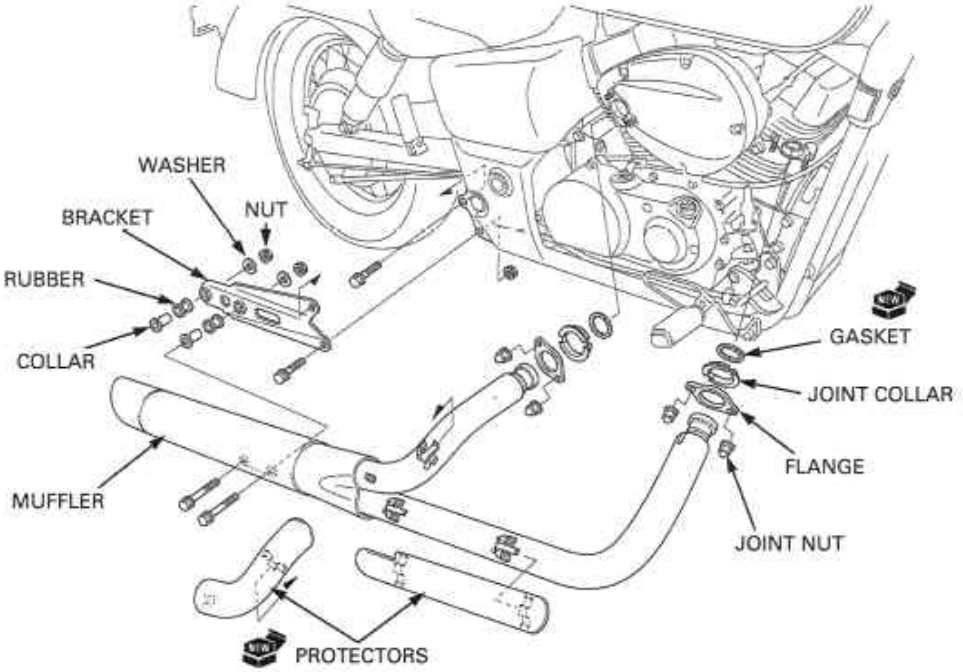
Drive the exhaust pipe protectors using a plastic hammer and break the lock tab (reverse side of the protector) and remove it.

Do not reuse the removed protector.

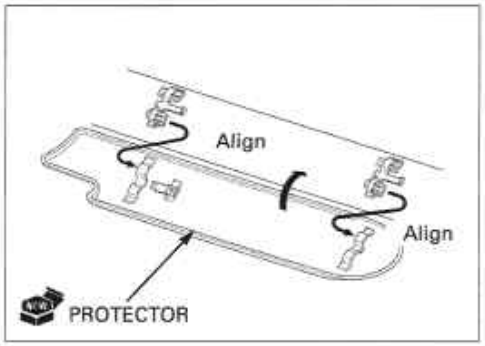


FRAME/BODY PANELS/EXHAUST SYSTEM

ASSEMBLY

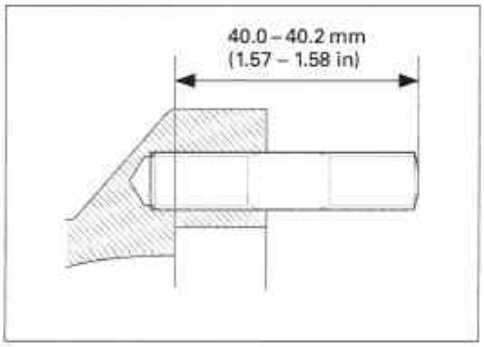


Install new exhaust pipe protectors.

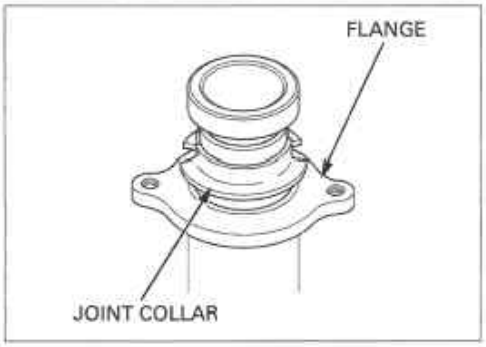


INSTALLATION

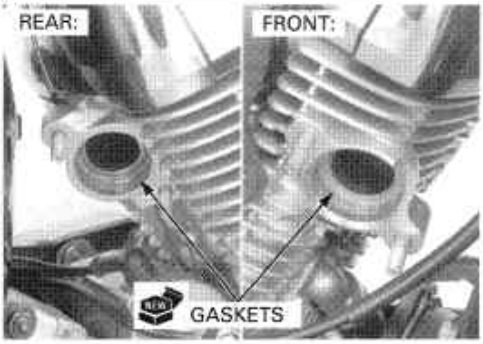
If the joint stud bolts are loose, tighten them. Be sure to verify the distance from the top of the stud to the cylinder head as shown.



Install the flanges and exhaust pipe joint collars.



Install new gaskets.

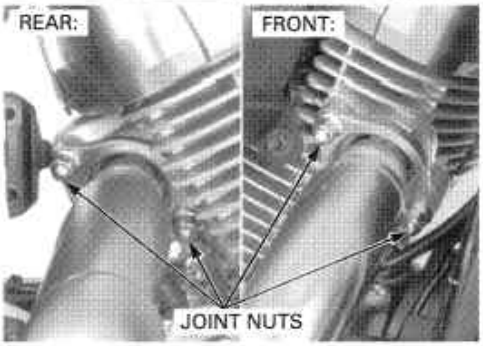


Install the muffler assembly.

Temporarily install the all fasteners.

Tighten the exhaust pipe joint nuts to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



Tighten the muffler mounting nuts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

NOTE:
Always inspect the exhaust system for leaks after installation.

MEMO

3. MAINTENANCE

3

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip free play			2 6 mm (1/16 1/4 in)
Spark plug	Standard		DPR6EA-9 (NGK), X20EPR-U9 (DENSO)
	For extended high speed riding		DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
Spark plug gap			0.8 – 0.9 mm (0.031 – 0.035 in)
Valve clearance	Intake		0.15 ± 0.02 mm (0.006 ± 0.001 in)
	Exhaust		0.20 ± 0.02 mm (0.008 ± 0.001 in)
Recommended engine oil			Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40
Engine oil capacity	After draining		2.5 liter (2.64 US qt, 2.20 Imp qt)
	After draining/filter change		2.6 liter (2.75 US qt, 2.29 Imp qt)
	After disassembly		3.2 liter (3.38 US qt, 2.82 Imp qt)
Engine idle speed			1,200 ± 100 rpm
Recommended final drive oil			Hypoid gear oil, SAE #80
Final drive oil capacity	After draining		160 cm³ (5.4 US oz, 5.6 Imp oz)
	After disassembly		170 cm³ (5.7 US oz, 6.0 Imp oz)
Recommended brake fluid			DOT 4
Brake pedal height			75 mm (3.0 in) above the top of the footpeg
Brake pedal free play			20 – 30 mm (3/4 – 1-1/4 in)
Clutch lever free play			10 – 20 mm (3/8 – 3/4 in)
Cold tire pressure	Up to 90 kg (200 lb) load	Front	200 kPa (2.00 kgf/cm², 29 psi)
		Rear	200 kPa (2.00 kgf/cm², 29 psi)
	Up to maximum weight capacity	Front	200 kPa (2.00 kgf/cm², 29 psi)
		Rear	250 kPa (2.50 kgf/cm², 36 psi)
Tire size		Front	120/90-17M/C 64S
		Rear	160/80-15M/C 74S
Tire brand	Bridgestone	Front	G701
		Rear	G702
	Dunlop	Front	D404FG
		Rear	D404
	Cheng shin	Front	M6002
		Rear	M6011R
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17lbf·ft)	Apply engine oil to the threads and seating surface
Timing hole cap	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply engine oil to the threads and seating surface
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft	
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Final drive oil drain bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front master cylinder reservoir cap screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Air cleaner cover socket bolt	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads
Alternator cover socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Spoke	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	

TOOLS

Valve adjusting wrench 07908-KE90000  or 07908-KE90100 (U.S.A. only) with 10-mm offset box wrench	Oil filter wrench 07HAA-PJ70101 	Spoke wrench 07JMA-MR60100  or equivalent commercially available in U.S.A.

MAINTENANCE SCHEDULE

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

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

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

		ITEMS	FREQUENCY WHICHEVER COMES FIRST ⇩ NOTE	⇨ X1,000 mi X1,000 km	ODOMETER READING (NOTE 1) 0.6 1.0	4 6.4	8 12.8	12 19.2	16 25.6	20 32.0	24 38.4	REFER TO PAGE
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	3-5
	*	THROTTLE OPERATION					I		I		I	3-5
	*	CARBURETOR CHOKE					I		I		I	3-6
		AIR CLEANER	NOTE 2					R			R	3-7
	*	SUB AIR CLEANER						R			R	3-8
		CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-8
		SPARK PLUG				I	R	I	R	I	R	3-9
	*	VALVE CLEARANCE			I		I		I		I	3-10
		ENGINE OIL			R		R		R		R	3-12
		ENGINE OIL FILTER			R		R		R		R	3-13
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-15
		RADIATOR COOLANT	NOTE 5				I		I		R	3-15
	*	COOLING SYSTEM					I		I		I	3-16
	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-17
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-17
NON-EMISSION RELATED ITEMS		FINAL DRIVE OIL					I		I		R	3-18
		BRAKE FLUID	NOTE 5			I	I	R	I	I	R	3-19
		BRAKE SHOES/PADS WEAR				I	I	I	I	I	I	3-20
		BRAKE SYSTEM			I		I		I		I	3-20
	*	BRAKE LIGHT SWITCH					I		I		I	3-22
	*	HEADLIGHT AIM					I		I		I	3-22
		CLUTCH SYSTEM			I	I	I	I	I	I	I	3-23
		SIDE STAND					I		I		I	3-24
	*	SUSPENSION					I		I		I	3-24
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-25
	**	WHEELS/TIRES			I	I	I	I	I	I	I	3-25
	**	STEERING HEAD BEARINGS			I		I		I		I	3-26

* Should be serviced by your dealer, unless the owner has proper tools and service data and is mechanically qualified

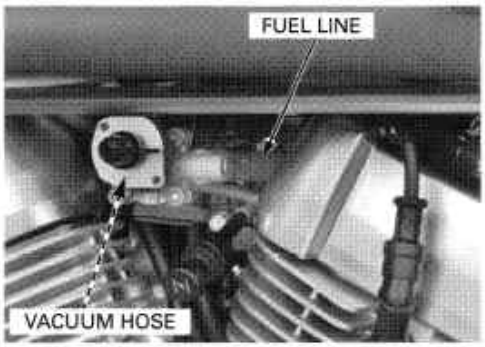
** In the interest of safety, we recommend these items be serviced only by your Honda dealer

NOTES:
1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. California type only.
5. Replace every 2 years, or at the indicated odometer intervals, whichever comes first. Replacement requires mechanical skill.

FUEL LINE

Check the fuel line for deterioration, damage or leakage.
Replace the fuel line if necessary.

Also check the fuel valve vacuum hose for damage.
Replace the vacuum hose if necessary.



THROTTLE OPERATION

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

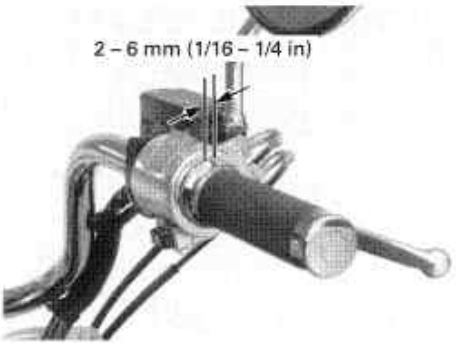
If the throttle grip does not return properly, lubricate the throttle cables and overhaul and lubricate the throttle grip housing.
For cable lubrication: Disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

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

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

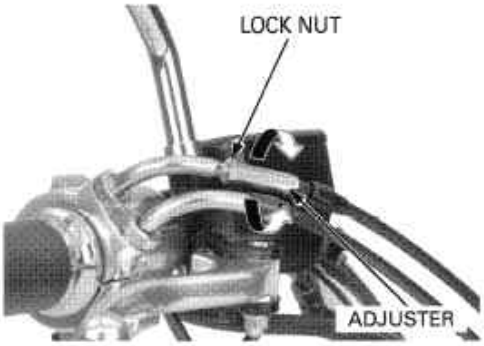
Measure the throttle grip free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/16 – 1/4 in)



Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustment is made with the upper adjuster.

Loosen the lock nut, turn the adjuster as required. Tighten the lock nut while holding the adjuster.

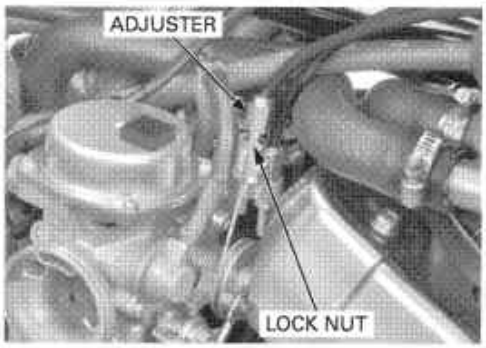


Major adjustment is made with the lower adjuster.

Remove the air cleaner housing (page 5-6).

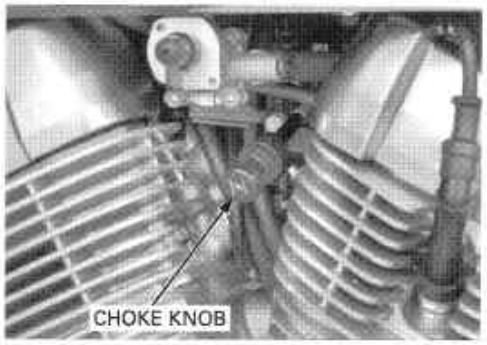
Loosen the lock nut, turn the adjuster as required. Tighten the lock nut while holding the adjuster.

Recheck the throttle operation and install the air cleaner housing (page 5-7).



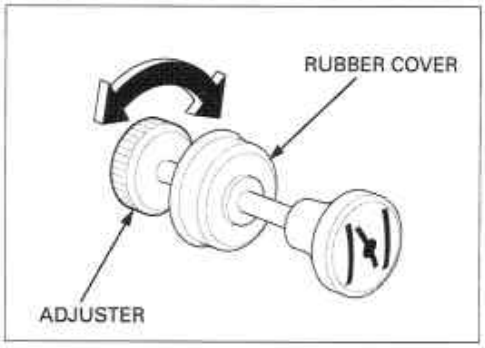
CARBURETOR CHOKE

This model's choke system uses a fuel enriching circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enriching circuit via a cable when the choke knob on the left side of the frame is pulled out.



Check for smooth operation of the SE valve knob. Check for any deterioration or damage to the SE valve cable.
If the operation is not smooth, lubricate the SE valve cable and SE valve knob sliding surface with a commercially available cable lubricant or a light weight oil.

To adjust the friction, pull the rubber cover away and turn the adjuster.



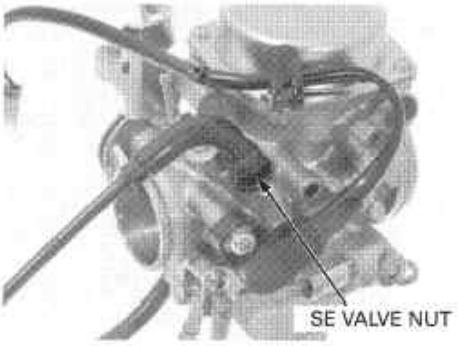
Starting enrichment system operation can be checked by the way the engine starts to runs:

- Difficulty in starting before the engine is warm up (easy once it is warmed up): SE valve is not completely opened.
- Idle speed is erratic even after warm-up (imperfect combustion): SE valve is not completely closed.

When the above symptoms occur, inspect the SE valve using the following procedure.

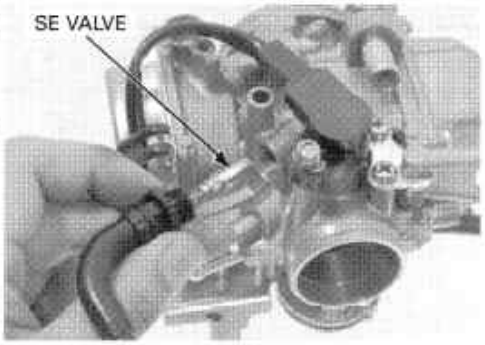
Remove the carburetor (page 5-7).

Loosen the SE valve nut and remove it from the carburetor.



Pull the SE valve knob all the way out to fully open position and recheck for smooth operation of the SE valve knob.
There should be no free play.

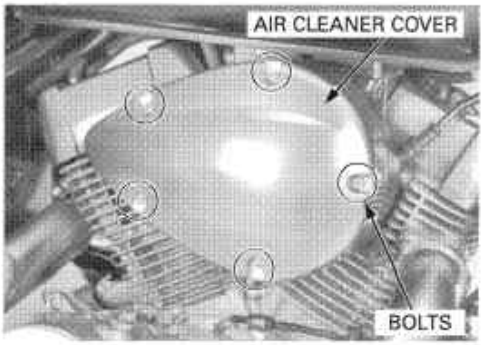
Check valve seat on the SE valve for damage.
Reinstall the SE valve in the reverse order of removal.



AIR CLEANER

NOTE:
The viscous paper element type air cleaner can not be cleaned because the element contains a dust adhesive.

Remove the bolts and air cleaner cover.

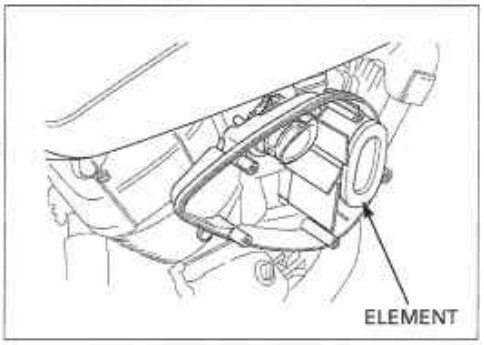


Remove the air cleaner element from the air cleaner housing.

Replace the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.

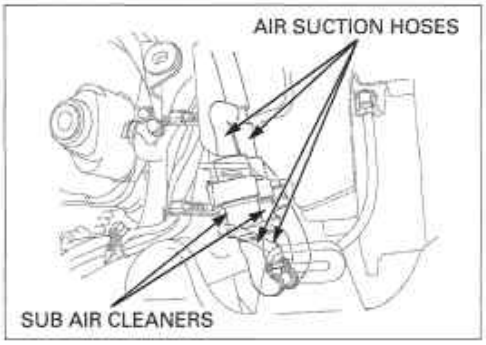
TORQUE:
Air cleaner cover socket bolt:
2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)



SUB AIR CLEANER

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

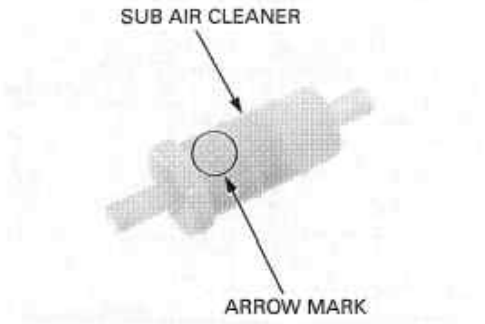
Disconnect the air suction hoses and remove the sub air cleaners.



Replace the sub air cleaner in accordance with the maintenance schedule.

Install the sub air cleaners with the arrow mark facing down (PAIR control valve side) and connect the air suction hoses.

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

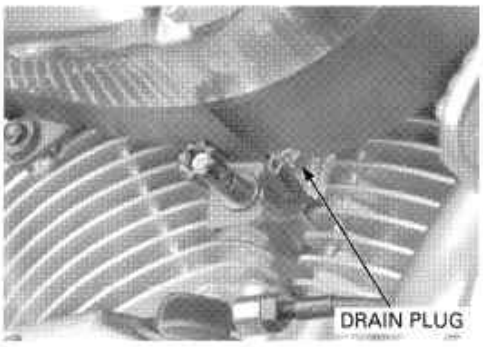


CRANKCASE BREATHER

NOTE:

Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposit level can be seen in the drain plug.

Remove the drain plug from the air cleaner housing and drain the deposits into a suitable container, then reinstall the drain plug securely.



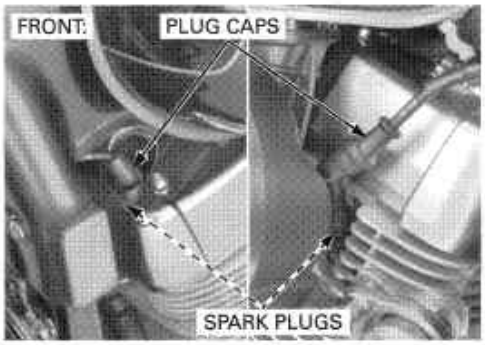
SPARK PLUG

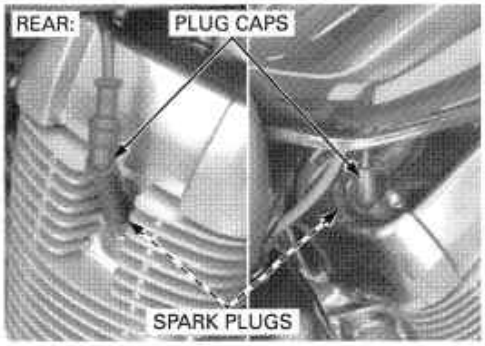
Disconnect the spark plug caps and clean around the spark plug bases.

NOTE:

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

Remove the spark plugs.





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

RECOMMENDED SPARK PLUG:

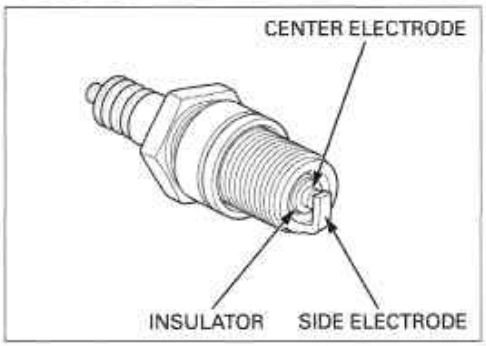
Standard:

DPR6EA-9 (NGK), X20EPR-U9 (DENSO)

For extended high speed riding:

DPR7EA-9 (NGK), X22EPR-U9 (DENSO)

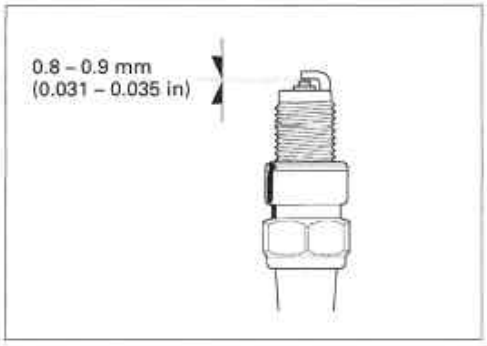
Clean the spark plug electrodes with a wire brush or special plug cleaner.



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

SPARK PLUG GAP: 0.8 – 0.9 mm (0.031 – 0.035 in)

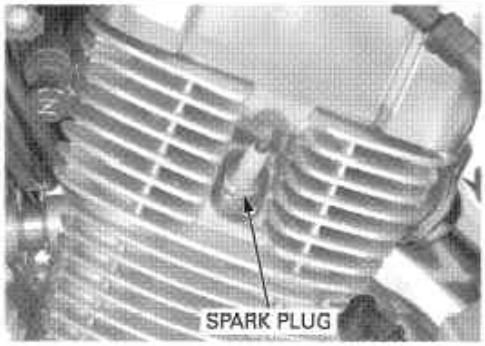
If necessary, adjust the gap by bending the side electrode carefully.



Thread each spark plug in by hand to prevent cross-threading and tighten them with a spark plug wrench.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Connect the spark plug caps.



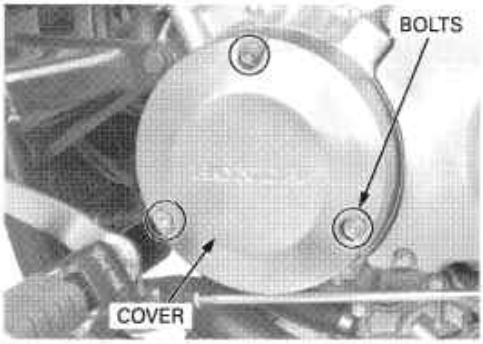
VALVE CLEARANCE

INSPECTION

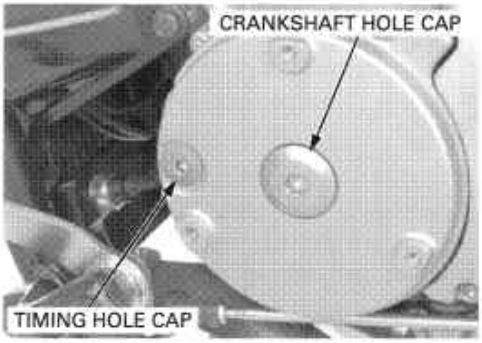
Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F)

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

Remove the bolts and alternator cover.

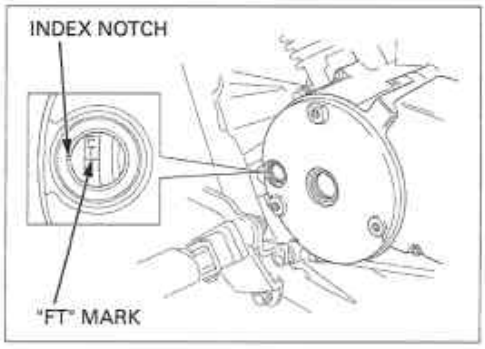


Remove the timing and crankshaft hole caps.



FRONT:

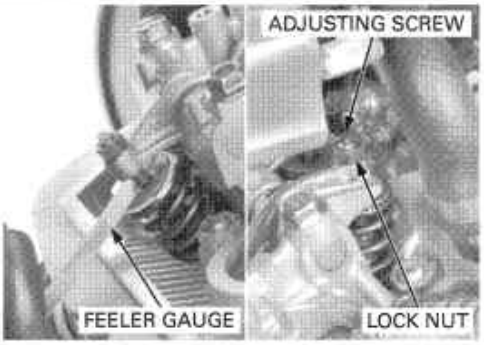
Rotate the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.
This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft counterclockwise one full turn and align the "FT" mark with the index notch again.



When checking the clearance, slide the feeler gauge from the center toward the outside.

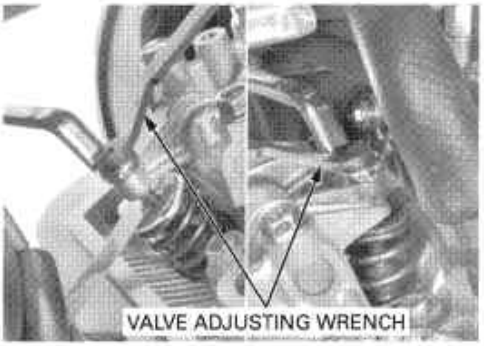
Check the valve clearances by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES:
INTAKE: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EXHAUST: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



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

TOOL:
Valve adjusting wrench — **07908-KE90000 or 07908-KE90100 (U.S.A. only) with 10-mm offset box wrench**



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

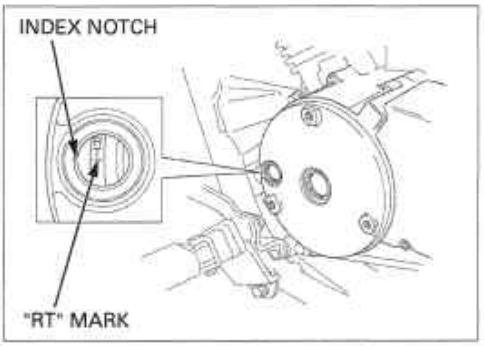
Hold the adjusting screw and tighten the lock nut to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the lock nut, recheck the valve clearance.

REAR:

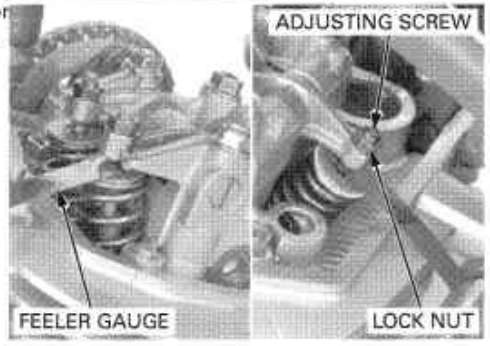
Rotate the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.



When checking the clearance, slide the feeler gauge from the center toward the outside.

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

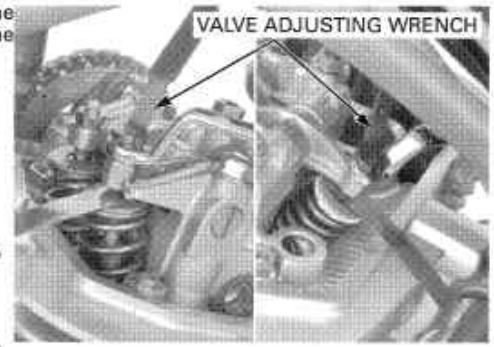
VALVE CLEARANCES:
INTAKE: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EXHAUST: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



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

TOOL:

Valve adjusting wrench	**07908-KE90000 or 07908-KE90100 (U.S.A. only) with 10-mm offset box wrench**



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

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

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

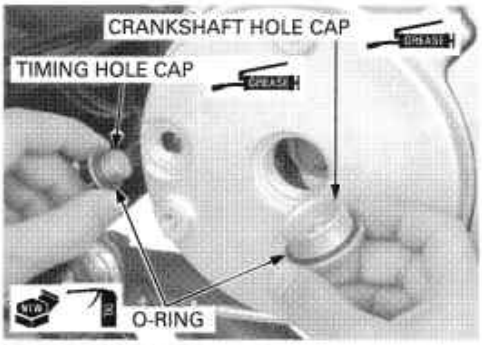
After tightening the lock nut, recheck the valve clearance.

Coat new O-rings with oil and install them into the timing and crankshaft hole cap grooves.
Apply grease to the timing and crankshaft hole cap threads.
Install the timing hole cap and tighten it to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

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

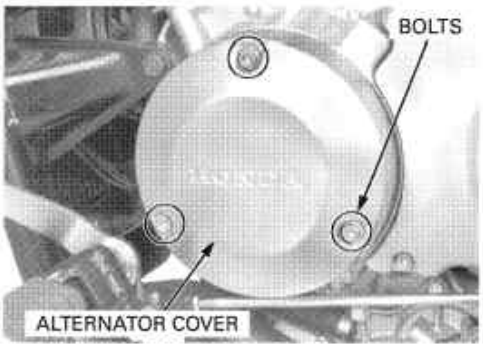
TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



Install the alternator cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the cylinder head cover (page 8-33).

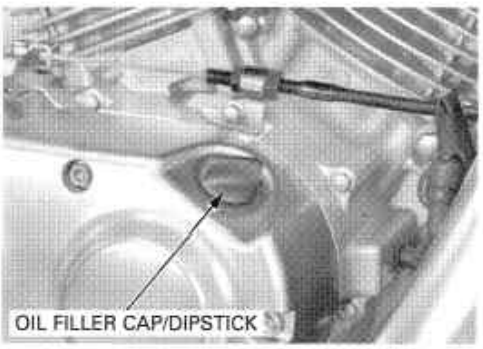


ENGINE OIL

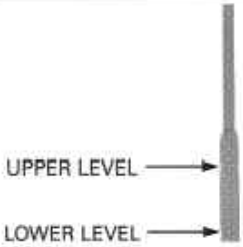
OIL LEVEL CHECK

Start the engine, and let it idle for 3 – 5 minutes.
Stop the engine and wait 2 – 3 minutes.
Hold the motorcycle in an upright position.

Remove the oil filler cap/dipstick and wipe the oil from the dipstick 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 mark on the dipstick, add the recommended oil to the upper level mark.

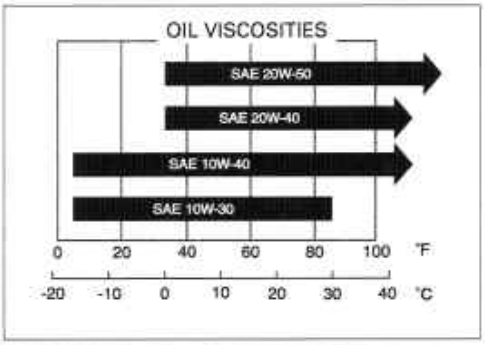


RECOMMENDED ENGINE OIL:

Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil
API service classification: SG or Higher
JASO T 903 standard: MA
Viscosity: SAE 10W-40

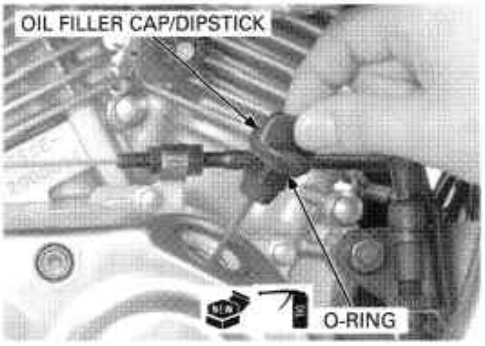
NOTE:

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



Coat a new O-ring with oil and install it.
Reinstall the oil filler cap/dipstick.

For engine oil change, refer to page 3-13.



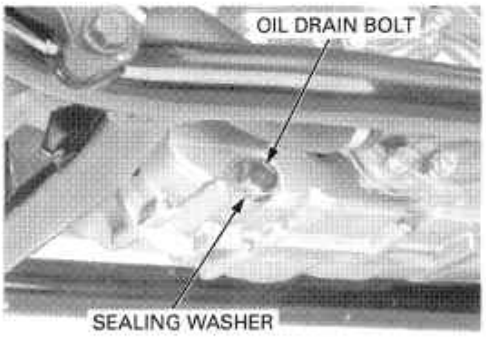
ENGINE OIL FILTER

NOTE:

Change the oil with engine warm and the motorcycle on its side stand to assure complete and rapid draining.

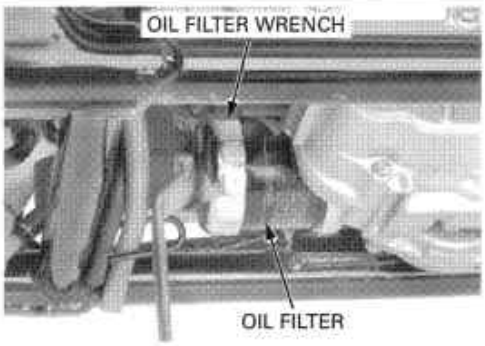
Start the engine, warm it up and stop it.

Remove the oil filler cap/dipstick (page 3-12).
Remove the oil drain bolt, sealing washer and drain the oil.



Remove the oil filter cartridge using the special tool and let the remaining oil drain out.

TOOL:
Oil filter wrench **07HAA-PJ70101 or 07HAA-PJ70100**

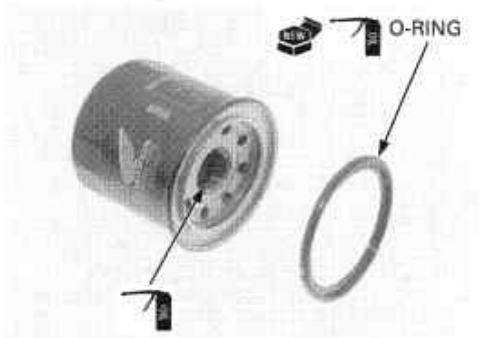


Coat a new O-ring with oil and install it to the oil filter cartridge.
Apply oil to the threads of a new oil filter cartridge.

Install the oil filter cartridge and tighten it to the specified torque.

TOOL:
Oil filter wrench **07HAA-PJ70101 or 07HAA-PJ70100**

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



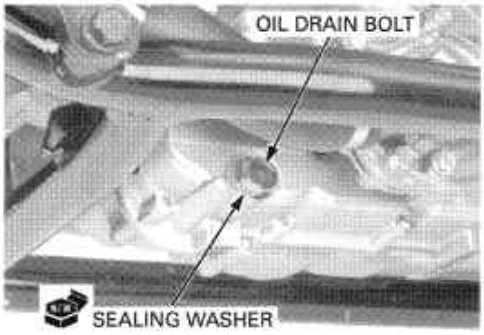
Install the oil drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

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

OIL CAPACITY:
2.5 liters (2.64 US qt, 2.20 Imp qt) at draining
2.6 liters (2.75 US qt, 2.29 Imp qt) at filter change
3.2 liters (3.38 US qt, 2.82 Imp qt) at disassembly

Check the engine oil level (page 3-12).
Install the oil filler cap/dipstick (page 3-13).
Make sure there are no oil leaks.



ENGINE IDLE SPEED

NOTE:

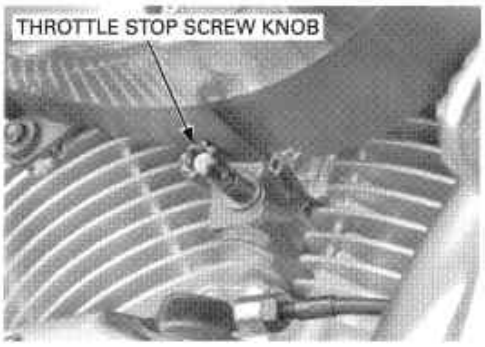
- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

Connect a tachometer.
Warm up the engine, shift the transmission into neutral and hold the motorcycle in an upright position.

Check the idle speed.

IDLE SPEED: 1,200 ± 100 rpm

If the adjustment is necessary, turn the throttle stop screw knob as required.



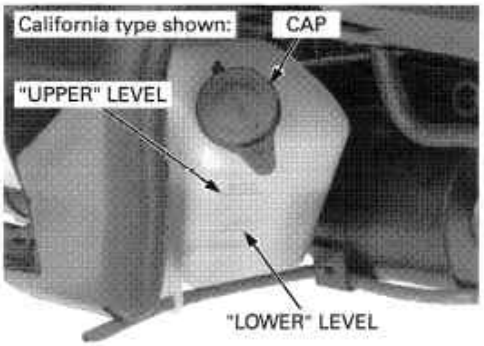
RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be between the "UPPER" and "LOWER" level lines with the motorcycle is in an upright position.

If the level is low, remove the reserve tank cap, and fill the tank to the "UPPER" level line with a 1:1 mixture of distilled water and antifreeze (coolant preparation: page 6-6).

RECOMMENDED ANTIFREEZE:

Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors.



NOTICE

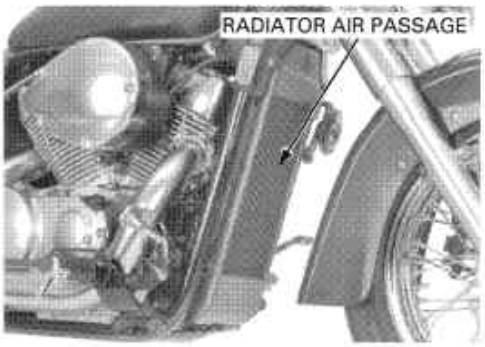
Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

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

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove any air from the cooling system (page 6-7).

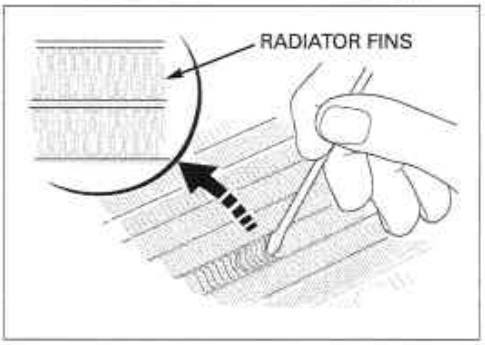
COOLING SYSTEM

Check the radiator air passage for clogs or damage.



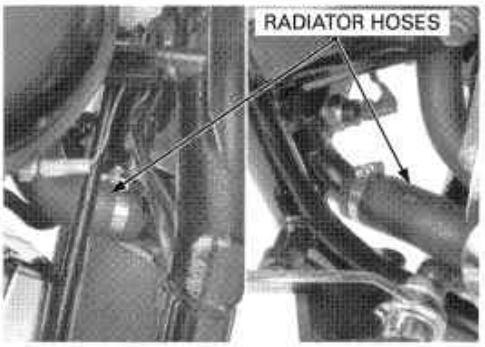
Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

For radiator replacement, refer to page 6-11.



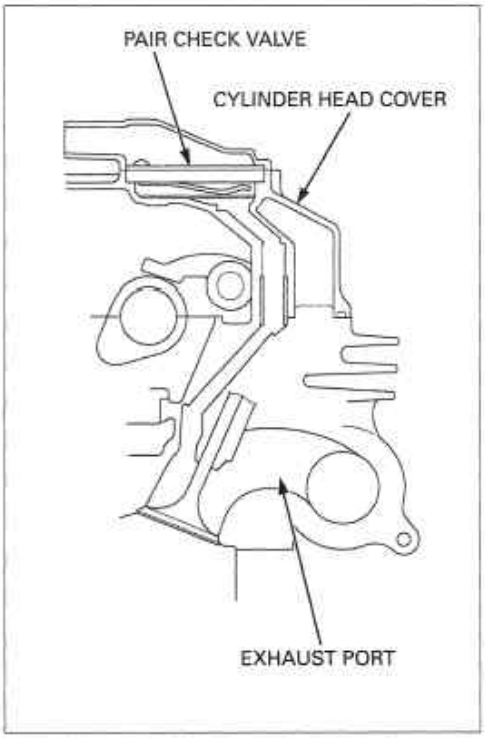
Remove the steering side covers (page 2-5).

Check for any coolant leakage from the water pump, radiator hoses and hose joints.
Check the radiator hoses for cracks or deterioration and replace if necessary.
Check that all hose clamps are tight.



SECONDARY AIR SUPPLY SYSTEM

- This model is equipped with a built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary 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.

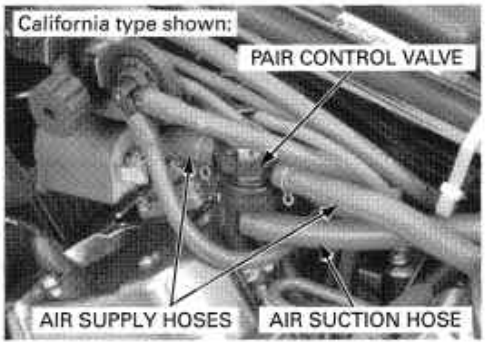


Remove the fuel tank (page 2-4).

If the hoses show any signs of heat damage, inspect the PAIR check valve in the cylinder head cover for damage.

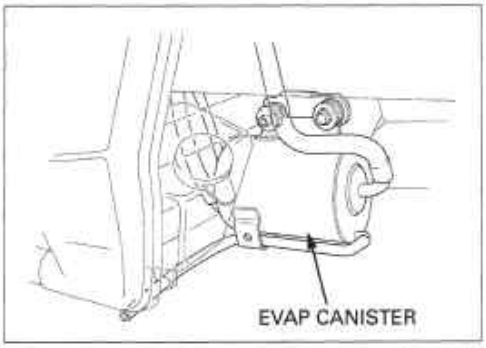
Check the PAIR (pulse secondary air injection) air supply hoses between the PAIR control valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

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



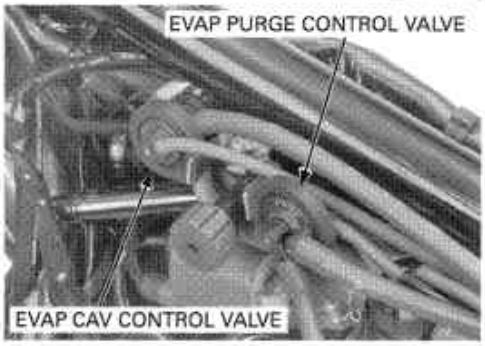
EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

Check the evaporative emission (EVAP) canister for cracks or damage.



Check the hoses between the fuel tank, EVAP canister, EVAP purge control valve, EVAP carburetor air vent (CAV) control valve and carburetor for deterioration, damage or loose connections. Also check that the hoses are not kinked or pinched.

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-24) for hose connections and routing.

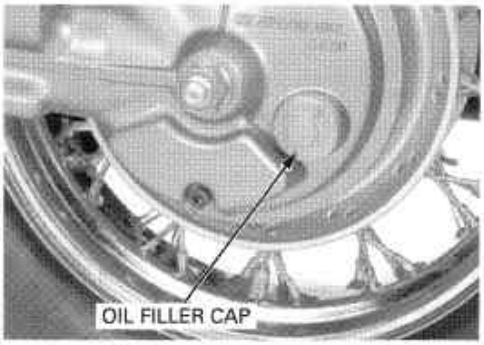


FINAL DRIVE OIL

OIL LEVEL CHECK

Place the motorcycle on its side stand on a level surface.

Remove the oil filler cap from the final gear case.



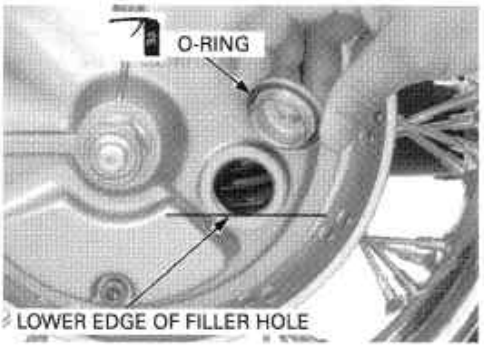
Check that the oil level is up to the lower edge of the oil filler hole.

Check for leaks if the oil level is low. Pour the recommended oil through the oil filler hole until it reaches the lower edge of the hole.

RECOMMENDED OIL: Hypoid gear oil, SAE #80

Coat a new O-ring with oil and install it onto the oil filler cap.
Install and tighten the oil filler cap.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



OIL CHANGE

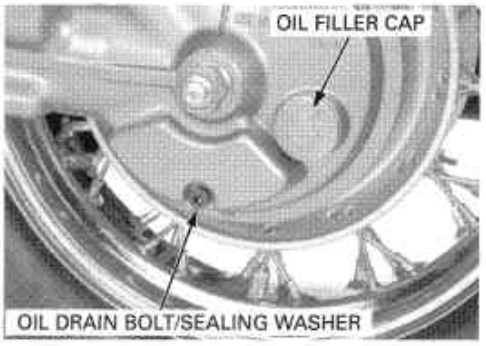
Remove the oil filler cap and drain bolt/sealing washer from the final gear case, slowly turn the rear wheel and drain the oil.

After the oil is completely drained, install the drain bolt with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill the final gear case with the recommended oil to the correct level (page 3-18).

OIL CAPACITY:
160 cm³ (5.4 US oz, 5.6 Imp oz) after draining
170 cm³ (5.7 US oz, 6.0 Imp oz) after disassembly



BRAKE FLUID

NOTICE

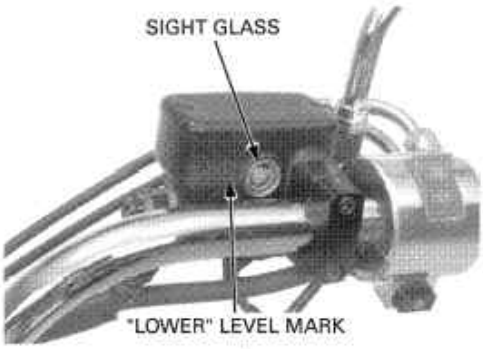
Spilled fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

- 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.

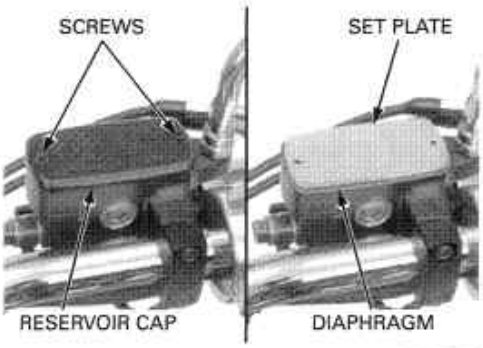
NOTE:

- When the fluid level is low, check the brake pads for wear (page 3-20). A low fluid level may be due to wear of the brake pads. If the brake pads are worn and the caliper pistons are pushed out, this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks (page 3-20).

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



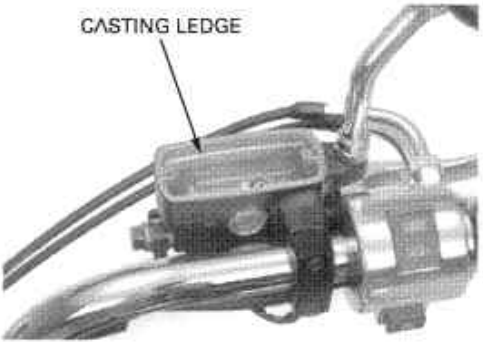
If the fluid level is near the "LOWER" level mark, remove the screws, reservoir cap, set plate and diaphragm.



Fill the reservoir with DOT 4 brake fluid from a sealed container to the casting ledge.

Install the diaphragm, set plate and reservoir cap and tighten the cap screws.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)



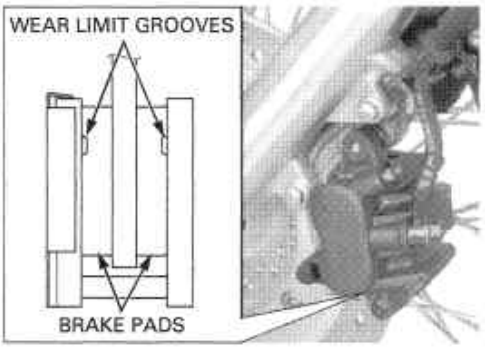
BRAKE SHOES/PADS WEAR

FRONT BRAKE PADS

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

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

For brake pad replacement, refer to page 16-7.



REAR BRAKE SHOES

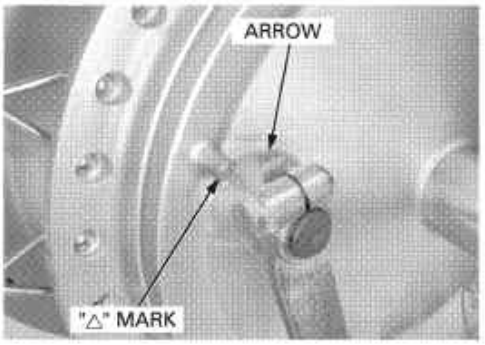
Inspect the brake drum I.D. (page 15-14) if the arrow on the brake arm aligns with the reference mark "△" on full application of the rear brake pedal.

Replace the brake shoes if the brake drum I.D. is within the service limit.

NOTE:

If no adjustment remains before the wear indicator limit is reached, this indicates excessive wear and the brake shoes need to be replaced.

For rear brake shoes replacement, refer to page 15-14.



BRAKE SYSTEM

Firmly apply the brake lever, and check that no air has entered the system.
If the lever feels soft or spongy when operated, bleed the air from the system.

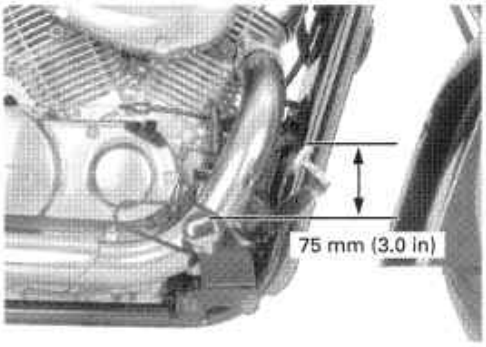
For air bleeding procedures, refer to page 16-6.

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

BRAKE PEDAL HEIGHT

Check the brake pedal height.

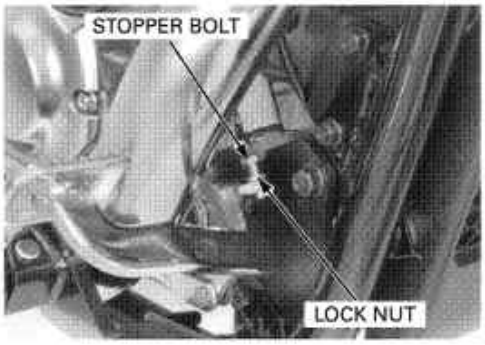
BRAKE PEDAL HEIGHT:
75 mm (3.0 in) above the top of the footpeg



To adjust:
Loosen the lock nut and turn the stopper bolt as required.
Tighten the lock nut to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:
After adjusting the brake pedal height, check the brake pedal free play (page 3-21) and rear brake light switch operation (page 3-22).

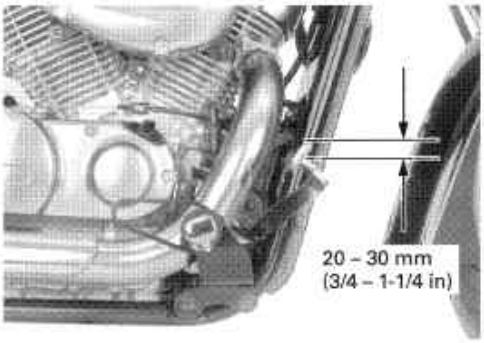


BRAKE PEDAL FREE PLAY

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

Check the brake pedal free play.

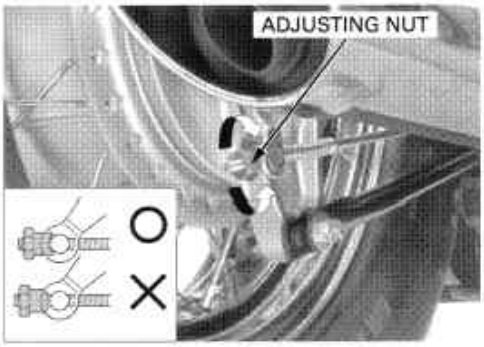
FREE PLAY: 20 – 30 mm (3/4 – 1-1/4 in)



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

If necessary, adjust the brake pedal free play by turning the adjusting nut.

NOTE:
After adjusting the brake pedal free play, check the rear brake light switch operation (page 3-22).



BRAKE LIGHT SWITCH

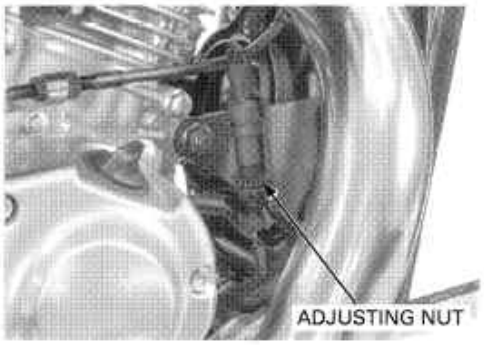
NOTE:
- The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are not synchronized, either replace the switch unit or the malfunctioning parts of the system.
- Make the rear brake light switch adjustments after the brake pedal height adjustment and the brake pedal free play adjustment have been made.

Check that the brake light comes on just prior to the brake actually being engaged.
If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Do not turn the switch body while turning the adjusting nut.

Hold the switch body and turn the adjusting nut as required.

Recheck the brake light switch operation.

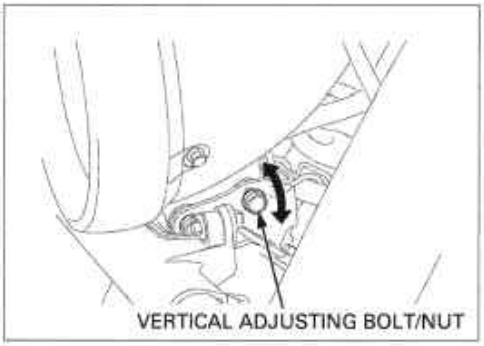


HEADLIGHT AIM

Hold the motorcycle in an upright position.

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

Adjust vertically by loosening the vertical adjusting bolt/nut.



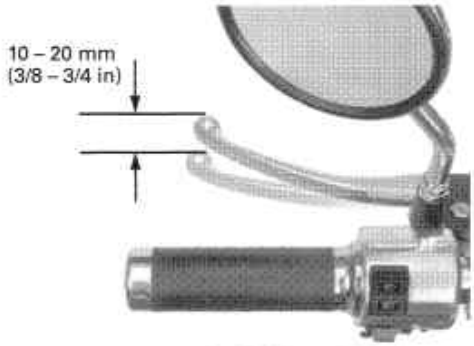
Adjust horizontally by turning the horizontal adjusting screw.

CLUTCH SYSTEM

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

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

FREE PLAY: 10 – 20 mm (3/8 – 3/4 in)

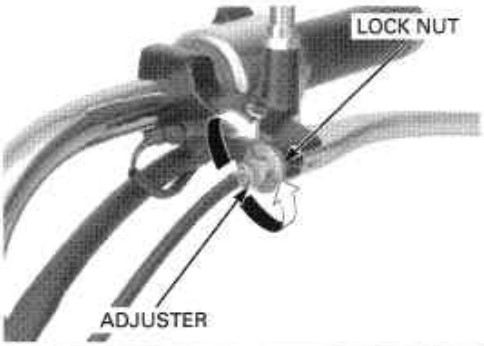


Minor adjustment is made with the upper adjuster at the clutch lever.
Loosen the lock nut and turn the adjuster as required.
Tighten the lock nut while holding the adjuster.

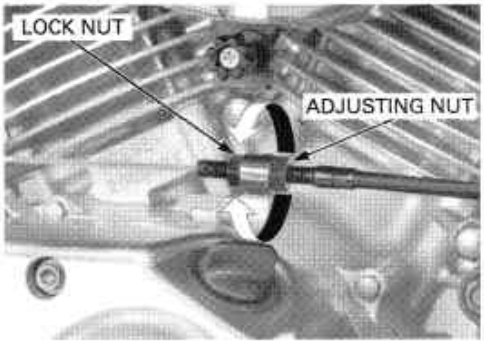
NOTICE

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

If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn.
Tighten the lock nut and make major adjustment (page 3-23).



Major adjustment is made with the lower adjusting nut at the engine.
Loosen the lock nut and turn the adjusting nut as required.
After adjustment is complete, tighten the lock nut while holding the adjusting nut.



Check the clutch operation.
If the free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (page 10-7).

SIDE STAND

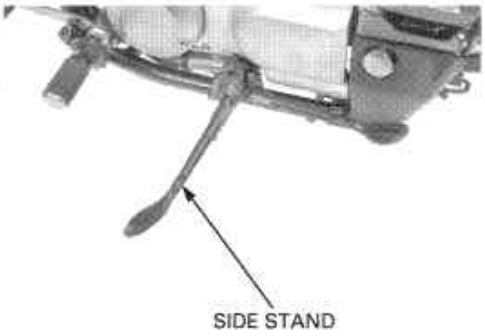
Hold the motorcycle in an upright position.

Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 20-20).



SUSPENSION

FRONT SUSPENSION INSPECTION

Check the action of the forks by applying the front brakes and compressing the front suspension several times.
Check the entire assembly for leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

For fork service, refer to page 14-16.

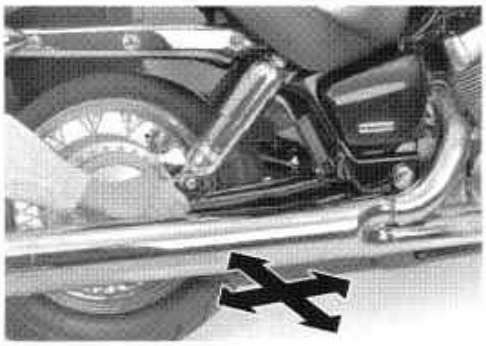
REAR SUSPENSION INSPECTION

Check the action of the shock absorbers by compressing them several times.
Check the entire shock absorber assembly for leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

For shock absorber service, refer to page 15-21.

Support the motorcycle securely and raise the rear wheel off the ground.
Check for worn swingarm bearings by grabbing the rear wheel and attempting to move the wheel side to side.

Replace the bearings if any looseness is noted (page 15-21).



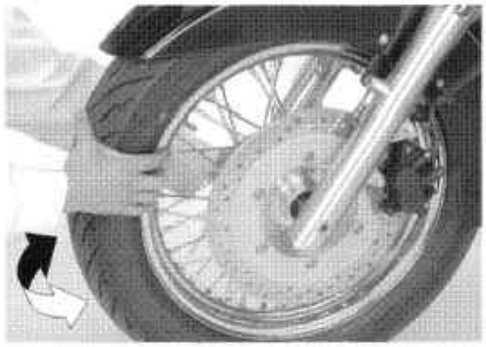
NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-13).
Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

WHEELS/TIRES

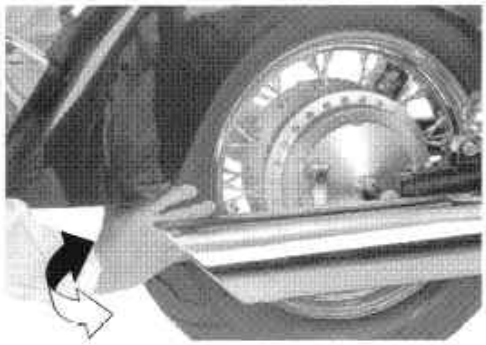
Support the motorcycle securely and raise the front wheel off the ground.
Hold the front fork leg and move the front wheel sideways forcefully to see if the wheel bearings are worn.

For front wheel service, refer to page 14-11.



Support the motorcycle securely and raise the rear wheel off the ground.
Hold the swingarm and move the rear wheel sideways with the force to see if the wheel bearings are worn.

For rear wheel service, refer to page 15-6.



Inspect the spokes for looseness by tapping them with a screwdriver.

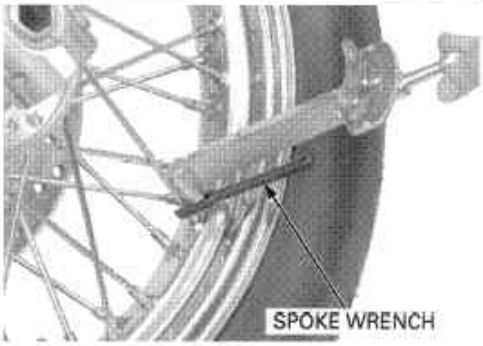
Tap on the spokes and be sure that the same clear metallic sound can be heard on all spokes.

If a spoke does not sound clearly, or if it sounds different from the other spokes, tighten it to the specified torque.

TOOL:

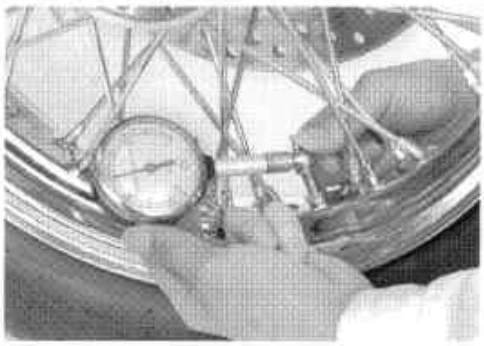
Spoke wrench — **07JMA-MR60100 or equivalent commercially available in U.S.A.**

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



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

RECOMMENDED TIRE PRESSURE:
Up to 90 kg (200 lbs) load:
Front: 200 kPa (2.00 kgf/cm², 29 psi)
Rear: 200 kPa (2.00 kgf/cm², 29 psi)
Up to maximum weight capacity:
Front: 200 kPa (2.00 kgf/cm², 29 psi)
Rear: 250 kPa (2.50 kgf/cm², 36 psi)



Check the tires for cuts, embedded nails, or other damage.
Check the front and rear wheels for trueness.

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

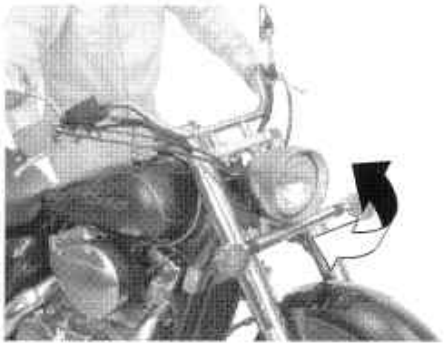
MINIMUM TREAD DEPTH: Front: 1.5 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS

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

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

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 14-24).



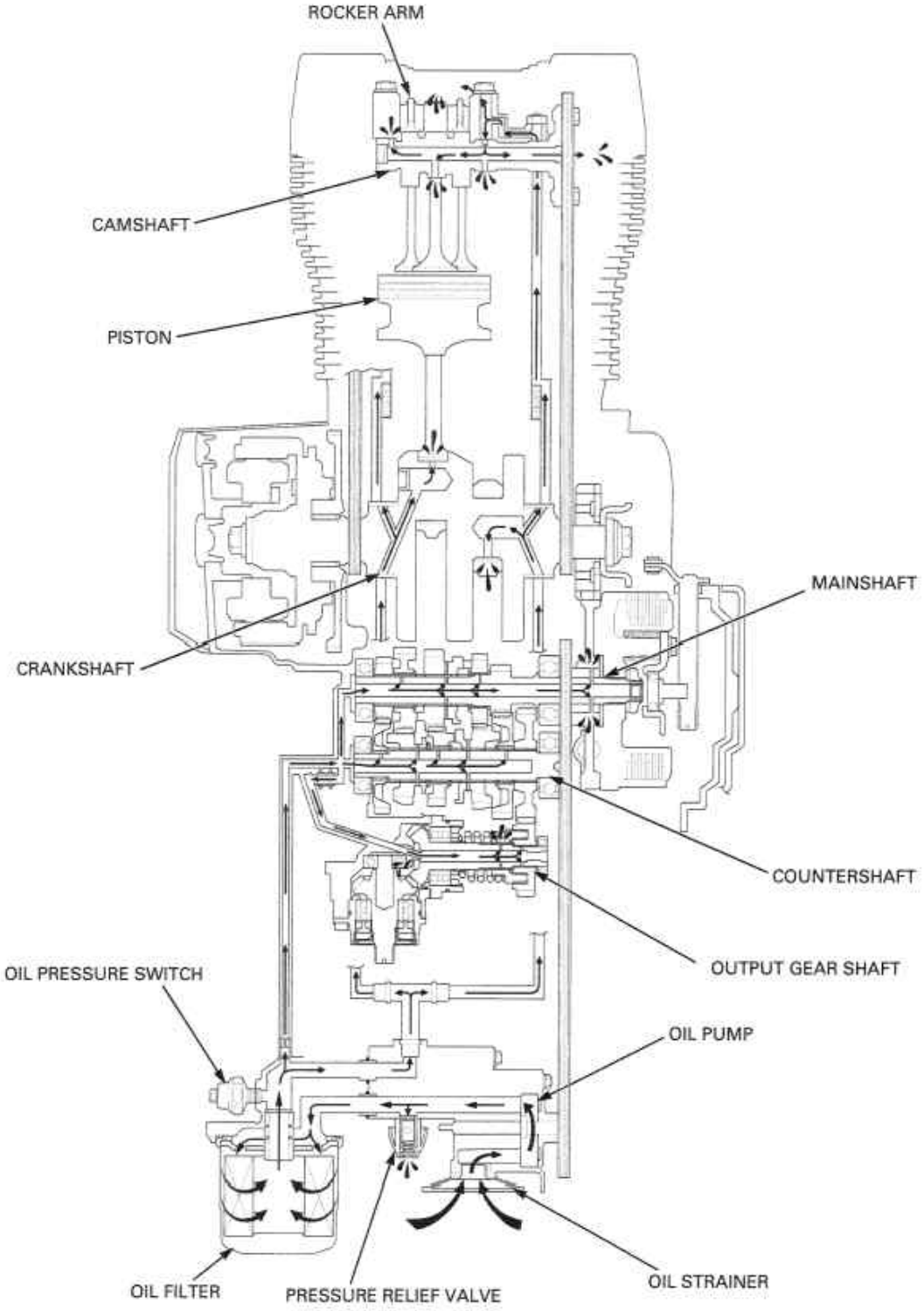
Check for steering stem bearings by grabbing the fork legs and attempting to move the front fork side to side.

Replace the bearings if any looseness is noted (page 14-24).

MEMO

4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- The crankcase must be separated to service the oil pump (page 4-6).
- 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.
- For engine oil level check, refer to 3-12.
- For engine oil and filter change, refer to 3-13.
- For final drive oil check and change, refer to 3-18.
- For oil pressure indicator inspection, refer to 20-15.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.5 liters (2.64 US qt, 2.20 Imp qt)	–
	After draining/filter change	2.6 liters (2.75 US qt, 2.29 Imp qt)	–
	After disassembly	3.2 liters (3.38 US qt, 2.82 Imp qt)	–
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (U.S.A. & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	–
Oil pressure at oil pressure switch		530 kPa (5.4 kgf/cm², 77 psi) at 5,000 rpm/(80°C/176°F)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.08 (0.001 – 0.003)	0.10 (0.004)

TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	

LUBRICATION SYSTEM

TOOLS

Oil pressure gauge set 07506-3000001  (or equivalent commercially available in U.S.A., Gauge set MT37A	Oil pressure gauge attachment 07510-4220100  or equivalent commercially available in U.S.A. (Adaptor AT77AH)

TROUBLE SHOOTING

Oil level too low
- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn stem seals
- Worn valve guide

Low oil pressure
- Oil level low
- Clogged oil strainer
- Faulty oil pump
- Internal oil leak
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive and/or driven sprocket
- Damaged oil pump
- Internal oil leak

High oil pressure
- Oil pressure relief valve stuck closed
- Clogged oil gallery or metering orifice
- Incorrect oil being used

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

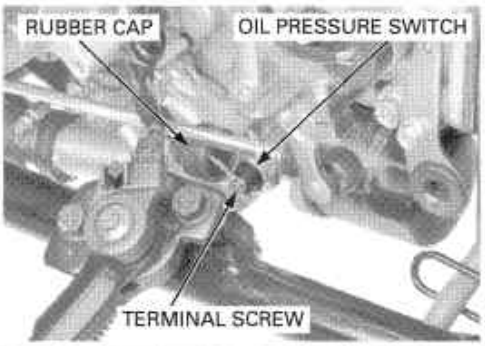
Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE CHECK

Remove the left crankcase rear cover (page 2-6).

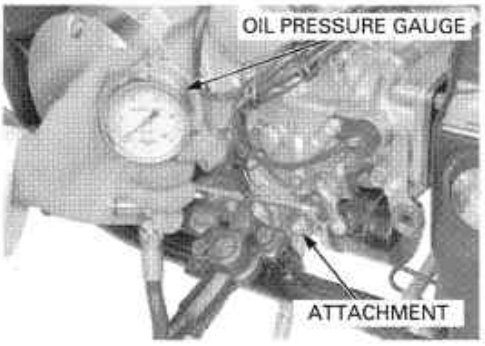
If the engine is cold, the pressure reading will be abnormally high. Warm up the engine to normal operating temperature before starting this test.
Stop the engine.

Remove the rubber cap and disconnect the oil pressure switch wire by removing the terminal screw.



Remove the oil pressure switch and connect an oil pressure gauge attachment and gauge to the pressure switch hole.

TOOLS:
Oil pressure gauge set 07506-3000001
Oil pressure gauge attachment 07510-4220100
(or equivalent commercially available in U.S.A., MT37A and adaptor AT77AH)



Check the oil level and add the recommended oil if necessary (page 3-12).

Start the engine and check the oil pressure at 5,000 rpm.

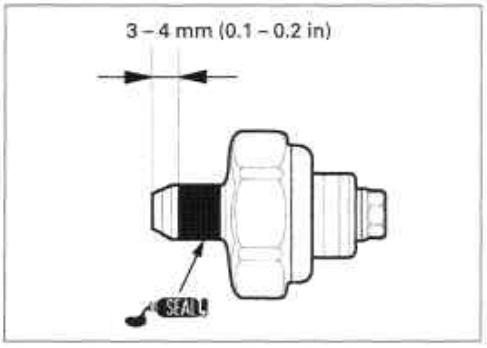
OIL PRESSURE:
530 kPa (5.4 kgf/cm², 77 psi) at 5,000 rpm (80°C/176°F)

Stop the engine.

Do not apply sealant to the thread head 3–4 mm (0.1–0.2 in).

Apply sealant to the oil pressure switch threads as shown and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the oil pressure switch wire and tighten the terminal screw.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the rubber cap.

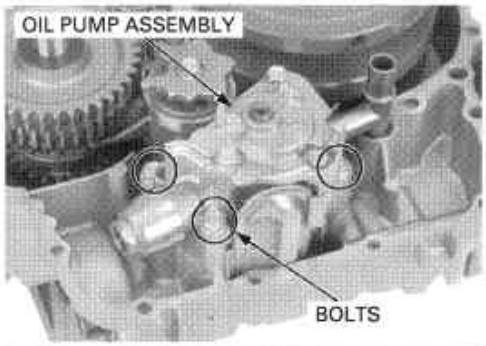
Start the engine.
Check that the oil pressure indicator turns off after 1 or 2 seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 20-15).

OIL PUMP

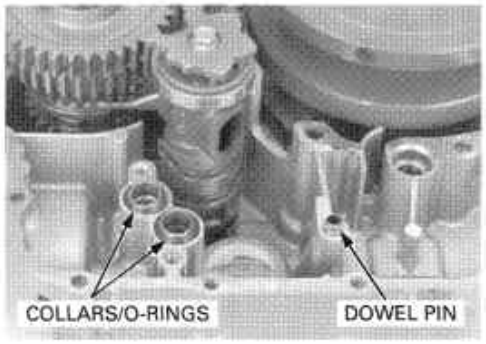
REMOVAL

Separate the crankcase (page 12-8).

Remove the bolts and oil pump assembly from the left crankcase.



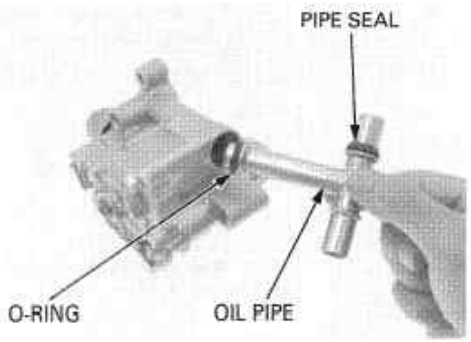
Remove the dowel pin, collars and O-rings.



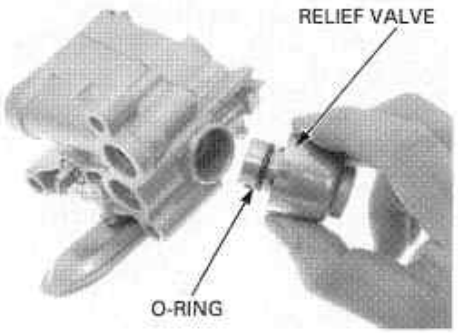
DISASSEMBLY

OIL PUMP BODY

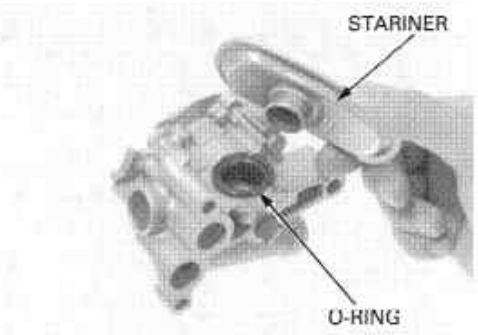
Remove the oil pipe, oil pipe seal and O-ring.



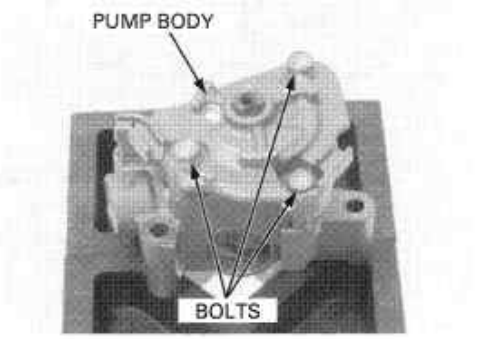
Remove the pressure relief valve and O-ring.



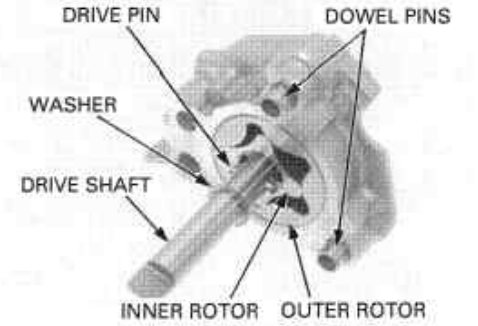
Remove the oil strainer and O-ring.



Remove the bolts and pump body from the pump cover.



Remove the dowel pins.
Remove the washer, drive shaft, drive pin, inner and outer rotors.



PRESSURE RELIEF VALVE

Check the operation of the pressure relief valve by pushing on the piston.

The snap ring is under spring pressure. Use care when removing it and wear eye and face protection. Be careful not to lose the disassembled parts.

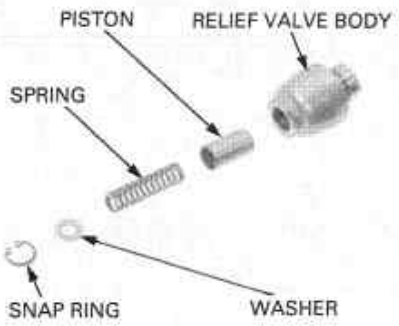
Remove the snap ring, washer, spring and piston from the pressure relief valve body.

Check the piston for wear, sticking or damage.
Check the valve spring for wear or fatigue.
Check the relief valve body for clogging or damage.

Clean all parts and assemble the relief valve in the reverse order of disassembly.

NOTE:

- Install the snap ring with the chamfered edge facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the groove.



INSPECTION

NOTE:

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

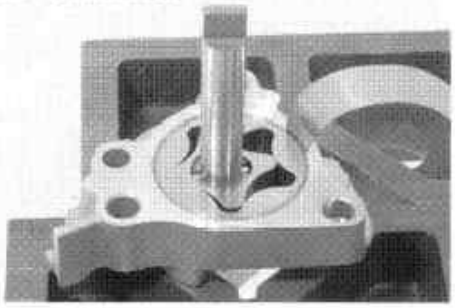
BODY CLEARANCE

Temporarily assemble the inner rotor, outer rotor, drive pin and pump shaft into the pump body.

Measure the body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

BODY CLERARANCE

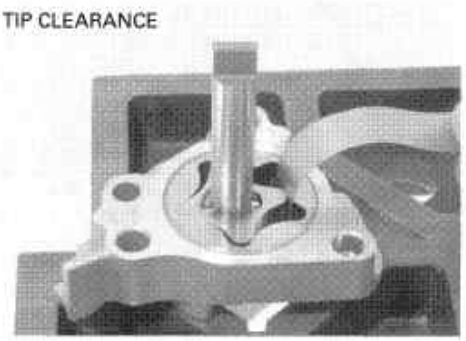


TIP CLEARANCE

Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

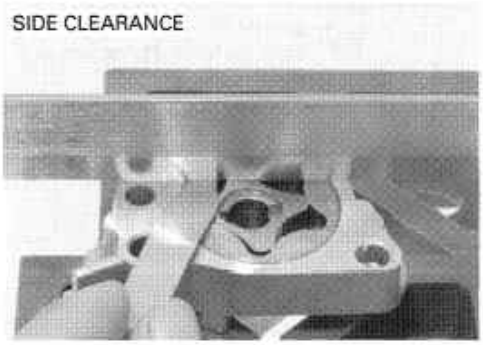
TIP CLEARANCE



SIDE CLEARANCE

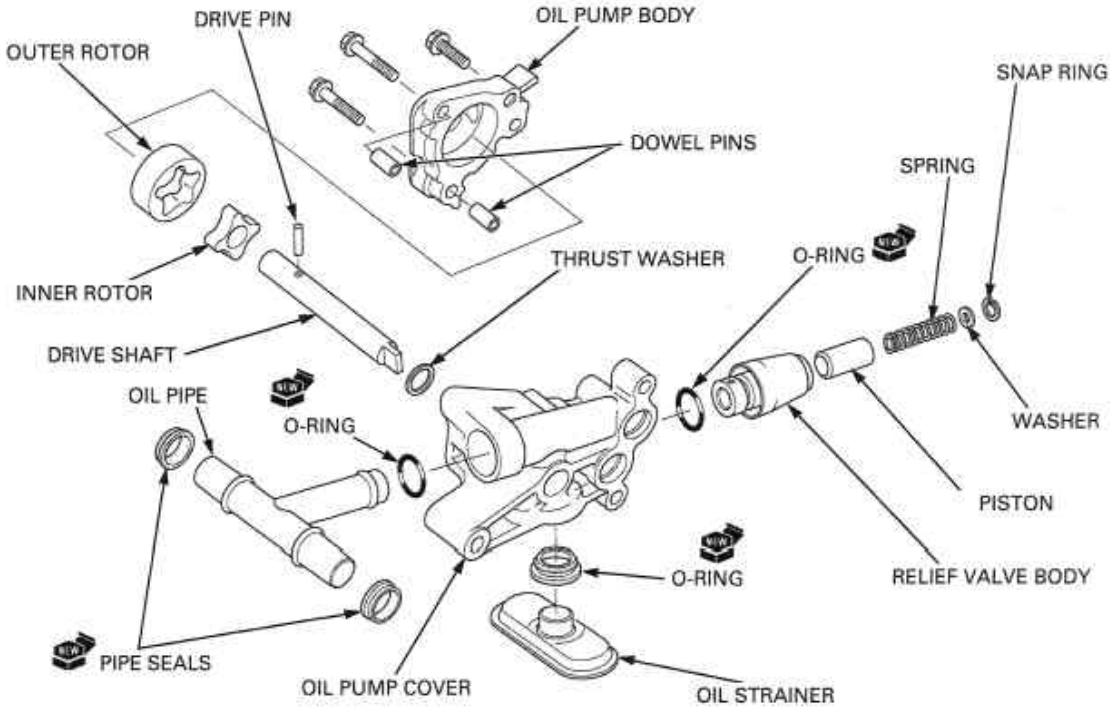
Measure the side clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



OIL PUMP ASSEMBLY

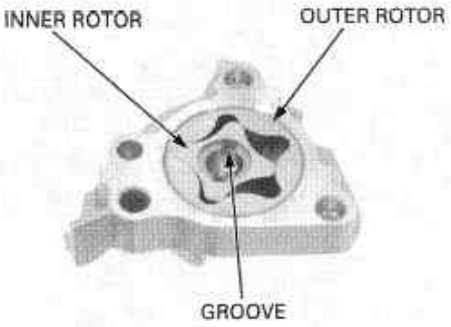
Dip all parts in clean engine oil.



Install the outer and inner rotors to the pump body.

NOTE:

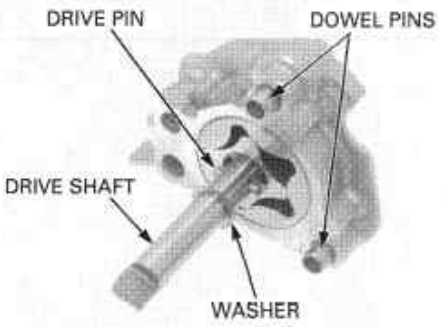
Install the inner rotor with the groove side facing the pump cover.



LUBRICATION SYSTEM

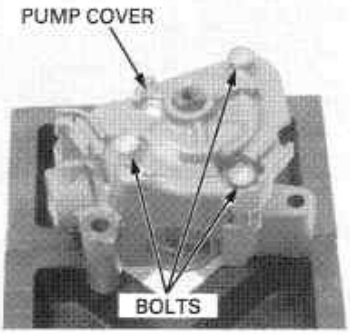
Install the drive shaft and drive pin by aligning the drive pin with the grooves in the inner rotor.

Place the washer into the inner rotor groove.
Install the dowel pins to the pump body.



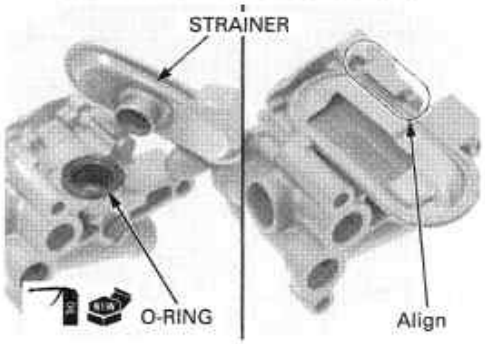
Install the pump cover on the pump body.
Install and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



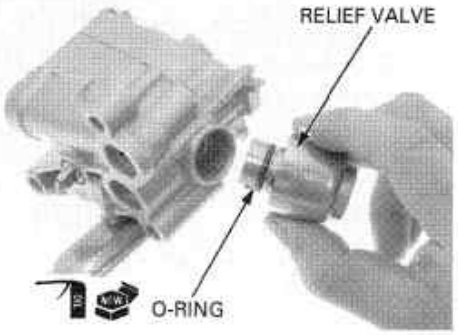
Clean the oil strainer.

Coat a new O-ring with oil and install it to the oil pump body.
Install the oil strainer to the oil pump by aligning its side end with the groove on the oil pump.



Coat a new O-ring with oil and install it to the pressure relief valve.

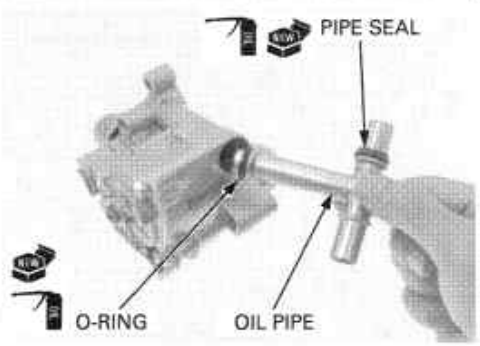
Install the pressure relief valve into the oil pump body.



Coat a new oil pipe seal and new O-ring with oil, then install them to the oil pipe.

NOTE:
Install an O-ring with its tapered side facing out.

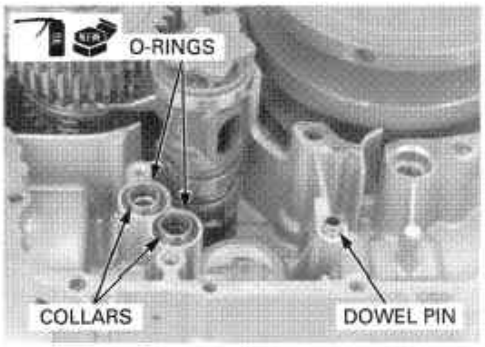
Install the oil pipe to the oil pump securely.



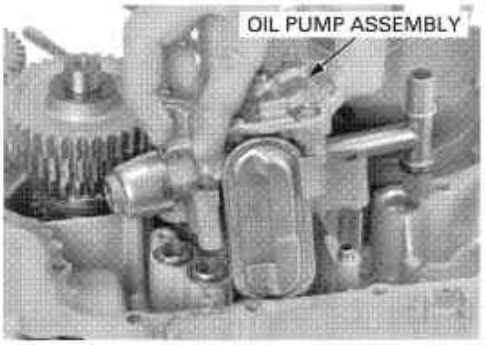
INSTALLATION

Install the dowel pin and collars.

Coat new O-rings with oil and install them.

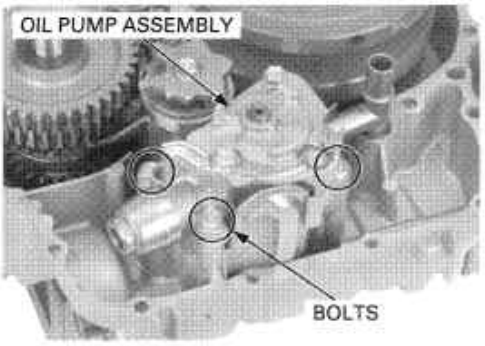


Install the oil pump assembly into the crankcase securely.



Install and tighten the bolts securely.

Assemble the crankcase (page 12-47).
Check the oil pressure (page 4-5).

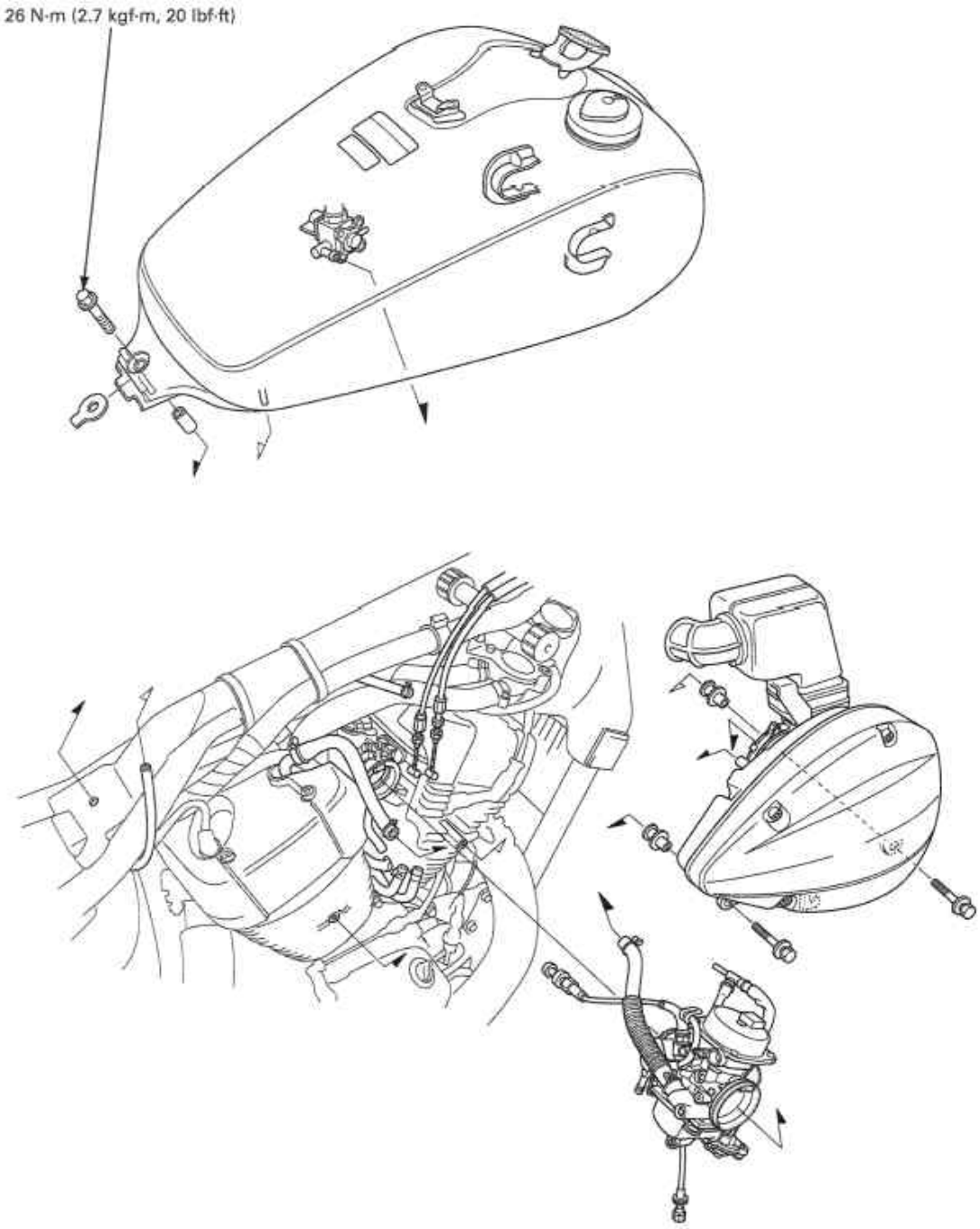


MEMO

5. FUEL SYSTEM

5

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.
- For fuel tank removal and installation, refer to page 2-4.
- Before disassembling the carburetor, place an approved fuel container under the float chamber, loosen the drain screw and drain the carburetor.
- After removing the intake manifold, cover the intake ports of the cylinder heads with shop towels to prevent any foreign material from dropping into the engine.
- Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragm might be damaged.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- All hoses used in the evaporative emission control system (California type only) and secondary air supply system are numbered for identification. When connecting any of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label for its proper routing (page 1-38).
- If the vehicle is to be stored for more than 1 month, drain the float chamber. Fuel left in the float chamber may cause clogging jets, resulting in hard starting or poor driveability.
- For throttle position sensor inspection, refer to page 18-11.

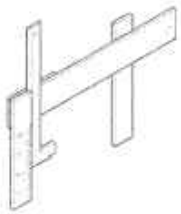
SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	49 State and Canada type	VE5BA
	California type	VE5BB
Main jet	Standard	#125
	High altitude	#122
Slow jet		#50
Pilot screw	Initial/final opening	page 5-25
	High altitude adjustment	page 5-26
Float level		18.5 mm (0.73 in)
Idle speed		1,200 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)

TORQUE VALUES

Air cleaner cover socket bolt	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)
PAIR check valve cover bolt	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)
Air cleaner chamber stay mounting screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Carburetor insulator band screw	See page 5-22
Air cleaner housing connecting tube band screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

TOOL

Carburetor float level gauge 07401-0010000	Pilot screw wrench 07KMA-MS60102	Pilot screw elbow guide 07PMA-MZ20110
		
	or 07MMA-MT3010B (U.S.A. only)	or 07PMA-MZ2011A (U.S.A. only)

FUEL SYSTEM

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetor
  - Clogged fuel strainer
  - Clogged fuel line
  - Clogged fuel tank breather hose
- Too much fuel getting to the engine
  - Clogged air cleaner
  - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Clogged starting enrichment valve circuit
- Improper starting enrichment valve operation
- Improper throttle operation
- No spark at plug (faulty ignition system – page 18-6)

Lean mixture
- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent hose
- Restricted fuel tank breather hose
- Intake air leak
- Faulty vacuum piston
- Faulty evaporative emission (EVAP) control system (California type only)
  - Faulty EVAP carburetor air vent (CAV) control valve
  - Clogged hose of the EVAP CAV system

Rich mixture
- Starting enrichment valve open (ON)
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Worn jet needle or needle jet
- Faulty vacuum piston
- Faulty EVAP control system (California type only)
  - Faulty EVAP purge control valve
  - Clogged hose of the EVAP purge system

Engine stalls, hard to start, rough idling
- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Misadjusted float level
- Restricted fuel tank breather hose
- Clogged air cleaner
- Clogged slow circuit
- Clogged starting enrichment valve circuit
- Faulty EVAP control system (California type only)
  - Faulty EVAP CAV control valve
  - Faulty EVAP purge control valve
  - Clogged hose of the EVAP control system
- Faulty ignition system (page 18-6)

Afterburn when engine braking is used
- Lean mixture in slow circuit
- Faulty air cut-off valve
- Faulty pulse secondary air injection (PAIR) system
  - Faulty PAIR control valve
- Improper PAIR control valve for high altitude riding (page 5-26)
- Faulty ignition system (page 18-6)

Backfiring or misfiring during acceleration
- Lean mixture
- Faulty ignition system (page 18-6)

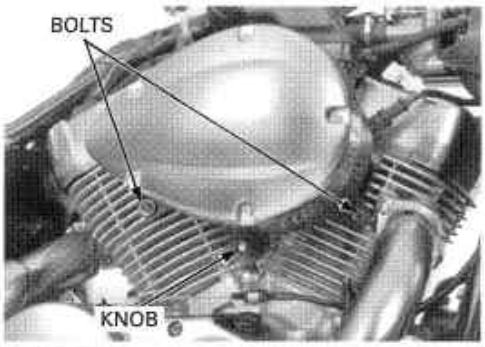
Poor performance (driveability) and poor fuel economy
- Clogged fuel system
- Faulty EVAP control system (California type only)
  - Faulty EVAP CAV control valve
  - Clogged hose of the EVAP CAV system
- Faulty ignition system (page 18-6)

AIR CLEANER HOUSING

REMOVAL

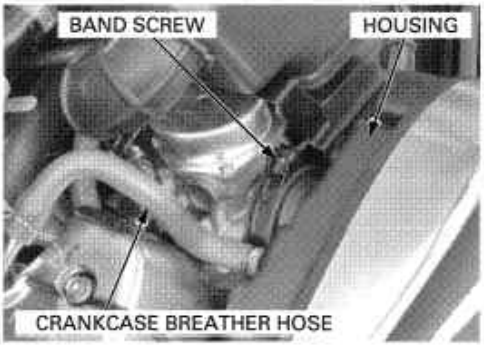
Remove the fuel tank (page 2-4).

Remove the throttle stop screw knob from the air cleaner housing stay.
Remove the air cleaner housing mounting bolts.

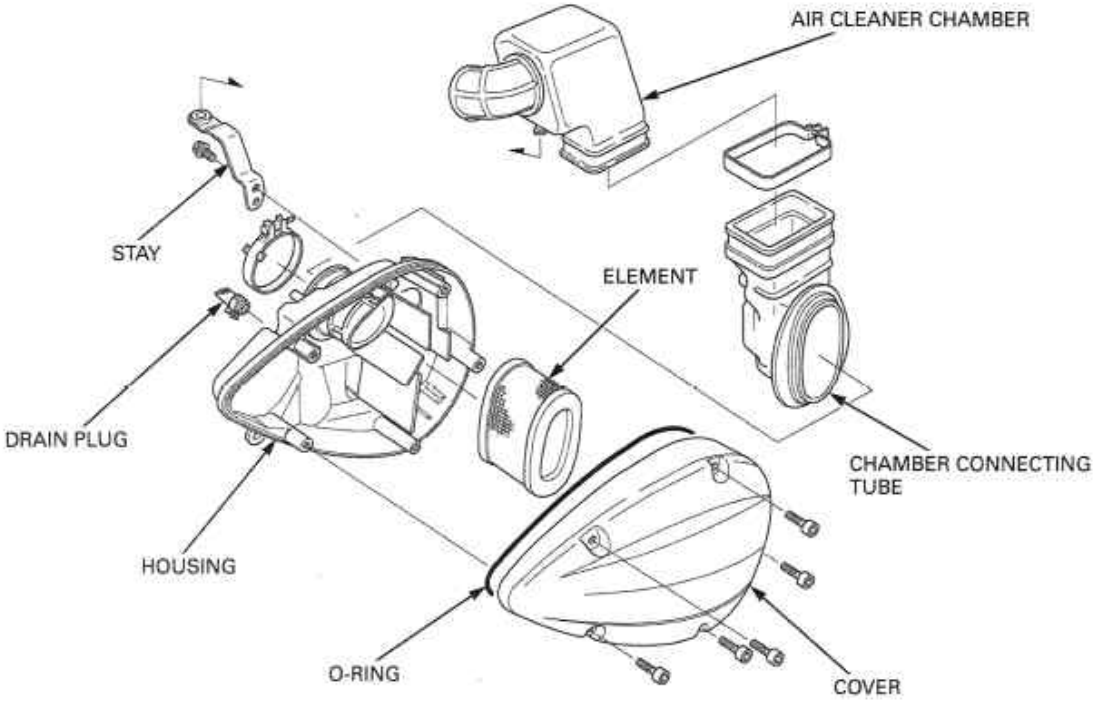


Loosen the connecting tube band screw.
Disconnect the crankcase breather hose from the air cleaner housing.

Remove the air cleaner housing.



DISASSEMBLY/ASSEMBLY

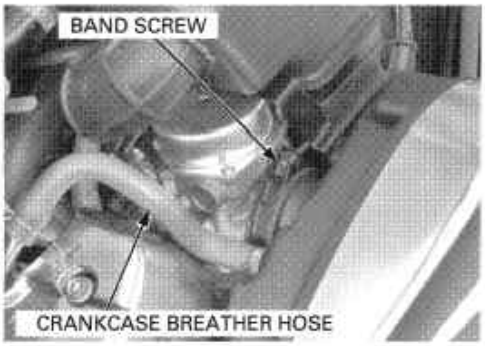


INSTALLATION

Connect the crankcase breather hose to the air cleaner housing.
Connect the connecting tube to the carburetor.

Tighten the insulator band screw to the specified torque.

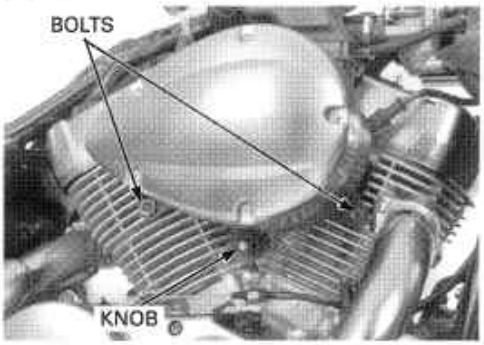
TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



Install the air cleaner housing mounting bolts, and tighten them.

Install the throttle stop screw knob onto the air cleaner housing stay.

Install the fuel tank (page 2-4).

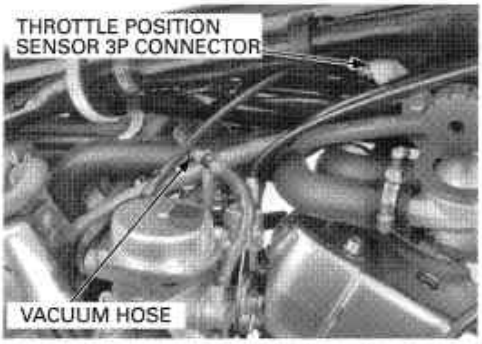


CARBURETOR REMOVAL

Remove the following:

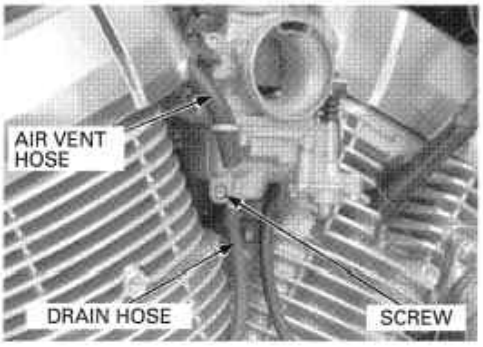
- Fuel tank (page 2-4).
- Air cleaner housing (page 5-6).

Disconnect the vacuum hose from the 3-way joint.
Disconnect the throttle position sensor 3P connector.



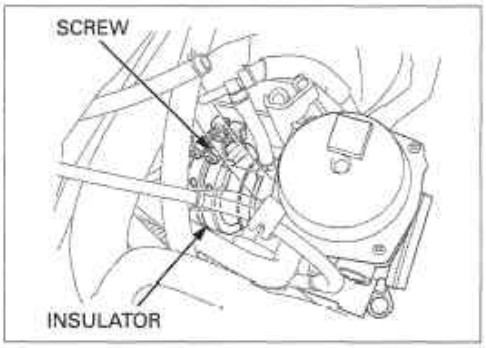
Connect the drain hose to the float chamber.
Loosen the carburetor drain screw and drain the gasoline to the approved gasoline container.

Disconnect the drain hose.
Release the air vent hose from the clamp.



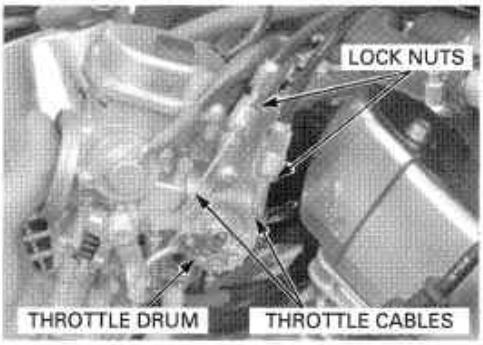
FUEL SYSTEM

Loosen the insulator band screw (carburetor side) and disconnect the carburetor from the insulator.



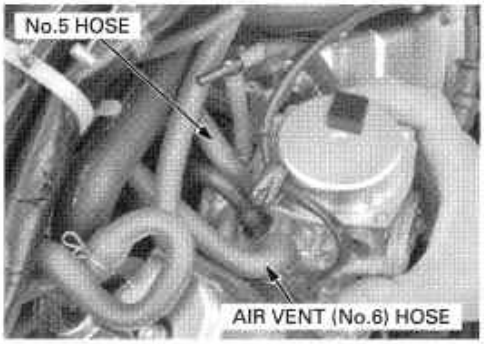
Loosen the lock nuts all the way.

Disconnect the throttle cables from the throttle drum and cable stays.



Disconnect the air vent (California type: No. 6) hose from the carburetor.

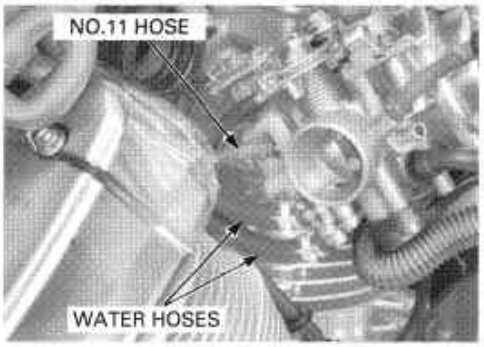
California type only: Disconnect the No. 5 hose.



Clamp the water hoses and disconnect them.

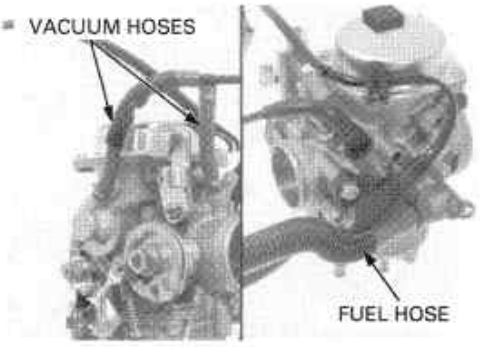
California type only: Disconnect the No. 11 hose.

Remove the carburetor.



CARBURETOR DISASSEMBLY/ INSPECTION

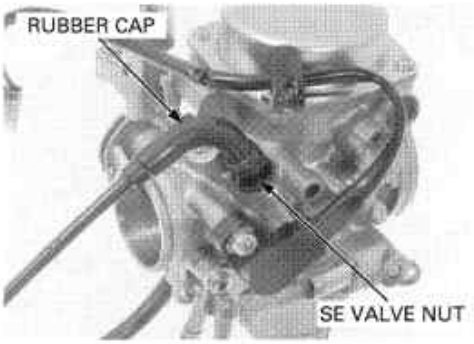
Remove the vacuum hoses and fuel hose from the carburetor.



SE VALVE

Slide the rubber cap off the starting enrichment (SE) valve nut.

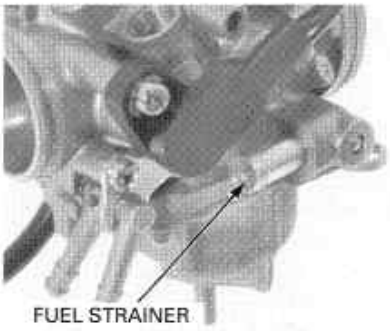
Loosen the SE valve nut and remove the SE valve from the carburetor.



CARBURETOR FUEL STRAINER

Remove the fuel strainer from the carburetor.

Check the strainer for clog or damage. Replace the strainer if necessary.



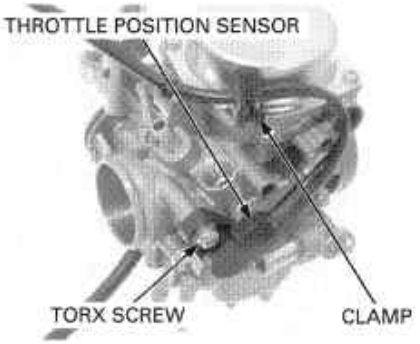
THROTTLE POSITION SENSOR

Release the throttle position sensor wire from the clamp.

Remove the torx screw and throttle position sensor.

NOTE:

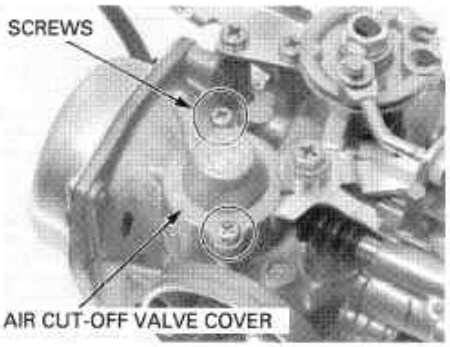
Do not remove the throttle position sensor unless it is necessary to replace it or disassemble the carburetor. For sensor inspection, refer to page 18-11.



AIR CUT-OFF VALVE

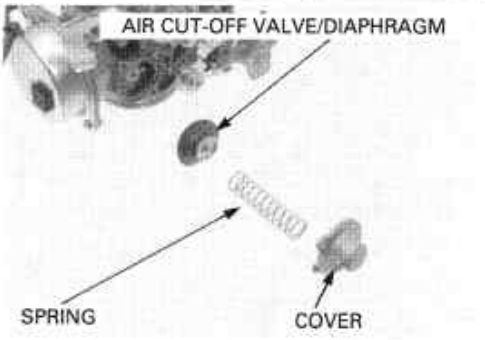
The air cut-off valve cover is under spring pressure. Do not lose the spring and screws.

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



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

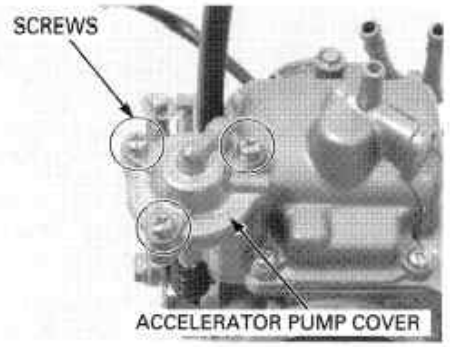
Check the diaphragm for pin holes, deterioration or other damage.
Check the air cut-off valve for wear or damage at the tip.
Check the orifice in the carburetor body for clog or restriction.



ACCELERATOR PUMP

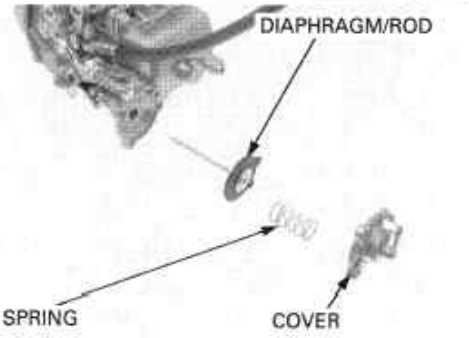
The accelerator pump cover is under spring pressure. Do not lose the spring and screws.

Remove the screws while holding the accelerator pump cover.

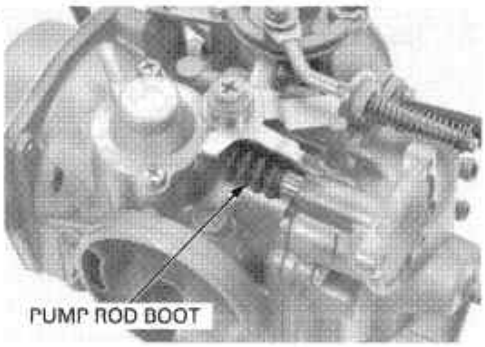


Remove the accelerator pump cover, spring and diaphragm/rod from the carburetor body.

Check the diaphragm for pin holes, deterioration or other damage.
Check the diaphragm/rod for wear or damage at the tip.
Check the orifice in the cover and carburetor body for clog or restriction.

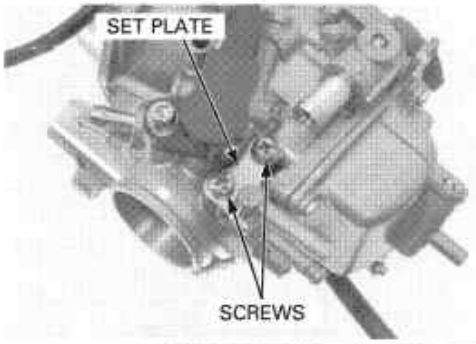


Check the pump rod boot for deterioration or damage.



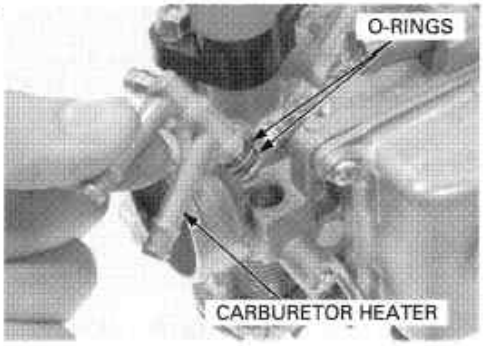
CARBURETOR HEATER

Remove the screws and set plate.



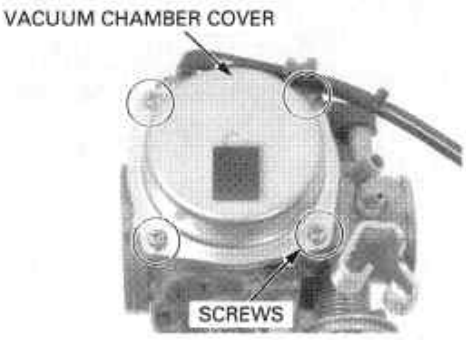
Remove the carburetor heater from the carburetor body.

Remove the O-rings from the carburetor heater.

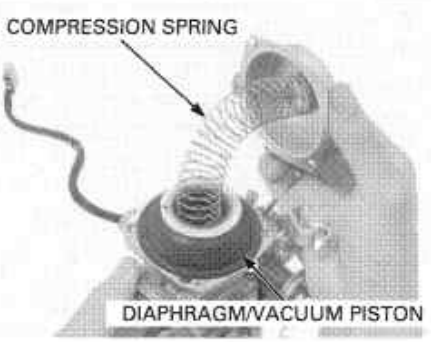


VACUUM CHAMBER

Remove the screws while holding the vacuum chamber cover.

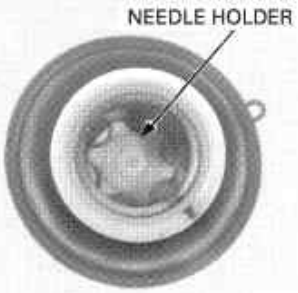


Remove the vacuum chamber cover, compression spring and diaphragm/vacuum piston from the carburetor body.



Be careful not to damage the diaphragm.

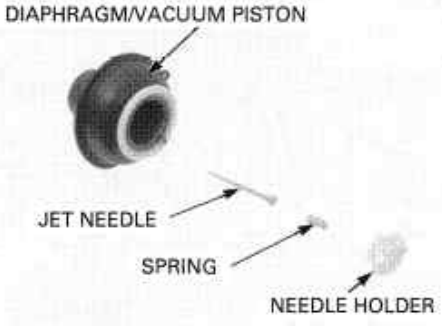
Turn the needle holder counterclockwise by using a screwdriver while pressing it in and release the holder flange from the vacuum piston.



Remove the needle holder, spring and jet needle.

Check the jet needle for stepped wear.
Check the vacuum piston for wear or damage.
Check the vacuum piston for smooth operation up and down in the carburetor body.
Check the diaphragm for pin holes, deterioration or other damage.

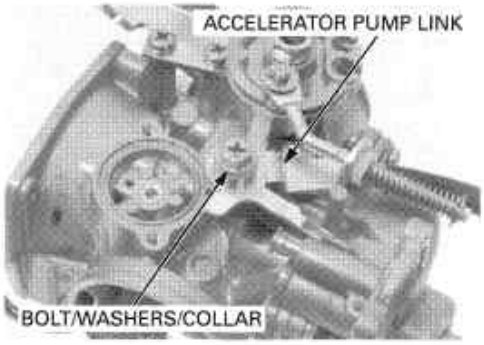
Air will leak out of the vacuum chamber if the diaphragm is damaged in any way, even with just a pin hole.



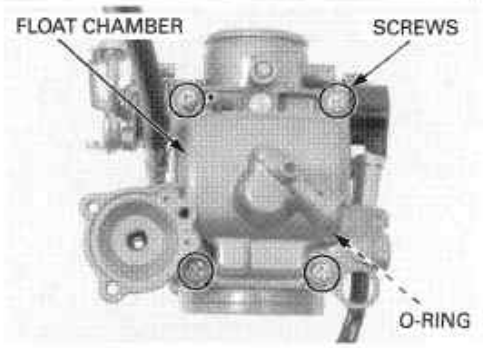
FLOAT CHAMBER

Remove the following:

- Bolt
- Plastic washer
- Accelerator pump link
- Collar
- Plain washer
- Spring washer

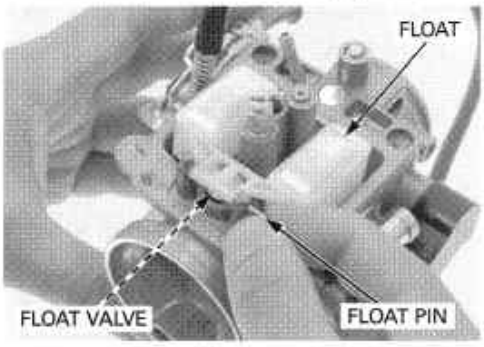


Remove the screws, float chamber and O-ring.

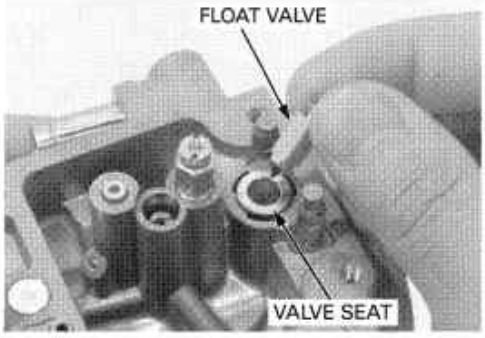


Remove the float pin, float and float valve.

Check the float for damage or fuel in the float.



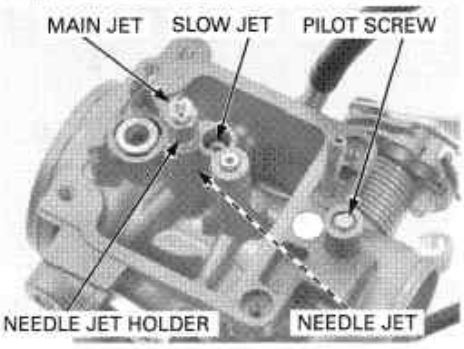
Check the float valve and valve seat for scoring, scratches, clogs or damage.
Check the tip of the float valve where it contacts the valve seat, for stepped wear or contamination.
Check the operation of the float valve.



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

Remove the following:

- Main jet
- Needle jet holder
- Needle jet
- Sow jet



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

Turn the pilot screw in and carefully count the number of turns until it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screw.

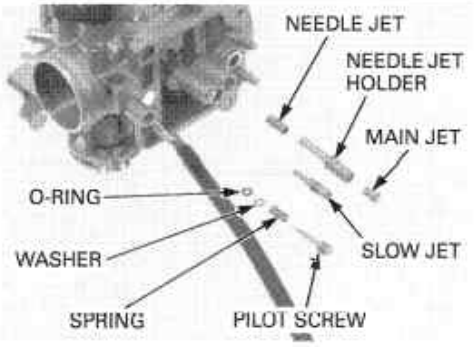
TOOL:

Pilot screw wrench	**07KMA-MS60102 or 07MMA-MT3010B (U.S.A. only)**

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

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

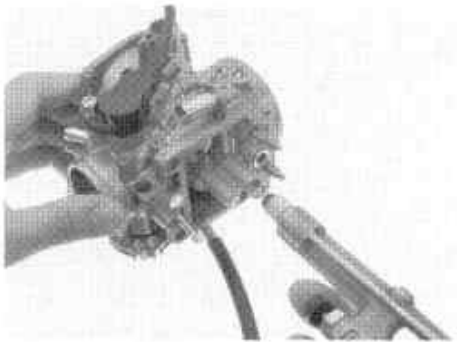
Clean the jets with cleaning solvent.



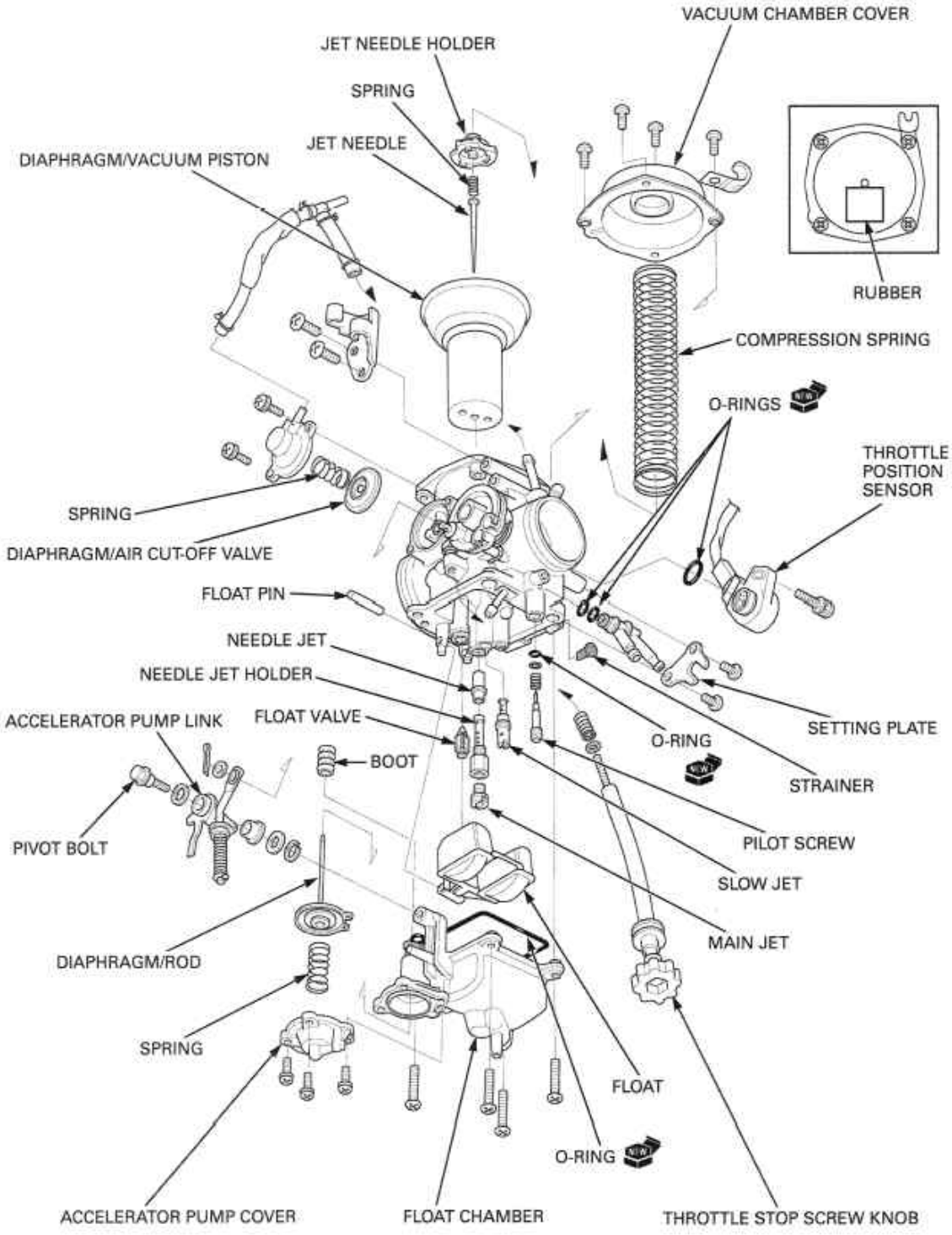
CARBURETOR CLEANING

Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.

Blow open all air and fuel passages in the carburetor body and float chamber with compressed air.



CARBURETOR ASSEMBLY



JETS AND FLOAT

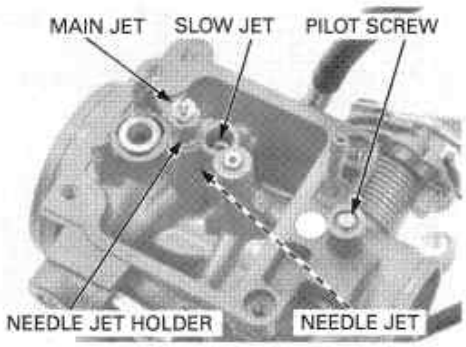
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

Install the pilot screw with the spring, washer and a new O-ring until it seats lightly. Return it to its original position as noted during removal.

TOOL:

Pilot screw wrench	**07KMA-MS60101 or 07MMA-MT3010B (U.S.A. only)**

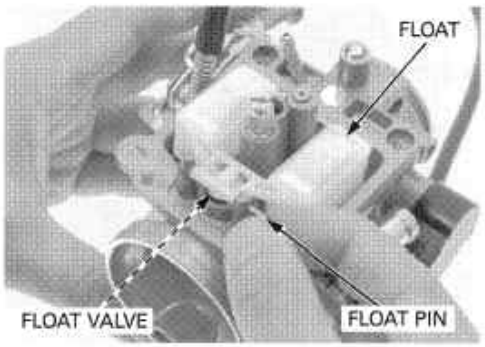
Perform the pilot screw adjustment if a new pilot screw is installed (page 5-25).



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

Install the needle jet, needle jet holder, main jet and slow jet.

Hang the float valve onto the float arm lip.
Install the float with the float valve and insert the float pin.



FLOAT LEVEL INSPECTION

NOTE:
Check the float level after checking the float valve, valve seat and float.

Set the float level gauge so it is perpendicular to the float chamber face at the highest point of the float.

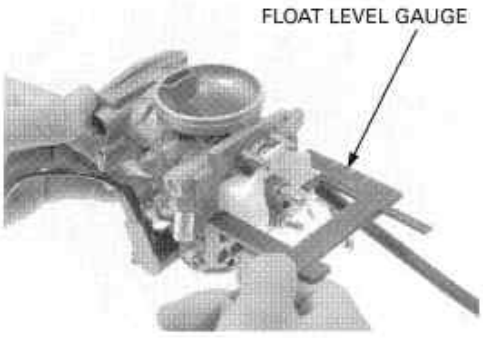
With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

TOOL:

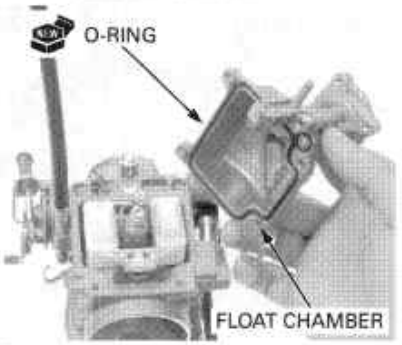
Carburetor float level gauge	**07401-0010000**

Float level: 18.5 mm (0.73 in)

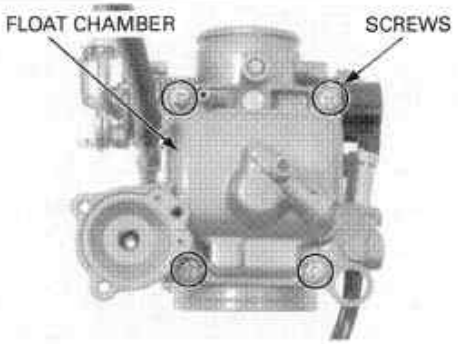
The float cannot be adjusted.
Replace the float if the float level is out of specification.



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



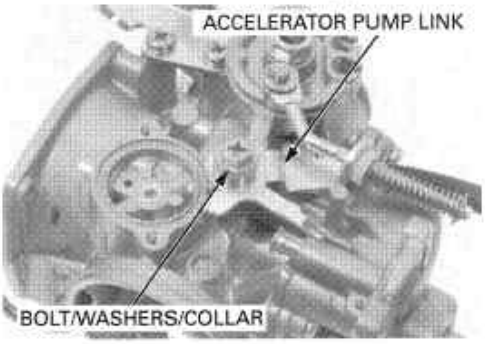
Install the float chamber and tighten the screws securely.



Install the following:

- Spring washer
- Plain washer
- Collar
- Accelerator pump link
- Plastic washer

Tighten the bolt securely.

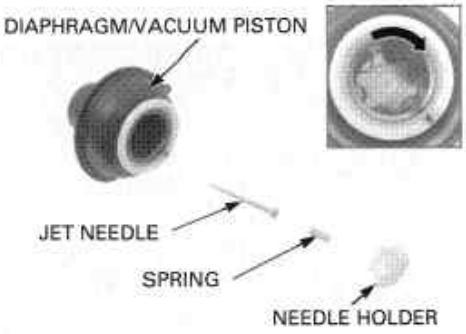


VACUUM CHAMBER

Insert the jet needle into the vacuum piston.

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

Turn the needle holder clockwise while pressing it until it locks.

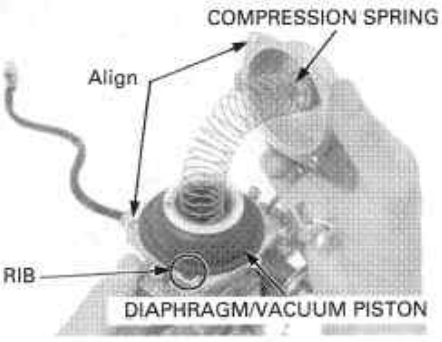


Install the diaphragm/vacuum piston into the carburetor body being careful not to damage the jet needle.

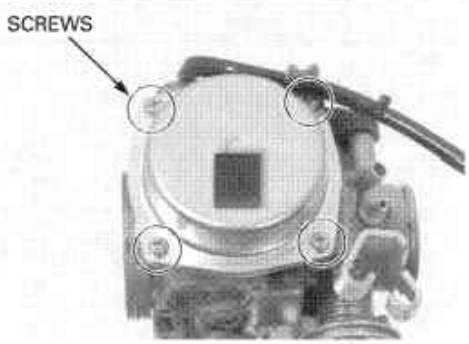
Lift the bottom of the piston with your finger to set the diaphragm rib into the groove in the carburetor body.

Be careful not to pinch the diaphragm.

Install the compression spring and vacuum chamber cover while lifting the piston in place. Align the bosses of the cover with the grooves of the carburetor body and secure the cover with at least two screws before releasing the vacuum piston.



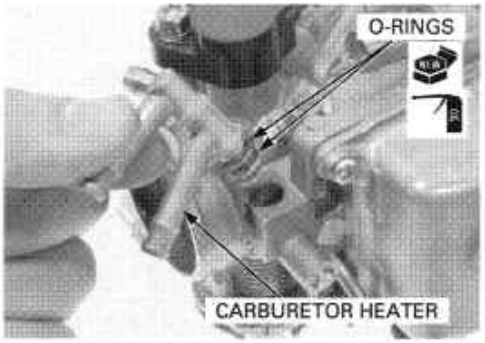
Install and tighten the screws securely.



CARBURETOR HEATER

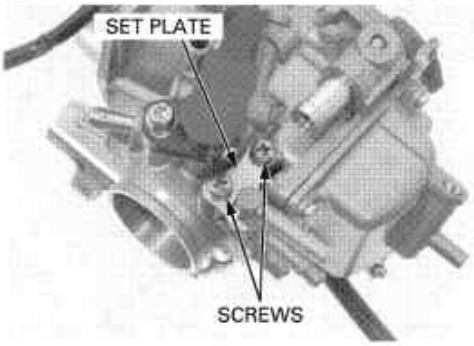
Coat new O-rings with oil and install them onto the carburetor heater.

Install the carburetor heater into the carburetor body.



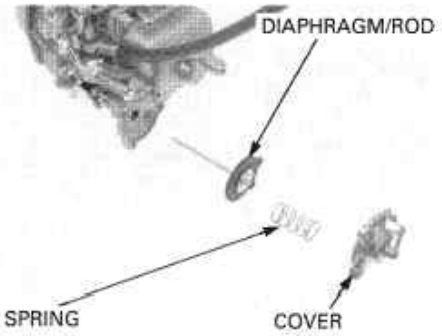
Install the set plate onto the carburetor heater.

Install and tighten the screws securely.

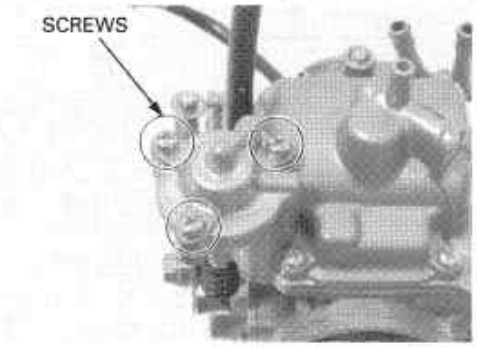


ACCELERATOR PUMP

Install the diaphragm/rod, spring and cover to the float chamber cover.



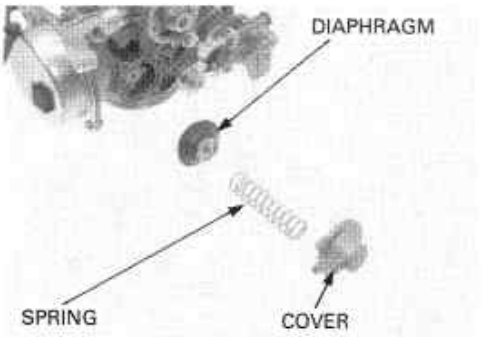
Install and thighten the screws securely while holding the cover.



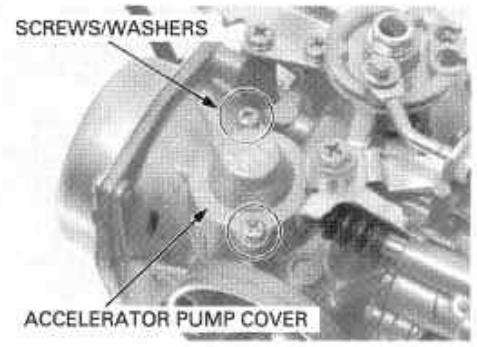
AIR CUT-OFF VALVE

Be careful not to pinch the diaphragm.

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

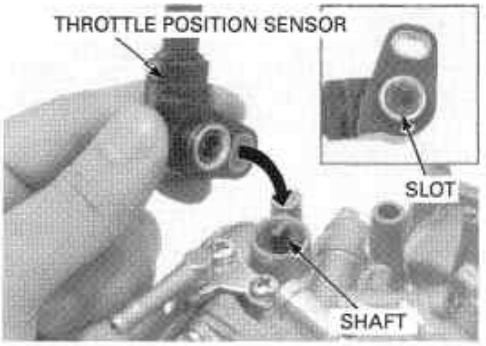


Install the screws while holding the air cut-off valve cover, and tighten the screws securely.



THROTTLE POSITION SENSOR

Install the throttle position sensor by aligning the slot in the sensor with the flat of the throttle shaft.



Measure the resistance (A) between the Blue and Black wire terminals at the throttle position sensor connector (page 18-11).

Resistance (A):

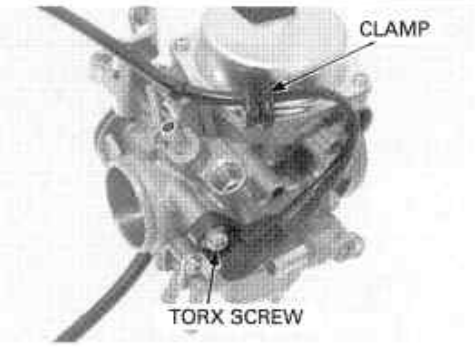
STANDARD: 4 – 6 kΩ (20°C/68°F)

Measure the resistance (B) between the Yellow and Black wire terminal, then adjust the throttle sensor initial position so that the resistance (B) is within the standard value.

Resistance (B) = Resistance (A) x (0.09 to 0.11)

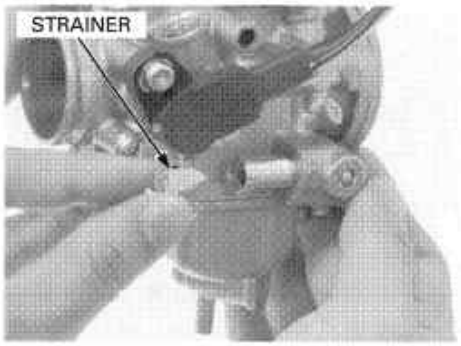
e.g:
When the resistance (A) is 5 kΩ, the resistance (B) should be 450 – 550 Ω.

Tighten the torx screw at the initial position.
Clamp the throttle position sensor wire.



CARBURETOR FUEL STRAINER

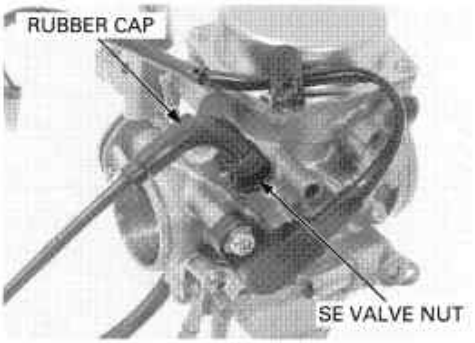
Install the fuel strainer into the carburetor body.



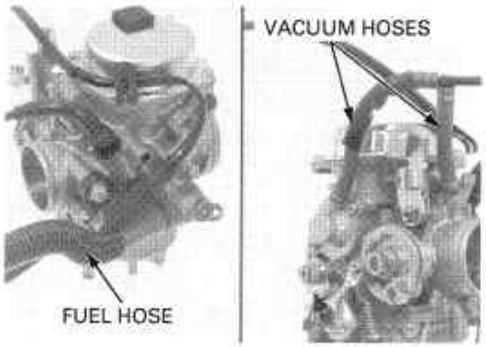
SE VALVE

Install the starting enrichment (SE) valve and tighten the SE valve nut.

Slide the rubber boot over the SE valve nut.



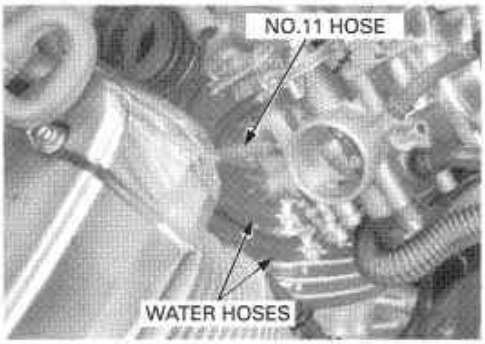
Connect the fuel and vacuum hoses.



CARBURETOR INSTALLATION

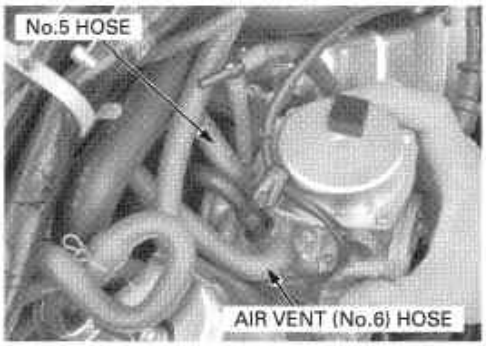
Connect the water hoses to the carburetor heater and release the clamps.

California type only: Connect the No.11 hose to the carburetor.

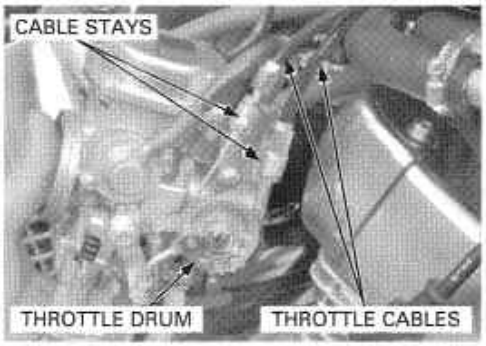


Connect the air vent (California type: No.6) hose to the carburetor.

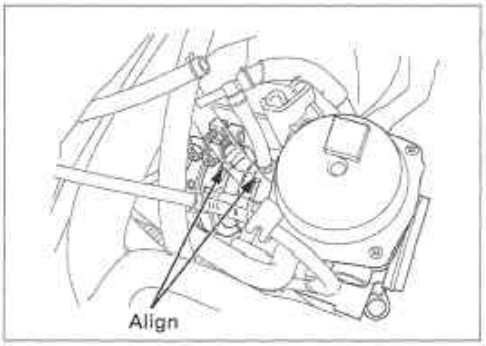
California type only: Connect the No. 5 hose.



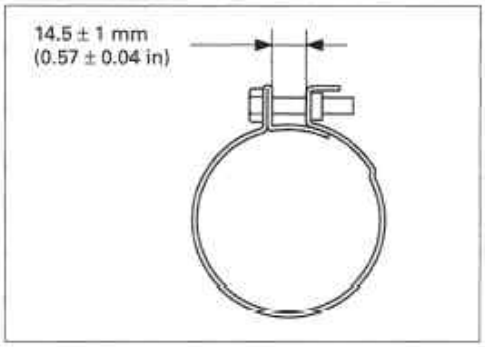
Connect the throttle cables to the throttle drum and install them onto the cable stays.



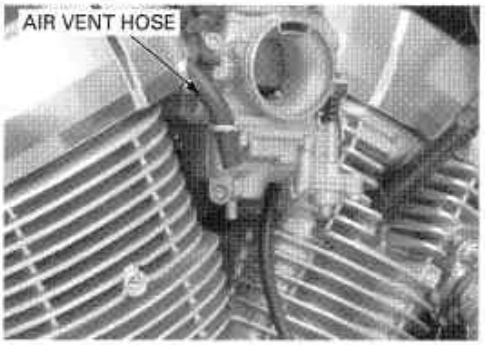
Connect the carburetor to the insulator while aligning its lug with the insulator groove.



Tighten the insulator band screw so the distance between the band ends is 14.5 ± 1 mm (0.57 ± 0.04 in).



Connect the air vent hose to the clamp.

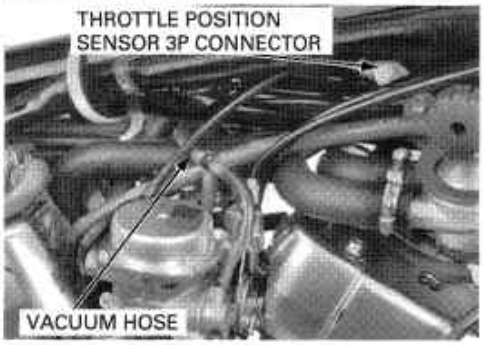


Connect the throttle position sensor 3P connector.
Connect the vacuum hose to the 3-way joint.

Install the air cleaner housing (page 5-7).

Perform the following inspections and adjustments:

- Engine idle speed (page 3-15)
- Throttle operation (page 3-5)
- Pilot screw if it was replaced (page 5-25)

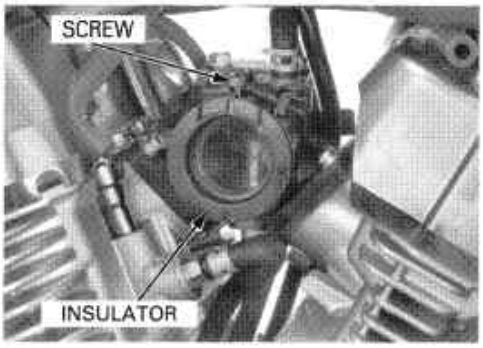


INTAKE MANIFOLD

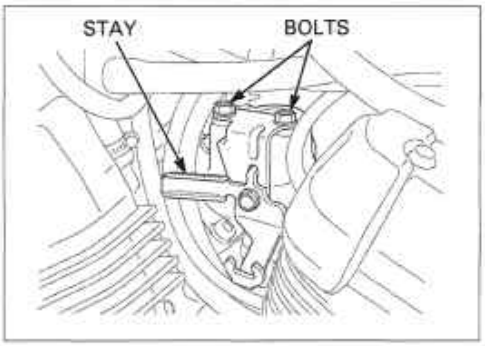
REMOVAL

Drain the coolant from the cooling system (page 6-6).
Remove the carburetor (page 5-7).

Loosen the insulator band screw and remove the insulator from the intake manifold.

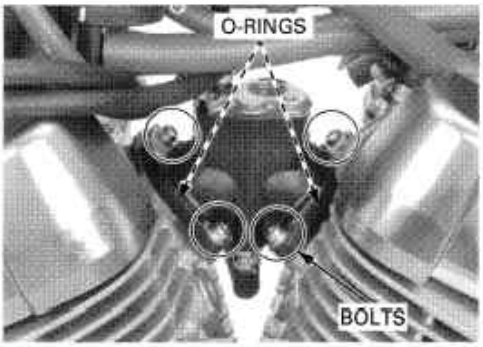


Remove the bolts and choke cable stay.



Remove the bolts, intake manifold and O-rings.

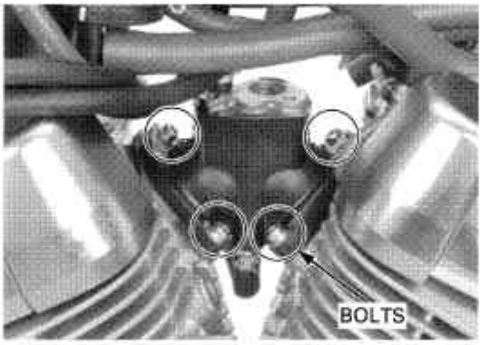
Seal the intake ports of the cylinder heads with tape or clean cloths to keep dirt and debris from entering the engine.



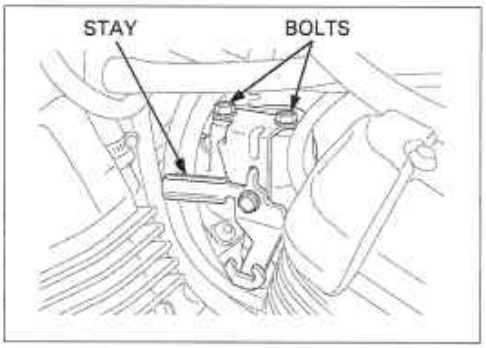
INSTALLATION

Install new O-rings onto the intake manifolds.

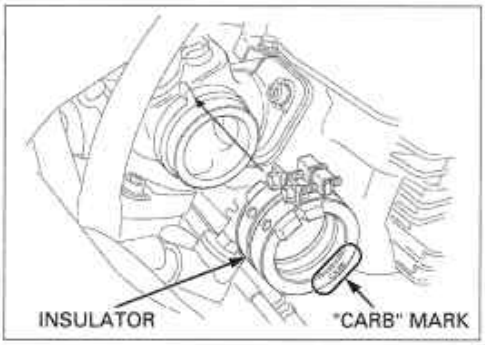
Install the intake manifold onto the cylinder heads. Install the bolts and tighten them.



Install the choke cable stay and bolts.
Tighten the bolt.

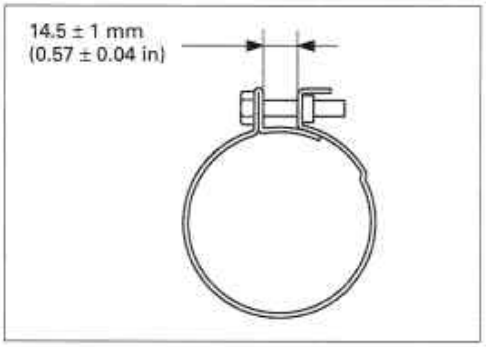


Install the insulator with the "CARB" mark facing the carburetor side, aligning its groove with the lug on the manifold.



Tighten the insulator band screw so the distance between the band ends is 14.5 ± 1 mm (0.57 ± 0.04 in).

Install the carburetor (page 5-21).
Fill and bleed the cooling system (page 6-7).



PILOT SCREW ADJUSTMENT

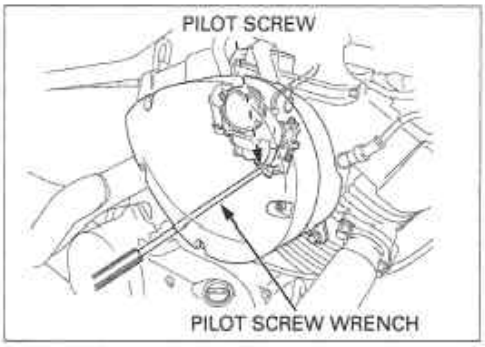
IDLE DROP PROCEDURE

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 50 rpm change.

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 to specification given. This is an initial setting prior to the final pilot screw adjustment.

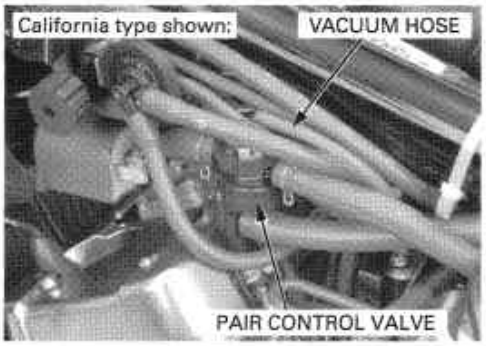


TOOL:

Pilot screw wrench	**07KMA-MS60102**
Pilot screw elbow guide	**07PMA-MZ20110**
or	
Pilot screw wrench	**07MMA-MT3010B (U.S.A. only)**
Pilot screw wrench guide	**07PMA-MZ2011A (U.S.A. only)**

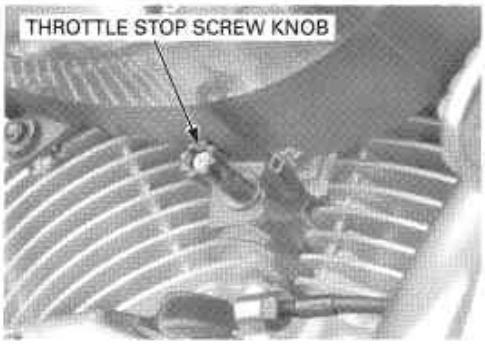
INITIAL OPENING: 2-3/4 turns out

2. Warm up the engine to operating temperature. Ride the motorcycle for approximately 10 minutes.
3. Stop the engine and connect a tachometer according to its manufacturer's instructions.
4. Remove the fuel tank (page 2-4) and 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 specified vacuum (page 5-28) and install the fuel tank (page 2-4).



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

TENTATIVE IDLE SPEED: 1,200 ± 100 rpm



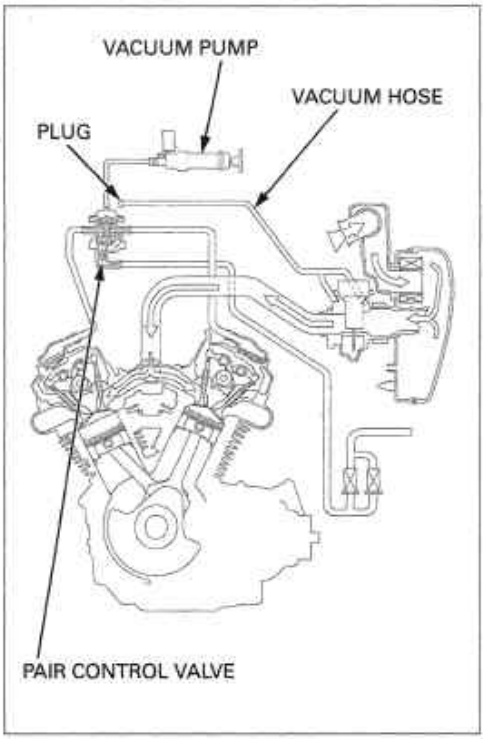
7. Turn the pilot screw in or out slowly to obtain the highest engine speed.
8. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw knob.
9. Turn the pilot screw in gradually until the engine speed drops by 50 rpm.
10. Turn the pilot screw out to the final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

FINAL OPENING: 1/2 turns out

11. Remove the fuel tank (page 2-4) and plug from the vacuum hose, then disconnect the vacuum pump and connect the vacuum hose to the PAIR control valve vacuum hose joint. Install the fuel tank (page 2-4).
12. Readjust the idle speed with the throttle stop screw knob.

    IDLE SPEED: 1,200 ± 100 rpm

13. Disconnect the tachometer.



HIGH ALTITUDE ADJUSTMENT

This adjustment must be made at high altitude to ensure proper high altitude operation.

When the vehicle is to be operated continuously above 6,500 feet (2,000 m), the carburetor setting must be changed as described below to improve driveability and decrease exhaust emissions.

	STANDARD SETTING Below 5,000 ft (1,500 m)	HIGH ALTITUDE SETTING Above 6,500 ft (2,000 m)
Main jet	#125	#122
Pilot screw opening	Factory preset (2-3/4 turns out)	7/8 turn from factory preset (1-7/8 turns out)
PAIR control valve*	P/N: 18650-MEG-003	P/N: 18650-MEG-801

* If the afterburn appears when snapping the throttle grip during engine braking, it is necessary to replace the PAIR control valve (page 5-28) for high altitude riding in addition to change to the carburetor setting.

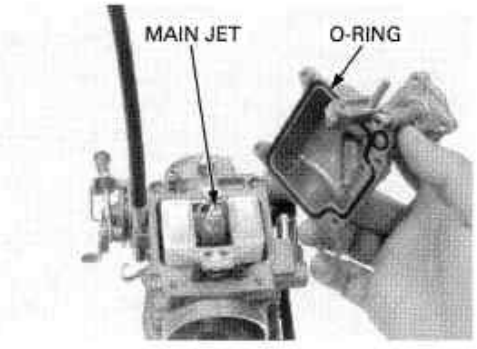
Remove the carburetor (page 5-7) and the float chamber.

Replace the standard main jet with the high altitude type.

HIGH ALTITUDE MAIN JET: #122

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

Install the float chamber and carburetor.

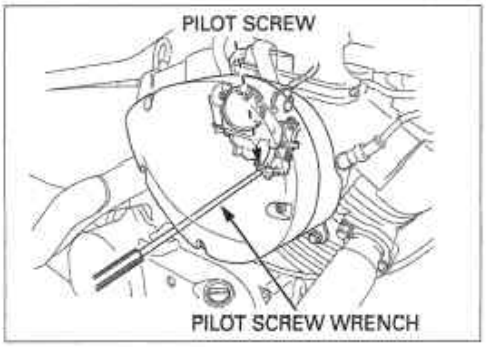


Warm up the engine to operating temperature. Ride the motorcycle for approximately 10 minutes.

Turn the pilot screw in to the specification given.

TOOL:

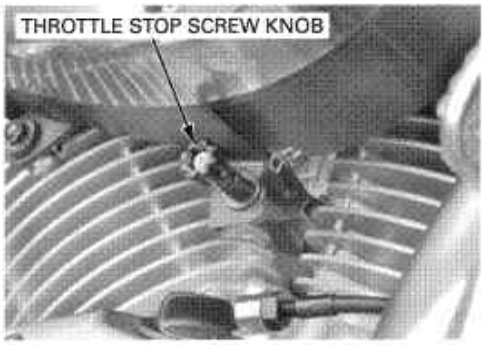
Pilot screw wrench	**07KMA-MS60102**
Pilot screw elbow guide	**07PMA-MZ20110**
or	
Pilot screw wrench	**07MMA-MT3010B (U.S.A. only)**
Pilot screw wrench guide	**07PMA-MZ2011A (U.S.A. only)**



HIGH ALTITUDE PILOT SCREW OPENING:
7/8 turn in from the factory preset position

Adjust the idle speed with the throttle stop screw knob.

IDLE SPEED: 1,200 ± 100 rpm



Do not attach the label to any part that can be easily removed from the vehicle.

Attach the Vehicle Emission Control Information Update label on the rear fender near the frame cross pipe as shown.
See Service Letter No. 132 for information on obtaining the label.

- Sustained operation at an altitude lower than 5,000 feet (1,500 m) with the parts replaced and adjusted for high altitude settings may cause the engine to idle roughly and stall in traffic. It may also cause engine damage due to overheating.

This adjustment must be made at low altitude to ensure proper low altitude operation.

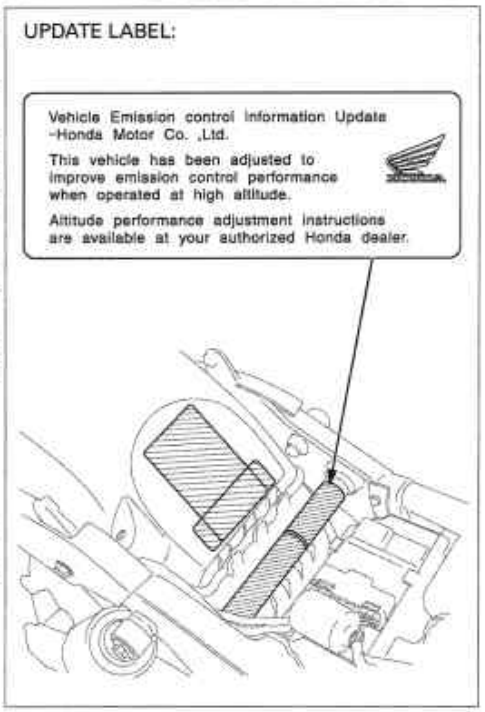
When the vehicle is to be operated continuously below 5,000 feet (1,500 m), replace and readjust the parts as follows:

Replace main jet with the standard main jet, and screw out the pilot screw to the specified number of turns from the high altitude setting.

STANDARD MAIN JET: #125

LOW ALTITUDE PILOT SCREW OPENING:
7/8 turn in from the high altitude setting

Replace the PAIR control valve with the standard type.
Warm up the engine and adjust the idle speed at low altitude with the throttle stop screw.

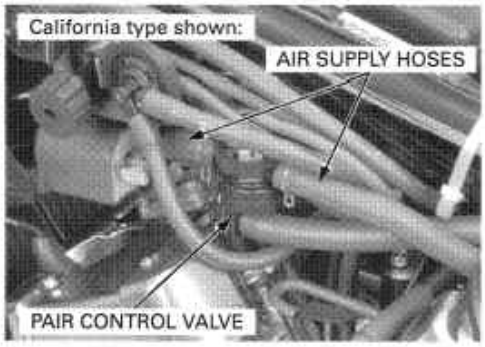


SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

Warm up the engine to operating temperature.

Check that the secondary air supply hoses are clean and free of carbon deposits.
Check the pulse secondary air injection (PAIR) check valves if the port is carbon fouled.



Remove the fuel tank (page 2-4).

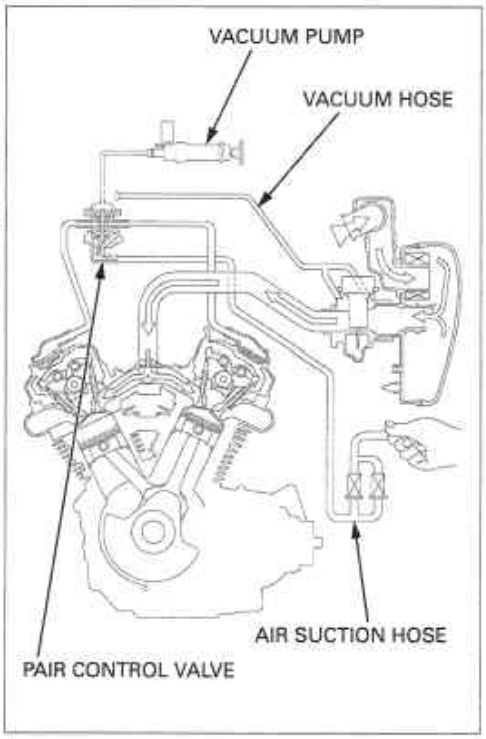
Disconnect the PAIR control valve vacuum hose and plug the vacuum hose.
Connect a vacuum pump to the PAIR control valve.

Install the fuel tank (page 2-4).
Start the engine and open the throttle slightly to be certain that air is sucked in through the air suction hose.
If the air is not drawn in, check the air suction hoses for clogs.

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

SPECIFIED VACUUM:
STANDARD SETTING: 65 kPa (485 mmHg)
HIGH ALTITUDE SETTING: 57 kPa (425 mmHg)

If the air is drawn in, or if the specified vacuum is not maintained, install a new PAIR control valve.
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



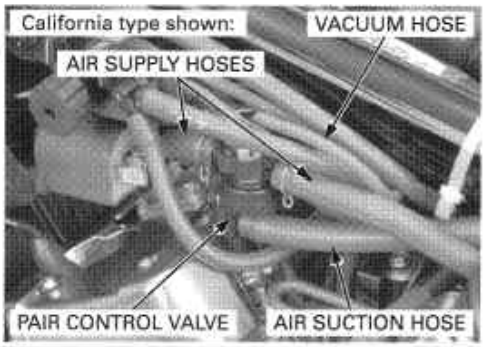
PAIR CONTROL VALVE REMOVAL/ INSTALLATION

Remove the fuel tank (page 2-4).

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

Remove the PAIR control valve.

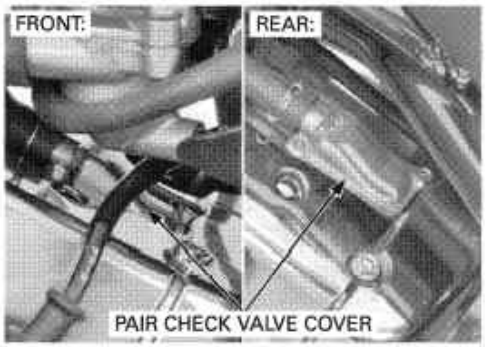
Installation is in the reverse order of removal.



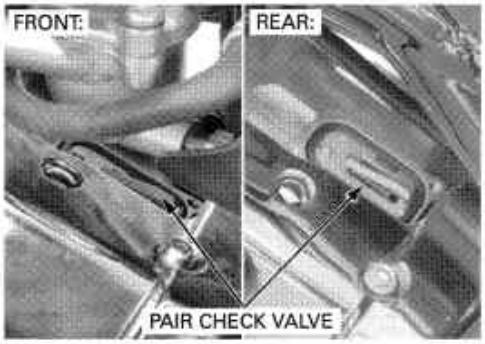
PAIR CHECK VALVE INSPECTION

Remove the fuel tank (page 2-4).

Remove the bolts and PAIR check valve cover.



Remove the PAIR check valve from the cylinder head cover.

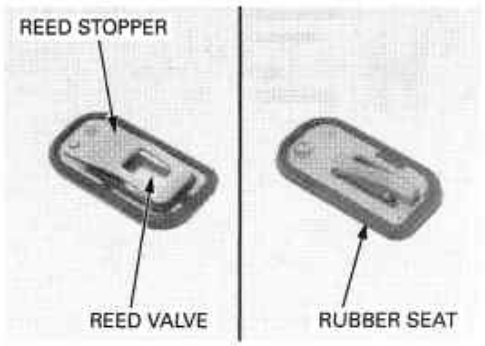


Check the reed for damage or fatigue. Replace if necessary.
Replace the PAIR check valve if the rubber seat is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.

Install the PAIR check valve and cover onto the cylinder head cover.

TORQUE: 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)

Install the fuel tank (page 2-4).



EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

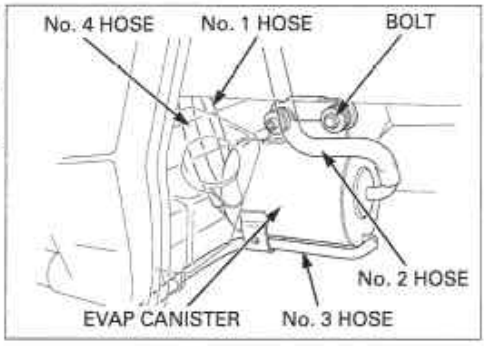
NOTE:
Refer to the Vacuum Hose Routing Diagram and Cable & Harness Routing (page 1-24) for hose connections and routing.

EVAP CANISTER REMOVAL/ INSTALLATION

Disconnect the No. 1, No.2, No.3 and No. 4 hoses from the EVAP canister, and remove the bolt and the EVAP canister with the bracket.

Remove the bolt and EVAP canister from the bracket.

Install the EVAP canister in the reverse order of removal.

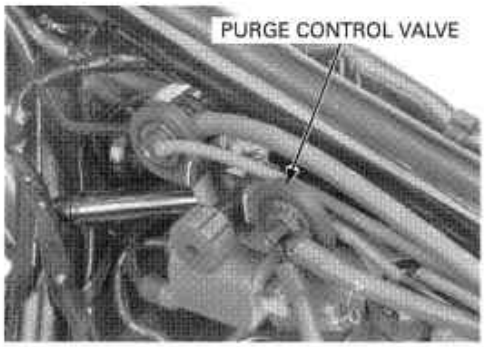


EVAP PURGE CONTROL VALVE INSPECTION

NOTE:
The EVAP purge control valve should be inspected if hot restart is difficult.

Remove the fuel tank (page 2-4).

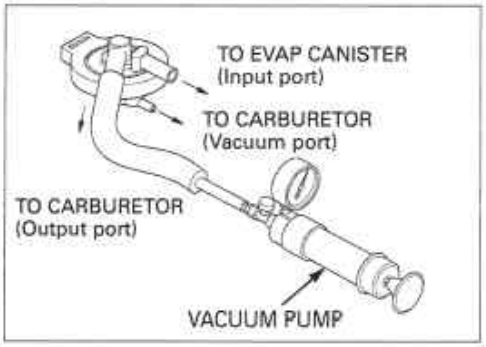
Remove the EVAP purge control valve.



Connect a vacuum pump to the No. 5 hose fitting (output port) that goes to the carburetor. Apply the specified vacuum to the EVAP purge control valve.

SPECIFIED VACUUM: 50 mm Hg (2.0 in Hg)

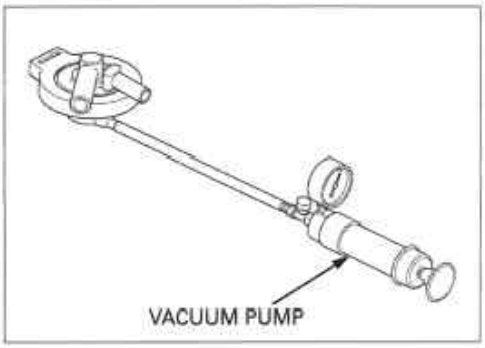
The specified vacuum should maintained.
Replace the EVAP purge control valve if vacuum is not maintained.



Remove the vacuum pump and connect it to the No. 11 hose fitting (vacuum port) that goes to the carburetor.
Apply the specified vacuum to the EVAP purge control valve.

SPECIFIED VACUUM: 250 mm Hg (9.8 in Hg)

The specified vacuum should maintained.
Replace the EVAP purge control valve if vacuum is not maintained.



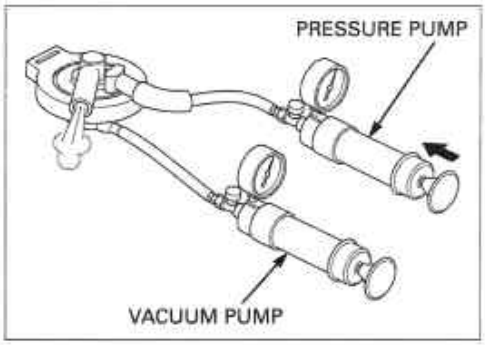
Connect a pressure pump to the No. 4 hose fitting (input port) that goes to EVAP canister.

Damage to the EVAP purge control valve may result from use of a high pressure air source. Use a hand-operated air pump only.

While applying the specified vacuum to the EVAP purge control valve vacuum port, pump air through the input port.

SPECIFIED VACUUM: 25 mm Hg (1.0 in Hg)

Air should flow through the EVAP purge control valve and out the output port that goes to the carburetors.
Replace the EVAP purge control valve if air does not flow out.



Remove the pumps and install the EVAP purge control valve.

EVAP CARBURETOR AIR VENT (CAV) CONTROL VALVE INSPECTION

NOTE:
The EVAP CAV control valve should be inspected if hot restart is difficult.

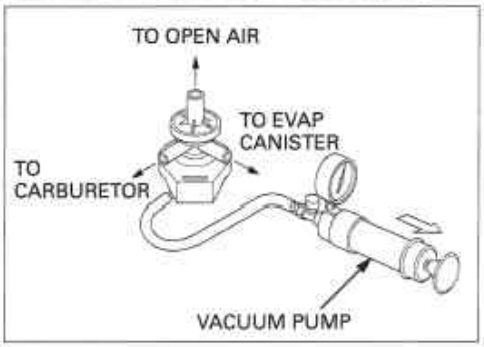
Remove the fuel tank (page 2-4).

Remove the EVAP CAV control valve.

Connect a vacuum pump to the No. 10 hose fitting (vacuum port) that goes to the intake manifold.
Apply the specified vacuum to the EVAP CAV control valve.

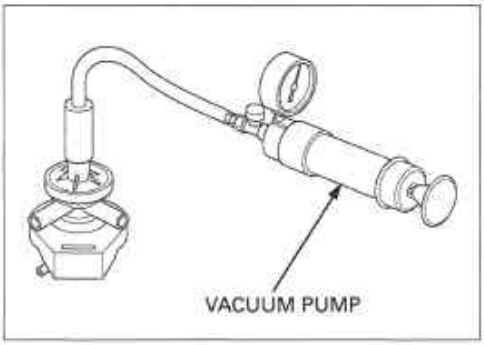
SPECIFIED VACUUM: 500 mm Hg (19.7 in Hg)

The specified vacuum should be maintained.
Replace the EVAP CAV control valve if vacuum is not maintained.



FUEL SYSTEM

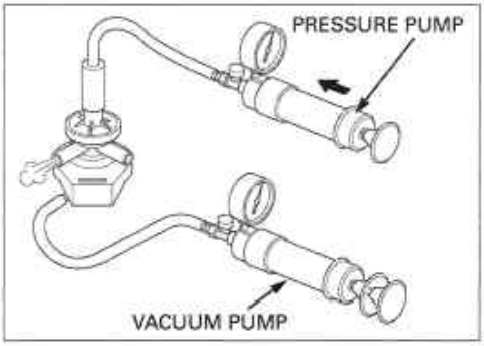
Remove the vacuum pump and connect it to the air vent fitting (open air port).
Apply vacuum to the EVAP CAV control valve. The vacuum should hold steady.
Replace the EVAP CAV control valve if vacuum leaks.



Remove the vacuum pump and reconnect it to the No. 10 hose fitting (vacuum port).
Connect a pressure pump to the open air port.

Damage to the EVAP CAV control valve may result from use of a high pressure air source. Use a hand-operated air pump only.

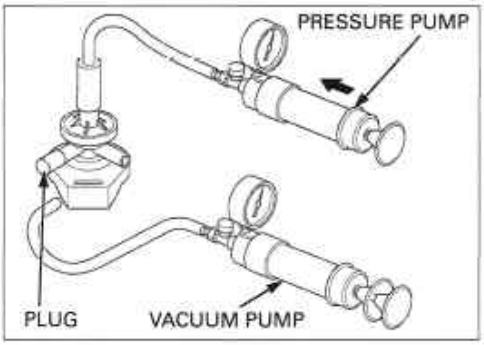
While applying vacuum to the EVAP CAV control valve vacuum port, pump air through the open air port.
Air should flow through the EVAP CAV control valve and out the air vent port (No. 6 hose fitting) that go to the carburetor air vent joint.



Plug the air vent port (No. 6 hose fitting) that go to the carburetor air vent joint.
While applying vacuum to the EVAP CAV control valve vacuum port, pump air through the open air port.
It should hold steady.

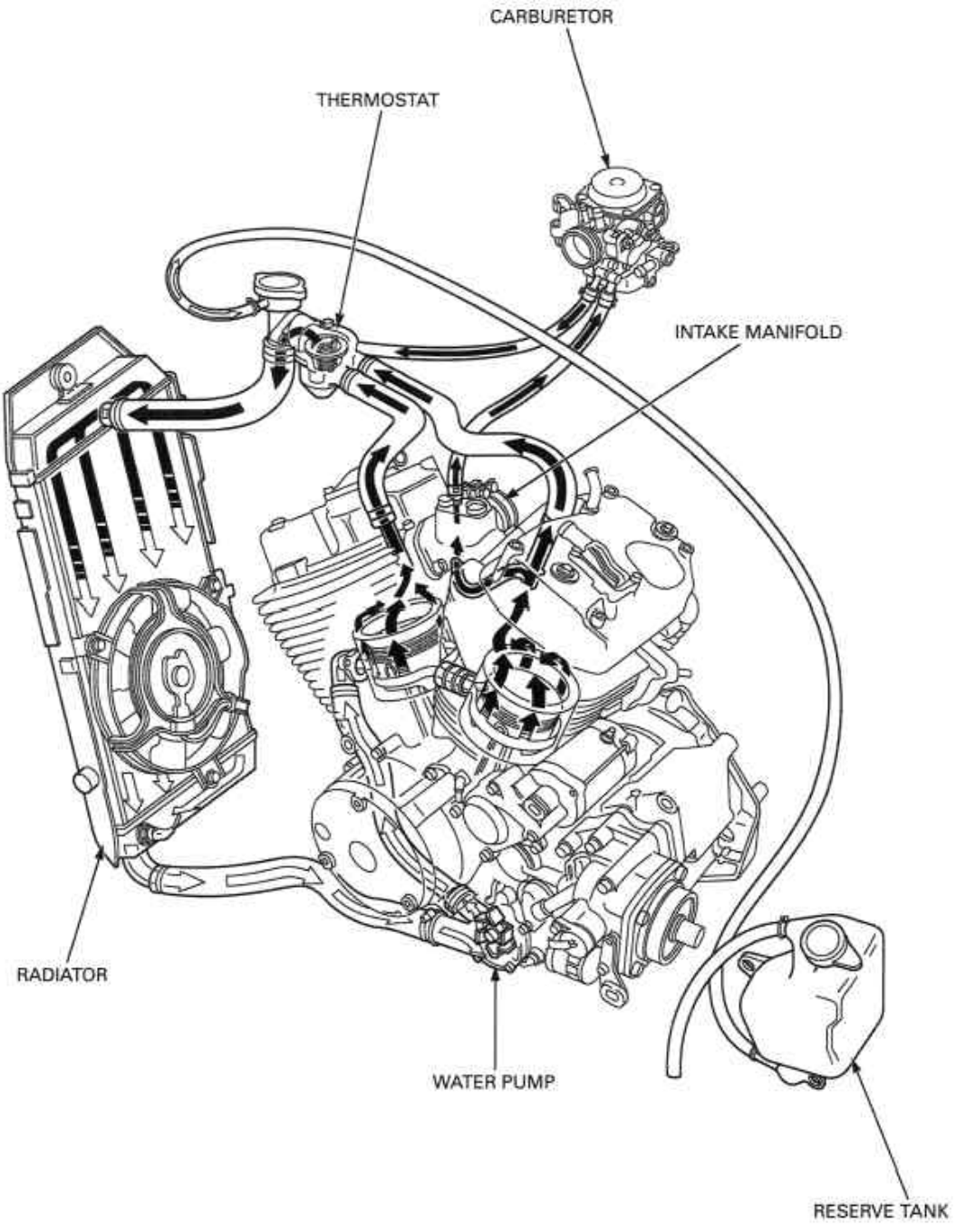
Replace the EVAP CAV control valve if pressure is not retained.

Remove the pumps and install the EVAP CAV control valve.



6. COOLING SYSTEM

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠WARNING

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

⚠CAUTION

Radiator coolant is toxic. Keep it away from eyes, mouth and skin.

- If any coolant gets in your eyes, rinse them with water and consult a physician 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.

NOTICE

Using coolant with silicate corrosion 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 service 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.
- For the thermostatic switch (coolant temperature indicator) inspection, refer to page 20-12.
- For fan motor switch inspection, refer to page 20-14.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.58 liters (1.67 US qt, 1.39 Imp qt)
	Reserve tank	0.38 liter(0.40 US qt, 0.33 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum at 95 °C (203 °F)
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		1:1 mixture with distilled water

TORQUE VALUES

Radiator filler mounting bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Thermostat housing cover bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Fan motor mounting bolt	4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Cooling fan mounting nut	2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)	Apply locking agent to the threads
Water pump cover bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Fan motor shroud mounting bolt	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Water hose band screw	See page 1-16	

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature indicator or thermostatic switch
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Engine temperature too low
- Thermostat stuck open
- Faulty fan motor switch

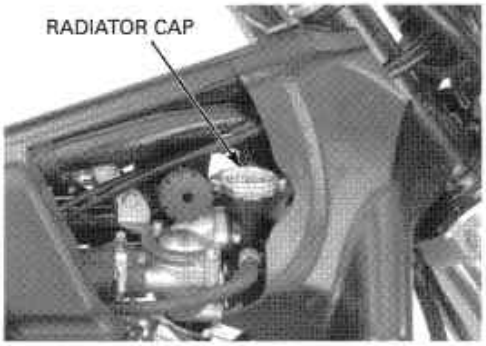
Coolant leaks
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

SYSTEM TESTING

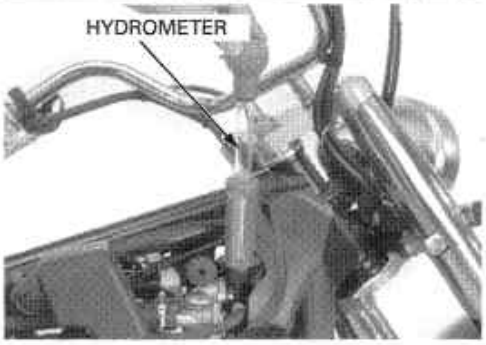
COOLANT (HYDROMETER TEST)

Remove the fuel tank (page 2-4).

Remove the radiator cap.



Test the coolant specific gravity using a hydrometer.



STANDARD COOLANT CONCENTRATION:
1:1 (distilled water and the recommended antifreeze)

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

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (page 6-5).

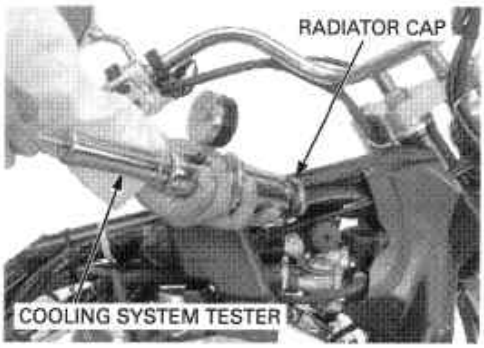
Wet the sealing surfaces of the cap, then install the cap onto the tester.

TOOLS:

Cooling system pressure tester	**SVTS4AH**
Cooling system adaptor	**OTCJ33984A**

Pressurize the radiator cap using the tester. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold the specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)



Pressurize the radiator, engine and hoses using the tester, and check for leaks.

NOTICE

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

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

Remove the tester and install the radiator cap.

Install the fuel tank (page 2-4).

COOLANT REPLACEMENT

PREPARATION

NOTICE

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

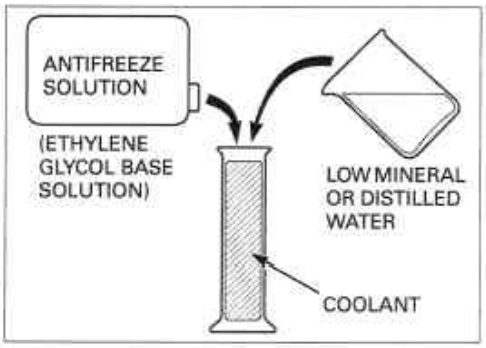
NOTE:

The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.

Mix only distilled, low mineral water with the recommended antifreeze.

RECOMMENDED ANTIFREEZE:
Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors

RECOMMENDED MIXTURE:
1:1 (distilled water and the recommended antifreeze)



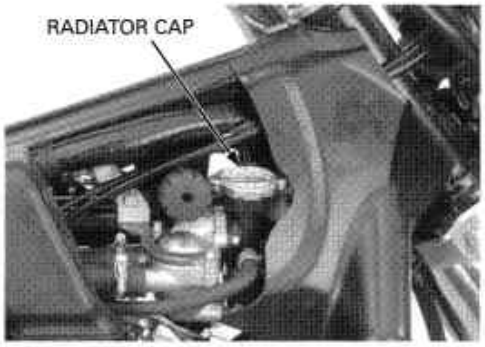
REPLACEMENT/AIR BLEEDING

NOTE:

When filling the system or reserve tank with coolant, or checking the coolant level, hold the motorcycle in an upright position.

Remove the fuel tank (page 2-4).

Remove the radiator cap.



Drain the coolant from the system by removing the drain bolt and sealing washer.

Reinstall the drain bolt with a new sealing washer.

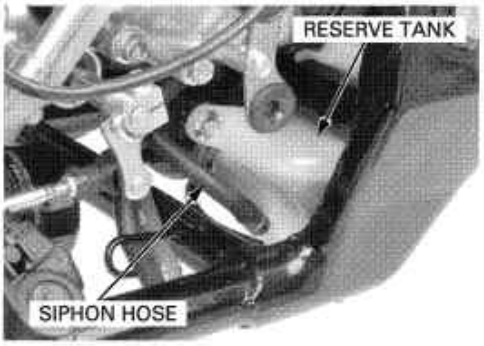
TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Remove the left crankcase rear cover (page 2-6).

Disconnect the siphon hose from the reserve tank and drain the reserve coolant.

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

Reconnect the siphon hose.

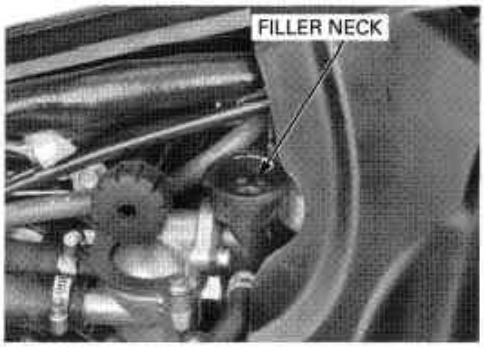


Fill the system with the recommended coolant through the filler opening up to the filler neck.

Install the fuel tank (page 2-4).

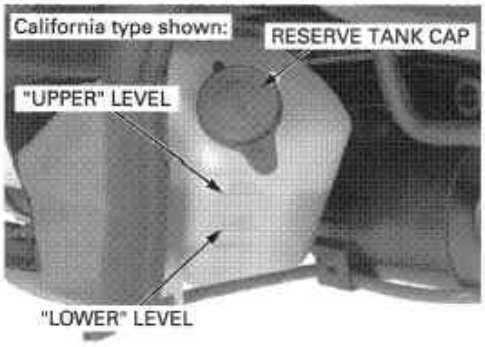
Bleed air from the system as follows:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine, remove the fuel tank (page 2-4) and add coolant up to the filler neck.
4. Install the radiator cap.



Remove the reserve tank cap.
Fill the reserve tank to the upper level line and install the tank cap.

Install the fuel tank (page 2-4).



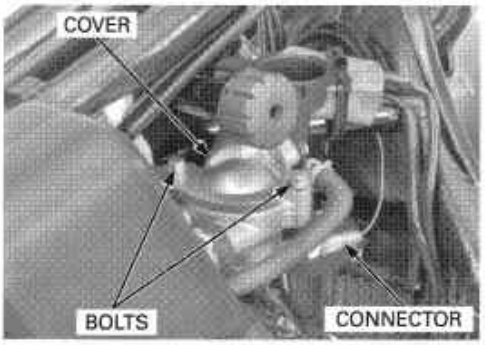
THERMOSTAT

REMOVAL

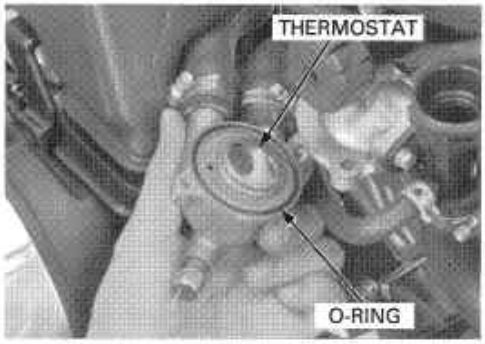
Drain the coolant from the system (page 6-7).
Remove the steering side covers (page 2-5).

Disconnect the thermostatic switch connector.

Place a shop towel under the thermostat housing.
Remove the bolts.



Remove the O-ring and thermostat.



THERMOSTAT INSPECTION

Visually inspect the thermostat for damage.
Replace the thermostat if the valve stays open at room temperature.

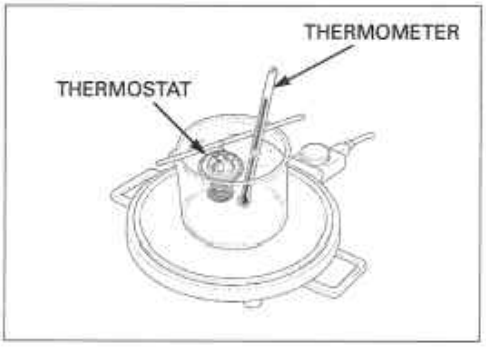
Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element. Do not let the thermostat or thermometer touch the pan, or you will get false readings.

Heat a container of water with an electric heating element for 5 minutes.
Suspend the thermostat in the heated water to check its operation.

THERMOSTAT BEGINS TO OPEN:
80 – 84 °C (176 – 183 °F)

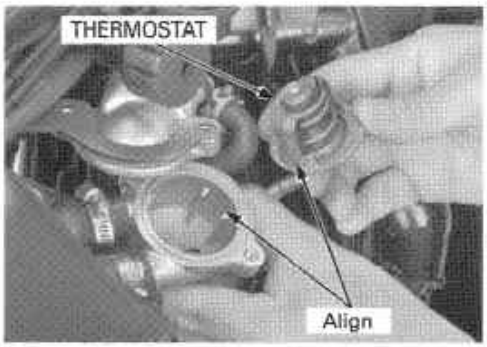
VALVE LIFT:
8 mm (0.3 in) minimum at 95 °C (203 °F)

Replace the thermostat if the valve opens at a temperature other than those specified.

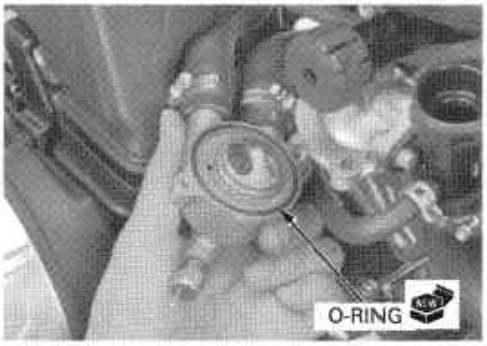


INSTALLATION

Install the thermostat by aligning it with the thermostat housing slot.



Install a new O-ring into the thermostat housing groove.

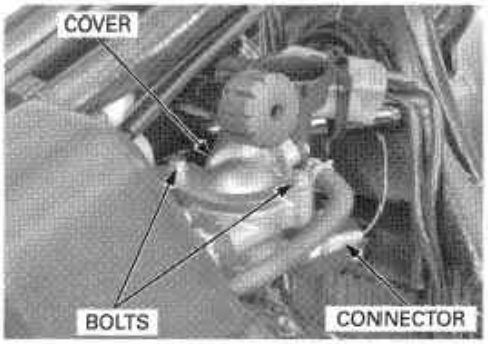


Install the thermostat housing to the cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the thermostatic switch connector.

Fill and bleed the cooling system (page 6-7).
Install the steering side covers (page 2-5).



THERMOSTAT HOUSING

REMOVAL/INSTALLATION

Drain the coolant from the system (page 6-7).
Remove the steering side covers (page 2-5).

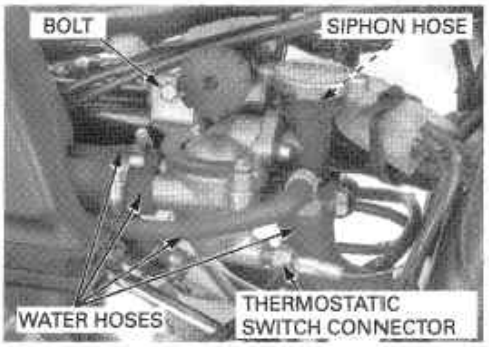
Disconnect the thermostatic switch connector.
Disconnect the water hoses and siphon hose.
Remove the bolt and thermostat housing assembly.

Route the hoses and wires properly (page 1-24).

Install the thermostat housing assembly in the reverse order of removal.

NOTE:

For water hose connection, refer to page 1-16.

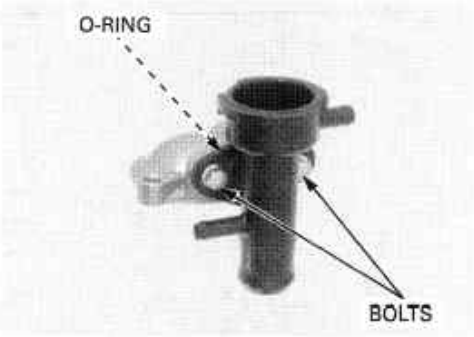


DISASSEMBLY

Remove the following:

- Thermostat housing (page 6-9)
- Thermostat (page 6-8)
- Thermostatic switch (page 20-13)

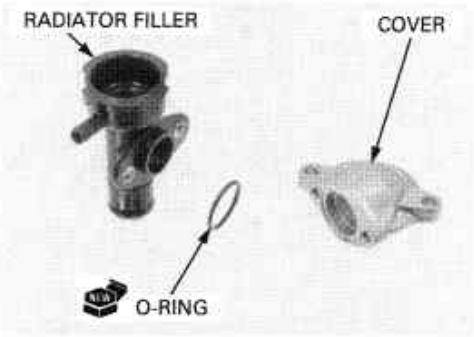
Remove the bolts and O-ring.



ASSEMBLY

Install a new O-ring to the radiator filler.

Assemble the radiator filler and thermostat housing cover.

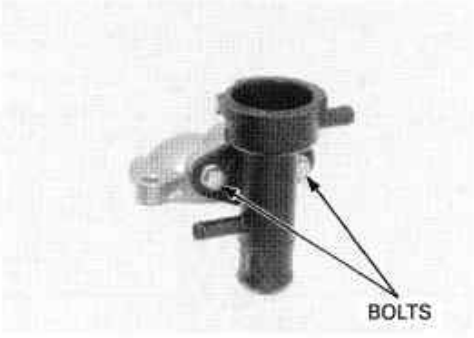


Install and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the following:

- Thermostatic switch (page 20-13)
- Thermostat (page 6-9)
- Thermostat housing (page 6-9)



RADIATOR/COOLING FAN

REMOVAL

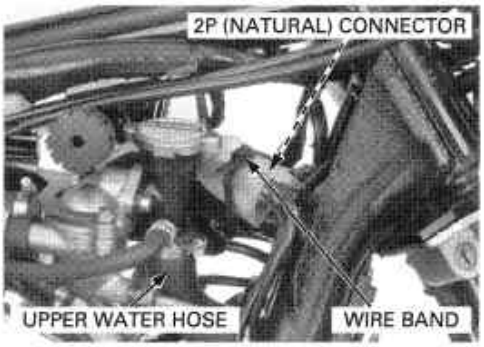
Be careful not to damage the radiator fins while servicing the radiator and fan motor.

Drain the coolant from the system (page 6-7).

Remove the steering side covers (page 2-5).

Remove the wire band and disconnect the fan motor switch 2P (Natural) connector.

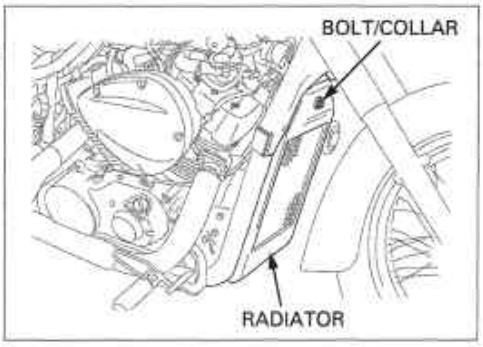
Disconnect the radiator upper water hose.



Disconnect the radiator lower water hose.

Remove the bolt and collar.

Release the rear brake light switch and ignition pulse generator wires from the radiator grill and remove the radiator.

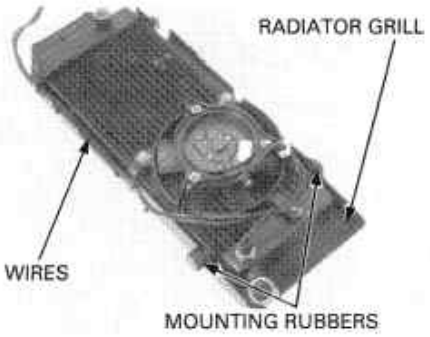


DISASSEMBLY

For fan motor switch information, refer to page 20-14.

Release the fan motor wires from the radiator grill.

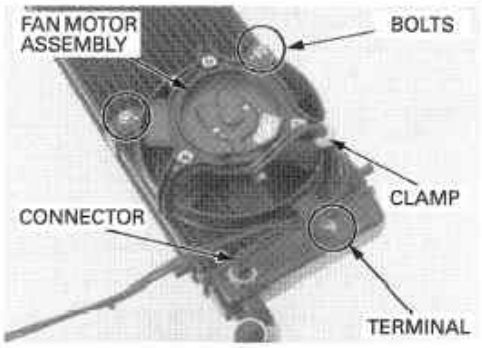
Remove the radiator mounting rubbers and radiator grill.



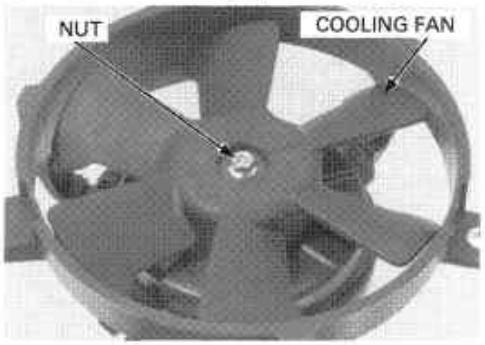
COOLING SYSTEM

Disconnect the fan motor switch connector and release the wires from the clamp.

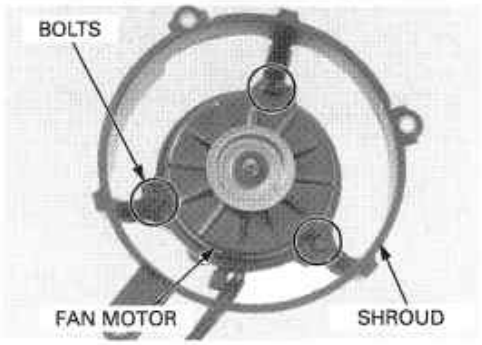
Remove the bolts, ground terminal and fan motor assembly.



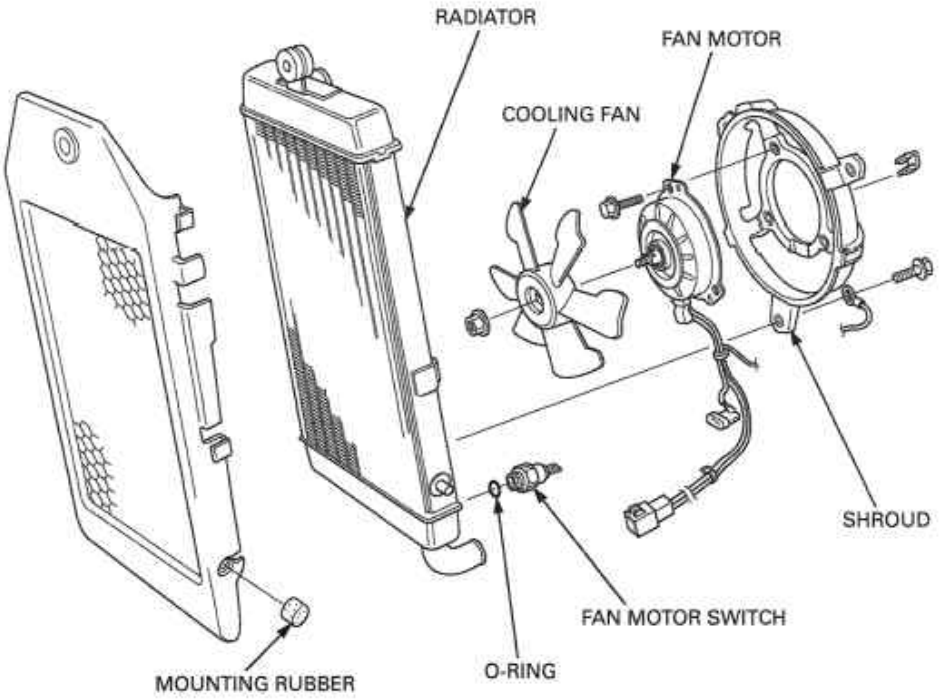
Remove the nut and cooling fan.



Remove the bolts and fan motor from the shroud.

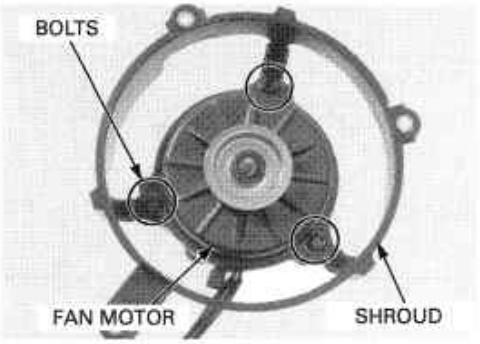


ASSEMBLY

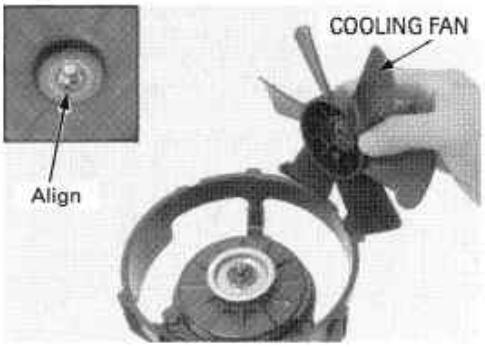


Install the fan motor on the shroud in the direction as shown and tighten the bolts to the specified torque.

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



Install the cooling fan onto the motor shaft, aligning the flat surfaces.



COOLING SYSTEM

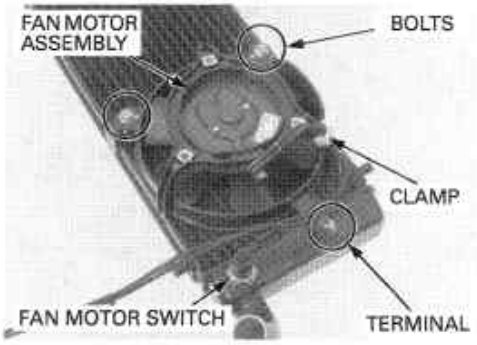
Apply locking agent to the nut threads.
Tighten the nut to the specified torque.

TORQUE: 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)

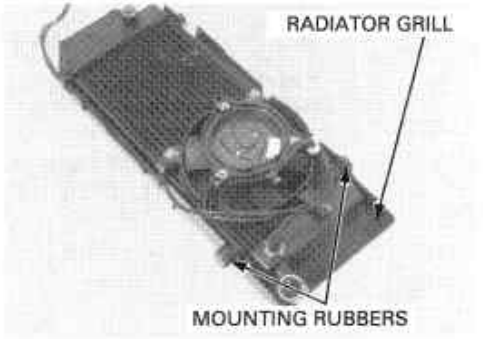
Install the fan motor assembly on the radiator and tighten the bolts with the ground terminal as shown.

TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)

Clamp the wires.



Install the radiator on the grill.
Install the mounting rubbers.
Route the wires through the shroud.



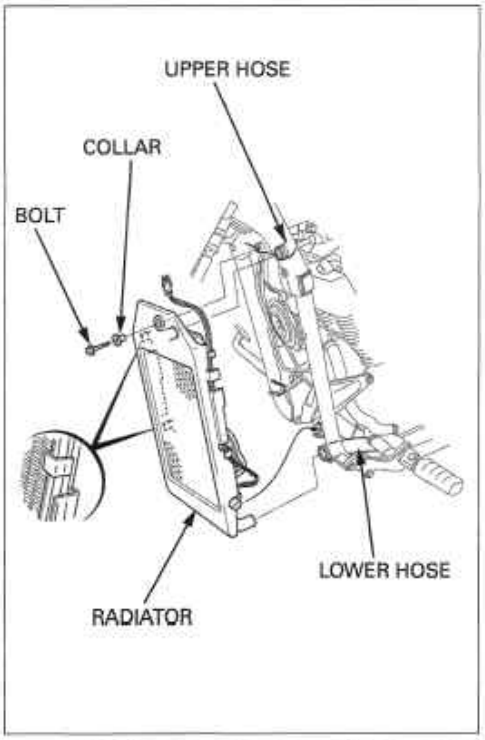
INSTALLATION

Install the radiator by inserting its mounting rubbers into the holder of the frame.

Route the rear brake light switch and ignition pulse generator wires through the radiator grill (page 1-24).

Install the collar, bolt and tighten the bolt.

Connect the radiator upper and lower water hoses (page 1-16).

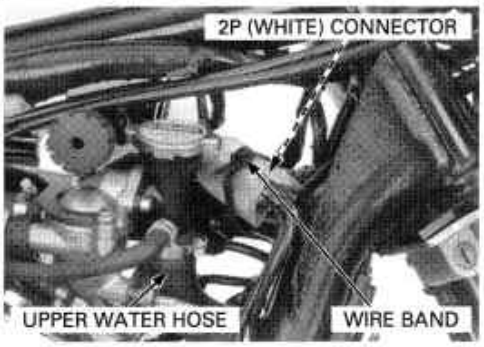


Route the wire properly (page 1-24).

Connect the fan motor switch 2P (White) connector and install the wire band.

Install the steering side covers (page 2-5).

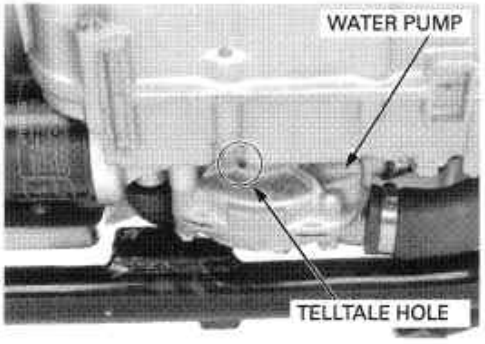
Fill and bleed the cooling system (page 6-7).



WATER PUMP

MECHANICAL SEAL INSPECTION

Inspect the telltale hole for signs of coolant leakage. If there is leakage, the water pump mechanical seal is defective and the water pump should be replaced.

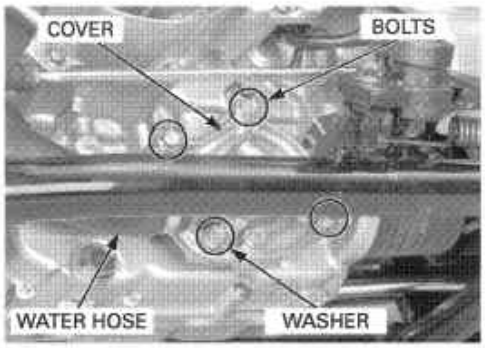


REMOVAL

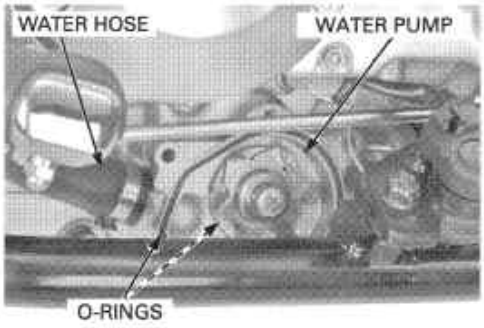
Drain the coolant from the system (page 6-7).

Disconnect the water hose.

Remove the bolts, sealing washer and water pump cover.



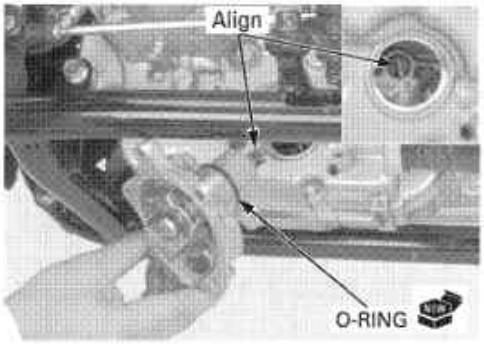
Disconnect the water hose.
Remove the O-rings and water pump.



INSTALLATION

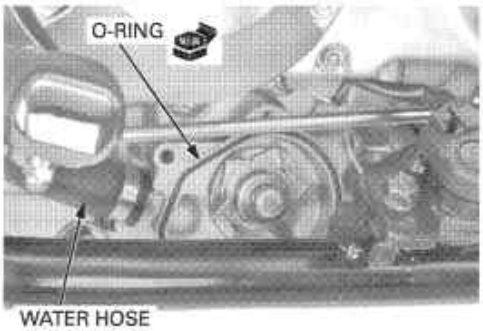
Coat a new O-ring with oil and install it onto the stepped section of the water pump.

Install the water pump while aligning its groove with the projection of the oil pump shaft.



Connect the water hose (page 1-16).

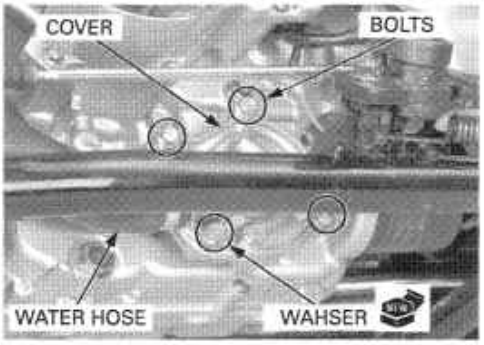
Install a new O-ring into the groove in the water pump.



Align the bolt holes in the pump and crankcase, and install the water pump cover with the bolts and a new sealing washer.
Tighten the bolts in a crisscross pattern in several steps.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Connect the water hose (page 1-16).



RADIATOR RESERVE TANK

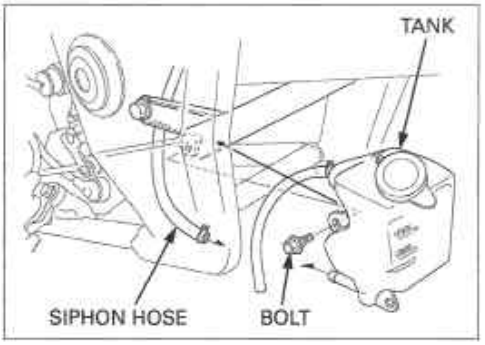
REMOVAL/INSTALLATION

Disconnect the siphon hose from the reserve tank and drain the reserve coolant.

Remove the bolt and reserve tank.

Route the hoses properly (page 1-24).

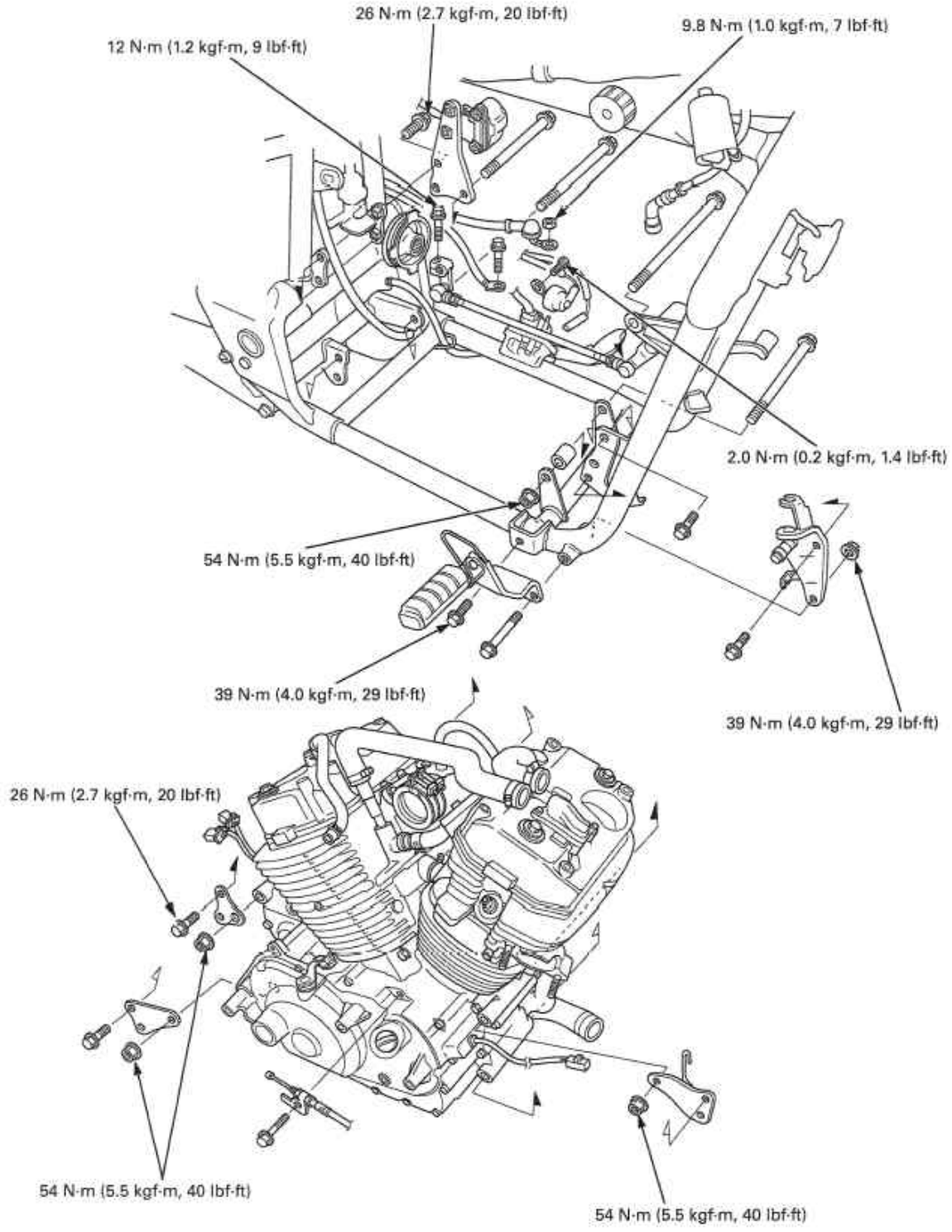
Installation is in the reverse order of removal.



MEMO

7. ENGINE REMOVAL/INSTALLATION

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you make a mistake with the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

NOTICE

Do not support the engine using the engine oil filter or it will be damaged.

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for servicing.
  - Cylinder head (page 8-14)
  - Cylinder/piston (page 9-4)
  - Crankshaft (page 12-9)
  - Transmission (Including gearshift drum/shift fork: page 12-18)
  - Output gear case (page 12-26)
  - Oil pump (page 4-6)
- The following components can be serviced with the engine in the frame.
  - Camshaft (page 8-8)
  - Carburetor (page 5-7)
  - Water pump (page 6-15)
  - Clutch/gearshift linkage (page 10-7)
  - Alternator/starter clutch (page 11-4)
  - Electric starter (page 19-6)

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	72.3 kg (159.4 lbs)
Engine oil capacity at disassembly	3.2 liters (3.38 US qt, 2.82 Imp qt)
Coolant capacity (radiator and engine)	1.58 liters (1.67 US qt, 1.39 Imp qt)

TORQUE VALUES

Engine mounting nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Engine hanger plate bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Starter motor cable terminal nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)
Oil pressure switch terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)
Main footpeg bracket mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Main footpeg bracket mounting nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

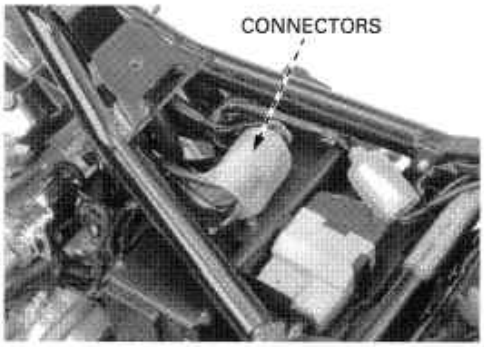
Drain the engine oil (page 3-13).
Drain the coolant from the cooling system (page 6-7).

Remove the following:
- Fuel tank (page 2-4)
- Spark plug caps (page 3-9)
- Thermostat housing (page 6-9)
- Rear brake light switch (page 20-18)
- Brake pedal (page 15-17)
- Left crankcase rear cover (page 2-6)
- Exhaust system (page 2-8)
- Carburetor (page 5-7)
- Radiator (page 6-11)
- Over head covers (page 8-6)
- Clutch cover (page 10-5)
- Alternator cover (page 3-10)

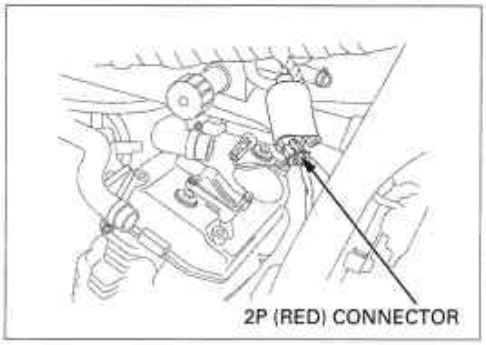
NOTE:
Wrap the intake manifold port with a shop towel or cover them with a piece of tape to prevent any foreign material from dropping into the engine.

Disconnect the following connectors:

- Ignition switch 3P (Black)
- Neutral/oil pressure switch 2P (Black)
- Vehicle speed sensor 3P (White)
- Alternator 3P (White)

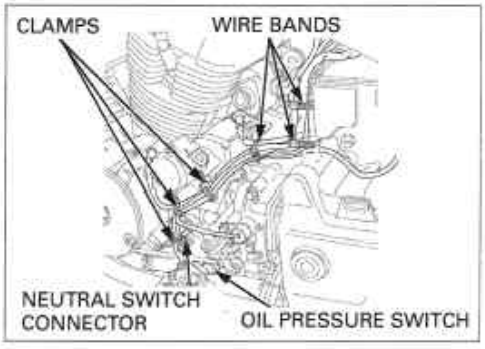


Disconnect the ignition pulse generator 2P (Red) connector.

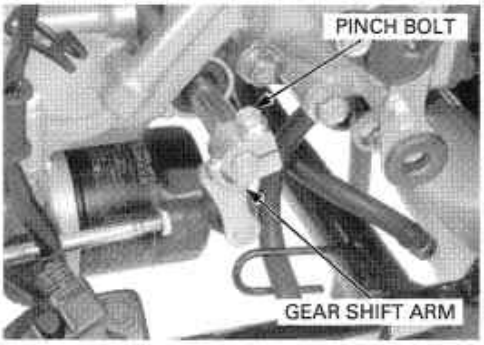


Release the wires from the clamps and wire bands.

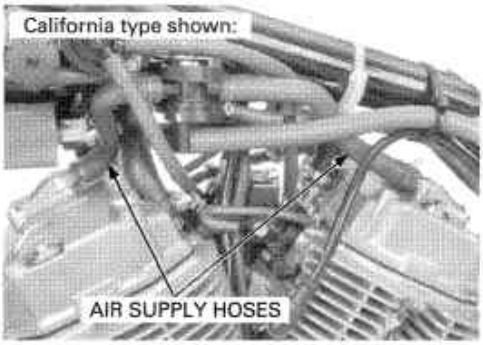
Disconnect the neutral switch connector.
Disconnect the oil pressure switch wire by removing the terminal screw.



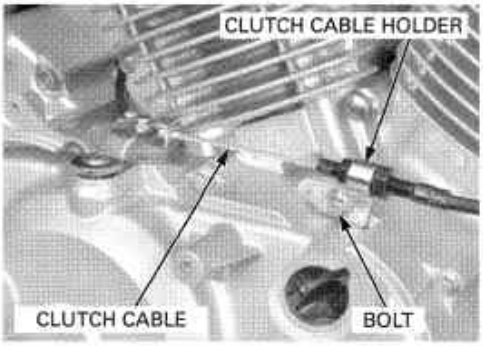
Remove the pinch bolt and gear shift arm.



Disconnect the secondary air supply hoses from the PAIR check valve cover.

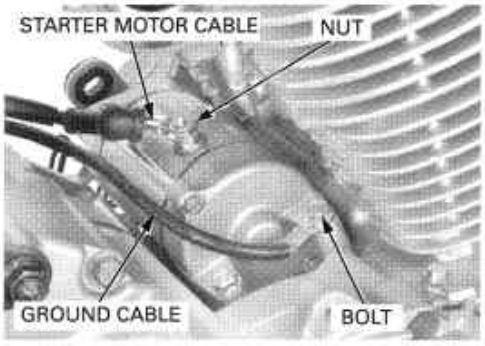


Remove the clutch cable holder bolt and disconnect the clutch cable end from the clutch lifter arm.



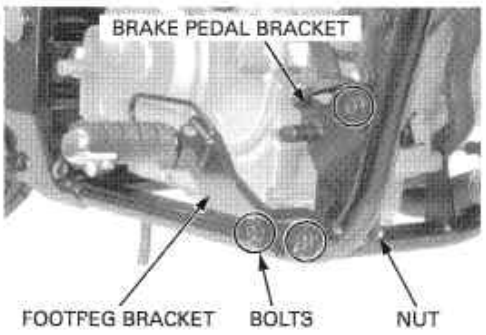
Remove the rubber cap and starter motor terminal nut.
Disconnect the starter motor cable.

Remove the bolt and disconnect the ground cable.



ENGINE REMOVAL/INSTALLATION

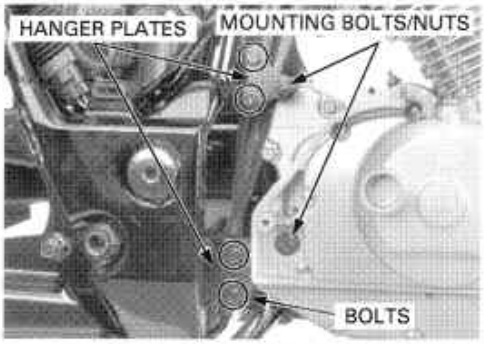
Remove the bolts, nut and right main footpeg and brake pedal brackets from the frame.



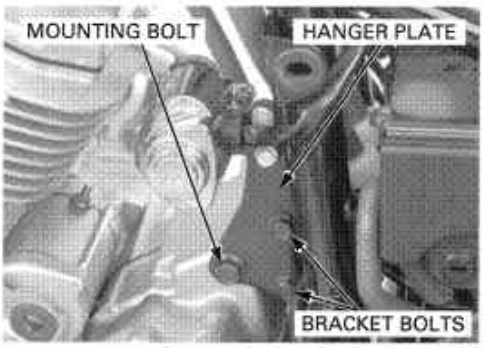
The jack height must be continually adjusted to relieve stress for bolt removal.

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

Remove the rear engine mounting nuts.
Remove the bolts and right rear engine hanger plates.

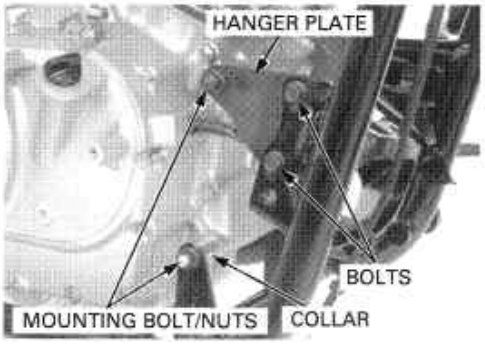


Remove the rear engine mounting bolts.
Remove the bolts and left rear engine hanger plate.



Remove the front engine mounting nuts.
Remove the bolts and front engine hanger plate.

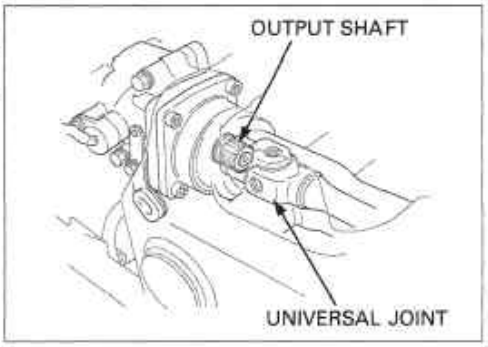
Remove the engine mounting bolts and collar.



Release the joint boot from the output gear case.

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

Move the engine forward and release the output shaft from the universal joint in the swingarm. Carefully maneuver the engine and remove it out of the frame to the right.



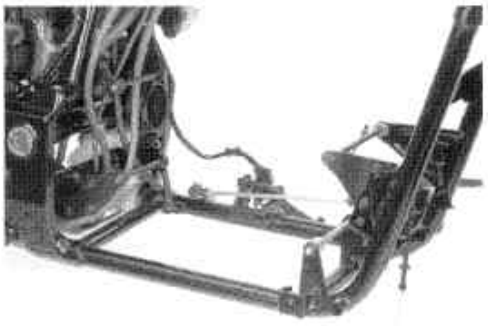
ENGINE INSTALLATION

NOTE:

- All the engine mounting bolts and nuts loosely install, then tighten the bolts and nuts to the specified torque in the specified sequence.
- Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence. If you make a mistake with the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.
- Route the wires, hoses and cables properly (page 1-24).

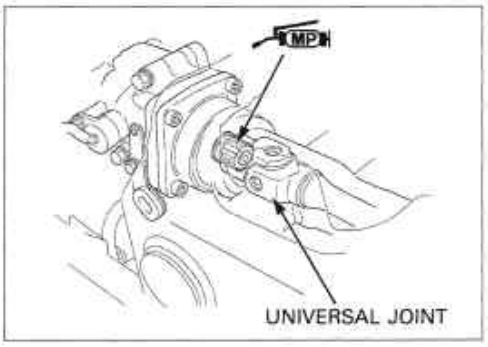
During engine installation, hold the engine securely and be careful not to damage the frame and engine.

Using a floor jack or other adjustable support, carefully place the engine into the frame and maneuver it into place.



Carefully align the mounting points.

Apply 1 g (0.04 oz) of molybdenum disulfide paste to the output shaft splines. Engage the output shaft with the universal joint.

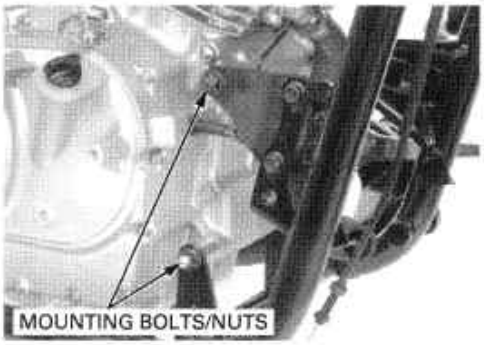


ENGINE REMOVAL/INSTALLATION

Temporarily install the all engine hanger plates, mounting fasteners and collar.

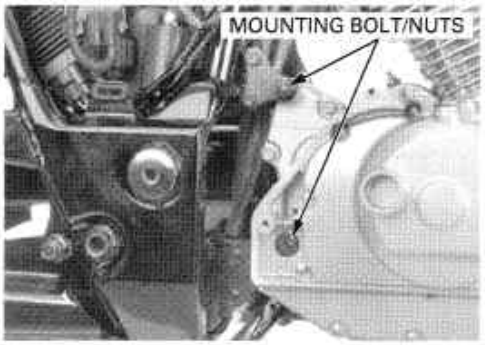
Tighten the front lower, then front upper engine mounting nuts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



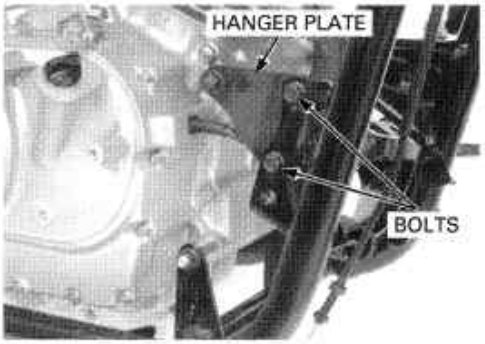
Tighten the rear lower, then rear upper engine mounting nuts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



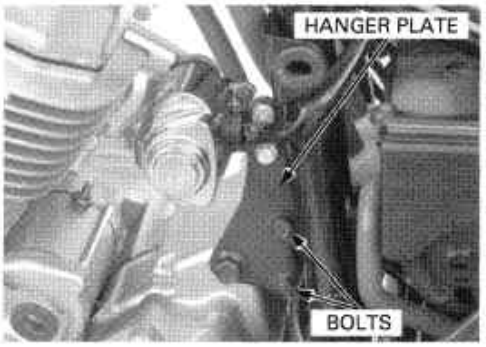
Tighten the front engine hanger plate bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



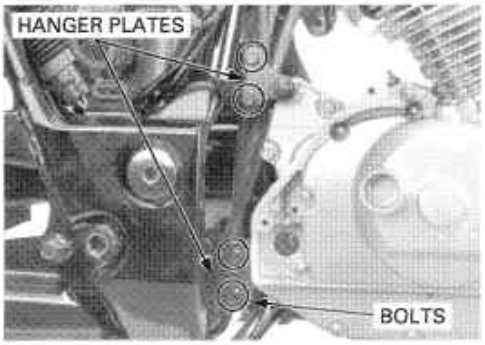
Tighten the left rear engine hanger plate bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



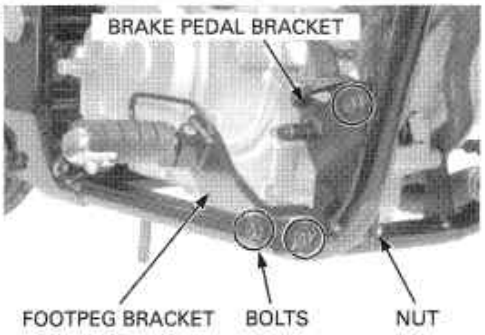
Tighten the right rear lower, then right rear upper engine hanger plate bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Install the right footpeg and brake pedal brackets and tighten the bolts and nut to the specified torque.

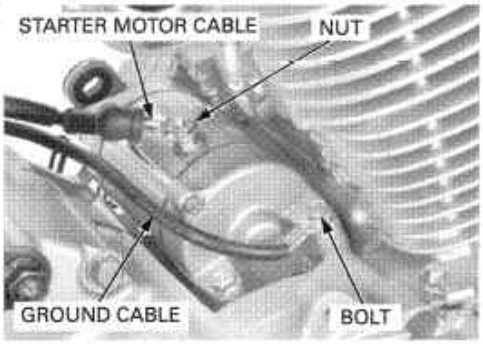
TORQUE:
Main footpeg bracket mounting bolt/nut:
39 N·m (4.0 kgf·m, 29 lbf·ft)



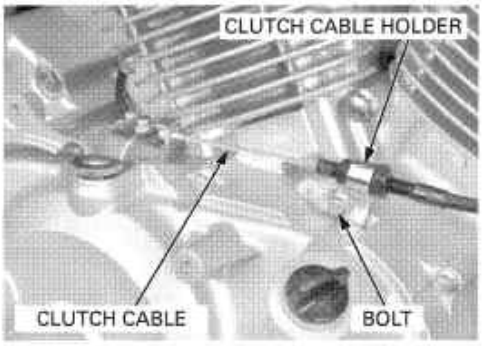
Connect the starter motor cable and tighten the terminal nut to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the ground cable and tighten the bolt securely

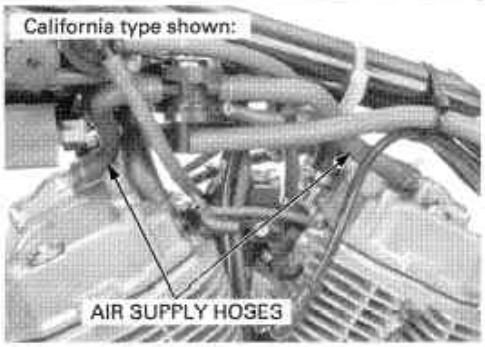


Connect the clutch cable end to the clutch lifter arm.
Install the clutch cable holder and bolt.
Tighten the bolt securely.



ENGINE REMOVAL/INSTALLATION

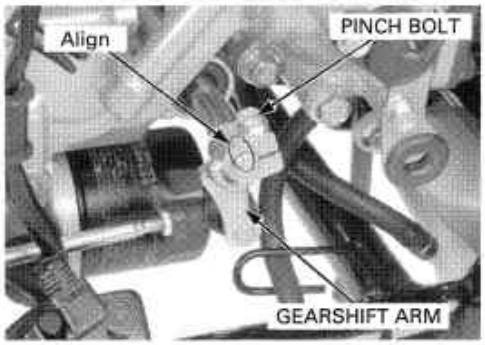
Connect the secondary air supply hoses to the PAIR check valve cover.



Install the gearshift arm to the gearshift spindle, aligning with the punch marks.

Tighten the gearshift arm pinch bolt to the specified torque.

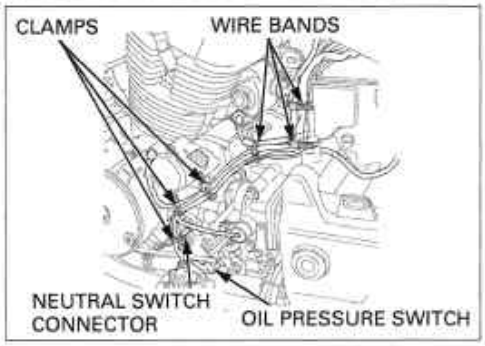
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



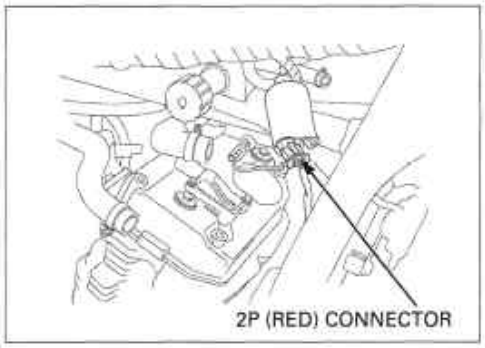
Clamp and bind the wires with the clamps and wire bands.

Connect the neutral switch connector.
Connect the oil pressure switch wire by tightening the terminal screw.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

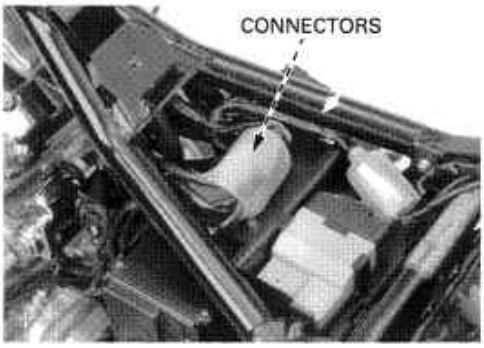


Connect the ignition pulse generator 2P (Red) connector.



Connect the following connectors:

- Ignition switch 3P (Black)
- Neutral/oil pressure switch 2P (Black)
- Vehicle speed sensor 3P (White)
- Alternator 3P (White)



Install the following:

- Radiator (page 6-15)
- Carburetor (page 5-21)
- Exhaust system (page 2-10)
- Left crankcase rear cover (page 2-6)
- Spark plug cap (page 3-9)
- Thermostat housing (page 6-9)
- Rear brake light switch (page 20-18)
- Brake pedal (page 15-19)
- Over head covers (page 8-33)
- Clutch cover (page 10-22)
- Alternator cover (page 3-10)
- Fuel tank (page 2-4)

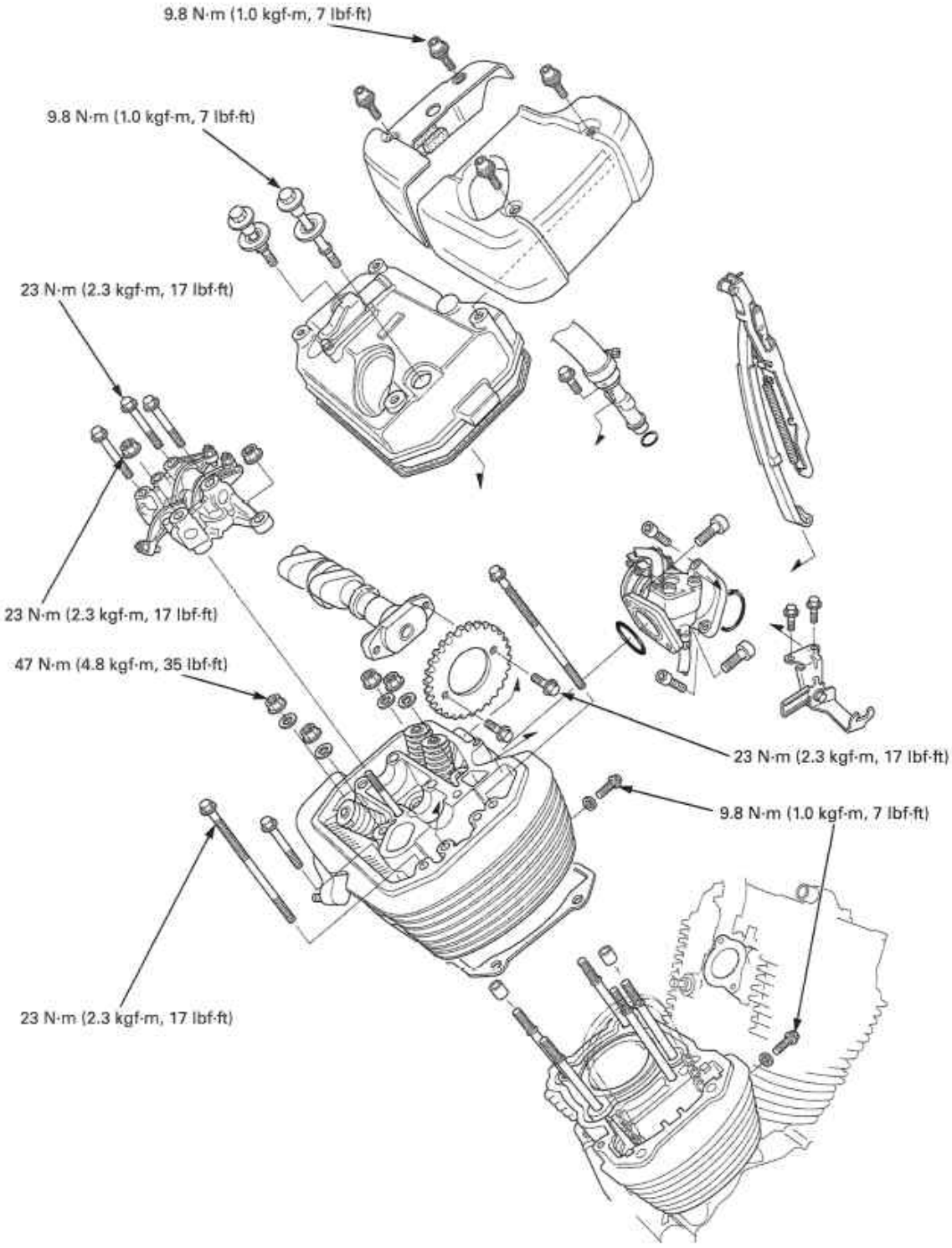
Fill the crankcase with engine oil (page 3-13).
Fill and bleed the cooling system (page 6-7).

Check the engine oil level (page 3-12).

MEMO

8. CYLINDER HEAD/VALVE

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- This section covers service of the rocker arm, camshaft, cylinder head and valve.
- The rocker arm and camshaft services can be done with the engine installed in the frame. The cylinder head and valve service requires engine removal.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head and camshaft holder. Clean the oil passages before assembling the cylinder head and cover.

SPECIFICATIONS

Unit: mm (in)

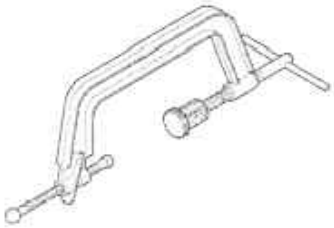
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 rpm			1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Camshaft	Cam lobe height	IN	37.188 – 37.348 (1.4641 – 1.4704)	37.16 (1.463)
		EX	37.605 – 37.765 (1.4805 – 1.4868)	37.58 (1.480)
	Runout		–	0.05 (0.002)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
	Oil clearance		0.020 – 0.141 (0.0008 – 0.0055)	0.16 (0.006)
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.83 (0.466)
	Rocker arm I.D.	IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
	Rocker arm-to-shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.07 (0.003)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.45 (0.215)
		EX	5.455 – 5.470 (0.2148 – 0.2154)	5.41 (0.213)
	Valve guide I.D.	IN	5.500 – 5.510 (0.2165 – 0.2169)	5.56 (0.219)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
	Stem-to-guide clearance	IN	0.010 – 0.035 (0.0004 – 0.0014)	0.10 (0.004)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	17.2 – 17.4 (0.677 – 0.685)	–
		EX	18.7 – 18.9 (0.736 – 0.744)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring	Free length	IN	42.14 (1.659)	40.58 (1.598)
		EX	46.11 (1.815)	44.72 (1.761)
Cylinder head warpage			–	0.10 (0.004)

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)
Cylinder head cover bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)
Cylinder head 10 mm nut	47 N·m (4.8 kgf·m, 35 lbf·ft) Apply engine oil to the threads and seating surface
Cylinder head 8 mm bolt	23 N·m (2.3 kgf·m, 17 lbf·ft) Apply engine oil to the threads and seating surface
Cylinder head 6 mm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply engine oil to the threads and seating surface
Cam sprocket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft) Apply locking agent to the threads
Cam chain tensioner bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)
Camshaft holder bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)
Camshaft holder nut	23 N·m (2.3 kgf·m, 17 lbf·ft)
Timing hole cap	9.8 N·m (1.0 kgf·m, 7 lbf·ft) Apply grease to the threads
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft) Apply grease to the threads
Alternator cover socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)
Over head cover socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)

CYLINDER HEAD/VALVE

TOOLS

Valve spring compressor 07757-0010000 	Valve guide reamer, 5.510 mm 07984-2000001  or 07984-200000D (U.S.A. only)	Valve guide driver, 5.5 mm 07742-0010100 
Valve seat cutter, 27.5 mm (45° IN) 07780-0010200  or equivalent commercially available in U.S.A.	Valve seat cutter, 35 mm (45° EX) 07780-0010400  or equivalent commercially available in U.S.A.	Flat cutter, 28 mm (32° IN) 07780-0012100  or equivalent commercially available in U.S.A.
Flat cutter, 35 mm (32° EX) 07780-0012300  or equivalent commercially available in U.S.A.	Interior cutter, 30 mm (60° IN) 07780-0014000  or equivalent commercially available in U.S.A.	Interior cutter, 37.5 mm (60° EX) 07780-0014100  or equivalent commercially available in U.S.A.
Cutter holder, 5.5 mm 07781-0010101  or equivalent commercially available in U.S.A.	Valve guide driver 07743-0020000  Not available in U.S.A.	

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.

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

- Valves
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem (page 9-3)

Compression too high

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

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 9-3)

Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn or damaged rocker arm and/or shaft
- Worn rocker arm follower or valve stem end
- Worn cam sprocket teeth
- Worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 9-3)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION

NOTE:
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.

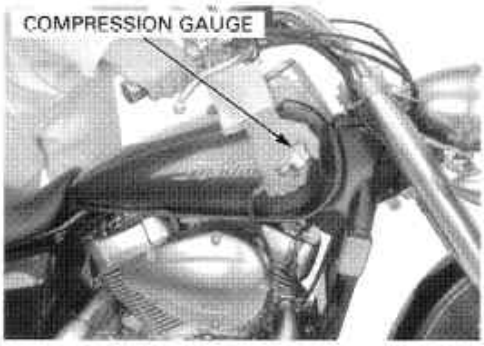
To measure the cylinder compression of each cylinder, remove only one plug at a time.

Warm up the engine to normal operating temperature.
Stop the engine, disconnect the spark plug caps and remove one spark plug at a time.

Shift the transmission into neutral.

Install a compression gauge into the spark plug hole.

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



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

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

Compression pressure:
1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi) at 400 rpm

Low compression can be caused by:

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

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

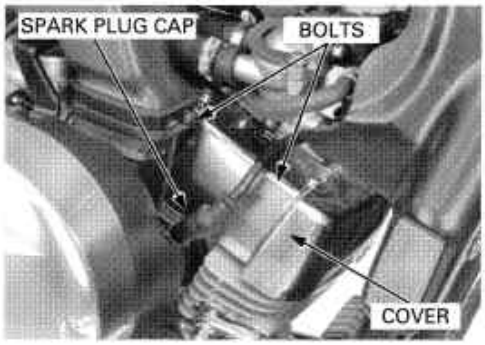
CYLINDER HEAD COVER REMOVAL

FRONT

Remove the fuel tank (page 2-4).

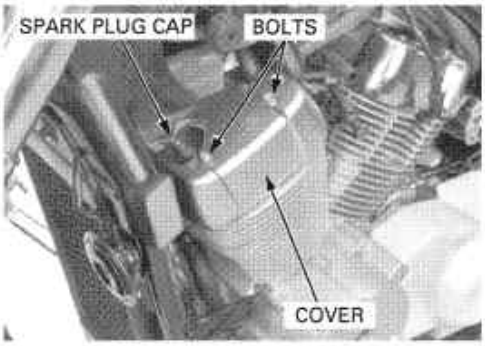
Disconnect the spark plug cap.

Remove the bolts and front right over head cover.



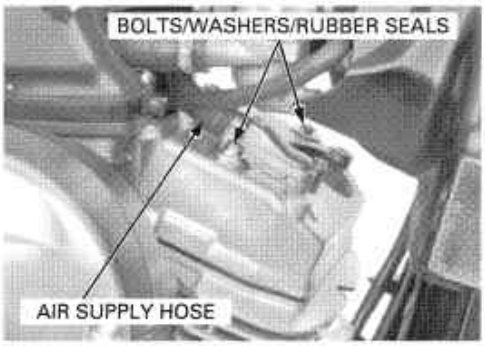
Disconnect the spark plug cap.

Remove the bolts and front left over head cover.



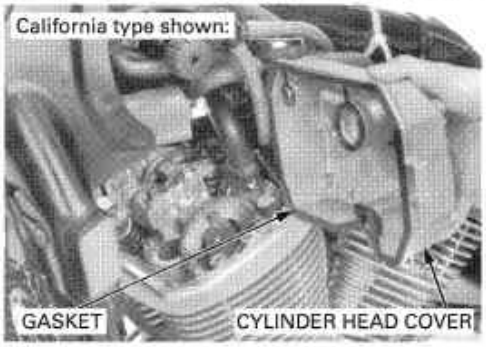
Disconnect the air supply hose.

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



Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.

Remove the cylinder head cover and gasket.



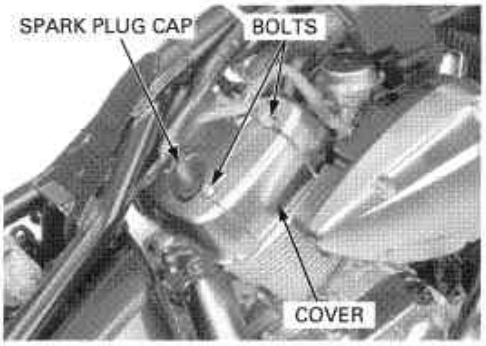
REAR

Remove the following:

- Fuel tank (page 2-4)
- Rear PAIR check valve (page 5-29)

Disconnect the spark plug cap.

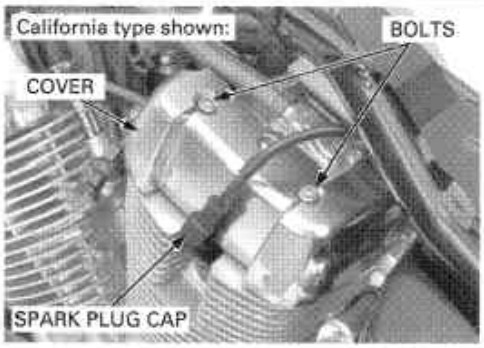
Remove the bolts and rear right over head cover.



CYLINDER HEAD/VALVE

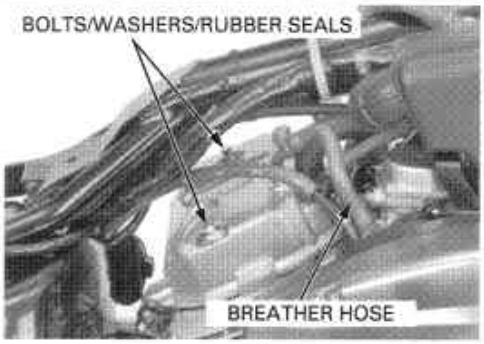
Disconnect the spark plug cap.

Remove the bolts and rear left over head cover.



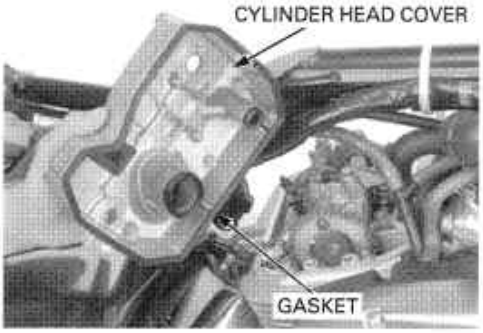
Disconnect the crankcase breather hose from the cylinder head cover.

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



Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.

Remove the cylinder head cover and gasket.



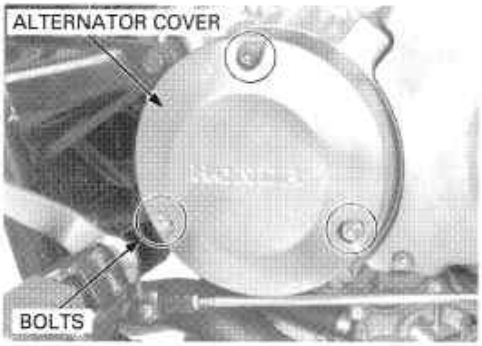
CAMSHAFT REMOVAL

NOTE:

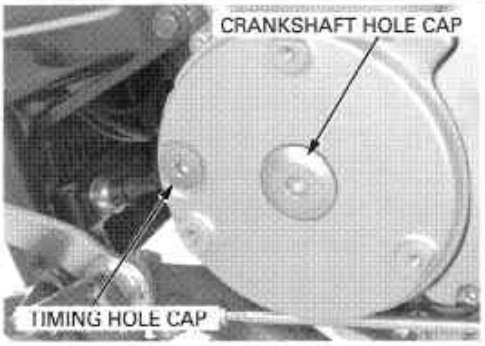
- The camshaft can be serviced with the engine in the frame.
- The front camshaft uses the same service procedure as the rear camshaft.

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

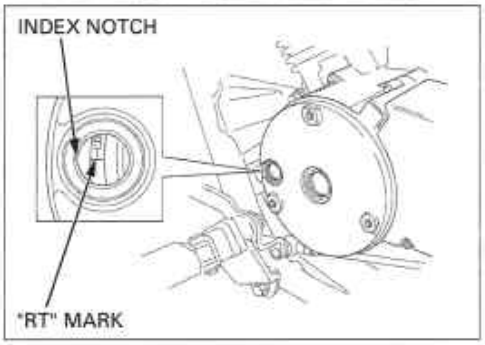
Remove the bolts and alternator cover.



Remove the crankshaft and timing hole caps from the left crankcase cover.



Turn the crankshaft counterclockwise and align the "RT" mark (front cylinder: "FT" mark) with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dead Center) on the exhaust stroke so the piston is at TDC on the compression stroke when removing the camshaft holder.



Measure the cam chain tensioner wedge B length as shown.

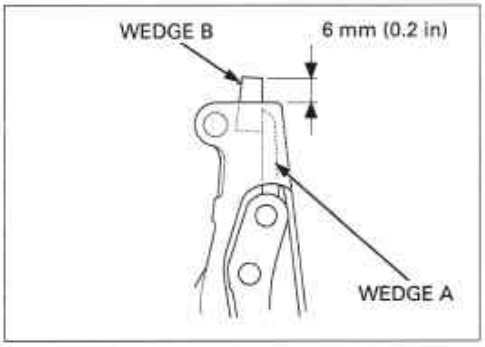
SERVICE LIMIT: 6 mm (0.2 in)

Replace the cam chain with a new one if the projection exceeds the service limit.

For the cam chain replacement, remove the following:

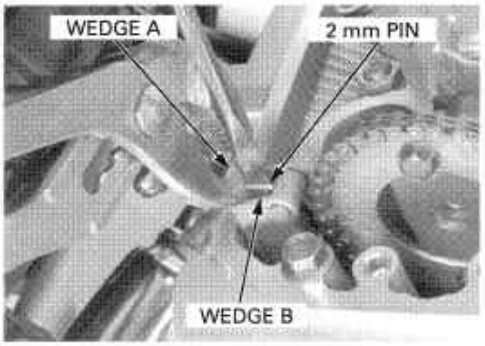
Front:
- Front camshaft
- Flywheel (page 11-5)

Rear:
- Rear camshaft
- Primary drive gear (page 10-12)



Be careful not to let the 2 mm pin fall into the crankcase.

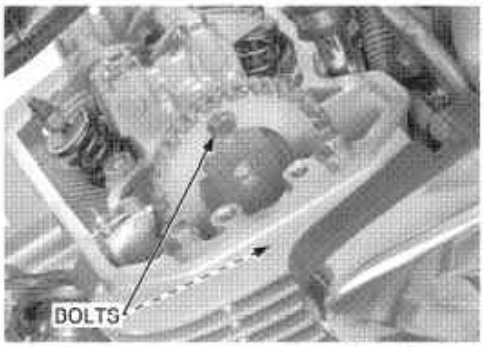
Install the 2 mm pin into the cam chain tensioner wedge A hole while pulling the wedge A straight up and pushing down the wedge B.



CYLINDER HEAD/VALVE

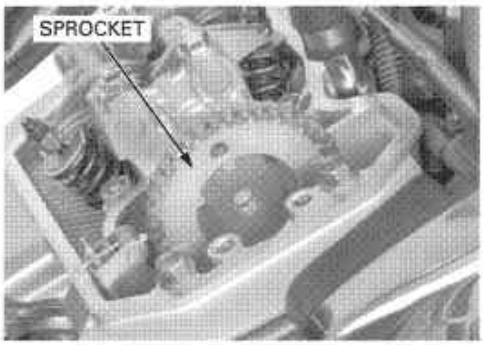
Be careful not to let the cam sprocket bolts fall into the crankcase.

Remove the cam sprocket bolt, turn the crankshaft counterclockwise one full turn (360°) and remove the other cam sprocket bolt.

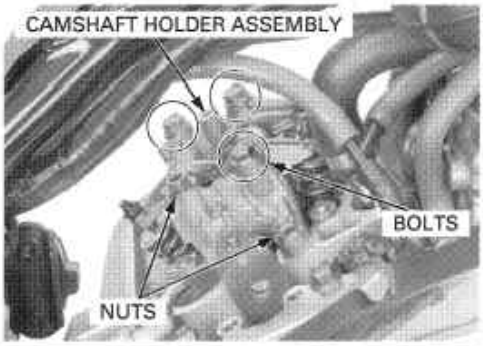


Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

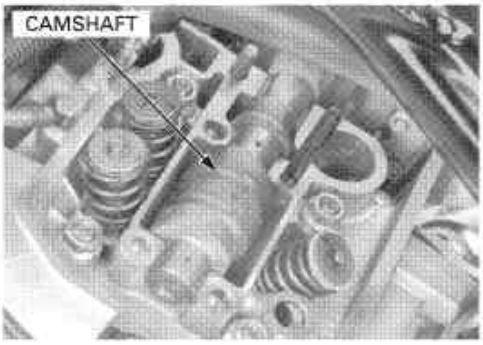
Remove the cam sprocket from the camshaft flange surface.



Make sure the piston is at TDC (Top Dead Center) on the compression stroke.
Loosen the bolts and nuts in a crisscross pattern in several steps, then remove them and camshaft holder assembly.



Remove the camshaft.

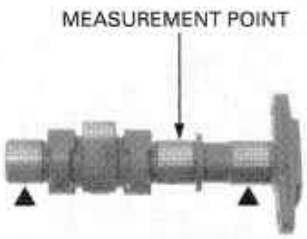


INSPECTION

CAMSHAFT RUNOUT

Support both end journals of the camshaft with V-blocks and check the camshaft runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

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

Measure each cam lobe height.

SERVICE LIMITS: IN: 37.16 mm (1.463 in)
EX: 37.58 mm (1.480 in)

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

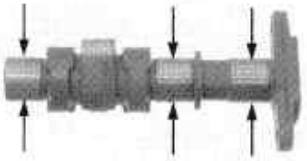
CAMSHAFT JOURNAL

Check the camshaft journal surfaces for scoring or evidence of insufficient lubrication.

Measure the O.D. of each camshaft journal.

SERVICE LIMIT: 21.90 mm (0.862 in)

NOTE:
Check the oil passages and camshaft holder for wear or damage if the journal surface is worn or damaged.



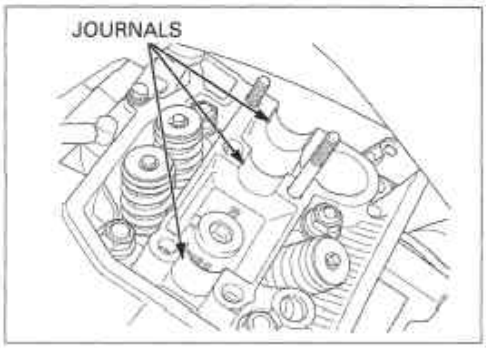
CAM SPROCKET

Check the cam sprocket for wear or damage.

CYLINDER HEAD/VALVE

CYLINDER HEAD

Check the camshaft journal surfaces of cylinder head for scoring, scratches or evidence of insufficient lubrication.

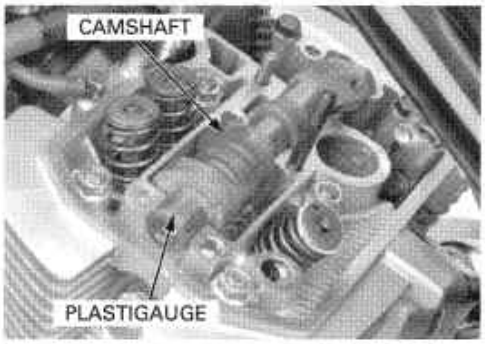


CAMSHAFT OIL CLEARANCE

Clean off any oil from the journals of the camshaft holders, cylinder head and camshaft.
Put the camshaft onto the cylinder head and lay a strip of plastigauge lengthwise on each camshaft journal.

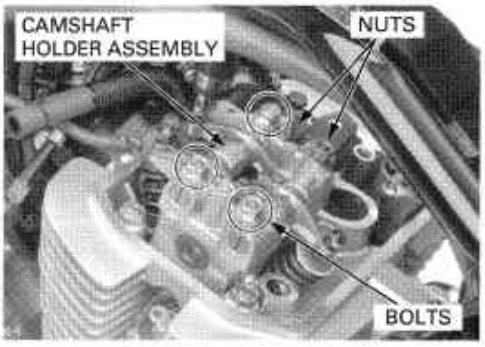
NOTE:

- Do not block any oil holes with the plastigauge.
- Do not rotate the camshaft during inspection.



Carefully install the camshaft holder and tighten the camshaft holder bolts and nuts to the specified torque in a crisscross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



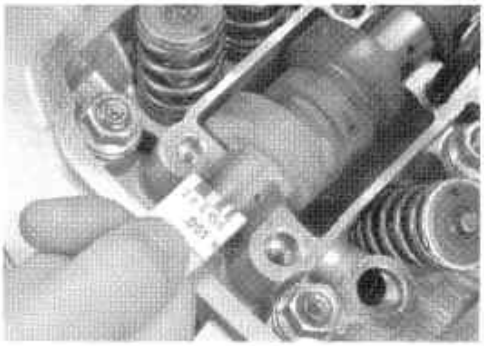
Remove the camshaft holder and measure the width of each plastigauge.

The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.16 mm (0.006 in)

When the service limit is exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holder if the clearance still exceeds the service limit.

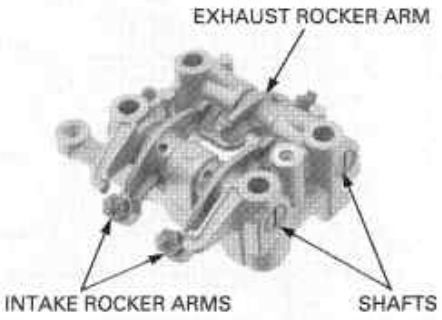


CAMSHAFT HOLDER DISASSEMBLY

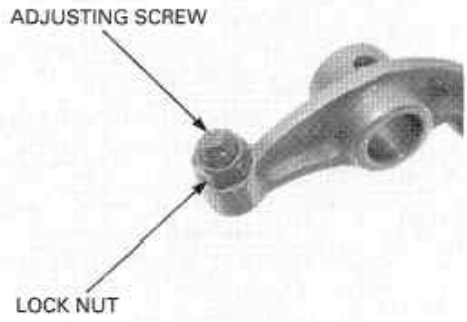
NOTE:

The front cylinder camshaft holder service uses the same procedure as the rear cylinder camshaft holder.

Remove the rocker arm shafts, intake and exhaust rocker arms.



Remove the lock nut and valve adjusting screw.

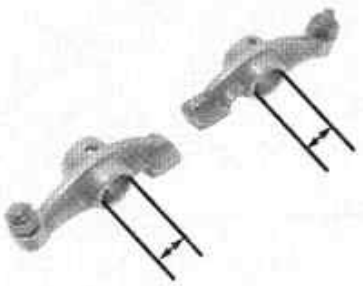


ROCKER ARM/ROCKER ARM SHAFT INSPECTION

Check the sliding surface of the rocker arms for wear or damage where they contact the camshaft, or for clogged oil holes.
Check the contact surface of the valve adjusting screw for wear or damage.

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)



Check the shaft for wear or damage.

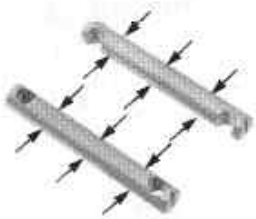
Measure each rocker arm shaft O.D.

SERVICE LIMIT: 11.83 mm (0.466 in)

Calculate the rocker arm-to-shaft clearance.

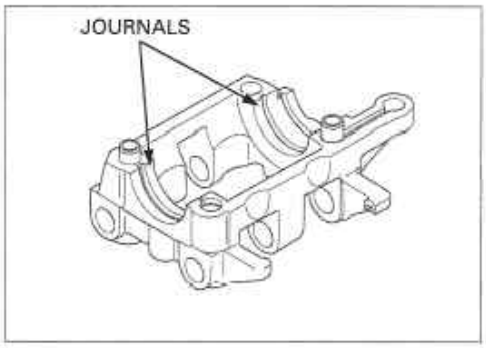
SERVICE LIMIT: 0.07 mm (0.003 in)

Replace the rocker arm and/or shaft if necessary.



CAMSHAFT HOLDER INSPECTION

Check the camshaft journal surfaces of each camshaft holder for scoring, scratches or evidence of insufficient lubrication.



CYLINDER HEAD REMOVAL

NOTE:

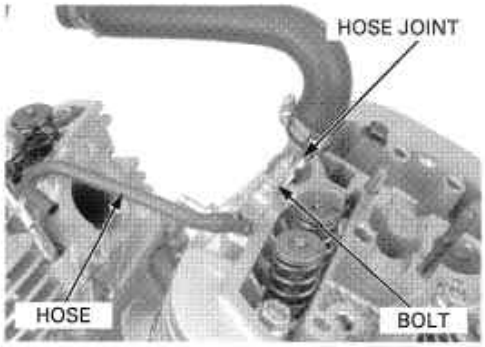
- The engine must be removed from the frame before servicing the cylinder head.
- The front cylinder head uses the same service procedure as the rear cylinder head.

Remove the following:

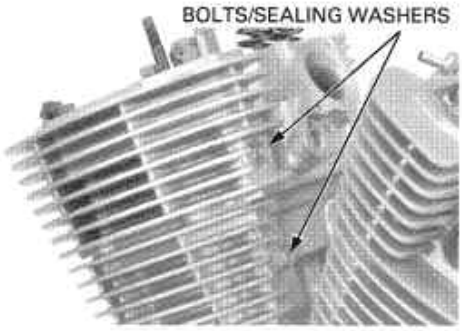
- Engine (page 7-4)
- Cylinder head cover (page 8-6)
- Camshaft (page 8-8)
- Intake manifold (page 5-22)

Remove the bolt and water hose joint from the cylinder.

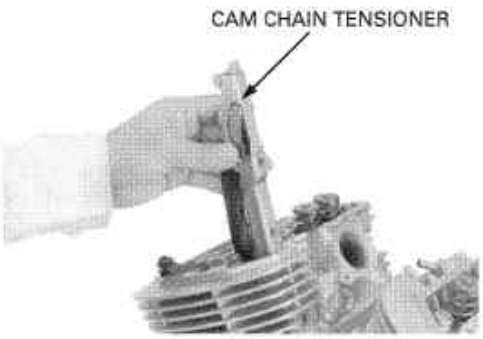
Rear cylinder head only: Disconnect the vacuum hose.



Remove the cam chain tensioner mounting bolts and sealing washers.



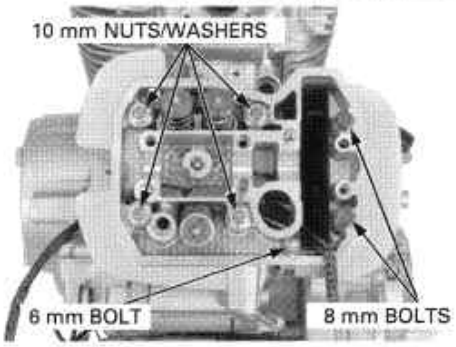
Remove the cam chain tensioner.



Loosen the bolts and nuts in a criss-cross pattern in several steps.

Remove the following cylinder head bolts and nuts:

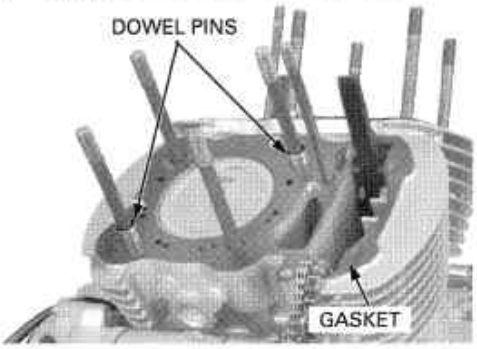
- 6 mm bolt
- 8 mm bolts
- 10 mm nuts/washers



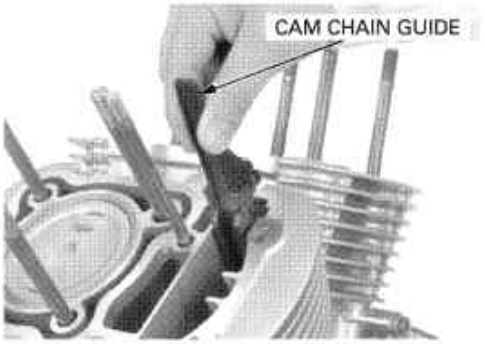
Be careful not to damage the mating surface when removing the cylinder head.

Remove the cylinder head.

Remove the gasket and dowel pins.

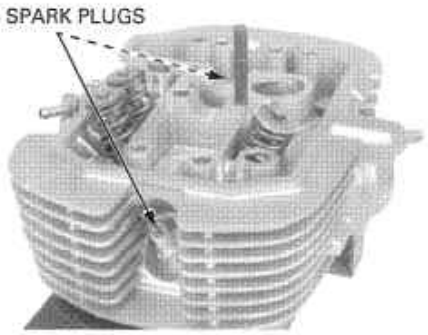


Remove the cam chain guide.



CYLINDER HEAD DISASSEMBLY

Remove the spark plugs.



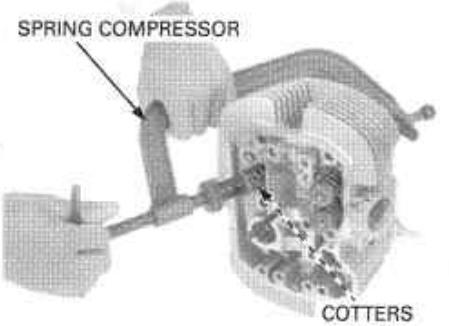
Mark all parts during disassembly so they can be placed back in their original position.

Remove the cotters using a special tool.

TOOL:
Valve spring compressor **07757-0010000**

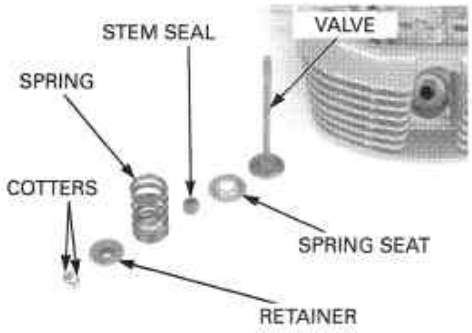
NOTICE

Compressing the valve spring more than necessary will cause loss of valve spring tension.



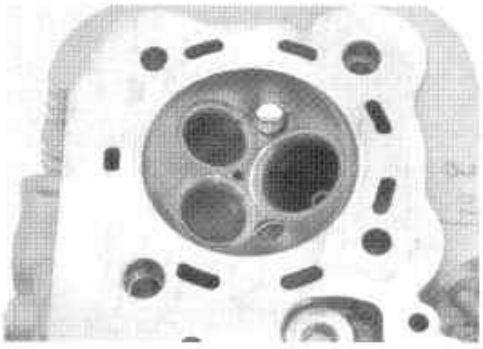
Do not reuse the removed stem seal.

Remove the valve spring compressor, then remove the retainer, spring and valve.
Remove the stem seal and spring seat.



Remove the carbon deposits from the combustion chamber and clean off the head gasket surface.

Check the spark plug hole and valve areas for cracks.

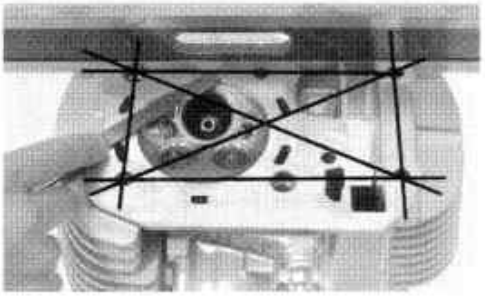


INSPECTION

CYLINDER HEAD

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

SERVICE LIMIT: 0.10 mm (0.004 in)

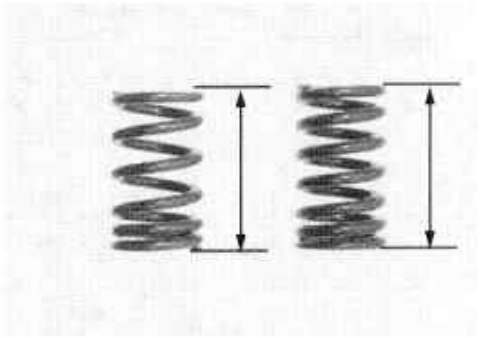


VALVE SPRING

Check the valve spring for fatigue or damage.

Measure the free length of each valve spring.

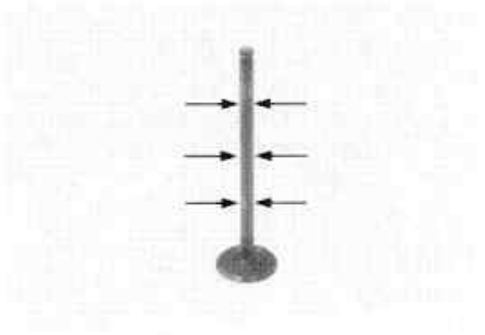
SERVICE LIMITS: IN: 40.58 mm (1.598 in)
EX: 44.72 mm (1.761 in)



VALVE STEM, VALVE GUIDE

Check each valve for bending, burning, scratches or abnormal wear.
Insert the valves in their original positions in the cylinder head. Check that each valve moves up and down smoothly, without binding.
Measure each valve stem O.D. and record it.

SERVICE LIMITS: IN: 5.45 mm (0.215 in)
EX: 5.41 mm (0.213 in)



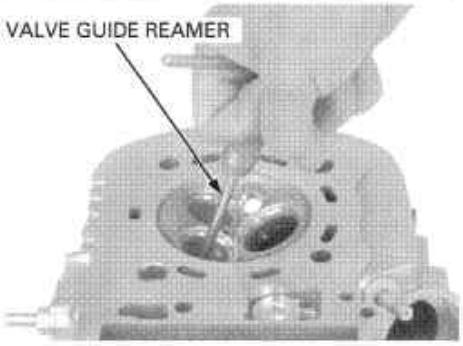
CYLINDER HEAD/VALVE

Ream the valve guide to remove any carbon build-up before measuring the guide I.D.

NOTE:

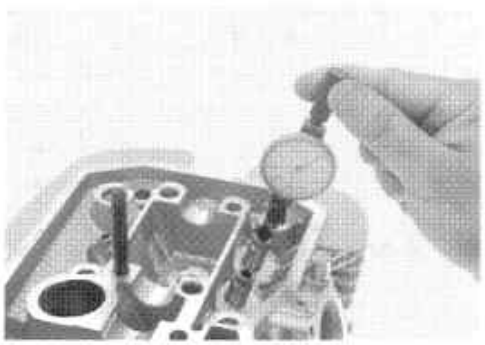
- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves maybe installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOLS:
Valve guide reamer
5.510 mm (IN/EX) **07984-2000001 or 07984-200000D (U.S.A. only)**



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

SERVICE LIMITS: IN: 5.56 mm (0.219 in)
EX: 5.56 mm (0.219 in)



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

SERVICE LIMITS: IN: 0.10 mm (0.004 in)
EX: 0.11 mm (0.004 in)

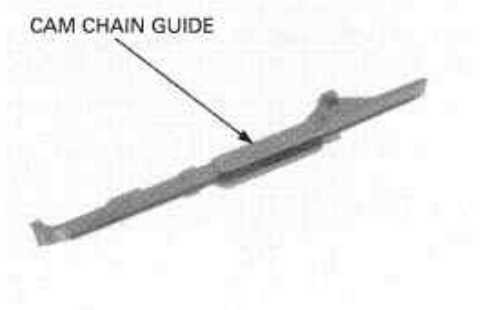
If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance.
If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limit with a new guide, also replace the valve.

NOTE:

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-20).

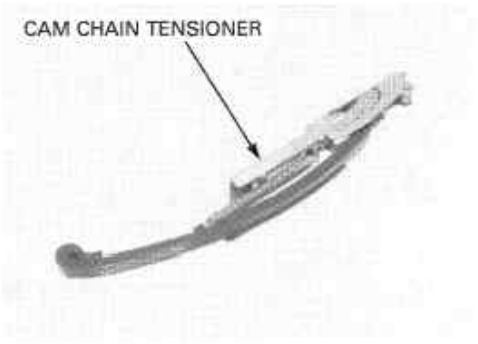
CAM CHAIN GUIDE

Check the cam chain guide for wear or damage.
Replace the cam chain guide if necessary.



CAM CHAIN TENSIONER

Check the cam chain tensioner for wear or damage. Replace the cam chain tensioner if necessary.



VALVE GUIDE REPLACEMENT

NOTE:

Refinish the valve seats whenever the valve guides are replaced to prevent uneven seating.

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

Heat the cylinder head to 130 — 140°C (275 — 290°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (300°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

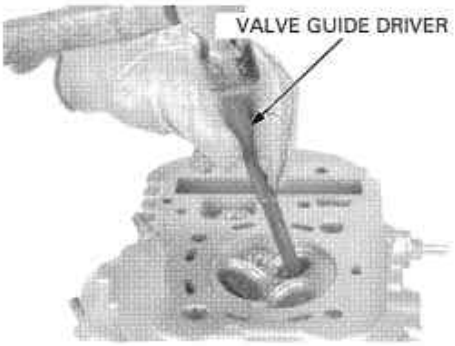
To avoid burns, wear insulated gloves when handling the heated cylinder head.

NOTICE

Using a torch to heat the cylinder head may cause warping.

Be careful not to damage the cylinder head.

Support the cylinder head and drive out the old guides from the combustion chamber side of the head.



TOOLS:

Valve guide driver
5.5 mm (IN/EX) 07742-0010100

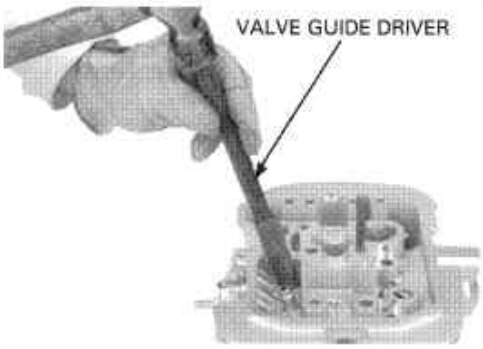
Adjust the valve guide driver to the valve guide height.

TOOLS:

Valve guide driver	**07743-0020000 Not available in U.S.A.**

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:

IN: 17.2 – 17.4 mm (0.677 – 0.685 in)
EX: 18.7 – 18.9 mm (0.736 – 0.744 in)

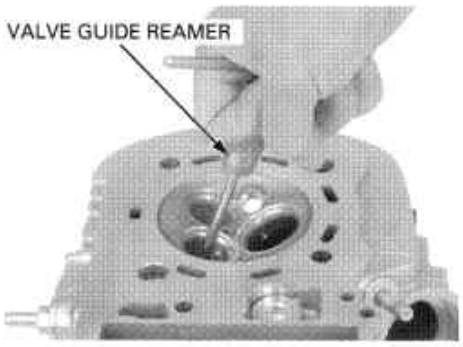


Drive new guides in from the camshaft side of the cylinder head to the valve guide height while the cylinder head is still heated.

Let the cylinder head cool to room temperature, then ream the new valve guides.

TOOLS:

Valve guide reamer 5.510 mm (IN/EX)	**07984-2000001 or 07984-200000D (U.S.A. only)**



NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves maybe installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

Clean the cylinder head thoroughly to remove any metal particles after reaming.

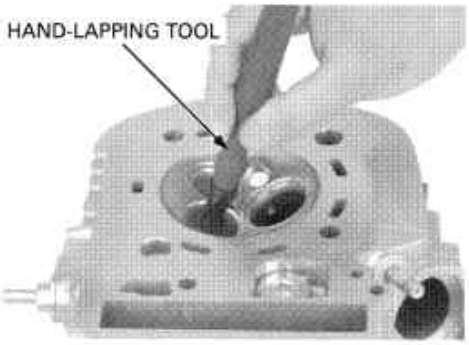
Reface the valve seat (page 8-21).

VALVE SEAT INSPECTION/REFACING

INSPECTION

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

Apply a thin coat of Prussian Blue to each valve face.
Tap the valve against the valve seat several times using a hand-lapping tool, without rotating valve, to make a clear pattern.



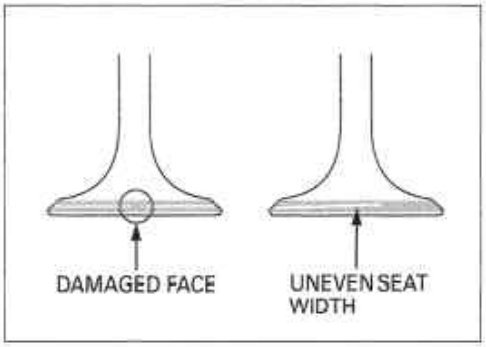
Remove the valve and inspect the valve seat face.

NOTE:

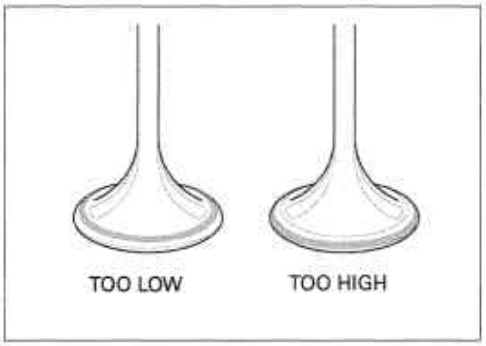
- The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

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.



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

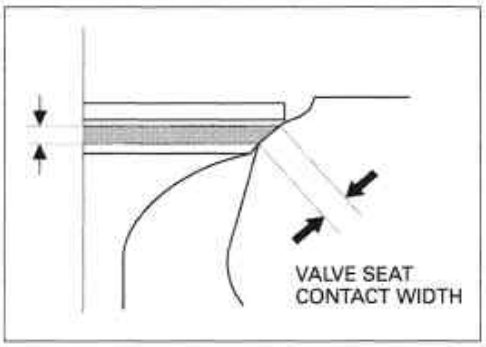


Inspect the width of the valve seat.

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

STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

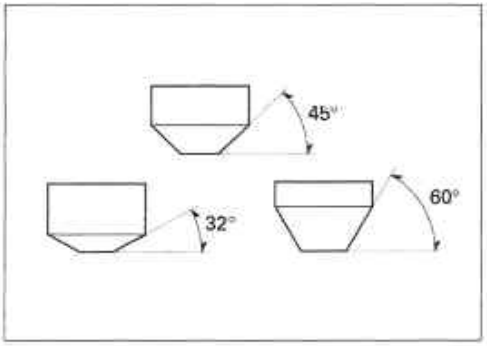
If the valve seat width is not within specification, reface the valve seat.



VALVE SEAT REFACING

NOTE:

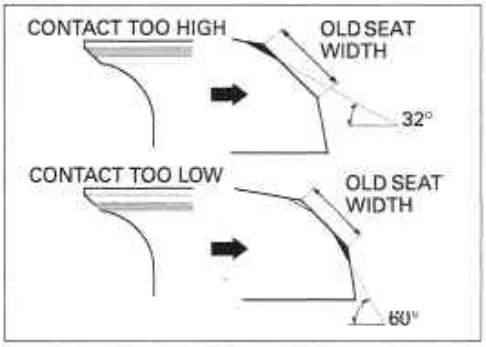
- Follow the refacer manufacturer's operating instructions.
- Reface the valve seat whenever the valve guide has been replaced.
- Be careful not to grind the seat more than necessary.



CYLINDER HEAD/VALVE

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.

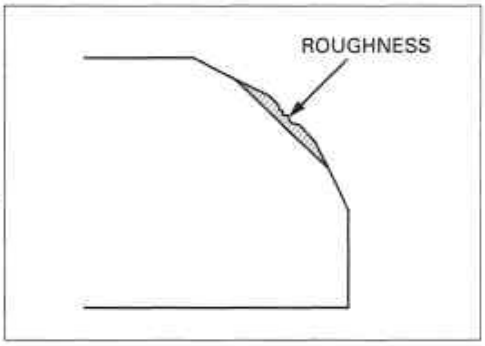


Using a 45° cutter, remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 27.5 mm (IN)	**07780-0010200**
Seat cutter, 35 mm (EX)	**07780-0010400**
Cutter holder, 5.5 mm	**07781-0010101**

or equivalent commercially available in U.S.A.

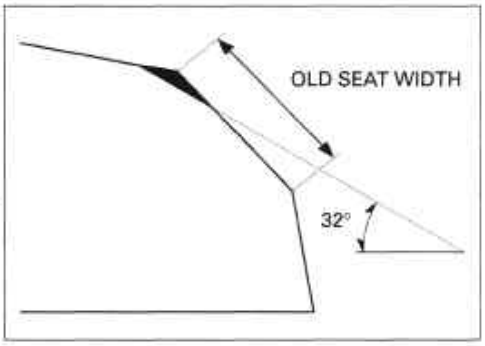


Using a 32° cutter, remove the top 1/4 of the existing valve seat material.

TOOLS:

Flat cutter, 28 mm (IN)	**07780-0012100**
Flat cutter, 35 mm (EX)	**07780-0012300**
Cutter holder, 5.5 mm	**07781-0010101**

or equivalent commercially available in U.S.A.

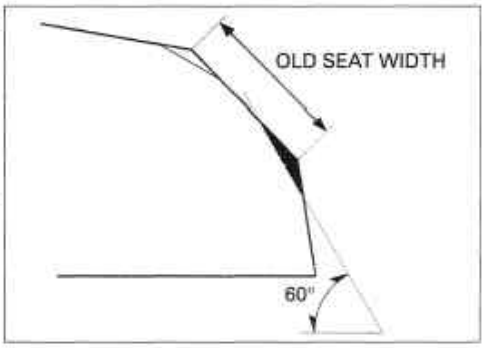


Using a 60° cutter, remove the bottom 1/4 of the old seat.

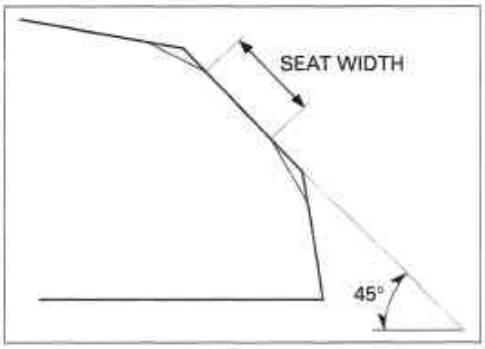
TOOLS:

Interior cutter, 30 mm (IN)	**07780-0014000**
Interior cutter, 37.5 mm (EX)	**07780-0014100**
Cutter holder, 5.5 mm	**07781-0010101**

or equivalent commercially available in U.S.A.



Using a 45° seat cutter, cut the seat to the proper width.
Make sure that all pitting and irregularities are removed.



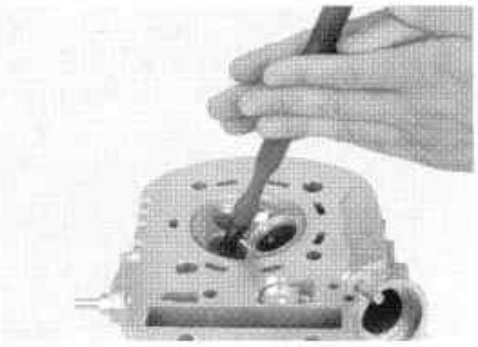
NOTICE

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

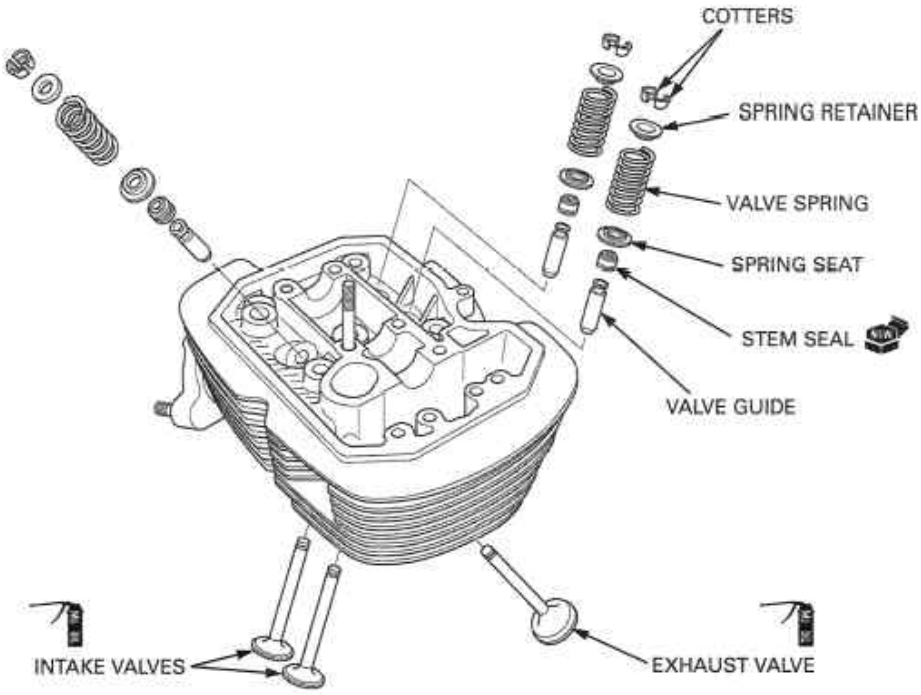
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

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

Recheck the seat contact after lapping.



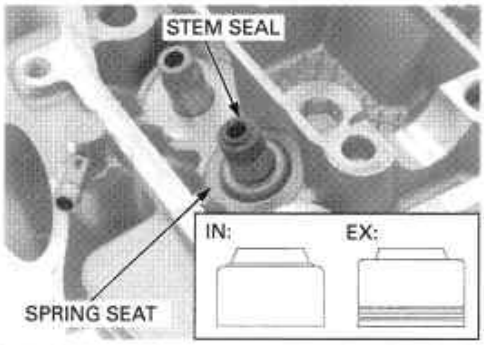
CYLINDER HEAD ASSEMBLY



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

Exhaust stem seal has stopper rings.

Install the spring seat and new stem seal.



Lubricate valve stem and valve guide inner surfaces with molybdenum disulfide oil.

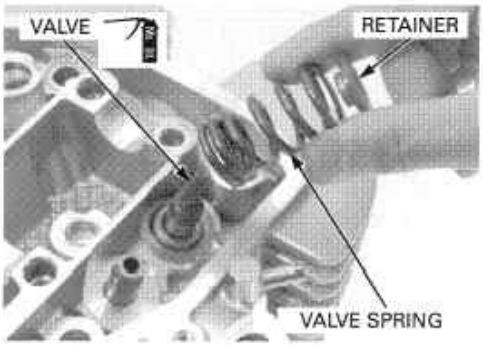
Install the valve into the valve guide.

NOTE:

To avoid damage to the stem seal, turn the valve slowly when valve installing.

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

Install the spring retainer.



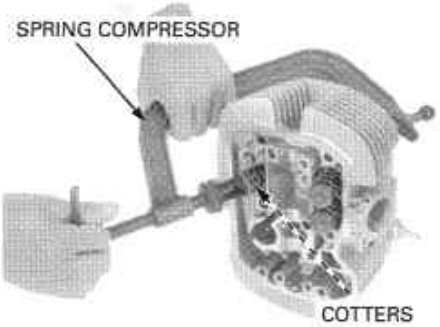
Grease the cotters to ease installation.

Install the cotters using a special tool.

TOOL:
Valve spring compressor 07757-0010000

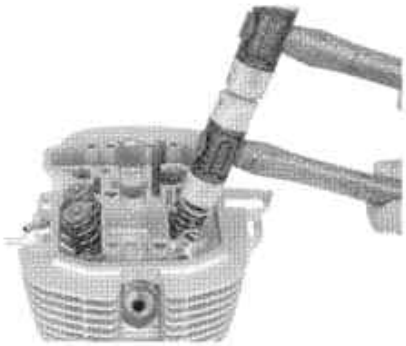
NOTICE

Compressing the valve springs more than necessary will cause loss of valve spring tension.

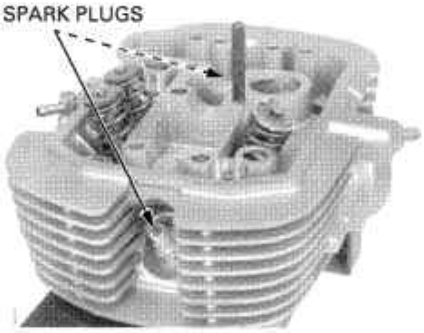


Support the cylinder head so the valve heads will not contact anything and possibly get damaged.

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



Install the spark plugs.



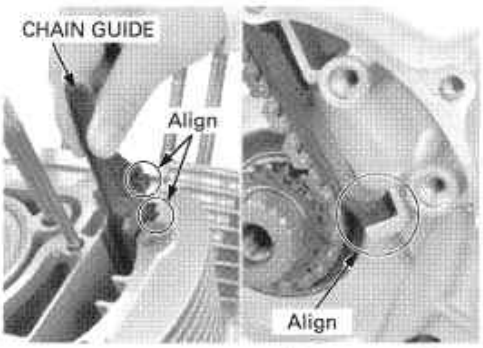
CYLINDER HEAD INSTALLATION

NOTE:

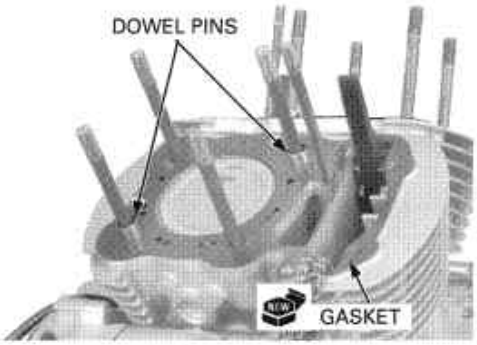
- The front cylinder head uses the same service procedure as the rear cylinder head.
- Be careful not to damage the mating surfaces when cleaning the cylinder head mating surface.
- When cleaning the cylinder head mating surface, place the shop towel over the cylinder opening to prevent dust or dirt from entering the engine.

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

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

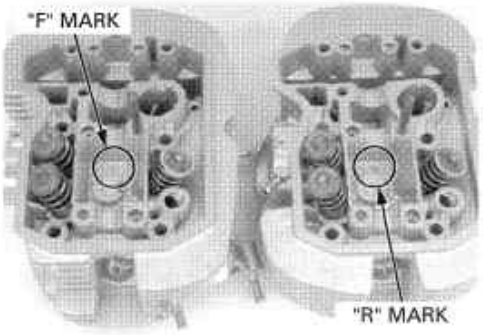


Install the dowel pins and a new gasket.



The cylinder heads are identified by marks on their oil pockets.

- "F": Front cylinder head
- "R": Rear cylinder head



Install the cylinder head to the cylinder.

Apply oil to the cylinder head each bolts and nuts threads and seating surfaces.

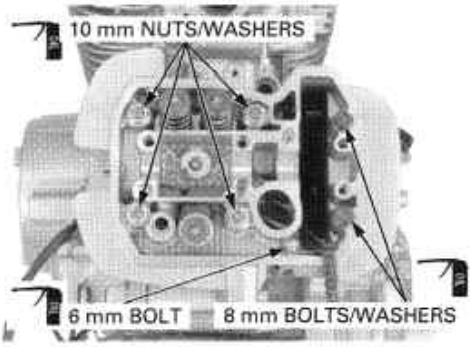
Install and tighten the cylinder head bolts, nuts and washer to the specified torque.

TORQUE:

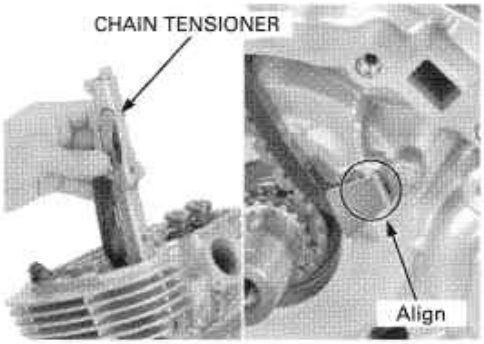
10 mm nut: 47 N·m (4.8 kgf·m, 35 lbf·ft)
8 mm bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)
6 mm bolt : 12 N·m (1.2 kgf·m, 9 lbf·ft)

NOTE:

- Tighten all to hand-tight, then torque the larger fasteners before tightening the smaller fasteners.
- Tighten the bolts and nuts in a crisscross pattern in several steps.

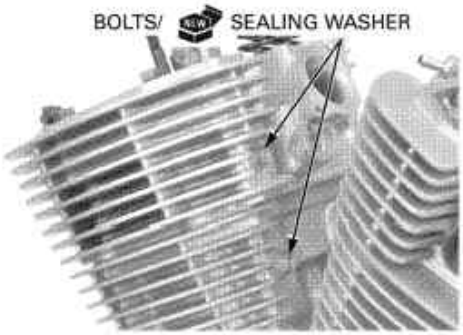


Install the cam chain tensioner, aligning its end with the groove in the crankcase.

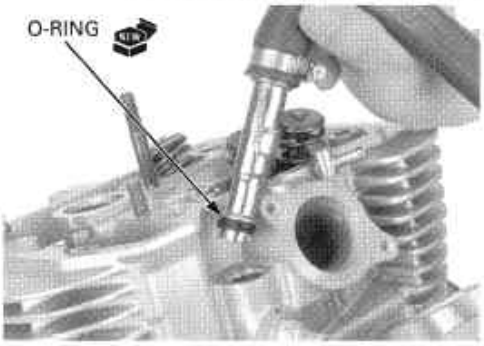


Install the tensioner bolts with new sealing washers and tighten them alternately.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



Install a new O-ring to the water hose joint.



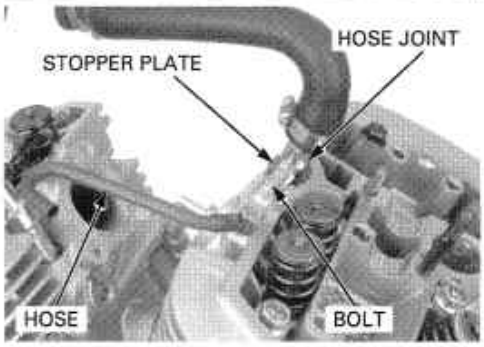
Install the water hose joint and tighten the bolt securely.

Rear cylinder only: Connect the vacuum hose.

Install the engine into the frame (page 7-7).

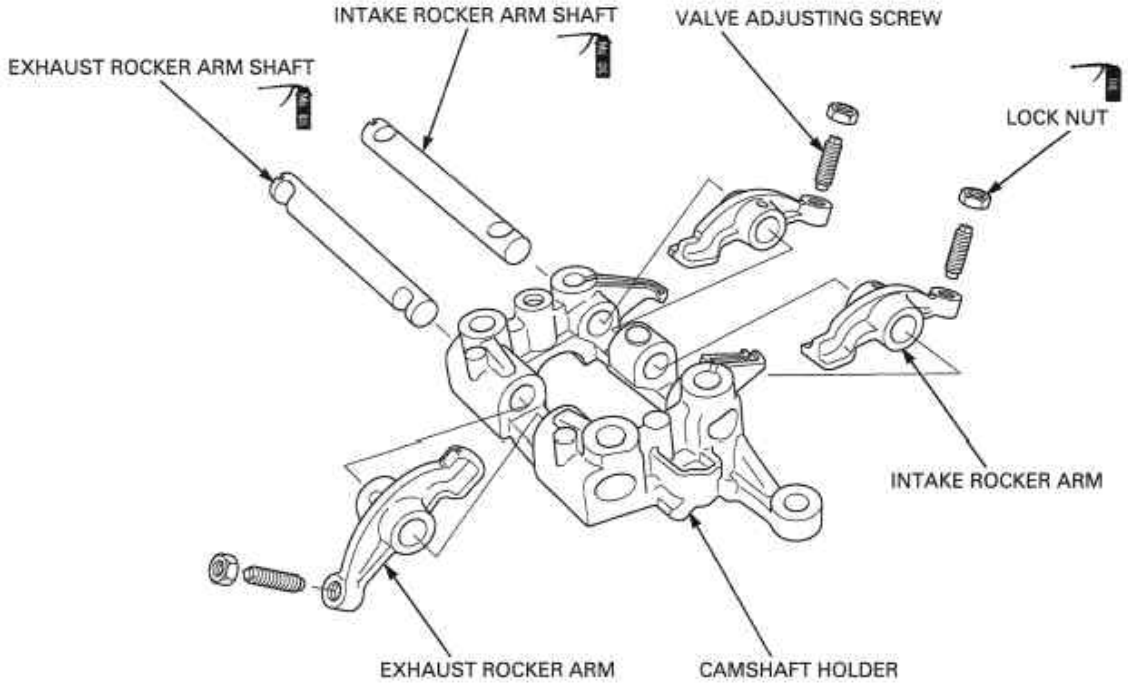
Install the following:

- Camshaft (page 8-28)
- Cylinder head cover (page 8-33)
- Intake manifold (page 5-23)

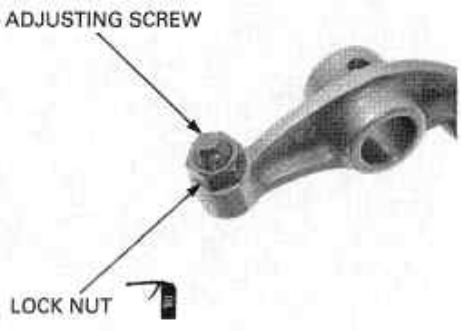


CAMSHAFT INSTALLATION

CAMSHAFT HOLDER ASSEMBLY



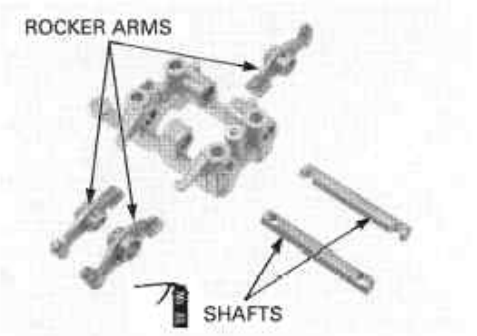
Apply engine oil to the valve adjusting screw lock nut threads and seating surface.
Install the valve adjusting screw and lock nut.



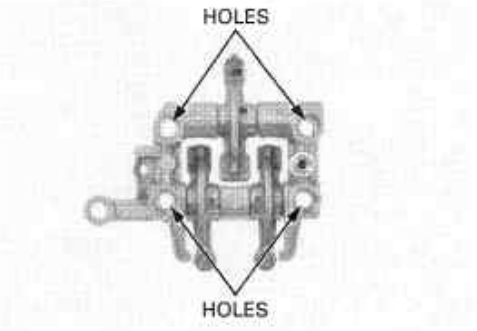
NOTE:

- The exhaust rocker arm has larger slipper face than the intake rocker arm.
- The intake rocker arm shaft has two holes on each end.
- The exhaust rocker arm shaft has two grooves on each end.

Apply molybdenum disulfide oil solution to the sliding surface of the shaft.
Install the rocker arms and shafts.



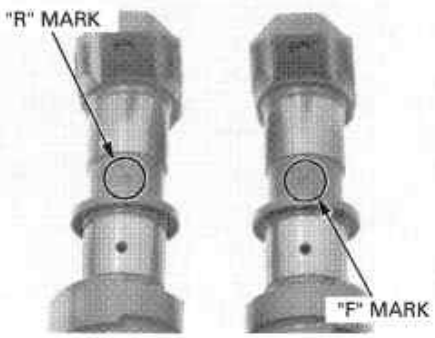
Align the intake rocker arm shaft holes with the holder holes.
Align the exhaust rocker arm shaft grooves with the holder holes.



CAMSHAFT INSTALLATION

NOTE:

- The camshafts are identified by the stamped marks:
  "F": Front cylinder camshaft
  "R": Rear cylinder camshaft
- If both (front and rear) camshafts were removed, install the front cylinder camshaft first, then install the rear cylinder camshaft.
- If the rear cylinder head was not serviced, remove the rear cylinder head cover to check the camshaft position.
- If the front cylinder head was not serviced, remove the front cylinder head cover to check the camshaft position.



CYLINDER HEAD/VALVE

FRONT CYLINDER TDC SETTING

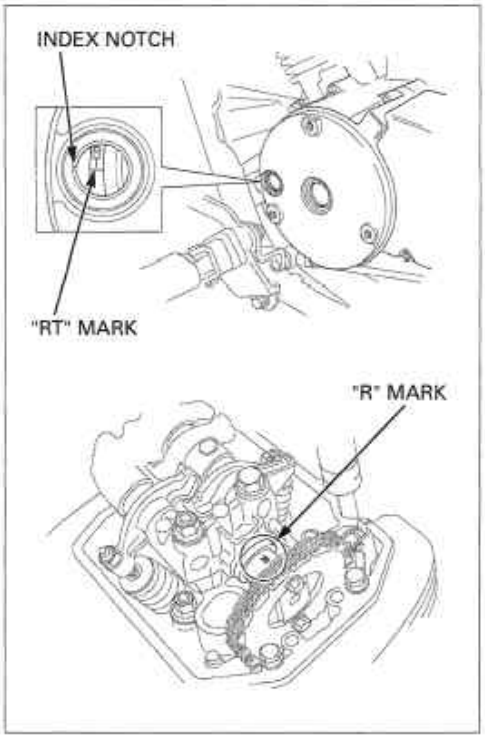
If the rear cylinder has not been serviced, begin here.

Remove the rear cylinder head cover (page 8-7) and check the rear cylinder camshaft position as follows:

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index notch on the left crankcase cover, then check the identification mark "R" on the rear camshaft.

- If the "R" mark faces up, turn the crankshaft counterclockwise 1/7 (52°) turn (align the "FT" mark on the flywheel with the index notch) and begin installation of the front camshaft.
- If the "R" mark faces down (cannot be seen), turn the crankshaft counterclockwise 1-1/7 (412°) turn (align the "FT" mark with the index notch) and begin installation of the front camshaft.

Install the front camshaft (page 8-31).



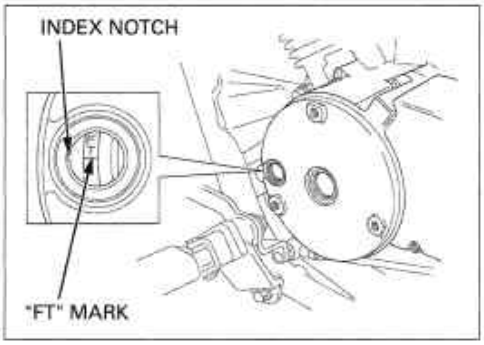
BOTH CYLINDER TDC SETTING

If both camshafts have been serviced, begin installation of the front camshaft.

Align the "FT" mark on the flywheel with the index notch on the left crankcase cover.

Install the front camshaft (page 8-31).

Set the rear cylinder at TDC (page 8-31).
Install the rear camshaft (page 8-31).



REAR CYLINDER TDC SETTING

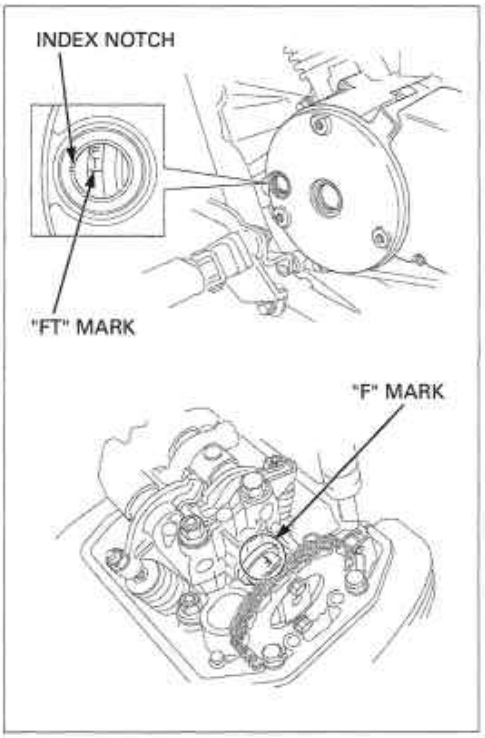
If the front cylinder has not been serviced, begin here.

Remove the front cylinder head cover (page 8-6) and check the front cylinder camshaft position as follows:

Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index notch on the left crankcase cover, then check the identification mark "F" on the front camshaft.

- If the "F" mark faces up, turn the crankshaft counterclockwise 1-6/7 (668°) turn (align the "RT" mark on the flywheel with the index notch) and begin installation of the rear camshaft.
- If the "F" mark faces down (cannot be seen), turn the crankshaft clockwise 6/7 (308°) turn (align the "RT" mark with the index notch) and begin installation of the rear camshaft.

Install the rear camshaft using the following procedure.

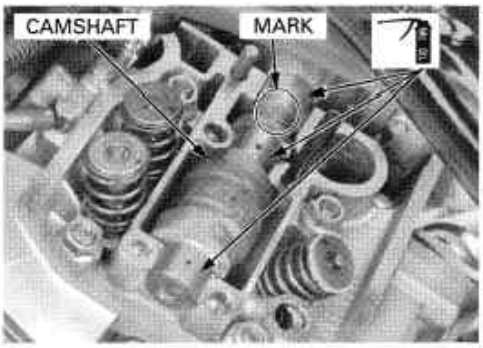


CAMSHAFT INSTALLATION

The front camshaft uses the same service procedure as the rear camshaft.

Lubricate the camshaft lobe and journal surfaces with molybdenum disulfide oil.

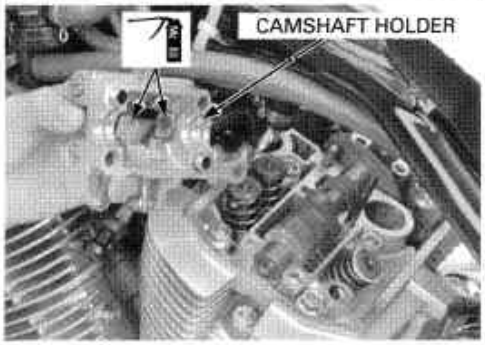
Install the camshaft with the camshaft identification mark (R: rear camshaft, F: front camshaft) facing up.



Lubricate each rocker arm slipper surfaces with molybdenum disulfide oil.

NOTE:
Before camshaft holder installation, loosen the valve adjusting screw and lock nut fully.

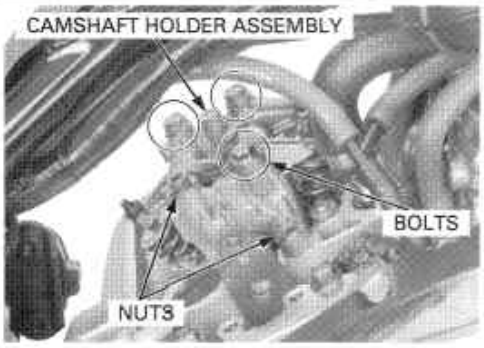
Install the camshaft holder assembly.



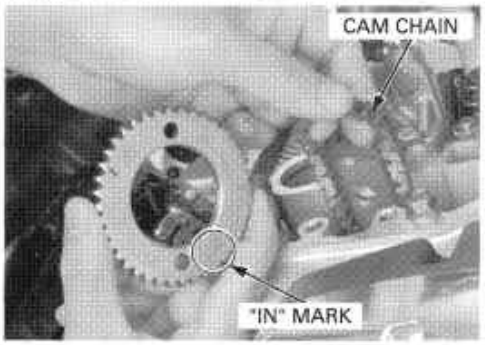
CYLINDER HEAD/VALVE

Install the camshaft holder bolts and nuts.
Tighten the bolts and nuts to the specified torque in a crisscross pattern in several steps.

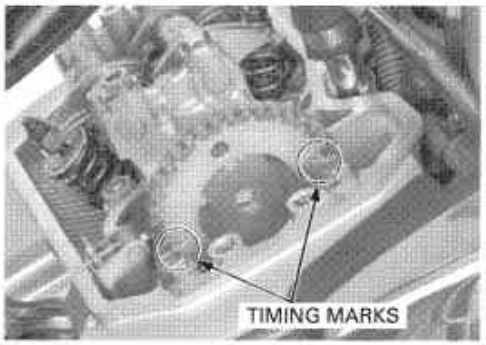
TORQUE:
8 mm bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)
8 mm nut: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the cam sprocket to the cam chain with the "IN" mark facing inside.



Install the cam sprocket on the camshaft flange and check that the timing marks align with the upper surface of the cylinder head.



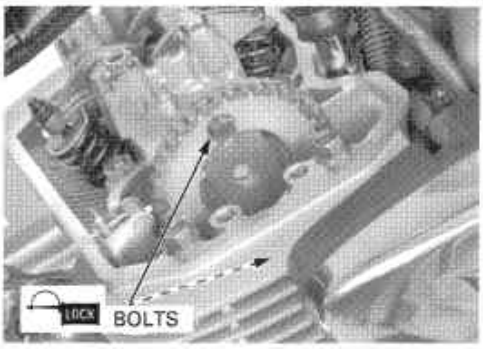
Be careful not to let the cam sprocket bolts fall into the crankcase.

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

Align the cam sprocket bolt holes in the cam sprocket and camshaft.
Temporarily install the cam sprocket bolt.
Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

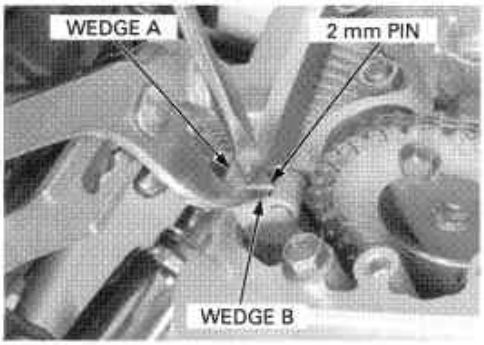
Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.



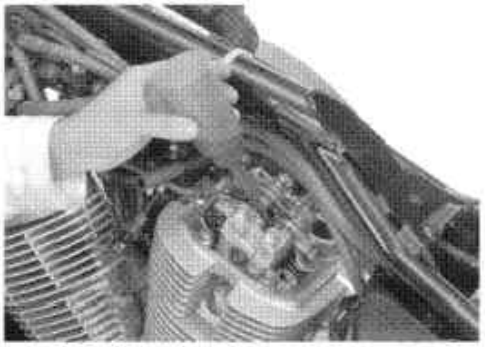
Remove the 2 mm pin while holding cam chain tensioner wedge A and pushing down the wedge B.

NOTE:

- Be careful not to let the 2 mm pin fall into the crankcase.
- Do not forget to remove the 2 mm pin before installing the cylinder head cover.



Fill the oil pockets in the head with engine oil.
Adjust the valve clearance (page 3-10).

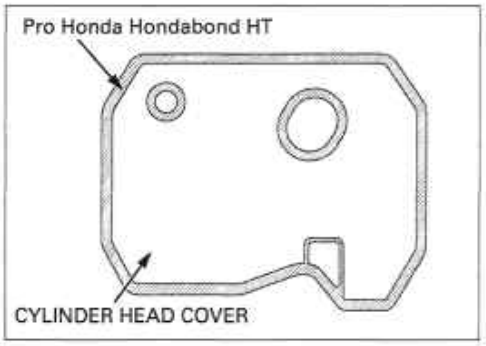


CYLINDER HEAD COVER INSTALLATION

Clean the gasket groove and cylinder head mating surface of the cylinder head cover.

Apply Pro Honda Hondabond HT or equivalent to the gasket groove of the cylinder head cover.

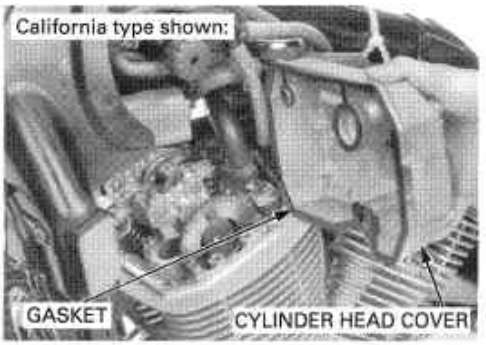
Install the gasket into the groove.



FRONT

Clean the cylinder head cover mating surface of the cylinder head.

Install the front cylinder head cover on the front cylinder.

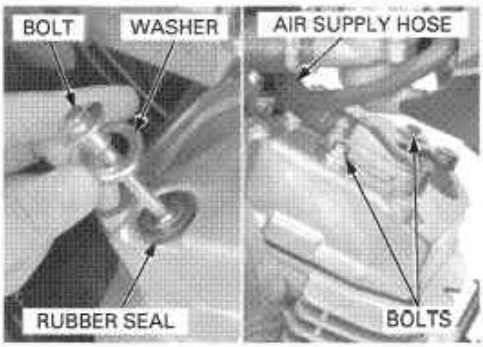


CYLINDER HEAD/VALVE

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

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

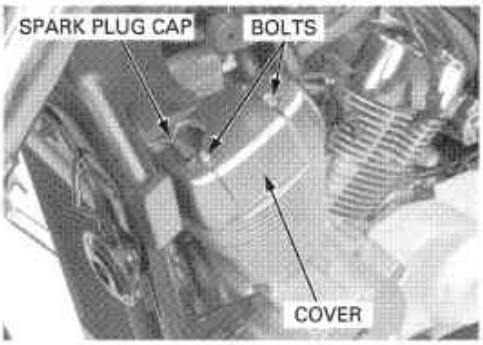
Connect the air supply hose.



Install the front left over head cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

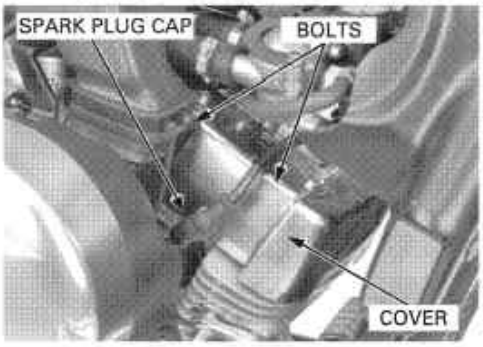
Connect the spark plug cap.



Install the front right over head cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

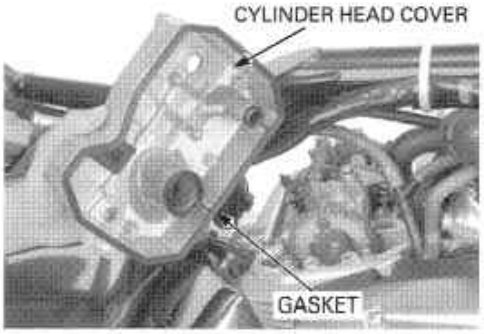
Connect the spark plug cap.



REAR

Clean the cylinder head cover mating surface of the cylinder head.

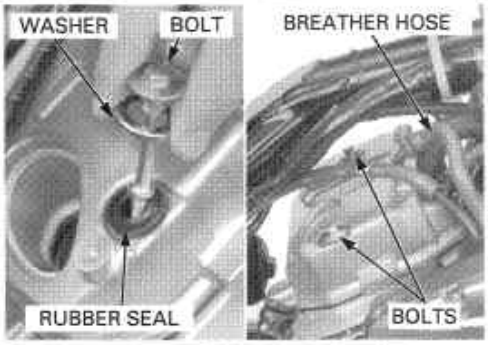
Install the rear cylinder head cover on the rear cylinder.



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

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

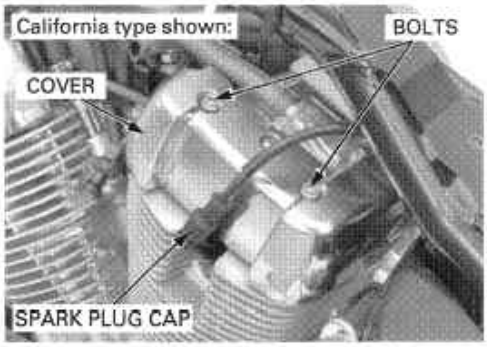
Connect the crankcase breather hose.



Install the rear left over head cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the spark plug cap.



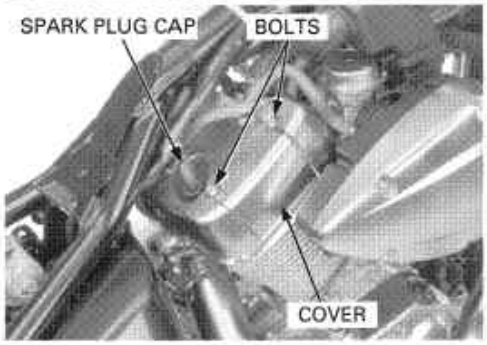
Install the rear right over head cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the spark plug cap.

Install the following:

- PAIR check valve (page 5-29)
- Fuel tank (page 2-4)

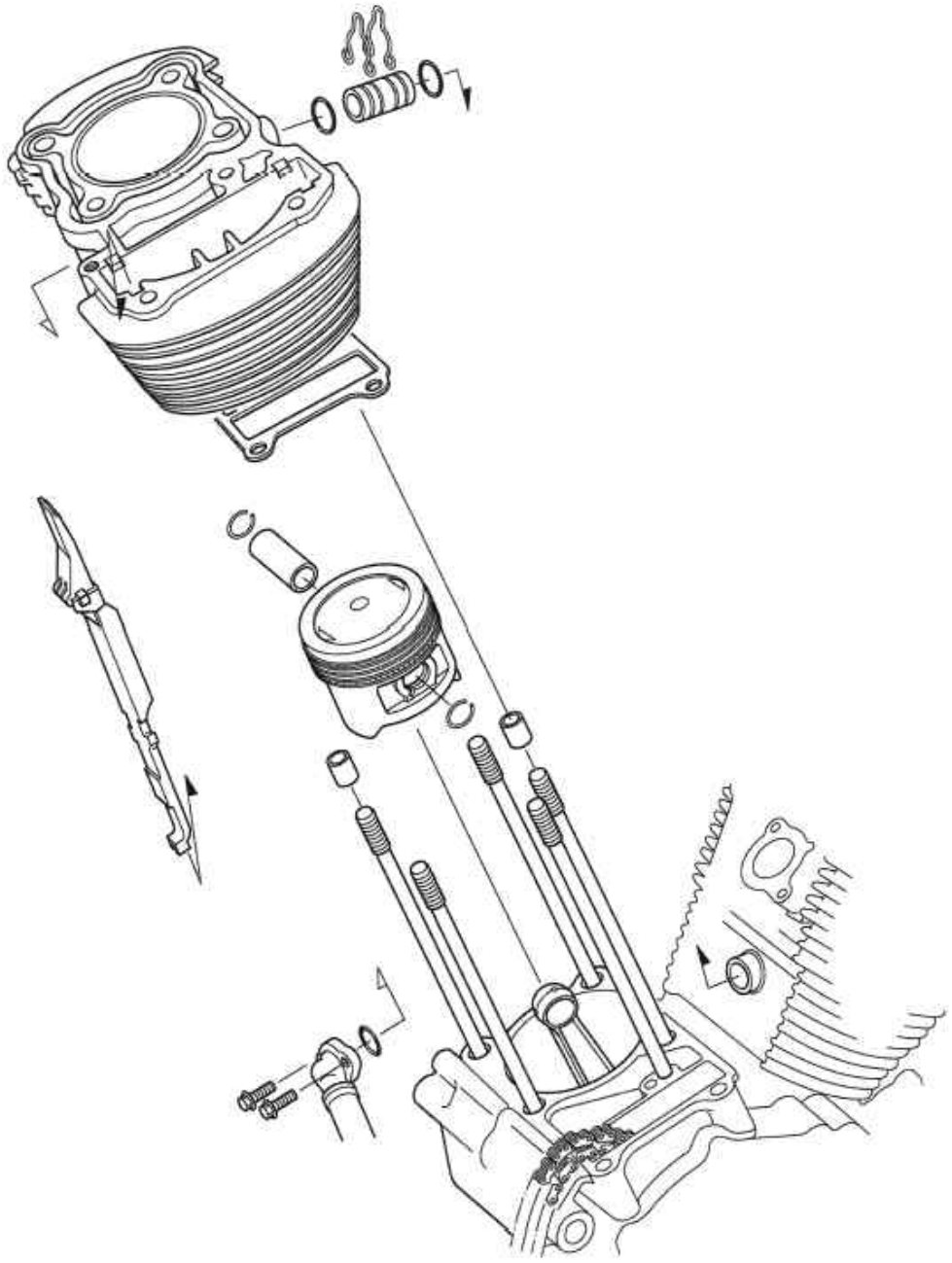


MEMO

9. CYLINDER/PISTON

CYLINDER/PISTON

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- This section covers service of the piston and cylinder. To service these parts, the engine must be removed from the frame.
- Take care not to damage the cylinder walls and pistons.
- Be careful not to damage the mating surfaces when removing the cylinder. Do not strike the cylinder too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder. Clean the oil passages before installing the cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out of round		–	0.06 (0.002)
	Taper		–	0.06 (0.002)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston rings	Piston O.D. at 17 mm (0.7 in) from bottom		78.97 – 78.99 (3.109 – 3.110)	78.90 (3.106)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.15 – 0.25 (0.006 – 0.010)	0.4 (0.02)
		Second	0.25 – 0.40 (0.010 – 0.016)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.80 (0.008 – 0.031)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.07 (0.003)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.034 (0.7093 – 0.7100)	18.07 (0.711)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

TORQUE VALUE

Cylinder stud bolt (page 9-8)

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

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

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

CYLINDER/PISTON REMOVAL

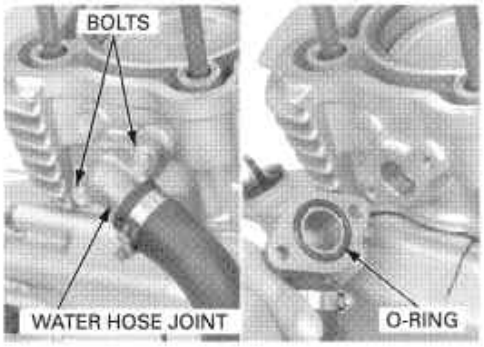
CYLINDER REMOVAL

The front cylinder uses the same service procedure as the rear cylinder.

Remove the cylinder head (page 8-14).

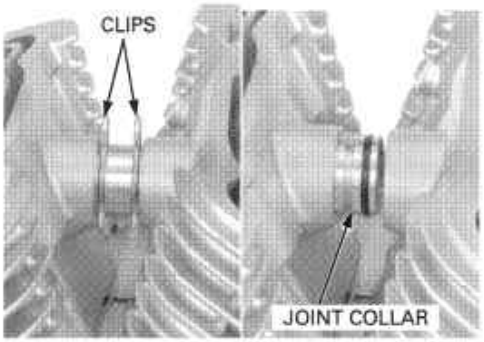
Front cylinder only:

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



Remove the retaining clips.

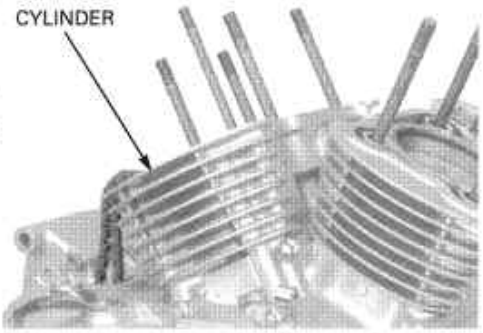
Slide the cylinder joint collar toward either the front or rear cylinder.



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

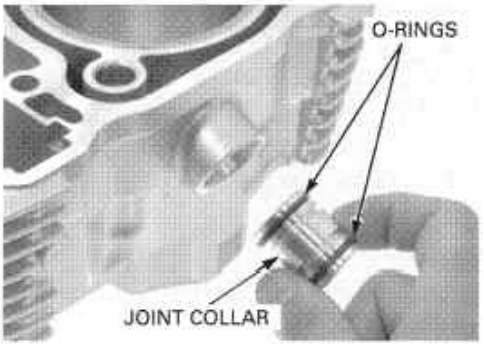
NOTE:

- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.



Remove the joint collar from the cylinder.

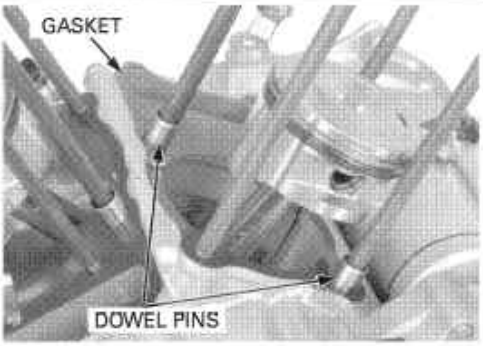
Remove the O-rings.



Remove the gasket and dowel pins.

Be careful not to damage the gasket surface.

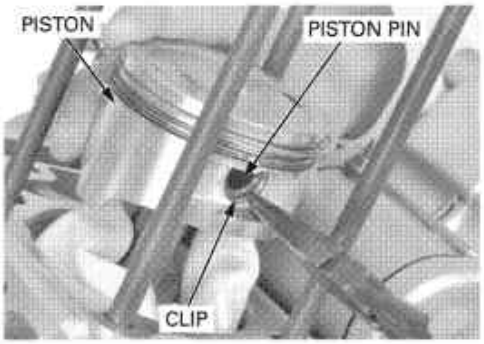
Clean off any gasket material from the cylinder upper surface.



PISTON REMOVAL

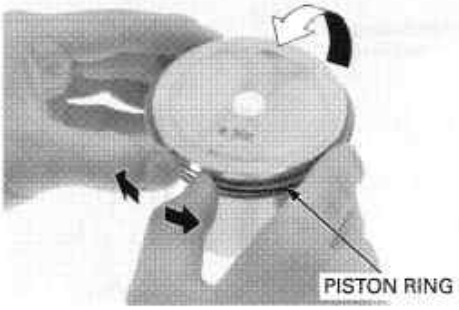
Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

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



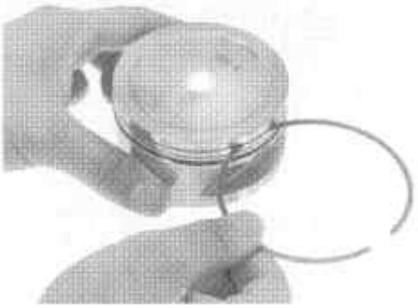
Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up a point opposite the gap.



Never use a wire brush; it will scratch the groove.

Clean carbon deposits from the ring grooves with a used piston ring that will be discarded.



INSPECTION

PISTON/PISTON RING

Always replace the piston rings as a set.

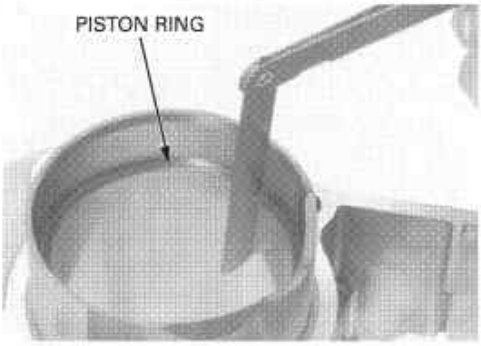
Inspect the piston rings for smooth movement by rotating them. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMITS:
Top: 0.08 mm (0.003 in)
Second: 0.07 mm (0.003 in)

Insert the piston ring into the bottom of the cylinder squarely using the piston crown.
Measure the ring end gap.

SERVICE LIMITS:
Top: 0.4 mm (0.02 in)
Second: 0.6 mm (0.02 in)
Oil (side rail): 1.0 mm (0.04 in)

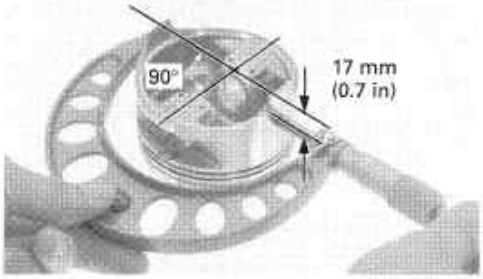


Measure the piston O.D. at a point 17 mm (0.7 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 78.90 mm (3.106 in)

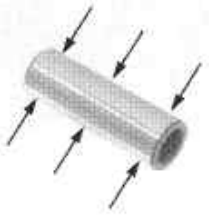
Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance (page 9-7).

SERVICE LIMIT: 0.10 mm (0.004 in)



Measure the piston pin O.D. at three points.

SERVICE LIMIT: 17.98 mm (0.708 in)

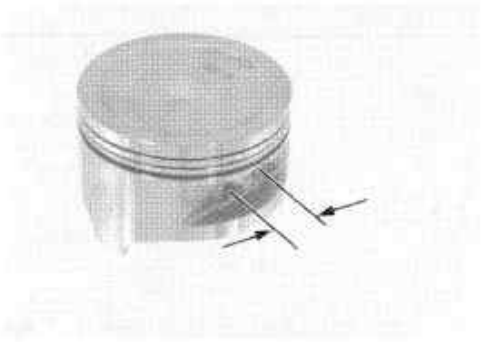


Measure the piston pin bore I.D.

SERVICE LIMIT: 18.05 mm (0.711 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



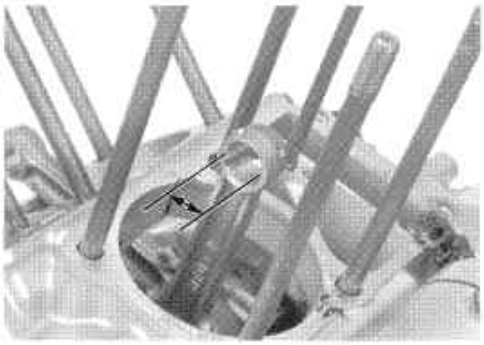
CONNECTING ROD

Measure the connecting rod small end I.D.

SERVICE LIMIT: 18.07 mm (0.711 in)

Calculate the connecting rod-to-piston pin clearance.

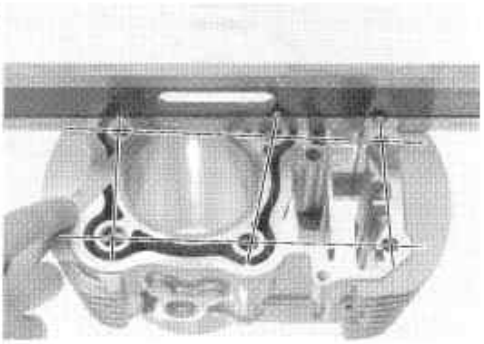
SERVICE LIMIT: 0.06 mm (0.002 in)



CYLINDER

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

SERVICE LIMIT: 0.10 mm (0.004 in)



Check the cylinder wall for scratches or wear. Measure the cylinder I.D. at three levels on the X and Y axes. Take the maximum reading to determine the cylinder wear.

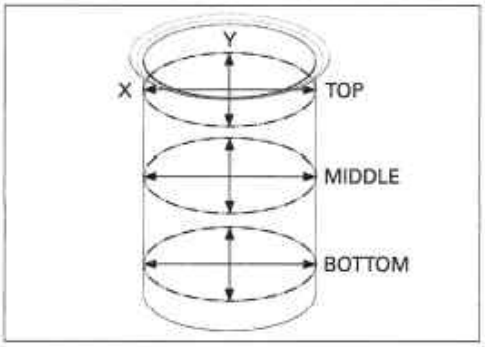
SERVICE LIMIT: 79.10 mm (3.114 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

CYLINDER/PISTON

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



SERVICE LIMITS:

Taper:	**0.06 mm (0.002 in)**
Out-of-round:	**0.06 mm (0.002 in)**

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

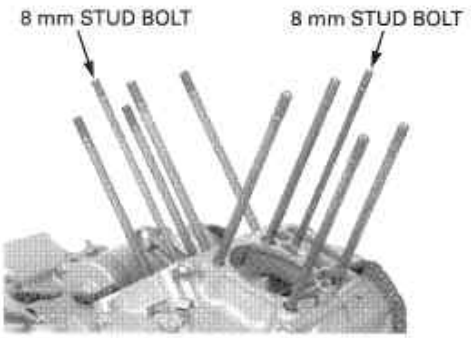
The following oversize pistons are available:

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

The piston to cylinder clearance for the oversize piston must be: 0.010 – 0.045 mm (0.0004 – 0.0018 in).

CYLINDER STUD BOLT REPLACEMENT

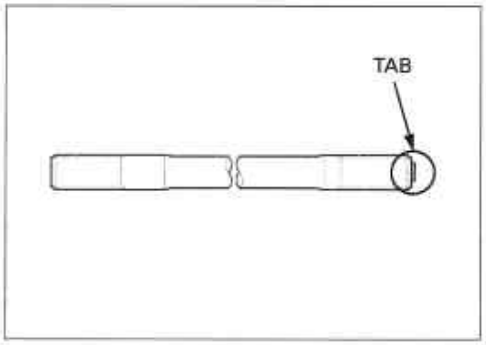
Thread two nuts onto the stud and tighten them together, and use a wrench on them to turn the stud bolt out.



Apply engine oil to the lower threads of a new stud bolt and install it.

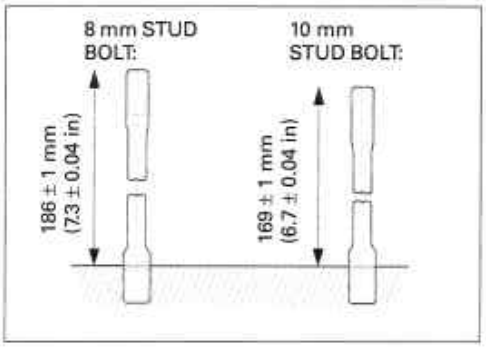
NOTE:

Install the stud bolts with its tab side facing the cylinder head side.



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

Adjust the height if necessary.



CYLINDER/PISTON INSTALLATION

PISTON RING INSTALLATION

Apply oil to the piston and piston ring outer surface.

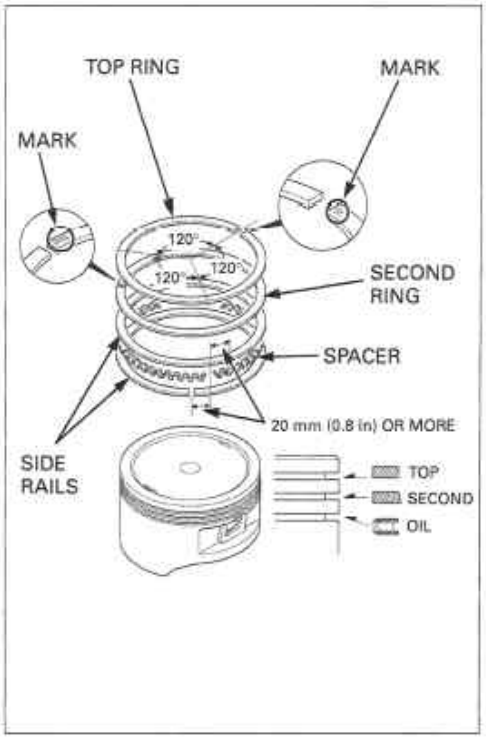
Be careful not to damage the piston and rings.

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

NOTE:

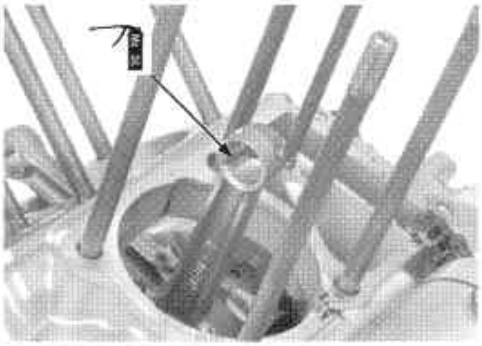
- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.
Stagger the side rail end gaps as shown.



PISTON INSTALLATION

Apply molybdenum disulfide oil to the connecting rod bore.

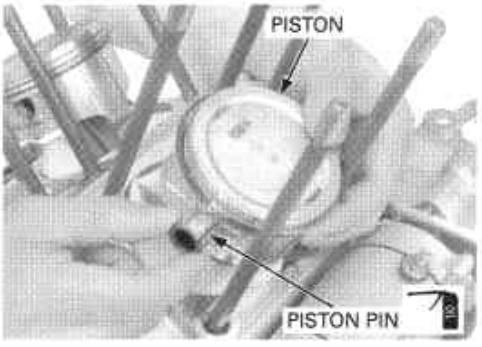


Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

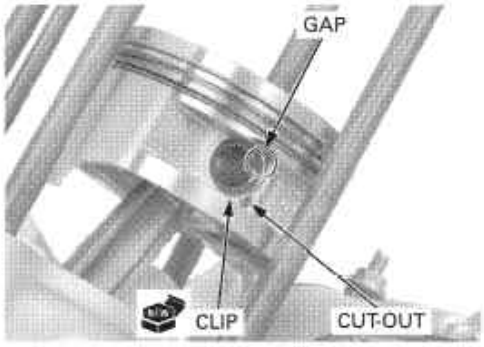
Apply engine oil to the piston pin outer surface.

Install the piston.
Install the piston pin through the piston and connecting rod.

Install new piston pin clips into the grooves in the piston pin hole.



NOTE:
- Make sure the piston pin clip is seated securely.
- Do not align the clip end gap with the piston cut-out.

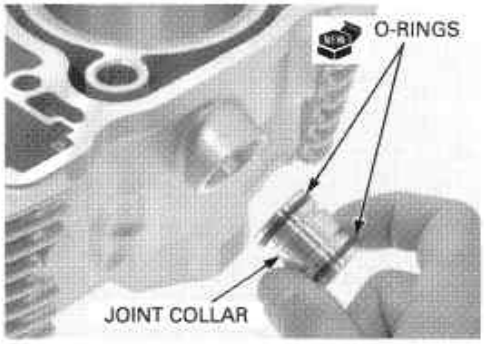


CYLINDER INSTALLATION

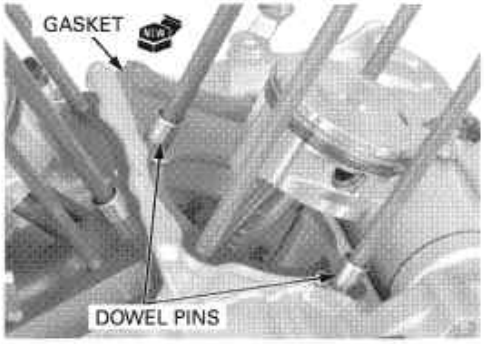
The front cylinder uses the same service procedure as the rear cylinder.

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

Install new O-rings to the joint collar.
Install the joint collar to the cylinder.



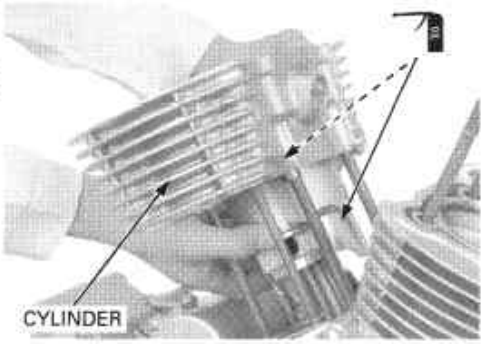
Install the dowel pins and a new gasket.



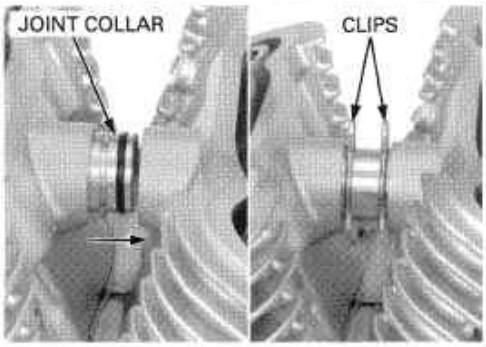
Be careful not to damage the piston rings and cylinder wall.

Apply engine oil to the cylinder wall, piston outer surface and piston rings.

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



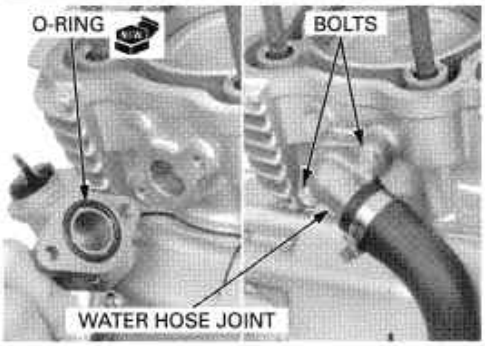
Slide the joint collar into the hole in the cylinder and connect it.
Install the retaining clips into the joint collar grooves.



Front cylinder only: Install a new O-ring to the groove on the water hose joint.

Install and tighten the hose joint bolts securely.

Install the cylinder head (page 8-26).

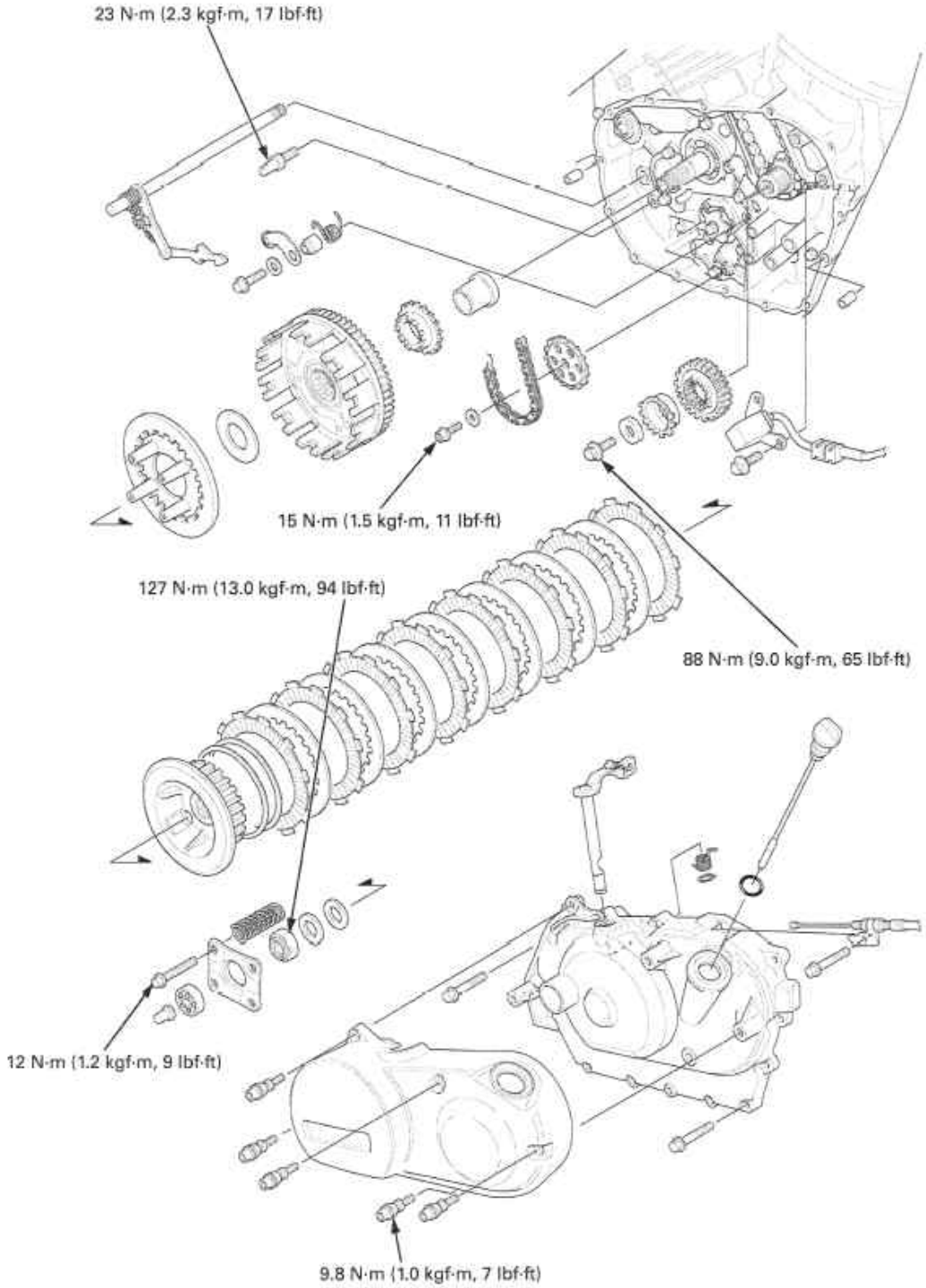


MEMO

10. CLUTCH/GEARSHIFT LINKAGE

CLUTCH/GEARSHIFT LINKAGE

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever free play			10 – 20 (3/8 – 3/4)	–
Clutch	Spring free length		45.3 (1.78)	43.9 (1.73)
	Disc thickness	Disc A	2.62 – 2.78 (0.103 – 0.107)	2.3 (0.09)
		Disc B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide		I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
		O.D.	31.959 – 31.975 (1.2582 – 1.2588)	31.92 (1.257)
Mainshaft O.D. at clutch outer guide			21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)
Clutch outer guide-to-mainshaft clearance			0.011 – 0.049 (0.0004 – 0.0019)	0.08 (0.003)
Clutch outer I.D.			32.000 – 32.025 (1.2598 – 1.2608)	32.09 (1.263)
Clutch outer-to-outer guide clearance			0.025 – 0.066 (0.0010 – 0.0026)	0.18 (0.007)
Oil pump drive sprocket I.D.			32.145 – 32.025 (1.2655 – 1.2608)	32.16 (1.266)
Oil pump drive sprocket-to-clutch outer guide clearance			0.066 – 0.17 (0.0026 – 0.0067)	0.23 (0.009)

TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	Replace with a new one and stake Apply oil to the threads and flange surface
Clutch cover socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Primary drive gear bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply oil to the threads and flange surface
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply locking agent to the threads
Gear shift pedal pivot bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Gear shift spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	

TOOLS

Clutch center holder 07JMB-MN50301	Gear holder, 2.5 07724-0010100
	
or 07HGB-001010B (plate) and 07HGB-001020B (collar) (U.S.A. only)	or 07724-001A100 (U.S.A. only)

CLUTCH/GEARSHIFT LINKAGE

TROUBLESHOOTING

Clutch lever engagement hard
- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Too much clutch lever free play
- Warped clutch plates
- Loose clutch lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

Clutch slips
- No clutch lever free play
- Worn clutch discs
- Weak clutch springs
- Clutch lifter sticking
- Engine oil level too low or oil additive used

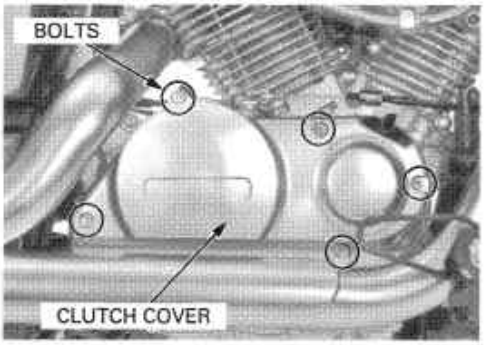
Hard to shift
- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged gearshift cam
- Bent fork shaft or damaged shift forks and shift drum (page 12-19)

Transmission jumps out of gear
- Broken shift drum stopper arm
- Weak or broken gearshift spindle return springs
- Worn or damaged gearshift cam
- Bent fork shaft or worn shift forks and shift drum (page 12-19)
- Worn gear dogs or dog holes (page 12-19)

RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-13).

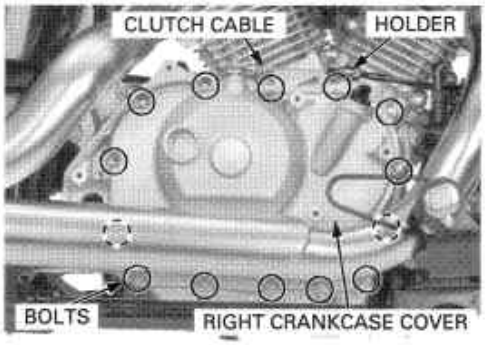
Remove the bolts and clutch cover.



Remove the bolts in a crisscross pattern in several steps.

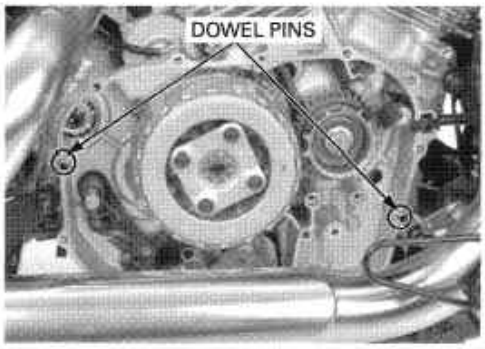
Remove the clutch cable holder and disconnect the clutch cable.

Remove the right crankcase cover.



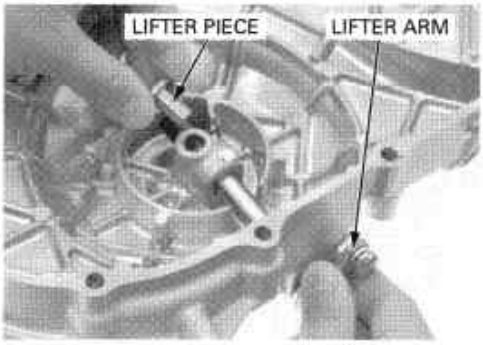
Be careful not to damage the mating surface.

Remove the dowel pins and clean off the sealant from the mating surface.



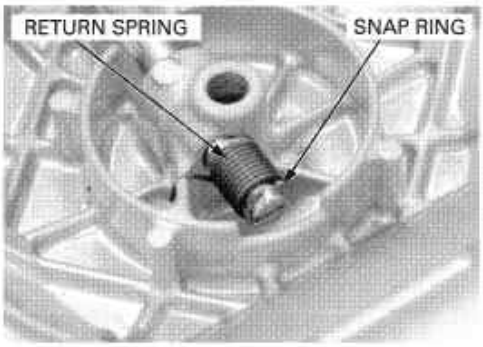
DISASSEMBLY

Remove the clutch lifter piece while turning the lifter arm clockwise.

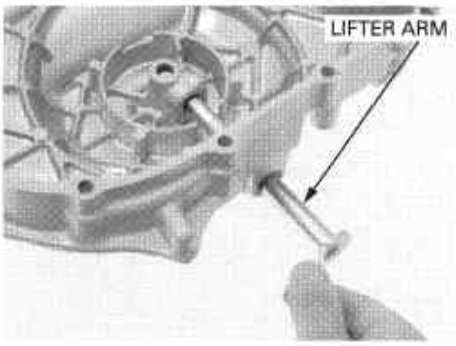


CLUTCH/GEARSHIFT LINKAGE

Remove the snap ring and return spring from the right crankcase cover.



Remove the clutch lifter arm.

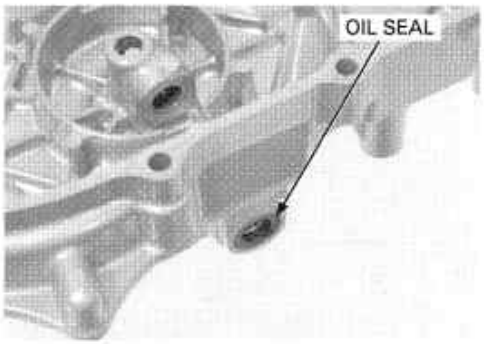


INSPECTION

Check the oil seal for fatigue or damage.
Check the lifter arm sliding surface of the right crankcase cover for wear, damage or loose fit.

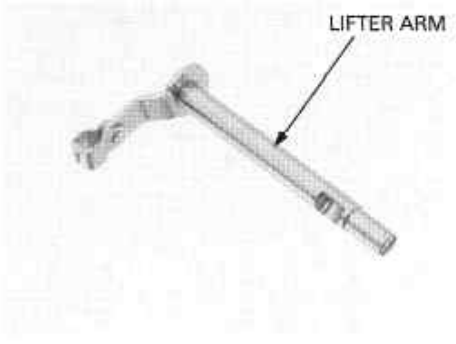
Replace these parts if necessary.

NOTE:
If the oil seal replacement is required, install the oil seal to the case surface.



Check the clutch lifter arm for wear, damage or bending.
Check the spring for fatigue or damage.

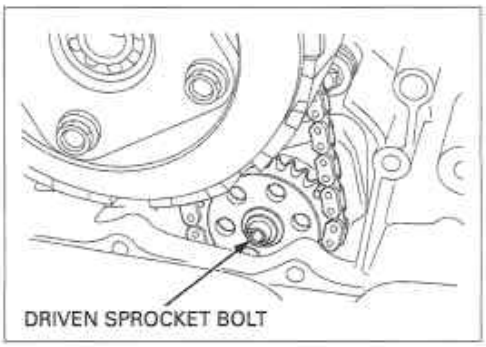
Replace these parts if necessary.



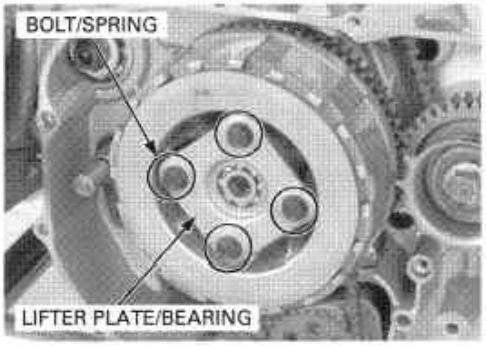
CLUTCH REMOVAL

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

If the oil pump driven sprocket will be removed, loosen the driven sprocket bolt while the clutch is still installed.

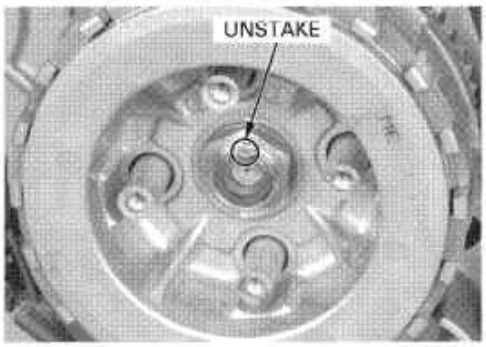


Loosen the clutch lifter plate bolts in a crisscross pattern in several steps.
Remove the lifter plate/bearing and clutch springs.



Be careful not to damage the main-shaft threads.

Unstake the clutch center lock nut.

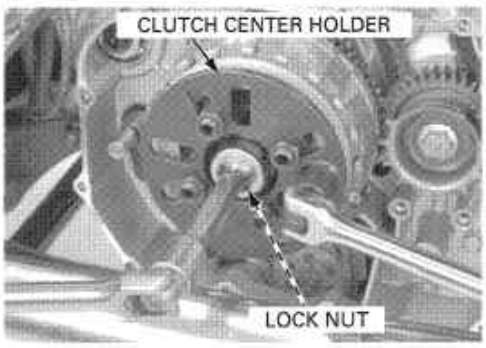


Hold the clutch center using a special tool and loosen the clutch center lock nut.

TOOL:

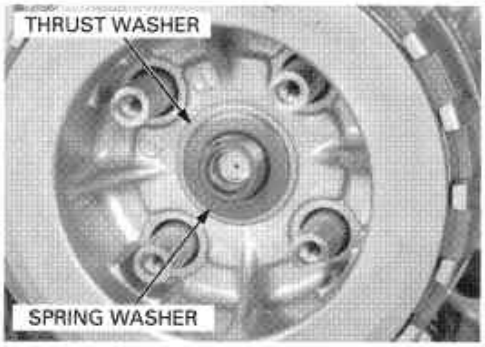
Clutch center holder	**07JMB-MN50301 or 07HGB-001010B (plate) and 07HGB-001020B (collar) (U.S.A. only)**

Remove the tool and clutch center lock nut.



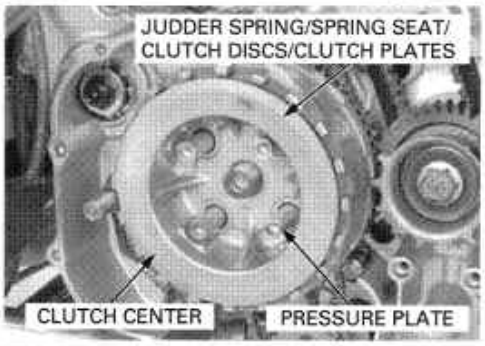
CLUTCH/GEARSHIFT LINKAGE

Remove the spring washer and thrust washer.

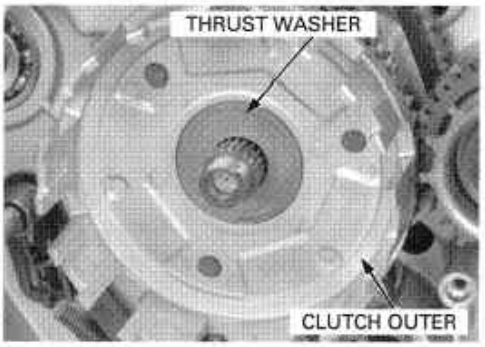


Remove the following:

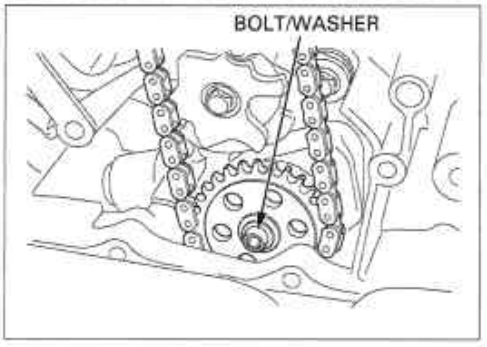
- Clutch center
- Pressure plate
- Clutch disc B
- Clutch plates
- Clutch disc A
- Judder spring
- Spring seat



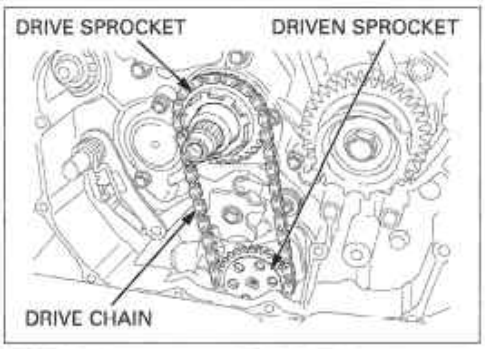
Remove the thrust washer and clutch outer.



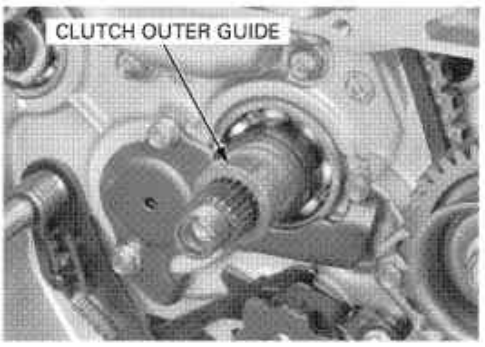
Remove the oil pump driven sprocket bolt and washer.



Remove the oil pump drive sprocket, driven sprocket and drive chain as a set.



Remove the clutch outer guide.

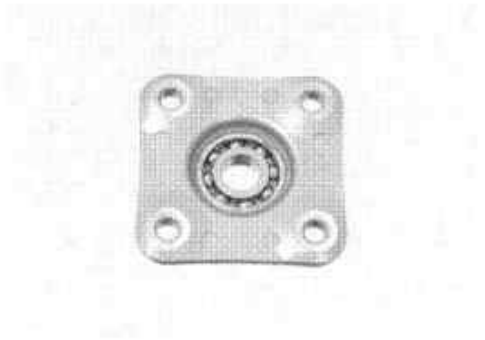


INSPECTION

LIFTER PLATE BEARING

Turn the inner race of the bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the lifter plate.

Remove and discard the bearing if the races do not turn smoothly and quietly, or if they fit loosely in the lifter plate.

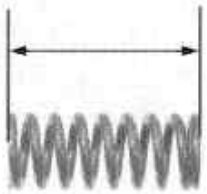


CLUTCH SPRING

Replace the clutch springs as a set.

Check the clutch spring free length.

SERVICE LIMIT: 43.9 mm (1.73 in)



CLUTCH/GEARSHIFT LINKAGE

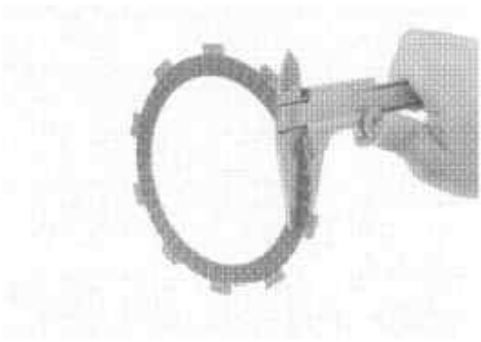
CLUTCH DISC

Replace the clutch discs and plates as a set.

Replace the clutch discs for signs of scoring or discoloration.

Measure the clutch disc thickness.

SERVICE LIMIT: Disc A: 2.3 mm (0.09 in)
Disc B: 2.6 mm (0.10 in)



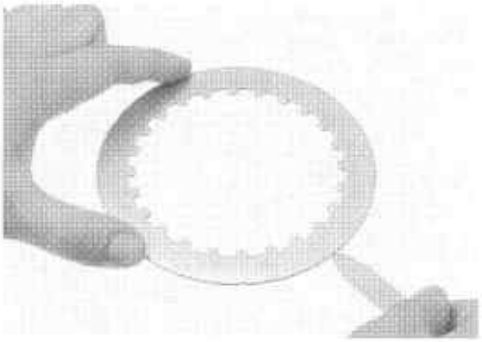
CLUTCH PLATE

Replace the clutch discs and plates as a set.

Check the clutch plate for discoloration.

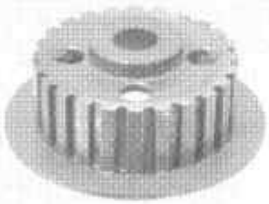
Check the clutch plate warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)



CLUTCH CENTER

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

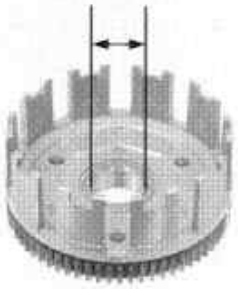


CLUTCH OUTER

Check the slot in the clutch outer for nicks, indentations or abnormal wear caused by the clutch discs.

Measure the clutch outer I.D.

SERVICE LIMIT: 32.09 mm (1.263 in)



CLUTCH OUTER GUIDE

Check the clutch outer guide for damage or abnormal wear.

Measure the clutch outer guide I.D.

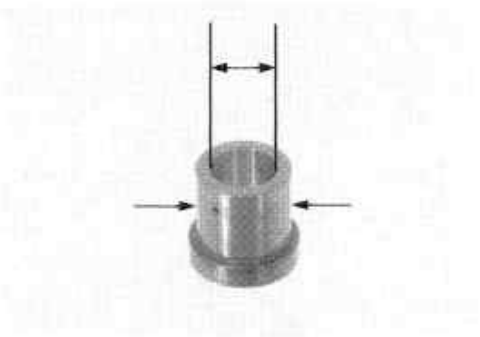
SERVICE LIMIT: 22.03 mm (0.867 in)

Measure the clutch outer guide O.D.

SERVICE LIMIT: 31.92 mm (1.257 in)

Calculate the clutch outer-to-outer guide clearance.

SERVICE LIMIT: 0.18 mm (0.007 in)



OIL PUMP DRIVE SPROCKET

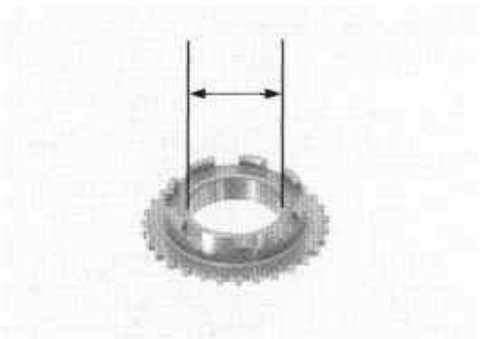
Check the oil pump drive sprocket for wear or damage.

Measure the I.D. of the drive sprocket.

SERVICE LIMIT: 32.16 mm (1.266 in)

Calculate the oil pump drive sprocket-to-clutch outer guide clearance.

SERVICE LIMIT: 0.23 mm (0.009 in)



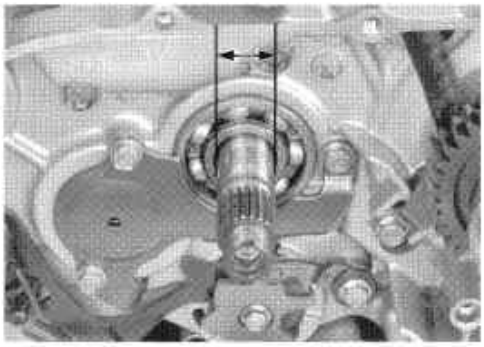
MAINSHAFT

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

SERVICE LIMIT: 21.95 mm (0.864 in)

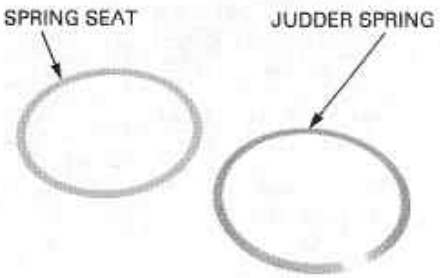
Calculate the clutch outer guide-to-mainshaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)



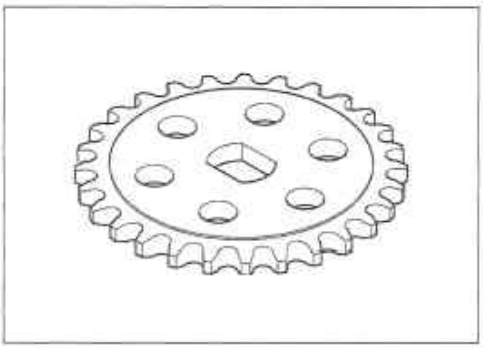
JUDDER SPRING/SPRING SEAT

Check the spring seat and judder spring for distortion, wear or damage.



OIL PUMP DRIVEN SPROCKET

Check the oil pump driven sprocket for wear or damage.



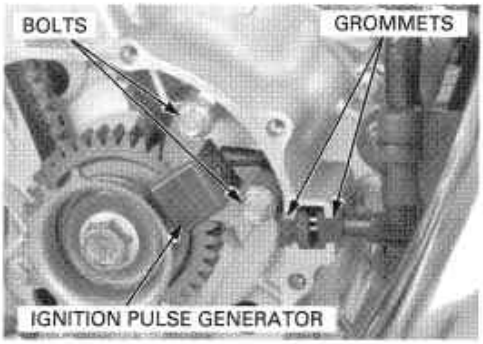
PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch (page 10-7).

Remove the ignition pulse generator mounting bolts.

Remove the ignition pulse generator and grommets.



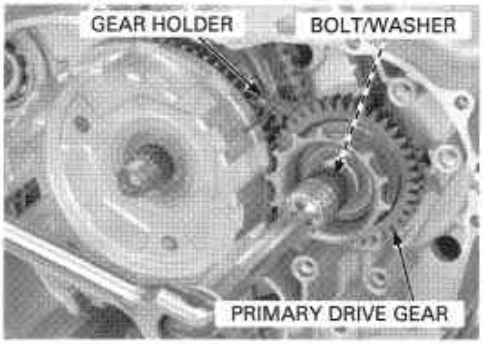
Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft (page 10-17).

Hold the primary drive gear using a special tool and remove the primary drive gear bolt and washer.

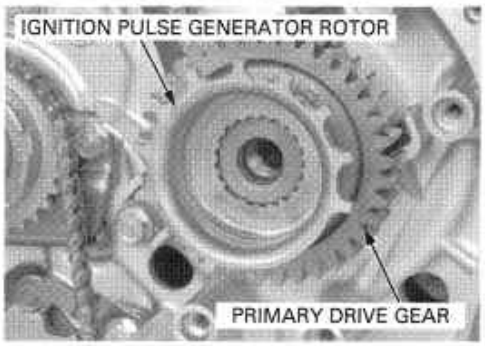
TOOL:

Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

Remove the gear holder and temporarily installed parts.

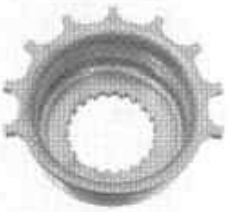


Remove the ignition pulse generator rotor and primary drive gear.

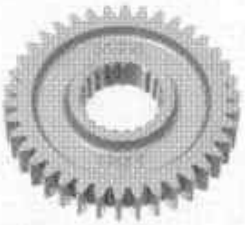


INSPECTION

Check the ignition pulse generator rotor for wear or damage.



Check the primary drive gear for wear or damage.

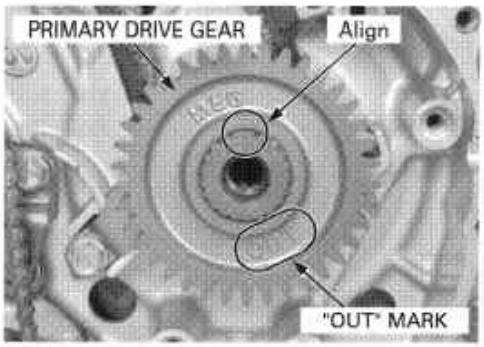


INSTALLATION

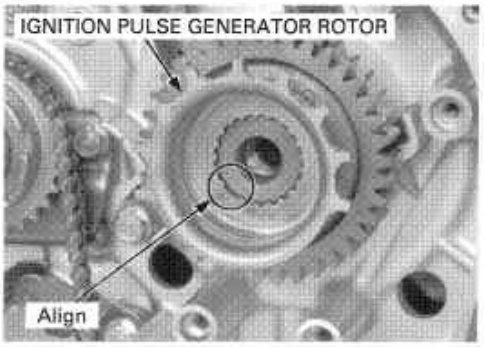
Install the primary drive gear on the crankshaft.

NOTE:

- Install the primary drive gear, aligning its wide groove with the wide tooth of the crankshaft.
- Install the primary drive gear with its "OUT" mark facing out.



Install the ignition pulse generator rotor, aligning its wide groove with the wide tooth of the crankshaft.



Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft.

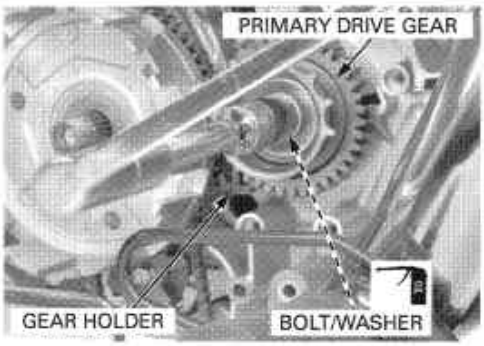
Apply oil to the primary drive gear bolt threads and seating surface.
Install the washer and primary drive gear bolt.

Hold the primary drive gear using a special tool.

TOOL:
Gear holder, 2.5 **07724-0010100 or 07724-001A100 (U.S.A. only)**

Tighten the bolt to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

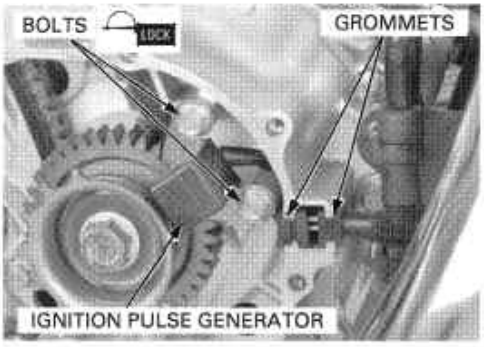


Remove the gear holder and temporarily installed parts.

Apply a locking agent to the ignition pulse generator mounting bolt threads (page 1-21).

Install the ignition pulse generator, wire grommets and tighten the bolts.

Install the clutch (page 10-17).



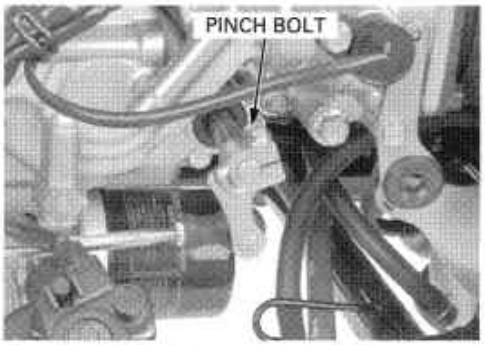
GEARSHIFT LINKAGE

REMOVAL

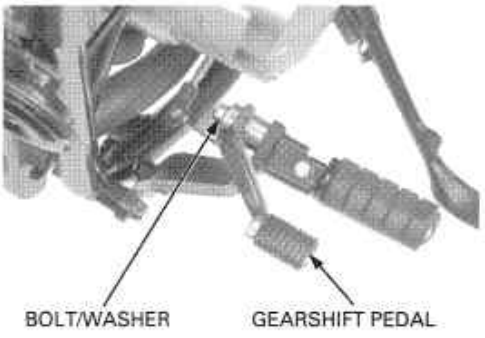
Remove the following:

- Left crankcase rear cover (page 2-6)
- Clutch (page 10-7)

Remove the pinch bolt and gearshift arm from the spindle.
Clean the gearshift spindle.

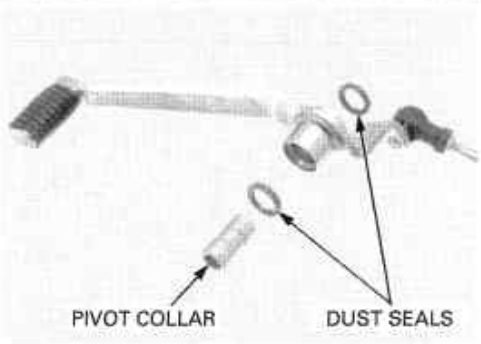


Remove the bolt, washer and gearshift pedal.



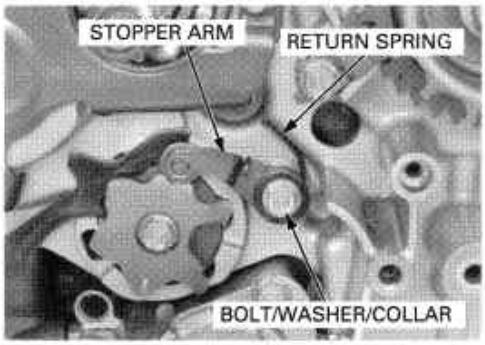
Remove the pivot collar and dust seals from the gearshift pedal.
Check the dust seals for wear or damage.

Replace the dust seal if necessary.

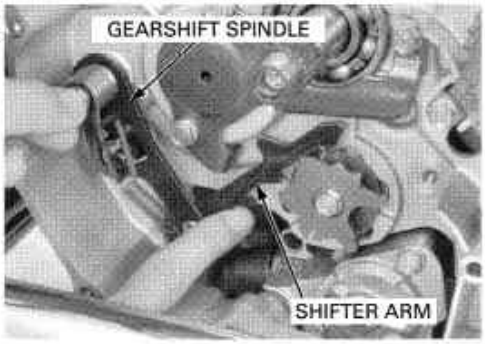


Remove the following:

- Bolt
- Washer
- Stopper arm
- Collar
- Return spring



Remove the gearshift spindle from the crankcase while unhooking the shifter arm from the gearshift cam plate.

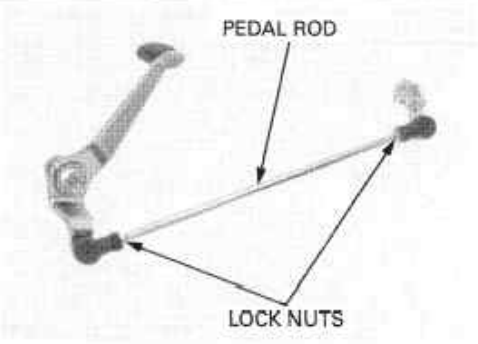


INSPECTION

Check the gearshift spindle for bend, wear or damage.

Check the return spring for fatigue or damage.

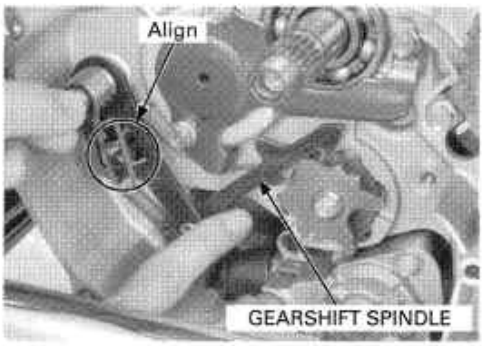
Check the gearshift pedal rod for damage or loose lock nuts.
Replace the rod if necessary.



INSTALLATION

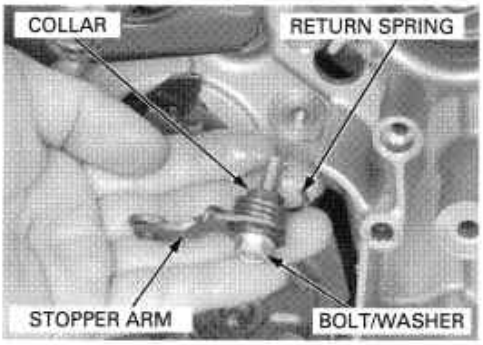
Install the gearshift spindle, aligning the return spring ends with the pin in the case.

Hook the shift arm to the gearshift cam plate.

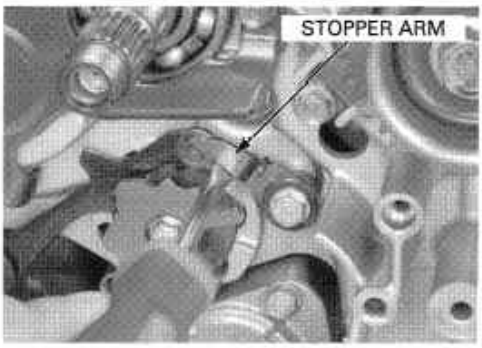


Install the following:

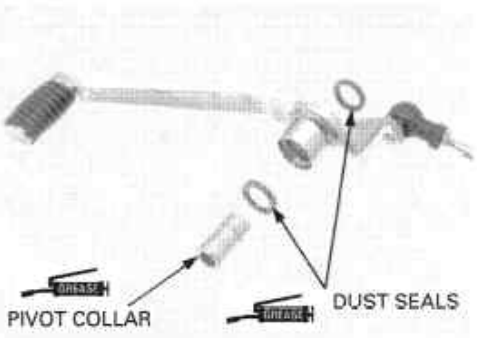
- Collar
- Return spring
- Stopper arm
- Washer
- Bolt



Hold the stopper arm with the screwdriver, and tighten the bolt securely as shown.

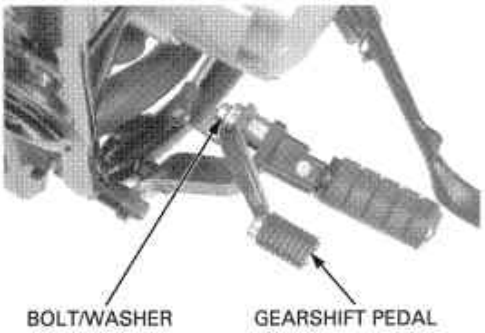


Apply grease to the dust seal lips and pivot collar.
Install the dust seals and pivot collar to the gearshift pedal.



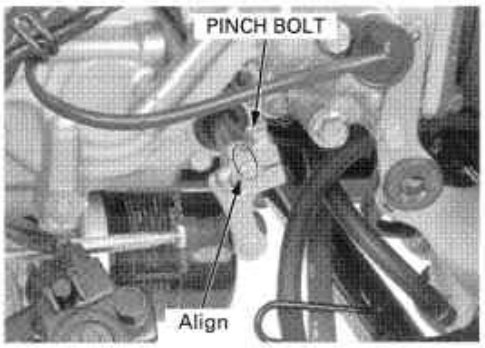
Install the gearshift pedal, washer and bolt.
Tighten the bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Install the gearshift arm to the spindle, aligning with the punch marks.
Tighten the pinch bolt to the specified torque.

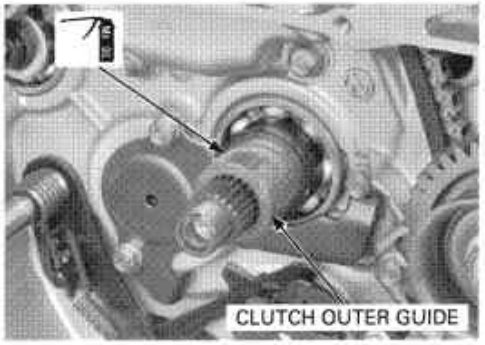
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



CLUTCH INSTALLATION

Apply molybdenum disulfide oil to the clutch outer guide outer surface.

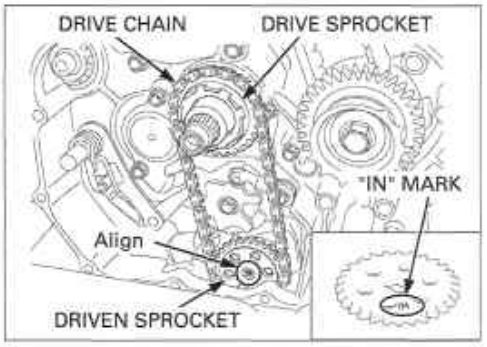
Install the clutch outer guide to the mainshaft.



CLUTCH/GEARSHIFT LINKAGE

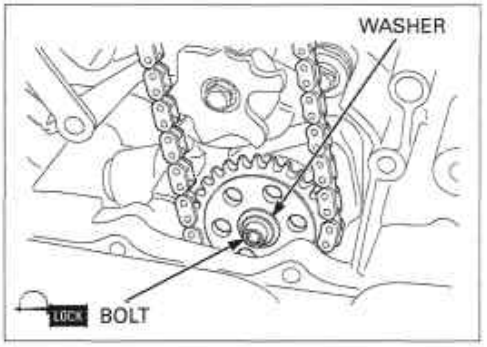
Install the oil pump drive chain, drive sprocket and driven sprocket as a set.

NOTE:
- Install the driven sprocket with the "IN" mark facing inside.
- Align the flat surfaces of the driven sprocket hole and oil pump shaft end.



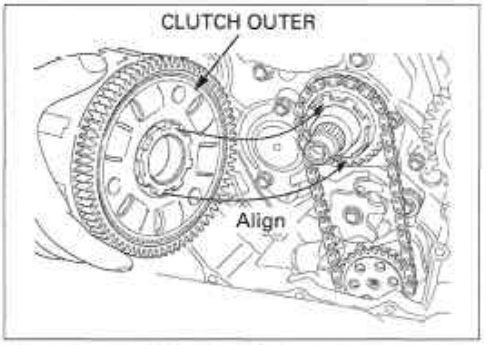
Apply locking agent to the oil pump driven sprocket bolt threads and install the washer and bolt.

NOTE:
Tighten the driven sprocket bolt to the specified torque after installing the clutch.

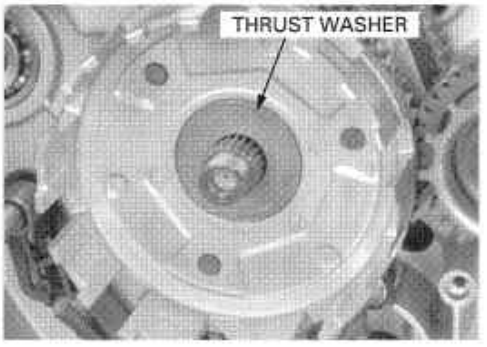


Install the clutch outer onto the mainshaft.

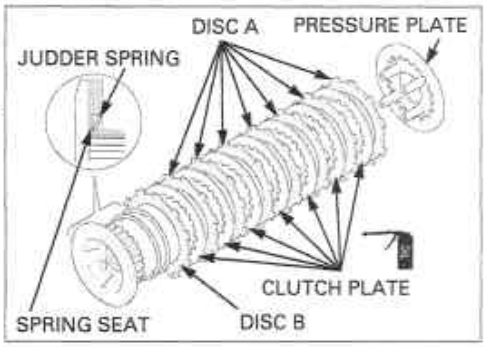
NOTE:
Align the grooves in the clutch outer with the bosses on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer onto the shaft.



Install the thrust washer onto the mainshaft.



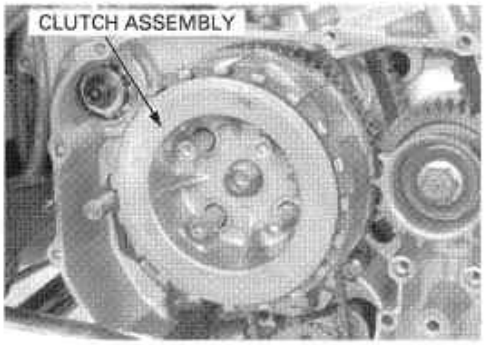
Coat the clutch discs and plates with engine oil.
Install the spring seat and judder spring to the clutch center as shown.



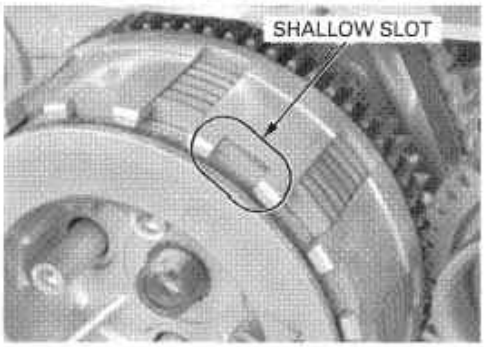
Clutch disc B has a larger I.D. than disc A.

Install the clutch disc B.
Install the seven clutch plate and seven disc A, starting with the clutch plate.
Install the pressure plate.

Install the clutch assembly into the clutch outer.

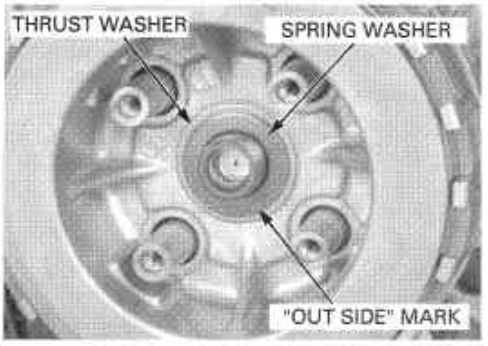


Install the clutch disc B into the shallow slots of the clutch outer.



Install the thrust washer.

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



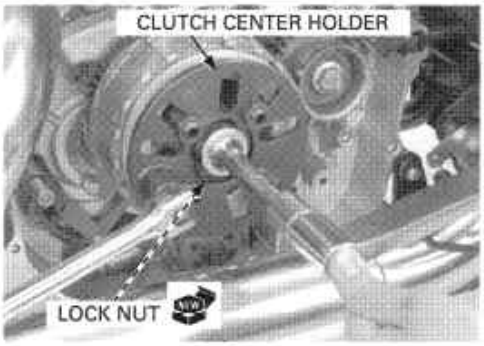
CLUTCH/GEARSHIFT LINKAGE

Apply oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft.
Hold the clutch center using a special tool and tighten the lock nut.

TOOL:

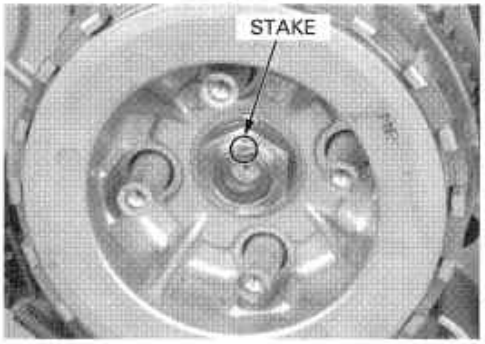
Clutch center holder	**07JMB-MN50301 or 07HGB-001010B (plate) and 07HGB-001020B (collar) (U.S.A. only)**

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)



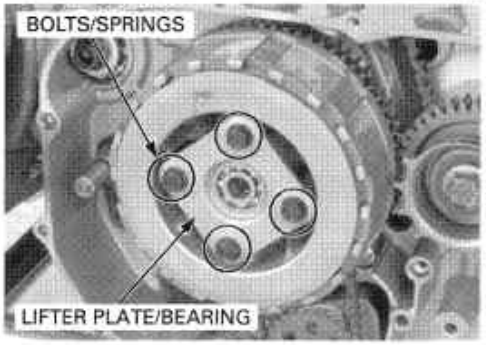
Be careful not to damage the mainshaft threads.

Stake the clutch center lock nut into the mainshaft groove.



Install the clutch springs, lifter plate/bearing and bolts.
Tighten the bolts in a crisscross pattern in several steps to the specified torque.

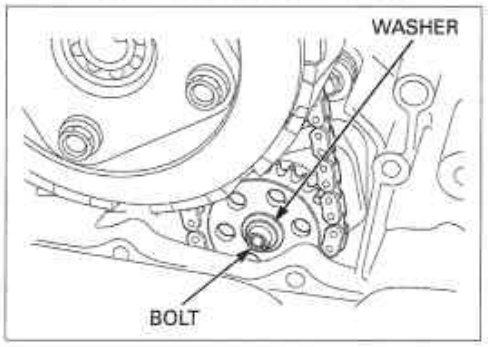
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Tighten the oil pump driven sprocket bolt if it is removed.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

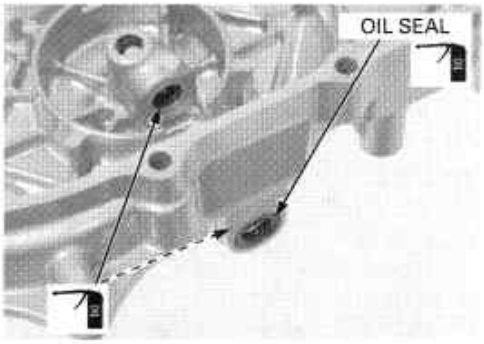
Install the right crankcase cover (page 10-21).



RIGHT CRANKCASE COVER INSTALLATION

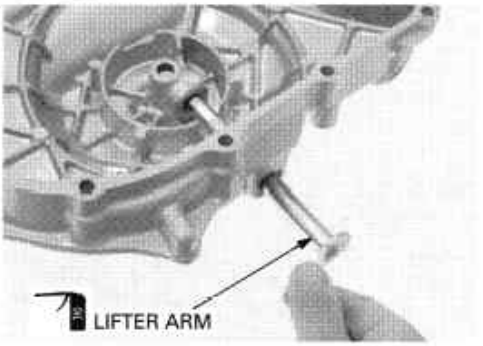
ASSEMBLY

Apply engine oil to the clutch lifter arm sliding surface of the right crankcase cover and dust seal lips.



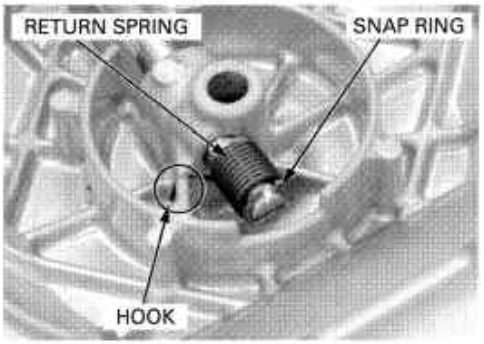
Apply engine oil to the clutch lifter arm sliding surface and slit.

Install the clutch lifter arm.



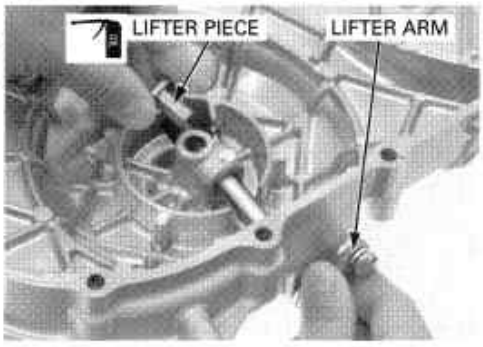
Install the return spring and snap ring.

Hook the spring end in the cover tab.



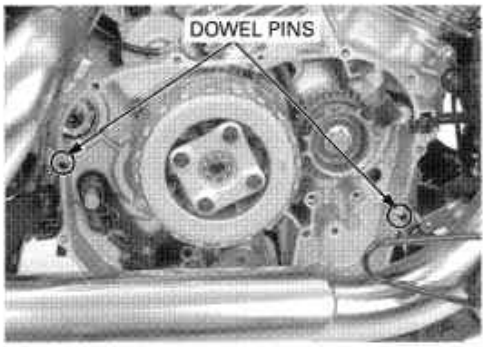
Apply engine oil to the clutch lifter piece.

Install the clutch lifter piece, aligning the piece end with the groove in the clutch lifter arm by turning the clutch lifter arm clockwise.



INSTALLATION

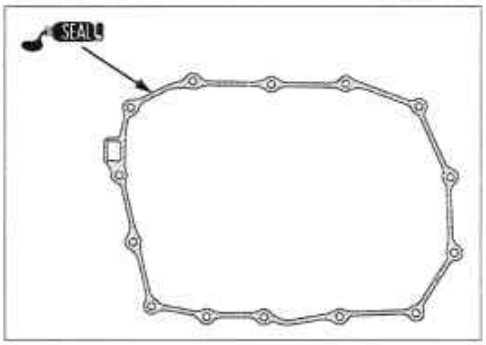
Install the two dowel pins.



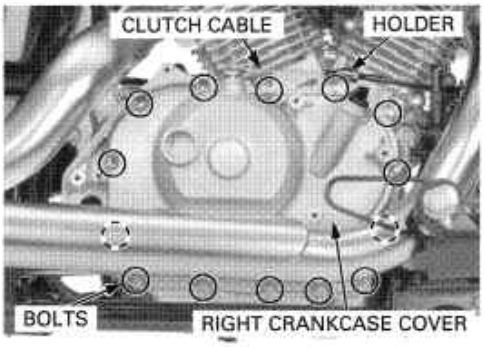
Be careful not to damage the mating surfaces.

Clean the mating surfaces of the right crankcase and cover.

Apply liquid sealant to the right crankcase cover mating surface.



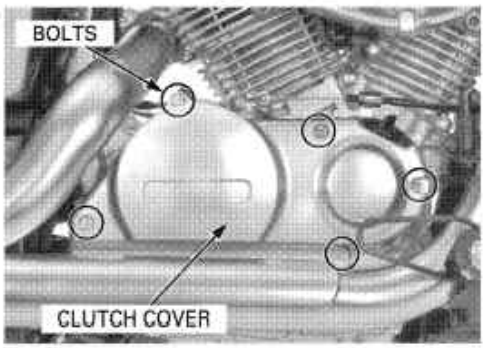
Connect the clutch cable.
Install the right crankcase cover, clutch cable holder and tighten the bolts in a crisscross pattern in several steps.



Install the clutch cover and tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

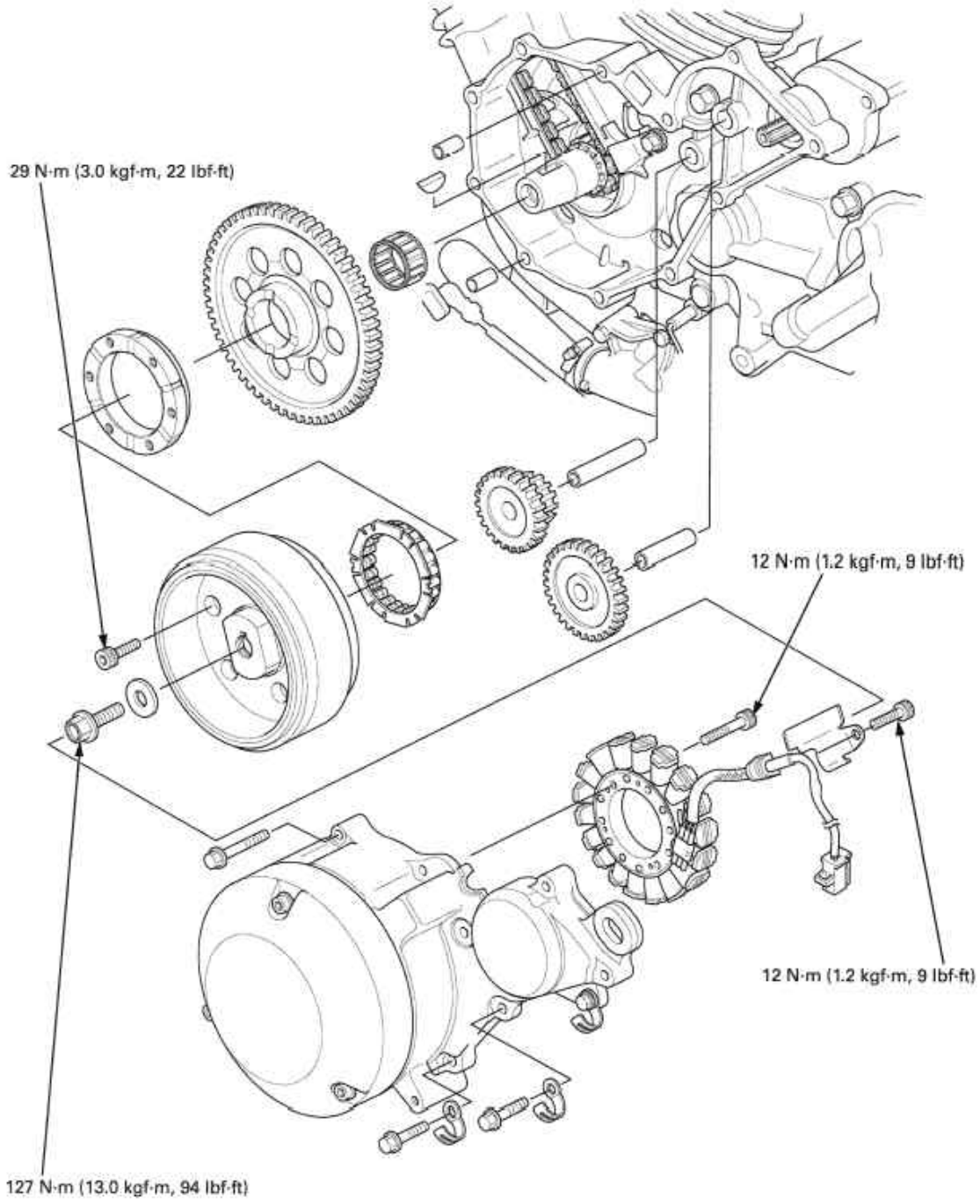
Fill the crankcase with the recommended engine oil (page 3-12).



11. ALTERNATOR/STARTER CLUTCH

ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator and flywheel. All service can be done with the engine installed in the frame.
- For alternator stator inspection, refer to page 17-11.
- For starter motor service, refer to page 19-6.

SPECIFICATIONS

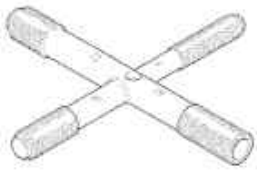
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.414 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)

TORQUE VALUES

Stator socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Flywheel bolt	127 N·m (13.0 kgf·m, 94 lbf·ft)	Left hand threads
Stator wire holder socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Starter one-way clutch outer socket bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply locking agent to the threads

TOOLS

Flywheel holder 07725-0040000  or equivalent commercially available in U.S.A.	Rotor puller 07733-0020001  or 07933-3290001 (U.S.A. only)

TROUBLESHOOTING

Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear

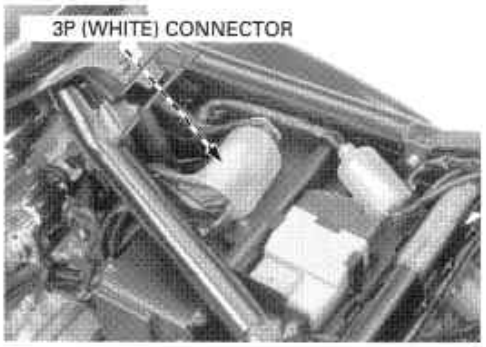
ALTERNATOR/STARTER CLUTCH

STATOR REMOVAL

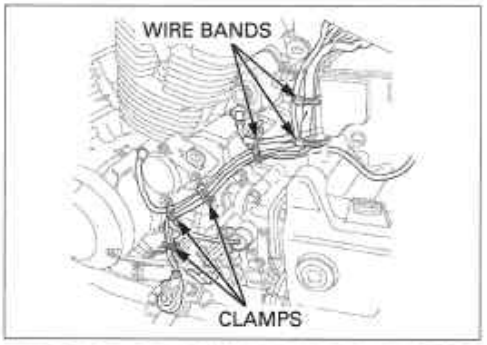
Remove the following:

- Seat (page 2-3)
- Left side cover (page 2-4)
- Left crankcase rear cover (page 2-6)

Disconnect the alternator 3P (White) connector.



Release the wires from the clamps and wire bands.



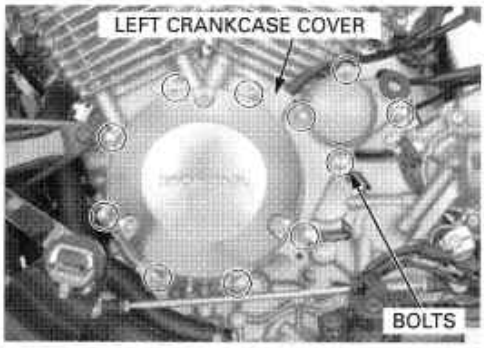
Place a container under the left crankcase cover to catch the engine oil.

Loosen the bolts in a crisscross pattern in several steps.

Remove the bolts and left crankcase cover.

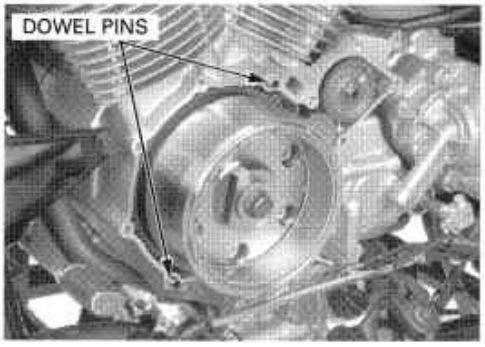
NOTE:

- The left crankcase cover (stator) is magnetically attached to the flywheel, be careful during removal.
- Be careful not to damage the alternator cover.



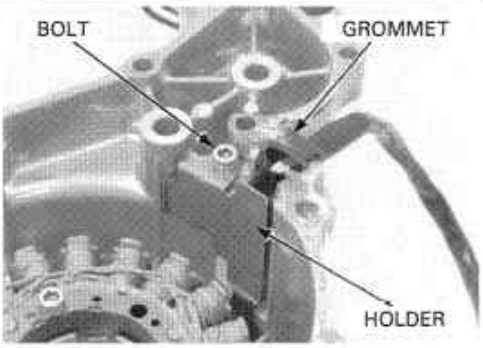
Be careful not to damage the mating surface.

Remove the dowel pins and clean off the sealant from the mating surface.

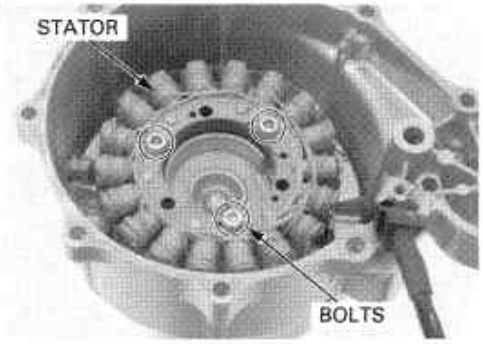


Remove the bolt and stator wire holder from the left crankcase cover.

Remove the wire grommet.



Remove the bolts and stator from the left crankcase cover.



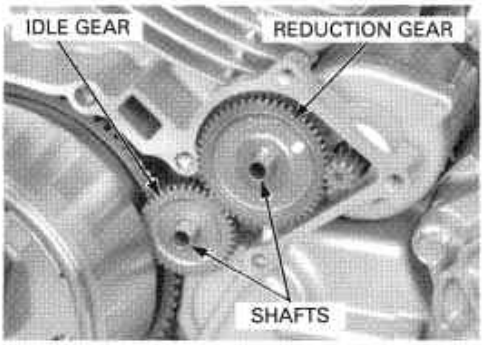
FLYWHEEL/STARTER CLUTCH

FLYWHEEL REMOVAL

Refer to (page 17-11) for alternator (charging coil) inspection.

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

Remove the starter reduction gear and shaft.
Remove the starter idle gear and shaft.

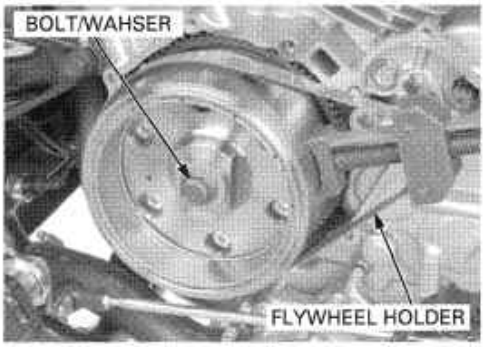


The flywheel bolt has left hand threads.

Remove the flywheel bolt and washer while holding the flywheel using a special tool.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

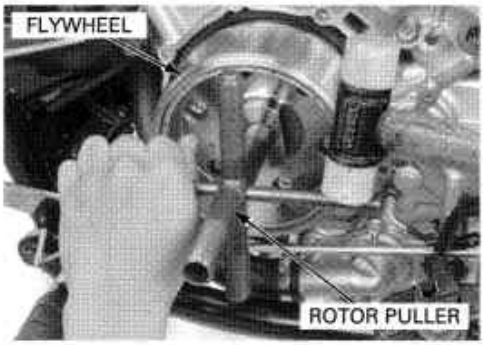


ALTERNATOR/STARTER CLUTCH

Remove the flywheel using a special tool.

TOOL:

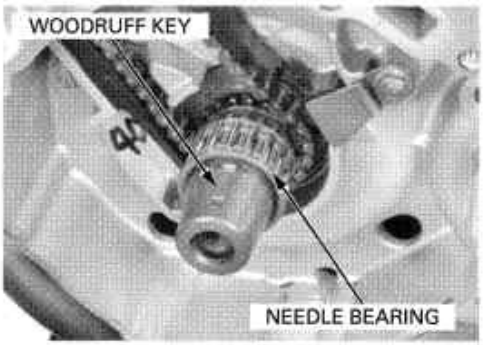
Rotor puller	**07733-0020001 or 07933-3290001**



Remove the needle bearing and woodruff key from the crankshaft.

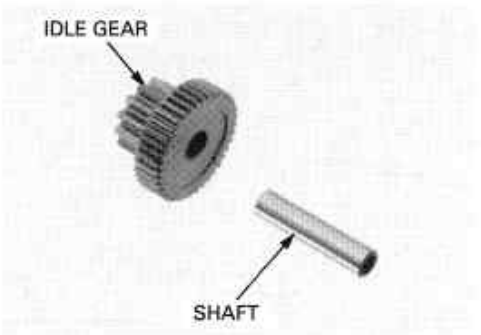
NOTE:

- When woodruff key removal, be careful not to damage the key groove and crankshaft.
- Do not lose the woodruff key.

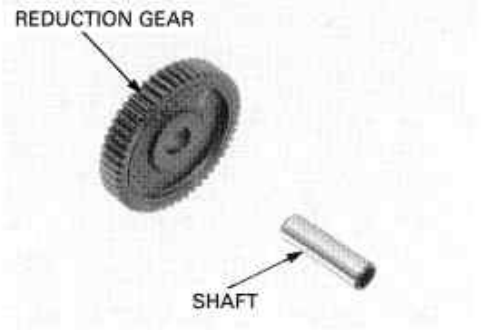


INSPECTION

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



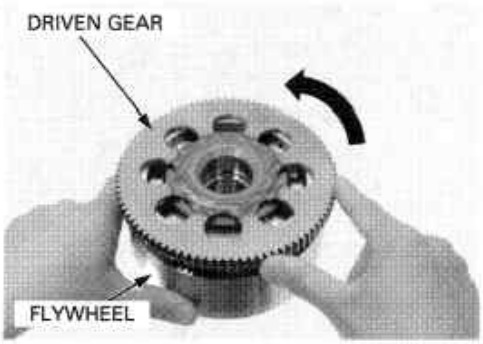
Check the starter reduction gear and shaft for wear or damage.



STARTER DRIVEN GEAR/STARTER CLUTCH REMOVAL

Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

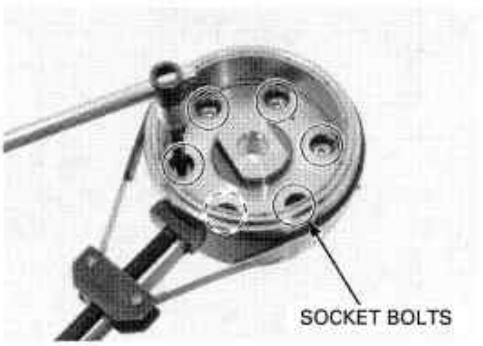
Remove the starter driven gear from the flywheel while turning the driven gear counterclockwise.



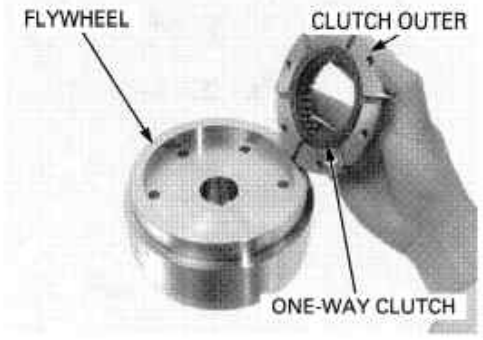
Remove the bolts while holding the flywheel using a special tool.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**



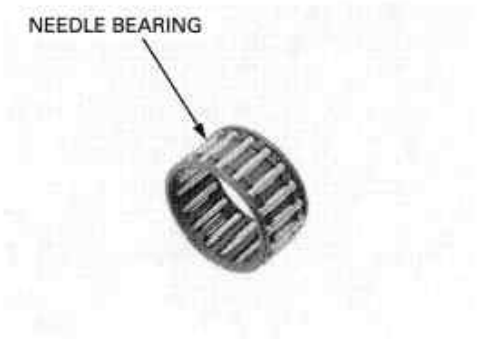
Remove the clutch outer/one-way clutch from the flywheel.



STARTER CLUTCH INSPECTION

NEEDLE BEARING

Check the needle bearing for abnormal wear or damage.



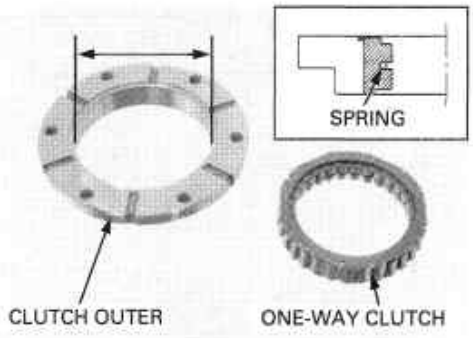
ALTERNATOR/STARTER CLUTCH

ONE-WAY CLUTCH

Check the one-way clutch sprag for abnormal wear, damage or irregular movement.

NOTE:

- Do not remove the one-way clutch from the clutch outer, unless it is necessary to replace with a new one.
- If the spring is removed from the one-way clutch groove, replace the one-way clutch assembly with a new one.



CLUTCH OUTER

Check the clutch inner contact surface for wear or damage.

Measure the clutch outer I.D.

SERVICE LIMIT: 74.46 mm (2.931 in)

STARTER DRIVEN GEAR

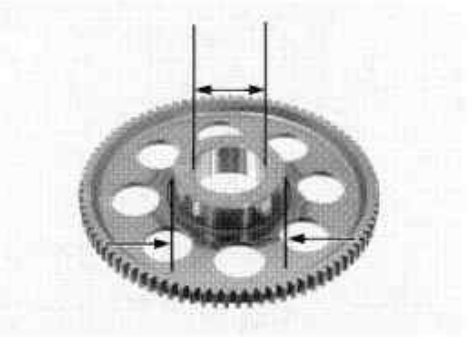
Check the one-way clutch sprag contact surface for wear or damage.

Measure the driven gear O.D.

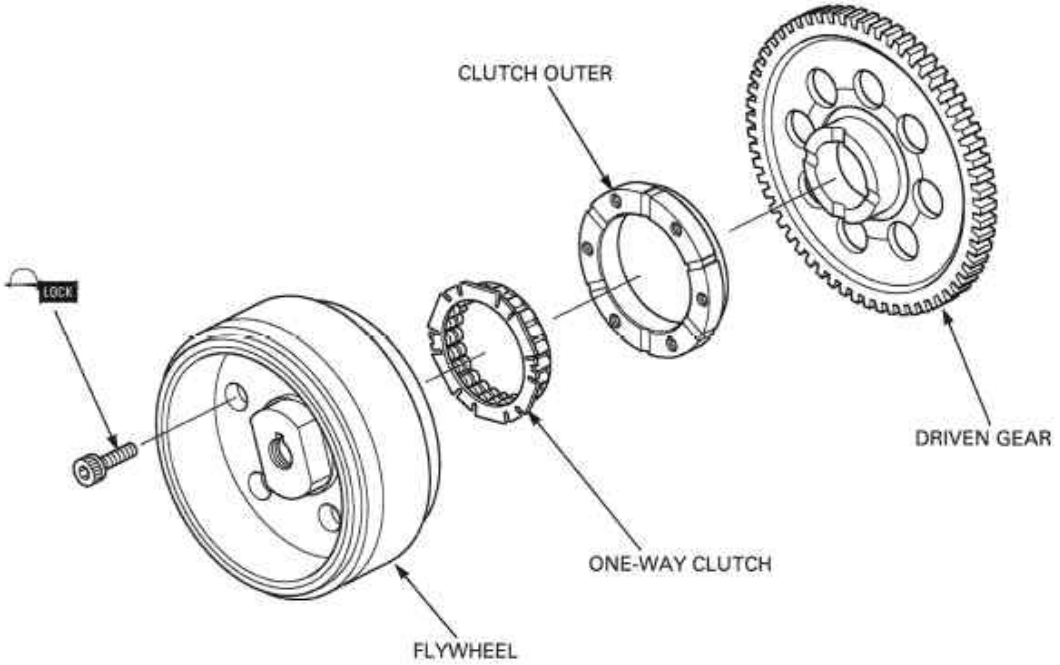
SERVICE LIMIT: 57.73 mm (2.273 in)

Measure the driven gear I.D.

SERVICE LIMIT: 37.10 mm (1.461 in)

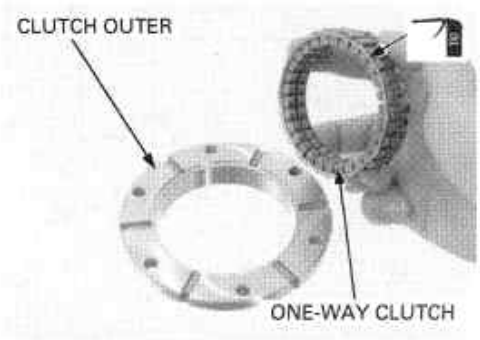


STARTER DRIVEN GEAR/STARTER CLUTCH INSTALLATION

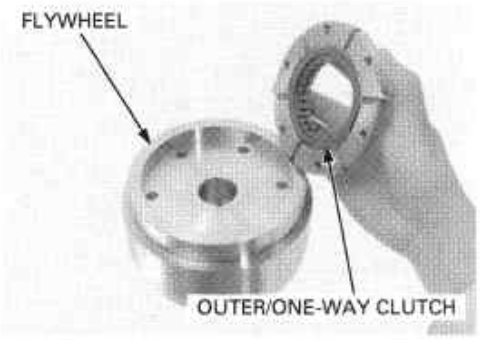


Clean the one-way clutch and apply engine oil to the sprag.
Install the one-way clutch into the clutch outer with its flange side facing the flywheel.

NOTE:
If the spring is removed from the one-way clutch groove, replace the one-way clutch assembly with a new one.



Install the clutch outer/one-way clutch to the flywheel.



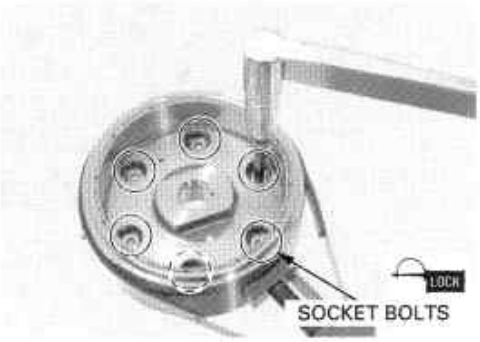
Hold the flywheel using a special tool.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

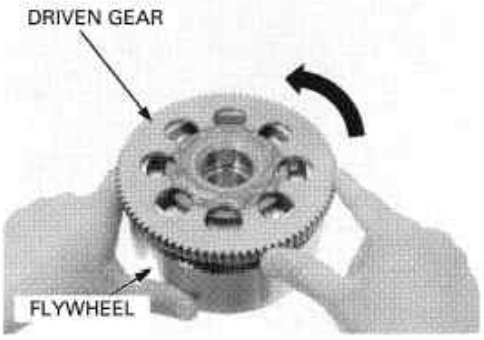
Clean and apply a locking agent to the bolt threads.
Install and tighten the bolts to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



Install the starter driven gear to the flywheel while turning the driven gear counterclockwise

Recheck the one-way clutch operation (page 11-7).



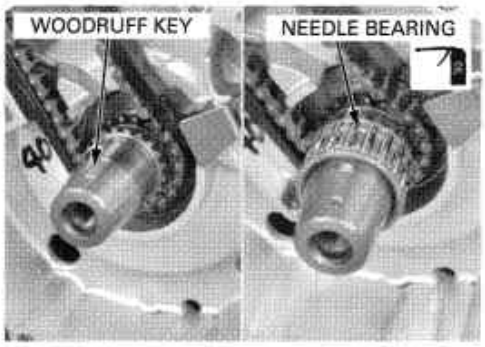
ALTERNATOR/STARTER CLUTCH

FLYWHEEL INSTALLATION

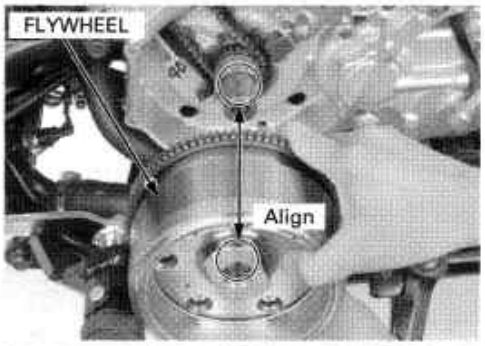
During woodruff key installation, be careful not to damage the key groove or crankshaft.

Install the woodruff key to the key groove of the crankshaft.

Apply engine oil to the needle bearing and install it to the crankshaft.
Wipe any oil off the mating surface of the crankshaft.



Wipe any oil off the mating surface of the flywheel.
Install the flywheel to the crankshaft, aligning the key groove of the flywheel with the woodruff key on the crankshaft.



Hold the flywheel using a special tool.

TOOL:

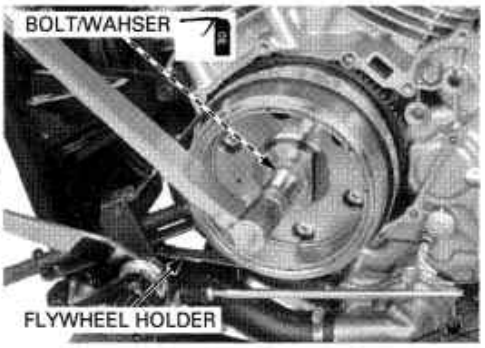
Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

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

The flywheel bolt has left hand threads.

Install and tighten the flywheel bolt with the washer to the specified torque.

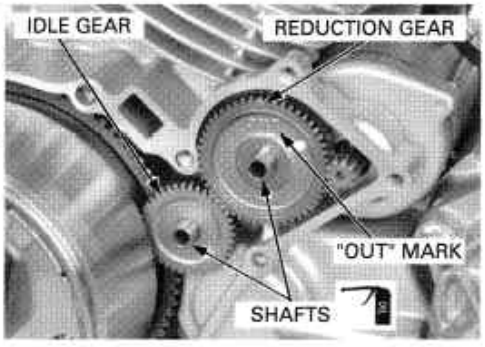
TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)



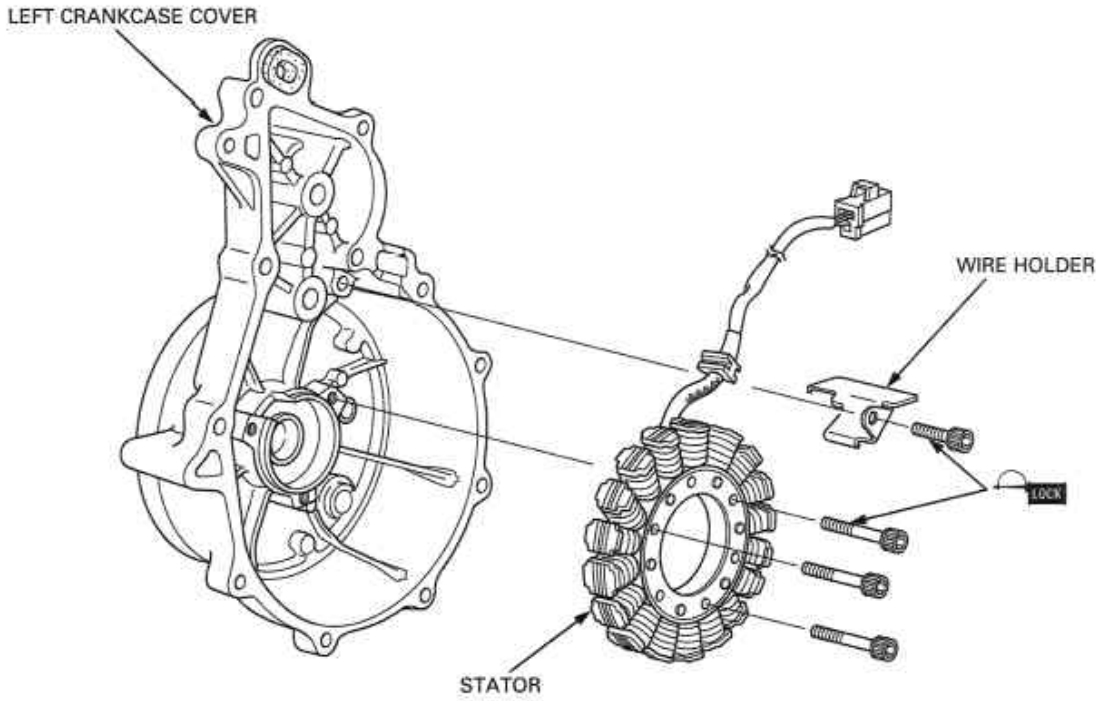
Apply engine oil to the starter reduction gear and starter idle gear shafts.
Install the starter reduction gear, idle gear and shafts to the left crankcase as an assembly.

NOTE:
Install the starter reduction gear with its "OUT" mark facing out.

Install the stator and left crankcase cover (page 11-11).

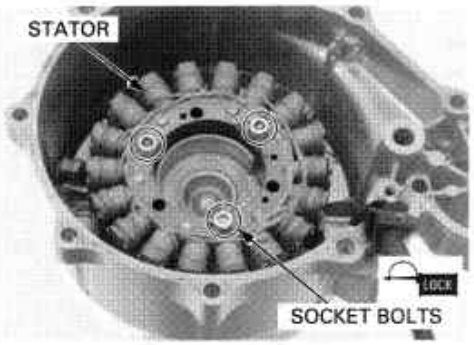


STATOR INSTALLATION



Install the stator to the left crankcase cover.
Clean and apply a locking agent to the bolt threads (page 1-21).
Install and tighten the stator socket bolts to the specified torque.

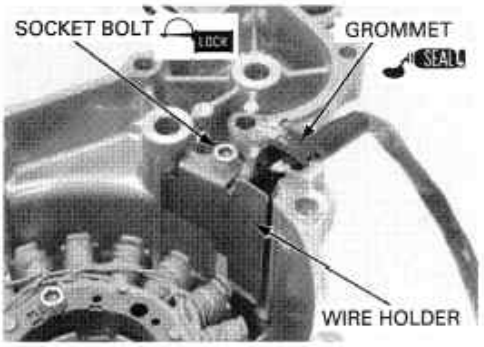
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Clean and apply sealant to the wire grommet seating surface and install the grommets into the grooves in the left crankcase cover.

Clean and apply a locking agent to the bolt threads (page 1-21).
Install the wire holder to the left crankcase cover.
Install and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

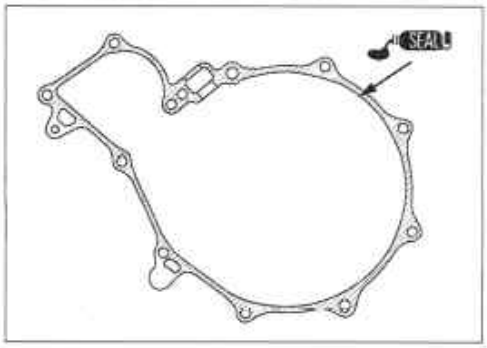


ALTERNATOR/STARTER CLUTCH

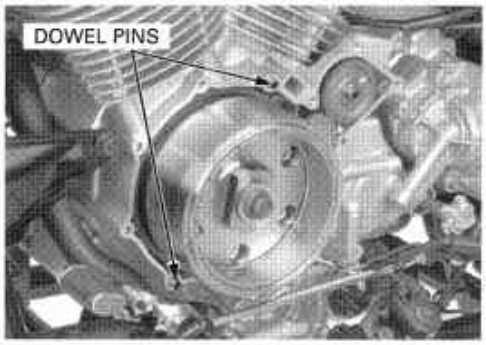
Clean off the sealant from the left crankcase cover mating surface.

Do not wipe off the excessive sealant by using the organic solvent.

Apply liquid sealant to the left crankcase cover mating surface.



Install the dowel pins.



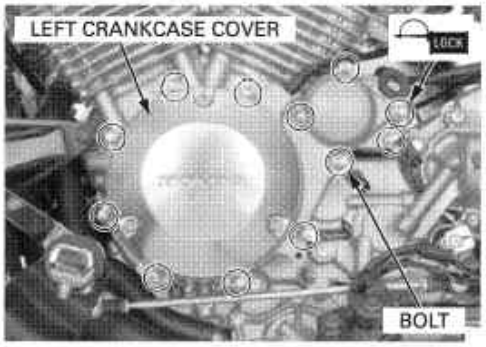
The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.

Install the left crankcase cover.

Apply the locking agent to the bolt threads (page 1-21).

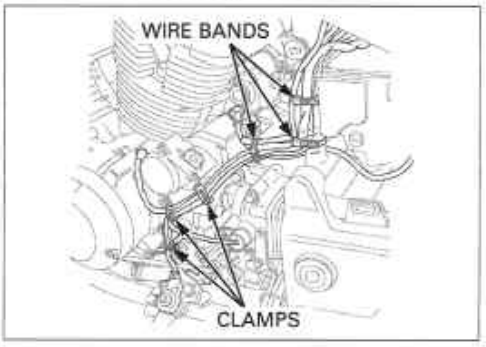
Install and tighten the left crankcase cover bolts in a crisscross pattern in several steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Route the wires properly (page 1-24).

Clamp and bind the wires with clamp and wire bands.

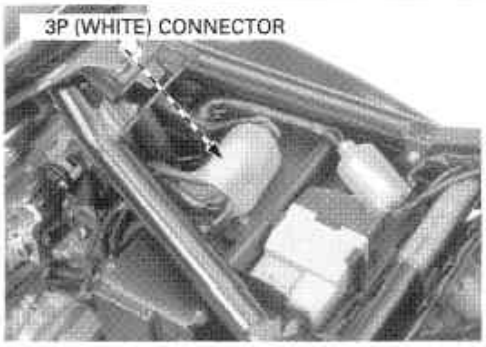


Connect the alternator 3P (White) connector.

Install the following:

- Left crankcase rear cover (page 2-6)
- Left side cover (page 2-4)
- Seat (page 2-3)

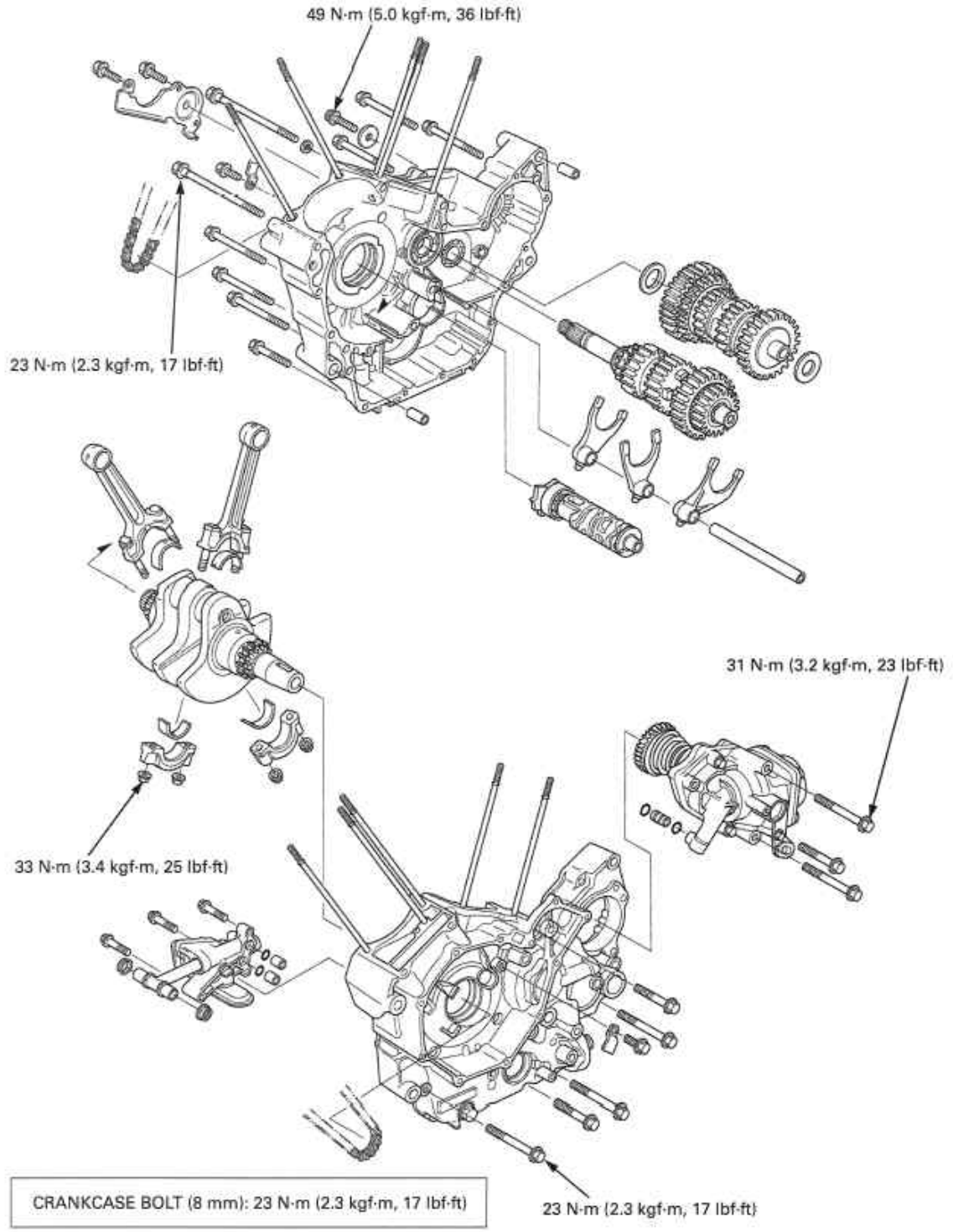
Check the engine oil level (page 3-12).



MEMO

12. CRANKSHAFT/TRANSMISSION

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
  - Oil pump
  - Crankshaft/connecting rod
  - Output gear
  - Transmission
- The following parts must be removed before separating the crankcase:
  - Oil filter (page 3-13)
  - Water pump (page 6-15)
  - Cylinder head (page 8-14)
  - Cylinder (page 9-4), piston (page 9-5)
  - Clutch (page 10-7), gearshift linkage (page 10-14) and primary drive gear (page 10-12)
  - Alternator (page 11-4), flywheel (page 11-5)
  - Starter motor (page 19-6)
  - Vehicle speed sensor (page 20-11)
  - Neutral switch (page 20-19)
  - Oil pressure switch (page 4-5)
  - Intake manifold (page 5-22)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crank pin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance. Incorrect oil clearance can cause major engine damage.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- Whenever you replace the output driven/drive gears, bearings, bearing holder or gear case, perform the gear contact pattern and backlash inspection and adjust the shim. The extension lines from the gear engagement surfaces should intersect at one point.
- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. 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 lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not over tighten the lock nuts. The specification later in the text gives both actual and indicated.
- Protect the output gear case with a shop towel or soft jaws while holding it in vise. Do not clamp it too tightly as it could damage the gear case.

CRANKSHAFT/TRANSMISSION

SPECIFICATIONS

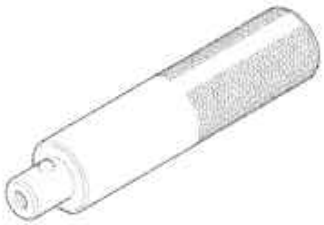
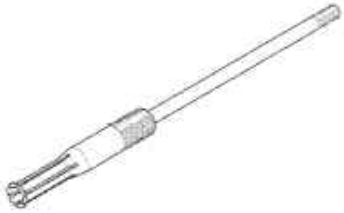
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)
	Crankshaft runout		–	0.03 (0.001)
	Main journal O.D.		52.982 – 53.000 (2.0859 – 2.0866)	52.976 (2.0857)
Main journal I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)
Shift fork, fork shaft	I.D.		13.000 – 13.018 (0.5118 – 0.5125)	13.03 (0.513)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D.			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)
Shift drum journal I.D.			12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Shift drum-to-shift drum journal clearance			0.016 – 0.042 (0.0006 – 0.0017)	0.09 (0.035)
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C4	31.000 – 31.025 (1.2204 – 1.2215)	31.05 (1.222)
		C2	24.000 – 24.021 (0.9449 – 0.9458)	24.04 (0.946)
	Gear busing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C1, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C2	23.959 – 23.980 (0.9433 – 0.9441)	23.94 (0.943)
	Gear-to-bushing clearance	M3, M5, C2	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C1, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
		C2	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
	Mainshaft O.D.	at M3	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	at C2	19.980 – 19.993 (0.7866 – 0.7871)	19.96 (0.786)
	Bushing-to-shaft clearance	M3	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.007 – 0.041 (0.0003 – 0.0016)	0.07 (0.003)
Output drive train	Output gear I.D.		24.000 – 24.021 (0.9449 – 0.9457)	24.04 (0.946)
	Output gear bushing	O.D.	23.959 – 23.980 (0.9433 – 0.9441)	23.70 (0.933)
		I.D.	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
	Output drive gear shaft O.D.		19.979 – 20.000 (0.7866 – 0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020 – 0.042 (0.0008 – 0.0016)	0.08 (0.003)
	Output gear damper spring free length		62.3 (2.45)	59 (2.32)
	Output drive gear backlash		0.08 – 0.23 (0.003 – 0.009)	0.40 (0.016)
	Backlash difference between measurements		–	0.10 (0.004)

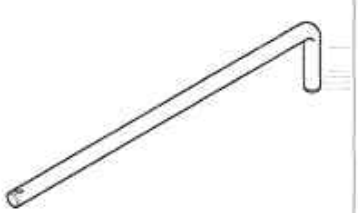
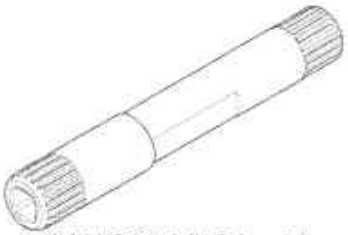
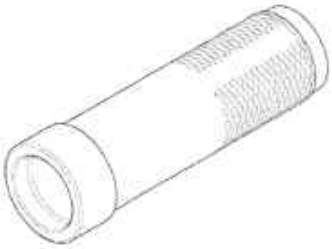
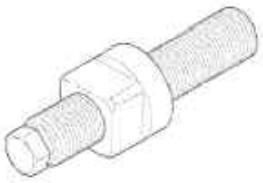
TOEQUE VALUES

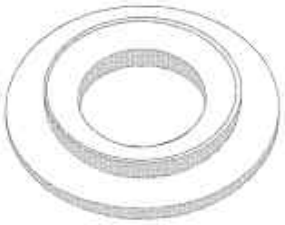
Crankcase bolt (8 mm)	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Crank pin bearing cap nut	33 N·m (3.4 kgf·m, 25 lbf·ft)	Apply oil to the threads and seating surface
Shift drum cam plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Output gear case mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply sealant to the threads
Output drive gear bearing holder bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply oil to the threads and seating surface
Output driven gear bearing holder socket bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply oil to the threads and seating surface
Output drive gear bearing lock nut		
(inner)	74 N·m (7.5 kgf·m, 54 lbf·ft)	Replace with a new one
(outer)	98 N·m (10.0 kgf·m, 72 lbf·ft)	Replace with a new one
Output driven gear bearing lock nut		
(inner)	74 N·m (7.5 kgf·m, 54 lbf·ft)	Replace with a new one
(outer)	98 N·m (10.0 kgf·m, 72 lbf·ft)	Replace with a new one
Output drive gear shaft bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	Apply oil to the threads

TOOLS

Driver 07749-0010000 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 62 x 68 mm 07746-0010500 	Pilot, 22 mm 07746-0041000 	Pilot, 17 mm 07746-0040400 
Pilot, 20 mm 07746-0040500 	Pilot, 30 mm 07746-0040700 	Remover handle 07936-3710100 
Bearing remover, 20 mm 07936-3710600 	Remover weight 07741-0010201  or 07936-371020A or 07936-3710200 (U.S.A. only)	Driver, 57 mm 070MF-MEG0100 

CRANKSHAFT/TRANSMISSION

Metal installer set 070MF-MEG0200 	Damper spring compressor 07964-ME90000 	Shaft holder A 07PAB-0010100  or 07923-6890101 (U.S.A. only)
Holder handle 07PAB-0010400 	Lock nut wrench, 36 x 47.8 mm 07916-MB00002 	Differential inspection tool 07KMK-HC50101  or 07KMK-HC5010A (U.S.A. only)
Bearing remover, 17 mm 07936-3710300 	Oil seal driver 07965-KE80200 	Driver, 40 mm I.D. 07746-0030100 
Attachment, 30 mm I.D. 07746-0030300 	Assembly bolt 07965-1660200 	Assembly collar 07965-1660302  or 07965-166030A

Threaded adaptor 07965-KA30000	Snap ring pliers 07914-5670101  not available in U.S.A. or 07914-5670100	Compressor seat 07967-9690200 

TROUBLESHOOTING

Excessive engine noise
- Worn main journal bearings
- Worn crankpin bearings
- Worn or damaged transmission gear
- Worn or damaged transmission bearings

Excessive noise in side gear
- Worn or damaged output shaft and final drive shaft gears
- Worn or damaged output gear case bearing
- Incorrect adjustment shim

Hard to shift
- Improper clutch operation (page 10-9)
- Incorrect engine oil viscosity
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Bent gearshift spindle

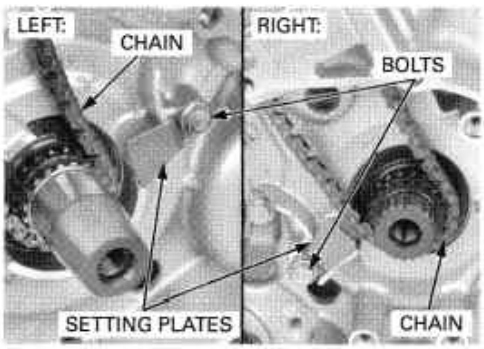
Transmission jumps out of gear
- Worn gear dogs or holes
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

CRANKCASE SEPARATION

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

Refer to Service Information (page 12-3) for removal of necessary parts before separating the crankcase.

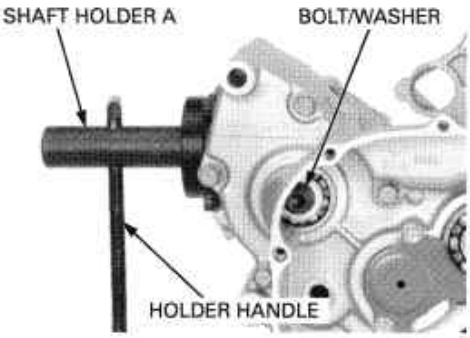
Remove the bolts and cam chain tensioner setting plates.
Remove the cam chains.



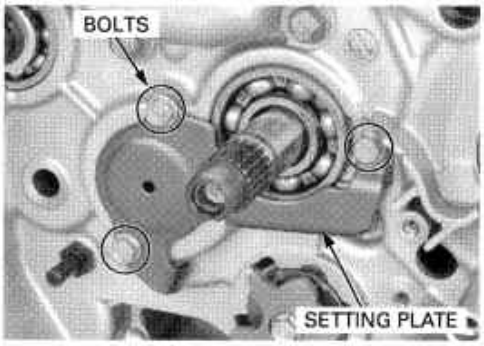
Hold the output driven gear shaft using the special tools, loosen the output drive gear shaft bolt and remove it with the washer.

TOOLS:

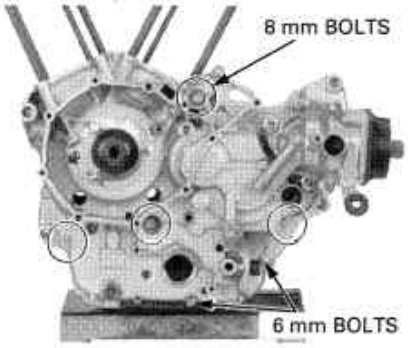
Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Holder handle	**07PAB-0010400**



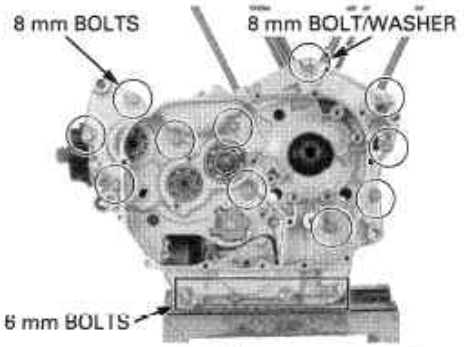
Remove the bolts and bearing setting plate.



Loosen and remove the 6 mm and 8 mm bolts in a crisscross pattern in several steps.



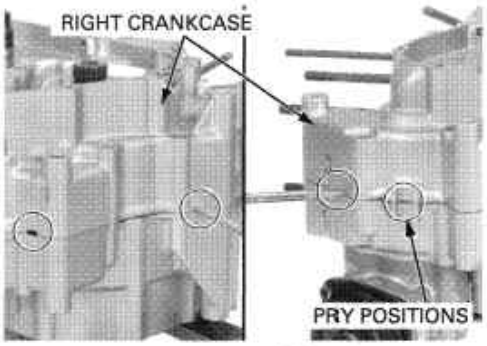
Loosen and remove the 6 mm and 8 mm bolts with washer in a crisscross pattern in several steps.



Place the crankcase with the left crankcase down and remove the right crankcase.

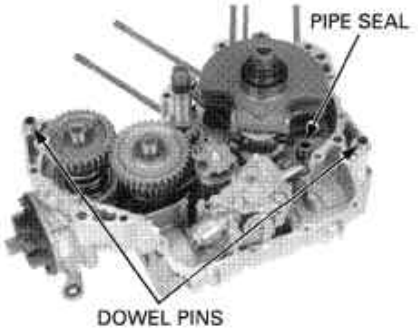
NOTE:

- Separate the right crankcase from the left crankcase while prying at the points as shown.
- Separate the right crankcase from the left crankcase while tapping them at several locations with a soft hammer.



Remove the dowel pins and pipe seal.

Clean off the sealant from the left and right crankcase mating surfaces.



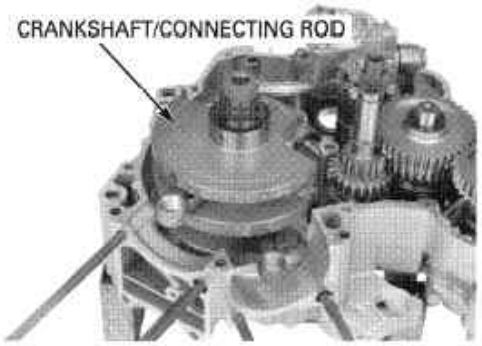
CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase (page 12-8).

During crankshaft and connecting rod service, be careful not to damage the main journal or crank pin bearing inserts.

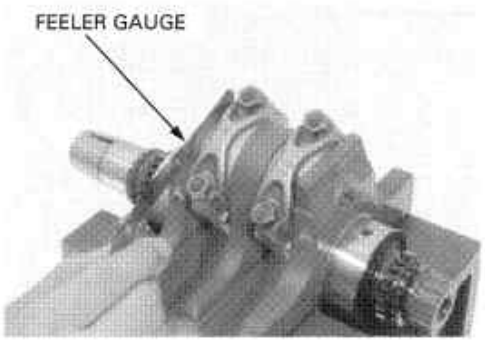
Remove the crankshaft/connecting rod from the left crankcase.



SIDE CLEARANCE INSPECTION

Before removing the connecting rods, check the big end side clearance.
Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end.

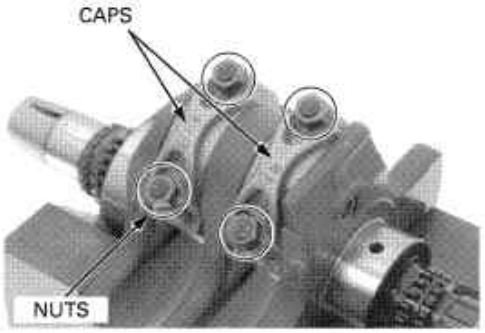
SERVICE LIMIT: 0.30 mm (0.012 in)



CONNECTING ROD REMOVAL

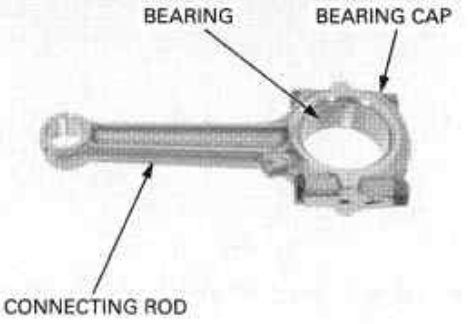
Tap the side of the cap lightly if bearing cap is hard to remove.

Remove the crankpin bearing cap nuts and the bearing caps.



Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

For the connecting rod small end inspection, refer to page 9-7.



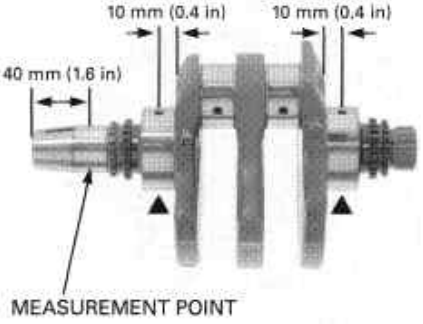
CRANKSHAFT INSPECTION

Check the camshaft journal surfaces for damage, discoloration or scratch.

CRANKSHAFT RUNOUT

Place the crankshaft on a stand or V-blocks.
Set a dial indicator on the main journals.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.03 mm (0.001 in)



CONNECTING ROD INSTALLATION

NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Wipe any oil from the connecting rod, cap and bearing inserts.
Install the bearing inserts on the connecting rods and caps by aligning the tab with the groove.

Apply molybdenum disulfide oil to the thrust surface of the bearings.

Install the rods and caps on the crankshaft by aligning the I.D. code on the rod and cap. Be sure each part is installed in its original position, as noted during removal.

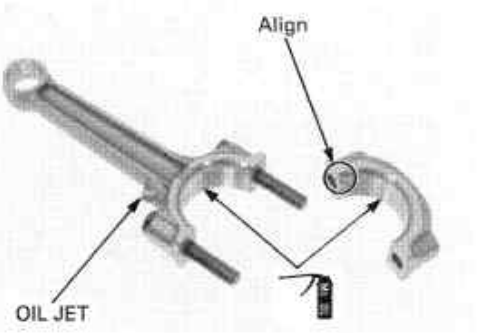
NOTE:

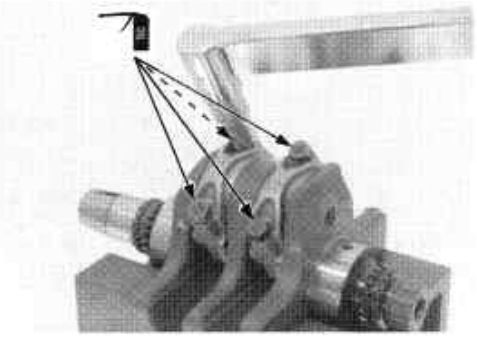
- Face the oil jet of front cylinder connecting rod to rearward (intake side) of the engine.
- Face the oil jet of rear cylinder connecting rod to rearward (exhaust side) of the engine.

Apply engine oil to the bering cap nut threads and seating surface, then tighten them in several steps alternately.

TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)

After tightening the nuts, check that the connecting rods move freely without binding.

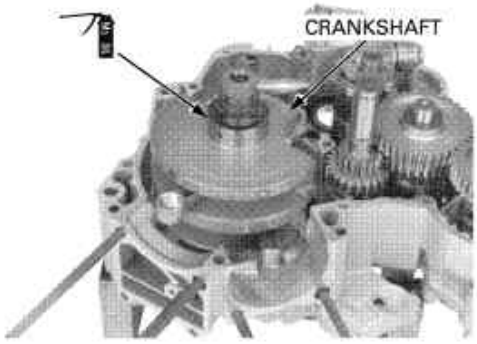




CRANKSHAFT INSTALLATION

Apply molybdenum disulfide oil to the main journal bearing inserts and install the crankshaft into the left crankcase.

Assemble the crankcase (page 12-47).

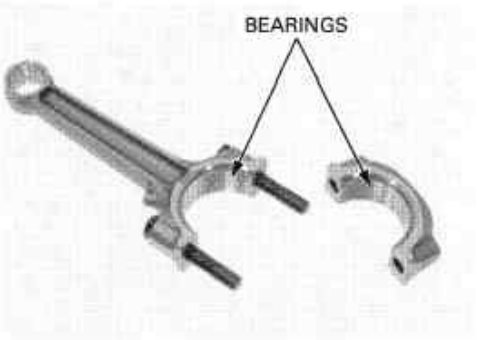


CRANKPIN BEARING

BEARING INSPECTION

Remove the connecting rod (page 12-10).
Check the bearing inserts for unusual wear, damage or peeling and replace them if necessary.

Select the replacement bearing (page 12-13).

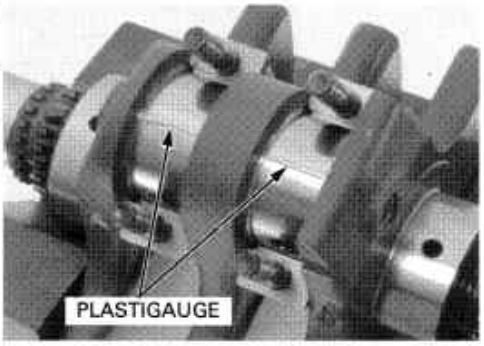


OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

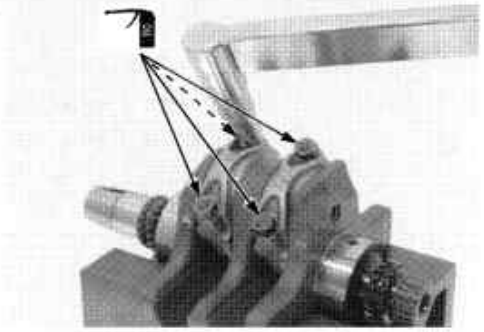
Carefully install the connecting rods and bearing caps on the correct crankpins.



Do not rotate the crankshaft during inspection.

Apply engine oil to the threads and seating surfaces of the bearing cap nuts.
Install the nuts and tighten them evenly.

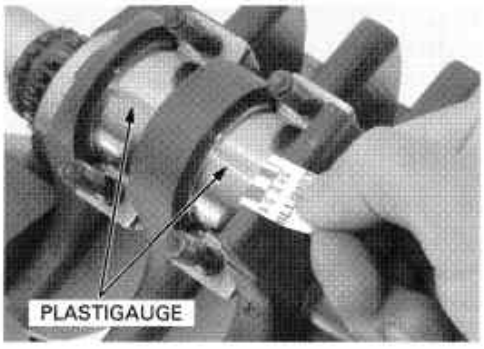
TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)



Remove the bearing caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)

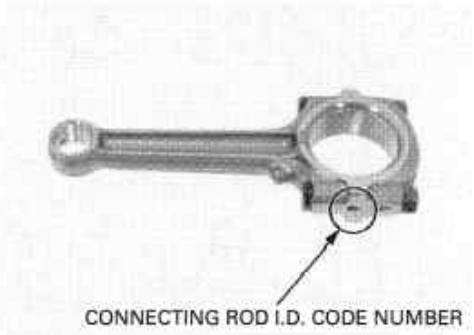
If the clearance exceeds the service limit, select the correct replacement bearings as follows.



BEARING SELECTION

Record the connecting rod I.D. code number.

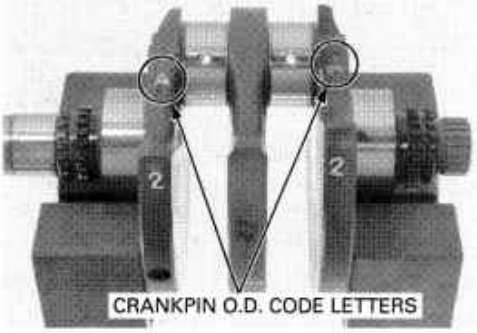
NOTE:
Number 3 or 4 on the connecting rod is the code for the connecting rod I.D.



Record the crankpin O.D. code letter.

NOTE:
Letters A or B on each crank weight is the code for the crankpin O.D.

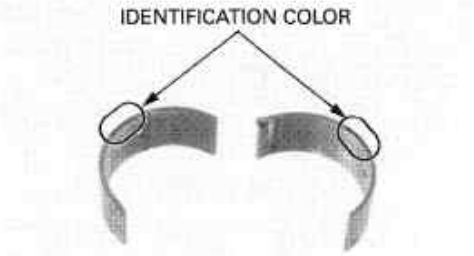
Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.



CRANKPIN BEARING SELECTION TABLE:

			CONNECTING ROD I.D. CODE	
			3	4
			43.000 – 43.008 mm (1.6929 – 1.6932 in)	43.008 – 43.016 mm (1.6932 – 1.6935 in)
CRANKPIN O.D. CODE	A	39.982 – 39.990 mm (1.5741 – 1.5744 in)	C (Pink)	B (Yellow)
	B	39.974 – 39.982 mm (1.5738 – 1.5741 in)	B (Yellow)	A (Green)

BEARING THICKNESS:
A (Green): Thick
B (Yellow): ↕
C (Pink): Thin



NOTICE

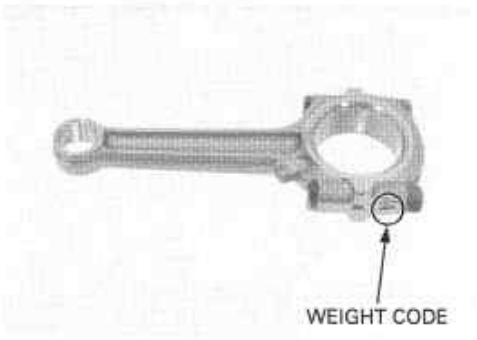
After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

CONNECTING ROD SELECTION

An alphabetical weight code is stamped on the cap. If a connecting rod requires replacement, you should select a rod with the same weight code as the original.

		WEIGHT
CONNECTING ROD WEIGHT CODE	A	398 – 403 g (14.0 – 14.2 oz)
	B	403 – 408 g (14.2 – 14.4 oz)
	C	408 – 413 g (14.4 – 14.6 oz)

Install the connecting rod (page 12-11) and crankshaft (page 12-11).



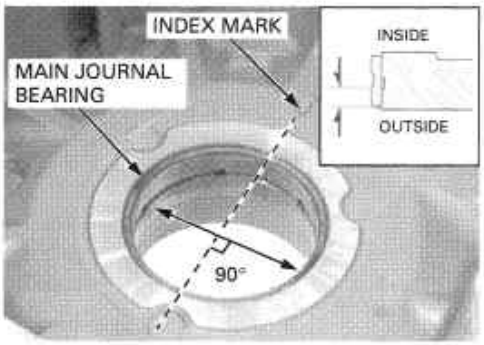
MAIN JOURNAL BEARING

BEARING INSPECTION

Remove the crankshaft (page 12-9).
Clean off any oil from the bearings.

Check the bearings for unusual wear, damage or peeling and replace them if necessary.

Measure the main journal bearing I.D. at between the bearing groove and crankcase outer side end of the bearing, and 90 degrees to the index mark.



Clean off any oil from the crankshaft journals.

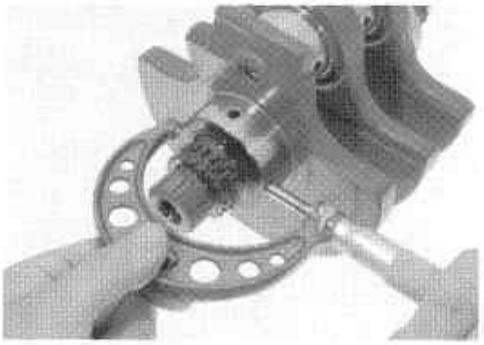
Measure and record the crankshaft main journal O.D.

SERVICE LIMIT: 52.976 mm (2.0857 in)

Calculate the main journal oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)

If the clearance exceeds the service limit, select the bearing.

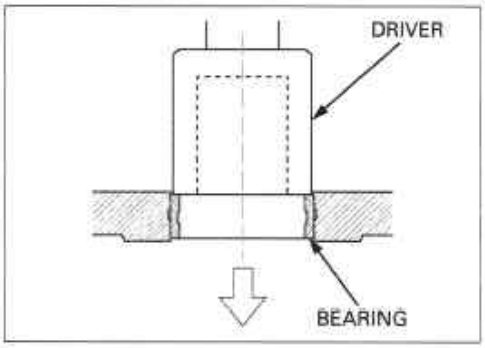


BEARING SELECTION

Set a special tool and hydraulic press on the outside of the crankcase.

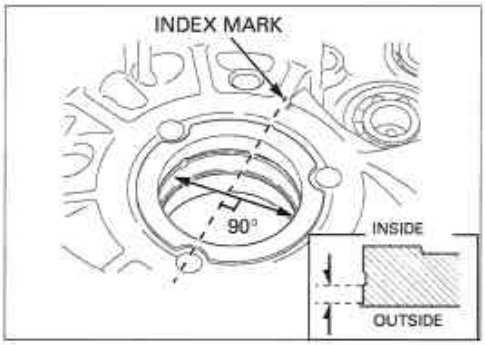
TOOL:
Driver, 57 mm **070MF-MEG0100**

Press the main journal bearings toward the inside of the crankcase.



Measure and record the crankcase main journal I.D. at between the main journal groove and crankcase outer side end, and 90 degrees to the index mark.

SERVICE LIMIT: 58.070 mm (2.2862 in)



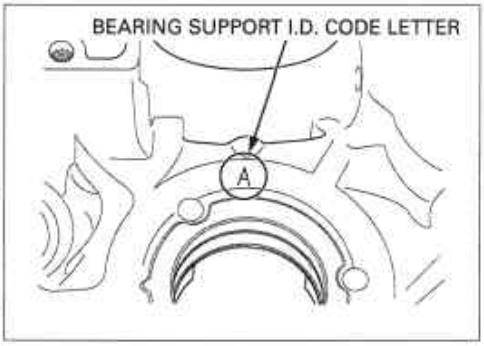
Depending upon the results of the above measurements there are four possible scenarios for main bearing selection:

- Crankshaft and crankcase are replaced
- Crankcase only is replaced
- Crankshaft only is replaced
- Main bearings only are replaced

Carefully refer to the following instructions and tables for main bearing selection.

Record the bearing support I.D. code letter.

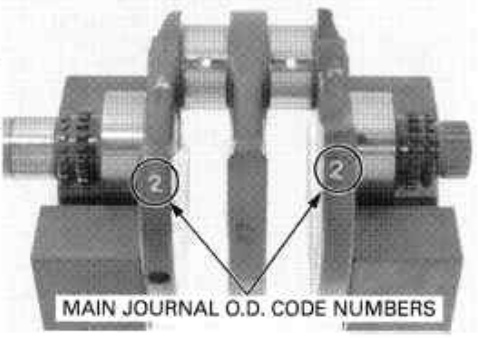
NOTE:
Letters A or B on each crankcase is the code for the crankcase I.D.



Record the main journal O.D. code number.

NOTE:
Letters 1, 2 or 3 on each crank weight is the code for crankshaft journal O.D.

Cross-reference the crankshaft and crankcase codes to determine the replacement bearing color.



CRANKSHAFT/TRANSMISSION

In case the crankshaft and crankcase are replaced:

			MAIN JOURNAL O.D. CODE		
			1	2	3
			52.994 – 53.000 mm (2.0864 – 2.0866 in)	52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)
BEARING SUPPORT I.D. CODE	A	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)
	B	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)

In case the crankcase only is replaced:

			MAIN JOURNAL O.D.			
			52.994 – 53.000 mm (2.0864 – 2.0866 in)	52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D. CODE	A	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	B	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)	A (Blue)

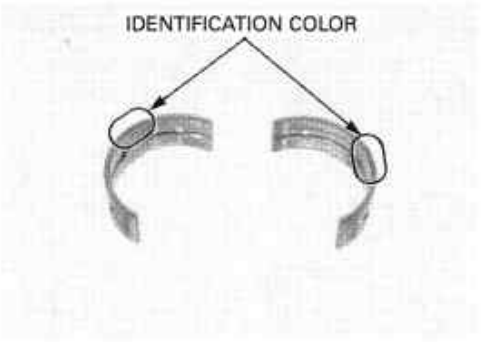
In case the crankshaft only is replaced:

		MAIN JOURNAL O.D. CODE		
		1	2	3
		52.994 – 53.000 mm (2.0864 – 2.0866 in)	52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)
BEARING SUPPORT I.D.	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)
	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)
	58.022 – 58.034 mm (2.2843 – 2.2848 in)	B (Black)	A (Blue)	A (Blue)
	58.034 – 58.046 mm (2.2848 – 2.2853 in)	A (Blue)	O.S. G (Red)	O.S. G (Red)
	58.046 – 58.058 mm (2.2853 – 2.2857 in)	O.S. G (Red)	O.S. F (Pink)	O.S. F (Pink)
	58.058 – 58.070 mm (2.2857 – 2.2862 in)	O.S. F (Pink)	O.S. E (Yellow)	O.S. E (Yellow)

In case of main bearing replacement only:

		MAIN JOURNAL O.D.			
		52.994 – 53.000 mm (2.0864 – 2.0866 in)	52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D.	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)	A (Blue)
	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	58.022 – 58.034 mm (2.2843 – 2.2848 in)	B (Black)	A (Blue)	A (Blue)	O.S. G (Red)
	58.034 – 58.046 mm (2.2848 – 2.2853 in)	A (Blue)	O.S. G (Red)	O.S. G (Red)	O.S. F (Pink)
	58.046 – 58.058 mm (2.2853 – 2.2857 in)	O.S. G (Red)	O.S. F (Pink)	O.S. F (Pink)	O.S. E (Yellow)
	58.058 – 58.070 mm (2.2857 – 2.2862 in)	O.S. F (Pink)	O.S. E (Yellow)	O.S. E (Yellow)	O.S. E (Yellow)

BEARING THICKNESS:
O.S. E (Yellow): Thick
O.S. F (Pink): ↑
O.S. G (Red):
A (Black): Middle
B (Brown):
C (Green): ↓
D (Yellow): Thin



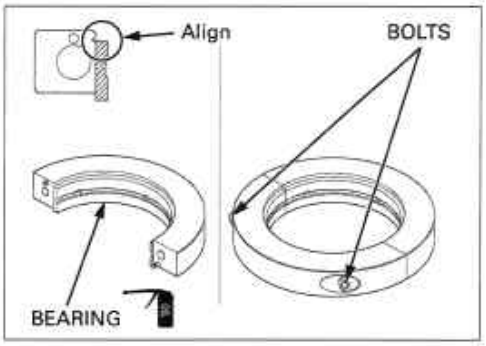
BEARING INSTALLATION

Apply engine oil to new bearing surface.
Set new bearings to the metal installer aligning its side edge with the metal installer grooves.

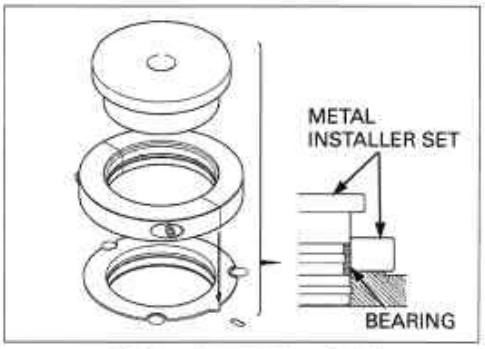
TOOL:
Metal installer set 070MF-MEG0200

Tighten the bolts alternately in several steps to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

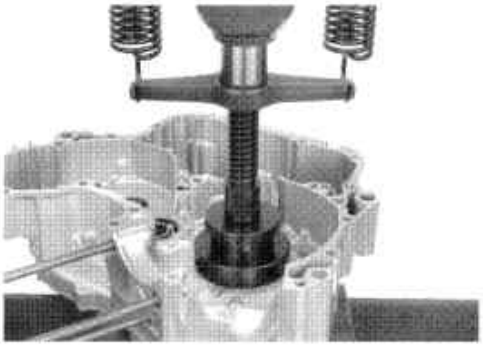


Set the bearings and special tools assembly on inside of the crankcase, fitting the bearing edge in the crankcase main journal.
Align the mating line of the bearings with the index mark on the crankcase as shown.

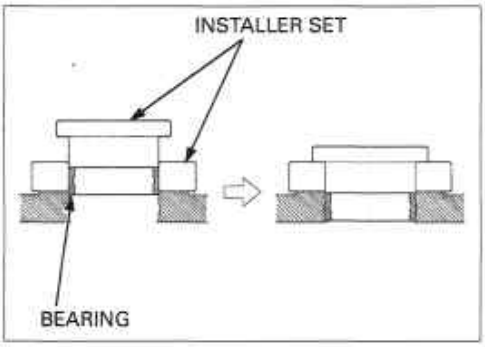


Set the hydraulic press.

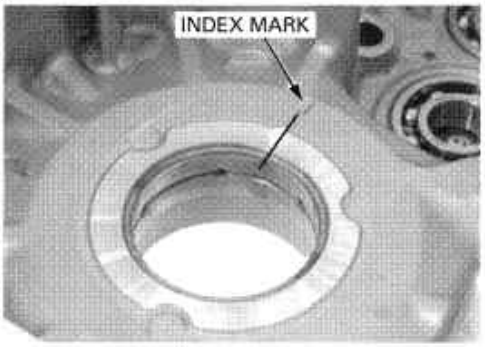
TOOL:
Metal installer set 070MF-MEG0200



Press the new bearings until the metal installer flange fully seat.



Make sure the bearing mating line aligns with the index mark on the crankcase.



Check the oil clearance (page 12-14).

- After selecting new bearings, recheck the clearance. Incorrect clearance can cause severe engine damage.

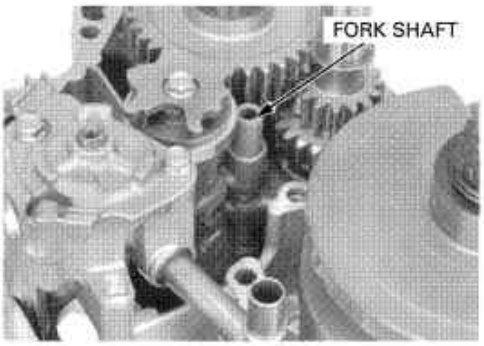
Install the crankshaft (page 12-11).

TRANSMISSION

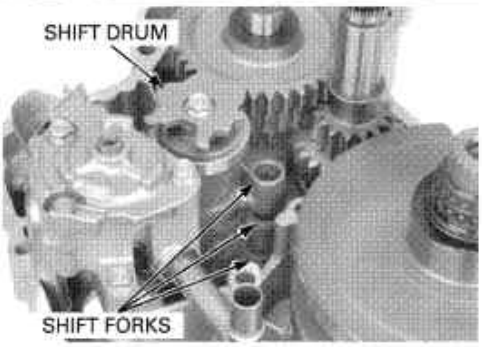
REMOVAL

Separate the crankcase (page 12-8).

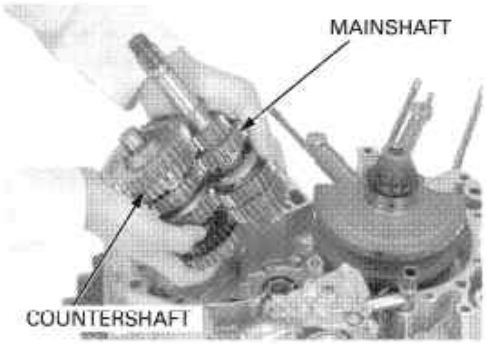
Remove the fork shaft from the shift forks.



Remove the shift forks and shift drum.

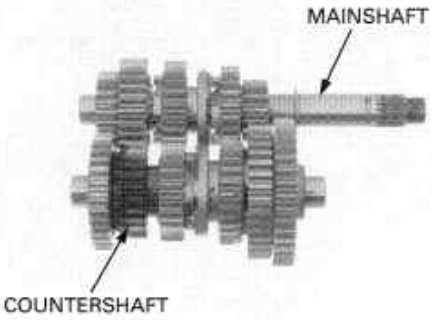


Remove the mainshaft and countershaft together.



TRANSMISSION DISASSEMBLY

Disassemble the mainshaft and countershaft.



INSPECTION

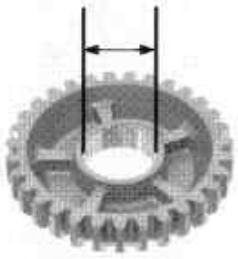
GEARS

Check the gear dogs, dog holes and teeth for damage or excessive wear.

Measure the I.D. of each gear.

SERVICE LIMITS:

M3, M5 gears:	**28.04 mm (1.104 in)**
C1, C4 gears:	**31.05 mm (1.222 in)**
C2 gears:	**24.04 mm (0.946 in)**



CRANKSHAFT/TRANSMISSION

BUSHINGS

Check the bushings for wear or damage.
Measure the O.D. of each bushing.

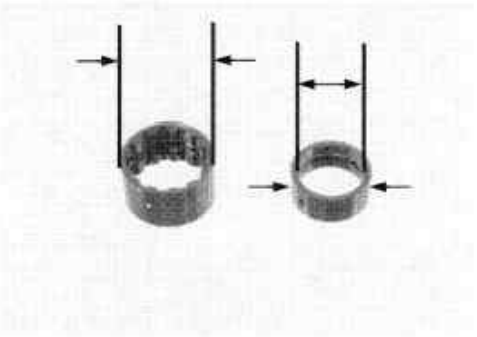
SERVICE LIMITS:

M3, M5, gear bushing:	**27.94 mm (1.100 in)**
C1, C4 gear bushing:	**30.93 mm (1.218 in)**
C2 gear bushing:	**23.94 mm (0.943 in)**

Measure the I.D. of each bushing.

SERVICE LIMITS:

M3 gear bushing:	**25.04 mm (0.986 in)**
C2 gear bushing:	**20.04 mm (0.789 in)**



MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for abnormal wear or damage.
Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.

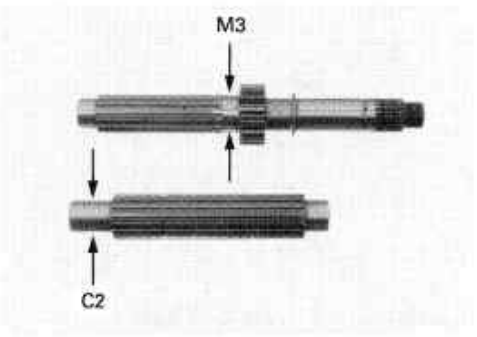
SERVICE LIMITS:

Mainshaft (at M3 gear bushing):	**24.94 mm (0.982 in)**
Countershaft (at C2 gear bushing):	**19.96 mm (0.786 in)**

Calculate the gear-to-bushing and bushing-to-shaft clearance.

SERVICE LIMITS:

Gear-to-bushing	
M3, M5, C2:	**0.10 mm (0.004 in)**
C1, C4:	**0.11 mm (0.004 in)**
Bushing-to-shaft	
M3:	**0.10 mm (0.004 in)**
C2:	**0.07 mm (0.003 in)**



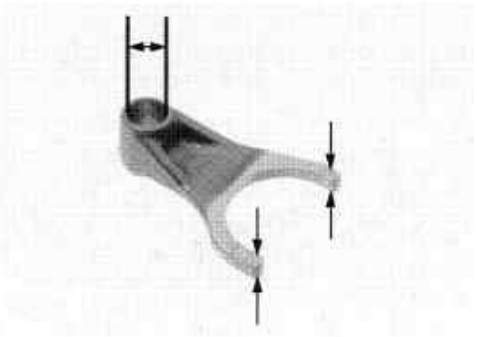
SHIFT FORK

Check for deformation or abnormal wear.
Measure the shift fork claw thickness.

SERVICE LIMITS: 5.6 mm (0.22 in)

Measure the shift fork I.D.

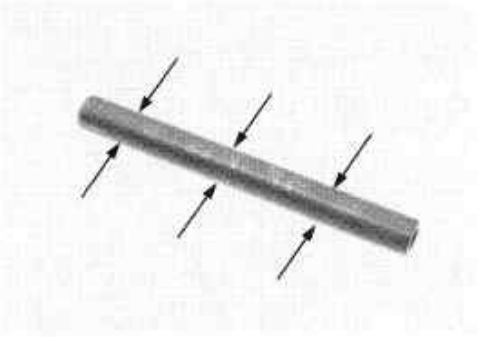
SERVICE LIMIT: 13.03 mm (0.513 in)



SHIFT FORK SHAFT

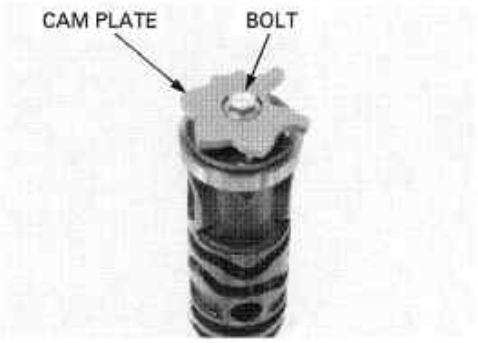
Check the shaft for bend, abnormal wear or damage.
Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.90 mm (0.508 in)

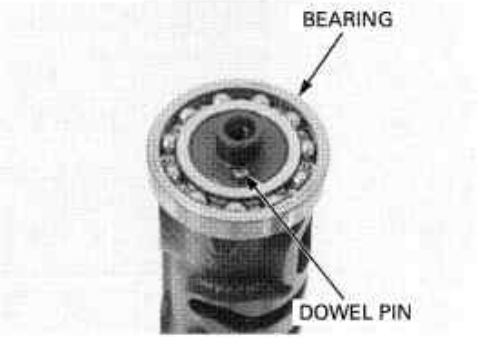


SHIFT DRUM/SHIFT DRUM BEARING

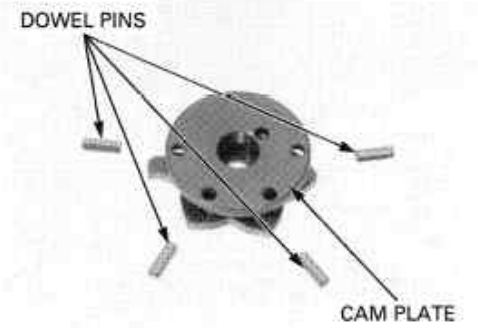
Remove the bolt and gearshift cam plate.



Remove the dowel pin and bearing.



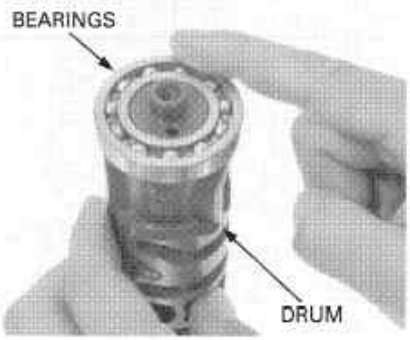
Remove the dowel pins from the gearshift cam plate.



Temporarily install the bearing on the shift drum. Turn the outer race of the bearing with your finger. The bearing should turn smoothly and quietly.

Also check that the bearing inner race fits tightly on the shift drum.

Remove and discard the bearing if the races do not turn smoothly, quietly, or if it fits loosely on the shift drum.



Check the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.

Measure the shift drum O.D. at left end.

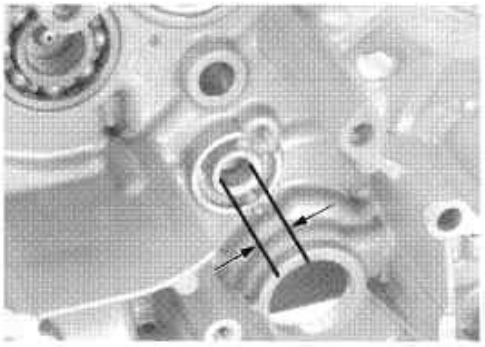
SERVICE LIMIT: 11.94 mm (0.470 in)

Check the shift drum journal in the left crankcase for excessive wear or damage.
Measure the shift drum journal I.D.

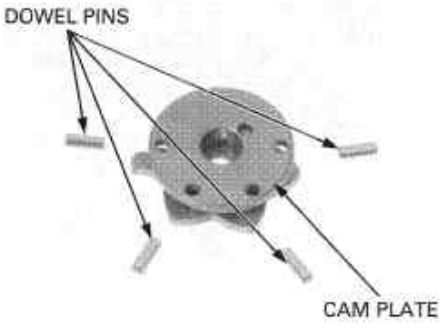
SERVICE LIMIT: 12.05 mm (0.474 in)

Calculate the shift drum-to-shift drum journal clearance.

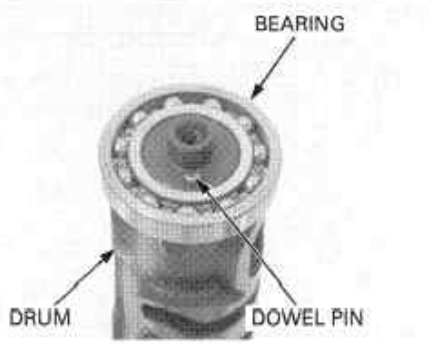
SERVICE LIMIT: 0.09 mm (0.0035 in)



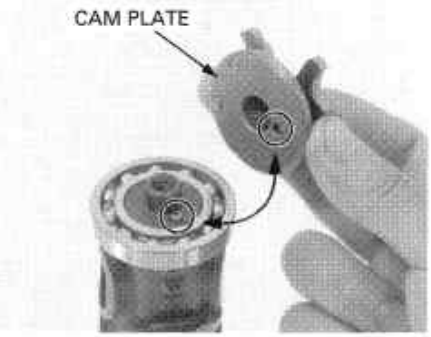
Install the dowel pins into the cam plate holes.



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

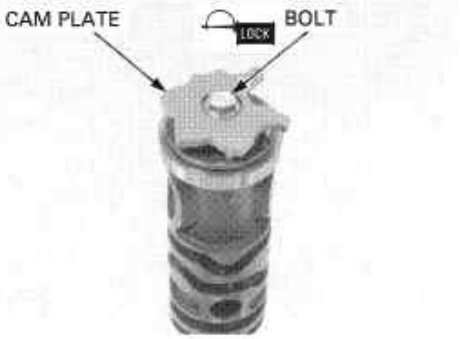


Install the gearshift cam plate by aligning the hole on the cam plate with the dowel pin.



Clean and apply a locking agent to the gearshift cam plate bolt (page 1-21).
Install and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



TRANSMISSION ASSEMBLY

Clean all parts in solvent.

Apply oil to the all gear teeth.

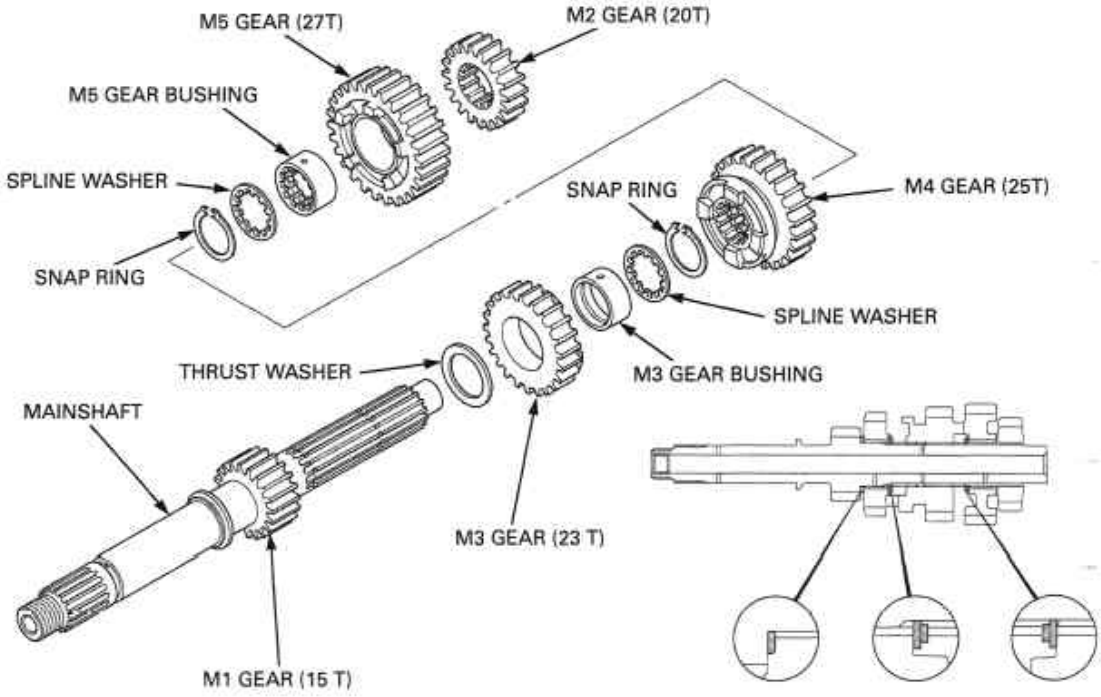
Apply molybdenum disulfide oil to the gear and bushing sliding surface and shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

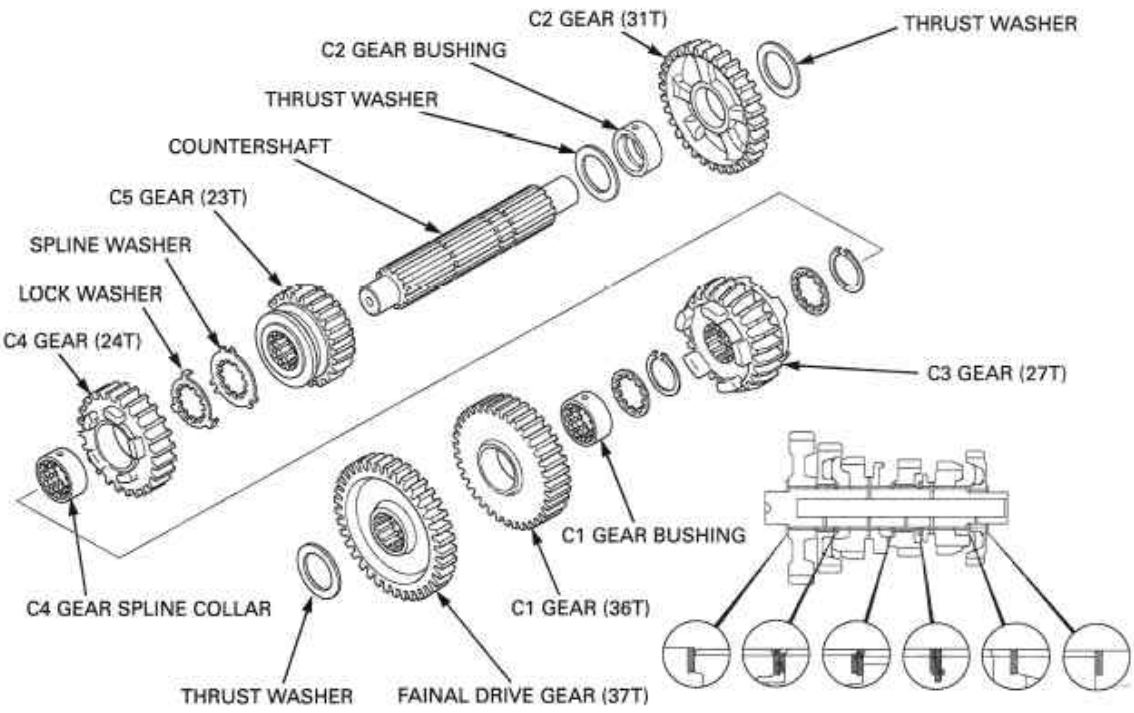
NOTE:

- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust load side.
- Do not reuse a worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.
- Align the lock washer tabs with the spline washer grooves.
- Align the oil holes in the M5 gear bushing and mainshaft, and C1, C4 gear bushing and countershaft.

MAINSHAFT

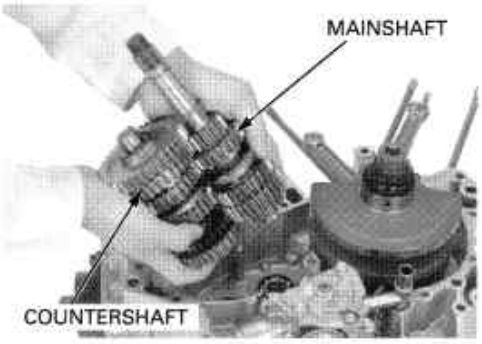


COUNTERSHAFT



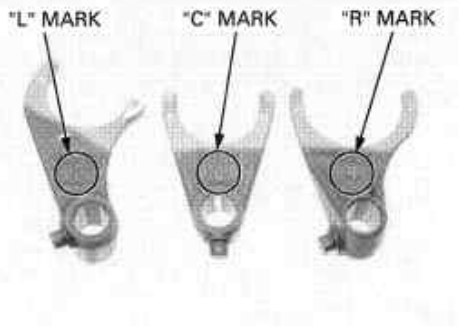
INSTALLATION

Install the mainshaft and countershaft together into the left crankcase.

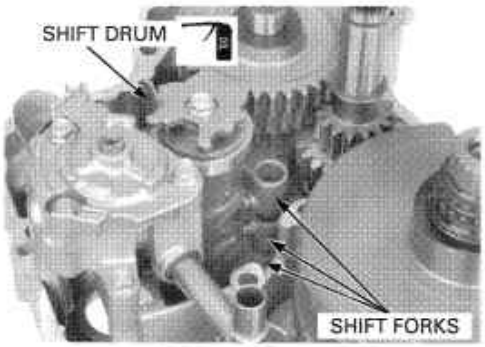


The shift forks have the following identification marks.

- "L": Left shift fork
- "C": Center shift fork
- "R": Right shift fork



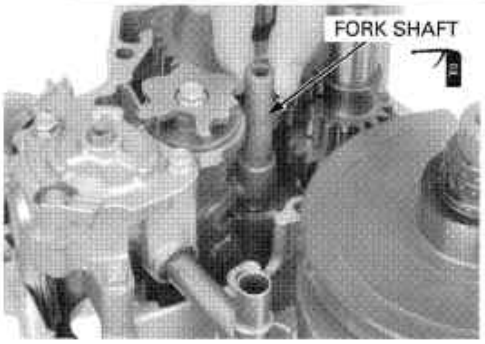
Install the shift forks into the shifter gear grooves with the markings facing up (right crankcase side). Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.



Apply engine oil to the shift fork shaft and insert it through the shift forks into the right crankcase.

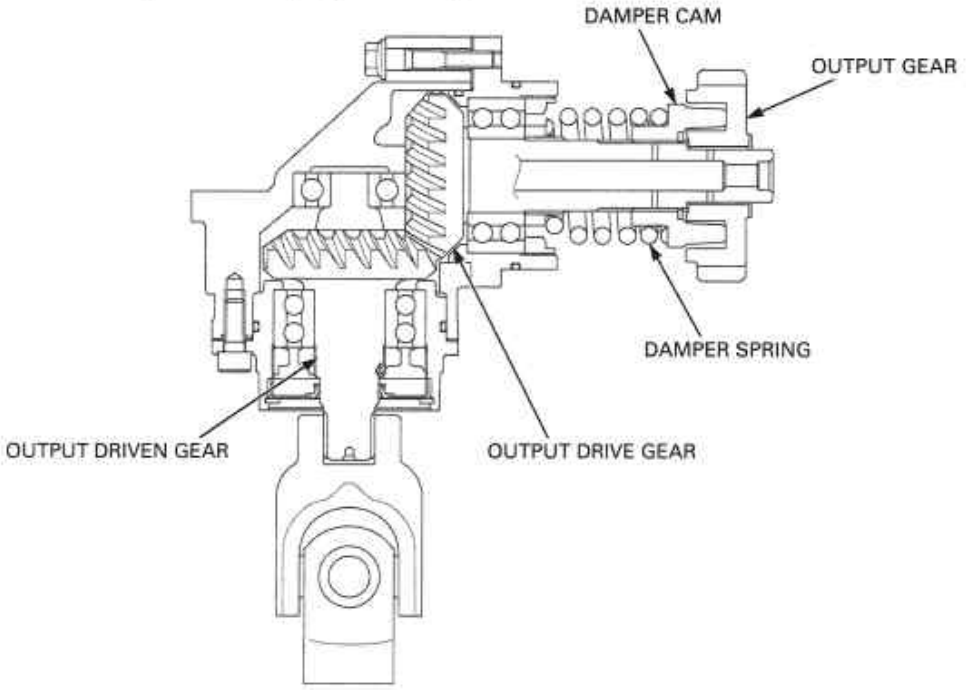
After installation, check for smooth transmission operation.

Assemble the crankcase (page 12-47).



OUTPUT GEAR

Description of the output gear assembly:



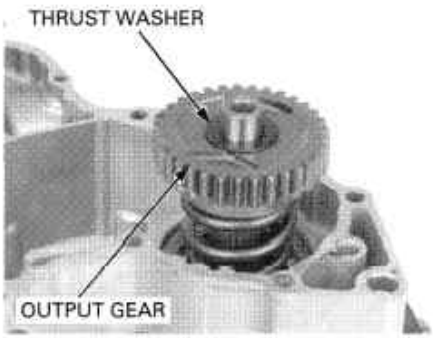
REMOVAL

Separate the crankcase (page 12-8).

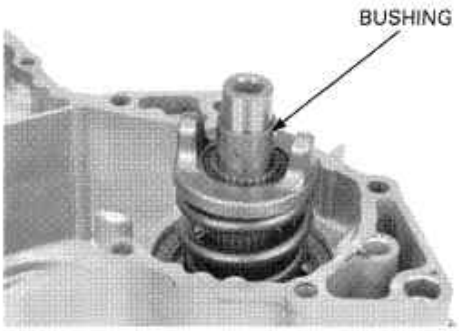
Remove the following:

- Crankshaft (page 12-9)
- Transmission (page 12-18)

Remove the thrust washer and output gear.



Remove the bushing from the output drive gear shaft.

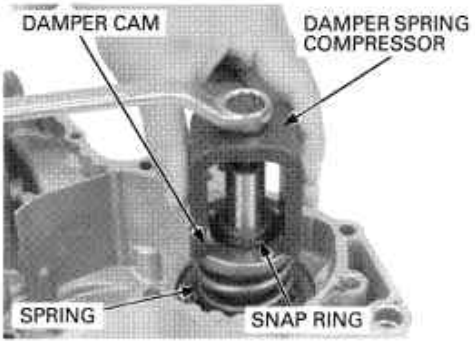


(Except U.S.A.)

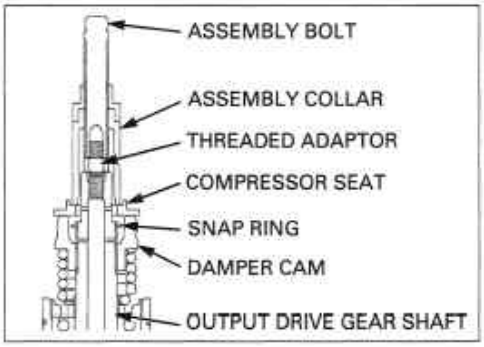
Set the damper spring compressor onto the damper cam and output drive gear shaft.

Compress the damper spring by turning the compressor bolt clockwise until the snap ring can be removed.

TOOLS:
Damper spring compressor 07964-ME90000



(U.S.A. only)
Place the threaded adaptor in the end of the output drive gear shaft and tighten the adaptor.
Place the compressor seat over the threaded adaptor with the stepped side facing upward.
Install the assembly bolt through the assembly collar and attach it to the threaded adaptor.
Center the compressor seat with the damper cam then begin to tighten the 23 mm nut of the assembly bolt until the snap ring is visible so it can be removed.

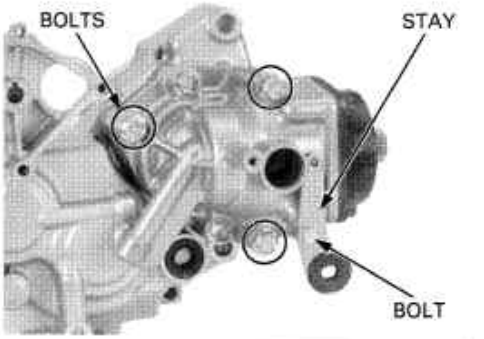


TOOLS:

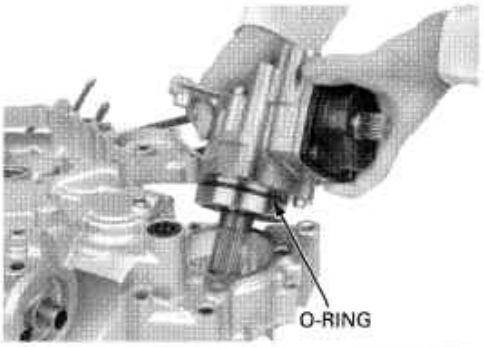
Assembly bolt	**07965-1660200**
Assembly collar	**07965-166030A or 07965-1660302**
Compressor seat	**07967-9690200**
Threaded adaptor	**07965-KA30000**
Snap ring pliers	**07914-5670101 not available in U.S.A. or 07914-5670100**

Remove the snap ring, special tools, damper cam and spring from the drive gear shaft.
Remove the bolt and stay.

Remove the output gear case mounting bolts.

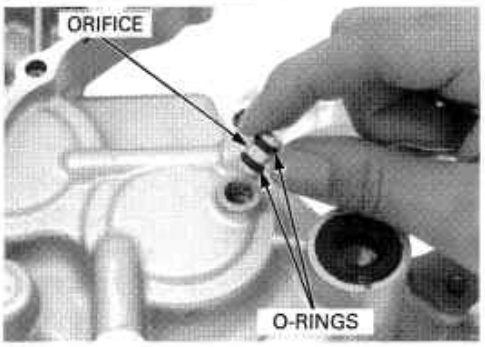


Remove the output gear case assembly and O-ring.



Remove the orifice and O-rings.
Check the orifice for clog or damage.

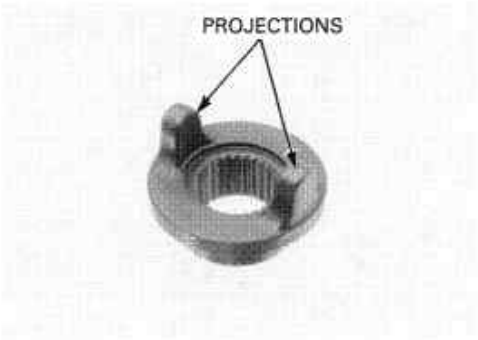
Replace it if necessary.



INSPECTION

DAMPER CAM

Check the projections of damper cam for damage or excessive wear.

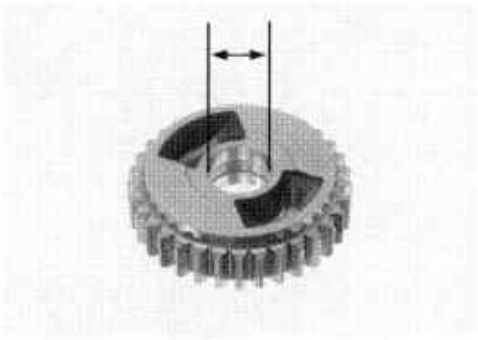


OUTPUT GEAR

Check the gear teeth for damage or excessive wear, and the gear dog holes for damage.

Measure the output gear I.D.

SERVICE LIMIT: 24.04 mm (0.946 in)



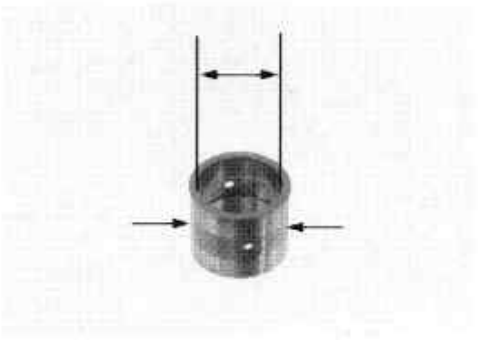
BUSHING

Check the output gear bushing for wear or damage. Measure the bushing I.D. and O.D.

SERVICE LIMIT: O.D. 23.70 mm (0.933 in)
I.D. 20.06 mm (0.790 in)

Calculate the output gear-to-bushing clearance.

SERVICE LIMIT: 0.082 mm (0.0032 in)



OUTPUT DRIVE GEAR SHAFT

Measure the O.D. of the output drive gear shaft at the bushing sliding area.

SERVICE LIMIT: 19.97 mm (0.786 in)

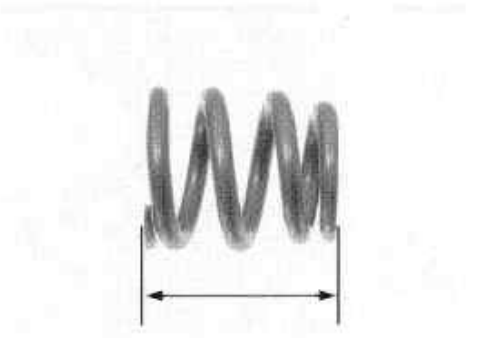
Calculate the bushing-to-shaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

DAMPER SPRING

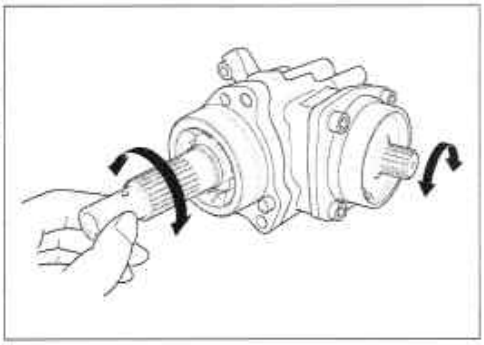
Measure the damper spring free length.

SERVICE LIMIT: 59 mm (2.32 in)



Turn the output drive gear shaft and check that the output drive and driven gear shafts turn smoothly and quietly without binding.

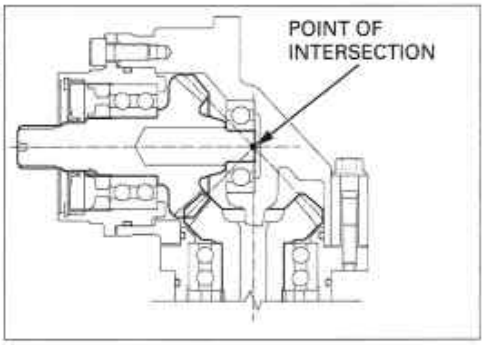
If the shafts do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. They must be checked after disassembly; replace faulty parts/assemblies as required.



BACKLASH INSPECTION/GEAR TOOTH CONTACT PATTERN CHECK

NOTE:

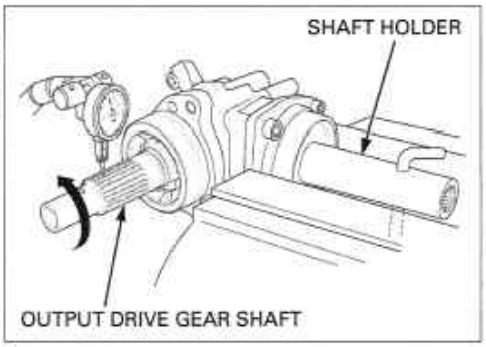
Perform the backlash inspection and contact pattern check whenever you replace the output driven/drive gears, bearings, bearing holder and gear case. The extension lines from the gear engagement surfaces should intersect at one point.



BACKLACH INSPECTION

Set the output gear case in a vise with soft jaws.

Set a horizontal type dial indicator on the output drive gear shaft as shown.
Hold the output driven gear shaft with the shaft holder and rotate the drive gear shaft until gear slack is taken up.



TOOL:

Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Holder handle	**07PAB-0010400**

Turn the drive gear shaft back and forth to read backlash.

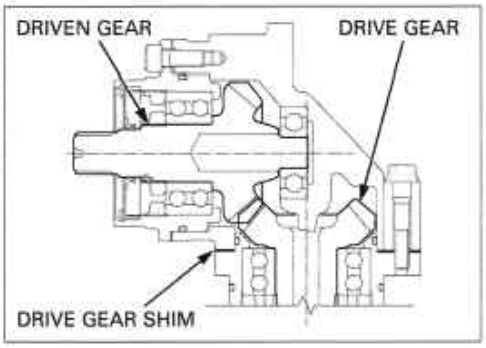
STANDARD: 0.08 – 0.23 mm (0.003 – 0.009 in)
SERVICE LIMIT: 0.40 mm (0.016 in)

Remove the dial indicator. Turn the drive gear shaft 120° and measure backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

Backlash difference between measurements
SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely or the case is deformed.
Inspect the bearings and case.

If the backlash is excessive, replace the output drive gear shim with a thinner one.
If the backlash is too small, replace the output drive gear shim with a thicker one.

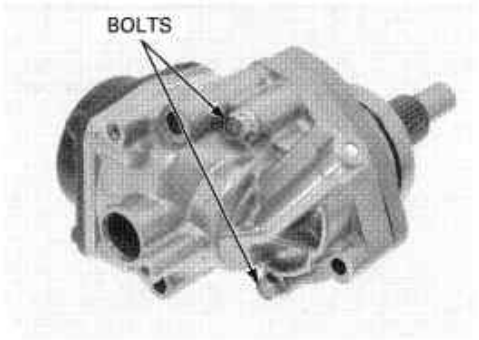


Backlash is changed by about 0.06 – 0.07 mm (0.002 – 0.003 in) when shim thickness is changed by 0.10 mm (0.004 in).

OUTPUT DRIVE GEAR SHIMS:
0.30 mm (0.012 in)
0.35 mm (0.014 in)
0.40 mm (0.016 in)
0.45 mm (0.018 in)
0.50 mm (0.020 in) – Standard
0.55 mm (0.022 in)
0.60 mm (0.024 in)
0.65 mm (0.026 in)
0.70 mm (0.028 in)
0.75 mm (0.030 in)

OUTPUT DRIVE GEAR SHIM REPLACEMENT

Remove the bolts and drive gear assembly from the gear case.

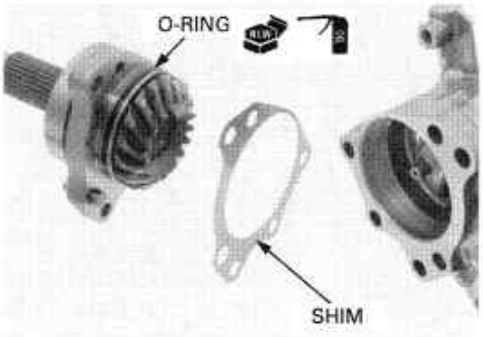


Remove the shim and O-ring from the bearing holder.

Select the replacement shim (page 12-31).

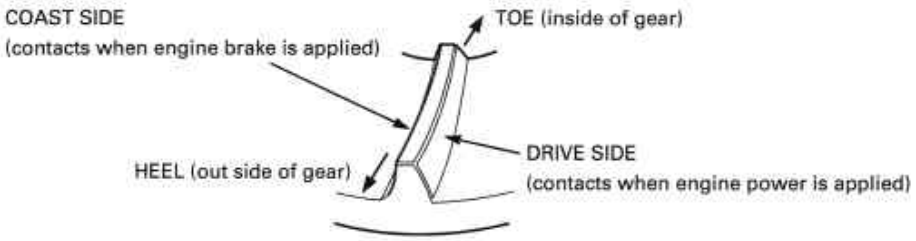
Coat a new O-ring with oil and install it into the bearing holder groove.
Install the shim.
Install the drive gear assembly to the gear case and tighten the bolts.

Recheck the backlash (page 12-30).
After backlash adjustment has been made, check the gear tooth contact pattern as described below.



GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:

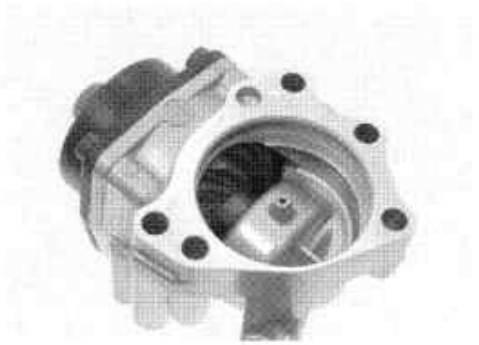


Remove the drive gear assembly from the gear case (page 12-32).
Apply a thin coat of Prussian Blue to the output driven gear teeth.

Reinstall the drive gear with the shim.

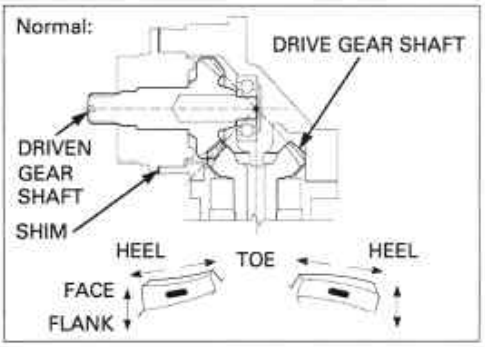
Rotate the drive gear shaft several times in the normal direction of rotation.

Remove the drive gear assembly and check the gear tooth contact pattern.

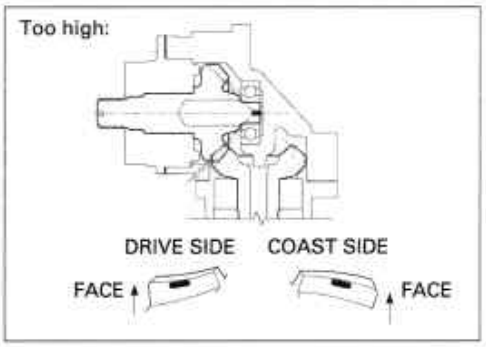


Contact is normal if Prussian Blue is transferred to the approximate center of each tooth and slightly to the toe.

If the pattern is not correct, remove and replace the output driven gear shim.

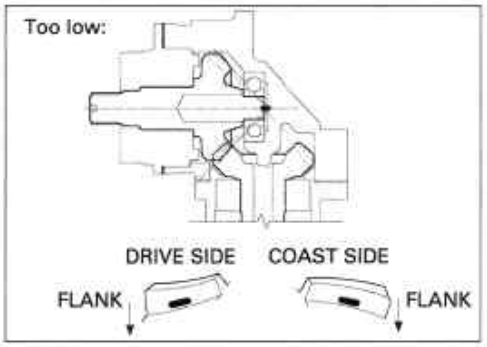


Replace the shim with a thinner one if the contact pattern is too high, toward the face.



Replace the shim with a thicker one if the contact pattern is too low, toward the flank.

The pattern will shift about 1.5 – 2.0 mm (0.06 – 0.08 in) when the shim thickness is changed by 0.10 mm (0.04 in)

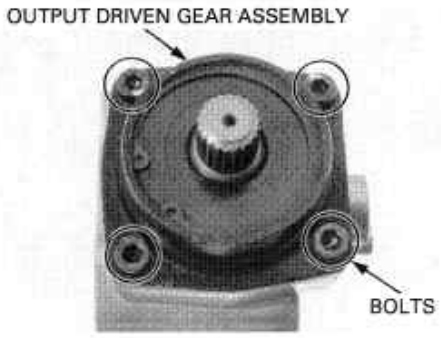


OUTPUT DRIVEN GEAR SHIMS:

- **0.20 mm (0.008 in)**
- **0.25 mm (0.010 in)**
- **0.30 mm (0.012 in)**
- **0.35 mm (0.014 in)**
- **0.40 mm (0.016 in) – Standard**
- **0.45 mm (0.018 in)**
- **0.50 mm (0.020 in)**
- **0.55 mm (0.022 in)**
- **0.60 mm (0.024 in)**
- **0.65 mm (0.026 in)**

OUTPUT DRIVEN GEAR SHIM REPLACEMENT

Remove the bolts and output driven gear assembly.

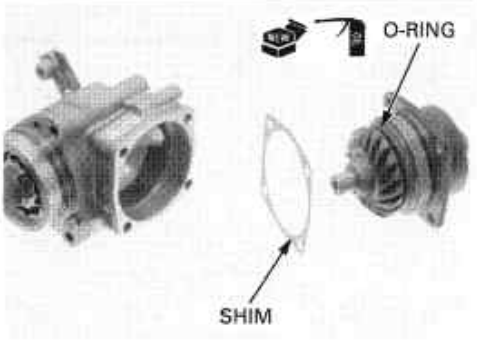


Remove the shim and O-ring from the bearing holder.

Select the replacement shim (page 12-33).

Coat a new O-ring with oil and install it into the bearing holder groove.
Install the shim.
Install the driven gear assembly to the gear case and tighten the bolts.

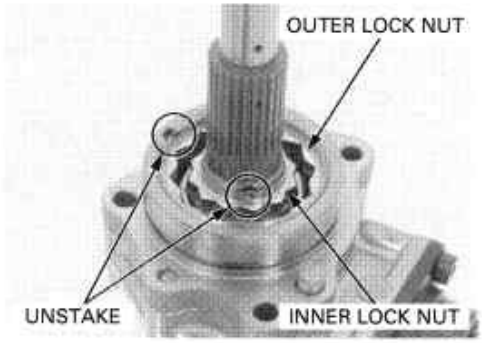
Recheck the contact pattern (page 12-32).



OUTPUT DRIVE GEAR DISASSEMBLY

Hold the output gear case in a vise with soft jaws.

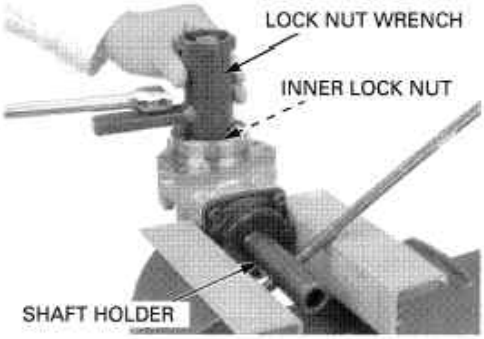
Unstake the bearing inner/outer race lock nuts.



Remove the bearing inner race lock nut using the special tools.

TOOLS:

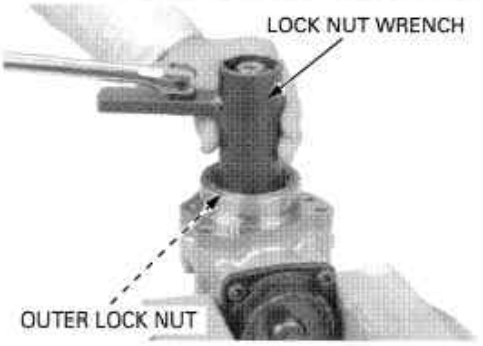
Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Holder handle	**07PAB-0010400**
Lock nut wrench, 36 x 47.8 mm	**07916-MB00002**



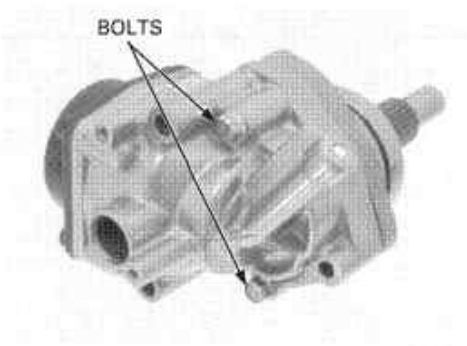
Remove the bearing outer race lock nut using a special tool.

TOOL:

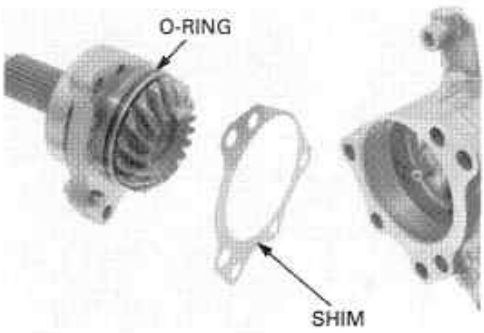
Lock nut wrench, 36 x 47.8 mm	**07916-MB00002**



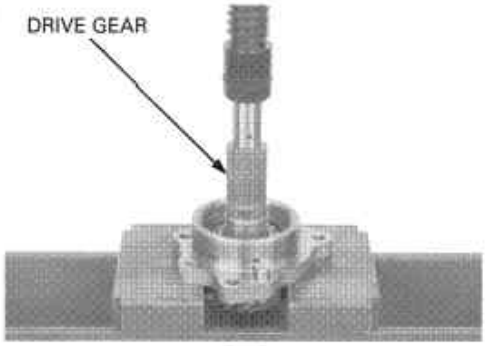
Remove the two bolts and the drive gear assembly from the gear case.



Remove the shim and O-ring from the bearing holder.



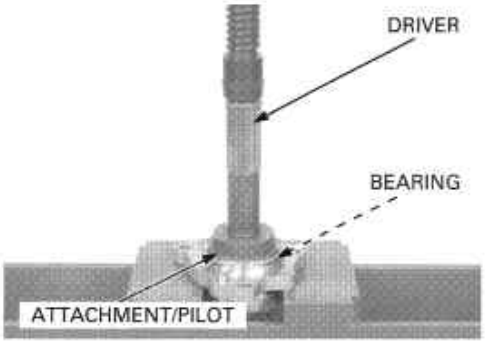
Press the drive gear out of the bearing using a hydraulic press.



Press the drive gear bearing out of the bearing holder using the special tools and a hydraulic press.

TOOLS:

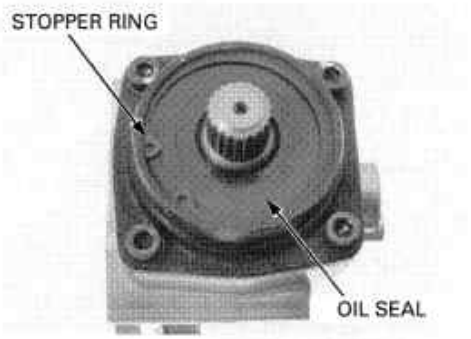
Driver	**07449-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 30 mm	**07746-0040700**



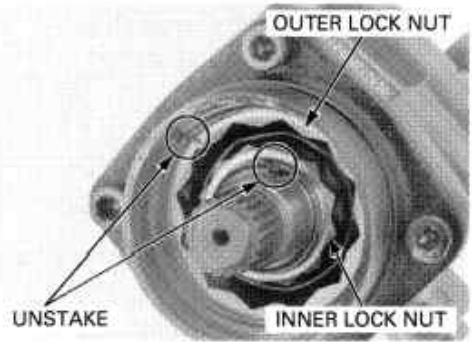
OUTPUT DRIVEN GEAR DISASSEMBLY

Hold the output gear case in a vise with soft jaws.

Remove the stopper ring and oil seal.



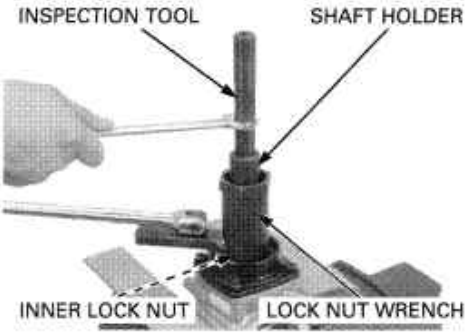
Unstake the bearing inner and outer race lock nuts.



Hold the driven gear shaft and remove the bearing inner race lock nut using the special tools.

TOOLS:

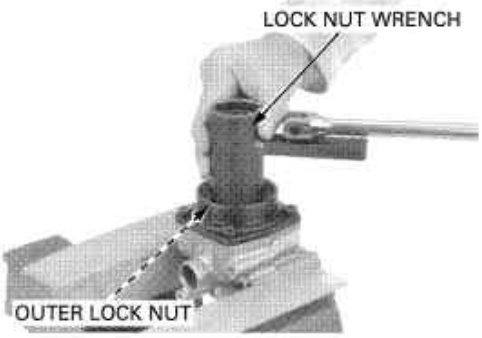
Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Lock nut wrench, 36 x 47.8 mm	**07916-MB00002**
Differential inspection tool	**07KMK-HC50101 or 07KMK-HC5010A (U.S.A. only)**



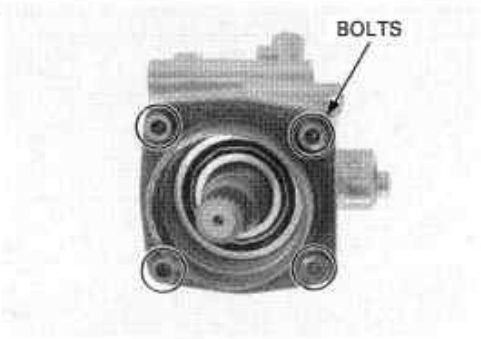
Remove the bearing outer race lock nut using a special tool.

TOOL:

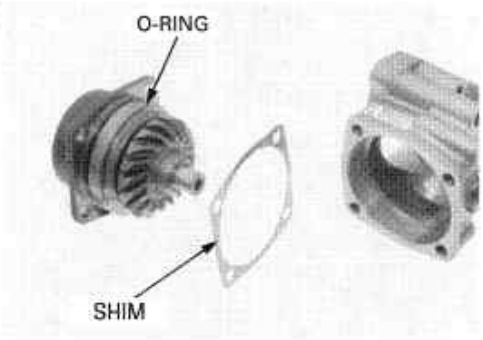
Lock nut wrench, 36 x 47.8 mm	**07916-MB00002**



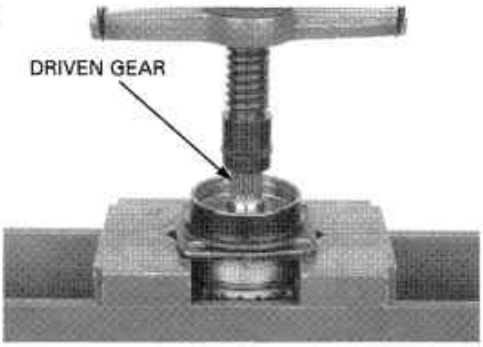
Remove the bolts and driven gear assembly from the gear case.



Remove the shim and O-ring from the bearing holder.



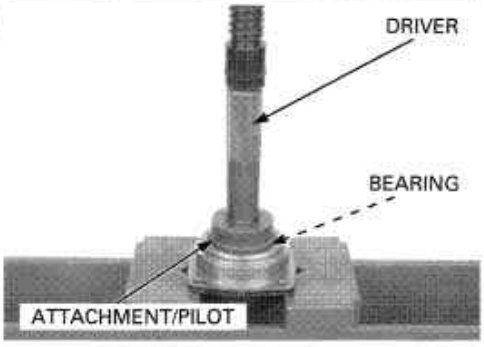
Press the driven gear out of the bearing using a hydraulic press.



Press the driven gear bearing out of the bearing holder using the special tools and a hydraulic press.

TOOLS:

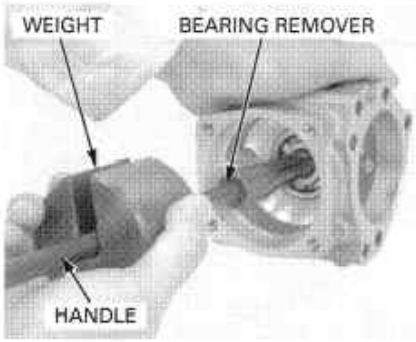
Driver	**07449-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 30 mm	**07746-0040700**



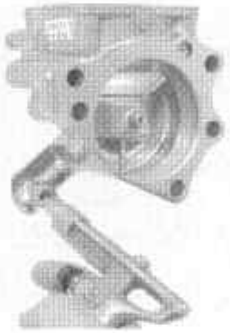
Remove the driven gear case bearing using the special tools.

TOOLS:

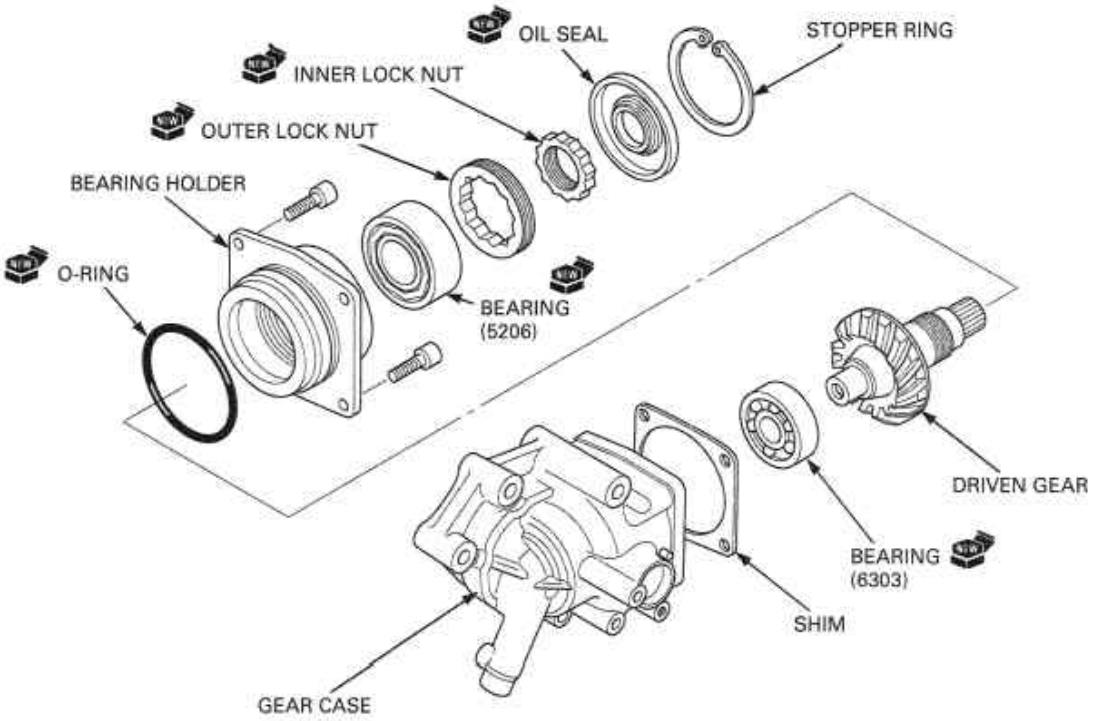
Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07936-3710201 or 07936-371020A or 07936-3710200 (U.S.A. only)**



Blow oil passage in the output gear case with compressed air.



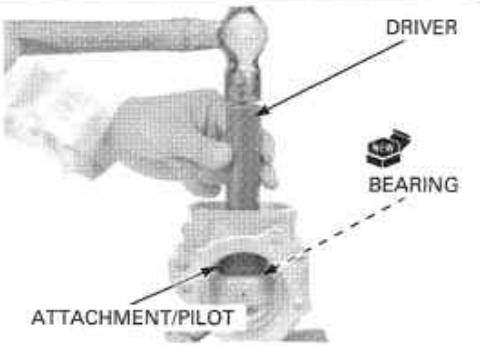
OUTPUT DRIVEN GEAR ASSEMBLY



Drive a new bearing into the gear case with the marked side facing up until it is fully seated.

TOOLS:

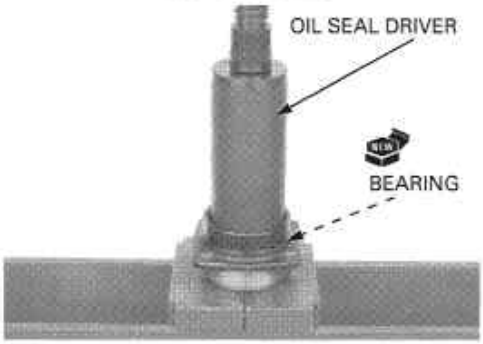
Driver	**07449-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 17 mm	**07746-0040400**



Press a new bearing into the bearing holder with the marked side facing up until it is fully seated and make sure it rotates freely after installation.

TOOL:

Oil seal driver	**07965-KE80200**

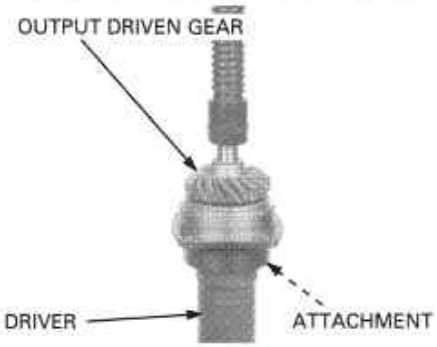


If the output driven gear requires replacement, the driven and drive gear must be replaced as a set.

Support the bearing inner race and press the output driven gear into the bearing holder using the special tools.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**

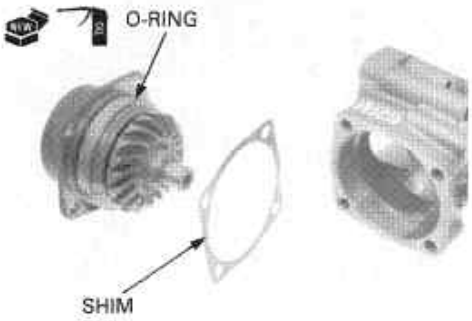


Coat a new O-ring with oil and install it into the bearing holder groove.

Install the shim.

NOTE:

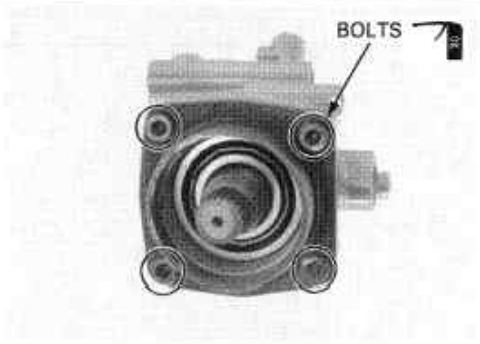
When the bearing, gear, holder and/or case have been replaced, use the 0.40 mm (0.016 in) shim for initial reference.



Hold the output gear case in a vise with soft jaws. Install the driven gear assembly into the gear case, aligning with the bolt holes

Apply engine oil to the threads and seating surface of the bolts and tighten them.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

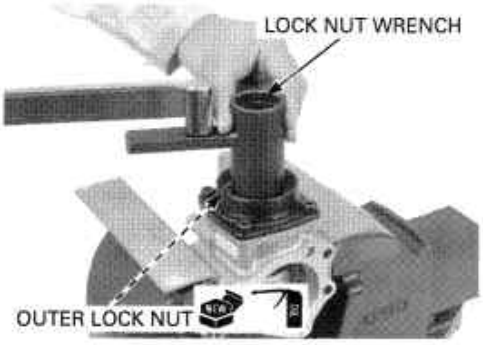


Apply engine oil to the threads of a new bearing outer race lock nut and tighten it to the specified torque using a special tool.

TOOL:
Lock nut wrench, 36 x 47.8 mm 07916-MB00002

Refer to torque wrench reading information, on page 12-3 "Service information".

TORQUE:
Actual: 98 N·m (10.0 kgf·m, 72 lbf·ft)
Indicated: 89 N·m (9.1 kgf·m, 66 lbf·ft)



Apply engine oil to the threads of a new inner race lock nut.

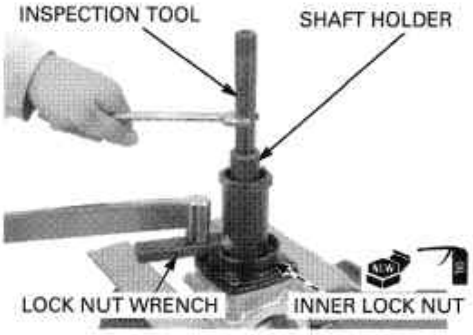
Hold the driven gear shaft and tighten it to the specified torque using the special tools.

TOOLS:

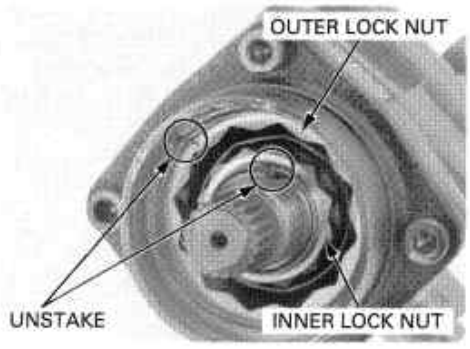
Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Lock nut wrench, 36 x 47.8 mm	**07916-MB00002**
Differential inspection tool	**07KMK-HC50101 or 07KMK-HC5010A (U.S.A. only)**

Refer to torque wrench reading information, on page 12-3 "Service information".

TORQUE:
Actual: 74 N·m (7.5 kgf·m, 54 lbf·ft)
Indicated: 67 N·m (6.8 kgf·m, 49 lbf·ft)



Stake the bearing inner and outer race lock nuts.

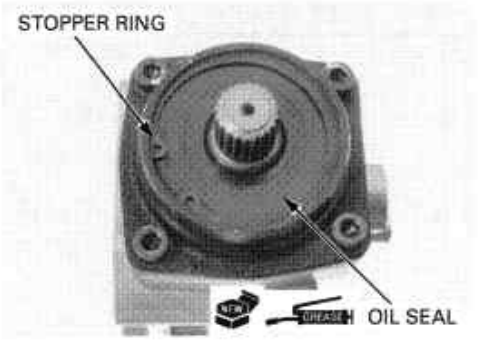


Pack grease into the seal lip cavity of a new oil seal and install it until the ring groove is visible so the stopper ring can be installed.

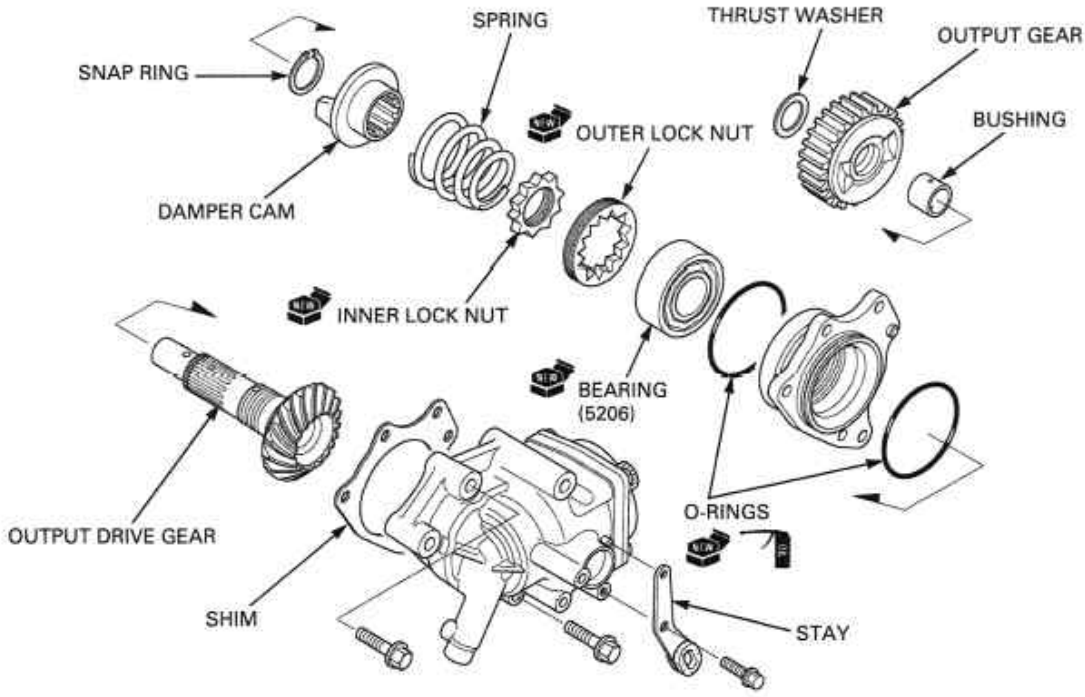
Install the stopper ring into the bearing holder groove securely.

NOTE:

- Install the stopper ring with the chamfered edge facing the thrust load side.
- Do not reuse worn stopper ring which could easily spin in the groove.
- Check that the stopper ring is seated in the groove.



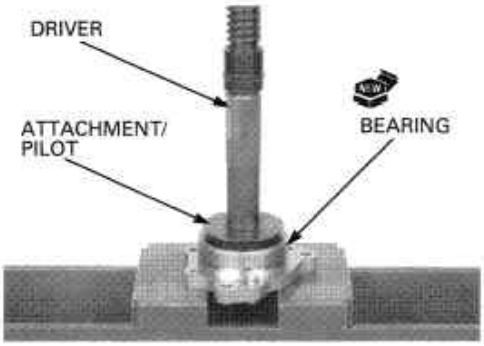
OUTPUT DRIVE GEAR ASSEMBLY



Press a new bearing into the bearing holder with the marked side facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**



CRANKSHAFT/TRANSMISSION

If the output drive gear requires replacement, the drive and driven gears must be replaced as a set.

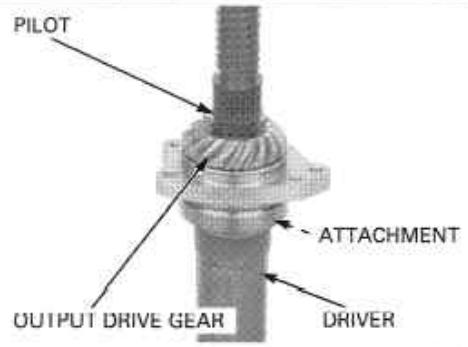
Support the bearing inner race and press the output drive gear using the special tools.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**
Pilot, 22 mm	**07746-0041000**

NOTE:

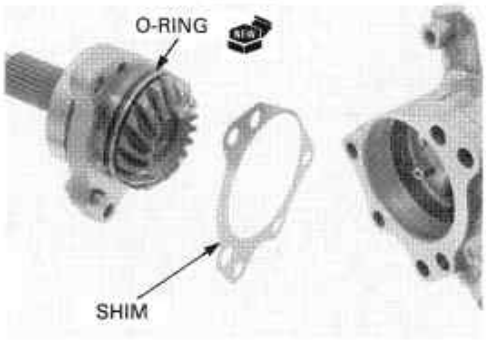
- Place the pilot's threaded end into the drive shaft.
- If the bearing, gear, holder and/or case is replaced, a new shim must be selected (See page 12-31. Backlash Inspection)



Coat a new O-ring with oil and install it into the bearing holder groove.
Install the shim.

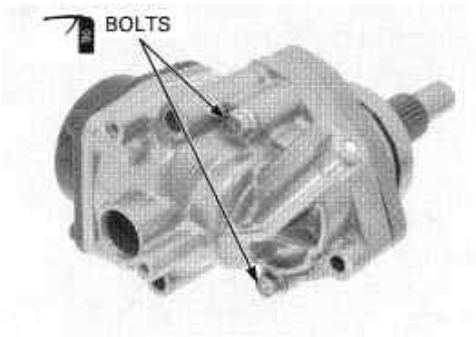
NOTE:

- When the bearing, gear, holder and/or case have been replaced, use the 0.50 mm (0.020 in) shim for initial reference.



Install the drive gear assembly into the gear case.
Apply oil to the bolt threads and seating surface.
Tighten the bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



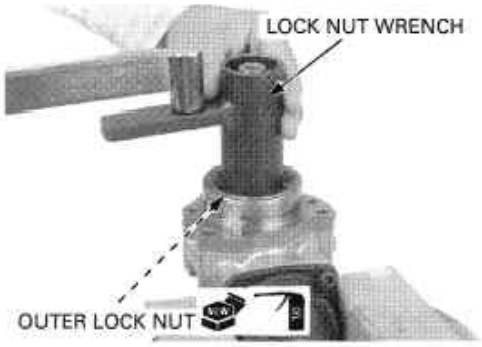
Hold the gear case in a vise with soft jaws.

Apply oil to the threads of a new bearing outer race lock nut and tighten it to the specified torque using a special tool.

TOOL:
Lock nut wrench, 36 x 47.8 mm 07916-MB00002

Refer to torque wrench reading information, on page 12-3 "Service information".

TORQUE:
Actual: 98 N·m (10.0 kgf·m, 72 lbf·ft)
Indicated: 89 N·m (9.1 kgf·m, 66 lbf·ft)



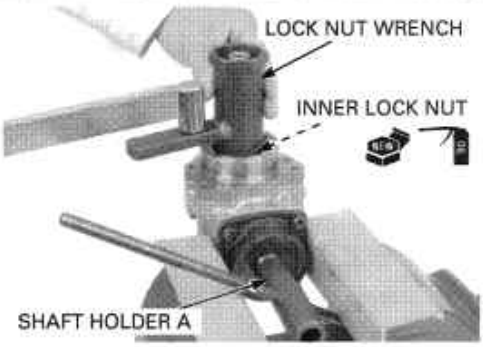
Apply engine oil to the threads of a new bearing inner race lock nut and tighten it to the specified torque using the special tools.

TOOLS:

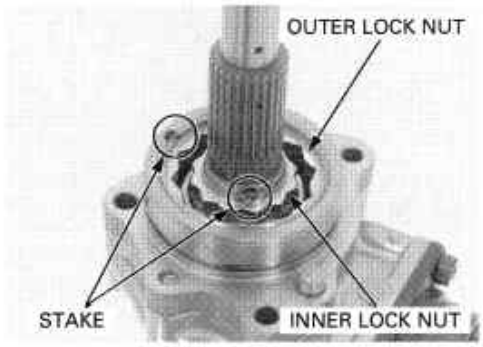
Lock nut wrench, 36 x 47.8 mm	**07916-MB00002**
Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Holder handle	**07PAB-0010400**

TORQUE:

Actual: 74 N·m (7.5 kgf·m, 54 lbf·ft)
Indicated: 67 N·m (6.8 kgf·m, 49 lbf·ft)

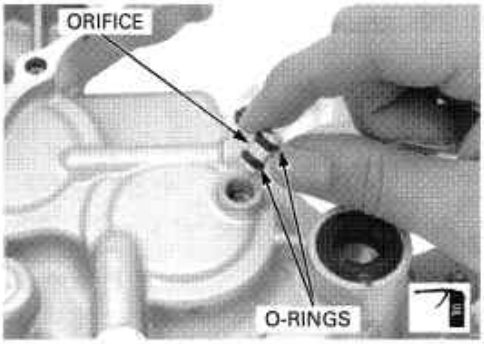


Stake the bearing inner and outer race lock nuts.



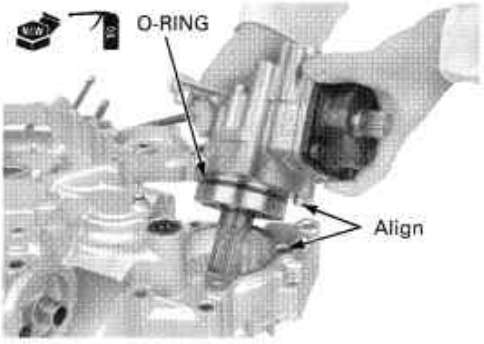
INSTALLATION

Coat new O-rings with oil and install them into the orifice grooves.
Install the orifice into the crankcase.



Coat a new O-ring with oil and install it into the groove in the gear case.

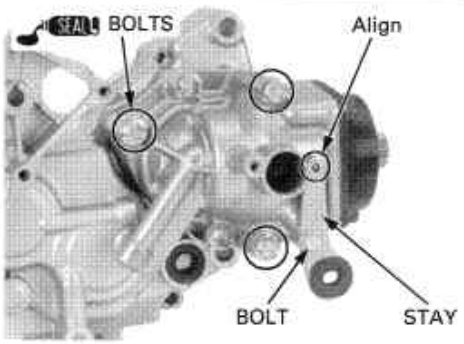
Install the output gear case assembly into the left crankcase by aligning the gear case boss with the crankcase hole.



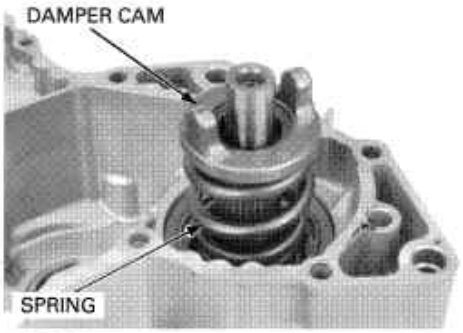
Apply sealant to the gear case mounting bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Install the stay, aligning its hole with the gear case boss and tighten the bolt securely.



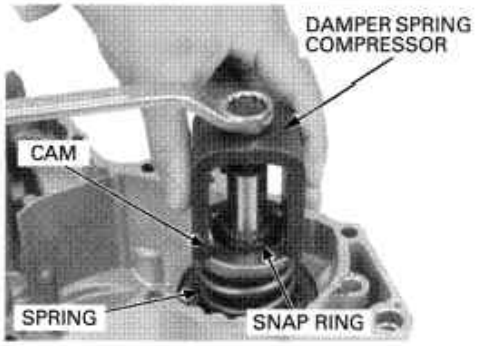
Install the damper spring over the drive gear shaft with the tightly wound coil facing the left crankcase.
Install the damper cam onto the spring.



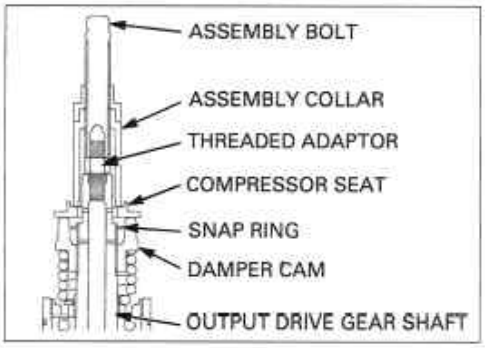
Install the snap ring on the damper cam.

(Except U.S.A.)
Set the damper spring compressor onto the damper cam and drive gear shaft.
Compress the damper spring by turning the compressor bolt clockwise until the snap ring groove is visible.

TOOL:
Damper spring compressor 07964-ME90000



(U.S.A. only)
Place the threaded adaptor in the end of the output drive gear shaft and tighten the adaptor.
Place the compressor seat over the threaded adaptor with the stepped side facing upward.
Install the assembly bolt through the assembly collar and attach it to the threaded adaptor.
Center the compressor seat with the damper cam then begin to tighten the 23 mm nut of the assembly bolt until the snap ring groove is visible so snap ring can be installed into the groove.



TOOLS:

Assembly bolt	**07965-1660200**
Assembly collar	**07965-1660030A or 07965-1660302**
Compressor seat	**07967-9690200**
Threaded adaptor	**07965-KA30000**

Install the snap ring into the groove in the shaft.

TOOLS:

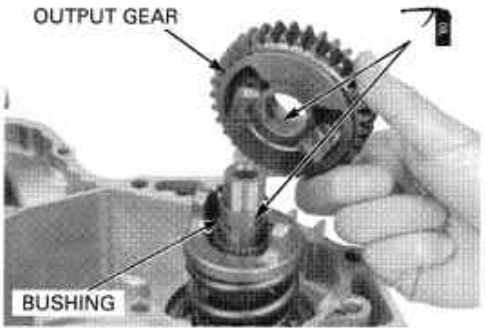
Snap ring pliers	**07914-5670101 not available in U.S.A. or 07914-5670100**

Loosen and remove the special tool.

NOTE:
- Install the snap ring with the chamfered edges facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the groove.

Apply oil to the sliding surface of the output gear and bushing.
Install the bushing into the output gear shaft.

Install the output gear onto the gear shaft by aligning the damper cam projections with the output gear holes.

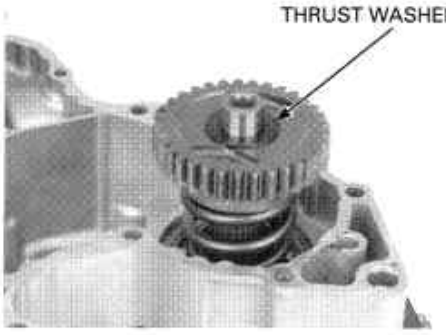


Install the thrust washer.

Install the followings:

- Crankshaft (page 12-11)
- Transmission (page 12-25)
- Oil pump (page 4-11)

Assemble the crankcase (page 12-47).



CRANKCASE BEARING REPLACEMENT

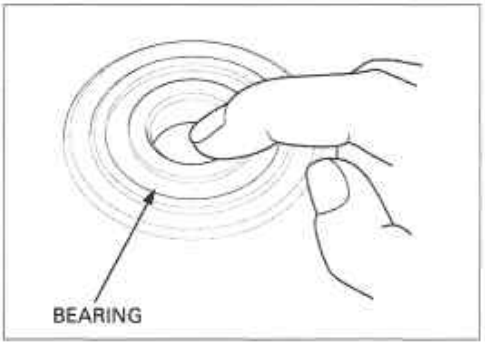
INSPECTION

Remove the following:

- Crankshaft (page 12-9)
- Transmission (page 12-18)
- Output gear (page 12-26)
- Oil pump (page 4-6)

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.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the crankcase.

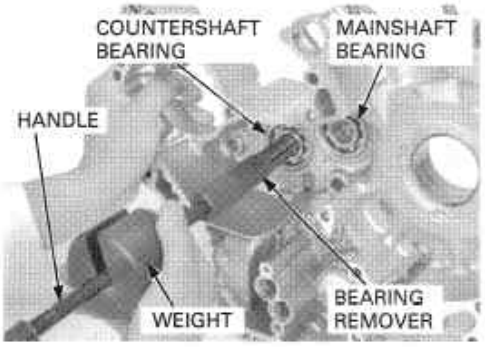


LEFT CRANKCASE BEARINGS

Remove the mainshaft and countershaft bearings using the special tools.

TOOLS:

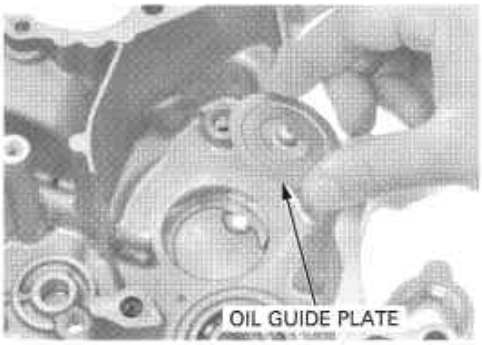
Bearing remover set, 20 mm	**07936-3710001**
– bearing remover, 20 mm	**07936-3710600**
– remover handle	**07936-3710100**
– remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**



Remove the oil guide plate from the crankcase.

Check the oil guide plate for clog or deformation.

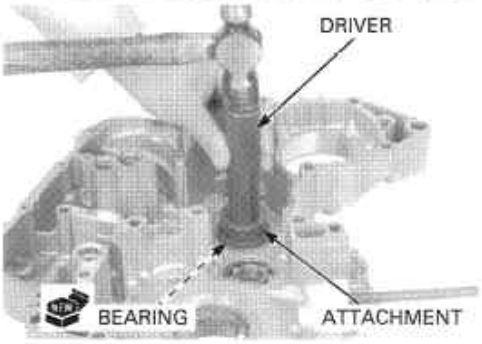
Install the oil guide plate into the crankcase.



Drive new bearings into the left crankcase with the marked side facing up until they are fully seated.

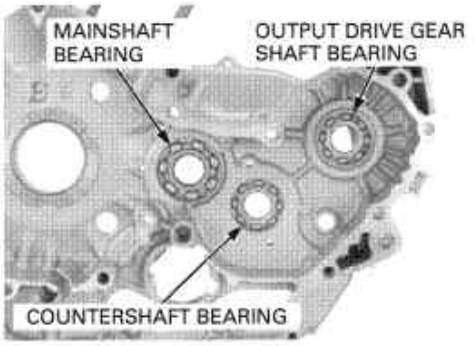
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**



RIGHT CRANKCASE BEARINGS

Drive the bearings out of the right crankcase.



Drive new bearings into the right crankcase with the marked side facing up until they are fully seated.

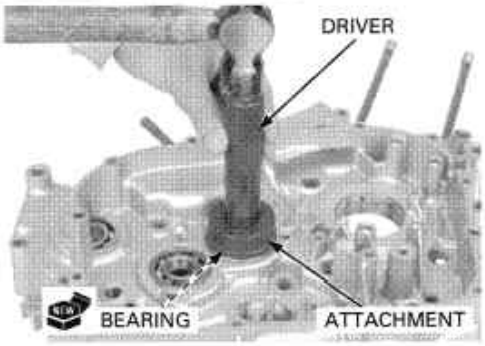
TOOLS:

Mainshaft bearing:

Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**
Pilot, 22 mm	**07746-0041000**

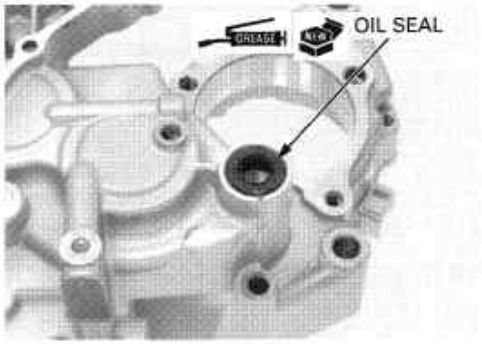
Countershaft/output drive gear shaft bearings:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 20 mm	**07746-0040500**



CRANKCASE ASSEMBLY

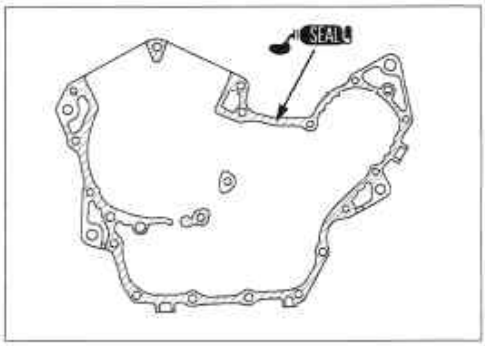
Apply grease to a new oil seal lip.
Install the oil seal.



Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them.

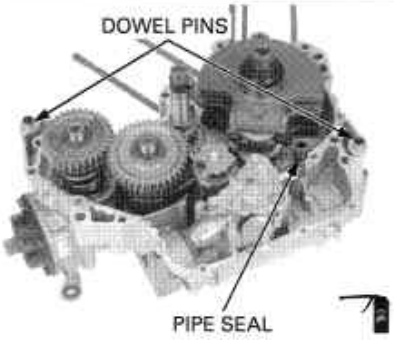
Make sure the all parts are installed in the left crankcase.

Apply liquid sealant to the crankcase mating surfaces.

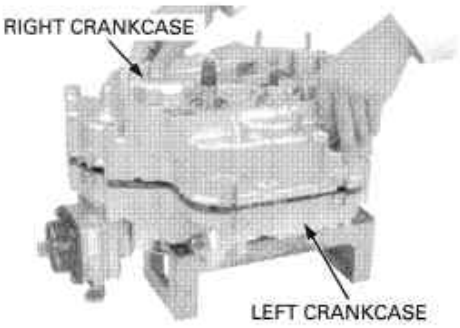


Install the two dowel pins into the left crankcase. Coat a new O-ring with oil and install it to the oil pipe.

NOTE:
Install an pipe seal with its tapered side facing out.



Install the right crankcase over the left crankcase.

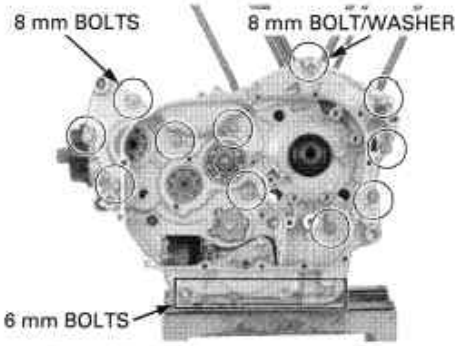


Install the right crankcase bolts with the washer.

Tighten the 8 mm bolts in a crisscross pattern in several steps.

TORQUE:
8 mm bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)

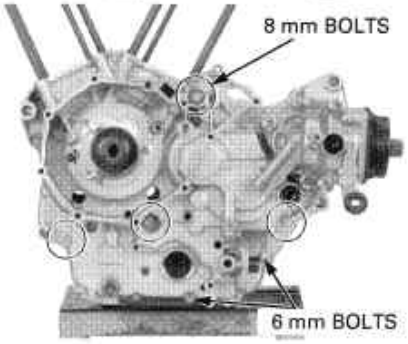
Tighten the 6 mm bolts.



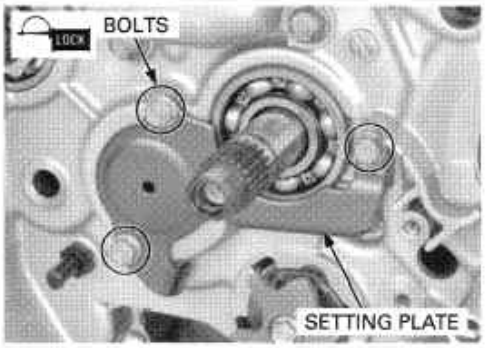
Install the left crankcase bolts and tighten the 8 mm bolts in a crisscross pattern in several steps.

TORQUE:
8 mm bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the 6 mm bolts.



Clean and apply locking agent to the bolt threads (page 1-21).
Install the bearing setting plate and tighten the bolts.



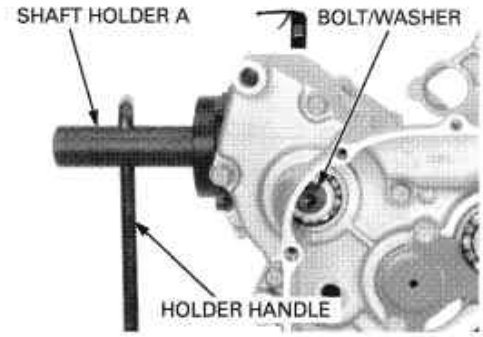
Apply engine oil to the bolt threads.
Install and tighten the bolt with the washer by holding the output driven gear shaft using the special tools.

TOOL:

Shaft holder A	**07PAB-0010100 or 07923-6890101 (U.S.A. only)**
Holder handle	**07PAB-0010400**

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)

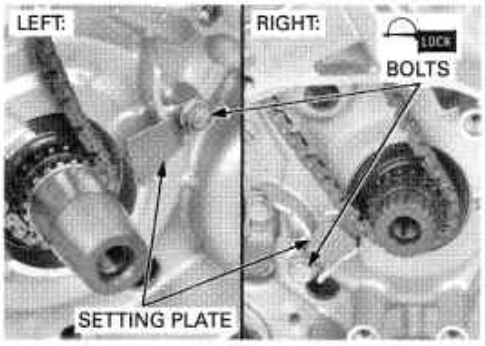
Recheck the all crankcase bolt torque values.



Install the cam chains.

Apply locking agent to the bolt threads (page 1-21).
Install the cam chain tensioner setting plates and tighten the bolts.

Install the remaining parts (page 12-3).
Install the engine into the frame (page 7-7).

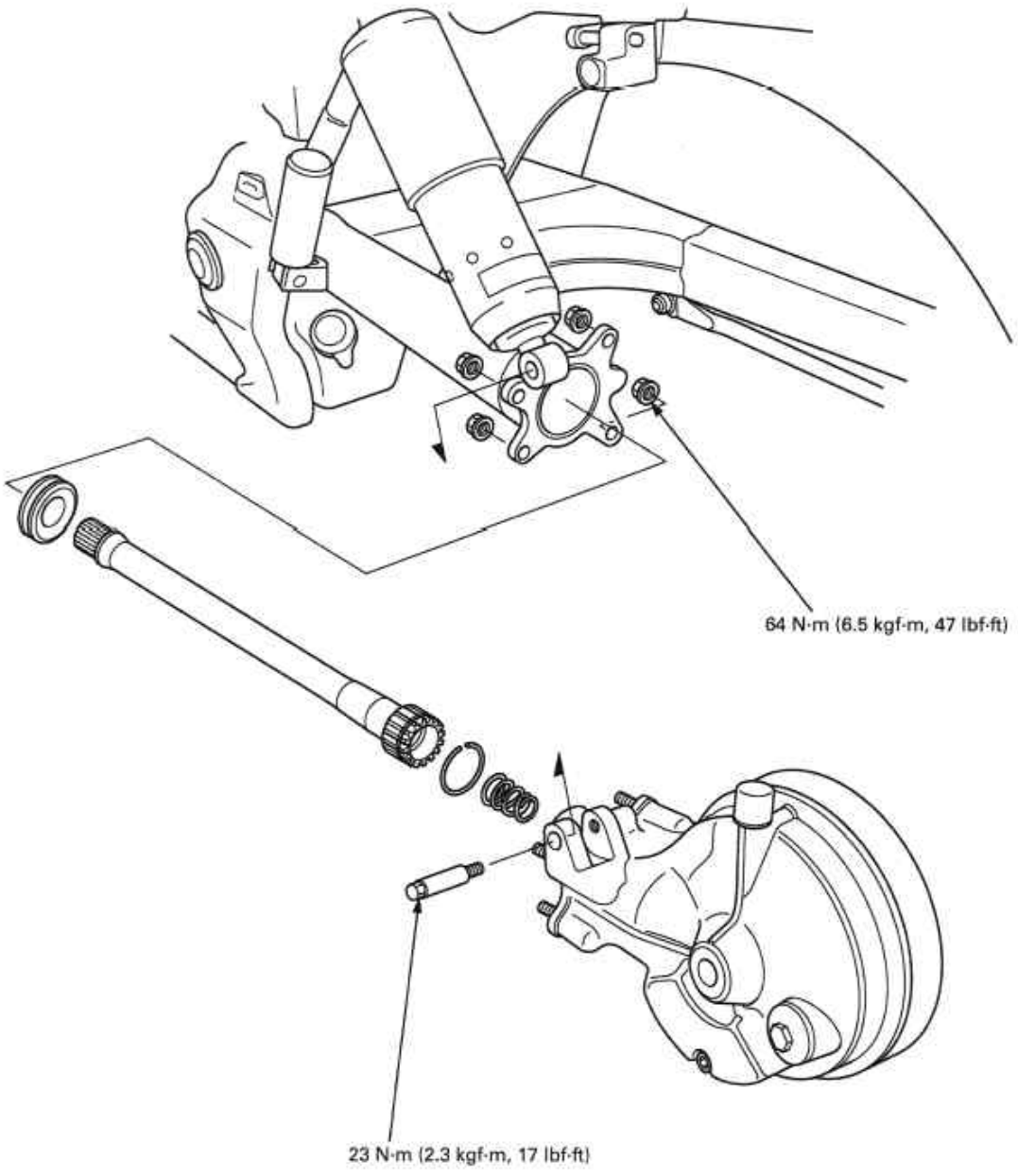


MEMO

13. FINAL DRIVE

13

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- The final drive gear assembly and final drive shaft must be removed together.
- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gears or gear case. the extension lines from the gear engagement surfaces should intersect at one point.
- Protect the gear case with a shop towel or soft jaws while holding it in a vise. Do not clamp the gear case too tightly or it could be damaged.
- Replace the ring and pinion gears as a set.

SPECIFICATIONS

Unit: mm (in)

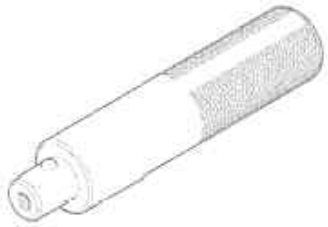
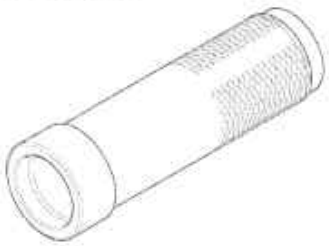
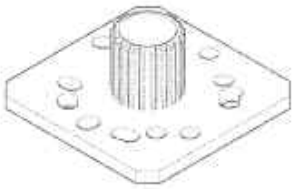
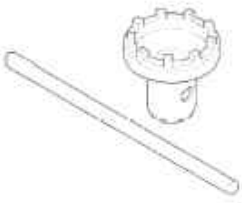
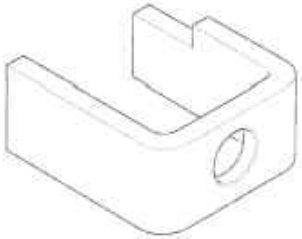
ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	After draining	160 cm^3 (5.4 US oz, 5.6 Imp oz)	–
	After disassembly	170 cm^3 (5.7 US oz, 6.0 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurements		–	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–
Final drive gear assembly preload		0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·ft)	–

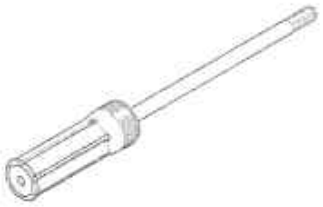
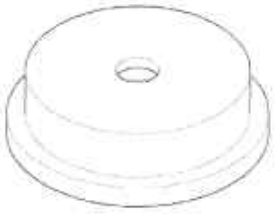
TORQUE VALUES

Pinion retainer	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Pinion retainer lock tab bolt	9.8 N·m (1.0 kgf·m,7 lbf·ft)	
Pinion joint nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply locking agent to the threads
Dust guard plate bolt	9.8 N·m (1.0 kgf·m,7 lbf·ft)	
Gear case cover 10 mm bolt	47 N·m (4.8 kgf·m, 35 lbf·ft)	Apply locking agent to the threads
Gear case cover 8 mm bolt	25 N·m (2.6 kgf·m, 19 lbf·ft)	
Final gear case assembly mounting nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Rear shock absorber lower mounting bolt (left side)	23 N·m (2.3 kgf·m, 17 lbf·ft)	

FINAL DRIVE

TOOLS

Driver 07749-0010000 	Attachment, 32 x 35 mm 07746-0010100 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 72 x 75 mm 07746-0010600 	Pilot, 19 mm 07746-0041400 	Driver, 40 mm I.D. 07746-0030100 
Attachment, 25 mm I.D. 07746-0030200 	Pinion holder plate 07924-ME40010 	Collar set "C" 07924-ME40020 
Oil seal driver 07965-MC70100 	Retainer wrench 07910-ME80000 	Pinion puller base 07HMC-MM80110  or 07HMC-MM8011A (U.S.A. only)

Puller shaft 07931-ME40000  or 07931-ME4010B and 07931-HB3020A (U.S.A. only)	Bearing remover, 35 mm 07936-3710400 	Remover handle 07936-3710100 
Remover weight 07741-0010201  or 07936-371020A or 07936-3710200 (U.S.A. only)	Bearing remover, 20 mm 07936-3710600  or equivalent commercially available in U.S.A.	Bearing driver attachment 07GAD-SD40101 
Oil seal driver attachment 07LAD-SM40100  or 07LAD-SM4A100 (U.S.A. only)	Oil seal driver, 55.7 x 60.3 mm 07965-KE80200 	Attachment, 44 x 49.5 mm 07945-3330300 

FINAL DRIVE

TROUBLESHOOTING

Excessive noise
- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gears
- Oil level too low
- Worn or damaged pinion gear and/or pinion joint splines

Oil leak
- Clogged breather
- Oil level too high
- Damaged seals
- Loose case cover bolts

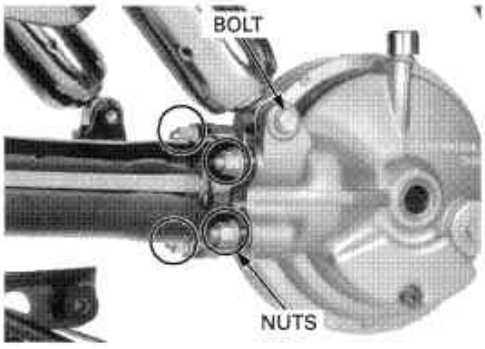
Excessive rear wheel backlash
- Worn drive shaft splines
- Excessive backlash between pinion and ring gears
- Worn driven flange and ring gear splines
- Excessive play in final drive case bearings
- Worn drive shaft, universal joint and/or pinion joint splines
- Excessive play or worn universal joint bearing

FINAL DRIVE REMOVAL

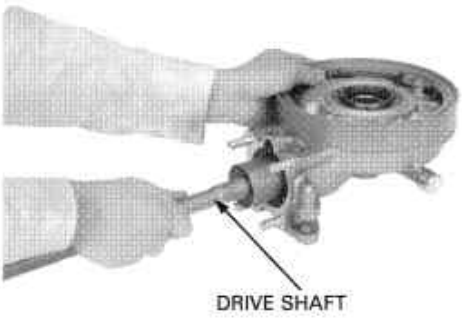
Drain the final drive oil (page 3-18).
Remove the rear wheel (page 15-6).

Remove the left shock absorber lower mounting bolt.

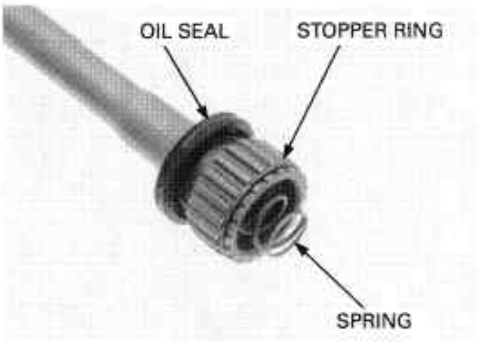
Remove the four mounting nuts and final drive gear case assembly.



Remove the drive shaft from the gear case by gently turning the drive shaft and pulling it.



Remove the spring, oil seal and stopper ring from the drive shaft.

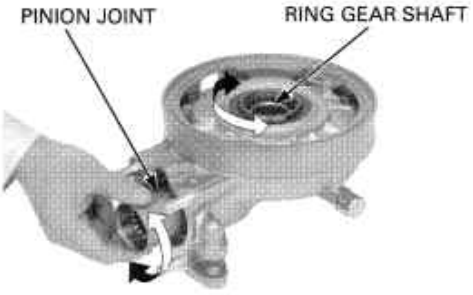


INSPECTION

Check the splines of the drive shaft for damage or wear.
If the splines of the drive shaft are damaged, check the universal joint splines also (page 15-23).

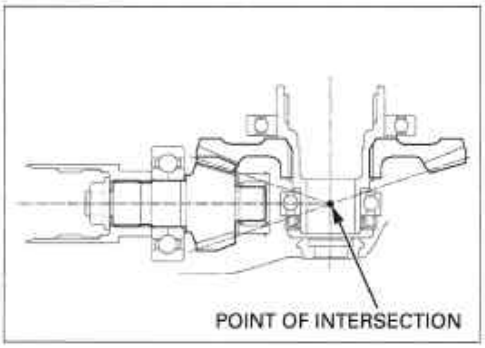
Turn the pinion joint and check that the pinion and ring gears turn smoothly and quietly without binding.

If the gears do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. They must be checked after disassembly; replace faulty parts/assemblies as required.



FINAL DRIVE DISASSEMBLY/ INSPECTION

NOTE:
Perform the backlash inspection and contact pattern check whenever you replace the pinion gear, ring gear, bearings and gear case. The extension lines from the gear engagement surfaces should intersect at one point.



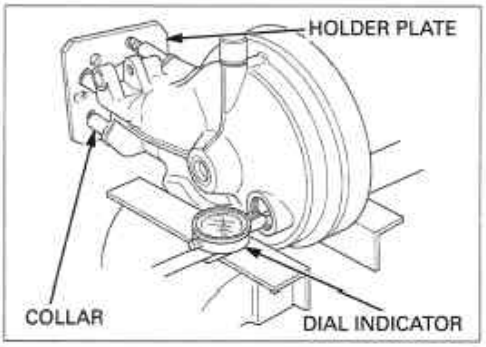
BACKLASH INSPECTION

Remove the oil filler cap.
Hold the final drive gear case assembly in a vise with soft jaws.

Install the special tools onto the gear case and into the pinion joint to hold the pinion gear.

TOOLS:

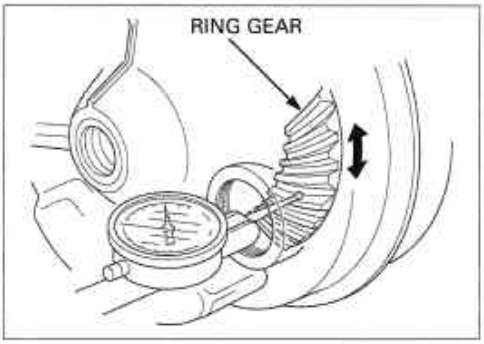
Pinion holder plate	**07924-ME40010**
Collar set "C"	**07924-ME40020**



Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Turn the ring gear back and forth to read the backlash.

STANDARD: 0.05 – 0.15 mm (0.002 – 0.006 in)
SERVICE LIMIT: 0.30 mm (0.012 in)



Remove the dial indicator. Turn the ring gear 120° and measure the backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

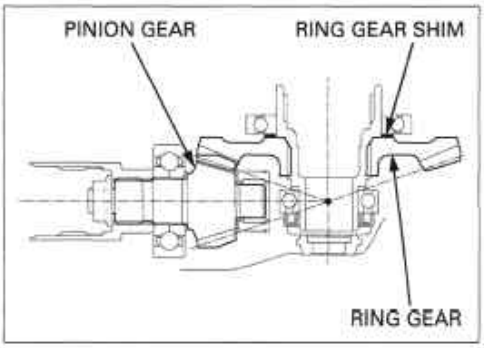
SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed.
Inspect the bearings and case.

If the backlash is excessive, replace the ring gear shim with a thicker one.
If the backlash is too small, replace the ring gear shim with a thinner one.

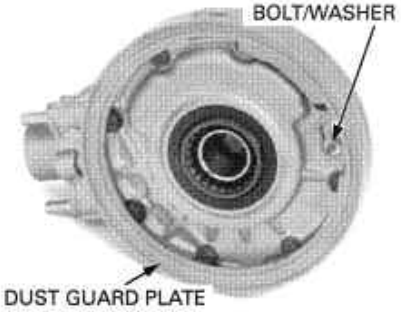
RING GEAR SHIMS:
A: 1.82 mm (0.072 in)
B: 1.88 mm (0.074 in)
C: 1.94 mm (0.076 in)
D: 2.00 mm (0.079 in) – Standard
E: 2.06 mm (0.081 in)
F: 2.12 mm (0.083 in)
G: 2.18 mm (0.086 in)
H: 2.24 mm (0.088 in)
I: 2.30 mm (0.091 in)

For ring gear shim replacement. refer to page 13-11.



FINAL GEAR CASE SEPARATION

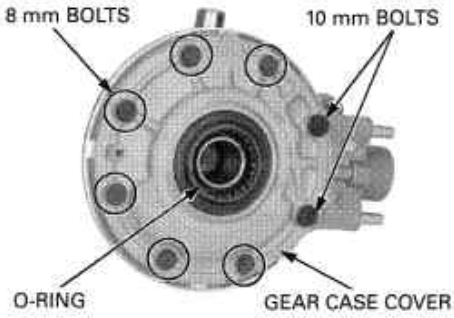
Remove the bolt, washer and the dust guard plate by turning it clockwise.



Remove the O-ring.

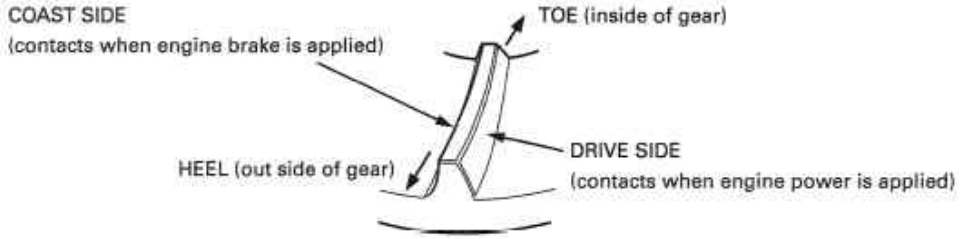
Loosen the cover bolts in a crisscross pattern in several steps and remove them.
Pry the gear case cover and remove it from the case.

Remove the wave washer.



GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:

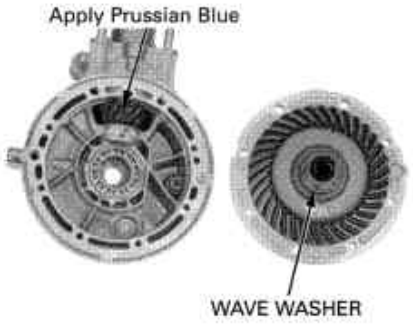


Keep dust and dirt out of the case and cover.

Clean the sealing material off the mating surfaces of the gear case and cover, being careful not to damage them.

Apply a thin coat of Prussian Blue to the pinion gear teeth.

Install the wave washer.

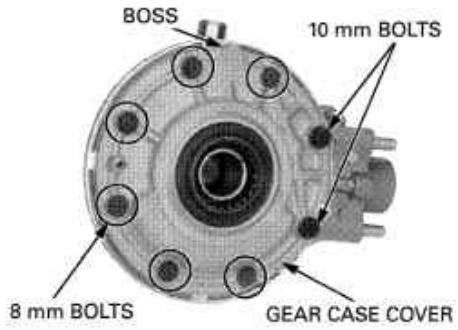


Install the case cover and tighten the bolts in a crisscross pattern in several steps until the cover evenly touches the gear case.
Tighten the two 10 mm bolts to the specified torque in several steps alternately.

TORQUE: 47 N·m (4.8 kgf·m, 35 lbf·ft)

Tighten the six 8 mm bolts to the specified torque in a crisscross pattern in several times.

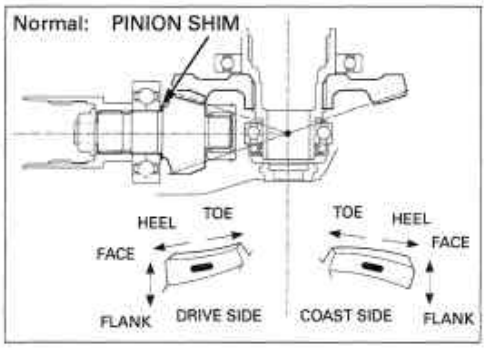
TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)



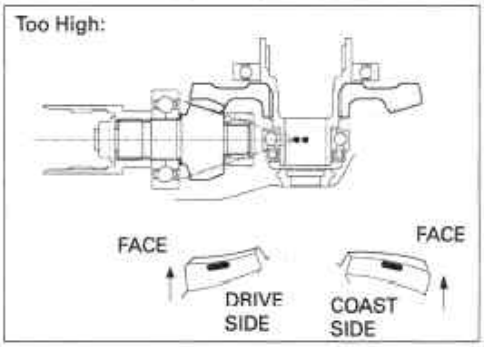
Remove the oil filler cap.
Rotate the ring gear several times in normal direction of rotation.
Check the gear tooth contact pattern through the oil filler hole.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.

If the patterns are not correct, remove and replace the pinion gear shim with a suitable one (page 13-12).

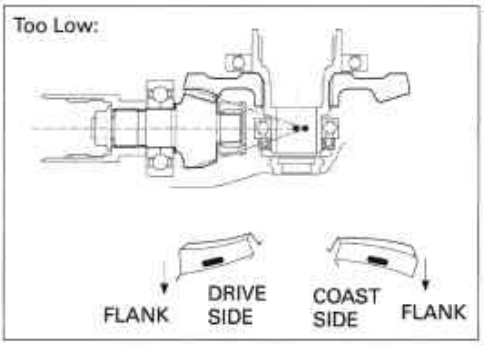


Replace the pinion gear shim with a thicker one if the contact pattern is too high, toward the face.



Replace the pinion gear shim with a thinner one if the contact pattern is too low, toward the flank.

The patterns will shift about 1.5 – 2.0 mm (0.06 – 0.08 in) when the thickness of the shim is changed by 0.1 mm (0.004 in).



PINION GEAR SHIMS:
A: 1.82 mm (0.072 in)
B: 1.88 mm (0.074 in)
C: 1.94 mm (0.076 in)
D: 2.00 mm (0.079 in) – Standard
E: 2.06 mm (0.081 in)
F: 2.12 mm (0.083 in)
G: 2.18 mm (0.086 in)

For pinion gear shim replacement, separate the final gear case (page 13-9) and refer to page 13-14.

RING GEAR REMOVAL/SHIM REPLACEMENT

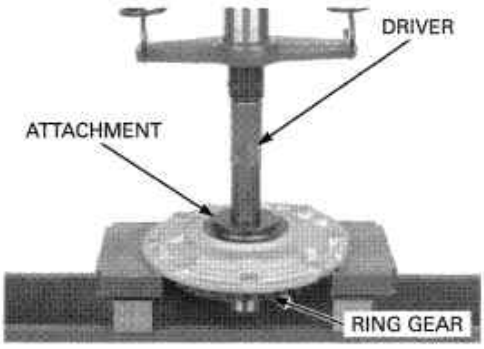
Remove the final gear case cover (page 13-9).

If the ring gear stays in the cover, remove it as follows:

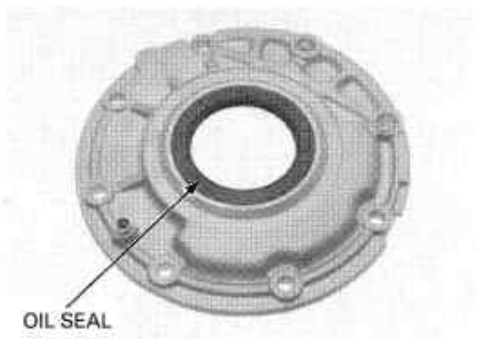
Press the ring gear out of the gear case cover using the special tools and hydraulic press.

TOOLS:

Driver	**07749-0010000**
Oil seal driver attachment	**07LAD-SM40100 or 07LAD-SM4A100 (U.S.A. only)**



Remove the oil seal.

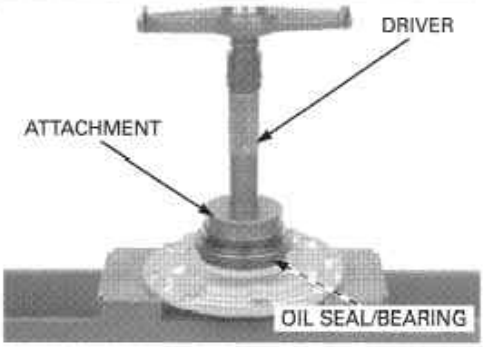


If the bearing remained in the cover, remove it as follows:

Press the oil seal and bearing out of the cover using the special tools and hydraulic press.

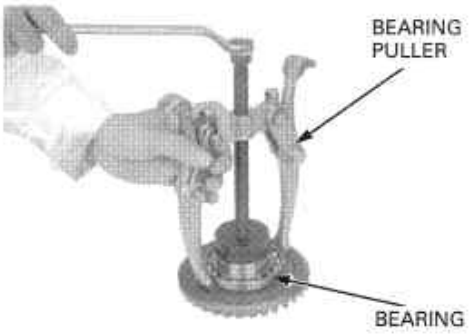
TOOLS:

Driver	**07749-0010000**
Oil seal driver	**07965-MC70100**
Attachment, 72 x 75 mm	**07746-0010600**



If the bearing remained on the ring gear, remove it as follows:

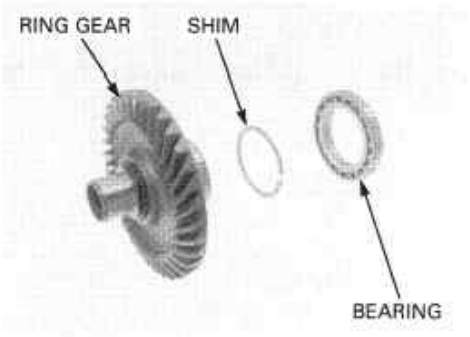
Remove the ring gear bearing using a commercially available bearing puller.



Select the replacement shim (page 13-9).

NOTE:

When the gear set, pinion bearing, ring gear bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thickness shim for initial reference.



PINION GEAR REMOVAL

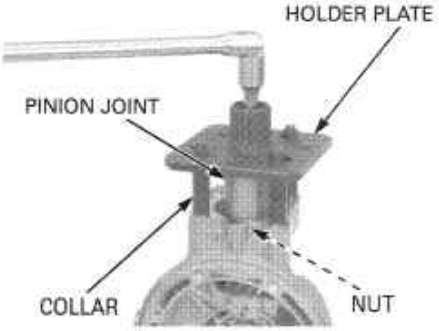
Hold the gear case in a vise with soft jaws.

Hold the pinion joint and remove the pinion joint nut using the special tools.

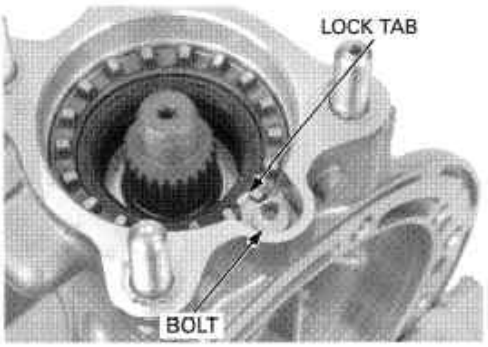
TOOLS:

Pinion holder plate	**07924-ME40010**
Collar set "C"	**07924-ME40020**

Remove the pinion joint.



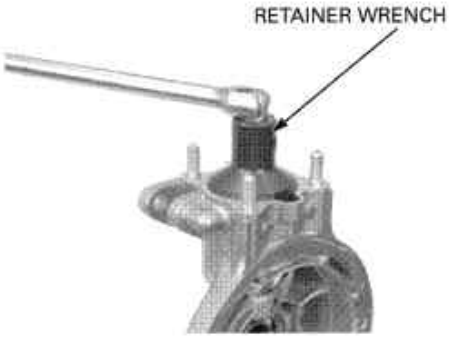
Remove the bolt and retainer lock tab.



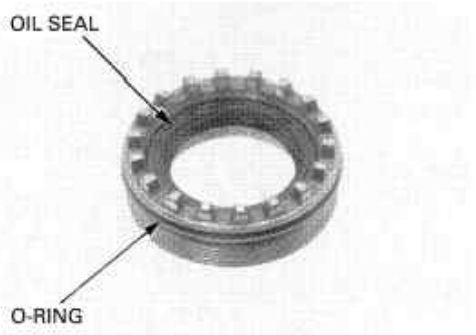
Remove the pinion retainer using the special tool.

TOOL:

Retainer wrench	**07910-ME80000**



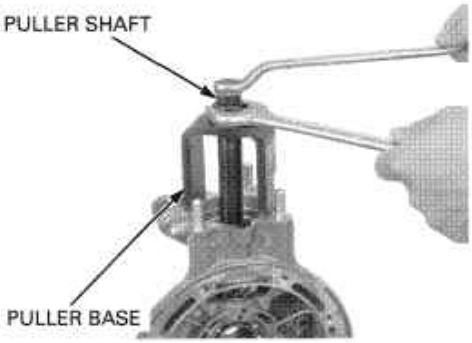
Remove the O-ring and oil seal from the pinion retainer.



Install the special tools onto the pinion gear shaft and gear case.

TOOLS:

Non-U.S.A.	
Pinion puller base	**07HMC-MM80110**
Puller shaft	**07931-ME40000**
U.S.A. only	
Puller base "A"	**07HMC-MM8011A**
Assembly shaft, 22 x 1.5 x 240 mm	**07931-ME4010B and**
Special nut	**07931-HB3020A**

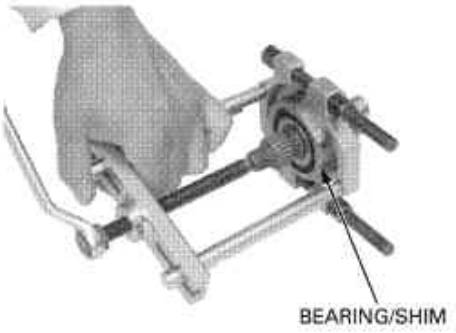


Pull the pinion gear assembly out of the gear case. Check the pinion gear needle bearing in the gear case for wear or damage.

PINION GEAR BEARING/SHIM REPLACEMENT

Pull the pinion gear bearing from the shaft with a commercially available bearing puller.

Remove the pinion shim.

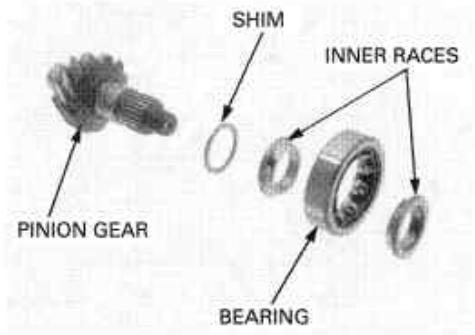


Select the replacement shim (page 13-11)

Install the shim and a new bearing onto the pinion gear.

NOTE:

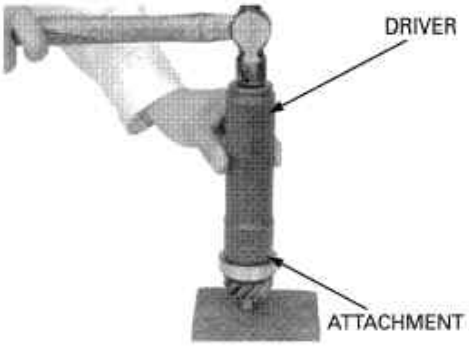
When the gear set, pinion bearing, ring gear bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thickness shim for initial reference.



Drive a new bearing with the marked side facing up.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 25 mm I.D.	**07746-0030200**



CASE BEARING REPLACEMENT

RING GEAR BEARING

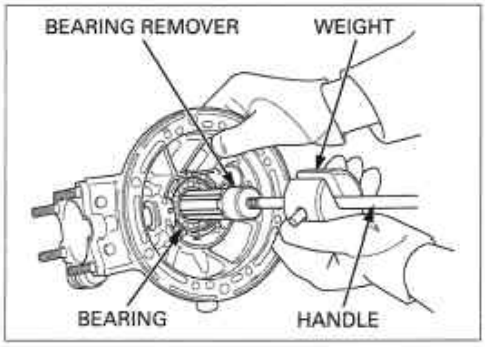
Be sure to wear heavy gloves when handling the heated gear case.

Heat the gear case to 80°C (176°F) evenly using a heat gun.

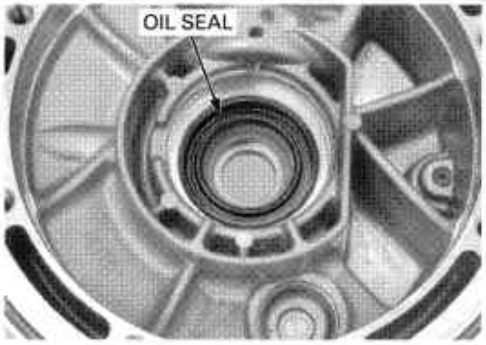
Remove the ring gear bearing from the gear case using the special tools.

TOOLS:

Bearing remover, 35 mm	**07936-3710400**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**

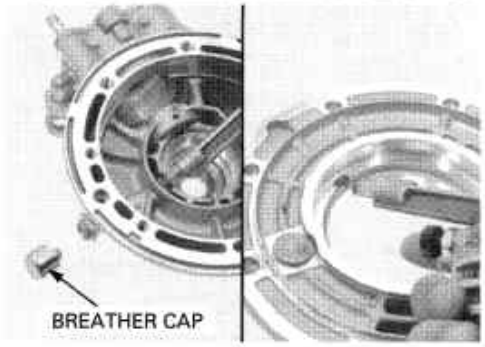


Remove the oil seal.



Remove the breather cap and blow compressed air through the hole.

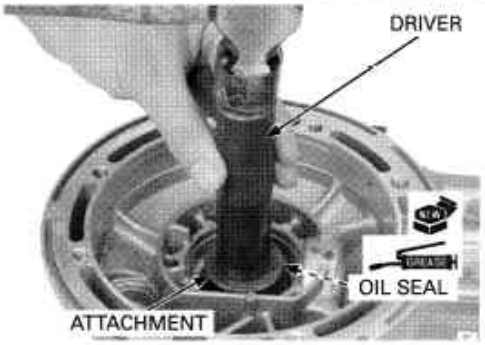
Install the breather cap.



Apply grease to a new oil seal lip.
Drive the oil seal into the gear case with the marked side facing down until it is fully seated.

TOOLS:

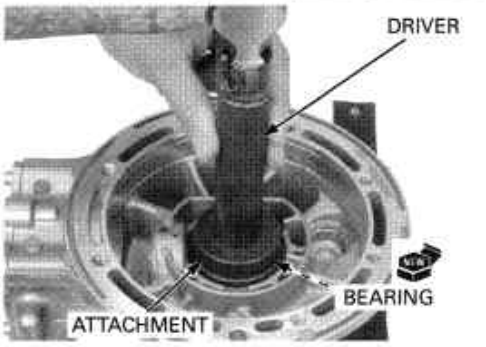
Driver	**07749-0010000**
Attachment, 44 x 49.5 mm	**07945-3330300**



Drive a new ring gear bearing into the gear case with the marked side facing inside until it is fully seated using the special tools.

TOOLS:

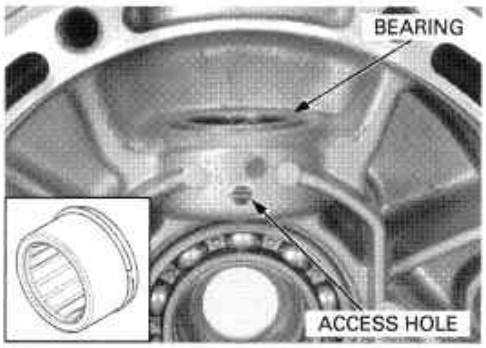
Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**



FINAL DRIVE

PINION NEEDLE BEARING

Rotate the stopper ring until the end of the stopper ring appears in the access hole.
Strike gently near the end of the ring with a punch to bend the end upward.
Grasp the end of the ring with needle-nose pliers and pull the stopper ring out through the access hole.



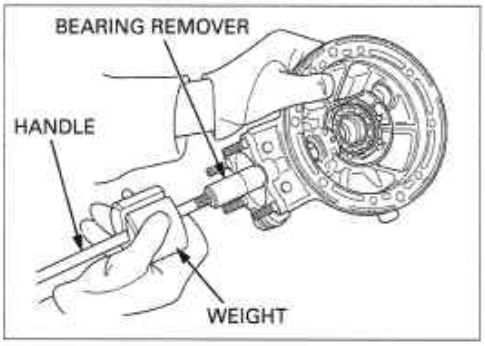
Be sure to wear heavy gloves when handling the heated gear case.

Heat the gear case to 80°C (176°F) and remove the needle bearing using the special tools.

TOOLS:

Bearing remover, 20 mm	**07936-3710600**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**

or equivalent commercially available in U.S.A.



Install a new stopper ring into the groove of a new bearing securely.

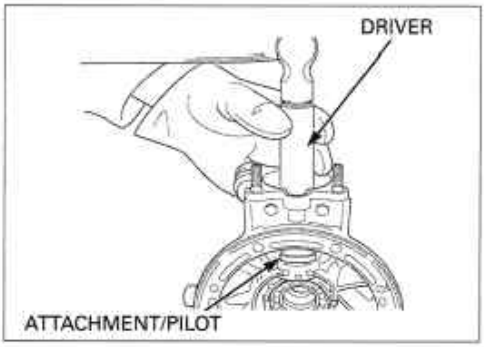
Place the needle bearing in a freezer.

Heat the gear case to 80°C (176°F).

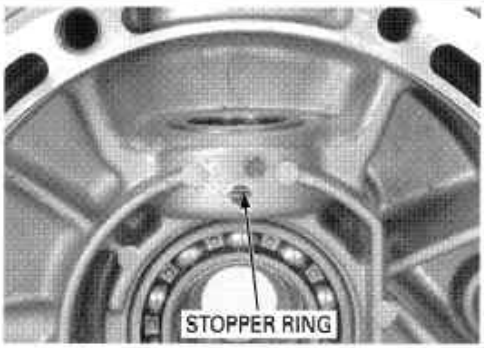
Remove the needle bearing from the freezer and drive it into the gear case with the marked side facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 19 mm	**07746-0041400**

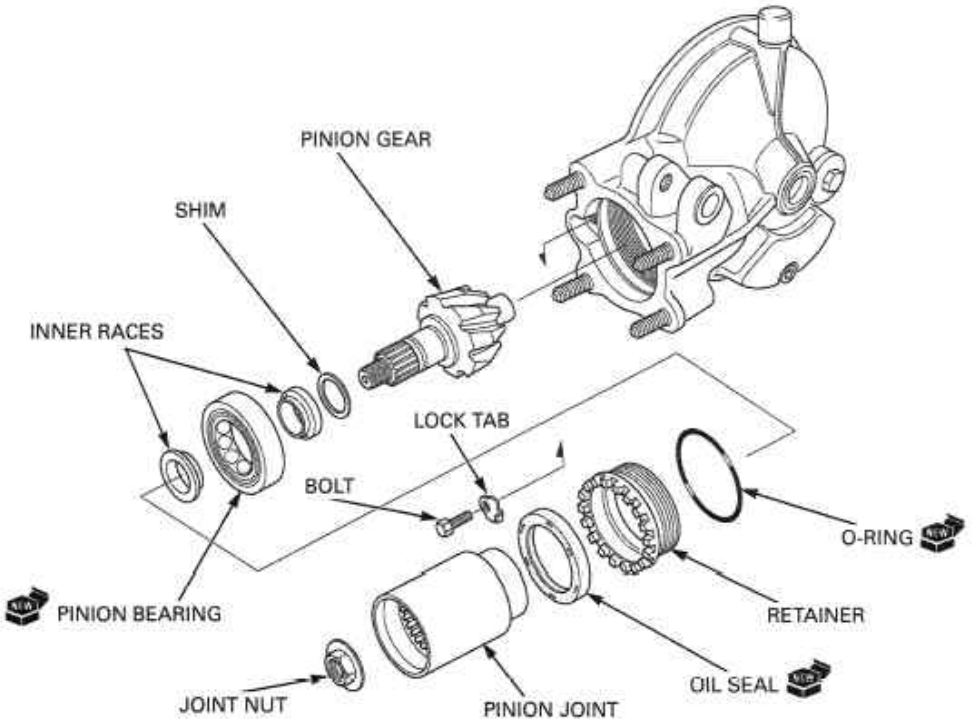


Make sure the stopper ring is securely set in the groove of the gear case.



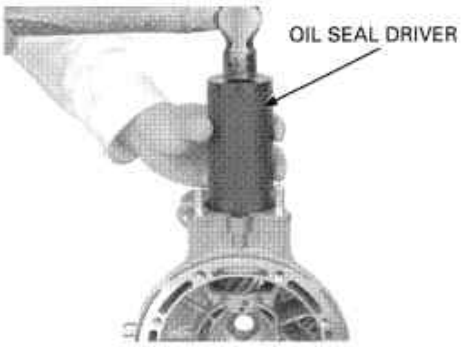
FINAL DRIVE ASSEMBLY

PINION GEAR INSTALLATION



Drive the pinion gear assembly into the gear case using the special tool.

TOOLS:
Oil seal driver, 55.7 x 60.3 mm 07965-KE80200

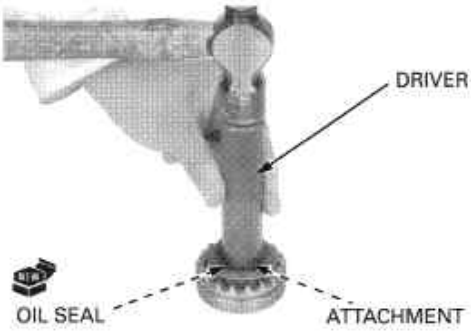


Drive a new oil seal into the pinion retainer with the marked side facing up until it is fully seated.

TOOLS:

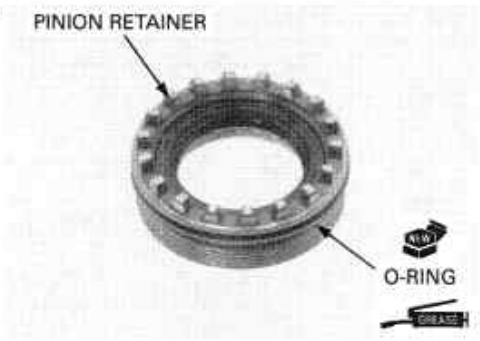
Driver	**07749-0010000**
Attachment, 44 x 49.5 mm	**07945-3330300**

Pack grease into the seal lip cavity.



FINAL DRIVE

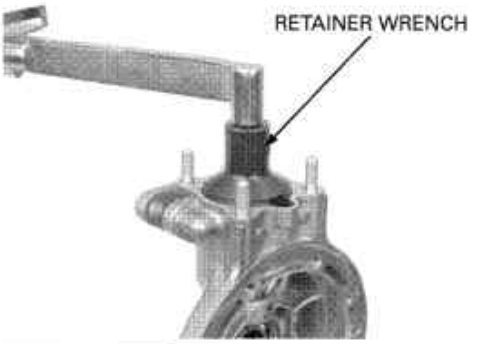
Coat a new O-ring with grease and install it into the retainer groove.



Hold the gear case in a vise with soft jaws.
Install the retainer into the gear case and tighten it to the specified torque using a special tool.

TOOL:
Retainer wrench 07910-ME80000

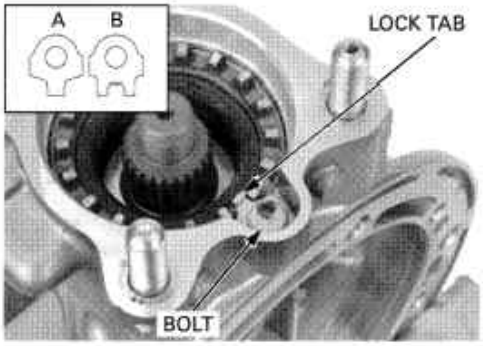
TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



The lock tab is available in the two types (A and B) as shown.

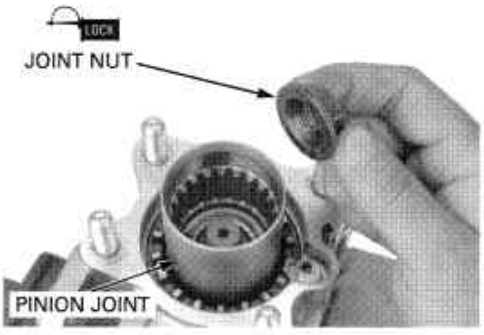
Install the lock tab with its tab facing up, depending on the position of the pinion retainer grooves in relation to the lock tab and tighten the bolt.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



Clean the threads of the pinion gear shaft and pinion joint nut thoroughly.

Apply locking agent to the joint nut threads and install the pinion joint and joint nut onto the pinion gear shaft.

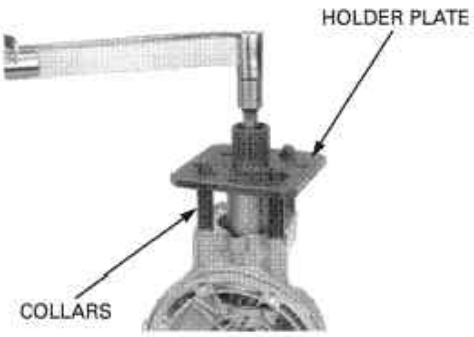


Hold the pinion joint with the special tools and tighten the pinion joint nut to the specified torque.

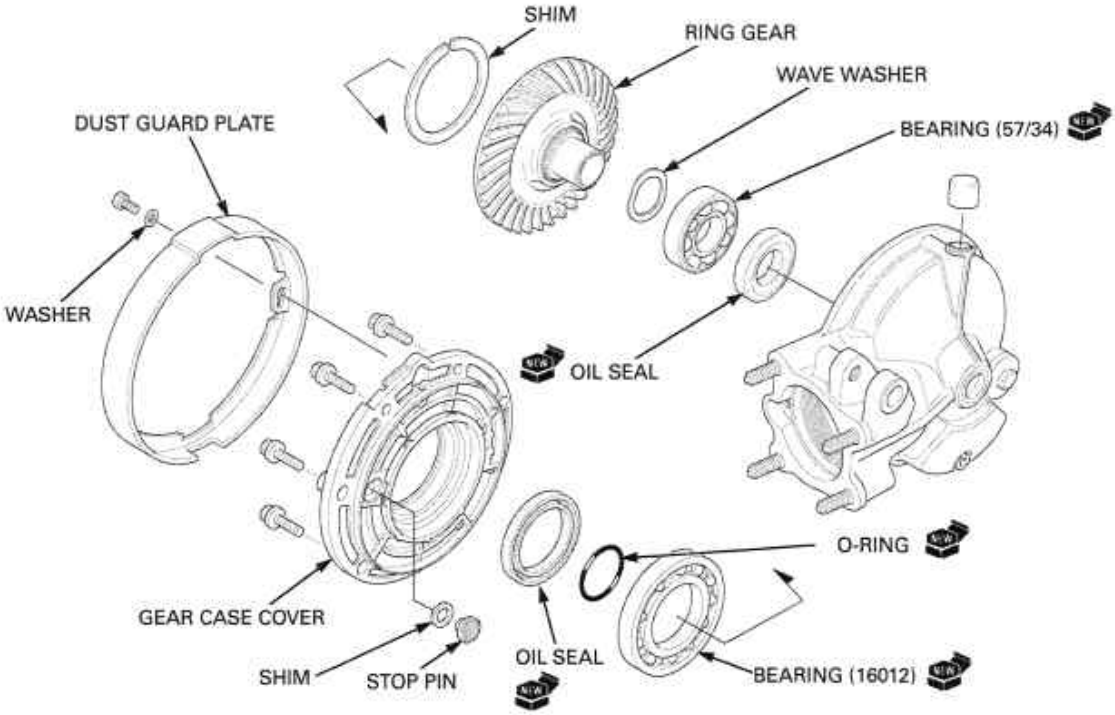
TOOLS:

Pinion holder plate	**07924-ME40010**
Collar set "C"	**07924-ME40020**

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



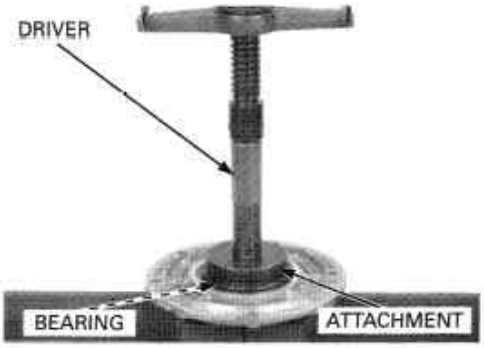
RING GEAR INSTALLATION



Press the ring gear bearing into the cover with the marked side facing inside until it is fully seated.

TOOLS:

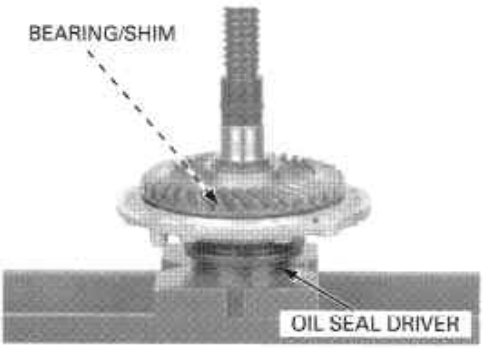
Driver	**07749-0010000**
Bearing driver attachment	**07GAD-SD40101**



FINAL DRIVE

Install the shim onto the ring gear.
Support the bearing inner race with the special tool and press the ring gear into the bearing using a hydraulic press.

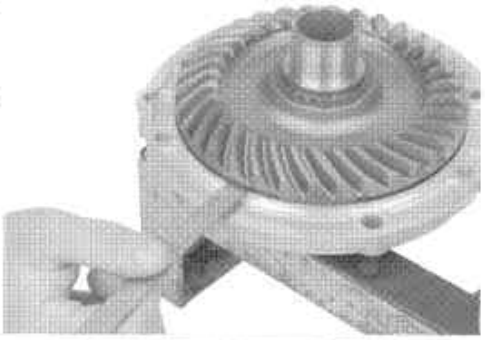
TOOLS:
Oil seal driver **07965-MC70100**



Measure the clearance between the ring gear and stop pin with a feeler gauge.

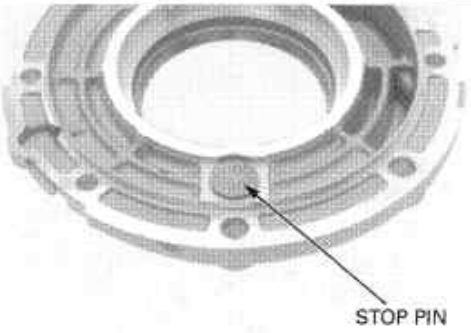
CLEARANCE: 0.30 – 0.60 mm (0.012 – 0.024 in)

Remove the ring gear if the clearance does not fall within the specification.



Be sure to wear heavy gloves when handling the heated gear case.

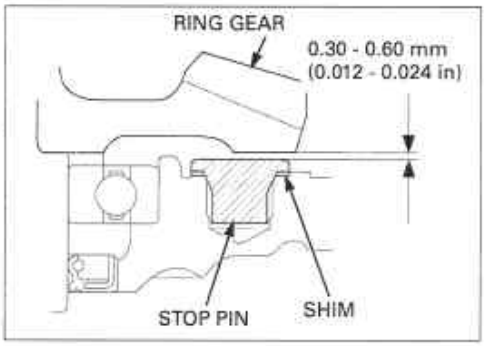
Heat the gear case cover to approximately 80°C (176°F). Heat the case cover evenly and slowly to prevent warpage.
When the gear case cover is heated to the proper temperature, remove the stop pin by tapping the cover.



Select a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the gear case cover.

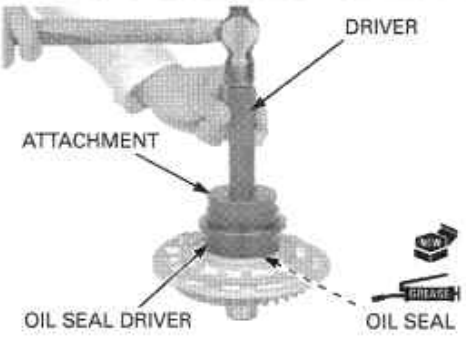


Apply grease to a new oil seal lips.

Install a new oil seal until it is flush with the cover surface using the special tools.

TOOLS:

Driver	**07749-0010000**
Oil seal driver	**07965-MC70100**
Attachment, 72 x 75 mm	**07746-0010600**



FINAL GEAR CASE ASSEMBLY

NOTE:

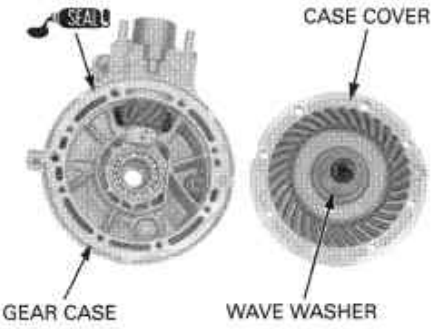
When the gear set, bearing and/or gear case has been replaced, check the tooth contact pattern (page 13-10) and gear case backlash (page 13-8).

Keep dust and dirt out of the case and cover.

Clean the mating surface of the gear case and cover, being careful not to damage them.

Apply liquid sealant to the mating surface of the gear case.

Install the wave washer.
Install the case cover onto the gear case.



Apply locking agent to the threads of the case cover 10 mm bolts.

Install the bolts, and tighten them in a crisscross pattern in several steps until the cover evenly touches the gear case.

Tighten the two 10 mm bolts to the specified torque in several steps alternately.

TORQUE: 47 N·m (4.8 kgf·m, 35 lbf·ft)

Tighten the six 8 mm bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

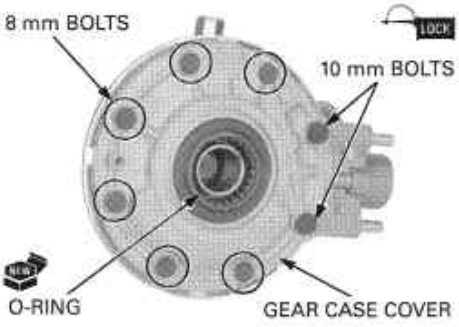
Install a new O-ring in the ring gear groove.

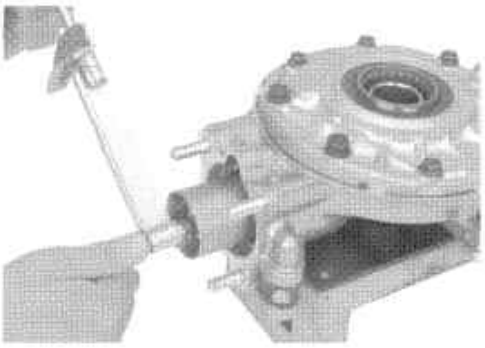
Check that the gear assembly turns smoothly without binding.

Measure the final gear assembly preload.

STANDARD:
0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·ft)

If the preload reading does not fall within the specification, check the bearings for proper installation.



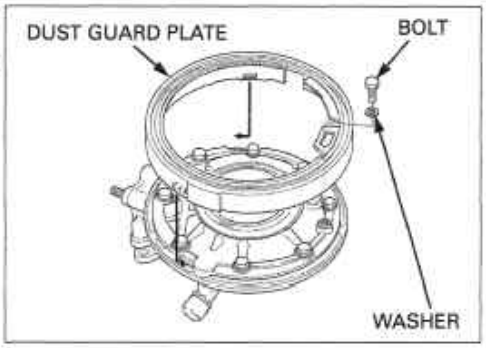


Install the dust guard plate, aligning its tabs with the cover grooves.

Turn the dust guard plate counterclockwise and install the bolt and washer.

Tighten the bolt to the specified torque.

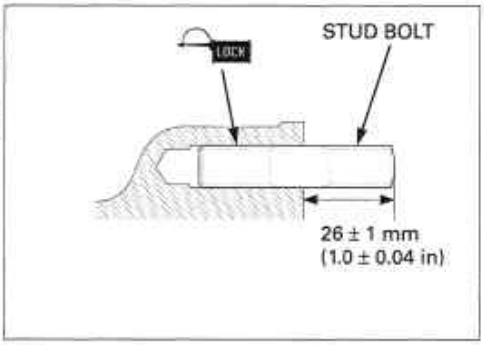
TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



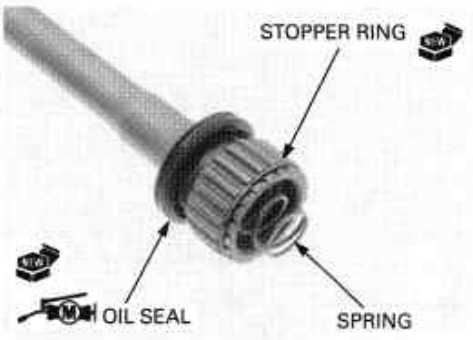
FINAL DRIVE INSTALLATION

Check that the gear case stud bolts are tight.
If any are loose, remove them, clean their threads with contact cleaner, then install them using a locking agent.

After installing, be sure to measure the distance from the top of each stud to the gear case surface as shown.



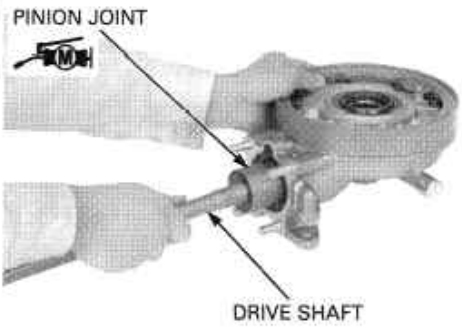
Install a new stopper ring into the drive shaft groove.
Install the spring into the drive shaft.
Apply 0.5 g (0.02 oz) of molybdenum disulfide grease to a new oil seal lips and install it onto the drive shaft.



Apply 2 g (0.08 oz) or more of molybdenum disulfide grease to the pinion joint splines.

Install the drive shaft into the pinion joint until the stopper ring seats in the pinion joint spline groove.

Make sure the stopper ring is seated properly by pulling on the drive shaft lightly.
Be careful not to damage the drive shaft oil seal.



Apply 1 g (0.04 oz) of molybdenum disulfide grease to the universal joint side splines of the drive shaft.

Insert the final drive assembly into the swingarm and align the drive shaft splines with the universal joint splines.

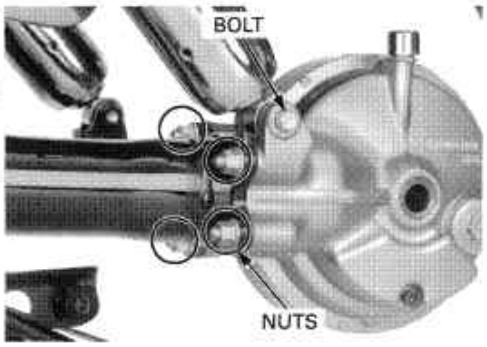
Install the gear case mounting nuts.
Tighten the gear case mounting nuts in a crisscross pattern in several steps.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Tighten the shock absorber lower mounting bolt.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

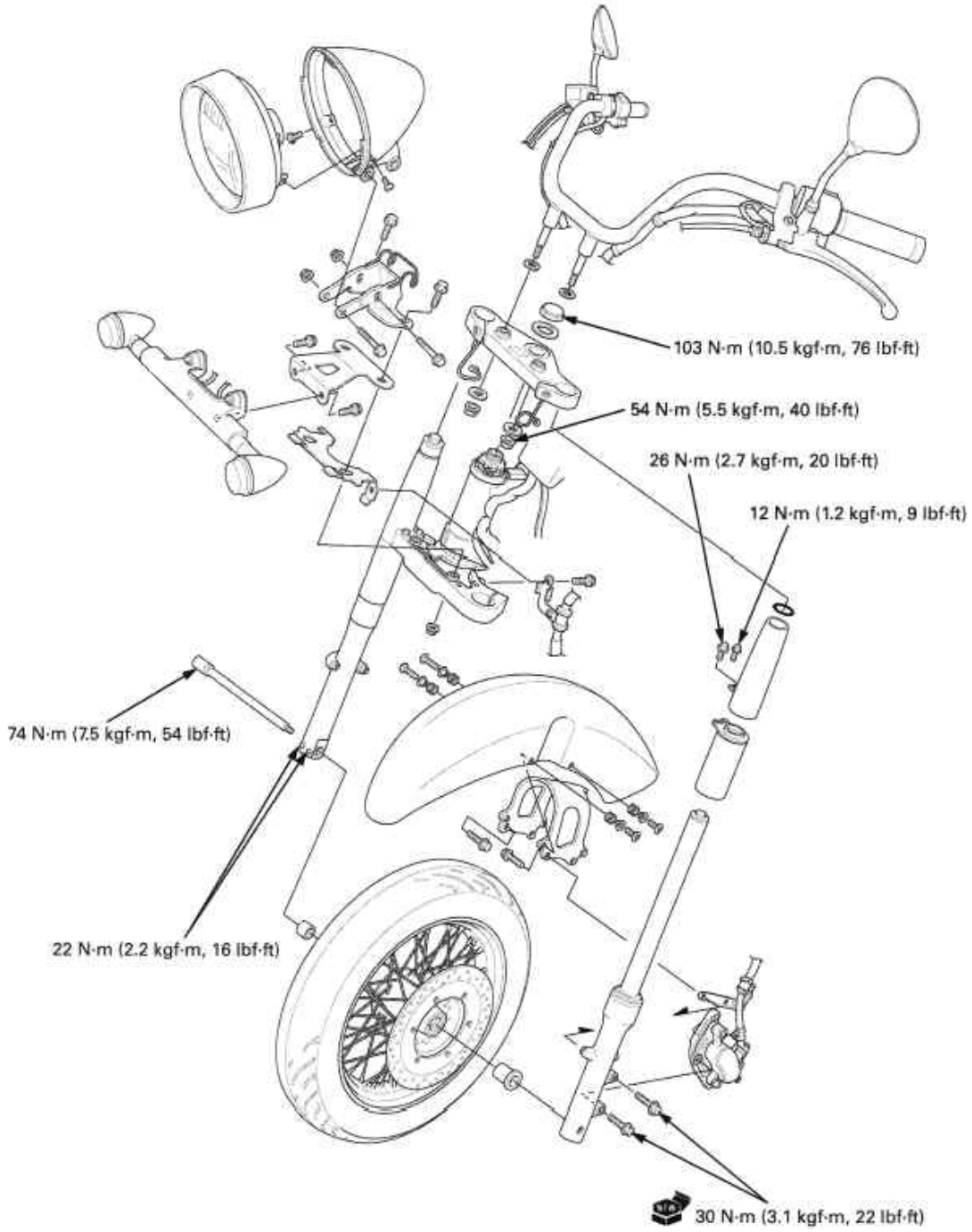
Install the rear wheel (page 15-13).
Fill the gear case with the recommended final drive gear oil (page 3-18).



MEMO

14. FRONT WHEEL/SUSPENSION/STEERING

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- For hydraulic brake system service, refer to page 16-2.

SPECIFICATIONS

Unit: mm (in)

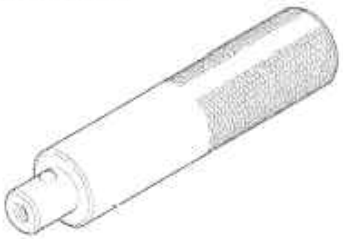
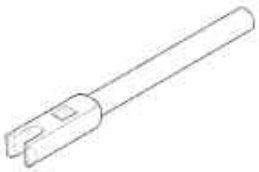
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm², 29 psi)	–
	Up to maximum weight capacity	200 kPa (2.00 kgf/cm², 29 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	367.8 (14.48)	360.4 (14.19)
	Tube runout	–	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	–
	Fluid level	105 (4.1)	–
	Fluid capacity	469 ± 2.5 cm³ (15.9 ± 0.08 US oz, 16.5 ± 0.09 Imp oz)	–
Steering head bearing preload		8.8 – 12.7 N (0.9 – 1.3 kgf, 6.5 – 9.4 lbf)	–

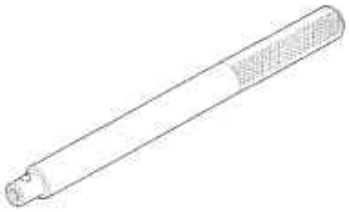
TORQUE VALUES

Handlebar mounting nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Spoke	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Front axle	74 N·m (7.5 kgf·m, 54 lbf·ft)	
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork center socket bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply locking agent to the threads
Fork cap	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork cover bolt (6 mm)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Fork cover bolt (8 mm)	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Fork top bridge pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Fork bottom bridge pinch bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one
Steering top thread	page 14-28	
Steering top thread lock nut	page 14-28	
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Clutch lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Clutch lever bracket holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

Driver 07749-0010000 	Attachment, 37 x 40 mm 07746-0010200 	Attachment, 42 x 47 mm 07746-0010300 
Attachment, 52 x 55 mm 07746-0010400 	Pilot, 20 mm 07746-0040500 	Bearing remover shaft 07746-0050100 
Bearing remover head, 20 mm 07746-0050600 	Spoke wrench 07JMA-MR60100  or equivalent commercially available in U.S.A.	Slider weight 07947-KA50100 
Driver attachment 07947-KF00100 	Attachment, 30 mm I.D. 07746-0030300 	Steering stem socket 07916-3710101  or 07916-3710100 (U.S.A. only)

Bearing remover 07946-3710500	Ball race remover 07953-MJ10000	Driver 07949-3710001
	 or 07953-MJ1000B or 07953-MJ1000A (U.S.A. only)	

TROUBLESHOOTING

Hard steering
- Steering top thread too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure
- Faulty tire

Steers to one side or does not track straight
- Bent fork leg
- Damaged steering head bearings
- Loose steering top thread
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot components (page 15-21)

Front wheel wobbles
- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Axle fastener not tightened properly

Wheel hard to turn
- Faulty wheel bearings
- Bent axle
- Brake drag (page 16-4)

Soft suspension
- Weak fork spring
- Low fluid level in fork
- Insufficient fluid weight (low viscosity)
- Low tire pressure

Stiff suspension
- High tire pressure
- Bent fork tube
- Fork slider binds
- High fluid level in fork leg
- Incorrect fluid weight (high viscosity)
- Clogged fork fluid passage

Front suspension noise
- Loose fork fasteners
- Insufficient fluid weight (low viscosity)
- Worn slider or fork tube bushing

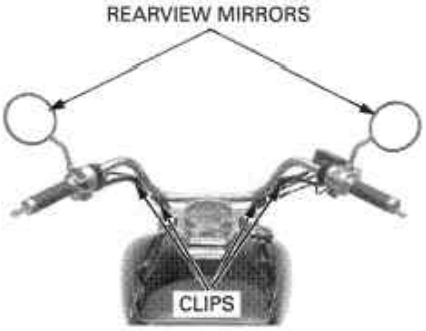
HANDLEBAR

REMOVAL

Remove the rearview mirrors.

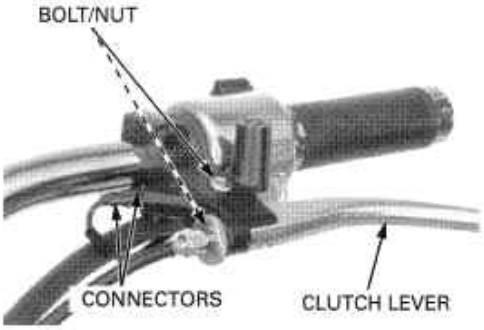
Release the handlebar switch wires and brake hose from the wire clips.

Remove the wire clips from the handlebar.

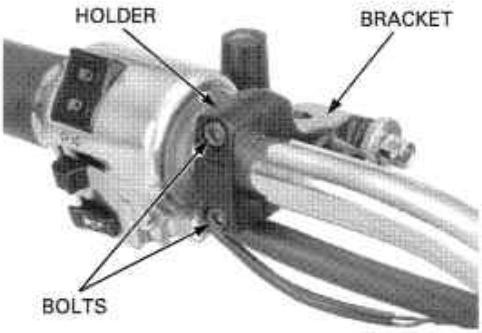


Remove the pivot bolt, nut and clutch lever from the clutch lever bracket.

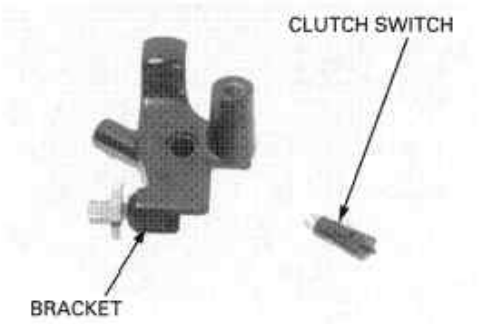
Disconnect the clutch switch connectors from the clutch switch.



Remove the bolts, holder and clutch lever bracket.

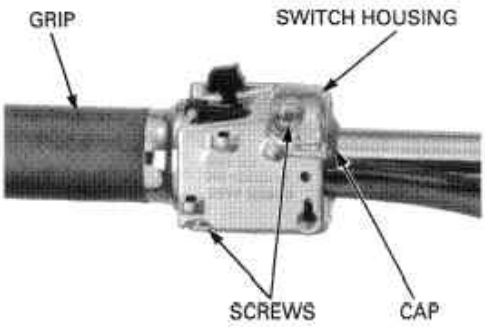


Remove the clutch switch from the clutch lever bracket.



Remove the screws and left handlebar switch housing.

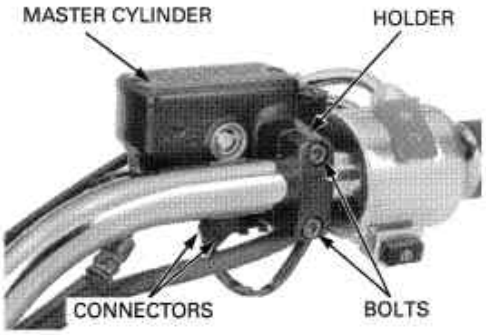
Remove the left handlebar grip and housing cap.



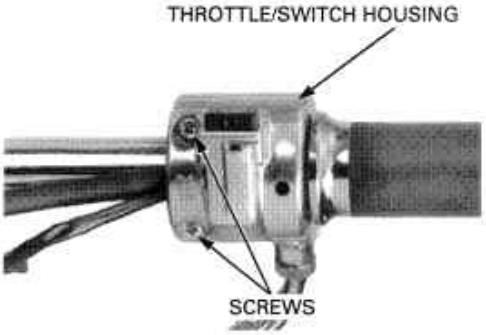
Disconnect the front brake light switch wire connectors from the switch.

Keep the reservoir upright to prevent air from entering the hydraulic system.

Remove the bolts, holder and master cylinder assembly.

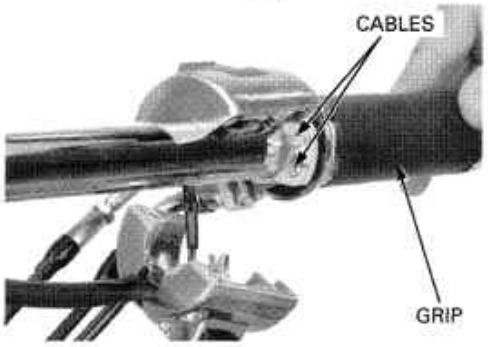


Remove the right handlebar switch/housing screws.

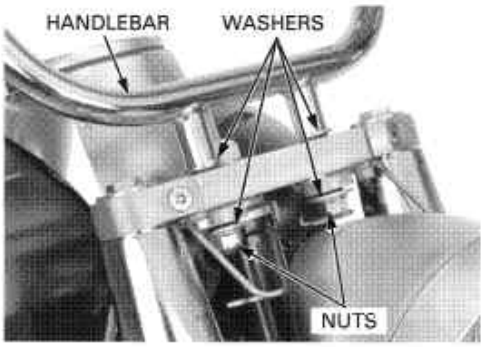


Disconnect the throttle cables from the throttle pipe and remove the throttle grip from the right handlebar.

Remove the right handlebar switch/throttle housing from the handlebar.



Remove the nuts, four washers and handlebar.

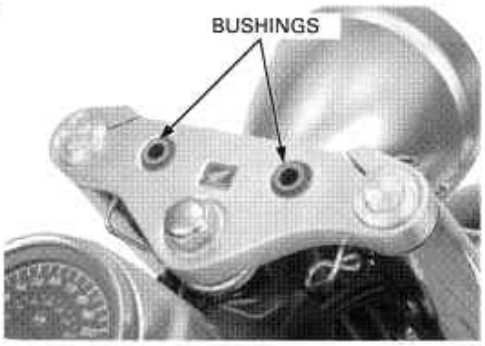


INSTALLATION

NOTE:

- Route the cable, hose and wires properly (page 1-24).

Check the handlebar bushings for abnormal wear or damage.



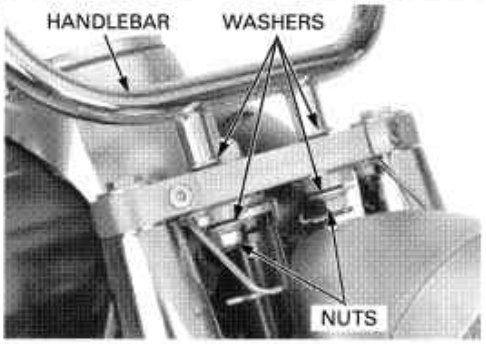
Install the handlebar, four washers and nuts onto the top bridge.

NOTE:

- Upper washer: smaller O.D.
- Lower washer: larger O.D.

Tighten the nuts to the specified torque.

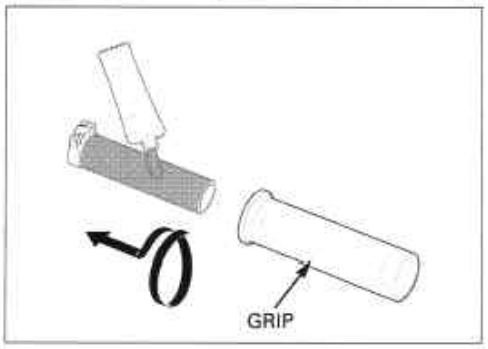
TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



Clean the inside surface of the right handlebar grip and the outside surface of the throttle pipe.
Apply Pro Honda Handgrip Cement or equivalent to the inside surface of the handlebar grip and to the outside surface of the throttle pipe. Wait 3 – 5 minutes and install the grip.

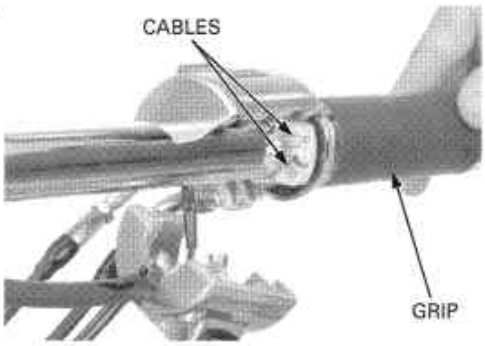
Allow the adhesive to dry for 1 hour before using.

Rotate the grip for even application of the adhesive.

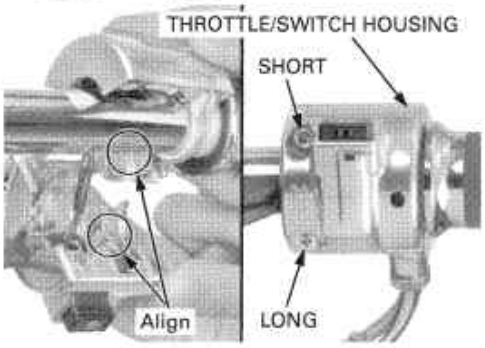


Apply grease 0.2 – 0.3g to the throttle grip pipe flange groove and sliding surface.

Install the throttle grip onto the handlebar and connect the throttle cables to the throttle grip flange.



Install the right handlebar throttle/switch housing with the two screws, aligning the locating pin with the hole in the handlebar.
Tighten the front long screw first, then tighten the rear short screw.

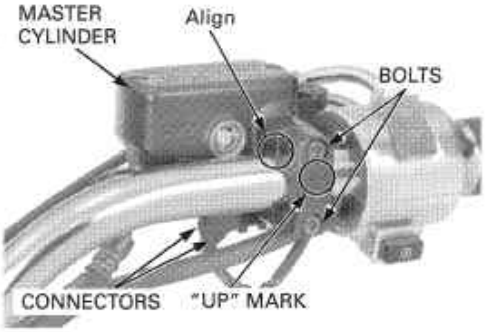


Install the holder with its "UP" mark facing up.

Install the master cylinder, holder and bolts.
Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the front brake light switch connectors.

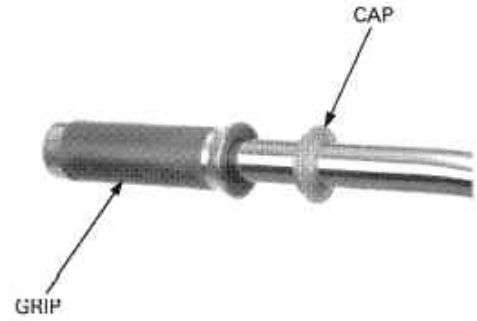


Install the housing cap.

Clean the inside surface of the left handlebar grip and the outside surface of the handlebar.
Apply Pro Honda Handgrip Cement or equivalent to the inside surface of the handlebar grip and to the outside surface of the handlebar. Wait 3 – 5 minutes and install the grip.

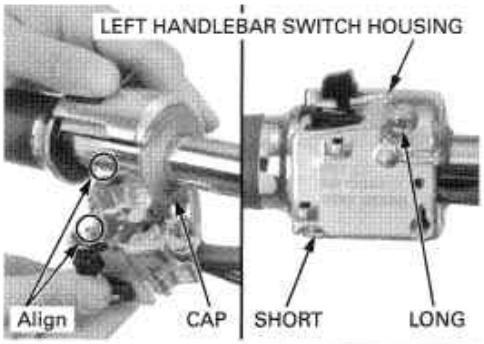
Allow the adhesive to dry for 1 hour before using.

Rotate the grip for even application of the adhesive.

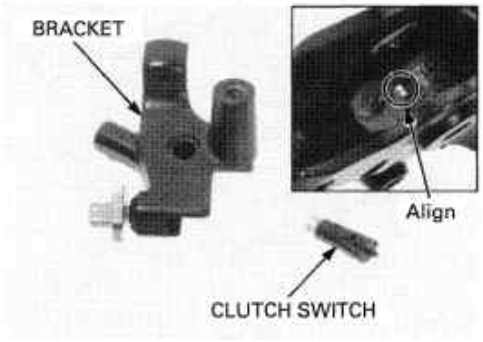


Set the housing cap flange into the housing groove.

Install the left handlebar switch housing and screws, aligning the locating pin with the hole in the handlebar.
Tighten the front short screw first, then tighten the rear long screw.



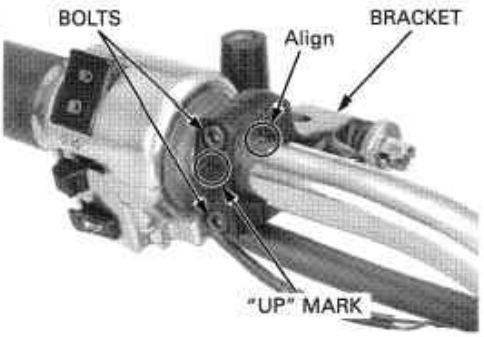
Install the clutch switch into the bracket, aligning the tab of the clutch switch and groove of the bracket.



Install the holder with its "UP" mark facing up.

Install the clutch lever bracket, holder and bolts.
Align the edge of the bracket with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



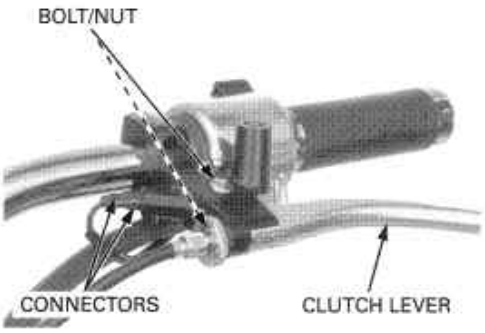
Connect the clutch switch connectors.
Connect the clutch cable on the clutch lever.

Apply grease to the clutch lever pivot bolt sliding surface.
Install the clutch lever onto the bracket and tighten the clutch lever pivot bolt to the specified torque.

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

Tighten the nut to the specified torque while holding the pivot bolt.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)

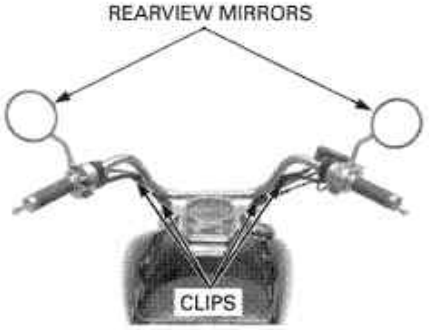


Install the wire clips onto the studs on the handlebar.

Secure the brake hose and switch wires with the clips.

Install the rearview mirrors.

Adjust the clutch lever free play (page 3-23).



FRONT WHEEL

REMOVAL

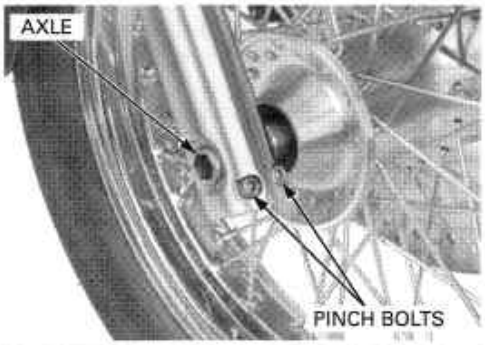
Loosen the axle pinch bolts.

Loosen the front axle .

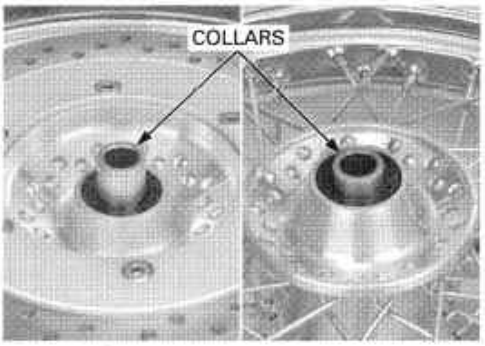
Support the motorcycle securely and raise the front wheel off the ground.

Do not operate the brake lever after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Remove the axle and front wheel.



Remove the side collars.

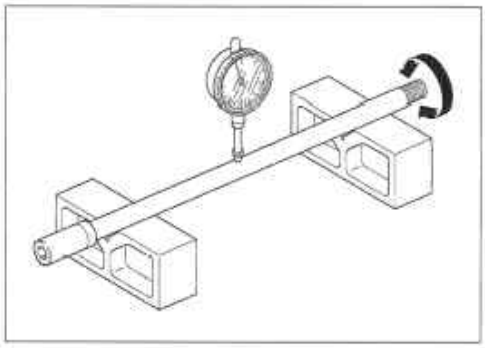


INSPECTION

AXLE

Set the front axle in V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

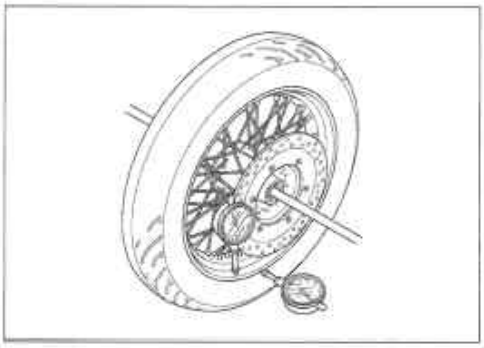
SERVICE LIMIT: 0.2 mm (0.008 in)



WHEEL RIM

Check the rim runout by placing the wheel in a trueing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

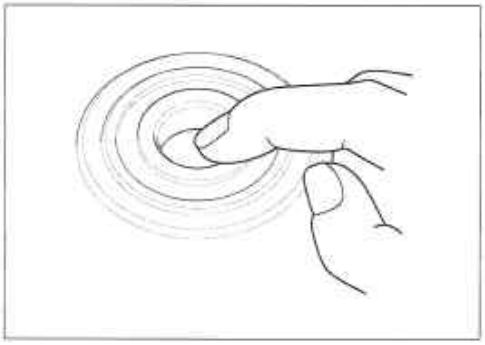


WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub (page 14-12).

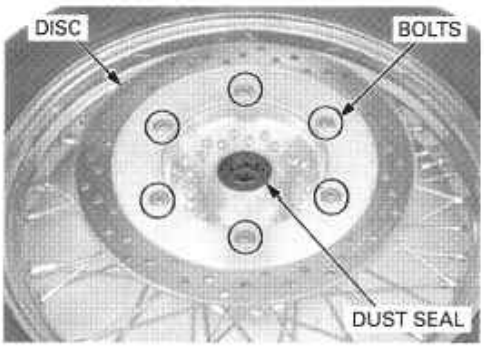


DISASSEMBLY

Remove the dust seals from both sides of the hub.

Do not reuse the bolts.

Remove the bolts and brake disc.

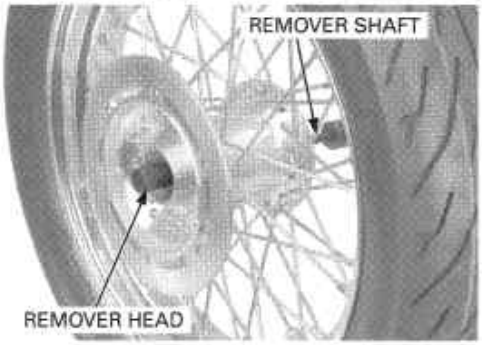


Replace the wheel bearings in pairs. Do not reuse old bearing.

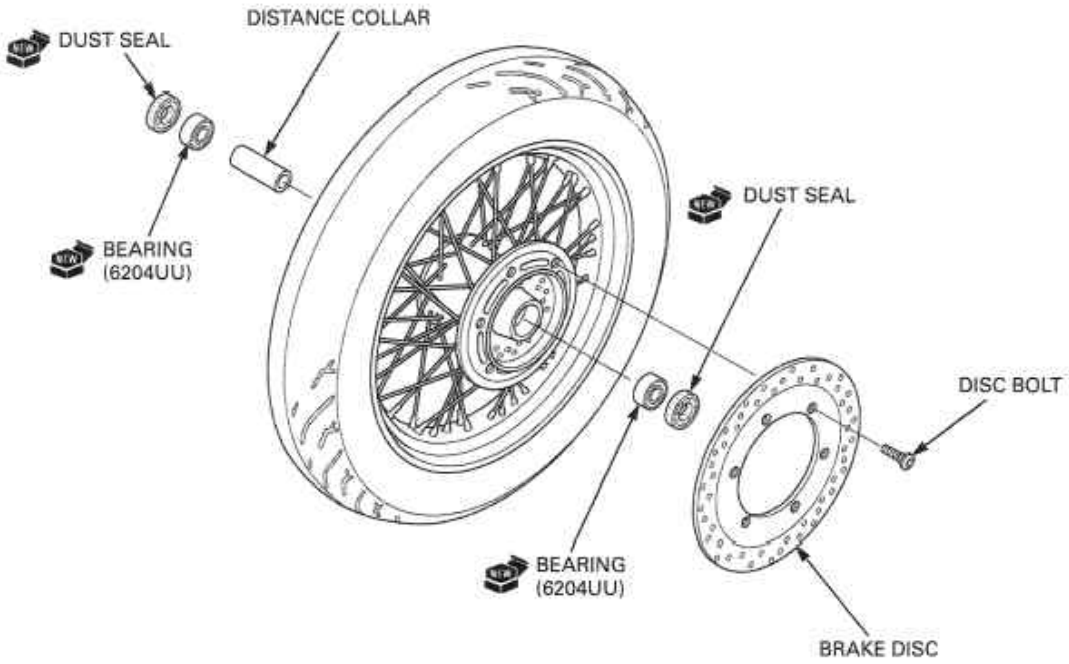
Install the remover head into the bearing.
From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	**07746-0050100**
Bearing remover head, 20 mm	**07746-0050600**



ASSEMBLY

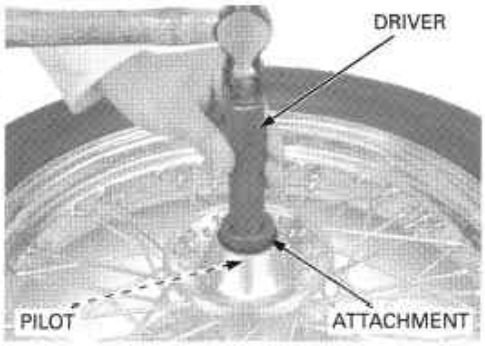


Drive in a new right bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.
Drive in a new left bearing squarely with the marked side facing up until it is seated on the collar.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**



FRONT WHEEL/SUSPENSION/STEERING

WHEEL CENTER ADJUSTMENT

Measure the distance B (rim width) and calculate distance A as follows:

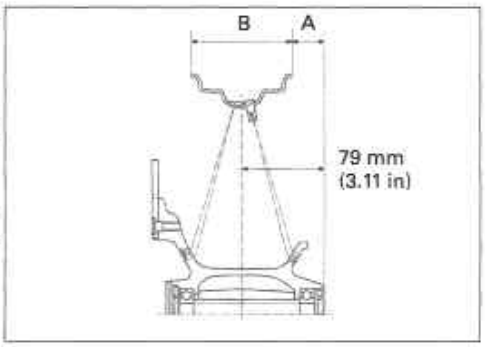
A = 79 mm (3.11 in) – B/2

Adjust the rim position and distance A by tightening the spokes to the specified torque in several progressive steps.

TOOL:

Spoke wrench	**07JMA-MR60100 or equivalent commercially available in U.S.A.**

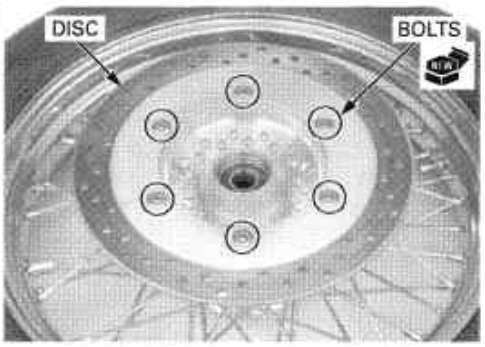
TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



Do not get grease on the brake disc or stopping power will be reduced.

Install the brake disc with the marked side facing out.
Install new bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

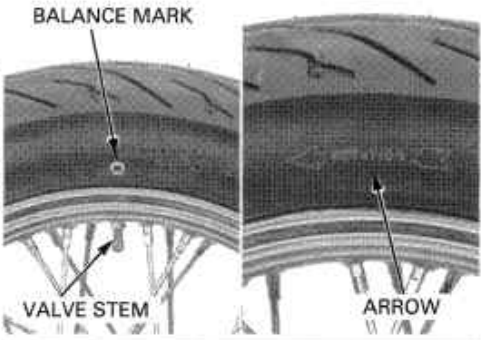


Carefully check balance before installing the wheel.

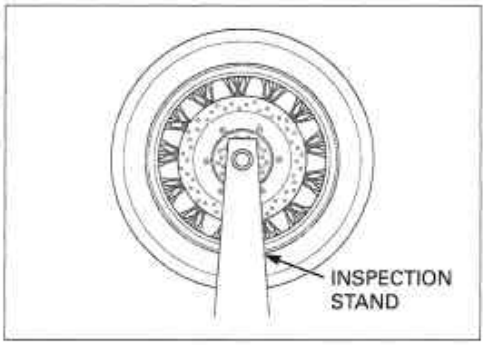
WHEEL BALANCE

NOTE:

- Mount the tire with the arrow mark facing in the direction of rotation.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (light mass point: a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

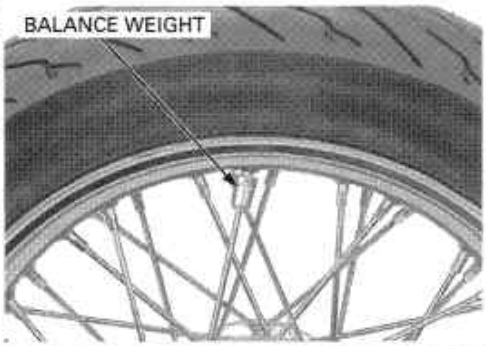


Mount the wheel, tire and brake disc assembly on an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.

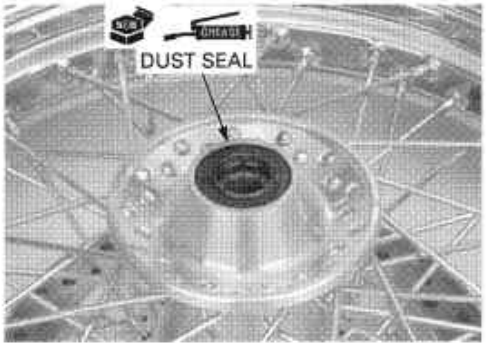


To balance the wheel, install a new balance weight on the lightest side of the spoke, on the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.
Do not add more than 60 g (2.1 oz) to the front wheel.

NOTE:
Never reuse the balance weight if once removed from the spoke.



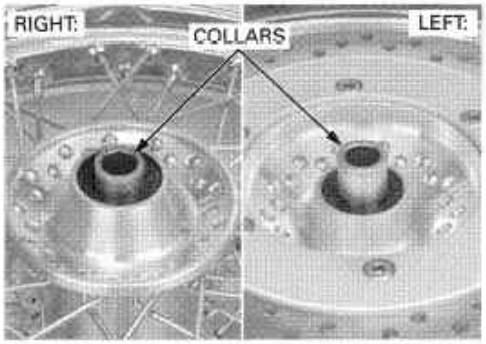
Apply grease to new dust seal lips and install the dust seals until they are flush with the wheel hub.



INSTALLATION

Install the left side (disc side) collar with it flange side facing out.

Install the side collars.



Be careful not to damage the pads.

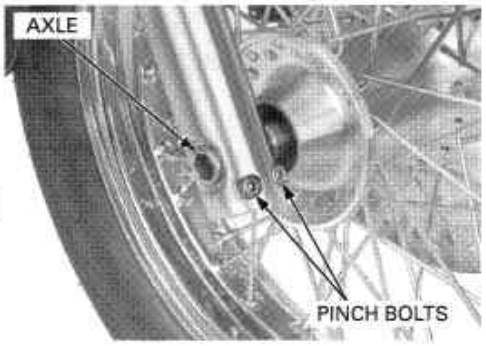
Place the front wheel between the fork legs so the brake disc is positioned between the brake pads.
Apply thin coat of grease to the axle sliding surface.
Insert the axle from the right side until it is fully seated.
Tighten the axle to the specified torque.

TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)

With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.

Tighten the pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



FORK

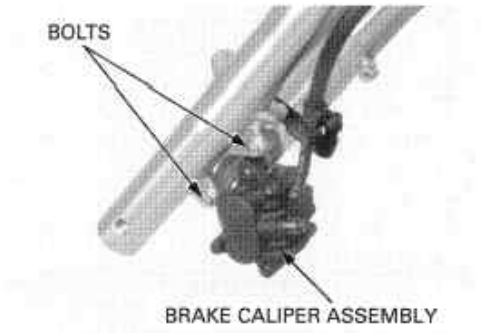
REMOVAL

When the fork is ready to be disassembled, loosen the fork cap, but do not remove it. Support the brake caliper so it does not hang from the brake hose.

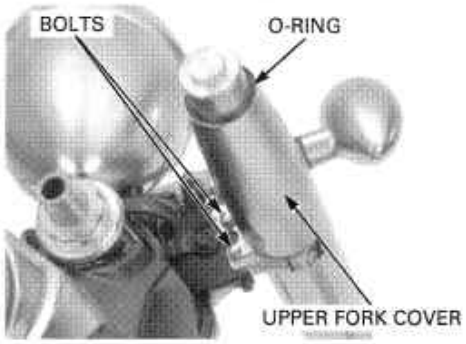
Remove the following:
- Front wheel (page 14-11)
- Front fender (page 2-6)
- Top bridge (page 14-24)

Left fork only: Do not reuse caliper mounting bolts.

Remove the bolts and brake caliper assembly.

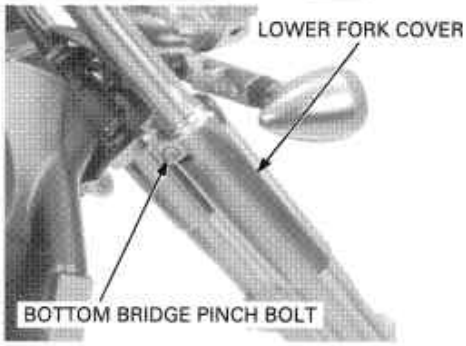


Remove the bolts and upper fork cover.
Remove the O-ring.



Loosen the bottom bridge pinch bolt. Pull the fork leg down and remove the fork tube from the bottom bridge.

Remove the lower fork cover.

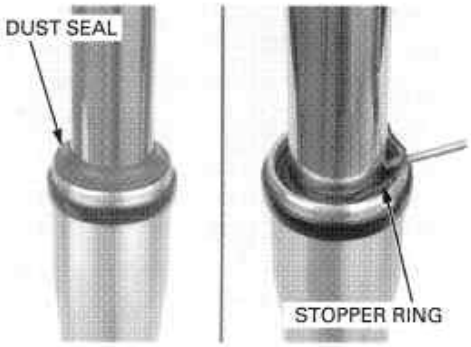


DISASSEMBLY

Remove the dust seal.

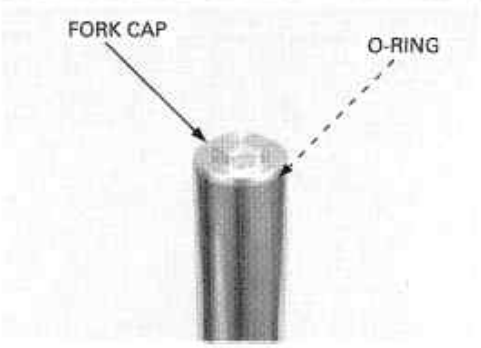
Do not scratch the fork tube sliding surface.

Remove the oil seal stopper ring.

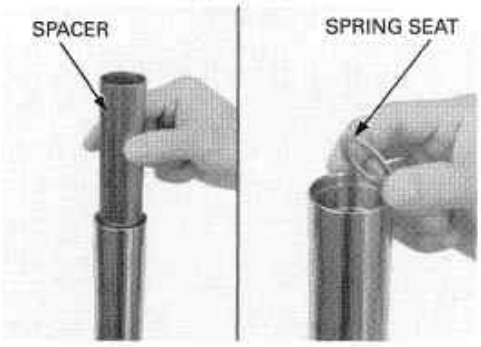


The fork cap is under spring pressure; use care when loosening it.

Remove the fork cap and O-ring.

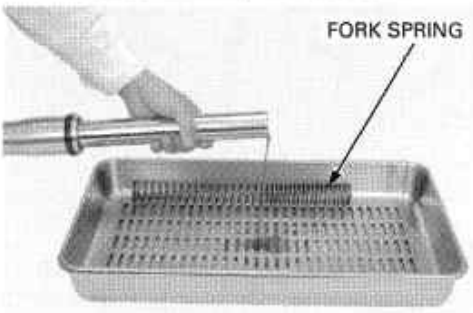


Remove the spacer and spring seat.



Remove the fork spring from the fork tube.

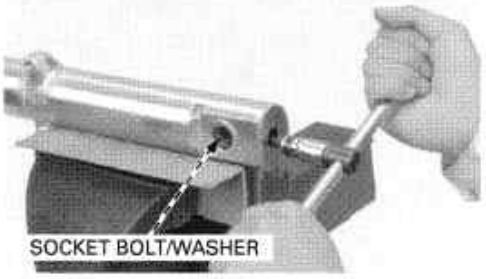
Pour out the fork fluid by pumping the fork tube several times.



Hold the fork slider in a vise with soft jaws.

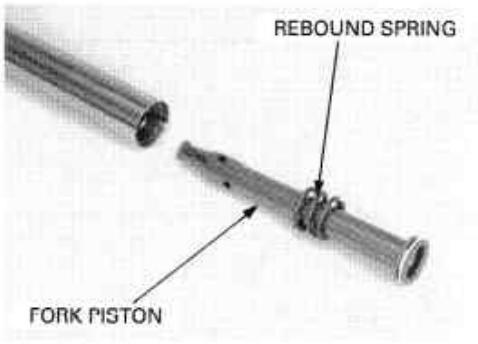
If the fork piston turns with the fork center socket bolt, temporarily install the fork spring, spring seat, spacer and fork cap.

Remove the fork center socket bolt and sealing washer.



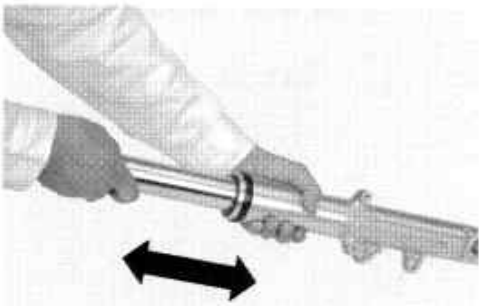
Do not remove the fork piston ring, unless it is necessary to replace with a new one.

Remove the fork piston and rebound spring.

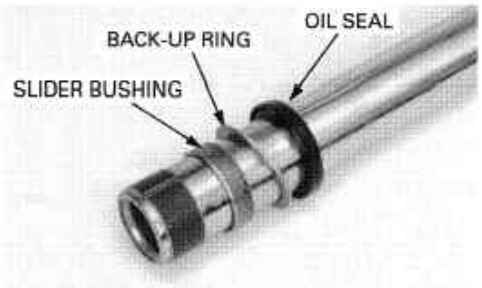


Using quick successive motions, pull the fork tube out of the fork slider.

Remove the oil lock piece.



Remove the oil seal, back-up ring and slider bushing.

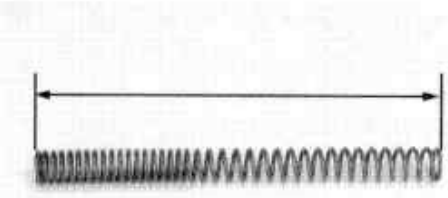


INSPECTION

FORK SPRING

Measure the fork spring free length.

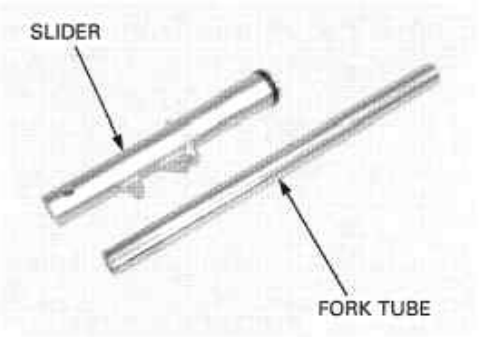
SERVICE LIMIT: 360.4 mm (14.19 in)



FORK TUBE/SLIDER/PISTON

Check the fork tube and slider for score marks, and excessive or abnormal wear.

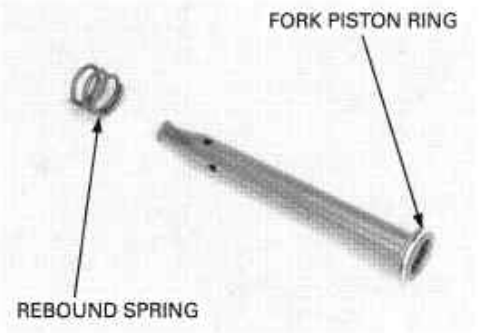
Replace any damaged component if necessary.



Check the fork piston for score marks, and excessive or abnormal wear.

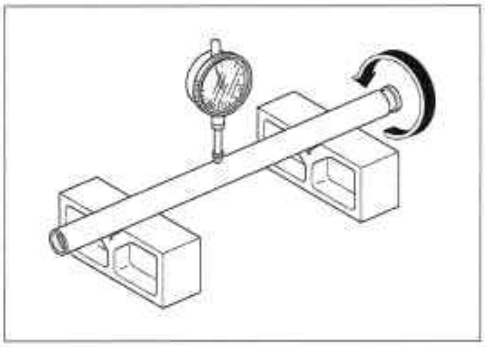
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

Replace any damaged component if necessary.



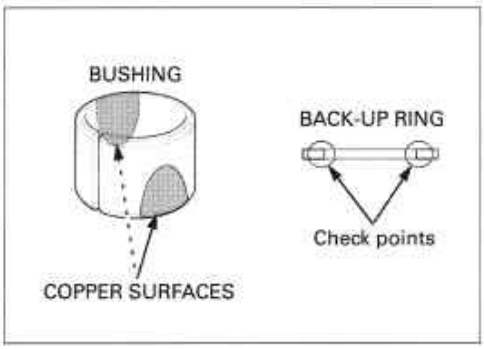
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



Visually inspect the slider and guide bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so the copper surface appears on more than 3/4 of the entire surface.

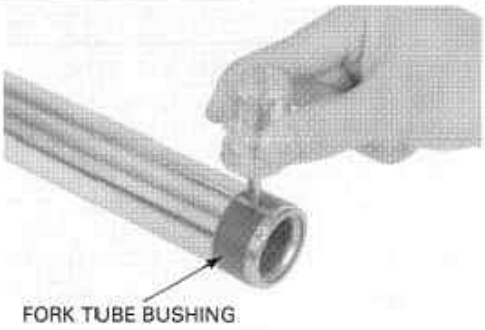
Check the back-up ring; replace it if there is any distortion at the points shown.



FRONT WHEEL/SUSPENSION/STEERING

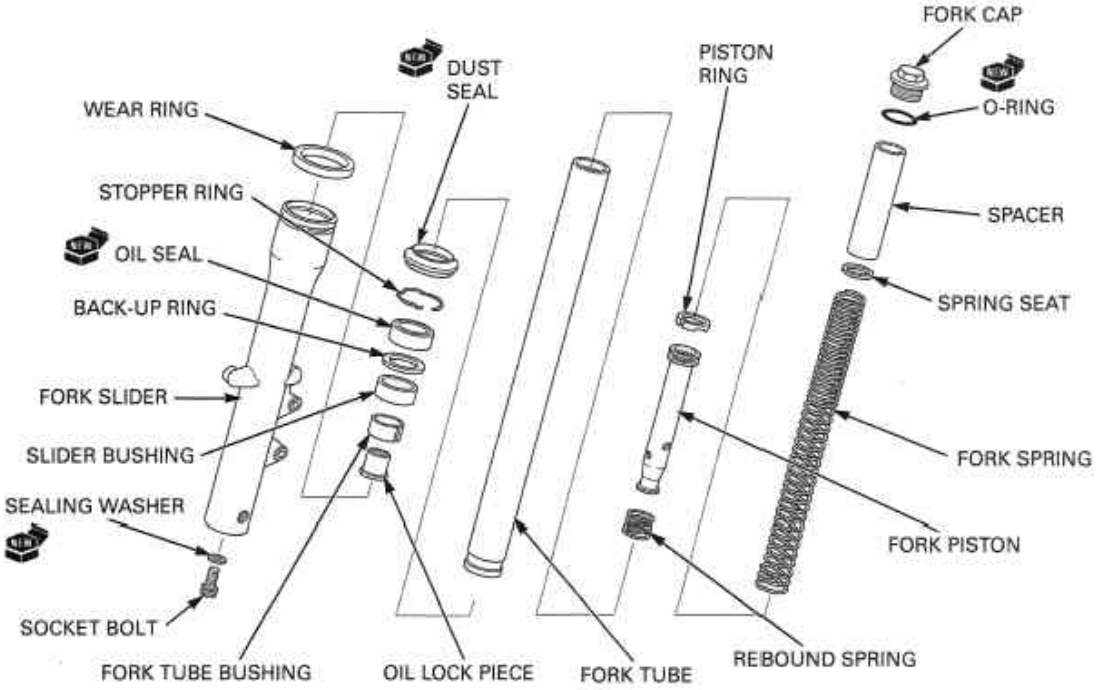
Do not remove the fork tube bushing unless it is necessary to replace it with a new one.

Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



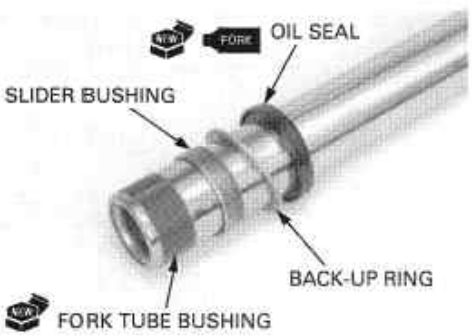
Do not open the bushing slit more than necessary.

Install a new fork tube bushing, being careful not to damage the coating of the bushing if it has been removed.

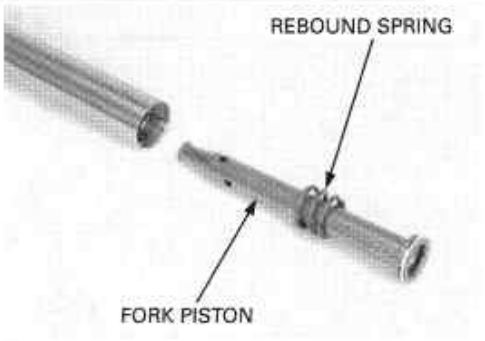
Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the oil seal with its marked side facing up.

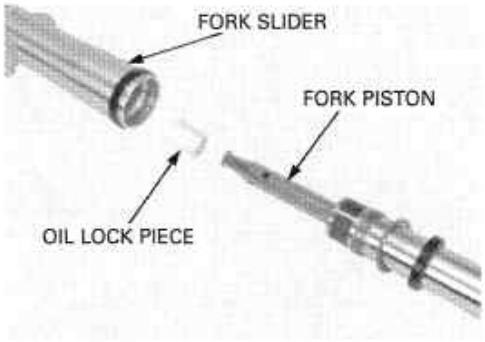
Apply fork fluid to the new oil seal lips.
Install the slider bushing, back-up ring and new oil seal onto the fork tube.



Install the rebound spring to the fork piston, then install them into the fork tube.

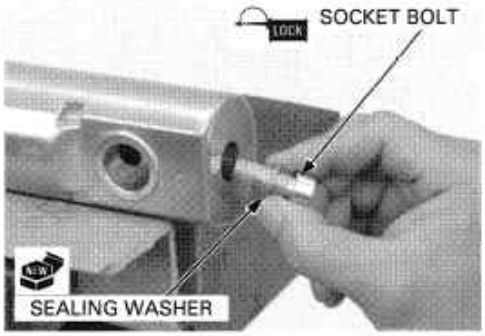


Install the oil lock piece to the fork piston end.
Install the fork tube assembly into the fork slider.



Hold the fork slider in a vise with soft jaws.

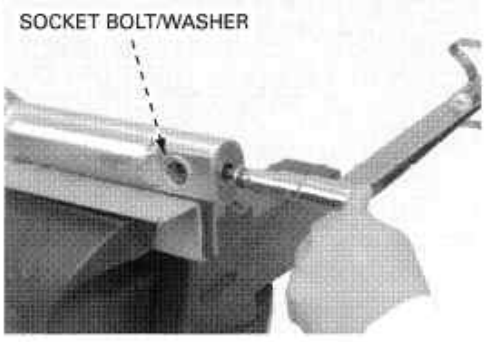
Apply a locking agent to the fork center socket bolt threads.
Install the socket bolt with a new sealing washer.



If the fork piston turns with the fork center socket bolt, temporarily install the fork spring, spring seat, spacer and fork cap

Tighten the fork center socket bolt to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



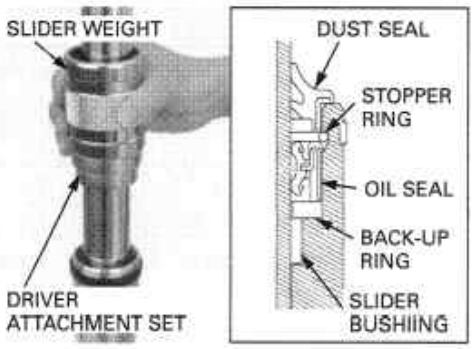
FRONT WHEEL/SUSPENSION/STEERING

Apply fork fluid to a new oil seal lips. Install the oil seal with the marked side facing up.

Drive the oil seal until the stopper ring groove is visible using a special tools.

TOOLS:

Slider weight	**07947-KA50100**
Driver attachment	**07947-KF00100**



Pour the specified amount of the recommended fork fluid into the fork tube.

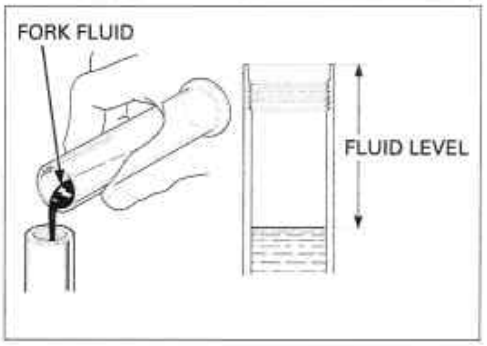
RECOMMENDED FORK FLUID:
Pro Honda Suspension Fluid SS-8

FORK FLUID CAPACITY:
469 ± 2.5 cm³ (15.9 ± 0.08 US oz, 16.5 ± 0.09 Imp oz)

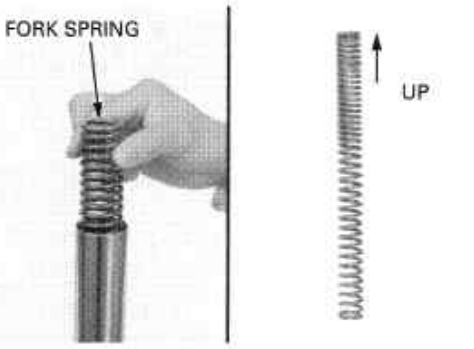
Slowly pump the fork tube several times to remove any trapped air from the lower portion of the fork tube.

Compress the fork tube fully. Measure the fluid level from the top of the fork tube.

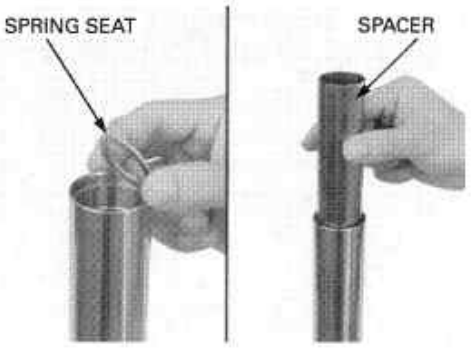
FORK FLUID LEVEL: 105 mm (4.1 in)



Pull the fork tube up and install the fork spring with the tightly wound coil side facing up.



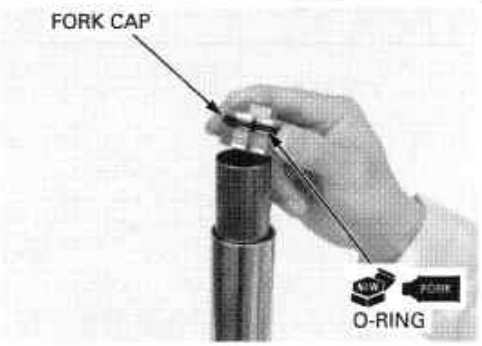
Install the spring seat and spacer.



Coat a new O-ring with fork fluid and install it into the fork cap groove.

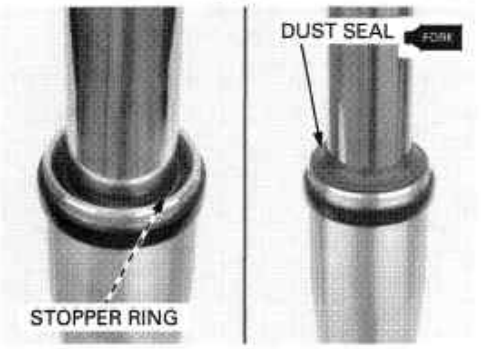
Be careful not to cross-thread the fork cap. Tighten the fork cap after installing the fork tube into the fork bridge.

Hold the fork cap securely and install it into the fork tube.



Install the stopper ring into the groove into the fork slider, being careful not to scratch the fork tube sliding surface.

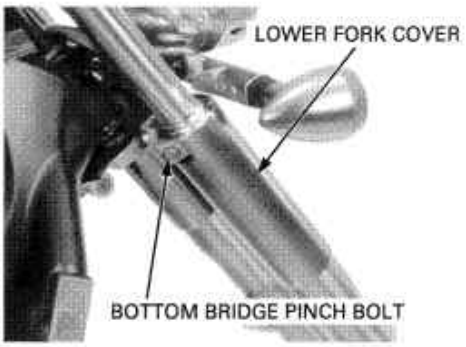
Coat a new dust seal with fork fluid and install it.



INSTALLATION

Install the lower fork cover and fork tube to the bottom bridge.

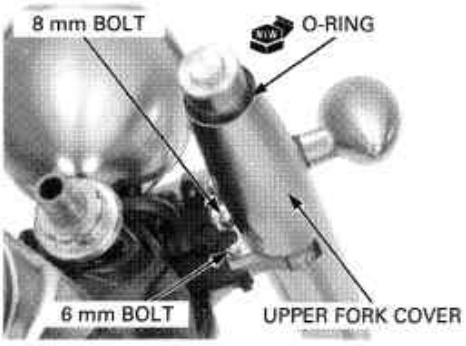
Temporarily tighten the bottom bridge pinch bolt lightly.



Install the upper fork cover, then tighten the 8 mm and 6 mm bolts to the specified torque.

TORQUE:
8 mm bolt: 26 N·m (2.7 kgf·m, 20 lbf·ft)
6 mm bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install a new O-ring.



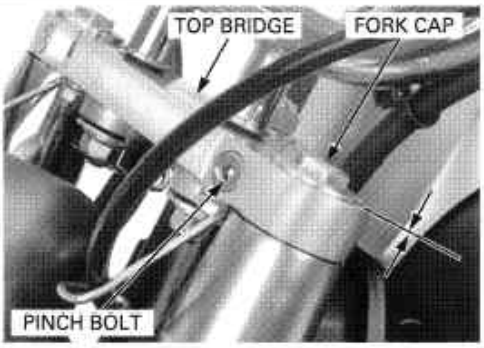
Install the fork top bridge (page 14-29).

Loosen the fork bridge pinch bolts and align the fork tube top end surface with the top bridge as shown. Tighten the fork bridge pinch bolts to the specified torque.

TORQUE:
Top bridge pinch bolt:
26 N·m (2.7 kgf·m, 20 lbf·ft)
Bottom bridge pinch bolt:
49 N·m (5.0 kgf·m, 36 lbf·ft)

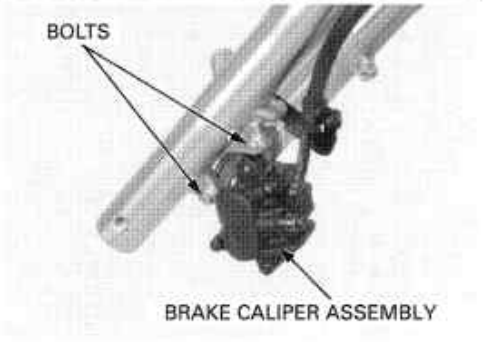
Tighten the fork cap to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Left fork only: Install the brake caliper with new mounting bolts and tighten the bolts.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



Install the following:

- Front fender (page 2-6)
- Front wheel (page 14-15)

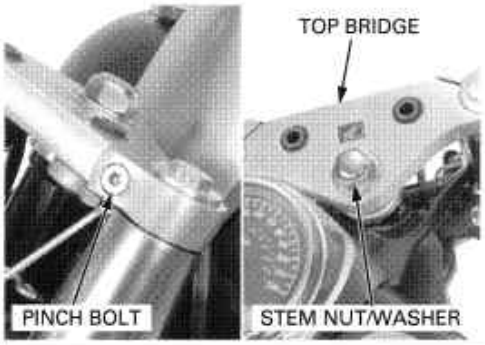
STEERING STEM

REMOVAL

Remove the following:

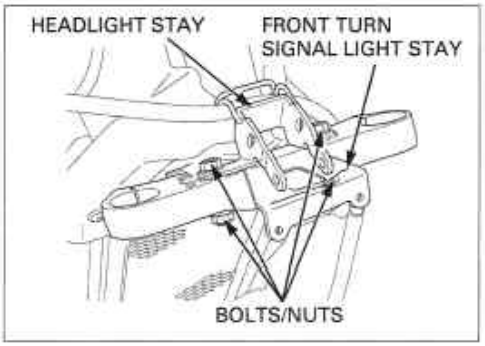
- Handlebar (page 14-6)
- Front wheel (page 14-11)
- Front fender (page 2-6)
- Headlight case (page 20-4)
- Turn signal light (page 20-5)

Loosen the top bridge pinch bolts.
Remove the stem nut, washer and top bridge.

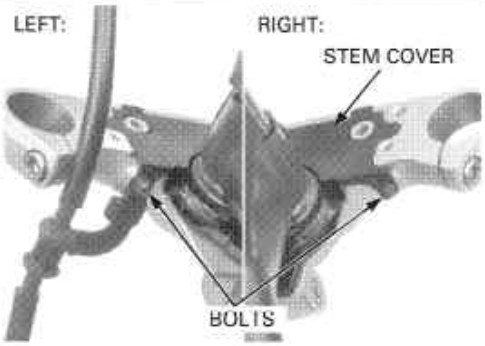


Remove the fork legs (page 14-16).

Remove the bolts and nuts, headlight stay and front turn signal light stay.

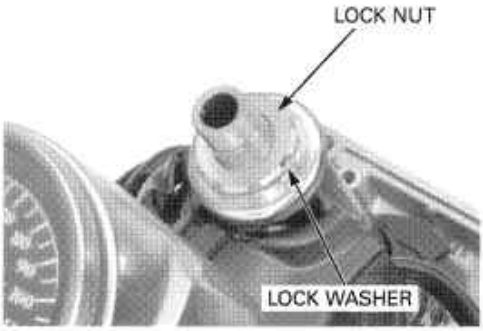


Remove the bolts and steering stem cover.



Straighten the lock washer tabs.

Remove the lock nut and lock washer.

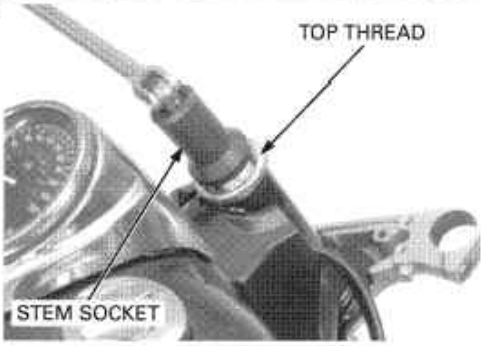


Loosen the steering top thread using the special tool.

TOOL:

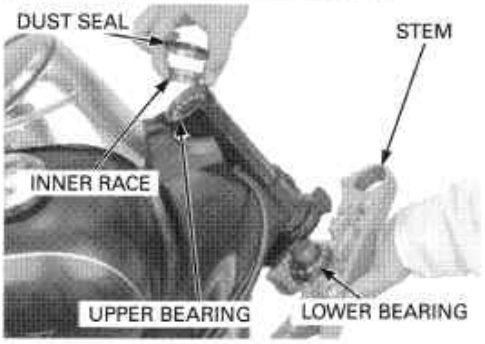
Steering stem socket	**07916-3710101 or 07916-3710100**

While holding the steering stem, remove the top thread.



Remove the following:

- Stem
- Dust seal
- Upper inner race
- Upper bearing
- Lower bearing



BEARING REPLACEMENT

Remove the upper bearing outer race using the special tools.

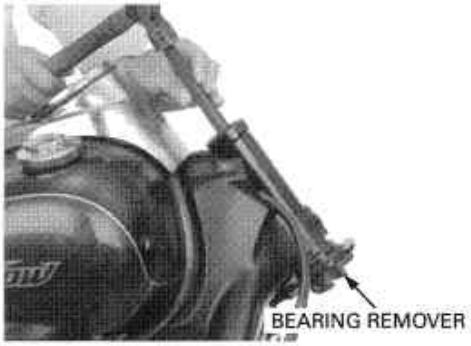
TOOLS:

Ball race remover	**07953-MJ10000 or 07953-MJ1000B or 07953-MJ1000A (U.S.A. only)**
	or
Driver	**07949-3710001**
Attachment, 37 x 40 mm	**07746-0010200**

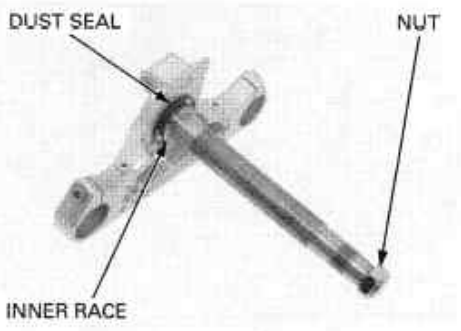
Remove the lower bearing outer race using the special tool and suitable shaft.

TOOL:

Bearing remover	**07946-3710500**



Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race.
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



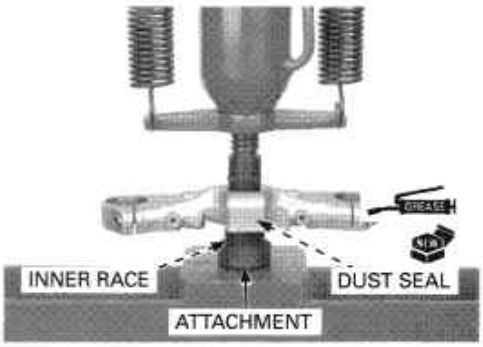
NOTE:
Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

- Excelite EP2 (Kyodo Yushi) or
- Stamina EP2 (Shell) or equivalent

Apply grease to a new dust seal lip and install it onto the steering stem.
Press a new lower bearing inner race using a special tool and hydraulic press.

TOOL:

Attachment, 30 mm I.D.	**07746-0030300**



Drive in a new upper bearing outer race into the steering head pipe using the special tools.

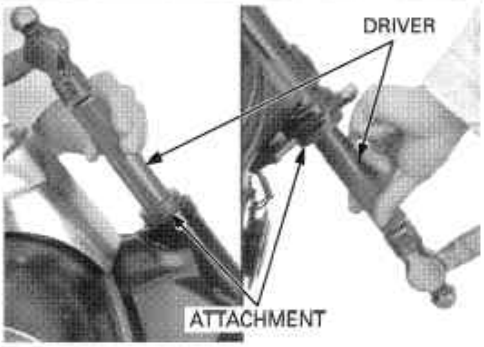
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**

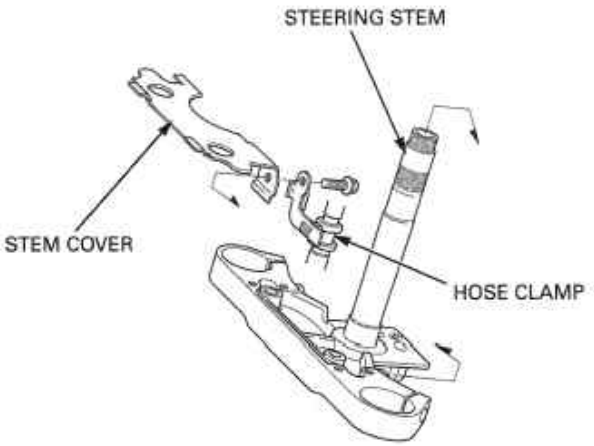
Drive in a new lower bearing outer race.

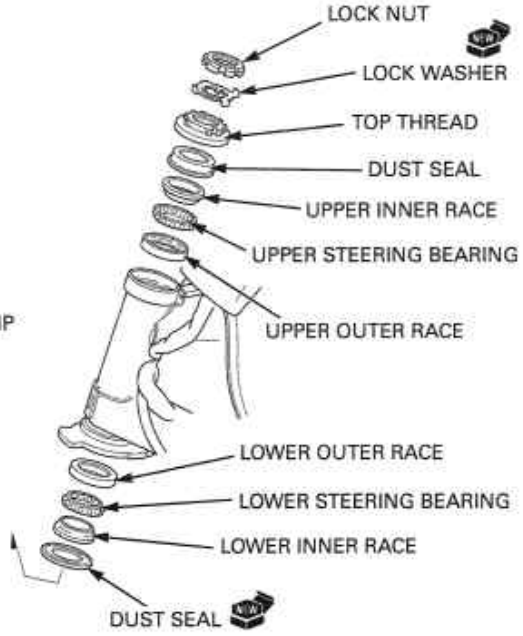
TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**



INSTALLATION





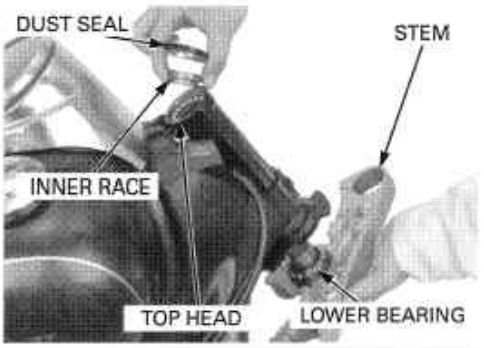
NOTE:
Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

- Excelite EP2 (Kyodo Yushi) or
- Stamina EP2 (Shell) or equivalent

Apply 3 – 5 g (0.1 – 0.2 oz) of grease (page 14-26) to each new steering bearing and fill it up. Install the lower steering bearing onto the stem.
Apply grease to a new upper dust seal lip.
Apply oil to the threads of the steering top thread.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

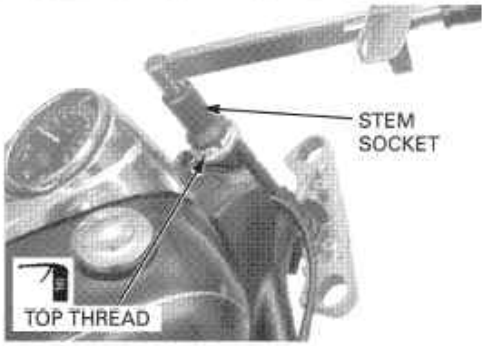
- Upper steering bearing
- Upper inner race
- Dust seal
- Top thread



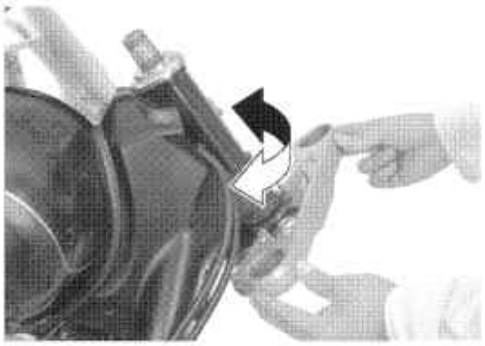
Tighten the top thread to the specified torque.

TOOL:
Steering stem socket **07916-3710101 or 07916-3710100 (U.S.A. only)**

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



Turn the steering stem left and right, lock-to-lock five times to seat the bearings.



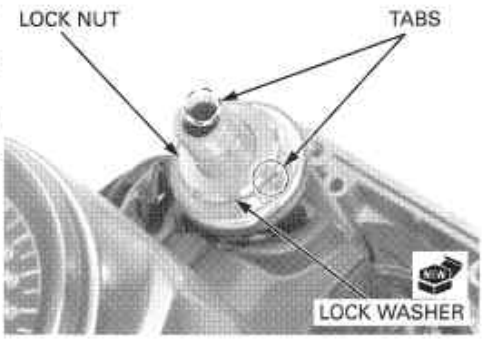
Retighten the top thread to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Install a new lock washer, aligning its bent tabs with the grooves in the top thread.

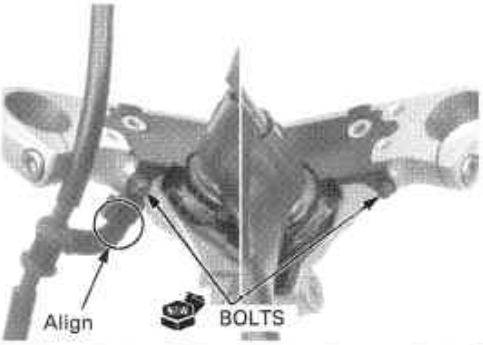
Install the lock nut until it contacts with the lock washer.

Further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer. Bend up the lock washer tabs into the grooves of the lock nut.

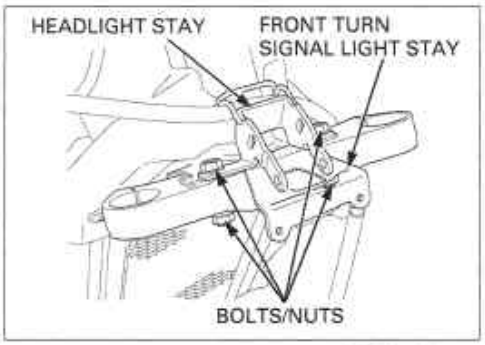


Install the steering stem cover, hose guide and tighten new bolts securely.

NOTE:
When installing the hose guide, align the hose guide tabs with the steering stem cover.



Install the front turn signal light stay, headlight stay, bolts, nuts and tighten the nuts.



Install the top bridge, washer and stem nut.

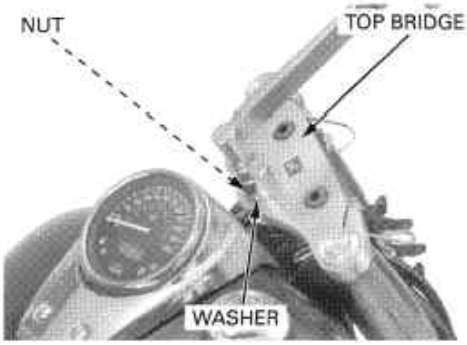
Install the fork legs into the bottom and top bridges (page 14-23).

Tighten the stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Turn the steering stem left and right, lock-to-lock several times to make sure the steering stem moves smoothly, without play or binding.

Route the hose, wires and cables into the cable guides properly (page 1-24).



Install the following:

- Front wheel (page 14-15)
- Front fender (page 2-6)
- Handlebar (page 14-8)
- Headlight case (page 20-4)
- Turn signal light (page 20-5)

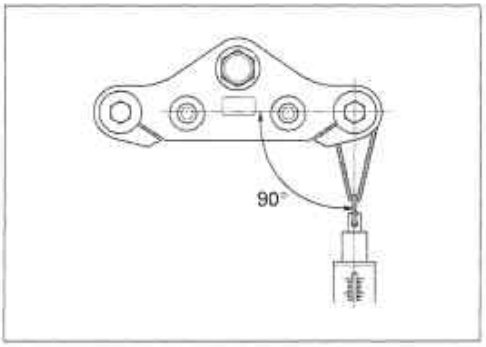
STEERING BEARING PRE-LOAD

Support the motorcycle securely and raise the front wheel off the ground.
Position the steering stem straight ahead.

Make sure there is no cable, wire harness or hose interference.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

Pull the spring scale keeping it at a right angle to the steering stem.
Read the scale at the point where the steering stem just starts to move.

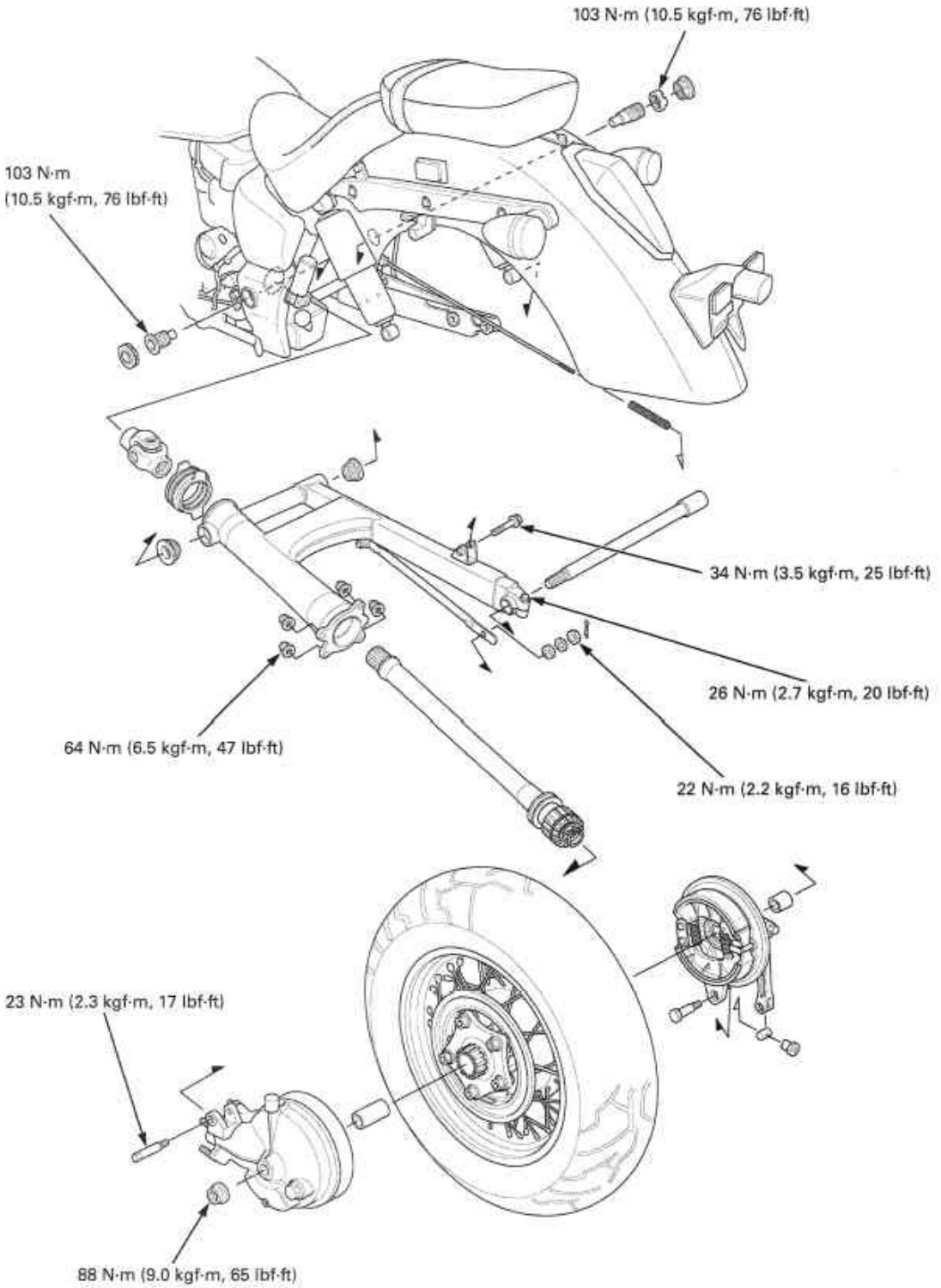


STEERING BEARING PRE-LOAD:
8.8 – 12.7 kgf (0.9 – 1.3 kgf, 6.5 – 9.4 lbf)

If the readings do not fall within the limits, readjust the steering top thread.

15. REAR WHEEL/BRAKE/SUSPENSION

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

⚠CAUTION

Frequent inhalation of brake shoe dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- Riding on damaged rims impairs safe operation of the vehicle.
- When servicing the rear wheel, shock absorber, or swingarm, raise the rear wheel off the ground by supporting the frame securely.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. 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 lock nut. The specification given in the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.

SPECIFICATIONS

Unit: mm (in)

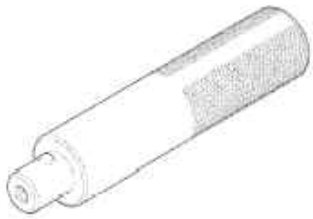
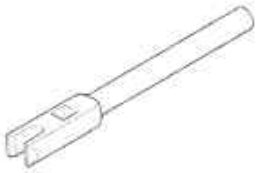
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm², 29 psi)	–
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm², 36 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	70 g (2.5 oz) max.
Rear brake	Drum I.D.	180.0 – 180.3 (7.09 –7.10)	181 (7.13)
	Lining thickness	4.4 – 4.7 (0.17 – 0.19)	2.1 (0.08)
Brake pedal height		75 mm (3.0 in) above the top of the footpeg	–
Brake pedal free play		20 – 30 (3/4 – 1-1/4)	–
Shock absorber spring preload adjuster setting		2nd position	–

TORQUE VALUES

Spoke	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Swingarm left pivot bolt	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Swingarm right pivot bolt	page 15-26	
Swingarm right pivot lock nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Stopper plate bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt: replace with a new one
Rear axle pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Rear brake stopper arm nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Rear brake arm pinch bolt	28 N·m (2.9 kgf·m, 21 lbf·ft)	
Rear shock absorber upper mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Rear shock absorber lower mounting bolt (right side)	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Rear shock absorber lower mounting bolt (left side)	23 N·m (2.3 kgf·m, 17 lbf·ft)	

REAR WHEEL/BRAKE/SUSPENSION

TOOLS

Driver 07749-0010000 	Attachment, 37 x 40 mm 07746-0010200 	Attachment, 42 x 47 mm 07746-0010300 
Pilot, 20 mm 07746-0040500 	Bearing remover shaft 07746-0050100 	Bearing remover head, 20 mm 07746-0050600 
Spoke wrench 07JMA-MR60100  or equivalent commercially available in U.S.A.	Lock nut wrench 07908-4690003 	

TROUBLESHOOTING

Soft suspension
- Incorrect suspension adjustment
- Weak shock absorber spring
- Oil leakage from damper unit
- Low tire pressure

Stiff suspension
- Incorrect suspension adjustment
- Bent damper rod
- Damaged shock absorber rubber mounts
- Damaged swingarm pivot bearings
- High tire pressure

Rear suspension noise
- Loose suspension fasteners
- Binding shock absorber case
- Worn shock absorber rubber mounts
- Faulty rear shock absorber

Rear wheel wobbles
- Bent rim
- Unbalanced rear tire and wheel
- Insufficient tire pressure
- Faulty swingarm pivot bearings
- Axle fastener not tightened properly
- Faulty tire

Wheel hard to turn
- Faulty wheel bearings
- Bent axle
- Brake drag

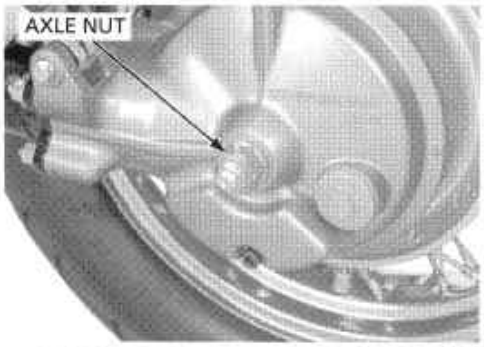
Poor brake performance
- Improper brake adjustment
- Worn brake shoes
- Brake linings oily, greasy or dirty
- Worn brake cam
- Worn brake drum
- Brake arm serrations improperly engaged
- Brake shoes worn at cam contact area

REAR WHEEL

REMOVAL

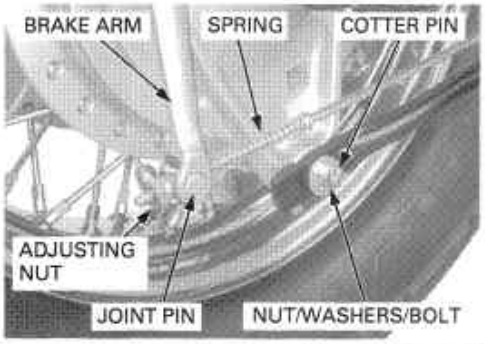
Remove the exhaust system (page 2-8).
Remove the axle nut.

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



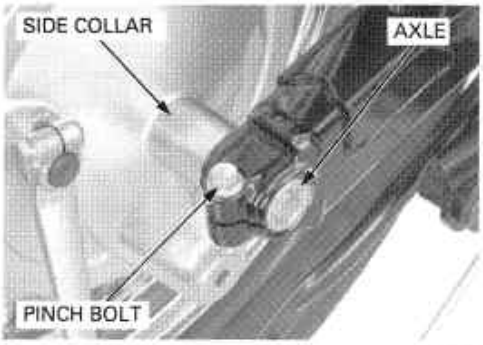
Remove the adjusting nut, joint pin and spring.

Remove the cotter pin, nut, washer, rubber washer and bolt.

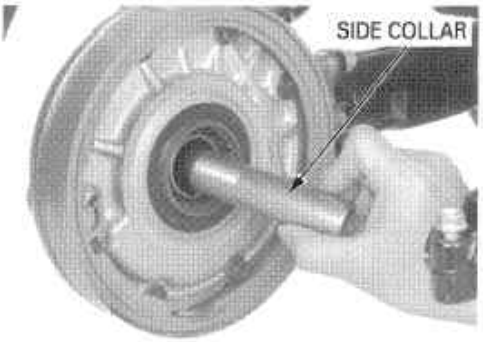


Loosen the pinch bolt and remove the axle and right side collar.

Move the rear wheel to the right to separate it from the final drive gear case and carefully remove the rear wheel out of the frame.



Remove the left side collar from the ring gear.

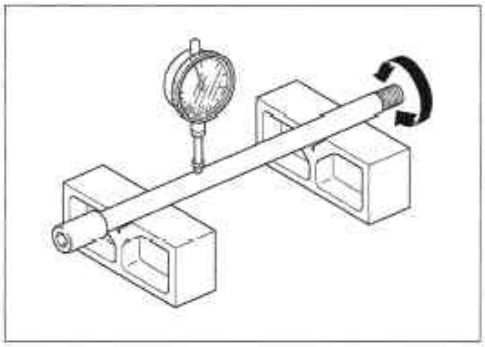


INSPECTION

AXLE

Set the rear axle in V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

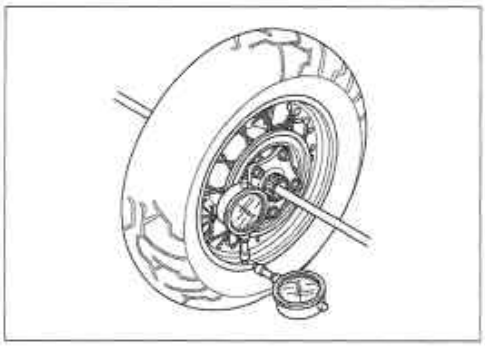
SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL RIM

Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

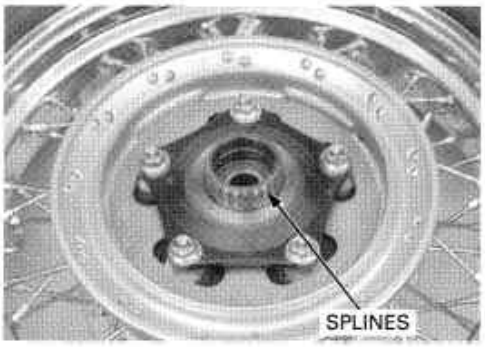


FINAL DRIVEN FLANGE

Check the driven flange splines for wear or damage. If damaged, check the splines of the ring gear also.

WHEEL BALANCE

Refer to page 14-14 for wheel balance. Do not add balance weight more than 70 g (2.5 oz) to the rear wheel.



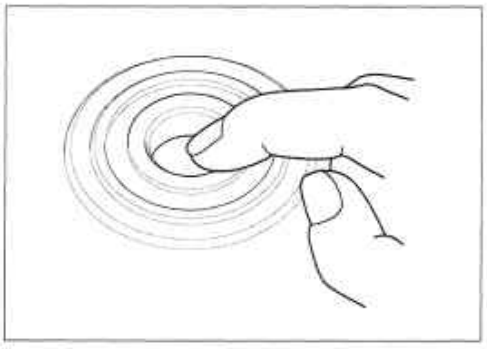
WHEEL BEARING

Remove the brake panel and driven flange (page 15-8).

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

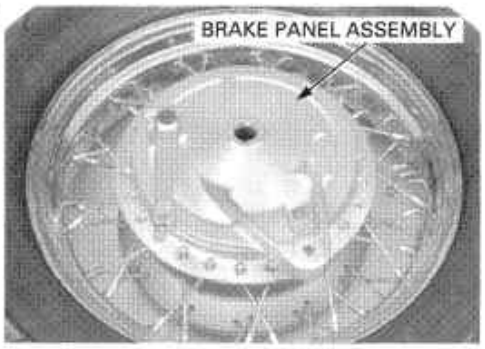
Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

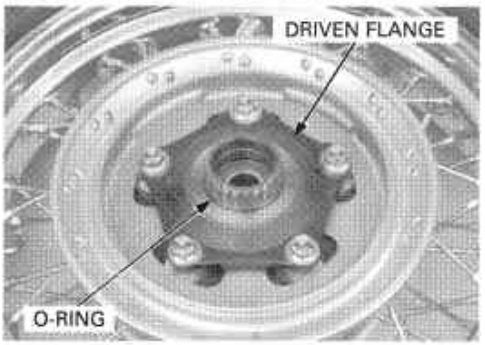


DISASSEMBLY

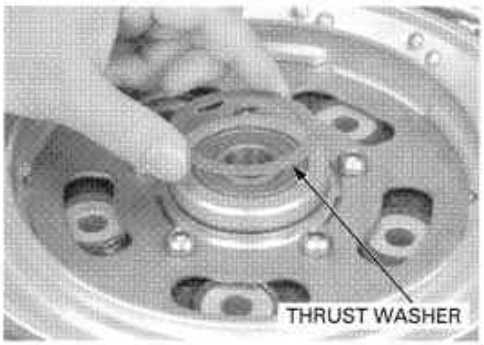
Remove the brake panel assembly from the right wheel hub.



Remove the O-ring
Remove the final driven flange from the left wheel hub.

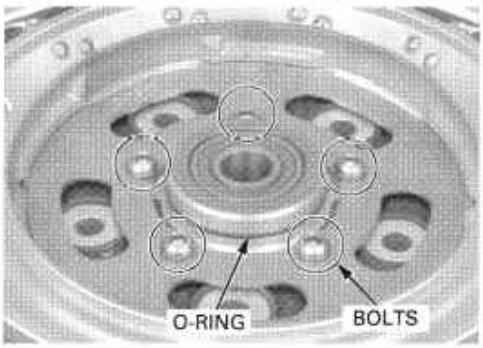


Remove the thrust washer.

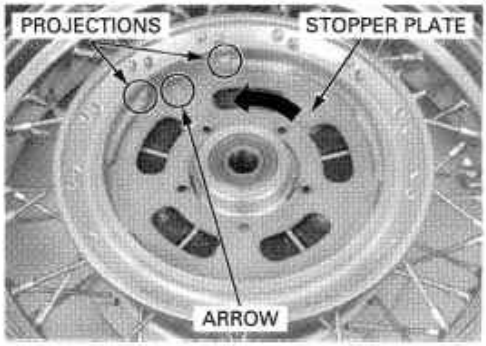


Do not reuse the bolts.

Remove the bolts.
Remove the O-ring.



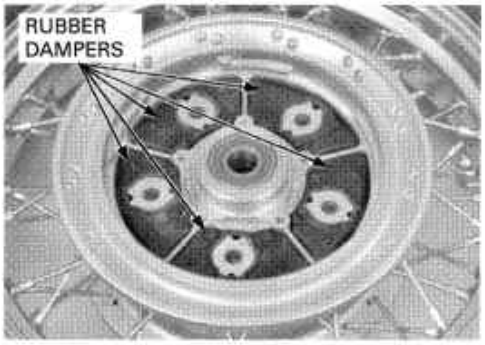
Align the arrow on the stopper plate between the projections on the wheel hub by turning the stopper plate and remove the plate.



Remove the rubber dampers.

Replace the rubber dampers as a set.

Check the rubber dampers for deterioration or damage.

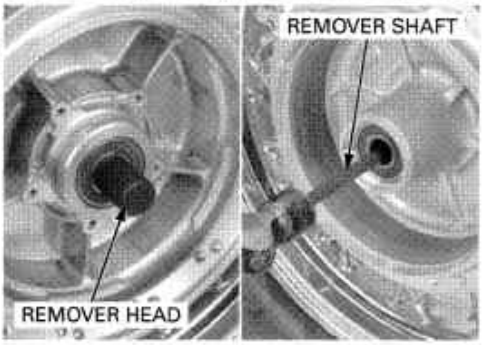


Replace the wheel bearings in pairs. Do not reuse old bearing.

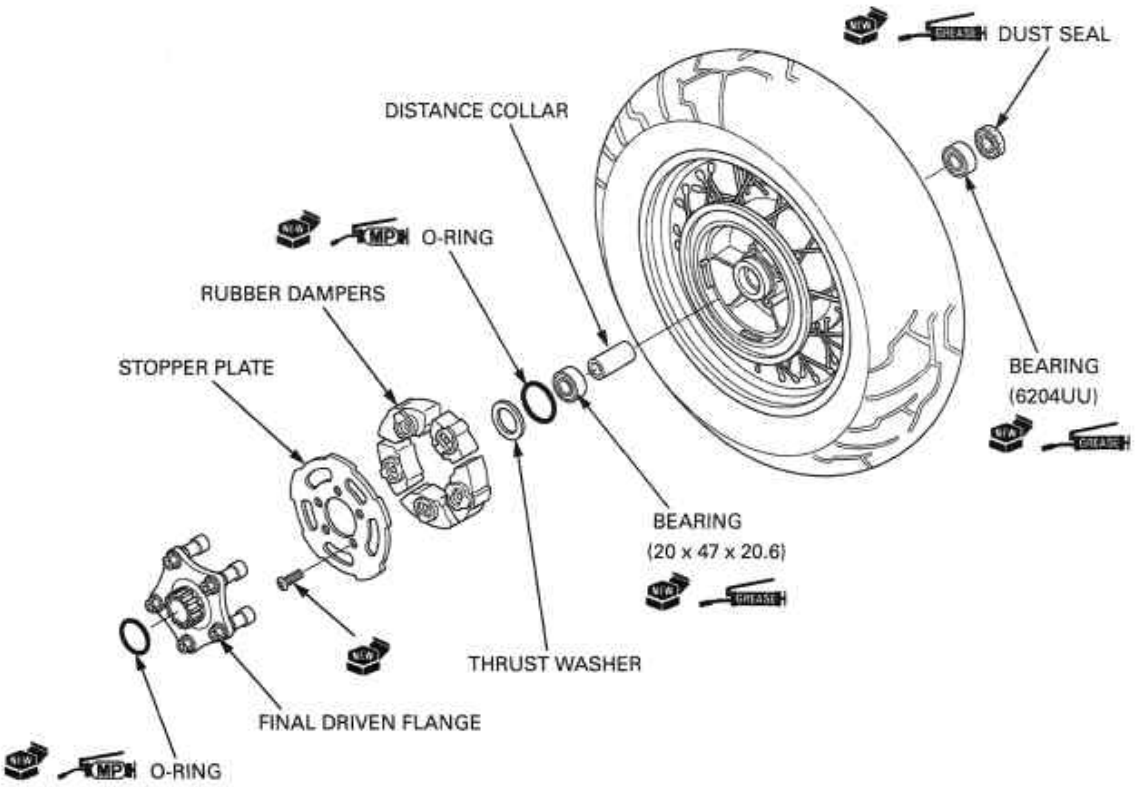
Install the remover head into the bearing.
From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	**07746-0050100**
Bearing remover head, 20 mm	**07746-0050600**



ASSEMBLY

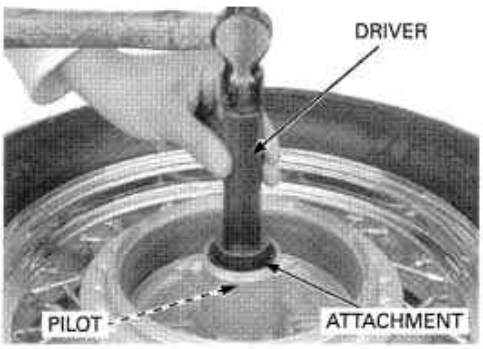


Drive in a new right bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.
Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

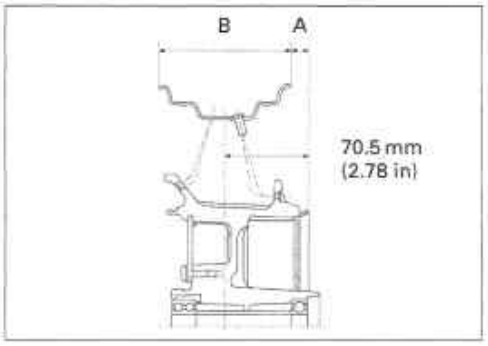
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**



WHEEL CENTER ADJUSTMENT

Measure the distance B (rim width) and calculate distance A as follows:

A = 70.5 mm (2.78 in) - B/2



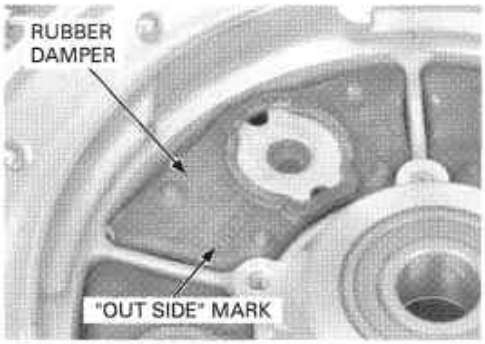
Adjust the rim position and distance A by tightening the spokes to the specified torque in several progressive steps.

TOOL:

Spoke wrench	**07JMA-MR60100 or equivalent commercially available in U.S.A.**

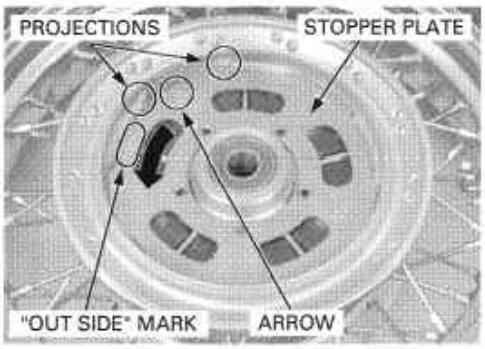
TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

Install the rubber dampers with its "OUT SIDE" mark facing out.



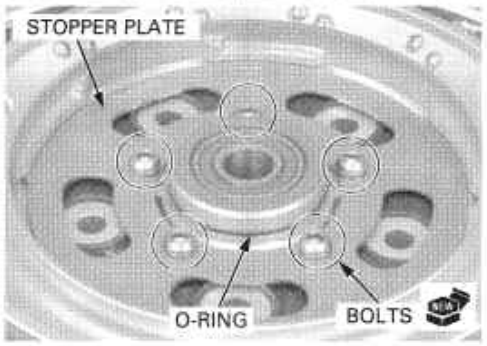
Install the stopper plate with the "OUT SIDE" mark facing up.

Install the stopper plate, aligning the arrow between the projections on the wheel hub.
Align the bolt holes by turning the stopper ring.

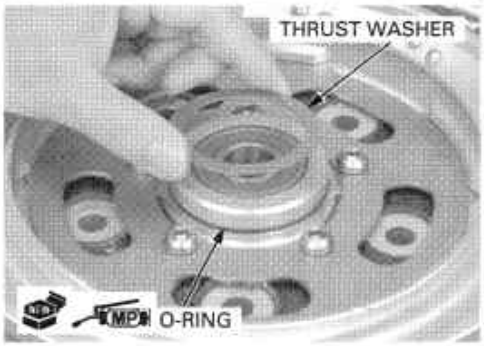


Install and tighten new bolts to the specified torque.

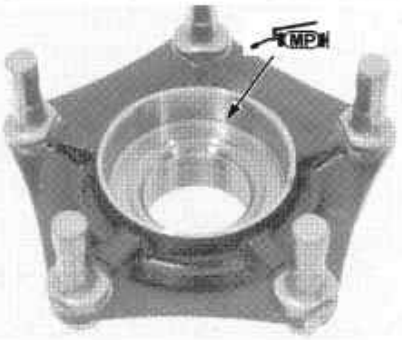
TORQUE: 20 N·m (20 kgf·m, 14 lbf·ft)



Pack molybdenum disulfide paste into the O-ring groove in the wheel hub.
Coat a new O-ring with molybdenum disulfide paste and install it into the left wheel hub groove.
Apply 2 – 3 g (0.07 – 0.11 oz) of molybdenum disulfide paste to the mating surface of the thrust washer and wheel hub end (driven flange side).

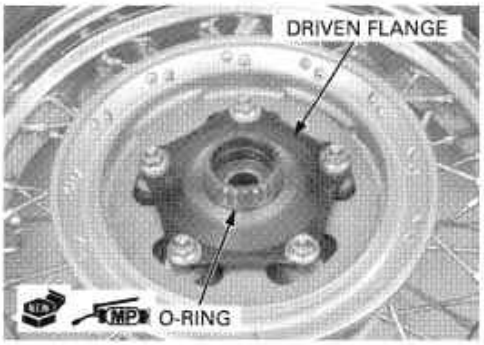


Apply 0.5 – 1.0 g (0.02 – 0.04 oz) of molybdenum disulfide paste to the mating surface of the final driven flange and thrust washer.

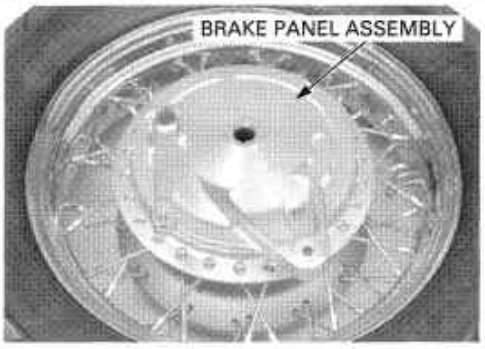


Coat a new O-ring with molybdenum disulfide paste and install it into the driven flange groove.

Install the driven flange into the left wheel hub.

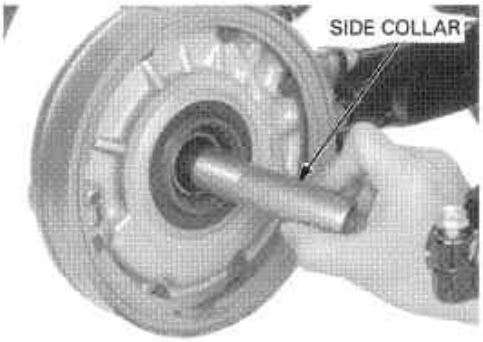


Install the brake panel assembly into the right wheel hub.



INSTALLATION

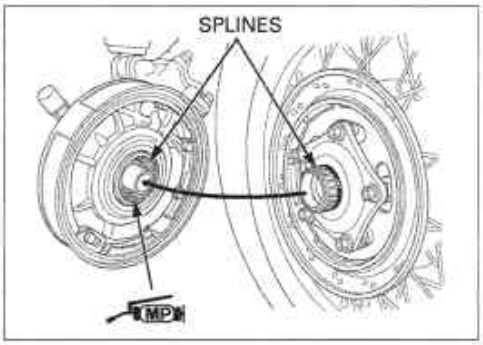
Install the left side collar into the ring gear.



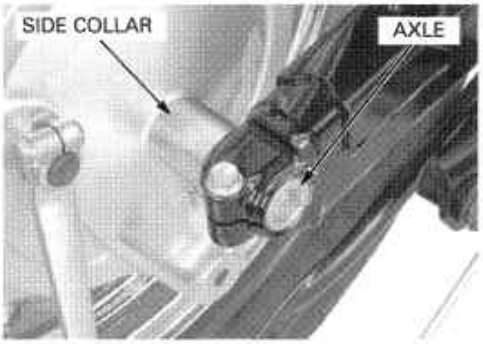
Apply 4 – 5 g (0.14 – 0.18 oz) of molybdenum disulfide paste to the joint surface of the final gear case O-ring guide and driven flange.

Hold the wheel securely and be careful not to damage the gear case.

Place the rear wheel into the swingarm and engage the driven flange spline with the ring gear spline.

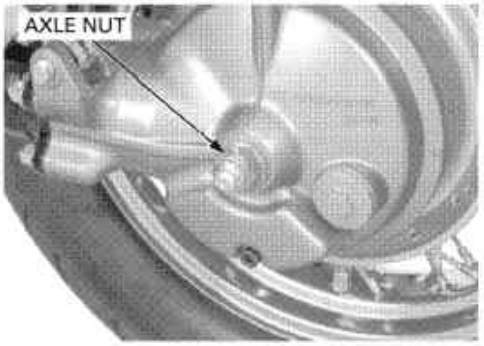


Install the right side collar and rear axle.



Install and tighten the axle nut to the specified torque while holding the axle.

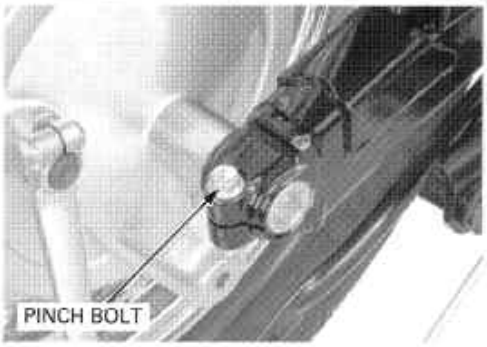
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)



With the rear brake applied, pump the swingarm up and down several times to seat the axle.

Tighten the pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



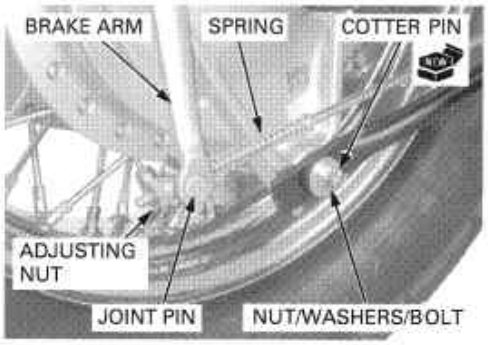
Connect the stopper arm to the brake panel with bolt, rubber washer, washer and nut.
Tighten the nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install a new cotter pin.
Install the spring, joint pin and adjusting nut.

Install the exhaust system (page 2-10).

Adjust the brake pedal free play (page 3-21).



REAR BRAKE

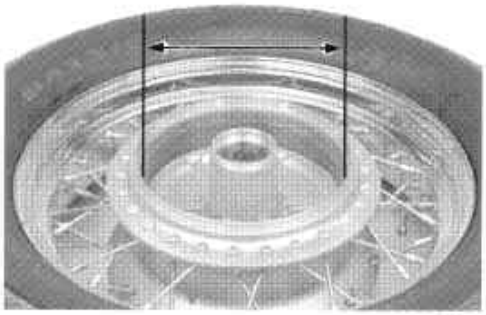
REMOVAL

Remove the rear wheel (page 15-6).
Remove the brake panel from the rear wheel (page 15-8).

INSPECTION

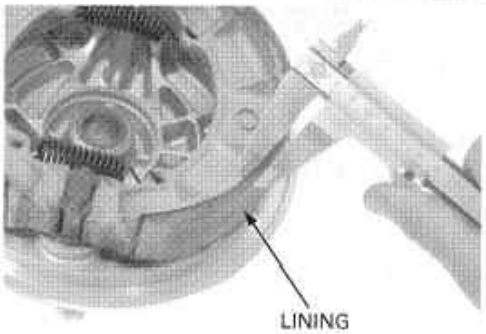
Measure the brake drum I.D.

SERVICE LIMIT: 181 mm (7.13 in)



Measure the brake lining thickness.

SERVICE LIMIT: 2.1 mm (0.08 in)

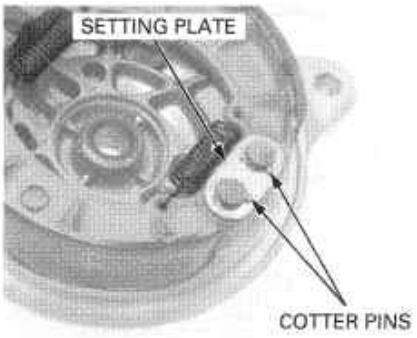


DISASSEMBLY

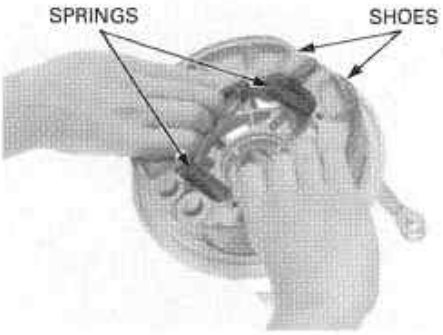
Remove the cotter pins and setting plate.

NOTE:

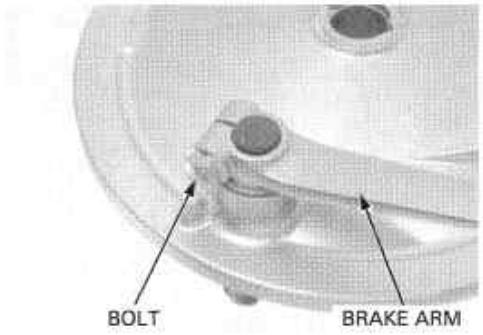
- Always replace the brake shoes as a set.
- When the brake shoes are reused, mark all parts before disassembly so they can be installed in their original locations.



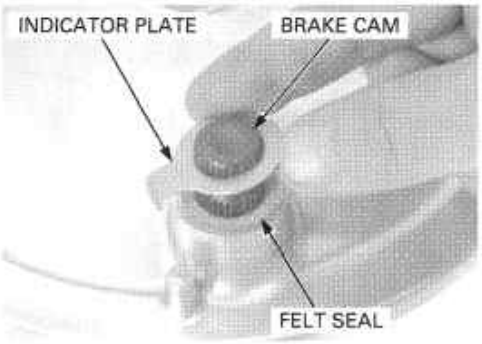
Remove the brake shoes and springs.



Remove the bolt and brake arm.

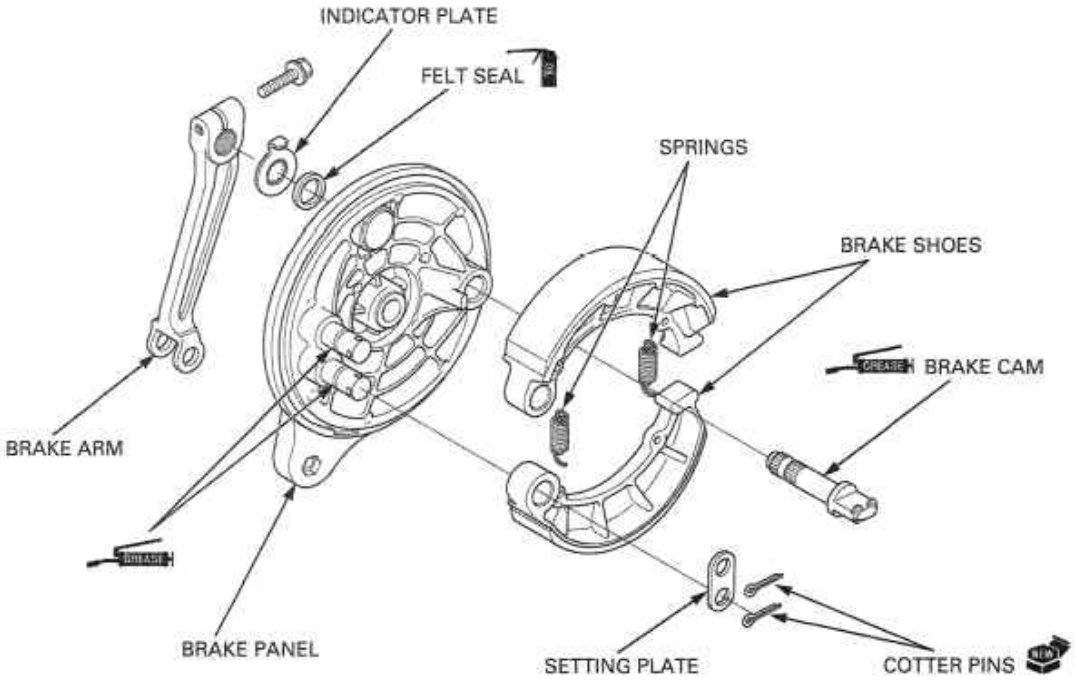


Remove the indicator plate, brake cam and felt seal.

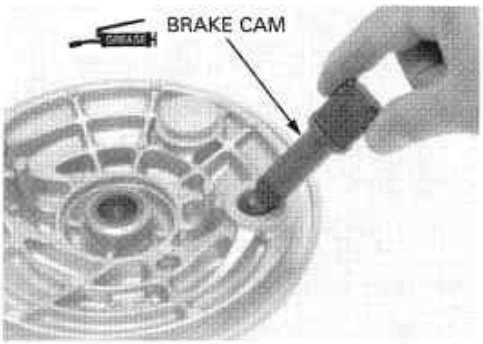


REAR WHEEL/BRAKE/SUSPENSION

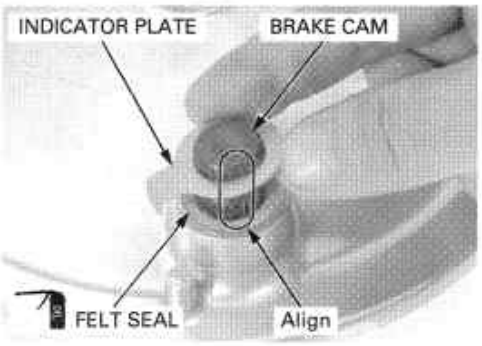
ASSEMBLY



Apply 0.5 – 1.0 g of grease to the brake cam surface.
Install the brake cam into the brake panel.

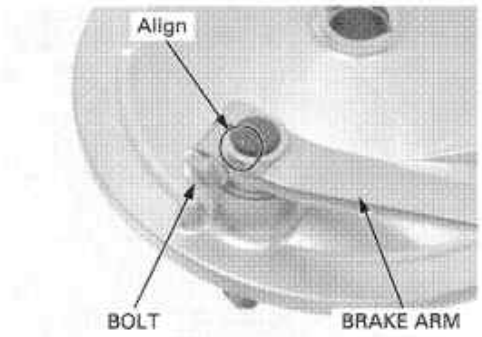


Apply oil to the felt seal and install it onto the brake panel.
Install the wear indicator plate on the brake cam aligning its wide tooth with the wide groove on the brake cam.



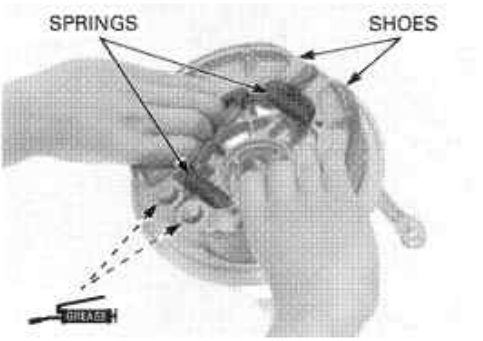
Install the brake arm aligning the punch marks of the arm and the brake cam.
Install and tighten the brake arm pinch bolt to the specified torque.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)



Apply 0.5 – 1.0 g of grease to the brake shoe-to-cam sliding surface.
Apply grease to the anchor pin sliding surface.
Install the brake shoes and springs.

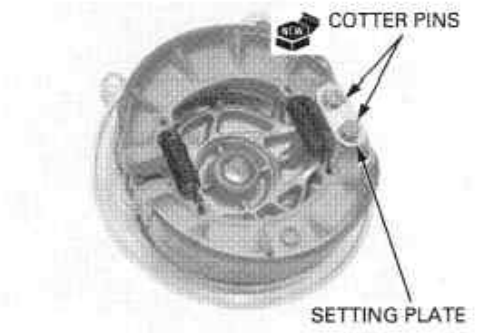
NOTE:
- If the brake shoes are reused, the shoes and springs must be placed back in their original locations.
- Install the springs with their ends facing up.



Install the setting plate and new cotter pins as shown.

INSTALLATION

Install the brake panel into the wheel hub (page 15-10).
Install the rear wheel (page 15-13).

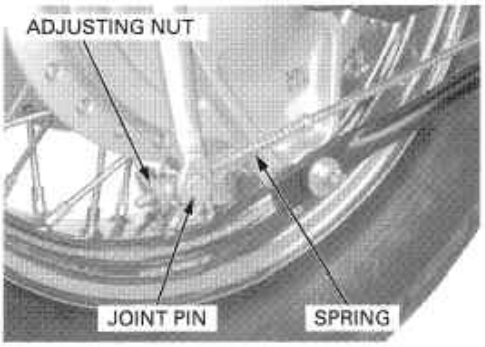


BRAKE PEDAL

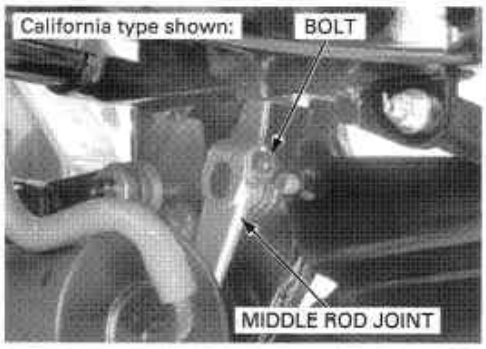
REMOVAL

Remove the exhaust system (page 2-8).

Remove the adjusting nut, joint pin and spring.

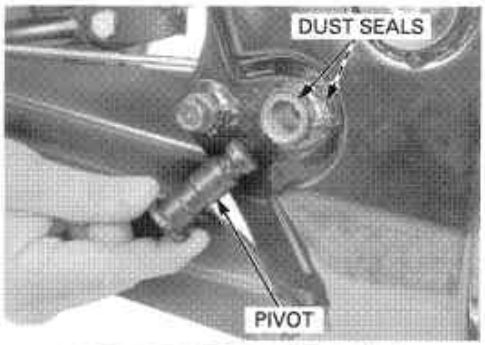


Remove the bolt and middle rod joint.



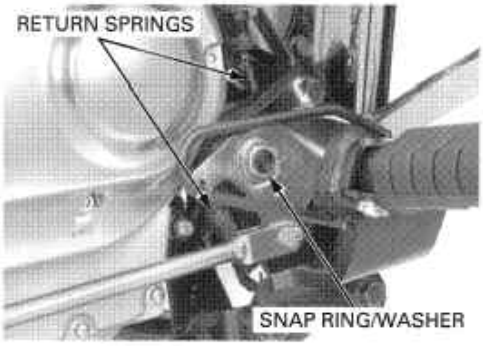
Remove the middle rod joint pivot and dust seals.

Check the dust seals for wear or damage.



Unhook the brake pedal and rear brake light switch return springs.

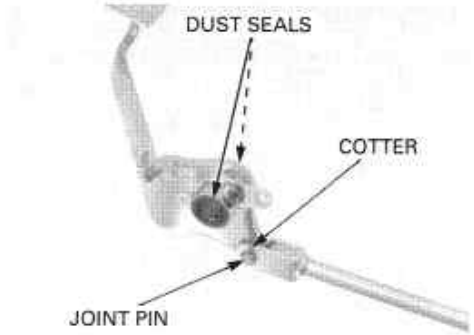
Remove the snap ring, washer and brake pedal assembly.



Remove the dust seals.

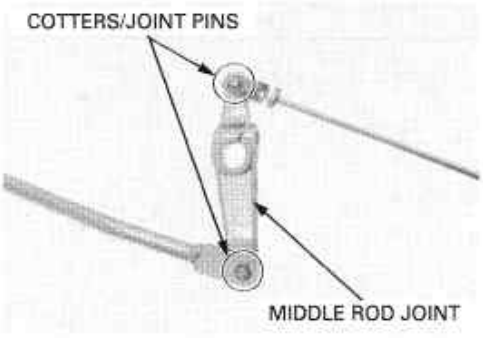
Check the dust seals for wear or damage.

Remove the cotter and joint pin.

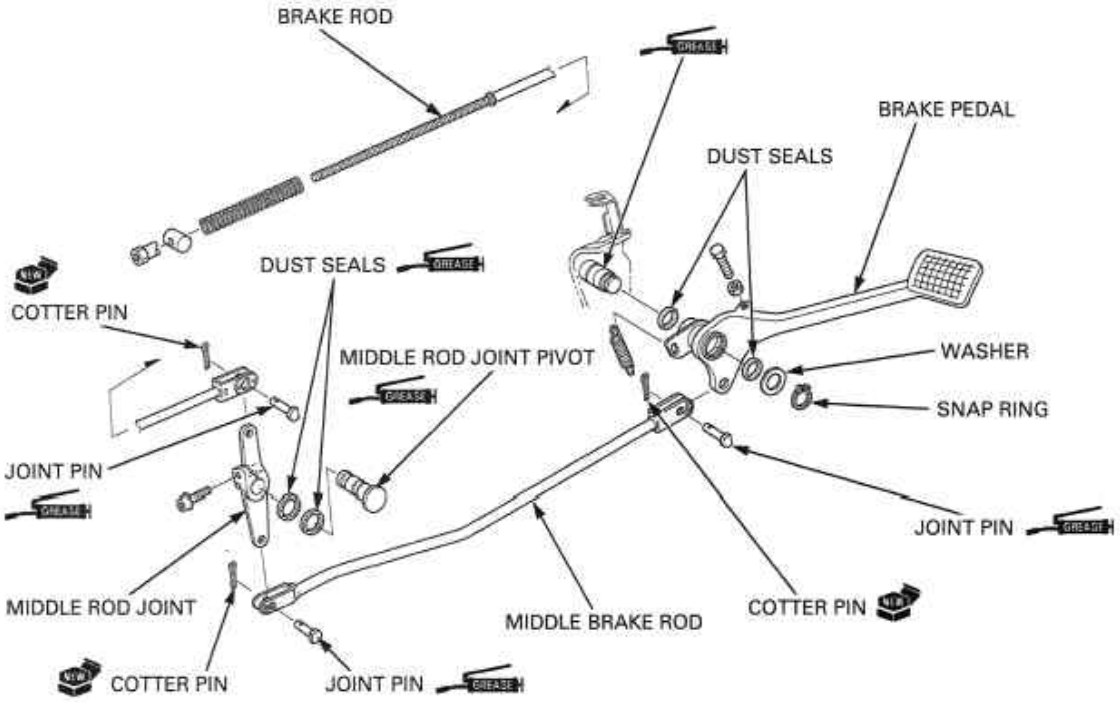


Remove the cotters and joint pins.

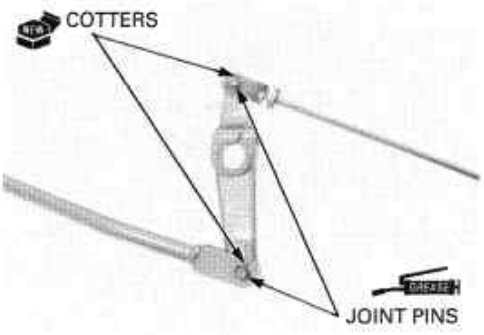
Check the brake pedal, rods, middle rod joint and pivot for wear or damage.
Check the joint pins for wear or damage.
Replace these parts if necessary.



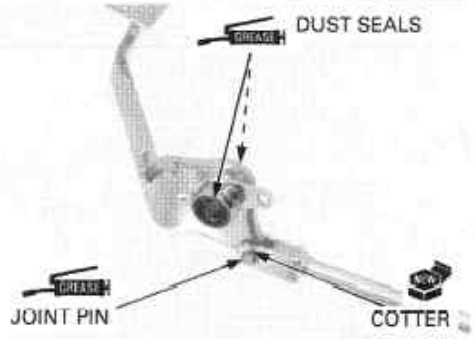
INSTALLATION



Apply grease to the joint pins.
Install the brake rods, joint pins and new cotters to the middle rod joint.



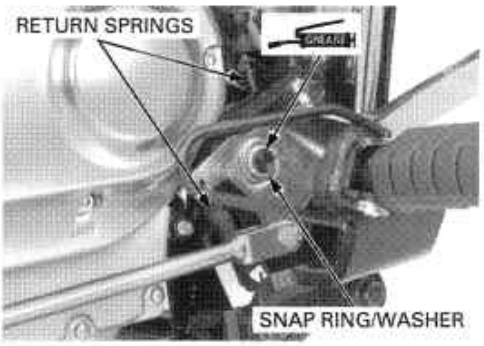
Apply grease to the joint pin.
Install the middle brake rod, joint pin and new cotter.
Apply grease to the dust seal lips.
Install the dust seals into the brake pedal.



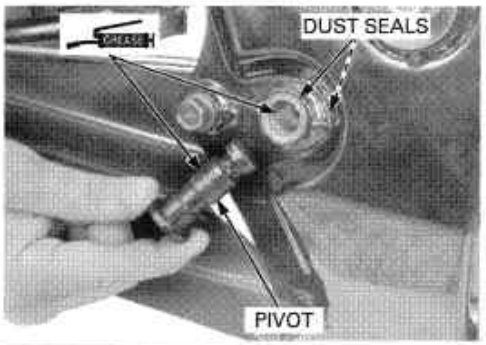
Apply grease to the brake pedal pivot sliding surface.
Install the brake pedal assembly to the bracket properly.
Install the washer and snap ring.

NOTE:
- Install the washers and snap rings with the chamfered edges facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the grooves.

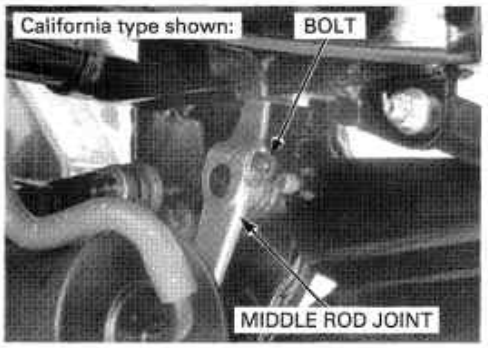
Hook the brake pedal and rear brake light switch return springs to the pedal.



Apply grease to the dust seal lips and middle joint pivot sliding surface.
Install the dust seals and middle rod joint pivot.



Install the middle rod joint to the pivot and tighten the bolt securely.

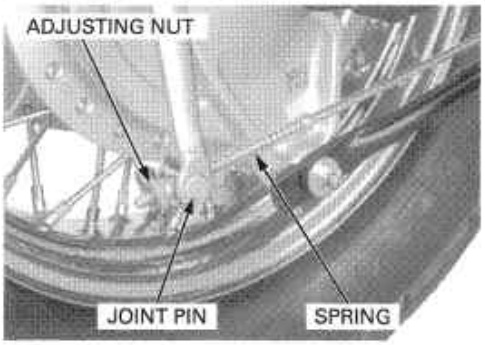


Install the spring, joint pin and adjusting nut.

Install the exhaust system (page 2-10).

Adjust the following:

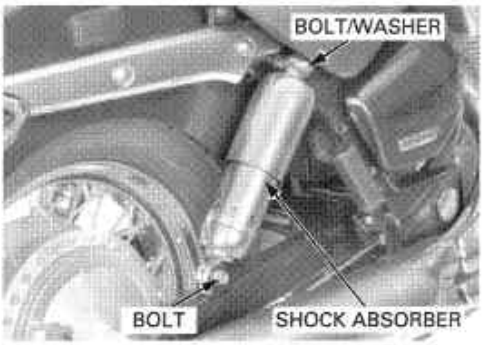
- Brake pedal free play (page 3-21)
- Brake pedal height (page 3-21)
- Rear brake light switch (page 3-22)



SHOCK ABSORBER

Support the frame and swingarm securely using a hoist or equivalent.

Remove the mounting bolts, washers, and the shock absorber.



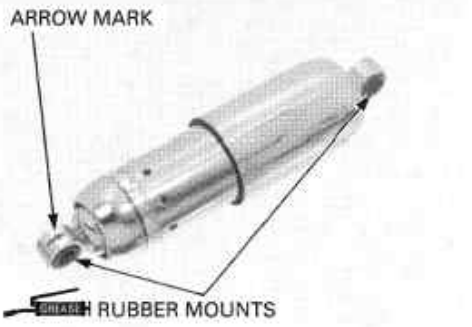
Replace the shock absorber as an assembly.

Check for deformation or oil leakage.
Check the rubber mounts for wear or damage.

Install the shock absorber with the arrow mark facing to the rear.

Install the shock absorber in the reverse order of removal.

TORQUE:
Upper mounting bolt:
26 N·m (2.7 kgf·m, 20 lbf·ft)
Lower mounting bolt (right side):
34 N·m (3.5 kgf·m, 25 lbf·ft)
Lower mounting bolt (left side):
23 N·m (2.3 kgf·m, 17 lbf·ft)



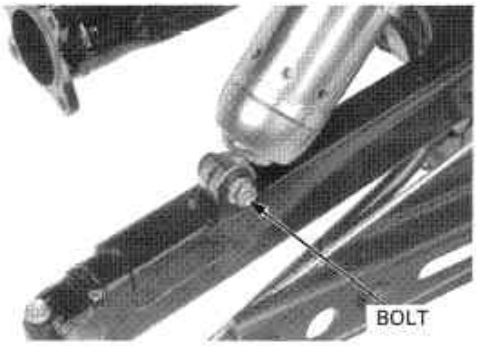
SWINGARM

REMOVAL

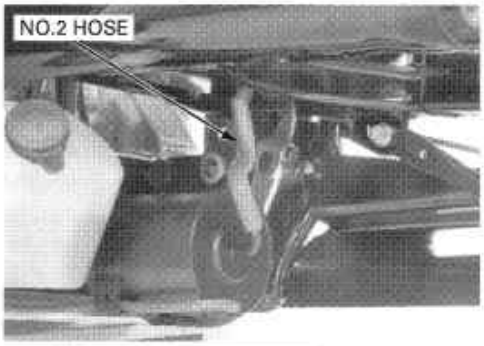
Remove the following:

- Left crankcase rear cover (page 2-6)
- Rear wheel (page 15-6)
- Final drive gear case (page 13-7)

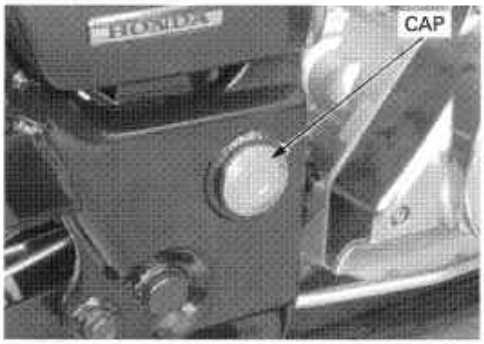
Remove the right shock absorber lower mounting bolt.



California type only: Disconnect the No.2 hose from the EVAP canister.



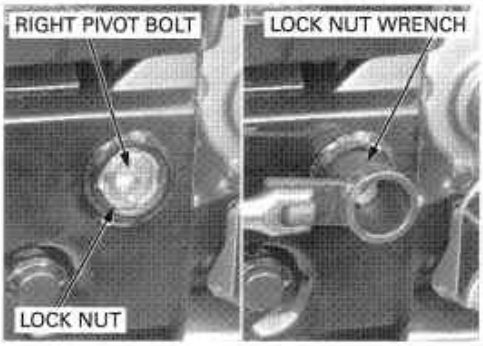
Remove the both pivot bolt caps.



Loosen the right pivot lock nut and remove it.

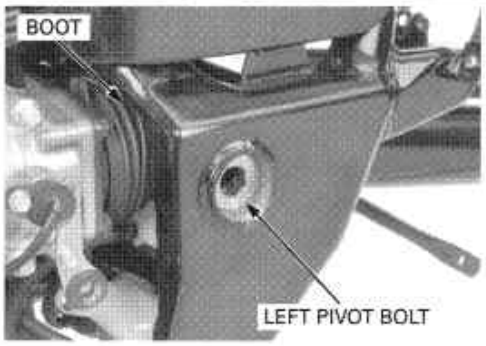
TOOL:
Lock nut wrench **07908-4690003**

Loosen the right pivot bolt.

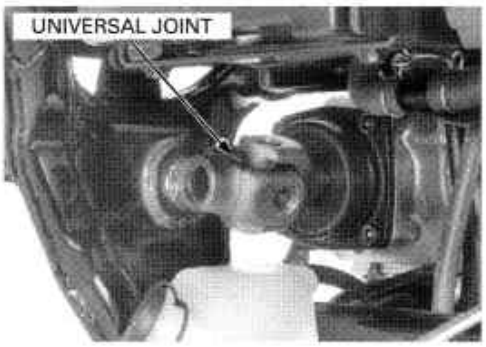


Loosen the left pivot bolt.

Release the joint boot from the output gear case. Remove the left and right pivot bolts, and swingarm from the frame.

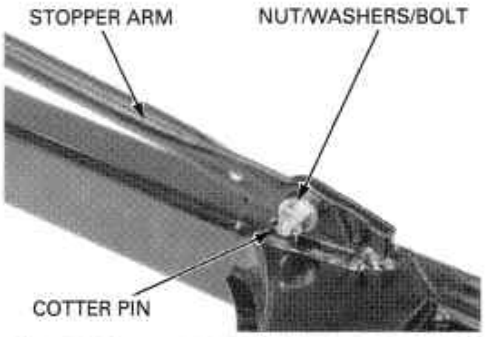


Remove the universal joint from the output shaft.



Remove the following:

- Cotter pin
- Nut
- Washer
- Spring washer
- Bolt
- Stopper arm

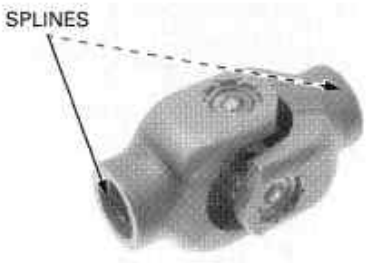


Remove the pivot bearings and joint boot.

INSPECTION

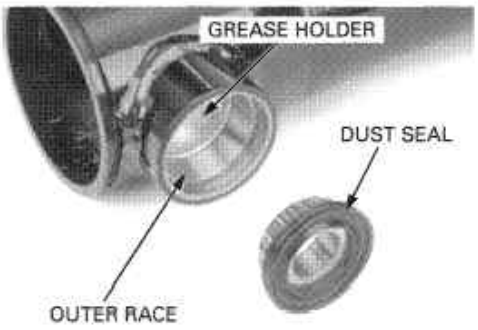
Check the boot for cuts or other damage.

Check that the universal joint moves smoothly without binding or noise.
Check the splines for wear or damage.
If damaged, check the splines of the output driven gear shaft and drive shaft also.



Both bearings, outer races and grease holders must be replaced as a set if any part is damaged or worn.

Check the bearings and dust seals for wear or damage.
Check the outer races for wear or damage.
Check the grease holders for damage or deformation.

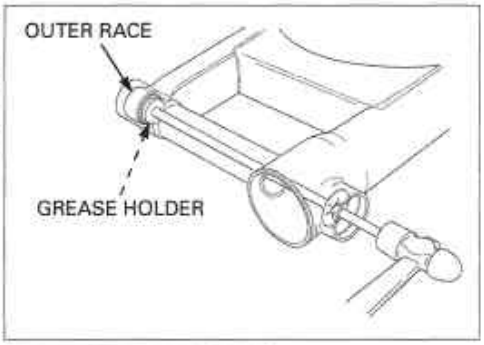


PIVOT BEARING OUTER RACE REPLACEMENT

Punch or drill an appropriate hole into the grease holder.

Insert a suitable driver through the swingarm and drive the other outer race and grease holder out of the swingarm.

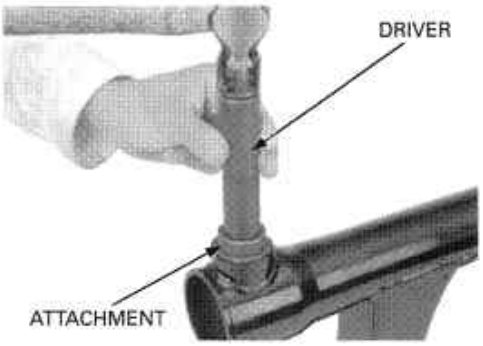
Drive the punched or drilled side outer race and grease holder out of the swingarm.



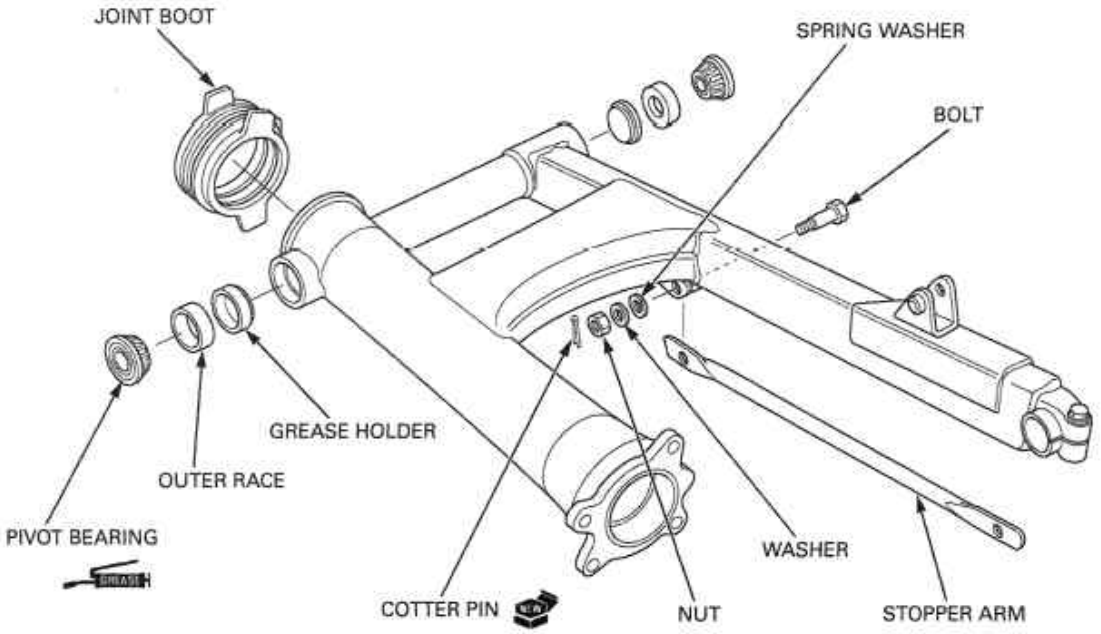
Install a new grease holder into the pivot.
Drive in a new outer race squarely until it is fully seated.

TOOLS:

Driver	**07949-0010000**
Attachment, 37 x 40 mm	**07746-0010200**



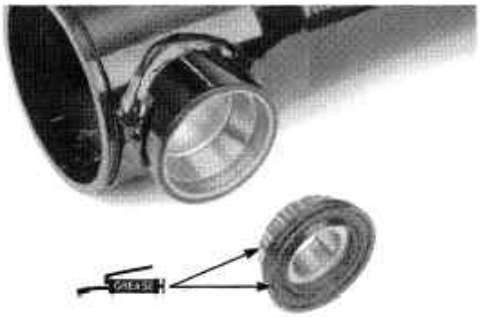
INSTALLATION



NOTE:
Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

- Excelite EP2 (Kyodo Yushi) or
- Stamina EP2 (Shell) or equivalent

Apply 1 – 1.5 g (0.04 – 0.05 oz) of grease to the needle rollers and dust seal lips of each bearing. Install the bearings into the swingarm pivots.

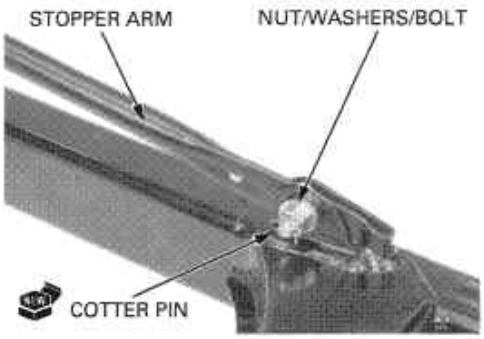


Install the joint boot into the swingarm groove properly with the "UP" mark facing up.

Install the following:

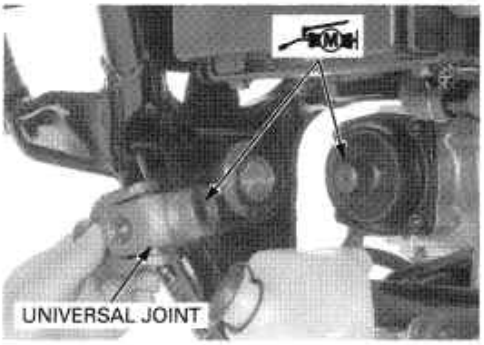
- Stopper arm
- Bolt
- Spring washer
- Washer
- Nut

Tighten the nut and install a new cotter pin.



Apply 1 g (0.04 oz) of molybdenum disulfide grease to the output shaft splines.

Install the universal joint onto the output shaft.



Set the swingarm into the frame and hold it.

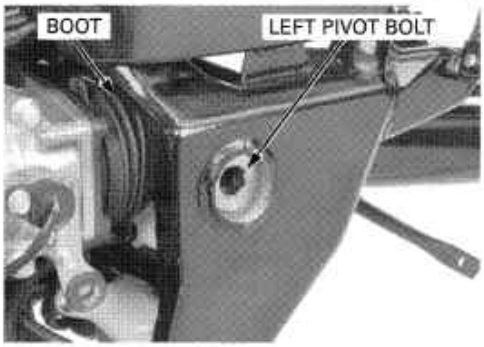
Install the joint boot over the output gear case.

Carefully align the swingarm pivots with the pivot bolts.

Install the left and right pivot bolts.

Tighten the left pivot bolt to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

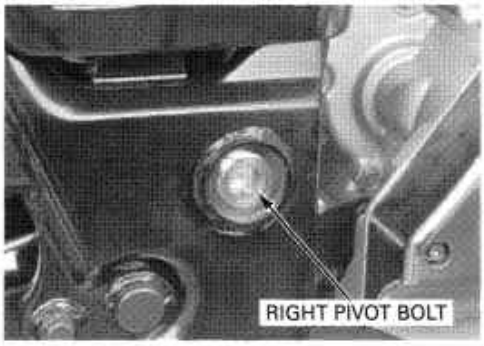


Temporarily tighten the right pivot bolt to the specified torque.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

Move the swingarm up and down several times to seat the pivot bearings.
Loosen the right pivot bolt counterclockwise 1/4 turn (90°) and tighten it to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

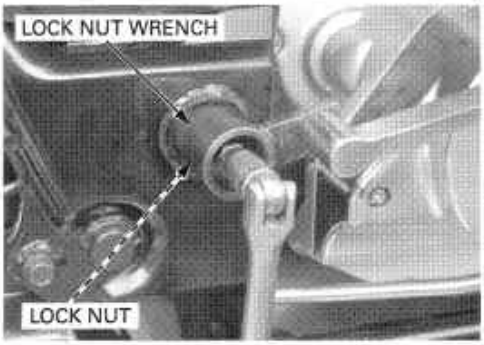


Install the right pivot lock nut.
Tighten the lock nut while holding the pivot bolt.

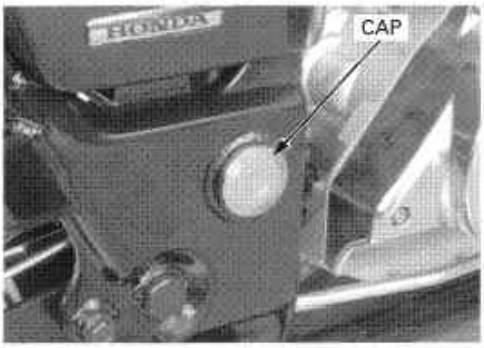
TOOL:
Lock nut wrench 07908-4690003

Refer to torque wrench reading information on page 15-3 "Service Information"

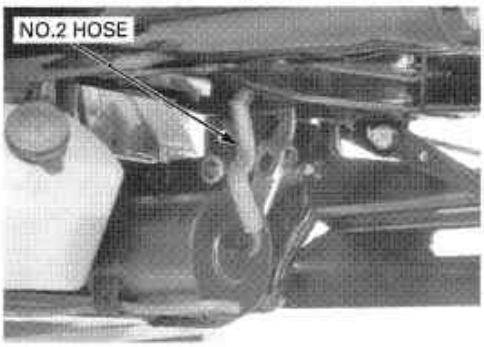
TORQUE:
Actual: 103 N·m (10.5 kgf·m, 76 lbf·ft)
Indicated: 93 N·m (9.5 kgf·m, 69 lbf·ft)



Install the pivot caps.



California type only: Connect the No.2 hose to the EVAP canister.

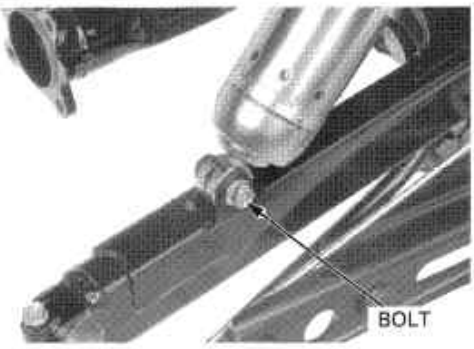


Install and tighten the right shock absorber lower mounting bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

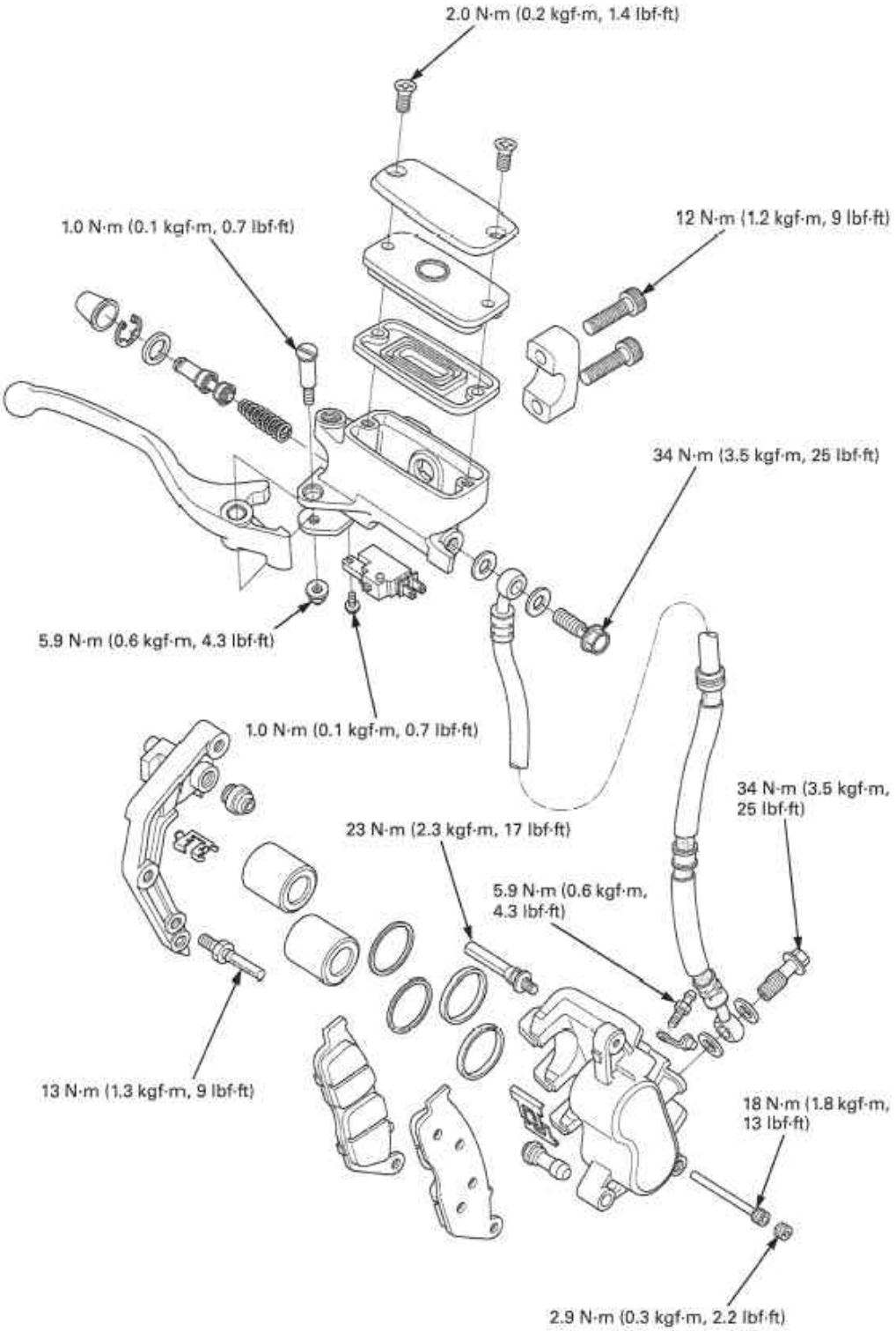
Install the following:

- Final drive gear case (page 13-22)
- Rear wheel (page 15-13)
- Left crankcase rear cover (page 2-6)



16. HYDRAULIC BRAKE

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (e.g., dirt, water) to enter 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 as they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Specified brake fluid		DOT 4	–
Front	Brake disc thickness	5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc wrapage	–	0.30 (0.012)
	Master cylinder I.D.	11.000 – 11.043 (0.4331 – 0.4348)	11.05 (0.435)
	Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0023)
	Caliper piston O.D.	25.335 – 25.368 (0.9974 – 0.9987)	25.320 (0.9968)

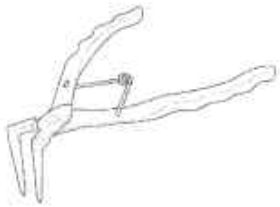
TORQUE VALUES

Brake caliper bleed valve	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Front master cylinder reservoir cap screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft	
Brake pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Brake pad pin plug	2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Front brake light switch screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper bracket pin	13 N·m (1.3 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Front brake caliper pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply locking agent to the threads
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one

HYDRAULIC BRAKE

TOOL

Snap ring pliers
07914-SA50001



TROUBLESHOOTING

Brake lever soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Bent brake lever

Brake lever hard
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever

Brake drag
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

BRAKE FLUID REPLACEMENT/AIR BLEEDING

NOTICE

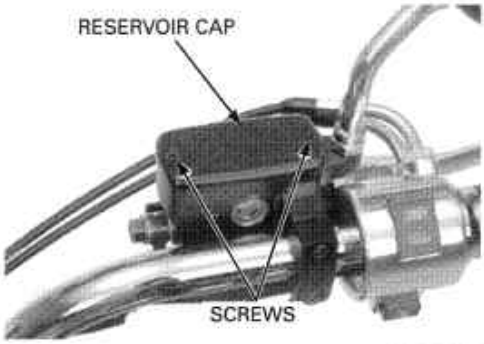
Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

NOTE:

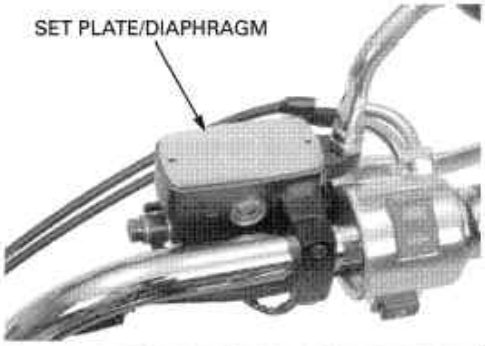
- Do not allow foreign material to enter the system when filling the reservoir.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

BRAKE FLUID DRAINING

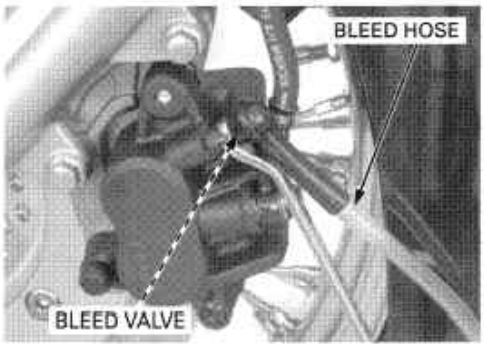
Turn the handlebar to the left until the front master cylinder reservoir is level before removing the reservoir cap.
Remove the screws and reservoir cap.



Remove the set plate and diaphragm.



Connect a bleed hose to the bleed valve.
Loosen the bleed valve and pump the brake lever until no more fluid flows out of the bleed valve.
Tighten the bleed valve.

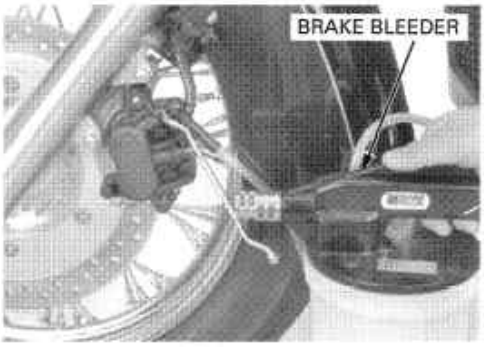


HYDRAULIC BRAKE

BRAKE FLUID FILLING/BLEEDING

Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.
Operate the brake bleeder and loosen the bleed valve.
If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir is low.



NOTE:

- Check the fluid level often while bleeding to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Perform the bleeding procedure until the system is completely flushed/bled.

NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever. If it is still spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:

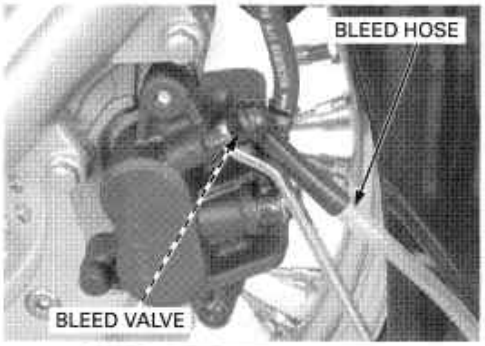
Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a bleed hose to the bleed valve.

Pressurize the system with the brake lever until lever resistance is felt.

Do not release the lever until the bleed valve has been closed.

1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.



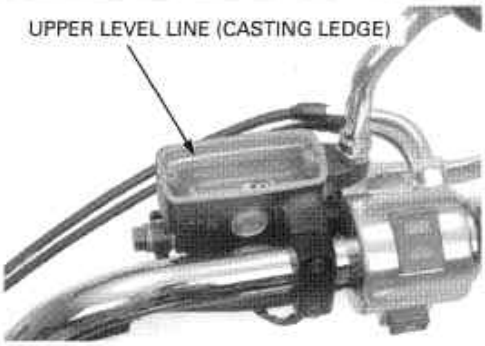
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1and 2 until air bubbles do not appear in the bleed hose.

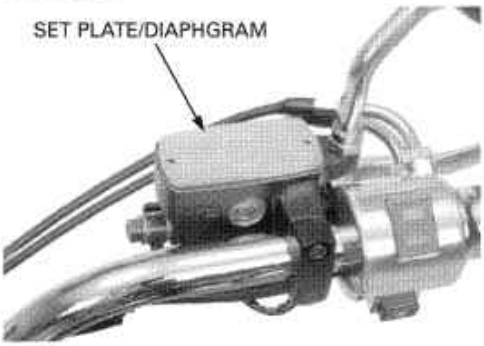
After bleeding the air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid.

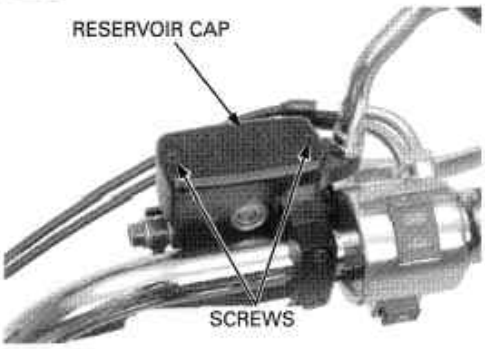


Install the diaphragm and set plate.



Install the reservoir cap and tighten the screws to the specified torque.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)



BRAKE PAD/DISC

BRAKE PAD REPLACEMENT

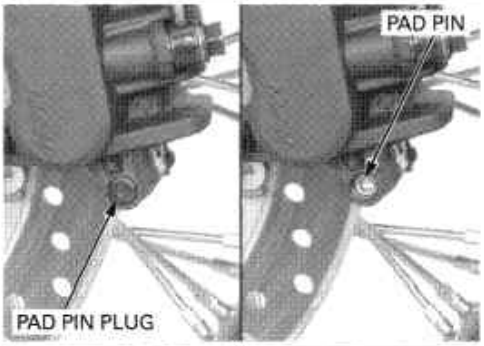
Check the brake fluid level in the reservoir as this operation causes the level to rise.

Push the caliper piston all the way in to allow installation of new brake pads.

HYDRAULIC BRAKE

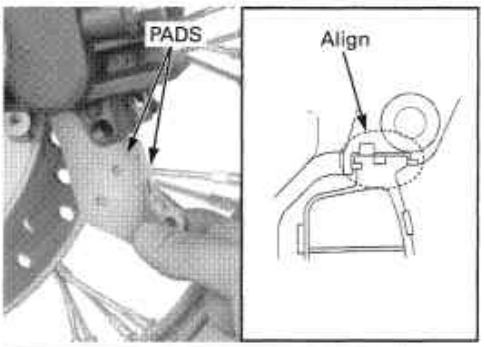
Remove the pad pin plug and loosen the pad pin.

Pull the pad pin out of the caliper body while pushing in the pads against the pad spring.
Remove the brake pads.



Make sure the pad spring is installed correctly.

Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.



Always replace the brake pads in pairs to ensure even disc pressure.

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

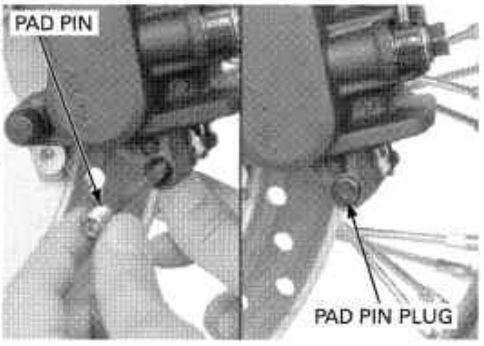
Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug and tighten it to the specified torque.

TORQUE: 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)

Operate the brake lever to seat the caliper piston against the pads.

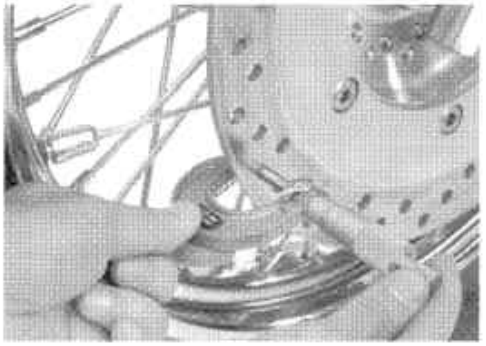


BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

SERVICE LIMIT: 5.0 mm (0.20 in)

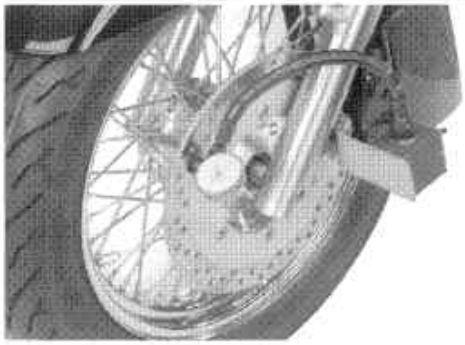


Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.30 mm (0.012 in)

Check the bearing for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the bearings are normal.

For brake disc replacement, refer to page 14-12.



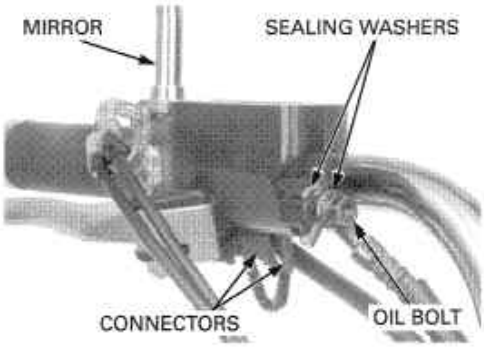
MASTER CYLINDER

DISASSEMBLY

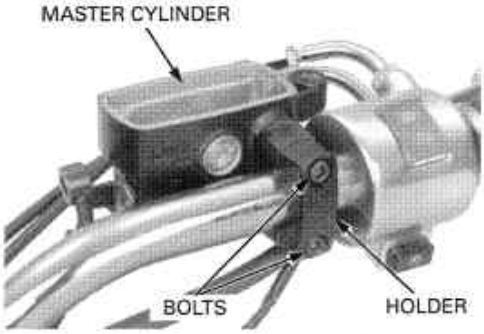
Drain the brake fluid from the hydraulic system (page 16-5).

When removing the oil bolt, cover the end of the hose to prevent contamination.

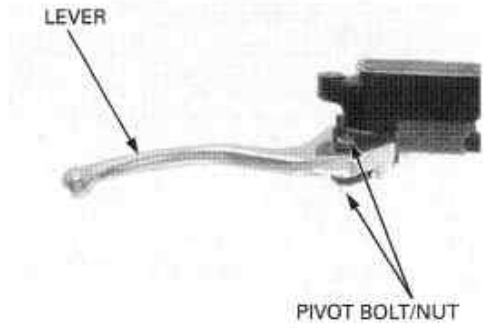
Remove the rear view mirror.
Remove the oil bolt and sealing washers.
Disconnect the front brake light switch connectors.



Remove the bolts, holder and master cylinder.

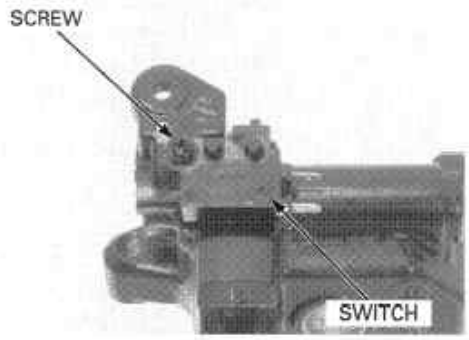


Remove the nut, pivot bolt and brake lever.

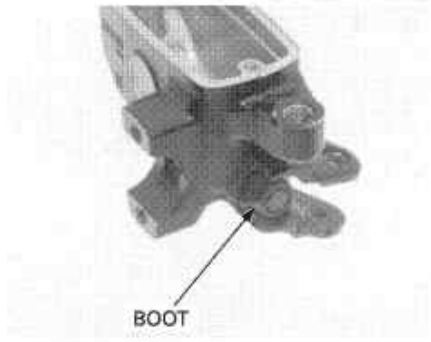


HYDRAULIC BRAKE

Remove the screw and front brake light switch.

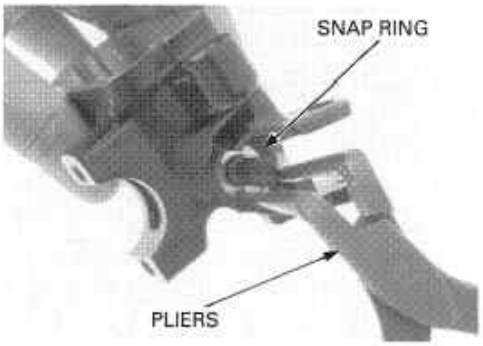


Remove the boot.



Remove the snap ring using a special tool.

TOOL:
Snap ring pliers **07914-SA50001**

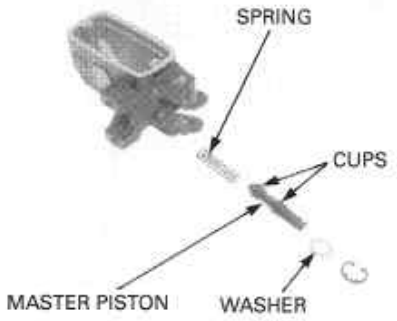


Remove the washer, master piston and spring.

Clean the master cylinder, reservoir and master piston in clean brake fluid.

INSPECTION

Check the piston cups and boot for wear, deterioration or damage.
Check the spring for fatigue or damage.
Check the master cylinder and piston for scoring, scratches or damage.



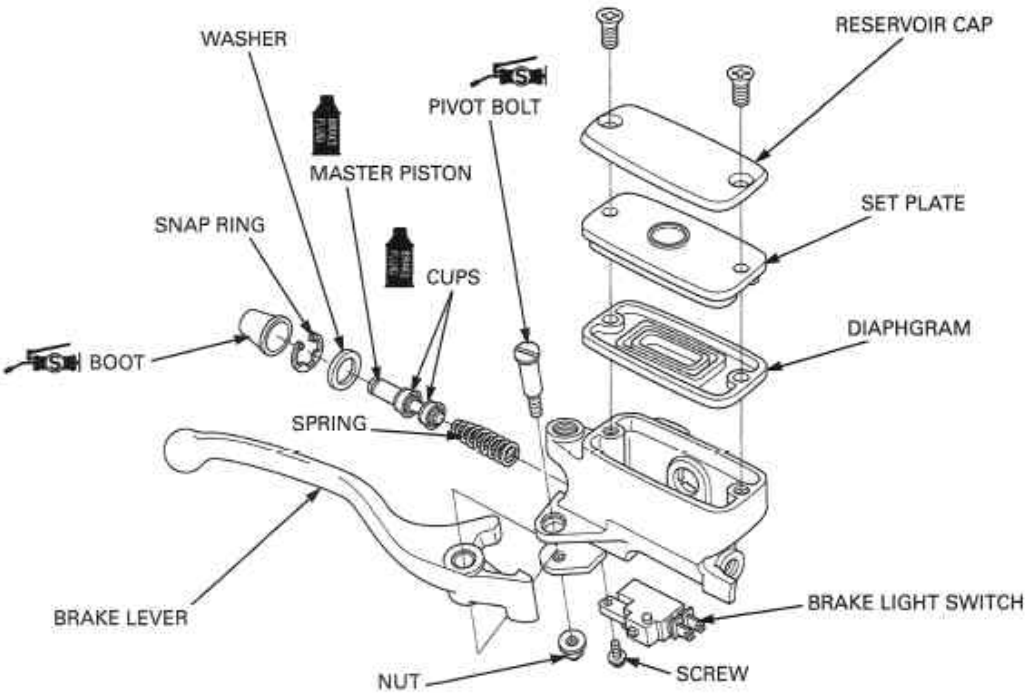
Measure the master cylinder I.D.

SERVICE LIMIT: 11.05 mm (0.435 in)

Measure the master piston O.D.

SERVICE LIMIT: 10.945 mm (0.4309 in)

ASSEMBLY



HYDRAULIC BRAKE

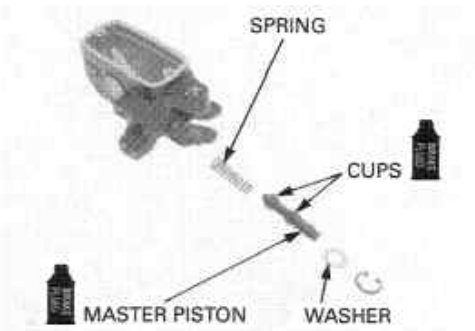
NOTE:
Replace the piston, spring, cups, washer and snap ring as a set.

Coat the master piston and piston cups with clean brake fluid.
Install the spring onto the piston end.

Do not allow the piston cup lips to turn inside out.

Install the master piston/spring into the master cylinder.

Install the washer on the piston.

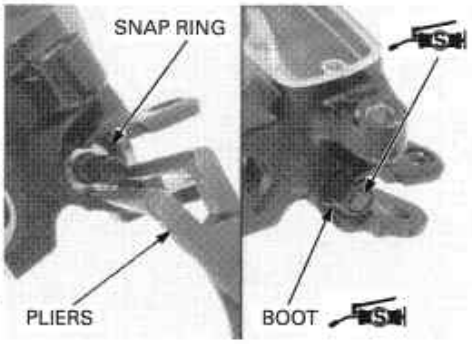


Install the snap ring into the groove in the master cylinder using a special tool.

TOOL:
Snap ring pliers 07914-SA50001

- Install the snap ring and washer with the chamfered edges facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the grooves.

Apply 0.1 g of silicone grease to the boot inner surface.
Install the boot into the master cylinder and the piston groove.

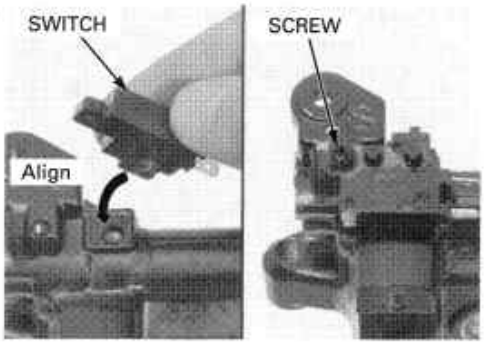


Apply silicone grease to the brake lever contacting surface of the piston.

Install the brake light switch, aligning its boss with the groove of the master cylinder.

Install and tighten the screw to the specified torque.

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

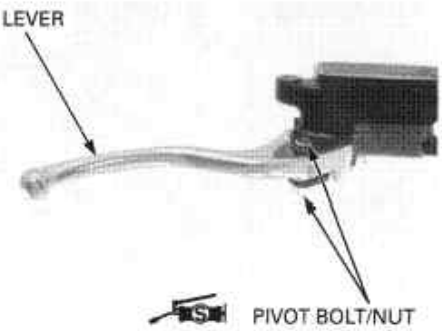


Apply 0.1 g of silicone grease to the brake lever pivot.
Install the brake lever and pivot bolt, and tighten it to the specified torque.

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

Tighten the nut to the specified torque while holding the pivot bolt.

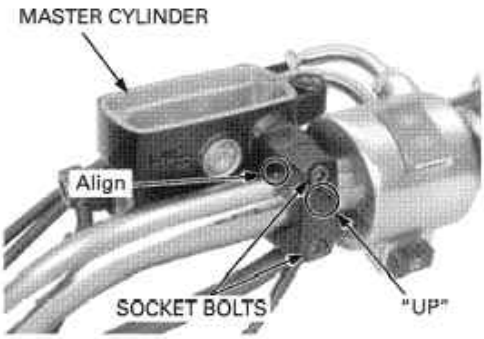
TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)



Install the holder with its "UP" mark facing up.

Install the master cylinder with the holder and two bolts.
Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Be sure to rest the hose joint pin against the stopper.

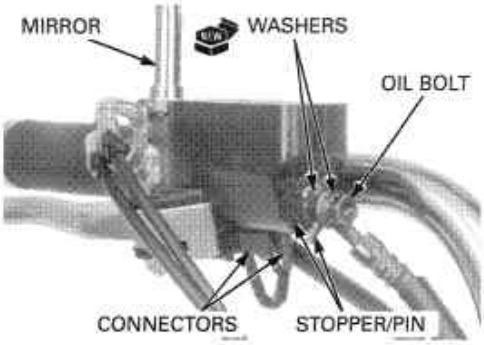
Connect the brake hose to the master cylinder with the oil bolt and new sealing washers.
Tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the rear view mirror.

Connect the brake light switch connectors.

Fill and bleed the hydraulic system (page 16-6).



FRONT BRAKE CALIPER

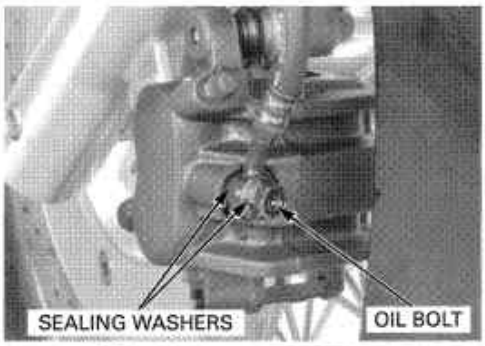
DISASSEMBLY

Drain the brake fluid from the hydraulic system (page 16-5).

Remove the brake pads (page 16-7).

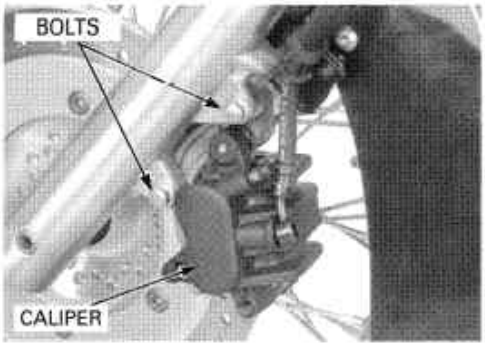
When removing the oil bolt, cover the end of the hose to prevent contamination.

Remove the oil bolt and sealing washers.



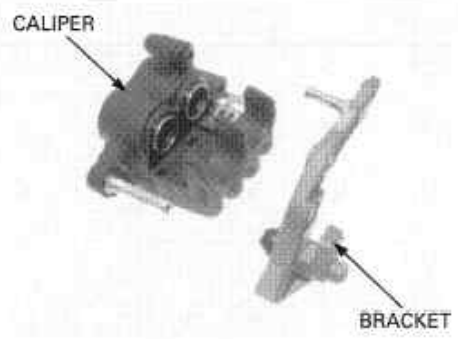
Do not reuse the bolts.

Remove the mounting bolts and caliper assembly.

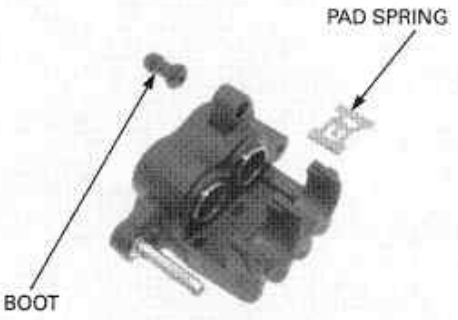


HYDRAULIC BRAKE

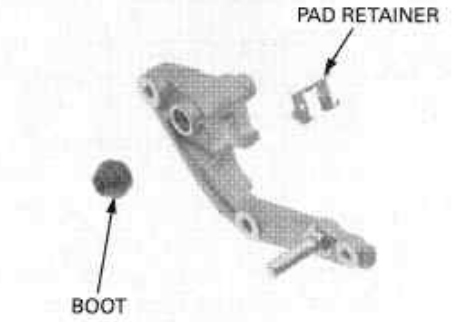
Disassemble the bracket from the caliper.



Remove the bracket pin boot and pad spring from the caliper.

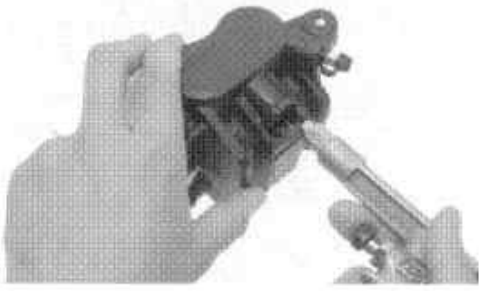


Remove the caliper pin boot and pad retainer from the bracket
Clean the retainer and bracket mating surfaces.



Do not use high pressure air or bring the nozzle too close the inlet.

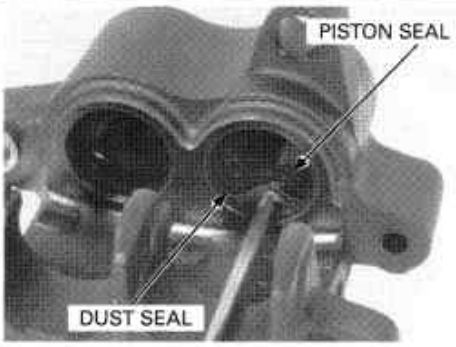
Place a shop towel over the pistons.
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust and piston seals in and lift them out.

Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.

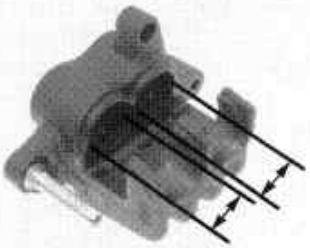


INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMIT: 25.460 mm (1.0023 in)



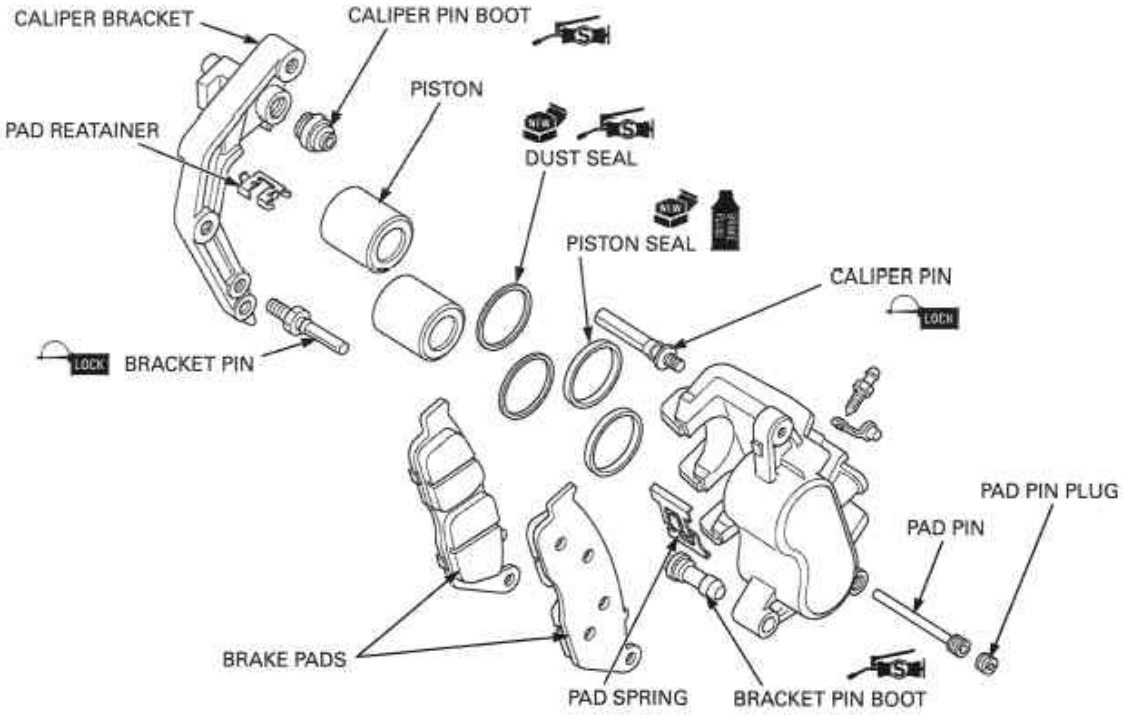
Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 25.320 mm (0.9968 in)

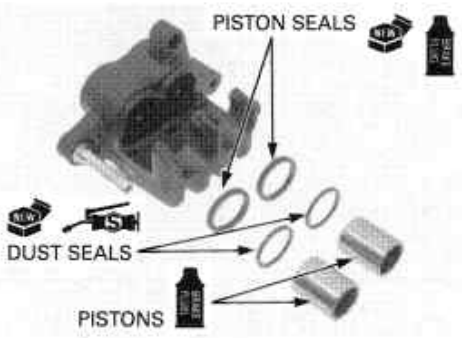
HYDRAULIC BRAKE

ASSEMBLY



Coat new piston seals with clean brake fluid, new dust seals with silicone grease and install them into the seal grooves in the caliper.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

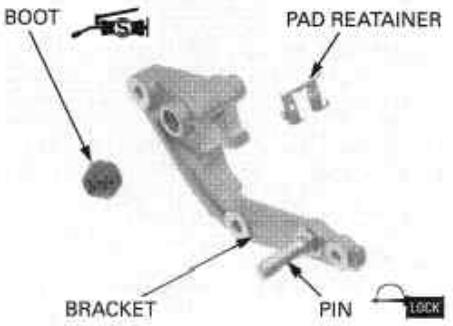


Check the caliper pin boot and replace it if they are hard, deteriorated or damaged.
Apply silicone grease to the inside of the caliper pin boot.
Install the caliper pin boot in the bracket.

Apply Honda Bond A or equivalent to the pad retainer mating surface.
Install the retainer onto the bracket.

If the bracket pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



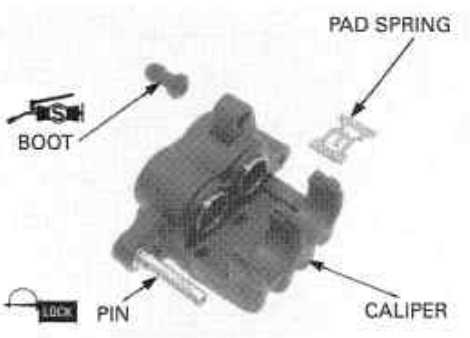
Check the bracket pin boots and replace them if they are hard, deteriorated or damaged.

Apply silicone grease to the inside of the bracket pin boot.

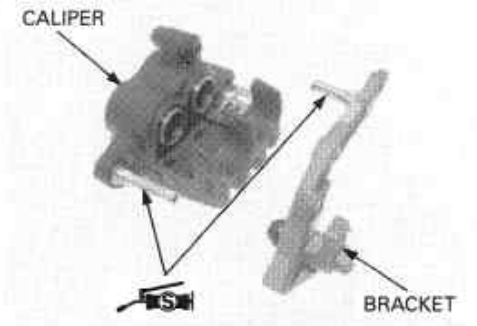
Install the bracket pin boot and pad spring in the caliper.

If the caliper pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



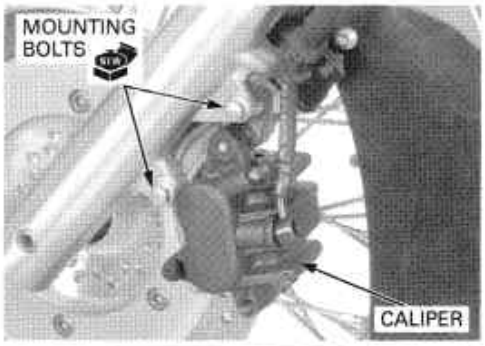
Apply silicone grease to the caliper and bracket pins.
Assemble the caliper bracket and the caliper body.



Install the brake caliper so the disc is positioned between the pads, being careful not to damage the pads.

Install new mounting bolts and tighten them to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

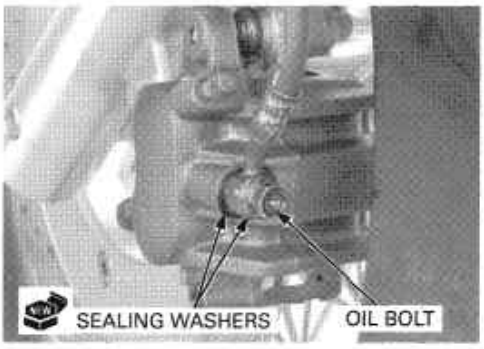


Connect the brake hose to the caliper with the oil bolt and new sealing washers, and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 16-7).

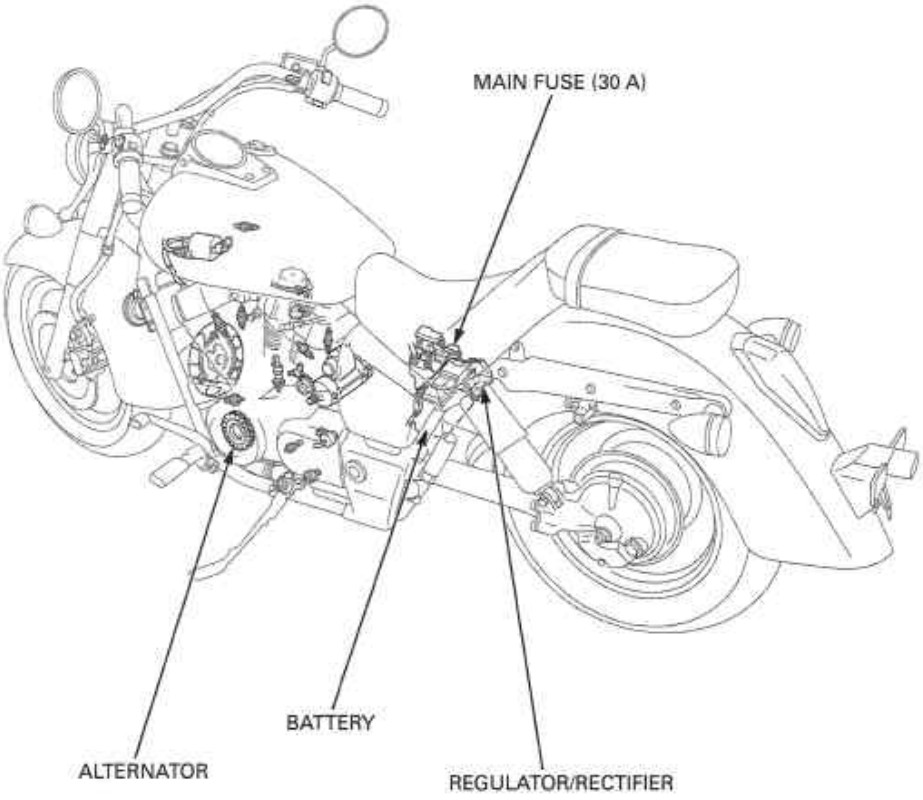
Fill and bleed the hydraulic system (page 16-6).



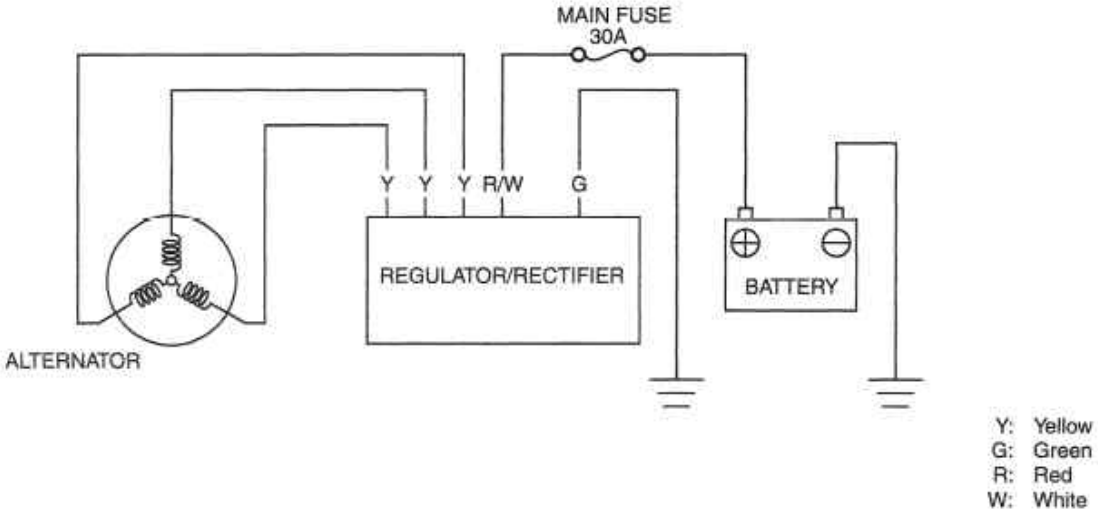
MEMO

17. BATTERY/CHARGING SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space.
- For 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 (MF) battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for 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, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When servicing the charging system, always follow the steps in the troubleshooting flow chart (page 17-5)
- For alternator service, refer to page 11-4.

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals after installation.
- For 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.

Recommended battery charger: Christie battery charger MC1012/2 (U.S.A. only)

BATTERY TESTING

Refer to the battery tester's Operation Manual for the recommended battery testing procedure.
The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

Recommended battery tester: BM-210-AH or BM-210 (U.S.A. only)

BATTERY/CHARGING SYSTEM

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 10Ah or 12V – 11Ah
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		346 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TORQUE VALUES

Battery box cover screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. **BATTERY TEST**

   Remove the battery (page 17-6).

   Check the battery condition using the recommended battery tester (page 17-7).

   RECOMMENDED BATTERY TESTER: BM210-AH or BM-210 (U.S.A. only)

   Is the battery 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 17-9).

   Is the current leakage below 1 mA?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.

3. **CURRENT LEAKAGE TEST WITHOUT REGURETOR/RECTIFIRE CONNECTOR**

   Disconnect the regulator/rectifier connector and recheck the battery current leakage.

   Is the current leakage below 1 mA?

   YES – Faulty regulator/rectifier.

   NO – • Shorted wire harness.
   • Faulty ignition switch.

4. **ALTERNATOR CHARGING COIL INSPECTION**

   Check the alternator charging coil (page 17-10).

   Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20°C/68°F)?

   NO – Faulty charging coil.

   YES – GO TO STEP 5.

5. **CHARGING VOLTAGE INSPECTION**

   Measure and record the battery voltage using a digital multimeter (page 17-6).

   Start the engine.

   Measure the charging voltage (page 17-9).

   Compare the measurements to result of the following calculation.

   STANDARD: Measured battery voltage < Measured charging voltage < 15.5 V

   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 connectors (page 17-10).

   Are the results of checked voltage and resistance correct?

   YES – Faulty regulator/rectifier.

   NO – • Open circuit in related wire.
   • Loose or poor contacts of related terminal.
   • Shorted wire harness.

BATTERY

REMOVAL/INSTALLATION

Remove the following:

- Seat (page 2-3).
- ICM (page 18-9).

Remove the screw.
Remove the battery case cover by unhooking the battery case hooks.

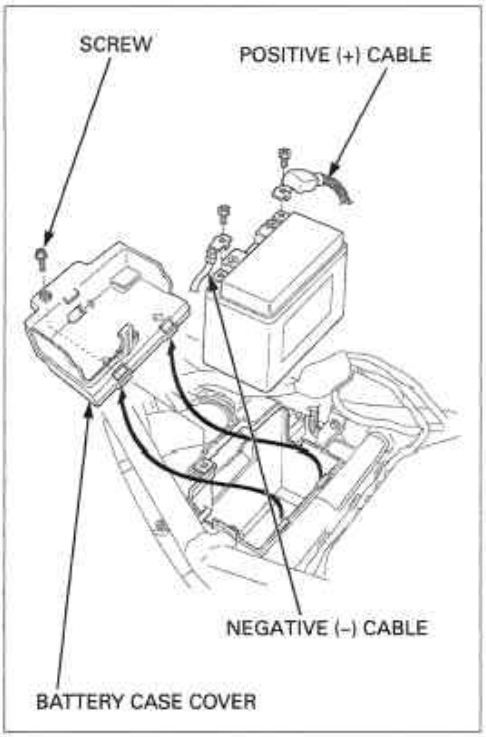
With the ignition switch turned to "OFF", disconnect the battery negative (–) cable first, then disconnect the battery positive (+) cable.
Remove the battery from the battery case.

Install the battery in the reverse order of removal.

NOTE:

- Connect the positive (+) cable first, then connect the negative (–) cable.
- After connecting the battery cables, coat the terminals with grease.

TORQUE:
Battery box cover screw:
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



VOLTAGE INSPECTION

Remove the battery case cover (page 17-6).

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F): Fully charged: 13.0–13.2 V
Under charged: Below 12.4 V

BATTERY TESTING

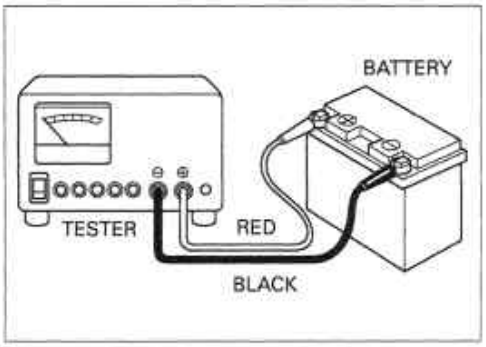
Remove the battery (page 17-6).

For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.

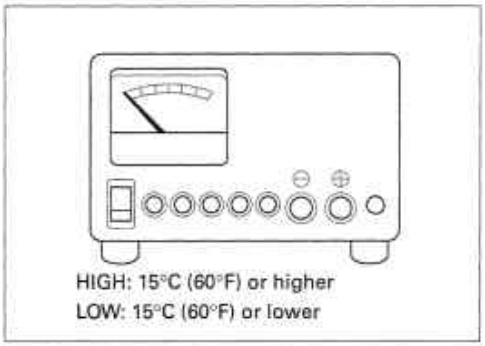
Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

TOOL:

Battery tester **BM-210-AH or BM-210 (U.S.A. only)**



Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.

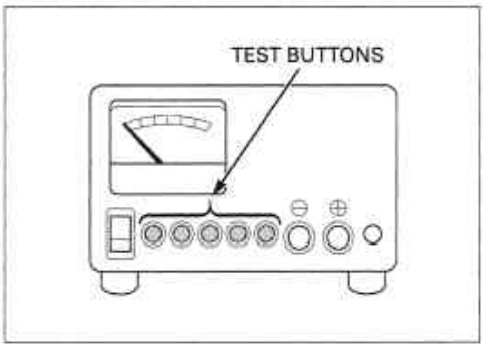


For the first check, do not charge the battery before testing; test it in an 'as is' condition.

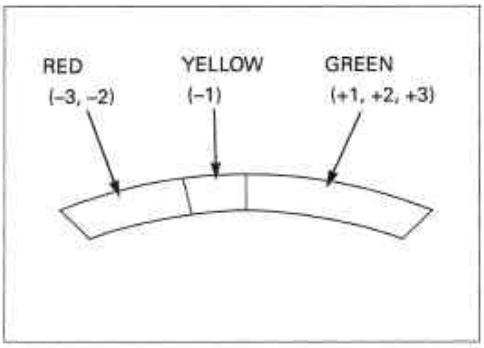
Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

NOTICE

- *To avoid damaging the tester, only test batteries with an amperage rating of less than 30 Ah.*
- *Tester damage can result from overheating when:*
  - *The test button is pushed in for more than 3 seconds.*
  - *The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.*
  - *More than ten consecutive tests are performed without allowing at least a 30 minute cool-down period.*



The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any battery reading in the green zone is OK. The battery should only be charged if they register in the YELLOW or RED zone.



BATTERY CHARGING

Remove the battery (page 17-6).

NOTE:

- Make sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.

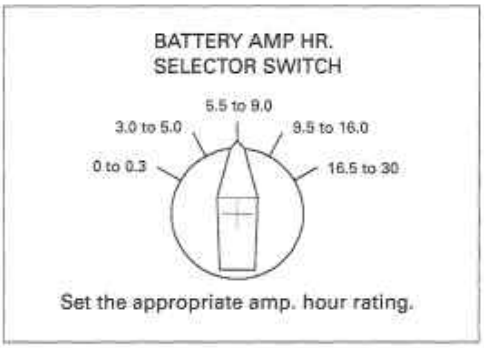
Turn the power ON/OFF at the charger, not at the battery terminal.

1. Turn the "POWER" switch to "OFF".

TOOL:

Christie battery charger	**MC1012/2 (U.S.A. only)**

2. Set the "BATTERY AMP. HR. SELECTOR SWITCH" for the size of the battery being charged.



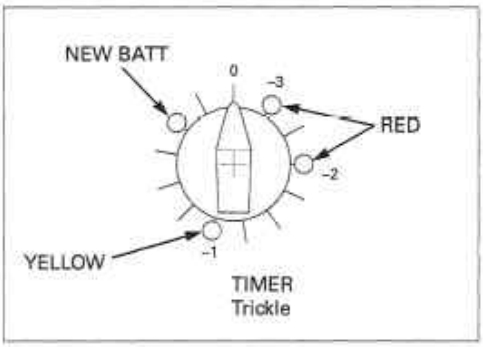
Set the appropriate amp. hour rating.

3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED –3, RED –2 or YELLOW –1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: red to positive, black to negative.

Connecting the cables with the POWER switch turned to "ON" can produce a spark which could ignite or explode the battery.

Connect the battery cables only when the "POWER" switch is turned to "OFF".

5. Turn the "POWER" switch to "ON".



The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.

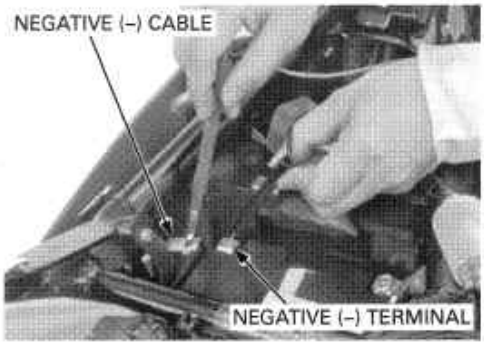
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" switch to "OFF" and disconnect the clamps.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Retest the battery using the Honda Battery Tester and recharge if necessary using the above steps.

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE TEST

Remove the battery case cover (page 17-6).

With the ignition switch turned to "OFF", disconnect the negative (–) cable from the battery.
Connect the ammeter (+) probe to the negative (–) cable and the ammeter (–) probe to the battery (–) terminal.
With the ignition switch turned to "OFF", check for current leakage.



NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition switch to "ON". A sudden surge of current may blow the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 1 mA maximum

If current leakage exceeds the specified value, a shorted circuit is the probable cause.
Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

NOTE:

Make sure the battery is in good condition before performing this test.

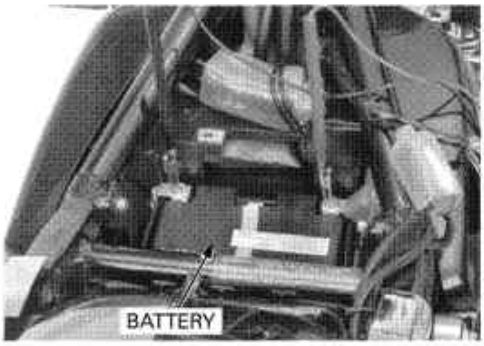
Connect a tachometer.

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

Remove the battery case cover (page 17-6).
Connect the ICM 22P connector.

Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.

Connect the multimeter between the positive and negative terminals of the battery.



NOTE:

To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on high beam, restart the engine. Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

STANDARD:

Measured battery voltage (page 17-6) < Measured charging voltage < 15.5 V

REGULATOR/RECTIFIER

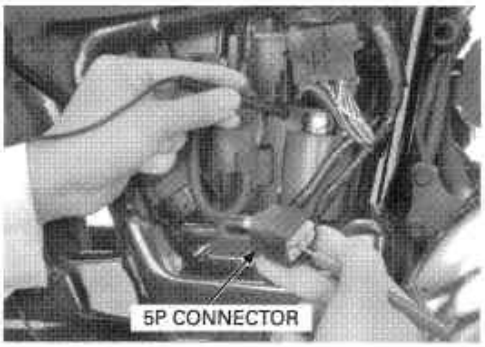
WIRE HARNESS INSPECTION

BATTERY CHARGING LINE

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

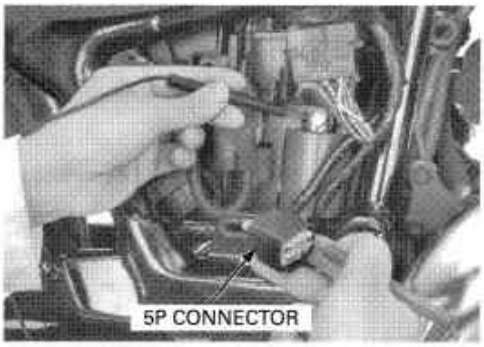
With the ignition switch turned to "OFF", disconnect the regulator/rectifier 5P connector.

Measure the voltage between the Red/white wire terminal (+) of the wire harness side connector and ground (–).
There should be battery voltage at all times.



GROUND LINE

Check for continuity between the Green wire terminal of the wire harness side connector and ground (–).
There should be continuity at all times.



CHARGING COIL LINE

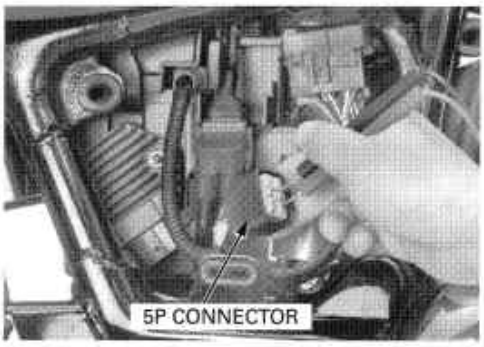
Check the continuity between the Yellow wire terminal and ground.

There should be no continuity.

Measure the resistance between the Yellow wire terminals.

STANDARD: 0.1 – 1.0 Ω at 20°C (68°F)

If the resistance measured at the regulator/rectifier 5P connector is abnormal, measure the resistance at the alternator 3P connector (page 17-11).



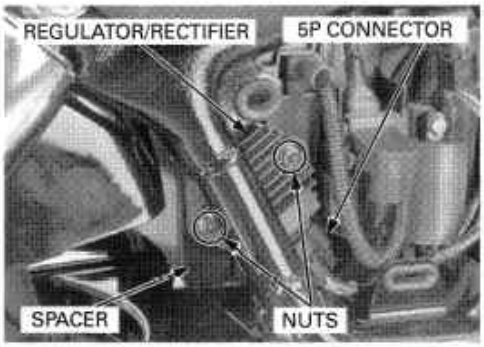
REMOVAL/INSTALLATION

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

With the ignition switch turned to "OFF", disconnect the regulator/rectifier 5P connector.

Remove the nuts, regulator/rectifier and spacer.

Install the regulator/rectifier in the reverse order of removal.

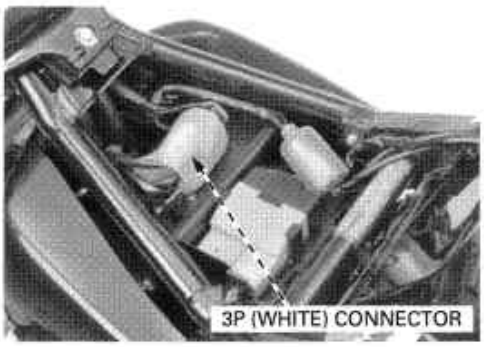


ALTERNATOR CHARGING COIL

INSPECTION

Remove the seat (page 2-3).

With the ignition switch turned to "OFF", disconnect the alternator 3P (White) connector.



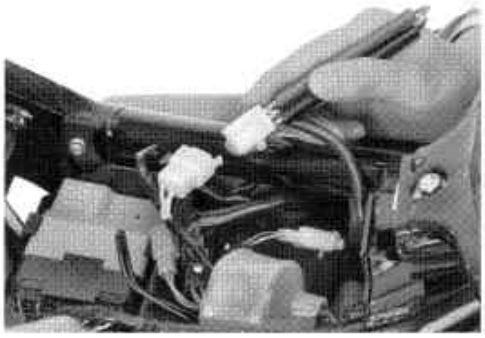
Measure the resistance between the Yellow wire terminals.

STANDARD: 0.1 – 1.0 Ω at 20°C (68°F)

Check for continuity between each wire terminals of the alternator/stator side connector and ground. There should be no continuity.

Replace the stator if the resistance is out of specification, or if any wire has continuity to ground.

For alternator/starter replacement, refer to page 11-4.

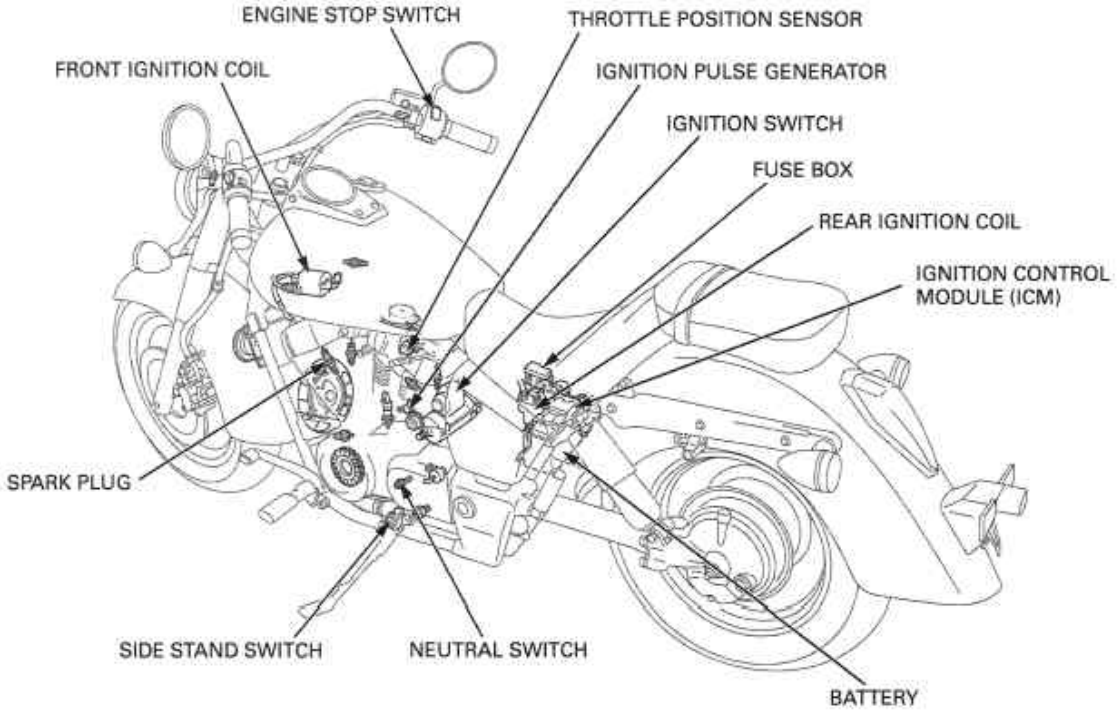


MEMO

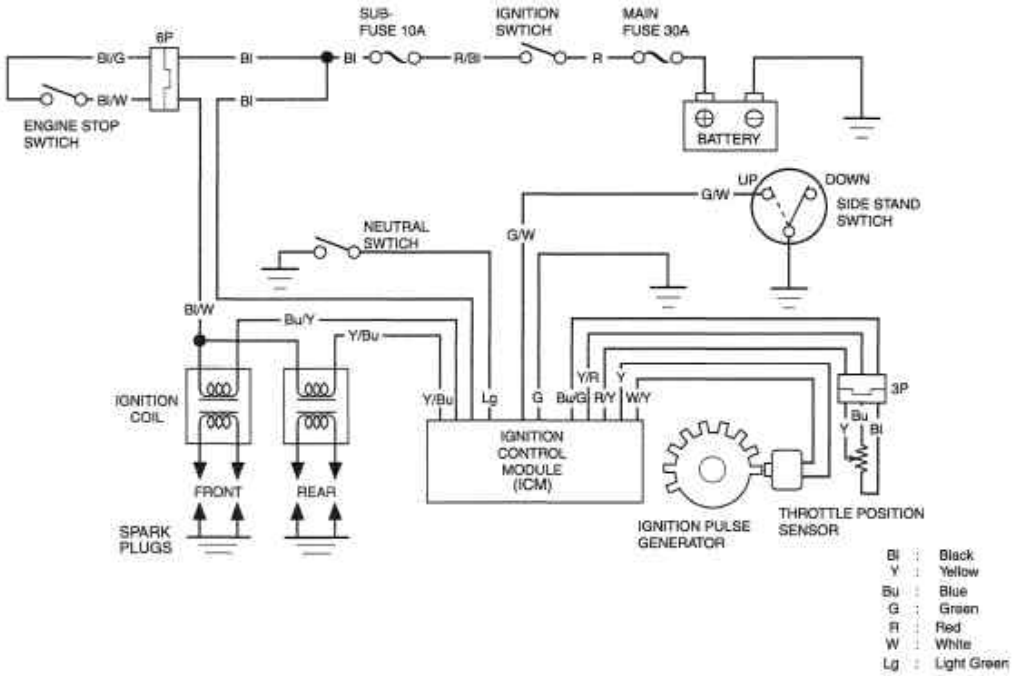
18. IGNITION SYSTEM

IGNITION SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- The Ignition Control Module (ICM) may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ICM. Always turn the ignition switch to "OFF" before servicing.
- Use spark plugs with the correct heat range. Using spark plugs with an incorrect heat range can damage the engine.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table on page 18-5.
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The Ignition Control Module (ICM) varies ignition timing according to the engine speed. The throttle position sensor signals the ICM to compensate the ignition timing according to the throttle opening.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- For spark plug inspection, refer to page 3-9.
- For ignition pulse generator service, refer to page 18-8.
- For throttle position sensor service, refer to page 18-11.
- See page 20-2 for following components:
  - Ignition switch
  - Engine stop switch
  - Neutral switch
  - Side stand switch

SPECIFICATIONS

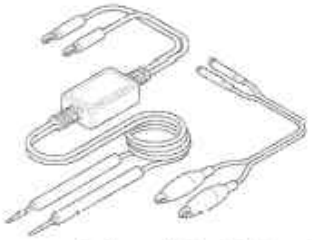
ITEM		SPECIFICATIONS
Spark plug	Standard	DPR6EA-9 (NGK), X20EPR-U9 (DENSO)
	For extended high speed riding	DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F"mark)		13 ° BTDC at idle
Throttle position sensor	Resistance (20 °C/68 °F)	4 – 6 kΩ
	Input voltage	5 V

TORQUE VALUES

Alternator cover socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Timing hole cap	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads

IGNITION SYSTEM

TOOL

Peak voltage adaptor 07HGJ-0020100 (not available in U.S.A.)  with commercially available digital multi-meter (impedance 10 MΩ/DCV minimum) or peak voltage tester (U.S.A. only)	IgnitionMate peak voltage tester MTP07-0286(U.S.A. only) 

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water in the spark plug cap (Leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned to "ON" and the engine stop switch at "○". (The engine is not cranked by the starter motor.)

No spark at spark plugs

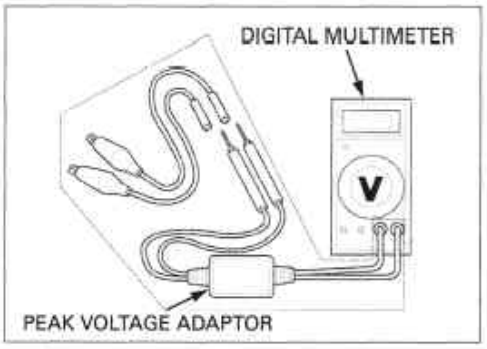
UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned to "ON" and the engine stop switch at "○". (Other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/white wire between the ignition coil and engine stop switch. 3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil. 4. Faulty ignition control module (ICM) (in case when the initial voltage is normal with the ICM connector disconnected).
	Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Battery is undercharged. (Voltage drops largely when the engine is started.) 3. No voltage at the Black wire of the ICM connector, or loose or poorly connected ICM connector. 4. Loose or poor connection or an open circuit in Green wire of the ICM. 5. Loose or poor connection or an open circuit in Blue/yellow or Yellow/blue wire between the ignition coils and ICM. 6. A short circuit in the ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. Loose or poor connection or an open circuit in No. 7 related wires. – Side stand switch line: Green/white wire – Neutral switch line: Light green wire 9. Faulty ignition pulse generator. (Measure peak voltage.) 10. Faulty ICM (in case when above No. 1 through 9 are normal).
	Initial voltage is normal but there is no peak voltage while cranking the engine.	1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Faulty peak voltage adaptor. 3. Faulty ICM (in case when above No. 1 and 2 are normal).
	Initial voltage is normal but peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ICM (in case when above No. 1 through 3 are normal).
	Initial and peak voltages are normal but no spark jumps.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil(s).
Ignition pulse generator	Peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (in case when above No. 1 through 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

NOTE:

- If no spark jumps at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter or use the peak voltage tester.



TOOLS:

Peak voltage adaptor **07HGJ-0020100 (not available in U.S.A.)**

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

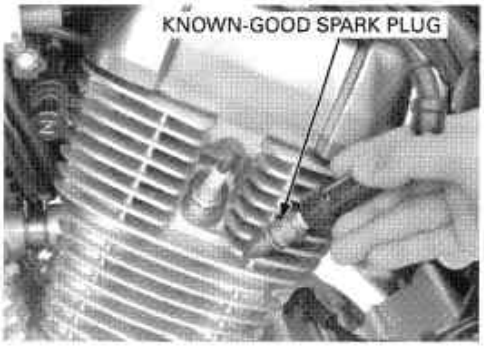
IgnitionMate peak voltage tester **MTP07-0286 (U.S.A. only)**

IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check that the cylinder compression is normal for each cylinder and the spark plugs are installed correctly in each cylinder head.

Disconnect all spark plug caps from the spark plugs. Connect known-good spark plugs to all spark plug caps and ground them to the cylinder heads as done in a spark test.



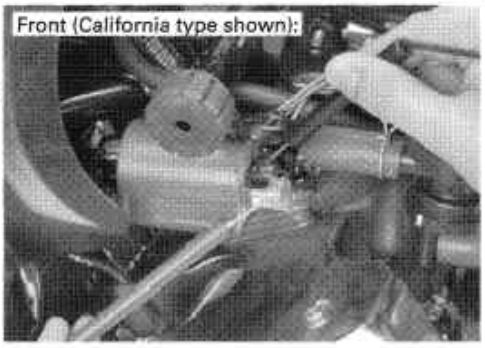
FRONT: Remove the fuel tank (page 2-4).

REAR: Remove the right side cover (page 2-4).

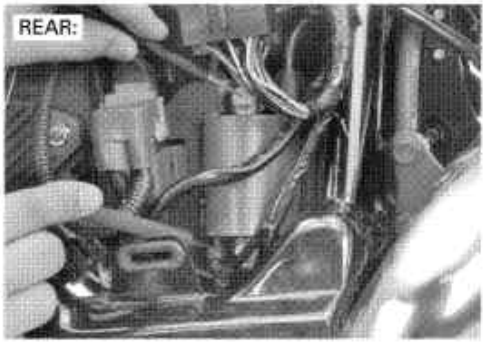
With the ignition coil primary wires connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and ground.

TOOLS:
Peak voltage adaptor **07HGJ-0020100 (not available in U.S.A.)**
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum) or
IgnitionMate peak voltage tester **MTP07-0286 (U.S.A. only)**

Front (California type shown):



REAR:



CONNECTIONS:
FRONT: Blue/yellow (+) – ground (–)
REAR: Yellow/blue (+) – ground (–)

Turn the ignition switch to "ON" with the engine stop switch at "Ω".
Check the initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, follow the checks in the troubleshooting table (page 18-5).

Shift the transmission into neutral.

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

NOTE:
Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the standard value, follow the checks in the troubleshooting table (page 18-5).

Install the removed parts in the reverse order of removal.

IGNITION PULSE GENERATOR PEAK VOLTAGE

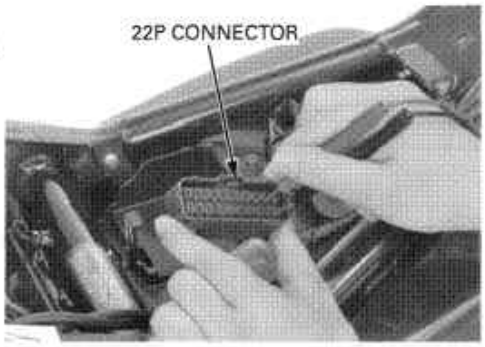
NOTE:
Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Remove the ICM (page 18-9).

Connect the peak voltage tester or adaptor probes to the wire harness side ICM connector terminals.

TOOLS:

Peak voltage adaptor	**07HGJ-0020100 (not available in U.S.A.)**
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum) or IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only)**



CONNECTION: White/yellow (+) – Yellow (–)

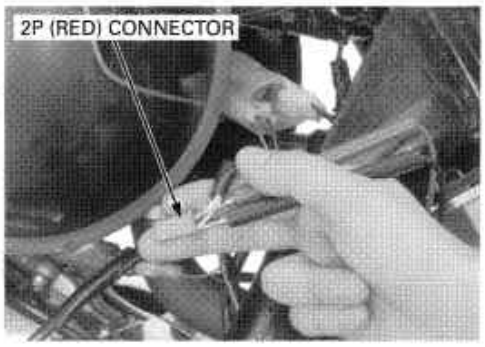
Turn the ignition switch to "ON" with the engine stop switch at "⎍".
Shift the transmission into neutral.
Crank the engine with the starter motor and measure the ignition pulse generator peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the voltage measured at the ICM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Remove the steering side covers (page 2-5).

Turn the ignition switch to "OFF".
Disconnect the ignition pulse generator 2P (Red) connector and connect the peak voltage tester or adaptor probes to the connector terminals of the ignition pulse generator side.



In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open or short circuit, or loose connection.
- If the peak voltage is lower than standard value, follow the checks in the troubleshooting table (page 18-5).

Install the removed parts in the reverse order of removal.

IGNITION COIL

FRONT IGNITION COIL

REMOVAL/INSTALLATION

Remove the following:

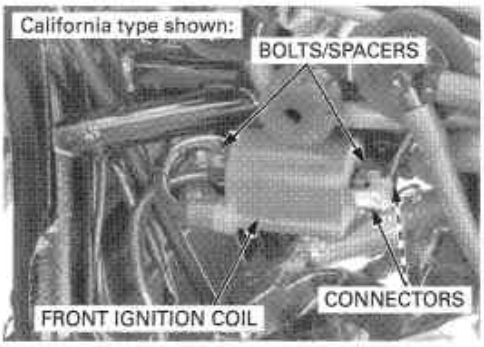
- Fuel tank (page 2-4)
- Steering side covers (page 2-5)

Disconnect the spark plug caps.

Disconnect the ignition coil primary wire connectors.
Remove the bolts, spacers and front ignition coil from the frame.

Route the spark plug wires properly (page 1-24).

Install the front ignition coil in the reverse order of removal.



REAR IGNITION COIL

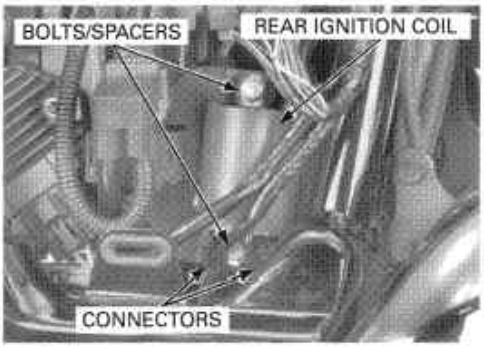
REMOVAL/INSTALLATION

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

Disconnect the spark plug caps.
Disconnect the ignition coil primary wire connectors.
Remove the bolts, spacers and rear ignition coil from the bracket.

Route the spark plug wires properly (page 1-24).

Install the rear ignition coil in the reverse order of removal.



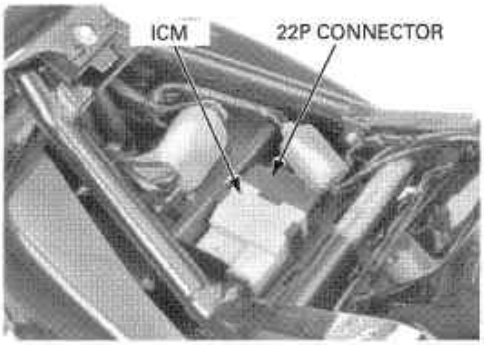
IGNITION CONTROL MODULE (ICM)

REMOVAL/INSTALLATION

Remove the seat (page 2-3).

Remove the ICM from the battery case cover and disconnect the ICM 22P connector.

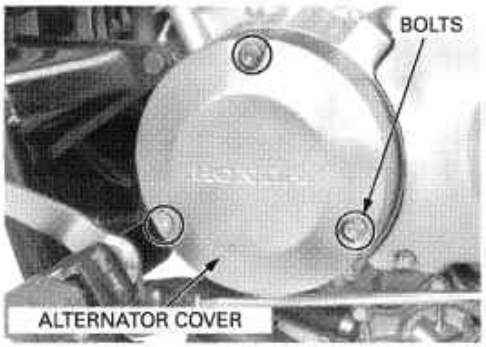
Install the ICM in the reverse order of removal.



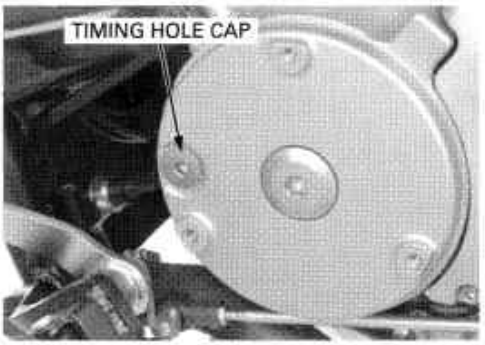
IGNITION TIMING

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

Remove the bolts and alternator cover.



Remove the timing hole cap.



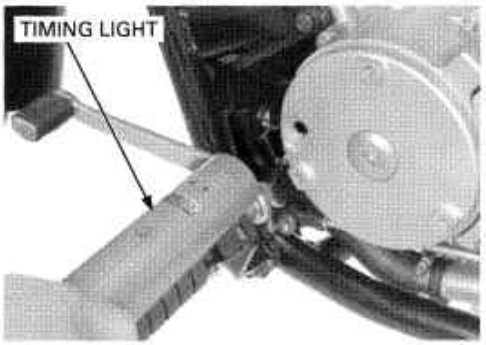
Connect a tachometer.

Read the manufacturer's instructions for timing light operation.

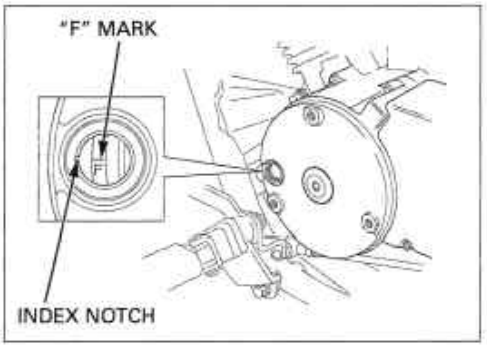
Connect the timing light to the front or rear spark plug wire.

Start the engine, let it idle and check the ignition timing.

IDLE SPEED: 1,200 ± 100 rpm

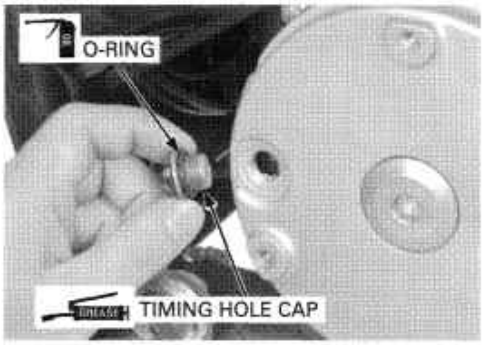


The timing is correct if the "F" mark on the flywheel aligns with the index notch on the left crankcase cover.



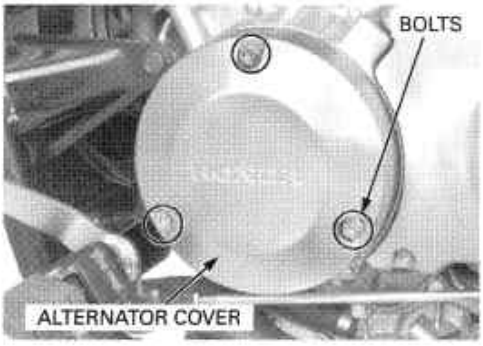
Coat a new O-ring with oil and install it into the timing hole cap groove.
Apply grease to the threads and seating surface of the timing hole cap.
Install the timing hole cap and tighten it.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



Install the alternator cover and tighten the bolts.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



THROTTLE POSITION SENSOR

INSPECTION

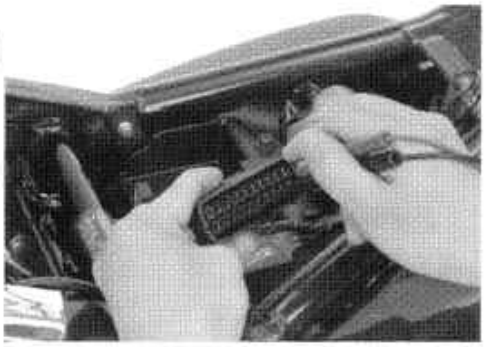
Remove the ICM (page 18-9).

Measure the resistance between the Yellow/red and Blue/green wire terminals of the wire harness side connector.

STANDARD: 4 – 6 kΩ (20°C/68°F)

Check that the resistance between the Red/yellow and Blue/green wire terminals varies with the throttle position while operating the throttle grip.

Fully open – Fully closed position:
Resistance decreases
Fully closed – Fully open position:
Resistance increases



If the correct measurements cannot be obtained, remove the fuel tank (page 2-4).
Disconnect the throttle position sensor 3P connector.

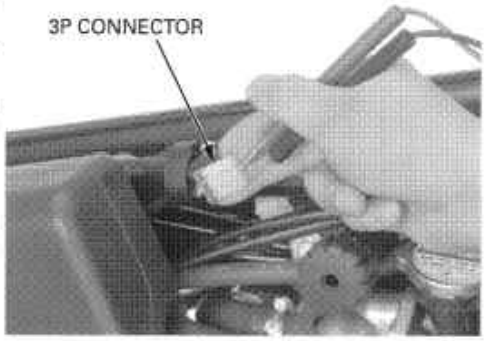
Measure the resistance between the Blue and Black wire terminals of the throttle position sensor side connector.

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 open – Fully closed position:
Resistance decreases
Fully closed – Fully open position:
Resistance increases

- If the measurement at the ICM is abnormal and the one at the throttle position sensor is normal, check for an open or short circuit, or loose or poor connections in the wire harness.
- If both measurements are abnormal, remove the carburetor and replace the throttle position sensor (page 5-9).



Connect the ICM 22P connector.

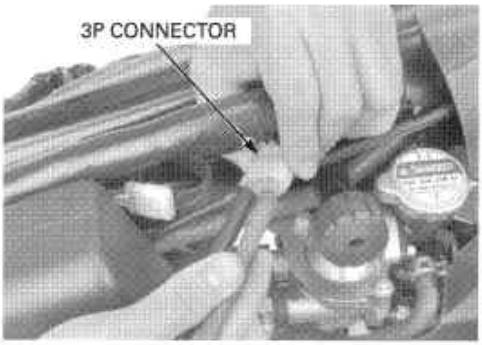
Turn the ignition switch to "ON" with the engine stop switch at "○".

Measure the input voltage between the Yellow/red (+) and Blue/green (–) wire terminals of the wire harness side of the 3P connector.

STANDARD: 5 V

If the input voltage is abnormal, or if there is no input voltage, check for an open or short circuit in the wire harness, or loose or poor ICM connector contact.

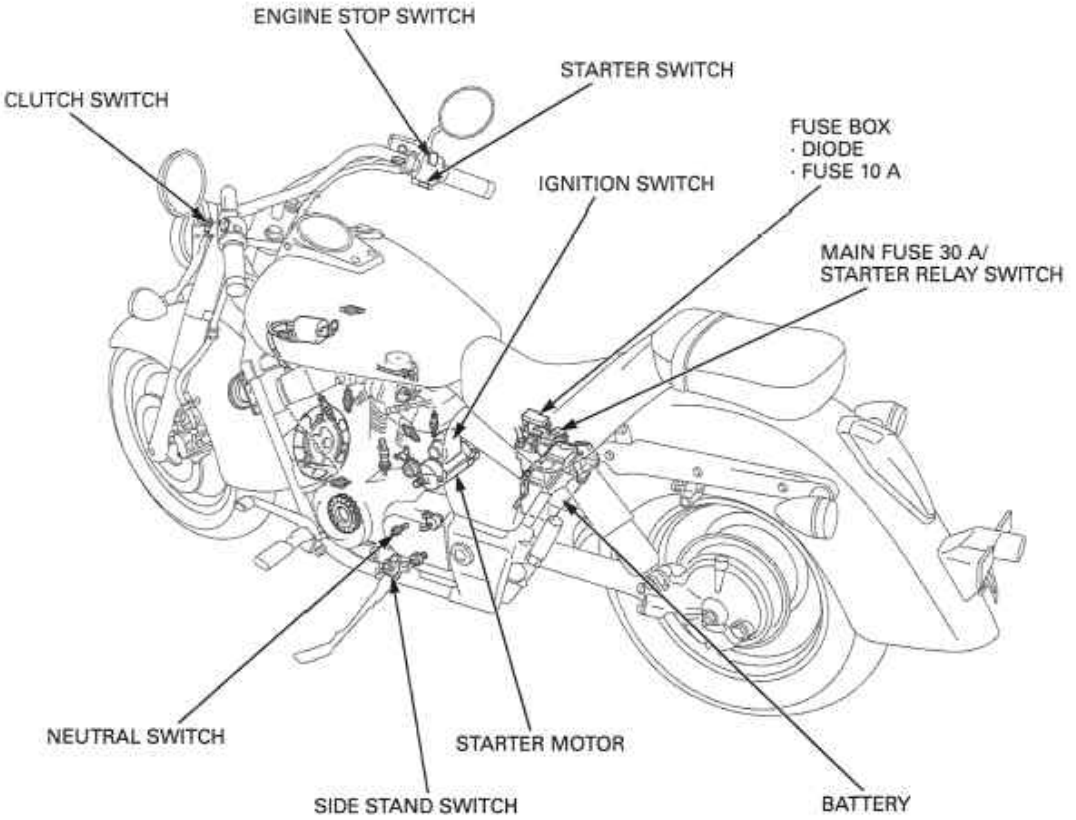
Install the removed parts in the reverse order of removal.



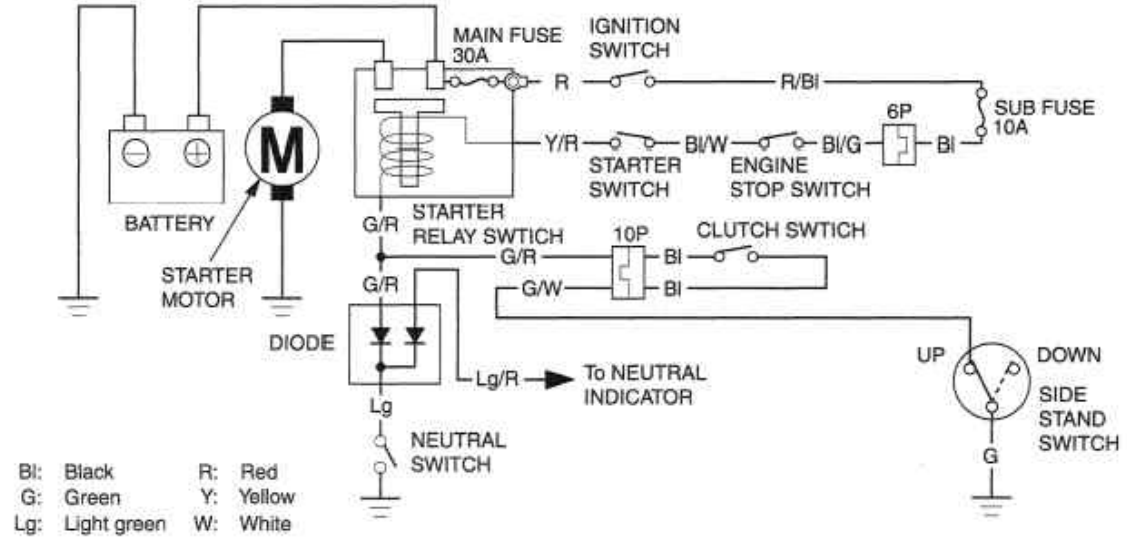
19. ELECTRIC STARTER

ELECTRIC STARTER

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- 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.
- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- For following component service, refer to page 20-2.
  - Ignition switch
  - Engine stop switch
  - Starter switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	6.5 (0.26)

TORQUE VALUES

Starter motor cable terminal nut 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

ELECTRIC STARTER

TROUBLESHOOTING

Starter motor does not turn

1. **Fuse Inspection**

   Check for blown main fuse or sub fuse.

   Is the fuse blown?

   YES – Replace the fuse

   NO – GO TO STEP 2.

2. **Battery Inspection**

   Make sure the battery is fully charged and in good condition (page 17-6).

   Is the battery in good condition?

   YES – GO TO STEP 3.

   NO – Replace the battery

3. **Starter Relay Switch Operation**

   Check the starter relay switch operation.
   You should hear the relay "CLICK" when the starter switch button is depressed.

   Is there a "CLICK"?

   YES – GO TO STEP 4.

   NO – GO TO STEP 5.

4. **Starter Motor Inspection**

   Apply battery voltage directly to the starter motor and check the operation.

   Does the starter motor turn?

   YES – • Poorly connected starter motor cable
   • Faulty starter relay switch (page 19-15)

   NO – Faulty starter motor (page 19-6)

5. **Relay Coil Ground Lines Inspection**

   Disconnect the starter relay switch connector, and check the relay coil ground lines as below for continuity:

   1. Green/red terminal – clutch switch diode – neutral switch line (with the transmission in neutral and clutch lever released).
   2. Green/red terminal – clutch switch – side stand switch line (in any gear except neutral, and with the clutch lever pulled in and the side stand up.

   Is there continuity?

   NO – • Faulty neutral switch (page 20-19)
   • Faulty diode (page 19-16)
   • Faulty clutch switch (page 20-19)
   • Faulty side stand switch (page 20-20)
   • Loose or poor contact connector
   • Open circuit in wire harness

   YES – GO TO STEP 6.

6. **Starter Relay Voltage Inspection**

   Connect the starter relay switch connector.

   With the ignition switch to "ON" and engine stop switch button "⟳" and the starter switch button pushed, measure the voltage at the starter relay switch connector (between Yellow/red (+) and body ground (–)).

   Is there battery voltage?

   NO – • Faulty ignition switch (page 20-16)
   • Faulty starter switch (page 20-17)
   • Faulty engine stop switch (page 20-17)
   • Loose or poor contact connector
   • Open circuit in wire harness

   YES – GO TO STEP 7.

7. Starter Relay Switch Continuity Inspection

Connect the starter relay switch connector.

Turn the ignition switch to "ON" and the engine stop switch " ⌒ ", check for continuity at the starter relay switch terminals when the starter switch button is pushed.

Is there continuity?

NO – Faulty starter relay switch

YES – Loose or poor contact starter relay switch connector

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.

1. Clutch Switch Inspection

Check the clutch switch operation (page 20-19).

Is the clutch switch operation normal?

NO – Faulty clutch switch

YES – GO TO STEP 2.

2. Side Stand Switch Inspection

Check the side stand switch operation (page 20-20).

Is the side stand switch operation normal?

NO – Faulty side stand switch (page 20-20)

YES – • Open circuit in wire harness
• Loose or poor contact connector

Starter motor turns slowly
- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

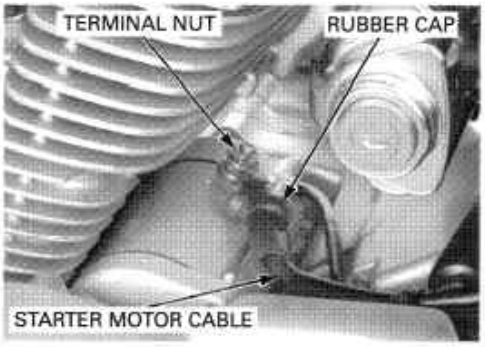
Starter motor turns, but engine does not turn
- Starter motor is running backwards
  – Case assembled improperly
  – Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter idle gear and/or reduction gear

Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problems

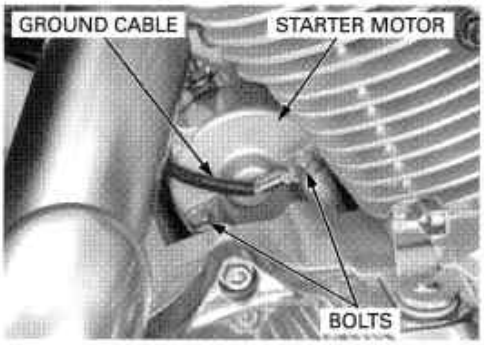
STARTER MOTOR

REMOVAL

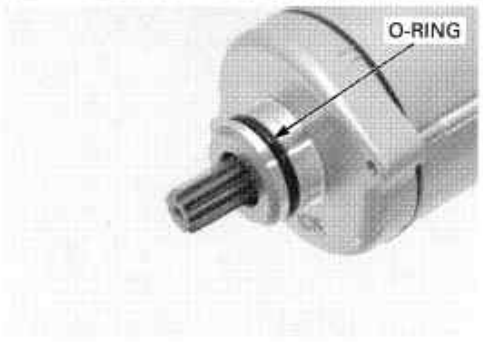
Remove the rubber cap and terminal nut.
Disconnect the starter motor cable.



Remove the bolts and ground cable.
Remove the starter motor from the crankcase.

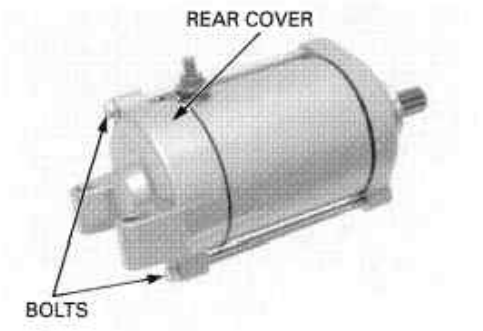


Remove the O-ring from the starter motor.



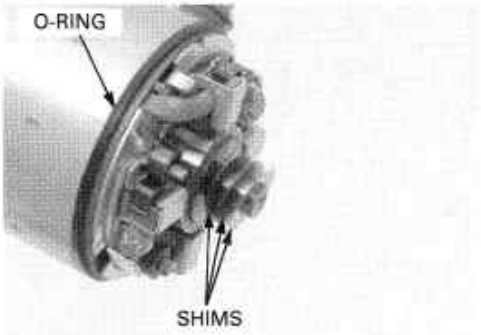
DISASSEMBLY/INSPECTION

Remove the bolts and rear cover.

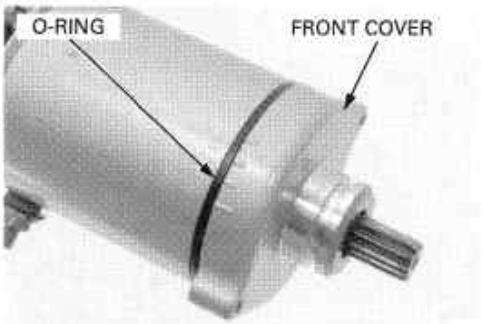


Record the location and number of shims.

Remove the shims and O-ring.

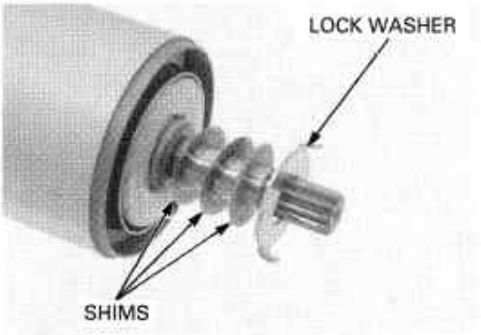


Remove the front cover and O-ring.

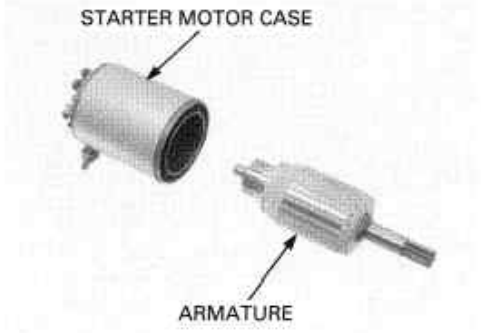


Record the location and number of shims.

Remove the lock washer and shims.



Remove the armature from the starter motor case.



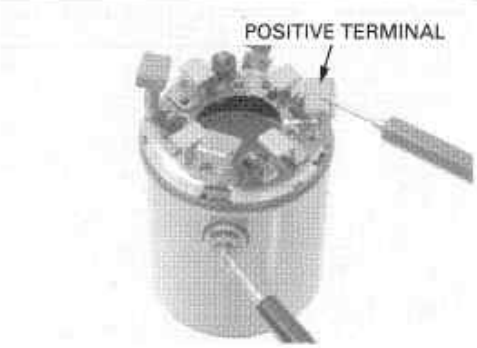
ELECTRIC STARTER

Check for continuity between starter motor cable terminal and positive terminals.

There should be continuity.

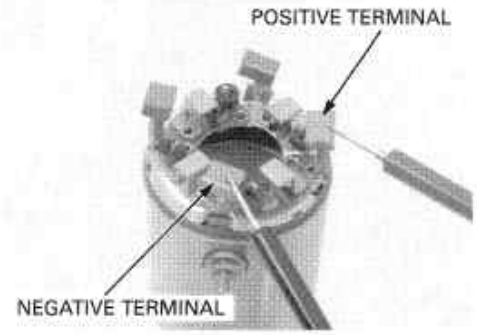
Check for continuity between starter motor cable terminal and starter motor case.

There should be no continuity.

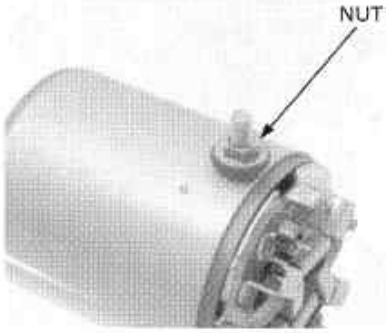


Check for continuity between positive and negative terminals.

There should be no continuity.

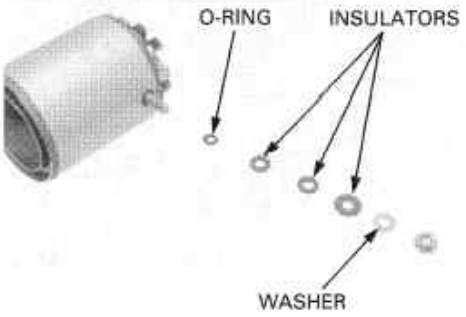


Remove the terminal nut.

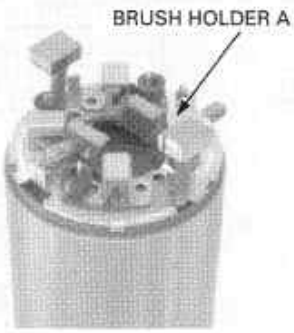


Record the location and number of insulators.

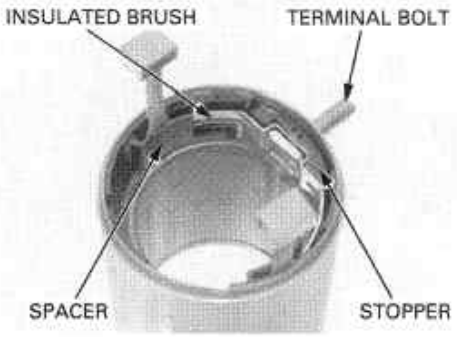
Remove the washer, insulators and O-ring.



Remove the brush holder A.



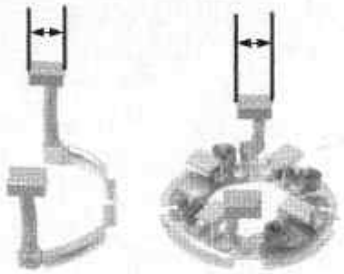
Remove the terminal bolt, stopper, insulated brush and spacer.



INSPECTION

Measure each brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

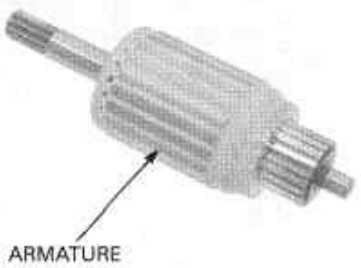


Check the commutator for damage or abnormal wear.

Do not use emery or sand paper on the commutator.

Check the commutator bar for discoloration. Clean the metallic debris off between commutator bars.

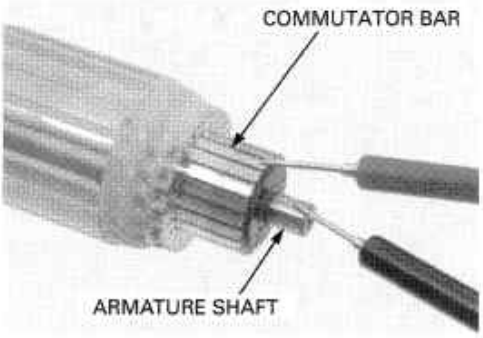
Replace the armature with a new one if necessary.



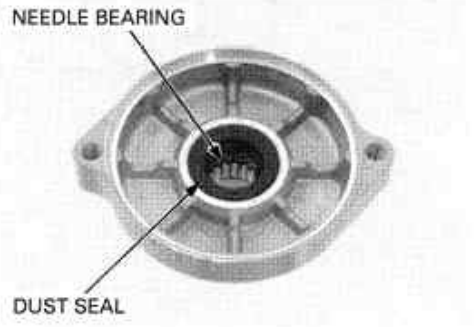
ELECTRIC STARTER

Check for continuity between pairs of commutator bars.
There should be continuity.

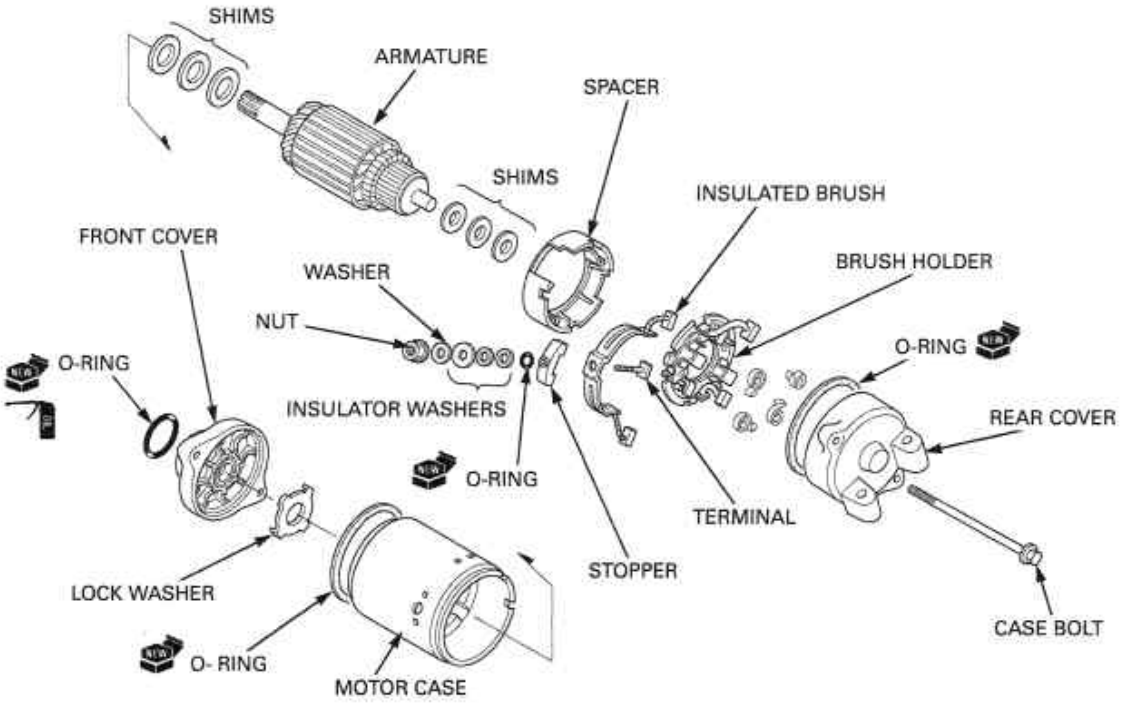
Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.



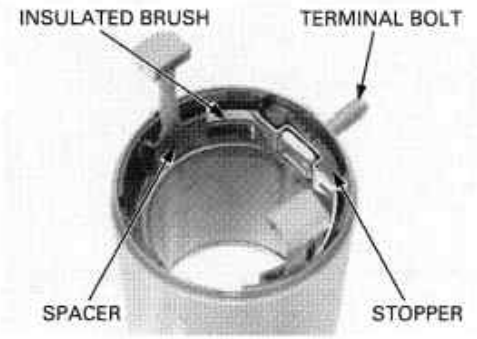
Check the dust seal and needle bearing for wear or damage.
Check the needle bearing rotates smoothly.



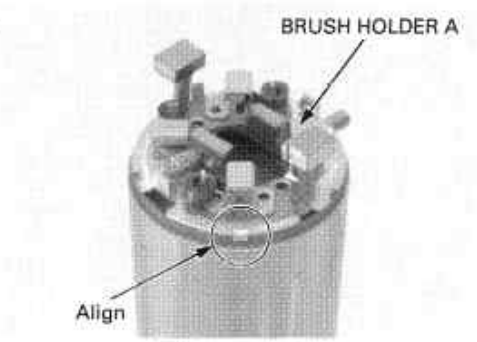
ASSEMBLY



Install the spacer, insulated brush, stopper and terminal bolt.



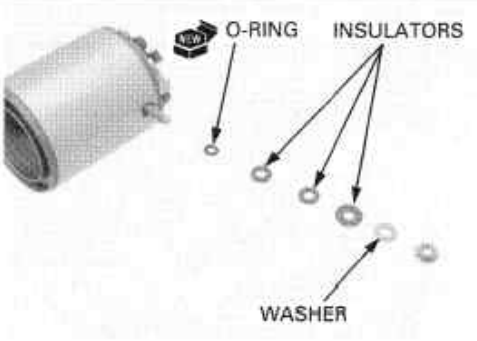
Install the brush holder A to the starter motor case aligning the tab of the brush holder A with the cut-out on the starter motor case.



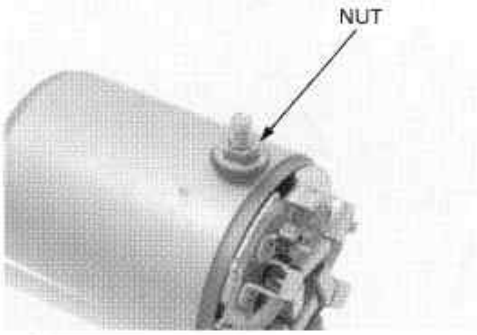
ELECTRIC STARTER

Install the insulators properly as noted during removal.

Install a new O-ring, insulators, washer and nut.



Tighten the terminal nut securely.

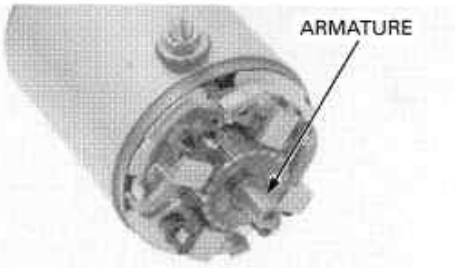


Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.

When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

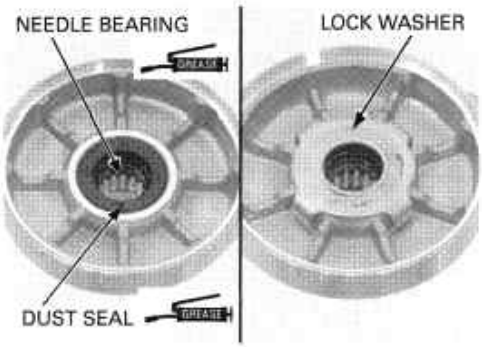
NOTICE

The coil may be damaged if the magnet pulls the armature against the case.



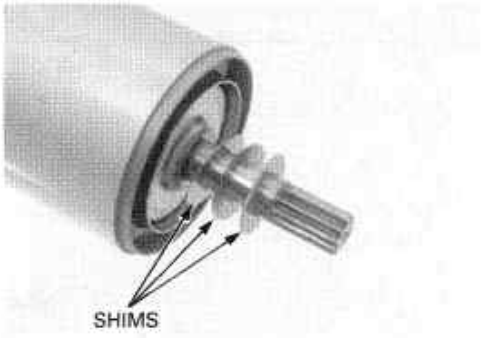
Apply grease to the dust seal lips and needle bearing.

Install the lock washer on the front cover.



Install the shims properly as noted during removal.

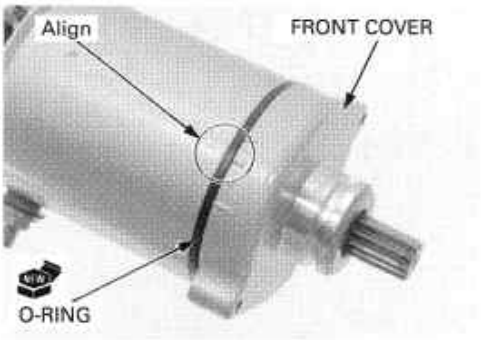
Install the shims.



Install a new O-ring and front cover, aligning the index marks.

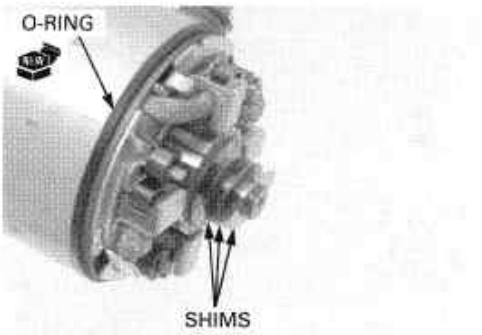
NOTICE

When installing the front cover, take care to prevent damaging the oil seal lip with the armature shaft.

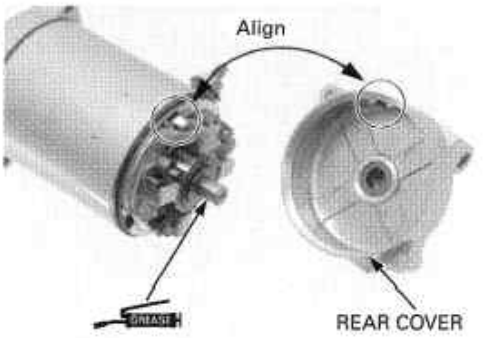


Install the shims properly as noted during removal.

Install a new O-ring and shims.

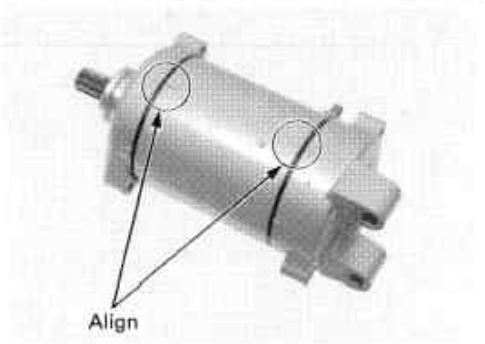


Apply thin coat of grease to the armature shaft end. Install the rear cover aligning its groove with the brush holder tab.

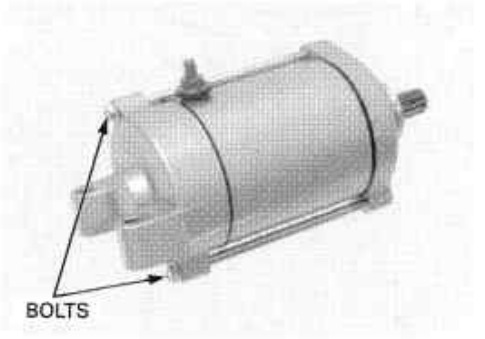


ELECTRIC STARTER

Align the index marks on the starter motor case with front and rear covers.

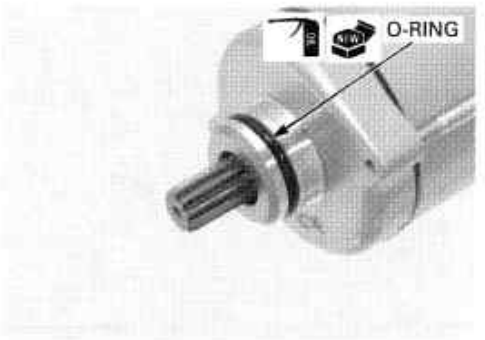


Install and tighten the bolts securely.



INSTALLATION

Apply oil to a new O-ring and install it to the starter motor groove.

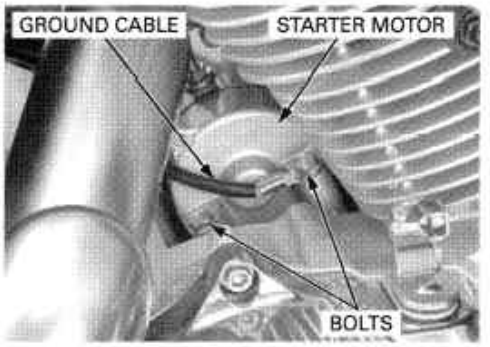


Install the starter motor onto the crankcase from the right side.

Connect the ground cable.

Route the cable properly (page 1-24).

Install and tighten the bolts securely.

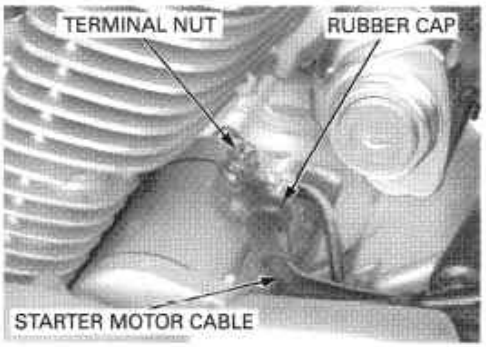


Route the cable properly (page 1-24).

Connect the starter motor cable.

Install and tighten the terminal nut to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



STARTER RELAY SWITCH

INSPECTION

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

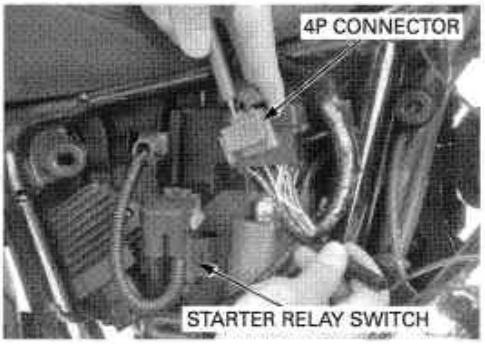
Shift the transmission into neutral.
Turn the ignition switch to "ON" with the engine stop switch at "Ω".
Push the starter switch button.
The coil is normal if the starter relay switch clicks.

If you do not hear the switch click, inspect the relay switch using the procedure below.

GROUND LINE

Disconnect the starter relay switch 4P connector.
Check for continuity between the Green/red wire (ground line) terminal and ground.

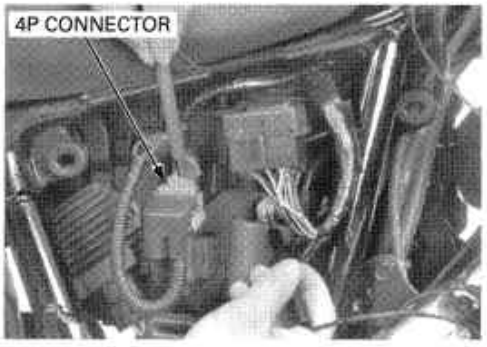
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is retracted, the ground circuit of the relay coil is normal. (In neutral, there is a slight resistance due to the diode.)



STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Turn the ignition switch to "ON" with the engine stop switch at "Ω".
Measure the voltage between the yellow/red wire terminal (+) and ground (–).

If the battery voltage appears when the starter switch button is pushed, the power supply circuit of the relay coil is normal.



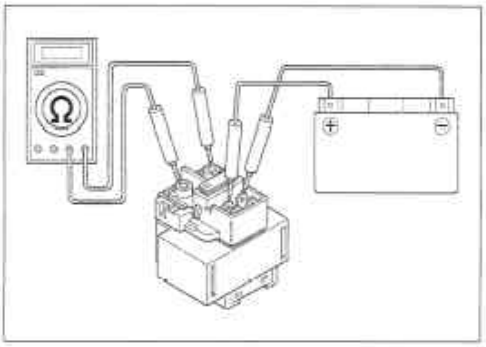
ELECTRIC STARTER

OPERATION CHECK

Disconnect the 4P connector, battery (+) cable and starter motor cable from the starter relay switch.

Connect a fully charged 12 V battery to the relay switch as shown.

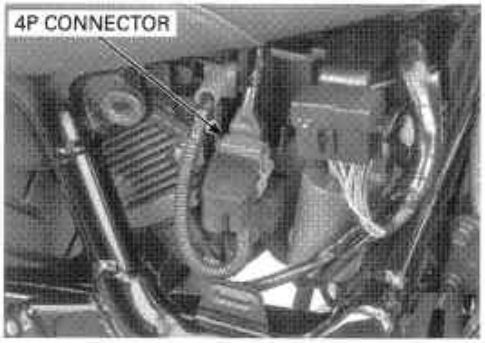
There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



REMOVAL/INSTALLATION

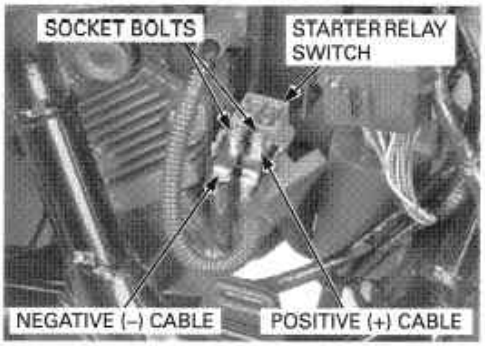
Remove the right side cover (page 2-4).

Turn the ignition switch to "OFF".
Disconnect the battery negative (–) cable (page 17-6).
Disconnect the starter relay 4P connector.



Remove the socket bolts and cables.
Remove the starter relay switch.

Installation is in the reverse order of removal.

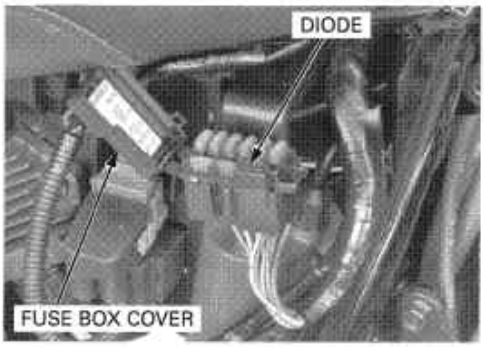


DIODE

INSPECTION

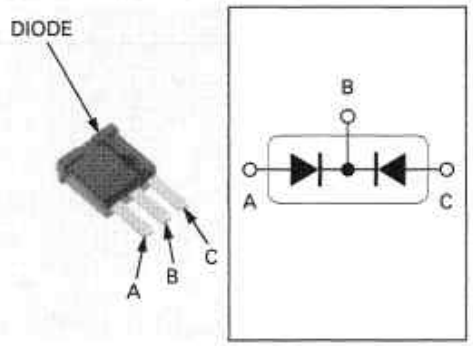
Remove the right side cover (page 2-4).

Open the fuse box cover and remove the diode.



Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

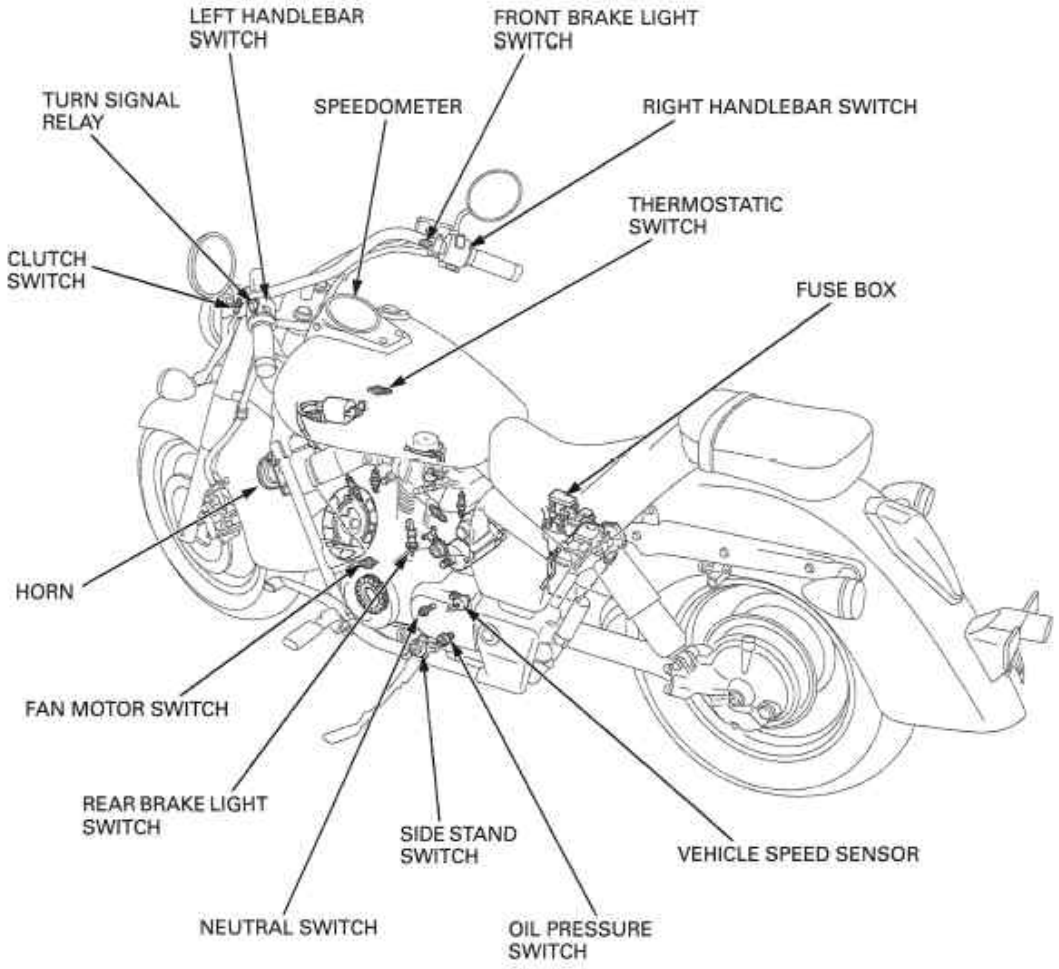
If there is continuity in one direction, the diode is normal.



MEMO

20. LIGHTS/METERS/SWITCHES

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes used are indicated throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	Y = Yellow	

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight	12 V – 60/55 W
	Brake/taillight	12 V – 21/5 W
	License light	12 V – 5 W
	Front turn signal/position light	12 V – 21/5 W x 2
	Rear turn signal light	12V – 21 W x 2
	Instrument light	LED x 5
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	Coolant temperature indicator	LED
Fuse	Main fuse	30 A
	Sub fuse	10 A x 5, 5 A x 1
Thermostatic switch	Start to close (ON)	112 – 118°C (234 – 244°F)
	Stop to open (OFF)	108°C (226°F) minimum
Fan motor switch	Start to close (ON)	98 – 102°C (208 – 216°F)
	Stop to open (OFF)	93 – 97°C (199 – 207°F)

TORQUE VALUES

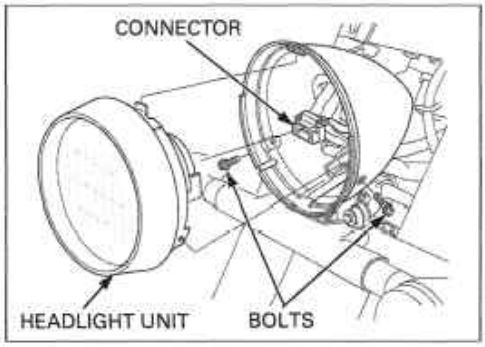
Thermostatic switch	7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)	Apply sealant to the threads
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Ignition switch mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Ignition switch cover screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand switch bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Horn mounting bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)	
Speedometer mounting socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Vehicle speed sensor mounting bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Oil pressure switch terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Headlight unit mounting bolt	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Brake/tail light mounting nut	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	

HEADLIGHT

BULB REPLACEMENT

Remove the two bolts and headlight unit from the headlight case.

Disconnect the headlight 3P connector.



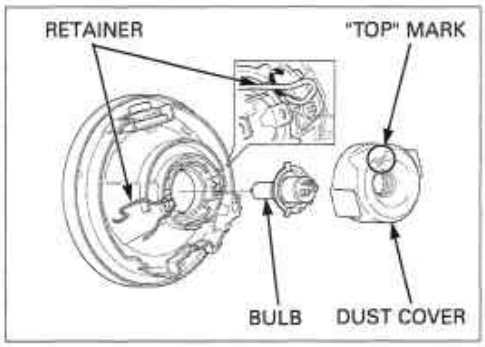
Remove the dust cover.

Unhook the retainer and remove the bulb.

NOTICE

Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

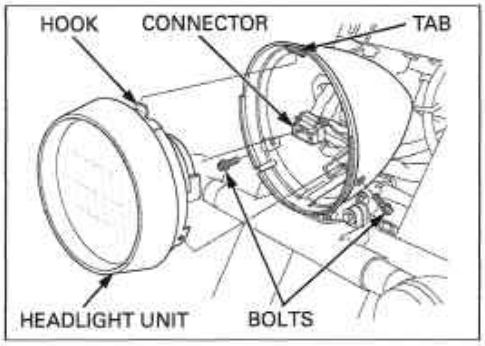
Install a new bulb, aligning its tabs with the grooves in the headlight unit.
Hook the retainer.
Install the dust cover with its "TOP" mark facing up.



Connect the headlight 3P connector.

Install the headlight unit into the case by aligning the unit hook with the case tab.
Install and tighten the bolts to the specified torque.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

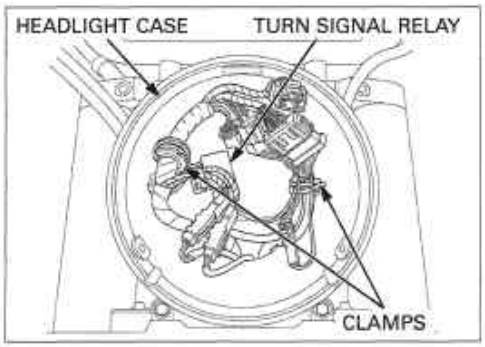


HEADLIGHT CASE REMOVAL/ INSTALLATION

Remove the following:

- Headlight unit (page 20-4).
- Front turn signal light (page 20-5)

Remove the turn signal relay from the headlight case.
Release the wire harnesses from the clamps.
Remove the wire harnesses from the headlight case.

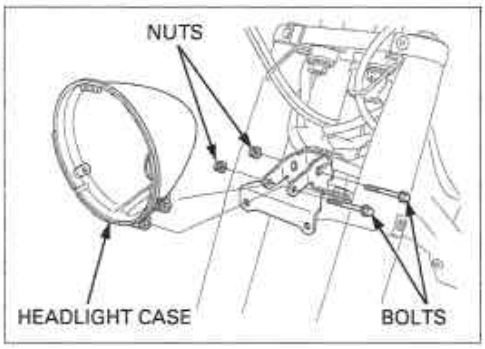


Remove the nuts, bolts and the headlight case from the stay.

Route the wire harnesses properly (page 1-24).

Install the headlight case in the reverse order of removal.

Adjust the headlight aim (page 3-22).



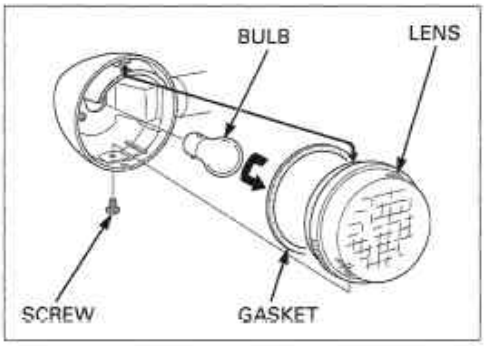
TURN SIGNAL LIGHT

BULB REPLACEMENT

Remove the screw and turn signal light lens.
While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure the lens gasket is installed in position and is in good condition, and replace it with a new one if necessary.

Install the lens, aligning its slot with the tab of the turn signal light, and tighten the screw.



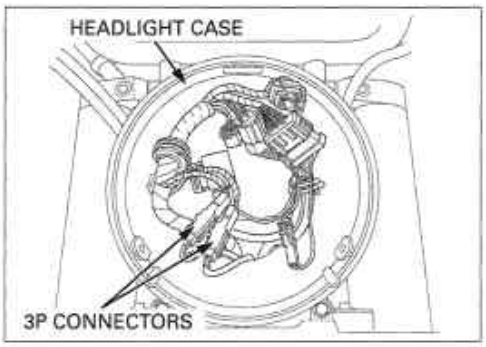
REMOVAL/INSTALLATION

FRONT:

Remove the headlight unit (page 20-4).

Disconnect the turn signal 3P connectors.

- Light blue: Right turn signal connector
- Orange: Left turn signal connector



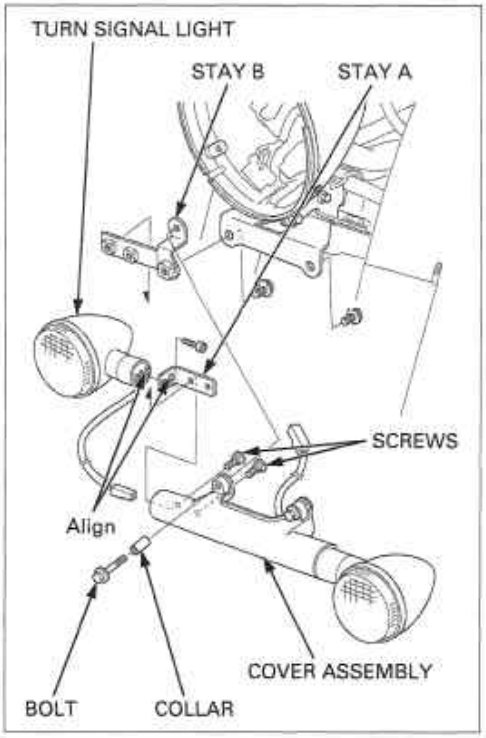
Remove the bolts, collars and turn signal cover assembly.

Remove the screws and turn signal light stay A and B from the cover.
Remove the bolt and stay A from the turn signal light.

Route the turn signal wire properly (page 1-24).

Installation is in the reverse order of removal.

NOTE:
Install the turn signal light, aligning its tab with the stay A slot.



REAR

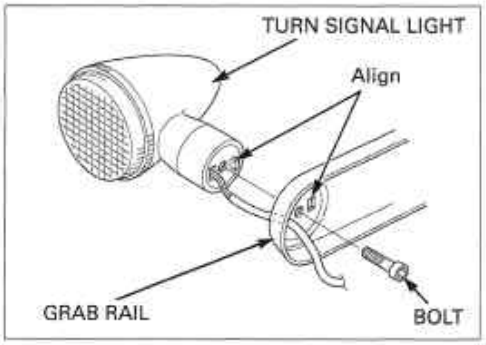
Remove the rear fender (page 2-7).

Remove the bolt and turn signal light from the grab rail.

Route the turn signal wire properly (page 1-24).

Install the turn signal light, aligning its tab with the grab rail slot and tighten the bolt.

Install the rear fender (page 2-7).



BRAKE/TAIL LIGHT

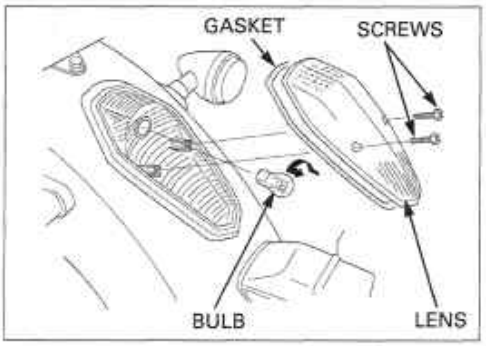
BULB REPLACEMENT

Remove the screws and brake/tail light lens.

While pushing in the bulb, turn it counterclockwise to remove it, and replace it.

Make sure that the lens gasket is installed in position and is in good condition, and replace it with a new one if necessary.

Install the removed parts in the reverse order of removal.



REMOVAL/INSTALLATION

Remove the following:

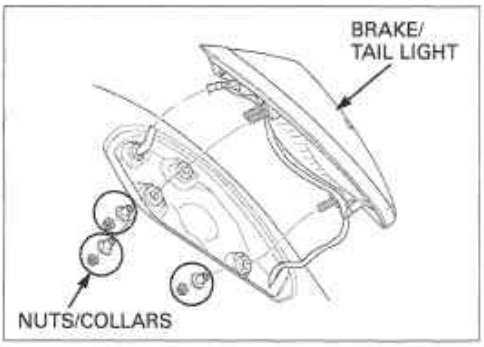
- Rear fender (page 2-7)
- License light (page 20-7)

Remove the nuts, collars and brake/tail light.

Route the wires properly (page 1-24).

Installation is in the reverse order of removal.

TORQUE:
Brake/tail light mounting bolt:
5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)



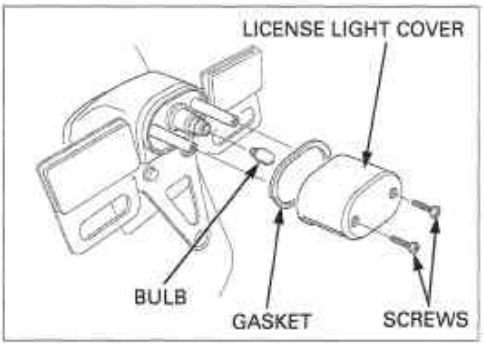
LICENSE LIGHT

BULB REPLACEMENT

Remove the screws and license light cover.

Remove the bulb and replace it.
Make sure that the lens gasket is installed in position and is in good condition, and replace it with a new one if necessary.

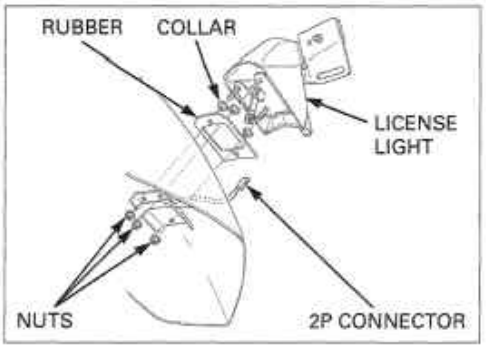
Install the removed parts in the reverse order of removal.



REMOVAL

Remove the nuts, collars, rubber and license light assembly.

Disconnect the license light 2P connector.

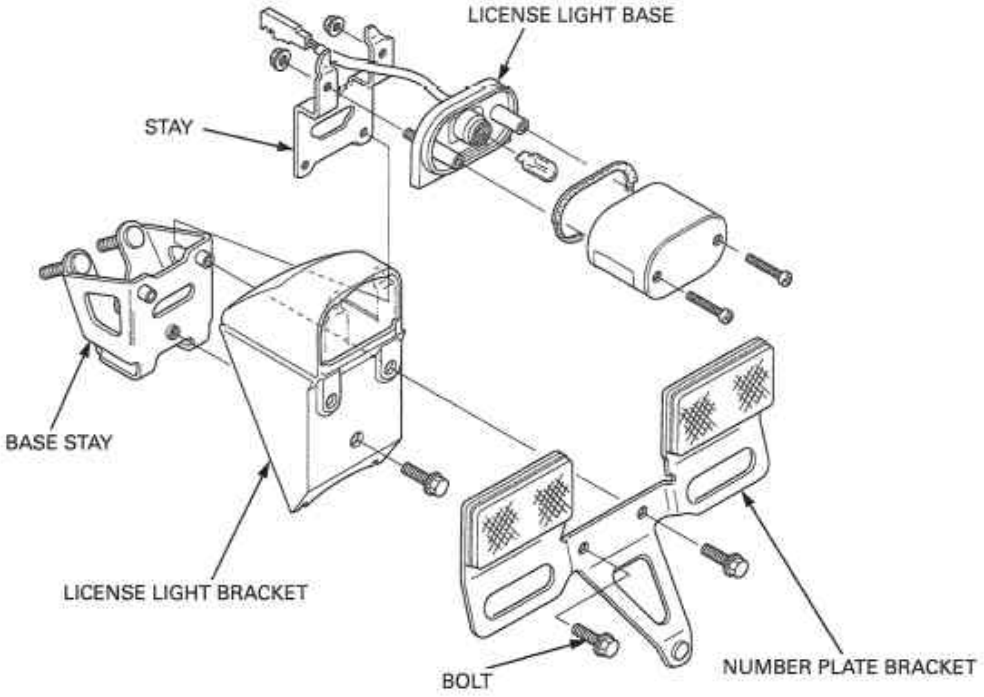


DISASSEMBLY/ASSEMBLY

Remove the license light bulb (page 20-7).

Remove the bolts and number plate bracket.
Remove the bolt, base stay and license light base/stay assembly from the license light bracket.
Remove the nuts and license light base.

Assembly is in the reverse order of disassembly.



INSTALLATION

Installation is in the reverse order of removal.

SPEEDOMETER/VEHICLE SPEED SENSOR

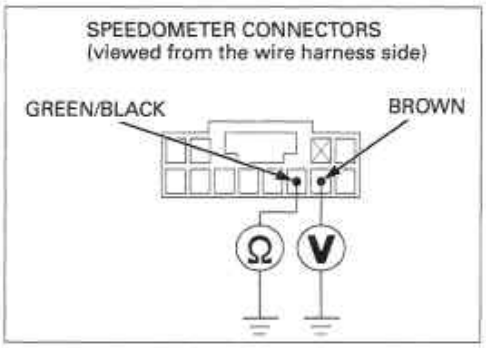
POWER/GROUND LINE INSPECTION

Remove the speedometer assembly (page 20-10).

POWER INPUT LINE

Measure the voltage between the Brown wire terminal (+) of the speedometer 12P connector and ground (–).
There should be battery voltage with the ignition switch turned to "ON".

If there is no voltage, check the following:
- open circuit in the Brown wire
- blown fuse (10 A)



GROUND LINE

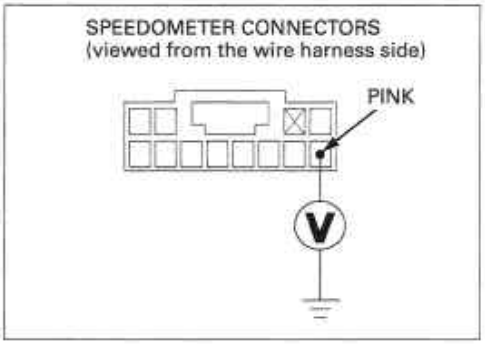
Check for continuity between the Green/black wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for an open circuit in the Green/black wire.

BACK-UP VOLTAGE LINE

Check this line if the odometer/trip meter does not function.
Measure the voltage between the Pink wire terminal (+) and ground (–).
There should be battery voltage at all times.

If there is no voltage, check the following:

- open circuit in the Pink wire
- blown fuse (5 A)
- open circuit in the Red wire



SPEEDOMETER INSPECTION

Speedometer does not operate

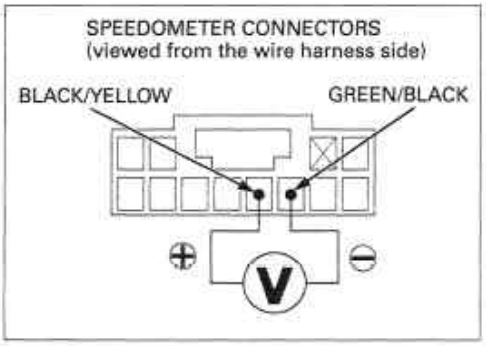
Check that the indicators function properly.
If they do not function, check the power/ground line (page 20-9).

Remove the speedometer assembly (page 20-10).

Support the motorcycle securely and raise the rear wheel off the ground.
Shift the transmission into neutral and turn the ignition switch to "ON".

Measure the voltage between the Black/yellow (+) and Green/black (–) wire terminals of the speedometer connector.
Slowly turn the rear wheel by hand.
There should be 0 V to 5 V pulse voltage.

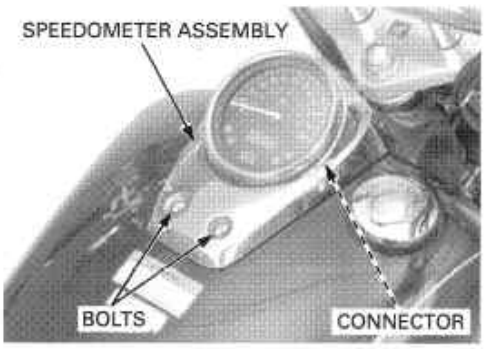
- If pulse voltage appears, replace the speedometer.
- If pulse voltage does not appear, check the following:
  - Black/yellow wire for an open or short circuit
  - Green/black wire for an open circuit
    If the wires are OK, check the vehicle speed sensor (page 20-11).



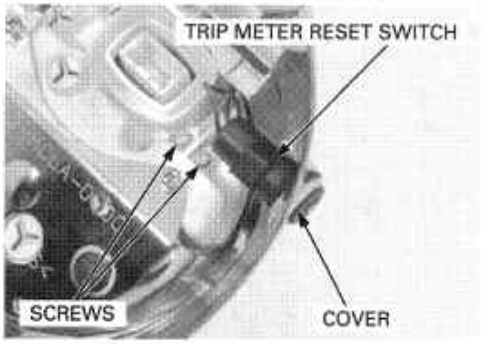
SPEEDOMETER REMOVAL/ INSTALLATION

Remove the bolts and speedometer assembly from the fuel tank.

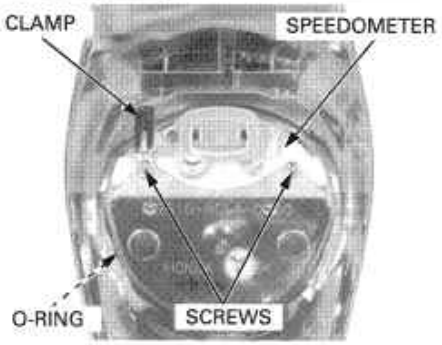
Slide the dust cover and disconnect the speedometer 12P connector.



Remove the screws, cover and trip meter reset switch.

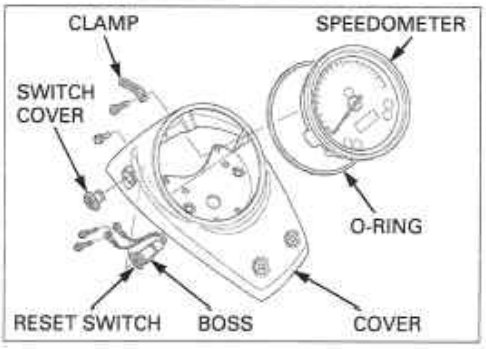


Remove the screws, clamp, speedometer and O-ring.



Install the removed parts into the speedometer cover in the reverse order of removal.

NOTE:
Install the reset switch with its boss facing down.

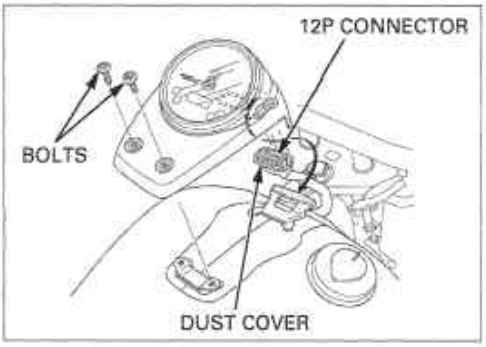


Connect the speedometer 12P connector and install the dust cover.

Install the speedometer assembly on the fuel tank, aligning the fuel tank tab with the meter slot.

Tighten the bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



VEHICLE SPEED SENSOR INSPECTION

Remove the seat (page 2-3).

Turn the ignition switch to "ON" and measure the voltage between the Brown (+) and Green/black (–) wire terminals of the speed sensor 3P (White) connector with the connector connected.
There should be battery voltage.

If there is no voltage, check for an open circuit in the Brown and Green/black wires.

Support the motorcycle securely and raise the rear wheel off the ground.
Shift the transmission into neutral and turn the ignition switch to "ON".
Measure the voltage between the Black/yellow (+) and Green/black (–) wire terminals.
Slowly turn the rear wheel by hand.
There should be 0 to 5 V pulse voltage.

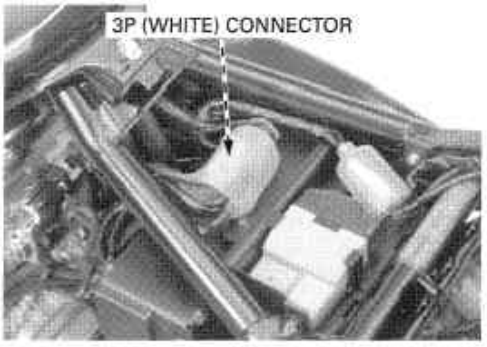
If pulse voltage does not appear, replace the vehicle speed sensor.

VEHICLE SPEED SENSOR REPLACEMENT

Remove the following:

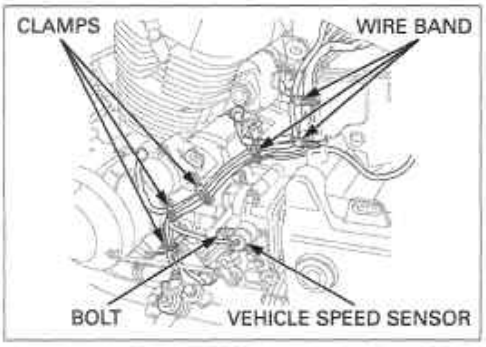
- Seat (page 2-3)
- Left side cover (page 2-4)
- Left crankcase rear cover (page 2-6)

Disconnect the vehicle speed sensor 3P (White) connector.



Release the vehicle speed sensor wire from the clamps and wire bands.

Remove the bolt and vehicle speed sensor from the crankcase.



Coat a new O-ring with oil and install it into the vehicle speed sensor groove.

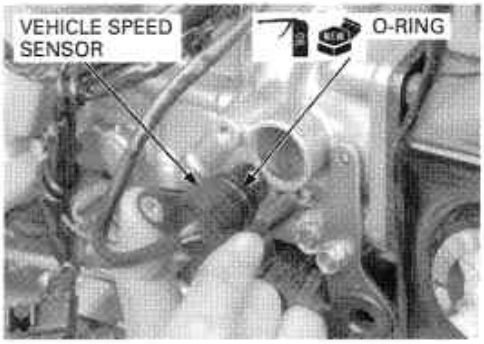
Route the vehicle speed sensor wire properly (page 1-24).

Install the vehicle speed sensor.

Tighten the mounting bolt to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the removed parts in the reverse order of removal.

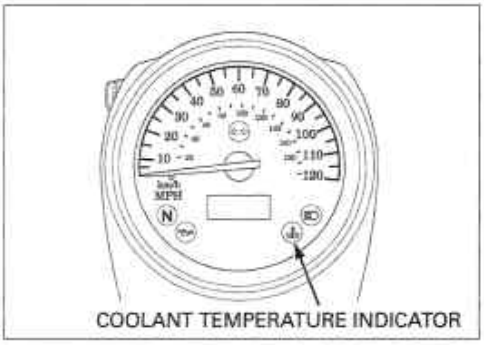


COOLANT TEMPERATURE INDICATOR/ THERMOSTATIC SWITCH

INSPECTION

The coolant temperature is too high, but the indicator does not come on

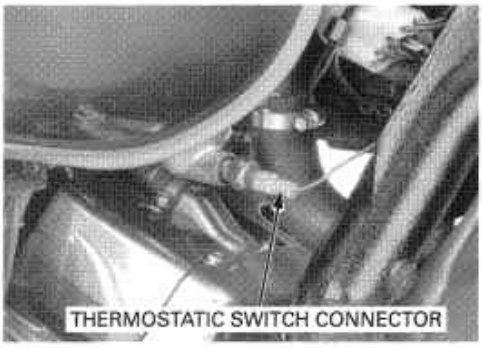
Check that the neutral and oil pressure indicators function properly.
If they do not function, check the power input line of the speedometer (page 20-9).



Remove the steering side covers (page 2-5).

Disconnect the thermostatic switch connector and ground it.
Turn the ignition switch to "ON" and check the indicator.

- If the indicator comes on, inspect the thermostatic switch.
- If the indicator does not come on, check for an open circuit in the Green/blue wire. If the wire is OK, replace the speedometer (page 20-10).



The coolant temperature is low but the indicator comes on.

Disconnect the thermostatic switch connector.
Turn the ignition switch to "ON" and check the indicator.

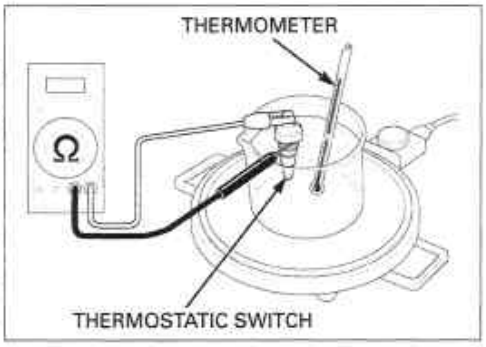
- If the indicator does not come on, inspect the thermostatic switch.
- If the indicator comes on, check for a short circuit in the Green/blue wire. If the wire is OK, replace the speedometer (page 20-10).

THERMOSTATIC SWITCH INSPECTION

Drain the coolant from the cooling system (page 6-7).
Remove the thermostatic switch (page 20-13).

Wear insulated gloves and adequate eye protection. Keep flammable materials away from the burner.

Heat the coolant (50-50 mixture) with an electric heating element.
Suspend the thermostatic switch in heated coolant and check the continuity through the switch as the coolant heats up.



NOTE:

- Soak the thermostatic switch in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the switch.
- Keep temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or thermostatic switch touch the pan.

Start to close (ON)	112 – 118°C (259 – 270°F)
Start to open (OFF)	Below 108°C (252°F)

Replace the thermostatic switch if it is out of specifications.

Install the thermostatic switch (page 20-13).

THERMOSTATIC SWITCH REPLACEMENT

Drain the coolant from the cooling system (page 6-7).
Remove the steering side covers (page 2-5).

Disconnect the thermostatic switch connector.
Remove the thermostatic switch from the thermostat housing.

Do not apply sealant to the thread head.

Apply sealant to the threads of a new thermostatic switch.
Install and tighten the thermostatic switch.

TORQUE: 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)

Fill and bleed the cooling system (page 6-7).
Install the steering side covers (page 2-5).

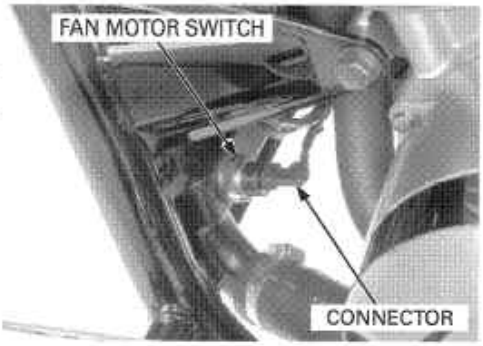
FAN MOTOR SWITCH

INSPECTION

The coolant temperature is low but the fan motor does not stop

Disconnect the connector from the fan motor switch and turn the ignition switch to "ON".

- If the fan motor does not stop, check for a short circuit in the Black wire.
- If the fan motor stops, replace the fan motor switch.

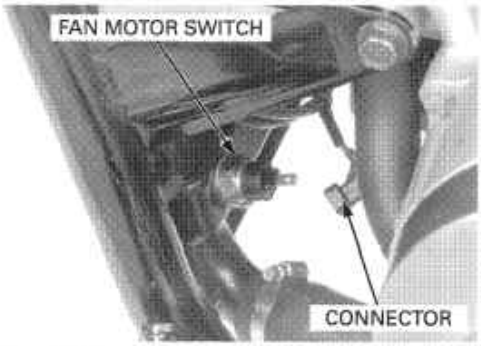


The coolant temperature indicator comes on but the fan motor does not start

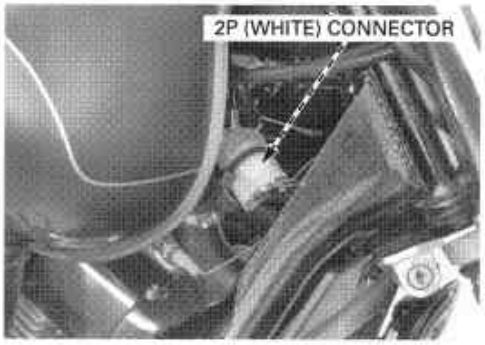
Before testing, check for a blown fuse (10 A).

Disconnect the connector from the fan motor switch and ground it.
Turn the ignition switch to "ON" and check the fan motor.

- If the motor starts, replace the fan motor switch.



- If the fan motor does not start, remove the steering side covers (page 2-5) and disconnect the fan motor 2P (White) connector.
  Measure the voltage between the Black/blue wire and ground.
  – If there is battery voltage, replace the fan motor (page 6-11).
  – If there is no voltage, check for an open circuit in the Green and Black/blue wires.



REPLACEMENT

Drain the coolant (page 6-7).

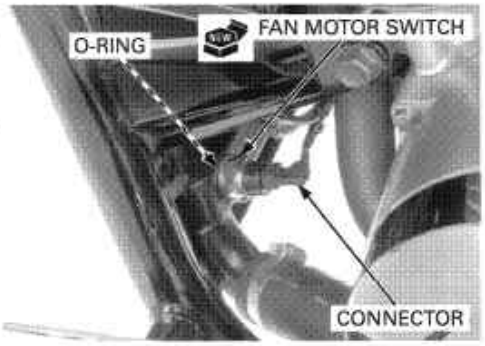
Disconnect the connector from the fan motor switch.
Remove the fan motor switch from the radiator.

Install a new O-ring into the fan motor switch groove.
Install and tighten the fan motor switch.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the connector to the fan motor switch.

Fill and bleed the cooling system (page 6-7).

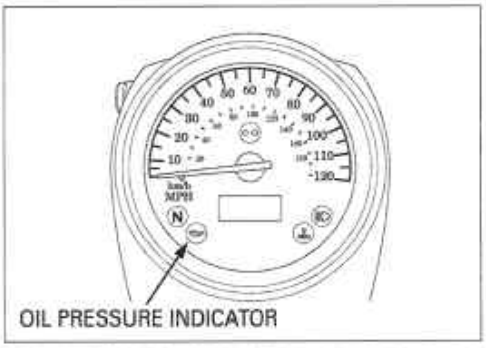


OIL PRESSURE INDICATOR

INSPECTION

Indicator does not come on with the ignition switch turned to "ON"

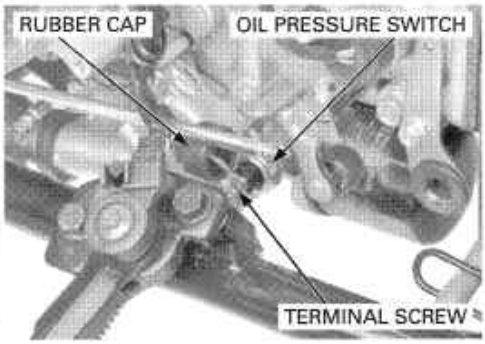
Check that the neutral and coolant temperature indicators function properly.
If they do not function properly, check the power input line of the speedometer (page 20-9).



Remove the left crankcase rear cover (page 2-6).

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw.
Ground the wire terminal.
Turn the ignition switch to "ON" and check the oil pressure indicator.

- If the indicator comes on, replace the oil pressure switch.
- If the indicator does not come on, check for loose an open circuit in the Blue/red wire. If the wire is OK, replace the speedometer (page 20-10).



Indicator stays on while the engine is running

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw.
Check for continuity between the wire terminal and ground.

- If there is continuity, check for a short circuit in the Blue/red wire.
- If there is no continuity, check the oil pressure (page 4-5).
  If the oil pressure is normal, replace the oil pressure switch.

After inspection, connect the oil pressure switch wire and tighten the terminal screw.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the rubber cap properly.

Install the left crankcase rear cover (page 2-6).

IGNITION SWITCH

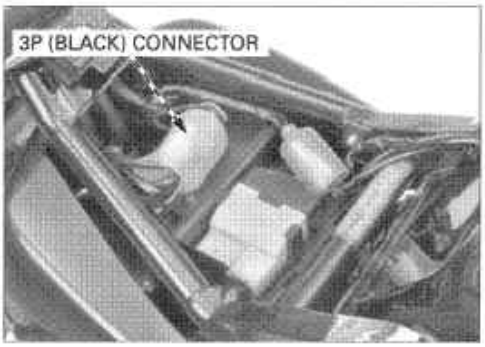
INSPECTION

Remove the seat (page 2-3).

Disconnect the ignition switch 3P (Black) connector.

Check for continuity between the switch side connector terminals in each switch position.
Continuity should exist between the color coded wires as shown in the chart.

	FAN	IG	BAT1
ON	O	O	O
OFF			
COLOR	Bu/O	R/Bl	R

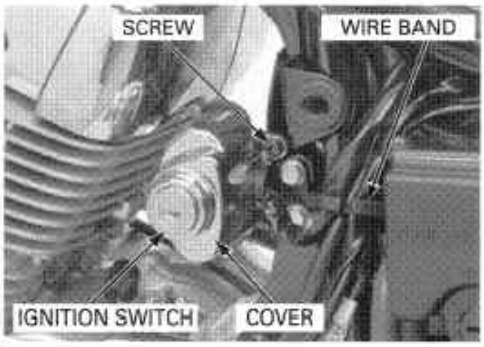


REMOVAL/INSTALLATION

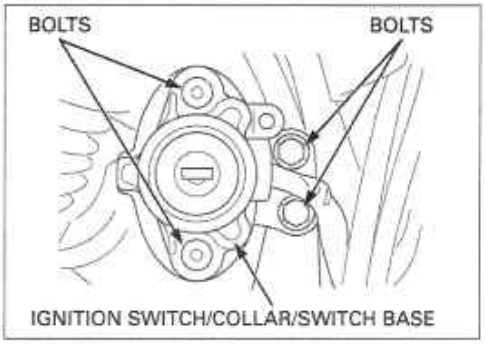
Remove the following:

- Seat (page 2-3)
- Left side cover (page 2-4)

Disconnect the ignition switch 3P (Black) connector.
Release the wire from the wire band.
Remove the screw and ignition switch cover.



Remove the bolts and ignition switch assembly.
Remove the bolts, ignition switch, collar and switch base from the stay.



Install the switch base, ignition switch and collar to the stay.
Tighten new bolts to the specified torque.

The ignition switch mounting bolt heads are broken by tighten them to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

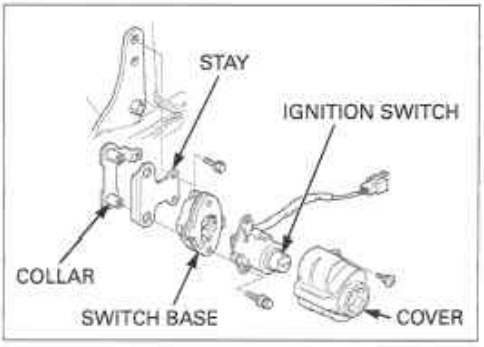
Install the ignition switch assembly to the frame.
Install the ignition switch cover and tighten the screw.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

Route the ignition switch wire properly (page 1-24).
Connect the ignition switch 3P (Black) connector.

Install the following:

- Left side cover (page 2-4)
- Seat (page 2-3)

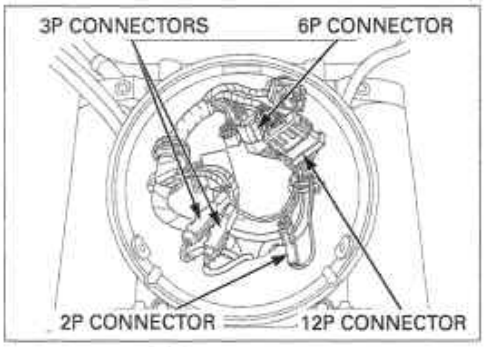


HANDLEBAR SWITCH

Remove the headlight unit (page 20-4).

Disconnect the left handlebar switch 12P, right handlebar switch 6P, dimmer switch 2P and turn signal light 3P connectors.

Check for continuity between the connector terminals in each switch position.
Continuity should exist between the color coded wires as shown in the charts.



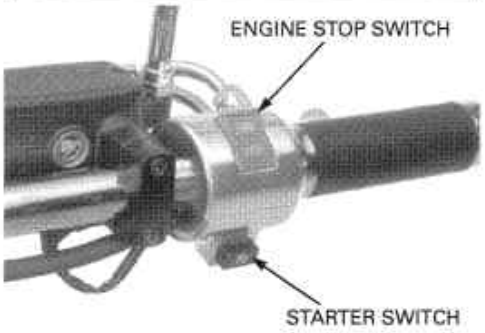
RIGHT HANDLEBAR SWITCH

ENGINE STOP SWITCH

	IG	BAT2
⊠		
⊓	O—O	
COLOR	Bl/W	Bl/G

STARTER SWITCH

	ST	IG	BAT4	HL
FREE			O—O	
PUSH	O—O			
COLOR	Y/R	Bl/W	Bl/R	Bu/W



LEFT HANDLEBAR SWITCH

TURN SIGNAL SWITCH

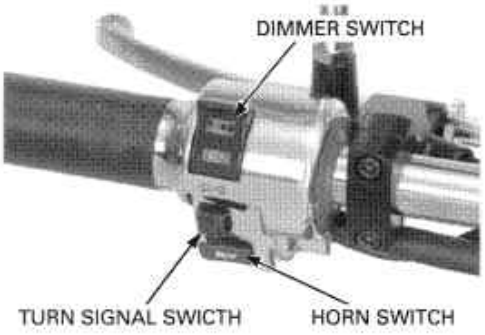
	W	R	L	PO	PR	PL
R	O—O			O		O
N				O	O	O
L	O		O	O	O	
COLOR	Gr	Lb	O	Br	Lb/W	O/W

HORN SWITCH

	Ho	BAT3
FREE		
PUSH	O—O	
COLOR	Lg	W/G

DIMMER SWITCH

	HL	Lo	Hi
Lo	O—O		
(N)	O—O	O	
Hi	O		O
COLOR	Bu/W	W	Bu

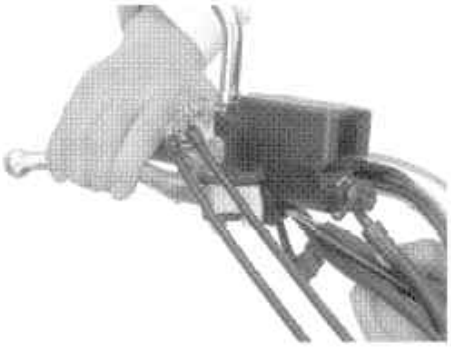


BRAKE LIGHT SWITCH

FRONT

Disconnect the brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the brake lever squeezed and no continuity with the lever released.

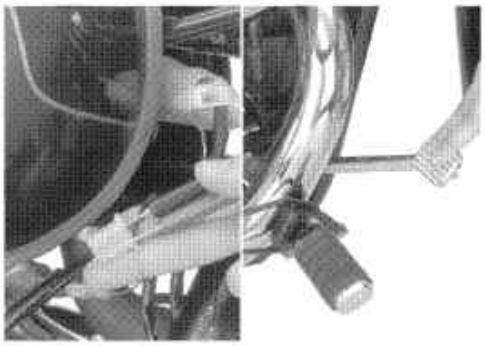


REAR

Remove the steering side covers (page 2-5).

Disconnect the rear brake light switch 3P (Gray) connector and check for continuity between the switch side connector terminals.

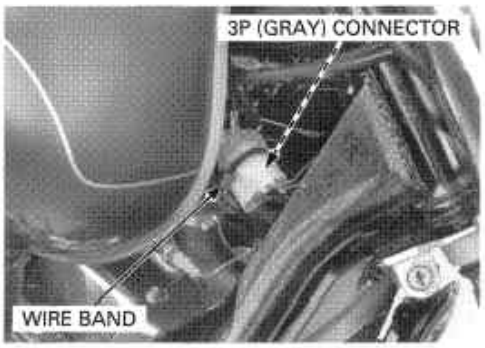
There should be continuity with the brake pedal depressed and no continuity with the pedal released.



REAR BRAKE LIGHT SWITCH REMOVAL/INSTALLATION

Remove the steering side covers (page 2-5).

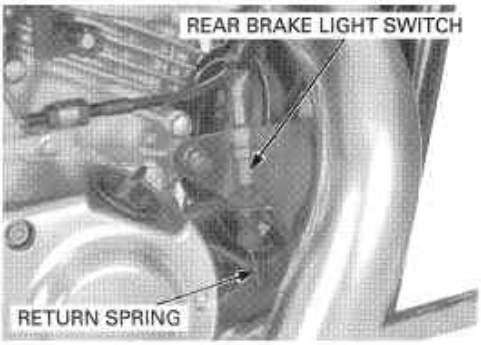
Remove the wire band and disconnect the rear brake light switch 3P (Gray) connector.



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

Route the wire properly (page 1-24).

Installation is in the reverse order of removal. Adjust the rear brake light switch (page 3-22).



CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.

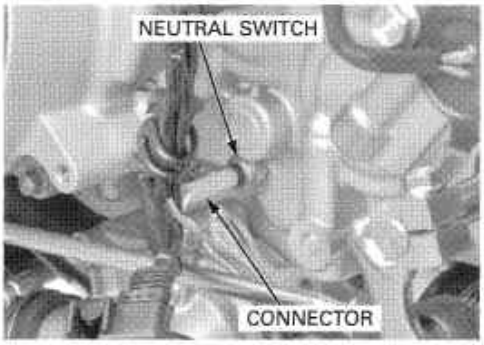
NEUTRAL SWITCH

Remove the left crankcase rear cover (page 2-6).

INSPECTION

Disconnect the neutral switch connector.
Check for continuity between the switch terminal and engine ground.

There should be continuity when the transmission is in neutral, and no continuity when the transmission is in gear except neutral.



REPLACEMENT

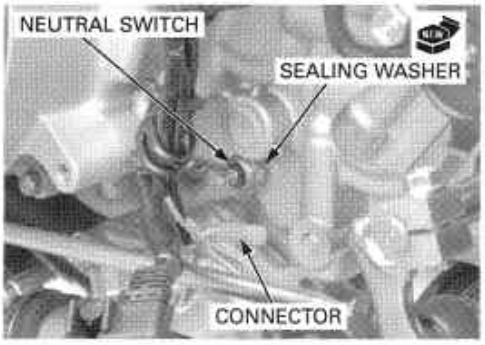
Disconnect the neutral switch connector.
Remove the neutral switch with the sealing washer from the crankcase.

Install the neutral switch with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector.

Install the left crankcase rear cover (page 2-6).

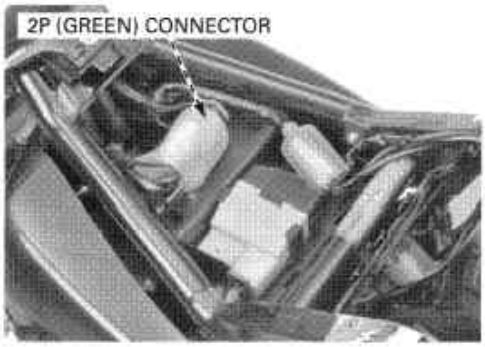


SIDE STAND SWITCH

INSPECTION

Remove the seat (page 2-3).

Disconnect the side stand switch 2P (Green) connector.
Check for continuity between the switch side connector terminals.
There should be continuity with the side stand retracted and no continuity with the side stand lowered.



REMOVAL/INSTALLATION

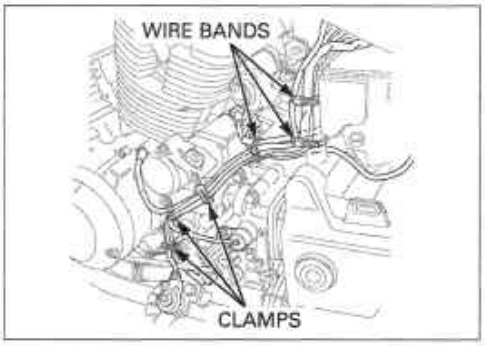
Remove the following:

- Seat (page 2-3)
- Left side cover (page 2-4)
- Left crankcase side cover (page 2-6)

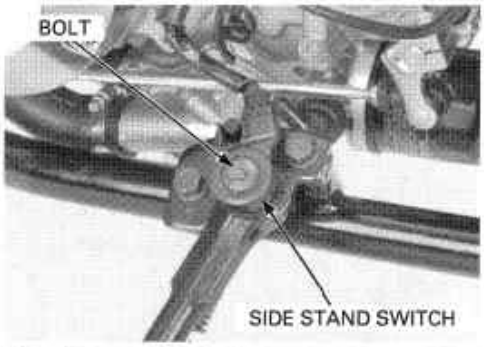
Support the motorcycle securely.

Disconnect the side stand switch 2P (Green) connector.

Release the side stand switch wire from the wire bands and clamps.



Remove the bolt and side stand switch.

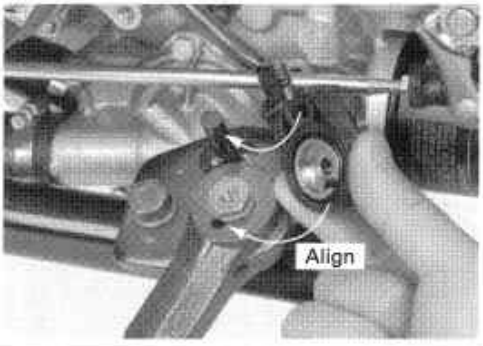


Install the side stand switch by aligning its pin with the side stand hole and switch groove with the bracket pin.
Install and tighten the bolt to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Route the side stand switch wire properly (page 1-24).

Install the removed parts in the reverse order of removal.

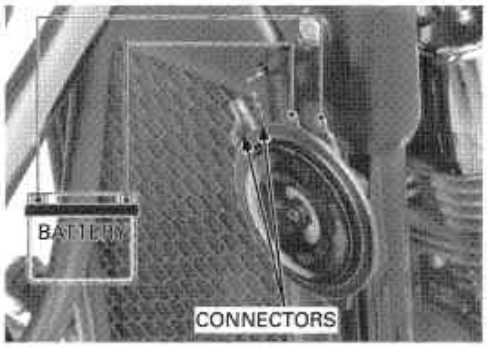


HORN

INSPECTION

Disconnect the connectors from the horn.
Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



REMOVAL/INSTALLATION

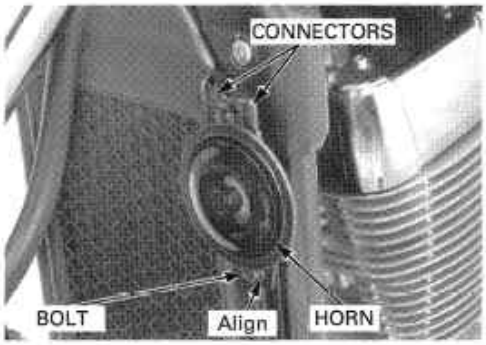
Disconnect the connectors from the horn.

Remove the bolt and horn.

Install the horn to the frame, aligning its flat with the horn stay.
Install and tighten the bolt to the specified torque.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Connect the connectors.



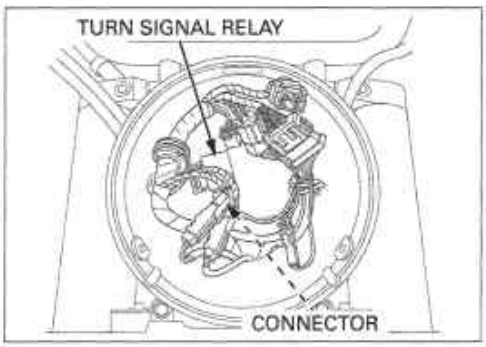
TURN SIGNAL RELAY

Turn signal light does not blink

Remove the headlight unit (page 20-4).

Remove the turn signal relay from the stay.
Slide the rubber cap and disconnect the connector.
Connect the White/green and Gray wire terminals of the wire harness side connector with a jumper wire.
Turn the ignition switch to "ON" and check the turn signal lights by operating the turn signal switch.

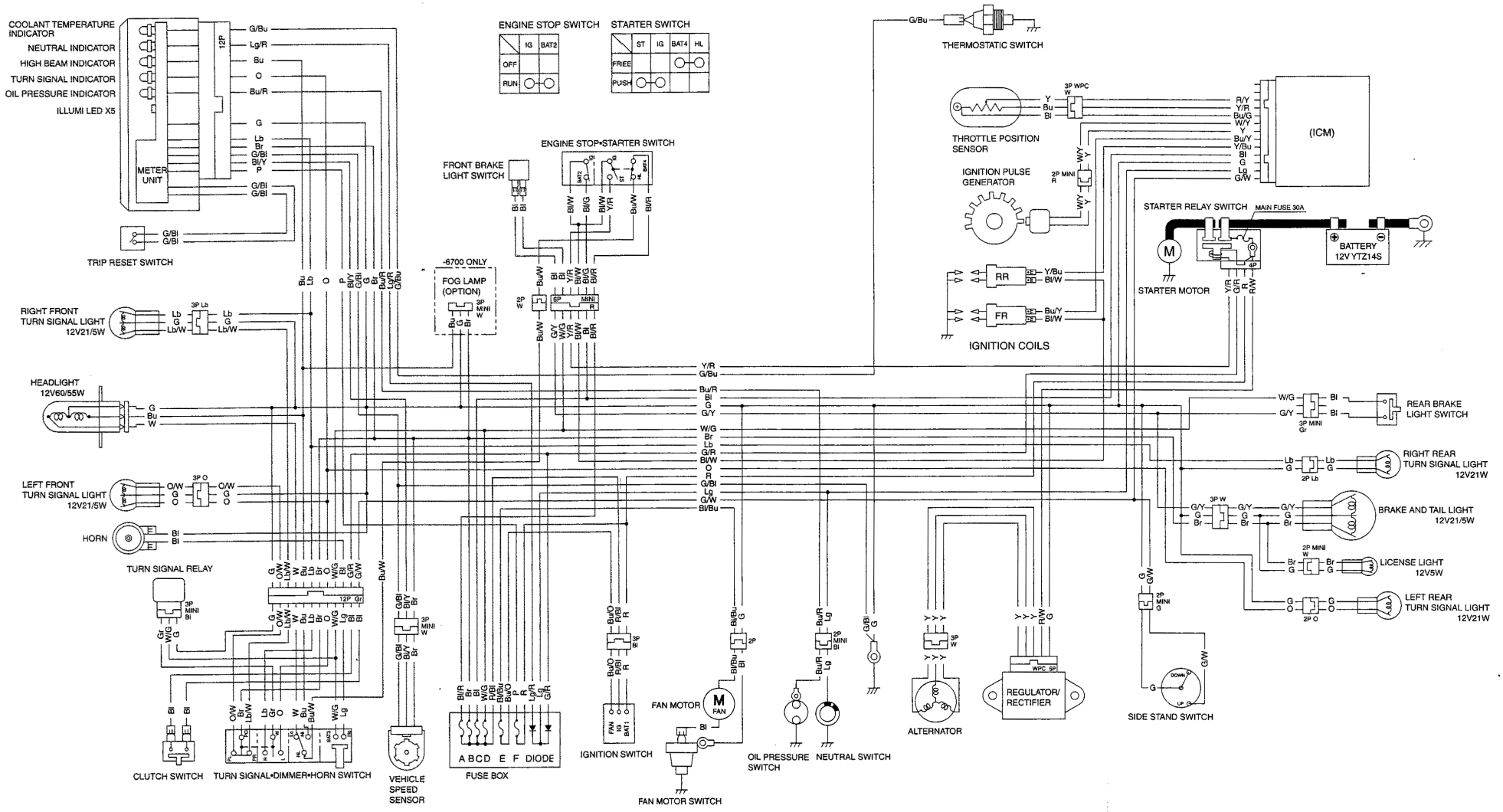
- If the light does not come on, check for an open circuit in the White/green and Gray wires.
- If the light comes on, check the connector terminals for loose or poor contact.
  If the connector terminals are OK, replace the turn signal relay.



21. WIRING DIAGRAM

21

WIRING DIAGRAM



TURN SIGNAL SWITCH

	W	R	L	PO	PR	PL
R	○	○			○	○
N						
L	○		○	○		○

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi	○		○

HORN SWITCH

	Ho	BAT3
FREE		
PUSH	○	○

FUSE
A 10A(HEADLIGHT)
B 10A(METER•TAIL)
C 10A(IGNITION•STARTER)
D 10A(TURN•HORN•STOP)
E 10A(FAN MOTOR)
F 5A(ODOMETER)

IGNITION SWITCH

	FAN	IG	BAT1	KEY
ON	○	○	○	KEY ON
OFF				KEY OFF

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

0030Z-MEG-6700

22. TROUBLESHOOTING

22

ENGINE DOES NOT START OR IS HARD TO START

1. **Fuel Line Inspection**

   Check fuel flow to carburetor.

   Does fuel reach the carburetor?

   NO – • Clogged fuel line and strainer
   • Clogged fuel tank breather
   • Sticking float valve
   • Pinched fuel valve vacuum hose

   YES – GO TO STEP 2.

2. **Spark Plug Inspection**

   Remove and inspect spark plugs.

   Is the spark plug wet?

   YES – • Flooded carburetor
   • Starting enrichment (SE) valve ON position (open)
   • Throttle valve open
   • Dirty air cleaner

   NO – GO TO STEP 3.

3. **Spark Test**

   Perform spark test.

   Is there weak or no spark?

   YES – • Faulty spark plug
   • Fouled spark plug
   • Loose or disconnected ignition system wires
   • Faulty ignition pulse generator
   • Faulty ignition coil
   • Faulty ignition control module (ICM)
   • Faulty engine stop switch

   NO – GO TO STEP 5.

4. **Cylinder Compression**

   Test cylinder compression.

   Is the compression low?

   YES – • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Seized valve
   • Improper valve timing

   NO – GO TO STEP 5.

5. **Engine Starting Condition**

   Start engine by following normal procedure.

   Does the engine start then stops?

   YES – • Improper choke operation
   • Incorrectly adjusted carburetor
   • Leaking carburetor insulator or intake manifold
   • Improper ignition timing (Faulty ICM, ignition pulse generator or throttle position sensor)
   • Contaminated fuel

ENGINE LACKS POWER

1. **Drive Train Inspection**

   Raise wheel off the ground and spin it by hand.

   Does the wheel spin freely?

   NO – • Brake dragging
   • Worn or damaged wheel bearings
   • Final gear bearing damaged

   YES – GO TO STEP 2.

2. **Tire Pressure Inspection**

   Check tire pressure.

   Are the tire pressures low?

   YES – • Faulty tire valve
   • Punctured tire

   NO – GO TO STEP 3.

3. **Clutch Inspection**

   Accelerate rapidly from low to second.

   Does the engine speed change accordingly when clutch is engaged?

   NO – • Clutch slipping
   • Worn clutch discs/plates
   • Warped clutch discs/plates
   • Weak clutch spring
   • Additive in engine oil

   YES – GO TO STEP 4.

4. **Engine Preformance Inspection**

   Accelerate lightly.

   Does the engine speed increase?

   NO – • Starting enrichment (SE) valve ON position (open)
   • Dirty air cleaner
   • Restricted fuel flow
   • Clogged muffler
   • Clogged fuel tank breather
   • Faulty throttle position sensor

   YES – GO TO STEP 5.

5. **Spark Plug Inspection**

   Remove and inspect spark plugs.

   Is the spark plug fouled or discolored?

   NO – • Plugs not serviced frequently enough
   • Incorrect spark plug heat range
   • Incorrect sprak plug gap

   YES – GO TO STEP 6.

6. **Engine Oil Inspection**

   Check oil level and condition.

   Is there correct level and good condition?

   NO – • Oil level too high
   • Oil level too low
   • Contaminated oil

   YES – GO TO STEP 7.

7. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

NO – • Faulty ignition control module (ICM)
• Faulty ignition pulse generator
• Faulty throttle position sensor

YES – GO TO STEP 8.

8. 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
• Improper valve timing

NO – GO TO STEP 9.

9. Carburetor Inspection

Check carburetor for clogging.

Is the carburetor for clogged?

YES – Carburetor not serviced frequently enough

NO – GO TO STEP 10.

10. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

Is the valve train lubricated properly?

NO – • Clogged oil passage
• Clogged oil orifice

YES – GO TO STEP 11.

11. Over Heating Inspection

Check for engine over heating.

Is the engine over heating?

YES – • Coolant level too low
• Fan motor not working
• Thermostat stuck closed
• Excessive carbon build-up in combustion chamber
• Use of poor quality fuel
• Wrong type of fuel
• Clutch slipping

NO – GO TO STEP 12.

12. Engine Knocking Inspection

Accelerate or run at high speed.

Is there knocking?

YES – • Worn piston and cylinder
• Wrong type of fuel
• Excessive carbon build-up in combustion chamber
• Ignition timing too advance (Faulty ICM)
• Lean fuel mixture
• Faulty throttle position sensor

NO – Engine does not knock

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. **Pilot Screw Inspection**

   Check carburetor pilot screw adjustment.

   Is the adjustment correct?

   NO – See page 5-25

   YES – GO TO STEP 2.

2. **Intake Air Leak Inspection**

   Check for leaking carburetor insulator and intake manifold.

   Is there leaking?

   YES – • Loose insulator bands
   • Damaged insulator
   • Faulty O-ring

   NO – GO TO STEP 3.

3. **Spark Test**

   Perform spark test.

   Is there weak or intermittent spark?

   YES – • Faulty spark plug
   • Fouled spark plug
   • Loose or disconnected ignition system wires
   • Faulty ignition pulse generator
   • Faulty ignition coil
   • Faulty engine stop switch
   • Faulty ignition control module (ICM)

   NO – GO TO STEP 4.

4. **Ignition Timing Inspection**

   Check ignition timing.

   Is the ignition timing correct?

   NO – • Faulty ignition control module (ICM)
   • Faulty ignition pulse generator
   • Faulty throttle position sensor

POOR PERFORMANCE AT HIGH SPEED

1. **Fuel Line Inspection**

   Disconnect fuel line at carburetor.

   Does fuel flow freely?

   NO – • Restricted fuel line and strainer
   • Restricted fuel tank breather
   • Faulty fuel valve vacuum hose

   YES – GO TO STEP 2.

2. **Spark Plug Inspection**

   Remove and inspect the spark plug.

   Is the spark plug in good condition?

   NO – • Plug not serviced frequently enough
   • Incorrect spark plug heat range
   • Incorrect spark plug gap
   • Faulty starting enrichment (SE) valve
   • Air cleaner dirty

   YES – GO TO STEP 3.

3. **Carburetor Inspection**

   Check carburetor for clogging.

   Is the carburetor clogged?

   YES – Carburetor not serviced frequently enough

   NO – GO TO STEP 4.

4. **Ignition Timing Inspection**

   Check ignition timing.

   Is the ignition timing correct?

   NO – • Faulty ignition control module (ICM)
   • Faulty ignition pulse generator
   • Faulty throttle position sensor

   YES – GO TO STEP 5.

5. **Valve Timing Inspection**

   Check valve timing.

   Is the valve timing correct?

   NO – Cam sprockets not installed properly

   YES – GO TO STEP 6.

6. **Valve Spring Inspection**

   Check valve springs.

   Is the valve spring free length within specification?

   NO – Faulty valve spring

   YES – GO TO STEP 7.

7. **Camshaft Inspection**

   Remove and inspect the camshaft.

   Is the cam lobe height within specification?

   NO – Faulty camshaft

   YES – Camshaft is OK

POOR HANDLING

Steering is heavy
- Steering top thread too tight
- Damaged steering head bearings
- Low tire pressure

Either wheel is wobbling
- Excessive wheel bearing play
- Bent rim
- Improperly installed wheel hub
- Excessively worn swingarm pivot bearings
- Bent frame

Motorcycle pulled to one side
- Front and rear wheels not aligned
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

MEMO

23. INDEX

INDEX