

2010-2013



HONDA

SERVICE MANUAL

VT750RS
SHADOW RS™

61MGR03

How To Use This Manual

This manual describes the service procedures for the VT750RS.

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

Section 4 through 19 describe parts of the motorcycle, grouped according to location.

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

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

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


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

If you don't know the source of the trouble, go to Troubleshooting section 21.

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.

HOW TO USE THIS MANUAL

SYMBOLS

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

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

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MEMO

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GENERAL INFORMATION

SERVICE RULES

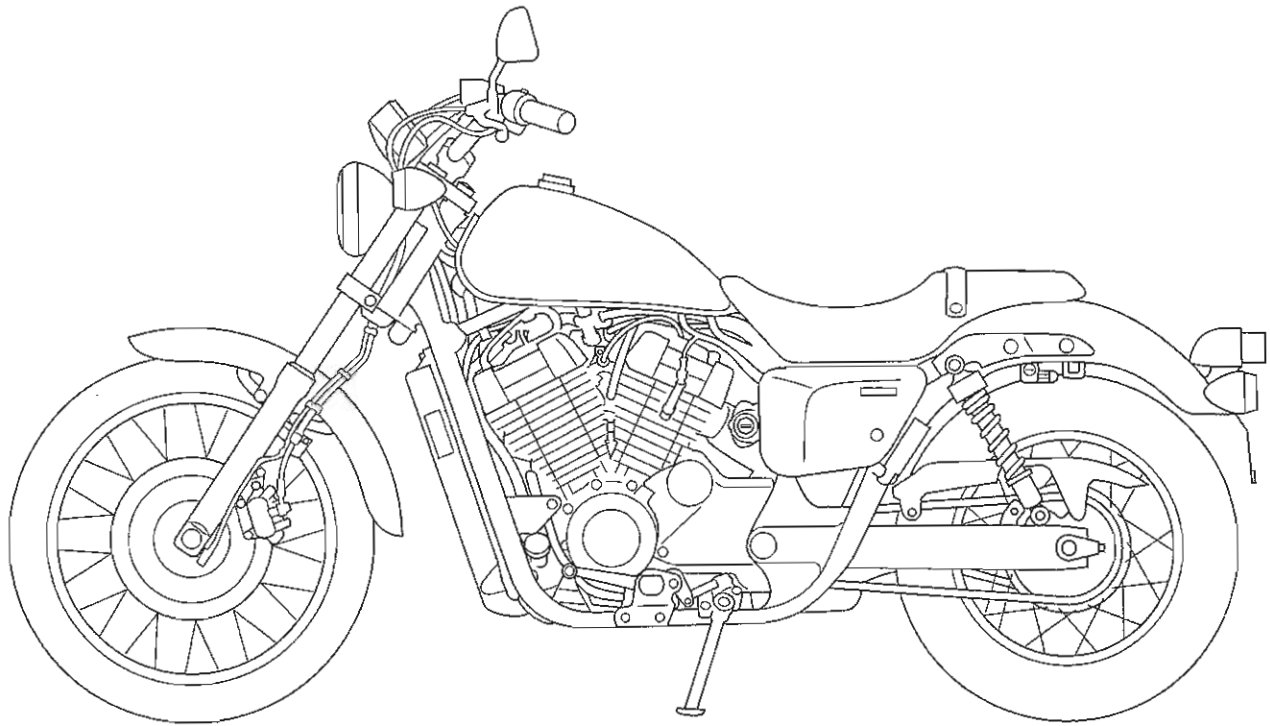
1. Use Honda Genuine or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 1-19).
9. Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

ABBREVIATION

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

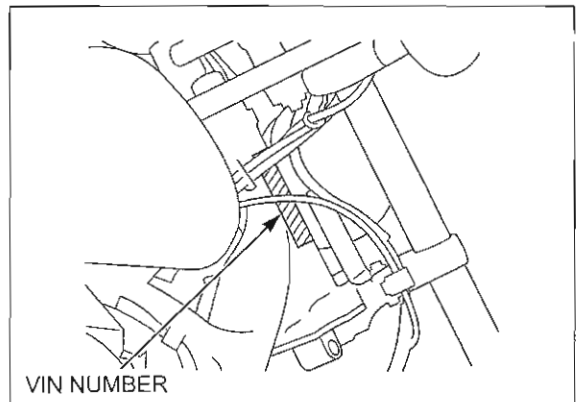
Abbrev. term	Full term
CKP sensor	Crankshaft Position sensor
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
ECM	Engine Control Module
ECT sensor	Engine Coolant Temperature sensor
EEPROM	Electrically Erasable Programmable Read Only Memory
EOP switch	Engine Oil Pressure switch
EVAP	Evaporative Emission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

MODEL IDENTIFICATION

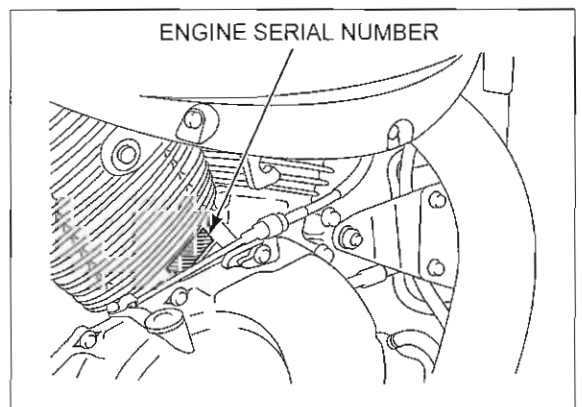


SERIAL NUMBERS

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

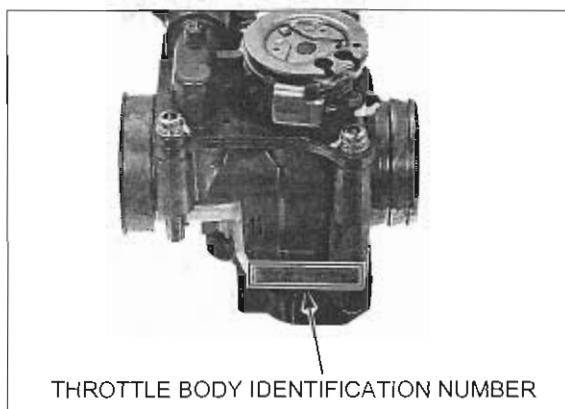


The engine serial number is stamped on the right side of the crankcase.



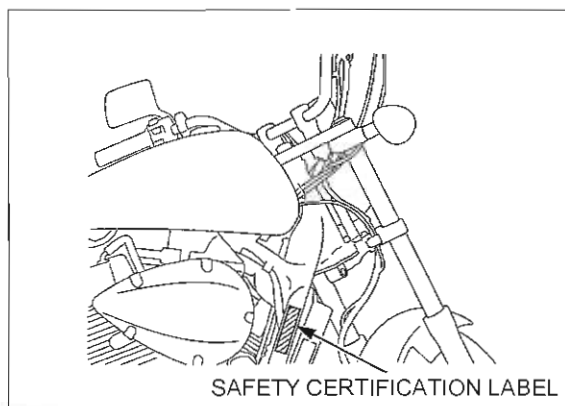
GENERAL INFORMATION

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

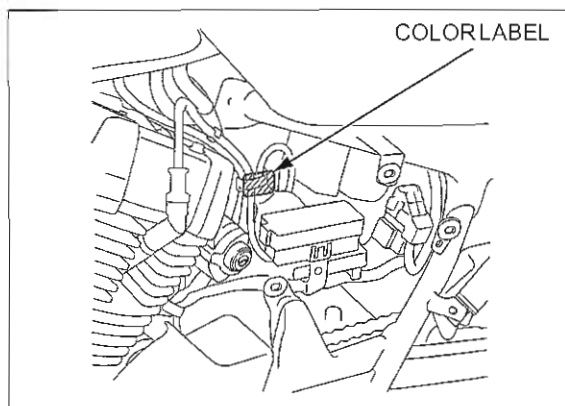


LABEL

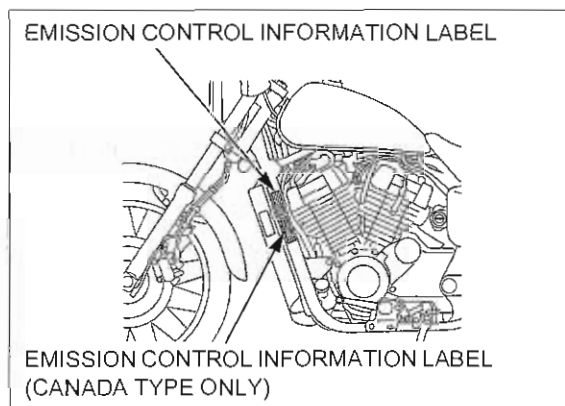
The Safety Certification Label is attached on right side of the frame down tube.



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



The Emission Control Information Label is attached on left side of the frame down tube.



GENERAL SPECIFICATIONS

ITEM		SPECIFICATIONS
DIMENSION	Overall length	2,285 mm (90.0 in)
	Overall width	865 mm (34.1 in)
	Overall height	1,135 mm (44.7 in)
	Wheelbase	1,560 mm (61.4 in)
	Seat height	750 mm (29.5 in)
	Footpeg height	302 mm (11.9 in)
	Ground clearance	155 mm (6.1 in)
	Curb weight (49 STATES/CANADA TYPE) (CALIFORNIA TYPE)	228 kg (503 lbs) 229 kg (505 lbs)
Maximum weight capacity	168 kg (370 lbs)	
FRAME	Frame type	Double cradle
	Front suspension	Telescopic fork
	Front axle travel	118 mm (4.6 in)
	Rear suspension	Swingarm
	Rear axle travel	90 mm (3.5 in)
	Front tire size	100/90-19M/C 57H
	Rear tire size	150/80B16M/C 71H
	Tire brand Front	D404F (DUNLOP)
	Rear	ME 880 Marathon (METZELER) D404 G (DUNLOP)
	Front brake	ME 880 Marathon (METZELER)
	Rear brake	Hydraulic single disc
	Caster angle	Internal expanding shoe
	Trail length	33°
	Fuel tank capacity	10 liters (2.64 US gal, 2.2 Imp gal)
Fuel tank reserve capacity	2.5 liters (0.66 US gal, 0.55 Imp gal) NEW	
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° TDC (at 1 mm lift)
	Exhaust valve closes	Rear: 5° ATDC (at 1 mm lift)
	Exhaust valve opens	25° ABDC (at 1 mm lift)
	Exhaust valve closes	35° BBDC (at 1 mm lift)
	Lubrication system	Front: 0° TDC (at 1 mm lift)
	Oil pump type	Rear: 5° BTDC (at 1 mm lift)
	Cooling system	Forced pressure and wet sump
Air filtration	Trochoid	
Engine dry weight	Liquid cooled	
Firing order	Viscous paper element	
Cylinder number	64.3 kg (141.8 lbs)	
FUEL DELIVERY SYSTEM	Type	PGM-FI
	Throttle bore	34 mm (1.3 in)
DRIVE TRAIN	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operating
	Transmission	Constant mesh, 5-speeds
	Primary reduction	1.666 (65/39)
	Final reduction	2.235 (38/17)
	Gear ratio 1st	3.166 (38/12)
	2nd	2.000 (34/17)
	3rd	1.500 (30/20)
4th	1.173 (27/23)	
5th	1.041 (25/24)	
Gearshift pattern	Left foot operated return system, 1 - N - 2 - 3 - 4 - 5	

GENERAL INFORMATION

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

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.3 liters (2.4 US qt, 2.0 Imp qt)	-
	At oil filter change	2.5 liters (2.6 US qt, 2.2 Imp qt)	-
	At disassembly	3.0 liters (3.2 US qt, 2.6 Imp qt)	-
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	-
Oil pressure at EOP switch		530 kPa (5.4 kgf/cm ² , 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 (PGM-FI) SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number		GQ9KA
Engine idle speed		1,200 ± 100 rpm
Throttle grip freeplay		2 - 6 mm (1/16 - 1/4 in)
Fuel injector resistance (20°C/68°F)	Front	11 - 13 kΩ
	Rear	11 - 13 kΩ
PAIR control solenoid valve resistance (20°C/68°F)		23 - 27 Ω
Fuel pressure at idle		333 - 353 kPa (3.4 - 3.6 kgf/cm ² , 48 - 51 psi)
Fuel pump flow (at 12 V)		50 cm ³ (1.7 US oz, 1.8 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.51 liters (2.65 US qt, 2.21 Imp qt)
	Reserve tank	0.75 liter (0.79 US qt, 0.66 Imp qt)
Radiator cap relief pressure		108 - 137 kPa (1.1 - 1.4 kgf/cm ² , 16 - 20 psi)
Thermostat	Begin to open	80 - 84°C (177 - 182°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 silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

GENERAL INFORMATION

CYLINDER HEAD/VALVE SPECIFICATIONS

ITEM		STANDARD		SERVICE LIMIT
Cylinder compression at 400 rpm		1,363 kPa (13.9 kgf/cm ² , 198 psi)		—
Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.001)		—
	EX	0.20 ± 0.02 (0.008 ± 0.001)		—
Cam chain tensioner wedge B length		—		6 (0.2)
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		0.040 – 0.094 (0.0016 – 0.0037)		0.113 (0.0044)
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)	
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 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.10 (0.004)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	18.7 – 18.9 (0.736 – 0.744)	—
EX		17.2 – 17.4 (0.680 – 0.690)	—	
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

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 (0.7) from the 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 freeplay			10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length		45.5 (1.79)	43.9 (1.73)
	Disc thickness	Disc A	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
		End disc	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.	29.994 – 30.007 (1.1809 – 1.1814)	29.98 (1.180)	
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)	0.093 (0.0036)
Oil pump drive sprocket I.D.			30.025 – 30.145 (1.1820 – 1.1868)	30.15 (1.187)
Oil pump drive sprocket-to-clutch outer guide clearance			0.018 – 0.151 (0.0007 – 0.0059)	0.183 (0.0072)

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 bearing area I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)	
Shift fork, fork shaft	I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.04 (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. at left end			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 – 0.052 (0.0006 – 0.0020)	0.09 (0.035)	
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)	
		C1, C2, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.05 (1.222)	
	Gear busing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)	
		C1, C2, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)	
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)	
		C1, C2, 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	27.995 – 28.016 (1.1022 – 1.1030)	28.04 (1.104)	
	Mainshaft O.D.		at M3 bushing	24.972 – 24.993 (0.9831 – 0.9840)	24.95 (0.982)
	Countershaft O.D.		at C2 bushing	27.967 – 27.980 (1.1011 – 1.1016)	27.95 (1.100)
Bushing-to-shaft clearance	M3	0.007 – 0.049 (0.0003 – 0.0019)	0.08 (0.003)		
	C2	0.015 – 0.048 (0.0006 – 0.0019)	0.08 (0.003)		

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		-	1.5 (0.06)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	-
	Driver and passenger	200 kPa (2.00 kgf/cm ² , 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 max.
Fork	Spring free length	440.4 (17.34)	431.6 (16.99)
	Tube runout	-	0.2 (0.01)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8 (10W)	-
	Fluid level	152 (6.0)	-
	Fluid capacity	468 ± 2.5 cm ³ (15.8 ± 0.08 US oz, 16.5 ± 0.09 Imp oz)	-
Steering head bearing pre-load		8.7 – 13.0 N (0.9 – 1.3 kgf)	-

REAR WHEEL/BRAKE/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		-	2.0 (0.08)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	-
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	-
Axle runout		-	0.2 (0.01)
Wheel rim runout	Radial	-	2.0 (0.08)
	Axial	-	2.0 (0.08)
Wheel balance weight		-	70 g max.
Drive chain	Size/link	DID	DID525V8-112LE
		RK	RK525SMOZ5-112LE
	Drive chain slack	30 – 40 (1-3/16 – 1-9/16)	-
Brake drum I.D.		180.0 – 180.3 (7.09 – 7.10)	181 (7.1)
Brake pedal stopper bolt length (Brake pedal height)		12 (0.5)	-
Brake pedal freeplay		20 – 30 (13/16 – 1-3/16)	-
Shock absorber spring pre-load adjuster setting		2nd position	-

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Recommended brake fluid	DOT 4	-
Brake disc thickness	6.0 ± 0.2 (0.23 ± 0.01)	5.0 (0.20)
Brake disc warpage	-	0.30 (0.012)
Master cylinder I.D.	11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
Caliper piston O.D.	25.335 – 25.368 (0.9974 – 0.9987)	25.320 (0.9968)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12 V – 11.2 Ah	
	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	0.399 kW/5,000 rpm	
	Charging coil resistance (20°C/68°F)	0.1 – 1.0 Ω	

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
	For extended high speed riding	DPR8EA-9 (NGK), X24EPR-U9 (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage		100 V minimum
Ignition timing ("F"mark)		8° BTDC at idle
CKP sensor peak voltage (at 20°C/68°F)		0.7 V minimum

ELECTRIC STARTER 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/tail light	12 V – 21/5 W
	Front turn signal light/Position light	12 V – 21/5 W x 2
	Rear turn signal light	12 V – 21 W x 2
	Instrument light	LED
	Turn signal indicator	LED
	High beam indicator	LED
	Fuel reserve indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	Coolant temperature indicator	LED
	MIL	LED
Fuse	Main fuse	30 A
	FI fuse	20 A
	Sub fuse	10 A x 5, 20 A x 1
ECT sensor resistance	50°C (122°F)	6.8 – 7.4 kΩ
	80°C (176°F)	2.1 – 2.6 kΩ

GENERAL INFORMATION

TORQUE VALUES

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5.2 (0.5, 3.8)	5 mm screw	4.2 (0.4, 3.1)
6 mm bolt and nut (includes SH flange bolt)	10 (1.0, 7)	6 mm screw	9 (0.9, 6.6)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, large flange) and nut	12 (1.2, 9)
10 mm bolt and nut	34 (3.5, 25)	8 mm flange bolt and nut	27 (2.8, 20)
12 mm bolt and nut	54 (5.5, 40)	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.

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	10 (1.0, 7)	See page 2-12
Exhaust pipe joint stud bolt	4	8	–	
Over head cover socket bolt	8	6	10 (1.0, 7)	
Seat mounting socket bolt	2	8	22 (2.2, 16)	
Shock absorber upper cover mounting bolt	6	10	34 (3.5, 25)	
Exhaust pipe joint nut	4	8	21 (2.1, 15)	
Muffler stay mounting bolt	4	8	34 (3.5, 25)	
Muffler mounting nut	2	10	34 (3.5, 25)	
Muffler bracket nut	2	8	27 (2.8, 20)	
Sidestand pivot bolt	1	10	9 (0.9, 6.6)	
Sidestand pivot lock nut	1	10	30 (3.1, 22)	Apply 1 g grease to the sliding surface. See page 2-14 See page 2-14
Sidestand bracket bolt	2	10	49 (5.0, 36)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	12	18 (1.8, 13)	Apply grease to the threads. Apply grease to the threads. Apply engine oil to the threads and seating surface.
Timing hole cap	1	14	10 (1.0, 7)	
Crankshaft hole cap	1	30	15 (1.5, 11)	
Valve adjusting screw lock nut	6	7	23 (2.3, 17)	
Oil filter cartridge	1	20	26 (2.7, 19)	Apply engine oil to the threads. Apply locking agent to the threads. See page 3-12
Oil filter boss (Crankcase side)	1	20	–	
Oil drain bolt	1	14	29 (3.0, 21)	
Alternator cover socket bolt	3	6	10 (1.0, 7)	
Air cleaner cover socket bolt	5	5	1.5 (0.2, 1.1)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
EOP switch	1	PT 1/8	12 (1.2, 9)	Apply sealant to the threads. See page 4-5
EOP switch terminal screw	1	4	2 (0.2, 1.5)	See page 4-5
Oil pump assembly bolt	3	6	13 (1.3, 10)	

GENERAL INFORMATION

FUEL SYSTEM (PGM-FI)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
PAIR check valve cover bolt	4	5	7 (0.7, 5.2)	
Insulator band screw (Throttle body side)	1	—	—	See page 5-49
Insulator band screw (Intake manifold side)	1	—	—	See page 5-53
Sensor unit torx screw	3	5	3.4 (0.3, 2.5)	
Fuel injector cap mounting bolt	2	5	5.1 (0.5, 3.8)	
IACV setting plate torx screw	2	5	2.1 (0.2, 1.5)	
Throttle cable guide screw	2	5	3.4 (0.3, 2.5)	
ECT sensor	1	12	23 (2.3, 17)	
Air cleaner chamber mounting screw	1	5	1.1 (0.1, 0.8)	
Air cleaner chamber connecting tube band screw	1	4	1 (0.1, 0.7)	
Bank angle sensor mounting bolt	2	4	2 (0.2, 1.5)	
Fuel pump assembly bolt	6	6	8.8 (0.9, 6.5)	See page 5-41

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump cover bolt	4	6	13 (1.3, 10)	
Water pump drain bolt	1	6	13 (1.3, 10)	
Fan motor mounting bolt	3	5	5.1 (0.5, 3.8)	
Cooling fan mounting nut	1	5	2.7 (0.3, 2.0)	Apply locking agent to the threads.
Drive chain guide plate upper mounting bolt	1	6	10 (1.0, 7)	Apply locking agent to the threads.
Drive chain guide plate lower mounting bolt	1	6	12 (1.2, 9)	CT bolt
Radiator filler mounting bolt	2	6	10 (1.0, 7)	
Thermostat housing cover bolt	2	6	10 (1.0, 7)	
Water hose band screw	12	—	—	See page 6-11
Fan motor assembly mounting bolt	3	6	8.4 (0.9, 6.2)	

ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine upper/lower mounting nut	2	10	54 (5.5, 40)	
Engine hanger plate bolt	2	8	26 (2.7, 19)	
Drive sprocket fixing plate bolt	2	6	10 (1.0, 7)	
Gearshift arm pinch bolt	1	6	12 (1.2, 9)	

CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	4	6	10 (1.0, 7)	
Cylinder head bolt	4	8	23 (2.3, 17)	Apply engine oil to the threads and seating surface.
Cylinder head nut	8	10	47 (4.8, 35)	Apply engine oil to the threads and seating surface.
Cam sprocket bolt	4	7	23 (2.3, 17)	Apply locking agent to the threads.
Cam chain tensioner bolt	4	6	10 (1.0, 7)	See page 8-24
Camshaft holder bolt	6	8	23 (2.3, 17)	
Camshaft holder nut	4	8	23 (2.3, 17)	

GENERAL INFORMATION

CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder stud bolt	2	8	–	See page 9-8
Cylinder stud bolt	6	10	–	See page 9-8
Cylinder stud bolt	2	12	–	See page 9-8

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)	Replace with a new one and stake. Apply engine oil to the threads and seating surface.
Clutch center lock nut	1	18	128 (13.1, 94)	
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Apply locking agent to the threads.
Primary drive gear bolt	1	12	88 (9.0, 65)	Apply engine oil to the threads and seating surface.
Stopper arm bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	
Gearshift pedal pivot bolt	1	10	34 (3.5, 25)	
Gearshift cam plate bolt	1	6	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	128 (13.1, 94)	Left hand threads Apply engine oil to the threads and seating surface.
Stator socket bolt	3	6	12 (1.2, 9)	Apply locking agent to the threads.
Starter one-way clutch outer socket bolt	6	8	30 (3.1, 22)	Apply locking agent to the threads.
Stator wire holder socket bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.

CRANKSHAFT/TRANSMISSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankcase bolt (8 mm)	13	8	23 (2.3, 17)	Apply engine oil to the threads and seating surface.
Crankpin bearing cap nut	4	8	33 (3.4, 24)	
Cam chain tensioner setting plate bolt	2	6	12 (1.2, 9)	Apply locking agent to the threads.
Transmission bearing setting plate bolt	2	6	12 (1.2, 9)	Apply locking agent to the threads.

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lever pivot bolt	1	6	1 (0.1, 0.7)	ALOC bolt; replace with a new one.
Clutch lever pivot nut	1	6	6 (0.6, 4.4)	
Handlebar upper holder bolt	4	8	22 (2.2, 16)	
Handlebar lower holder nut	2	8	27 (2.8, 20)	
Brake disc bolt	6	8	42 (4.3, 31)	
Spoke	52	BC4	4.2 (0.4, 3.1)	
Front axle bolt	1	14	59 (6.0, 44)	Apply locking agent to the threads.
Front axle pinch bolt	2	8	22 (2.2, 16)	
Fork socket bolt	2	8	20 (2.0, 15)	
Fork cap	2	38	22 (2.2, 16)	
Tire valve nut	1	8V1	4 (0.4, 3.0)	
Fork top bridge pinch bolt	2	8	27 (2.8, 20)	
Fork bottom bridge pinch bolt	2	10	49 (5.0, 36)	Apply engine oil to the threads. See page 13-34
Steering top thread	1	26	—	
Steering top thread lock nut	1	26	—	
Steering stem nut	1	24	103 (10.5, 76)	See page 13-35

REAR WHEEL/BRAKE/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spoke	52	BC4	4.2 (0.4, 3.1)	U-nut
Tire valve nut	1	8V1	4 (0.4, 3.0)	
Rear axle nut	1	18	93 (9.5, 69)	
Rear brake stopper arm nut	2	8	22 (2.2, 16)	U-nut
Rear brake arm pinch bolt	1	8	29 (3.0, 21)	
Driven sprocket nut	5	12	88 (9.0, 65)	U-nut
Rear shock absorber mounting bolt	2	8	26 (2.7, 19)	
Swingarm pivot nut	1	14	88 (9.0, 65)	U-nut
Swingarm pivot adjusting bolt	1	26	25 (2.5, 18)	
Swingarm pivot lock nut	1	26	64 (6.5, 47)	See page 14-24
Drive chain slider screw	2	5	2.4 (0.2, 1.8)	See page 14-24

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake caliper bleed valve	1	8	5.5 (0.6, 4.1)	Apply locking agent to the threads. ALOC bolt; replace with a new one.
Master cylinder reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Brake pad pin	1	10	18 (1.8, 13)	
Brake pad pin plug	1	10	2.5 (0.3, 1.8)	
Brake hose oil bolt	2	10	34 (3.5, 25)	
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.4)	
Front brake light switch screw	1	4	1.2 (0.1, 0.9)	
Master cylinder holder bolt	2	6	12 (1.2, 9)	
Brake caliper bracket pin	1	8	12 (1.2, 9)	
Brake caliper pin	1	8	27 (2.8, 20)	
Brake caliper mounting bolt	2	8	30 (3.1, 22)	

BATTERY/CHARGING SYSTEM

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

GENERAL INFORMATION

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor cable terminal nut	1	6	10 (1.0, 7)	
Starter motor assembly bolt	2	5	4.9 (0.5, 3.6)	
Negative brush screw	1	5	3.7 (0.4, 2.7)	

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)	
Lower meter cover mounting screw	4	4	0.9 (0.1, 0.7)	
Ignition switch mounting bolt	2	6	12 (1.2, 9)	One-way bolt
Sidestand switch bolt	1	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
Fuel reserve sensor	1	18	23 (2.3, 17)	
Horn mounting bolt	1	8	21 (2.1, 15)	

LUBRICATION & SEAL POINTS

ENGINE

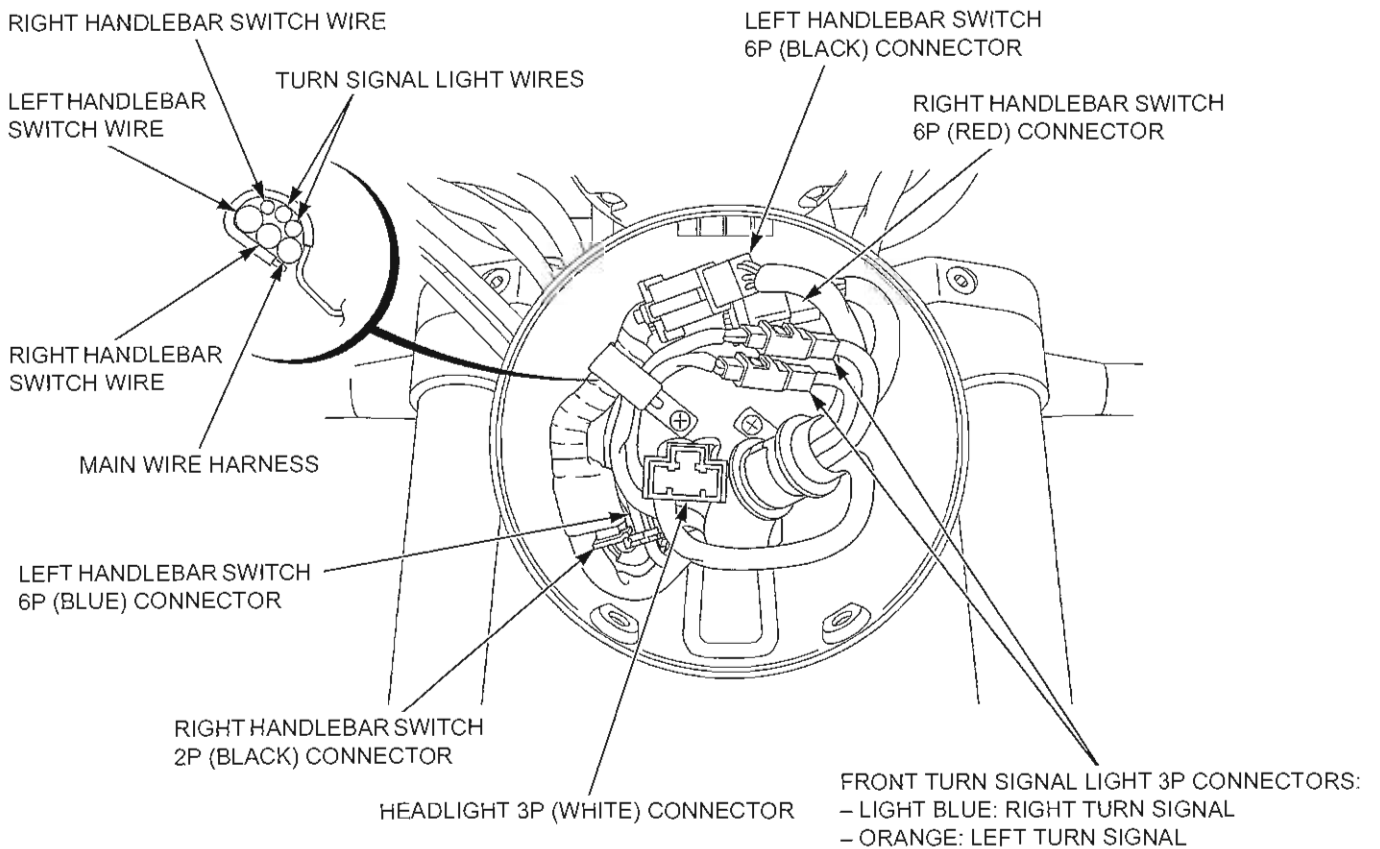
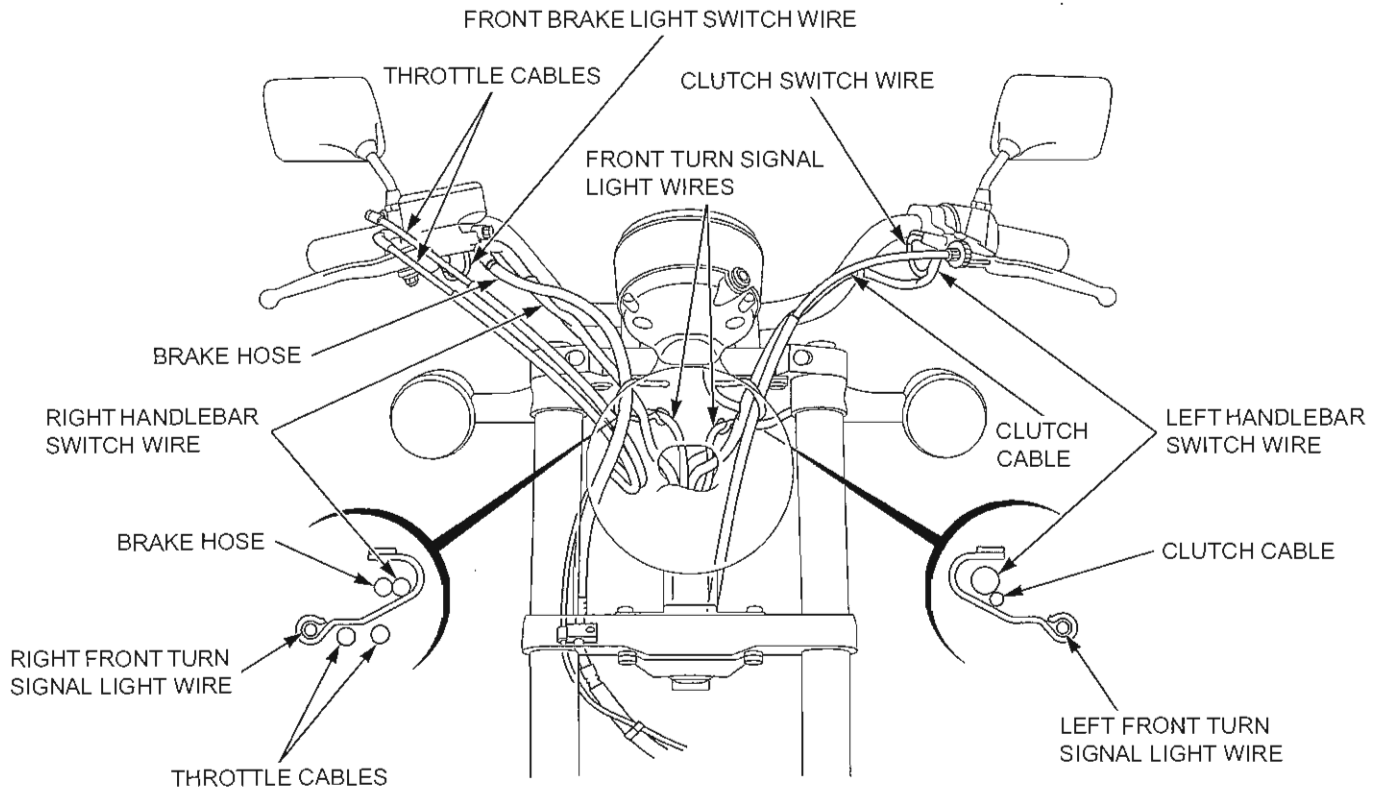
MATERIAL	LOCATION	REMARKS
Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Camshaft lobes and journal surface Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Crankpin bearing thrust surface Crankshaft main journals Clutch outer guide outer surface Transmission gear shift fork groove Transmission gear sliding surface and tooth flank Transmission bushing sliding surface Connecting rod small end inner surface	
Engine oil	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 and seating surface Clutch lifter arm sliding surface of the right crankcase cover Clutch discs Cylinder wall Valve adjusting screw lock nut threads and seating surface Shift fork shaft whole surface Crankpin bearing cap nut threads and seating surface Engine oil filter cartridge threads Oil pipe seal Injector seal ring Each bearings rotating area Each O-rings	
Multi-purpose grease	Each oil seal lips	
Liquid sealant (Three Bond 1207B or equiva- lent)	CKP sensor wire grommet Stator wire grommet Right and left crankcase mating surface Right crankcase cover mating surface Left crankcase cover mating surface Left crankcase cover bolt threads (marked "△")	See page 12-24 See page 10-24 See page 11-12 Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) See page 11-12
Locking agent	Cam sprocket bolt threads Starter one-way clutch outer socket bolt threads Oil pump driven sprocket bolt threads Stator wire holder socket bolt threads Gearshift cam plate bolt threads Transmission bearing setting plate bolt threads Countershaft oil seal setting plate bolt threads Cam chain tensioner setting plate bolt threads Stator socket bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in) Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
Honda Bond A or Pro Honda handgrip cement (U.S.A. only)	Cylinder head cover-to-gasket groove	

GENERAL INFORMATION

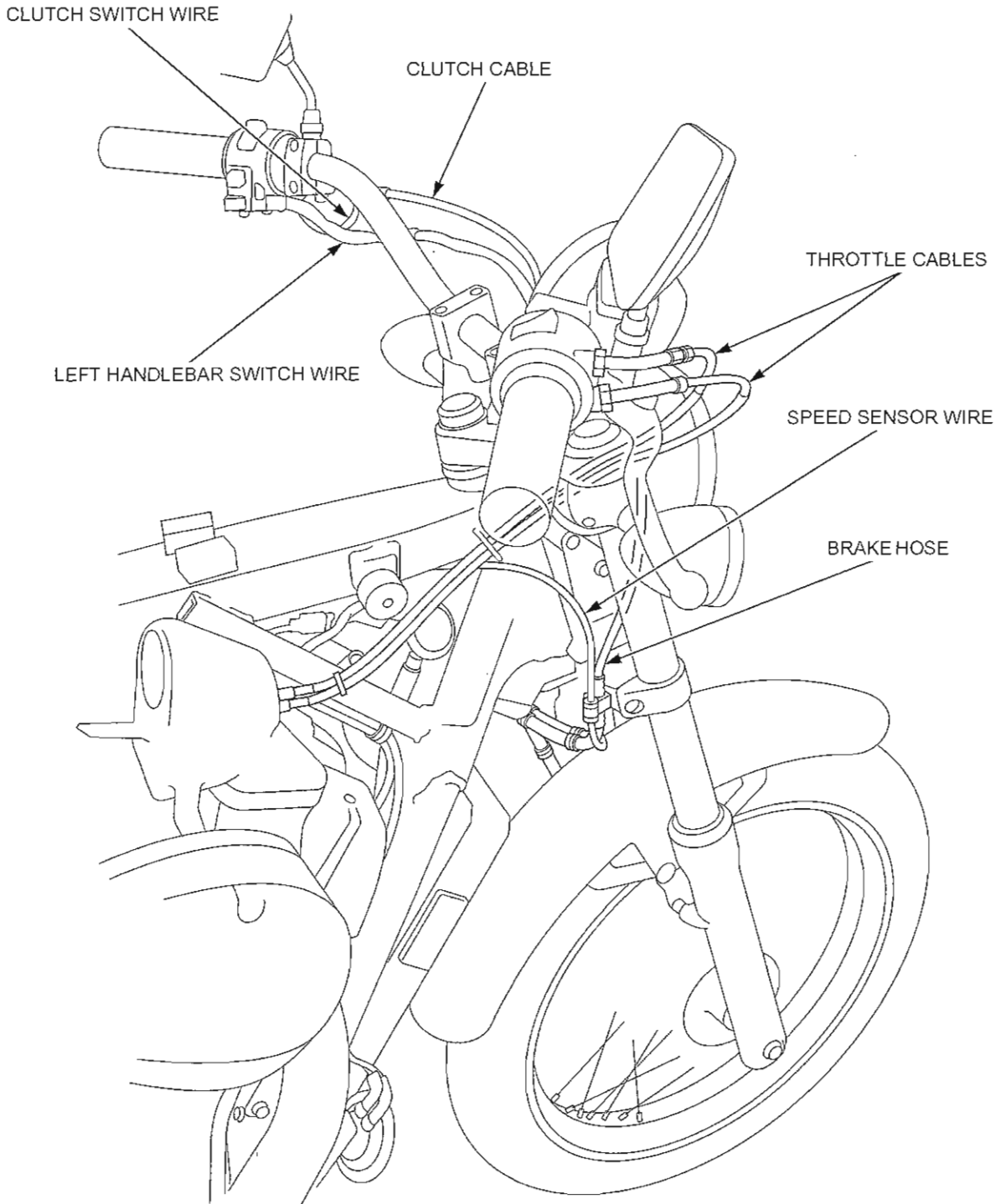
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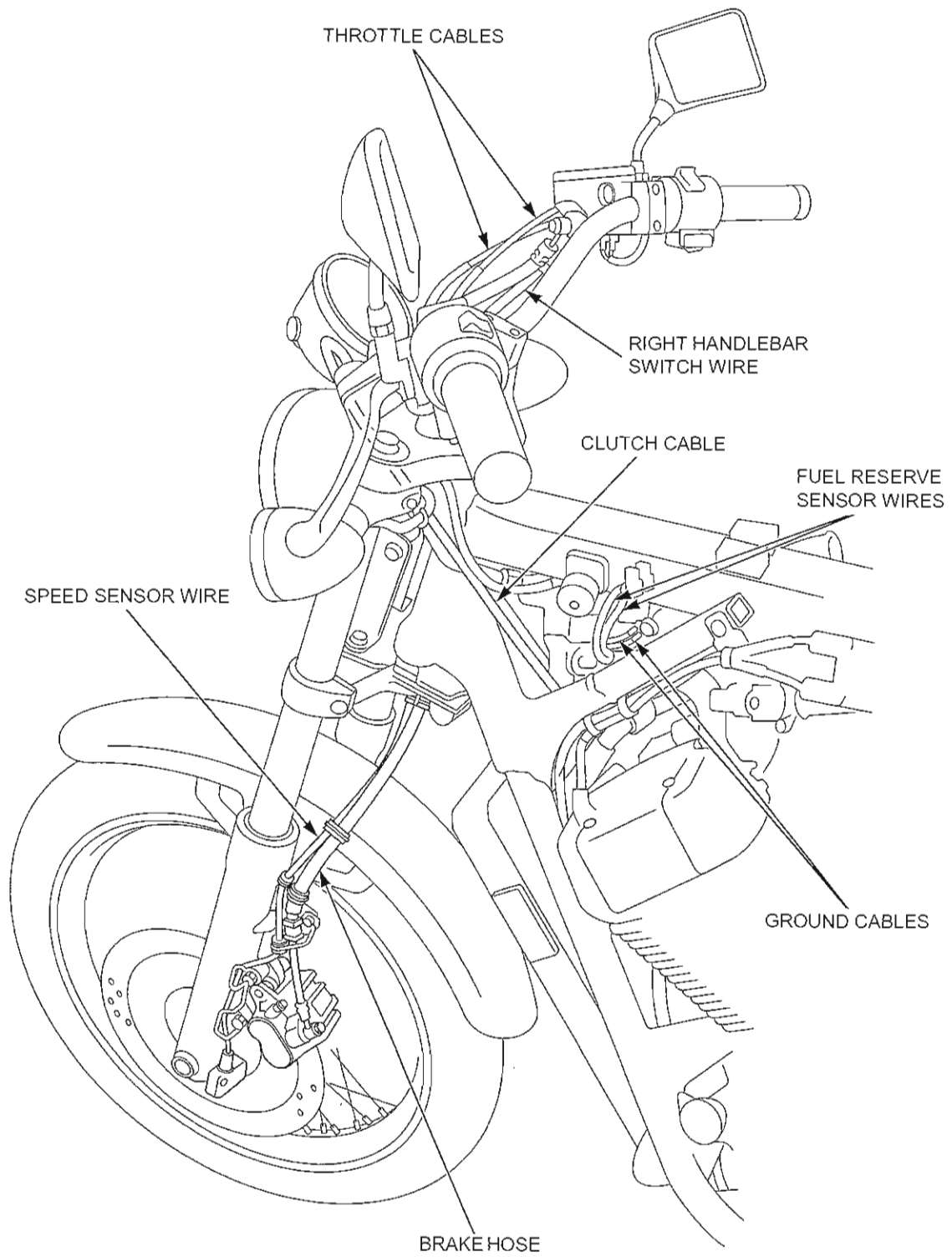
MATERIAL	LOCATION	REMARKS
Multi-purpose grease	Throttle cable end Foot peg sliding area Pillion step sliding area Throttle pipe flange groove and sliding surface Clutch lever pivot bolt sliding surface Gearshift spindle oil seal lips Gearshift pedal dust seal lips Speedometer gear box inner surface Front/rear axle sliding surface Shock absorber mount bushing inner surface Rear brake middle rod joint bolt sliding surface Rear brake cam sliding surface Brake shoe-to-anchor pin sliding surface Brake pedal pivot sliding surface Rear brake joint pins Front/rear wheel dust seal lips Swingarm pivot bearing needle rollers Swingarm pivot dust seal lips	Spreading 0.2 – 0.3 g Spreading 0.2 – 0.3 g Spreading 0.2 – 0.3 g
Urea based multi-purpose grease with extreme pressure (example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan) or equivalent	Steering head bearings Steering head bearing dust seal lips	Apply 3 – 5 g for each bearing
Cable lubricant	Throttle cable outer inside Clutch cable outer inside	
Honda Bond A or Pro Honda handgrip cement (U.S.A. only)	Handlebar grip rubber inside Pad retainer mating surface	
Engine oil	Rear brake cam felt seal	
Silicone grease	Fuel pump O-rings Brake lever pivot bolt sliding surface Brake lever-to-master piston contacting area Brake caliper and bracket pin boot inside Brake caliper dust seal	Apply 0.1 g Apply 0.1 g Apply 0.4 g
DOT 4 brake fluid	Brake master piston and cups Brake caliper piston and piston seals	
Pro Honda Suspension Fluid SS-8 (10W)	Fork dust seal and oil seal lips Fork cap O-ring	

CABLE & HARNESS ROUTING

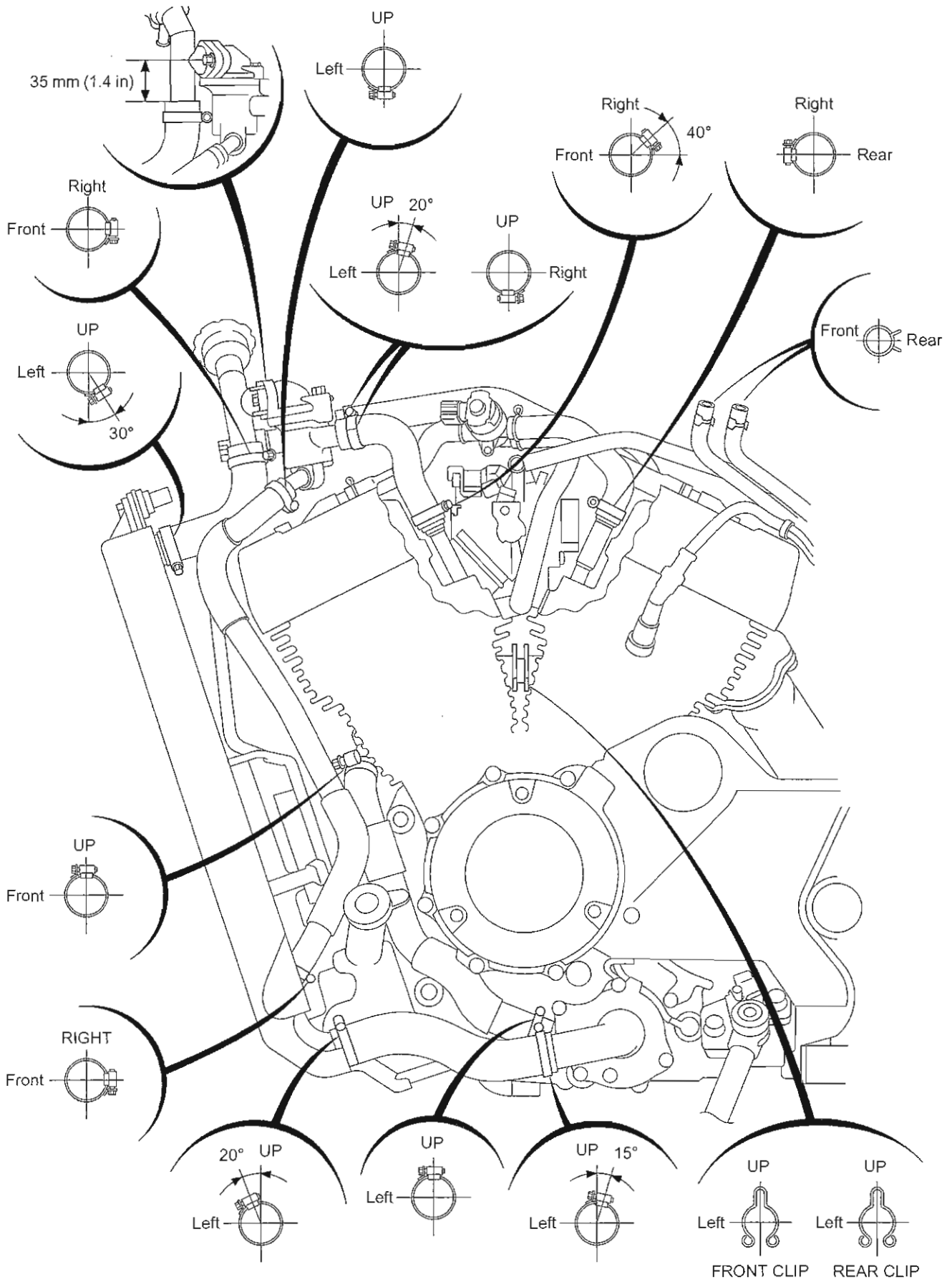


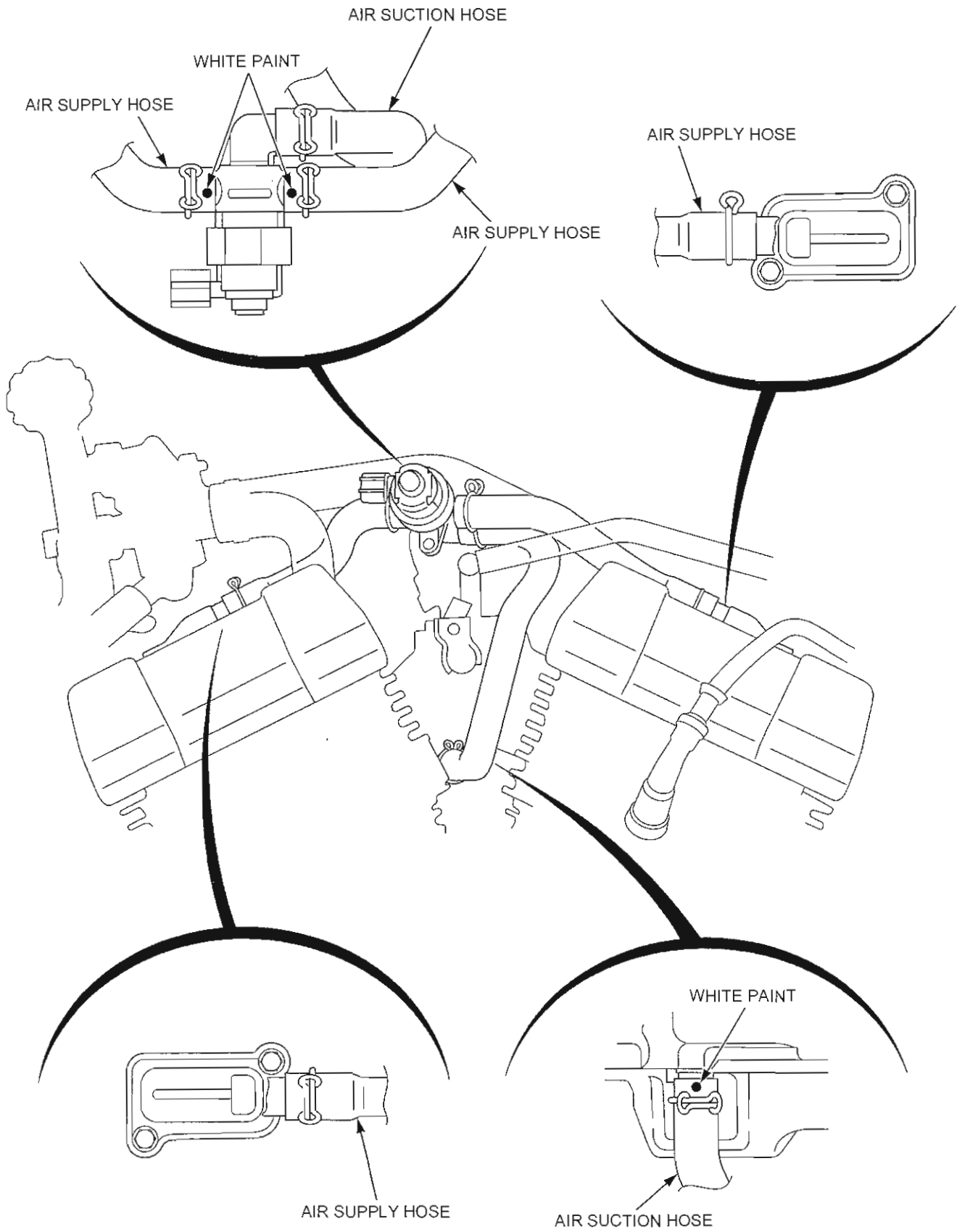
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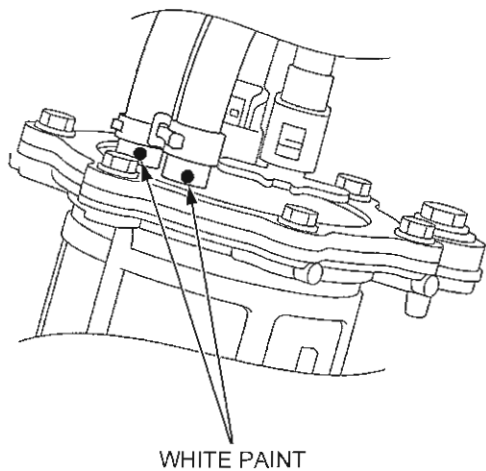
GENERAL INFORMATION



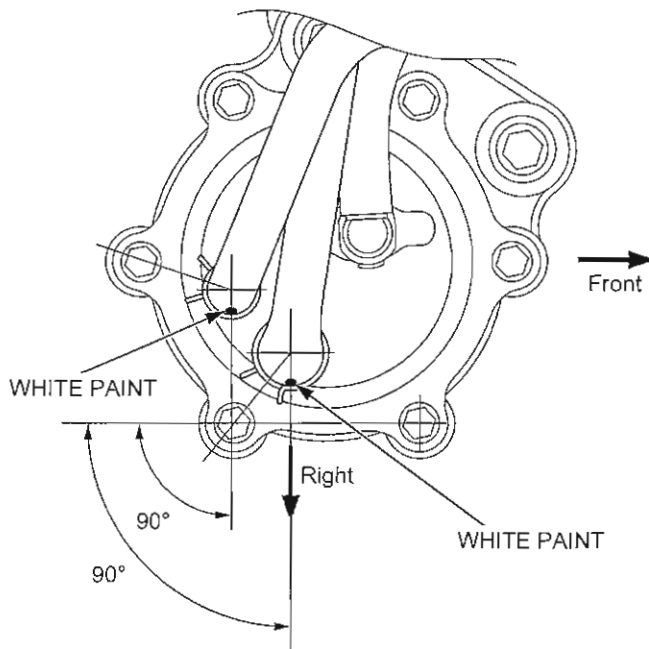


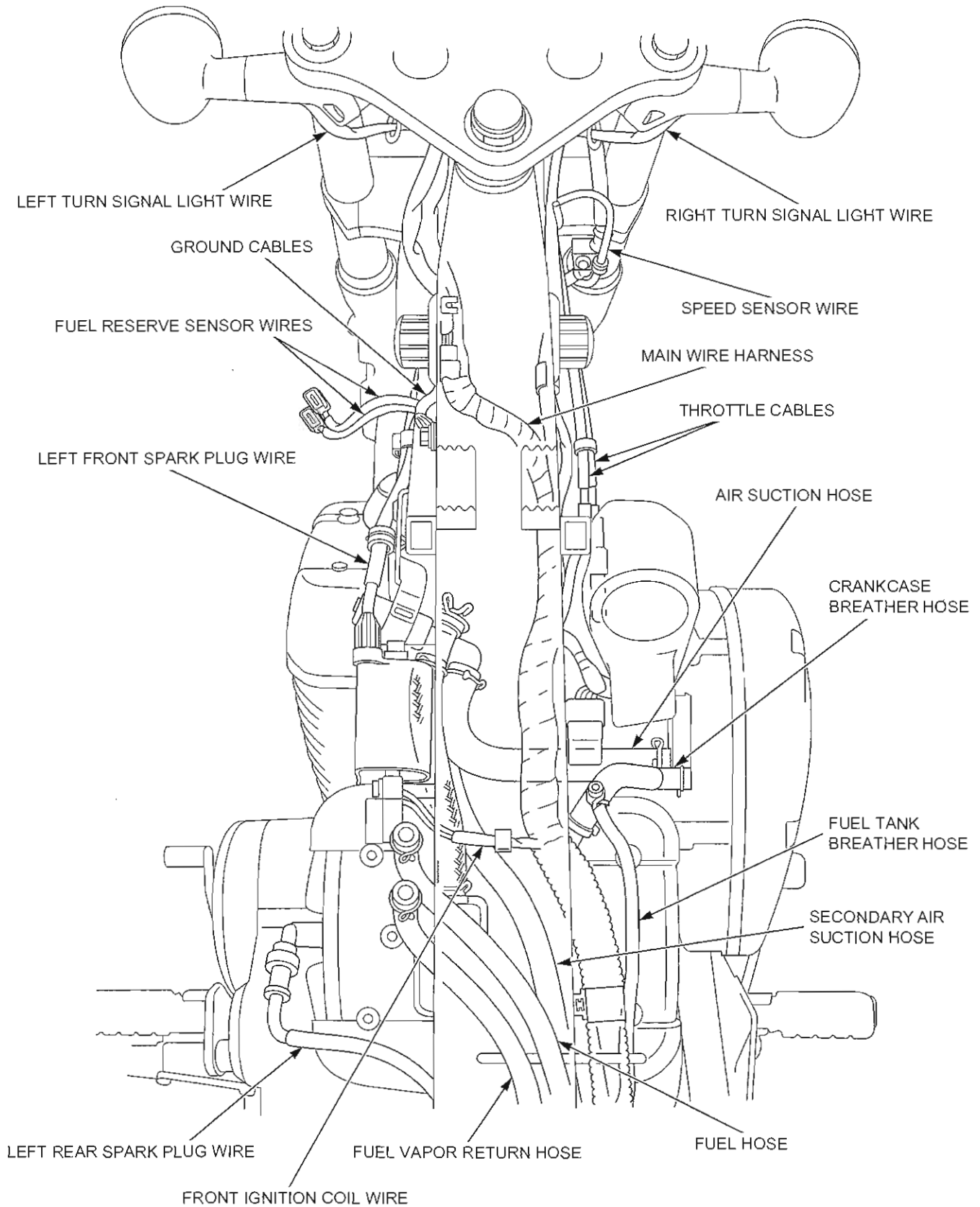
GENERAL INFORMATION

Right side view:

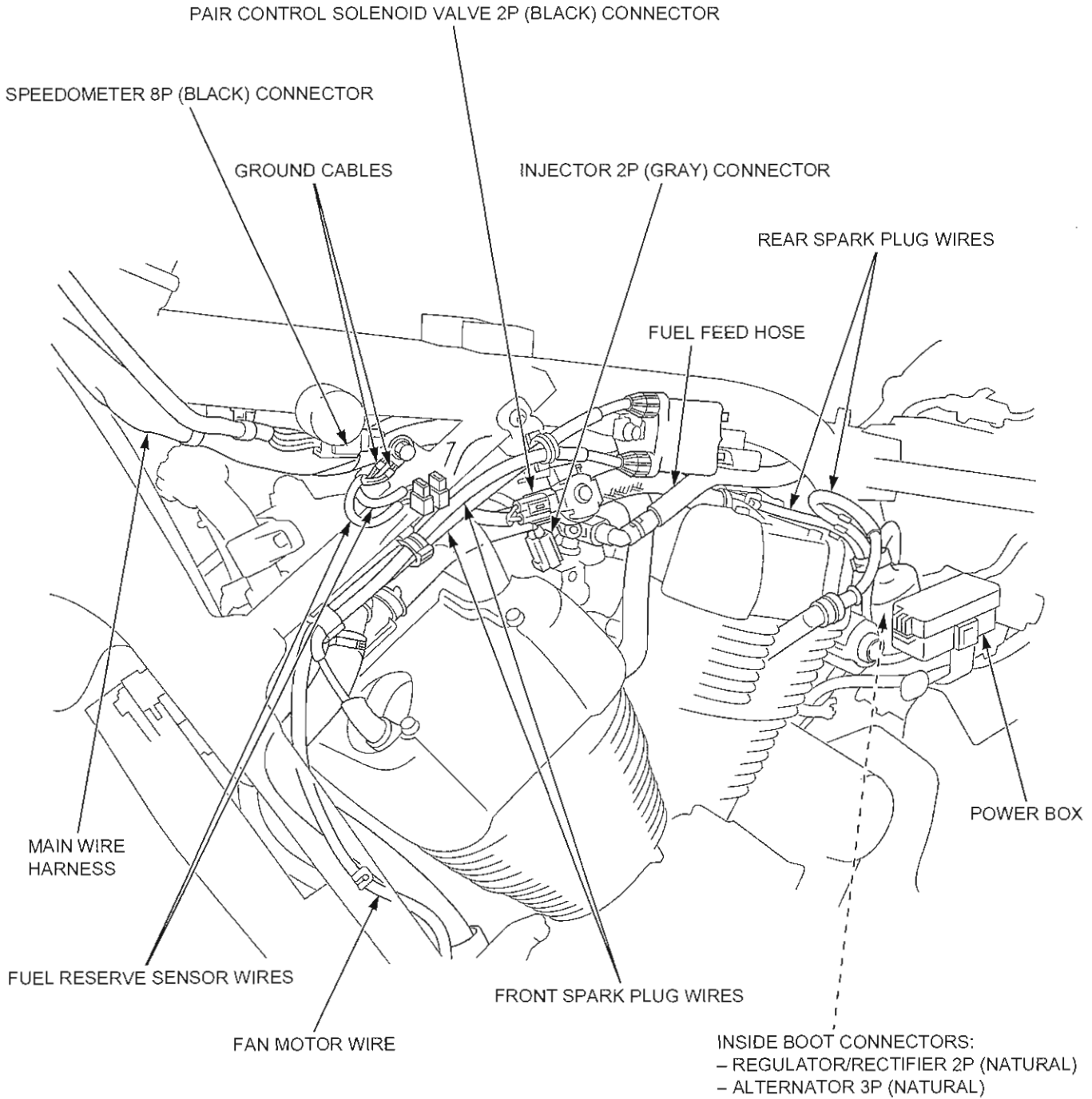


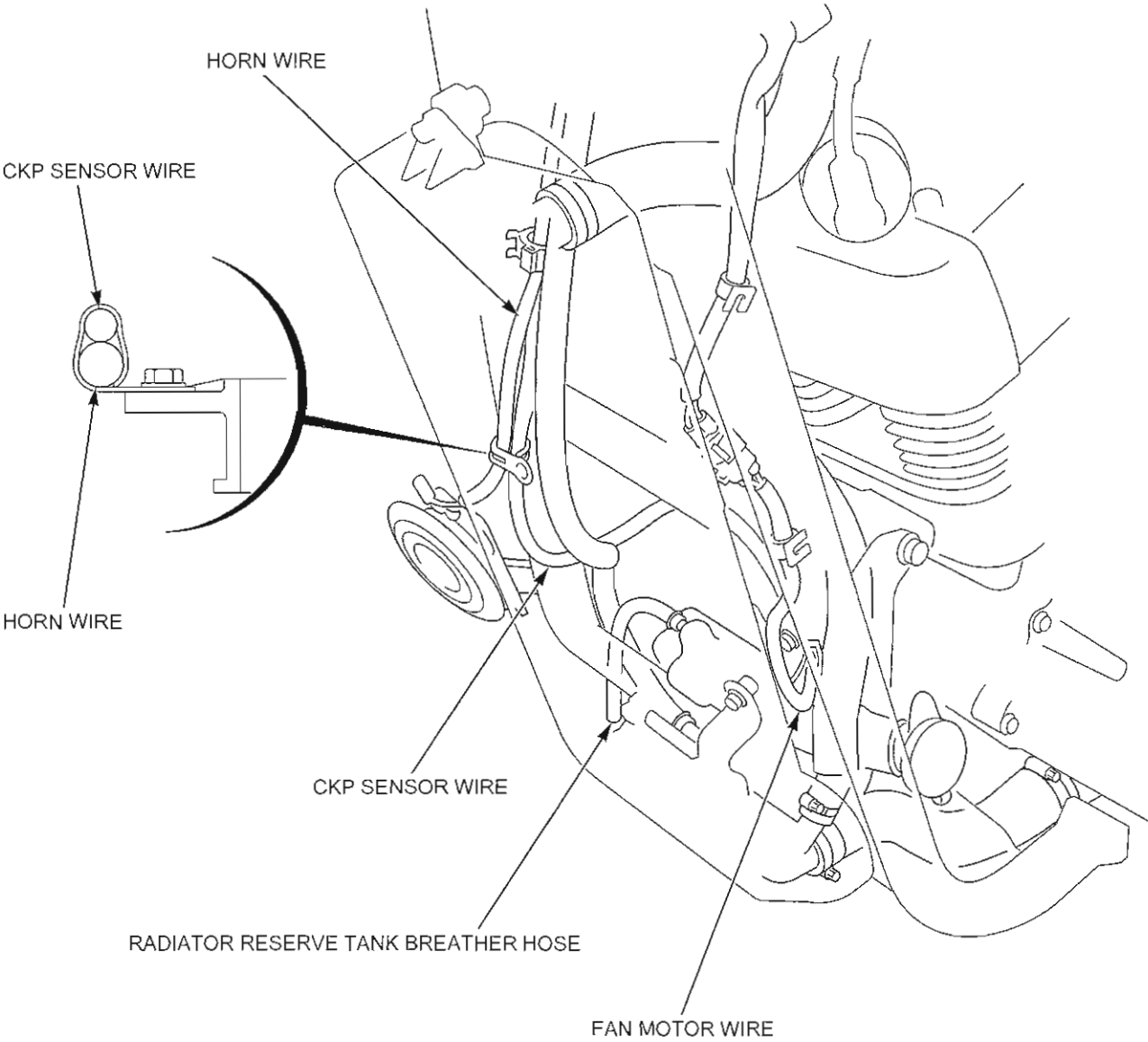
Upper side view:



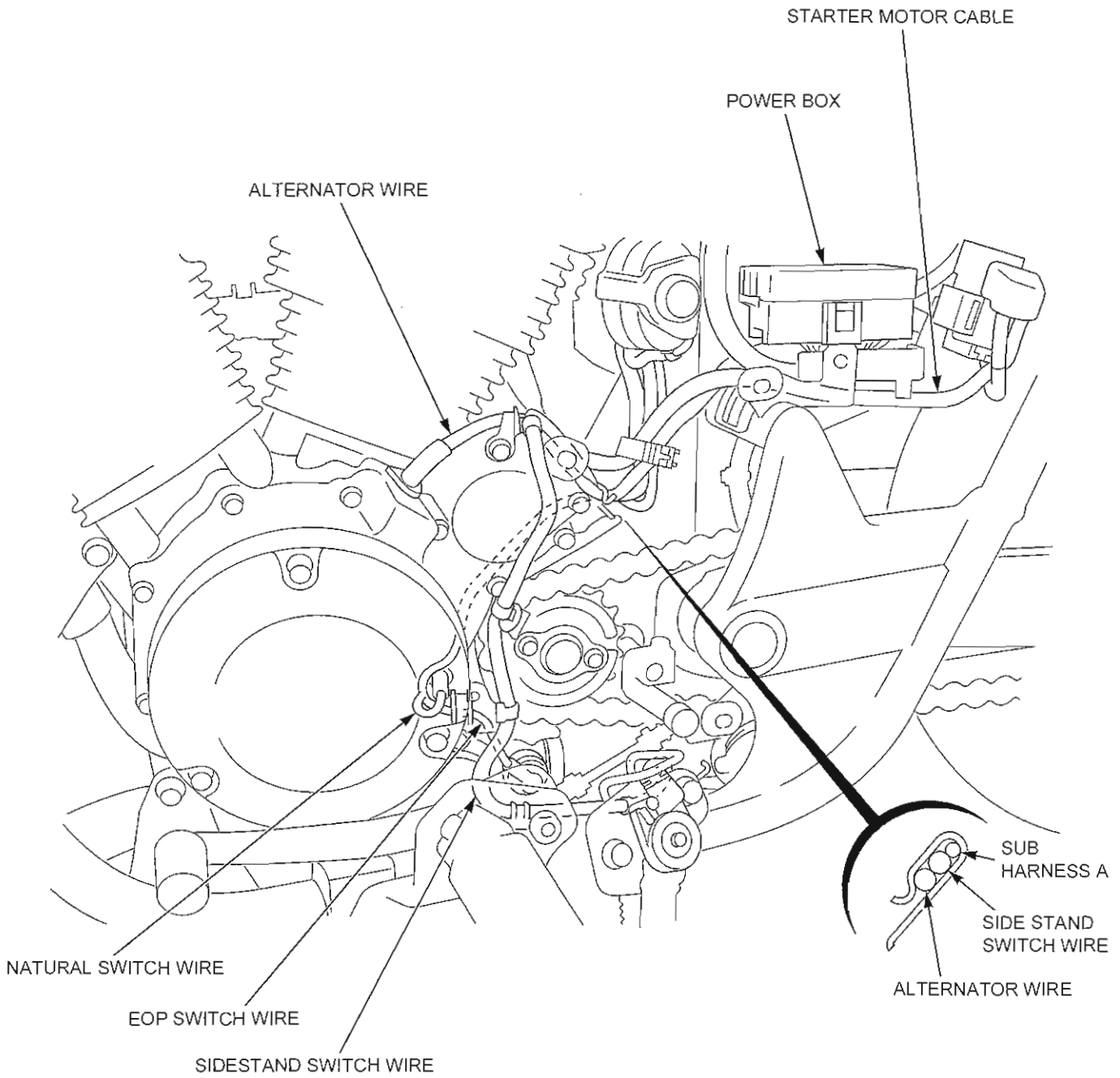


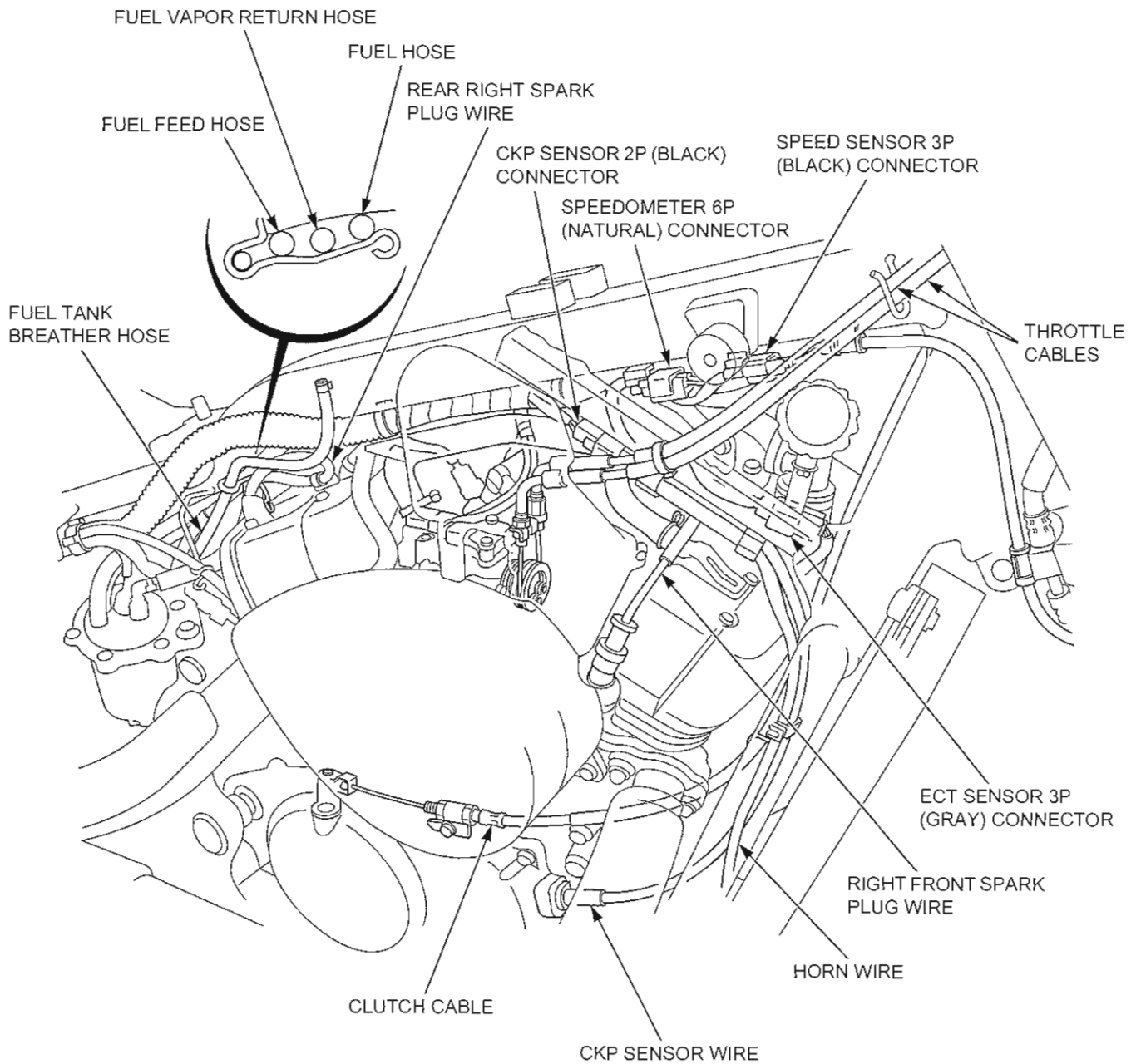
GENERAL INFORMATION



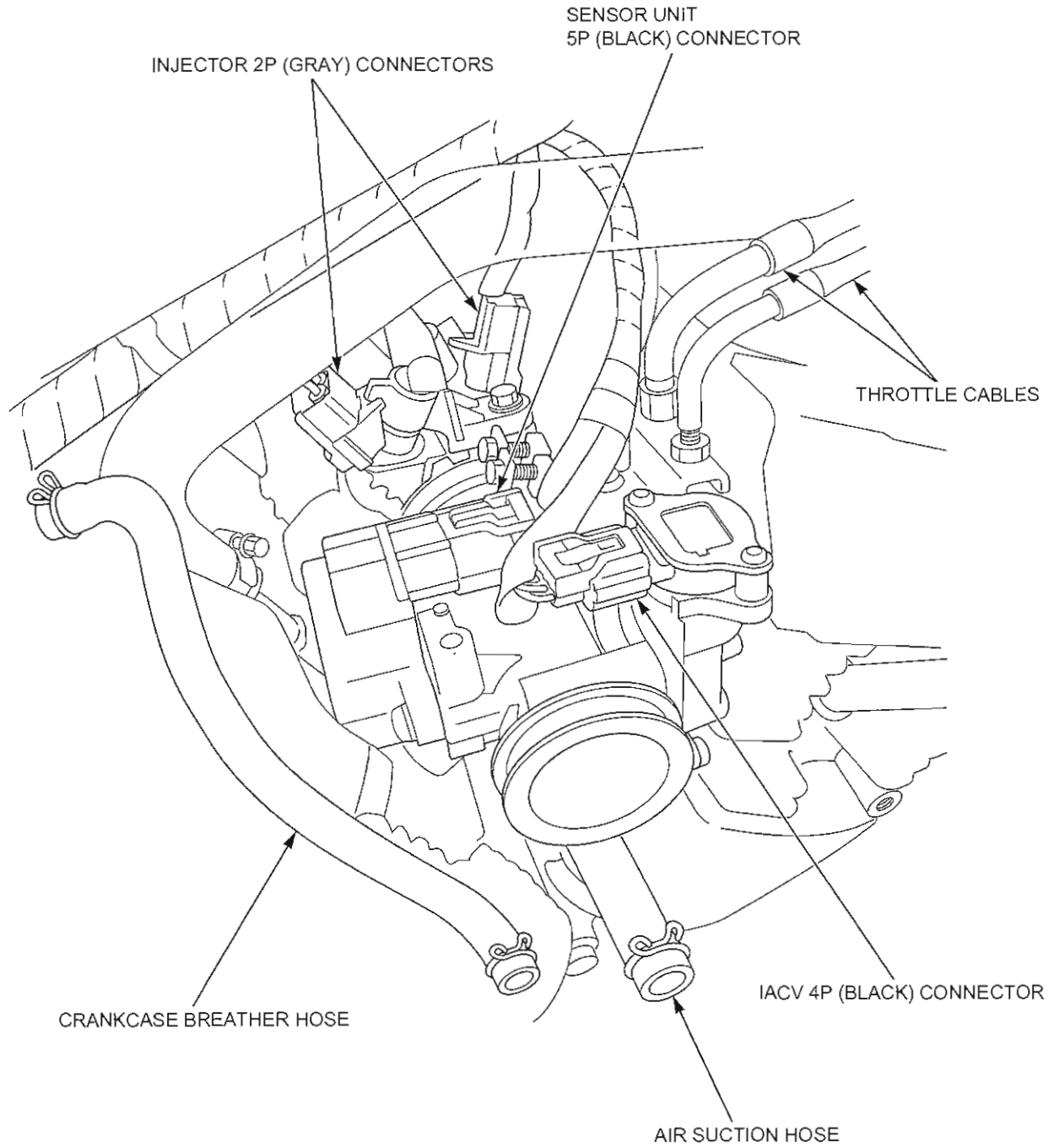


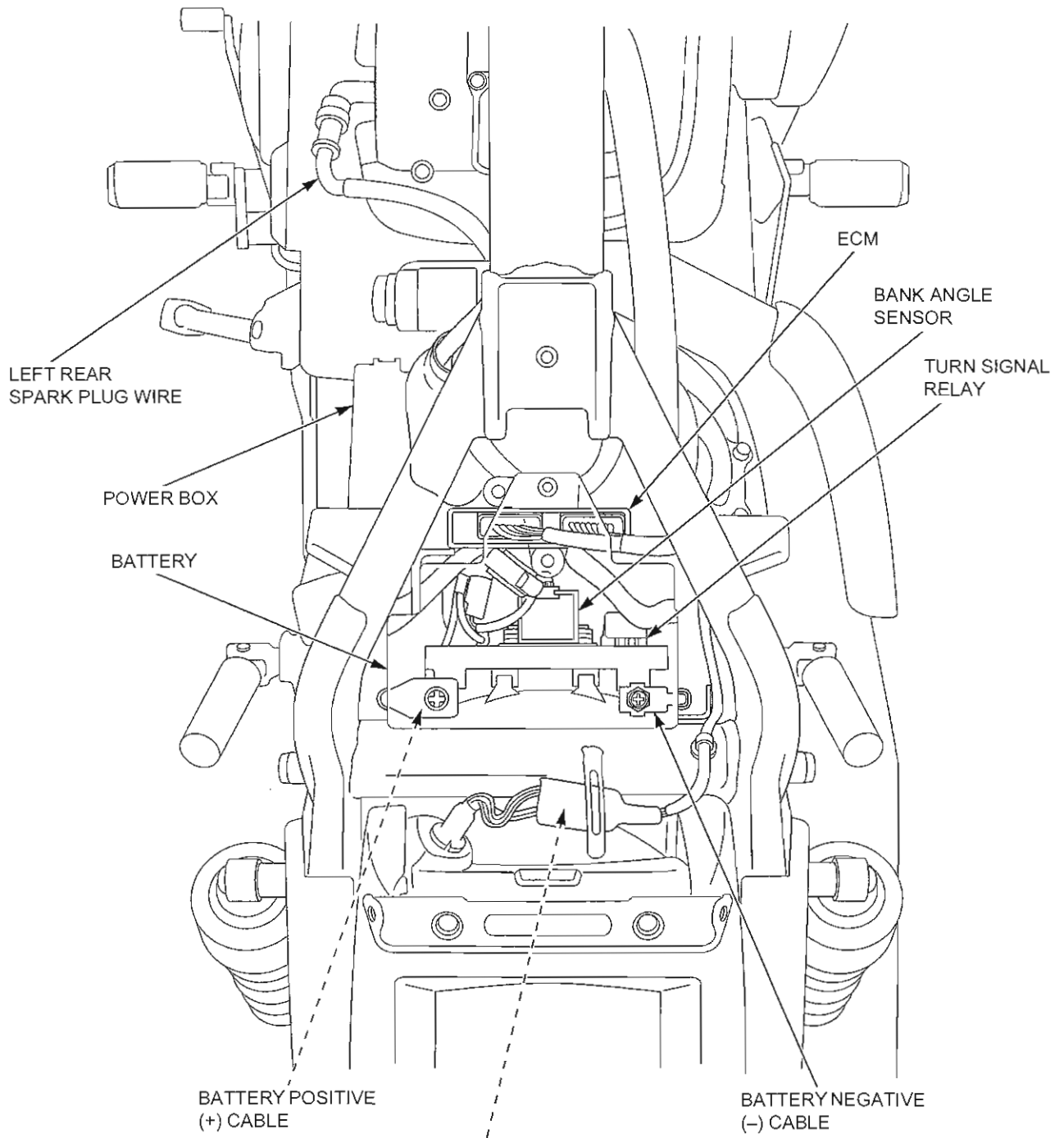
GENERAL INFORMATION





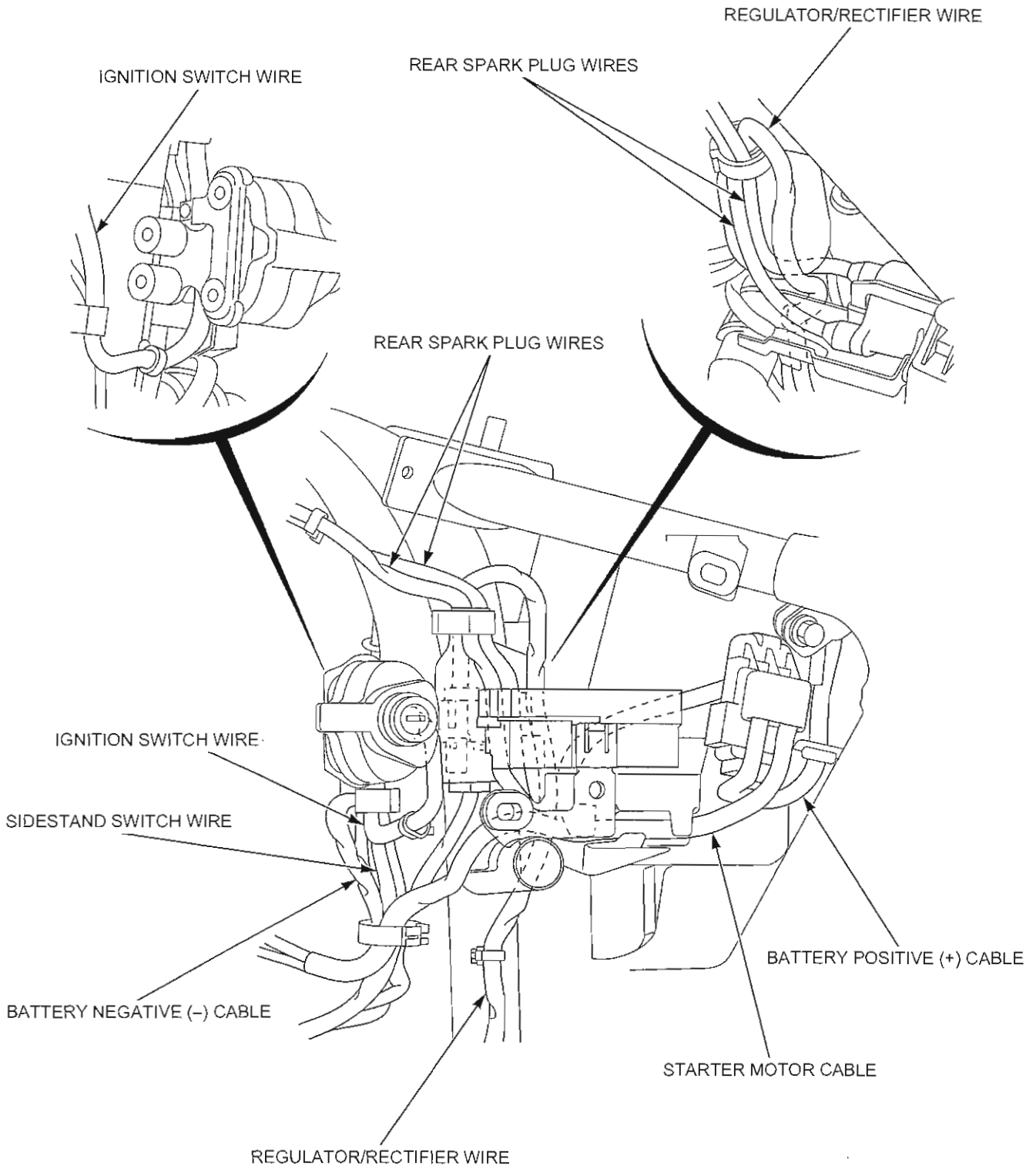
GENERAL INFORMATION

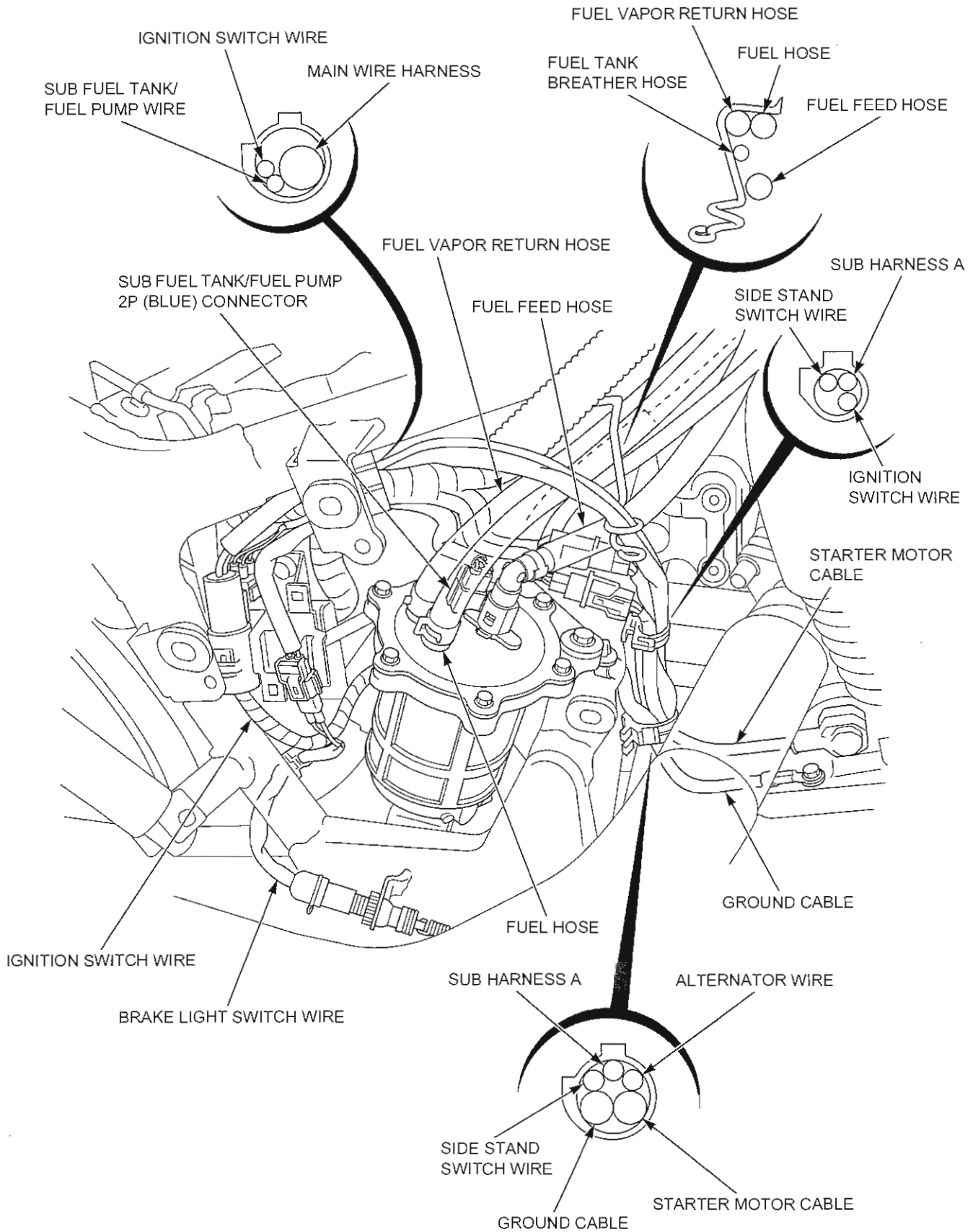




- INSIDE BOOT CONNECTORS:
- REAR SUB-HARNESS 2P (NATURAL) CONNECTOR
 - REAR SUB-HARNESS 3P (NATURAL) CONNECTOR

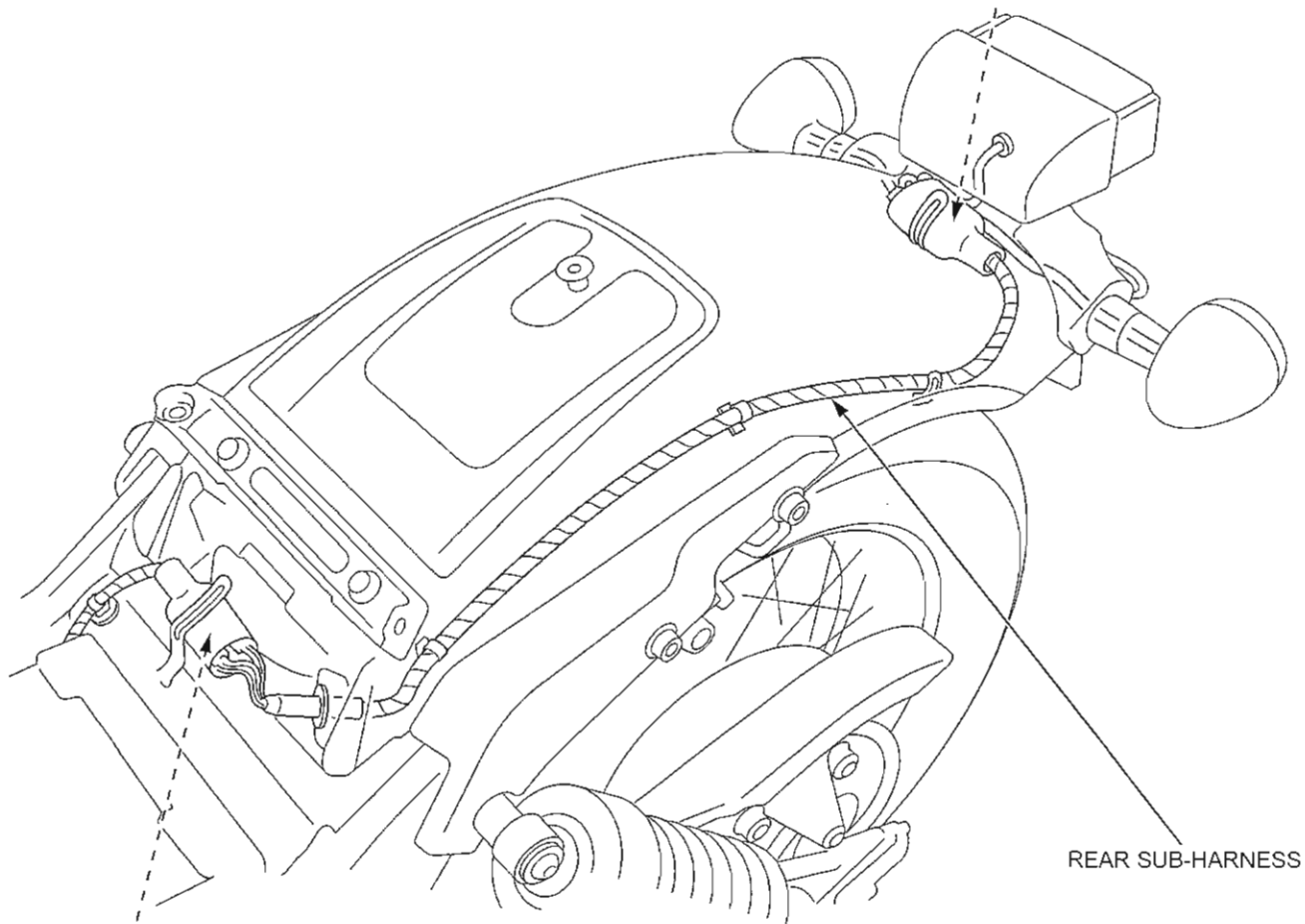
GENERAL INFORMATION





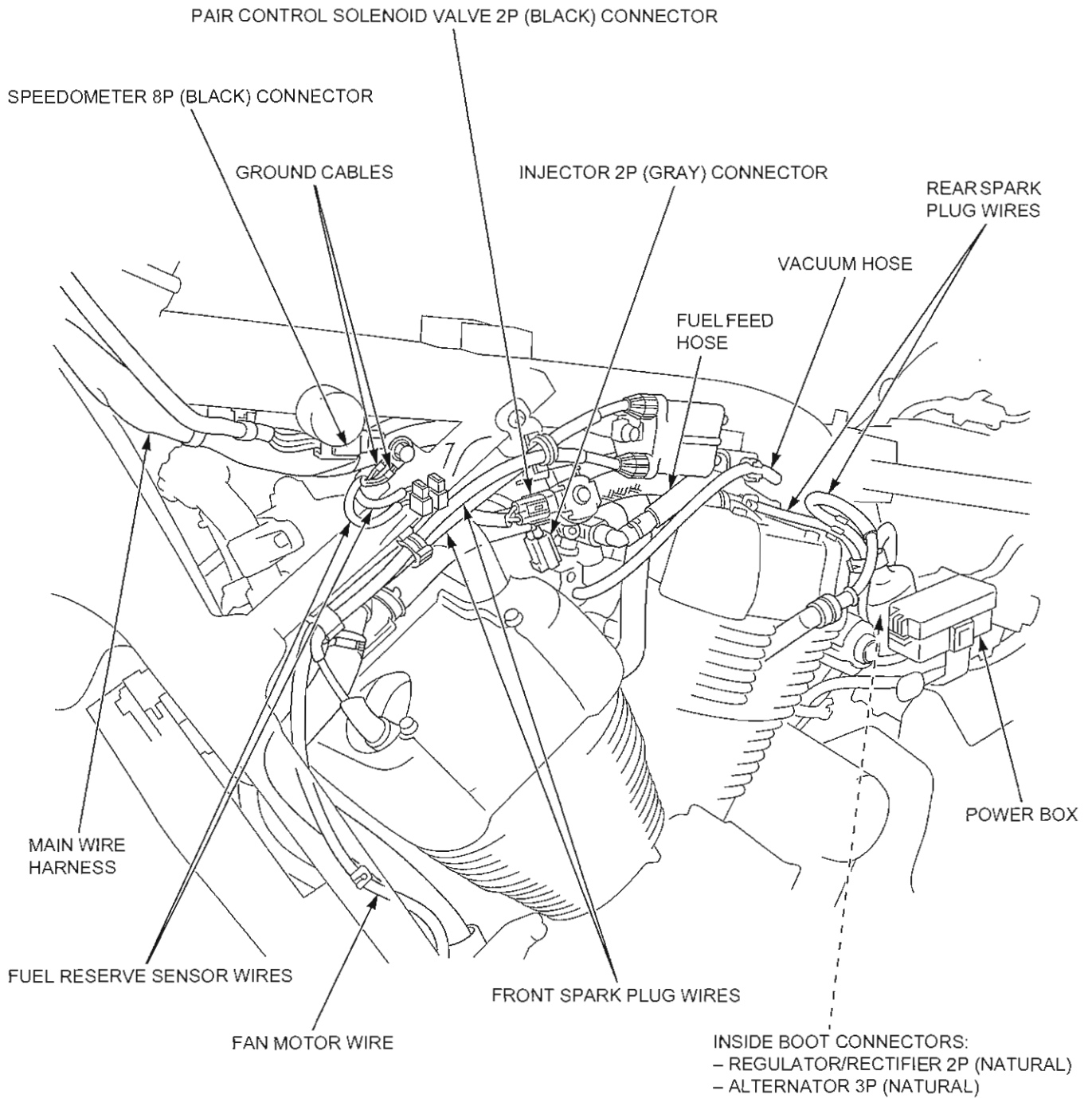
GENERAL INFORMATION

- INSIDE BOOT CONNECTORS:
- RIGHT TURN SIGNAL LIGHT 2P (LIGHT BLUE) CONNECTOR
 - LEFT TURN SIGNAL LIGHT 2P (ORANGE) CONNECTOR
 - BRAKE/TAIL LIGHT 3P (NATURAL) CONNECTOR

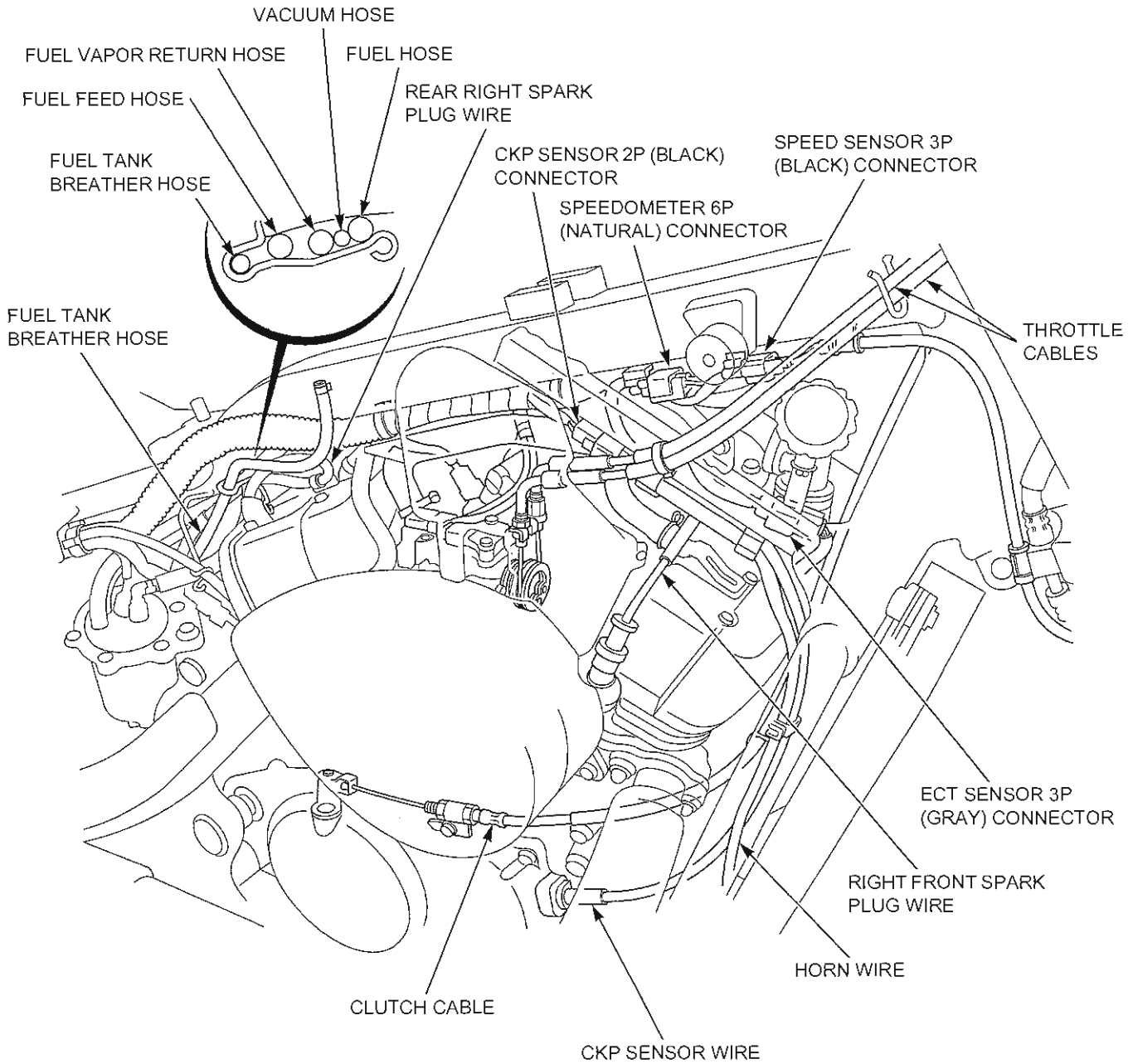


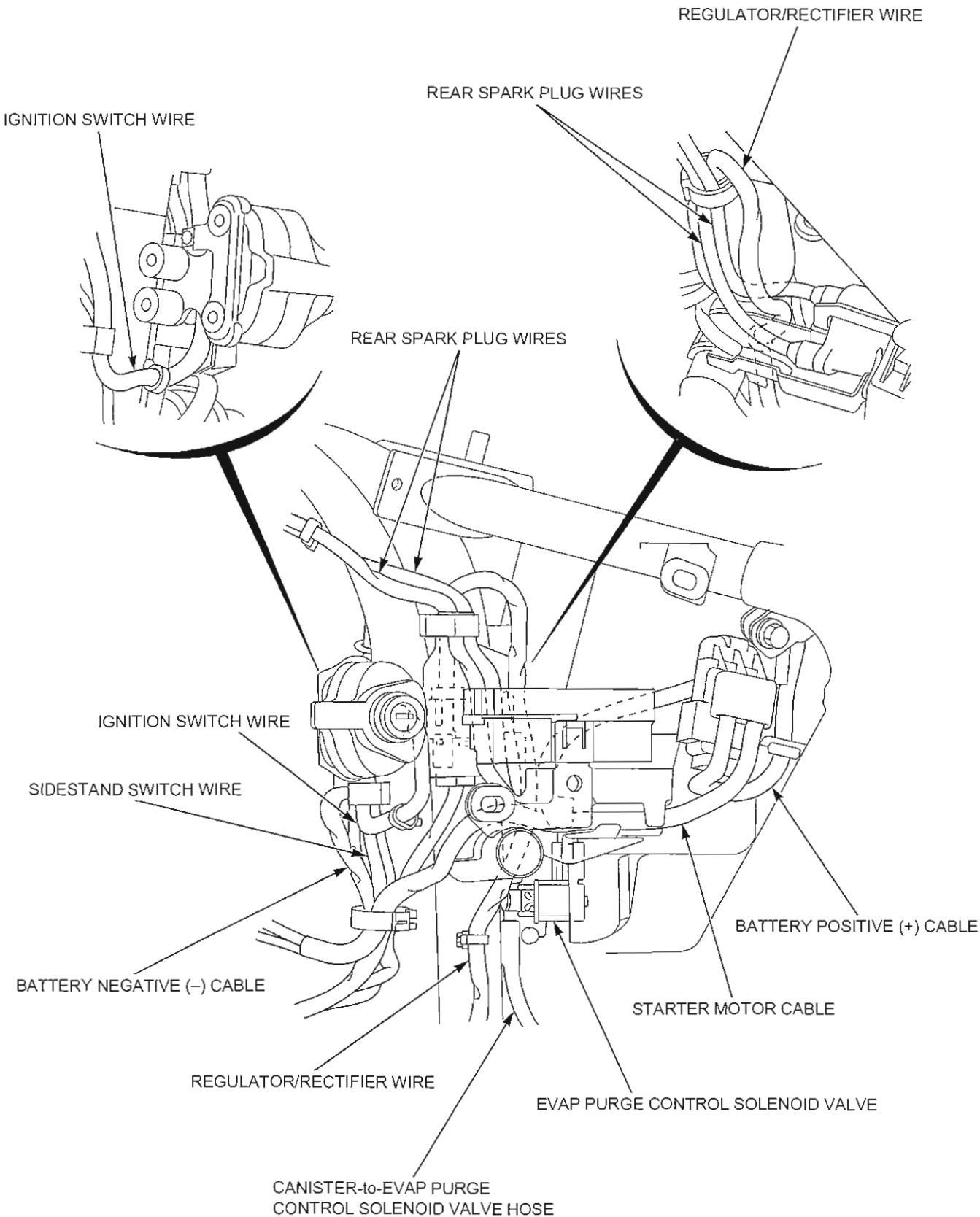
- INSIDE BOOT CONNECTORS:
- REAR SUB-HARNESS 3P (NATURAL) CONNECTOR
 - REAR SUB-HARNESS 2P (NATURAL) CONNECTOR

EVAP CONTROL SYSTEM (U.S.A. TYPE)

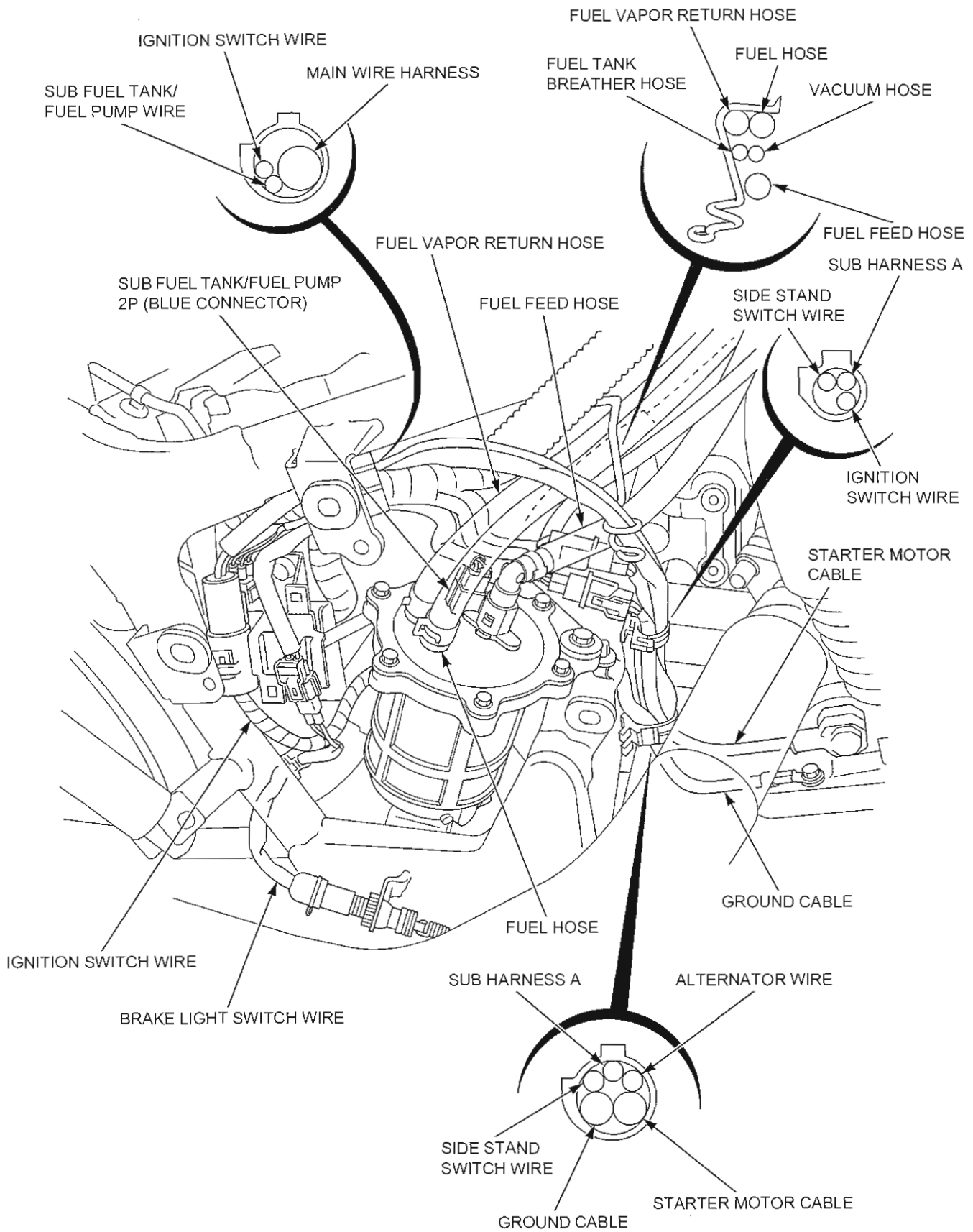


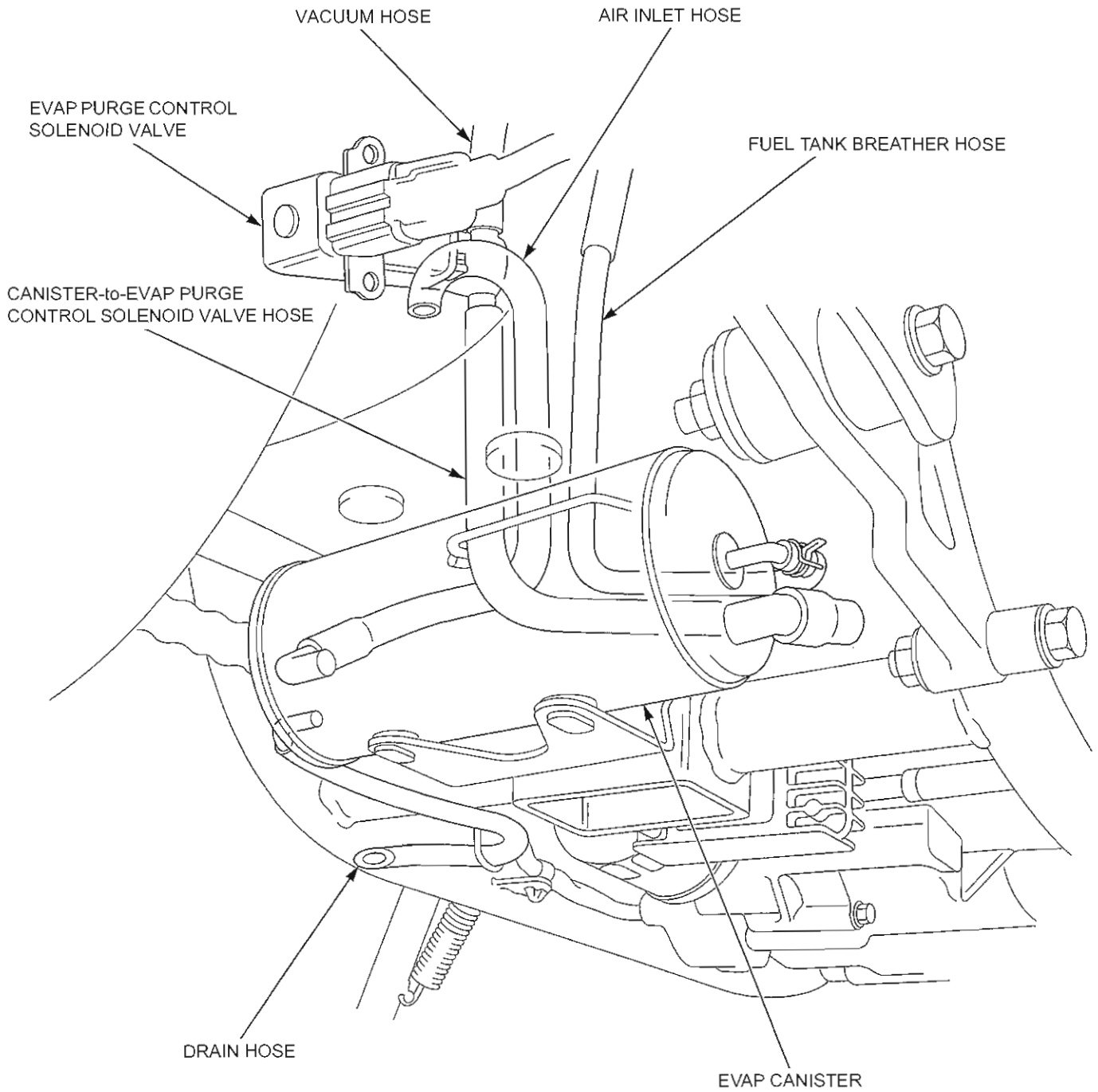
GENERAL INFORMATION





GENERAL INFORMATION





GENERAL INFORMATION

EMISSION CONTROL SYSTEMS

EXHAUST EMISSION REQUIREMENT

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

NOISE EMISSION REQUIREMENT

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

WARRANTY COMPLIANCE

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

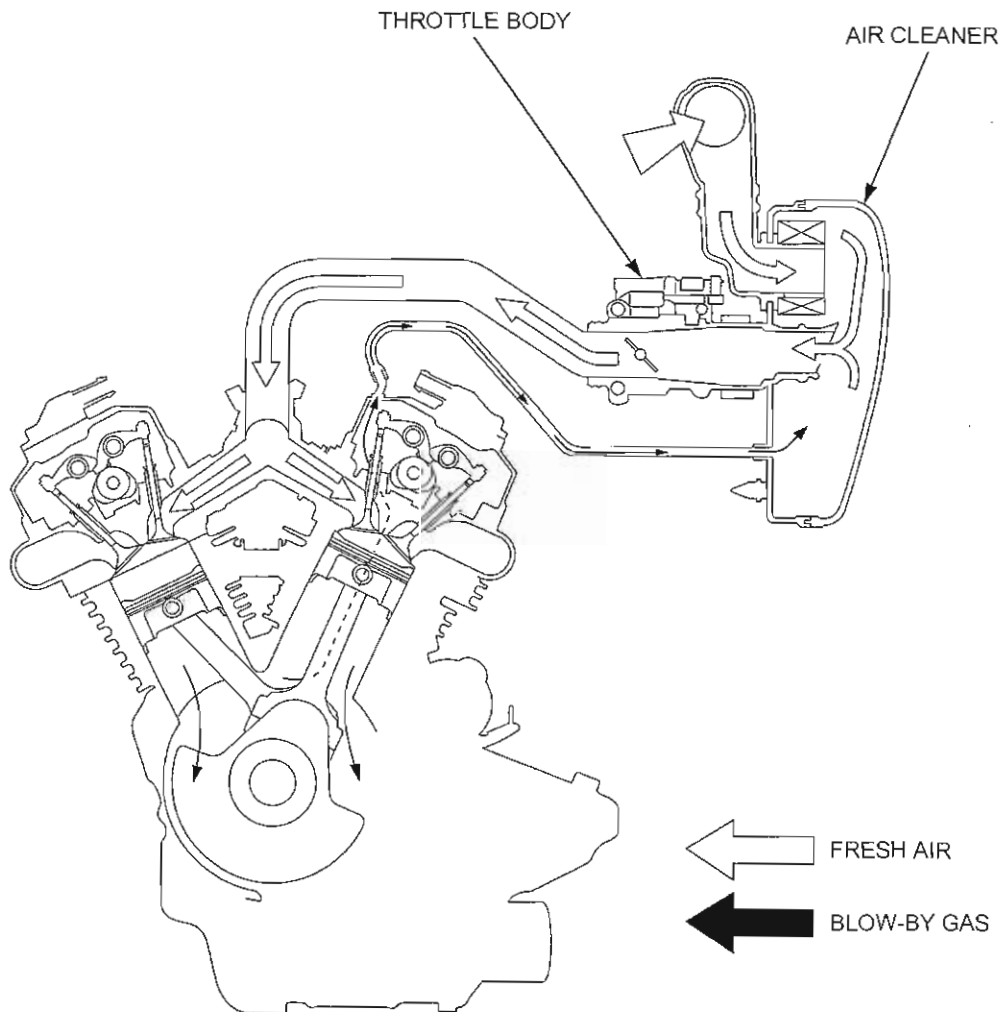
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NO_x) and hydrocarbons (HC). The 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 it is toxic. Uncontrolled fuel evaporation also releases hydrocarbons to the atmosphere.

Honda Motor Co., Ltd. utilizes various systems (page 1-41), to reduce carbon monoxide 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 rear cylinder head, air cleaner and throttle body.



EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of a pulse secondary air supply system, and an oxidation catalytic converter PGM-FI system.

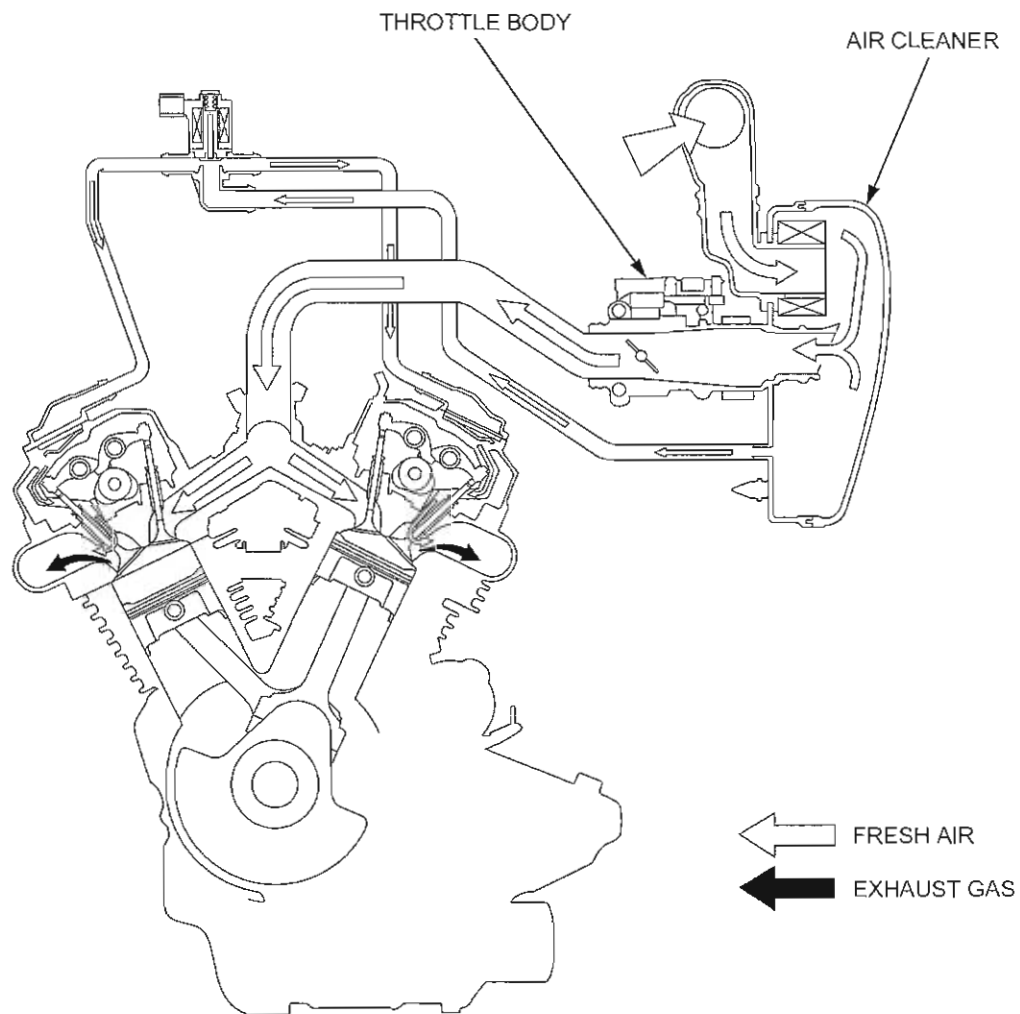
SECONDARY AIR SUPPLY SYSTEM

The pulse secondary air supply system introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR control solenoid 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 PAIR check valve prevents reverse air flow through the system. The PAIR control solenoid valve is operated by the solenoid valve. The solenoid valve is controlled by the ECM, and the fresh air passage is opened/closed according the running condition (ECT/IAT/TP/MAP sensor and engine revolution).

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



OXIDATION CATALYTIC CONVERTER

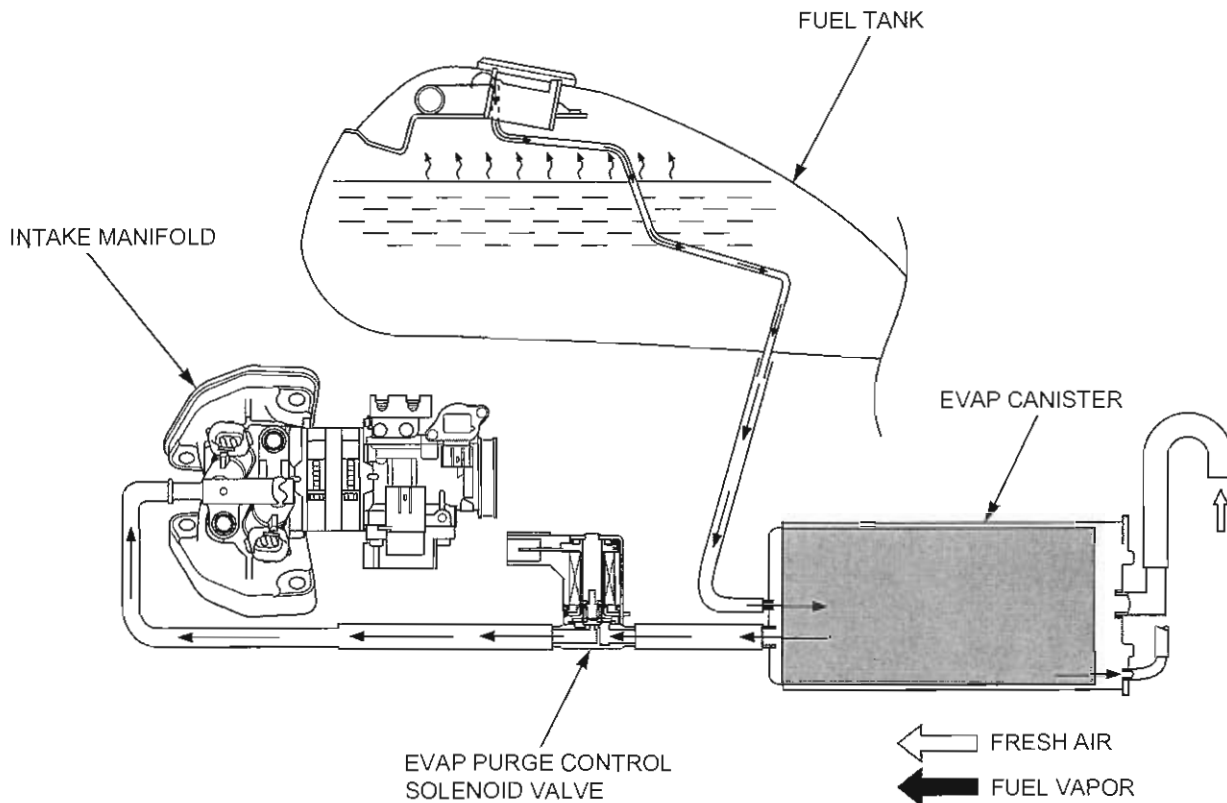
This motorcycle is equipped with an oxidation catalytic converter.

The oxidation catalytic converter is in the exhaust system. Through chemical reactions, it converts HC and CO in the engine's exhaust to carbon dioxide (CO₂) and water vapor.

GENERAL INFORMATION

EVAPORATIVE EMISSION CONTROL SYSTEM (U.S.A. TYPE)

This model complies with CARB evaporative emission requirements. Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed 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 intake manifold.



NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: U.S. Federal law prohibits, and 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.

FUEL PERMEATION EMISSION CONTROL SYSTEM

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

2. FRAME/BODY PANELS/EXHAUST SYSTEM

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OVER HEAD COVER.....	2-4	SIDESTAND	2-13

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the body panels and exhaust system.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust system gaskets with new ones after removing the exhaust system 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

Seat mounting socket bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Shock absorber upper cover mounting bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Left crankcase rear cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Exhaust pipe joint nut	21 N·m (2.1 kgf·m, 15 lbf·ft)	
Muffler stay mounting bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Muffler bracket nut	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Exhaust pipe joint stud bolt	—	See page 2-12
Over head cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Sidestand pivot bolt	9 N·m (0.9 kgf·m, 6.6 lbf·ft)	Apply 1 g grease to the sliding surface. See page 2-14
Sidestand pivot lock nut	30 N·m (3.1 kgf·m, 22 lbf·ft)	See page 2-14
Sidestand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt; replace with a new one.

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

SEAT

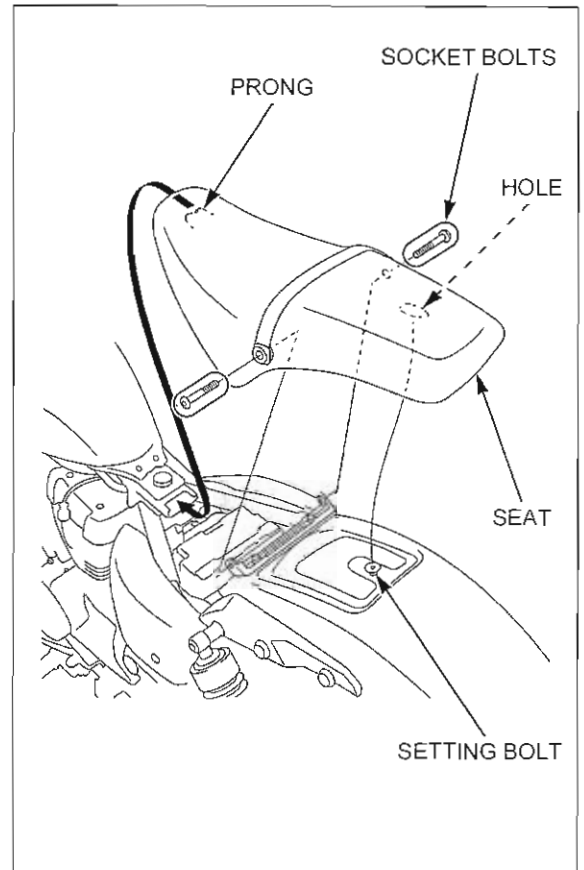
REMOVAL/INSTALLATION

Remove the seat mounting socket bolts.
Slide and remove the seat rearwards to avoid damaging the rear fender surface.

Install the seat by inserting its prong to the frame and hole of the rear side seat to the setting bolt, then push the seat forward.

Align the bolt holes and install the seat mounting socket bolts, then tighten them to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



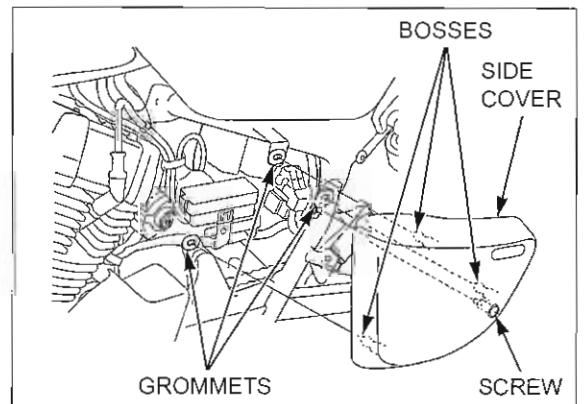
SIDE COVER

REMOVAL/INSTALLATION

Be careful not to damage the side cover bosses.

Loosen the screw and remove the side cover by releasing its bosses from the frame grommets.

Installation is in the reverse order of removal.



LEFT CRANKCASE REAR COVER

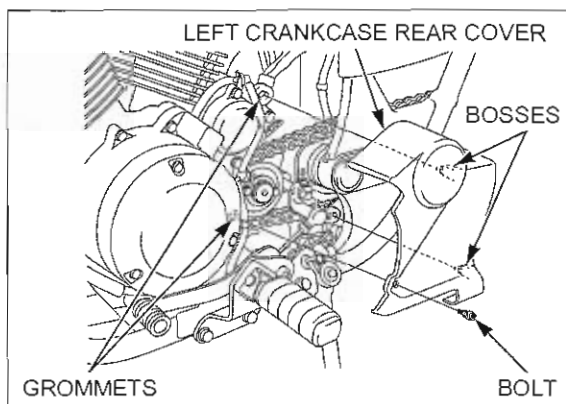
REMOVAL/INSTALLATION

Remove the socket 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:
10 N·m (1.0 kgf·m, 7 lbf·ft)



OVER HEAD COVER

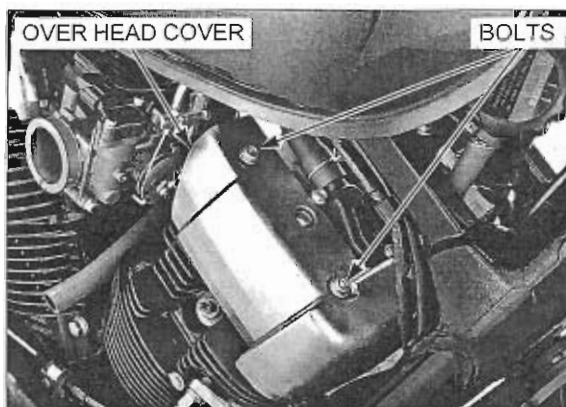
REMOVAL/INSTALLATION

FRONT

Remove the spark plug caps (page 3-7).

Right side only: Remove the air cleaner housing (page 5-45).

Remove the socket bolts and front right over head cover.

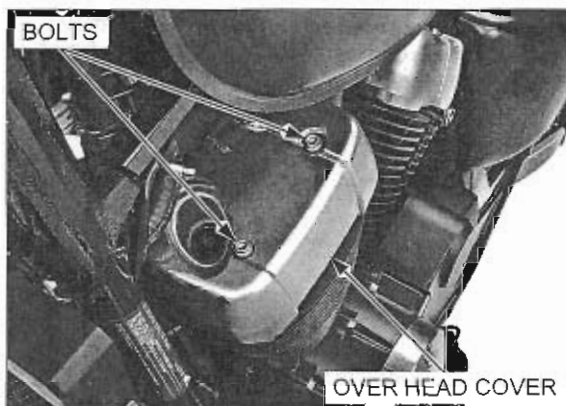


Remove the socket bolts and front left over head cover.

Installation is in the reverse order of removal.

TORQUE:

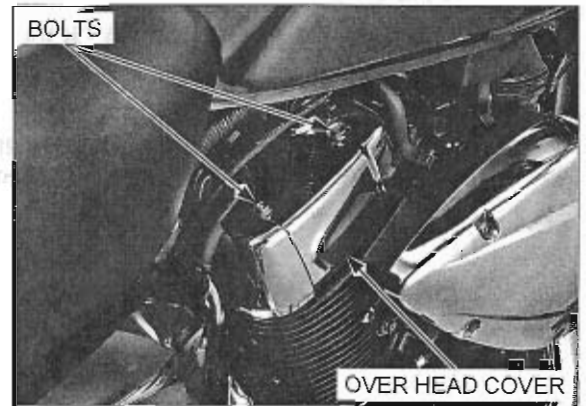
Over head cover socket bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)



REAR

Remove the spark plug caps (page 3-7).

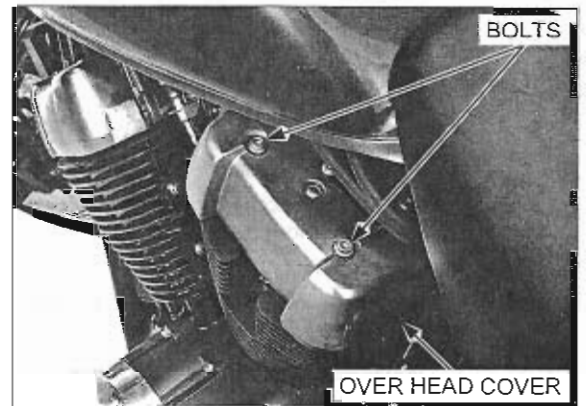
Remove the socket bolts and rear right over head cover.



Remove the socket bolts and rear left over head cover. Installation is in the reverse order of removal.

TORQUE:

Over head cover socket bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)



FRONT FENDER

REMOVAL/INSTALLATION

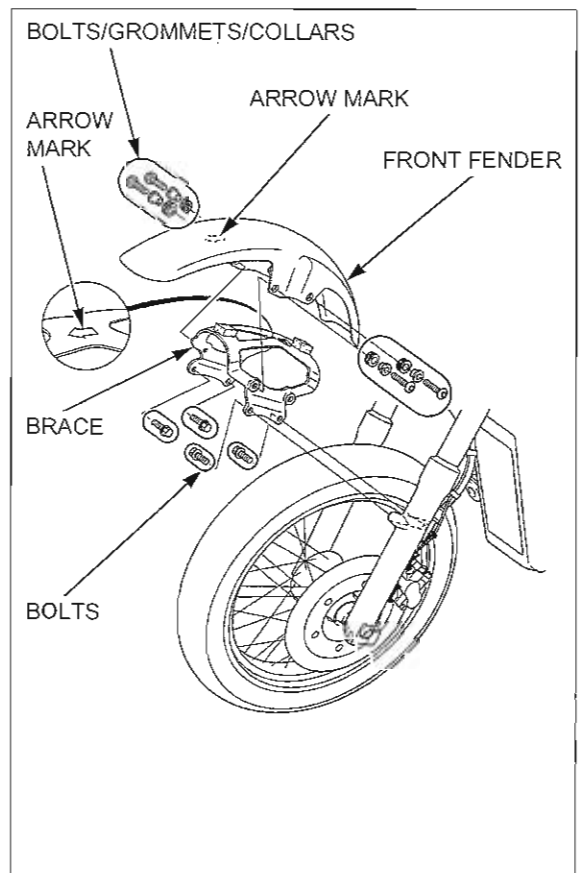
Remove the following:

- Bolts
- Collars
- Front fender brace
- Front fender
- Grommets

NOTE:

Install the front fender and front fender brace with the arrow mark facing forward.

Installation is in the reverse order of removal.



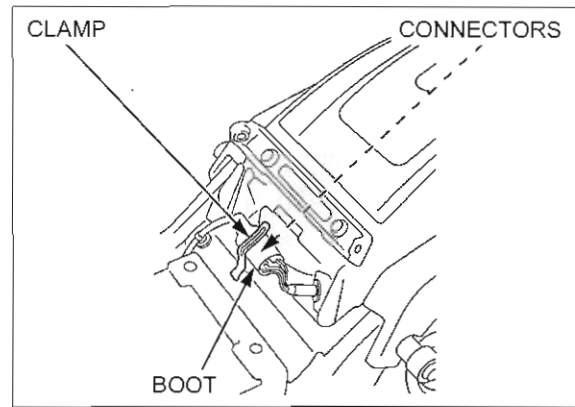
REAR FENDER

REMOVAL/INSTALLATION

Remove the seat (page 2-3).

Release the boot from the clamp.

Disconnect the brake/tail/license light 3P (Natural) and rear turn signal light 2P (Natural) connectors.



Remove the following:

- Bolts
- Collars
- Washers
- Shock absorber upper covers
- Rear fender assembly

NOTE:

When removing the rear fender assembly, be careful not to damage the wires.

Route the wires properly (page 1-19).

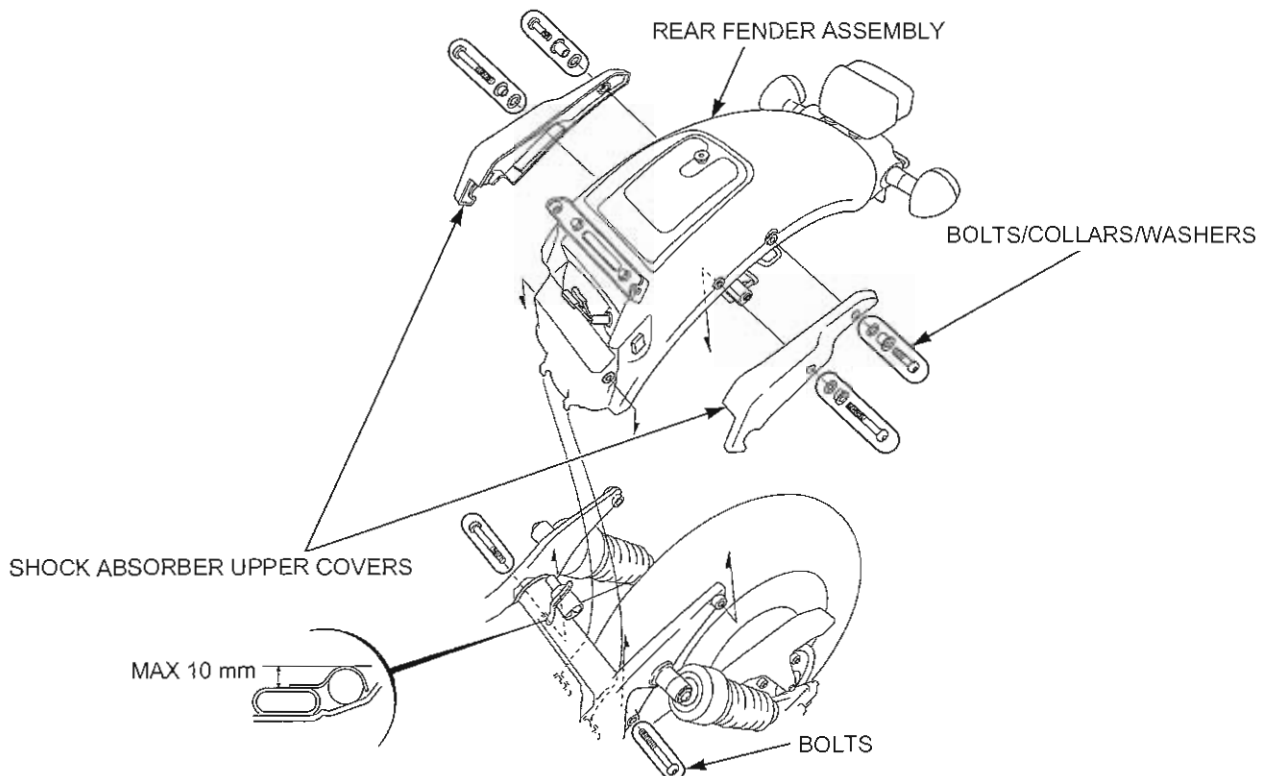
Installation is in the reverse order of removal.

NOTE:

- Set the clamp height as shown.
- Align the grooves with the rear fender tabs.
- Be careful not to damage the tabs and grooves.

TORQUE:

Shock absorber upper cover mounting bolt:
34 N·m (3.5 kgf·m, 25 lbf·ft)



DISASSEMBLY/ASSEMBLY

Remove the rear fender assembly (page 2-6).

Remove the brake/tail light assembly (page 2-8).

NOTE:

When removing the rear fender/sub-frame, be careful not to damage the wires.

Remove the bolts and seat bracket.

Remove the grommets and setting bolt.

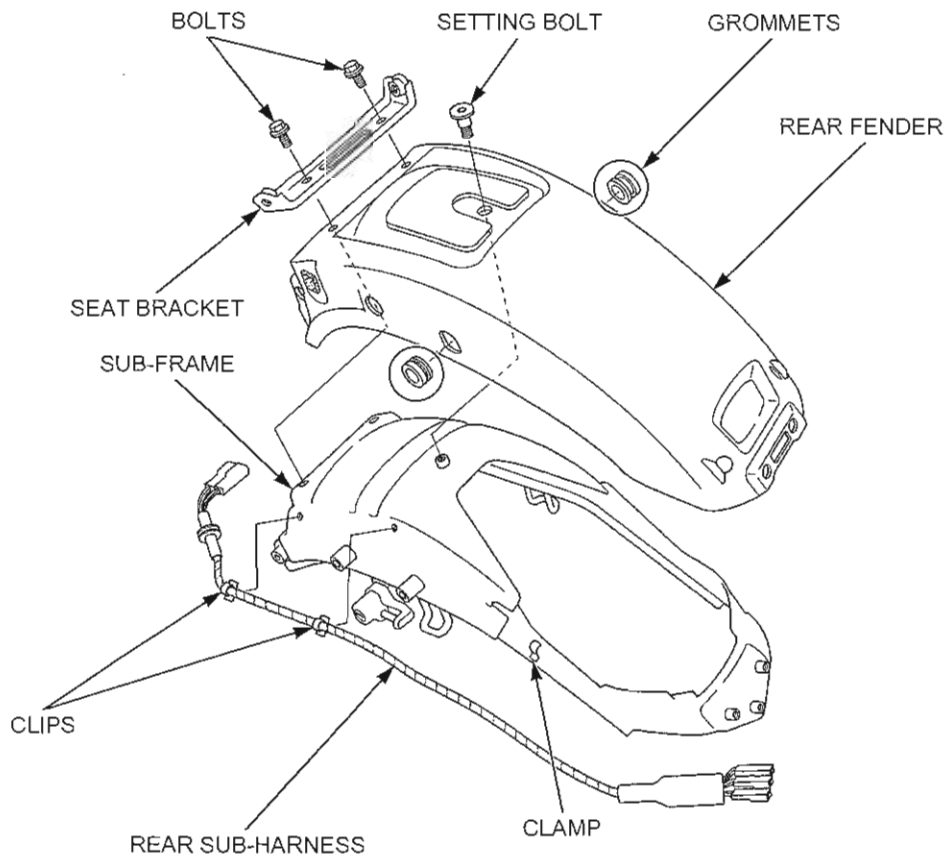
Remove the rear fender from the sub-frame.

Release the rear sub-harness clamp and clips.

Remove the rear sub-harness from the sub-frame.

Route the wires properly (page 1-19).

Installation is in the reverse order of removal.



BRAKE/TAIL LIGHT ASSEMBLY

REMOVAL/INSTALLATION

Remove the socket bolts and turn signal stay cover.

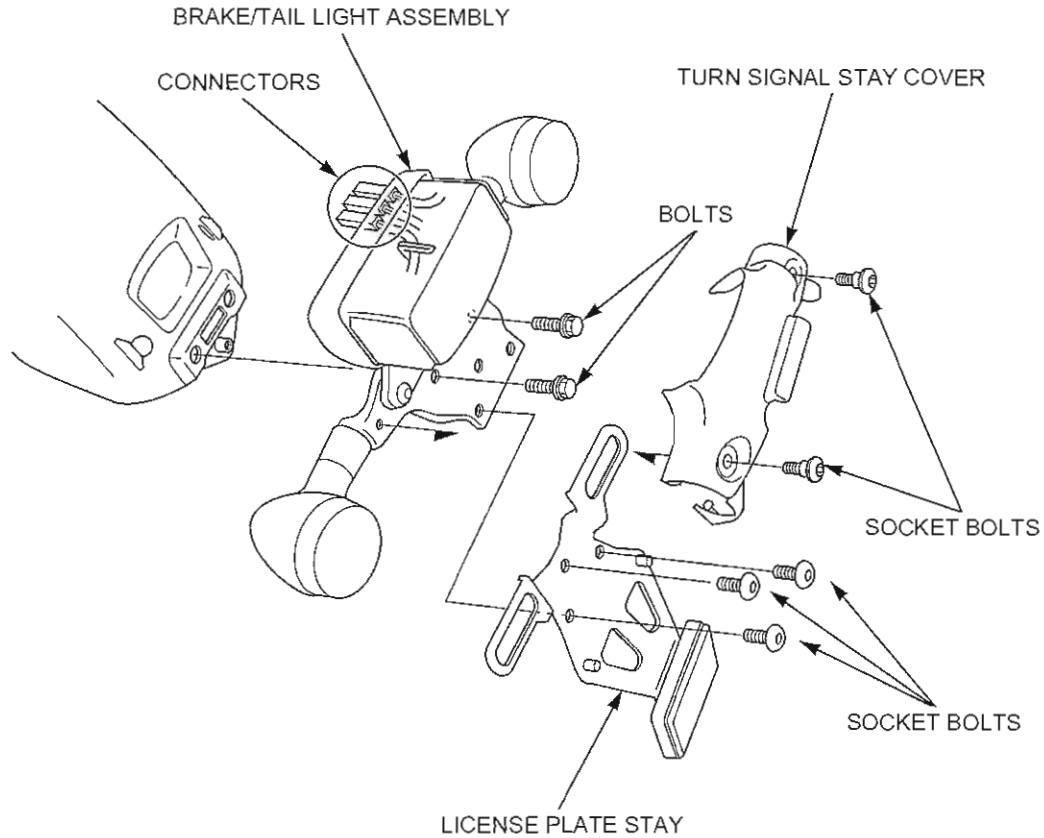
Remove the socket bolts and license plate stay.

Remove the bolts and brake/tail light assembly from the rear fender.

Disconnect the brake/tail light 3P (Natural) connector.

Disconnect the left and right turn signal light 2P (Orange and light blue) connectors.

Installation is in the reverse order of removal.



FOOT PEG

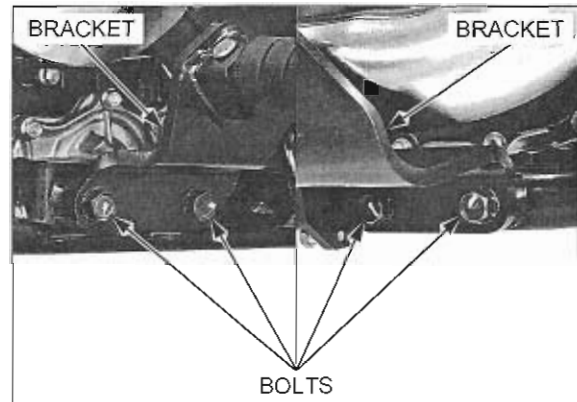
REMOVAL/INSTALLATION

Left side: Remove the gearshift pedal (page 10-14).

Right side: Remove the brake pedal (page 14-25).

Remove the bolts and foot peg bracket.

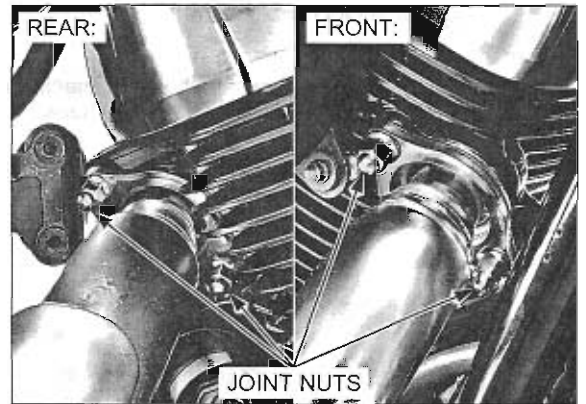
Installation is in the reverse order of removal.



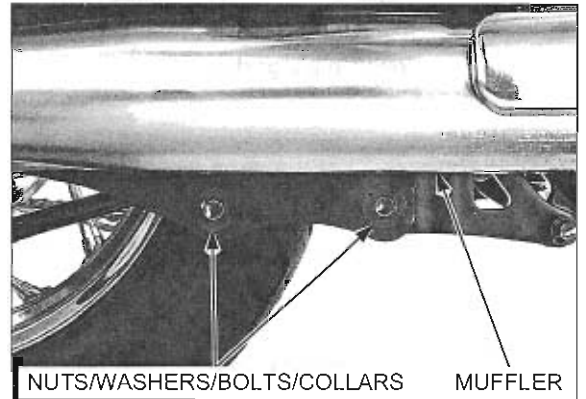
EXHAUST SYSTEM

REMOVAL

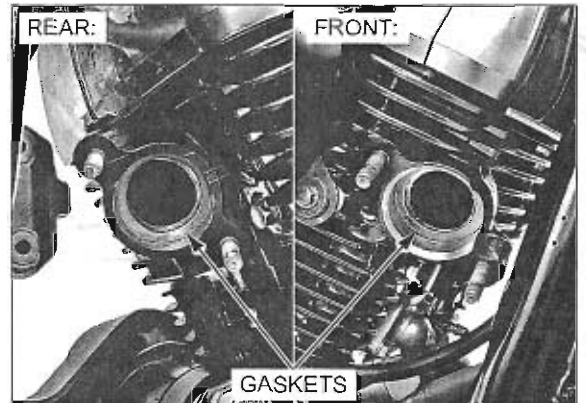
Remove the exhaust pipe joint nuts.



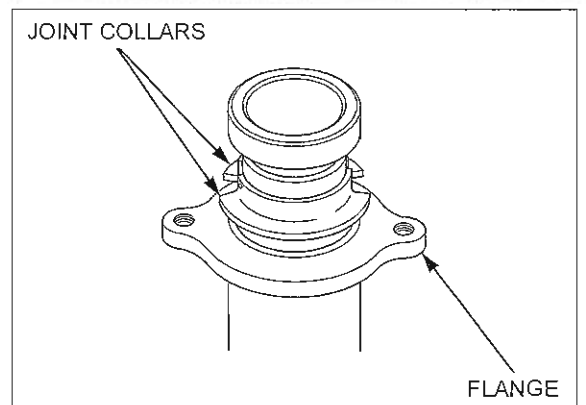
Remove the nuts, muffler bracket bolts, washers, collars and exhaust system assembly.



Remove the gaskets.



Remove the exhaust pipe joint collars and flanges.



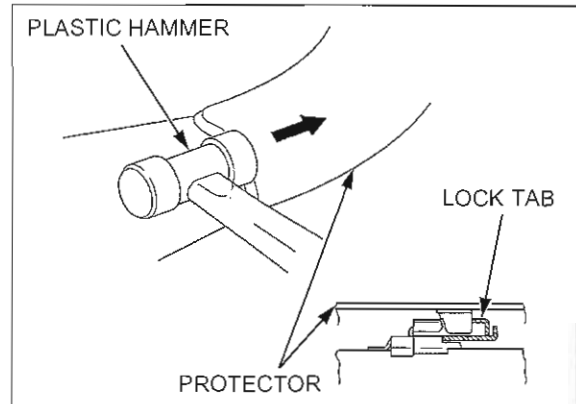
FRAME/BODY PANELS/EXHAUST SYSTEM

DISASSEMBLY

Rear muffler only: Drive the rear exhaust pipe protector using a plastic hammer and break the lock tab (reverse side of the protector) and remove it.

NOTE:

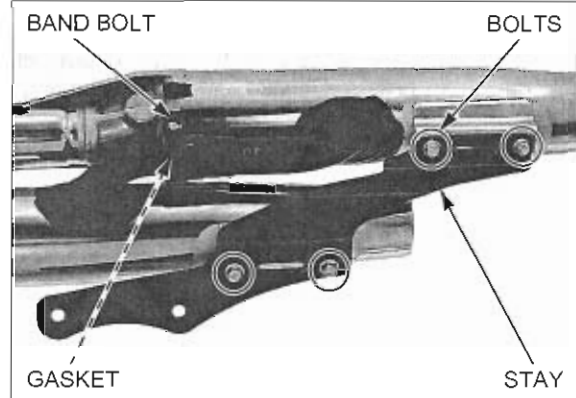
- The rear exhaust pipe protector can be removed without removing the exhaust system from the motorcycle.
- Do not reuse the removed protector.



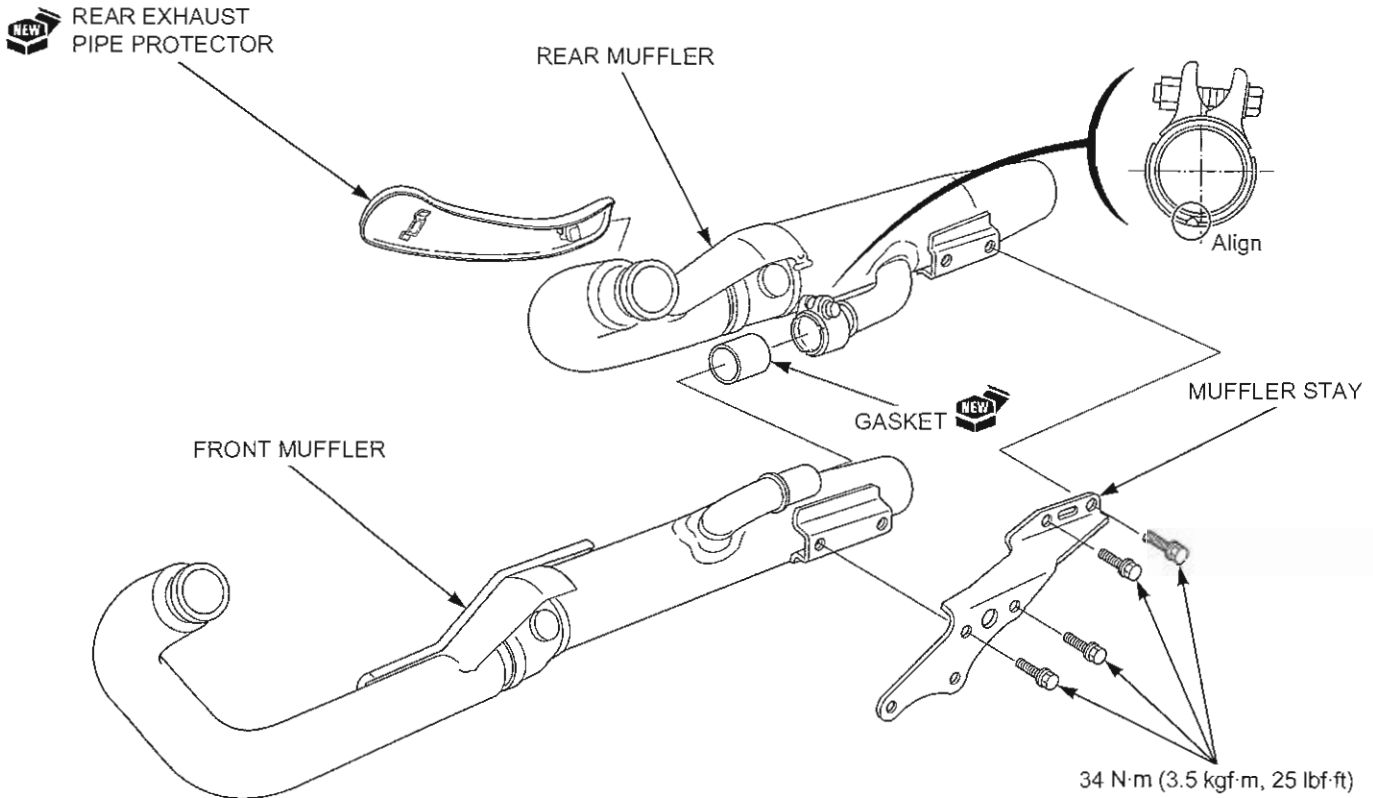
Loosen the muffler joint band bolt.

Remove the bolts, muffler stay and separate the mufflers.

Remove the gasket.



ASSEMBLY



FRAME/BODY PANELS/EXHAUST SYSTEM

Install a new gasket onto the front muffler joint pipe.

Assemble the front and rear mufflers.

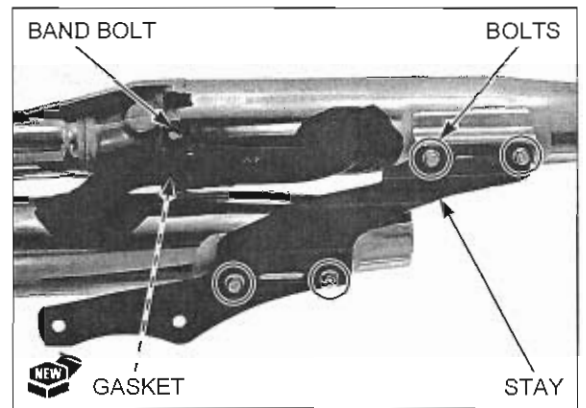
Install the muffler stay and bolts, then tighten them to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

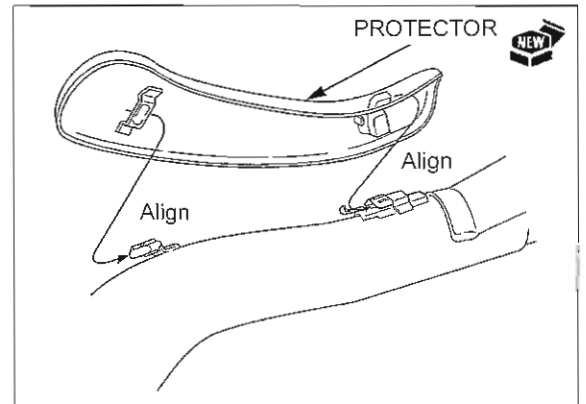
Tighten the muffler joint band bolt securely.

NOTE:

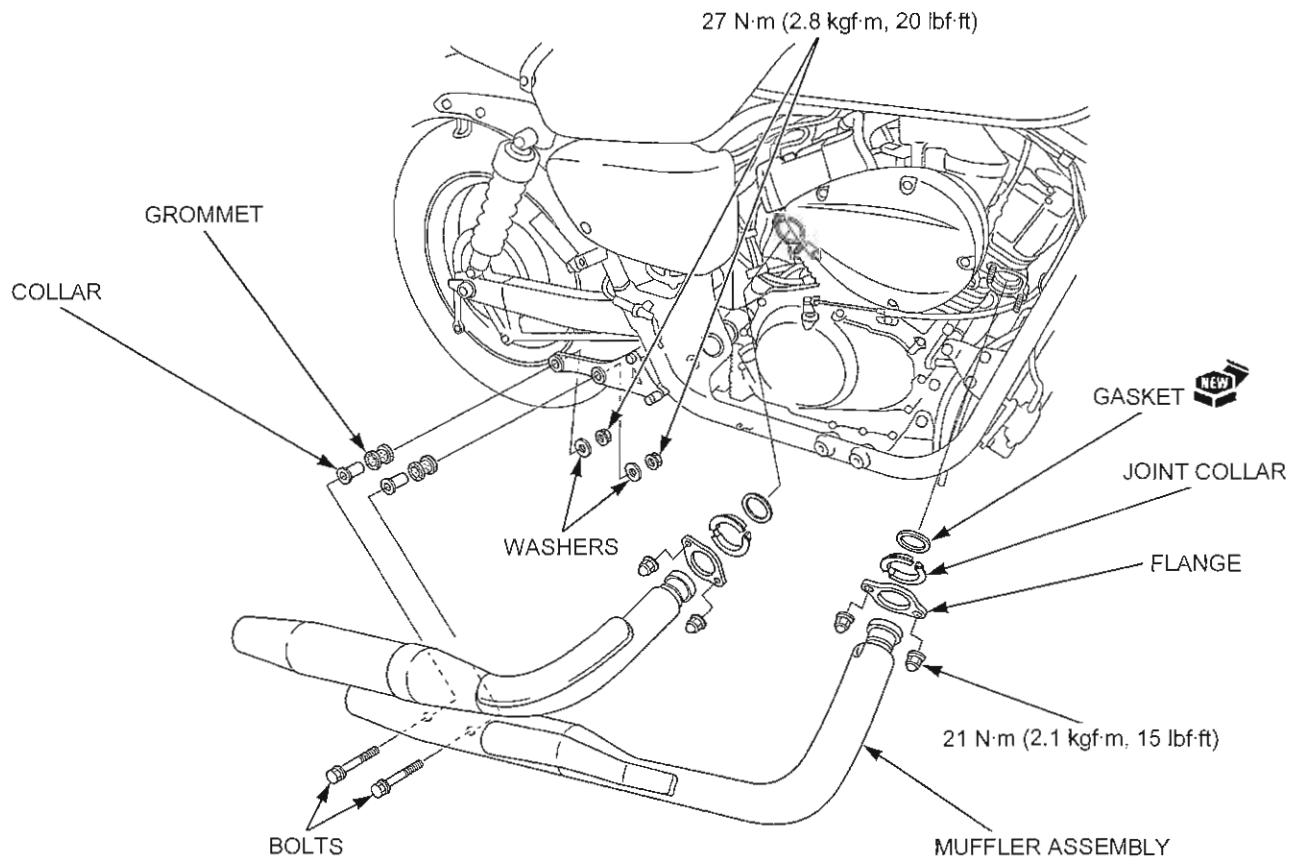
Align the muffler band tab with the rear muffler groove.



Rear muffler only: Install a new rear exhaust pipe protector.

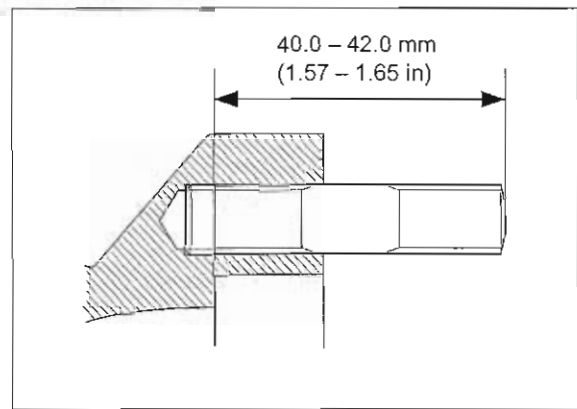


INSTALLATION

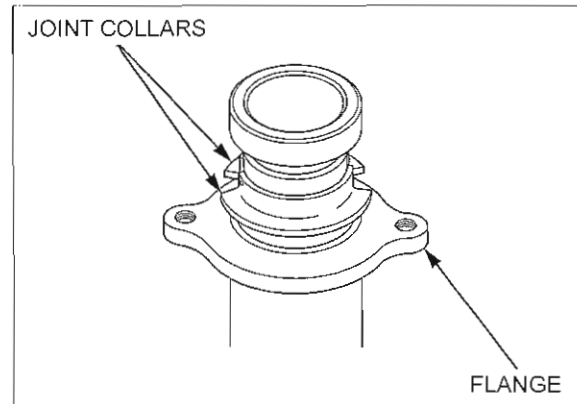


FRAME/BODY PANELS/EXHAUST SYSTEM

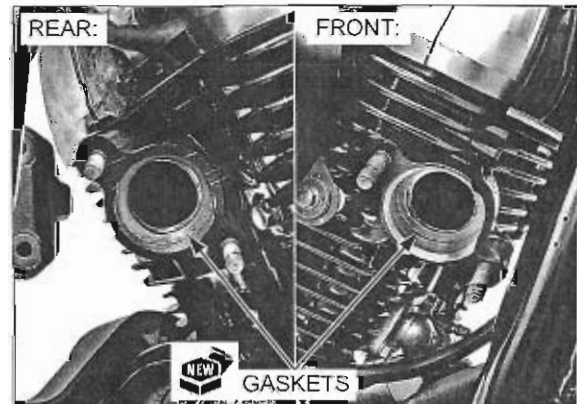
If the exhaust pipe joint stud bolts are loose, tighten them. Be sure to verify the distance from the top of the stud to the cylinder head as shown.



Install the flanges and exhaust pipe joint collars to the muffler assembly.



Install new gaskets.



Install the exhaust system assembly.

NOTE:

Inserting the rear exhaust pipe to the rear exhaust port first, then insert the front exhaust pipe to the front exhaust port.

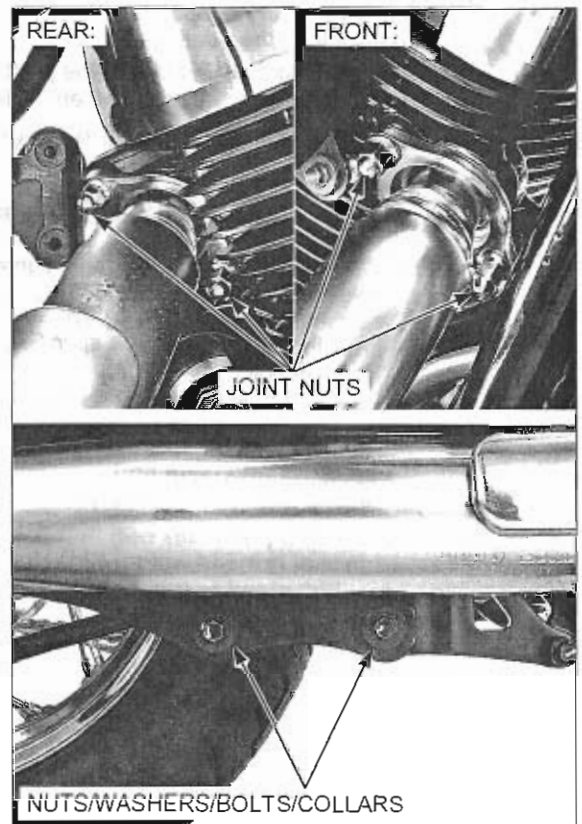
Temporarily install the muffler bracket bolts, collars, washers and nuts.

Tighten the exhaust pipe joint nuts to the specified torque.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Tighten the muffler bracket nuts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

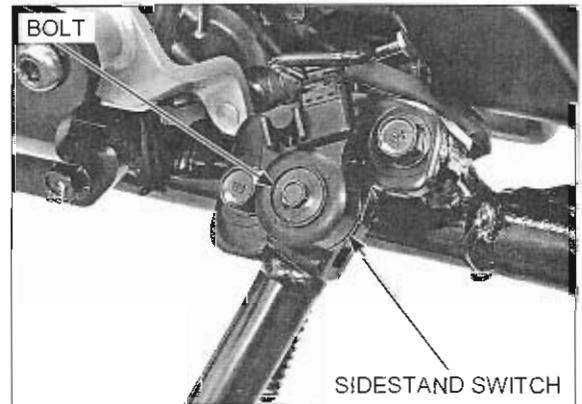


SIDESTAND

REMOVAL/INSTALLATION

Hold the motorcycle in an upright position.

Remove the bolt and sidestand switch.



FRAME/BODY PANELS/EXHAUST SYSTEM

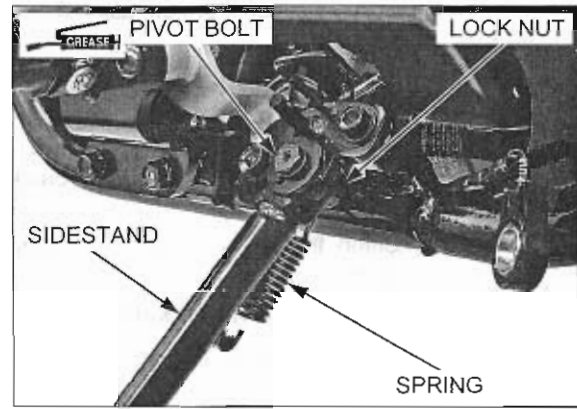
Retract the sidestand.
Unhook the sidestand spring.
Hold the pivot bolt and loosen the pivot lock nut.
Remove the lock nut, pivot bolt and sidestand.
Installation is in the reverse order of removal.

NOTE:

- Apply 1 g grease to the sidestand pivot sliding surface.
- When installing the sidestand, tighten the sidestand pivot bolt to the specified torque. Loosen the sidestand pivot bolt 45 – 90°, and then tighten the pivot lock nut to the specified torque while holding the pivot bolt.
- Replace the sidestand switch bolt with a new one.

TORQUE:

- Sidestand pivot bolt:**
9 N·m (0.9 kgf·m, 6.6 lbf·ft)
- Sidestand pivot lock nut:**
30 N·m (3.1 kgf·m, 22 lbf·ft)
- Sidestand switch bolt:**
10 N·m (1.0 kgf·m, 7 lbf·ft)



SERVICE INFORMATION	3-2	EVAPORATIVE EMISSION CONTROL SYSTEM (U.S.A. TYPE)	3-16
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MAINTENANCE

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 an open area or with an exhaust evacuation system in an enclosed area.

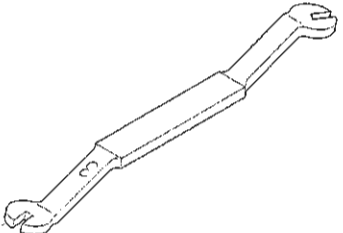
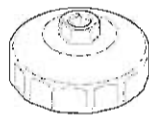
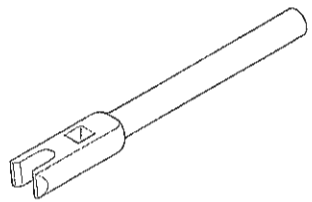
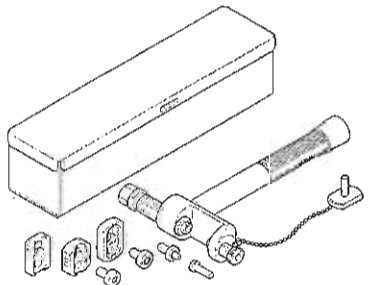
SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip freeplay			2 – 6 mm (1/16 – 1/4 in)
Spark plug	Standard		DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
	For extended high speed riding		DPR8EA-9 (NGK), X24EPR-U9 (DENSO)
Spark plug gap			0.8 – 0.9 mm (0.03 – 0.04 in)
Valve clearance	IN		0.15 ± 0.02 mm (0.006 ± 0.001 in)
	EX		0.20 ± 0.02 mm (0.008 ± 0.001 in)
Recommended engine oil			Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Engine oil capacity	At draining		2.3 liters (2.4 US qt, 2.0 Imp qt)
	At oil filter change		2.5 liters (2.6 US qt, 2.2 Imp qt)
	At disassembly		3.0 liters (3.2 US qt, 2.6 Imp qt)
Engine idle speed			1,200 ± 100 rpm
Recommended antifreeze			Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Drive chain	Size/link	DID	DID525V8-112LE
		RK	RK525SMOZ5-112LE
	Drive chain slack		30 – 40 mm (1-3/16 – 1-9/16 in)
Recommended brake fluid			DOT 4
Brake pedal stopper bolt length (Brake pedal height)			12 mm (0.5 in)
Brake pedal freeplay			20 – 30 mm (13/16 – 1-3/16 in)
Clutch lever freeplay			10 – 20 mm (3/8 – 13/16 in)
Shock absorber spring pre-load adjuster setting			2nd position
Cold tire pressure	Driver only	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	200 kPa (2.00 kgf/cm ² , 29 psi)
	Driver and passenger	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	250 kPa (2.50 kgf/cm ² , 36 psi)
Tire size	Front	100/90-19M/C 57H	
	Rear	150/80B16M/C 71H	
Tire brand	DUNLOP	Front	D404F
		Rear	D404 G
	METZELER	Front	ME 880 Marathon
		Rear	ME 880 Marathon
Minimum tire tread depth	Front	1.5 mm (0.06 in)	
	Rear	2.0 mm (0.08 in)	

TORQUE VALUES

Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and seating surface.
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads.
Oil filter cartridge	26 N·m (2.7 kgf·m, 19 lbf·ft)	Apply engine oil to the threads and O-ring.
Oil drain bolt	29 N·m (3.0 kgf·m, 21 lbf·ft)	
Master cylinder reservoir cap screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Air cleaner cover socket bolt	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads.
Alternator cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Spoke	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Drive sprocket fixing plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Driven sprocket nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Oil filter boss (Crankcase side)	-	Apply locking agent to the threads. See page 3-12

TOOLS

<p>Valve adjusting wrench 07908-KE90000</p>  <p>or 07908-KE90100 (U.S.A. only) with 10 mm offset box wrench</p>	<p>Oil filter wrench 07HAA-PJ70101</p>  <p>or 07AAA-PLCA100 (U.S.A. only)</p>	<p>Spoke wrench, 6.1 mm 07JMA-MR60100</p> 
<p>Drive chain tool set 07HMH-MR10103</p>  <p>or 07HMH-MR1010C (U.S.A. only)</p>		

MAINTENANCE

MAINTENANCE SCHEDULE

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

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

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

ITEMS	FREQUENCY	WHICHEVER COMES FIRST	x 1,000 mi x 100 km	ODOMETER READING (NOTE 1)							REFER TO PAGE	
				0.6	4	8	12	16	20	24		
		NOTE		10	64	128	192	256	320	384		
EMISSION RELATED ITEMS	*	FUEL LINE				I		I		I	3-5	
	*	THROTTLE OPERATION				I		I		I	3-5	
		AIR CLEANER	NOTE 2				R			R	3-6	
		CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	3-6	
		SPARK PLUG			I	R	I	R	I	R	3-7	
	*	VALVE CLEARANCE			I		I		I		3-8	
		ENGINE OIL			Initial = 600 mi (1,000 km) or 1 month: R Regular = Every 8,000 mi (12,800 km) or 12 months: R							3-11
		ENGINE OIL FILTER			R		R		R		R	3-12
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-13
		RADIATOR COOLANT	NOTE 4				I		I		R	3-14
	NON-EMISSION RELATED ITEMS	*	COOLING SYSTEM				I		I		I	3-14
*		SECONDARY AIR SUPPLY SYSTEM				I		I		I	3-15	
*		EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 5				I			I	3-16	
		DRIVE CHAIN			Every = 500 mi (800 km) I, L							3-16
		BRAKE FLUID	NOTE 4			I	I	R	I	I	R	3-21
		BRAKE SHOES/PADS WEAR				I	I	I	I	I	I	3-22
		BRAKE SYSTEM			I		I		I		I	3-22
*		BRAKE LIGHT SWITCH					I		I		I	3-24
*		HEADLIGHT AIM					I		I		I	3-24
		CLUTCH SYSTEM			I	I	I	I	I	I	I	3-25
		SIDESTAND					I		I		I	3-25
*	SUSPENSION					I		I		I	3-26	
*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-26	
**	WHEELS/TIRES			I	I	I	I	I	I	I	3-27	
**	STEERING HEAD BEARINGS			I		I		I		I	3-28	

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

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

NOTES:

1. 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. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
5. U.S.A. type only.

FUEL LINE

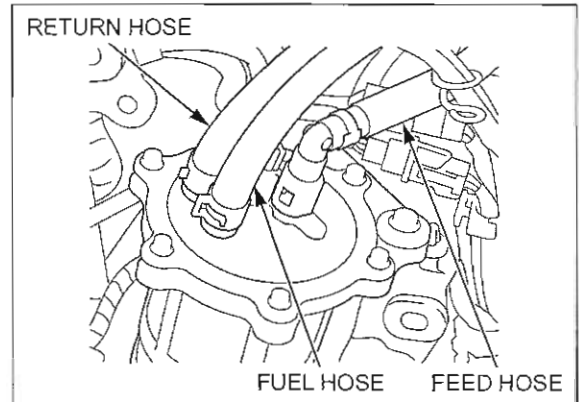
Remove the right side cover (page 2-3).

Check the fuel line for deterioration, damage or leakage.

Check the following:

- Fuel hose
- Fuel vapor return hose
- Fuel feed hose

Replace the fuel and fuel vapor return hoses if necessary.



THROTTLE OPERATION

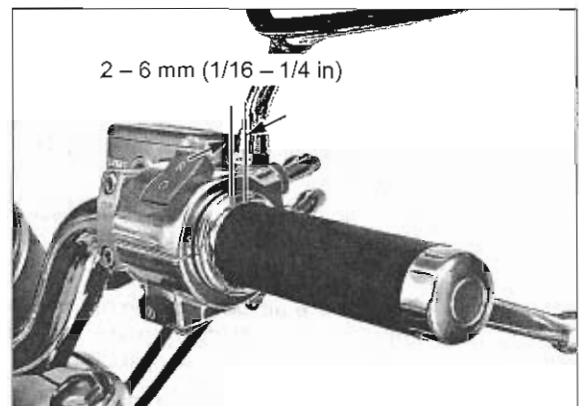
Check for smooth operation of the throttle and that it returns automatically to the fully closed position from open position in any steering positions.

Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables, if throttle operation is not smooth.

Measure freeplay at the throttle grip flange.

FREEPLAY: 2 – 6 mm (1/16 – 1/4 in)



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

Minor adjustment is made with the upper adjuster.

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

After adjustment, tighten the lock nut securely.

Recheck the throttle operation.

If the correct freeplay cannot be reached using the adjuster, turn the adjuster all the way in and then turn it out one turn.

Tighten the lock nut and make major adjustment (page 3-5).

Major adjustment is made with the lower adjuster.

Remove the air cleaner housing (page 5-45).

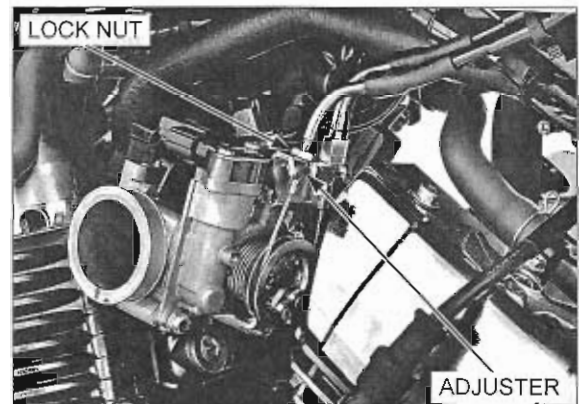
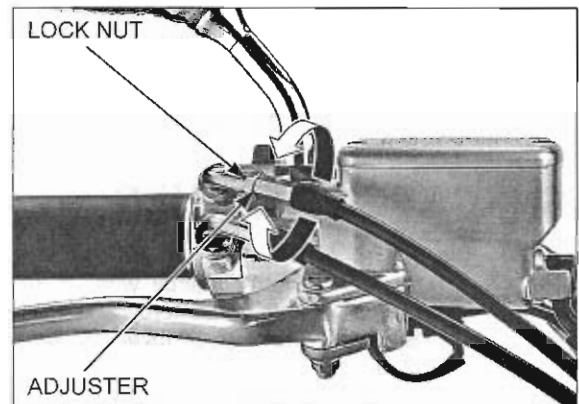
Adjust the freeplay by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut.

Recheck the throttle operation.

Replace any damaged parts, if necessary.

Install the removed parts in the reverse order of removal.

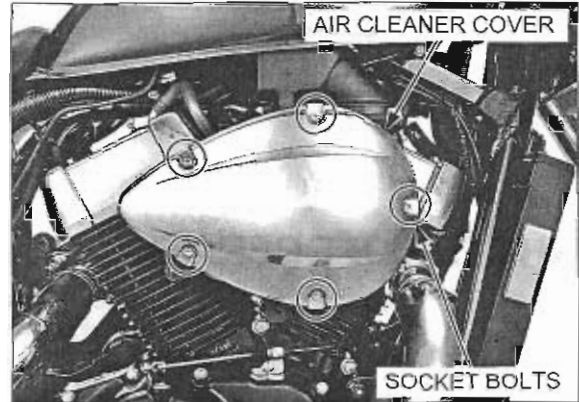


AIR CLEANER

NOTE:

- The viscous paper element type air cleaner can not be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in usually wet or dusty areas, more frequent inspections are required.

Remove the socket bolts and air cleaner cover.



Remove the air cleaner element from the air cleaner housing.

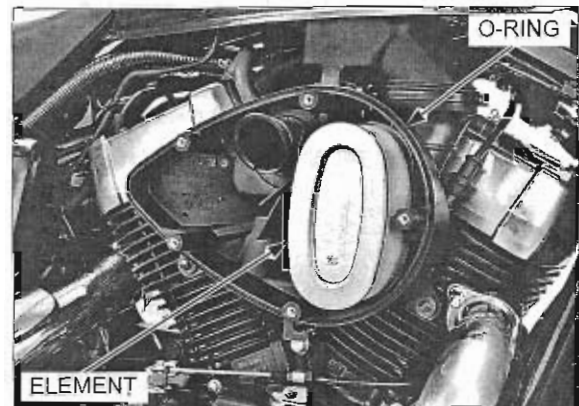
Make sure that the O-ring is installed in position and is in good condition, and replace it with a new one if necessary.

Replace the air cleaner element in accordance with the maintenance schedule (page 3-4) 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:
1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)



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

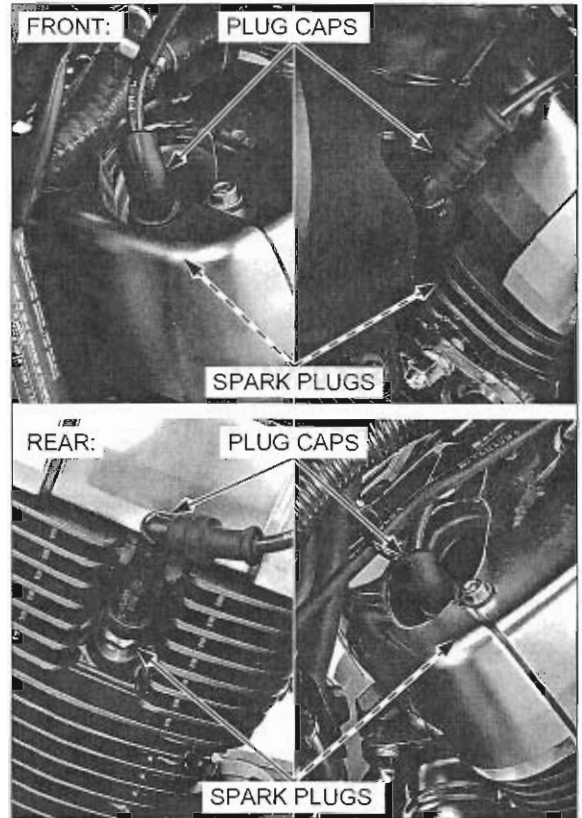
REMOVAL

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 spark plugs, and be sure that no debris is allowed to enter into the combustion chamber.

Remove the spark plugs.



INSPECTION

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

RECOMMENDED SPARK PLUG:

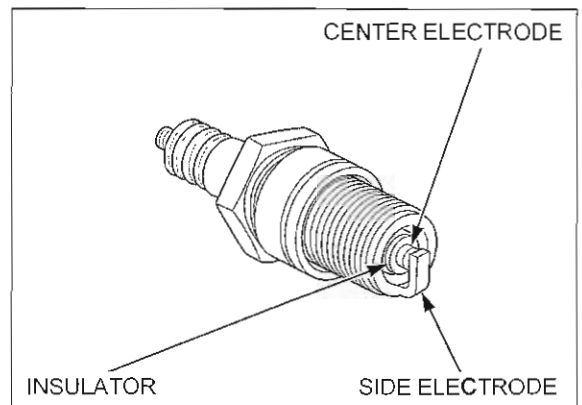
Standard:

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

For extended high speed riding:

DPR8EA-9 (NGK), X24EPR-U9 (DENSO)

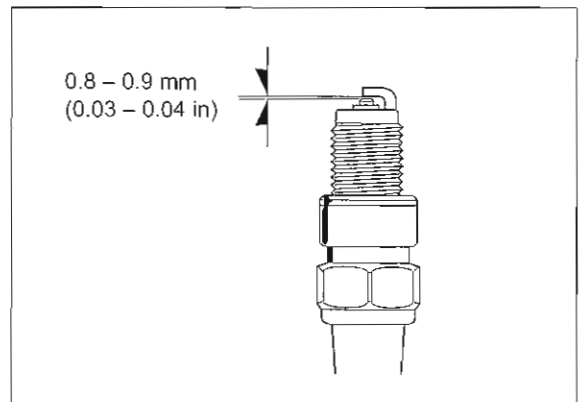
Clean the spark plug electrodes with a wire brush or special plug cleaner.



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

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

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



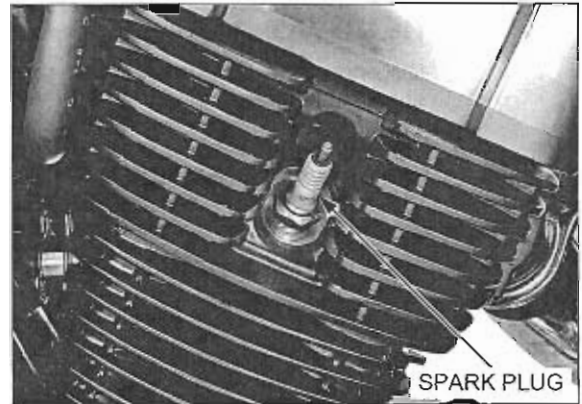
MAINTENANCE

INSTALLATION

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

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the spark plug caps.



VALVE CLEARANCE

INSPECTION

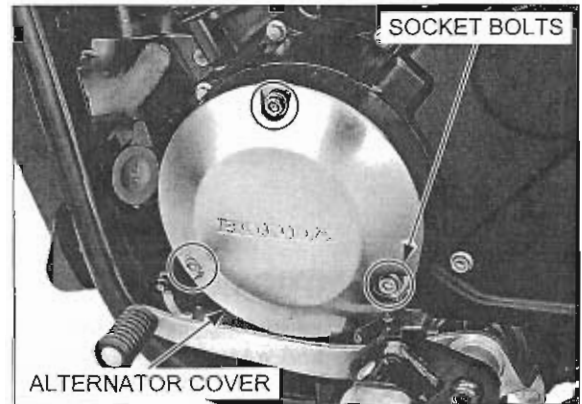
NOTE:

After this valve clearance inspection, check the engine idle speed (page 3-13).

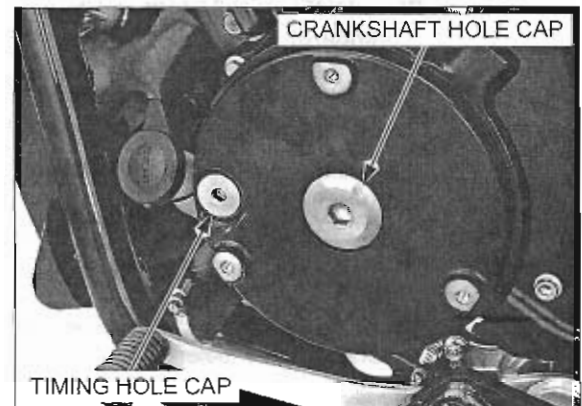
Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

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

Remove the socket bolts and alternator cover.



Remove the timing and crankshaft hole caps.

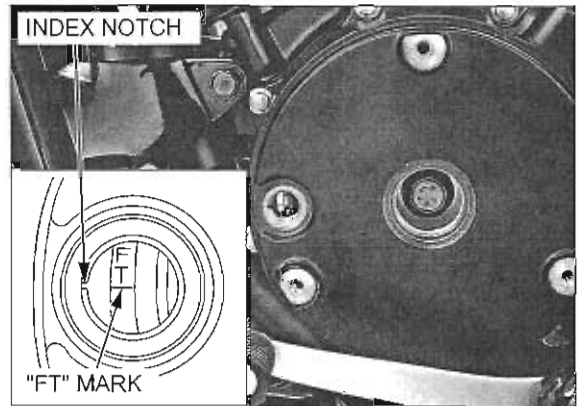


FRONT

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.

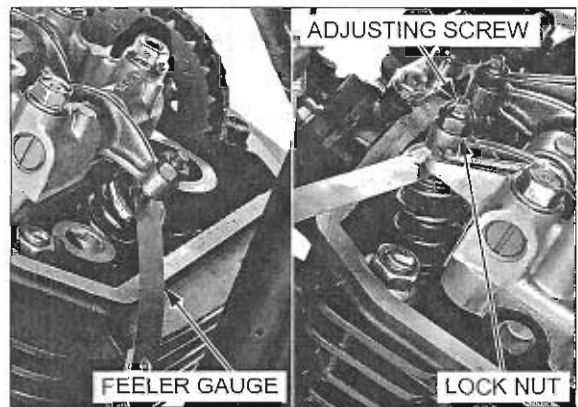


When checking the valve clearance, slide the feeler gauge from the center toward the outside.

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

VALVE CLEARANCE:

IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EX: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



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

TOOL:

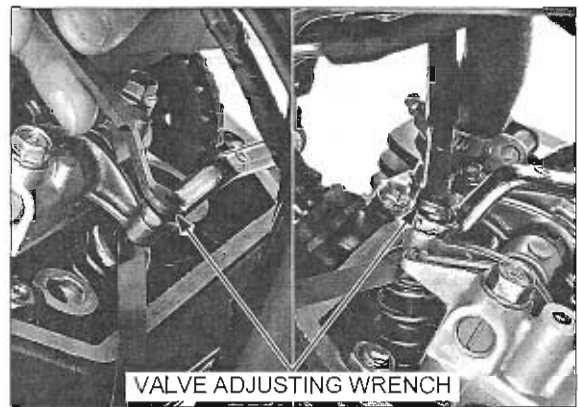
Valve adjusting wrench 07908-KE90000 or 07908-KE90100 (U.S.A. only) with 10 mm offset box wrench

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

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

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the valve adjusting screw lock nut, recheck the valve clearance.

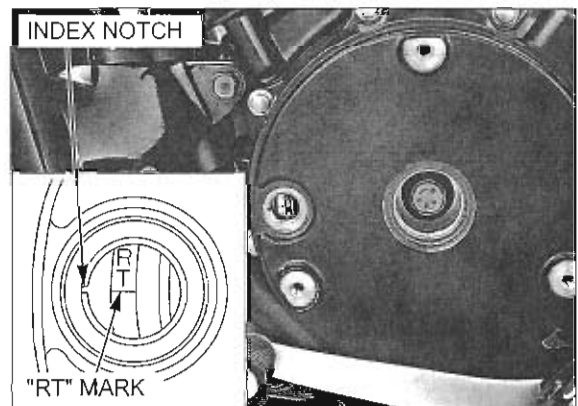


REAR

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.

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 "RT" mark with the index notch again.



MAINTENANCE

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

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

VALVE CLEARANCE:

IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EX: 0.20 ± 0.02 mm (0.008 ± 0.001 in)

Adjust by loosening the valve adjusting screw 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 valve adjusting screw lock nut threads and seating surface.

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

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the valve adjusting screw lock nut, recheck the valve clearance.

Coat new O-rings with engine 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: 10 N·m (1.0 kgf·m, 7 lbf·ft)

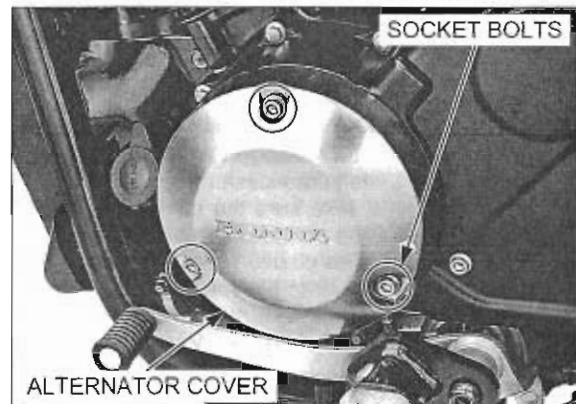
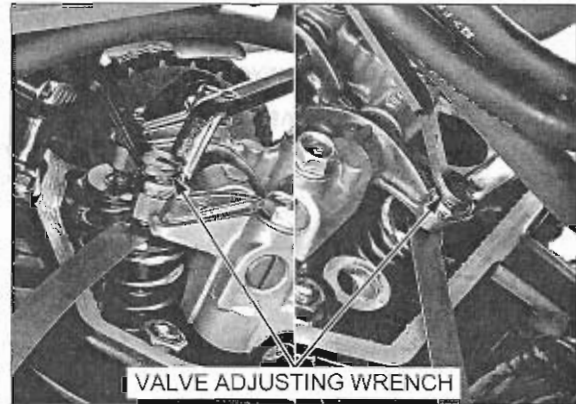
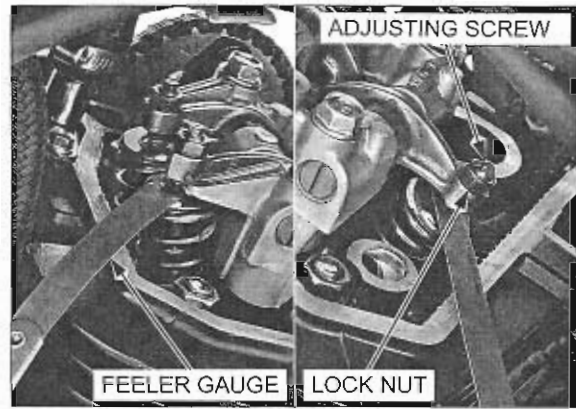
Install the crankshaft hole cap and tighten it to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the cylinder head cover (page 8-30).



ENGINE OIL

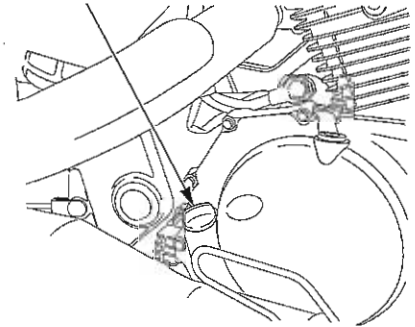
OIL LEVEL INSPECTION

Support the motorcycle using a safety stand or hoist in a level and upright position.

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

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

OIL FILLER CAP/DIPSTICK



If the level is below or near the lower level on the dipstick, fill the recommended engine oil to the upper level (page 3-12).

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

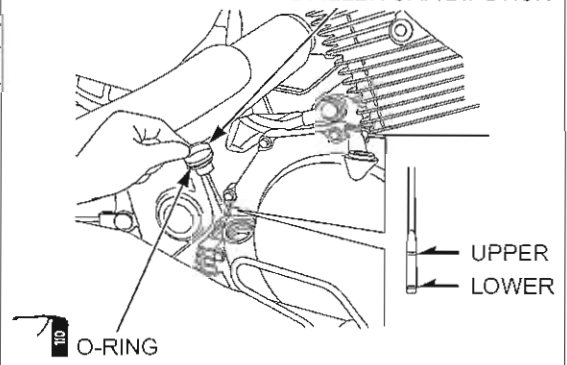
Apply engine oil to the O-ring.

Install the oil filler cap/dipstick.

Recheck the engine oil level.

Make sure there are no engine oil leaks.

OIL FILLER CAP/DIPSTICK



OIL CHANGE

ENGINE OIL DRAINING

Remove the oil filler cap/dipstick.

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

Drain the engine oil completely.

Reinstall the engine oil drain bolt with new sealing washer and tighten it to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)

Fill the recommended engine oil (page 3-12).



DRAIN BOLT

SEALING WASHER

MAINTENANCE

ENGINE OIL FILLING

Remove the oil filler cap/dipstick.

Fill the specified amount of recommended engine oil into the engine.

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

RECOMMENDED ENGINE OIL:

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

API service classification: SG or Higher

JASO T 903 standard: MA

Viscosity: 10W-30

OIL CAPACITY:

2.3 liters (2.4 US qt, 2.0 Imp qt) at draining

2.5 liters (2.6 US qt, 2.2 Imp qt) at filter change

3.0 liters (3.2 US qt, 2.6 Imp qt) at disassembly

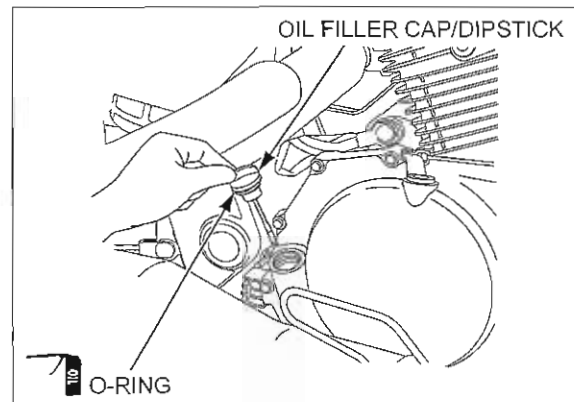
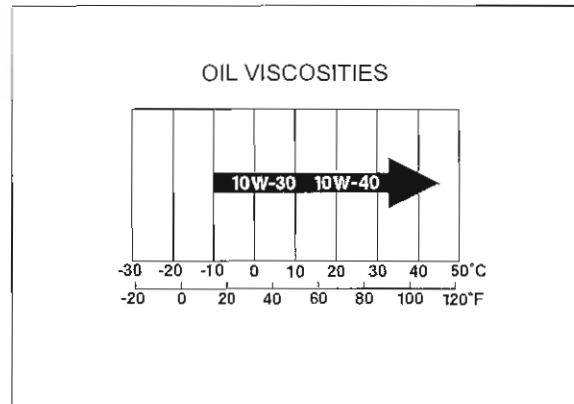
Check that the O-ring is in good condition, replace it if necessary.

Apply engine oil to the O-ring.

Install the oil filler cap/dipstick.

Check the engine oil level (page 3-11).

Make sure there are no engine oil leaks.



ENGINE OIL FILTER

Drain the engine oil (page 3-11).

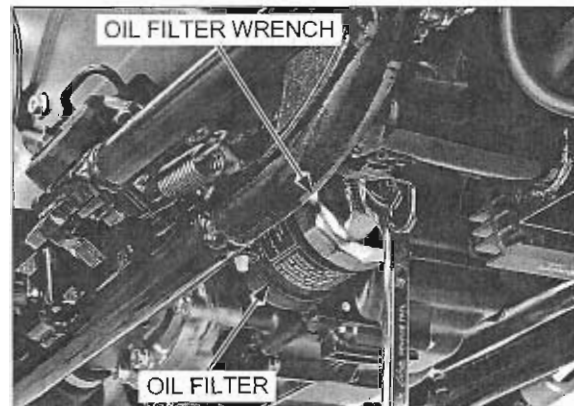
Loosen the oil filter cartridge using the special tool.

TOOL:

Oil filter wrench

07HAA-PJ70101 or
07AAA-PLCA100
(U.S.A. only)

Remove and let the remaining engine oil drain out.

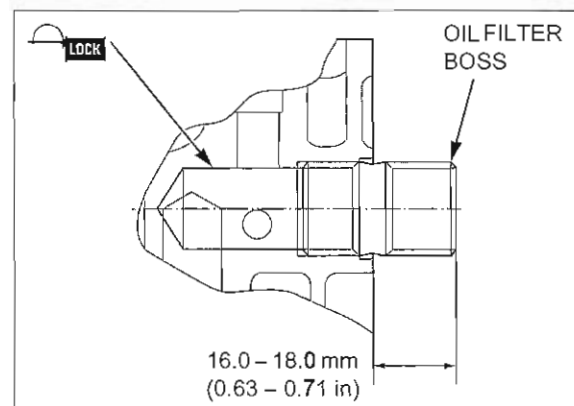


Check that the oil filter boss protrusion from the crankcase is specified length as shown.

SPECIFIED LENGTH: 16.0 – 18.0 mm (0.63 – 0.71 in)

NOTE:

Apply locking agent to the oil filter boss threads (crankcase side), then install it, if the oil filter boss is removed from the crankcase.



Apply engine oil to new oil filter cartridge threads and O-ring.

Install and tighten the oil filter cartridge with the special tool to the specified torque.

TOOL:

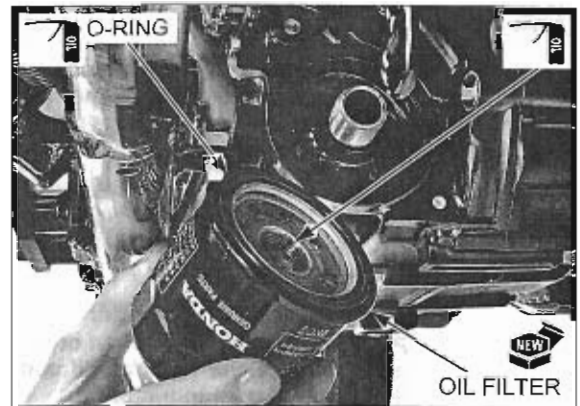
Oil filter wrench

07HAA-PJ70101 or
07AAA-PLCA100
(U.S.A. only)

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)

Fill the recommended engine oil (page 3-12).

Make sure there are no engine oil leaks.



ENGINE IDLE SPEED

NOTE:

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect following items.
 - No DTC and MIL blinking
 - Spark plug condition (page 3-7)
 - Air cleaner condition (page 3-6)
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment from the previous designs.
- Use a tachometer with graduations of 50 rpm smaller that will accurately indicate 50 rpm change.

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

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

Start the engine and let it idle. Check the idle speed.

ENGINE IDLE SPEED: 1200 ± 100 rpm

If the idle speed is out of the specification, check the following:

- Throttle operation and throttle grip freeplay (page 3-5)
- Intake air leak or engine top-end problem (page 8-5)
- IACV operation (page 5-61)

RADIATOR COOLANT

Check the coolant level of the reserve tank. The level should be between the rear end of UPPER and LOWER level lines with the motorcycle in an upright position.

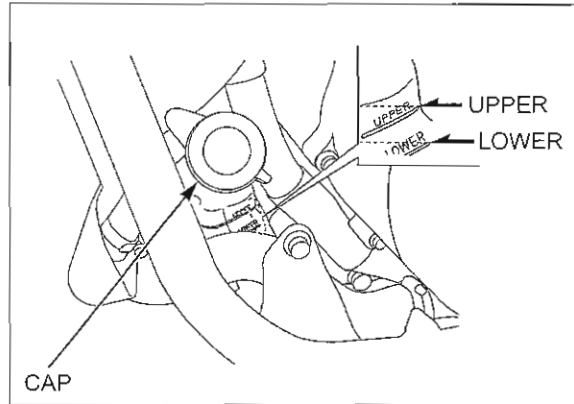
If the level is low, remove the reserve tank cap, and fill the tank to the rear end of UPPER level line with a 1:1 mixture of distilled water and antifreeze (coolant preparation: page 6-6).

RECOMMENDED ANTIFREEZE:

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

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.

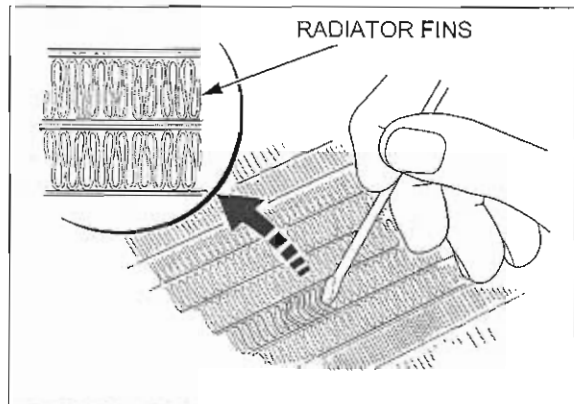


COOLING SYSTEM

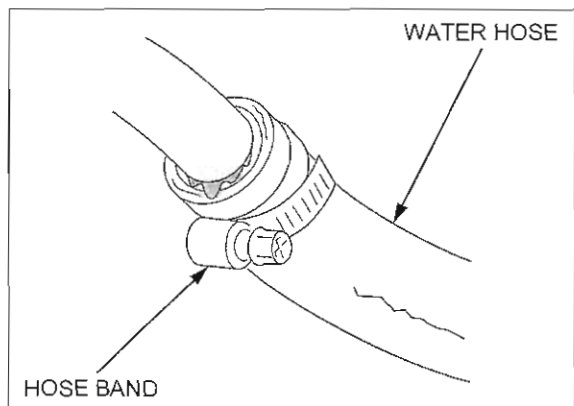
Check the radiator air passage for clogs or damage.

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 (page 6-12).

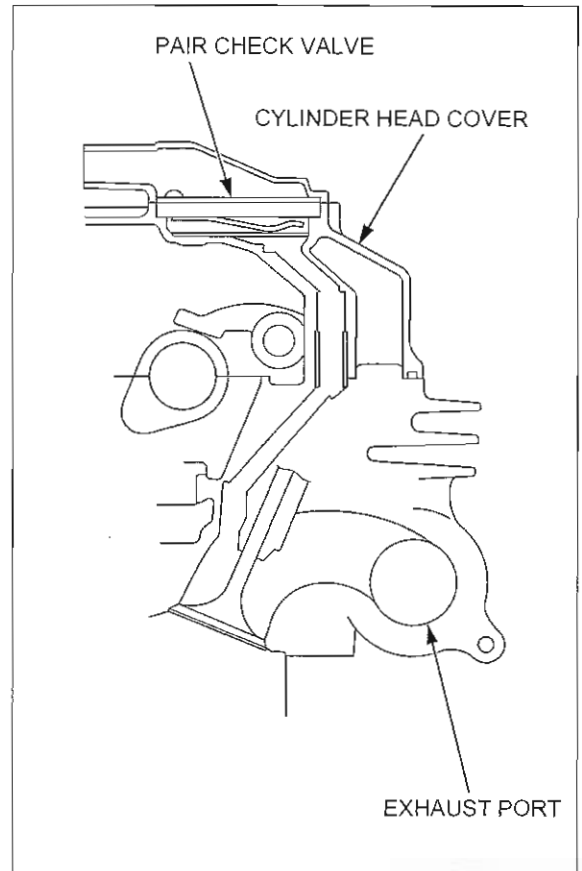


Check for any coolant leakage from the water pump, water hoses and hose joints. Check the radiator hoses for cracks or deterioration and replace them if necessary. Check that all water hose bands are tight (page 6-11).



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 covers.
- 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.

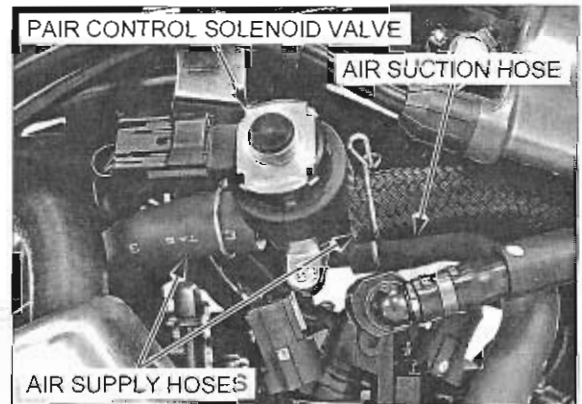


Remove the fuel tank (page 5-43).

If the hoses show any signs of heat damage, inspect the PAIR check valves in the cylinder head covers for damage (page 5-64).

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



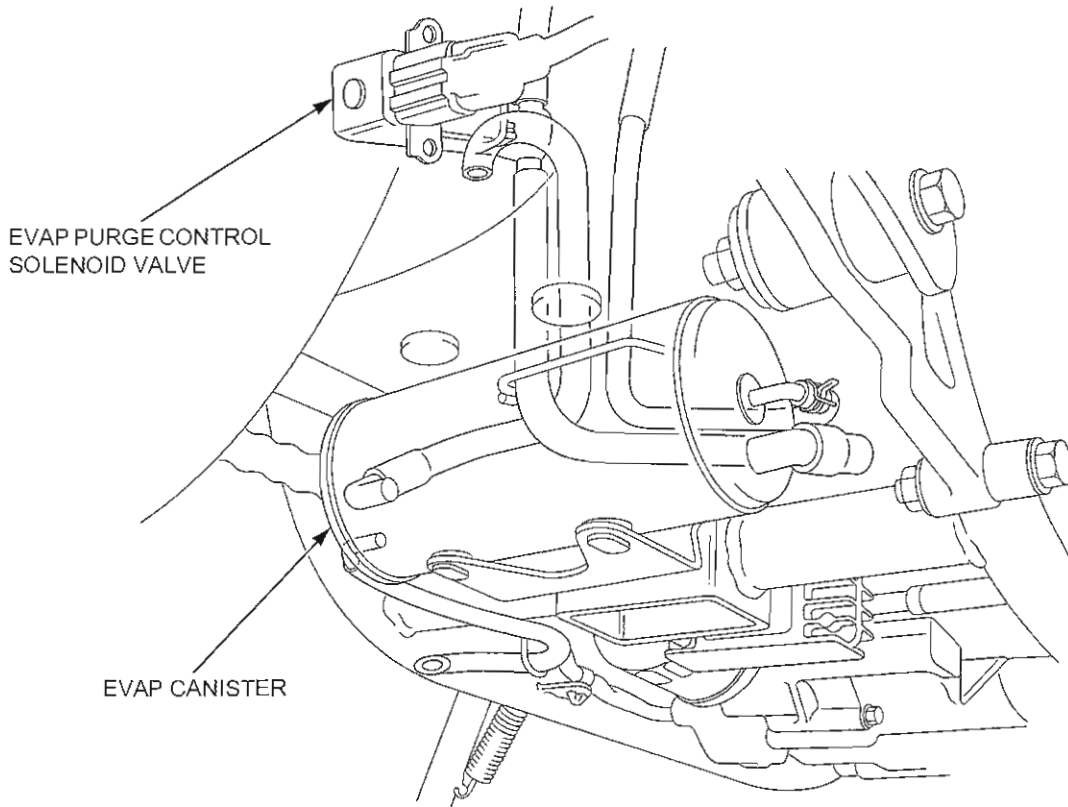
MAINTENANCE

EVAPORATIVE EMISSION CONTROL SYSTEM (U.S.A. TYPE)

Check the hoses between the fuel tank, intake manifold, EVAP canister, EVAP purge control solenoid valve for deterioration, damage or loose connection.

Check the EVAP canister for cracks or other damage.

Refer to the cable & harness routing for hose connections (page 1-19).



DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

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

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

DRIVE CHAIN SLACK: 30 – 40 mm (1-3/16 – 1-9/16 in)

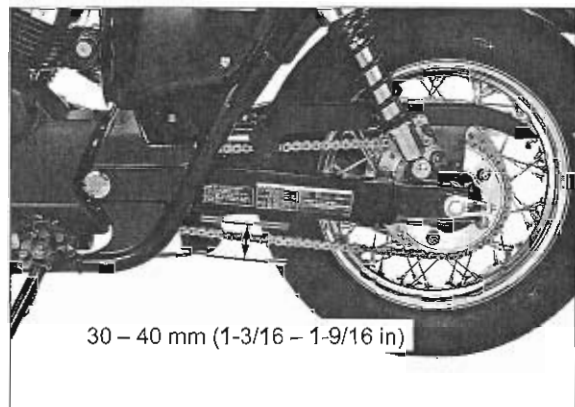
NOTICE

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

⚠ WARNING

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

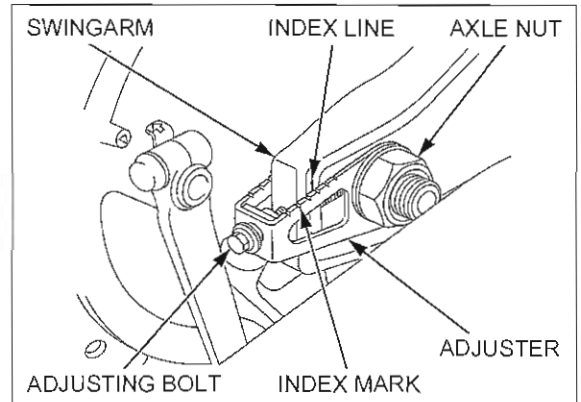
Lubricate the drive chain with #80 – 90 gear oil or chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



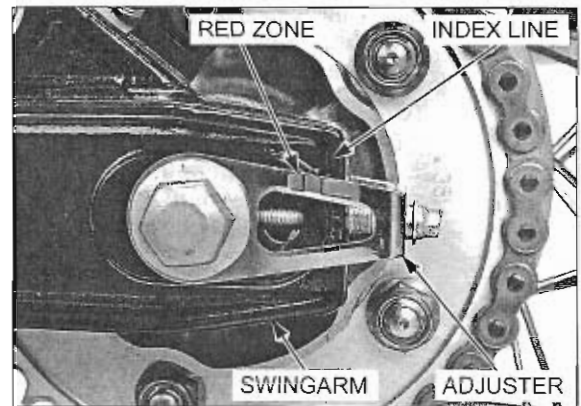
ADJUSTMENT

Loosen the rear axle nut.
 Turn both adjusting bolts an equal number of turns until the correct drive chain slack is obtained.
 Make sure the index marks on both adjusters are aligned with the index line of the swingarm.
 Tighten the rear axle nut to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

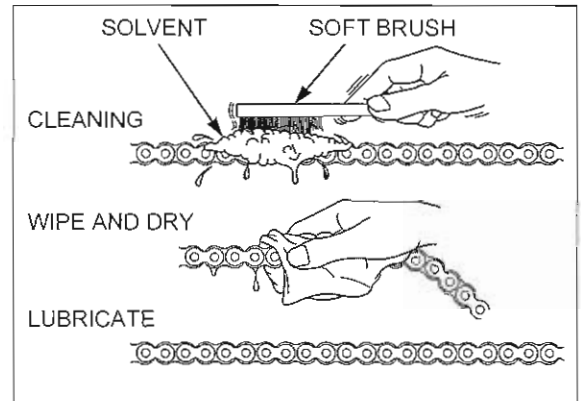


Recheck the drive chain slack and free wheel rotation.
 Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.
 Check the drive chain wear indicator label attached on the left drive chain adjuster.
 If the red zone of the indicator label reaches the index line of the swingarm, replace the drive chain with a new one (page 3-19).

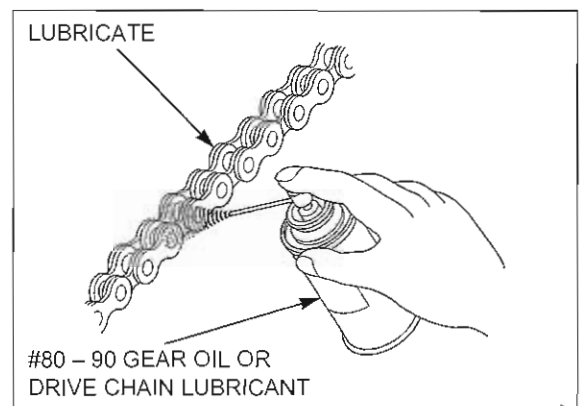


CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.
 Be sure the chain has dried completely before lubricating.
 Inspect the drive chain for possible damage or wear.
 Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.
 Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.
 Inspect and replace sprocket as necessary.



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



MAINTENANCE

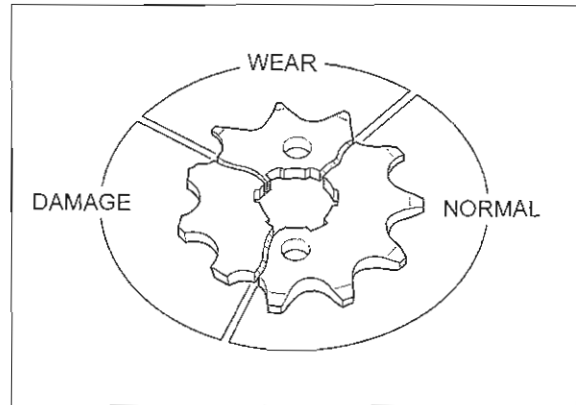
SPROCKET INSPECTION

Remove the left crankcase rear cover (page 2-4).

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

Never use a new drive chain on worn sprockets.

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



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

TORQUE:

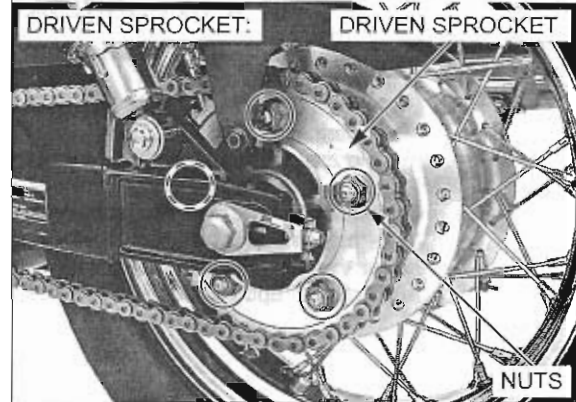
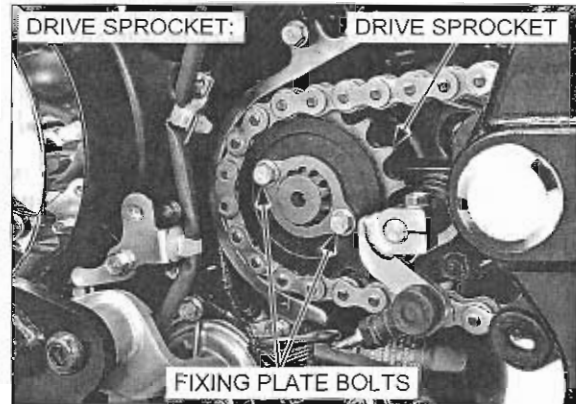
Drive sprocket fixing plate bolt:

10 N·m (1.0 kgf·m, 7 lbf·ft)

Driven sprocket nut:

88 N·m (9.0 kgf·m, 65 lbf·ft)

Install the left crankcase rear cover (page 2-4).



REPLACEMENT

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

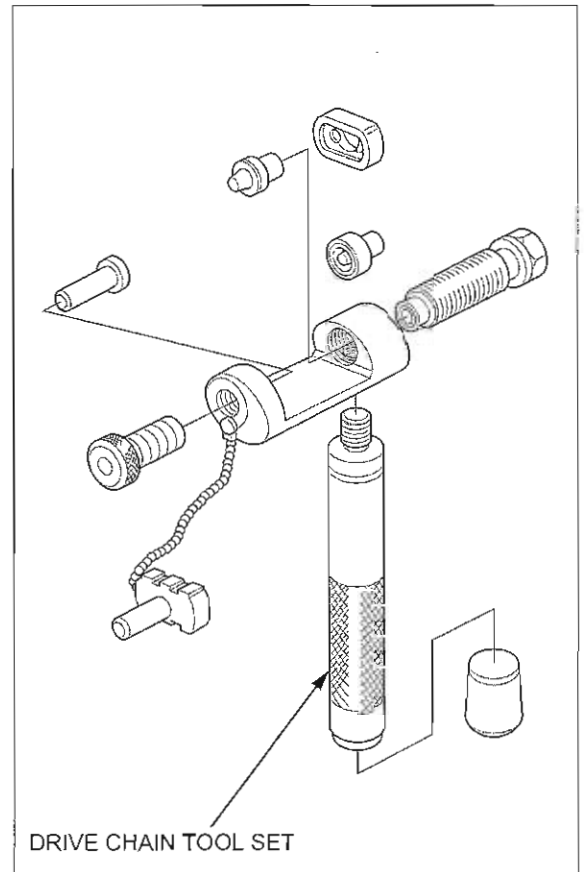
Loosen the drive chain adjusters all the way to maximum drive chain slack is obtained.

Assemble the special tool as shown.

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

TOOL:
Drive chain tool set

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

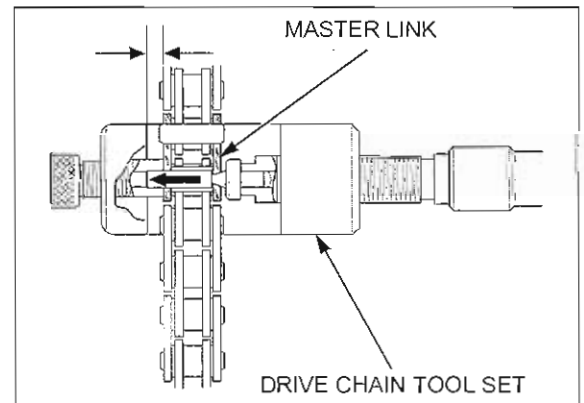


Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

TOOL:
Drive chain tool set

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

Remove the drive chain.

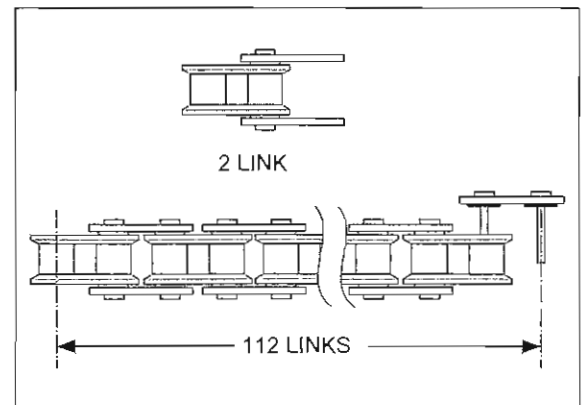


Include the master link when you count the drive chain links.

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

STANDARD LINKS: 112 LINKS

REPLACEMENT CHAIN
DID: DID525V8-112LE
RK: RK525SMOZ5-112LE



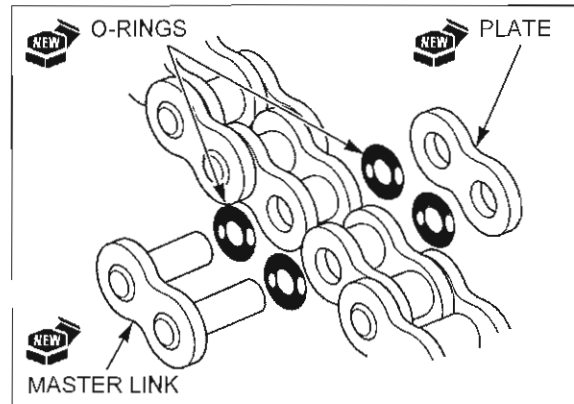
MAINTENANCE

NOTE:

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

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

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

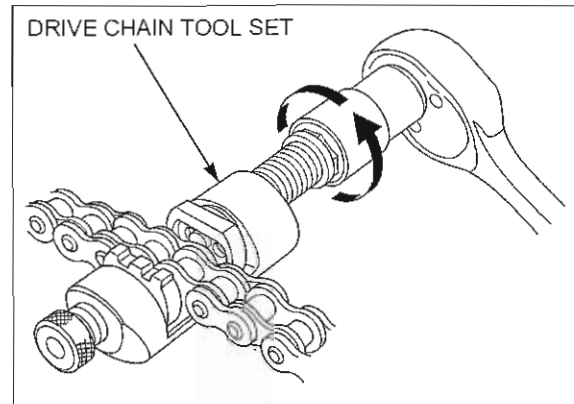


Assemble and set the drive chain tool set.

TOOL:

Drive chain tool set

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



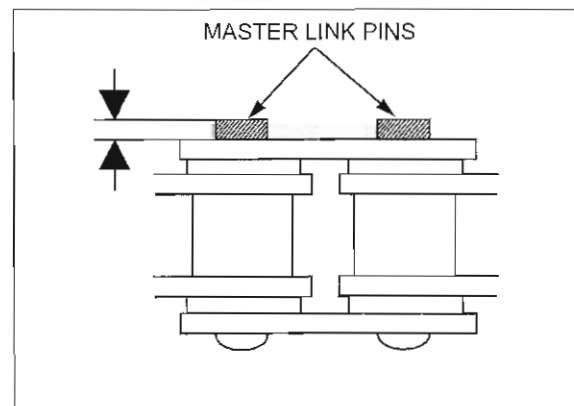
Make sure that the master link pins are installed properly.
Measure the master link pin length projected from the plate.

STANDARD LENGTH:

DID: 1.3 – 1.5 mm (0.05 – 0.06 in)

RK: 1.2 – 1.4 mm (0.05 – 0.06 in)

Stake the master link pins.

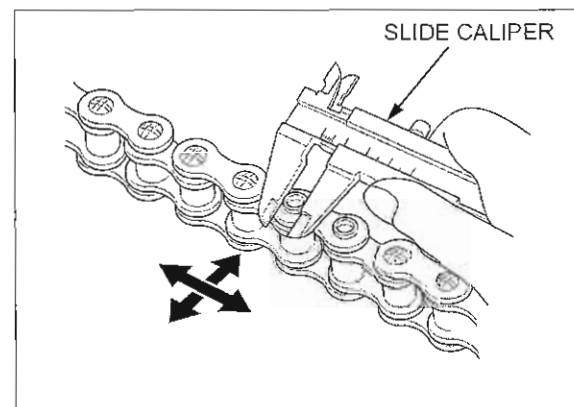


Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

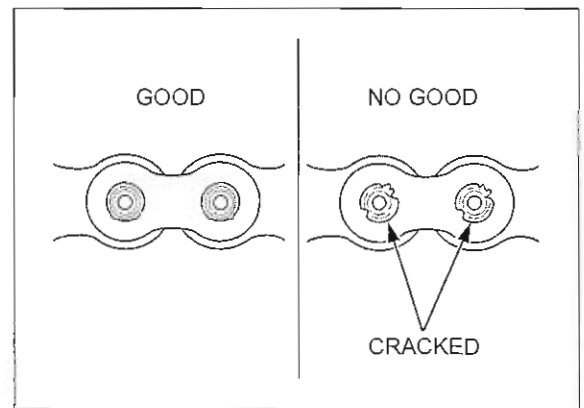
DIAMETER OF THE STAKED AREA:

DID: 5.50 – 5.80 mm (0.22 – 0.23 in)

RK: 5.25 – 5.65 mm (0.21 – 0.22 in)



A drive chain with a clip-type master link must not be used. After staking, check the staked area of the master link for cracks. If there is any cracking, replace the master link, O-rings and plate.



BRAKE FLUID

NOTICE

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

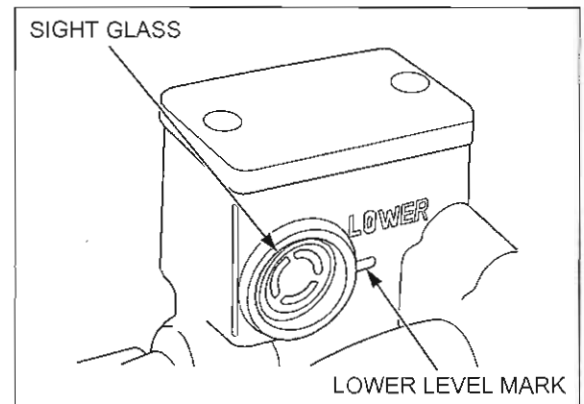
NOTE:

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

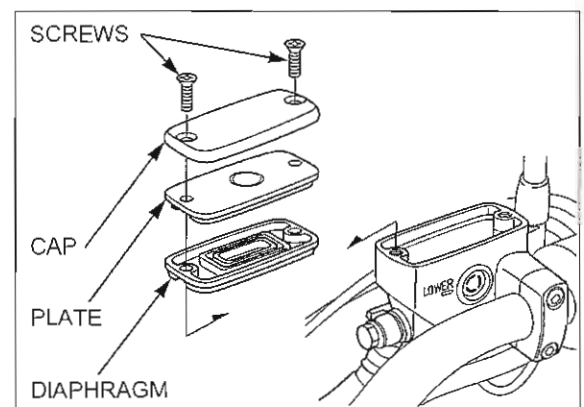
When the fluid level is low, check the brake pads for wear (page 3-22).

A low fluid level may be due to wear of the brake pads. If the brake pads are worn and 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 3-22).

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.

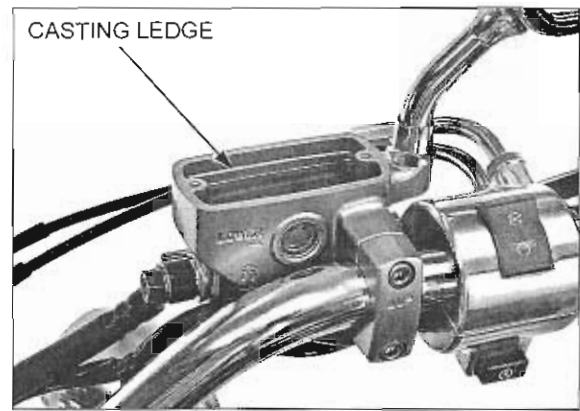


MAINTENANCE

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

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

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



BRAKE SHOES/PADS WEAR

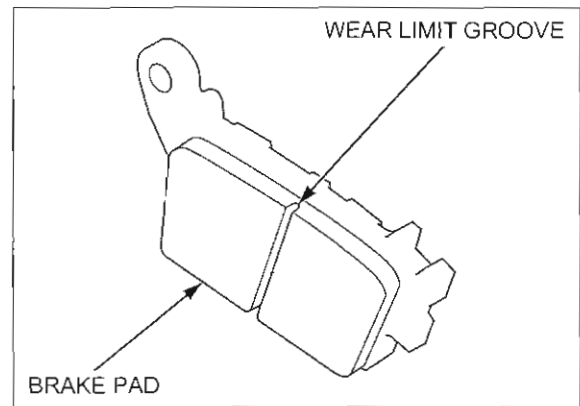
FRONT BRAKE PADS

Check the brake pad for wear.

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

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

For brake pad replacement (page 15-7).



REAR BRAKE SHOES

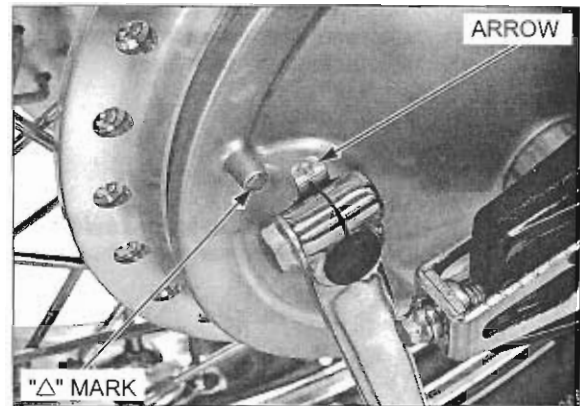
Check the indicator plate position when the brake pedal is applied.

If the arrow on the indicator plate aligns with the "Δ" mark, inspect the brake drum (page 14-14).

If the brake drum I.D. is within the service limit, replace the brake shoes (page 14-14).

NOTE:

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



BRAKE SYSTEM

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

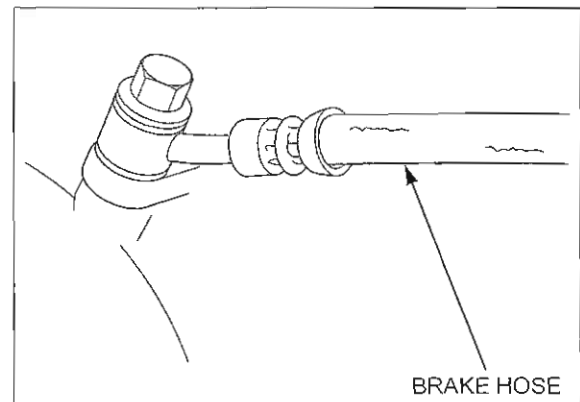
If the lever feels soft or spongy when operated, bleed the air from the system.

For air bleeding procedures (page 15-5).

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

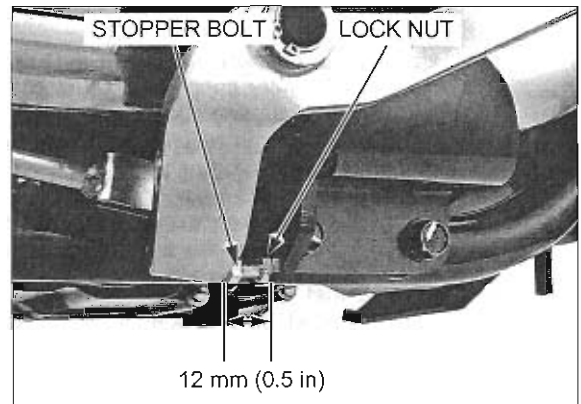
Check the brake pedal height.

BRAKE PEDAL STOPPER BOLT LENGTH:
12 mm (0.5 in)

To adjust:
Loosen the lock nut and turn the stopper bolt as required.
Tighten the lock nut securely.

After adjusting the brake pedal height, check the following:

- Brake pedal freeplay (page 3-23)
- Rear brake light switch operation (page 3-24)



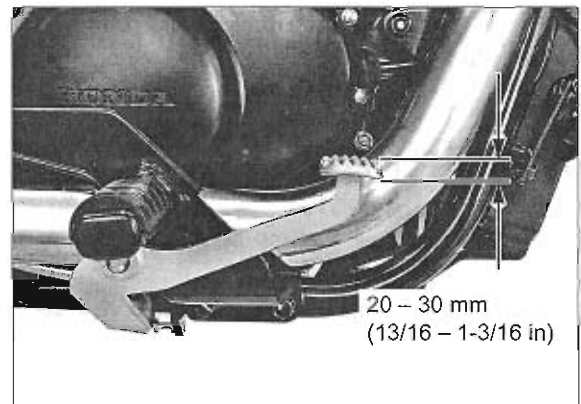
BRAKE PEDAL FREEPLAY

NOTE:

Perform brake pedal freeplay adjustment after adjusting brake pedal height.

Check the brake pedal freeplay.

FREEPLAY: 20 – 30 mm (13/16 – 1-3/16 in)

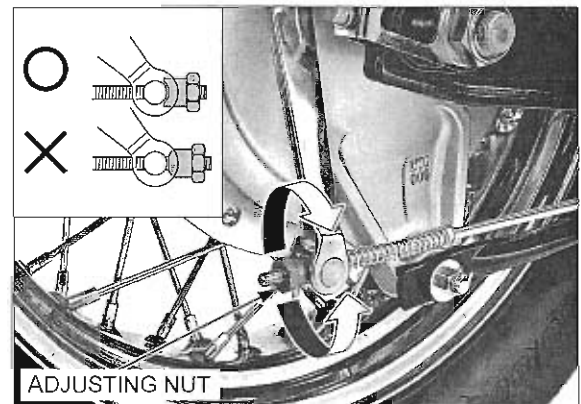


Make sure the cut-out on the adjusting nut is seated on the joint pin.

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

NOTE:

After adjusting the brake pedal freeplay, check the rear brake light switch operation (page 3-24).



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 freeplay adjustment have been made.

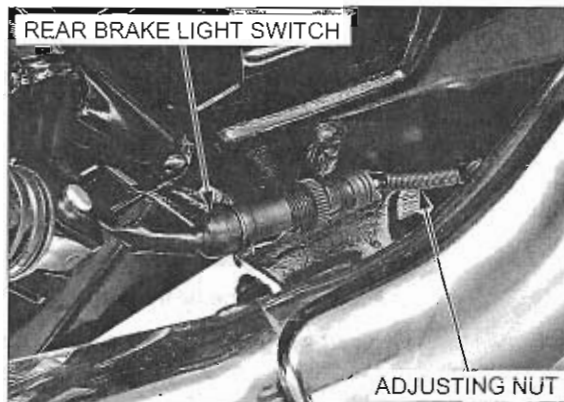
Check that the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the rear brake light switch so that the light comes on at the proper time.

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

Hold the rear brake light switch body and turn the adjusting nut as required.

Recheck the rear brake light switch operation.



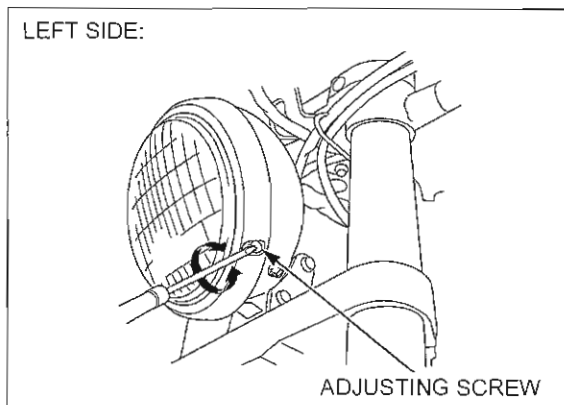
HEADLIGHT AIM

NOTE:

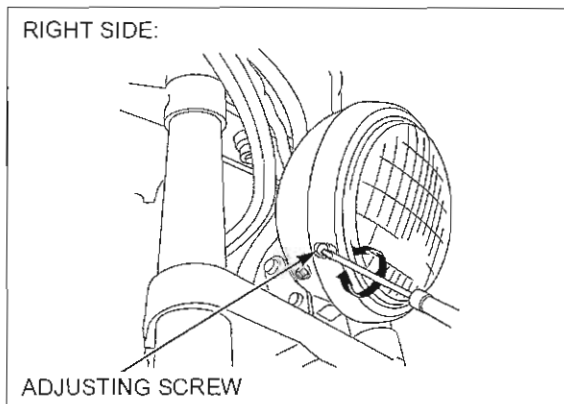
Adjust the headlight beam as specified by local laws and regulations.

Hold the motorcycle in an upright position.

Adjust vertically by turning the left side adjusting screw.



Adjust horizontally by turning the right side adjusting screw.

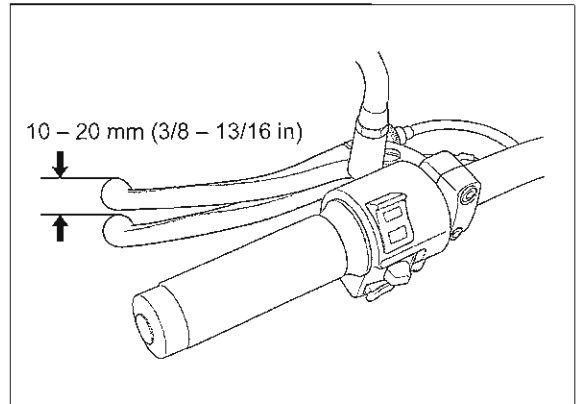


CLUTCH SYSTEM

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

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

FREEPLAY: 10 – 20 mm (3/8 – 13/16 in)



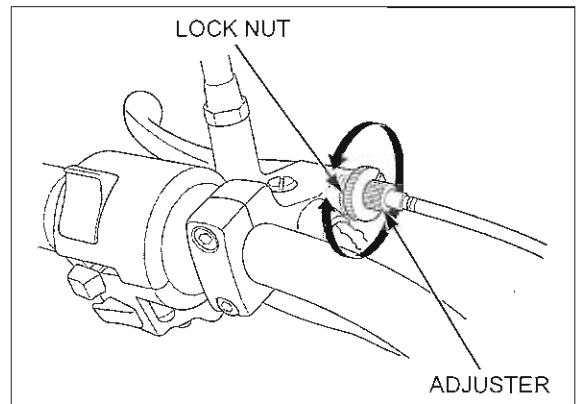
The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.

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

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

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

Tighten the lock nut and make major adjustment (page 3-25).



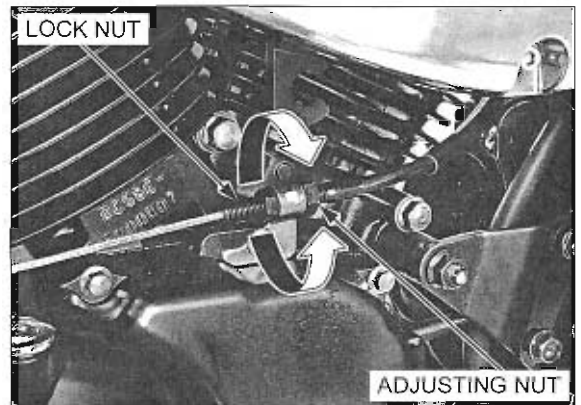
Major adjustment is made with the lower adjusting nut at the engine.

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 freeplay cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (page 10-6).



SIDESTAND

Hold the motorcycle in an upright position.

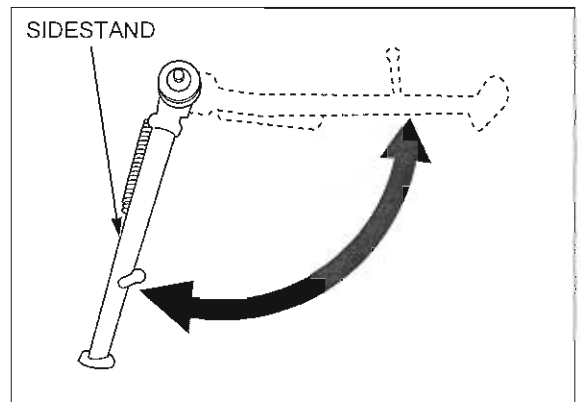
Check the sidestand spring for damage or loss of tension.

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

Check the sidestand ignition cut-off system:

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

If there is a problem with the system, check the sidestand switch (page 19-20).



SUSPENSION

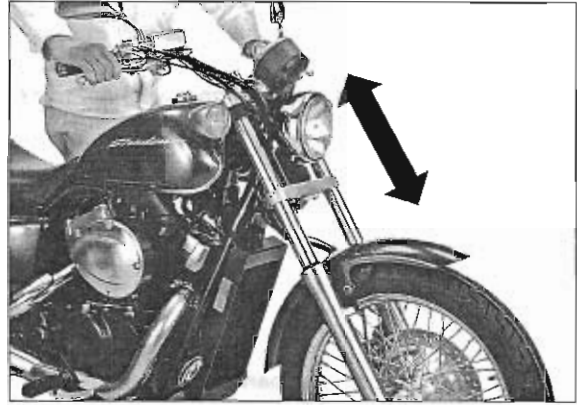
FRONT SUSPENSION INSPECTION

Check the action of the forks by applying the front brake 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 (page 13-21).



REAR SUSPENSION INSPECTION

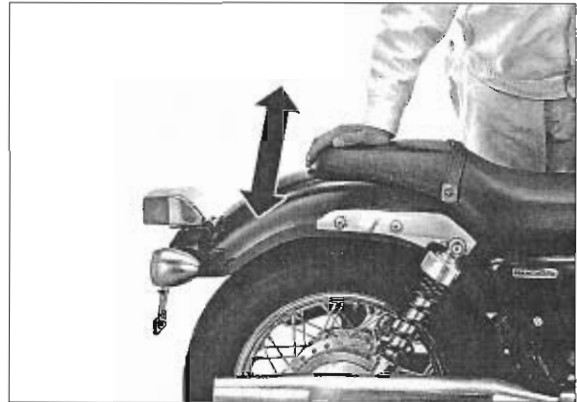
Check the action of the shock absorbers by compressing them several times.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

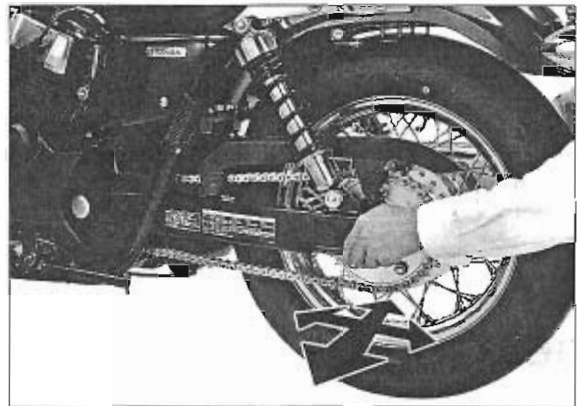
For shock absorber service (page 14-17).



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

Check for worn swingarm bearings by grabbing the rear end of the swingarm to move it side to side.

Replace the bearings if any looseness is noted (page 14-18).



NUTS, BOLTS, FASTENERS

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

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

WHEELS/TIRES

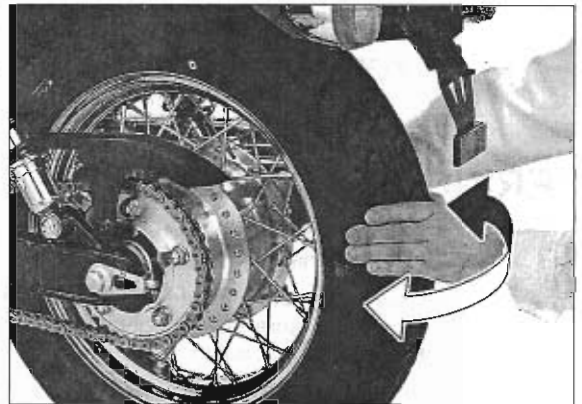
Support the motorcycle securely and raise the front wheel off the ground.
Hold the front fork leg and move the front wheel sideways forcefully to see if the wheel bearings are worn.

For front wheel service (page 13-14).



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 (page 14-6).



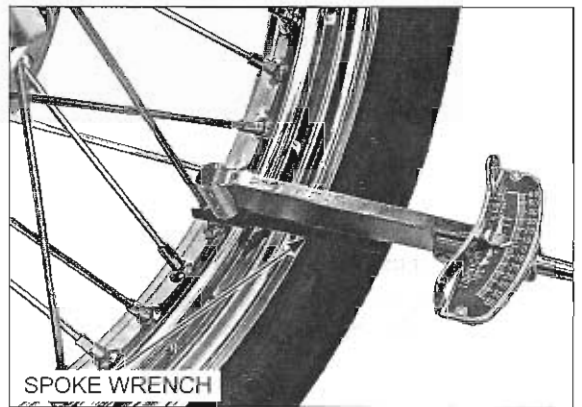
Inspect the spokes for looseness by tapping them with a screwdriver.

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, 6.1 mm 07JMA-MR60100

TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)



MAINTENANCE

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

RECOMMENDED TIRE PRESSURE:

Driver only:

Front: 200 kPa (2.00 kgf/cm², 29 psi)

Rear: 200 kPa (2.00 kgf/cm², 29 psi)

Driver and passenger:

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.

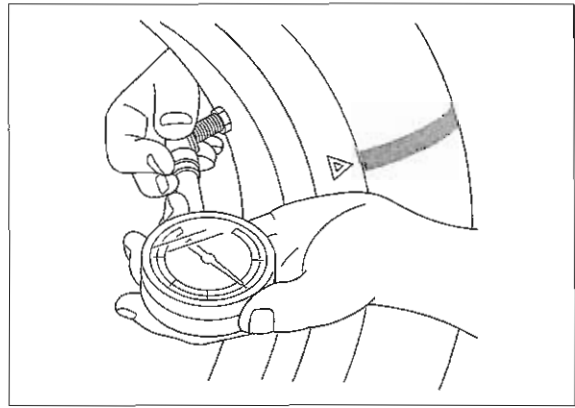
Measure the tread depth at the center of the tires.

Replace the tires when the tread depth reaches the following limits.

MINIMUM TIRE TREAD DEPTH:

Front: 1.5 mm (0.06 in)

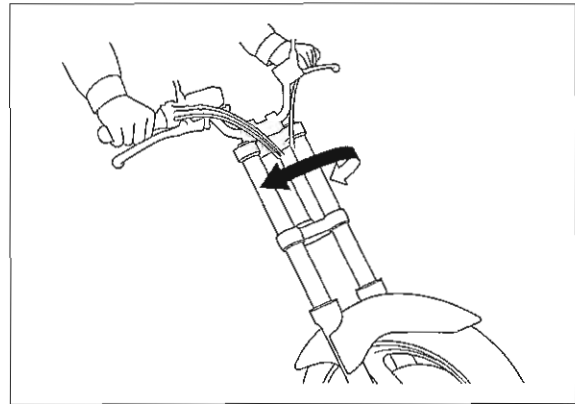
Rear: 2.0 mm (0.08 in)



STEERING HEAD BEARINGS

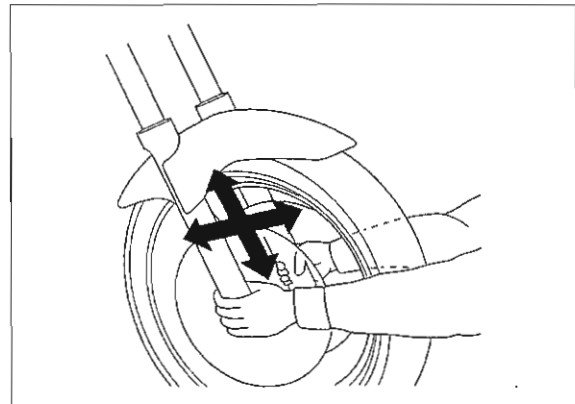
Support the motorcycle securely and raise the front wheel off the ground.

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



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

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 13-30).

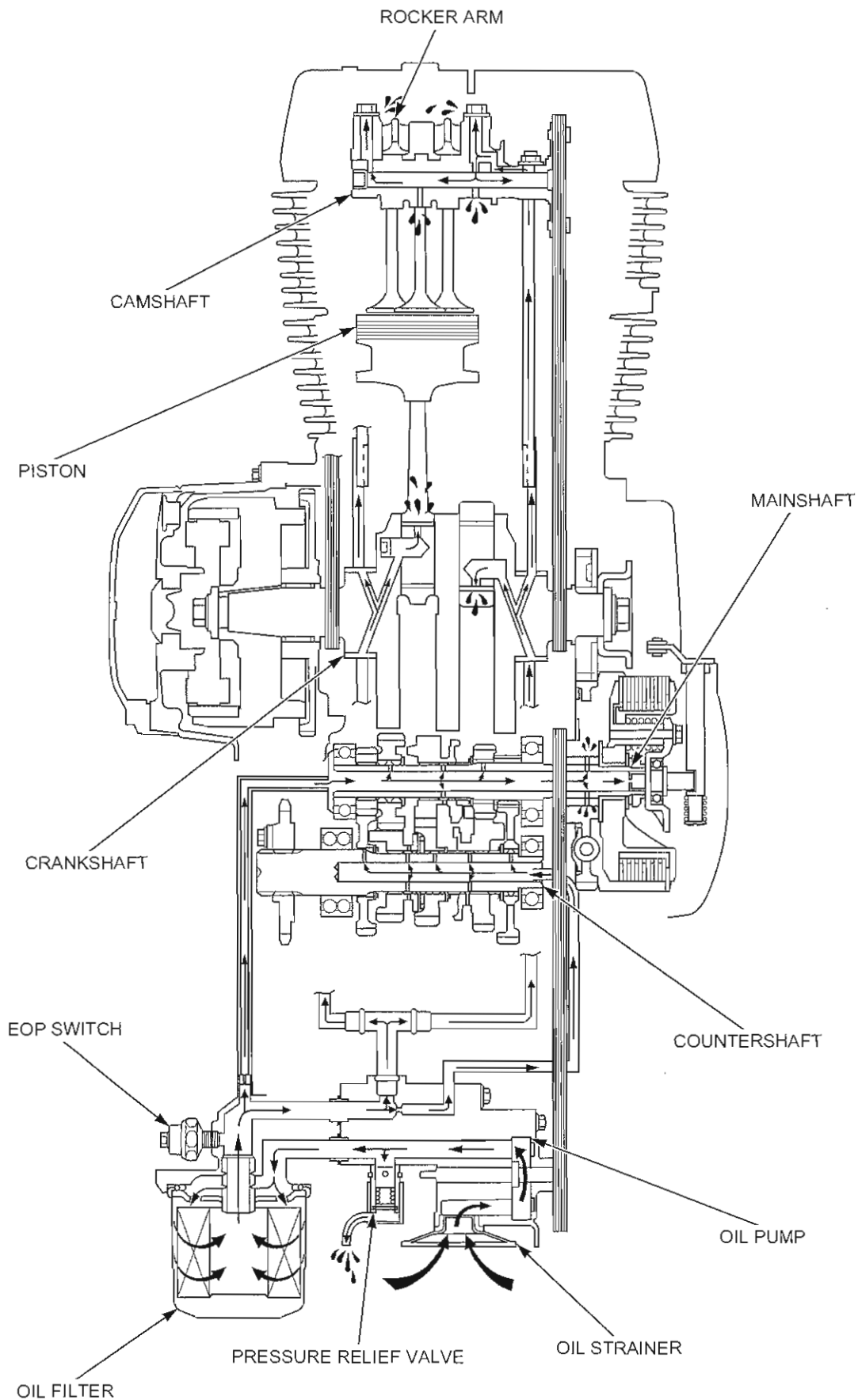


4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM4-2
SERVICE INFORMATION4-3
TROUBLESHOOTING.....4-4

OIL PRESSURE INSPECTION4-5
OIL PUMP4-6

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION**GENERAL****⚠ CAUTION**

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

- The crankcase must be separated to service the oil pump.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that oil pressure is correct.
- For engine oil level check (page 3-11).
- For engine oil (page 3-11) and filter change (page 3-12).
- For oil pressure indicator inspection (page 19-15).

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.3 liters (2.4 US qt, 2.0 Imp qt)	—
	At oil filter change	2.5 liters (2.6 US qt, 2.2 Imp qt)	—
	At disassembly	3.0 liters (3.2 US qt, 2.6 Imp qt)	—
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	—
Oil pressure at EOP switch		530 kPa (5.4 kgf/cm ² , 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)

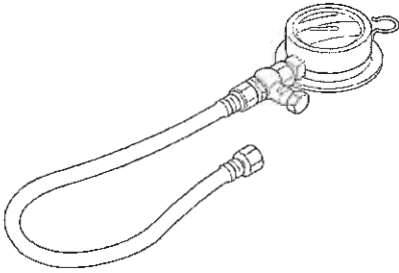
TORQUE VALUES

EOP switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads. See page 4-5
EOP switch terminal screw	2 N·m (0.2 kgf·m, 1.5 lbf·ft)	See page 4-5
Oil pump assembly bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	

LUBRICATION SYSTEM

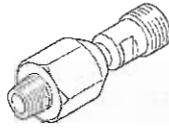
TOOLS

Oil pressure gauge set
07506-3000001



or MT37A (Snap-On)
or equivalent commercially available in
U.S.A.

Oil pressure gauge attachment
07406-0030000



or AT77 (Snap-On)
or equivalent commercially available in
U.S.A.

TROUBLESHOOTING

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

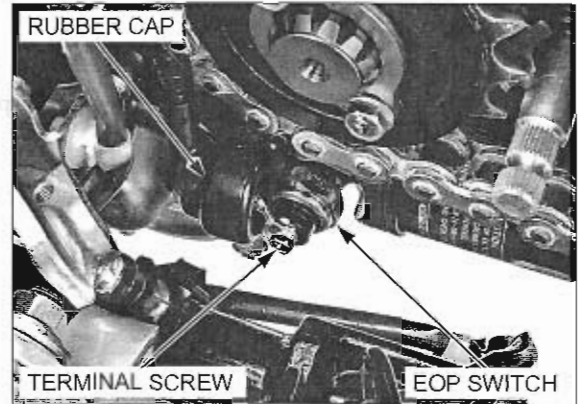
OIL PRESSURE INSPECTION

Remove the left crankcase rear cover (page 2-4).

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 EOP switch wire by removing the terminal screw.



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

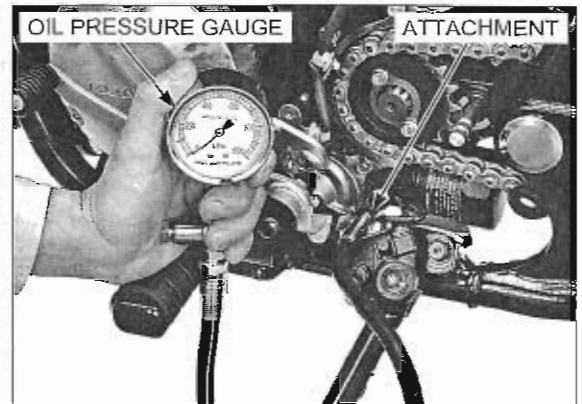
TOOLS:

Oil pressure gauge set

07506-300001 or MT37A (Snap-On) or equivalent commercially available in U.S.A.

Oil pressure gauge attachment

07406-0030000 or AT77 (Snap-On) or equivalent commercially available in U.S.A.



Check the oil level and add the recommended engine oil if necessary (page 3-11).

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 Apply liquid sealant (Three Bond 1207B or equivalent) to the EOP switch threads as shown and tighten it to the specified torque.

*3 - 4 mm
(0.1 - 0.2 in) from
the end.*

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the EOP switch wire and tighten the terminal screw to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m, 1.5 lbf·ft)

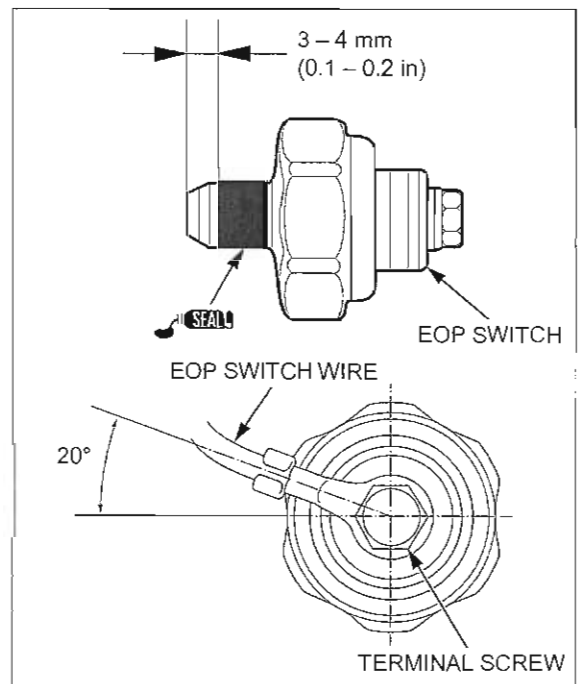
NOTE:

Connect the EOP switch wire to the specified angle as shown.

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 19-15).

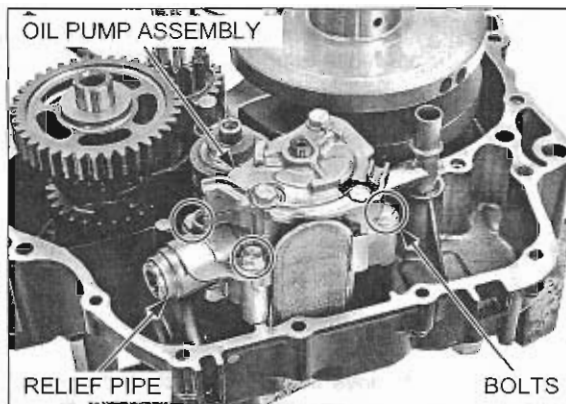


OIL PUMP

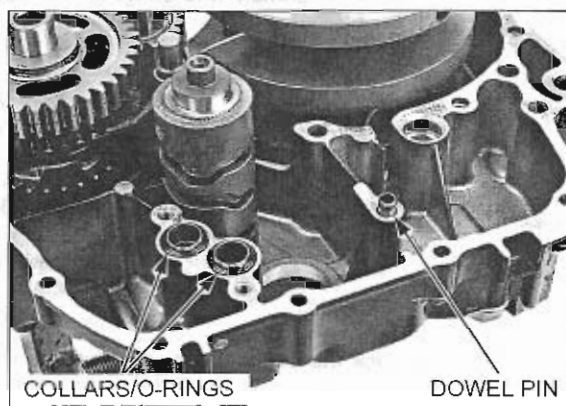
REMOVAL

Separate the crankcase (page 12-6).

Remove the bolts, relief pipe and oil pump assembly from the left crankcase.



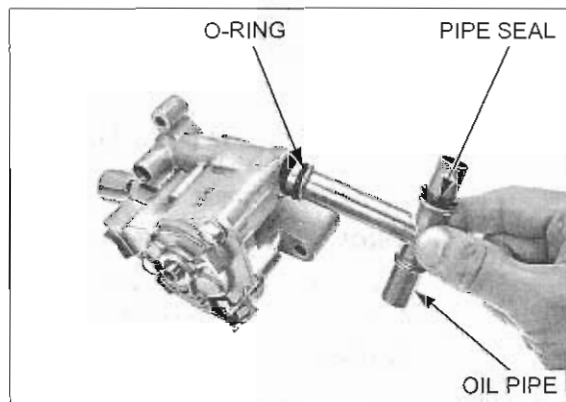
Remove the dowel pin, collars and O-rings.



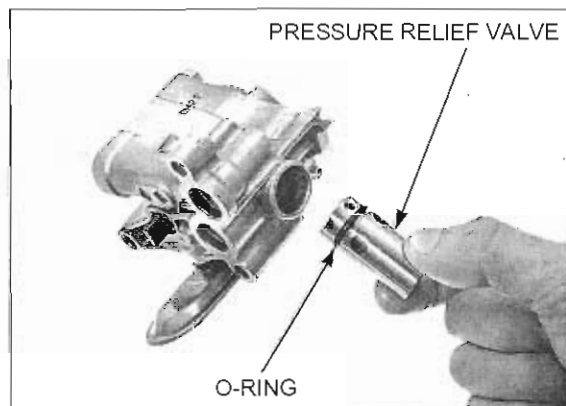
DISASSEMBLY

OIL PUMP BODY

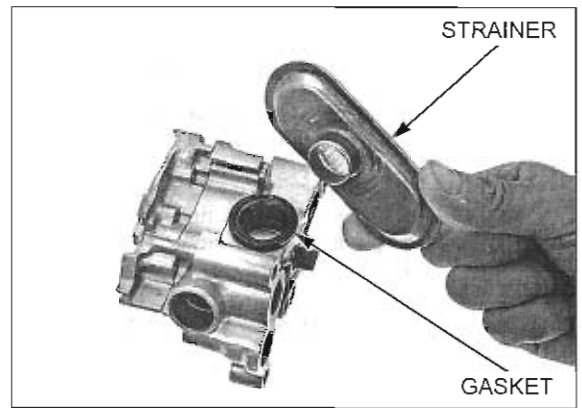
Remove the oil pipe, oil pipe seal and O-ring.



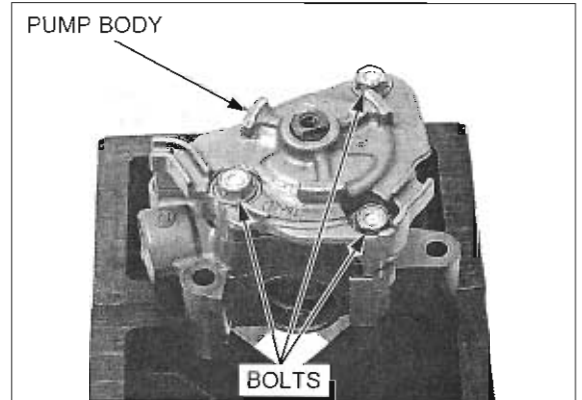
Remove the pressure relief valve and O-ring.



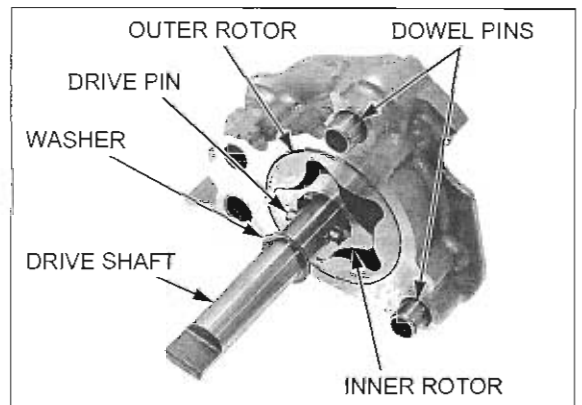
Remove the oil strainer and gasket.



Remove the oil pump assembly bolts and pump body from the pump cover.



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

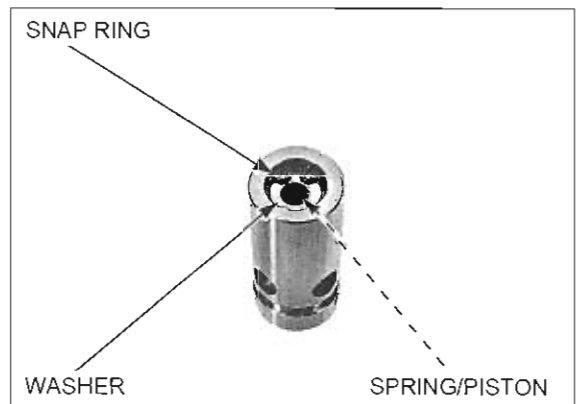


PRESSURE RELIEF VALVE

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

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

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.



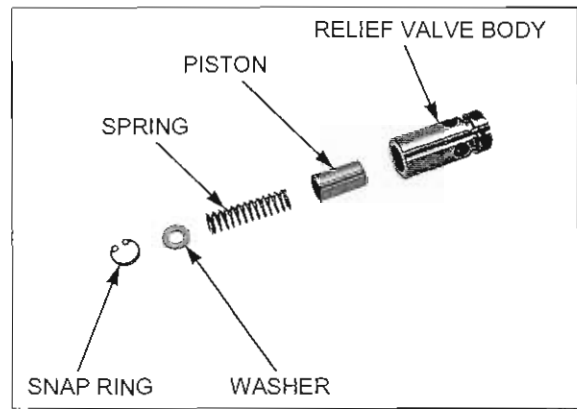
LUBRICATION SYSTEM

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 pressure 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:

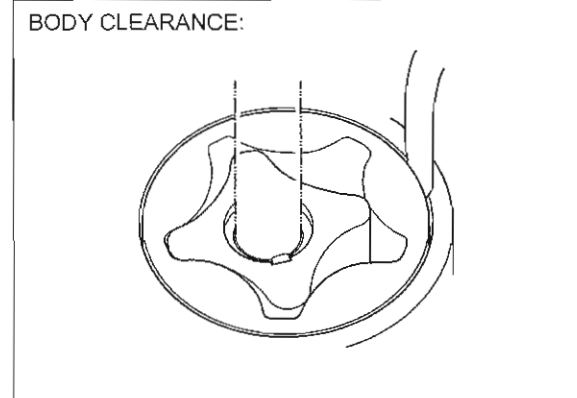
Measure each clearance at several points and use the largest reading to compare the service limit.

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)

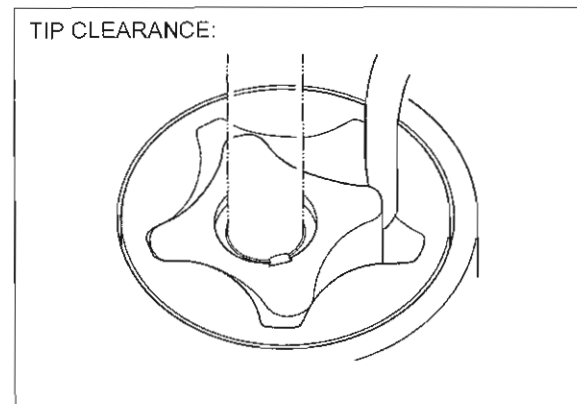


BODY CLEARANCE:

TIP CLEARANCE

Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

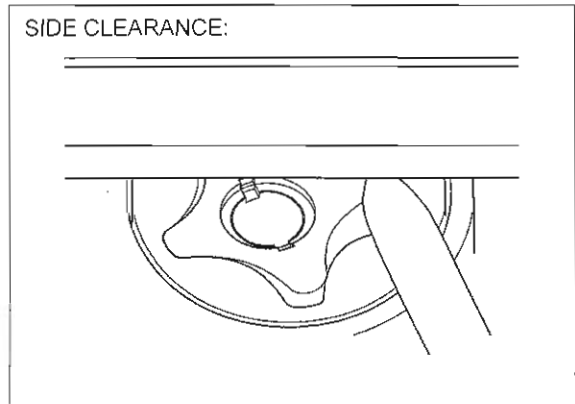


TIP CLEARANCE:

SIDE CLEARANCE

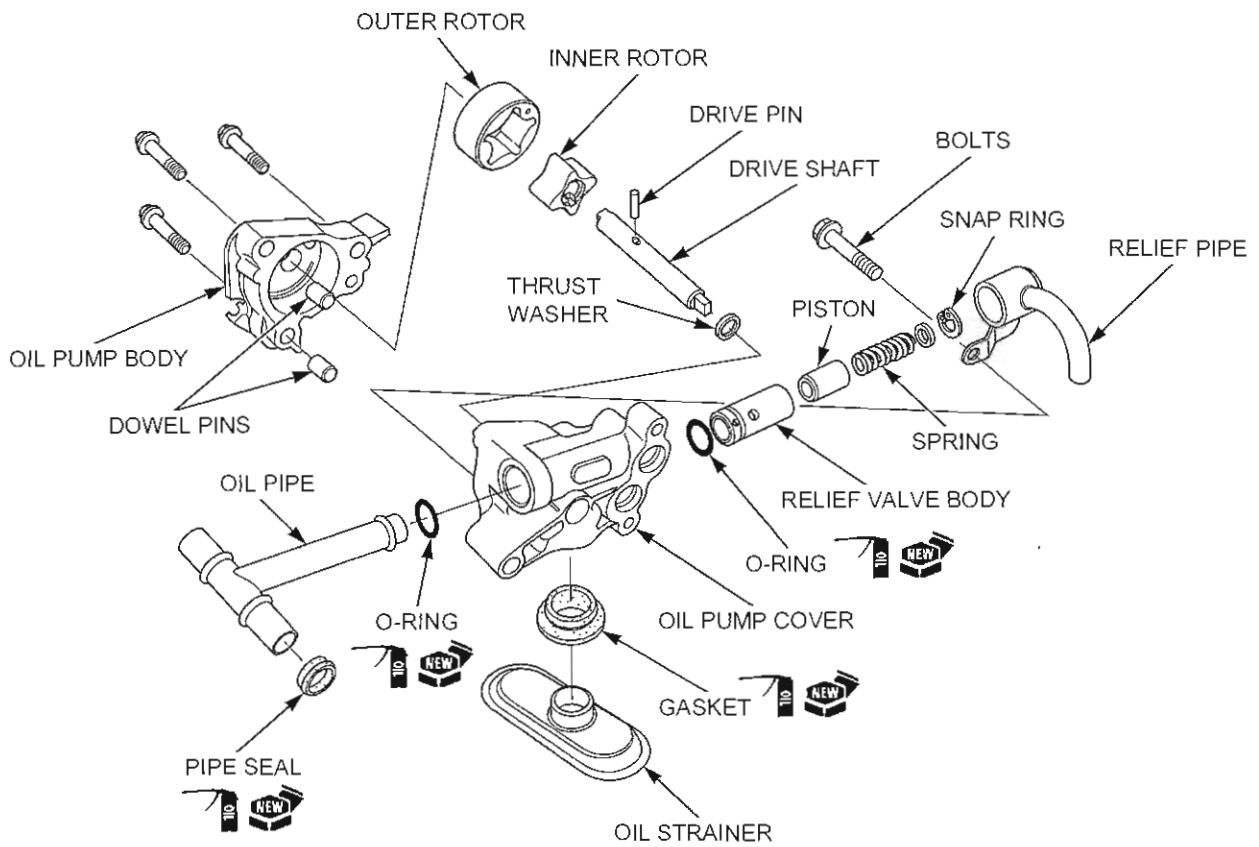
Measure the side clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



OIL PUMP ASSEMBLY

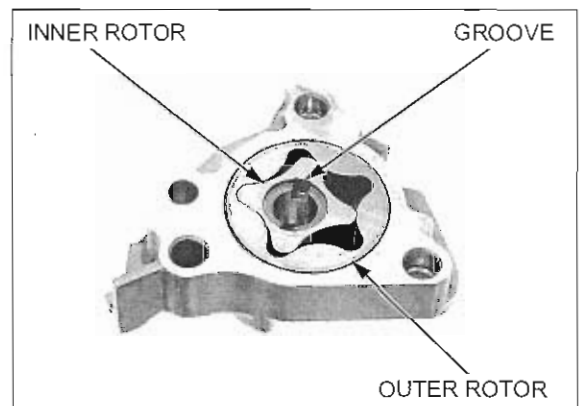
Dip all parts in clean engine oil.



Install the outer and inner rotors to the pump body.

NOTE:

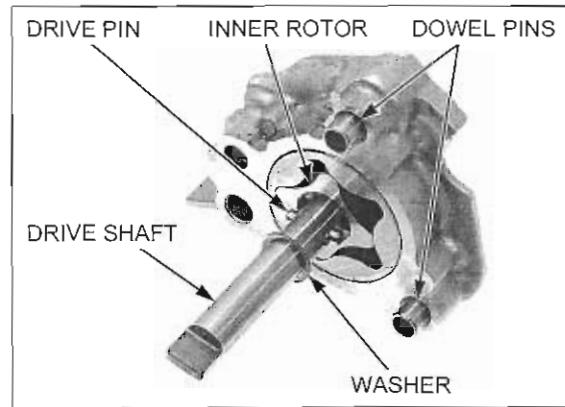
Install the inner rotor with the groove side facing the pump cover.



LUBRICATION SYSTEM

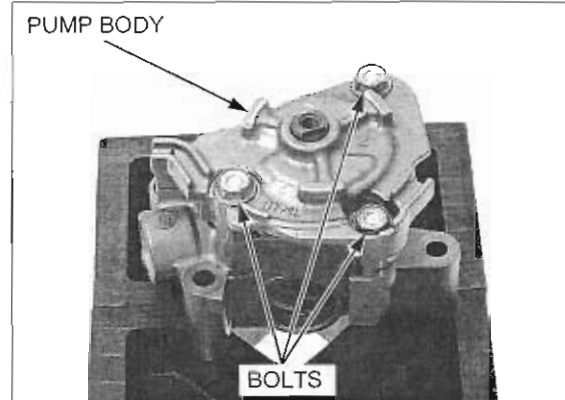
Install the drive shaft and drive pin by aligning the drive pin with the grooves in the inner rotor.

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



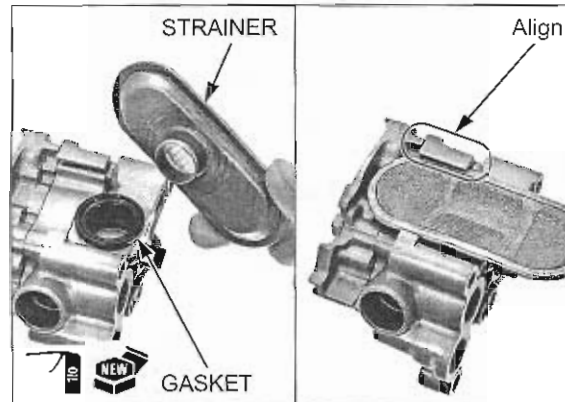
Install the pump cover on the pump body.
Install and tighten the oil pump assembly bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



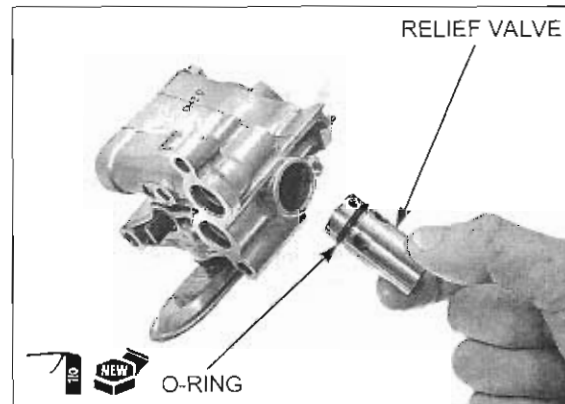
Clean the oil strainer.

Coat a new gasket with engine oil and install it to the pump body.
Install the oil strainer to the pump cover by aligning its side end with the groove on the pump cover.



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

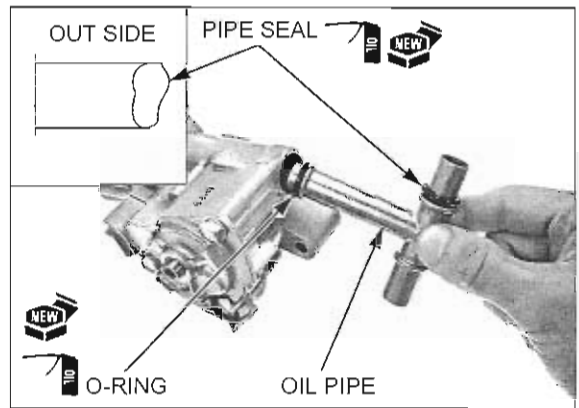
Install the pressure relief valve into the pump cover.



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

NOTE:

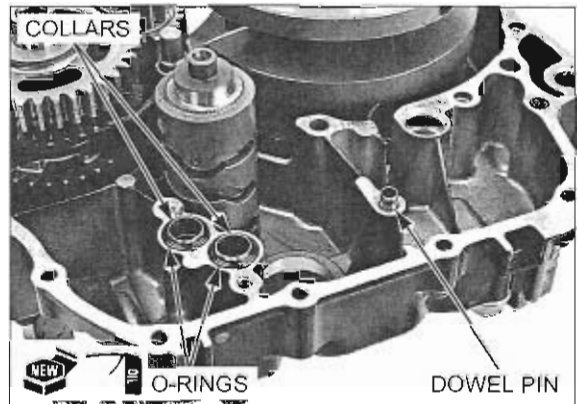
Install an pipe seal with its tapered side facing out.
Install the oil pipe to the pump cover securely.



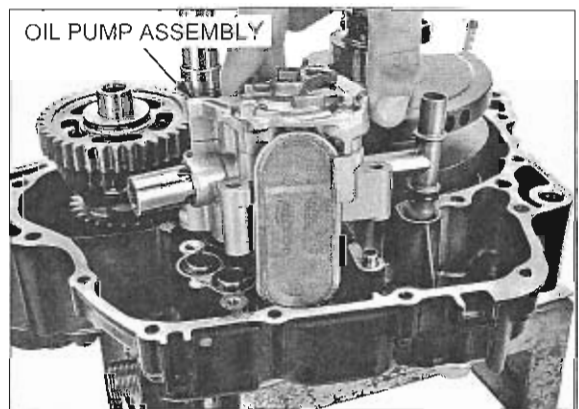
INSTALLATION

Install the dowel pin and collars.

Coat new O-rings with engine oil and install them.



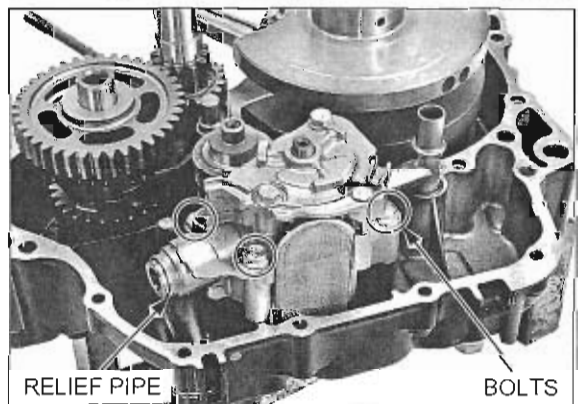
Install the oil pump assembly into the crankcase securely.



Install the relief pipe and bolts.

Tighten the bolts securely.

Assemble the crankcase (page 12-24).
Check the oil pressure (page 4-5).

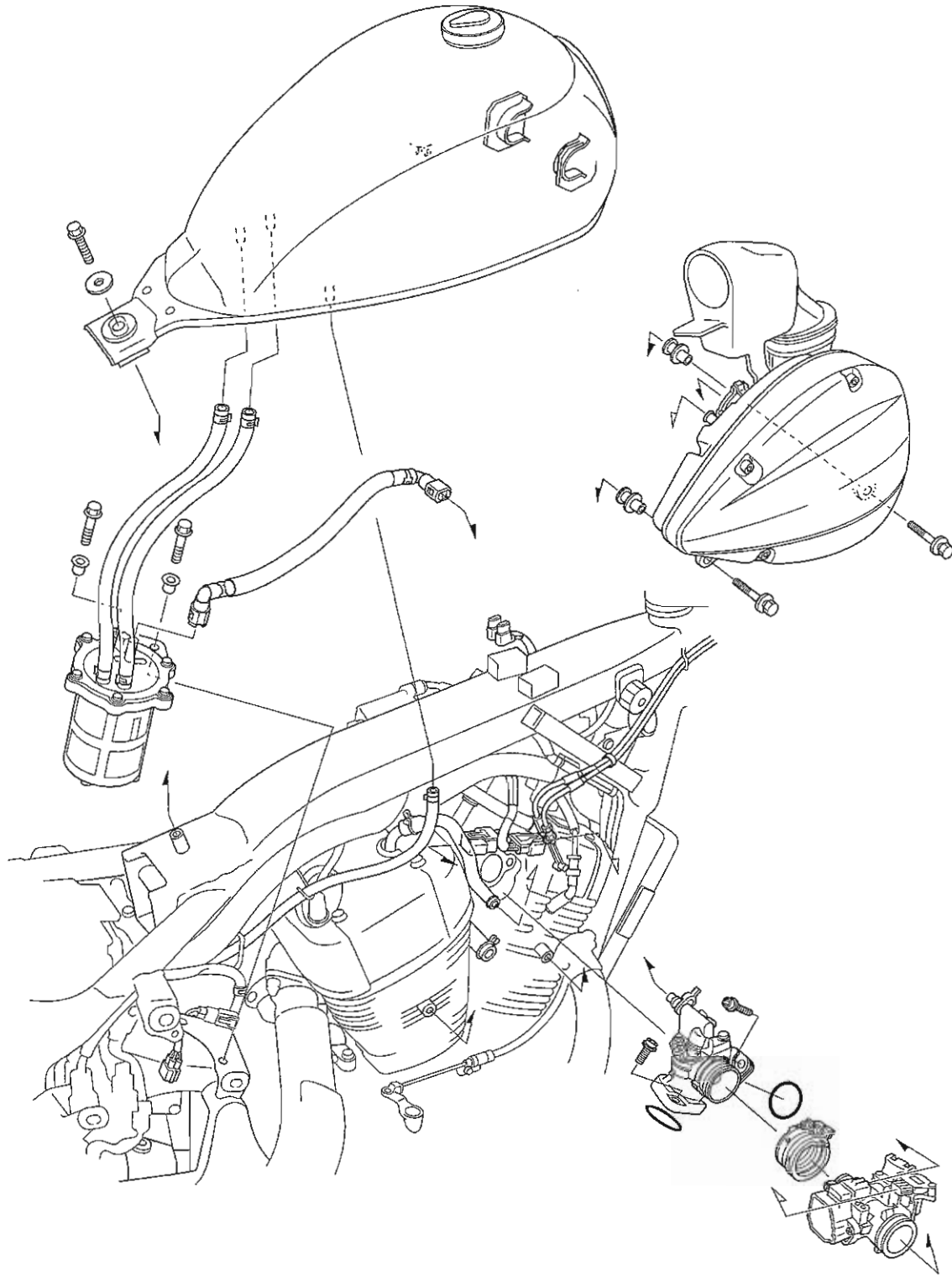


MEMO

Vertical text on the right margin, possibly bleed-through or a stamp, including the number 100.

COMPONENT LOCATION	5-2	FUEL CUT RELAY	5-42
SERVICE INFORMATION	5-3	FUEL TANK	5-43
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COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- Before disconnecting the fuel feed hose, relieve pressure from the system by disconnecting the quick connect fitting from the system (page 5-30).
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bend, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Seal the cylinder head intake port with tape or a clean cloth to keep dirt and debris from entering the intake port after the throttle body has been removed.
- Prevent dirt and debris from entering the throttle bore and air passages after the throttle body has been removed. Clean them using compressed air if necessary.
- Do not loosen or tighten the white painted bolts, nuts and screws of the throttle body loosening or tightening them can cause throttle valve and idle control failure.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the PGM-FI parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Use a digital tester for PGM-FI system inspection.
- For fuel reserve sensor inspection (page 19-13).
- 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

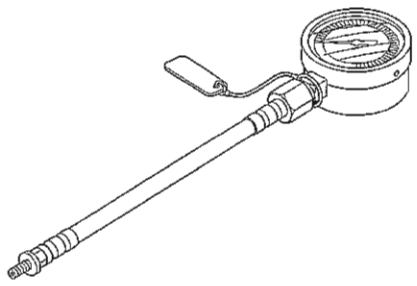
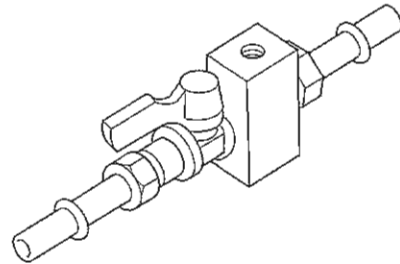
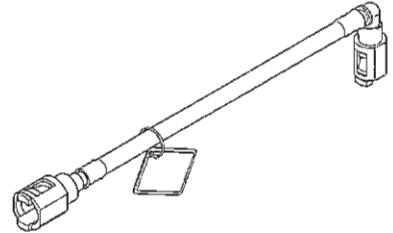
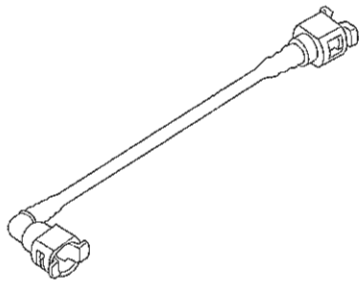


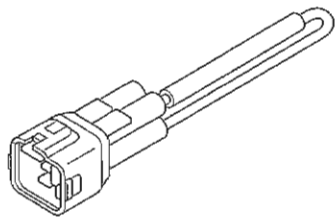
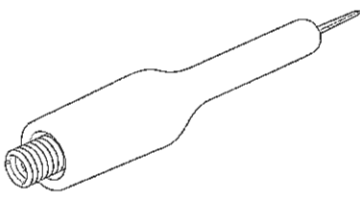
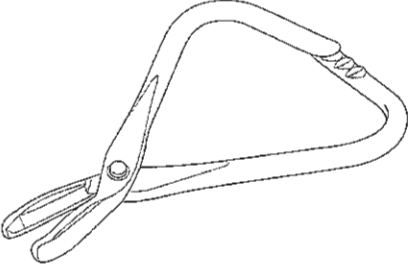
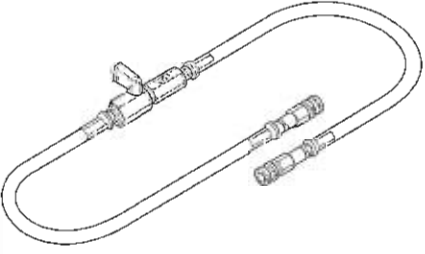
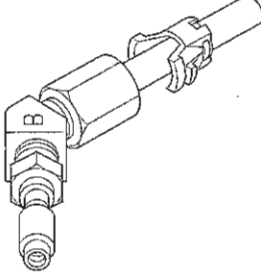
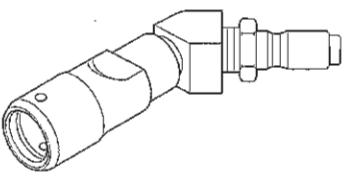
ITEM		SPECIFICATIONS
Throttle body identification number		GQ9KA
Engine idle speed		1,200 ± 100 rpm
Throttle grip freeplay		2 – 6 mm (1/16 – 1/4 in)
Fuel injector resistance (20°C/68°F)	Front	11 – 13 kΩ
	Rear	11 – 13 kΩ
PAIR control solenoid valve resistance (20°C/68°F)		23 – 27 Ω
Fuel pressure at idle		333 – 353 kPa (3.4 – 3.6 kgf/cm ² , 48 – 51 psi)
Fuel pump flow (at 12 V)		50 cm ³ (1.7 US oz, 1.8 Imp oz) minimum/10 seconds

TORQUE VALUES

PAIR check valve cover bolt	7 N·m (0.7 kgf·m, 5.2 lbf·ft)	
Air cleaner chamber mounting screw	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)	
Air cleaner chamber connecting tube band screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
IACV setting plate torx screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Throttle cable guide screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Fuel injector cap mounting bolt	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Sensor unit torx screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Insulator band screw (Throttle body side)	–	See page 5-49
Insulator band screw (Intake manifold side)	–	See page 5-53
Air cleaner cover socket bolt	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Bank angle sensor mounting bolt	2 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Fuel pump assembly bolt	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)	See page 5-41

FUEL SYSTEM (PGM-FI)

TOOLS

<p>Fuel pressure gauge (0 – 100 psi) 07406-0040004</p>  <p>or 07406-004000B (U.S.A. only)</p>	<p>Pressure gauge manifold 07ZAJ-S5A0111</p>  <p>Not available in U.S.A.</p>	<p>Hose attachment, 6 mm/9 mm 07ZAJ-S5A0130</p>  <p>Not available in U.S.A.</p>
<p>Hose attachment, 9 mm/9 mm 07ZAJ-S5A0120</p>  <p>Not available in U.S.A.</p>	<p>Attachment joint, 6 mm/9 mm 07ZAJ-S5A0150</p>  <p>Not available in U.S.A.</p>	<p>HDS pocket tester TDS3557-0112-01 (U.S.A. only)</p> 
<p>SCS connector 070PZ-ZY30100</p> 	<p>Test probe 07ZAJ-RDJA110</p> 	<p>Hose clip 07614-0050101</p>  <p>or equivalent</p>
<p>Pressure manifold hose 07AMJ-HW3A100 (U.S.A. only)</p> 	<p>Adaptor, male "B" 07AAJ-S6MA200 (U.S.A. only)</p> 	<p>Adaptor, female "B" 07AAJ-S6MA400 (U.S.A. only)</p> 

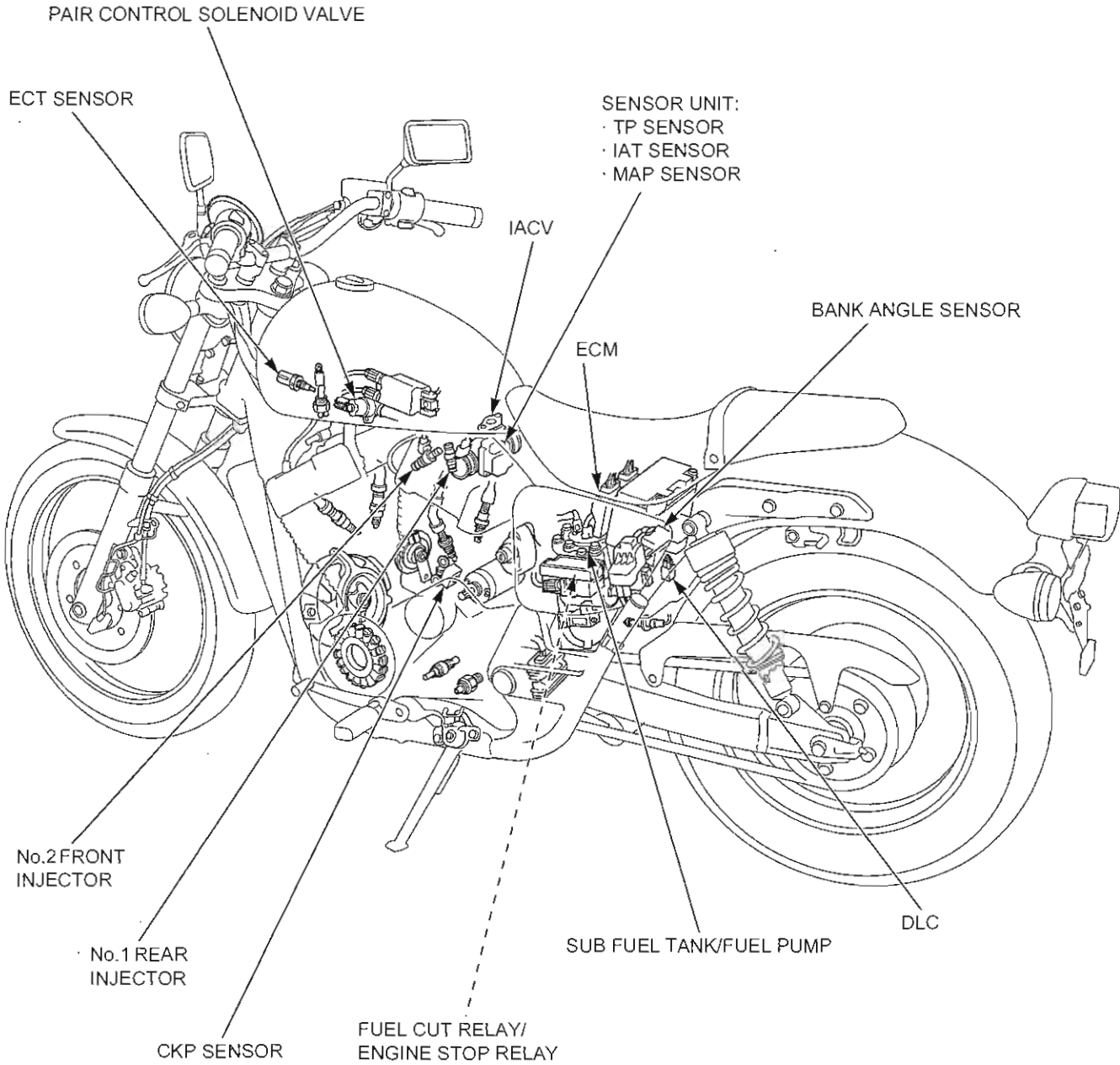
PGM-FI SYMPTOM TROUBLESHOOTING

When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 5-15) and begin the appropriate troubleshooting procedure. If there are no DTC/MIL blinking stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find cause.

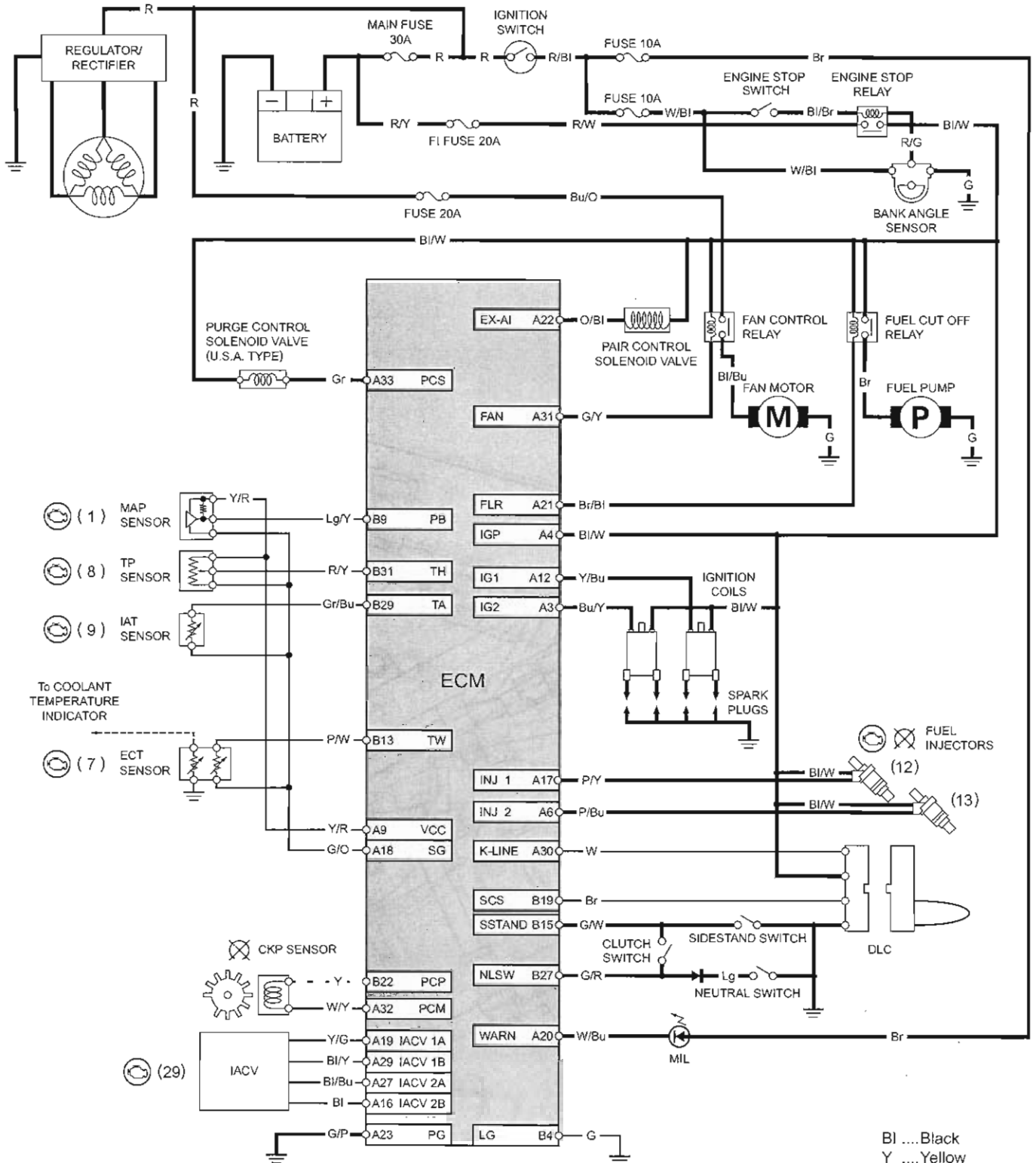
Symptom	Diagnosis procedure	Also check for
Engine cranks but won't start (No DTC and MIL blinking)	<ol style="list-style-type: none"> 1. Crank the starter for more than 10 seconds and check the DTC (page 5-13) and execute the troubleshooting according to the DTC. 2. Inspect the fuel supply system (page 5-30). 3. Inspect the ignition system (page 17-6). 4. Inspect the IACV (page 5-61). 	<ul style="list-style-type: none"> • No fuel to injector <ul style="list-style-type: none"> – Clogged fuel filter – Pinched or clogged fuel feed hose – Pinched or clogged fuel tank breather hose – Faulty fuel pump – Faulty fuel pump circuits • Intake air leak • Contaminated/deteriorated fuel • Faulty fuel injector
Engine cranks but won't start (No fuel pump operation sound when the turning the ignition ON)	<ol style="list-style-type: none"> 1. ECM power/ground circuits malfunction (page 5-59) 2. Inspect the fuel supply system (page 5-30). 	<ul style="list-style-type: none"> • Faulty bank angle sensor or related circuit • Faulty engine stop relay or related circuit • Faulty engine stop switch or related circuit • Blown FI fuse (20 A)
Engine stalls, hard to start, rough idling	<ol style="list-style-type: none"> 1. Inspect the idle speed (page 3-13). 2. Inspect the IACV (page 5-61). 3. Inspect the fuel supply system (page 5-30). 4. Inspect the battery charging system (page 16-8). 5. Inspect the ignition system (page 17-6). 	<ul style="list-style-type: none"> • Restricted fuel feed hose • Contaminated/deteriorated fuel • Intake air leak • Faulty MAP sensor • Restricted fuel tank breather hose
Afterburn when engine braking is used	<ol style="list-style-type: none"> 1. Inspect the PAIR system (page 5-62). 2. Inspect the ignition system (page 17-6). 	
Backfiring or misfiring during acceleration	Inspect the ignition system (page 17-6).	
Poor performance (driveability) and poor fuel economy	<ol style="list-style-type: none"> 1. Inspect the fuel supply system (page 5-30). 2. Inspect the air cleaner element (page 3-6). 3. Inspect Ignition system (page 17-6). 	<ul style="list-style-type: none"> • Faulty pressure regulator • Faulty injector • Faulty MAP sensor
Idle speed is below specifications or fast idle too low (No DTC and MIL blinking)	<ol style="list-style-type: none"> 1. Inspect the idle speed (page 3-13). 2. Inspect the IACV (page 5-61). 3. Inspect the ignition system (page 17-6). 	<ul style="list-style-type: none"> • Faulty fuel supply system • Faulty MAP sensor
Idle speed is above specifications or fast idle too high (No DTC and MIL blinking)	<ol style="list-style-type: none"> 1. Inspect the idle speed (page 3-13). 2. Inspect the throttle operation and freeplay (page 3-5). 3. Inspect the IACV (page 5-61). 4. Inspect the ignition system (page 17-6). 	<ul style="list-style-type: none"> • Intake air leak • Engine top end problem • Air cleaner condition
MIL stays ON but no DTC set, or MIL never comes ON at all	Inspect the MIL circuit (page 5-29).	
MIL stays ON at all (No DTC set)	Inspect the DLC circuit.	<ul style="list-style-type: none"> • Short circuit in the DLC related wire

FUEL SYSTEM (PGM-FI)

PGM-FI SYSTEM LOCATION

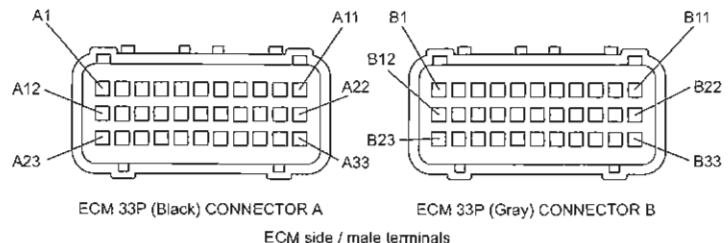


PGM-FI SYSTEM DIAGRAM



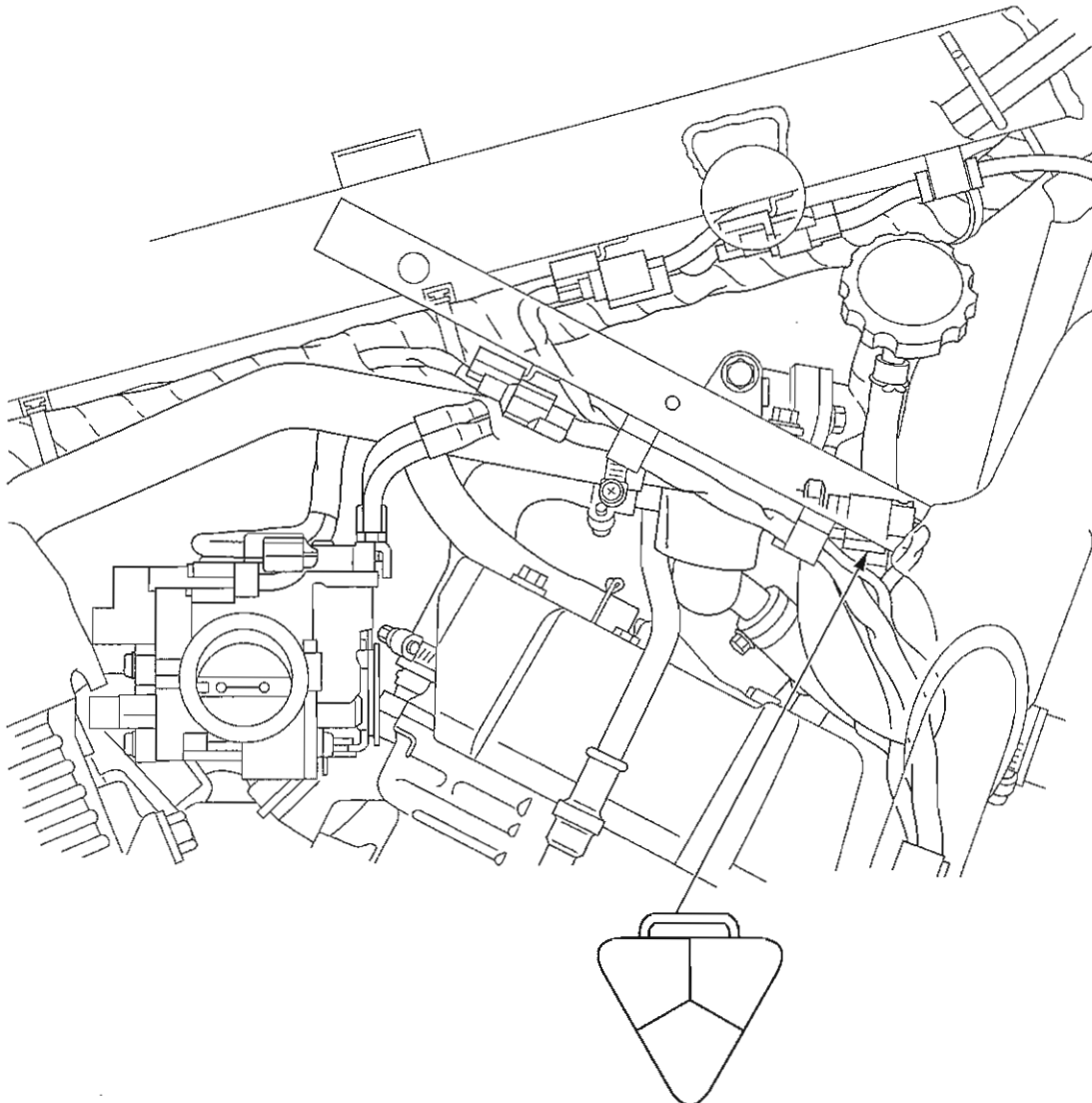
- BlBlack
- YYellow
- Bu....Blue
- GGreen
- RRed
- WWhite
- BrBrown
- OOrange
- Lg....Light green
- PPink
- Gr....Gray

- () = DTC/MIL number
- ⊗ = Engine does not start when detecting DTC / MIL
- ⏏ = Short terminals for reading DTC / MIL



CONNECTOR LOCATION

NOTE: Remove the fuel tank (page 5-43).

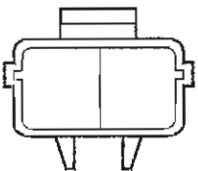
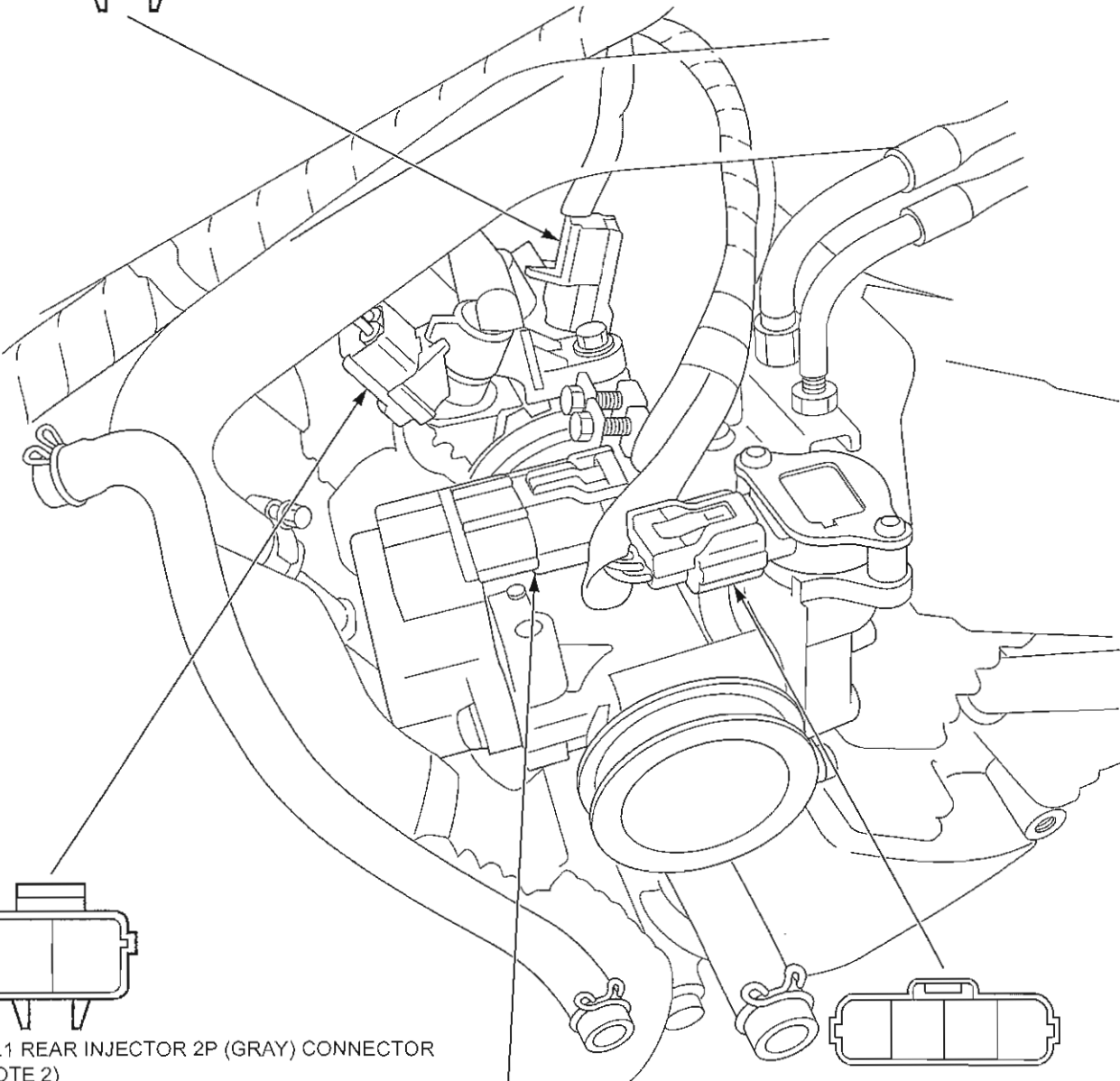
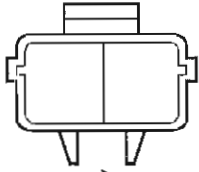


ECT SENSOR 3P (GRAY) CONNECTOR

NOTE 1: Remove the air cleaner housing (page 5-45).

NOTE 2: Remove the fuel tank (page 5-43).

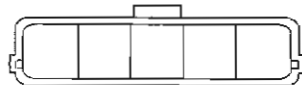
No.2 FRONT INJECTOR 2P (GRAY) CONNECTOR
(NOTE 2)



No.1 REAR INJECTOR 2P (GRAY) CONNECTOR
(NOTE 2)



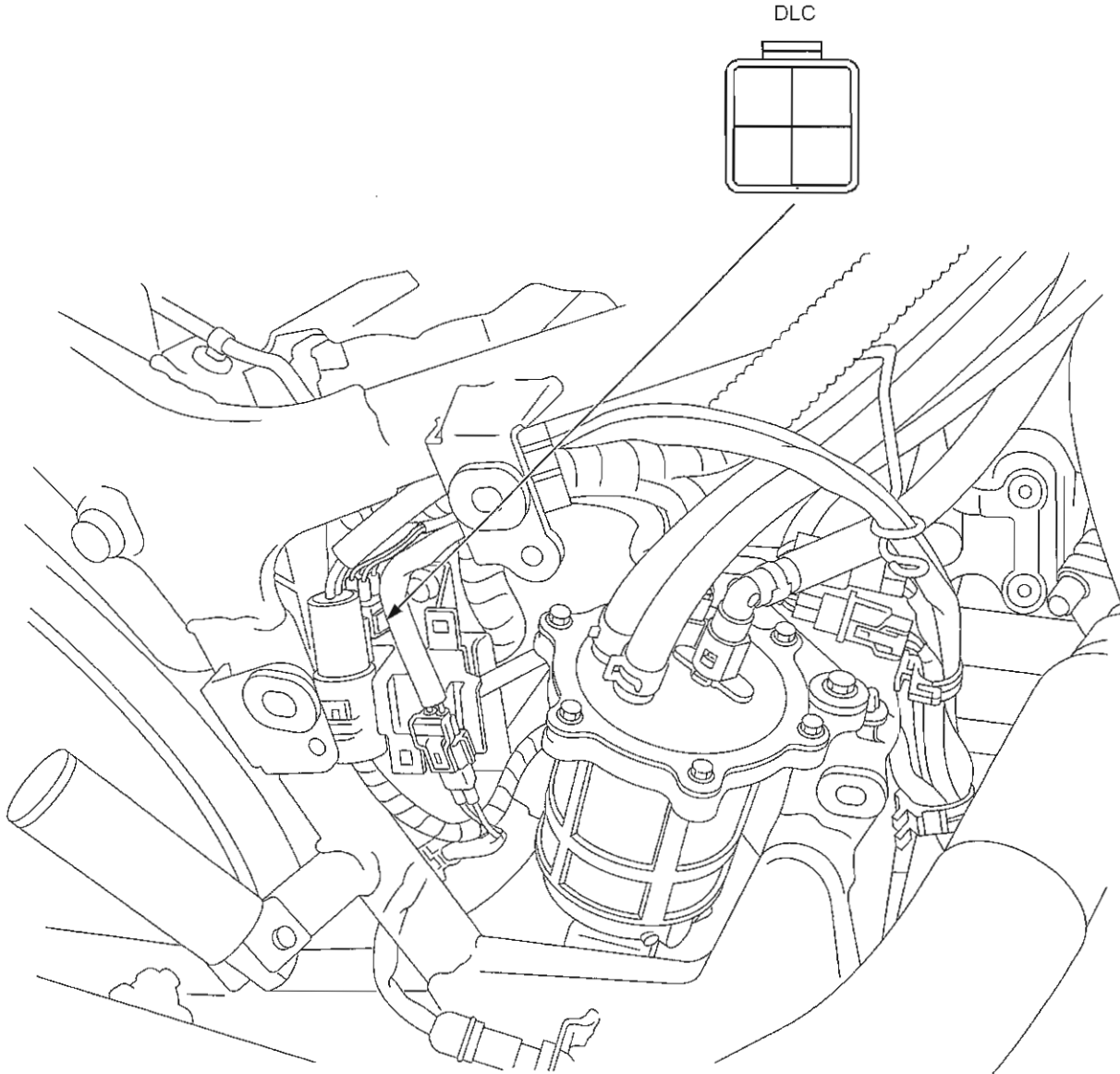
IACV 4P (BLACK) CONNECTOR
(NOTE 1)



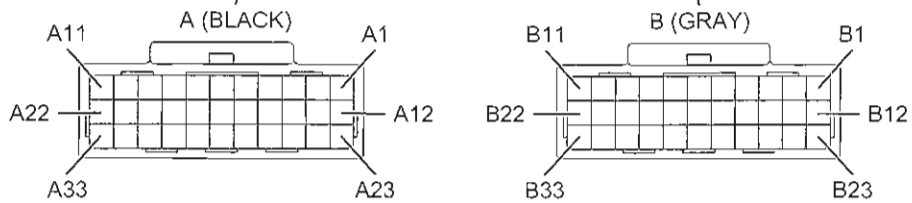
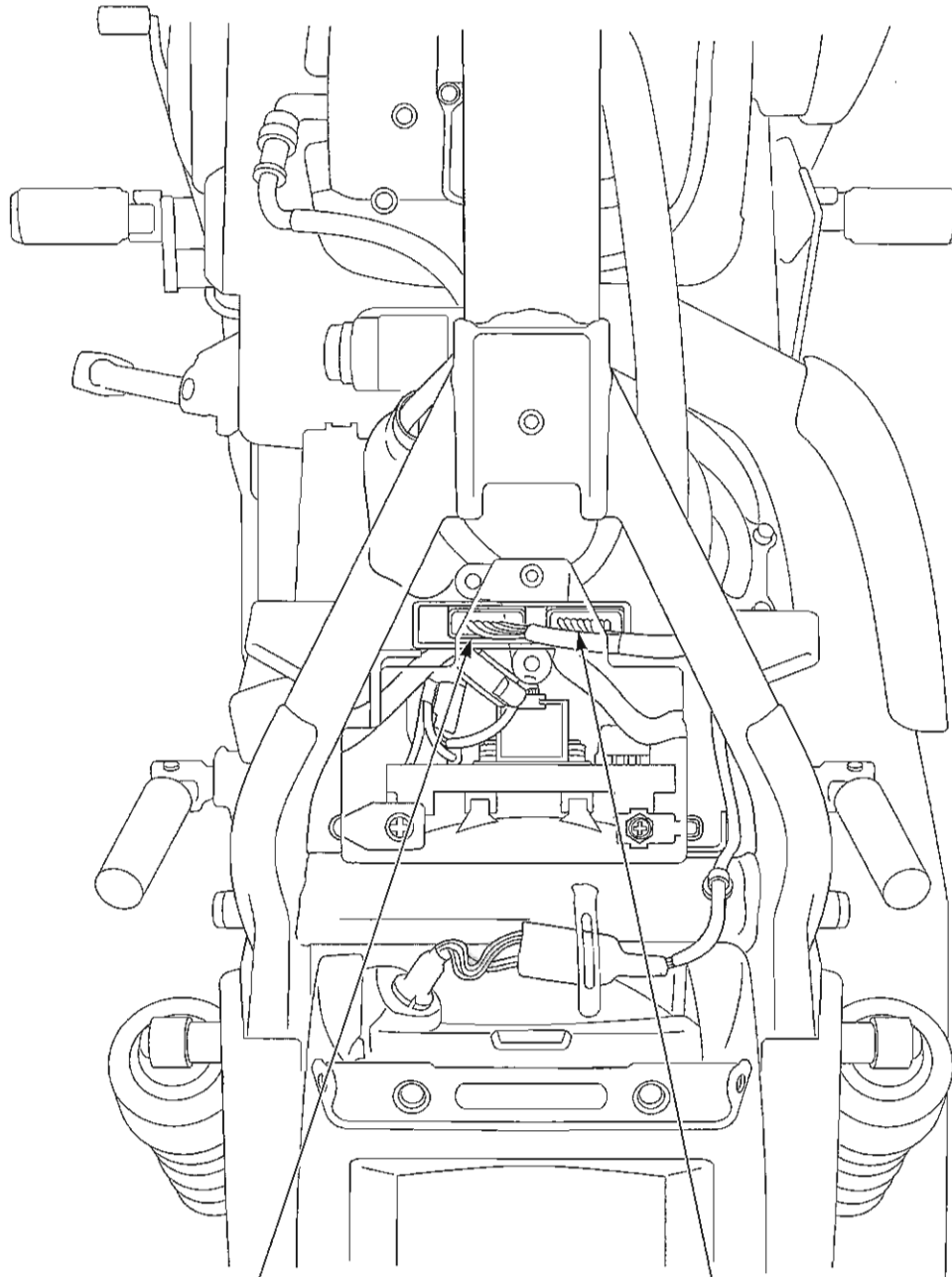
SENSOR UNIT 5P (BLACK) CONNECTOR
(NOTE 1)

FUEL SYSTEM (PGM-FI)

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



NOTE: Remove the battery (page 16-6).



ECM 33P CONNECTORS

PGM-FI TROUBLESHOOTING INFORMATION

GENERAL TROUBLESHOOTING

Intermittent Failure

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

Opens and Shorts

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

If the MIL has come on

Refer to DTC READOUT (page 5-13).

If the MIL did not stay on

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

SYSTEM DESCRIPTION

SELF-DIAGNOSIS SYSTEM

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

FAIL-SAFE FUNCTION

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

DTC (Diagnostic Trouble Code)

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

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

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

For example, in the case of the TP sensor:

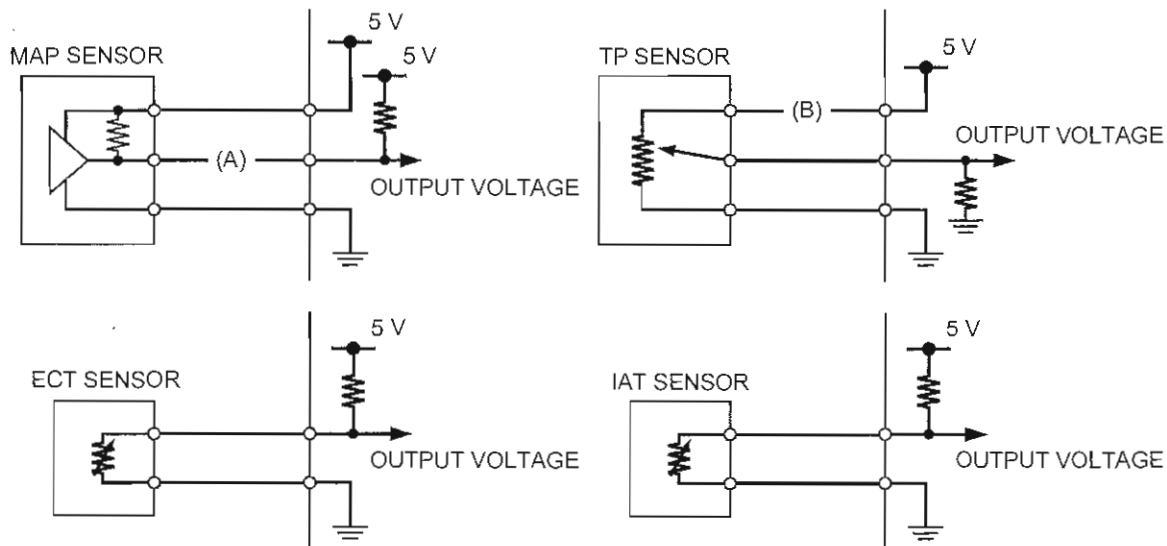
- DTC 08 - 1 = (TP sensor voltage) - (lower than the specified value)
- DTC 08 - 2 = (TP sensor voltage) - (higher than the specified value)

- The MAP, ECT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor.

If a failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the HDS pocket tester.

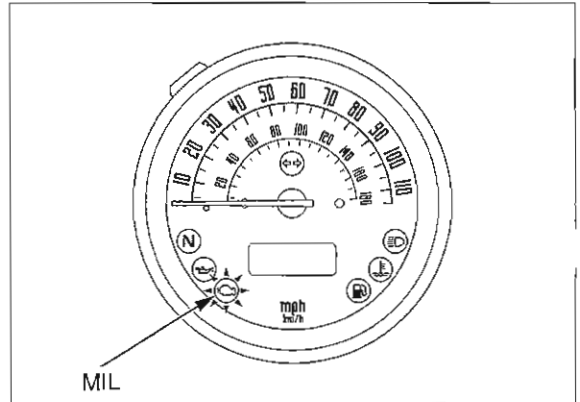
For example:

- If the output voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be displayed.
- If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.



MIL Blink Pattern

- If the HDS pocket tester is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is the equivalent to the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL will blink the current DTC, in case the ECM detects the problem at present, when the ignition switch ON or idling with the sidestand down. The MIL will stay ON when the engine speed is over 2,000 rpm or with the sidestand up.
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.5 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by five short blinks, the MIL is 25 (two long blinks = 20 blinks, plus five short blinks).
- When the ECM stores more than one DTC, the MIL will indicate them by blinking in the order from the lowest number to highest number.



MIL Check

When the ignition switch is turned to ON and engine stop switch "O", the MIL will stay on for a few seconds, then go off. If the MIL does not come on, troubleshoot the MIL circuit (page 5-29).

CURRENT DTC/FREEZE DTC

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

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

HDS POCKET TESTER INFORMATION

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

How to connect the HDS pocket tester

Turn the ignition switch OFF.

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

Remove the dummy connector from the DLC.

Connect the HDS pocket tester to the DLC.

TOOL:

HDS pocket tester TDS3557-0112-01
(U.S.A. only)

Turn the ignition switch ON and engine stop switch "O", check the DTC and freeze data.

NOTE:

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

ECM reset

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

DTC READOUT

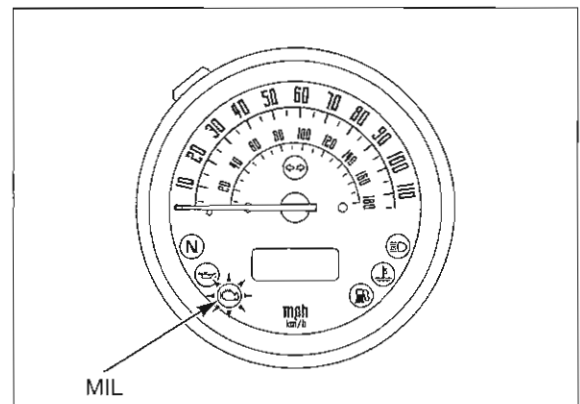
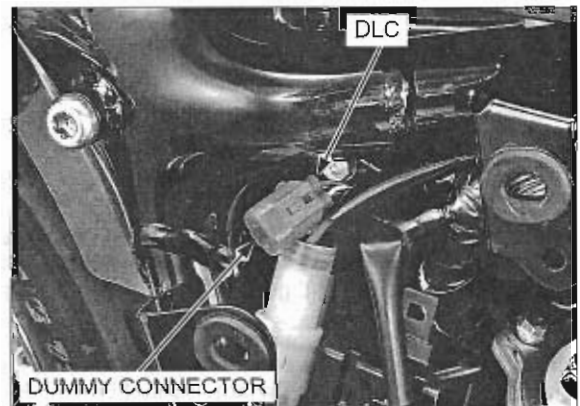
Start the engine and check the MIL.

- If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.
- When the ignition switch is turned to ON, the MIL will stay on for a few seconds, then go off.

If the MIL stays on or blinks, connect the HDS pocket tester to the DLC (page 5-13).

Read the DTC, freeze data and follow the troubleshooting index (page 5-15).

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



FUEL SYSTEM (PGM-FI)

Reading DTC with the MIL

Turn the ignition switch OFF.

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

Remove the dummy connector and short the DLC terminals using the special tool.

TOOL:

SCS connector 070PZ-ZY30100

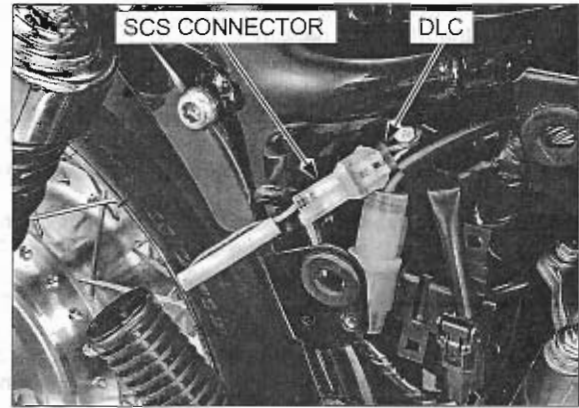
CONNECTION: Brown – Green

Make sure the engine stop switch is turned to "O".

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

NOTE:

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



ERASING DTC

NOTE:

Start the erasing procedure with the engine stopped.

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

Erase the DTCs with the HDS while the engine is stopped.

Erase the DTCs with the HDS.

How to erase the DTC with SCS connector

1. Remove the right side cover (page 2-3).
2. Remove the dummy connector and short the DLC terminals using the special tool.

TOOL:

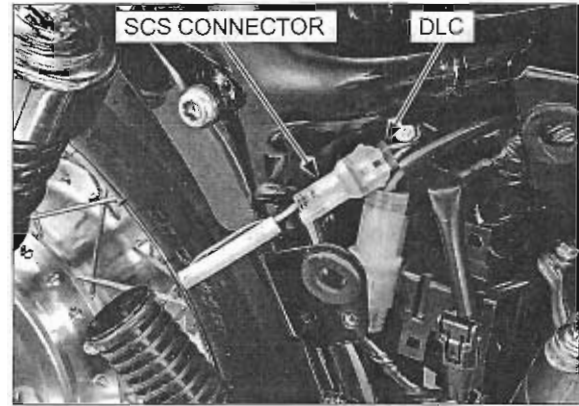
SCS connector 070PZ-ZY30100

CONNECTION: Brown – Green

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

NOTE:

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



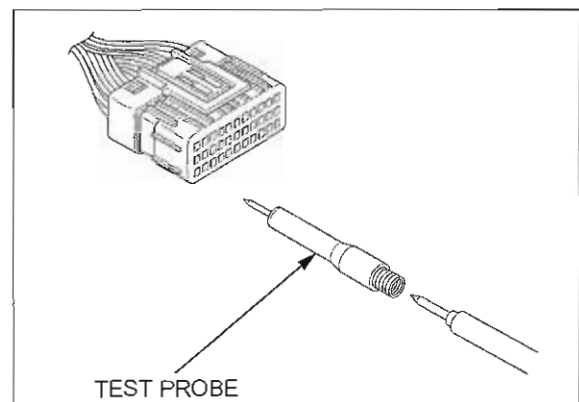
CIRCUIT INSPECTION

INSPECTION AT ECM CONNECTOR

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

TOOL:

Test probe 07ZAJ-RDJA110



DTC INDEX

DTC (MIL blinks)	Function Failure	Symptom/Fail-safe function	Refer to (DTC)
1-1 (1)	MAP sensor circuit low voltage (less than 0.2 V) • Sensor unit (MAP sensor) or its circuit malfunction	• Engine operates normally • Pre-Program value: 760 mmHg/1,013 hPa	5-16
1-2 (1)	MAP sensor circuit high voltage (more than 3.9 V) • Loose or poor contact of the sensor unit connector • Sensor unit (MAP sensor) or its circuit malfunction	• Engine operates normally • Pre-Program value: 760 mmHg/1,013 hPa	5-17
7-1 (7)	ECT sensor circuit low voltage (less than 0.08 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-Program value: 90°C/194°F • Cooling fan turns on	5-18
7-2 (7)	ECT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-Program value: 90°C/194°F • Cooling fan turns on	5-19
8-1 (8)	TP sensor circuit low voltage (less than 0.3 V) • Sensor unit (TP sensor) or its circuit malfunction	• Poor engine acceleration • Pre-Program value: 0°	5-20
8-2 (8)	TP sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the sensor unit connector • Sensor unit (TP sensor) or its circuit malfunction	• Poor engine acceleration • Pre-Program value: 0°	5-22
9-1 (9)	IAT sensor circuit low voltage (less than 0.08 V) • Sensor unit (IAT sensor) or its circuit malfunction	• Engine operates normally • Pre-program value: 35°C/77°F	5-23
9-2 (9)	IAT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the sensor unit connector • Sensor unit (IAT sensor) or its circuit malfunction	• Engine operates normally • Pre-Program value: 35°C/77°F	5-24
12-1 (12)	No.1 (rear) injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-25
13-1 (13)	No.2 (front) injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-26
29-1 (29)	IACV circuit malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	5-26
33-2 (-)	ECM EEPROM malfunction	• Engine operates normally	5-28

DTC TROUBLESHOOTING

DTC 1-1 (MAP SENSOR LOW VOLTAGE)

1. MAP Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".
Check the MAP sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – GO TO STEP 2.

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

2. MAP Sensor Input Voltage Inspection

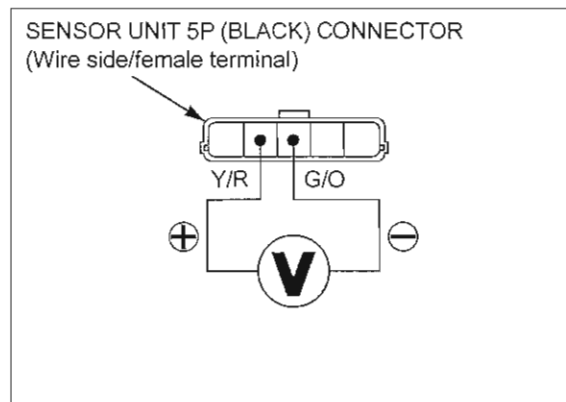
Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) connector.
Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire side.

CONNECTION: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. MAP Sensor Input Line Inspection

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

Check for continuity at the Yellow/red wire between the sensor unit 5P and ECM 33P (Black) connectors.

CONNECTION: A9 – Yellow/red

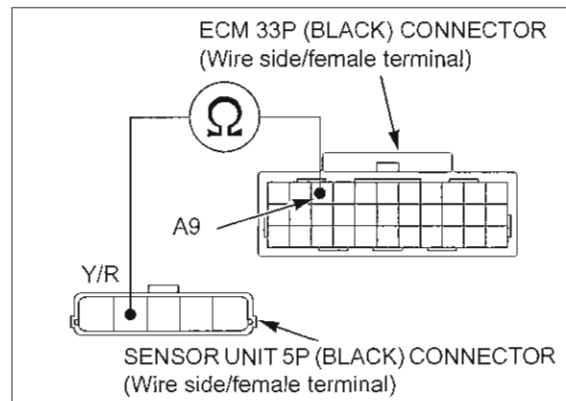
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

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

NO – Open circuit in Yellow/red wire



4. MAP Sensor Output Line Short Circuit Inspection

Connect the ECM 33P (Black) connector.

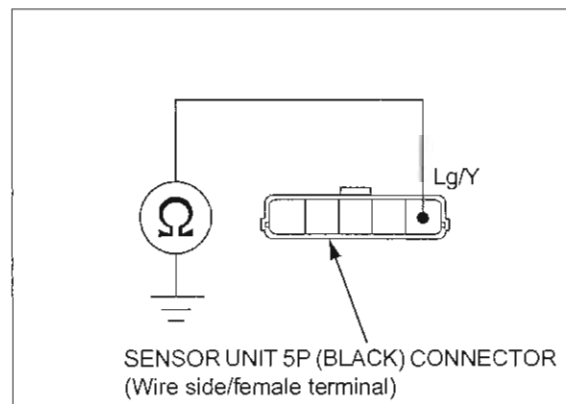
Check for continuity between the sensor unit 5P (Black) connector terminal of the wire side and ground.

CONNECTION: Light green/yellow – Ground

Is there continuity?

YES – Short circuit in Light green/yellow wire

NO – GO TO STEP 5.



5. MAP Sensor Inspection

Replace the sensor unit with a known good one (page 5-47).

Erase the DTCs (page 5-14).

Turn the ignition switch ON and engine stop switch "O".

Check the MAP sensor with the HDS pocket tester.

Is DTC 1-1 indicated?

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

NO – Faulty original sensor unit (MAP sensor)

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

NOTE:

Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) connector and recheck the DTC.

1. MAP Sensor System Inspection 1

Turn the ignition switch ON and engine stop switch "O".

Check the MAP sensor with the HDS pocket tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

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

2. MAP Sensor System Inspection 2

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector. Connect the sensor unit terminals at the wire side with a jumper wire.

CONNECTION: Light green/yellow – Green/orange

Turn the ignition switch ON and engine stop switch "O".

Check the MAP sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – Faulty sensor unit (MAP sensor)

NO – GO TO STEP 3.

3. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Remove the jumper wire.

Turn the ignition switch ON and engine stop switch "O".

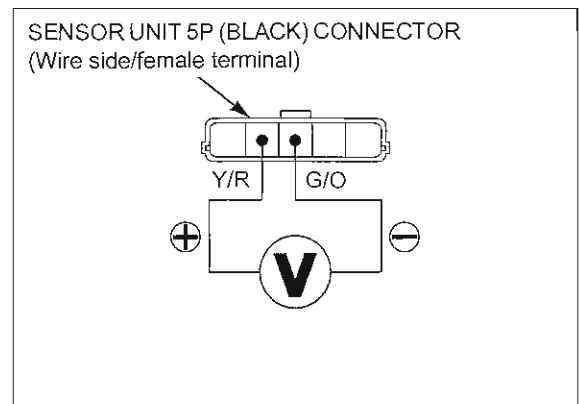
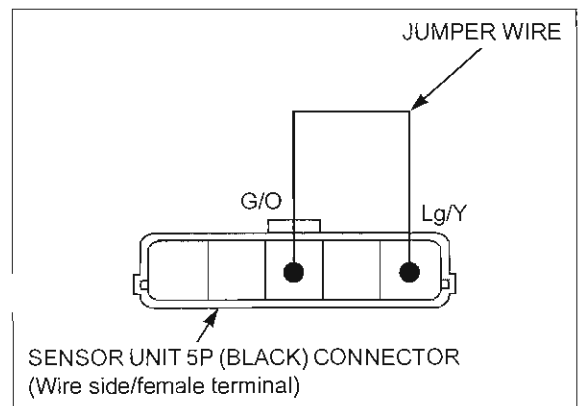
Measure the voltage at the wire side.

CONNECTION: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – • Open circuit in Green/orange wire
• Open circuit in Yellow/red wire



FUEL SYSTEM (PGM-FI)

4. MAP Sensor Output Line Open Circuit Inspection

Disconnect the ECM 33P (Gray) connector.
Check for continuity at the Light green/yellow wire between the sensor unit 5P (Black) and ECM 33P (Gray) connectors.

CONNECTION: B9 – Light green/yellow

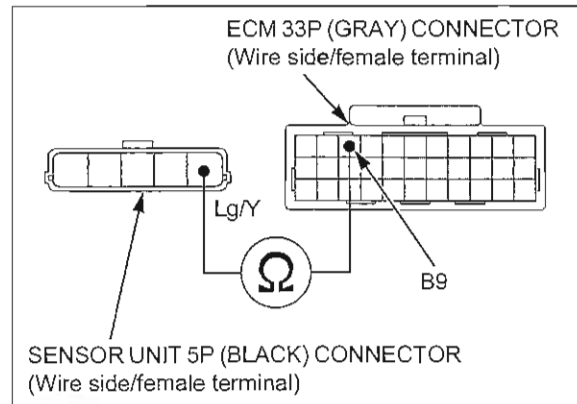
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

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

NO – Open circuit in Light green/yellow wire



DTC 7-1 (ECT SENSOR LOW VOLTAGE)

1. ECT Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".

Check the ECT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. ECT Sensor Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 3P (Gray) connector.

Turn the ignition switch ON and engine stop switch "O".

Check the ECT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.

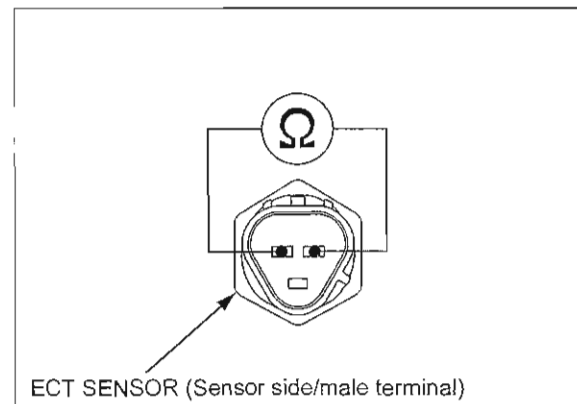
Measure the resistance at the ECT sensor terminals.

STANDARD: 2.3 – 2.6 k Ω (20°C/68°F)

Is the resistance within 2.3 – 2.6 k Ω ?

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

NO – Faulty ECT sensor



4. ECT Sensor Short Circuit Inspection

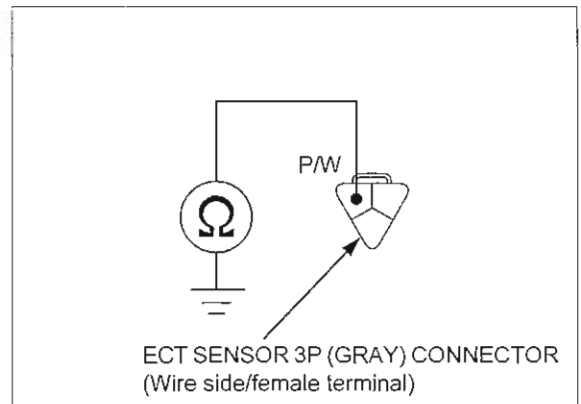
Check for continuity between the ECT sensor 3P (Gray) connector of the wire side and ground.

CONNECTION: Pink/white – Ground

Is there continuity?

YES – Short circuit in Pink/White wire

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



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

NOTE:

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

1. ECT Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".

Check the ECT sensor with the HDS pocket tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the ECT sensor 3P (Gray) connector

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P (Gray) connector. Connect the ECT sensor 3P (Gray) connector of the wire side terminals with a jumper wire.

CONNECTION: Pink/white – Green/orange

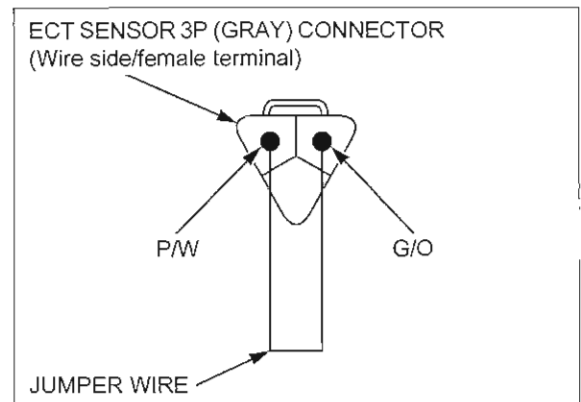
Turn the ignition switch ON and engine stop switch "O".

Check the ECT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – Faulty ECT sensor

NO – GO TO STEP 3.



FUEL SYSTEM (PGM-FI)

3. ECT Sensor Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the jumper wire.

Disconnect the ECM 33P connectors.
Check for continuity between the ECM 33P (Black and Gray) and ECT sensor 3P (Gray) connectors of the wire side.

CONNECTION: B13 – Pink/white
A18 – Green/orange

TOOL:

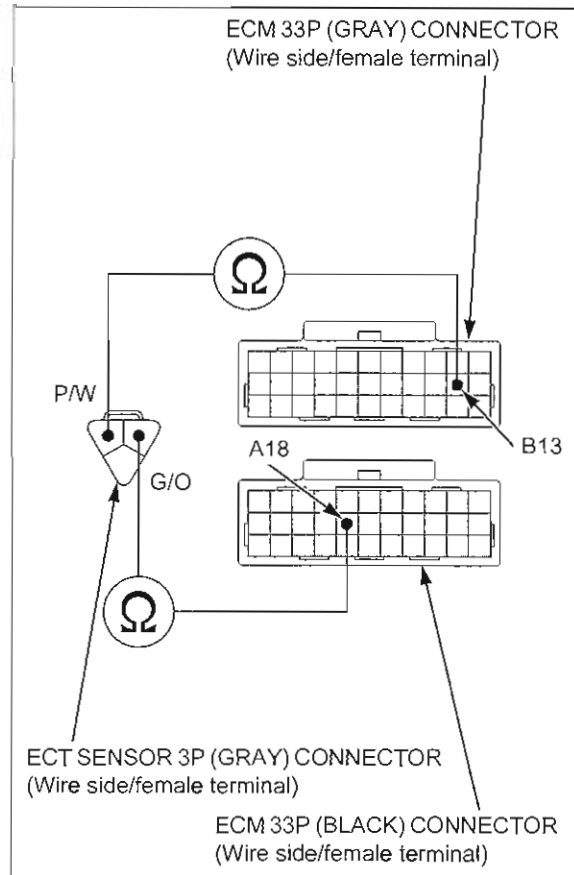
Test probe 07ZAJ-RDJA110

Is there continuity?

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

NO –

- Open circuit in Pink/white wire
- Open circuit in Green/orange wire



DTC 8-1 (TP SENSOR LOW VOLTAGE)

NOTE:

Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) connector and recheck the DTC.

1. TP Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".

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

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – GO TO STEP 2.

2. TP Sensor Inspection

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

Does the voltage increase continuously?

YES –

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

NO – Faulty sensor unit (TP sensor)

3. TP Sensor Input Voltage Inspection

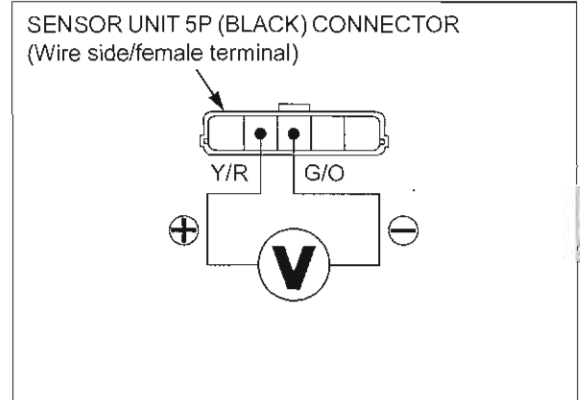
Turn the ignition switch OFF.
 Disconnect the sensor unit 5P (Black) connector.
 Turn the ignition switch ON and engine stop switch "O".
 Measure the voltage at the wire side.

CONNECTION: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 5.

NO – GO TO STEP 4.



4. TP Sensor Circuit Inspection

Turn the ignition switch OFF.
 Disconnect the ECM 33P (Black) connector.
 Check for continuity at the Yellow/red wire between the sensor unit 5P (Black) and ECM 33P (Black) connectors.

CONNECTION: A9 – Yellow/red

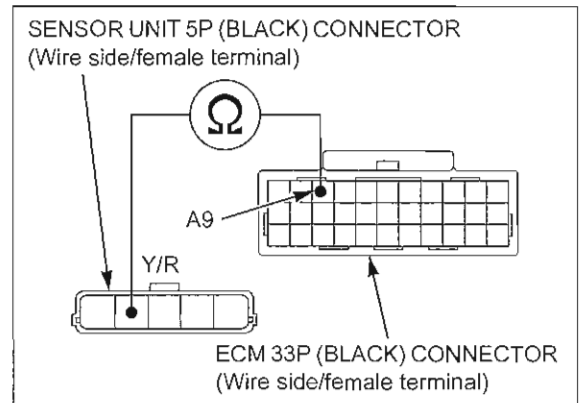
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

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

NO – Open circuit in Yellow/red wire



5. TP Sensor Output Line Open Circuit Inspection

Disconnect the ECM 33P (Gray) connector.
 Check for continuity at the Red/yellow wire between the sensor unit 5P (Black) and ECM 33P (Gray) connectors.

CONNECTION: B31 – Red/yellow

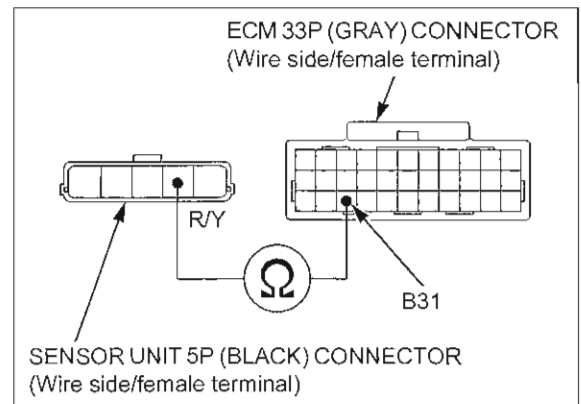
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 6.

NO – Open circuit in Red/yellow wire



6. TP Sensor Output Line Short Circuit Inspection

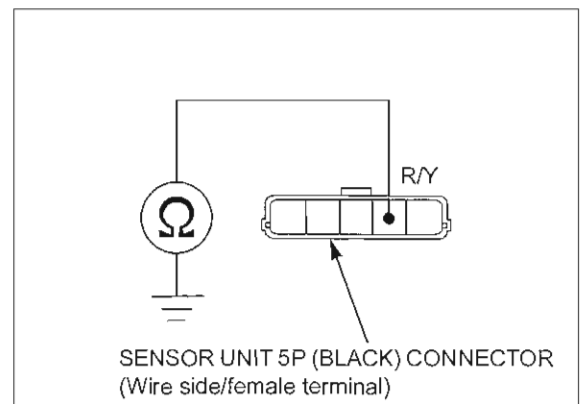
Connect the ECM 33P (Gray) connector.
 Disconnect the sensor unit 5P (Black) connector.
 Check for continuity between the sensor unit 5P (Black) connector terminal of the wire side and ground.

CONNECTION: Red/yellow – Ground

Is there continuity?

YES – Short circuit in Red/yellow wire

NO – GO TO STEP 7.



FUEL SYSTEM (PGM-FI)

7. TP Sensor Inspection

Replace the sensor unit with a known good one.
Erase the DTCs (page 5-14).
Turn the ignition switch ON and engine stop switch "O".

Check the TP sensor with the HDS pocket tester.

Is DTC 8-1 indicated?

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

NO – Faulty original sensor unit (TP sensor)

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

NOTE:

Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) connector and recheck the DTC.

1. TP Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".

Check the TP sensor with the HDS pocket tester.

Is about 5 V indicated?

YES – GO TO STEP 3.

NO – GO TO STEP 2.

2. TP Sensor Inspection

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

Does the voltage increase continuously?

YES – Intermittent failure

NO – Faulty sensor unit (TP sensor)

3. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) connector.
Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire side.

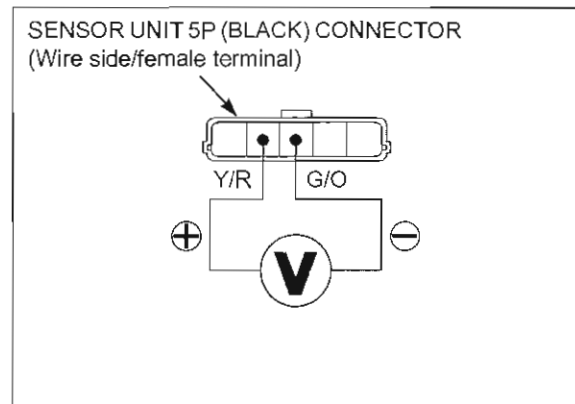
CONNECTION: Yellow/red (+) – Green/orange (-)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO –

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



4. TP Sensor Resistance Inspection

Turn the ignition switch OFF.

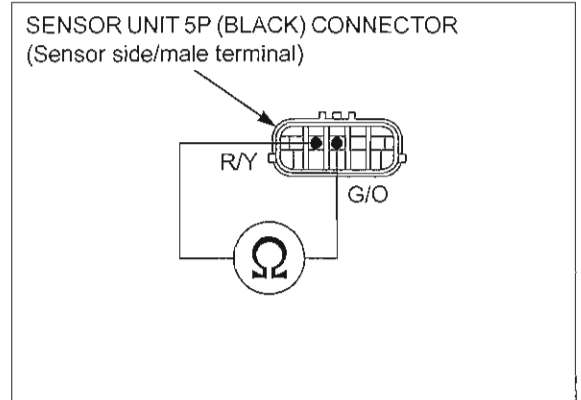
Remove the throttle body (page 5-47).
Measure the resistance at the sensor unit (TP sensor) side.

CONNECTION: Red/yellow – Green/orange

Is the resistance within 0.5 – 1.5 kΩ?

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

NO – Faulty sensor unit (TP sensor)



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

NOTE:

Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) connector and recheck the DTC.

1. IAT Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".

Check the IAT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – GO TO STEP 2.

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

2. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector.

Turn the ignition switch ON and engine stop switch "O".

Check the IAT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty sensor unit (IAT sensor)

3. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

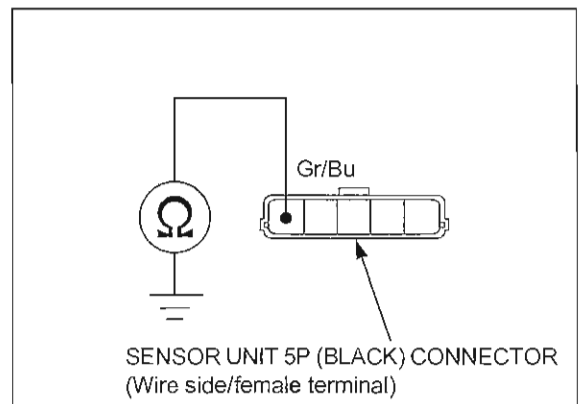
Check for continuity between the sensor unit 5P (Black) connector terminal of the wire side and ground.

CONNECTION: Gray/blue – Ground

Is there continuity?

YES – Short circuit in Gray/blue wire

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



FUEL SYSTEM (PGM-FI)

DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

NOTE:

Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) connector and recheck the DTC.

1. IAT Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".

Check the IAT sensor with the HDS pocket tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO –

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

2. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector. Connect the sensor unit 5P (Black) connector terminals with a jumper wire.

CONNECTION: Gray/blue – Green/orange

Turn the ignition switch ON and engine stop switch "O".

Check the IAT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – Faulty sensor unit (IAT sensor)

NO – GO TO STEP 3.

3. IAT Sensor Output Line Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black and Gray) connectors.

Check for continuity at the Gray/blue and Green/orange wire between the sensor unit 5P (Black) and ECM 33P (Black and Gray) connectors.

CONNECTION: B29 – Gray/blue
A18 – Green/orange

TOOL:

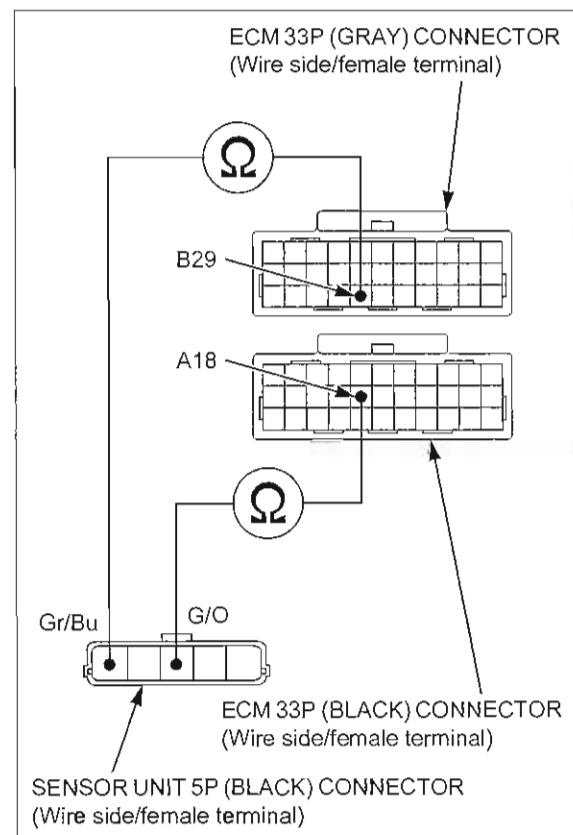
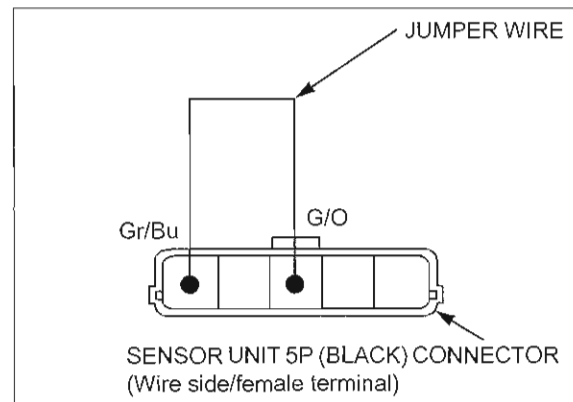
Test probe 07ZAJ-RDJA110

Is there continuity?

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

NO –

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



DTC 12-1 (No.1 REAR INJECTOR)

NOTE:

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

DTC	INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12-1	No.1 Rear	Black/white	Pink/yellow	A17
13-1	No.2 Front	Black/white	Pink/blue	A6

1. Injector System Inspection

Erase the DTCs (page 5-14).
Turn the ignition switch ON and engine stop switch "O", start the engine and check the injector with the HDS pocket tester.

Is DTC 12-1 indicated?

YES – GO TO STEP 2.

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

2. Injector Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the injector 2P (Gray) connector.
Turn the ignition switch ON and engine stop switch "O".

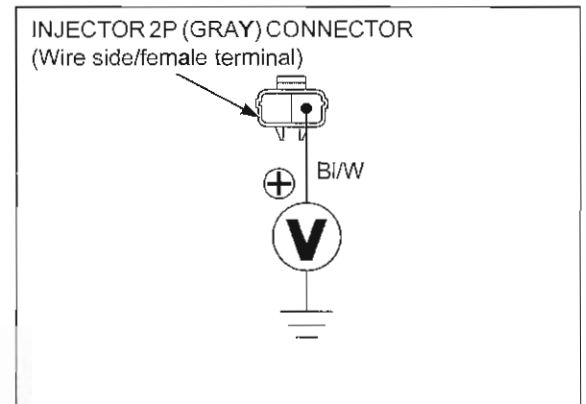
Measure the voltage between the injector 2P (Gray) connector of the wire side and ground.

CONNECTION: Black/white (+) – Ground (-)

Is there battery voltage?

YES – GO TO STEP 3.

NO – Open or short circuit in Black/white wire



3. Injector Signal Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Check for continuity between the ECM 33P (Black) and injector 2P (Gray) connectors as shown.

CONNECTION: No.1 Rear: A17 – Pink/yellow
No.2 Front: A6 – Pink/blue

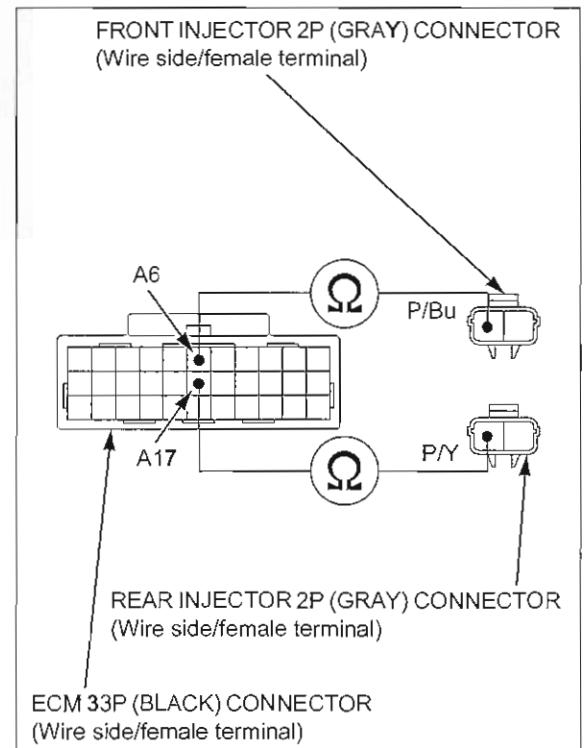
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 4.

NO – Open circuit in SIGNAL line wire



FUEL SYSTEM (PGM-FI)

4. Injector Signal Line Short Circuit Inspection

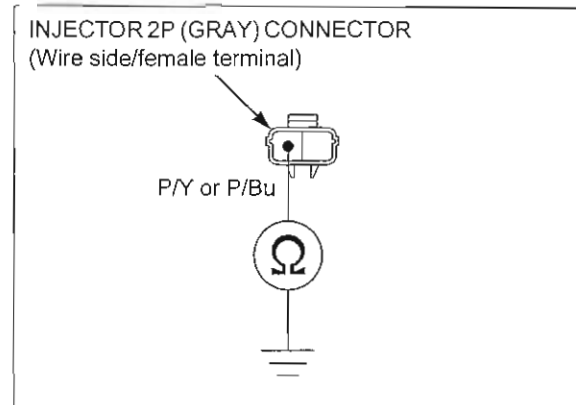
Connect the ECM 33P (Black) connector.
Check for continuity between the injector 2P (Gray) connector of the wire side and ground.

CONNECTION:

- No.1 Rear: Pink/yellow – Ground
- No.2 Front: Pink/blue – Ground

Is there continuity?

- YES – Short circuit in SIGNAL line wire
- NO – GO TO STEP 5.



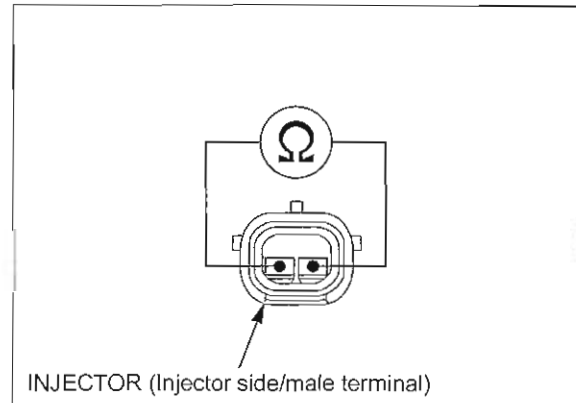
5. Injector Resistance Inspection

Measure the resistance of the injector connector terminals.

STANDARD: 11 – 13 Ω (20°C/68°F)

Is the resistance within 11 – 13 Ω (20°C/68°F)?

- YES – Replace the ECM with a known good one, and recheck.
- NO – Faulty injector



DTC 13-1 (No.2 FRONT INJECTOR)

See page 5-25

DTC 29-1 (IACV)

NOTE:

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

1. Recheck DTC

Erase the DTCs (page 5-14).
Start the engine and recheck the DTC.

Is DTC 29-1 indicated?

- YES – GO TO STEP 2.
- NO –
 - Intermittent failure
 - Loose or poor contact on the IACV 4P (Black) connector

2. IACV Short Circuit Inspection

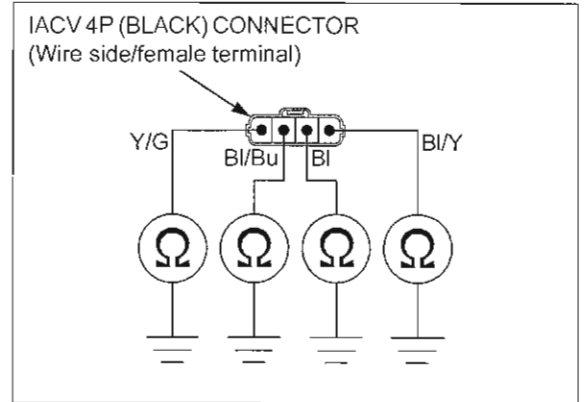
Turn the ignition switch OFF.
 Disconnect the IACV 4P (Black) connector.
 Check for continuity between the IACV 4P (Black) connector and ground.

- CONNECTION:** Black – Ground
 Black/blue – Ground
 Black/yellow – Ground
 Yellow/green – Ground

Is there continuity?

- YES** – • Short circuit in Black or Black/blue wire
 • Short circuit in Black/yellow or Yellow/green wire

NO – GO TO STEP 3.



3. IACV Circuit Continuity Inspection

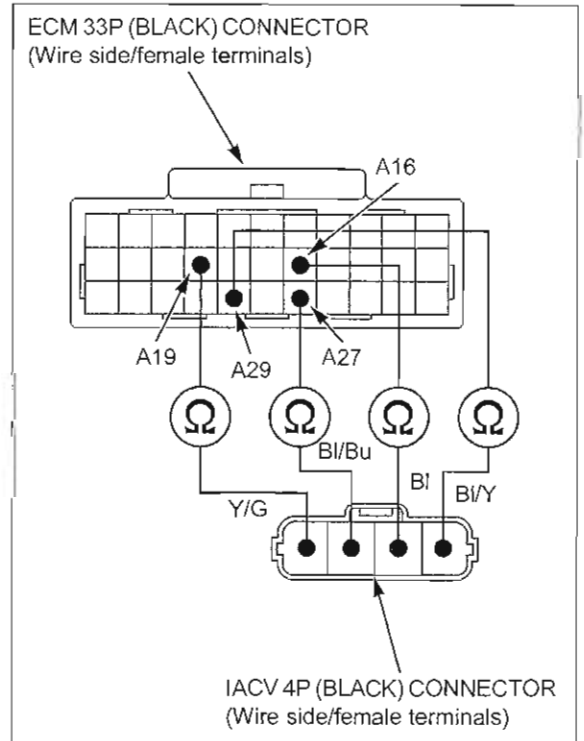
Disconnect the ECM 33P (Black) connector.
 Check for continuity between the ECM 33P (Black) and IACV 4P (Black) connectors.

- CONNECTION:** A19 – Yellow/green
 A27 – Black/blue
 A16 – Black
 A29 – Black/yellow

TOOL:
 Test probe 07ZAJ-RDJA110

Is there continuity?

- YES** – GO TO STEP 4.
NO – • Open or loose contact in Yellow/green or Black/blue wire
 • Open or loose contact in Black or Black/yellow wire



4. IACV Resistance Inspection

Measure the resistance at the IACV 4P (Black) connector terminals.

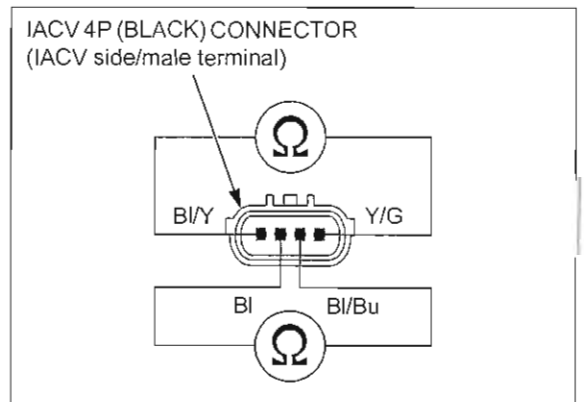
- CONNECTION:** Yellow/green – Black/yellow
 Black – Black/blue

STANDARD: 99 – 121 Ω (25°C/77°F)

Is the resistance within 99 – 121 Ω (25°C/77°F)?

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

NO – Faulty IACV



DTC 33-2 (EEPROM)

1. Recheck DTC

Erase the DTCs (page 5-14).
Turn the ignition switch ON and engine stop switch "O".
Recheck the ECM EEPROM.

Is DTC 33-2 indicated?

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

SENSOR UNIT POWER LINE INSPECTION

NOTE:

Before starting the inspection, check for loose or poor contact on the ECM 33P (Black) and sensor unit 5P (Black) connectors, then recheck the MIL blinking.

1. Sensor Unit Input Voltage Inspection

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage at the sensor unit 5P (Black) connector terminals.

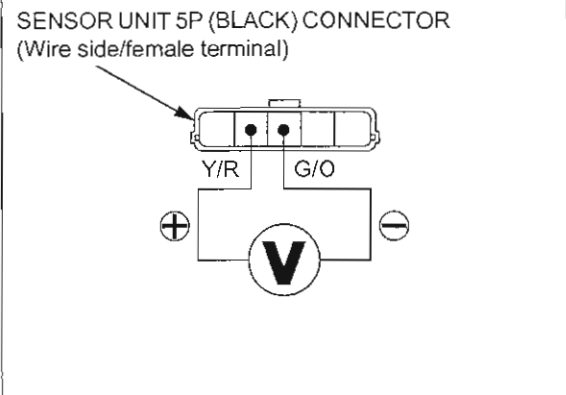
CONNECTION: Yellow/red (+) – Green/orange (–)

STANDARD: 4.75 – 5.25 V

Is the voltage within 4.75 – 5.25 V?

YES – Turn the ignition switch OFF. Connect the sensor unit 5P (Black) connector and start the DTC troubleshooting (page 5-16).

NO – GO TO STEP 2.



2. Sensor Unit Input Voltage Line Short Circuit Inspection

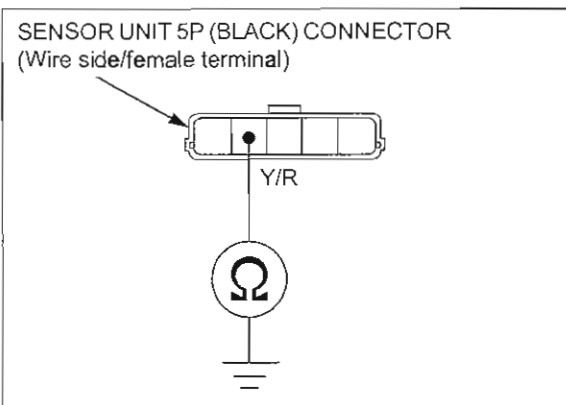
Check for continuity between the sensor unit 5P (Black) connector wire side and ground.

CONNECTION: Yellow/red – Ground

Is there continuity?

YES – Short circuit in Yellow/red wire

NO – GO TO STEP 3.



3. Sensor Unit Power Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector.

Check for continuity between the sensor unit 5P (Black) and ECM 33P (Black) connectors of the wire side.

CONNECTION:

- A9 – Yellow/red
- A18 – Green/orange

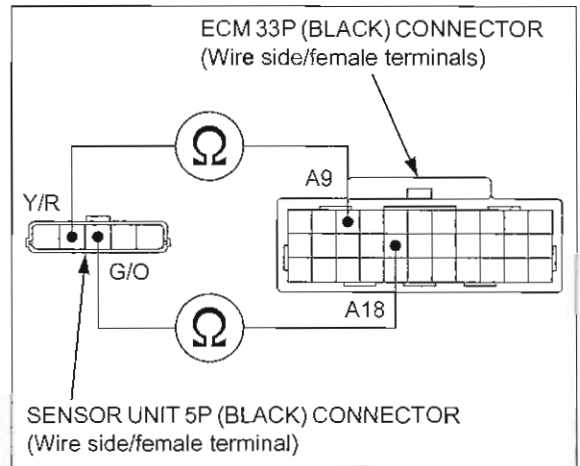
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

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

- NO** –
- Open circuit in Yellow/red wire
 - Open circuit in Green/orange wire



MIL CIRCUIT INSPECTION

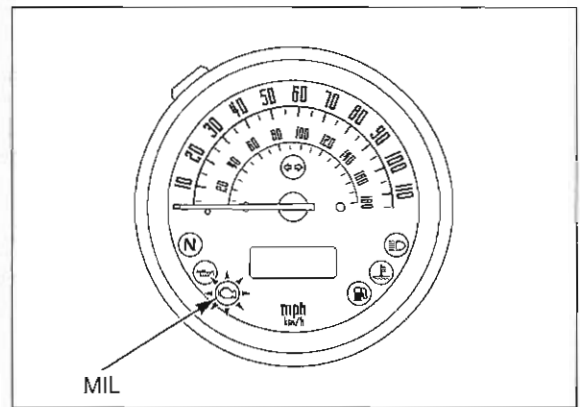
If the engine can be started but the MIL does not come on when the ignition switch ON and engine stop switch "O", check as follows:

Check the speedometer function properly.

- If they do not function, check the speedometer power input line (page 19-9).
- If they function properly, check as follows:

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector.



Ground the A20 terminal of the wire side connector with a jumper wire.

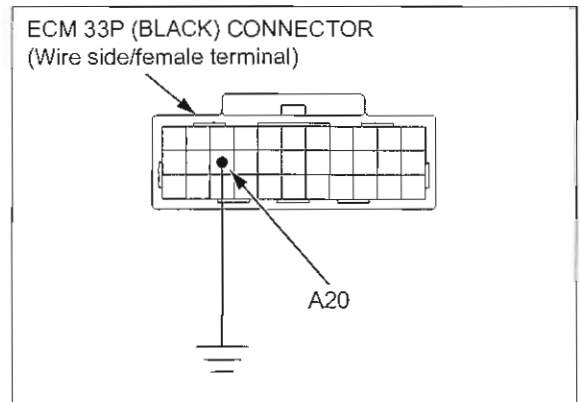
TOOL:

Test probe 07ZAJ-RDJA110

Turn the ignition switch ON and engine stop switch "O", the MIL should come on.

- If the MIL come on, replace the ECM.
- If the MIL does not come on, check for open circuit in White/blue wire between the speedometer and ECM.

If the wire is OK, replace the speedometer (page 19-7).



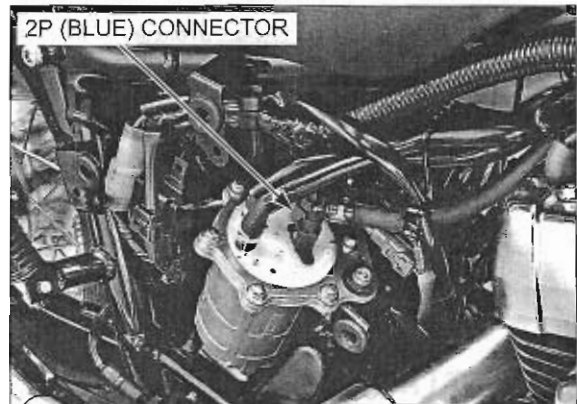
FUEL LINE REPLACEMENT

FUEL PRESSURE RELIEVING

NOTE:

Before disconnecting fuel feed hose, relieve pressure from the system as follows.

1. Remove the right side cover (page 2-3).
2. Turn the ignition switch OFF.
3. Disconnect the sub fuel tank/fuel pump 2P (Blue) connector.
4. Start the engine, and let it idle until it stalls.
5. Turn the ignition switch OFF.
6. Disconnect the battery negative (-) cable (page 16-6).



QUICK CONNECT FITTING REMOVAL

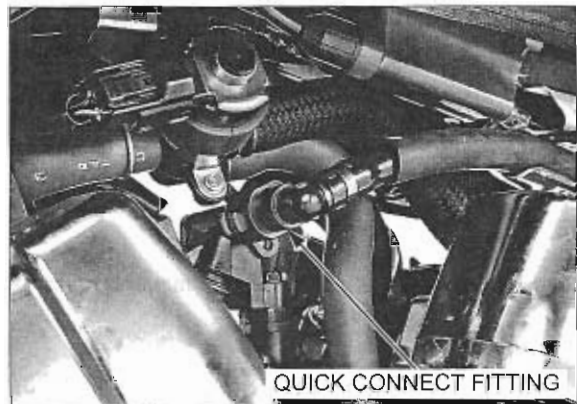
NOTE:

Do not bend or twist fuel feed hose.

INJECTOR HOSE SIDE

1. Relieve the fuel pressure (page 5-30).
2. Check the fuel quick connect fitting for dirt, and clean if necessary.

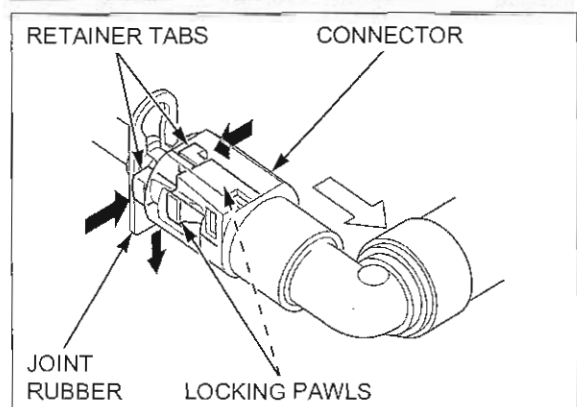
Place a shop towel over the quick connect fitting.



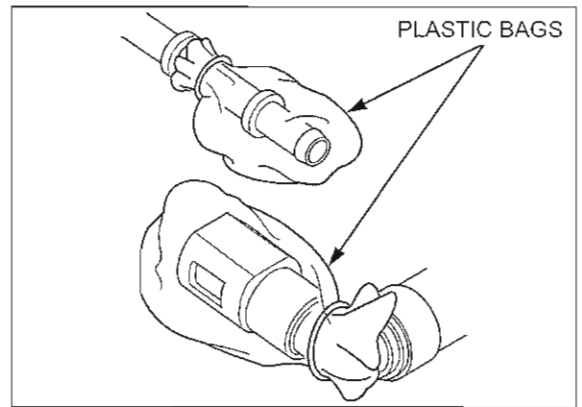
3. Hold the connector with one hand and squeeze the retainer tabs with the other hand release them from the locking pawls. Pull the connector off, then remove the retainer and joint rubber from the fuel joint.

NOTE:

- Absorb the remaining fuel in the fuel feed hose from flowing out with a shop towel.
- Be careful not to damage the hose or other parts.
- Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.



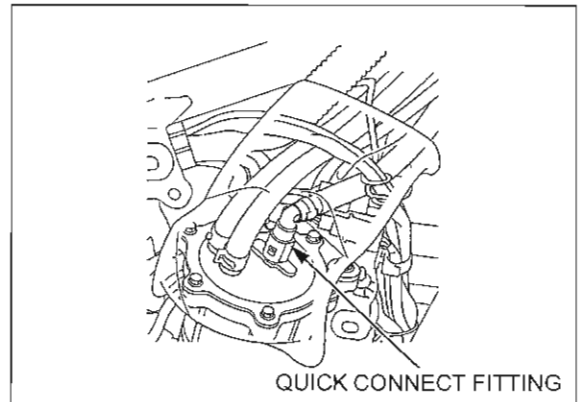
4. To prevent damage and keep foreign matter out, cover the disconnected connector and fuel joint with the plastic bags.



FUEL PUMP SIDE

1. Check the fuel quick connect fitting for dirt, and clean if necessary.

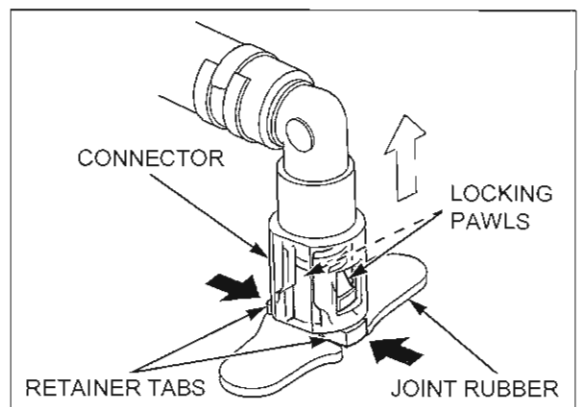
Place a shop towel over the quick connect fitting.



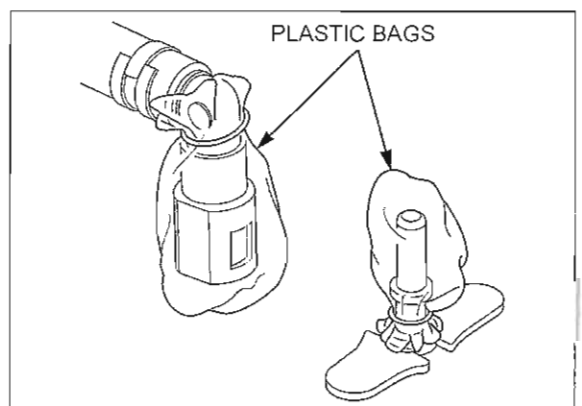
2. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls. Pull the connector off, then remove the retainer and joint rubber from the fuel joint.

NOTE:

- Prevent the remaining fuel in the fuel feed hose from flowing out with a shop towel.
- Be careful not to damage the hose or other parts.
- Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.



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



QUICK CONNECT FITTING INSTALLATION

NOTE:

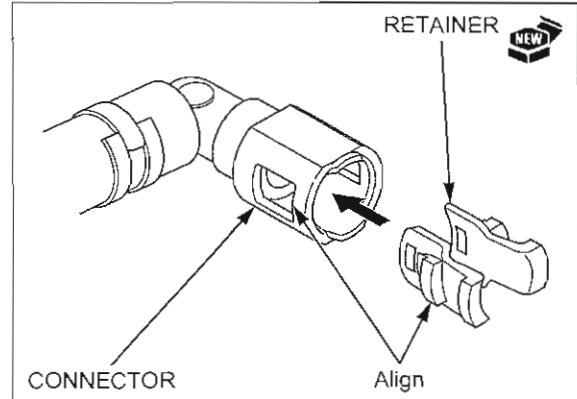
- Always replace the retainer and joint rubber of the quick connect fitting when the fuel feed hose is disconnected.
- Replace the retainer and joint rubber with the same manufacturer's item that was removed.
- Do not bend or twist the fuel feed hose.

INJECTOR HOSE SIDE

1. Insert a new retainer into the connector.

NOTE:

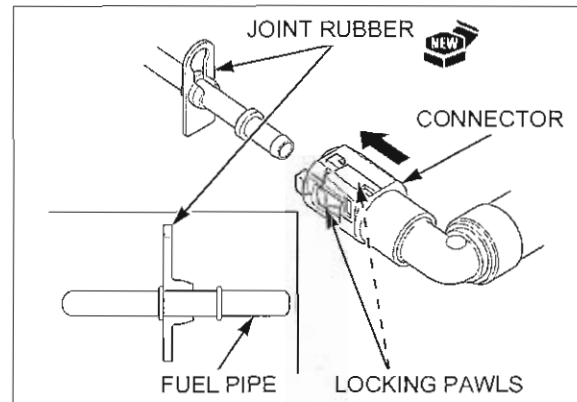
Align the new retainer locking pawls with the connector grooves.



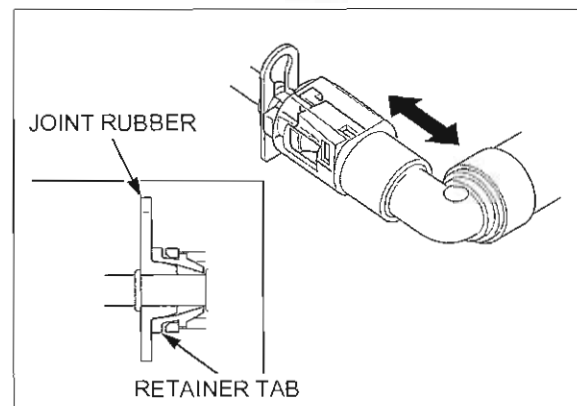
2. Install a new joint rubber to the fuel pipe as shown.

3. Install the connector to the fuel pipe by aligning retainer tabs with joint rubber grooves. Then press the quick connect fitting onto the pipe until both locking pawls lock with a "CLICK".

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



4. Make sure the connection is secure and that the locking pawls are firmly locked into place; check visually and by pulling the connector.
5. Make sure the joint rubber is in place (between the retainer tabs).
6. Increase the fuel pressure and check that there is no leakage in fuel supply system (page 3-5).

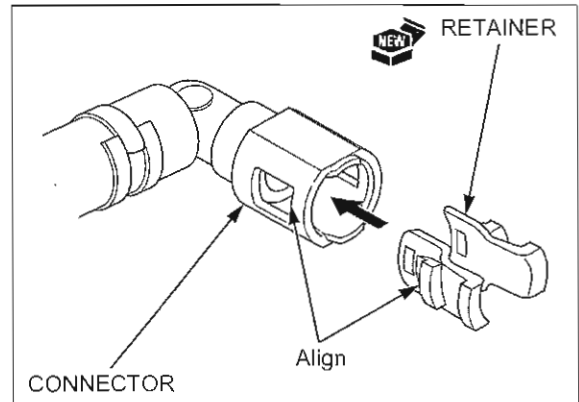


FUEL PUMP SIDE

1. Insert a new retainer into the connector.

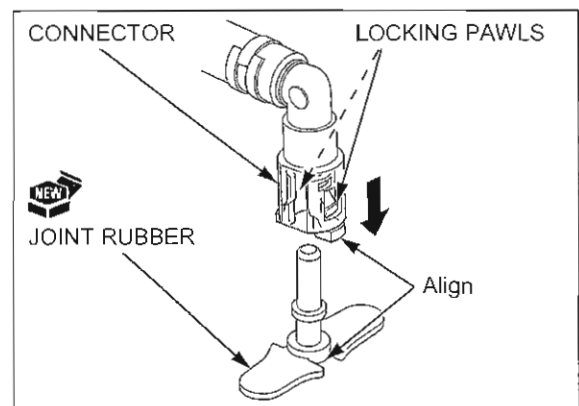
NOTE:

Align the new retainer locking pawls with the connector grooves.

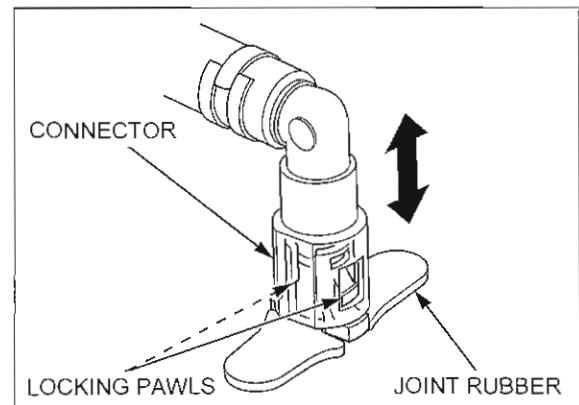


2. Install a new joint rubber to the fuel joint as shown.
3. Install the connector to the fuel joint by aligning retainer tabs with joint rubber grooves. Then press the quick connect fitting onto the joint until both locking pawls lock with a "CLICK".

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



4. Make sure the connection is secure and that the locking pawls are firmly locked into place; check visually and by pulling the connector.
5. Make sure the joint rubber is in place (between the retainer tabs).
6. Increase the fuel pressure and check that there is no leakage in fuel supply system (page 3-5).



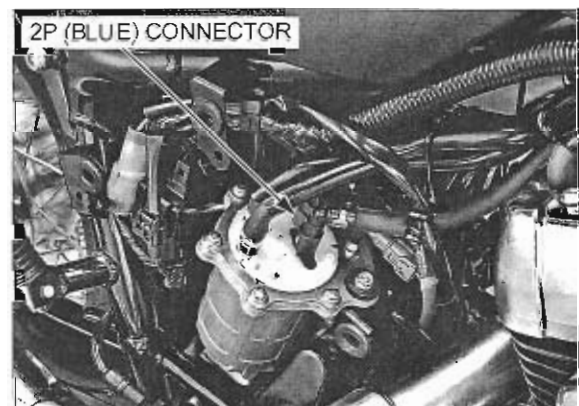
FUEL PRESSURE NORMALIZATION

1. Connect the sub fuel tank/fuel pump 2P (Blue) connector.
2. Connect the battery negative (-) cable (page 16-6).
3. Turn the ignition switch ON and engine stop switch "O".

NOTE:

Do not start the engine.

4. The fuel pump will run for about 2 seconds, and fuel pressure should rise to its normal operating level. Repeat 2 or 3 times, and check that there is no leakage in the fuel supply system.
5. Turn the ignition switch OFF.
6. Install the right side cover (page 2-3).



FUEL SYSTEM (PGM-FI)

FUEL PRESSURE TEST

Relieve the fuel pressure and disconnect the quick connect fitting from the sub fuel tank/fuel pump (page 5-30).

Attach the fuel pressure gauge, attachments, joint and manifold.

TOOLS:

- | | |
|---|---------------|
| (1): Fuel pressure gauge
(0 – 100 psi) | 07406-0040004 |
| (2): Pressure gauge manifold | 07ZAJ-S5A0111 |
| (3): Hose attachment, 6 mm/9 mm | 07ZAJ-S5A0130 |
| (4): Hose attachment, 9 mm/9 mm | 07ZAJ-S5A0120 |
| (5): Attachment joint, 6 mm/9 mm | 07ZAJ-S5A0150 |

TOOLS, U.S.A. only:

- | | |
|------------------------|---------------|
| Fuel pressure gauge | 07406-004000B |
| Pressure manifold hose | 07AMJ-HW3A100 |
| Adaptor, male "B" | 07AAJ-S6MA200 |
| Adaptor, female "B" | 07AAJ-S6MA400 |

Temporarily connect the negative (-) cable to the battery.

Connect the sub fuel tank/fuel pump 2P (Blue) connector.

Start the engine and let it idle.

Read the fuel pressure.

STANDARD:

333 – 353 kPa (3.4 – 3.6 kgf/cm², 48 – 51 psi)

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

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

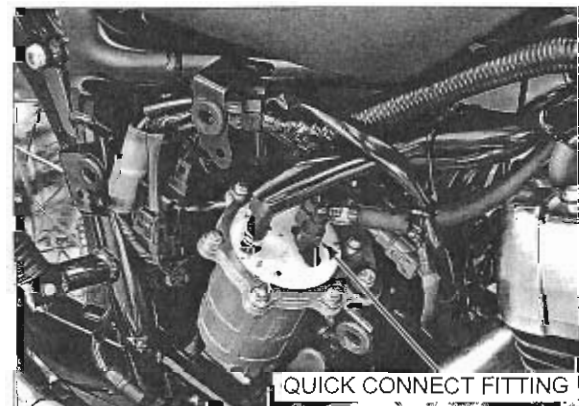
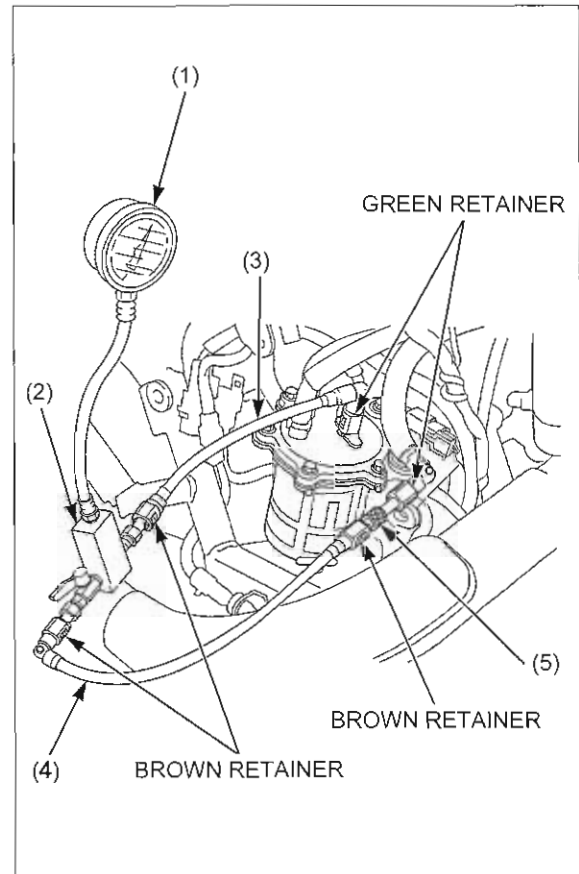
- Fuel line leaking
- Pinched or clogged fuel feed hose or fuel tank breather hose
- Sub fuel tank/fuel pump (page 5-36)
- Clogged fuel filter (Assembly of the sub fuel tank/fuel pump: page 5-36)

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

After inspection, relieve the fuel pressure and disconnect the quick connect fitting from the sub fuel tank/fuel pump (page 5-30).

Remove the fuel pressure gauge, attachment, joint and manifold from the sub fuel tank/fuel pump.

Connect the quick connect fitting to the sub fuel tank/ fuel pump (page 5-32).



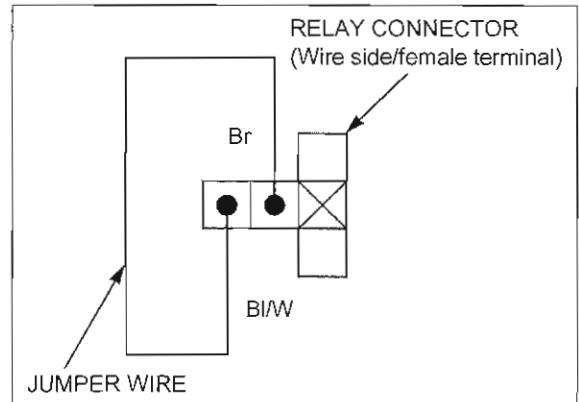
FUEL FLOW INSPECTION

Relieve the fuel pressure and disconnect the quick connect fitting from the sub fuel tank/fuel pump (page 5-30).

Remove the fuel cut relay (page 5-42).

Turn the ignition switch OFF.

Connect the Brown and Black/white wire terminals of the wire side using a jumper wire.



Connect the hose attachment to the fuel pipe of the sub fuel tank/fuel pump.

TOOL:

Hose attachment, 6 mm/9 mm 07ZAJ-S5A0130

TOOLS, U.S.A. only:

Pressure manifold hose 07AMJ-HW3A100

Adaptor, female "B" 07AAJ-S6MA400

Wipe spilled gasoline out of the container.

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

Temporarily connect the negative (-) cable to the battery.

Connect the sub fuel tank/fuel pump 2P (Blue) connector.

Turn the ignition switch ON, engine stop switch "C".

Measure the amount of fuel flow.

NOTE:

- The fuel pump operates for 2 seconds. Repeat 5 times so that the total measuring time.
- Return fuel to the fuel tank when the first fuel is flowed.

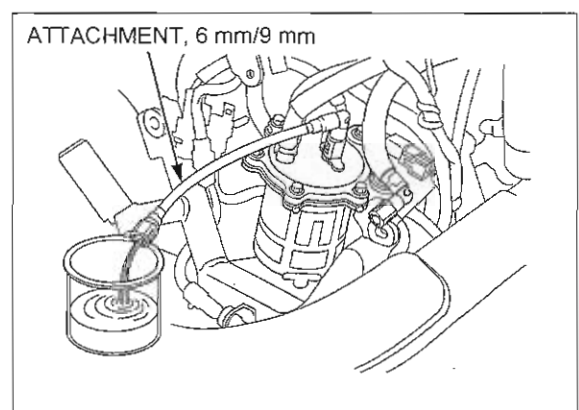
Amount of fuel flow:

50 cm³ (1.7 US oz, 1.8 Imp oz) minimum
/10 seconds at 12 V

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

- Sub fuel tank/fuel pump (page 5-36)
- Clogged fuel filter (Assembly of the sub fuel tank/fuel pump: page 5-36)

Connect the quick connect fitting to the sub fuel tank/fuel pump (page 5-32).



SUB FUEL TANK/FUEL PUMP

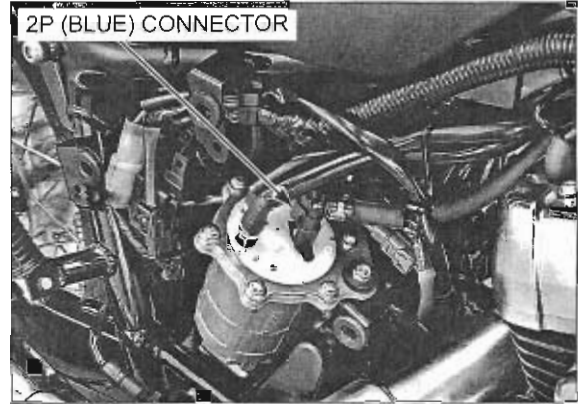
INSPECTION

Turn the ignition switch ON, engine stop switch "O" and confirm that the fuel pump operates for a few seconds. If the fuel pump does not operate, inspect as follows:

Turn the ignition switch OFF.

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

Disconnect the sub fuel tank/fuel pump 2P (Blue) connector.



Turn the ignition switch ON, engine stop switch "O" and measure the voltage between the terminals.

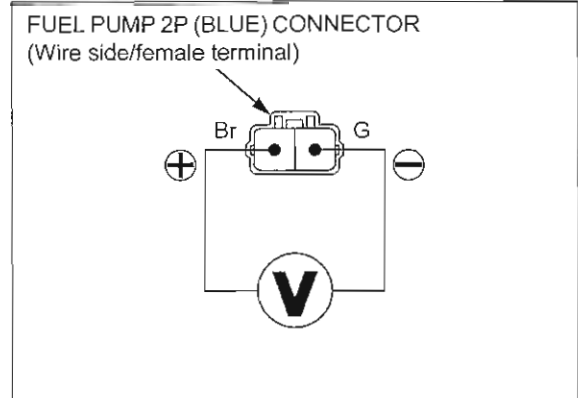
CONNECTION: Brown (+) – Green (-)

There should be battery voltage for a few seconds.

If there is battery voltage, replace the sub fuel tank/fuel pump assembly.

If there is no battery voltage, inspect the following:

- Open circuit in Brown wire and/or Green wire
- Sub fuse 10 A (ENG STOP)
- Main fuse 30 A
- FI fuse 20 A
- Ignition switch (page 19-16)
- Fuel cut relay (page 5-42)
- Engine stop relay (page 5-58)
- Engine stop switch (page 19-17)
- Bank angle sensor (page 5-56)
- ECM (page 5-59)



REMOVAL

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

Relieve the fuel pressure and disconnect the quick connect fitting from the sub fuel tank/fuel pump (page 5-30).

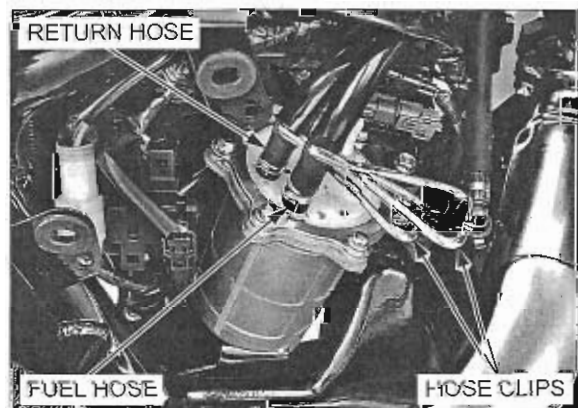
Clamp the fuel vapor return hose and fuel hose.

TOOL:

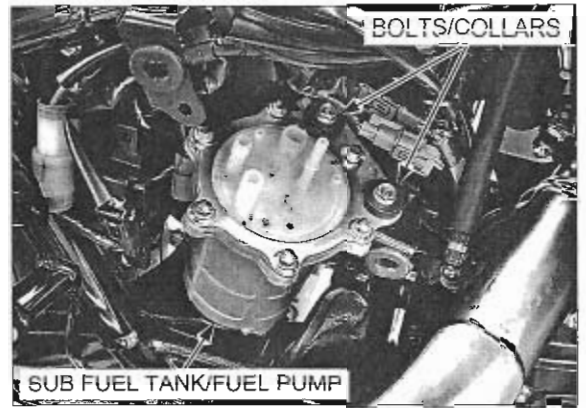
Hose clip

07614-0050101 or equivalent

Wipe off spilled out gasoline. Disconnect the fuel vapor return hose and fuel hose from the sub fuel tank/fuel pump.



Remove the bolts, collars and sub fuel tank/fuel pump.
 Check the sub fuel tank/fuel pump for damage, replace it if necessary.



DISASSEMBLY

NOTE:

- To prevent dirt and debris from entering the fuel pump, always clean it before disassembly.
- Clean the inside of the sub fuel tank, fuel pump unit and fuel pump filter with clean gasoline. Never use commercially available carburetor cleaners.
- Always replace all O-rings with new ones when the fuel pump has been disassembled.
- Be careful not to damage the fuel pump unit wire.

Wipe excess gasoline out of the container.

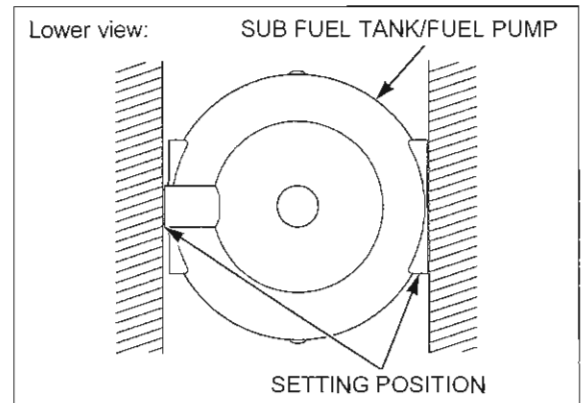
Drain the gasoline from the fuel pump case and store it in an approved container.

Do not over-tighten the vise on the sub fuel tank/fuel pump.

Set the sub fuel tank/fuel pump in a vise with a piece of wood or soft jaws to prevent damage.

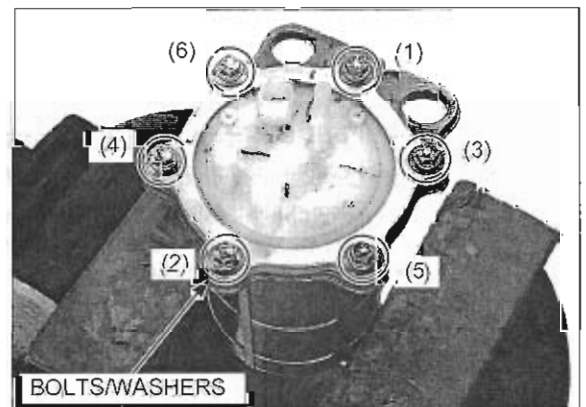
NOTE:

Set the sub fuel tank/fuel pump in a vise as shown.



Be careful not to drop the fuel pump unit.

Loosen the fuel pump assembly bolts in the specified sequence as shown and remove the bolts and spring washers.

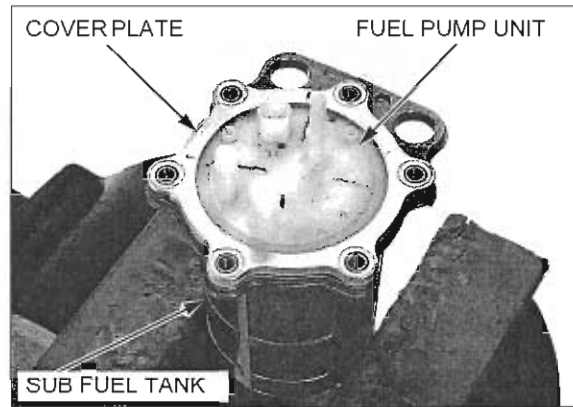


FUEL SYSTEM (PGM-FI)

Remove the cover plate and fuel pump unit from the sub fuel tank.

NOTE:

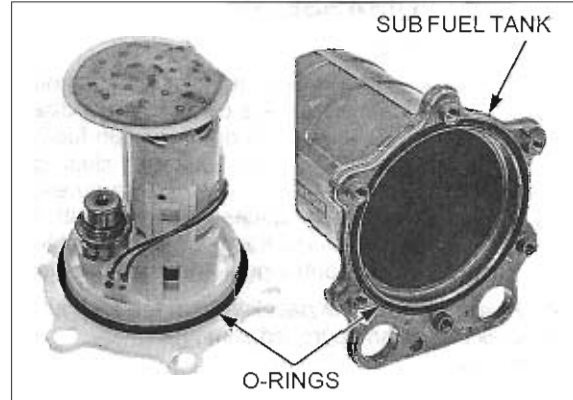
Be careful not to damage the fuel pump unit and fuel pump unit wire.



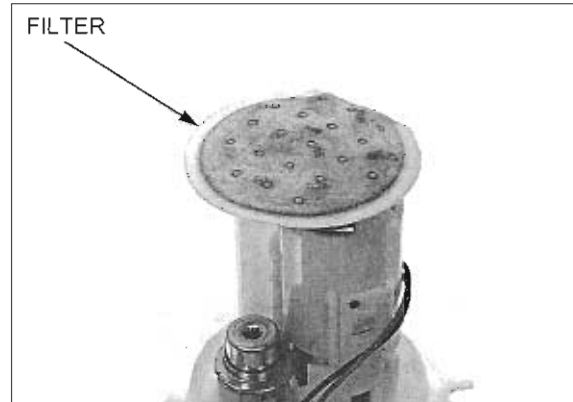
Do not reuse the O-rings.

Remove the O-rings.

Clean the inside of the sub fuel tank with clean gasoline.



Visually inspect the fuel pump filter for dirt, debris or any clogging, and replace it if necessary.

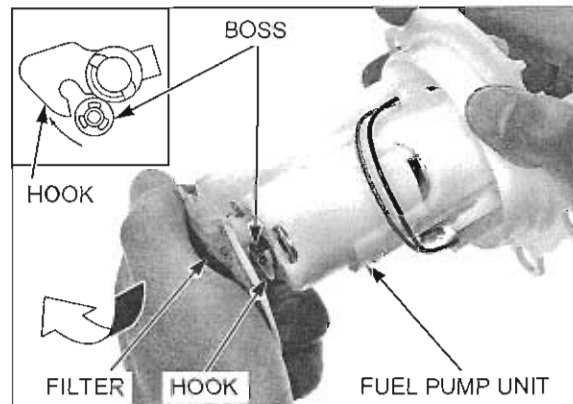


FUEL PUMP FILTER REPLACEMENT

Be careful not to damage the fuel pump filter and fuel pump unit.

Hold the bottom face of the fuel pump filter.

Disengage the fuel pump filter hook from the fuel pump unit boss by turning the fuel pump filter clockwise, then remove the fuel pump filter.

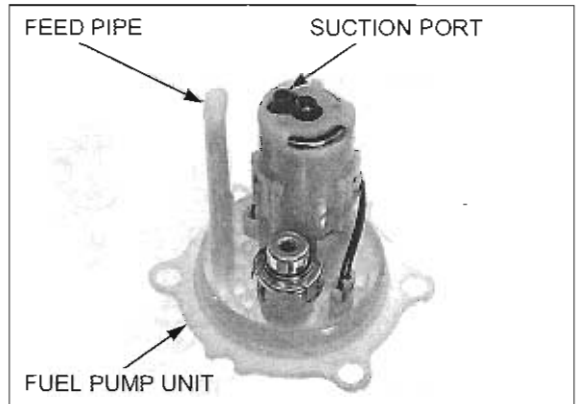


Before installing the fuel pump filter, check the fuel pump unit for dirt.

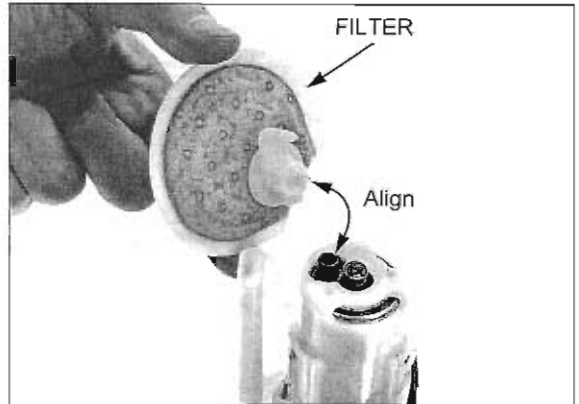
If necessary, clean the fuel pump unit with compressed air.

NOTE:

- Place a shop towel over the fuel pump unit to prevent dirt from entering the feed pipe and suction port.
- Do not blow compressed air directly into the feed pipe or suction port.



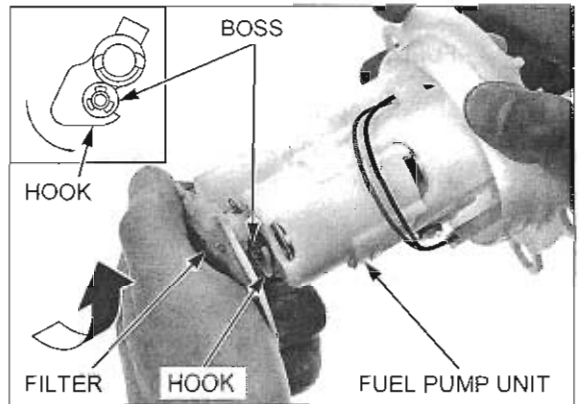
Install the fuel pump filter to the fuel pump unit while aligning the holes for the suction port.



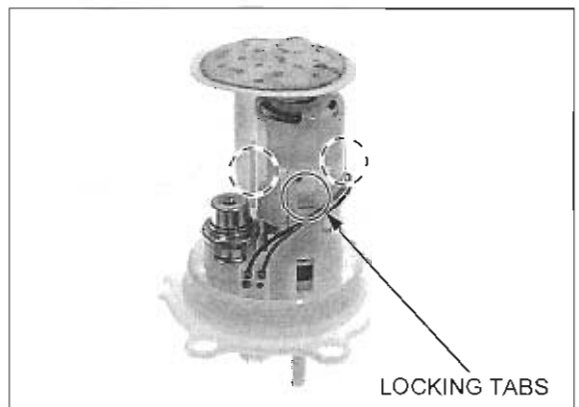
Be careful not to damage the fuel pump filter and fuel pump unit.

Hold the bottom face of the fuel pump filter and push in until it is fully seated on the fuel pump unit.

Engage the fuel pump filter hook to the fuel pump unit boss by turning the fuel pump filter counterclockwise.

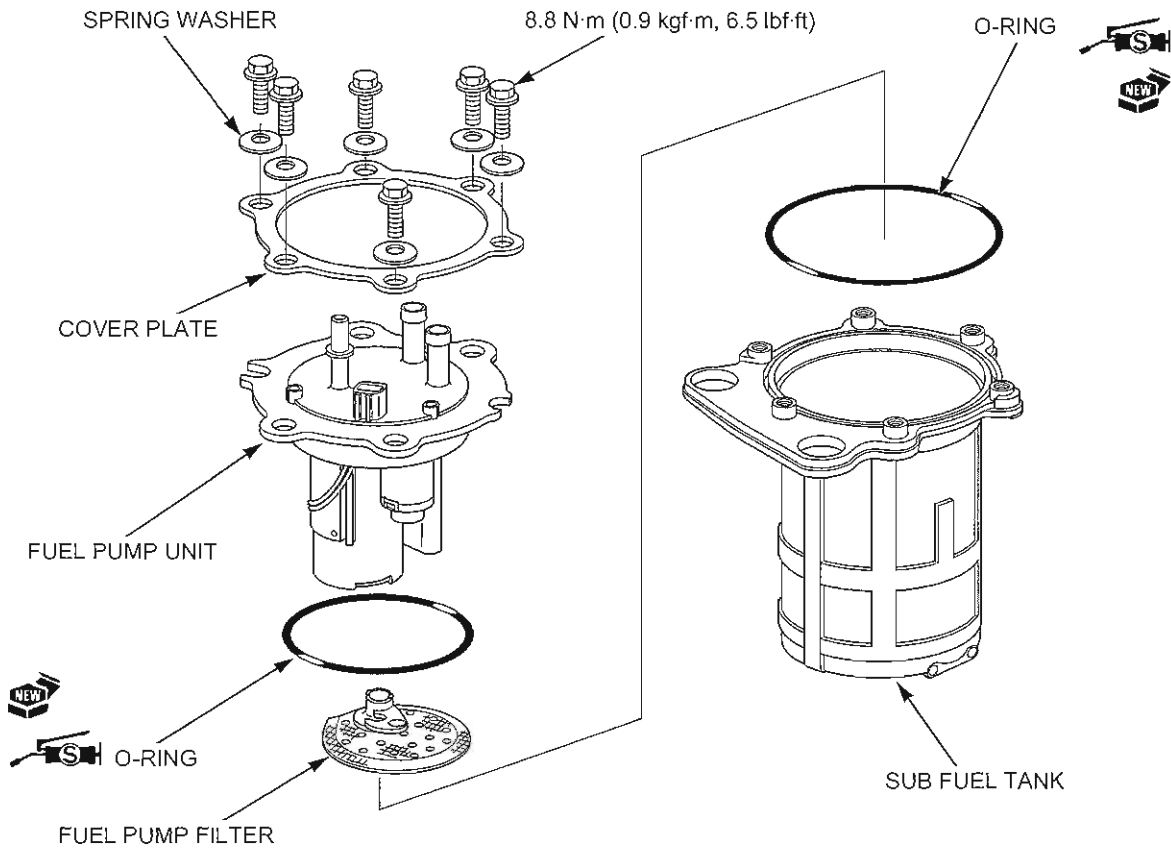


Make sure the fuel pump unit securely connected and that the locking tabs are firmly locked into place.



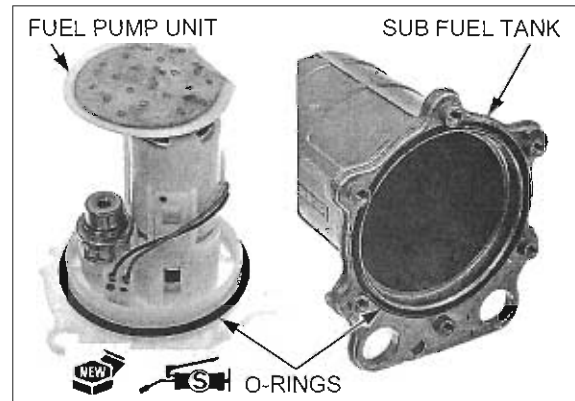
FUEL SYSTEM (PGM-FI)

ASSEMBLY



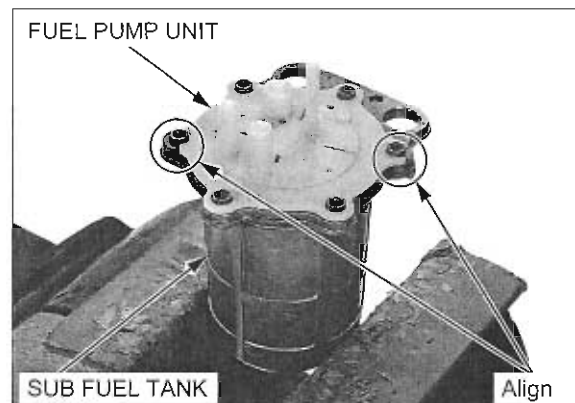
Apply silicone grease to new O-rings.

Install the O-rings onto the fuel pump unit and sub fuel tank.



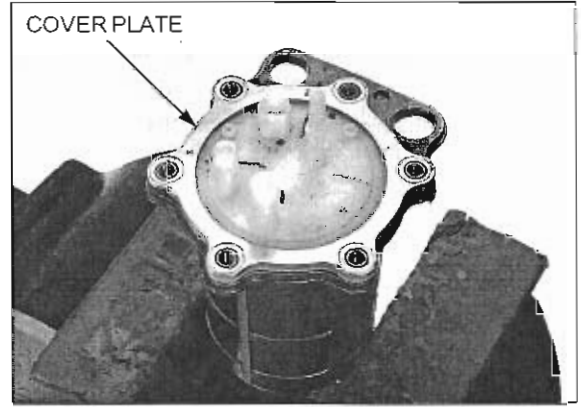
Set the sub fuel tank in a vise (page 5-37).

Install the fuel pump unit into the sub fuel tank while aligning the bosses of the sub fuel tank and fuel pump unit, making sure the fuel pump unit sits flush against the sub fuel tank.



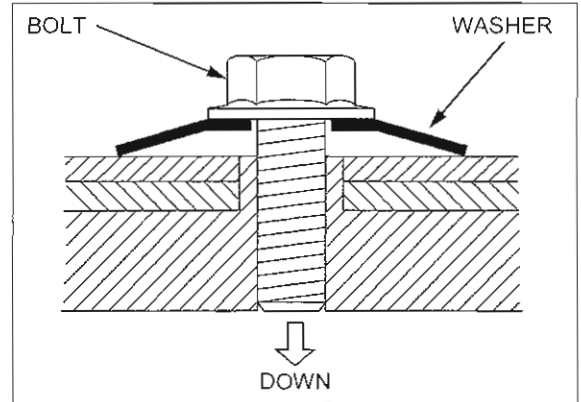
FUEL SYSTEM (PGM-FI)

Install the cover plate with the chamfered edges facing up.



Install the spring washers to the fuel pump assembly bolts as shown.

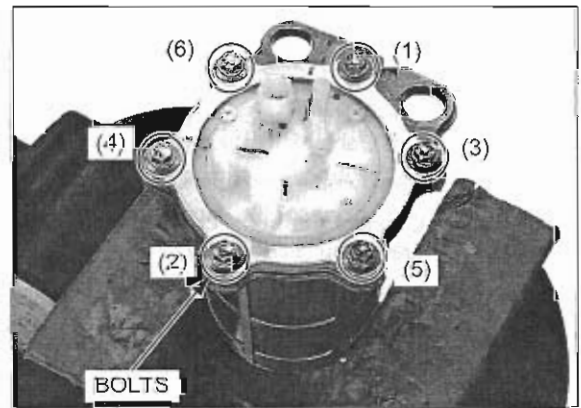
Install the fuel pump assembly bolts.



Be careful not to drop the fuel pump unit.

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

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

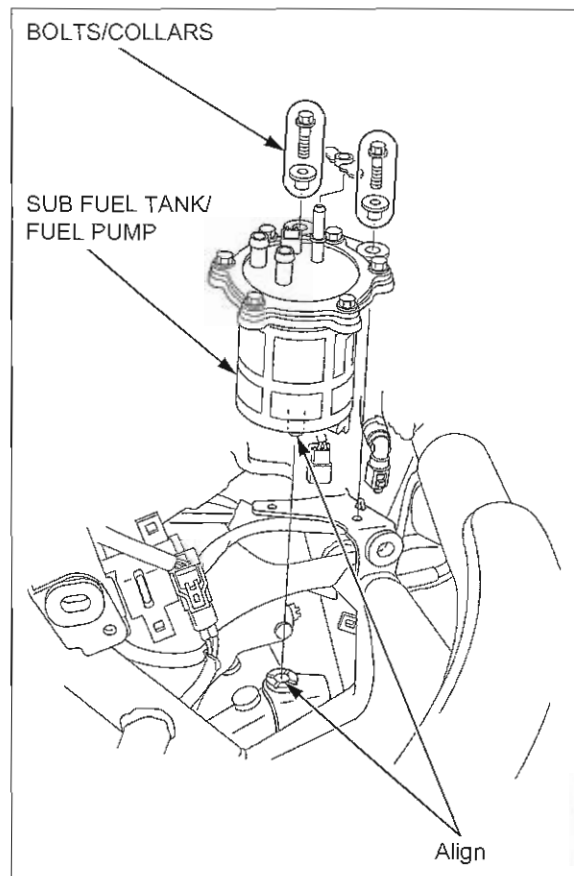


FUEL SYSTEM (PGM-FI)

INSTALLATION

Install the sub fuel tank/fuel pump into the frame by aligning its tab with the grommet of the frame.

Install the collars and bolts.
Tighten the bolts securely.



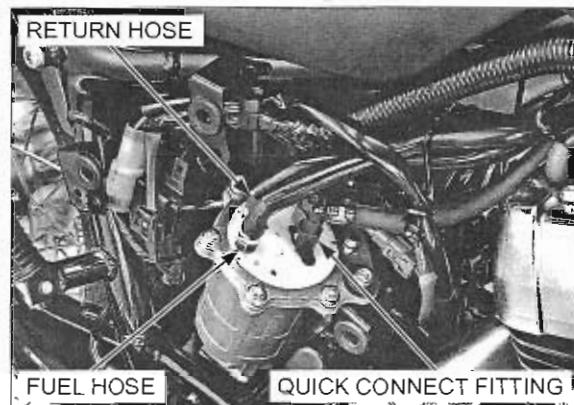
Connect the fuel hose and fuel vapor return hose to the sub fuel tank/fuel pump.

Remove the hose clips.

Connect the quick connect fitting to the sub fuel tank/fuel pump (page 5-32).

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

Fuel pressure normalization (page 5-33).



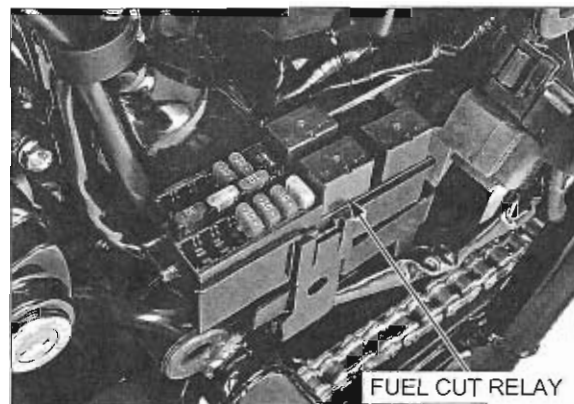
FUEL CUT RELAY

INSPECTION

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

Remove the power box cover.

Disconnect the fuel cut relay from the power box.



Connect the ohmmeter to the fuel cut relay connector terminals.

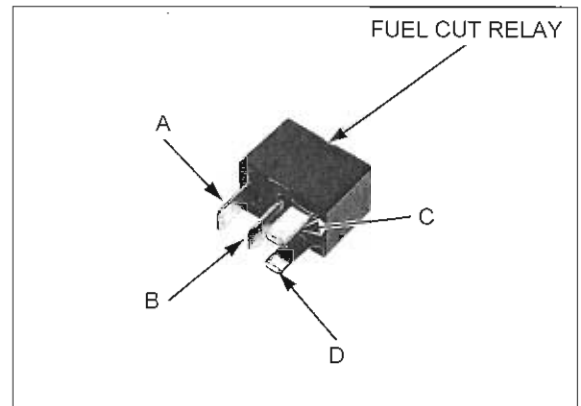
CONNECTION: A – B

Connect the 12 V battery to the following fuel cut relay connector terminals.

CONNECTION: C – D

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the fuel cut relay.

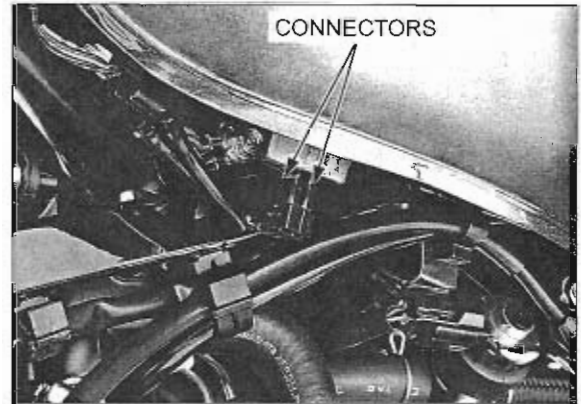


FUEL TANK

REMOVAL

Remove the seat (page 2-3).

Disconnect the fuel reserve sensor connectors.



Remove the fuel tank mounting bolt and washer.



Remove the fuel tank breather hose.



FUEL SYSTEM (PGM-FI)

Clamp the fuel vapor return hose and fuel hose.

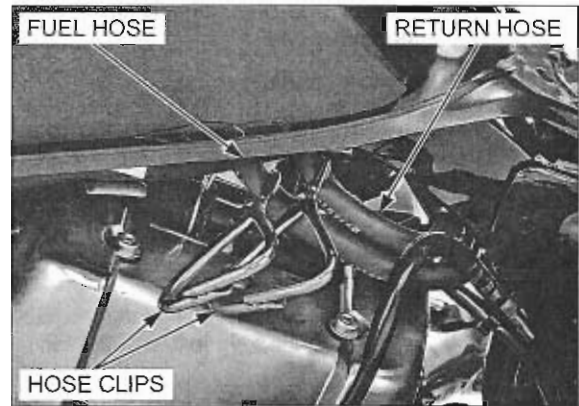
TOOL:

Hose clip

07614-0050101 or
equivalent

Wipe off spilled out gasoline. Disconnect the fuel vapor return hose and fuel hose from the fuel tank.

Remove the fuel tank by moving it rearward.



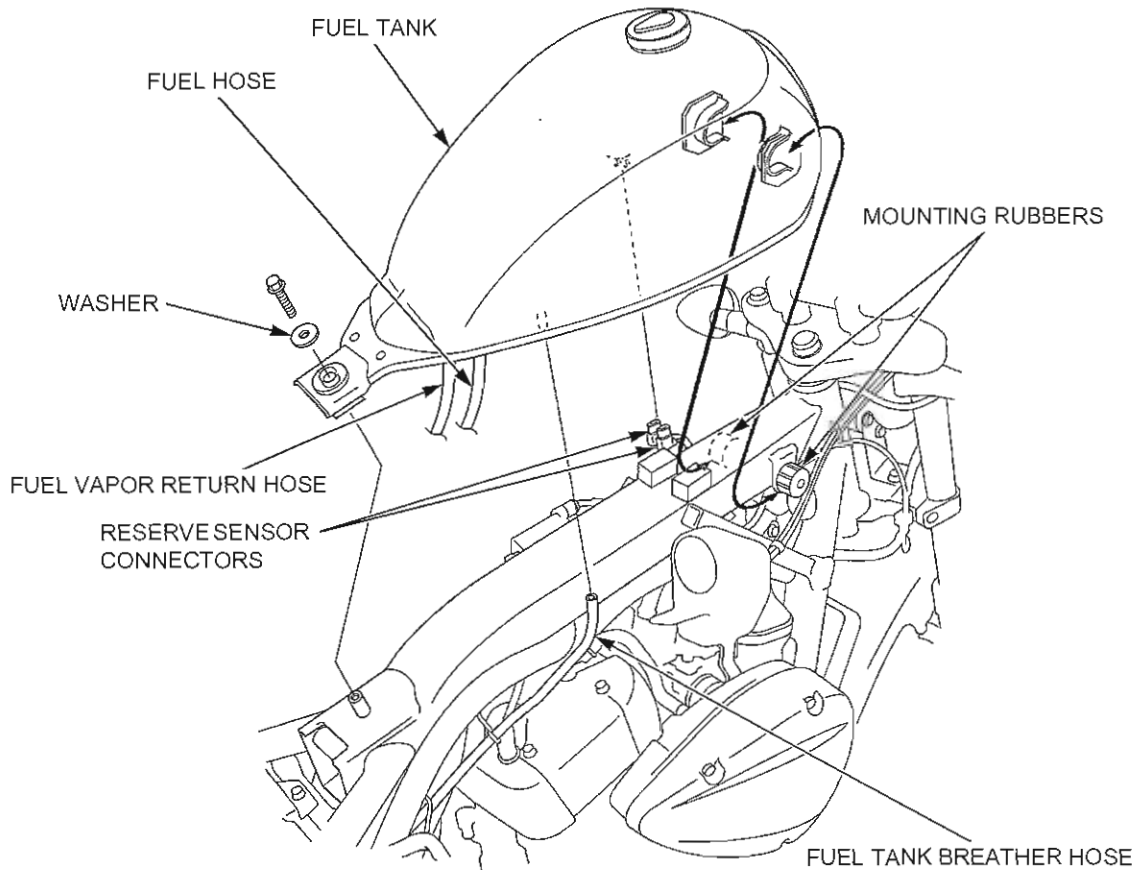
INSTALLATION

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

Install the washer and tighten the fuel tank mounting bolt securely.

Connect the following:

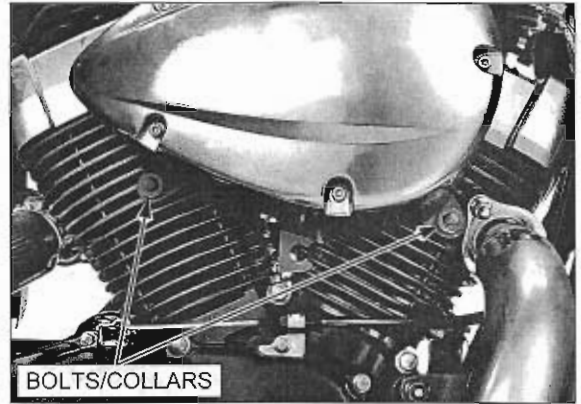
- Fuel hose
- Fuel vapor return hose
- Fuel tank breather hose
- Fuel reserve sensor connectors



AIR CLEANER HOUSING

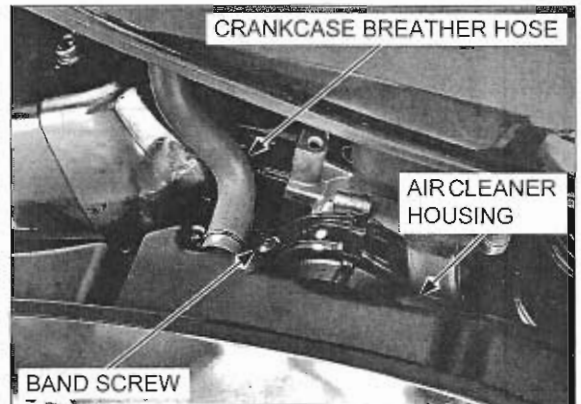
REMOVAL

Remove the air cleaner housing mounting bolts and collars.

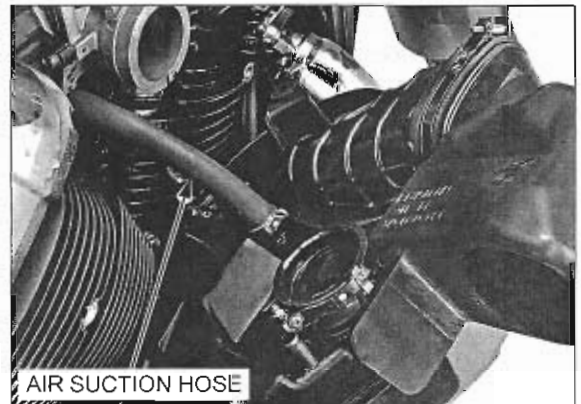


Disconnect the crankcase breather hose from the air cleaner housing.
Loosen the air cleaner housing connecting tube band screw.

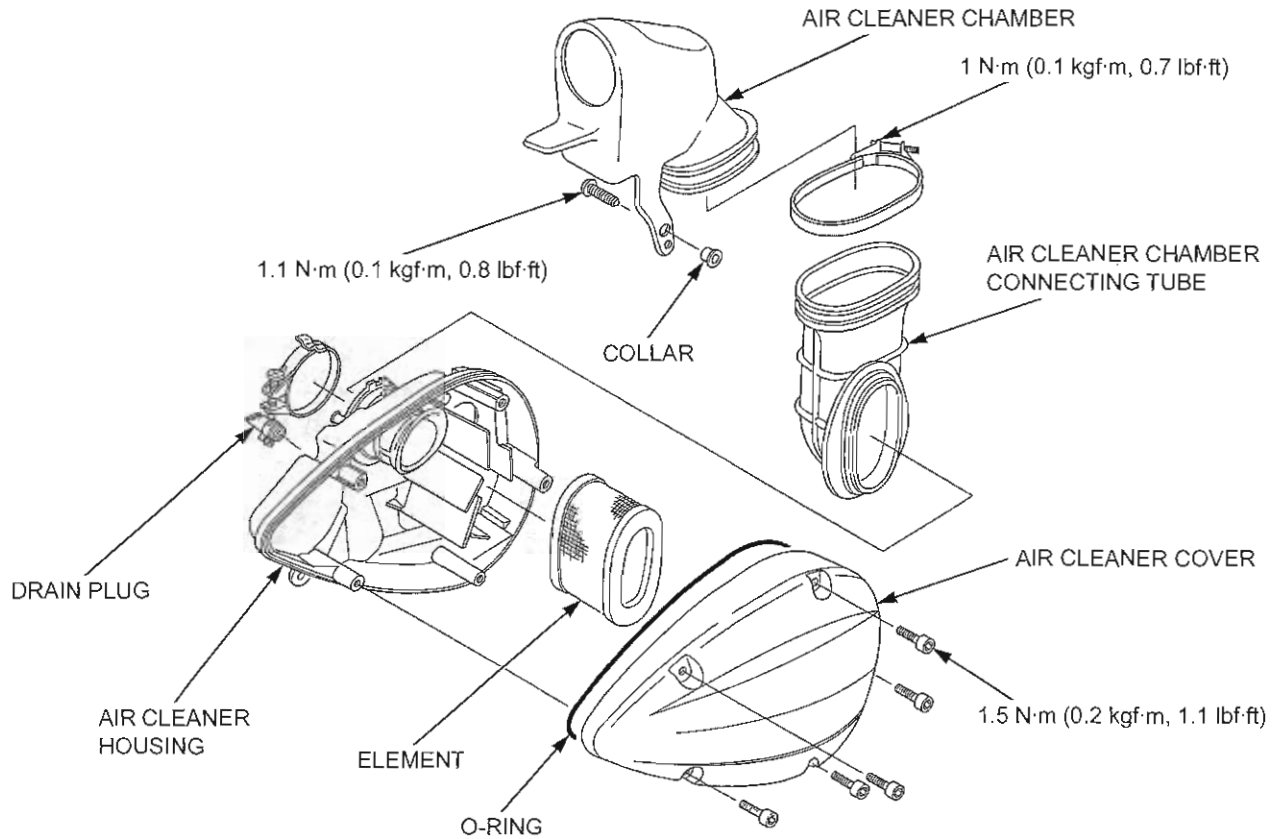
Remove the air cleaner housing.



Disconnect the PAIR air suction hose from the air cleaner housing.

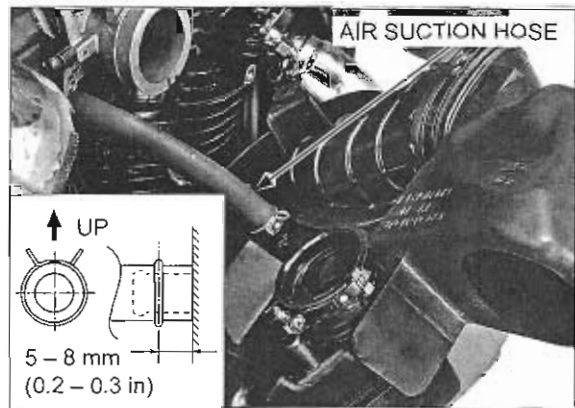


DISASSEMBLY/ASSEMBLY



INSTALLATION

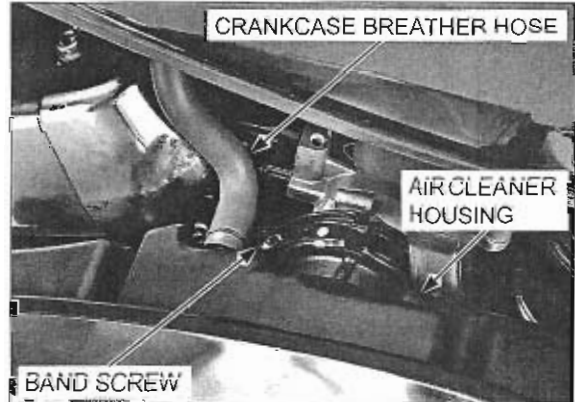
Connect the PAIR air suction hose to the air cleaner housing as shown.



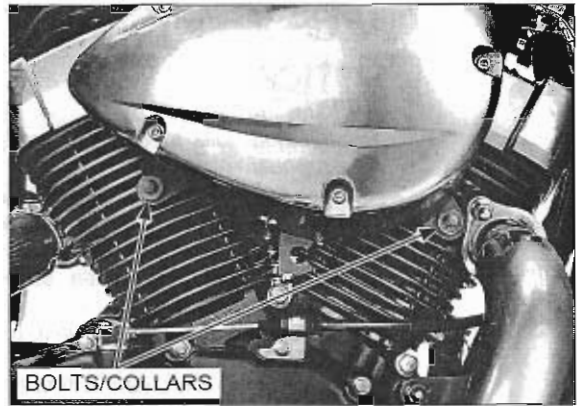
Connect the crankcase breather hose to the air cleaner housing.

Connect the connecting tube to the throttle body.

Tighten the air cleaner housing connecting tube band screw securely.



Install the collars, air cleaner housing mounting bolts, and tighten the mounting bolts securely.



THROTTLE BODY

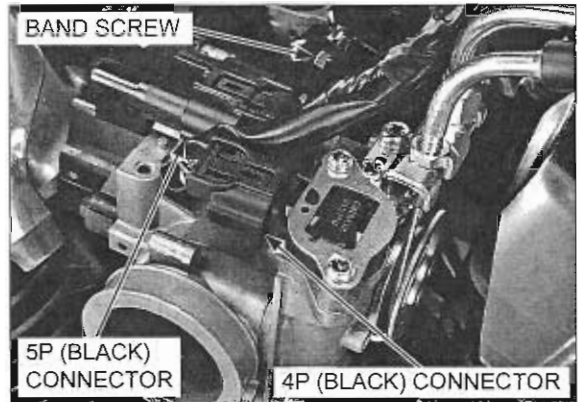
REMOVAL

Remove the air cleaner housing (page 5-45).

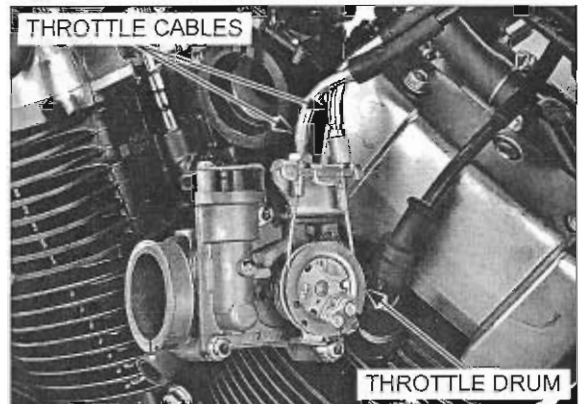
Disconnect the IACV 4P and sensor unit 5P (Black) connectors.

Loosen the insulator band screw.

Remove the throttle body from the insulator.



Loosen the throttle cable lock nuts and adjusting nut then disconnect the throttle cables from the throttle drum and cable bracket.



DISASSEMBLY/ASSEMBLY

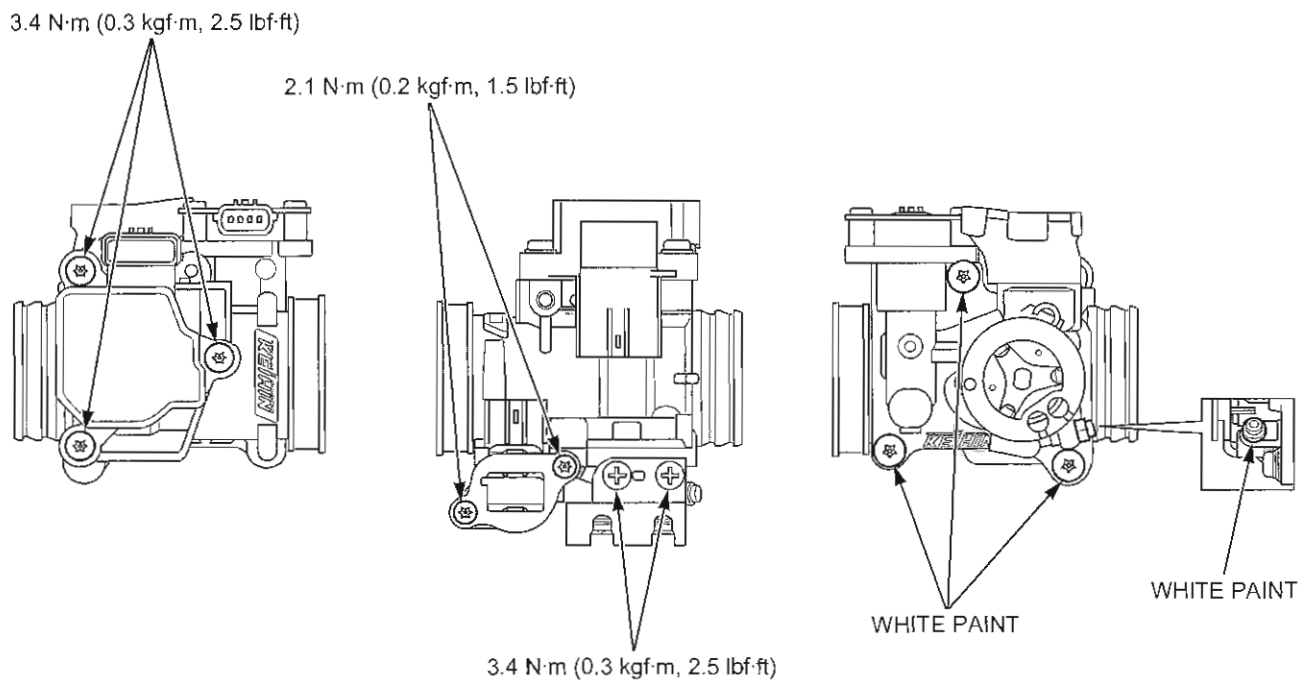
NOTICE

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

NOTE:

Perform the throttle valve fully closed reset procedure (page 5-50), if the sensor unit is removed from the throttle body.

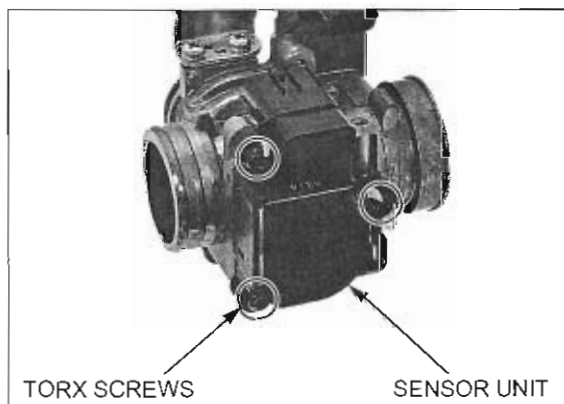
For IACV replacement (page 5-61).



If necessary, remove the torx screws and sensor unit from the throttle body.

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

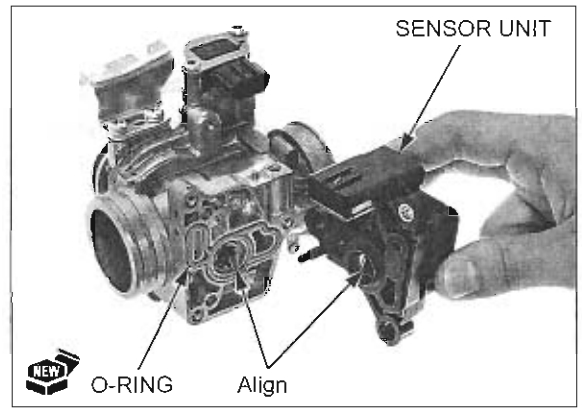
Blow open all air passages and sensor holes in the throttle body with compressed air.



Install a new O-ring into the groove of the throttle body.
Install the sensor unit while aligning TP sensor slot with the throttle valve shaft.

Tighten the sensor unit torx screws to the specified torque.

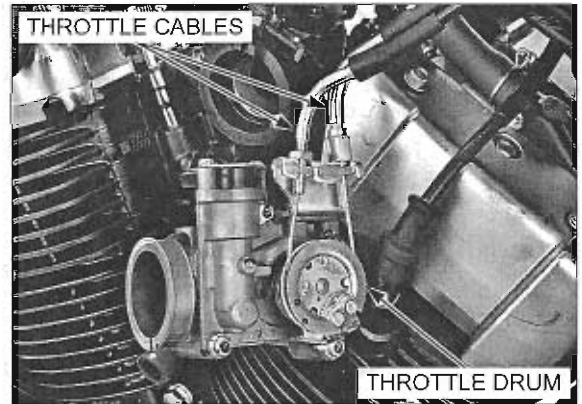
TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)



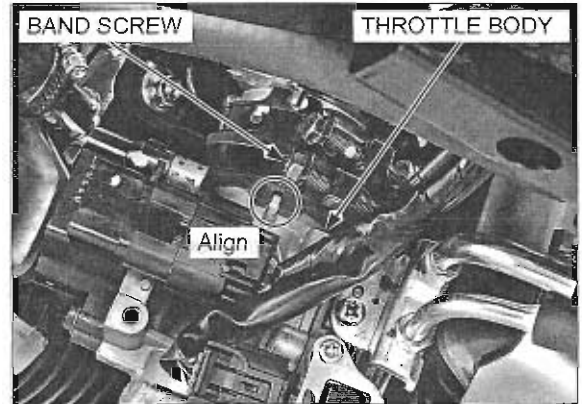
INSTALLATION

Route the throttle cables properly (page 1-19).

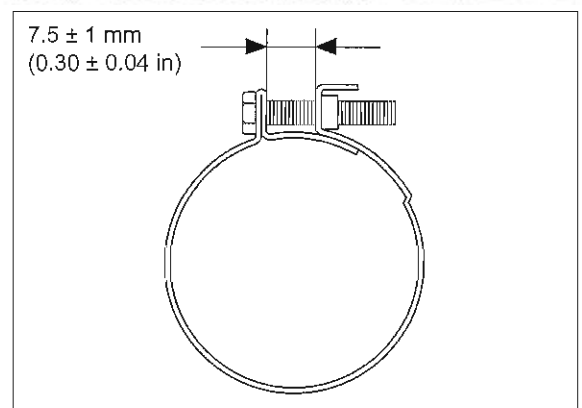
Connect the throttle cables to the throttle drum and cable bracket.



Install the throttle body to the insulator by aligning its lug with the slot in the insulator.



Tighten the insulator band screw so the insulator band distance is 7.5 ± 1 mm (0.30 ± 0.04 in).

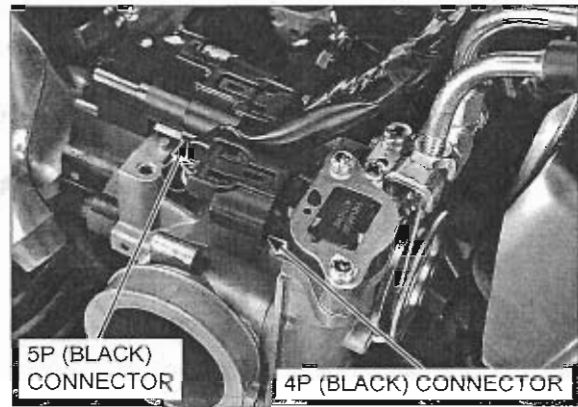


FUEL SYSTEM (PGM-FI)

Connect the sensor unit 5P and IACV 4P (Black) connectors.

Adjust the throttle grip freeplay (page 3-5).

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



THROTTLE VALVE FULLY CLOSED POSITION RESET PROCEDURE

NOTE:

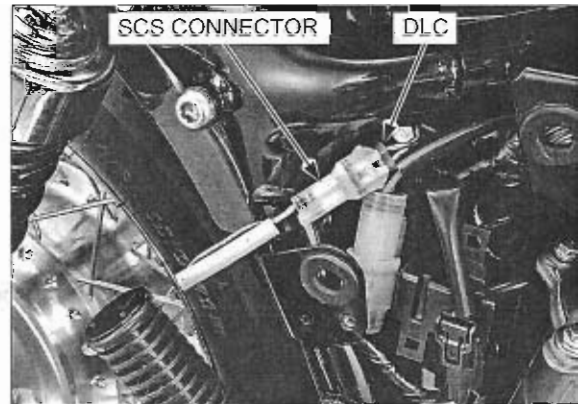
If the sensor unit is removed, reset the throttle valve fully closed position as following procedure.

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

1. Erase the DTCs (page 5-14).
2. Turn the ignition switch OFF.
3. Remove the dummy connector and short DLC terminals using the special tool.

TOOL:

SCS connector 070PZ-ZY30100

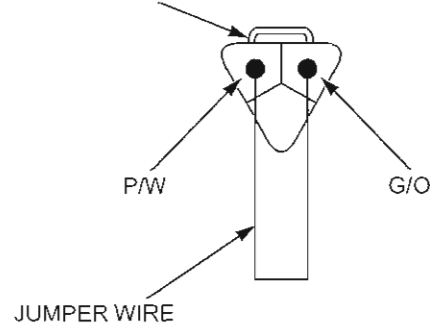


4. Disconnect the ECT sensor 3P (Gray) connector (page 6-10).

Connect the ECT sensor 3P (Gray) connector terminals with a jumper wire.

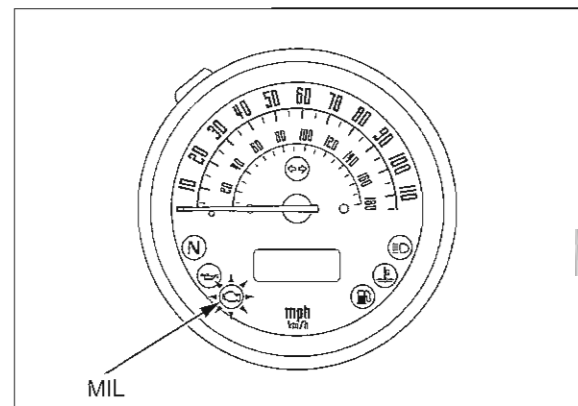
CONNECTION: Pink/white – Green/orange

ECT SENSOR 3P (GRAY) CONNECTOR
(Wire side/female terminal)



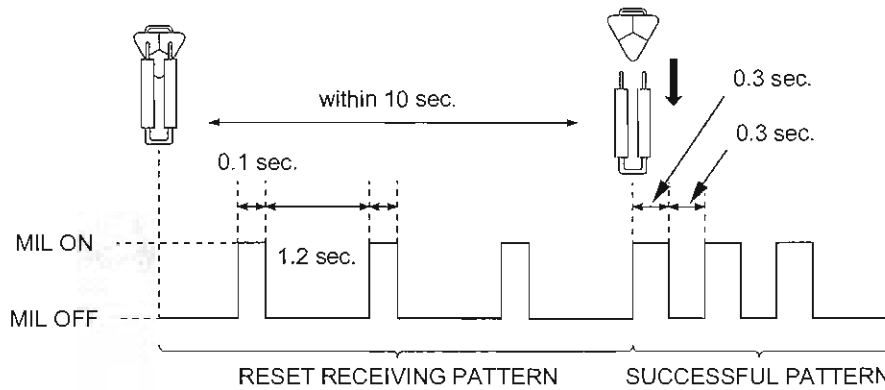
5. Turn the ignition switch ON and engine stop switch "O".

Within 10 seconds after turning the ignition switch ON, disconnect the jumper wire from the ECT sensor 3P (Gray) connector.



6. Check if the MIL blinks.

If the MIL begins short blink (0.3 seconds), the throttle valve fully closed position is reset.



If the MIL stays lit, the throttle valve fully closed position is not reset, repeat the reset procedure from step 1.

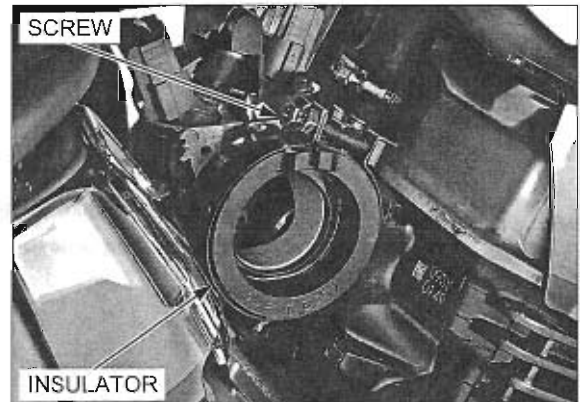
INTAKE MANIFOLD

REMOVAL

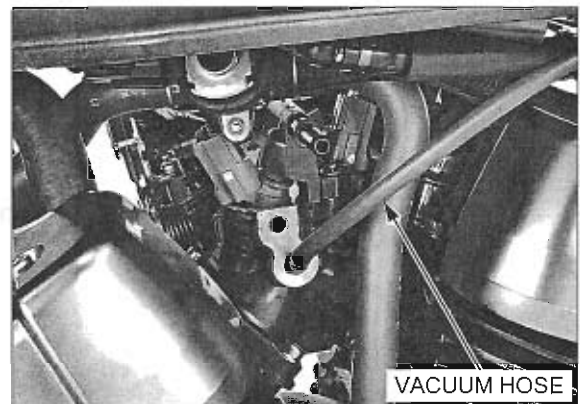
Relieve the fuel pressure and disconnect the quick connect fitting from the injector hose side.

Remove the throttle body (page 5-47).

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

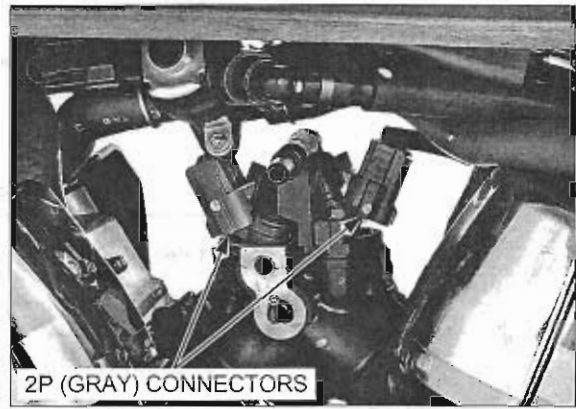


U.S.A. TYPE: Disconnect the vacuum hose.



FUEL SYSTEM (PGM-FI)

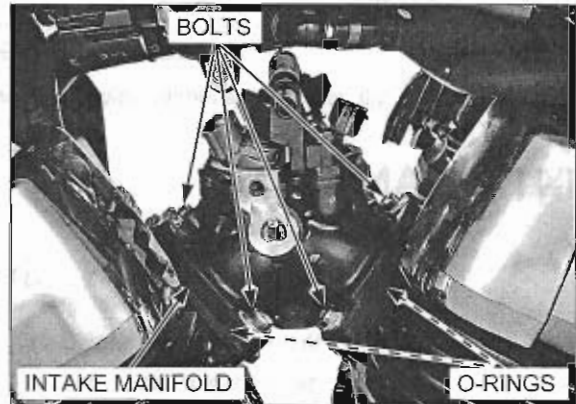
Disconnect the injector 2P (Gray) connectors.



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.

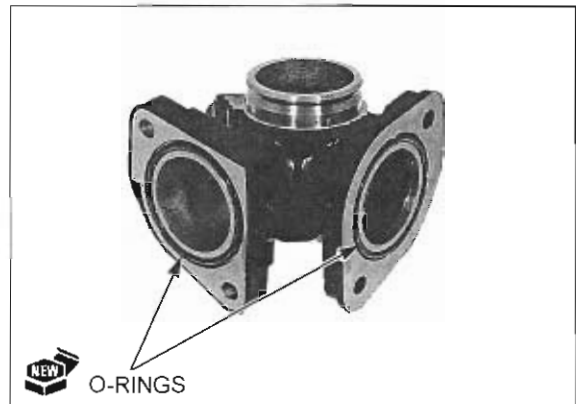
For the injector removal (page 5-54).



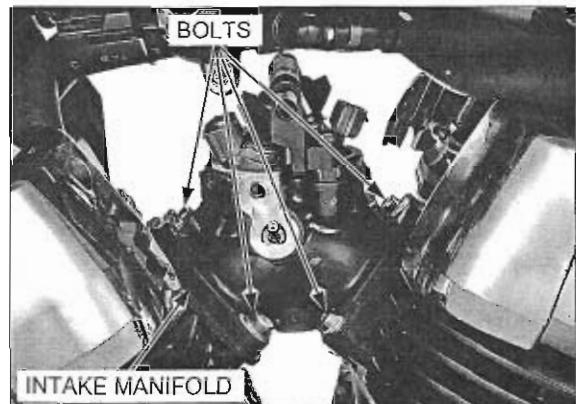
INSTALLATION

Install new O-rings onto the intake manifold.

Install the injectors, if they are removed (page 5-55).



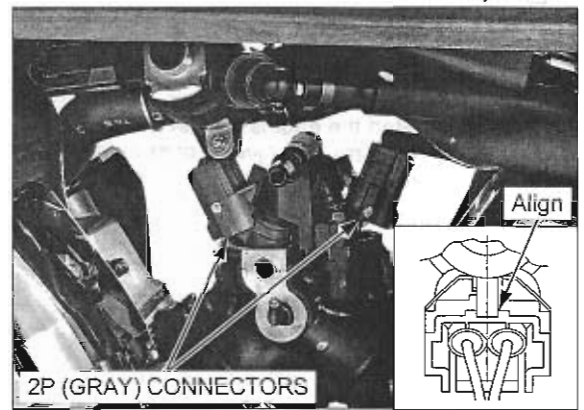
Install the intake manifold onto the cylinder heads.
Install the bolts and tighten them.



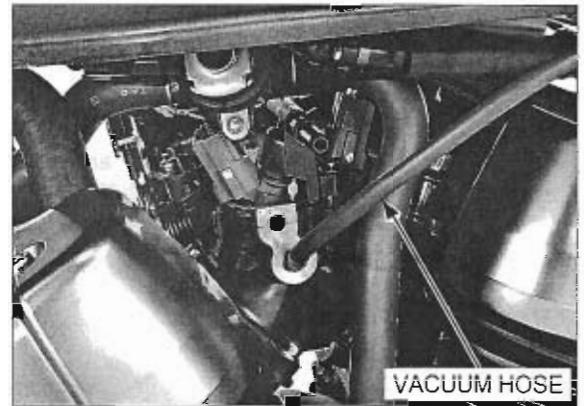
Connect the injector 2P (Gray) connectors.

NOTE:

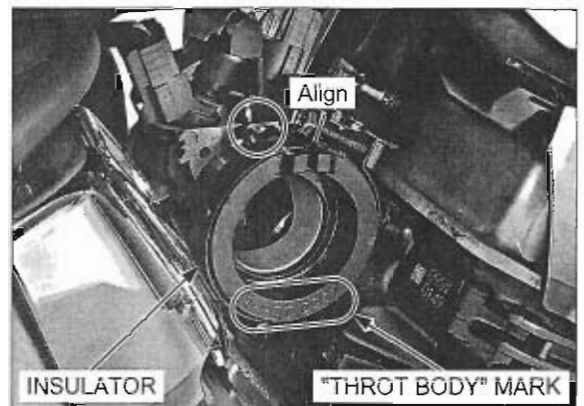
Align the tab of the injector cap with groove of the injector connector as shown.



U.S.A. TYPE: Connect the vacuum hose.



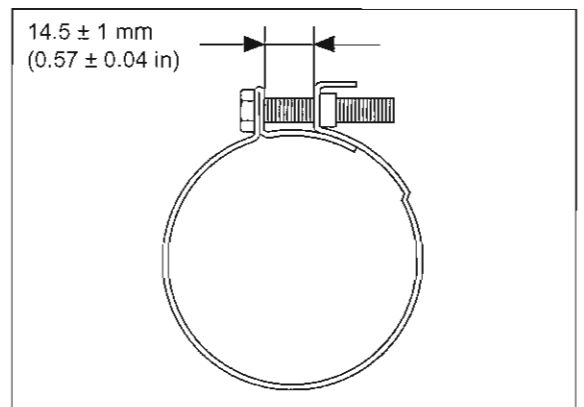
Install the insulator with the "THROT BODY" mark facing the throttle body side, aligning its slot with the lug on the intake manifold.



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

Connect the quick connect fitting to the injector hose side (page 5-32).

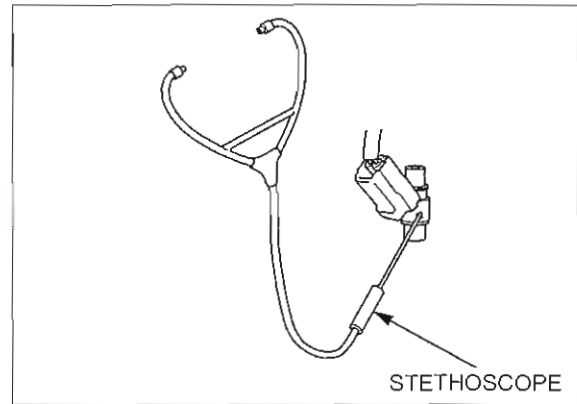
Install the throttle body (page 5-49).



INJECTOR

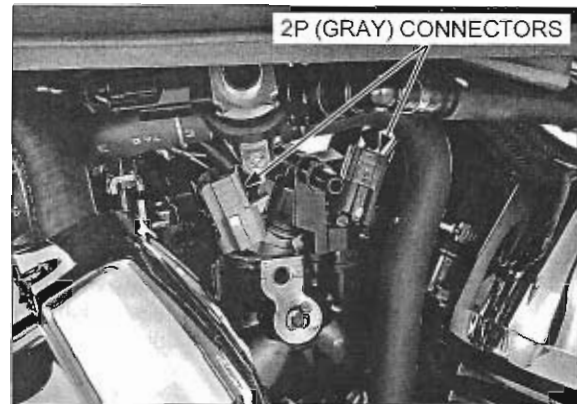
INSPECTION

Start the engine and let it idle.
Confirm the injector operating sounds with a sounding rod or stethoscope.

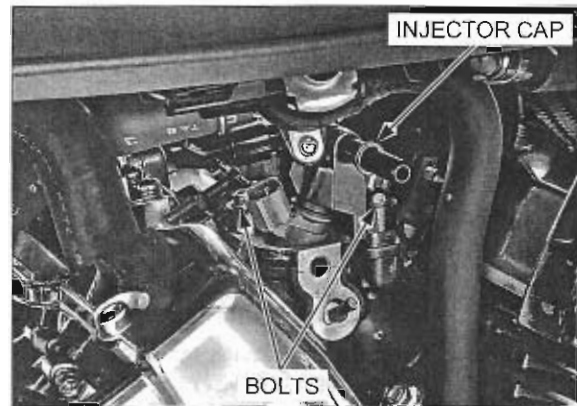


REMOVAL

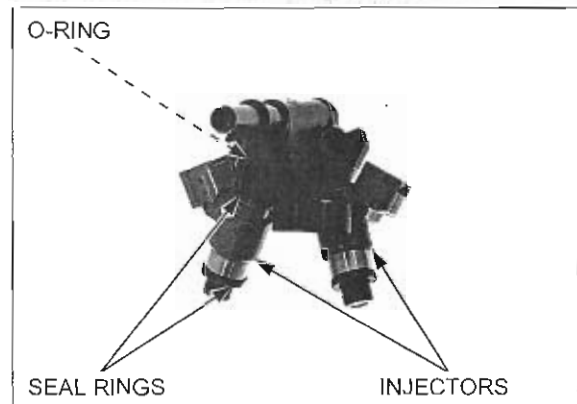
Relieve the fuel pressure and disconnect the quick connect fitting from the injector hose side (page 5-30).
Disconnect the injector 2P (Gray) connectors.



Remove the bolts and injector cap with injectors from the intake manifold.



Remove the injectors from the injector cap.
Remove the O-ring and seal rings.

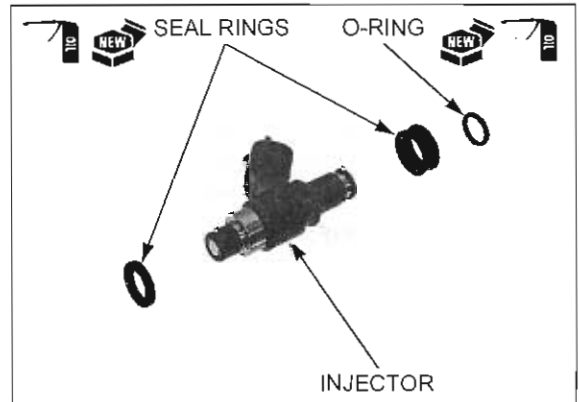


INSTALLATION

Coat new O-rings and new seal rings with engine oil.

Replace the O-ring and seal ring with new ones as a set.

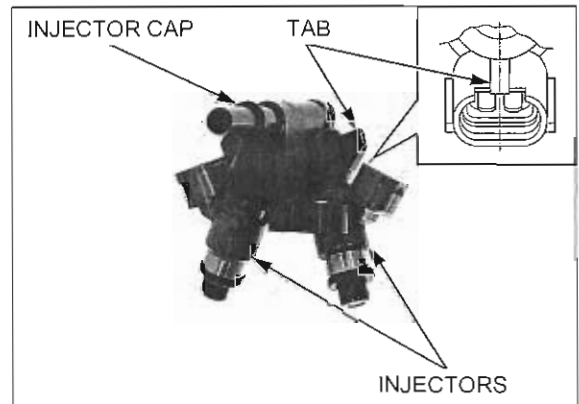
Install new O-rings and new seal rings, being careful not to damage.



Install the injectors into the injector cap.

NOTE:

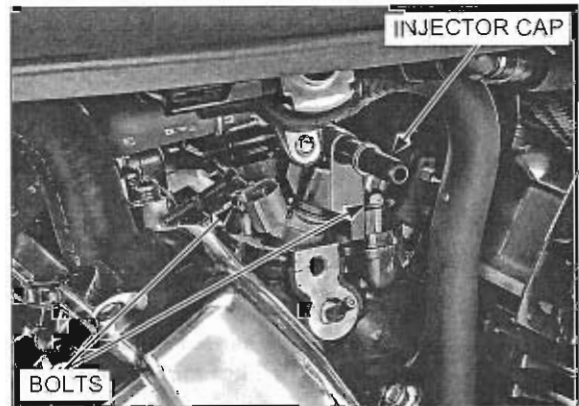
Align the tab of the injector cap with the injector terminals as shown.



Install the injector cap with the injectors to the intake manifold.

Install and tighten the bolts to the specified torque.

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

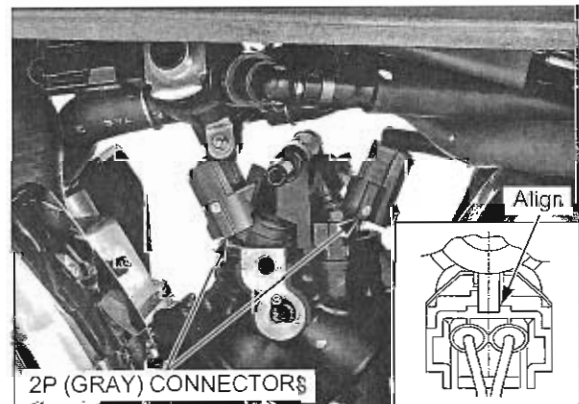


Connect the injector 2P (Gray) connectors.

NOTE:

Align the tab of the injector cap with groove of the injector connector as shown.

Connect the quick connect fitting to the injector hose side (page 5-32).



ECT SENSOR

REMOVAL/INSTALLATION

Remove the thermostat housing (page 6-10).

Remove the ECT sensor and sealing washer.

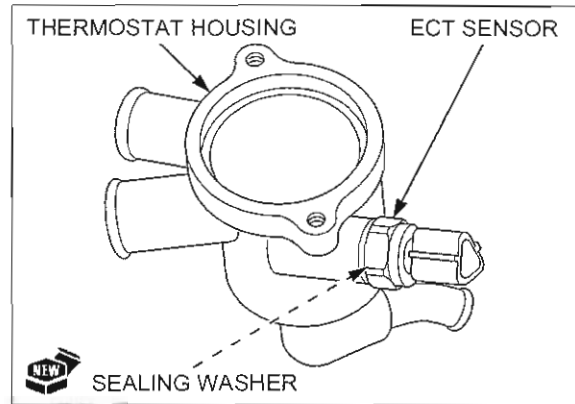
Always replace a sealing washer with a new one.

Install a new sealing washer and ECT sensor. Tighten the ECT sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the thermostat housing (page 6-11).

Fill the cooling system with recommended coolant (page 6-7).



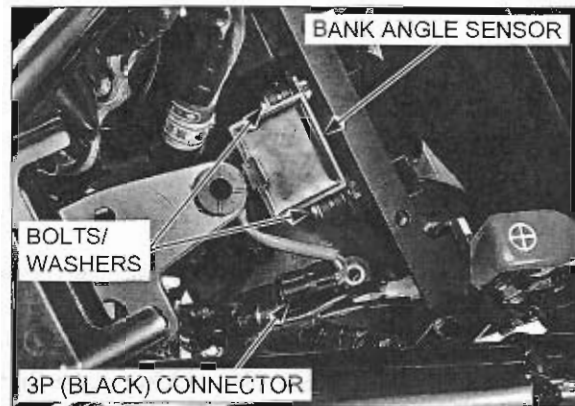
BANK ANGLE SENSOR

REMOVAL/INSTALLATION

Remove the battery case (page 16-6).

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

Remove the bolts, washers and bank angle sensor.

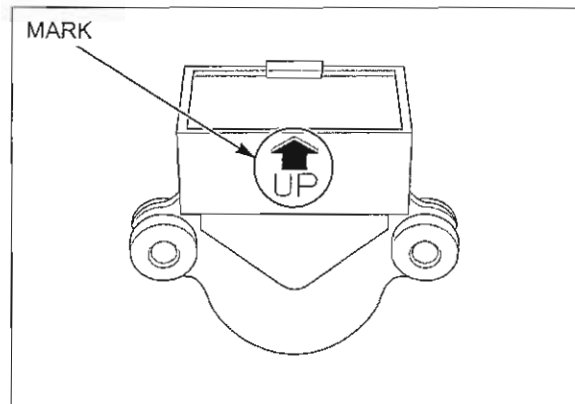


Install the bank angle sensor with its "UP" mark facing up.

Install the removed parts in the reverse order of removal.

TORQUE:

**Bank angle sensor mounting bolt:
2 N·m (0.2 kgf·m, 1.5 lbf·ft)**



SYSTEM INSPECTION

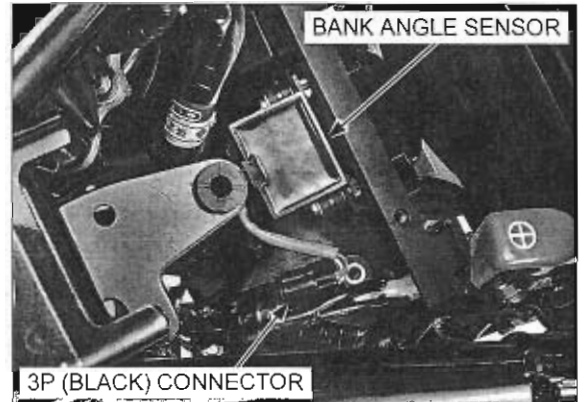
Support the motorcycle on a level surface.

Remove the battery case (page 16-6).

Do not disconnect the bank angle sensor 3P (Black) connector during inspection.

Remove the bank angle sensor with the bank angle sensor 3P (Black) connector is connected (page 5-56).

Connect the battery (page 16-6).



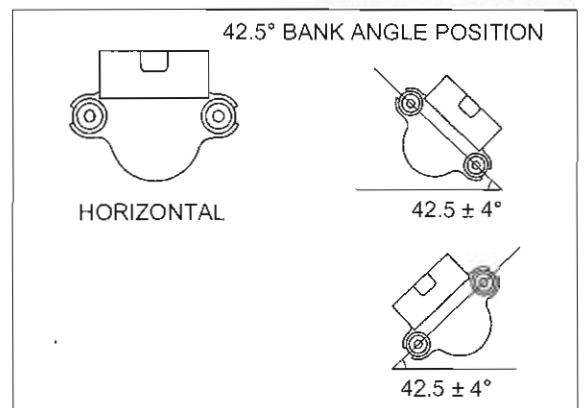
Before you perform this test, turn the ignition switch OFF, then turn the ignition switch ON and engine stop switch "O".

Place the bank angle sensor is horizontal (normal position) as shown, and ignition switch ON and engine stop switch "O".

Incline the bank angle sensor $42.5 \pm 4^\circ$ to the left or right with keep the ignition switch ON and engine stop switch "O".

The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.



INPUT VOLTAGE/GROUND LINE INSPECTION

NOTE:

Check the bank angle sensor system inspection (page 5-57) before checking the input voltage/ground line.

1. Input Voltage Line Inspection

Turn the ignition switch OFF.

Remove the battery case (page 16-6).

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

Temporarily install the battery (page 16-6).

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage at the bank angle sensor 3P (Black) connector of wire side and ground.

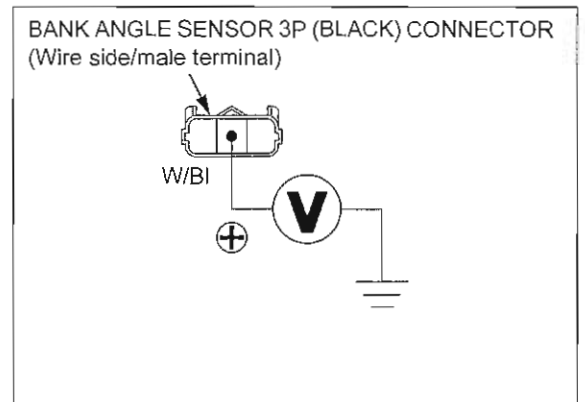
CONNECTION: White/black (+) – Ground (-)

STANDARD: Battery voltage

Is there battery voltage?

YES – GO TO STEP 2.

- NO** –
- Open circuit in White/black wire
 - Faulty ignition switch
 - Blown main fuse 30 A
 - Blown sub fuse 10 A (ENG STOP)



FUEL SYSTEM (PGM-FI)

2. Engine Stop Relay Coil Line Inspection

Turn the engine stop switch "O".

Measure the voltage at the bank angle sensor 3P (Black) connector of wire side and ground.

CONNECTION: Red/green (+) – Ground (-)

STANDARD: Battery voltage

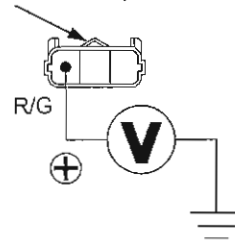
Is there battery voltage?

YES – GO TO STEP 3.

NO –

- Open circuit in Red/green wire
- Faulty engine stop relay
- Faulty engine stop switch

BANK ANGLE SENSOR 3P (BLACK) CONNECTOR
(Wire side/male terminal)



3. Ground Line Inspection

Turn the ignition switch OFF.

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

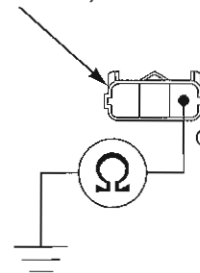
CONNECTION: Green – Ground

Is there continuity?

YES – Faulty bank angle sensor

NO – Open circuit in Green wire

BANK ANGLE SENSOR 3P (BLACK) CONNECTOR
(Wire side/male terminal)



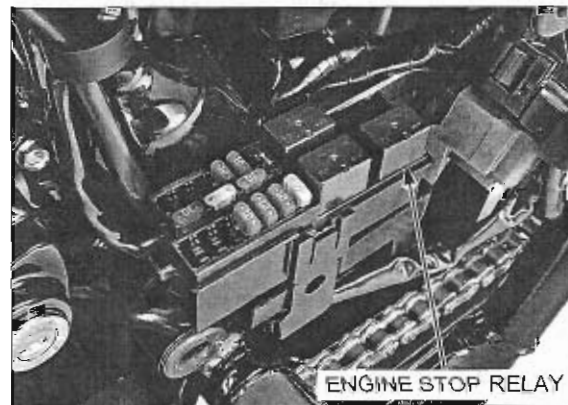
ENGINE STOP RELAY

INSPECTION

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

Remove the power box cover.

Remove the engine stop relay from the power box.



Connect the ohmmeter to the relay connector terminals.

CONNECTION: A – B

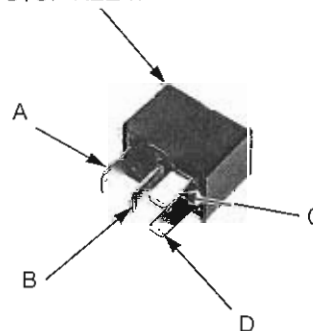
Connect the 12 V battery to the following relay connector terminals.

CONNECTION: C – D

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the engine stop relay.

ENGINE STOP RELAY



ECM

ECM POWER/GROUND LINE INSPECTION

Engine does not start (MIL does not blink)

1. ECM Power Input Voltage Inspection

Disconnect the ECM 33P (Black and Gray) connectors (page 5-60).
Temporarily install the battery (page 16-6).

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage at the ECM 33P (Black) connector terminals and ground.

CONNECTION: A4 (+) – Ground (-)

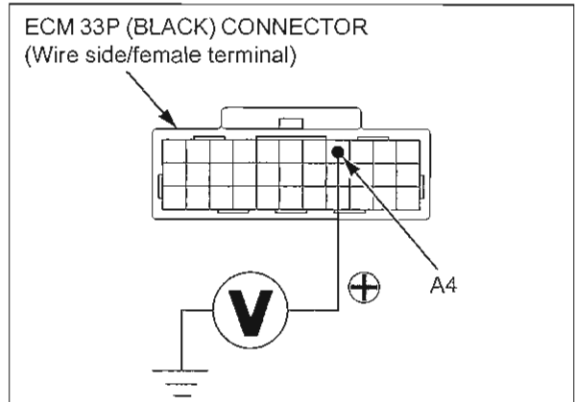
TOOL:

Test probe **07ZAJ-RDJA110**

Does the battery voltage exist?

YES – GO TO STEP 2.

NO – GO TO STEP 3.



2. ECM Ground Line Inspection

Turn the ignition switch OFF.
Check for continuity between the ECM 33P (Black and Gray) connector terminals and ground.

CONNECTION: A23 – Ground
B4 – Ground

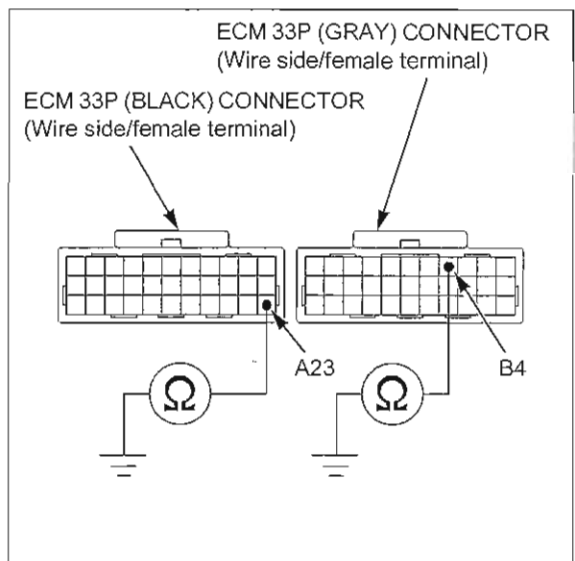
TOOL:

Test probe **07ZAJ-RDJA110**

Is there continuity?

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

NO – Open circuit in GROUND line



3. Engine Stop Relay Inspection 1

Turn the ignition switch OFF.
Remove the engine stop relay from the power box (page 5-58).

Turn the ignition switch ON and engine stop switch "O".

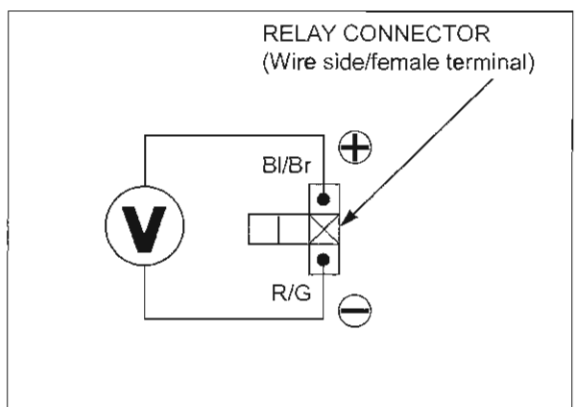
Measure the voltage at the engine stop relay terminals.

CONNECTION: Black/brown (+) – Red/green (-)

Is there battery voltage?

NO – Inspect the bank angle sensor (page 5-56)

YES – GO TO STEP 4.



FUEL SYSTEM (PGM-FI)

4. Engine Stop Relay Inspection 2

Turn the ignition switch OFF.
Connect the engine stop relay connector terminals with a jumper wire as shown.

CONNECTION: Red/white – Black/white

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage at the ECM 33P (Black) connector terminals and ground.

CONNECTION: A4 (+) – Ground (-)

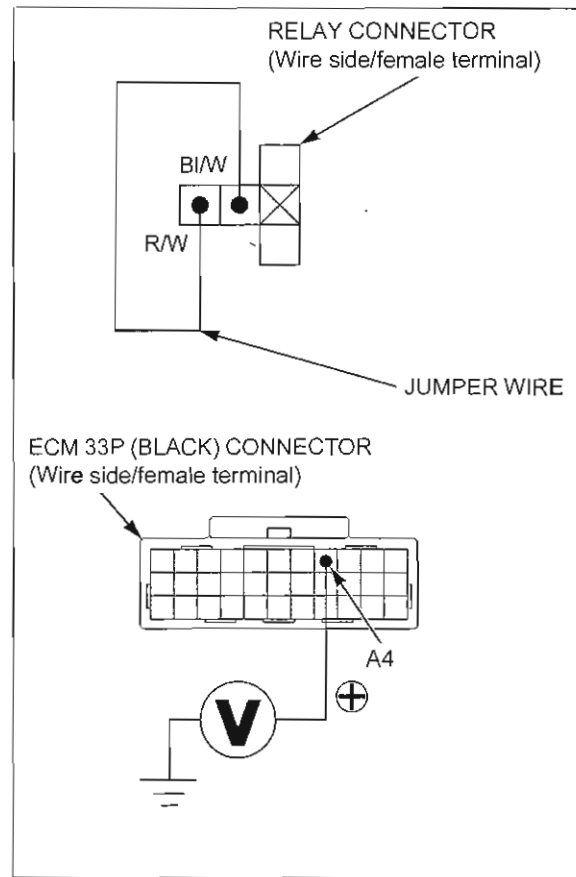
TOOL:

Test probe 07ZAJ-RDJA110

Is there battery voltage?

YES – • Inspect the engine stop relay (page 5-58)
• Inspect the engine stop switch (page 19-17)

NO – • Open circuit in Red/white or Black/white wire between the battery and ECM
• Faulty FI fuse (20 A)



REMOVAL/INSTALLATION

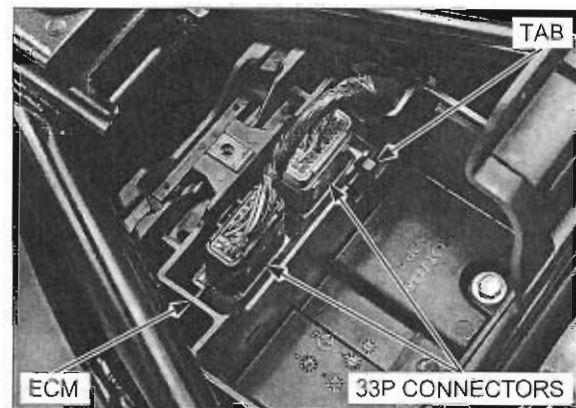
Turn the ignition switch OFF.

Remove the battery (page 16-6).

Be careful not to damage the ECM and wire harnesses.

Release the tab and remove the ECM.
Disconnect the ECM 33P connectors.

Installation is in the reverse order of removal.



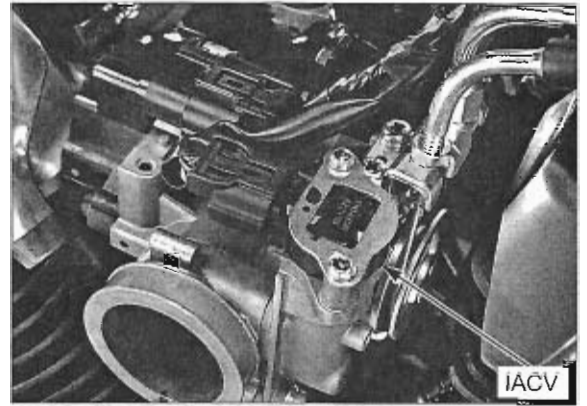
IACV

INSPECTION

Remove the air cleaner housing (page 5-45).

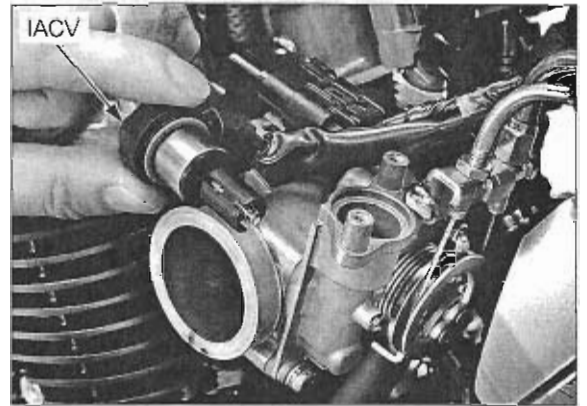
The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned to ON, the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned to ON.



The IACV operation can be checked visually as following:

- Remove the IACV (page 5-61) from the throttle body with its 4P (Black) connector connected, then turn the ignition switch ON.



REMOVAL

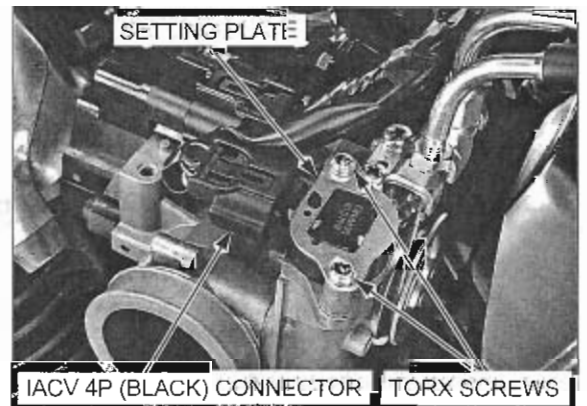
NOTE:

Always clean the throttle body before the IACV removal to prevent dirt and debris from entering the IACV passage.

Remove the air cleaner housing (page 5-45).

Disconnect the IACV 4P (Black) connector.

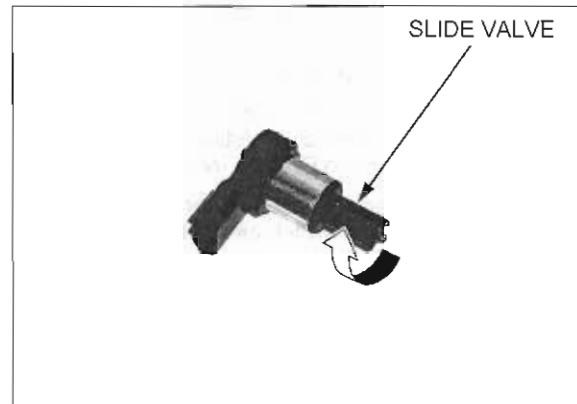
Remove the torx screws, setting plate and IACV.



FUEL SYSTEM (PGM-FI)

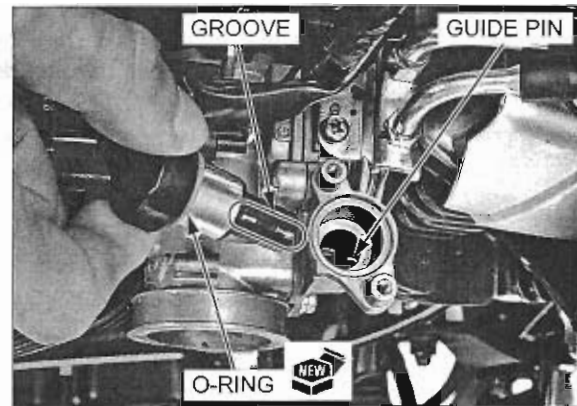
INSTALLATION

Turn the slide valve clockwise until lightly seated on IACV.



Install a new O-ring to the IACV.

Install the IACV into the throttle body while aligning the valve slit with the guide pin in the throttle body.



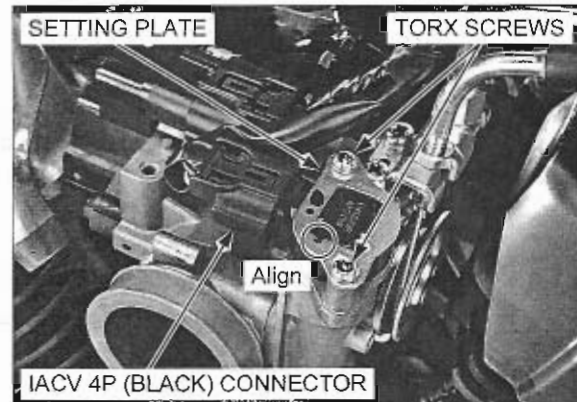
Install the setting plate while aligning its groove with the boss of the IACV.

Connect the IACV 4P (Black) connector.

Install and tighten the IACV setting plate torx screws to the specified torque.

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

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



SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

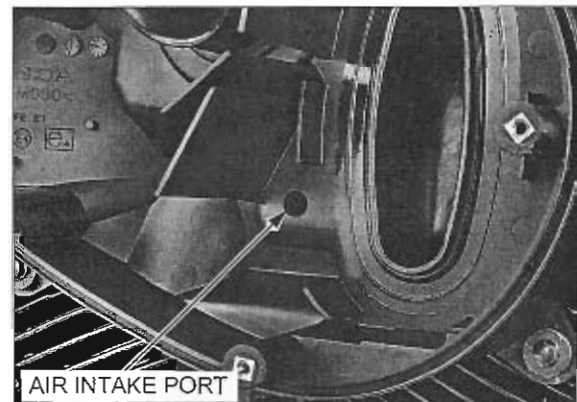
Start the engine and warm it up to coolant temperature is 80°C (176°F).

Stop the engine.

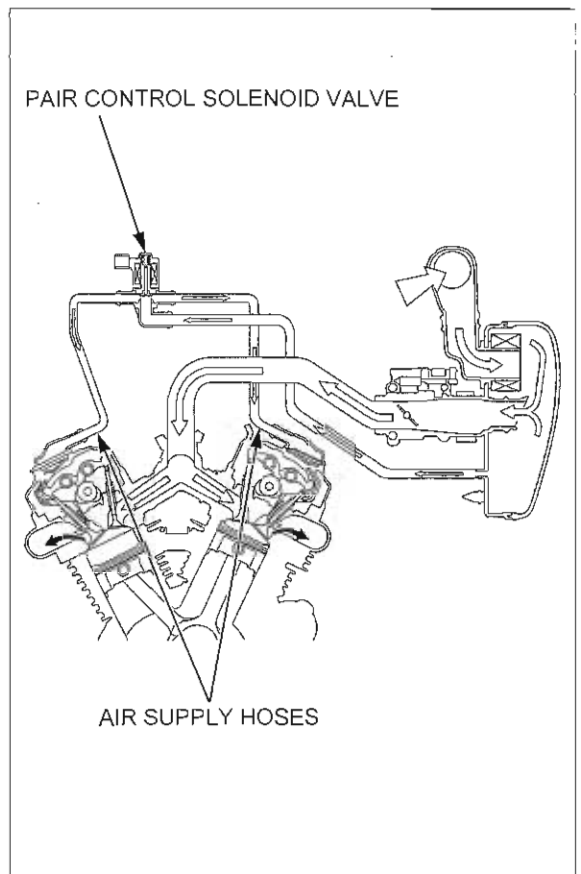
Remove the air cleaner cover (page 3-6).

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

Check the PAIR check valve if the port is carbon fouled (page 5-64).



Start the engine and open the throttle slightly to be certain that air is sucked in through the air supply hose. If the air is not drawn in, check the air supply hoses for clogs and PAIR control solenoid valve (page 5-63).



PAIR CONTROL SOLENOID VALVE

REMOVAL/INSTALLATION

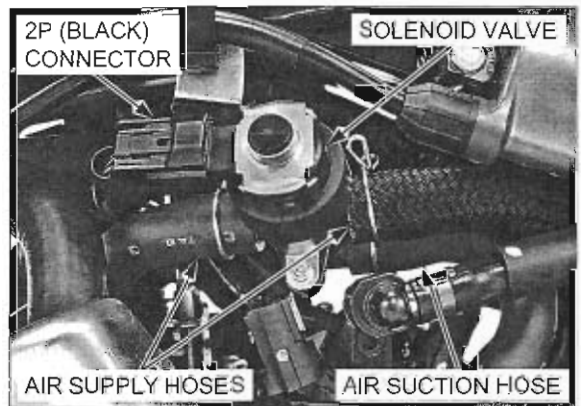
Remove the fuel tank (page 5-43).

Disconnect the PAIR control solenoid valve 2P (Black) connector.

Disconnect the air suction and air supply hoses from the PAIR control solenoid valve.

Remove the PAIR control solenoid valve from the stay of the frame.

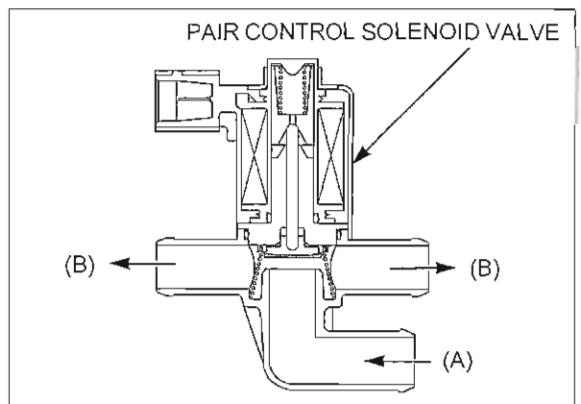
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR control solenoid valve (page 5-63).

Check that air does not flow (A) to (B) when the 12 V battery is connected to the PAIR control solenoid valve terminals. Air should flow (A) to (B) when there is no voltage applied to the PAIR control solenoid valve terminals.



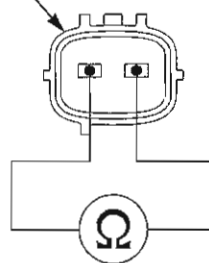
FUEL SYSTEM (PGM-FI)

Measure the resistance between the connector terminals.

STANDARD: 23 – 27 Ω (20°C/68°F)

If it is out of the standard, replace the PAIR control solenoid valve.

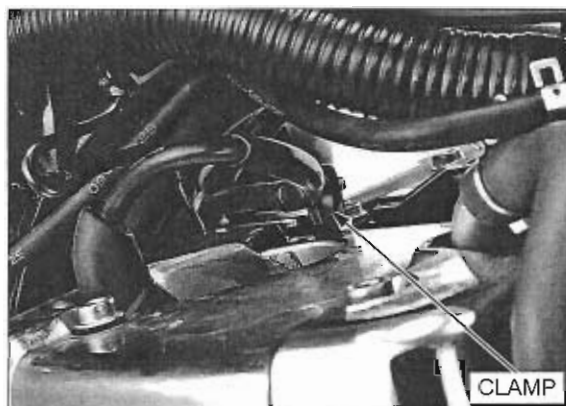
2P (BLACK) CONNECTOR
(Solenoid valve side/male terminal)



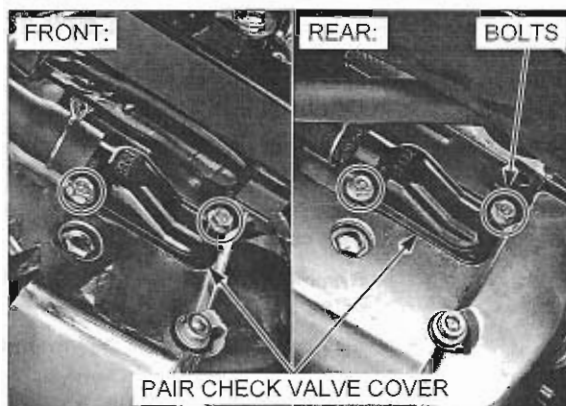
PAIR CHECK VALVE INSPECTION

Remove the fuel tank (page 5-43).

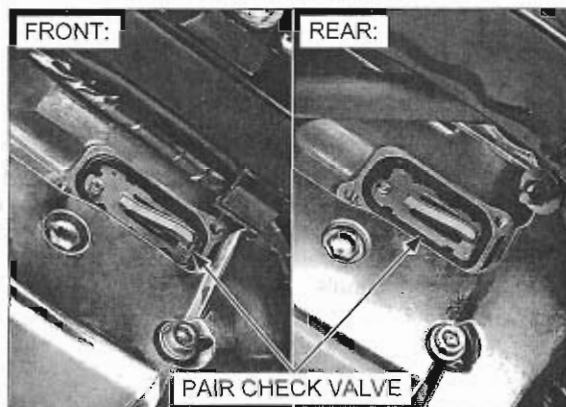
Remove the spark plug wire clamp from the stay.



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.

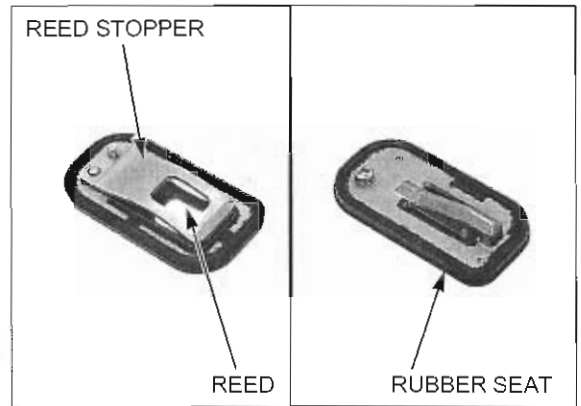
Install the PAIR check valve in the reverse order of removal.

TORQUE:

PAIR check valve cover bolt:
 7 N·m (0.7 kgf-m, 5.2 lbf-ft)

Install the spark plug wire clamp to the stay.

Install the fuel tank (page 5-44).



EVAP PURGE CONTROL SOLENOID VALVE/CANISTER (U.S.A. TYPE)

REMOVAL/INSTALLATION

Remove the bolts, stay, collars and EVAP canister.

Disconnect the following from the EVAP canister:

- Fuel tank breather hose
- Canister-to-EVAP purge control solenoid valve hose
- Air inlet hose
- Drain hose

Disconnect the EVAP purge control solenoid valve 2P (Black) connector.

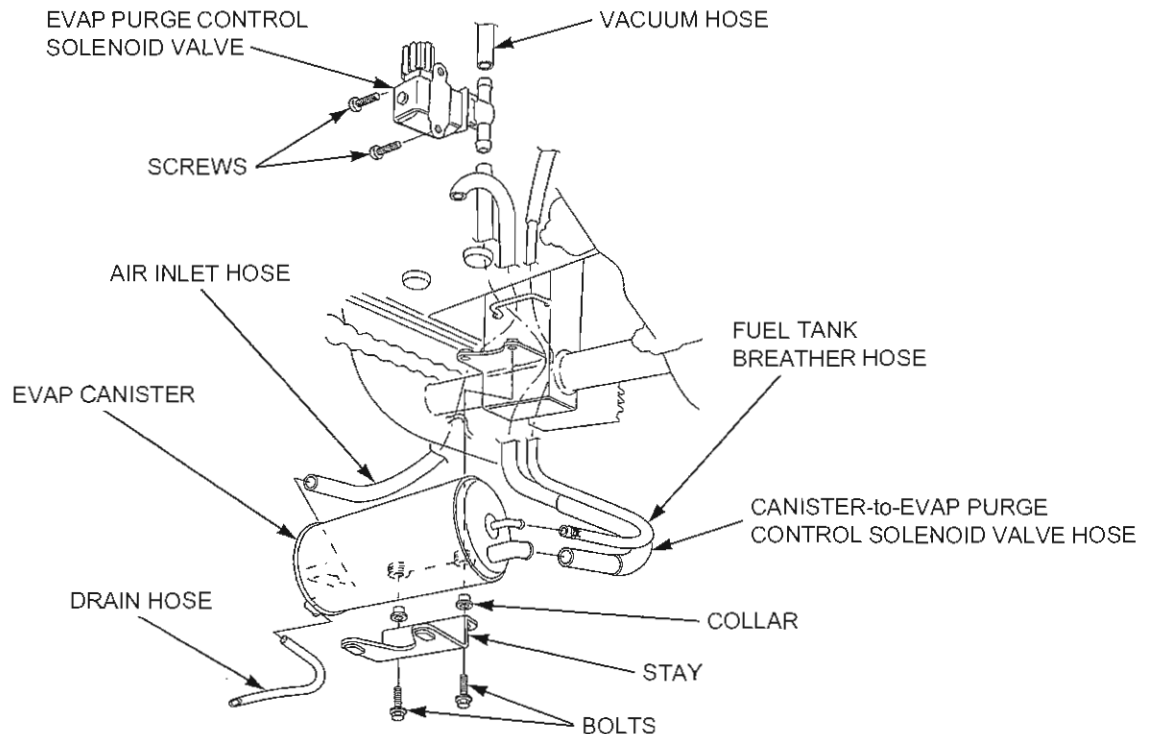
Remove the screws and EVAP purge control solenoid valve.

Disconnect the following from the EVAP purge control solenoid valve:

- Vacuum hose
- Canister-to-EVAP purge control solenoid valve hose

Installation is in the reverse order of removal.

Route the hoses and wire properly (page 1-19).

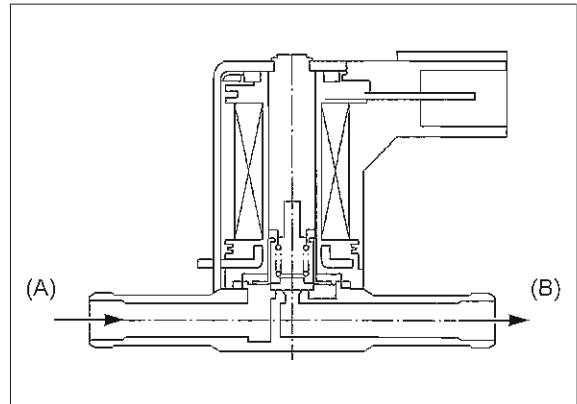


FUEL SYSTEM (PGM-FI)

INSPECTION

Remove the EVAP purge control solenoid valve (page 5-65).

Check that air should flow (A) to (B), only when a 12 V battery is connected to the EVAP purge control solenoid valve terminal.

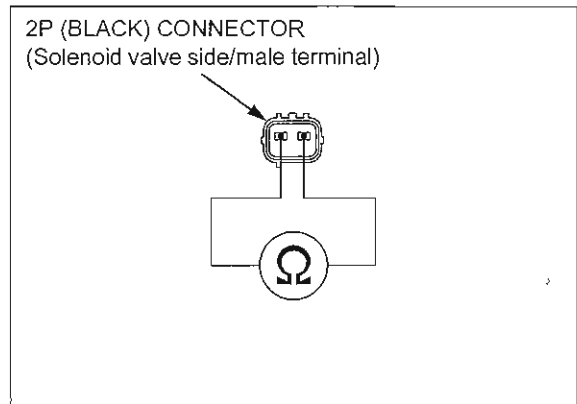


Measure the resistance at the EVAP purge control solenoid valve 2P (Black) connector solenoid valve side.

STANDARD 30 – 34 Ω (20°C/68°F)

If the resistance is out specification, replace the EVAP purge control solenoid valve.

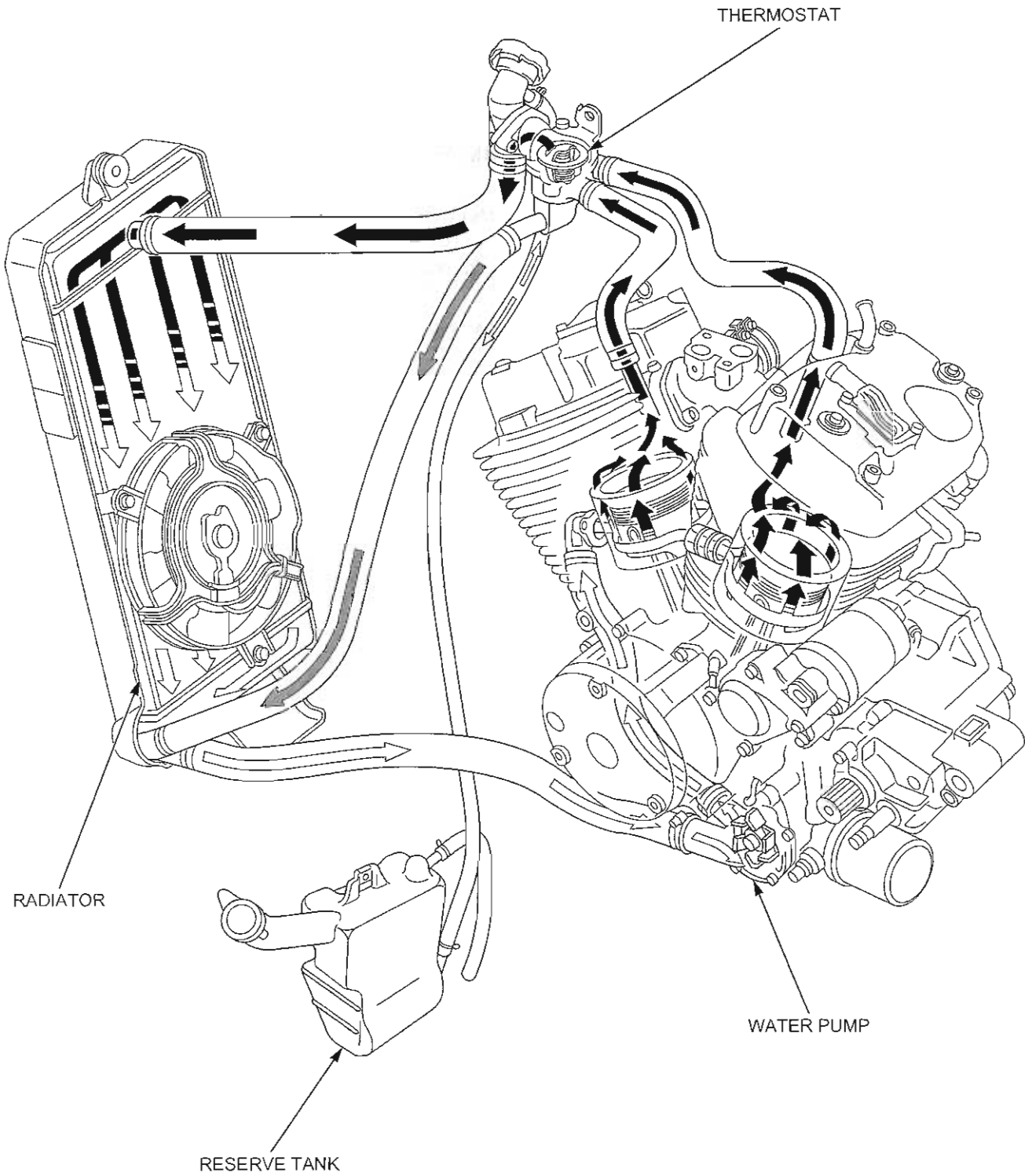
2P (BLACK) CONNECTOR
(Solenoid valve side/male terminal)



6. COOLING SYSTEM

SYSTEM FLOW PATTERN.....	6-2	THERMOSTAT HOUSING.....	6-10
SERVICE INFORMATION.....	6-3	RADIATOR/COOLING FAN.....	6-12
TROUBLESHOOTING.....	6-4	WATER PUMP.....	6-16
SYSTEM TESTING.....	6-5	RADIATOR RESERVE TANK.....	6-18
COOLANT REPLACEMENT.....	6-6	FAN CONTROL RELAY.....	6-19
THERMOSTAT.....	6-8		

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠ WARNING

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

NOTICE

Using coolant with silicate 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.
- The engine must be removed to service the water pump.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For the ECT sensor inspection (page 19-13).
- 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
Coolant capacity	Radiator and engine	2.51 liters (2.65 US qt, 2.21 Imp qt)
	Reserve tank	0.75 liter (0.79 US qt, 0.66 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (177 – 182°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 silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

TORQUE VALUES

Radiator filler mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Thermostat housing cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fan motor mounting bolt	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Cooling fan mounting nut	2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)	Apply locking agent to the threads.
Water pump cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Water pump drain bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Fan motor assembly mounting bolt	8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)	
Water hose band screw	–	See page 6-11
Drive chain guide plate upper mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Drive chain guide plate lower mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt

COOLING SYSTEM

TROUBLESHOOTING

Engine temperature too high

- Faulty coolant temperature indicator or ECT sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty fan motor
- Faulty water pump

Engine temperature too low

- Thermostat stuck open

Coolant leaks

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

SYSTEM TESTING

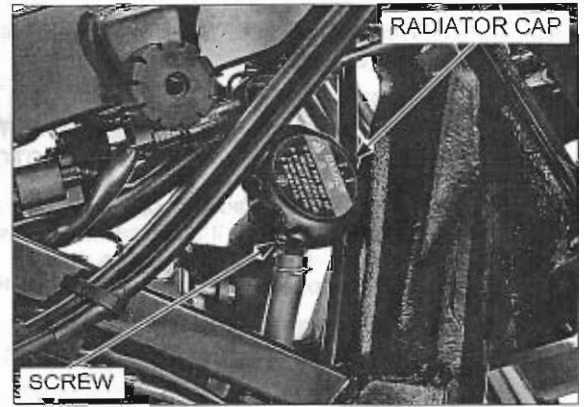
COOLANT (HYDROMETER TEST)

Remove the fuel tank (page 5-43).

Remove the screw and radiator cap.

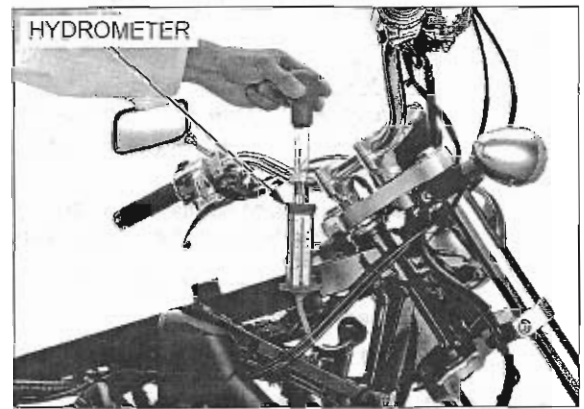
CAUTION

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



Test the coolant specific gravity using a hydrometer.

Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio %	5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
	10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
	15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
	20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
	25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
	30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
	35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
	40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
	45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
	50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
	55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071	

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the 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

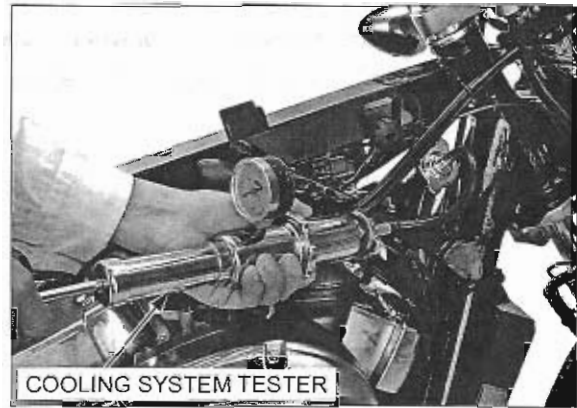
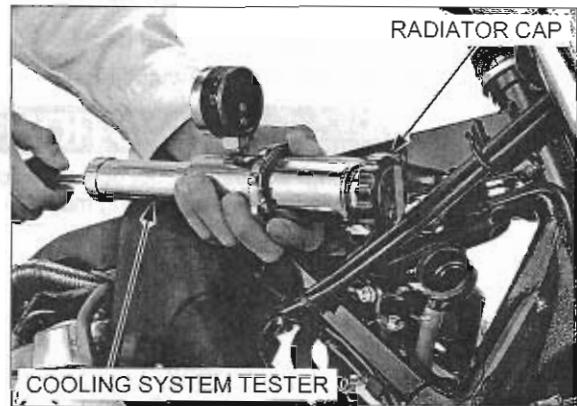
Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

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.

Tighten the screw.

Install the fuel tank (page 5-44).



COOLANT REPLACEMENT

PREPARATION

NOTE:

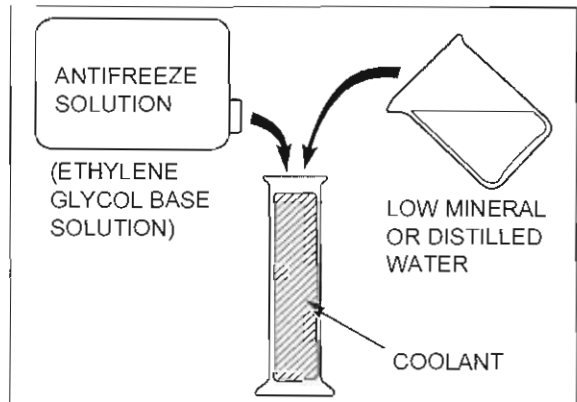
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the recommended antifreeze.

RECOMMENDED ANTIFREEZE:

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

STANDARD COOLANT CONCENTRATION:

1:1 (mixture with distilled water)



REPLACEMENT/AIR BLEEDING

NOTE:

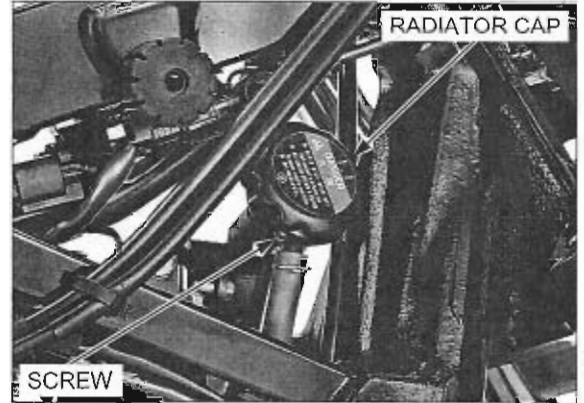
When filling the system or reserve tank with coolant or checking the coolant level, place the motorcycle in an upright position on a flat, level surface.

Remove the fuel tank (page 5-43).

Remove the screw and radiator cap.

CAUTION

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



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

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

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



Remove the radiator (page 6-12).

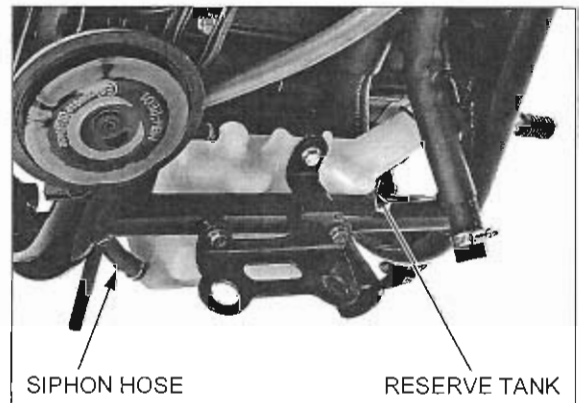
Disconnect the siphon hose from the reserve tank and drain the coolant.

Empty the coolant by removing the reserve tank (page 6-18).

Rinse the inside of the reserve tank with water.

Install the following:

- Reserve tank (page 6-18)
- Radiator (page 6-16)

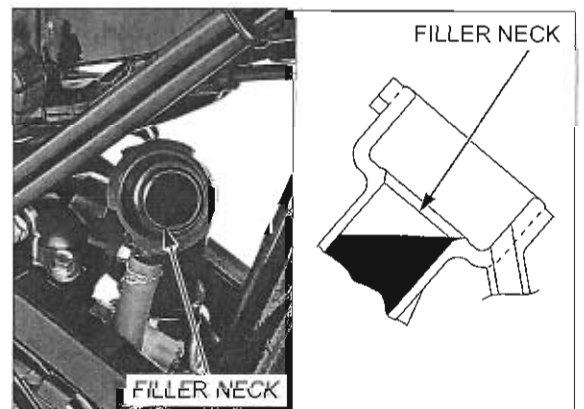


Fill the system with the recommended coolant through the filler opening up to the filler neck.

Install the fuel tank (page 5-44).

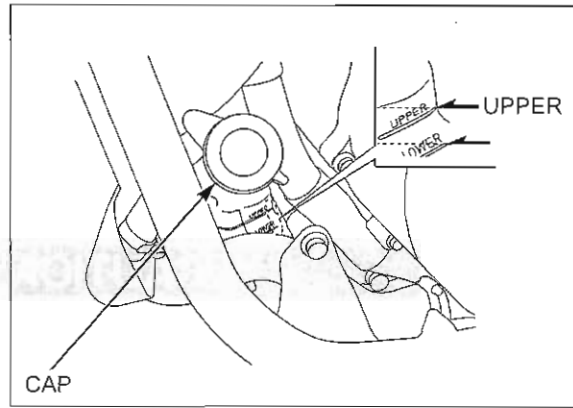
Bleed air from the system as follows:

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 5-43) and add the coolant up to the filler neck.
4. Install the radiator cap and tighten the screw.



COOLING SYSTEM

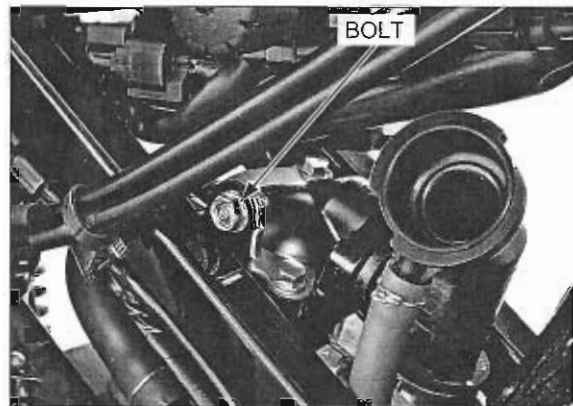
- Remove the reserve tank cap.
- Fill the reserve tank to the upper level line and install the tank cap.
- Install the fuel tank (page 5-44).



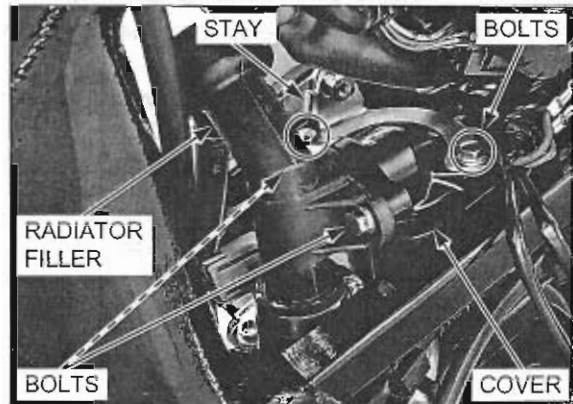
THERMOSTAT

REMOVAL

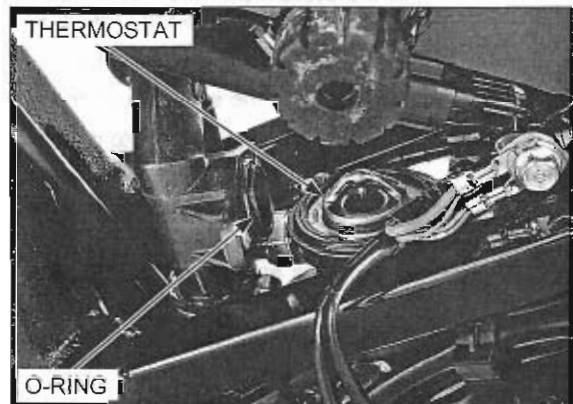
- Drain the coolant from the system (page 6-7).
- Disconnect the front spark plug caps (page 3-7).
- Place a shop towel under the thermostat housing.
- Remove the thermostat housing stay mounting bolt.



- Remove the thermostat housing cover bolts, stay and radiator filler mounting bolts.
- Remove the thermostat housing cover.

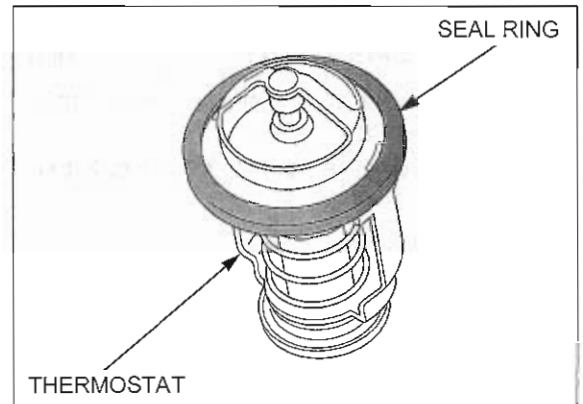


- Remove the O-ring and thermostat.



THERMOSTAT INSPECTION

Visually inspect the thermostat for damage.
Check for damage of the seal ring.



Replace the thermostat if the valve stays open at room temperature.

Wear insulated gloves and adequate eye protection.

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

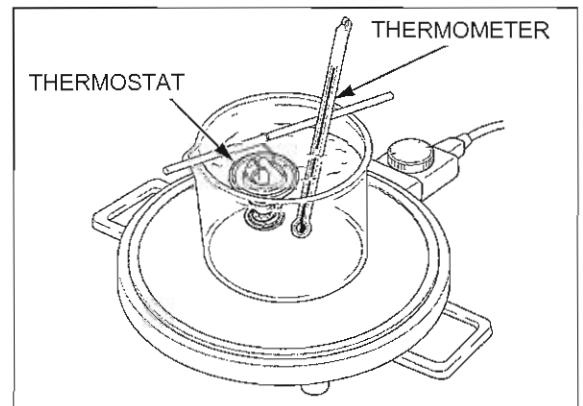
Keep flammable materials away from the electric heating element.

THERMOSTAT BEGIN TO OPEN:
80 – 84° C (177 – 182° F)

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

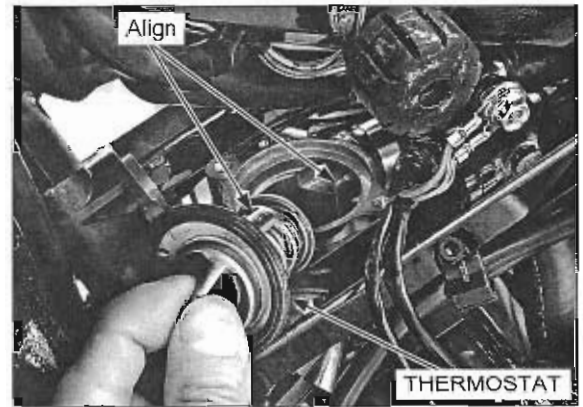
Do not let the thermostat or thermometer touch the pan, or you will get false readings.

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

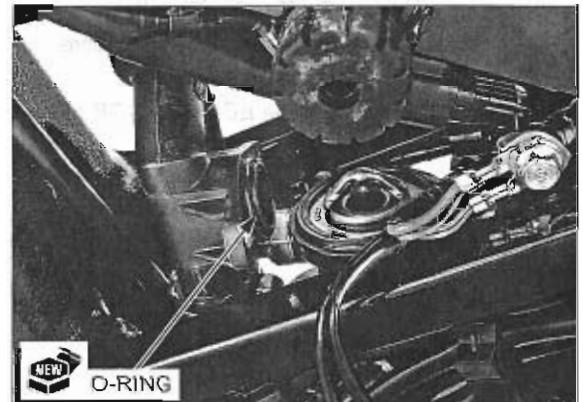


INSTALLATION

Install the thermostat by aligning its flange with the thermostat housing slot.



Install new O-ring into the radiator filler.



COOLING SYSTEM

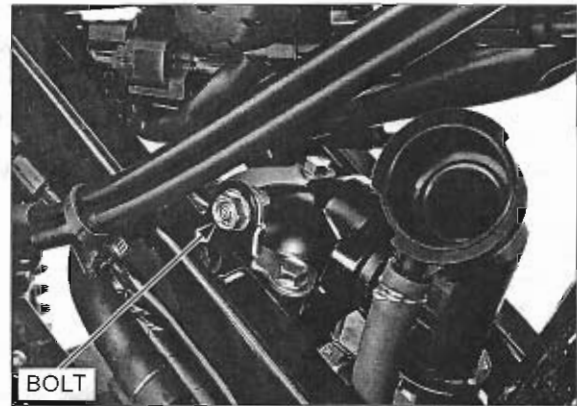
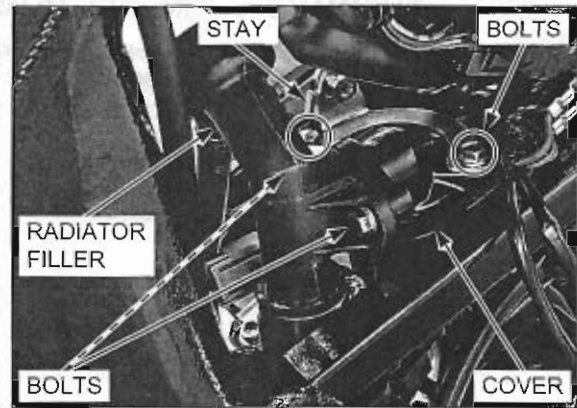
Install the stay, thermostat housing cover and tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the radiator filler and tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the thermostat housing stay mounting bolt.
Fill and bleed the cooling system (page 6-7).



THERMOSTAT HOUSING

REMOVAL

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

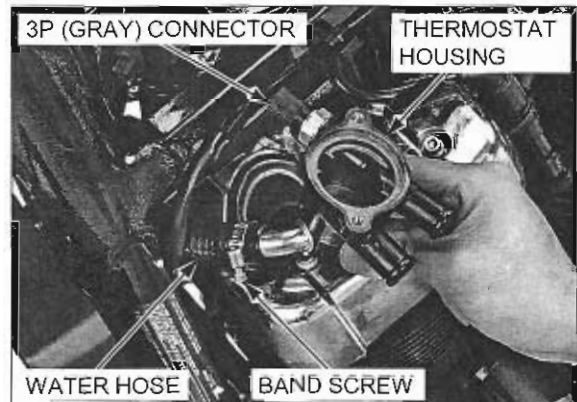
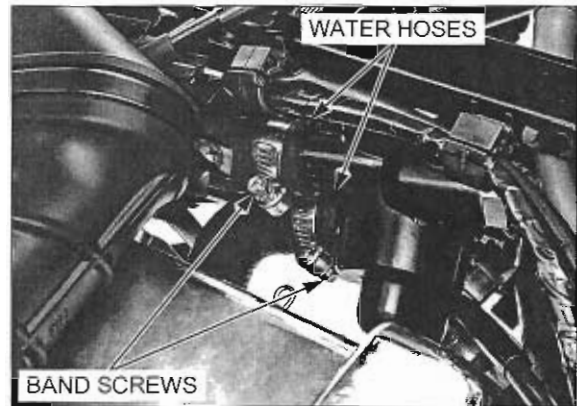
Remove the thermostat (page 6-8).

Loosen the water hose band screws and disconnect the water hoses.

Pull out the thermostat housing.

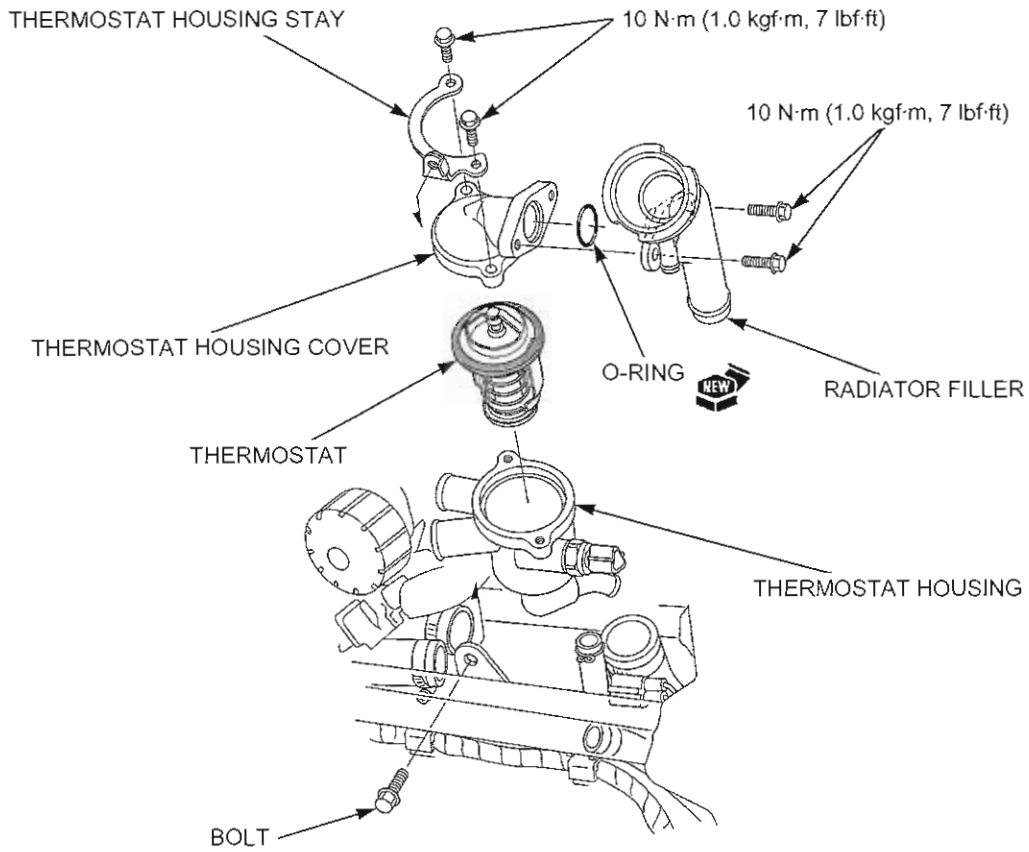
Loosen the water hose band screw and disconnect the water hose.

Disconnect the ECT sensor 3P (Gray) connector.

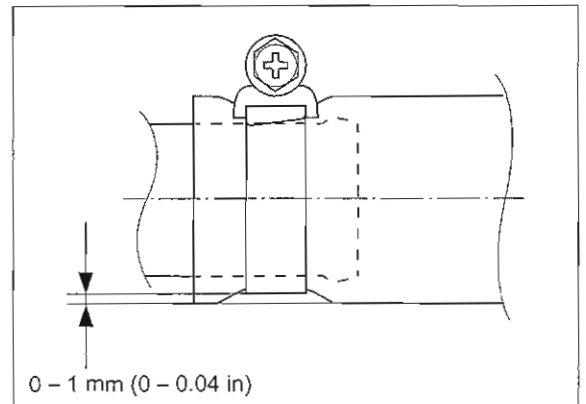


INSTALLATION

Route the hoses and wires properly (page 1-19). Installation is in the reverse order of removal.



Tighten the water hose band screws to the specified range as shown.

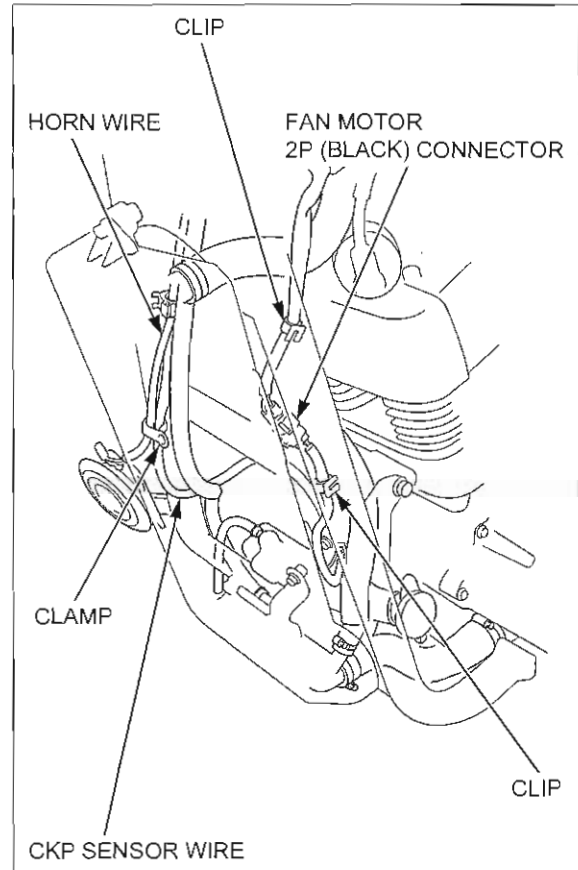


RADIATOR/COOLING FAN

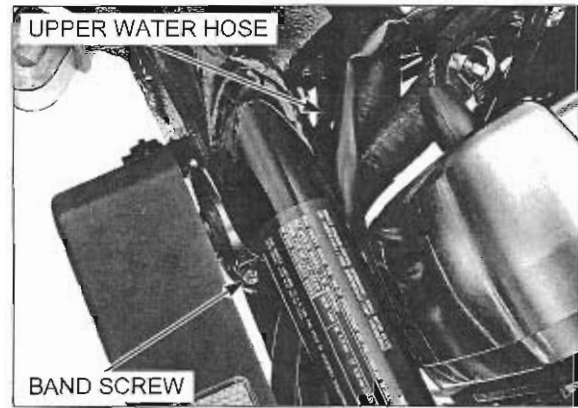
REMOVAL

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

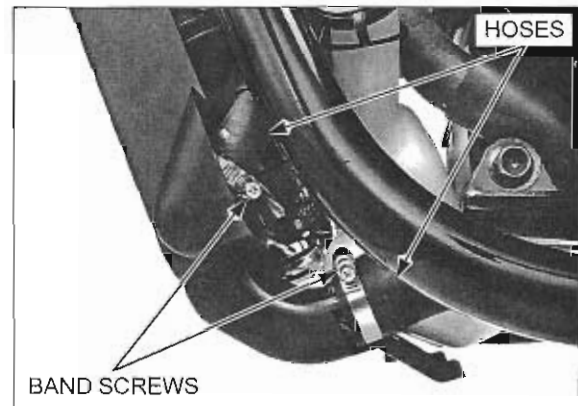
- Drain the coolant from the system (page 6-7).
- Remove the clips and disconnect the fan motor 2P (Black) connector.
- Release the CKP sensor and horn wire from the clamp.



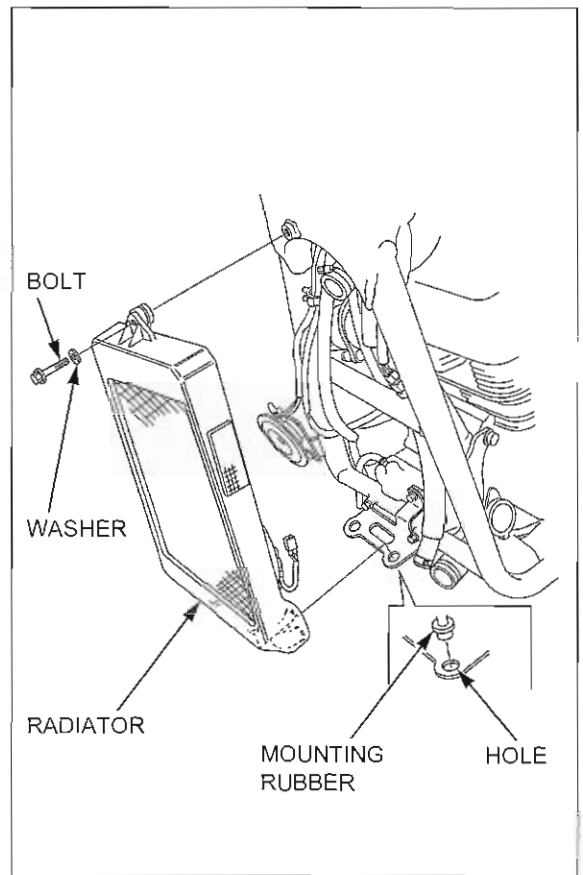
Loosen the water hose band screw and disconnect the radiator upper water hose from the radiator.



Loosen the water hose band screws and disconnect the radiator lower water hoses from the radiator.

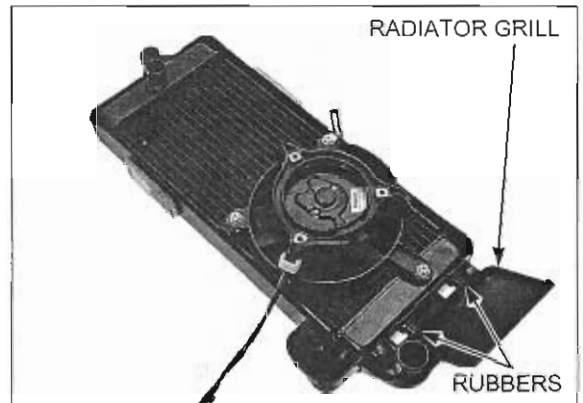


Remove the bolt and washer.
Release the mounting rubber from the hole of frame.
Remove the radiator.

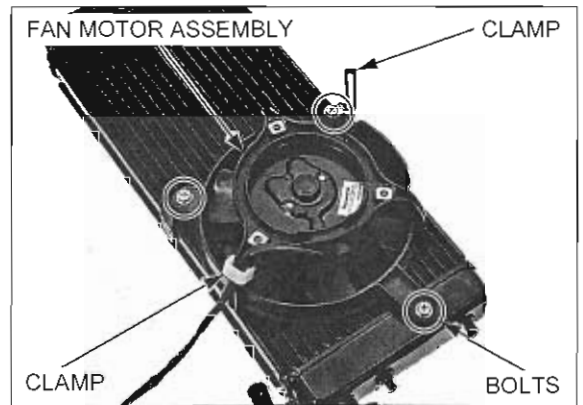


DISASSEMBLY

Remove the radiator mounting rubbers and radiator grill.

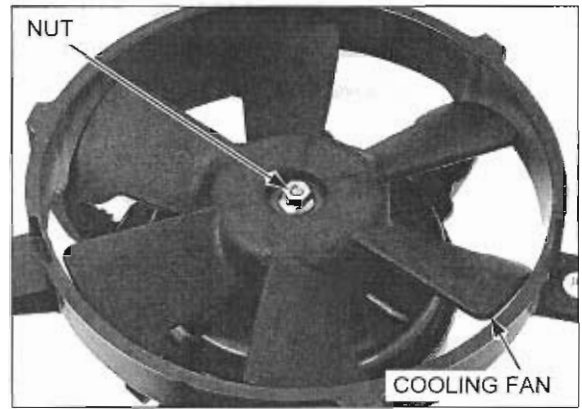


Remove the bolts, clamps and fan motor assembly.

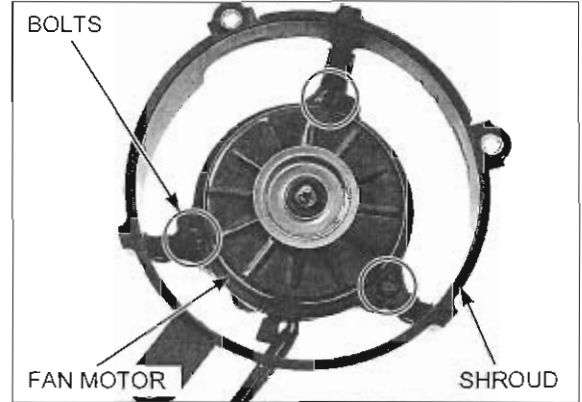


COOLING SYSTEM

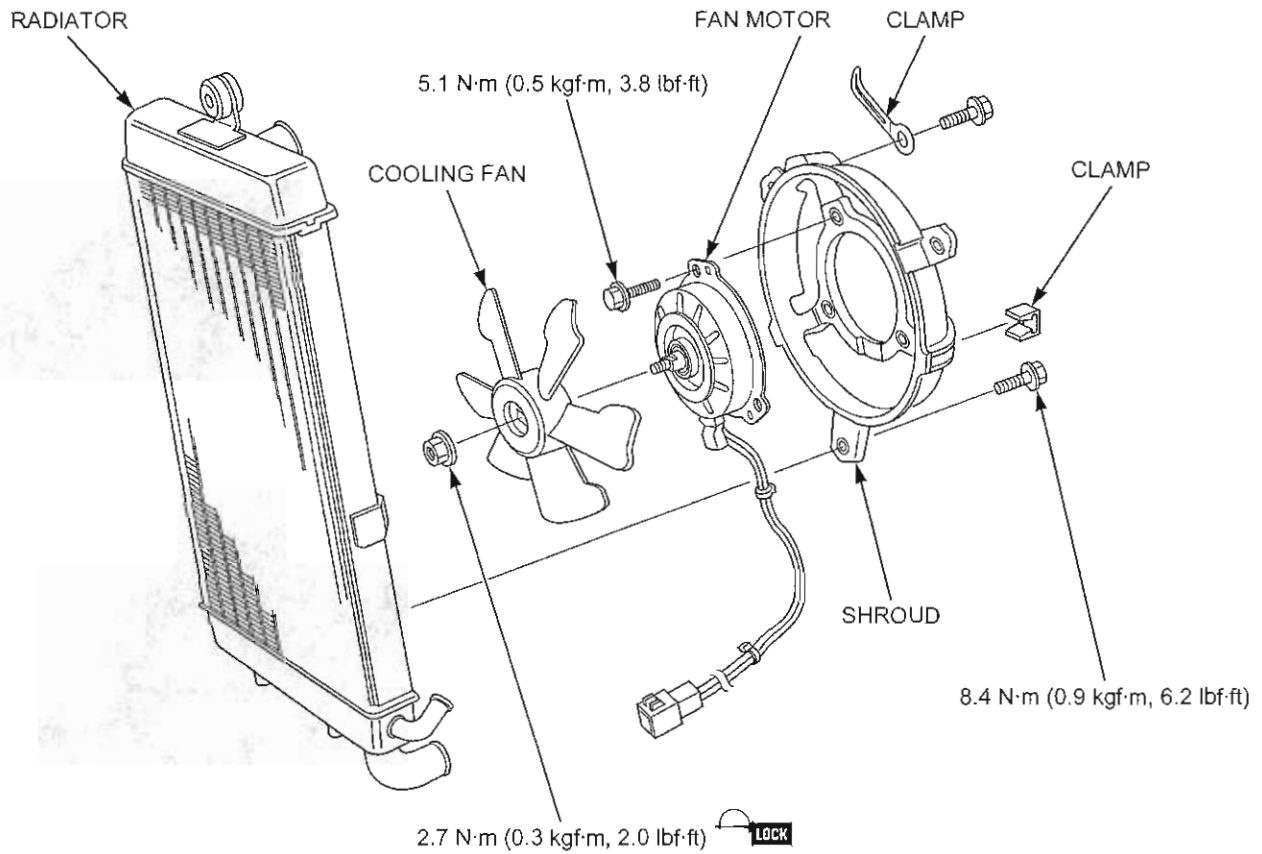
Remove the nut and cooling fan.



Remove the bolts and fan motor from the shroud.

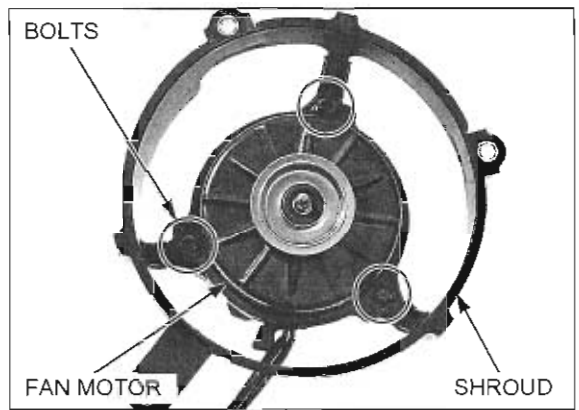


ASSEMBLY

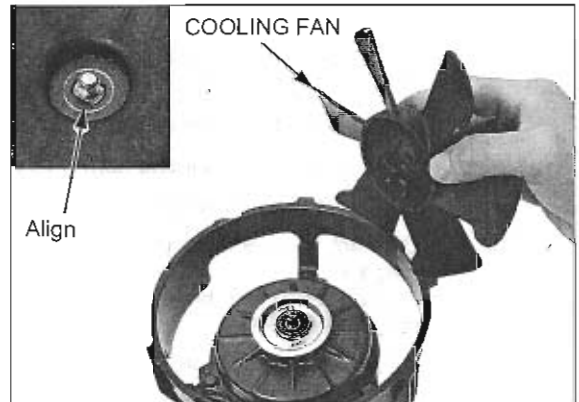


Install the fan motor on the shroud in the direction as shown and tighten the bolts to the specified torque.

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

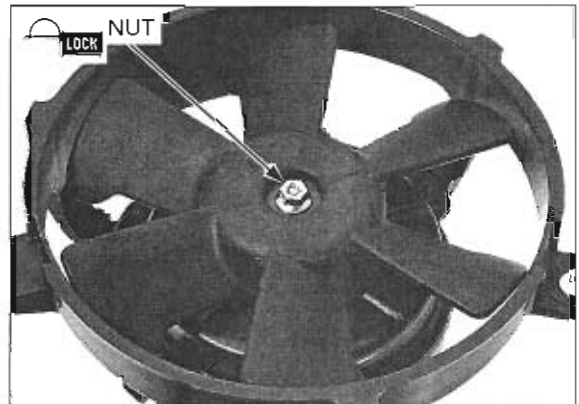


Install the cooling fan onto the motor shaft, aligning the flat surfaces.



Clean and apply locking agent to the nut threads. Tighten the nut to the specified torque.

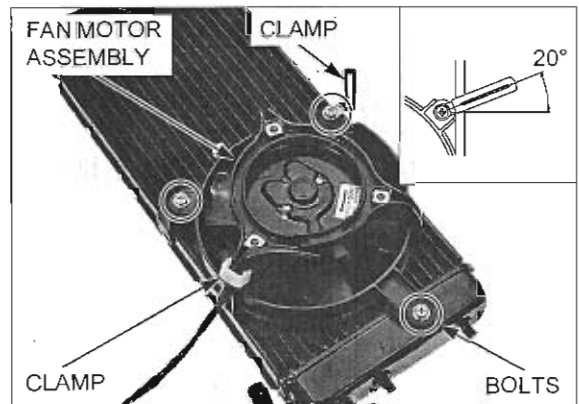
TORQUE: 2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)



Install the fan motor assembly and clamps onto the radiator.

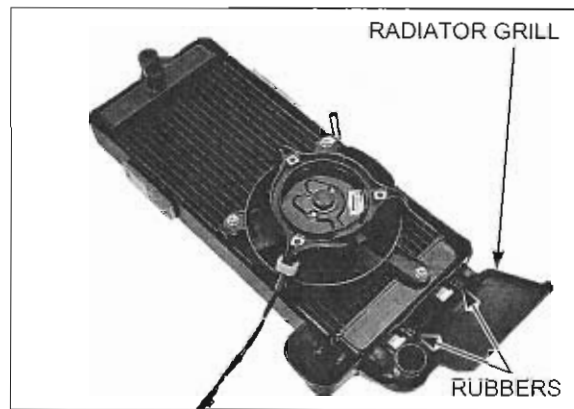
Install and tighten the bolts to the specified torque.

TORQUE: 8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)



COOLING SYSTEM

Install the radiator on the radiator grill and mounting rubbers.



INSTALLATION

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

Install the bolt, washer and tighten the bolt.

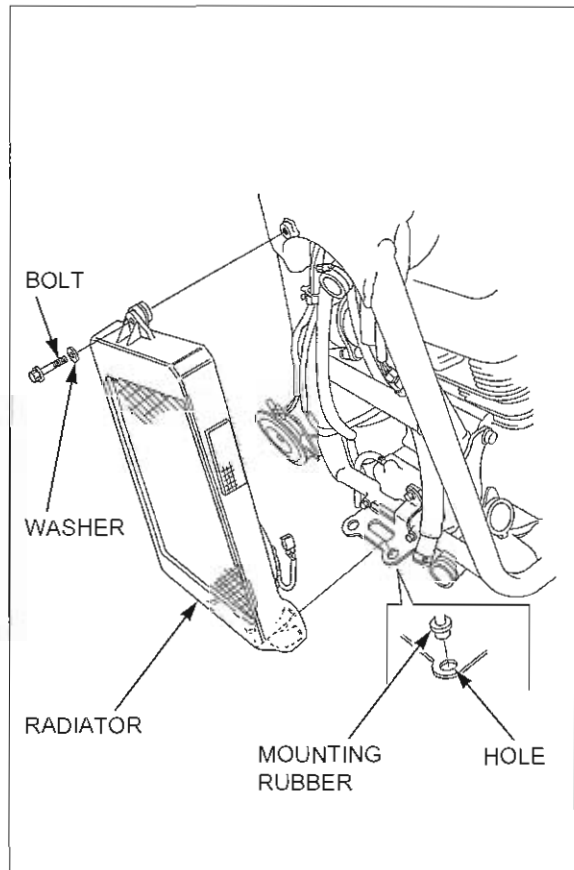
Install the CKP sensor and horn wire to the clamp.

Connect the fan motor 2P (Black) connector.

Connect the radiator upper and lower water hoses (page 1-19).

Tighten the water hose band screws to the specified range (page 6-11).

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



WATER PUMP

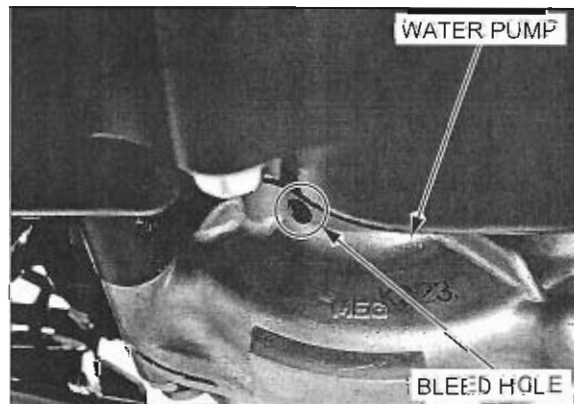
MECHANICAL SEAL INSPECTION

Check the bleed hole of the water pump for signs of coolant leakage.

NOTE:

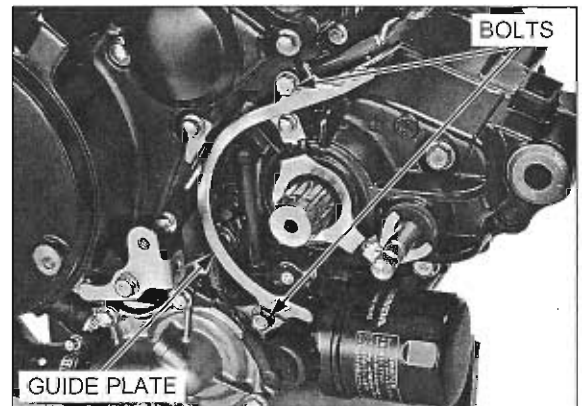
- A small amount of coolant weeping from the bleed hole is normal.
- Make sure that there are no continuous coolant leakage from the bleed hole while operating the engine.

Replace the water pump as an assembly if necessary.



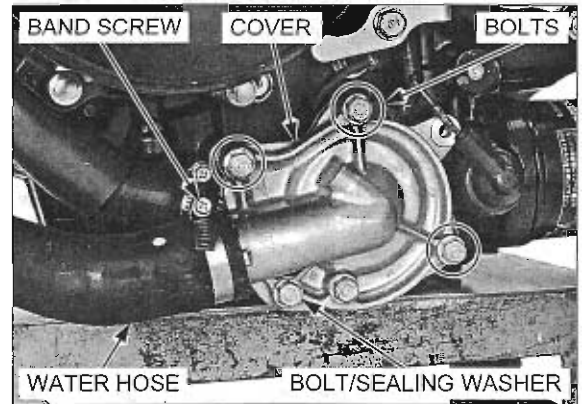
REMOVAL

Remove the engine from the frame (page 7-4).
Remove the bolts and drive chain guide plate.



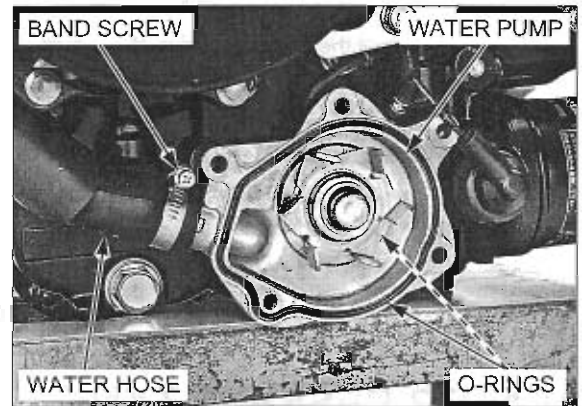
Loosen the water hose band screw and disconnect the water hose.

Remove the bolts, sealing washer and water pump cover.



Loosen the water hose band screw and disconnect the water hose.

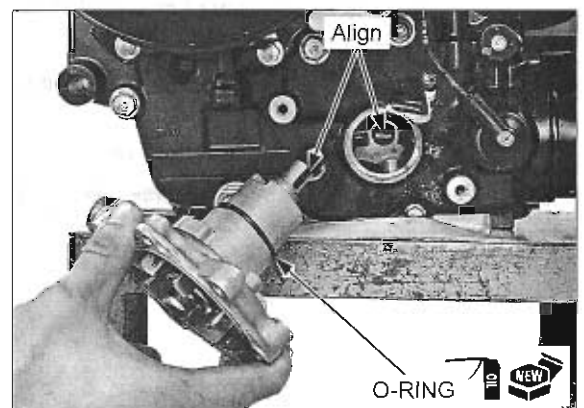
Remove the O-rings and water pump.



INSTALLATION

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

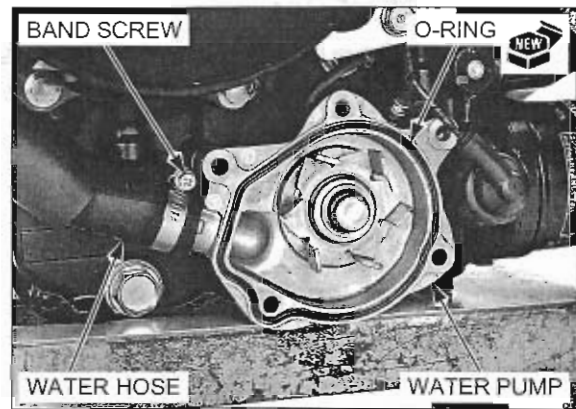
Install the water pump while aligning its groove with the projection of the oil pump shaft.



COOLING SYSTEM

Connect the water hose (page 1-19).
Tighten the water hose band screw to the specified range (page 6-11).

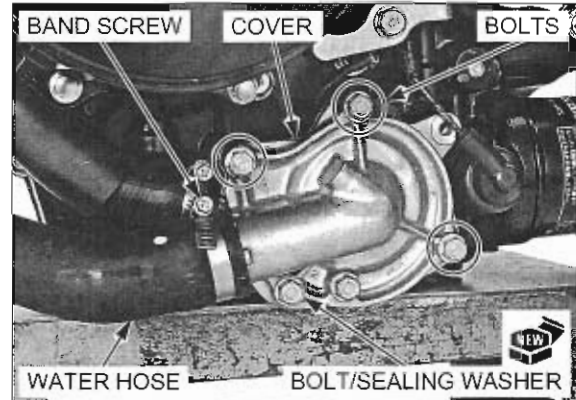
Install a new O-ring into the groove in the water pump.



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

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)

Connect the water hose (page 1-19).
Tighten the water hose band screw to the specified range (page 6-11).



Clean and apply locking agent to the drive chain guide plate upper mounting bolt.

Install the bolts and drive chain guide plate.

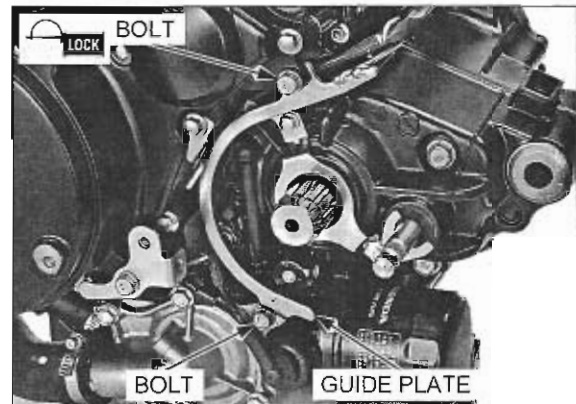
Tighten the drive chain guide plate upper mounting bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Tighten the drive chain guide plate lower mounting bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

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



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

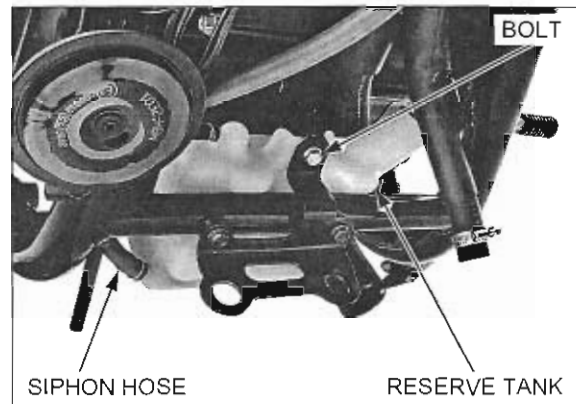
Remove the radiator (page 6-12).

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

Remove the bolt and reserve tank.

Installation is in the reverse order of removal.

Route the hoses properly (page 1-19).



FAN CONTROL RELAY

SYSTEM INSPECTION

The coolant temperature is low but the fan motor does not stop

Remove the fan control relay (page 6-19) and turn the ignition switch ON.

If the fan motor does not start, replace the fan control relay.

The coolant temperature indicator comes on but the fan motor does not start

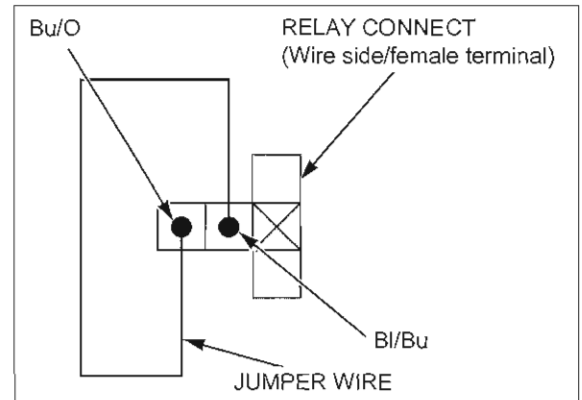
Before testing, check for a blown sub fuse 20 A (FAN).

Remove the fan control relay (page 6-19).

Connect the fan control relay connector terminals with a jumper wire as shown.

CONNECTION: Black/blue – Blue/orange

Turn the ignition switch ON and check the fan motor.

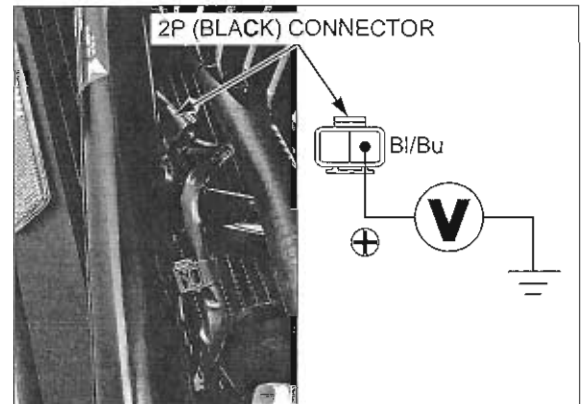


- If the fan motor starts, replace the fan control relay.
- If the fan motor does not start, disconnect the fan motor 2P (Black) connector.

Measure the voltage between the fan motor 2P (Black) connector terminal at the wire side and ground.

CONNECTION: Black/blue (+) – Ground (-)

- If there is battery voltage, replace the fan motor (page 6-12).
- If there is no voltage, check for an open circuit in the Blue/orange and Black/blue wires.

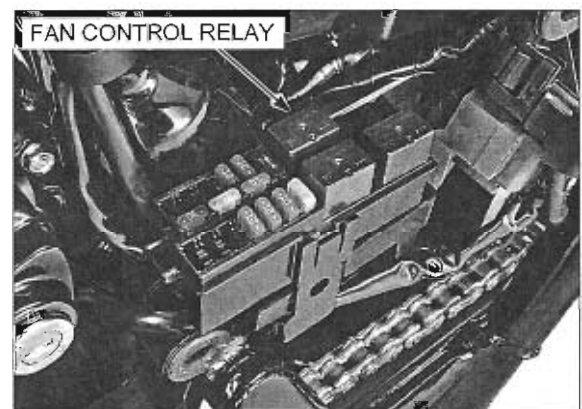


INSPECTION

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

Remove the power box cover.

Disconnect the fan control relay from the power box.



COOLING SYSTEM

Connect the ohmmeter to the relay connector terminals.

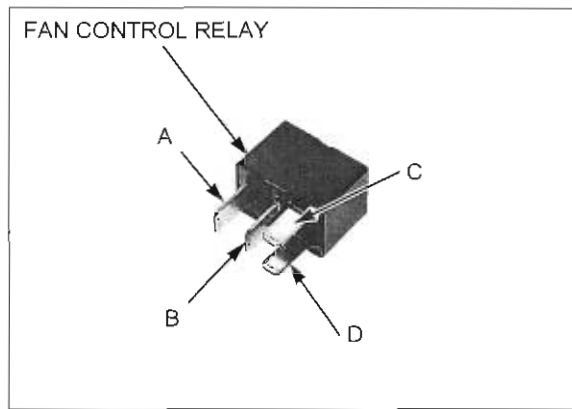
CONNECTION: A – B

Connect the 12 V battery to the following relay connector terminals.

CONNECTION: C – D

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the fan control relay.



7. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION7-2

SERVICE INFORMATION7-3

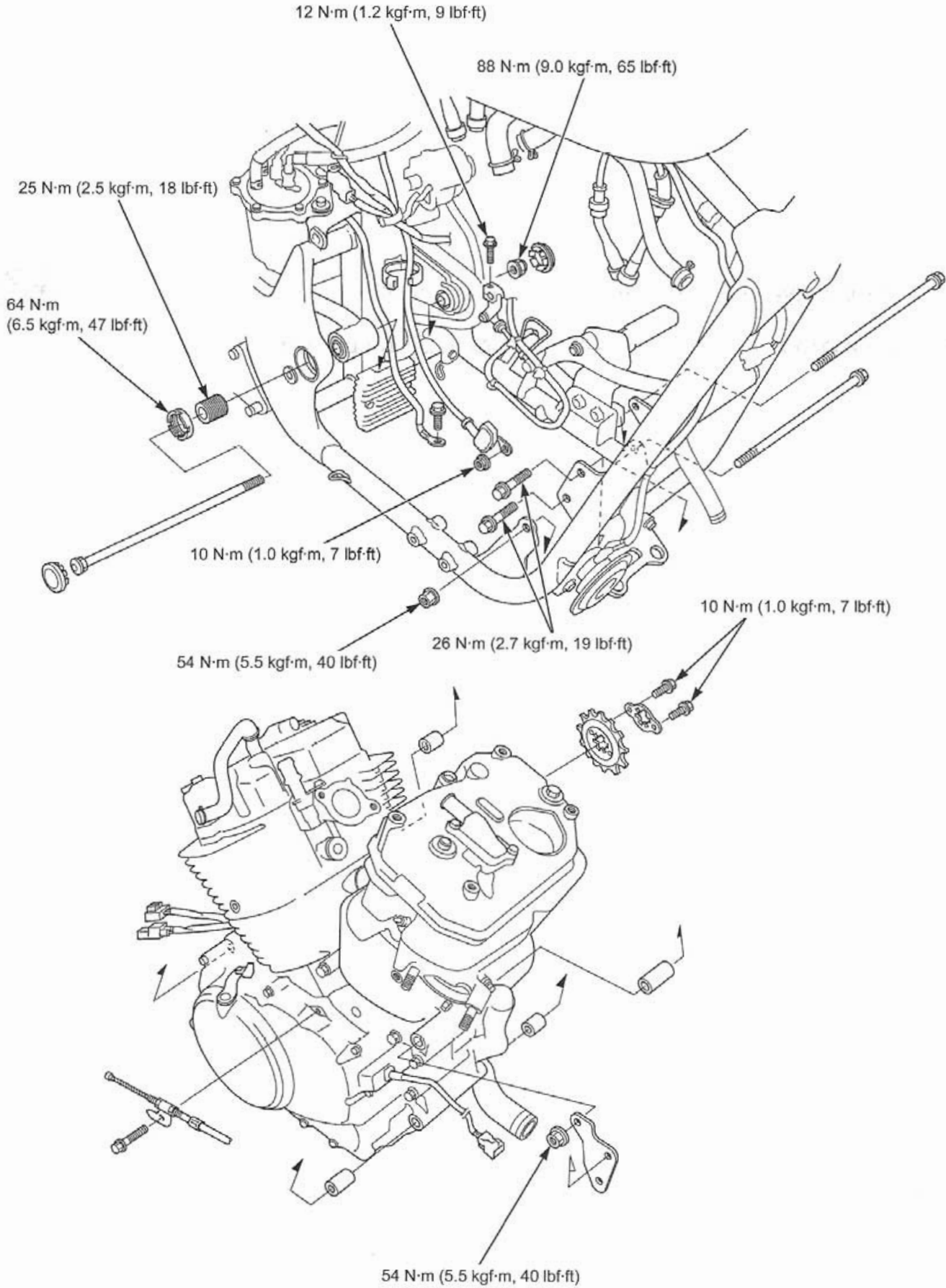
ENGINE REMOVAL7-4

ENGINE INSTALLATION7-7

7

ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION



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.
- 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 8-13)
 - Cylinder/piston (page 9-4)
 - Crankshaft (page 12-7)
 - Transmission (Including gearshift drum/shift fork: page 12-17)
 - Oil pump (page 4-6)
 - Water pump (page 6-17)
- The following components can be serviced with the engine in the frame.
 - Camshaft (page 8-7)
 - Throttle body (page 5-47)
 - Clutch/gearshift linkage (page 10-3)
 - Alternator/starter clutch (page 11-3)
 - Starter motor (page 18-7)

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	64.3 kg (141.8 lbs)
Engine oil capacity at disassembly	3.0 liters (3.2 US qt, 2.6 Imp qt)
Coolant capacity (radiator and engine)	2.51 liters (2.65 US qt, 2.21 Imp qt)

TORQUE VALUES

Engine upper/lower mounting nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Engine hanger plate bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)
Starter motor cable terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Drive sprocket fixing plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

Drain the engine oil (page 3-11).

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

Remove the following:

- Spark plug caps (page 3-7)
- Brake pedal/rod (page 14-25)
- Right foot peg (page 2-8)
- Left crankcase rear cover (page 2-4)
- Exhaust system (page 2-9)
- Injectors (page 5-54)
- Throttle body (page 5-47)
- Radiator (page 6-12)
- Radiator reserve tank (page 6-18)
- Over head covers (page 2-4)
- Alternator cover (page 17-10)

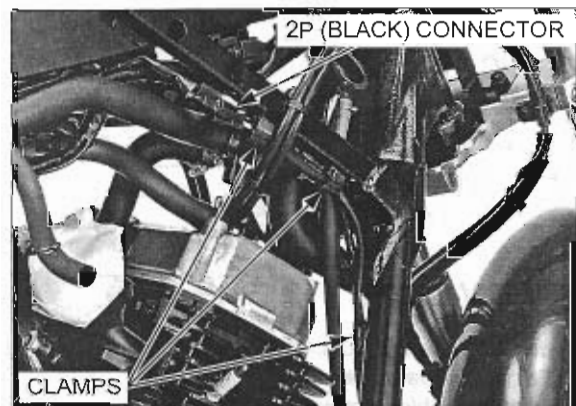
Fully slacken the drive chain (page 3-16).

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.

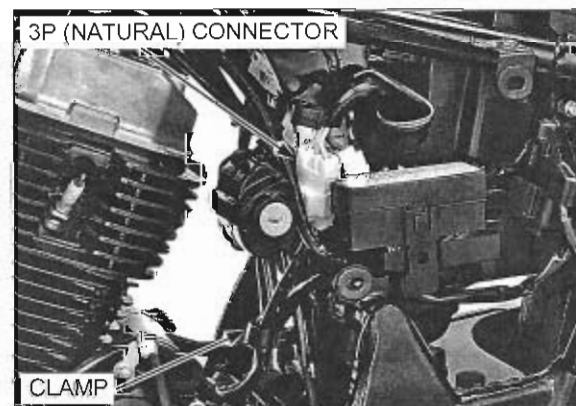
Release the CKP sensor wire from the clamps.

Disconnect the CKP sensor 2P (Black) connector.



Release the alternator wire from the clamp.

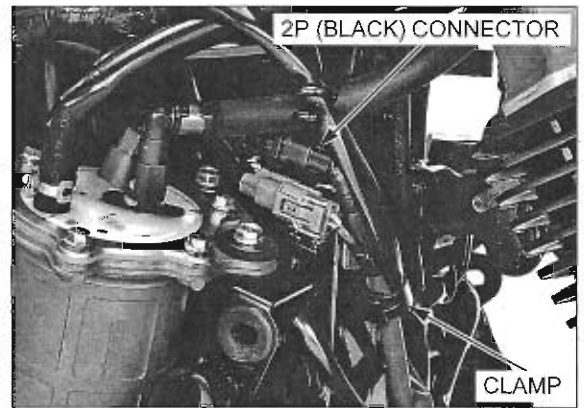
Disconnect the alternator 3P (Natural) connector.



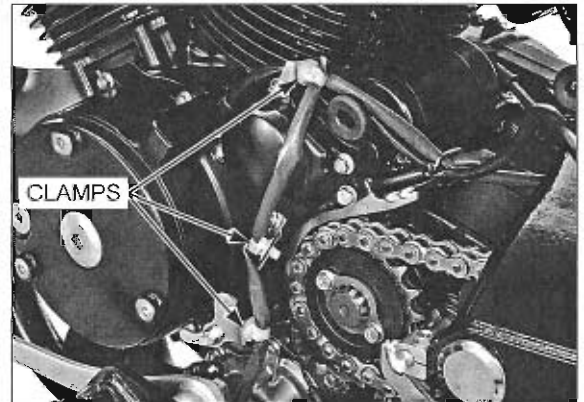
ENGINE REMOVAL/INSTALLATION

Release the clamp from the wire harnesses.

Disconnect the engine sub-harness 2P (Black) connector.



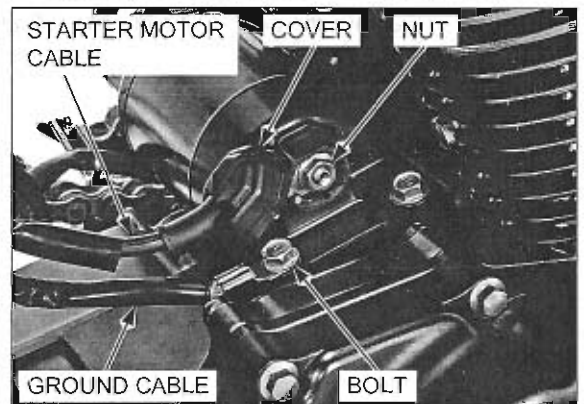
Release the sidestand switch wire clamps from each stay.



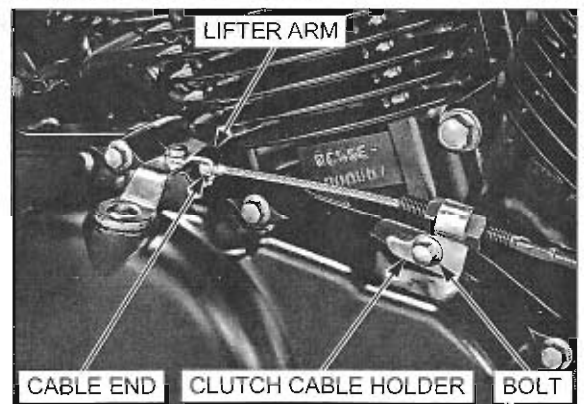
Open the terminal cover and remove the starter motor terminal nut.

Disconnect the starter motor cable.

Remove the bolt and disconnect the ground cable.

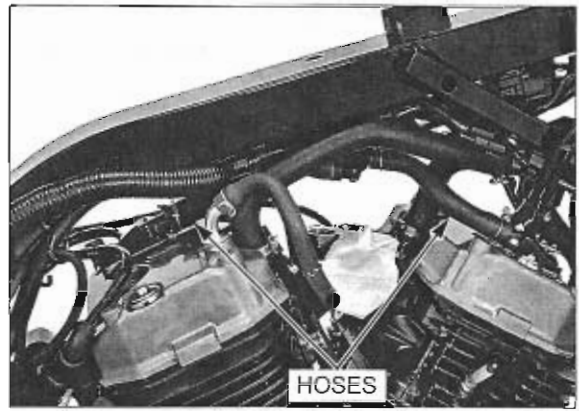


Remove the clutch cable holder by removing the bolt and disconnect the clutch cable end from the clutch lifter arm.

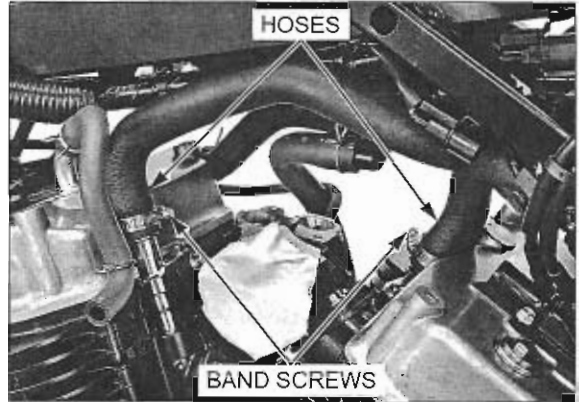


ENGINE REMOVAL/INSTALLATION

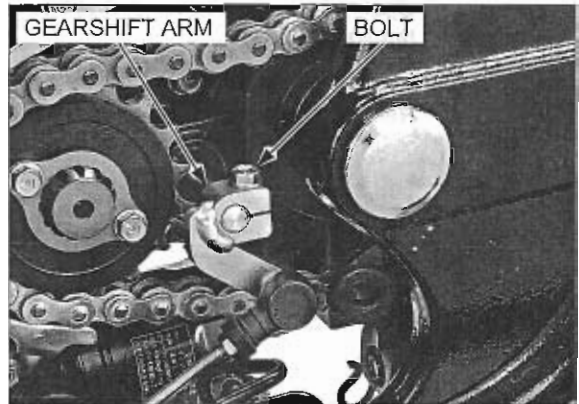
Disconnect the secondary air supply hoses from the PAIR check valve covers.



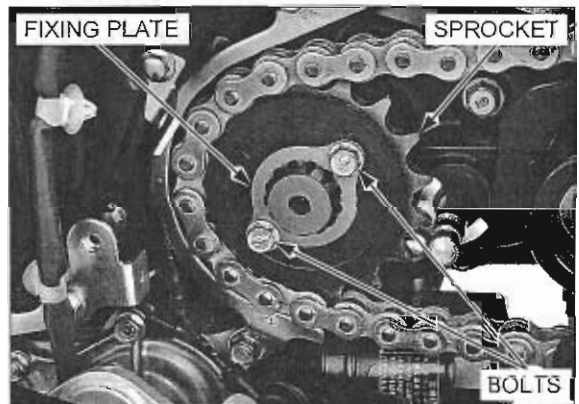
Loosen the water hose band screws and disconnect the water hoses.



Remove the pinch bolt and gearshift arm.



Remove the bolts and drive sprocket fixing plate.
Remove the drive sprocket.



ENGINE REMOVAL/INSTALLATION

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

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

NOTE:

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

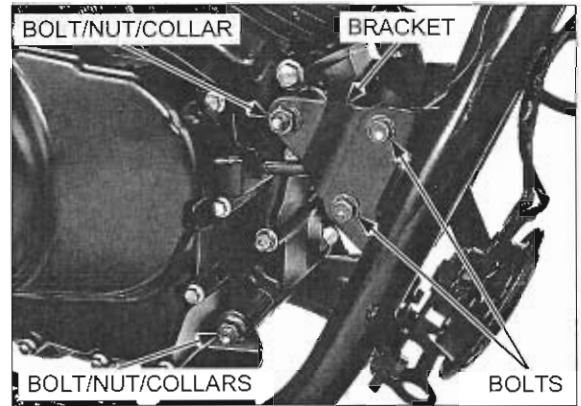
Remove the engine upper and lower mounting nut.

Remove the following:

- Engine upper and lower mounting bolts
- Engine bracket bolts
- Engine bracket
- Collars

Remove the swingarm pivot bolt (page 14-18).

Remove the engine from the right side of the frame.

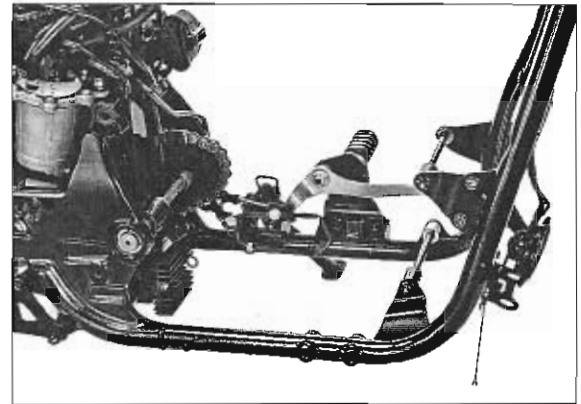


ENGINE INSTALLATION

Note the direction of engine hanger/mounting bolts.

NOTE:

- All the engine hanger/mounting bolts and nuts loosely install, then tighten the bolts and nuts to the specified torque in the specified sequence.
- Route the wires, hoses and cables properly (page 1-19).



Carefully install the engine into the frame.

Loosely install the engine hanger/mounting bolts, nuts, hanger plate and collars.

Install and tighten the swingarm pivot bolt (page 14-23).

Tighten all the engine bracket bolts and mounting bolts/nuts to the specified torque.

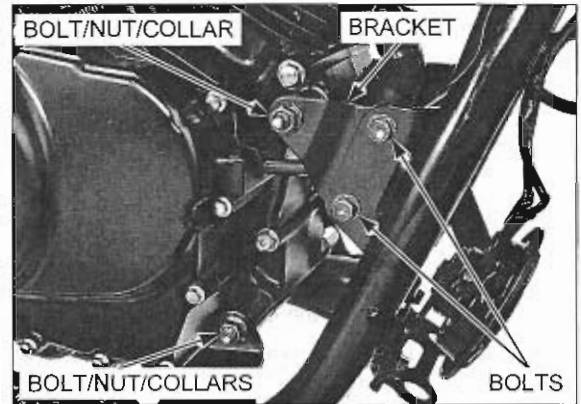
TORQUE:

Engine upper/lower mounting nut:

54 N·m (5.5 kgf·m, 40 lbf·ft)

Engine hanger plate bolt:

26 N·m (2.7 kgf·m, 19 lbf·ft)



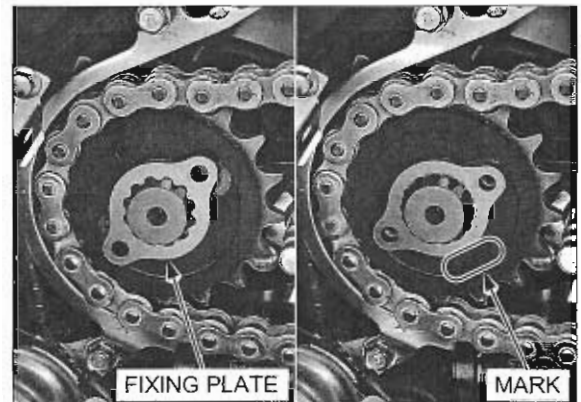
Install the drive chain to the drive sprocket.

Install the drive sprocket to the countershaft with the mark facing out.

Align the drive sprocket fixing plate tooth and countershaft groove, then install the fixing plate.

Install and tighten the drive sprocket fixing plate bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

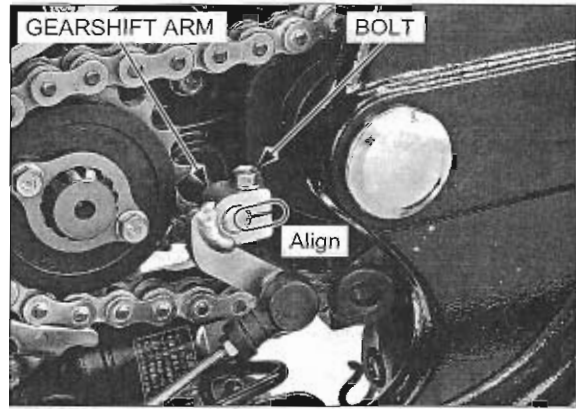


ENGINE REMOVAL/INSTALLATION

Install the gearshift arm onto the gearshift spindle, while aligning its slit with the punch mark on the spindle.

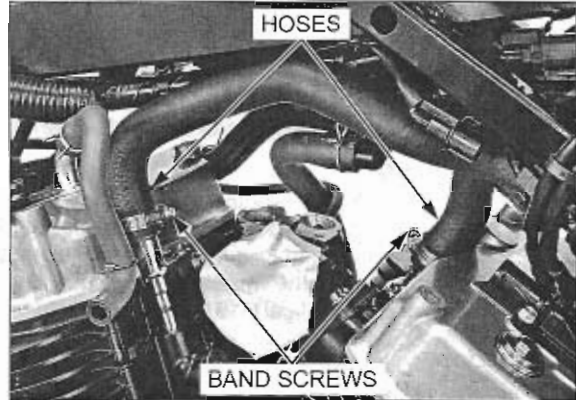
Install and tighten the gearshift arm pinch bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

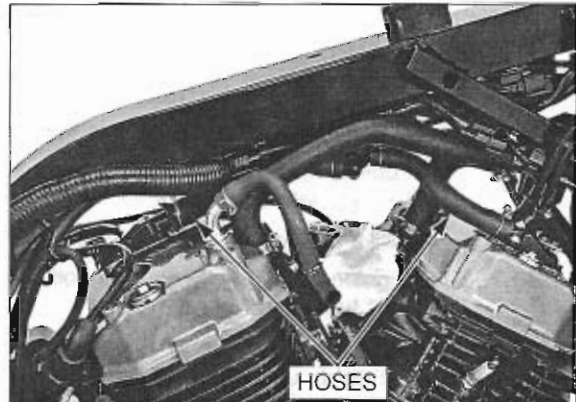


Connect the water hoses.

Tighten the water hose band screws to the specified range (page 6-11).

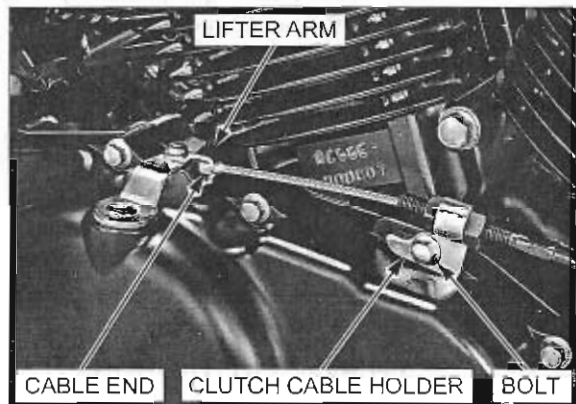


Connect the secondary air supply hoses to the PAIR check valve covers.



Connect the clutch cable end to the clutch lifter arm.

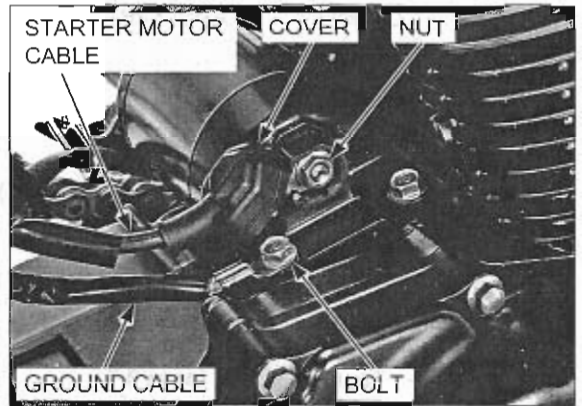
Install the clutch cable holder and tighten the bolt securely.



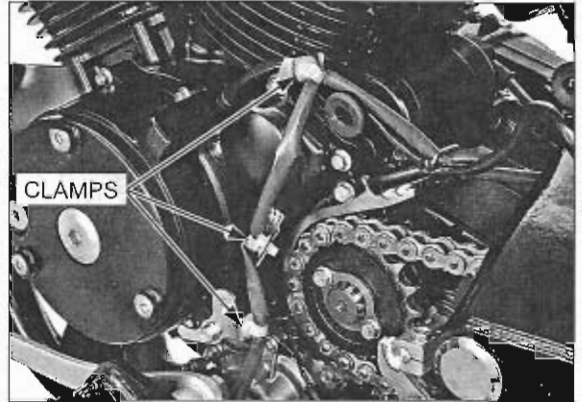
ENGINE REMOVAL/INSTALLATION

Install the ground cable with the bolt and tighten the bolt.
Connect the starter motor cable and tighten the terminal nut to the specified torque.

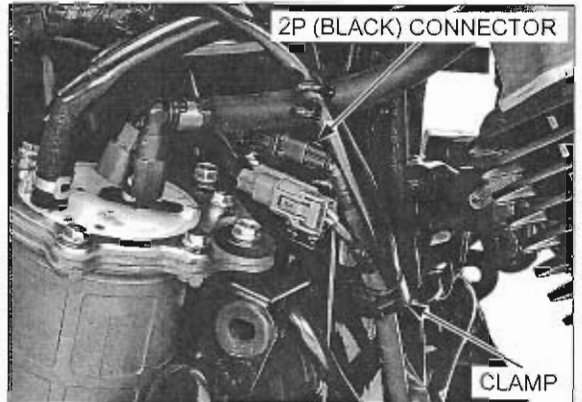
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



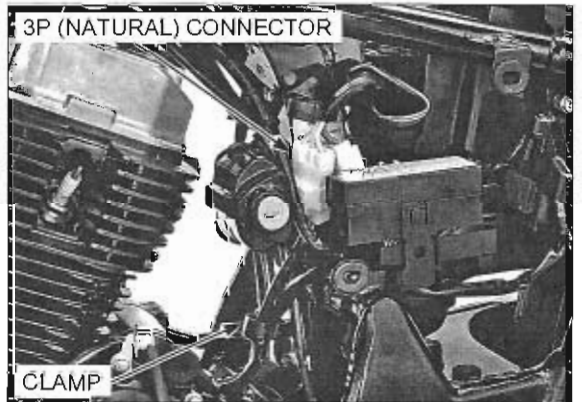
Install the sidestand switch wire clamp to each stay.



Connect the engine sub-harness 2P (Black) connector.
Bind the wire harnesses with the clamp.



Connect the alternator 3P (Natural) connector.
Bind the wire harnesses with the clamp.



ENGINE REMOVAL/INSTALLATION

Connect the CKP sensor 2P (Black) connector.

Install the CKP sensor and horn wires to the clamps.

Install the following:

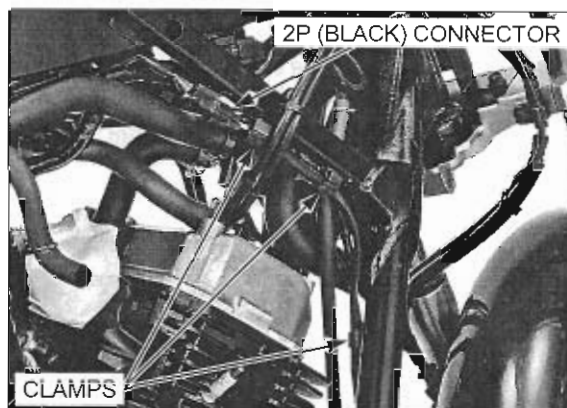
- Right foot peg (page 2-8)
- Brake pedal (page 14-27)
- Left crankcase rear cover (page 2-4)
- Exhaust system (page 2-11)
- Injectors (page 5-55)
- Throttle body (page 5-49)
- Radiator (page 6-16)
- Radiator reserve tank (page 6-18)
- Over head covers (page 2-4)
- Spark plug caps (page 3-7)
- Alternator cover (page 17-11)

Fill the crankcase with recommended engine oil (page 3-12).

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

Adjust the following:

- Clutch lever freeplay (page 3-25)
- Drive chain slack (page 3-16)

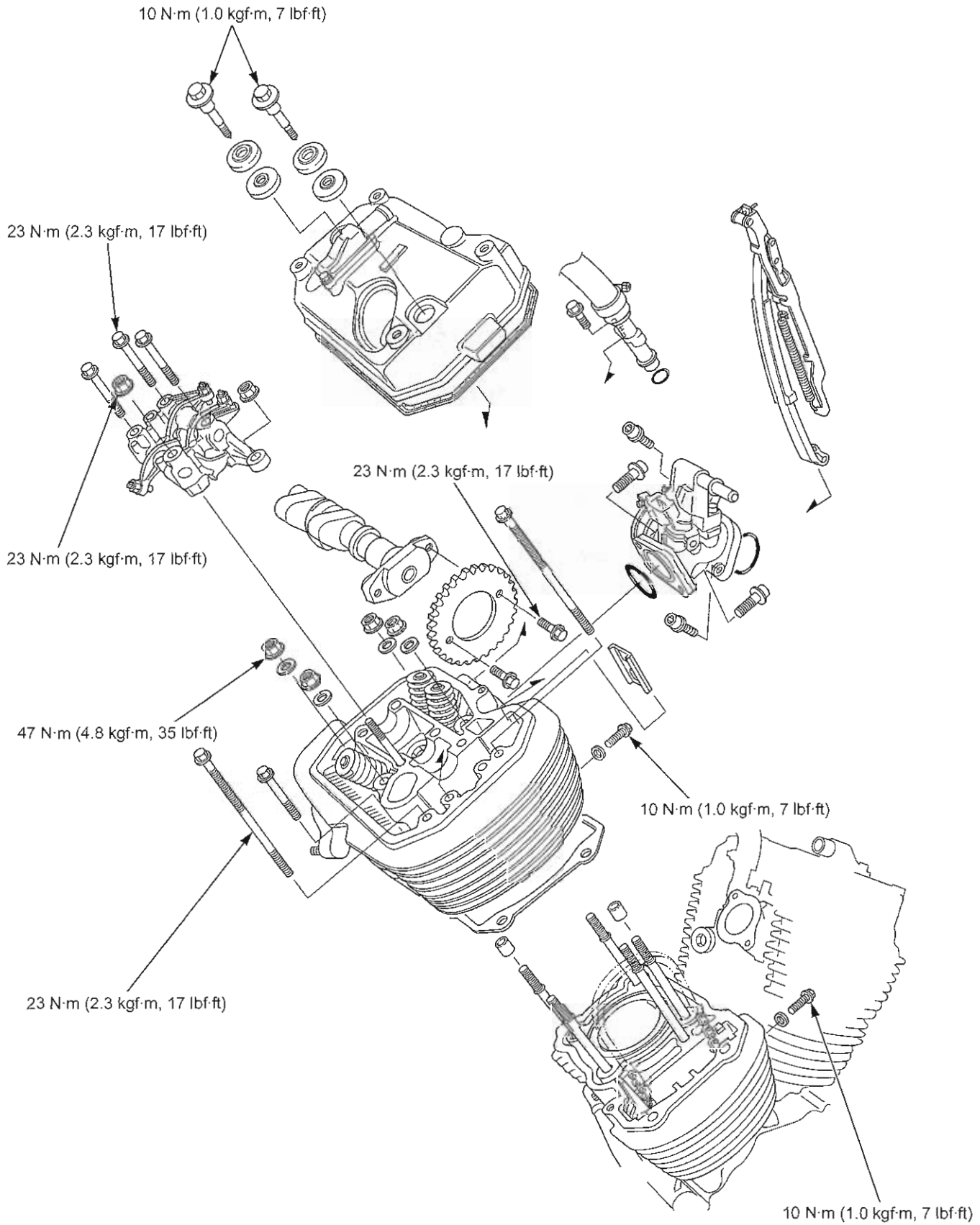


8. CYLINDER HEAD/VALVE

COMPONENT LOCATION	8-2	CYLINDER HEAD DISASSEMBLY	8-14
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CYLINDER HEAD COVER REMOVAL	8-6	CYLINDER HEAD INSTALLATION	8-22
CAMSHAFT REMOVAL	8-7	CAMSHAFT INSTALLATION	8-25
CYLINDER HEAD REMOVAL.....	8-13	CYLINDER HEAD COVER INSTALLATION	8-30

CYLINDER HEAD/VALVE

COMPONENT LOCATION



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 positions.
- 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 camshaft holder.

SPECIFICATIONS

Unit: mm (in)

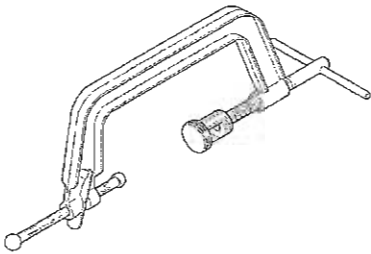
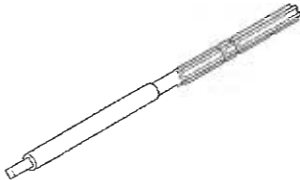
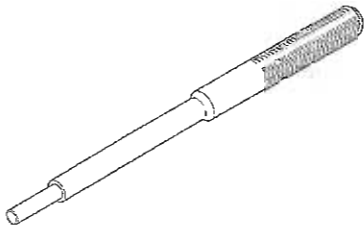






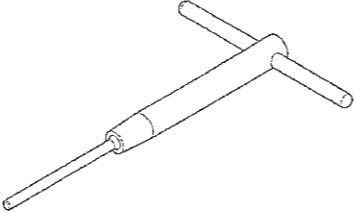
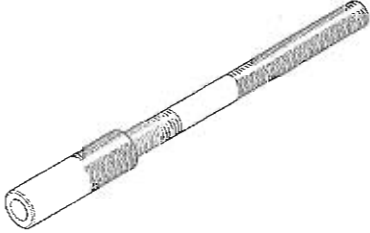
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 rpm			1,363 kPa (13.9 kgf/cm ² , 198 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Cam chain tensioner wedge B length			–	6 (0.2)
Camshaft	Cam lobe height	IN	37.188 – 37.348 (1.4641 – 1.4704)	37.16 (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			0.040 – 0.094 (0.0016 – 0.0037)	0.113 (0.0044)
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 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.10 (0.004)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	18.7 – 18.9 (0.736 – 0.744)	–
		EX	17.2 – 17.4 (0.680 – 0.690)	–
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

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply engine oil to the threads and seating surface.
Cylinder head nut	47 N·m (4.8 kgf·m, 35 lbf·ft)	
Cylinder head bolt	23 N·m (2.3 kgf·m, 17 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	10 N·m (1.0 kgf·m, 7 lbf·ft)	See page 8-24
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)	

CYLINDER HEAD/VALVE

TOOLS

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

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.
- If the performance is poor at low speeds, check for white smoke in the drain plug of the air cleaner housing. If the drain plug is smoky, check for seized piston ring (page 9-5).

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 HEAD/VALVE

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 stops 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:

1,363 kPa (13.9 kgf/cm², 198 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

COMPRESSION GAUGE



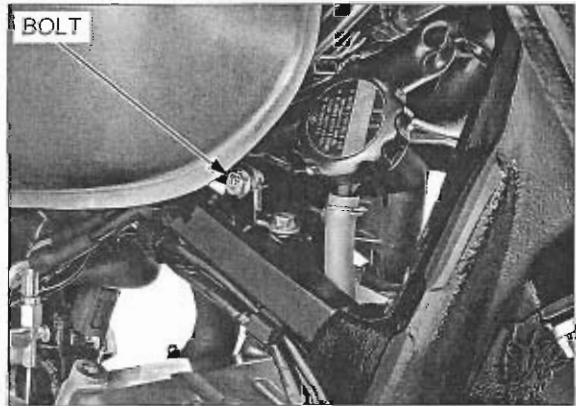
CYLINDER HEAD COVER REMOVAL

FRONT

Remove the following:

- Over head covers (page 2-4)
- PAIR check valve (page 5-64)

Remove the thermostat housing stay mounting bolt to get the clearance for cylinder head cover removal.

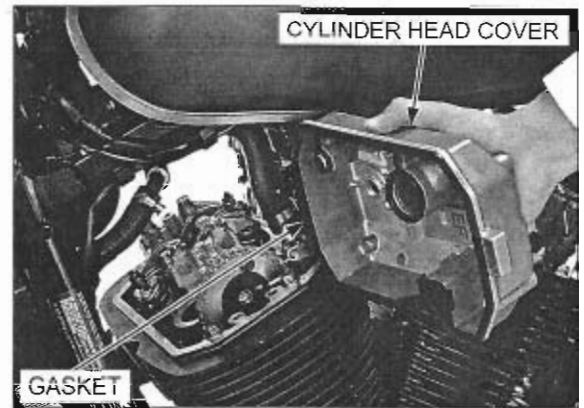


Remove the cylinder head cover bolts, washers and rubber seals.



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

Remove the cylinder head cover and gasket.



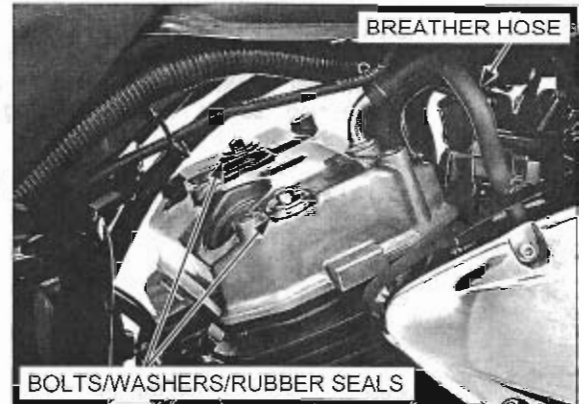
REAR

Remove the following:

- Over head covers (page 2-4)
- PAIR check valve (page 5-64)

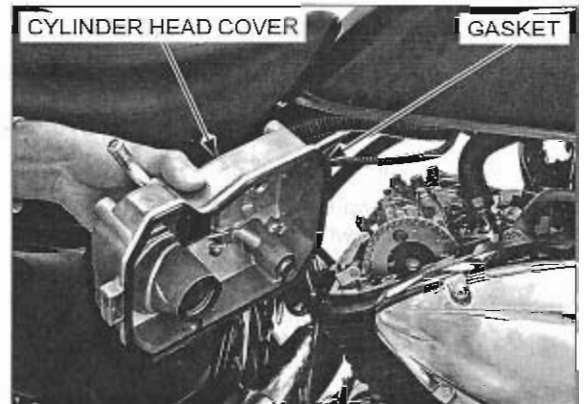
Disconnect the crankcase breather hose from the cylinder head cover.

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.



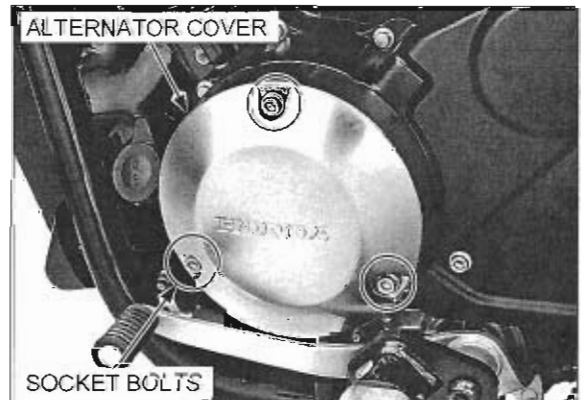
CAMSHAFT REMOVAL

NOTE:

The front and rear camshafts service procedures are the same.

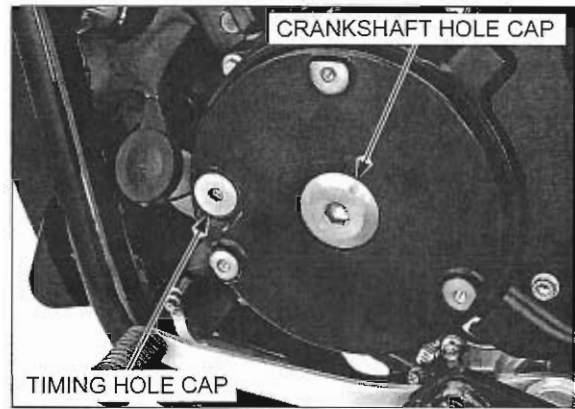
Remove the rear cylinder head cover (page 8-7).

Remove the socket bolts and alternator cover.



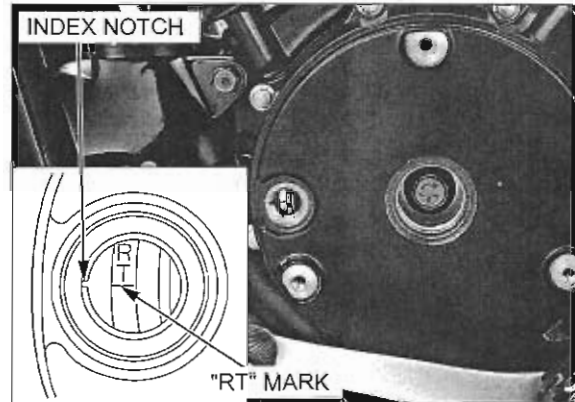
CYLINDER HEAD/VALVE

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.

SERVICE LIMIT: 6 mm (0.2 in)

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

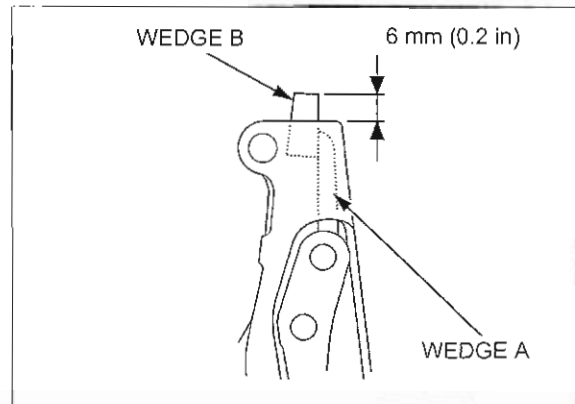
For the cam chain replacement, remove the following:

Front:

- Front camshaft
- Flywheel (page 11-5)

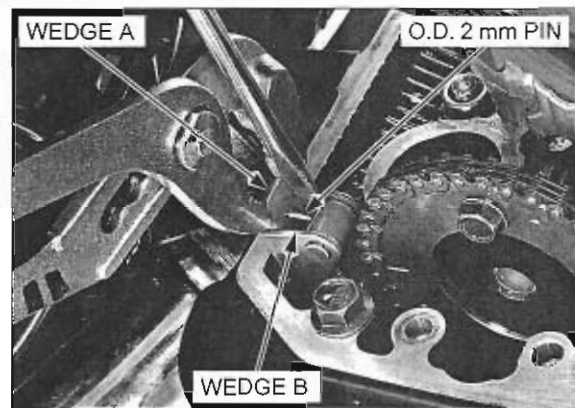
Rear:

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



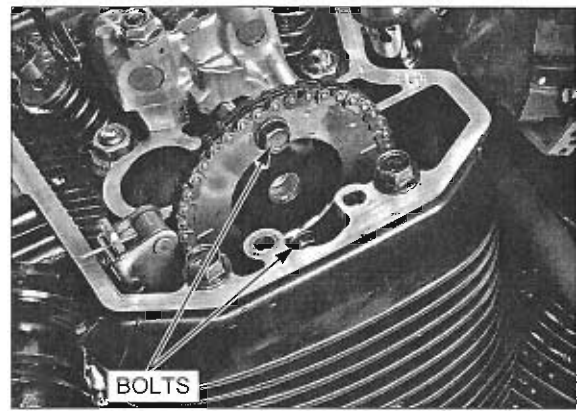
Be careful not to let the O.D. 2 mm pin fall into the crankcase.

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



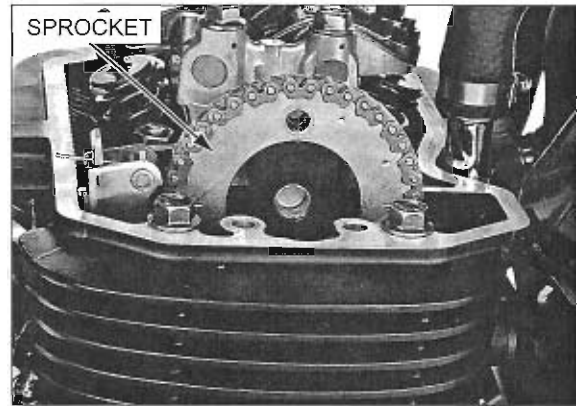
Be careful not to let the cam sprocket bolts fall into the crankcase.

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

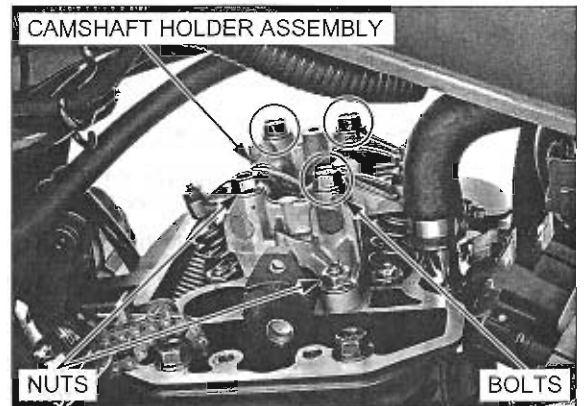


Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

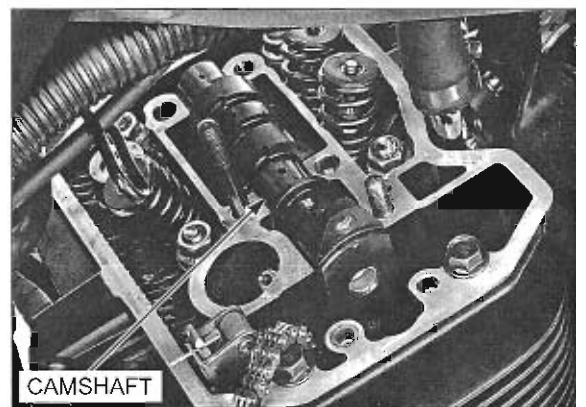
Remove the cam sprocket from the camshaft flange.



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.



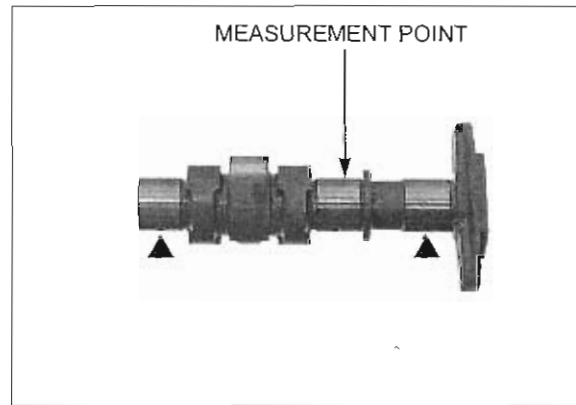
CYLINDER HEAD/VALVE

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.

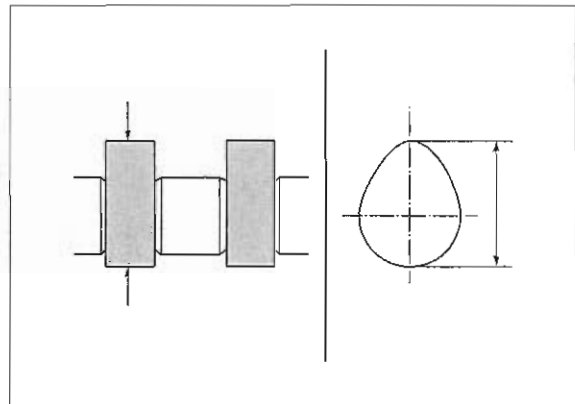
Measure each cam lobe height.

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

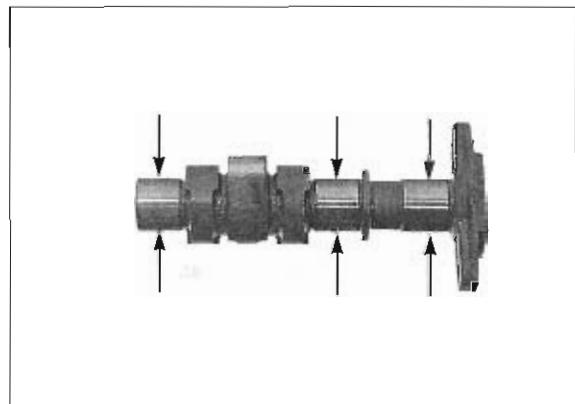
Check the camshaft journal surfaces for scoring or evidence of insufficient lubrication.

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.



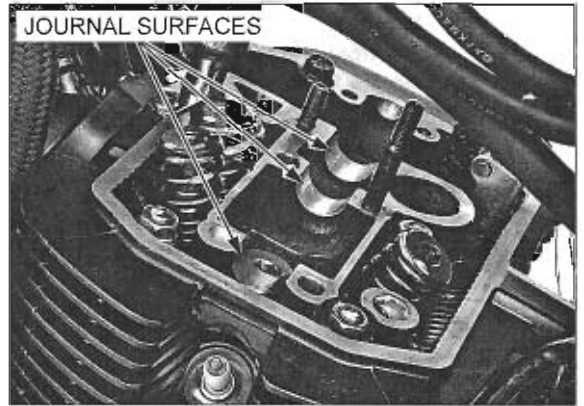
CAM SPROCKET

Check the cam sprocket for wear or damage.



CYLINDER HEAD

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



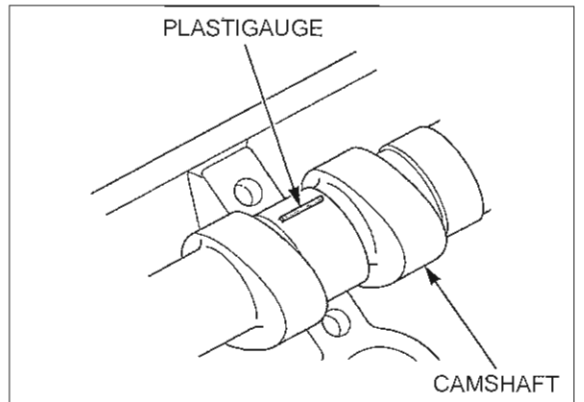
CAMSHAFT OIL CLEARANCE

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.

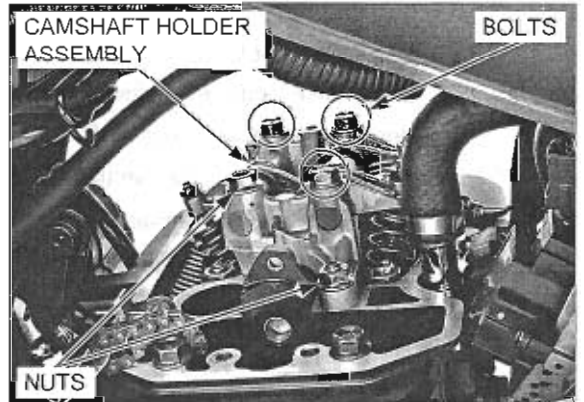
NOTE:

- Do not block any oil passages 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)



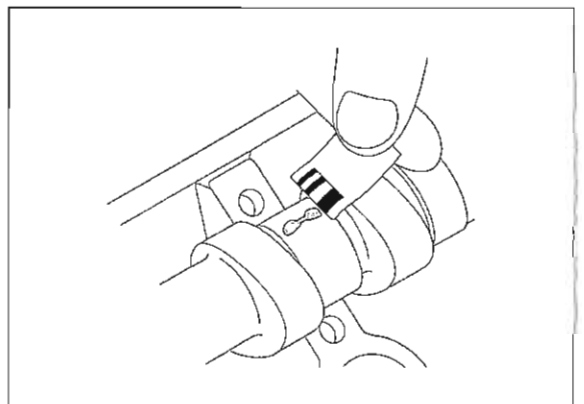
Remove the camshaft holder and measure the width of each plastigauge.

The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.113 mm (0.0044 in)

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

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



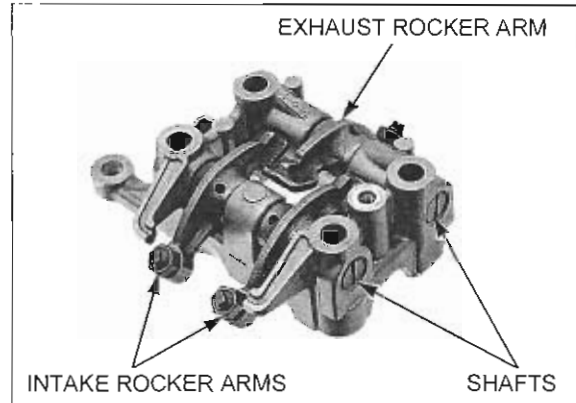
CYLINDER HEAD/VALVE

CAMSHAFT HOLDER DISASSEMBLY

NOTE:

The front and rear camshaft holders service procedures are the same.

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



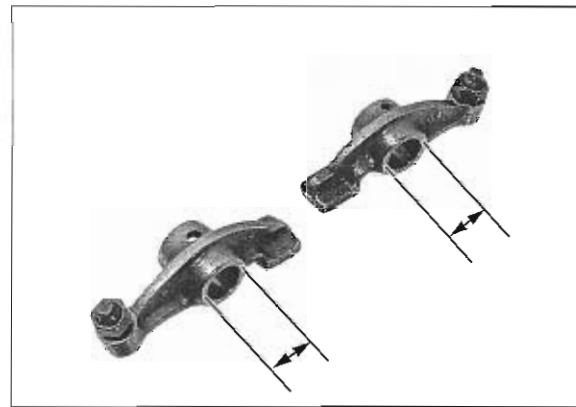
ROCKER ARM INSPECTION

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)



ROCKER ARM SHAFT INSPECTION

Check the rocker arm shafts 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.

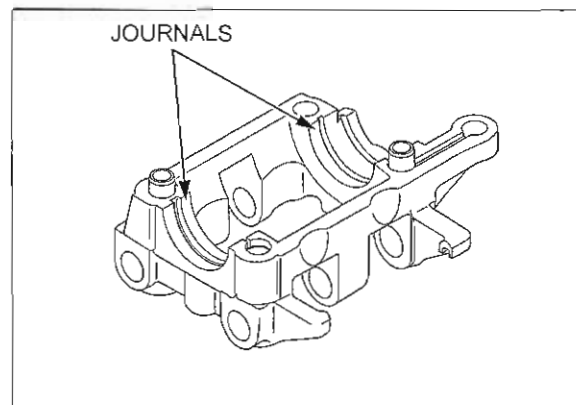
SERVICE LIMIT: 0.07 mm (0.003 in)

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

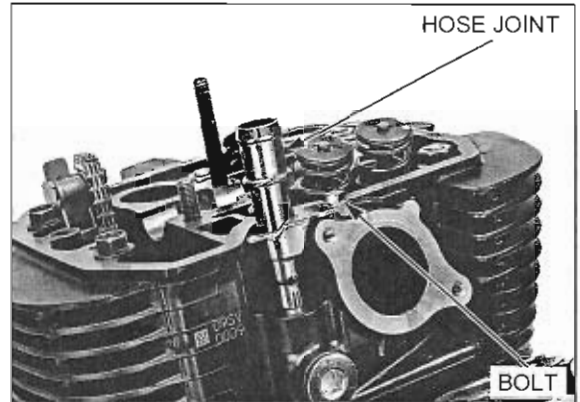
NOTE:

- The engine must be removed from the frame before servicing the cylinder head.
- The front and rear cylinder heads service procedures are the same.

Remove the following:

- Engine (page 7-4)
- Cylinder head cover (page 8-6)
- Camshaft (page 8-7)
- Intake manifold (page 5-51)

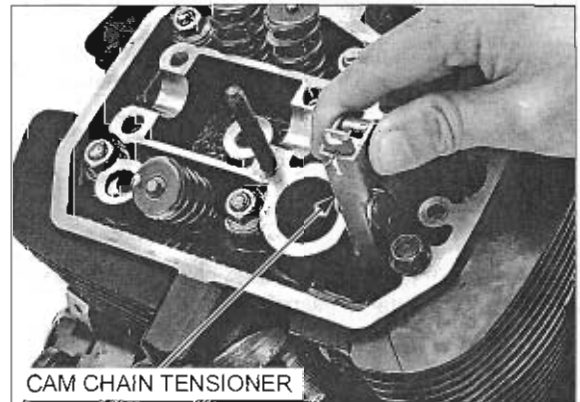
Remove the bolt and water hose joint from the cylinder.



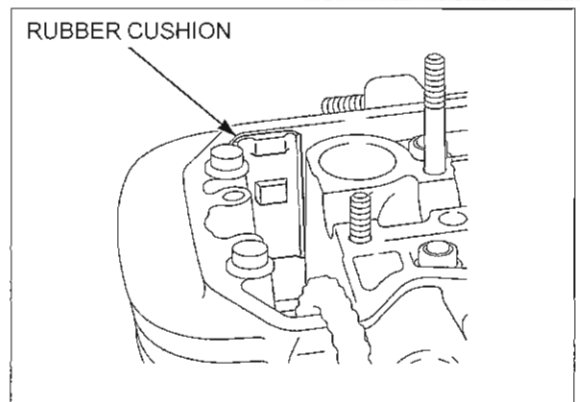
Remove the cam chain tensioner bolts and sealing washers.



Remove the cam chain tensioner.



Remove the rubber cushion.



CYLINDER HEAD/VALVE

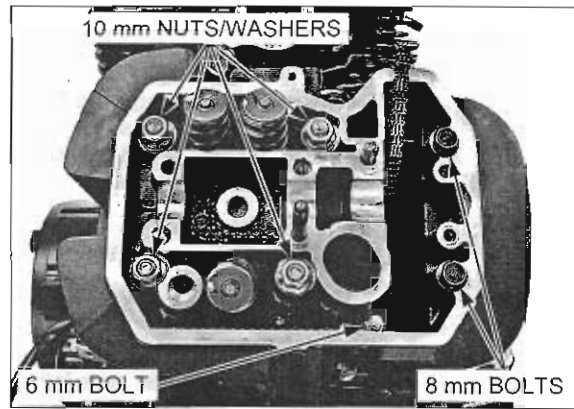
Loosen the bolts and nuts in a crisscross pattern in several steps.

Remove the following cylinder head bolts and nuts:

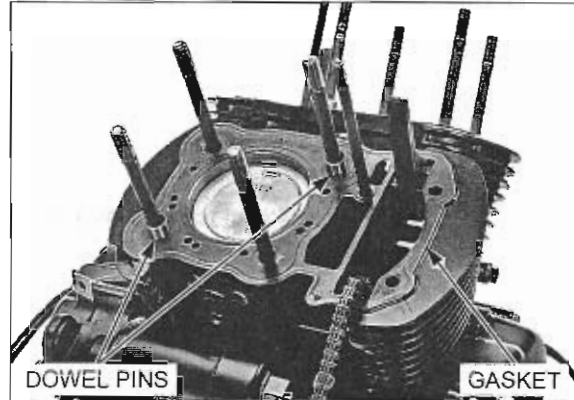
- 6 mm bolt
- 8 mm bolts
- 10 mm nuts/washers

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

Remove the cylinder head.



Remove the gasket and dowel pins.



CYLINDER HEAD DISASSEMBLY

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

Remove the spark plugs (page 3-7).

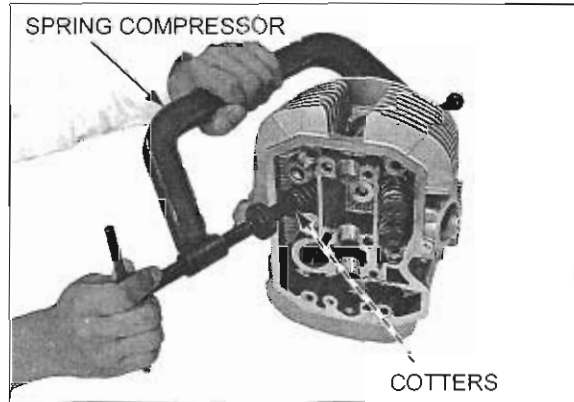
Remove the cotters using a special tool.

TOOL:

Valve spring compressor 07757-0010000

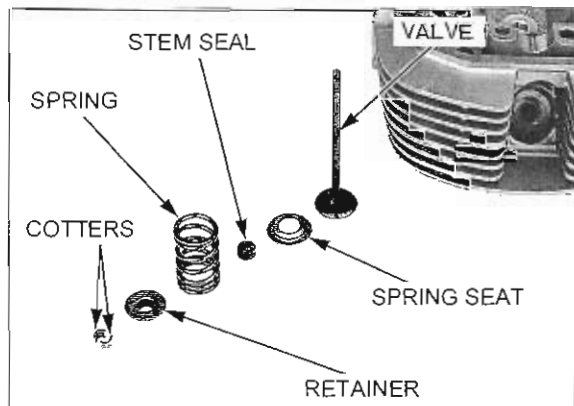
NOTE:

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



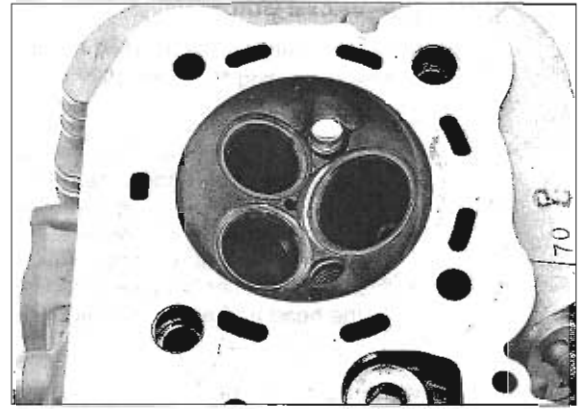
Do not reuse the removed stem seal.

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 holes and valve areas for cracks.

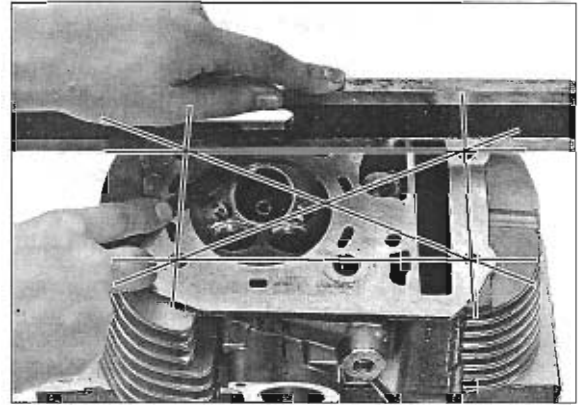


INSPECTION

CYLINDER HEAD

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

SERVICE LIMIT: 0.10 mm (0.004 in)

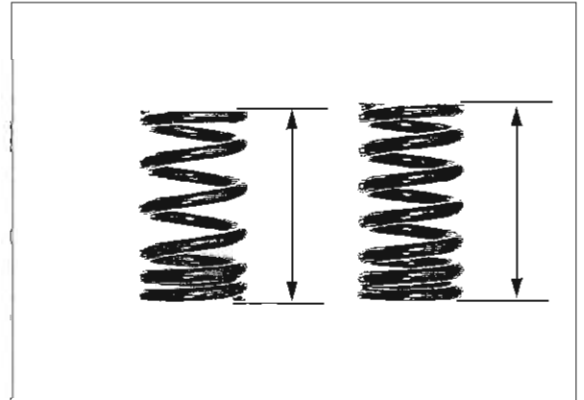


VALVE SPRING

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

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

VALVE GUIDE

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

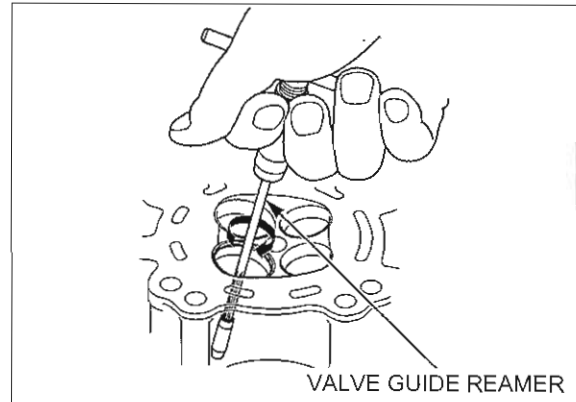
NOTE:

- 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.

TOOL:

Valve guide reamer
5.510 mm (IN/EX)

07984-2000001 or
07984-200000D
(U.S.A. only)



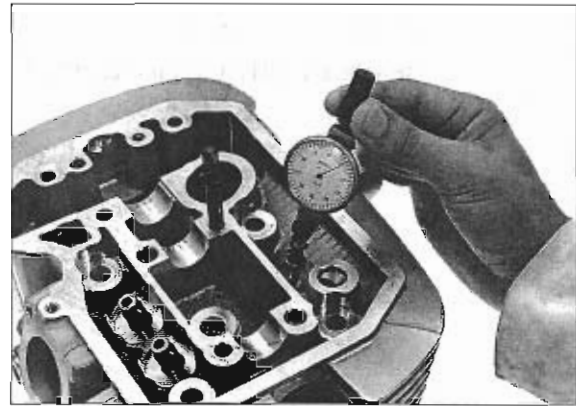
Measure each valve guide I.D. and record it.

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.

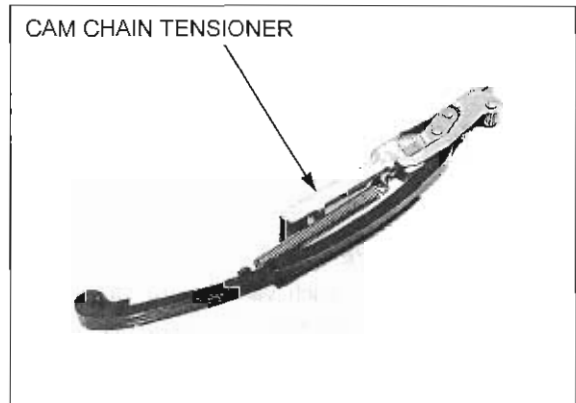


NOTE:

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-19).

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.

Do not use a torch to heat the cylinder head; it may cause warping.

Heat the cylinder head to 130 – 140°C (266 – 284°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (302°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

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

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.

TOOL:

Valve guide driver

5.5 mm (IN/EX)

07742-0010100

Adjust the valve guide driver to the valve guide height.

TOOL:

Valve guide driver

07743-0020000

Not available in U.S.A.

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:

IN: 18.7 – 18.9 mm (0.736 – 0.744 in)

EX: 17.2 – 17.4 mm (0.680 – 0.690 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.

U.S.A. only installation:

Mark the depth of the valve guide using a marker. Use the valve guide driver to correct the depth.

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

TOOL:

Valve guide reamer

5.510 mm (IN/EX)

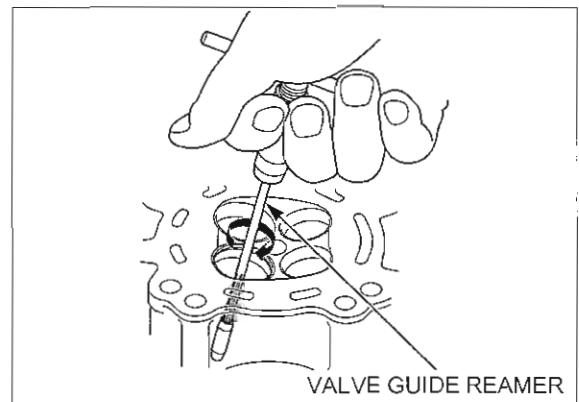
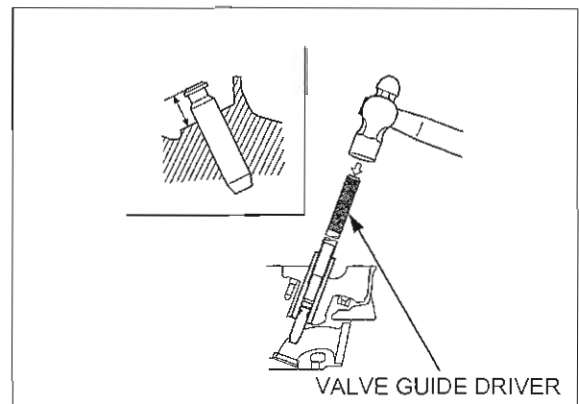
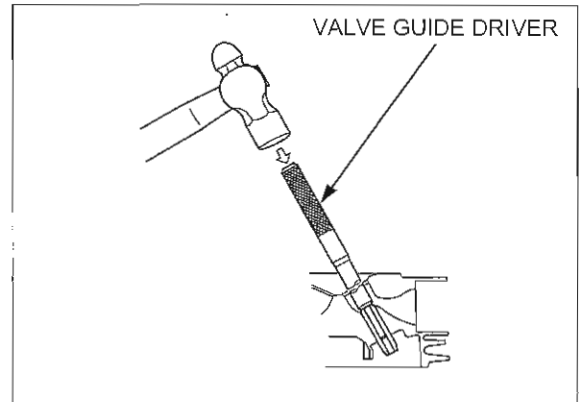
07984-2000001 or
07984-200000D
(U.S.A. only)

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 8-19).

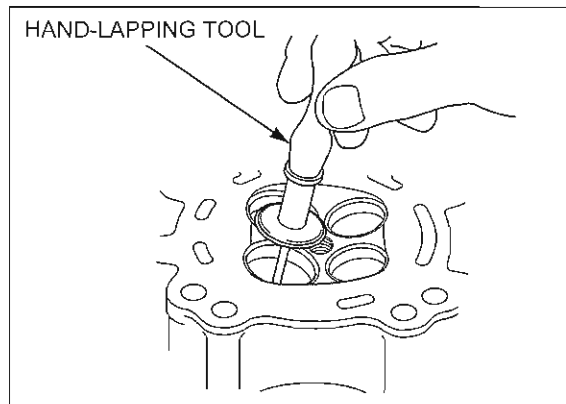


VALVE SEAT INSPECTION/REFACING

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.



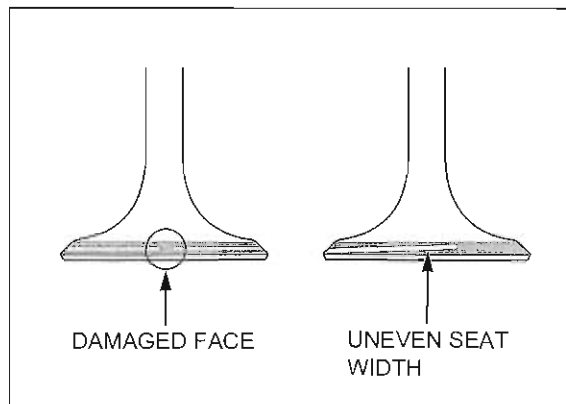
Remove the valve and inspect the valve seat face.

NOTE:

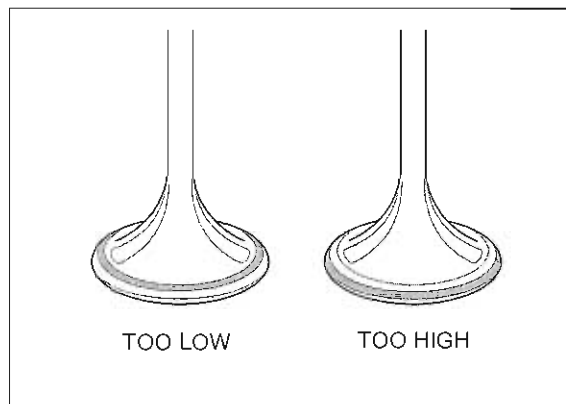
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Inspect the valve seat face for:

- Damaged face:
 - Replace the valve and reface the valve seat.
- Uneven seat width:
 - Replace the valve and reface the valve seat.



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



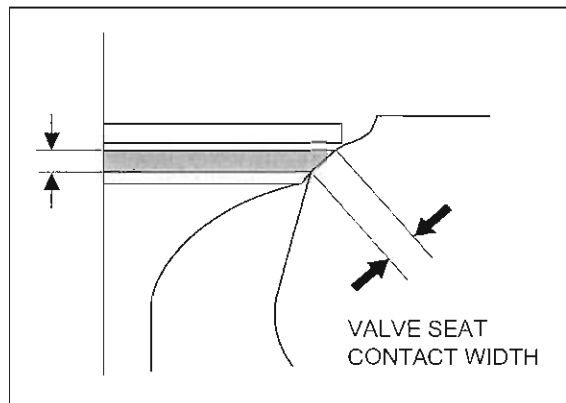
Inspect the width of the valve seat.

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)

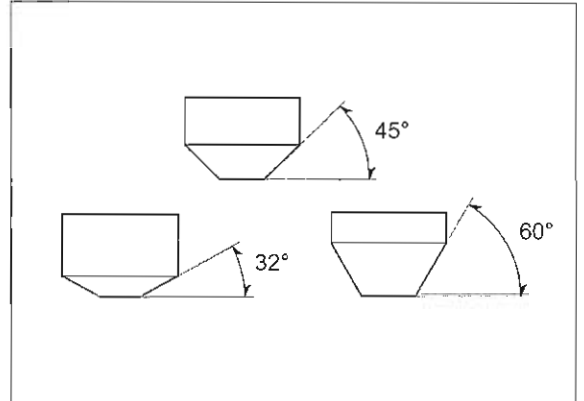
If the valve seat width is not within specification, reface the valve seat.



VALVE SEAT REFACING

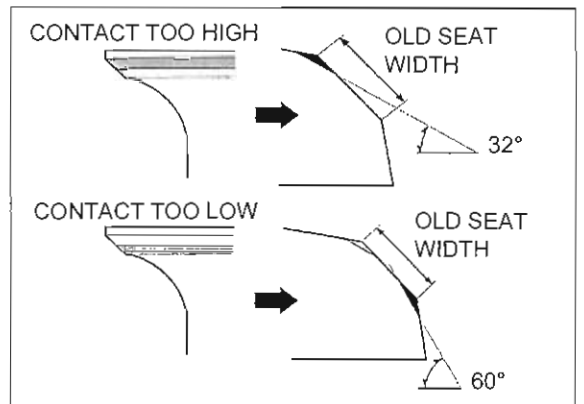
NOTE:

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



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

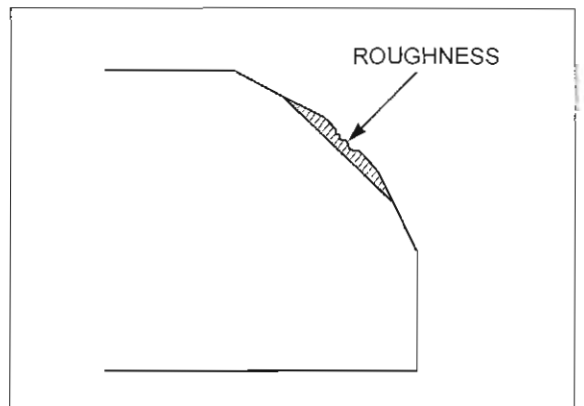
If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



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

TOOLS:

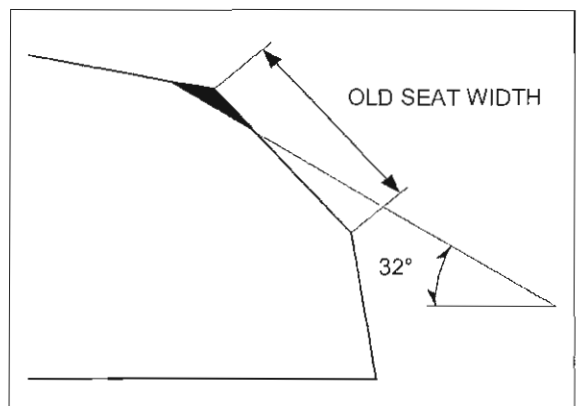
- Seat cutter, 27.5 mm (45° IN) 07780-0010200
- Seat cutter, 35 mm (45° EX) 07780-0010400
- Cutter holder, 5.5 mm 07781-0010101
- or equivalent commercially available in U.S.A.



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

TOOLS:

- Flat cutter, 28 mm (32° IN) 07780-0012100
- Flat cutter, 35 mm (32° EX) 07780-0012300
- Cutter holder, 5.5 mm 07781-0010101
- or equivalent commercially available in U.S.A.

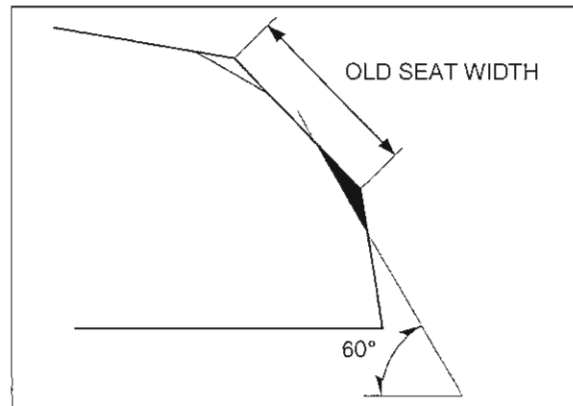


CYLINDER HEAD/VALVE

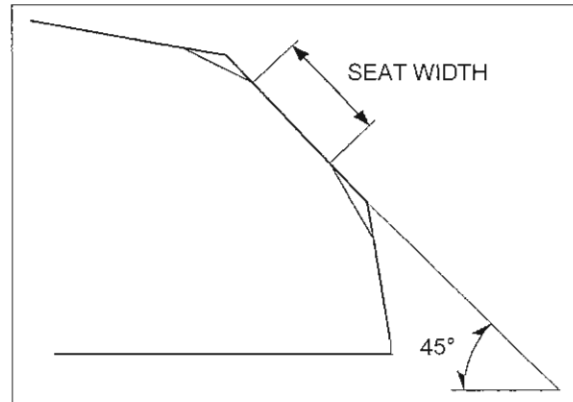
Using a 60° cutter, remove the bottom 1/4 of the old seat.

TOOLS:

Interior cutter, 30 mm (60° IN) 07780-0014000
Interior cutter, 37.5 mm (60° 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.



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

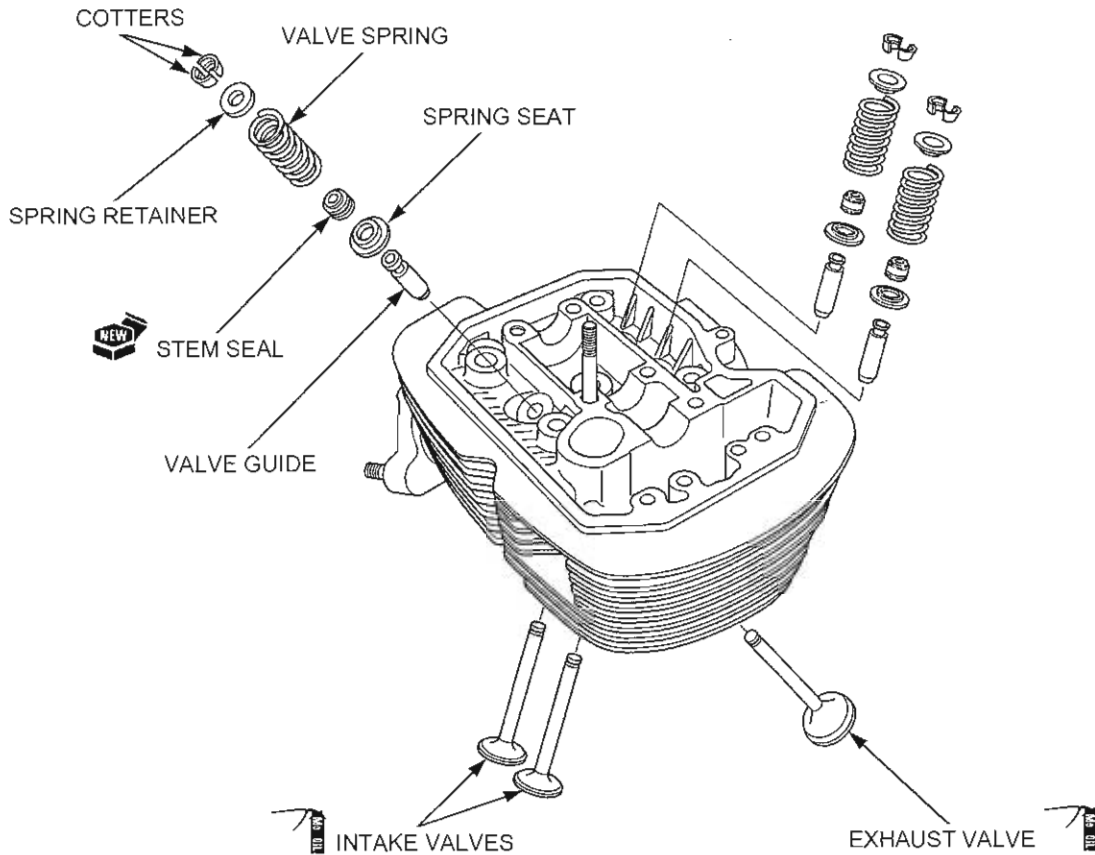
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

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

Recheck the seat contact after lapping.

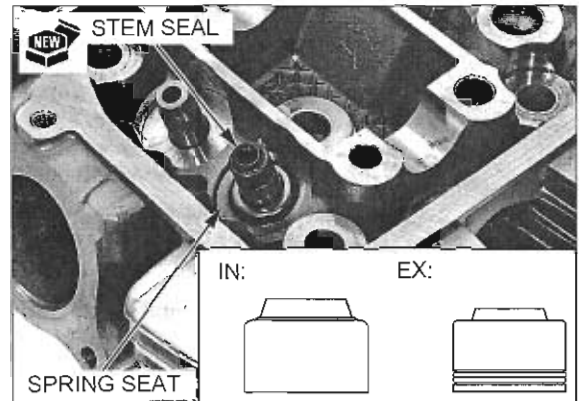


CYLINDER HEAD ASSEMBLY



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 the molybdenum oil solution to the valve guide sliding surface of the valve stem.

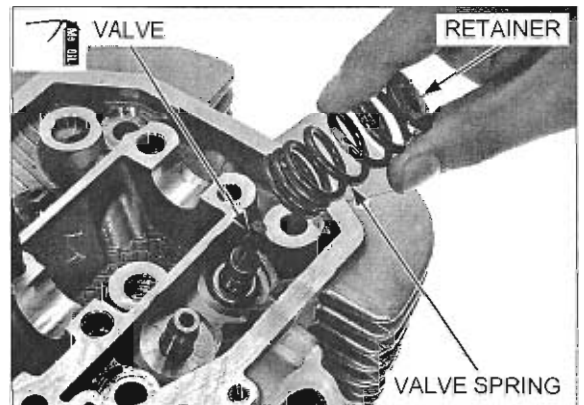
Install the valve into the valve guide.

NOTE:

- Exhaust valve spring has a larger O.D. than intake valve spring.
- To avoid damage to the stem seal, turn the valve slowly when installing the valve.

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

Install the spring retainer.



CYLINDER HEAD/VALVE

Grease the cotters to ease installation.

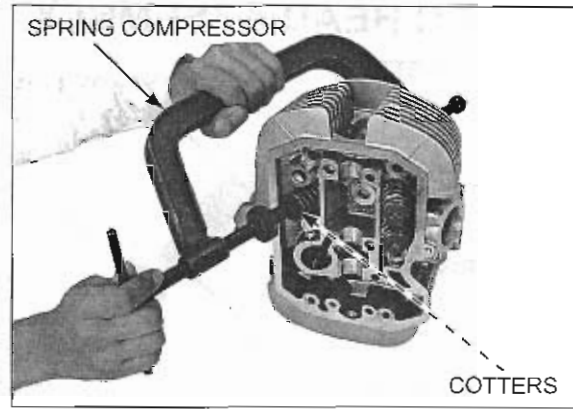
Install the cotters using a special tool.

TOOL:

Valve spring compressor 07757-0010000

NOTE:

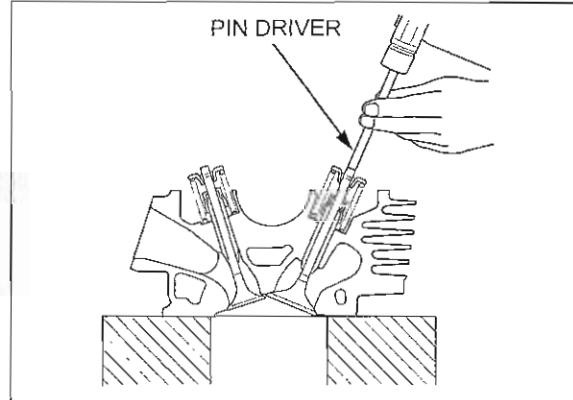
Compressing the valve springs more than necessary will cause loss of valve spring tension.



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

Tap the valve stems gently with a plastic hammer and pin driver to seat the cotters firmly as shown.

Install the spark plugs (page 3-8).



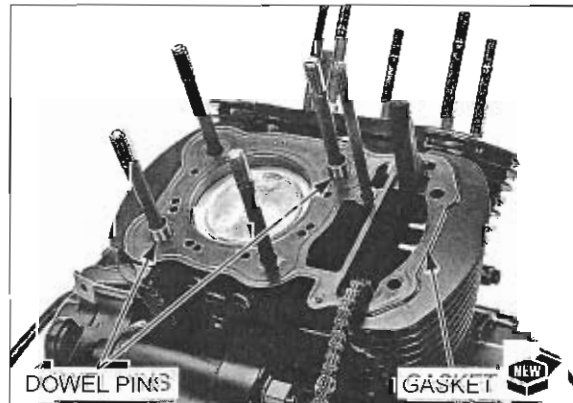
CYLINDER HEAD INSTALLATION

NOTE:

- The front and rear cylinder head service procedures are the same.
- Be careful not to damage the 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.

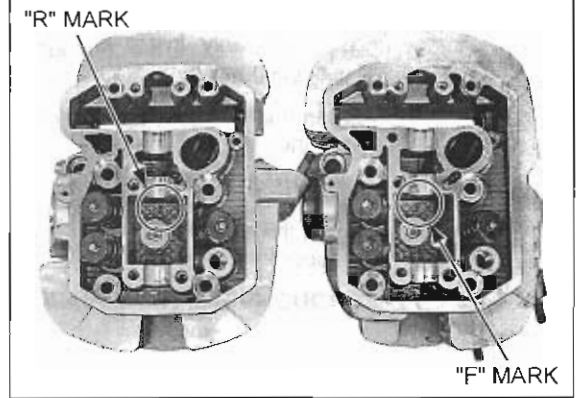
Clean the gasket mating surfaces of the cylinder and cylinder head thoroughly, being careful not to damage them.

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

Install and tighten the cylinder head 8 mm bolts, 10 mm nuts and washer to the specified torque.

TORQUE:

Cylinder head nut: 47 N·m (4.8 kgf·m, 35 lbf·ft)

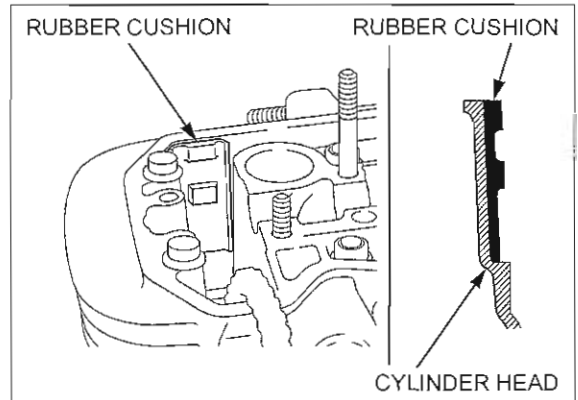
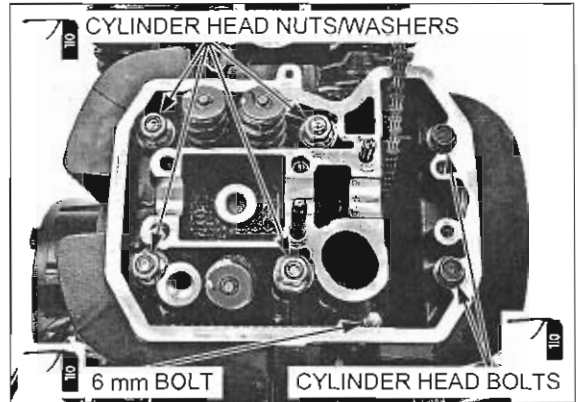
Cylinder head bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install and tighten the 6 mm bolt securely.

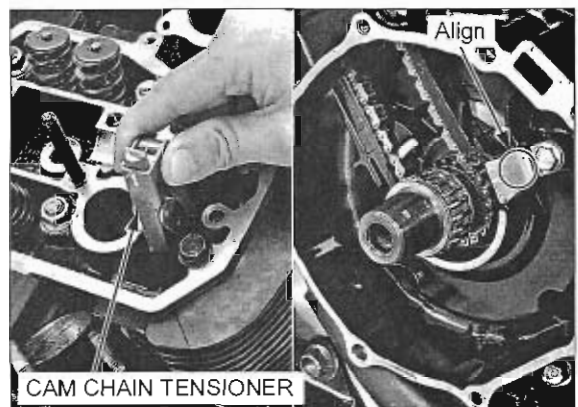
NOTE:

- 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 rubber cushion onto cylinder head as shown.



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



CYLINDER HEAD/VALVE

Tighten the tensioner bolts as follow:

1. Temporarily install the tensioner bolts with new sealing washers.
2. Tighten the cylinder head side cam chain tensioner bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

3. Tighten the cylinder side cam chain tensioner bolt to the specified torque.

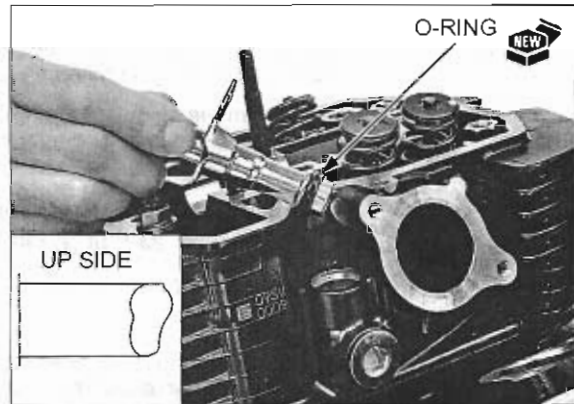
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



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

NOTE:

Install a O-ring with its tapered side facing up.

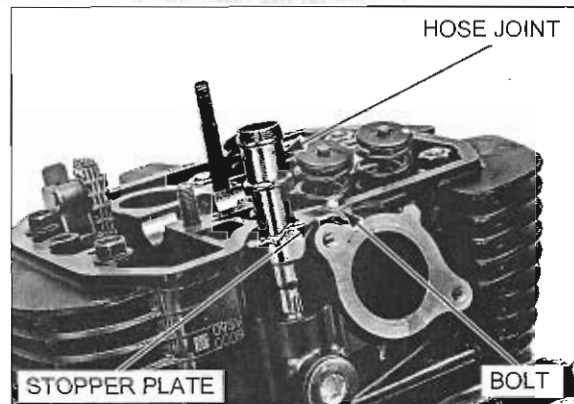


Install the water hose joint by aligning the bolt holes in the stopper plate and cylinder head. Install and tighten the bolt securely.

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

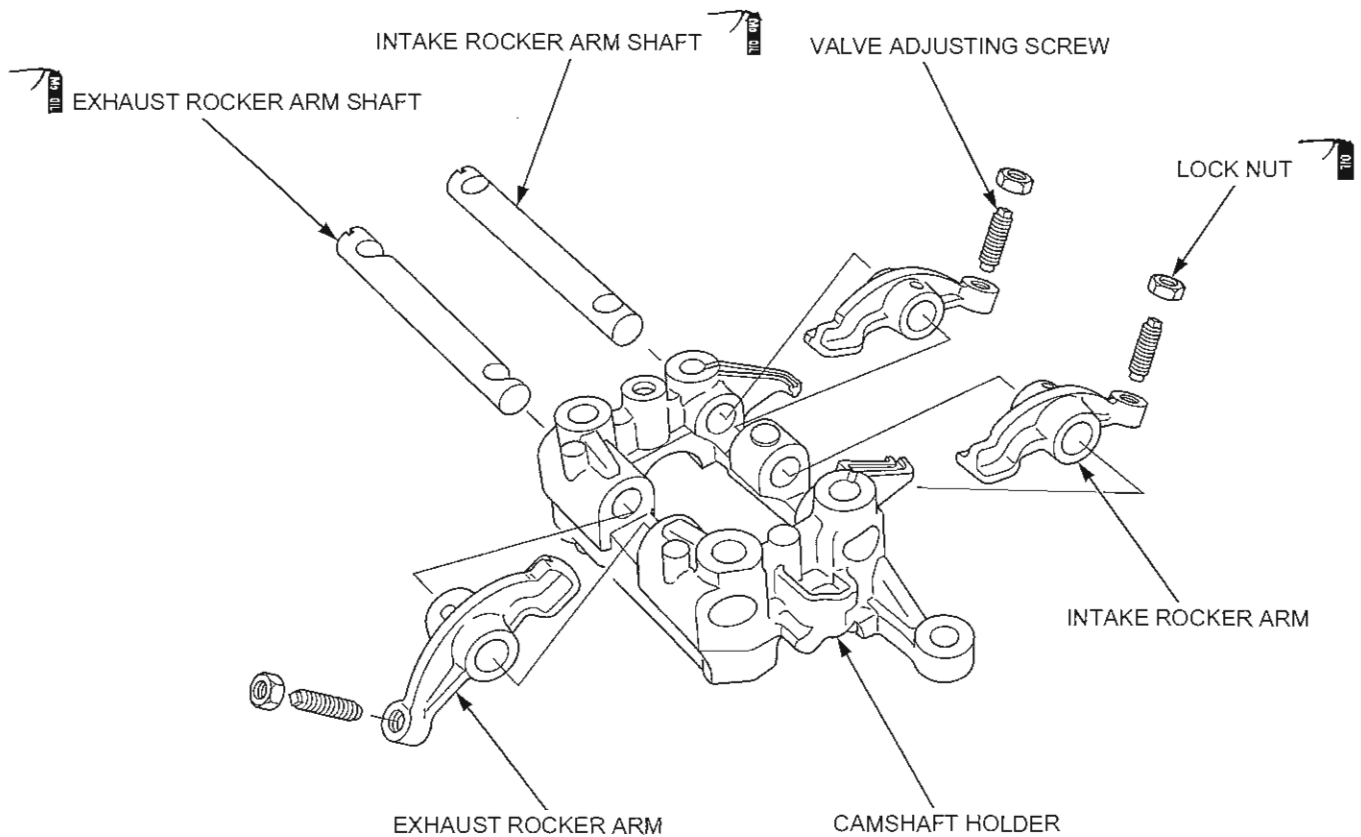
Install the following:

- Camshaft (page 8-25)
- Cylinder head cover (page 8-30)
- Intake manifold (page 5-52)

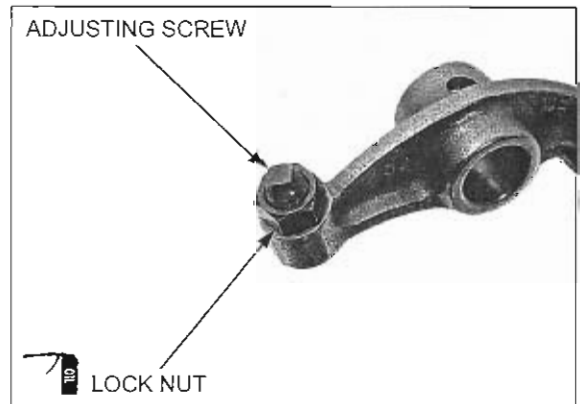


CAMSHAFT INSTALLATION

CAMSHAFT HOLDER ASSEMBLY



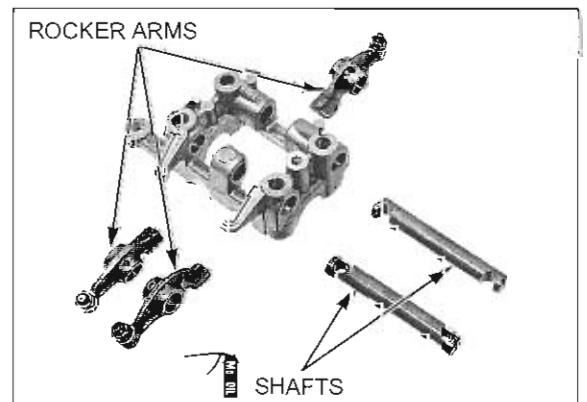
If disassembled the valve adjusting lock nut and adjusting screw. Apply engine oil to the valve adjusting screw lock nut threads and seating surface. Install the valve adjusting screw and lock nut.



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.

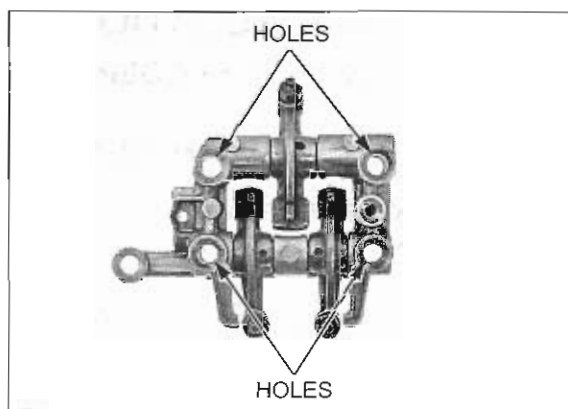
Apply molybdenum oil solution to the rocker arm shaft outer surface. Install the rocker arms and shafts.



CYLINDER HEAD/VALVE

Align the intake rocker arm shaft holes with the camshaft holder holes.

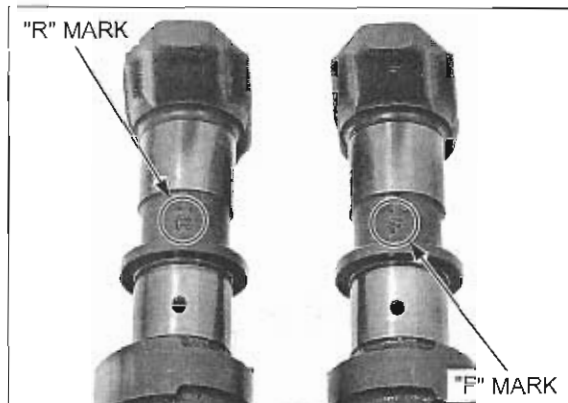
Align the exhaust rocker arm shaft grooves with the camshaft holder holes.



CAMSHAFT TIMING PROCEDURE

NOTE:

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



FRONT CYLINDER TDC SETTING

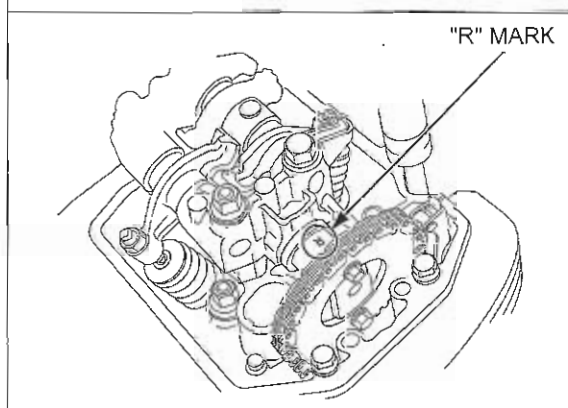
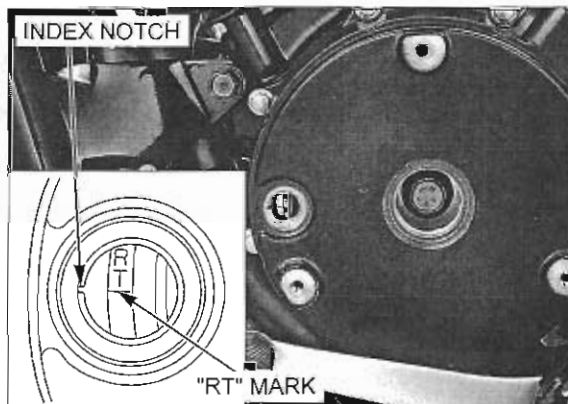
If the rear cylinder has not been serviced, begin here.

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 $1\frac{1}{7}$ (412°) 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 $\frac{1}{7}$ (52°) turn (align the "FT" mark with the index notch) and begin installation of the front camshaft.

Install the front camshaft (page 8-28).



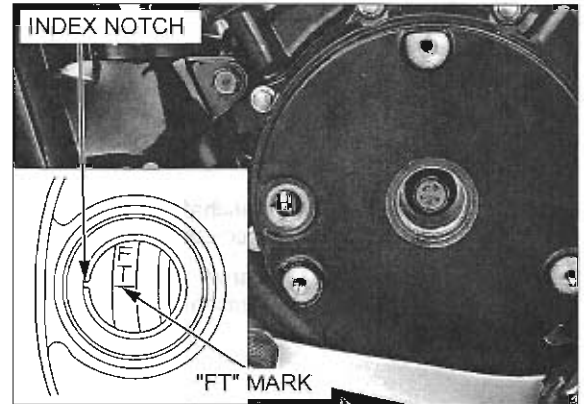
BOTH CYLINDER TDC SETTING

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 8-28).

Set the rear cylinder at TDC (page 8-27).

Install the rear camshaft (page 8-28).



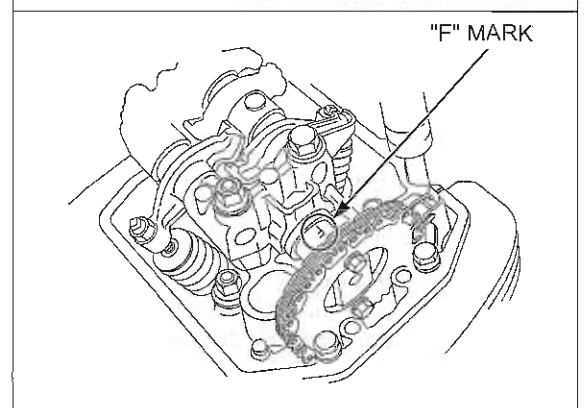
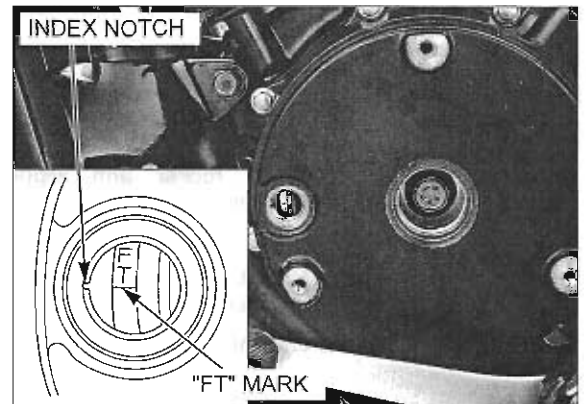
REAR CYLINDER TDC SETTING

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 6/7 (308°) 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 counterclockwise 1-6/7 (668°) turn (align the "RT" mark with the index notch) and begin installation of the rear camshaft.

Install the rear camshaft using the following procedure.



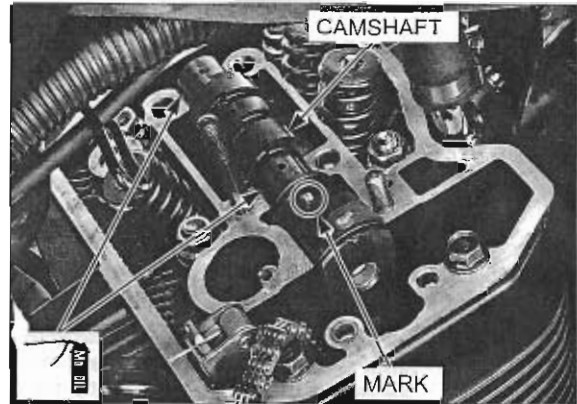
CAMSHAFT INSTALLATION

NOTE:

- The front and rear camshafts service procedures are the same.
- Make sure to follow the CAMSHAFT TIMING PROCEDURE (page 8-26) before installing the camshaft.

Lubricate the camshaft lobes and journal surfaces with molybdenum oil solution.

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

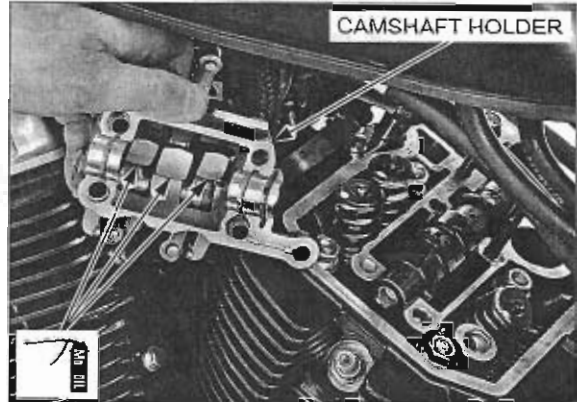


Lubricate each rocker arm slipper surface with molybdenum oil solution.

NOTE:

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

Install the camshaft holder assembly.

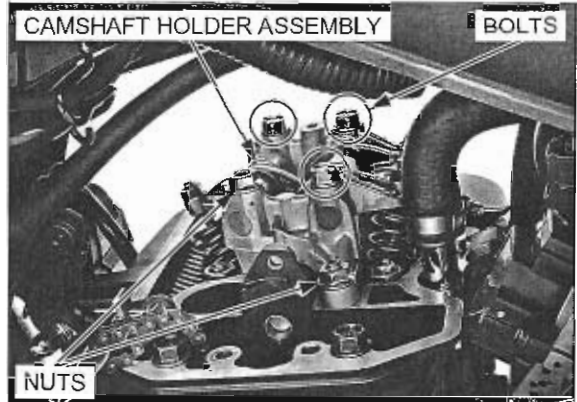


Install the camshaft holder bolts and nuts. Tighten the bolts and nuts to the specified torque in a crisscross pattern in several steps.

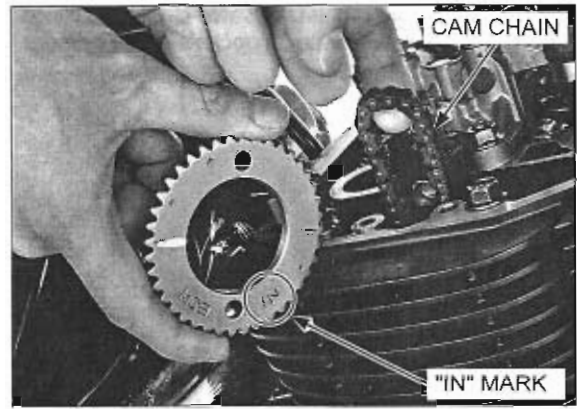
TORQUE:

Camshaft holder bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)

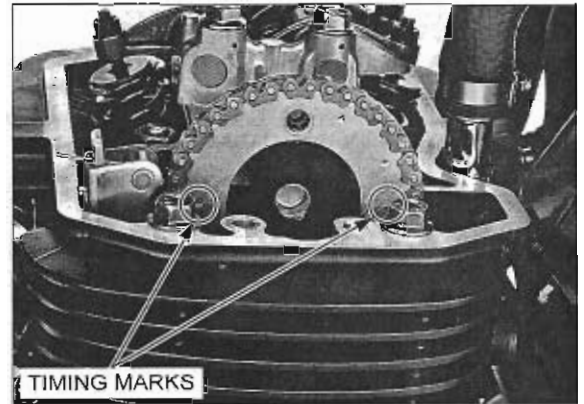
Camshaft holder nut: 23 N·m (2.3 kgf·m, 17 lbf·ft)



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.

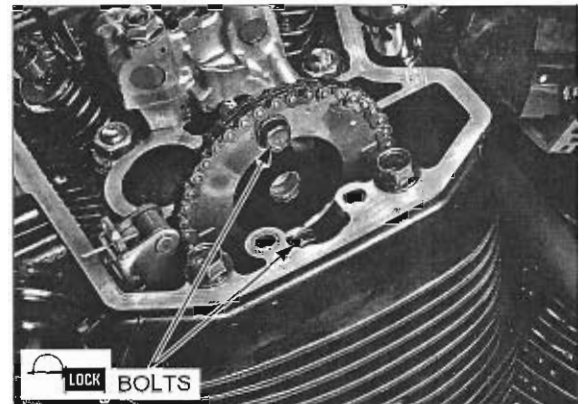
Temporarily install the cam sprocket bolt.

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.

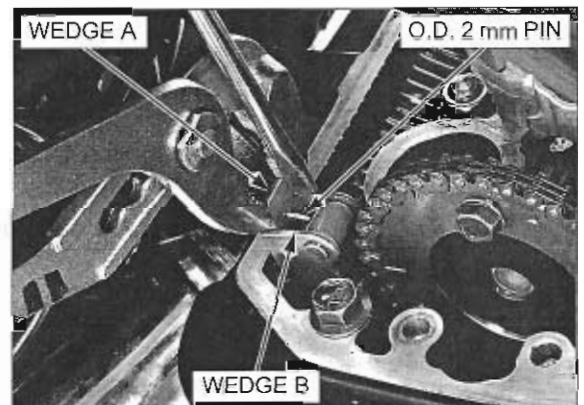
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



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

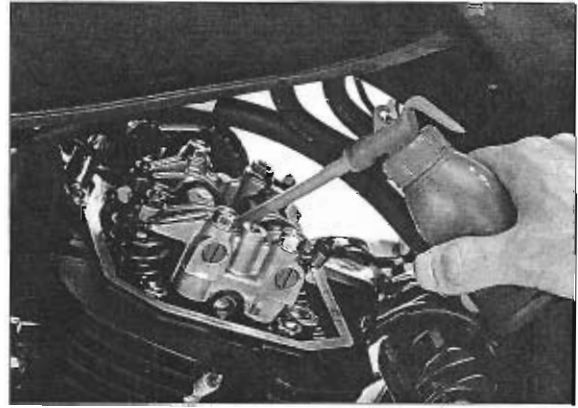
NOTE:

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



CYLINDER HEAD/VALVE

Adjust the valve clearance (page 3-8).
Fill the oil pockets in the cylinder head with engine oil.



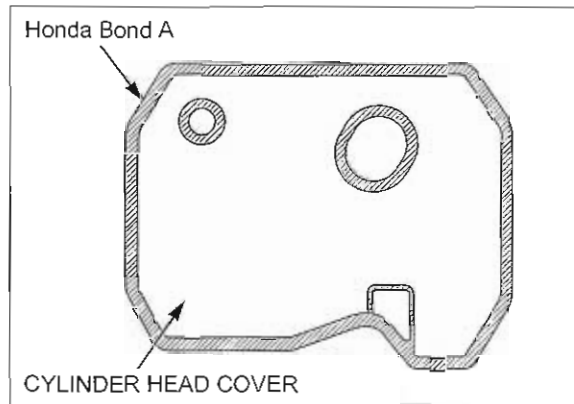
CYLINDER HEAD COVER INSTALLATION

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

Check the gasket is in good condition, replace it if necessary.

Apply Honda Bond A or Pro Honda handgrip cement (U.S.A. only) to the gasket groove of the cylinder head cover.

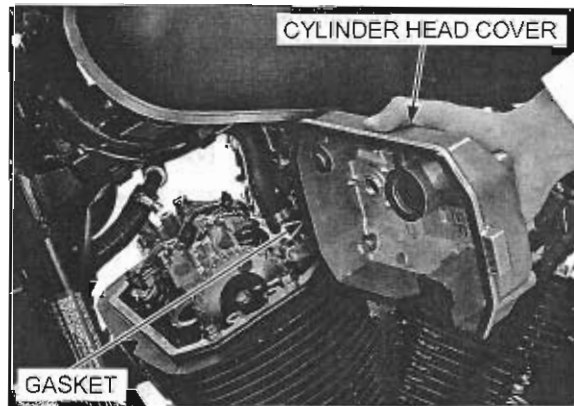
Install the gasket into the groove.



FRONT

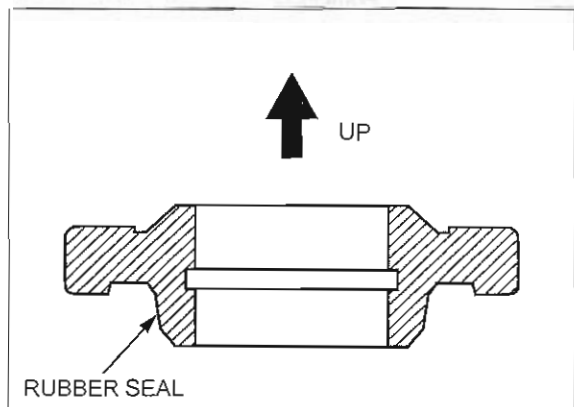
Clean the cylinder head cover mating surface of the cylinder head.

Install the front cylinder head cover on the front cylinder head.



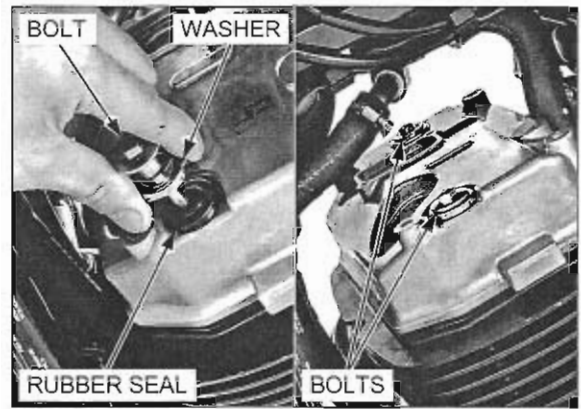
Check the condition of the rubber seals, replace them if necessary.

Install the rubber seals onto the cylinder head cover in the direction as shown.



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

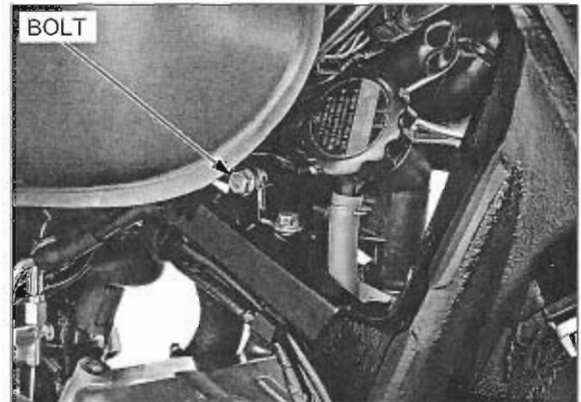
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Set the thermostat housing assembly to its original position.
Install and tighten the bolt securely.

Install the following:

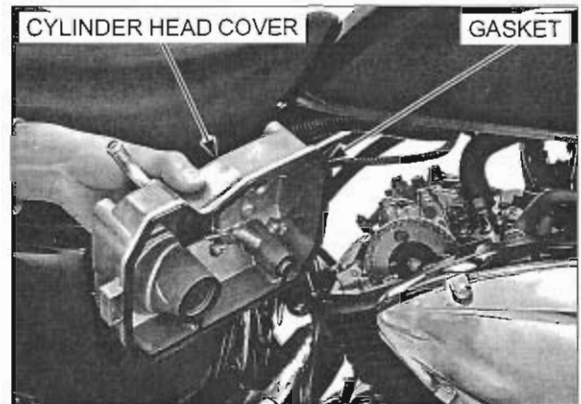
- PAIR check valve (page 5-64)
- Over head covers (page 2-4)



REAR

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

Install the rear cylinder head cover on the rear cylinder head.



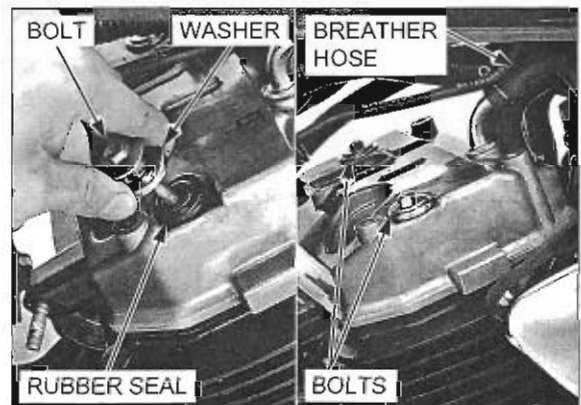
Install the rubber seals (page 8-30).
Install the washers.
Install and tighten the cylinder head cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the crankcase breather hose.

Install the following:

- PAIR check valve (page 5-64)
- Over head covers (page 2-4)



MEMO



Vertical text on the right edge, likely bleed-through from the reverse side of the page. The text is extremely faint and difficult to read, but appears to contain several lines of information, possibly including a date and a name.

9. CYLINDER/PISTON

COMPONENT LOCATION9-2

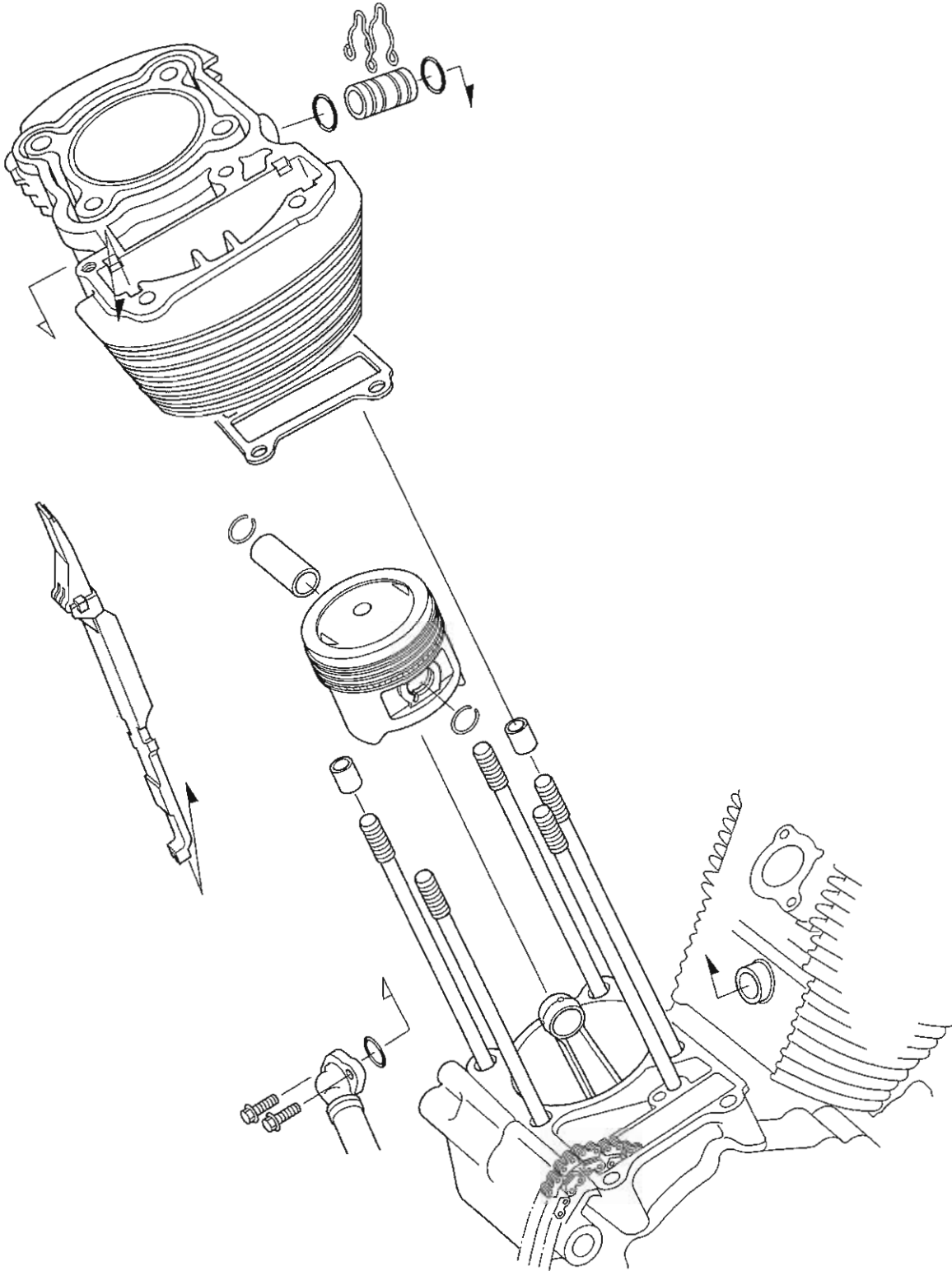
SERVICE INFORMATION9-3

TROUBLESHOOTING.....9-3

CYLINDER/PISTON REMOVAL9-4

CYLINDER/PISTON INSTALLATION.....9-9

COMPONENT LOCATION



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 position.
- 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 (0.7) from the 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 VALUES

Cylinder stud bolt (8 mm)	–	See page 9-8
Cylinder stud bolt (10 mm)	–	See page 9-8
Cylinder stud bolt (12 mm)	–	See 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 bore
- Worn cylinder, piston or piston rings
- Worn connecting rod small end

CYLINDER/PISTON REMOVAL

CYLINDER REMOVAL

NOTE:

The front and rear cylinder service procedures are the same.

Remove the cylinder head (page 8-13).

Remove the cam chain guide.

Front cylinder only: Remove the bolts, water hose joint and O-ring.

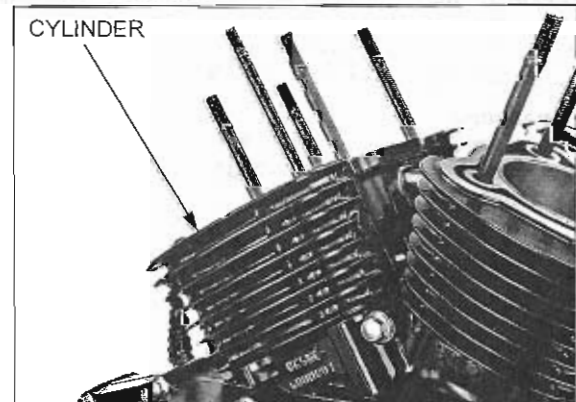
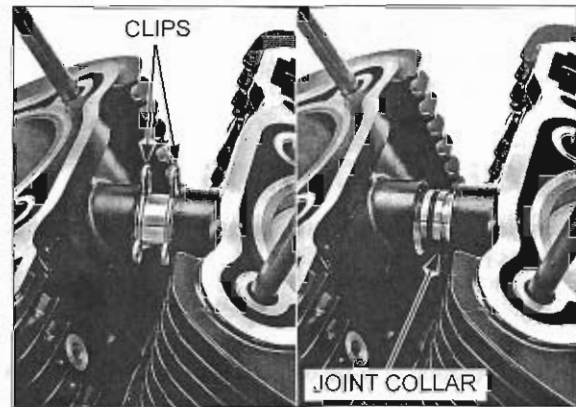
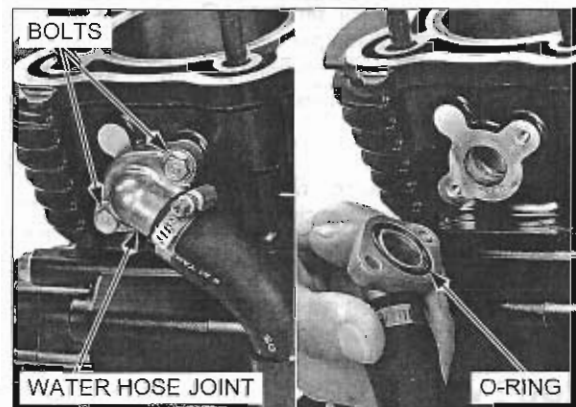
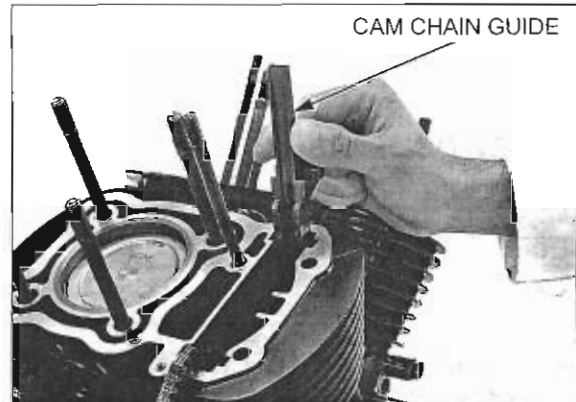
Remove the retaining clips.

Slide the cylinder joint collar toward either the front or rear cylinder.

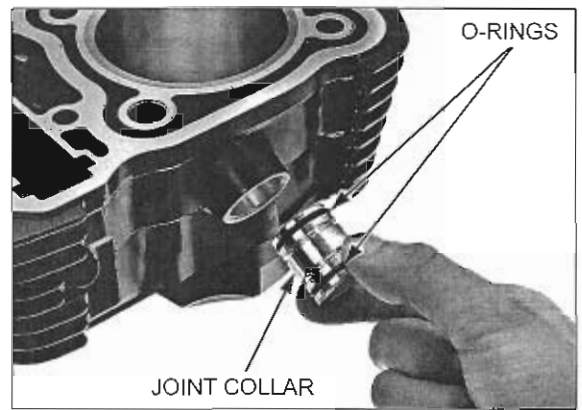
Lift the cylinder and remove it, being careful not to damage the piston with the stud bolts.

NOTE:

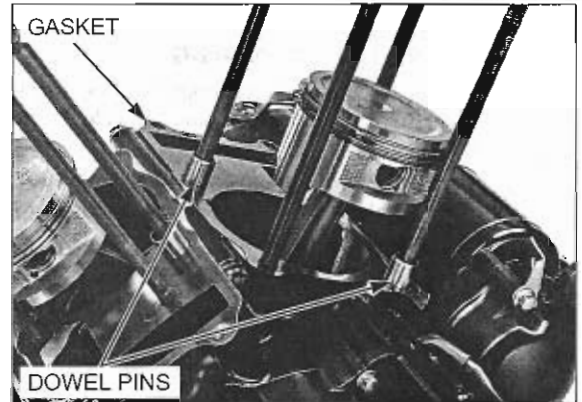
- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.



Remove the joint collar from the cylinder.
Remove the O-rings.



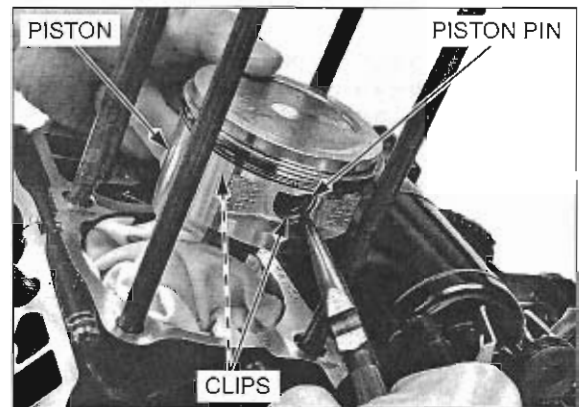
Remove the gasket and dowel pins.



PISTON REMOVAL

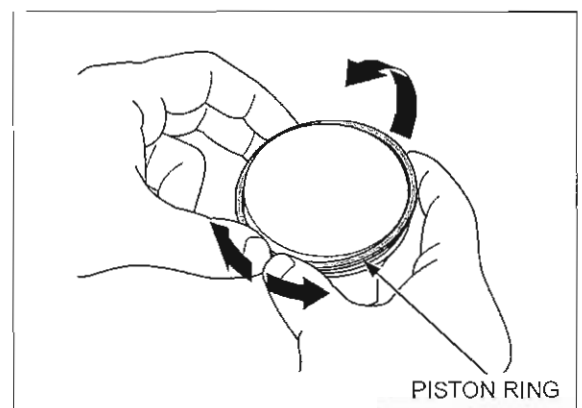
Place a clean shop towel over the crankcase to prevent the piston pin clips from falling into the crankcase.

Remove the piston pin clips with pliers. Push the piston pin out of the piston and connecting rod, and remove the piston.



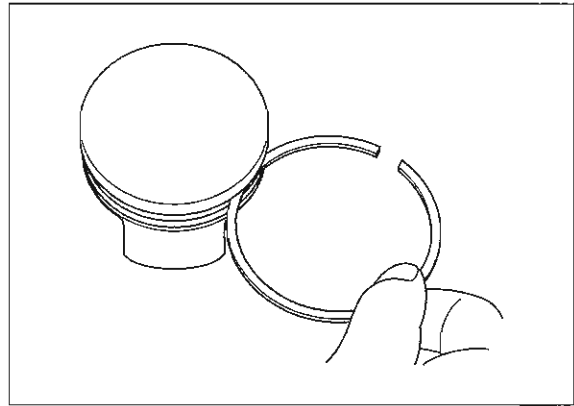
Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up a point opposite the gap.



CYLINDER/PISTON

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

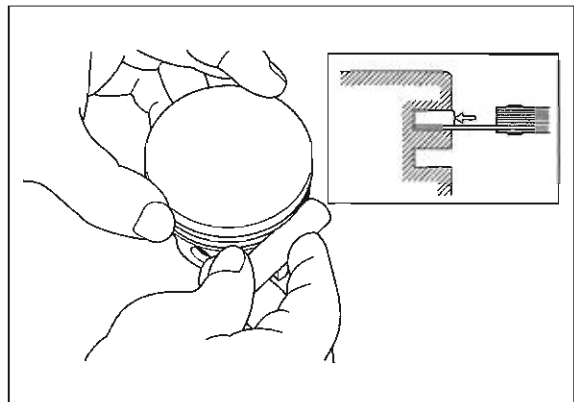
Always replace the piston rings as a set. Inspect the piston rings for free movement by rotating them. The rings should be able to move freely without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMITS:

Top: 0.08 mm (0.003 in)

Second: 0.07 mm (0.003 in)



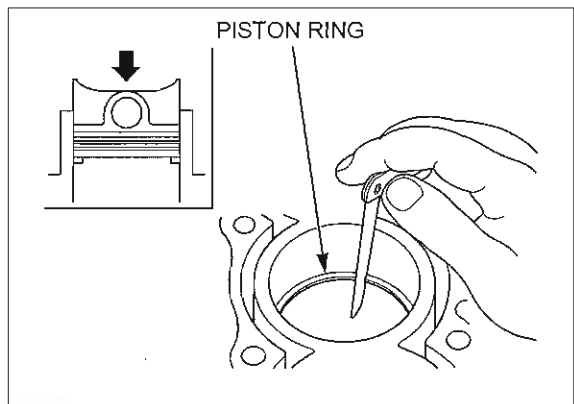
Insert the piston ring into the bottom of the cylinder squarely using the piston crown. Measure the piston ring end gap.

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)

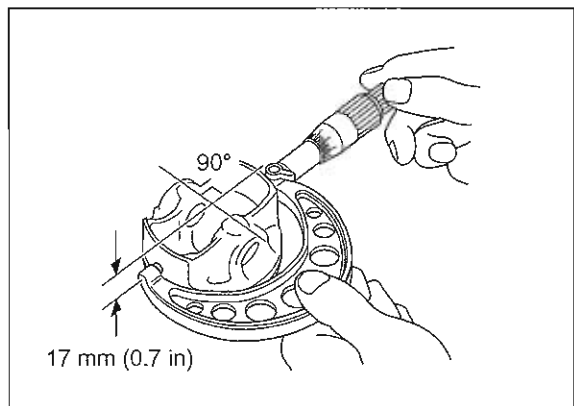


Measure the piston O.D. at a point 17 mm (0.7 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 78.90 mm (3.106 in)

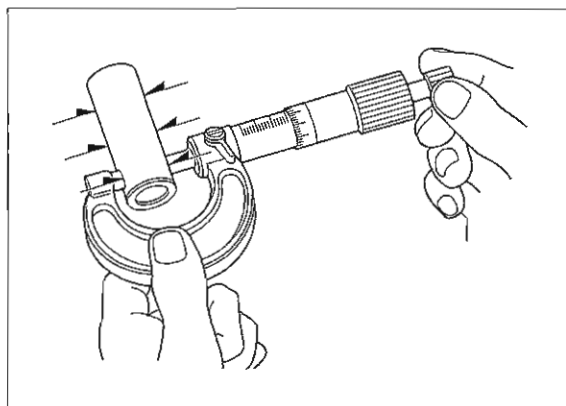
Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance (page 9-8).

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)

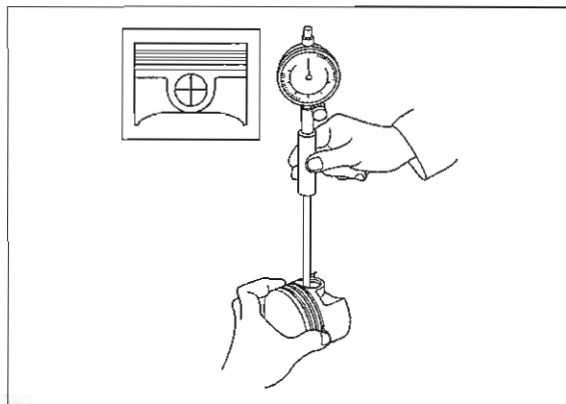


Measure the piston pin bore I.D.

SERVICE LIMIT: 18.05 mm (0.711 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



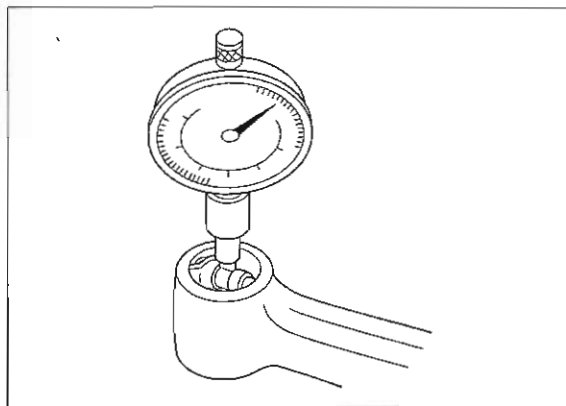
CONNECTING ROD

Measure the connecting rod small end I.D.

SERVICE LIMIT: 18.07 mm (0.711 in)

Calculate the connecting rod-to-piston pin clearance.

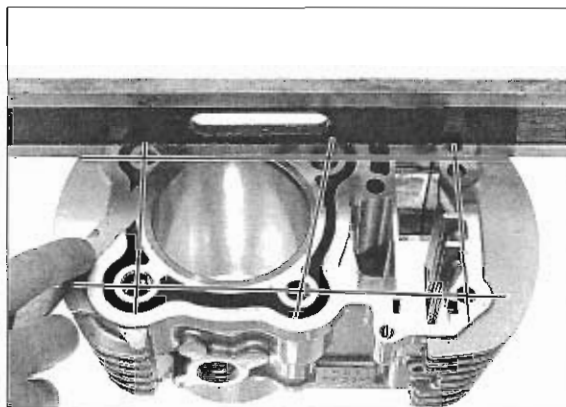
SERVICE LIMIT: 0.06 mm (0.002 in)



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)



CYLINDER/PISTON

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)

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)

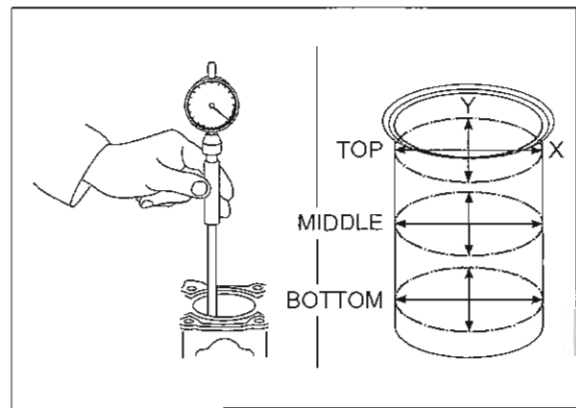
The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:

0.25 mm (0.010 in)

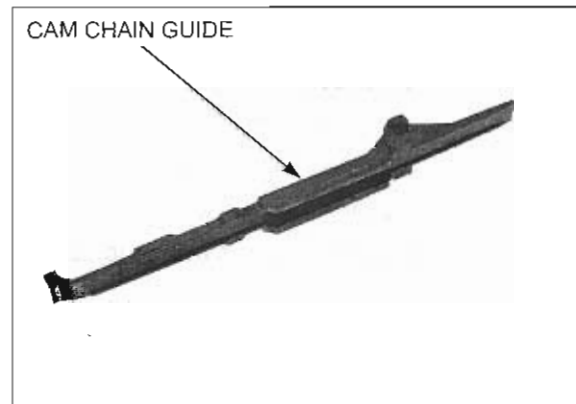
0.50 mm (0.020 in)

The piston to cylinder clearance for the oversize piston must be: 0.010 – 0.045 mm (0.0004 – 0.0018 in).



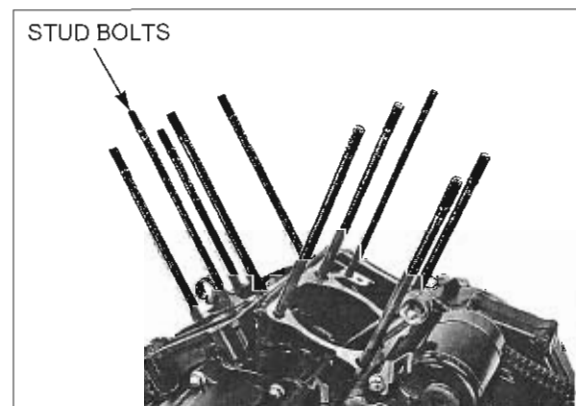
CAM CHAIN GUIDE

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



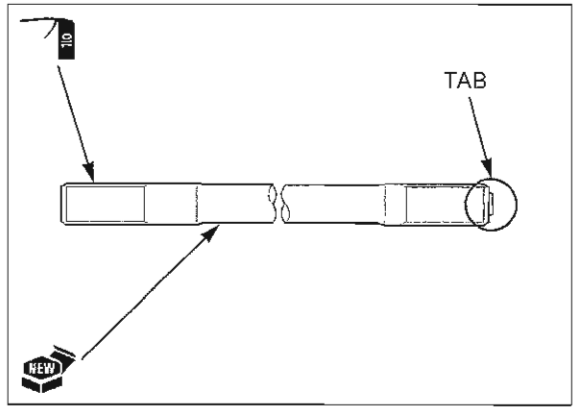
CYLINDER STUD BOLT REPLACEMENT

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



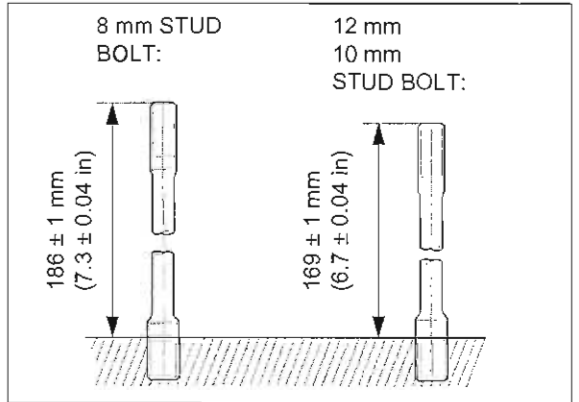
Apply engine oil to the lower threads of a new stud bolt and install it.

NOTE:
Install the 8 mm and 10 mm 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 engine oil to the piston and piston ring outer surface.

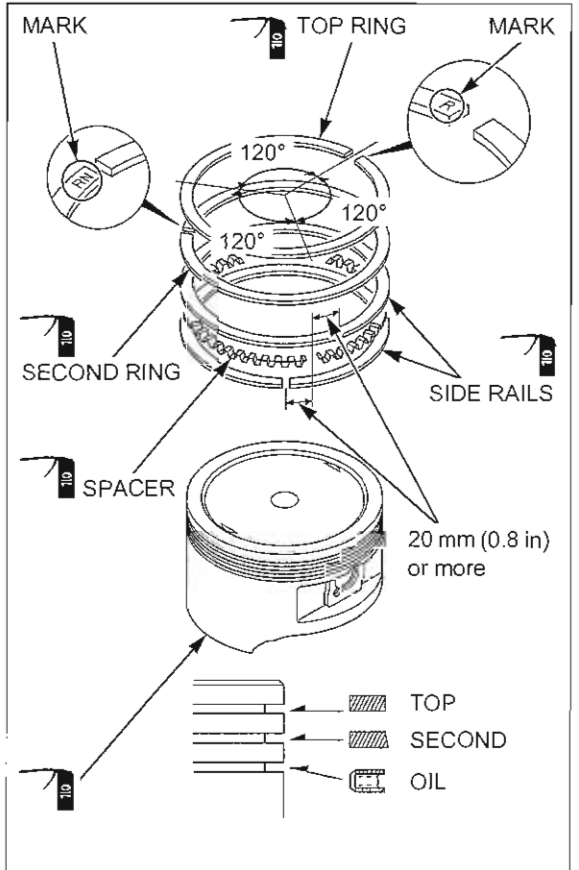
Be careful not to damage the piston and rings.

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.

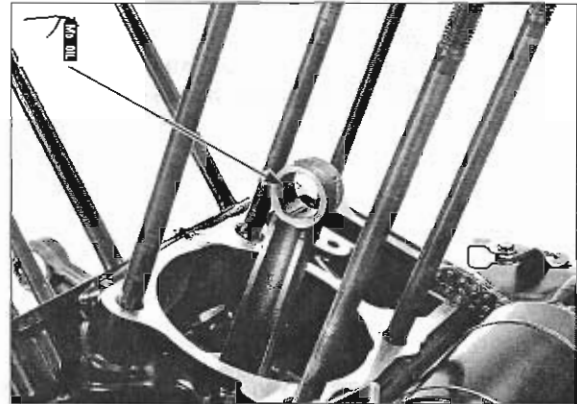
Stagger the piston ring end gaps 120° apart from each other.
Stagger the side rail end gaps as shown.



CYLINDER/PISTON

PISTON INSTALLATION

Apply molybdenum oil solution to the connecting rod small end inner surface.



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

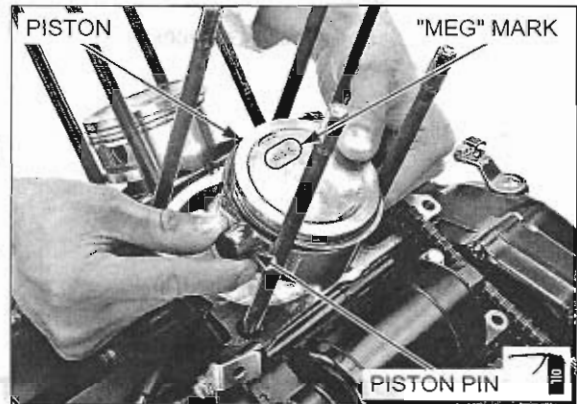
Apply engine oil to the piston pin outer surface.

Install the piston.

Install the piston pin through the piston and connecting rod.

NOTE:

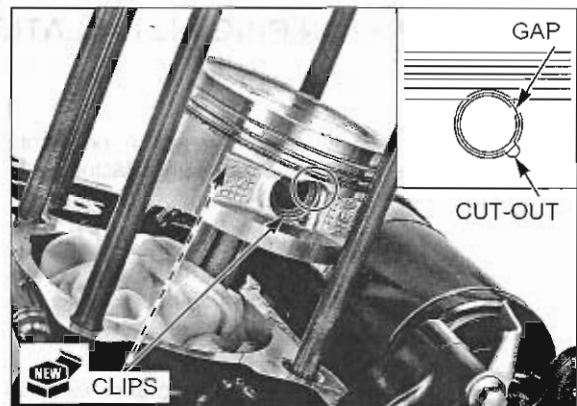
Install the piston with its "MEG" mark facing the intake side.



Install new piston pin clips into the grooves in the piston pin hole.

NOTE:

- Make sure the piston pin clips are seated securely.
- Do not align the clip end gap with the piston cut-out.



CYLINDER INSTALLATION

NOTE:

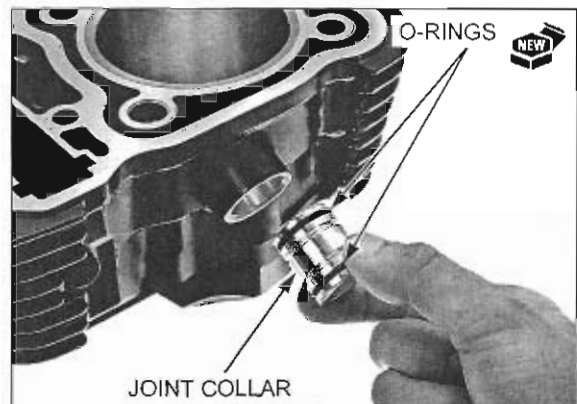
The front and rear cylinder service procedures are the same.

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

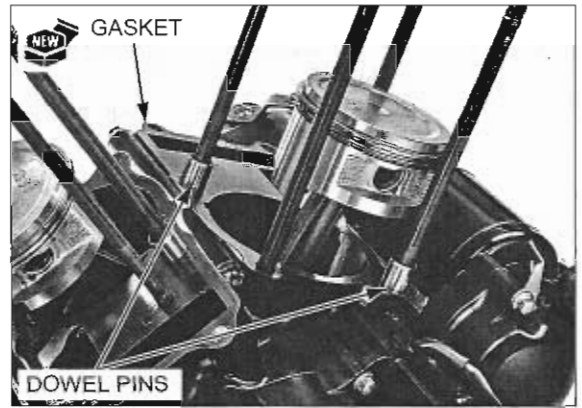
Be careful not to let the foreign material fall into the crankcase.

Install new O-rings to the joint collar.

Install the joint collar to the cylinder.



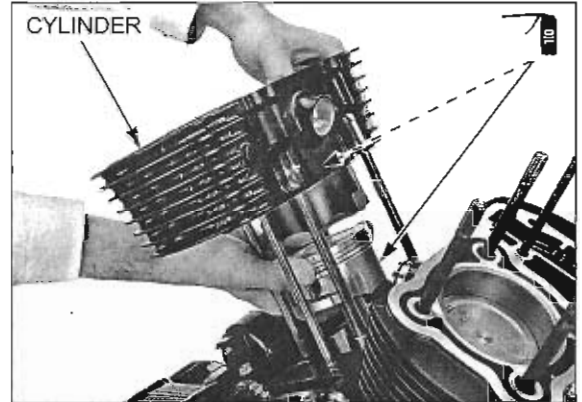
Install the dowel pins and a new gasket.



Be careful not to damage the piston rings and cylinder wall.

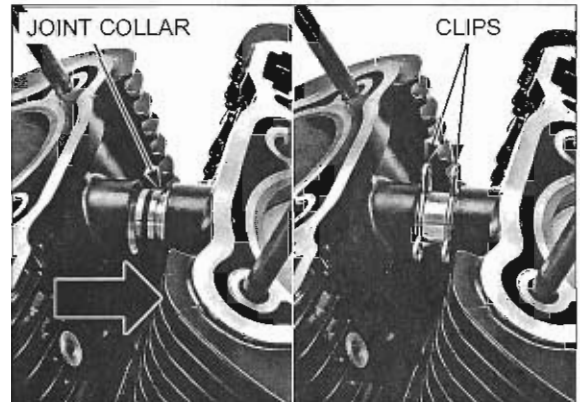
Apply engine oil to the cylinder wall, piston outer surface and piston rings.

Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.

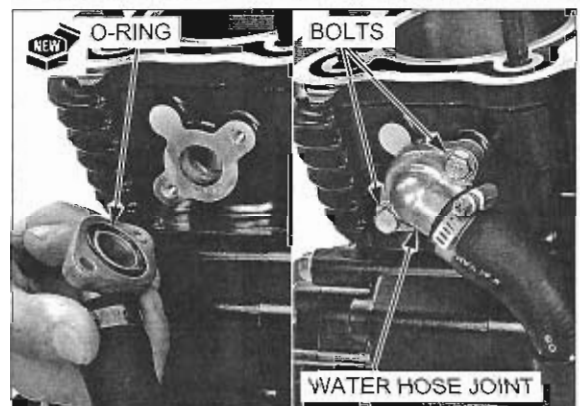


Slide the joint collar into the hole in the cylinder and connect it.

Install the retaining clips into the joint collar grooves.



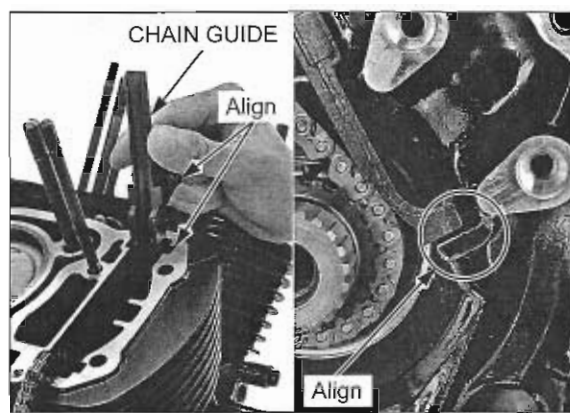
Front cylinder only: Install a new O-ring into the water hose joint groove. Install and tighten the hose joint bolts securely.



CYLINDER/PISTON

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 cylinder head (page 8-22).

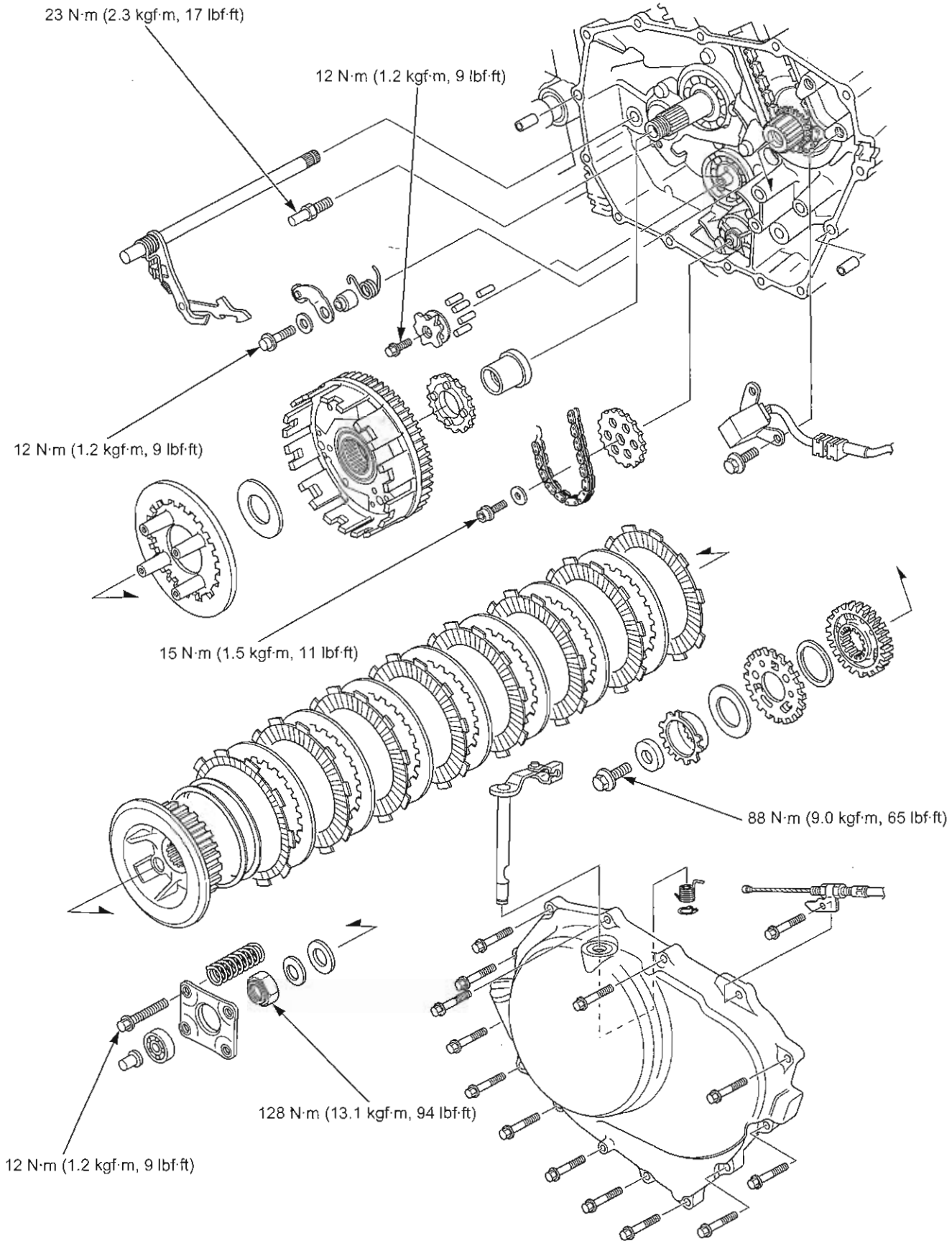


10. CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION	10-2	PRIMARY DRIVE GEAR	10-12
SERVICE INFORMATION	10-3	GEARSHIFT LINKAGE	10-14
TROUBLESHOOTING	10-4	CLUTCH INSTALLATION	10-19
RIGHT CRANKCASE COVER REMOVAL	10-5	RIGHT CRANKCASE COVER INSTALLATION	10-23
CLUTCH REMOVAL	10-6		

CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION



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)

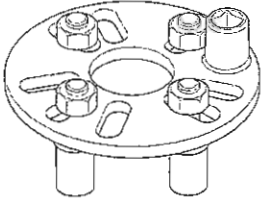

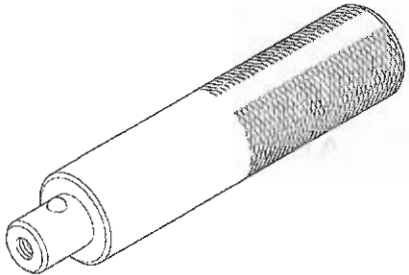
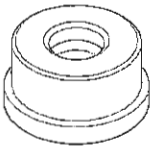
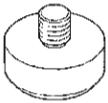
ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length	45.5 (1.79)	43.9 (1.73)
	Disc thickness	Disc A	2.62 – 2.78 (0.103 – 0.109)
		End disc	2.92 – 3.08 (0.115 – 0.121)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide	I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
	O.D.	29.994 – 30.007 (1.1809 – 1.1814)	29.98 (1.180)
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)	0.093 (0.0036)
Oil pump drive sprocket I.D.		30.025 – 30.145 (1.1820 – 1.1868)	30.15 (1.187)
Oil pump drive sprocket-to-clutch outer guide clearance		0.018 – 0.151 (0.0007 – 0.0059)	0.183 (0.0072)

TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	128 N·m (13.1 kgf·m, 94 lbf·ft)	Replace with a new one and stake. Apply engine oil to the threads and seating surface.
Primary drive gear bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply engine oil to the threads and seating 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.
Gearshift pedal pivot bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift cam plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.

CLUTCH/GEARSHIFT LINKAGE

TOOLS

<p>Clutch center holder 07JMB-MN50302</p>  <p>or 07HGB-001010B (plate) and 07HGB-001020B (collar) (U.S.A. only)</p>	<p>Gear holder, 2.5 07724-0010100</p>  <p>or 07724-001A100 (U.S.A. only)</p>	<p>Driver 07749-0010000</p> 
<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Pilot, 30 mm 07746-0040700</p> 	

TROUBLESHOOTING

Clutch lever too hard to pull in

- 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 freeplay
- Warped clutch plates
- Loose clutch center lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

Clutch slips

- No clutch lever freeplay
- 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 12-18)

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 12-18)
- Worn gear dogs or dog holes (page 12-18)

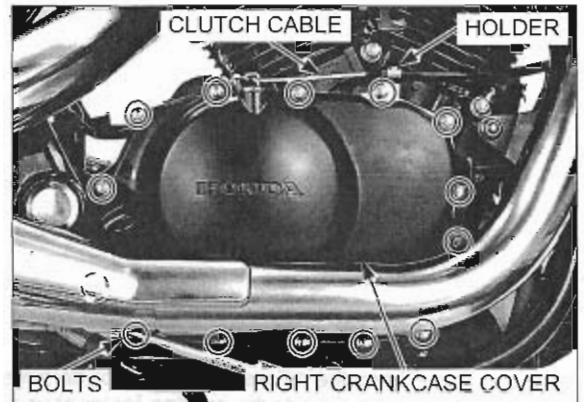
RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-11).

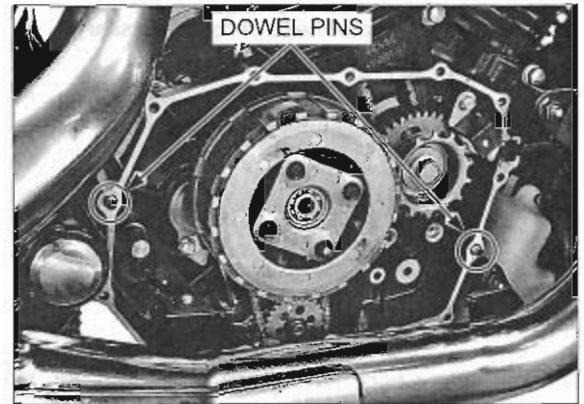
Remove the bolts in a crisscross pattern in several steps.

Remove the clutch cable holder and disconnect the clutch cable.

Remove the right crankcase cover.

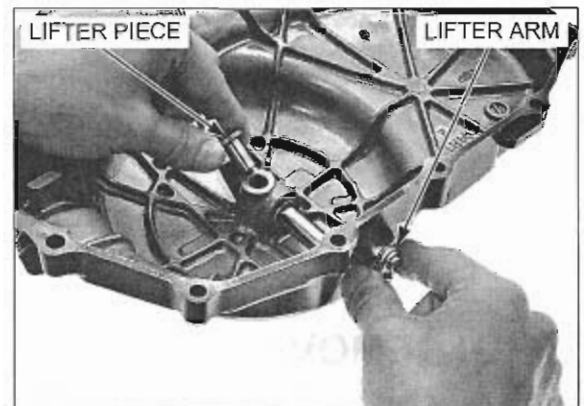


Be careful not to damage the mating surface. Remove the dowel pins and clean off the sealant from the mating surface.

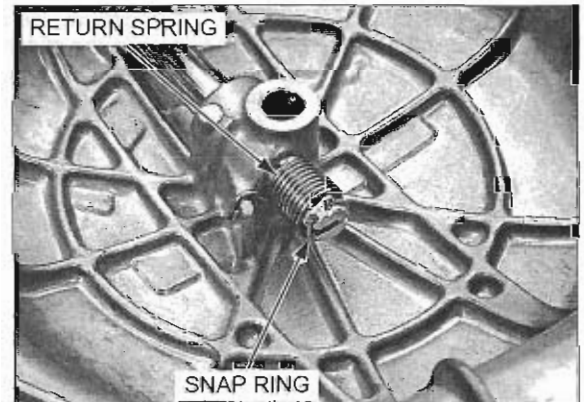


DISASSEMBLY

Remove the clutch lifter piece while turning the clutch lifter arm clockwise.

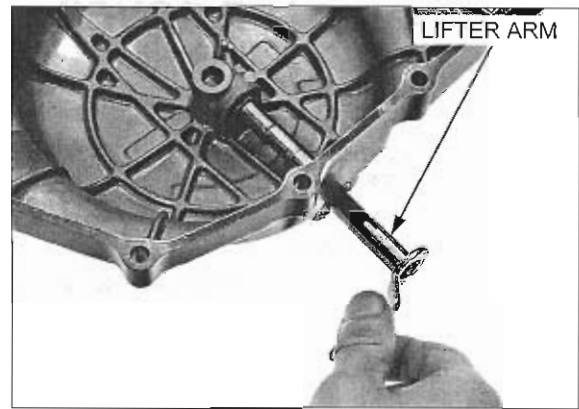


Remove the snap ring and return spring from the clutch lifter arm.



CLUTCH/GEARSHIFT LINKAGE

Remove the clutch lifter arm from the right crankcase cover.

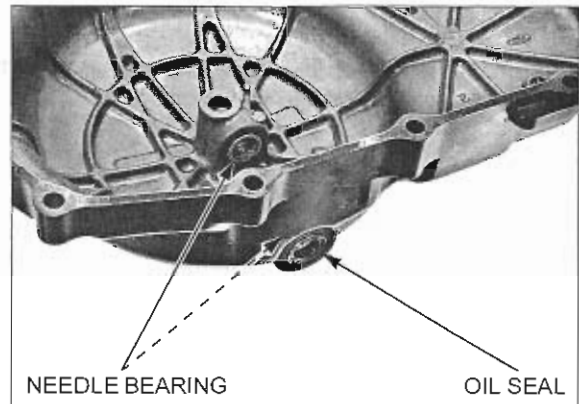


INSPECTION

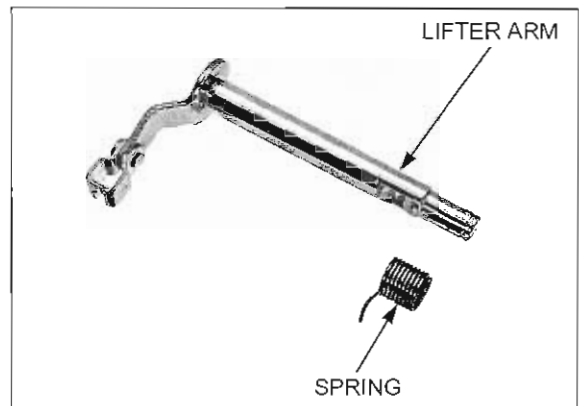
Check the oil seal for fatigue or damage.
Check the needle bearing for wear or damage.
Replace these parts if necessary.

NOTE:

If the oil seal replacement is required, install the oil seal flush with the case surface.



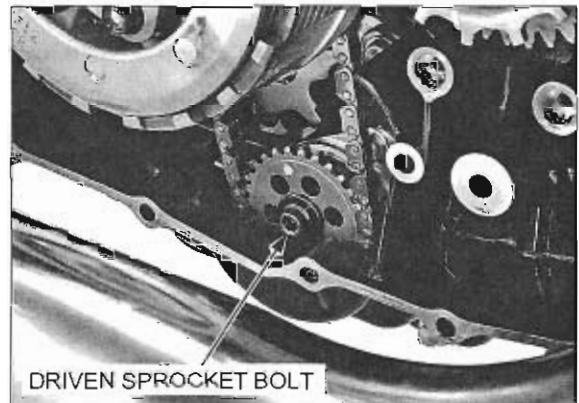
Check the clutch lifter arm for wear, damage or bending.
Check the spring for fatigue or damage.
Replace these parts if necessary.



CLUTCH REMOVAL

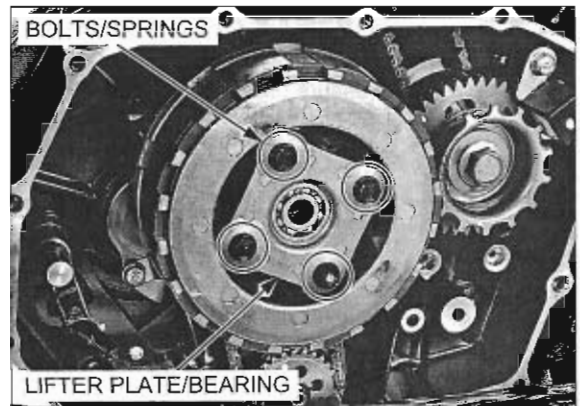
Remove the right crankcase cover (page 10-5).

If the oil pump driven sprocket will be removed, loosen the driven sprocket bolt while the clutch is still installed.

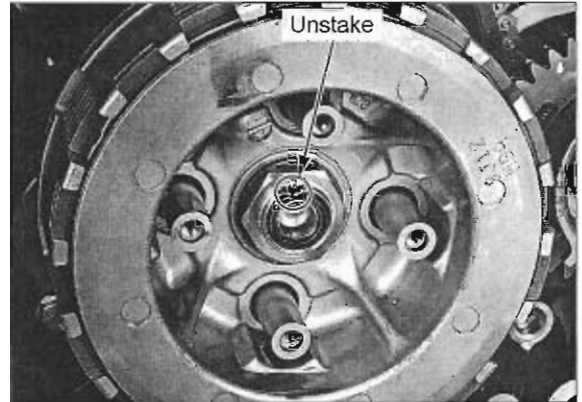


CLUTCH/GEARSHIFT LINKAGE

Loosen the clutch lifter plate bolts in a crisscross pattern in several steps.
Remove the lifter plate/bearing and clutch springs.

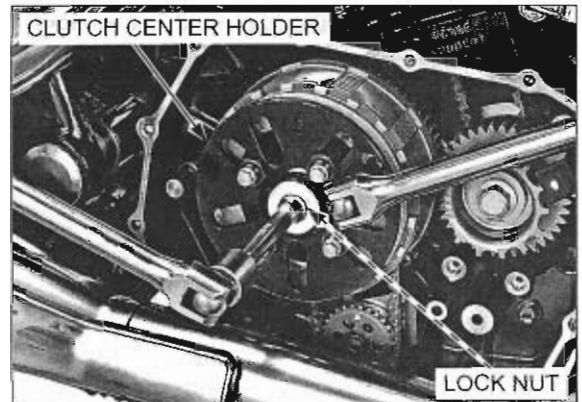


Be careful not to damage the mainshaft threads. Unstake the clutch center lock nut.



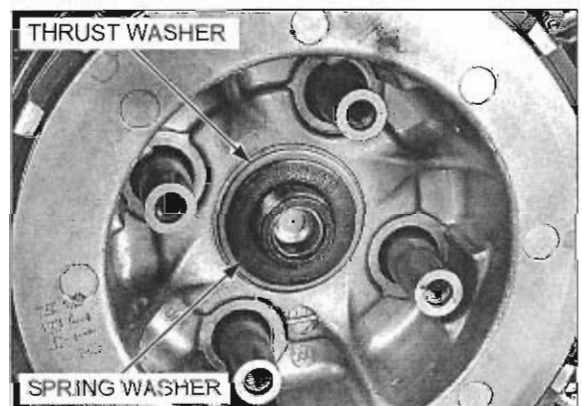
Hold the clutch center using a special tool and loosen the clutch center lock nut.

TOOL:
Clutch center holder 07JMB-MN50302 or
 07HGB-001010B
 (plate) and
 07HGB-001020B
 (collar) (U.S.A. only)



Remove the special tool and clutch center lock nut.

Remove the spring washer and thrust washer.



CLUTCH/GEARSHIFT LINKAGE

Remove the following:

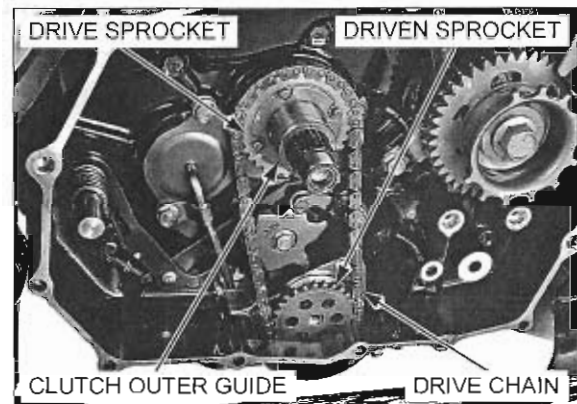
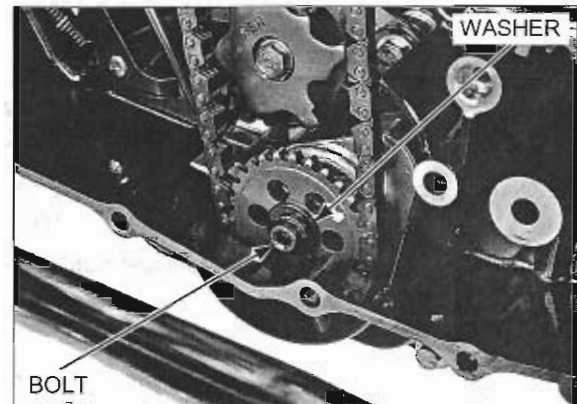
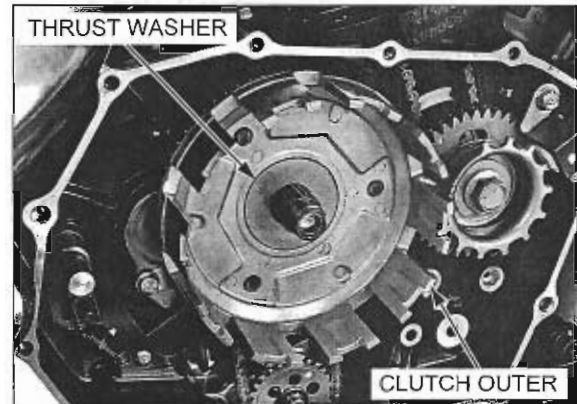
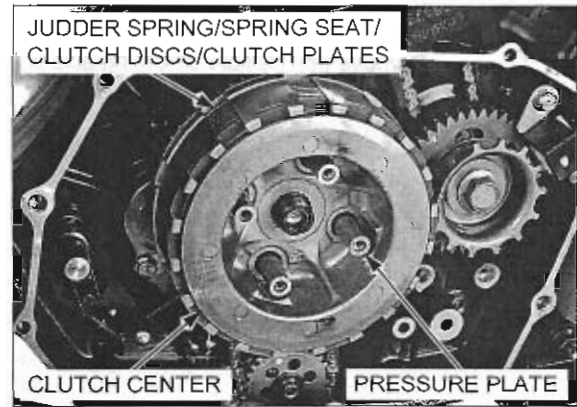
- Clutch center
- Pressure plate
- End clutch disc
- Clutch plates
- Clutch disc A
- Judder spring
- Spring seat

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

CLUTCH LIFTER 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.

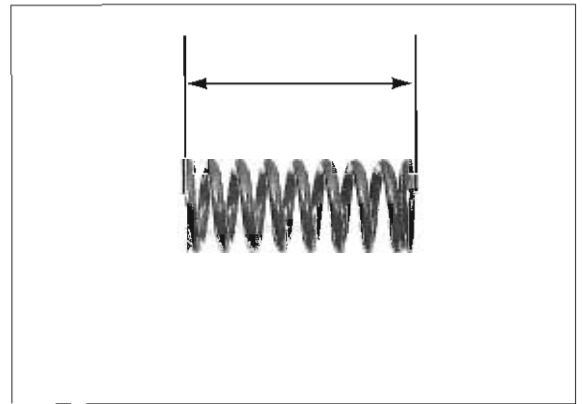


CLUTCH SPRING

Replace the clutch springs as a set.

Check the clutch spring free length.

SERVICE LIMIT: 43.9 mm (1.73 in)



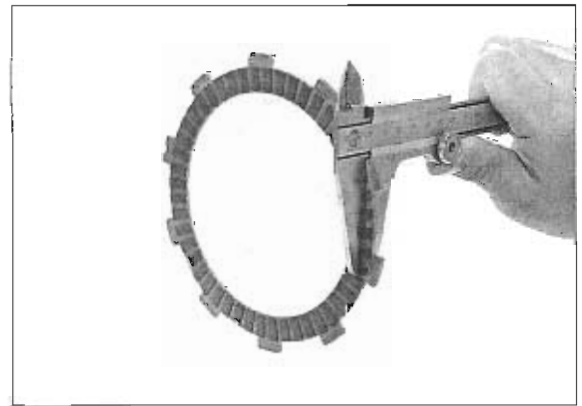
CLUTCH DISC

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 LIMITS: Disc A: 2.3 mm (0.09 in)
End disc: 2.6 mm (0.10 in)**



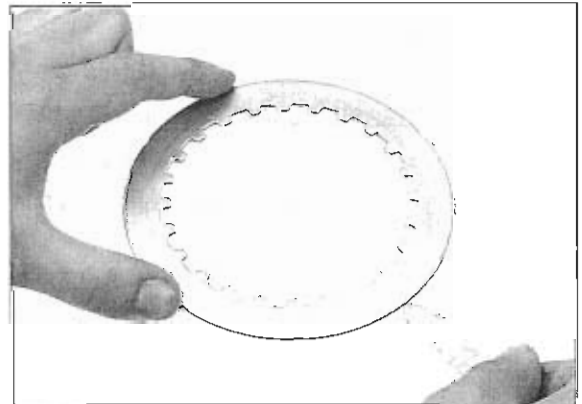
CLUTCH PLATE

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.

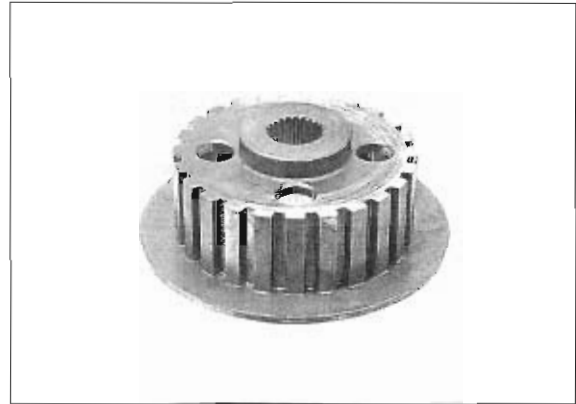
SERVICE LIMIT: 0.30 mm (0.012 in)



CLUTCH/GEARSHIFT LINKAGE

CLUTCH CENTER

Check the clutch center for nicks, indentations or abnormal wear caused by the clutch plates.



CLUTCH OUTER

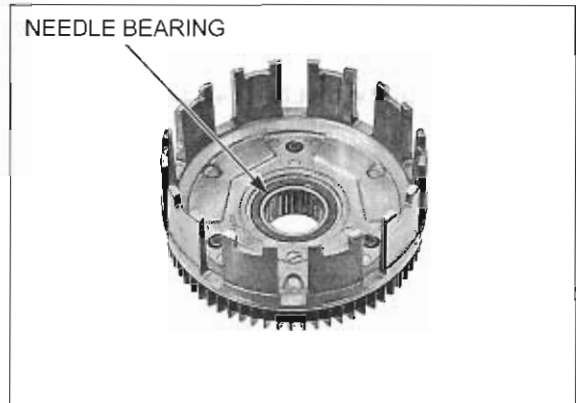
Check the primary driven gear teeth for wear or damage.

Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

Check the needle bearing for wear or damage.

Also check that the bearing outer race fits tightly in the clutch outer.

Replace the bearing if necessary (page 10-10).



CLUTCH OUTER NEEDLE BEARING REPLACEMENT

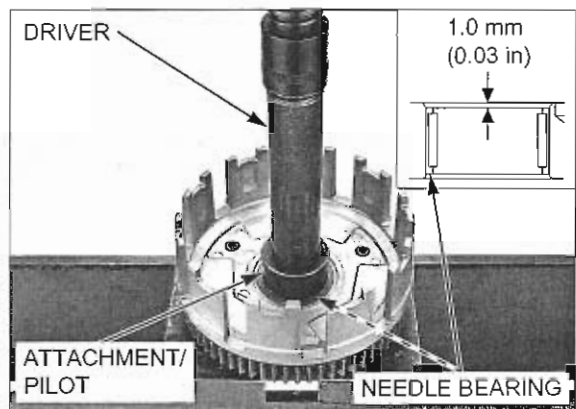
Press the needle bearing out of the clutch outer.

Press a new needle bearing into the clutch outer with the mark facing up.

The needle bearing outer surface is 1.0 mm (0.03 in) below the outer edge of the clutch outer needle bearing cavity.

TOOLS:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 30 mm	07746-0040700



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: 29.98 mm (1.180 in)



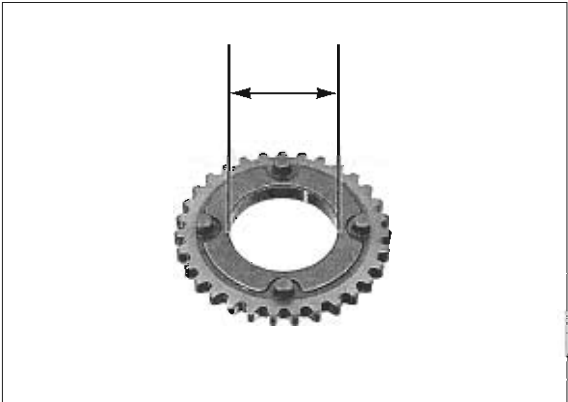
OIL PUMP DRIVE SPROCKET

Check the oil pump drive sprocket for wear or damage.
Measure the I.D. of the drive sprocket.

SERVICE LIMIT: 30.15 mm (1.187 in)

Calculate the oil pump drive sprocket-to-clutch outer guide clearance.

SERVICE LIMIT: 0.183 mm (0.0072 in)



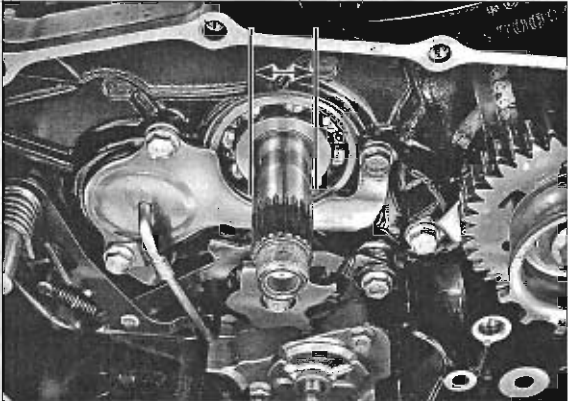
MAINSHAFT

Measure the mainshaft O.D. at the clutch outer guide sliding surface.

SERVICE LIMIT: 21.95 mm (0.864 in)

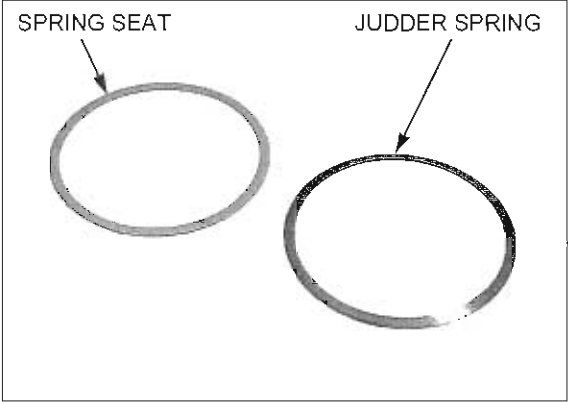
Calculate the clutch outer guide-to-mainshaft clearance.

SERVICE LIMIT: 0.093 mm (0.0036 in)



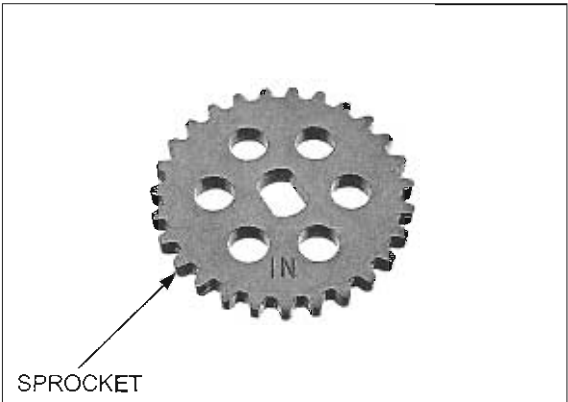
JUDDER SPRING/SPRING SEAT

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.



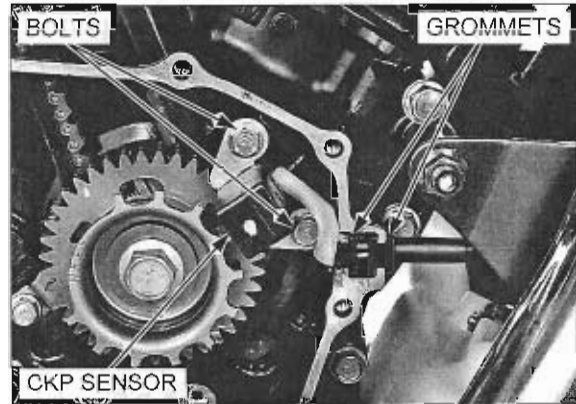
PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch (page 10-6).

Remove the CKP sensor mounting bolts.

Remove the CKP sensor and grommets.



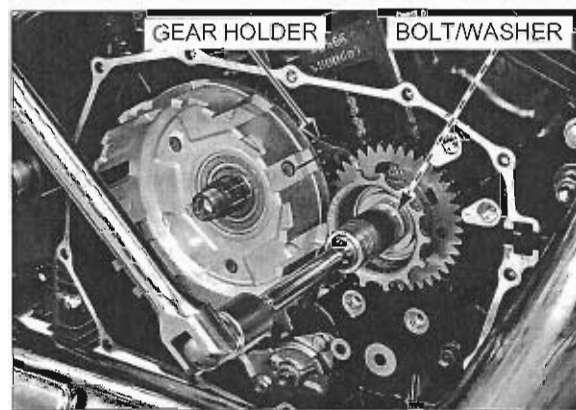
Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft (page 10-19).

Hold the primary drive gear assembly using a special tool and remove the primary drive gear bolt and washer.

TOOL:

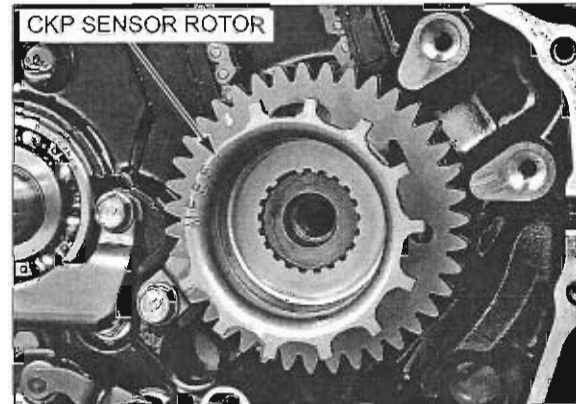
Gear holder, 2.5

**07724-0010100 or
07724-001A100
(U.S.A. only)**



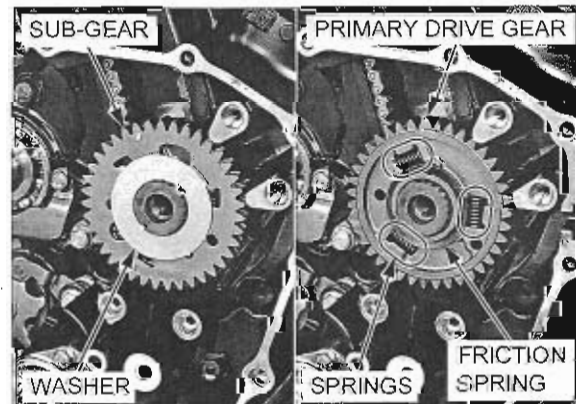
Remove the gear holder and temporarily installed parts.

Remove the CKP sensor rotor.



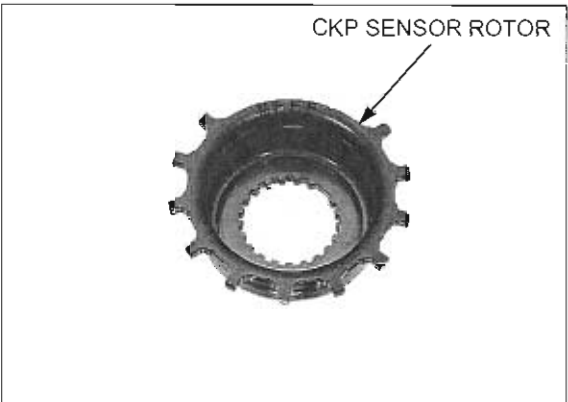
Remove the following:

- Washer
- Primary drive sub-gear
- Friction spring
- Primary drive gear and springs

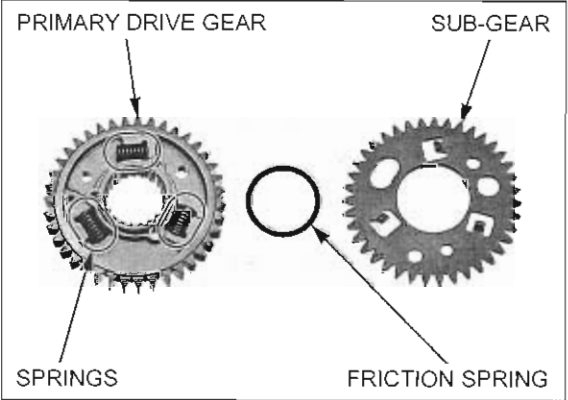


INSPECTION

Check the CKP sensor rotor for wear or damage.

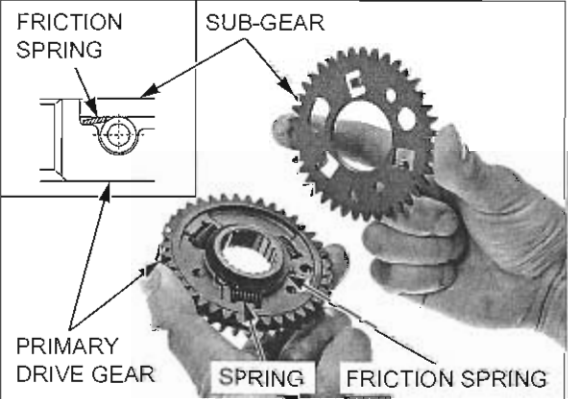


Check the serrated teeth of the primary drive gear and sub-gear for wear or damage.
Check the primary drive gear springs and friction spring for fatigue or damage.



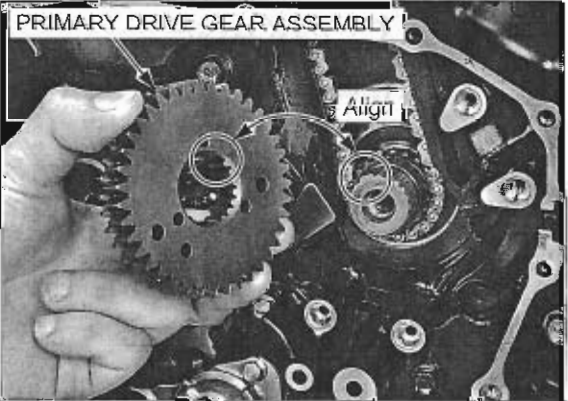
INSTALLATION

Be sure to install the springs into the primary drive gear grooves.
Install the friction spring as shown.
Set the sub-gear onto the drive gear by aligning the three holes on the sub-gear and primary drive gear, and contacting the sub-gear tabs against the drive gear springs.



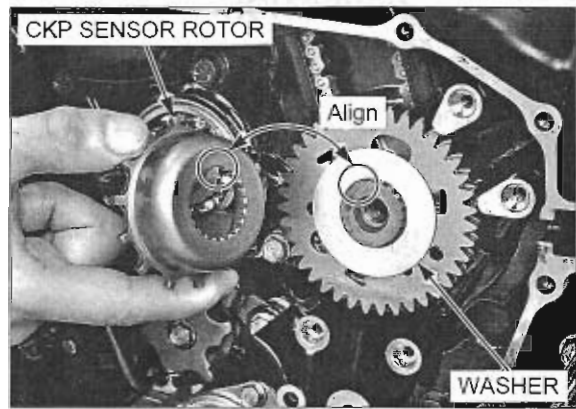
Install the primary drive gear assembly on the crankshaft.

NOTE:
Install the primary drive gear, aligning its wide groove with the wide tooth of the crankshaft.



CLUTCH/GEARSHIFT LINKAGE

Install the washer and CKP sensor 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 (page 10-19).

Apply engine oil to the primary drive gear bolt threads and seating surface.

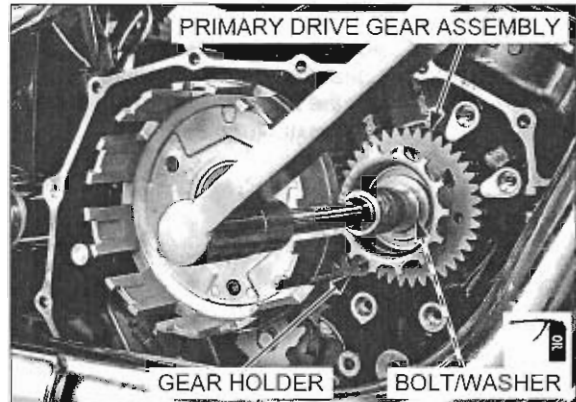
Install the washer and primary drive gear bolt.

Hold the primary drive gear assembly 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.

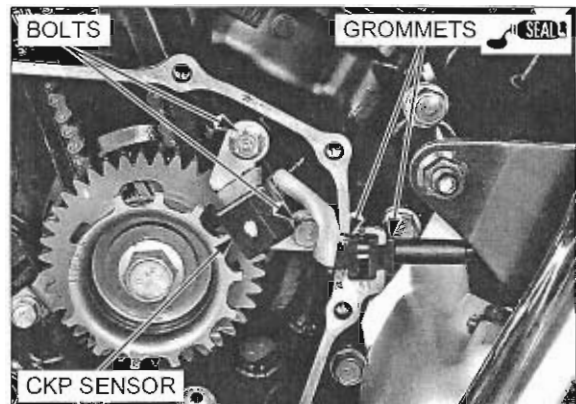
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Remove the gear holder and temporarily installed parts.

Apply liquid sealant to the CKP sensor wire grommets.

Install the CKP sensor, wire grommets and tighten the bolts.

Install the clutch (page 10-19).



GEARSHIFT LINKAGE

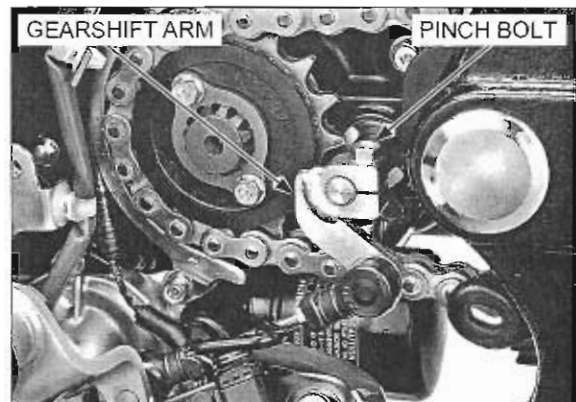
REMOVAL

Remove the following:

- Left crankcase rear cover (page 2-4)
- Clutch (page 10-6)

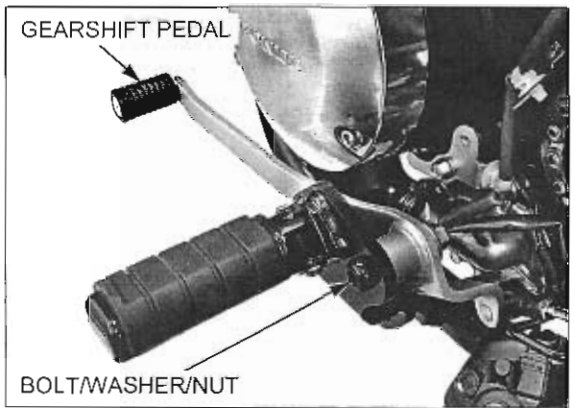
Remove the pinch bolt and gearshift arm from the spindle.

Clean the gearshift spindle serration.



CLUTCH/GEARSHIFT LINKAGE

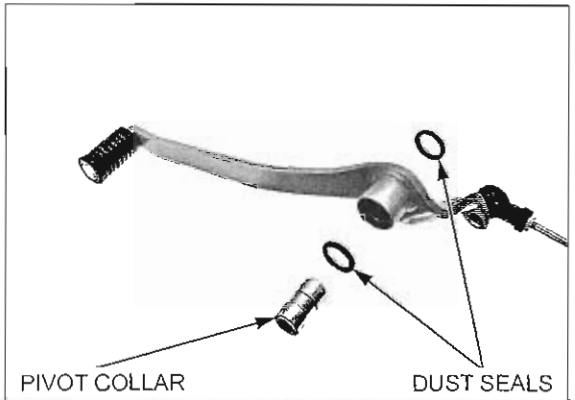
Remove the pivot bolt, washer, nut and gearshift pedal.



Remove the pivot collar and dust seals from the gearshift pedal.

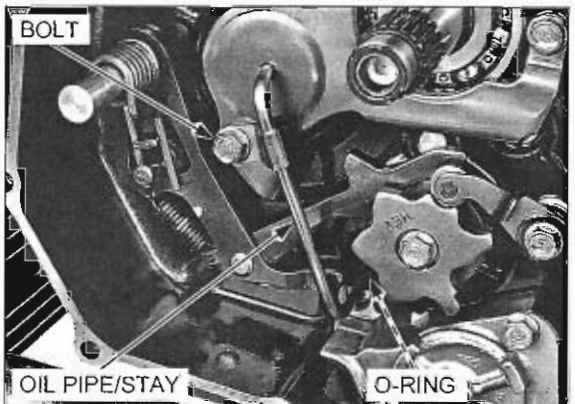
Check the dust seals for wear or damage.

Replace the dust seal if necessary.

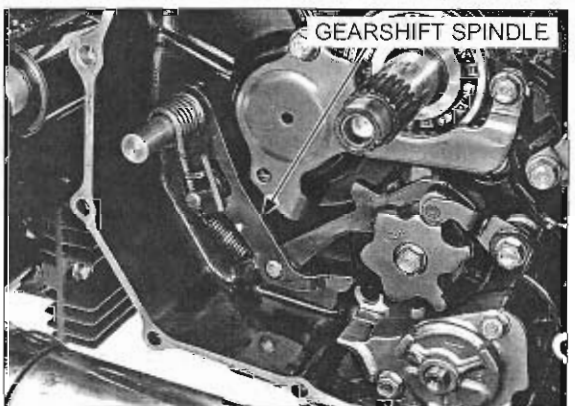


Remove the oil pipe stay mounting bolt and oil pipe/stay.

Remove the O-ring from the oil pipe/stay.

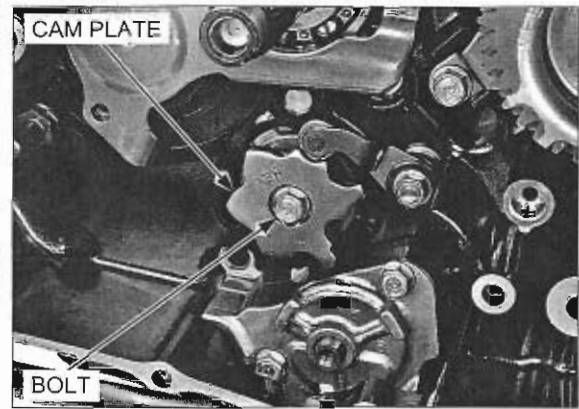


Pull out the gearshift spindle from the crankcase while unhooking the shifter arm from the gearshift cam plate.

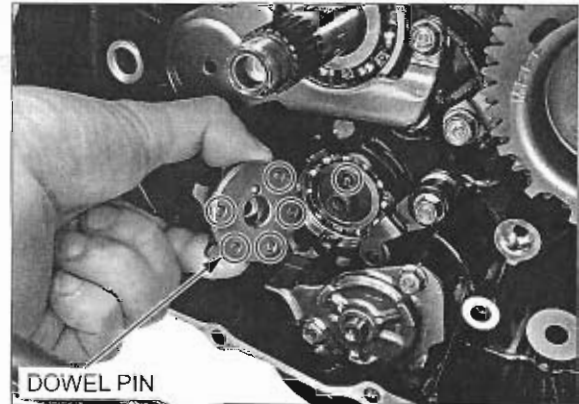


CLUTCH/GEARSHIFT LINKAGE

Remove the gearshift cam plate bolt and cam plate.

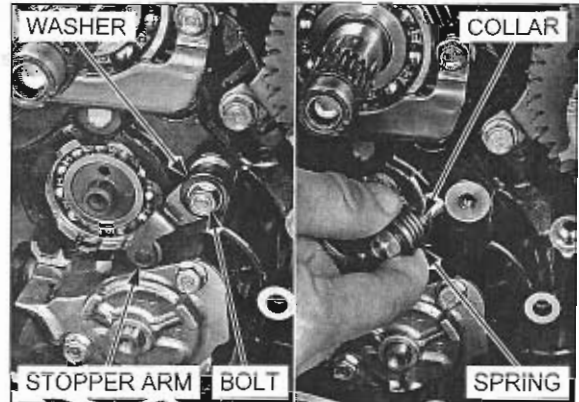


Remove the dowel pin from the gearshift drum and cam plate.



Remove the following:

- Stopper arm bolt
- Washer
- Stopper arm
- Return spring
- Collar



INSPECTION

Remove the drive sprocket (page 7-4).

Remove the bolts and setting plate.

Apply grease to the oil seal lips.

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

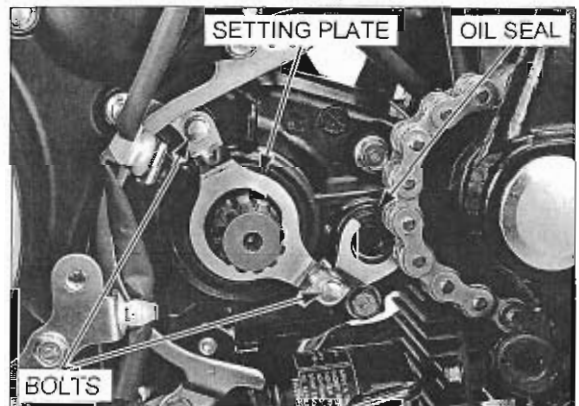
NOTE:

Install the oil seal with its marked side facing out.

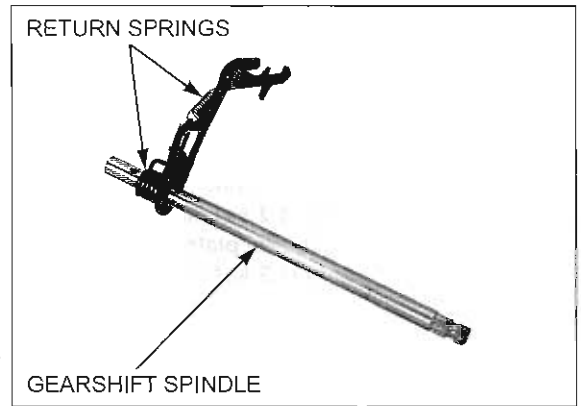
Apply locking agent to the countershaft oil seal setting plate bolts threads.

Install and tighten the countershaft oil seal setting plate bolts securely.

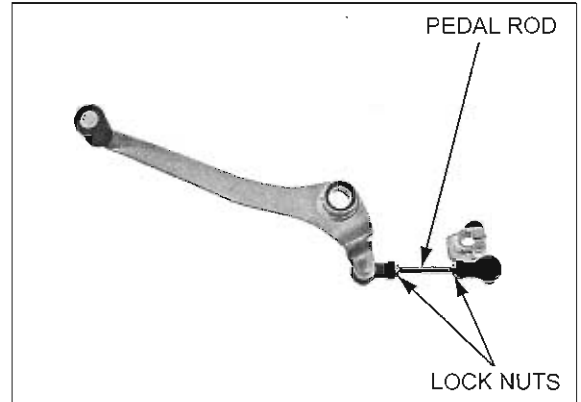
Install the drive sprocket (page 7-7).



Check the gearshift spindle for bend, wear or damage.
Check the return springs for fatigue or damage.



Check the gearshift pedal rod for damage or loose lock nuts.
Replace the rod if necessary.



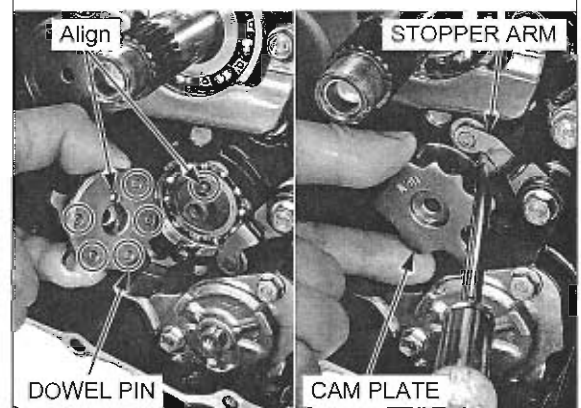
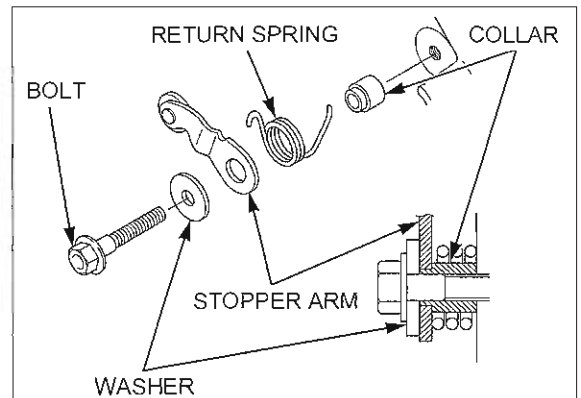
INSTALLATION

Install the following:

- Collar
- Return spring
- Stopper arm
- Washer
- Stopper arm bolt

Install the dowel pin into the gearshift drum and cam plate.

Install the cam plate by aligning the hole in the cam plate with the dowel pin while lift up the stopper arm with a screwdriver.



CLUTCH/GEARSHIFT LINKAGE

Apply a locking agent to the cam plate bolt threads and install it.

Tighten the stopper arm bolt and cam plate bolt to the specified torque.

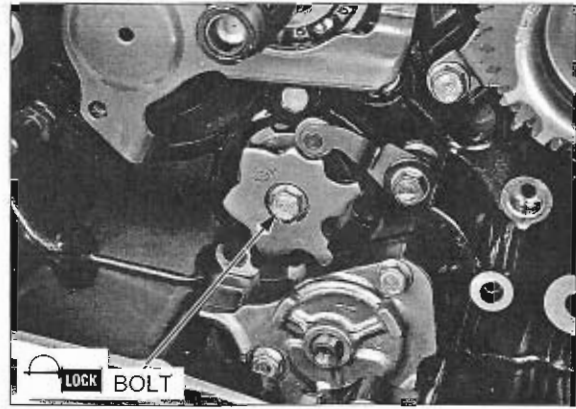
TORQUE:

Stopper arm bolt:

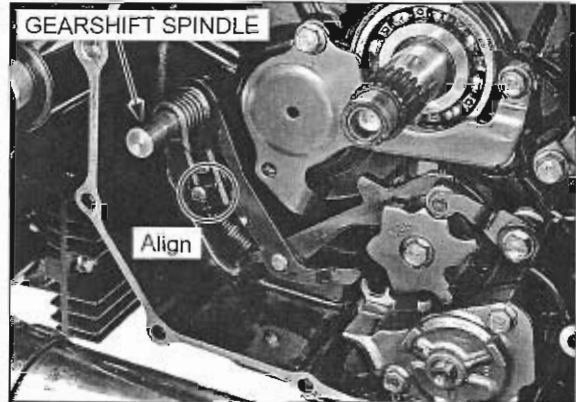
12 N·m (1.2 kgf·m, 9 lbf·ft)

Gearshift cam plate bolt:

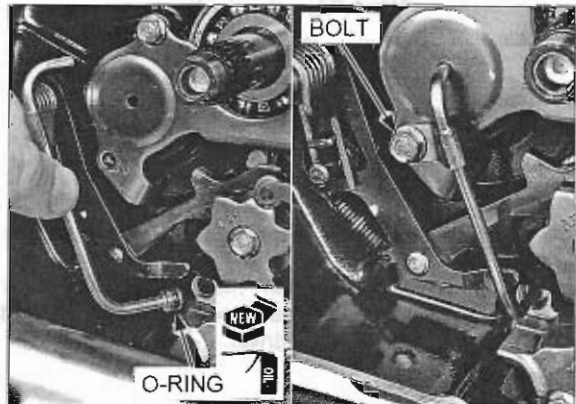
12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the gearshift spindle into the crankcase by aligning the return spring ends with the return spring pin bolt to avoid damaging the spindle oil seal (left crankcase side).



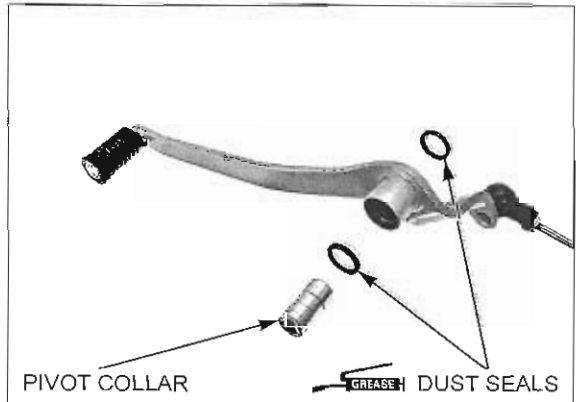
Coat a new O-ring with engine oil and install it onto the oil pipe/stay groove. Install the oil pipe/stay with the mounting bolt and tighten the bolt securely.



Apply grease to the dust seal lips. Install the dust seals and pivot collar to the gearshift pedal.

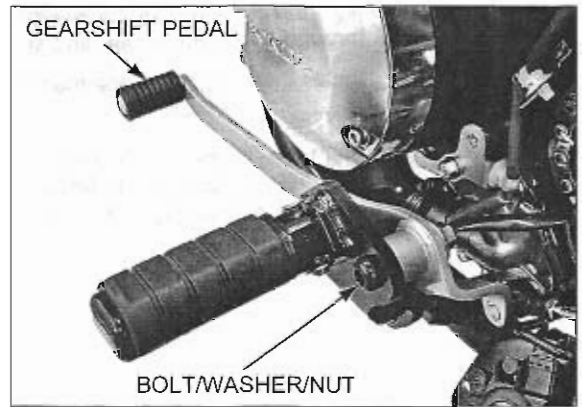
NOTE:

Install the dust seal with its flat side facing out.



Install the gearshift pedal, pivot bolt, washer and nut. Tighten the pivot bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

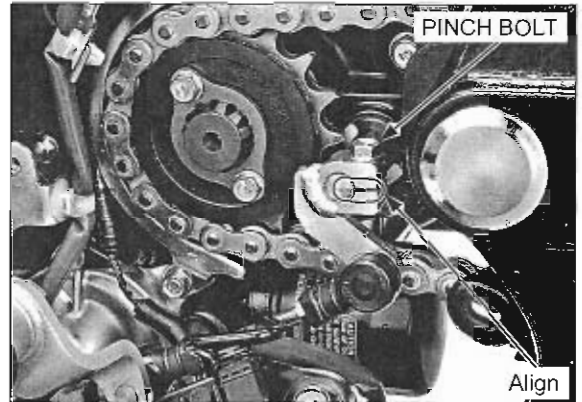


Install the gearshift arm onto the gearshift spindle, while aligning its slit with the punch marks. Tighten the pinch bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the following:

- Left crankcase rear cover (page 2-4)
- Clutch (page 10-19)



CLUTCH INSTALLATION

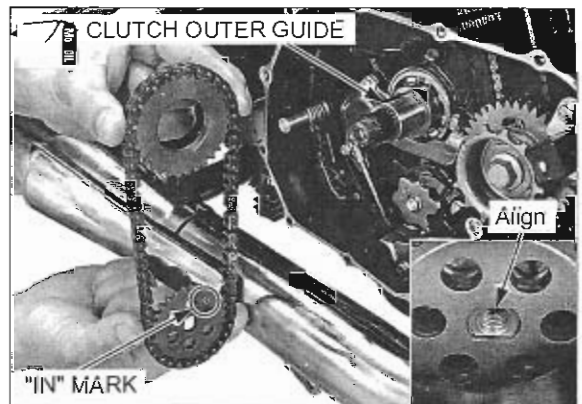
Apply molybdenum oil solution to the clutch outer guide outer surface.

Install the clutch outer guide to the mainshaft.

Install the oil pump drive chain, drive sprocket and driven sprocket as a set.

NOTE:

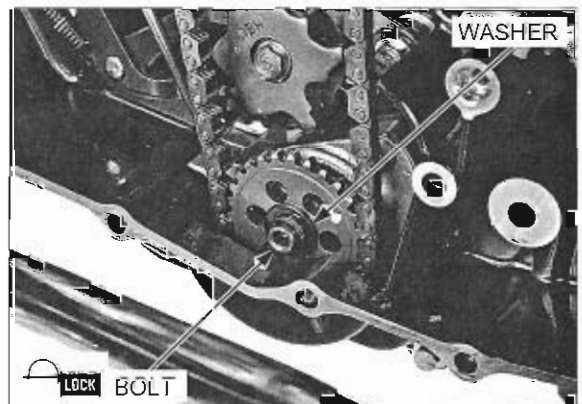
- Install the oil pump driven sprocket with the "IN" mark side facing inside.
- Align the flat surfaces of the driven sprocket hole and oil pump shaft end.



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.



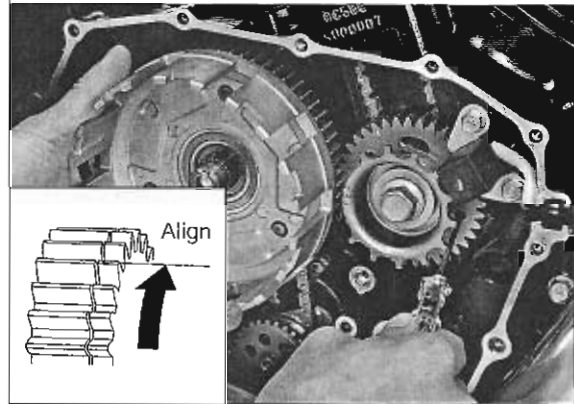
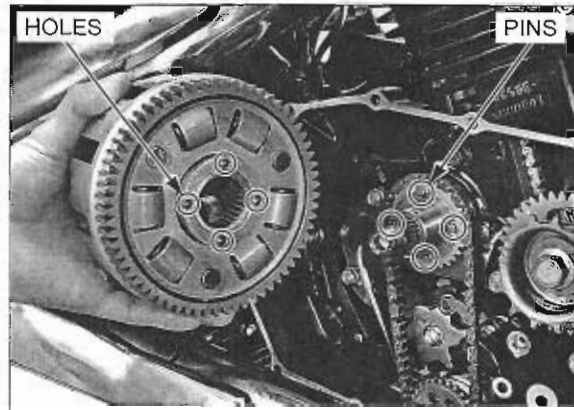
CLUTCH/GEARSHIFT LINKAGE

Hold the primary drive gear by inserting the screwdriver through the primary drive gear and sub-gear.

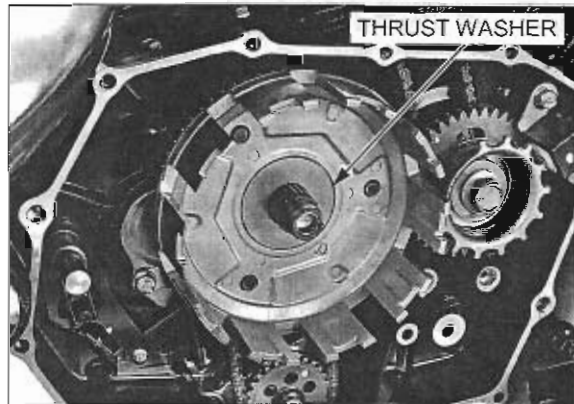
Install the clutch outer onto the mainshaft.

NOTE:

Align the holes in the clutch outer with the pins on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer onto the mainshaft.



Install the thrust washer onto the mainshaft.

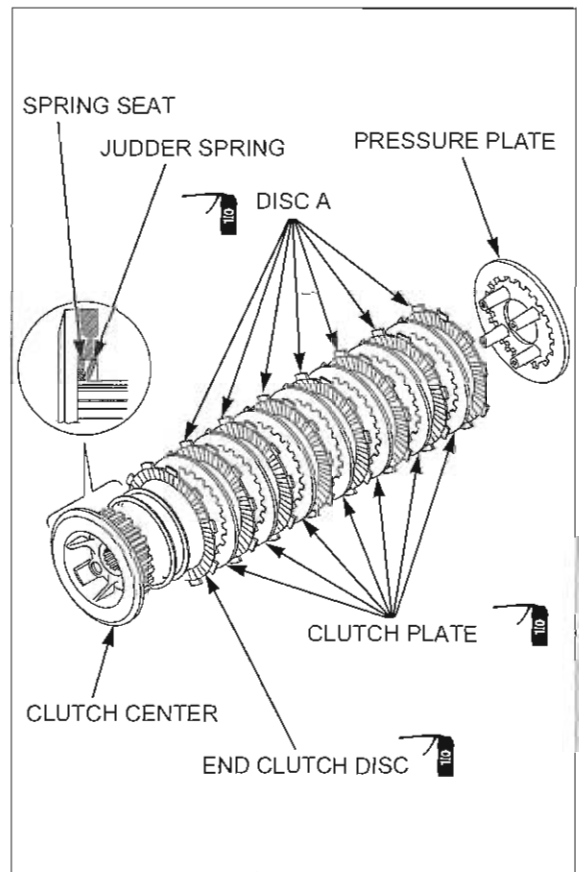


CLUTCH/GEARSHIFT LINKAGE

Coat the clutch discs and plates with engine oil.
Install the spring seat and judder spring to the clutch center as shown.

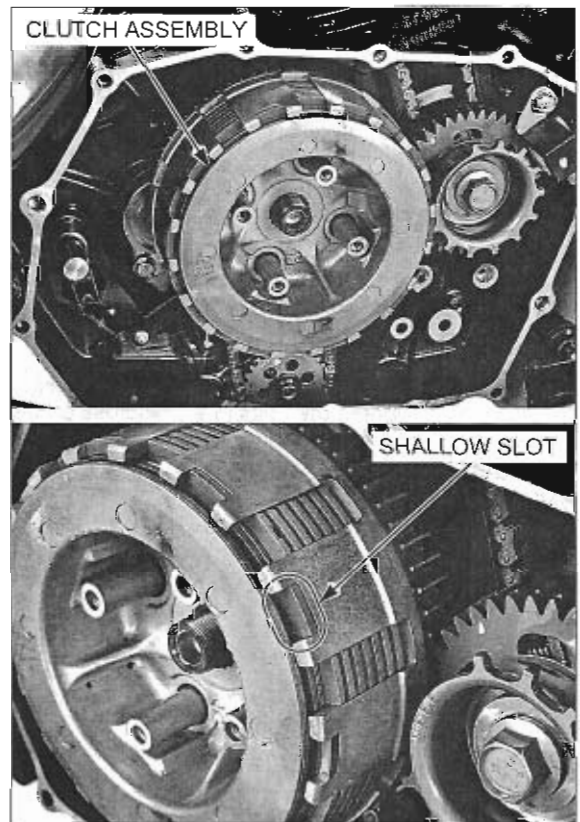
End clutch disc has a larger I.D. than disc A.

Install the end clutch disc.
Install the seven clutch plates and seven discs A, starting with the clutch plate.
Install the pressure plate.



Install the clutch assembly into the clutch outer.

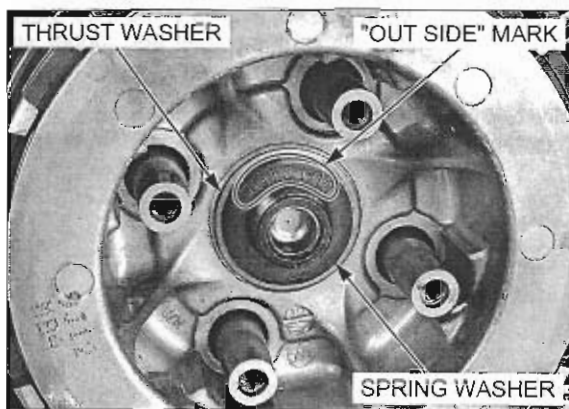
Install the end clutch disc into the shallow slots of the clutch outer.



CLUTCH/GEARSHIFT LINKAGE

Install the thrust washer.

Install the spring washer with its "OUT SIDE" mark facing out.



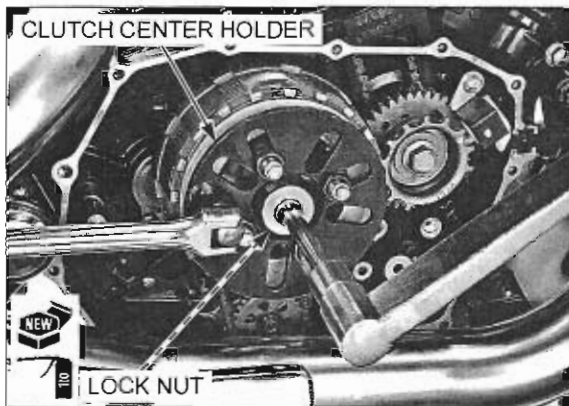
Apply engine oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft.

Hold the clutch center using a special tool and tighten the lock nut to the specified torque.

TOOL:

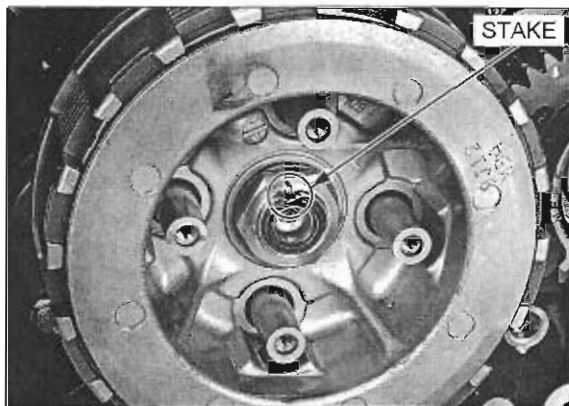
Clutch center holder 07JMB-MN50302 or
 07HGB-001010B
 (plate) and
 07HGB-001020B
 (collar) (U.S.A. only)

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



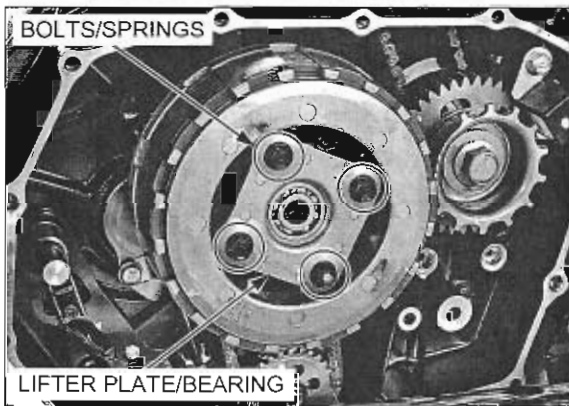
Be careful not to damage the mainshaft threads.

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.

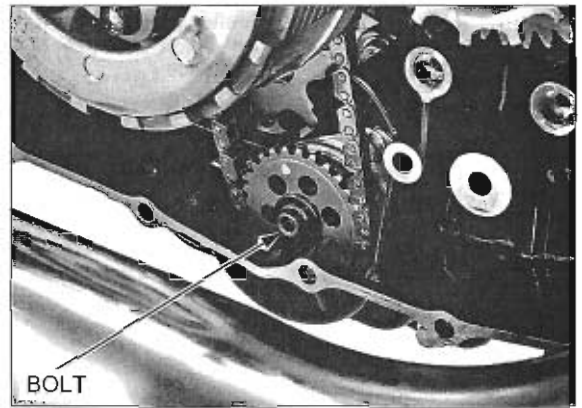
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



If the oil pump driven sprocket is removed, tighten the oil pump driven sprocket bolt to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the right crankcase cover (page 10-23).

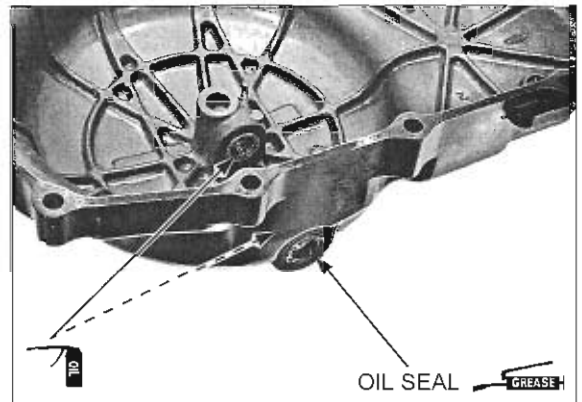


RIGHT CRANKCASE COVER INSTALLATION

ASSEMBLY

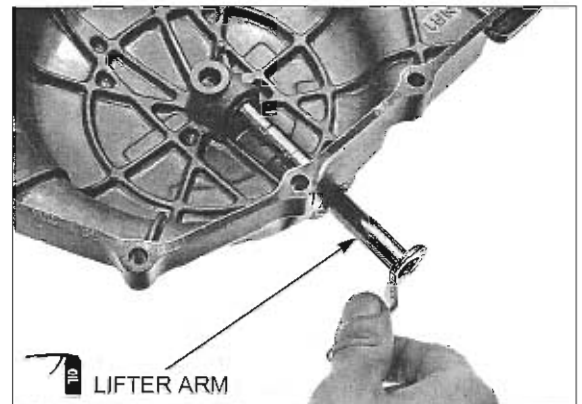
Apply engine oil to the needle bearing of the right crankcase cover.

Apply grease to the oil seal lips.



Apply engine oil to the clutch lifter arm sliding surface and slit.

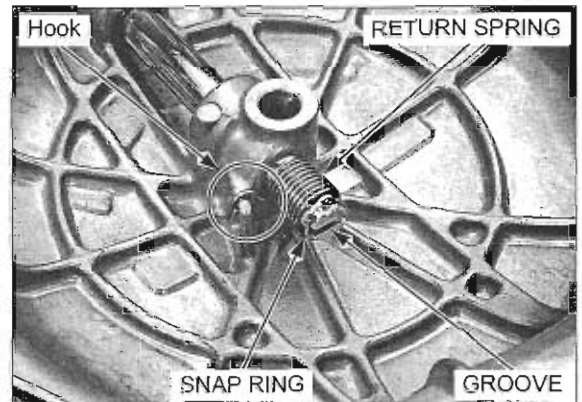
Install the clutch lifter arm.



Install the return spring by inserting its short end into the clutch lifter arm groove.

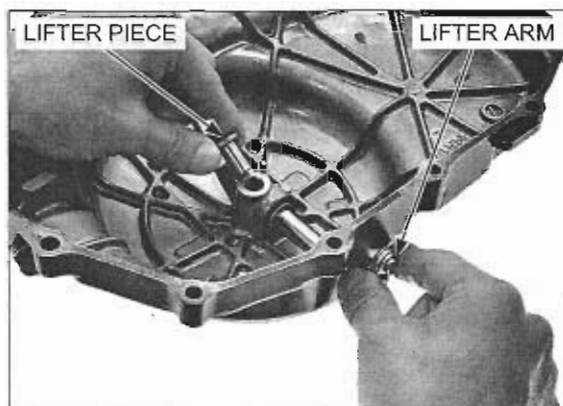
Install the snap ring to the clutch lifter arm groove securely.

Hook the long spring end to the cover tab.



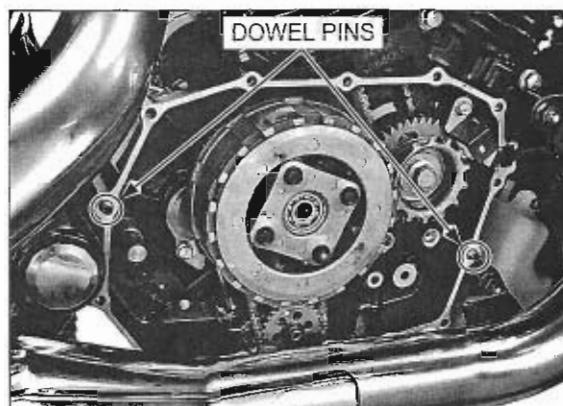
CLUTCH/GEARSHIFT LINKAGE

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

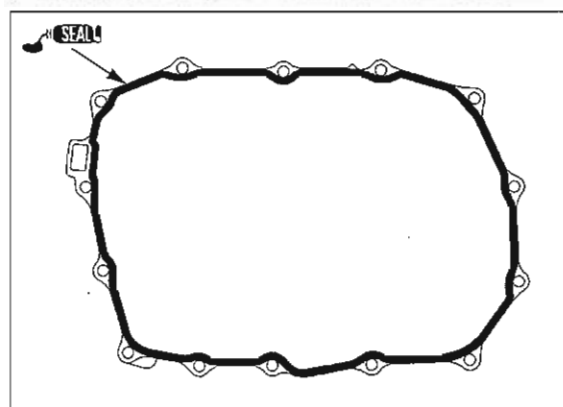
Install the dowel pins.



Be careful not to damage the mating surfaces.

Clean the mating surfaces of the right crankcase and cover.

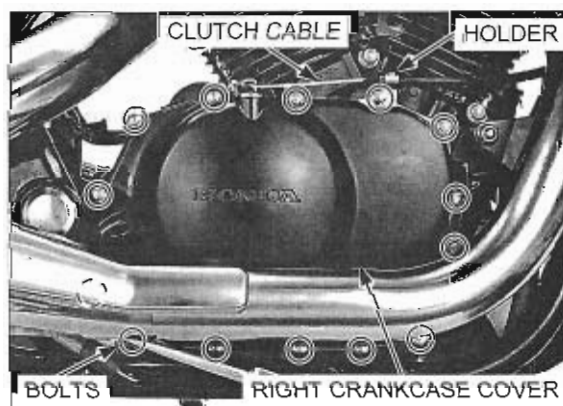
Apply liquid sealant (Three Bond 1207B or equivalent) to the right crankcase cover mating surface.



Connect the clutch cable.

Install the right crankcase cover, clutch cable holder and tighten the bolts in a crisscross pattern in several steps.

Fill the crankcase with the recommended engine oil (page 3-12).

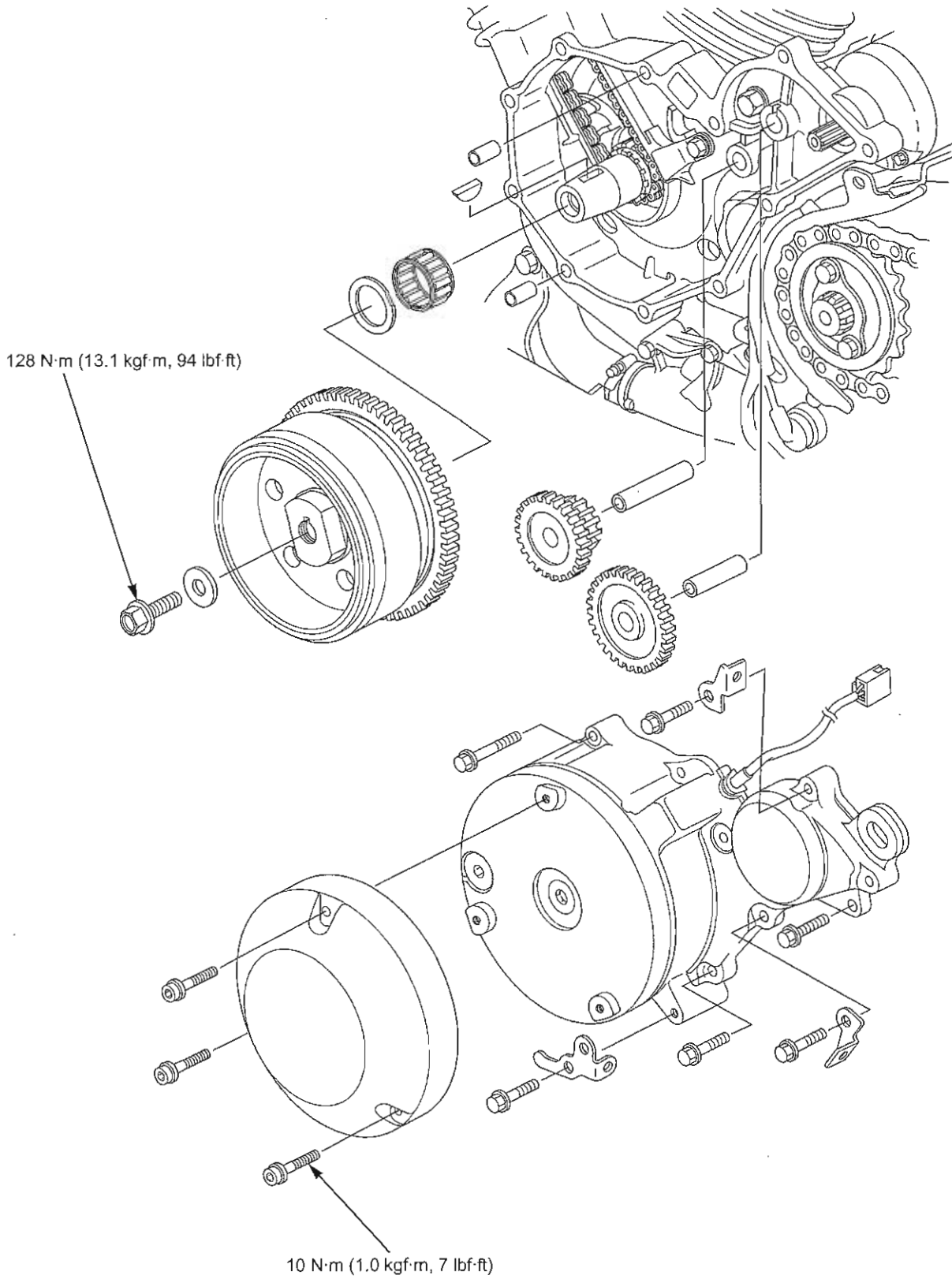


11. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION	11-2	STATOR REMOVAL	11-4
SERVICE INFORMATION	11-3	FLYWHEEL/STARTER CLUTCH	11-5
TROUBLESHOOTING.....	11-3	STATOR INSTALLATION.....	11-11

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 inspection (page 16-9).
- For starter motor service (page 18-4).

SPECIFICATIONS

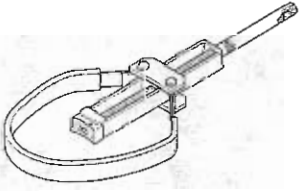
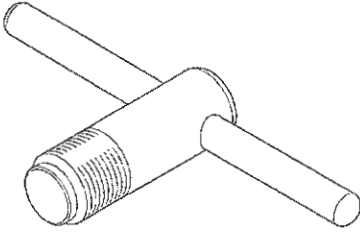
Unit: mm (in)

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	128 N·m (13.1 kgf·m, 94 lbf·ft)	Left hand threads Apply engine oil to the threads and seating surface.
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	30 N·m (3.1 kgf·m, 22 lbf·ft)	Apply locking agent to the threads.
Alternator cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	

TOOLS

<p>Flywheel holder 07725-0040001</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Rotor puller 07933-3290001</p>  <p>or 07733-0020001 (U.S.A. only)</p>
--	--

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:

- Left side cover (page 2-3)
- Left crankcase rear cover (page 2-4)

Release the clamp and disconnect the alternator 3P (Natural) connector.

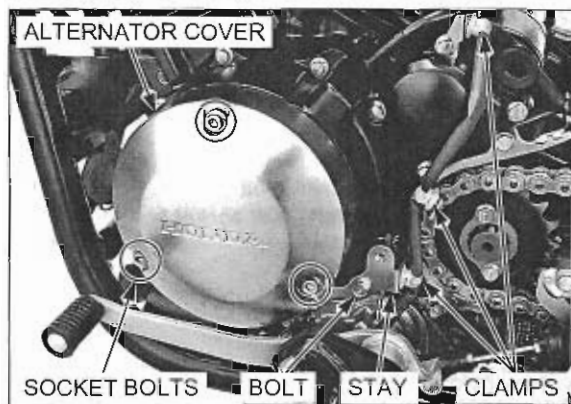


Release the sidestand switch wire clamps from each stays.

Release the alternator wire from the guide.

Remove the bolt and stay.

Remove the socket bolts and alternator cover.



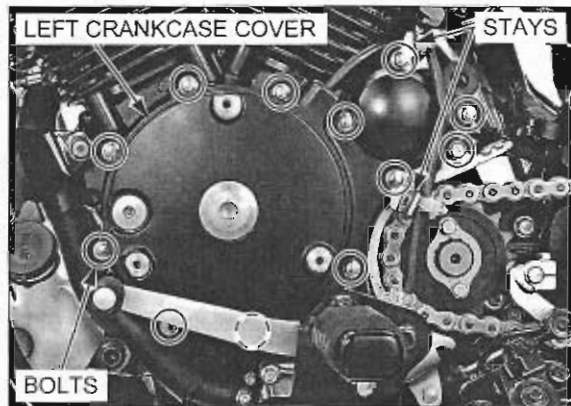
Place a container under the left crankcase cover to catch the engine oil.

Remove the bolts, stays and left crankcase cover.

Loosen the bolts in a crisscross pattern in several steps.

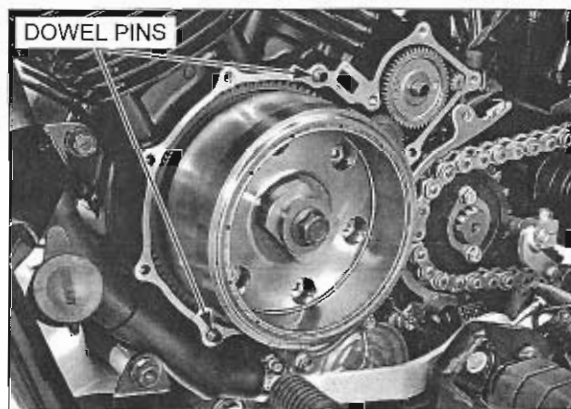
NOTE:

The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful not to damage the alternator cover during removal.



Be careful not to damage the mating surface.

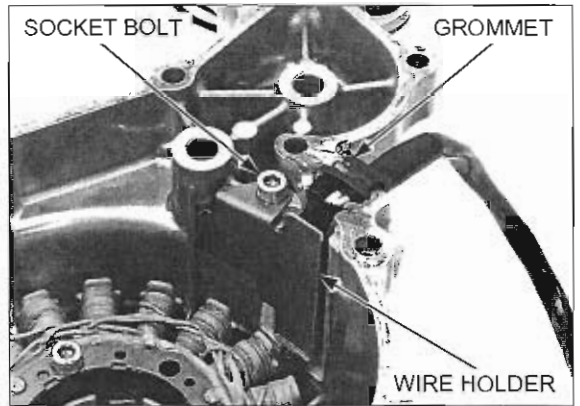
Remove the dowel pins and clean off the sealant from the mating surface.



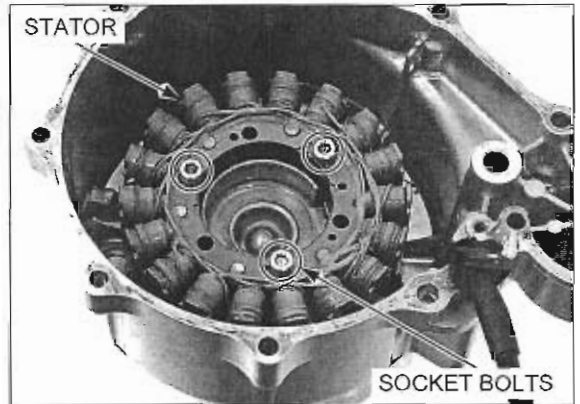
ALTERNATOR/STARTER CLUTCH

Remove the socket bolt and stator wire holder from the left crankcase cover.

Remove the wire grommet.



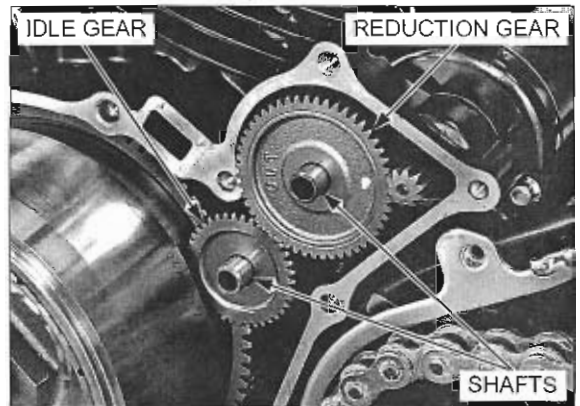
Remove the socket bolts and stator from the left crankcase cover.



FLYWHEEL/STARTER CLUTCH

FLYWHEEL REMOVAL

For alternator inspection (page 16-9). 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

07725-0040001 or equivalent commercially available in U.S.A.



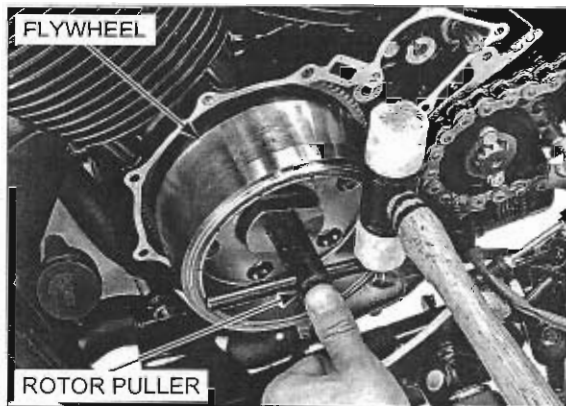
ALTERNATOR/STARTER CLUTCH

Remove the flywheel using a special tool.

TOOL:

Rotor puller

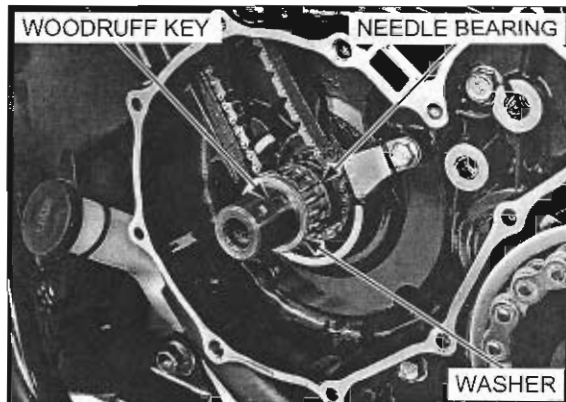
07933-3290001 or
37733-0020001
(U.S.A. only)



Remove the washer, needle bearing and woodruff key from the crankshaft.

NOTE:

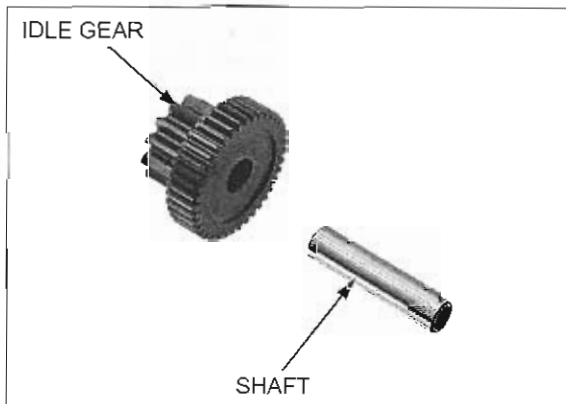
- During woodruff key removal, be careful not to damage the key groove and crankshaft.
- Do not lose the woodruff key.



STARTER IDLE/REDUCTION GEAR INSPECTION

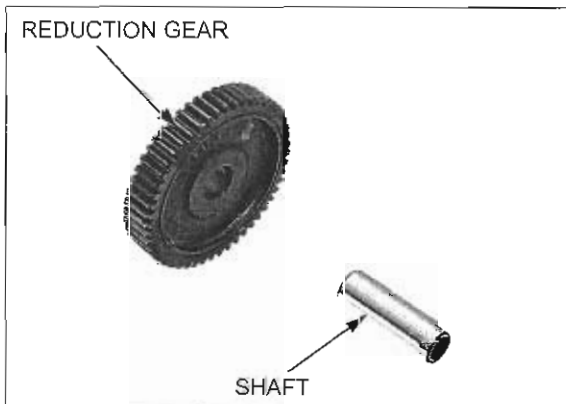
STARTER IDLE GEAR/SHAFT

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



STARTER REDUCTION GEAR/SHAFT

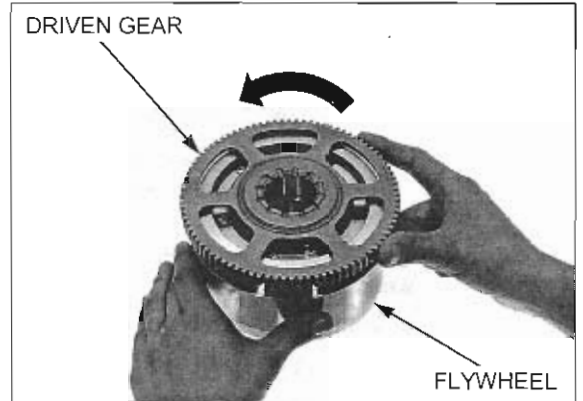
Check the starter reduction gear and shaft for wear or damage.



STARTER DRIVEN GEAR/STARTER CLUTCH REMOVAL

Check the operation of the one-way clutch by turning the starter driven gear. You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

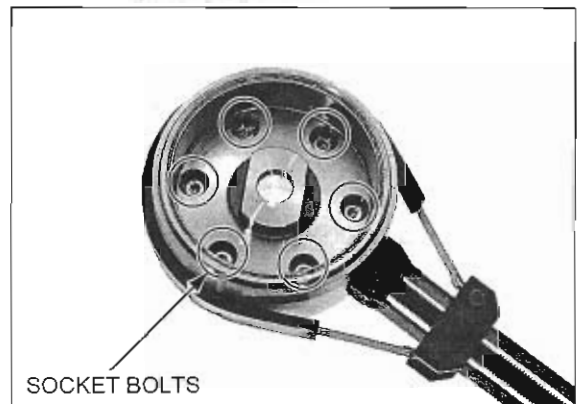
Remove the starter driven gear from the flywheel while turning the driven gear counterclockwise.



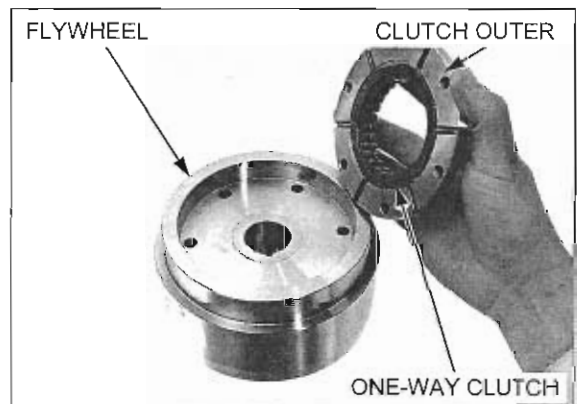
Remove the socket bolts while holding the flywheel using a special tool.

TOOL:
Flywheel holder

07725-0040001 or equivalent commercially available in U.S.A.



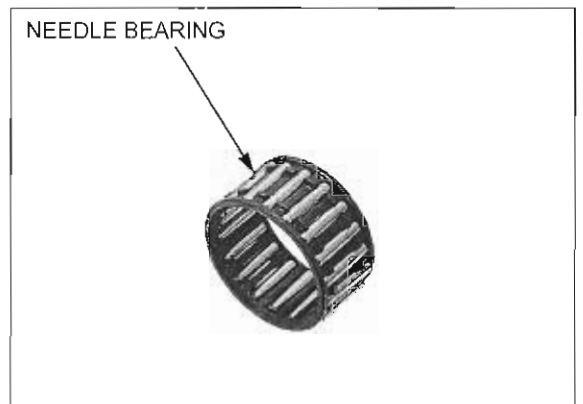
Remove the starter clutch outer/one-way clutch from the flywheel.



STARTER CLUTCH INSPECTION

NEEDLE BEARING

Check the needle bearing for abnormal wear or damage.



ALTERNATOR/STARTER CLUTCH

ONE-WAY CLUTCH/STARTER CLUTCH OUTER

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.

Check the starter clutch outer inner contact surface for wear or damage.

Measure the starter clutch outer I.D.

SERVICE LIMIT: 74.46 mm (2.931 in)

STARTER DRIVEN GEAR

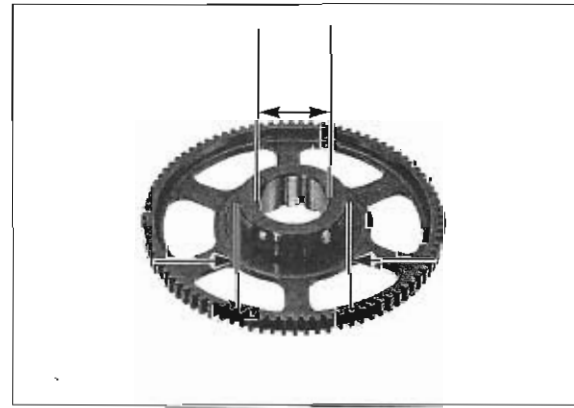
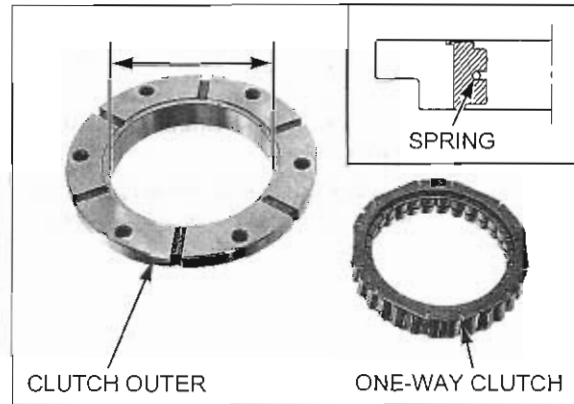
Check the one-way clutch sprag contact surface for wear or damage.

Measure the starter driven gear O.D.

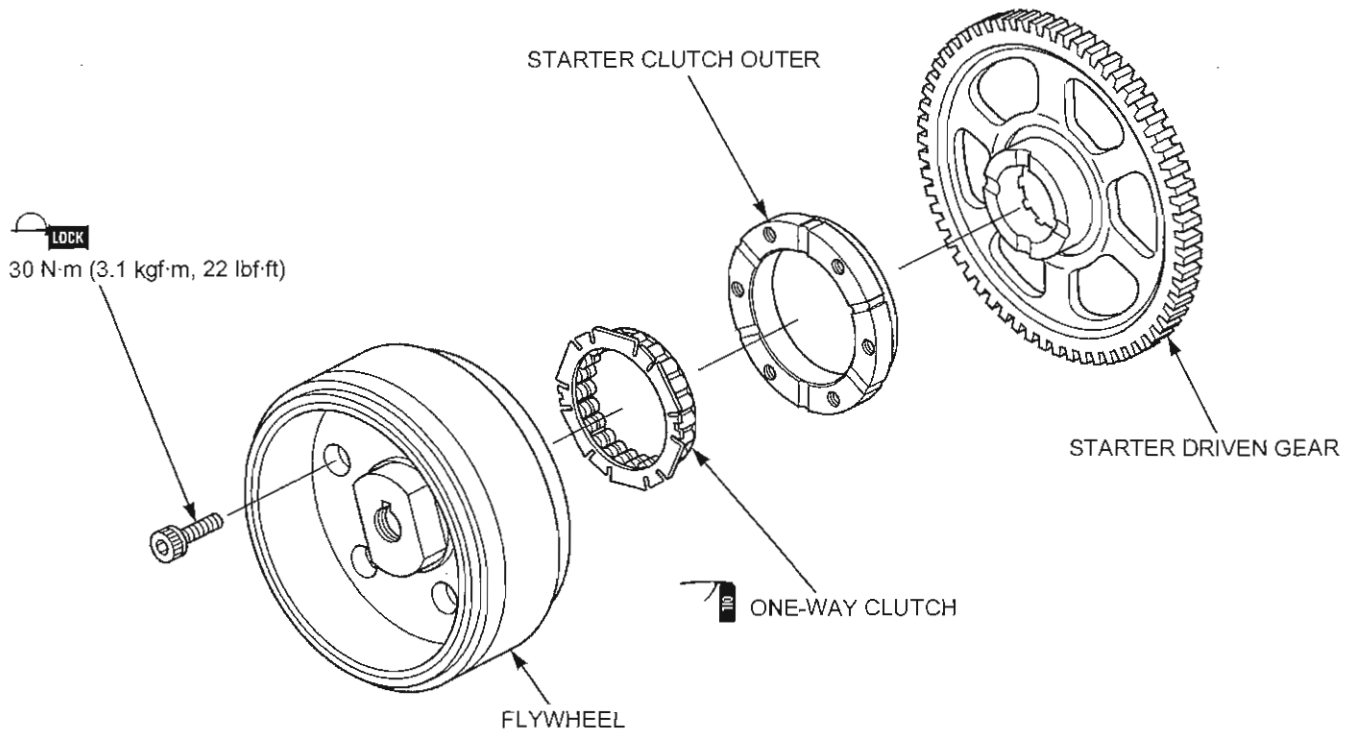
SERVICE LIMIT: 57.73 mm (2.273 in)

Measure the starter driven gear I.D.

SERVICE LIMIT: 37.10 mm (1.461 in)



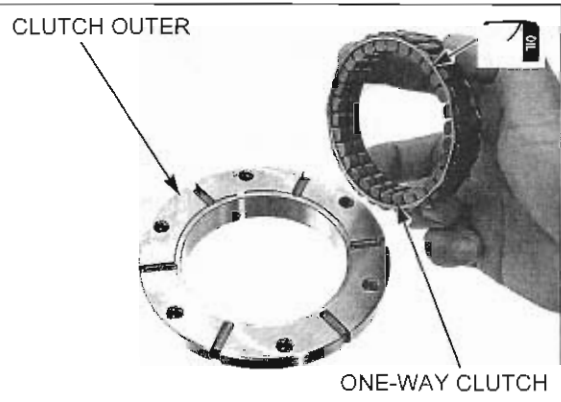
STARTER DRIVEN GEAR/STARTER CLUTCH INSTALLATION



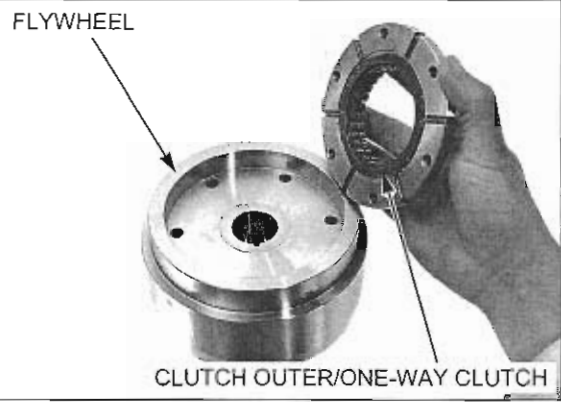
ALTERNATOR/STARTER CLUTCH

Clean the one-way clutch and apply engine oil to the sprag.
Install the one-way clutch into the starter 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 starter clutch outer/one-way clutch to the flywheel.

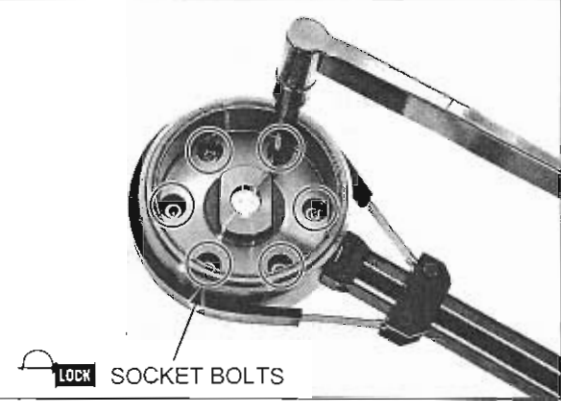


Hold the flywheel using a special tool.

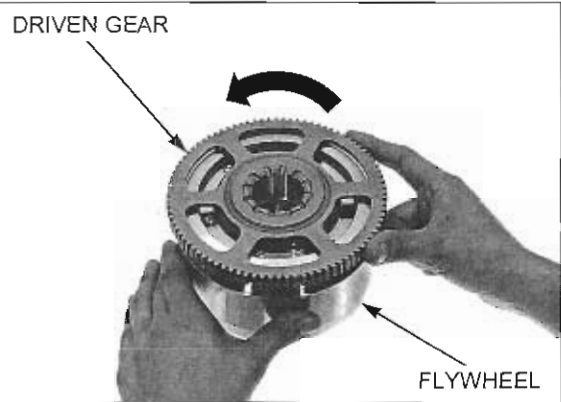
TOOL:
Flywheel holder **07725-0040001** or equivalent commercially available in U.S.A.

Clean and apply a locking agent to the socket bolt threads.
Install and tighten the socket bolts to the specified torque.

TORQUE: 30 N·m (3.1 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

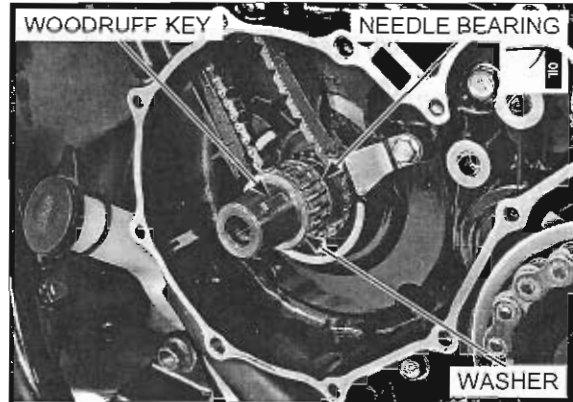
During woodruff key installation, be careful not to damage the key groove or crankshaft.

Install the woodruff key to the key groove of the crankshaft.

Apply engine oil to the needle bearing and install it to the crankshaft.

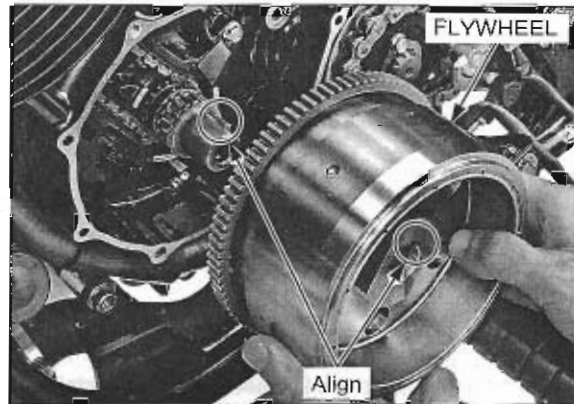
Install the washer to the crankshaft.

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.



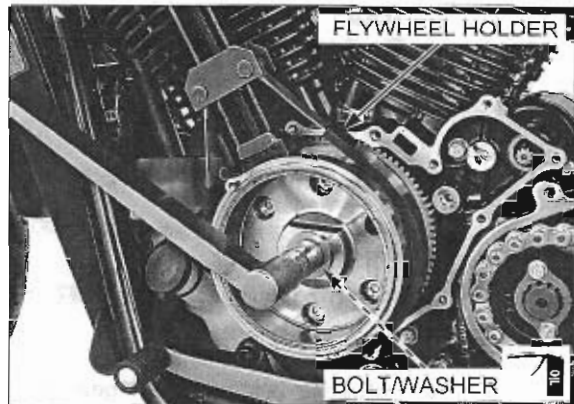
Hold the flywheel using a special tool.

TOOL:

Flywheel holder

07725-0040001 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: 128 N·m (13.1 kgf·m, 94 lbf·ft)

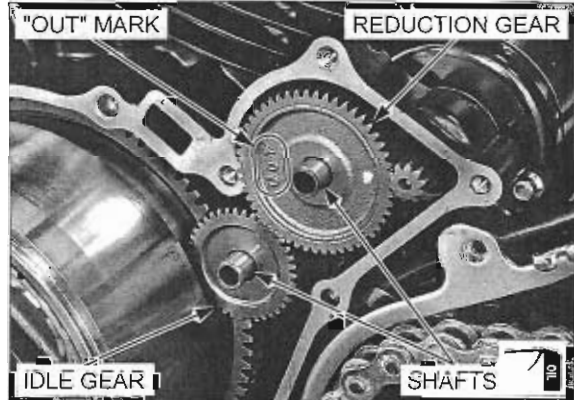
Apply engine oil to the starter reduction gear and starter idle gear shaft sliding surface.

Install the starter reduction gear, idle gear and shafts to the left crankcase as an assembly.

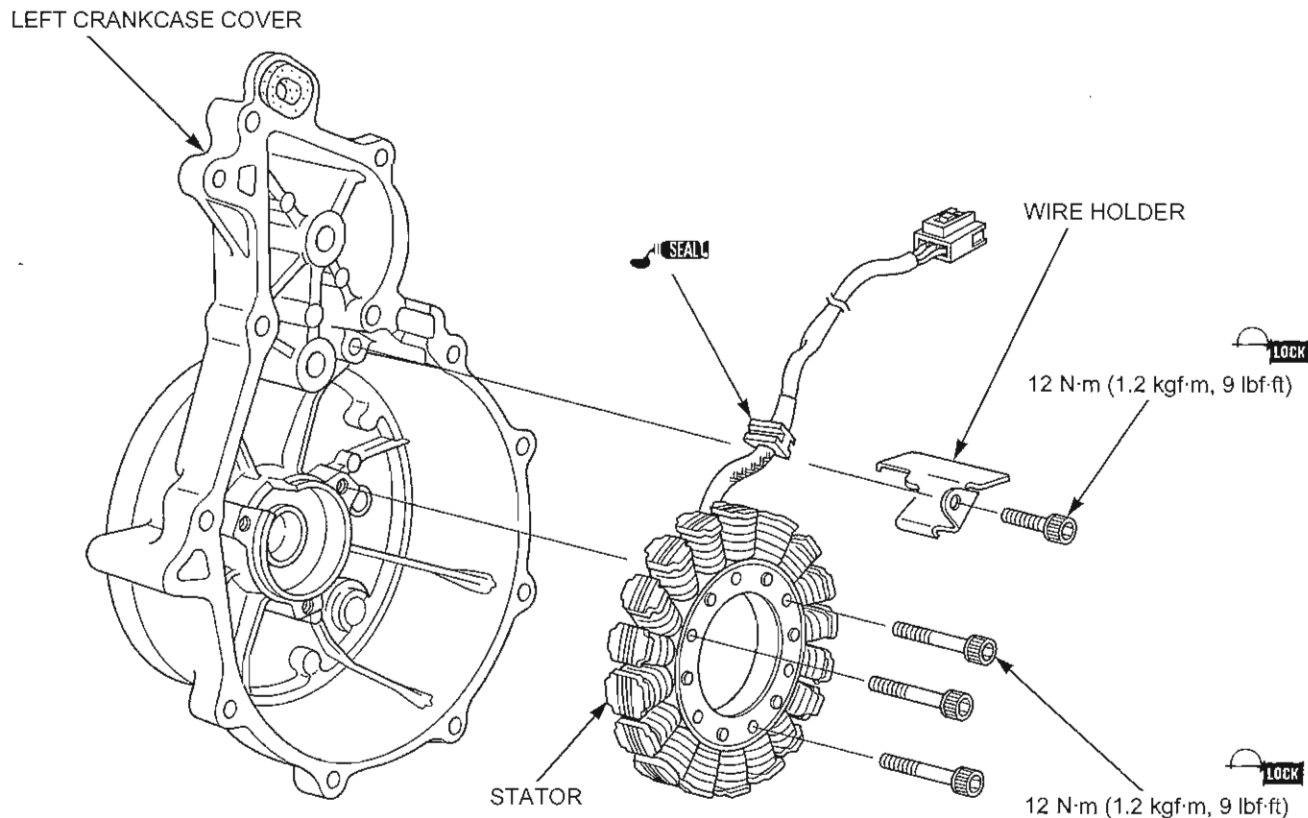
NOTE:

Install the starter reduction gear with its "OUT" mark facing out.

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

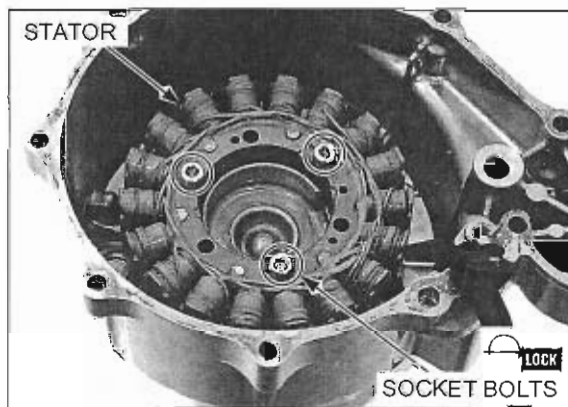


STATOR INSTALLATION



Install the stator to the left crankcase cover.
 Clean and apply a locking agent to the socket bolt threads (page 1-17).
 Install and tighten the stator socket bolts to the specified torque.

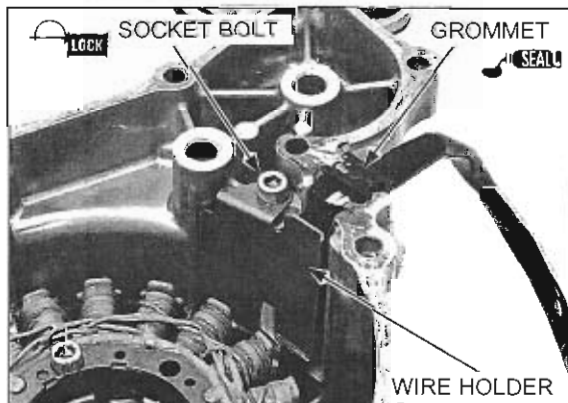
TORQUE: 12 N-m (1.2 kgf-m, 9 lbf-ft)



Apply liquid sealant to the stator wire grommet.
 Install the grommet into the grooves in the left crankcase cover.

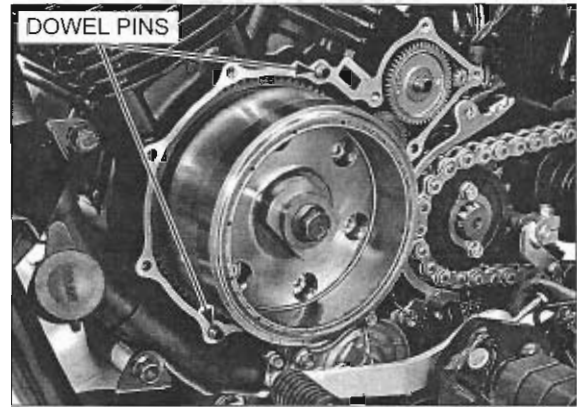
Clean and apply a locking agent to the socket bolt threads (page 1-17).
 Install the wire holder to the left crankcase cover.
 Install and tighten the bolt to the specified torque.

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



ALTERNATOR/STARTER CLUTCH

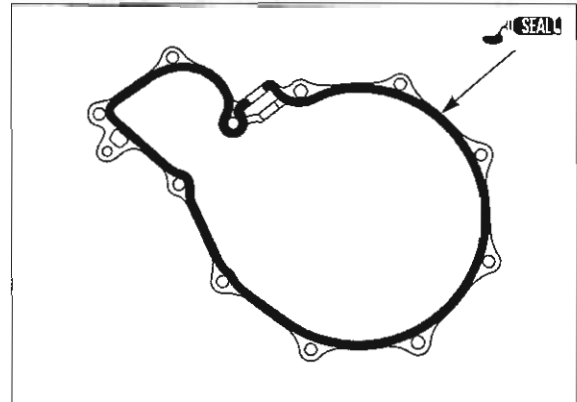
Install the dowel pins.



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 (Three Bond 1207B or equivalent) to the left crankcase cover mating surface.

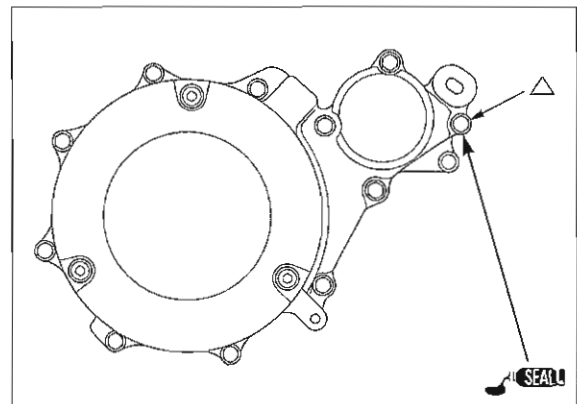


NOTE:

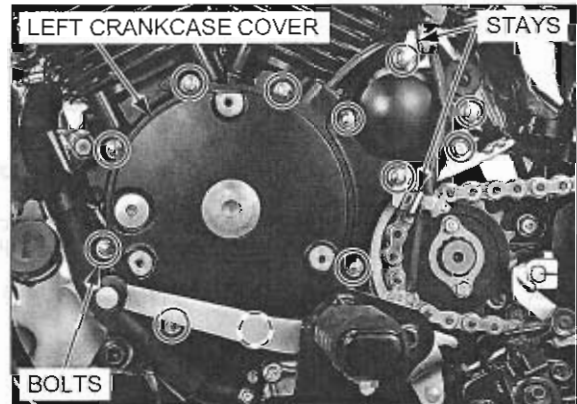
The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.

Install the left crankcase cover.

Apply liquid sealant (Three Bond 1207B or equivalent) to the one left crankcase cover bolt (marked "Δ") threads as shown.



Install the stays and tighten the left crankcase cover bolts in a crisscross pattern in several steps.



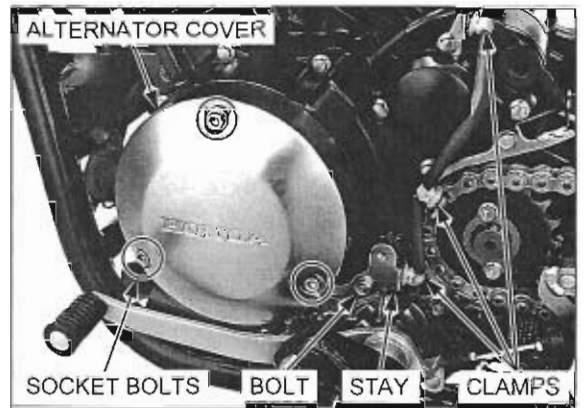
ALTERNATOR/STARTER CLUTCH

Install the following:

- Alternator cover and socket bolt
- Stay and bolt
- Alternator wire to the guide
- Sidestand switch wire clamps to the stays.

Tighten the alternator cover socket bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Route the wires properly (page 1-19).

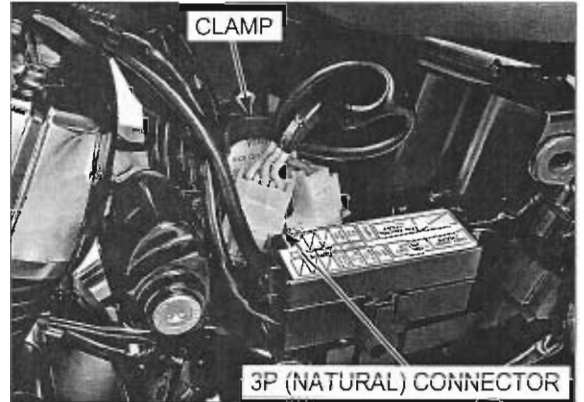
Clamp the alternator wire.

Connect the alternator 3P (Natural) connector.

Install the following:

- Left crankcase rear cover (page 2-4)
- Left side cover (page 2-3)

Check the engine oil level (page 3-11).



MEMO

10

11

12

13

14

15

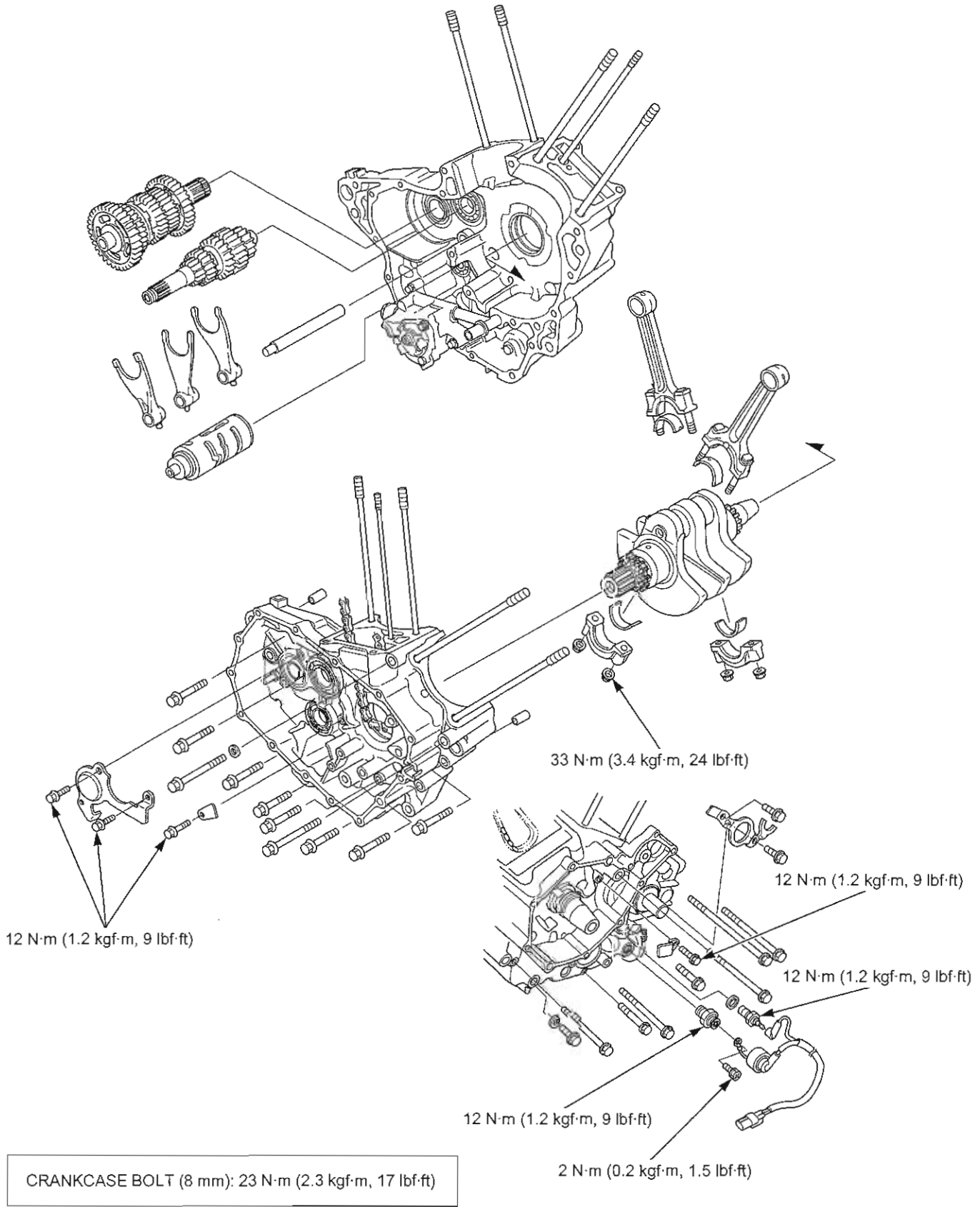
16

Case 2:00-cv-00000-AM Document 1-1 Filed 01/10/09 Page 1 of 1

12. CRANKSHAFT/TRANSMISSION

COMPONENT LOCATION.....	12-2	CRANKPIN BEARING	12-10
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TROUBLESHOOTING.....	12-5	TRANSMISSION	12-17
CRANKCASE SEPARATION.....	12-6	CRANKCASE BEARING REPLACEMENT	12-22
CRANKSHAFT/CONNECTING ROD	12-7	CRANKCASE ASSEMBLY.....	12-24

CRANKSHAFT/TRANSMISSION COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
 - Oil pump
 - Crankshaft/connecting rod
 - Transmission
- The following parts must be removed before separating the crankcase:
 - Oil filter cartridge (page 3-12)
 - Water pump (page 6-17)
 - Cylinder head (page 8-13)
 - Cylinder/piston (page 9-4)
 - Clutch (page 10-6)
 - Gearshift linkage (page 10-14)
 - Primary drive gear (page 10-12)
 - Flywheel (page 11-5)
 - Starter motor (page 18-7)
 - Neutral switch (page 19-20)
 - EOP switch (page 4-5)
- 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 crankpin 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.

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 bearing area I.D.		58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)
Shift fork, fork shaft	I.D.	13.000 – 13.021 (0.5118 – 0.5126)	13.04 (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. at left end		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 – 0.052 (0.0006 – 0.0020)	0.09 (0.035)
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)
		C1, C2, C4	31.000 – 31.025 (1.2205 – 1.2215)
	Gear busing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)
		C1, C2, C4	30.950 – 30.975 (1.2185 – 1.2195)
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)
		C1, C2, C4	0.025 – 0.075 (0.0010 – 0.0030)
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)
		C2	27.995 – 28.016 (1.1022 – 1.1030)
	Mainshaft O.D.	at M3 bushing	24.972 – 24.993 (0.9831 – 0.9840)
	Countershaft O.D.	at C2 bushing	27.967 – 27.980 (1.1011 – 1.1016)
Bushing-to-shaft clearance	M3	0.007 – 0.049 (0.0003 – 0.0019)	
	C2	0.015 – 0.048 (0.0006 – 0.0019)	

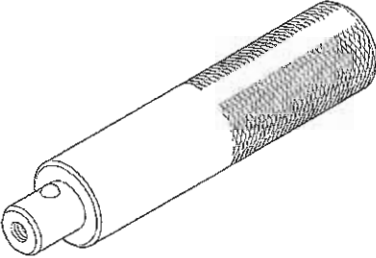
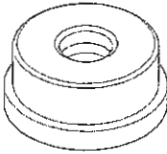
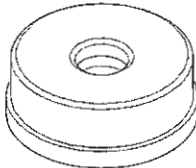


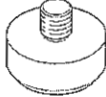
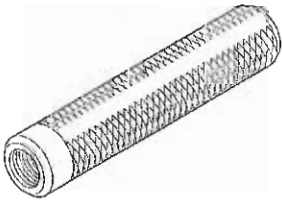
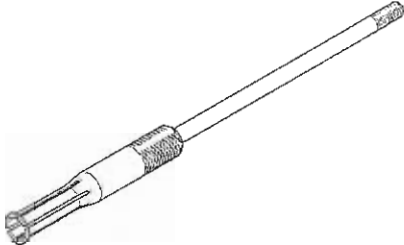
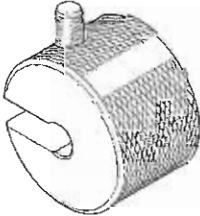
CRANKSHAFT/TRANSMISSION

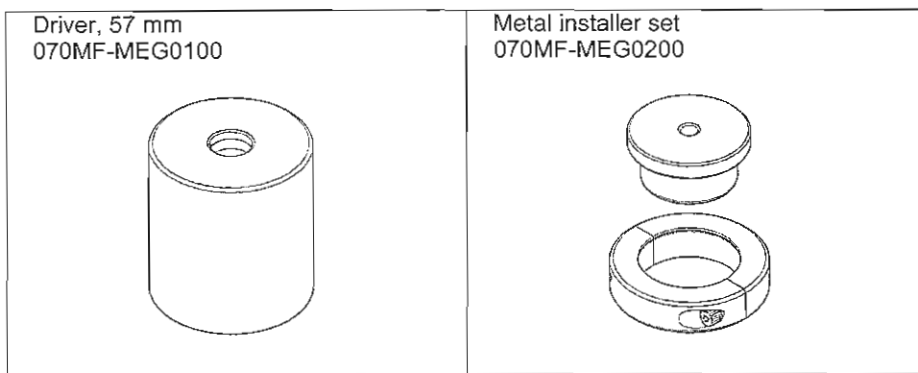
TORQUE VALUES

Crankcase bolt (8 mm)	23 N·m (2.3 kgf·m, 17 lbf·ft)
Crankpin bearing cap nut	33 N·m (3.4 kgf·m, 24 lbf·ft)
Cam chain tensioner setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Transmission bearing setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
EOP switch terminal screw	2 N·m (0.2 kgf·m, 1.5 lbf·ft)
EOP switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply engine oil to the threads and seating surface.
 Apply locking agent to the threads.
 Apply locking agent to the threads.
 See page 4-5
 Apply sealant to the threads.
 See page 4-5

TOOLS

<p>Driver 07749-0010000</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 
<p>Pilot, 20 mm 07746-0040500</p> 	<p>Pilot, 22 mm 07746-0041000</p> 	<p>Pilot, 28 mm 07746-0041100</p> 
<p>Remover handle 07936-3710100</p> 	<p>Bearing remover, 20 mm 07936-3710600</p> 	<p>Remover weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only)</p>



TROUBLESHOOTING

Excessive engine noise

- Worn main journal bearings
- Worn crankpin bearings
- Worn or damaged transmission gear
- Worn or damaged transmission bearings

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

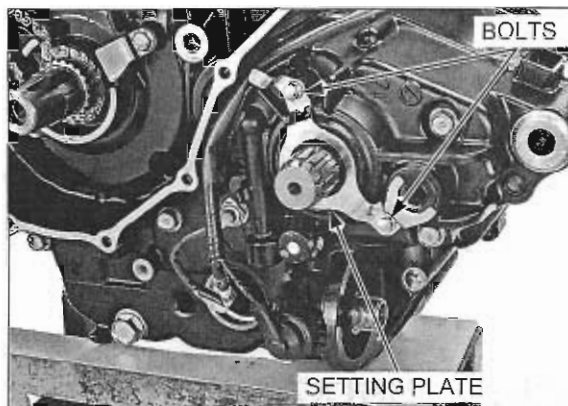
- Worn gear dogs or holes
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

CRANKCASE SEPARATION

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

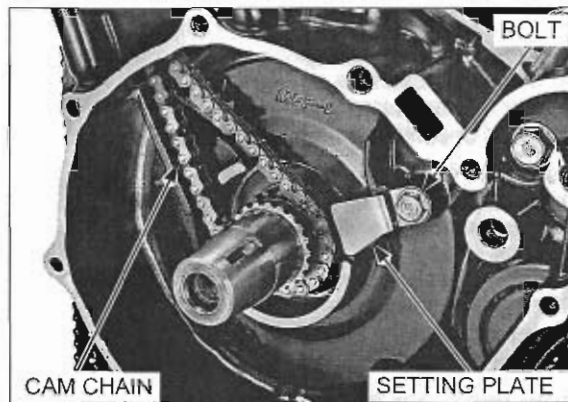
Refer to Service Information (page 12-3) for removal of necessary parts before separating the crankcase.

Remove the bolts and countershaft bearing oil seal setting plate.



Remove the bolt and front cam chain tensioner setting plate.

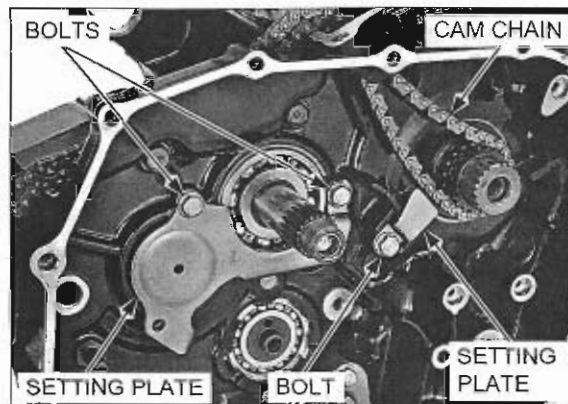
Remove the front cam chain.



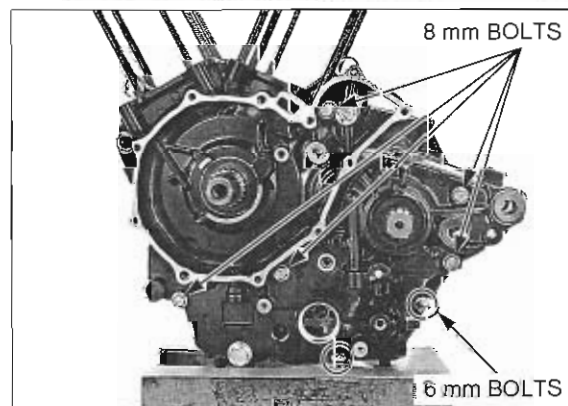
Remove the bolts and transmission bearing setting plate.

Remove the bolt and rear cam chain tensioner setting plate.

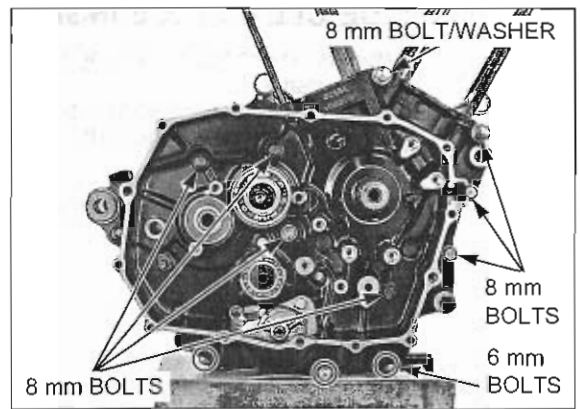
Remove the rear cam chain from the crankshaft.



Loosen and remove the 6 mm bolt first, then remove the 8 mm bolts in a crisscross pattern in several steps.



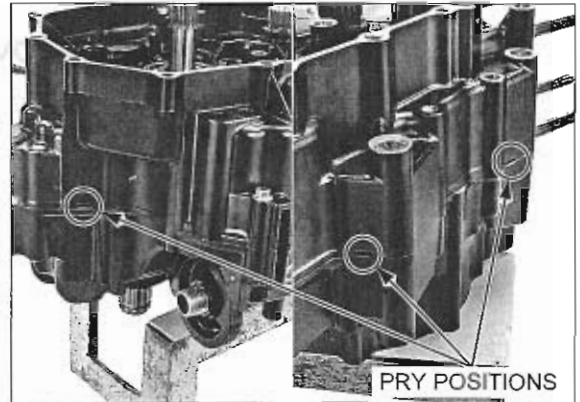
Loosen and remove the 6 mm bolt first, then remove the 8 mm bolts with washer in a crisscross pattern in several steps.



Place the crankcase with the left crankcase down and remove the right crankcase.

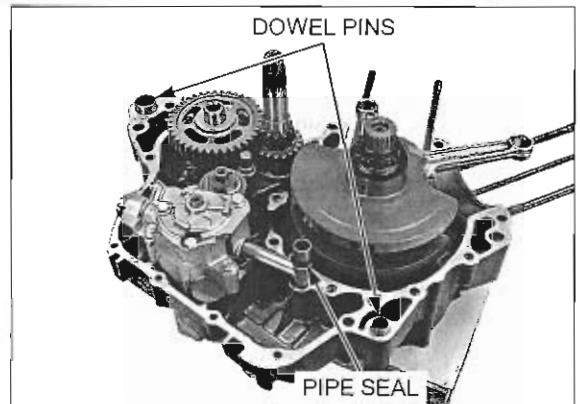
NOTE:

- 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.



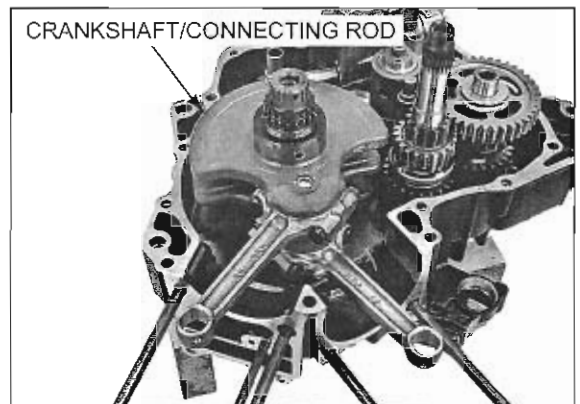
CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase (page 12-6).

Remove the crankshaft/connecting rod from the left crankcase.

During crankshaft and connecting rod service, be careful not to damage the main journal or crankpin bearing inserts.

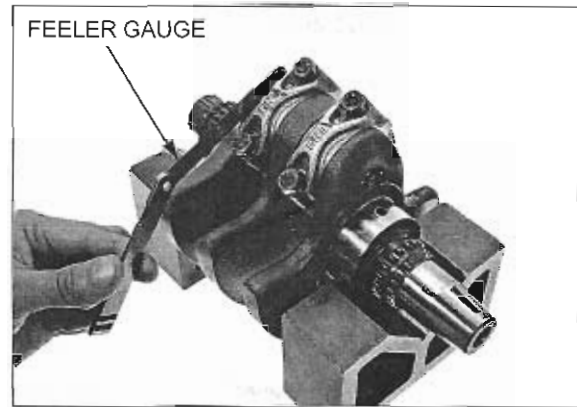


SIDE CLEARANCE INSPECTION

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.

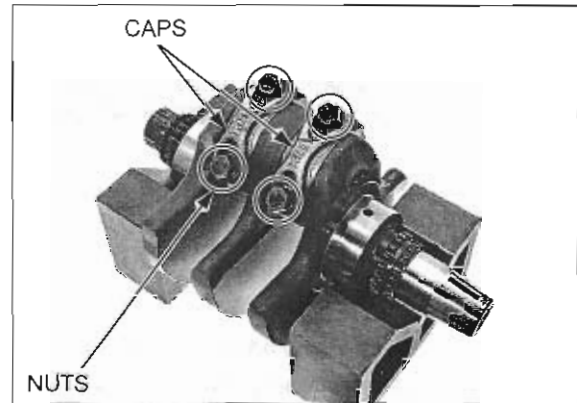
SERVICE LIMIT: 0.30 mm (0.012 in)



CONNECTING ROD REMOVAL

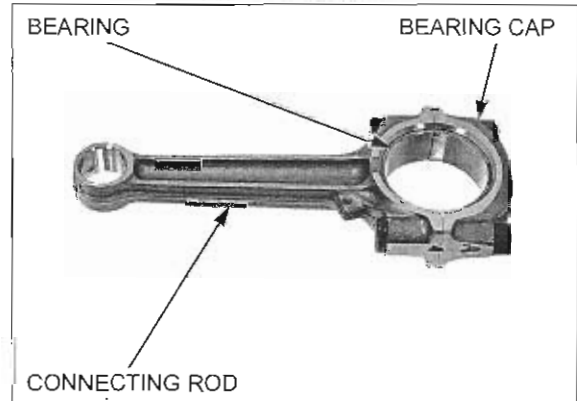
Tap the side of the cap lightly if bearing cap is hard to remove.

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 (page 9-7).



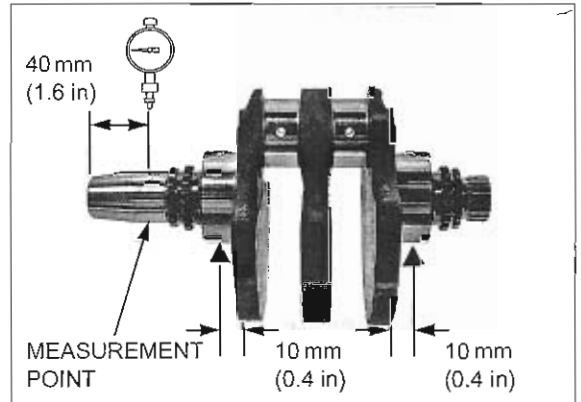
CRANKSHAFT INSPECTION

Check the crankshaft 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 oil solution to the thrust surface of the crankpin 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.

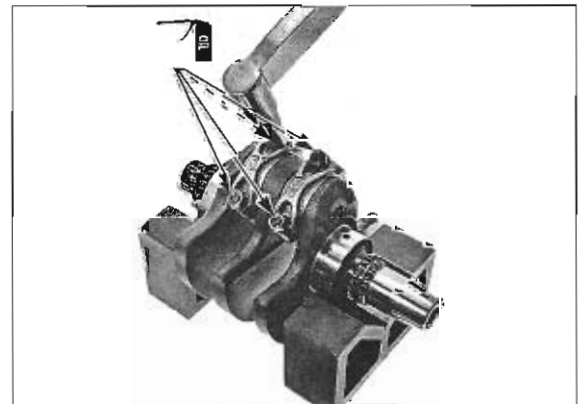
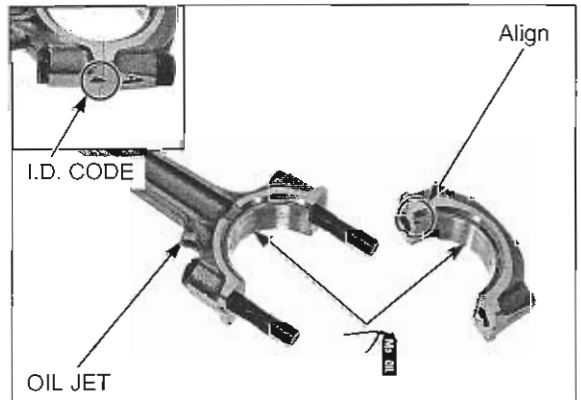
NOTE:

- Face the oil jet of front cylinder connecting rod to rearward (intake side) of the cylinder.
- Face the oil jet of rear cylinder connecting rod to rearward (exhaust side) of the cylinder.

Apply engine oil to the bearing cap nut threads and seating surface, then tighten them to the specified torque in several steps alternately.

TORQUE: 33 N·m (3.4 kgf·m, 24 lbf·ft)

After tightening the nuts, check that the connecting rods move freely without binding.

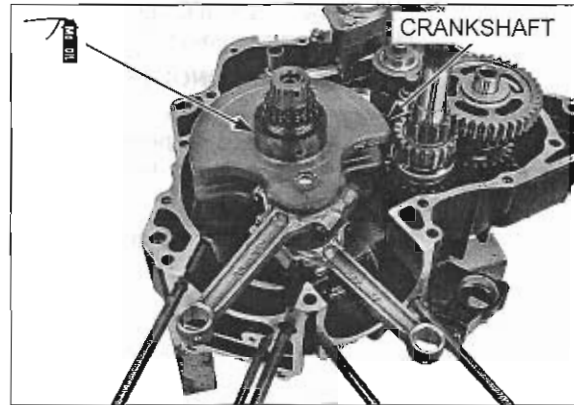


CRANKSHAFT/TRANSMISSION

CRANKSHAFT INSTALLATION

Apply molybdenum oil solution to the crankshaft main journals and install the crankshaft into the left crankcase.

Assemble the crankcase (page 12-24).



CRANKPIN BEARING

NOTICE

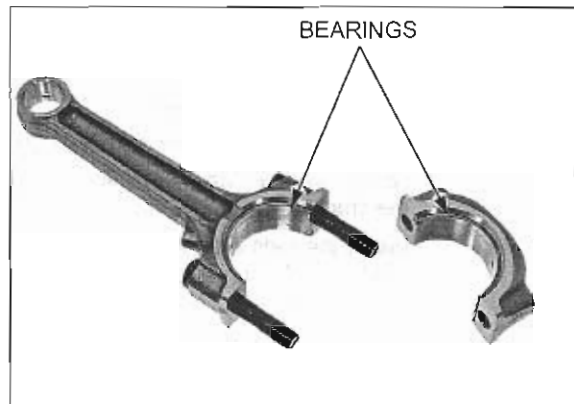
Do not interchange the bearing inserts. They must be installed in their original locations, or the correct bearing oil clearance may not be obtained, resulting in engine damage.

BEARING INSPECTION

Remove the connecting rod (page 12-8).

Check the bearing inserts for unusual wear, damage or peeling and replace them if necessary.

Select the replacement bearing (page 12-11).

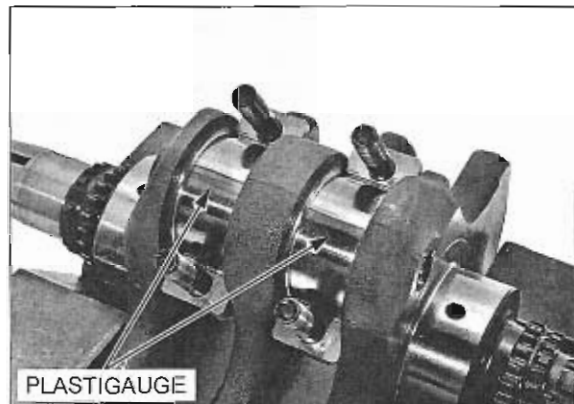


OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

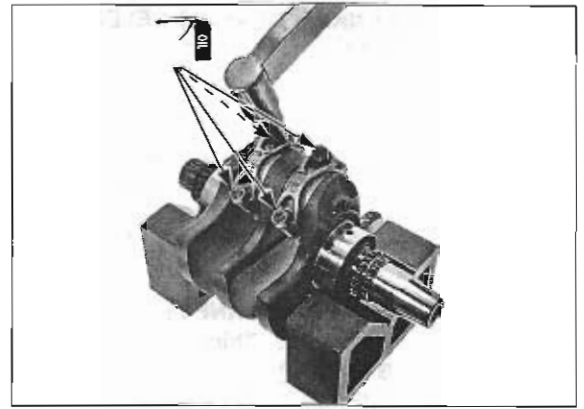
Carefully install the connecting rods and bearing caps on the correct crankpins.



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.

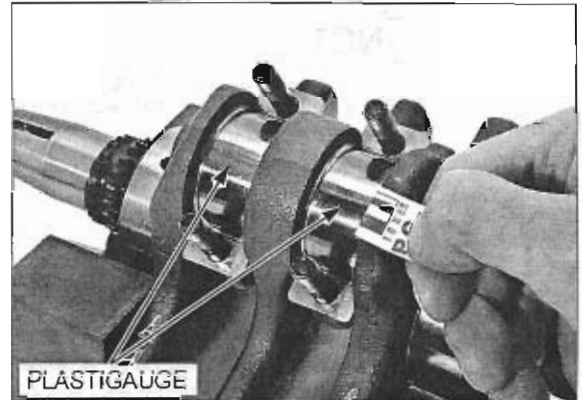
TORQUE: 33 N·m (3.4 kgf·m, 24 lbf·ft)



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.

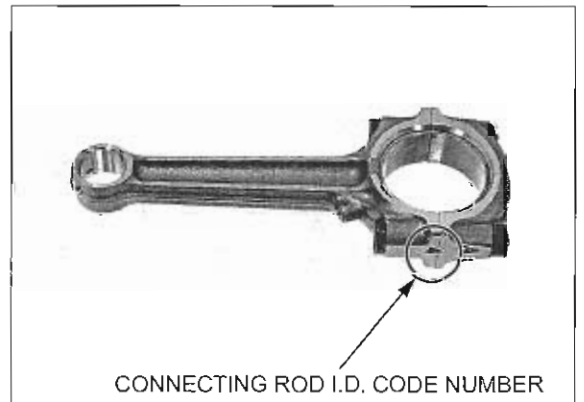


BEARING SELECTION

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.

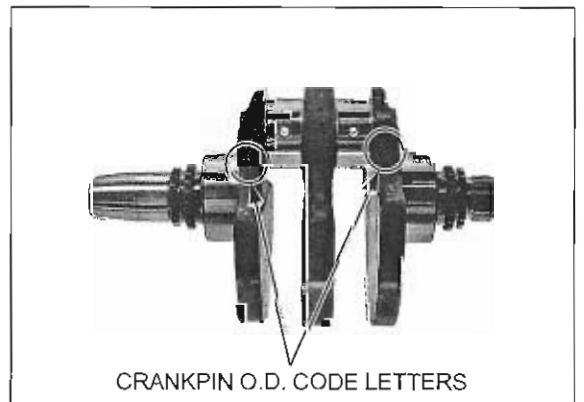


Record the crankpin O.D. code letter.

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.



CRANKSHAFT/TRANSMISSION

CRANKPIN BEARING SELECTION TABLE:

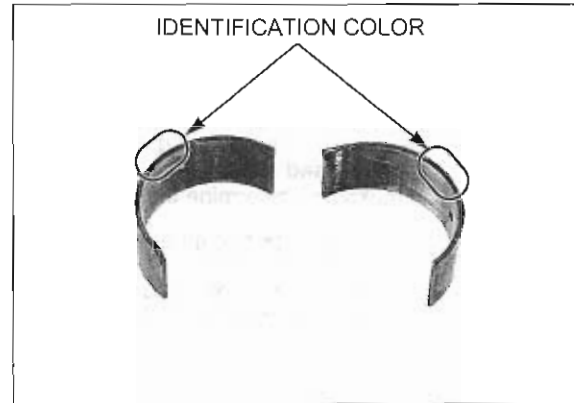
			CONNECTING ROD I.D. CODE	
			3	4
			43.000 – 43.008 mm (1.6929 – 1.6932 in)	43.008 – 43.016 mm (1.6932 – 1.6935 in)
CRANKPIN O.D. CODE	A	39.982 – 39.990 mm (1.5741 – 1.5744 in)	C (Pink)	B (Yellow)
	B	39.974 – 39.982 mm (1.5738 – 1.5741 in)	B (Yellow)	A (Green)

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.



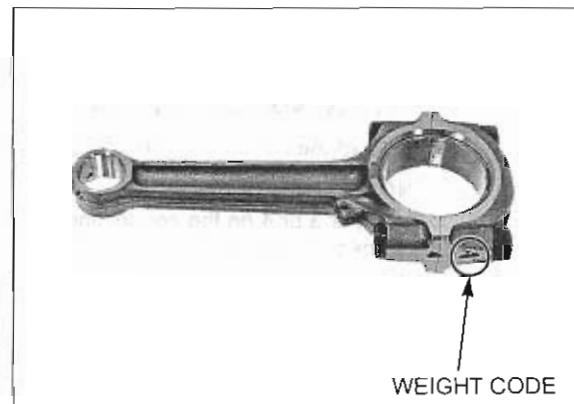
CONNECTING ROD SELECTION

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. But if that is unavailable, you may use one of the others specified in the following chart.

CONNECTING ROD WEIGHT COMBINATION TABLE:

- The "O" mark in the table indicated that matching is possible in the crossed codes.

		REAR WEIGHT CODE		
		A	B	C
FRONT WEIGHT CODE	A		O	O
	B	O	O	O
	C	O	O	



		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 following:

- Connecting rod (page 12-9)
- Crankshaft (page 12-10)

MAIN JOURNAL BEARING

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.

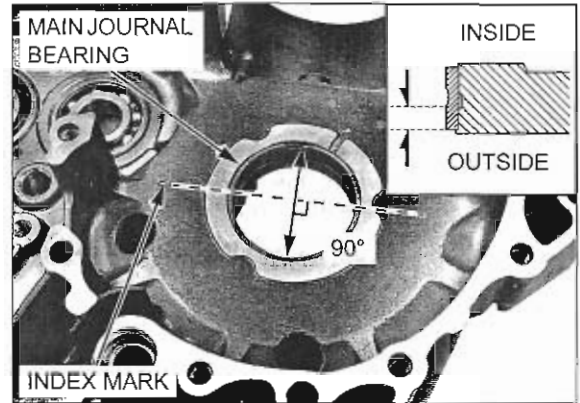
BEARING INSPECTION

Remove the crankshaft (page 12-7).

Clean off any oil from the bearings.

Check the bearings for unusual wear, damage or peeling and replace them if necessary.

Measure and record the main journal bearing I.D. at between the bearing groove and crankcase outside 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.



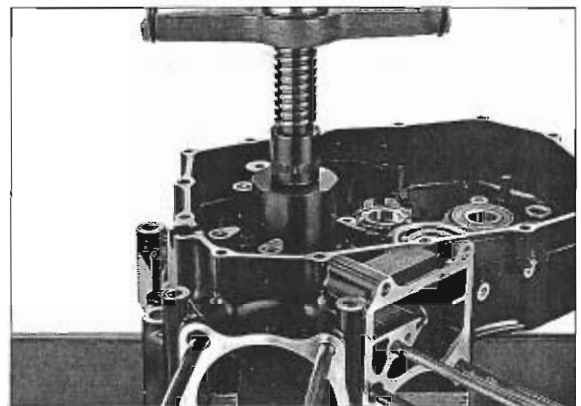
BEARING SELECTION

Set a special tool and hydraulic press on the outside of the crankcase.

TOOL:

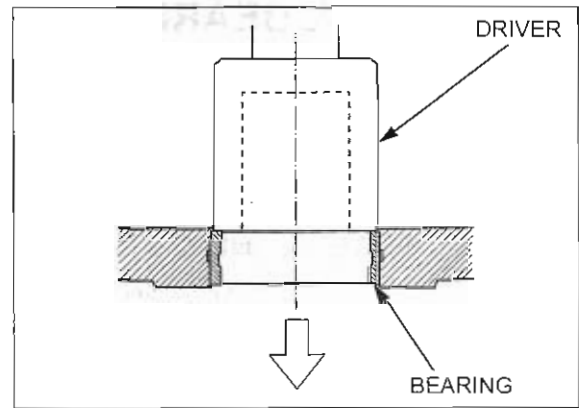
Driver, 57 mm

070MF-MEG0100



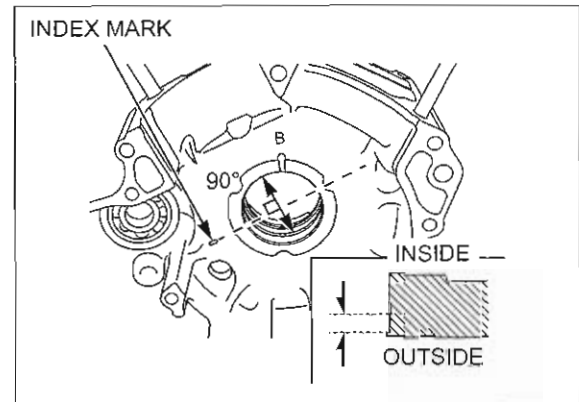
CRANKSHAFT/TRANSMISSION

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 outside 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 journal bearing selection:

- Crankshaft and crankcase are replaced
- Crankcase only is replaced
- Crankshaft only is replaced
- Main journal bearings only are replaced

Carefully refer to the following instructions and tables for main journal bearing selection.

Record the bearing support I.D. code letter.

NOTE:

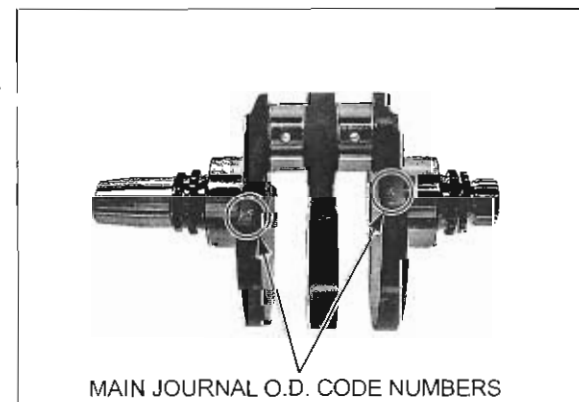
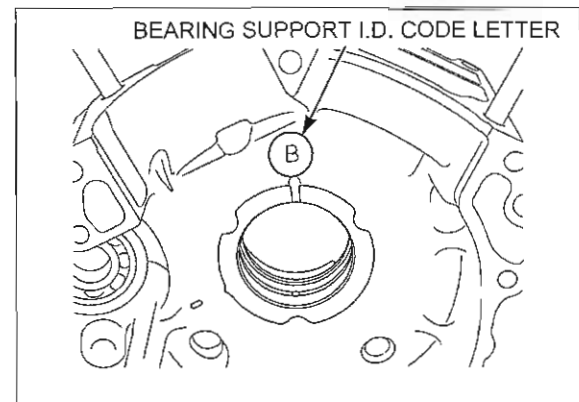
Letters A or B on each crankcase is the code for the crankcase I.D.

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	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 I.D.		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)
	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)

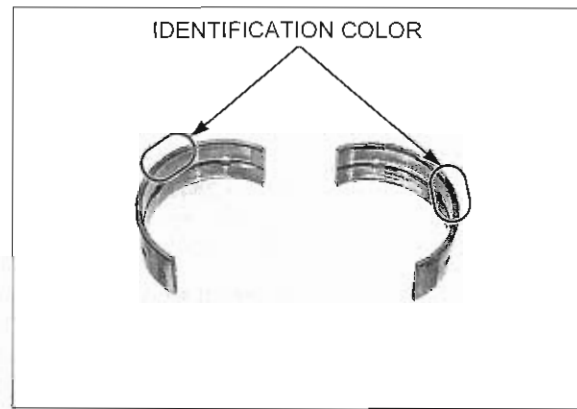
In case of main bearing replacement only:

BEARING SUP-PORT I.D.		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)
			58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)
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)

CRANKSHAFT/TRANSMISSION

BEARING THICKNESS:

O.S. E (Yellow): Thick
O.S. F (Pink): ↑
O.S. G (Red): ↓
A (Blue): Middle
B (Black):
C (Brown):
D (Green): Thin



BEARING INSTALLATION

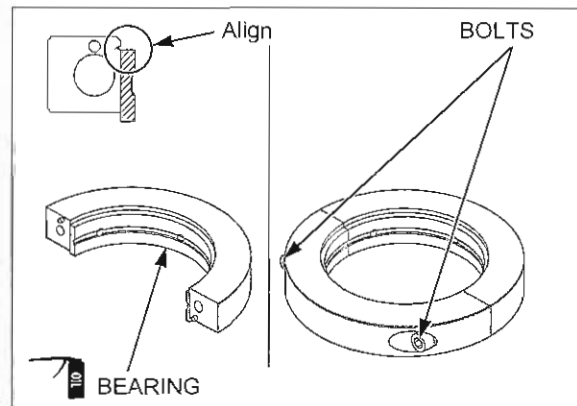
Apply engine oil to new bearing surface.
Set new bearings to the metal installer aligning its side edge with the metal installer grooves.

TOOL:

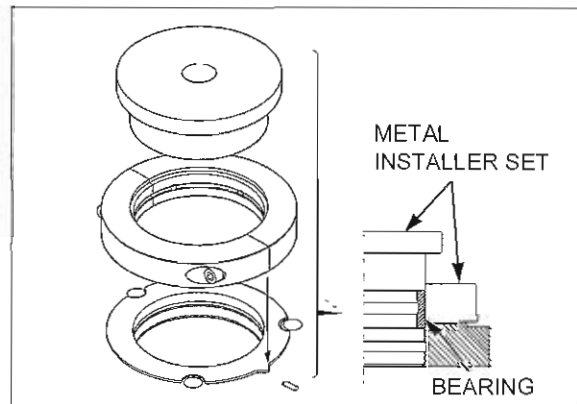
Metal installer set **070MF-MEG0200**

Tighten the bolts alternately in several steps to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



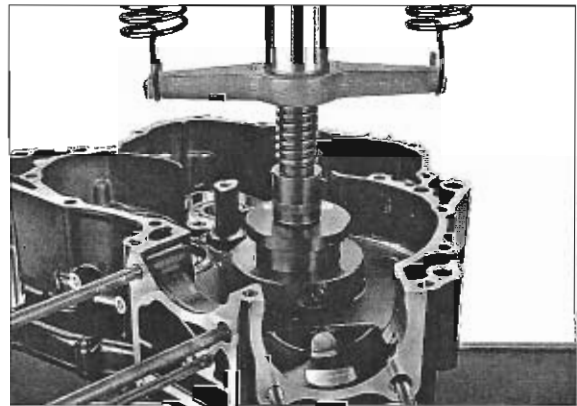
Set the bearings and special tools assembly on inside of the crankcase, fitting the bearing edge in the crankcase main journal.
Align the mating line of the bearings with the index mark on the crankcase as shown.



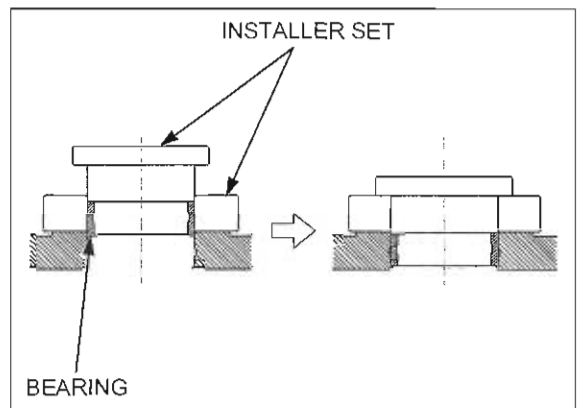
Set the hydraulic press.

TOOL:

Metal installer set **070MF-MEG0200**



Press the new bearings until the metal installer flange fully seated.



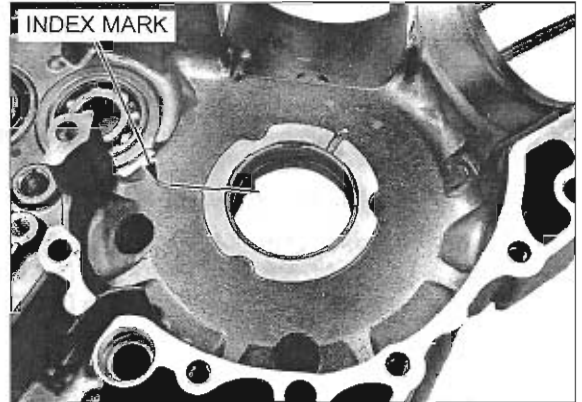
Make sure the bearing mating line aligns with the index mark on the crankcase.

Check the oil clearance (page 12-13).

NOTE:

After selecting new bearings, recheck the clearance. Incorrect clearance can cause severe engine damage.

Install the crankshaft (page 12-10).



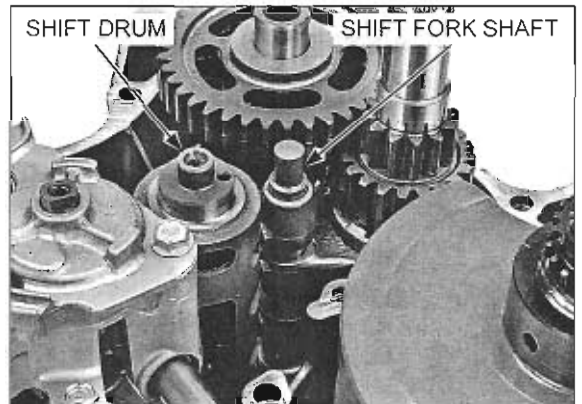
TRANSMISSION

REMOVAL

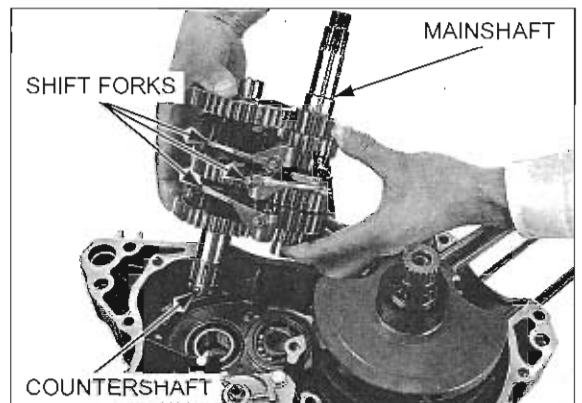
Separate the crankcase (page 12-6).

Remove the shift fork shaft from the shift forks.

Remove the shift drum.



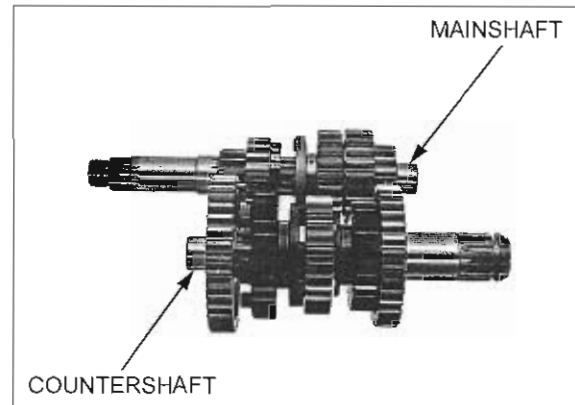
Remove the mainshaft, countershaft and shift forks together.



CRANKSHAFT/TRANSMISSION

TRANSMISSION DISASSEMBLY

Disassemble the mainshaft and countershaft.



INSPECTION

GEARS

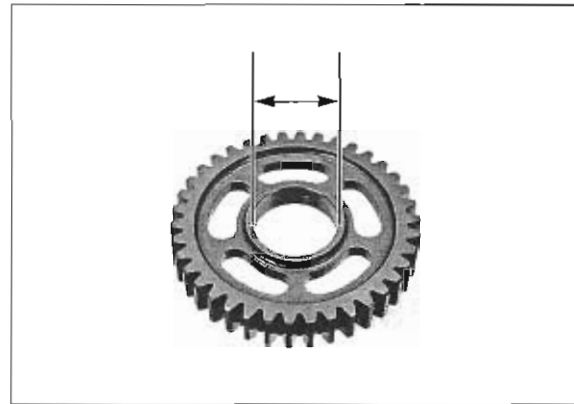
Check the gear dogs, dog slots and teeth for damage or excessive wear.

Measure the I.D. of each gear.

SERVICE LIMITS:

M3, M5 gears: 28.04 mm (1.104 in)

C1, C2, C4 gears: 31.05 mm (1.222 in)



BUSHINGS

Check the bushings for wear or damage.

Measure the O.D. of each bushing.

SERVICE LIMITS:

M3, M5, gear bushings: 27.94 mm (1.100 in)

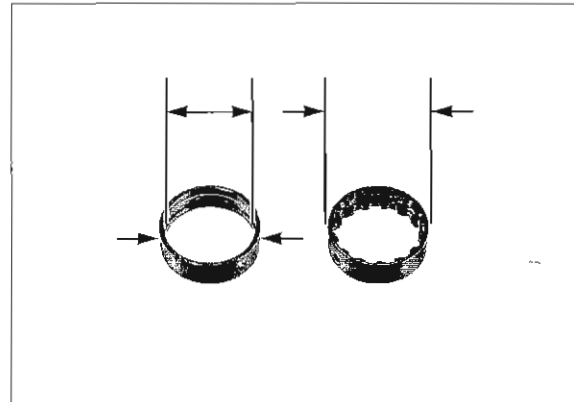
C1, C2, C4 gear bushings: 30.93 mm (1.218 in)

Measure the I.D. of each bushing.

SERVICE LIMITS:

M3 gear bushing: 25.04 mm (0.986 in)

C2 gear bushing: 28.04 mm (1.104 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):
 24.95 mm (0.982 in)

Countershaft (at C2 gear bushing):
 27.95 mm (1.100 in)

Calculate the gear-to-bushing and bushing-to-shaft clearance.

SERVICE LIMITS:

Gear-to-bushing

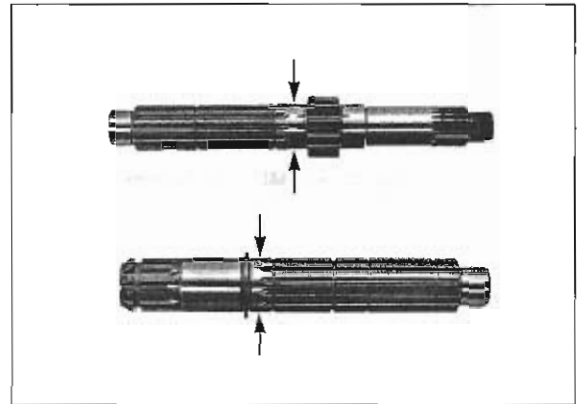
M3, M5: 0.10 mm (0.004 in)

C1, C2, C4: 0.11 mm (0.004 in)

Bushing-to-shaft

M3: 0.08 mm (0.003 in)

C2: 0.08 mm (0.003 in)



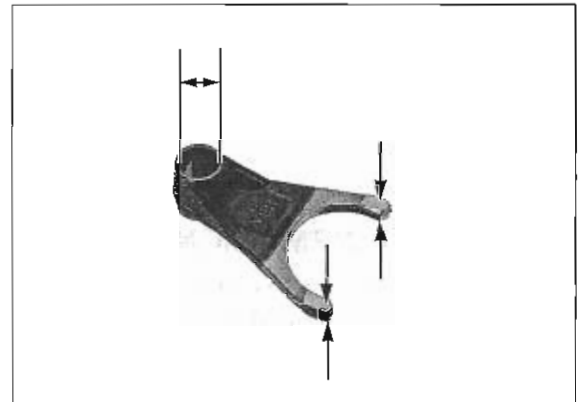
SHIFT FORK

Check for deformation or abnormal wear.
 Measure the shift fork claw thickness.

SERVICE LIMIT: 5.6 mm (0.22 in)

Measure the shift fork I.D.

SERVICE LIMIT: 13.04 mm (0.513 in)

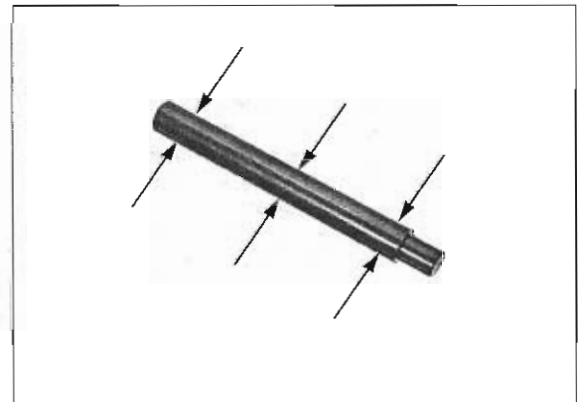


SHIFT FORK SHAFT

Check the shift fork shaft for bend, abnormal wear or damage.

Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.90 mm (0.508 in)



CRANKSHAFT/TRANSMISSION

SHIFT DRUM/SHIFT DRUM BEARING

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)

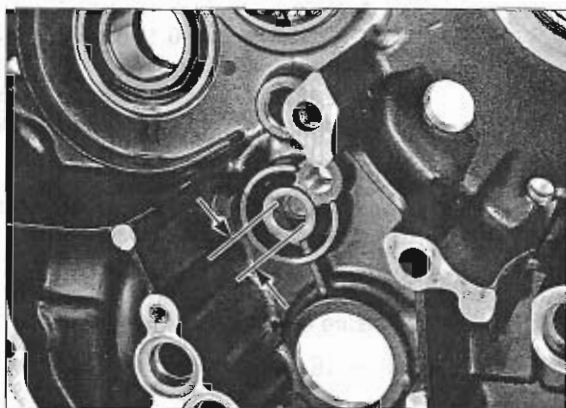


Check the shift drum journal in the left crankcase for excessive wear or damage.
Measure the shift drum journal I.D.

SERVICE LIMIT: 12.05 mm (0.474 in)

Calculate the shift drum-to-shift drum journal clearance.

SERVICE LIMIT: 0.09 mm (0.035 in)



TRANSMISSION ASSEMBLY

Clean all parts in solvent.

Apply engine oil to the all gear teeth.

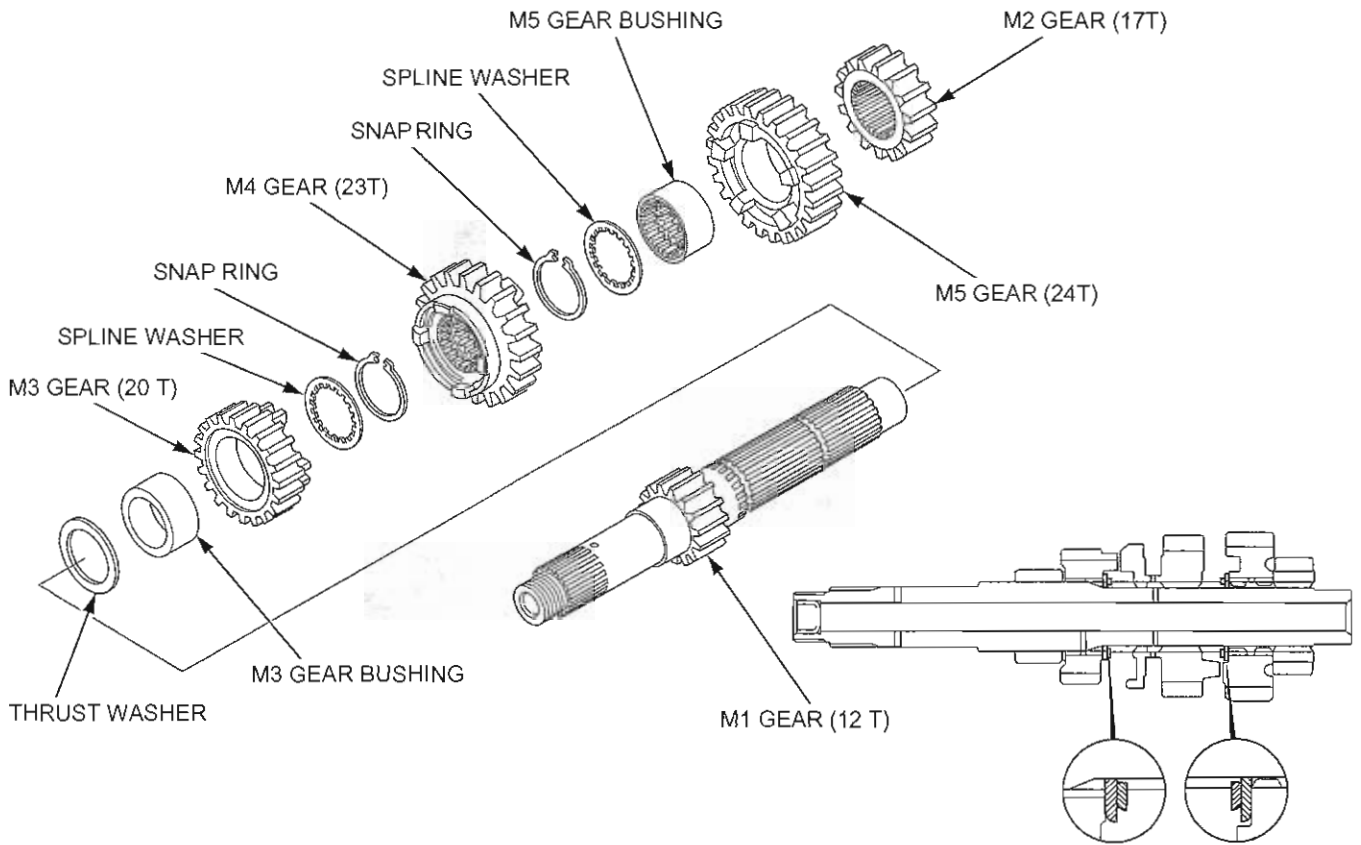
Apply molybdenum oil solution to the gear bushing sliding surface and shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

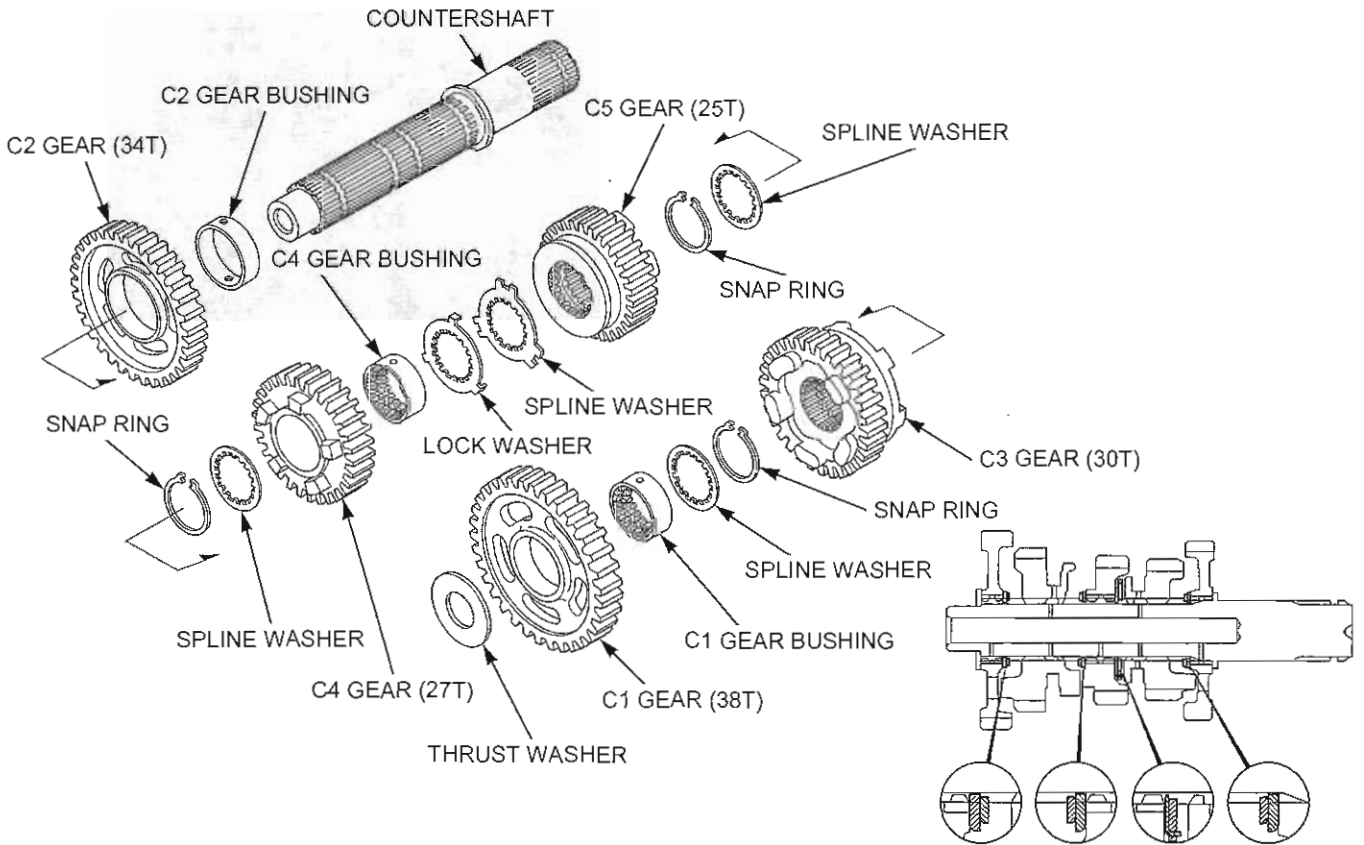
NOTE:

- 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

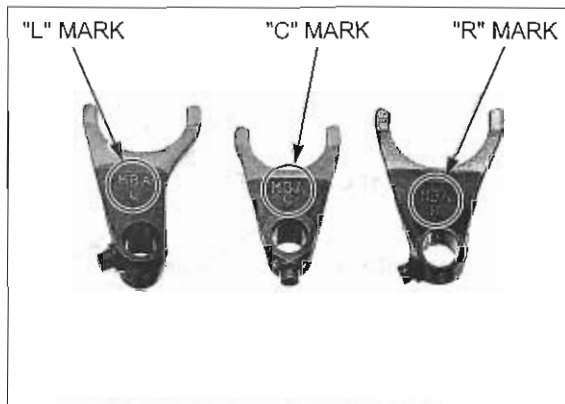


CRANKSHAFT/TRANSMISSION

INSTALLATION

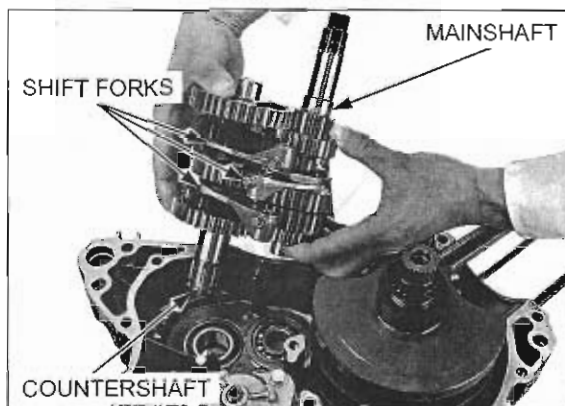
The shift forks have the following identification marks.

- "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 mainshaft, countershaft and shift forks together into the left crankcase.



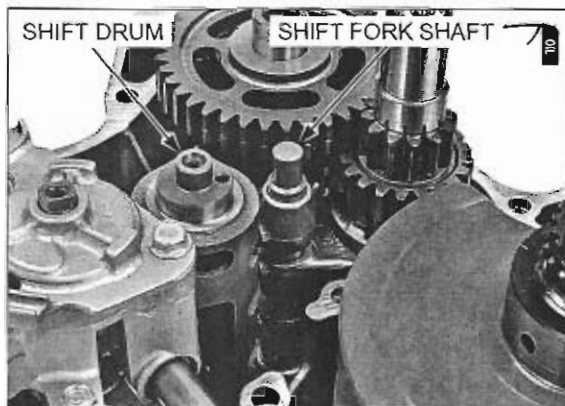
Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.

Apply engine oil to the shift fork shaft whole surface.

Insert the shift fork shaft through the shift forks into the left crankcase.

After installation, check for smooth transmission operation.

Assemble the crankcase (page 12-24).



CRANKCASE BEARING REPLACEMENT

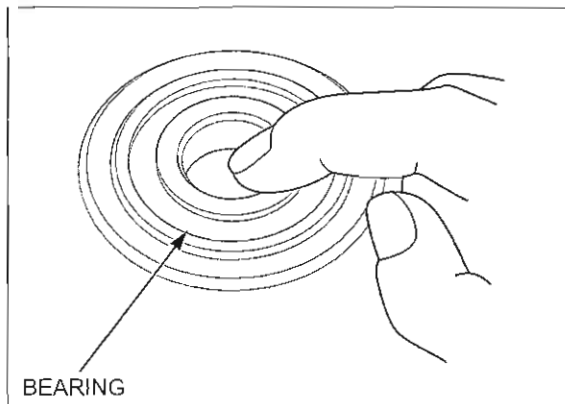
INSPECTION

Remove the following:

- Crankshaft (page 12-7)
- Transmission (page 12-17)
- Oil pump (page 4-6)

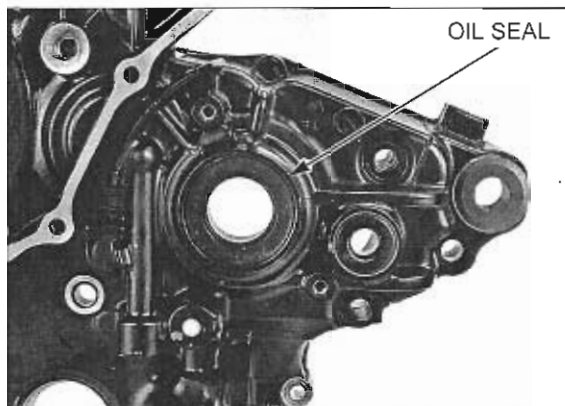
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the crankcase.

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 countershaft oil seal from the left crankcase.

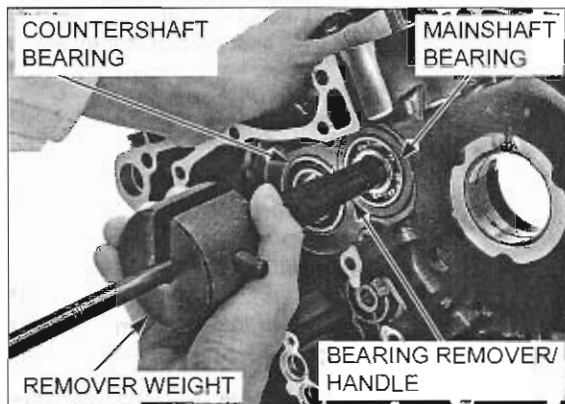


Remove the mainshaft bearing using the special tools.

TOOLS:

- | | |
|------------------------|--|
| Bearing remover, 20 mm | 07936-3710600 |
| Remover handle | 07936-3710100 |
| Remover weight | 07741-0010201 or
07936-371020A
(U.S.A. only) |

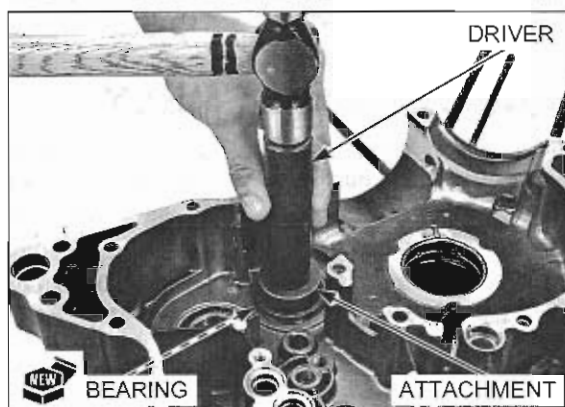
Drive the countershaft bearing out of the left crankcase.



Drive new bearings into the left crankcase with the marked side facing up until they are fully seated.

TOOLS:

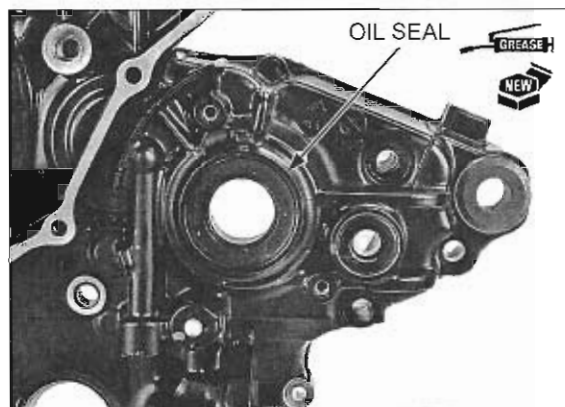
- | | |
|------------------------------|---------------|
| Mainshaft bearing: | |
| Driver | 07749-0010000 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 20 mm | 07746-0040500 |
| Countershaft bearing: | |
| Driver | 07749-0010000 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Pilot, 28 mm | 07746-0041100 |



Apply grease to a new countershaft oil seal lip.

Install the oil seal with its marked side facing up.

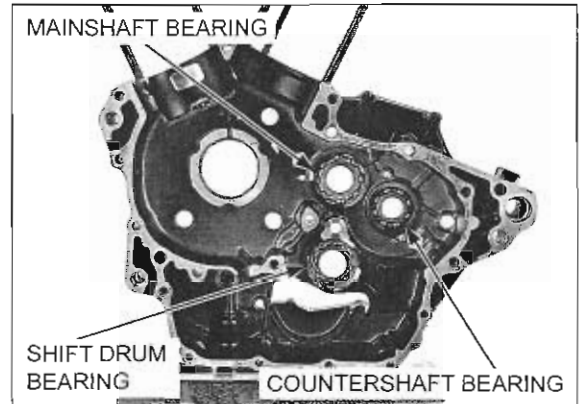
Install a new countershaft oil seal until it is flush with the crankcase surface.



CRANKSHAFT/TRANSMISSION

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:

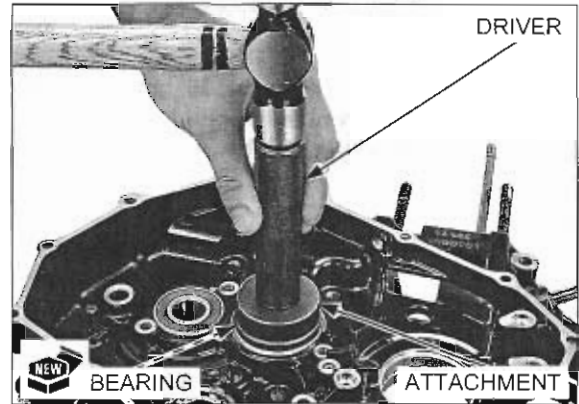
Mainshaft bearing:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000

Countershaft bearing:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500

Install a new shift drum bearing with the marked side facing up.

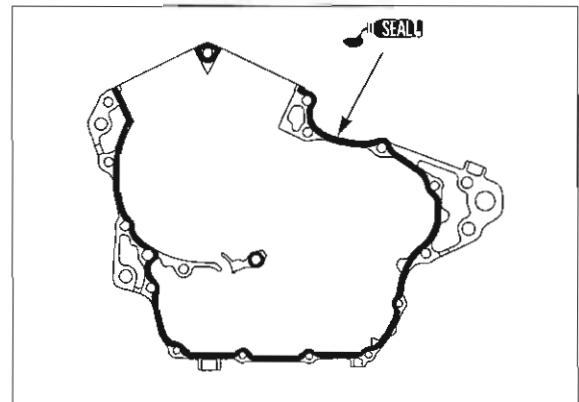


CRANKCASE ASSEMBLY

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 (Three Bond 1207B or equivalent) to the right and left crankcase mating surfaces.

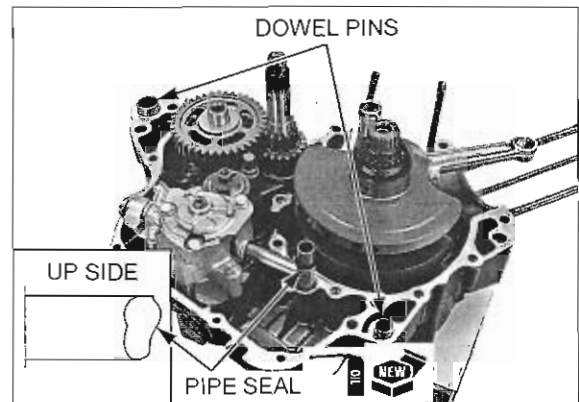


Install the dowel pins into the left crankcase.

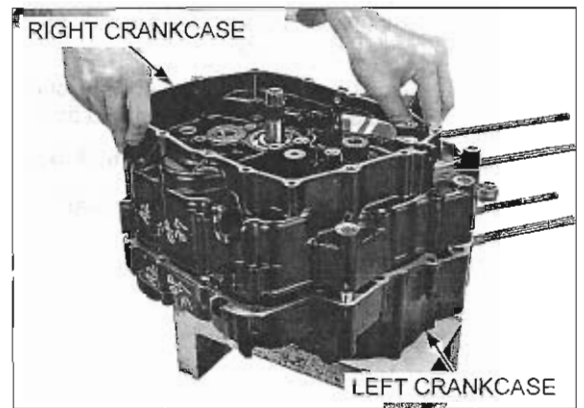
Coat a new pipe seal with engine oil and install it to the oil pipe.

NOTE:

Install a new pipe seal with its tapered side facing up.



Install the right crankcase over the left crankcase.

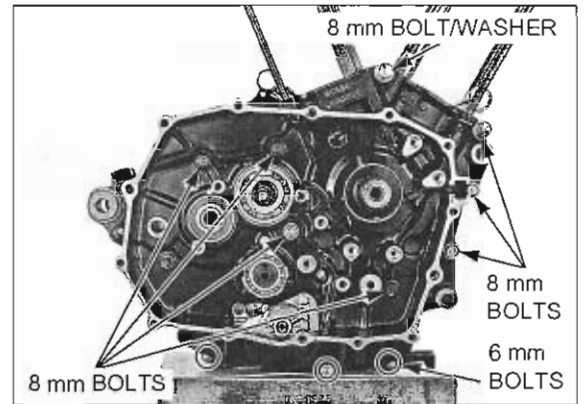


Install the crankcase bolts (8 mm) and washer.

Tighten the crankcase bolts (8 mm) in a crisscross pattern in several steps to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the 6 mm bolts securely.

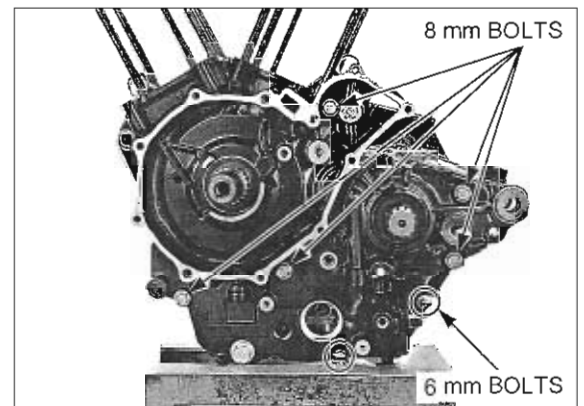


Install the crankcase bolts (8 mm).

Tighten the crankcase bolts (8 mm) in a crisscross pattern in several steps to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the 6 mm bolts securely.



Clean and apply locking agent to the bearing setting plate bolt threads (page 1-17).

Install the bearing setting plate and tighten the bolts to the specified torque.

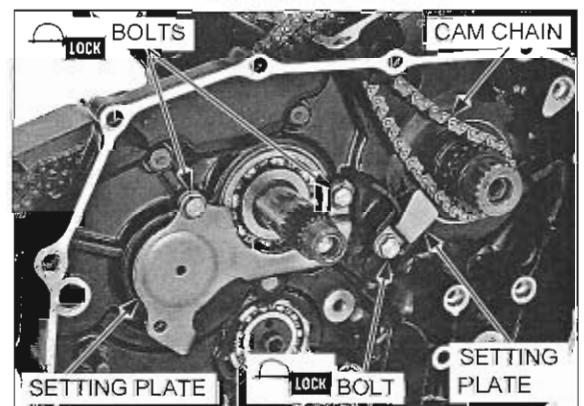
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Clean and apply locking agent to the cam chain tensioner setting plate bolt threads (page 1-17).

Install the rear cam chain tensioner setting plate with the bolt, then tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the rear cam chain through the crankcase.



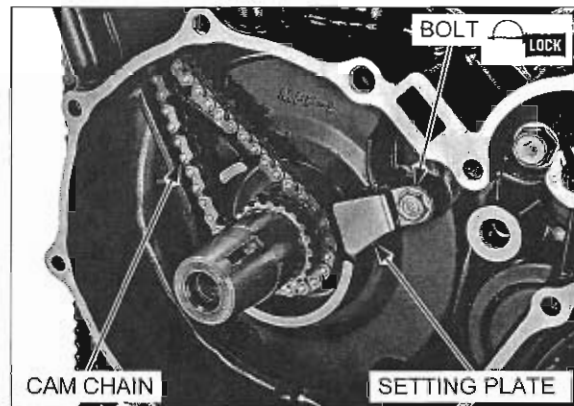
CRANKSHAFT/TRANSMISSION

Apply a locking agent to the cam chain tensioner setting plate bolt threads.

Install the front cam chain tensioner setting plate with the bolt, then tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the front cam chain through the crankcase.



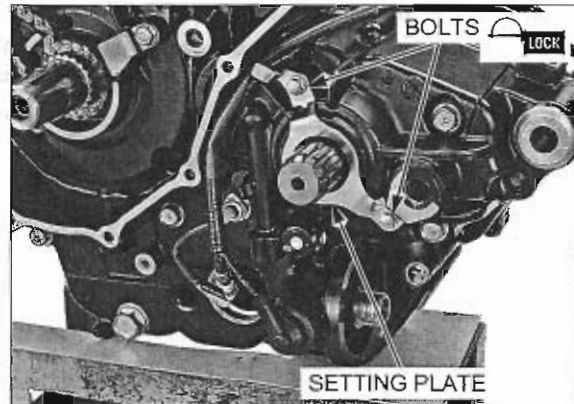
Clean and apply locking agent to the countershaft oil seal setting plate bolt threads.

Install and tighten the countershaft oil seal setting plate bolt securely.

Route the engine sub-harness properly (page 1-19).

Install the removed parts (page 12-3).

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

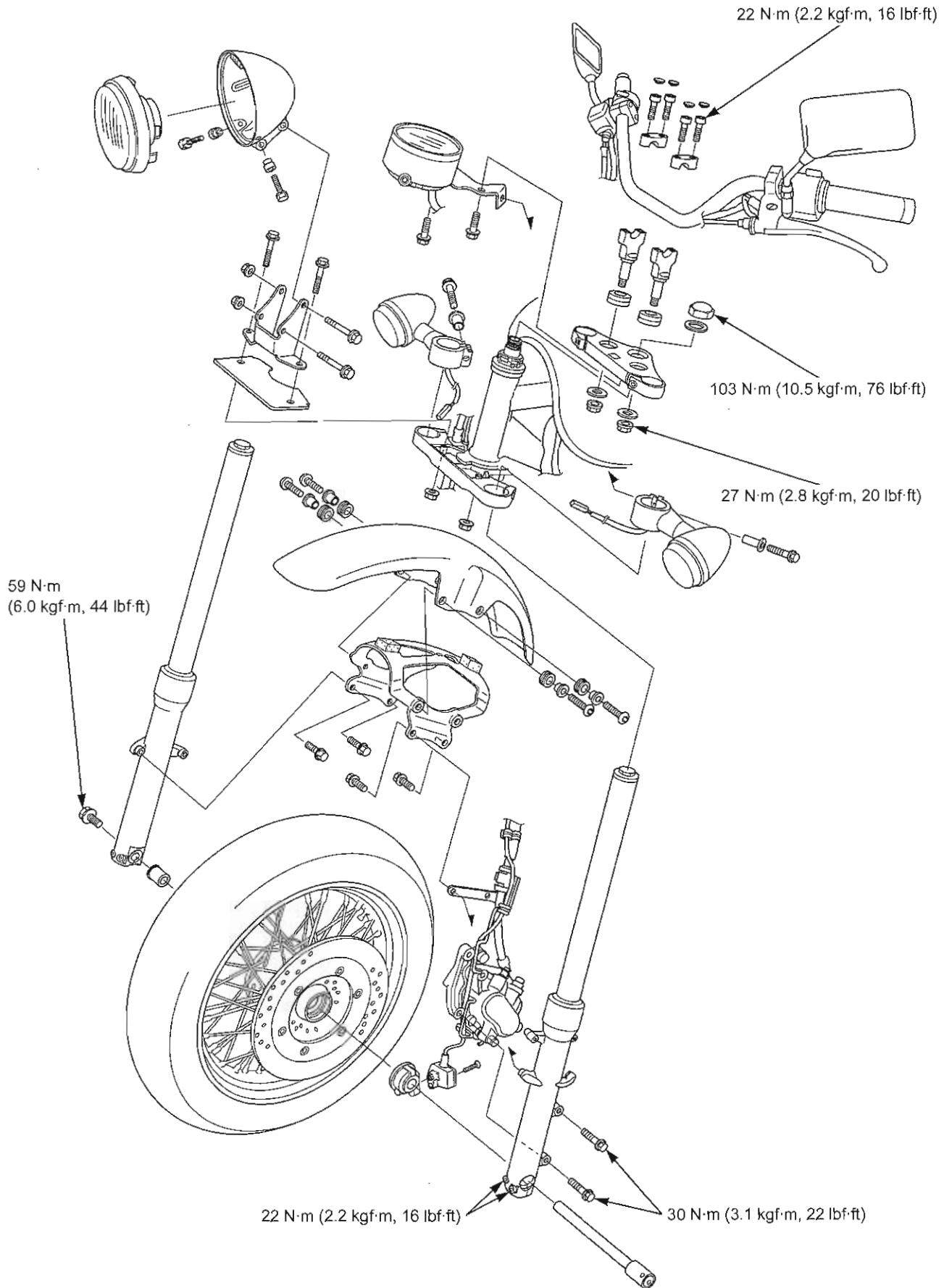


13. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION.....	13-2	FRONT WHEEL	13-14
SERVICE INFORMATION	13-3	FORK.....	13-21
TROUBLESHOOTING.....	13-5	STEERING STEM	13-30
HANDLEBAR	13-6		

FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- 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 (page 15-3).

SPECIFICATIONS

Unit: mm (in)

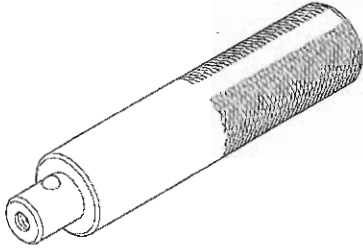
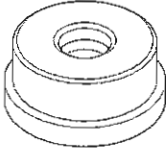
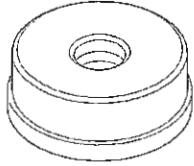

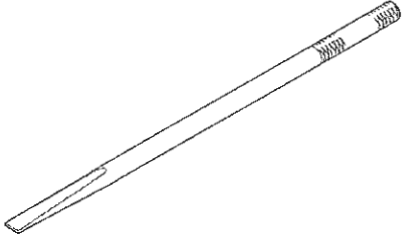
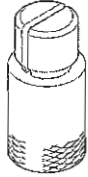
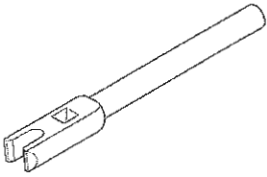
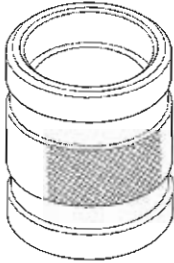
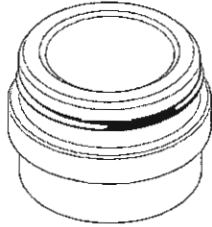
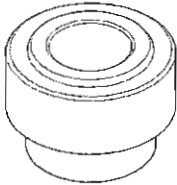
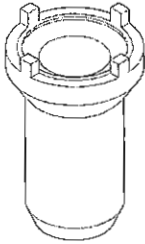
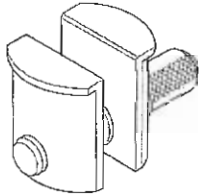
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		-	1.5 (0.06)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	-
	Driver and passenger	200 kPa (2.00 kgf/cm ² , 29 psi)	-
Axle runout		-	0.2 (0.01)
Wheel rim runout	Radial	-	2.0 (0.08)
	Axial	-	2.0 (0.08)
Wheel balance weight		-	60 g max.
Fork	Spring free length	440.4 (17.34)	431.6 (16.99)
	Tube runout	-	0.2 (0.01)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8 (10W)	-
	Fluid level	152 (6.0)	-
	Fluid capacity	468 ± 2.5 cm ³ (15.8 ± 0.08 US oz, 16.5 ± 0.09 Imp oz)	-
Steering head bearing pre-load		8.7 – 13.0 N (0.9 – 1.3 kgf)	-

TORQUE VALUES

Handlebar upper holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Handlebar lower holder nut	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one.
Spoke	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Front axle bolt	59 N·m (6.0 kgf·m, 44 lbf·ft)	
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads.
Fork cap	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork top bridge pinch bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Fork bottom bridge pinch bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt; replace with a new one.
Steering top thread	-	See page 13-34
Steering top thread lock nut	-	See page 13-35
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Clutch lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6 N·m (0.6 kgf·m, 4.4 lbf·ft)	

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

<p>Driver 07749-0010000</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 
<p>Pilot, 20 mm 07746-0040500</p> 	<p>Bearing remover shaft 07GGD-0010100</p> 	<p>Bearing remover head, 20 mm 07746-0050600</p> 
<p>Spoke wrench, 6.1 mm 07JMA-MR60100</p> 	<p>Slider weight 07947-KA50100</p> 	<p>Driver attachment 07947-KF00100</p> 
<p>Attachment, 30 mm I.D. 07746-0030300</p> 	<p>Steering stem socket 07916-3710101 or 07916-3710100</p> 	<p>Bearing remover 07946-3710500</p> 

<p>Ball race remover set 07953-MJ10000</p> 	<p>Remover attachment 07953-MJ10100</p>  <p>or 07953-MJ1000B or 07953-MJ1000A (U.S.A. only) and a long drift</p>	<p>Driver shaft 07953-MJ10200</p> 
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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 14-18)

Front wheel wobbles

- Bent rim
- Worn wheel bearings
- Bent spokes
- Faulty tire
- Unbalanced tire and wheel
- Axle fastener not tightened properly

Wheel hard to turn

- Faulty wheel bearings
- Bent axle
- Brake drag (page 15-4)

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

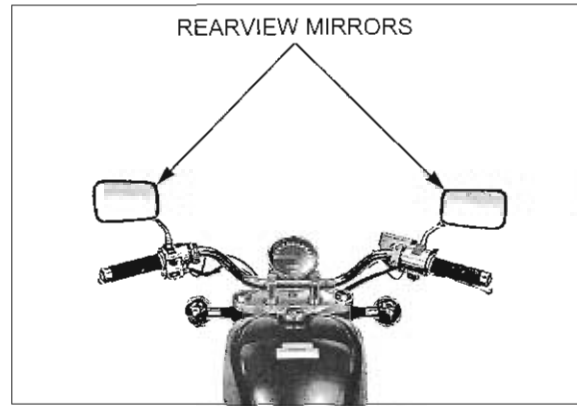
Front suspension noise

- Loose fork fasteners
- Insufficient fluid weight (low viscosity)
- Worn slider or fork tube bushing

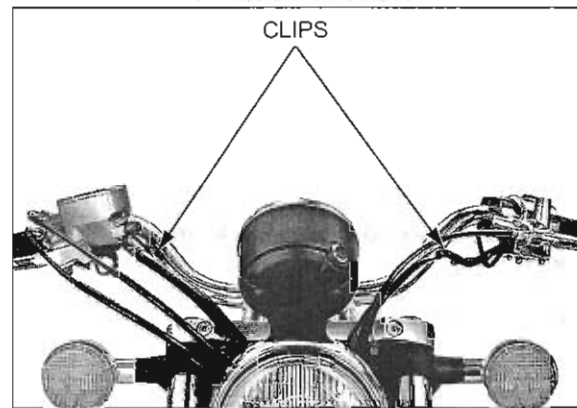
HANDLEBAR

REMOVAL

Remove the rearview mirrors.

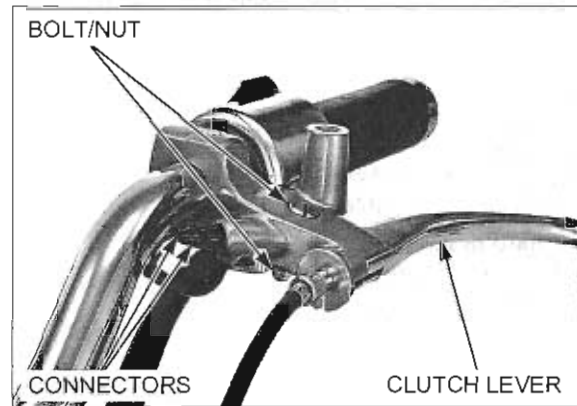


Release the handlebar switch wire clips from the handlebar.

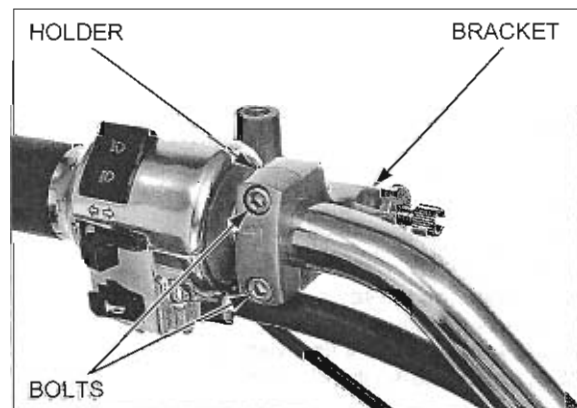


Remove the pivot nut, bolt and clutch lever from the clutch lever bracket.

Disconnect the clutch switch connectors from the clutch switch.

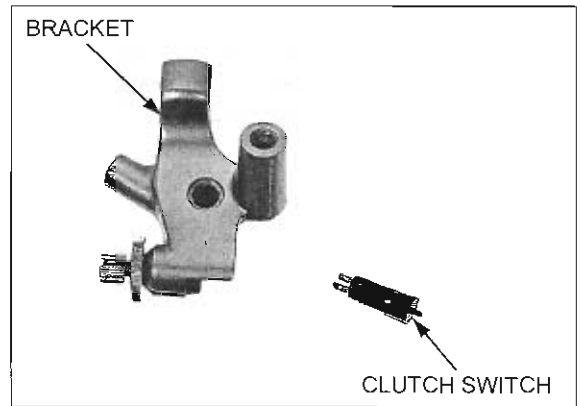


Remove the bolts, holder and clutch lever bracket.

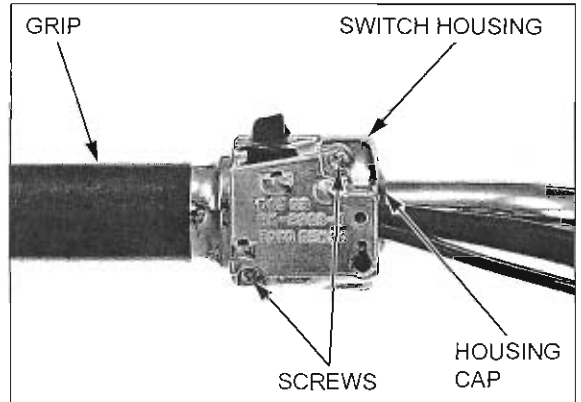


FRONT WHEEL/SUSPENSION/STEERING

Remove the clutch switch from the clutch lever bracket.



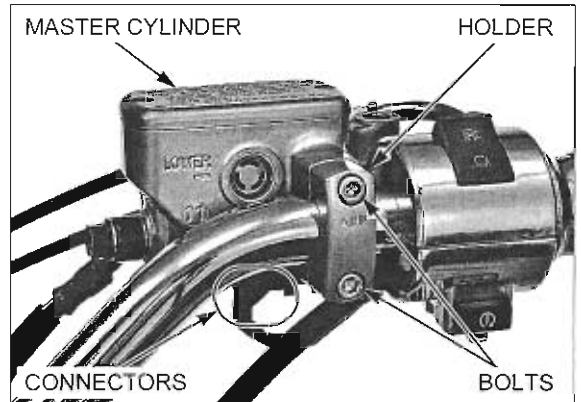
Remove the screws and left handlebar switch housing.
Remove the left handlebar grip and housing cap.



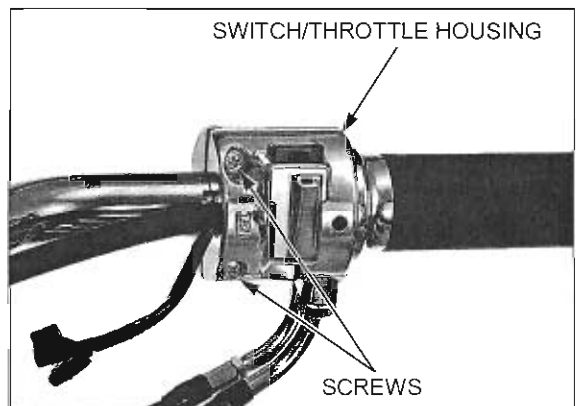
Disconnect the front brake light switch wire connectors from the switch.

Keep the reservoir upright to prevent air from entering the hydraulic system.

Remove the bolts, holder and master cylinder assembly.



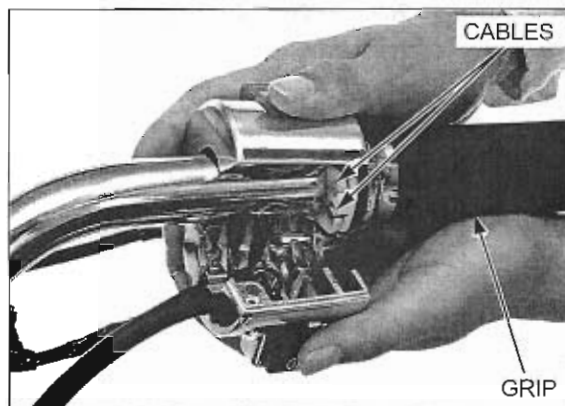
Remove the right handlebar switch/throttle housing screws.



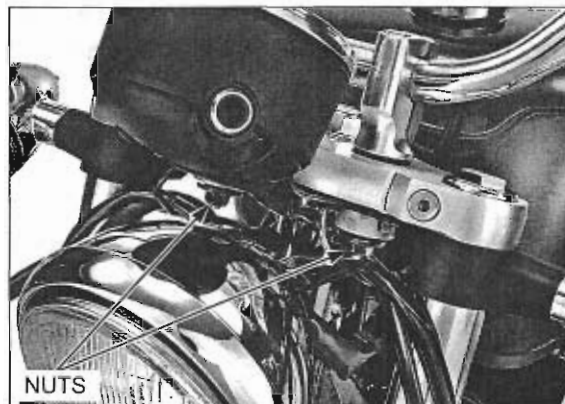
FRONT WHEEL/SUSPENSION/STEERING

Disconnect the throttle cables from the throttle pipe and remove the throttle grip from the right handlebar.

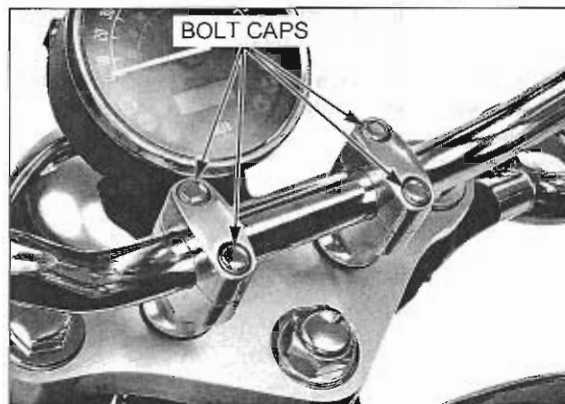
Remove the right handlebar switch/throttle housing from the handlebar.



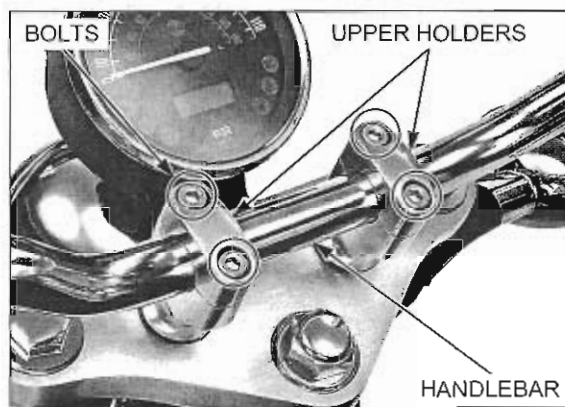
Loosen the handlebar lower holder nuts.



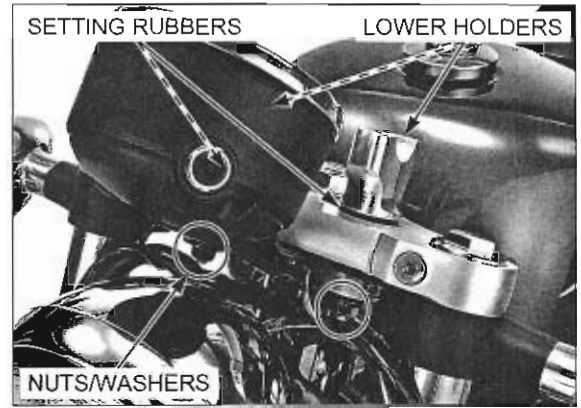
Remove the bolt caps.



Remove the bolts, handlebar upper holders and handlebar.



Remove the handlebar lower holder nuts, washers, setting rubbers and handlebar lower holders.

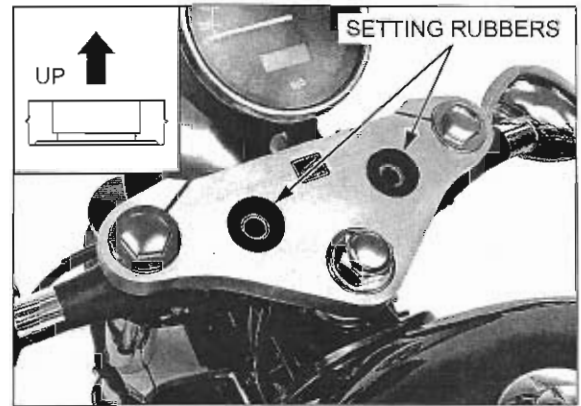


INSTALLATION

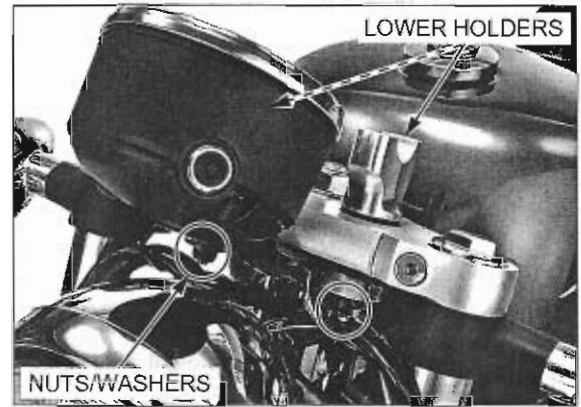
NOTE:

Route the cable, hose and wires properly (page 1-19).

Install the setting rubbers onto the top bridge with its small I.D. side facing up as shown.



Install the handlebar lower holders, washers and nuts onto the top bridge.

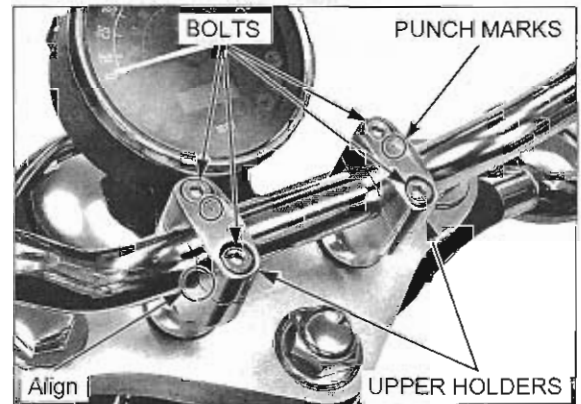


Place the handlebar on the lower holders aligning the punch mark on the handlebar with the top surface of the lower holders.

Install the upper holders with its punch mark facing forward.

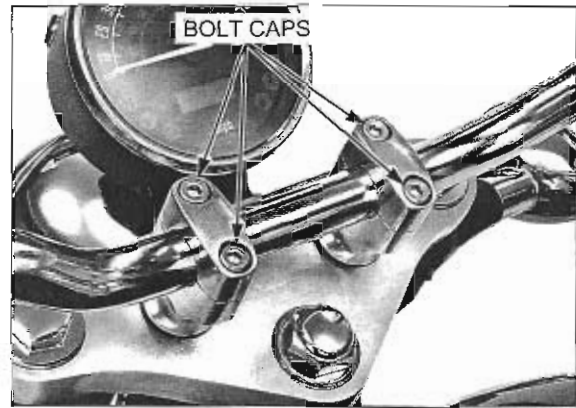
Tighten the front side bolts first, then the rear side bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



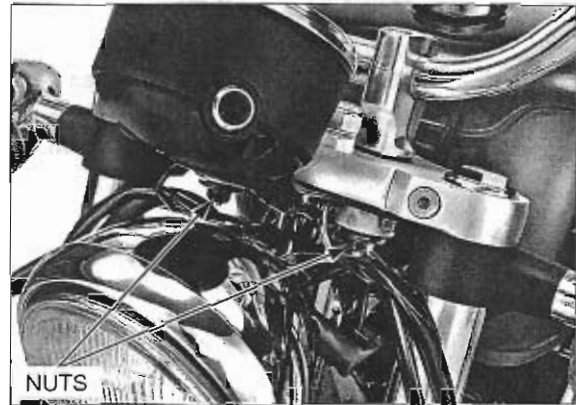
FRONT WHEEL/SUSPENSION/STEERING

Install the bolt caps.



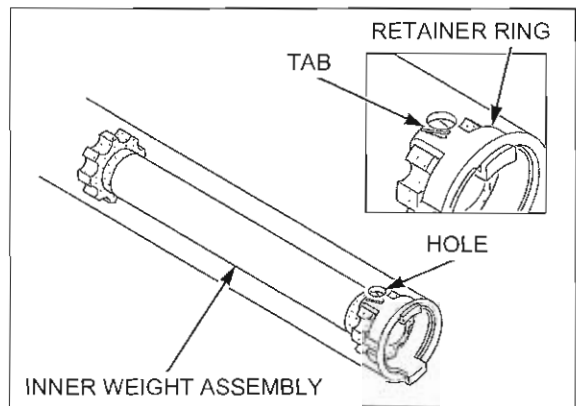
Tighten the handlebar lower holder nuts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

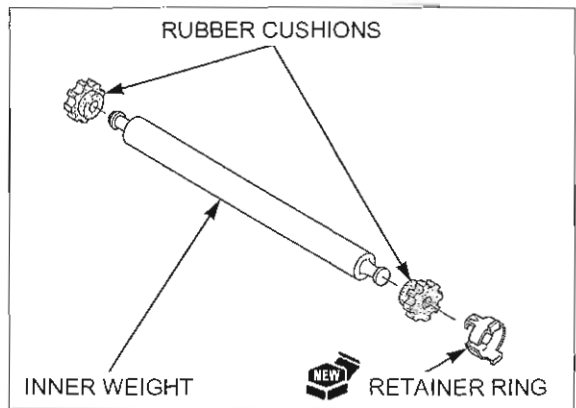


INNER WEIGHT REMOVAL/INSTALLATION

Remove the grip or throttle pipe from the handlebar. Straighten the weight retainer tabs by the screwdriver or punch.

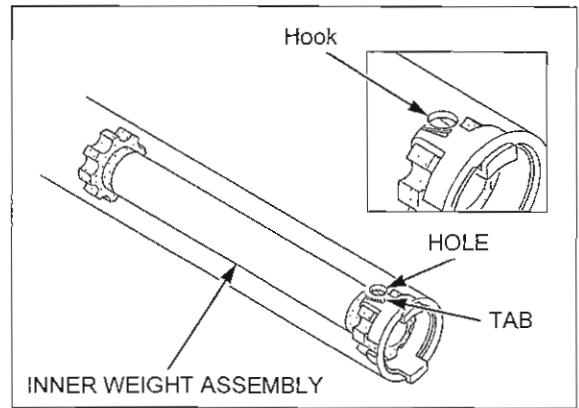


Remove the inner weight assembly from the handlebar. Discard the retainer ring. Check the rubber cushions for wear or damage. Install a new retainer ring onto the inner weight.

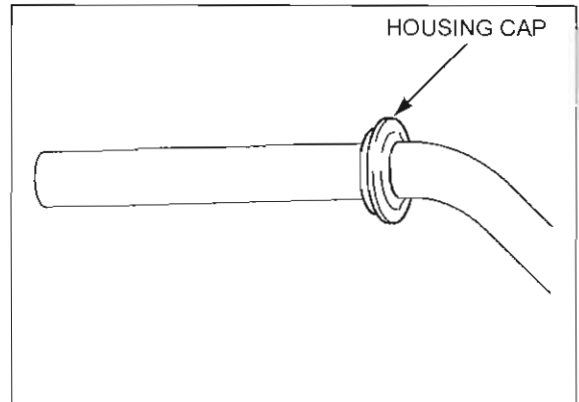


FRONT WHEEL/SUSPENSION/STEERING

Insert the inner weight assembly into the handlebar by hooking the retainer ring tabs with the holes in the handlebar.



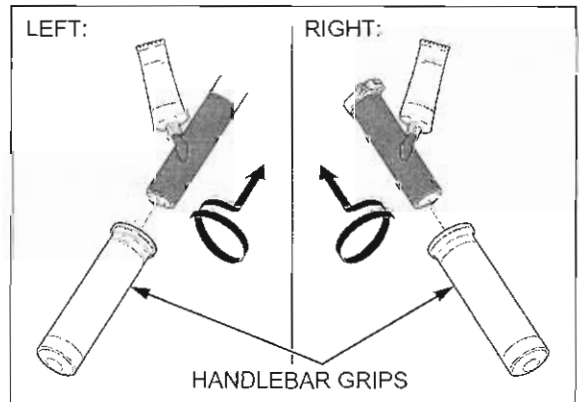
Install the housing cap onto the left side of the handlebar.



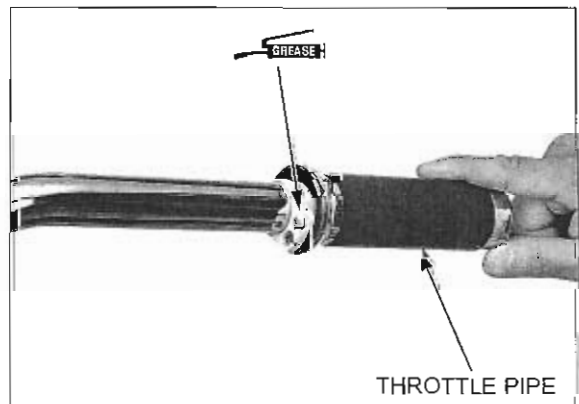
Clean the inside surface of the both handlebar grip and the outside surface of the handlebar and throttle pipe. Apply Honda Bond A or Honda Bond A or Pro Honda handgrip cement (U.S.A. only) to the inside surface of the handlebar grip and to the outside surface of the handlebar and throttle pipe. Wait 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.



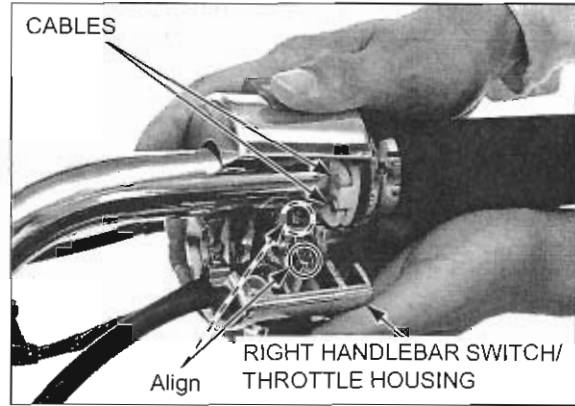
Apply grease 0.2 - 0.3 g to the throttle pipe flange groove and sliding surface.



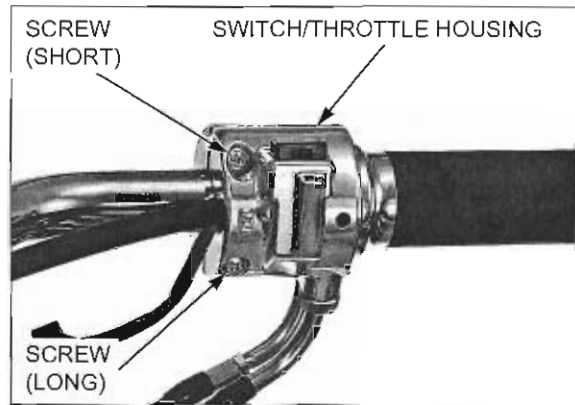
FRONT WHEEL/SUSPENSION/STEERING

Connect the throttle cables to the throttle pipe flange.

Install the right handlebar switch/throttle housing with the screws, aligning the locating pin with the hole in the handlebar.



Tighten the front long screw first, then tighten the rear short screw.

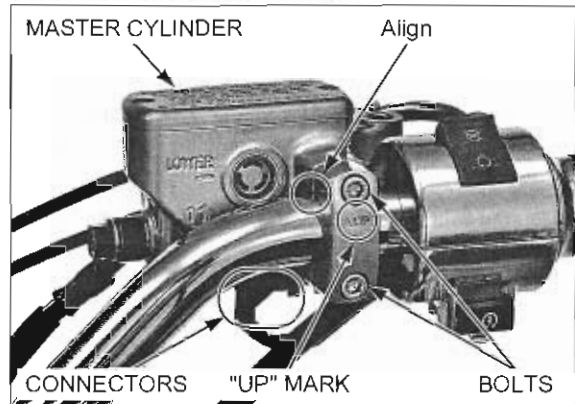


Install the holder with its "UP" mark facing up.

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.

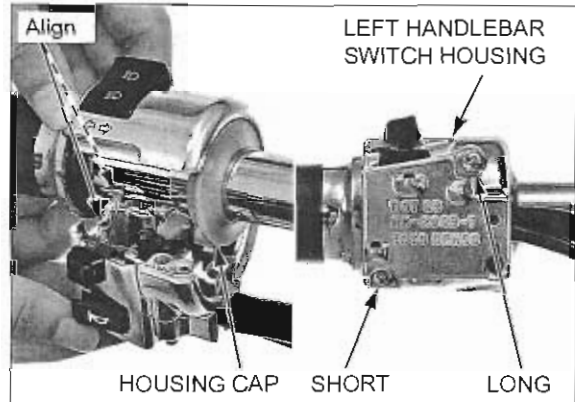
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the front brake light switch connectors.



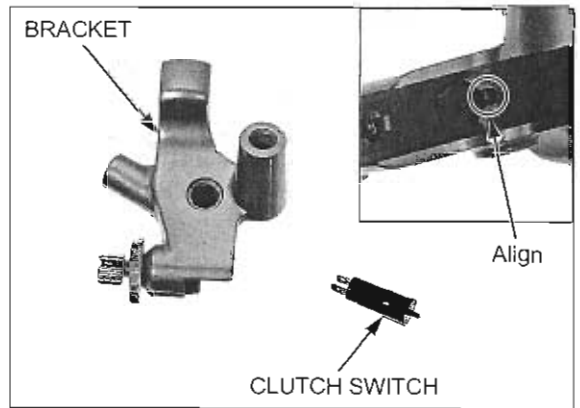
Set the housing cap flange into the housing groove.

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.



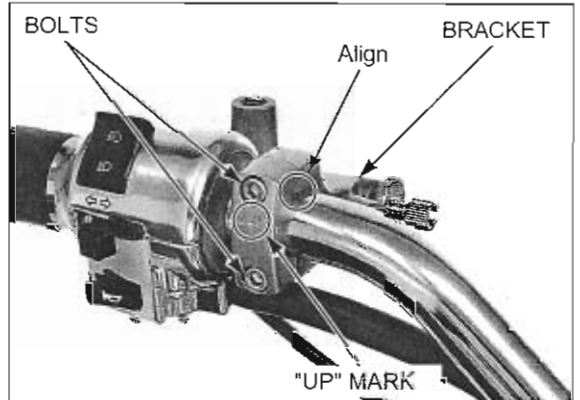
FRONT WHEEL/SUSPENSION/STEERING

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 securely.



Connect the clutch switch connectors.
Connect the clutch cable on the clutch lever.

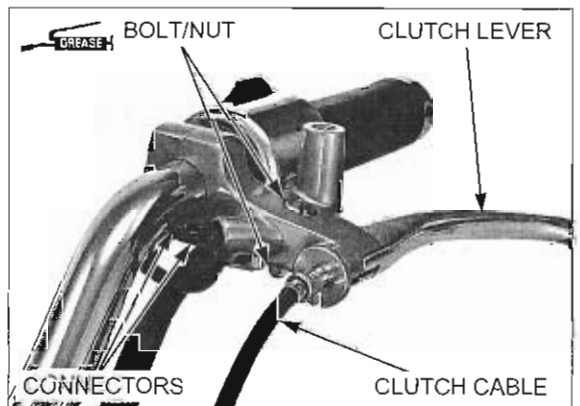
Apply grease to the clutch lever pivot bolt sliding surface.

Install the clutch lever onto the bracket and tighten the clutch lever pivot bolt to the specified torque.

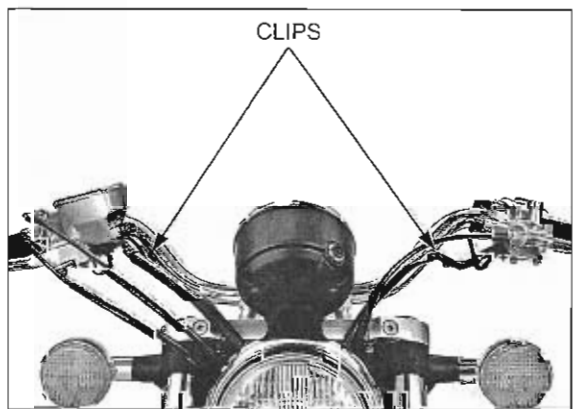
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Tighten the nut to the specified torque while holding the pivot bolt.

TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)



Install the handlebar switch wire clips to the handlebar.



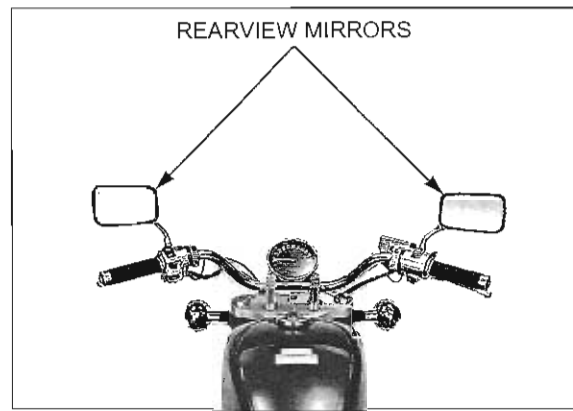
FRONT WHEEL/SUSPENSION/STEERING

Install the rearview mirrors.

Adjust the clutch lever freeplay (page 3-25).

Check the following:

- Throttle operation (page 3-5)
- Clutch system (page 10-6)
- Front brake light switch (page 3-24)

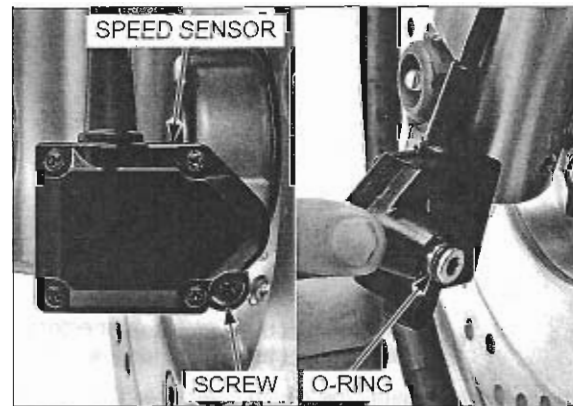


FRONT WHEEL

REMOVAL

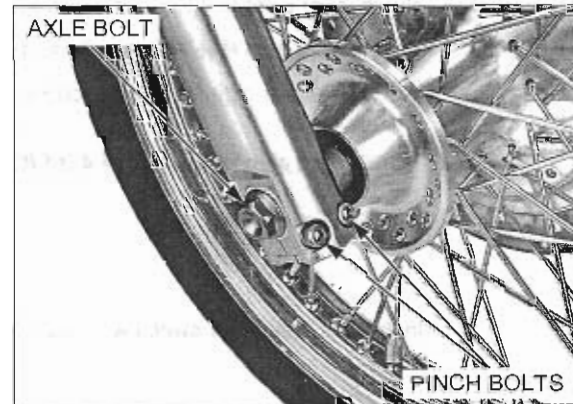
Remove the screw and speed sensor.

Remove the O-ring from the speed sensor.



Loosen the right axle pinch bolts.

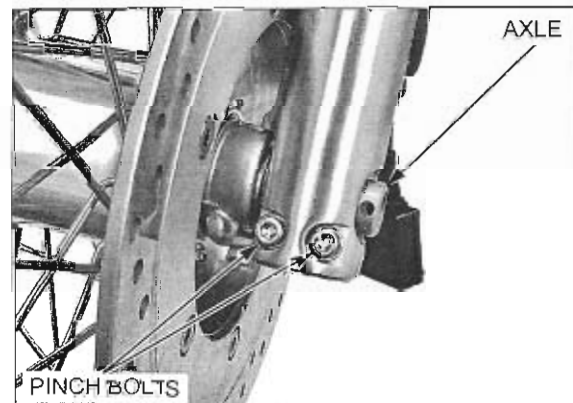
Remove the axle bolt.



Loosen the left axle pinch bolts.

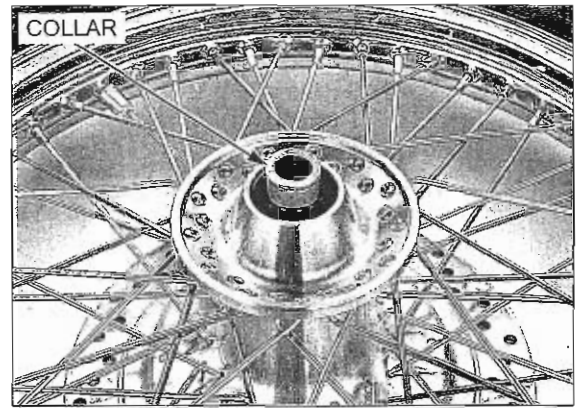
Support the motorcycle securely and raise the front wheel off the ground.

Remove the axle and front wheel.

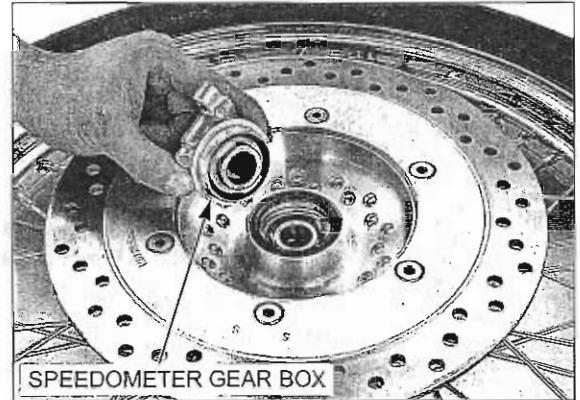


Do not operate the brake lever after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Remove the side collar from the right side of the wheel.



Remove the speedometer gear box from the left side of the wheel.

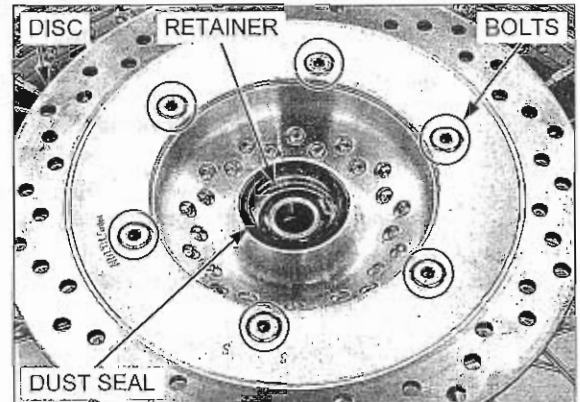


DISASSEMBLY

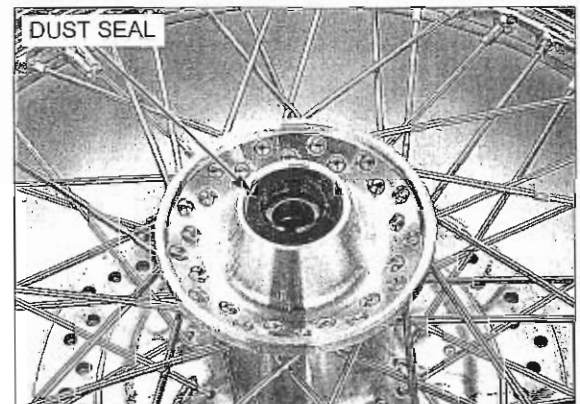
Remove the dust seal and retainer from the left side of the hub.

Do not reuse the bolts.

Loosen the brake disc bolts in a crisscross pattern in several steps and remove the bolts and brake disc.



Remove the dust seal from the right side of the hub.

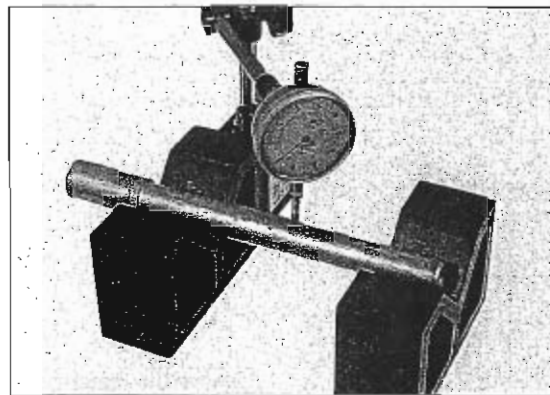


INSPECTION

AXLE

Set the 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 (0.01 in)



WHEEL RIM

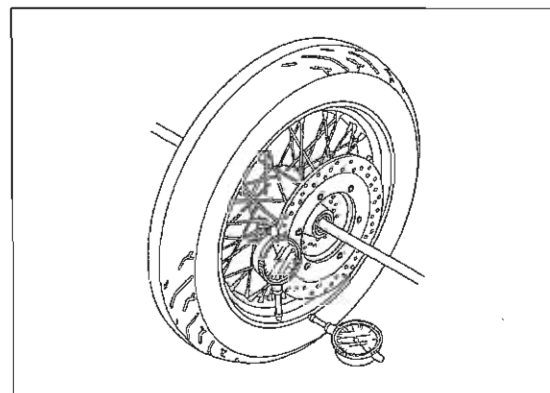
Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.

NEW

SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)



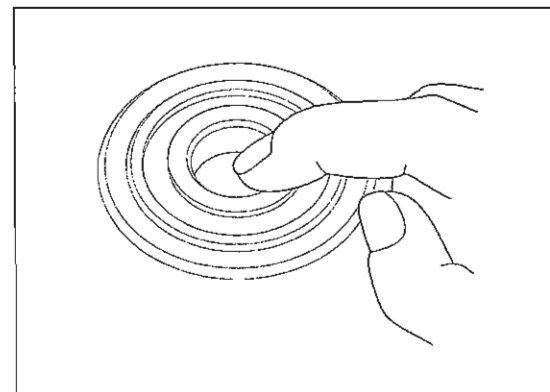
WHEEL BEARING

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.

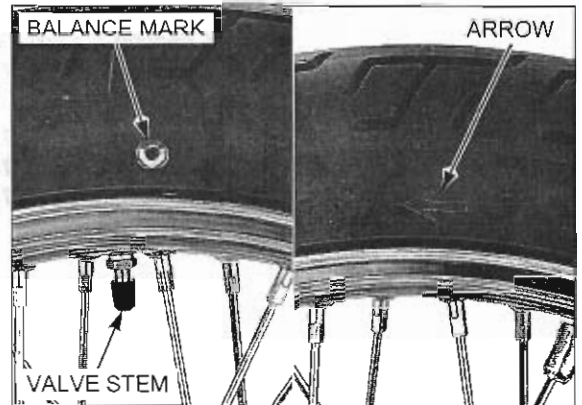
Replace the wheel bearing, if necessary (page 13-17).



WHEEL BALANCE

NOTE:

- Carefully check balance before installing the wheel.
- Mount the tire with the arrow mark facing in the direction of rotation.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (light mass point: a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

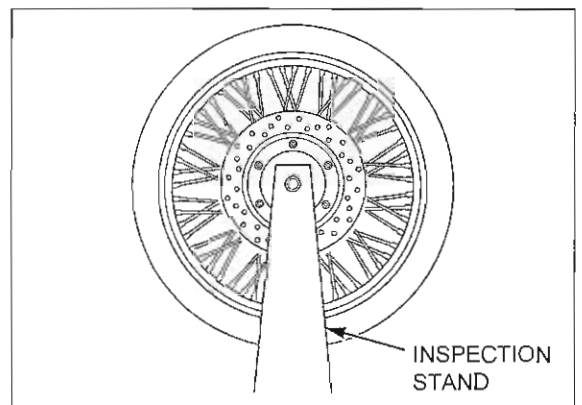


Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this 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 to the front wheel.

NOTE:

Never reuse the balance weight if once removed from the spoke.



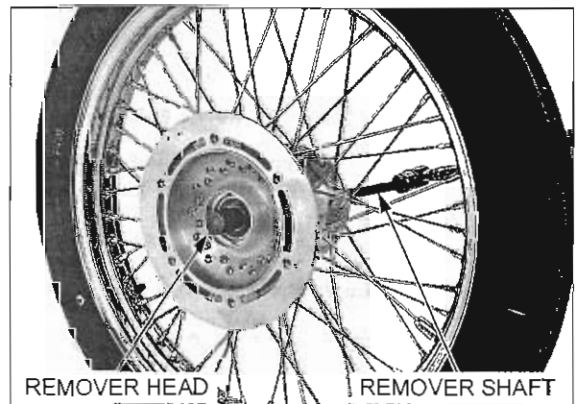
WHEEL BEARING REPLACEMENT

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 07GGD-0010100
- Bearing remover head, 20 mm 07746-0050600



FRONT WHEEL/SUSPENSION/STEERING

Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new right bearing squarely with the marked side facing up until it is seated on the collar.

TOOLS:

Driver

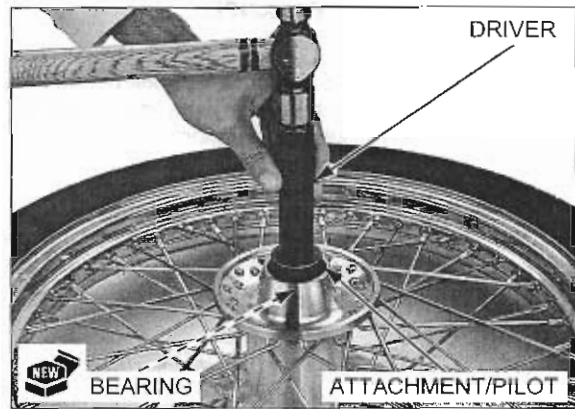
07749-0010000

Attachment, 42 x 47 mm

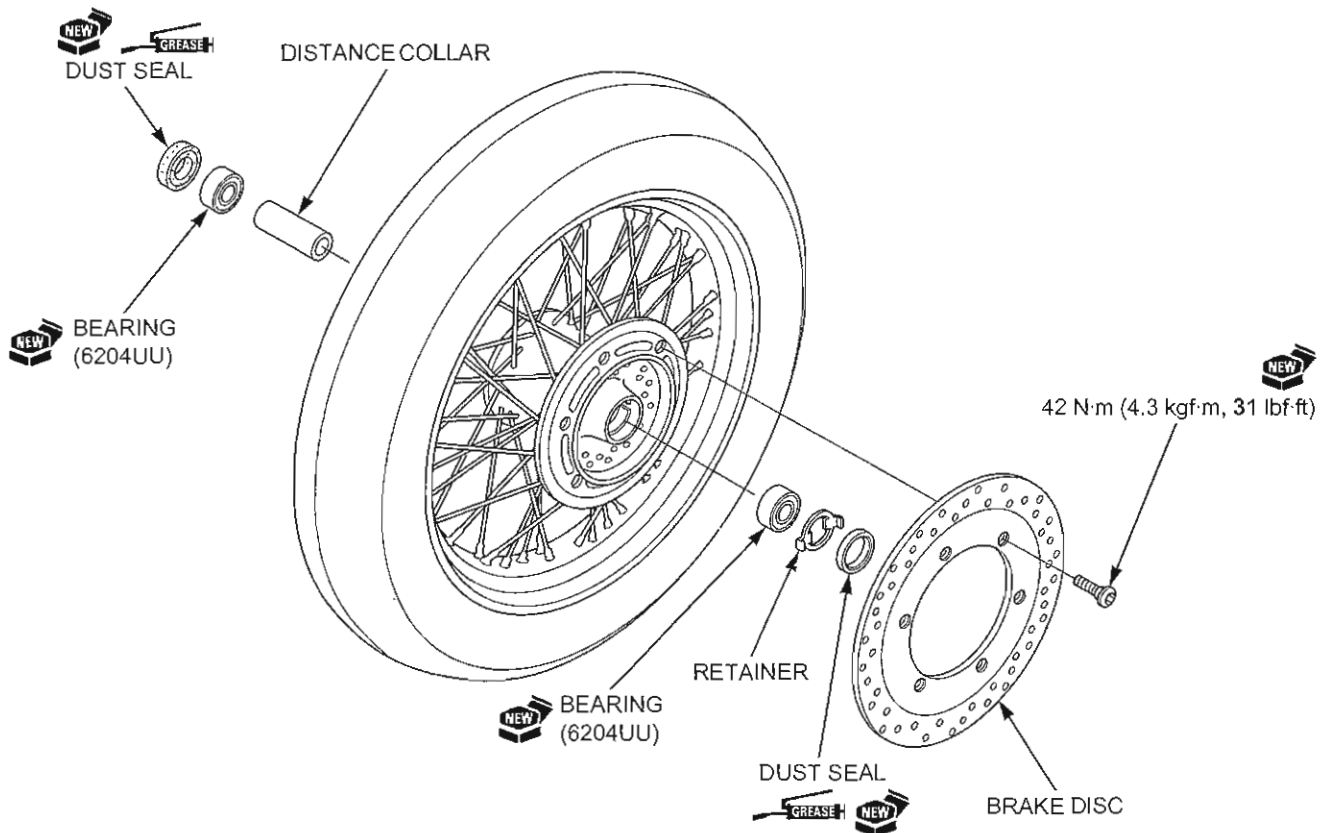
07746-0010300

Pilot, 20 mm

07746-0040500



ASSEMBLY



WHEEL CENTER ADJUSTMENT

Measure the distance B (rim width) and calculate distance A as follows:

$$A = 79 \text{ mm (3.11 in)} - B/2$$

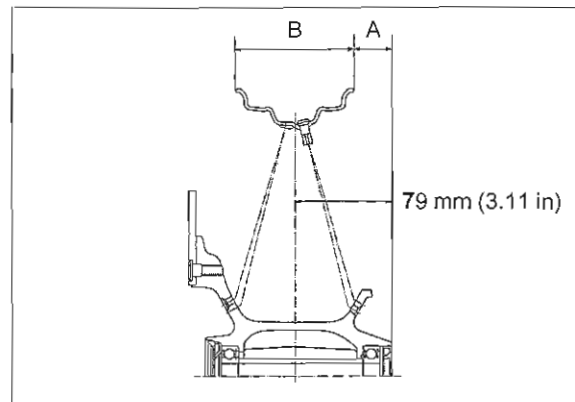
Adjust the rim position and distance A by tightening the spokes to the specified torque in several progressive steps.

TOOL:

Spoke wrench, 6.1 mm

07JMA-MR60100

TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)

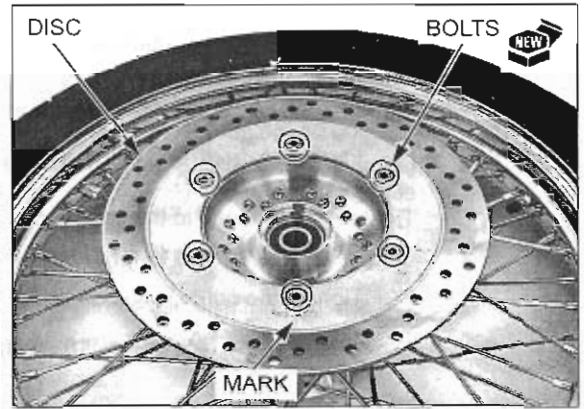


Install the brake disc with the marked side facing out.

Do not get grease on the brake disc or stopping power will be reduced.

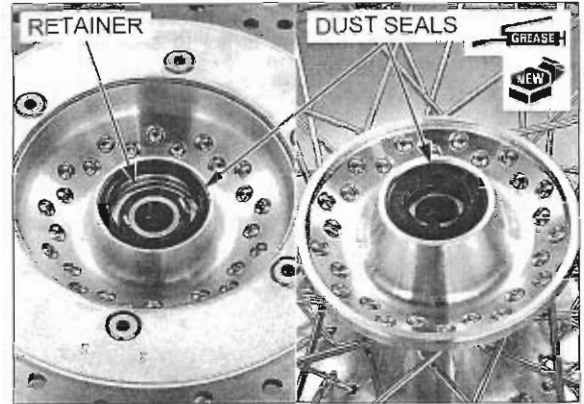
Install new bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Install the speedometer gear retainer into the left wheel hub, aligning the tangs with the slots in the hub.

Apply grease to new dust seal lips and install the dust seals until they are flush with the wheel hub.

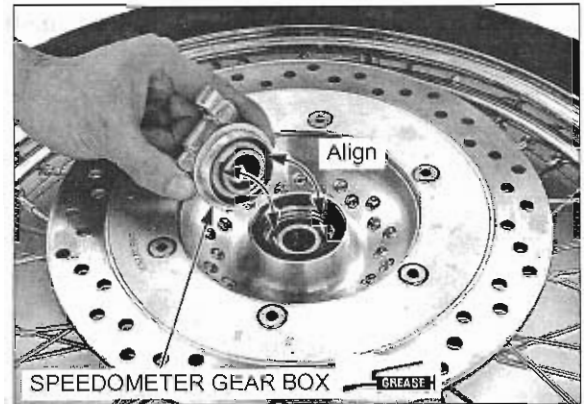


INSTALLATION

Apply grease to the inside of the speedometer gear box, and install the gear box into the left wheel hub.

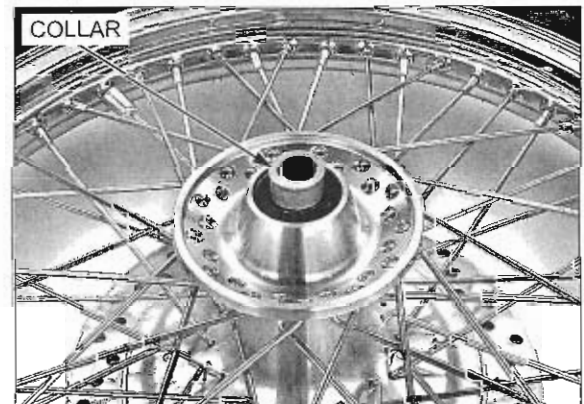
NOTE:

Install the gear box while aligning its grooves with the retainer tabs.



It flange side facing out.

Install the side collar into the right side of the wheel.



FRONT WHEEL/SUSPENSION/STEERING

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.

Align the groove in the speedometer gear box with the lug on the left fork leg.

Insert the front axle from the left side until it is fully seated.

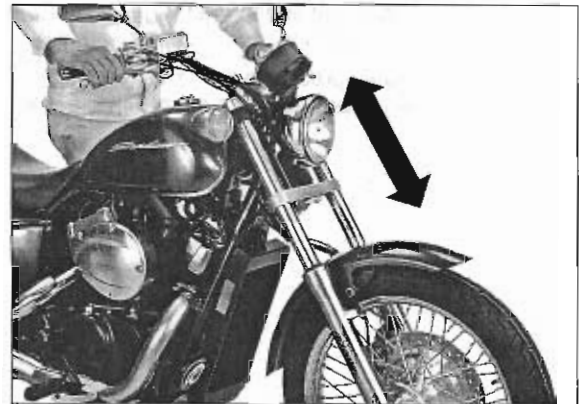
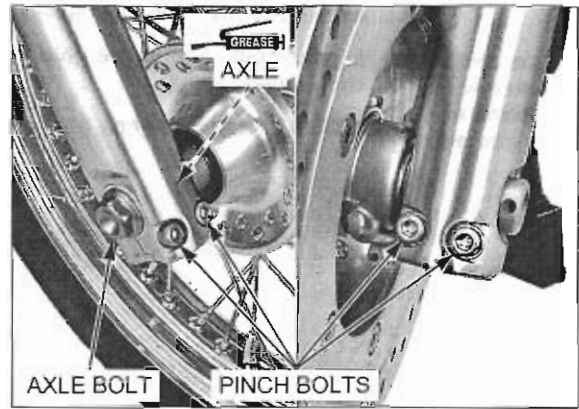
Tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)

Tighten the right axle pinch bolts to the specified torque.

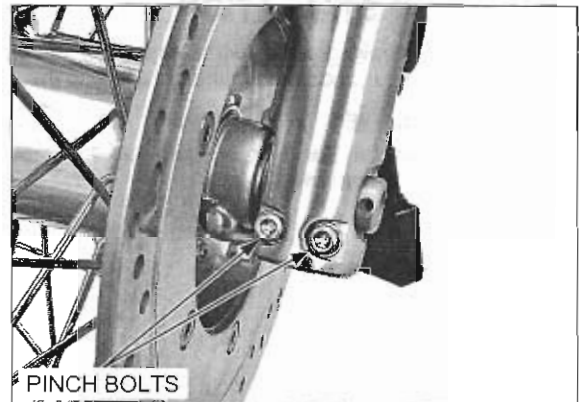
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.



Tighten the left axle pinch bolts to the specified torque.

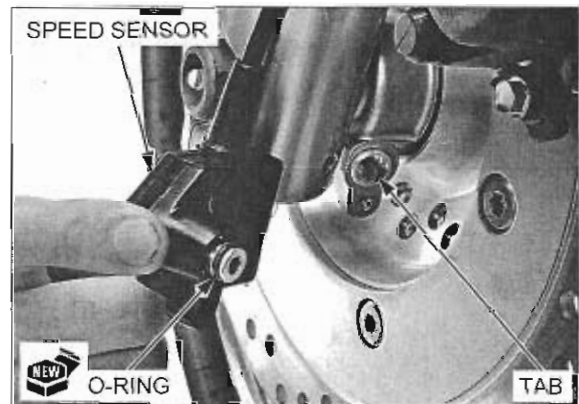
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install a new O-ring onto the speed sensor shaft groove.

Install the speed sensor by aligning the slot with the tab of the gear box.

Install and tighten the screw securely.



FORK

REMOVAL

Remove the following:

- Front wheel (page 13-14)
- Front fender (page 2-5)

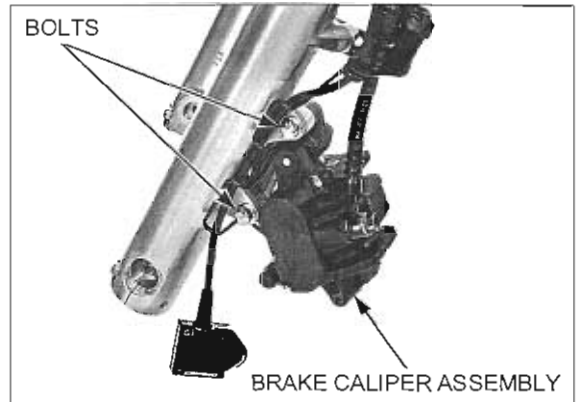
Do not reuse caliper mounting bolts.

Remove the bolts and brake caliper assembly.

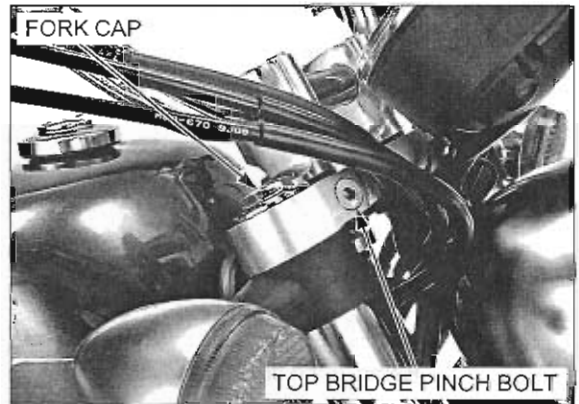
NOTE:

Support the brake caliper so it does not hang from the brake hose.

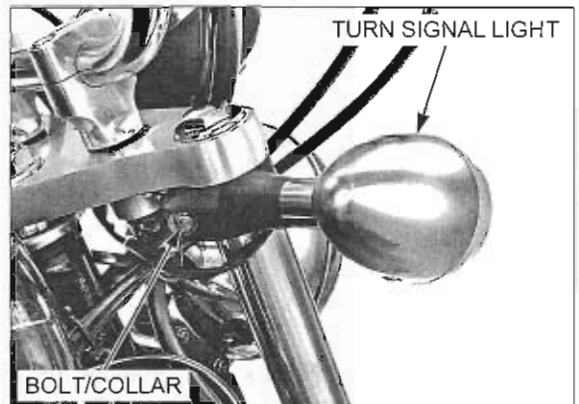
Remove the speed sensor wire guide (page 15-13).



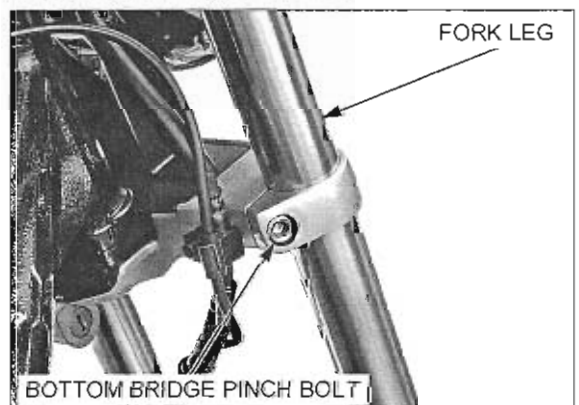
Loosen the top bridge pinch bolt. When the fork will be disassembled. Loosen the fork cap but do not remove yet.



Remove the bolt, collar and turn signal light.



Loosen the bottom bridge pinch bolt, then remove the fork leg.



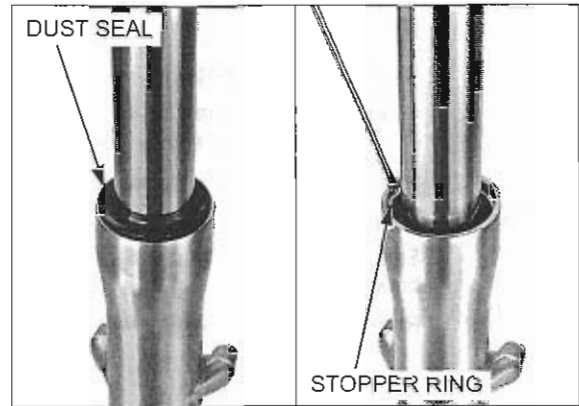
FRONT WHEEL/SUSPENSION/STEERING

DISASSEMBLY

Remove the dust seal.

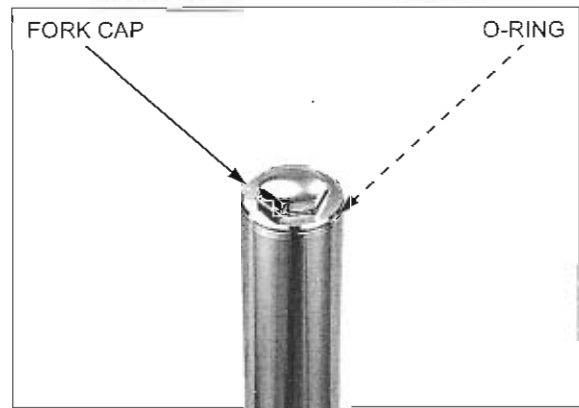
Do not scratch the fork tube sliding surface.

Remove the oil seal stopper ring.

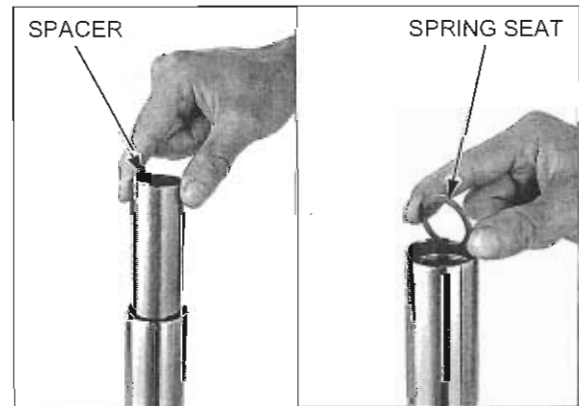


The fork cap is under spring pressure; use care when loosening it.

Remove the fork cap and O-ring.

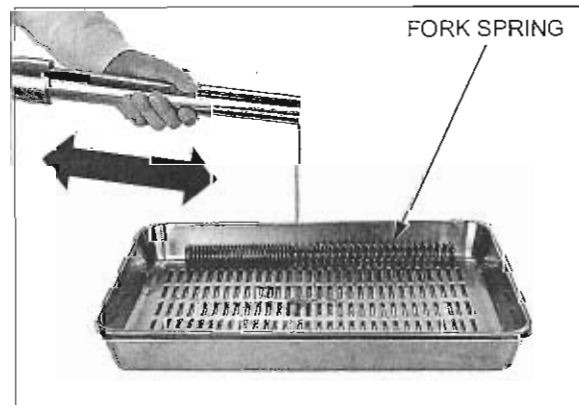


Remove the spacer and spring seat.



Remove the fork spring from the fork tube.

Pour out the fork fluid by pumping the fork tube several times.



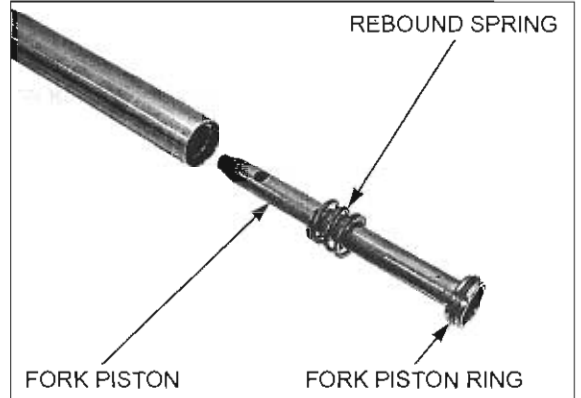
FRONT WHEEL/SUSPENSION/STEERING

Do not over-tighten the vise on the fork slider. Hold the fork slider in a vise with soft jaws.

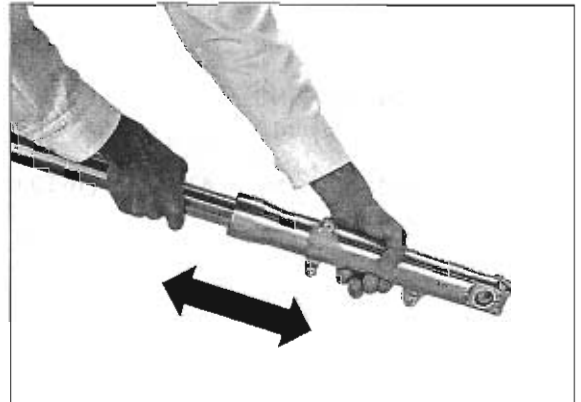
If the fork piston turns with the fork socket bolt, temporarily install the fork spring, spring seat, spacer and fork cap. Remove the fork socket bolt and sealing washer.



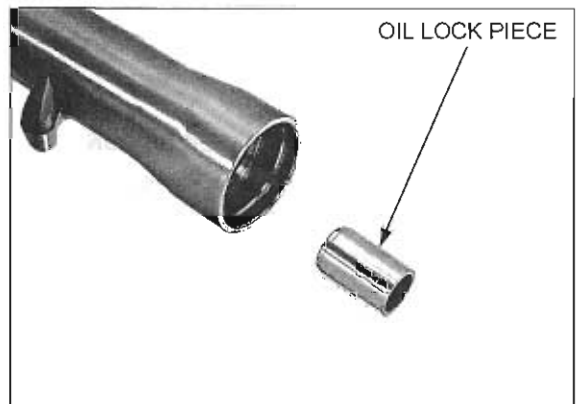
Do not remove the fork piston ring, unless it is necessary to replace with a new one. Remove the fork piston and rebound spring.



Using quick successive motions, pull the fork tube out of the fork slider.



Remove the oil lock piece from the fork slider.



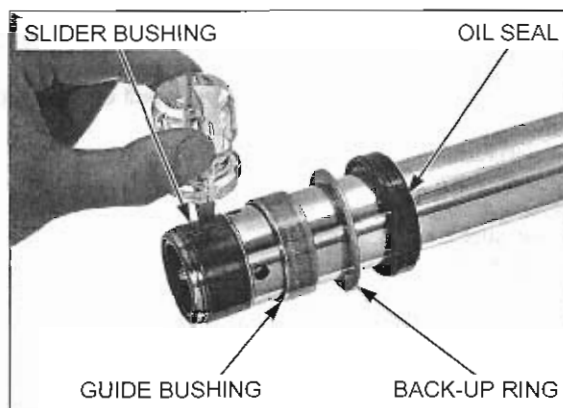
FRONT WHEEL/SUSPENSION/STEERING

Do not damage the slider bushing, especially the sliding surface. To prevent loss of tension, do not open the bushing more than necessary.

Carefully remove the slider bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.

Remove the following:

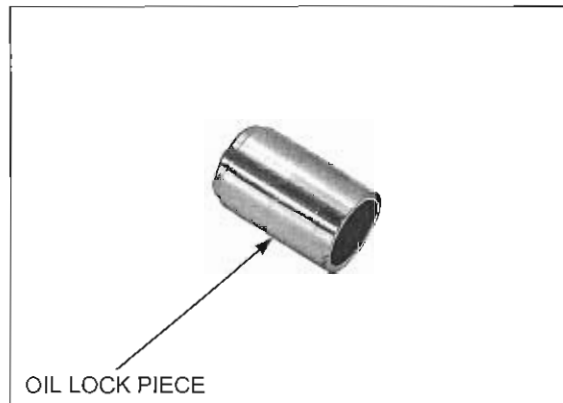
- Guide bushing
- Back-up ring
- Oil seal



INSPECTION

OIL LOCK PIECE

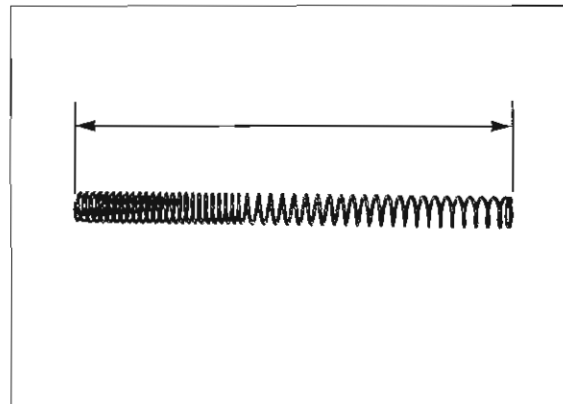
Check the oil lock piece for wear or damage.



FORK SPRING

Measure the fork spring free length.

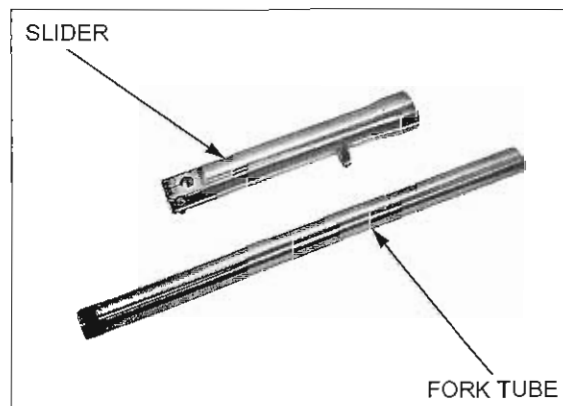
SERVICE LIMITS: 431.6 mm (16.99 in)



FORK TUBE/SLIDER/PISTON

Check the fork tube and fork slider for score marks, and excessive or abnormal wear.

Replace any damaged component if necessary.

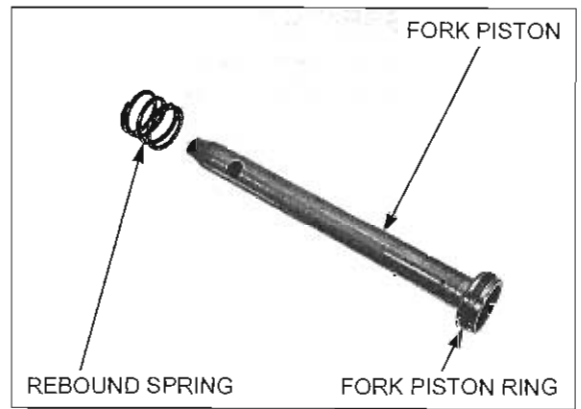


FRONT WHEEL/SUSPENSION/STEERING

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.

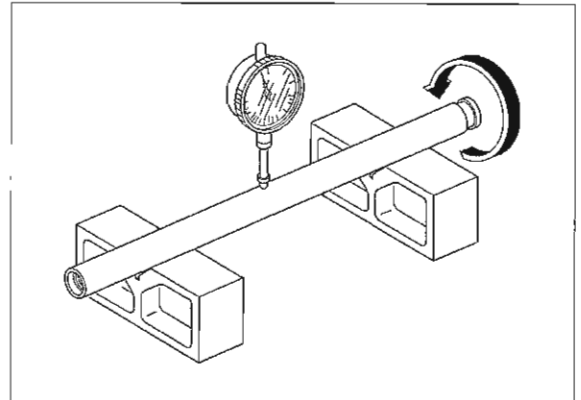
Replace any damaged component if necessary.



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.

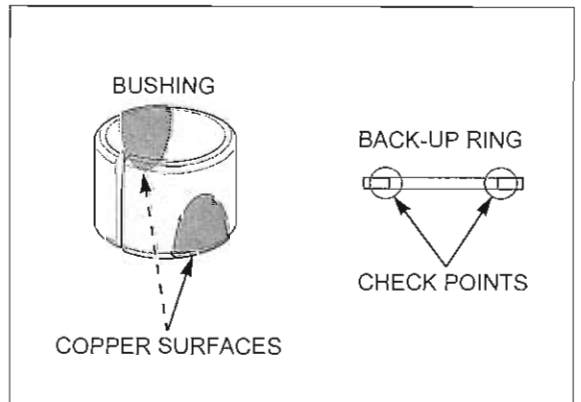
SERVICE LIMIT: 0.2 mm (0.01 in)



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.

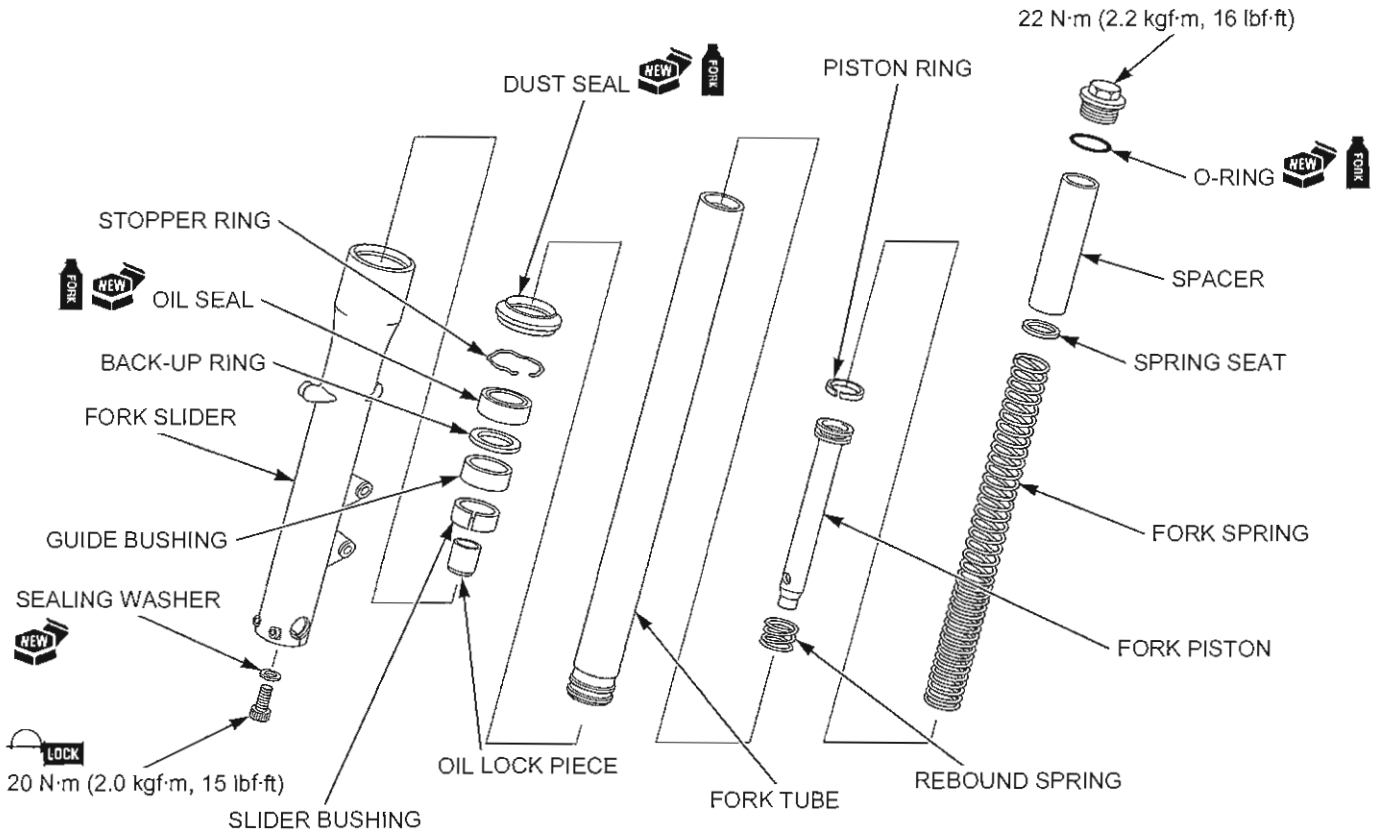
Check the back-up ring; replace it if there is any distortion at the points shown.



FRONT WHEEL/SUSPENSION/STEERING

ASSEMBLY

Before assembly, wash all parts with a high flash point and non-flammable solvent and wipe them off completely.



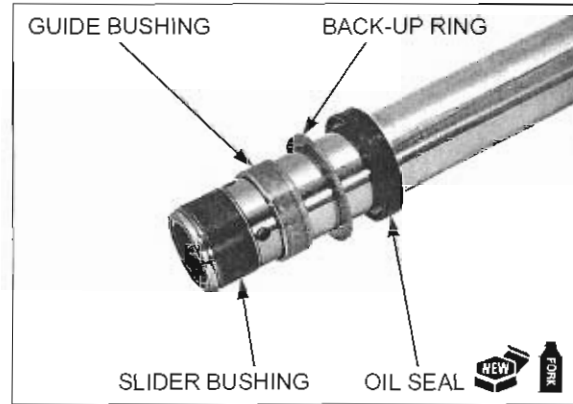
Do not open the bushing slit more than necessary.

Install the slider 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.

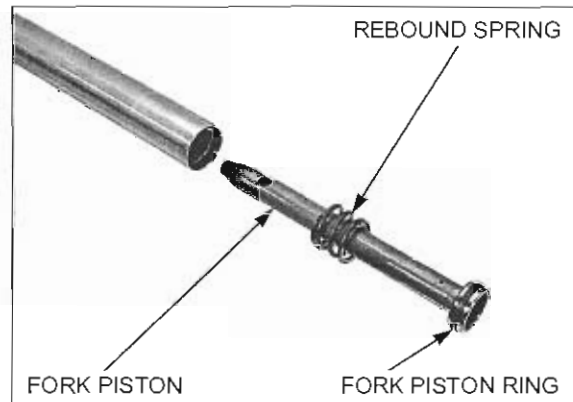
Install the oil seal with its marked side facing up.

Apply fork fluid to the new oil seal lips. Install the guide bushing, back-up ring and new oil seal onto the fork tube.



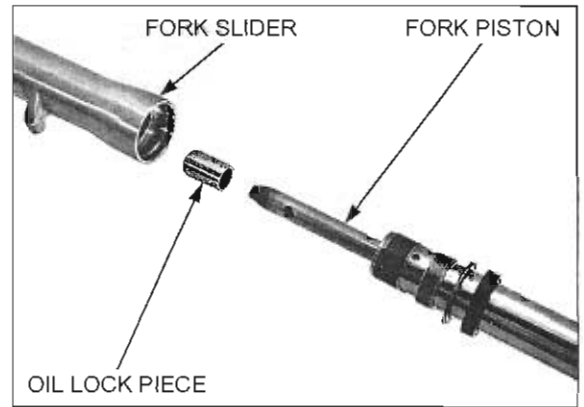
Install the rebound spring to the fork piston, then install them into the fork tube.

If the piston ring is removed, install a new piston ring into the fork piston groove.



FRONT WHEEL/SUSPENSION/STEERING

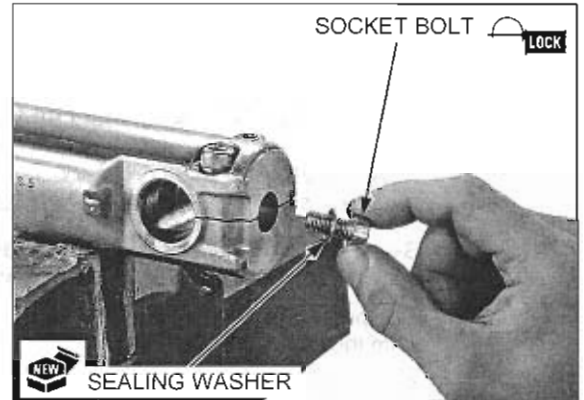
Install the oil lock piece to the fork piston end.
Install the fork tube assembly into the fork slider.



Do not over-tighten the vise on the fork slider.

Hold the fork slider in a vise with soft jaws.

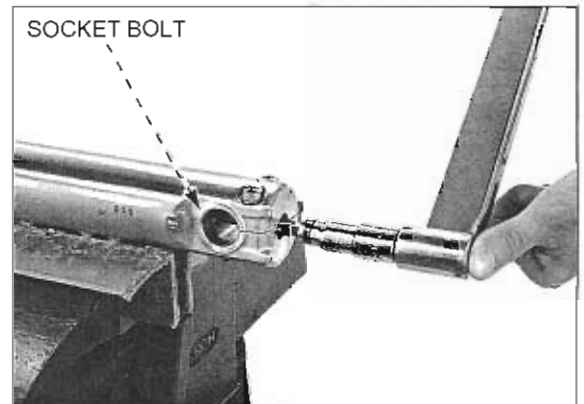
Apply locking agent to the fork socket bolt threads.
Install the socket bolt with a new sealing washer.



If the fork piston turns with the fork socket bolt, temporarily install the fork spring, spring seat, spacer and fork cap.

Tighten the fork socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)



Drive the oil seal until the stopper ring groove is visible using the special tools.

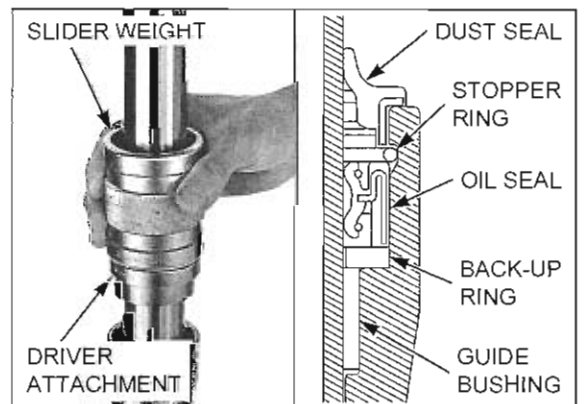
TOOLS:

Slider weight

07947-KA50100

Driver attachment

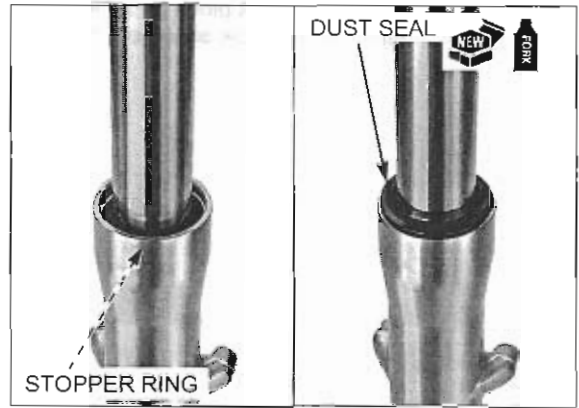
07947-KF00100



FRONT WHEEL/SUSPENSION/STEERING

Install the stopper ring into the groove of the fork slider, being careful not to scratch the fork tube sliding surface.

Coat a new dust seal lips with fork fluid and install it.



Pour the specified amount of the recommended fork fluid into the fork tube.

RECOMMENDED FORK FLUID:

Pro Honda Suspension Fluid SS-8 (10W)

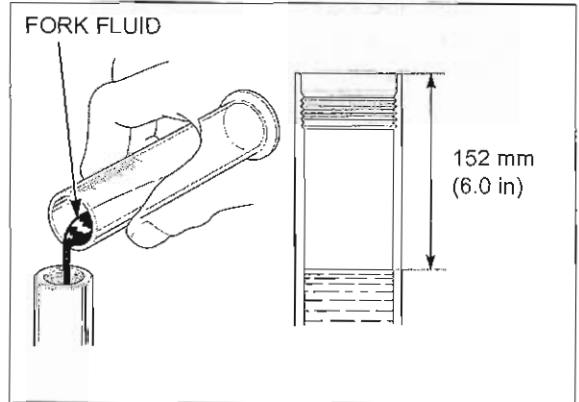
FORK FLUID CAPACITY:

$468 \pm 2.5 \text{ cm}^3$ (15.8 \pm 0.08 US oz, 16.5 \pm 0.09 Imp oz)

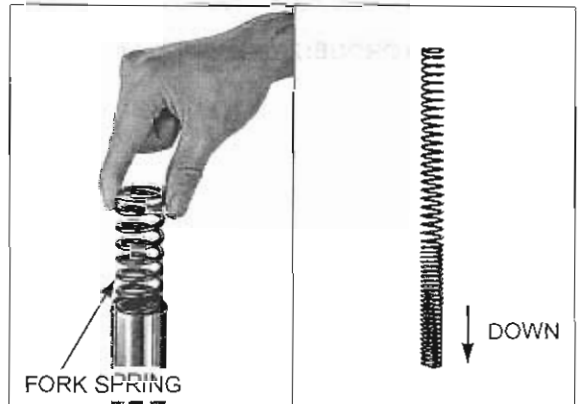
Slowly pump the fork tube several times to remove any trapped air from the lower portion of the fork tube.

Compress the fork tube fully. Measure the fluid level from the top of the fork tube.

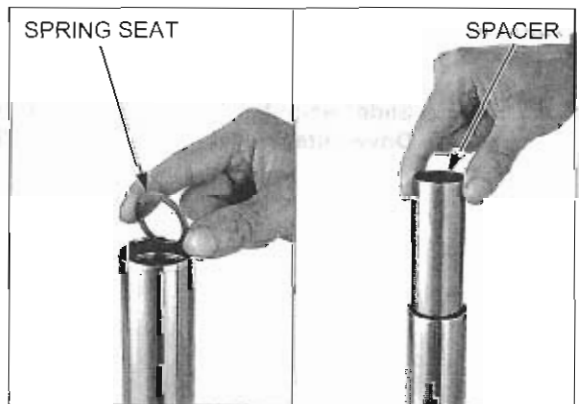
FORK FLUID LEVEL: 152 mm (6.0 in)



Pull the fork tube up and install the fork spring with the tightly wound coil side facing down.



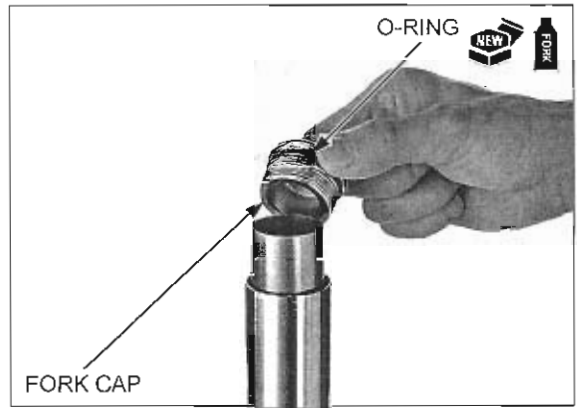
Install the spring seat and spacer.



Coat a new O-ring with fork fluid and install it into the fork cap groove.

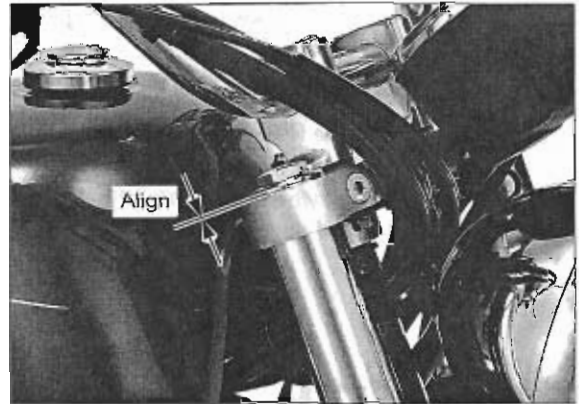
Be careful not to cross-thread the fork cap. Tighten the fork cap after installing the fork leg into the steering stem and top bridge.

Hold the fork cap securely and install it into the fork tube.



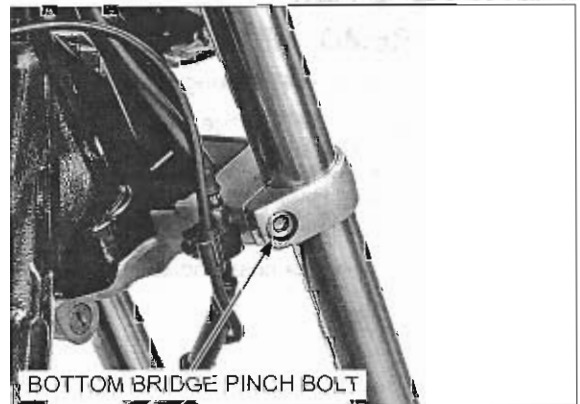
INSTALLATION

Install the fork leg into the steering stem and top bridge. Align the fork tube top end surface with the top bridge as shown.

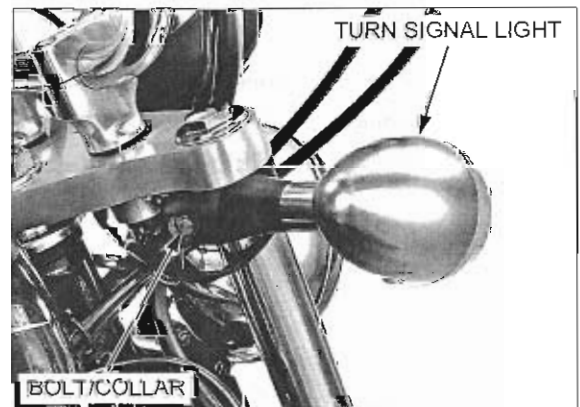


Tighten the bottom bridge pinch bolts to the specified torque.

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



Install the turn signal light, collar and bolt. Tighten the bolt securely.



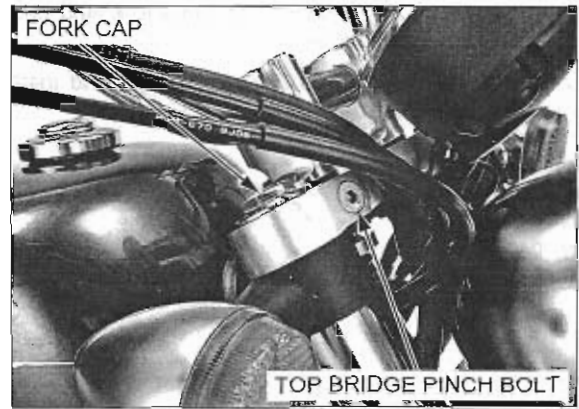
FRONT WHEEL/SUSPENSION/STEERING

Tighten the fork cap to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the top bridge pinch bolt to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



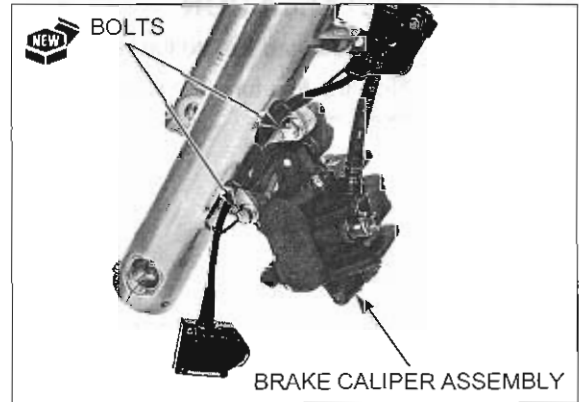
Install the speed sensor wire guide (page 15-17).

Install the brake caliper and tighten new bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the following:

- Front fender (page 2-5)
- Front wheel (page 13-19)



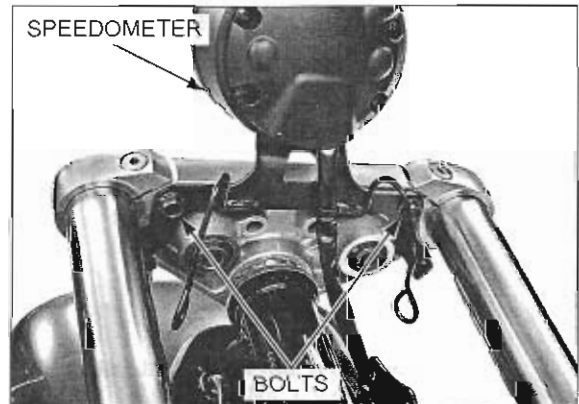
STEERING STEM

REMOVAL

Remove the following:

- Handlebar (page 13-6)
- Front wheel (page 13-14)
- Front fender (page 2-5)
- Headlight case (page 19-4)
- Turn signal light (page 19-5)

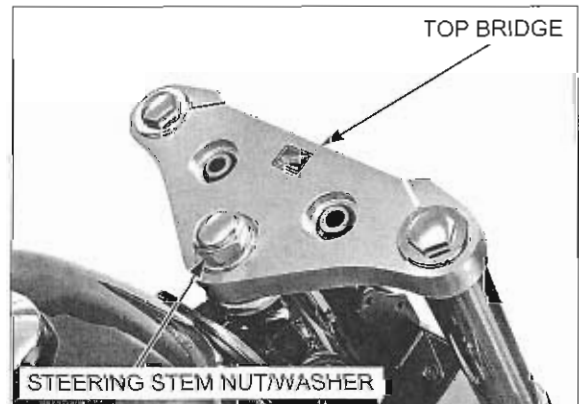
Remove the bolts and speedometer.



Remove the steering stem nut and washer.

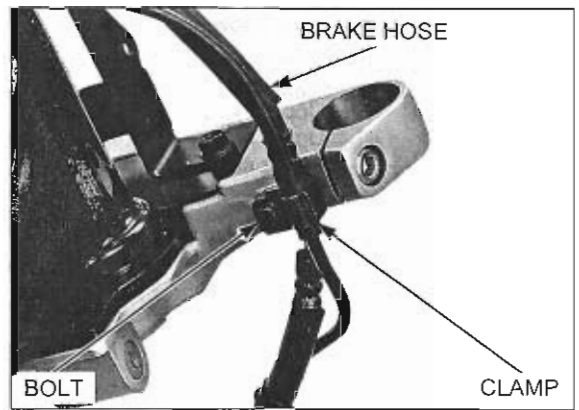
Remove the fork legs (page 13-21).

Remove the fork top bridge.

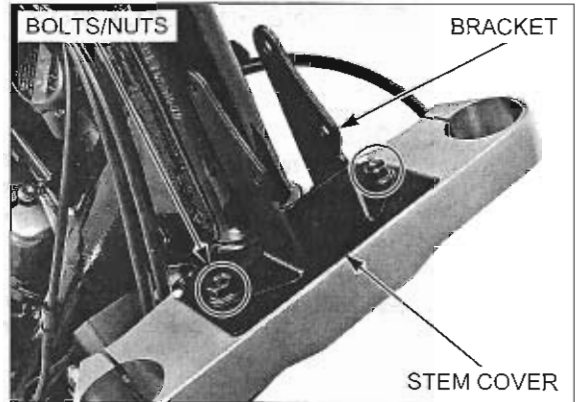


FRONT WHEEL/SUSPENSION/STEERING

Do not reuse the brake hose mounting bolt. Remove the bolt, clamp and release the speed sensor wire and brake hose.

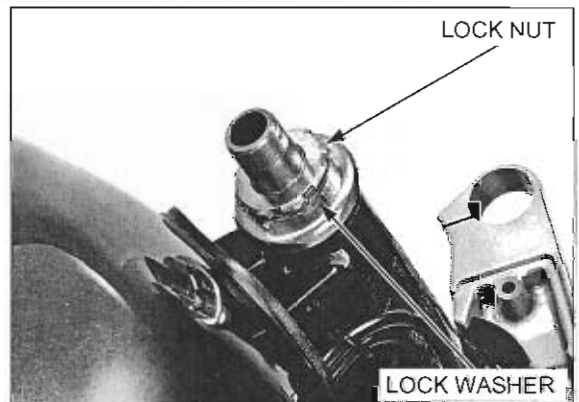


Remove the bolts, nuts, headlight case bracket and steering stem cover.



Straighten the lock washer tabs.

Remove the steering top thread lock nut and lock washer.

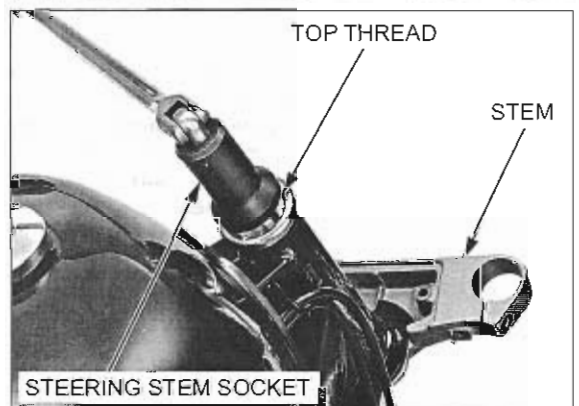


Loosen the steering top thread using the special tool.

TOOL:

Steering stem socket 07916-3710101 or 07916-3710100

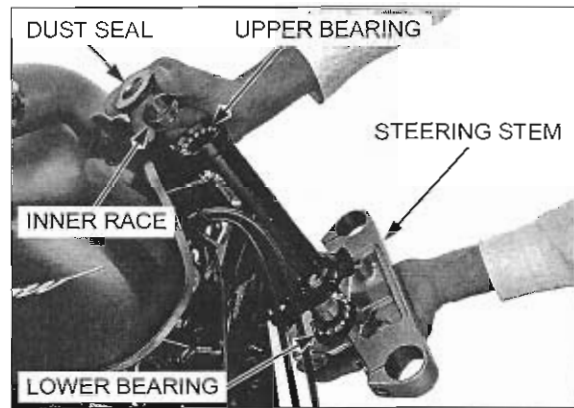
While holding the steering stem, remove the steering top thread.



FRONT WHEEL/SUSPENSION/STEERING

Remove the following:

- Steering stem
- Dust seal
- Upper inner race
- Upper steering head bearing
- Lower steering head bearing



BEARING REPLACEMENT

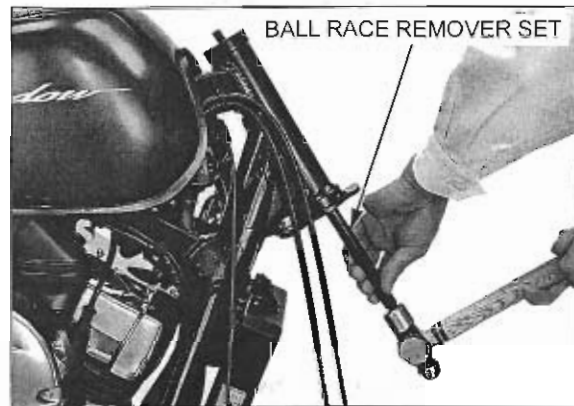
Remove the upper bearing outer race using the special tools.

TOOLS:

- | | |
|-----------------------|---------------|
| Ball race remover set | 07953-MJ10000 |
| - Remover attachment | 07953-MJ10100 |
| - Driver shaft | 07953-MJ10200 |

TOOLS, U.S.A. only:

- | | |
|-----------------------|---|
| Ball race remover set | 07953-MJ1000B or
07953-MJ1000A
and a long drift |
|-----------------------|---|



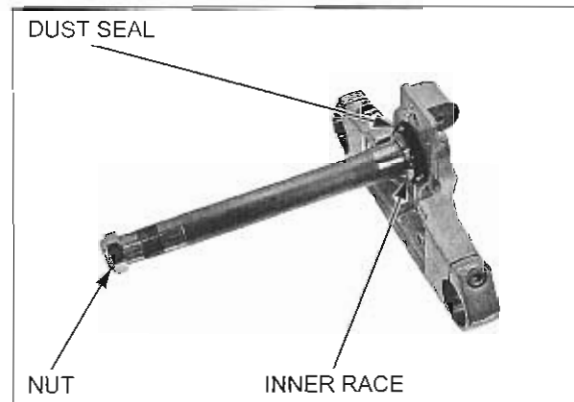
Remove the lower bearing outer race using the special tool and suitable shaft.

TOOL:

- | | |
|-----------------|---------------|
| Bearing remover | 07946-3710500 |
|-----------------|---------------|



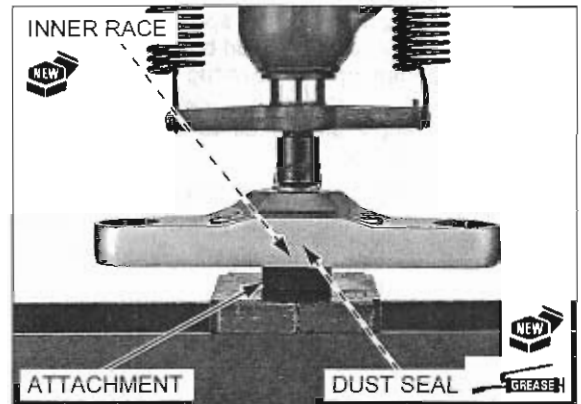
Install the steering stem nut onto the steering stem to prevent the threads from being damaged when removing the lower bearing inner race. Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem. Remove the dust seal.



FRONT WHEEL/SUSPENSION/STEERING

Apply specified grease (page 1-17) 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

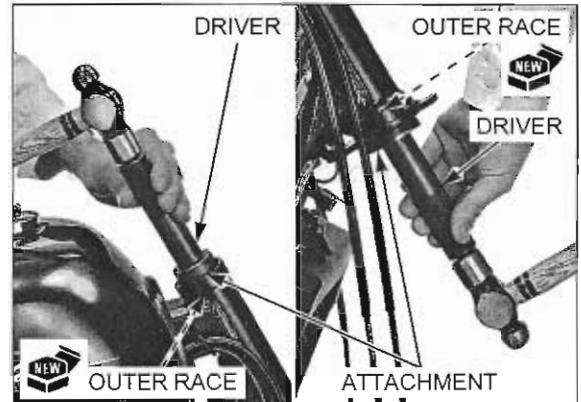


Drive in a new upper bearing outer race into the steering head pipe using the special tools.

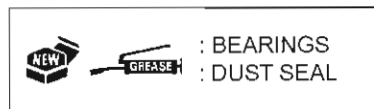
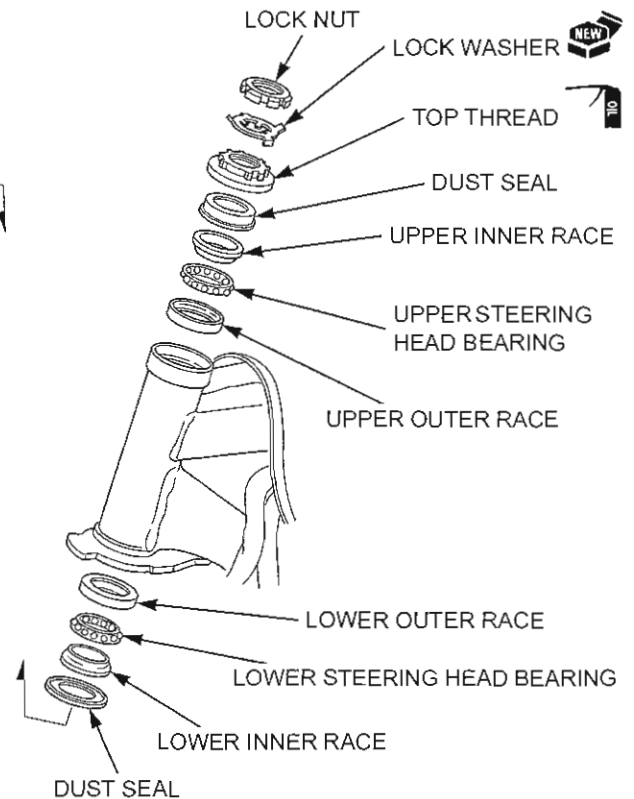
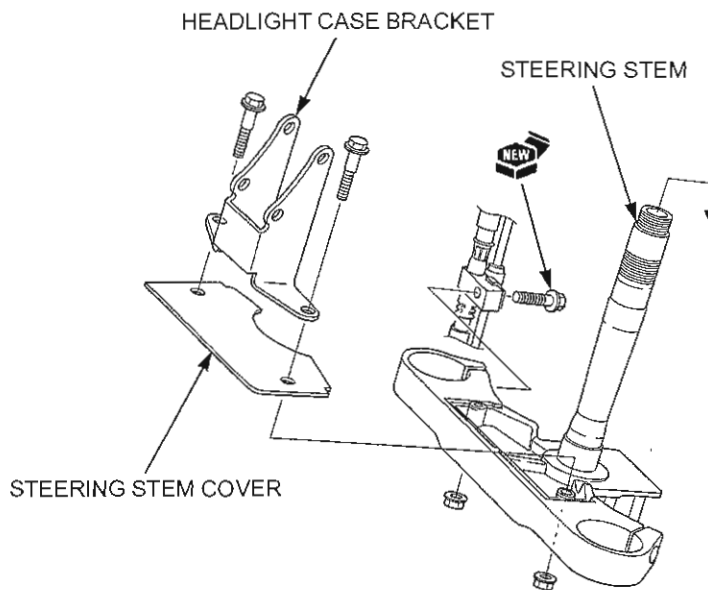
TOOLS:
Driver 07749-0010000
Attachment, 42 x 47 mm 07746-0010300

Drive in a new lower bearing outer race into steering head pipe using the special tools.

TOOLS:
Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400



INSTALLATION

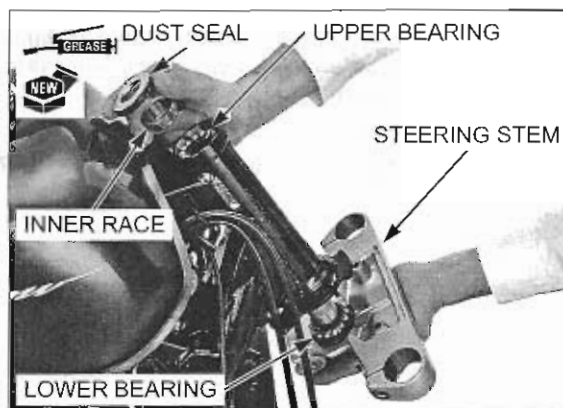


FRONT WHEEL/SUSPENSION/STEERING

Apply 3 – 5 g of specified grease (page 1-17) to each new steering head bearing and fill it up. Install the lower steering head bearing onto the stem. Apply grease to a new upper dust seal lip. Apply engine 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 head bearing
- Upper inner race
- Dust seal
- Steering top thread

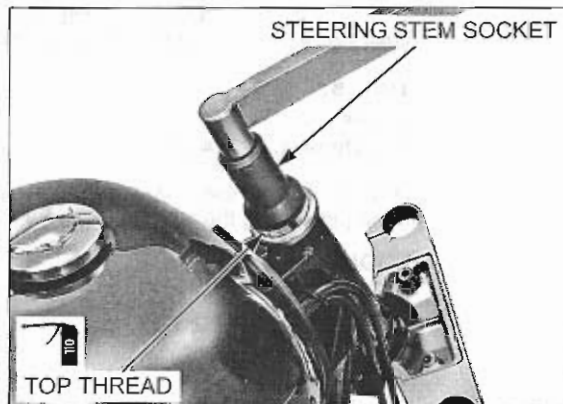


Tighten the steering top thread to the specified torque.

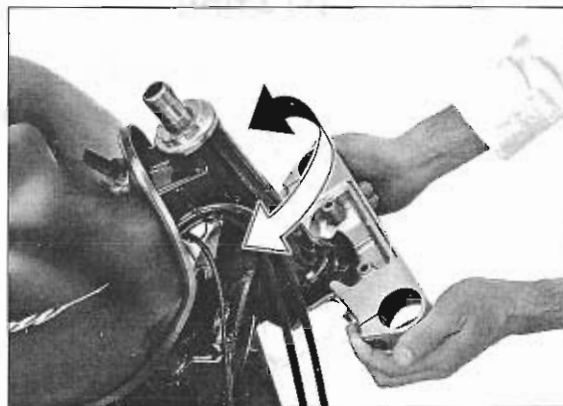
TOOL:

Steering stem socket 07916-3710101 or
 07916-3710100

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

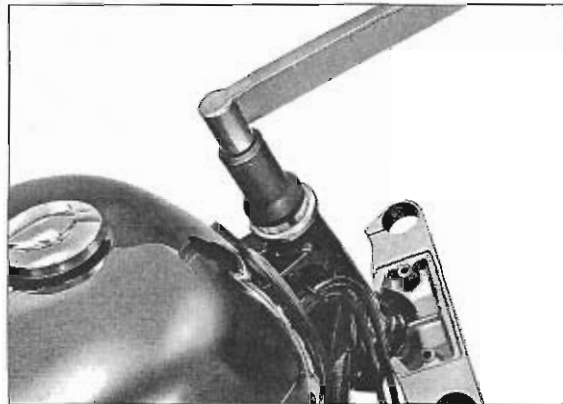


Turn the steering stem left and right, lock-to-lock five times to seat the bearings.



Retighten the steering top thread to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



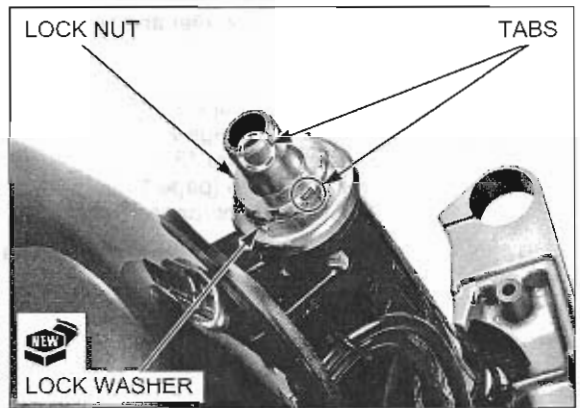
FRONT WHEEL/SUSPENSION/STEERING

Install a new lock washer, aligning its bent tabs with the grooves in the steering top thread.

Install the lock nut until it contacts with the lock washer.

Further tighten the lock nut, within 90°, to align its grooves with the tabs of the lock washer.

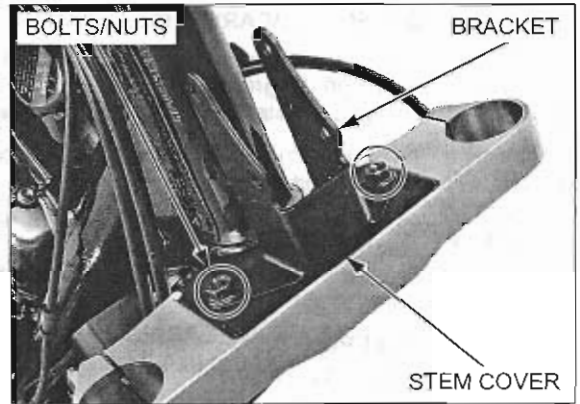
Bend up the lock washer tabs into the grooves of the lock nut.



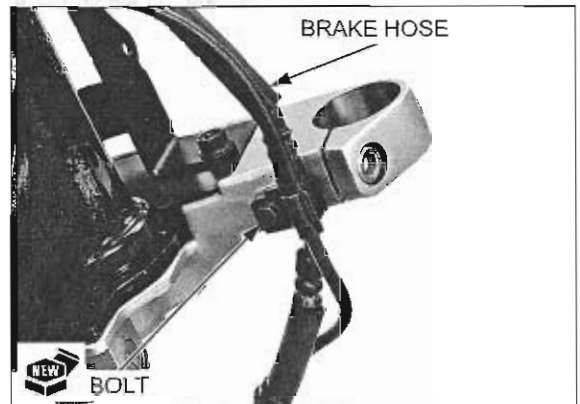
Install the steering stem cover onto the steering stem.

Tighten the nuts securely after installing the headlight case.

Temporarily install the headlight case bracket, bolts and nuts.



Set the brake hose, speed sensor wire and clamp then tighten new bolt securely.



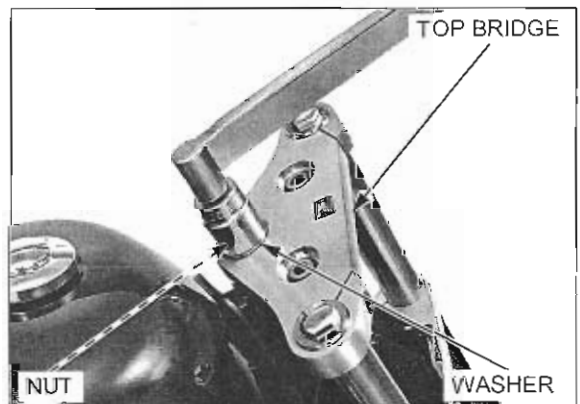
Install the top bridge, washer and stem nut.

Install the fork legs into the steering stem and top bridges (page 13-29).

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.



FRONT WHEEL/SUSPENSION/STEERING

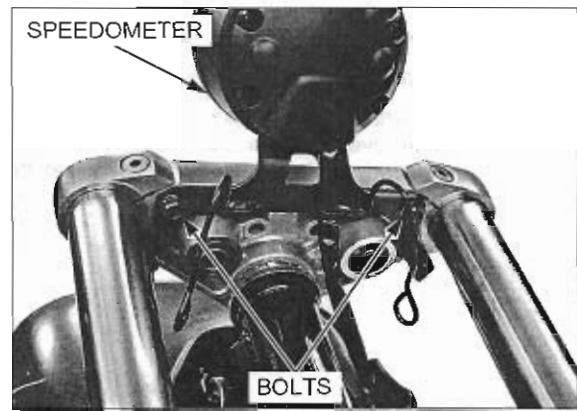
Install the speedometer and tighten the bolts securely.

Route the hose, wires and cables properly (page 1-19).

Install the following:

- Front wheel (page 13-19)
- Front fender (page 2-5)
- Handlebar (page 13-9)
- Headlight case (page 19-4)
- Turn signal light (page 19-5)

Tighten the headlight case bracket nuts securely.



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.

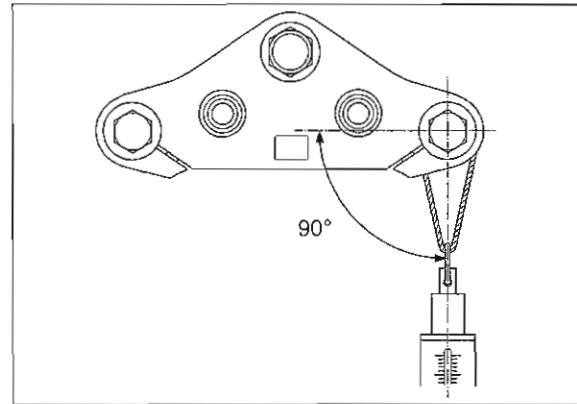
Pull the spring scale keeping it at a right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.

STEERING BEARING PRE-LOAD:

8.7 – 13.0 N (0.9 – 1.3 kgf)

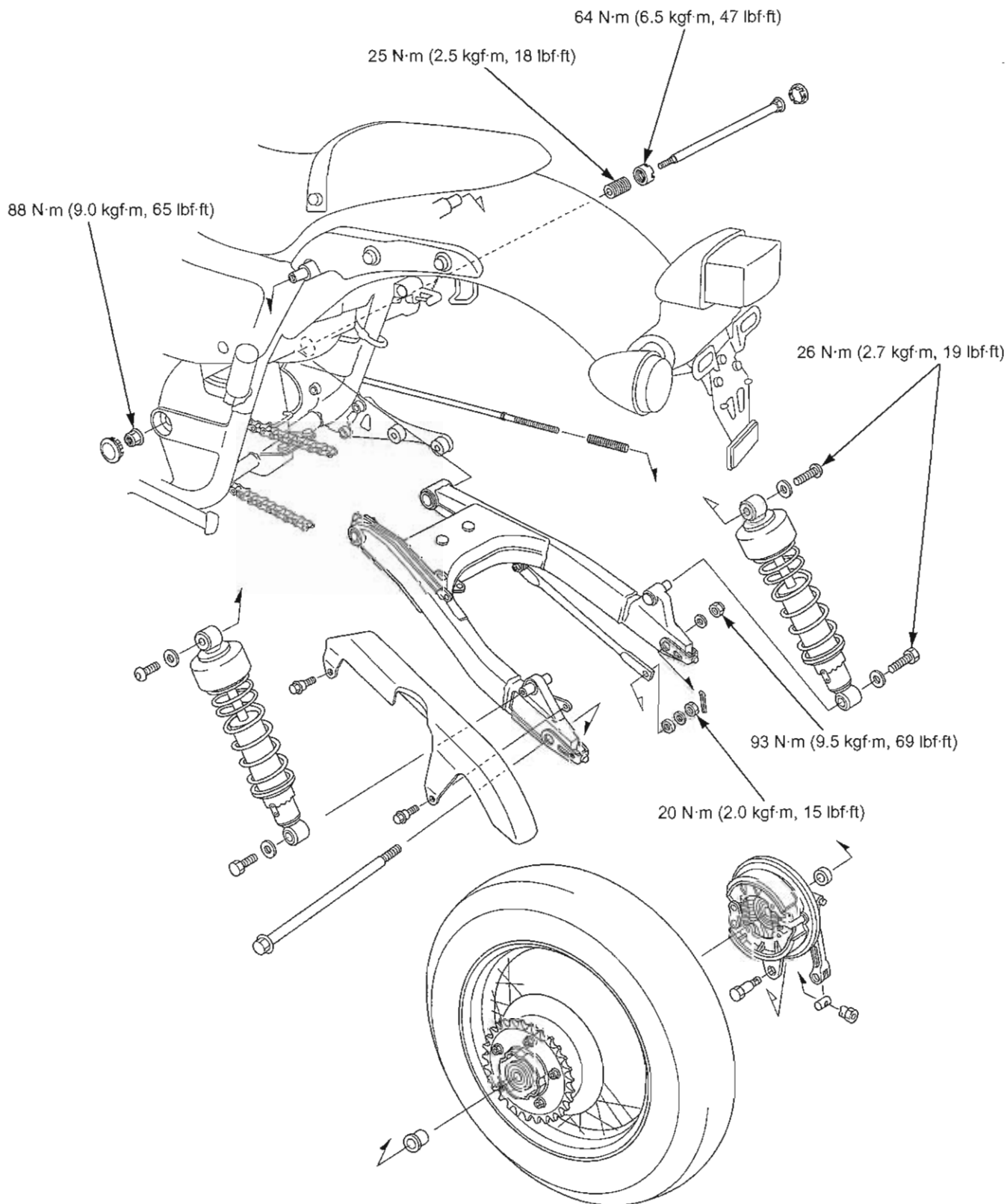
If the readings do not fall within the limits, readjust the steering top thread.



14. REAR WHEEL/BRAKE/SUSPENSION

COMPONENT LOCATION	14-2	REAR BRAKE	14-14
SERVICE INFORMATION	14-3	SHOCK ABSORBER	14-17
TROUBLESHOOTING	14-5	SWINGARM	14-18
REAR WHEEL	14-6	BRAKE PEDAL/ROD	14-25

COMPONENT LOCATION



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.
- A hoist or equivalent is required to support the motorcycle when servicing the rear wheel, shock absorber, or swingarm.
- 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 swingarm right pivot lock nut. The specification given in the actual torque applied to the swingarm right pivot 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)

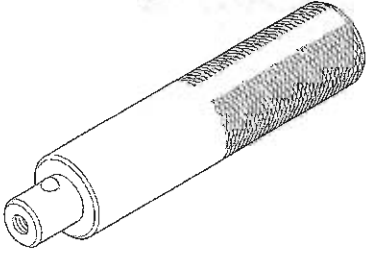
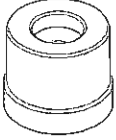
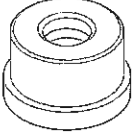
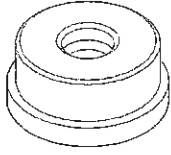


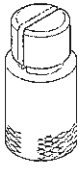
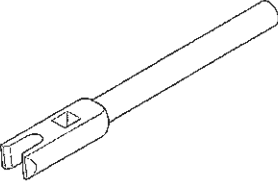
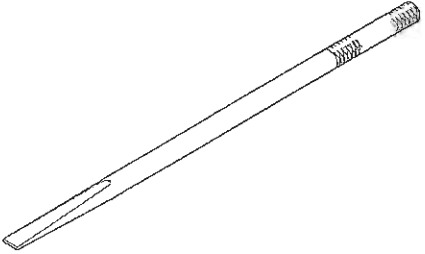
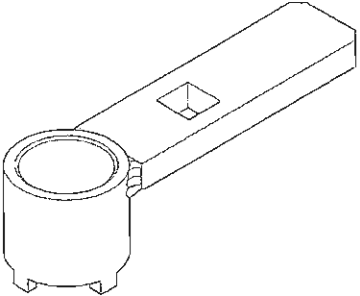
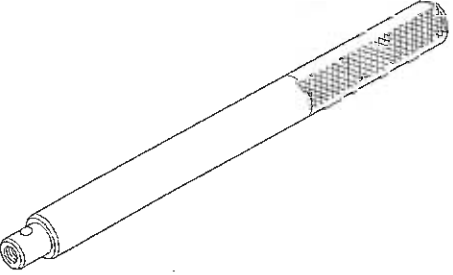
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	70 g max.
Drive chain	Size/link	DID	DID525V8-112LE
		RK	RK525SMOZ5-112LE
	Drive chain slack	30 – 40 (1-3/16 – 1-9/16)	—
Brake drum I.D.		180.0 – 180.3 (7.09 – 7.10)	181 (7.1)
Brake pedal stopper bolt length (Brake pedal height)		12 (0.5)	—
Brake pedal freeplay		20 – 30 (13/16 – 1-3/16)	—
Shock absorber spring pre-load adjuster setting		2nd position	—

TORQUE VALUES

Spoke	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
		See page 14-24
Swingarm pivot adjusting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	See page 14-24
Swingarm pivot lock nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	See page 14-24
Rear brake stopper arm nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Rear brake arm pinch bolt	29 N·m (3.0 kgf·m, 21 lbf·ft)	
Rear shock absorber mounting bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)	
Driven sprocket nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive chain slider screw	2.4 N·m (0.2 kgf·m, 1.8 lbf·ft)	

REAR WHEEL/BRAKE/SUSPENSION

TOOLS

<p>Driver 07749-0010000</p> 	<p>Attachment, 28 x 30 mm 07946-1870100</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 
<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Pilot, 15 mm 07746-0040300</p> 	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Bearing remover head, 20 mm 07746-0050600</p> 	<p>Spoke wrench, 6.1 mm 07JMA-MR60100</p> 	<p>Bearing remover shaft 07GGD-0010100</p> 
<p>Pivot lock nut wrench 07GMA-KT70200 or 07GMA-KT7A200 (U.S.A. only)</p> 	<p>Driver shaft 07949-3710001</p> 	

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
- Worn wheel bearing
- Bent spokes
- Faulty tire
- Unbalanced tire and wheel
- Faulty swingarm pivot bearings
- Axle fastener not tightened properly
- Insufficient tire pressure

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

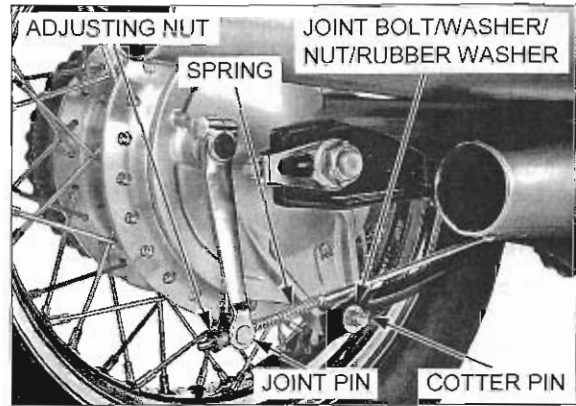
REAR WHEEL

REMOVAL

Remove the adjusting nut, joint pin and spring.

Remove the following:

- Cotter pin
- Nut
- Washer
- Rubber washer
- Joint bolt



Loosen the axle nut.

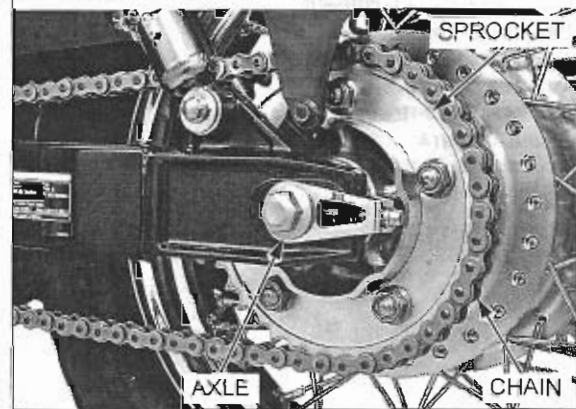
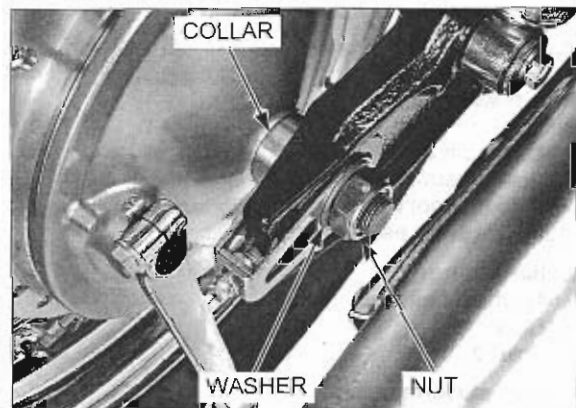
Support the motorcycle using a safety stand or a hoist, raise the rear wheel off the ground.

Remove the axle nut and washer.

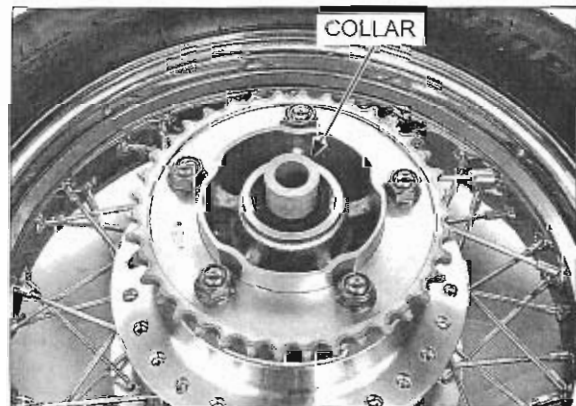
Fully slacken the drive chain (page 3-16).

Derail the drive chain from the driven sprocket.

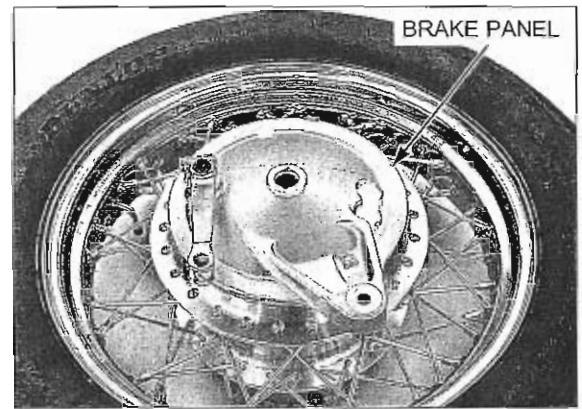
Remove the rear axle, then remove the rear wheel and right side collar.



Remove the left side collar.



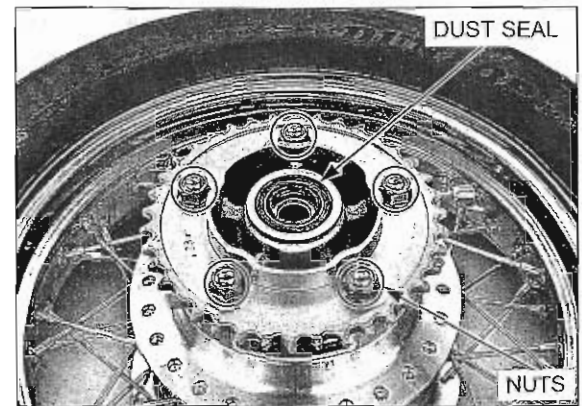
Remove the brake panel from the right wheel hub.



DISASSEMBLY

Remove the dust seal.

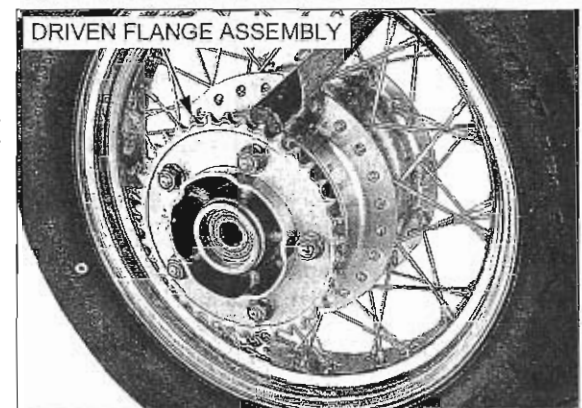
If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.



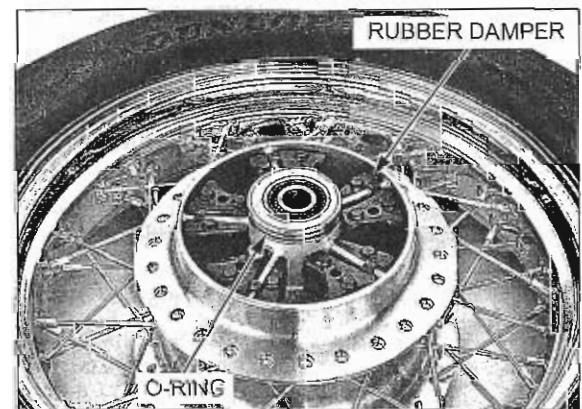
Remove the driven flange assembly from the wheel hub.

NOTE:

If it is hard to remove the driven flange assembly, tap the sprocket in several locations with a piece of wood or a soft hammer.

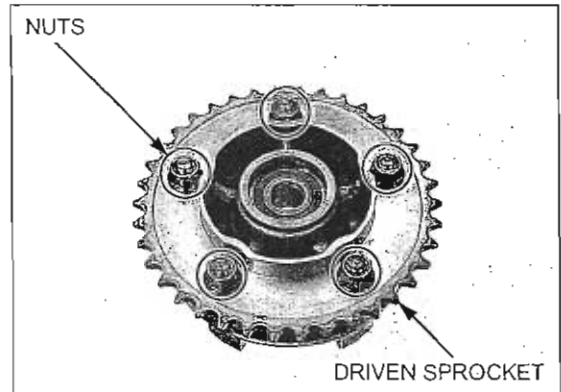


Remove the wheel rubber dampers and O-ring.



REAR WHEEL/BRAKE/SUSPENSION

Remove the nuts and driven sprocket.

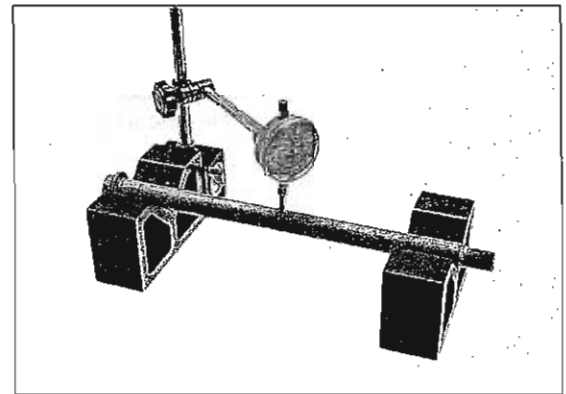


INSPECTION

AXLE

Set the 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 (0.01 in)



WHEEL RIM

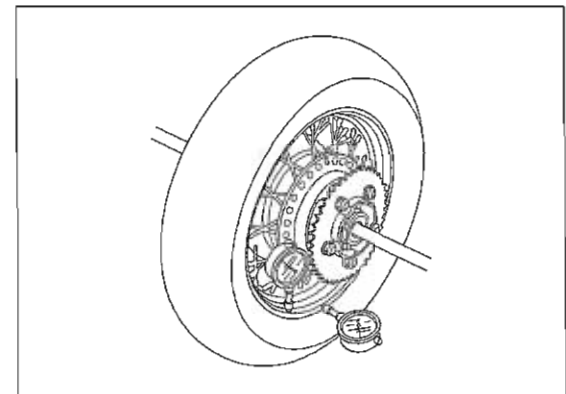
Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.

NEW

SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)



WHEEL/DRIVEN FLANGE BEARING

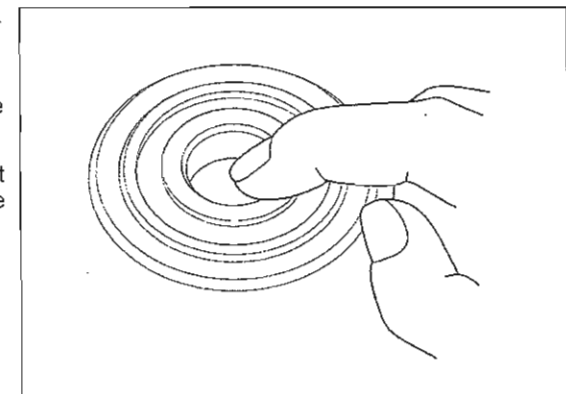
Remove the brake panel and driven flange (page 14-7).

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.

Replace the each bearing, if necessary.

- Wheel bearing (page 14-10)
- Driven flange bearing (page 14-9)

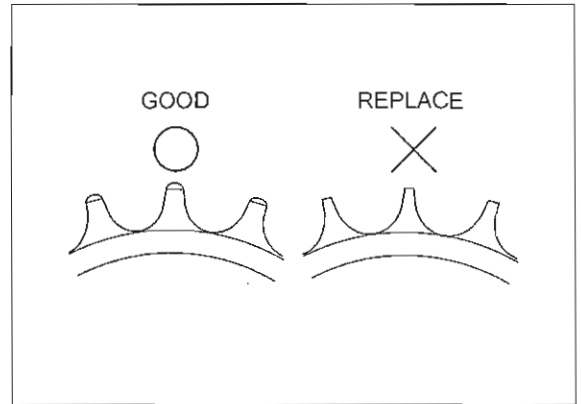


DRIVEN SPROCKET

Check the condition of the final driven sprocket teeth. Replace the sprocket if worn or damaged.

NOTE:

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

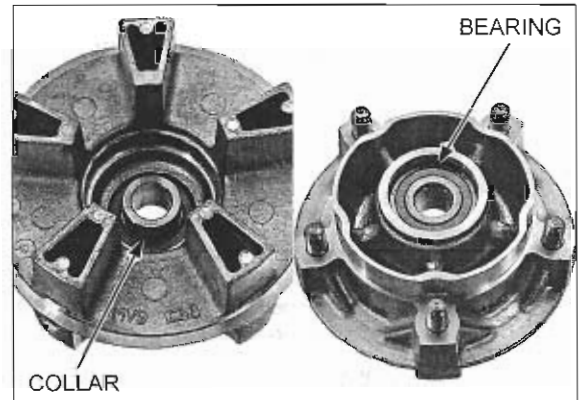


WHEEL BALANCE

For wheel balance (page 13-17). Do not add balance weight more than 70 g to the rear wheel.

DRIVEN FLANGE BEARING REPLACEMENT

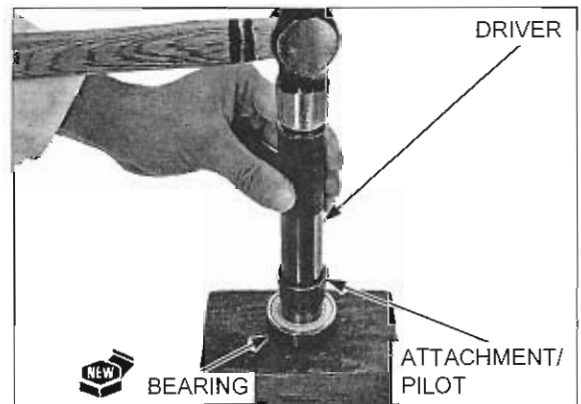
Drive the bearing and collar out of the driven flange using the suitable tool.



Place the new driven flange bearing with the marked side facing down. From the opposite side drive in the driven flange collar squarely to the driven flange bearing using the special tool.

TOOLS:

- | | |
|------------------------|---------------|
| Driver | 07749-0010000 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Pilot, 20 mm | 07746-0040500 |

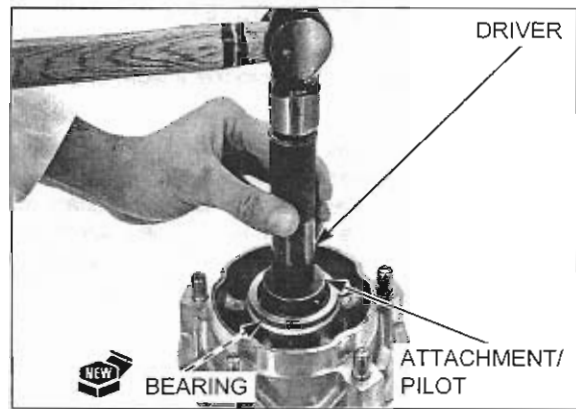


REAR WHEEL/BRAKE/SUSPENSION

Drive in a new bearing and collar into the final driven flange with the marked side facing up until it is seated.

TOOLS:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



WHEEL BEARING REPLACEMENT

Install the bearing remover head into the bearing.

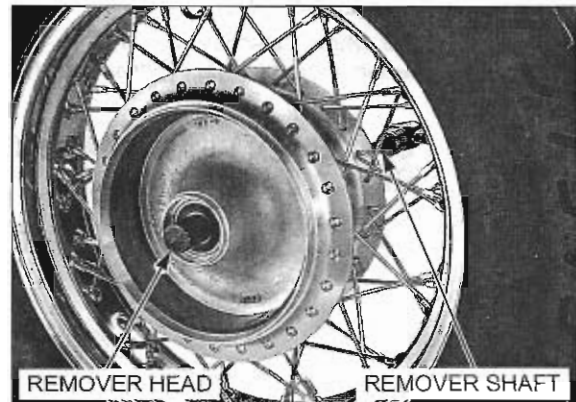
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.

If the bearings are removed, they must be replaced with new ones.

Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	07GGD-0010100
Bearing remover head, 20 mm	07746-0050600



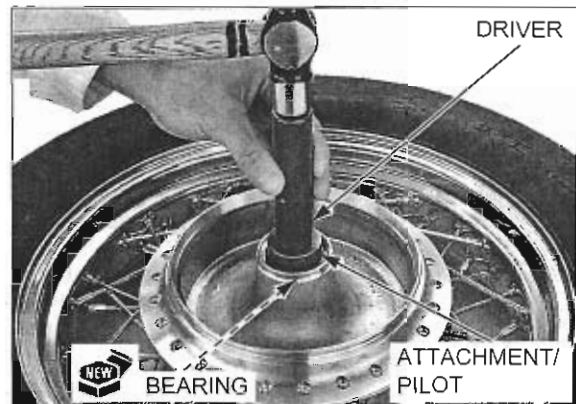
Drive in a right bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.

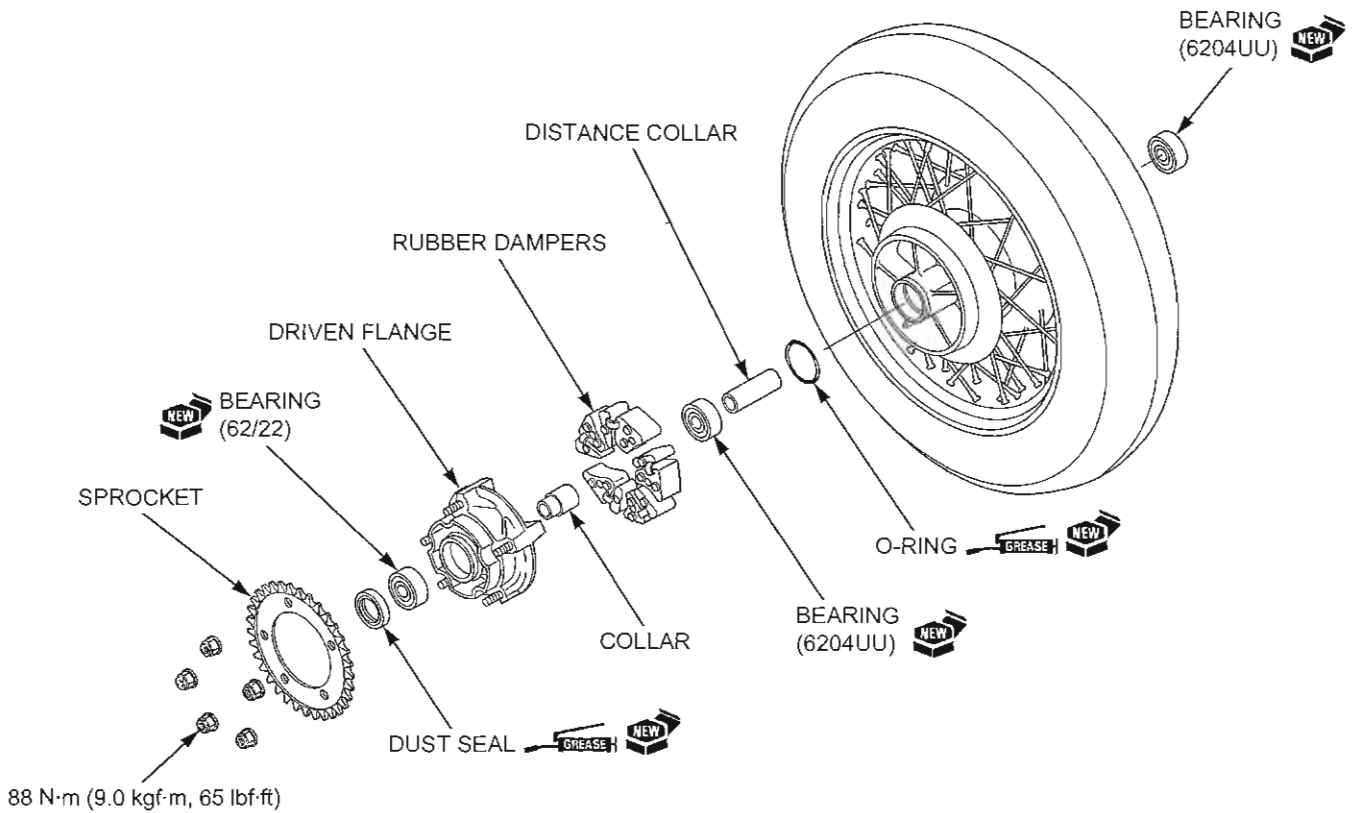
Drive in a new left bearing squarely with the marked side facing up until it is seated.

TOOLS:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



ASSEMBLY



WHEEL CENTER ADJUSTMENT

Measure the distance B (rim width) and calculate distance A as follows:

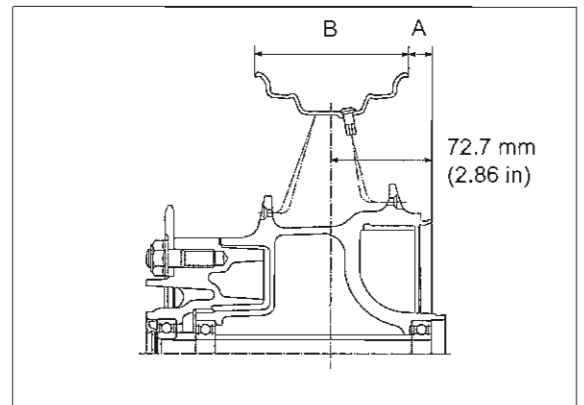
$$A = 72.7 \text{ mm (2.86 in)} - B/2$$

Adjust the rim position and distance A by tightening the spokes to the specified torque in several progressive steps.

TOOL:

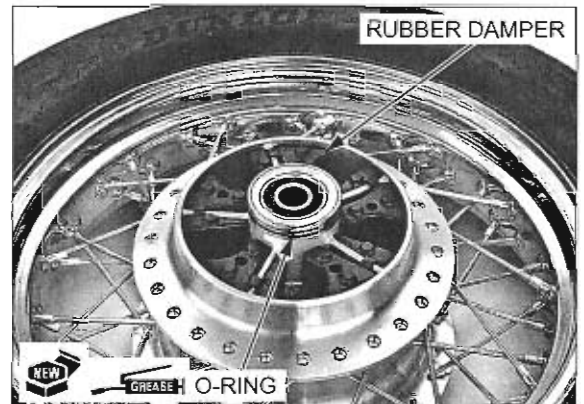
Spoke wrench, 6.1 mm 07JMA-MR60100

TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)



Replace the rubber dampers as a set. Check the rubber dampers for deterioration or damage and replace the rubber dampers with a new one if necessary.

Coat a new O-ring with grease. Install the rubber dampers and O-ring into the wheel hub.



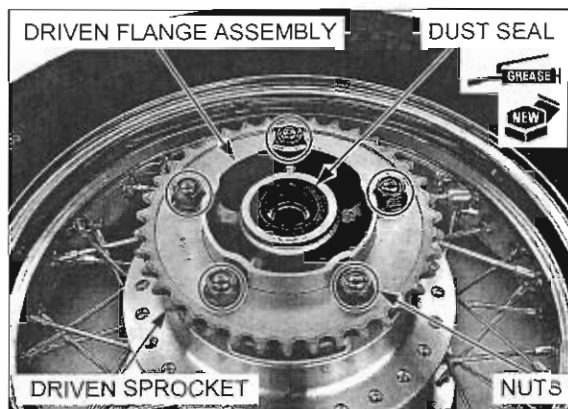
REAR WHEEL/BRAKE/SUSPENSION

Install the final driven flange assembly onto the left wheel hub.

If the driven sprocket is removed, install the driven sprocket and nuts onto the driven flange, then tighten the driven sprocket nuts to the specified torque.

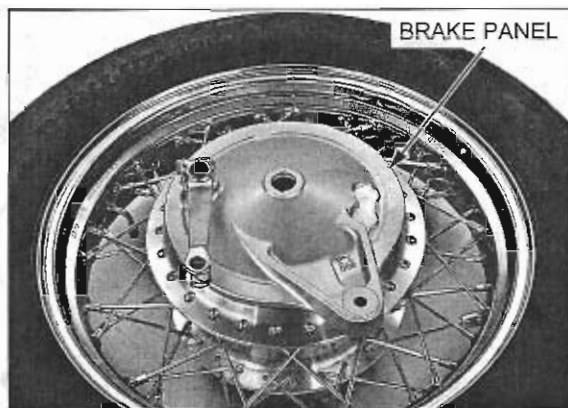
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Apply grease to the new dust seal lips, then install it into the driven flange.



INSTALLATION

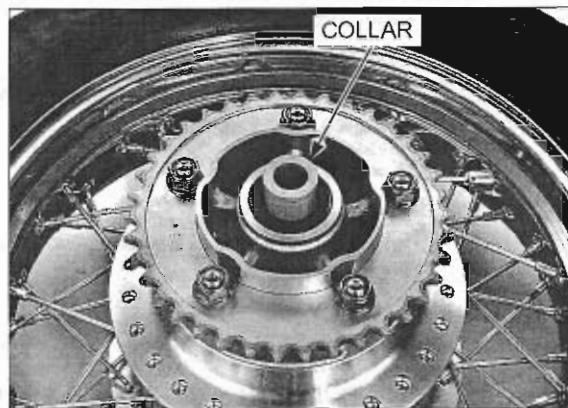
Install the brake panel assembly into the right wheel hub.



Install left side collar.

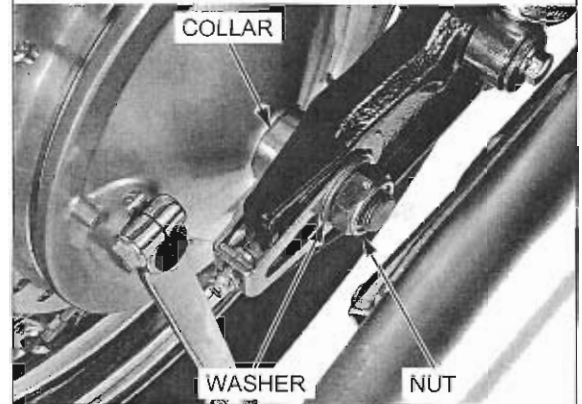
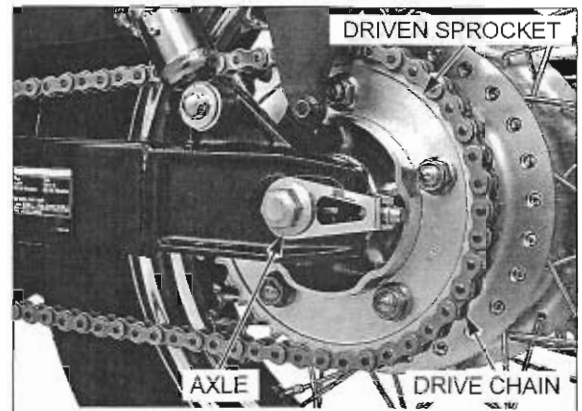
NOTE:

The left side collar is longer than the right side collar.



REAR WHEEL/BRAKE/SUSPENSION

Position the rear wheel between the swingarm.
Install the drive chain over the driven sprocket.
Insert the rear axle through the swingarm, wheel and right side collar.
Install the washer and axle nut.



Install the stopper arm joint bolt.

Install the following:

- Bolt
- Rubber washer
- Washer
- Stopper arm nut

Tighten the stopper arm nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install a new cotter pin.

Connect the brake rod to the brake arm with the spring and joint pin.

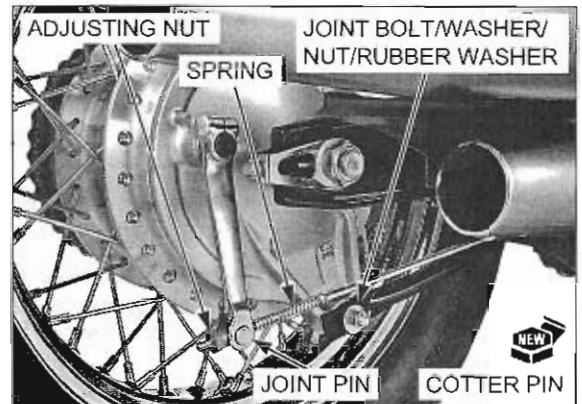
Install the rear brake adjusting nut.

Adjust the drive chain slack (page 3-16).

Tighten the rear axle nut to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

Adjust the brake pedal freeplay (page 3-23).

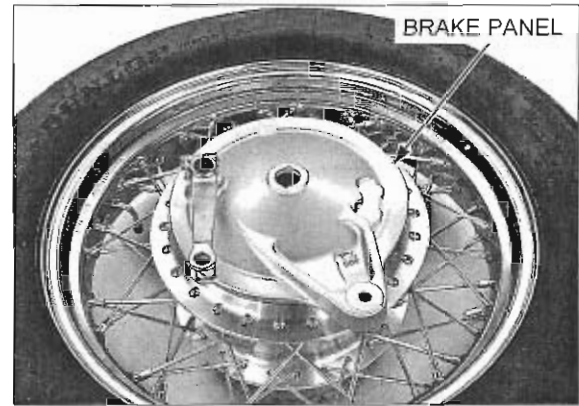


REAR BRAKE

REMOVAL

Remove the rear wheel (page 14-6).

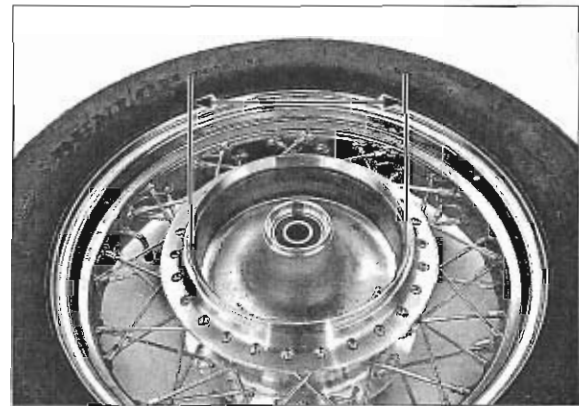
Remove the brake panel.



INSPECTION

Measure the rear brake drum I.D.

SERVICE LIMIT: 181 mm (7.1 in)

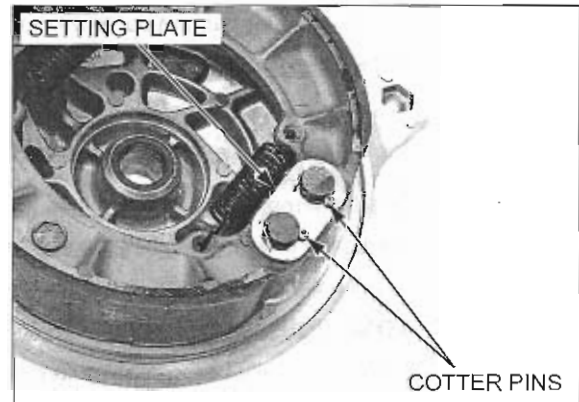


DISASSEMBLY

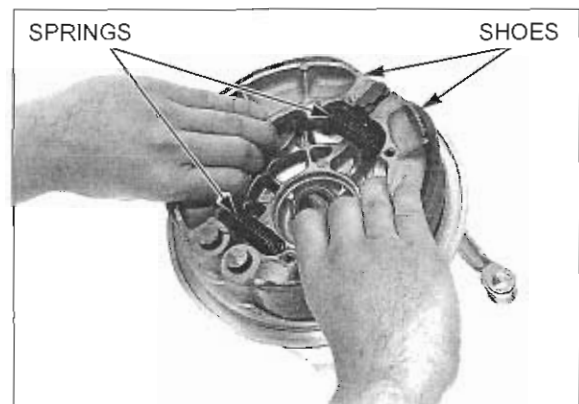
Remove the cotter pins and setting plate.

NOTE:

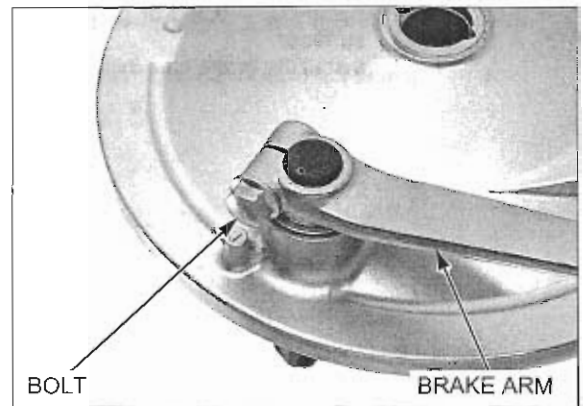
- Always replace the brake shoes as a set.
- When the brake shoes are reused, mark all parts before disassembly so they can be installed in their original locations.



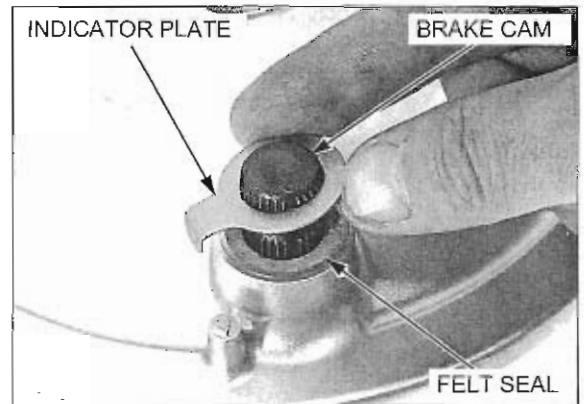
Remove the brake shoes and springs.



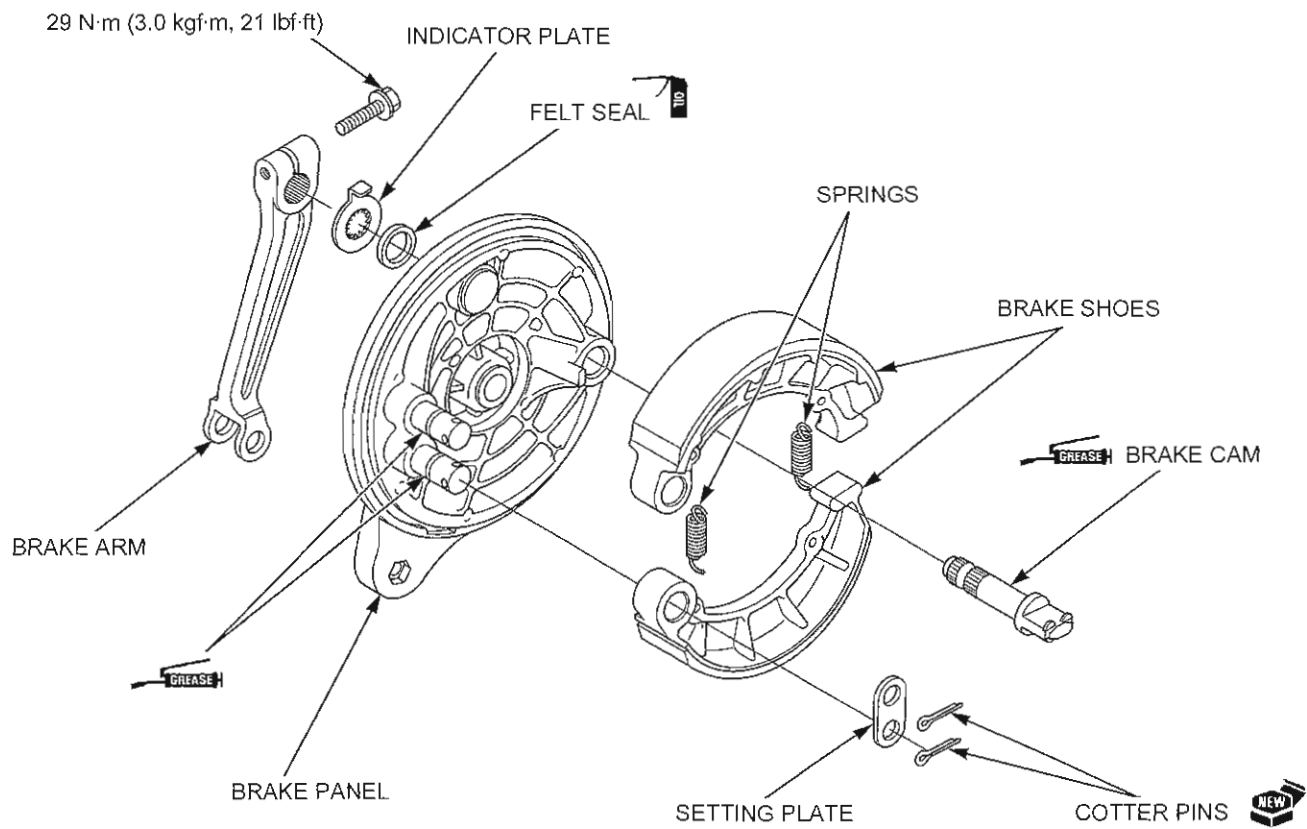
Remove the bolt and brake arm.



Remove the indicator plate, brake cam and felt seal.

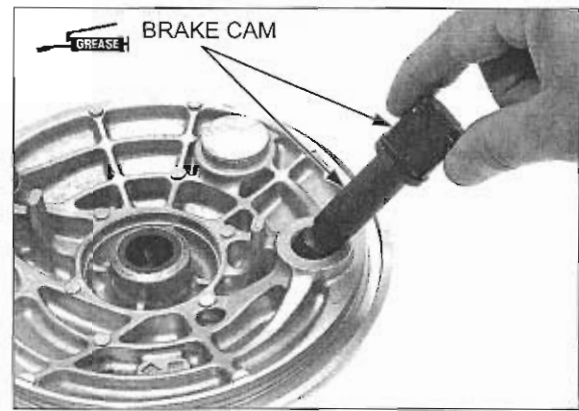


ASSEMBLY

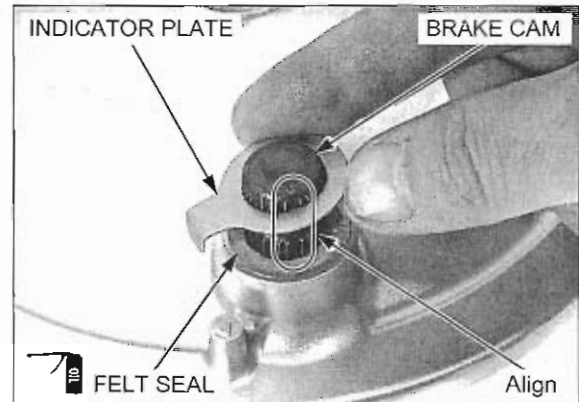


REAR WHEEL/BRAKE/SUSPENSION

Apply 0.2 ~ 0.3 g of grease to the brake cam sliding surface.
Install the brake cam into the brake panel.

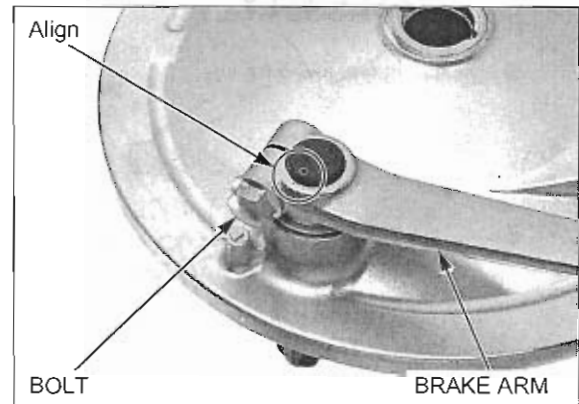


Apply engine oil to the felt seal and install it onto the brake panel.
Install the wear indicator plate on the brake cam aligning its wide tooth with the wide groove on the brake cam.



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.

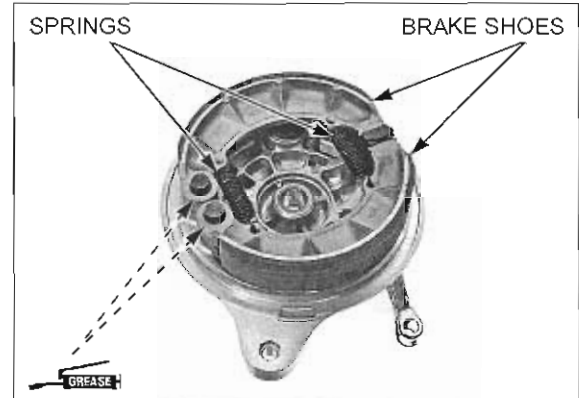
TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)



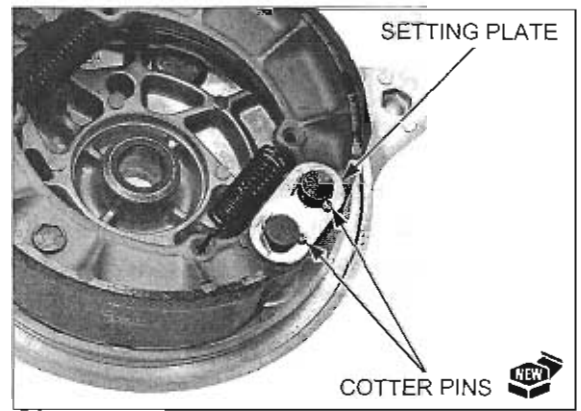
Apply 0.2 ~ 0.3 g of grease to the brake shoe-to-anchor pin sliding surface.
Install the brake shoes and springs.

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 brake drum.
Install the rear wheel (page 14-12).

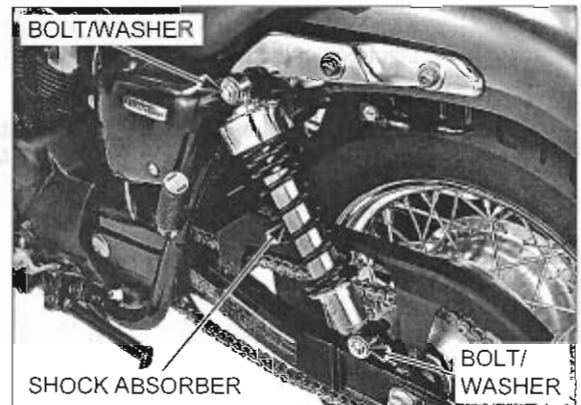


SHOCK ABSORBER

Right side: Remove the exhaust system (page 2-9).

Support the frame and swingarm securely using a hoist or equivalent.

Remove the bolts, washers, and the shock absorber.



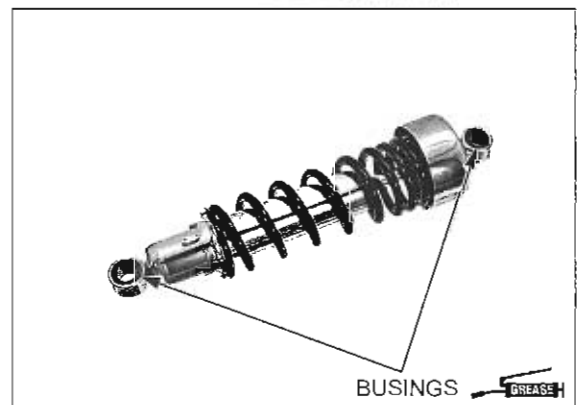
Replace the shock absorber as an assembly.

Check for deformation or oil leakage.
Check the busings for wear or damage, replace them if necessary.

Apply grease to the shock absorber mount bushing inner surface.

Install the shock absorber in the reverse order of removal.

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



SWINGARM

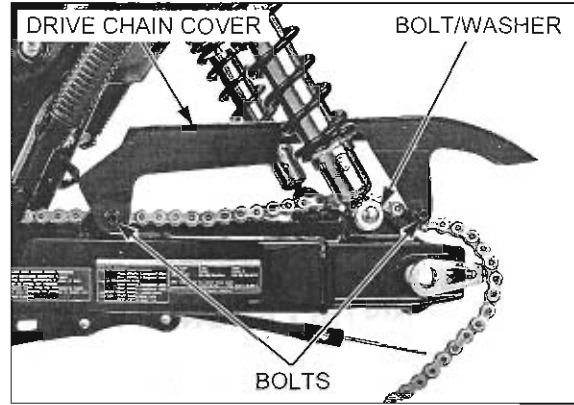
REMOVAL

Remove the following:

- Rear wheel (page 14-6)
- Exhaust system (page 2-9)

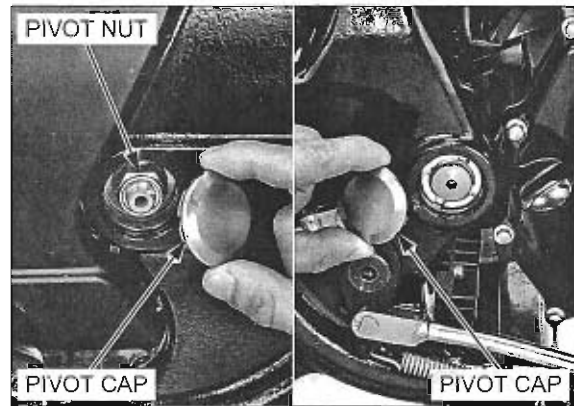
Remove the bolts and drive chain cover.

Remove the shock absorber lower mounting bolts and washers.



Remove the pivot caps from both swingarm pivot.

Remove the swingarm pivot nut.

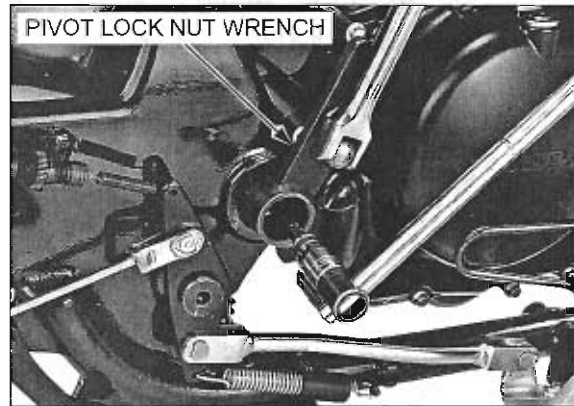


Remove the swingarm pivot lock nut while holding the pivot bolt using the special tool.

TOOL:

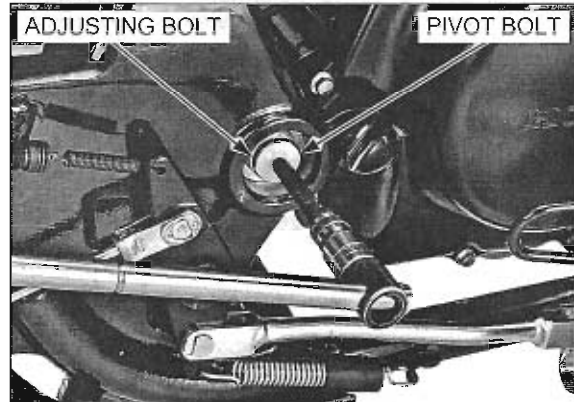
Pivot lock nut wrench

07GMA-KT70200 or
07GMA-KT7A200
(U.S.A. only)



Loosen the swingarm adjusting bolt by turning the pivot bolt.

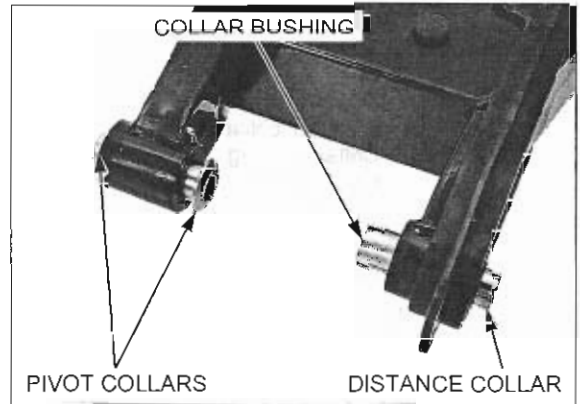
Remove the pivot bolt and swingarm.



REAR WHEEL/BRAKE/SUSPENSION

Remove the swingarm pivot collars from the right side pivot.

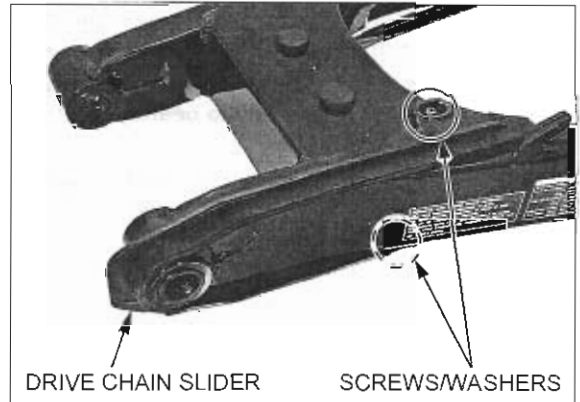
Remove the swingarm pivot distance collar from the left side pivot and remove the collar bushing from the distance collar.



DISASSEMBLY

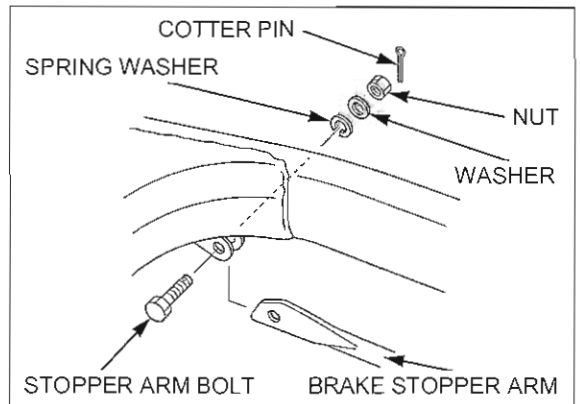
Remove the following:

- Drive chain slider screws
- Drive chain slider washers
- Drive chain slider

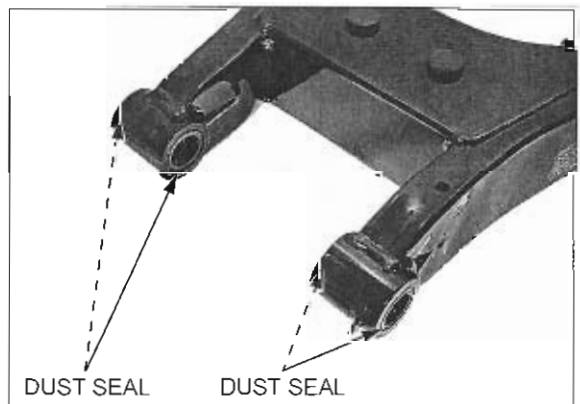


Remove the following:

- Cotter pin
- Nut
- Washer
- Spring washer
- Brake stopper arm bolt
- Brake stopper arm



Remove the dust seals from the side pivots.



REAR WHEEL/BRAKE/SUSPENSION

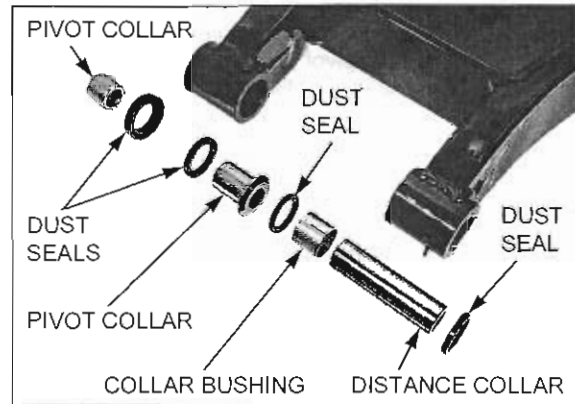
INSPECTION

Check the following:

- Swing arm
- Distance collar
- Collar bushing
- Pivot collars
- Dust seals

Check the left side pivot needle bearing for wear or damage.

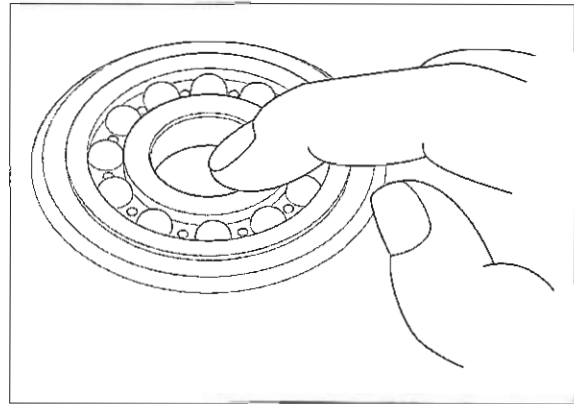
Replace the bearings if necessary.



Turn the inner race of the right side pivot ball bearing with your finger.

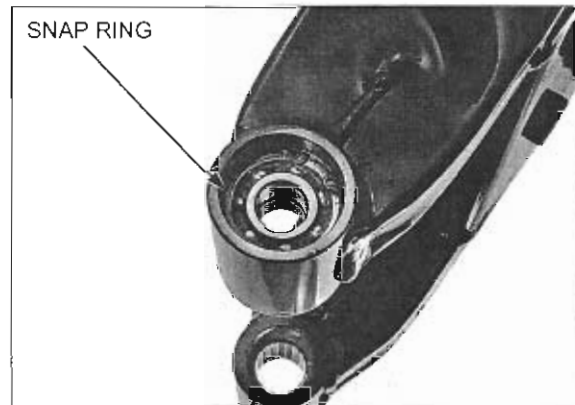
The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the swingarm pivot.

Remove and discard the bearing if the race does not turn smoothly and quietly, or if it fits loosely in the swingarm pivot.



PIVOT BEARING REPLACEMENT

Remove the snap ring from the right pivot.



Drive the ball bearings out of the swingarm using a hydraulic press and special tools.

TOOLS:

Pilot, 15 mm

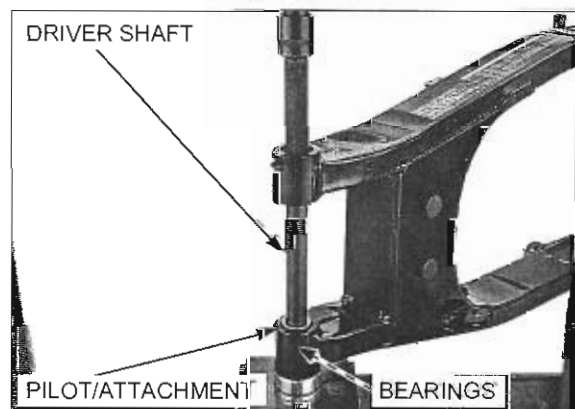
07746-0040300

Attachment, 28 x 30 mm

07946-1870100

Driver shaft

07949-3710001

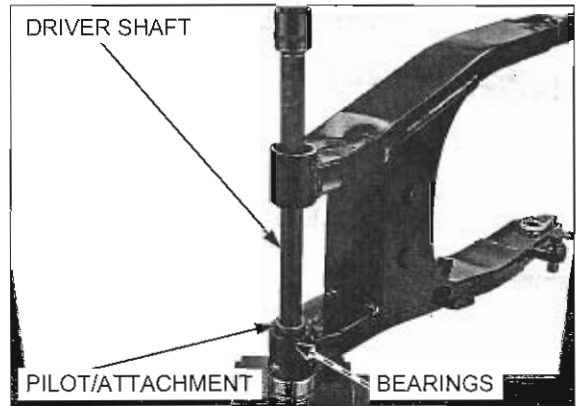


REAR WHEEL/BRAKE/SUSPENSION

Drive the needle bearing out of the swingarm using a hydraulic press and special tools.

TOOLS:

Pilot, 20 mm	07746-0040500
Attachment, 28 x 30 mm	07946-1870100
Driver shaft	07949-3710001

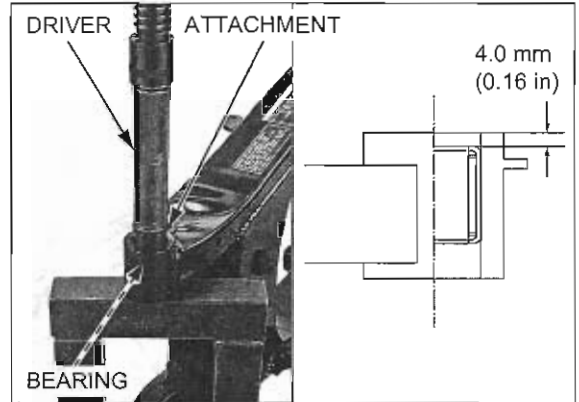


Apply grease to the new needle bearing.

Press the needle bearing into the swingarm with the marked side facing out so the needle bearing outer surface is 4.0 mm (0.16 in) below the outer edge of the swingarm pivot bearing cavity.

TOOLS:

Driver	07749-0010000
Attachment, 28 x 30 mm	07946-1870100

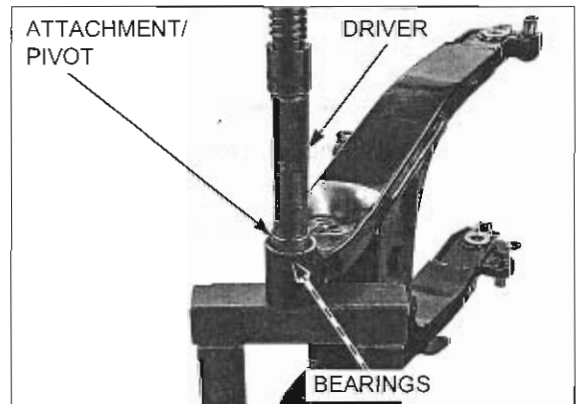


Apply grease to the new ball bearings.

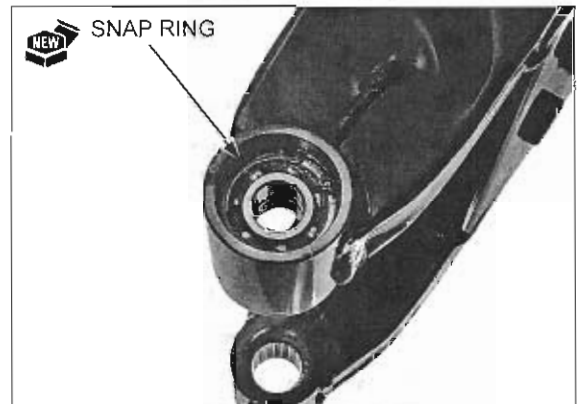
Press the ball bearings into the swingarm with the marked side facing out until they are fully seated.

TOOLS:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300

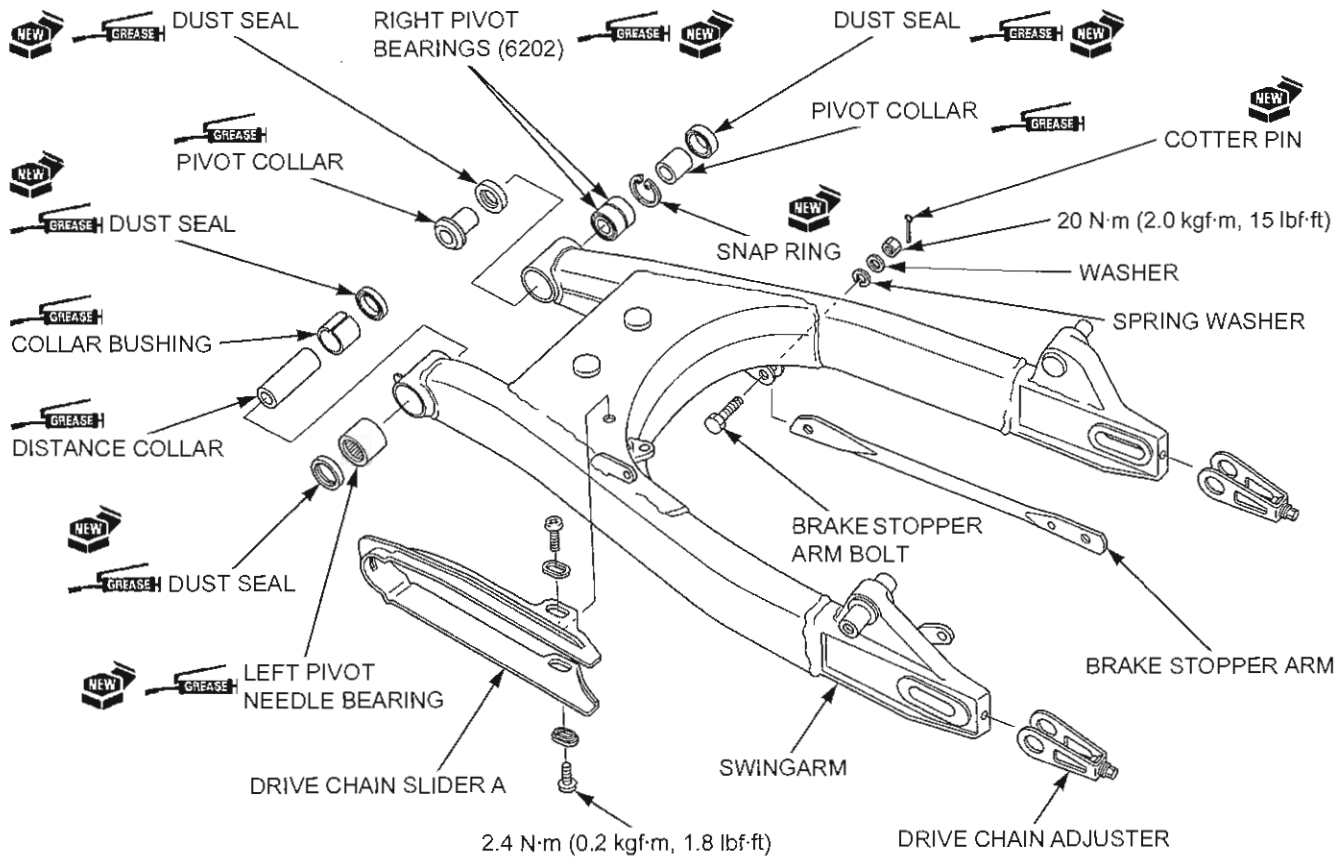


Install a new snap ring into the right pivot groove securely.



REAR WHEEL/BRAKE/SUSPENSION

ASSEMBLY



Apply grease to the new dust seal lips.
Install the dust seals into the side pivots.

NOTE:
Install the dust seals flush with the pivot surface.

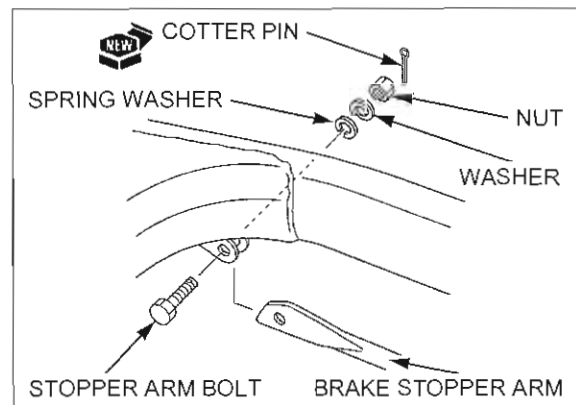
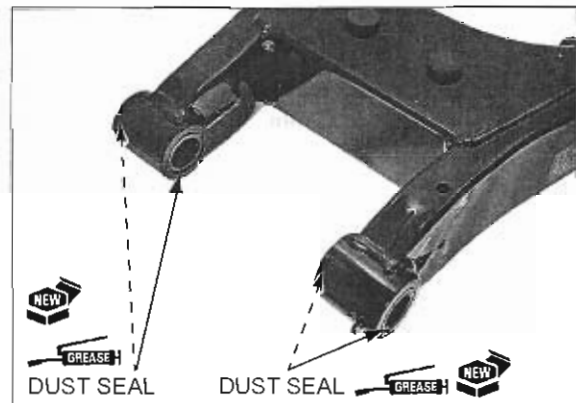
Install the following:

- Brake stopper arm
- Brake stopper arm bolt
- Spring washer
- Washer
- Nut

Tighten the nut to the specified torque.

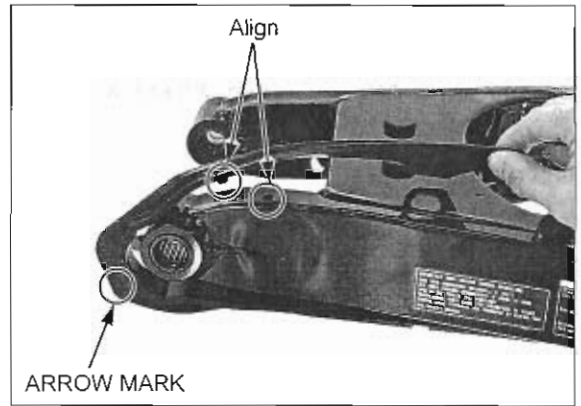
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install a new cotter pin.



Install the drive chain slider with the arrow mark facing down.

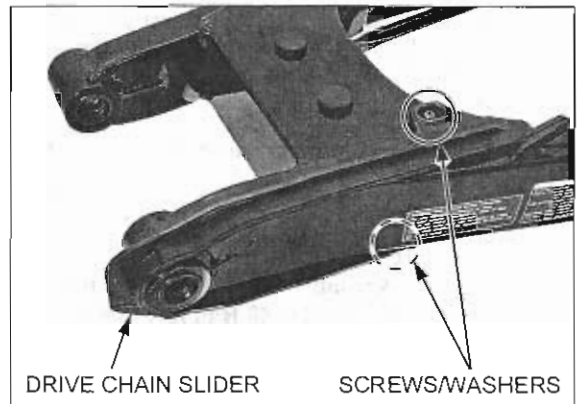
Aligning its tab with the hole the swingarm.



Install the chain slider washers and screws.

Tighten the screws to the specified torque.

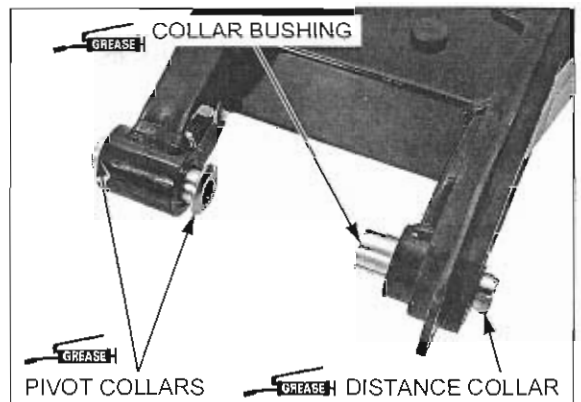
TORQUE: 2.4 N·m (0.2 kgf·m, 1.8 lbf·ft)



INSTALLATION

Apply grease to the distance collar, distance collar bushing and pivot collars outer and inner surfaces.

Install the collar bushing to the distance collar and install the distance collar in the left side pivot. Install the pivot collars in the right side pivot.



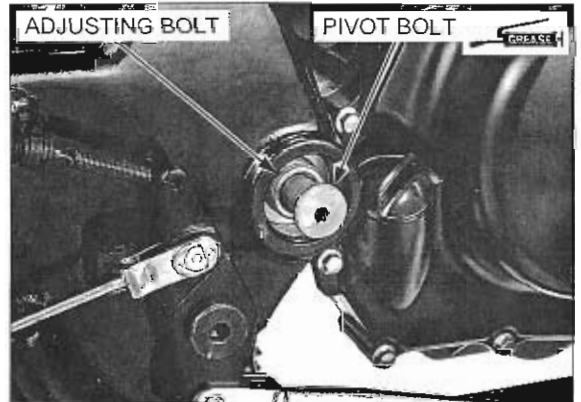
NOTE:

Be sure the tip of the adjusting bolt does not protrude inward.

Place the swingarm into the frame.

Apply grease to the swingarm pivot bolt outer surface. Insert the swingarm pivot bolt.

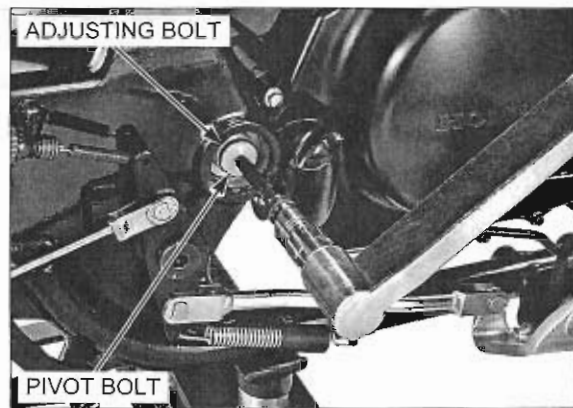
Push the pivot bolt's hex shank into the adjusting bolt's socket head.



REAR WHEEL/BRAKE/SUSPENSION

Tighten the swingarm pivot adjusting bolt with the pivot bolt.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



Refer to torque wrench reading information (page 14-3).

Install and tighten the swingarm pivot lock nut fully, then tighten it to the specified torque while holding the pivot bolt.

TOOL:

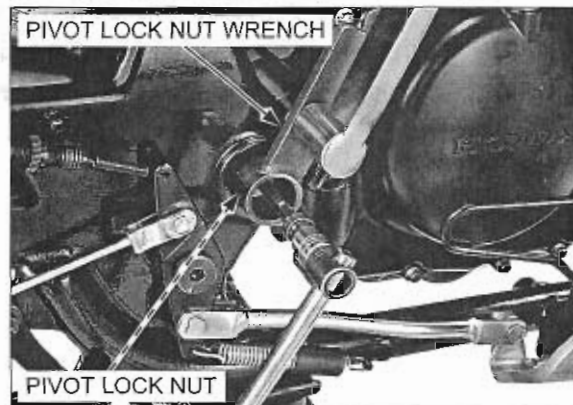
Pivot lock nut wrench

07GMA-KT70200 or
07GMA-KT7A200
(U.S.A. only)

TORQUE:

Actual: 64 N·m (6.5 kgf·m, 47 lbf·ft)

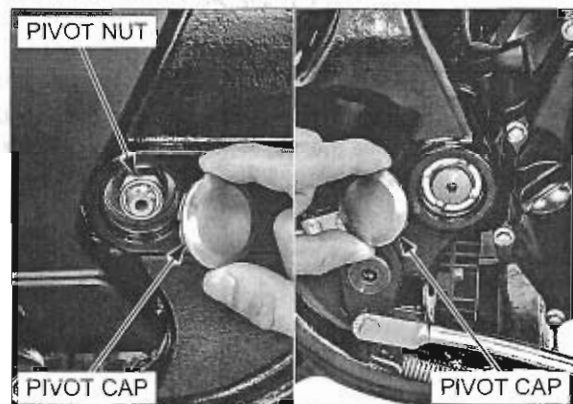
Indicated: 58 N·m (5.9 kgf·m, 43 lbf·ft)



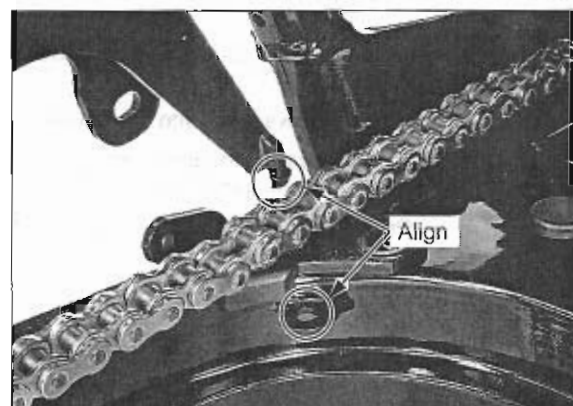
Install and tighten the swingarm pivot nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Install the pivot bolt caps.



Install the drive chain cover by aligning its tab with the swingarm hole.



Install the shock absorbers to the swing arm.

Install the shock absorber lower mounting bolts and washers.

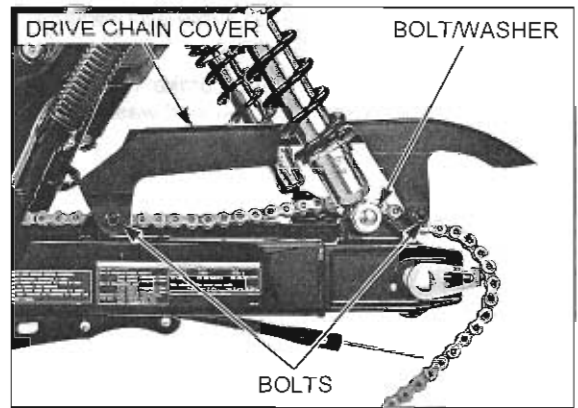
Tighten the shock absorber lower mounting bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)

Install and tighten the drive chain cover bolts.

Install the following:

- Rear wheel (page 14-12)
- Exhaust system (page 2-11)

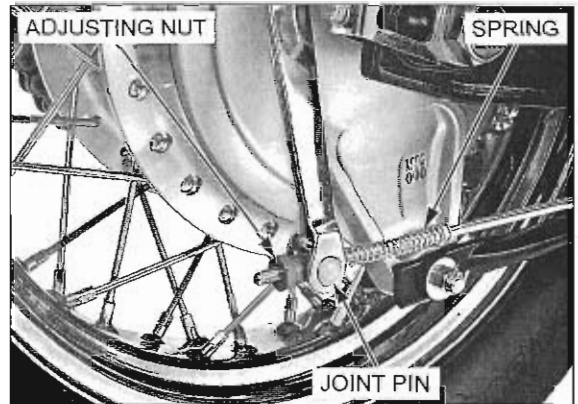


BRAKE PEDAL/ROD

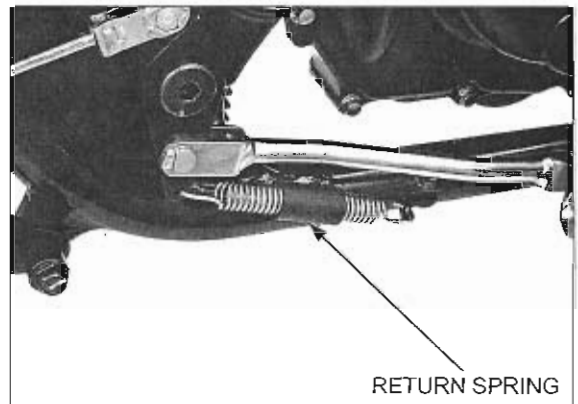
REMOVAL

Remove the exhaust system (page 2-9).

Remove the adjusting nut, joint pin and spring.

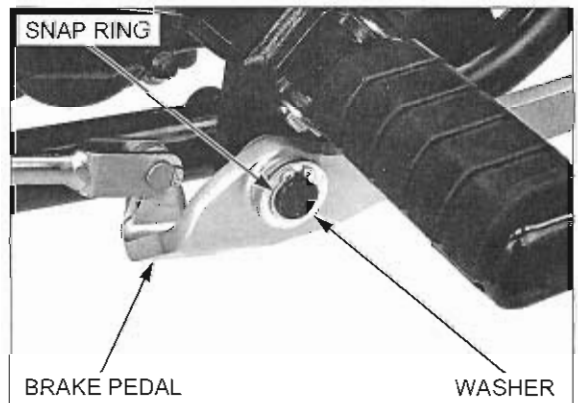


Unhook the rear brake return spring from the frame.



Remove the following:

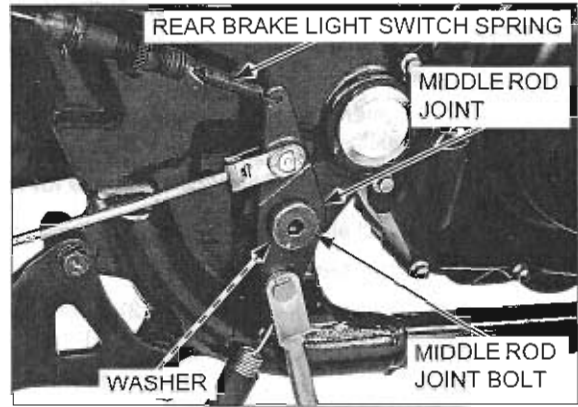
- Snap ring
- Washer
- Brake pedal



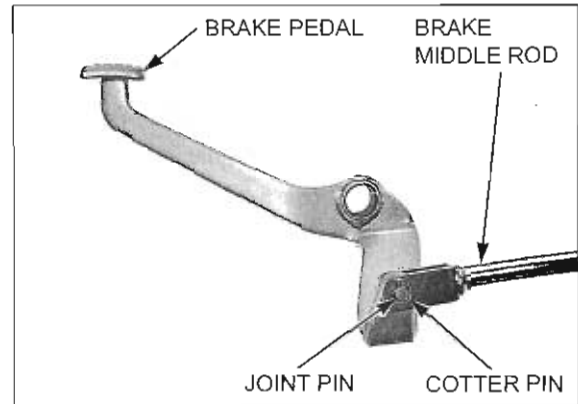
REAR WHEEL/BRAKE/SUSPENSION

Unhook the rear brake light switch spring from the rear brake middle rod.

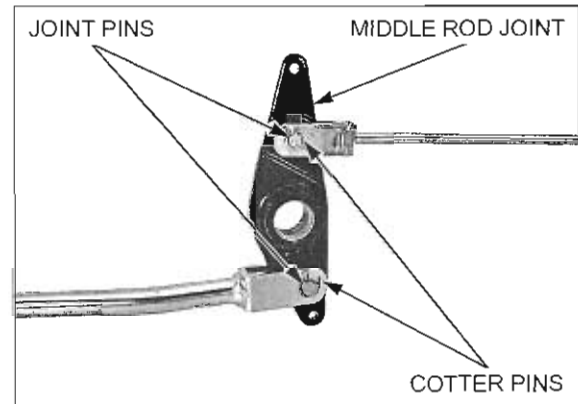
Remove the rear brake middle rod joint bolt, brake pedal/rod assembly and washer.



Remove the cotter pin, joint pin and brake middle rod from the brake pedal.



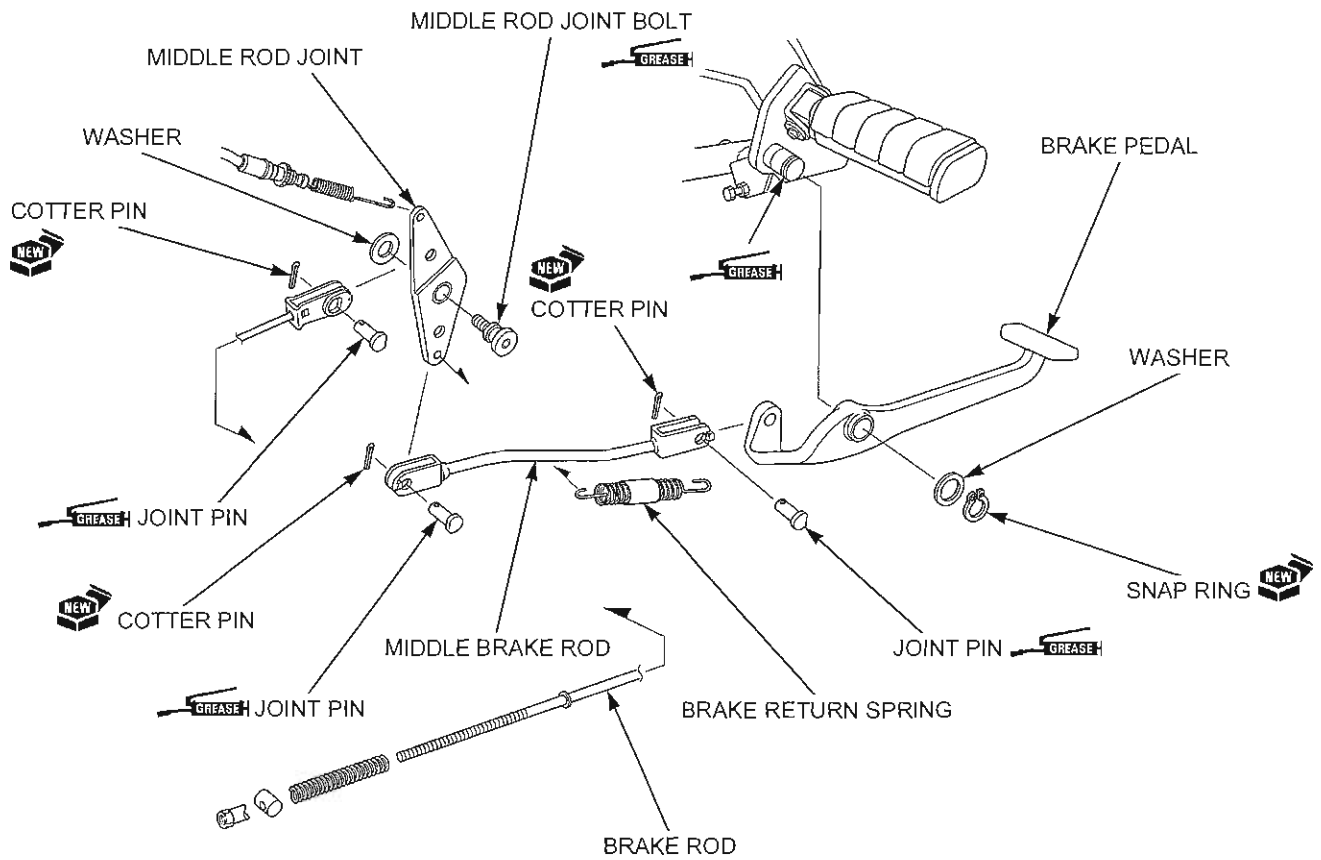
Remove the cotter pins and joint pins from the rear brake middle arm.



INSTALLATION

Install the removed parts in the reverse order of removal.

Adjust the brake pedal freeplay (page 3-23).



MEMO

①

②

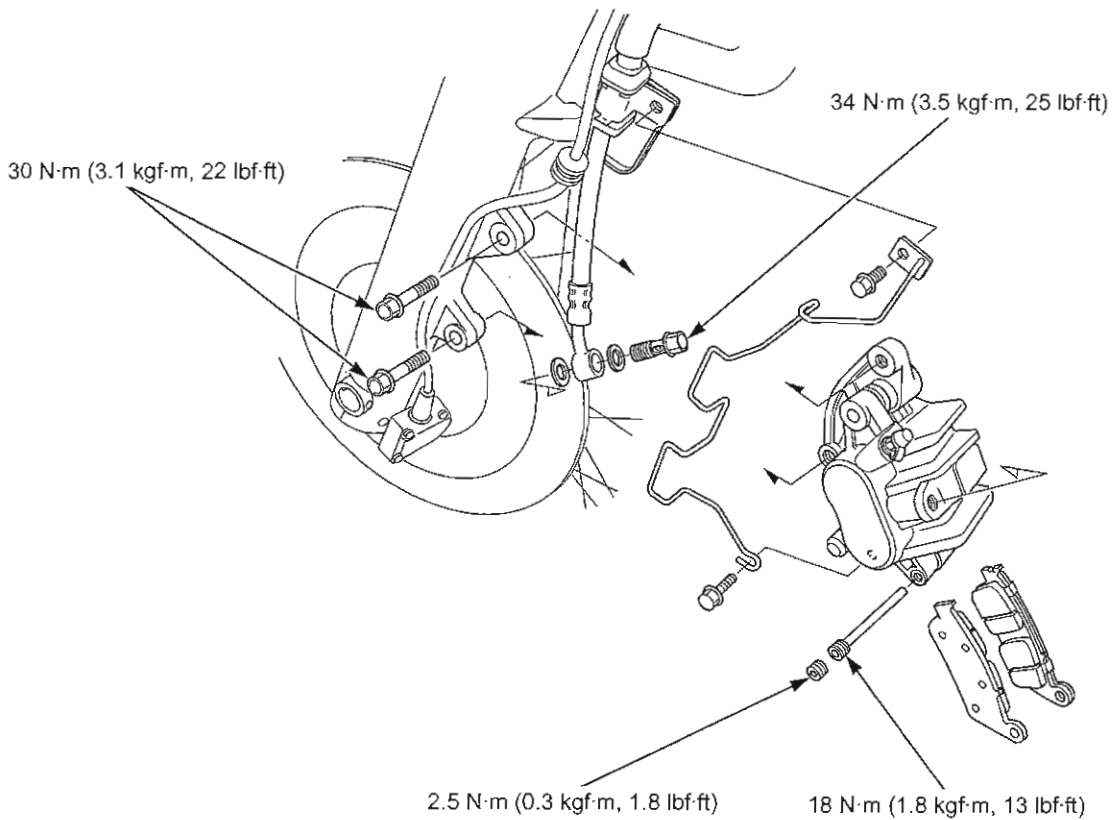
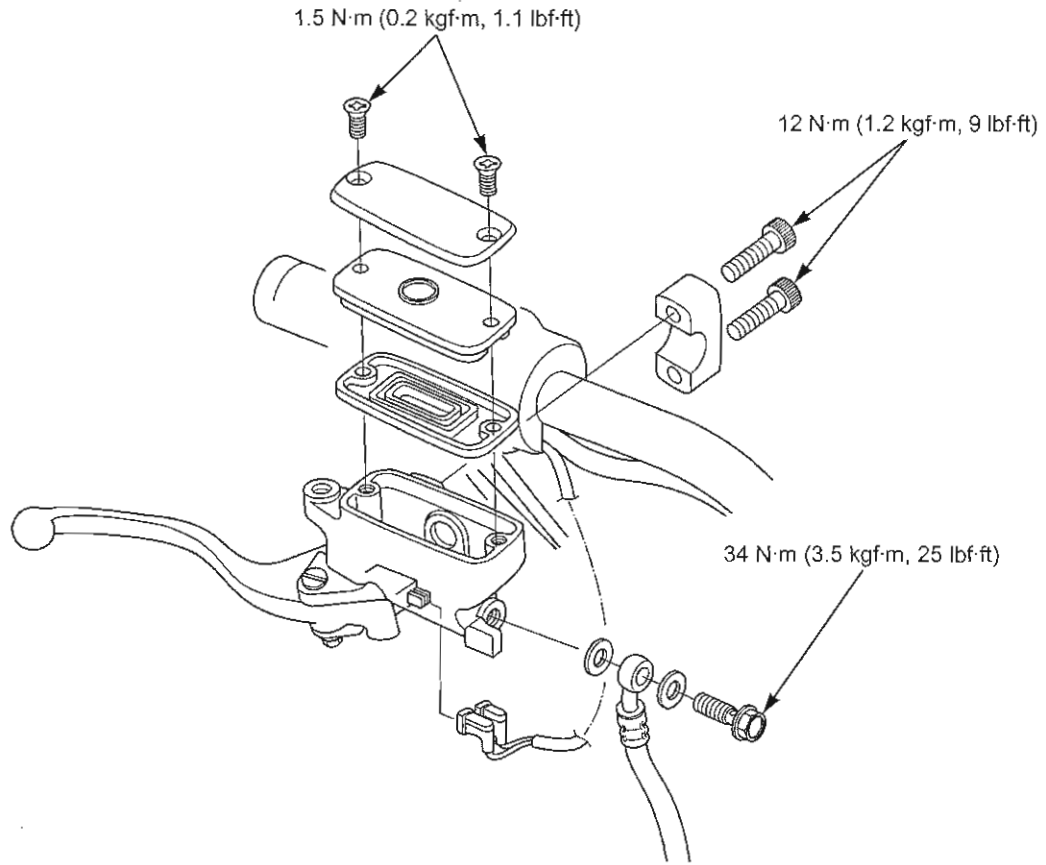
③

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

15. HYDRAULIC BRAKE

| | | | |
|--|------|----------------------------|-------|
| COMPONENT LOCATION..... | 15-2 | BRAKE PAD/DISC..... | 15-7 |
| SERVICE INFORMATION..... | 15-3 | FRONT MASTER CYLINDER..... | 15-8 |
| TROUBLESHOOTING..... | 15-4 | FRONT BRAKE CALIPER..... | 15-13 |
| BRAKE FLUID REPLACEMENT/AIR
BLEEDING..... | 15-5 | | |

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

⚠ CAUTION

- Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
 - Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

NOTICE

Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- 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 |
|-------------------------|-----------------------------------|-----------------|
| Recommended brake fluid | DOT 4 | — |
| Brake disc thickness | 6.0 ± 0.2 (0.23 ± 0.01) | 5.0 (0.20) |
| Brake disc warpage | — | 0.30 (0.012) |
| Master cylinder I.D. | 11.000 – 11.043 (0.4331 – 0.4348) | 11.055 (0.4352) |
| Master piston O.D. | 10.957 – 10.984 (0.4314 – 0.4324) | 10.945 (0.4309) |
| Caliper cylinder I.D. | 25.400 – 25.450 (1.0000 – 1.0020) | 25.460 (1.0024) |
| Caliper piston O.D. | 25.335 – 25.368 (0.9974 – 0.9987) | 25.320 (0.9968) |

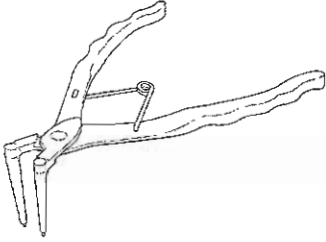
TORQUE VALUES

| | | |
|-------------------------------------|---------------------------------|-------------------------------------|
| Brake caliper bleed valve | 5.5 N·m (0.6 kgf·m, 4.1 lbf·ft) | |
| Master cylinder reservoir cap screw | 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft) | |
| Brake pad pin | 18 N·m (1.8 kgf·m, 13 lbf·ft) | |
| Brake pad pin plug | 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft) | |
| Brake hose oil bolt | 34 N·m (3.5 kgf·m, 25 lbf·ft) | |
| Brake lever pivot bolt | 1 N·m (0.1 kgf·m, 0.7 lbf·ft) | |
| Brake lever pivot nut | 6 N·m (0.6 kgf·m, 4.4 lbf·ft) | |
| Front brake light switch screw | 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft) | |
| Master cylinder holder bolt | 12 N·m (1.2 kgf·m, 9 lbf·ft) | |
| Brake caliper bracket pin | 12 N·m (1.2 kgf·m, 9 lbf·ft) | Apply locking agent to the threads. |
| Brake caliper pin | 27 N·m (2.8 kgf·m, 20 lbf·ft) | Apply locking agent to the threads. |
| 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 pads/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pads/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper pistons
- Sticking/worn master piston
- Bent brake lever

Brake lever hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper pistons
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever

Brake drag

- Contaminated brake pads/disc
- Misaligned wheel
- Badly worn brake pads/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper pistons

BRAKE FLUID REPLACEMENT/AIR BLEEDING

NOTE:

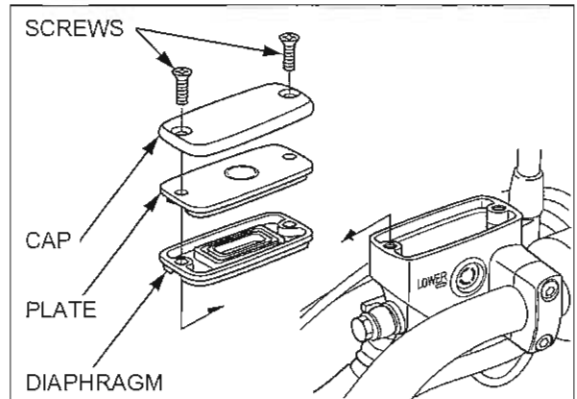
- Do not allow foreign material to enter the system when filling the reservoir.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

BRAKE FLUID DRAINING

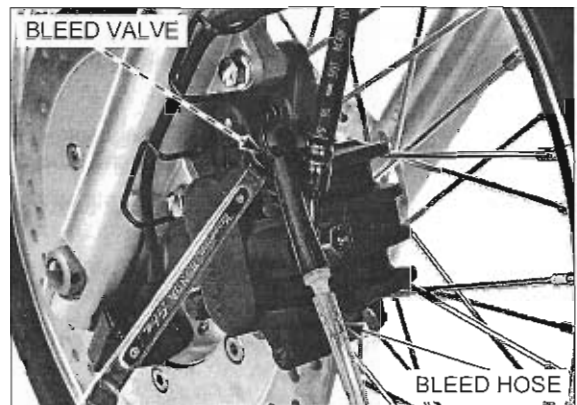
Turn the handlebar to the left until the front master cylinder reservoir is level before removing the reservoir cap.

Remove the following:

- Screws
- Reservoir cap
- Set plate
- 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.



BRAKE FLUID FILLING/BLEEDING

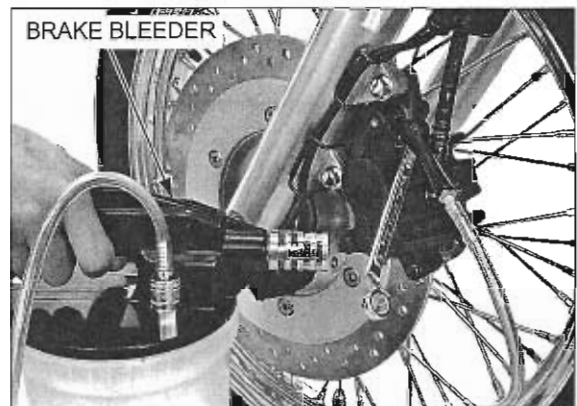
Fill the reservoir with DOT 4 brake fluid from a sealed container.

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.



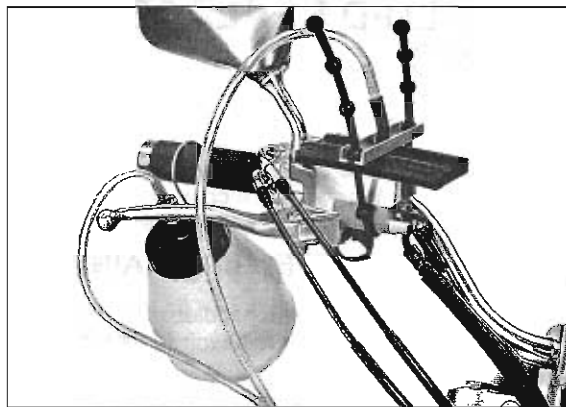
HYDRAULIC BRAKE

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.

1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.

NOTE:

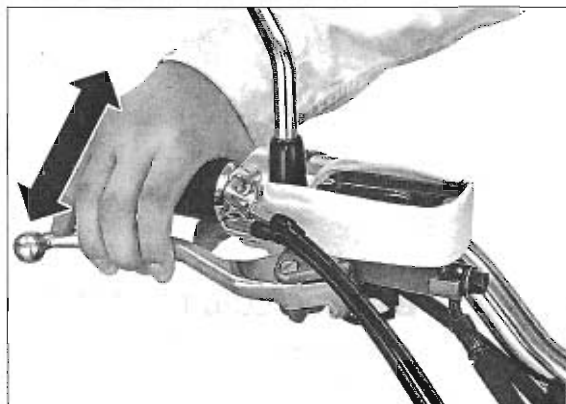
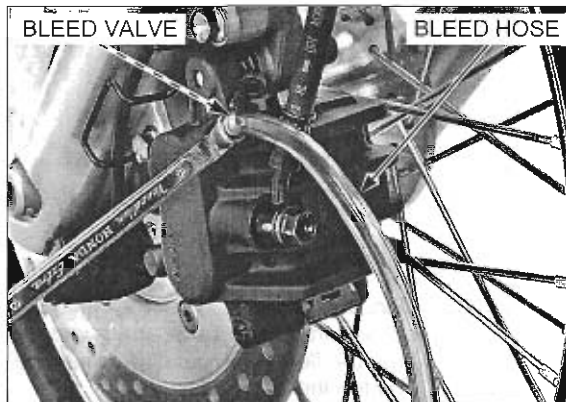
Do not release the lever until the bleed valve has been closed.

2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

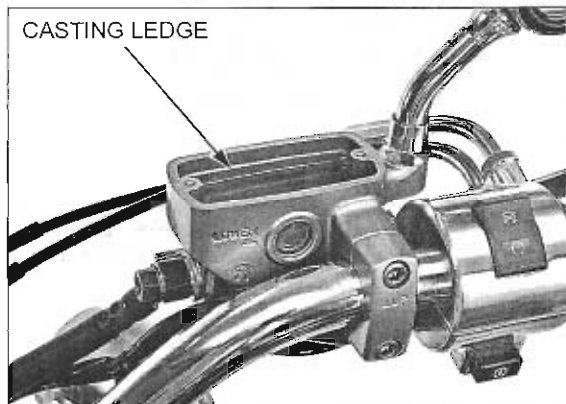
Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

After bleeding the air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)



Fill the reservoir to the casting ledge with DOT 4 brake fluid.

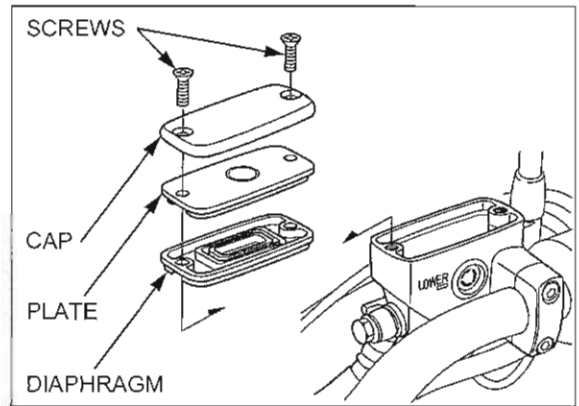


Install the following:

- Diaphragm
- Set plate
- Reservoir cap
- Screws

Tighten the screws to the specified torque.

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

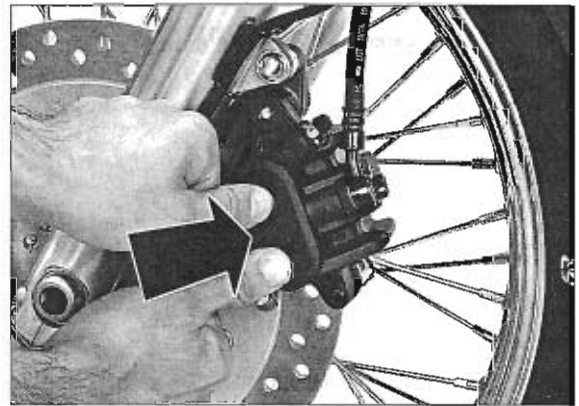


BRAKE PAD/DISC

BRAKE PAD REPLACEMENT

Check the brake fluid level in the reservoir as this operation causes the level to rise.

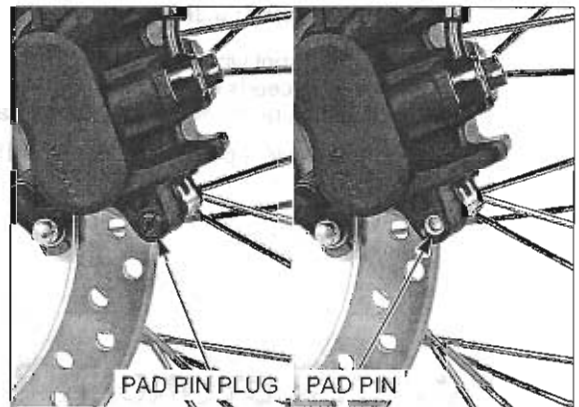
Push the caliper piston all the way in to allow installation of new brake pads.



Remove the pad pin plug and loosen the pad pin.

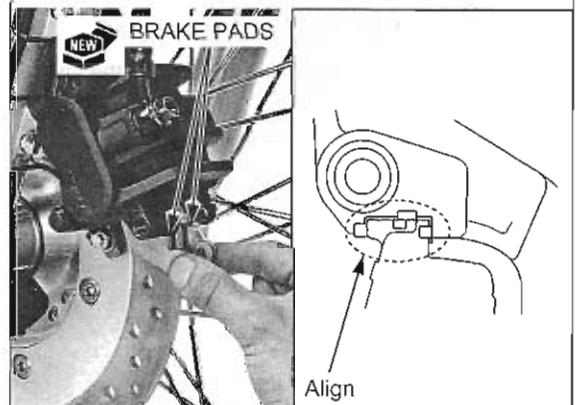
Pull the pad pin out of the caliper body while pushing in the pads against the pad spring.

Remove the brake pads.



Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure.

Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.



HYDRAULIC BRAKE

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads with the caliper body.

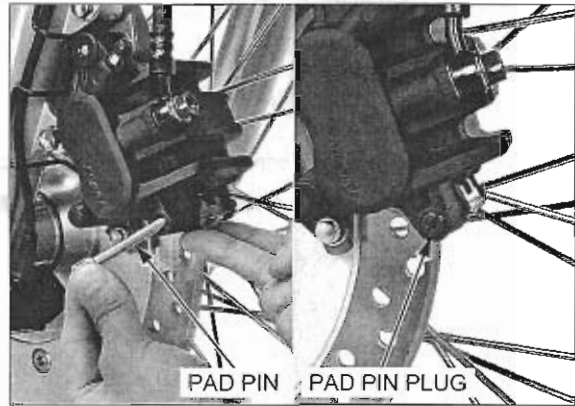
Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug and tighten it to the specified torque.

TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)

Operate the brake lever to seat the caliper piston against the pads.

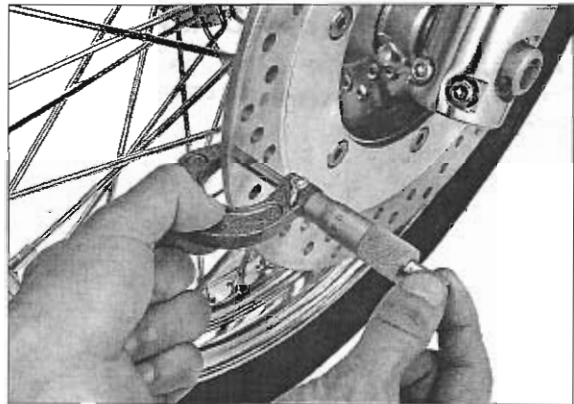


BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

SERVICE LIMIT: 5.0 mm (0.20 in)



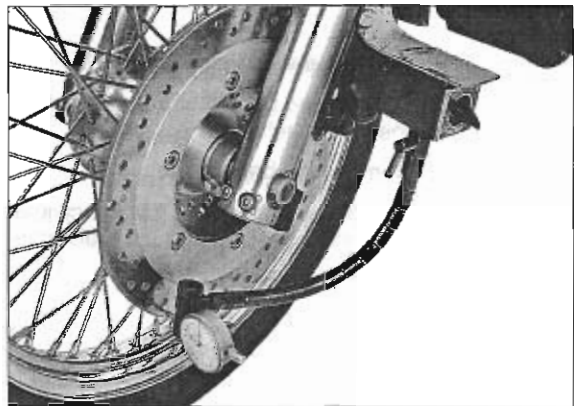
Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.30 mm (0.012 in)

Check the front wheel bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the bearings are normal.

For brake disc replacement (page 13-15).



FRONT MASTER CYLINDER

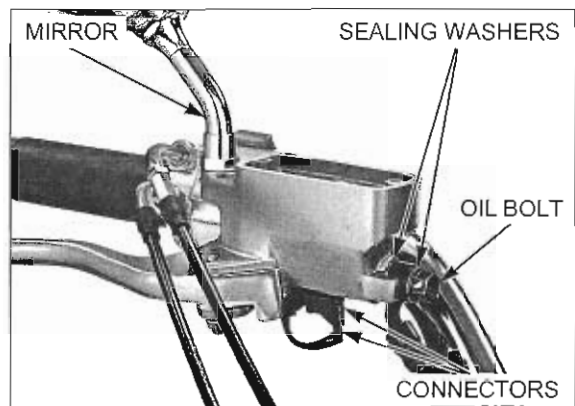
DISASSEMBLY

Drain the brake fluid from the hydraulic system (page 15-5).

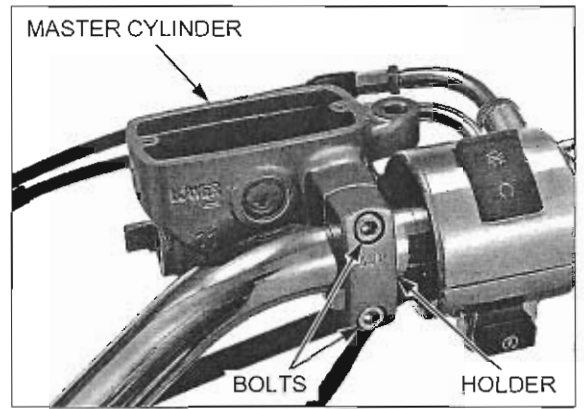
Remove the rearview mirror.

When removing the oil bolt, cover the end of the hose to prevent contamination.

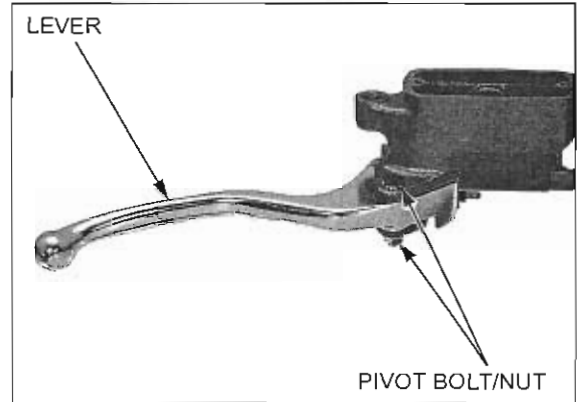
Remove the oil bolt and sealing washers. Disconnect the front brake light switch connectors.



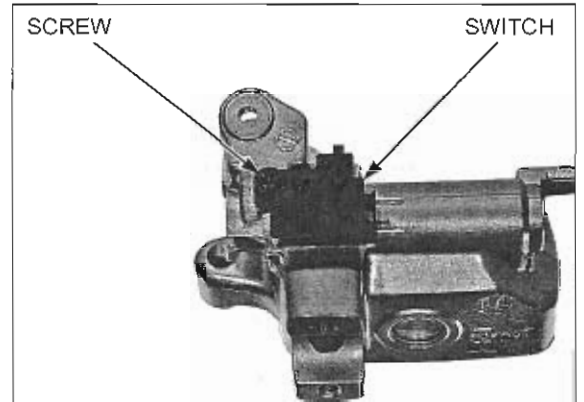
Remove the bolts, holder and master cylinder.



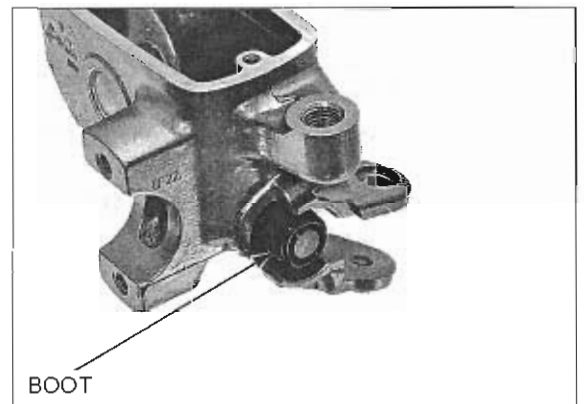
Remove the nut, pivot bolt and brake lever.



Remove the screw and front brake light switch.



Remove the boot.



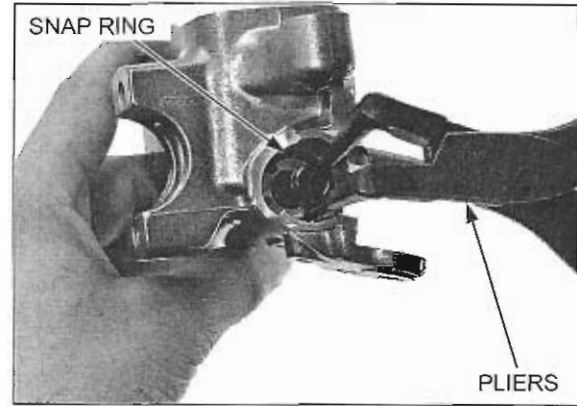
HYDRAULIC BRAKE

Remove the snap ring using a special tool.

TOOL:

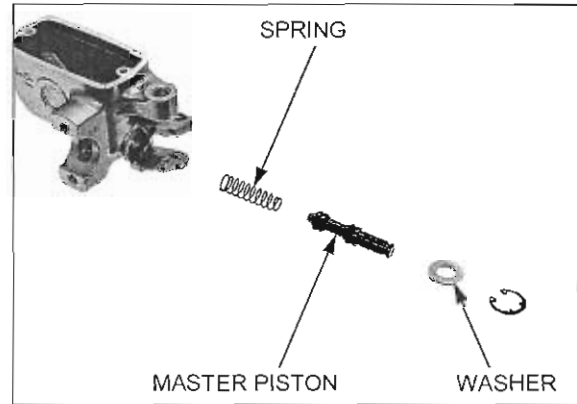
Snap ring pliers

07914-SA50001



Remove the washer, master piston and spring.

Clean the master cylinder, reservoir and master piston in clean brake fluid.



INSPECTION

Check the master cylinder for abnormal scratches or damage.

Measure the master cylinder I.D.

SERVICE LIMIT: 11.055 mm (0.4352 in)

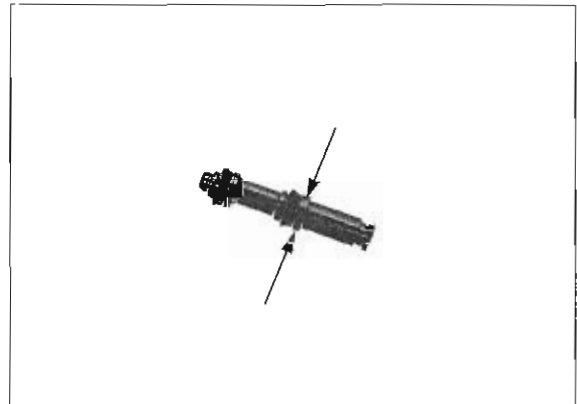


Check the piston cups and boot for wear, deterioration or damage.

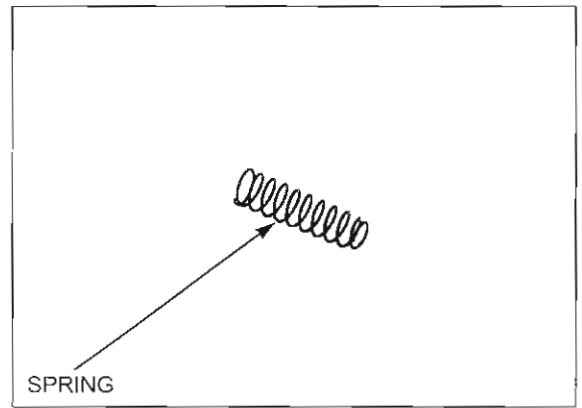
Check the master piston for abnormal scratches or damage.

Measure the master piston O.D.

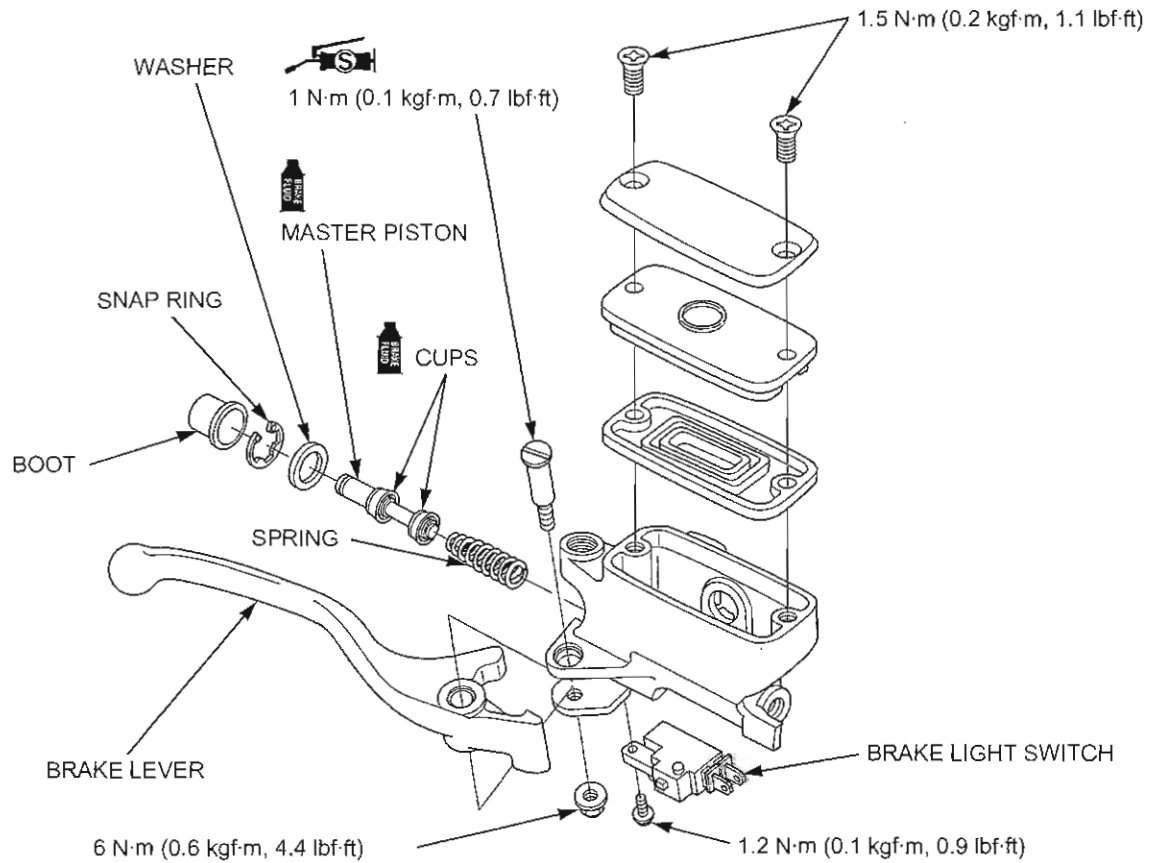
SERVICE LIMIT: 10.945 mm (0.4309 in)



Check the spring for fatigue or damage.



ASSEMBLY



NOTE:

Replace the piston, spring, cups, washer and snap ring as a set.

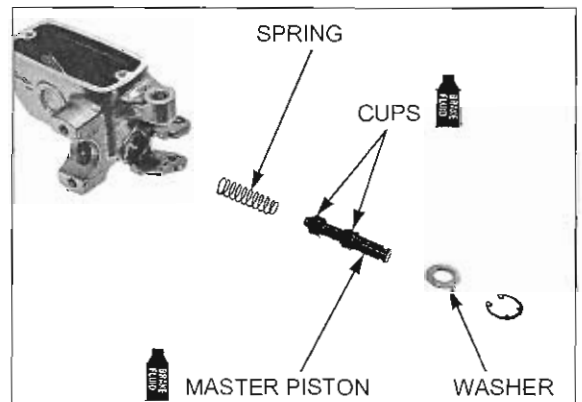
Coat the master piston and piston cups with clean brake fluid.

Install the spring onto the piston end.

Install the master piston/spring into the master cylinder.

Install the washer on the piston.

Do not allow the piston cup lips to turn inside out.



HYDRAULIC BRAKE

Install the snap ring into the groove in the master cylinder using a special tool.

TOOL:

Snap ring pliers

07914-SA50001

NOTE:

- 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.

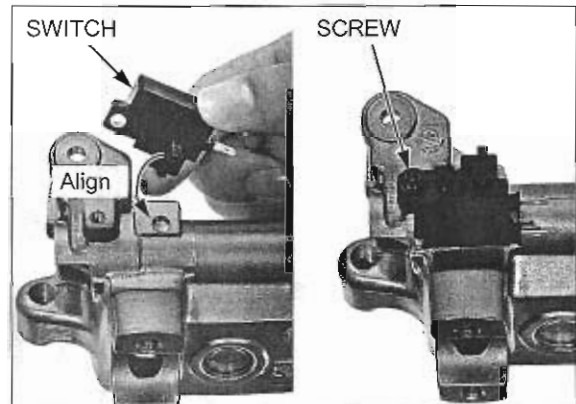
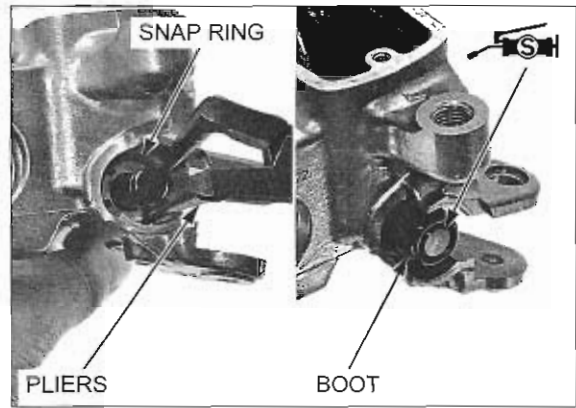
Install the boot into the master cylinder and piston groove.

Apply 0.1 g of silicone grease to the brake lever contacting area 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: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



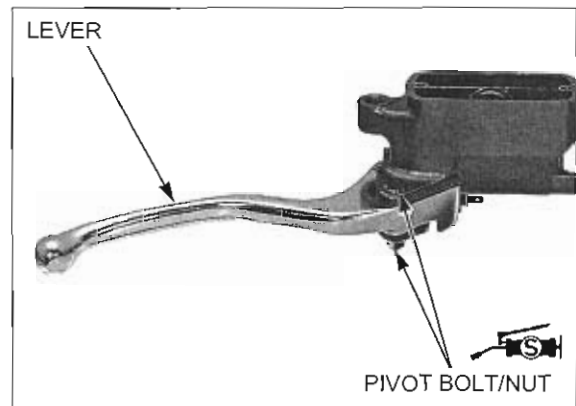
Apply 0.1 g of silicone grease to the brake lever pivot sliding surface.

Install the brake lever and pivot bolt, and tighten it to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Tighten the nut to the specified torque while holding the pivot bolt.

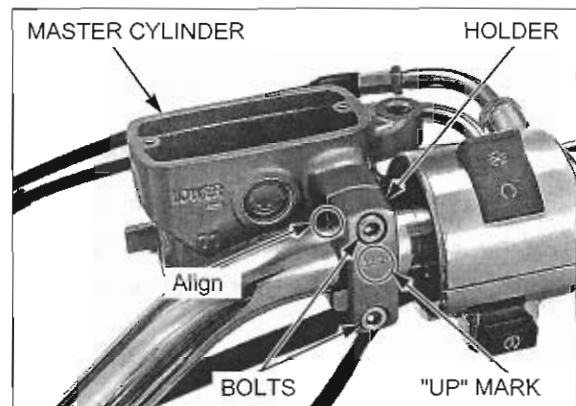
TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)



Install the holder with its "UP" mark facing up.

Install the master cylinder with the 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 to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the brake hose to the master cylinder with the oil bolt and new sealing washers.

NOTE:

Be sure to rest the hose joint against the stopper.

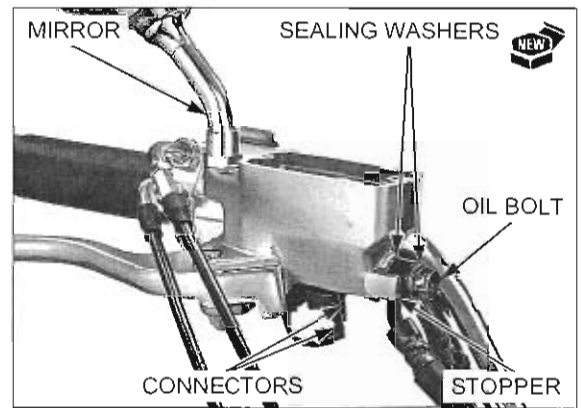
Tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the rearview mirror.

Connect the brake light switch connectors.

Fill and bleed the hydraulic system (page 15-5).



FRONT BRAKE CALIPER

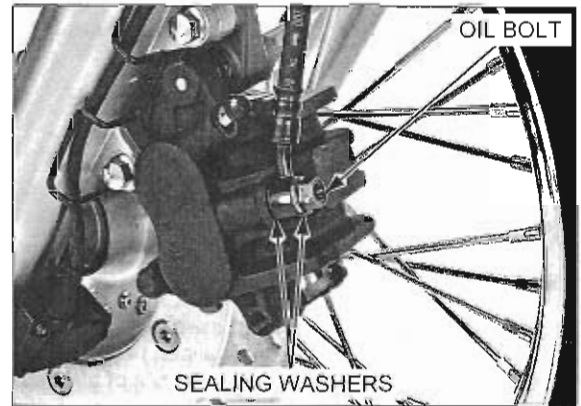
DISASSEMBLY

Drain the brake fluid from the hydraulic system (page 15-5).

Remove the brake pads (page 15-7).

Remove the oil bolt and sealing washers.

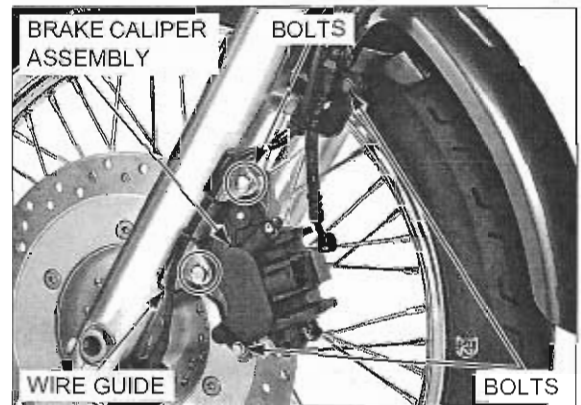
When removing the oil bolt, cover the end of hose to prevent contamination.



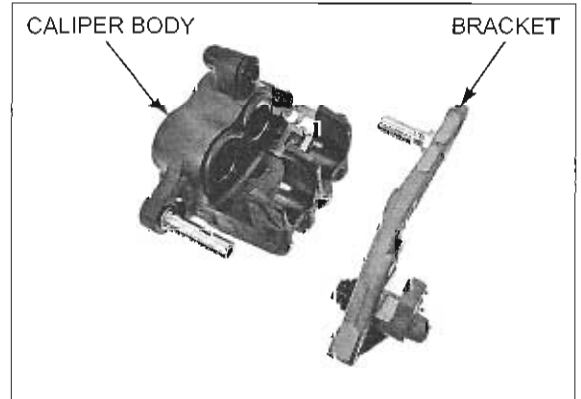
Remove the bolts and speed sensor wire guide.

Remove the bolts and brake caliper assembly.

Do not reuse the caliper mounting bolts.

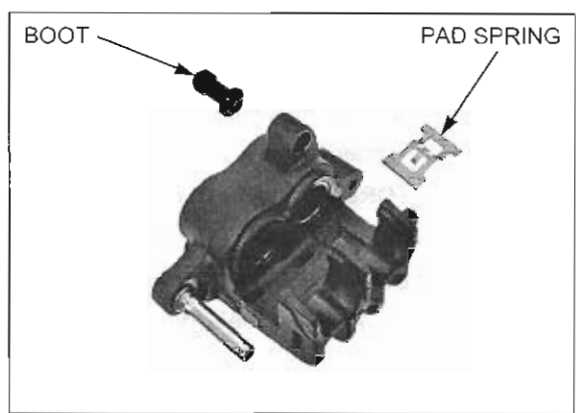


Remove the bracket from the caliper body.

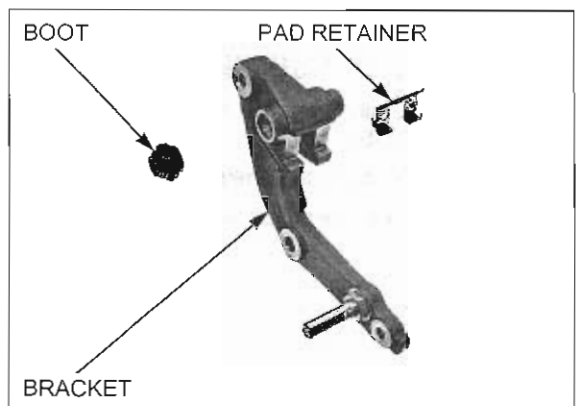


HYDRAULIC BRAKE

Remove the bracket pin boot and pad spring from the caliper body.



Remove the caliper pin boot and pad retainer from the bracket.
Clean the retainer and bracket mating surfaces.



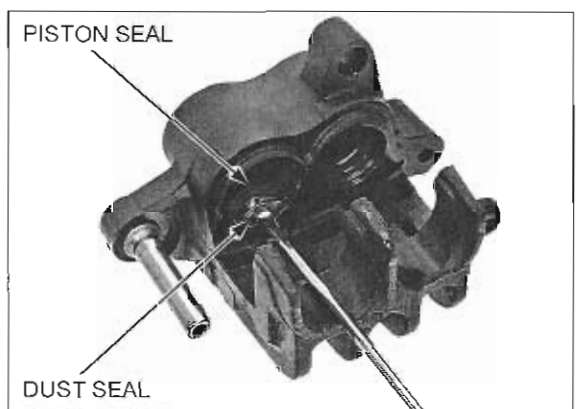
Do not use high pressure air or bring the nozzle too close the inlet.

Place a shop towel over the pistons.
Position the caliper body with the piston facing down and apply short bursts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust and piston seals in and lift them out.
Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.

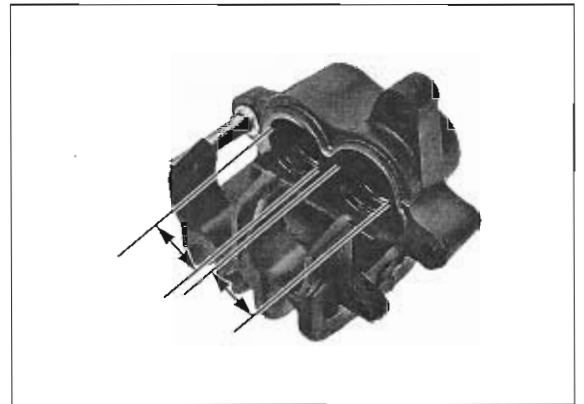


INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

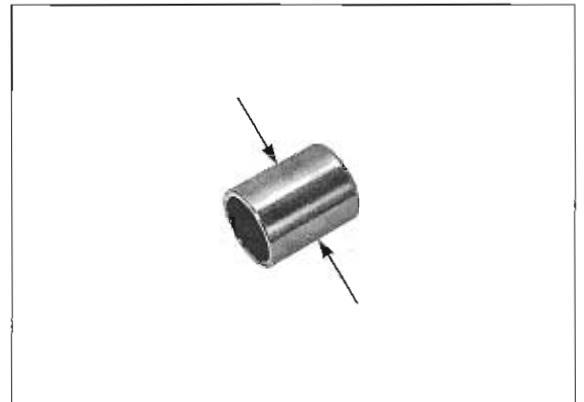
SERVICE LIMIT: 25.460 mm (1.0024 in)



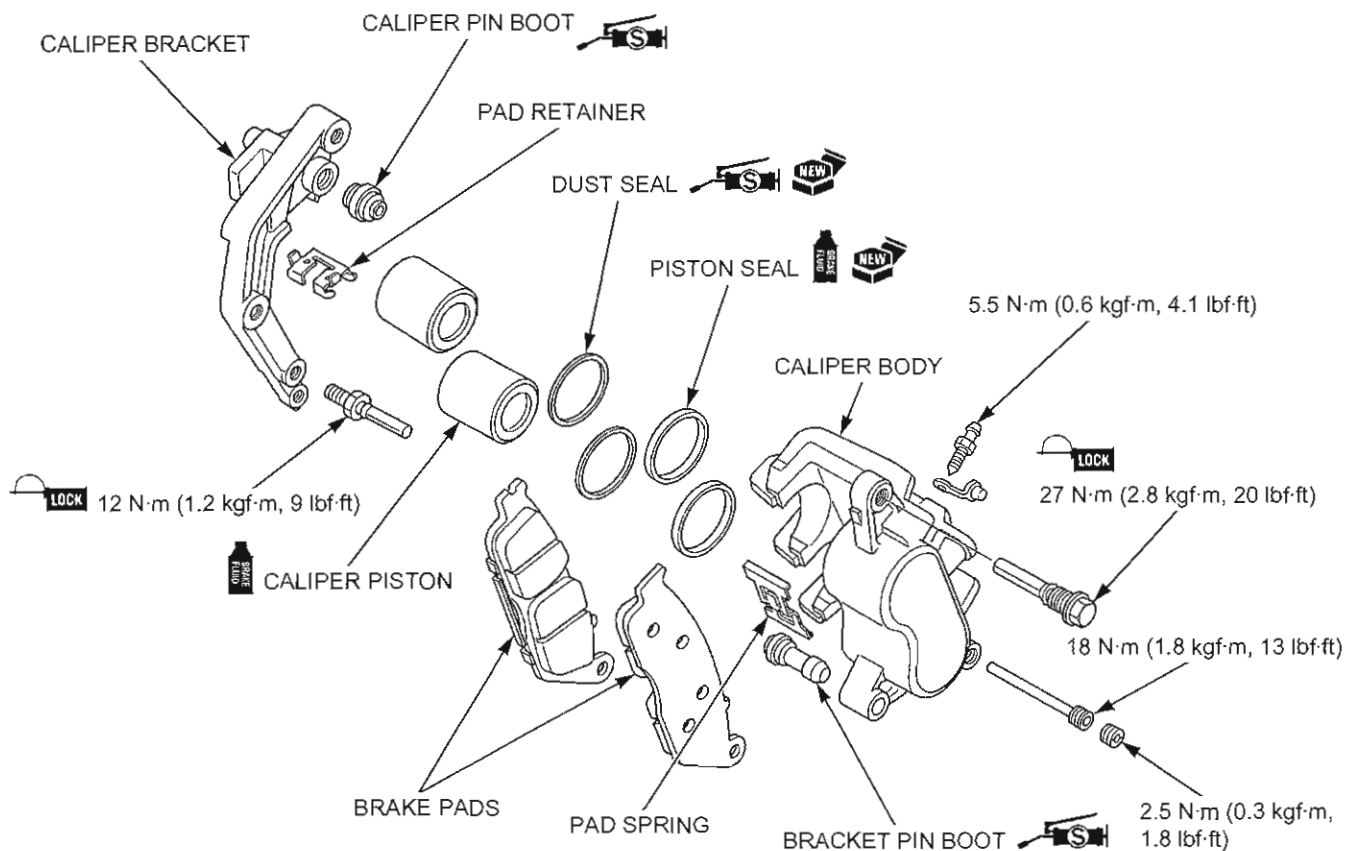
Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 25.320 mm (0.9968 in)



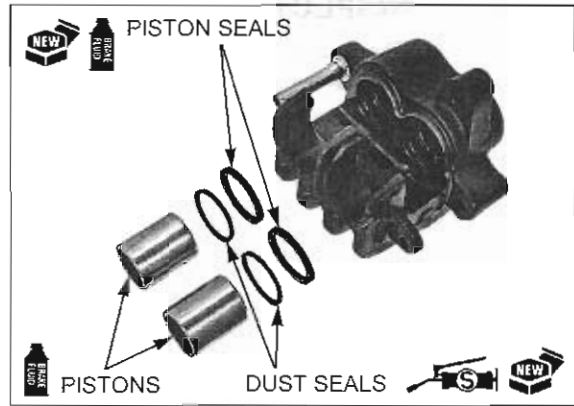
ASSEMBLY



HYDRAULIC BRAKE

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 it is hard, deteriorated or damaged.

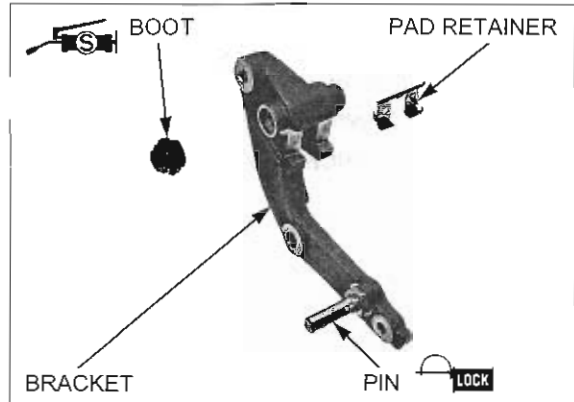
Apply 0.4 g of silicone grease to the inside of the caliper pin boot.

Install the caliper pin boot in the bracket.

Apply Honda Bond A or Pro Honda hand grip cement (U.S.A. only) 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 to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



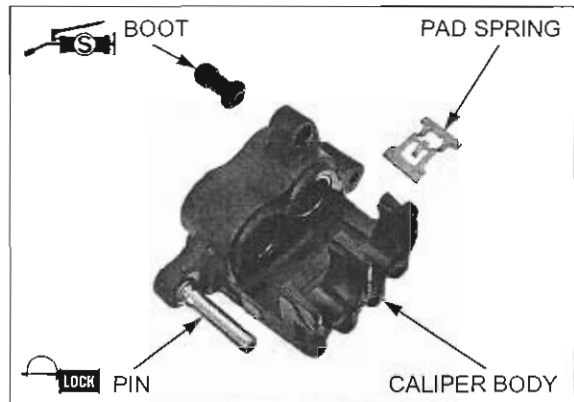
Check the bracket pin boot and replace it if it is hard, deteriorated or damaged.

Apply 0.4 g of silicone grease to the inside of the bracket pin boot.

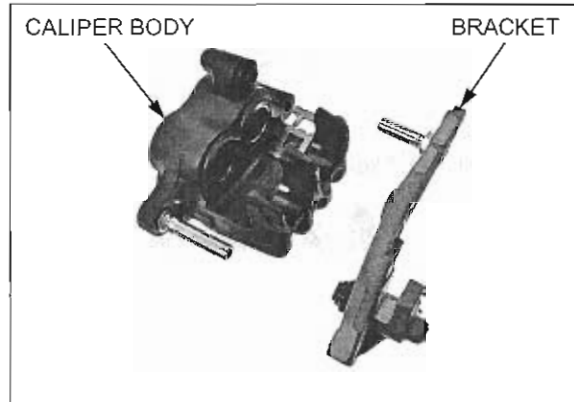
Install the bracket pin boot and pad spring onto the caliper body.

If the caliper pin is removed, apply locking agent to the threads and tighten it to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Install the caliper bracket to the caliper body.

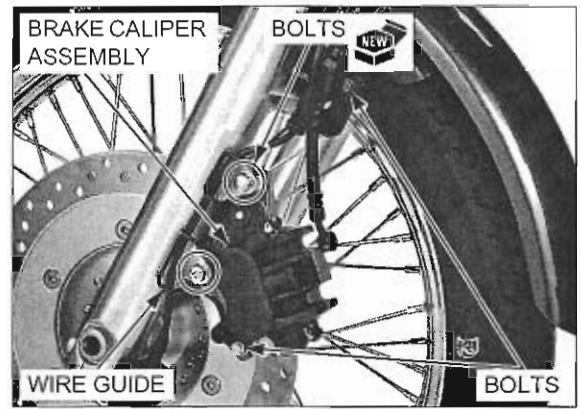


Install the brake caliper assembly so the disc is positioned between the pads, being careful not to damage the pads.

Install new caliper mounting bolts and tighten them to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install and tighten the bolts and speed sensor wire guide.

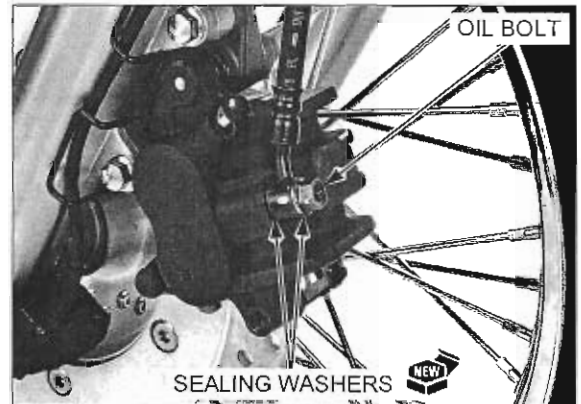


Connect the brake hose to the caliper body with the oil bolt and new sealing washers, and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 15-7).

Fill and bleed the hydraulic system (page 15-5).

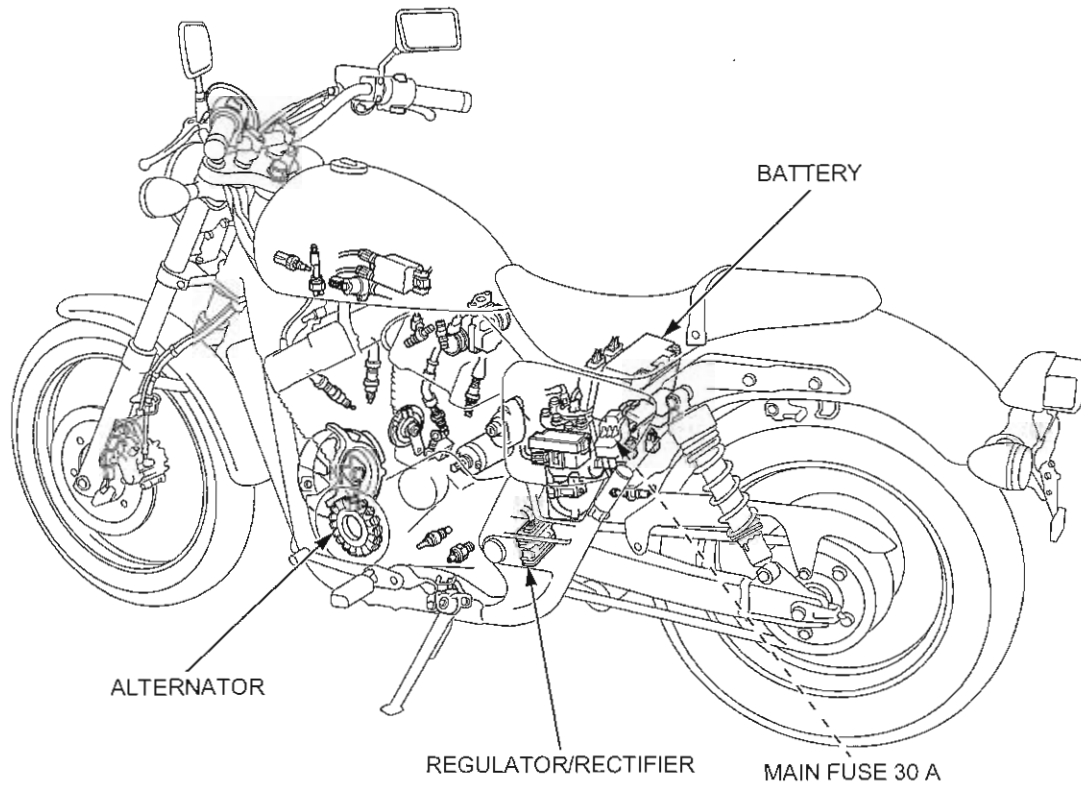


16. BATTERY/CHARGING SYSTEM

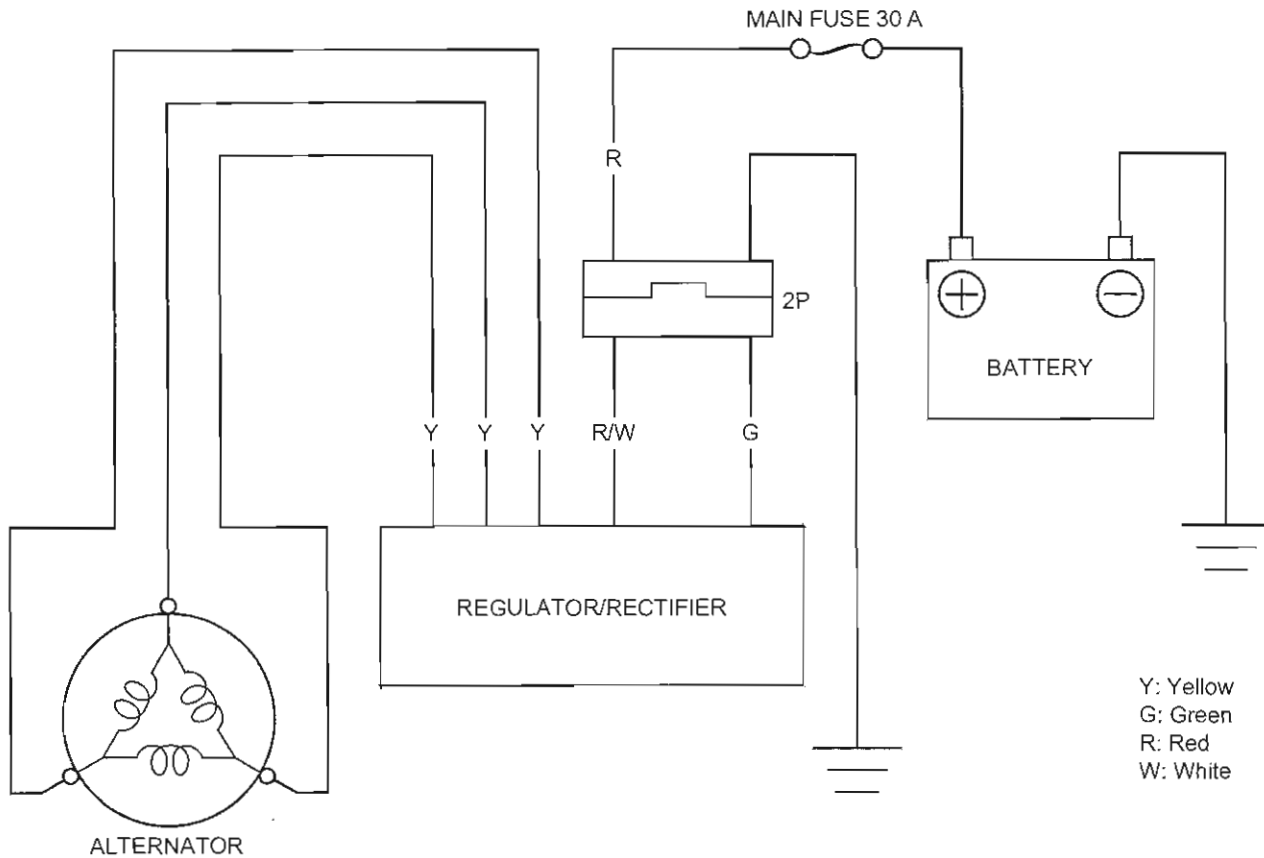
| | | | |
|--------------------------|------|---------------------------------|------|
| SYSTEM LOCATION..... | 16-2 | BATTERY..... | 16-6 |
| SYSTEM DIAGRAM..... | 16-2 | CHARGING SYSTEM INSPECTION..... | 16-7 |
| SERVICE INFORMATION..... | 16-3 | REGULATOR/RECTIFIER..... | 16-8 |
| TROUBLESHOOTING..... | 16-5 | ALTERNATOR CHARGING COIL..... | 16-9 |

BATTERY/CHARGING SYSTEM

SYSTEM LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or call a physician immediately.

NOTICE

- *Always turn off the ignition switch before disconnecting any electrical component.*
- *Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is 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 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 16-5).
- For alternator service (page 11-3).
- 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 | |

BATTERY CHARGING

- Turn power ON/OFF at the charger, not at the battery terminal.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.
- Quick charging should only be done in an emergency; slow charging is preferred.

BATTERY TESTING

Refer to the battery tester's Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

Recommended battery tester: Micro 404XL (U.S.A. only)

BATTERY/CHARGING SYSTEM

SPECIFICATIONS

| ITEM | | SPECIFICATIONS | |
|------------|--------------------------------------|--------------------|----------------|
| Battery | Capacity | 12 V – 11.2 Ah | |
| | 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 | 0.399 kW/5,000 rpm | |
| | Charging coil resistance (20°C/68°F) | 0.1 – 1.0 Ω | |

TORQUE VALUE

Battery case lid screw

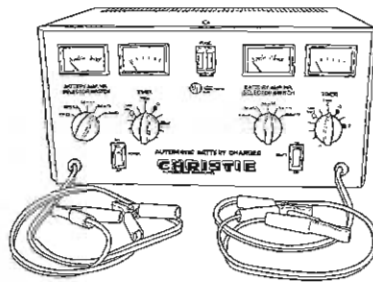
1 N·m (0.1 kgf·m, 0.7 lbf·ft)

TOOLS

Motorcycle battery analyzer
Micro 404XL (U.S.A. only)



Christie battery charger
MC1012/2T (U.S.A. only)



TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST

Remove the battery (page 16-6).

Check the battery condition using the recommended battery tester.

Recommended battery tester: Micro 404XL (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 16-6).

Check the battery current leakage test (Leak test; page 16-7).

Is the current leakage below 1 mA?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER 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 16-9).

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 16-7).

Start the engine.

Measure the charging voltage (page 16-8).

Compare the measurements to result of the following calculation.

STANDARD: Measured BV < Measured CV < 15.5 V

•BV = Battery Voltage (page 16-7)

•CV = Charging Voltage

Is the measured charging voltage within the standard voltage?

YES – Faulty battery

NO – GO TO STEP 6.

6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connector (page 16-8).

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 seat (page 2-3).

Remove the screw and open the battery case lid.

Turn the ignition switch OFF and 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.

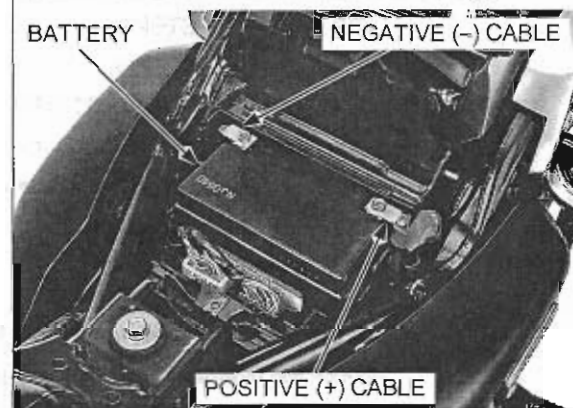
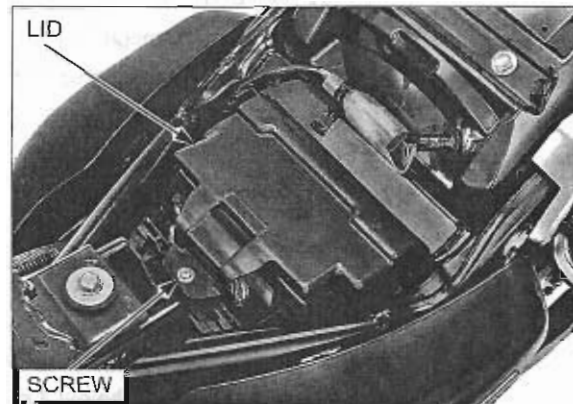
NOTE:

Connect the positive (+) cable first, then connect the negative (-) cable.

TORQUE:

Battery case lid screw:

1 N·m (0.1 kgf·m, 0.7 lbf·ft)



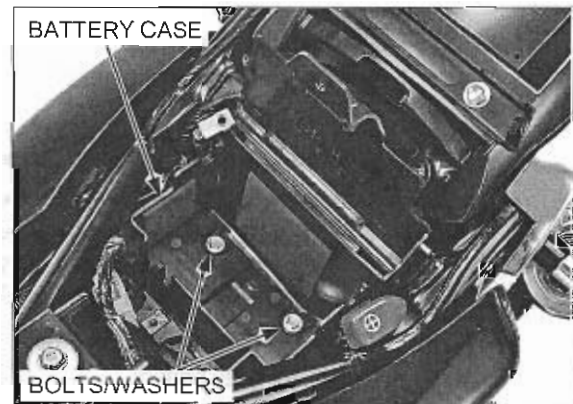
BATTERY CASE REMOVAL/INSTALLATION

Remove the following:

- Battery (page 16-6)
- ECM (page 5-60)

Remove the bolts, washers and battery case.

Installation is in the reverse order of removal.



VOLTAGE INSPECTION

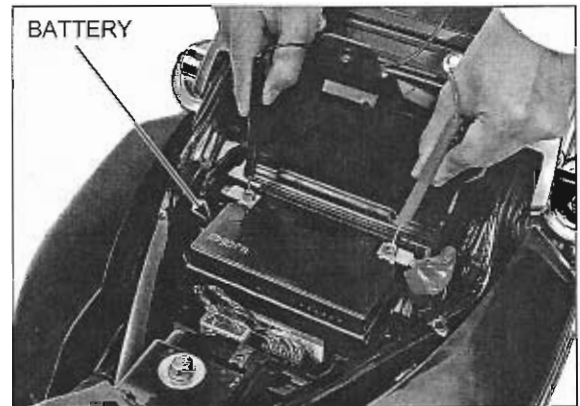
Open the battery case lid (page 16-6).

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F):

Fully charged: 13.0 – 13.2 V

Needs charging: Below 12.4 V



BATTERY TESTING

Remove the battery (page 16-6).

Refer to the instructions that are appropriate to the battery testing equipment available to you.

TOOL:

Motorcycle battery analyzer **Micro 404XL**
(U.S.A. only)

BATTERY CHARGING (U.S.A. only)

Remove the battery (page 16-6).

Refer to the instructions that are appropriate to the battery charging equipment available to you.

TOOL:

Christie battery charger **MC1012/2T**
(U.S.A. only)

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE TEST

Open the battery case lid (page 16-6).

Turn the ignition switch OFF and 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.

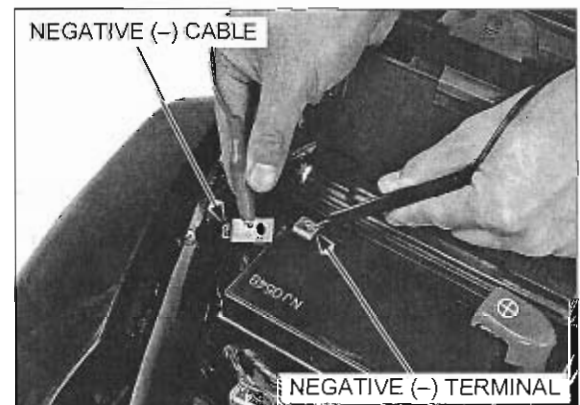
NOTE:

- 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 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.



BATTERY/CHARGING SYSTEM

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.

Open the battery case lid (page 16-6).

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.

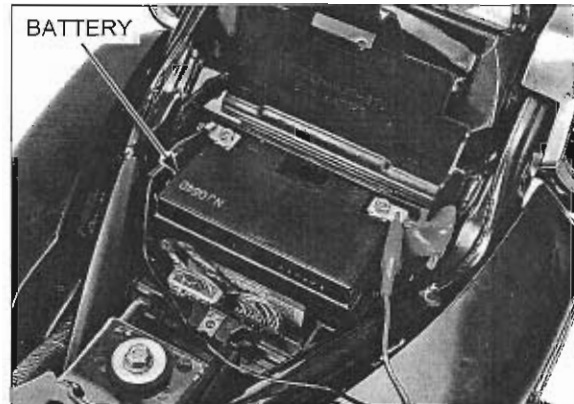
Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

STANDARD:

Measured BV < Measured CV < 15.5 V

- BV = Battery Voltage (page 16-7)
- CV = Charging Voltage

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.



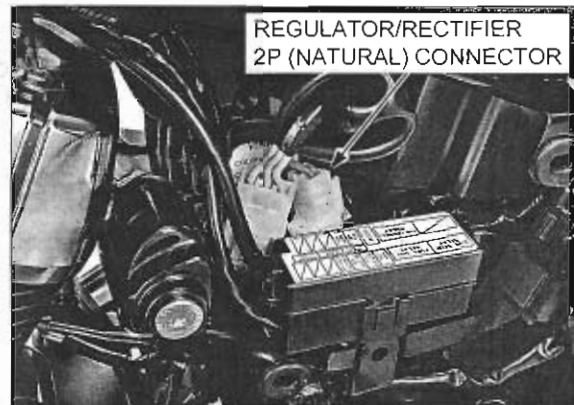
REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

BATTERY CHARGING LINE

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

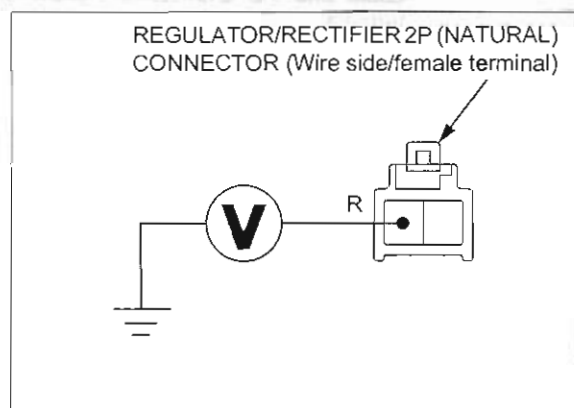
With the ignition switch turned to OFF, disconnect the regulator/rectifier 2P (Natural) connector.



Measure the voltage between the regulator/rectifier 2P (Natural) connector of the wire side and ground.

CONNECTION: Red (+) – Ground (-)

There should be battery voltage at all times.



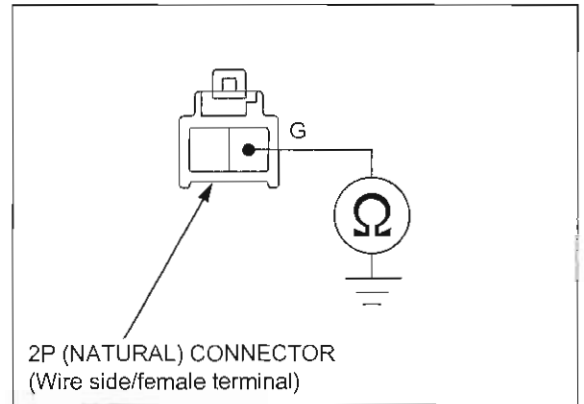
GROUND LINE

Check for continuity between the regulator/rectifier 2P (Natural) connector of the wire side and ground.

CONNECTION: Green – Ground

There should be continuity at all times.

If all components of the charging system are normal and there are no loose connection at the regulator/rectifier connector, replace the regulator/rectifier.



REMOVAL/INSTALLATION

Remove the following:

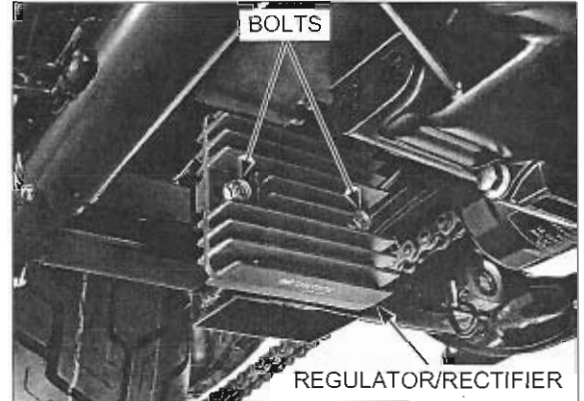
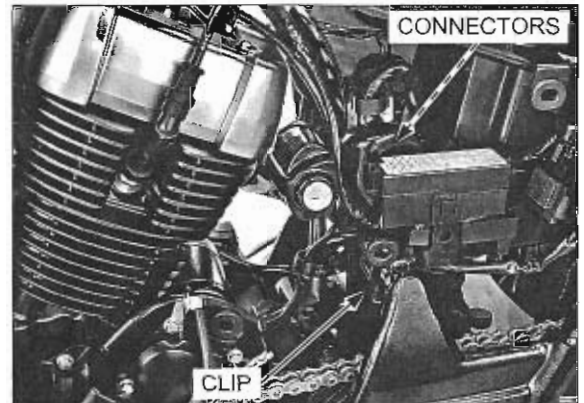
- Left side cover (page 2-3)
- Left crankcase rear cover (page 2-4)

Remove the clip.

With the ignition switch turned to OFF, disconnect the regulator/rectifier 2P (Natural) and alternator 3P (Natural) connectors.

Remove the bolts and regulator/rectifier.

Install the regulator/rectifier in the reverse order of removal.

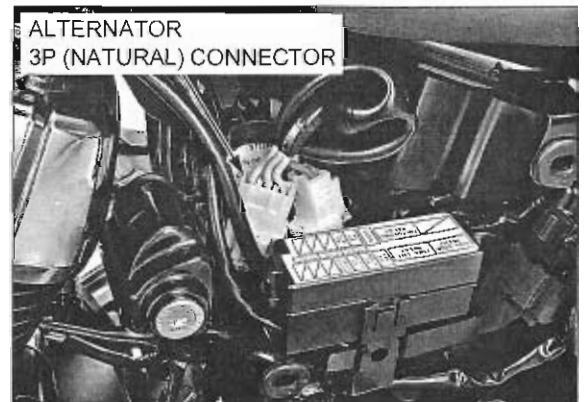


ALTERNATOR CHARGING COIL

INSPECTION

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

With the ignition switch turned to OFF, disconnect the alternator 3P (Natural) connector.



BATTERY/CHARGING SYSTEM

Measure the resistance at the alternator/stator side connector of all terminals.

CONNECTION: Yellow – Yellow

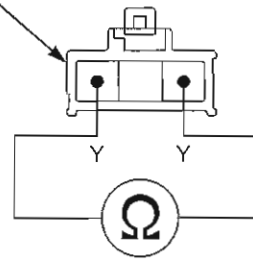
STANDARD: 0.1 – 1.0 Ω at 20°C (68°F)

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 (page 11-4).

ALTERNATOR 3P (NATURAL) CONNECTOR
(Alternator/stator side/female terminal)

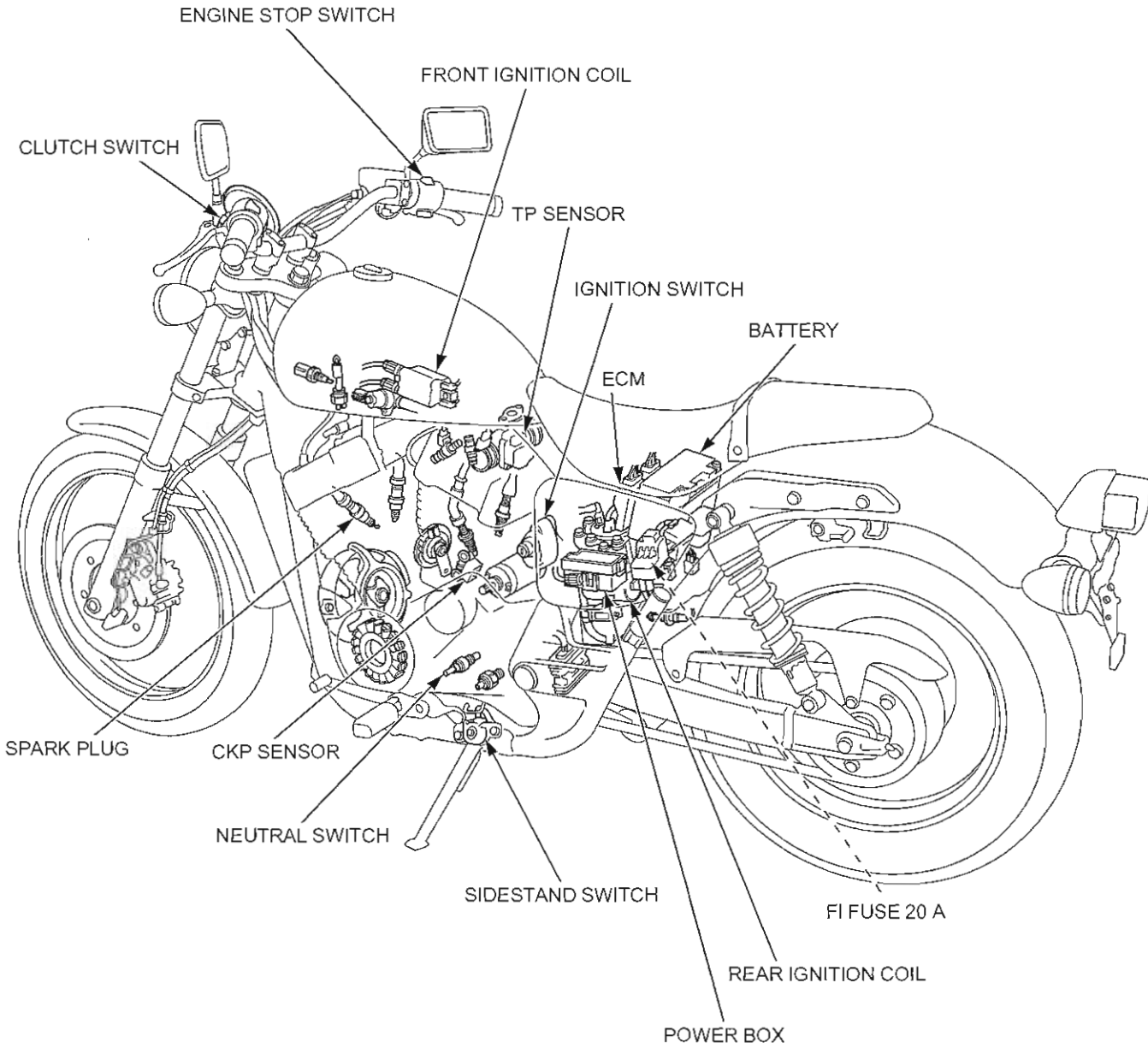


17. IGNITION SYSTEM

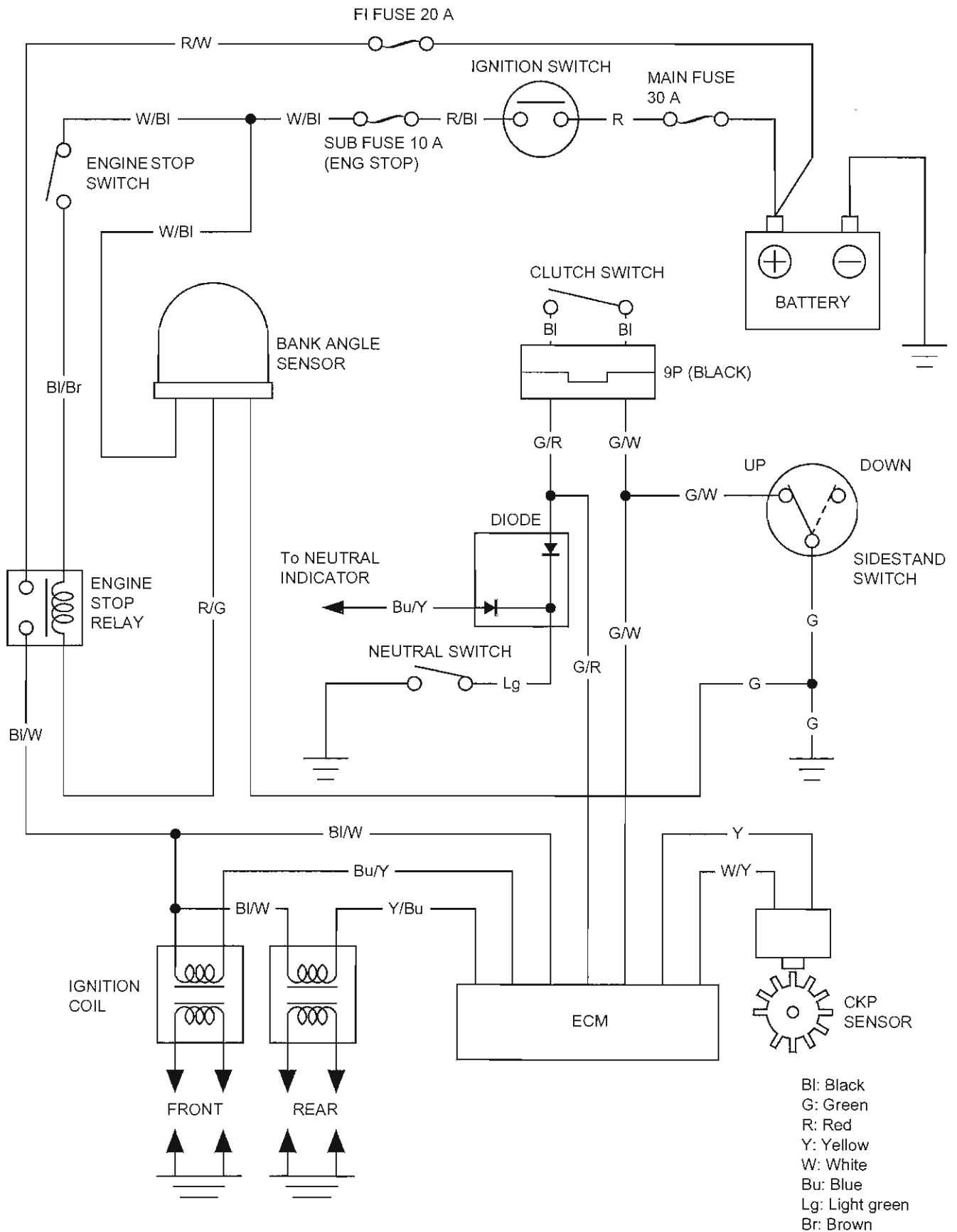
| | | | |
|---------------------------|------|----------------------------------|-------|
| SYSTEM LOCATION..... | 17-2 | IGNITION SYSTEM INSPECTION | 17-6 |
| SYSTEM DIAGRAM | 17-3 | IGNITION COIL | 17-9 |
| SERVICE INFORMATION | 17-4 | IGNITION TIMING | 17-10 |
| TROUBLESHOOTING..... | 17-5 | | |

IGNITION SYSTEM

SYSTEM LOCATION



SYSTEM DIAGRAM



IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

NOTICE

- The ECM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn the ignition switch 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 (page 17-5).
- The ignition timing cannot be adjusted since the ECM is factory preset.
- 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 (page 3-7).
- Refer to the following components informations:
 - Ignition switch (page 19-16)
 - Engine stop switch (page 19-17)
 - Neutral switch (page 19-20)
 - Sidestand switch (page 19-20)
 - Diode (page 18-16)
 - ECM (page 5-59)
 - Bank angle sensor (page 5-56)
 - Engine stop relay (page 5-58)
 - Clutch switch (page 19-19)
- 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 | |

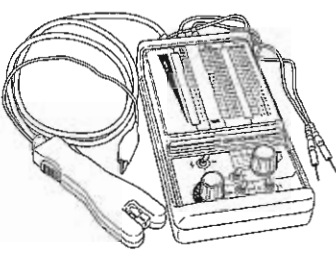
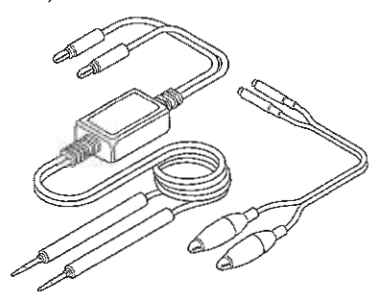
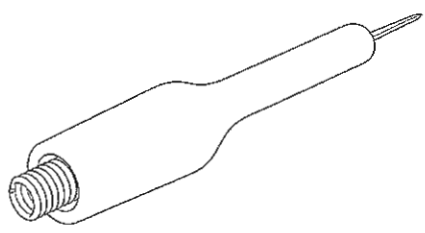
SPECIFICATIONS

| ITEM | | SPECIFICATIONS |
|--|--------------------------------|-----------------------------------|
| Spark plug | Standard | DPR7EA-9 (NGK), X22EPR-U9 (DENSO) |
| | For extended high speed riding | DPR8EA-9 (NGK), X24EPR-U9 (DENSO) |
| Spark plug gap | | 0.8 – 0.9 mm (0.03 – 0.04 in) |
| Ignition coil primary peak voltage | | 100 V minimum |
| Ignition timing ("F"mark) | | 8° BTDC at idle |
| CKP sensor peak voltage (at 20°C/68°F) | | 0.7 V minimum |

TORQUE VALUES

| | | |
|------------------------------|------------------------------|------------------------------|
| Alternator cover socket bolt | 10 N·m (1.0 kgf·m, 7 lbf·ft) | |
| Timing hole cap | 10 N·m (1.0 kgf·m, 7 lbf·ft) | Apply grease to the threads. |

TOOLS

| | | |
|--|---|--|
| <p>IgnitionMate peak voltage tester
MTP07-0286 (U.S.A. only)</p>  | <p>Peak voltage adaptor
07HGJ-0020100 (not available in
U.S.A.)</p>  <p>with commercially available digital
multimeter (impedance 10 MΩ/DCV
minimum)</p> | <p>Test probe
07ZAJ-RDJA110</p>  |
|--|---|--|

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 original 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 "O" (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 "O" (Other electrical components are normal). | <ol style="list-style-type: none"> 1. Faulty engine stop relay. 2. An open circuit in Black/white wire between the ignition coil and engine stop relay. 3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil. 4. Faulty ECM (in case when the initial voltage is normal with the ECM connector disconnected). |
| | Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine. | <ol style="list-style-type: none"> 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 between the Black/white (+) and body ground (-) at the ECM connector or loosen ECM connection. 4. An open circuit or loose connection in Green wire at the ECM. 5. An open circuit or loose connection in Blue/yellow or Yellow/blue wires between the ignition coils and ECM. 6. Faulty sidestand switch, clutch switch or neutral switch. 7. Loose or poor connection or an open circuit in No. 6 related wires. <ul style="list-style-type: none"> – Sidestand switch line: Green/white wire – Neutral switch line: Light green wire – Clutch switch line: Green/white wire 8. Faulty CKP sensor (Measure peak voltage). 9. Faulty ECM (in case when above No. 1 through 8 are normal). |
| | Initial voltage is normal but there is no peak voltage while cranking the engine. | <ol style="list-style-type: none"> 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 CKP sensor (Measure peak voltage). 4. Faulty ECM (in case when above No. 1 and 2 are normal). |
| | Initial voltage is normal but peak voltage is lower than the standard value. | <ol style="list-style-type: none"> 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 ECM (in case when above No. 1 through 3 are normal). |
| | Initial and peak voltages are normal but no spark jumps. | <ol style="list-style-type: none"> 1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil(s). |
| CKP sensor | Peak voltage is lower than the standard value. | <ol style="list-style-type: none"> 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 CKP sensor (in case when above No. 1 through 3 are normal). |
| | No peak voltage. | <ol style="list-style-type: none"> 1. Faulty peak voltage adaptor. 2. Faulty CKP sensor. |

IGNITION SYSTEM INSPECTION

NOTE:

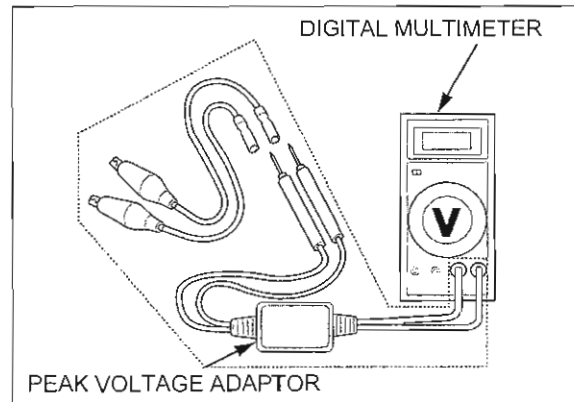
- If no spark jumps at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the imrie diagnostic tester (model 625) is used, follow the manufacture's instruction.

Connect the peak voltage adaptor to the digital multimeter or use the peak voltage tester.

TOOLS:

IgnitionMate peak voltage tester MTP07-0286
(U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
(not available in
U.S.A.)

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



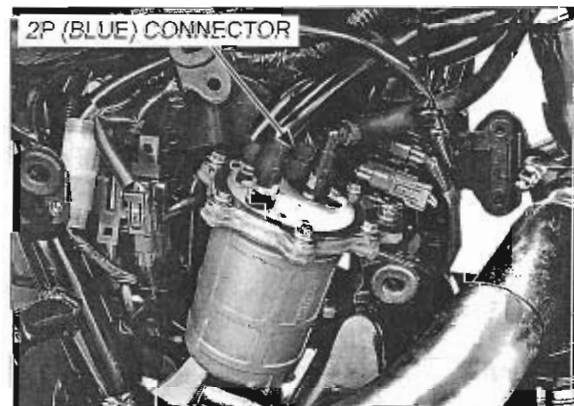
IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

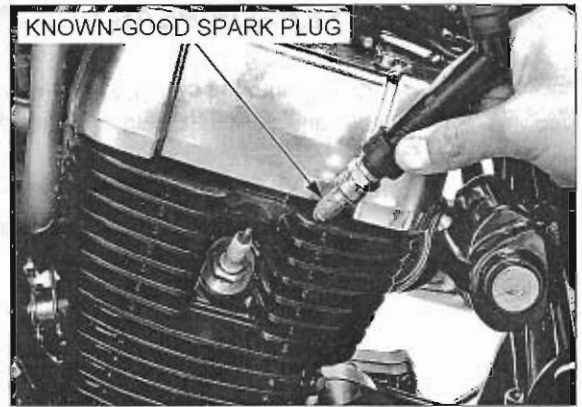
- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check that the cylinder compression is normal for each cylinder and the spark plugs are installed correctly in each cylinder head.

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

Disconnect the sub fuel tank/fuel pump 2P (Blue) connector.



Disconnect all spark plug caps from the spark plugs. Connect the known-good spark plugs to all spark plug caps and ground them to the cylinder heads as done in a spark test.



REAR: Remove the battery case and temporarily battery connected (page 16-6).

With the ignition coil primary wires connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and ground.

TOOLS:

IgnitionMate peak voltage tester MTP07-0286
(U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
(not available in
U.S.A.)

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



CONNECTIONS:

FRONT: Blue/yellow (+) – Ground (-)

REAR: Yellow/blue (+) – Ground (-)

Turn the ignition switch ON with the engine stop switch at "O".

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 17-5).

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 17-5).

Install the removed parts in the reverse order of removal.

IGNITION SYSTEM

CKP SENSOR 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 battery (page 16-6).

Disconnect the ECM 33P (Gray) connector and then connect battery (page 16-6).

Connect the peak voltage adaptor probes to the wire side ECM connector terminal.

TOOLS:

IgnitionMate peak voltage tester MTP07-0286
(U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
(not available in
U.S.A.)

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

Test probe 07ZAJ-RDJA110

CONNECTION: Yellow (+) – Ground (–)

Turn the ignition switch ON with the engine stop switch at "O".

Shift the transmission into neutral.

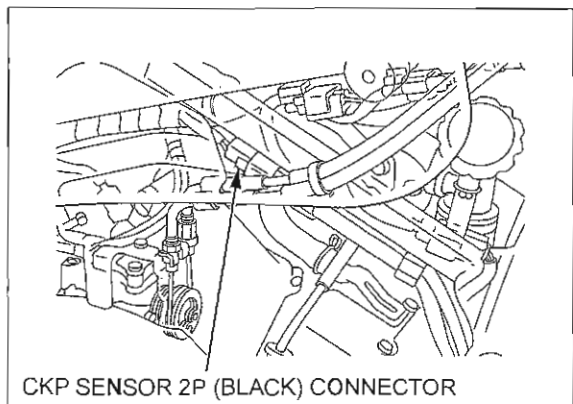
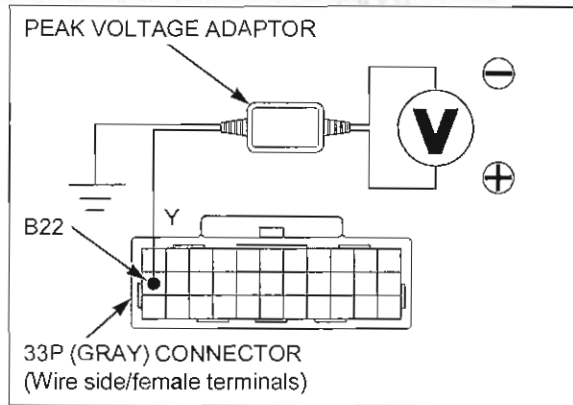
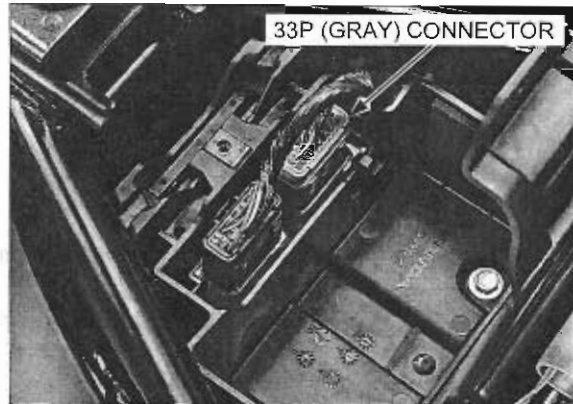
Crank the engine with the starter motor and measure the CKP sensor peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the voltage measured at the ECM connector is abnormal, measure the peak voltage at the CKP sensor connector.

Turn the ignition switch OFF.

Disconnect the CKP sensor 2P (Black) connector.

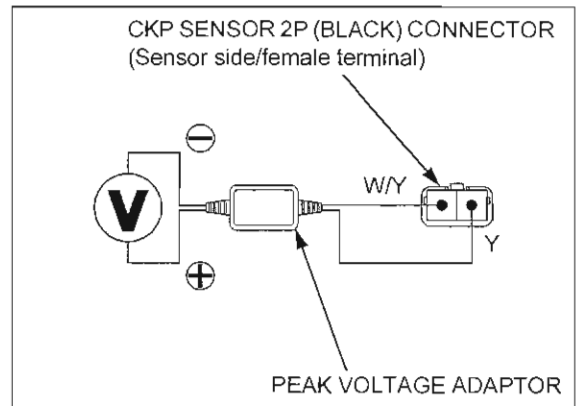


Connect the peak voltage tester or adaptor probes to the connector terminals of the CKP sensor side.

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open or short circuit, or loose connection.
- If the peak voltage is lower than standard value, follow the checks in the troubleshooting table (page 17-5).

Install the removed parts in the reverse order of removal.



IGNITION COIL

REMOVAL/INSTALLATION

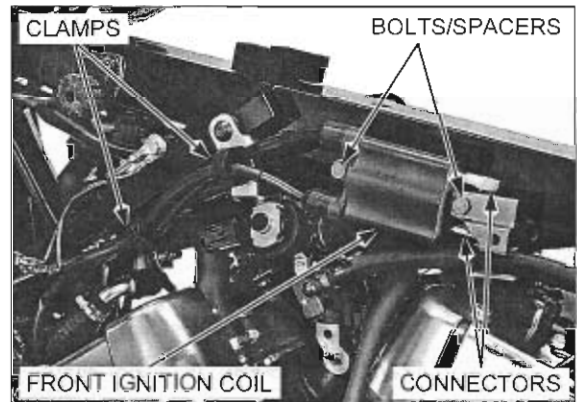
FRONT

Remove the fuel tank (page 5-43).
Disconnect the spark plug caps (page 3-7).

Disconnect the ignition coil primary wire connectors.
Release the spark plug wires from the clamps.
Remove the bolts, spacers and front ignition coil from the frame.

Route the spark plug wires properly (page 1-19).

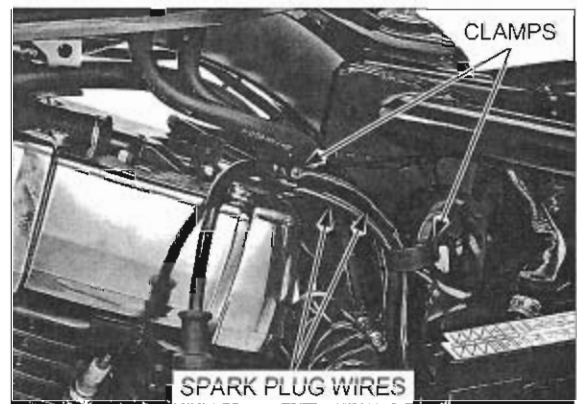
Install the front ignition coil in the reverse order of removal.



REAR

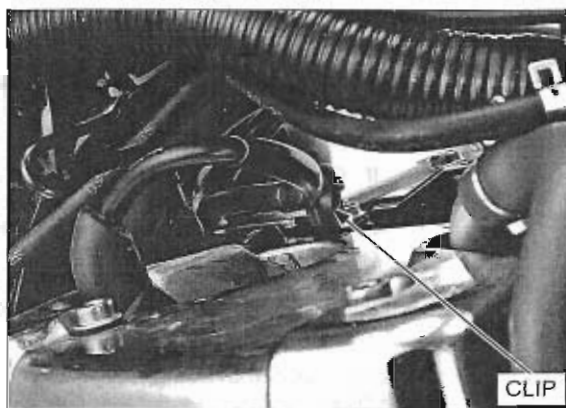
Remove the left side cover (page 2-3).
Remove the battery case (page 16-6).
Disconnect the spark plug caps (page 3-7).

Release the spark plug wires from the each clamp.



IGNITION SYSTEM

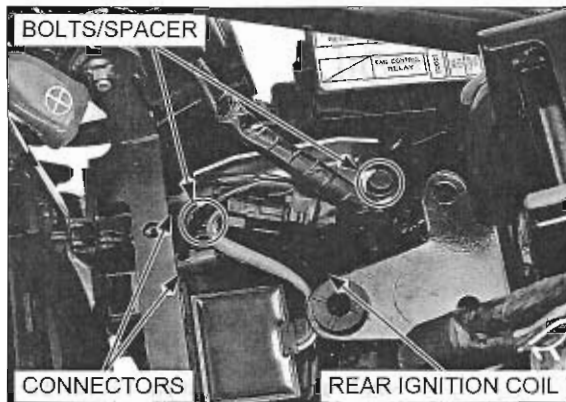
Release the clip from the stay.



Disconnect the ignition coil primary wire connectors. Remove the bolts, spacer and rear ignition coil.

Route the spark plug wires properly (page 1-19).

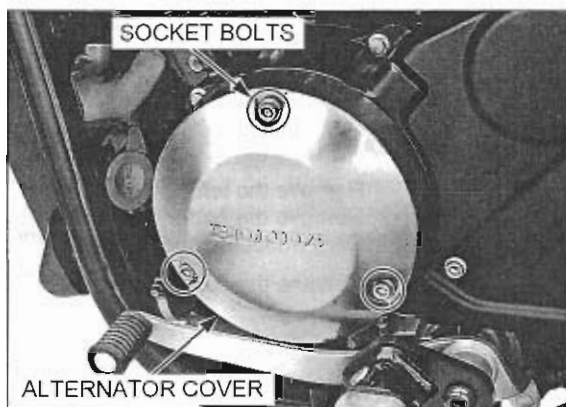
Install the rear ignition coil in the reverse order of removal.



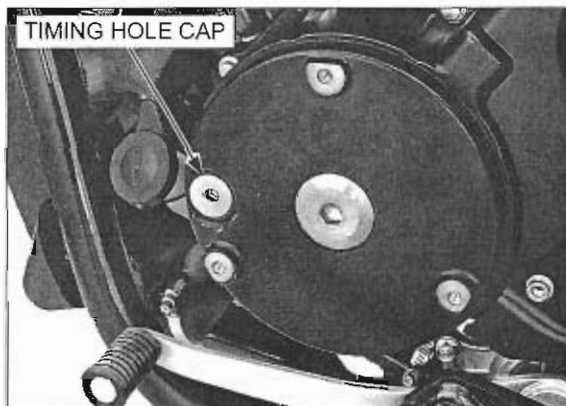
IGNITION TIMING

Start the engine, warm it up to normal operating temperature and then stop it.

Remove the socket bolts and alternator cover.



Remove the timing hole cap.



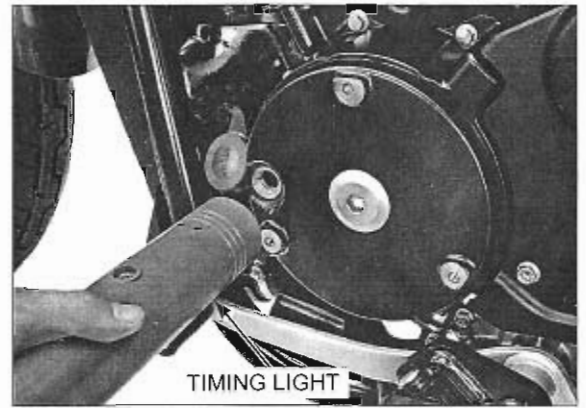
Connect a tachometer.

Read the manufacturer's instructions for timing light operation.

Connect the timing light to the front spark plug wire.

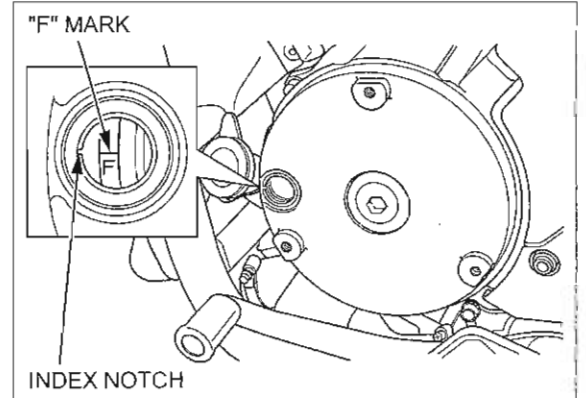
Start the engine, let it idle and check the ignition timing.

IDLE SPEED: 1,200 ± 100 rpm



TIMING LIGHT

The timing is correct if the "F" mark on the flywheel aligns with the index notch on the left crankcase cover.



"F" MARK

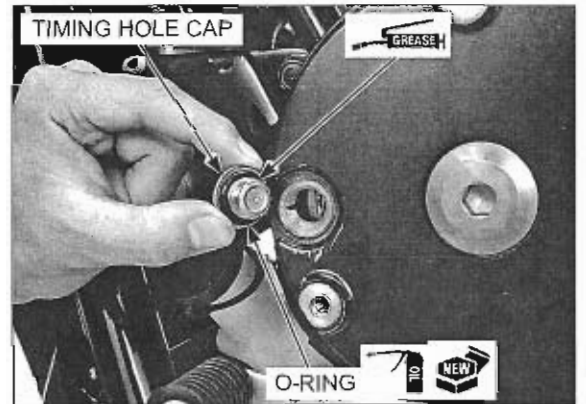
INDEX NOTCH

Coat a new O-ring with engine oil and install it into the timing hole cap groove.

Apply grease to the threads of the timing hole cap.

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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



TIMING HOLE CAP

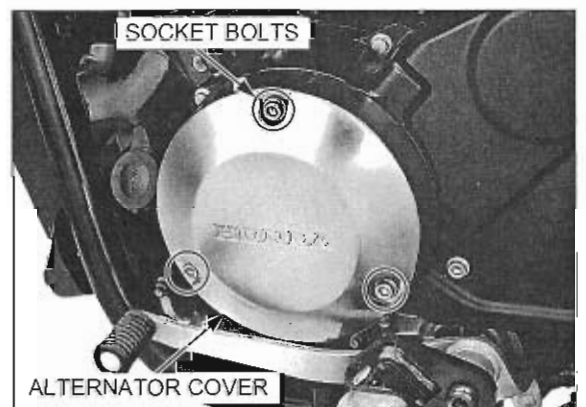
GREASE

O-RING

7 TO NEW

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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



SOCKET BOLTS

ALTERNATOR COVER

MEMO

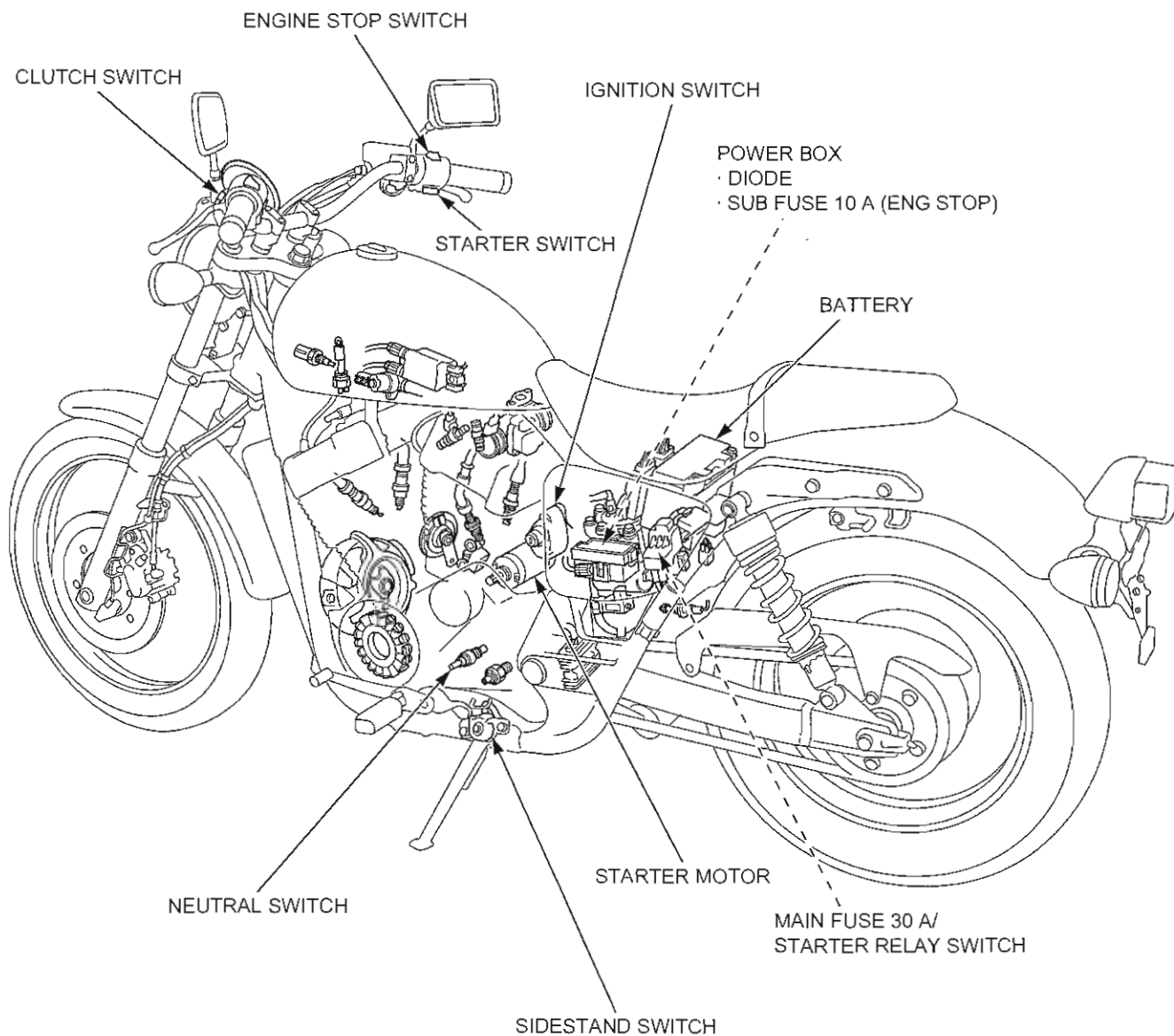


Vertical text along the right edge, possibly bleed-through or a margin note.

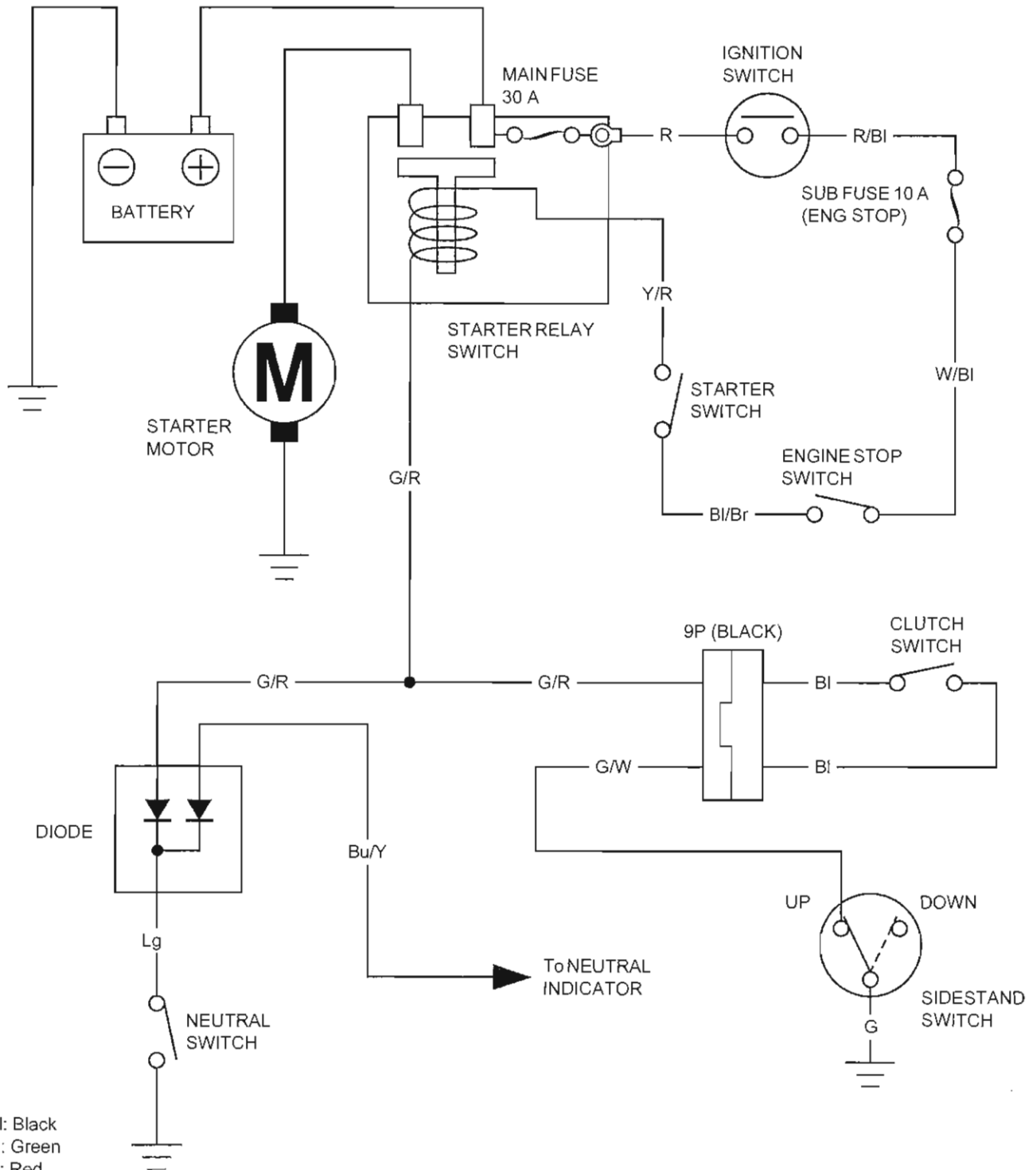
18. ELECTRIC STARTER

| | | | |
|---------------------------|------|----------------------------|-------|
| SYSTEM LOCATION..... | 18-2 | STARTER MOTOR | 18-7 |
| SYSTEM DIAGRAM | 18-3 | STARTER RELAY SWITCH | 18-15 |
| SERVICE INFORMATION | 18-4 | DIODE | 18-16 |
| TROUBLESHOOTING..... | 18-5 | | |

ELECTRIC STARTER SYSTEM LOCATION



SYSTEM DIAGRAM



- Bl: Black
- G: Green
- R: Red
- Y: Yellow
- W: White
- Br: Brown
- Lg: Light green
- Bu: Blue

ELECTRIC STARTER

SERVICE INFORMATION

GENERAL

NOTICE

- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- Always turn the ignition switch 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 18-5).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- Refer to the following components information:
 - Ignition switch (page 19-16)
 - Engine stop switch (page 19-17)
 - Starter switch (page 19-17)
 - Neutral switch (page 19-20)
 - Sidestand switch (page 19-20)
 - Clutch switch (page 19-19)
- 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

SPECIFICATION

| ITEM | STANDARD | Unit: mm (in) |
|----------------------------|-------------|---------------|
| | | SERVICE LIMIT |
| Starter motor brush length | 12.5 (0.49) | 6.5 (0.26) |

TORQUE VALUES

Starter motor cable terminal nut 10 N·m (1.0 kgf·m, 7 lbf·ft)
Starter motor assembly bolt 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)
Negative brush screw 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection

Check for blown main fuse 30 A or sub fuse 10 A (ENG STOP).

Is the fuse blown?

YES – Replace the fuse

NO – GO TO STEP 2.

2. Battery Inspection

Make sure the battery is fully charged and in good condition (page 16-7).

Is the battery in good condition?

YES – GO TO STEP 3.

NO – Charge or replace the battery

3. Starter Relay Switch Operation

Check the starter relay switch operation.

You should hear the relay "CLICK" when the starter switch button is depressed.

Is there a "CLICK"?

YES – GO TO STEP 4.

NO – GO TO STEP 5.

4. Starter Motor Inspection

Apply battery voltage directly to the starter motor and check the operation.

Does the starter motor turn?

YES – • Poorly connected starter motor cable
• Faulty starter relay switch (page 18-15)

NO – Faulty starter motor (page 18-7)

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 – diode – neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/red terminal – clutch switch – sidestand switch line (in any gear except neutral, and with the clutch lever pulled in and the sidestand up).

Is there continuity?

YES – GO TO STEP 6.

NO – • Faulty neutral switch (page 19-20)
• Faulty diode (page 18-16)
• Faulty clutch switch (page 19-19)
• Faulty sidestand switch (page 19-20)
• Loose or poor contact connector
• Open circuit in wire harness

6. Starter Relay Voltage Inspection

Connect the starter relay switch connector.

With turn the ignition switch ON and engine stop switch button "O" 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?

YES – GO TO STEP 7.

NO – • Faulty ignition switch (page 19-16)
• Faulty starter switch (page 19-17)
• Faulty engine stop switch (page 19-17)
• Loose or poor contact connector
• Open circuit in wire harness

ELECTRIC STARTER

7. Starter Relay Switch Continuity Inspection

Remove the starter relay switch.

Connect the fully charged 12 V battery positive wire to the starter relay switch Yellow/red wire terminal and negative wire to the Green/red wire terminal.

Check for continuity between the starter relay switch large terminals while the battery connected.

Is there continuity?

YES – Loose or poor contact starter relay switch connector

NO – Faulty starter relay switch

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the sidestand up and the clutch lever pulled in.

1. Clutch Switch Inspection

Check the clutch switch operation (page 19-19).

Is the clutch switch operation normal?

YES – GO TO STEP 2.

NO – Faulty clutch switch

2. Sidestand Switch Inspection

Check the sidestand switch operation (page 19-20).

Is the sidestand switch operation normal?

YES – • Open circuit in wire harness
• Loose or poor contact connector

NO – Faulty sidestand switch (page 19-20)

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

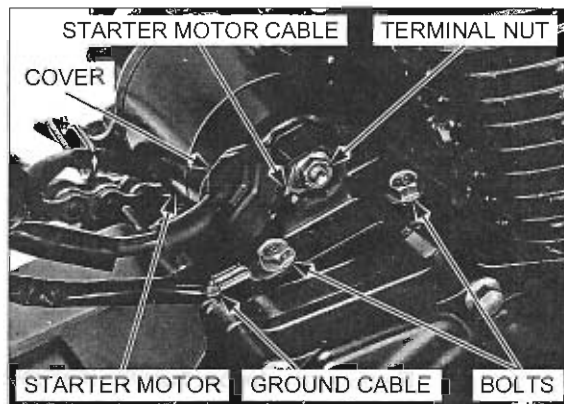
STARTER MOTOR**REMOVAL**

Disconnect the battery negative (-) cable (page 16-6).

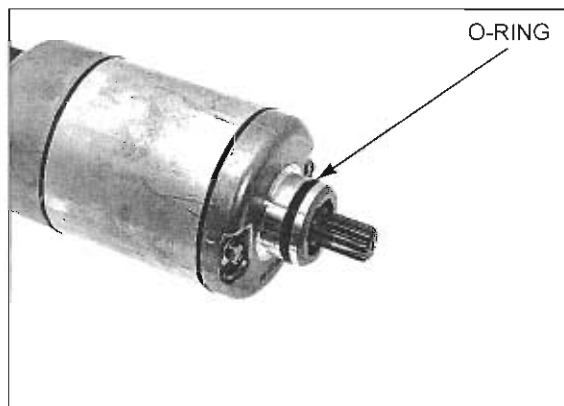
Open the terminal cover and remove the terminal nut. Disconnect the starter motor cable.

Remove the bolts and ground cable.

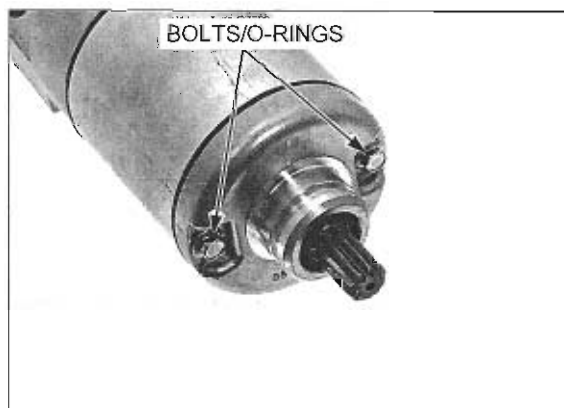
Remove the starter motor from the crankcase.



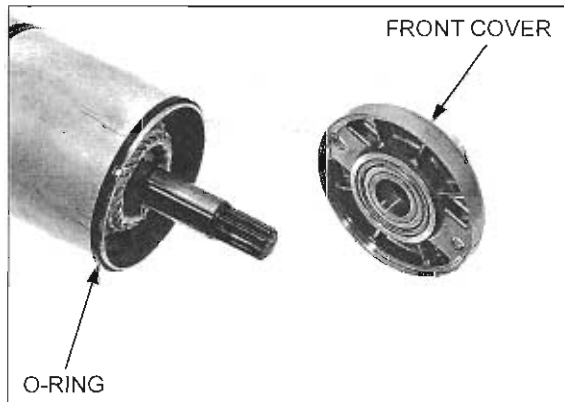
Remove the O-ring from the starter motor.

**DISASSEMBLY/INSPECTION**

Remove the assembly bolts and O-rings.

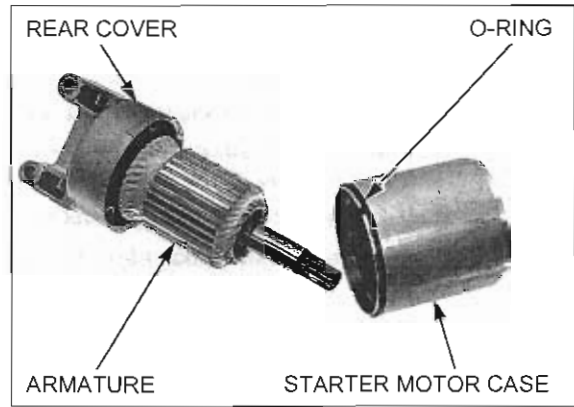


Remove the front cover and O-ring.

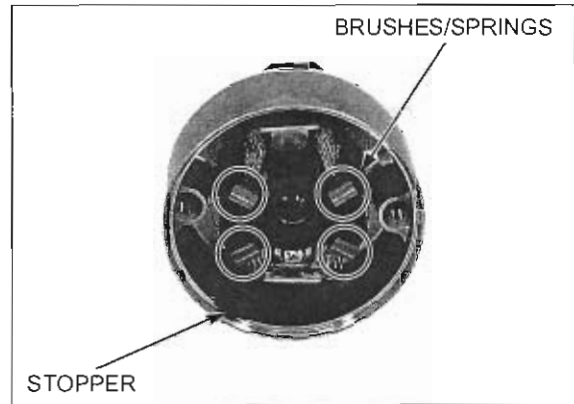


ELECTRIC STARTER

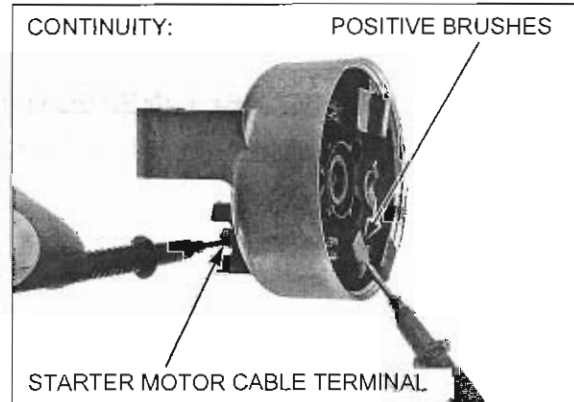
Remove the starter motor case and O-ring.
Remove the armature from the rear cover.



Remove the brushes and springs from the brush holder.
Remove the stopper from the rear cover.



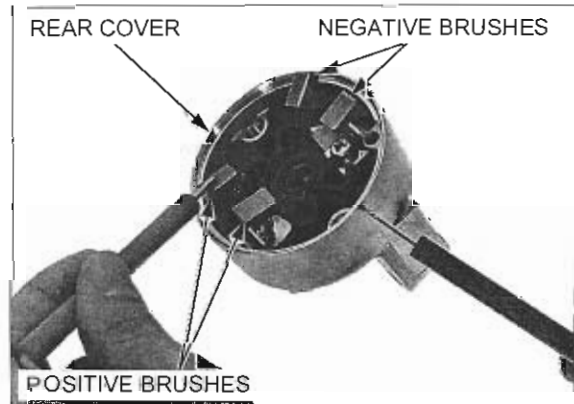
Check for continuity between starter motor cable terminal and positive brushes.
There should be continuity.



Check for continuity between positive brushes and rear cover.
There should be no continuity.

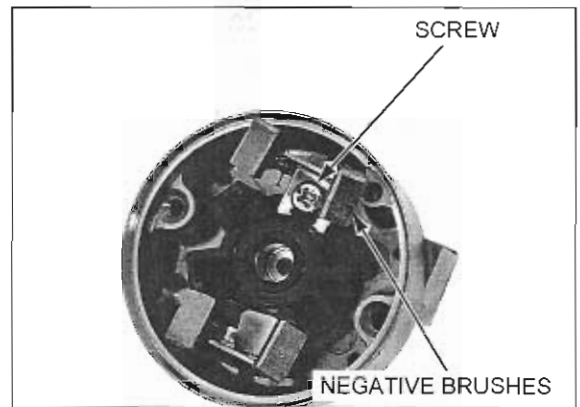
Check for continuity between negative brushes and rear cover.
There should be continuity.

Check for continuity between positive and negative brushes.
There should be no continuity.

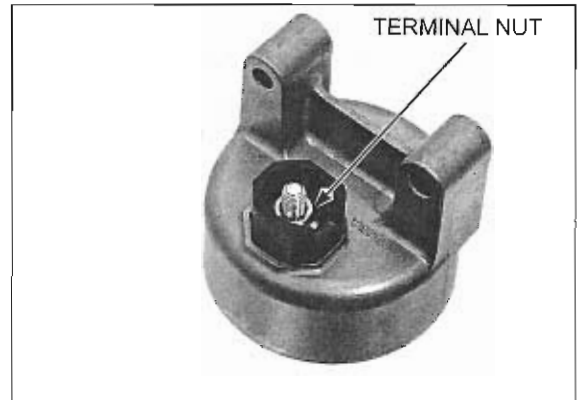


ELECTRIC STARTER

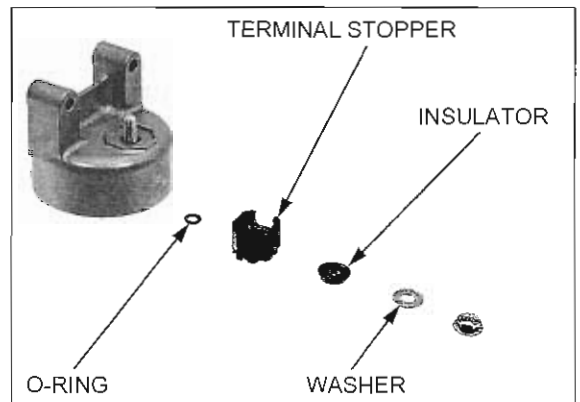
Remove the screw and negative brushes.



Remove the terminal nut.

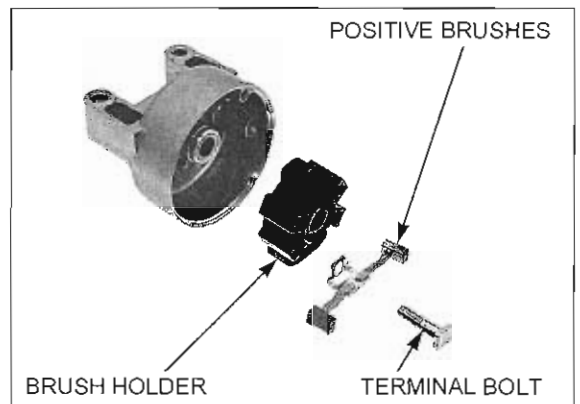


Remove the washer, insulator, terminal stopper and O-ring.



Remove the terminal bolt, positive brushes and brush holder.

Check the brush holder for crack or damage.

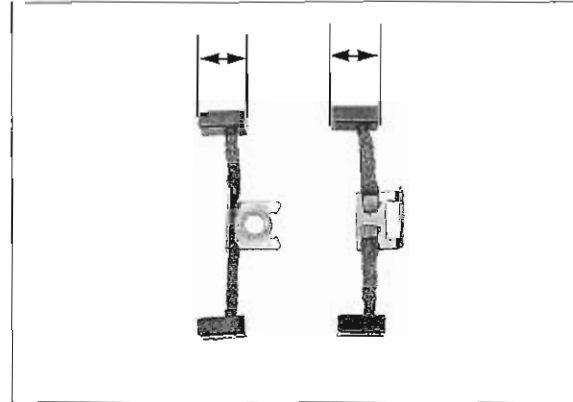


ELECTRIC STARTER

INSPECTION

Measure each brush length.

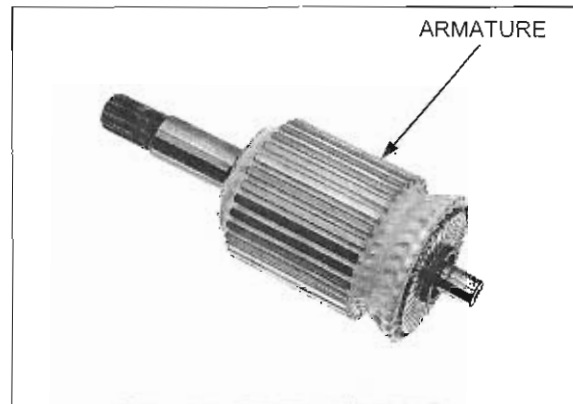
SERVICE LIMIT: 6.5 mm (0.26 in)



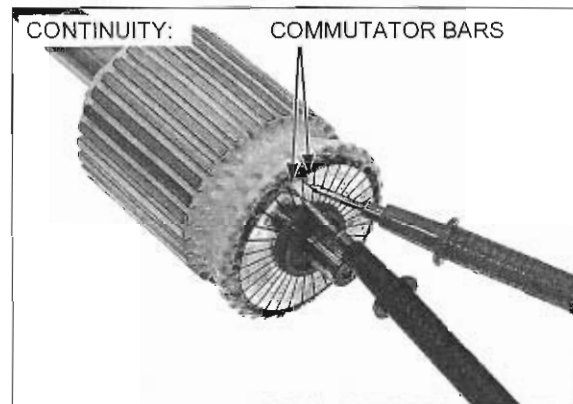
Check the commutator for damage or abnormal wear.

Do not use emery or sand paper on the commutator.

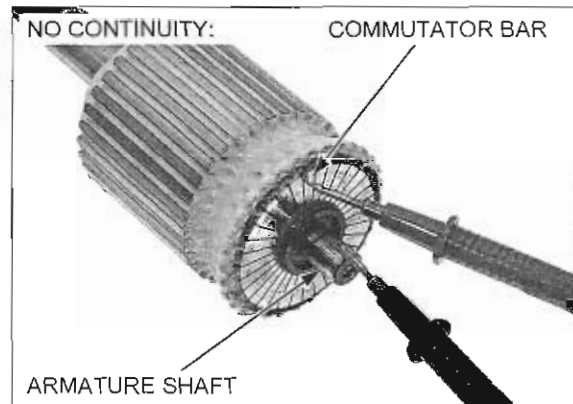
Check the commutator bar for discoloration.
Clean the metallic debris off between commutator bars.
Replace the armature with a new one if necessary.



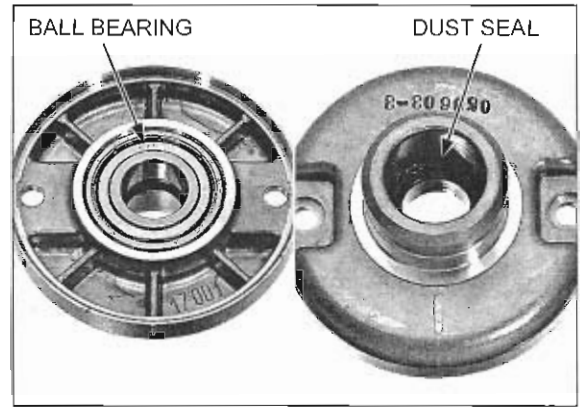
Check for continuity between pairs of commutator bars.
There should be continuity.



Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.



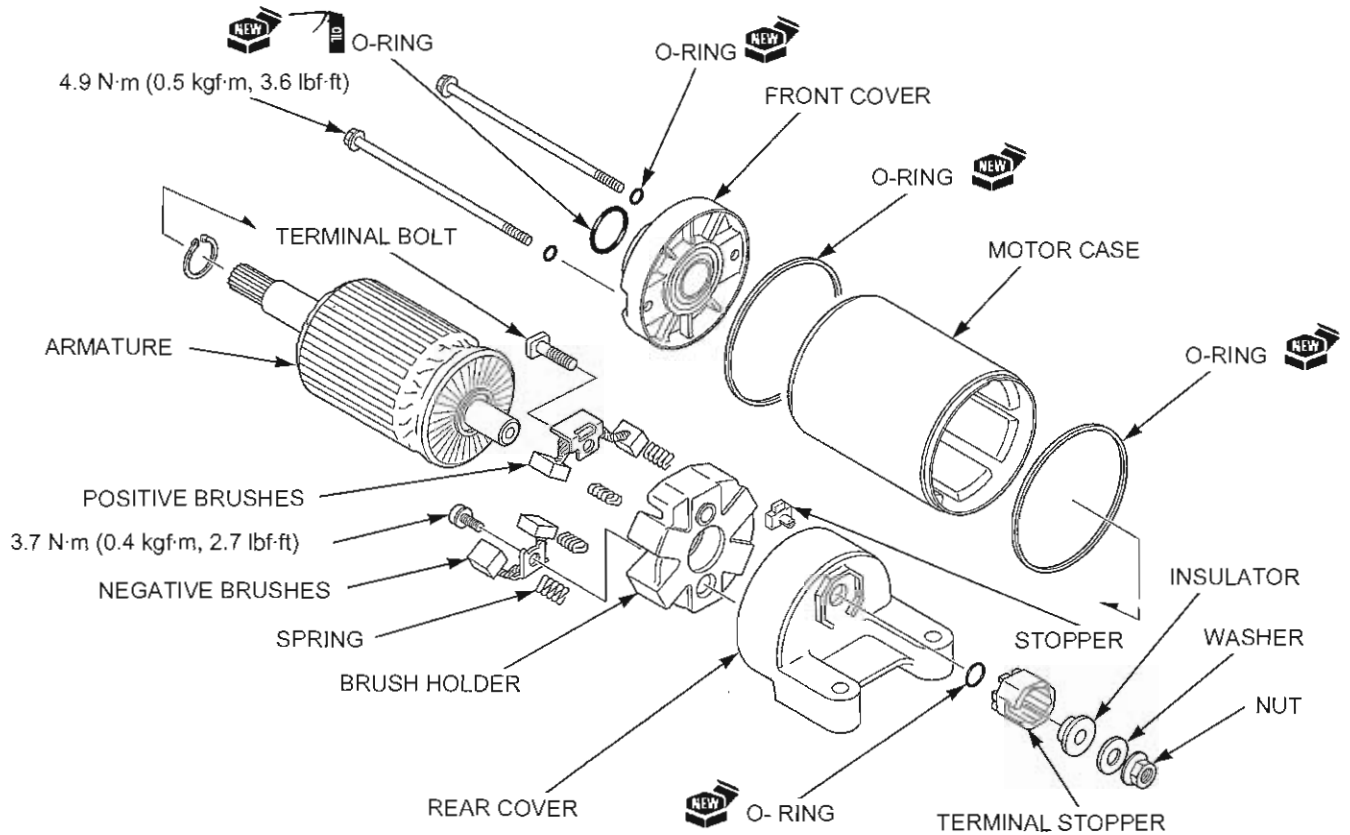
Check the dust seal and ball bearing for wear or damage.
 Check the ball bearing rotates smoothly.



Check the bushing of the rear cover for wear or damage.

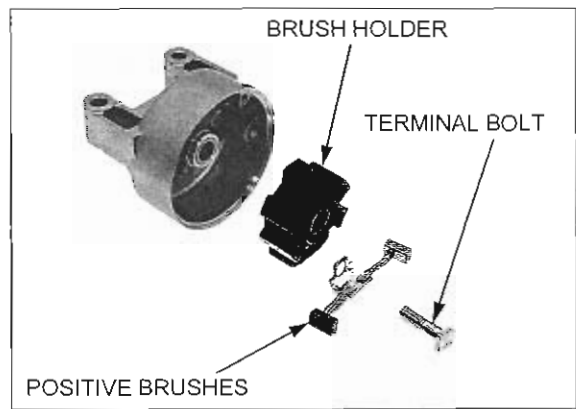


ASSEMBLY

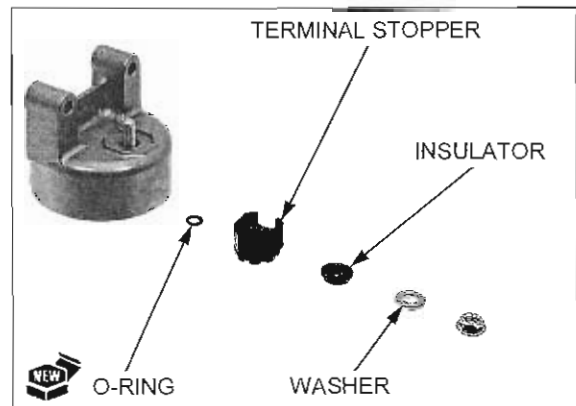


ELECTRIC STARTER

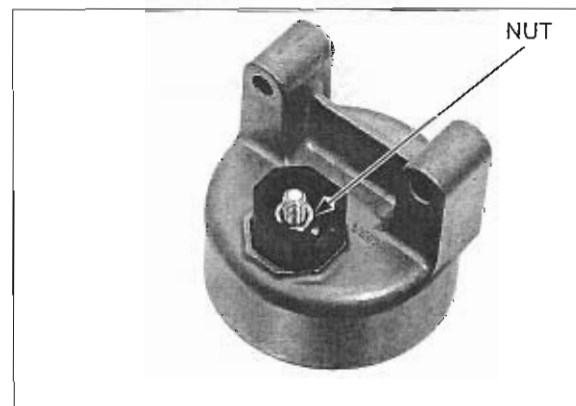
Install the brush holder, positive brushes and terminal bolt.



Install a new O-ring, terminal stopper, insulator and washer.

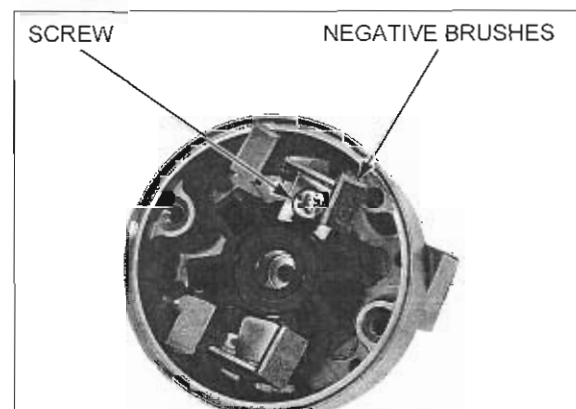


Install and tighten the terminal nut securely.



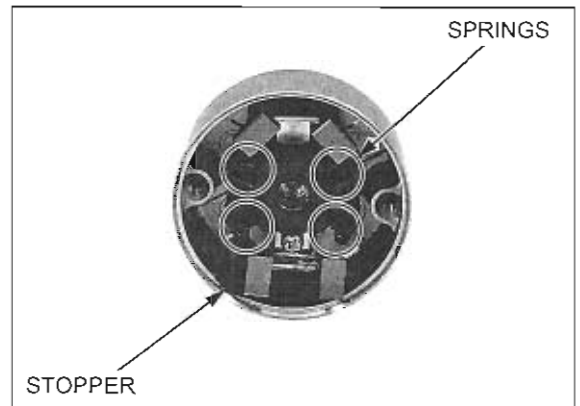
Install the negative brushes and tighten the screw to the specified torque.

TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)

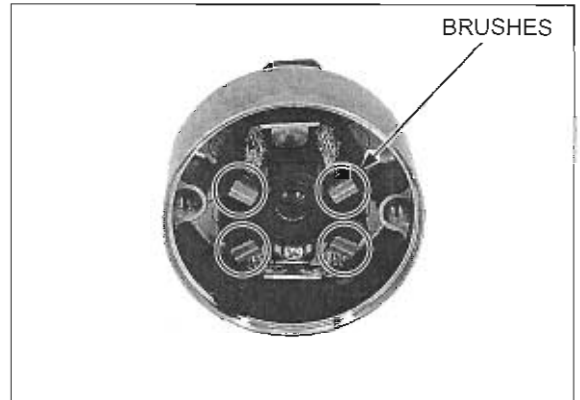


ELECTRIC STARTER

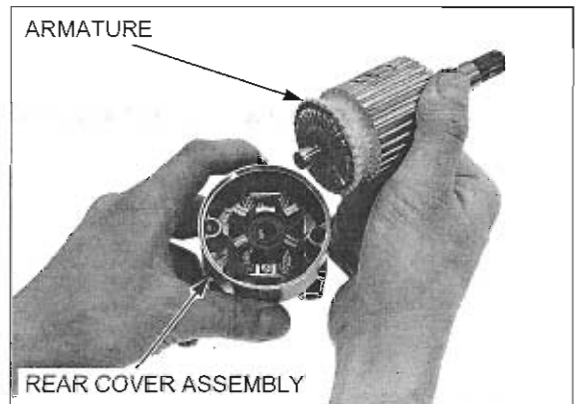
Install the brush springs to the brush holder grooves.
Install the stopper to the rear cover.



Install the brushes to the brush holder.



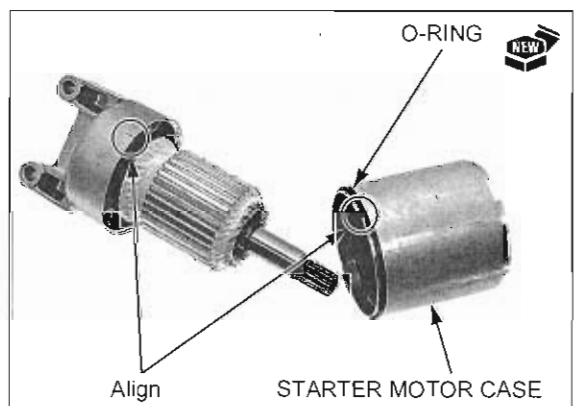
Install the armature to the rear cover assembly.



Install a new O-ring to the starter motor case.
Install the starter motor case with its groove with the stopper on the rear cover assembly.

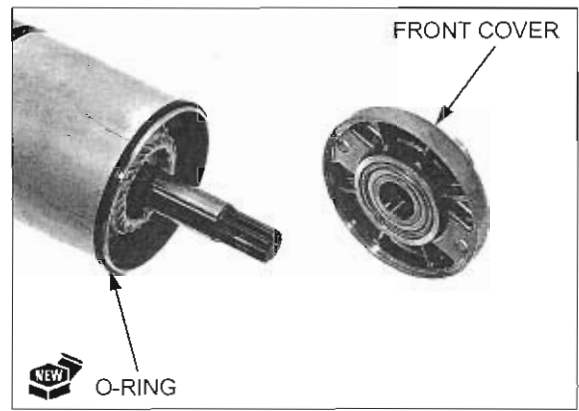
NOTICE

The coil may be damaged if the magnet pulls the armature against the case.

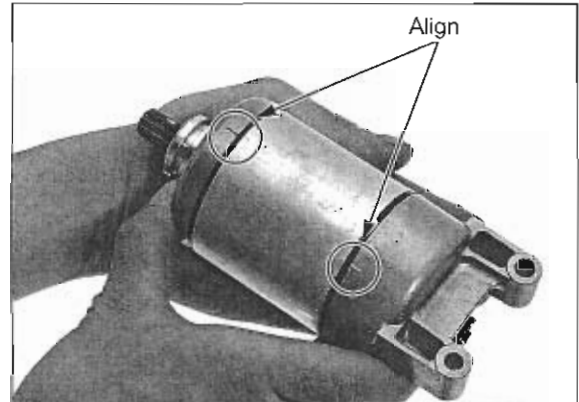


ELECTRIC STARTER

Install a new O-ring to the starter motor case.
Install the front cover to the starter motor case.

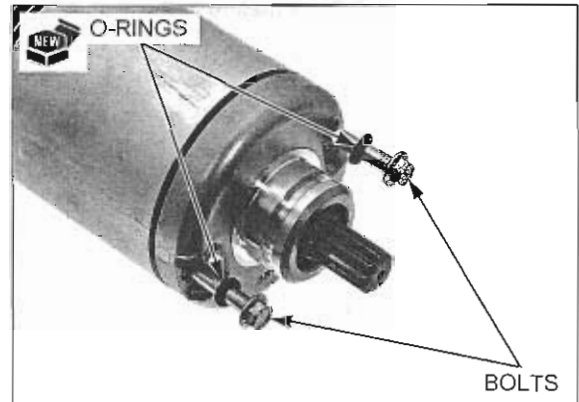


Align the index marks on the front cover, starter motor case and rear cover.



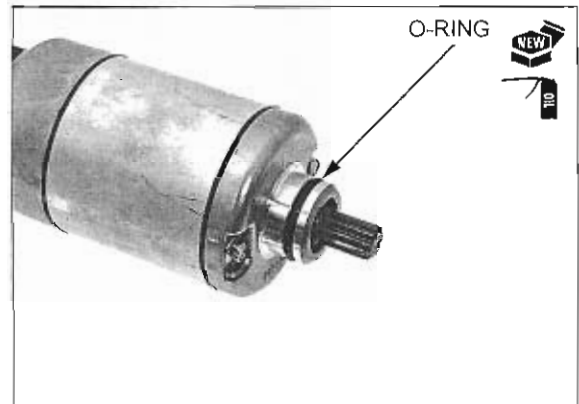
Install new O-rings to the assembly bolts.
Install and tighten the assembly bolts to the specified torque.

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



INSTALLATION

Apply engine 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.

Route the cable properly (page 1-19).

Connect the ground cable.
Install and tighten the bolts securely.

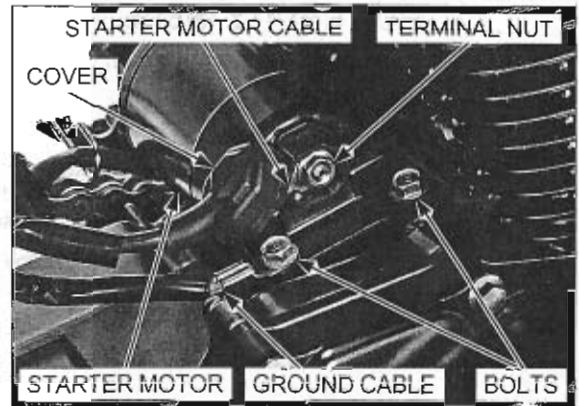
Route the cable properly (page 1-19).

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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Close the terminal cover.

Connect the battery negative (-) cable (page 16-6).



STARTER RELAY SWITCH

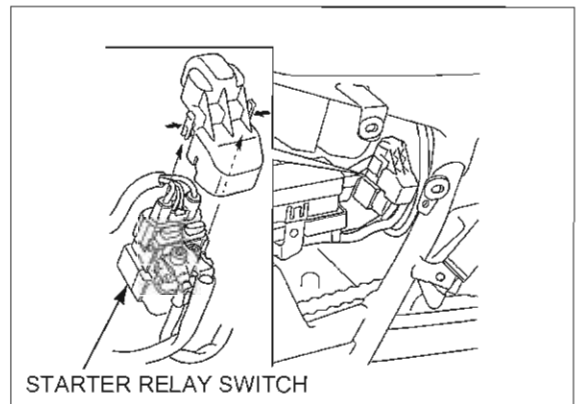
OPERATION INSPECTION

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

Shift the transmission into neutral.
Turn the ignition switch ON with the engine stop switch at "O".
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 following:

- Input line (page 18-15)
- Ground line (page 18-15)
- Continuity (page 18-16)



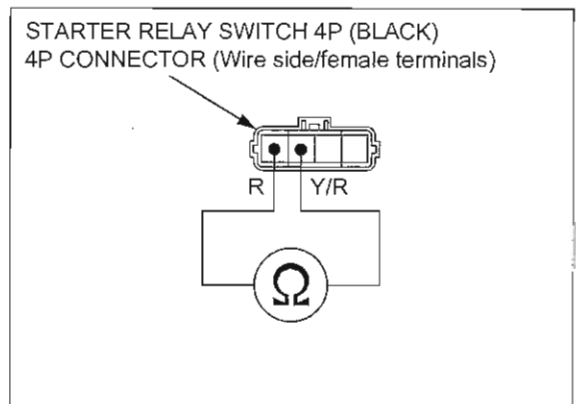
INPUT LINE INSPECTION

Disconnect the starter relay switch 4P (Black) connector.

Check for continuity between the starter relay switch 4P (Black) connector of the wire side.

CONNECTION: Red - Yellow/red

If there is continuity when the ignition switch ON and starter switch pushed, the input line is normal.



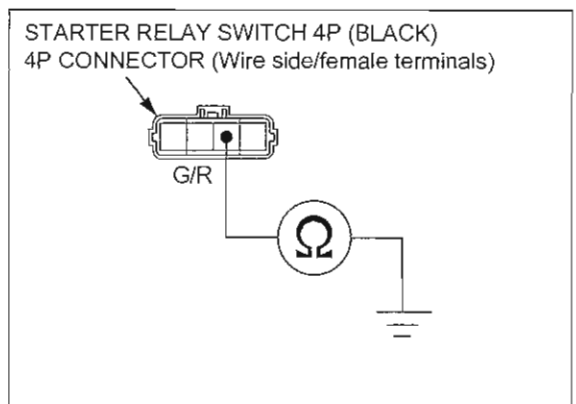
GROUND LINE INSPECTION

Disconnect the starter relay switch 4P (Black) connector.

Check for continuity between the starter relay switch 4P (Black) connector of the wire side and ground.

CONNECTION: Green/black - Ground

If there is continuity when the transmission is in neutral and clutch lever released or when the clutch lever pulled and the sidestand up, the ground circuit is normal (In neutral, there is a slight resistance due to the diode.)



ELECTRIC STARTER

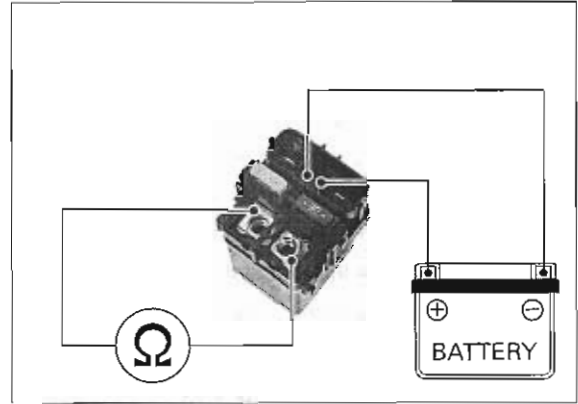
CONTINUITY INSPECTION

Remove the starter relay switch (page 18-16).

Connect an ohmmeter to the starter relay switch large terminals.

Connect a fully charged 12 V battery positive (+) wire to the starter relay switch Yellow/red terminal and negative (-) wire to the Green/red terminal.

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 left side cover (page 2-3).

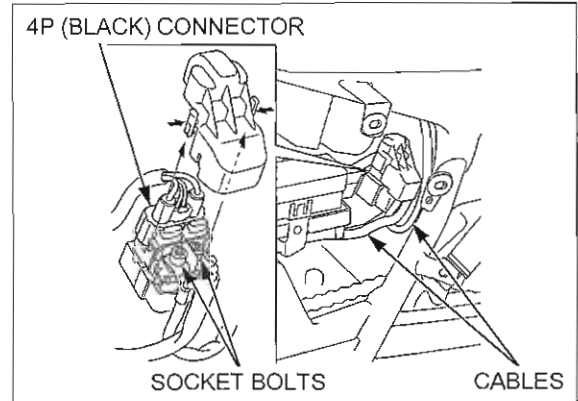
Turn the ignition switch OFF.

Disconnect the battery negative (-) cable (page 16-6). Pull out the starter relay switch from the stay.

Disconnect the starter relay switch 4P (Black) connector.

Remove the socket bolts and cables.

Installation is in the reverse order of removal.

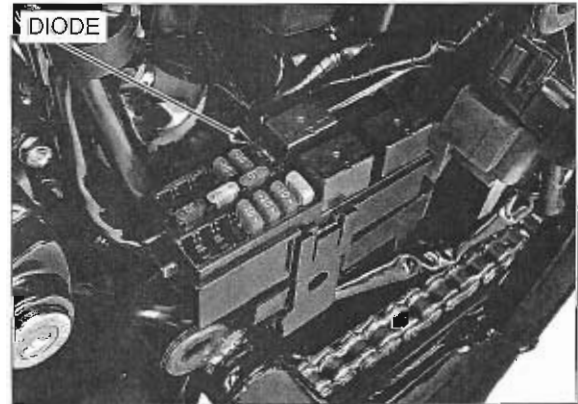


DIODE

INSPECTION

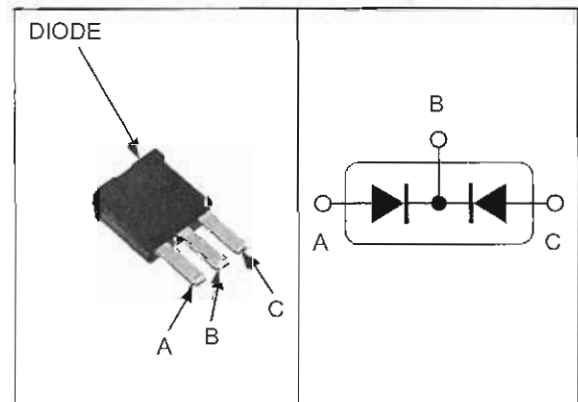
Remove the left side cover (page 2-3).

Open the power box cover and remove the diode.



Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

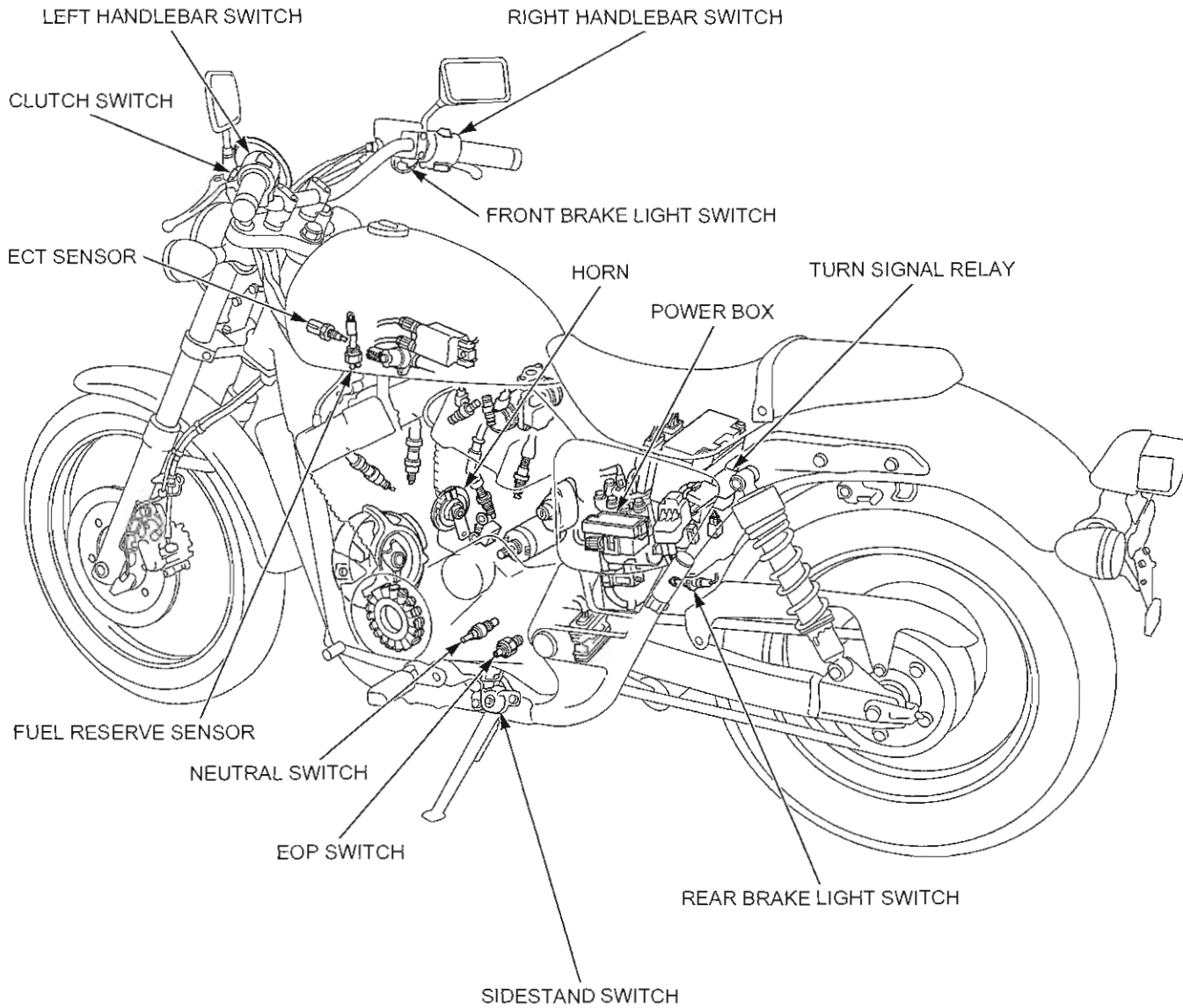
If there is continuity in one direction, the diode is normal.



19. LIGHTS/METERS/SWITCHES

| | | | |
|---|-------|-----------------------------|-------|
| SYSTEM LOCATION..... | 19-2 | OIL PRESSURE INDICATOR..... | 19-15 |
| SERVICE INFORMATION..... | 19-3 | IGNITION SWITCH..... | 19-16 |
| HEADLIGHT..... | 19-4 | HANDLEBAR SWITCH..... | 19-16 |
| TURN SIGNAL LIGHT..... | 19-5 | BRAKE LIGHT SWITCH..... | 19-18 |
| BRAKE/TAIL LIGHT..... | 19-6 | CLUTCH SWITCH..... | 19-19 |
| SPEEDOMETER/SPEED SENSOR..... | 19-7 | NEUTRAL SWITCH..... | 19-20 |
| COOLANT TEMPERATURE INDICATOR/
ECT SENSOR..... | 19-12 | SIDESTAND SWITCH..... | 19-20 |
| FUEL RESERVE SENSOR..... | 19-13 | HORN..... | 19-22 |
| | | TURN SIGNAL RELAY..... | 19-22 |

LIGHTS/METERS/SWITCHES
SYSTEM LOCATION



SERVICE INFORMATION

GENERAL

NOTICE

- Note the following when replacing the halogen headlight bulb.
 - Wear clean gloves while replacing the bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
- Be sure to install the dust cover after replacing the 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/tail light | 12 V – 21/5 W |
| | Front turn signal light/Position light | 12 V – 21/5 W x 2 |
| | Rear turn signal light | 12 V – 21 W x 2 |
| | Instrument light | LED |
| | Turn signal indicator | LED |
| | High beam indicator | LED |
| | Fuel reserve indicator | LED |
| | Neutral indicator | LED |
| | Oil pressure indicator | LED |
| | Coolant temperature indicator | LED |
| | MIL | LED |
| Fuse | Main fuse | 30 A |
| | FI fuse | 20 A |
| | Sub fuse | 10 A x 5, 20 A x 1 |
| ECT sensor resistance | 50°C (122°F) | 6.8 – 7.4 kΩ |
| | 80°C (176°F) | 2.1 – 2.6 kΩ |

TORQUE VALUES

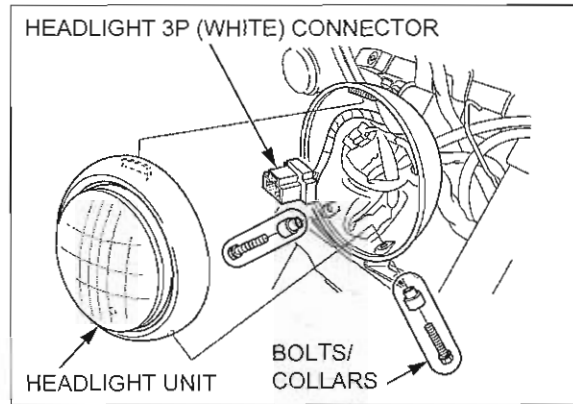
| | | |
|----------------------------------|---------------------------------|-----------------------------------|
| Ignition switch mounting bolt | 12 N·m (1.2 kgf·m, 9 lbf·ft) | One-way bolt |
| Neutral switch | 12 N·m (1.2 kgf·m, 9 lbf·ft) | |
| Sidestand switch bolt | 10 N·m (1.0 kgf·m, 7 lbf·ft) | ALOC bolt; replace with a new one |
| Horn mounting bolt | 21 N·m (2.1 kgf·m, 15 lbf·ft) | |
| EOP switch terminal screw | 2 N·m (0.2 kgf·m, 1.5 lbf·ft) | See page 4-5 |
| Fuel reserve sensor | 23 N·m (2.3 kgf·m, 17 lbf·ft) | |
| Lower meter cover mounting screw | 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft) | |

HEADLIGHT

BULB REPLACEMENT

Remove the bolts, collars and headlight unit from the headlight case.

Disconnect the headlight 3P (White) connector.



Remove the dust cover.

Unhook the retainer and remove the bulb.

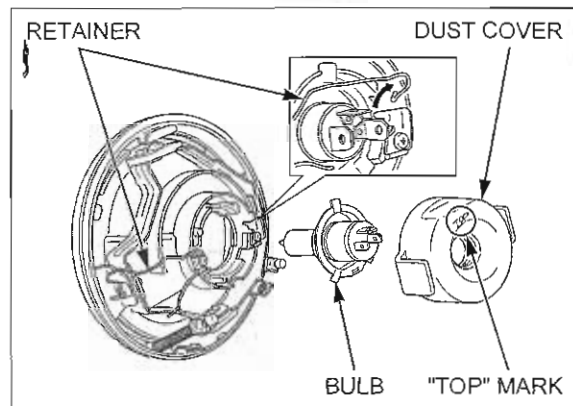
NOTICE

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.

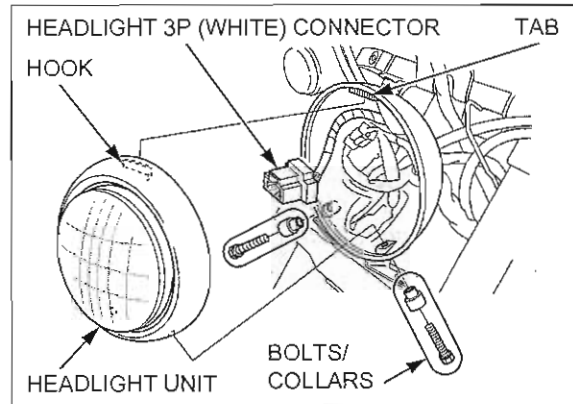


Connect the headlight 3P (White) connector.

Install the headlight unit into the headlight case by aligning the headlight unit hook with the headlight case tab.

Install the collars and bolts.

Tighten the bolts securely.

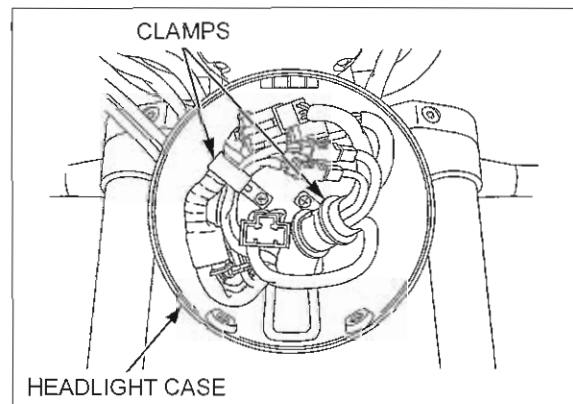


HEADLIGHT CASE REMOVAL/ INSTALLATION

Remove the headlight unit (page 19-4).

Release the wire harnesses from the clamps.

Remove the wire harnesses from the headlight case.

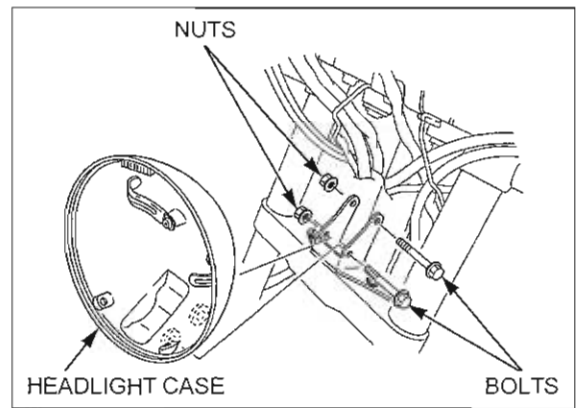


Remove the nuts, bolts and headlight case from the brackets.

Route the wire harnesses properly (page 1-19).

Install the headlight case in the reverse order of removal.

Adjust the headlight aim (page 3-24).



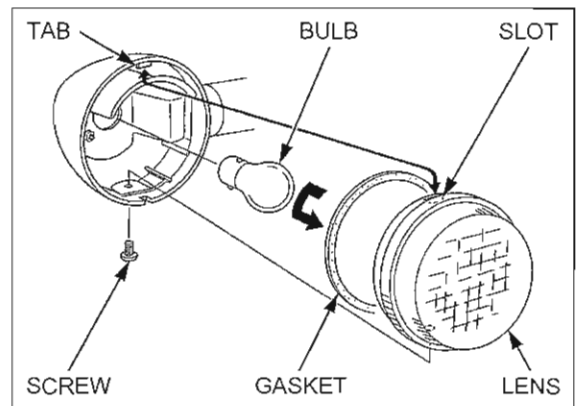
TURN SIGNAL LIGHT

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.



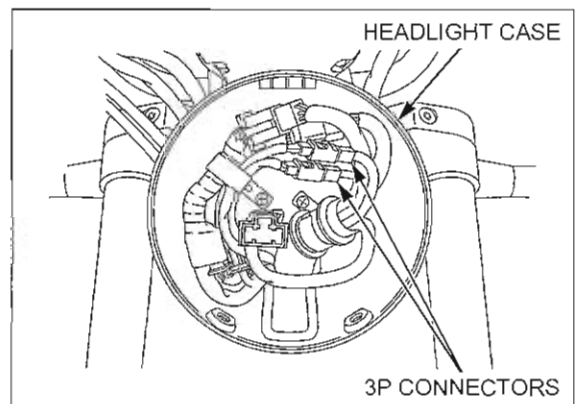
REMOVAL/INSTALLATION

FRONT

Remove the headlight unit (page 19-4).

Disconnect the turn signal 3P connectors.

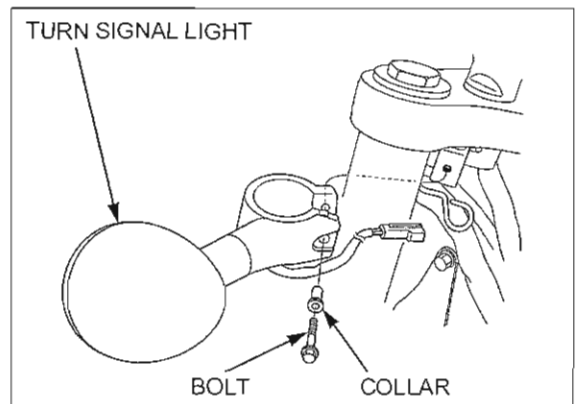
- Light blue: Right turn signal connector
- Orange: Left turn signal connector



Remove the bolt, collar and turn signal light.

Route the turn signal wire properly (page 1-19).

Installation is in the reverse order of removal.



LIGHTS/METERS/SWITCHES

REAR

Remove the brake/tail light assembly (page 2-8).

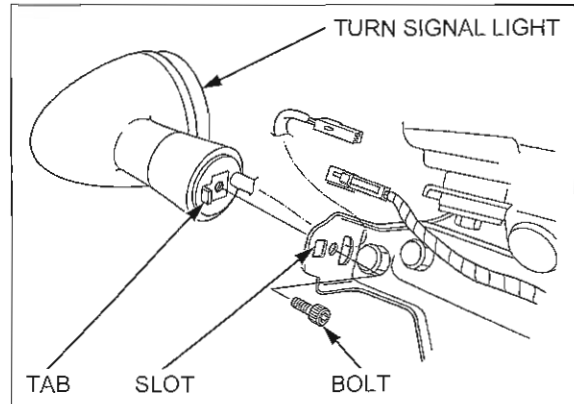
Remove the bolt and turn signal light from the brake/tail light assembly.

Route the turn signal light wire properly (page 1-19).

Installation is in the reverse order of removal.

NOTE:

Install the turn signal light, aligning its tab with the turn signal stay slot and tighten the bolt.



BRAKE/TAIL LIGHT

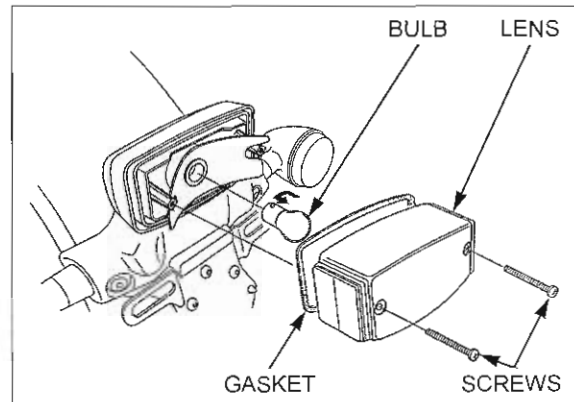
BULB REPLACEMENT

Remove the screws and brake/tail light lens.

While pushing in the bulb, turn it counterclockwise to remove it, and replace it with a new one.

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.

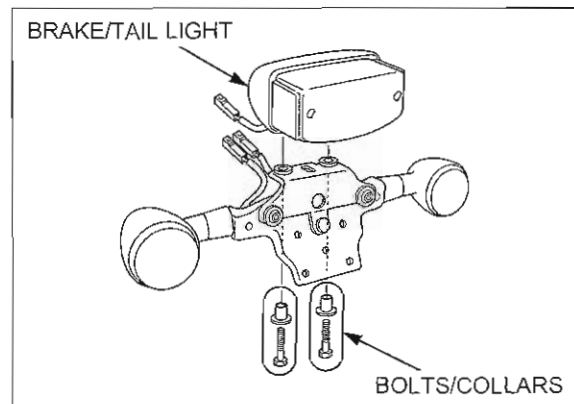


REMOVAL/INSTALLATION

Remove the brake/tail light assembly (page 2-8).

Remove the bolts, collars and brake/tail light.

Installation is in the reverse order of removal.

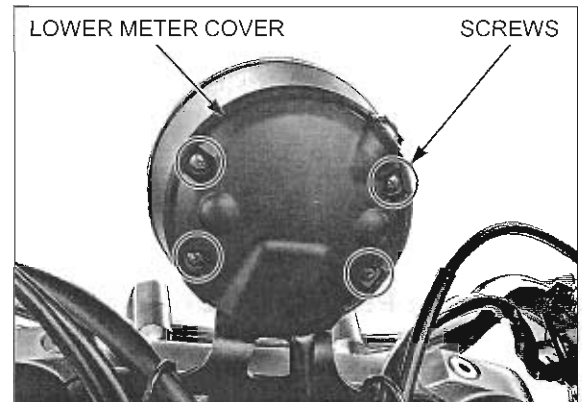


SPEEDOMETER/SPEED SENSOR

SPEEDOMETER REMOVAL/ INSTALLATION

Remove the headlight case (page 19-4).

Remove the screws and lower meter cover.



Disconnect the speedometer 16P (Gray) connector.

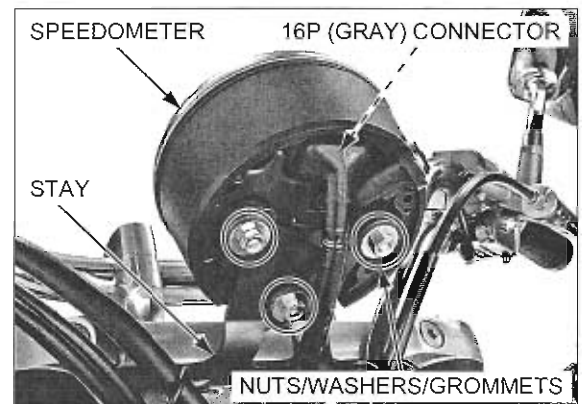
Remove the nuts, washers and grommets.

Remove the speedometer from the stay.

Installation is in the reverse order of removal.

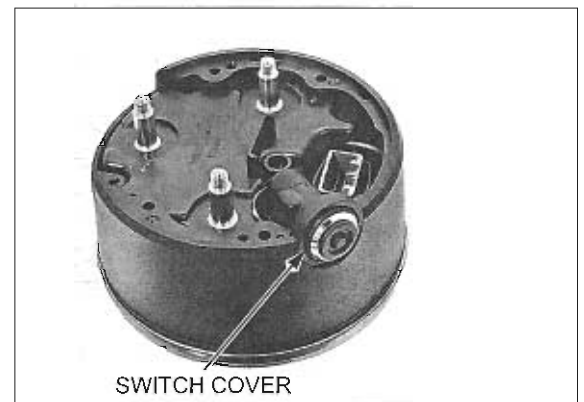
TORQUE:

Lower meter cover mounting screw:
0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)



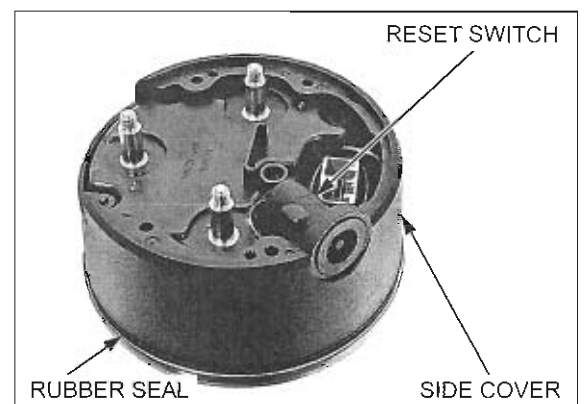
SPEEDOMETER DISASSEMBLY

Remove the switch cover.



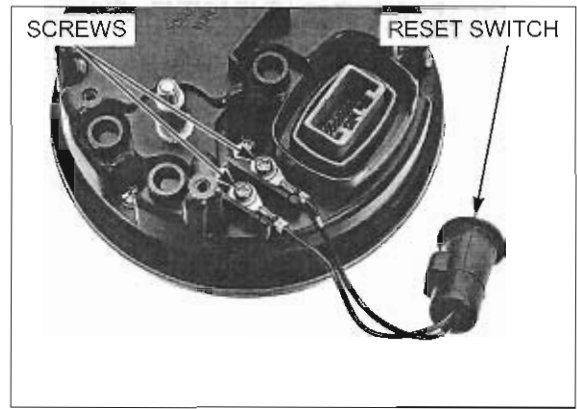
Remove the trip meter reset switch from the speedometer side cover.

Remove the speedometer side cover and rubber seal from the speedometer.

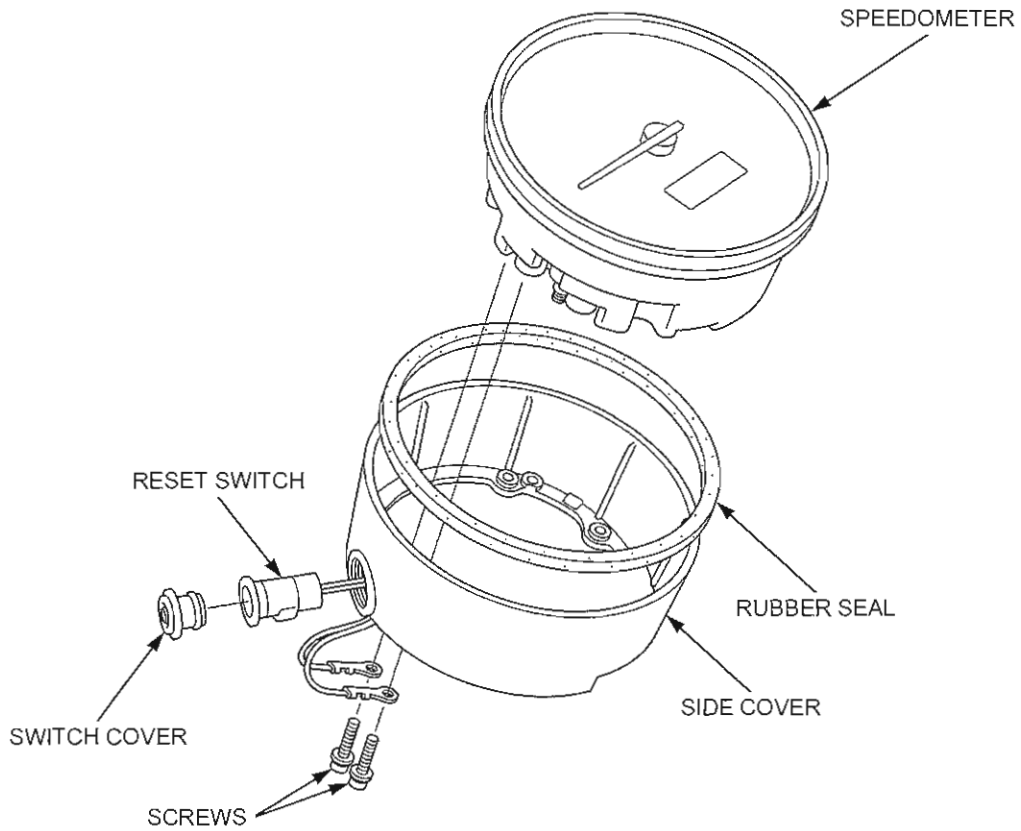


LIGHTS/METERS/SWITCHES

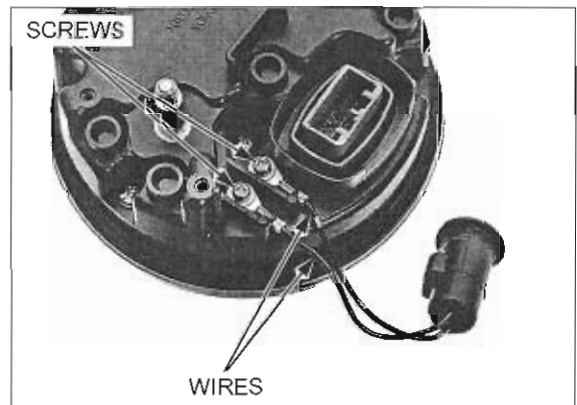
Remove the screws and trip meter reset switch from the speedometer.



SPEEDOMETER ASSEMBLY



Install the trip meter reset switch wires with the screws.

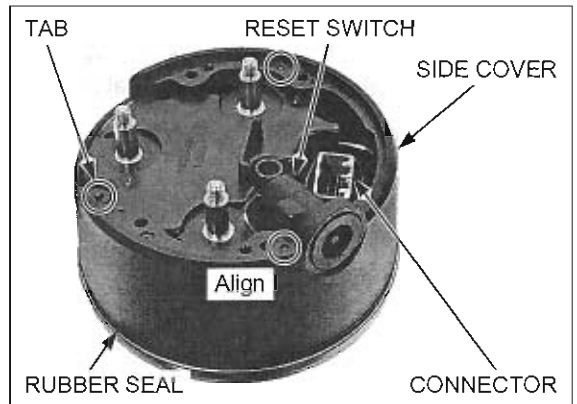


Install the rubber seal and speedometer side cover to the speedometer.

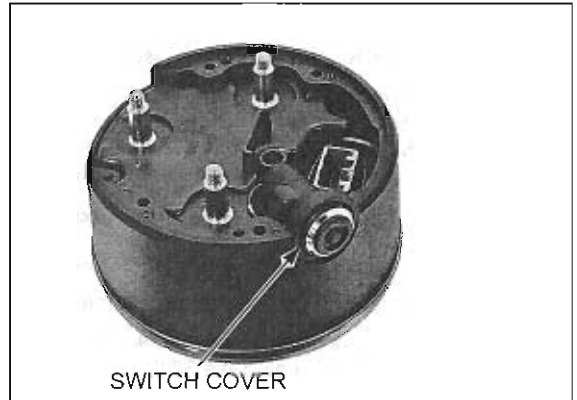
NOTE:

Align the speedometer tabs with holes of speedometer side cover.

Install the trip meter reset switch with its tab facing opposite side of the speedometer connector.



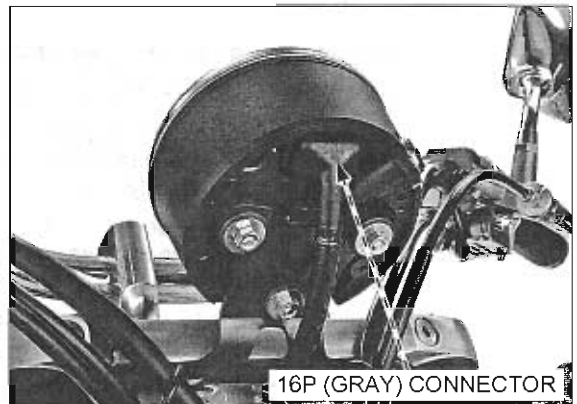
Install the switch cover.



SPEEDOMETER INSPECTION

Remove the lower meter cover (page 19-7).

Perform the following inspections with the speedometer 16P (Gray) connector connected.



POWER INPUT LINE

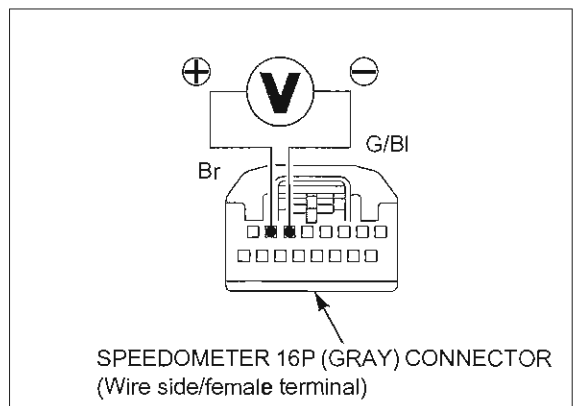
Measure the voltage between the speedometer 16P (Gray) connector terminals at the wire side.

CONNECTION: Brown (+) – Green/black (–)

There should be battery voltage with the ignition switch is turned to ON.

If there is no voltage, check the following:

- Open circuit in the Brown wire
- Blown main fuse (30 A)
- Blown sub fuse 10 A (ILLUMI)
- Ignition switch (page 19-16)



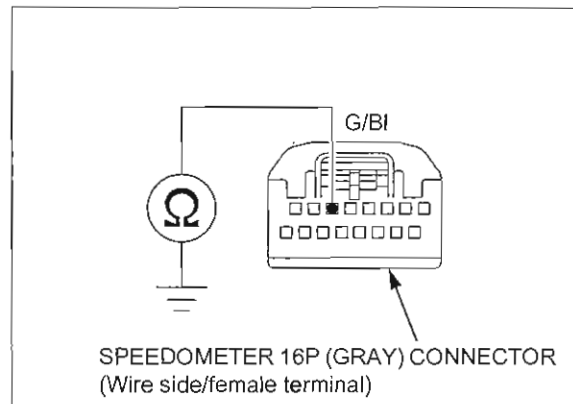
LIGHTS/METERS/SWITCHES

GROUND LINE

Check for continuity between the speedometer 16P (Gray) connector terminals at the wire side and ground.

CONNECTION: Green/black – 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.

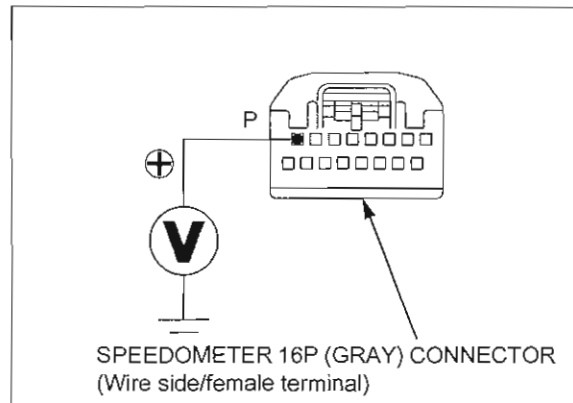
Measure the voltage between the speedometer 16P (Gray) connector terminal at the wire side and ground.

CONNECTION: Pink (+) – Ground (-)

There should be battery voltage at all times.

If there is no voltage, check the following:

- Open circuit in the Pink wire
- Blown main fuse 30 A
- Blown sub fuse 10 A (BUCK UP)
- Open circuit in the Pink wire between the power box and battery



SPEEDOMETER SIGNAL LINE INSPECTION

Check that the odometer/trip meter functions properly.

- If they do not function properly, perform the power/ground line inspection (page 19-9).
- If they function properly, check the following.

Remove the lower meter cover (page 19-7).

Remove the speed sensor from the speedometer gear box (page 13-14).

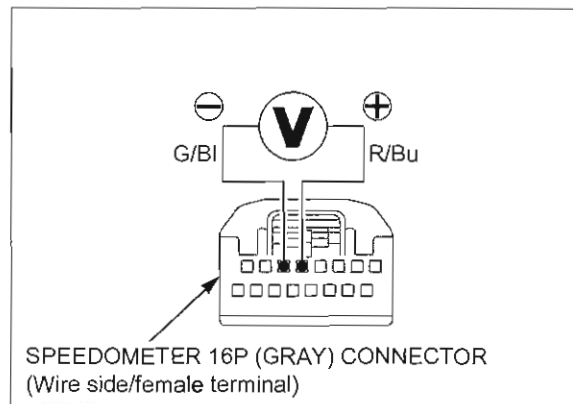
Measure the voltage between the speedometer 16P (Gray) connector terminals at the wire side.

CONNECTION: Red/blue (+) – Green/black (-)

Turn the ignition switch ON and slowly turn the sensor shaft by using a screwdriver.

There should be 0 to 12 V pulse voltage.

- If the pulse voltage is present, check the speedometer gear box function. If it is OK, replace the speedometer.
- If the pulse voltage is absent, check for an open or short circuit in the Red/blue wire. If the wire is OK, check the speed sensor (page 19-11).



SPEED SENSOR INSPECTION

NOTE:

Before starting the inspection, inspect the speedometer.

Remove the fuel tank (page 5-43).

Disconnect the speed sensor 3P (Black) connector.

Turn the ignition switch ON and engine stop switch "O".

Measure the voltage at the wire side.

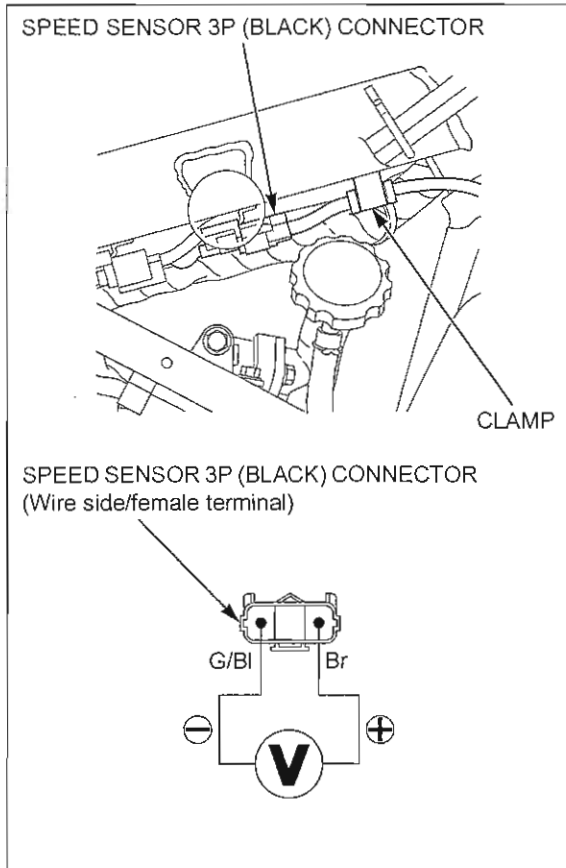
CONNECTION: Brown (+) – Green/black (-)

There should be battery voltage.

If there is battery voltage, replace the speed sensor (page 19-11).

If there is no battery voltage, inspect the following:

- Open circuit in Brown wire and/or Green/black wire
- Blown main fuse 30 A
- Blown sub fuse 10 A (ILLUMI)
- Ignition switch (page 19-16)

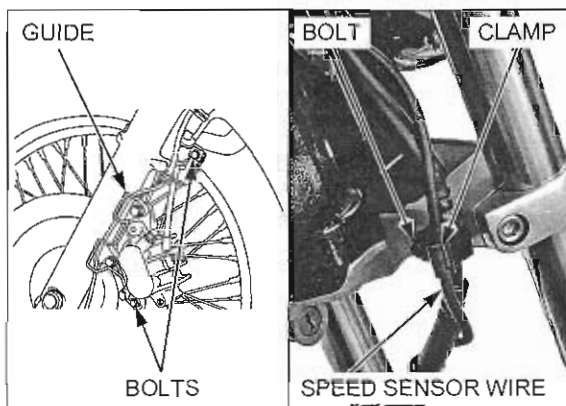


SPEED SENSOR REMOVAL/ INSTALLATION

Remove the speed sensor and O-ring (page 13-14).

Remove the bolts and speed sensor wire guide.

Remove the bolt, clamp and speed sensor wire from the steering stem.



LIGHTS/METERS/SWITCHES

Remove the fuel tank (page 5-43).

Release the speed sensor wire from the clamp.

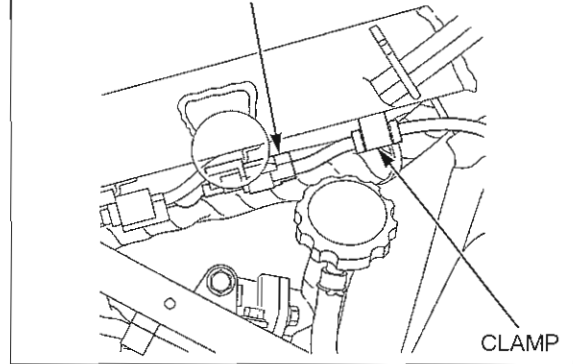
Disconnect the speed sensor 3P (Black) connector.

Route the wires properly (page 1-19).

Installation is in the reverse order of removal.

Install the new O-ring and speed sensor (page 13-19).

SPEED SENSOR 3P (BLACK) CONNECTOR



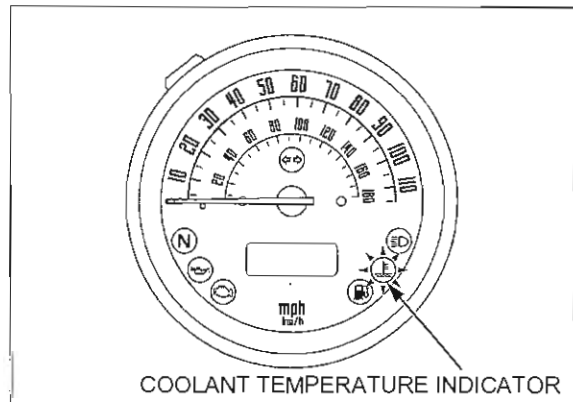
COOLANT TEMPERATURE INDICATOR/ECT SENSOR

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 19-9).



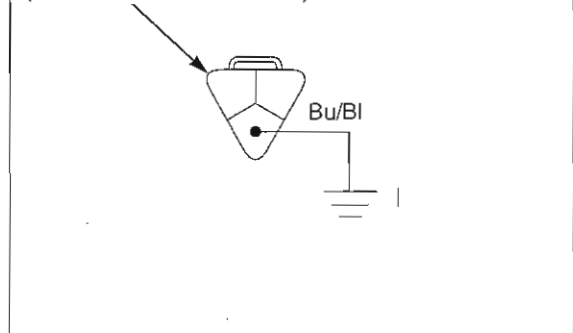
Disconnect the ECT sensor 3P (Gray) connector (page 6-10).

Ground the Blue/black wire of the ECT sensor 3P connector with a jumper wire.

Turn the ignition switch ON and check the coolant temperature indicator.

- If the indicator comes on, inspect the ECT sensor (page 19-13).
- If the indicator does not come on, check for an open circuit in the Blue/black wire. If the wire is OK, replace the speedometer (page 19-7).

ECT SENSOR 3P (GRAY) CONNECTOR
(Wire side/female terminal)



The coolant temperature is low but the indicator comes on.

Disconnect the ECT sensor 3P connector.

Turn the ignition switch ON and check the coolant temperature indicator.

- If the indicator does not come on, inspect the ECT sensor (page 19-13).
- If the indicator comes on, check for a short circuit in the Green/blue wire. If the wire is OK, replace the speedometer (page 19-7).

ECT SENSOR INSPECTION

Drain the coolant from the cooling system (page 6-7).
Remove the ECT sensor (page 5-56).

Wear insulated gloves and adequate eye protection. Keep flammable materials away from the burner.

Heat the coolant (1:1 mixture) with an electric heating element.
Suspend the ECT sensor in heated coolant and check the continuity through the sensor.

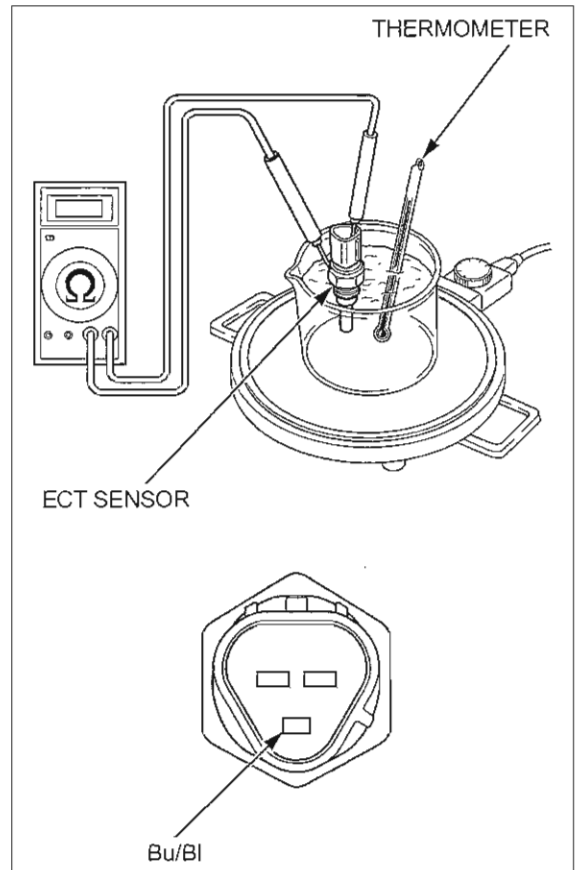
NOTE:

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.

CONNECTION: Blue/black – Ground

| | | |
|-------------|--------------|--------------|
| Temperature | 50°C (122°F) | 80°C (176°F) |
| Resistance | 6.8 – 7.4 kΩ | 2.1 – 2.6 kΩ |

Replace the ECT sensor if it is out of specifications.
Install the ECT sensor (page 5-56).



FUEL RESERVE SENSOR

INSPECTION

Fuel tank is empty, but the indicator does not come on

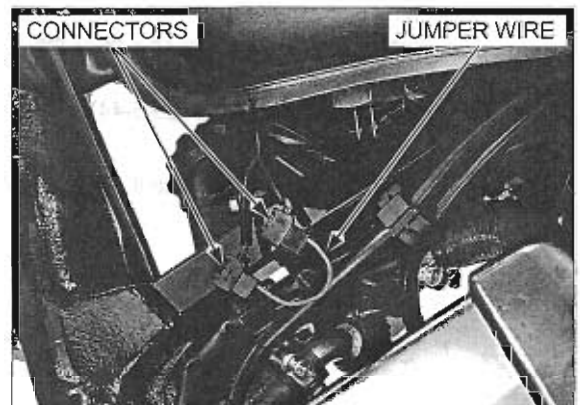
Check the speedometer power/ground line (page 19-9).

Disconnect the fuel reserve sensor connectors.
Connect the fuel reserve sensor connectors with a jumper wire.

Turn the ignition switch ON and check the fuel reserve indicator.

- If the indicator comes on, replace the fuel reserve sensor (page 19-14).
- If the indicator does not come on, check the following:
 - Open circuit in Brown/yellow wire
 - Open circuit in Brown/white wire
 - Open circuit in Green wire

If the wire is OK, replace the speedometer (page 19-7).



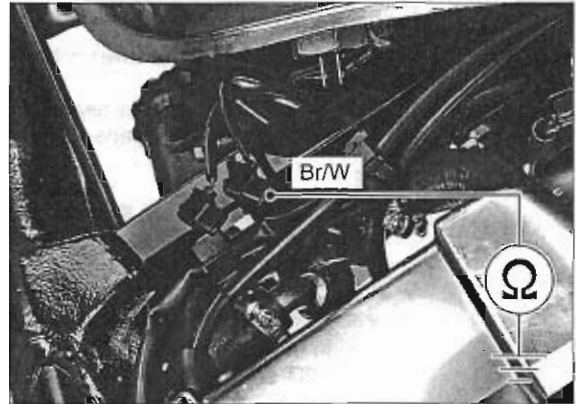
LIGHTS/METERS/SWITCHES

Enough fuel in the fuel tank, but the indicator stays on

Disconnect the fuel reserve sensor connectors.

Check for continuity between the Brown/white wire and ground.

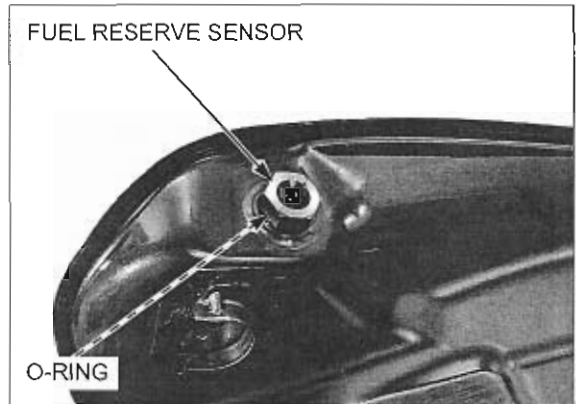
- If there is continuity, check for short circuit in Brown/white wire.
- If there is no continuity, replace the fuel reserve sensor (page 19-14).



REMOVAL/INSTALLATION

Remove the fuel tank (page 5-43).

Drain the fuel into an approved fuel container. Remove the fuel reserve sensor and O-ring.



Install a new O-ring onto the fuel reserve sensor. Install and tighten the fuel reserve sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

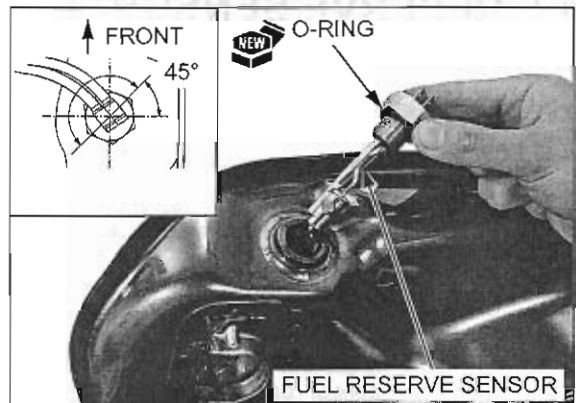
NOTE:

Install the fuel reserve sensor to the specified angle as shown.

Install the fuel tank (page 5-44).

NOTE:

After installing the fuel tank, check that there is no fuel leak.

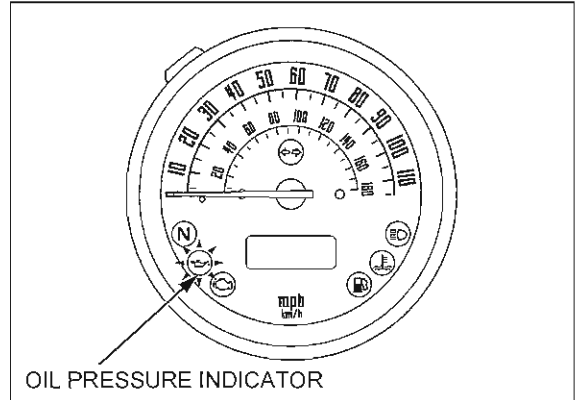


OIL PRESSURE INDICATOR

INSPECTION

Indicator does not come on with the ignition switch turned to ON

Check the power input line of the speedometer (page 19-9).

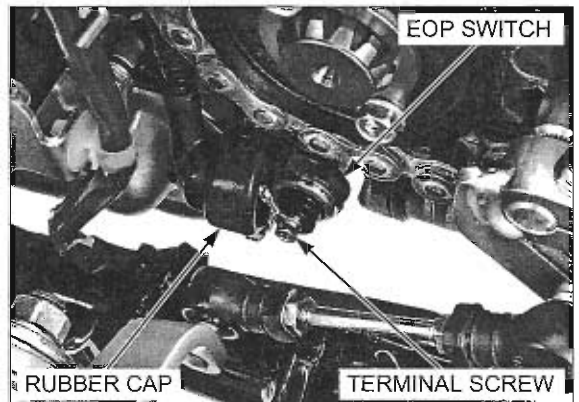


Remove the left crankcase rear cover (page 2-4).

Remove the rubber cap, and disconnect the EOP switch wire by removing the terminal screw. Ground the wire terminal.

Turn the ignition switch ON and check the oil pressure indicator.

- If the indicator comes on, replace the EOP switch.
- If the indicator does not come on, check for an open circuit in the Blue/red and/or White wire. If the wire is OK, replace the speedometer (page 19-7).



Indicator stays on while the engine is running

Remove the rubber cap, and disconnect the EOP switch wire by removing the terminal screw.

Check for continuity between the wire terminal and ground.

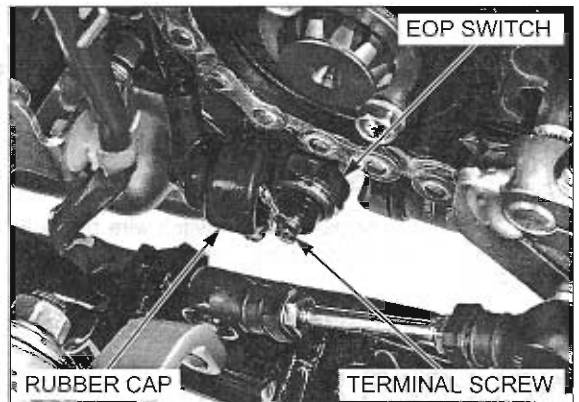
- If there is, check for a short circuit in the Blue/red and/or White wire.
- If there is no continuity, check the oil pressure (page 4-5).
If the oil pressure is normal, replace the EOP switch.

After inspection, connect the EOP switch wire and tighten the terminal screw (page 4-5).

TORQUE: 2 N·m (0.2 kgf·m, 1.5 lbf·ft)

Install the rubber cap properly.

Install the left crankcase rear cover (page 2-4).



IGNITION SWITCH

INSPECTION

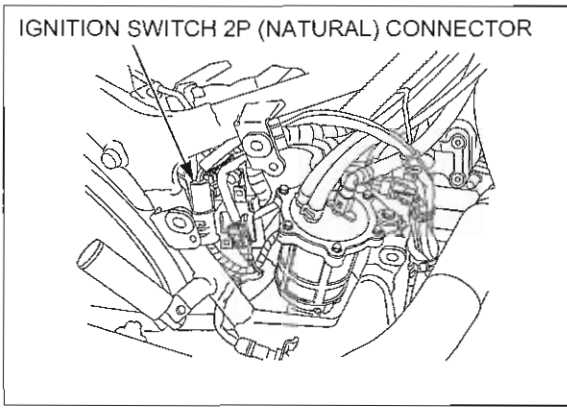
Remove the right side cover (page 2-3).

Disconnect the ignition switch 2P (Natural) connector.

Check for continuity between the switch side connector terminals in each switch position.

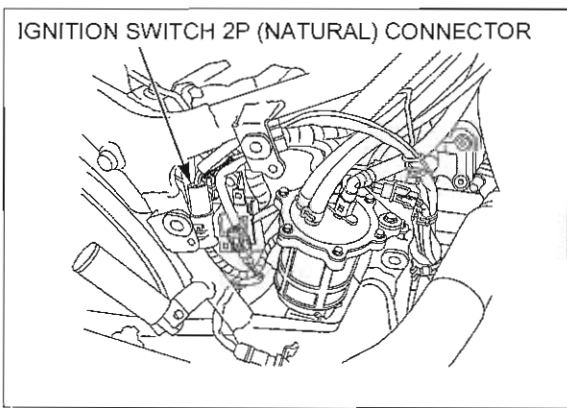
Continuity should exist between the color coded wires as shown in the chart.

| | | |
|-------|------|------|
| | IG | BAT1 |
| ON | ○—○ | |
| OFF | | |
| COLOR | R/BI | R |



REMOVAL/INSTALLATION

Disconnect the ignition switch 2P (Natural) connector.



Remove the bolts and ignition switch assembly.

Remove the bolts, ignition switch, collar and switch base from the stay.

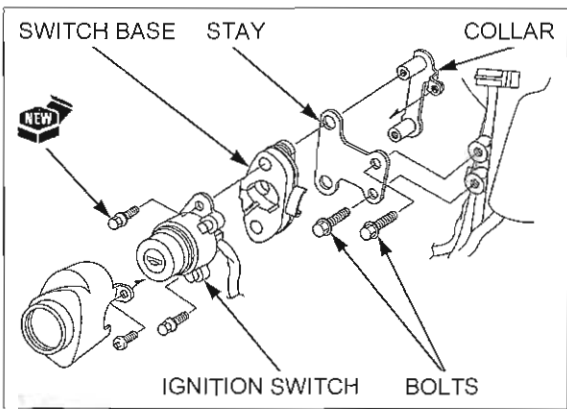
Install the switch base, ignition switch and collar to the stay.

Tighten new bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Route the ignition switch wire properly (page 1-19).
Connect the ignition switch 2P (Natural) connector.

The ignition switch mounting bolt heads are broken by tighten them to the specified torque.



HANDLEBAR SWITCH

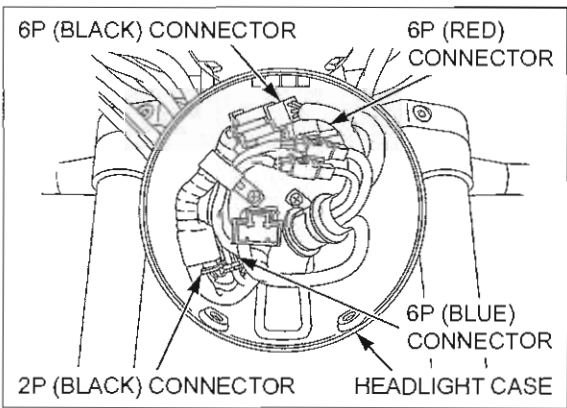
Remove the headlight unit (page 19-4).

Disconnect the following connectors:

- Left handlebar switch 6P (Black)
- Left handlebar switch 6P (Blue)
- Right handlebar switch 6P (Red)
- Right handlebar switch 2P (Black)

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

Check for continuity between the wire terminals of the handlebar switch connector.

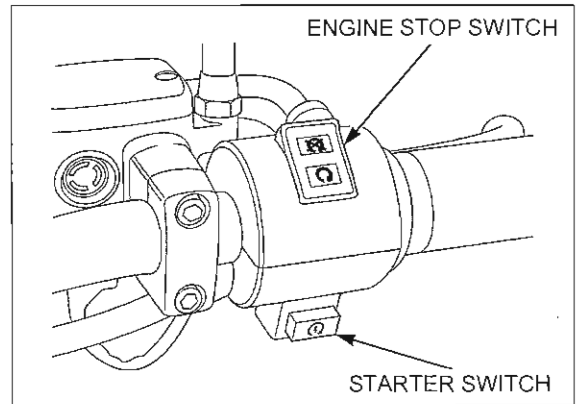
Continuity should exist between the color coded wire terminals as follows:

ENGINE STOP SWITCH

| | | |
|-------|------|------|
| | BAT2 | IG |
| OFF | | |
| RUN | ○ | ○ |
| COLOR | W/B | B/Br |

STARTER SWITCH

| | | | | |
|-------|------|-----|------|------|
| | IG | ST | BAT1 | HL |
| FREE | | | ○ | ○ |
| PUSH | ○ | ○ | | |
| COLOR | B/Br | Y/R | Bl/R | Bu/W |



LEFT HANDLEBAR SWITCH

Check for continuity between the wire terminals of the handlebar switch connector.

Continuity should exist between the color coded wire terminals as follows:

TURN SIGNAL SWITCH

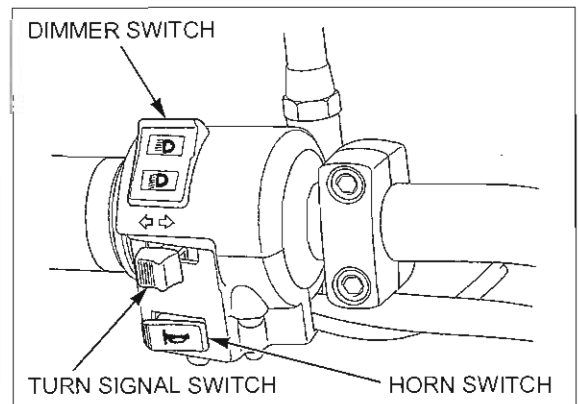
| | | | | | | |
|-------|----|----|---|----|------|-----|
| | W | R | L | PO | PR | PL |
| R | ○ | ○ | | ○ | ○ | ○ |
| N | | | | ○ | ○ | ○ |
| L | ○ | | ○ | ○ | ○ | |
| COLOR | Gr | Lb | O | Br | Lb/W | O/W |

HORN SWITCH

| | | |
|-------|----|------|
| | Ho | BAT3 |
| FREE | | |
| PUSH | ○ | ○ |
| COLOR | Lg | W/G |

DIMMER SWITCH

| | | | |
|-------|------|----|----|
| | HL | Lo | Hi |
| Lo | ○ | ○ | |
| (N) | ○ | ○ | ○ |
| Hi | ○ | | ○ |
| COLOR | Bu/W | W | Bu |

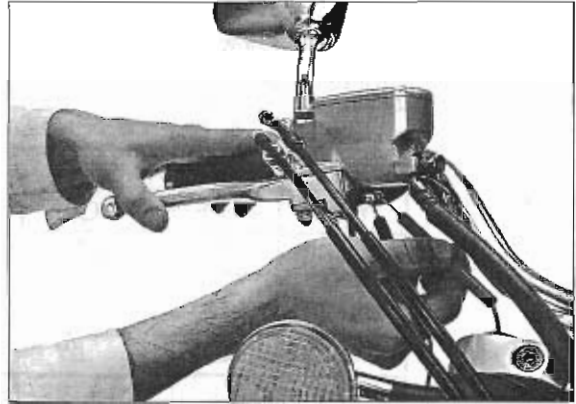


BRAKE LIGHT SWITCH

FRONT

Disconnect the brake light switch connectors and check for continuity between the switch terminals.

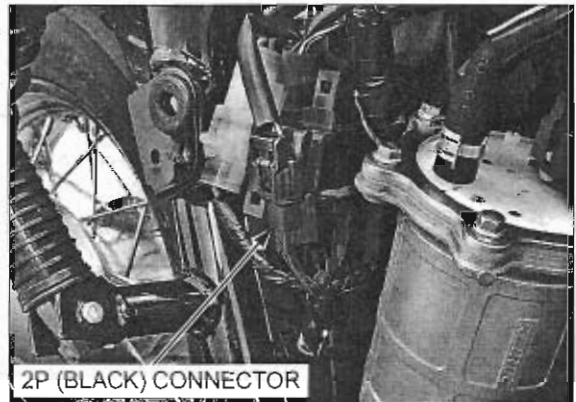
There should be continuity with the brake lever squeezed and no continuity with the lever released.



REAR

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

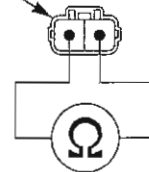
Disconnect the rear brake light switch 2P (Black) connector.



Check for continuity between the brake light switch side connector terminals.

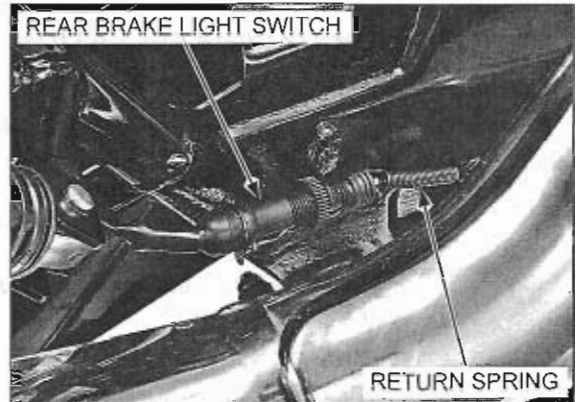
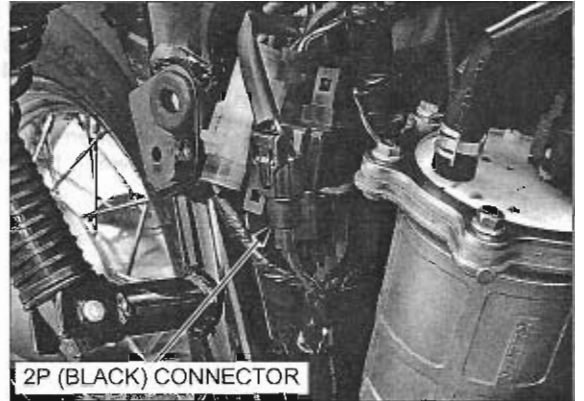
There should be continuity with the brake pedal depressed and no continuity with the pedal released.

2P (BLACK) CONNECTOR
(Wire side/male terminal)



REAR BRAKE LIGHT SWITCH REMOVAL/INSTALLATION

Disconnect the rear brake light switch 2P (Black) connector.



Unhook the return spring and remove the rear brake light switch.

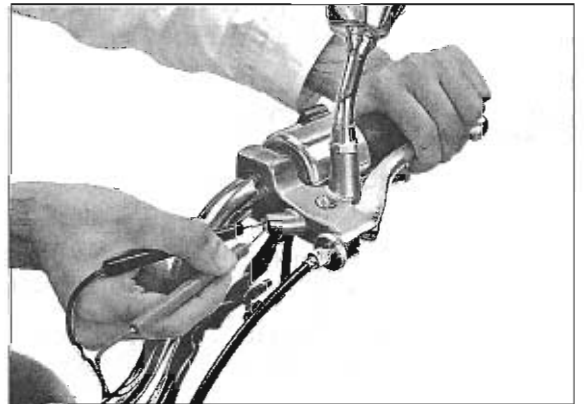
Route the wire properly (page 1-19).

Installation is in the reverse order of removal. Adjust the rear brake light switch (page 3-24).

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.

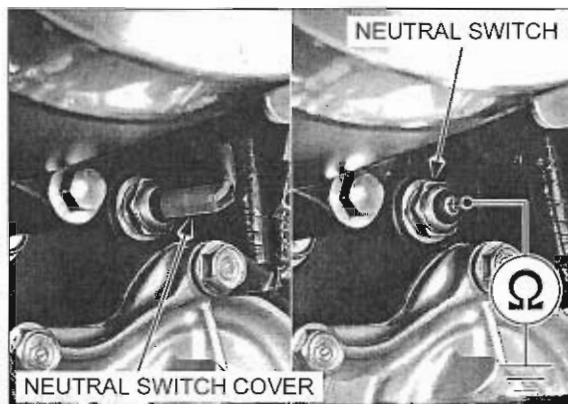


NEUTRAL SWITCH

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.



REMOVAL/INSTALLATION

Remove the following:

- Left crankcase rear cover (page 2-4)
- Right foot peg (page 2-8)

Disconnect the neutral switch connector.
Remove the neutral switch with the sealing washer from the crankcase.

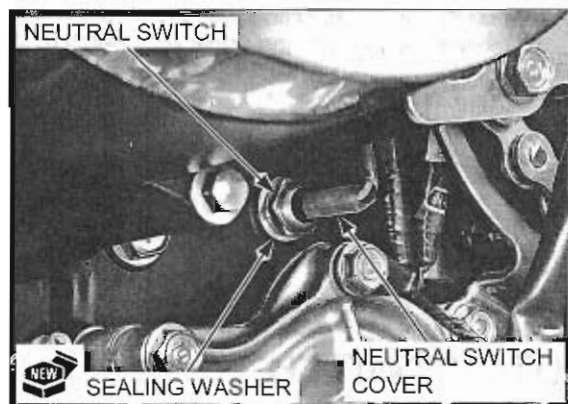
Install the neutral switch with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector.

Install the following:

- Left crankcase rear cover (page 2-4)
- Right foot peg (page 2-8)



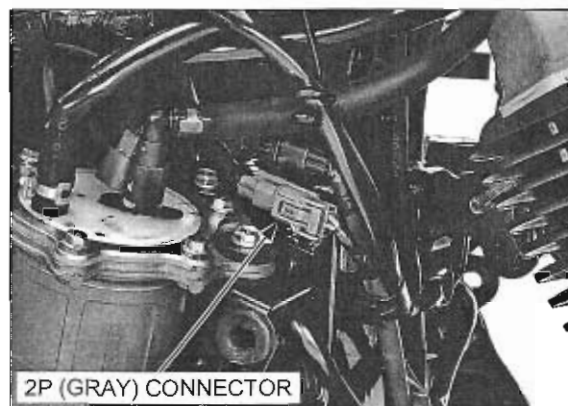
SIDESTAND SWITCH

INSPECTION

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

Disconnect the sidestand switch 2P (Gray) connector.
Check for continuity between the switch side connector terminals.

There should be continuity with the sidestand retracted and no continuity with the sidestand lowered.



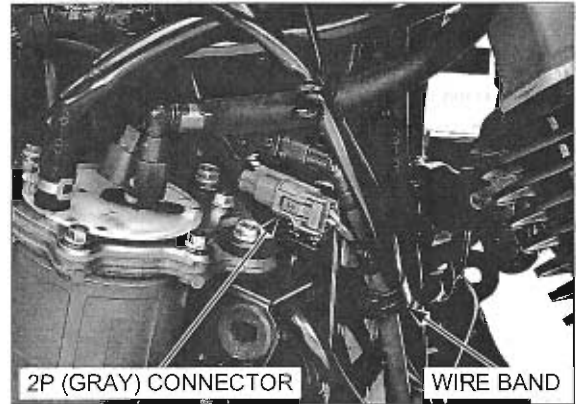
REMOVAL/INSTALLATION

Remove the following:

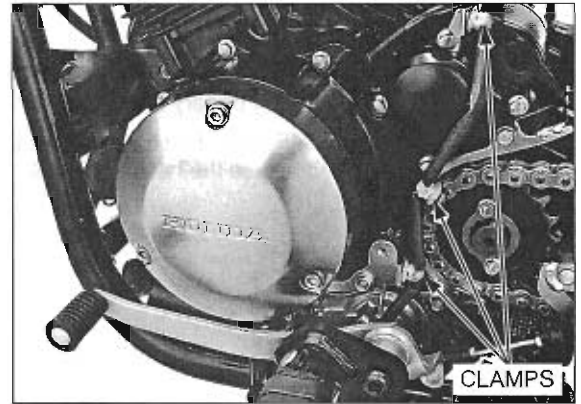
- Right side cover (page 2-3)
- Left crankcase rear cover (page 2-4)

Support the motorcycle securely.

Release the wire band and disconnect the sidestand switch 2P (Gray) connector.

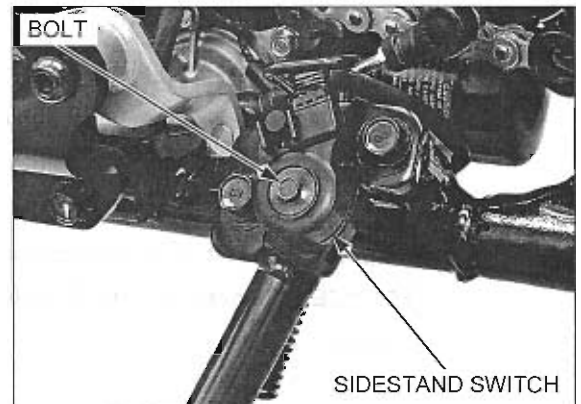


Release the sidestand switch wire clamps from the stays.

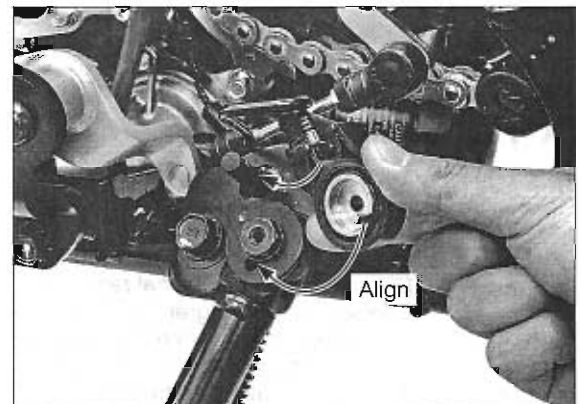


Do not reuse the sidestand switch bolt.

Remove the bolt and sidestand switch.



Install the sidestand switch by aligning its pin with the sidestand hole and switch groove with the bracket pin.



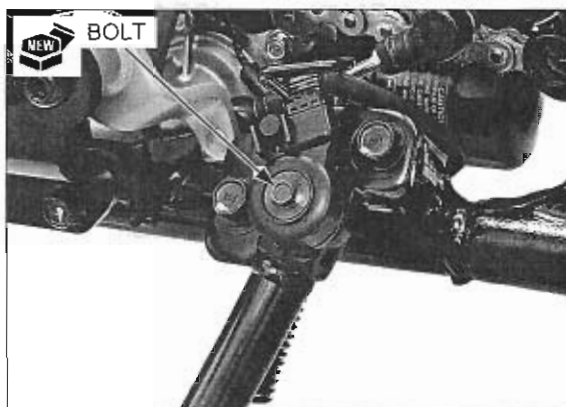
LIGHTS/METERS/SWITCHES

Install a new sidestand switch bolt.
Tighten the bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

*Route the sidestand
switch wire properly
(page 1-19).*

Install the removed parts in the reverse order of removal.

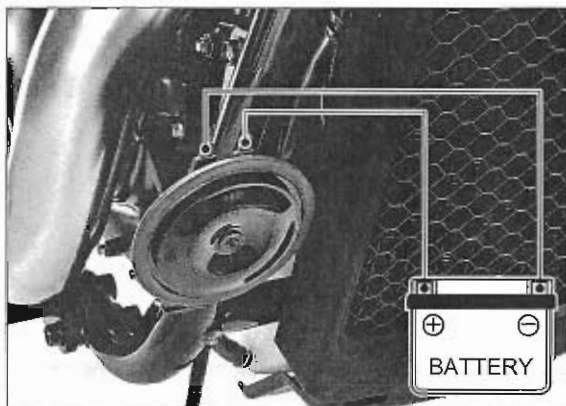


HORN

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.

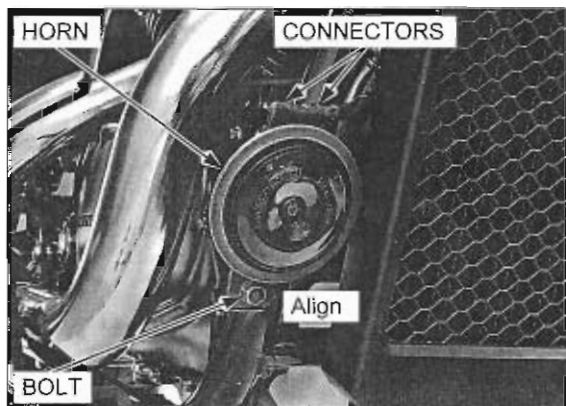
Remove the bolt and horn.

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 battery case (page 16-6).

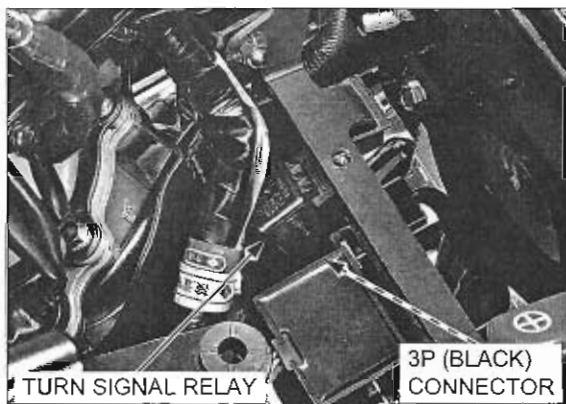
Remove the turn signal relay from the stay.

Disconnect the turn signal relay 3P (Black) connector.
Connect the White/green and Gray wire terminals of the wire side connector with a jumper wire.

Turn the ignition switch 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.

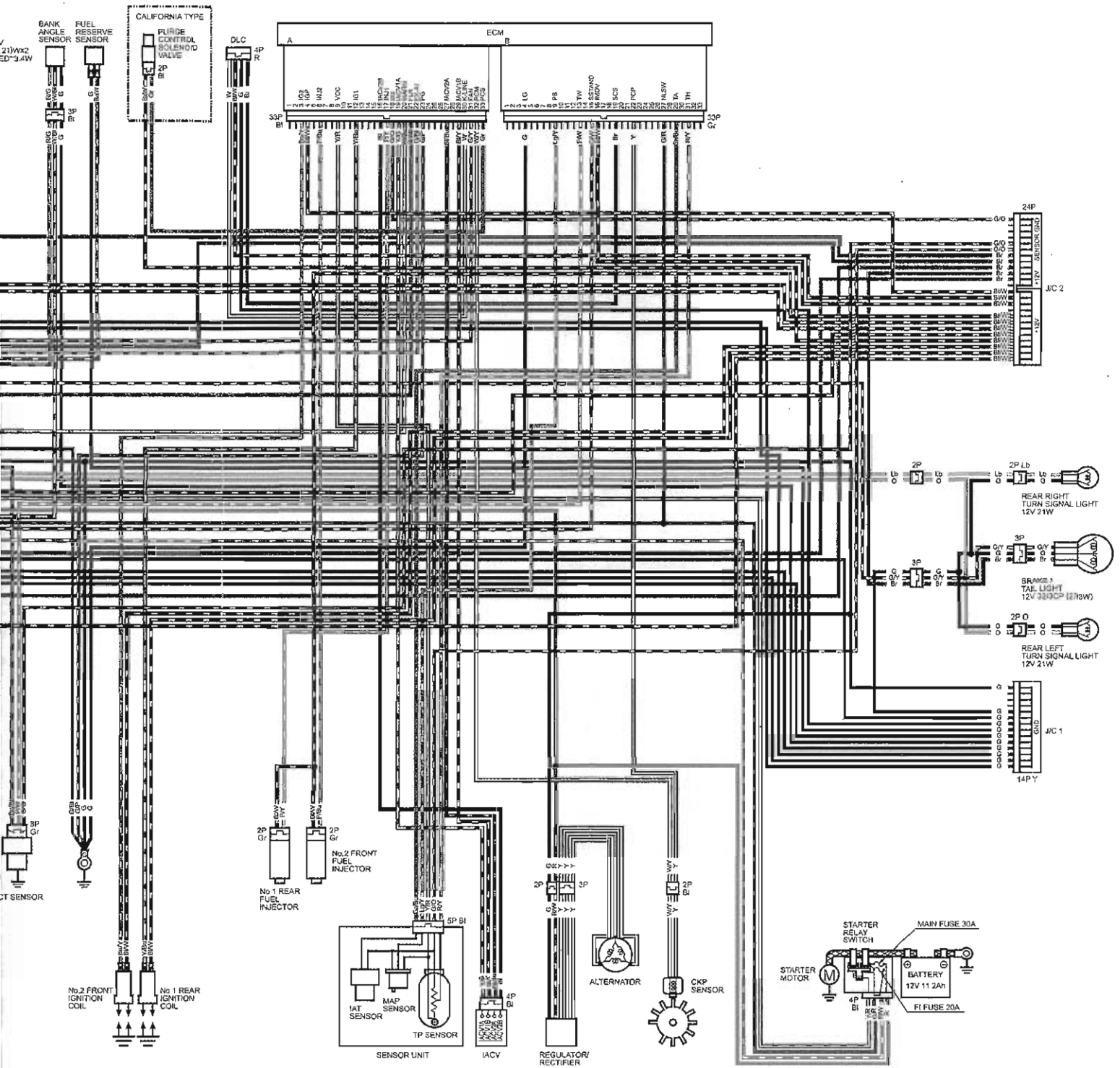


20. WIRING DIAGRAM

WIRING DIAGRAM.....20-2

MEMO

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



CONTINUITY

| TURN SIGNAL SWITCH | | | | |
|--------------------|---|----|----|----|
| R | L | PO | PR | PL |
| ○ | ○ | ○ | ○ | ○ |
| ○ | ○ | ○ | ○ | ○ |
| ○ | ○ | ○ | ○ | ○ |

| DIMMER SWITCH | | |
|---------------|----|----|
| HL | Lo | HI |
| ○ | ○ | ○ |
| ○ | ○ | ○ |
| ○ | ○ | ○ |

| HORN SWITCH | |
|-------------|------|
| Ho | BAT3 |
| ○ | ○ |
| ○ | ○ |
| ○ | ○ |

| ENGINE STOP SWITCH | |
|--------------------|----|
| BAT2 | IG |
| ○ | ○ |
| ○ | ○ |
| ○ | ○ |

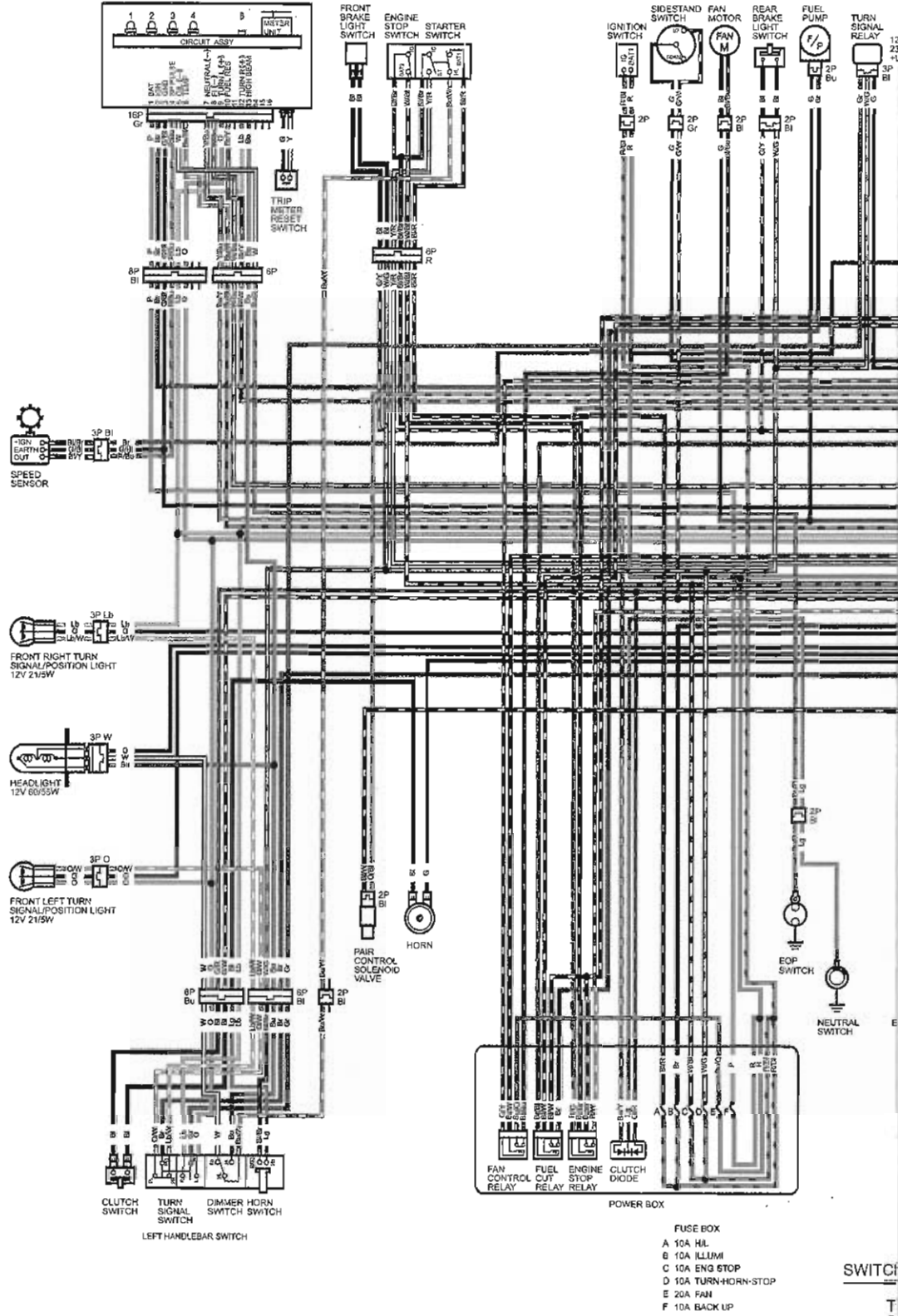
| STARTER SWITCH | | | |
|----------------|----|------|----|
| IG | ST | BAT1 | HL |
| ○ | ○ | ○ | ○ |
| ○ | ○ | ○ | ○ |
| ○ | ○ | ○ | ○ |

| IGNITION SWITCH | | |
|-----------------|------|-----|
| IG | BAT1 | KEY |
| ○ | ○ | ○ |
| ○ | ○ | ○ |
| ○ | ○ | ○ |

- BI BLACK
 - Y YELLOW
 - Bu BLUE
 - G GREEN
 - R RED
 - W WHITE
 - V VIOLET
 - Br BROWN
 - O ORANGE
 - Lb LIGHT BLUE
 - Lg LIGHT GREEN
 - P PINK
 - Gr GRAY
- TWO COLORED WIRE (EXAMPLE: YELLOW/RED)

WIRING DIAGRAM

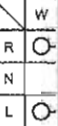
- 1 TEMP INDICATOR
- 2 NEUTRAL INDICATOR
- 3 PGM-FI INDICATOR
- 4 OIL PRESSURE INDICATOR
- 5 ILLUMINATION



SWITCH

T

S



WIRING T



21. TROUBLESHOOTING

ENGINE DOES NOT START OR IS
HARD TO START21-2

ENGINE LACKS POWER21-3

POOR PERFORMANCE AT LOW AND IDLE
SPEED21-5

POOR PERFORMANCE
AT HIGH SPEED 21-6

POOR HANDLING 21-6

ENGINE DOES NOT START OR IS HARD TO START

1. Spark Plug Inspection

Remove and inspect spark plugs.

Is the spark plug in good condition?

- YES** – • Incorrect spark plug heat range
• Incorrect spark plug gap
• Dirty air cleaner

NO – GO TO STEP 2.

2. 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 CKP sensor
• Faulty ignition coil
• Faulty ECM

NO – GO TO STEP 3.

3. Fuel Pump Inspection

Check for operation of the fuel pump and inspect the fuel flow.

Is the fuel pump unit normal?

YES – GO TO STEP 4.

NO – Faulty fuel pump unit

4. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

YES – GO TO STEP 5.

NO – Faulty PGM-FI system

5. 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
• Valve clearance too small

NO – GO TO STEP 6.

6. Engine Starting Condition

Start engine by following normal procedure.

Does the engine start then stops?

- YES** – • Leaking insulator or intake manifold
• Improper ignition timing (Faulty ECM or CKP sensor)
• Contaminated fuel
• Faulty IACV

ENGINE LACKS POWER

1. **Drive Train Inspection**

Raise wheel off the ground and spin it by hand.

Does the wheel spin freely?

YES – GO TO STEP 2.

NO – • Brake dragging
• Worn or damaged wheel bearings
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 the clutch is engaged?

YES – GO TO STEP 4.

NO – • Clutch slipping
• Worn clutch discs/plates
• Warped clutch discs/plates
• Weak clutch spring
• Additive in engine oil
4. **Engine Performance Inspection**

Accelerate lightly.

Does the engine speed increase?

YES – GO TO STEP 5.

NO – • Dirty air cleaner
• Restricted fuel flow
• Clogged muffler
5. **Spark Plug Inspection**

Remove and inspect spark plugs.

Is the spark plug fouled or discolored?

YES – • Plugs not serviced frequently enough
• Incorrect spark plug heat range
• Incorrect spark plug gap

NO – GO TO STEP 6.
6. **Engine Oil Inspection**

Check oil level and condition.

Is there correct level and good condition?

YES – GO TO STEP 7.

NO – • Oil level too high
• Oil level too low
• Contaminated oil
7. **Ignition Timing Inspection**

Check ignition timing.

Is the ignition timing correct?

YES – GO TO STEP 8.

NO – • Faulty ECM
• Faulty CKP sensor

TROUBLESHOOTING

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
 - Seized valve

NO – GO TO STEP 9.

9. Fuel pump Inspection

Inspect the fuel flow.

Is the fuel pump unit normal?

YES – GO TO STEP 10.

NO – Faulty fuel pump unit

10. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI System normal?

YES – GO TO STEP 11.

NO – Faulty PGM-FI system

11. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

Is the valve train lubricated properly?

YES – GO TO STEP 12.

- NO** –
- Clogged oil passage
 - Clogged oil filter
 - Faulty oil pump or oil pressure relief valve

12. 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
 - Wrong type of fuel
 - Clutch slipping

NO – GO TO STEP 13.

13. Engine Knocking Inspection

Accelerate or run at high speed.

Is there knocking?

- YES** –
- Worn piston and cylinder
 - Wrong type of fuel
 - Excessive carbon build-up in combustion chamber
 - Ignition timing too advance (Faulty ECM)
 - Lean fuel mixture
 - Faulty CKP sensor

NO – Engine does not knock

POOR PERFORMANCE AT LOW AND IDLE SPEED**1. Intake Air Leak Inspection**

Check the insulator for leaks.

Are these leaks?

- YES** – • Loose insulator bands
• Loose intake manifold mounting bolts
• Damaged insulator
• Faulty O-rings

NO – GO TO STEP 2.

2. 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 CKP sensor
• Faulty ignition coil
• Faulty engine stop switch
• Faulty ECM

NO – GO TO STEP 3.

3. Fuel Pump Inspection

Inspect the fuel flow.

Is the fuel pump unit normal?

YES – GO TO STEP 4.

NO – Faulty fuel pump unit

4. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

YES – GO TO STEP 5.

- NO** – • Faulty ECM
• Faulty CKP sensor

5. PGM-FI System Inspection

Check the PGM-FI system

Is the PGM-FI system normal?

NO – Faulty PGM-FI system

POOR PERFORMANCE AT HIGH SPEED

1. Fuel Pump Inspection

Inspect the fuel flow.

Is the fuel pump unit normal?

YES – GO TO STEP 2.

NO – Faulty fuel pump unit

2. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

YES – GO TO STEP 3.

NO – Faulty PGM-FI system

3. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

YES – GO TO STEP 4.

NO – • Faulty ECM
• Faulty CKP sensor

4. Valve Timing Inspection

Check valve timing.

Is the valve timing correct?

YES – GO TO STEP 5.

NO – Cam sprockets not installed properly

5. Valve Spring Inspection

Check valve springs.

Is the valve spring free length within specification?

YES – GO TO STEP 6.

NO – Faulty valve spring

6. Camshaft Inspection

Remove and inspect the camshaft.

Is the cam lobe height within specification?

YES – Camshaft is OK

NO – Faulty camshaft

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
- Bent spokes
- Improperly installed wheel hub
- Excessively worn swingarm pivot bearings
- Bent frame

Motorcycle pulls to one side

- Front and rear wheels not aligned
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

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