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HONDA

SERVICE MANUAL

FSC600/A

SILVER WING™



HOW TO USE THIS MANUAL

This service manual describes the service procedures for the FSC600.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and emission levels are at the proper levels.

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Sections 4 through 21 describe parts of the motorcycle, grouped according to location.

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

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

If you do not know the source of the trouble, go to section 23 Troubleshooting.

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

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

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

These signal words mean:

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

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

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

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

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

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SYMBOLS

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

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

1. GENERAL INFORMATION

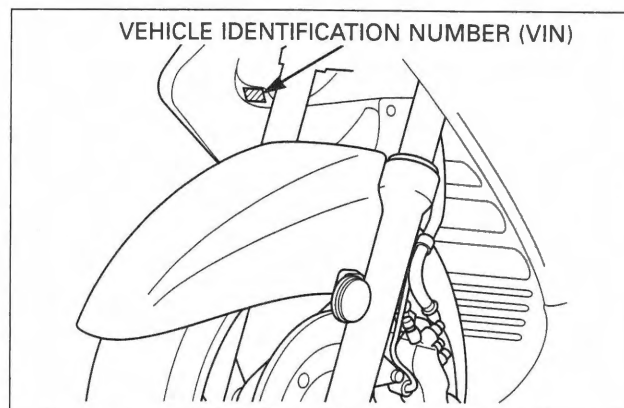
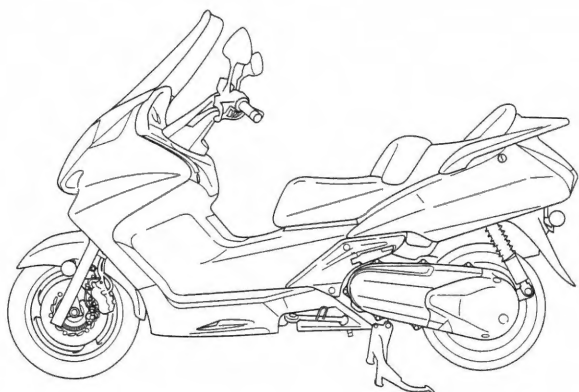
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SERVICE RULES

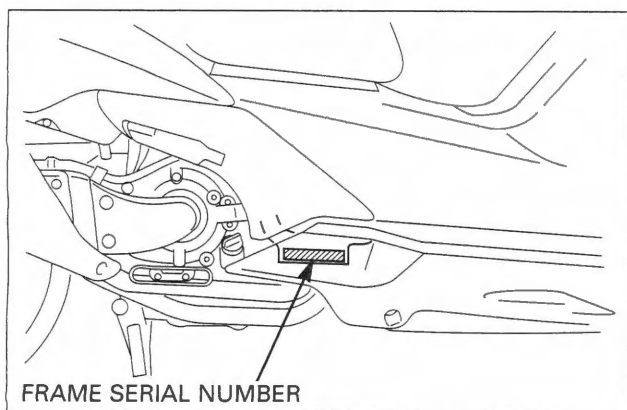
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English 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 on pages 1-20 through 1-33, Cable and Harness Routing.

GENERAL INFORMATION

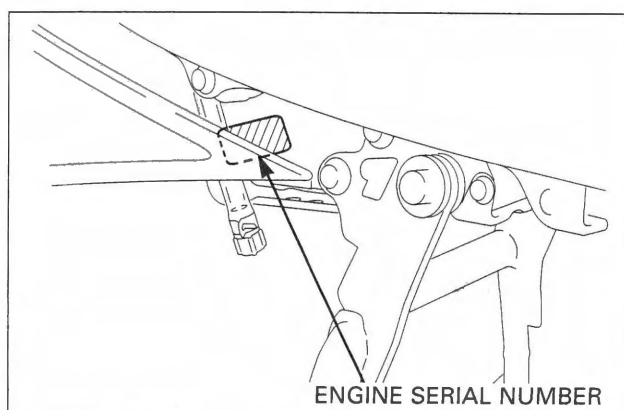
MODEL IDENTIFICATION



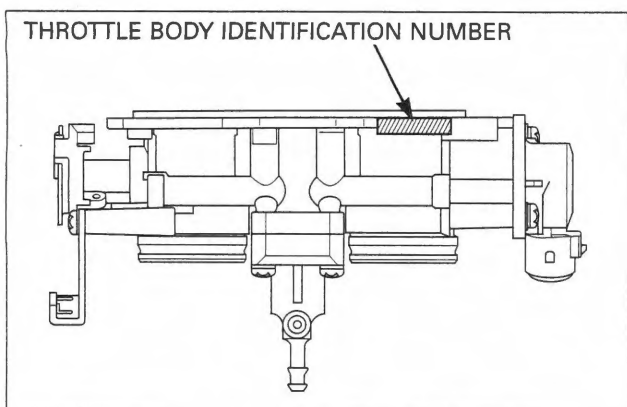
The Vehicle Identification Number (VIN) is located on the front air duct cover.



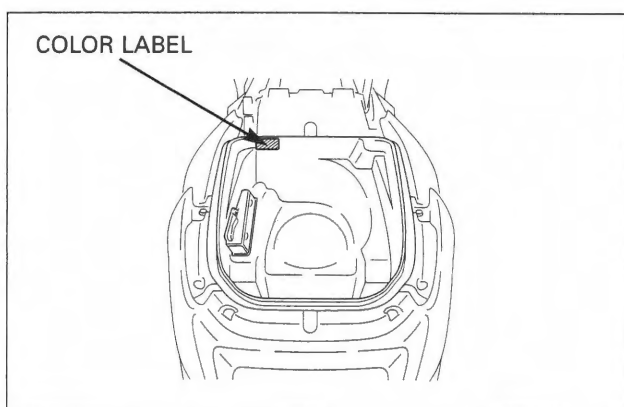
(1) The frame serial number is stamped on the right side of the frame.



(2) The engine serial number is stamped on the left crankcase.



(3) The throttle body identification number is stamped on the intake side of the throttle body as shown.



(4) The color label is attached as shown. When ordering color-coded parts, always specify the designated color code.

SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,275 mm (89.6 in)
	Overall width	770 mm (30.3 in)
	Overall height	1,430 mm (56.3 in)
	Wheelbase	1,595 mm (62.8 in)
	Seat height	'02 - '07: 755 mm (29.7 in)
		After '07: 740 mm (29.1 in)
	Ground clearance	140 mm (5.5 in)
	Dry weight	'02 - '04: STD TYPE 220 kg (485 lbs)
		'03, '04: ABS TYPE 228 kg (502 lbs)
		After '04: STD TYPE 227 kg (501 lbs)
		ABS TYPE 232 kg (511 lbs)
	Curb weight	'02 - '04: STD TYPE 239 kg (527 lbs)
		'03, '04: ABS TYPE 246 kg (542 lbs)
		After '04: STD TYPE 245 kg (540 lbs)
		ABS TYPE 250 kg (551 lbs)
	Maximum weight capacity	
		'02 - '04, After '04 (U.S.A. type) 166 kg (366 lbs)
		After '04 (Canada type) 170 kg (375 lbs)
FRAME	Gross weight	'02 - '04: STD TYPE 404 kg (891 lbs)
		'03, '04: ABS TYPE 412 kg (908 lbs)
		After '04 (U.S.A. type): STD TYPE 411 kg (906 lbs)
		ABS TYPE 416 kg (917 lbs)
		'05 - '07 (Canada type): STD TYPE 415 kg (915 lbs)
		After '04 (Canada type): ABS TYPE 420 kg (926 lbs)
	Frame type	Back bone
	Front suspension	Telescopic fork
	Front wheel travel	120 mm (4.7 in)
	Front axle travel	106 mm (4.2 in)
	Rear suspension	Unit swing
	Rear axle travel	115 mm (4.5 in)
	Front tire size	120/80-14M/C 58S
	Rear tire size	150/70-13M/C 64S
	Tire brand	
	Bridgestone	Front: HOOP B03 / Rear: HOOP B02
	IRC	Front: SS530F / Rear: SS530R
	Front brake	Hydraulic single disc brake with 3 pots caliper
	Rear brake	Hydraulic single disc brake with 2 pots caliper
	Caster angle	28°30'
	Trail length	105 mm (4.1 in)
	Fuel tank capacity	16.0 liter (4.22 US gal, 3.52 Imp gal)

GENERAL INFORMATION

GENERAL (Cont'd)

ITEM		SPECIFICATIONS
ENGINE	Bore and stroke	72.0 x 71.5 mm (2.83 x 2.81 in)
	Displacement	582 cm ³ (35.5 cu-in)
	Compression ratio	10.2 : 1
	Valve train	Chain drive and DOHC
	Intake valve opens	5° BTDC (At 1 mm lift)
	closes	39° ABDC (At 1 mm lift)
	Exhaust valve opens	35° BBDC (At 1 mm lift)
	closes	-5° ATDC (At 1 mm lift)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
CARBURETION	Air filtration	Paper element
	Engine dry weight	77.0 kg (169.7 lbs)
DRIVE TRAIN	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	32 mm (1.3 in)
ELECTRICAL	Clutch system	Dry, automatic centrifugal clutch
	Primary reduction	V-belt
	V-belt ratio	2.100 - 0.850
	Final reduction	6.016
ELECTRICAL	Ignition system	Full transistor digital ignition
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted/triple phase, full wave rectification
	Lighting system	Battery

GENERAL INFORMATION

Unit: mm (in)

LUBRICATION SYSTEM			
ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.0 liter (2.1 US qt, 1.8 Imp qt)	—
	At disassembly	2.6 liter (2.7 US qt, 2.3 Imp qt)	—
	At oil filter change	2.2 liter (2.3 US qt, 1.9 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 T903 standard : MA Viscosity : SAE 10W-30	
Oil pressure at oil pressure switch		530 kPa (5.4 kgf/cm ² , 77 psi) at 5,500 min ⁻¹ (rpm) (80 °C/176 °F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.12 – 0.22 (0.005 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

FUEL SYSTEM (Programmed Fuel Injection)			
ITEM		SPECIFICATIONS	
Throttle body identification number	'02 – '07:	GQ80B	
	After '07:	GQ80D	
No.1 and No.2 cylinders vacuum difference		20 mm Hg	
Base throttle valve for synchronization		No.1	
Idle speed		1,300 ± 100 min ⁻¹ (rpm)	
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)	
Intake air temperature sensor resistance (at 40°C/88°F)		1.136 kΩ ± 30 %	
Engine coolant temperature sensor resistance (at 20°C/68°F)		2 – 3 kΩ	
Fuel injector resistance (at 20°C/68°F)		11.1 – 12.3 Ω	
PAIR solenoid valve resistance (at 20°C/68°F)		19 – 25 Ω	
CMP sensor peak voltage (at 20°C/68°F)		0.7 V minimum	
CKP sensor peak voltage (at 20°C/68°F)		0.7 V minimum	
Manifold absolute pressure at idle		64.8 kPa (0.66 kgf/cm ² , 9.4 psi)	
Fuel pressure at idle		294 kPa (3.0 kgf/cm ² , 43 psi)	
Fuel pump flow (at 12 V)		Minimum 60 cm ³ (2.0 US oz, 2.1 Imp oz) for 10 seconds	

COOLING SYSTEM			
ITEM		SPECIFICATIONS	
Coolant capacity	Radiator and engine	2.2 liter (2.3 US qt, 1.9 Imp qt)	
	Reserve tank	0.8 liter (0.8 US qt, 0.7 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 (176 – 183 °F)	
	Fully open	95 °C (203 °F)	
	Valve lift	8 mm (0.3 in) minimum	
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors	
Standard coolant concentration		50% mixture with soft water	

GENERAL INFORMATION

Unit: mm (in)

CYLINDER HEAD/VALVES				
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,373 kPa (14.0 kgf/cm ² , 199 psi) at 250 min ⁻¹ (rpm)	—
Cylinder head warpage			—	0.05 (0.002)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.22 ± 0.03 (0.009 ± 0.001)	—
	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
		EX	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
		EX	0.020 – 0.047 (0.0008 – 0.0019)	—
	Valve guide projection above cylinder head	IN	15.3 – 15.5 (0.60 – 0.61)	—
		EX	15.3 – 15.5 (0.60 – 0.61)	—
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN/EX	40.19 (1.582)	38.2 (1.50)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Camshaft	Cam lobe height	IN	35.120 – 35.200 (1.3827 – 1.3858)	34.82 (1.371)
		EX	35.180 – 35.260 (1.3850 – 1.3882)	34.88 (1.373)
	Runout		—	0.05 (0.002)
	Oil clearance		0.030 – 0.072 (0.012 – 0.0028)	0.10 (0.004)

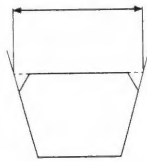
Unit: mm (in)

CYLINDER/PISTON			STANDARD	SERVICE LIMIT
ITEM				
Cylinder	I.D.		72.000 – 72.015 (2.8346 – 2.8352)	72.10 (2.839)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.10 (0.004)
Piston, piston rings	Piston mark direction		“IN” mark facing toward the intake side	—
	Piston O.D.		71.97 – 71.99 (2.833 – 2.834)	71.90 (2.831)
	Piston O.D. measurement point		18 mm (0.7 in) from bottom of skirt	—
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.04 (0.671)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.96 (0.668)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.02 (0.001)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.065 (0.0026)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.50 (0.020)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.00 (0.040)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

DRIVE PULLEY/CLUTCH/DRIVEN PULLEY		STANDARD	SERVICE LIMIT
ITEM			
Clutch	Clutch outer I.D.	160.0 – 160.2 (6.30 – 6.31)	160.5 (6.32)
	Lining thickness	4.0 (0.16)	1.0 (0.04)
Drive belt width		28.0 (1.10)	27.0 (1.06)
Movable drive face	Bushing I.D.	38.024 – 38.057 (1.4970 – 1.4983)	38.10 (1.50)
	Boss O.D.	37.995 – 38.031 (1.4959 – 1.4973)	37.95 (1.494)
	Weight roller O.D.	27.92 – 28.08 (1.099 – 1.106)	27.5 (1.08)
Driven pulley	Face spring free length	107.7 (4.24)	102.7 (4.04)
	Driven face O.D.	47.965 – 47.985 (1.8883 – 1.8892)	47.94 (1.887)
	Movable driven face I.D.	48.000 – 48.025 (1.8898 – 1.8907)	48.06 (1.892)

FINAL REDUCTION		
ITEM		SPECIFICATIONS
Final reduction oil capacity	At draining	0.32 liter (0.34 US qt, 0.28 Imp qt)
	At disassembly	0.35 liter (0.37 US qt, 0.31 Imp qt)
Recommended final reduction oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil. API service classification : SG or Higher. JASO T903 standard : MA Viscosity : SAE 10W-30

Unit: mm (in)

ALTERNATOR/STARTER CLUTCH		UNIT: MM (IN)	
ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	Boss O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.70 (2.272)
	Bushing I.D.	29.046 – 29.062 (1.1435 – 1.1442)	29.10 (1.146)
Starter clutch outer I.D.		74.412 – 74.442 (2.9296 – 2.9308)	74.49 (2.933)

Unit: mm (in)

CRANKCASE/CRANKSHAFT/BALANCER		Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Side clearance	0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
	Crank pin oil clearance	0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main bearing oil clearance	0.025 – 0.041 (0.0010 – 0.0016)	0.07 (0.003)

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Up to maximum weight capacity	200 kPa (2.00 kgf/cm ² , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Fork	Spring free length	331.4 (13.05)	325 (12.8)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	97 (3.8)	—
	Fluid capacity	302 ± 2.5 cm ³ (10.2 ± 0.08 US oz, 10.6 ± 0.09 Imp oz)	—
Steering head bearing pre-load		13 – 17 N (1.3 – 1.7 kgf, 2.9 – 3.7 lbf)	—

REAR WHEEL/SUSPENSION

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	225 kPa (2.25 kgf/cm ² , 33 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Right swingarm pivot O.D.		35.012 – 35.028 (1.3784 – 1.3791)	34.70 (1.366)

GENERAL INFORMATION

Unit: mm (in)

BRAKE SYSTEM

BRAKE SYSTEM			STANDARD	SERVICE LIMIT
ITEM				
Front	Specified brake fluid		DOT 4	—
	Brake disc thickness	'02 – '06 standard type	4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
		After '02 ABS type/ After '06 standard type	5.8 – 6.2 (0.22 – 0.24)	5.0 (0.20)
	Brake disc runout		—	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.	Upper	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
		Lower	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
	Caliper piston O.D.	Upper	26.935 – 26.968 (1.0604 – 1.0617)	26.910 (1.0594)
		Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Lower	26.935 – 26.968 (1.0604 – 1.0617)	26.910 (1.0594)
Rear	Specified brake fluid		DOT 4	—
	Brake disc thickness		6.3 – 6.7 (0.25 – 0.26)	5.5 (0.22)
	Brake disc runout		—	0.30 (0.012)
	Master cylinder I.D.		12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.		27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
	Caliper piston O.D.		26.935 – 26.968 (1.0604 – 1.0617)	26.910 (1.0594)
	Parking	Caliper cylinder I.D.		20.00 – 20.05 (0.787 – 0.789)
Caliper piston O.D.		19.935 – 19.968 (0.7848 – 0.7861)	19.927 (0.7845)	

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 11 (10) Ah
	Current leakage		1.1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/0.5 h
Alternator	Capacity		441 W/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 0.5 Ω

GENERAL INFORMATION

IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	NGK	CR8EH-9
	DENSO	U24FER9
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
CKP sensor peak voltage		0.7 V minimum
Ignition timing ("F" mark)		12° BTDC at idle

ELECTRIC STARTER

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	8.5 (0.33)

LIGHTS/METERS/SWITCHES

LIGHTS/METERS/SWITCHES			
ITEM		SPECIFICATIONS	
Bulbs	Headlight	12 V – 55 W x 2	
	Brake/tail light	12 V – 21/5 W x 2	
	Front turn signal/position light	12 V – 21 W x 2	
	Rear turn signal	12 V – 21 W x 2	
	License light	12 V – 5 W	
	Instrument light	LED	
	Turn signal indicator	LED	
	High beam indicator	LED	
	Parking indicator	LED	
	Oil pressure indicator	LED	
	PGM-FI warning indicator	LED	
	Temp warning indicator	LED	
	V-Matic indicator	LED	
	ABS warning indicator (ABS TYPE)	LED	
Luggage box instrument light	12 V – 3.4 W		
Fuse	Main fuse	Main A: 30 A, Main B: 30 A	
	Sub fuse (ABS TYPE)	30A x 2, 15 A x 2, 10 A x 5	
	Sub fuse (STD TYPE)	15 A x 2, 10 A x 4	
Thermosensor resistance		at 80°C/176°F	2.1 – 2.6 kΩ
		at 120°C/248°F	0.65 – 0.73 kΩ

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 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt and nut (include small flange bolt)	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
10 mm bolt and nut	34 (3.5, 25)	8 mm flange bolt and nut	26 (2.7, 20)
12 mm bolt and nut	54 (5.5, 40)	10 mm flange bolt and nut	39 (4.0, 29)

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

NOTES: 1. Apply oil to the threads and seating surface.
 2. Apply a locking agent to the threads.
 3. CT bolt.
 4. UBS bolt.
 5. Torx bolt.
 6. Apply sealant to the threads.
 7. ALOC bolt: replace with a new one.
 8. U-nut.
 9. One-way bolt.

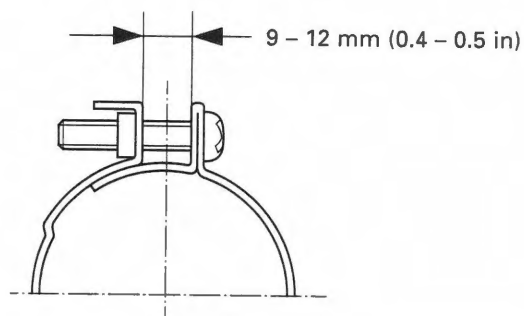
ENGINE	ITEM	QTY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
MAINTENANCE:					
	Timing hole cap	1	14	10 (1.0, 7)	NOTE 1
	Balancer shaft hole cap	1	14	10 (1.0, 7)	NOTE 1
	Oil strainer screen cap	1	36	15 (1.5, 11)	NOTE 1
	Oil filter cartridge	1	20	26 (2.7, 20)	NOTE 1
	Transmission oil check bolt	1	8	13 (1.3, 9)	
	Transmission oil drain bolt	1	8	13 (1.3, 9)	
	Spark plug	2	10	16 (1.6, 12)	
LUBRICATION SYSTEM:					
	Oil pump screw	1	4	3 (0.3, 2.2)	
	Oil pump drive sprocket bolt	1	10	49 (5.0, 36)	NOTE 1
	Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
	Oil cooler bolt	1	20	64 (6.5, 47)	NOTE 1
FUEL SYSTEM:					
	Fuel rail mounting bolt	2	6	10 (1.0, 7)	
	Fast idle wax unit mounting screw	2	4	4 (0.4, 2.9)	
COOLING SYSTEM:					
	Water pump cover bolt	2	6	13 (1.3, 9)	NOTE 3
CYLINDER HEAD/VALVES:					
	Reed valve cover bolt	2	6	13 (1.3, 9)	NOTE 3
	Breather separator bolt	3	6	13 (1.3, 9)	NOTE 2, 3
	Cylinder head sealing bolt	2	18	32 (3.3, 24)	NOTE 2
	Cylinder head 9 mm bolt	6	9	44 (4.5, 33)	NOTE 1
	Camshaft holder bolt	12	6	12 (1.2, 9)	NOTE 1
	Cylinder head cover bolt	4	6	10 (1.0, 7)	
	Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
	Cam chain tensioner pivot bolt	1	6	12 (1.2, 9)	

GENERAL INFORMATION

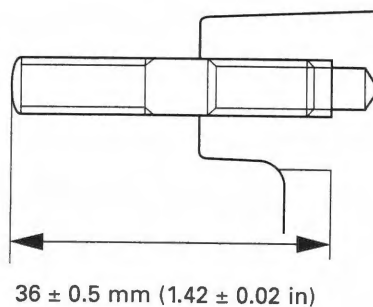
ENGINE (Cont'd)

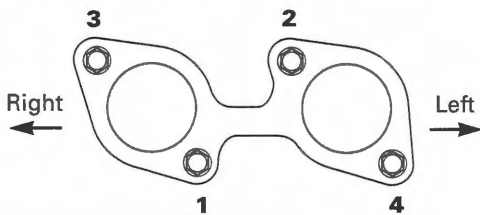
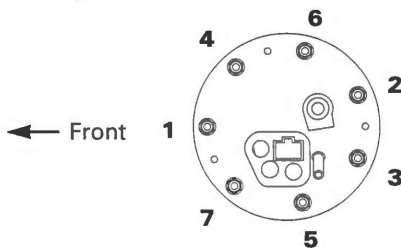
ENGINE (Cont'd)	ITEM	QTY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
DRIVE PULLEY/CLUTCH/DRIVEN PULLEY:					
	Drive plate bolt	6	8	26 (2.7, 20)	NOTE 1, 4
	Element cover screw	1	4	1 (0.1, 0.7)	
	Left rear cover special bolt	4	6	10 (1.0, 7)	
	Drive face bolt	1	12	103 (10.5, 76)	
	Driven pulley nut	1	16	54 (5.5, 40)	
FINAL REDUCTION:					
	Transmission cover socket bolt	2	8	25 (2.5, 18)	
	Transmission cove flange bolt	5	8	25 (2.5, 18)	
ALTERNATOR/STARTER CLUTCH:					
	Starter clutch socket bolt	6	8	29 (3.0, 22)	NOTE 2
	CKP sensor socket bolt	2	6	12 (1.2, 9)	NOTE 1, 4
	Flywheel bolt	1	12	103 (10.5, 76)	
	Stator socket bolt	3	6	12 (1.2, 9)	
CRANKCASE/CRANKSHAFT/BALANCER:					
	Right crankcase socket bolt (10 mm)	1	10	34 (3.5, 25)	NOTE 2
	Right crankcase sealing bolt (18 mm)	1	18	44 (4.5, 33)	NOTE 2
	Left crankcase socket bolt	1	8	23 (2.3, 17)	NOTE 2
	Connecting rod bearing cap nut	4	9	42 (4.3, 31)	NOTE 1
LIGHTS, METERS, SWITCHES:					
	Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 6
	ECT/Thermosensor	1	12	23 (2.3, 17)	

Insulator band:



Exhaust pipe stud bolt:



FRAME		QTY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ITEM					
FRAME BODY PANELS/EXHAUST SYSTEM:					
Rear frame bolt	4	8	26 (2.7, 20)		
Rear spoiler bolt	4	8	26 (2.7, 20)		
Exhaust pipe band bolt	2	8	21 (2.1, 15)		
Exhaust pipe joint nut.					
Tightening procedure:					
					
Exhaust pipe mounting bolt	1	8	22 (2.2, 16)		
Muffler protector bolt	3	5	4 (0.4, 2.9)		
Muffler tail cover mounting bolt	4	5	4 (0.4, 2.9)		
Windscreen garnish set screw	2	5	2 (0.2, 1.4)		
Windscreen set screw	6	5	1 (0.1, 0.7)		
FUEL SYSTEM:					
Fuel pump banjo bolt (Fuel tank side)	1	12	22 (2.2, 16)		
Fuel hose sealing nut (Throttle body side)	1	12	22 (2.2, 16)		
Fuel pump mounting nut	7	6	12 (1.2, 9)		
Tightening procedure:					
					
Fuel tank mounting nut	1	8	21 (2.1, 15)		
Fuel tank mounting bolt	2	6	12 (1.2, 9)		
O2 sensor (After '07)	1	18	44 (4.5, 33)		
COOLING SYSTEM:					
Cooling fan nut	1	5	3 (0.3, 2.2)		NOTE 2
Fan motor mounting bolt	3	5	5 (0.5, 3.6)		
Radiator shroud mounting bolt	3	6	9 (0.9, 6.5)		
Radiator reserve tank mounting bolt	2	6	10 (1.0, 7)		
ENGINE MOUNTING:					
Engine mounting nut	3	10	39 (4.0, 29)		
FRONT WHEEL/SUSPENSION/STEERING:					
Handle post pinch bolt (upper)	1	12	128 (13.0, 94)		
Handle post pinch bolt (lower)	1	10	69 (7.0, 51)		
Steering stem nut	1	26	74 (7.5, 54)		
Steering top thread	1	26	13 (1.3, 9)		
Steering stem pinch bolt	4	10	69 (7.0, 51)		
Front axle bolt	1	14	59 (6.0, 43)		
Front fork axle holder bolt	2	8	22 (2.2, 16)		
Front fork cap	2	36	23 (2.3, 17)		
Front fork socket bolt	2	10	29 (3.0, 22)		NOTE 2 NOTE 7
Front brake disc bolt	6	8	42 (4.3, 31)		
Handlebar lower holder nut	2	10	39 (4.0, 29)		

GENERAL INFORMATION

FRAME (Cont'd)

ITEM	QTY	THREAD DIA. (mm)	TORQUE N•m (kgf•m, lbf•ft)	REMARKS
REAR WHEEL/SUSPENSION:				
Rear brake disc bolt	4	8	42 (4.3, 31)	NOTE 7
Rear axle nut	1	18	138 (14.1, 102)	NOTE 8
Rear shock absorber upper mounting bolt	2	8	22 (2.2, 16)	
Rear shock absorber lower mounting bolt	2	10	39 (4.0, 29)	
Final shaft holder bolt	2	10	49 (5.0, 36)	
Right swingarm torx bolt	3	10	34 (3.5, 25)	NOTE 5
Swingarm case bolt (center swingarm)	4	10	37 (3.8, 27)	NOTE 2
Right swingarm pivot mounting bolt	5	8	24 (2.4, 17)	
Swingarm flange mounting bolt	6	8	25 (2.5, 18)	
BRAKE SYSTEM:				
Master cylinder reservoir cover screw	4	4	2 (0.2, 1.4)	
Master cylinder holder bolt	4	6	12 (1.2, 9)	
Brake lever pivot bolt	2	6	1 (0.1, 0.7)	
Brake lever pivot nut	2	6	6 (0.6, 4.3)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Rear brake light/limit switch screw	2	4	1 (0.1, 0.7)	
Brake caliper mounting bolt	4	8	30 (3.1, 22)	NOTE 7
Front brake caliper body B bolt	3	8	32 (3.3, 24)	NOTE 7
Brake caliper bleed valve	3	8	6 (0.6, 4.3)	
Brake pad pin	2	10	18 (1.8, 13)	
Rear caliper pad pin plug	1	10	3 (0.3, 2.2)	
Front caliper main pin bolt	1	8	22 (2.2, 16)	NOTE 2
Front caliper sub pin bolt	1	8	12 (1.2, 9)	NOTE 2
Rear caliper main pin bolt	1	12	28 (2.9, 21)	NOTE 2
Rear caliper sub pin bolt	1	8	12 (1.2, 9)	NOTE 2
Parking brake caliper mounting bolt	1	8	30 (3.1, 22)	NOTE 2
Parking brake caliper pin bolt	1	8	23 (2.3, 17)	
Brake hose oil bolt	7	10	34 (3.5, 25)	
Brake pipe nut	4	10	14 (1.4, 10)	NOTE 1
ANTI-LOCK BRAKE SYSTEM (ABS)				
Front pulser ring bolt	3	5	8 (0.8, 5.8)	NOTE 5, 7
Rear pulser ring bolt	3	5	8 (0.8, 5.8)	NOTE 5, 7
Brake pipe nut	5	10	14 (1.4, 10)	
LIGHTS/METERS/SWITCHES:				
Ignition switch mounting bolt	2	8	26 (2.7, 20)	NOTE 9
OTHERS:				
Sidestand pivot bolt	1	10	10 (1.0, 7)	
Sidestand pivot nut	1	10	29 (3.0, 22)	
Sidestand switch mounting bolt	1	6	10 (1.0, 7)	

TOOLS

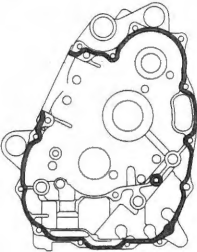
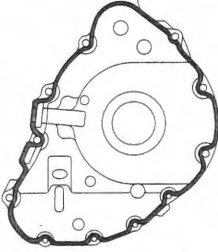
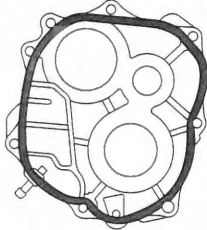
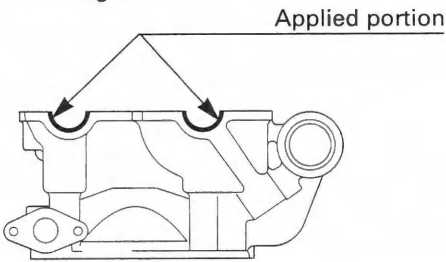
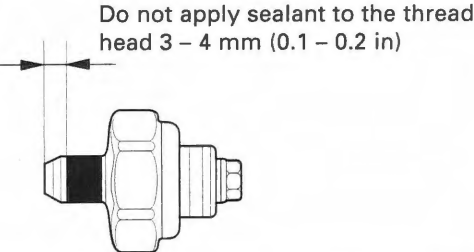
- NOTES: 1. Equivalent commercially available.
 2. Alternative tool.
 3. Newly provided tool.
 4. Newly designed tool.
 5. U.S.A. only

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Fuel pressure gauge	07406-0040002	NOTE 5: 07406-004000B or 07406-004000A	5
Oil pressure gauge	07506-3000000	NOTE 1	4
Oil pressure gauge attachment	07510-4220100	NOTE 1	4
Universal bearing puller	07631-0010000	NOTE 1	11
Adjustable pin spanner	07702-0020001		14
Universal holder	07725-0030000	NOTE 5: 07AMB-MCTA100	10
Flywheel holder	07725-0040000	NOTE 1	12
Flywheel puller	07733-0020001	NOTE 5: 07933-3950000	12
Remover weight	07741-0010201	NOTE 5: 07936-371020A or 07936-3710200	11, 13, 14, 15
Attachment, 28 x 30 mm	07946-1870100		10
Attachment, 32 x 35 mm	07746-0010100		10, 11
Attachment, 42 x 47 mm	07746-0010300		13, 14, 15
Attachment, 52 x 55 mm	07746-0010400		11, 14
Attachment, 62 x 68 mm	07746-0010500		11
Attachment, 40 x 42 mm	07746-0010900		14
Attachment, 30 mm	07746-0030300		14
Pilot, 17 mm	07746-0040400		10
Pilot, 20 mm	07746-0040500		11, 13, 14, 15
Pilot, 25 mm	07746-0040600		10, 11
Pilot, 30 mm	07746-0040700		11
Pilot, 35 mm	07746-0040800		15
Pilot, 22 mm	07746-0041000		11
Bearing remover shaft	07746-0050100		14
Bearing remover head, 20 mm	07746-0050600		14
Driver	07749-0010000		10, 11, 13, 14, 15
Tensioner holder	07AMG-001A100	NOTE 5	8
Valve spring compressor	07757-0010000		8
Valve seat cutter		NOTE 1	
Seat cutter, 24.5 mm	07780-0010100		8
Seat cutter, 29 mm	07780-0010300		8
Flat cutter, 30 mm	07780-0012200		8
Flat cutter, 27 mm	07780-0013300		8
Interior cutter, 30 mm	07780-0014000		8
Interior cutter, 26 mm	07780-0014500		8
Cutter holder, 4.5 mm	07781-0010600		8
Snap ring pliers	07914-SA50001		16
Lock nut wrench	07916-KM10000		14
Remover handle	07936-3710100		11, 13, 15
Bearing remover	07936-3710400		15
Bearing remover, 20 mm	07936-3710600		11, 13
Bearing remover, 25 mm	07936-ZV10100	NOTE 5: 07936-ZV1A100	11
Attachment, 28 x 30 mm	07946-1870100		11
Bearing driver attachment	07947-6340400		11
Slider weight	07947-KA50100		14
Fork seal driver attachment, 41 mm	07947-KF00100		14
Oil seal driver attachment	07948-SC20200		10
Ball race remover	07953-4250002	NOTE 5: 07953-MJ1000B	14
Driver handle	07953-MJ10200		10
Piston ring slider	07954-2830000		9
Piston base	07958-2500001		9
Valve spring compressor attachment	07959-KM30101		8
Assembly shaft	07965-VM00200		11
Oil filter wrench	07HAA-PJ70100		3, 4
Peak voltage adaptor	07HGJ-0020100		5, 18, 20
IgnitionMate peak voltage tester	MTP07-0286	NOTE 5	5, 18, 20

GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Bearing driver attachment, 78 x 90	07GAD-SD40101		15
Needle bearing remover	07HMC-MR70100	Not available in U.S.A.	10
Valve guide driver 4.5 mm	07HMD-ML00101		8
Tappet hole protector	07HMG-MR70002	Not available in U.S.A.	8
Valve guide reamer, 4.508 mm	07HMH-ML00101	NOTE 5: 07HMH-ML0010B	8
Bearing remover shaft	07JAC-PH80200		14
Pilot, 32 x 50 mm	07MAD-PR90200		11
Compression gauge attachment	07RMJ-MY50100	NOTE 1	8
Adjustable bearing remover	07YAC-0010101		14
Assembly collar	07YMF-KPB0100		11
Christie battery charger	MC1012/2	NOTE 5	17
Battery tester	BM-210-AH or BM-210	NOTE 5	17
ECU test harness	07YMZ-0010100	NOTE 5: 07WMZ-MBGA000	5
Clutch outer puller	07ZMC-MCT0100	NOTE 5: 07ZMC-MCTA100	10
Driver attachment, 110 x 140 mm	07ZMD-MCT0100	NOTE 5: 07ZMD-MCTA100	15
Clutch spring compressor	07ZME-MCT0100	NOTE 5: 07ZME-MCTA100	10
Clutch outer assembly tool	07ZMF-MCT0100		10
Crank assembly guide	07ZMG-MCT0100	NOTE 5: 07ZMG-MCTA100	13
Slide hammer 3/8 x 16		Commercially available in U.S.A.	10, 14
Adjustable bearing puller 25-40 mm	07736-A01000B or 07736-A01000A	NOTE 5	10, 14
Assembly collar	07ZMF-MCTA100	NOTE 5	10
Threaded shaft 22 x 1.5 x 240	07931-ME4010B	NOTE 5	10
Special nut	07931-HB3020A	NOTE 5	10
ECM test harness 32P	070MZ-0010201		5
SCS connector	070PZ-ZY30100		5
O2 sensor wrench	07LAA-PT50101		5

LUBRICATION & SEAL POINTS

ENGINE	LOCATION	MATERIAL	REMARKS
	Crankcase mating surface	Liquid sealant (Three Bond 1207B or equivalent)	
			
	Right crankcase cover mating surface	Liquid sealant (Three Bond 1207B or equivalent)	
			
	Transmission cover mating surface	Liquid sealant (Three Bond 1215 or equivalent)	
			
	Cylinder head mating surface	Liquid sealant (Three Bond 1211 or Shell KE45T or equivalent)	
			
	Oil pressure switch threads	Liquid sealant (Three Bond 1207B or equivalent)	
			

GENERAL INFORMATION

ENGINE (Cont'd)		
LOCATION	MATERIAL	REMARKS
Swingarm center bolt threads Right crankcase 10 mm socket bolt threads Right crankcase 18 mm sealing bolt threads Left crankcase 8 mm socket bolt threads Cylinder head 18 mm sealing bolt threads Breather separator bolt threads Cam sprocket bolt threads Oil pump driven sprocket bolt threads Starter clutch bolt threads	Locking agent	Three Bond 2415, 1323B or LOCTITE DL-200, DL-648 or equivalent
Driven pulley Ø40 bearing area and 2 mm width groove	Molybdenum disulfide paste	
Main bearing thrust surface and sliding surface	Molybdenum disulfide grease	
Connecting rod bearing sliding surface Piston pin sliding area Crankshaft thrust surface Crankshaft Ø29 surface of the starter driven gear area Balancer shaft sub-gear sliding area Camshaft bearing surface, cam surface and thrust surface Valve stem sliding area Valve lifter outer sliding area Water pump sliding area and thrust surface Starter reduction gear and idle gear shaft sliding surface	Molybdenum disulfide oil (a mixture of 50% engine oil and 50% molybdenum disulfide grease)	Do not apply to the mechanical seal sliding surface
Driven face boss inner surface Movable driven face cam groove	Lithium based grease (Shell ALVANIA R3, Nippon Oil POWERNOC WB3, Idemitsu Kosan AUTOLEX B or equivalent)	Filling 23 – 28 g : Do not apply to the driven pulley surface. Filling 7 – 9 g : Do not apply to the driven pulley surface
Final gear shaft Ø22 bearing area Final gear shaft dust seal lips Each oil seal lip	Multi-purpose grease	
Balancer shaft hole cap threads Timing hole cap threads Oil strainer screen cap threads Cylinder wall surface Cylinder head bolt threads and seating surface Camshaft holder bolt threads and seating surface Connecting rod bolt/nut threads and seating surfaces Piston sliding area Piston ring sliding area Cam chain whole surface Oil pump drive sprocket bolt threads and seating surface Oil pump drive chain whole surface Oil filter cartridge threads and mating surface Oil cooler bolt threads and seating surface Drive face bolt threads Transmission gear teeth and shaft Starter clutch sliding lock surface Flywheel bolt threads and seating surface Each O-ring Each bearing rotating area	Engine oil	

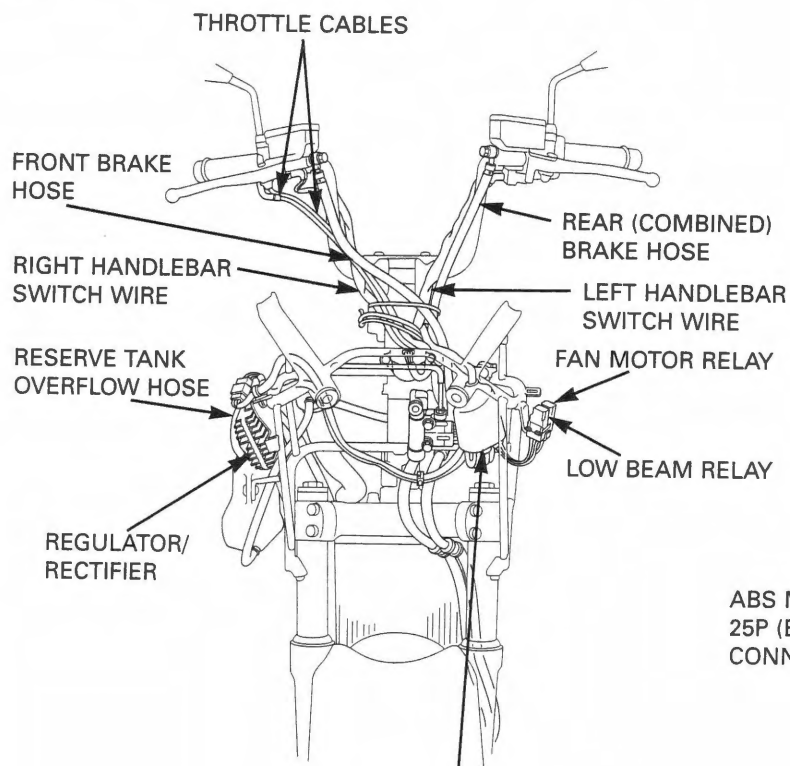
GENERAL INFORMATION

FRAME		
LOCATION	MATERIAL	REMARKS
Brake lever pivot Brake lever-to-master piston contacting area Caliper pin boot inside Caliper dust seals Parking brake caliper push rod sliding surface Parking brake caliper shaft sliding surface Parking brake caliper boot lip Throttle cable A and B inside	Silicone grease	Apply 0.1 g Apply 0.1 g Apply 0.4 g min. Apply 0.4 g min. Apply 0.4 g min. Apply 0.4 g min. Apply 0.4 g min. Filling 0.1 cm ³
Steering head bearing rolling surface Steering head dust seal lips	Urea based water resistant grease with extreme pressure agent (example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan), or equivalent.	Filling 3 – 5 g
Sidestand pivot shaft Centerstand bracket outer sliding surface Seat catch hook Each dust seal lip	Multi-purpose grease	
Brake pipe joint nut threads	Engine oil	
Brake master cylinder inner surface Brake master pistons and cups Caliper piston outer surfaces Caliper piston seals	DOT 4 brake fluid	
Fork oil seal lips	Pro Honda Suspension Fluid SS-8	
Handle grip rubber inside Air cleaner connecting tube-to-housing mating area	Honda bond A, Honda Hand Grip Cement (U.S.A. only) or equivalent	Applied area 80% min.
Fork socket bolt threads Caliper pin bolt threads	Locking agent	

GENERAL INFORMATION

CABLE & HARNESS ROUTING

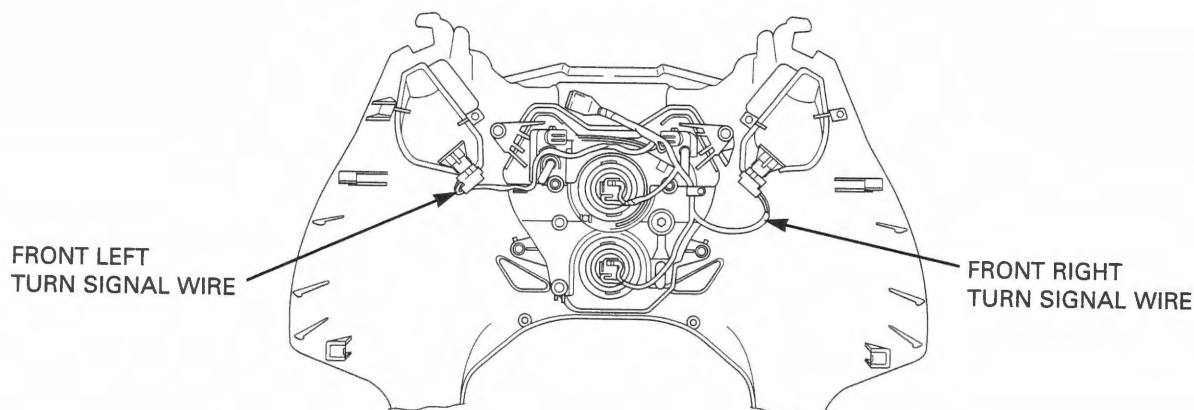
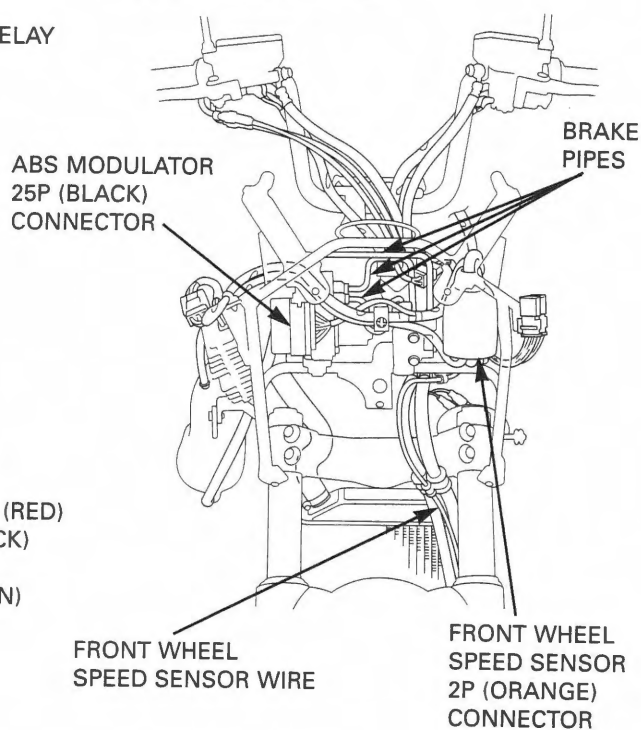
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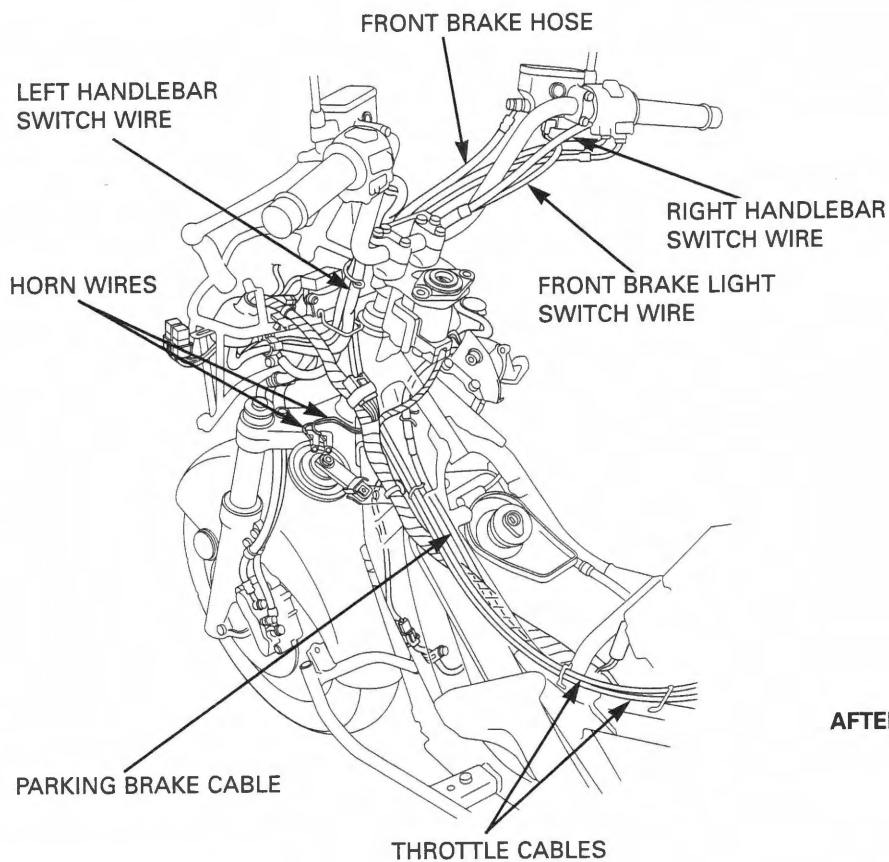
CONNECTORS:

- IGNITION SWITCH 3P
- LEFT HANDLEBAR SWITCH 9P
- LEFT HANDLEBAR SWITCH 6P
- RIGHT HANDLEBAR SWITCH 9P (RED)
- BANK ANGLE SENSOR 3P (BLACK)
- HEADLIGHT/POSITION LIGHT/TURN SIGNAL LIGHT 9P (BROWN)

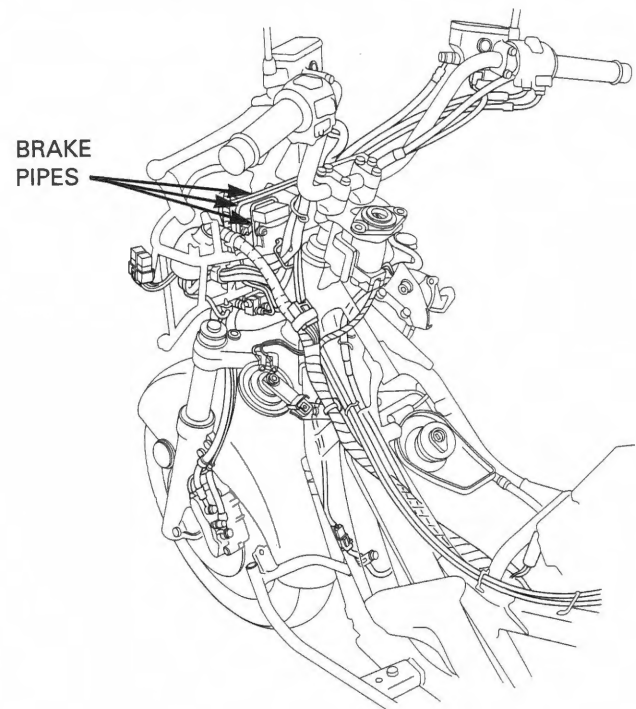
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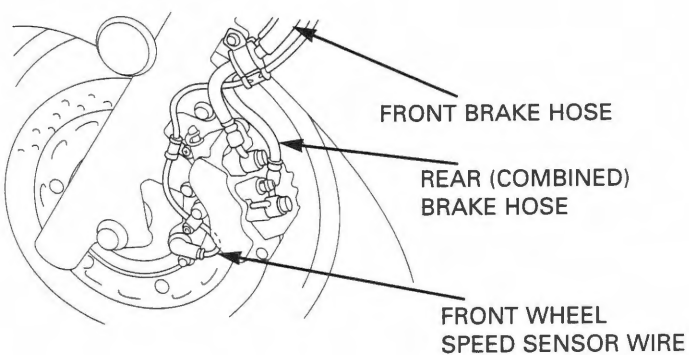
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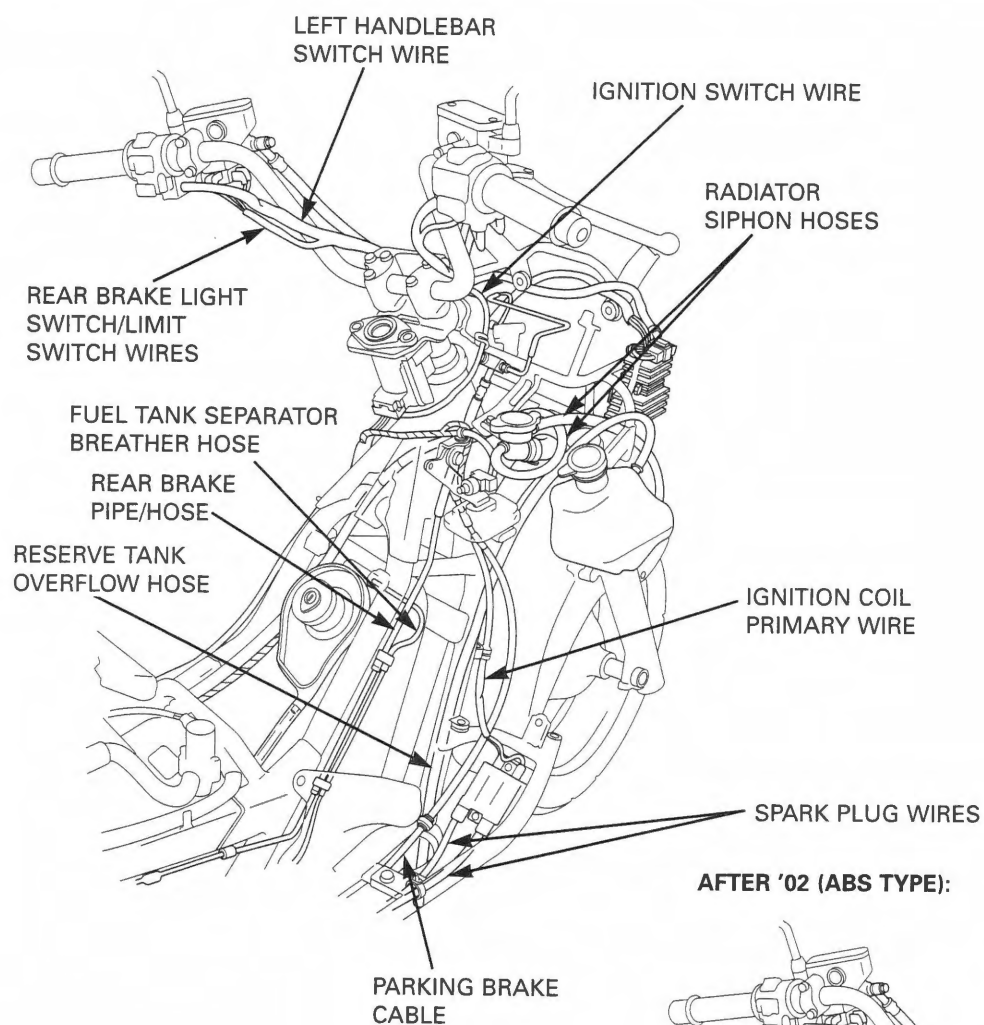


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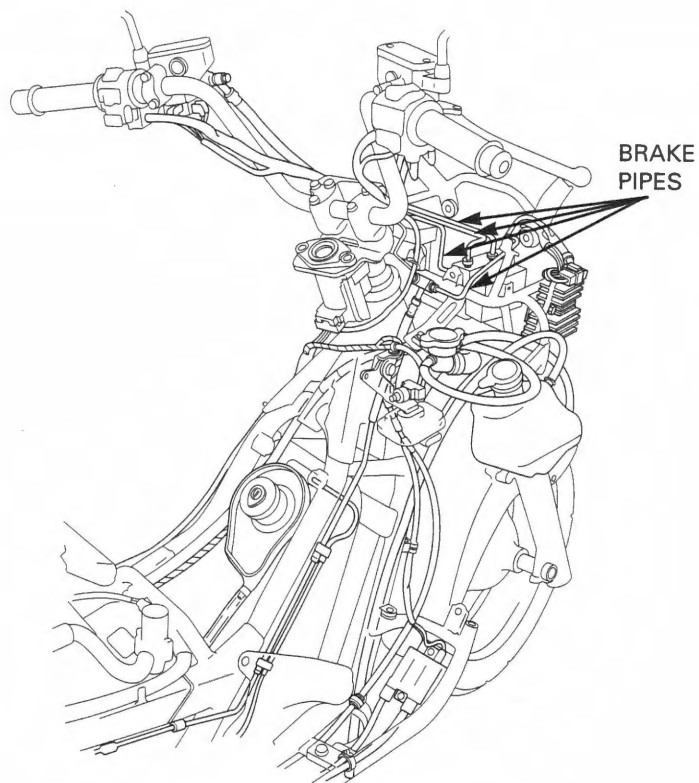


GENERAL INFORMATION

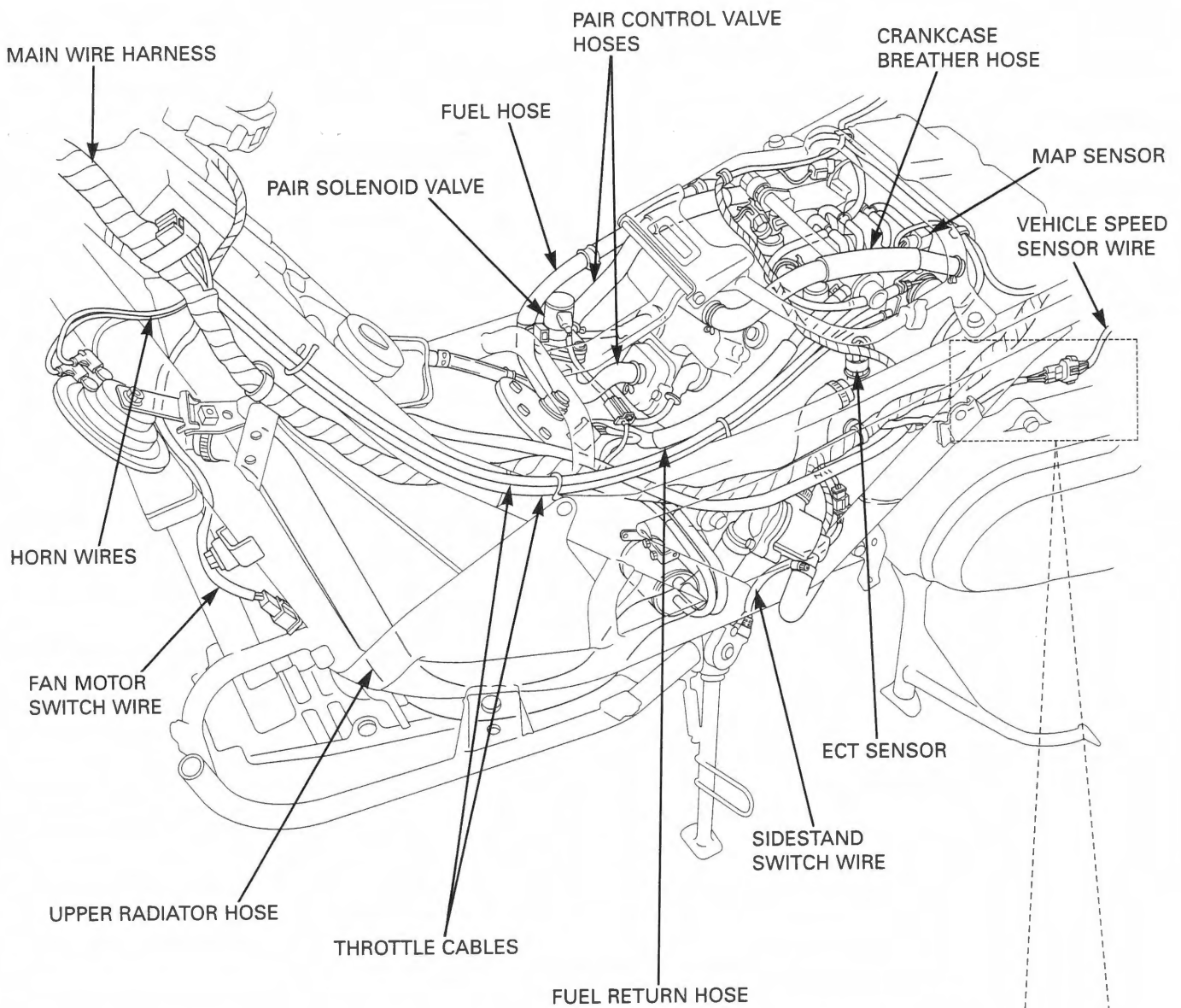
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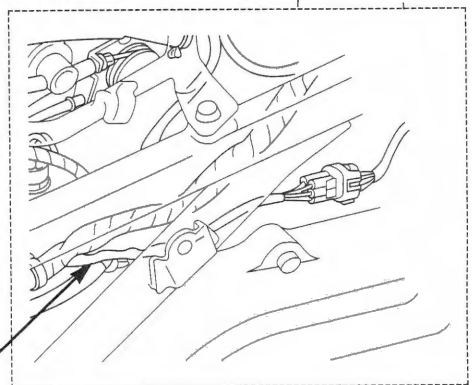
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STD TYPE:



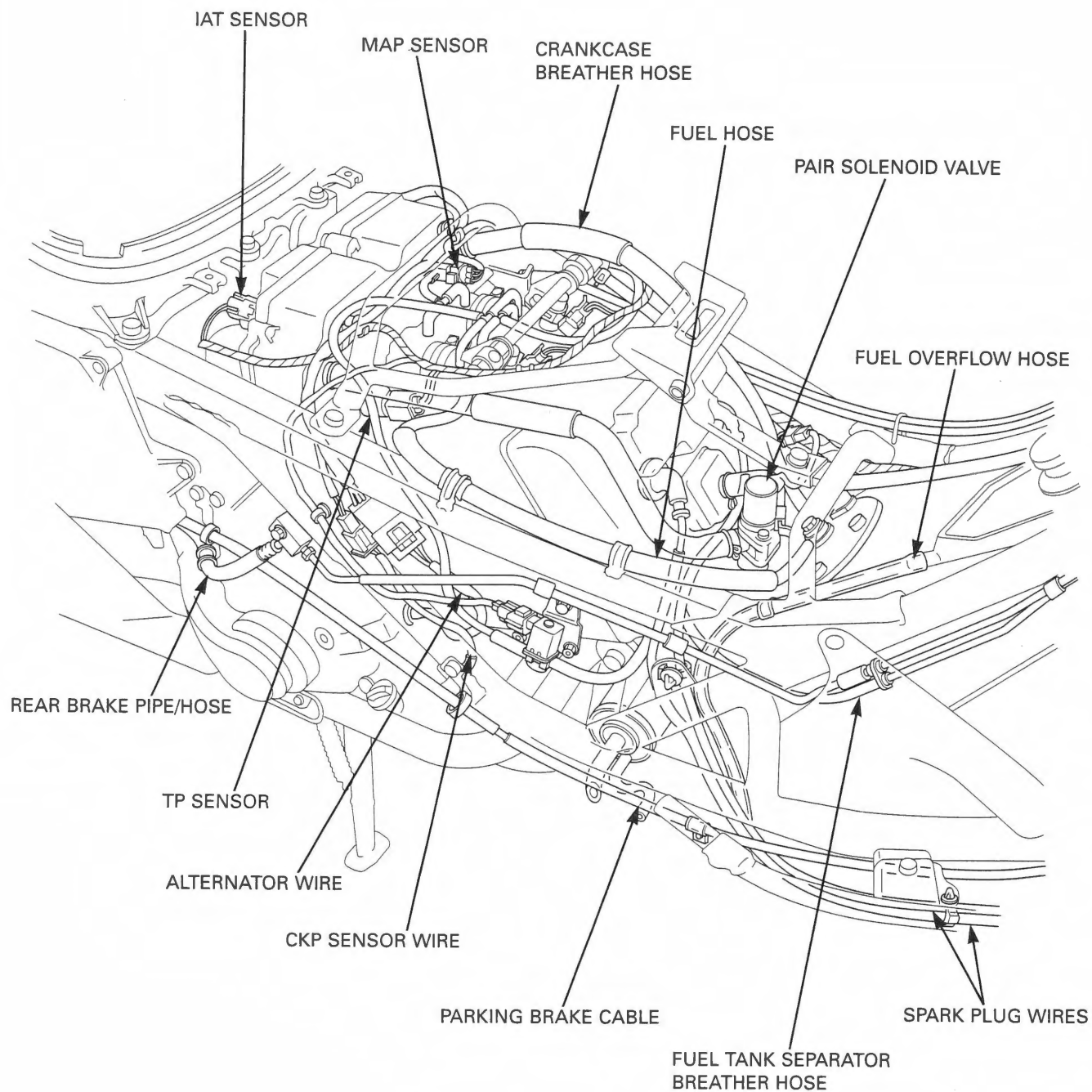
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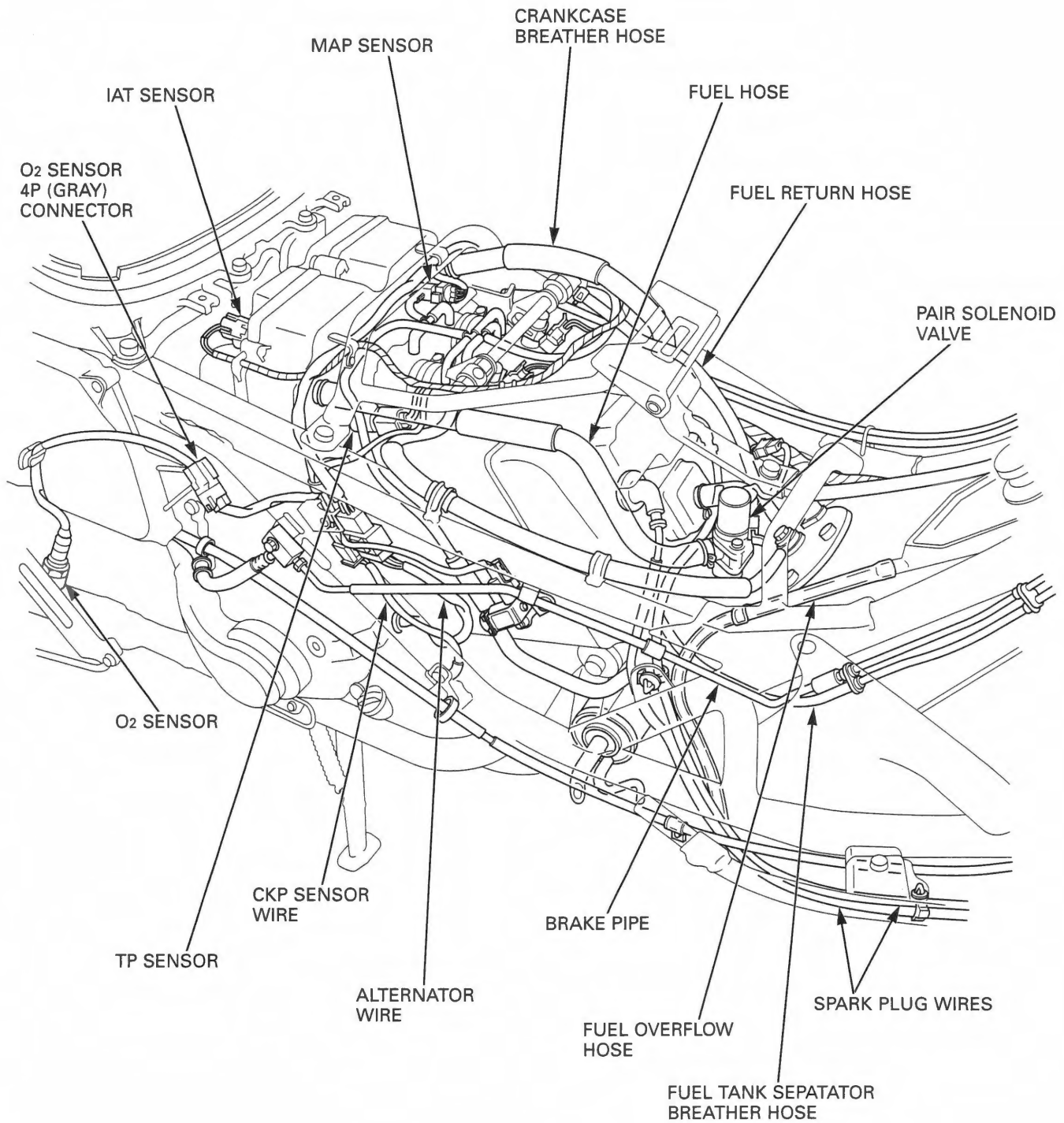
VEHICLE SPEED SENSOR/
REAR WHEEL SPEED SENSOR WIRE

GENERAL INFORMATION

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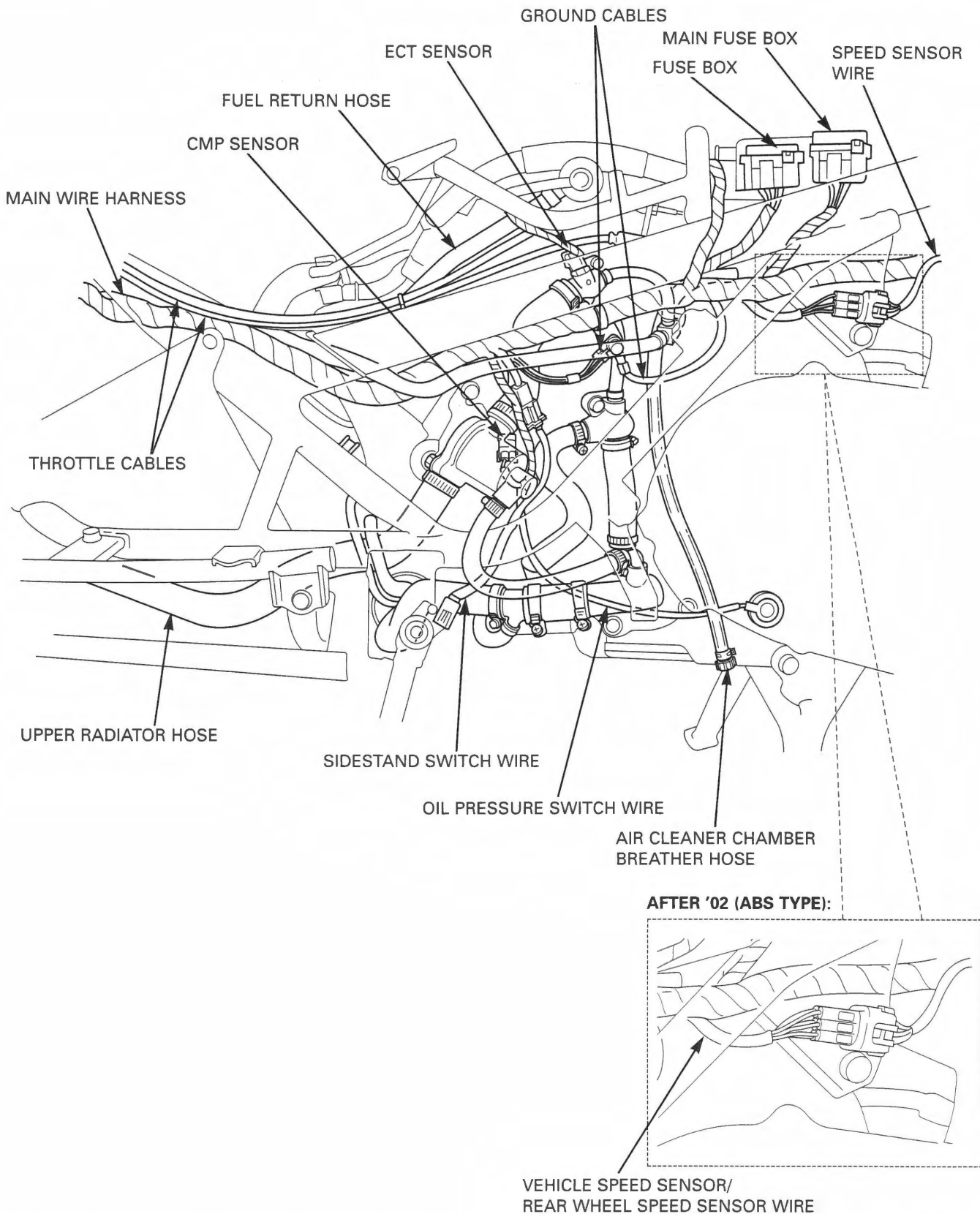


AFTER '07:

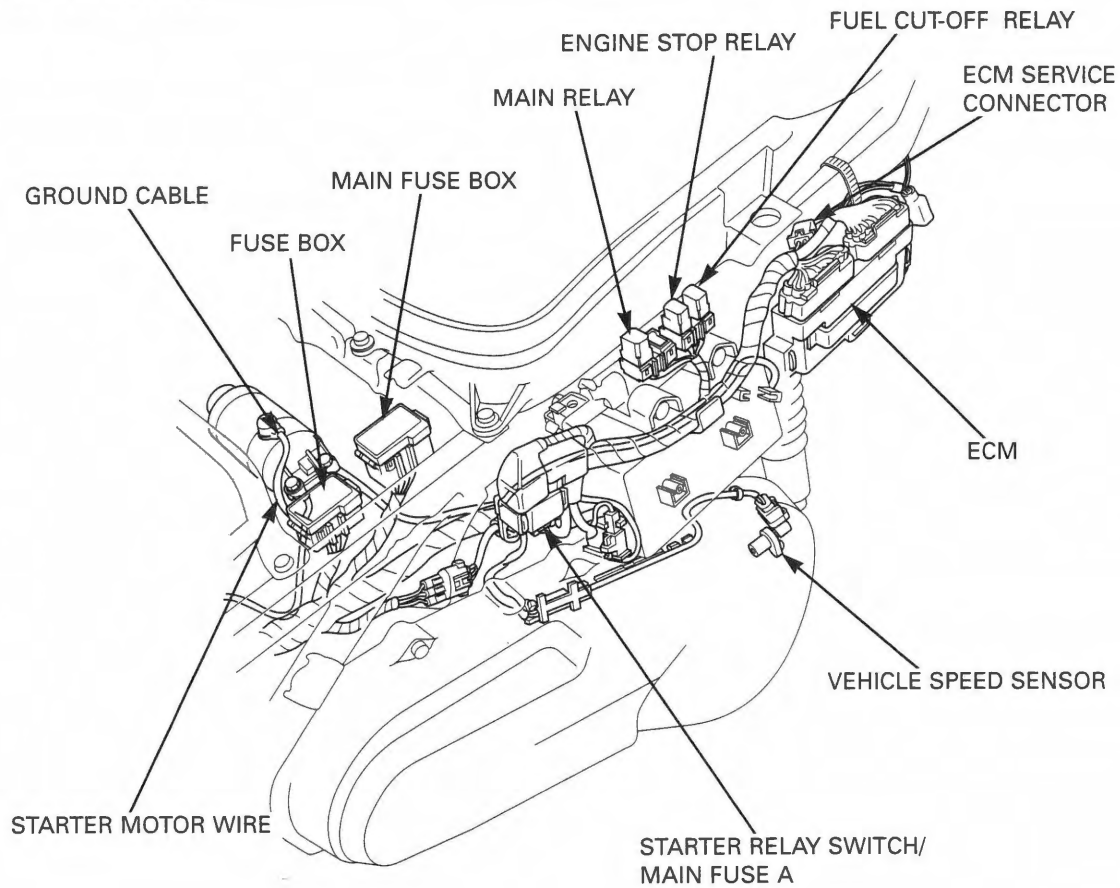


GENERAL INFORMATION

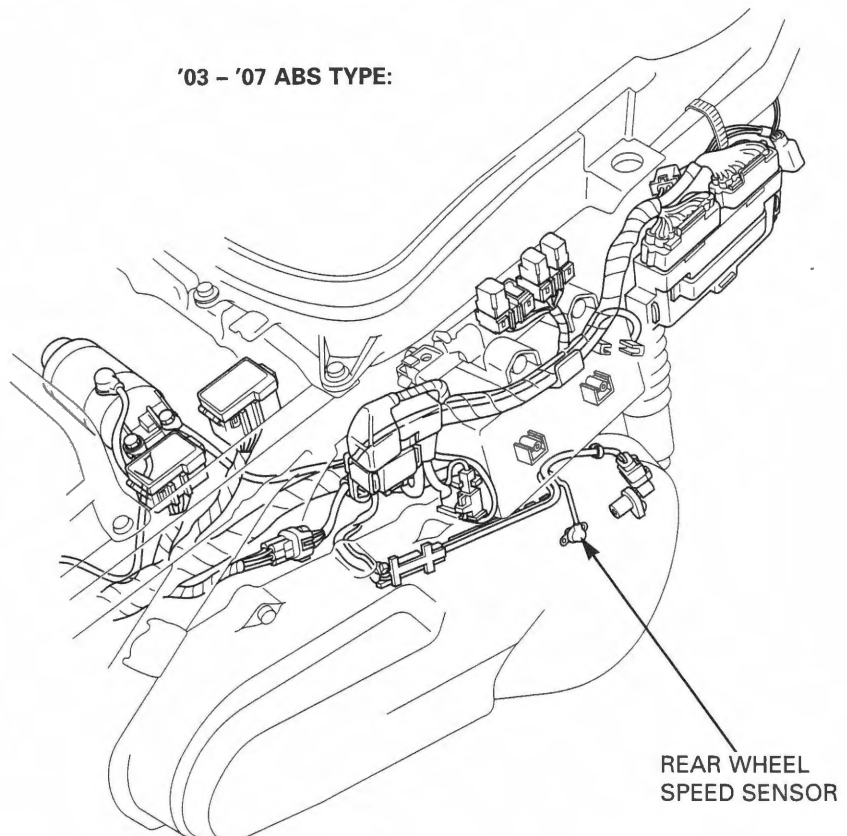
STD TYPE:



'02 - '07 STD TYPE:

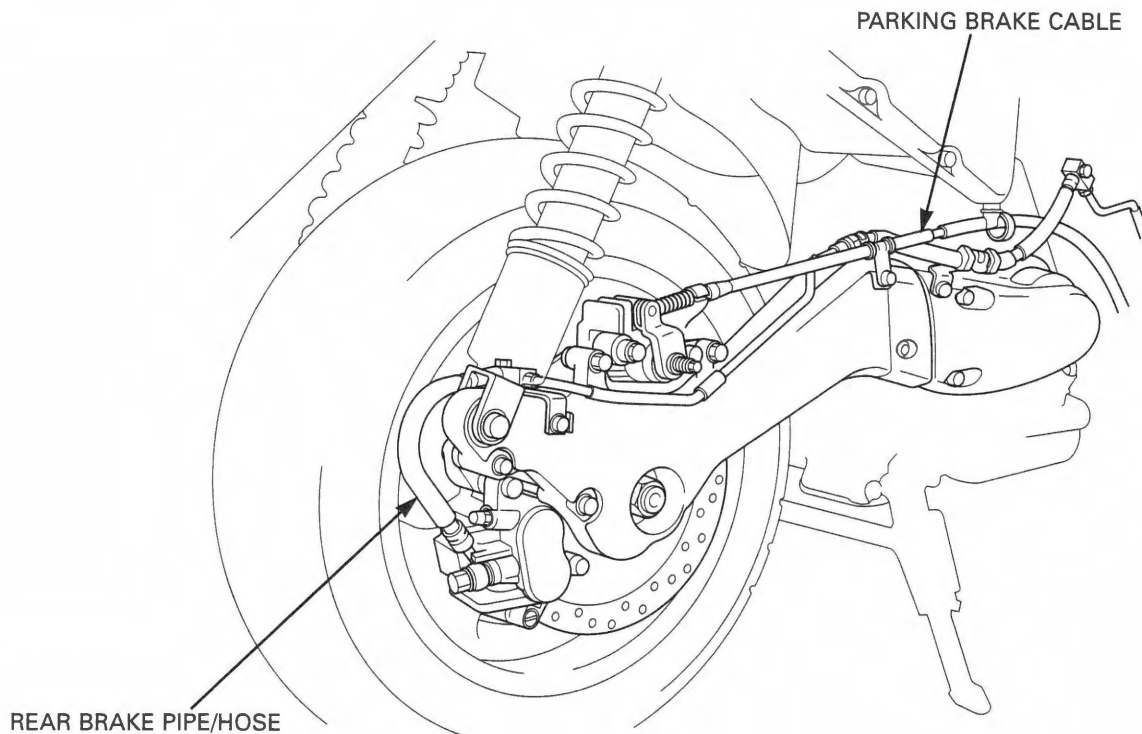
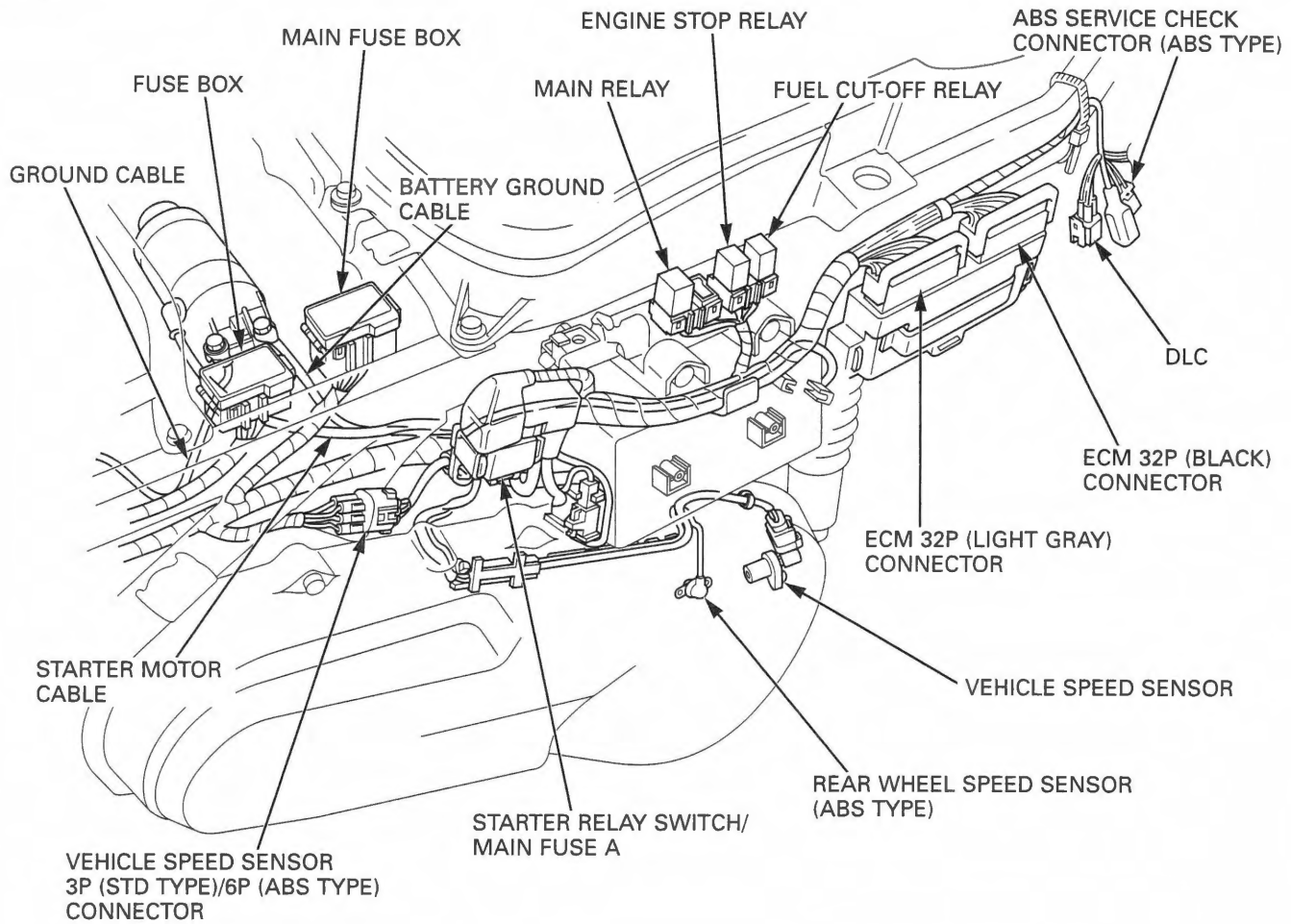


'03 - '07 ABS TYPE:

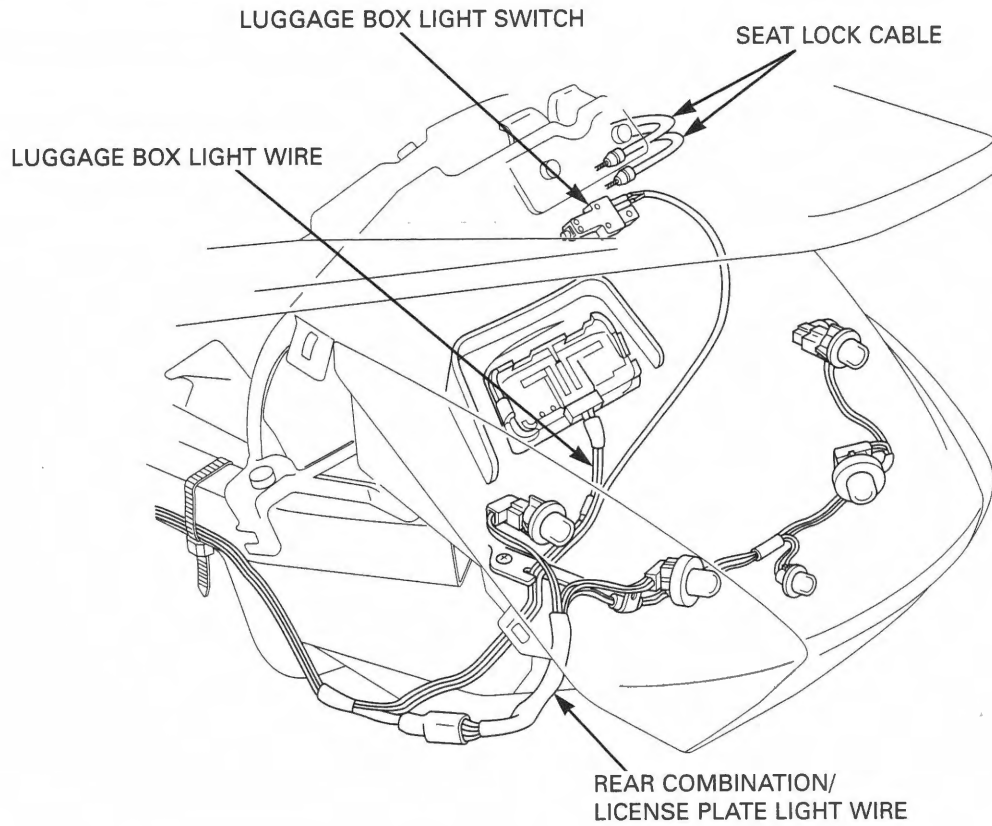


GENERAL INFORMATION

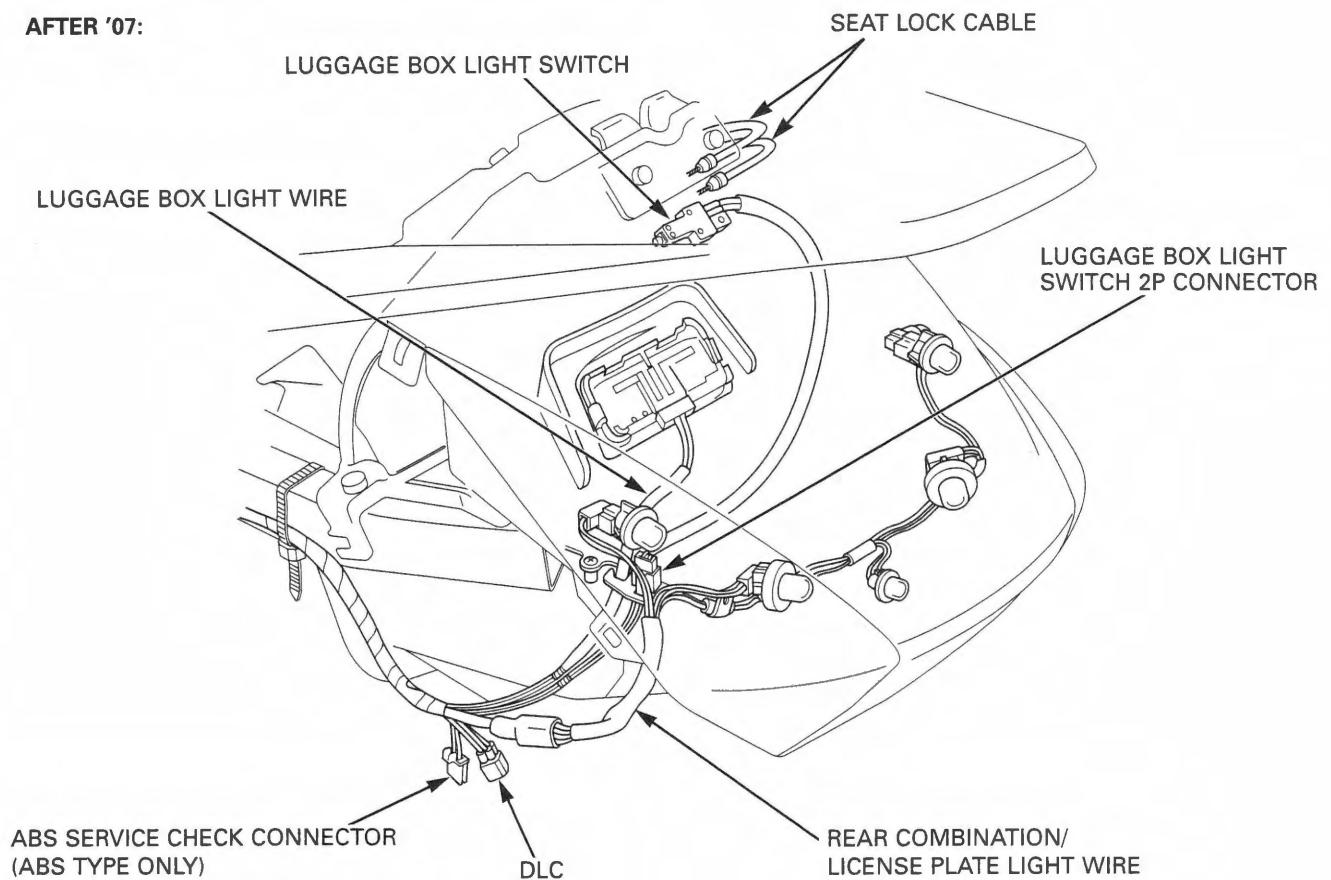
AFTER '07:



'02 - '07:

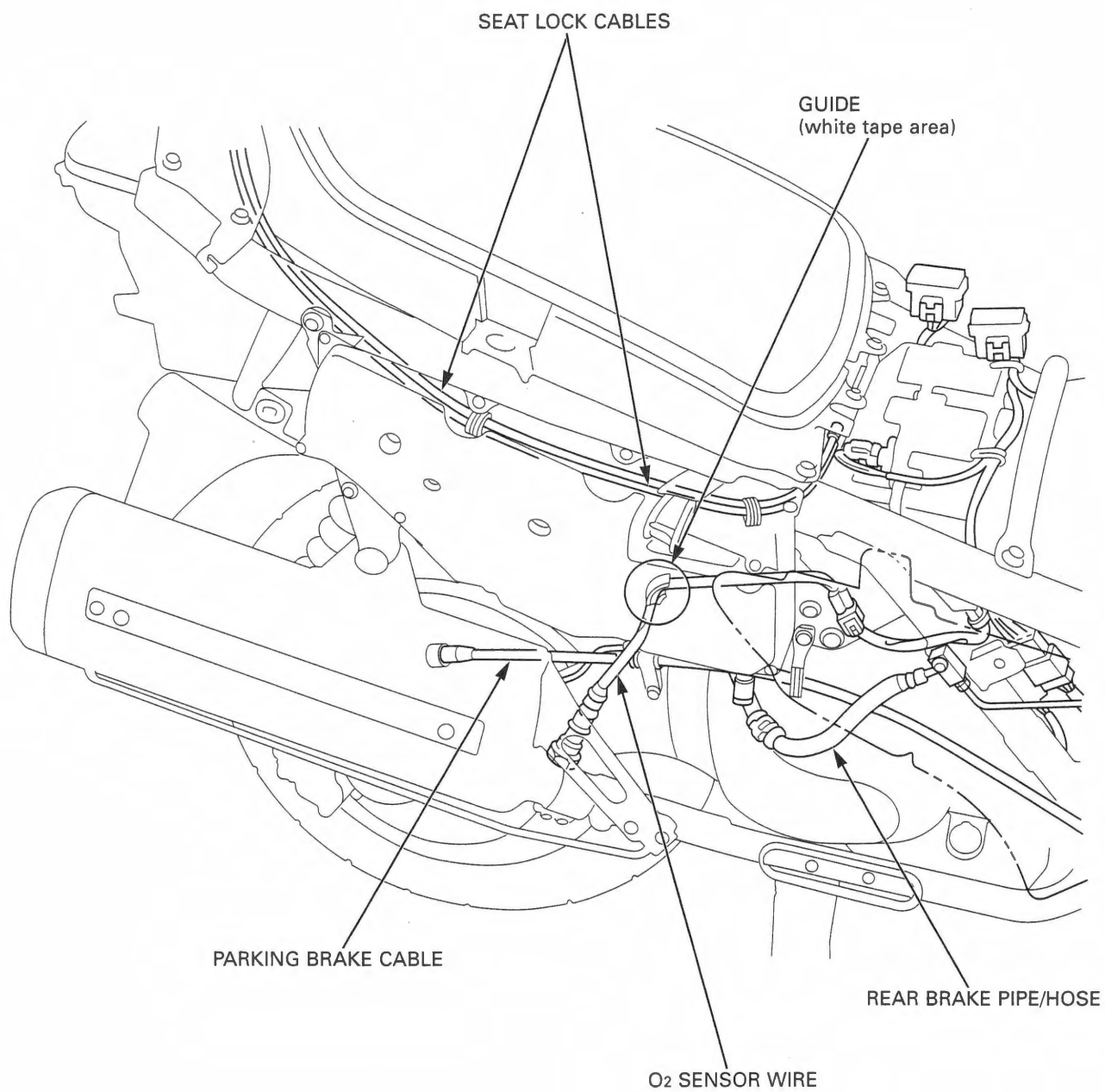


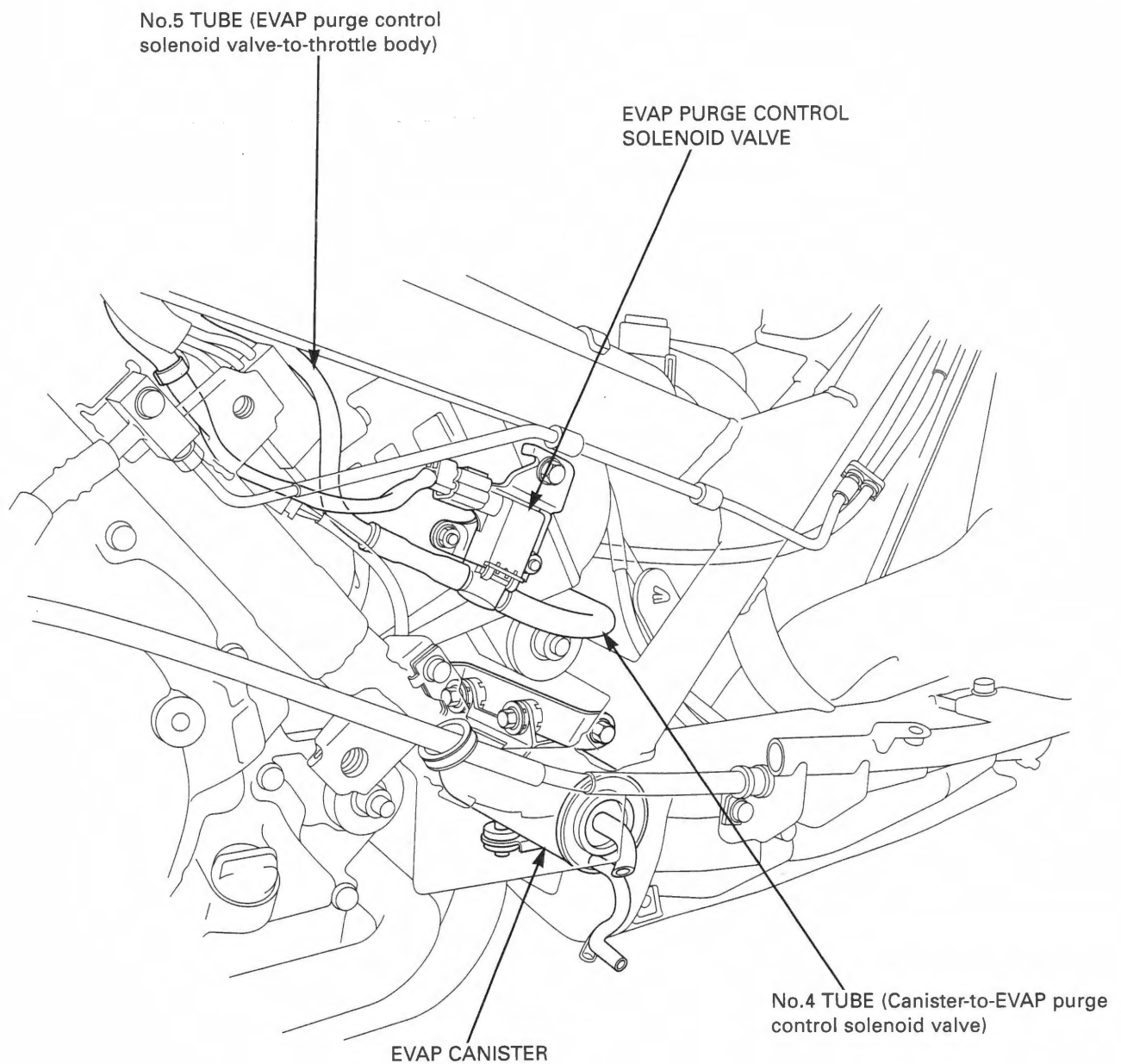
AFTER '07:



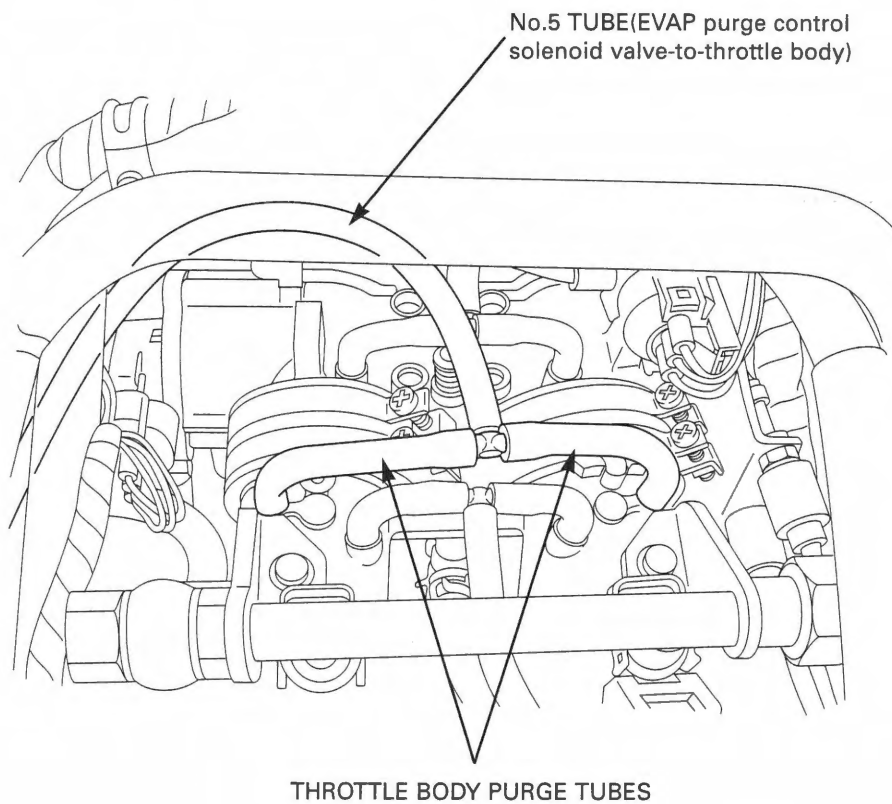
GENERAL INFORMATION

AFTER '07:

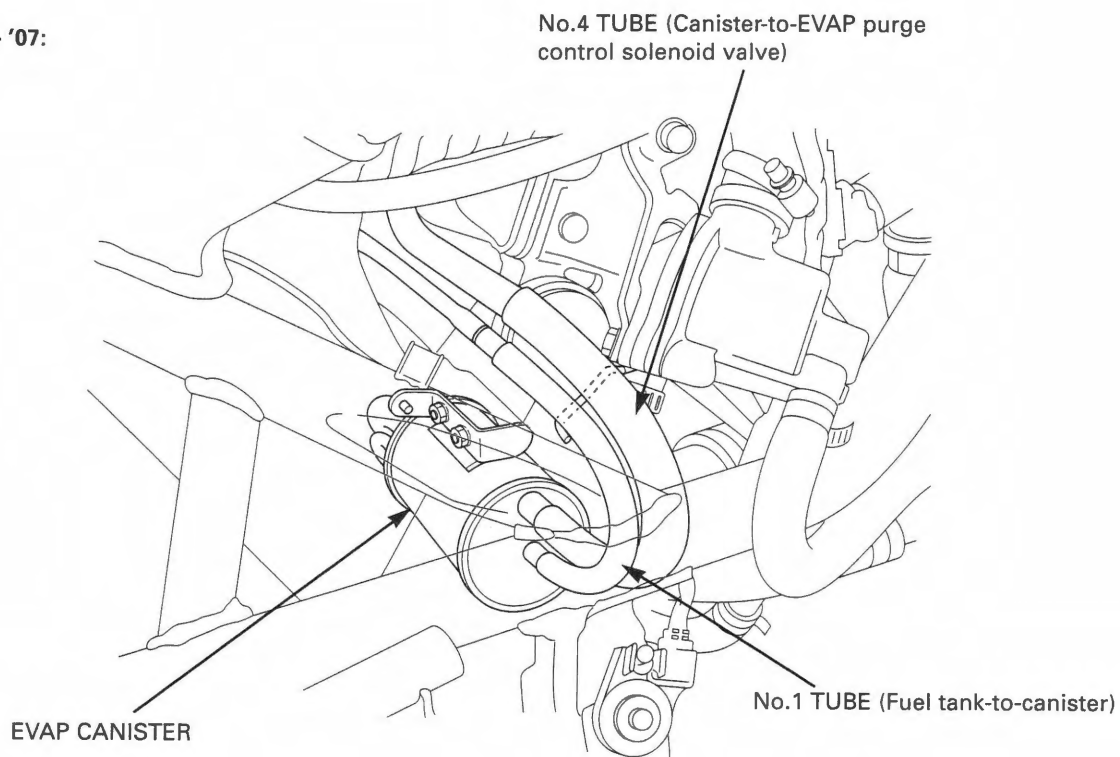




GENERAL INFORMATION



'02 - '07:





GENERAL INFORMATION

EMISSION CONTROL SYSTEMS

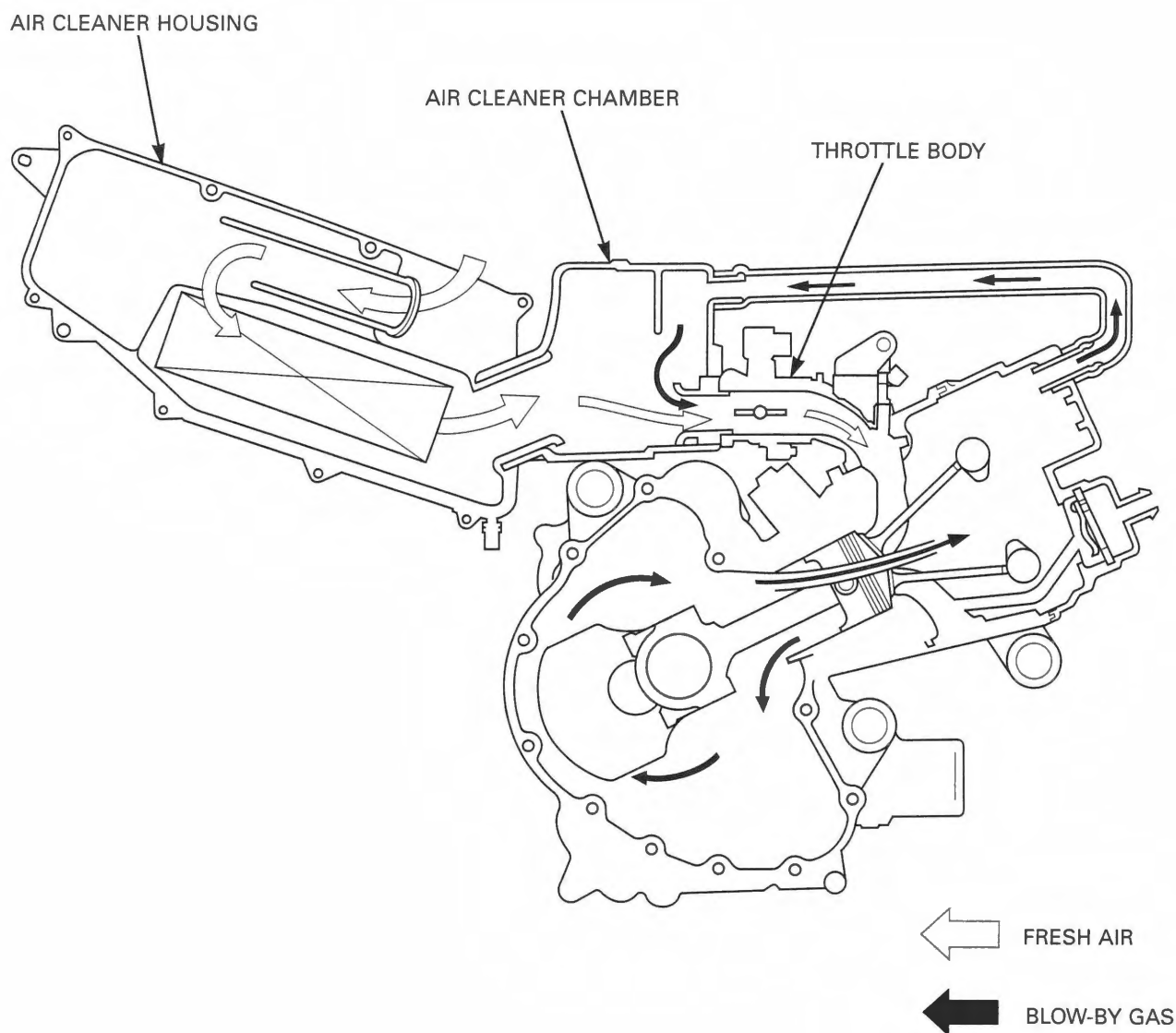
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, hydrocarbons and oxides of nitrogen. 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.

Honda Motor Co., Ltd. Uses PGM-FI, oxidation catalyst, and a PAIR system to reduce carbon monoxide, hydrocarbons, and oxides of nitrogen.

CRANKCASE EMISSION CONTROL SYSTEM

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



EXHAUST EMISSION CONTROL SYSTEM

OXIDATION CATALYST

The oxidation catalyst (OC) converts hydrocarbons and carbon monoxide in the exhaust gas to carbon dioxide and water vapor.

EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system includes a secondary air supply system, a PGM-FI system, and an oxidation catalytic converter.

No adjustment to these systems should be made although periodic inspection of the components is recommended.

PULSE SECONDARY AIR SUPPLY SYSTEM

The exhaust emission control system also employs a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the Pulse Secondary Air Injection (PAIR) control valve.

This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The reed valve prevents reverse air flow through the system. The PAIR solenoid control valve is controlled by the PGM-FI unit, and the fresh air passage is opened and closed according the running condition (ECT/IAT/TP/MAP sensor and engine revolution).

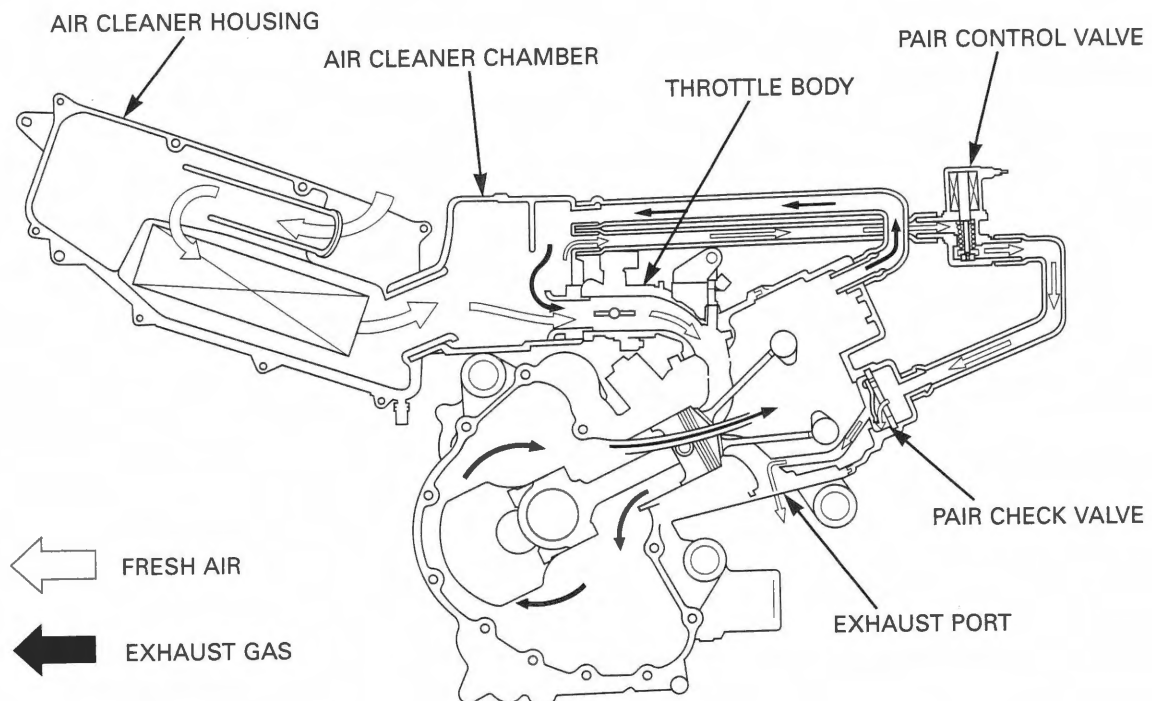
No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.

PGM-FI SYSTEM

PGM-FI SYSTEM

The PGM-FI system uses sequential multiport fuel injection. It has four subsystems: Air Intake, Engine Control, Fuel Control, and Exhaust Control.

The Engine Control Module (ECM) uses various sensors to determine how much air is going into the engine. It then controls how much fuel to inject under all operating conditions.

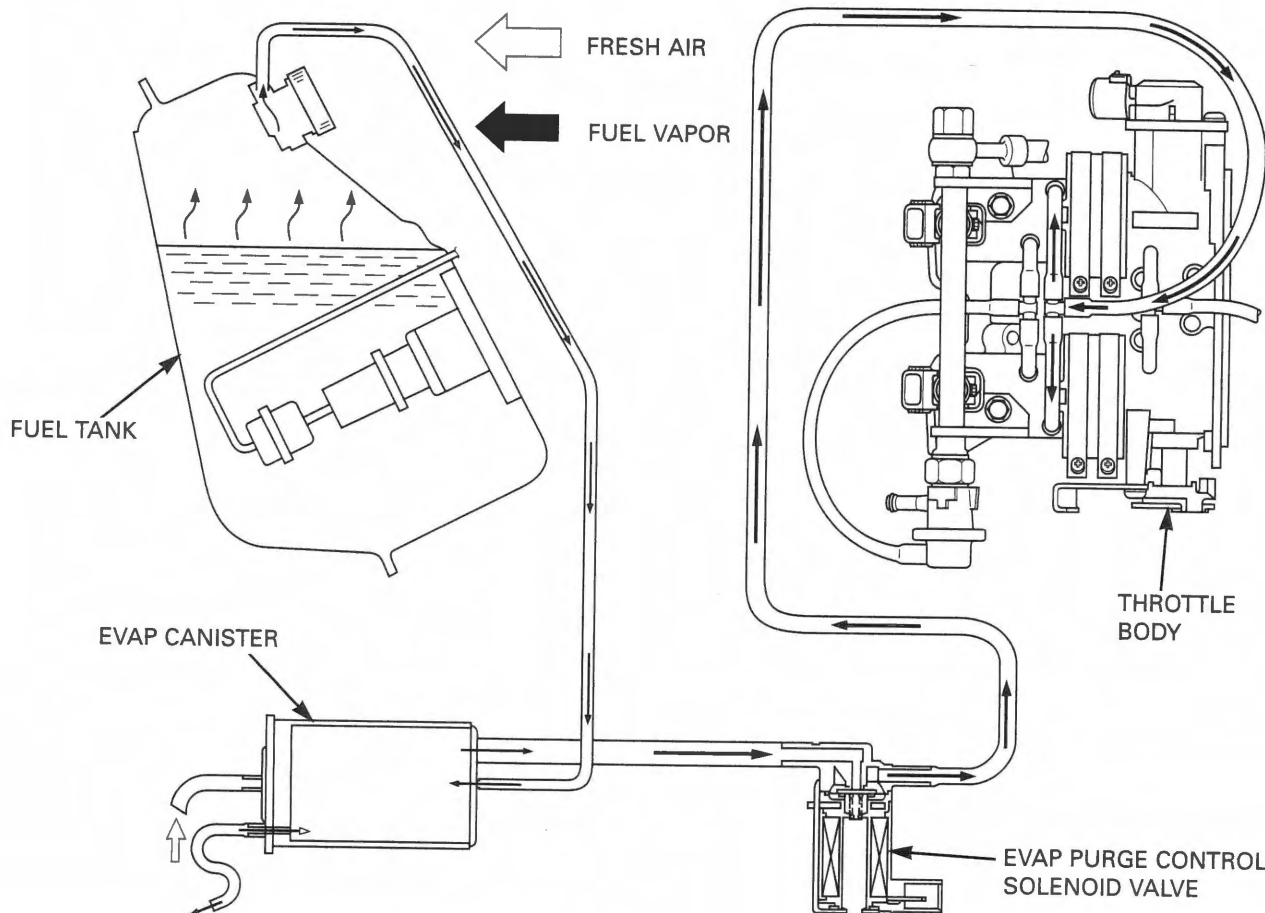


GENERAL INFORMATION

EVAPORATIVE EMISSION CONTROL SYSTEM

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

Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the EVAP purge control valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body.



NOISE EMISSION CONTROL SYSTEM

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

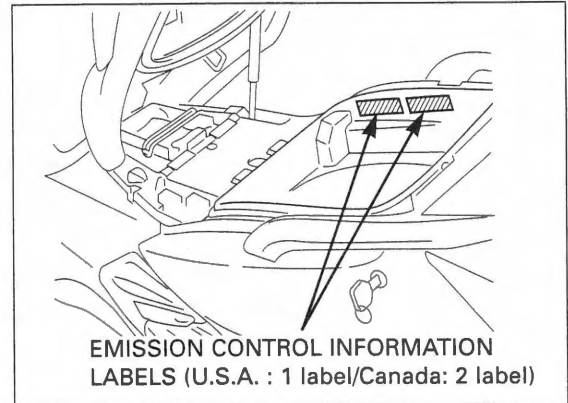
AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

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

EMISSION CONTROL INFORMATION LABELS

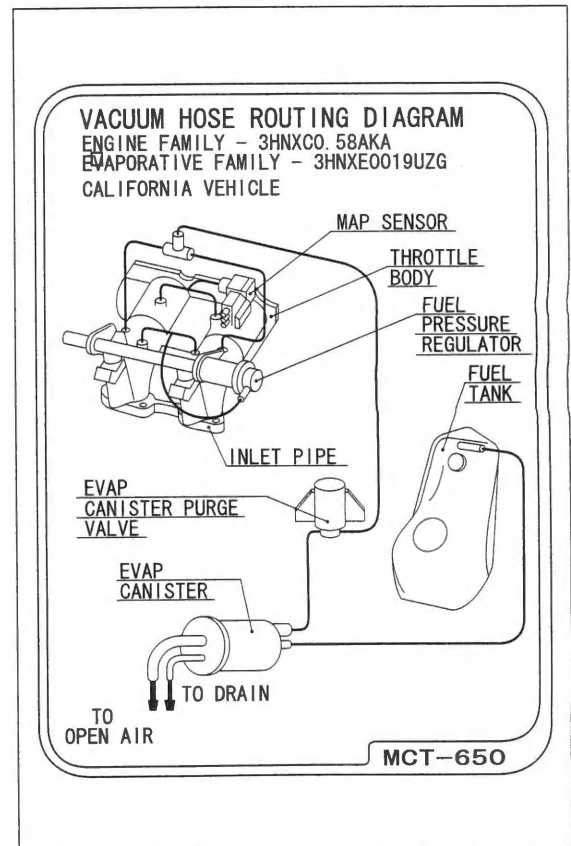
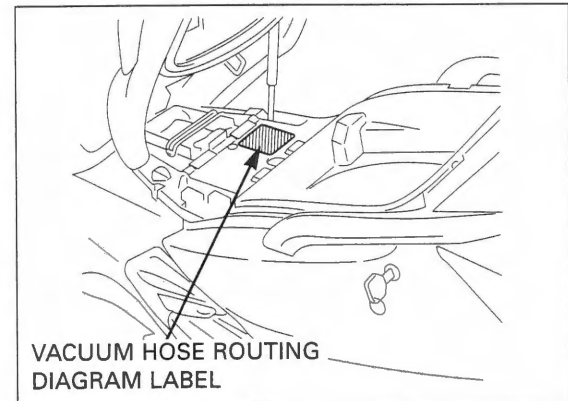
An Emission Control Information Label is located on the right side of the luggage box as shown.

It gives base tune-up specifications.

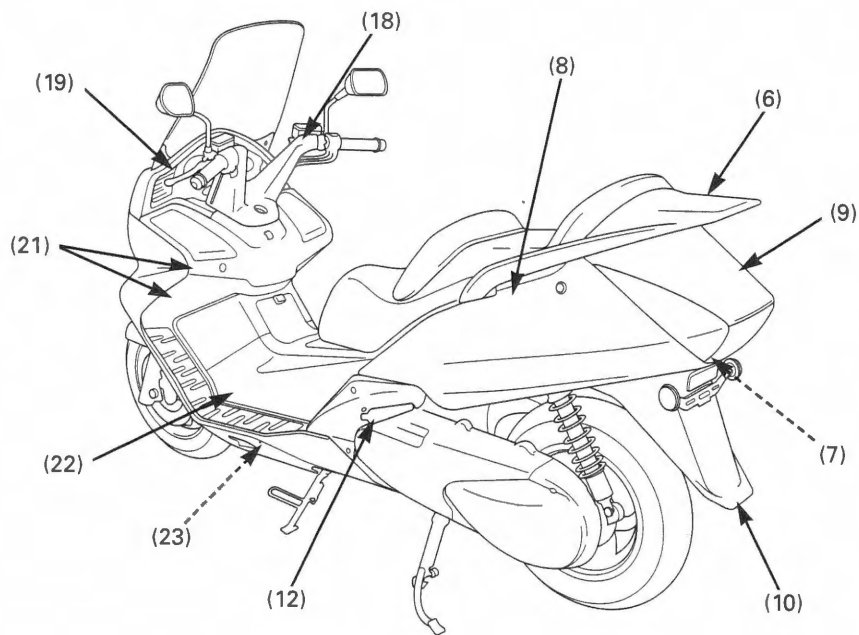
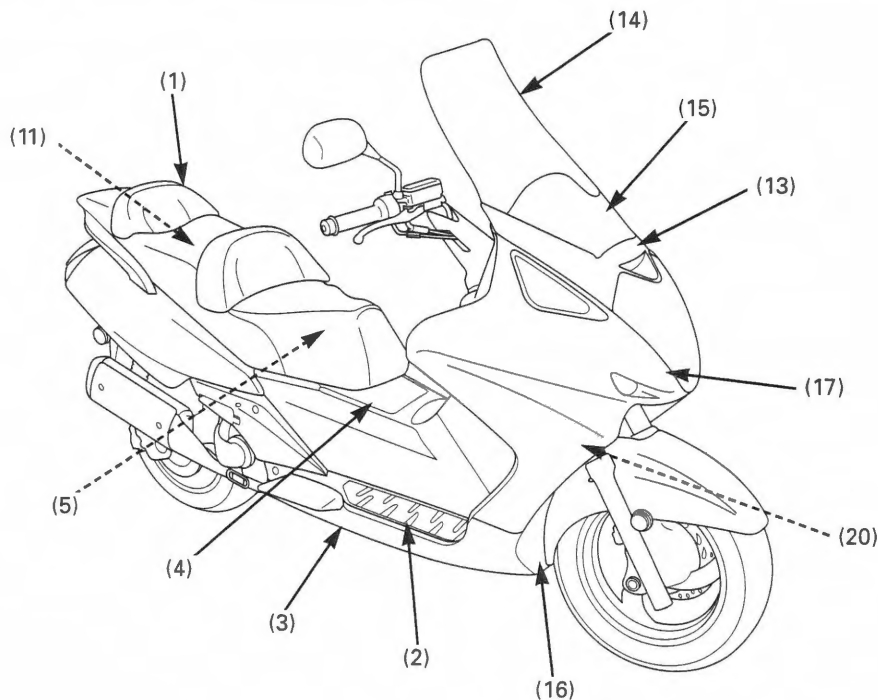


VACUUM HOSE ROUTING DIAGRAM LABEL ('02-'04)

The Vacuum Hose Routing Diagram Label is located on top of the cover under the seat.



BODY PANEL LOCATIONS



(1) Seat (page 2-3)

(2) Floor Mat (page 2-4)

(3) Floor Skirt (page 2-4)

(4) Spark Plug Maintenance Lid (page 2-5)

(5) Seat Under Cover (page 2-5)

(6) Rear Spoiler (page 2-6)

(7) Rear Under Cover (page 2-6)

(8) Side Body Cover (page 2-7)

(9) Rear Body Cover (page 2-7)

(10) Rear Fender (page 2-10)

(11) Luggage Box (page 2-10)

(12) Passenger Footpeg (page 2-12)

(13) Windshield Garnish (page 2-12)

(14) Windshield (page 2-13)

(15) Front Meter Visor (page 2-13)

(16) Front Lower Cover (page 2-20)

(17) Front Cover (page 2-14)

(18) Handlebar Cover (page 2-14)

(19) Meter Panel (page 2-15)

(20) Front Airduct Cover (page 2-21)

(21) Inner Cover/Floor Upper Cover
(page 2-15)

(22) Floorstep (page 2-20)

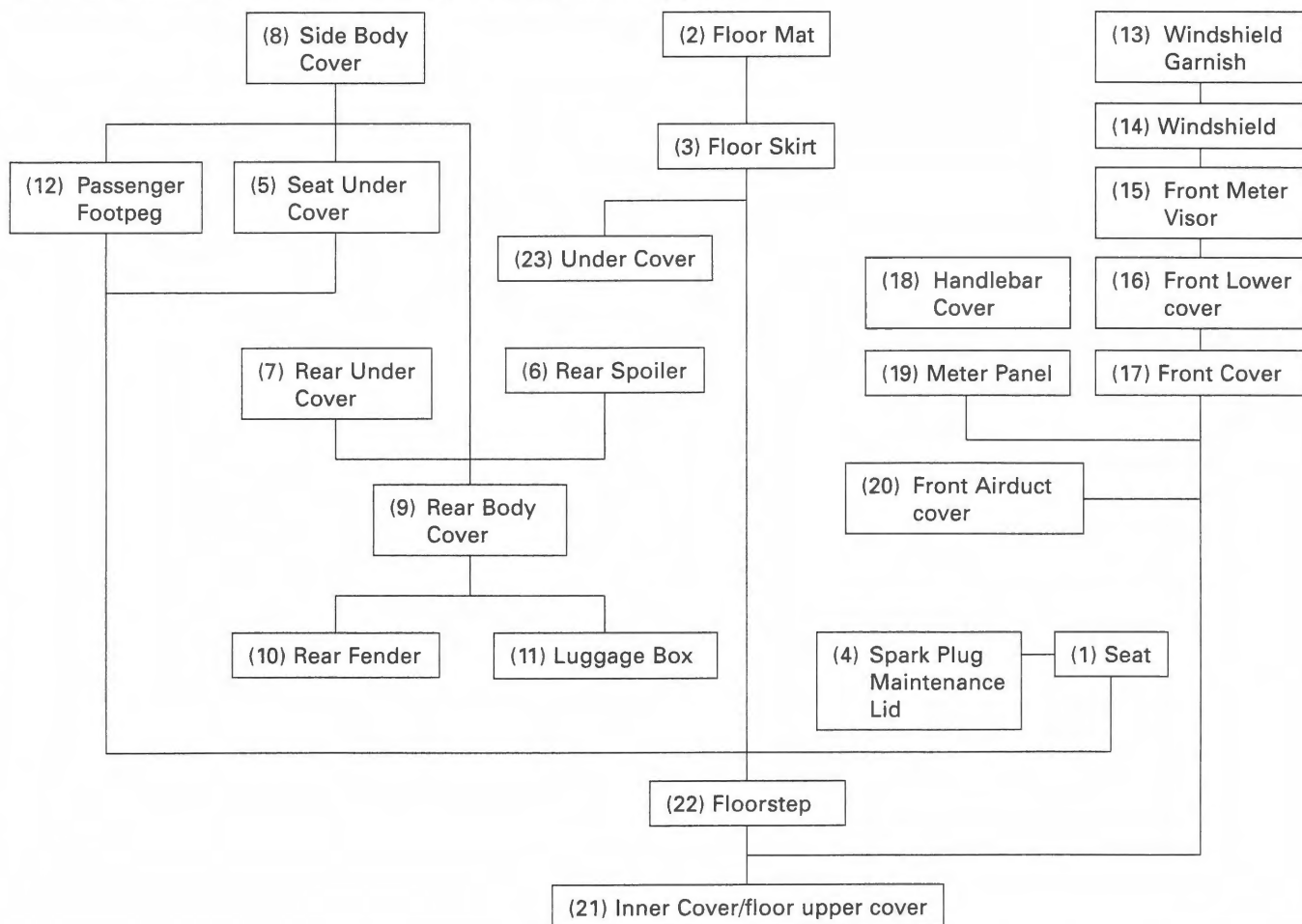
(23) Under Cover (page 2-21)

2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	LUGGAGE BOX	2-10
BODY PANEL REMOVAL CHART	2-1	PASSENGER FOOTPEG	2-12
SERVICE INFORMATION	2-2	WINDSHIELD	2-12
TROUBLESHOOTING	2-2	FRONT COVER	2-14
TRIM CLIP	2-3	HANDLEBAR COVER	2-14
SEAT	2-3	METER PANEL	2-15
FLOOR MAT	2-4	INNER COVER/FLOOR UPPER COVER	2-15
FLOOR SKIRT	2-4	FLOORSTEP	2-20
SPARK PLUG MAINTENANCE LID	2-5	FRONT LOWER COVER	2-20
SEAT UNDER COVER	2-5	UNDER COVER	2-21
FRONT FENDER	2-6	FRONT AIRDUCT COVER	2-21
REAR SPOILER	2-6	MUFFLER ('02 - '07)	2-22
BODY COVER	2-6	MUFFLER/EXHAUST PIPE (After '07)	2-24
REAR FENDER	2-10		

BODY PANEL REMOVAL CHART

This chart shows the removal order of various frame and body panels.



SERVICE INFORMATION

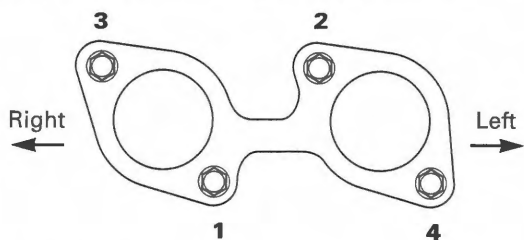
GENERAL

- This section covers removal and installation of the body panels and exhaust system.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamp first then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Rear frame bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)
Rear spoiler bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)
Exhaust pipe band bolt	21 N•m (2.1 kgf•m, 15 lbf•ft)
Exhaust pipe mounting bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)

Exhaust pipe joint nut tightening procedure:



Muffler protector bolt	4 N•m (0.4 kgf•m, 2.9 lbf•ft)
Muffler tail cover mounting bolt	4 N•m (0.4 kgf•m, 2.9 lbf•ft)
Windscreen garnish set screw	2 N•m (0.2 kgf•m, 1.4 lbf•ft)
Windscreen set screw	1 N•m (0.1 kgf•m, 0.7 lbf•ft)

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

TRIM CLIP

REMOVAL

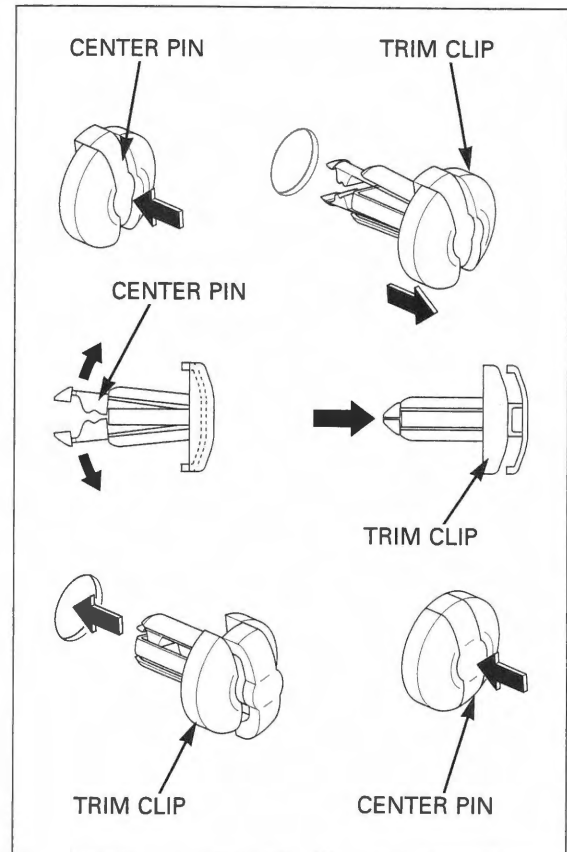
Release by pushing the center pin.
Remove the trim clip.

INSTALLATION

Raise the center pin by spreading apart the pin ends and then push the pin back.

Install the trim clip.

Lock by pushing the center pin flush.



SEAT

REMOVAL

Unlock the seat with the ignition key.
Open the seat.

Remove the B-clips, collars, set pin and seat damper unit.

Remove the nuts and the seat.

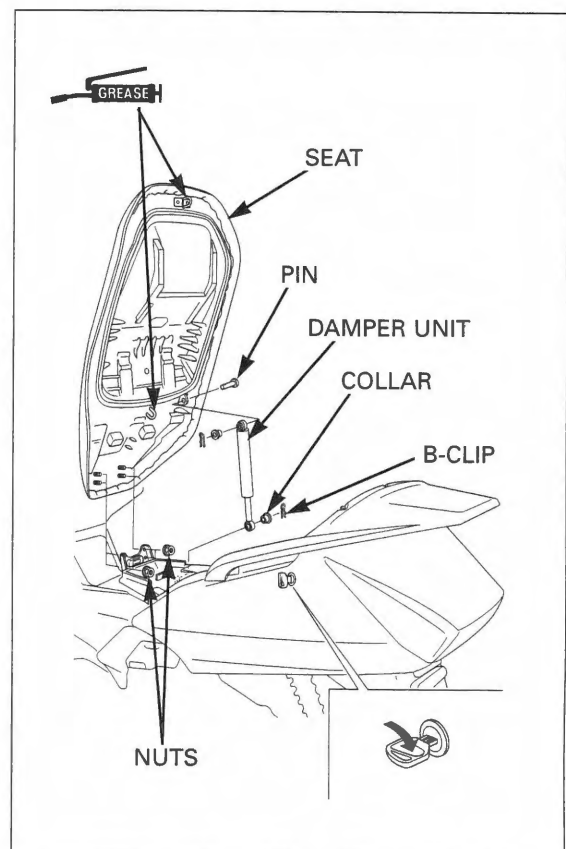
INSTALLATION

Apply grease to the seat catches.

Installation is in the reverse order of removal.

After installation, check the seat installation by moving the seat.

To lock the seat, push the front and rear seat lock securely.



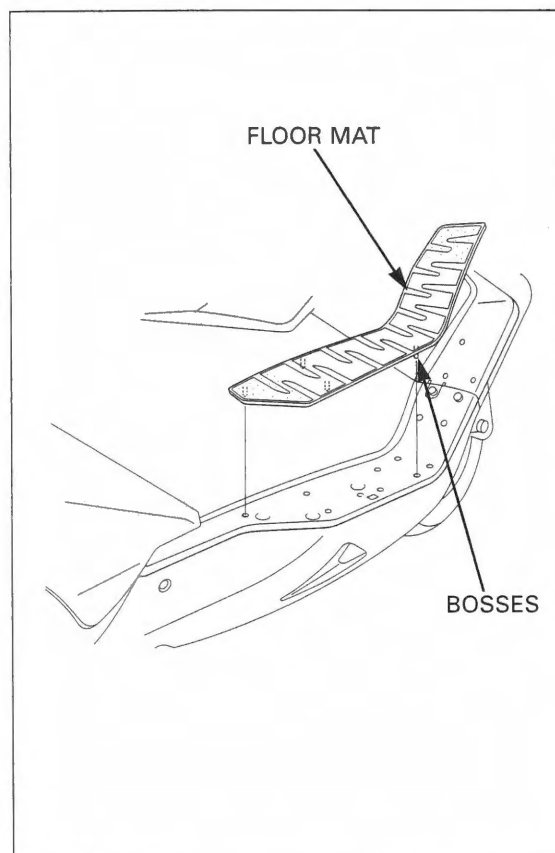
FLOOR MAT

REMOVAL

Release the bosses on the reverse side of the mat and remove the floor mat.

INSTALLATION

Align the bosses on the reverse side of the mat and install the floor mat securely.



FLOOR SKIRT

REMOVAL

Remove the floor mat (see above).

Remove the tapping screws and special bolts.

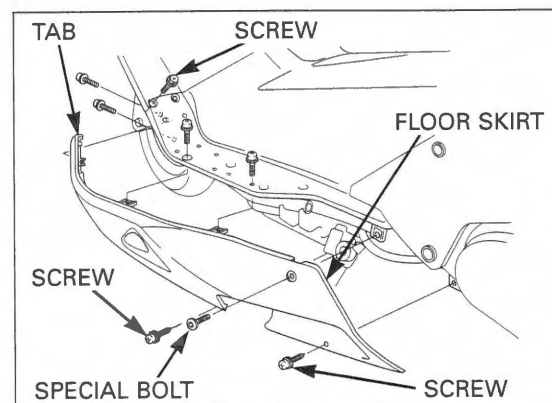
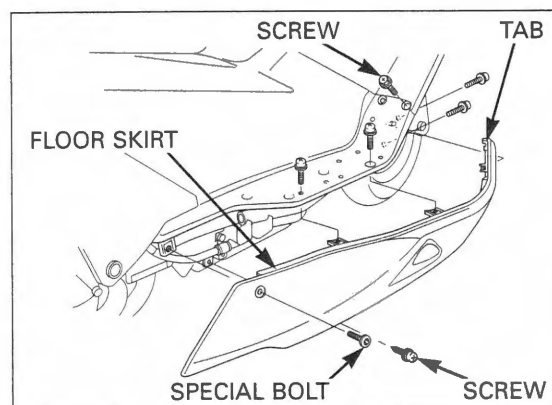
Be careful not to damage the tab on the floor skirt.

Release the front end tab on the floor skirt from the groove on the floorstep, then remove the floor skirt.

INSTALLATION

Installation is in the reverse order of removal.

When installing, make sure the tab on the floor skirt is attached to the step floor.



SPARK PLUG MAINTENANCE LID

REMOVAL/INSTALLATION

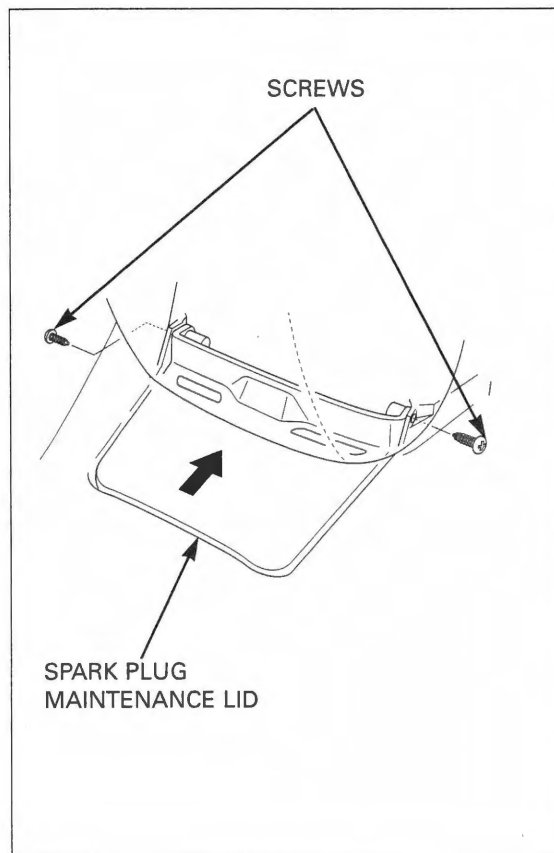
Open the seat (page 2-3).

Remove the screws.

Release the tabs on the maintenance lid from the groove on the floorstep.

Remove the spark plug maintenance lid.

Installation is in the reverse order of removal.



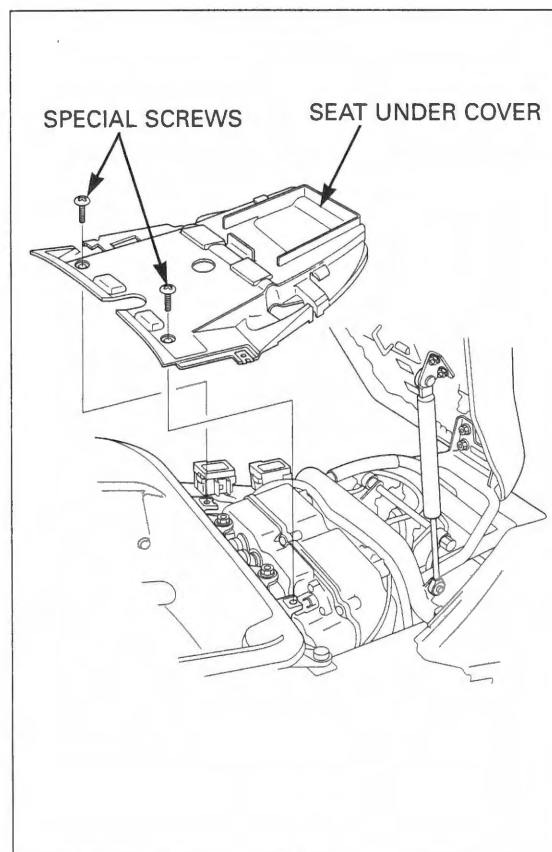
SEAT UNDER COVER

REMOVAL/INSTALLATION

Remove the side body cover front side set screws (page 2-7).

Remove the seat under cover special screws and remove the seat under cover.

Installation is in the reverse order of removal.



FRONT FENDER

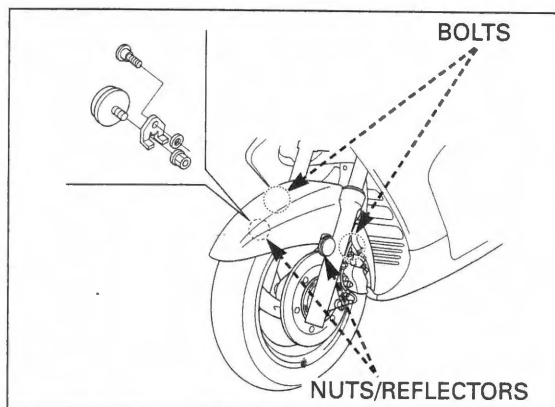
REMOVAL/INSTALLATION

Remove the two bolts from the rear side of the front fender.

Remove the nuts and both reflex reflectors.

Remove the two bolts, washers, both reflector stays and front fender.

Installation is in the reverse order of removal.



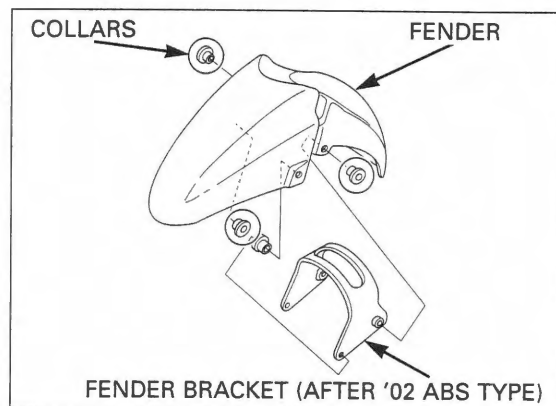
DISASSEMBLY/ASSEMBLY (AFTER '02 ABS TYPE/ AFTER '06 STD TYPE)

Remove the front fender bracket from the front fender.

Remove the four collars from the front fender.

Install the four collars to the front fender.

Install the front fender bracket into the guides of the front fender inside.



REAR SPOILER

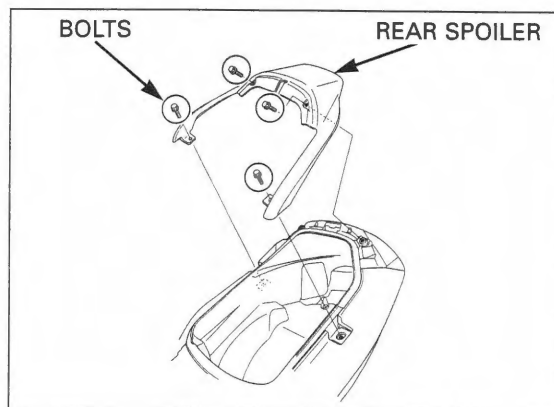
REMOVAL/INSTALLATION

Unlock the seat with the ignition key.
Open the seat.

Remove the bolts and rear spoiler.

Installation is in the reverse order of removal.

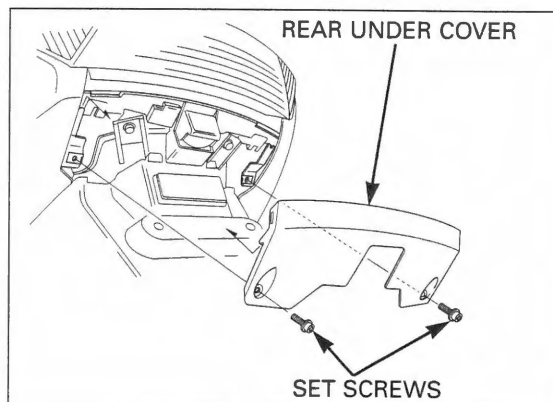
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



BODY COVER

REAR UNDER COVER REMOVAL

Remove the set screws and remove the rear under cover.



SIDE BODY COVER REMOVAL

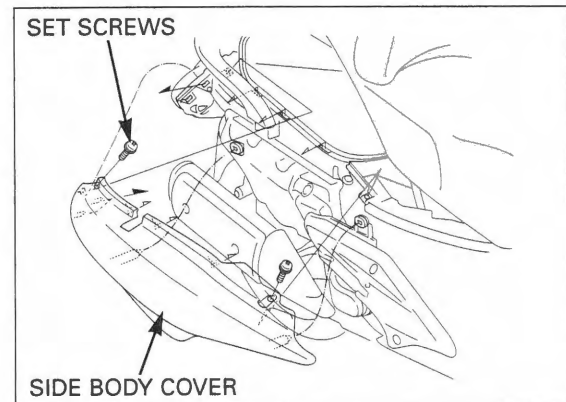
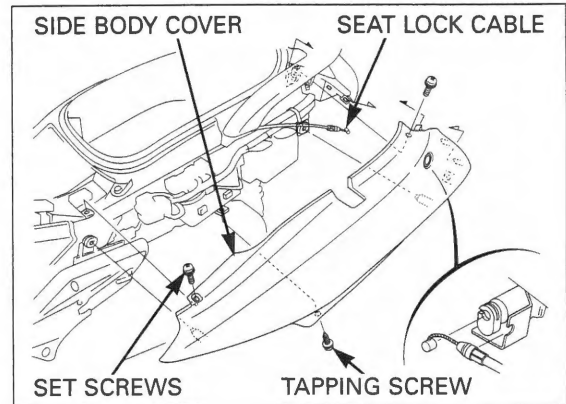
Open the seat (page 2-3).

Remove the rear under cover (page 2-6).

Be careful not to damage the tabs on the rear body cover and bosses on the side body covers.

Remove the tapping screw, set screws and side body cover.

Disconnect the seat lock cable from the key cylinder (left side only).



REAR BODY COVER REMOVAL

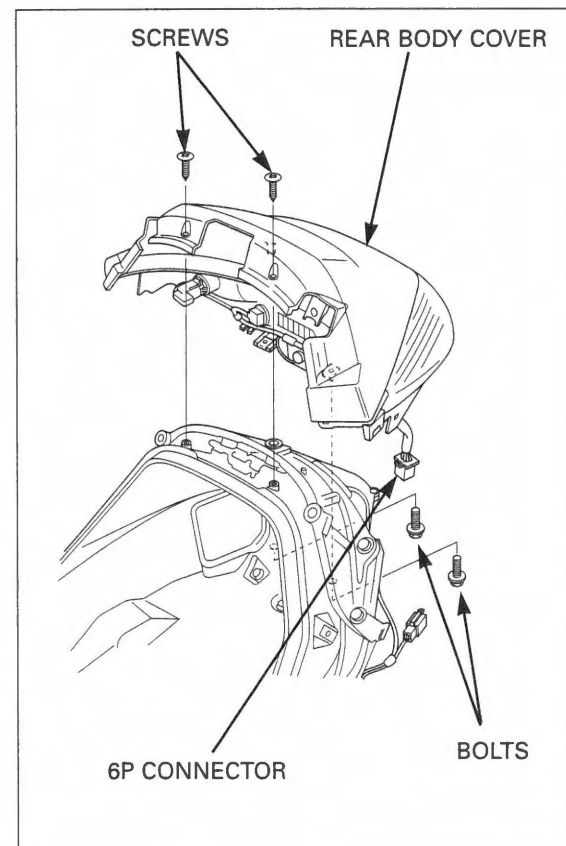
Remove the rear spoiler (page 2-6).

Remove the side body covers (see above).

Remove the bolts and tapping screws.

Disconnect the rear combination light and license plate light 6P connector.

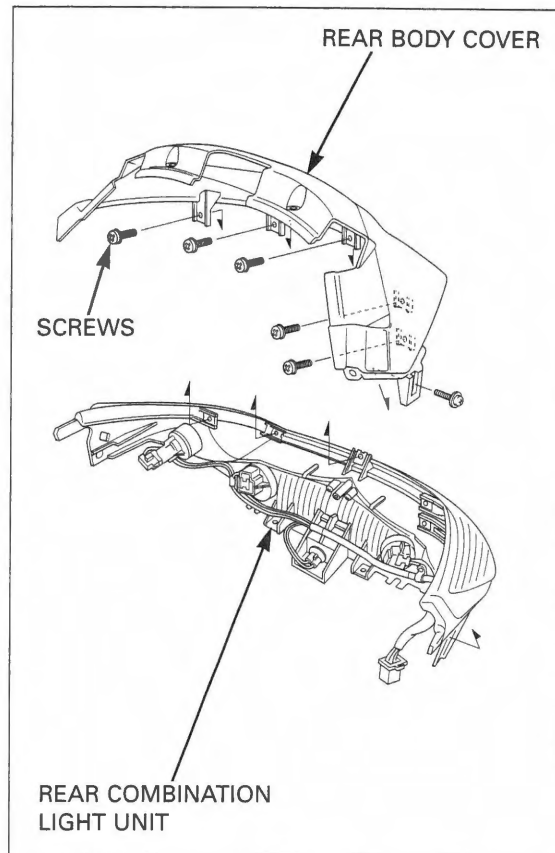
Remove the rear body cover.



REAR BODY COVER DISASSEMBLY/ASSEMBLY

Remove the screws, then remove the rear combination light unit from the rear body cover.

Assembly is in the reverse order of disassembly.



During installation, be careful not to damage the wire harness. Route the wire harness and cables correctly (page 1-20).

REAR BODY COVER INSTALLATION

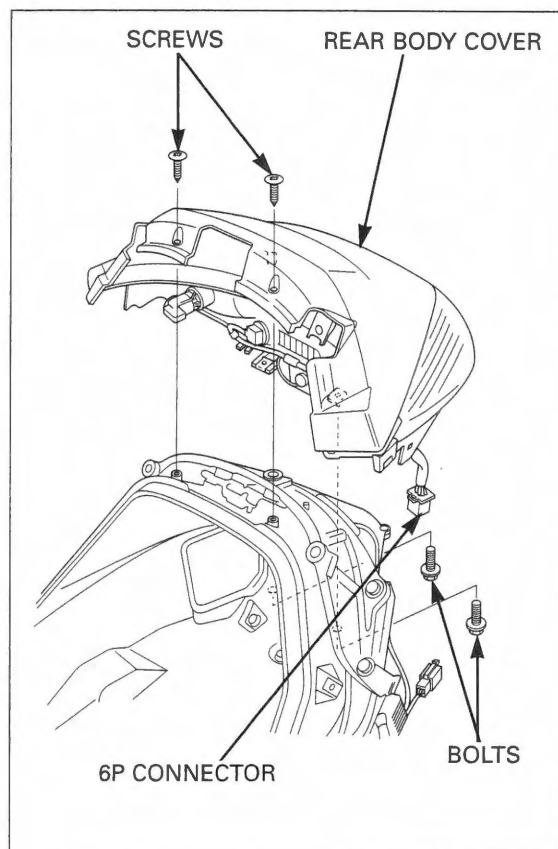
Connect the rear combination light and license plate light 6P connector.

Install the rear body cover then tighten the bolts and screws.

Install the side body covers (page 2-9).

Install the rear under cover (page 2-9).

Install the rear spoiler (page 2-6).



SIDE BODY COVER INSTALLATION

Connect the seat lock cable to the key cylinder (left side only).

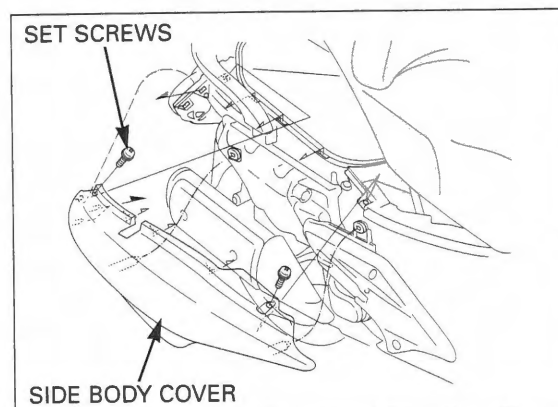
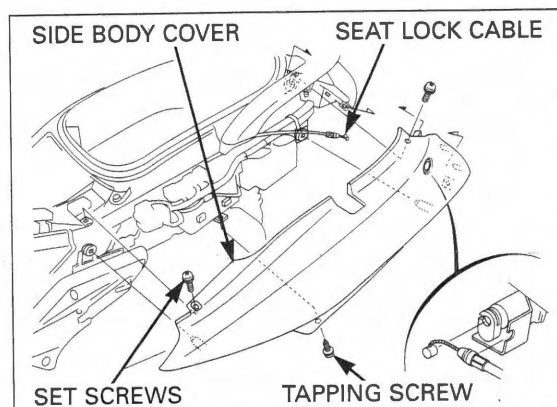
Be careful not to damage the tabs on the rear body cover and bosses on the side body covers.

Align the grooves on the side body cover with the tabs on the rear body cover.

Align the bosses on the side body cover with the grommet on the frame and passenger footpeg, then install the side body cover.

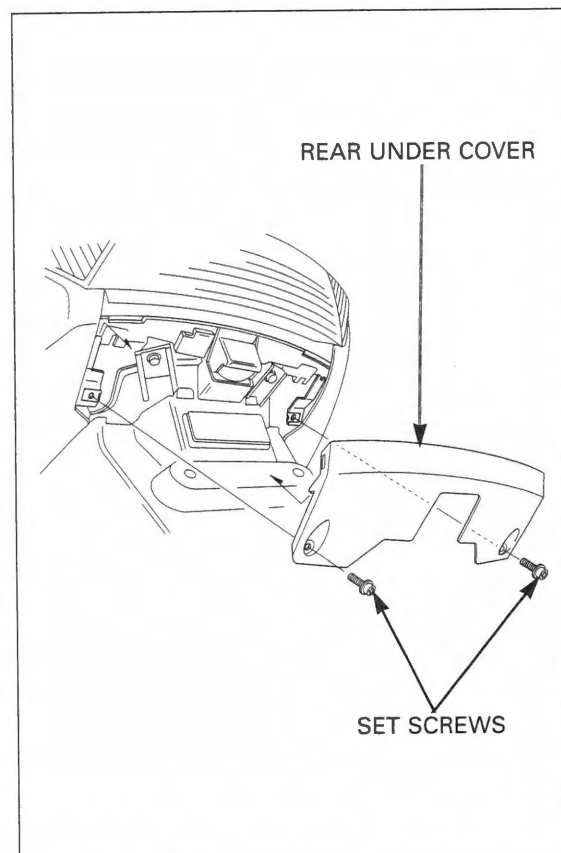
Install and tighten the set screws and tapping screws.

Install the rear under cover (see below).



REAR UNDER COVER INSTALLATION

Install the rear under cover and tighten the set screws securely.



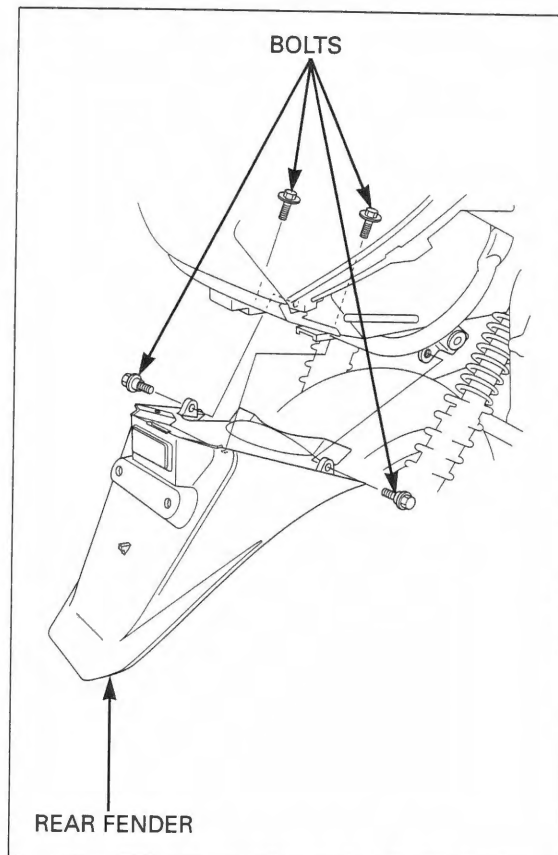
REAR FENDER

REMOVAL

Remove the body cover (page 2-6).
Remove the luggage box mat (page 2-11).

Remove the bolts and rear fender.

Installation is in the reverse order of removal.



LUGGAGE BOX

REAR FRAME

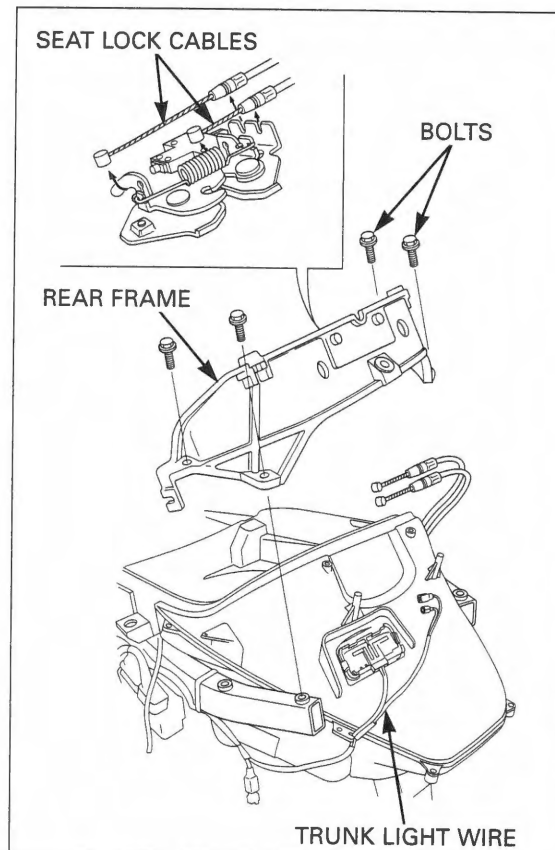
REMOVAL/INSTALLATION

Remove the body cover (page 2-6).

Disconnect the seat lock cables and trunk light switch wire connector from the seat catch.
Remove the bolts and rear frame.

Installation is in the reverse order of removal.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



UPPER LUGGAGE BOX

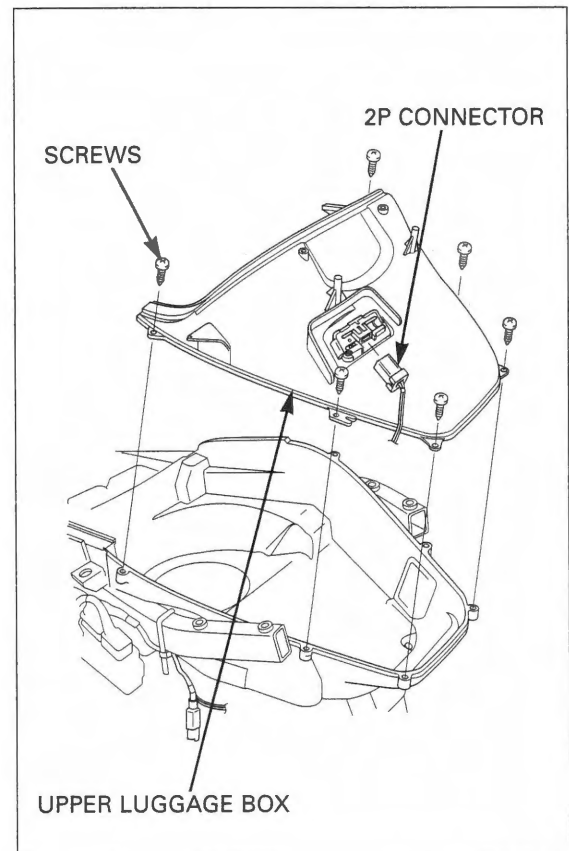
REMOVAL/INSTALLATION

Remove the rear frame (page 2-10).

Disconnect the luggage box light 2P connector.
Remove the screws and upper luggage box.

Installation is in the reverse order of removal.

Route the luggage box light wire correctly (page 1-20).



LOWER LUGGAGE BOX

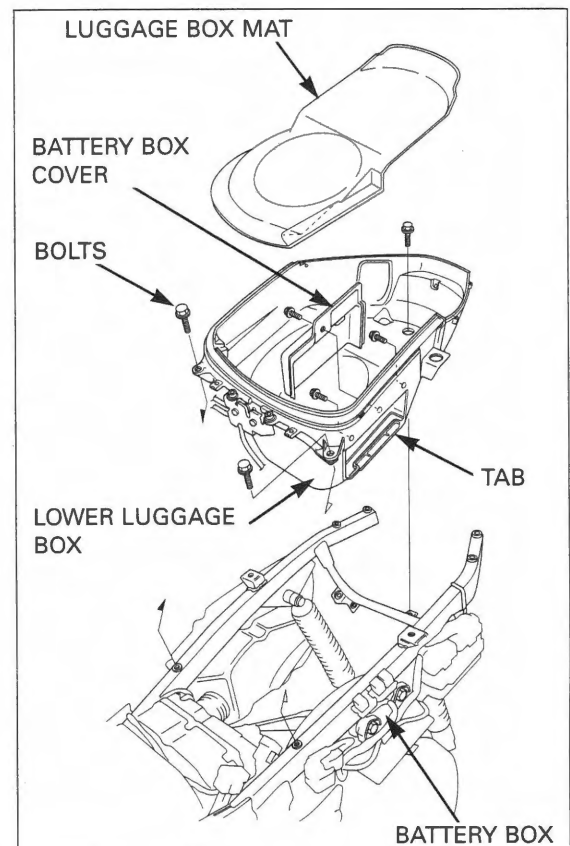
REMOVAL/INSTALLATION

Remove the upper luggage box (see above).

Remove the bolts and battery box from the frame.
Remove the bolt and battery box cover.
Remove the luggage box mat.
Remove the luggage box bolts.
Remove the tab on the luggage box from the hook on the battery box.
Remove the lower luggage box.

Installation is in the reverse order of removal.

During installation, be careful not to damage the wire harness.

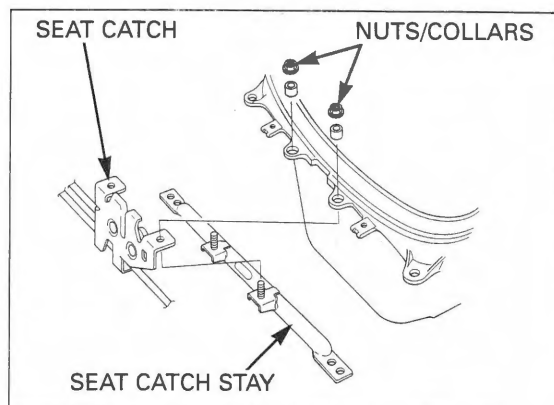


SEAT CATCH

DISASSEMBLY/ASSEMBLY

Remove the nuts and collars.
Remove the seat catch and seat catch stay from the lower luggage box.

Assembly is in the reverse order of disassembly.

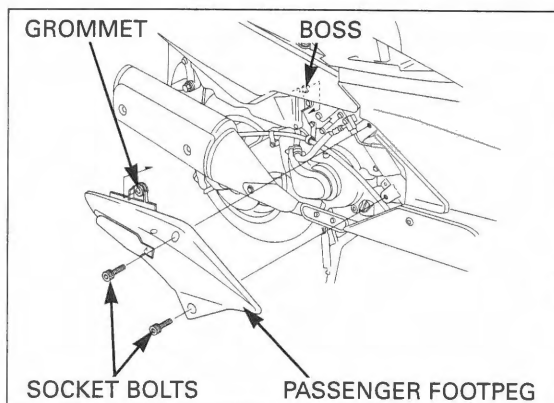


PASSENGER FOOTPEG

REMOVAL/INSTALLATION

Remove the passenger footpeg socket bolts.
Release the grommet on the passenger footpeg from the boss on the side body cover and remove the passenger footpeg.

Installation is in the reverse order of removal.

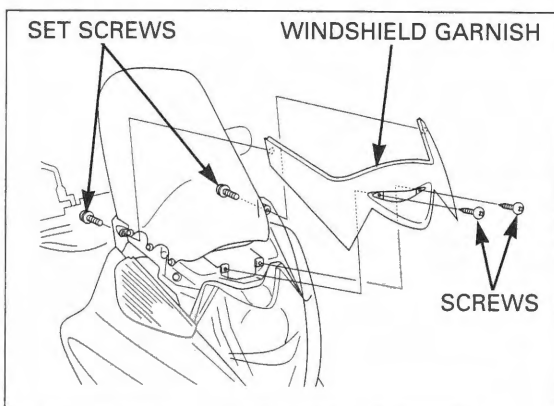


WINDSHIELD

WINDSHIELD GARNISH

REMOVAL/INSTALLATION

Remove the screws and set screws.
Remove the windshield garnish.

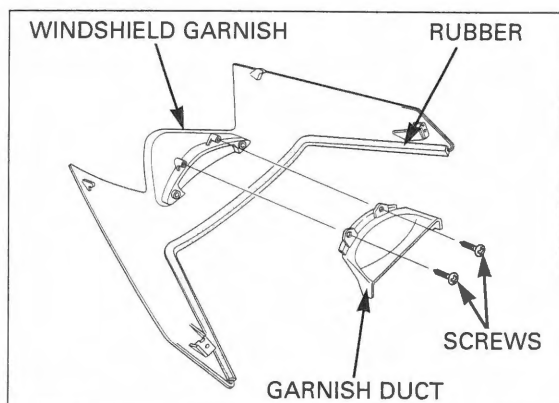


Remove the rubber from the windshield garnish.
Remove the screws and garnish duct from the windshield garnish.

Installation is in the reverse order of removal.

TORQUE:

Windscreen garnish set screw:
2 N·m (0.2 kgf·m, 1.4 lbf·ft)



WINDSHIELD

REMOVAL

Remove the windshield garnish (page 2-12).

Remove the set screws and plastic washers.
Remove the windshield.

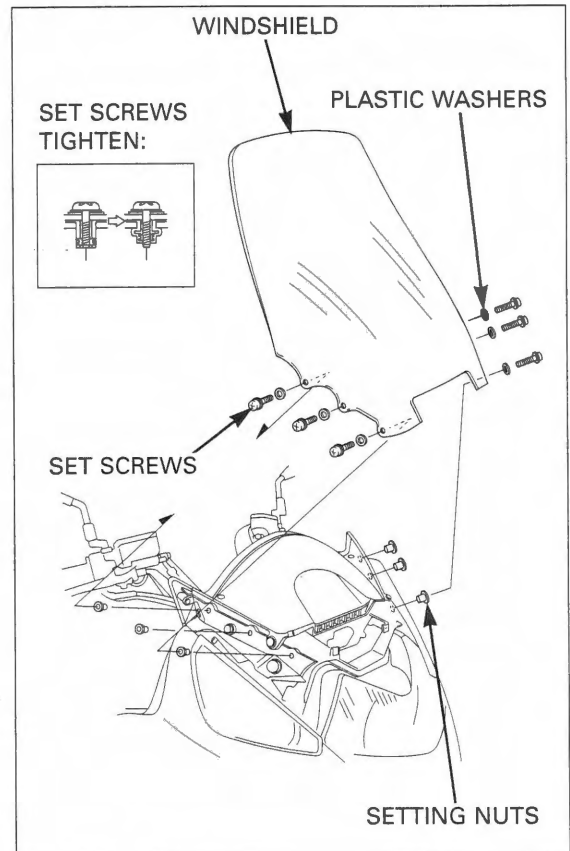
Be careful not to scratch or damage the windshield surface.

INSTALLATION

Install the windshield aligning the holes on the windshield with the setting nuts.

Install the plastic washers and set screws.
Tighten the set screws securely as shown.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



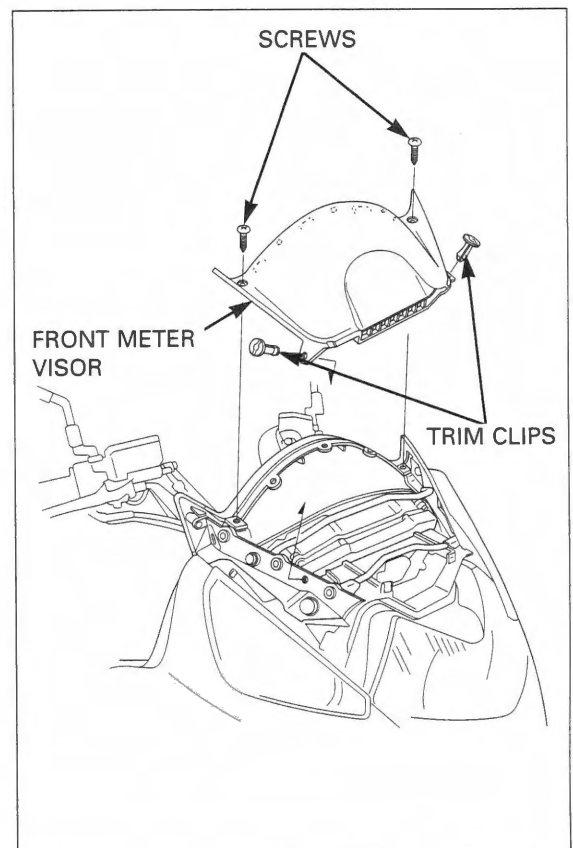
FRONT METER VISOR

REMOVAL/INSTALLATION

Remove the windshield (see above).

Remove the trim clips, screws and front meter visor.

Installation is in the reverse order of removal.



FRONT COVER

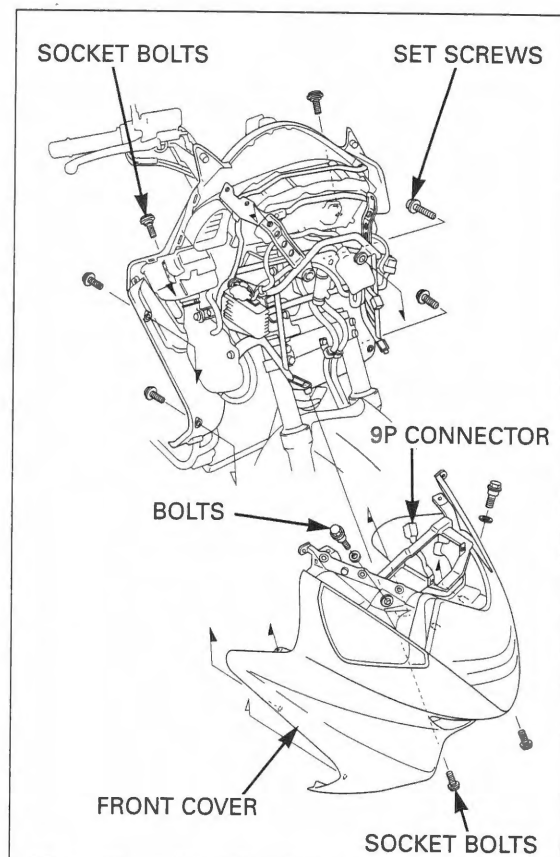
REMOVAL/INSTALLATION

Remove the windshield (page 2-12).
Remove the front lower cover (page 2-20).
Remove the bolts, socket bolts and set screws.
Release the tabs on the front cover from the inner cover, floorstep and floor skirt.
Remove the front cover.
Disconnect the headlight/front turn signal unit 9P brown connector.

During installation, be careful not to damage the tabs on the

Installation is in the reverse order of removal.

After installation, make sure the tabs on the front cover are attached on to the inner cover, floorstep and floor skirt.



HANDLEBAR COVER

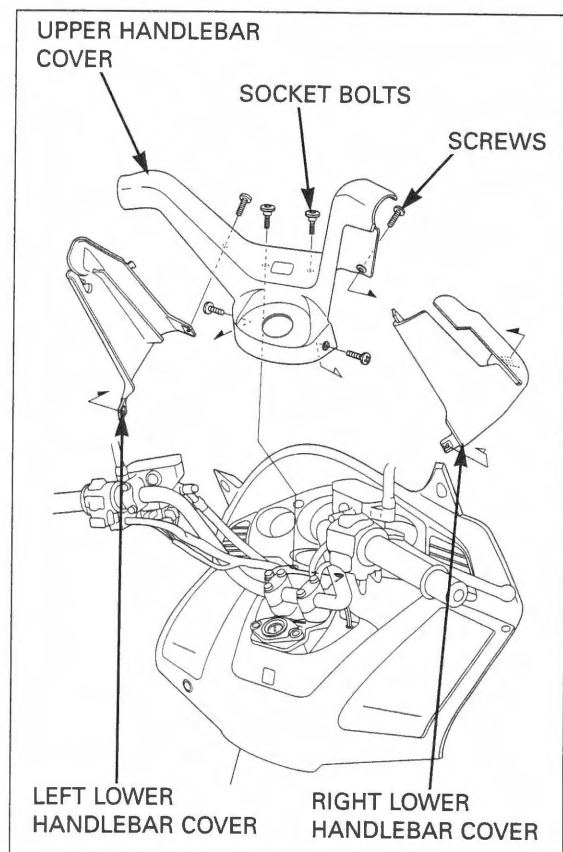
REMOVAL/INSTALLATION

Remove the screws, socket bolts, right lower handlebar cover and left lower handlebar cover.
Remove the screws, bolts and upper handlebar cover.

During installation, be careful not to damage the wire harness.

Installation is in the reverse order of removal.

When installing, align the tabs on the right and left lower handlebar cover with the tabs on the upper handlebar cover.



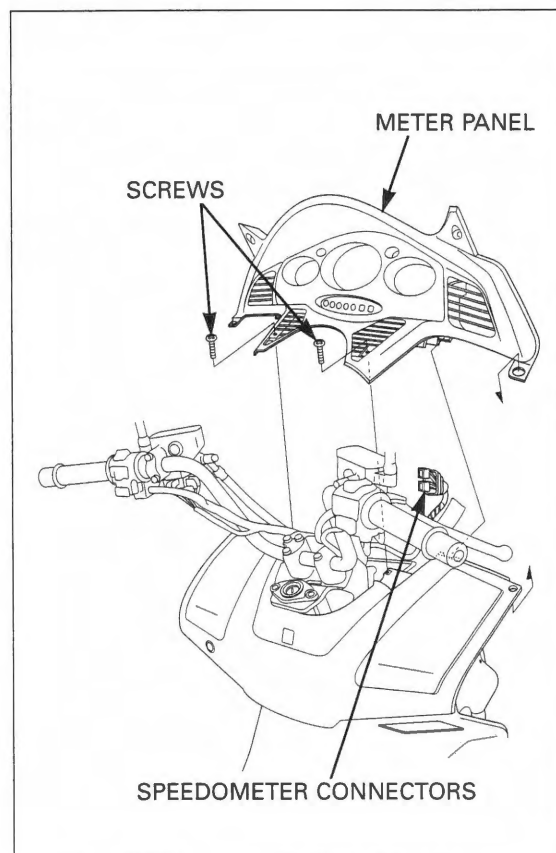
METER PANEL

REMOVAL/INSTALLATION

Remove the windshield (page 2-12).

Disconnect the speedometer 16P and 12P connectors.
Remove the screws and meter panel.

Installation is in the reverse order of removal.



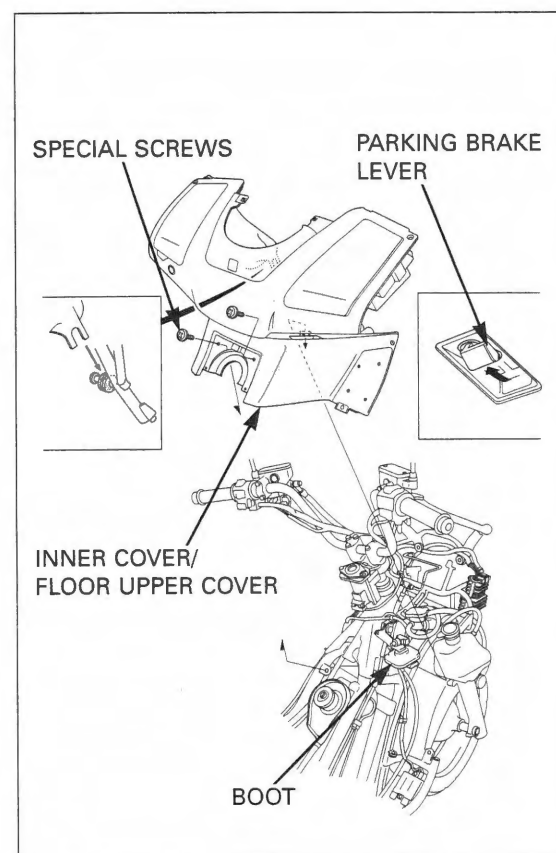
INNER COVER/FLOOR UPPER COVER

REMOVAL

Remove the front cover (page 2-14).
Remove the meter panel (see above).
Remove the floorstep (page 2-20).

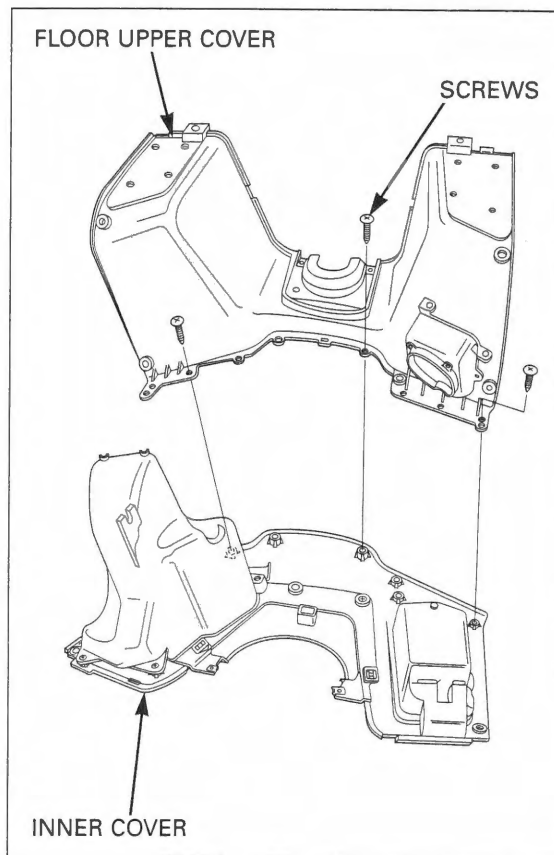
Pull up the parking brake lever.

Remove the parking brake lever boot from the inner cover.
Remove the special screws.
Release the hook on the inner cover from the grommet on the frame.
Remove the inner cover and floor upper cover as an assembly.



DISASSEMBLY/ASSEMBLY ('02 - '06)

Remove the screws and separate the inner cover and floor upper cover.



LEFT INNER POCKET

Remove the screws.

Remove the left inner pocket lock lever from the inner pocket groove.

Remove the left inner pocket from the inner cover.

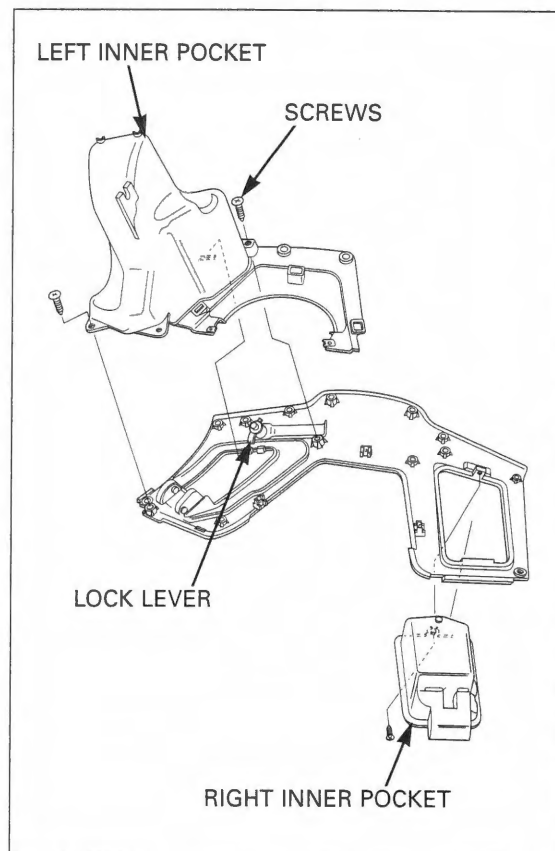
RIGHT INNER POCKET

Release the tab on the right inner pocket from the upper inner cover.

Remove the right inner pocket from the inner cover.

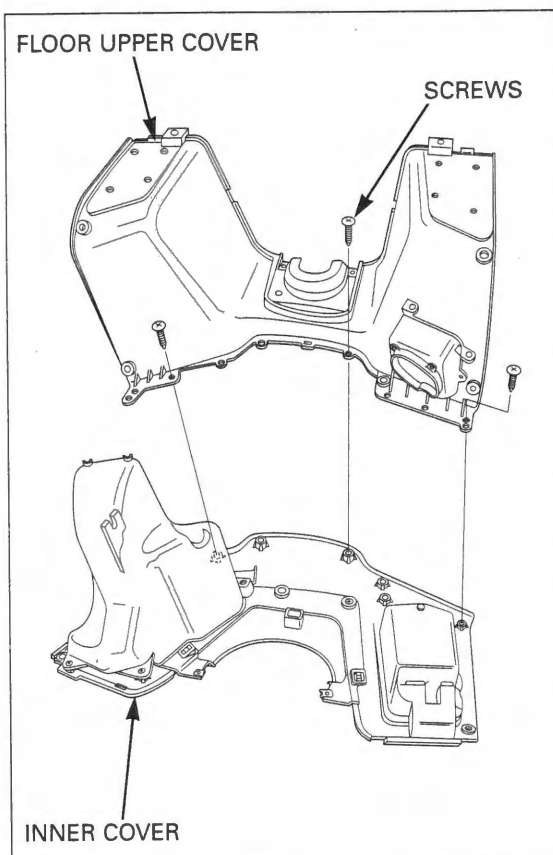
Assembly is in the reverse order of disassembly.

Be careful not to damage the inner pocket groove and lock lever.



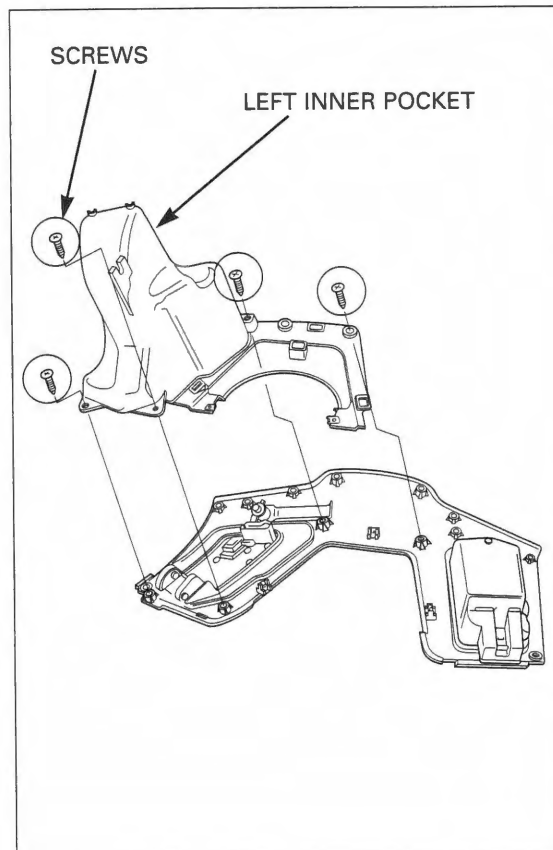
DISASSEMBLY/ASSEMBLY (AFTER '06)

Remove the screws and separate the inner cover and floor upper cover.



LEFT INNER POCKET

Remove the screws then remove the left inner pocket from the inner cover.



FRAME/BODY PANELS/EXHAUST SYSTEM

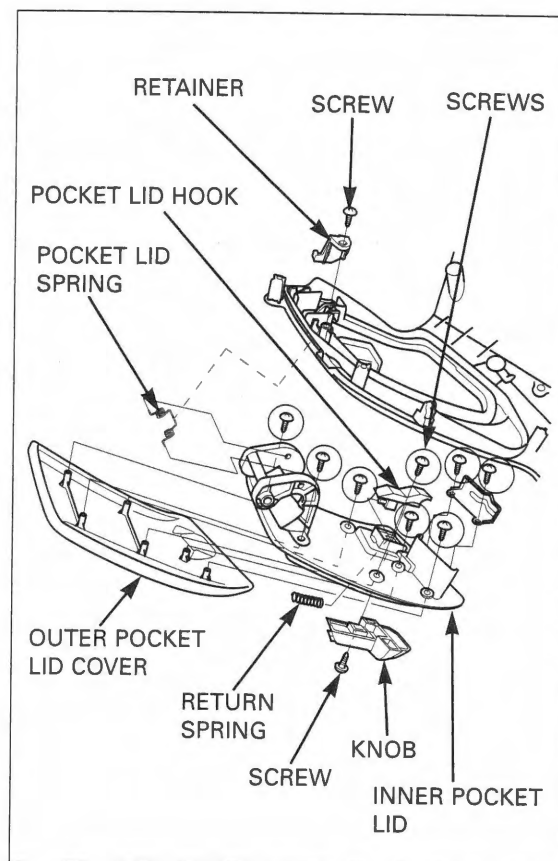
Remove the pocket lid spring from the left inner pocket lid and inner cover.

Remove the screw, retainer and then remove the left inner pocket lid.

Remove the screws and left outer pocket lid cover.

Remove the screw, knob, pocket lid hook and return spring from the left inner pocket lid.

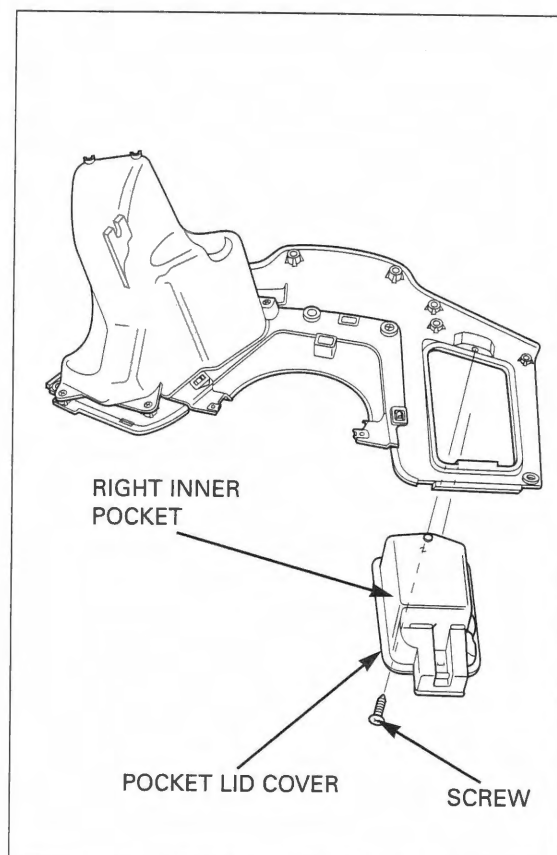
Assembly is in the reverse order of disassembly.



RIGHT INNER POCKET

Open the right pocket lid cover and remove the screw. Release the tab on the right inner pocket from the inner cover.

Remove the right inner pocket from the inner cover.



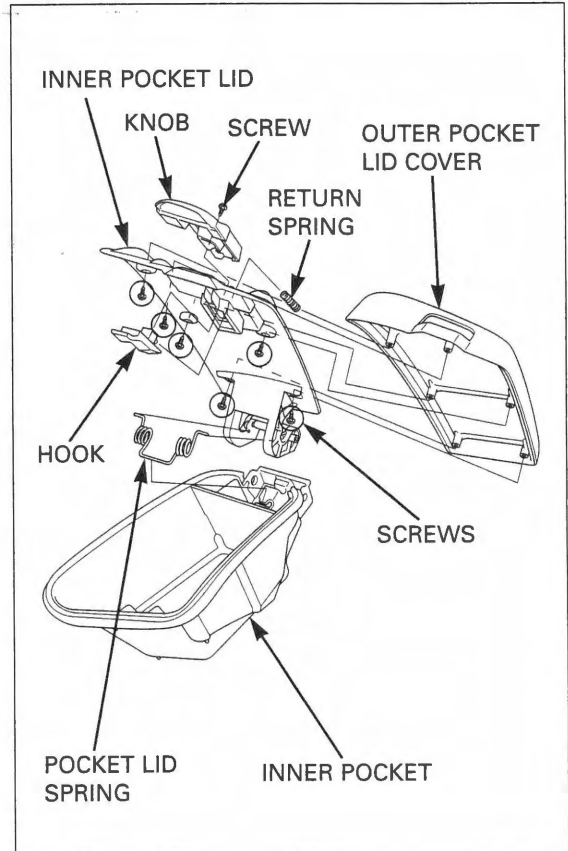
Remove the pocket lid spring from the right inner pocket lid and right inner pocket.

Separate the right inner pocket lid and right inner pocket.

Remove the screws and the right outer pocket lid cover and right inner pocket lid.

Remove the screw, knob, pocket lid hook and return spring from the right inner pocket lid.

Assembly is in the reverse order of disassembly.



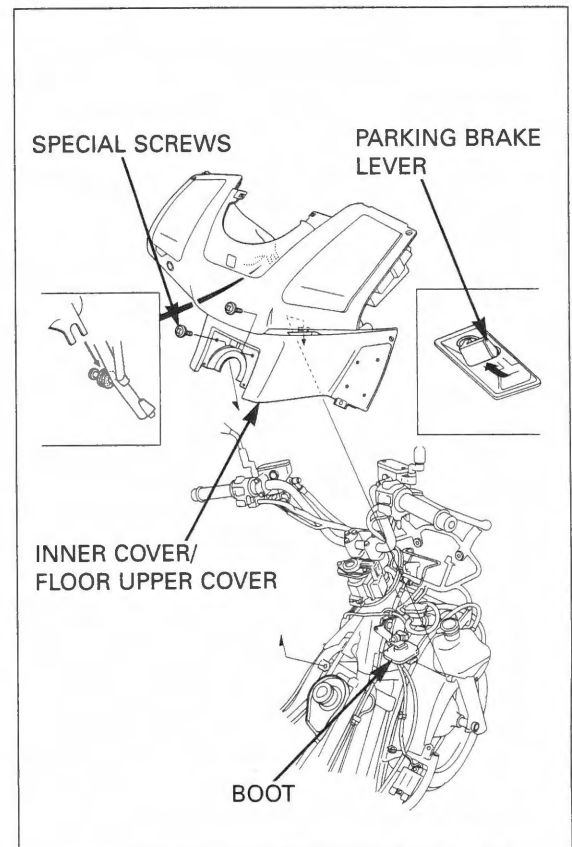
INSTALLATION

During installation, be careful not to damage the wire harness and the hoses.

Pull up the parking brake lever. Install the inner cover through the hole with the parking brake lever and align the hook on the inner cover to the grommet on the frame.

After installation, check the parking brake lever operation (page 3-19).

Installation is in the reverse order of removal.



FLOORSTEP

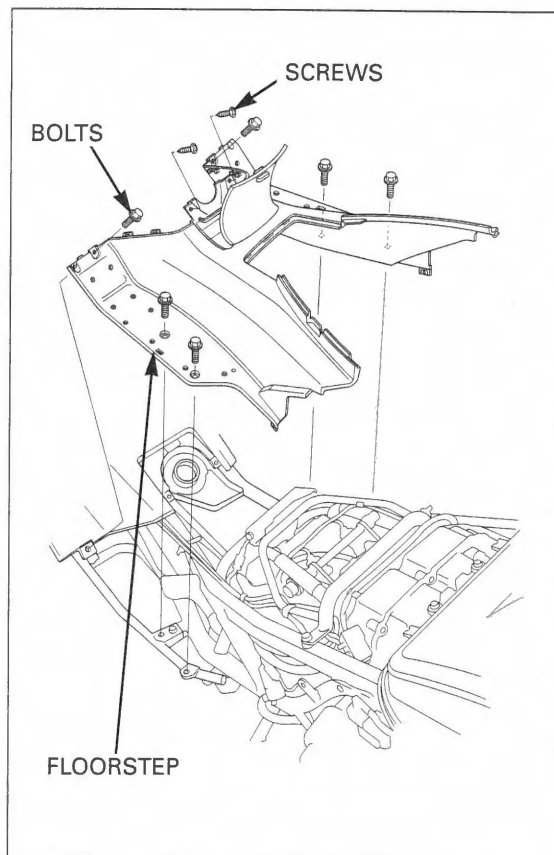
REMOVAL/INSTALLATION

Remove the seat (page 2-3).
Remove the maintenance lid (page 2-5).
Remove the floor skirt (page 2-4).
Remove the passenger footpeg (page 2-12).

Remove the screws and washer bolts.
Remove the floorstep.

During installation, be careful not to damage the wire harness.

Installation is in the reverse order of removal.

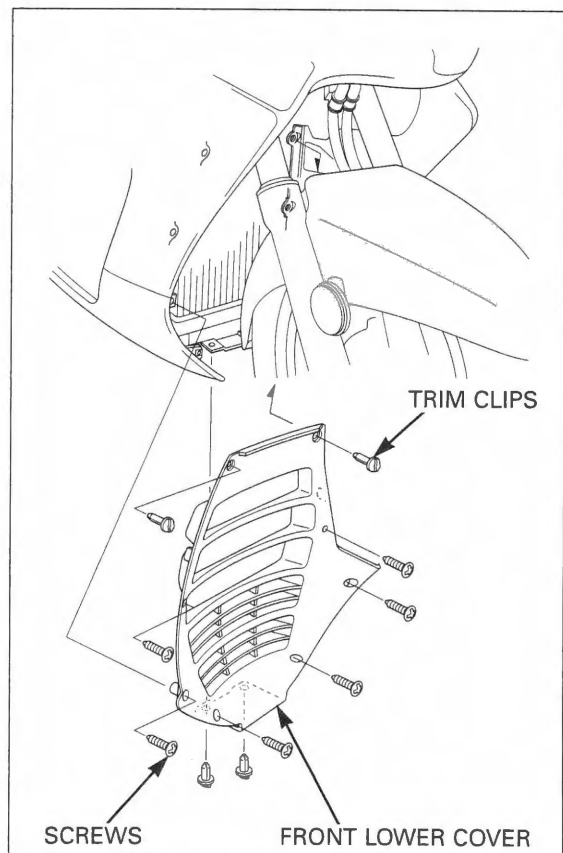


FRONT LOWER COVER

REMOVAL/INSTALLATION

Remove the screws and trim clips.
Remove the front lower cover.

Installation is in the reverse order of removal.



UNDER COVER

REMOVAL/INSTALLATION

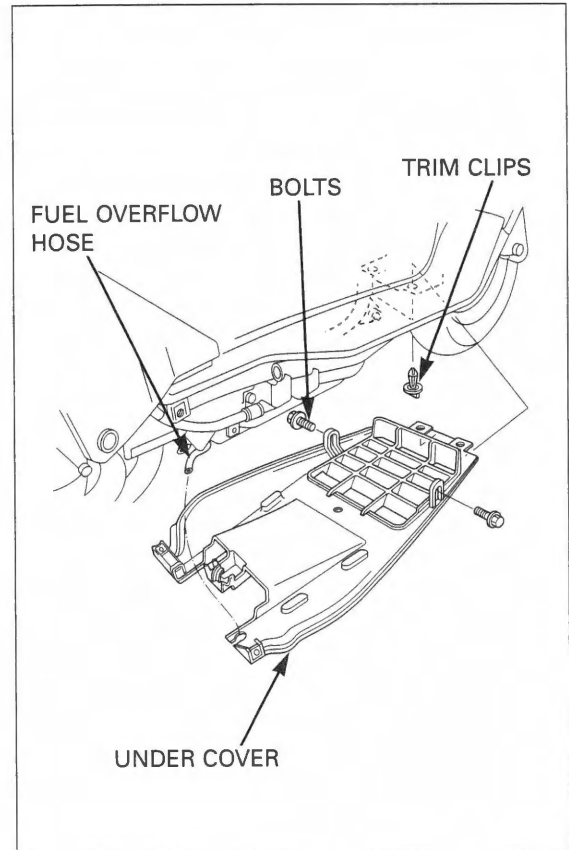
Remove the floor skirt (page 2-4).

Remove the bolts, trim clips and under cover from the lower frame.

Remove the fuel overflow hose from the hole on the under cover.

Remove the fuel tank separator breather hose from the hook on the under cover.

Installation is in the reverse order of removal.



FRONT AIRDUCT COVER

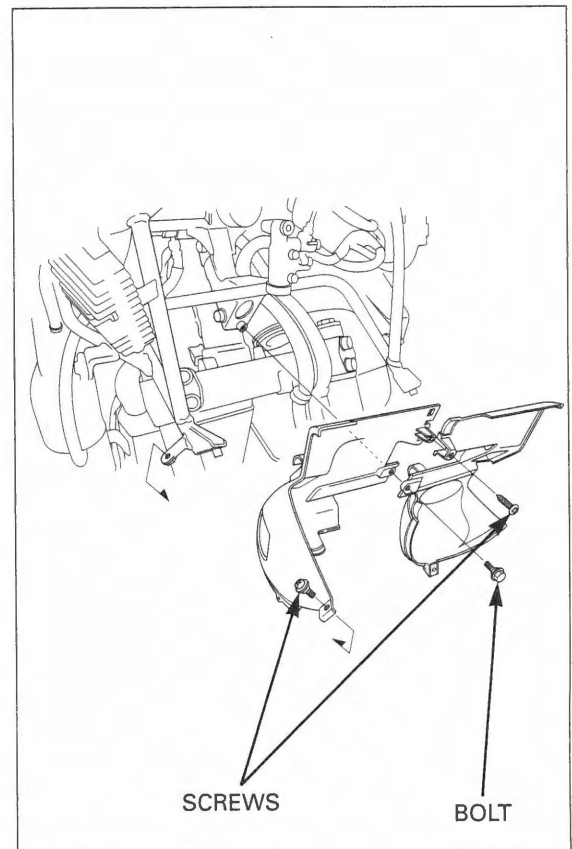
REMOVAL/INSTALLATION

Remove the front cover. (page 2-14).

Remove the bolt and screws.

Separate and remove the right/left airduct covers.

Installation is in the reverse order of removal.



MUFFLER ('02 – '07)

REMOVAL

Remove the right floor skirt (page 2-4).

Remove the exhaust pipe joint nuts.

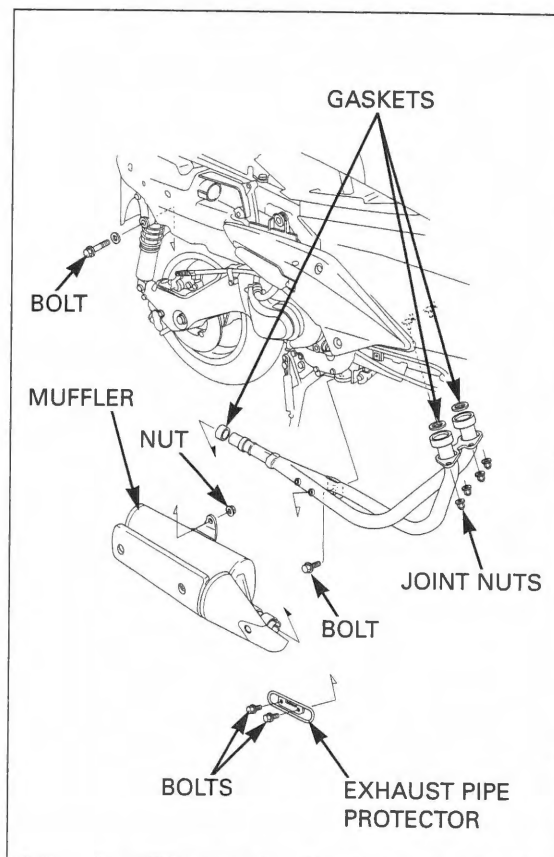
Loosen the exhaust pipe band bolt.

Remove the muffler mount bolts, washer, nut and muffler from the exhaust pipe.

Remove the exhaust pipe mount bolt and exhaust pipe.

Remove the bolts and exhaust pipe protector.

Remove the gaskets.



MUFFLER DISASSEMBLY/ASSEMBLY

Remove the socket bolts and tail cover.

Remove the socket bolts and muffler protector.

Remove the bolts and muffler protector stay.

Assembly is in the reverse order of disassembly.

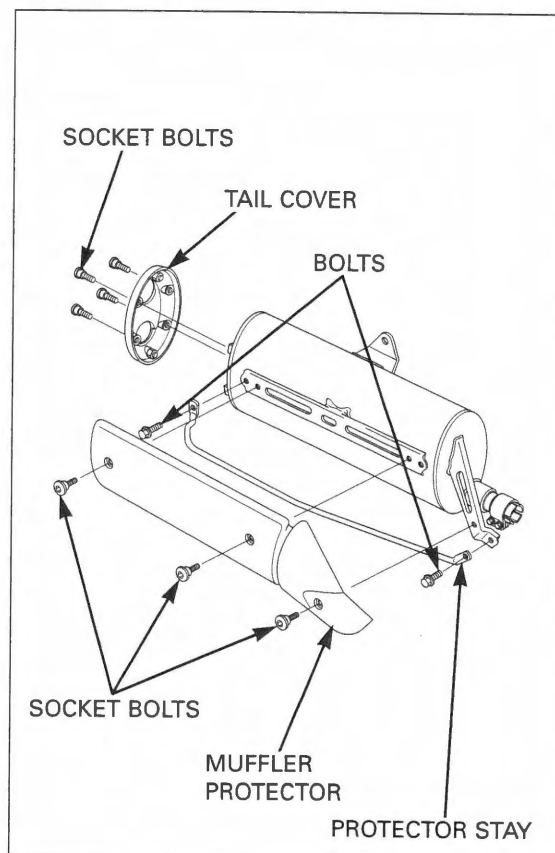
TORQUE:

Muffler protector bolt:

4 N·m (0.4 kgf·m, 2.9 lbf·ft)

Muffler tail cover mounting bolt:

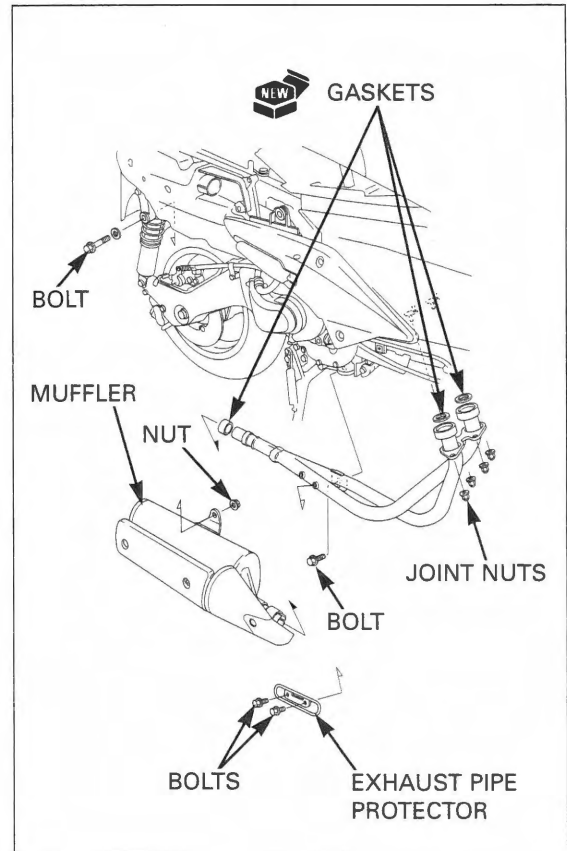
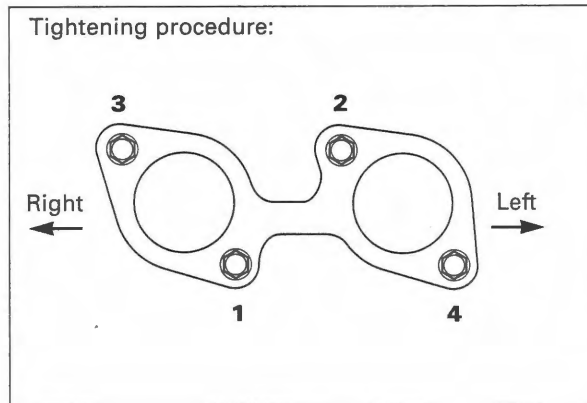
4 N·m (0.4 kgf·m, 2.9 lbf·ft)



INSTALLATION

Replace the gaskets with new ones.
Install the exhaust pipe protector and tighten the bolts.
Install the exhaust pipe and muffler then loosely tightening all fasteners.

Tighten the joint nuts in the sequence shown.



Tighten the mount bolts, nut and band bolts.

TORQUE:

Exhaust pipe band bolt 21 N·m (2.1 kgf·m, 15 lbf·ft)

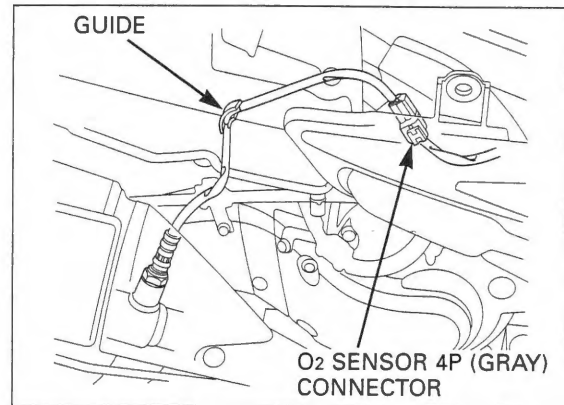
After installation, inspect the exhaust system for leaks.

MUFFLER/EXHAUST PIPE (After '07)

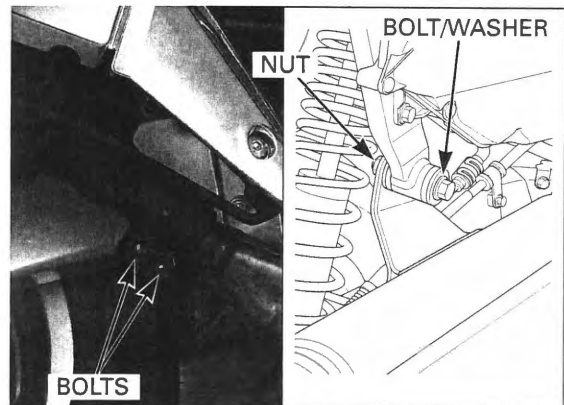
MUFFLER REMOVAL

Remove the right side body cover (page 2-6).

Disconnect the O₂ sensor 4P (Gray) connector and release the wire from the guide.



Loosen the muffler band bolts. Remove the muffler mounting bolt, washer and nut, then remove the muffler from the exhaust pipe. Remove the muffler gasket.



MUFFLER DISASSEMBLY/ASSEMBLY

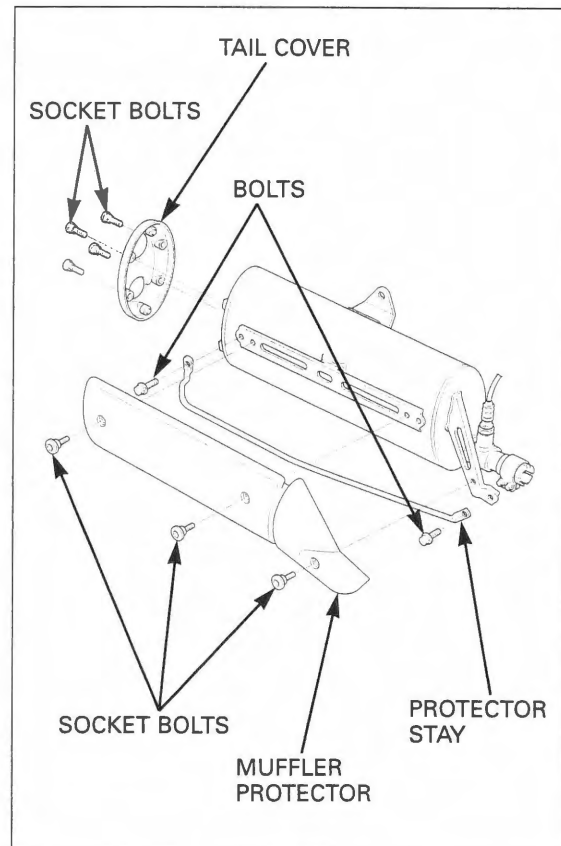
Remove the socket bolts and tail cover. Remove the socket bolts and muffler protector. Remove the bolts and muffler protector stay.

Assembly is in the reverse order of disassembly.

TORQUE:

- Muffler protector bolt:
4 N·m (0.4 kgf·m, 2.9 lbf·ft)
- Muffler tail cover mounting bolt:
4 N·m (0.4 kgf·m, 2.9 lbf·ft)

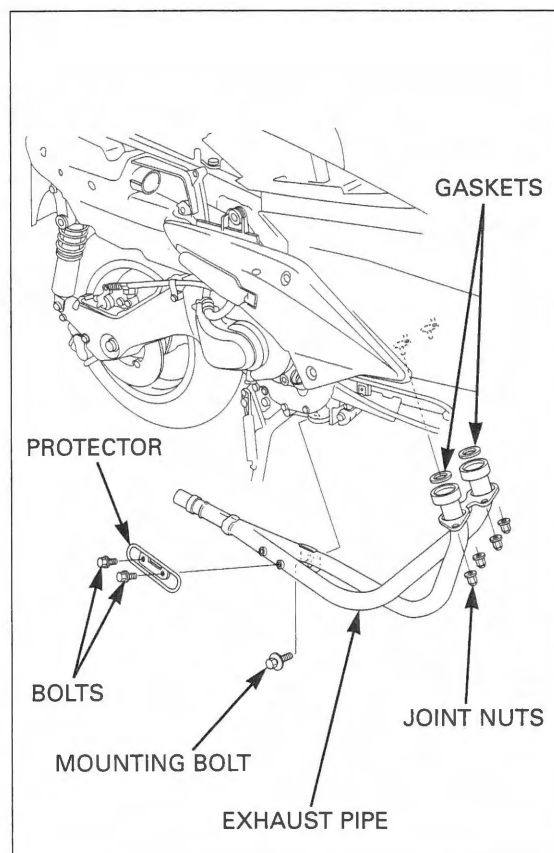
- Refer to procedure for the O₂ sensor removal/installation (page 5-110).



EXHAUST PIPE REMOVAL

Remove the exhaust pipe joint nuts, exhaust pipe mounting bolt and exhaust pipe.
Remove the gaskets from the exhaust port.

Remove the bolts and exhaust pipe protector.



EXHAUST PIPE INSTALLATION

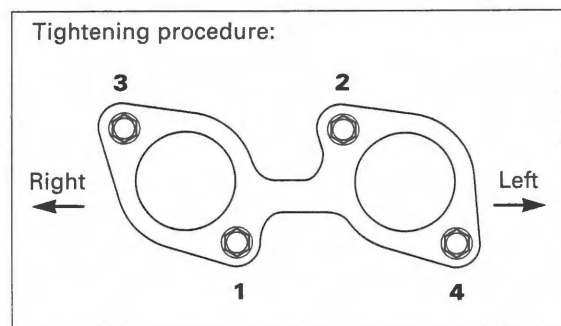
Replace the exhaust pipe gaskets with new ones.
Install the exhaust pipe protector and tighten the bolts.

Install the exhaust pipe, then loosely tighten the exhaust pipe joint nuts.

Install the exhaust pipe mounting bolt.

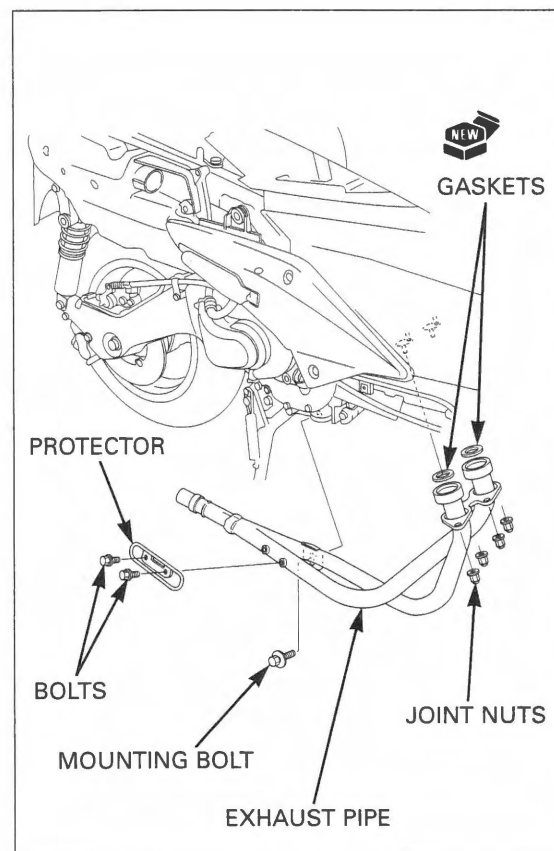
Install the exhaust pipe joint nuts and tighten them in the sequence as shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Tighten the exhaust pipe mounting bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



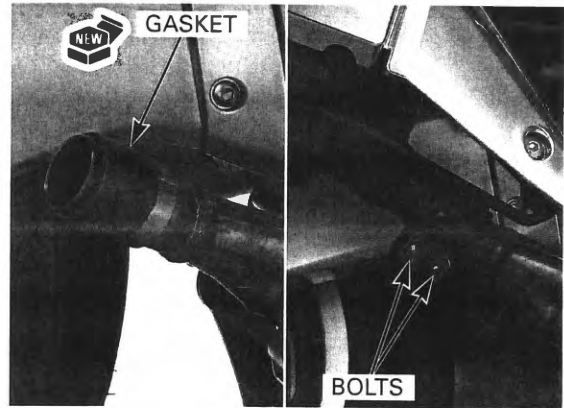
FRAME/BODY PANELS/EXHAUST SYSTEM

MUFFLER INSTALLATION

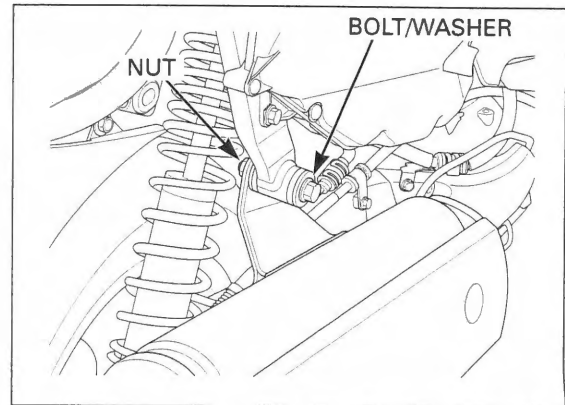
Replace the muffler gasket with a new one.
Install the muffler, mounting bolt, washer and nut,
then loosely tighten the nut.

Tighten the muffler band bolts to the specified torque.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)



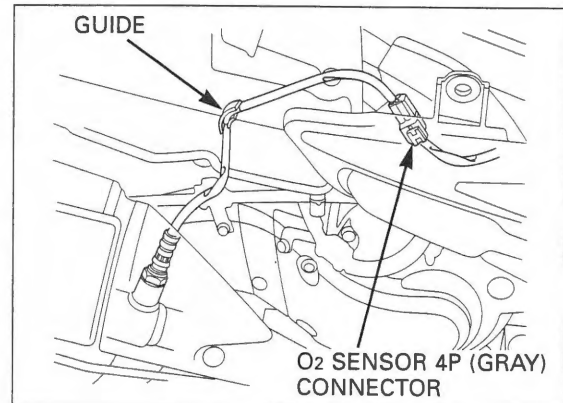
Hold the muffler mounting bolt and tighten the nut.



Connect the O₂ sensor 4P (Gray) connector and set
the wire into the guide.

Install the right side body cover (page 2-9).

After installation, inspect the exhaust system for
leaks.



3. MAINTENANCE

SERVICE INFORMATION	3-1	EVAPORATIVE EMISSION CONTROL	
MAINTENANCE SCHEDULE	3-3	SYSTEM	3-16
FUEL LINE	3-4	FINAL DRIVE OIL	3-16
THROTTLE OPERATION	3-4	BRAKE FLUID	3-17
AIR CLEANER	3-5	BRAKE PAD WEAR	3-18
CRANKCASE BREATHER	3-5	BRAKE SYSTEM	3-18
SPARK PLUG	3-5	BRAKE LOCK OPERATION	3-19
VALVE CLEARANCE	3-7	HEADLIGHT AIM	3-20
ENGINE OIL	3-11	SIDESTAND	3-20
ENGINE OIL FILTER	3-12	SUSPENSION	3-20
ENGINE IDLE SPEED	3-13	NUTS, BOLTS, FASTENERS	3-21
RADIATOR COOLANT	3-14	WHEELS/TIRES	3-21
COOLING SYSTEM	3-14	STEERING HEAD BEARINGS	3-22
SECONDARY AIR SUPPLY SYSTEM	3-15		

SERVICE INFORMATION

GENERAL

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

MAINTENANCE

SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip free play			2 – 6 mm (1/16 – 1/4 in)
Spark plug	NGK		CR8EH-9
	DENSO		U24FER9
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance	IN		0.16 ± 0.03 (0.006 ± 0.001)
	EX		0.22 ± 0.03 (0.009 ± 0.001)
Engine oil capacity	At draining		2.0 liter (2.1 US qt, 1.8 Imp qt)
	At draining/oil filter change		2.2 liter (2.3 US qt, 1.9 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 T903 standard: MA Viscosity: SAE 10W-30
Engine idle speed			1,300 ± 100 min ⁻¹ (rpm)
Final reduction oil capacity (At draining)			0.32 liter (0.34 US qt, 0.28 Imp qt)
Recommended final reduction oil			Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil. API service classification: SG or Higher JASO T903 standard: MA Viscosity: SAE 10W-30
Recommended brake fluid			DOT 4
Parking brake lever stroke			3 – 6 notch
Tire size		Front	120/80-14M/C 58S
		Rear	150/70-13M/C 64S
Tire brand	Bridgestone	Front	HOOP B03
		Rear	HOOP B02
	IRC	Front	SS530F
		Rear	SS530R
Tire air pressure	Up to 90 kg (200 lb) load	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	225 kPa (2.25 kgf/cm ² , 33 psi)
	Up to maximum weight capacity	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	250 kPa (2.50 kgf/cm ² , 36 psi)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Timing hole cap	10 N•m (1.0 kgf•m, 7 lbf•ft)	Apply oil to the threads and seating surface.
Balancer shaft hole cap	10 N•m (1.0 kgf•m, 7 lbf•ft)	Apply oil to the threads and seating surface.
Oil strainer screen cap	15 N•m (1.5 kgf•m, 11 lbf•ft)	Apply oil to the threads and seating surface.
Oil filter cartridge	26 N•m (2.7 kgf•m, 20 lbf•ft)	Apply oil to the threads and seating surface.
Transmission oil check bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)	
Transmission oil drain bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)	
Spark plug	16 N•m (1.6 kgf•m, 12 lbf•ft)	

TOOLS

Oil filter wrench	07HAA-PJ70100
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MAINTENANCE SCHEDULE

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

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

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

ITEMS			FREQUENCY	WHICHEVER COMES FIRST ↓ NOTE	⇨ ODOMETER READING (NOTE 1)								REFER TO PAGE
					x1,000 mi	0.6	4	8	12	16	20	24	
					x100 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	3-4	
	*	THROTTLE OPERATION					I		I		I	3-4	
		AIR CLEANER	NOTE 2					R			R	3-5	
		CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-5	
		SPARK PLUG					R		R		R	3-5	
	*	VALVE CLEARANCE							I			3-7	
		ENGINE OIL	'02 – '05			R		R		R		R	3-11
			AFTER '05	INITIAL = 600 mi (1,000 km) or 1 month : R REGULAR = Every 8,000 mi (12,800 km) or 12 months : R									
		ENGINE OIL FILTER				R		R		R		R	3-12
	*	ENGINE OIL STRAINER SCREEN						C		C		C	3-11
	*	ENGINE IDLE SPEED				I	I	I	I	I	I	I	3-13
		RADIATOR COOLANT	NOTE 5					I		I		R	3-14
	*	COOLING SYSTEM						I		I		I	3-14
NON - EMISSION RELATED ITEMS	*	SECONDARY AIR SUPPLY SYSTEM						I		I		I	3-15
	*	EVAPORATIVE EMISSION CONTROL SYSTEM							I			I	3-16
	*	DRIVE BELT	NOTE 4						I	R			10-7
	*	BELT CASE AIR CLEANER						C		C		C	10-4
	*	FINAL DRIVE OIL	NOTE 6										3-16
		BRAKE FLUID	NOTE 5										
		BRAKE PADS WEAR						I	I	I	I	I	3-17
		BRAKE SYSTEM						I		I		I	3-17
	*	BRAKE LOCK OPERATION						I		I		I	3-18
	*	BRAKE LOCK OPERATION						I		I		I	3-19
	*	HEADLIGHT AIM							I			I	3-19
	**	CLUTCH SHOES WEAR						I	I	I	I	I	10-15
		SIDESTAND							I			I	3-20
	*	SUSPENSION							I			I	3-20
	*	NUTS, BOLTS, FASTENERS							I			I	3-21
	**	WHEELS/TIRES							I			I	3-21
**	STEERING HEAD BEARINGS							I			I	3-22	

* Should be serviced by your Honda dealer, unless you have the proper tools and service data and are mechanically qualified. Refer to the official Honda service manual (page 210).

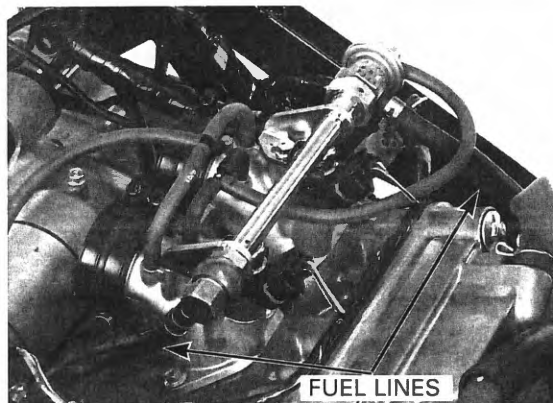
** In the interest of safety, we recommend these items be serviced only by your Honda dealer.

- NOTES:
- At higher odometer readings, repeat at the frequency interval established here.
 - Service more frequently if the scooter is ridden in unusually wet or dusty areas.
 - Service more frequently if the scooter is ridden often at full throttle or in the rain.
 - Inspect every 12,000 mi (19,200 km) after replacement.
 - Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill. Refer to the official Honda service manual.
 - Replace every 2 years. Replacement requires mechanical skill.

FUEL LINE

Remove the floorstep (page 2-20).

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



THROTTLE OPERATION

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

Measure the free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/16 – 1/4 in)

! WARNING

Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle slide operation and may lead to a loss of throttle control while riding.

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

Minor adjustment are made with the upper adjuster. Adjust the free play by loosening the lock nut and turning the adjuster.

Major adjustments are made with the lower adjuster.

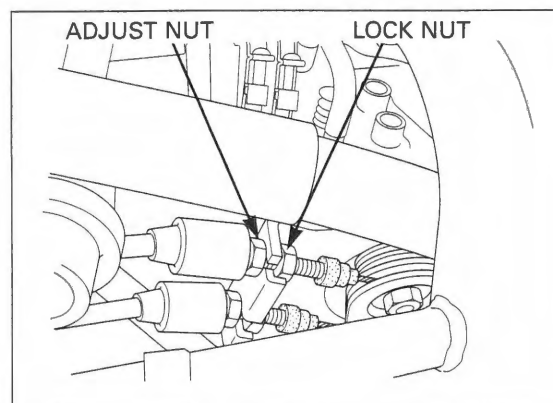
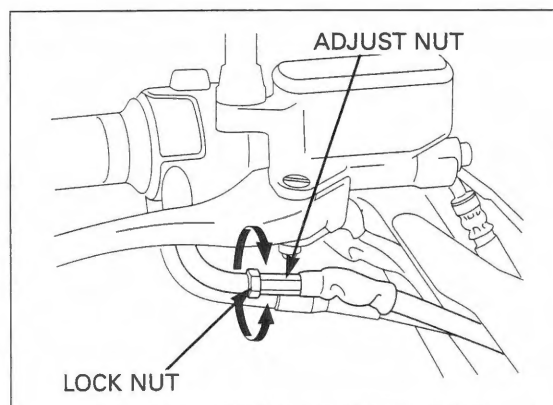
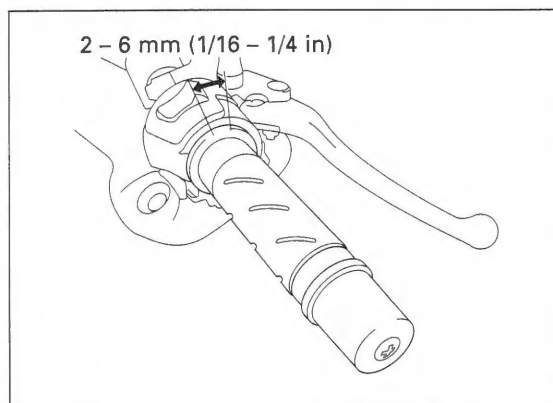
Remove the seat under cover (page 2-5).

Adjust the free play 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.

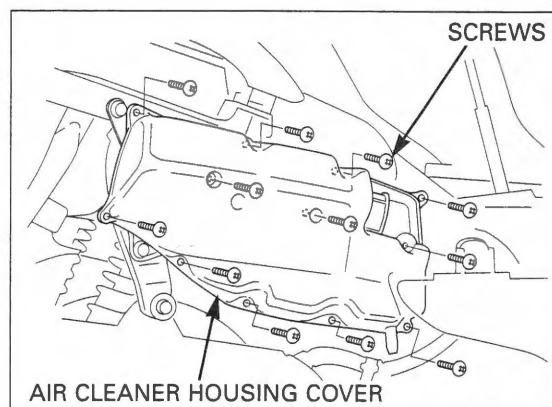


AIR CLEANER

Remove the right side body cover (page 2-6).

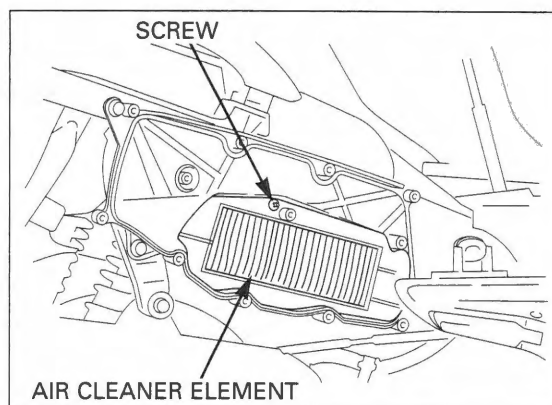
Remove the O₂ sensor wire from the air cleaner housing cover (After '07).

Remove the screws and air cleaner housing cover.
Remove the screws and air cleaner element.



Remove and discard the air cleaner element in accordance with the maintenance schedule (page 3-3). Also replace the air cleaner element any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.

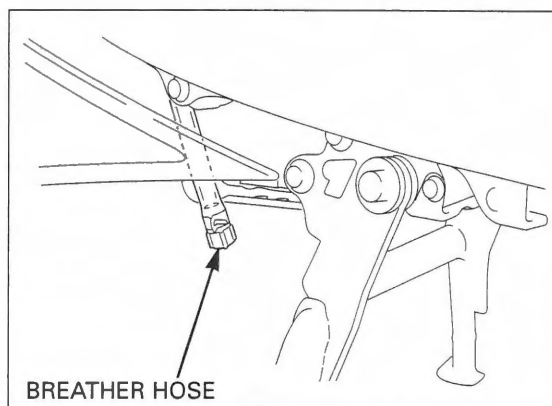


CRANKCASE BREATHER

- Service more frequently when ridden in rain, at full throttle, or after the scooter is washed or overturned. Service if the deposits level can be seen in the transparent section of the breather hose.

The air cleaner chamber drain hose is lower the left swingarm.

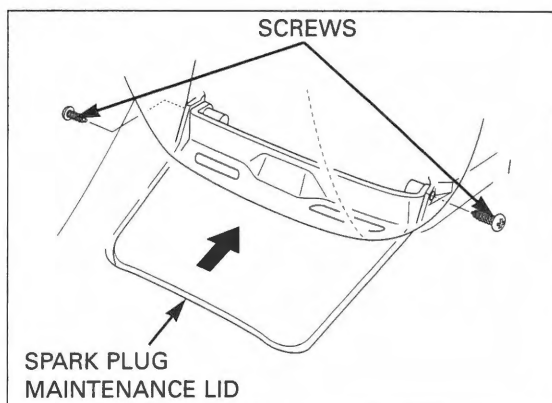
Remove the air cleaner chamber drain hose plug from the hose end and drain deposits into a suitable container, then install the air cleaner chamber drain hose plug.



SPARK PLUG

REMOVAL

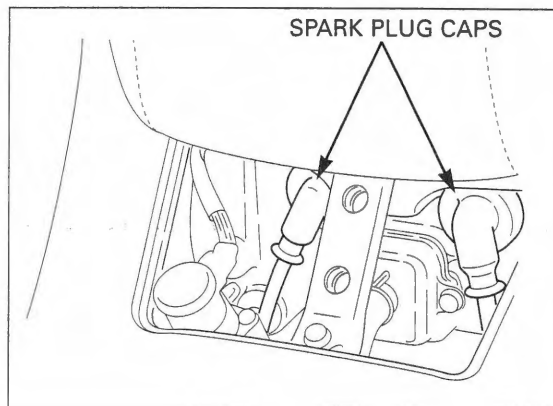
Remove the clips and spark plug maintenance lid.



MAINTENANCE

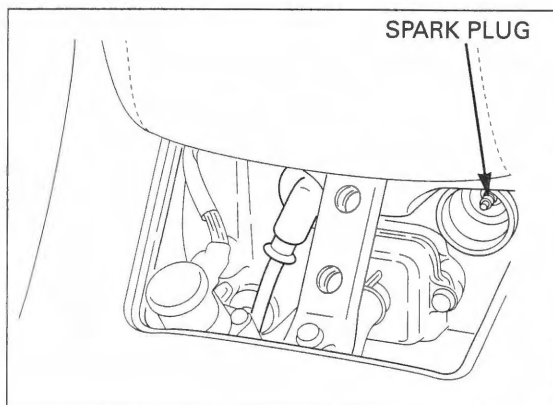
Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

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



Remove the spark plug using a equipped spark plug wrench or an equivalent tool.

Inspect or replace as described in the maintenance schedule.



INSPECTION

Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration.

Replace the plug if necessary.

If the electrode are contaminated with carbon deposits, clean the electrodes using spark plug cleaner.

Replace the spark plug if necessary.

Always use specified spark plugs on this motorcycle.

SPECIFIED SPARK PLUG:

NGK: CR8EH-9

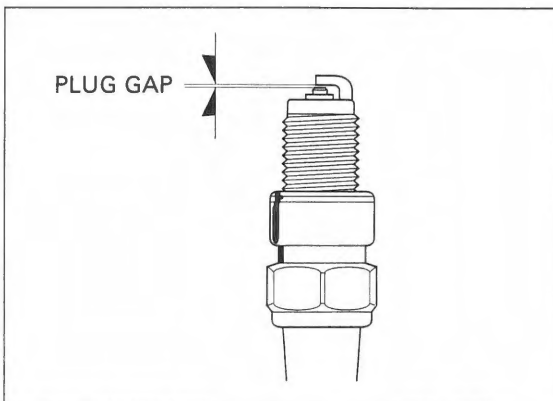
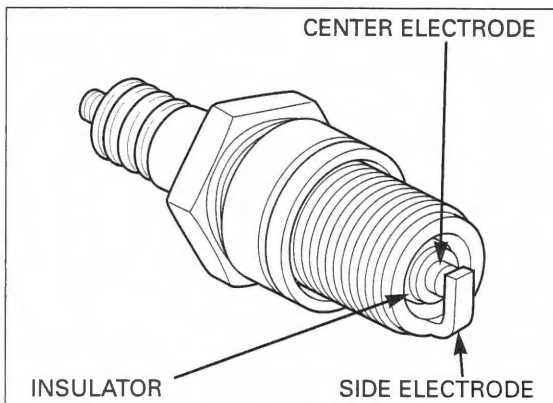
DENSO: U24FER9

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

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

SPARK PLUG GAP:

0.80 – 0.90 mm (0.031 – 0.035 in)

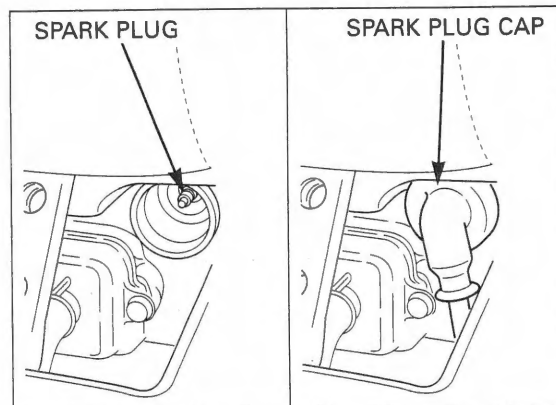


Install the spark plug in the cylinder head and hand tighten, then torque to the specification.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Install the spark plug cap.

Install the removed parts in the reverse order of removal.



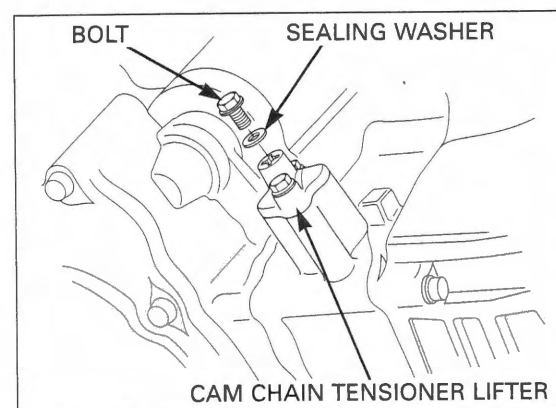
VALVE CLEARANCE

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

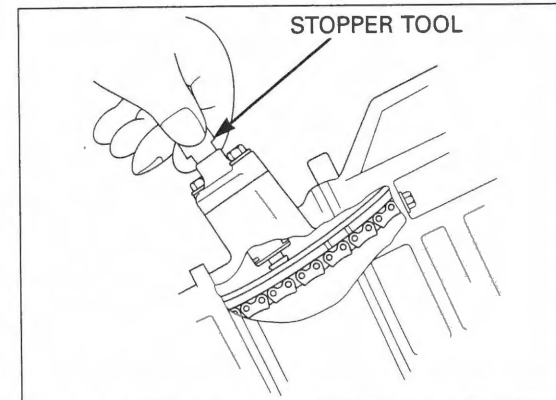
INSPECTION

Remove the cylinder head cover (page 8-4).

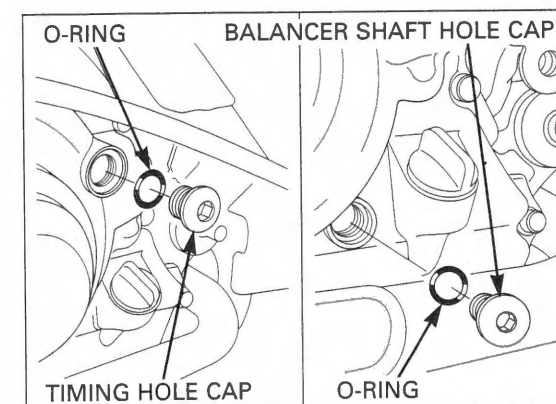
Remove the cam chain tensioner lifter sealing bolt and sealing washer.



Turn the cam chain tensioner lifter shaft fully and secure it using the mechanic's tensioner stopper tool (page 8-7).

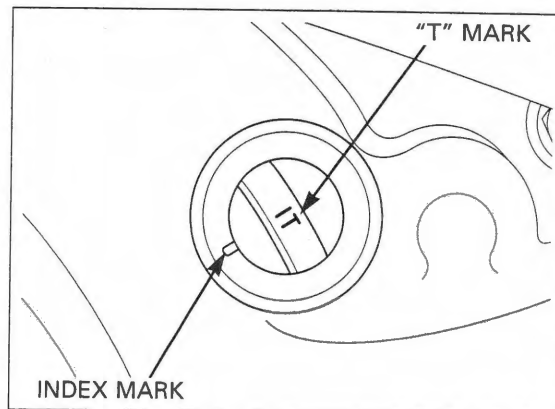


Remove the timing hole cap and O-ring.
Remove the balancer shaft hole cap and O-ring.

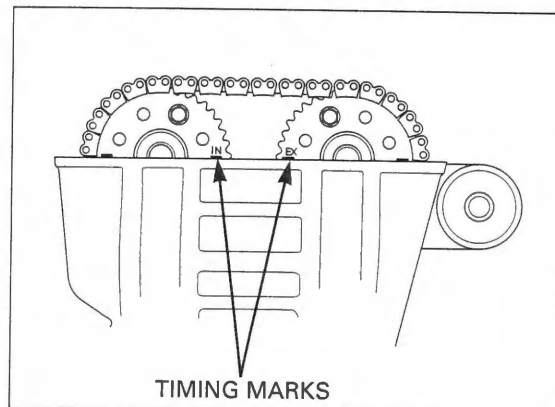


MAINTENANCE

Turn the crank shaft counterclockwise and align the "T" mark on the flywheel with the index mark on the right crankcase cover.



The timing marks on the cam sprockets must be flush with the cylinder head surface as shown.



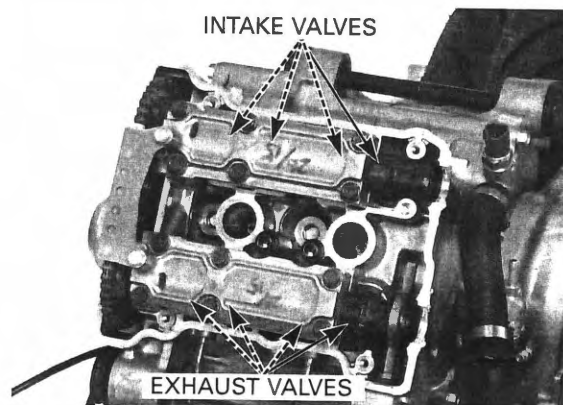
Record the clearance for each valve for reference if valve clearance adjustment is required.

Measure the valve clearances for the #1 or #2 cylinder on the compression stroke by inserting the feeler gauge between the valve lifter and the cam lobe.

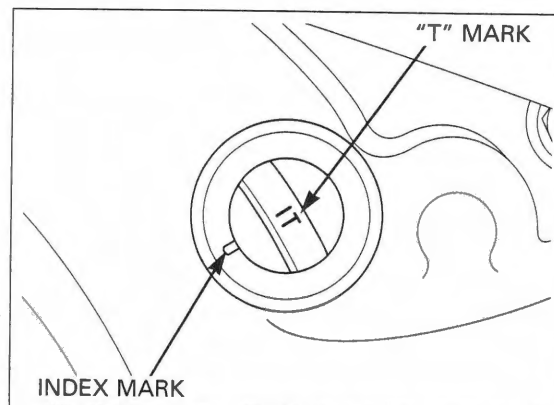
VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)

EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)



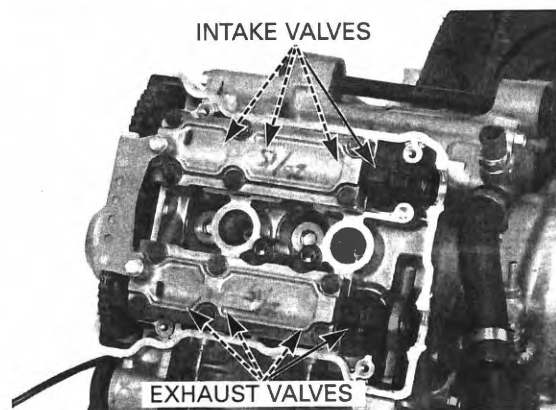
Turn the crank shaft counterclockwise a full turn (360°) and align the "T" mark on the flywheel with the index mark on the right crankcase cover.



Record the clearance for each valve for reference if valve clearance adjustment is required.

Check the valve clearance of the other cylinder using a feeler gauge.

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)
EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)

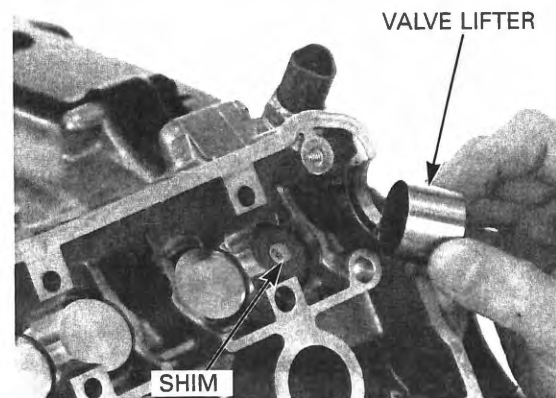


ADJUSTMENT

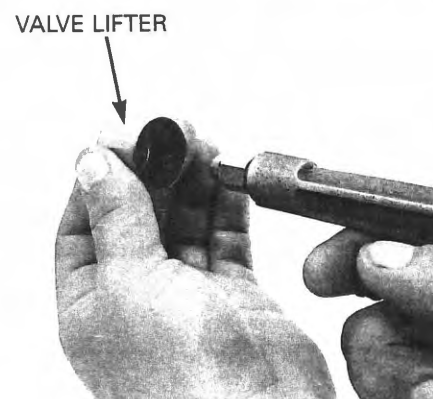
Remove the camshaft (page 8-6).

Remove the valve lifters and shims.

- The shims may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with tweezers or a magnet.



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



Sixty-nine different shim thicknesses are available from 1.200 mm to 2.900 mm in intervals of 0.025 mm.

Measure the shim thickness and record it.

Calculate the new shim thickness using the equation below.

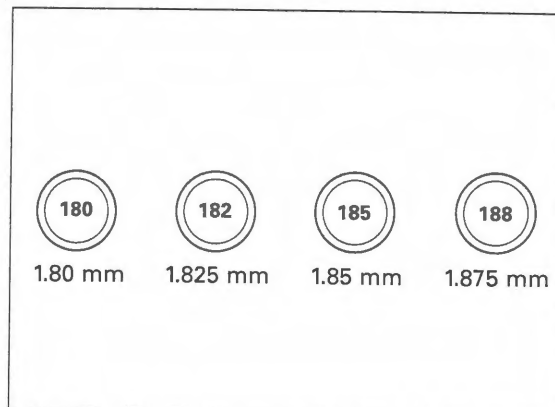
$$A = (B - C) + D$$

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



MAINTENANCE

- Make sure the correct shim is selected by measuring it with a micrometer.
- Reface the valve seat if carbon deposits result in a clearance of over 2.900 mm.



Install the shims and valve lifters in their original locations.

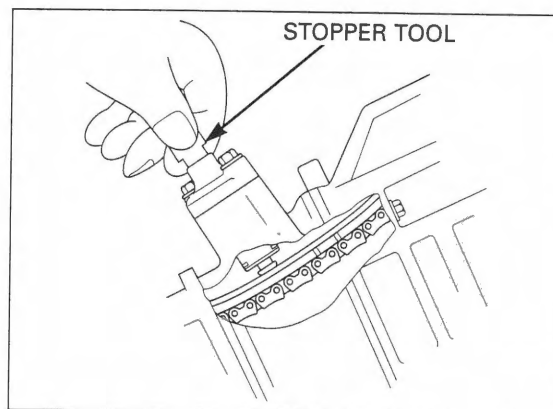
Install the newly selected shim on the valve retainer. Apply molybdenum disulfide oil to the valve lifters. Install the valve lifters into the valve lifter holes.

Install the camshaft (page 8-23).

Rotate the camshafts by rotating the crankshaft clockwise several times.

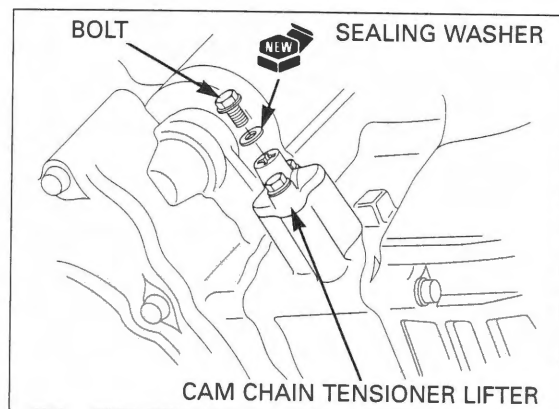
Recheck the valve clearance.

Remove the cam chain tensioner stopper tool.



Install the new sealing washer and cam chain tensioner lifter sealing bolt. Tighten the bolt.

Install the removed parts in the reverse order of removal.



ENGINE OIL

OIL LEVEL INSPECTION

CAUTION

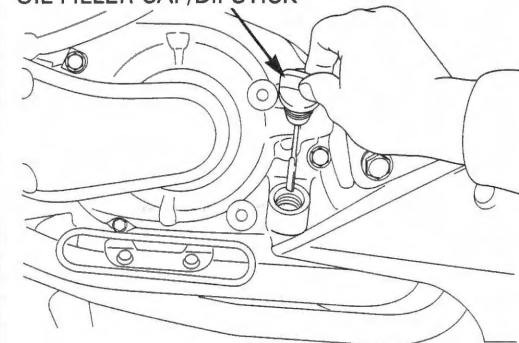
Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

Start the engine and let it idle for 2 – 3 minutes. Turn off the engine and support the scooter on a level surface.

Remove the oil filler cap/dipstick and wipe the oil from the dipstick with a clean cloth.

Insert the dipstick into the oil filler hole without screwing it in.

OIL FILLER CAP/DIPSTICK



UPPER LEVEL LINE

LOWER LEVEL LINE

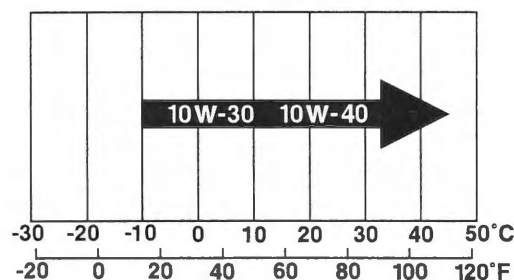
If the oil level is below or near the lower level line on the dipstick, add the recommended engine oil until the oil level is to the upper level line.

RECOMMENDED ENGINE OIL:
Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil.
API service classification: SG or Higher.
JASO T903 standard: MA
Viscosity: SAE 10W-30

Reinstall the filler cap/dipstick.

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

OIL VISCOSITIES



See below for engine oil change.

ENGINE OIL & STRAINER SCREEN

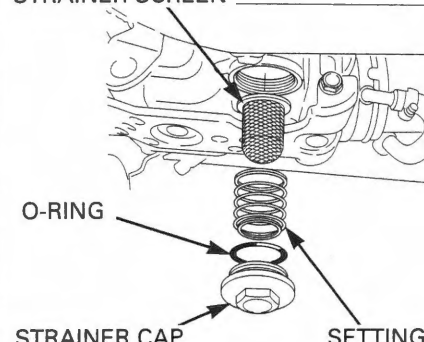
Warm up the engine.

Stop the engine and remove the oil filler cap/dipstick.

Remove the oil strainer cap, O-ring, setting spring and strainer screen.

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

STRAINER SCREEN



O-RING

STRAINER CAP

SETTING SPRING

MAINTENANCE

Clean the oil strainer screen.

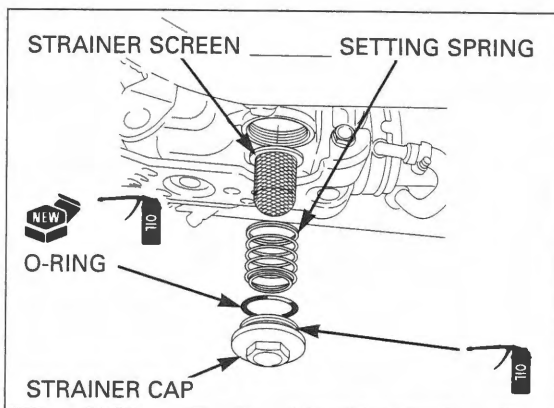
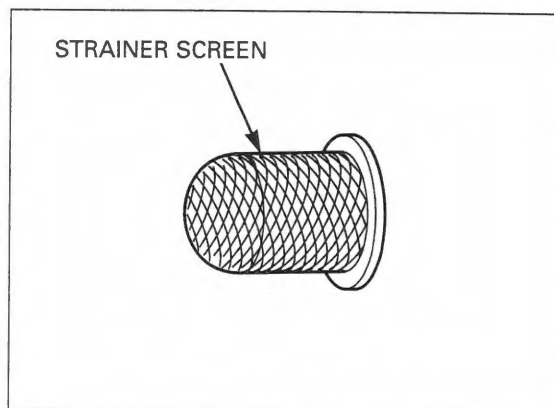
⚠ CAUTION

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.

After draining the oil completely, install the strainer screen and setting spring into the engine.

Apply clean engine oil to the strainer cap threads, flange surface and a new O-ring. Install and tighten the strainer cap with a new O-ring.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

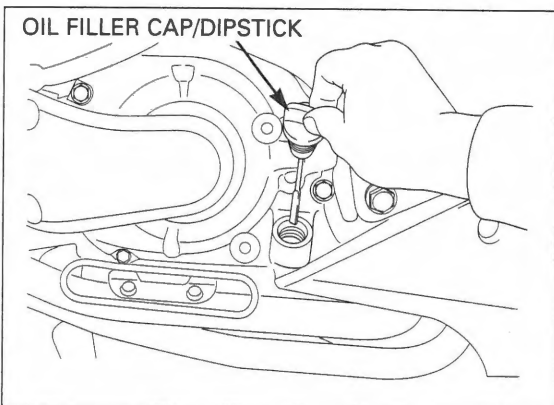


Fill the crankcase with the recommended engine oil.

OIL CAPACITY:

- 2.0 liter (2.1 US qt, 1.8 Imp qt)
at draining
- 2.2 liter (2.3 US qt, 1.9 Imp qt)
at oil filter change

Install the oil filler cap/dipstick.
Check the engine oil level (page 3-11).
Make sure there are no oil leaks.



ENGINE OIL FILTER

REPLACEMENT

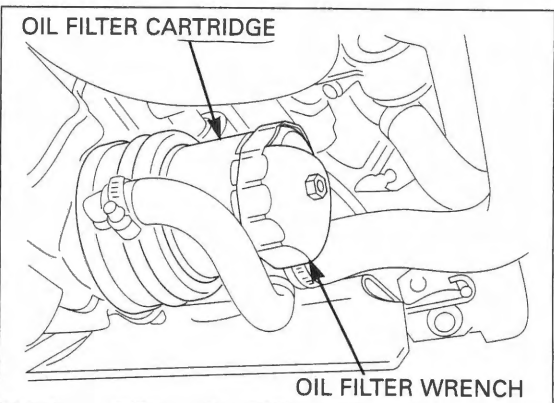
Drain the engine oil (page 3-11).

Remove and discard the oil filter cartridge using the special tool.

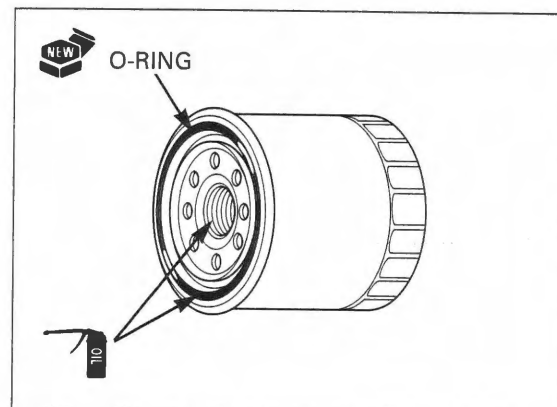
TOOL:

Oil filter wrench

07HAA-PJ70100



Apply clean engine oil to the new oil filter cartridge threads, flange surface and a new O-ring.



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

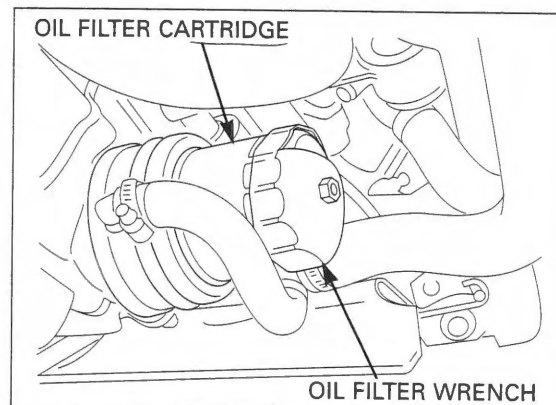
TOOL:

Oil filter wrench

07HAA-PJ70100

TORQUE: 26 N•m (2.7 kgf•m, 20 lbf•ft)

Refill the engine oil (page 3-12).



ENGINE IDLE SPEED

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

Warm up the engine.

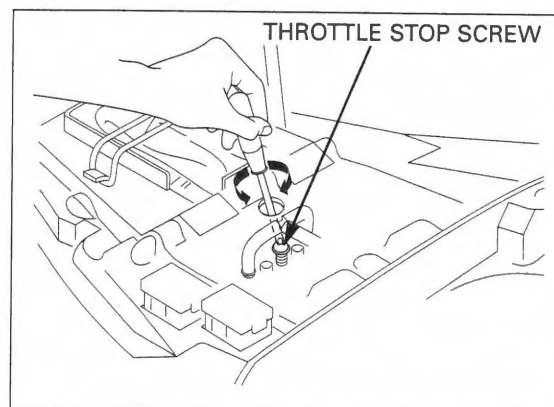
Place the scooter on its centerstand.

Unlock the seat with the ignition key.

Open the seat.

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

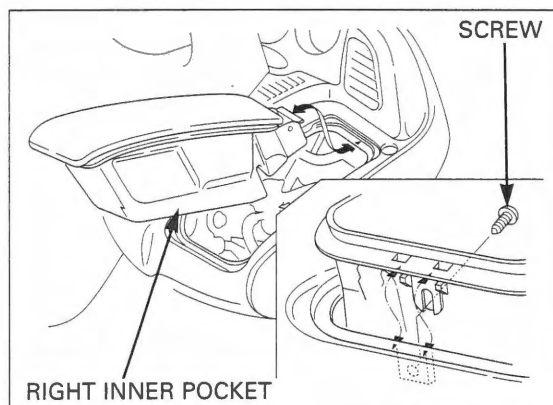
IDLE SPEED: 1,300 ± 100 min⁻¹ (rpm)



RADIATOR COOLANT

Place the scooter on its centerstand.

Remove the screw and right inner pocket.

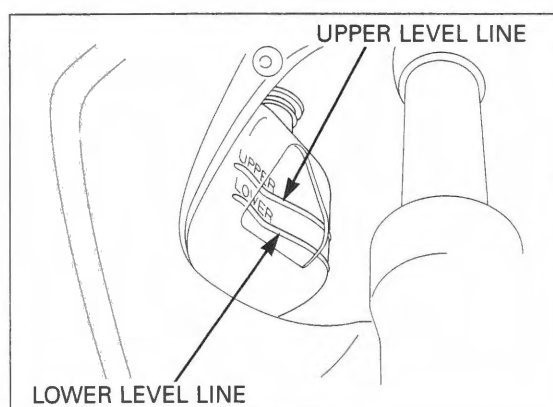


Check the coolant level in the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines with the scooter upright on a level surface.

If the level is low, remove the reserve tank cap and fill the tank to the "UPPER" level line with 1:1 mixture of distilled water and antifreeze (coolant mixture preparation: page 6-4).

NOTICE

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

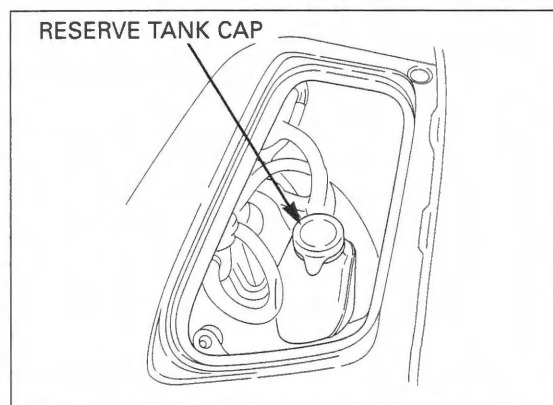


Check to see if there are any coolant leaks when the coolant level decrease very rapidly.

If reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.

Be sure to remove all air from the cooling system (page 6-5).

Reinstall the filler cap.



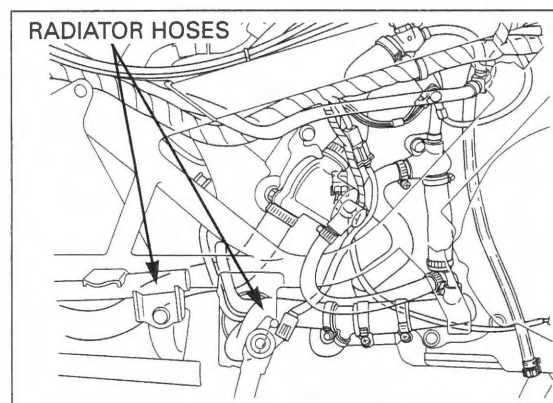
COOLING SYSTEM

Remove the floorstep (page 2-20).

Check for any coolant leakage from the water pump, radiator hoses and hose joints.

Check the radiator hoses for cracks or deterioration and replace if necessary.

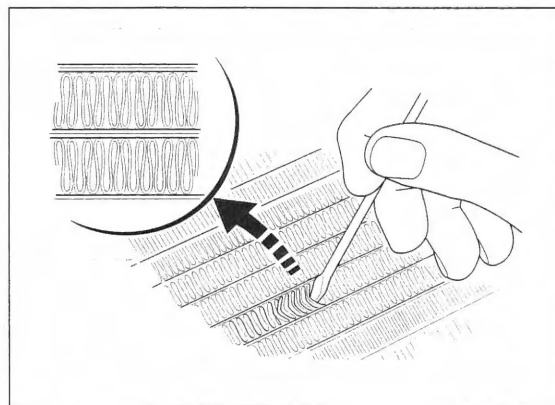
Check that all hose clamps are tight.



Remove the front lower cover (page 2-20).

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

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



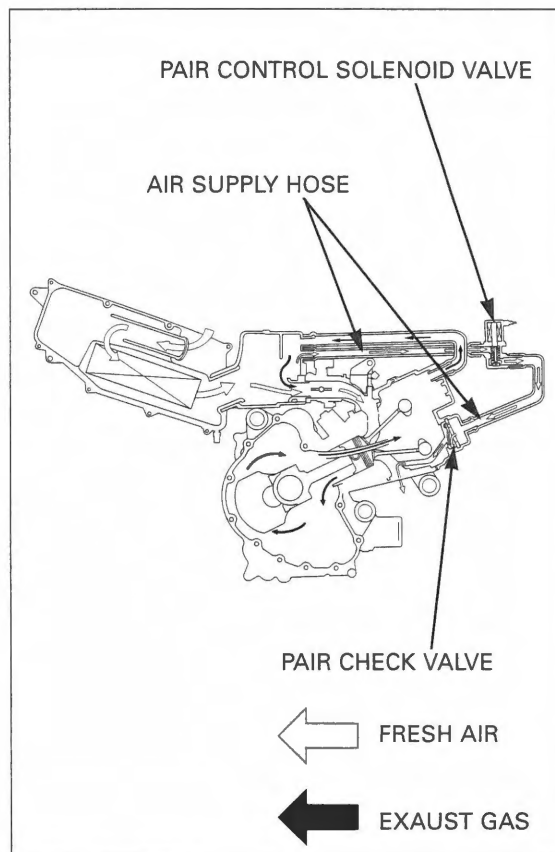
SECONDARY AIR SUPPLY SYSTEM

- This model is equipped with a built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

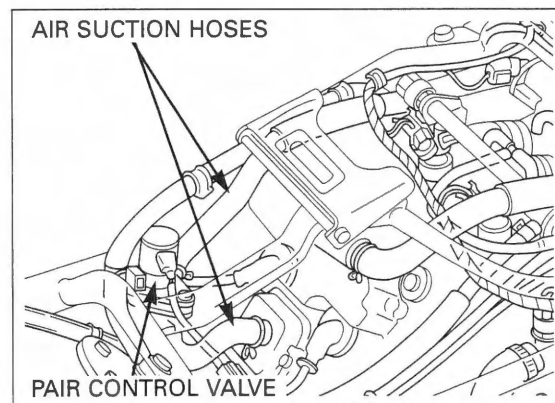
Remove the air cleaner housing (page 5-89).

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

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



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

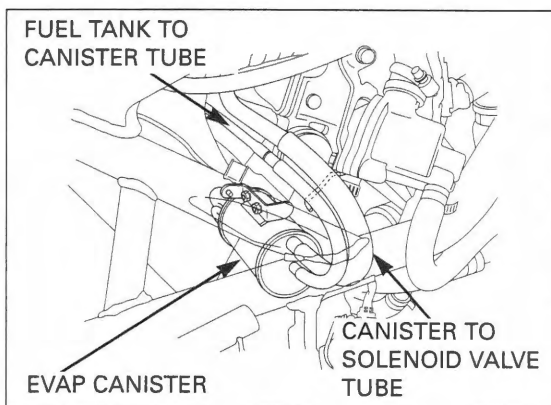
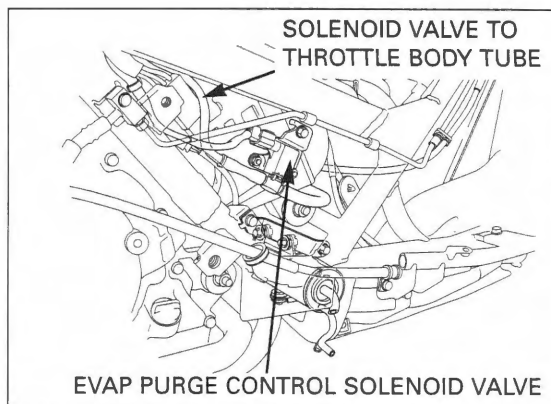


EVAPORATIVE EMISSION CONTROL SYSTEM

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

Check the tubes between the fuel tank, EVAP canister, EVAP purge control valve and throttle body for deterioration, damage or loose connections. Also check that the tubes are not kinked or pinched.

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-37) for tube connections and routing.



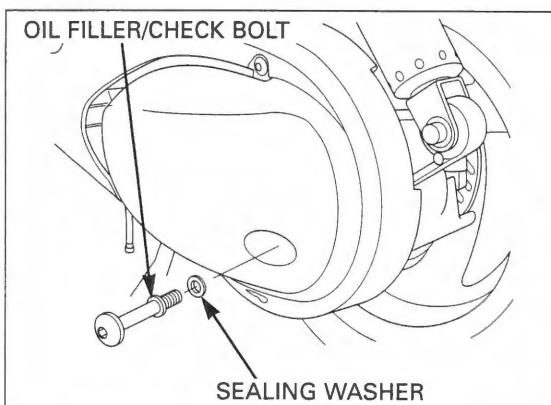
FINAL DRIVE OIL

LEVEL CHECK

Place the scooter on its centerstand.

Start the engine and let it idle for a few minutes. Remove the final drive oil filler/check bolt and check whether the oil flows out from the filler/check bolt hole. If the level is low (no oil flows out), add the recommended oil as described below.

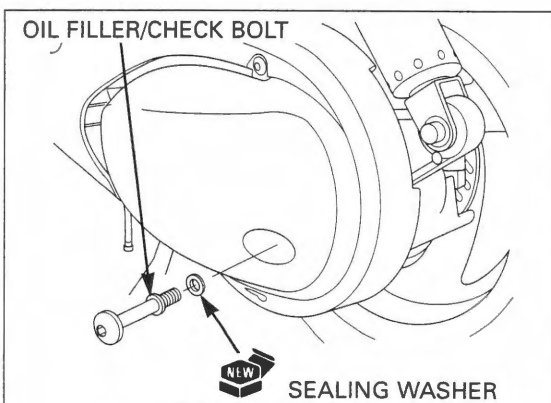
Pour the recommended oil through the oil filler bolt hole until it reaches the lower edge of the oil filler bolt hole.



RECOMMENDED FINAL REDUCTION OIL:
Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil.
API service classification: SG or Higher.
JASO T903 standard: MA
Viscosity: SAE 10W-30

Install the final drive oil filler/check bolt with a new sealing washer and tighten it.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



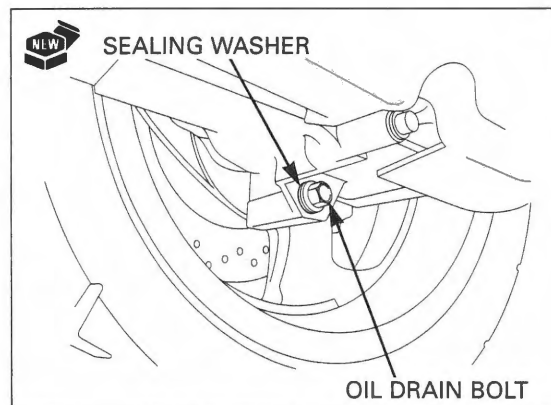
OIL CHANGE

Remove the left rear cover (page 10-3).

Remove the final drive oil drain bolt and the final drive oil filler bolt. Slowly turn the rear wheel and drain the oil. After draining the oil completely, install the oil drain bolt with a new sealing washer and tighten it.

Fill the transmission case with the recommended oil up to correct level (page 3-16).

OIL CAPACITY: 0.32 liter (0.34 US qt, 0.28 Imp qt)
at draining



BRAKE FLUID

NOTICE

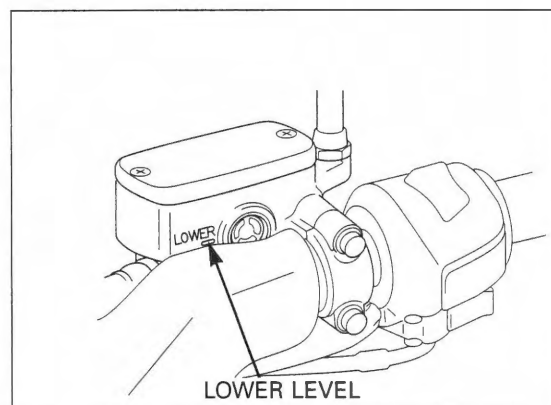
- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

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

FRONT BRAKE

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

If the level is near the lower level line, check brake pad wear (see below).

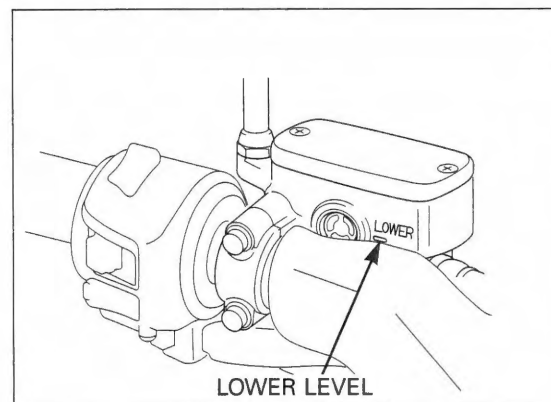


REAR BRAKE

Place the scooter on a level surface and support it in an upright position.

Check the rear brake fluid reservoir level.

If the level is near the lower level line, check brake pad wear (see next page).

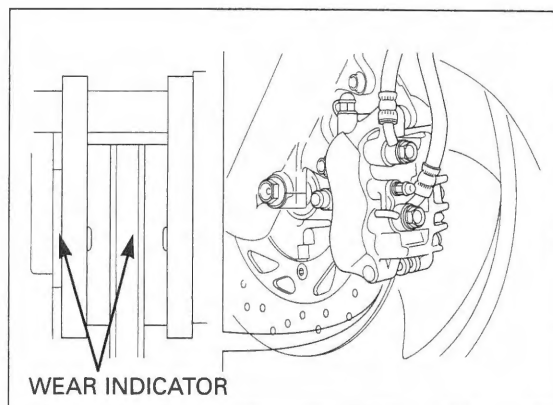


BRAKE PAD WEAR

FRONT BRAKE PADS

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

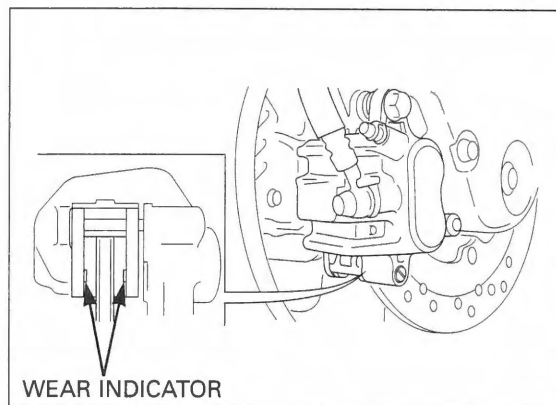
Refer to page 16-9 for brake pad replacement.



REAR BRAKE PADS

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

Refer to page 16-11 for brake pad replacement.



BRAKE SYSTEM

INSPECTION

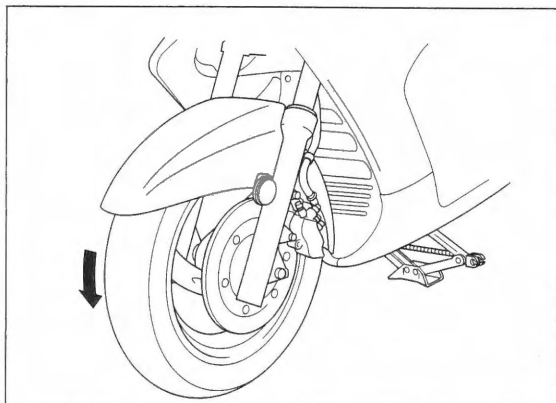
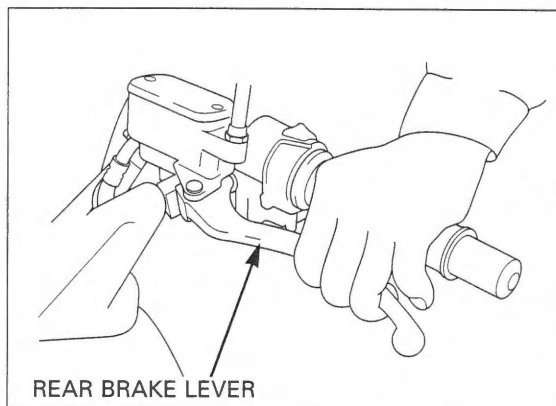
This model is equipped with Combined Brake System.
Check the rear brake operation as follows:

Place the scooter on its centerstand.
Jack-up the scooter to raise the front wheel off the ground.

NOTICE

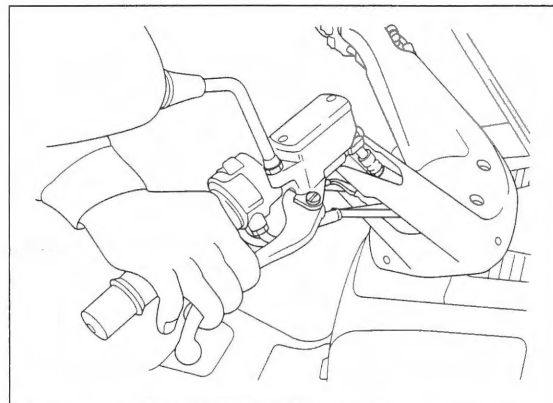
Do not use the oil filter as a jack point.

Operate the rear brake lever.
Make sure the front wheel does not turn while the rear brake lever is operated.



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.

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



BRAKE LOCK OPERATION

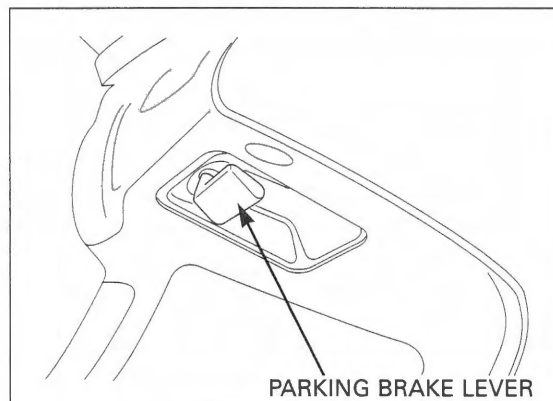
INSPECTION

Release the parking brake pulling the lever this side and move the parking brake lever downward.

Pull up the parking brake lever slowly and check the parking brake lever stroke.

PARKING BRAKE LEVER STROKE: 3 – 6 notches

If out of specification, adjust the parking brake lever (see below).



ADJUSTMENT

Place the scooter on its centerstand.
Release the parking brake lever lock.
Pull up the parking brake lever until 1 notch.

Loosen the lock nut.
Turn the adjust bolt until you feel resistance when turn the rear wheel by your hand.
Hold the adjust bolt and tighten the lock nut.

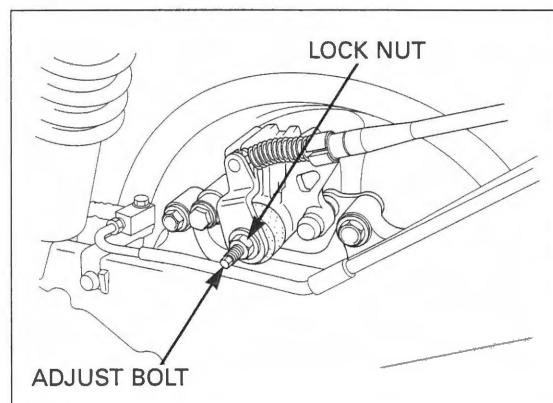
Release the parking brake lever lock.
Make sure the rear wheel turns smoothly.

Pull the parking brake lever slowly and check the lever stroke.

STANDARD: 3 – 6 notches

ALL STROKE: 9 notches

If the lever stroke is out of specification, adjust again.



HEADLIGHT AIM

Place the scooter on a level surface.

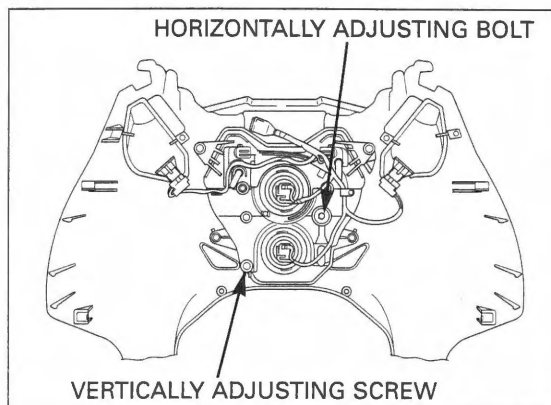
Adjust the headlight beam vertically by turning the vertical beam adjuster.

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

A clockwise rotation moves the beam down and counterclockwise rotation moves the beam up.

Adjust the headlight beam horizontally by turning the horizontal beam adjuster.

A clockwise rotation moves the beam toward the right side of the rider.



SIDESTAND

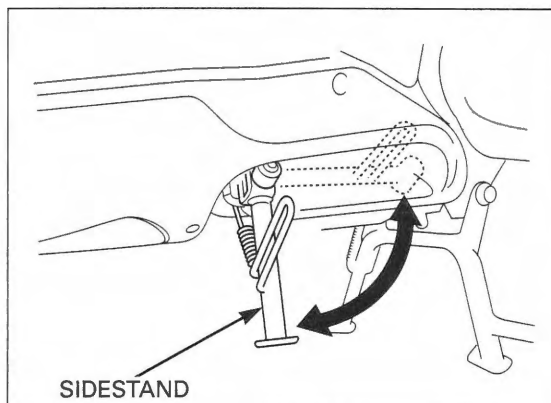
Support the scooter on a level surface.

Check the sidestand spring for fatigue or damage.
Check the sidestand assembly for smooth movement and lubricate the sidestand pivot if necessary.

Check the sidestand ignition cut-off system:

- Start the engine.
- Fully lower the sidestand while running the engine.
- The engine should stop as the sidestand is lowered.

If there is a problem with the system, check the sidestand switch (page 21-20).



SUSPENSION

FRONT SUSPENSION INSPECTION

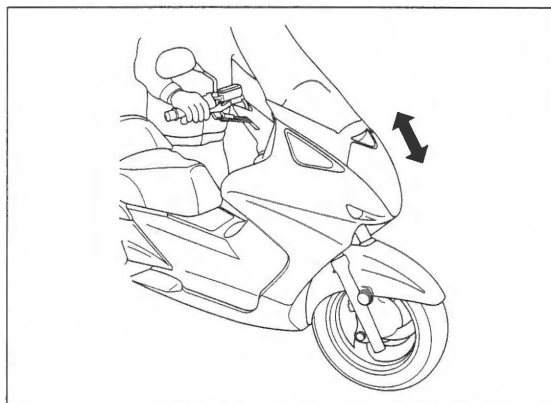
Check the action of the forks by certain operating the front brakes and compressing the front suspension several times.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 14 for fork service.



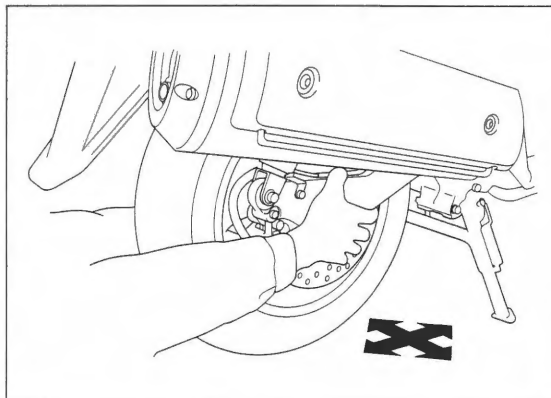
REAR SUSPENSION INSPECTION

Support the scooter and raise the rear wheel off the ground.

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

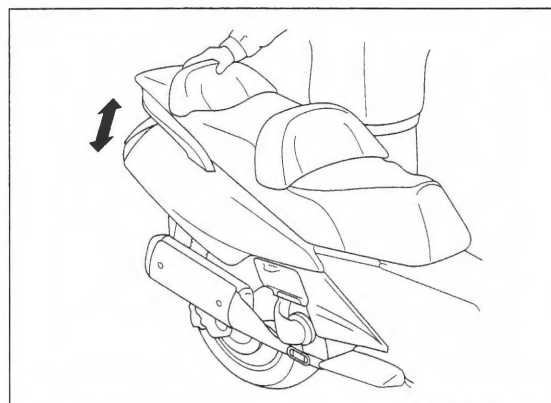
Check for worn swingarm bearings by grabbing the rear swingarm and attempting to move the swingarm side to side.

Replace the bearings if any looseness is noted.



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

Refer to section 15 for shock absorber service.



NUTS, BOLTS, FASTENERS

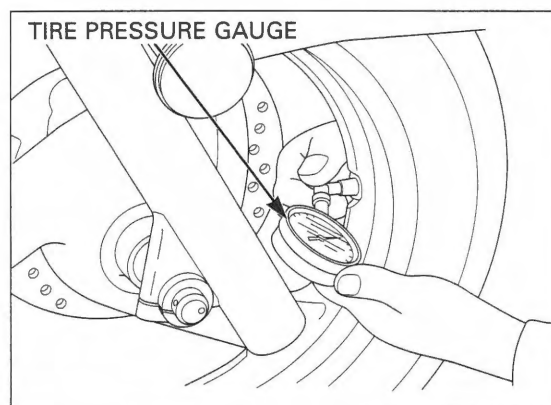
Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-11).
Check that all safety clips, hose clamps and cable stays are in place and properly secured.

WHEELS/TIRES

Tire pressure should be checked when the tires are cold.

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Tire pressure kPa (kgf/cm ² , psi)	Up to 90 kg (200 lb) load	200 (2.00, 29)	225 (2.25, 33)
	Up to maximum weight capacity	200 (2.00, 29)	250 (2.50, 36)
Tire size		120/80-14M/C (58S)	150/70-13M/C (64S)
Tire brand	Bridgestone	HOOP B03	HOOP B02
	IRC	SS530F	SS530R



Check the tires for cuts, embedded nails, or other damage.
Check the front and rear wheels for trueness (refer to section 14 and 15).

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

MINIMUM TREAD DEPTH:

FRONT: 1.5 mm (0.06 in)

REAR: 2.0 mm (0.08 in)



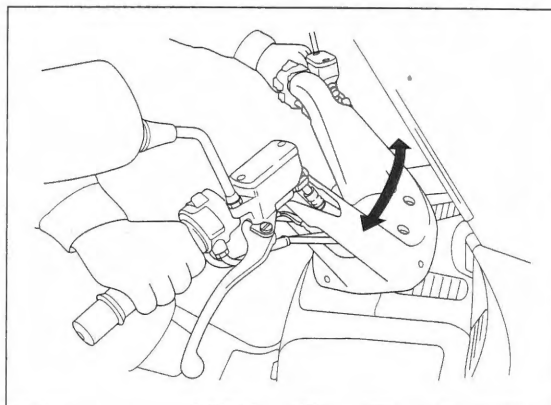
STEERING HEAD BEARINGS

Check that the control cables do not interfere with handlebar rotation.

Support the scooter and raise the front wheel off the ground.

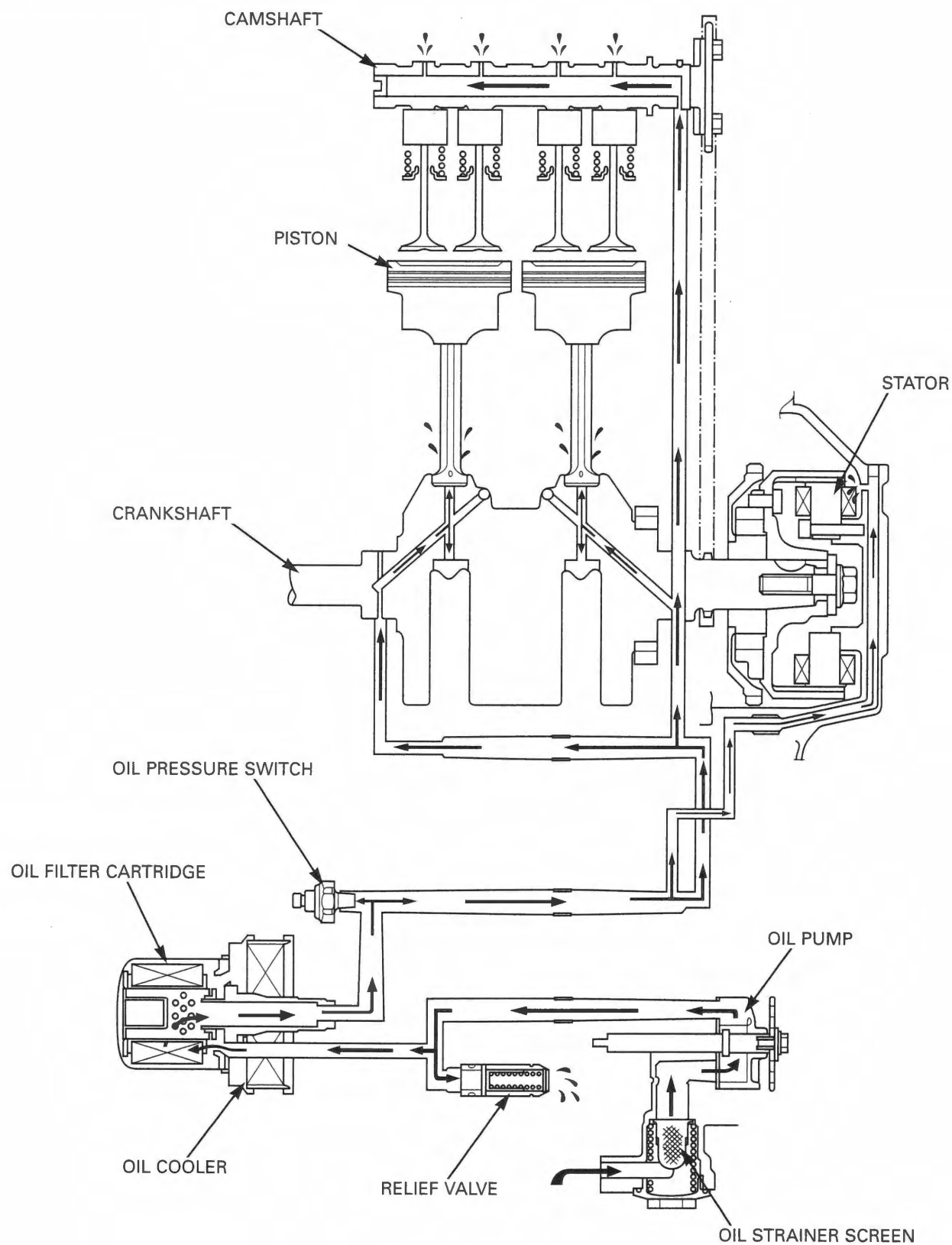
Check that the handlebar moves freely from side to side.

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



MEMO

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

SERVICE INFORMATION	4-1	OIL PRESSURE RELIEF VALVE	4-4
TROUBLESHOOTING	4-2	OIL PUMP	4-5
OIL PRESSURE CHECK	4-3	OIL COOLER	4-9

SERVICE INFORMATION

GENERAL

4

⚠ CAUTION

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in enclosed area.
- 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 engine must be removed from the frame before servicing the oil pressure relief valve. However, the oil pump service may be done with the engine installed in the frame.
- 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 engine has been installed, check that there are no oil leaks and that oil pressure is correct.
- For oil pressure indicator inspection, refer to section 21 of this manual.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.0 liter (2.1 US qt, 1.8 Imp qt)	—
	At disassembly	2.6 liter (2.7 US qt, 2.3 Imp qt)	—
	At oil filter change	2.2 liter (2.3 US qt, 1.9 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 T903 standard : MA Viscosity : SAE10W-30	—
Oil pressure at oil pressure switch		530 kPa (5.4 kgf/cm ² , 77 psi) at 5,500 min ⁻¹ (rpm) (80 °C/176 °F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.12 – 0.22 (0.005 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

LUBRICATION SYSTEM

TORQUE VALUES

Oil pump screw	3 N•m (0.3 kgf•m, 2.2 lbf•ft)	
Oil pump drive sprocket bolt	49 N•m (5.0 kgf•m, 36 lbf•ft)	Apply oil to the threads and seating surface.
Oil pump driven sprocket bolt	15 N•m (1.5 kgf•m, 11 lbf•ft)	Apply a locking agent to the threads.
Oil cooler bolt	64 N•m (6.5 kgf•m, 47 lbf•ft)	Apply oil to the threads and seating surface.
Oil pressure switch	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply sealant to the threads.
Oil strainer screen cap	15 N•m (1.5 kgf•m, 11 lbf•ft)	Apply oil to the threads and seating surface.
Oil filter cartridge	26 N•m (2.7 kgf•m, 20 lbf•ft)	Apply oil to the threads and seating surface.

TOOLS

Oil filter wrench	07HAA-PJ70100	
Oil pressure gauge	07506-3000000	Commercially available in U.S.A.
Oil pressure gauge attachment	07510-4220100	

TROUBLESHOOTING

Oil level low

- Oil consumption
- External oil leak
- Worn piston ring or incorrect piston ring installation
- Worn valve guide or seal

Oil contamination (White appearance)

- From coolant mixing with oil
 - Faulty water pump mechanical seal
 - Faulty head gasket
 - Water leak in crankcase

No oil pressure

- Oil level too low
- Oil pump drive chain or drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure

- Pressure relief valve stuck open
- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level too low

High oil pressure

- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Incorrect oil being used

Seized engine

- No or low oil pressure
- Clogged oil orifice/passage
- Internal oil leak
- Non-recommended oil used

Oil contamination

- Deteriorated oil
- Faulty oil filter
- Worn piston ring (White appearance with water or moisture)
 - Damaged water pump mechanical seal
 - Damaged head gasket
 - Oil relief not frequent enough

Oil pressure warning indicator does not work

- Faulty oil pressure switch
- Short circuit in the indicator wire
- Low or no oil pressure

OIL PRESSURE CHECK

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

Warm up the engine.
Stop the engine.

Remove the screw cover and screw.
Disconnect the oil pressure switch cord.

Remove the oil pressure switch.
Connect the oil pressure gauge attachment and gauge to the pressure switch hole.

TOOLS:

Oil pressure gauge

07506-3000000
(Commercially
available in U.S.A.)

Oil pressure gauge attachment

07510-4220100
(Commercially
available in U.S.A.)

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

Start the engine and check the oil pressure at 5,500 min^{-1} (rpm).

**OIL PRESSURE: 530 kPa (5.4 kgf/cm², 77 psi) at
5,500 min^{-1} (rpm) (80 °C/176 °F)**

Stop the engine and remove the oil pressure gauge attachment and gauge from the pressure switch hole.

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

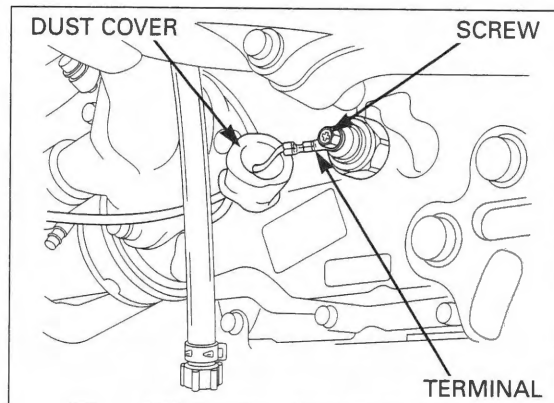
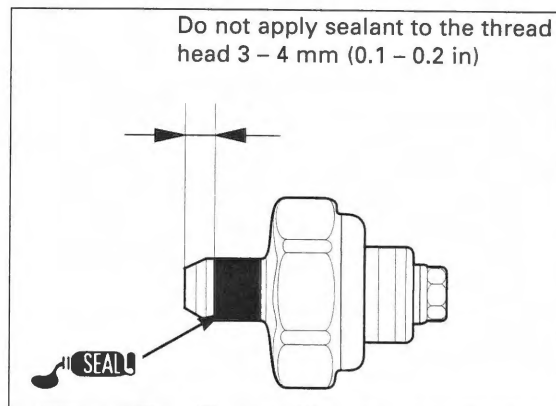
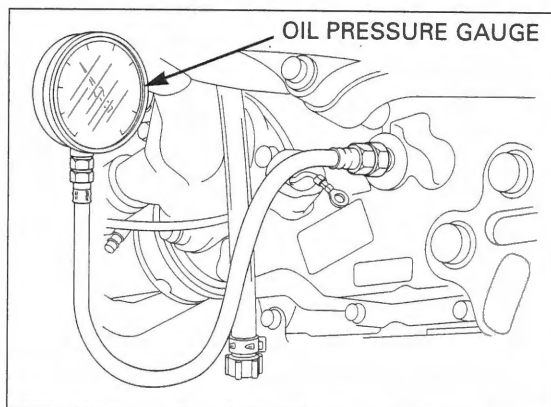
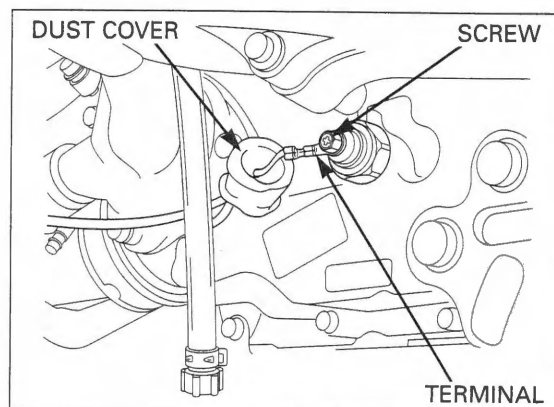
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Route the oil pressure switch cord correctly (page 1-26).

Connect the oil pressure switch cord and tighten the screw.

Start the engine.

Check the oil pressure indicator goes out after one or two seconds. If the oil pressure indicator stay on, stop the engine immediately and determine the cause (page 21-17).

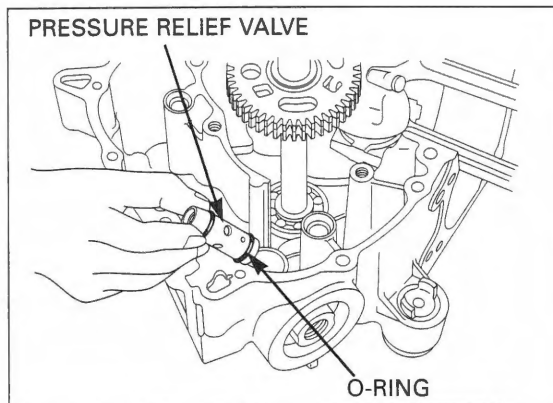


OIL PRESSURE RELIEF VALVE

REMOVAL

Separate the crankcase (page 13-2).

Remove the pressure relief valve and O-ring from the left crankcase.



INSPECTION

- Be careful not to loose the disassembled parts.

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

Remove the pressure valve snap ring and disassemble the pressure relief valve.

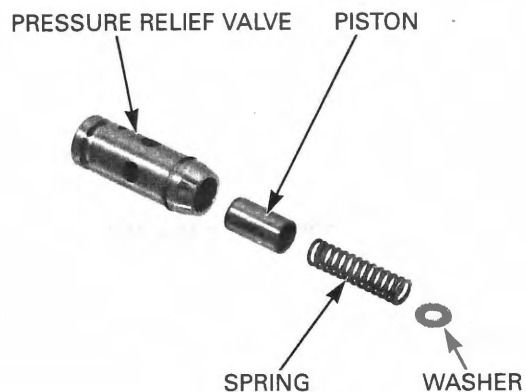
Check the piston for wear, sticking or damage.
Check the valve spring and piston for wear or damage.

Check the relief valve for clogging or damage.

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

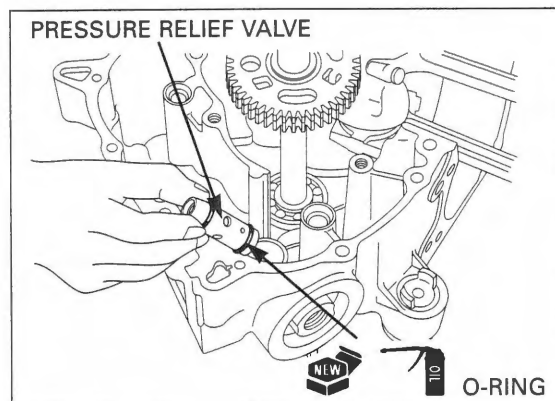
The snap ring is under spring pressure. Use care when removing it and wear eye and face protection.

SNAP RING



INSTALLATION

Apply oil to a new O-ring and install in the pressure relief valve groove, and install the relief valve to the left crankcase.



OIL PUMP

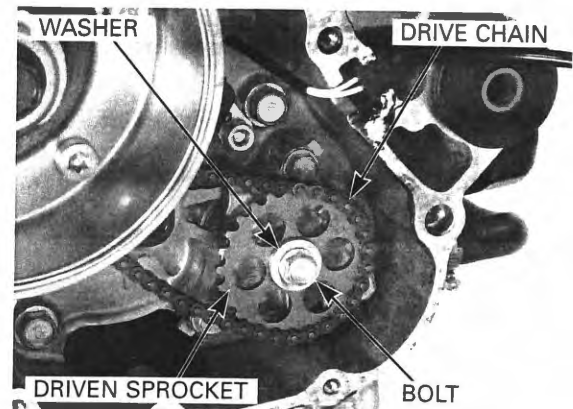
REMOVAL

Remove the right crankcase cover (page 12-2).

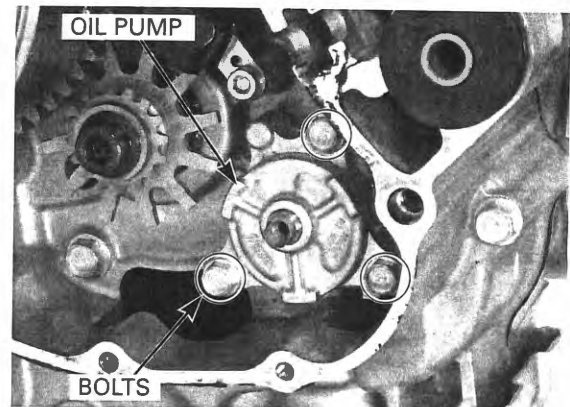
When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.

Remove the bolt and washer.

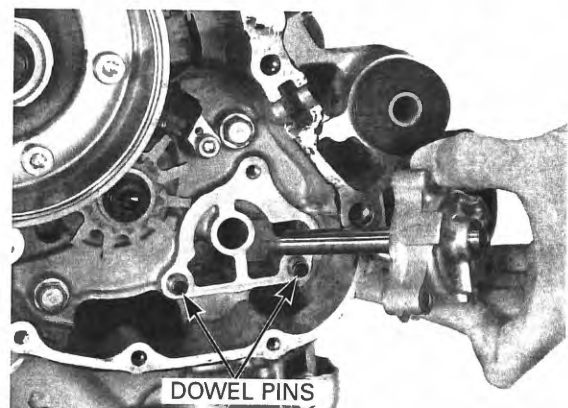
Remove the oil pump driven sprocket and drive chain.



Remove the bolts and oil pump from the right crankcase.

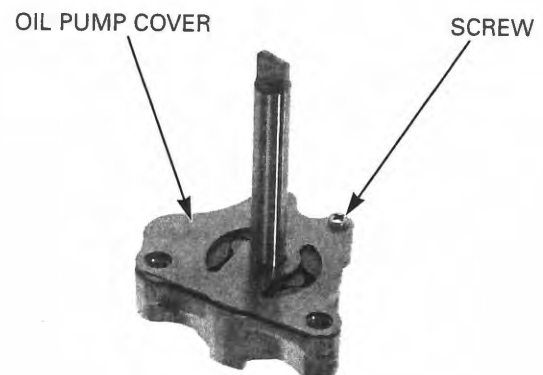


Remove the dowel pin from the right crankcase.



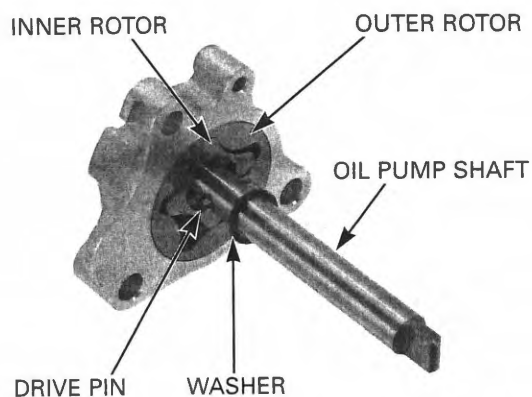
DISASSEMBLY

Remove the screw and oil pump cover.



LUBRICATION SYSTEM

Remove the drive pin, washer, oil pump shaft, oil pump outer rotor and inner rotor.



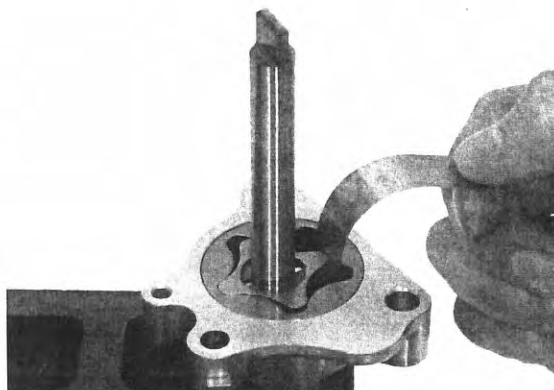
INSPECTION

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

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

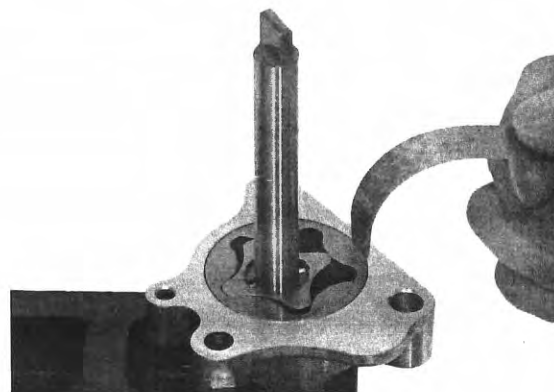
Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



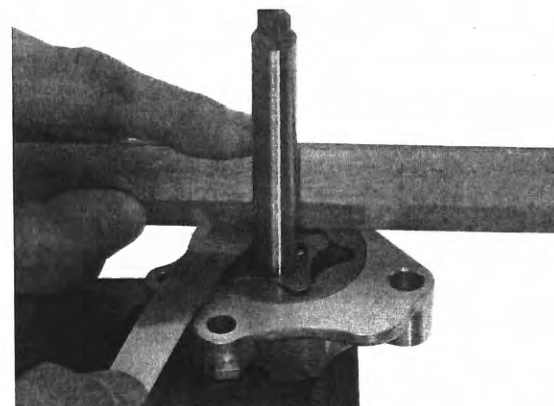
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



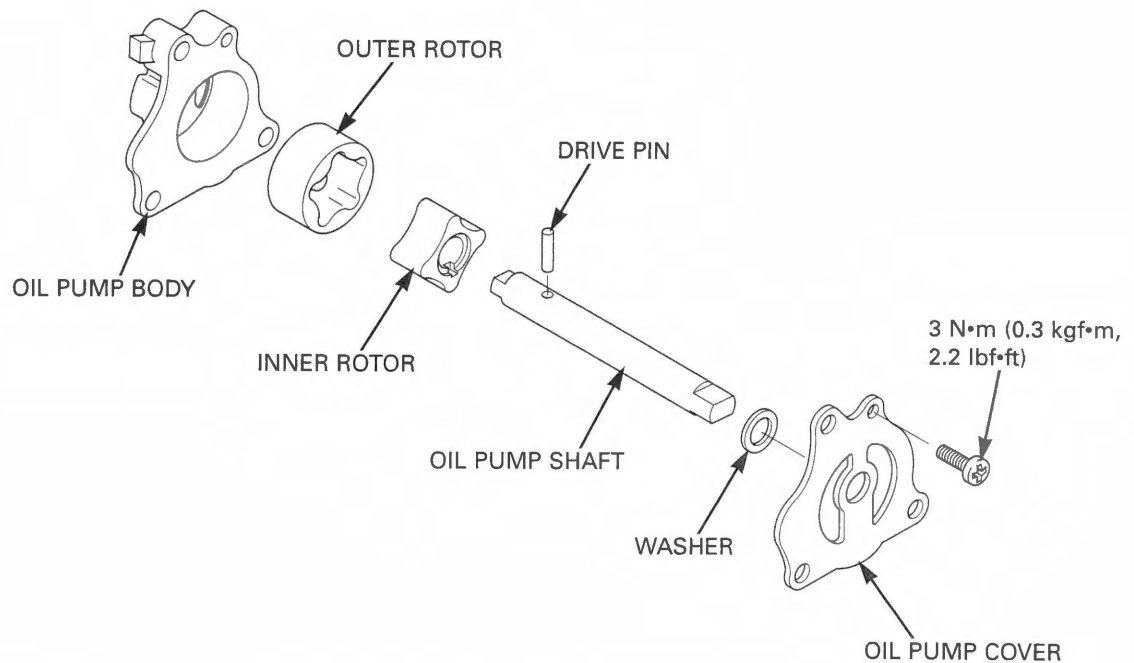
Measure the side clearance with the straight edge and feeler gauge.

SERVICE LIMIT: 0.12 mm (0.005 in)

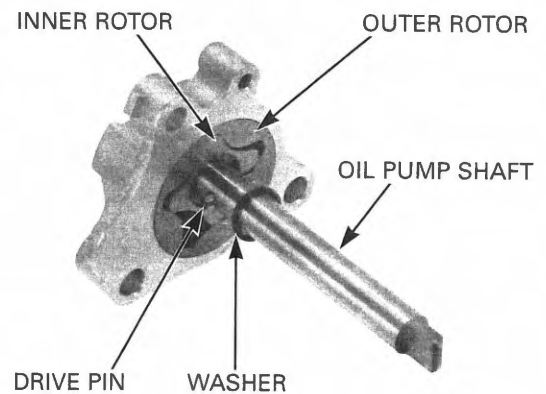


ASSEMBLY

Dip all parts in clean engine oil.

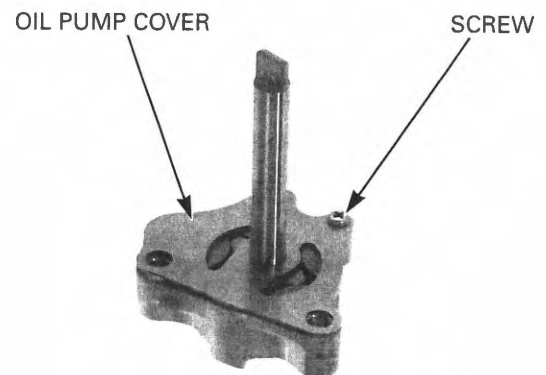


Install the outer rotor into the oil pump body.
 Install the inner rotor with the slot side facing the pump cover.
 Install the oil pump shaft and drive pin by aligning the slots in the inner rotor.
 Place the washer into the inner rotor groove.



Install the oil pump cover onto the oil pump body.
 Install and tighten the oil pump cover screw to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

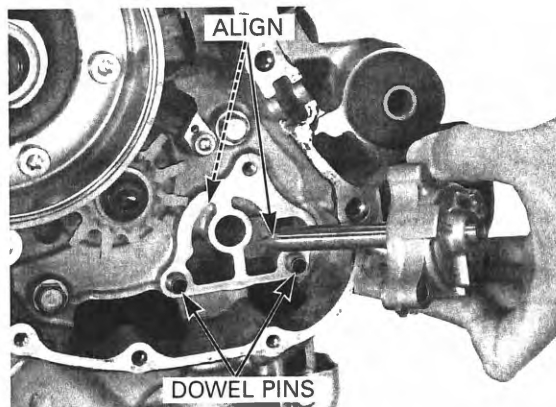


LUBRICATION SYSTEM

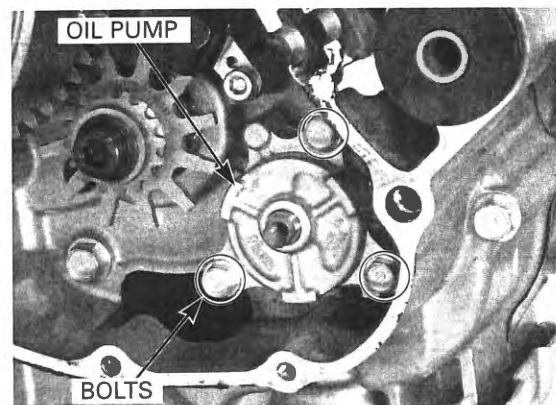
INSTALLATION

Install the dowel pin to the right crankcase cover.

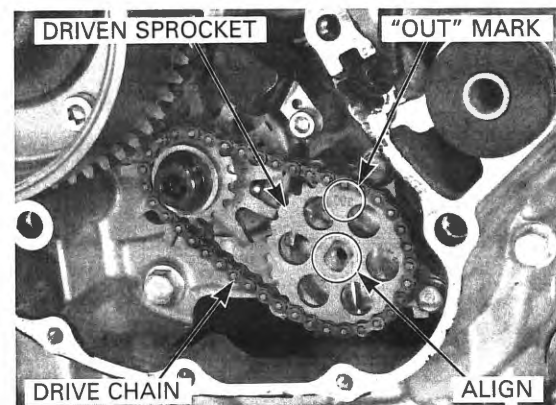
Install the oil pump while rotating the pump shaft to seat the lug into the groove in the water pump shaft.



Align the bolt holes in the oil pump and right crankcase.
Install and tighten the mounting bolts securely.



Install the oil pump driven sprocket and drive chain with the "OUT" mark facing out and aligning the flat surfaces of the sprocket and pump shaft.

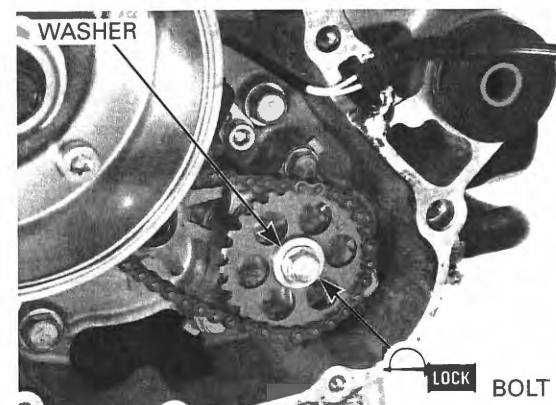


Apply a locking agent to the oil pump driven sprocket bolt threads.
Install and tighten the driven sprocket bolt to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the right crankcase cover (page 12-3).

After installation, fill the crankcase with recommended engine oil and check that there are no oil leaks.



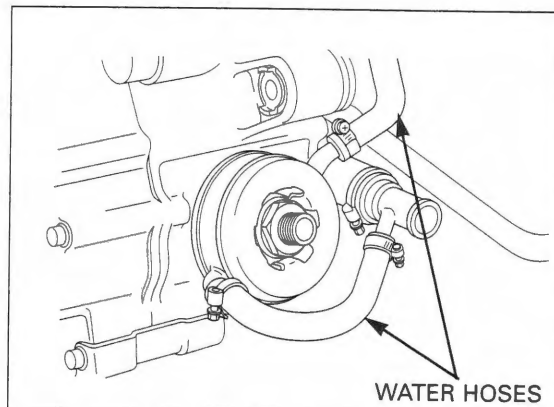
OIL COOLER

REMOVAL

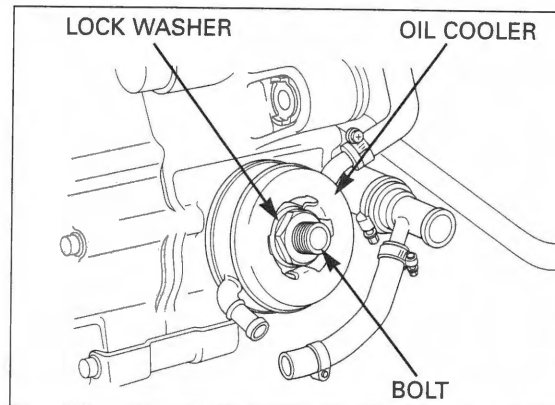
Drain the engine oil and remove the oil filter cartridge (page 3-11, 12).

Drain the coolant from the system (page 6-5).

Loosen the hose bands and disconnect the oil cooler water hoses from the cooler.



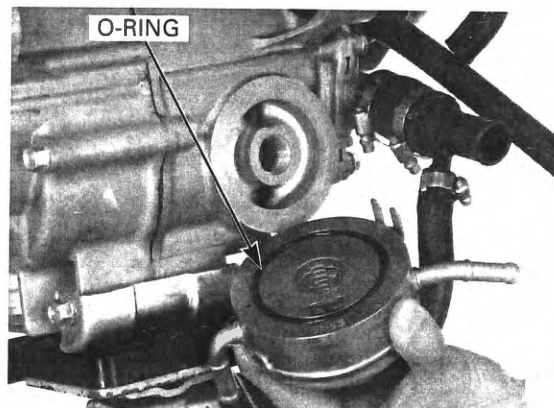
Remove the oil cooler mounting bolt, lock washer and oil cooler.



Remove the O-ring.

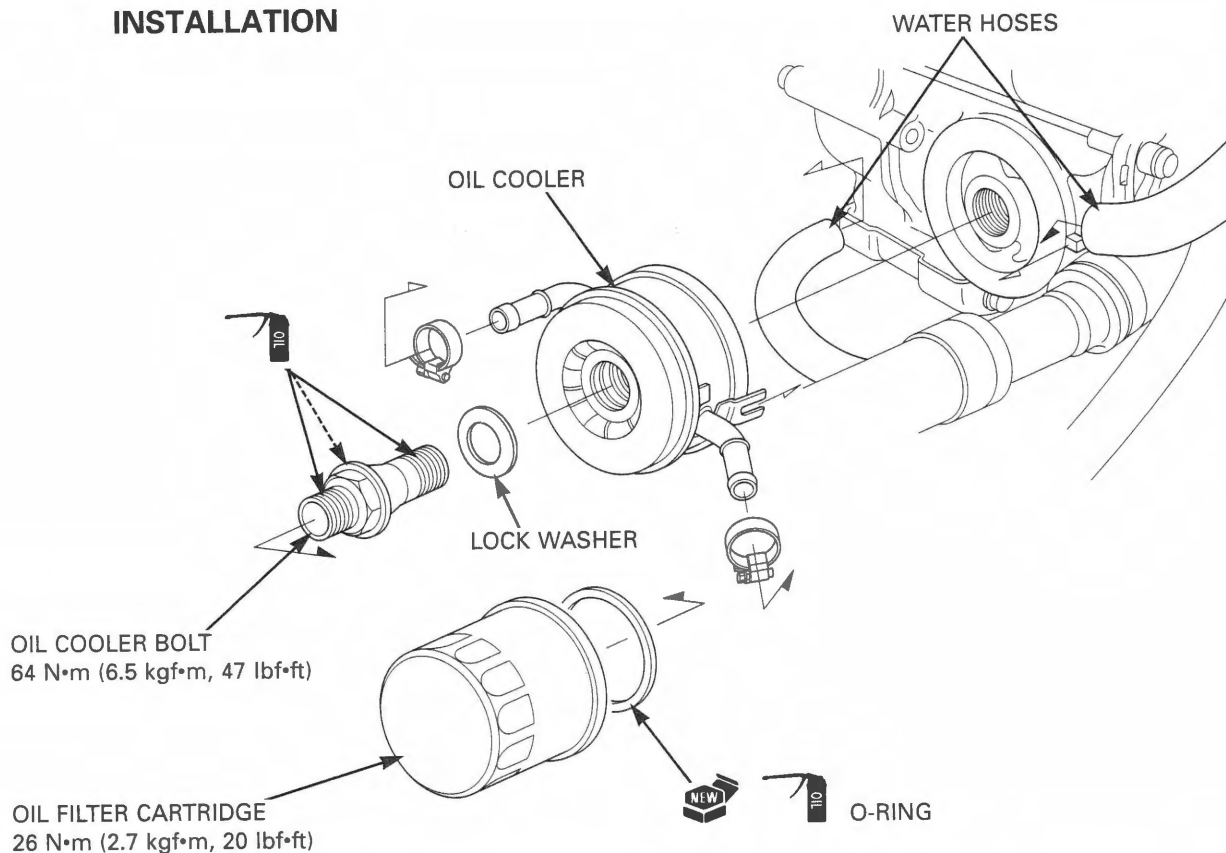
INSPECTION

Check the oil cooler for damage.



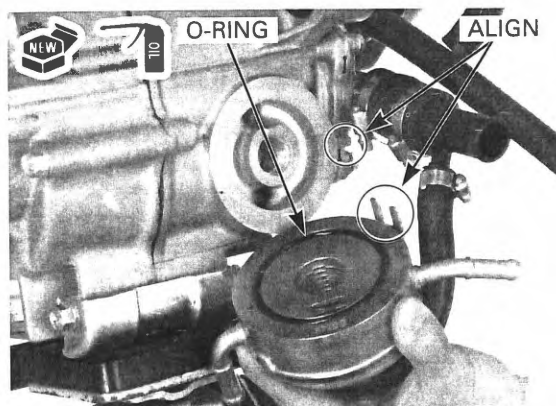
LUBRICATION SYSTEM

INSTALLATION



Coat a new O-ring with engine oil and install it into the oil cooler groove.

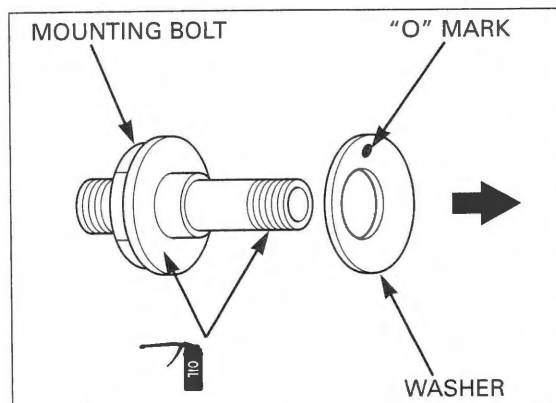
Install the oil cooler aligning its guide groove with the lug on the crankcase.



Apply oil to the oil cooler mounting bolt threads and seating surface.

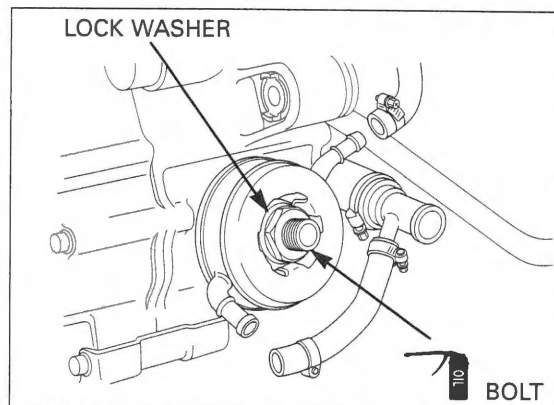
Install the lock washer and oil cooler bolt.

Install the lock washer with its concave side ("O" mark) facing the oil cooler.



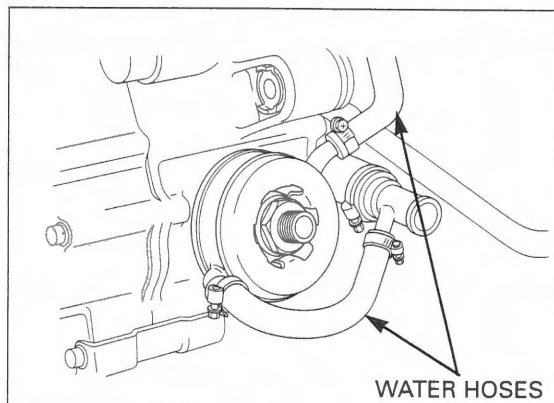
Tighten the oil cooler mounting bolt to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

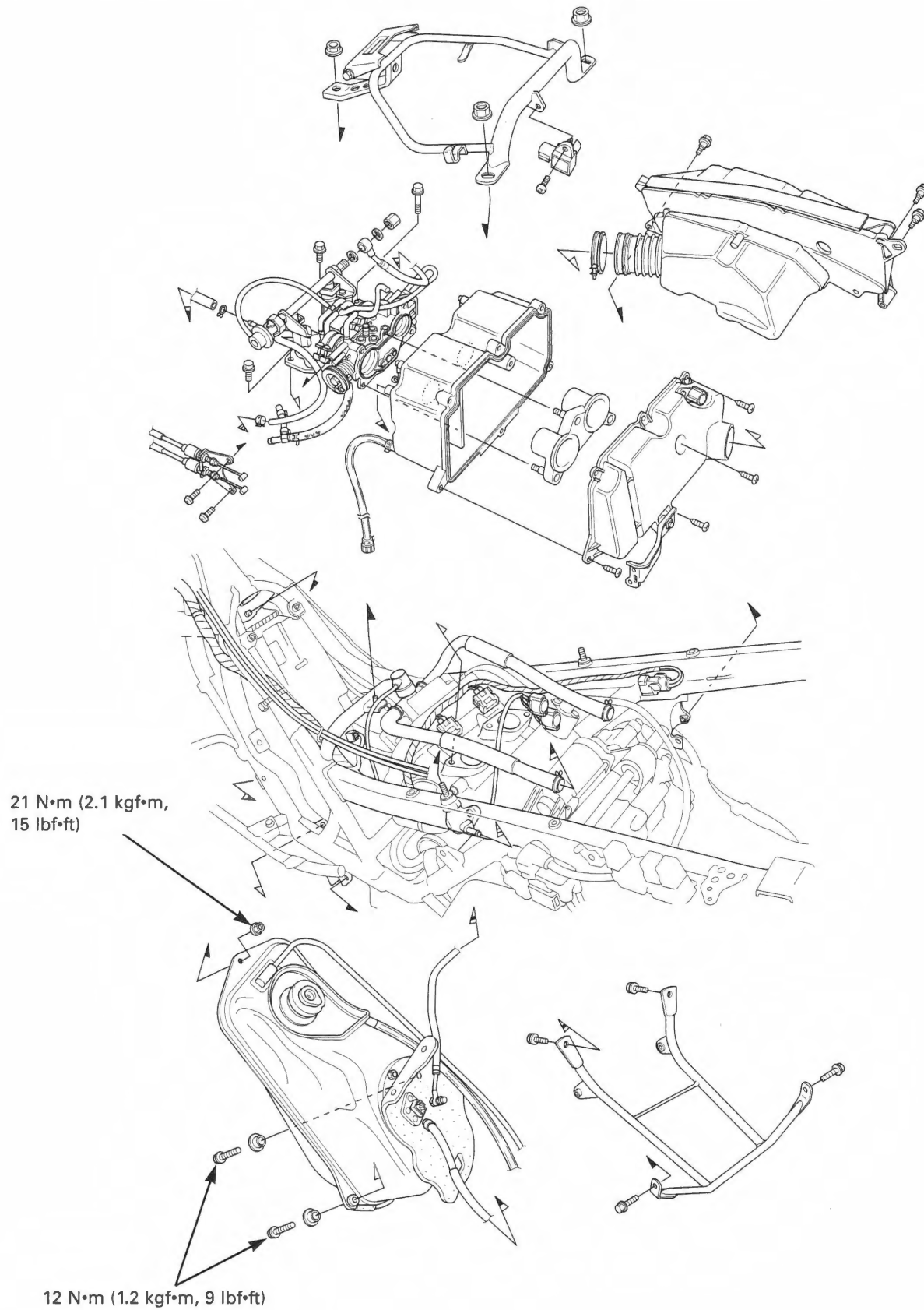


Connect the oil cooler water hoses and tighten the hose bands securely.

Install the oil filter cartridge and fill the crankcase with the recommended engine oil (page 3-11).
Fill the cooling system and bleed the air (page 6-5).



FUEL SYSTEM (Programmed Fuel Injection)



5. FUEL SYSTEM (Programmed Fuel Injection)

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AIR CLEANER HOUSING	5-89		

SERVICE INFORMATION

GENERAL

- This section covers service of the fuel system.
- These services can be done with the engine installed in the frame.
- Be sure to relieve the fuel pressure with the engine off.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

FUEL SYSTEM (Programmed Fuel Injection)

- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from fully open to fully close after the throttle cable has been removed; it may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel rail on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel hose and return hose. Clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.
- Do not push the fuel pump base under the fuel tank when the fuel tank is stored.
- Always replace the packing when the fuel pump is removed.
- The programmed fuel injection system is equipped with the Self-Diagnostic System described on page 5-8, 12. If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting procedure (page 5-16, 44, 60).
- The PGM-FI system is provided with 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 secured by making use of the numerical values of a situation preset in advance in the simulated program map. It must be remembered, however, that when any abnormality is detected in four injectors and/or the Crankshaft Position (CKP) and Camshaft Position (CMP) sensor the fail safe function stops the engine to avoid engine damage.
- For PGM-FI system location, see page 5-4 ('02 – '07), page 5-6 (After '07).
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- For fuel unit inspection, see section 21.
- The vehicle speed sensor sends digital pulse signals to the ECM (PGM-FI unit) for computation. For vehicle speed sensor inspection, see section 21.
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel hoses, release the fuel pressure by loosening the fuel tube banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.
- Use a digital tester for PGM-FI system inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	'02 – '07:	GQ80B
	After '07:	GQ80D
No.1 and No.2 cylinders vacuum difference		20 mm Hg
Base throttle valve for synchronization		No.1
Idle speed		1,300 ± 100 min ⁻¹ (rpm)
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 40°C/88°F)		1.136 kΩ ± 30 %
Engine coolant temperature sensor resistance (at 20°C/68°F)		2 – 3 kΩ
Fuel injector resistance (at 20°C/68°F)		11.1 – 12.3 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		19 – 25 Ω
CMP sensor peak voltage (at 20°C/68°F)		0.7 V minimum
CKP sensor peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle		64.8 kPa (0.66 kgf/cm ² , 9.4 psi)
Fuel pressure at idle		294 kPa (3.0 kgf/cm ² , 43 psi)
Fuel pump flow (at 12 V)		Minimum 60 cm ³ (2.0 US oz, 2.1 Imp oz) for 10 seconds

TORQUE VALUES

Fuel rail mounting bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	See page 5-83 for tightening sequence.
Fast idle wax unit mounting screw	4 N•m (0.4 kgf•m, 2.9 lbf•ft)	
Fuel pump banjo bolt (Fuel tank side)	22 N•m (2.2 kgf•m, 16 lbf•ft)	
Fuel tube sealing nut (Throttle body side)	22 N•m (2.2 kgf•m, 16 lbf•ft)	
Fuel pump mounting nut	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Fuel tank mounting nut	21 N•m (2.1 kgf•m, 15 lbf•ft)	
Fuel tank mounting bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
O ₂ sensor (After '07)	44 N•m (4.5 kgf•m, 33 lbf•ft)	

TOOLS

Fuel pressure gauge	07406-0040002 or 07406-004000B or 07406-004000A (U.S.A. only)
IgnitionMate peak voltage tester or Peak voltage adaptor	MTP07-0286 (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)
ECU test harness	07YMZ-0010100 (two required) or 07WMZ-MBGA000 (U.S.A. only)
ECM test harness 32P	070MZ-0010201
O ₂ sensor wrench	07LAA-PT50101
SCS connector	070PZ-ZY30100

TROUBLESHOOTING

Engine won't start

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Faulty fuel pump
- Clogged fuel filter
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

Engine stall, hard to start, rough idling

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted
- Starter valve synchronization misadjusted

Backfiring or misfiring during acceleration

- Ignition system malfunction

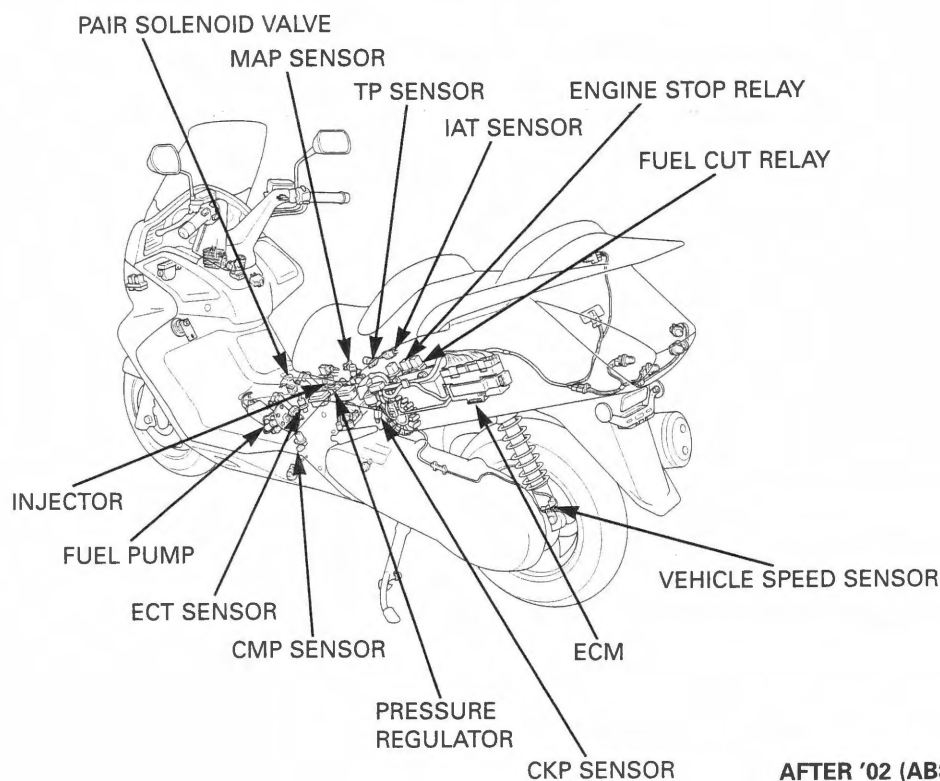
Poor performance (driveability) and poor fuel economy

- Pinched or clogged fuel hose
- Faulty pressure regulator

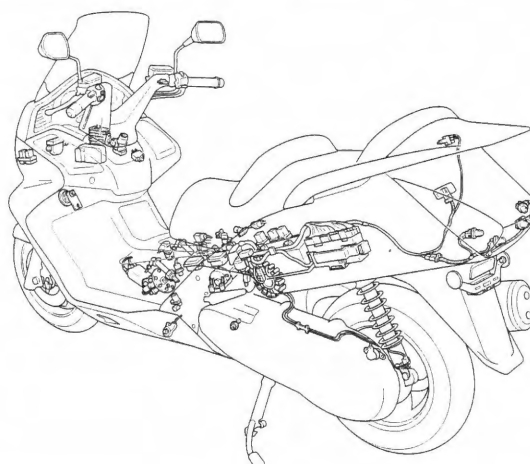
FUEL SYSTEM (Programmed Fuel Injection)

SYSTEM LOCATION ('02 – '07)

STD TYPE:

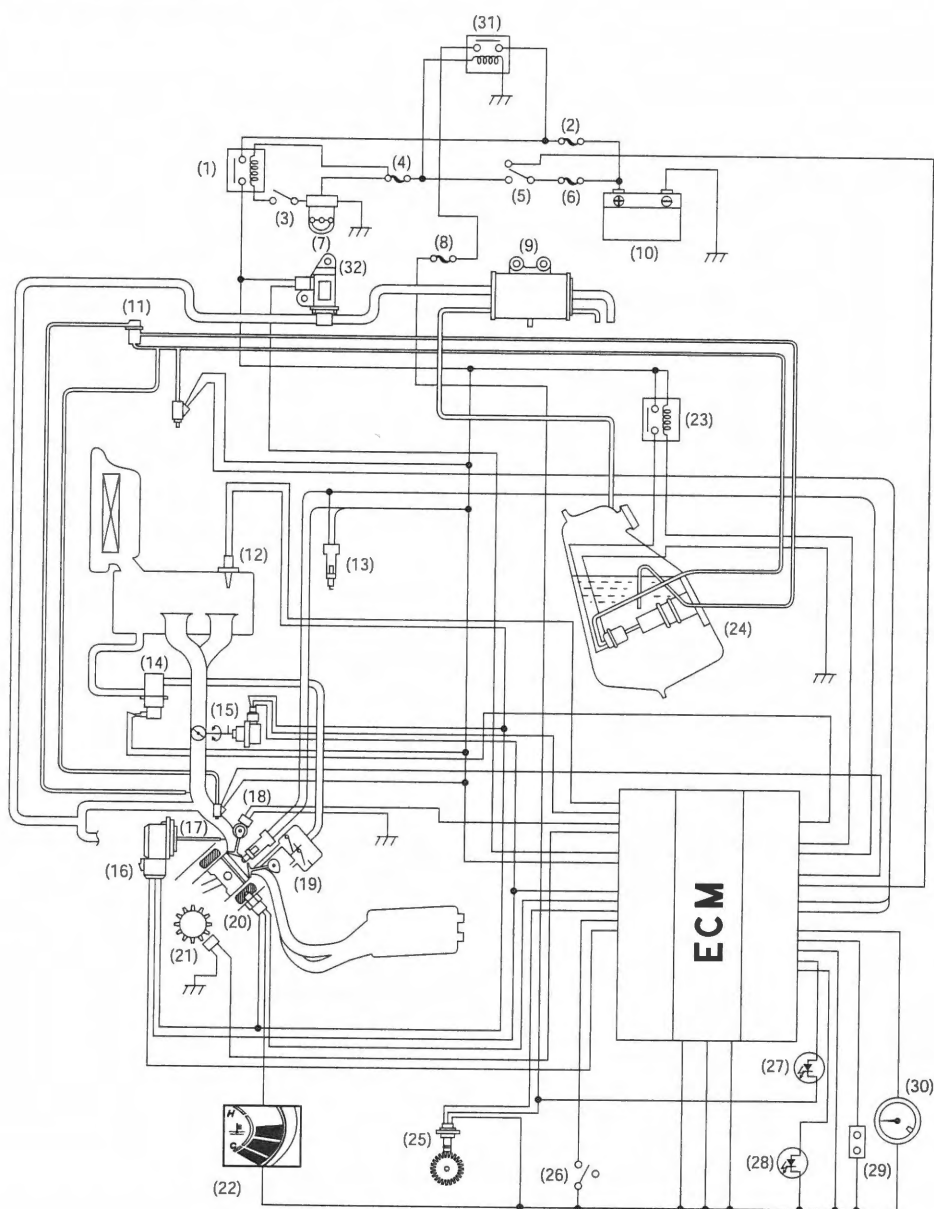


AFTER '02 (ABS TYPE): SHOWN



FULL NAME	ABBREVIATIONS
Manifold absolute pressure sensor	MAP sensor
Throttle position sensor	TP sensor
Intake air temperature sensor	IAT sensor
Engine coolant temperature sensor	ECT sensor
Camshaft position sensor	CMP sensor
Crankshaft position sensor	CKP sensor
Engine control module	ECM

SYSTEM DIAGRAM ('02 - '07)

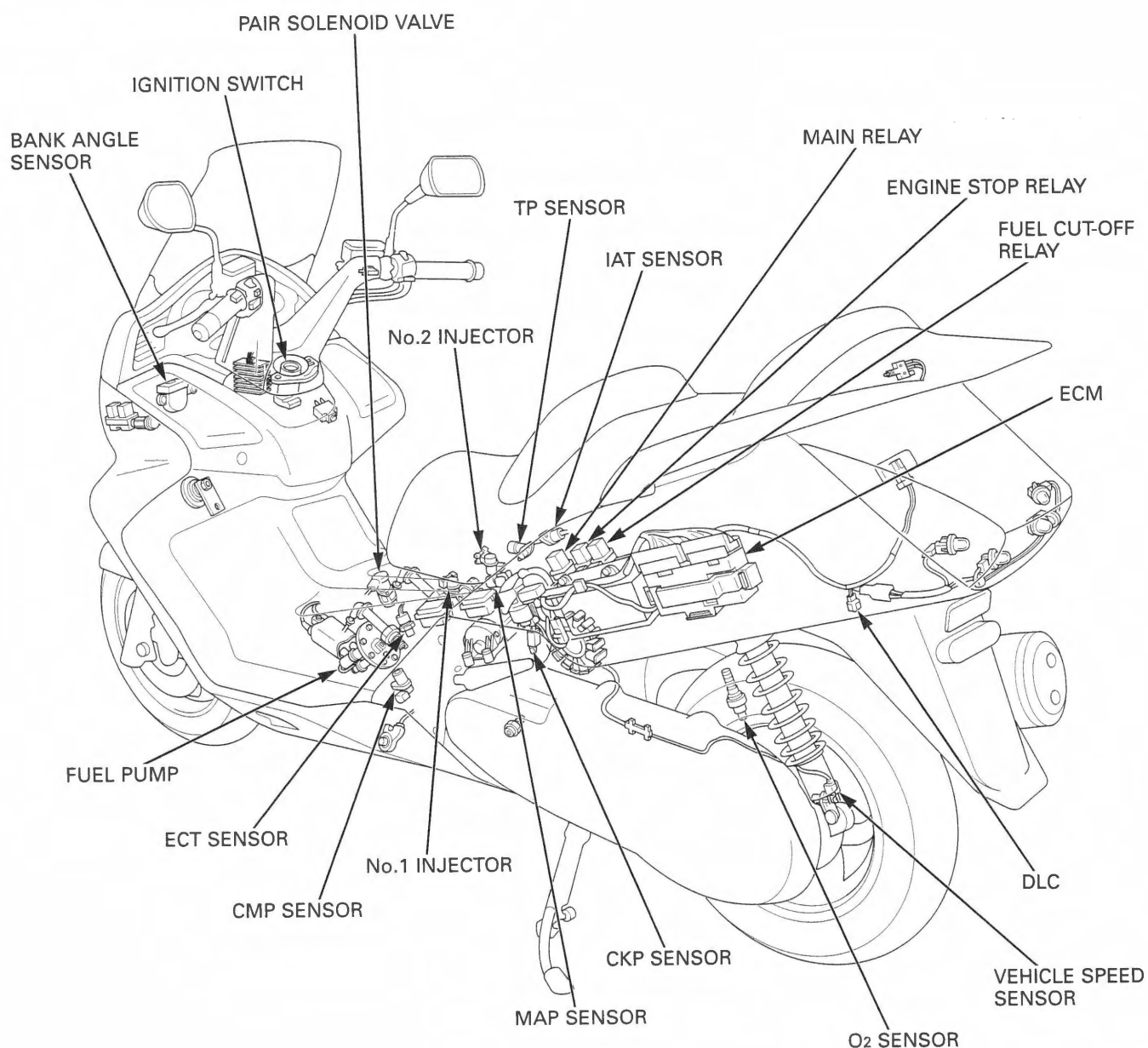


- (1) Engine stop relay
- (2) Main fuse B (30A)
- (3) Engine stop switch
- (4) Sub-fuse (15A)
- (5) Ignition switch
- (6) Main fuse A (30A)
- (7) Bank angle sensor
- (8) Sub-fuse (10A)
- (9) EVAP canister
- (10) Battery
- (11) Pressure regulator
- (12) IAT sensor
- (13) Spark plug
- (14) PAIR solenoid valve
- (15) TP sensor
- (16) MAP sensor

- (17) Injector
- (18) CMP sensor
- (19) PAIR check valve
- (20) ECT sensor
- (21) CKP sensor
- (22) Water temperature LCD
- (23) Fuel cut-off relay
- (24) Fuel pump
- (25) Vehicle speed sensor
- (26) Sidestand switch
- (27) Malfunction indicator lamp (MIL)
- (28) Immobilizer indicator
- (29) Service check connector
- (30) Tachometer
- (31) Main relay
- (32) EVAP purge control solenoid valve

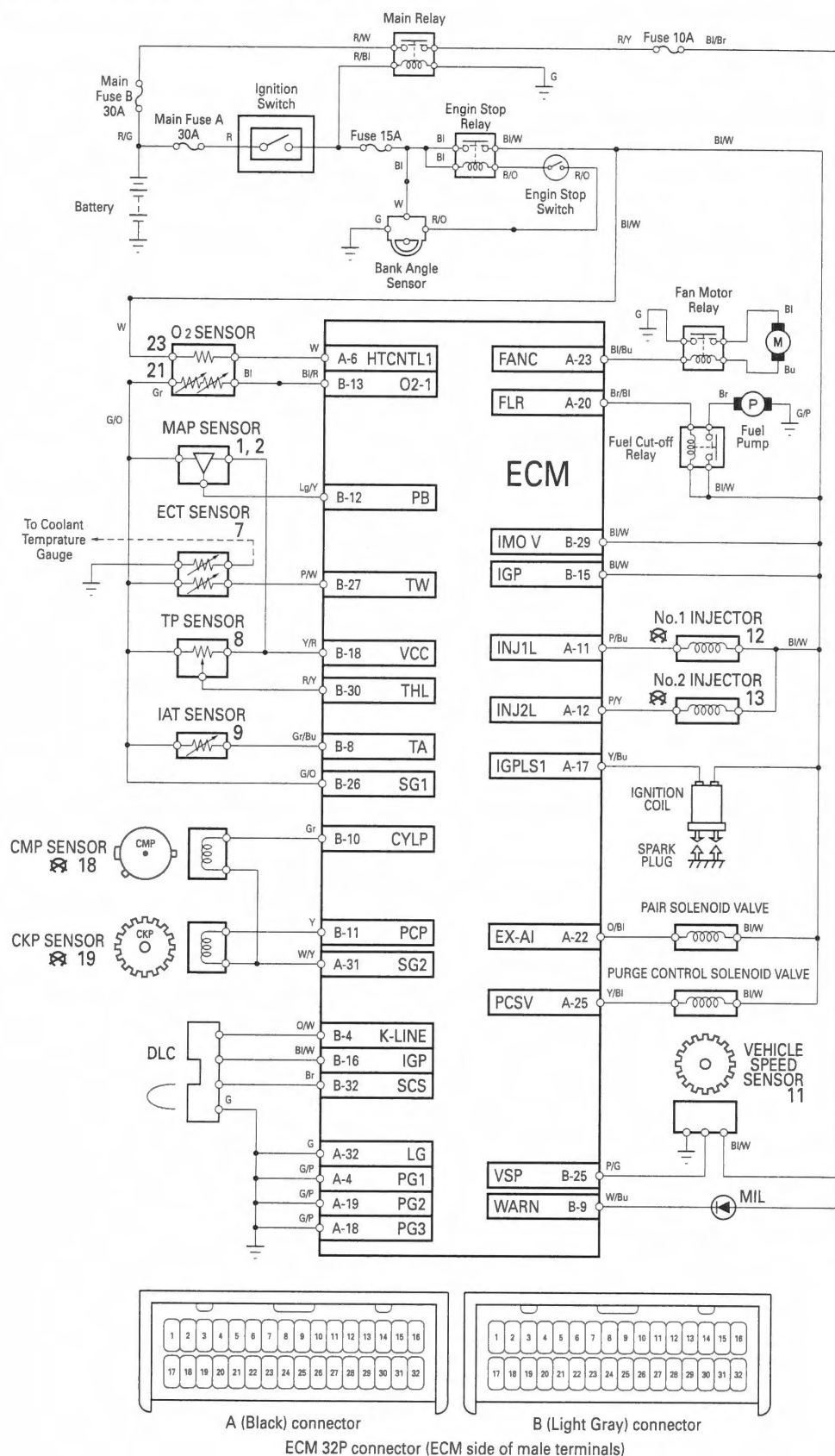
FUEL SYSTEM (Programmed Fuel Injection)

SYSTEM LOCATION (After '07)



FULL NAME	ABBREVIATIONS
Manifold absolute pressure sensor	MAP sensor
Throttle position sensor	TP sensor
Intake air temperature sensor	IAT sensor
Engine coolant temperature sensor	ECT sensor
Camshaft position sensor	CMP sensor
Crankshaft position sensor	CKP sensor
Engine control module	ECM
Data link connector	DLC

SYSTEM DIAGRAM (After '07)



PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM ('02 - '07)

SELF-DIAGNOSTIC PROCEDURES

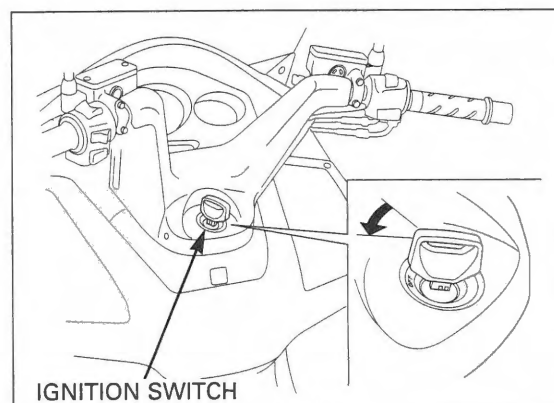
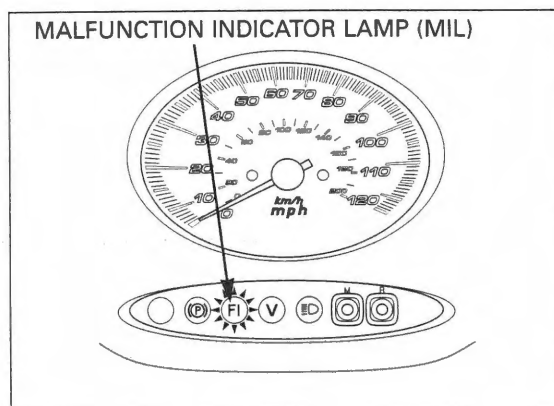
Place the scooter on its centerstand.
Start the engine and let it idle.

If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.
If the malfunction indicator lamp (MIL) does not light or blink, the system has no self-diagnosis memory data.

If the MIL blinks, note how many times the MIL blinks, and determine the cause of the problem (page 5-16 through 5-43).

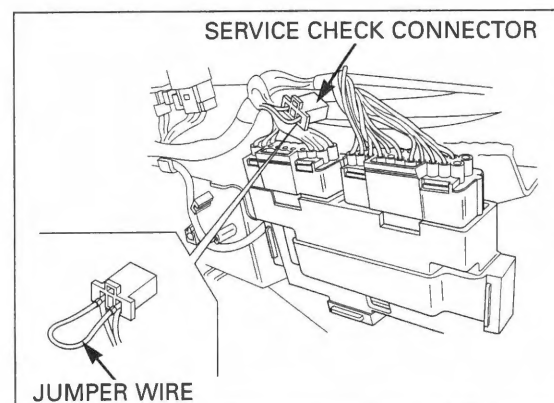
If you wish to read the PGM-FI self-diagnosis memory data, perform the following:

Turn the ignition switch to "OFF".

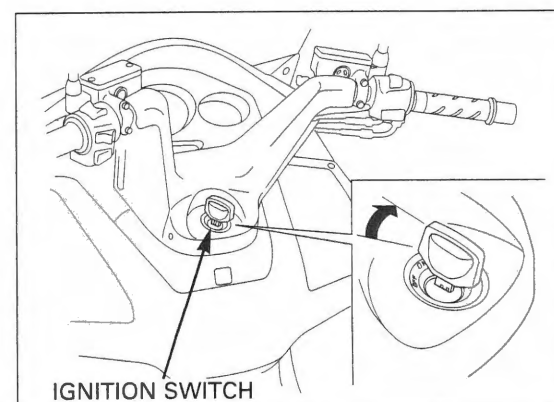


Remove the left side body cover (page 2-6).

Short the PGM-FI system service check connector terminals using a jumper wire.



Turn the ignition switch to "ON" and the engine stop switch to "RUN".



FUEL SYSTEM (Programmed Fuel Injection)

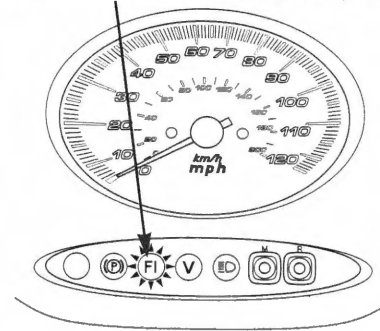
Even if the PGM-FI has memory data, the MIL does not blink when the engine running.

If the ECM has no self diagnosis memory data, the MIL will illuminate when you turn the ignition switch to "ON".

If the ECM has self diagnosis memory data, the MIL will start blinking when you turn the ignition switch to "ON".

Note how many times the MIL blinks, and determine the cause of the problem (page 5-16 through 5-43).

MALFUNCTION INDICATOR LAMP (MIL)



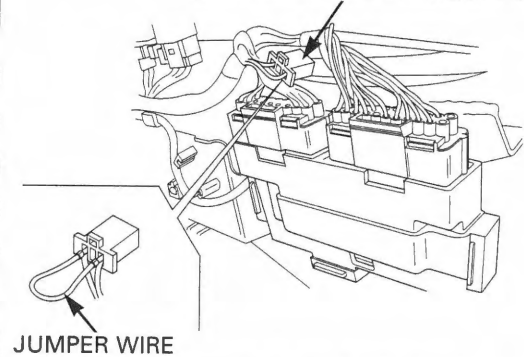
SELF-DIAGNOSIS RESET PROCEDURE

1. Turn the engine stop switch to "RUN" and the ignition switch to "OFF".
2. Short the service check connector of the PGM-FI system using a jumper wire.
3. Turn the ignition switch to "ON".
4. Remove the jumper wire from the service check connector.
5. The MIL lights for about 5 seconds.
While the indicator is lit, short the service check connector again with the jumper wire.
Self diagnosis memory data is erased if the MIL turns off and then starts blinking.

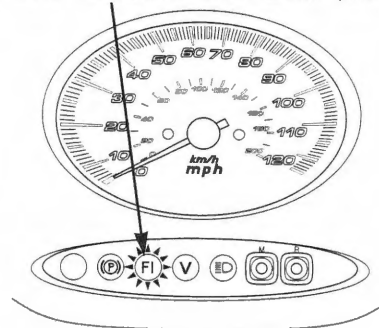
- The service check connector must be jumped while the indicator is lit. If not, the MIL will not start blinking.
- Note that the self diagnosis memory data cannot be erased if you turn off the ignition switch before the MIL starts blinking.

If the MIL blinks 20 times, the data has not been erased, so try again.

SERVICE CHECK CONNECTOR



MALFUNCTION INDICATOR LAMP (MIL)



FUEL SYSTEM (Programmed Fuel Injection)

PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the CKP sensor and CMP sensor inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that all spark plugs are installed correctly.
- Use the recommended digital multimeter or a 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.
- Disconnect the fuel pump/fuel unit connector before checking the peak voltage.

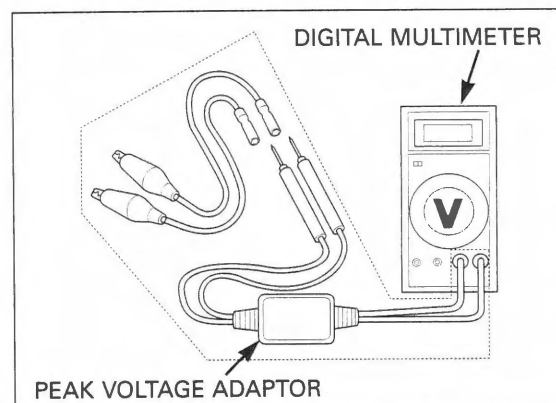
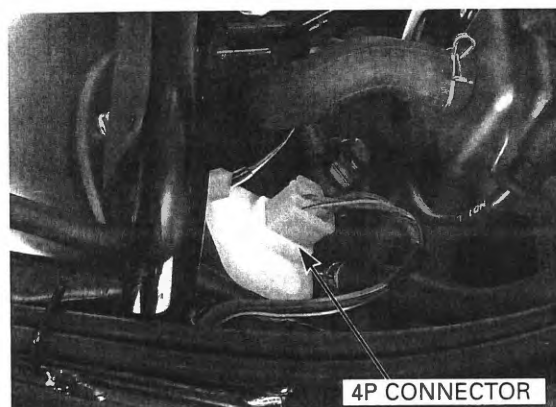
Remove the floorstep. (page 2-20)
Disconnect the fuel pump/fuel unit 4P connector.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

IgnitionMate peak voltage tester or
Peak voltage adaptor MTP07-0286 (U.S.A. only) or
07HGJ-0020100
(not available in U.S.A.)

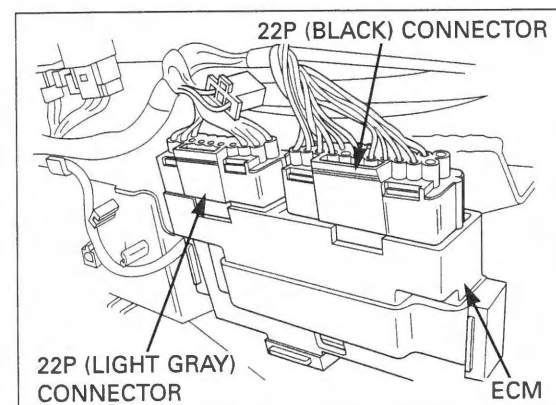
With commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)



TEST HARNESS CONNECTION

Remove the left side body cover (page 2-6).

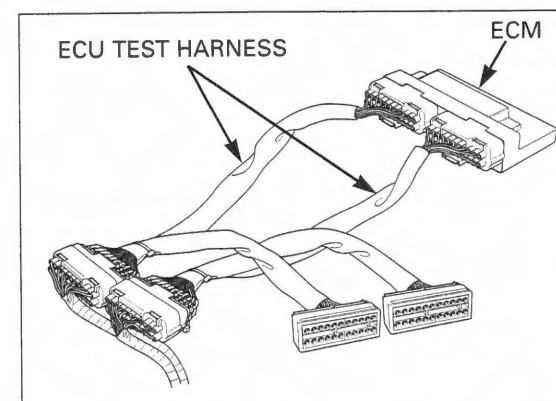
Remove the ECM from the stay.
Disconnect the 22P (Black) and 22P (Light gray) connectors from the ECM.



Connect the ECU test harnesses between the main wire harness and the ECM.

TOOL:
ECU test harness

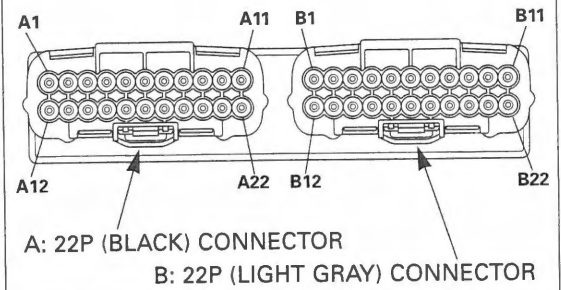
07YMZ-0010100
(two required) or
07WMZ-MBGA000
(U.S.A. only)



TEST HARNESS TERMINAL LAYOUT

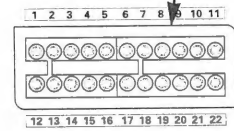
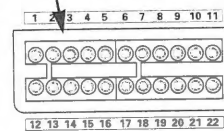
The ECM connector terminals are numbered as shown in the illustration.

VIEW FROM WIRE HARNESS SIDE:



The test harness terminals are the same layout as for the ECM connector terminals as shown.

FOR 22P (BLACK) CONNECTOR
FOR 22P (LIGHT GRAY) CONNECTOR



PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM (After '07)

SELF-DIAGNOSTIC PROCEDURE

Support the scooter with its centerstand.
Start the engine and let it idle.

If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.

If the malfunction indicator lamp (MIL) does not light or blink, the system has no self-diagnosis memory data.

If the MIL blinks, note how many times the MIL blinks or read the Diagnosis Trouble Code (DTC) with the Honda Diagnosis System (HDS) pocket tester, and determine the cause of the problem (MIL: page 5-44, DTC: page 5-60).

If you wish to read the PGM-FI self-diagnosis memory data, perform the following:

DTC (WITH THE HDS POCKET TESTER)

Turn the ignition switch to "OFF".

Open the seat and then remove the left maintenance lid.

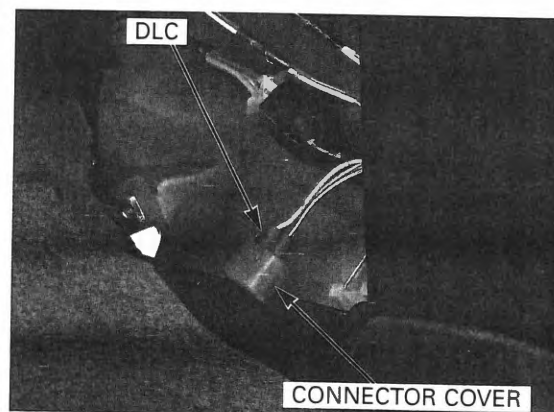
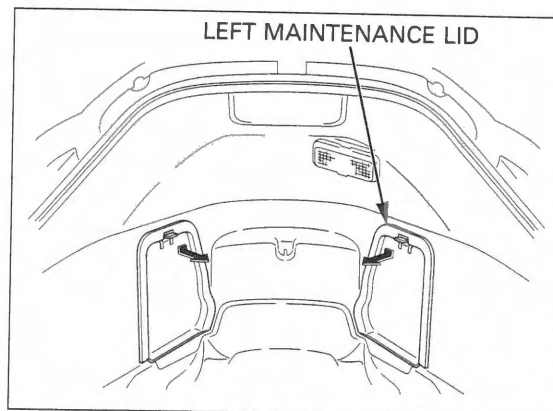
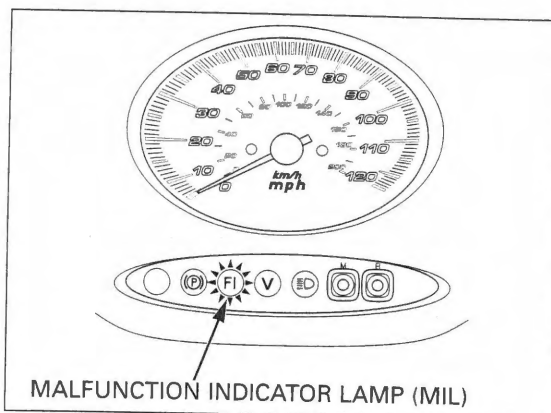
Remove the connector cover from the DLC.

Connect the Honda Diagnosis System (HDS) pocket tester to the DLC.

Turn the ignition switch to "ON" and engine stop switch to "○".

Check the Diagnostic Trouble Code (DTC) and note it. Also, check the freeze data.

Refer to the DTC code index (page 5-60) and begin the appropriate troubleshooting procedure.



MIL CODE (WITHOUT THE HDS POCKET TESTER)

Turn the ignition switch to "OFF".

Open the seat and then remove the left maintenance lid.

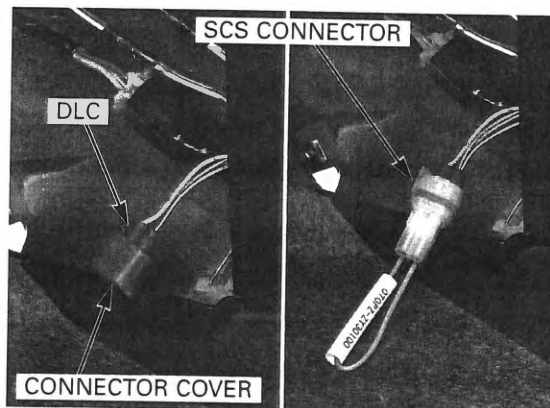
Remove the connector cover from the DLC.

Short the DLC terminal using the special tool.

TOOL:

SCS connector

070PZ-ZY30100

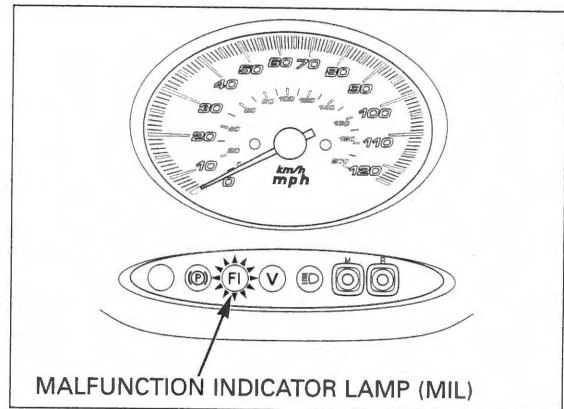


Turn the ignition switch to "ON" and engine stop switch to "○".

If the ECM has no self diagnosis memory data, the MIL will illuminate when you turn the ignition switch to "ON" and engine stop switch to "○".

If the ECM has self diagnosis memory data, the MIL will start blinking when you turn the ignition switch to "ON" and engine stop switch to "○".

Note how many times the MIL blinks, and determine the cause of the problem (page 5-44).



SELF-DIAGNOSIS RESET PROCEDURE

Reset the self-diagnosis memory data in either of 2 ways;

WITH THE HDS POCKET TESTER

Use the Honda Diagnosis System (HDS) pocket tester to clear the ECM memory.

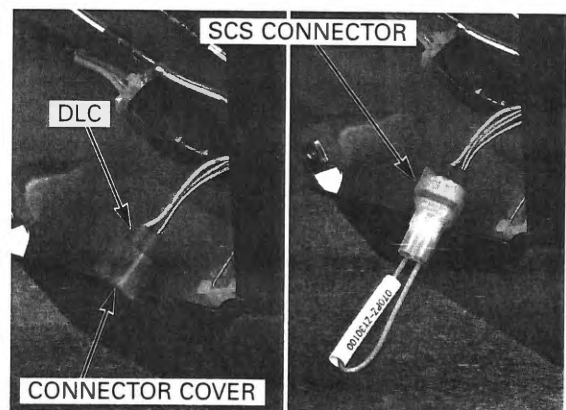
WITHOUT THE HDS POCKET TESTER

1. Turn the ignition switch to "OFF".
Open the seat and then remove the left maintenance lid.
Remove the connector cover from the DLC.
2. Short the DLC terminals using the special tool.

TOOL:

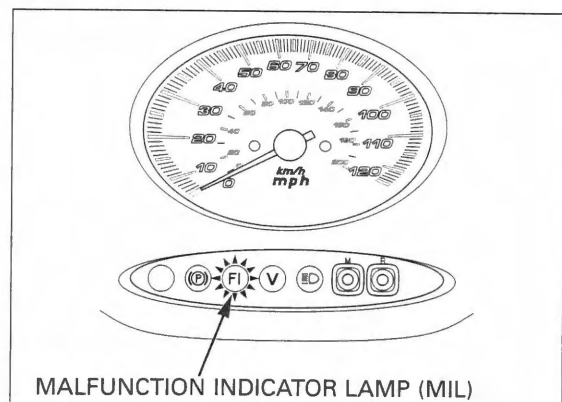
SCS connector **070PZ-ZY30100**

3. Turn the ignition switch to "ON" and engine stop switch to "○".
4. Disconnect the SCS connector from the DLC.



5. The MIL lights about 5 seconds.
While the indicator lights, short the DLC terminals again with the SCS connector.
Self-diagnosis memory data is erased, if the MIL turns off and starts blinking.

- The DLC must be jumped while the indicator is lit. If not, the MIL will not start blinking.
- Note that the self diagnosis memory data cannot be erased if you turn off the ignition switch before the MIL starts blinking.
- If the MIL blinks 20 times, the data has not been erased, perform the procedure again.



FUEL SYSTEM (Programmed Fuel Injection)

PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the CKP sensor and CMP sensor inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that all spark plugs are installed correctly.
- Use the recommended digital multimeter or a 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.
- Disconnect the fuel pump/fuel unit connector before checking the peak voltage.

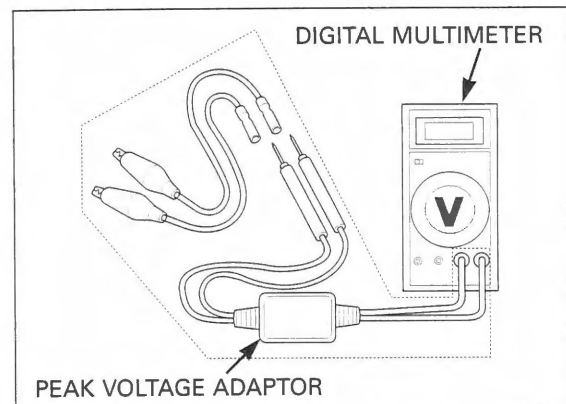
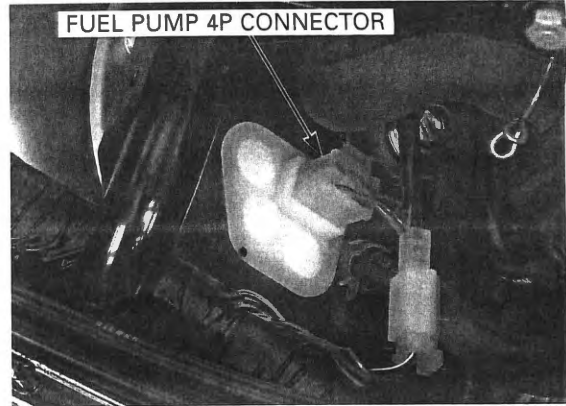
Remove the floorstep. (page 2-20)
Disconnect the fuel pump/fuel unit 4P connector.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

IgnitionMate peak voltage tester or
Peak voltage adaptor MTP07-0286 (U.S.A. only) or
07HGJ-0020100
(not available in U.S.A.)

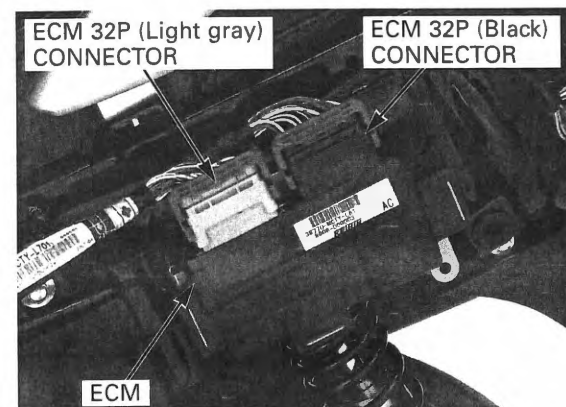
With commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)



TEST HARNESS CONNECTION

Remove the left side body cover (page 2-6).

Disconnect the 32P (Black) and 32P (Light gray) connectors from the ECM.

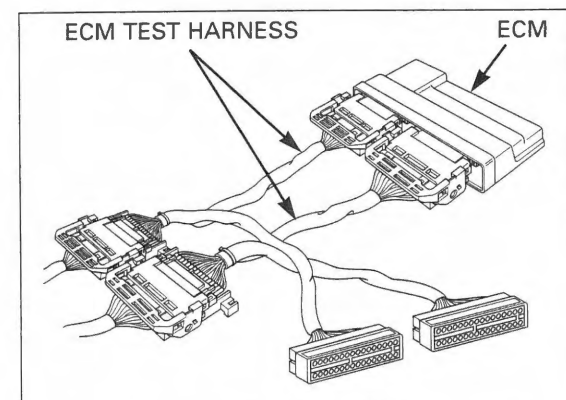


Connect the ECM test harnesses between the main wire harness and the ECM.

TOOL:

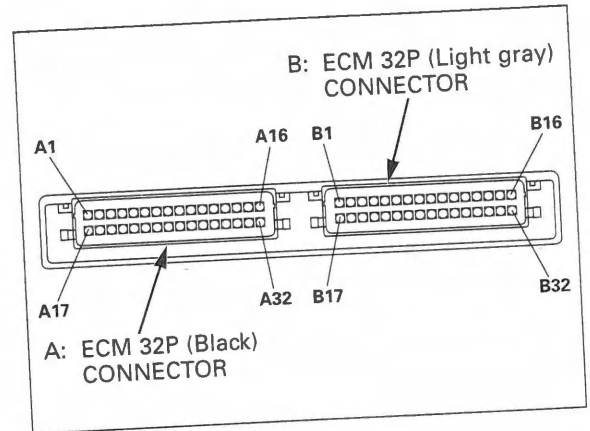
ECM test harness 32P

070MZ-0010201
(two required)

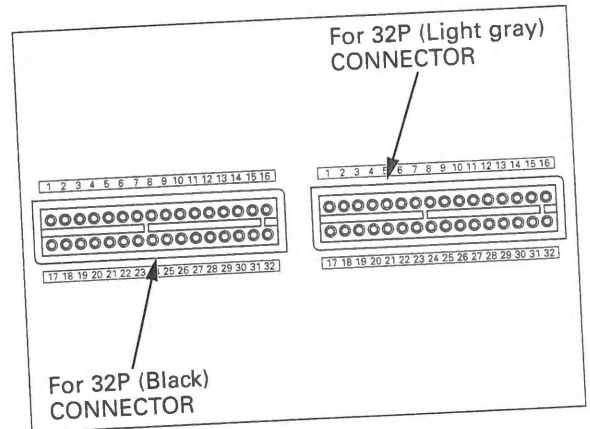


TEST HARNESS TERMINAL LAYOUT

The ECM connector terminals are numbered as shown in this illustration.



The ECM test harness terminals are same layout as for the ECM connector terminals as shown.



FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI SELF-DIAGNOSIS MALFUNCTION INDICATOR LAMP (MIL) FAILURE CODES ('02 - '07)

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 33). When the indicator lights for 1.3 seconds it is equivalent to 10 blinks. For example, a 1.3 second illumination and two blinks (0.5 second x 2) of the indicator equals 12 blinks. Follow code 12 on page 5-32.
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example, if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 and 2 on page 5-18, 20.

Number of PGM-FI MIL blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
0	 No blinks	- Open circuit at the power input wire of the ECM - Faulty bank angle sensor - Open circuit in bank angle sensor related circuit - Faulty engine stop relay - Open circuit in engine stop relay related wires - Faulty engine stop switch - Open circuit in engine stop switch related wires - Faulty ignition switch - Faulty ECM - Blown PGM-FI fuse (20 A) - Open circuit in engine stop switch ground - Blown sub-fuse (10 A) (Starter/ignition)	Engine does not start	—
	 No blinks	- Open or short circuit in MIL wire - Faulty ECM	Engine operates normally	—
	 Stay lit	- Short circuit in service check connector - Faulty ECM - Short circuit in service check connector wire	Engine operates normally	—
1	 Blinks	- Loose or poor contacts on MAP sensor connector - Open or short circuit in MAP sensor wire - Faulty MAP sensor	Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-18
2	 Blinks	- Loose or poor connection of the MAP sensor vacuum tube - Faulty MAP sensor	Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-20
7	 Blinks	- Loose or poor contact on ECT sensor - Open or short circuit in ECT sensor wire - Faulty ECT sensor	Hard start at a low temperature (simulate using numerical values; 90°C/194°F)	5-22
8	 Blinks	- Loose or poor contact on TP sensor connector - Open or short circuit in TP sensor wire - Faulty TP sensor	Poor engine response when operating the throttle quickly (simulate using numerical values; throttle opens 0°)	5-24
9	 Blinks	- Loose or poor contact on IAT sensor - Open or short circuit in IAT sensor wire - Faulty IAT sensor	Engine operates normally (simulate using numerical values; 35°C/95°F)	5-28

FUEL SYSTEM (Programmed Fuel Injection)

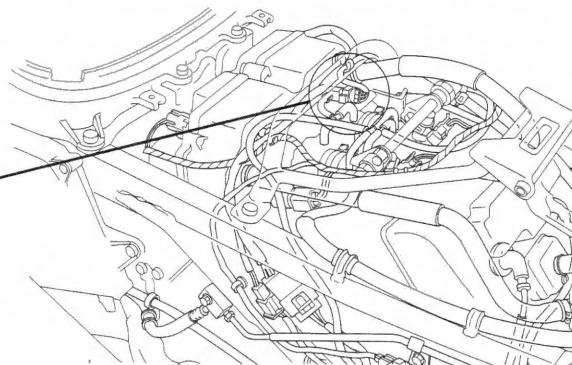
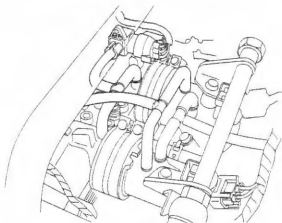
Number of PGM-FI malfunction indicator blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
11	 Blinks	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor connector • Faulty vehicle speed sensor	• Engine operates normally	5-30
12	 Blinks	• Loose or poor contact on No.1 injector connector • Open or short circuit in No.1 injector wire • Faulty No.1 injector	• Engine does not start	5-32
13	 Blinks	• Loose or poor contact on No.2 injector connector • Open or short circuit in No.2 injector wire • Faulty No.2 injector	• Engine does not start	5-35
18	 Blinks	• Loose or poor contact on CMP sensor • Open or short circuit in CMP sensor • Faulty CMP sensor	• Engine does not start	5-38
19	 Blinks	• Loose or poor contact on CKP sensor • Open or short circuit in CKP sensor • Faulty CKP sensor	• Engine does not start	5-40
33	 Blinks	• Faulty E²-PROM in ECM	• Engine operates normally • Does not hold the self-diagnosis data	5-42

FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 1 BLINK (MAP SENSOR)

Turn the ignition switch to "OFF".

Disconnect the MAP sensor 3P connector.
Check for loose or poor contact on the MAP sensor connector.



Connect the MAP sensor connector.
Place the scooter on its main stand.
Start the engine and check that the MIL blinks.

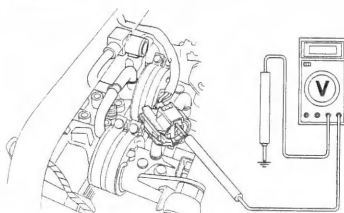
Does not blink

- Loose or poor contact on the MAP sensor connector.

1 blink

Turn the ignition switch to "OFF".

Disconnect the MAP sensor 3P connector.
Turn the ignition switch to "ON".
Measure the voltage at the wire harness side connector.



Out of range

- Open or short circuit in Yellow/Red wire.
- Loose or poor contact on the ECM connectors.

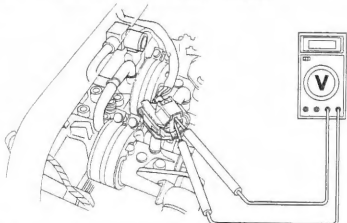
Connection: Yellow/Red (+) – Ground (–)
Standard: 4.75 – 5.25 V

Voltage exists

Measure the voltage between the connector terminals on the wire harness side.

Out of range

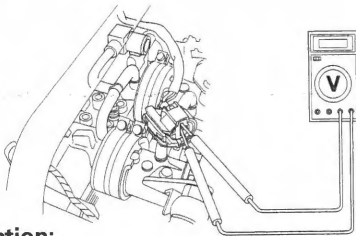
- Open or short circuit in Green/Orange wire.
- Loose or poor contact on the ECM connectors.



Connection: Yellow/Red (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

Voltage exists

Measure the voltage between the terminals on the wire harness side.



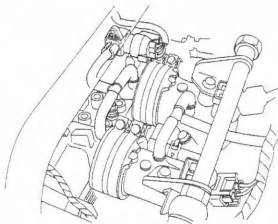
Connection:
Light green/Yellow (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

Out of range

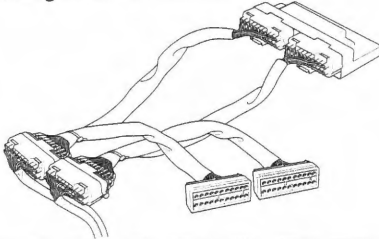
- Open or short circuit in Light green/Yellow wire.
- Loose or poor contact on the ECM connectors.

Voltage exists

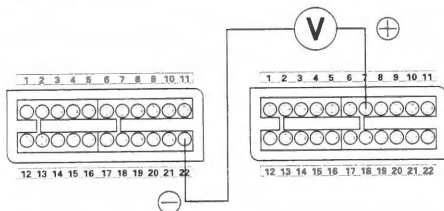
Turn the ignition switch to "OFF".
Connect the MAP sensor 3P connector.



Disconnect the ECM connectors.
Connect the test harness to ECM connectors.
Turn the ignition switch to "ON".



Measure the voltage at the test harness terminals (page 5-11).



Connection: B7 (+) – A22 (–)
Standard: 2.7 – 3.1 V (760 mm Hg/1,013 kPa)

Out of range

- Faulty MAP sensor.

Voltage exists

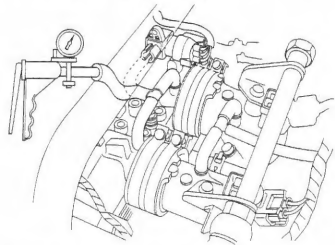
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 2 BLINKS (MAP SENSOR)

Turn the ignition switch to "OFF".

Disconnect the vacuum tube from the MAP sensor.
Connect the vacuum gauge between the throttle body and the MAP sensor using a 3-way joint.
Start the engine and measure the manifold absolute pressure at idle speed.

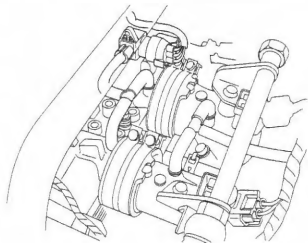


Standard: 150 – 250 mm Hg

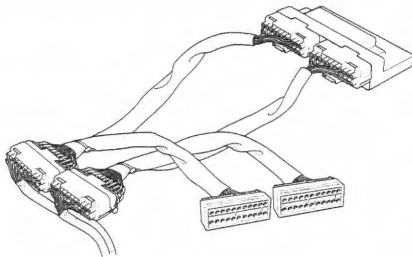
Out of range →

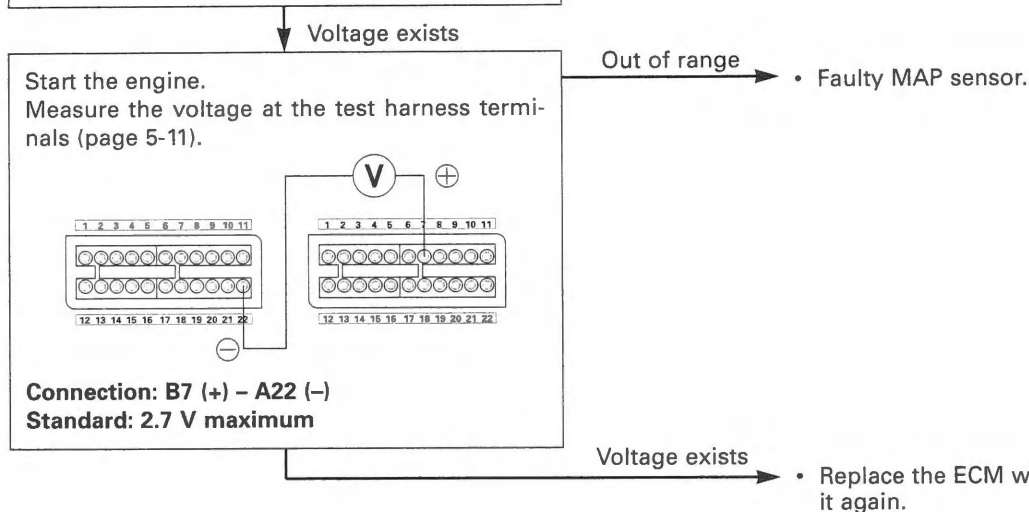
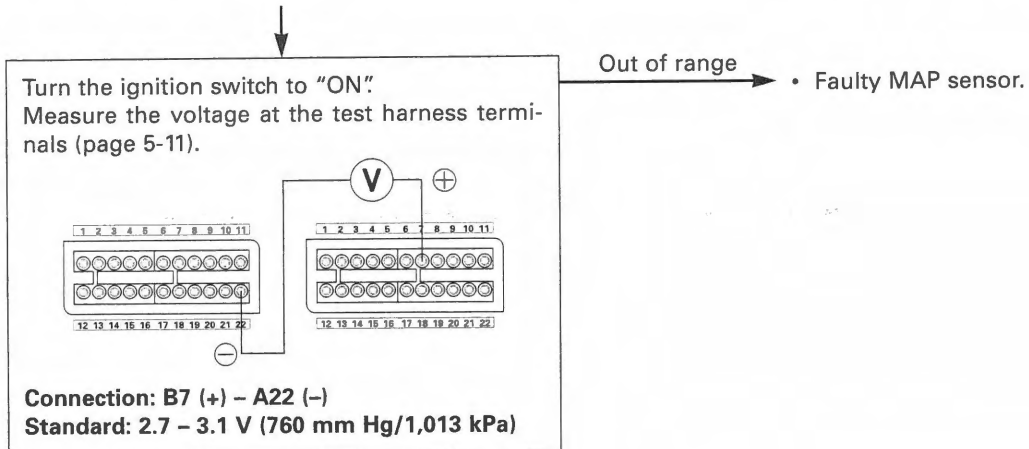
• Check tube installation.

Disconnect the vacuum gauge and connect the tube to the MAP sensor.



Disconnect the ECM connectors.
Connect the test harness to the ECM connector.



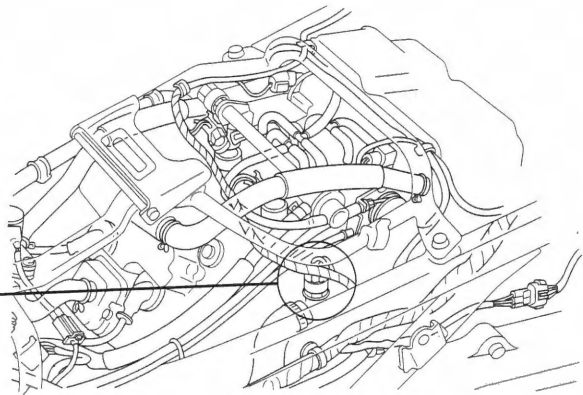
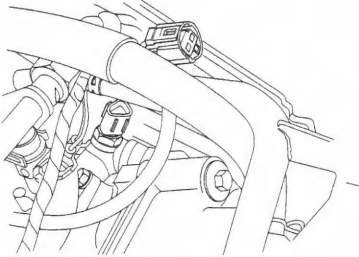


FUEL SYSTEM (Programmed Fuel Injection)

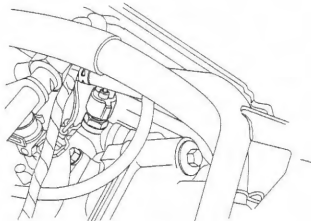
PGM-FI MIL 7 BLINKS (ECT SENSOR)

Turn the ignition switch to "OFF".

Disconnect the ECT sensor 3P connector.
Check for loose or poor contact on the ECT sensor connector.



Connect the ECT sensor connector.
Place the scooter on its main stand.
Turn the ignition switch to "ON".



Check that the MIL blinks.

No blinks

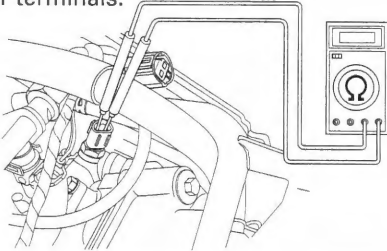
- Loose or poor contact on the ECT sensor connector.

7 blinks

Abnormal

- Faulty ECT sensor.

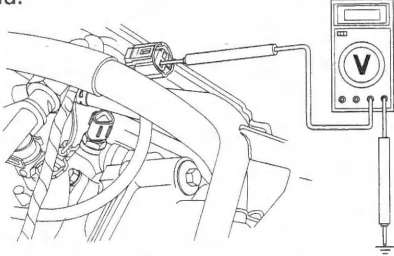
Turn the ignition switch to "OFF".
Disconnect the ECT sensor connector.
Measure the resistance at the ECT sensor terminals.



Connection: Pink/White (+) – Green/Orange (–)
(sensor side terminals)
Standard: 2.3 – 2.6 k Ω (20°C/68°F)

Normal

Turn the ignition switch to "ON".
Measure the voltage between the ECT sensor connector terminal on the wire harness side and ground.



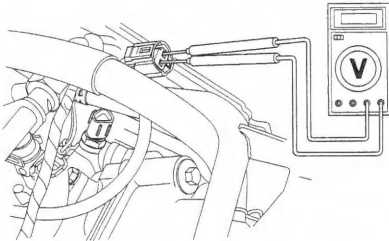
Connection: Pink/White (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range

- Open or short circuit in Pink and Pink/White wire.
- Loose or poor contacts on the ECM connector.

Voltage exists

Measure the voltage at the ECT sensor connector on the wire harness side.



Connection: Pink/White (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

Out of range

- Open or short circuit in Green/Orange wire.
- Loose or poor contacts on the ECM connector.

Voltage exists

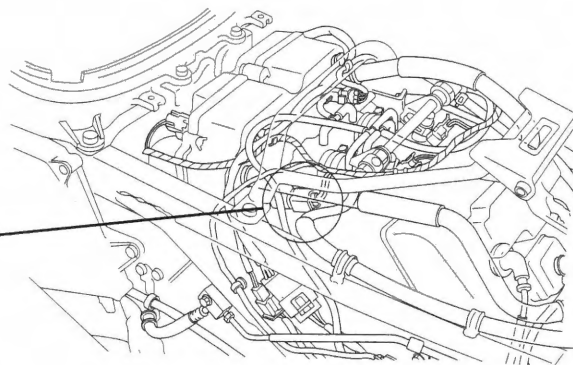
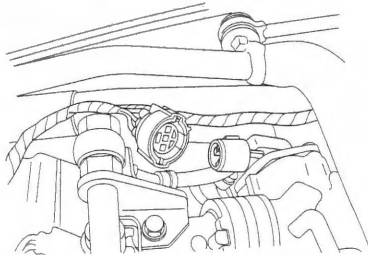
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

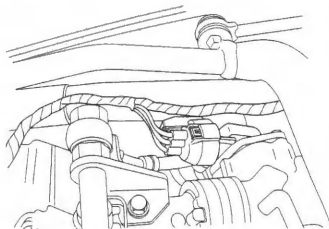
PGM-FI MIL 8 BLINKS (TP SENSOR)

Turn the ignition switch to "OFF".

Disconnect the TP sensor 3P connector.
Check for loose or poor contact on the TP sensor connector.



Connect the TP sensor connector.
Place the scooter on its main stand.
Start the engine and check that the MIL blinks.



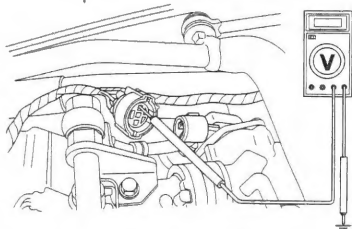
Does not blink

- Loose or poor contact on the TP sensor connector.

8 blinks

Turn the ignition switch to "OFF".

Disconnect the TP sensor 3P connector.
Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminal and ground.



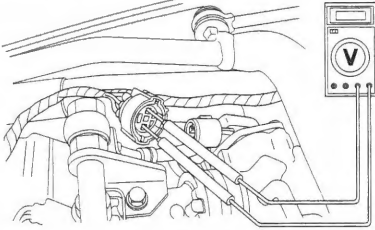
Out of range

- Open or short circuit in the Yellow/Red wire.
- Loose or poor contact on the ECM connector.

Connection: Yellow/Red (+) – Ground (–)
Standard: 4.75 – 5.25 V

Voltage exists

Measure the voltage at the TP sensor terminals of the wire harness side.



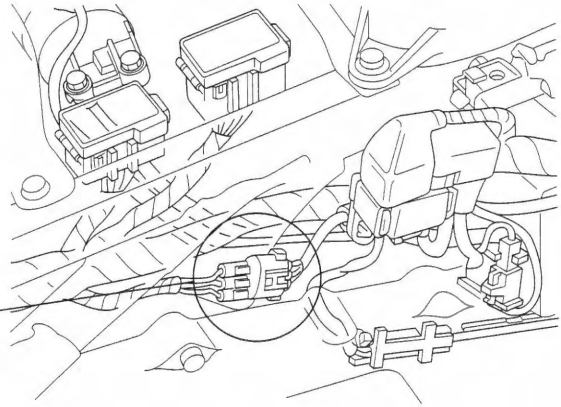
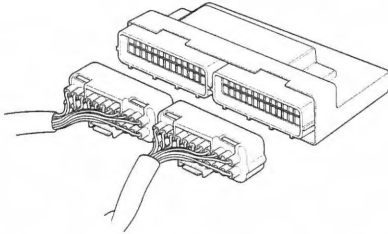
Connection: Yellow/Red (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

Out of range →

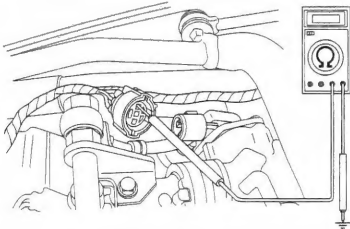
- Open or short circuit in Green/Orange wire.
- Loose or poor contact on the ECM connectors.

↓ Voltage exists

Turn the ignition switch to "OFF".
Disconnect the ECM 22P connectors.



Check for continuity between the TP sensor connector terminal on the wire harness side and ground.



Continuity →

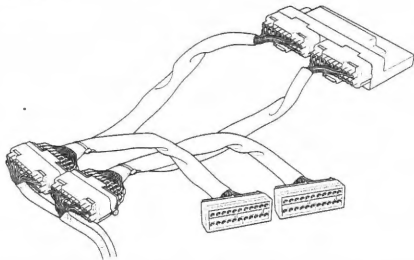
- Short circuit in Red/Yellow wire.

Connection: Red/Yellow (+) – Ground (–)
Standard: No continuity

↓ No continuity

FUEL SYSTEM (Programmed Fuel Injection)

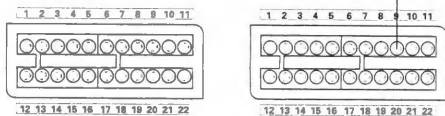
Connect the test harness to the ECM connectors.



Check for continuity between the test harness terminal and the TP sensor connector terminal.

No continuity

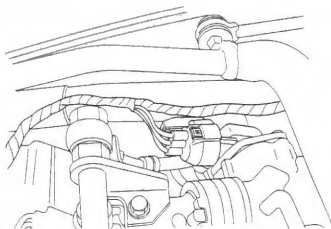
- Open or short circuit in Red/Yellow wire.



Connection: Red/Yellow – B9
Standard: Continuity

Continuity

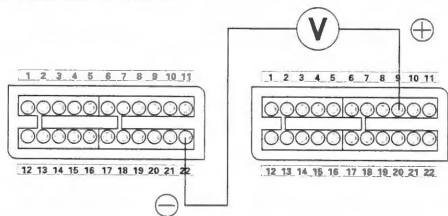
Connect the TP sensor 3P connector.



Turn the ignition switch ON.
Measure the voltage at the test harness terminals.

Normal

- Replace the ECM with a new one, and inspect it again.



Connection: B9 (+) – A22 (-)
Standard: *0.4 – 0.6 V (throttle fully closed)
*4.2 – 4.8 V (throttle fully open)

Out of range

- Faulty TP sensor.

FUEL SYSTEM (Programmed Fuel Injection)

A voltage marked * refers to the value when the voltage reading at the TP sensor 3P connector (page 5-24) shows 5 V. When the reading shows other than 5 V, derive a voltage at the test harness as follows:

In the case of a voltage of 4.75 V at the TP sensor 3P connector:

$$0.4 \times 4.75/5.0 = 0.38 \text{ V}$$

$$0.6 \times 4.75/5.0 = 0.57 \text{ V}$$

Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.

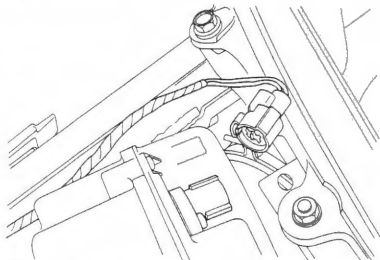
To determine the throttle fully open range in the above equations, replace 0.4 and 0.6 with 4.2 and 4.8, respectively.

FUEL SYSTEM (Programmed Fuel Injection)

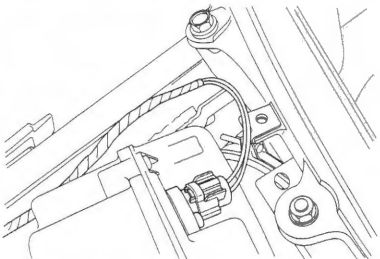
PGM-FI MIL 9 BLINKS (IAT SENSOR)

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.
Check for loose or poor contact on the IAT sensor connector.



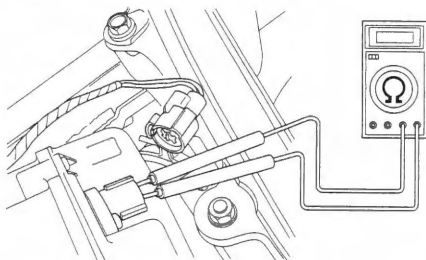
Connect the IAT sensor 2P connector.
Place the scooter on its main stand.
Turn the ignition switch ON.
Check that the MIL blinks.



9 blinks

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.
Measure the resistance at the IAT sensor (at 20 – 30 °C/68 – 86 °F).



Standard: 1 – 4 k Ω

Normal

Turn the ignition switch ON.

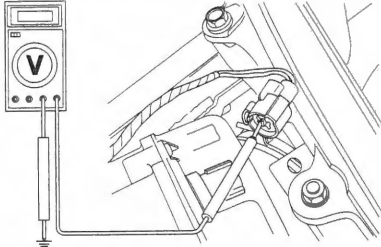
No blinks

- Loose or poor contact on the IAT sensor connector.

Abnormal

- Faulty IAT sensor.

Measure the voltage between the terminals on the wire harness side.



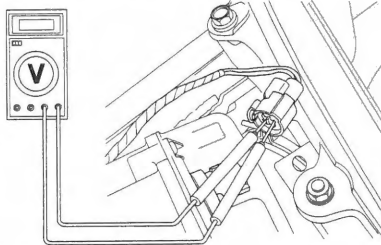
Connection:
Gray/Blue (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range

- Open or short circuit in Gray/Blue wire.
- Loose or poor contact on the ECM connectors.

Voltage exists

Measure the voltage between the terminals on the wire harness side.



Connection:
Gray/Blue (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

Out of range

- Open or short circuit in Green/Orange wire.
- Loose or poor contact on the ECM connectors.

Voltage exists

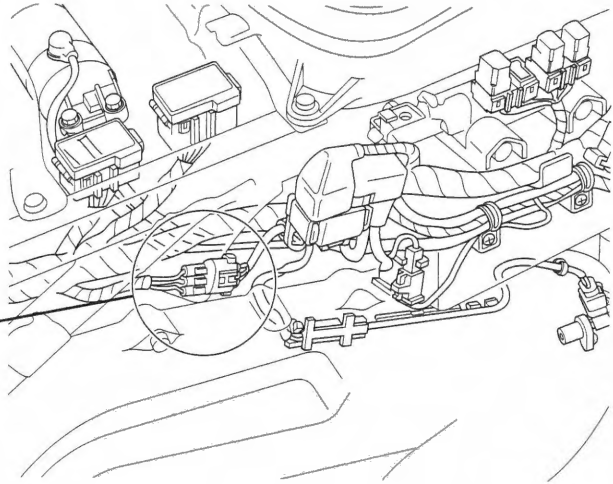
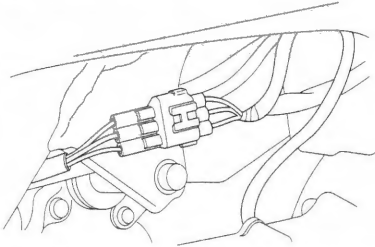
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 11 BLINKS (VEHICLE SPEED SENSOR)

Turn the ignition switch to "OFF".

Disconnect the vehicle speed sensor (3P: '02, 6P: AFTER '02 ABS TYPE) connector.
Check for loose or poor contact on the vehicle speed sensor connector.



Connect the vehicle speed sensor (3P: '02, 6P: AFTER '02 ABS TYPE) connector.
Place the scooter on its main stand.
Start the engine and keep the engine revs more than 5,000 min⁻¹ (rpm) for 20 seconds or more.
Check that the MIL blinks.

No blinks

- Loose or poor contact on the vehicle speed sensor connector.

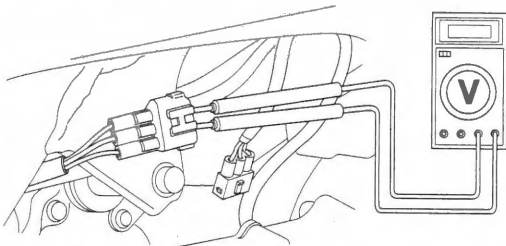
11 blinks

Turn the ignition switch to "OFF".

Disconnect the vehicle speed sensor (3P: '02, 6P: AFTER '02 ABS TYPE) connector.
Turn the ignition switch to "ON".
Measure the voltage at the wire harness side connector.

Out of range

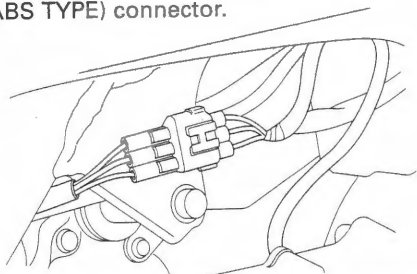
- Open or short circuit in Black/Brown wire of the engine sub-harness or main wire harness.



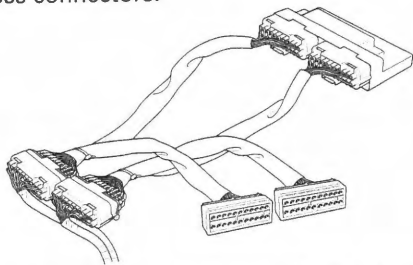
Connection: Black/Brown (+) – Green/Black (–)
Standard: 12 V

Voltage exists

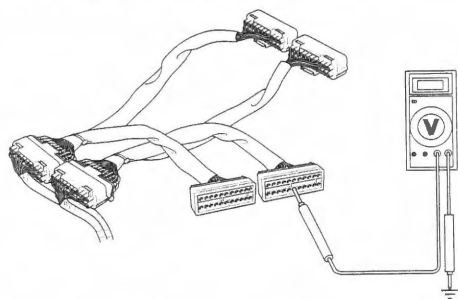
Connect the speed sensor (3P: '02, 6P: AFTER '02 ABS TYPE) connector.



Disconnect the ECM connectors.
Connect the test harness to the wire harness connectors.



Place the scooter on its main stand and lift the rear wheel off the ground.
Measure the voltage at the test harness terminals with the ignition switch turned to "ON" while slowly turning the rear wheel by hand.



Connection: Pink/Green (+) - Ground (-)
Standard: Repeat 0 to 5V

Abnormal

- Open or short circuit in Pink/Green wire of the engine sub-harness or main wire harness.

Normal

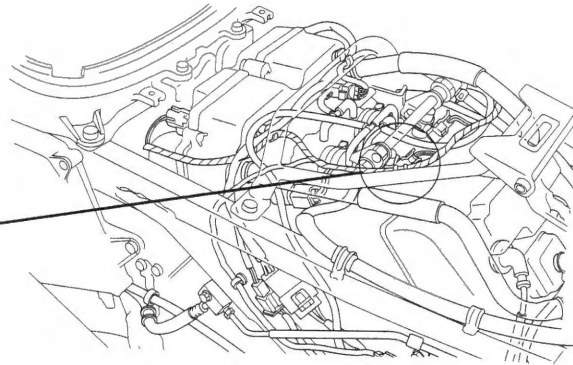
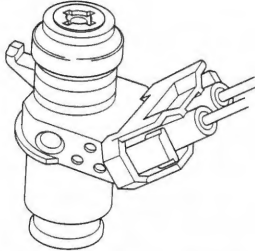
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

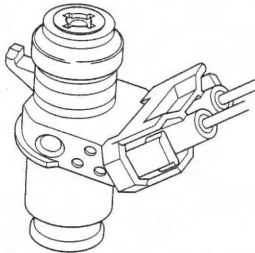
PGM-FI MIL 12 BLINKS (No.1 INJECTOR)

Turn the ignition switch to "OFF".

Disconnect the No.1 injector 2P connector.
Check for loose or poor contact on the No.1 injector 2P connector.



Connect the No.1 injector 2P connector.
Place the scooter on its main stand.
Turn the ignition switch to "ON".
Check that the MIL blinks.

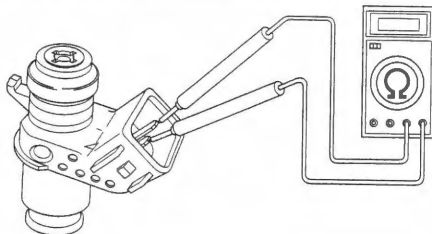


Does not blink

- Loose or poor contact on the No.1 injector connector.

12 blinks

Turn the ignition switch to "OFF".
Disconnect the No.1 injector 2P connector and
measure the resistance of the No.1 injector.



Abnormal

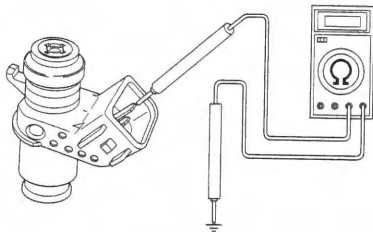
- Faulty No.1 injector.

Connection:

Black/White (+) – Pink/Blue (–)
Standard: 11.1 – 12.3 Ω (20°C/68°F)

Normal

Check for continuity between the No.1 injector and ground.



Connection:

Black/White (+) – Ground (–)

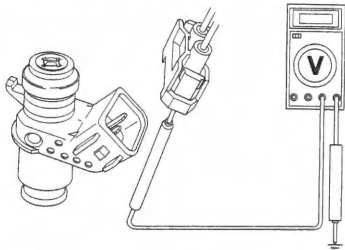
Standard: No continuity

Continuity

- Faulty No.1 injector.

No continuity

Turn the ignition switch to "ON".
Measure the voltage between the No.1 injector connector on the wire harness side and ground.



Connection:

Black/White (+) – Ground (–)

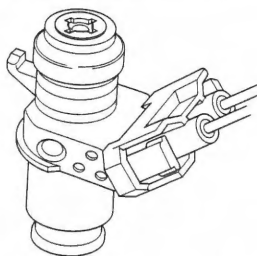
Standard: Battery voltage

Out of range

- Open or short circuit in Black/White wire.

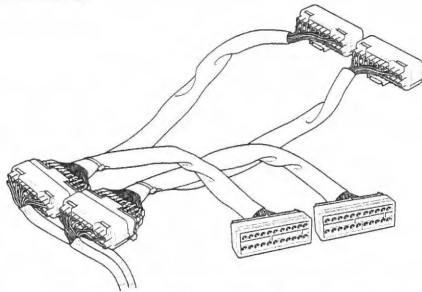
Voltage exists

Turn the ignition switch to "OFF".
Connect the No.1 injector connector.

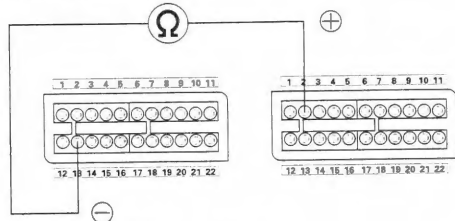


FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the ECM connectors.
Connect the test harness to the wire harness connectors.



Measure the resistance at the test harness terminals.



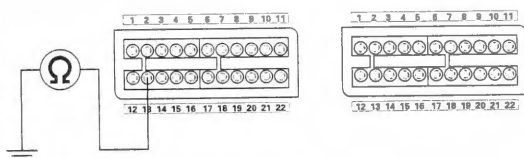
Connection: A13 (-) - B2 (+)
Standard: 9 - 15 Ω (20°C/68°F)

Out of range

- Open circuit in Black/White and/or Pink/Blue wire.

Normal

Check for continuity between the test harness terminal and ground.



Connection: A13 - Ground
Standard: No continuity

Continuity

- Short circuit in Pink/Blue wire.

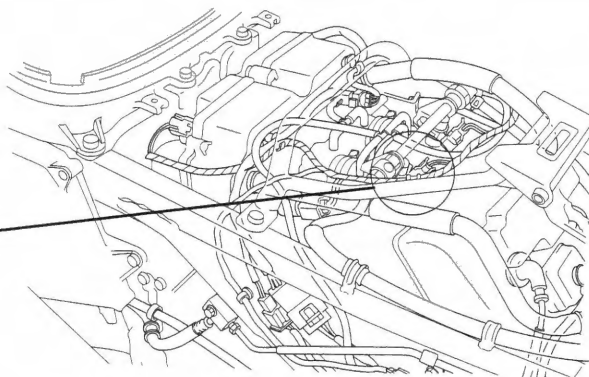
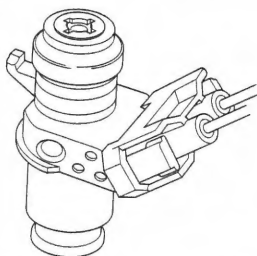
No continuity

- Replace the ECM with a new one, and inspect it again.

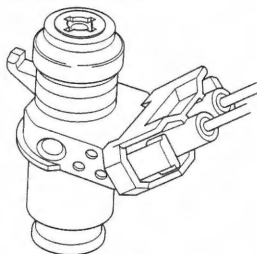
PGM-FI MIL 13 BLINKS (No.2 INJECTOR)

Turn the ignition switch to "OFF".

Disconnect the No.2 injector 2P connector.
Check for loose or poor contact on the No.2 injector 2P connector.



Connect the No.2 injector 2P connector.
Place the scooter on its main stand.
Turn the ignition switch to "ON".
Check that the MIL blinks.

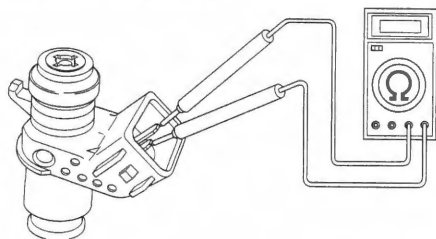


Does not blink

- Loose or poor contact on the No.2 injector connector.

13 blinks

Turn the ignition switch to "OFF".
Disconnect the No.2 injector 2P connector and measure the resistance of the No.2 injector.



Abnormal

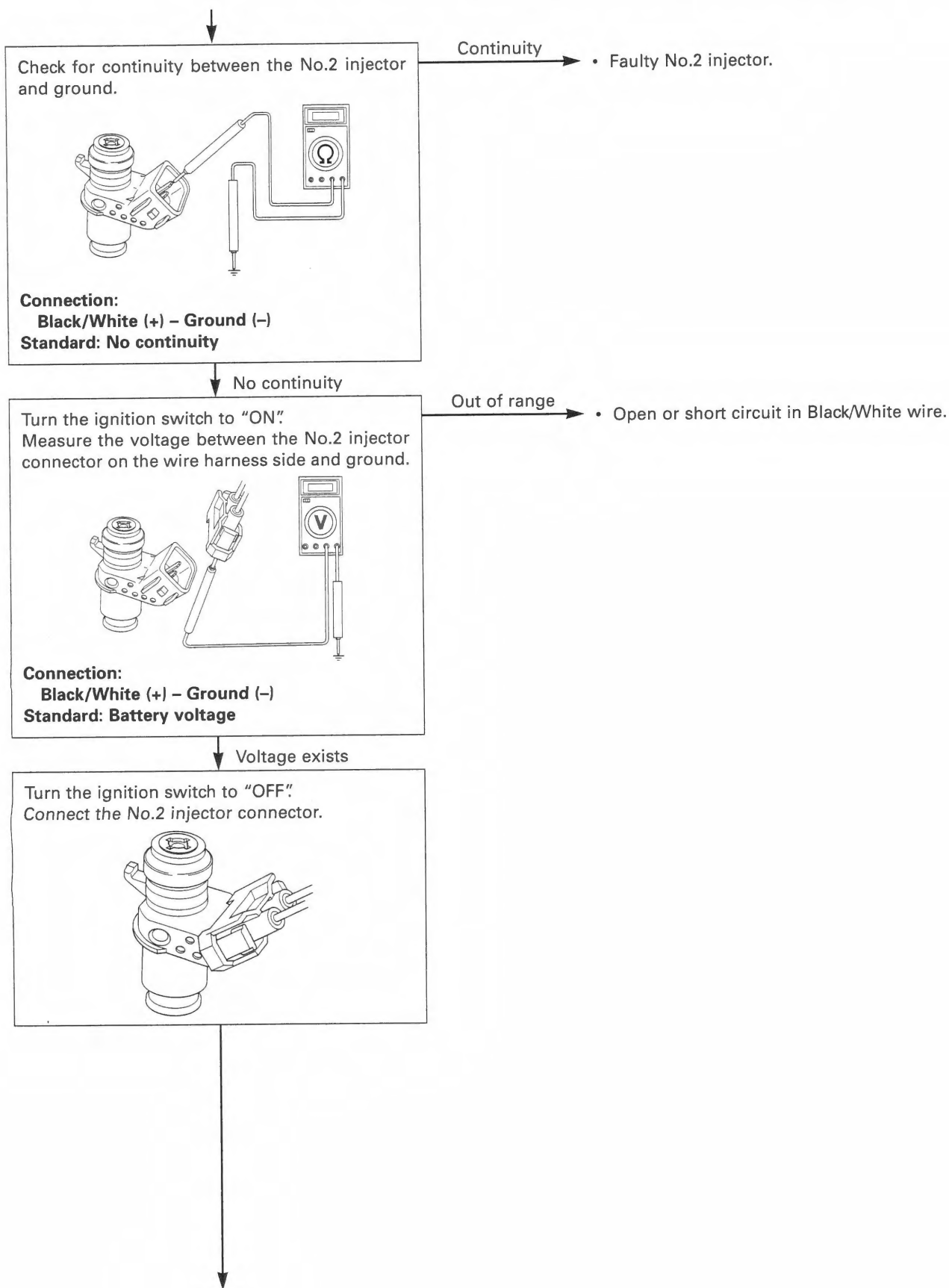
- Faulty No.2 injector.

Connection:

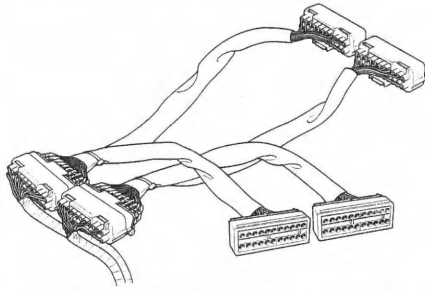
Black/White (+) – Pink/Yellow (–)
Standard: 11.1 – 12.3 Ω (20°C/68°F)

Normal

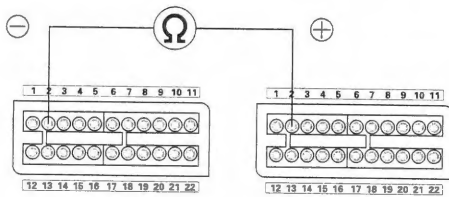
FUEL SYSTEM (Programmed Fuel Injection)



Disconnect the ECM connectors.
Connect the test harness to the wire
harness connectors.



Measure the resistance at the test
harness terminals.



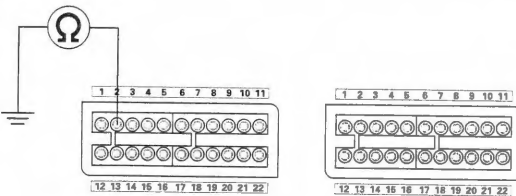
Connection: A2 (-) - B2 (+)
Standard: 9 - 15 Ω (20°C/68°F)

Out of range

- Open circuit in Black/White and/or Pink/Yellow wire.

Normal

Check for continuity between the test harness
terminal and ground.



Connection: A2 - Ground
Standard: No continuity

Continuity

- Short circuit in Pink/Yellow wire.

No continuity

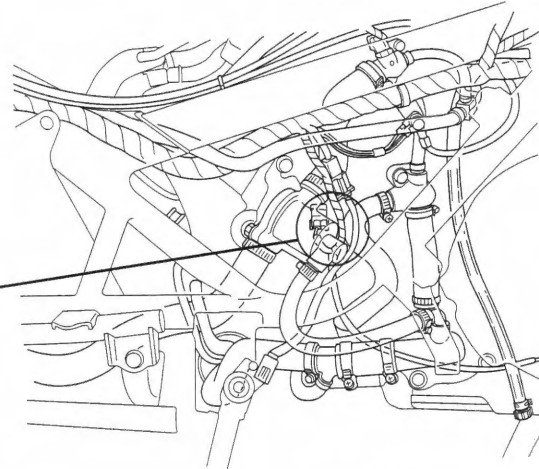
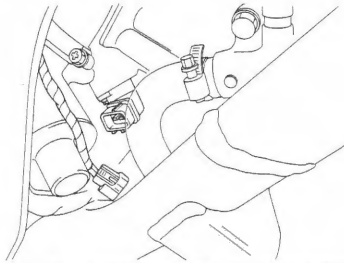
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 18 BLINKS (CMP SENSOR)

Turn the ignition switch to "OFF".

Disconnect the CMP sensor 2P connector.
Check for loose or poor contact on the CMP sensor 2P connector.



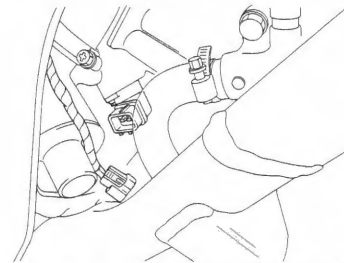
Connect the CMP sensor 2P connector.
Place the scooter on its main stand.
Turn the starter motor for more than 10 seconds
and then check that the MIL blinks.

Does not blink

- Loose or poor contact on the CMP sensor 2P connector.

18 blinks

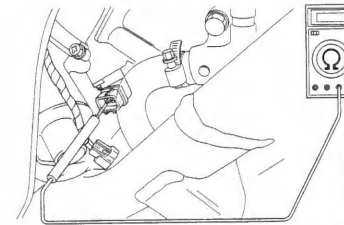
Turn the ignition switch to "OFF" and the engine
stop switch to "OFF".
Disconnect the CMP sensor 2P connector.



Check the continuity between the CMP sensor
connector terminal and ground.

Continuity

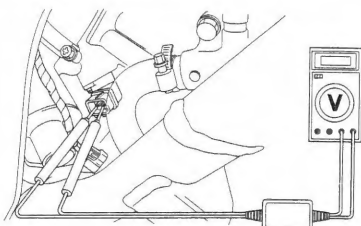
- Faulty CMP sensor.



Connection: White/Yellow – Ground
Standard: No continuity

No continuity

Crank the engine with the starter motor and measure the CMP sensor peak voltage at the CMP sensor 2P connector.



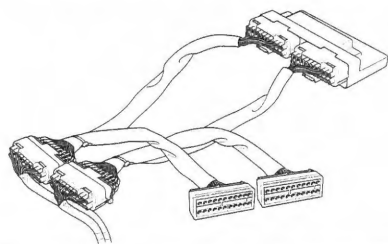
Connection: Gray (+) – White/Yellow (–)
Standard: 0.7 V minimum (20°C/68°F)

Out of range

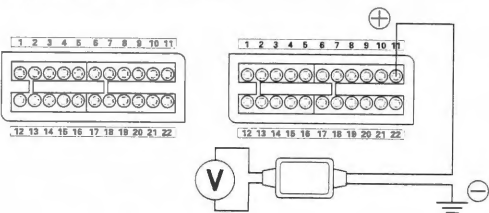
- Faulty CMP sensor.

Normal

Connect the CMP sensor 2P connector.
 Disconnect the ECM connectors.
 Connect the test harness to ECM connectors.



Crank the engine with the starter motor and measure the CMP sensor peak voltage at the test harness terminals.



Connection: B11 (+) – Ground (–)
Standard: 0.7 V minimum (20°C/68°F)

Out of range

- Open circuit in White/Yellow and/or Gray wire.

Normal

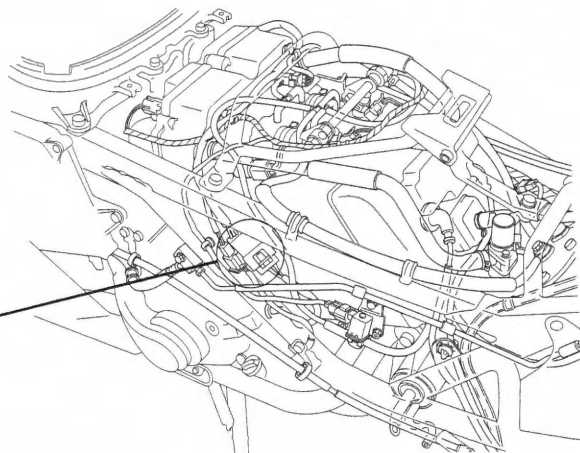
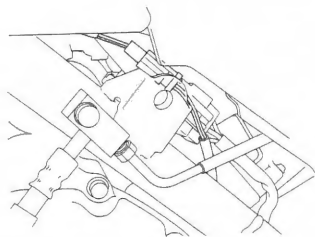
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 19 BLINKS (CKP SENSOR)

Turn the ignition switch to "OFF".

Disconnect the CKP sensor 2P connector.
Check for loose or poor contact on the CKP sensor 2P connector.



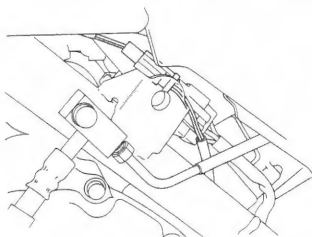
Connect the CKP sensor 2P connector.
Place the scooter on its main stand.
Turn the starter motor for more than 10 seconds
and then check that the MIL blinks.

Does not blink

- Loose or poor contact on the CKP sensor 2P connector.

19 blinks

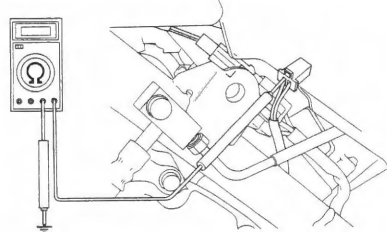
Turn the ignition switch to "OFF" and the engine
stop switch to "OFF".
Disconnect the CKP sensor 2P connector.



Check the continuity between the CKP sensor
connector terminal and ground.

Abnormal

- Faulty CKP sensor.

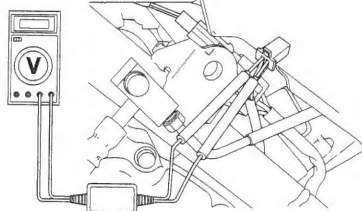


Connection: White/Yellow - Ground
Standard: No continuity

No continuity

↓

Crank the engine with the starter motor and measure the CKP sensor peak voltage at the CKP sensor 2P connector.



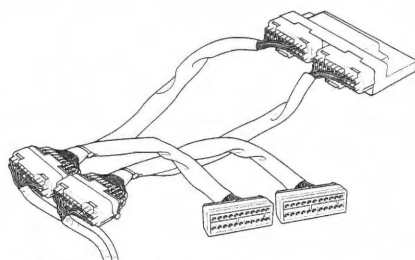
Connection: Yellow (+) – White/Yellow (–)
Standard: 0.7 V minimum (20°C/68°F)

Out of range →

- Faulty CKP sensor.

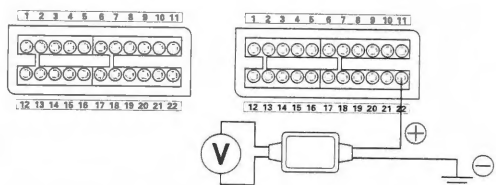
Normal ↓

Connect the CKP sensor 2P connector.
 Disconnect the ECM connectors.
 Connect the test harness to ECM connectors.



↓

Crank the engine with the starter motor and measure the CKP sensor peak voltage at the test harness terminals.



Connection: B22 (+) – Ground (–)
Standard: 0.7 V minimum (20°C/68°F)

Out of range →

- Open circuit in White/Yellow wire.
- Open circuit in Yellow wire.

Normal →

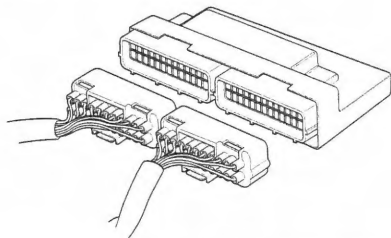
- Replace the ECM with a new one, and inspect it again.

FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 33 BLINKS (E²-PROM)

Turn the ignition switch to "OFF".

Disconnect the ECM connectors.
Check for loose or poor contact on the
ECM connectors.



Connect the ECM connectors.
Short the service check connector with a jumper
wire (page 5-8).
Turn the ignition switch to "ON" and check that
the MIL blinks.

33 blinks

Reset the self-diagnosis memory data (page 5-9).
Turn the ignition switch to "ON" and check that the
MIL blinks.

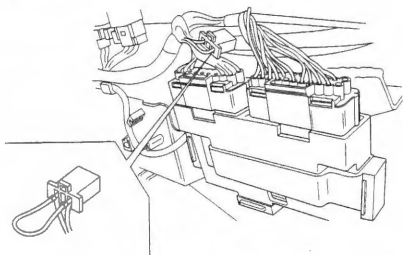
33 blinks

• Replace the ECM.

Does not blink 33 times

Blinks

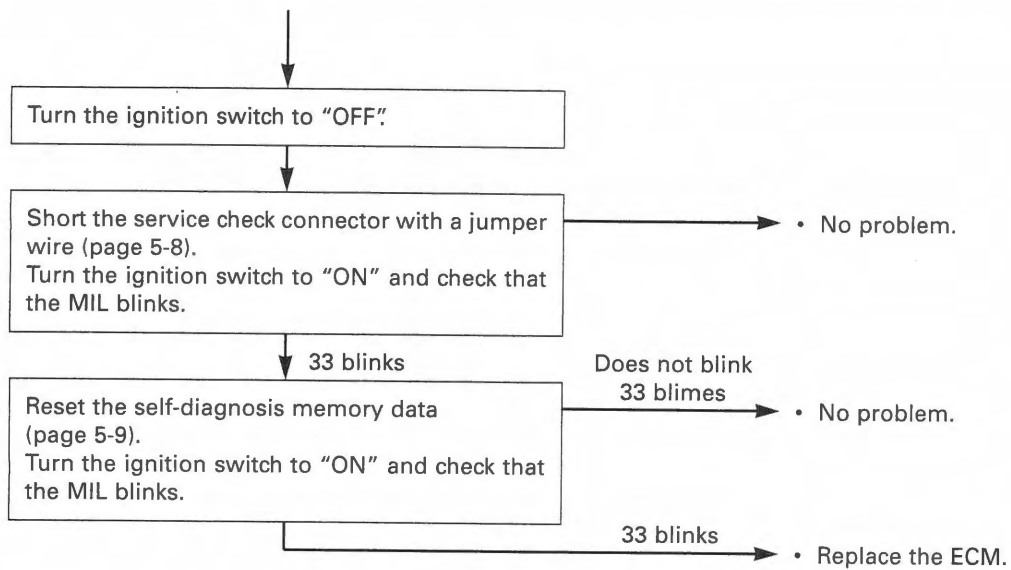
Remove the jumper wire from the service check
connector.



Turn the ignition switch to "ON" and check that
the MIL blinks.

• No problem.

33 blinks



FUEL SYSTEM (Programmed Fuel Injection)

MIL CODE INDEX (After '07)

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 33). When the indicator lights for 1.3 seconds, it is equivalent to 10 blinks. For example, a 1.3 second illumination and two blinks (0.5 second x 2) of the indicator equals 12 blinks. Follow the "MIL 12 BLINKS" troubleshooting (page 5-55).
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example, if the indicator blinks once, then two times, two failures have occurred. Follow the "MIL 1 BLINK" troubleshooting (page 5-46) and "MIL 2 BLINKS" troubleshooting (page 5-47).

MIL	Function Failure	Causes	Symptoms	Refer to
No blinks	ECM malfunction	• Faulty ECM	• Engine does not start	5-115
No blinks	ECM power/ground circuit malfunction	• Open circuit at the power input wire • Faulty bank angle sensor • Open circuit in bank angle sensor related circuit • Faulty engine stop relay • Open circuit in engine stop relay related wires • Faulty engine stop switch • Open circuit in engine stop switch related wires • Open circuit in engine stop switch ground • Blown main fuse B (30 A) • Blown sub-fuse (15 A) (Starter, Ignition, Fuel pump)	• Engine does not start	5-115
No blinks	ECM output line malfunction	• ECM output voltage line (Yellow/red wire) short circuit	• Engine does not start	—
No blinks	MIL circuit malfunction	• Open or short circuit in MIL wire • Faulty ECM	• Engine operates normally	—
Stay lit	Datalink circuit malfunction	• Short circuit in DLC • Short circuit in DLC wire • Faulty ECM	• Engine operates normally	—
1 blink	MAP sensor circuit malfunction	• Loose or poor contacts on MAP sensor connector • Open or short circuit in MAP sensor wire • Faulty MAP sensor	• Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-46
2 blinks	MAP sensor performance problem	• Loose or poor connection of the MAP sensor vacuum hose • Faulty MAP sensor	• Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-47
7 blinks	ECT sensor circuit malfunction	• Loose or poor contact on ECT sensor • Open or short circuit in ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (simulate using numerical values; 90°C/194°F)	5-48
8 blinks	TP sensor circuit malfunction	• Loose or poor contact on TP sensor connector • Throttle quickly • Open or short circuit in TP sensor wire • Faulty TP sensor	• Poor engine response and performance when operating the throttle quickly (simulate using numerical values; throttle opens 0°)	5-50
9 blinks	IAT sensor circuit malfunction	• Loose or poor contact on IAT sensor connector • Open or short circuit in IAT sensor wire • Faulty IAT sensor	• Engine operates normally (simulate using numerical values; 35°C/95°F)	5-52

FUEL SYSTEM (Programmed Fuel Injection)

MIL	Function Failure	Causes	Symptoms	Refer to
11 blinks	Vehicle speed sensor circuit malfunction	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor wire • Faulty vehicle speed sensor	• Engine operates normally	5-53
12 blinks	No. 1 injector circuit malfunction	• Loose or poor contact on No. 1 injector connector • Open or short circuit in No. 1 injector wire • Faulty No. 1 injector	• Engine does not start	5-55
13 blinks	No. 2 injector circuit malfunction	• Loose or poor contact on No. 2 injector connector • Open or short circuit in No. 2 injector wire • Faulty No. 2 injector	• Engine does not start	5-55, 56
18 blinks	CMP sensor no signal	• Loose or poor contact on CMP sensor connector • Open or short circuit in CMP sensor wire • Faulty CMP sensor	• Engine operates normally	5-56
19 blinks	CKP sensor no signal	• Loose or poor contact on CKP sensor connector • Open or short circuit in CKP sensor wire • Faulty CKP sensor	• Engine operates normally	5-57
21 blinks	O ₂ sensor circuit malfunction	• Loose or poor contact on O₂ sensor connector • Short circuit in O₂ sensor wire • Faulty O₂ sensor	• Engine operates normally	5-58
23 blinks	O ₂ sensor heater malfunction	• Loose or poor contact on O₂ sensor connector • Open or short circuit in O₂ sensor heater wire • Faulty O₂ sensor	• Engine operates normally	5-59

MIL TROUBLESHOOTING (AFTER '07)

MIL 1 BLINK (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the MIL blinking.

1. MAP Sensor System Inspection

Turn the ignition switch to "OFF".

Connect the ECM test harness to the ECM connectors (page 5-14).

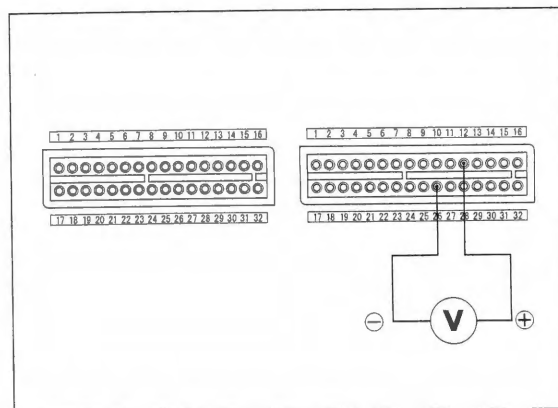
Turn the ignition switch to "ON" and engine stop switch to "○".

Measure the voltage at the test harness terminals.

CONNECTION: B12 (+) – B26 (–)

Is the voltage within 2.7 – 3.1 V?

- YES —
- Intermittent failure.
 - Loose or poor contact on the ECM connectors.
- NO —
- About 5 V.
GO TO STEP 2.
 - About 0 V.
GO TO STEP 3.



2. MAP Sensor Output/Ground Line Inspection

Turn the ignition switch to "OFF".

Disconnect the MAP sensor 3P connector.

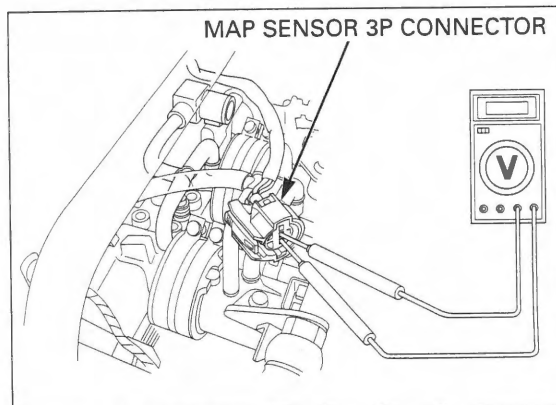
Turn the ignition switch to "ON" and engine stop switch to "○".

Measure the voltage at the wire harness side.

CONNECTION: Light green/yellow (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

- YES — Faulty MAP sensor.
- NO —
- Open circuit in Light green/yellow wire.
 - Open circuit in Green/orange wire.



3. MAP Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the MAP sensor 3P connector.

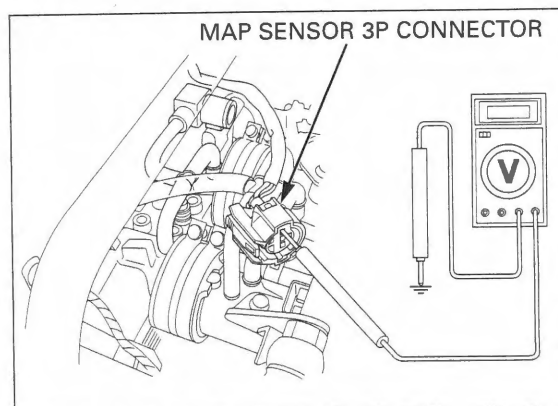
Turn the ignition switch to "ON" and engine stop switch to "○".

Measure the voltage at the wire harness side.

CONNECTION: Yellow/red (+) – Ground (–)

Is the voltage within 4.75 – 5.25 V?

- YES — GO TO STEP 4.
- NO — GO TO STEP 5.



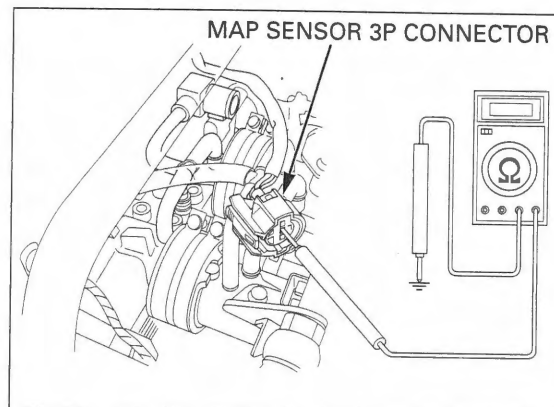
4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM test harness and ECM 32P connectors disconnected.
Check for continuity between the MAP sensor 3P connector terminal of the wire harness side and ground.

CONNECTION: Light green/yellow – Ground

Is there continuity?

YES — Short circuit in Light green/yellow wire.
NO — Faulty MAP sensor.



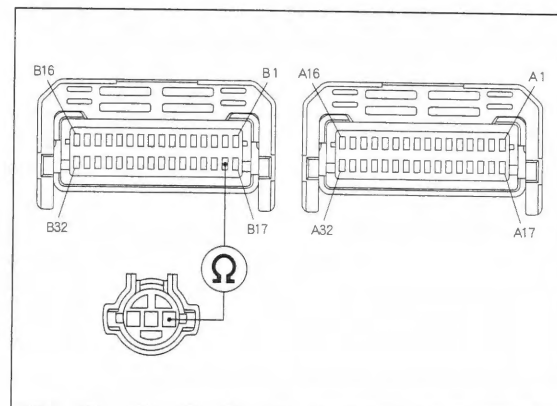
5. MAP Sensor Power Input Line Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connectors.
Check for continuity at the Yellow/red wire between the MAP sensor 3P connector and ECM 32P (Light gray) connector terminal of the wire harness side.

CONNECTION: Yellow/red - B18 (Yellow/red)

Is there continuity?

YES — Replace the ECM with a new one, and recheck.
NO — Open circuit in Yellow/red wire.



MIL 2 BLINKS (MAP SENSOR)

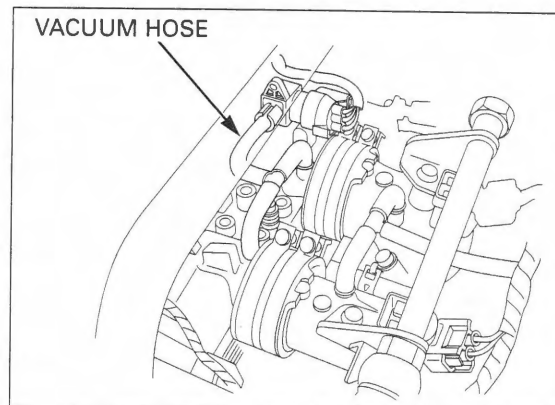
- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the MIL blinking.

1. MAP Sensor Hose Inspection

Turn the ignition switch to "OFF".
Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connection correct?

YES — GO TO STEP 2.
NO — Correct the hose connection or installation.



2. MAP Sensor System Inspection

Connect the ECM test harness to the ECM connectors (page 5-14).

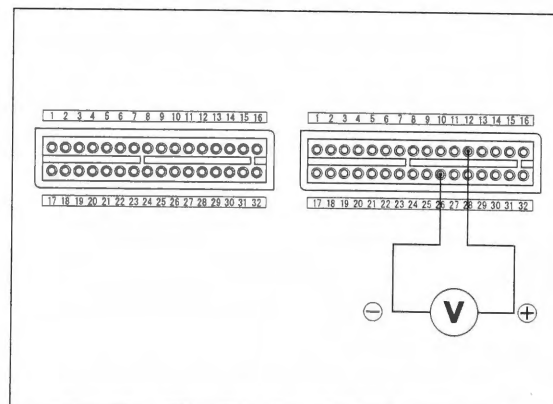
Turn the ignition switch to "ON" and engine stop switch to "O".

Measure the voltage at the test harness terminals.

CONNECTION: B12 (+) – B26 (–)

Is the voltage within 2.7 – 3.1 V?

YES — GO TO STEP 3.
NO — Faulty MAP sensor.



FUEL SYSTEM (Programmed Fuel Injection)

3. MAP Sensor System Inspection At Idle

Start the engine.

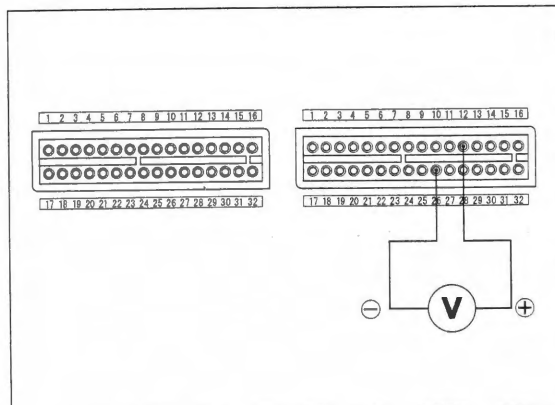
Measure the voltage at the test harness terminals.

CONNECTION: B12 (+) – B26 (–)

Is the voltage less than 2.7 V?

YES — Replace the ECM with a new one, and recheck.

NO — Faulty MAP sensor.



MIL 7 BLINKS (ECT SENSOR)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P connector and recheck the MIL blinking.

1. ECT Sensor System Inspection

Turn the ignition switch to "OFF".

Connect the ECM test harness to the ECM 32P connectors (page 5-14).

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

Measure the voltage at the test harness terminals.

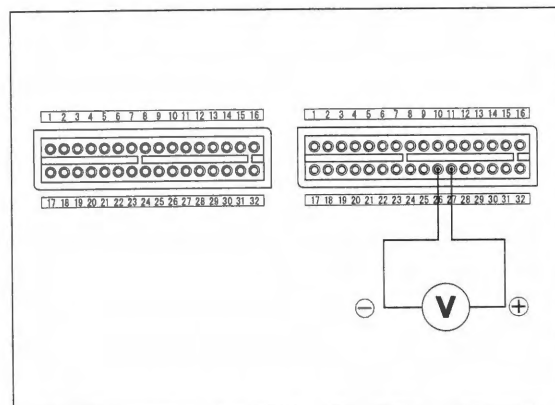
CONNECTION: B27 (+) – B26 (–)

Is the voltage within 2.7 – 3.1 V (20°C/68°F)?

YES — • Intermittent failure.

- Loose or poor contact on the ECM connector.

NO — GO TO STEP 2.



2. ECT Sensor Output Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the ECT sensor 3P connector.

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

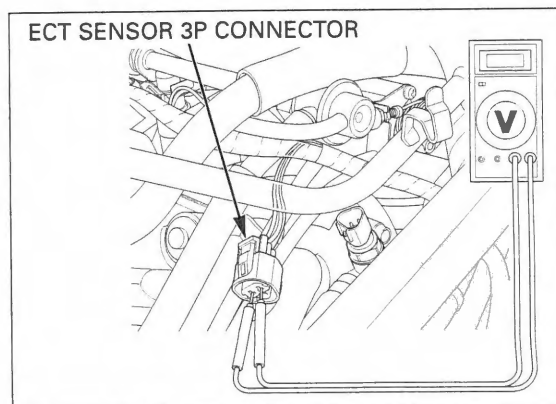
Measure the voltage at the test ECT sensor 3P connector of the wire harness side.

CONNECTION: Pink/white (+) – Green/orange (–)

Is the voltage within 4.75 - 5.25 V?

YES — GO TO STEP 3.

NO — GO TO STEP 4.



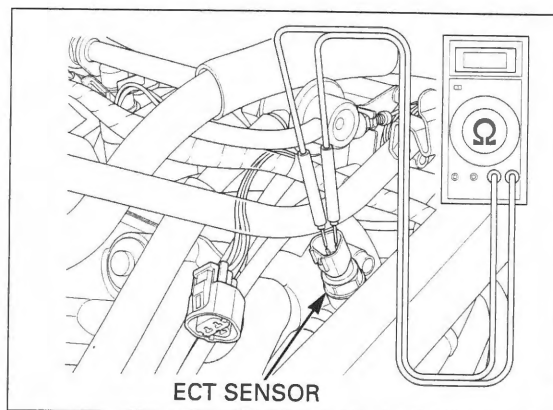
3. ECT Sensor Resistance Inspection

Turn the ignition switch to "OFF".
Measure the resistance at the ECT sensor terminals.

CONNECTION: Pink/white - Green/orange

Is the resistance within 2.3 – 2.6 k Ω (20°C/68°F)?

- YES — Replace the ECM with a new one, and recheck.
NO — Faulty ECT sensor.



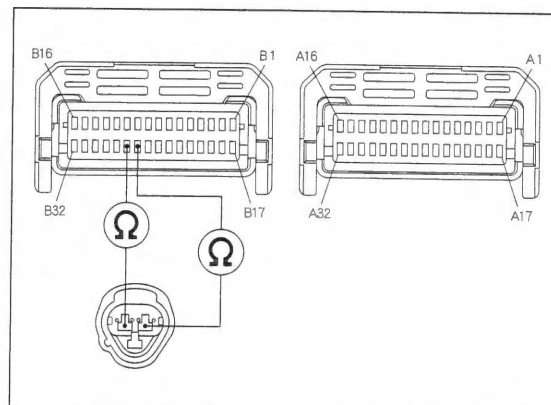
4. ECT Sensor Output/Ground Line Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM test harness and the ECM 32P connector disconnected.
Check for continuity at the Pink/white and Green/orange wires between the ECT sensor 3P connector and ECM 32P (Light gray) connector terminals of the wire harness side.

CONNECTION: Pink/white – B27 (Pink/white)
Green/orange – B26 (Green/orange)

Is there continuity?

- YES — GO TO STEP 5.
NO — • Open circuit in Pink/white wire.
• Open circuit in Green/orange wire.



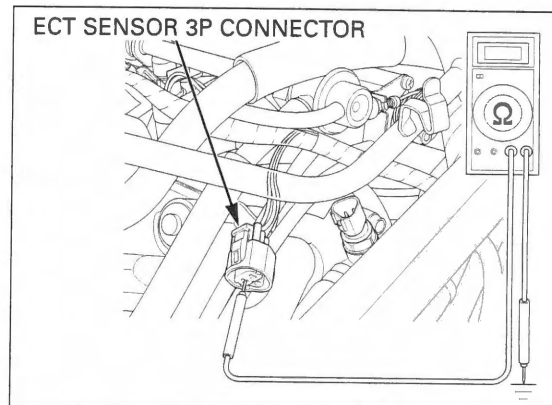
5. ECT Sensor Input Line Short Circuit Inspection

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

CONNECTION: Pink/white - Ground

Is there continuity?

- YES — Short circuit in Pink/white wire.
NO — Replace the ECM with a new one, and recheck.



FUEL SYSTEM (Programmed Fuel Injection)

MIL 8 BLINKS (TP SENSOR)

- Before starting the inspection, check for loose or poor contact on the TP sensor connector and recheck the MIL blinking.

1. TP Sensor System Inspection

Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM 32P connectors (page 5-14).
Turn the ignition switch to "ON" and engine stop switch to "○".
Measure the voltage at the test harness terminals.

CONNECTION: B30 (+) – B26 (-)

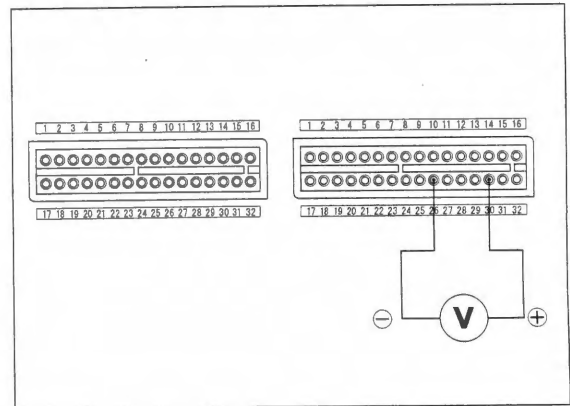
STANDARD: *0.4 - 0.6 V (throttle fully closed)
***4.2 - 4.8 V (throttle fully opened)**

NOTE:

- A voltage marked * refers to the value of the ECM output voltage (STEP 2) when the voltage reading shows 5 V.
When the ECM output voltage reading shows other than 5 V, calculate the TP sensor output voltage at the test harness as follows:
In the case of the ECM output voltage is 4.75 V:
 $0.4 \times 4.75/5.0 = 0.38 \text{ V}$
 $0.6 \times 4.75/5.0 = 0.57 \text{ V}$
Thus, the solution is "0.38 - 0.57 V" with the throttle fully closed.
Replace 0.4 and 0.6 with 4.2 and 4.8 respectively, in the above equations to determine the throttle fully opened range.

Is the voltage at the standard value?

- YES — • Intermittent failure.
• Loose or poor contact on the ECM connector.
- NO — GO TO STEP 2.



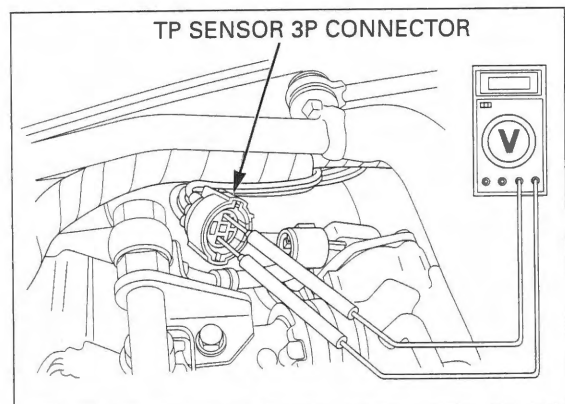
2. TP Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the TP sensor 3P connector.
Turn the ignition switch to "ON" and engine stop switch to "○".
Measure the voltage at the wire harness 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. ECM Output Voltage Inspection

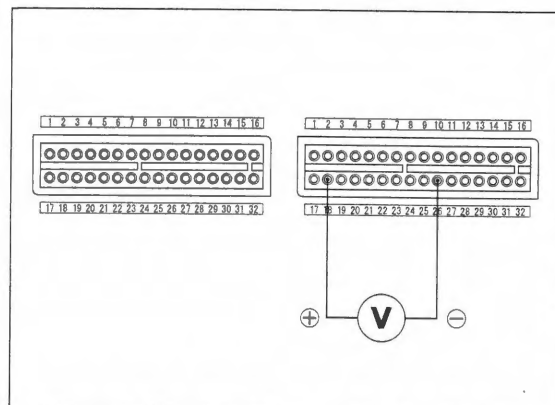
Turn the ignition switch to "ON" and engine stop switch to "O".

Measure the voltage at the test harness terminals.

CONNECTION: B18 (+) – B26 (–)

Is the voltage within 4.75 – 5.25 V?

- YES — • Open circuit in Yellow/red wire.
• Open circuit in Green/orange wire.
- NO — Replace the ECM with a new one, and recheck.



4. TP Sensor Output Line Inspection

Turn the ignition switch to "OFF".

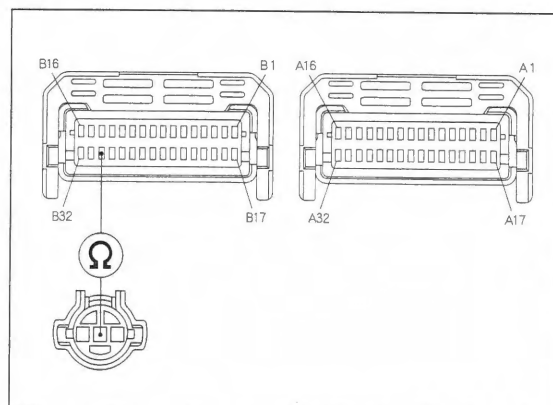
Disconnect the ECM test harness and the ECM 32P connectors disconnected.

Check for continuity between the TP sensor 3P connector and ECM 32P (Light gray) connector terminal of the wire harness side.

CONNECTION: Red/yellow – B30 (Red/yellow)

Is there continuity?

- YES — GO TO STEP 5.
- NO — Open circuit in Red/yellow wire.



5. TP Sensor Output Line Short Circuit Inspection

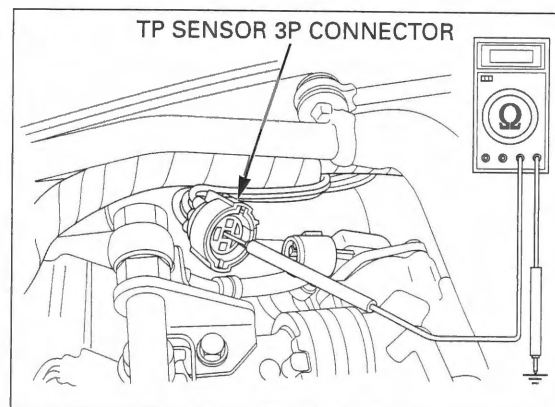
Turn the ignition switch to "OFF".

Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

CONNECTION: Red/yellow – Ground

Is there continuity?

- YES — Short circuit in Red/yellow wire.
- NO — Faulty TP sensor.



MIL 9 BLINKS (IAT SENSOR)

- Before starting the inspection, check for loose or poor contact on the IAT sensor connector and recheck the MIL blinking.

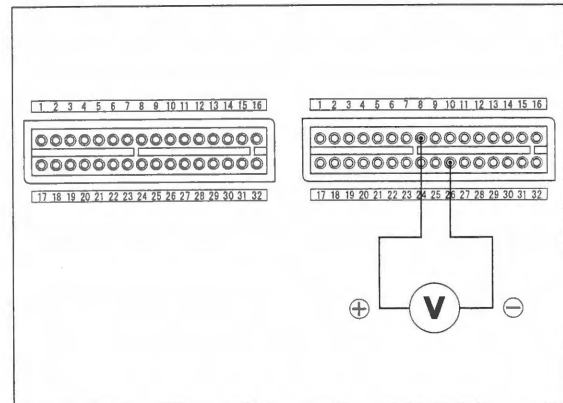
1. IAT Sensor System Inspection

Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 5-14).
Turn the ignition switch to "ON" and engine stop switch to "○".
Measure the voltage at the test harness terminals.

CONNECTION: B8 (+) – B26 (–)

Is the voltage within 2.7 – 3.1 V (20°C/68°F)?

- YES —
- Intermittent failure.
 - Loose or poor contact on the ECM connectors.
- NO — GO TO STEP 2.



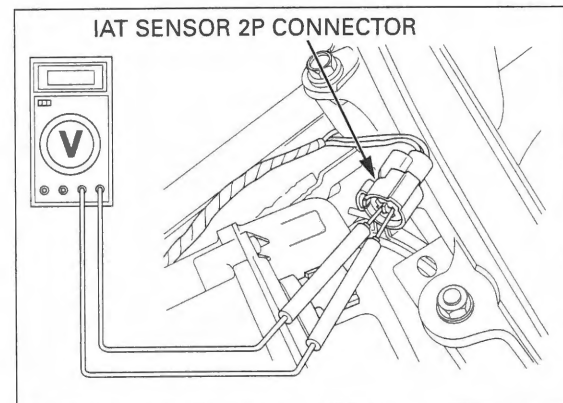
2. IAT Sensor Output Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the IAT sensor 2P connector.
Turn the ignition switch to "ON" and engine stop switch to "○".
Measure the voltage at the wire harness side.

CONNECTION: Gray/blue (+) – Green/orange(–)

Is the voltage within 4.75 – 5.25 V?

- YES — GO TO STEP 3.
NO — GO TO STEP 4.

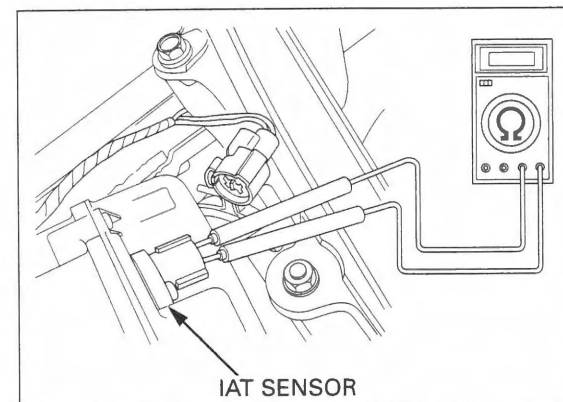


3. IAT Sensor Resistance Inspection

Turn the ignition switch to "OFF".
Measure the resistance at the IAT sensor terminals (at 20 – 30°C/68 – 86°F).

Is the resistance within 1 – 4 kΩ (20 – 30°C/68 – 86°F)?

- YES — Replace the ECM with a new one and recheck.
NO — Faulty IAT sensor.



4. IAT Sensor Output/Ground Line Open Circuit Inspection

Turn the ignition switch to "OFF".

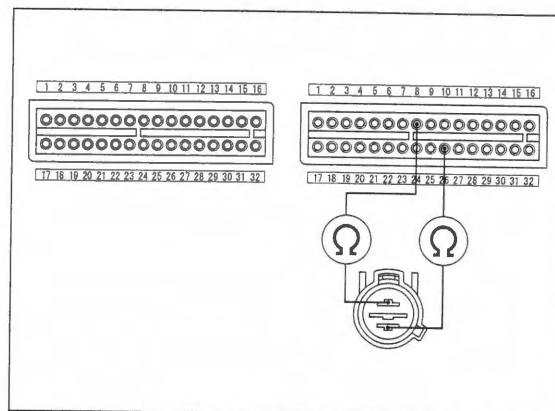
Check for continuity at the Gray/blue and Green/orange wires between the IAT sensor 2P connector terminals of the wire harness side and test harness terminals.

CONNECTION: Gray/blue – B8
Green/orange – B26

Is there continuity?

YES — GO TO STEP 5.

NO — • Open circuit in Gray/blue wire.
• Open circuit in Green/orange wire.



5. IAT Sensor Output Line Short Circuit Inspection

Disconnect the ECM test harness and the 32P connector disconnected.

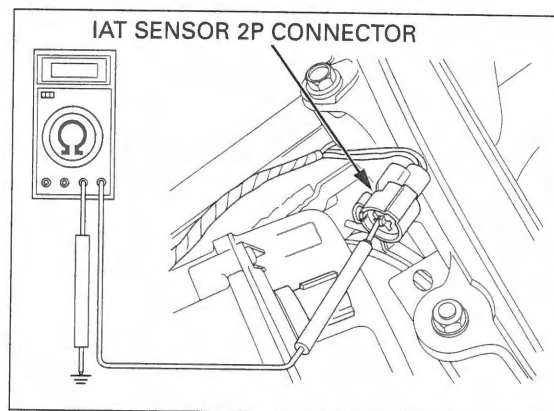
Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

CONNECTION: Gray/blue – Ground

Is there continuity?

YES — Short circuit in Gray/blue wire.

NO — Replace the ECM with a new one, and recheck.



MIL 11 BLINKS (VEHICLE SPEED SENSOR)

- Before starting the inspection, check for loose or poor contact on the vehicle speed sensor connector and recheck the MIL blinking.

1. Vehicle Speed Sensor Pulse Inspection

Turn the ignition switch to "OFF".

Connect the ECM test harness to the ECM connectors (page 5-14).

Support the scooter with its centerstand and lift the rear wheel off the ground.

Measure the voltage at the test harness terminals with the ignition switch to "ON" and engine stop switch to "○" while slowly turning the rear wheel by hand.

CONNECTION: B25 (+) – A4 (–)

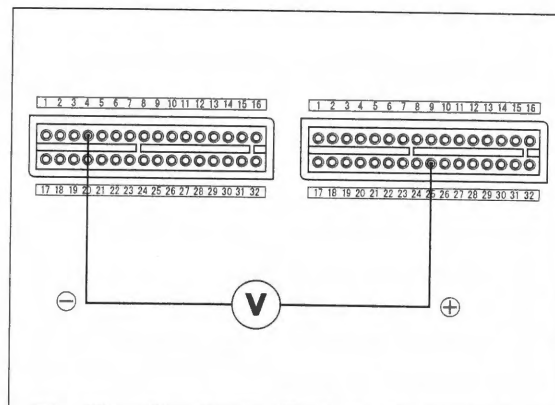
STANDARD: Repeat 0 to 5 V

Is the voltage at the standard value?

YES — • Intermittent failure.

• Loose or poor contact on the ECM connectors.

NO — GO TO STEP 2.



FUEL SYSTEM (Programmed Fuel Injection)

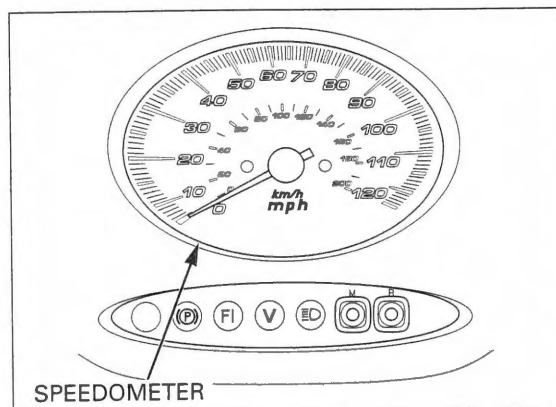
2. Combination Meter Inspection

Check for operation of speedometer.

Does the speedometer operate normally?

YES — Open or short circuit in Pink/green wire between the ECM and vehicle speed sensor.

NO — GO TO STEP 3.



3. Vehicle Speed Sensor Input Voltage Inspection

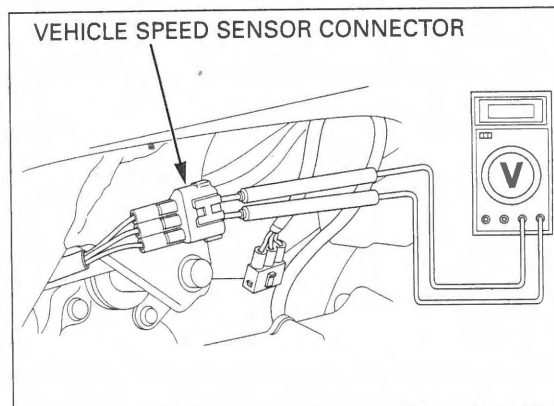
Turn the ignition switch to "OFF".
Disconnect the vehicle speed sensor 3P connector.
Turn the ignition switch to "ON" and engine stop switch to "O".
Measure the voltage at the wire harness side.

CONNECTION: Black/brown (+) – Green/black (–)

Does the battery voltage exist?

YES — GO TO STEP 4.

NO — • Open circuit in Black/brown wire.
• Open circuit in Green/black wire.



4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

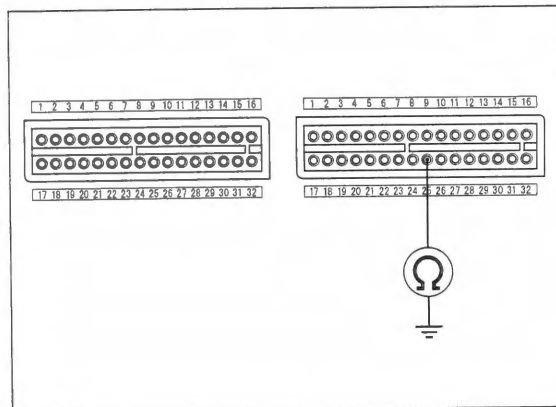
Turn the ignition switch to "OFF".
Check for continuity between the test harness terminal and ground.

CONNECTION: B25 – Ground

Is there continuity?

YES — Short circuit in Pink/green wire.

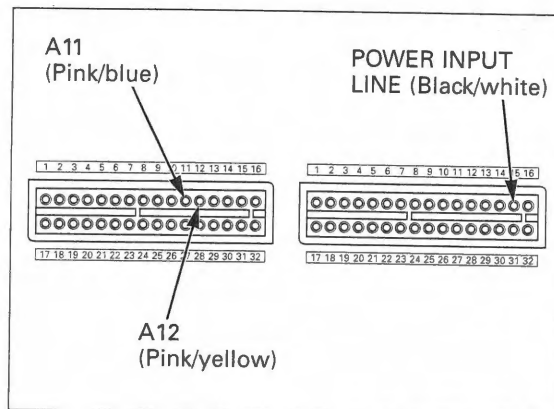
NO — Inspect the vehicle speed sensor (page 21-8).



MIL 12 BLINKS (NO.1 INJECTOR)

- Before starting the inspection, check for loose or poor contact on the injector connector and recheck the MIL blinking.

MIL	INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12	No. 1	Black/white	Pink/blue	A11
13	No. 2	Black/white	Pink/yellow	A12



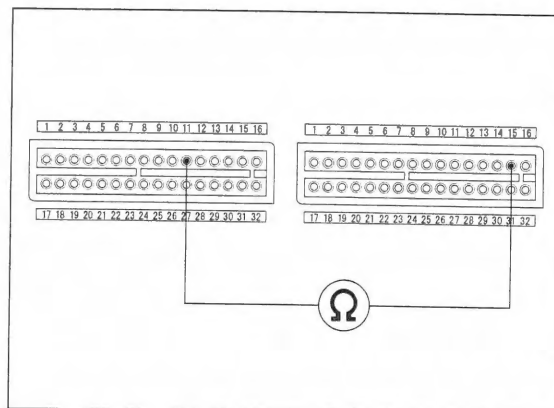
1. Injector Circuit Resistance Inspection

Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 5-14).
Measure the resistance at the test harness terminals.

CONNECTION: POWER INPUT LINE (B15) – SIGNAL AT ECM

Is the resistance within 11.1 – 12.3 Ω (20°C/68°F)?

- YES — GO TO STEP 4.
NO — GO TO STEP 2.

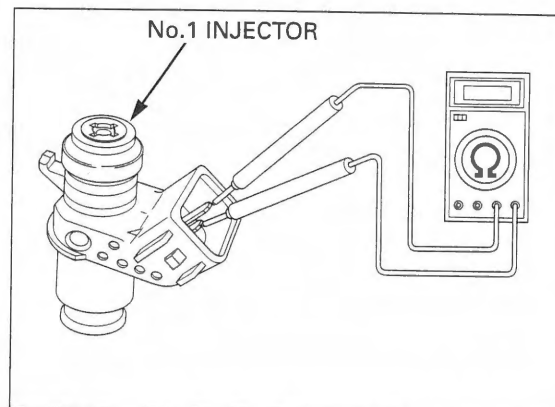


2. Injector Resistance Inspection

Disconnect the No.1 injector 2P (Black) connector and measure the resistance at the No.1 injector terminals.

Is the resistance within 11.1 – 12.3 Ω (20°C/68°F)?

- YES — GO TO STEP 3.
NO — Faulty injector.



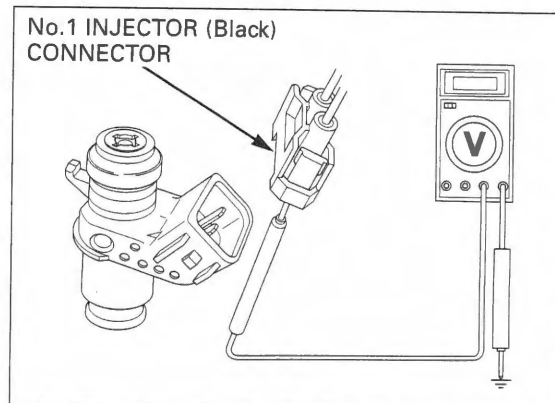
3. Injector Input Voltage Inspection

Turn the ignition switch to "ON" and engine stop switch to "O".
Measure the voltage between the No. 1 injector 2P (Black) connector terminal of the wire harness side and ground.

CONNECTION: POWER INPUT LINE (+) – Ground (–)

Does the battery voltage exist?

- YES — Open circuit in SIGNAL LINE wire.
NO — Open circuit in POWER INPUT LINE wire.



FUEL SYSTEM (Programmed Fuel Injection)

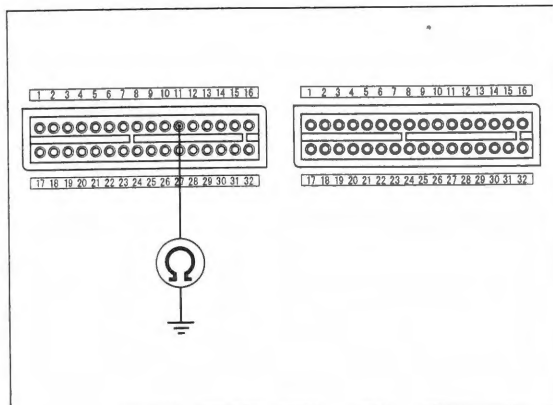
4. Injector Signal Line Short Circuit Inspection

Check for continuity between the test harness terminal and ground.

CONNECTION: SIGNAL AT ECM – Ground

Is there continuity?

- YES — • Short circuit in SIGNAL LINE wire.
• Faulty injector.
- NO — Replace the ECM with a new one, and recheck.



MIL 13 BLINKS (NO.2 INJECTOR)

See page 5-55.

MIL 18 BLINKS (CMP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CMP sensor connector and recheck the MIL blinking.

1. CMP Sensor Peak Voltage Inspection at ECM

Turn the ignition switch to "OFF".

Connect the ECM test harness to the ECM connectors.

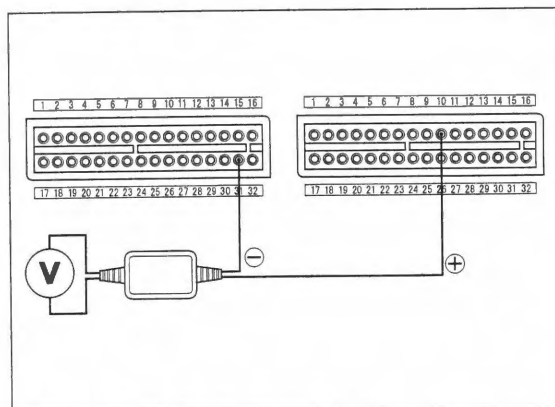
Turn the ignition switch to "ON" and engine stop switch to "○".

Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the test harness terminals.

CONNECTION: B10 (+) – A31 (–)

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

- YES — • Intermittent failure.
• Loose or poor contact on the ECM connectors.
- NO — GO TO STEP 2.



2. CMP Sensor Peak Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the CMP sensor 2P connector.

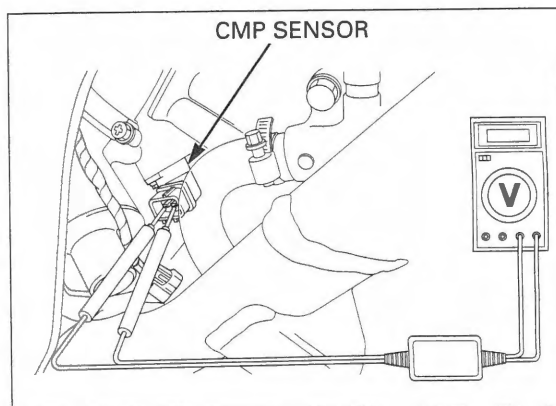
Turn the ignition switch to "ON" and engine stop switch to "○".

Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the CMP sensor terminals.

CONNECTION: Gray (+) – White/yellow (–)

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

- YES — Open or short circuit in White/yellow wire or Gray wire.
- NO — Faulty CMP sensor.



MIL 19 BLINKS (CKP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CKP sensor connector and recheck the MIL blinking.

1. CKP Sensor Peak Voltage Inspection at ECM

Turn the ignition switch to "OFF".

Connect the ECM test harness to the ECM connectors (page 5-14).

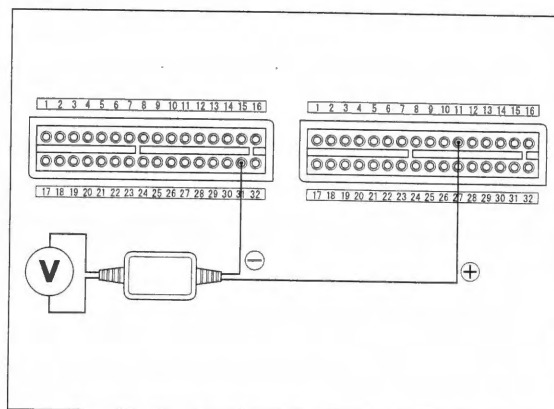
Turn the ignition switch to "ON" and engine stop switch to "○".

Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the test harness terminals.

CONNECTION: B11 (+) – A31 (–)

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

- YES — • Intermittent failure.
- Loose or poor contact on the ECM connectors.
- NO — GO TO STEP 2.



2. CKP Sensor Peak Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the CKP sensor 2P (Red) connector.

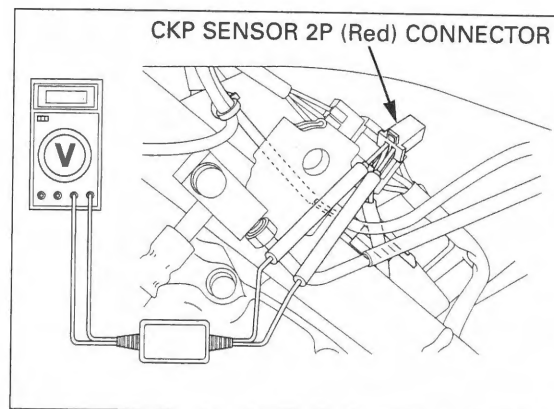
Turn the ignition switch to "ON" and engine stop switch to "○".

Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the CKP sensor 2P (Red) connector terminals of the sensor side.

CONNECTION: Yellow (+) – White/yellow (–)

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

- YES — Open or short circuit in Yellow or White/yellow wire.
- NO — Faulty CKP sensor.



FUEL SYSTEM (Programmed Fuel Injection)

MIL 21 BLINKS (O₂ SENSOR)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor connector and recheck the MIL blinking.

1. O₂ Sensor Open Circuit Inspection

Turn the ignition switch to "OFF".

Connect the ECM test harness to the ECM connectors (page 5-14).

Disconnect the O₂ sensor 4P (Gray) connector.

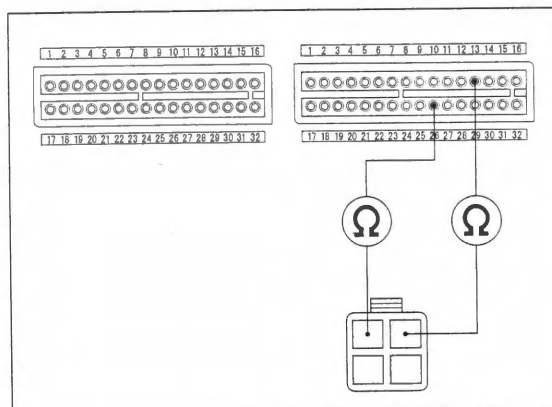
Check for continuity between the O₂ sensor 4P (Gray) connector terminals of the wire harness side and test harness terminals.

CONNECTION: Black/red – B13
Green/orange – B26

Is there continuity?

YES — GO TO STEP 2.

NO — • Open circuit in Black/red wire.
• Open circuit in Green/orange wire.



2. O₂ Sensor Short Circuit Inspection

Disconnect the ECM test harness and the ECM 32P connector disconnected.

Check for continuity between the O₂ sensor 4P (Gray) connector terminal of the wire harness side and ground.

CONNECTION: Black/red – Ground

Is there continuity?

YES — Short circuit in Black/red wire.

NO — GO TO STEP 3.

3. O₂ Sensor Inspection

Replace the O₂ sensor with a new one (page 5-110).

Reset the ECM (page 5-13).

Turn the ignition switch to "ON" and engine stop switch to "○".

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

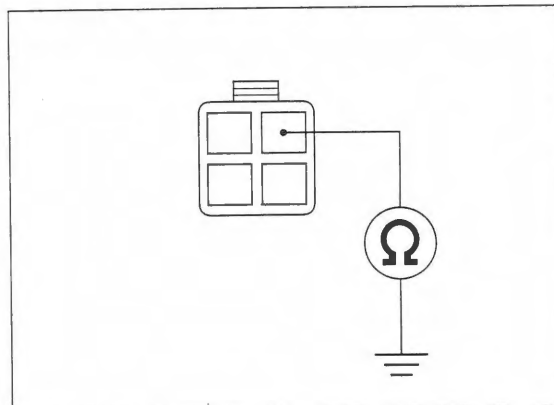
Test ride the scooter, then stop the engine.

Perform the self-diagnostic procedure (page 5-12) and check that the MIL blinks.

Is the MIL 21 blinks?

YES — Replace the ECM with a new one, and recheck.

NO — Faulty original O₂ sensor.



MIL 23 BLINKS (O₂ SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor connector and recheck the MIL blinking.

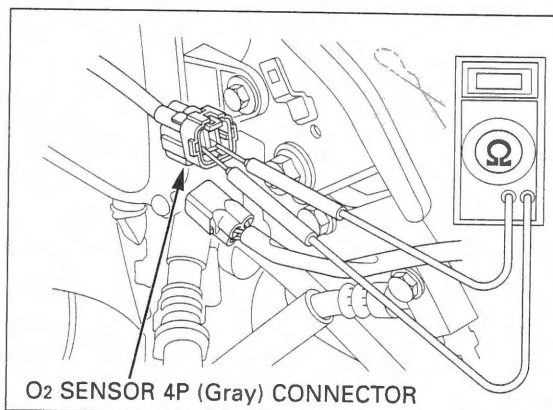
1. O₂ Sensor Heater Resistance Inspection

Turn the ignition switch to "OFF".
Disconnect the O₂ sensor 4P (Gray) connector and measure the resistance at the sensor side connector.

CONNECTION: White – White

Is the resistance within 10 – 40 Ω (20°C/68°F)?

- YES — GO TO STEP 2.
NO — Faulty O₂ sensor.



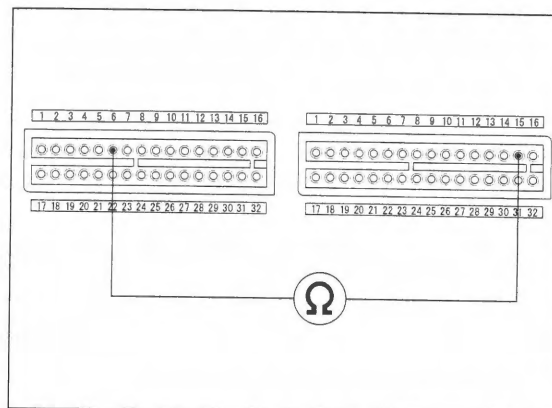
2. O₂ Sensor Heater Open circuit Inspection

Connect the ECM test harness to the ECM connectors (page 5-14).
Connect the O₂ sensor 4P (Gray) connector.
Measure the resistance at the test harness terminals.

CONNECTION: A6 – B15

Is the resistance within 10 – 40 Ω (20°C/68°F)?

- YES — GO TO STEP 3.
NO — • Open circuit in Black/white wire
• Open circuit in White wire



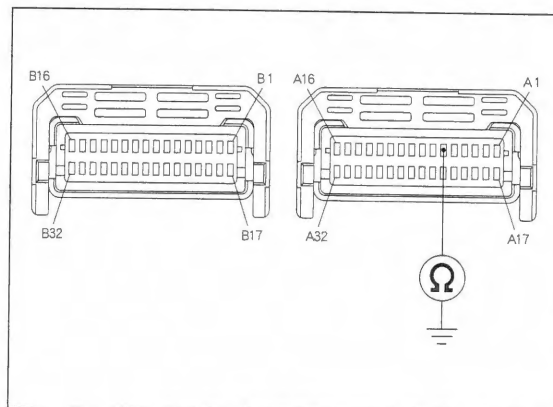
3. O₂ Sensor Heater Short Circuit Inspection 1

Disconnect the ECM test harness and ECM 32P connectors disconnected.
Disconnect the O₂ sensor 4P (Gray) connector.
Check for continuity between the ECM 32P (Black) connector terminal of the wire harness side and ground.

CONNECTION: A6 (White) – Ground

Is there continuity?

- YES — Short circuit in White wire.
NO — GO TO STEP 4.



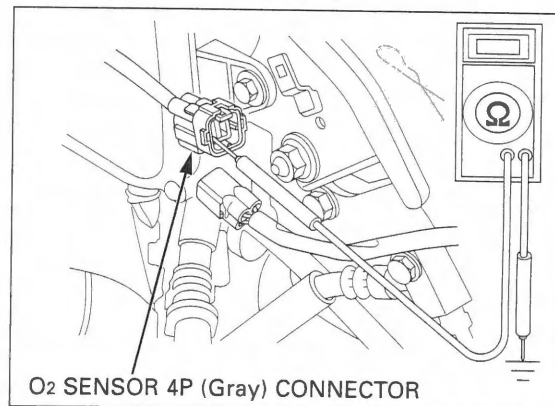
4. O₂ Sensor Heater Short Circuit Inspection 2

Check for continuity between the O₂ sensor 4P (Gray) connector terminal of the sensor side and ground.

CONNECTION: White – Ground

Is there continuity?

- YES — Faulty O₂ sensor.
NO — Replace the ECM with a new one, and recheck.



DTC CODE INDEX (After '07)

- The Diagnostic Trouble Codes (DTC) are based upon Malfunction Indicator Lamp (MIL) codes and are displayed as hyphenated numbers. The digits before the hyphen are equal to an MIL code and indicate the Function Failure. The digit after the hyphen details the symptom. For example, in the case of the TP sensor, the ECM stores two levels of information, a function failure and a detail of the symptom:

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

or

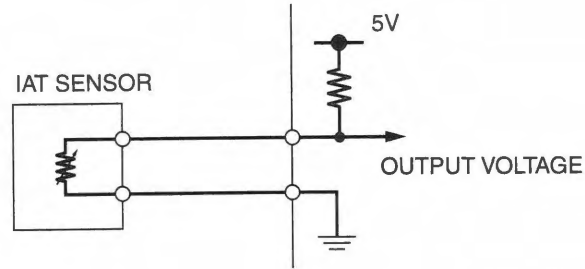
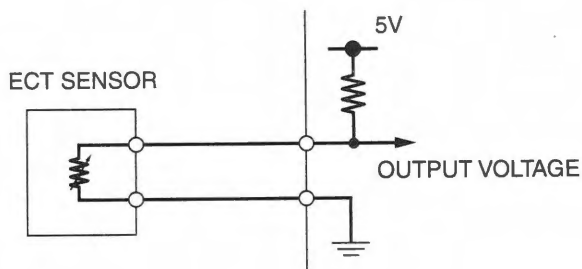
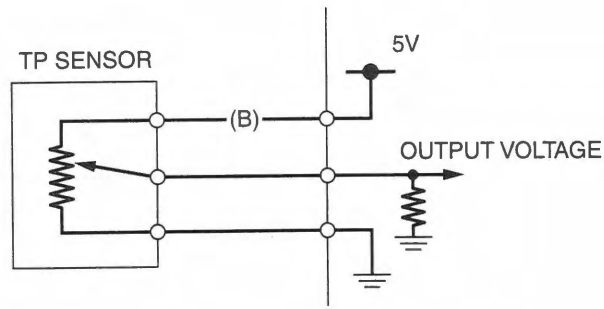
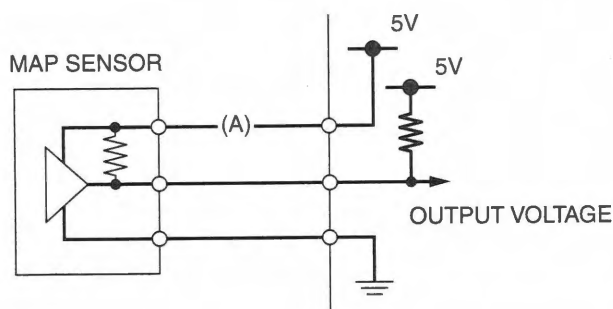
(08 - 2) = TP sensor voltage - higher than the specified value.

- The MAP, ECT, TP and IAT sensor can be mean diagnosis according to the sensor output voltage value.

If the failure occurs, the ECM determines the failure function, the output voltage is high or low compared to the standard voltage, then read out the DTC to the HDS pocket tester.

For example:

- If the input 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 read out.
- 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 read out.



FUEL SYSTEM (Programmed Fuel Injection)

DTC	Function Failure	Causes	Symptoms	Refer to
—	ECM malfunction	Faulty ECM	- Engine does not start - MIL does not blink	5-115
—	ECM power input circuit malfunction	- Open circuit at the power input wire of the ECM - Faulty bank angle sensor - Open circuit in bank angle sensor related circuit - Faulty engine stop relay - Open circuit in engine stop relay related wires - Faulty engine stop switch - Open circuit in engine stop switch related wires - Faulty ignition switch - Blown main fuse B (30 A) - Blown sub-fuse (15 A) (Starter, Ignition, Fuel pump)	- Engine does not start - MIL does not blink	—
—	ECM output line malfunction	ECM output voltage line (Yellow/red wire) short circuit	Engine does not start	—
—	MIL circuit malfunction	- Open or short circuit in MIL wire - Faulty ECM	- Engine operates normally - MIL does not blink	—
—	Datalink circuit malfunction	- Short circuit in DLC - Short circuit in DLC wire - Faulty ECM	- Engine operates normally - MIL stays lit	—
1-1	MAP sensor circuit low voltage	- Open or short circuit in MAP sensor wire - Faulty MAP sensor	Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-63
1-2	MAP sensor circuit high voltage	- Loose or poor contact on MAP sensor connector - Open circuit in MAP sensor wire - Faulty MAP sensor	Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-64
2-1	MAP sensor performance problem	- Loose or poor connection of the MAP sensor vacuum hose - Faulty MAP sensor	Engine operates normally (simulate using numerical values; 64.8 kPa/486 mmHg)	5-65
7-1	ECT sensor circuit low voltage	- Short circuit in ECT sensor wire - Faulty ECT sensor	Hard start at a low temperature (simulate using numerical values; 90°C/194°F)	5-66
7-2	ECT sensor circuit high voltage	- Loose or poor contact on ECT sensor - Open circuit in ECT sensor wire - Faulty ECT sensor	Hard start at a low temperature (simulate using numerical values; 90°C/194°F)	5-67
8-1	TP sensor circuit low voltage	- Loose or poor contact on TP sensor connector - Open or short circuit in TP sensor wire - Faulty TP sensor	Poor engine response and performance when operating the throttle quickly (simulate using numerical values; throttle opens 0°)	5-68
8-2	TP sensor circuit high voltage	- Open circuit in TP sensor wire - Faulty TP sensor	Poor engine response and performance when operating the throttle quickly (simulate using numerical values; throttle opens 0°)	5-69
9-1	IAT sensor circuit low voltage	- Short circuit in IAT sensor wire - Faulty IAT sensor	Engine operates normally (simulate using numerical values; 35°C/95°F)	5-70
9-2	IAT sensor circuit high voltage	- Loose or poor contact on IAT sensor - Open circuit in IAT sensor wire - Faulty IAT sensor	Engine operates normally (simulate using numerical values; 35°C/95°F)	5-71

FUEL SYSTEM (Programmed Fuel Injection)

DTC	Function Failure	Causes	Symptoms	Refer to
11-1	Vehicle speed sensor no signal (circuit malfunction)	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor connector • Faulty vehicle speed sensor	• Engine operates normally	5-72
12-1	No. 1 injector circuit malfunction	• Loose or poor contact on No. 1 injector connector • Open or short circuit in No. 1 injector wire • Faulty No. 1 injector	• Engine does not start	5-73
13-1	No. 2 injector circuit malfunction	• Loose or poor contact on No. 2 injector connector • Open or short circuit in No. 2 injector wire • Faulty No. 2 injector	• Engine does not start	5-73, 74
18-1	CMP sensor no signal	• Loose or poor contact on CMP sensor connector • Open or short circuit in CMP sensor wire • Faulty CMP sensor	• Engine does not start	5-74
19-1	CKP sensor no signal	• Loose or poor contact on CKP sensor connector • Open or short circuit in CKP sensor wire • Faulty CKP sensor	• Engine does not start	5-75
21-1	O2 sensor circuit malfunction	• Loose or poor contact on O2 sensor connector • Short circuit in O2 sensor wire • Faulty O2 sensor	• Engine operates normally	5-76
23-1	O2 sensor heater malfunction	• Loose or poor contact on O2 sensor connector • Open or short circuit in O2 sensor heater wire • Faulty O2 sensor	• Engine operates normally	5-77
33-2	EEPROM in ECM malfunction	• Faulty ECM	• Engine operates normally • Does not hold the self diagnosis data	5-78

DTC TROUBLESHOOTING (After '07)

DTC 1-1 (MAP SENSOR LOW VOLT-AGE)

1. MAP Sensor System Inspection

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

Check the MAP sensor with the HDS pocket tester.

Is about 0 V or below indicated?

YES — GO TO STEP 2.

NO — Intermittent failure.

2. MAP Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the MAP sensor 3P connector.

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

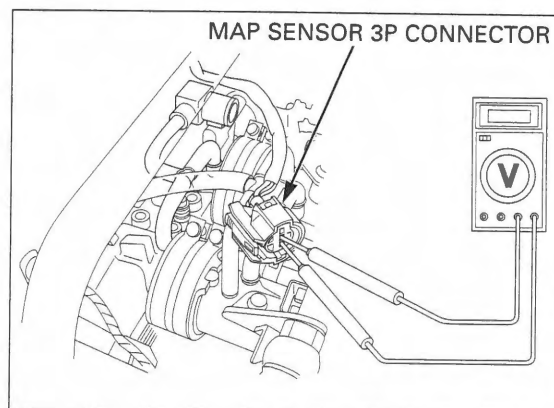
Measure the voltage at the wire harness side.

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 to "OFF".

Disconnect the ECM 32P connectors.

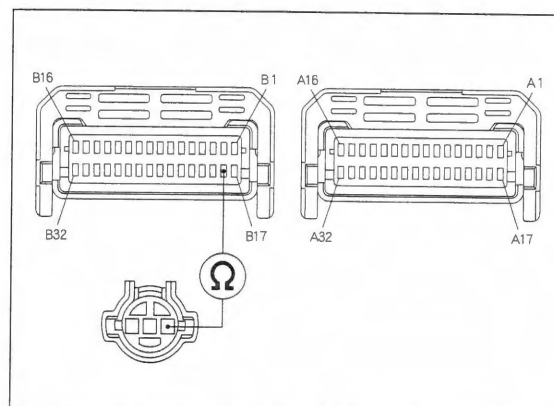
Check for continuity at the Yellow/Red wire between the MAP sensor 3P connector and ECM 32P (Light gray) connector terminal of the wire harness side.

CONNECTION: Yellow/red – B18 (Yellow/red)

Is there continuity?

YES — Replace the ECM with a new one, and recheck.

NO — Open circuit in Yellow/red wire.



4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch to "OFF".

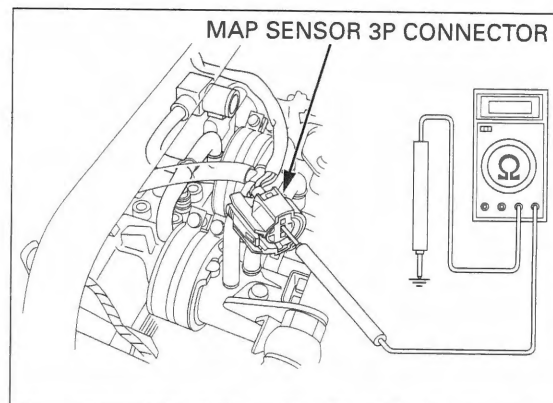
Check for continuity between the MAP sensor 3P connector terminal of the wire harness side and ground.

CONNECTION: Light green/yellow – Ground

Is there continuity?

YES — Short circuit in Light green/yellow wire.

NO — GO TO STEP 5.



FUEL SYSTEM (Programmed Fuel Injection)

5. MAP Sensor Inspection

Replace the MAP sensor with a new one (page 5-105).

Reset the ECM (page 5-13).

Turn the ignition switch to "ON" and engine stop switch to "○".

Check the MAP sensor with the HDS pocket tester.

Is the DTC 1-1 indicated?

YES — Replace the ECM with a new one, and recheck.

NO — Faulty original MAP sensor.

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the DTC.

1. MAP Sensor System Inspection 1

Turn the ignition switch to "ON" and engine stop switch to "○".

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 MAP sensor connector.

2. MAP Sensor System Inspection 2

Turn the ignition switch to "OFF".

Disconnect the MAP sensor 3P connector.

Connect the MAP sensor terminals at the wire harness side with a jumper wire.

CONNECTION: Light green/Yellow – Green/orange

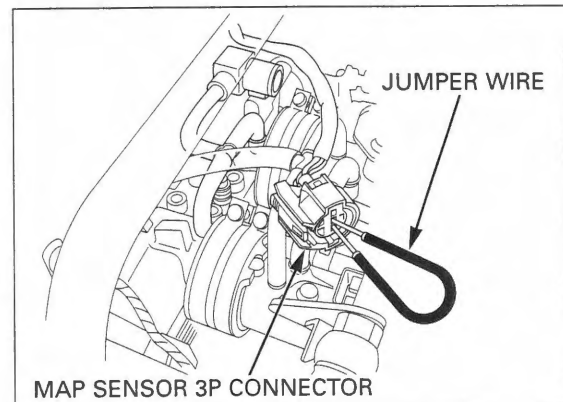
Turn the ignition switch to "ON" and engine stop switch to "○".

Check the MAP sensor with the HDS pocket tester.

Is about 0 V indicated?

YES — Faulty MAP sensor.

NO — GO TO STEP 3.



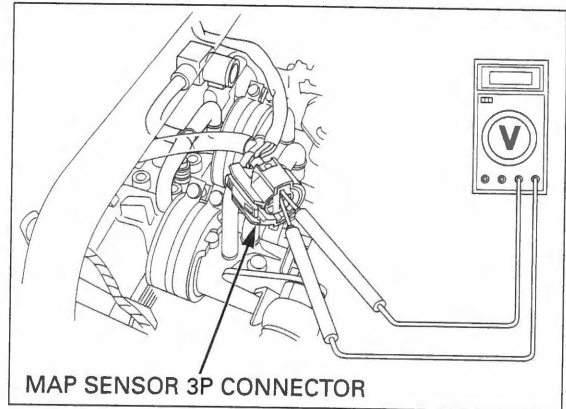
3. MAP Sensor Input/Ground Line Inspection

Turn the ignition switch to "OFF".
Remove the jumper wire.
Turn the ignition switch to "ON" and engine stop switch to "○".
Measure the voltage at the wire harness 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.



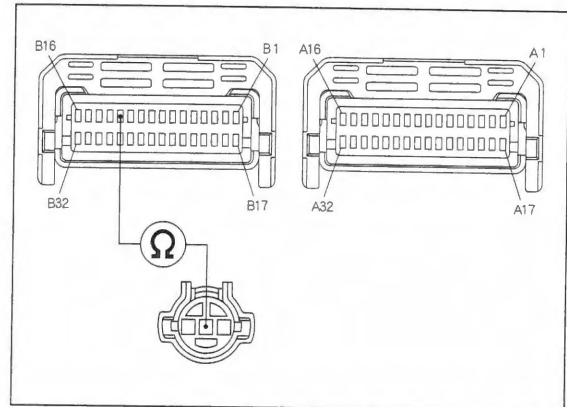
4. MAP Sensor Output Line Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connectors.
Check for continuity at the Light green/yellow wire between the MAP sensor 3P connector and ECM 32P (Light gray) connector terminal of the wire harness side.

CONNECTION: Light Green/yellow – B12 (Light green/yellow)

Is there continuity?

YES — Replace the ECM with a new one, and recheck.
NO — Open circuit in Light green/yellow wire.



DTC 2-1 (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor connector and recheck the DTC.

1. MAP Sensor System Inspection

Turn the ignition switch to "ON" and engine stop switch to "○".
Start the engine and let it idle, check the HDS pocket tester.

Is the DTC 2-1 indicated?

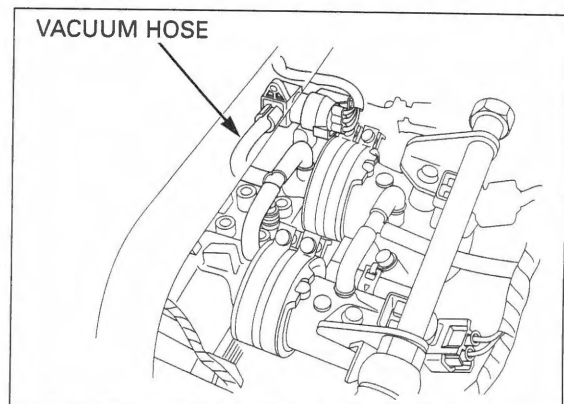
YES — GO TO STEP 2.
NO — Intermittent failure.

2. Manifold Absolute Pressure Test

Turn the ignition switch to "OFF".
Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connection correct?

YES — GO TO STEP 3.
NO — Correct the hose installation.



FUEL SYSTEM (Programmed Fuel Injection)

3. MAP Sensor System Inspection

Replace the MAP sensor with a new one (page 5-105).

Turn the ignition switch to "ON" and engine stop switch to "○".

Start the engine and let it idle, check the HDS pocket tester.

Is the DTC 2-1 indicated?

YES — Replace the ECM with a new one, and recheck.

NO — Faulty original MAP sensor.

DTC 7-1 (ECT SENSOR LOW VOLTAGE)

1. ECT Sensor System Inspection

Turn the ignition switch to "ON" and engine stop switch to "○".

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 to "OFF".

Disconnect the ECT sensor 3P connector.

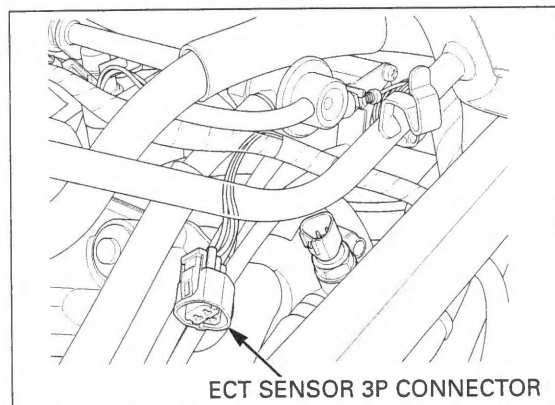
Turn the ignition switch to "ON" and engine stop switch to "○".

Check the ECT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES — GO TO STEP 3.

NO — Faulty ECT sensor.



3. ECT Sensor Output Line Short Circuit Inspection

Turn the ignition switch to "OFF".

Disconnect the ECM 32P connectors.

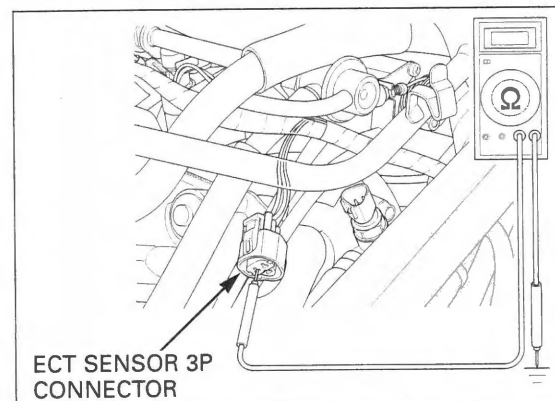
Check for continuity between the ECT sensor 3P connector terminal of the wire harness side and ground.

CONNECTION: Pink/white – Ground

Is there continuity?

YES — Short circuit in Pink/White wire.

NO — Replace the ECM with a new one, and recheck.



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the ECT sensor connector and recheck the DTC.

1. ECT Sensor System Inspection

Turn the ignition switch to "ON" and engine stop switch to "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 connector.

2. ECT Sensor Inspection

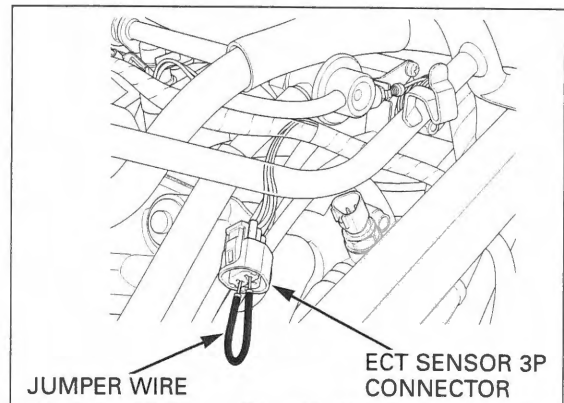
Turn the ignition switch to "OFF".
Disconnect the ECT sensor 3P connector.
Connect the ECT sensor terminals at the wire harness side with a jumper wire.

CONNECTION: Pink/White – Green/orange

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

Is about 0 V indicated?

- YES — Faulty ECT sensor.
NO — GO TO STEP 3.



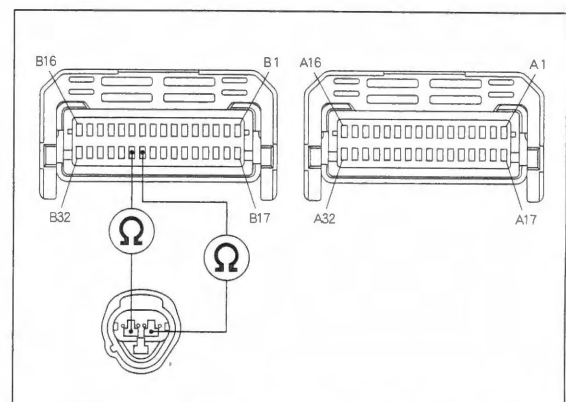
3. ECT Sensor Output Line Inspection

Turn the ignition switch to "OFF".
Remove the jumper wire.
Disconnect the ECM 32P connectors.
Check for continuity at the Pink/white and Green/orange wires between the ECT sensor 3P connector and ECM 32P (Light gray) connector terminals of the wire harness side.

**CONNECTION: Pink/white – B27 (Pink/white)
Green/orange – B26 (Green/orange)**

Is there continuity?

- YES — Replace the ECM with a new one, and recheck.
NO —
- Open circuit in Pink/white wire.
 - Open circuit in Green/orange wire.



DTC 8-1 (TP SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the TP sensor connector and recheck the DTC.

1. TP Sensor System Inspection

Turn the ignition switch to "ON" and engine stop switch to "○".

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

Is 0 V indicated?

YES — GO TO STEP 2.

- NO —
- Intermittent failure.
 - Loose or poor contact on the TP sensor connector.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the TP sensor 3P connector.

Turn the ignition switch to "ON" and engine stop switch to "○".

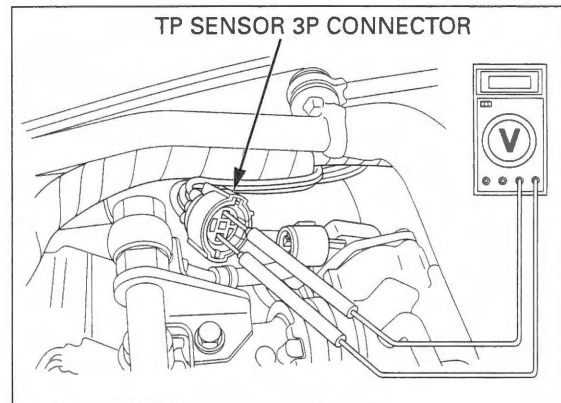
Measure the voltage at the wire harness side.

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. TP Sensor Circuit Inspection

Turn the ignition switch to "OFF".

Disconnect the ECM 32P connectors.

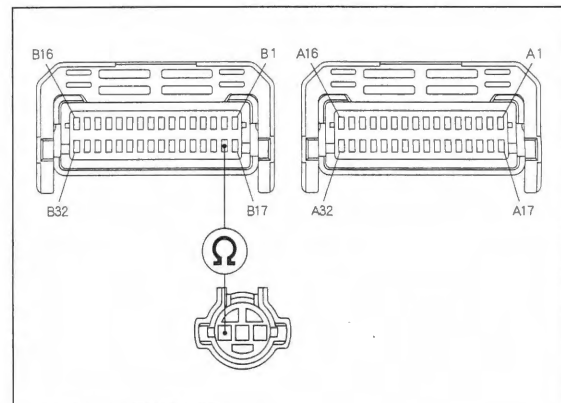
Check for continuity at the Yellow/Red wire between the TP sensor 3P connector and ECM 32P (Light gray) connector terminal of the wire harness side.

CONNECTION: Yellow/red – B18 (Yellow/red)

Is there continuity?

YES — Replace the ECM with a new one, and recheck.

NO — Open circuit in Yellow/red wire.



4. TP Sensor Output Line Open Circuit Inspection

Turn the ignition switch to "OFF".

Disconnect the ECM 32P connectors.

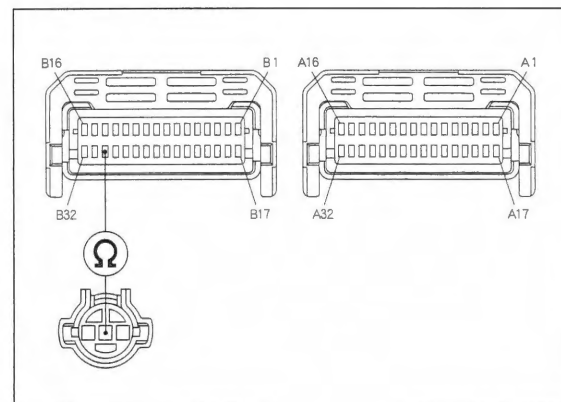
Check for continuity at the Red/yellow wire between the TP sensor 3P connector and ECM 32P (Light gray) connector terminal of the wire harness side.

CONNECTION: Red/yellow – B30 (Red/yellow)

Is there continuity?

YES — GO TO STEP 5.

NO — Open circuit in Red/yellow wire.



5. TP Sensor Output Line Short Circuit Inspection

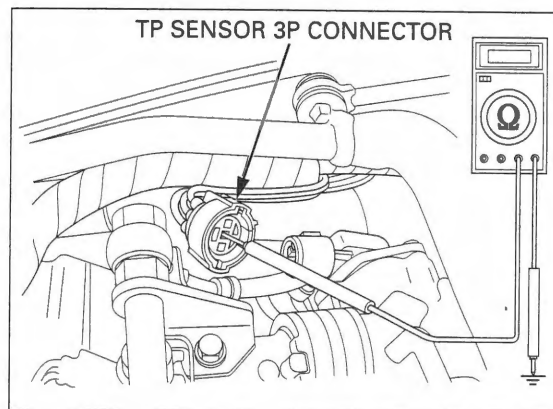
Disconnect the TP sensor 3P connector.
Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

CONNECTION: Red/yellow – Ground

Is there continuity?

YES — Short circuit in Red/yellow wire.

NO — GO TO STEP 6.



6. TP Sensor Inspection

Replace the TP sensor with a new one.

Reset the ECM (page 5-13).

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

Check the TP sensor with the HDS pocket tester.

Is the DTC 8-1 indicated?

YES — Replace the ECM with a new one, and recheck.

NO — Faulty original TP sensor.

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

1. TP Sensor System Inspection

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

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

Is about 5 V indicated?

YES — GO TO STEP 2.

NO — • Intermittent failure.
• Loose or poor contact on the TP sensor connector.

2. TP Sensor Resistance Inspection

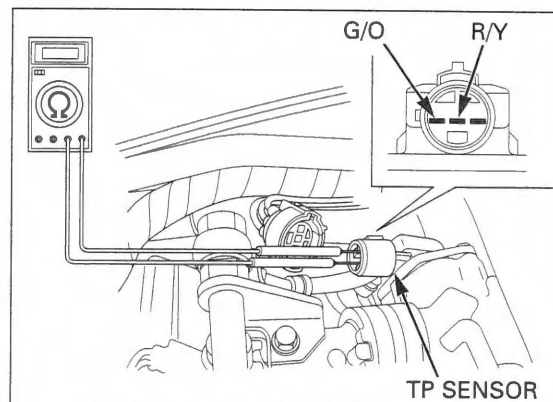
Turn the ignition switch to "OFF".
Disconnect the TP sensor 3P connector.
Measure the resistance at the TP sensor terminals.

CONNECTION: Red/yellow – Green/orange

Is the resistance within 0.5 – 1.5 k Ω (20°C/68°F)?

YES — GO TO STEP 3.

NO — Faulty TP sensor.



FUEL SYSTEM (Programmed Fuel Injection)

3. TP Sensor Input Voltage Inspection

Turn the ignition switch to "ON" and engine stop switch to "○".

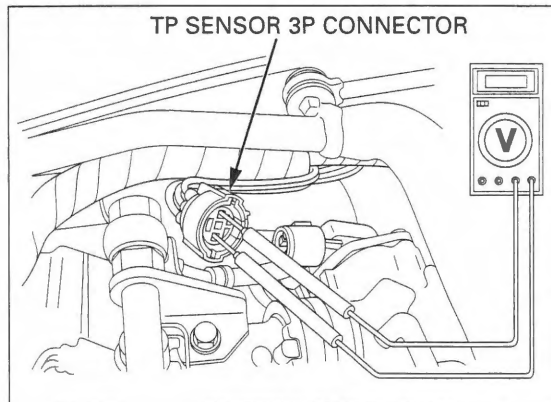
Measure the voltage at the wire harness side.

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

Is the voltage within 4.75 – 5.25 V?

YES — Replace the ECM with a new one, and recheck.

NO — Open circuit in Green/orange wire.



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. IAT Sensor System Inspection

Turn the ignition switch to "ON" and engine stop switch to "○".

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 IAT sensor connector.

2. IAT Sensor Inspection

Turn the ignition switch to "OFF".

Disconnect the IAT sensor 2P connector.

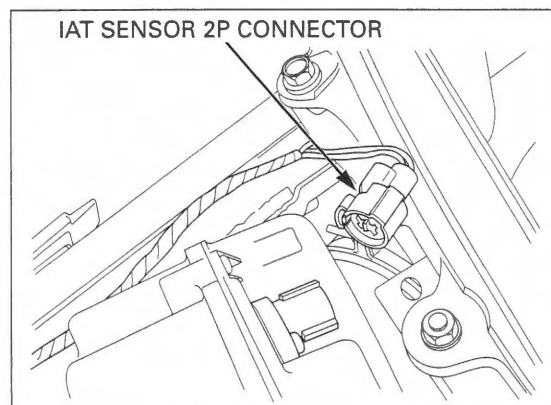
Turn the ignition switch to "ON" and engine stop switch to "○".

Check the IAT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES — GO TO STEP 3.

NO — Faulty IAT sensor.



3. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch to "OFF".

Disconnect the ECM 32P connectors.

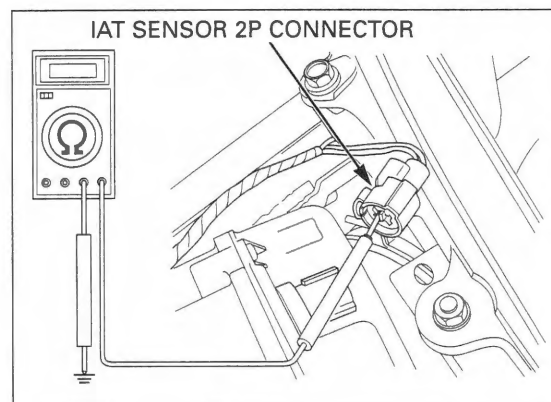
Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

CONNECTION: Gray/blue – Ground

Is there continuity?

YES — Short circuit in Gray/blue wire.

NO — Replace the ECM with a new one, and recheck.



DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

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

1. IAT Sensor System Inspection

Turn the ignition switch to "ON" and engine stop switch to "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 IAT sensor connector.

2. IAT Sensor Inspection

Turn the ignition switch to "OFF".

Disconnect the IAT sensor 2P connector.

Connect the IAT sensor terminals at the wire harness side with a jumper wire.

CONNECTION: Gray/blue – Green/orange

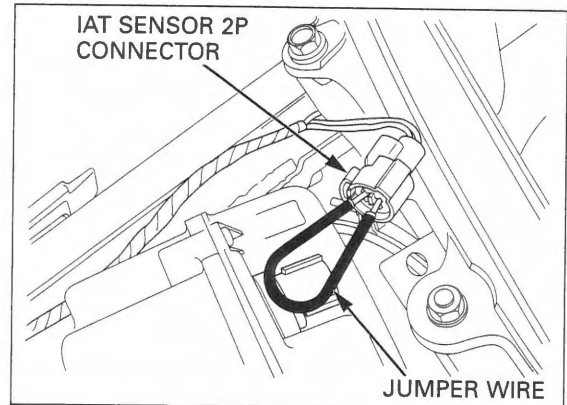
Turn the ignition switch to "ON" and engine stop switch to "O".

Check the IAT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES — Faulty IAT sensor.

NO — GO TO STEP 3.



3. IAT Sensor Output Line Inspection

Turn the ignition switch to "OFF".

Disconnect the jumper wire.

Disconnect the ECM 32P connectors.

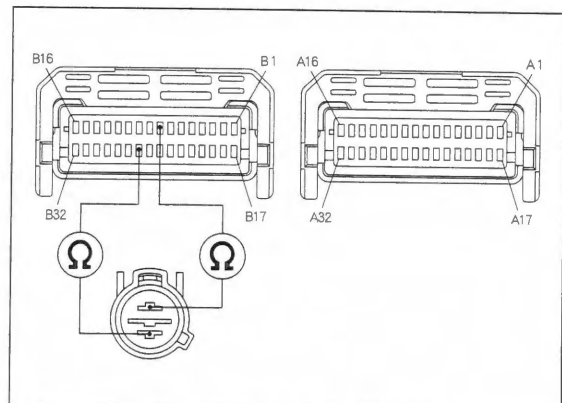
Check for continuity at the Gray/blue and Green/orange wire between the IAT sensor 2P connector and ECM 32P (Light gray) connector terminals of the wire harness side.

**CONNECTION: Gray/blue – B8 (Gray/blue)
Green/orange – B26 (Green/orange)**

Is there continuity?

YES — Replace the ECM with a new one, and recheck.

- NO —
- Open circuit in Gray/blue wire.
 - Open circuit in Green/orange wire.



DTC 11-1 (VEHICLE SPEED SENSOR)

- Before starting the inspection, check for loose or poor contact on the vehicle speed sensor connector and recheck the DTC.

1. Vehicle Speed Sensor System Inspection

Support the scooter with its centerstand and lift the rear wheel off the ground.
Check the vehicle speed sensor with the HDS pocket tester at 10 km/h.

Is 10 km/h indicated?

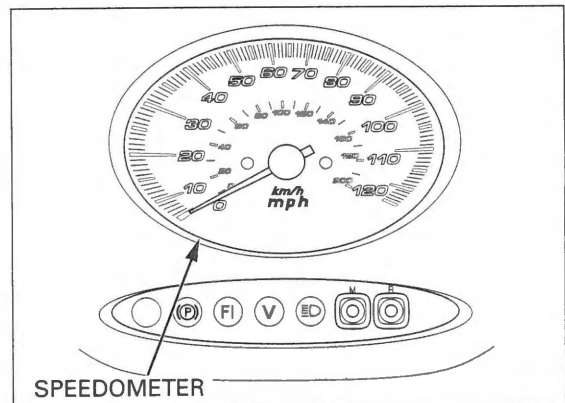
- YES — • Intermittent failure.
• Loose or poor contact on the vehicle speed sensor connector.
- NO — GO TO STEP 2.

2. Combination Meter Inspection

Check for operation of speedometer.

Does the speedometer operate normally?

- YES — Open or short circuit in Pink/green wire between the ECM and vehicle speed sensor.
- NO — GO TO STEP 3.



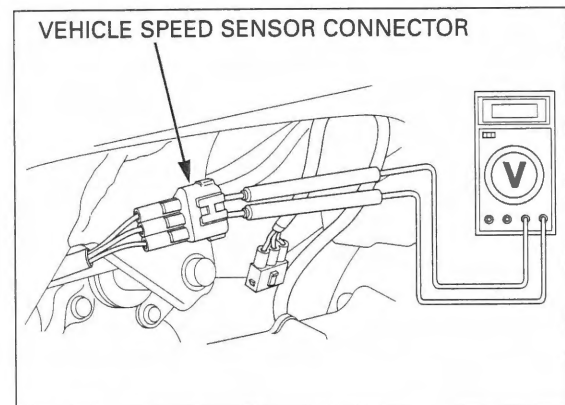
3. Vehicle Speed Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the vehicle speed sensor 3P connector.
Turn the ignition switch to "ON" and engine stop switch to "O".
Measure the voltage at the wire harness side.

CONNECTION: Black/brown (+) – Green/Black (-)

Does the battery voltage exist?

- YES — GO TO STEP 4.
- NO — • Open circuit in Black/brown wire.
• Open circuit in Green/black wire.



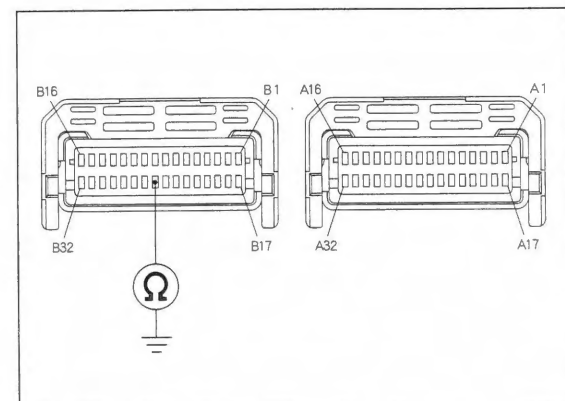
4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connectors.
Check for continuity between the ECM 32P (Light gray) connector terminal of the wire harness side and ground.

CONNECTION: B25 (Pink/green) – Ground

Is there continuity?

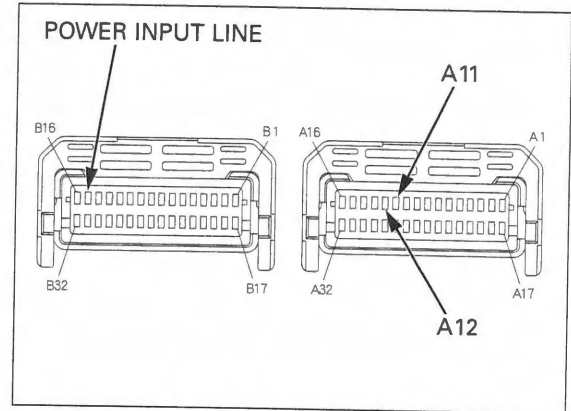
- YES — Short circuit in the Pink/green wire.
- NO — Inspect vehicle speed sensor (page 21-9).



DTC 12-1 (NO.1 INJECTOR)

- Before starting the inspection, check for loose or poor contact on the injector connectors and recheck the DTC.

MIL	INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNL AT ECM
12	No. 1	Black/white	Pink/blue	A11
13	No. 2	Black/white	Pink/yellow	A12



1. Injector System Inspection

Reset the ECM (page 5-13).

Turn the ignition switch to "ON" and check the No.1 injector with the HDS pocket tester.

Is the DTC 12-1 indicated?

YES — GO TO STEP 2.

NO — • Intermittent failure.

- Loose or poor contact on the injector connector.

2. Injector Circuit Resistance Inspection

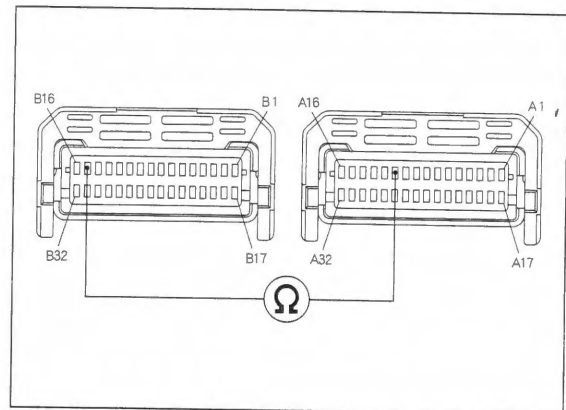
Turn the ignition switch to "OFF".
Disconnect the ECM 32P connectors.
Measure the resistance at the wire harness side.

CONNECTION: POWER INPUT LINE (B15) – SIGNAL AT ECM

Is the resistance within 11.1 – 12.3 Ω (20°C/68°F)?

YES — GO TO STEP 5.

NO — GO TO STEP 3.



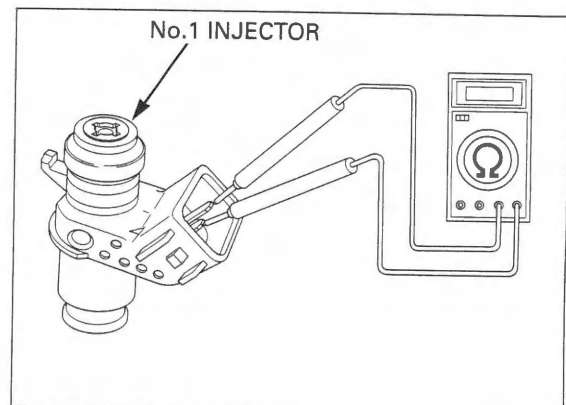
3. Injector Resistance Inspection

Disconnect the No.1 injector 2P (Black) connector and measure the resistance of the No.1 injector terminals.

Is the resistance within 11.1 – 12.3 Ω (20°C/68°F)?

YES — GO TO STEP 4.

NO — Faulty injector.



FUEL SYSTEM (Programmed Fuel Injection)

4. Injector Input Voltage Inspection

Turn the ignition switch to "ON" and engine stop switch to "○".

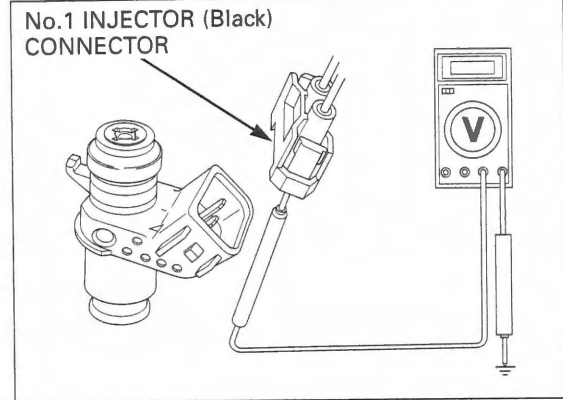
Measure the voltage between the No.1 injector 2P (Black) connector terminal of the wire harness side and ground.

CONNECTION: POWER INPUT LINE (+) – Ground (-)

Does the battery voltage exist?

YES — Open circuit in SIGNAL LINE wire.

NO — Open circuit in POWER INPUT LINE wire.



5. Injector Signal Line Short Circuit Inspection

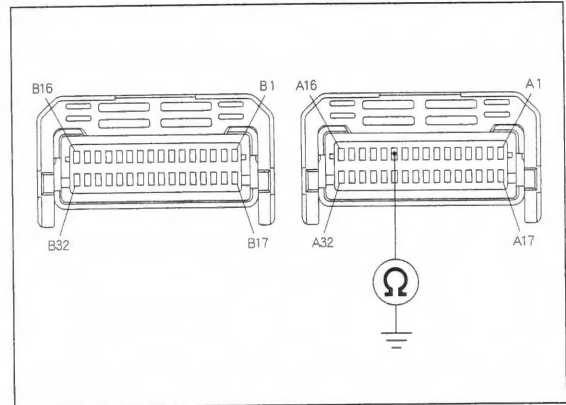
Check for continuity between the ECM 32P (Black) connector terminal of the wire harness side and ground.

CONNECTION: SIGNAL AT ECM – Ground

Is there continuity?

YES — • Short circuit in SIGNAL LINE wire.
• Faulty injector.

NO — Replace the ECM with a new one, and recheck.



DTC 13-1 (NO.2 INJECTOR)

See page 5-73

DTC 18-1 (CMP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CMP sensor connector and recheck the DTC.

1. CMP Sensor Peak Voltage Inspection

Turn the ignition switch to "OFF".

Disconnect the CMP sensor 2P connector.

Turn the ignition switch to "ON" and engine stop switch to "○".

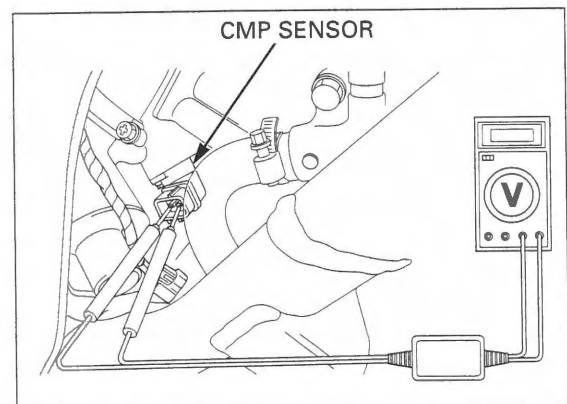
Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the CMP sensor terminals.

CONNECTION: Gray (+) – White/yellow (-)

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

YES — GO TO STEP 2.

NO — Faulty CMP sensor.



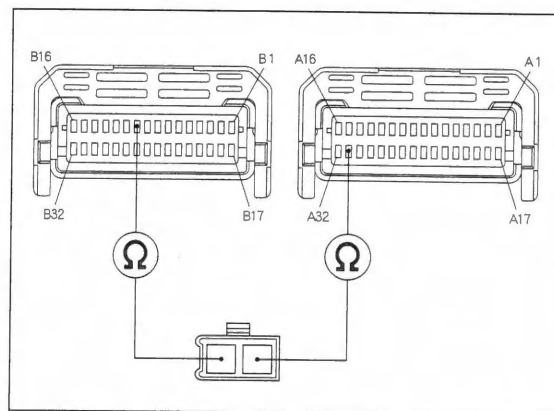
2. CMP Sensor Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connectors.
Check for continuity at the Grey and White/Yellow wire between the CMP sensor 2P connector and ECM 32P connector terminals of the wire harness side.

CONNECTION: Gray – B10 (Gray)
White/yellow – A31 (White/yellow)

Is there continuity?

- YES — Short circuit in Gray wire.
NO — • Open circuit in Gray wire.
• Open circuit in White/yellow wire.



DTC 19-1 (CKP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CKP sensor connector and recheck the DTC.

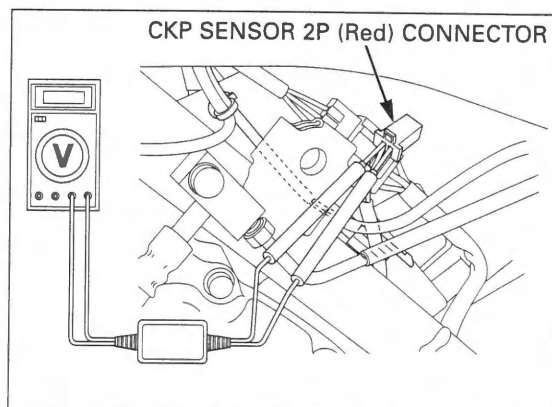
1. CKP Sensor Peak Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the CKP sensor 2P (Red) connector.
Turn the ignition switch to "ON" and engine stop switch to "O".
Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the CKP sensor 2P (Red) connector of the sensor side.

CONNECTION: Yellow (+) – White/yellow (–)

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

- YES — GO TO STEP 2.
NO — Faulty CKP sensor.



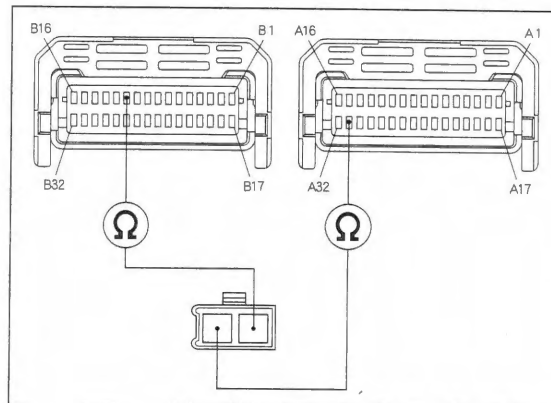
2. CKP Sensor Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connectors.
Check for continuity at the Yellow and White/yellow wire between the CKP sensor 2P (Red) connector and ECM 32P connector terminals of the wire harness side.

CONNECTION: Yellow – B11 (Yellow)
White/Yellow – A31 (White/yellow)

Is there continuity?

- YES — Short circuit in Yellow wire.
NO — • Open circuit in Yellow wire.
• Open circuit in White/yellow wire.



DTC 21-1 (O₂ SENSOR)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor connector and recheck the DTC.

1. O₂ Sensor Open Circuit Inspection

Turn the ignition switch to "OFF".

Disconnect the O₂ sensor 4P (Gray) connector and ECM connectors.

Check for continuity between the O₂ sensor 4P (Gray) connector and ECM 32P (Light gray) connector terminals of the wire harness side.

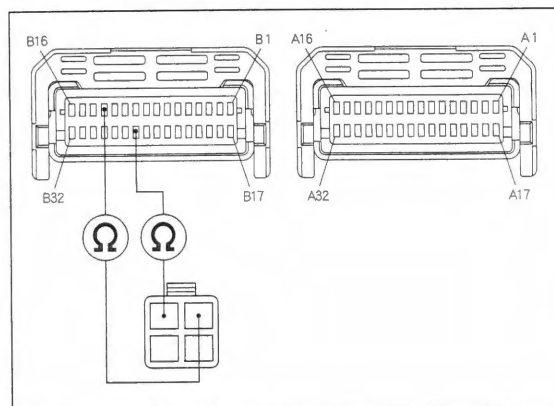
**CONNECTION: Black/red – B13 (Black/red)
Green/orange – B26 (Green/orange)**

Is there continuity?

YES — GO TO STEP 2.

NO —

- Open circuit in Black/red wire.
- Open circuit in Green/orange wire.



2. O₂ Sensor System Short Circuit Inspection

Disconnect the ECM connectors.

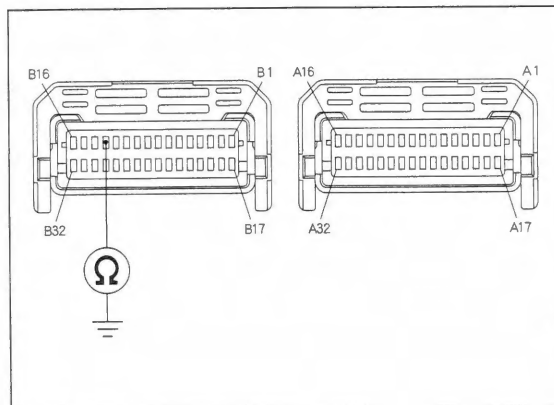
Check for continuity between the ECM 32P (Light gray) connector terminal of the wire harness side and ground.

CONNECTION: B13 (Black/red) – Ground

Is there continuity?

YES — Short circuit in Black/red wire.

NO — GO TO STEP 3.



3. O₂ Sensor Inspection

Replace the O₂ sensor with a new one (page 5-110).

Reset the ECM (page 5-13).

Turn the ignition switch to "ON" and engine stop switch to "○".

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

Test ride the scooter and recheck the O₂ sensor with the HDS pocket tester.

Is the DTC 21-1 indicated?

YES — Replace the ECM with a new one, and recheck.

NO — Faulty original O₂ sensor.

DTC 23-1 (O₂ SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor 4P (Gray) connector and recheck the DTC.

1. O₂ Sensor System Inspection

Reset the ECM (page 5-13).

Start the engine and check the O₂ sensor heater with the HDS pocket tester.

Is the DTC 23-1 indicated?

YES — GO TO STEP 2.

- NO —
- Intermittent failure.
 - Loose or poor contact on the O₂ sensor 4P (Gray) connector.

2. O₂ Sensor Heater Resistance Inspection

Turn the ignition switch to "OFF".

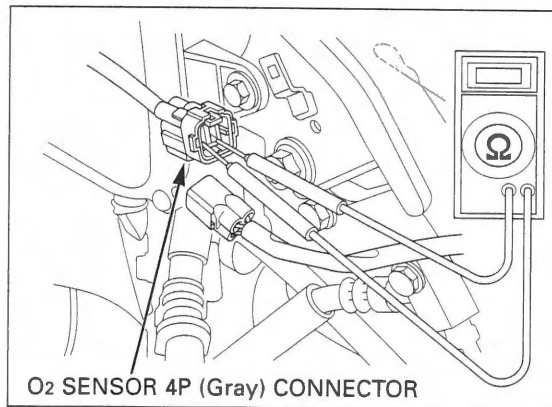
Disconnect the O₂ sensor 4P (Gray) connector and measure the resistance at the sensor side connector.

CONNECTION: White – White

Is the resistance within 10 - 40 Ω (20°C/68°F)?

YES — GO TO STEP 3.

- NO —
- Faulty O₂ sensor.



3. O₂ Sensor Heater Open circuit Inspection

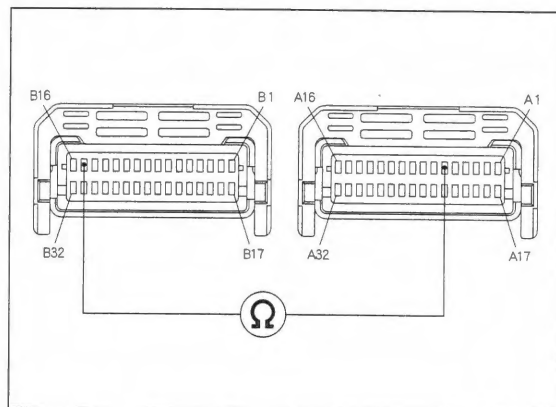
Connect the O₂ sensor 4P (Gray) connector.
Disconnect the ECM 32P connectors.
Measure the resistance at the wire harness side.

CONNECTION: B15 (Black/white) – A6 (white)

Is the resistance within 10 - 40 Ω (20°C/68°F)?

YES — GO TO STEP 4.

- NO —
- Open circuit in Black/white wire.
 - Open circuit in White wire.



4. O₂ Sensor Heater Short Circuit Inspection 1

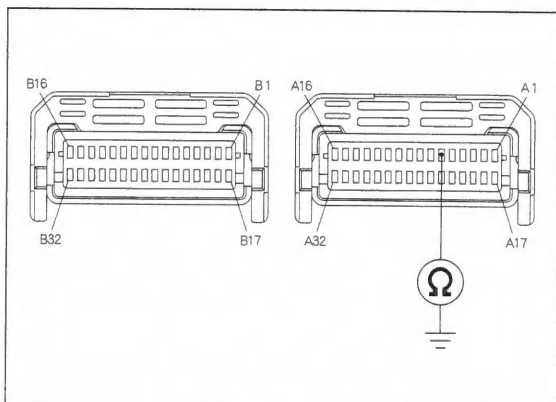
Disconnect the O₂ sensor 4P (Gray) connector.
Check for continuity between the ECM 32P (Black) connector terminal of the wire harness side and ground.

CONNECTION: A6 (White) – Ground

Is there continuity?

YES — Short circuit in White wire.

NO — GO TO STEP 5.



FUEL SYSTEM (Programmed Fuel Injection)

5. O₂ Sensor Heater Short Circuit Inspection 2

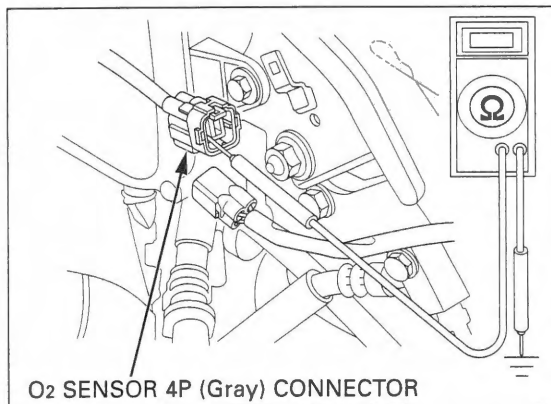
Check for continuity between the O₂ sensor 4P (Gray) connector terminal of the sensor side and ground.

CONNECTION: White - Ground

Is there continuity?

YES — Faulty O₂ sensor.

NO — Replace the ECM with a new one, and recheck.



DTC 33-2 (EEPROM)

1. Recheck DTC

Reset the ECM (page 5-13).

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

Recheck the ECM EEPROM.

Is the DTC 33-2 indicated?

YES — Replace the ECM with a new one, and recheck.

NO — Intermittent failure.

FUEL LINE INSPECTION

FUEL PRESSURE INSPECTION

NOTICE

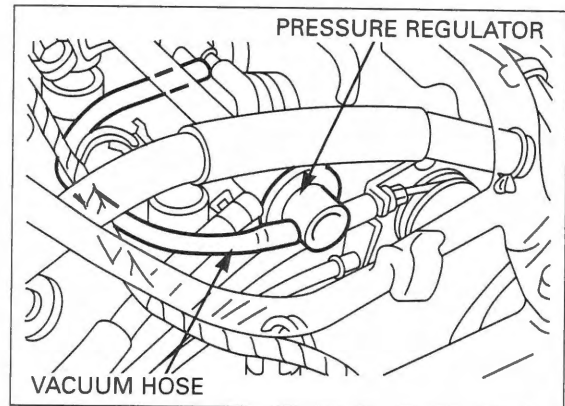
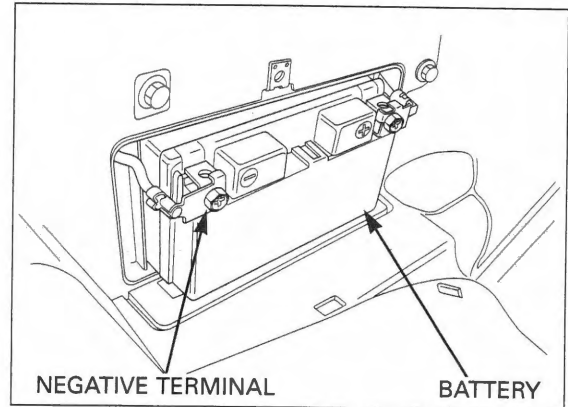
- Before disconnecting the fuel hoses, relieve the fuel pressure by loosening the service check bolt at the fuel tank.
- Always replace the sealing washer when the service check bolt is removed or loosened.

Remove the battery box cover (page 18-4).

Disconnect the battery negative cable from the battery terminal.

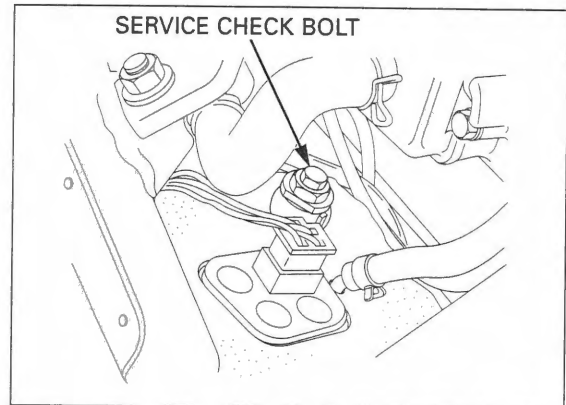
Remove the floorstep (page 2-20).

Disconnect and plug the pressure regulator vacuum hose.



Cover the service check bolt with a rag or shop towel.

Slowly loosen the service check bolt and drain the remaining fuel into an approved gasoline container.

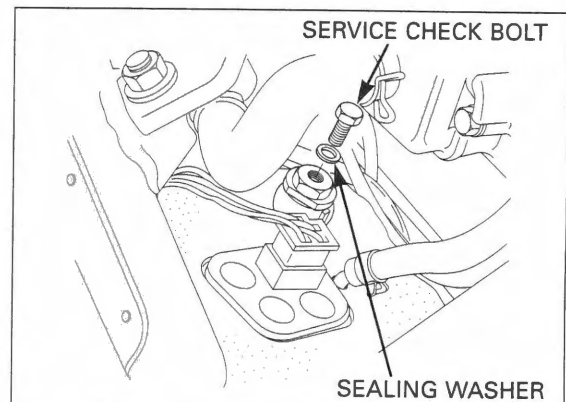


Remove the service check bolt and sealing washer. Attach the fuel pressure gauge.

TOOL:

Fuel pressure gauge

07406-0040002 or
07406-004000B or
07406-004000A
(U.S.A. only)



FUEL SYSTEM (Programmed Fuel Injection)

Connect the battery negative cable.
Start the engine.
Read the fuel pressure at idle speed.

IDLE SPEED: $1,300 \pm 100$ rpm

STANDARD: 294 kPa (3.0 kgf/cm², 43 psi)

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

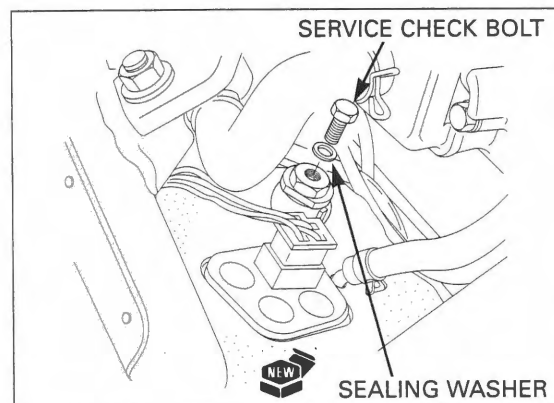
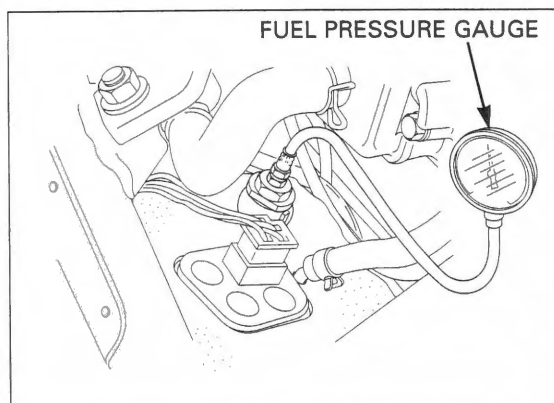
- Pinched or clogged fuel return hose
- Pressure regulator
- Fuel pump (page 5-82)

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

- Fuel line leaking
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 5-82)

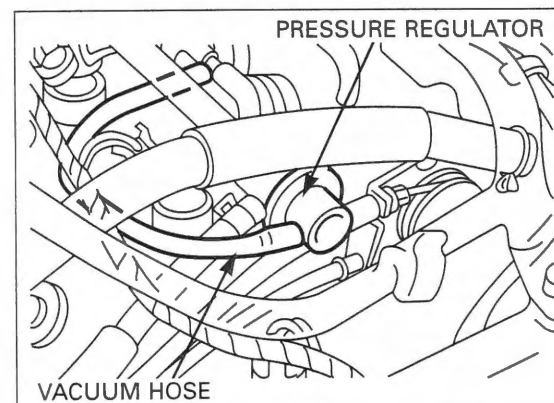
Always replace the sealing washer when the service check bolt is removed or loosened.

After inspection, remove the fuel pressure gauge and reinstall and tighten the service check bolt with a new sealing washer.



Connect the pressure regulator vacuum hose.

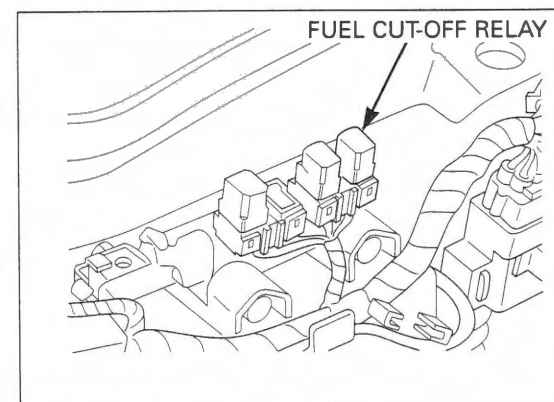
Install the removed parts in the reverse order of removal.



FUEL FLOW INSPECTION

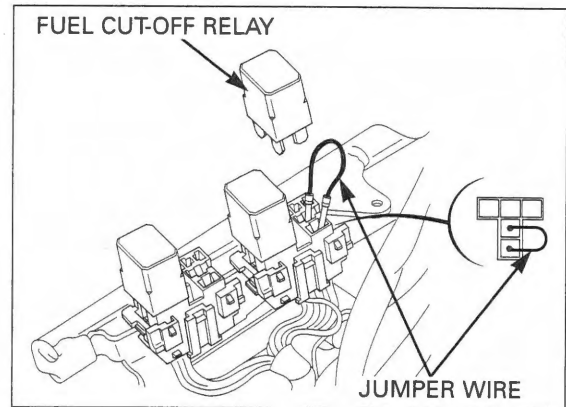
Remove the left side body cover (page 2-6).
Remove the floorstep (page 2-20).

Remove the fuel cut-off relay.



FUEL SYSTEM (Programmed Fuel Injection)

Jump the Brown and Black/White wire terminals of the wire harness side using a jumper wire.



- When the fuel return hose is disconnected, gasoline may spill out from the hose. Place a approved gasoline container under the hose and drain the gasoline.
- Wipe off any spilled out gasoline.

Disconnect the fuel return hose at the fuel tank and plug the return hose joint.

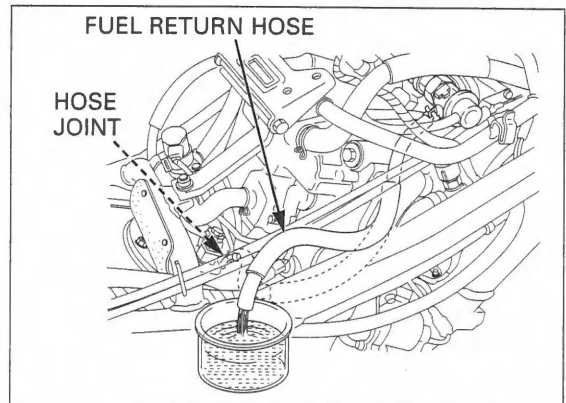
Turn the ignition switch to "ON" for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:

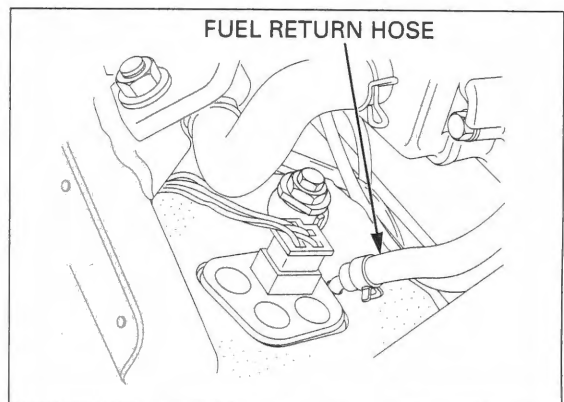
**Minimum 60 cm³ (2.0 US oz, 2.1 Imp oz)/
10 seconds**

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

- Pinched or clogged fuel hose and fuel return hose
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 5-82)



After inspection, connect the fuel return hose.
Start the engine and check for leaks.



FUEL PUMP

INSPECTION

Turn the ignition switch to "ON" and confirm that the fuel pump operates for a few seconds.

If the fuel pump does not operate, inspect as follows:

Remove the floorstep (page 2-20).

Disconnect the fuel pump/fuel unit 4P connector.

Turn the ignition switch to "ON" and measure the voltage between the terminals.

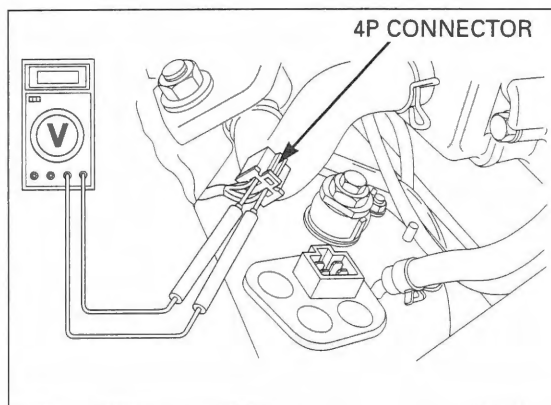
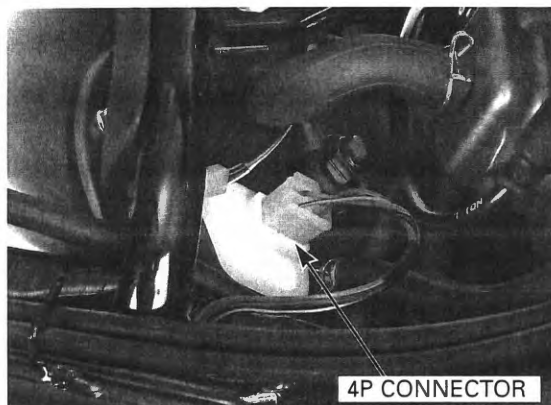
Connection: Brown (+) – Green/Pink (–)

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.

If there is no battery voltage, inspect the following:

- Main fuse 30A
- Sub fuse 15A
- Fuel cut-off relay (page 5-84)
- Engine stop relay (page 5-113)
- Bank angle sensor (page 5-112)
- ECM (page 5-114, 115)



REMOVAL

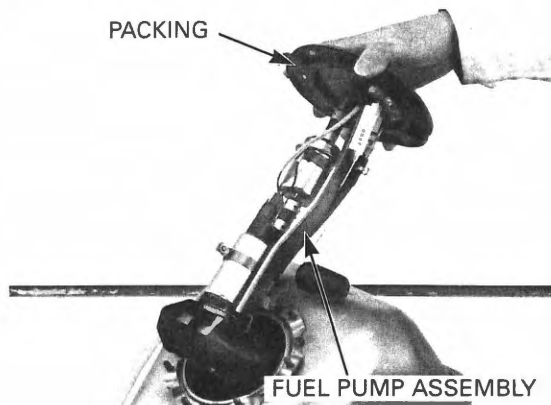
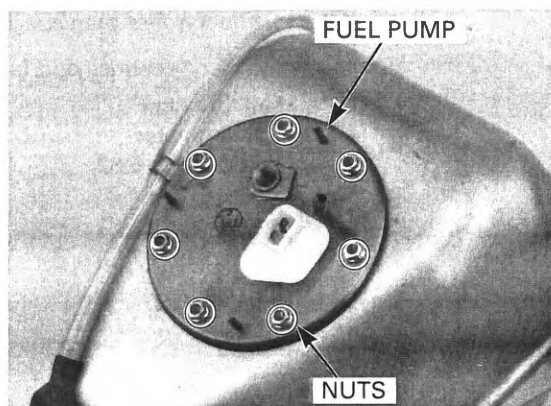
NOTICE

- Before disconnecting the fuel hose, relieve the fuel pressure by loosening the service check bolt at the fuel tank.
- Always replace the sealing washer when the service check bolt is removed or loosened.

Remove the fuel tank (page 5-84).

Remove the fuel pump mounting nuts.

Remove the fuel pump assembly and packing.

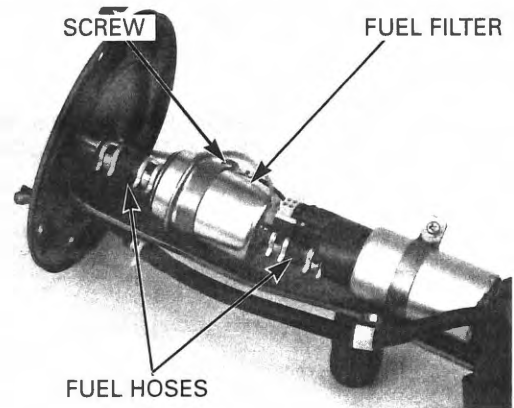


FUEL FILTER REPLACEMENT

Disconnect the fuel hoses from the fuel filter.
Remove the screw and fuel filter.

*Note the direction
of the fuel filter.*

Install the fuel filter in the reverse order of removal.

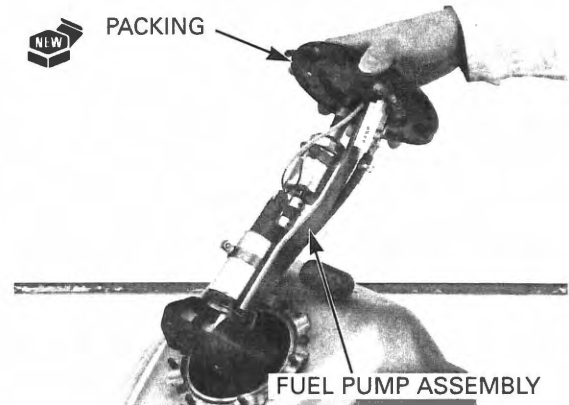


INSTALLATION

*Always replace
the packing with a
new one.*

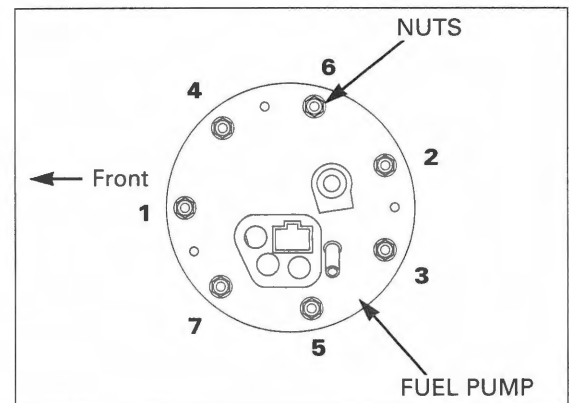
Place a new packing onto the fuel pump base.

Install the fuel pump being careful not to damage the fuel pump wires.



Install and tighten the fuel pump mounting nuts in the sequence as shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



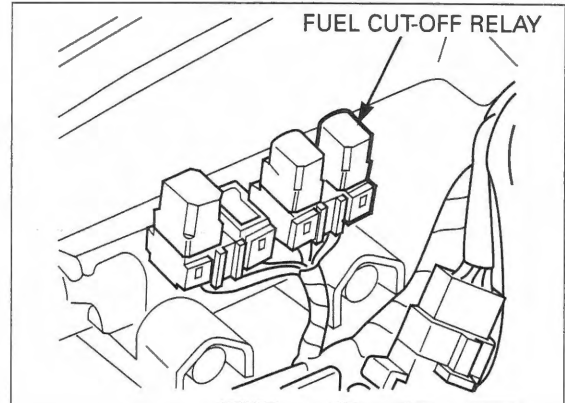
FUEL SYSTEM (Programmed Fuel Injection)

FUEL CUT-OFF RELAY

INSPECTION

Remove the left side body cover (page 2-6).

Remove the fuel cut-off relay.



Connect the ohmmeter to the fuel cut-off relay connector terminals.

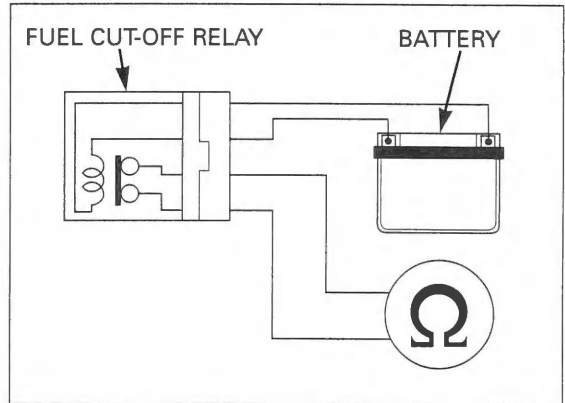
CONNECTION: Black/White – Brown

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

CONNECTION: Brown/Black – Black/White

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-off relay.

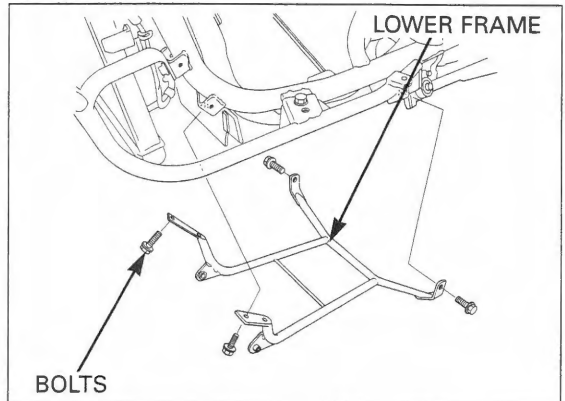


FUEL TANK

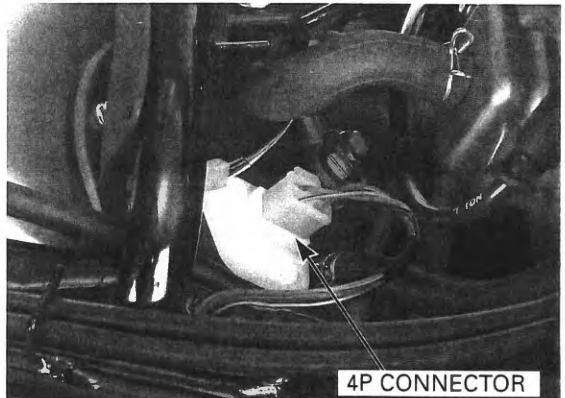
REMOVAL

Relieve the fuel pressure (page 5-79).

Remove the bolts and lower frame.

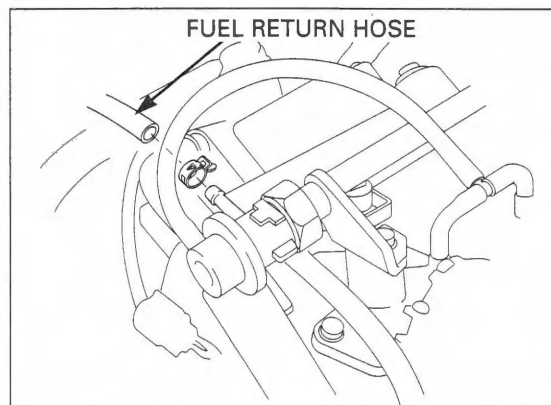


Disconnect the fuel pump/fuel unit 4P connector.

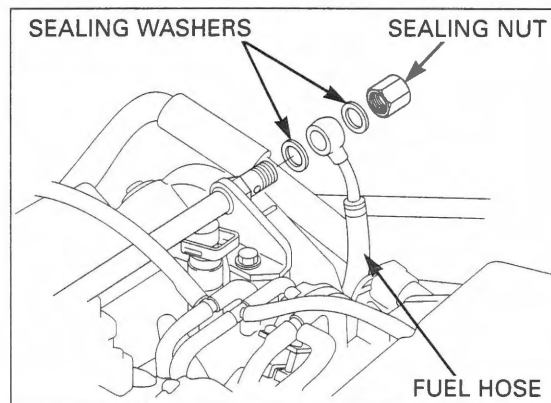


FUEL SYSTEM (Programmed Fuel Injection)

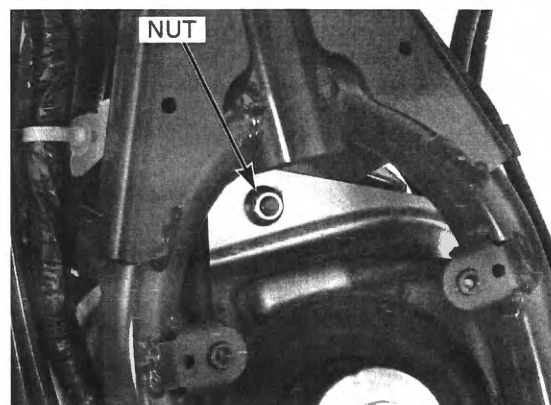
Disconnect the fuel return hose from the pressure regulator.



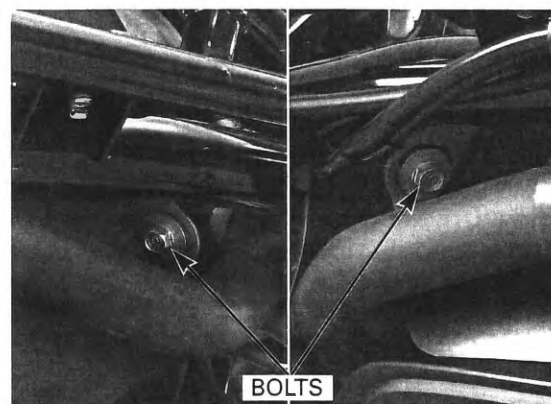
Remove the sealing nut and sealing washers, then disconnect the fuel hose.



Remove the fuel tank upper mounting nut.

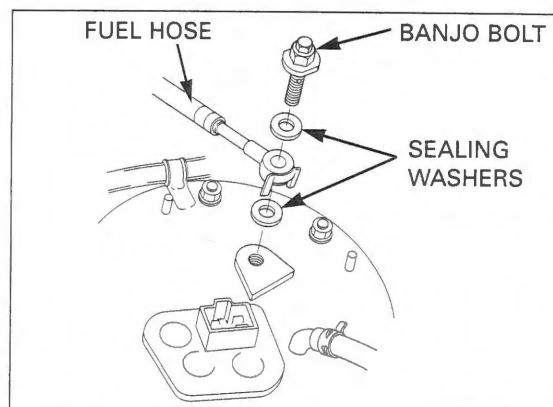


Remove the fuel tank mounting bolts and the fuel tank.



FUEL SYSTEM (Programmed Fuel Injection)

Remove the banjo bolt and sealing washers, then disconnect the fuel hose from the fuel pump.

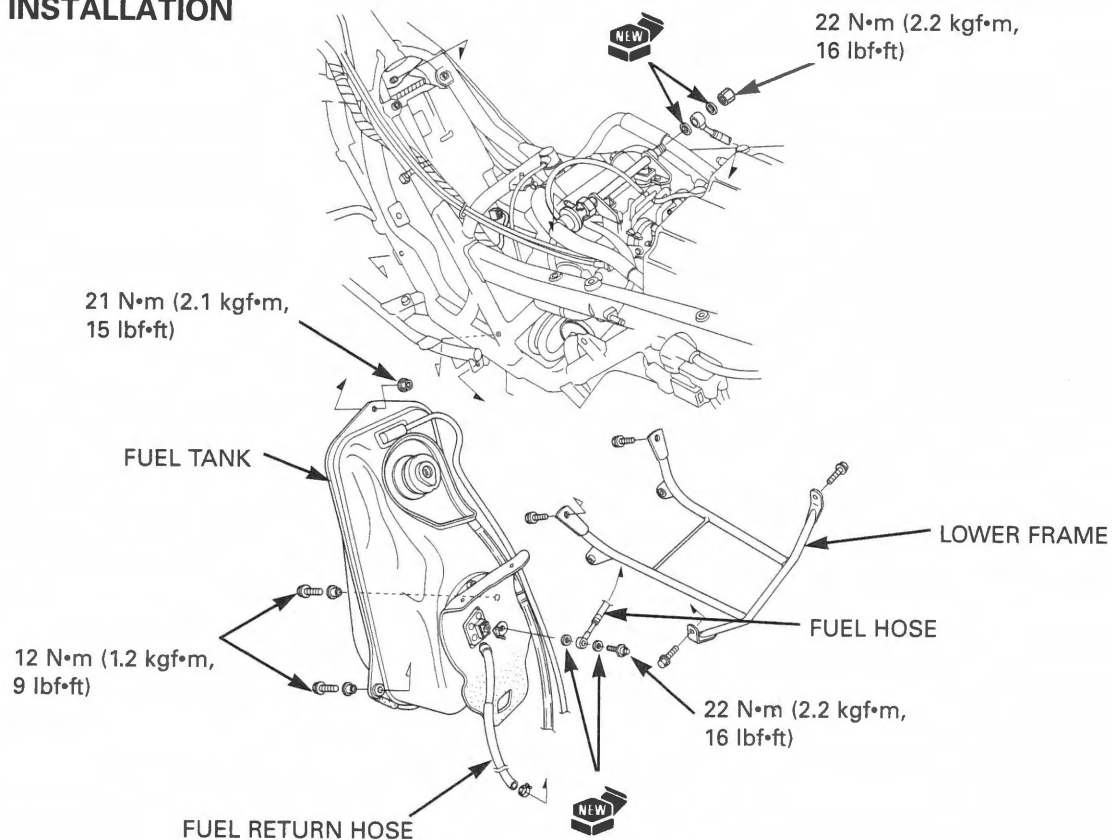


Remove the fuel return hose and heat guard rubber.

Refer to page 5-82 for fuel pump removal.



INSTALLATION



FUEL SYSTEM (Programmed Fuel Injection)

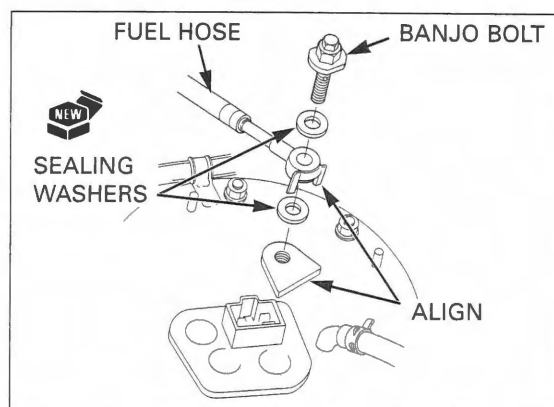
Install the heat guard rubber and connect the fuel return hose.



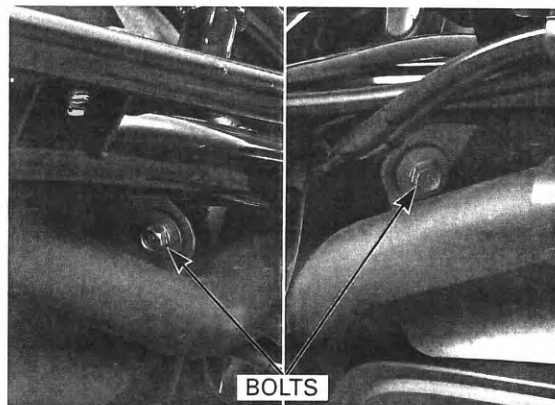
While aligning the stopper on the fuel hose banjo with the the fuel pump, connect the fuel hose banjo to the fuel rail with new sealing washers.

Install and tighten the fuel hose banjo bolt to the specified torque.

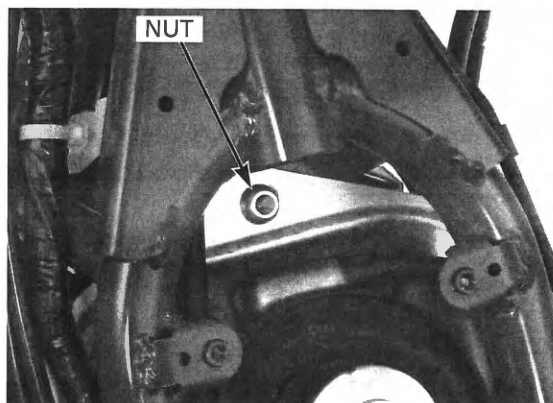
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the fuel tank on the frame.
Tighten the mounting bolts.



Tighten the upper mounting nut.

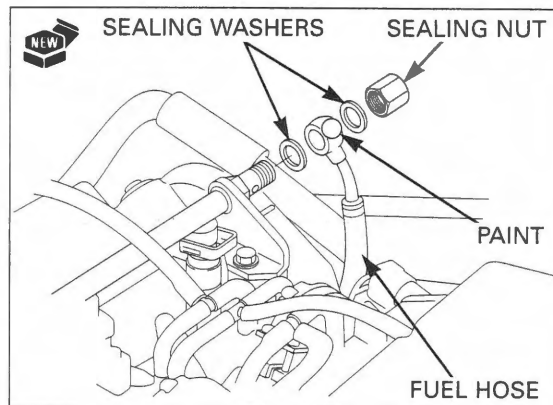


FUEL SYSTEM (Programmed Fuel Injection)

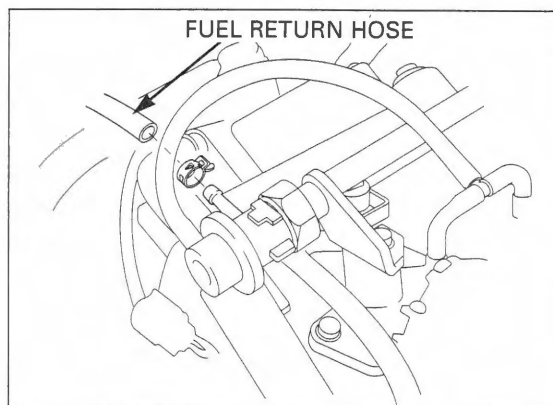
With the painted side of the fuel hose banjo facing up, align the banjo to the stopper on the fuel rail stay, and connect the fuel hose banjo to the fuel rail with new sealing washers.

Install and tighten the sealing nut to the specified torque.

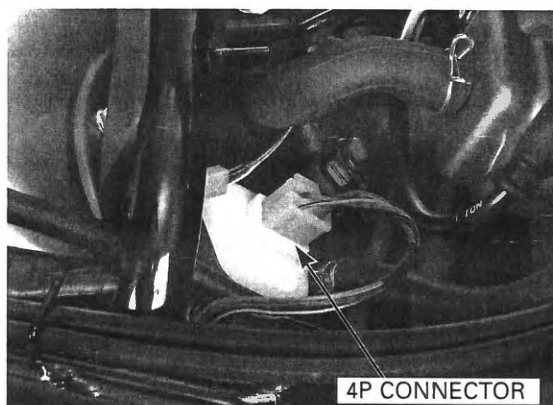
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Connect the fuel return hose to the pressure regulator.

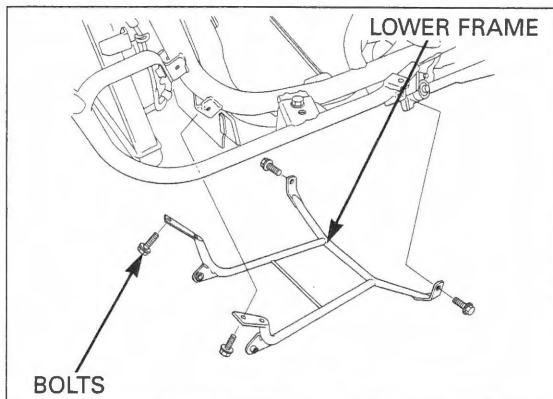


Connect the fuel pump/fuel unit 4P connector.



Install the lower frame and tighten the bolts.

Install the removed parts in the reverse order of removal.

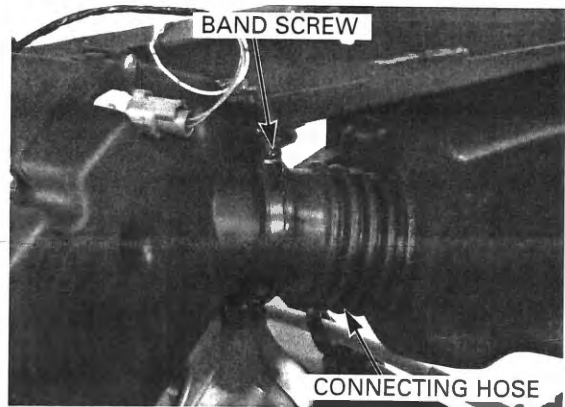


AIR CLEANER HOUSING

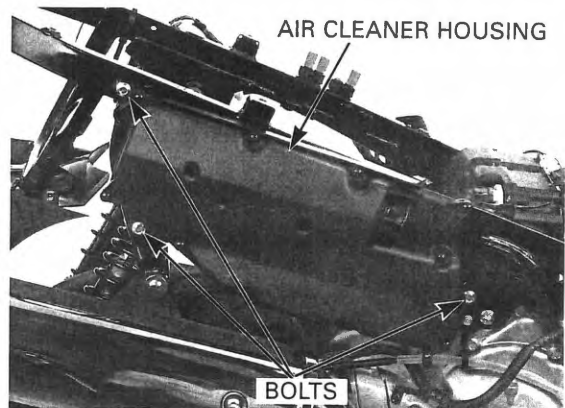
REMOVAL

Remove the luggage box (page 2-10).

Loosen the air cleaner housing-to-air cleaner chamber connecting hose band screw.
Disconnect the connecting hose from the air cleaner chamber.



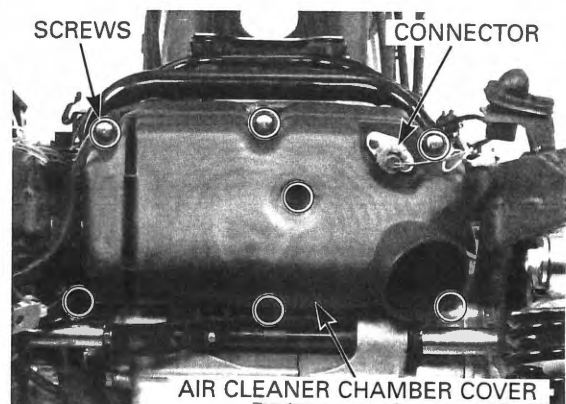
Remove the bolts and air cleaner housing from the frame.



Remove the air cleaner chamber stay bolt.

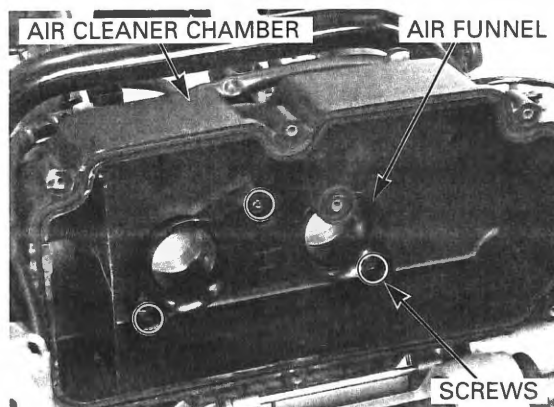


Disconnect the IAT sensor connector from the air cleaner chamber cover.
Remove the screws and air cleaner chamber cover.

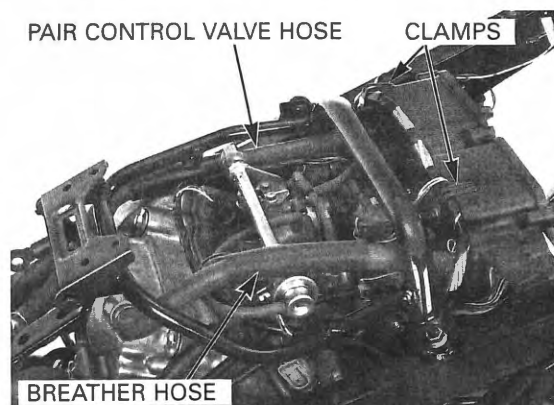


FUEL SYSTEM (Programmed Fuel Injection)

Remove the screws and air funnel, then remove the air cleaner chamber from the throttle body.



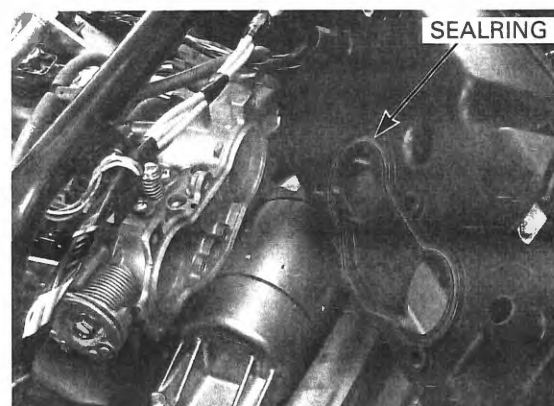
Disconnect the crankcase breather hose and PAIR control valve hose from the air cleaner chamber. Remove the luggage box light wire from the clamps.



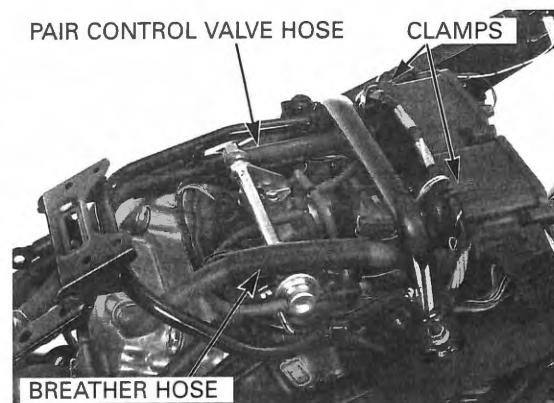
Remove the seal ring.

INSTALLATION

Check that the air cleaner chamber seal ring is in good condition, and replace if necessary.

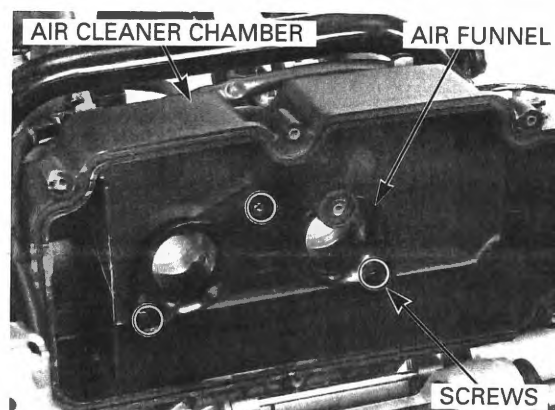


Connect the PAIR control valve hose and crankcase breather hose. Install the luggage box light wire to the clamps.

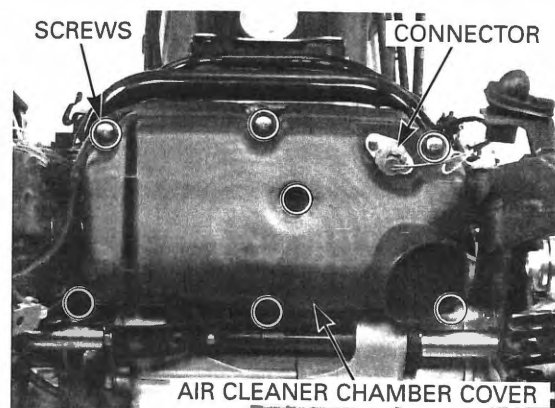


FUEL SYSTEM (Programmed Fuel Injection)

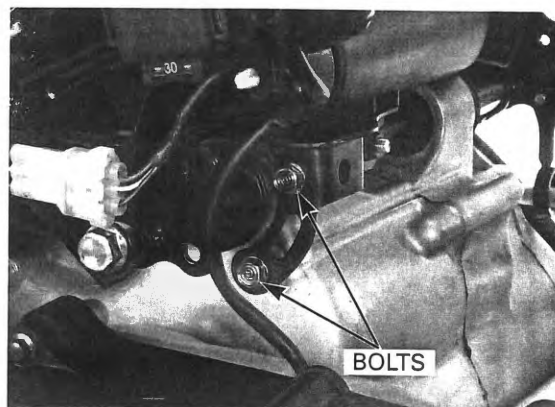
Install the air cleaner chamber to the throttle body.
Install the air funnel and tighten the screws.



Install the air cleaner chamber cover to the air cleaner chamber.
Install and tighten the screws.
Connect the IAT sensor connector.



Tighten the air cleaner housing stay bolts.



Install the air cleaner housing to the frame.
Install and tighten the bolts securely.

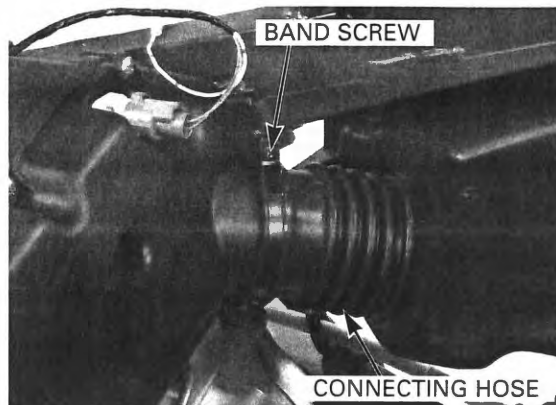


FUEL SYSTEM (Programmed Fuel Injection)

Connect the air cleaner housing-to-air cleaner chamber connecting hose.

Tighten the connecting hose band screw.

Install the luggage box (page 2-10).



THROTTLE BODY/INTAKE MANIFOLD

REMOVAL

- Before disconnecting the fuel hose, relieve the fuel pressure by loosening the service check bolt (page 5-79).
- Always replace the sealing washer when the service check bolt is removed or loosened.

Drain the coolant from the cooling system (page 6-4).

Remove the seat under cover (page 2-5).

Remove the air cleaner housing (page 5-89).

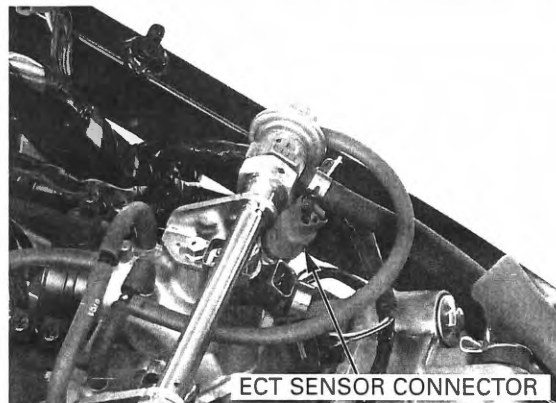
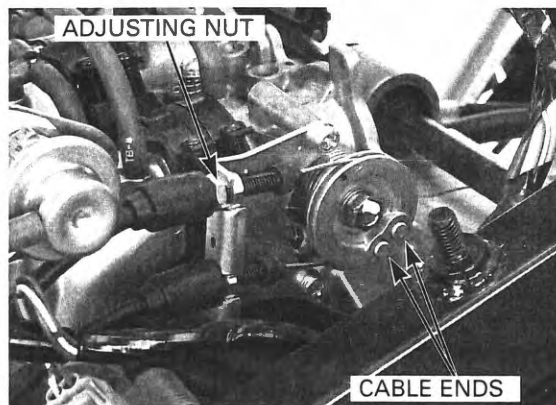
Remove the seat hinge stay (page 7-2).

Relieve the fuel pressure (page 5-79).

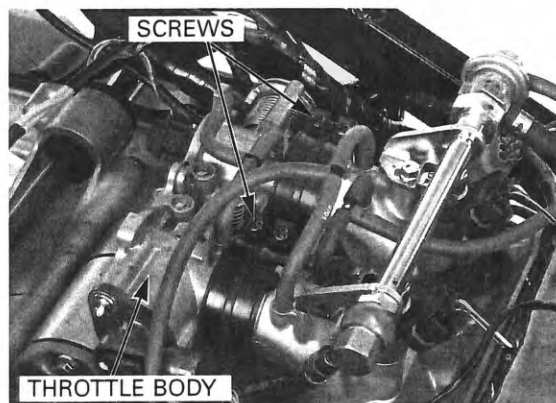
Loosen the lock nut and turn the throttle cable adjuster to increase the freeplay.

Disconnect the throttle cable ends from the throttle drum.

Disconnect the ECT sensor connector.

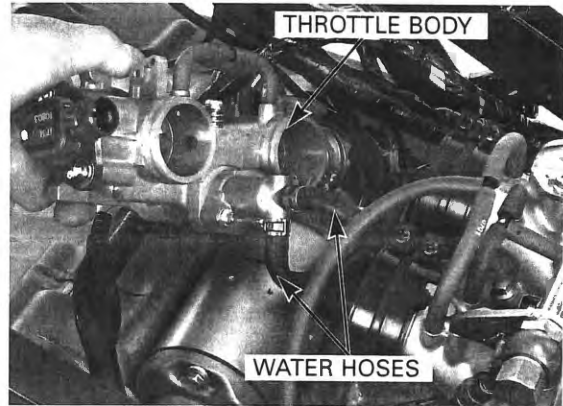


Loosen the insulator band screws and remove the throttle body from the insulator.

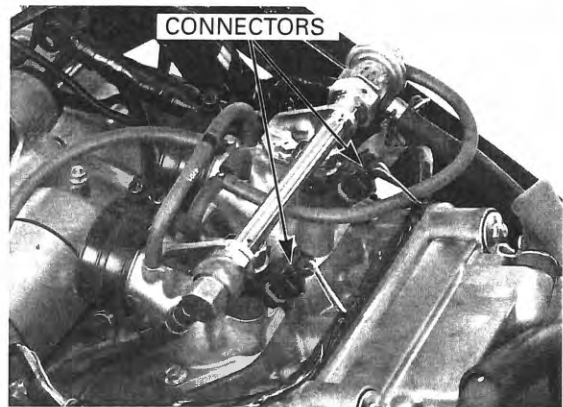


FUEL SYSTEM (Programmed Fuel Injection)

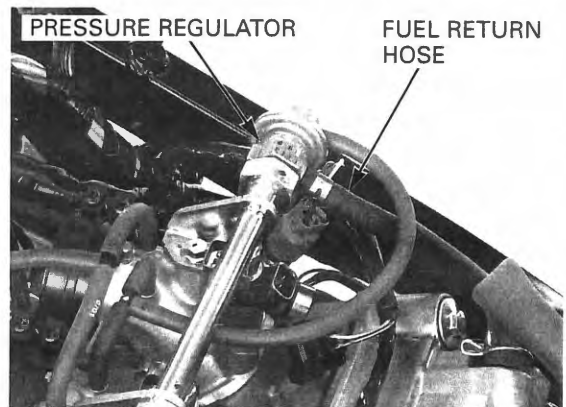
Disconnect the fast idle wax unit water hoses from the wax unit.
Remove the throttle body.



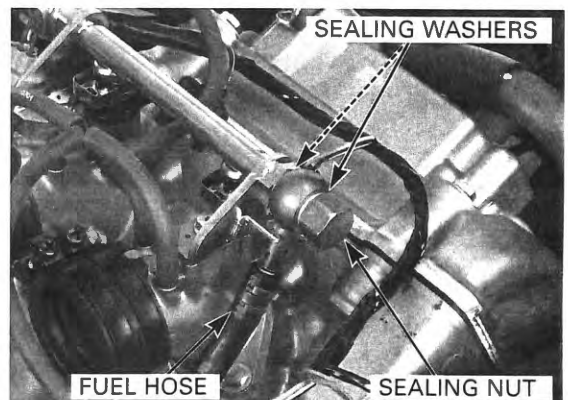
Disconnect the injector connectors from the injectors.



Disconnect the fuel return hose from the pressure regulator.

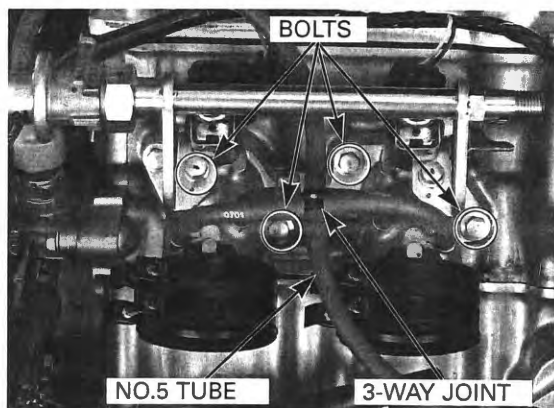


Remove the sealing nut and sealing washers, then disconnect the fuel hose.



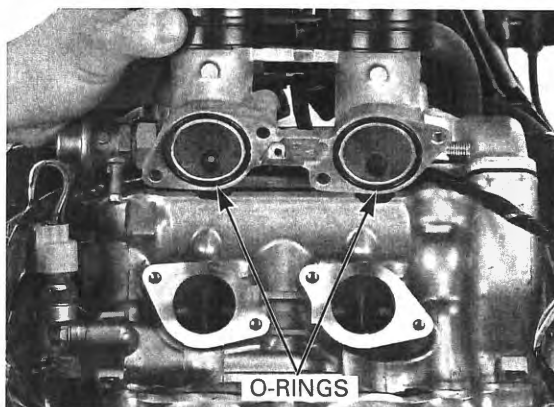
FUEL SYSTEM (Programmed Fuel Injection)

Remove the bolts and intake manifold from the cylinder head.
Disconnect the No.5 tube from the 3-way joint.

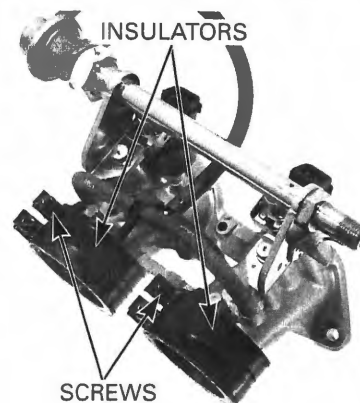


Remove the O-rings from the intake manifold.

Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the intake manifold has been removed.



Loosen the insulator band screws and remove the insulators from the intake manifold.



NOTICE

- Do not damage the throttle body, this may cause incorrect throttle and idle valve synchronization.
- The throttle body is factory pre-set, do not disassemble it in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws on the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.

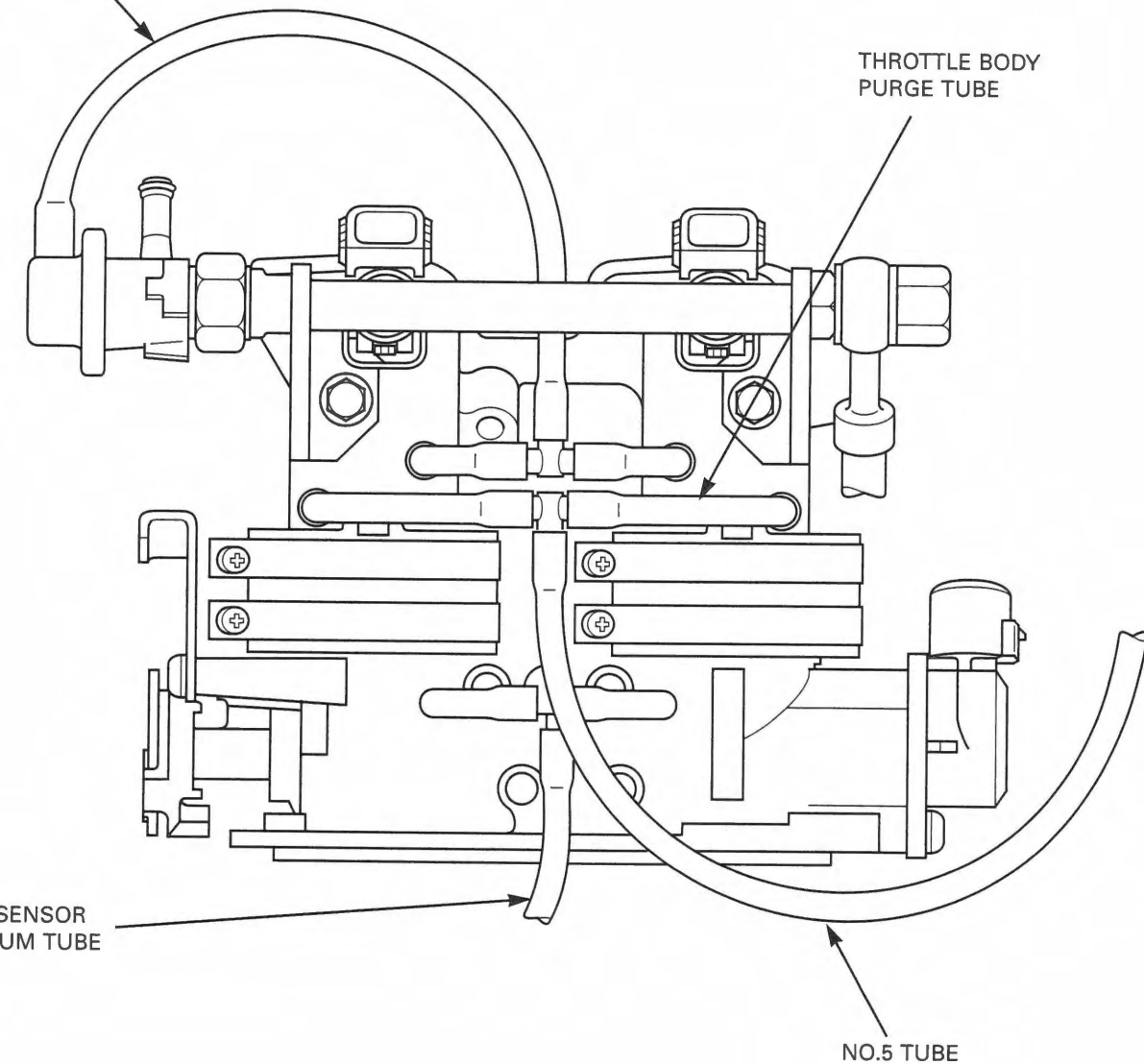
THROTTLE BODY VACUUM TUBE ROUTING

PRESSURE REGULATOR
VACUUM TUBE

THROTTLE BODY
PURGE TUBE

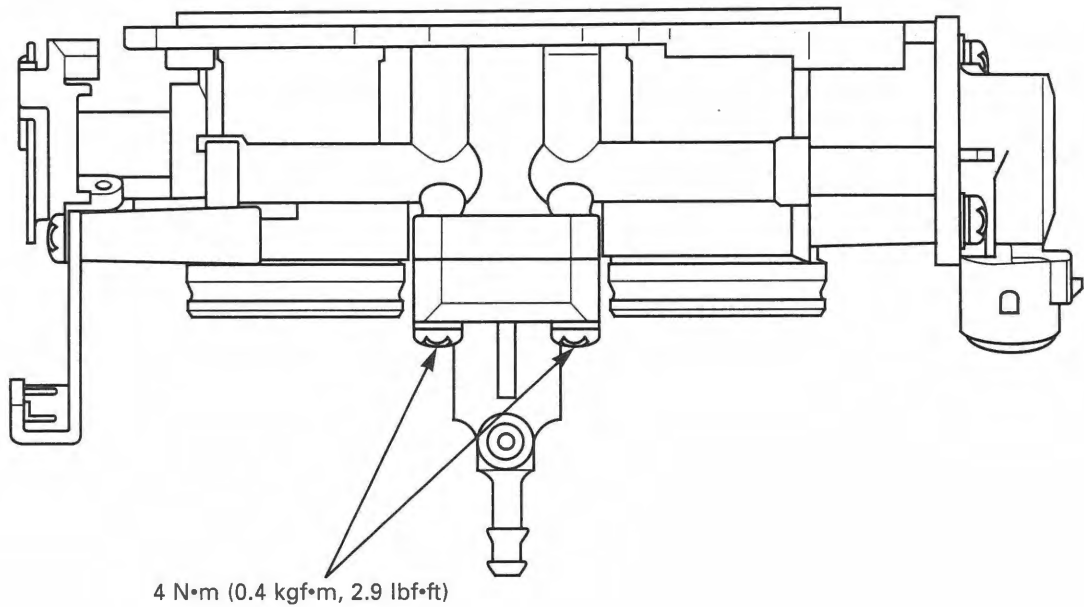
MAP SENSOR
VACUUM TUBE

NO.5 TUBE

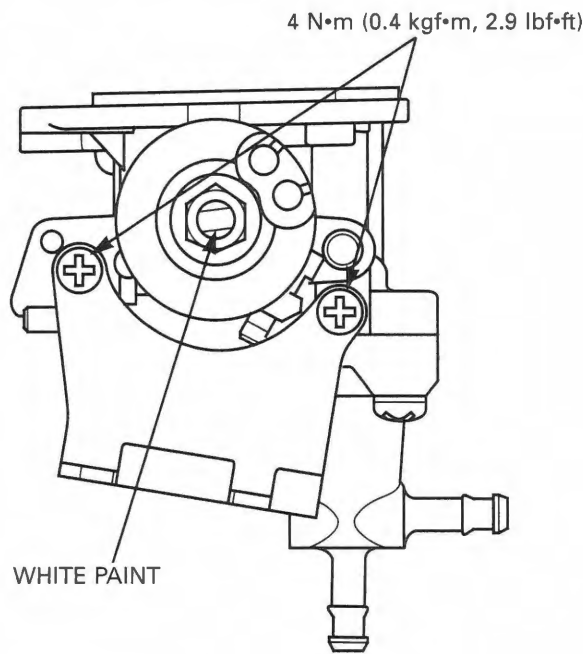


FUEL SYSTEM (Programmed Fuel Injection)

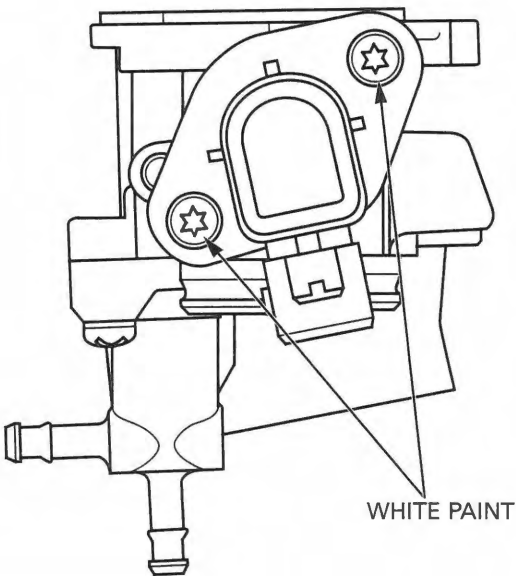
THROTTLE BODY TOP VIEW:



THROTTLE BODY LEFT SIDE VIEW:

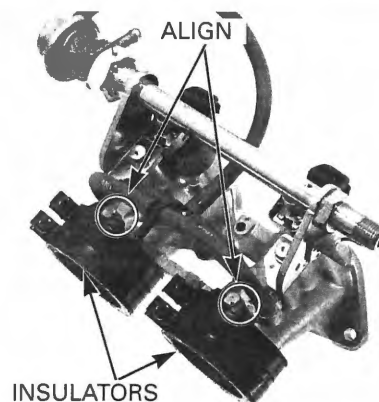


THROTTLE BODY RIGHT SIDE VIEW:

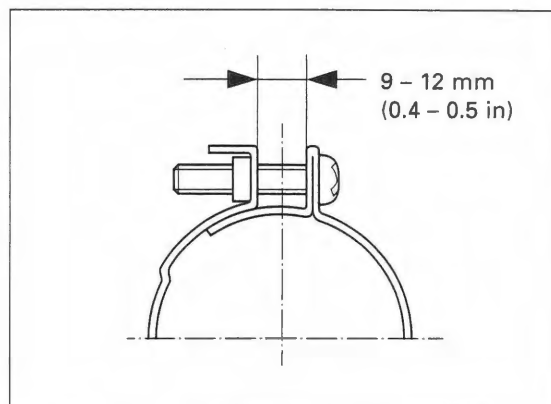


INSTALLATION

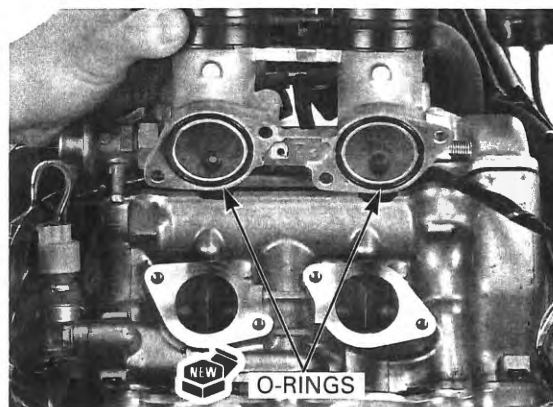
Install the insulators with their grooves aligning with the throttle body tabs.



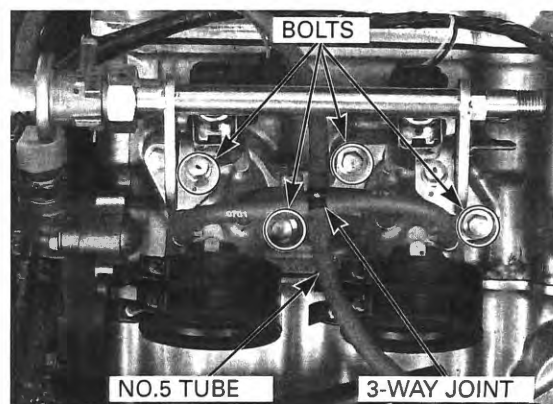
Tighten the throttle body side insulator band so that the insulator band distance is 9 – 12 mm (0.4 – 0.5 in).



Install new O-rings into the intake manifold grooves.



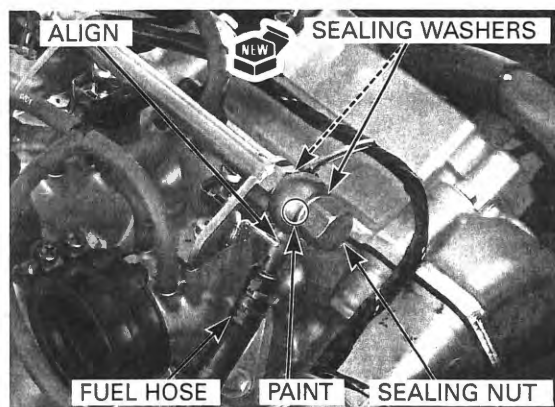
Install the intake manifold to the cylinder head.
Install and tighten the bolts securely.
Install the No. 5 tube to the 3-way joint.



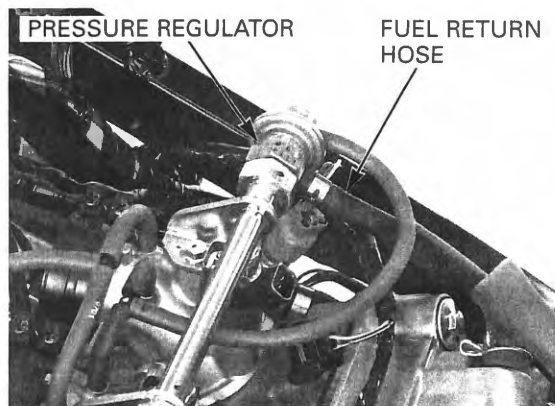
FUEL SYSTEM (Programmed Fuel Injection)

With the painted side of the fuel hose banjo facing up, align the banjo to the stopper on the fuel rail stay, and connect the fuel hose banjo to the fuel rail with new sealing washers. Install and tighten the sealing nut to the specified torque.

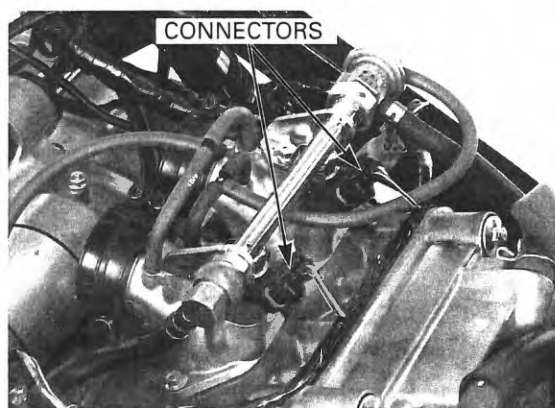
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



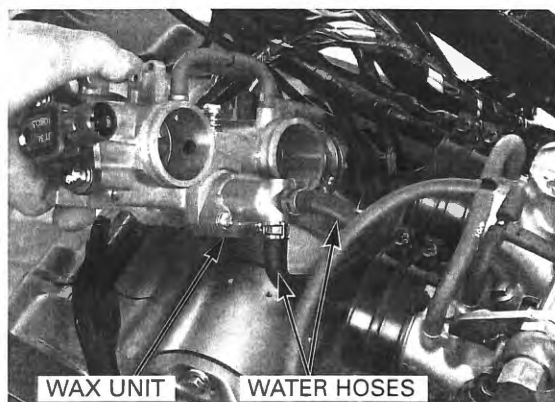
Connect the fuel return hose to the pressure regulator.



Connect the injector connectors.

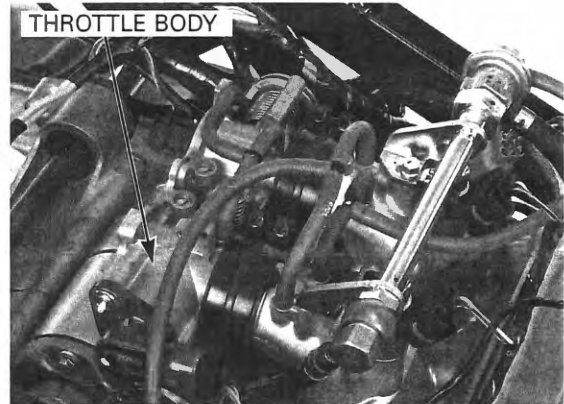


Connect the water hoses to the fast idle wax unit.

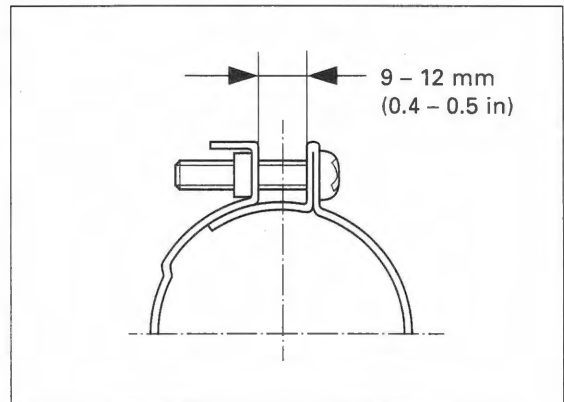


FUEL SYSTEM (Programmed Fuel Injection)

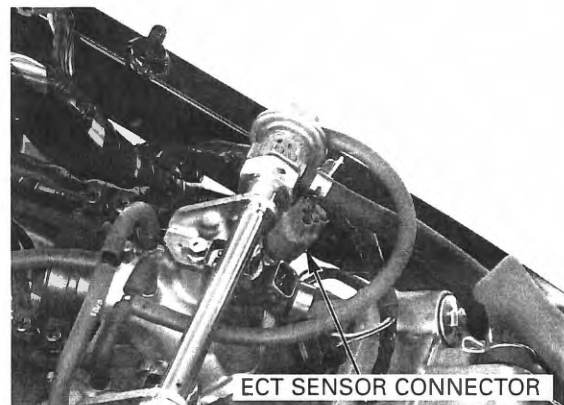
Install the throttle body to the insulators.



Tighten the throttle body side insulator band so that the insulator band distance is 9 – 12 mm (0.4 – 0.5 in).



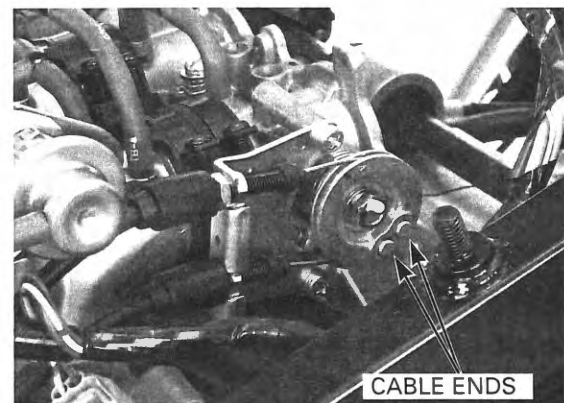
Connect the ECT sensor connector.



Connect the throttle cable ends to the throttle drum.

Install the removed parts in the reverse order of removal.

Adjust the throttle grip free play (page 3-4).

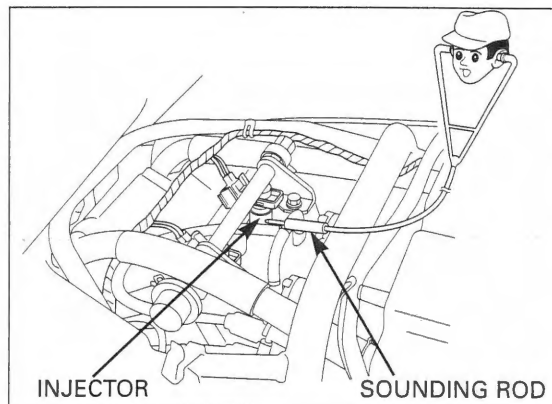


INJECTOR

INSPECTION

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

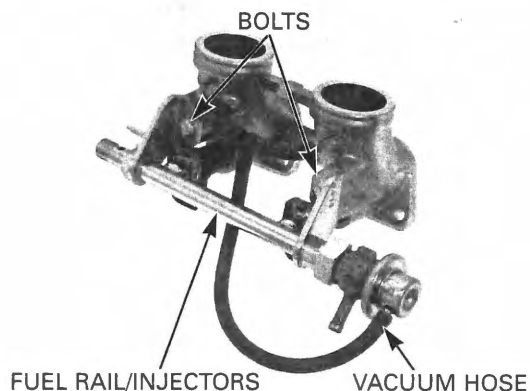
If the injector does not operate properly, replace it.



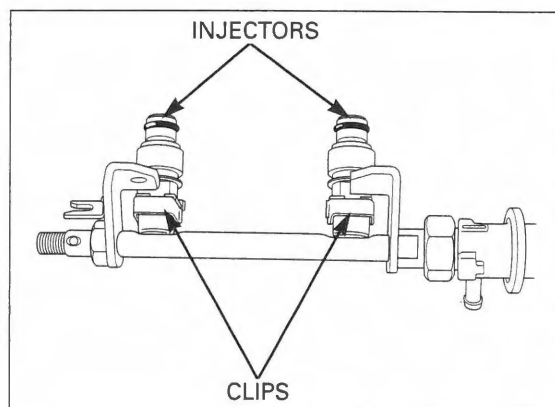
REMOVAL

Remove the intake manifold (page 5-92).

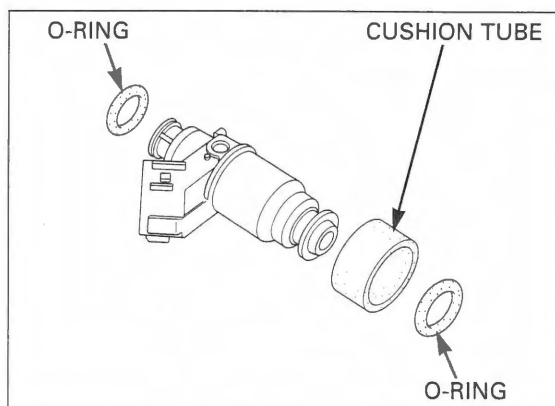
Disconnect the vacuum hose from the pressure regulator.
Remove the bolts and fuel rail/injectors as an assembly.



Remove the injector mounting clips and injectors from the fuel rail.



Remove the O-rings and cushion tube.

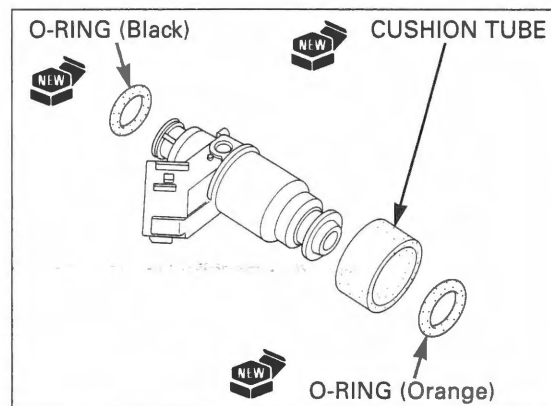


INSTALLATION

Replace the O-rings and cushion tube with new ones as a set.

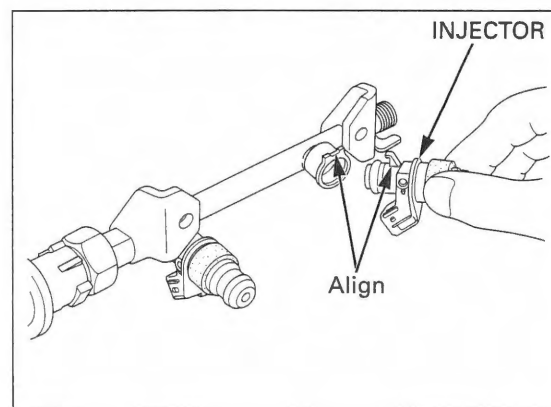
- Install new O-rings to the injector.
- Black O-ring: fuel rail side
 - Orange O-ring: throttle body side

Install a new cushion tube.

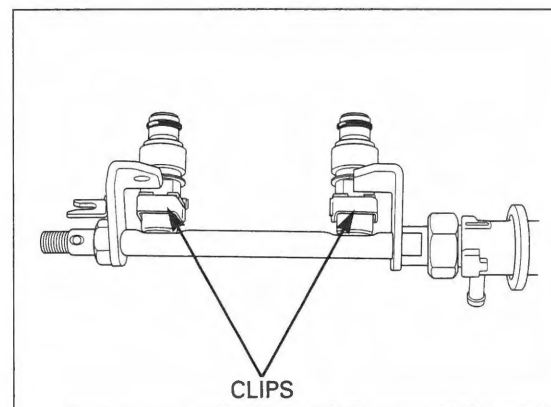


Align the lug on the injector with the cut-out on the fuel rail.

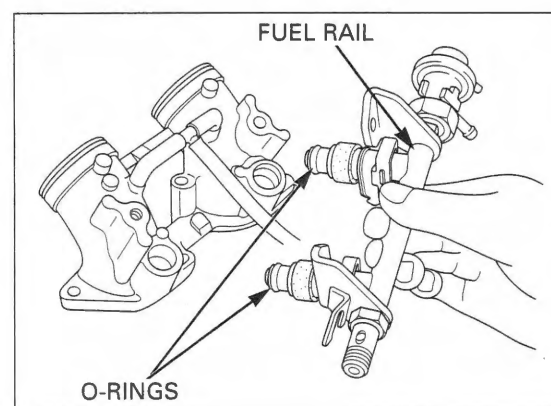
Install the fuel injectors into the fuel rail, being careful not to damage the O-ring.



Install the injector mounting clips.



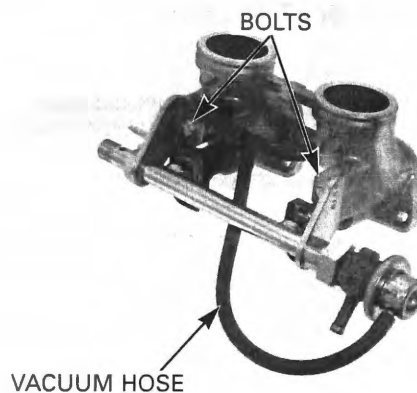
Install the fuel rail/injector assembly onto the throttle body, being careful not to damage the O-rings.



FUEL SYSTEM (Programmed Fuel Injection)

Install and tighten the fuel rail mounting bolts.
Connect the vacuum hose to the pressure regulator.

Install the intake manifold (page 5-97).



PRESSURE REGULATOR

REMOVAL/INSTALLATION

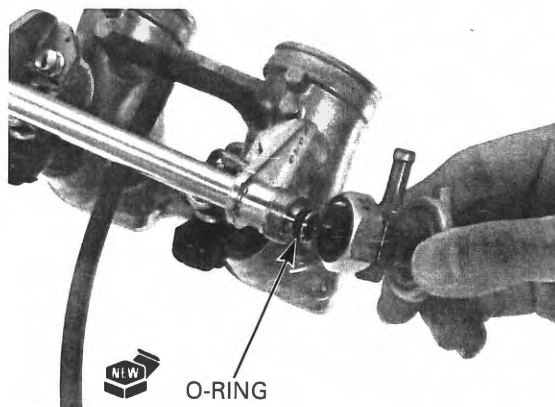
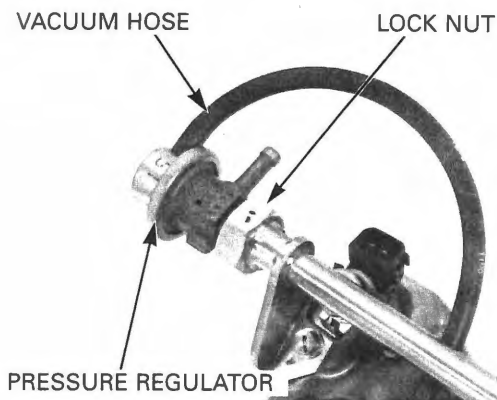
NOTICE

Do not apply excessive force to the fuel rail.

Remove the intake manifold (page 5-92).

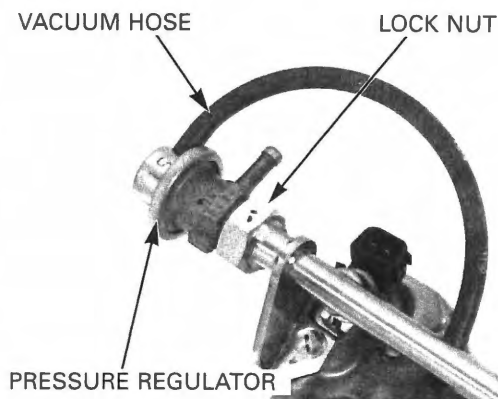
Disconnect the vacuum hose from the pressure regulator.
Holding the fuel rail, loosen the pressure regulator lock nut, then remove the pressure regulator.

Install a new O-ring into the pressure regulator body.
Install the pressure regulator onto the fuel rail.



Check that the pressure regulator angle is as shown.
Hold the fuel rail and tighten the pressure regulator lock nut.

Connect the vacuum hose to the pressure regulator.



FAST IDLE WAX UNIT

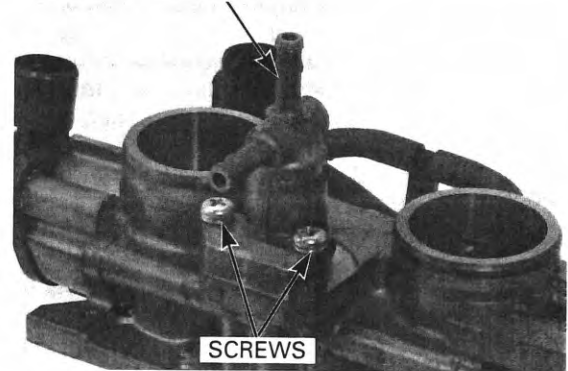
Do not disassemble the fast idle wax unit.

REMOVAL/INSTALLATION

Remove the throttle body (page 5-92).

Remove the screws and fast idle wax unit assembly.

WAX UNIT ASSEMBLY



Replace the O-ring with a new one.

Remove the O-ring from the wax unit.

Installation is in the reverse order of removal.

TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



AIR SCREW SYNCHRONIZATION

- Synchronize the air screw with the engine at the normal operating temperature.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

Remove the seat under cover (page 2-5).

Disconnect the No.1 or No.2 vacuum hose from the intake manifold.

Connect the suitable hose to the disconnected vacuum joint.

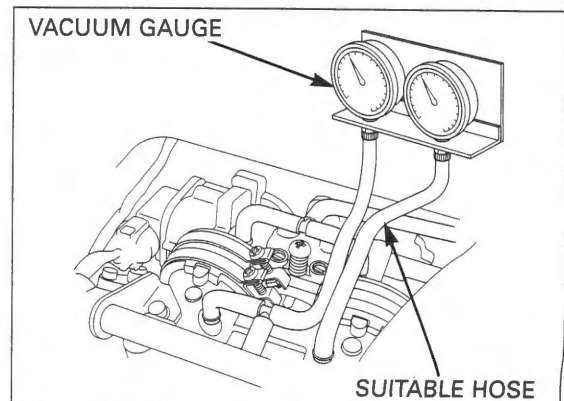
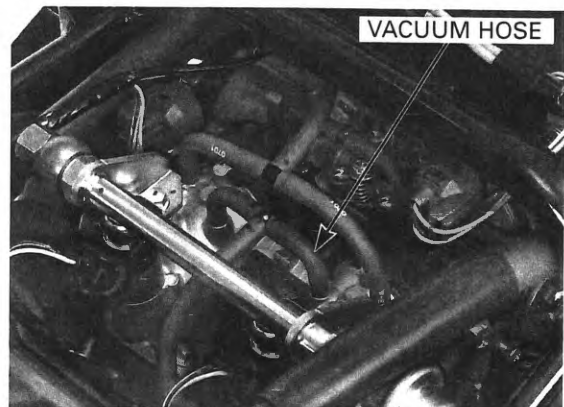
Connect the vacuum gauges to the vacuum hoses.

Connect the tachometer.

Start the engine and let it idle until the radiator cooling fan starts.

1. Check the difference in vacuum between each cylinder.

VACUUM DIFFERENCE: 20 mm Hg



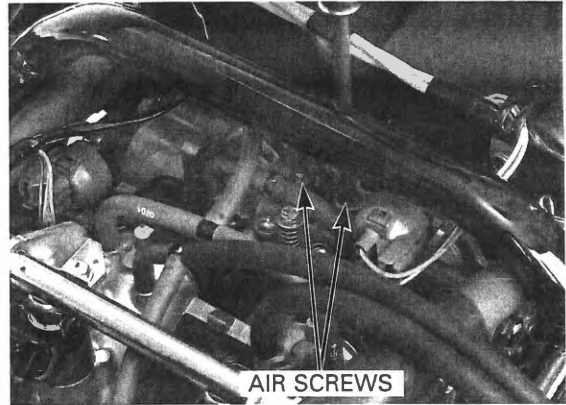
FUEL SYSTEM (Programmed Fuel Injection)

2. Adjust the vacuum difference within specified value by turning the air screw on the higher vacuum pressure side cylinder counterclockwise.
If the air screw is turned counterclockwise 1-1/2 turns or more, turn the other cylinder air screw clockwise 1/2 turn, then repeat step 1.

3. Disconnect the vacuum gauges and hose from the hose joint.
Connect the vacuum hose to the intake manifold.

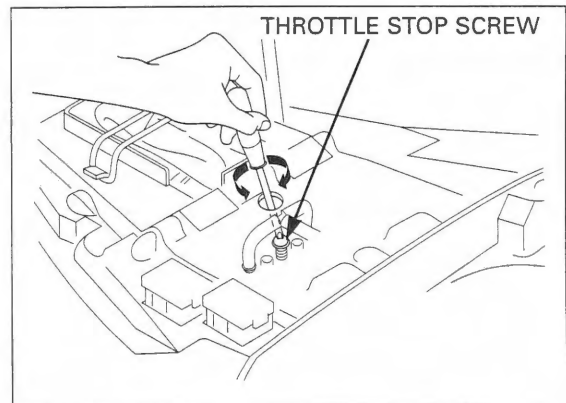
Install the seat under cover (page 2-5).

Start the engine and let it idle.



4. Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,300 ± 100 rpm



MAP SENSOR

OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM;

- '02 - '07: page 5-10
- After '07: page 5-14

Measure the voltage at the test harness terminals.

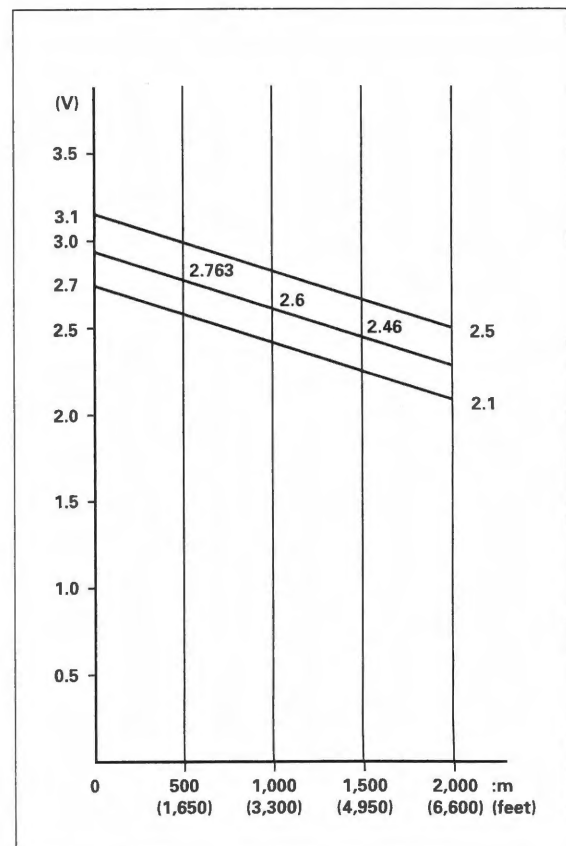
CONNECTION:

'02 - '07: B7 (+) - A22 (-)

After '07: B12 (+) - B26 (-)

STANDARD: 2.7 - 3.1 V

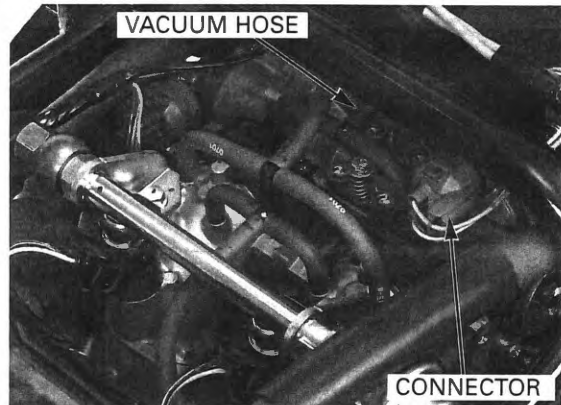
The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,013 hPa).
The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.
Check the sea level measurement and be sure that the measured voltage falls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



MAP SENSOR REMOVAL/ INSTALLATION

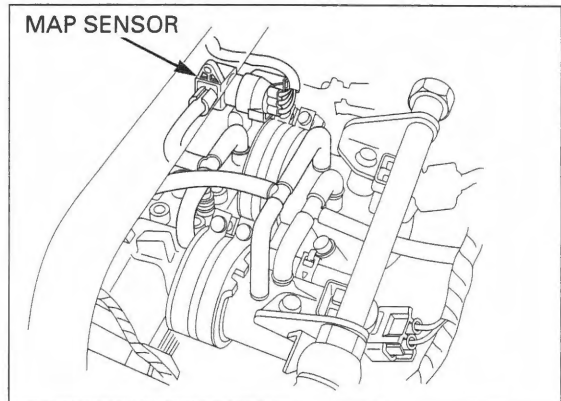
Remove the luggage box (page 2-10).

Disconnect the MAP sensor 3P connector.
Disconnect the vacuum hose from the MAP sensor.



Remove the screw and MAP sensor from the frame.

Installation is in the reverse order of removal.

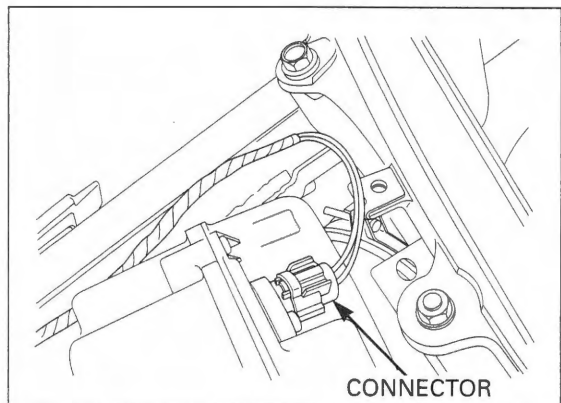


IAT SENSOR

REMOVAL/INSTALLATION

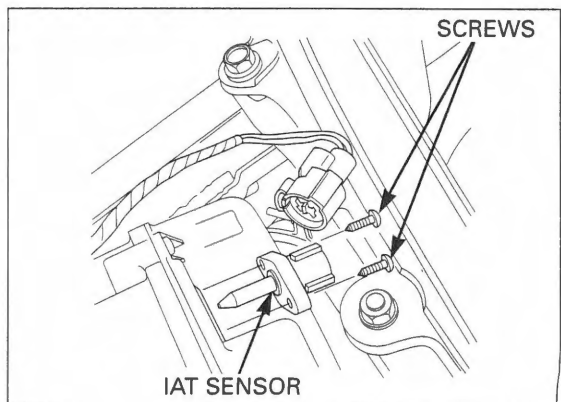
Remove the seat under cover (page 2-5).

Disconnect the IAT sensor connector.



Remove the screws and IAT sensor from the air cleaner chamber cover.

Installation is in the reverse order of removal.



FUEL SYSTEM (Programmed Fuel Injection)

ECT SENSOR

Replace the ECT sensor while the engine is cold.

REMOVAL/INSTALLATION

Drain the coolant from the system (page 6-5).
Remove the seat under cover (page 2-5).

Disconnect the ECT sensor connector from the sensor.

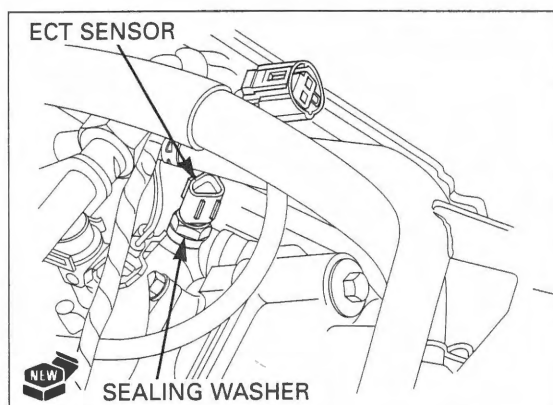
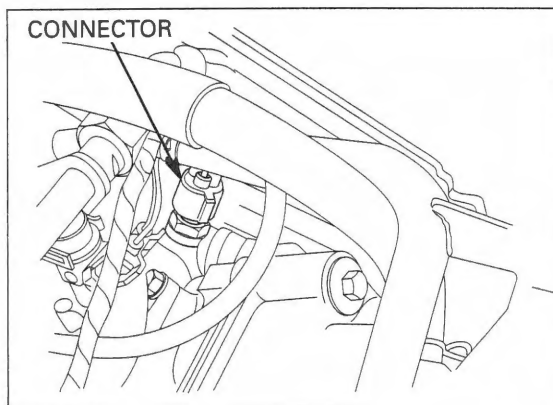
Remove the ECT sensor and sealing washer.

Always replace a sealing washer with a new one.

Install the ECT sensor with a new sealing washer.
Tighten the ECT sensor.

Connect the ECT sensor connector.

Fill the cooling system with the recommended coolant (page 6-5).

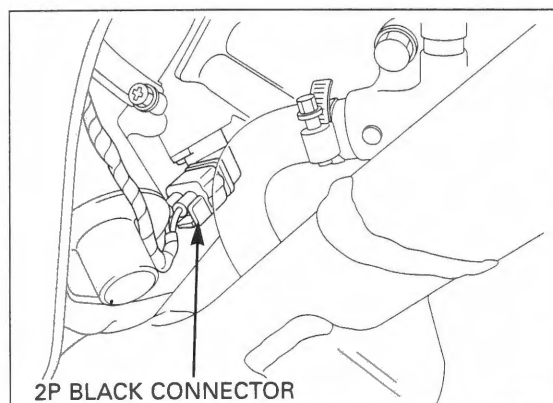


CMP SENSOR

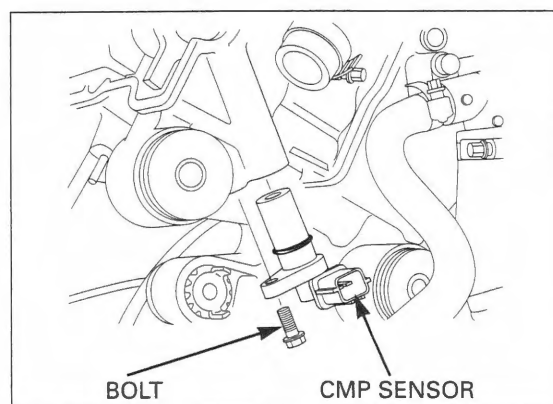
REMOVAL/INSTALLATION

Remove the floorstep (page 2-20).

Disconnect the CMP sensor 2P (Black) connector.

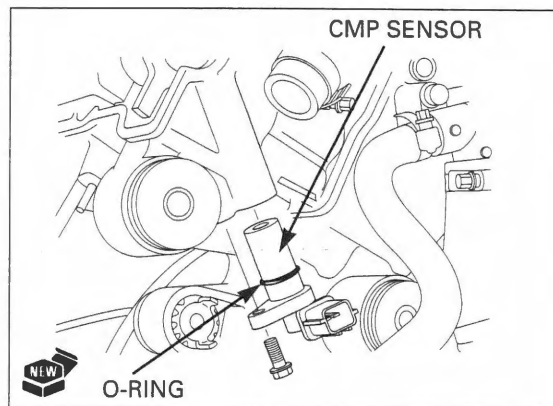


Remove the bolt and CMP sensor from the cylinder head.



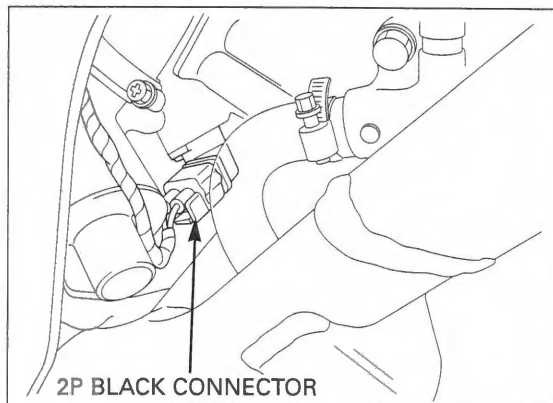
Install a new O-ring onto the CMP sensor.
Install the CMP sensor into the cylinder head.

Install and tighten the mounting bolt.



Routing the CMP sensor wire properly, connect the 2P (Black) connector.

Install the removed parts in the reverse order of removal.



TP SENSOR ('02 - '07)

INSPECTION

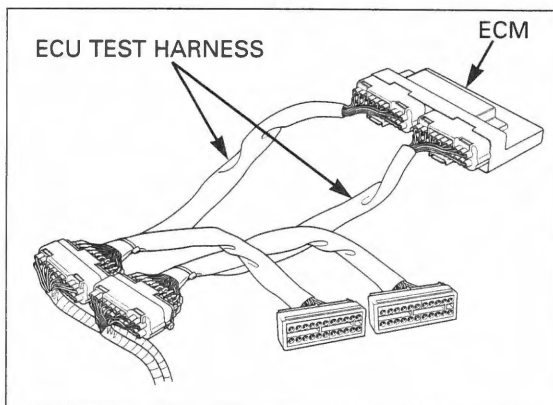
Remove the left side body cover (page 2-6).

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.
Check the connectors for loose or corroded terminals.
Connect the ECU test harness between the ECM and main wire harness.

TOOL:

ECU test harness

07YMZ-0010100
(two required) or
07WMZ-MBGA000
(U.S.A. only)



1. INPUT VOLTAGE INSPECTION

Turn the ignition switch to "ON" and measure and record the input voltage at the test harness terminals using a digital multimeter.

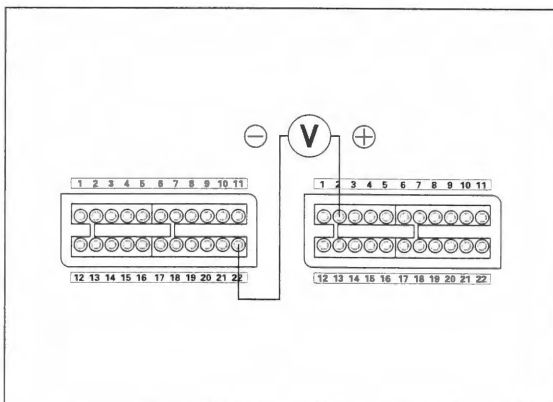
CONNECTION:

B2 (+) - A22 (-)

Standard: 4.5 - 5.5 V

If the measurement is out of specification, check the following:

- Loose connection on the ECM connectors
- Open circuit in wire harness



FUEL SYSTEM (Programmed Fuel Injection)

2. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

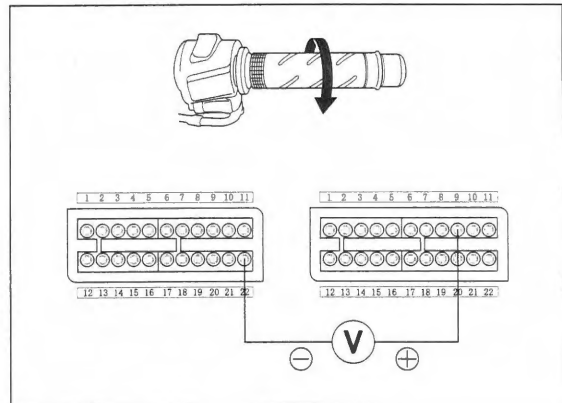
Turn the ignition switch to "ON" and measure and record the output voltage at the test harness terminals.

CONNECTION:

B9 (+) – A22 (–)

MEASURING CONDITION:

At throttle fully open



3. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

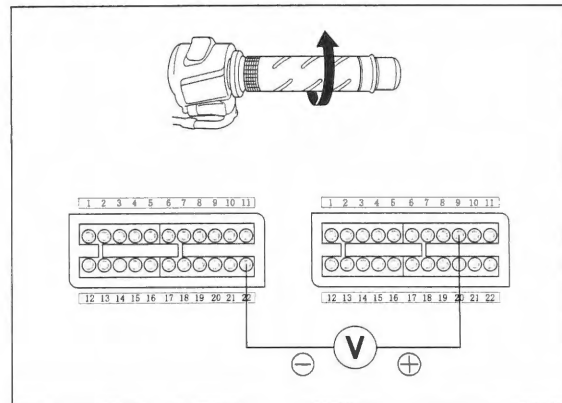
Turn the ignition switch to "ON" and measure and record the output voltage with the throttle fully closed.

CONNECTION:

B9 (+) – A22 (–)

MEASURING CONDITION:

At throttle fully closed



4. CALCULATE RESULT COMPARISON

Compare the measurement of the result with the following calculation.

With the throttle fully open:

Measured input voltage (step 1) x 0.824 = Vo

The sensor is normal if the measurement output voltage measured in step 2 is within 10% of Vo.

With the throttle fully closed:

Measured input voltage (step 1) x 0.1 = Vc

The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of Vc.

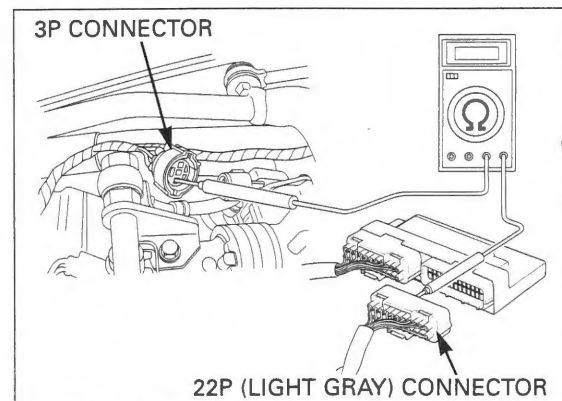
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

CONTINUITY INSPECTION

Remove the seat under cover (page 2-5).

Disconnect the ECM 22P (Light gray) connector and the TP sensor 3P connector. Check for continuity between the ECM and TP sensor.

If there is no continuity, check for an open or short circuit in the wire harness.



TP SENSOR (After '07)

INSPECTION

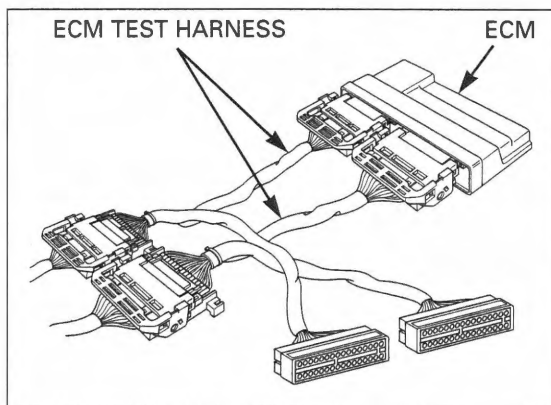
Remove the left side body cover (page 2-6).

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors.
Check the connector for loose or corroded terminals.
Connect the ECM test harness between the ECM and main wire harness.

TOOL:

ECM test harness

070MZ-0010201
(two required)



1. INPUT VOLTAGE INSPECTION

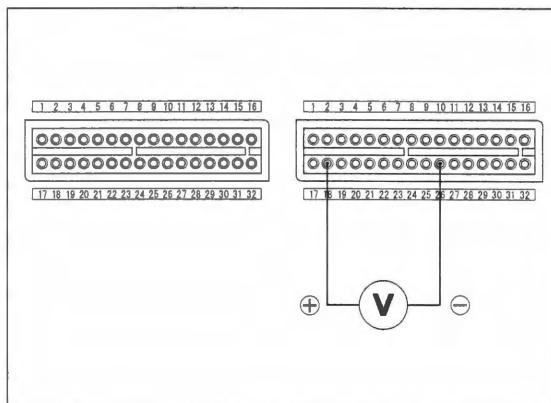
Turn the ignition switch to "ON" and measure and record the input voltage at the test harness terminals using a digital multimeter.

CONNECTION: B18 (+) – B26 (–)

STANDARD: 4.75 – 5.25 V

If the measurement is out of specification, check the following:

- Loose connection of the ECM multi-connector.
- Open circuit in wire harness.



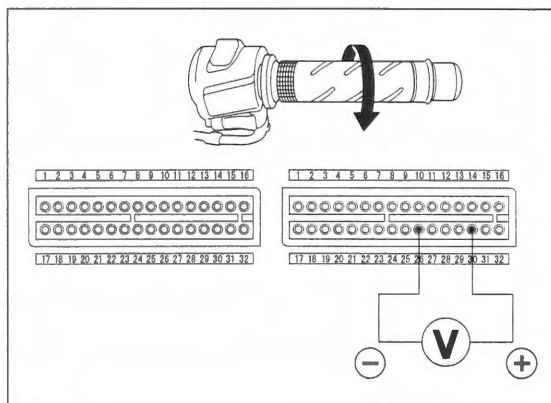
2. OUTPUT VOLTAGE INSPECTION WITH THE THROTTLE FULLY OPENED

Turn the ignition switch to "ON" and measure and record the output voltage at the test harness terminals.

CONNECTION: B30 (+) – B26 (–)

MEASURING CONDITION:

At throttle fully opened



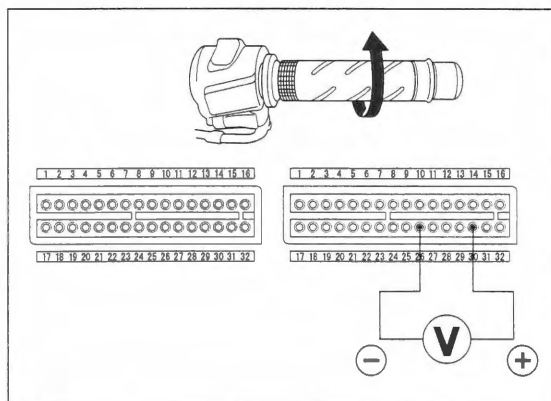
3. OUTPUT VOLTAGE INSPECTION WITH THE THROTTLE FULLY CLOSED

Turn the ignition switch to "ON" and measure and record the output voltage with the throttle fully closed.

CONNECTION: B30 (+) – B26 (–)

MEASURING CONDITION:

At throttle fully closed



FUEL SYSTEM (Programmed Fuel Injection)

4. CALCULATE RESULT COMPARISON

Compare the measurement to the result of the following calculation.

With the throttle fully opened:

$$\text{Measured input voltage (step 1)} \times 0.824 = V_o$$

The sensor is normal if the measurement output voltage measured in step 2 is within 10% of V_o .

With the throttle fully closed:

$$\text{Measured input voltage (step 1)} \times 0.1 = V_c$$

The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of V_c .

Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

O₂ SENSOR (After '07)

REMOVAL

- Handle the O₂ sensor with care.
- Do not get grease, oil or other materials in the O₂ sensor air hole, or it may be damaged.
- Do not service the O₂ sensor while it is hot.

Remove the right side body cover (page 2-6).
Remove the muffler protector (page 2-22).

Disconnect the O₂ sensor 4P (Gray) connector.
Release the wire from the guide.

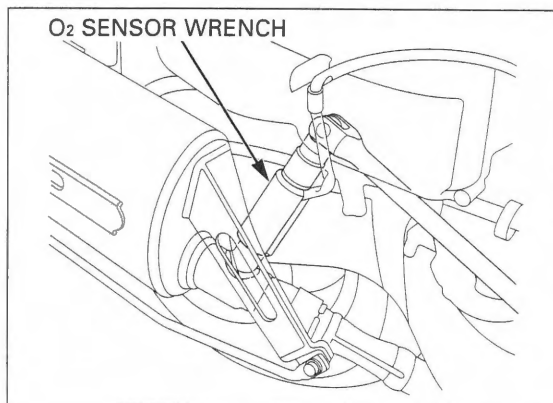
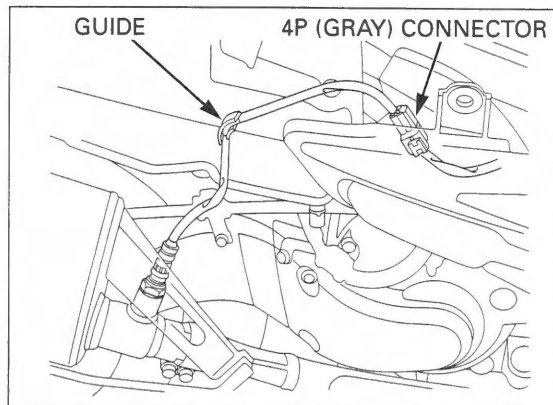
Remove the O₂ sensor using the special tool.

TOOL:

O₂ sensor wrench

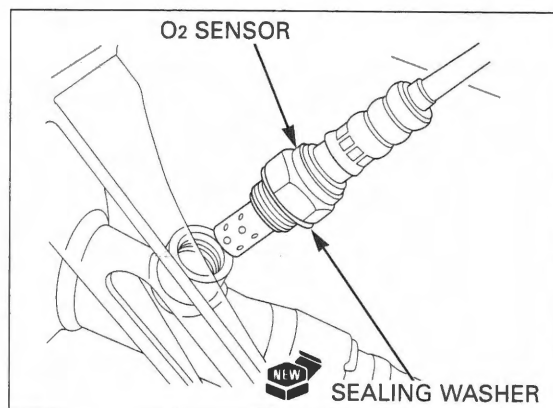
07LAA-PT50101

- Be careful not to damage the sensor wire.
- Do not use an impact wrench while removing the O₂ sensor, or it may be damaged.



INSTALLATION

Install a new sealing washer to the O₂ sensor.



Using the special tool, install and tighten the O₂ sensor to the specified torque.

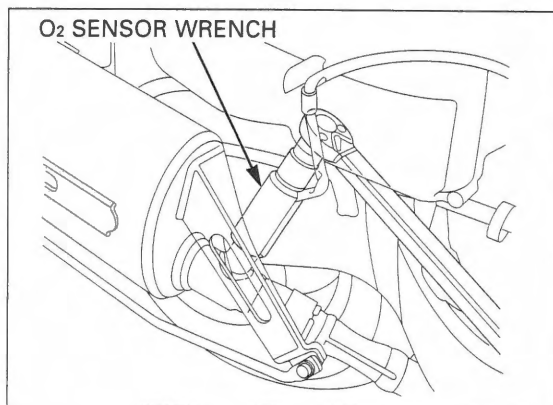
TOOL:

O₂ sensor wrench

07LAA-PT50101

- Be careful not to damage the sensor wire.
- Do not use an impact wrench while installing the O₂ sensor, or it may be damaged.

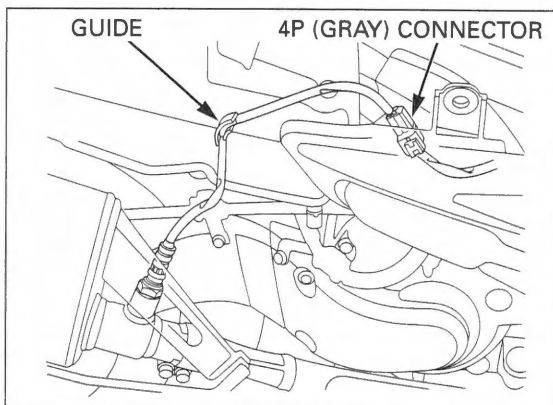
TORQUE: 44 N.m (4.5 kgf.m, 33 lbf.ft)



Route the O₂ sensor wire properly (page 1-20).

Connect the O₂ sensor 4P (Gray) connector and set the wire into the guide.

Install the muffler protector (page 2-22).
Install the right side body cover (page 2-9).



BANK ANGLE SENSOR

INSPECTION

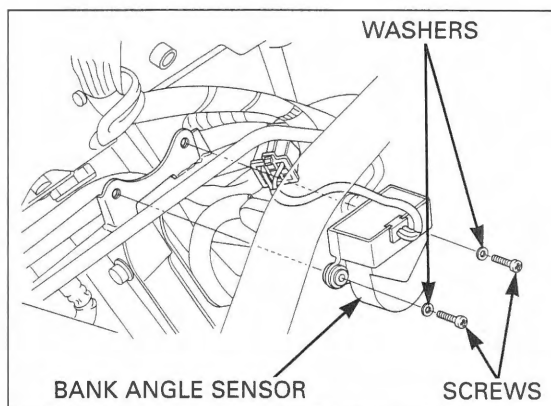
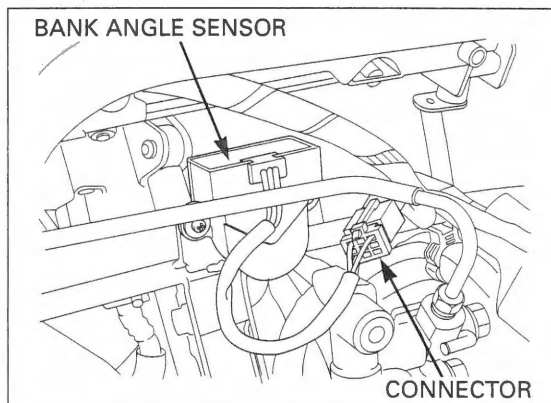
Support the motorcycle on a level surface.
Remove the front cover (page 2-14).

Turn the ignition switch to "ON" and measure the voltage between the following terminals of the bank angle sensor connector with the connector connected.

TERMINAL	STANDARD
White (+) – Green (–)	Battery voltage
Red/White (+) – Green (–)	0 – 1 V

Turn the ignition switch to "OFF".
Remove the screws, washers and bank angle sensor.

*Do not disconnect
the bank angle
sensor connector
during inspection.*



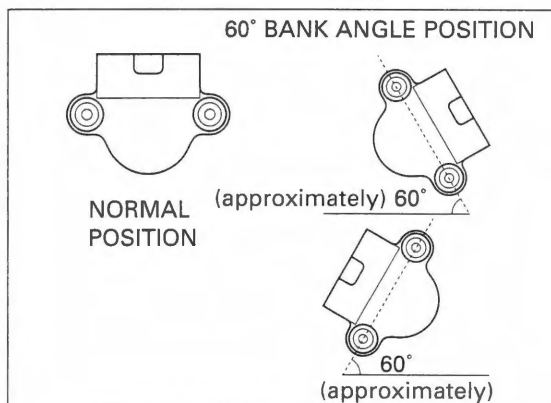
Place the bank angle sensor horizontal as shown, and turn the ignition switch to "ON" with the engine stop switch to "RUN".

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

Incline the bank angle sensor approximately 60 degrees to the left or right with the ignition switch turned to "ON".

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

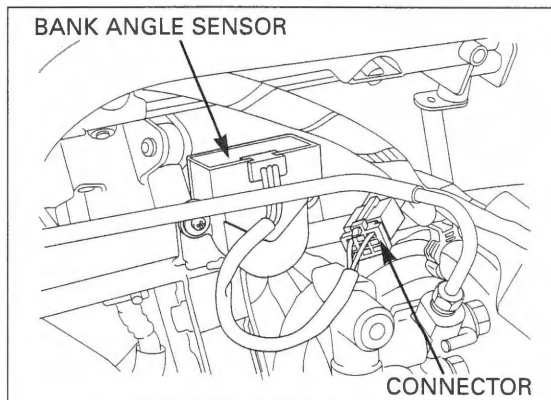
If you repeat this test, first turn the ignition switch to "OFF", then turn the ignition switch to "ON".



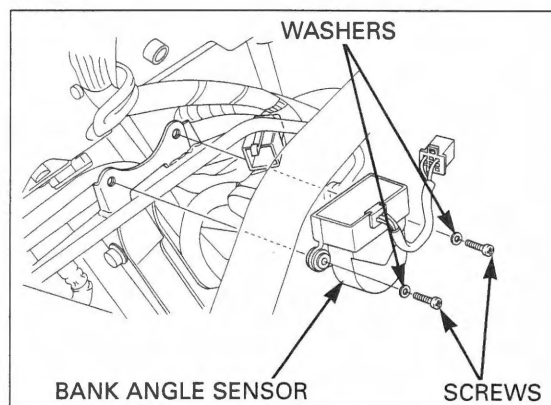
REMOVAL/INSTALLATION

Remove the front cover (page 2-14).

Disconnect the bank angle sensor 9P (Black) connector.

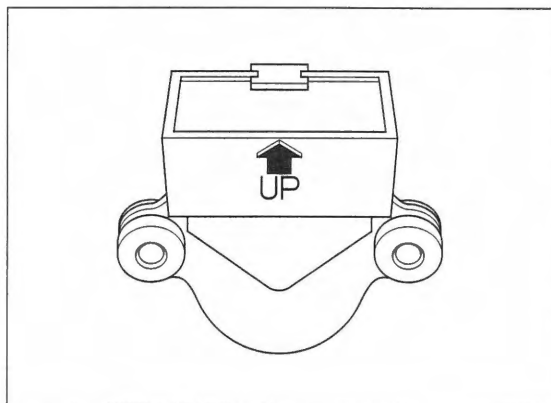


Remove the two screws, washers and bank angle sensor.



Installation is in the reverse order of removal.

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

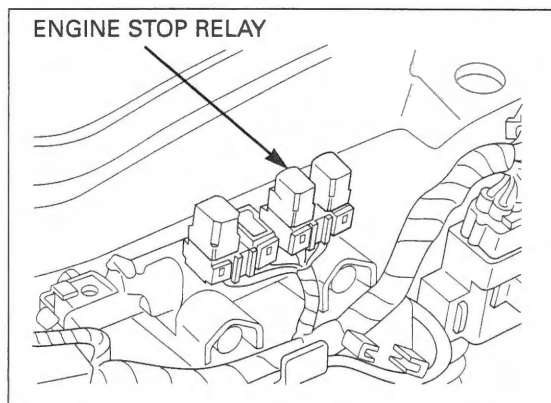


ENGINE STOP RELAY

INSPECTION

Remove the left side body cover (page 2-6).

Remove the engine stop relay.



Connect the ohmmeter to the engine stop relay connector terminals.

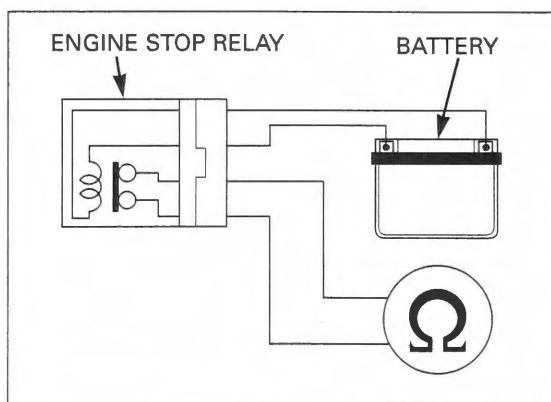
CONNECTION: Black/White – Black

Connect the 12-V battery to the following engine stop relay connector terminals.

CONNECTION: Black/Orange – Black

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.



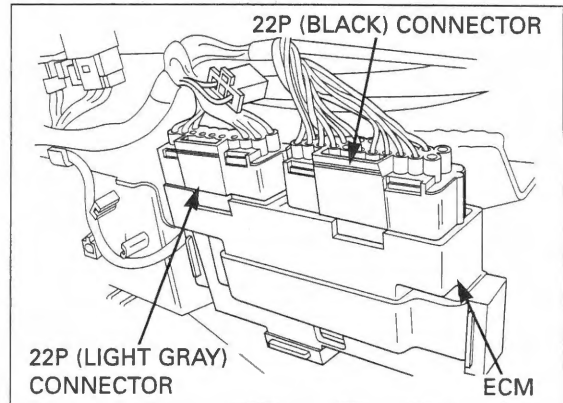
ECM (ENGINE CONTROL MODULE) ('02 – '07)

REMOVAL/INSTALLATION

Remove the left side body cover (page 2-6).

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.

Remove the ECM from the frame.



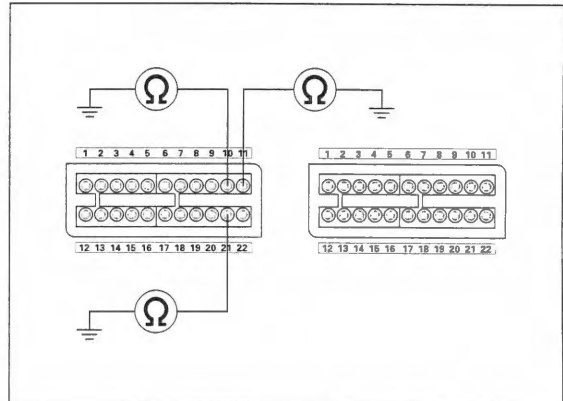
POWER/GROUND LINE INSPECTION

Connect the test harness between the main wire harness and ECM (page 5-10).

TOOL:

ECU test harness

07YMZ-0010100
(two required) or
07WMZ-MBGA000
(U.S.A. only)



GROUND LINE

Check for continuity between the ECM test harness connector A10 terminal and ground, between the A21 terminal and ground, and between the A11 terminal and ground.

There should be continuity at all times.

If there is no continuity, check for an open circuit in the Green/Pink wires or Green wire.

POWER INPUT LINE

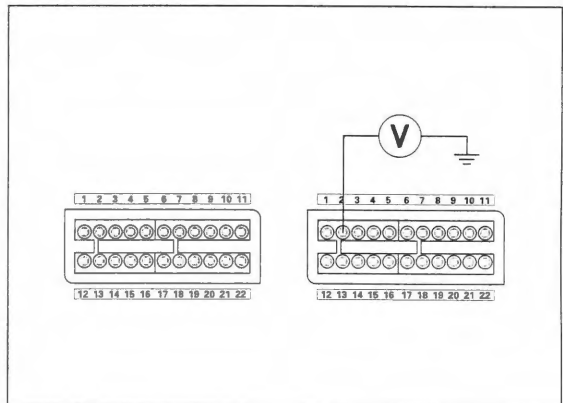
Turn the ignition switch to "ON" with the engine stop switch in the "RUN" position.

Measure the voltage between the ECM test harness connector B2 terminal (+) and ground.

There should be battery voltage.

If there is no voltage, check for an open circuit in the Black/White wire between the ECM and engine stop relay.

If the wire is OK, check the engine stop relay (page 5-113).



ECM (ENGINE CONTROL MODULE) (After '07)

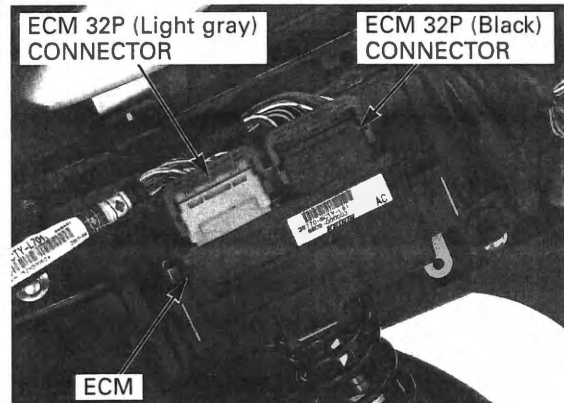
REMOVAL/INSTALLATION

Remove the left side body cover (page 2-6).

Disconnect the ECM 32P (Black) and 32P (Light gray) connectors.

Remove the ECM from the frame.

Installation is in the reverse order of removal.



POWER/GROUND LINE INSPECTION

ENGINE DOES NOT START (MIL DOES NOT BLINK)

1. ECM Power Input Voltage Inspection

- Before starting the inspection, check for loose or poor contact on the ECM 32P connectors and recheck.

Connect the test harness to the ECM 32P connectors (page 5-14).

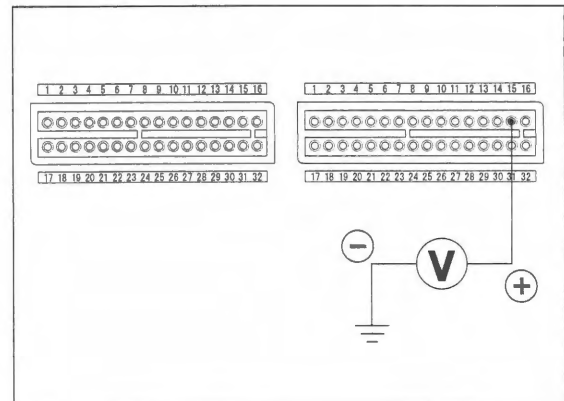
Turn the ignition switch to "ON" and engine stop switch to "O".

Measure the voltage at the test harness terminal and ground.

CONNECTION: B15 (+) - Ground (-)

Does the battery voltage exist?

- YES — GO TO STEP 2.
NO — GO TO STEP 3.



2. ECM Ground Line Inspection

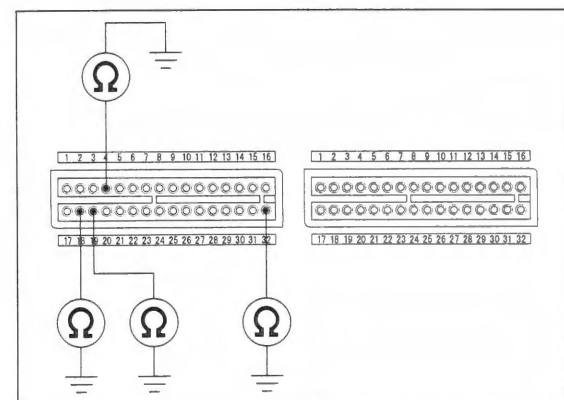
Turn the ignition switch to "OFF".

Check for continuity between the test harness terminals and ground.

**CONNECTION: A4 - Ground
A18 - Ground
A19 - Ground
A32 - Ground**

Is there continuity?

- YES — Replace the ECM with a new one, and recheck.
NO —
- Open circuit in Green/pink (A4) wire.
 - Open circuit in Green/pink (A18) wire.
 - Open circuit in Green/pink (A19) wire.
 - Open circuit in Green (A32) wire.



FUEL SYSTEM (Programmed Fuel Injection)

3. Engine Stop Relay Inspection 1

Turn the ignition switch to "OFF".
Remove the engine stop relay.
Turn the ignition switch to "ON" and engine stop switch to "O".
Measure the voltage at the engine stop relay connector terminals.

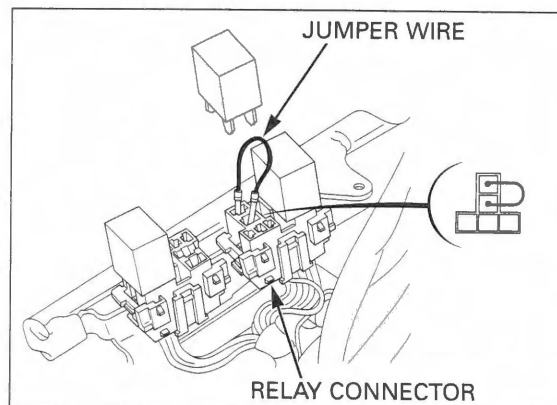
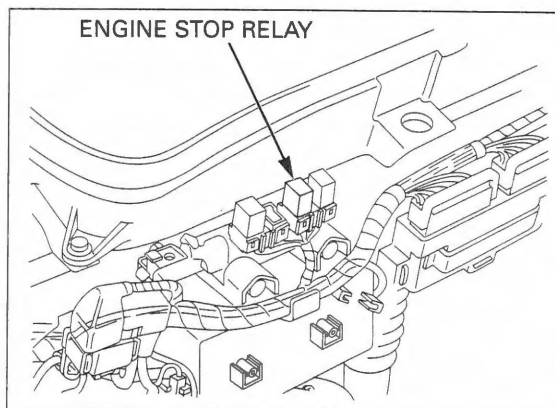
CONNECTION: Black (+) - Black/Orange (-)

Does the battery voltage exist?

YES — GO TO STEP 4.

NO —

- Open circuit in Black wire.
- Open circuit in Black/orange wire.
- Faulty engine stop switch (page 21-12).
- Open circuit in Red/orange wire between the engine stop switch and bank angle sensor.
- Inspect the bank angle sensor (page 5-112).



4. Engine Stop Relay Inspection 2

Turn the ignition switch to "OFF".
Jump the engine stop relay connector terminals.

CONNECTION: Black - Black/white

Turn the ignition switch to "ON".
Measure the voltage at the ECM connector terminal and ground.

CONNECTION: B15 (+) - Ground (-)

Does the battery voltage exist?

YES — Inspect the engine stop relay (page 5-113).
NO — Open circuit in power input line (Black/white or Black) between the battery and ECM.

PAIR SOLENOID VALVE

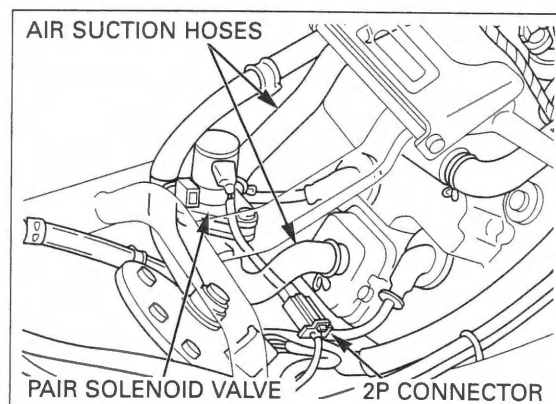
REMOVAL/INSTALLATION

Remove the floorstep (page 2-20).

Disconnect the PAIR solenoid valve 2P connector.

Disconnect the PAIR air suction hoses.
Remove the bolt and PAIR solenoid valve.

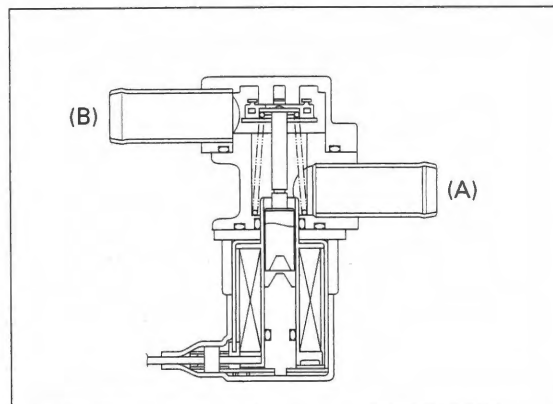
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR solenoid valve.

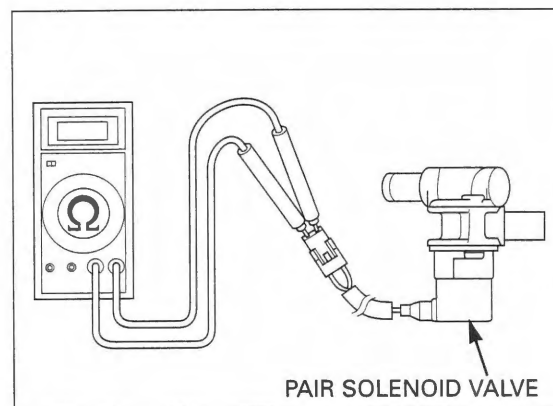
Check that air flows (A) to (B), only when the 12-V battery is connected to the PAIR solenoid valve terminals.



Check the resistance between the terminals of the PAIR solenoid valve.

STANDARD: 20 – 24 Ω (20 °C/68°F)

If the resistance is out of specification, replace the PAIR solenoid valve.



EVAPORATIVE EMISSION CONTROL SYSTEM

NOTE:

- Refer to the Vacuum Hose Routing Diagram and Cable & Harness Routing (page 1-36) for the tube connections and routing.

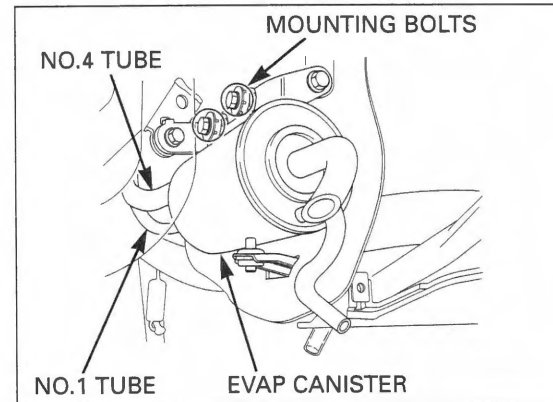
EVAPORATIVE EMISSION (EVAP) CANISTER REMOVAL/INSTALLATION

Remove the floor mats and the floor skirts (page 2-4).

Disconnect the No. 1 and No. 4 tube from the EVAP canister.

Remove the four bolts and EVAP canister from the bracket.

Install the EVAP canister in the reverse order of removal.

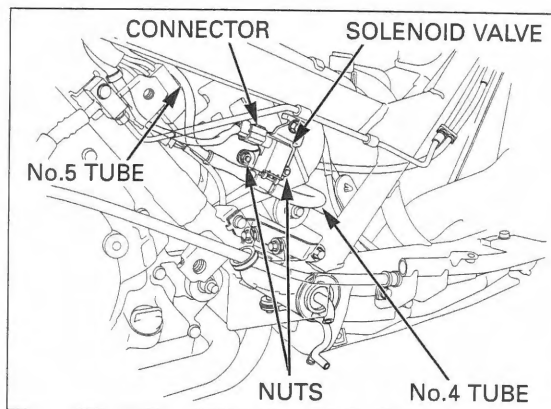


EVAP PURGE CONTROL SOLENOID VALVE

REMOVAL/INSTALLATION

Disconnect the No.4 and No.5 tubes from the EVAP purge control solenoid valve.
Remove the nuts and solenoid valve from the stay.
Disconnect the 2P connector from the solenoid valve.

Install the solenoid valve in the reverse order of removal.



INSPECTION

Remove the solenoid valve.

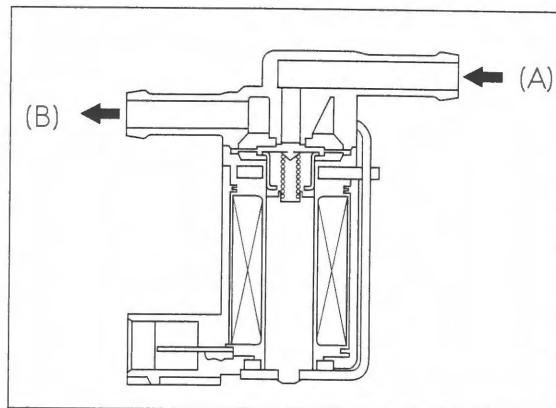
Check air flow from tube fitting (A) (input port) to tube fitting (B) (output port).
Air should not flow out.

Connect the 12-V battery to the solenoid valve connector.

CONNECTION:

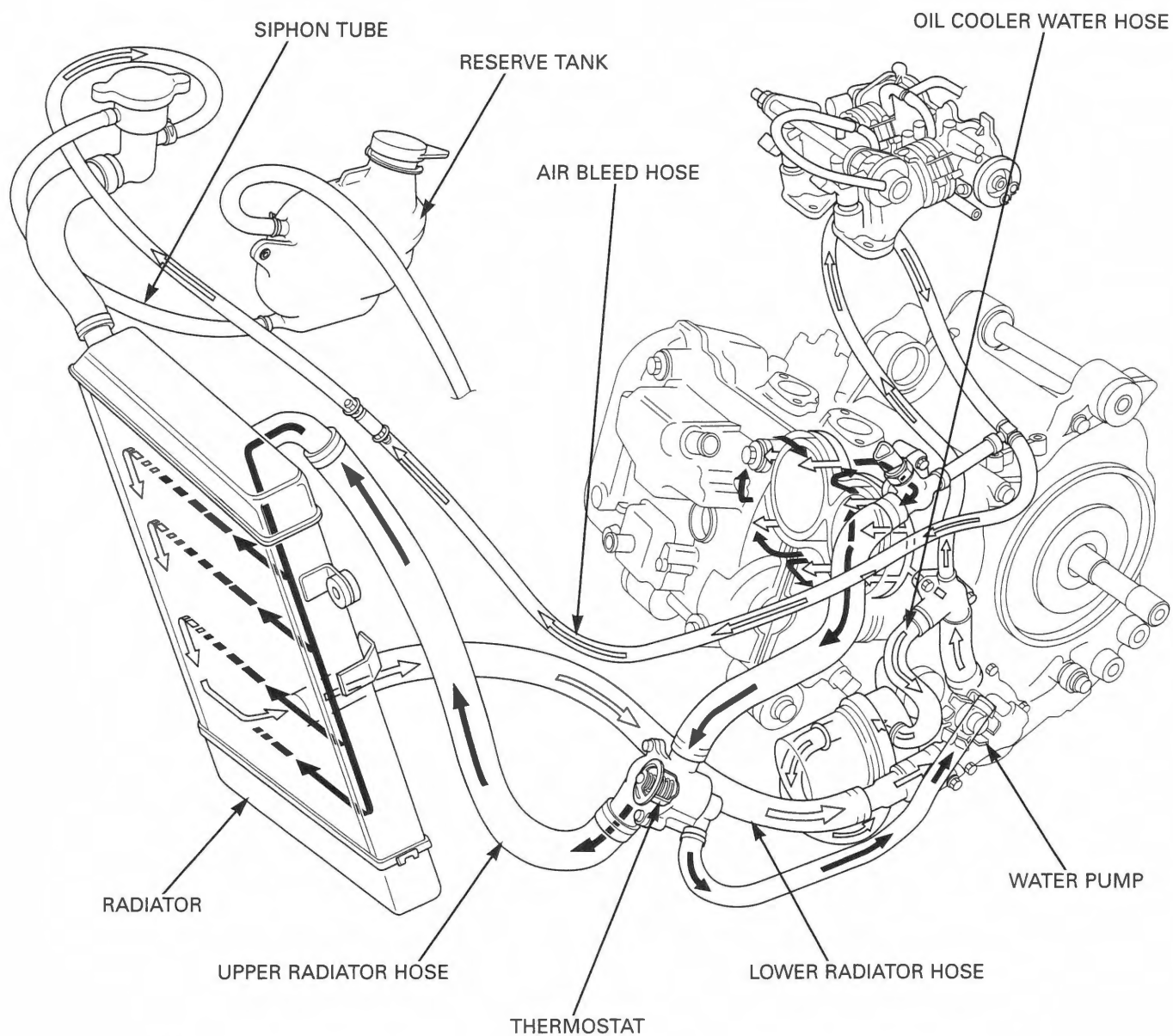
Battery (+) – Black/White terminal
Battery (–) – Yellow/Black terminal

Air should flow when the battery is connected.



MEMO

SYSTEM FLOW PATTERN



6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-6
SERVICE INFORMATION	6-1	WATER PUMP	6-8
TROUBLESHOOTING	6-2	RADIATOR	6-11
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-15
COOLANT REPLACEMENT	6-4	FAN MOTOR RELAY	6-16

SERVICE INFORMATION

GENERAL

6

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

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

- This section covers service of the cooling system.
- These services can be done with the engine installed in the frame.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 5 for engine coolant temperature (ECT) sensor inspection.
- Refer to section 21 for coolant temperature indicator, ECT/thermosensor inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.2 liter (2.3 US qt, 1.9 Imp qt)
	Reserve tank	0.8 liter (0.8 US qt, 0.7 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		50% mixture with soft water

COOLING SYSTEM

TORQUE VALUES

Water pump cover bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)	CT bolt
Cooling fan nut	3 N•m (0.3 kgf•m, 2.2 lbf•ft)	Apply a locking agent to the threads.
Fan motor bolt	5 N•m (0.5 kgf•m, 3.6 lbf•ft)	
Radiator shroud mounting bolt	9 N•m (0.9 kgf•m, 6.5 lbf•ft)	
Radiator reserve tank mounting bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	

TROUBLESHOOTING

Engine temperature too high

- Faulty radiator cap
- Faulty temperature gauge or thermosensor
- Air in system
- Thermostat stuck closed
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Coolant leak

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

Engine temperature too low

- Faulty temperature gauge or thermosensor
- Thermostat stuck open
- Faulty fan motor switch

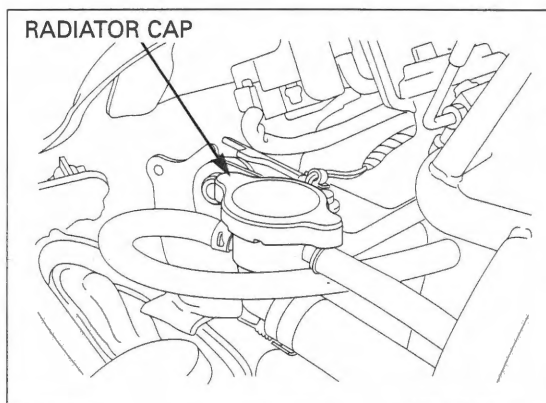
SYSTEM TESTING

COOLANT (HYDROMETER TEST)

Remove the right inner pocket (page 3-14).

Remove the bolt and pull out the radiator cap (filler neck) to the lid opening.

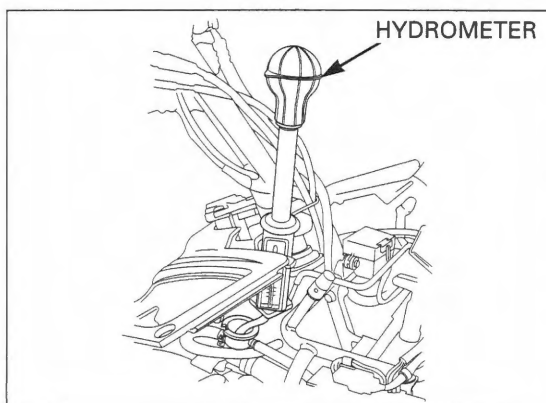
Remove the radiator cap.



Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").

For maximum corrosion protection, a 50% solution of ethylene glycol and distilled water is recommended (page 6-4).

Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

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

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

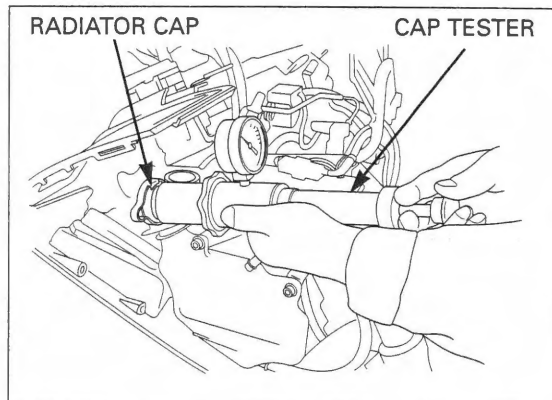
Remove the radiator cap (page 6-3).

Before installing the cap in the tester, wet the sealing surface.

Pressure test the radiator cap.
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)



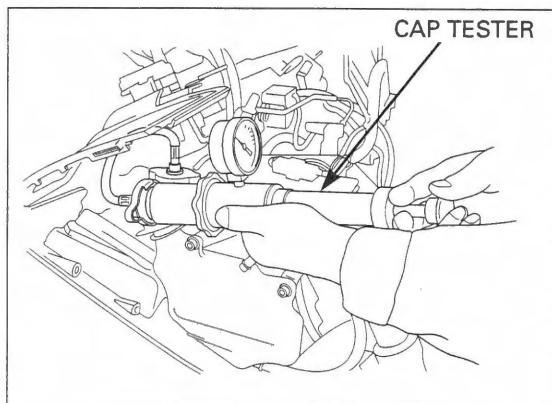
Excessive pressure can damage the cooling system components. Do not exceed 103 kPa (1.05kgf/cm², 15 psi).

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

NOTICE

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

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



COOLANT REPLACEMENT

PREPARATION

NOTICE

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

NOTE:

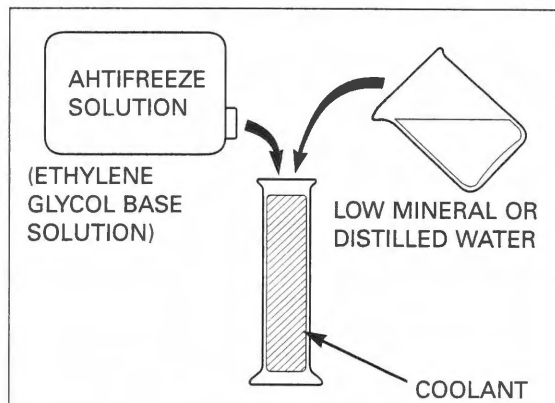
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
Mix only distilled, low mineral water with the recommended antifreeze.

RECOMMENDED ANTIFREEZE:

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

RECOMMENDED MIXTURE:

1:1 (Distilled water and recommended antifreeze)



When filling the system or reserve tank with coolant (checking the coolant level), place the scooter in a vertical position on a flat, level surface.

REPLACEMENT/AIR BLEEDING

Remove the following:

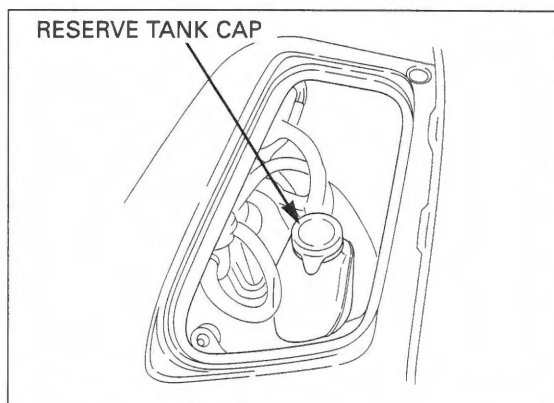
- right inner pocket (page 3-14)
- radiator cap

Remove the drain bolt and drain the coolant from the system with the sidestand applied.

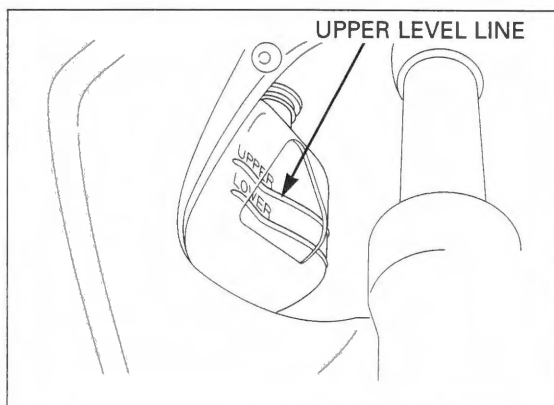


Remove the reserve tank cap and drain the coolant from the reserve tank.

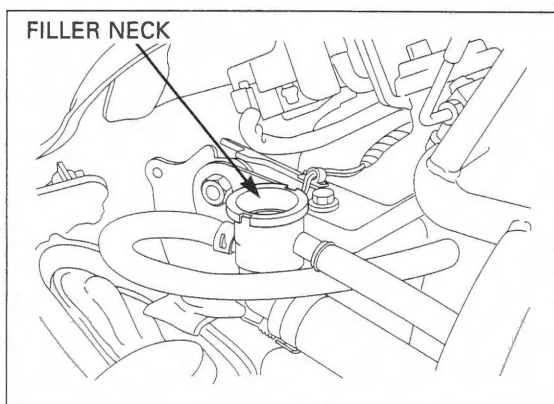
Reinstall the drain bolt with the new sealing washer securely.



Place the scooter on its centerstand on a flat, level surface.
Fill the reserve tank to the upper level line.



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



COOLING SYSTEM

Bleed air from the system as follow:

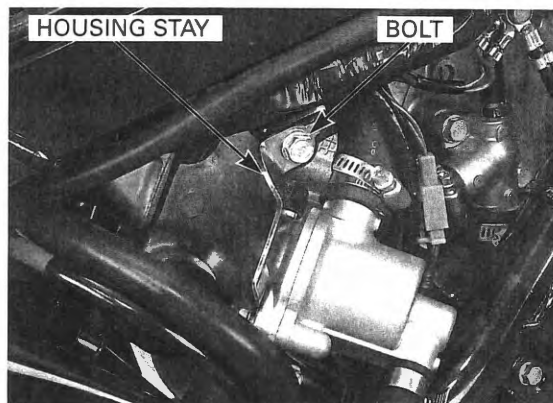
1. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

THERMOSTAT

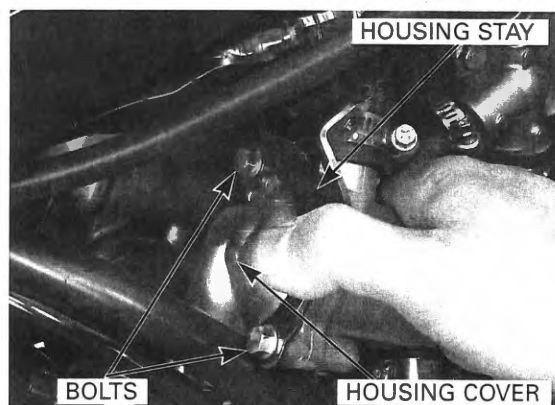
REMOVAL

Remove the left body cover (page 2-6).
Drain the coolant (page 6-5).

Remove the bolt and thermostat housing stay from the frame.



Remove the bolts, housing stay and thermostat housing cover.



Remove the O-ring from the housing cover.
Remove the thermostat.



INSPECTION

Visually inspect the thermostat for damage.

Keep flammable materials away from the electric heating element.

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

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

Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

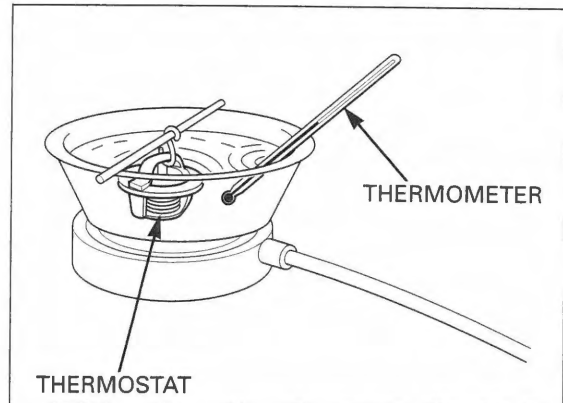
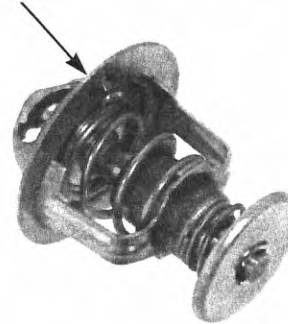
THERMOSTAT BEGIN TO OPEN:

80 – 84 °C (176 – 183 °F)

VALVE LIFT:

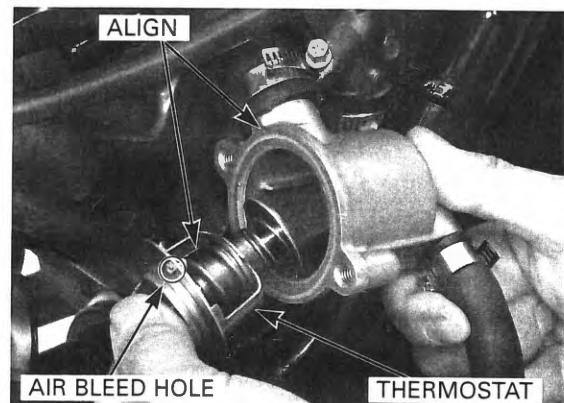
8 mm (0.3 in) minimum at 85 °C (185 °F)

THERMOSTAT



INSTALLATION

Install the thermostat into the housing with its air bleed hole facing up and aligning its ribs with the grooves in the housing.

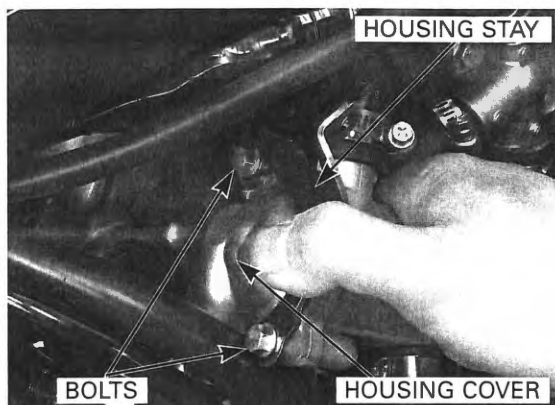


Install a new O-ring into the housing cover groove.



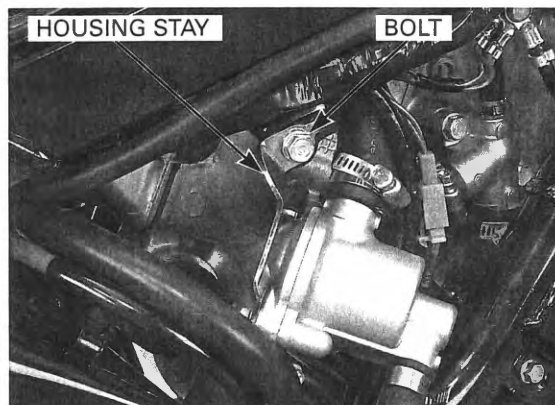
COOLING SYSTEM

Install the housing cover and housing stay to the housing.
Tighten the bolts securely.



Install the housing stay to the frame.
Tighten the bolt securely.

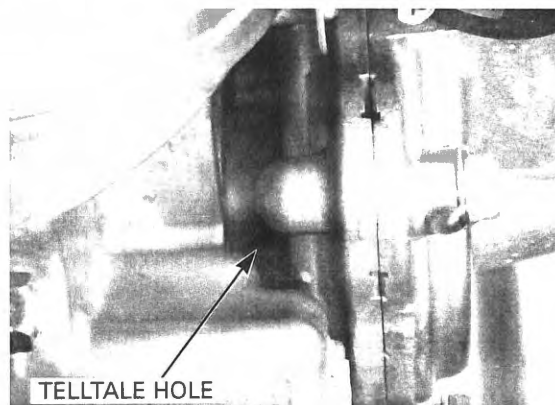
Fill the system with recommended coolant and bleed the air (page 6-5).
Install the left body cover (page 2-9).



WATER PUMP

MECHANICAL SEAL INSPECTION

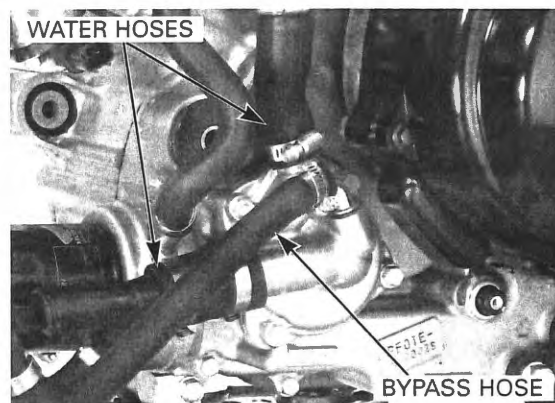
Inspect the telltale hole for sign of coolant leakage.
If there is leakage, the mechanical seal is defective,
and it should be replaced (see before).



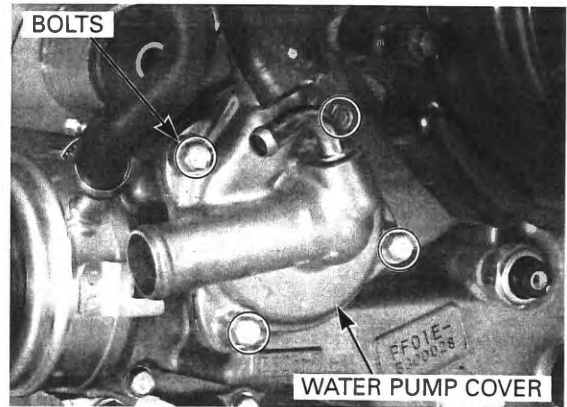
REMOVAL

Drain the coolant (page 6-5).

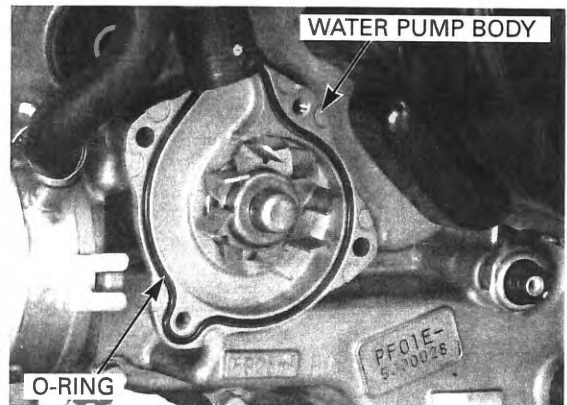
Loosen the hose bands and disconnect the water hoses and bypass hose from the water pump.



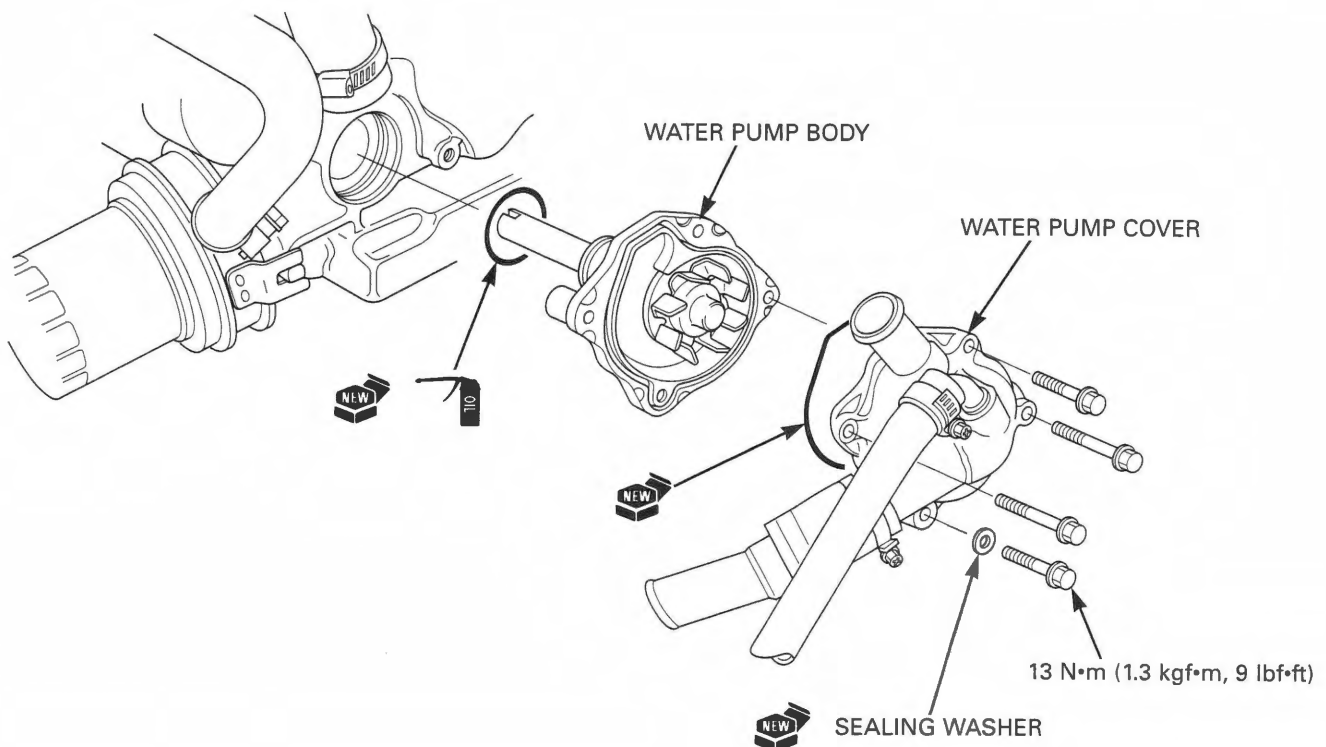
Remove the bolts and water pump cover.



Remove the O-ring from the water pump body.
Remove the water pump body from the crankcase.



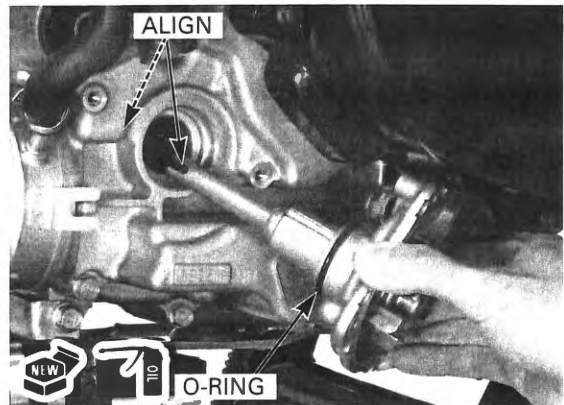
INSTALLATION



COOLING SYSTEM

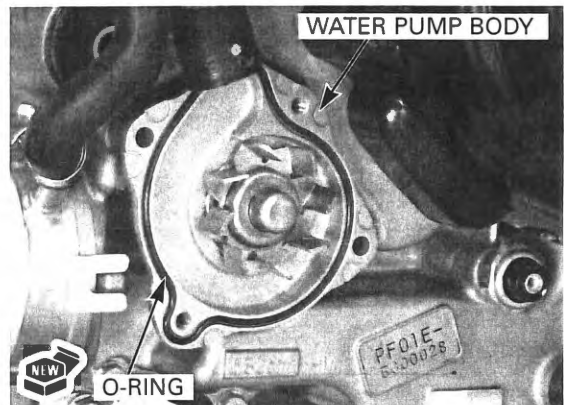
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with oil pump shaft end.



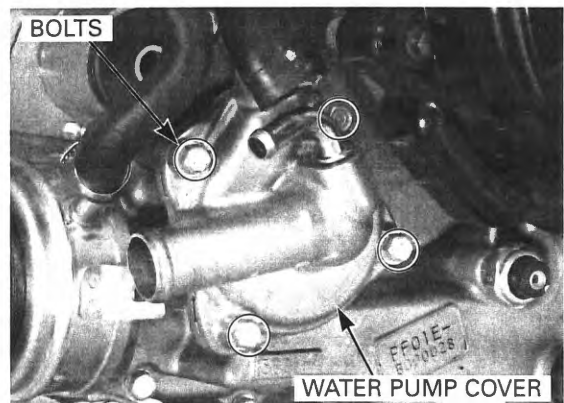
Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

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



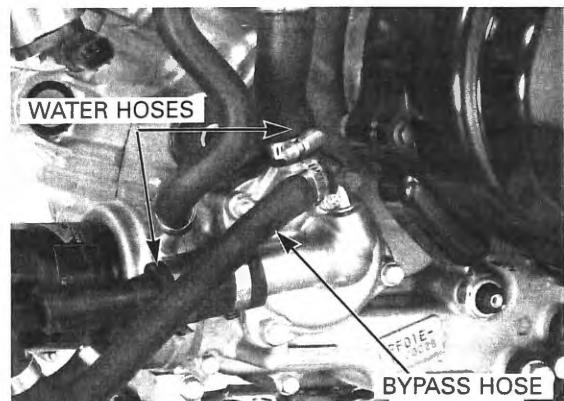
Install the water pump cover and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



Connect the water hoses and bypass hose, then tighten the hose bands.

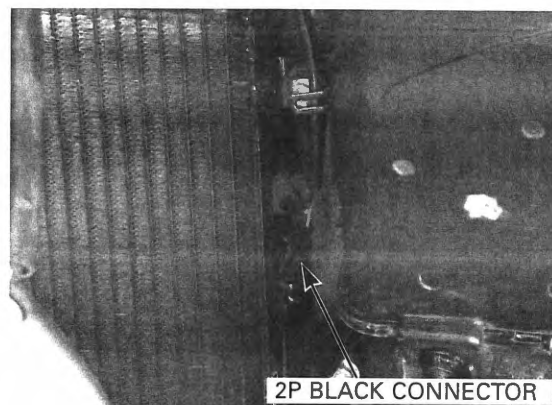
Fill the system with recommended coolant and bleed the air (page 6-5).



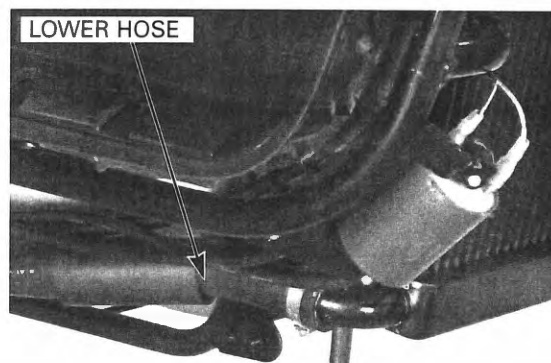
RADIATOR

REMOVAL

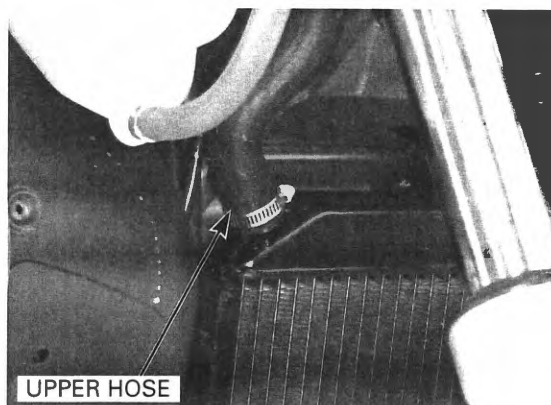
Drain the coolant (page 6-5).
Remove the floor skirts (page 2-4).
Remove the front cover (page 2-14).
Remove the front airduct cover (page 2-21).
Disconnect the fan motor 2P black connector.



Loosen the hose band and disconnect the radiator lower hose from the radiator.

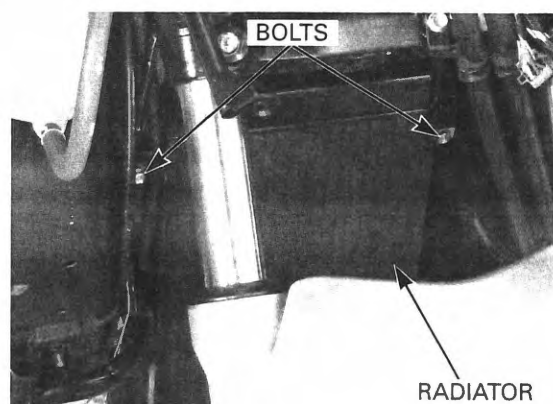


Loosen the hose band and disconnect the radiator upper hose from the radiator.



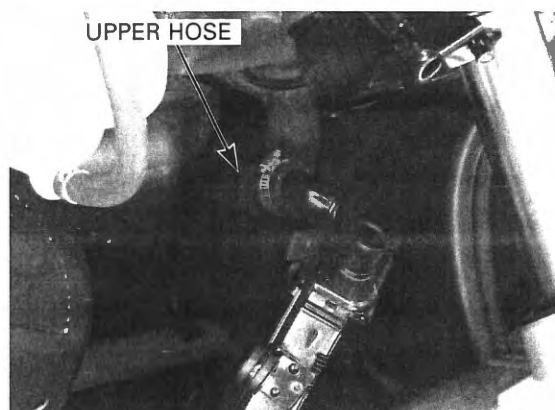
Be careful not to damage the radiator core.

Remove the bolts and radiator from the frame.



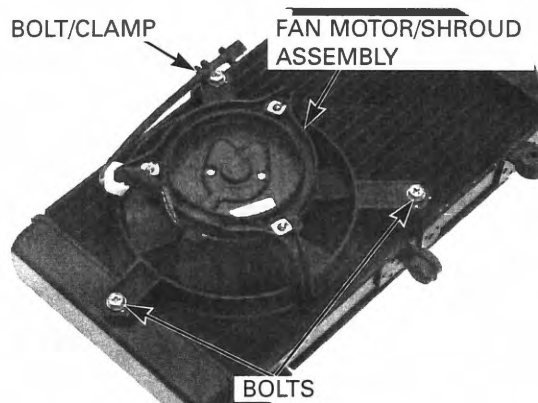
COOLING SYSTEM

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

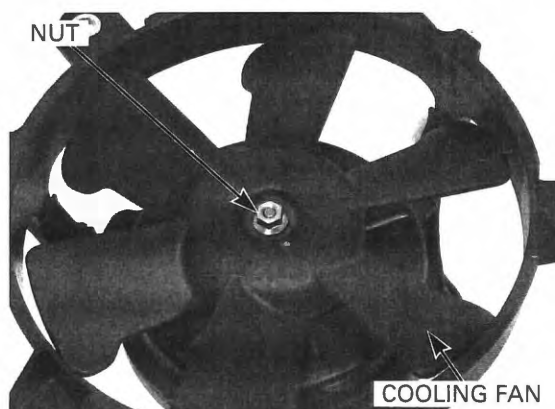


DISASSEMBLY

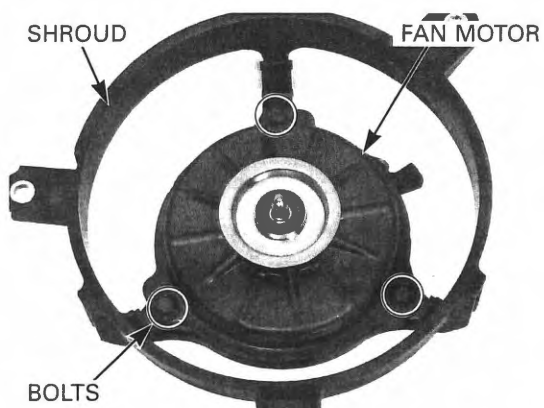
Remove the bolts, clamp and fan motor/shroud assembly.



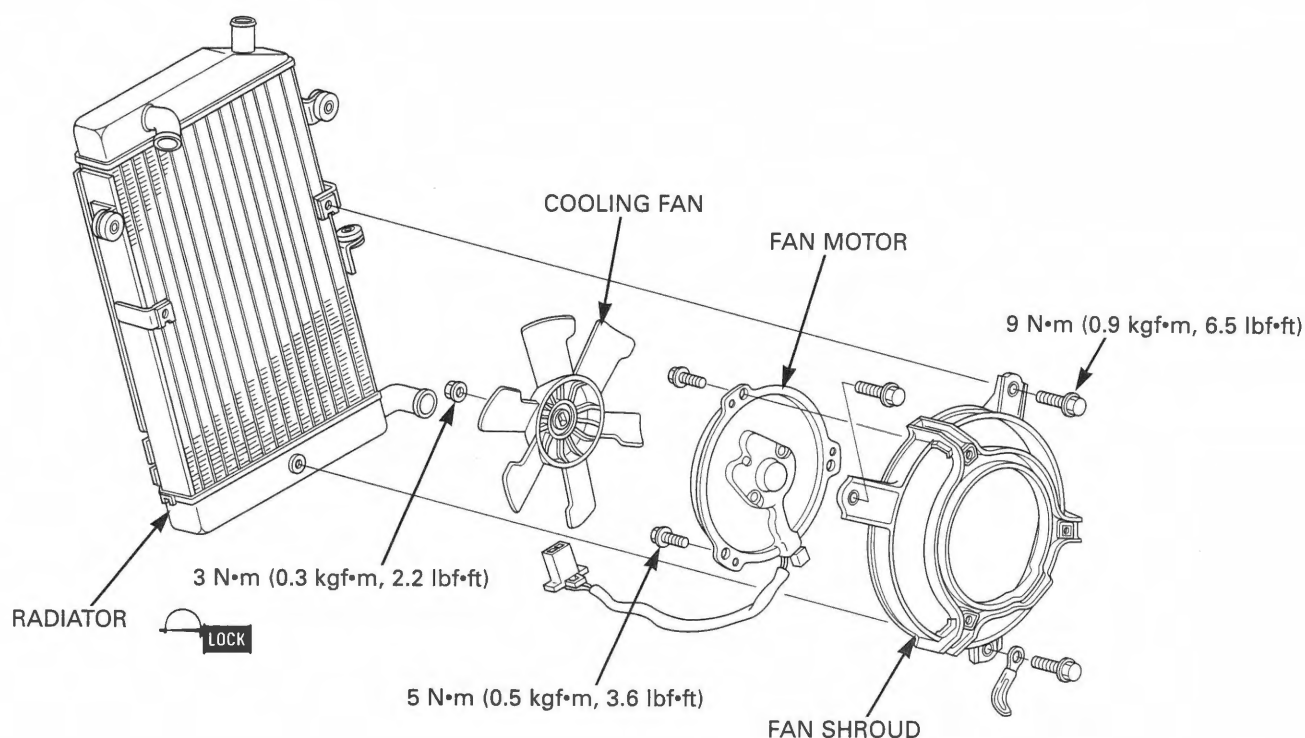
Remove the nut and cooling fan.



Remove the bolts and fan motor from the shroud.

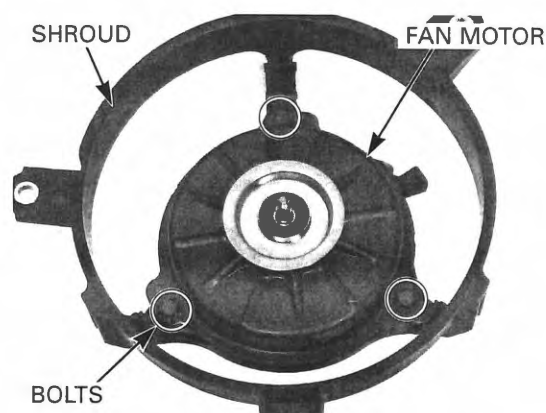


ASSEMBLY



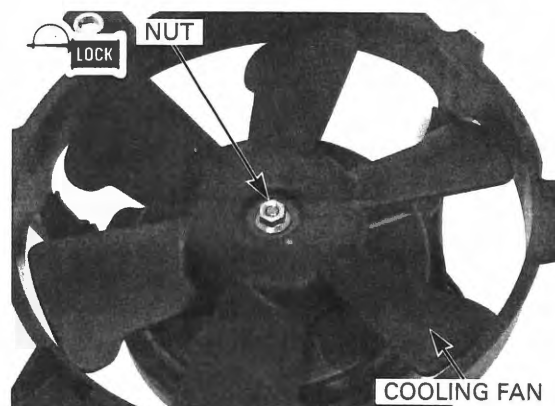
Install the fan motor to the shroud.
Tighten the bolts to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



Install the cooling fan onto the fan motor shaft by aligning the flat surface.
Apply a locking agent to the cooling fan nut threads.
Tighten the nut to the specified torque.

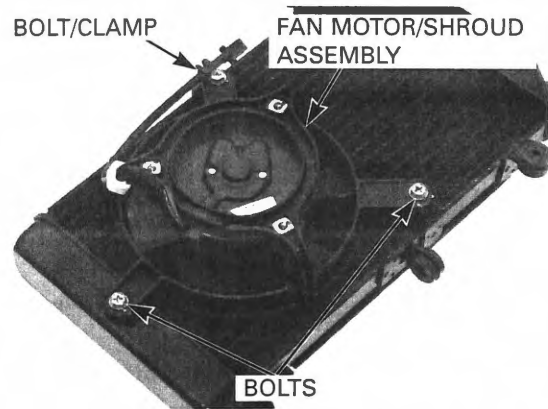
TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



COOLING SYSTEM

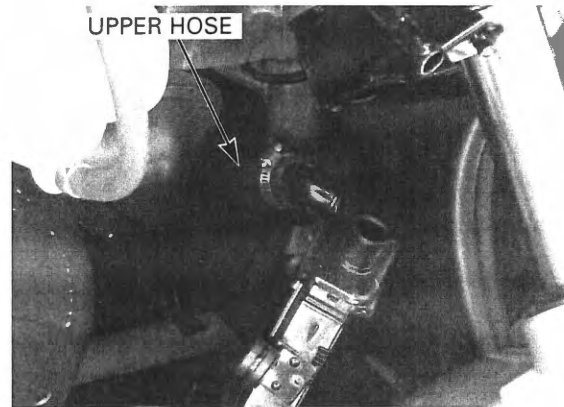
Install the fan motor/shroud assembly to the radiator.
Route the fan motor wire properly.
Install and tighten the bolts and clamp to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

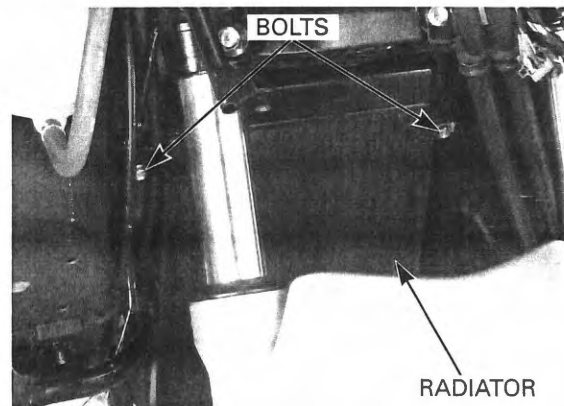


INSTALLATION

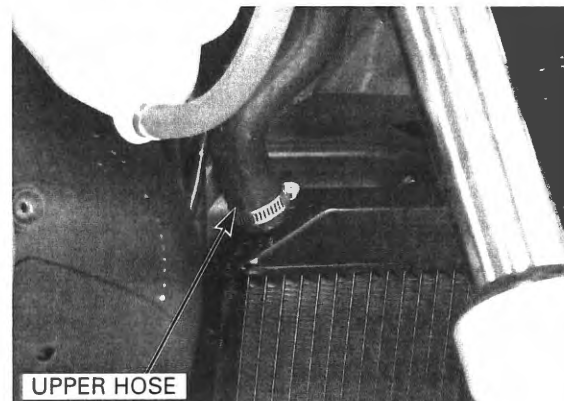
Connect the upper hose to the radiator.
Tighten the hose band securely.



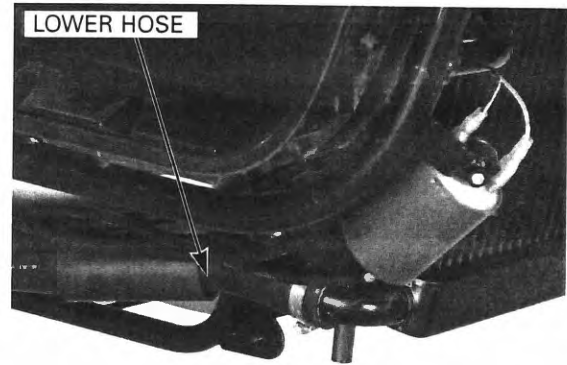
Install the radiator to the frame.
Tighten the bolts securely.



Connect the upper hose to the radiator.
Tighten the hose band securely.



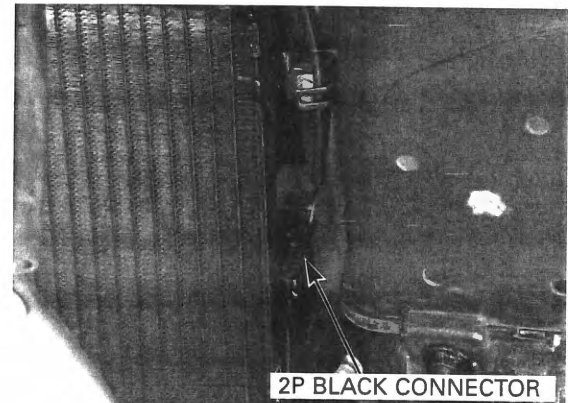
Connect the lower hose to the radiator.
Tighten the hose band securely.



Connect the fan motor 2P black connector.

Route the wire harness and hoses correctly
(page 1-20).

Fill the system with recommended coolant and bleed
the air (page 6-5).
Install the floor skirt (page 2-4).
Install the front airduct cover (page 2-21).
Install the front cover (page 2-14).



RADIATOR RESERVE TANK

REMOVAL

Remove the front cover (page 2-14).

Remove the bolts and radiator reserve tank from the
frame.

Open the reserve tank cap and drain the coolant from
the reserve tank.

Disconnect the siphon tube.

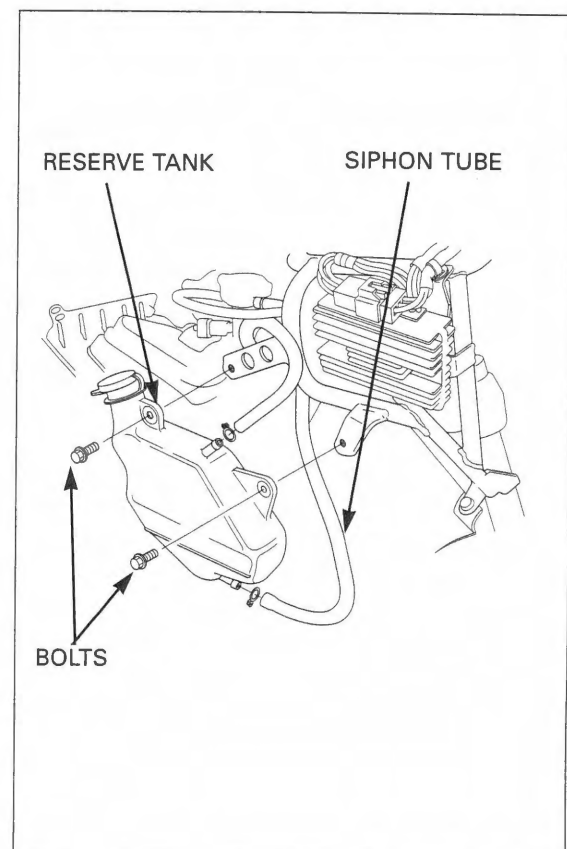
INSTALLATION

Installation is in the reverse order of removal.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Pour the recommended coolant to the upper level line
with the centerstand applied.

Install the front cover (page 2-14).

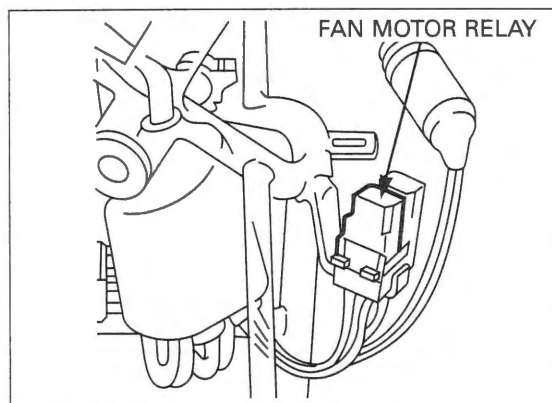


FAN MOTOR RELAY

INSPECTION

Remove the front cover (page 2-14).

Remove the fan motor relay.



Connect the ohmmeter to the fan motor relay connector terminals.

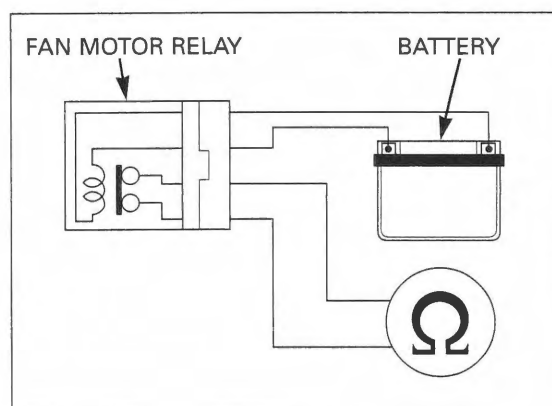
CONNECTION: Green – Black

Connect the 12-V battery to the following fan motor relay connector terminals.

CONNECTION: Black/Blue – Blue

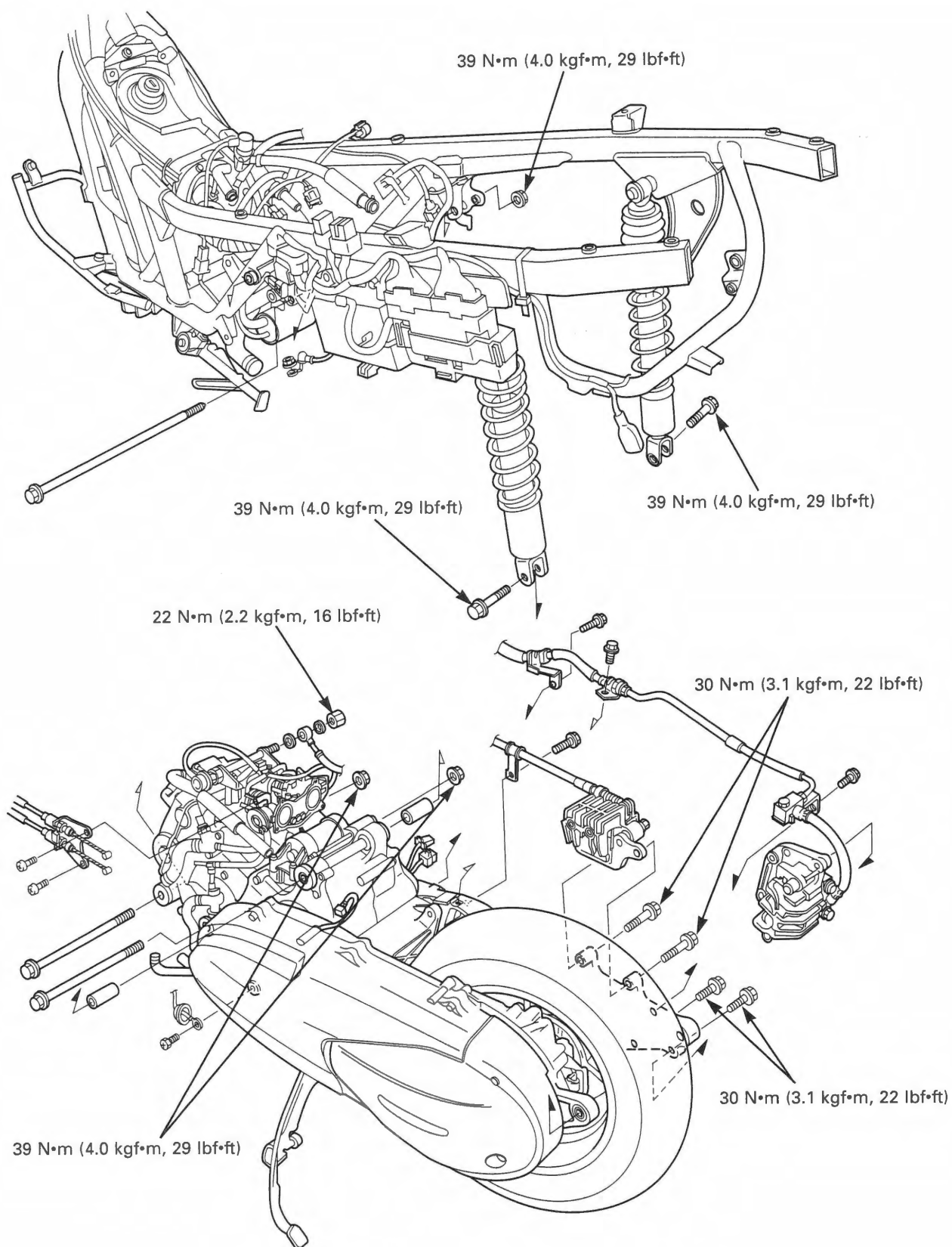
There should be continuity only when the 12-V battery is connected.

If there is no continuity when the 12-V battery is connected, replace the fan motor relay.



MEMO

ENGINE REMOVAL/INSTALLATION



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	MAIN STAND	7-6
ENGINE REMOVAL	7-2	ENGINE INSTALLATION	7-6

SERVICE INFORMATION

GENERAL

- Support the scooter on its main stand during engine removal and installation, .
- Support the frame using a jack or other adjustable support to ease in the removal of the hanger bolt.
- The following components can be serviced with the engine installed in the frame.
 - Oil pump (Section 4)
 - Injector (Section 5)
 - Water pump (Section 6)
 - Cylinder head (Section 8)
 - Drive and driven pulleys/clutch (Section 10)
 - Final reduction (Section 11)
 - Alternator/starter clutch (Section 12)
- The following components require engine removal for service.
 - Cylinder/piston (Section 9)
 - Crankshaft/crankcase/balancer (Section 13)

7

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		76.8 kg (169.3 lbs)
Engine oil capacity	At draining	2.0 liter (2.1 US qt, 1.8 Imp qt)
	At disassembly	2.6 liter (2.7 US qt, 2.3 Imp qt)
	At oil filter change	2.2 liter (2.3 US qt, 1.9 Imp qt)

TORQUE VALUES

Engine mounting nut	39 N•m (4.0 kgf•m, 29 lbf•ft)	ALOC bolt: replace with a new one. Apply a locking agent to the threads.
Rear shock absorber lower mounting bolt	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Rear brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	
Parking brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	
Fuel tube sealing nut	22 N•m (2.2 kgf•m, 16 lbf•ft)	

ENGINE REMOVAL

Remove the following:

- Luggage box (page 2-10)
- Floorstep (page 2-20)
- Muffler and exhaust pipe (page 2-22, 24)
- Air cleaner housing/air cleaner chamber (page 5-89)
- Starter motor (page 20-4)

Drain the coolant from the system (page 6-5).

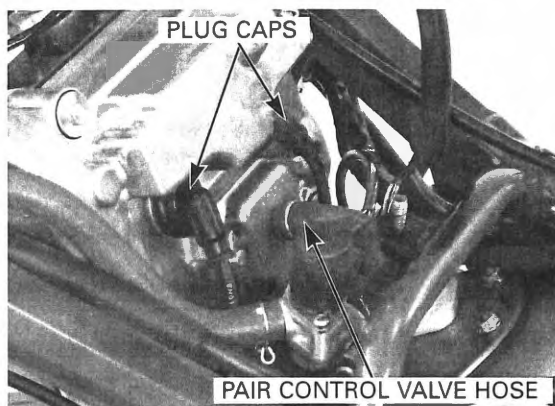
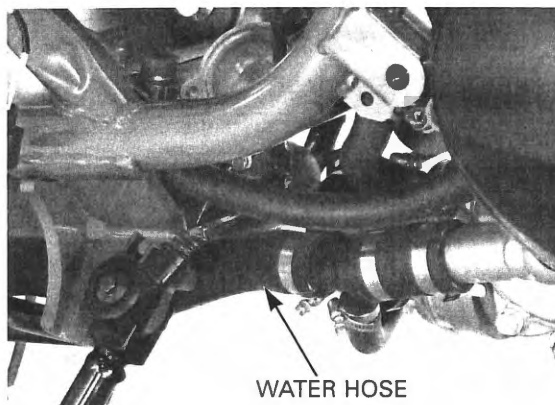
Release the fuel pressure (page 5-38)

Support the scooter on its main stand.

Loosen the hose band and disconnect the water hose from the hose joint.

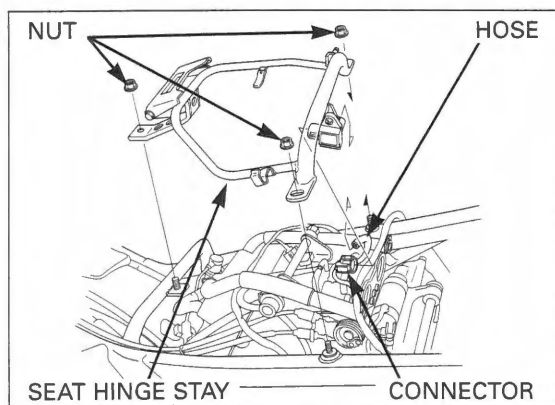
Remove the spark plug caps.

Disconnect the PAIR control valve hose from the cylinder head.

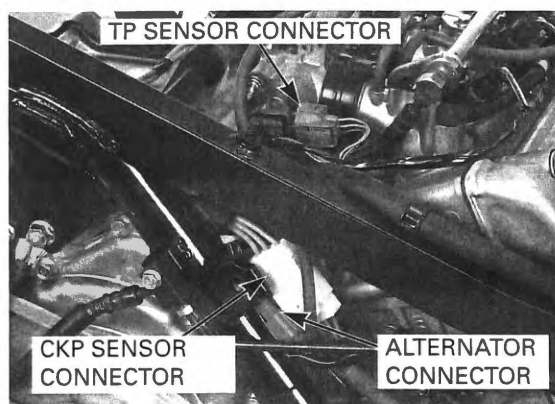


Disconnect the MAP sensor connector and vacuum hose from the sensor.

Remove the bolts, nut and seat hinge stay from the frame.

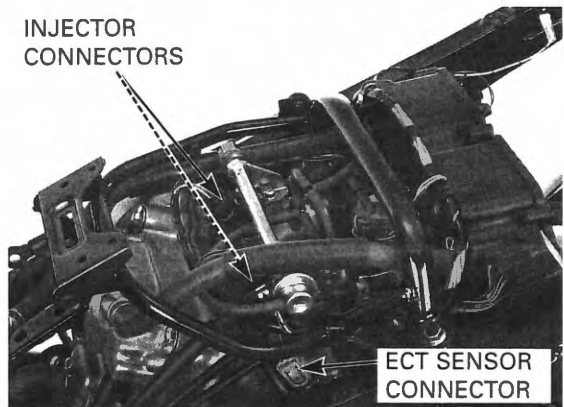


Disconnect the alternator 3P white connector, CKP sensor 2P red connector and TP sensor connector.

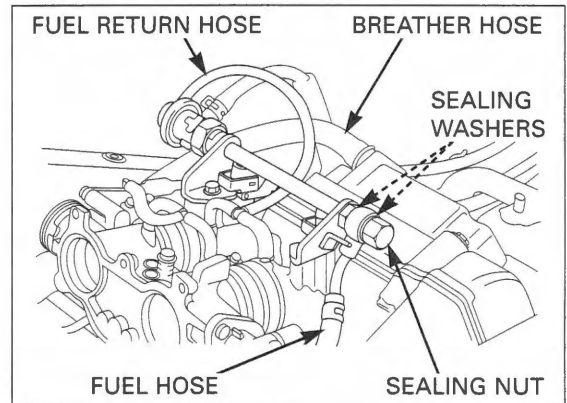


ENGINE REMOVAL/INSTALLATION

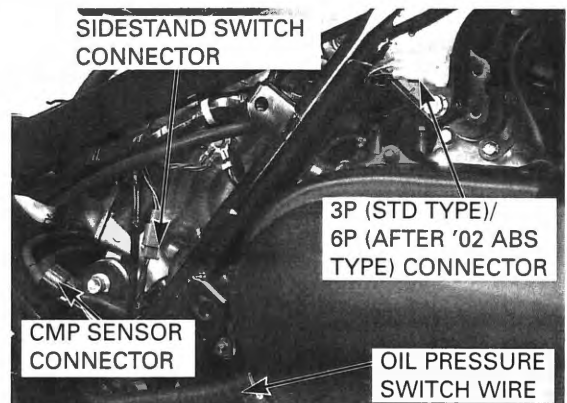
Disconnect the ECT sensor connector and injector connectors.



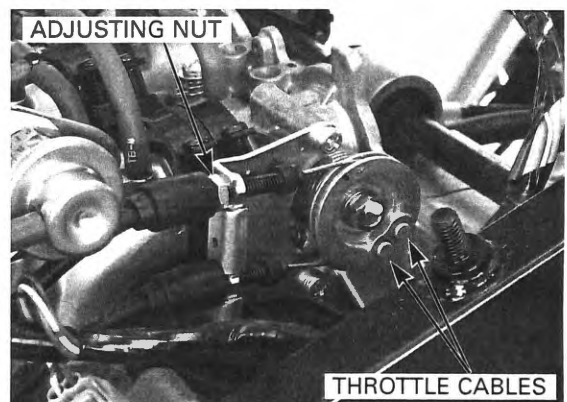
Disconnect the fuel return hose from the fuel pipe. Remove the sealing nut and sealing washers then disconnect the fuel hose. Disconnect the crankcase breather hose from the cylinder head cover.



Disconnect the rear wheel speed sensor/speed sensor 3P (STD TYPE)/6P (AFTER '02 ABS TYPE) connector, sidestand switch 2P green connector and CMP sensor 2P black connector. Remove the screw and disconnect the oil pressure switch wire.

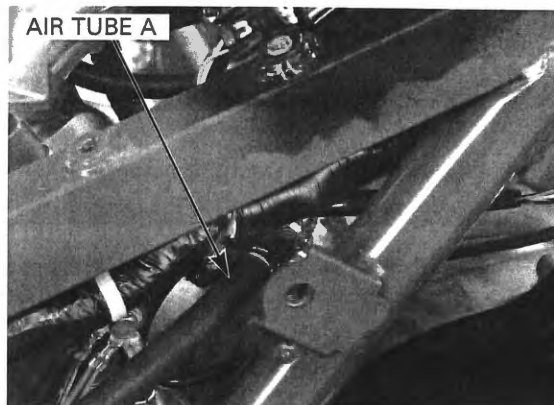


Loosen the throttle cables free play with the adjusting nut. Disconnect the throttle cable ends from the throttle drum.

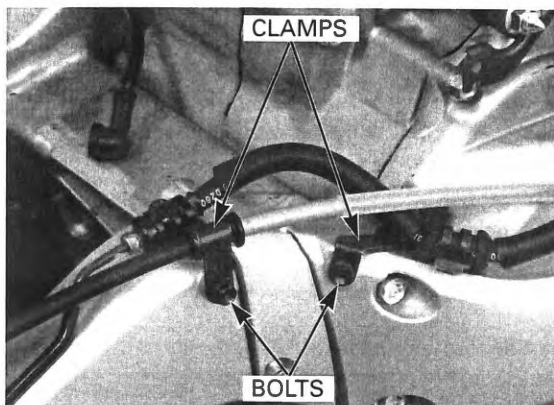


ENGINE REMOVAL/INSTALLATION

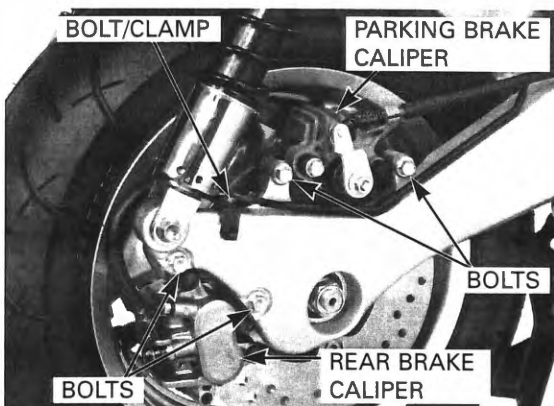
Disconnect the air tube A from the 3-way joint.



Remove the bolts and rear brake hose/parking brake wire clamps.



Remove the bolt and rear brake hose clamp.
Remove the bolts and rear brake caliper.
Remove the bolts and parking brake caliper.

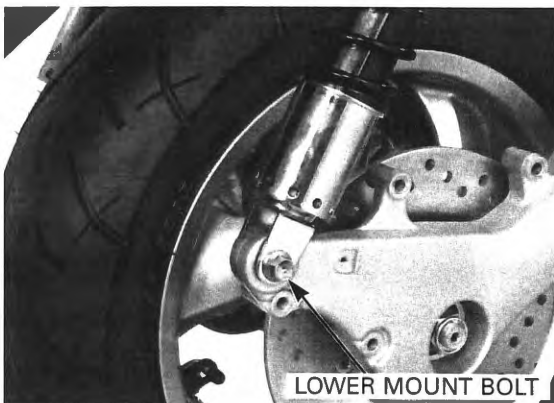


Place a floor jack or other adjustable support under the frame.

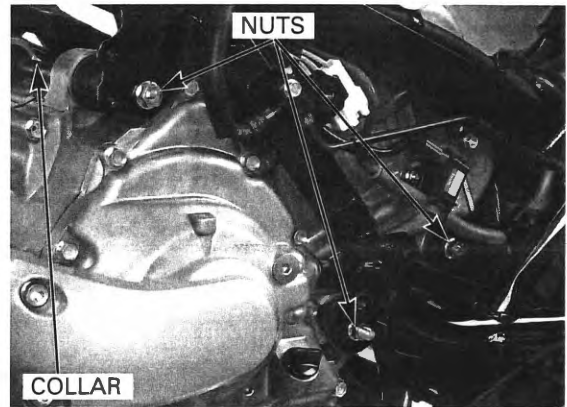
NOTICE

Do not use the oil filter as a jack point.

Remove the rear cushion lower mount bolts.

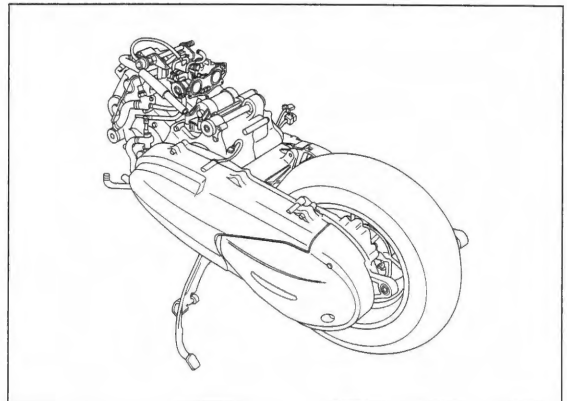
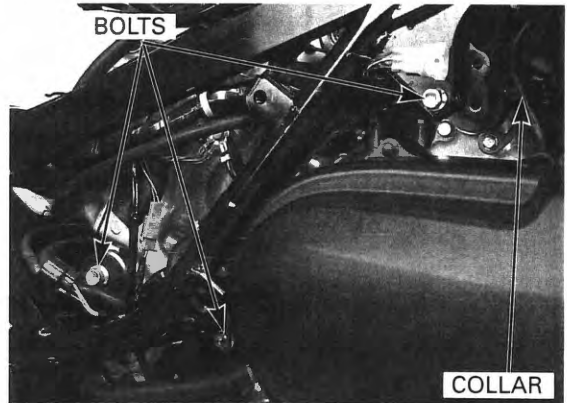


Remove the engine mount nuts.



Pull out the engine mount bolts and collars then remove the engine from the frame.

After removing the engine, be careful not to catch your hand or finger between the swingarm and crankcase.

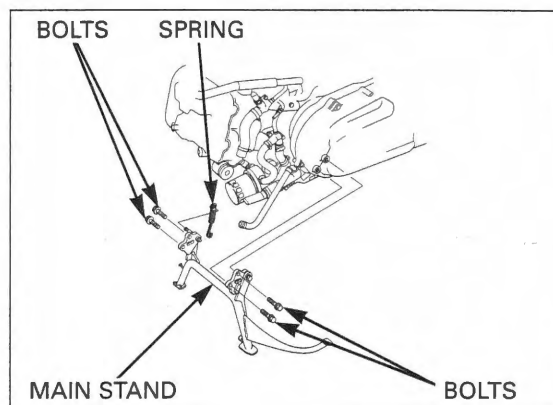


MAIN STAND

REMOVAL/INSTALLATION

Remove the bolts and return spring.
Remove the main stand from the frame.

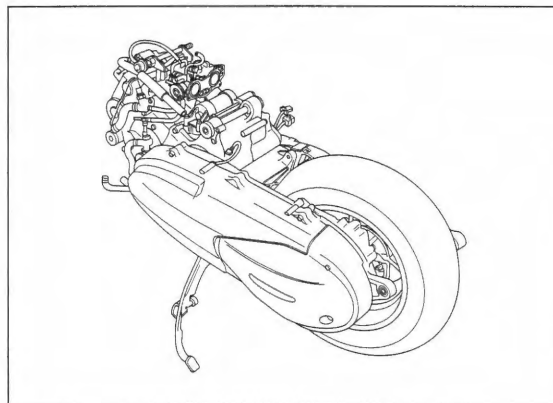
Installation is in the reverse order of removal.



ENGINE INSTALLATION

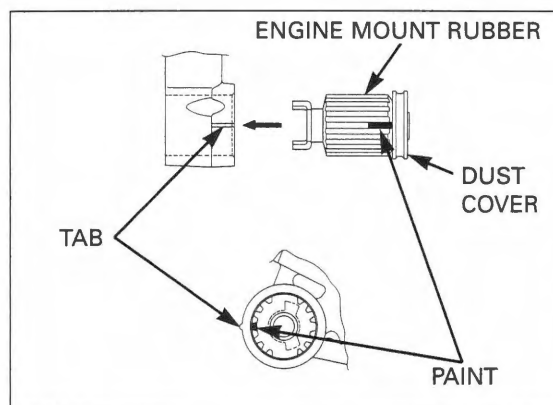
NOTICE

As installing the engine, be careful not to catch your hand or finger between the swingarm and crankcase.



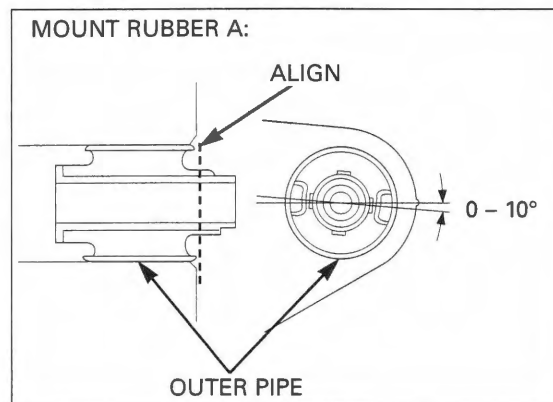
Remove the engine mount dust covers.
Check the engine mount rubbers for damage and replace if necessary.
If you replace the mount rubber, refer to following illustration and be careful not to choose the wrong type mount rubber.

- '02: Install the engine to the frame by aligning the tab of the engine and paint of engine mount rubber.

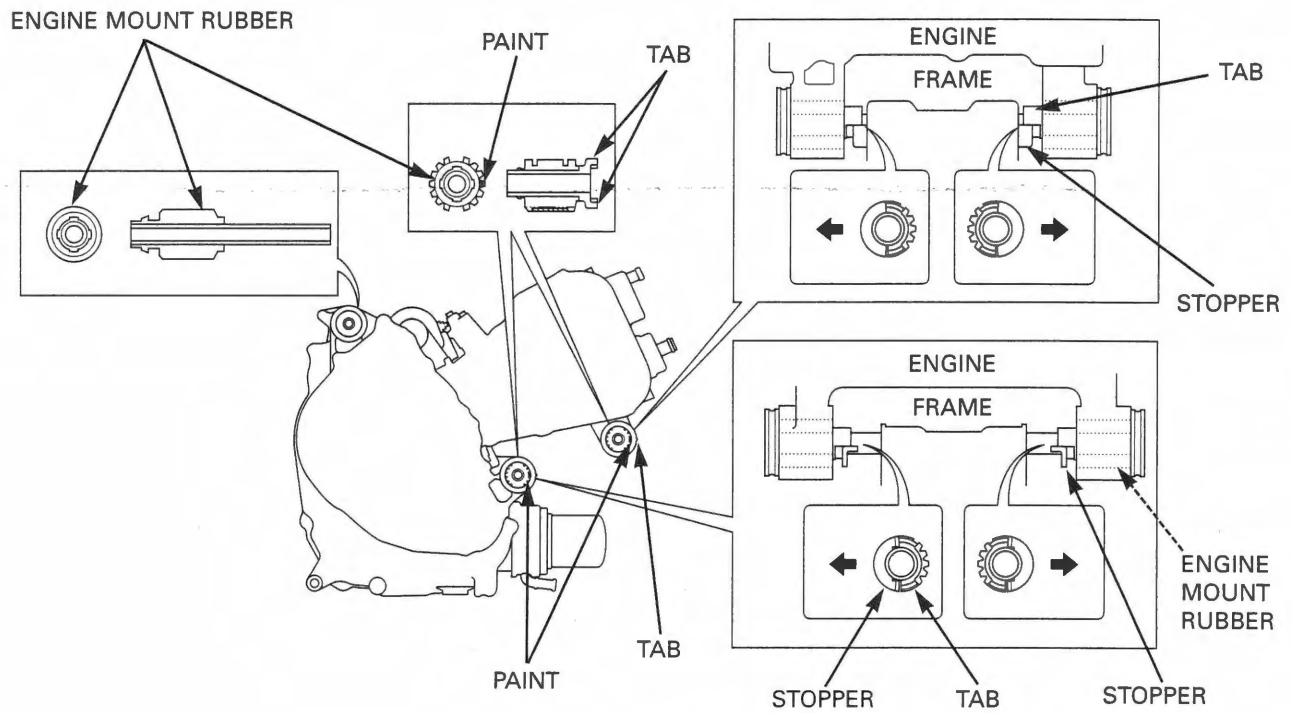


- After '02:* Set the engine mount rubber to the engine mount so that there will be certainly a difference of $0^\circ - 10^\circ$ between both center lines as shown.

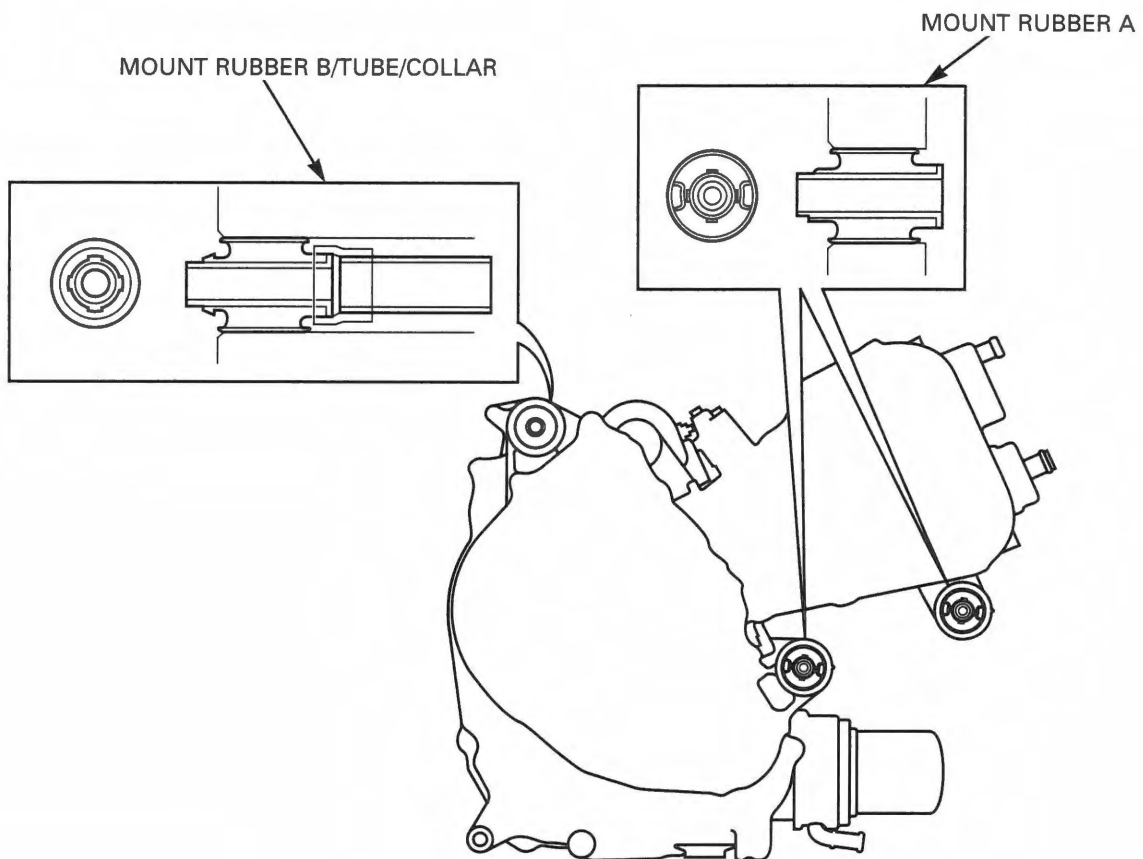
Install the engine mount rubber into the engine mount with a hydraulic press so that the outer surface of the outer pipe align the outer surface of the engine mount.



'02:

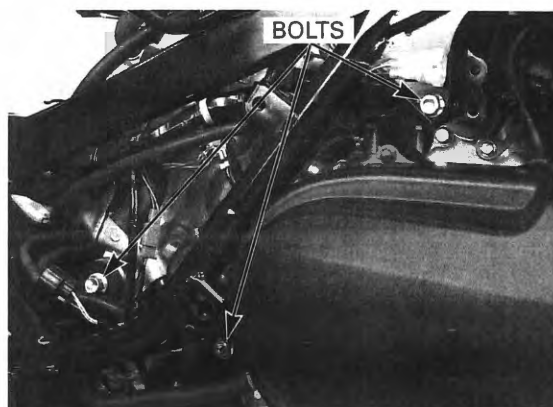


After '02:



ENGINE REMOVAL/INSTALLATION

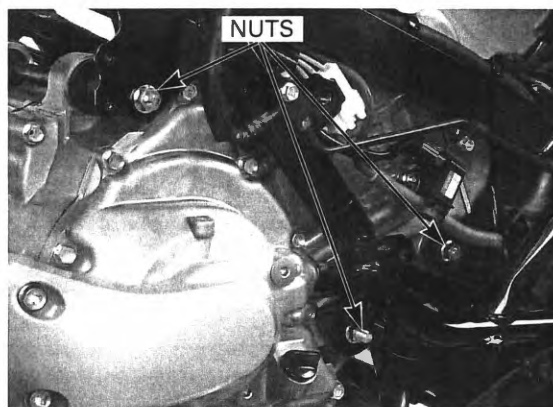
Set the engine to the frame and install the engine mount bolt.



Make sure there is no opening between the upper end of tabs and stoppers of the front engine mounts.

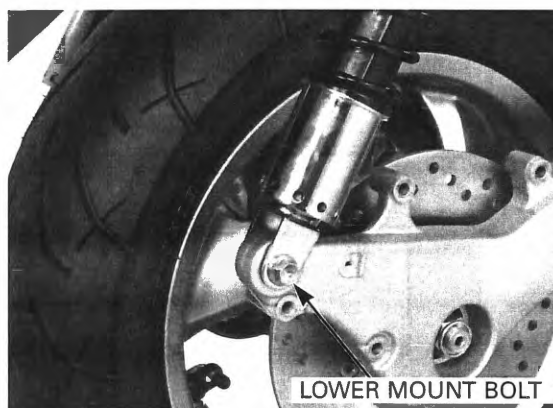
Tighten the engine mount nut to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Install and tighten the rear cushion lower mount bolts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



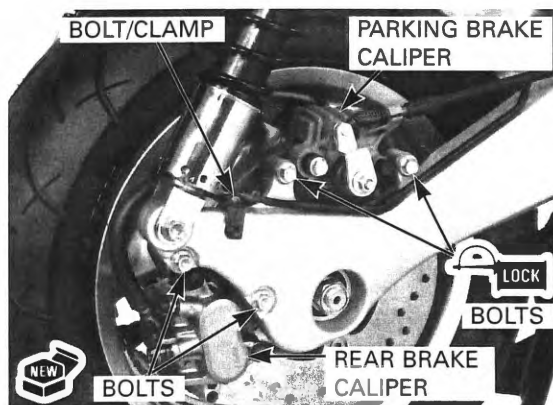
Install the rear caliper.
Install and tighten the new rear caliper mount bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Apply a locking agent to the parking brake caliper bolt threads.
Install and tighten the parking brake caliper mount bolts to the specified torque.

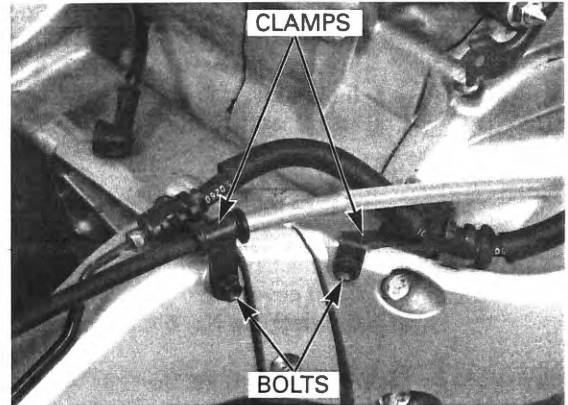
TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the rear brake hose clamp and tighten the bolts.

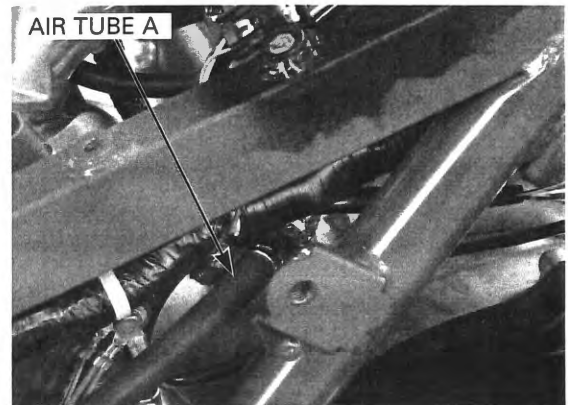


Route the tubes, cables and wire harness correctly (page 1-20).

Install the rear brake hose/parking brake wire clamps and tighten the bolts.

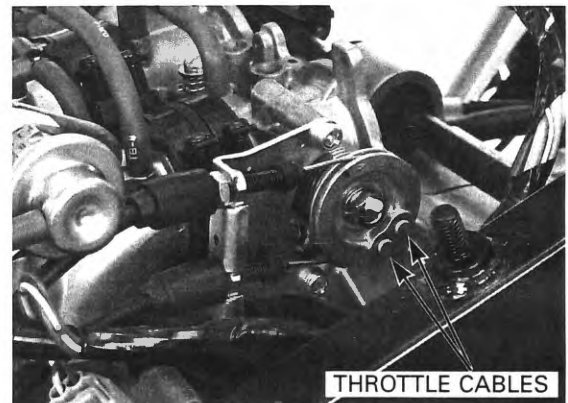


Connect air tube A to the 3-way joint.



Connect the throttle cables to the throttle drum.

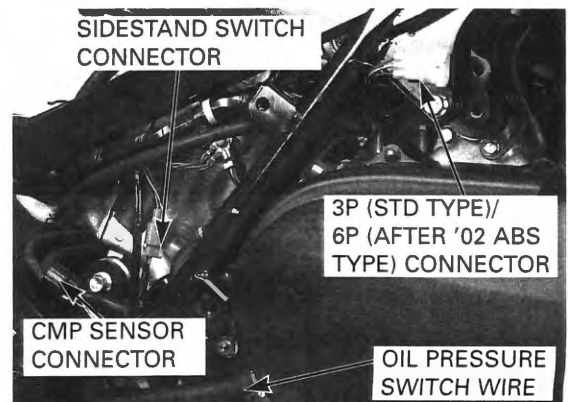
Adjust the throttle grip free play (page 3-4).



Connect the oil pressure switch wire to the oil pressure switch.

Tighten the screw and install the dust cover.

Connect the rear wheel speed sensor/speed sensor 3P (STD TYPE)/6P (AFTER '02 ABS TYPE) connector, side-stand switch 2P green connector and CMP sensor 2P black connector.

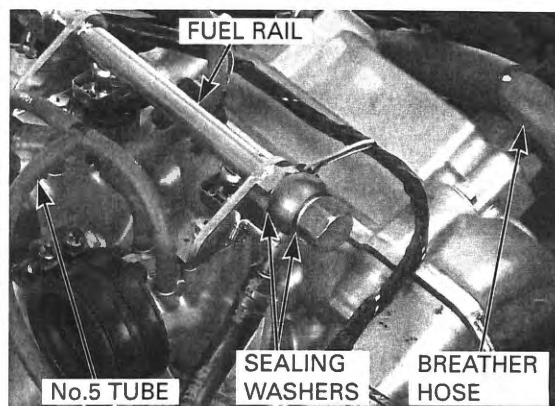


ENGINE REMOVAL/INSTALLATION

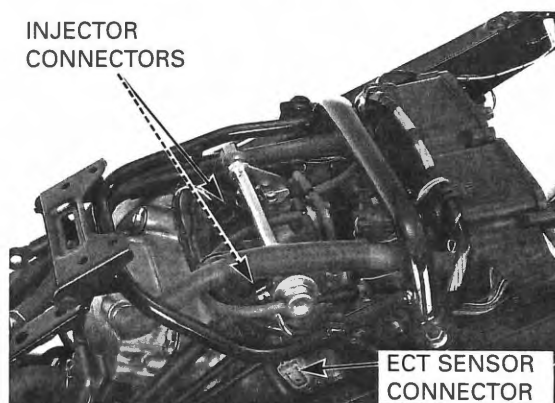
Connect the fuel return hose to the fuel rail. While aligning the fuel hose banjo to the stopper on the fuel rail stay, connect the fuel hose banjo to the fuel rail with new sealing washers. Install and tighten the sealing nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

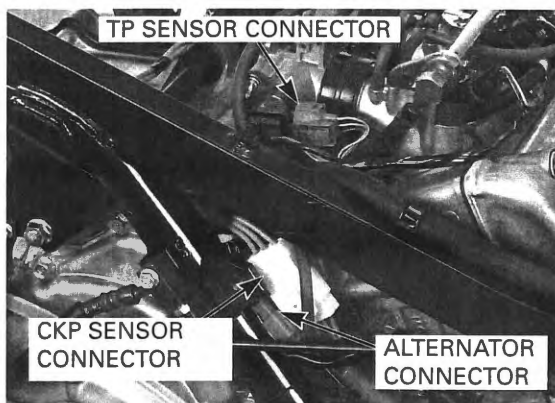
Connect the crankcase breather hose to the cylinder head cover. Connect the No. 5 tube to the 3-way joint.



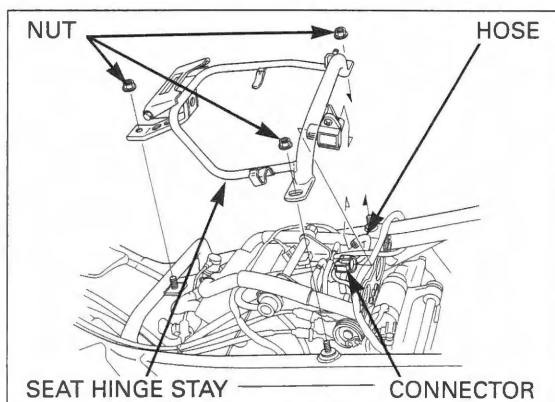
Connect the ECT sensor connector and injector connectors.



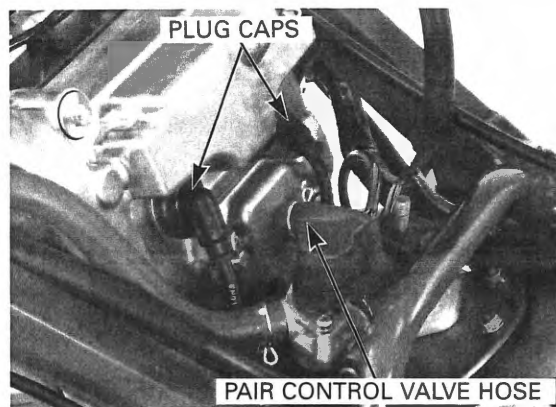
Connect the alternator 3P white connector, CKP sensor 2P red connector and TP sensor connector.



Install the seat hinge stay to the frame. Tighten the nuts. Connect the MAP sensor connector and vacuum hose to the sensor.



Install the spark plug caps.
Connect the PAIR control valve hose to the cylinder head.

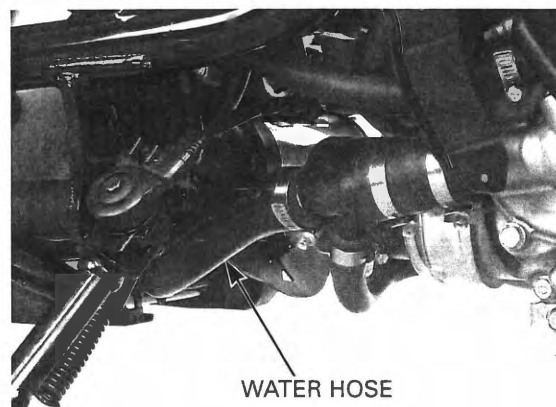


Connect the water hose to the hose joint.
Tighten the hose band.

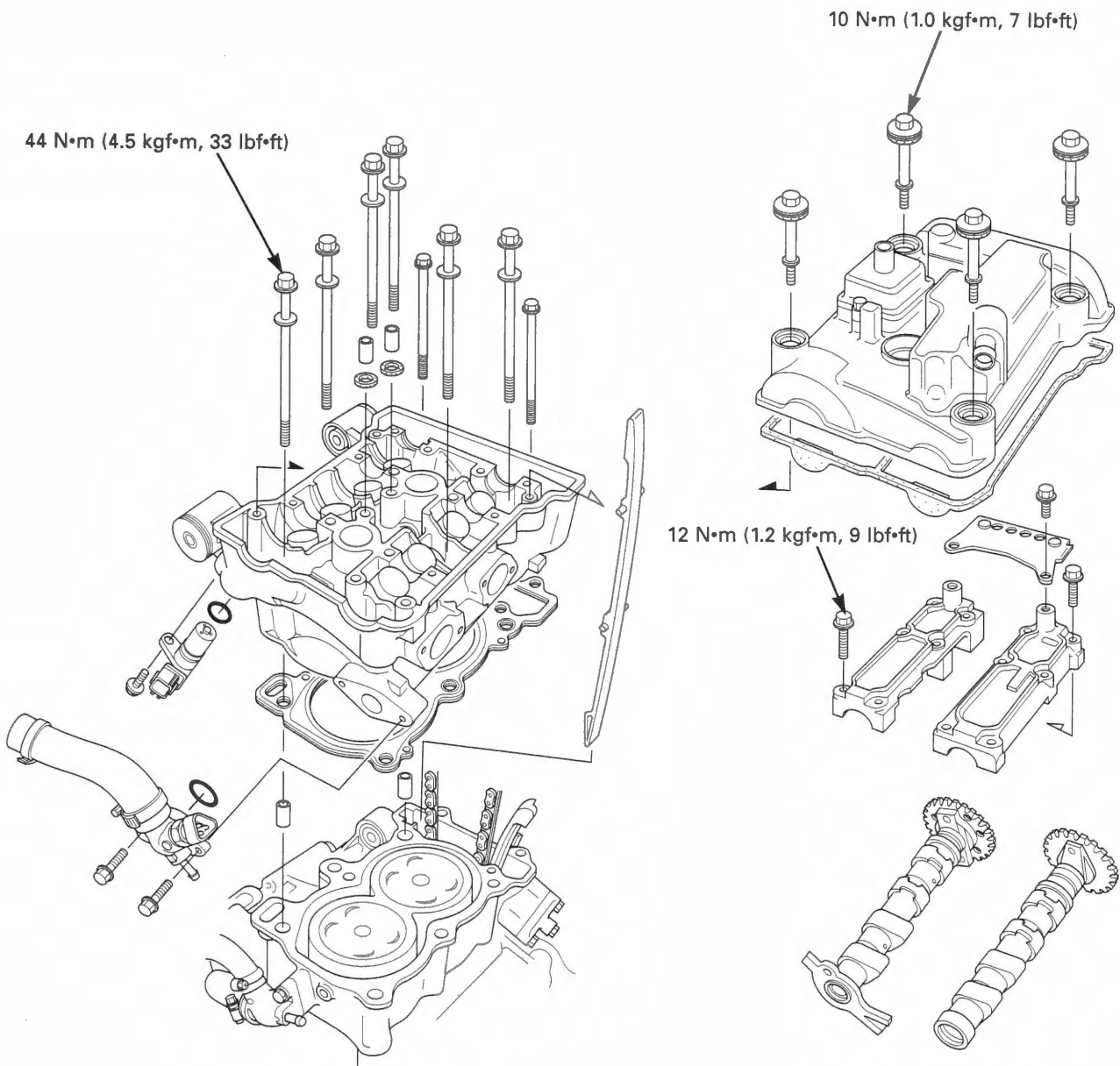
Install the following:

- Starter motor (page 20-10)
- Air cleaner housing/air cleaner chamber (page 5-90)
- Muffler and exhaust pipe (page 2-23, 25)
- Floorstep (page 2-20)
- Luggage box (page 2-10)

Fill the cooling system with recommended coolant and bleed the air (page 6-4).



CYLINDER HEAD/VALVES



8. CYLINDER HEAD/VALVES

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-16
TROUBLESHOOTING	8-3	VALVE SEAT INSPECTION/REFACING	8-17
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SERVICE INFORMATION

GENERAL

8

- This section covers service of the cylinder head, valves and camshafts. These services can be done with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head too hard during removal.

SPECIFICATIONS

Unit: mm (in)

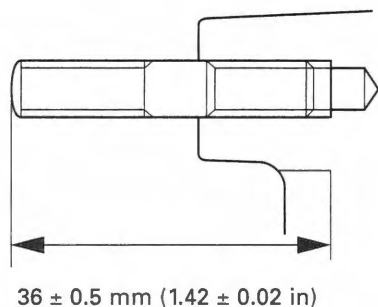
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,373 kPa (14.0 kgf/cm ² , 199 psi) at 250 min ⁻¹ (rpm)	—
Cylinder head warpage			—	0.05 (0.002)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.22 ± 0.03 (0.009 ± 0.001)	—
	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
		EX	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
		EX	0.020 – 0.047 (0.0008 – 0.0019)	—
	Valve guide projection above cylinder head	IN	15.3 – 15.5 (0.60 – 0.61)	—
		EX	15.3 – 15.5 (0.60 – 0.61)	—
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN/EX	40.19 (1.582)	38.2 (1.50)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Camshaft	Cam lobe height	IN	35.120 – 35.200 (1.3827 – 1.3858)	34.82 (1.371)
		EX	35.180 – 35.260 (1.3850 – 1.3882)	34.88 (1.373)
	Runout		—	0.05 (0.002)
	Oil clearance		0.030 – 0.072 (0.012 – 0.0028)	0.10 (0.004)

CYLINDER HEAD/VALVES

TORQUE VALUES

Reed valve cover bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)	CT bolt
Breather separator bolt	13 N•m (1.3 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads CT bolt
Cylinder head sealing bolt	32 N•m (3.3 kgf•m, 24 lbf•ft)	Apply a locking agent to the threads
Cylinder head 9 mm bolt	44 N•m (4.5 kgf•m, 33 lbf•ft)	Apply oil to the threads and seating surface
Camshaft holder bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply oil to the threads and seating surface
Cylinder head cover bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	
Cam sprocket bolt	20 N•m (2.0 kgf•m, 14 lbf•ft)	Apply a locking agent to the threads
Cam chain tensioner pivot bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	

Exhaust pipe stud bolt:



TOOLS

Tensioner holder	07AMG-001A100 (U.S.A. only)
Valve spring compressor	07757-0010000
Valve seat cutter	
– Seat cutter, 24.5 mm	07780-0010100 — or equivalent commercially available in U.S.A.
– Seat cutter, 29 mm	07780-0010300 —
– Flat cutter, 30 mm	07780-0012200 —
– Flat cutter, 27 mm	07780-0013300 —
– Interior cutter, 30 mm	07780-0014000 —
– Interior cutter, 26 mm	07780-0014500 —
– Cutter holder, 4.5 mm	07781-0010600 —
Valve spring compressor attachment	07959-KM30101
Valve guide driver 4.5 mm	07HMD-ML00101
Tappet hole protector	07HMG-MR70002 not available in U.S.A.
Valve guide reamer, 4.508 mm	07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)
Compression gauge attachment	07RMJ-MY50100 commercially available in U.S.A.

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (Section 9).

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

- Valves:
 - Incorrect valve adjustment
 - Burned or bent valve
 - Incorrect valve timing
 - Broken valve spring
 - Uneven valve seating
- Cylinder head:
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head
- Faulty cylinder, piston or piston rings (Section 9)

Compression too high or overheating

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

Excessive smoke

- Cylinder head:
 - Worn valve stem or valve guide
 - Damaged stem seal
- Worn cylinder, piston or piston rings (Section 9)

Excessive noise

- Cylinder head:
 - Incorrect valve adjustment
 - Sticking valve or broken valve spring
 - Damaged or worn camshaft
 - Loose or worn cam chain
 - Worn or damaged cam chain tensioner
 - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (Section 9)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.

Stop the engine and remove all the spark plug caps and remove the number one spark plug (page 3-5). Disconnect the fuel pump 4P black connector (page 5-82).

Install a compression gauge into the spark plug hole.

TOOL:

Compression gauge attachment 07RMJ-MY50100
(Commercially available in U.S.A.)

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

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

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

Compression pressure:

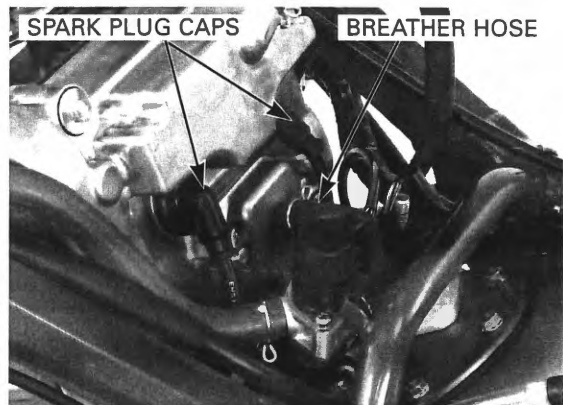
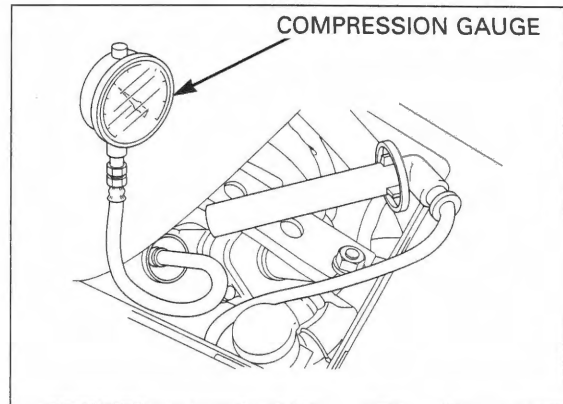
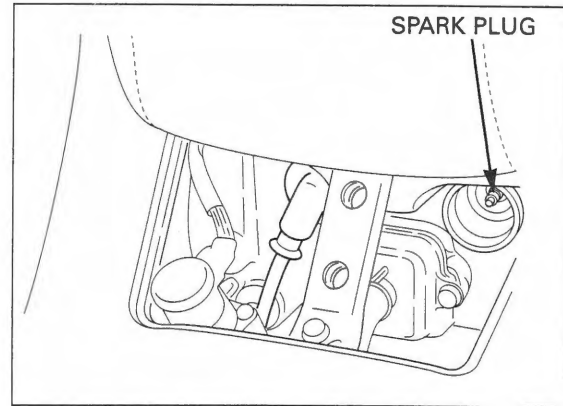
1,373 kPa (14.0 kgf/cm², 199 psi) at 250 min⁻¹ (rpm)

Low compression can be caused by:

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

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head



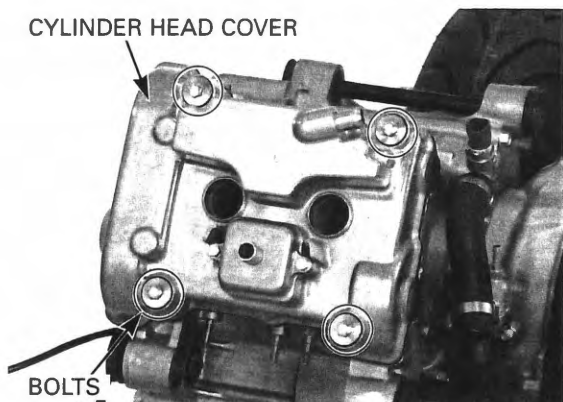
CYLINDER HEAD COVER REMOVAL

Remove the floorstep (page 2-20).

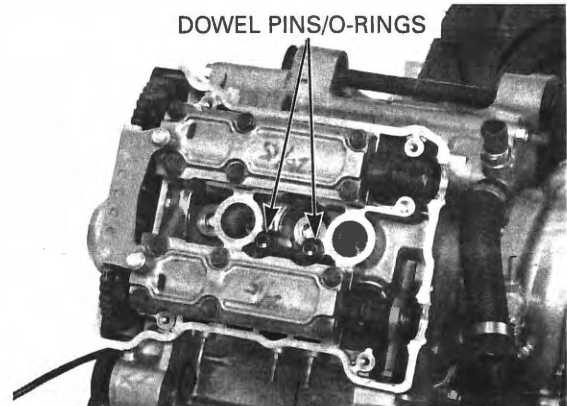
Remove the spark plug caps.

Disconnect the crankcase breather hose from the cylinder head cover.

Remove the bolts and cylinder head cover.

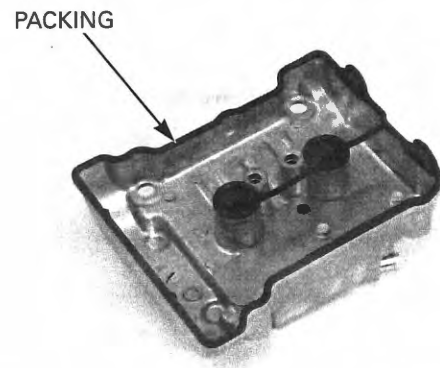


Remove the dowel pins and O-rings.

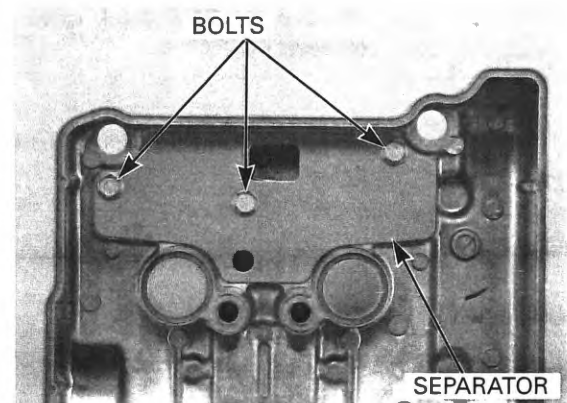


CYLINDER HEAD COVER DISASSEMBLY

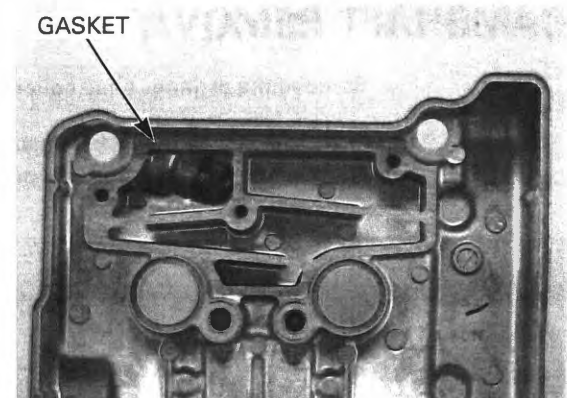
Remove the cylinder head cover packing.



Remove the bolts and breather separator.

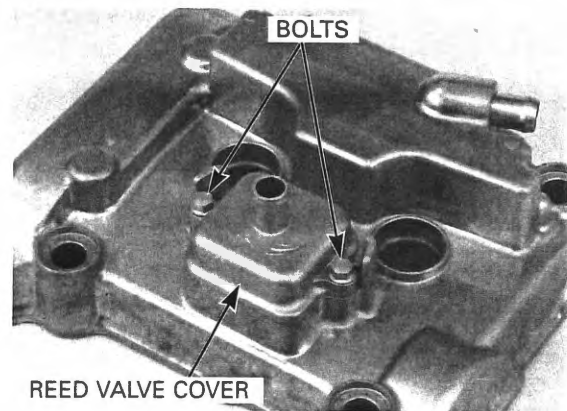


Remove the separator gasket.

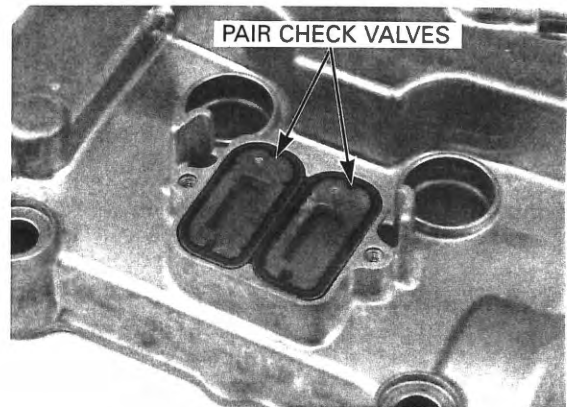


CYLINDER HEAD/VALVES

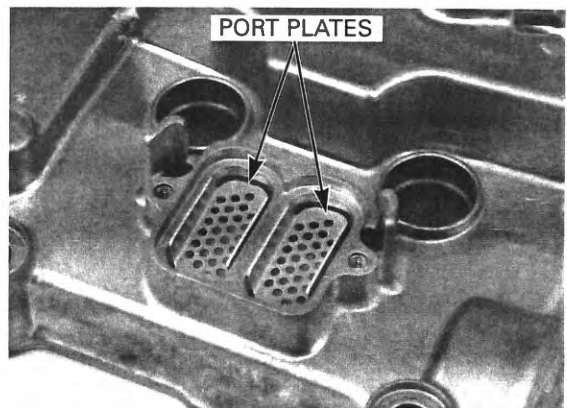
Remove the bolts and PAIR reed valve cover from the cylinder head cover.



Remove the PAIR check valves from the cylinder head cover.
Check the PAIR check valves for wear or damage, replace if necessary.



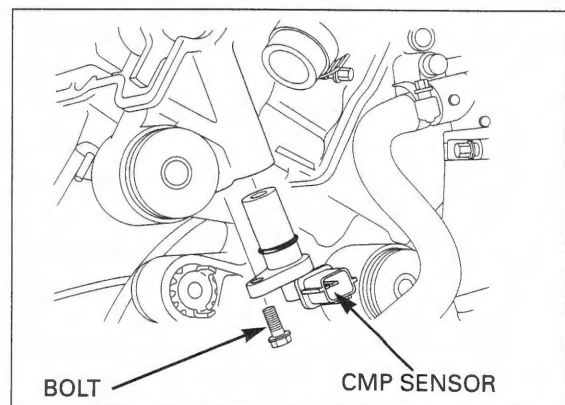
Remove the PAIR check valve port plates from the cylinder head cover.



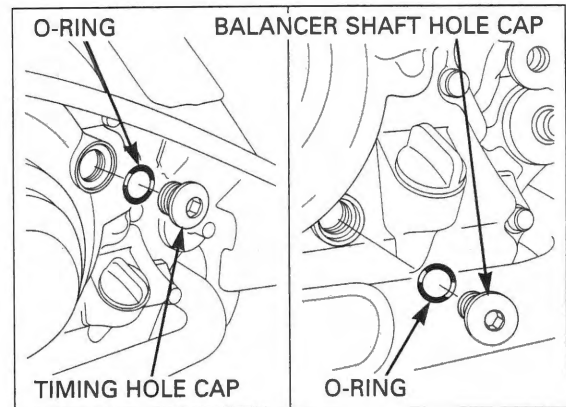
CAMSHAFT REMOVAL

Remove the cylinder head cover (page 8-4).

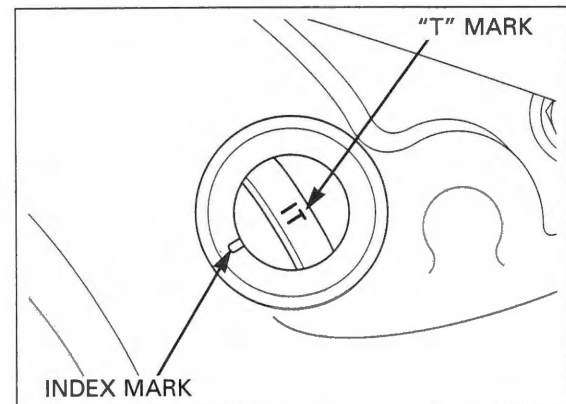
Avoid damaging the CMP sensor while removing the camshafts. Remove the bolt, O-ring and CMP sensor from the cylinder head.



Remove the timing hole cap and O-ring.
Remove the balancer shaft hole cap and O-ring.



Turn the crankshaft counterclockwise, align the "T" mark on the flywheel with the index mark on the right crankcase cover.
Make sure the No.1 piston is at TDC (Top Dead Center) on the compression stroke.



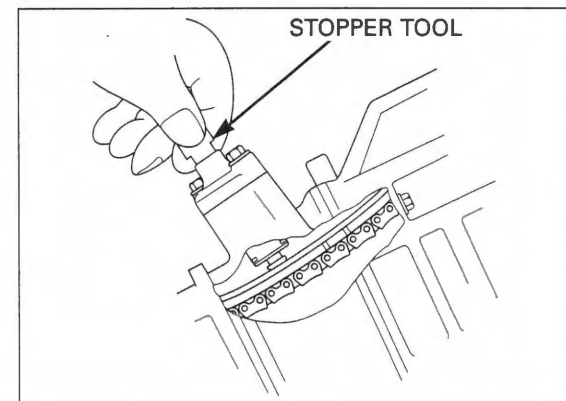
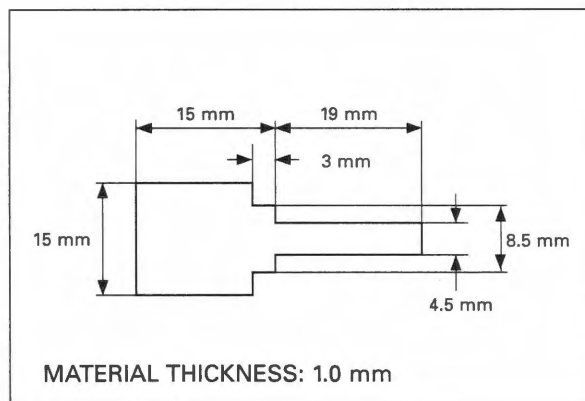
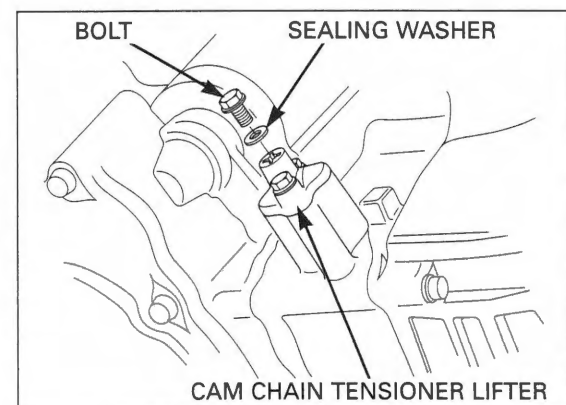
Remove the cam chain tensioner lifter sealing bolt and sealing washer.

Turn the tensioner lifter shaft full in (clockwise) and secure it using the stopper tool or tensioner holder.

TOOL:
Tensioner holder

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

This tool can easily be made from a thin (1 mm thickness) piece of steel.



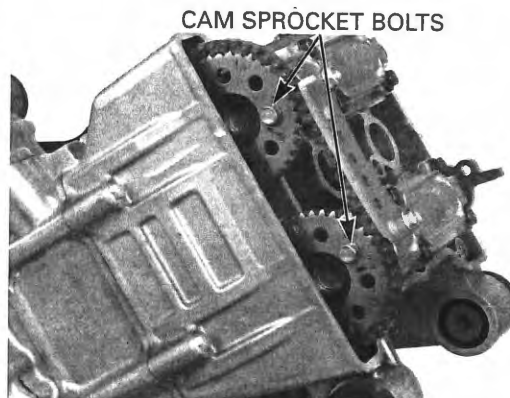
CYLINDER HEAD/VALVES

If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follow:

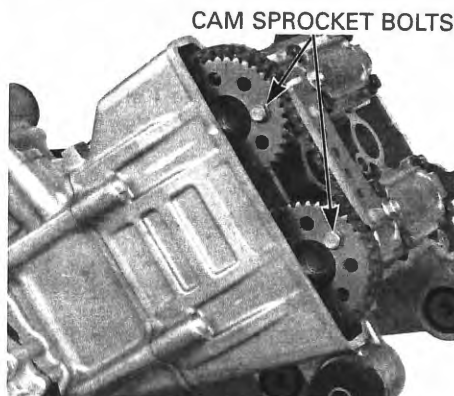
- It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

Be careful not to drop the cam sprocket bolts into the crankcase.

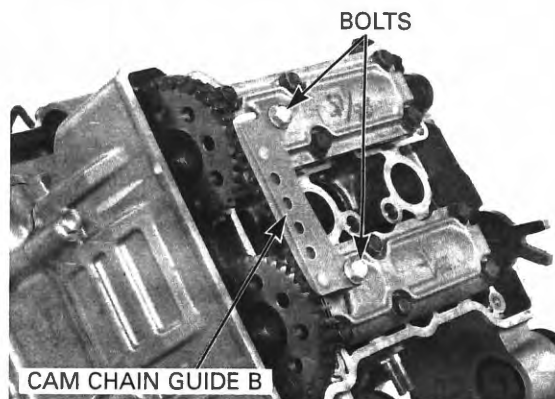
- Remove the cam sprocket bolts from intake and exhaust camshafts.



- Turn the crankshaft one full turn (360°), remove the other cam sprocket bolts from the camshafts.

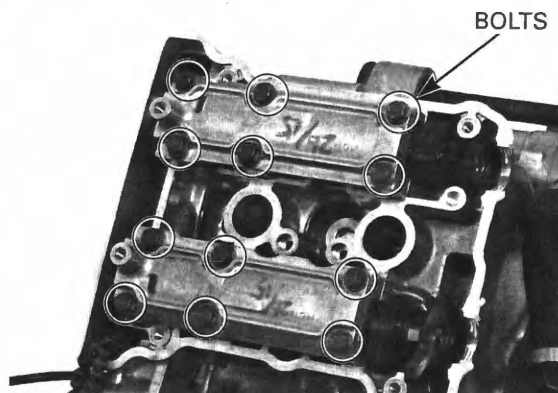


- Remove the bolts and cam chain guide B.
- Remove the cam sprocket from the camshaft.



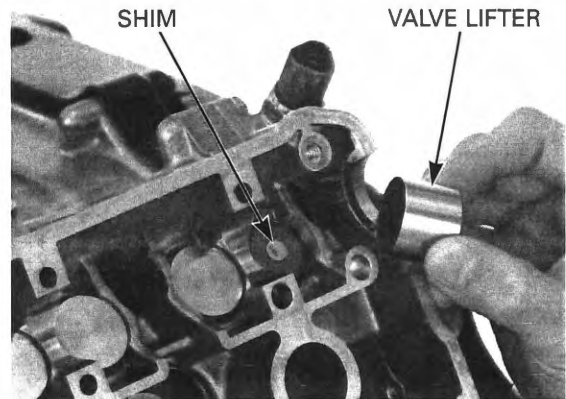
Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.

Loosen and remove the camshaft holder bolts in a crisscross pattern in several steps, then remove the camshaft holders and camshafts.



Remove the valve lifters and shims.

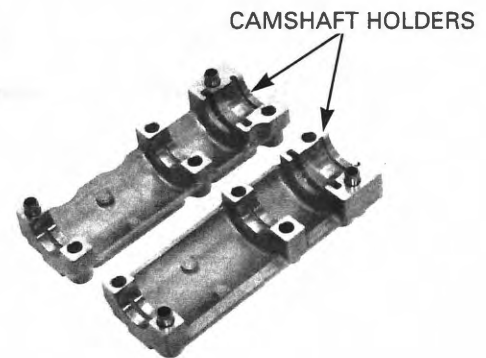
- Be careful not to damage the valve lifter bore.
- The shims may stick to the inside of the valve lifters. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with tweezers or a magnet.



INSPECTION

CAMSHAFT HOLDER

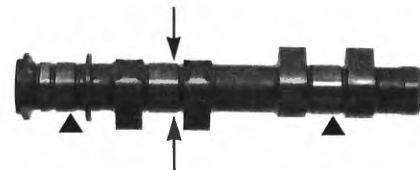
Inspect the bearing surface of each camshaft holder for scoring, scratches, or evidence of insufficient lubrication.



CAMSHAFT RUNOUT

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

Using a micrometer, measure each cam lobe height.

SERVICE LIMITS:

IN: 34.82 mm (1.371 in)

EX: 34.88 mm (1.373 in)

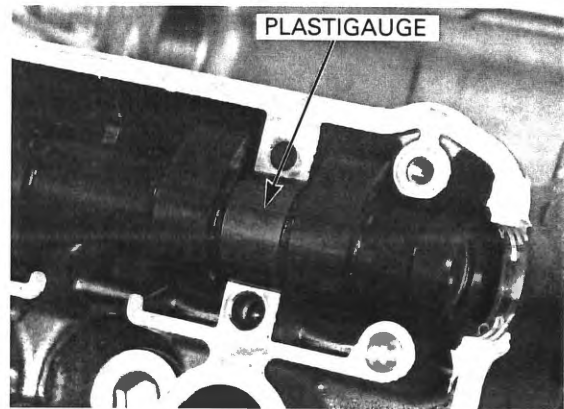


CYLINDER HEAD/VALVES

CAMSHAFT OIL CLEARANCE

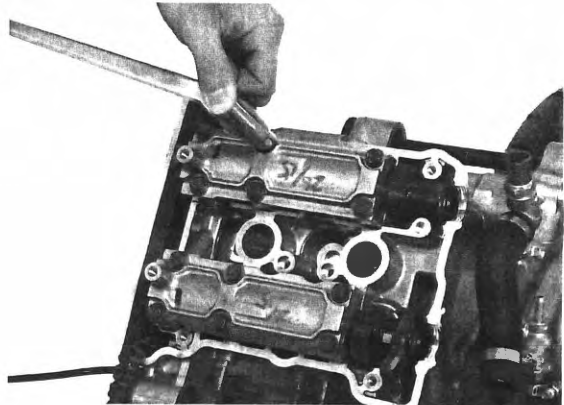
Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.

Lay a strip of plastigauge lengthwise on top of each camshaft journal.



Install the camshaft holders and tighten the bolts in a crisscross pattern in two to three steps.

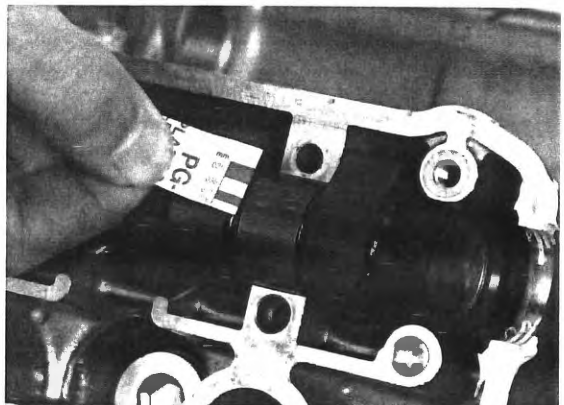
TORQUE: 12 N•m (1.2 kgf•m, 9 lbf•ft)



Remove the camshaft holders and measure the width of each plastigauge.
The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



CAM CHAIN GUIDE B

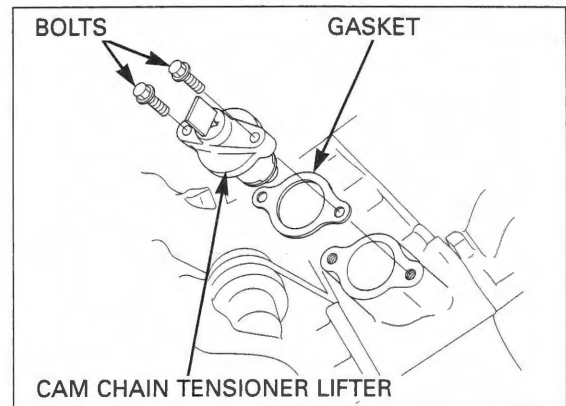
Inspect the cam chain slipper surface of the cam chain guide for wear or damage.



CYLINDER HEAD REMOVAL

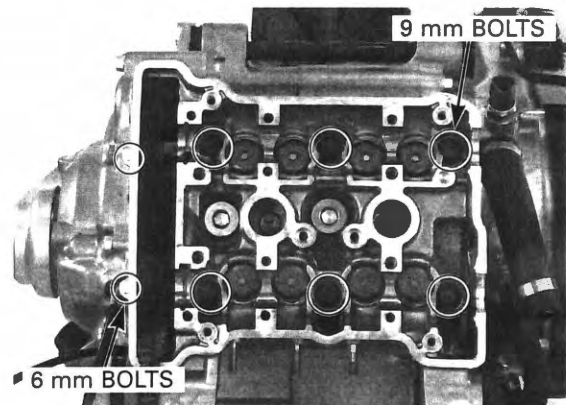
Remove the camshaft (page 8-6).

Remove the bolts and cam chain tensioner lifter and gasket.

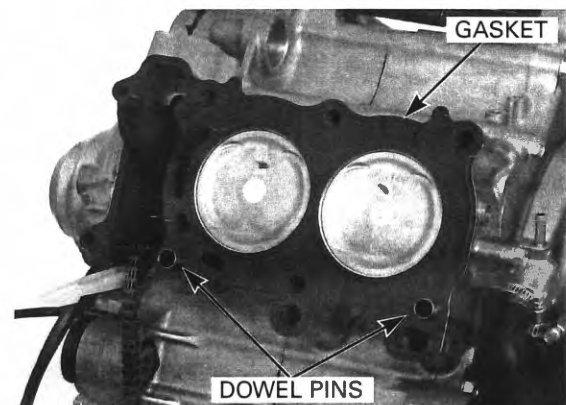


Loosen the 9 mm bolts in a criss-cross pattern in two or three steps.

Remove the two 6 mm bolts.
Remove the six 9 mm bolts and washers.
Remove the cylinder head.



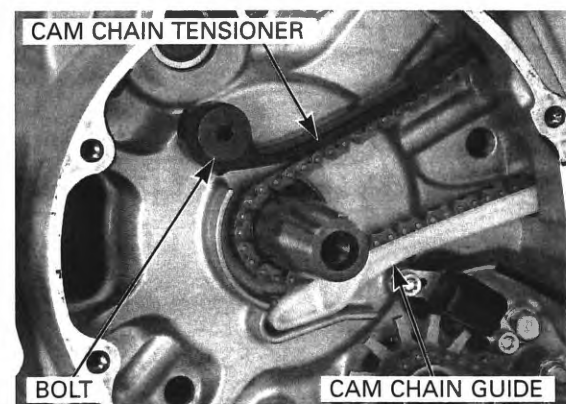
Remove the dowel pins and cylinder head gasket.



Remove the flywheel (page 12-5).

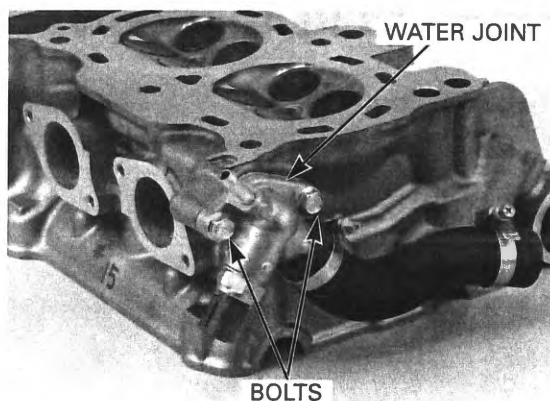
Remove the cam chain guide.
Remove the socket bolt and chain guide.

Remove the cam chain from the crankshaft.



CYLINDER HEAD DISASSEMBLY

Remove the bolts and water joint.



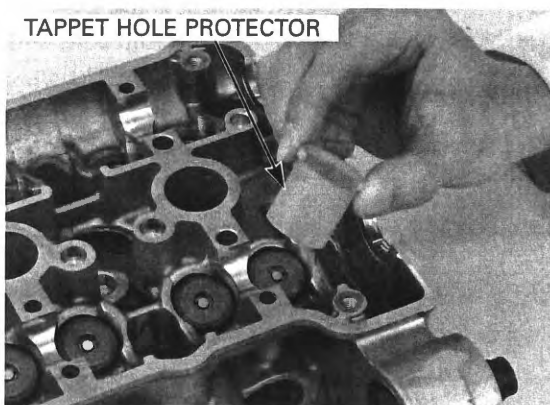
Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

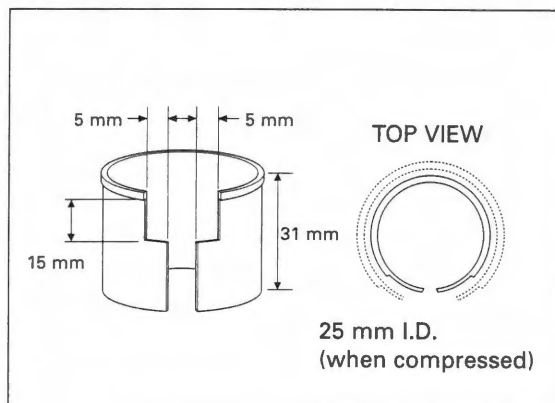
TOOL:

Tappet hole protector

07HMG-MR70002
(Not available in U.S.A.)



An equivalent tool can easily be made from a 35-mm plastic film container as shown.



To prevent loss of tension, do not compress the valve spring more than necessary to remove the cotters.

Remove the valve spring cotters using the special tools as shown.

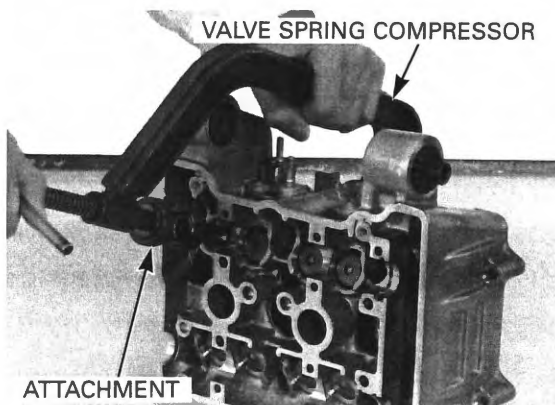
TOOLS:

Valve spring compressor

07757-0010000

Valve spring compressor attachment

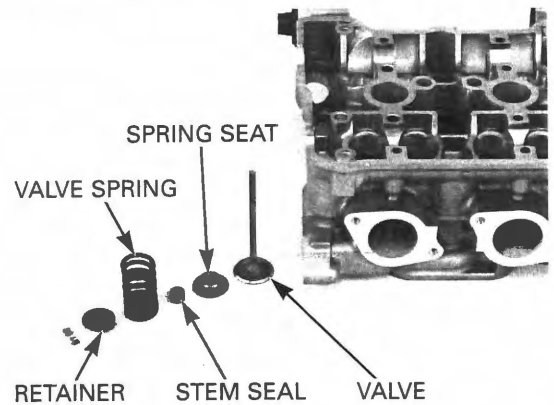
07959-KM30101



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

Remove the following:

- Spring retainer
- Valve spring
- Valve
- Stem seal
- Valve spring seat

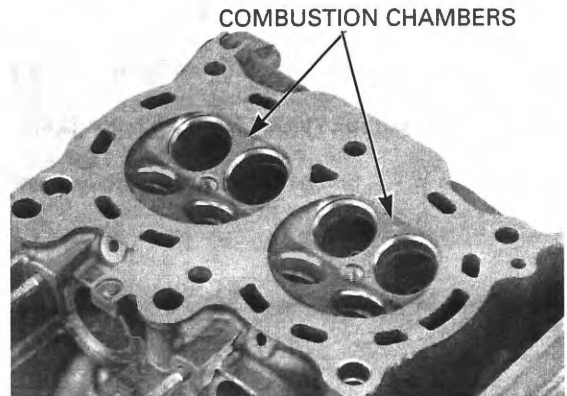


CYLINDER HEAD INSPECTION

CYLINDER HEAD

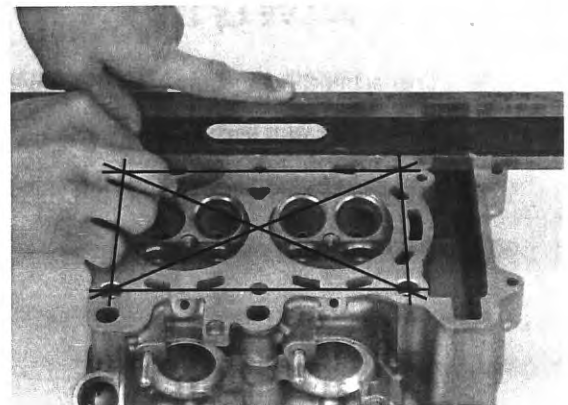
Avoid damaging the mating and valve seat surfaces.

Remove the carbon deposits from the combustion chambers.
Check the spark plug hole and valve areas for cracks.



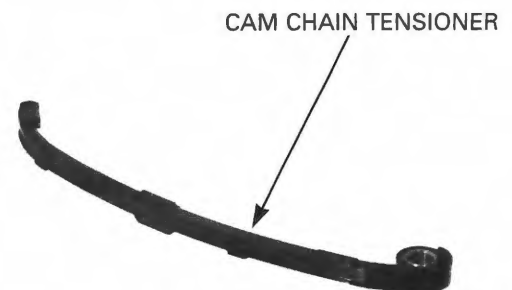
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



CAM CHAIN TENSIONER/ CAM CHAIN GUIDE

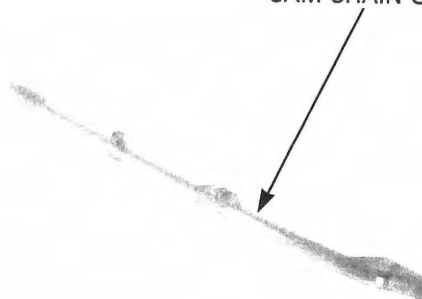
Inspect the cam chain tensioner for excessive wear or damage. Replace if necessary.



CYLINDER HEAD/VALVES

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

CAM CHAIN GUIDE

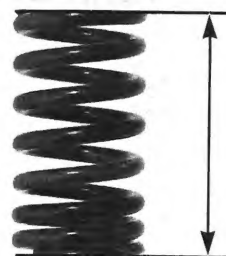


VALVE SPRING

Measure the free length of the valve springs.

SERVICE LIMIT: 38.2 mm (1.50 in)

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



VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.

Measure each valve lifter O.D.

SERVICE LIMIT: 25.97 mm (1.022 in)

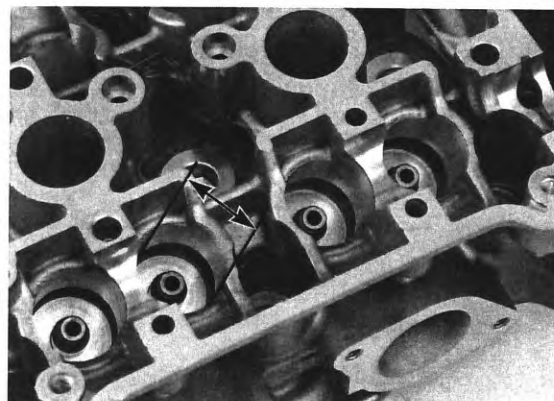


VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.

Measure each valve lifter bore I.D.

SERVICE LIMIT: 26.04 mm (1.025 in)



VALVE/VALVE GUIDE

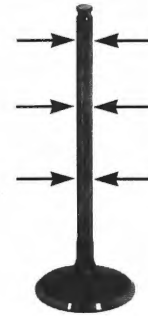
Inspect each valve for bends, burns, or abnormal stem wear.

Check valve movement in the guide. Measure and record each valve stem O.D.

SERVICE LIMITS:

IN: 4.465 mm (0.1758 in)

EX: 4.455 mm (0.1754 in)



Ream the guides to remove any carbon deposits before checking clearances.

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

TOOL:

Valve guide reamer, 4.508 mm 07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)

Measure and record each valve guide I.D.

SERVICE LIMITS:

IN: 4.540 mm (0.1787 in)

EX: 4.540 mm (0.1787 in)

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

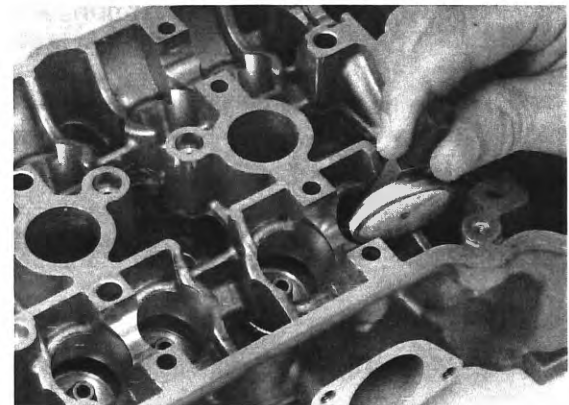
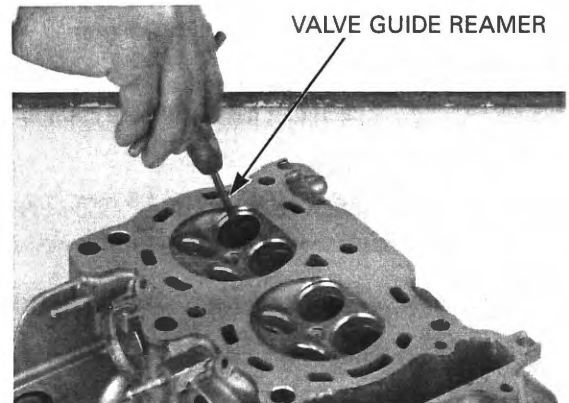
STANDARDS:

IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)

EX: 0.020 – 0.047 mm (0.0008 – 0.0019 in)

Reface the valve seats whenever the valve guides are replaced (page 8-17).

If the stem-to-guide clearance is out of standard, 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 is out of standard with the new guides, replace the valves and guides.



VALVE GUIDE REPLACEMENT

Chill the valve guides in a freezer for about an hour.

Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head.

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

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

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

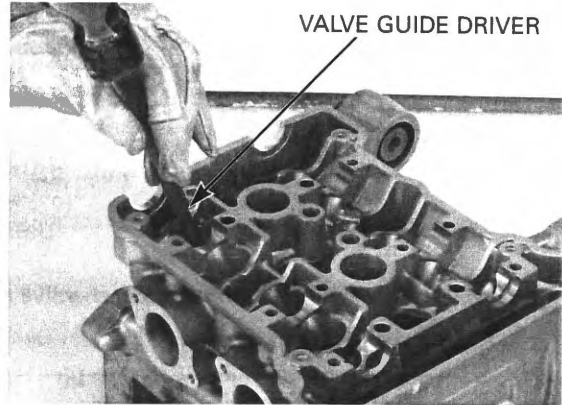
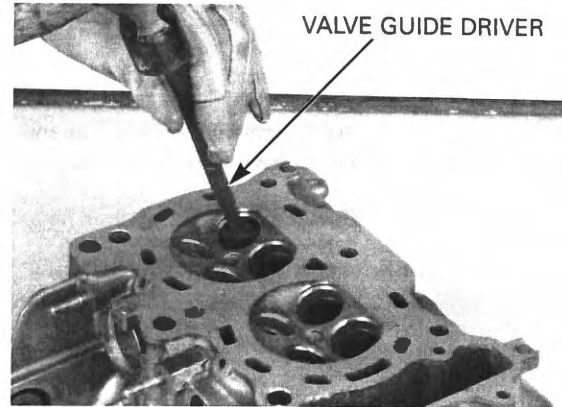
TOOL:

Valve guide driver 4.5 mm 07HMD-ML00101

Drive new guides in the cylinder head from the camshaft side while the cylinder head is still heated.

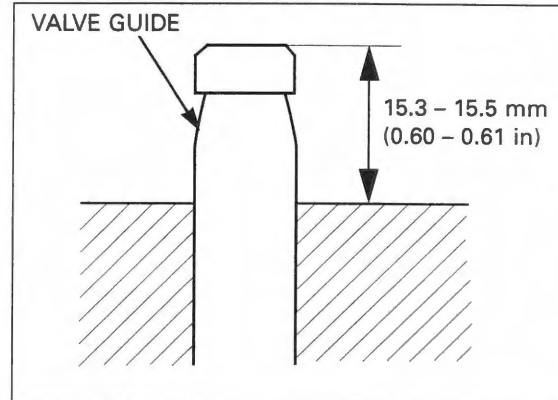
TOOL:

Valve guide driver 4.5 mm 07HMD-ML00101



**VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:
IN/EX: 15.3 – 15.5 mm (0.60 – 0.61 in)**

Let the cylinder head cool to room temperature.



Ream the new valve guides.

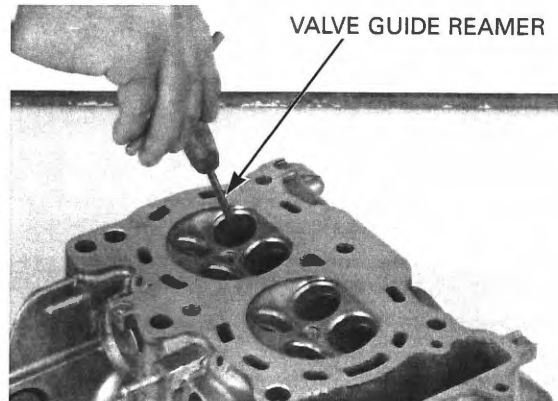
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

**Valve guide reamer, 4.508 mm 07HMH-ML00101 or
07HMH-ML0010B
(U.S.A. only)**

Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat (page 8-17).

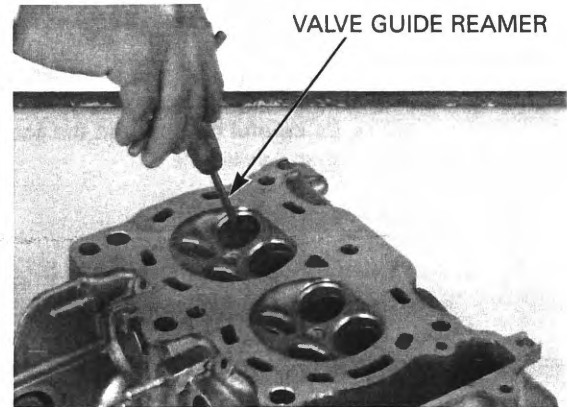


VALVE SEAT INSPECTION/REFACING

INSPECTION

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

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

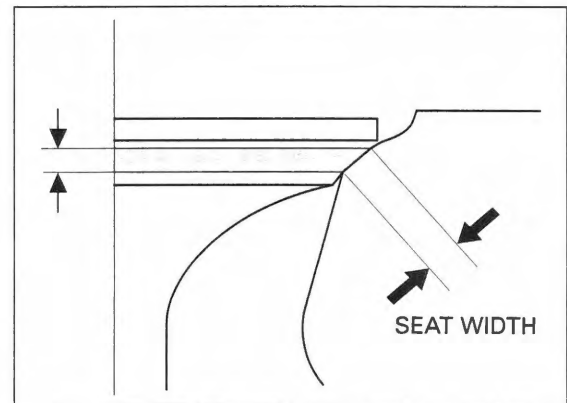


The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

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

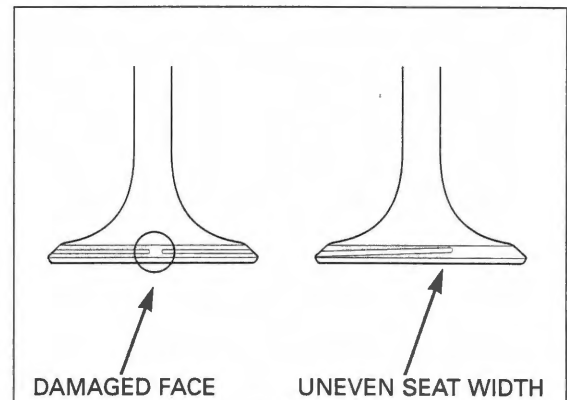
STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

If the valve seat width is not within specification, reface the valve seat (page 8-18).

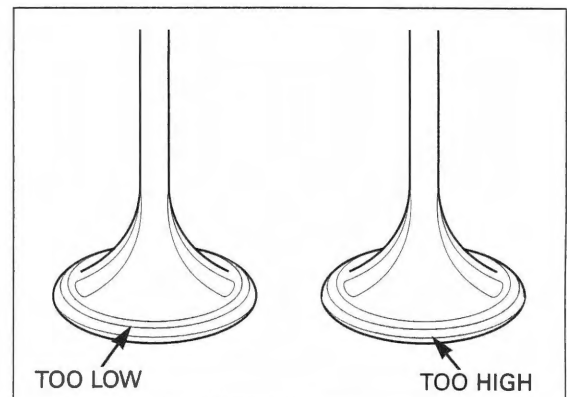


Inspect the valve seat face for:

- Uneven seat width:
 - Bent or collapsed valve stem;
 - Replace the valve and reface the valve seat
- Damaged face:
 - Replace the valve and reface the valve seat

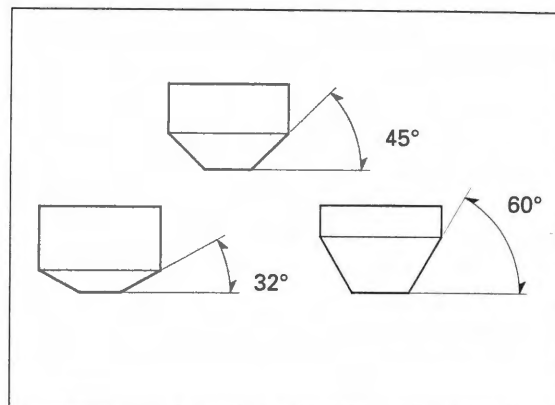


- Contact area (too low or too high):
 - Reface the valve seat



VALVE SEAT REFACING

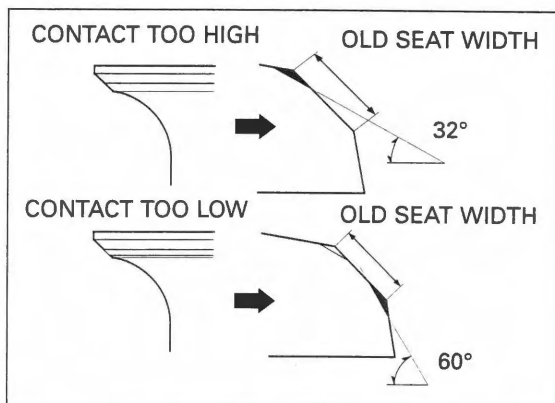
- Follow the refacing manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.



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.

Refinish the seat to specifications, using a 45° finish cutter.



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

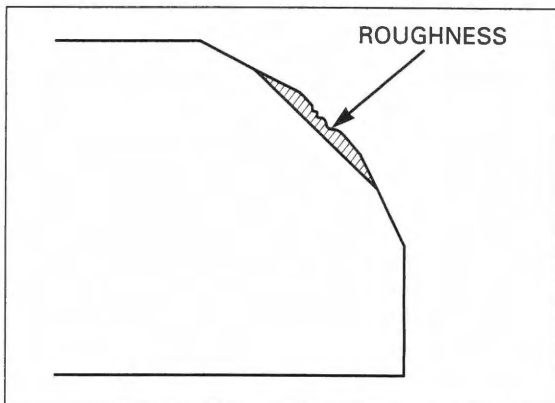
TOOLS:

Valve seat cutter, 29 mm (45° IN) 07780-0010300

Valve seat cutter, 24.5 mm (45° EX) 07780-0010100

Valve seat cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.



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

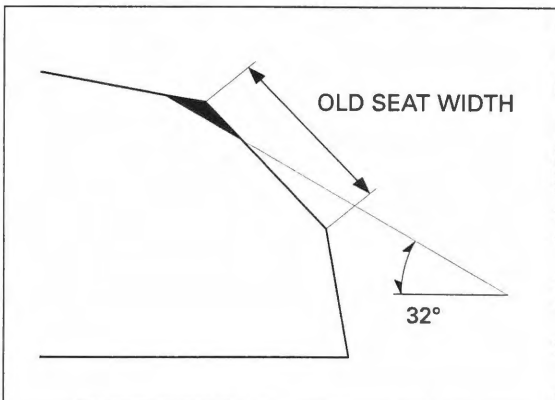
TOOLS:

Valve seat cutter, 30 mm (32° IN) 07780-0012200

Valve seat cutter, 27 mm (32° EX) 07780-0013300

Valve seat cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.



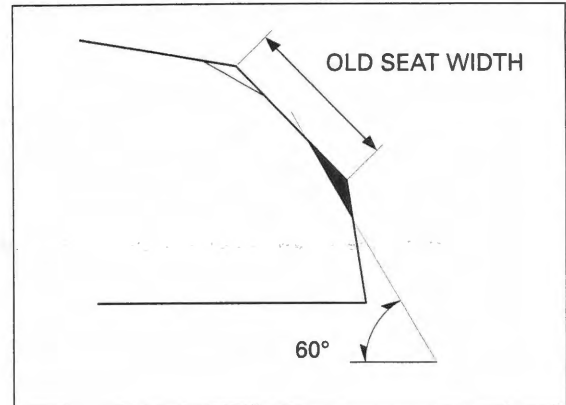
Using a 60° interior cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Valve seat cutter, 30 mm (60° IN) 07780-0012200

Valve seat cutter, 26 mm (60° EX) 07780-0013300

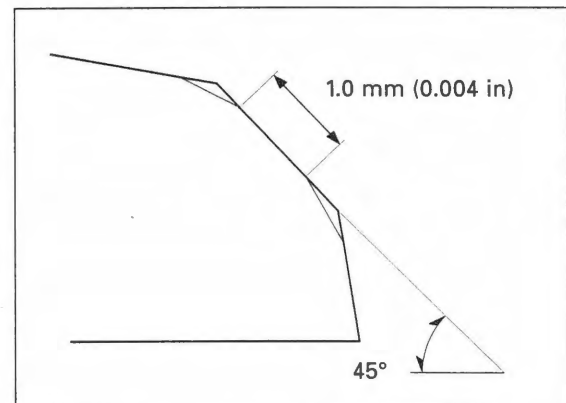
Valve seat cutter holder, 4.5 mm 07781-0010600
or equivalent commercially available in U.S.A.



Using a 45° seat cutter, cut the seat to the proper width.

VALVE SEAT WIDTH: 1.0 mm (0.004in)

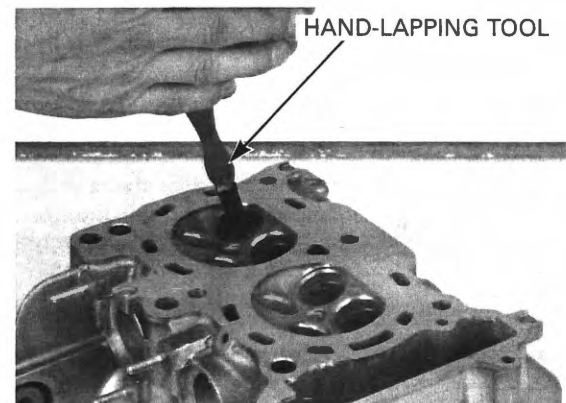
Make sure that all pitting and irregularities are removed.



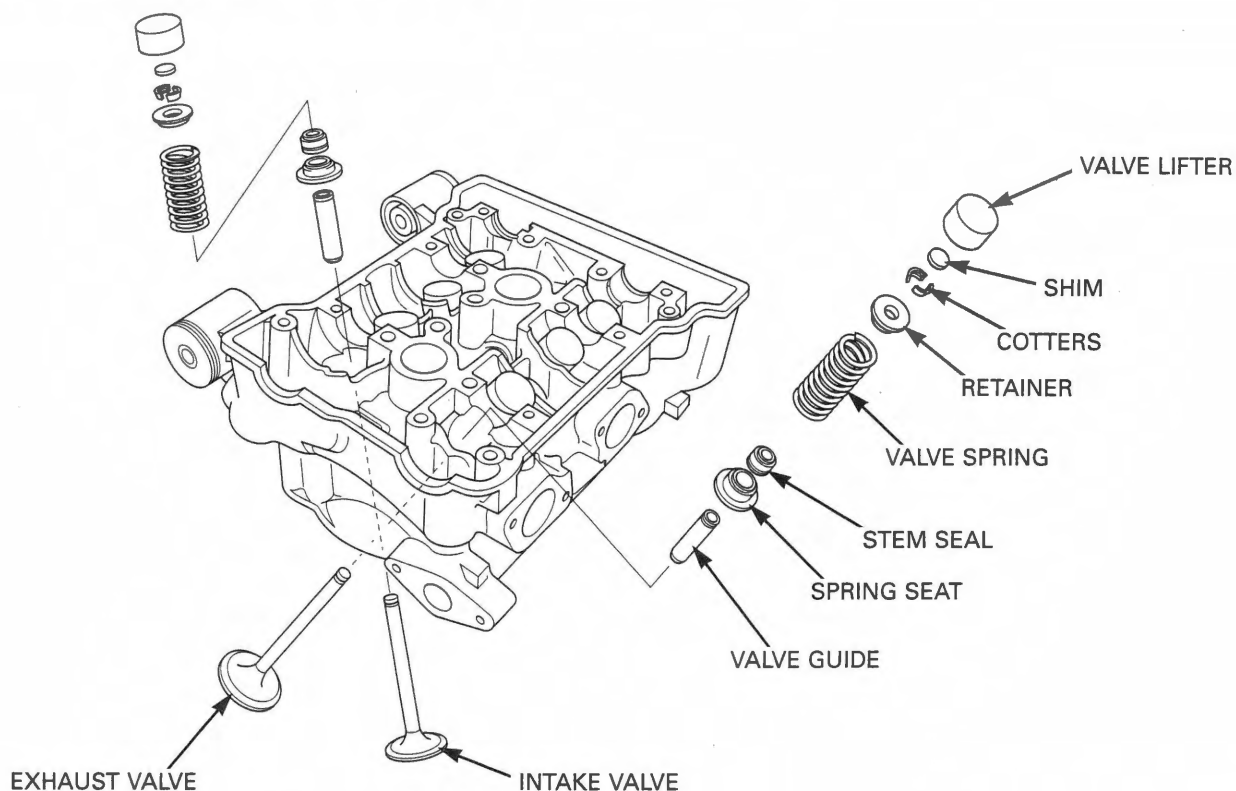
Excessive lapping pressure may deform or damage the seat. Do not allow lapping compound to enter the guides.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure. Change the angle of lapping tool frequently to prevent uneven seat wear.

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



CYLINDER HEAD ASSEMBLY

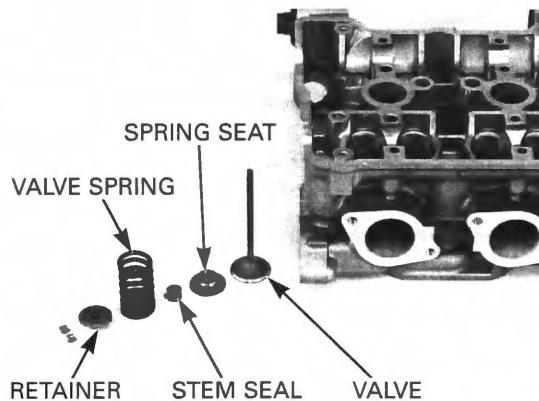


Clean the cylinder head assembly with solvent and blow out all oil passages with compressed air.

Install the valve spring seats.
Install the new stem seals.

Lubricate the valve stems with molybdenum disulfide oil and insert the valve into the valve guide.

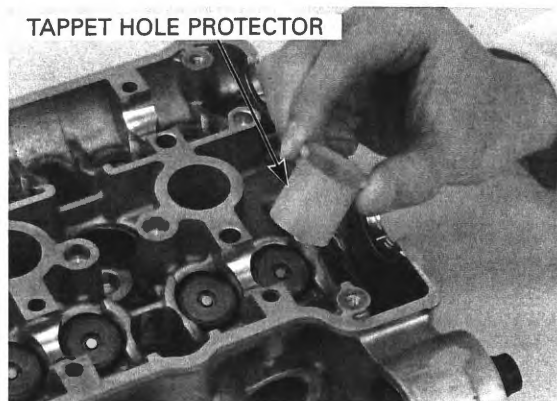
To avoid damage to the stem seal, turn the valve slowly when inserting.



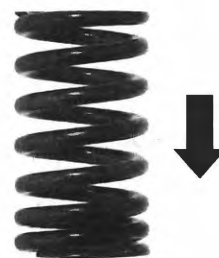
Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector

07HMG-MR70002
(Not available in U.S.A.)



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



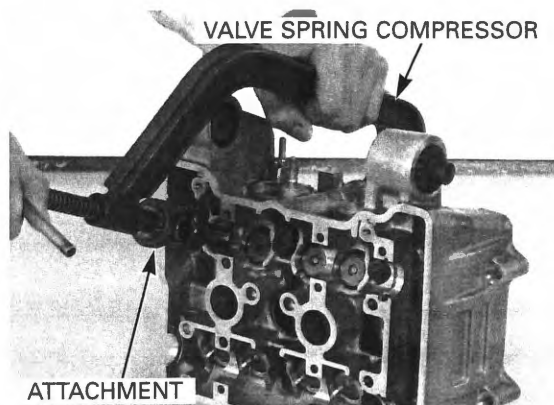
Install the valve cotters using the special tools as shown.

NOTICE

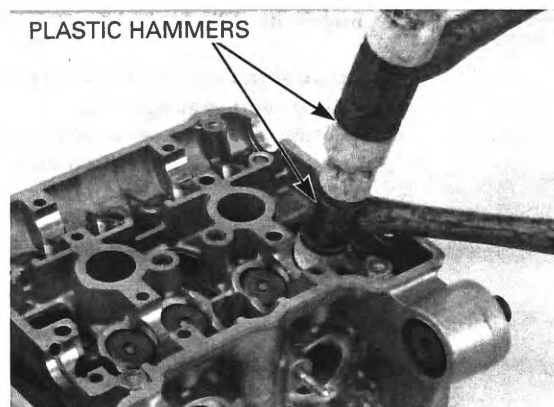
To prevent loss of tension, do not compress the valve spring more than necessary to remove the cotters.

TOOLS:

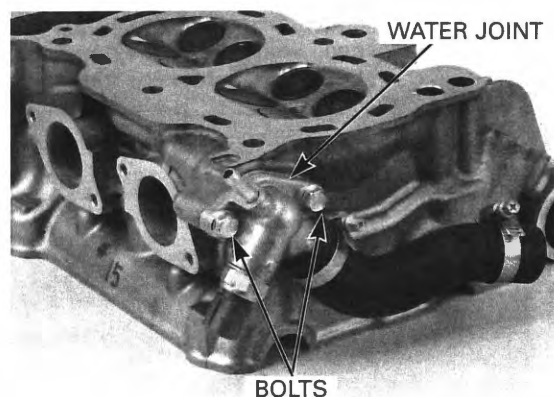
Valve spring compressor 07757-0010000
Valve spring compressor attachment 07959-KM30101



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



Install the water joint and tighten the bolts.



CYLINDER HEAD INSTALLATION

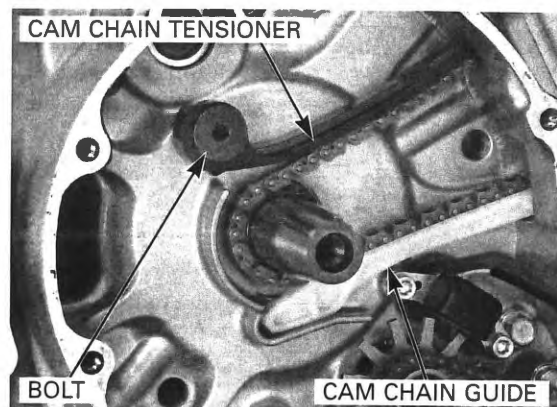
Install the cam chain to the crankshaft.

Install the cam chain tensioner and tighten the socket bolt to the specified torque.

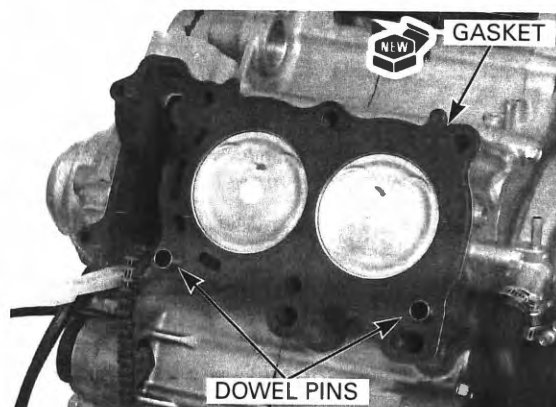
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the cam chain guide.

Install the flywheel (page 12-9).



Install the dowel pins and a new cylinder head gasket as shown.



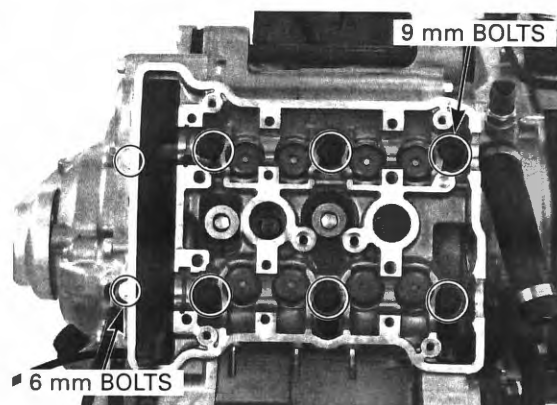
Install the cylinder head.

Apply engine oil to the cylinder head 9 x 155 mm bolt threads and seating surface.

Tighten the bolts in a crisscross pattern in two to three steps to the specified torque.

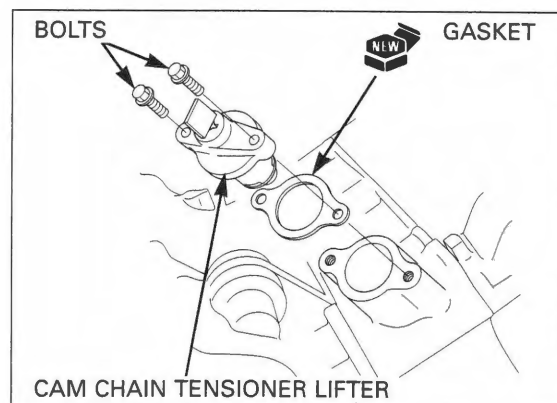
TORQUE:

9 mm bolt: 44 N·m (4.5 kgf·m, 33 lbf·ft)



Install the cam chain tensioner lifter onto the cylinder head with a new gasket.

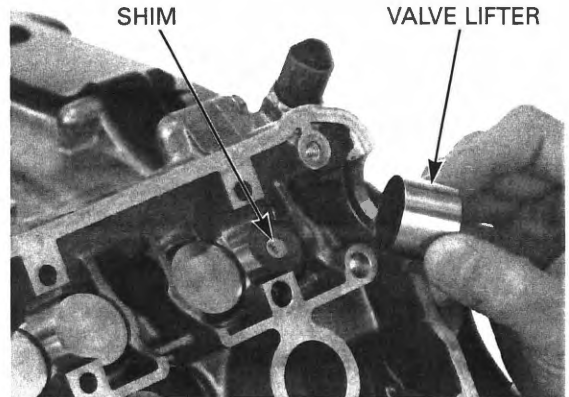
Install and tighten the mounting bolts.



CAMSHAFT INSTALLATION

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

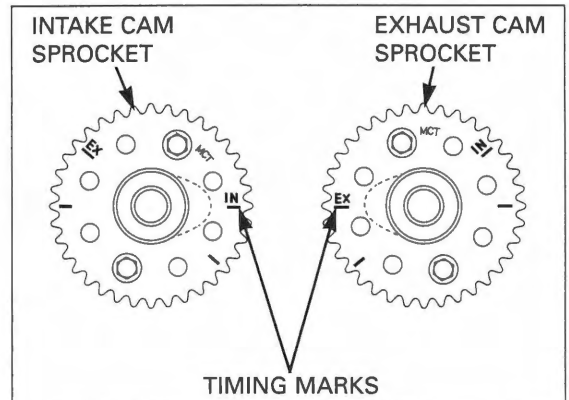
Install the shims and valve lifters into the valve lifter bores.



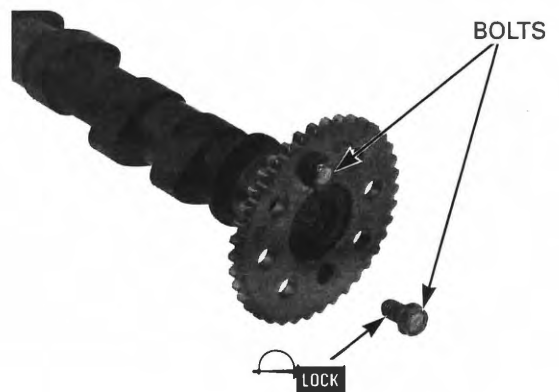
If the sprockets are removed, install the following:

Install the intake cam sprocket with the timing mark (IN) facing inward and the No.1 cam lobes facing in as shown.

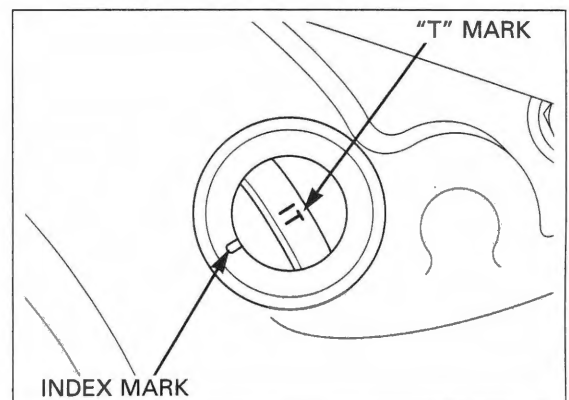
Install the exhaust cam sprocket with the timing mark (EX) facing inward and the No.1 cam lobes facing in as shown.



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

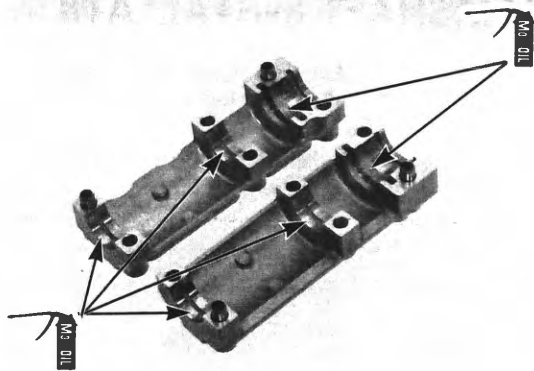


Turn the crankshaft counterclockwise, align the "T" mark on the flywheel with the index mark on the right crankcase cover.

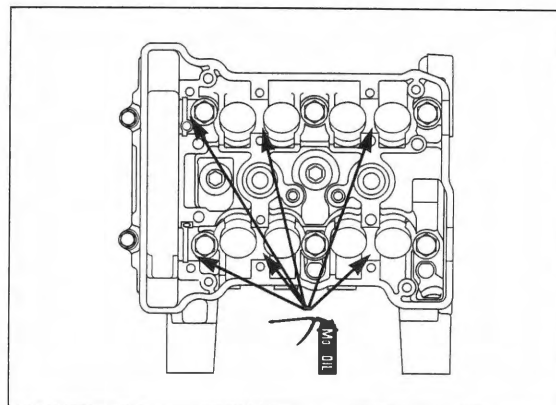


CYLINDER HEAD/VALVES

Apply molybdenum disulfide oil to the camshaft journals of the camshaft holder.

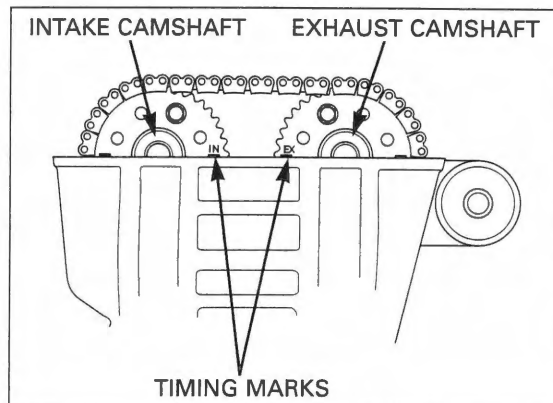


Apply molybdenum disulfide oil to the camshaft journals of the cylinder head.



Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

- Install each camshafts to the correct locations. Note the identification marks.
"IN": Intake camshaft
"EX": Exhaust camshaft
- Make sure the timing marks on the cam sprockets are facing inward and flush with the cylinder head upper surface as shown.

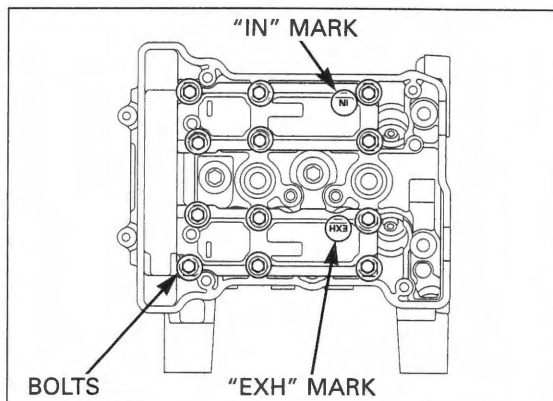


Install the intake and exhaust camshaft holders onto the camshafts.

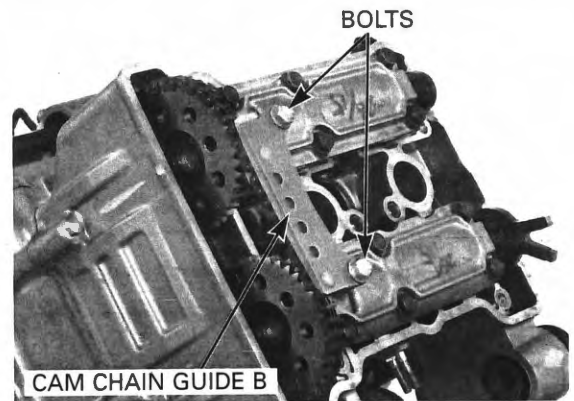
- Install each camshaft holders to the correct locations. Note the identification marks.
"IN": Intake camshaft holder
"EXH": Exhaust camshaft holder

Apply engine oil to the camshaft holder bolt threads and seating surface.
Install and tighten the holder bolts in a crisscross pattern in two to three steps to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

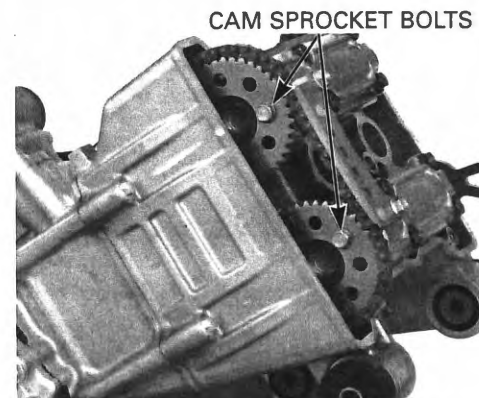


Install the cam chain guide B, and tighten the bolts.

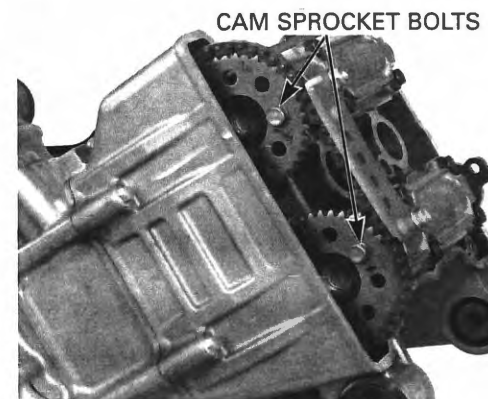


In case the cam sprockets were removed, apply locking agent to the cam sprocket bolt threads. Install and tighten the cam sprocket bolts to the specified torque.

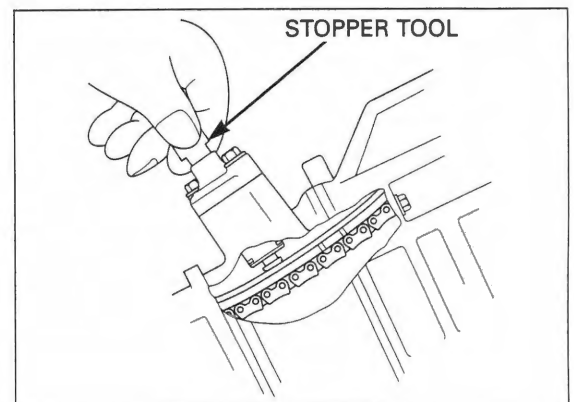
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.



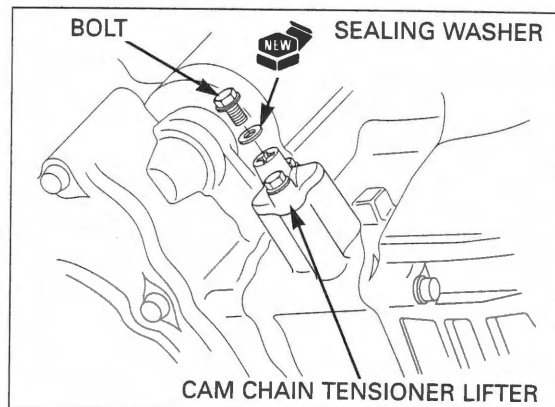
Remove the stopper tool from the cam chain tensioner lifter.



CYLINDER HEAD/VALVES

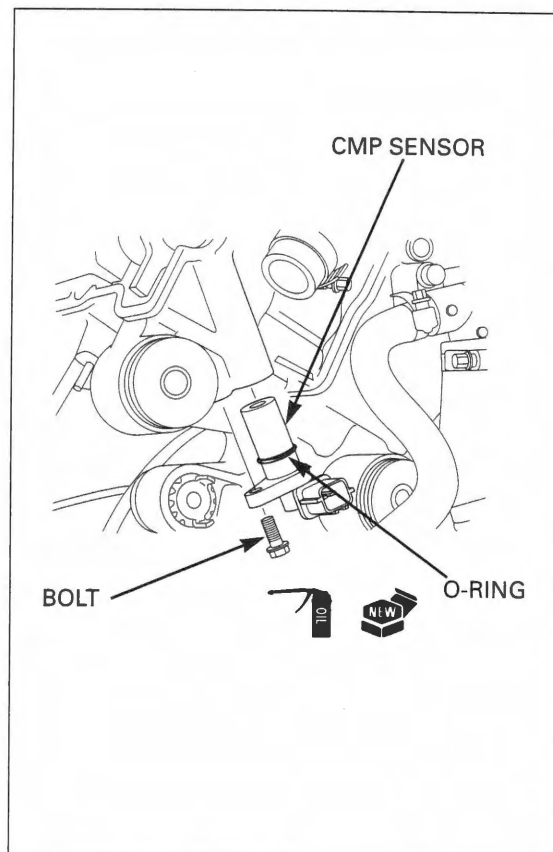
Install a new sealing washer and tighten the sealing bolt.

Recheck the valve timing.



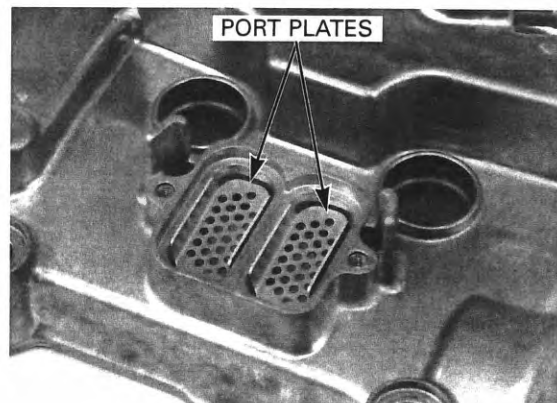
Apply oil to the new O-ring, and install it onto the CMP sensor.
Install the CMP sensor into the cylinder head.

Install and tighten the mounting bolt.

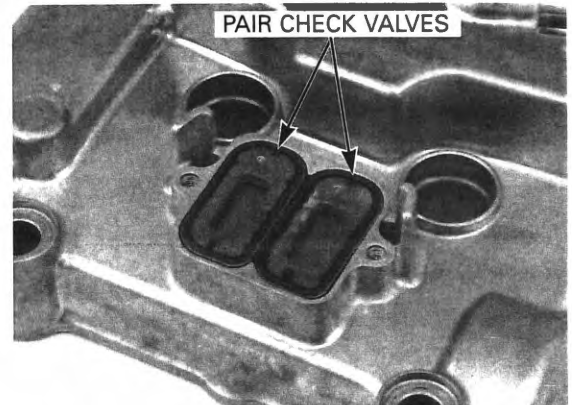


CYLINDER HEAD COVER ASSEMBLY

Install the PAIR check valve port plates into the cylinder head cover.

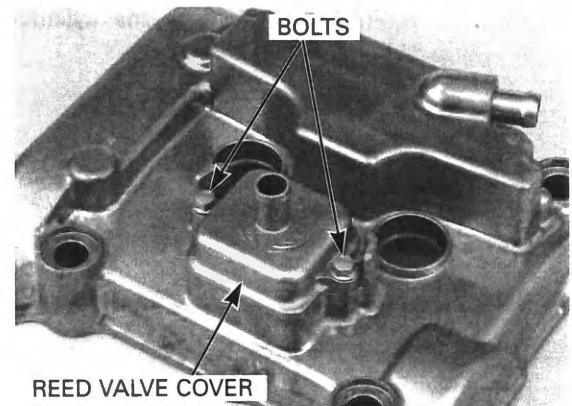


Install the PAIR check valves into the cylinder head covers.

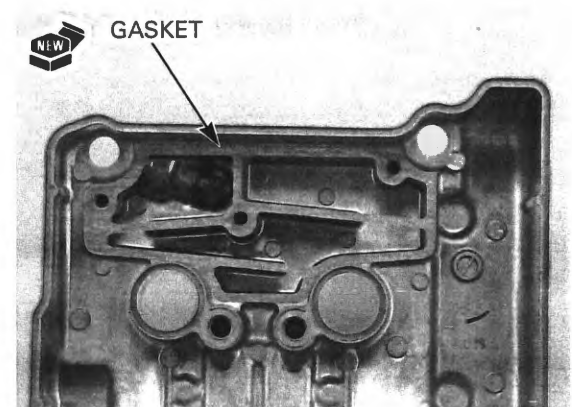


Install the reed valve cover to the cylinder head cover and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



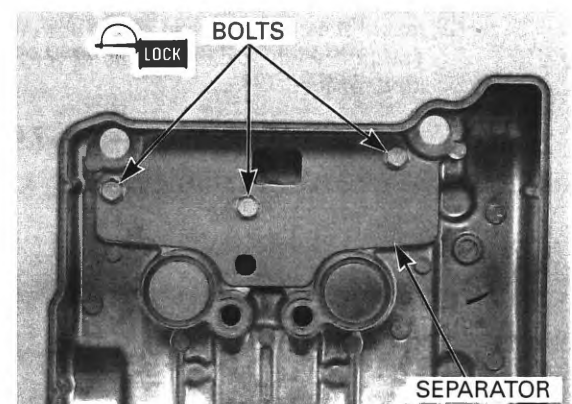
Install a new gasket to the cylinder head cover.



Install the crankcase breather separator to the cylinder head cover.

Apply a locking agent to the crankcase breather separator mounting bolt threads. Install and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

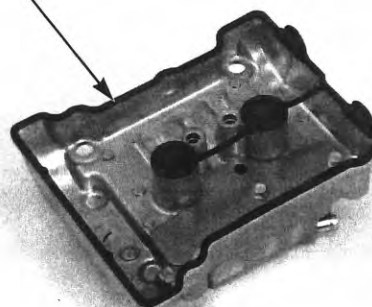


CYLINDER HEAD/VALVES

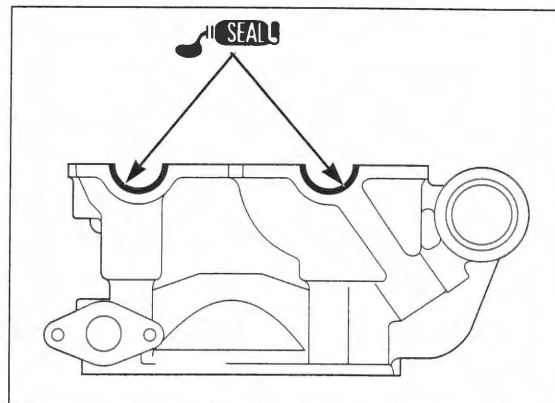
CYLINDER HEAD COVER INSTALLATION

Install the cylinder head packing into the groove of the cylinder head cover.

PACKING

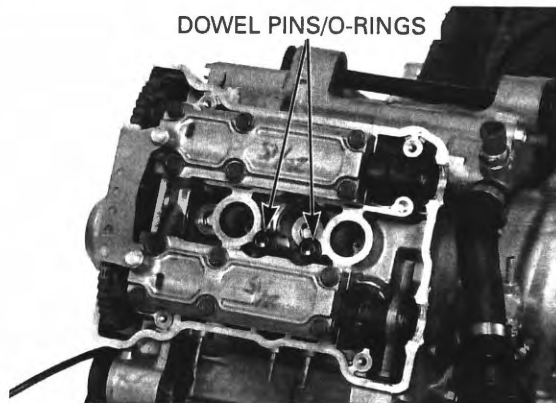


Apply sealant to the cylinder head semi-circular cutouts as shown.



Install the dowel pins and O-rings.

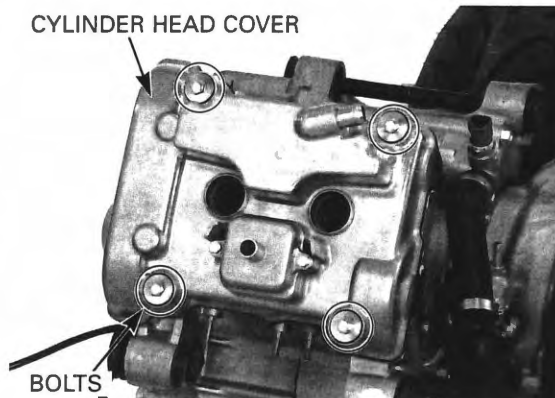
DOWEL PINS/O-RINGS



Install the cylinder head cover onto the cylinder head and tighten the cylinder head cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

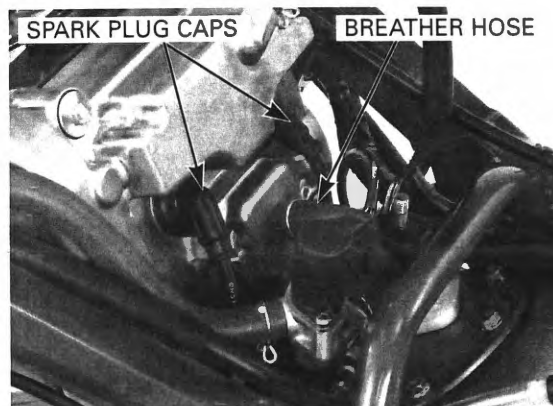
CYLINDER HEAD COVER



Connect the crankcase breather hose from the cylinder head cover.

Install the spark plug cap.

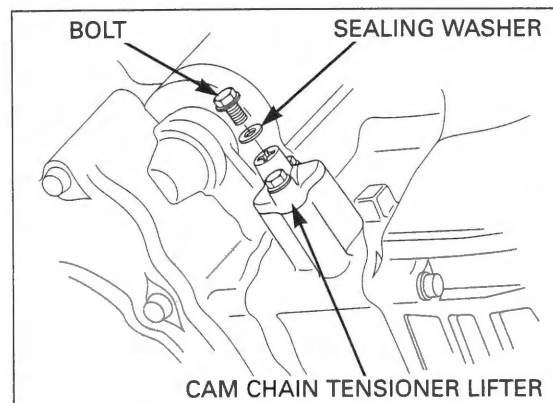
Install the floorstep (page 2-20).



CAM CHAIN TENSIONER LIFTER

REMOVAL

Remove the cam chain tensioner sealing bolt and sealing washer.



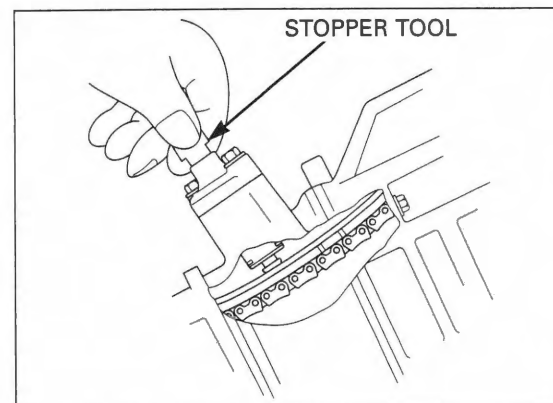
Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool or tensioner holder to prevent damaging the cam chain.

TOOL:

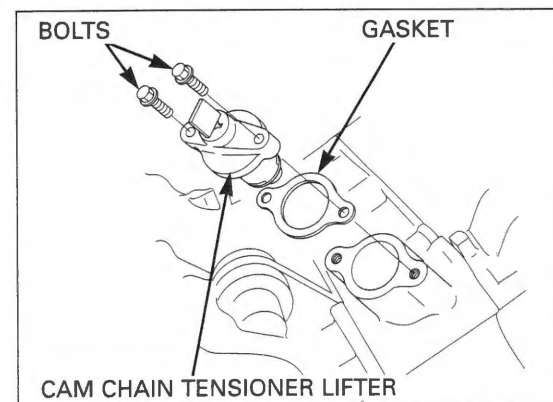
Tensioner holder

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

See page 8-7 for detail of the tool.



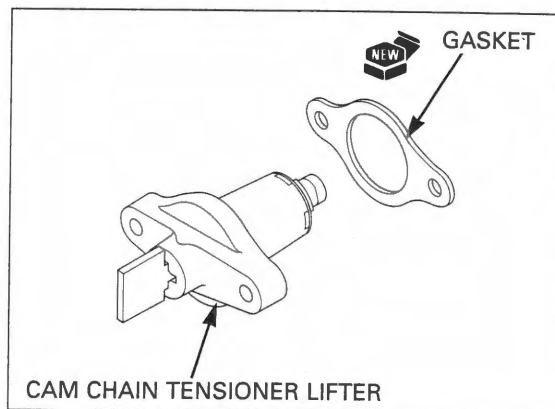
Remove the bolts and cam chain tensioner lifter.
Remove the gasket.



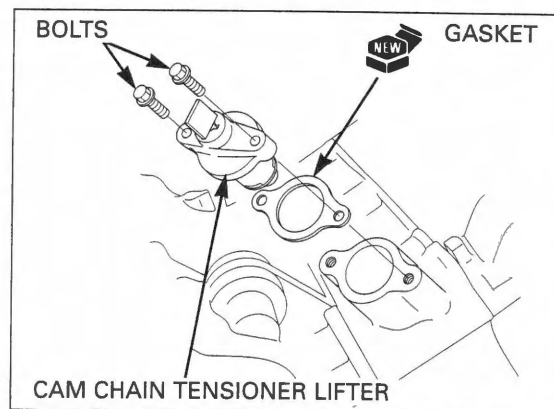
CYLINDER HEAD/VALVES

INSTALLATION

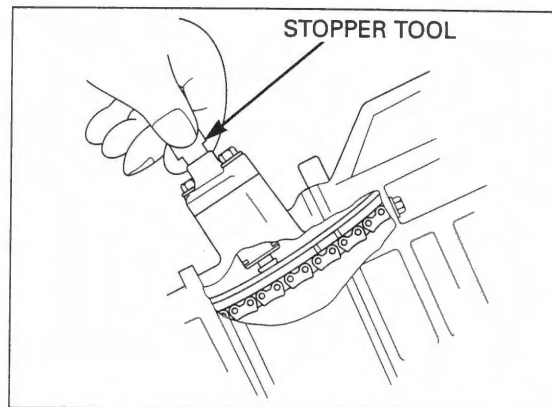
Install the new gasket onto the cam chain tensioner lifter.



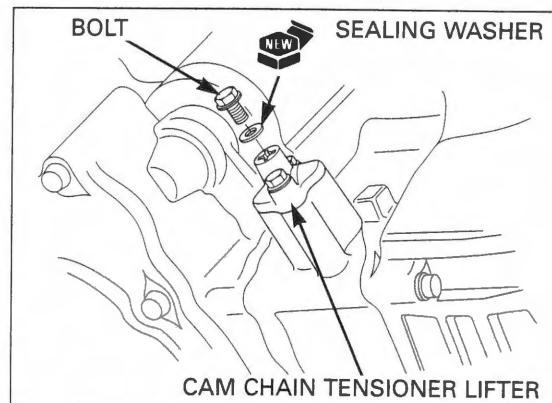
Install the cam chain tensioner lifter into the cylinder head.
Install and tighten the mounting bolts.



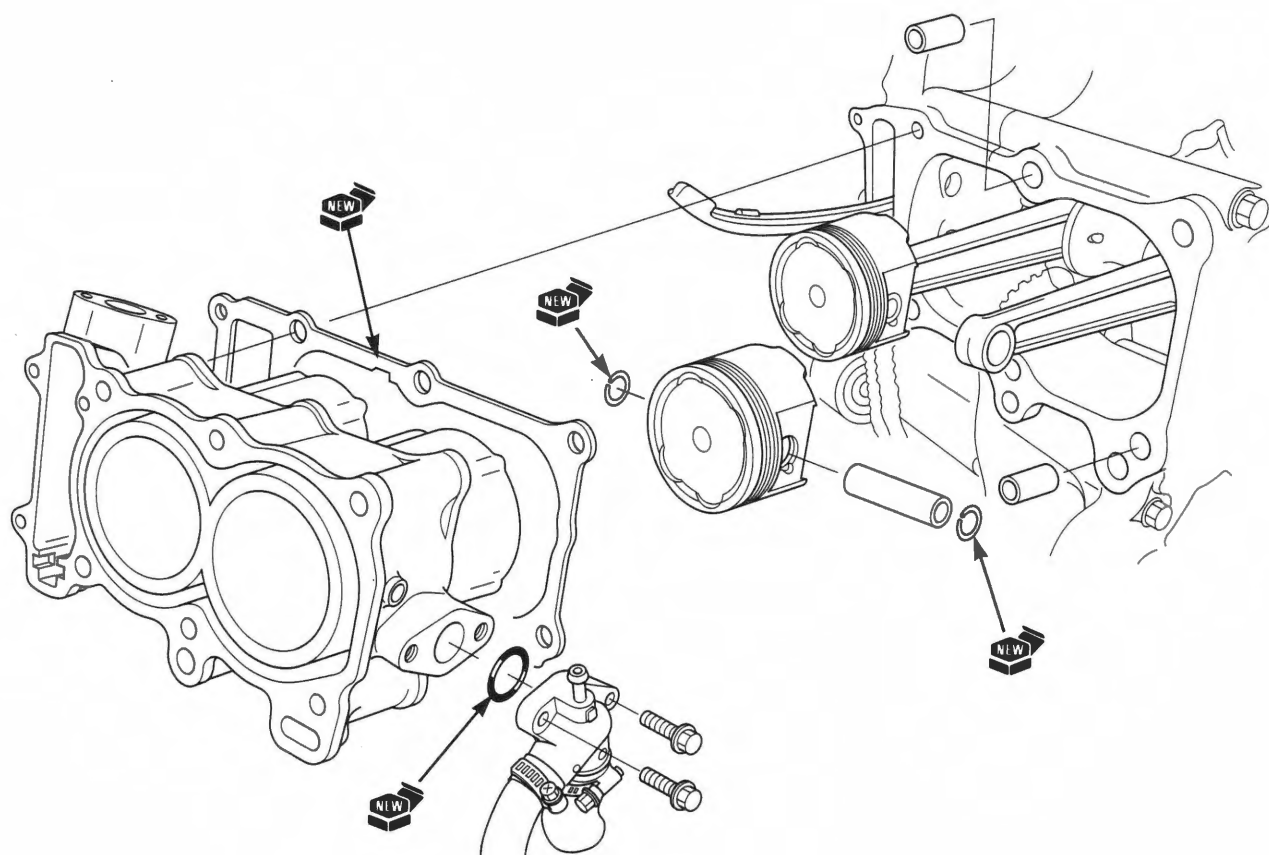
Remove the stopper tool.



Install a new sealing washer and tighten the sealing bolt.



MEMO



9. CYLINDER/PISTON

SERVICE INFORMATION

9-1

CYLINDER/PISTON REMOVAL

9-3

TROUBLESHOOTING

9-2

CYLINDER/PISTON INSTALLATION

9-6

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the cylinder and piston. These services can be done with the engine installed in the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces by using a screwdriver when disassembling the cylinder.
- Clean all disassembled parts with clean solvent and dry them using compressed air before inspection.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Camshaft lubricating oil is fed through the oil passage in the cylinder. Clean the oil passage before installing the cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		72.000 – 72.015 (2.8346 – 2.8352)	72.10 (2.839)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.10 (0.004)
Piston, piston rings	Piston mark direction		“IN” mark facing toward the intake side	—
	Piston O.D.		71.97 – 71.99 (2.833 – 2.834)	71.90 (2.831)
	Piston O.D. measurement point		18 mm (0.7 in) from bottom of skirt	—
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.04 (0.671)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.96 (0.668)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.02 (0.001)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.065 (0.0026)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.50 (0.020)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.00 (0.040)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

TOOLS

Piston ring slider
Piston base

07954-2830000 (two required)
07958-2500001 (two required)

TROUBLESHOOTING

Compression to 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
- Bent connecting rod

Compression to high, overheating or knocking

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

Excessive smoke

- Worn cylinder, piston or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall
- Cylinder head/valve problem (Section 8)

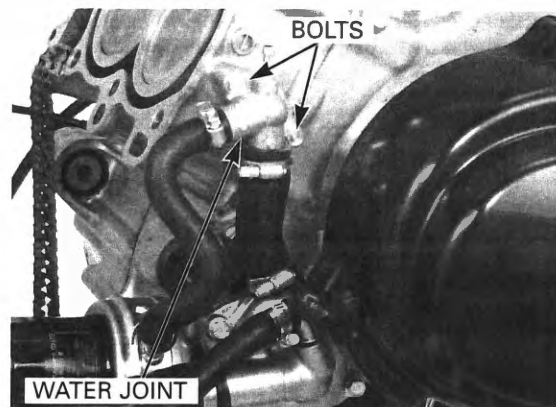
Abnormal noise

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Excessive carbon build-up

CYLINDER/PISTON REMOVAL

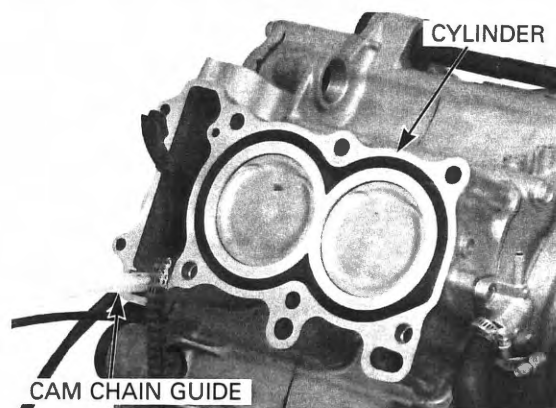
Remove the cylinder head (page 8-11).

Remove the bolts and water joint from the cylinder.

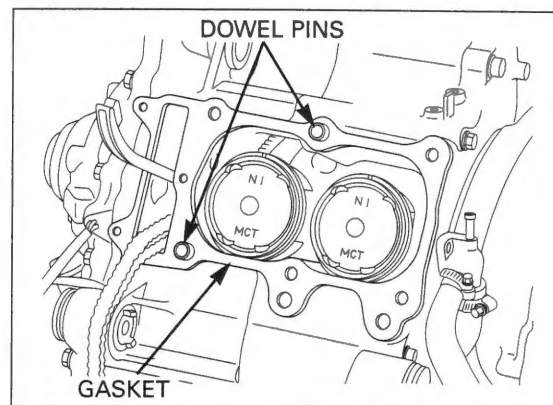


Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.

Remove the cam chain guide and cylinder.

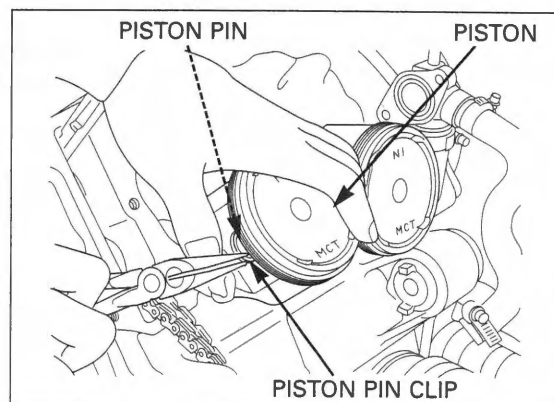


Remove the dowel pins and gasket.



Place clean shop towels in the crankcase to keep the piston pin clips, or other parts, from falling into the crankcase.

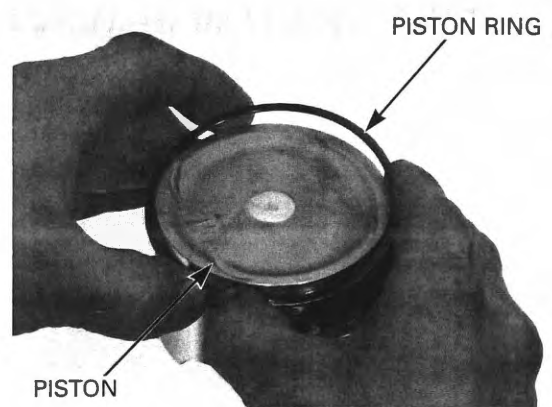
Remove the piston pin clips with pliers.
Remove the piston pin out of the piston.
Remove the piston.



CYLINDER/PISTON

Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up at a point opposite the gap.



Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.



INSPECTION

PISTON RING

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

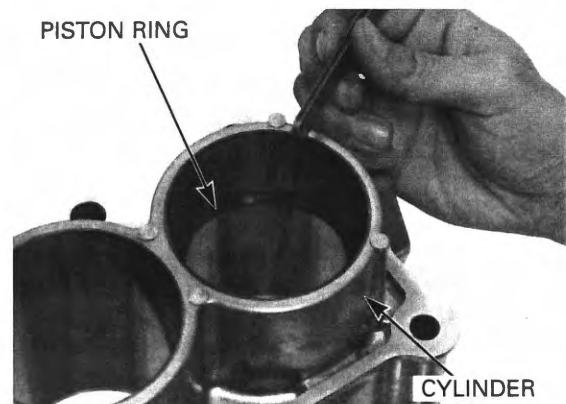
Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-groove clearance.

SERVICE LIMITS: Top: 0.08 mm (0.003 in)
Second: 0.065 mm (0.0026 in)



Insert each piston ring into the bottom of the cylinder squarely using the piston. Measure the ring end gap.

SERVICE LIMITS: Top: 0.50 mm (0.020 in)
Second: 0.65 mm (0.026 in)
Oil (side rail): 1.00 mm (0.040 in)



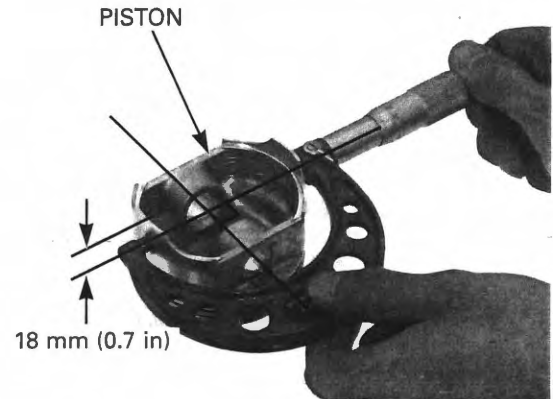
PISTON/PISTON PIN

Measure the piston O.D. at the point 10 mm (0.4 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 71.90 mm (2.831 in)

Calculate the cylinder-to-piston clearance (cylinder I.D.: page 9-6).

SERVICE LIMIT: 0.10 mm (0.004 in)



Measure the piston pin hole. Take the maximum reading to determine the I.D.

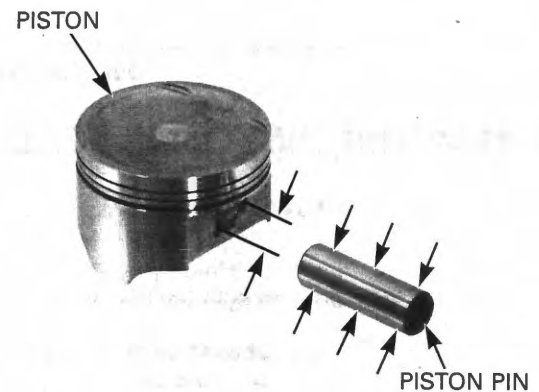
SERVICE LIMIT: 17.04 mm (0.671 in)

Measure the piston pin O.D. at piston and connecting rod sliding areas.

SERVICE LIMIT: 16.96 mm (0.668 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.02 mm (0.001 in)

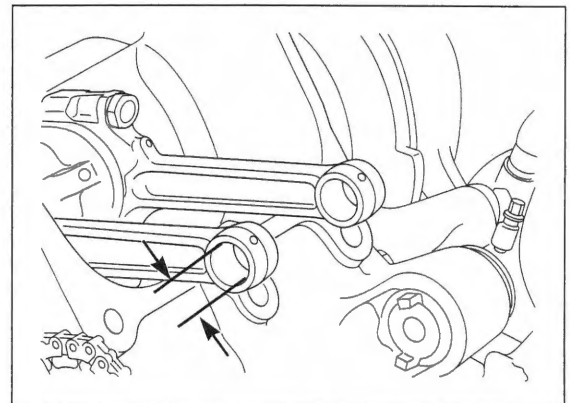


Measure the connecting rod small end I.D..

SERVICE LIMIT: 17.06 mm (0.672 in)

Calculate the connecting rod-to-piston pin clearance.

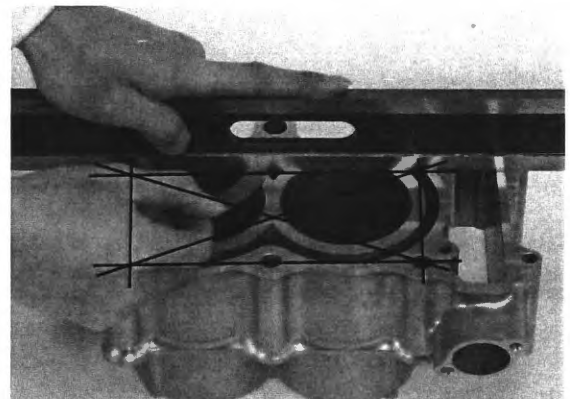
SERVICE LIMIT: 0.06 mm (0.002 in)



CYLINDER

Check the cylinder for warpage with a straight edge and feeler gauge in the directions shown.

SERVICE LIMIT: 0.10 mm (0.004 in)



CYLINDER/PISTON

Check the cylinder wall for wear or damage.
Measure and record the cylinder I.D. at three levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

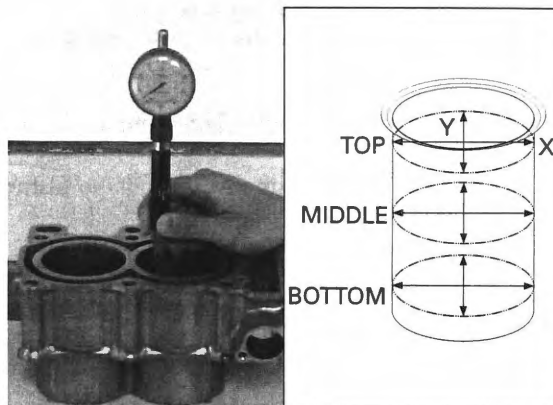
SERVICE LIMIT: 72.10 mm (2.839 in)

Calculate the piston-to cylinder clearance.
Take a maximum reading to determine the clearance.
Refer to page 9-5 for measurement of the piston O.D.

SERVICE LIMIT: 0.10 mm (0.004 in)

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

SERVICE LIMITS: Taper: 0.10 mm (0.004 in)
Out-of-round: 0.10 mm (0.004 in)



CYLINDER/PISTON INSTALLATION

PISTON RING INSTALLATION

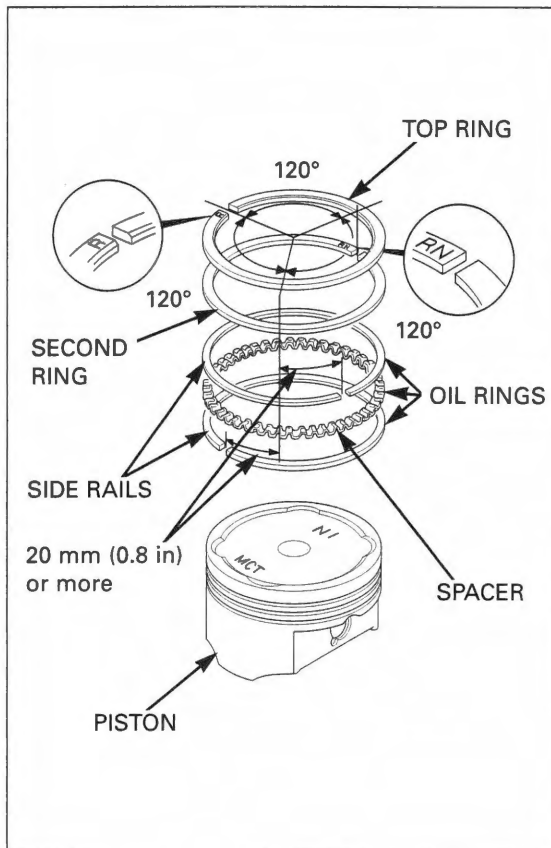
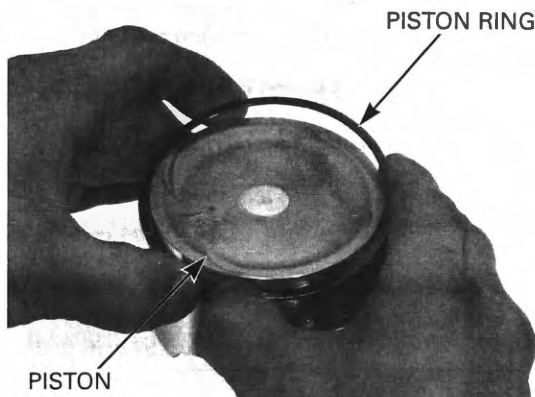
Be careful not to damage the piston and rings

Carefully install the piston rings into the piston ring grooves with the markings facing up.

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.

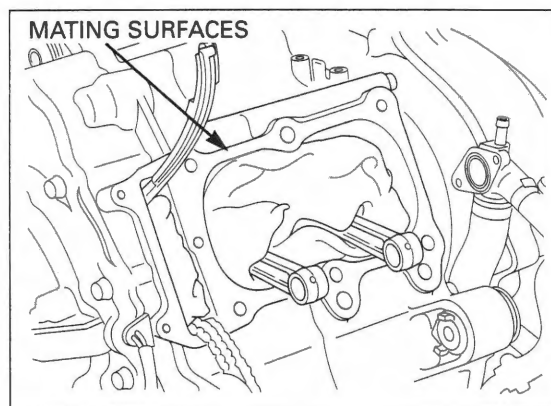
Stagger the piston ring end gaps 120° degrees apart from each other.

Stagger the side rail end gaps as shown.



CYLINDER/PISTON INSTALLATION

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



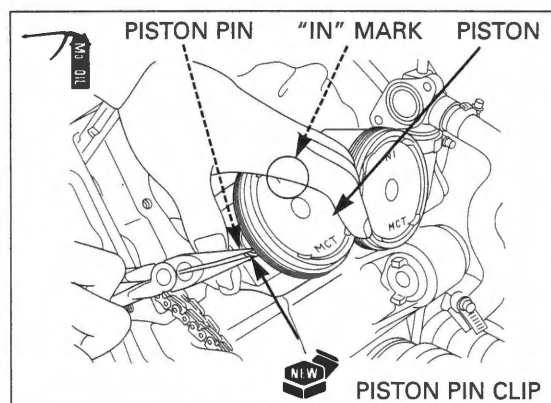
Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Apply molybdenum disulfide oil to the piston pin. Apply engine oil to the connecting rod small end and piston pin hole.

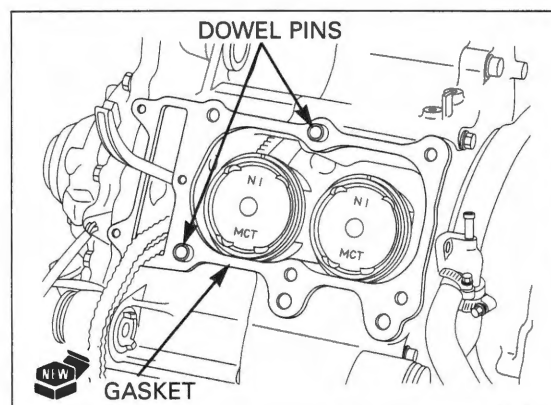
Install the piston with the "IN" mark facing the intake side.

Install the piston pin and new pin clip.

- Make sure that the piston pin clips are seated.
- Do not align the piston pin clip end gap with the piston cut-out.



Install the dowel pins and a new gasket.



Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

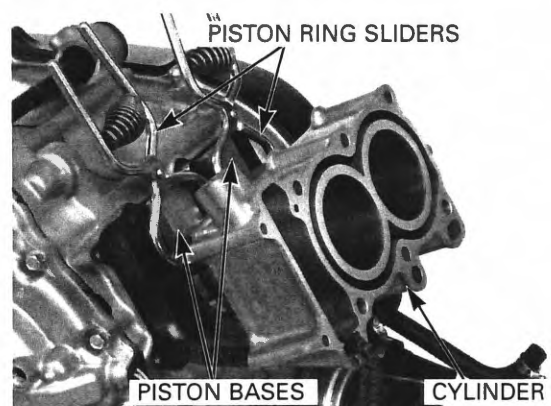
Be careful not to damage the piston rings and cylinder walls.

Pass the cam chain through the cylinder and install the cylinder over the piston using the special tools.

TOOLS:

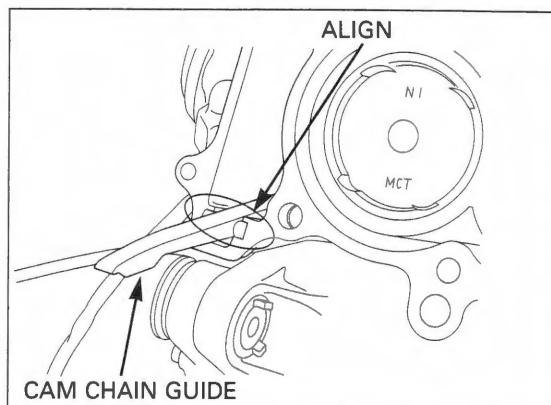
Piston ring slider
Piston base

07954-2830000
07958-2500001

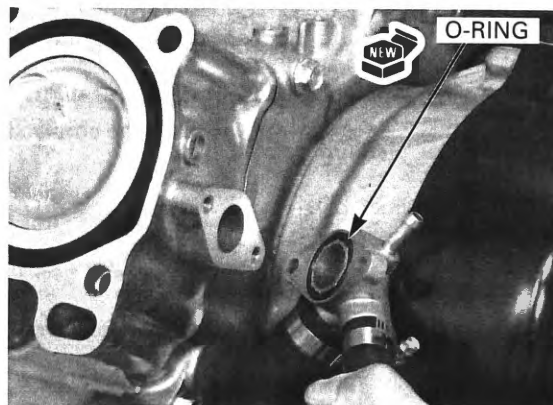


CYLINDER/PISTON

Install the cam chain guide by aligning its tab with the groove on the cylinder.



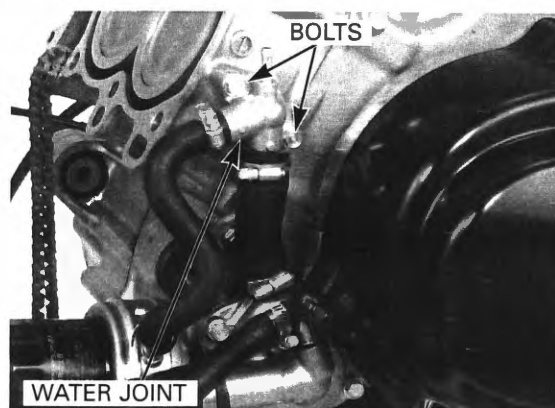
Install a new O-ring into the water joint groove.



Install the water joint to the cylinder.
Tighten the bolts.

Make sure that the cylinder touches the
crankcase evenly.

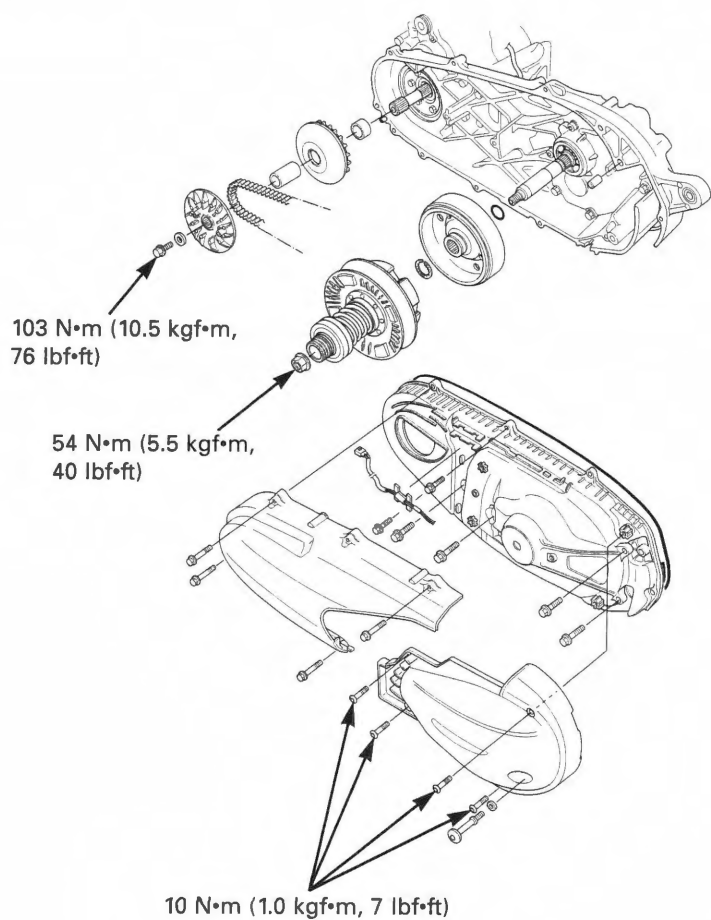
Install the cylinder head (page 8-22).



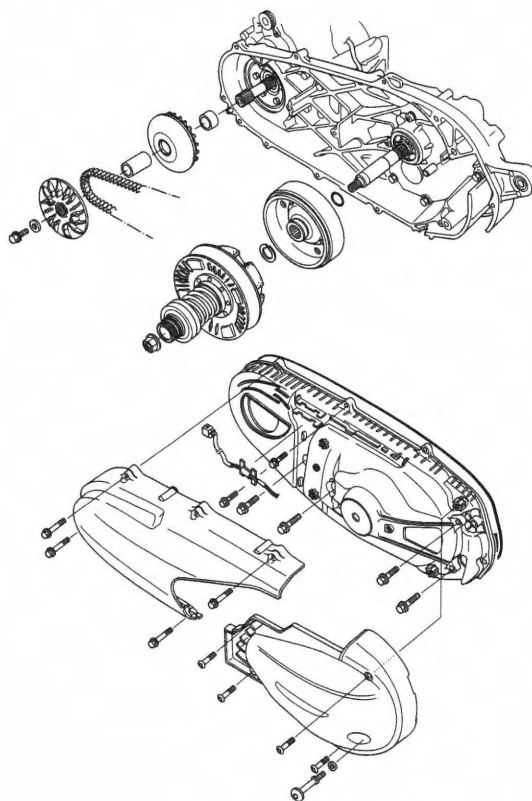
MEMO

DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

STD TYPE:



AFTER '02 (ABS TYPE):



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

SERVICE INFORMATION	10-1	DRIVE PULLEY	10-6
TROUBLESHOOTING	10-2	CLUTCH/DRIVEN PULLEY	10-10
LEFT REAR COVER	10-3		

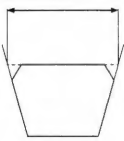
SERVICE INFORMATION

GENERAL

- This section covers maintenance of the drive pulley, driven pulley and clutch.
- These services can be done with the engine installed in the frame.
- To prevent belt slippage, avoid getting grease and oil on the V-belt and pulley drive faces.
- Do not apply grease to the movable drive face and weight rollers.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch	Clutch outer I.D.	160.0 – 160.2 (6.30 – 6.31)	160.5 (6.32)
	Lining thickness	4.0 (0.16)	1.0 (0.04)
Drive belt width		28.0 (1.10)	27.0 (1.06)
Movable drive face	Bushing I.D.	38.024 – 38.057 (1.4970 – 1.4983)	38.10 (1.50)
	Boss O.D.	37.995 – 38.031 (1.4959 – 1.4973)	37.95 (1.494)
	Weight roller O.D.	27.92 – 28.08 (1.099 – 1.106)	27.5 (1.08)
Driven pulley	Face spring free length	107.7 (4.24)	102.7 (4.04)
	Driven face O.D.	47.965 – 47.985 (1.8883 – 1.8892)	47.94 (1.887)
	Movable driven face I.D.	48.000 – 48.025 (1.8898 – 1.8907)	48.06 (1.892)

10

TORQUE VALUES

Drive plate bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)
Element cover screw	1 N•m (0.1 kgf•m, 0.7 lbf•ft)
Left rear cover special bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)
Drive face bolt	103 N•m (10.5 kgf•m, 76 lbf•ft) UBS bolt. Apply oil to the threads and seating surface.
Driven pulley nut	54 N•m (5.5 kgf•m, 40 lbf•ft)

DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

TOOLS

Universal holder	07725-0030000	or 07AMB-MCTA100 (U.S.A. only)
Attachment, 28 x 30 mm	07946-1870100	
Attachment, 32 x 35 mm	07746-0010100	
Pilot, 17 mm	07746-0040400	
Pilot, 25 mm	07746-0040600	
Driver	07749-0010000	
Oil seal driver attachment	07948-SC20200	
Driver handle	07953-MJ10200	
Needle bearing remover	07HMC-MR70100	not available in U.S.A.
Clutch outer puller	07ZMC-MCT0100	or 07ZMC-MCTA100 (U.S.A. only)
Clutch spring compressor	07ZME-MCT0100	or 07ZME-MCTA100 (U.S.A. only)
Clutch outer assembly tool	07ZMF-MCT0100	
Assembly collar	07ZMF-MCTA100	(U.S.A. only)
Threaded shaft 22 x 1.5 x 240 mm	07931-ME4010B	(U.S.A. only)
Special nut	07931-HB3020A	(U.S.A. only)
Adjustable bearing puller 25 – 40 mm	07736-A01000B	or 07736-A01000A and commercially available slide hammer

TROUBLESHOOTING

Engine starts but scooter won't move

- Worn drive belt
- Damaged ramp plate
- Worn or damaged clutch shoe
- Broken driven face spring

Engine stalls or scooter creeps

- Broken clutch shoe spring

Poor performance at high speed or lack of power

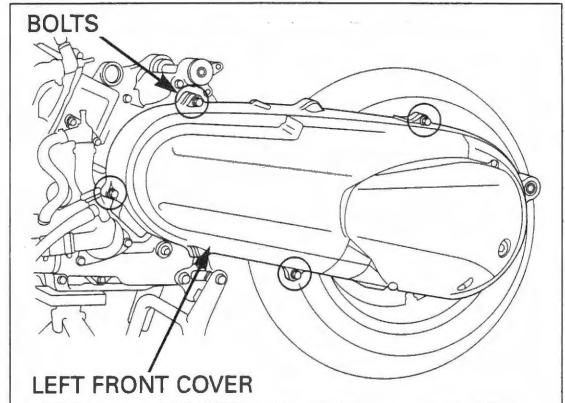
- Worn drive belt
- Weak driven face spring
- Worn weight rollers
- Contaminated pulley faces

LEFT REAR COVER

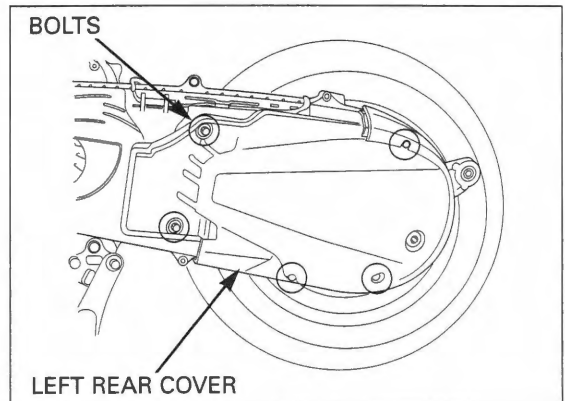
REMOVAL

Remove the left passenger footpeg (page 2-12).

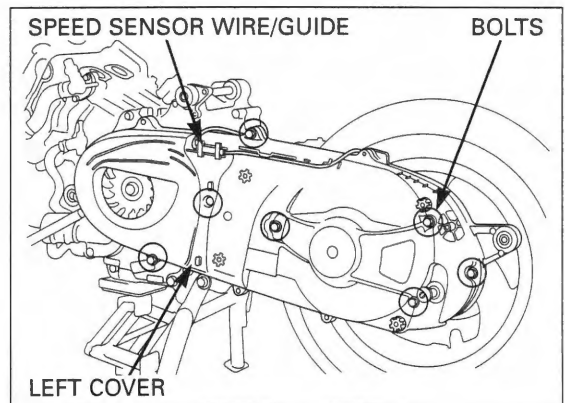
Remove the bolts and the left front cover.



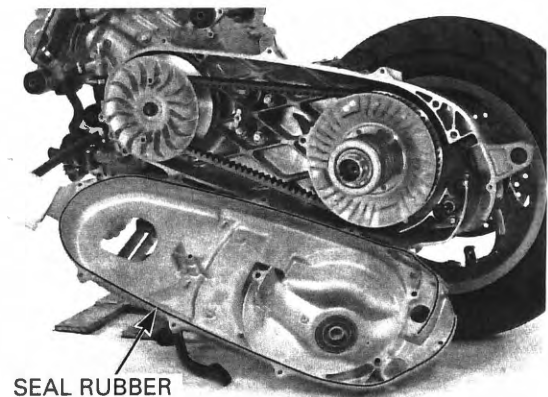
Remove the special bolts and the left rear cover.



Remove the speed sensor wire and guide from the left cover.
Remove the bolts and left cover.

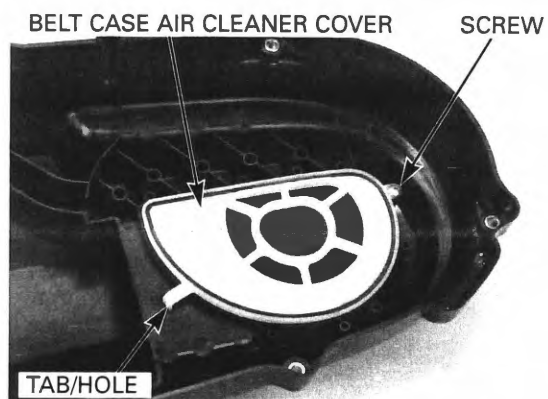


Remove the seal rubber from the left cover.



BELT CASE AIR CLEANER

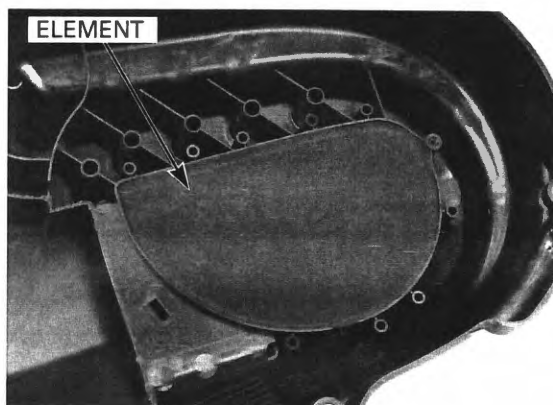
Remove the screw.
Remove the belt case air cleaner cover with its tab located in the hole on the left front cover.



Check the air cleaner element.
Remove the element from the base and wash it in cleaning solvent if necessary.
Dry the element thoroughly, then install it on the base.

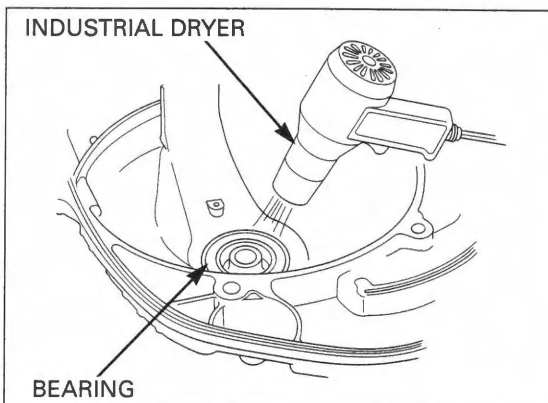
Install the air cleaner cover with its tab in the hole on the left front cover.
Tighten the screw to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



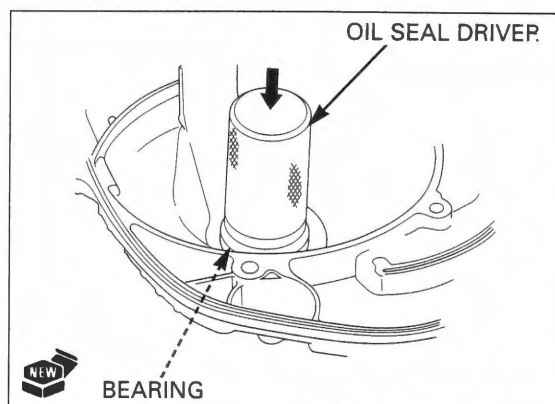
DRIVESHAFT BEARING REPLACEMENT

Heat the left cover around the driveshaft bearing with industrial dryer.
Remove the driveshaft bearing from the left cover.



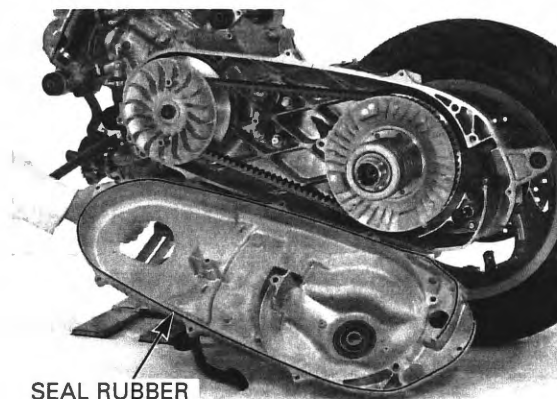
Install the new driveshaft bearing into the left cover using a special tool.

TOOL:
Oil seal driver attachment 07948-SC20200

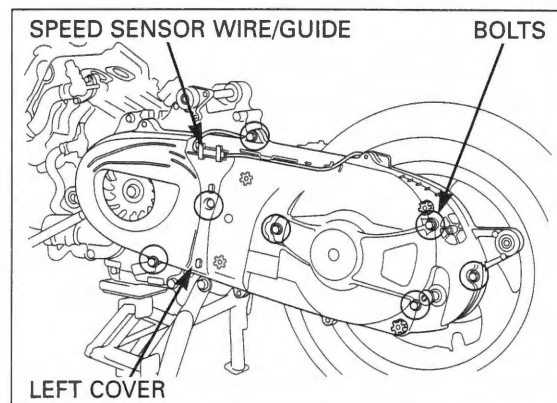


INSTALLATION

Check the seal rubber and replace it if it is deteriorated or damaged.
Clean the gasket groove in the left cover.

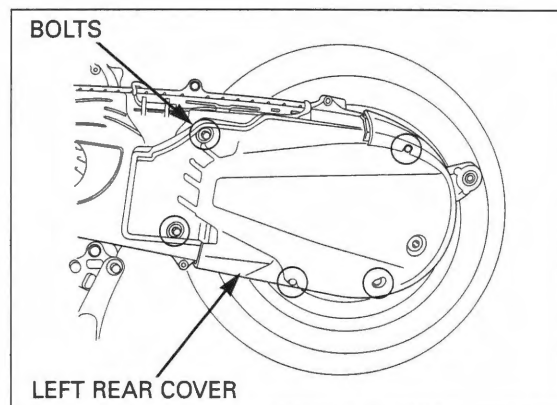


Install the left cover onto the crankcase by aligning the dowel pins with the holes.
Tighten the left cover bolts.
Route the speed sensor wire and install the wire guide on the left cover as shown.



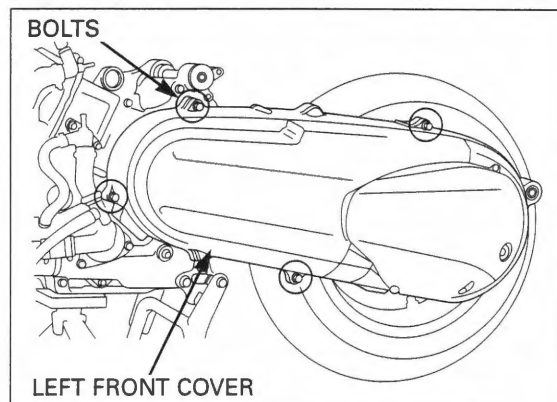
Install the left rear cover to the left cover.
Tighten the special bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Install the left front cover and tighten the bolts.

Install the left passenger footpeg (page 2-12).



DRIVE PULLEY

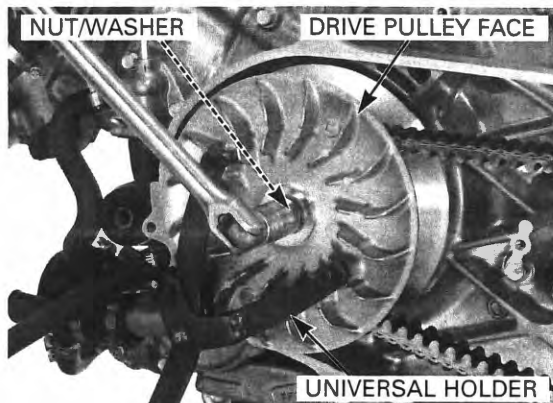
REMOVAL

Remove the left rear cover (page 10-3).

Hold the drive pulley face with the special tool and loosen the drive pulley face bolt.

TOOL:

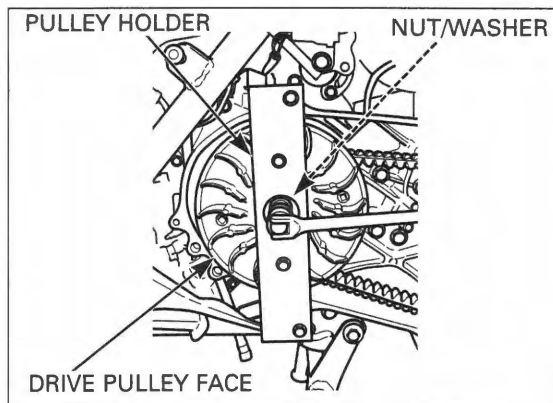
Universal holder 07725-0030000



U.S.A. only

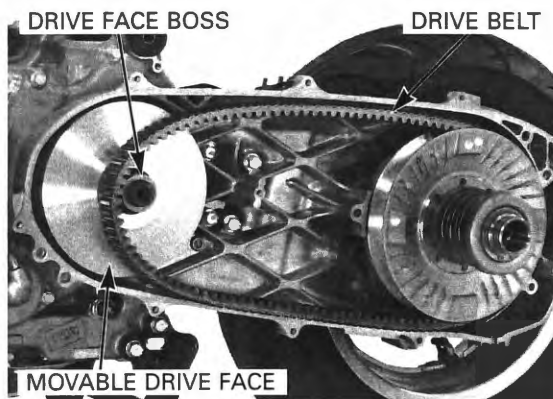
Pulley holder 07AMB-MCTA100

Remove the nut, washer and drive pulley face.



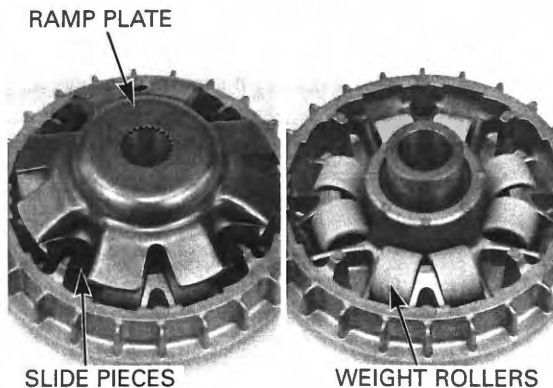
Remove the drive belt from the crankshaft.

Remove the movable drive face assembly while holding the back of the face (ramp plate).



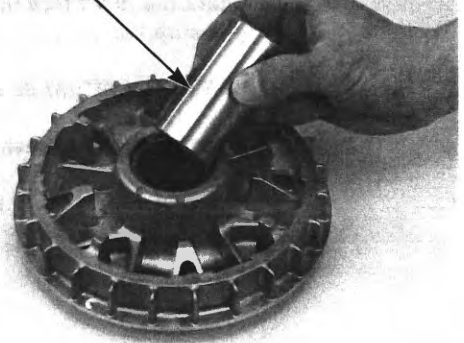
DISASSEMBLY

Remove the ramp plate, slide pieces and weight rollers.



Remove the drive face boss from the movable drive face.

DRIVE FACE BOSS

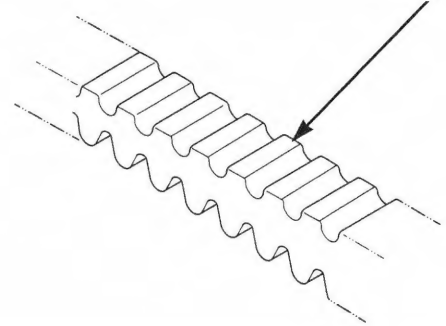


INSPECTION

DRIVE BELT

Check the drive belt for cracks, separation or abnormal or excessive wear.

COG



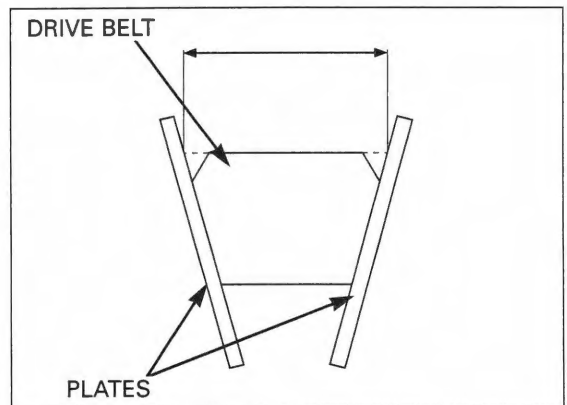
Attach the suitable plates as shown.
Measure the drive belt width.

SERVICE LIMIT: 27.0 mm (1.06 in)

Remove the clutch/driven pulley, then replace the drive belt if necessary.

DRIVE BELT

PLATES

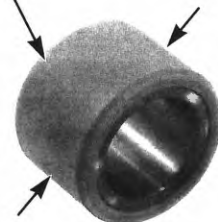


WEIGHT ROLLER

Check each roller for wear or damage.
Measure the weight roller O.D.

SERVICE LIMIT: 27.5 mm (1.08 in)

WEIGHT ROLLER



DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

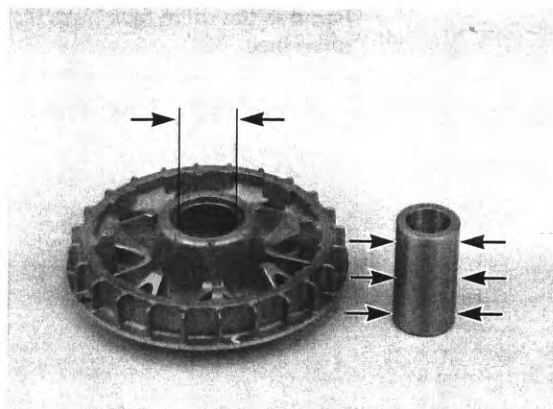
MOVABLE DRIVE FACE

Check the drive face boss for wear or damage.
Measure the boss O.D..

SERVICE LIMIT: 37.95 mm (1.494 in)

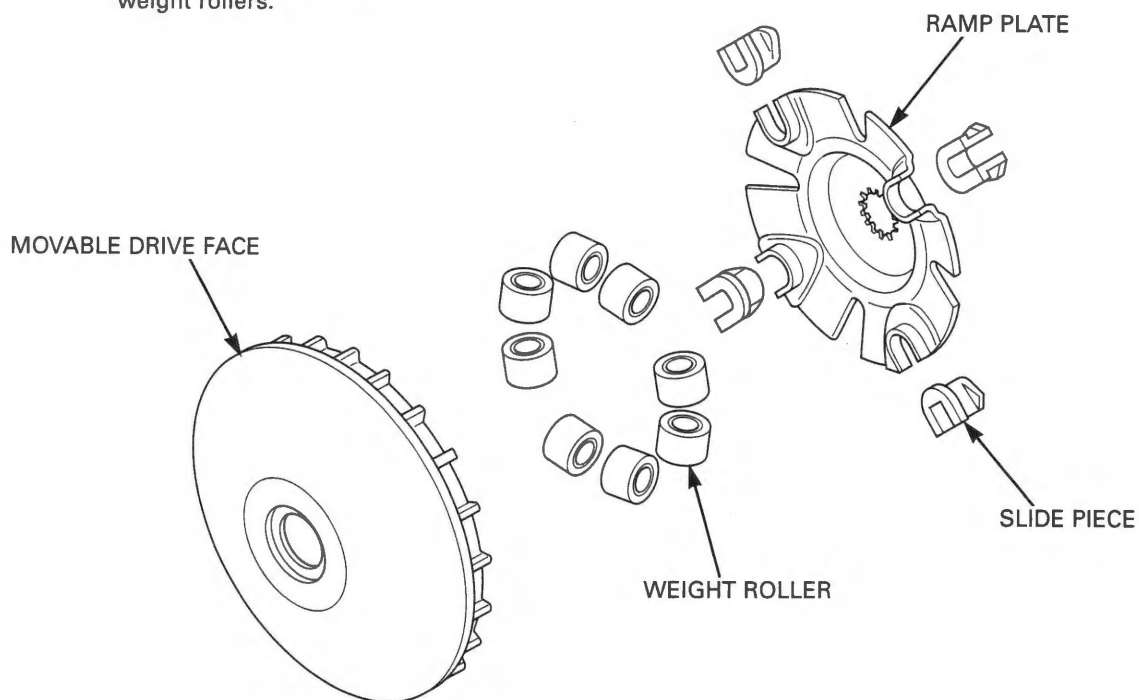
Measure the face bushing I.D..

SERVICE LIMIT: 38.10 mm (1.50 in)



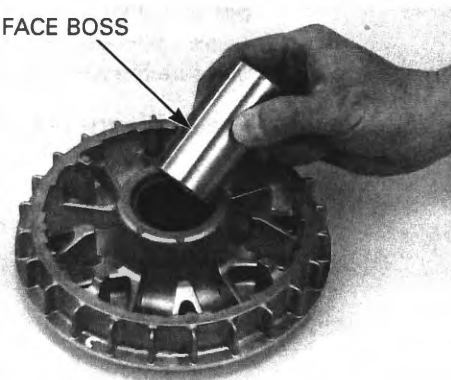
ASSEMBLY

Clean any oil or grease from the pulley faces and weight rollers.



Install the drive face boss into the movable drive face.

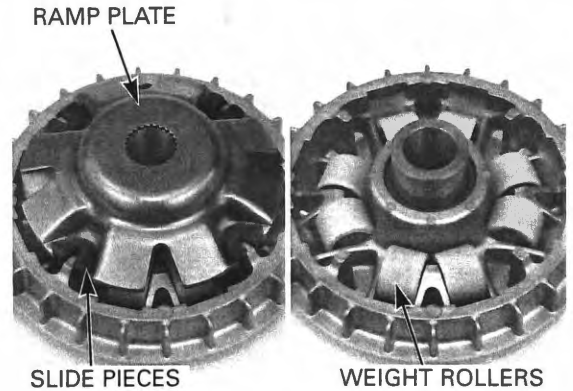
DRIVE FACE BOSS



Install the weight rollers in the movable drive face.

Install the slide pieces in the ramp plate.

Install the ramp plate in the movable drive face.

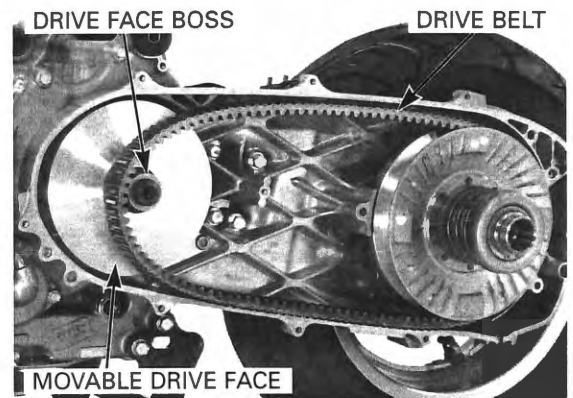


INSTALLATION

Clean any oil or grease from the pulley faces and the drive belt.

Install the movable drive face assembly on the crankshaft while holding the ramp plate.

Install the drive belt onto the drive face boss.



Install the drive pulley face and washer.

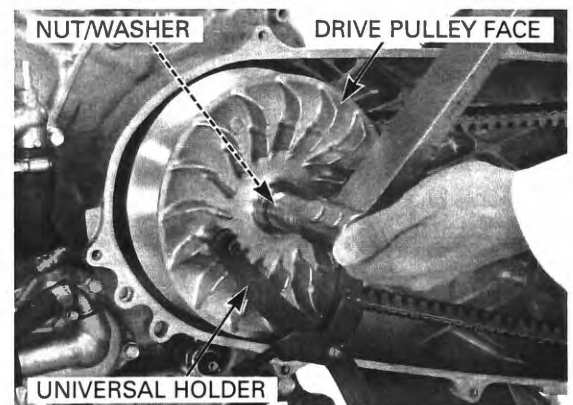
Apply oil to the drive pulley face nut threads and seating surface and install the nut.

Hold the drive face with the special tool and tighten the bolt to the specified torque.

TOOL:

Universal holder

07725-0030000



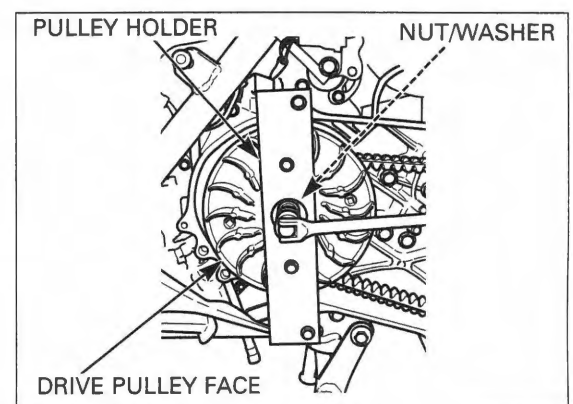
U.S.A. only

Pulley holder

07AMB-MCTA100

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Install the left cover (page 10-5).



CLUTCH/DRIVEN PULLEY

REMOVAL

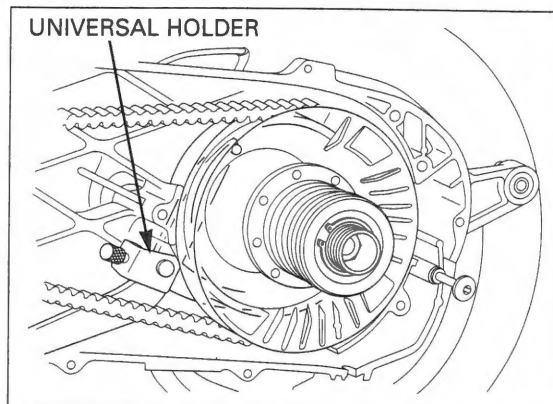
Remove the left cover (page 10-3).

Place the universal holder in the holes on the back (Inside) of the clutch outer.

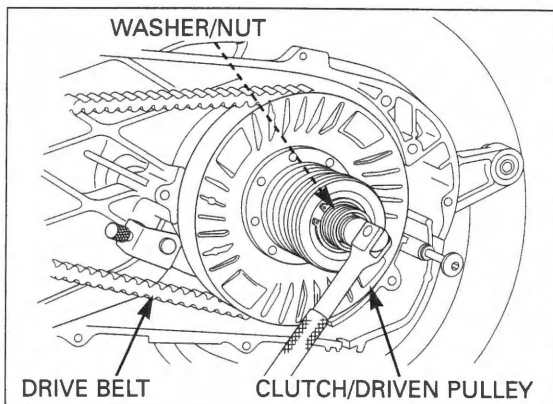
Hold the clutch outer with the special tool as shown.

TOOL:
Universal holder

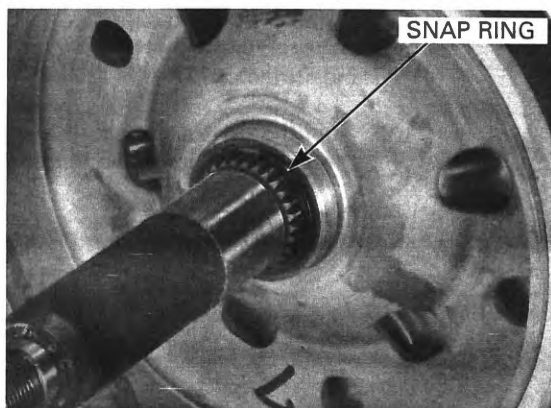
**07725-0030000 or
07AMB-MCTA100
(U.S.A. only)**



Remove the nut, washer and clutch/driven pulley assembly.
Remove the drive belt from the driven pulley.

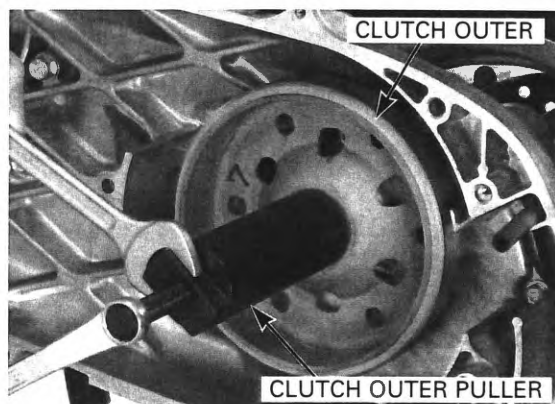


Remove the snap ring from the driveshaft.



Remove the clutch outer from the driveshaft using a special tool.

TOOL:
Clutch outer puller **07ZMC-MCT0100 or
07ZMC-MCTA100 (U.S.A. only)**

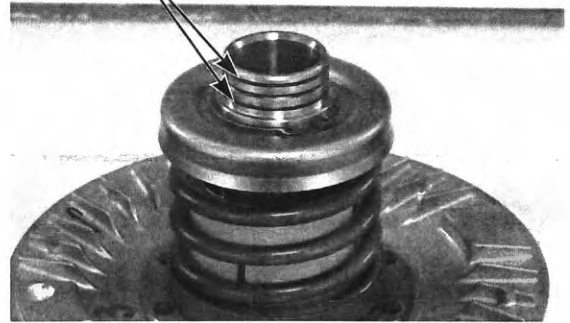


DISASSEMBLY

CLUTCH/DRIVEN PULLEY DISASSEMBLY

Remove the O-rings from the driven face grooves.

O-RINGS

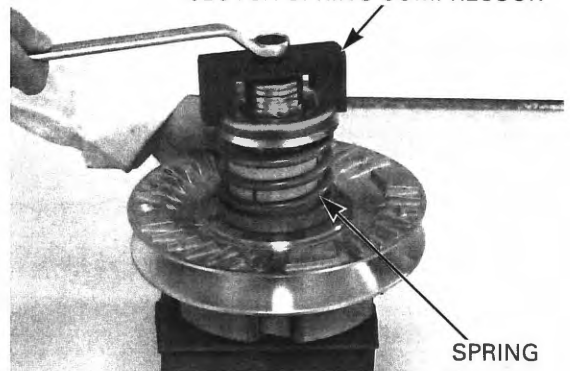


Set the clutch spring compressor onto the driven pulley/clutch assembly.

TOOL:

Clutch spring compressor 07ZME-MCT0100 or
07ZME-MCTA100
(U.S.A. only)

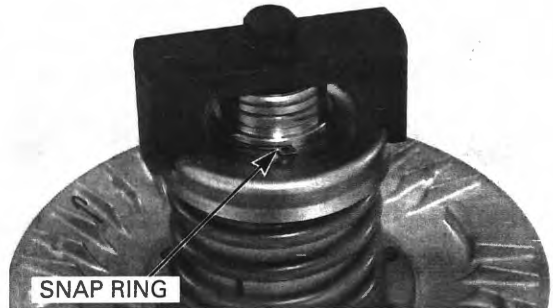
CLUTCH SPRING COMPRESSOR



SPRING

Hold the clutch spring compressor in a vise.
Compress the driven face spring.

Remove the snap ring from the driven face groove.

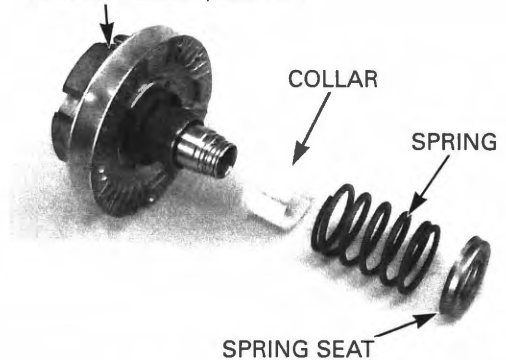


SNAP RING

Remove the spring compressor and disassemble the following:

- Spring seat
- Driven face spring
- Spring collar
- Driven pulley/clutch assembly

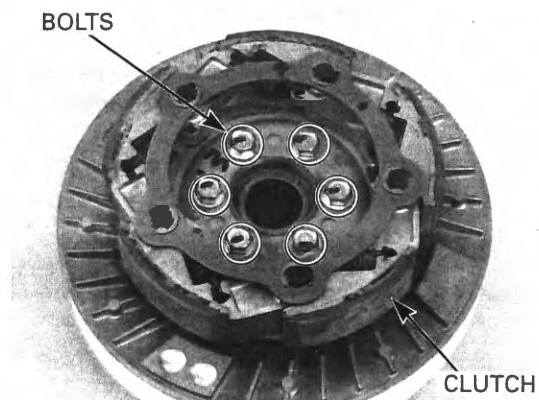
DRIVEN PULLEY/CLUTCH



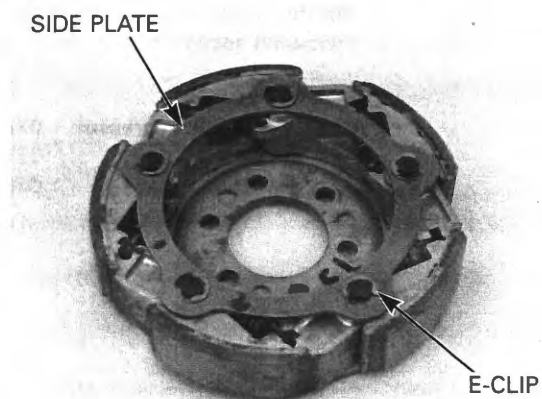
DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

CLUTCH DISASSEMBLY

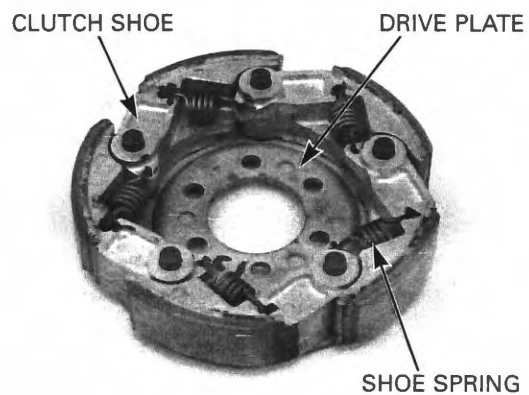
Remove the bolts and clutch from the drive pulley.



Remove the E-clips and clutch side plate.



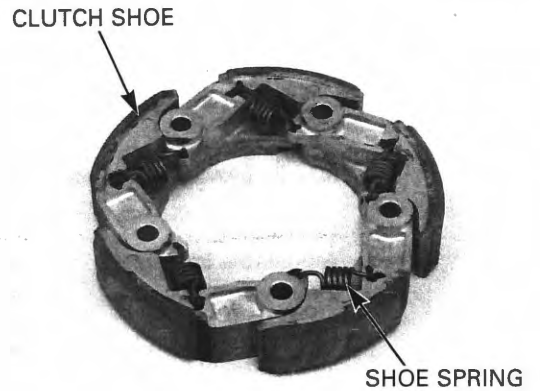
Remove the clutch shoes and shoe springs from the drive plate.



Remove the damper rubbers from the clutch shoes.



Remove the clutch shoes and shoe springs.

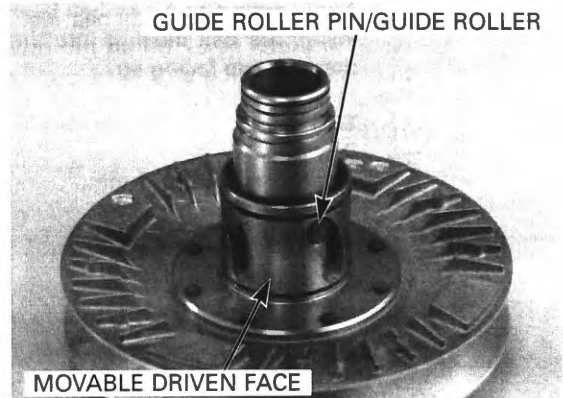


DRIVEN PULLEY DISASSEMBLY

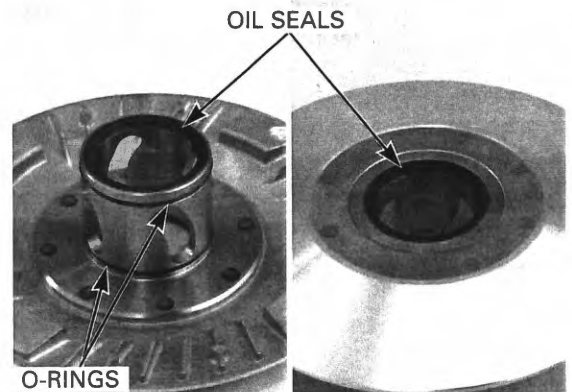
Remove the seal collar.



Remove the guide roller pins, guide rollers and the movable driven face.



Remove the O-rings and oil seals from the movable driven face.



DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

DRIVEN FACE BEARING REPLACEMENT

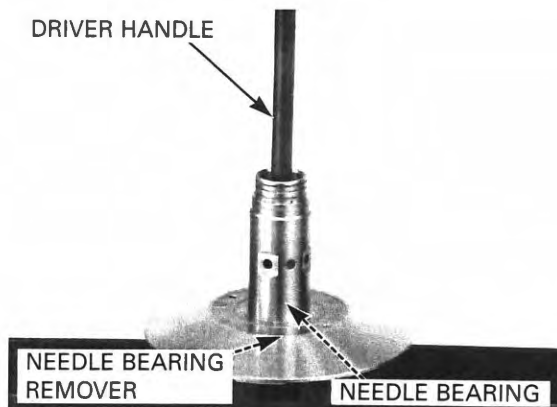
Remove the driven face needle bearing using the special tools.

TOOLS:

Driver handle	07953-MJ10200
Needle bearing remover	07HMC-MR70100 (Not available in U.S.A.)

U.S.A. only

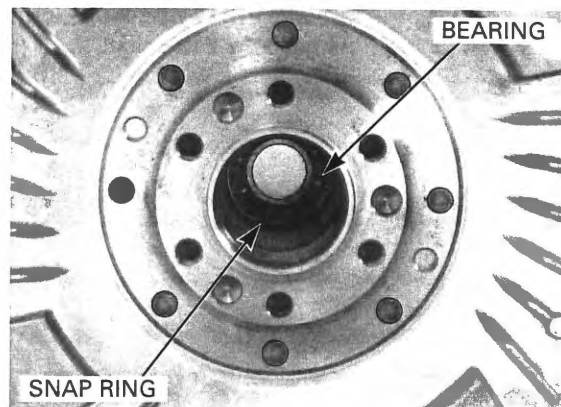
Adjustable bearing puller 25 – 40 mm	07736-A01000B or 07736-A01000A and commercially available slide hammer
--------------------------------------	---



Remove the snap ring, then remove the ball bearing.

TOOLS:

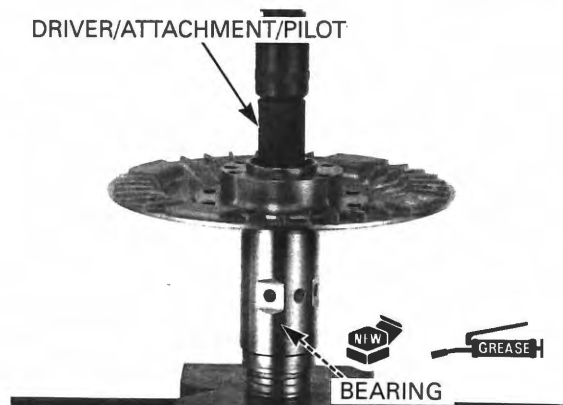
Driver	07749-0010000
Attachment, 28 x 30 mm	07946-1870100
Pilot, 17 mm	07746-0040400



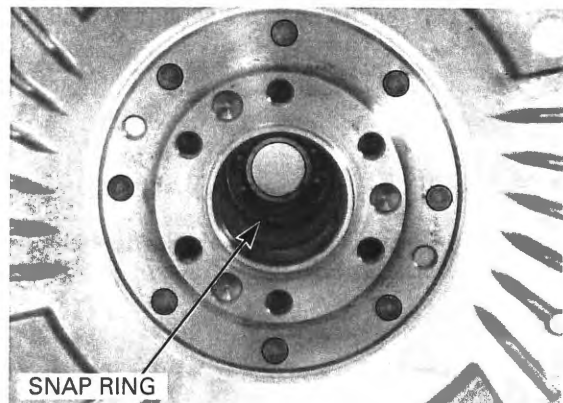
Apply grease to a new ball bearing.
Install the ball bearing into the driven face with the marked side facing up.

TOOL:

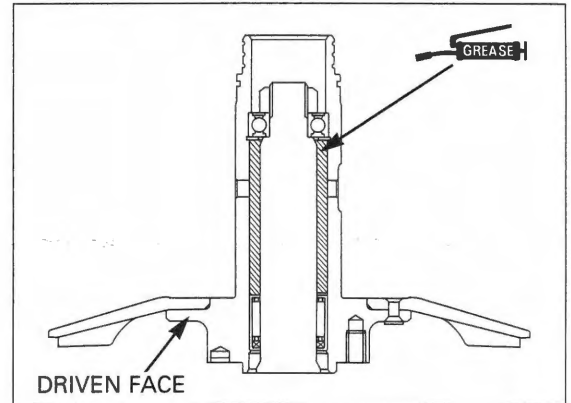
Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400



Install the snap ring to the groove in the driven face.



Fill 23 – 28 g of grease to the driven face inner surface.



Apply grease to a new needle bearing.
Press the needle bearing into the driven face with the marked side facing up.

TOOL:

Driver

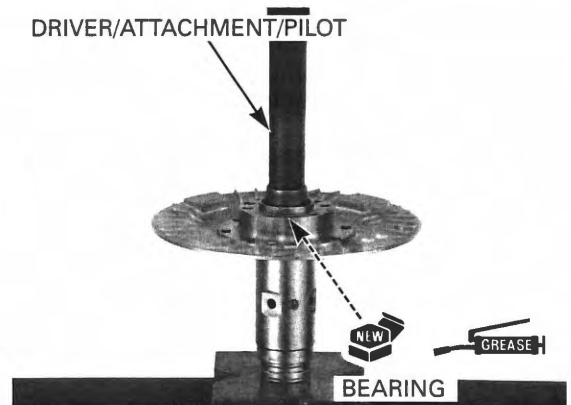
07749-0010000

Attachment, 32 x 35 mm

07746-0010100

Pilot, 25 mm

07746-0040600

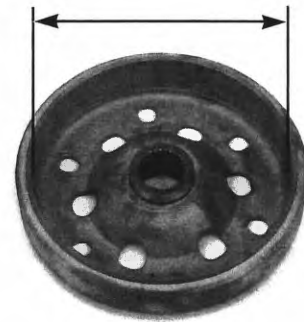


INSPECTION

CLUTCH OUTER

Check the clutch outer for wear or damage.
Measure the clutch outer I.D.

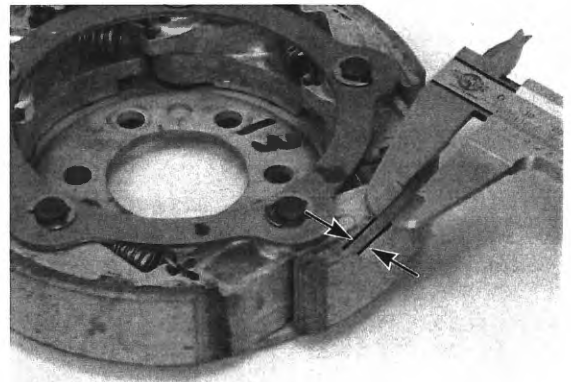
SERVICE LIMIT: 160.5 mm (6.32 in)



CLUTCH SHOE LINING

Check the clutch shoe for wear or damage.
Measure the thickness of each shoe.

SERVICE LIMIT: 1.0 mm (0.04 in)

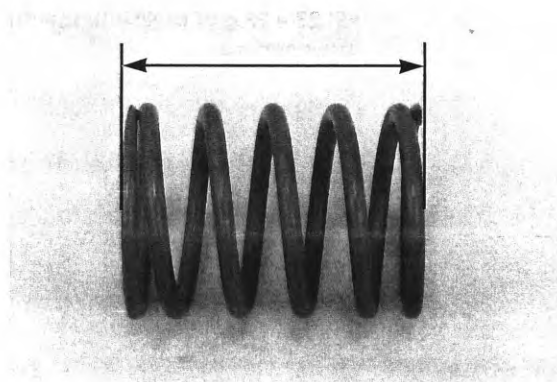


DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

DRIVEN FACE SPRING

Measure the driven face spring free length.

SERVICE LIMIT: 102.7 mm (4.04 in)

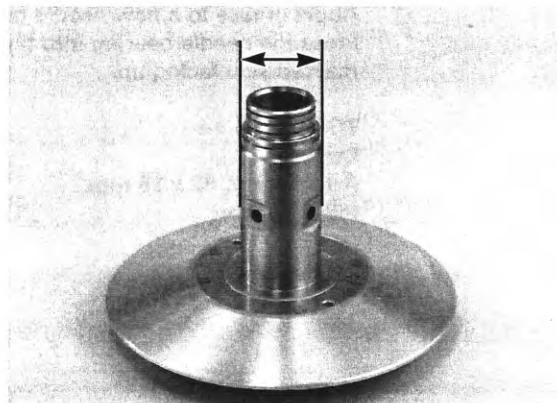


DRIVEN FACE

Check the driven face for scratches, scoring or damage.

Measure the driven face boss O.D.

SERVICE LIMIT: 47.94 mm (1.887 in)



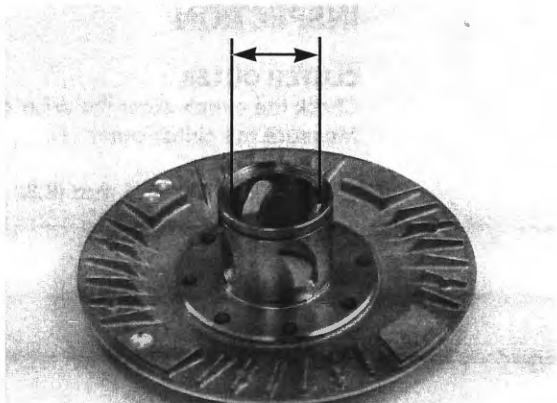
MOVABLE DRIVEN FACE

Check the movable driven face for scratches, scoring or damage.

Check the guide grooves for stepped wear or damage.

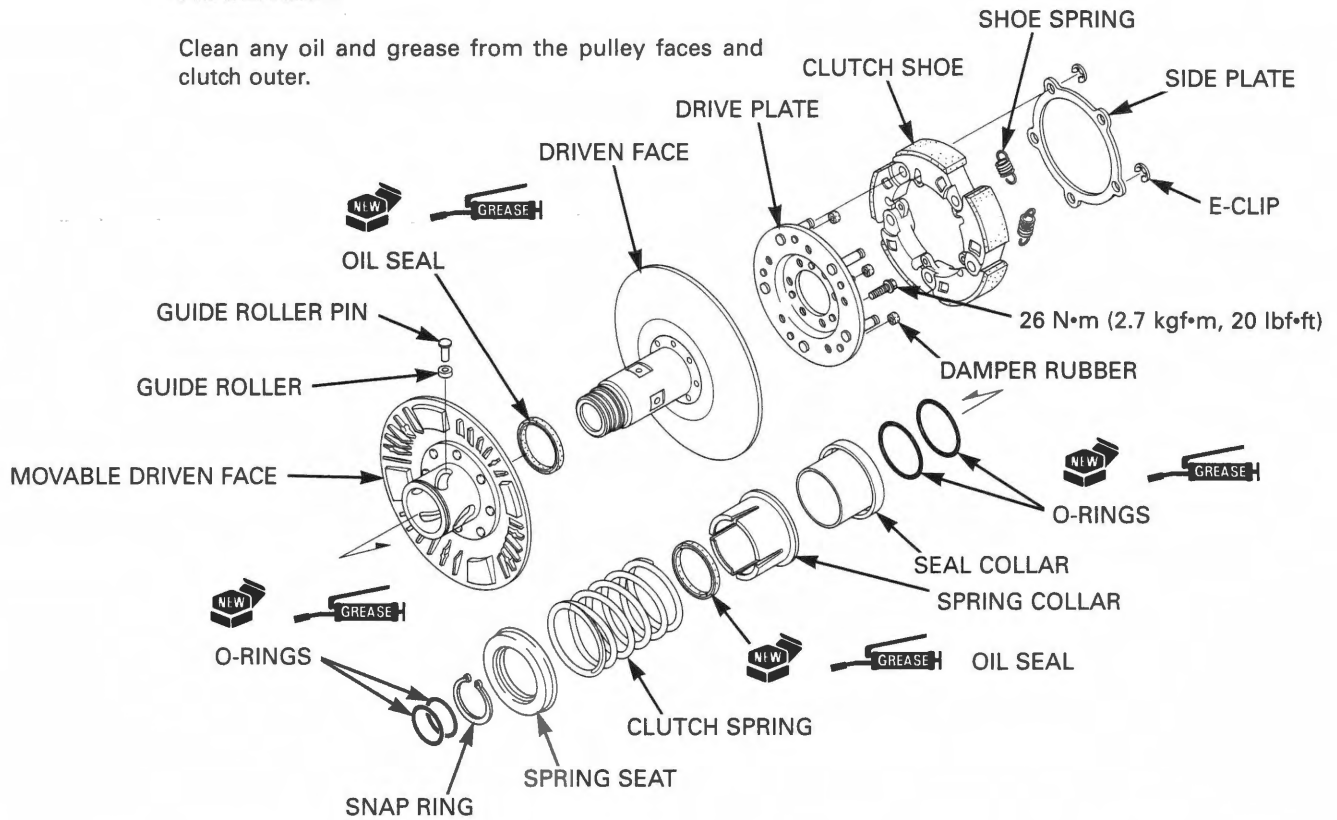
Measure the movable driven face I.D.

SERVICE LIMIT: 48.06 mm (1.892 in)



ASSEMBLY

Clean any oil and grease from the pulley faces and clutch outer.

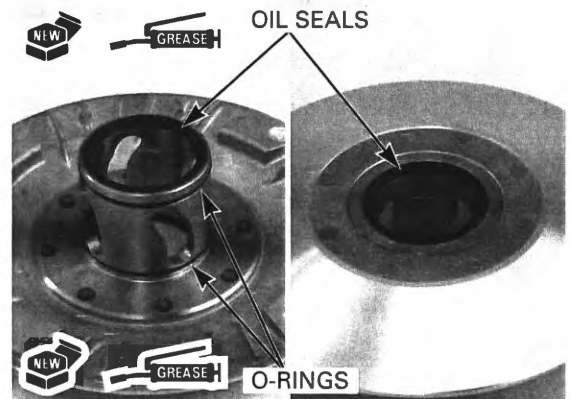


DRIVEN PULLEY ASSEMBLY

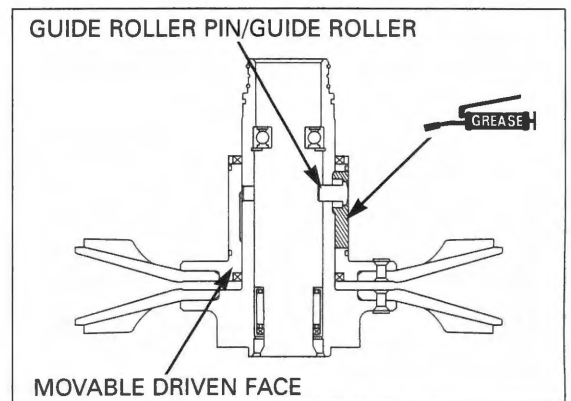
Clean any oil from the drive belt sliding surfaces on the driven face.

Apply grease to new oil seal lips and install them into the movable driven face.

Coat new O-rings with grease and install them into the movable driven face grooves.



Install the movable driven face onto the driven face.
Install the guide rollers and guide roller pins.
Fill 7 – 9 g of grease in each guide groove.



DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

Install the seal collar.



CLUTCH ASSEMBLY

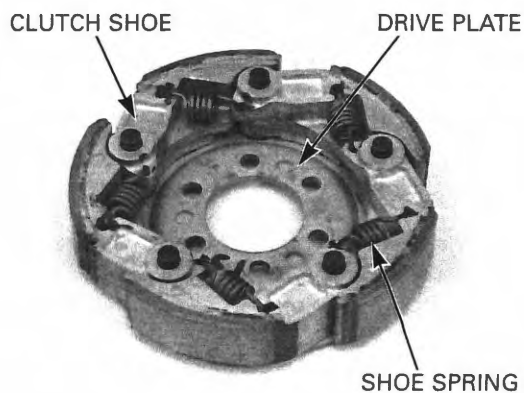
Assemble the clutch shoes and shoe springs.



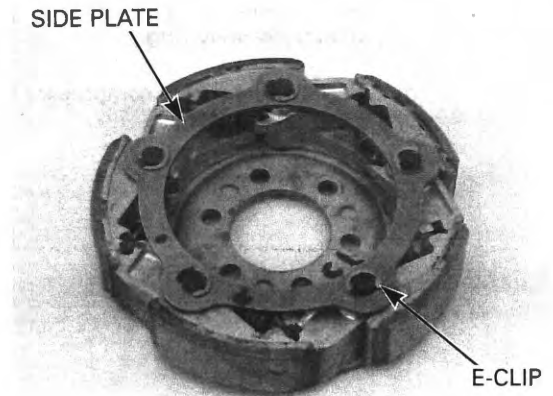
Install the damper rubbers into the clutch shoes.



Install the clutch shoes and shoe springs onto the drive plate.

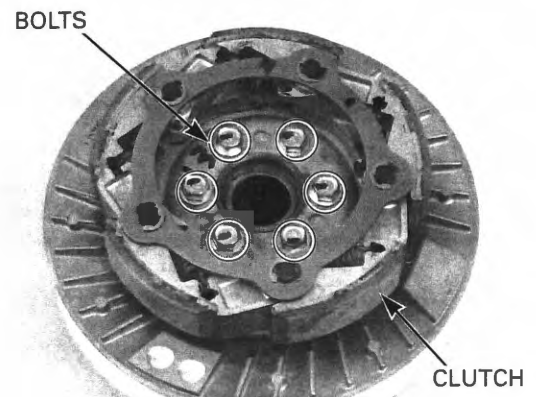


Install the clutch side plate and secure it with the E-clips.



Install the clutch to the driven pulley and tighten the bolts to the specified torque.

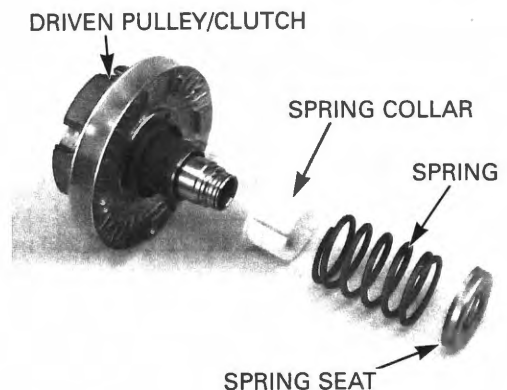
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



CLUTCH/DRIVEN PULLEY ASSEMBLY

Assemble the following:

- Driven pulley/clutch assembly
- Spring collar
- Driven face spring
- Spring seat



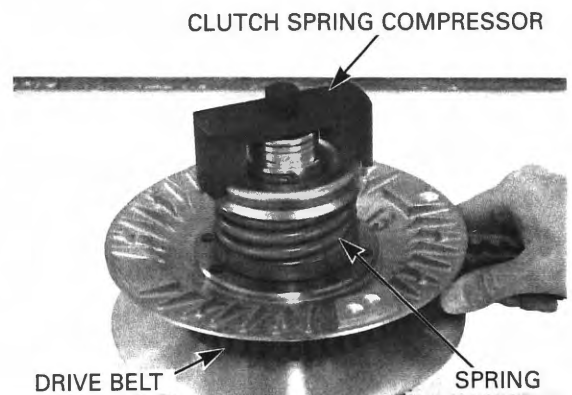
Set the clutch spring compressor over the clutch/driven pulley assembly and hold the spring compressor in a vice.

TOOL:

Clutch spring compressor

07ZME-MCT0100 or
07ZME-MCTA100
(U.S.A. only)

Install the drive belt into the driven pulley. Squeeze and hold the drive belt in your hand as shown.



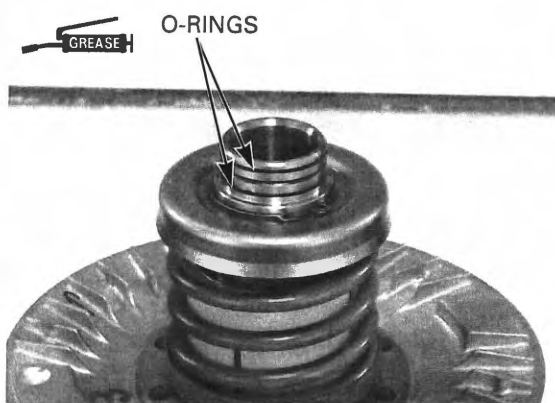
DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

Compress the driven face spring.
Install the snap ring.

Remove the spring compressor from the clutch/driven pulley assembly.



Apply grease to the O-rings and install them on the driven face grooves.

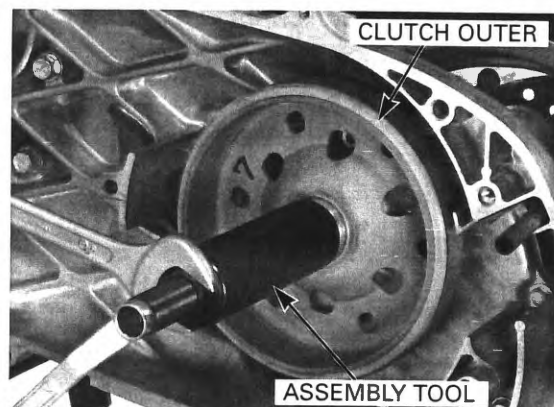


INSTALLATION

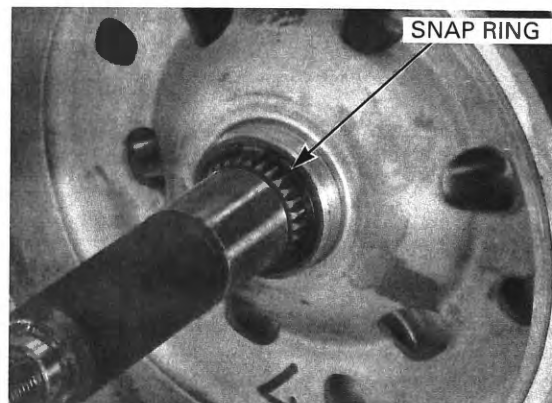
Install the clutch outer using a special tool.

TOOL:

Clutch outer assembly tool	07ZMF-MCT0100
U.S.A. only	
Assembly collar	07ZMF-MCTA100
Threaded shaft 22 x 1.5 x 240 mm	07931-ME4010B
Special nut	07931-HB3020A



Install the snap ring to the drive shaft.



DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

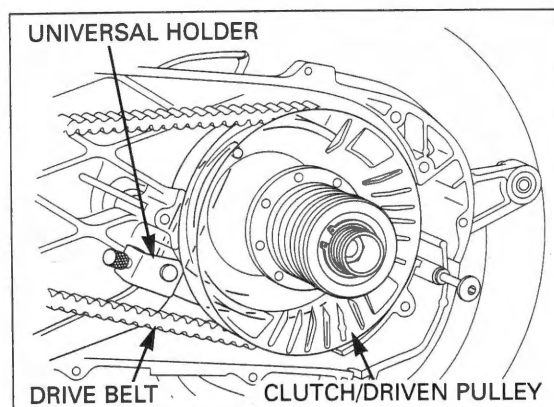
Hold the clutch outer with the special tool as shown.

TOOL:

Universal holder

**07725-0030000 or
07AMB-MCTA100
(U.S.A. only)**

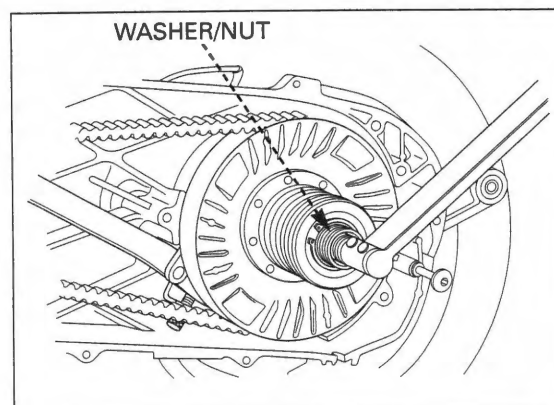
Install the clutch/driven pulley assembly and drive belt to the drive shaft.

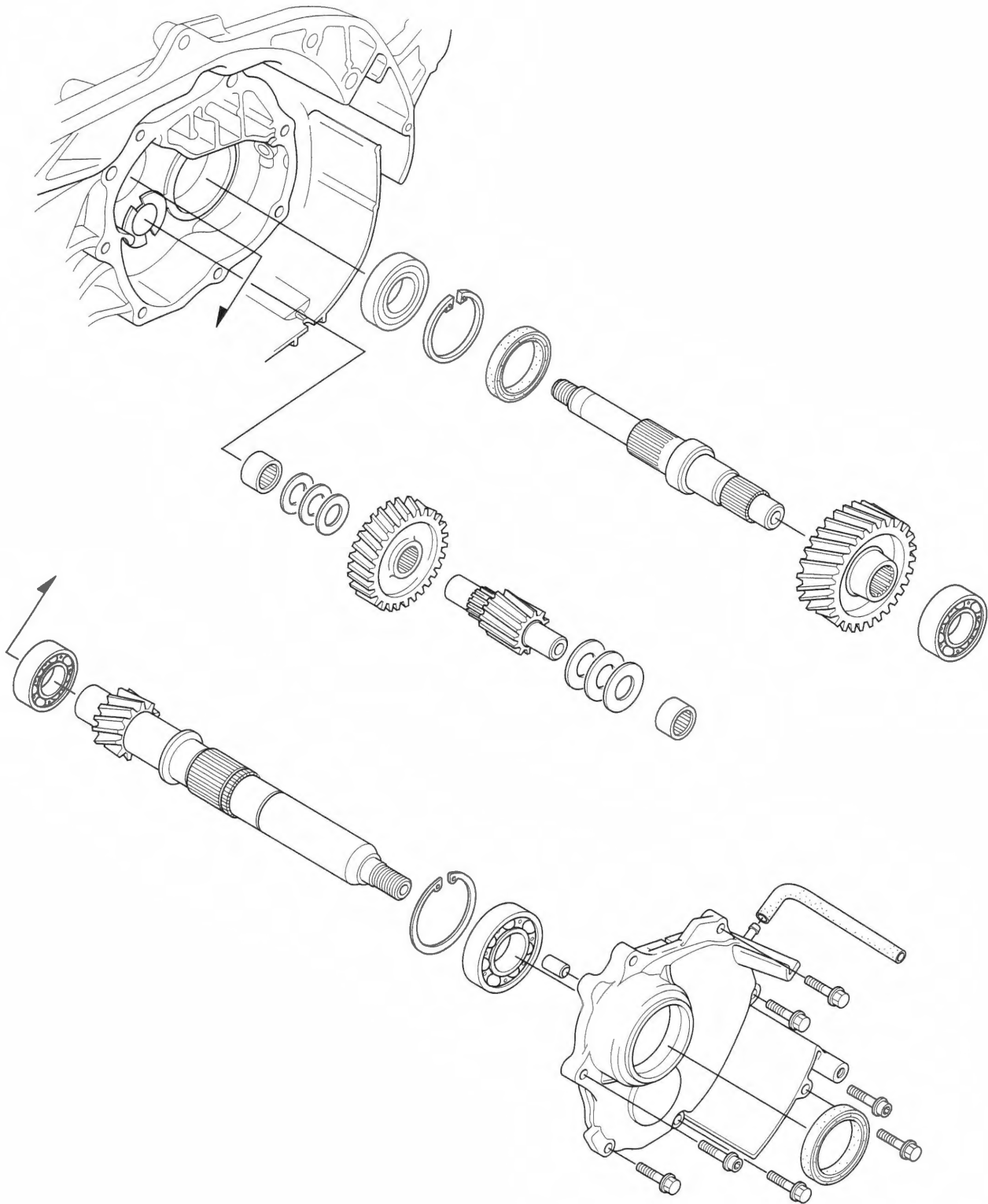


Install the washer and nut.
Tighten the nut to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Install the drive pulley (page 10-9).
Install the rear wheel (page 15-12).





11. FINAL REDUCTION

SERVICE INFORMATION	11-1	FINAL REDUCTION INSPECTION	11-4
TROUBLESHOOTING	11-2	BEARING REPLACEMENT	11-5
FINAL REDUCTION DISASSEMBLY	11-3	FINAL REDUCTION ASSEMBLY	11-8

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the final reduction.
- These services can be done with the engine installed in the frame.
- When installing the drive shaft, be sure to use the special tool; position the special tool against the bearing inner race and pull the drive shaft into the bearing.
- Refer to page 3-16 for final drive oil inspection and change.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Final reduction oil capacity	At draining	0.32 liter (0.34 US qt, 0.28 Imp qt)
	At disassembly	0.35 liter (0.37 US qt, 0.31 Imp qt)
Recommended final reduction oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil. API service classification: SG or Higher. JASO T903 standard: MA Viscosity: SAE 10W-30

11

TORQUE VALUES

Transmission cover bolt 25 N•m (2.5 kgf•m, 18 lbf•ft)

TOOLS

Remover weight	07741-0010201	or 07936-371020A or 07936-3710200 (U.S.A. only)
Attachment, 32 x 35 mm	07746-0010100	
Attachment, 52 x 55 mm	07746-0010400	
Attachment, 62 x 68 mm	07746-0010500	
Pilot, 20 mm	07746-0040500	
Pilot, 25 mm	07746-0040600	
Pilot, 30 mm	07746-0040700	
Pilot, 22 mm	07746-0041000	
Driver	07749-0010000	
Remover handle	07936-3710100	
Bearing remover, 20 mm	07936-3710600	
Bearing remover, 25 mm	07936-ZV10100	or 07936-ZV1A100 (U.S.A. only)
Attachment, 28 x 30 mm	07946-1870100	
Bearing driver attachment	07947-6340400	
Pilot, 32 x 50 mm	07MAD-PR90200	
Universal bearing puller	07631-0010000	commercially available in U.S.A.
Remover handle	07936-3710100	
Assembly shaft	07965-VM00200	
Assembly collar	07YMF-KPB0100	

TROUBLESHOOTING

Engine starts but scooter won't move

- Damaged transmission
- Seized transmission
- Faulty drive and driven pulleys/clutch (Section 10)

Abnormal noise

- Worn, seized or chipped gears
- Worn or damaged transmission bearing

Oil leak

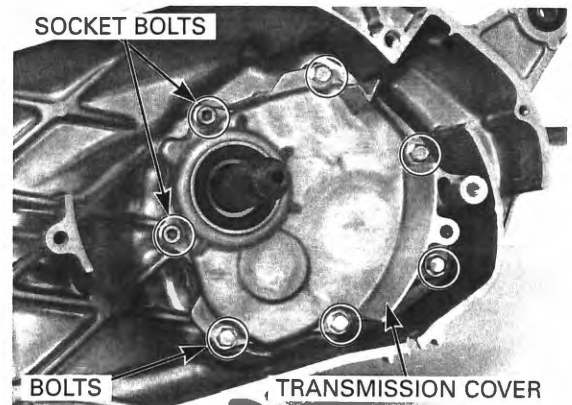
- Oil level too high
- Worn or damaged oil seal
- Cracked crankcase

FINAL REDUCTION DISASSEMBLY

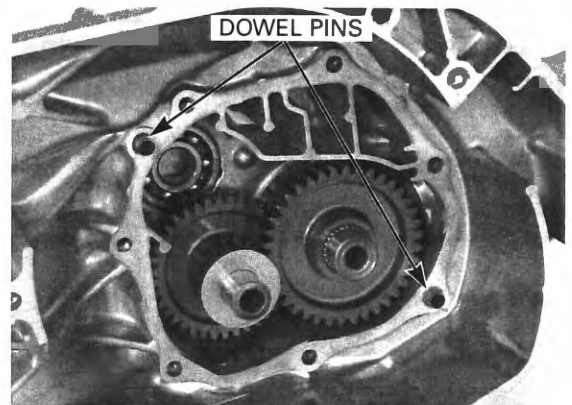
TRANSMISSION DISASSEMBLY

Drain the final drive oil (page 3-16).
Remove the clutch/driven pulley assembly (page 10-10).
Remove the rear wheel (page 15-4).

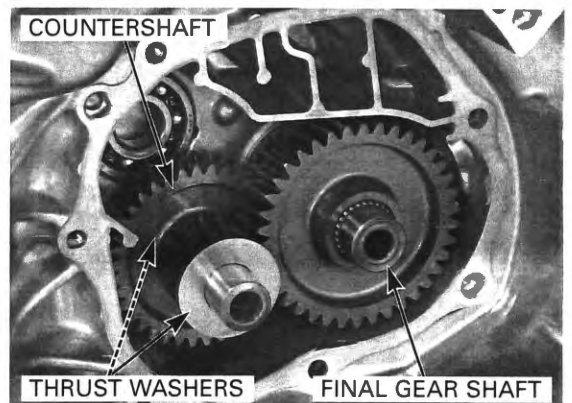
Remove the bolts and transmission cover.



Remove the dowel pins.



Remove the final gear shaft, countershaft and thrust washers.

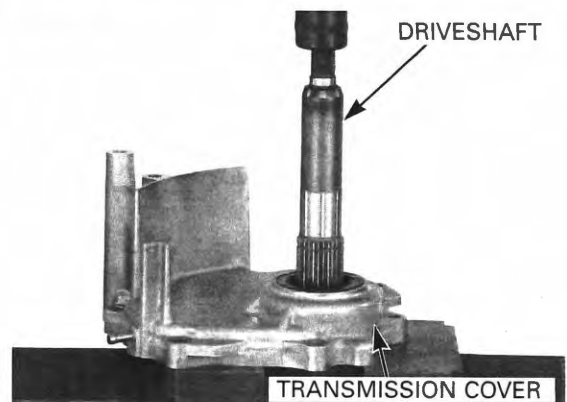


DRIVE SHAFT REMOVAL

Be careful not to damage the transmission cover mating surface.

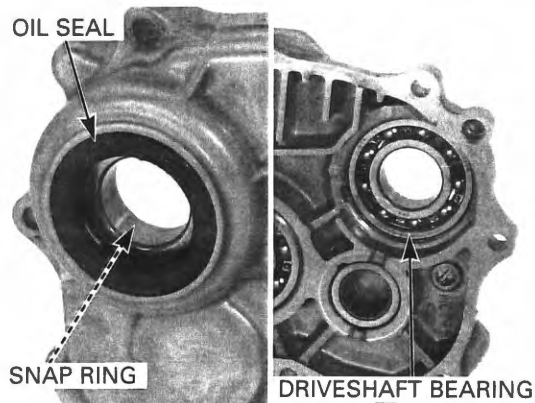
Press the driveshaft out of the transmission cover.

Check the drive shaft for wear or damage.



FINAL REDUCTION

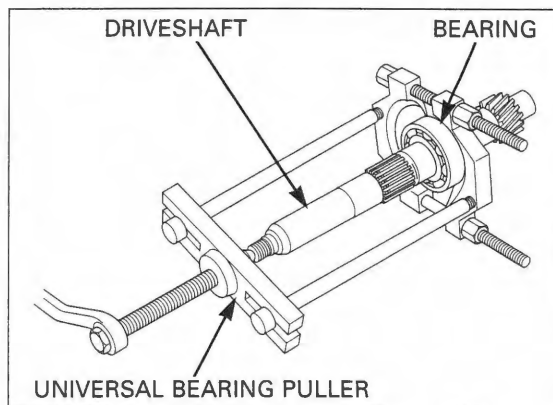
Remove the driveshaft oil seal, snap ring and bearing from the transmission cover.



If the bearing is left on the driveshaft, remove it with the special tool.

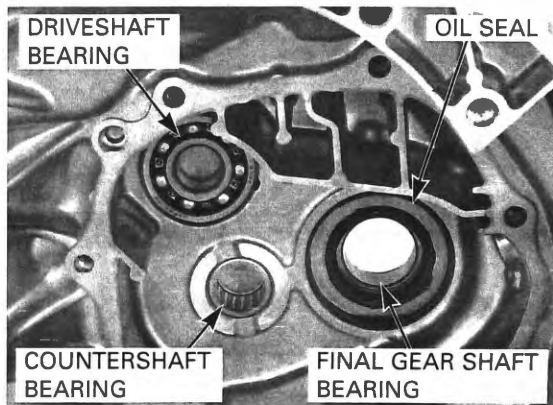
TOOL:
Universal bearing puller

07631-0010000
(Commercially
available in
U.S.A.)

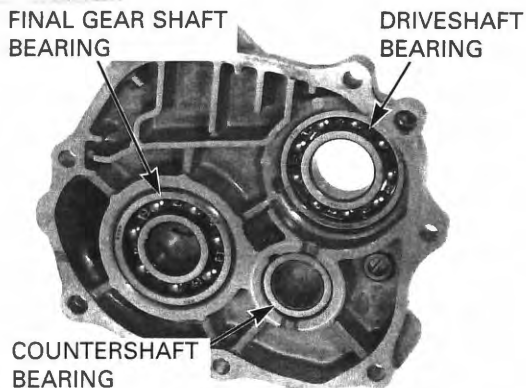


FINAL REDUCTION INSPECTION

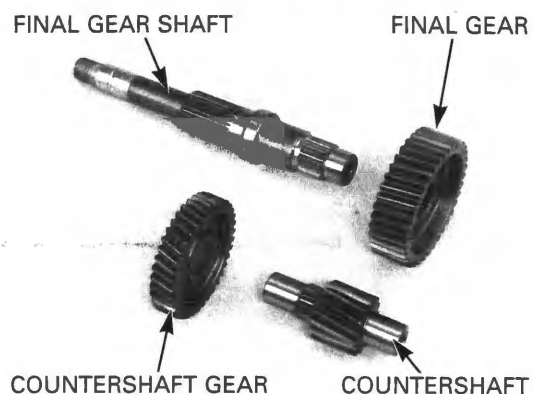
Check the oil seal and bearings in the left swingarm for wear or damage.



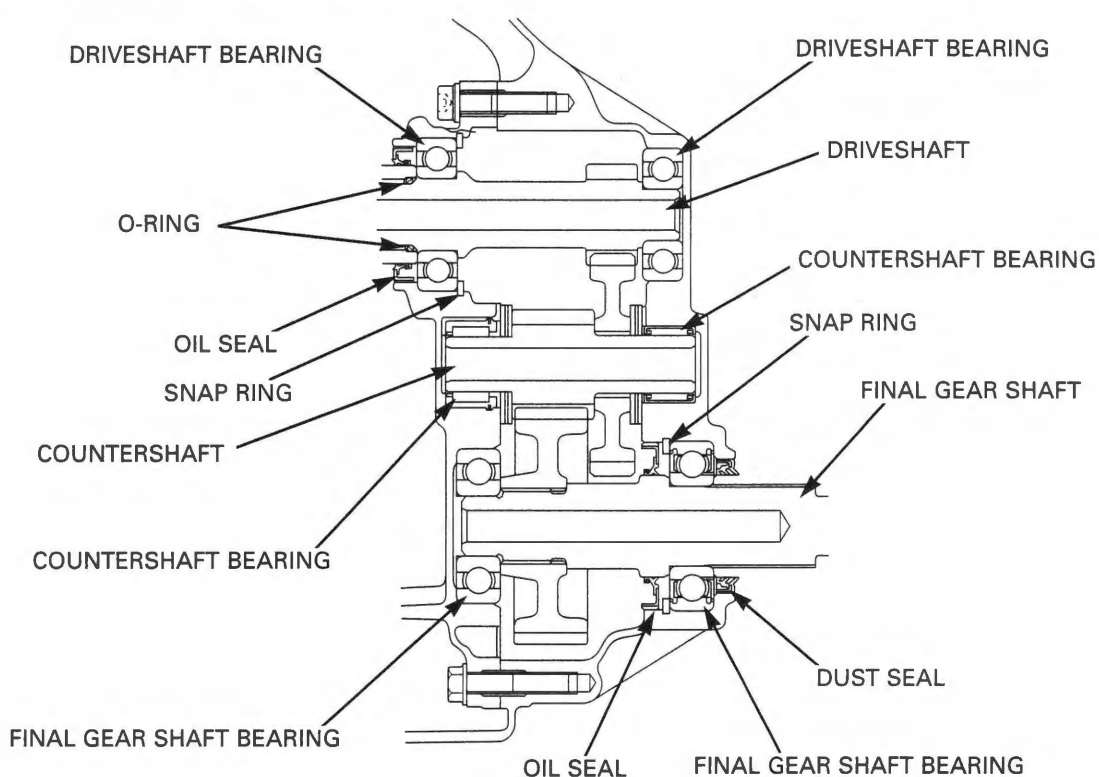
Check the bearings in the transmission cover for wear or damage.



Check the countershaft, countershaft gear and final gear shaft for wear or damage.



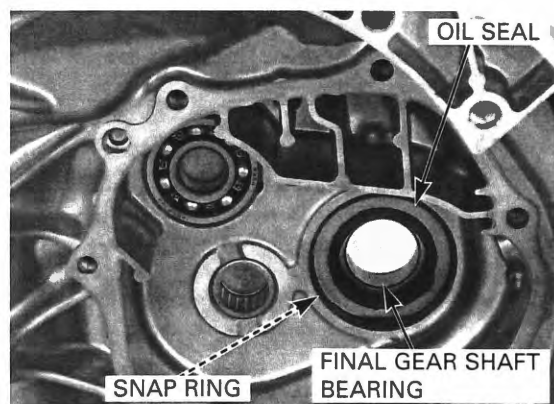
BEARING REPLACEMENT



LEFT CRANKCASE

Be careful not to damage the left crankcase mating surface.

Remove the final gear shaft oil seal, snap ring and bearing.

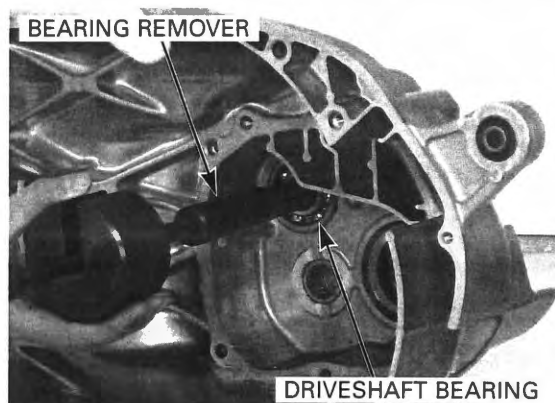


FINAL REDUCTION

Remove the driveshaft bearing using the special tools.

TOOLS:

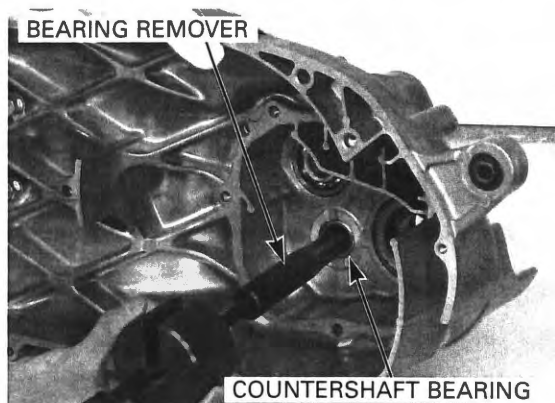
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)
Remover handle	07936-3710100
Bearing remover, 17 mm	07936-3710600



Remove the countershaft bearing using the special tools.

TOOLS:

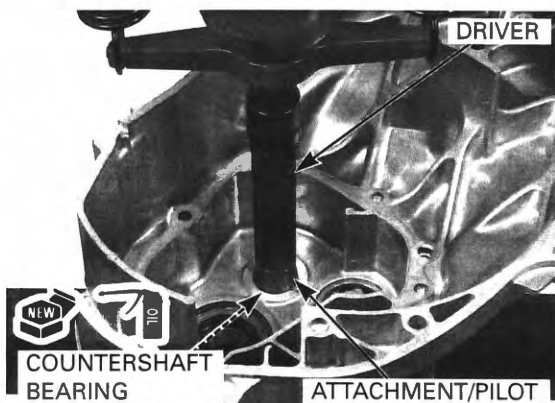
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)
Remover handle	07936-3710100
Bearing remover, 17 mm	07936-3710600



Apply engine oil to the needle rollers of a new countershaft bearing.
Press the countershaft bearing into the left swingarm using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 28 x 30 mm	07946-1870100
Pilot, 22 mm	07746-0041000

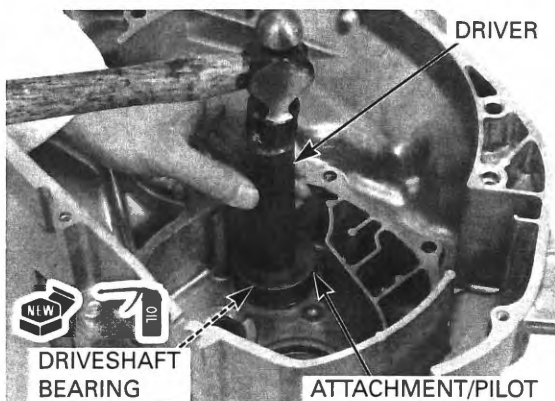


Apply engine oil to the new bearings cavities.
Drive new bearings into the left swingarm.

Final gear shaft bearing:

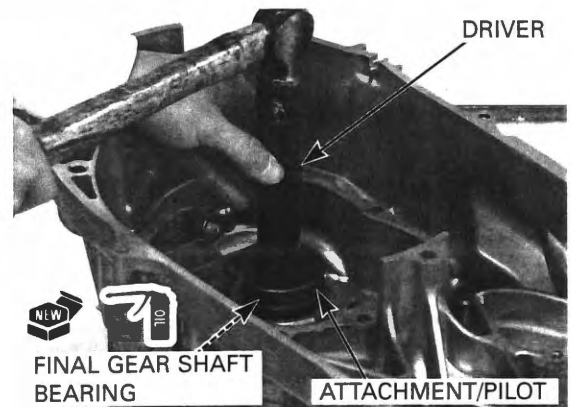
TOOLS:

Driveshaft bearing:	
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500



Final gear shaft bearing:
Driver
Bearing driver attachment
Pilot, 32 x 50 mm

07749-0010000
 07947-6340400
 07MAD-PR90200

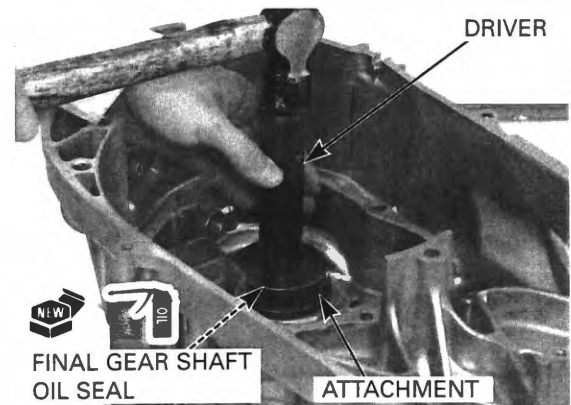


Apply oil to a new final gear shaft oil seal lip and outer surface.
 Install the final gear shaft oil seal.

TOOLS:

Driver
Attachment, 62 x 68 mm

07749-0010000
 07746-0010500



TRANSMISSION COVER

Be careful not to damage the transmission cover mating surface.

Remove the final gear shaft bearing using the special tools.

TOOLS:

Remover weight
Bearing remover, 25 mm

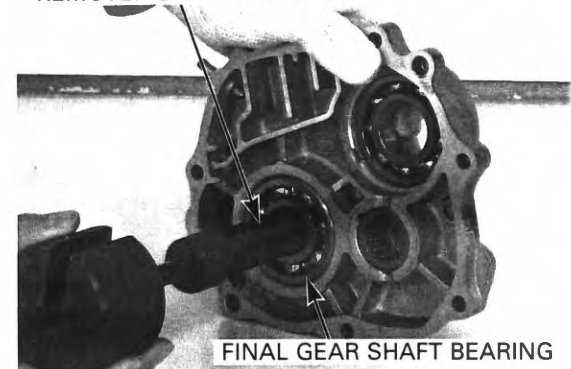
07741-0010201
 07936-ZV10100

U.S.A. only
Remover weight

07936-371020A or
 07936-3710200
 07936-ZV1A100

Bearing remover, 25 mm

REMOVER SHAFT ASSEMBLY



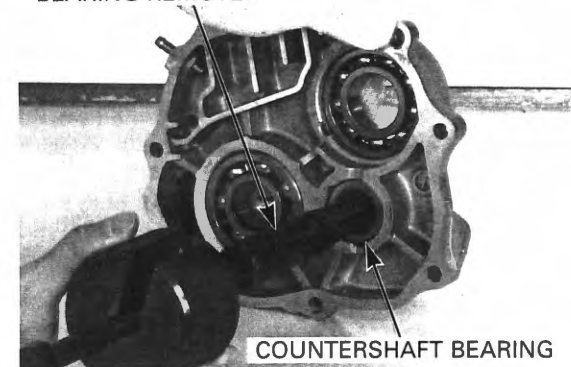
Remove the countershaft bearing using the special tools.

TOOLS:

Remover weight
Bearing remover handle
Bearing remover, 20 mm

07741-0010201
 07936-3710100
 07936-3710600

BEARING REMOVER

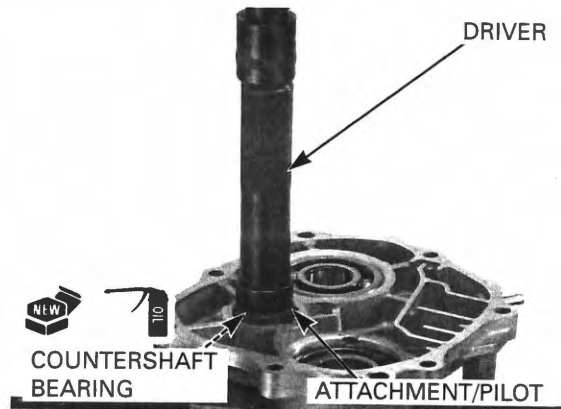


FINAL REDUCTION

Apply engine oil to the needle rollers of a new countershaft bearing.
Press the countershaft bearing into the transmission cover using the special tools.

TOOLS:

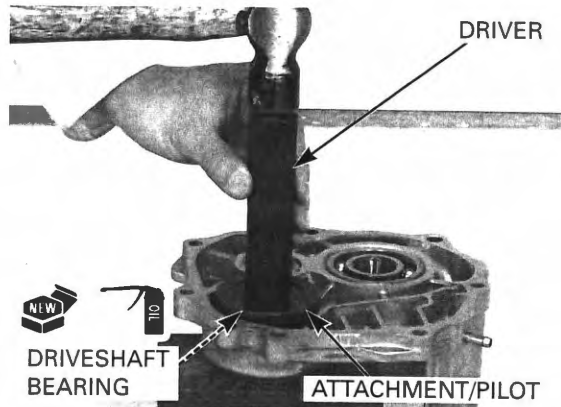
Driver	07749-0010000
Attachment, 32 x 35 mm	07946-0010100
Pilot, 22 mm	07746-0041000



Apply engine oil to the new bearing cavities.
Drive a new driveshaft bearing into the transmission cover using the special tools.

TOOLS:

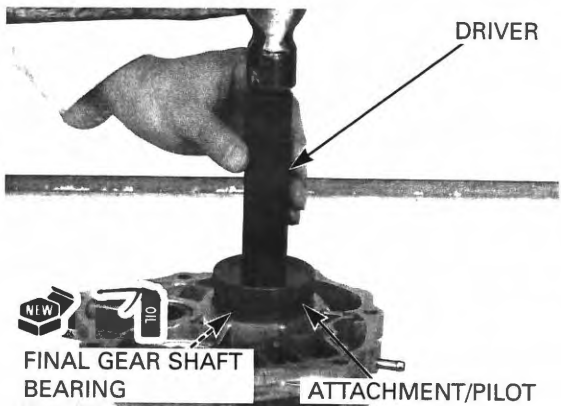
Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500
Pilot, 30 mm	07746-0040700



Apply engine oil to new bearing cavities.
Drive new final gear shaft bearing into the transmission cover using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500
Pilot, 25 mm	07746-0040600



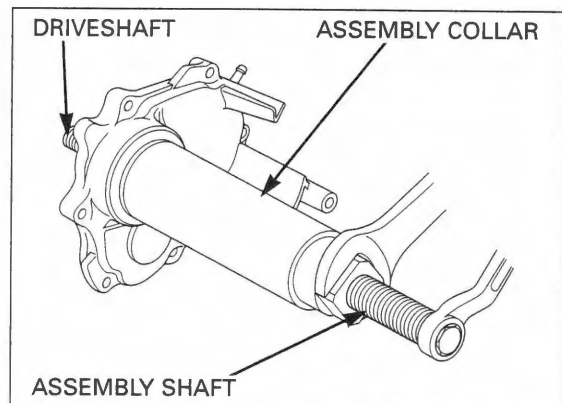
FINAL REDUCTION ASSEMBLY

DRIVESHAFT INSTALLATION

Install the driveshaft into the transmission cover.
Position the assembly collar against the driveshaft bearing inner race.
Thread the assembly shaft onto the driveshaft.
Hold the assembly shaft and draw the driveshaft into the bearing inner race by turning the nut.

TOOLS:

Assembly shaft	07965-VM00200
Assembly collar	07YMF-KPB0100



Using the special tools, install the driveshaft oil seal until it is flush with the transmission cover surface.

TOOLS:

Assembly shaft

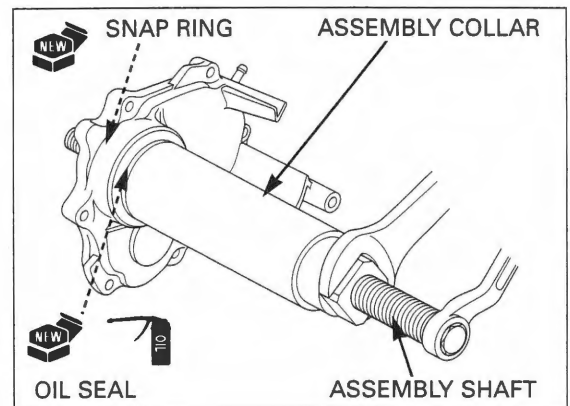
07965-VM00200

Assembly collar

07YMF-KPB0100

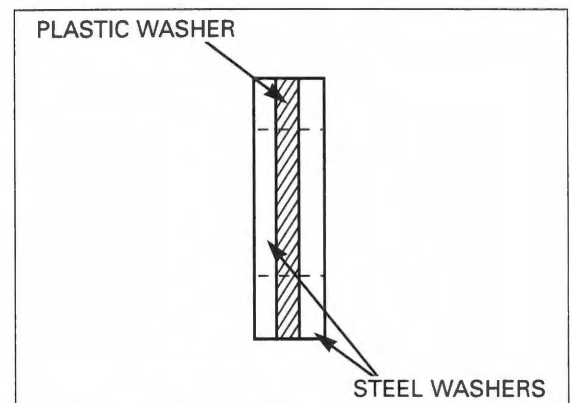
Apply oil to a new driveshaft oil seal lip and outer surface.

Install the new snap ring.



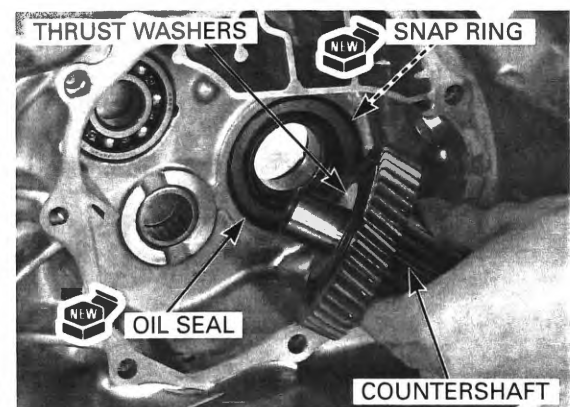
TRANSMISSION ASSEMBLY

Assemble the countershaft thrust washers as shown in the following illustration.



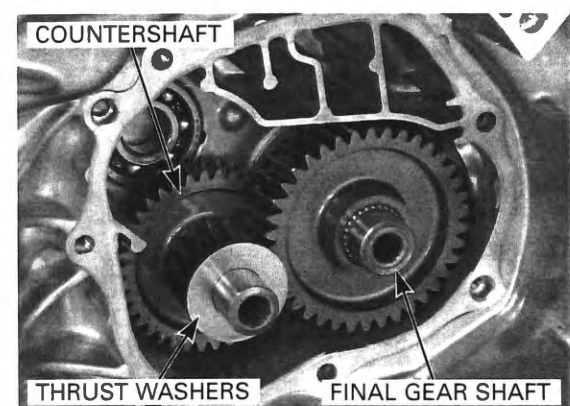
Install the new snap ring and new oil seal.

Install the thrust washer on the left swingarm side of the countershaft.



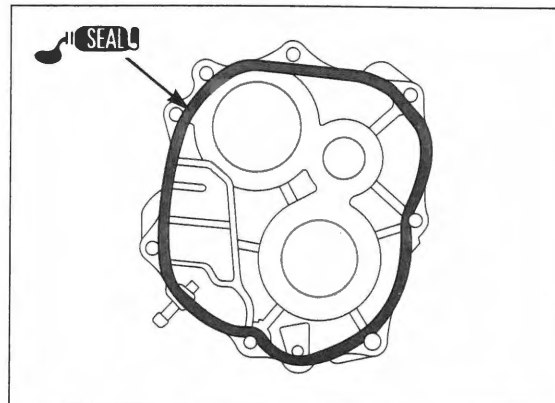
Install the countershaft and final gear shaft into the left swingarm.

Install the thrust washers onto the countershaft.

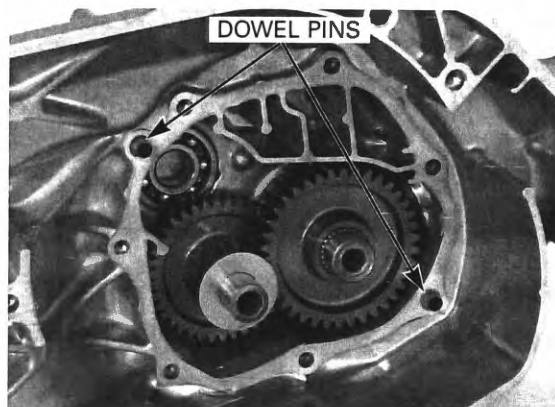


FINAL REDUCTION

Clean the mating surfaces of the left swingarm and transmission cover.
Apply sealant to the transmission cover mating surface as shown.



Install the dowel pins.



Install the transmission cover and tighten the bolts in a crisscross pattern in 2 – 3 steps.

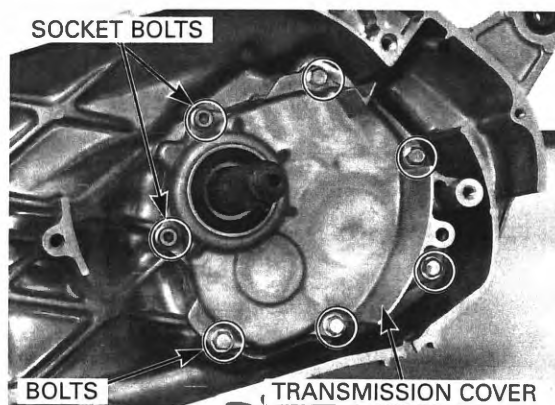
Tighten the socket bolts to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

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

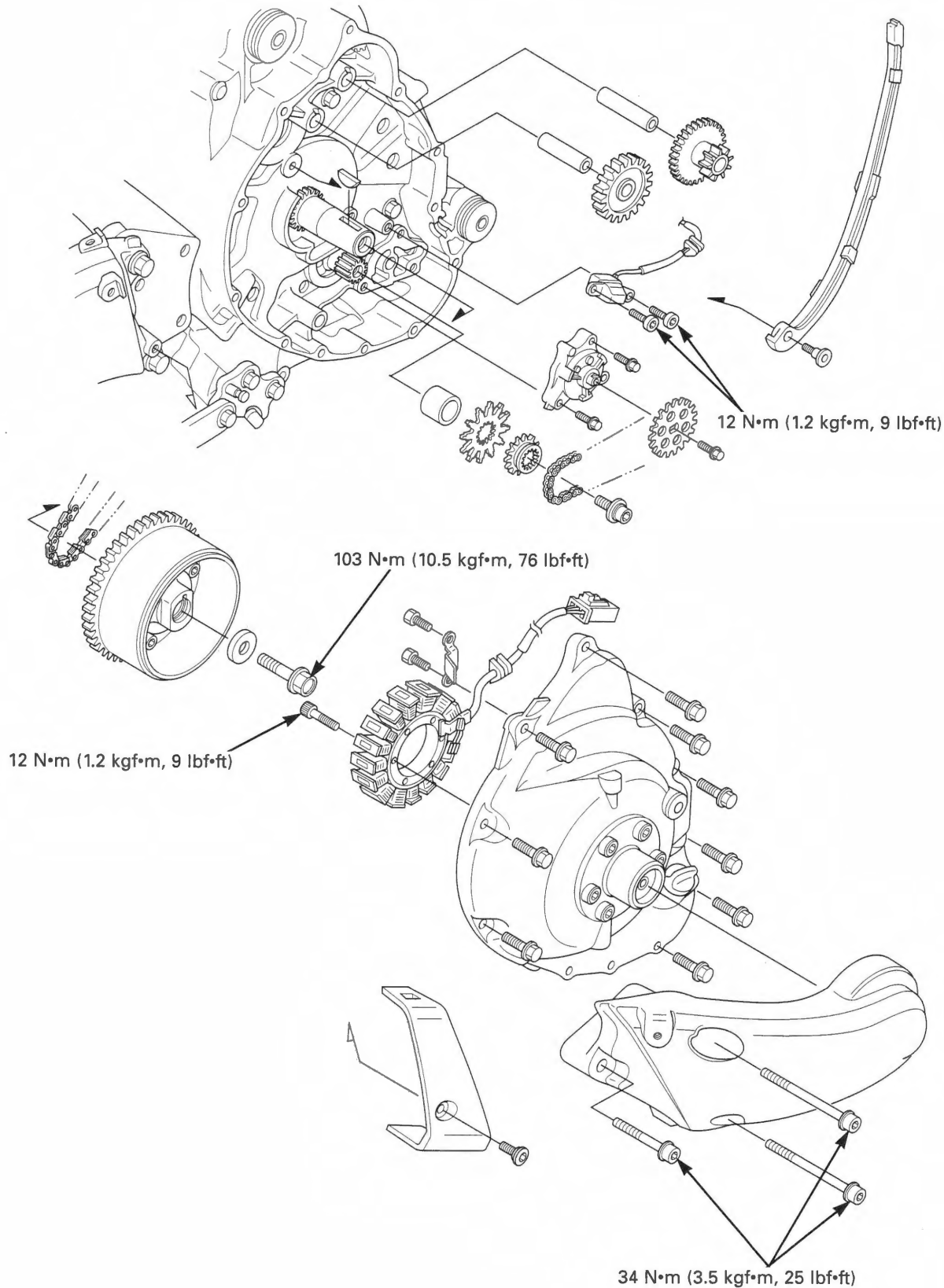
Install the clutch/driven pulley assembly (page 10-20).

Install the rear wheel (page 15-12).



MEMO

ALTERNATOR/STARTER CLUTCH



12. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	12-1	FLYWHEEL/STARTER CLUTCH/ CKP SENSOR	12-5
TROUBLESHOOTING	12-1		
ALTERNATOR STATOR	12-2		

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the starter reduction gear, alternator, crankshaft position (CKP) sensor, flywheel and starter clutch.
- These services can be done with the engine installed in the frame.
- Refer to section 18 for alternator inspection, and to section 19 for CKP sensor inspection.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	Boss O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.70 (2.272)
	Bushing I.D.	29.046 – 29.062 (1.1435 – 1.1442)	29.10 (1.146)
Starter clutch outer I.D.		74.412 – 74.442 (2.9296 – 2.9308)	74.49 (2.933)

TORQUE VALUES

Starter clutch socket bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)	Apply a locking agent to the threads.
CKP sensor socket bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Flywheel bolt	103 N•m (10.5 kgf•m, 76 lbf•ft)	UBS bolt. Apply oil to the threads and seating surface.
Stator socket bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Right swingarm torx bolt	34 N•m (3.5 kgf•m, 25 lbf•ft)	Torx bolt.

12

TOOLS

Flywheel holder	07725-0040000	commercially available in U.S.A.
Flywheel puller	07733-0020001	or 07933-3950000 (U.S.A. only)

TROUBLESHOOTING

Starter motor turns, but engine does not turn

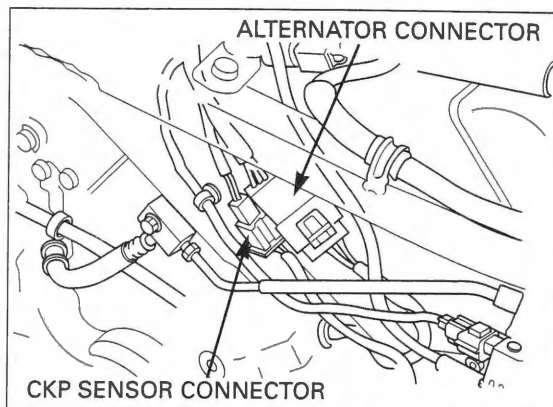
- Faulty starter clutch
- Damaged starter reduction gear

ALTERNATOR STATOR

RIGHT CRANKCASE COVER REMOVAL

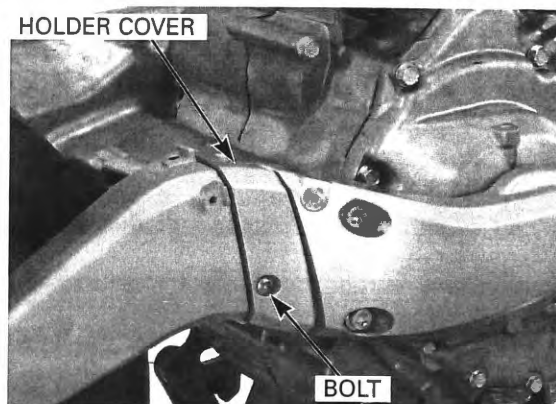
Drain the engine oil (page 3-11).

Disconnect the alternator 3P white connector and CKP sensor 2P red connector, and free the wires from the clamps.

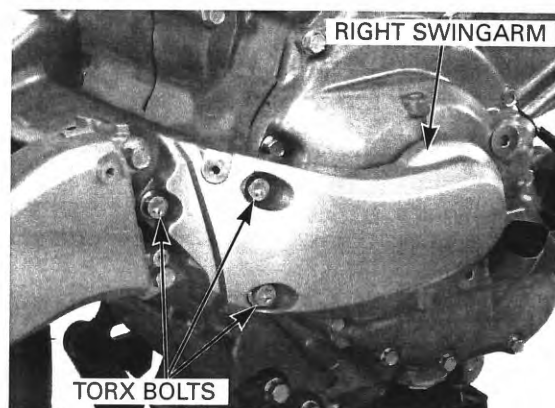


Remove the rear brake hose/parking brake wire clamps (page 7-4).

Remove the bolt and driveshaft holder cover.



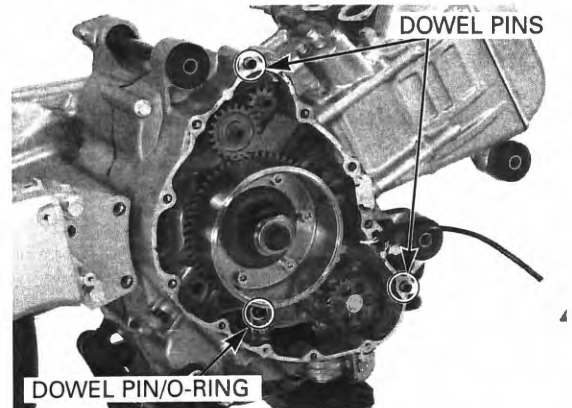
Remove the torx bolts and right swingarm.



Remove the bolts and right crankcase cover.



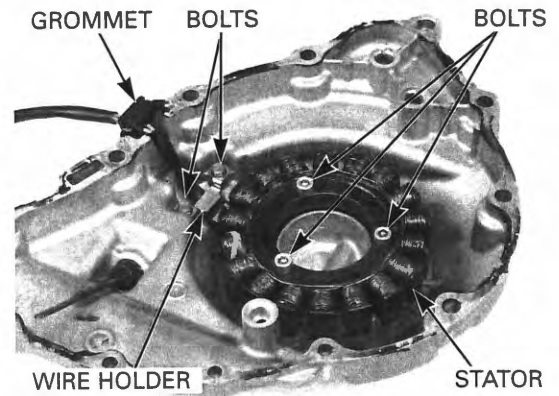
Remove the dowel pins and O-ring.



STATOR REMOVAL/INSTALLATION

REMOVAL

Remove the bolts and stator wire holder.
Remove the stator mount bolts, grommet and the stator from the left crankcase cover.



INSTALLATION

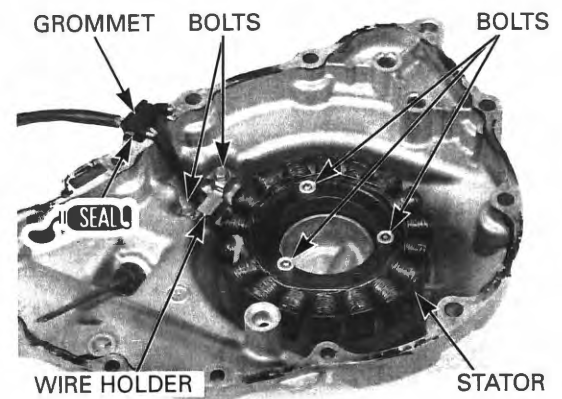
Install the stator and tighten the stator mount bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply sealant to the grommet seating surface and install it to the cover groove properly.

Install the stator wire holder and tighten the bolts to the specified torque.

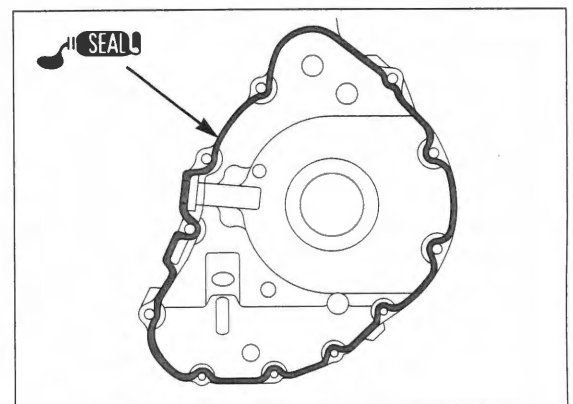
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



RIGHT CRANKCASE COVER INSTALLATION

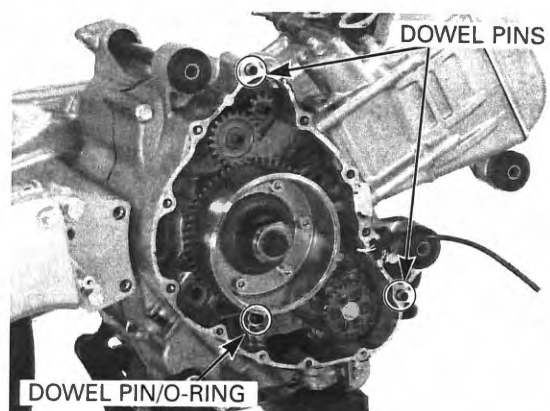
Clean the mating surfaces of the right crankcase and cover.

Apply sealant to the right crankcase cover mating surface as shown.



ALTERNATOR/STARTER CLUTCH

Install the dowel pins and O-ring.

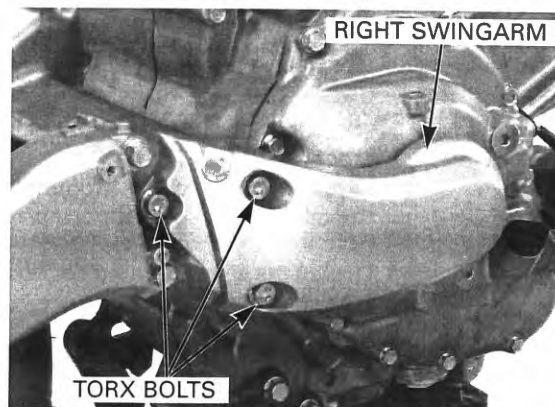


Install the right crankcase cover and tighten the bolts in a crisscross pattern in 2 or 3 steps.



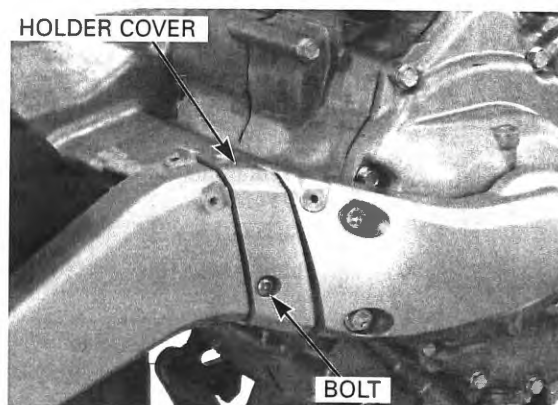
Install the right swingarm and tighten the torx bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Install the driveshaft holder cover.
Tighten the bolt.

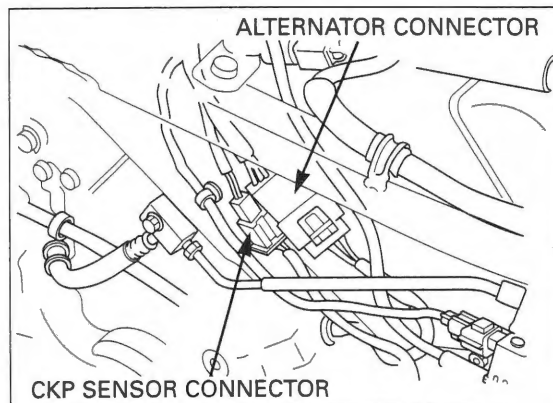
Install the rear brake hose/parking brake wire clamps
(page 7-9).



Route and clamp the alternator and CKP sensor wires properly (page 1-24).

Connect the alternator 3P white connector and CKP sensor 2P red connector.

Fill the crankcase with the recommended engine oil (page 3-11).



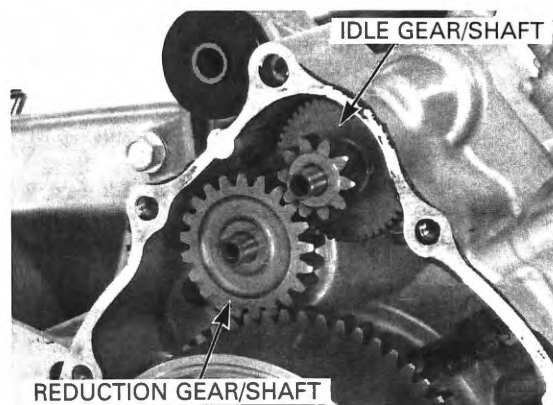
FLYWHEEL/STARTER CLUTCH/ CKP SENSOR

REMOVAL

Remove the right crankcase cover (page 12-2).

Pull the reduction gear shaft out and remove the reduction gear.

Pull the idle gear shaft out and remove the idle gear.



Hold the flywheel with the special tool and loosen the flywheel nut.

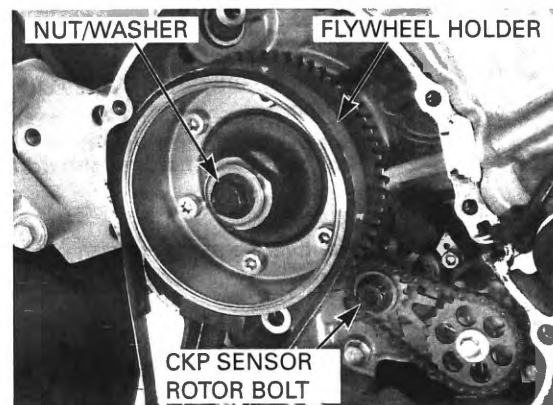
TOOL:

Flywheel holder

07725-0040000
(Commercially
available in
U.S.A.)

When the CKP sensor rotor is ready to be removed, loosen the CKP sensor rotor bolt.

Remove the flywheel nut and washer.

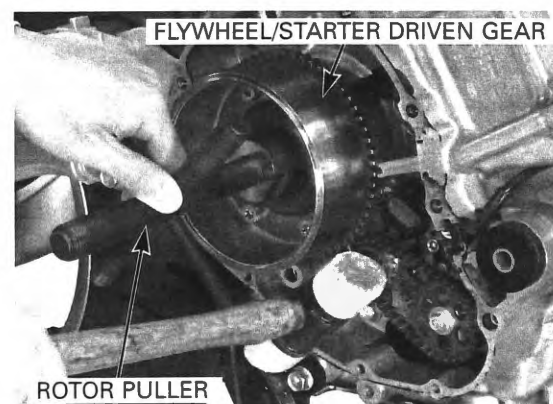


Remove the flywheel/starter driven gear assembly using the special tool.

TOOL:

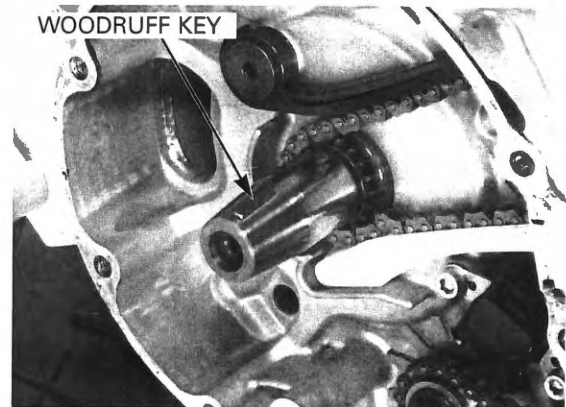
Flywheel puller

07733-0020001 or
07933-3950000
(U.S.A. only)



ALTERNATOR/STARTER CLUTCH

Remove the woodruff key and starter driven gear from the crankshaft.

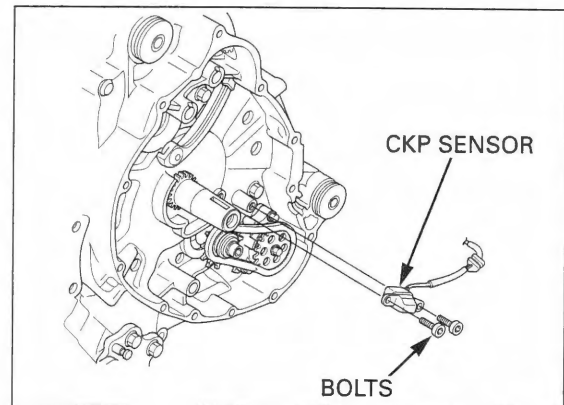


CKP SENSOR REMOVAL/INSTALLATION

Remove the socket bolts and CKP sensor from the right crankcase.

Installation is in the reverse order of removal.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

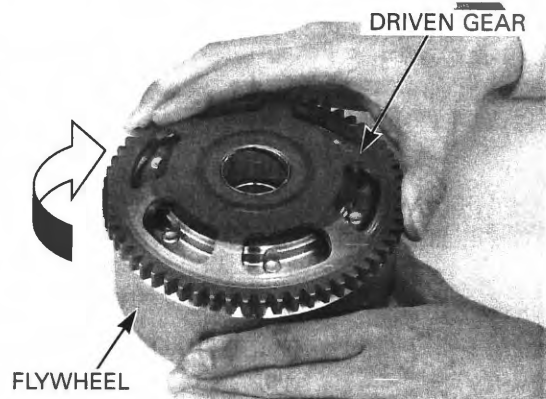


DISASSEMBLY

Check the operation of the sprag clutch by turning the driven gear.

You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

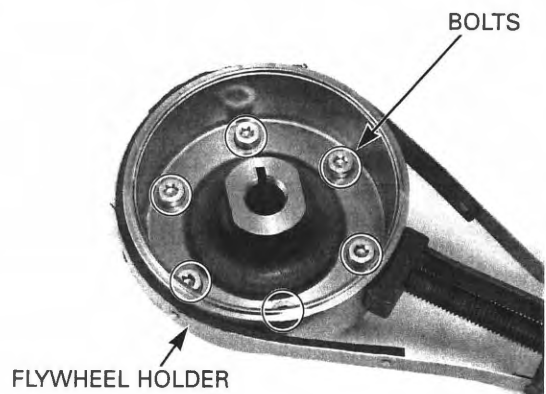
Remove the starter driven gear by turning the driven gear.



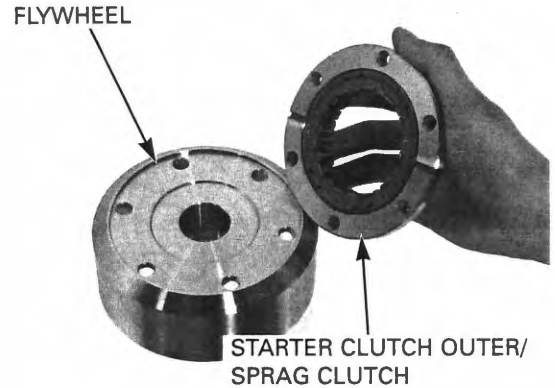
Hold the flywheel with the special tool and remove the starter clutch outer bolts.

TOOL:
Flywheel holder

07725-0040000
(Commercially
available in
U.S.A.)



Remove the starter clutch outer and sprag clutch from the flywheel.



INSPECTION

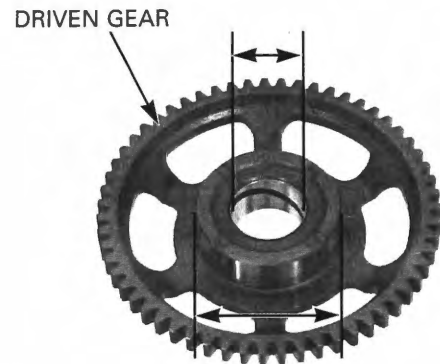
Check the starter driven gear teeth for wear or damage.

Measure the starter driven gear boss O.D.

SERVICE LIMIT: 57.70 mm (2.272 in)

Measure the starter driven gear bushing I.D.

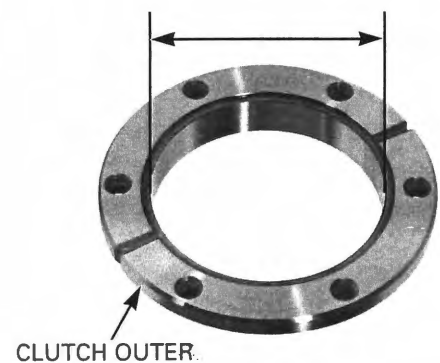
SERVICE LIMIT: 29.10 mm (1.146 in)



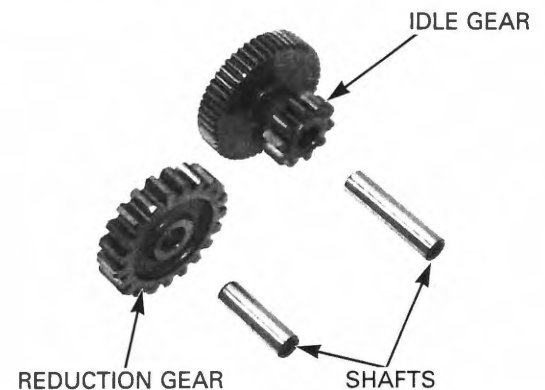
Check the starter clutch outer and sprag clutch for abnormal wear or damage.

Measure the starter clutch outer I.D.

SERVICE LIMIT: 74.49 mm (2.933 in)

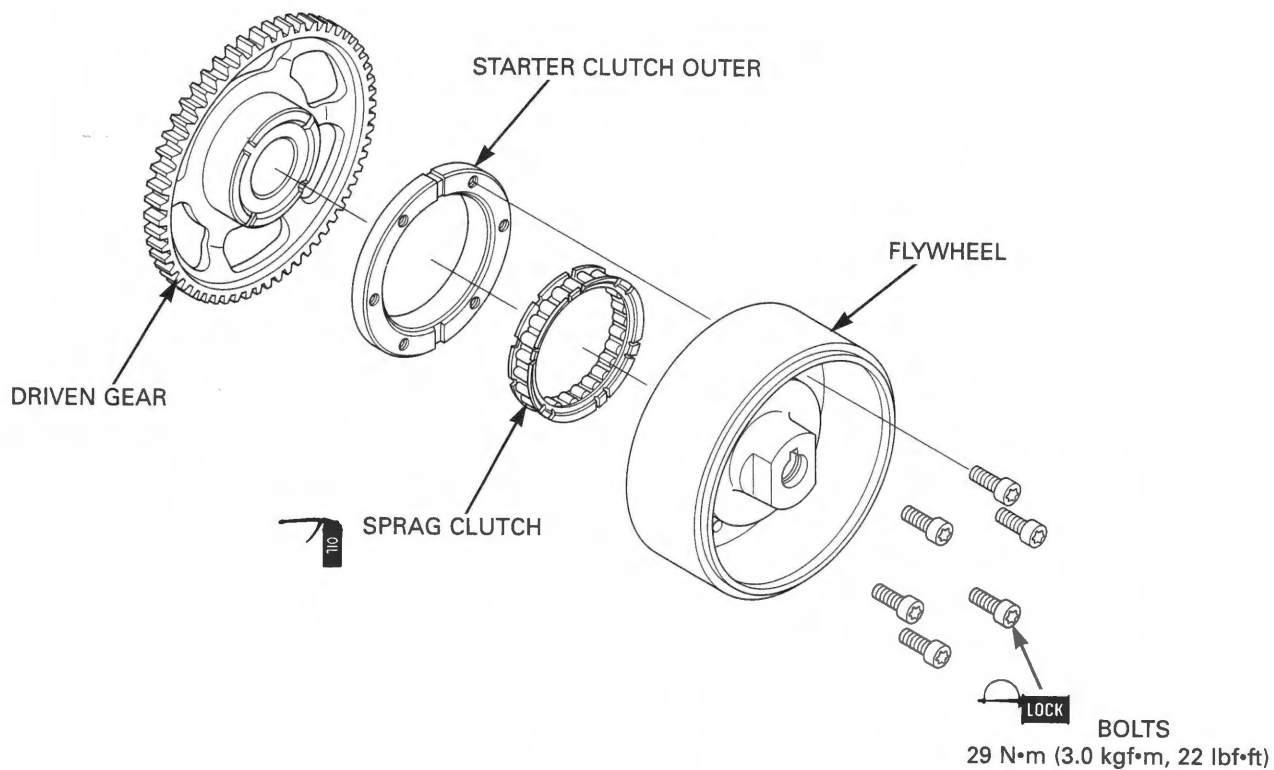


Check the starter reduction gear teeth, shaft and journal for wear or damage.
Check the starter idle gear teeth, shaft and journal for wear or damage.

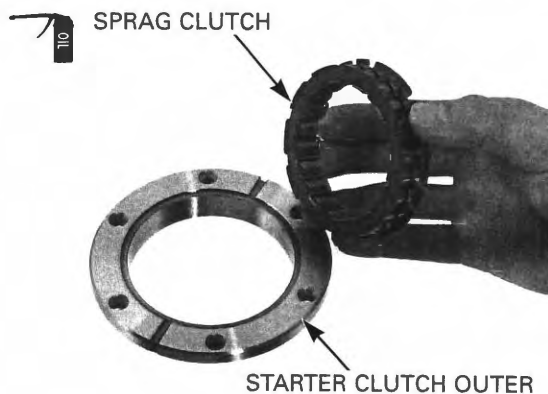


ALTERNATOR/STARTER CLUTCH

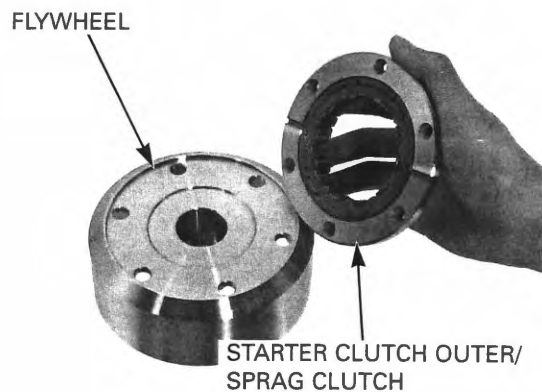
ASSEMBLY



Apply oil to the sprag clutch outer surfaces.
Install the sprag clutch into the starter clutch outer as shown.



Install the starter clutch assembly on the flywheel.



Align the bolt holes on the starter clutch outer and flywheel.
Apply locking agent to the starter clutch bolt threads and install them.

Hold the flywheel with the special tool and tighten the starter clutch outer bolts to the specified torque.

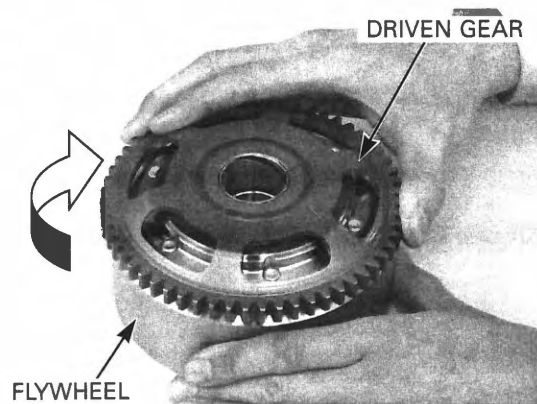
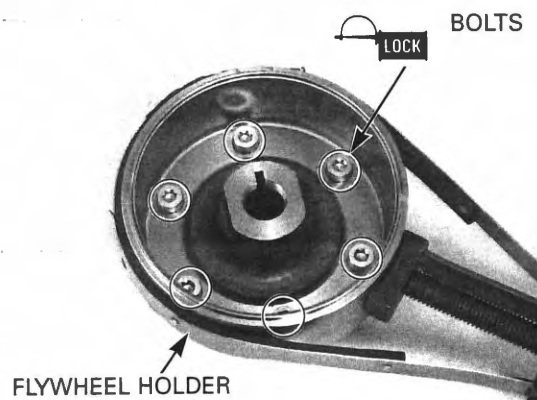
TOOL:

Flywheel holder

07725-0040000
(Commercially
available in
U.S.A.)

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

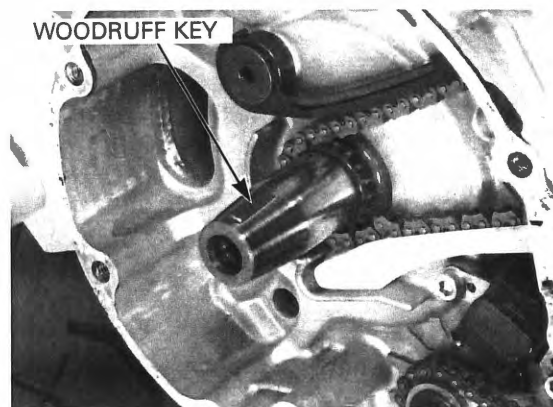
Apply molybdenum oil solution to the starter driven gear bushing.
Install the starter driven gear by turning the driven gear clockwise.



INSTALLATION

Clean any oil from the tapered portion of the crankshaft.

Install the woodruff key in the crankshaft key groove.



Clean any oil from the tapered portion of the flywheel I.D..

Install the flywheel onto the crankshaft, aligning the key way with the woodruff key.

Apply oil to the washer and flywheel nut threads and seating surface.

Install the washer and flywheel nut to the crankshaft.

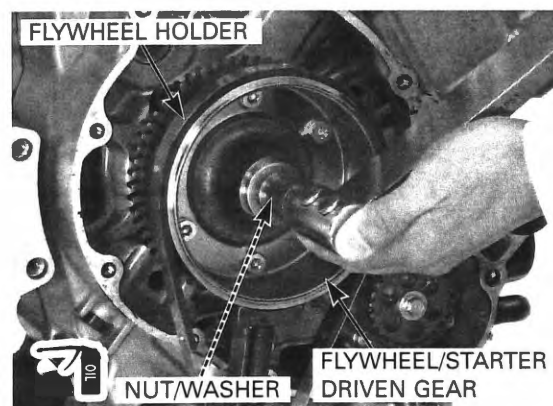
Hold the flywheel with the special tool and tighten the flywheel nut to the specified torque.

TOOL:

Flywheel holder

07725-0040000
(Commercially
available in U.S.A.)

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

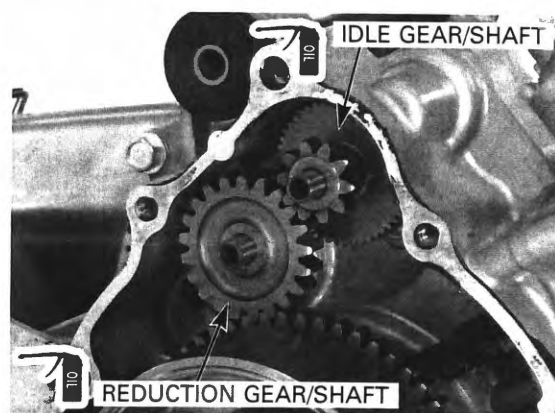


ALTERNATOR/STARTER CLUTCH

Apply oil to the starter reduction gear, starter idle gear and shafts.

Install the starter reduction gear, starter idle gear and shafts to the right crankcase as assembly.

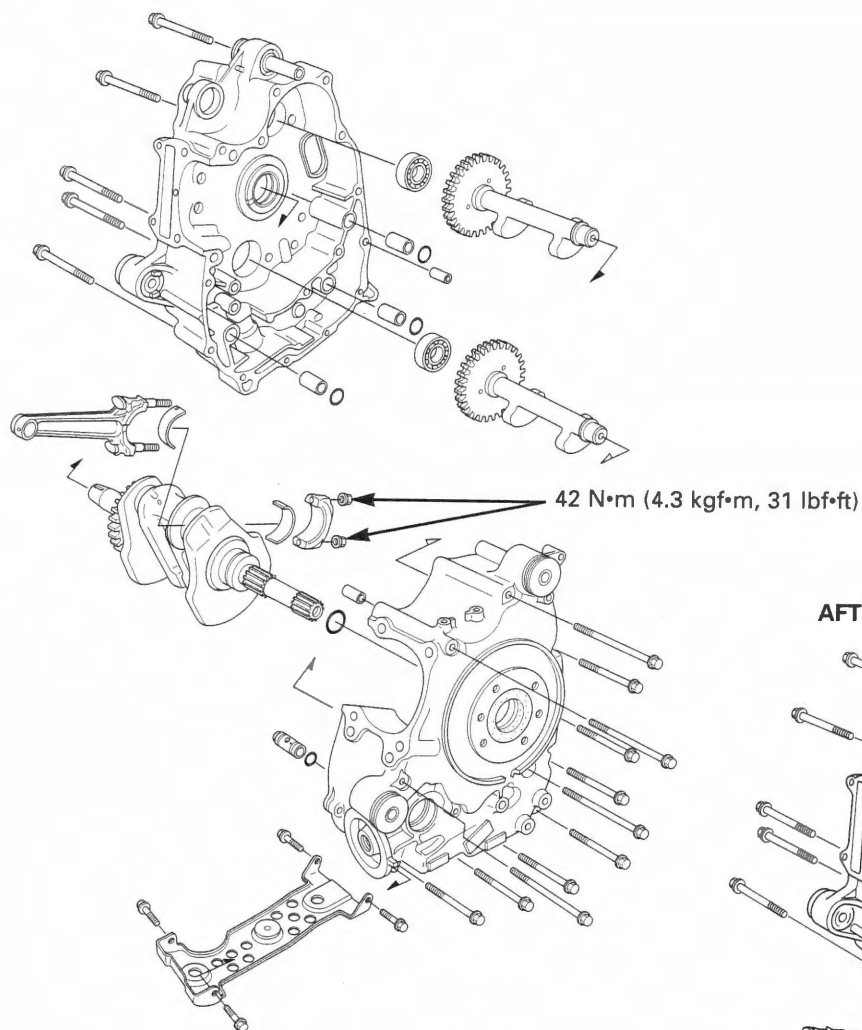
Install the right crankcase cover (page 12-3).



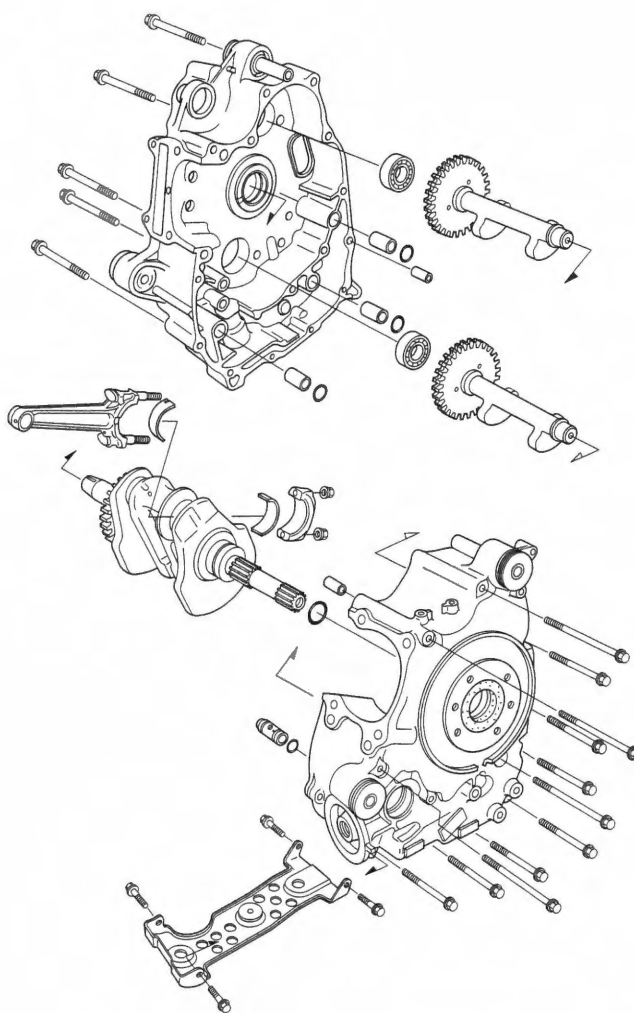
MEMO

CRANKCASE/CRANKSHAFT/BALANCER

'02:



AFTER '02:



13. CRANKCASE/CRANKSHAFT/BALANCER

SERVICE INFORMATION	13-1	CRANKSHAFT/CONNECTING ROD	13-4
TROUBLESHOOTING	13-1	BALANCER SHAFT	13-9
CRANKCASE SEPARATION	13-2	CRANKCASE ASSEMBLY	13-12

SERVICE INFORMATION

GENERAL

- This section covers the crankcase separation to service the crankshaft and balancer.
- The following components must be removed before separating the crankcase.
 - Oil pump (section 4)
 - Water pump (section 6)
 - Engine (section 7)
 - Cylinder head (section 8)
 - Cylinder, piston (section 9)
 - Left swingarm (section 10)
 - Flywheel, starter clutch (section 12)
 - Starter motor (section 19)
- Be careful not to damage the crankcase mating surfaces when separating and assembling the crankcase halves.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Side clearance	0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
	Crank pin oil clearance	0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main bearing oil clearance	0.025 – 0.041 (0.0010 – 0.0016)	0.07 (0.003)

13

TORQUE VALUES

Right crankcase sealing bolt (10 mm)	34 N•m (3.5 kgf•m, 25 lbf•ft)	Apply a locking agent to the threads.
(18 mm)	44 N•m (4.5 kgf•m, 33 lbf•ft)	Apply a locking agent to the threads.
Left crankcase sealing bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)	Apply a locking agent to the threads.
Connecting rod bearing cap nut	42 N•m (4.3 kgf•m, 31 lbf•ft)	Apply oil to the threads and seating surface.

TOOLS

Remover weight	07741-0010201	or 07936-371020A or 07936-3710200 (U.S.A. only)
Attachment, 42 x 47 mm	07746-0010300	
Pilot, 20 mm	07746-0040500	
Driver	07749-0010000	
Remover handle	07936-3710100	
Bearing remover, 20 mm	07936-3710600	
Crank assembly guide	07ZMG-MCT0100	or 07ZMG-MCTA100 (U.S.A. only)

TROUBLESHOOTING

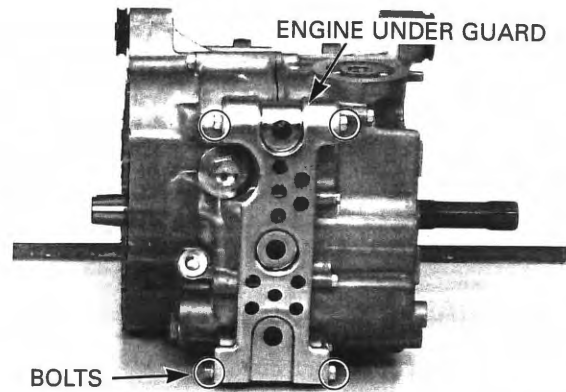
Abnormal engine noise

- Worn connecting to small end
- Worn or damaged connecting rod big end bearing
- Worn or damaged crankshaft bearings

CRANKCASE SEPARATION

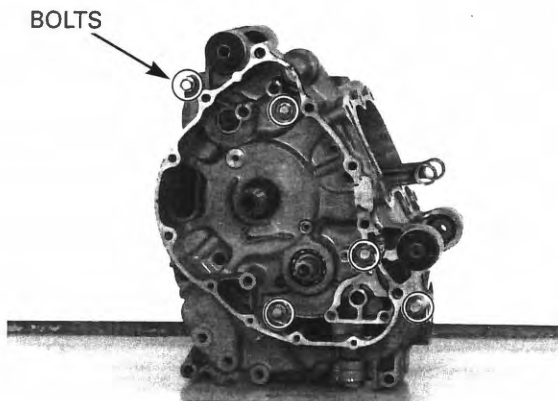
Remove the engine and main stand (section 7).
Remove the parts required for crankcase separation
(page 13-1).

Remove the bolts and engine under guard.



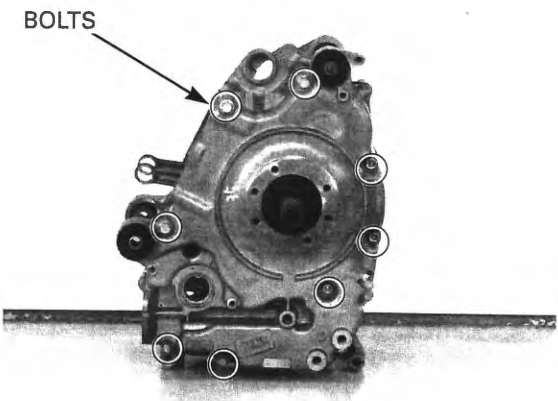
*Loosen the bolts
in a crisscross
pattern in
several steps.*

Remove the bolts from the right crankcase.



*Loosen the bolts
in a crisscross
pattern in
several steps.*

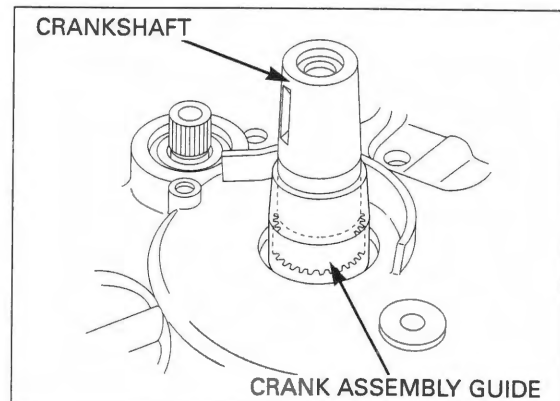
Remove the bolts from the left crankcase.



Install the special tool to the crankshaft.

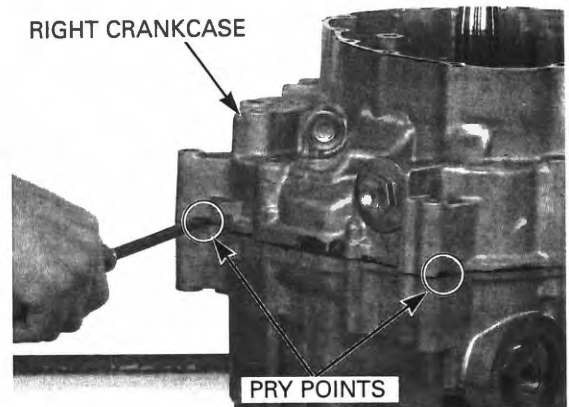
TOOL:
Crank assembly guide

07ZMG-MCT0100 or
07ZMG-MCTA100
(U.S.A. only)

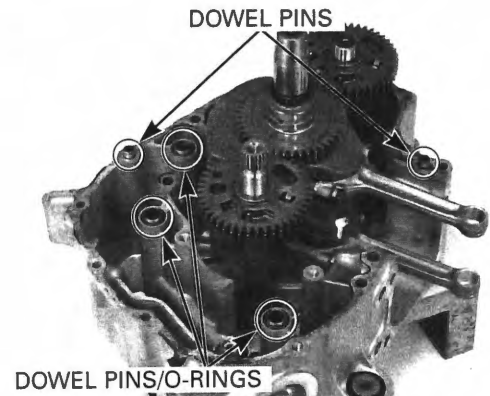


Place the crankcase assembly with the left side down and separate the right crankcase from the left crankcase.

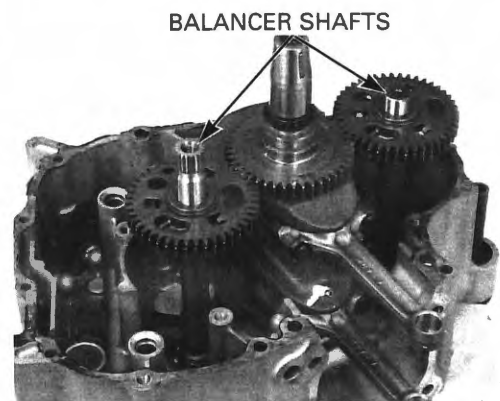
- Separate the right crankcase from the left crankcase while prying at the points as shown.
- Separate the right crankcase from the left crankcase while tapping them at several locations with a soft hammer.



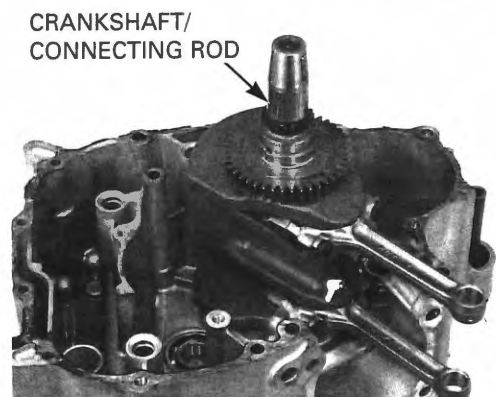
Remove the dowel pins and O-rings.
Clean the sealant from the left and right crankcase mating surfaces.



Remove the balancer shafts from the left crankcase.

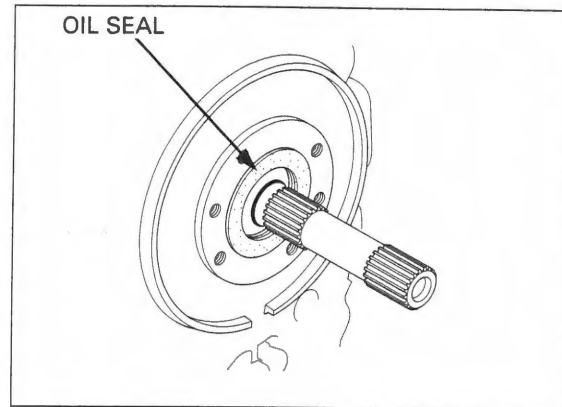


Remove the crankshaft/connecting rod from the left crankcase.



CRANKCASE/CRANKSHAFT/BALANCER

Remove the oil seal from the left crankcase.



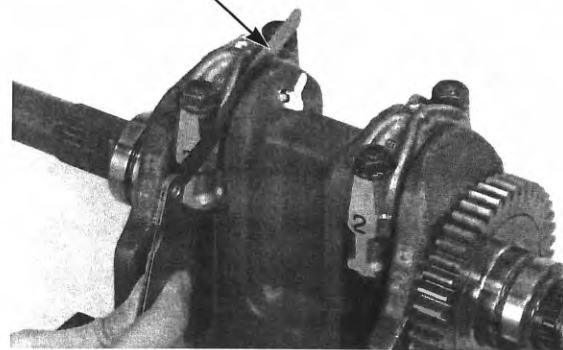
CRANKSHAFT/CONNECTING ROD

DISASSEMBLY

Inspect the connecting rod big end side clearance before removing the connecting rod. Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end as shown.

STANDARD: 0.40 mm (0.016 in)

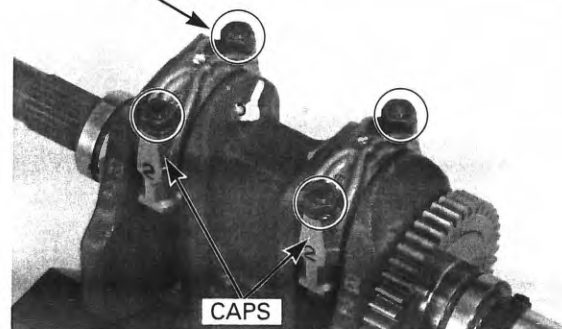
FEELER GAUGE



Tap the side of the cap lightly if the bearing cap is hard to remove.

Remove the connecting rod bearing cap nuts, bearing cap and connecting rod.

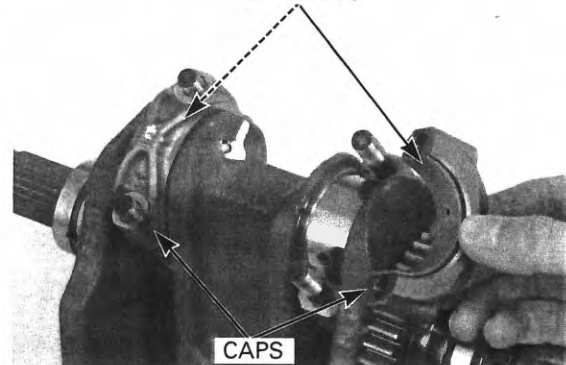
NUTS



Mark the bearing caps, bearings and connecting rod as you remove them to indicate the correct cylinder and position on the crank pins for reassembly.

Connecting rod small end inspection (page 9-5).

BEARINGS

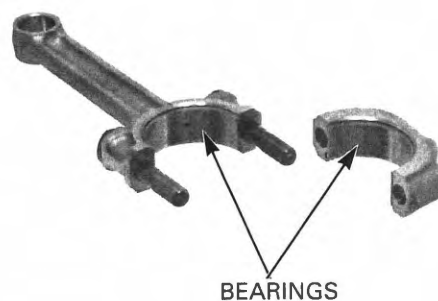


Inspect the timing sprocket teeth and balancer drive gear teeth for wear or damage. Replace if necessary.



CONNECTING ROD BEARING INSPECTION

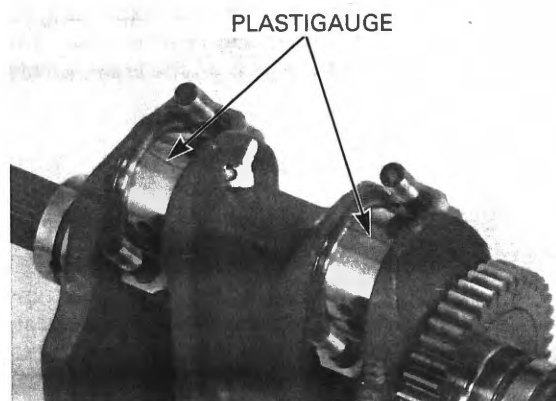
Inspect the bearing inserts for unusual wear, damage or peeling and replace if necessary.



CRANK PIN OIL CLEARANCE

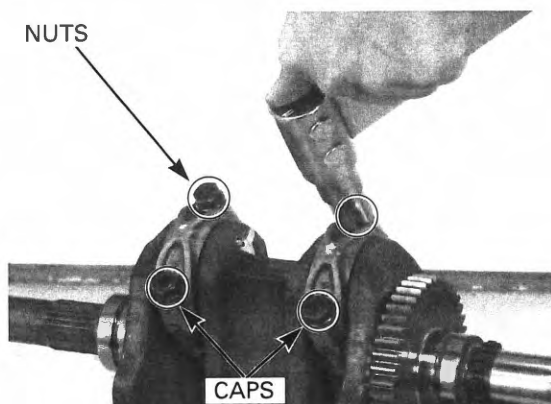
Do not rotate the crankshaft during inspection.

Clean off any oil from the connecting rod bearing inserts and crank pin. Put a strip of plastigauge on each crank pin, avoiding the oil hole.



Apply oil engine to the connecting rod bearing cap nut threads and seating surface. Install the connecting rod bearing and bearing cap to the original location. Install and tighten the connecting rod bearing cap nuts in a crisscross pattern in several steps.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



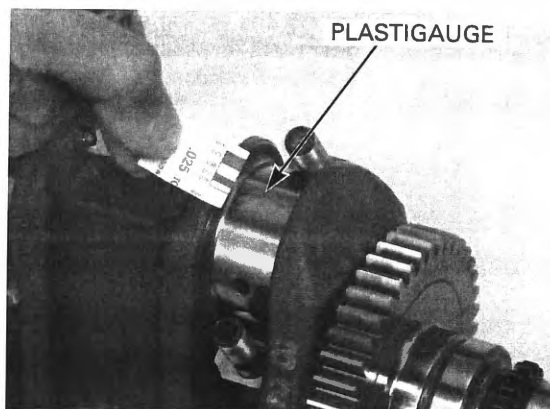
CRANKCASE/CRANKSHAFT/BALANCER

Remove the connecting rod bearing cap nuts, bearing cap and bearing.

Measure the compressed plastigauge at its widest point on each crank pin 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.



CONNECTING ROD BEARING SELECTION

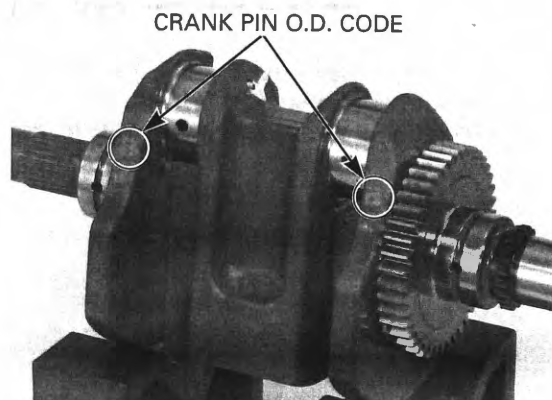
Determine the connecting rod I.D. number.

The code will be either a number 1 or 2 located on the rod in the area shown.



CONNECTING ROD I.D. NUMBER

Determine the corresponding crank pin O.D. code (or measure the crank pin O.D.). The code will be either a letter A or B on the crank weight.



Cross reference the crank pin and connecting rod codes to determine the replacement bearing color.

Unit: mm (in)

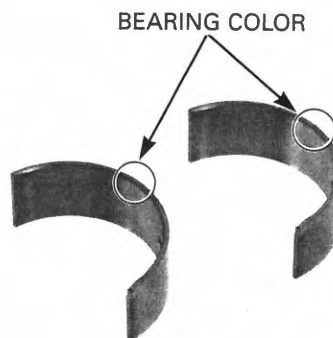
Crank pin O.D. code Connecting rod I.D. number		A	B
		42.982 – 42.990 (1.6922 – 1.6925)	42.974 – 42.981 (1.6919 – 1.6922)
1	46.000 – 46.007 (1.8110 – 1.8113)	C (Yellow)	B (Green)
2	46.008 – 46.016 (1.8113 – 1.8116)	B (Green)	A (Brown)

BEARING INSERT THICKNESS:

A (Brown): 1.500 – 1.504 mm (0.0591 – 0.0592 in)

B (Green): 1.496 – 1.499 mm (0.0589 – 0.0590 in)

C (Yellow): 1.492 – 1.495 mm (0.0587 – 0.0589 in)



CRANKSHAFT/CRANKCASE SELECTION

Crankcase and crankshaft are select fitted.

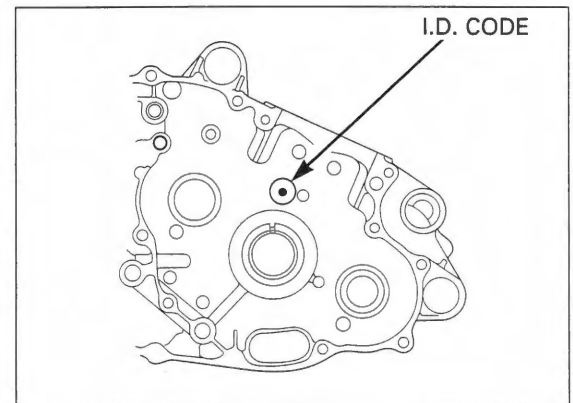
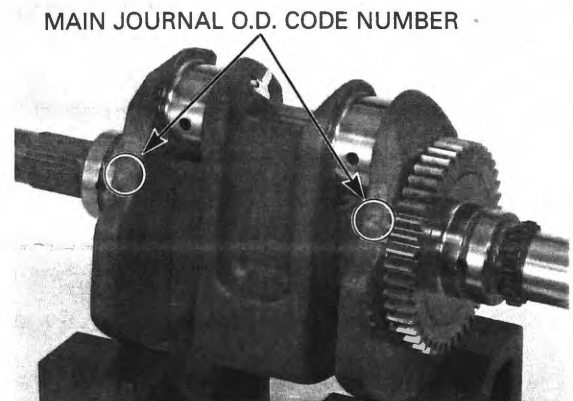
Record the main journal O.D. code number (1 or 2).

Record the main journal bearing I.D. code (A or Nothing).

If the crankcase and/or crankshaft are replaced, select them with the following fitting table.

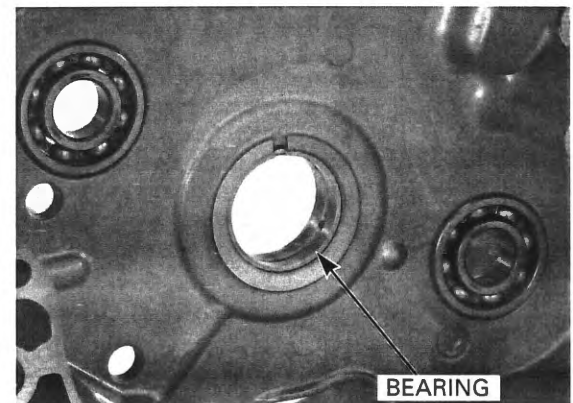
Main journal O.D. code	1	2
Main journal bearing I.D. code		
A	O	O
Nothing		O

The "O" mark in the table indicates that mating is possible in the crossed codes.



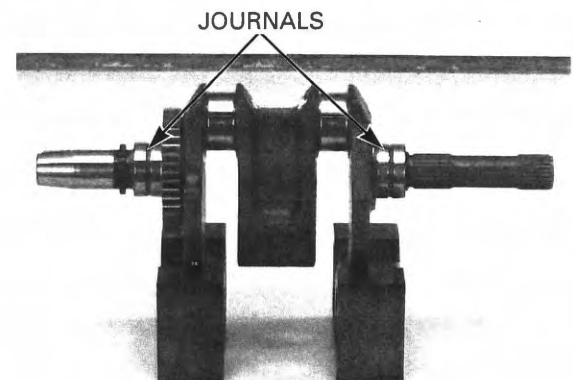
MAIN BEARING INSPECTION

Inspect the bearing inserts for unusual wear, damage or peeling and replace the crankcase if necessary.



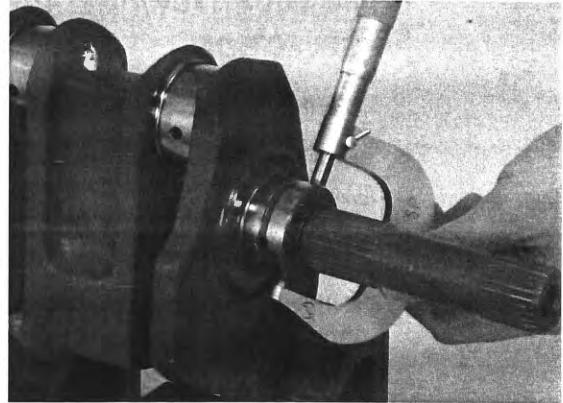
MAIN BEARING OIL CLEARANCE

Clean off any oil from the main bearing inserts and crankshaft journals.



CRANKCASE/CRANKSHAFT/BALANCER

Measure and record the crankshaft main journal O.D..



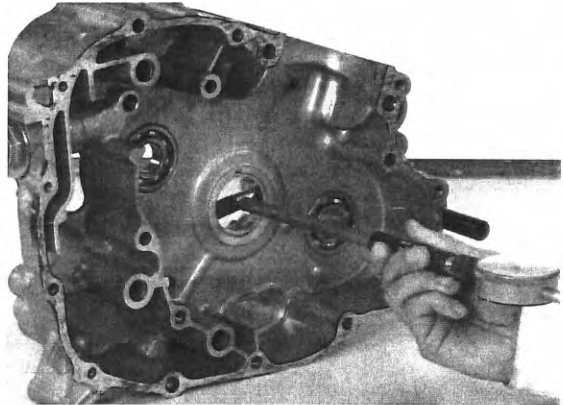
Measure and record the main bearing I.D..

Calculate the oil clearance by subtracting the journal O.D. from bearing I.D..

STANDARD: 0.025 – 0.041 mm (0.0010 – 0.0016 mm)

SERVICE LIMIT: 0.07 mm (0.003 in)

Replace the crankcase if the service limit is exceeded.
Select the replacement crankcase (page 13-7).



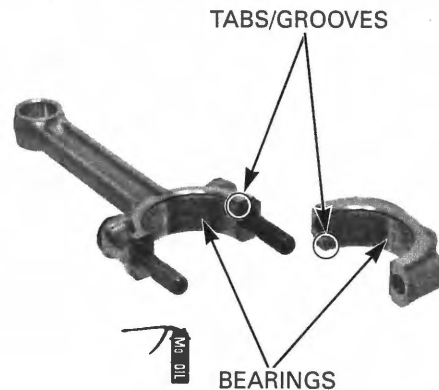
Be sure that each part is installed in its original position.

ASSEMBLY

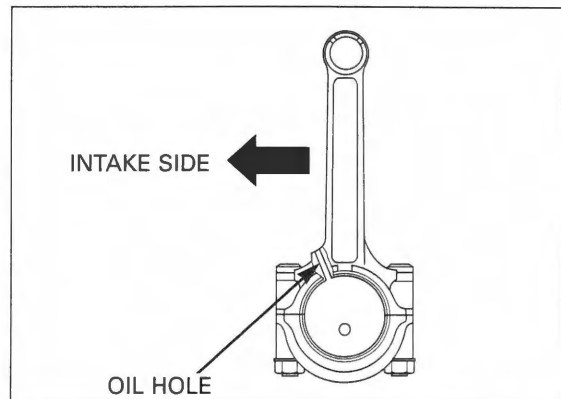
Clean off any oil from the main bearing inserts and connecting rod bearing cap.

Apply molybdenum disulfide oil to the bearings.

Install the main bearing to the connecting rod and bearing cap aligning the tab on the bearing with the groove on the connecting rod and bearing cap.

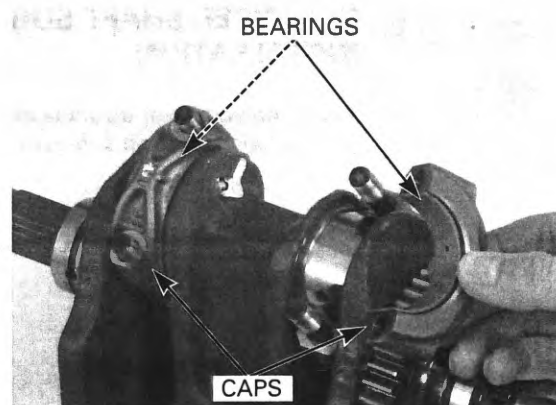


Install the connecting rods with its oil holes facing intake side as shown.



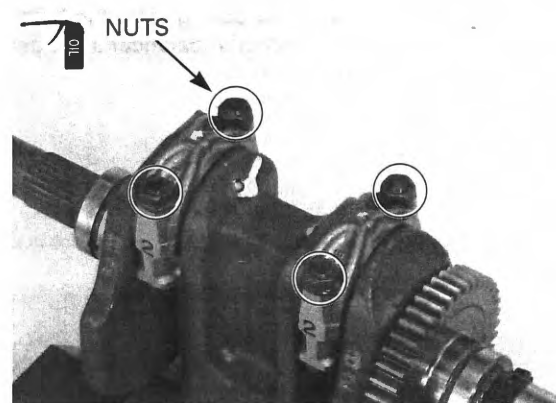
Align the I.D. code on the bearing cap and connecting rod.

Install the bearing caps on the crank pin.



Apply oil to the connecting rod bearing cap bolt/nut threads and flange surface. Install and tighten the connecting rod bearing cap nuts to the specified torque in several steps.

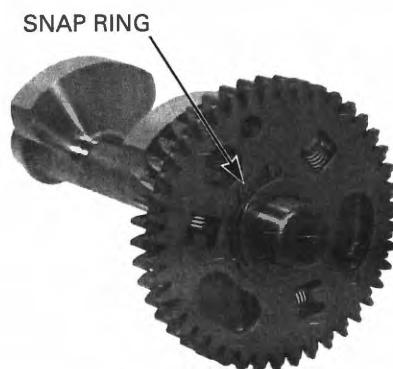
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



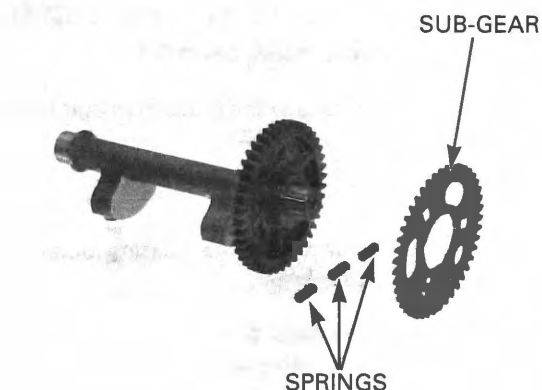
BALANCER SHAFT

BALANCER SHAFT SUB-GEAR REMOVAL

Remove the snap ring.

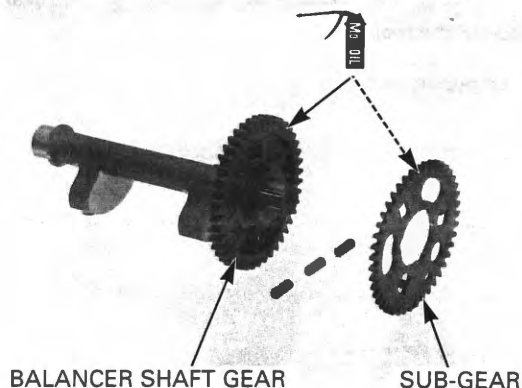


Remove the balancer shaft sub-gear and springs.

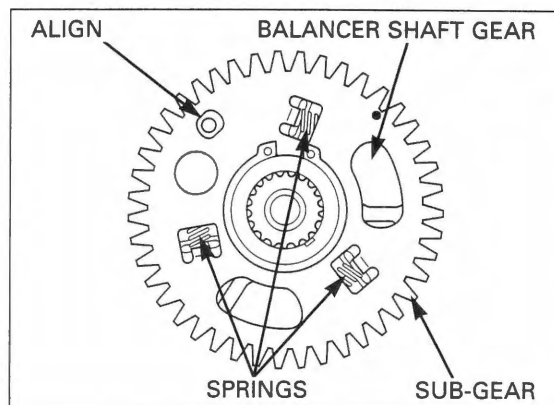


BALANCER SHAFT SUB-GEAR INSTALLATION

Apply molybdenum disulfide oil to the balancer shaft gear-to-balancer shaft sub-gear sliding surface.



Install the springs into the balancer shaft gear. Assemble the balancer shaft gear and sub-gear as shown.



Install the washer and snap ring.

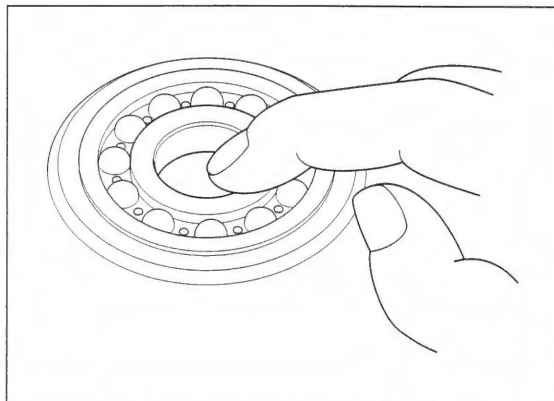


BALANCER SHAFT BEARING REPLACEMENT

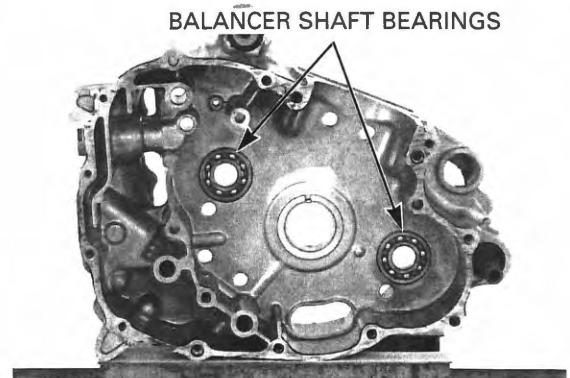
Remove the crankshaft and balancer shaft (page 13-3).

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the crankcase.

Replace the bearings if the races does not turn smoothly and quietly, or if they fit loosely in the crankcase.



Remove the balancer shaft bearings from the right crankcase.



Remove the balancer shaft bearings from the left crankcase using the special tools.

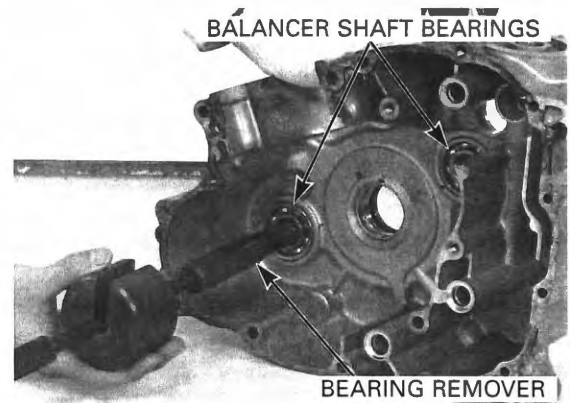
TOOLS:

Remover weight

07741-0010201 or
07936-371020A or
07936-3710200
(U.S.A. only)
07936-3710100
07936-3710600

Remover handle

Bearing remover, 20 mm



Install the new bearings to the right crankcase using the special tools.

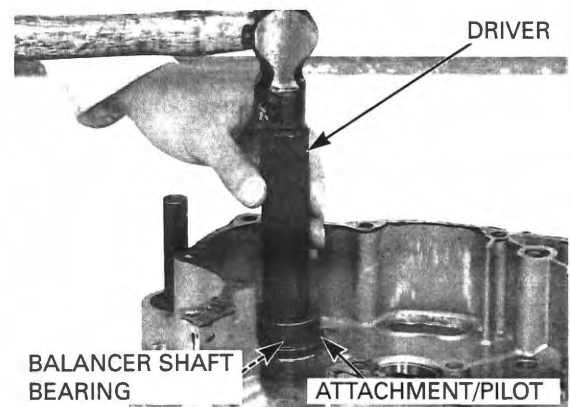
TOOLS:

Driver

Attachment, 42 x 47 mm

Pilot, 20 mm

07749-010000
07746-0010300
07746-0040500



Install the new bearings to the left crankcase using the special tools.

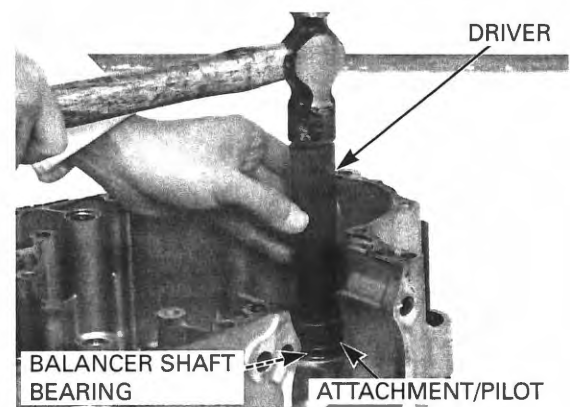
TOOLS:

Driver

Attachment, 42 x 47 mm

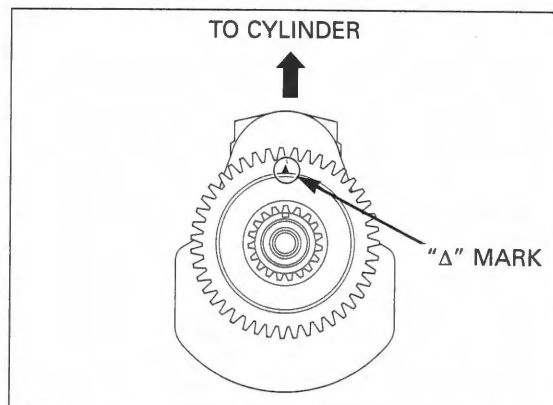
Pilot, 20 mm

07749-010000
07746-0010300
07746-0040500

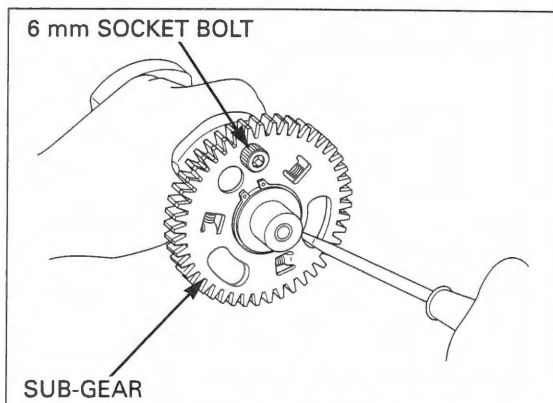


CRANKCASE ASSEMBLY

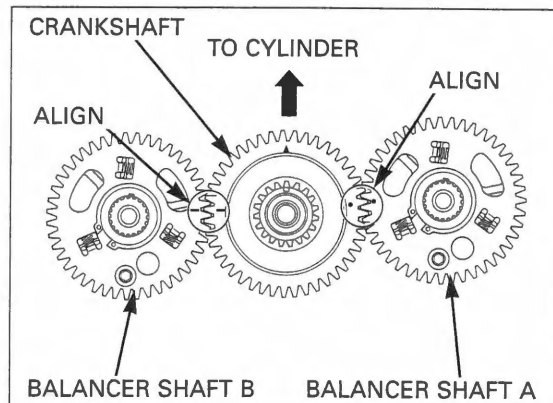
Install the crankshaft/connecting rod to the left crankcase with the "Δ" mark on the crankshaft facing the cylinder side.



Turn the balancer shaft sub-gear clockwise and align the teeth on the sub-gear and balancer shaft gear. Install the suitable 6 mm socket bolt into the bolt holes on the gears, then tighten the bolt temporarily.

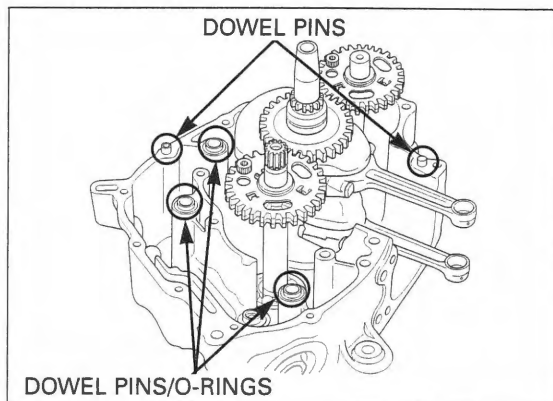


Install the balancer shaft A to align the "O" mark with the punch mark on the crankshaft. Install the balancer shaft B to align the index line with the index line on the crankshaft.

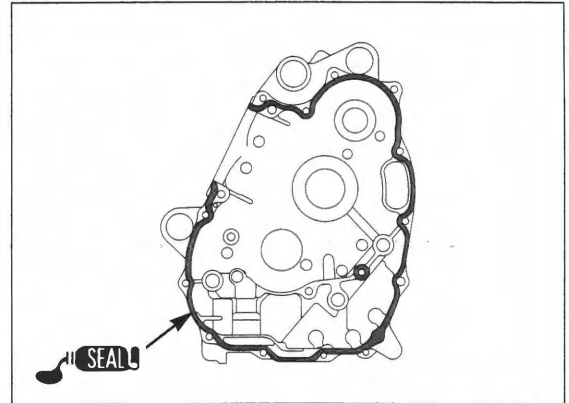


Clean the right and left crankcase mating surface thoroughly, being careful not to damage them.

Install the dowel pins and O-rings.



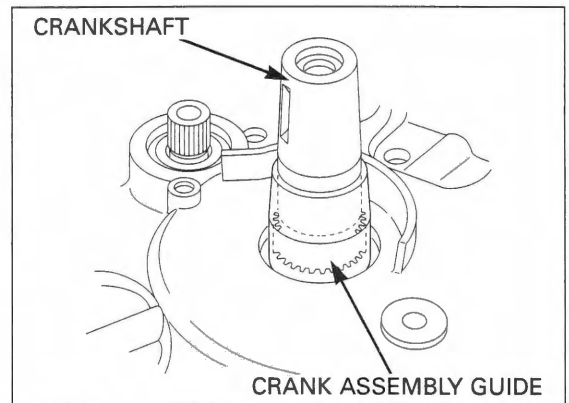
Apply a light but through coating of sealant to all crankcase mating surfaces except the oil passage area.



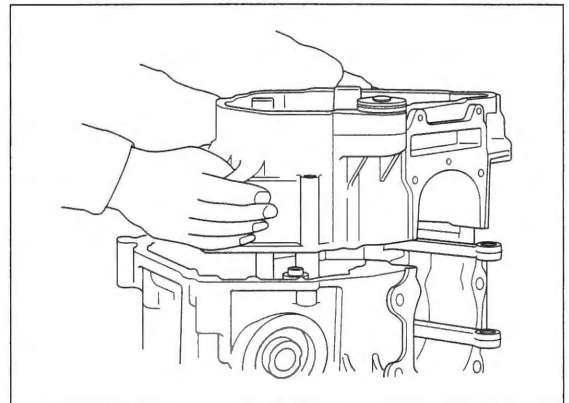
Install the special tool to the crankshaft.

TOOL:
Crank assembly guide

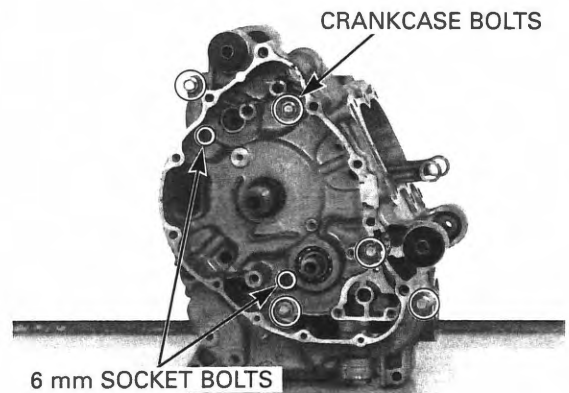
07ZMG-MCT0100 or
07ZMG-MCTA100
(U.S.A. only)



Install the right crankcase over the left crankcase.
Remove the special tool.



Install the right crankcase bolts and tighten them in a crisscross pattern in 2 – 3 steps.
Remove the 6 mm socket bolts.



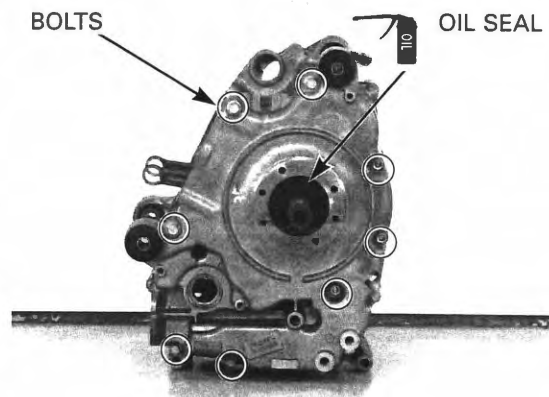
CRANKCASE/CRANKSHAFT/BALANCER

Install the left crankcase bolts and tighten them in a crisscross pattern in 2 – 3 steps.

Make sure that the crankshaft turns smoothly.

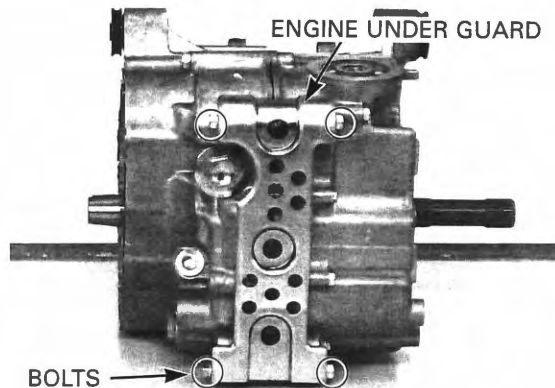
Apply oil to a new crankshaft oil seal lip and outer surface.

Install the crankshaft oil seal until it is flush with the crankcase surface.



Install the engine under guard and tighten the bolts.

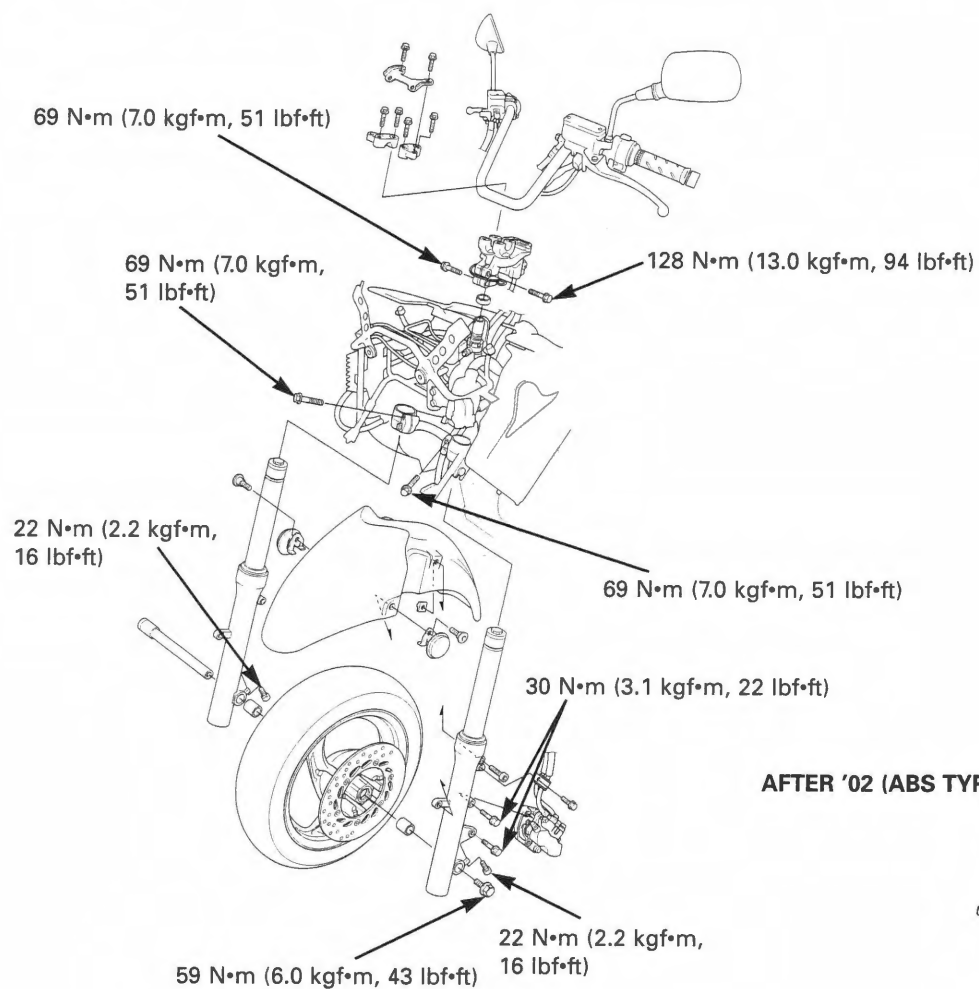
Install the removed parts in the reverse order of removal.



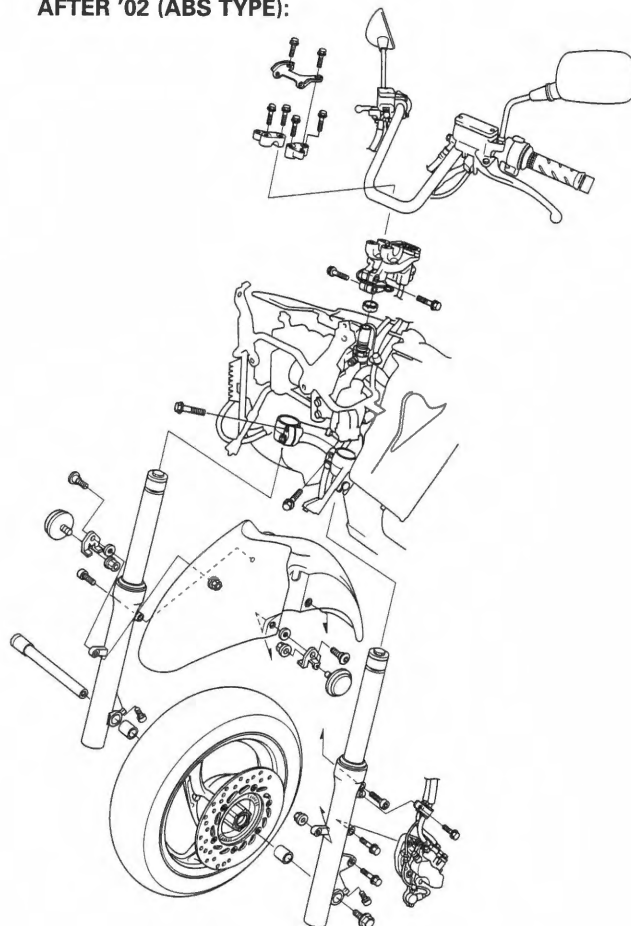
MEMO

FRONT WHEEL/SUSPENSION/STEERING

STD TYPE:



AFTER '02 (ABS TYPE):



14. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	14-1	FORK	14-8
TROUBLESHOOTING	14-2	STEERING HANDLE	14-18
FRONT WHEEL	14-3	STEERING STEM	14-26

SERVICE INFORMATION

GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated parts and clean a contaminated disc with a high quality brake degreasing agent.
- This section covers the front wheel, fork, handlebar, and steering.
- A jack or other support is required to support the vehicle.
- Do not twist or bend the brake hose and pipe when servicing.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to section 16 for brake system information.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Up to maximum weight capacity	200 kPa (2.00 kgf/cm ² , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	331.4 (13.05)	325 (12.8)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	97 (3.8)	—
	Fluid capacity	302 ± 2.5 cm ³ (10.2 ± 0.08 US oz, 10.6 ± 0.09 Imp oz)	—
Steering head bearing pre-load		13 – 17 N (1.3 – 1.7 kgf, 2.9 – 3.7 lbf)	—

14

TORQUE VALUES

Handle post pinch bolt (upper)	128 N•m (13.0 kgf•m, 94 lbf•ft)
Handle post pinch bolt (lower)	69 N•m (7.0 kgf•m, 51 lbf•ft)
Steering stem nut	74 N•m (7.5 kgf•m, 54 lbf•ft)
Steering top thread	13 N•m (1.3 kgf•m, 9 lbf•ft)
Steering stem pinch bolt	69 N•m (7.0 kgf•m, 51 lbf•ft)
Front axle bolt	59 N•m (6.0 kgf•m, 43 lbf•ft)
Front fork axle holder bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)
Front fork cap	23 N•m (2.3 kgf•m, 17 lbf•ft)
Front fork socket bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)
Front brake disc bolt	42 N•m (4.3 kgf•m, 31 lbf•ft)
Handlebar lower holder nut	39 N•m (4.0 kgf•m, 29 lbf•ft)

See page 14-30

Apply a locking agent to the threads.
ALOC bolt: replace with a new one.

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

Adjustable pin spanner	07702-0020001	
Remover weight	07741-0010201	or 07936-371020A or 07936-3710200 (U.S.A. only)
Attachment, 42 x 47 mm	07746-0010300	
Attachment, 52 x 55 mm	07746-0010400	
Attachment, 40 x 42 mm	07746-0010900	
Attachment, 30 mm	07746-0030300	
Pilot, 20 mm	07746-0040500	
Bearing remover shaft	07746-0050100	
Bearing remover head, 20 mm	07746-0050600	
Driver	07749-0010000	
Lock nut wrench	07916-KM10000	
Slider weight	07947-KA50100	
Fork seal driver attachment, 41 mm	07947-KF00100	
Ball race remover	07953-4250002	or 07953-MJ1000B (U.S.A. only)
Bearing remover shaft	07JAC-PH80200	not available in U.S.A.
Adjustable bearing remover	07YAC-0010101	not available in U.S.A.
Slide hammer 3/8 x 16		commercially available in U.S.A.
Adjustable bearing puller 25 – 40 mm	07736-A01000B	

TROUBLESHOOTING

Hard steering

- Steering stem top thread too tight
- Worn or damaged steering bearings
- Worn or damaged steering bearing races
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

Steers to one side or does not track straight

- Damaged or loose steering bearings
- Bent fork
- Bent front axle: wheel installed incorrectly
- Bent frame
- Faulty front tire
- Worn or damaged front wheel bearings
- Worn or damaged engine mounting bushings (section 7)

Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty front tire
- Loose front axle fasteners

Wheel turns hard

- Faulty front wheel bearings
- Bent front axle
- Brake drag (section 16)

Soft suspension

- Weak fork spring
- Insufficient fluid in fork
- Deteriorated fork fluid
- Incorrect fork fluid weight
- Low tire pressure

Hard suspension

- Bent fork tube
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage
- High tire pressure

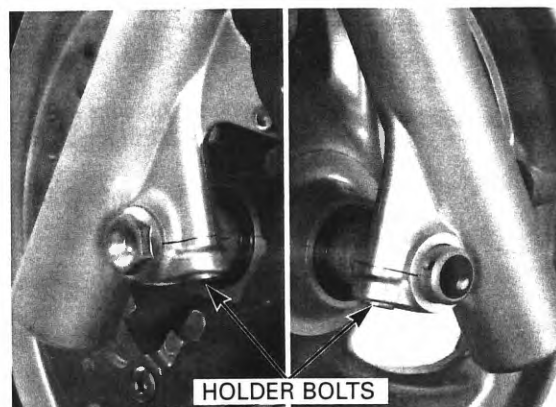
Front suspension noise

- Worn slider or fork tube bushing
- Insufficient fluid in fork
- Loose fork fasteners

FRONT WHEEL

REMOVAL

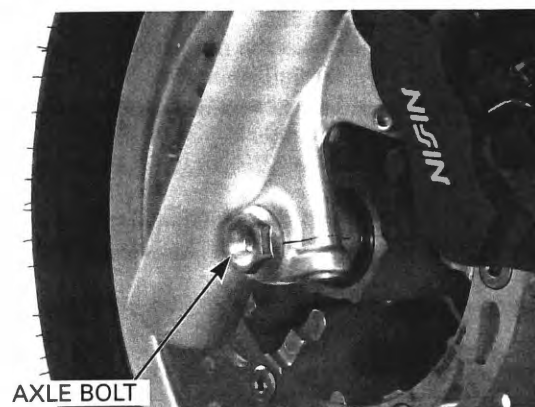
Loosen the right and left front axle holder bolts.



Loosen the front axle bolt.

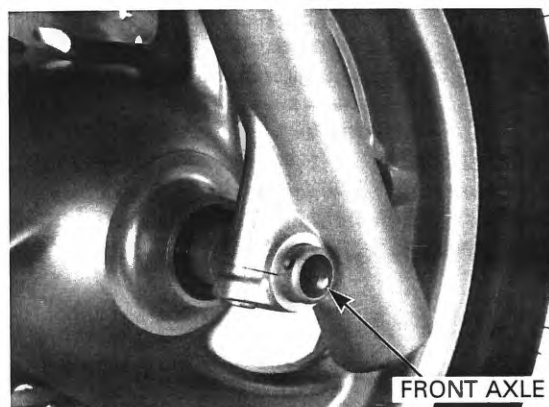
Support the scooter using a hoist or equivalent and raise the front wheel off the ground.

Remove the front axle bolt.

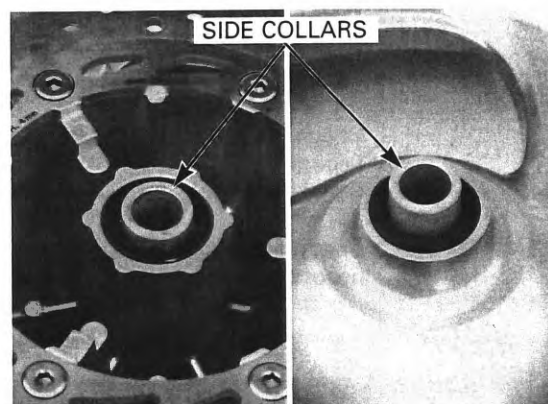


Do not operate the front and rear brake lever after removing the front wheel.

Pull the front axle out and remove the front wheel.



Remove the right and left side collar from the wheel hub.



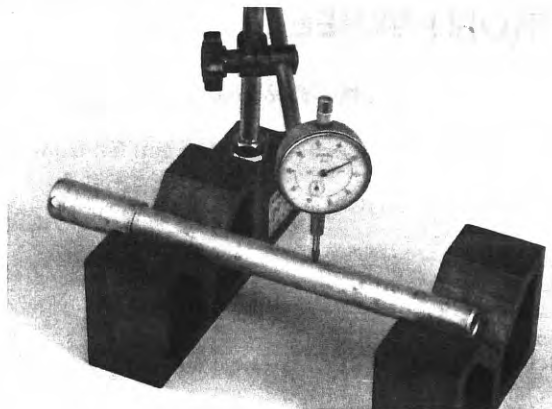
FRONT WHEEL/SUSPENSION/STEERING

INSPECTION

AXLE

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

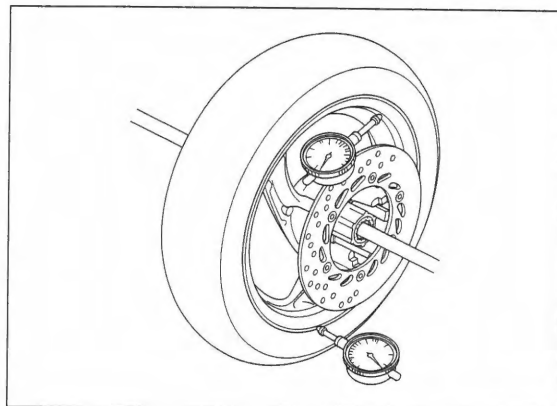
SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL

Check the rim runout by placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

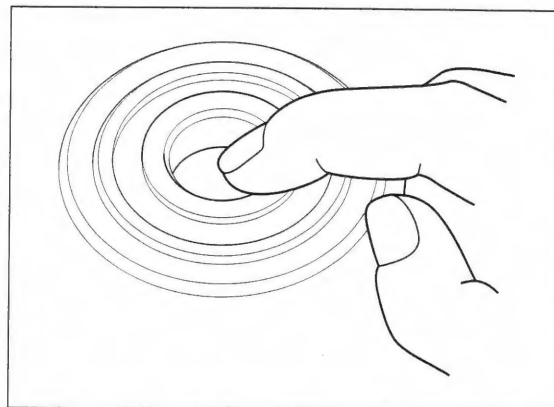


WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.



DISASSEMBLY

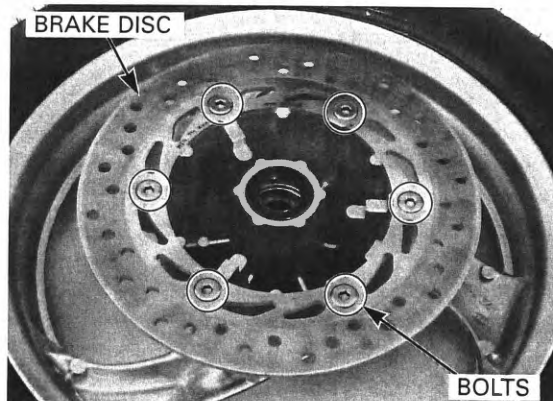
Remove the brake disc bolts and brake disc.

Check the brake disc for wear or damage, replace if necessary.

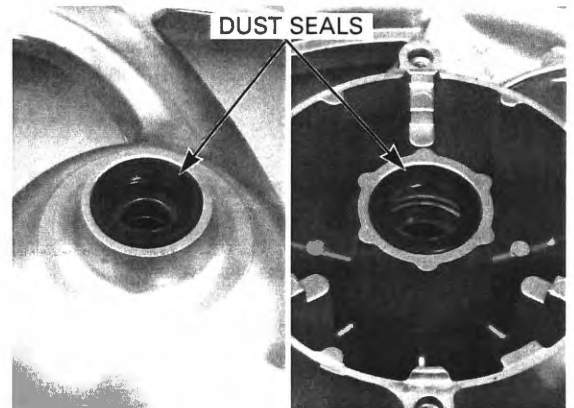
AFTER '02 (ABS TYPE):

Remove the pulser ring bolts and pulser ring.

Check the pulser ring for clacks or damage, replace if necessary.



Remove the dust seals.

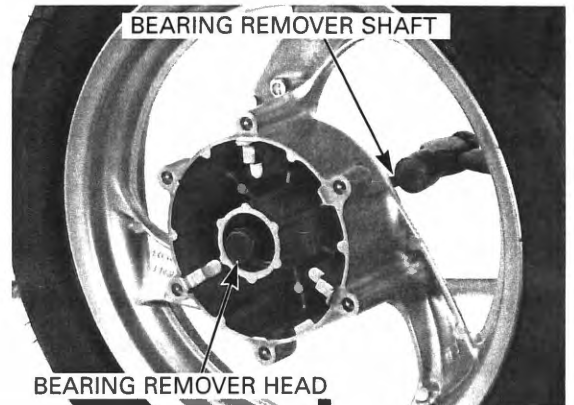


Replace the wheel bearings in pairs. Do not reuse old bearings.

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. Remove the distance collar and drive out the other bearing.

TOOLS:

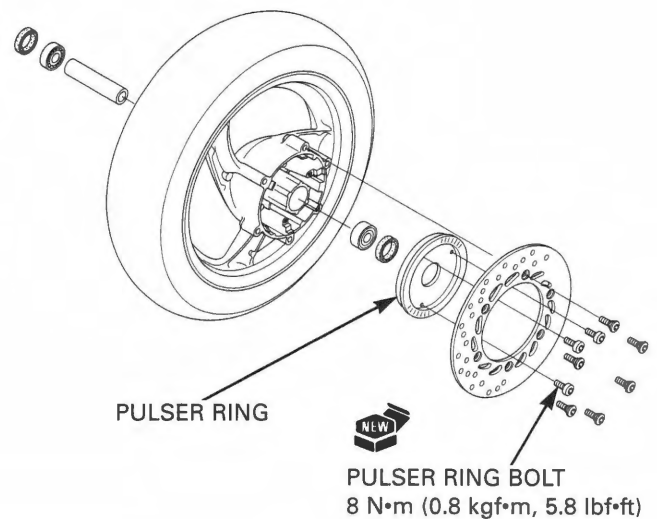
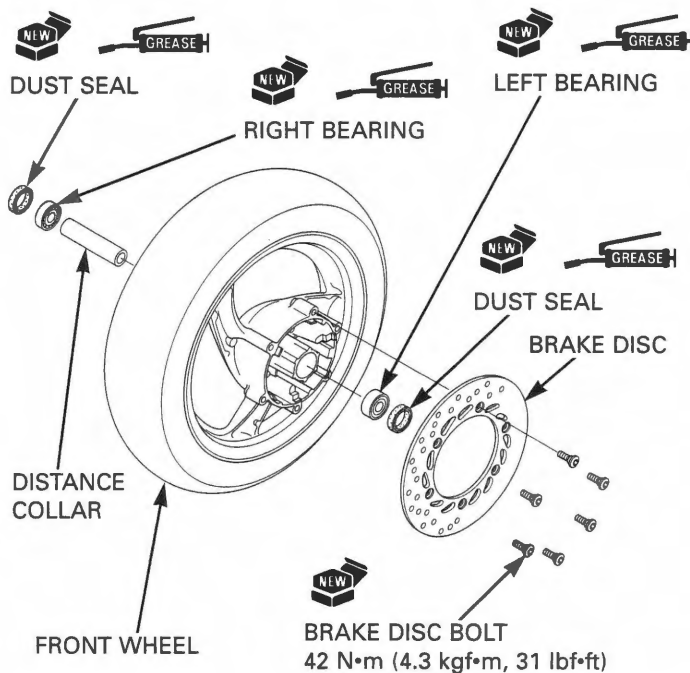
Bearing remover shaft 07746-0050100
Bearing remover head, 20 mm 07746-0050600



ASSEMBLY

STD TYPE:

AFTER '02 (ABS TYPE):



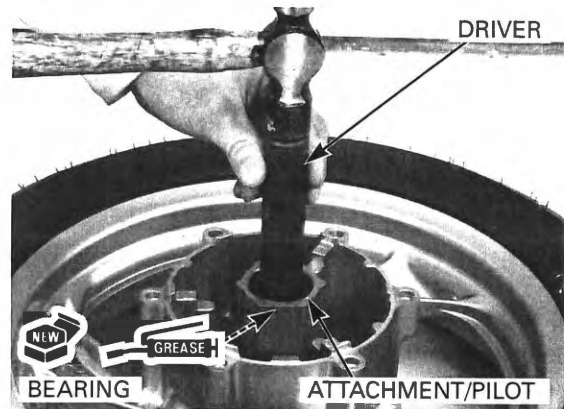
FRONT WHEEL/SUSPENSION/STEERING

Pack the new bearing cavities with grease.
Drive the new left bearing squarely with the sealed side facing up until it is fully seated.

TOOLS:

Driver	07749-0010000
Attachment, 40 x 42 mm	07746-0010900
Pilot, 20 mm	07746-0040500

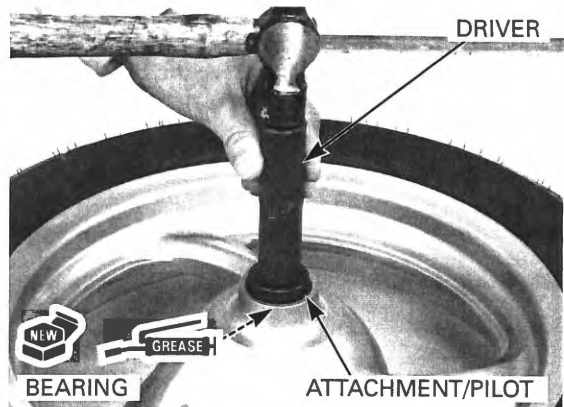
Install the distance collar.



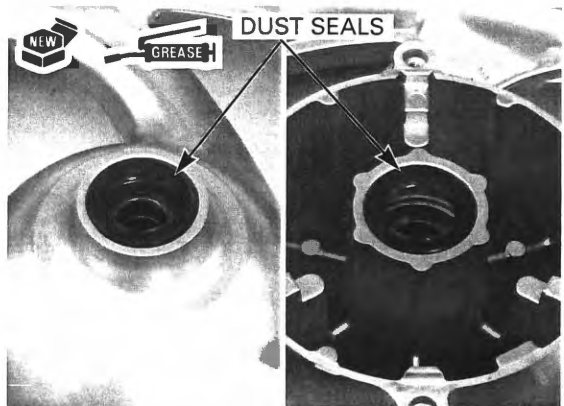
Drive a new right bearing squarely with the sealed side facing up until it is fully seated.

TOOLS:

Driver	07749-0010000
Attachment, 40 x 42 mm	07746-0010900
Pilot, 20 mm	07746-0040500



Apply grease to the new dust seal lips.
Install the dust seals into the wheel hub until there are flush with the wheel hubs.



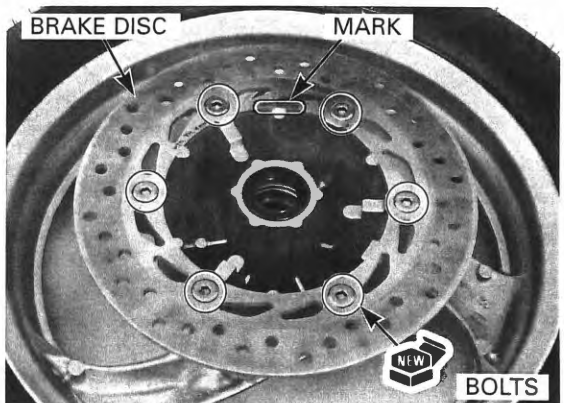
Install the brake disc onto the wheel hub with the marked side facing out.
Install new disc bolts and tighten them to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

AFTER '02 (ABS
TYPE):

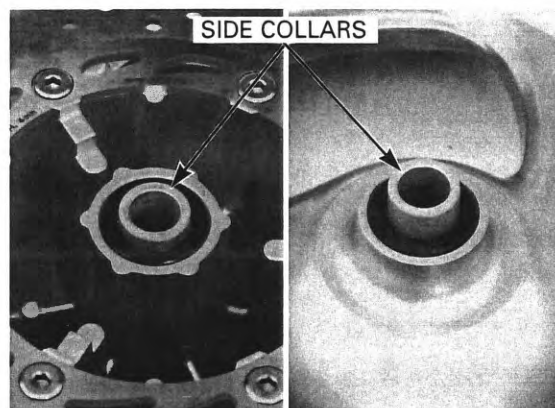
Install the pulser ring onto the wheel hub.
Install the new pulser ring bolts and tighten them to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)



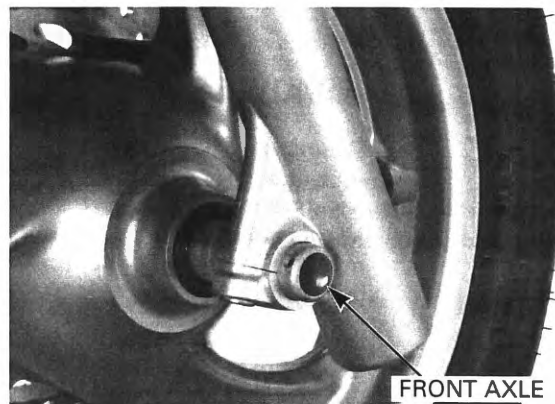
INSTALLATION

Install the side collars into the wheel hub.



Be careful not to damage the brake pads.

Install the front wheel between the fork leg while inserting the disc between the pads. Install the front axle from the right side.

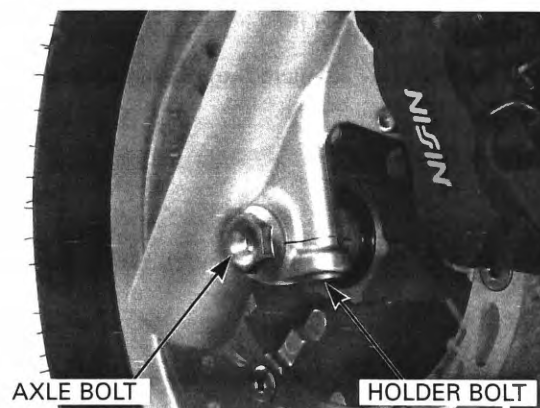


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

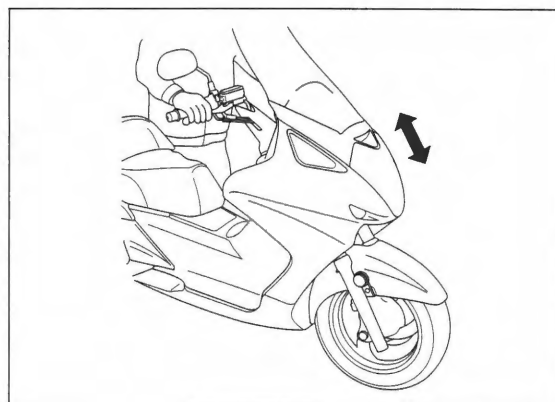
Tighten the left axle holder bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.

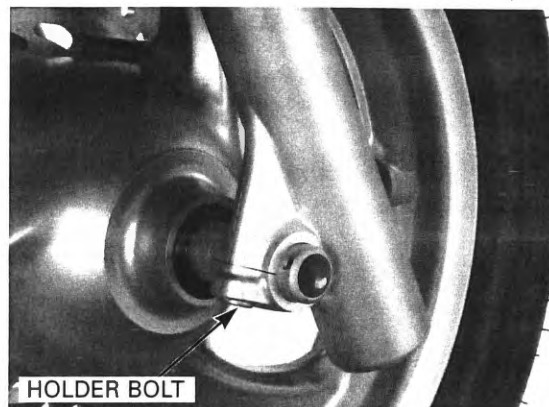
Check the brake operation by applying the brake lever.



FRONT WHEEL/SUSPENSION/STEERING

Tighten the right axle holder bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

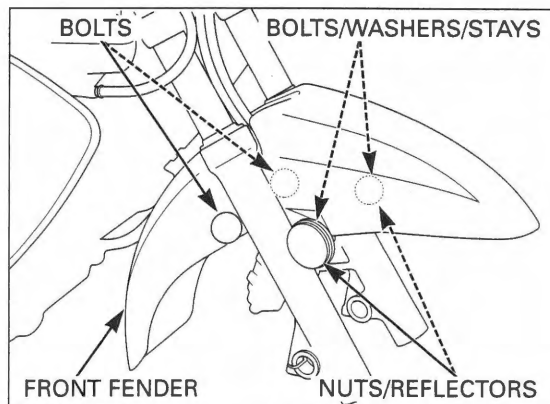


FORK

REMOVAL

Remove the following:

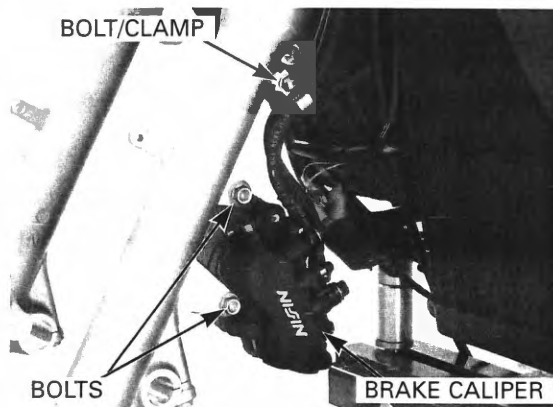
- Front wheel (page 14-3)
- Nuts and both reflectors
- Front side two bolts, washers and reflector stays
- Rear side two bolts and front fender



Remove the bolt and brake hose clamp.

Support the brake caliper so that it does not hang from the brake hose. Do not twist the brake hose.

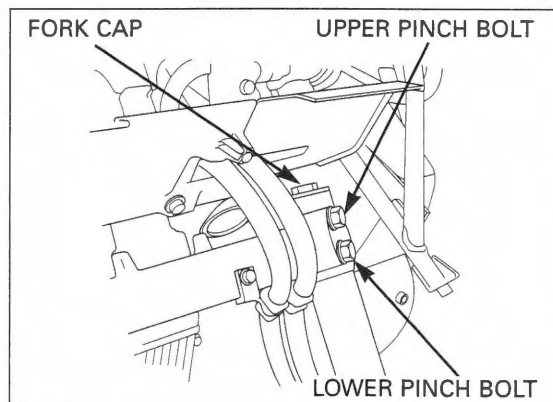
Remove the mount bolts and front brake caliper from the fork leg.



Remove the upper fork pinch bolt.

When the fork is ready to be disassembled, loosen the fork cap, but do not remove it.

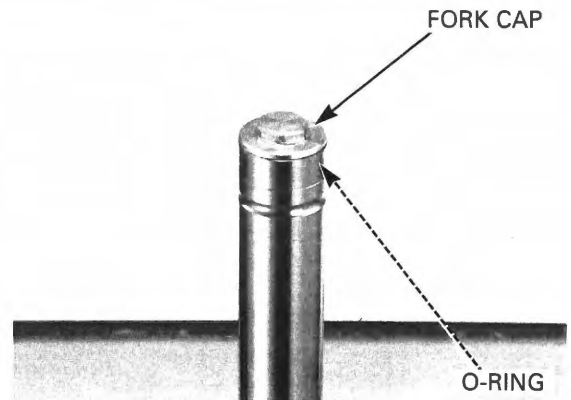
Loosen the lower fork pinch bolt and remove the fork tube from the steering stem.



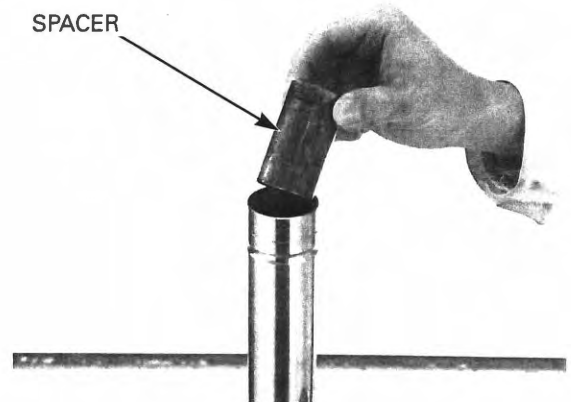
DISASSEMBLY

Remove the fork cap and O-ring from the fork tube.

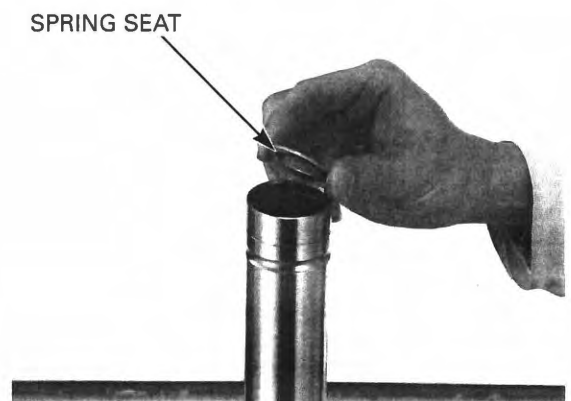
The fork cap is under spring pressure. Use care when removing it and wear eye and face protection.



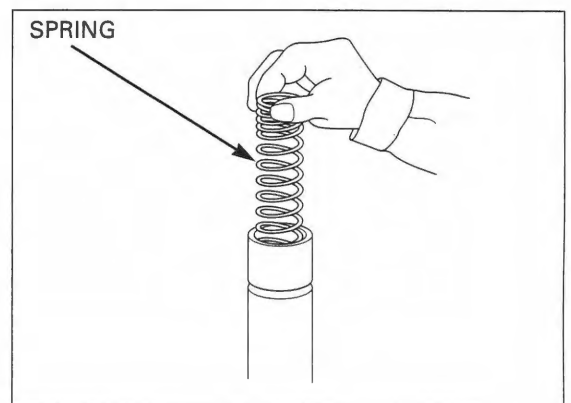
Remove the spring spacer from the fork tube.



Remove the spring seat from the fork tube.

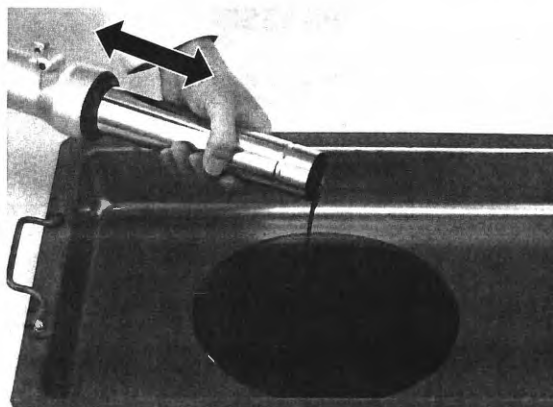


Remove the fork spring from the fork tube.



FRONT WHEEL/SUSPENSION/STEERING

Pour the fork oil from the fork leg by pumping the fork 8 – 10 times.



Do not over tighten the fork slider.

Hold the axle holder in a vise with a piece of wood or soft jaws to avoid damage.

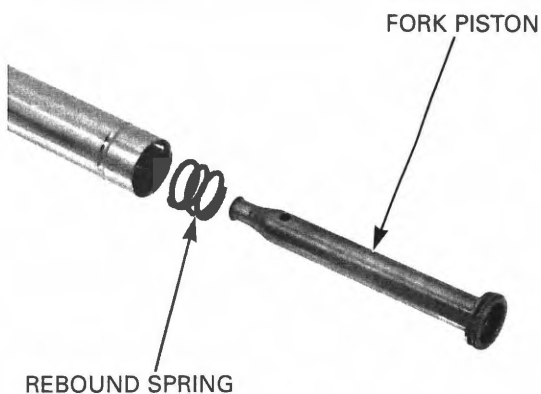
Loosen and remove the fork socket bolt and sealing washer from the bottom case.

If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spring spacer and fork cap.

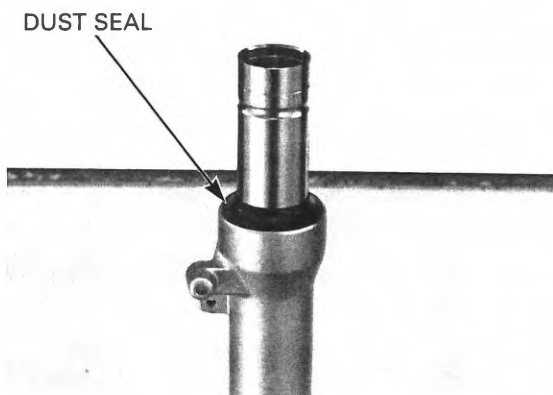


Do not remove the fork piston ring, unless it is necessary to replace with a new one.

Remove the fork piston and rebound spring.



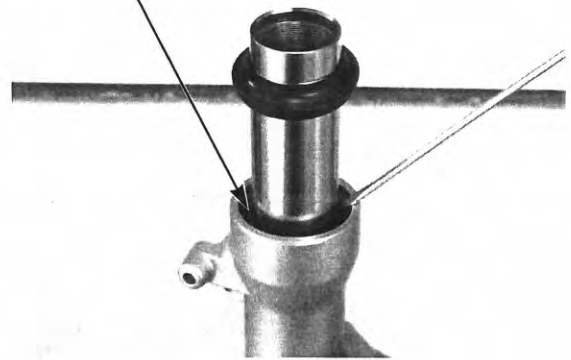
Remove the dust seal from the bottom case.



*Do not scratch
the fork tube
sliding surface.*

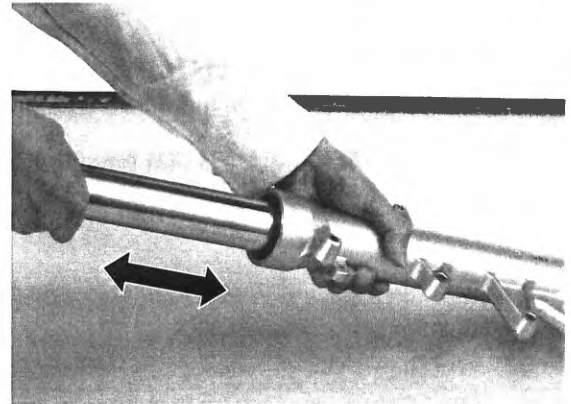
Remove the stopper ring from the groove on the bottom case.

STOPPER RING



Check that the fork tube moves smoothly in the bottom case. If it does not, check the fork tube for bending or damage, and bushings for wear or damage.

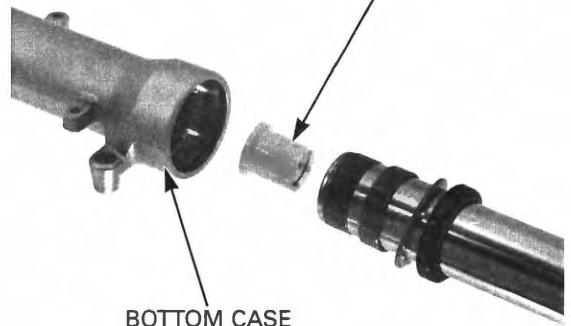
Using quick successive motions, pull the fork tube out of the bottom case.



Remove the oil lock piece from the bottom case.

OIL LOCK PIECE

BOTTOM CASE

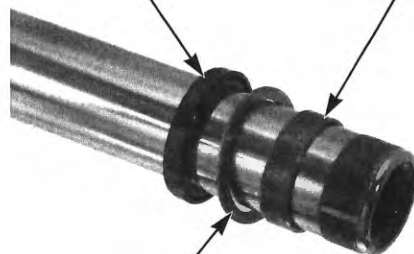


Remove the oil seal, back-up ring and slider bushing from the fork tube.

OIL SEAL

SLIDER BUSHING

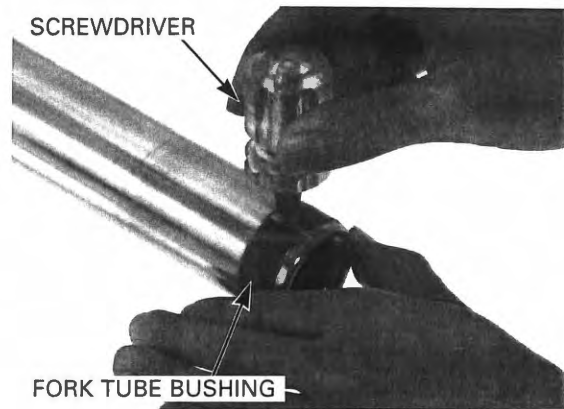
BACK-UP RING



FRONT WHEEL/SUSPENSION/STEERING

Do not remove the fork tube bushing unless it is necessary to replace it with a new one.

Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.

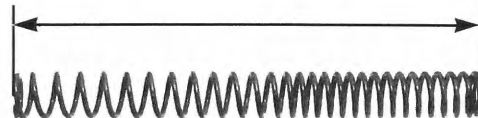


INSPECTION

FORK SPRING

Measure the fork spring free length.

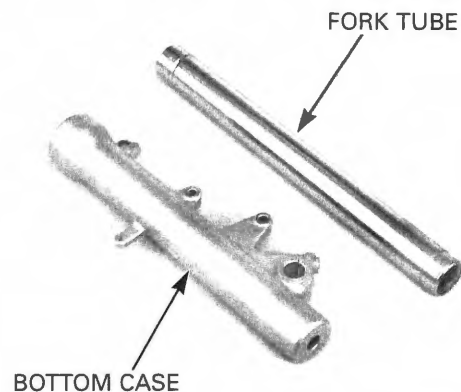
SERVICE LIMIT: 325 mm (12.8 in)



FORK TUBE/BOTTOM CASE

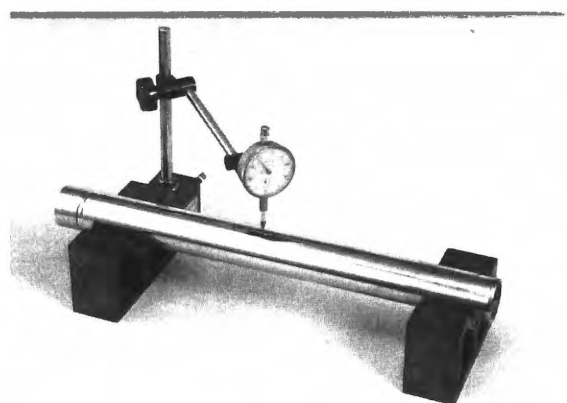
Check the fork tube and bottom case for score marks and excessive or abnormal wear.

Replace the component if necessary.



Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

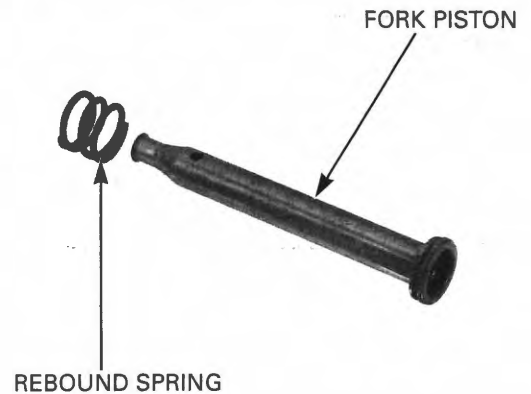


FORK PISTON

Check the fork piston for score marks and excessive or abnormal wear.

Check the rebound spring for fatigue or damage.

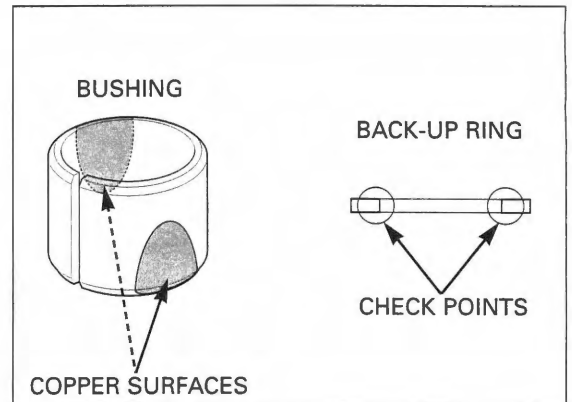
If the fork piston is removed, replace with a new one.



FORK TUBE BUSHING

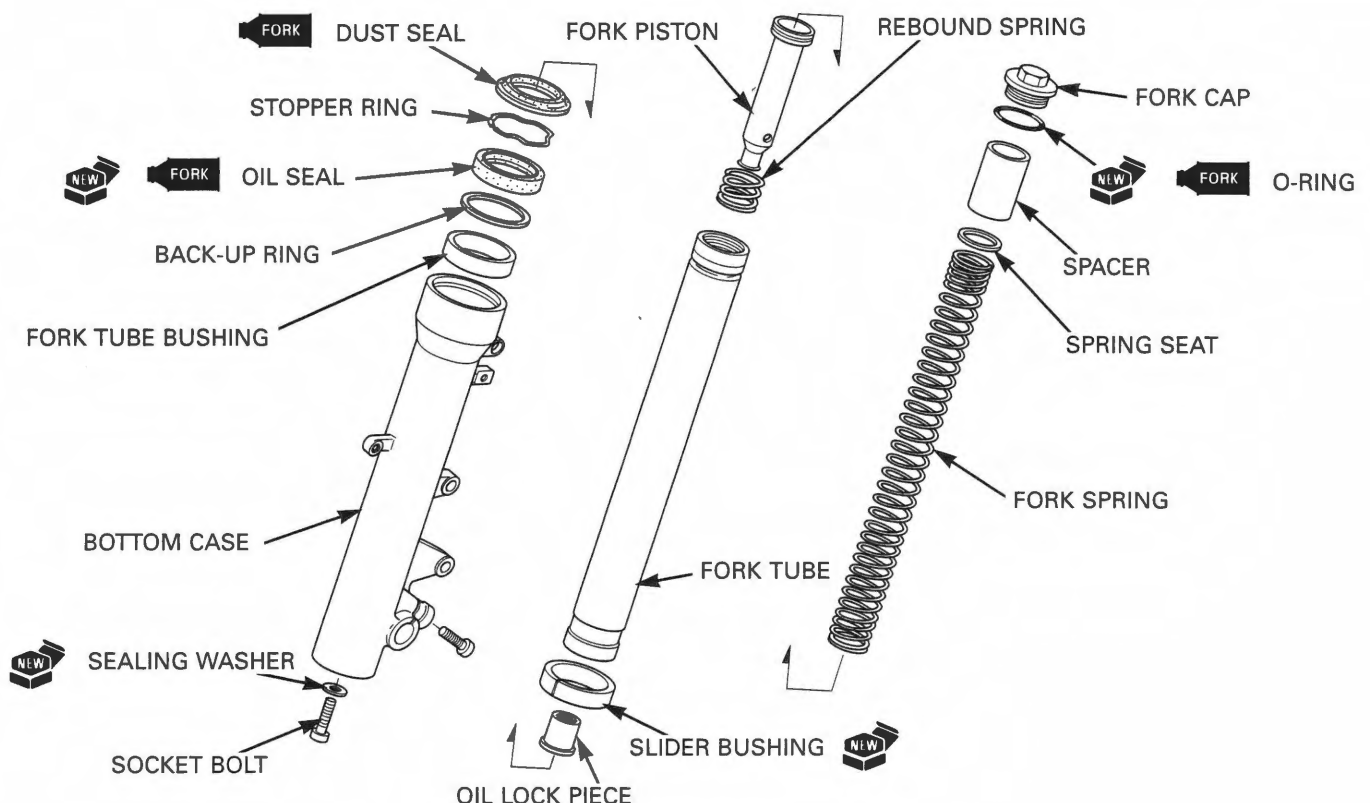
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the point shown.



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



FRONT WHEEL/SUSPENSION/STEERING

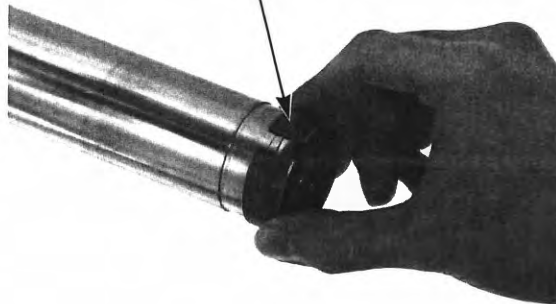
Be careful not to damage the fork tube bushing coating. Do not open the fork tube bushing more than necessary.

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install a new fork tube bushing if the tube bushing has been removed.



FORK TUBE BUSHING



Install the slider bushing and back-up ring to the fork tube.

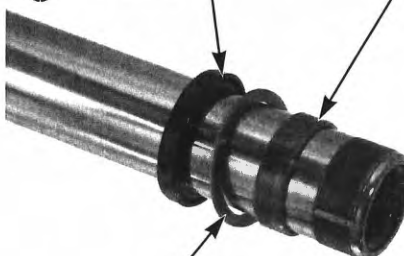
Apply fork oil to the new oil seal lip.

Install the new oil seal to the fork tube with its marking side facing up.



OIL SEAL

SLIDER BUSHING

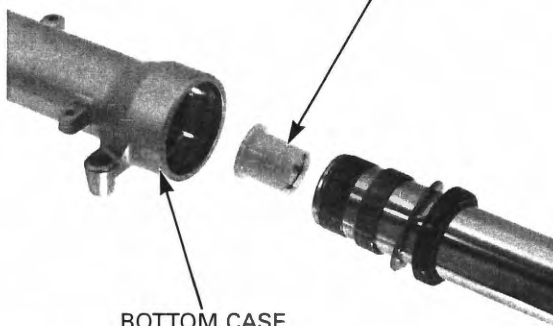


BACK-UP RING

Install the oil lock piece onto the fork piston end.

Coat the fork tube bushing with the fork oil and install the fork into the bottom case.

OIL LOCK PIECE



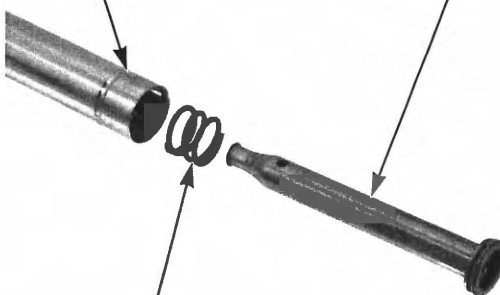
BOTTOM CASE

Install the rebound spring to the fork piston.

Install the fork piston/rebound spring into the fork tube.

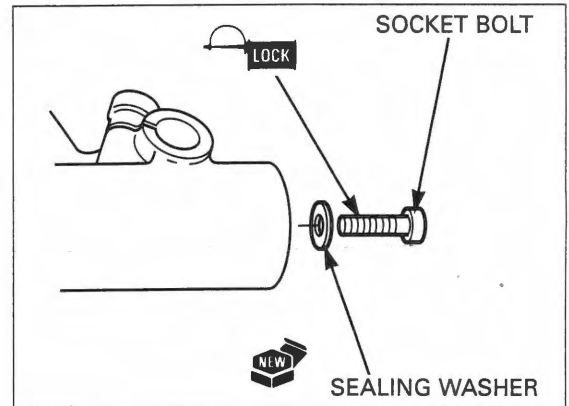
FORK TUBE

FORK PISTON



REBOUND SPRING

Apply locking agent to the socket bolt threads.
Install the socket bolt with a new sealing washer into the fork piston.



*Do not over
tighten the
fork slider.*

Hold the bottom case in a vise with a soft jaws or shop towel.

Tighten the fork socket bolt to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

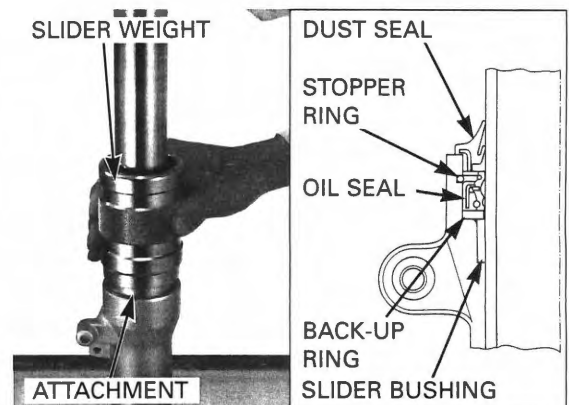
If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spring spacer and fork cap.



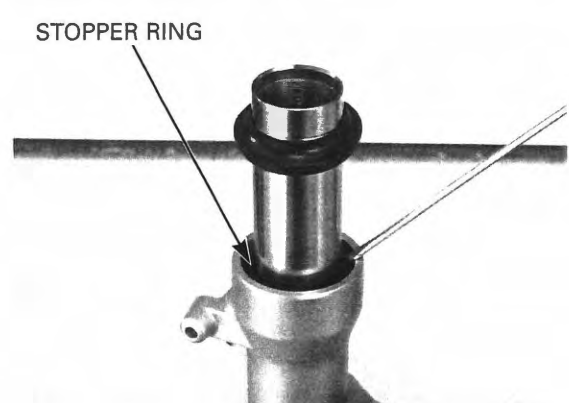
Drive the new oil seal in the fork tube until the stop ring groove is visible, using the special tools.

TOOLS:

Slider weight 07947-KA50100
Fork seal driver attachment, 41 mm 07947-KF00100

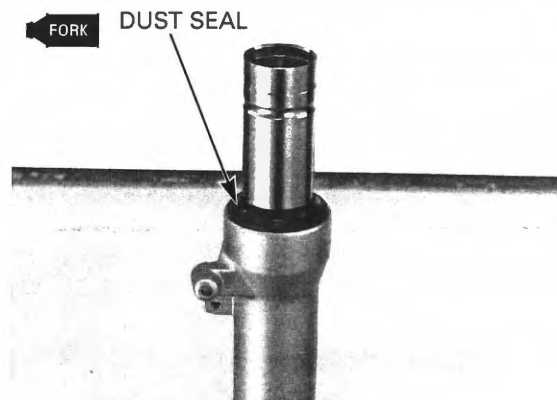


Install the stopper ring in the groove in the bottom case.



FRONT WHEEL/SUSPENSION/STEERING

Coat a dust seal lip with fork fluid and install it into the bottom case.



Pour the specified amount of recommended fork fluid in the fork tube.

RECOMMENDED FLUID: Pro Honda Suspension Fluid SS-8

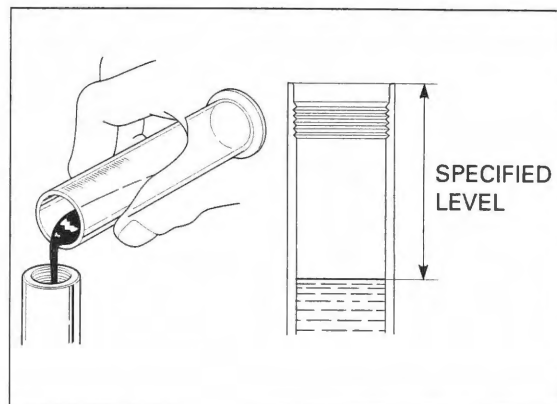
FORK FLUID CAPACITY:

$302 \pm 2.5 \text{ cm}^3$ (10.2 $\pm$ 0.08 US oz, 10.6 $\pm$ 0.09 Imp oz)

Slowly pump the fork tube several times to remove trapped air.

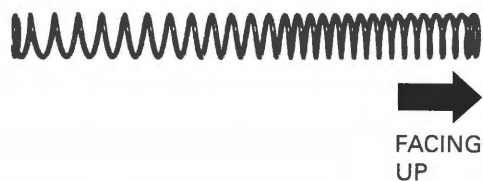
Compress the fork tube fully and measure the oil level from the top of the fork tube.

OIL LEVEL: 97 mm (3.8 in)

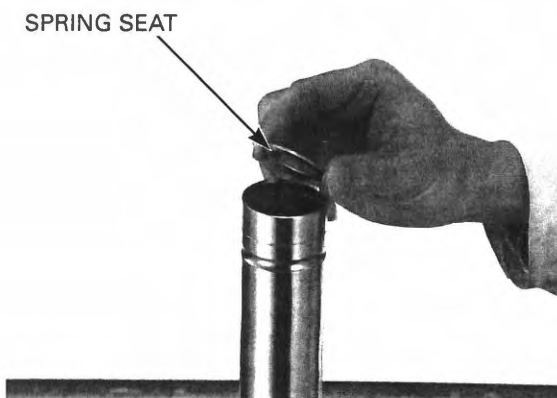


Pull the fork tube up fully.

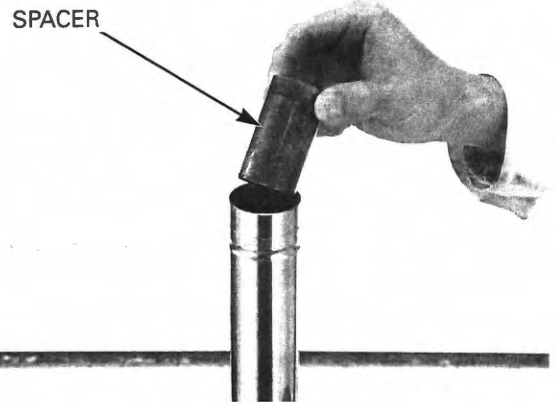
Install the fork spring with the tightly wound end facing up.



Install the spring seat.

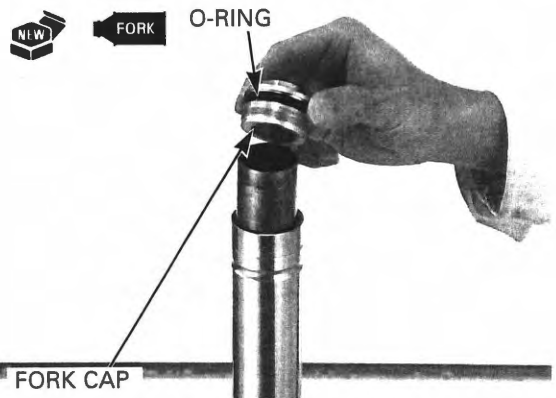


Install the spring spacer.



Apply fork oil to a new O-ring and install it on the fork cap.
Install the fork cap in the fork tube.

Tighten the fork cap after installing the fork tube in the fork bridge.



INSTALLATION

Install the fork in the steering stem and align the groove of the fork tube with the upper bolt hole in the stem, then install the upper pinch bolt.
Align the index line on the fork tube with the upper surface of the steering stem.

Tighten the steering stem lower pinch bolt to the specified torque.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

Tighten the fork cap to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the steering stem upper pinch bolt to the specified torque.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

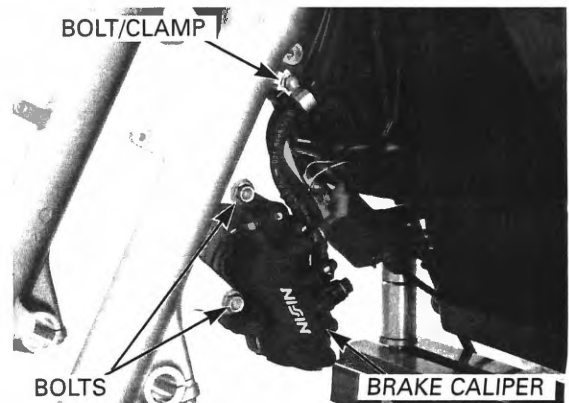
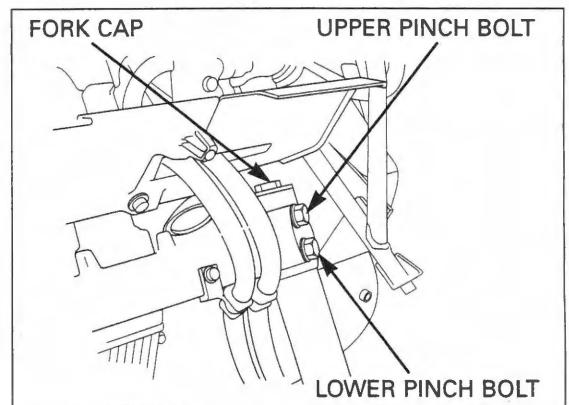
Tighten the steering stem lower pinch bolt to the specified torque.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

Install the brake caliper onto the fork leg with new mount bolts.

TORQUE: 30 N·m (3.1 kgf·m, 2.2 lbf·ft)

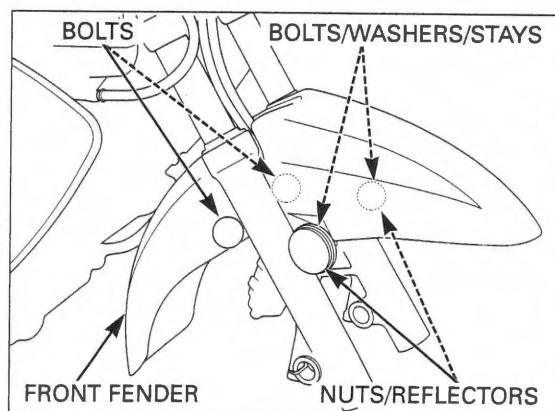
Install the brake hose clamp on the fork leg with the bolt.



FRONT WHEEL/SUSPENSION/STEERING

Install the following to fork leg:

- Rear side two bolts and front fender
- Reflector stays, washers and front side two bolts
- Nuts and both reflectors
- Front wheel (page 14-7)



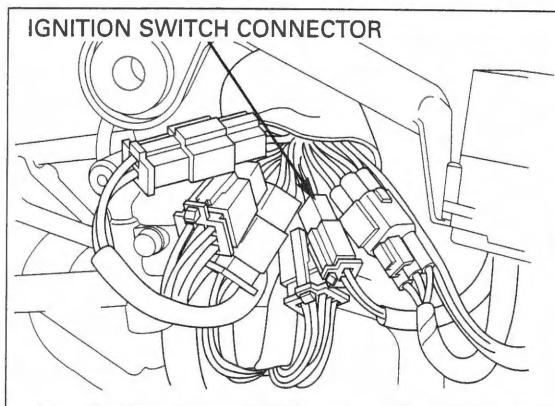
STEERING HANDLE

REMOVAL

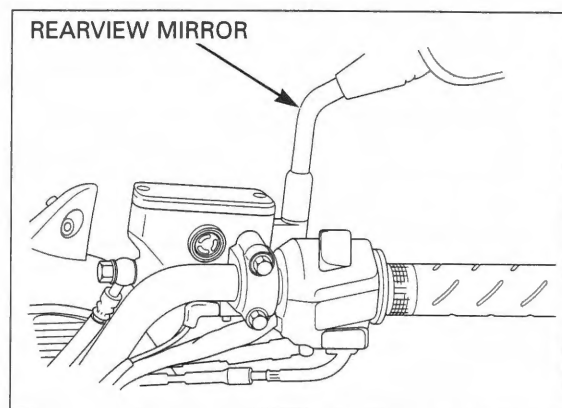
Remove the front cover (page 2-14).

Remove the handlebar cover (page 2-14).

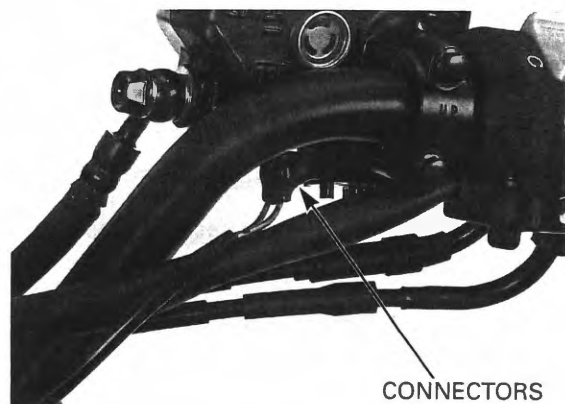
Disconnect the ignition switch 3P connector.



Remove the right and left rearview mirrors.

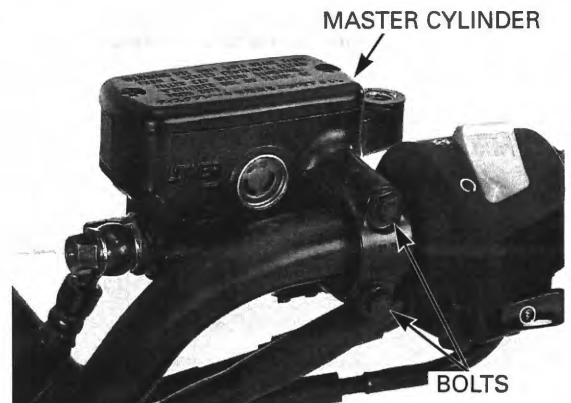


Disconnect the front brake light switch connectors.

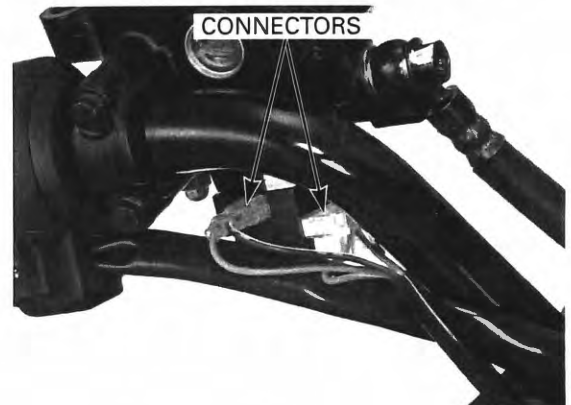


Keep the master cylinder upright to prevent air from entering the hydraulic system.

Remove the bolts, master cylinder holder and front master cylinder.

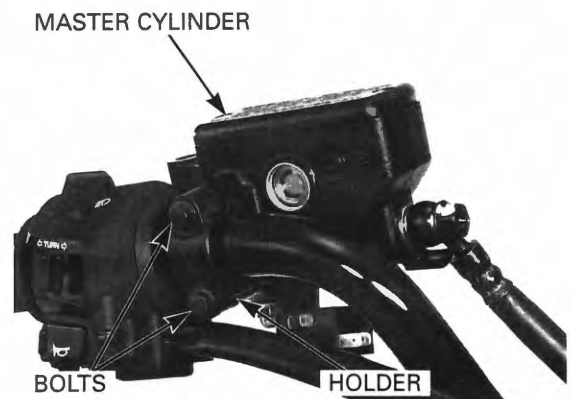


Disconnect the rear brake light switch connectors and limit switch connectors.

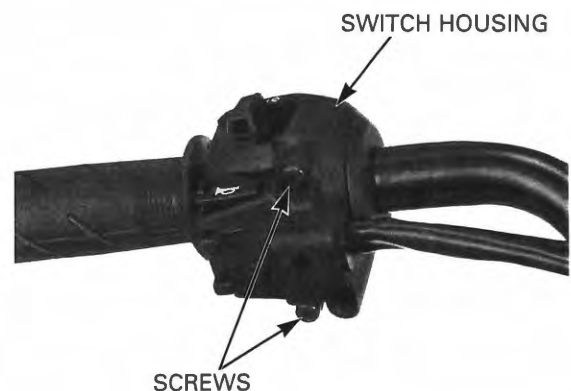


Keep the master cylinder upright to prevent air from entering the hydraulic system.

Remove the bolts, master cylinder holder and rear master cylinder.

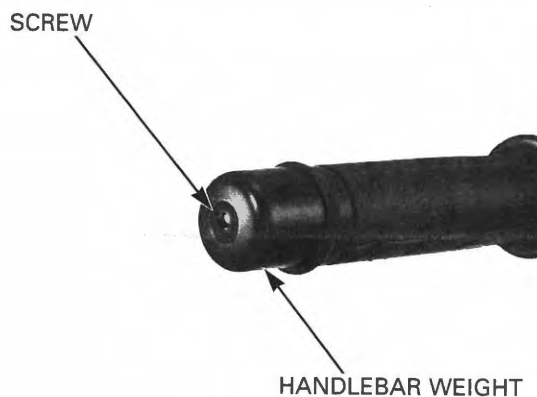


Remove the screws and left handlebar switch housing.

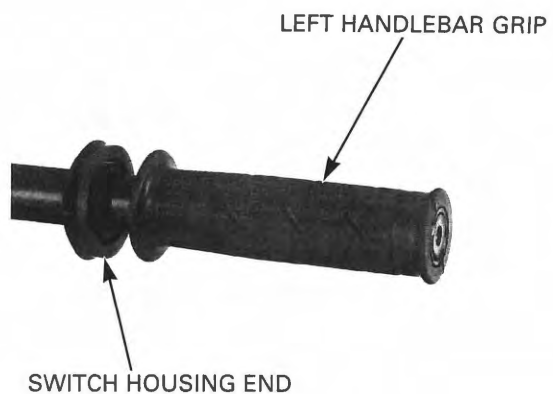


FRONT WHEEL/SUSPENSION/STEERING

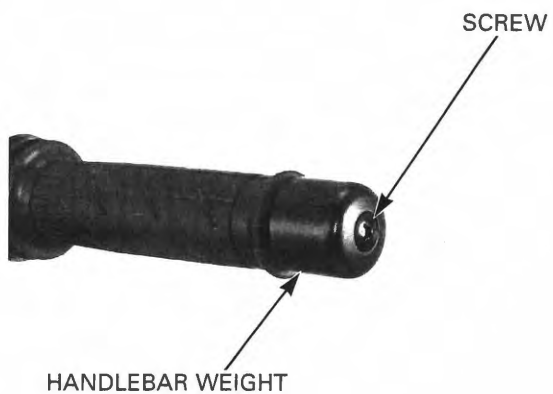
Hold the handlebar weight and remove the screw and the left handlebar weight.



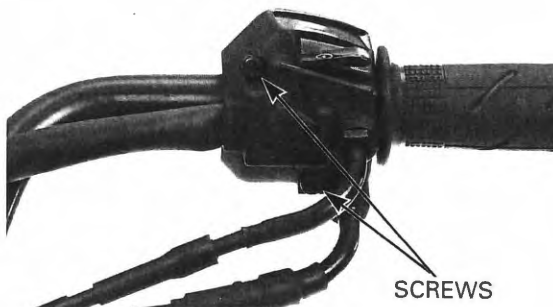
Remove the left handlebar grip from the steering handle.
Remove the left handlebar switch housing end.



Hold the handlebar weight and remove the screw and the right handlebar weight.

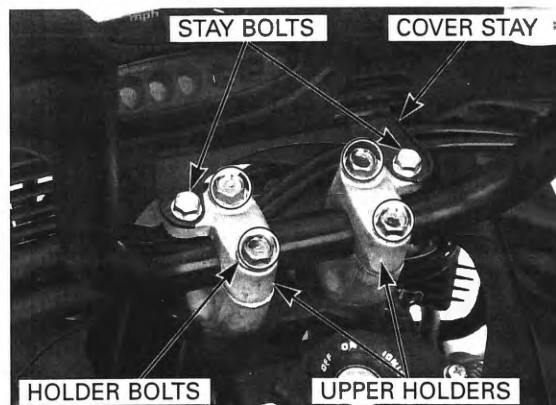


Remove the screws and right handlebar switch housing.



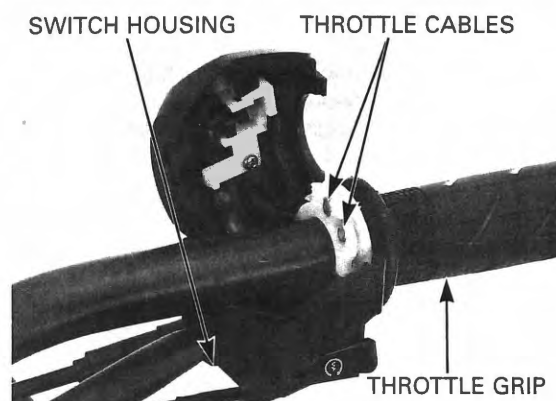
Remove the bolts and handlebar cover stay.

Remove the bolts and the upper holders.
Remove the handlebar.

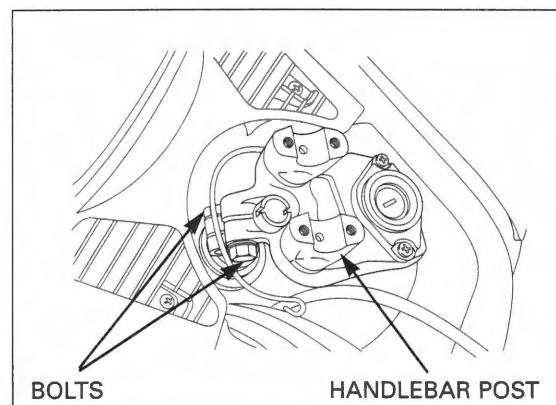


Remove the throttle grip/right handlebar switch housing from the handlebar.

Disconnect the throttle cables end from the throttle grip.



Remove the handlebar post pinch bolt.
Remove the handlebar post from the steering stem.



Remove the nuts and handlebar lower holders from the handlebar post.

INSTALLATION

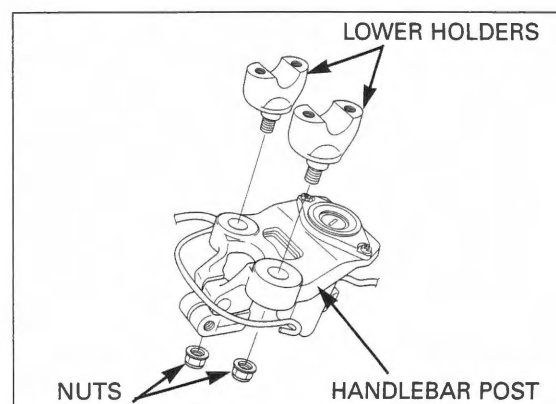
- Route the cables and wires properly (page 1-20).

Install the handlebar lower holder to the handlebar post.

Install the handlebar temporarily (page 14-22).

Tighten the handlebar lower holder nuts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



FRONT WHEEL/SUSPENSION/STEERING

Install the handlebar post over the steering stem, aligning the pin on the handlebar post with the groove on the stem.

Install the pinch bolt, aligning the bolt hole with the groove in the stem.

Tighten the handlebar post pinch bolt to the specified torque.

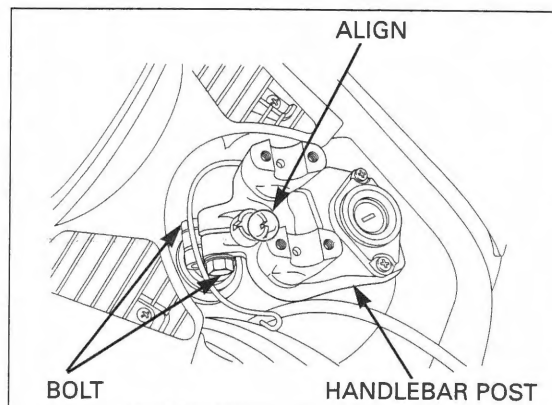
Tighten the upper bolt first, then tighten the lower bolt.

PINCH BOLT UPPER

TORQUE: 128 N·m (13.0 kgf·m, 94 lbf·ft)

PINCH BOLT LOWER

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)



Install the handlebar to the handle post.

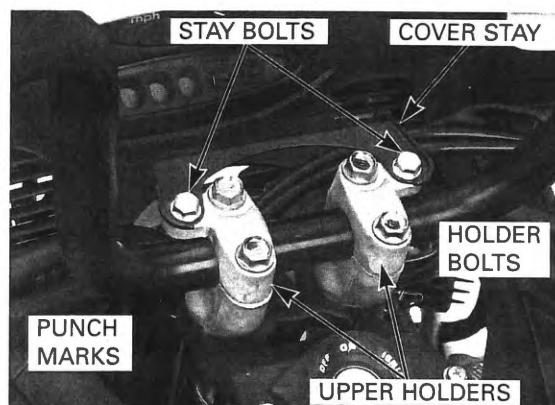
Install the upper holders with its punch marks facing forward.

Align the punch mark on the handlebar with the cut out on the upper holder.

Install the upper holder bolts.

Tighten the front bolts first, then tighten the rear bolts.

Install the handlebar cover stay and tighten the bolts.

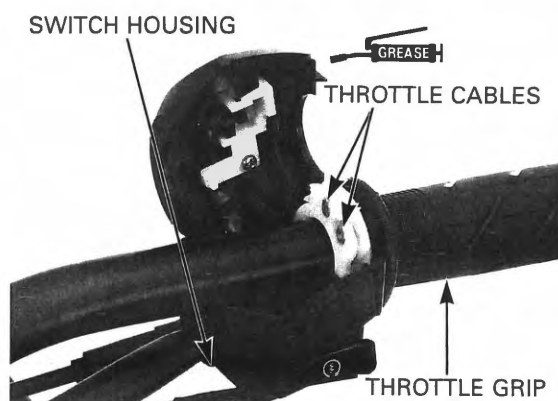


Apply grease to the throttle grip flange groove, throttle grip inner surface and throttle cable end.

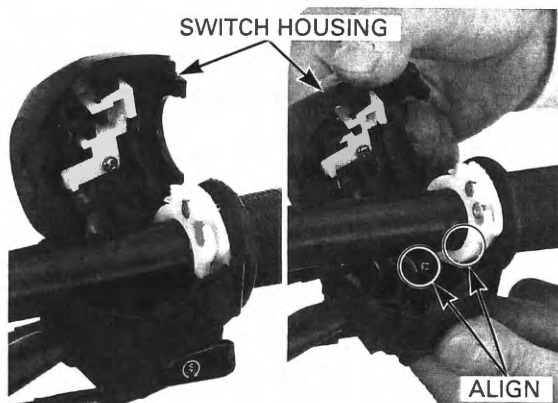
Install the throttle grip to the right handlebar switch housing.

Connect the throttle cables to the throttle grip.

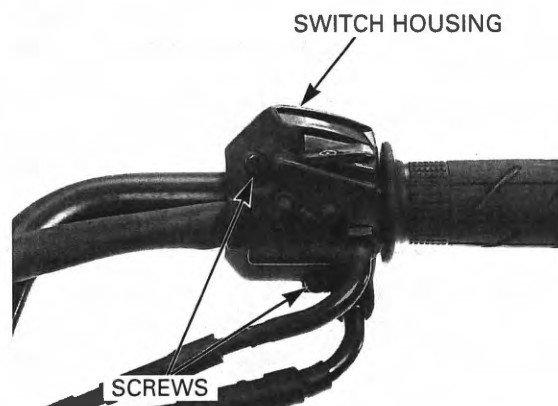
Install the right handlebar switch housing/throttle grip to the handlebar.



Align the pin on the right handlebar switch housing with the hole on the steering handle.

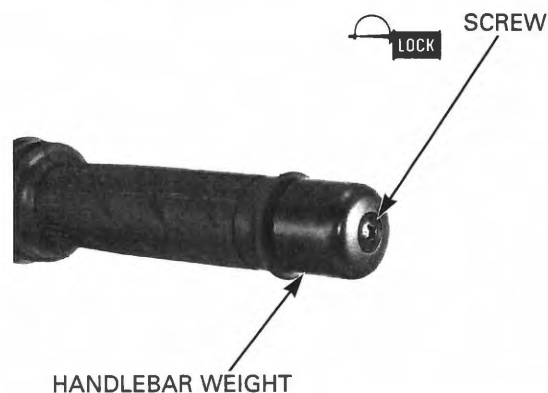


Install the screws and tighten the forward screw first, then tighten the rear screw.



Install the right handlebar weight to the steering handle.

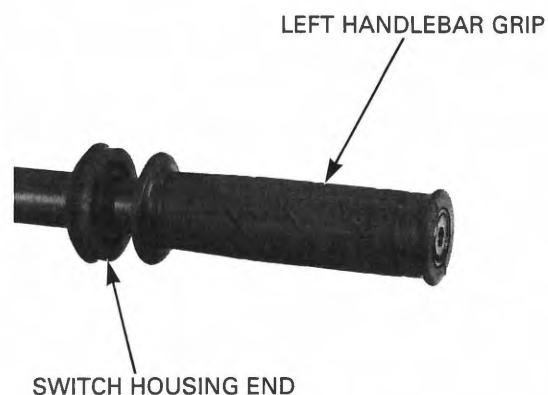
Clean and apply a locking agent to the screw threads. Install and tighten the screw.



Install the left handlebar switch housing end onto the steering handle.

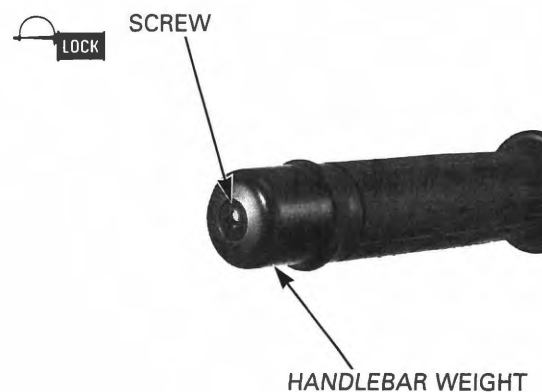
Allow the adhesive to dry for an hour before using.

Apply Honda Bond A or, Honda Hand Grip Cement (U.S.A. only) or equivalent to the inside surface of the handlebar grip and to the clean surface of the steering handle. Wait 3 – 5 minutes and install the grip. Rotate the grip for even application of the adhesive.



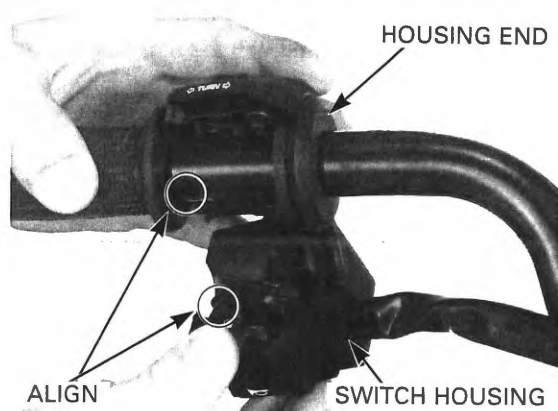
Install the left handlebar weight to the steering handle.

Clean and apply a locking agent to the screw threads. Install and tighten the screw.

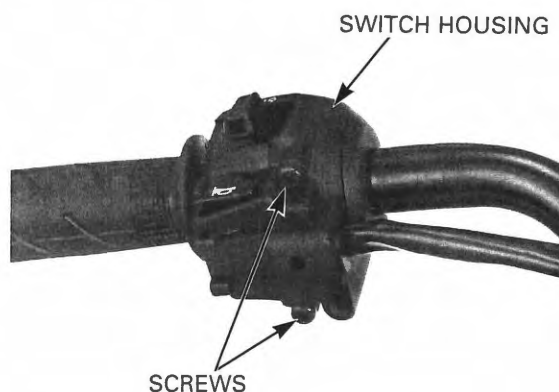


FRONT WHEEL/SUSPENSION/STEERING

Align the pin on the left handlebar switch housing with the hole on the steering handle. Install the left handlebar switch housing to the steering handle by aligning it with the groove on the left handlebar switch housing end.

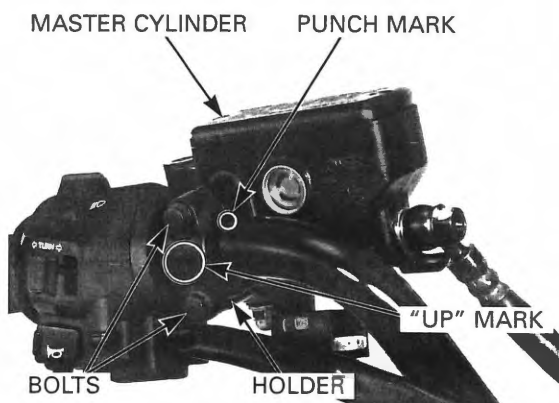


Install the screws and tighten the forward screw first, then tighten the rear screw.

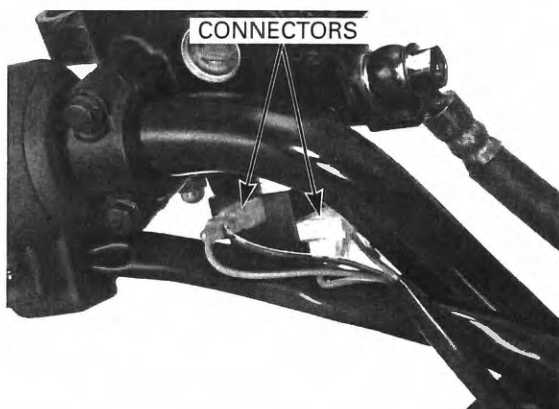


Install the rear master cylinder and holder with the "UP" mark facing up. Align the end of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



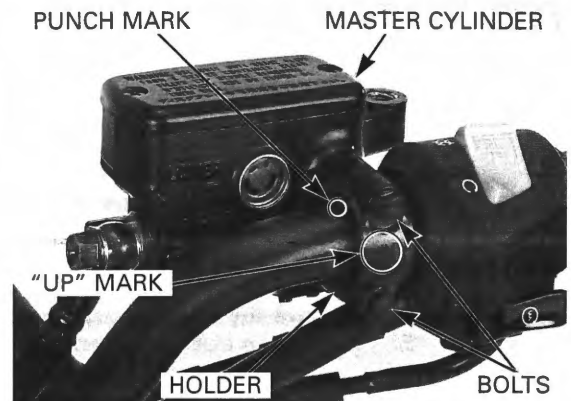
Connect the rear brake light switch connectors and limit switch connectors.



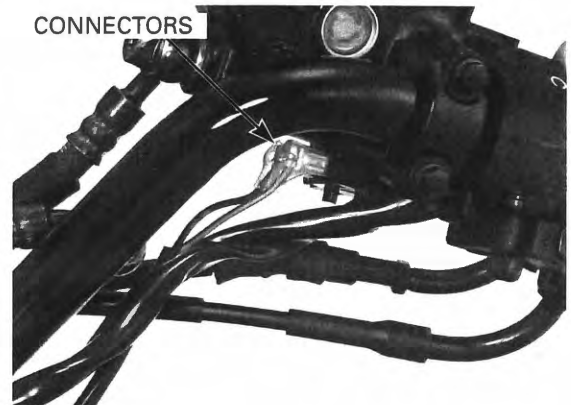
Install the front master cylinder and holder with the "UP" mark facing up.

Align the end 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.

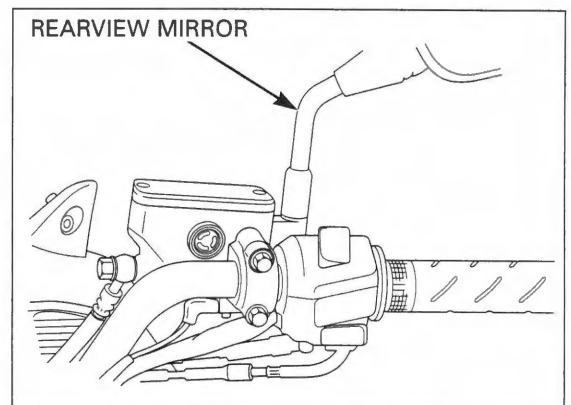
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the front brake light switch connector.



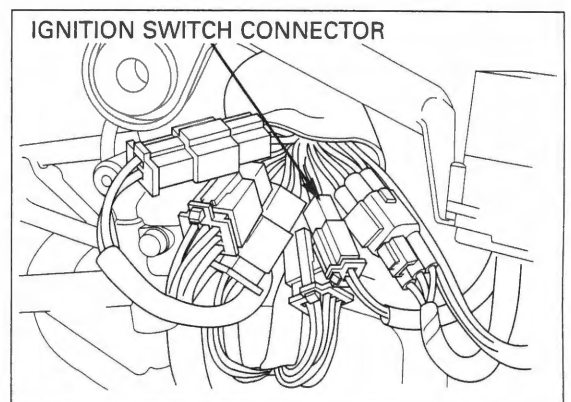
Install the right and left rearview mirrors.



Connect the ignition switch 3P connector.

Install the handlebar cover (page 2-14).

Install the front cover (page 2-14).



STEERING STEM

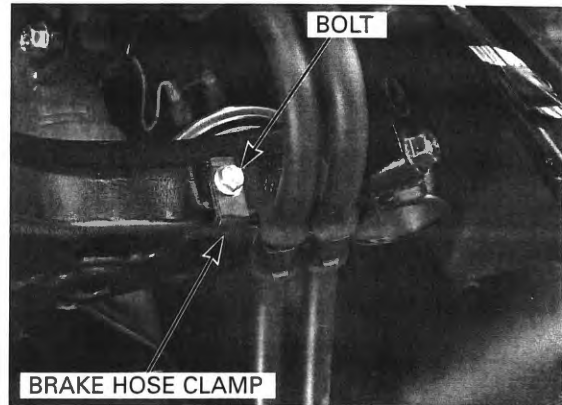
REMOVAL

Remove the following:

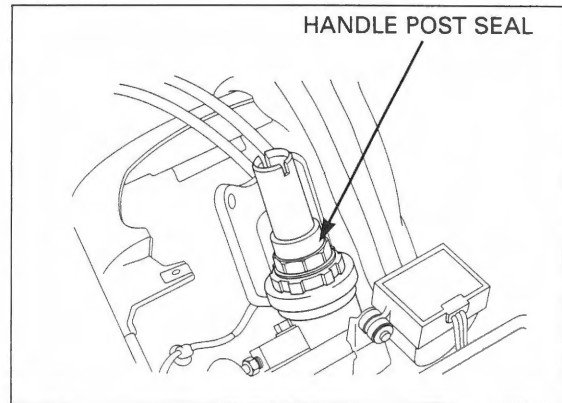
- Front cover (page 2-14)
- Steering handle (page 14-18)
- Front airduct cover (page 2-21)
- Fork (page 14-8)

AFTER '02 (ABS
TYPE):

Remove the bolt and brake hose/front wheel sensor wire clamp from the steering stem.



Remove the handle post seal from the steering stem.



AFTER '02 (ABS
TYPE):

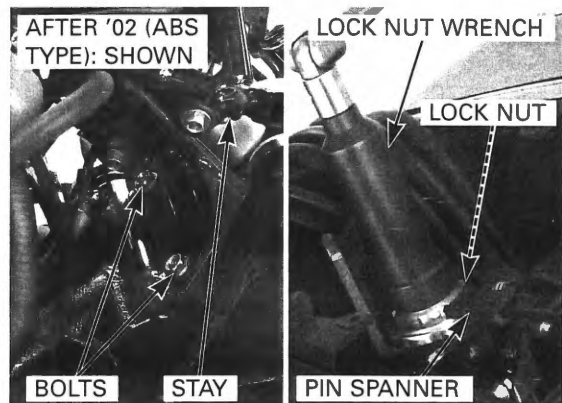
Remove the front cover stay mount bolts and move the front cover stay assembly forward.

Hold the steering stem top thread using the pin spanner and remove the steering stem lock nut.

TOOLS:

Adjustable pin spanner
Lock nut wrench

07702-0020001
07916-KM10000



Remove the lock washer.

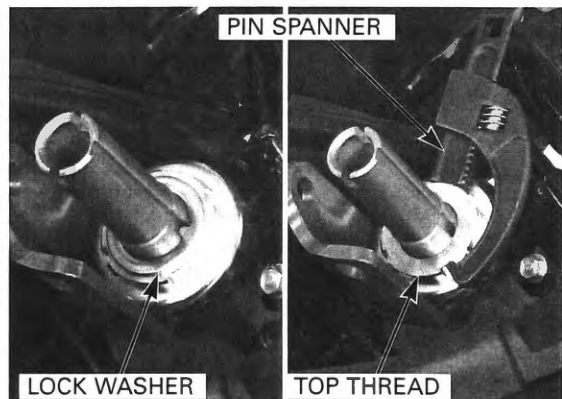
Loosen the steering stem top thread using the pin spanner.

TOOL:

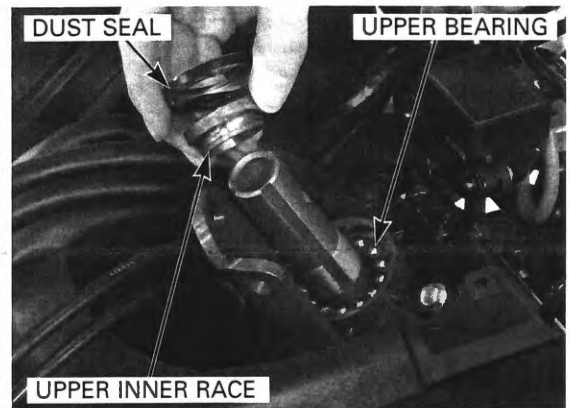
Adjustable pin spanner

07702-0020001

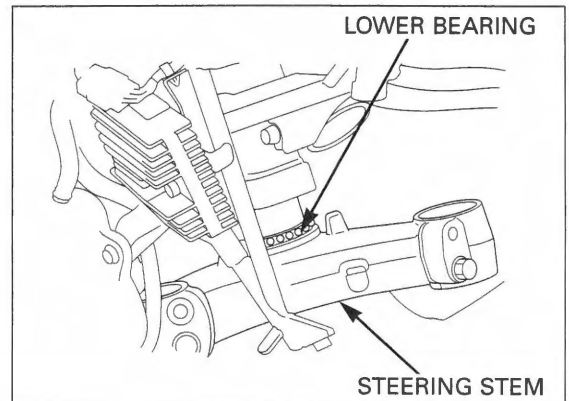
Hold the steering stem and remove the steering stem top thread.



Remove the dust seal, upper inner race and upper bearing.



Remove the steering stem and lower bearing.



BEARING REPLACEMENT

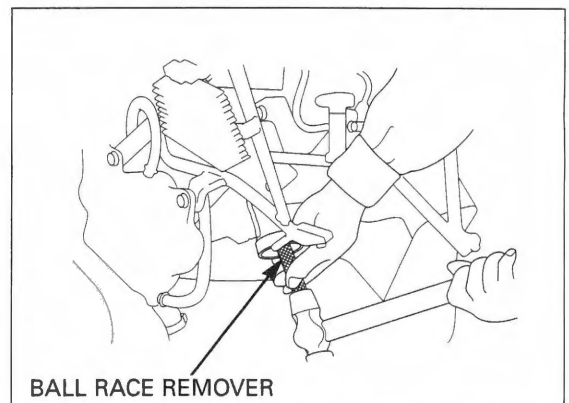
Always replace the bearings and races as a set.

Remove the upper bearing outer race.

TOOL:

Ball race remover

07953-4250002 or
07953-MJ1000B
(U.S.A. only)



Remove the lower bearing outer race.

TOOLS:

Remover weight

07741-0010201 or
07936-371020A or
07936-3710200
(U.S.A. only)
07JAC-PH80200
07YAC-0010101

Bearing remover shaft

Adjustable bearing remover

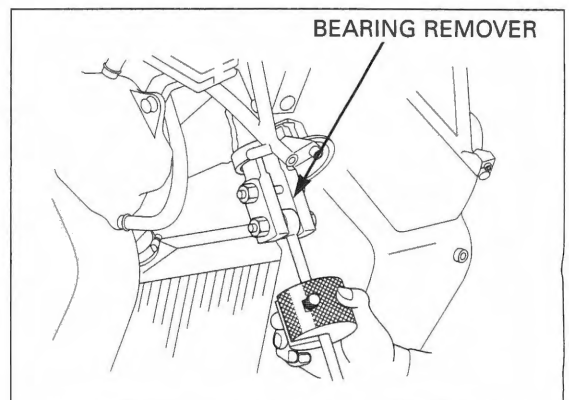
U.S.A. only

Slider hammer 3/8 x 16

commercially
available in U.S.A.

Adjustable bearing puller 25 - 40 mm

07736-A01000B



FRONT WHEEL/SUSPENSION/STEERING

Drive a new lower bearing race into the steering head pipe.

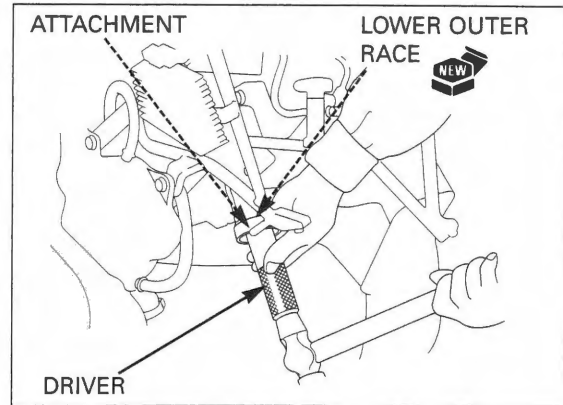
TOOLS:

Driver

07749-0010000

Attachment, 52 x 55 mm

07746-0010400



Drive a new upper bearing race into the steering head pipe.

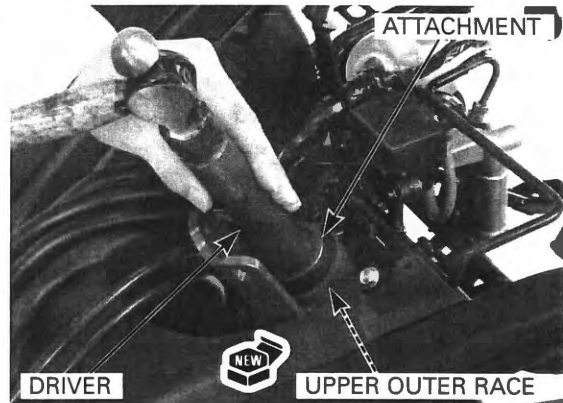
TOOLS:

Driver

07749-0010000

Attachment, 42 x 47 mm

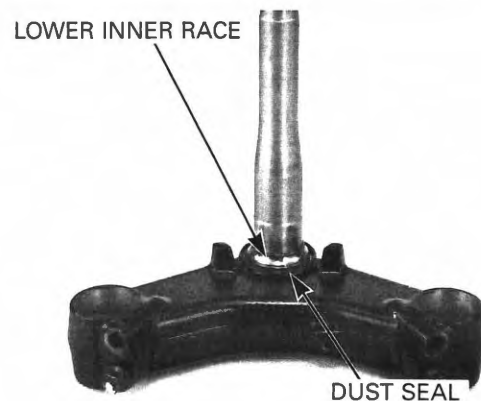
07746-0010300



Install the steering stem lock nut onto the steering stem to prevent the threads from being damaged when removing the lower bearing inner race from the steering stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the steering stem.

Remove the dust seal.

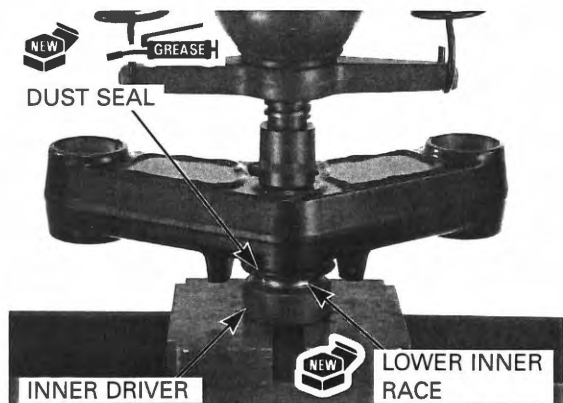


Apply grease to a new lower bearing inner race using a hydraulic press.

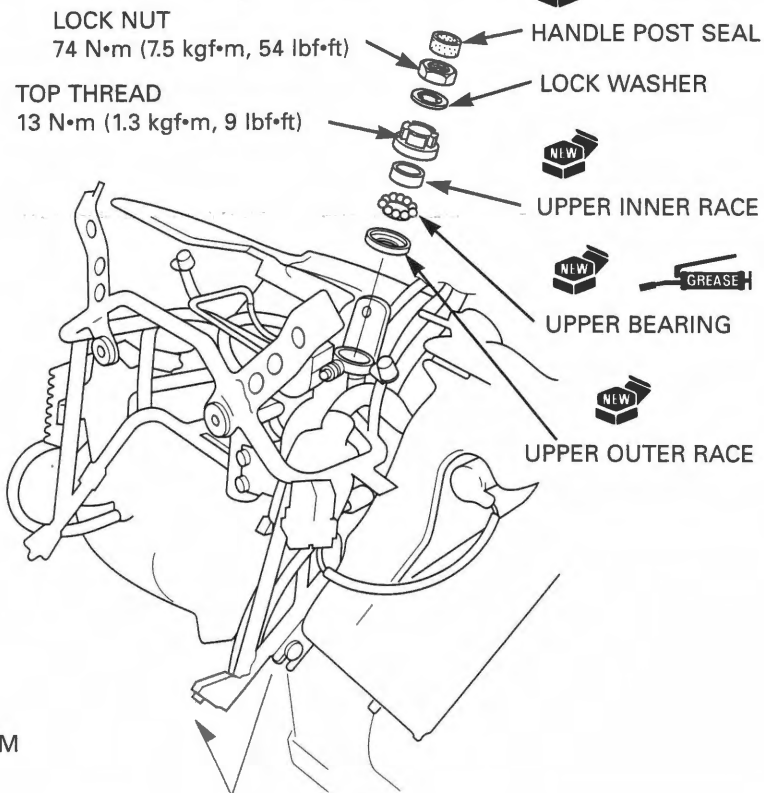
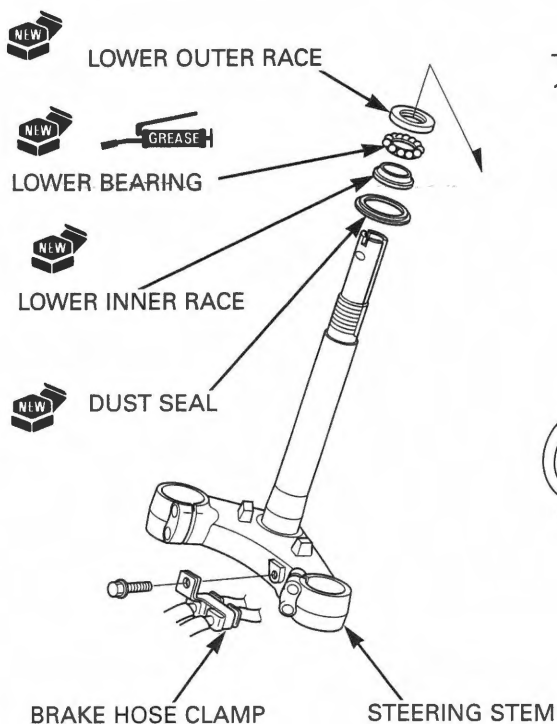
TOOL:

Attachment, 30 mm

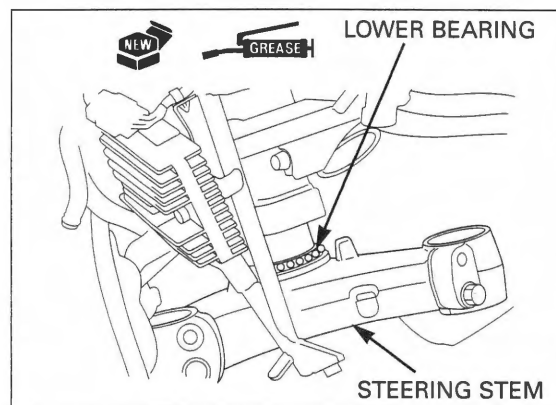
07746-0030300



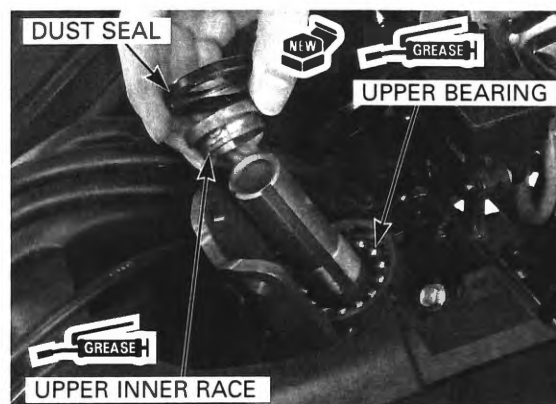
INSTALLATION



Apply urea based water resistant grease with extreme pressure agent (example: EXCELITE EP2 manufactured by KYODO YUSHI, JAPAN), or equivalent to each new bearing and inner race. Install the lower bearing onto the stem. Insert the steering stem into the steering head pipe.



Install the upper bearing and upper inner race.



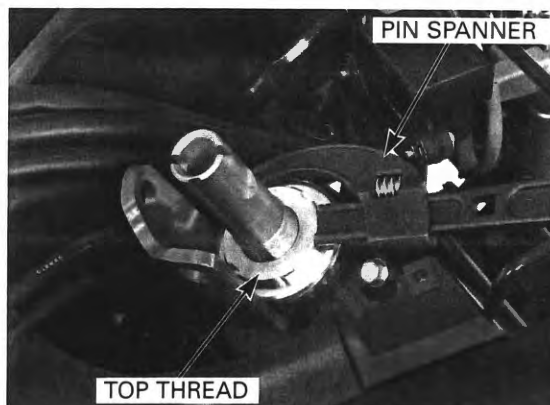
FRONT WHEEL/SUSPENSION/STEERING

Install the steering top thread and tighten it to the specified torque.

TOOL:

Adjustable pin spanner 07702-0020001

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

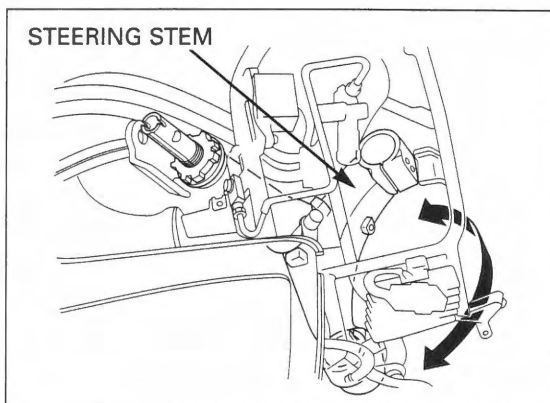


Turn the steering stem lock-to-lock several times to seat the bearings.

Temporarily loosen the steering stem top thread.

Install the fork (page 14-17).

Install the front wheel (page 14-7).



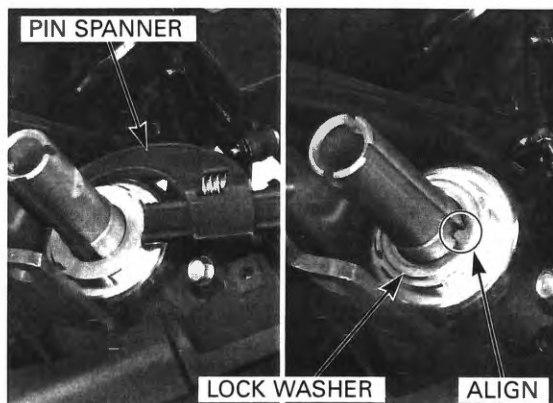
Tighten the steering top thread to the specified torque with the front wheel grounded.

TOOL:

Adjustable pin spanner 07702-0020001

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Install the lock washer aligning its tab in the groove on the steering stem.



Install the steering stem lock nut.

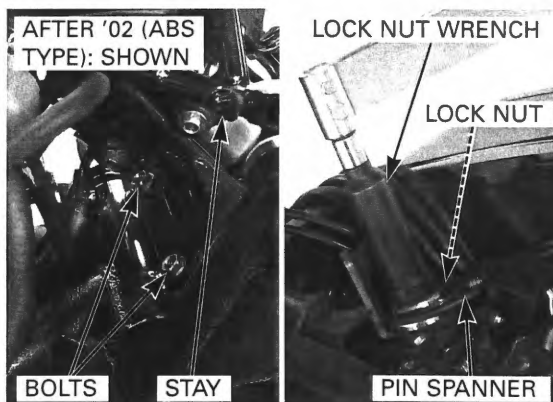
Hold the steering stem top thread using the pin spanner and tighten the steering stem lock nut to the specified torque.

TOOLS:

Adjustable pin spanner 07702-0020001
Lock nut wrench 07916-KM10000

TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)

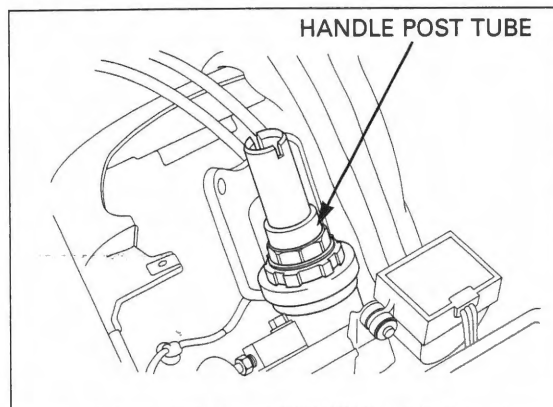
Make sure that the steering stem moves smoothly without play or binding.



AFTER '02 (ABS
TYPE):

Install the front cover stay and mount bolts to the frame with tighten the bolts.

Install the handle post tube to the steering stem.

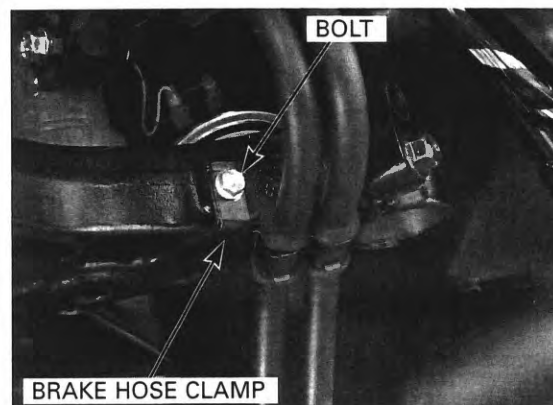


Install the following:

- Fork (page 14-17)
- Front airduct cover (page 2-21)
- Steering handle (page 14-21)
- Front cover (page 2-14)

AFTER '02 (ABS
TYPE):

Set the brake hose/wheel speed sensor wire clamp and tighten the bolt.



STEERING BEARING PRELOAD

Raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube.
Make sure that there is no cable or wire harness interference.
Pull the spring scale keeping the scale at a right angle to the steering stem.

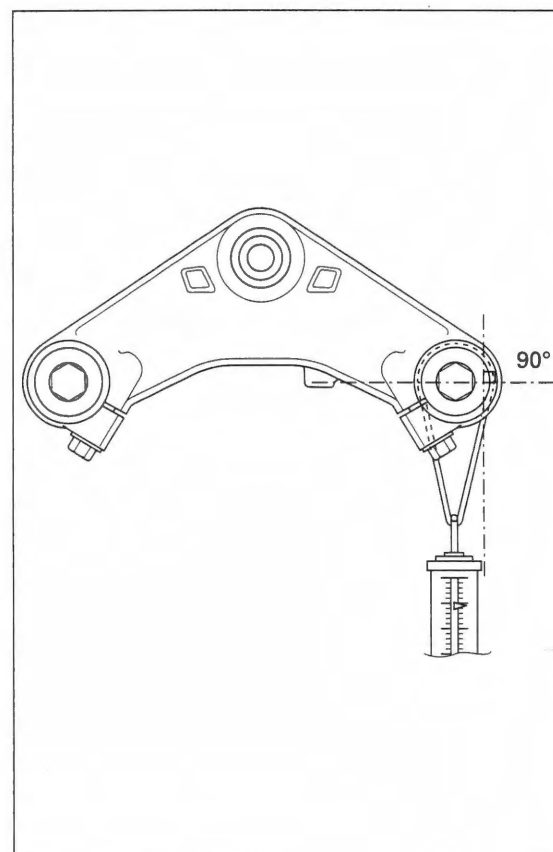
Read the scale at the point where the steering stem just starts to move.

STEERING BEARING PRELOAD:

13 – 17 N (1.3 – 1.7 kgf, 2.9 – 3.7 lbf)

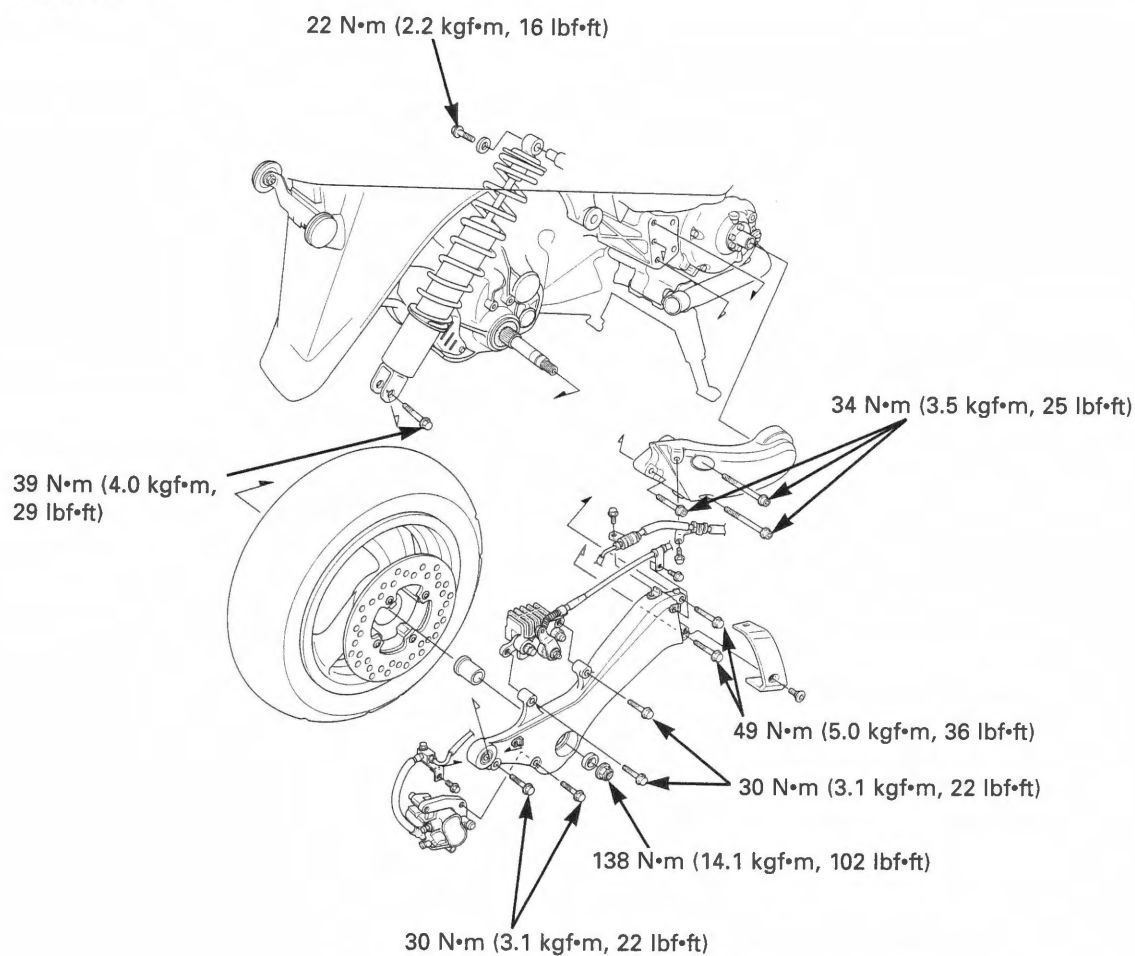
If the readings do not fall within the limits, readjust the steering top thread.

Install the removed parts in the reverse order of removal.

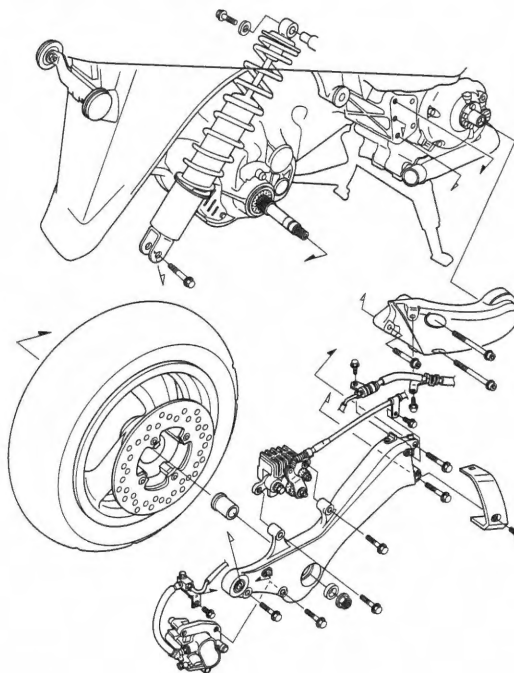


REAR WHEEL/SUSPENSION

STD TYPE:



AFTER '02 (ABS TYPE):



15. REAR WHEEL/SUSPENSION

SERVICE INFORMATION

15-2

REAR WHEEL/SWINGARM

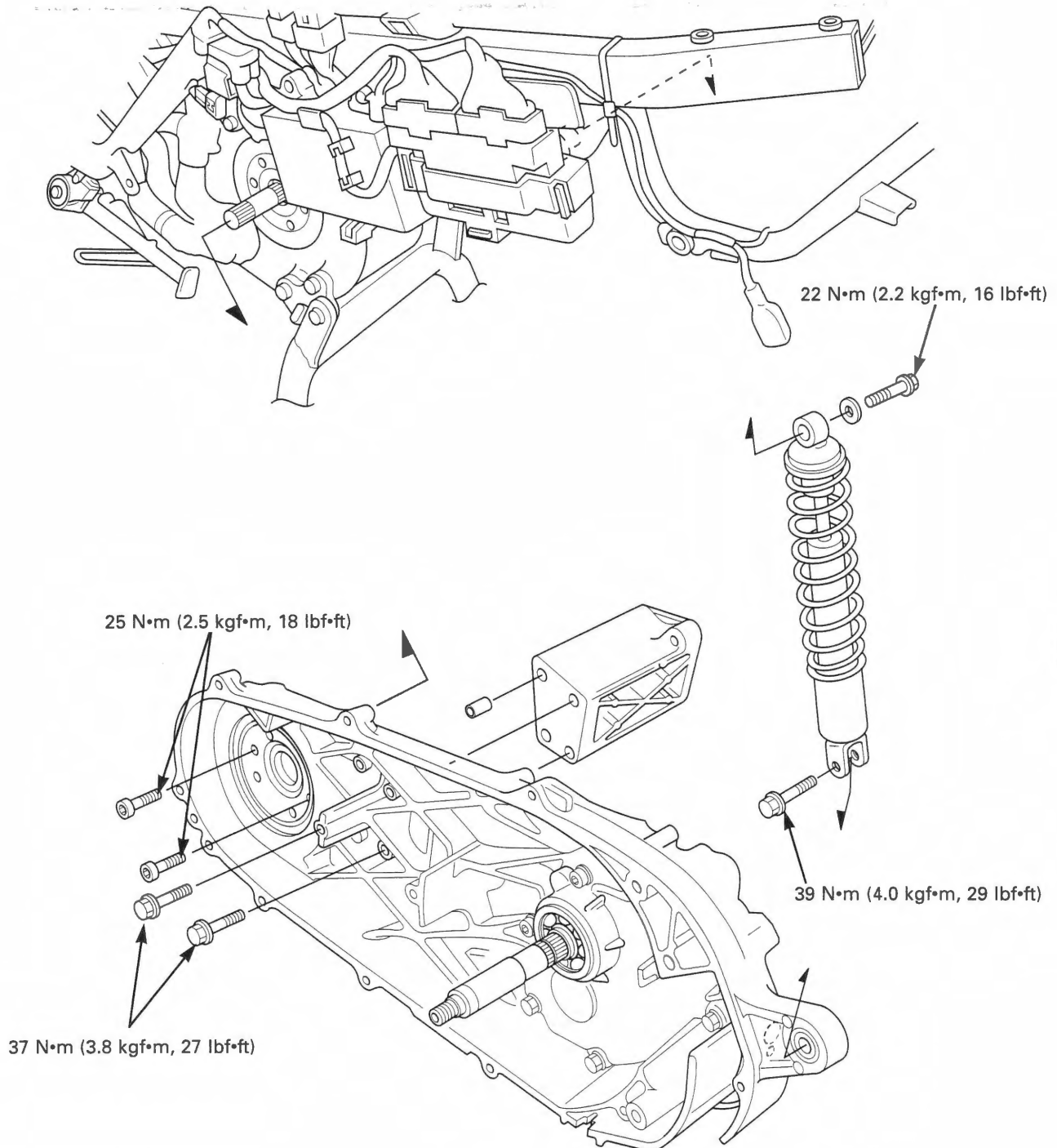
15-4

TROUBLESHOOTING

15-3

REAR SHOCK ABSORBER

15-13



SERVICE INFORMATION

GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated parts and clean a contaminated disc with a high quality brake degreasing agent.
- Riding on damaged rims impairs safe operation of the vehicle.
- This section covers of the rear wheel and rear suspension.
- A jack or other support is required to support the vehicle.
- Do not twist or bend the brake hose when servicing.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to section 16 for brake system information.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	225 kPa (2.25 kgf/cm ² , 33 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Right swingarm pivot O.D.		35.012 – 35.028 (1.3784 – 1.3791)	34.70 (1.366)

TORQUE VALUES

Rear brake disc bolt	42 N•m (4.3 kgf•m, 31 lbf•ft)	ALOC bolt: replace with a new one.
Rear axle nut	138 N•m (14.1 kgf•m, 102 lbf•ft)	U-nut.
Rear shock absorber upper mounting bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)	
Rear shock absorber lower mounting bolt	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Final shaft holder bolt	49 N•m (5.0 kgf•m, 36 lbf•ft)	
Right swingarm torx bolt	34 N•m (3.5 kgf•m, 25 lbf•ft)	Torx bolt.
Swingarm case bolt (center swingarm)	37 N•m (3.8 kgf•m, 27 lbf•ft)	Apply a locking agent to the threads.
Right swingarm pivot bolt	24 N•m (2.4 kgf•m, 17 lbf•ft)	
Left swingarm flange socket bolt	25 N•m (2.5 kgf•m, 18 lbf•ft)	
Rear brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	ALOC bolt: replace with a new one.
Parking brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	Apply a locking agent to the threads.

TOOLS

Remover weight	07741-0010201	or 07936-371020A or 07936-3710200 (U.S.A. only)
Attachment, 42 x 47 mm	07746-0010300	
Pilot, 20 mm	07746-0040500	
Pilot, 35 mm	07746-0040800	
Driver	07749-0010000	
Remover handle	07936-3710100	
Bearing remover, 35 mm	07936-3710400	
Bearing driver attachment, 78 x 90	07GAD-SD40101	
Driver attachment, 110 x 140 mm	07ZMD-MCT0100	or 07ZMD-MCTA100 (U.S.A. only)

TROUBLESHOOTING

Rear wheel wobbling

- Bent rim
- Faulty tire
- Axle nut and/or engine mount bolt not tightened properly
- Loose or worn final gear shaft bearing
- Insufficient tire pressure
- Unbalanced tire and wheel

Soft suspension

- Weak rear shock absorber spring
- Oil leakage from damper unit

Hard suspension

- Bent damper rod
- Worn or damaged engine mount bushings
- High tire pressure

Rear suspension noisy

- Loose mounting fasteners
- Faulty shock absorber
- Weak rear suspension mount bushings

REAR WHEEL/SWINGARM

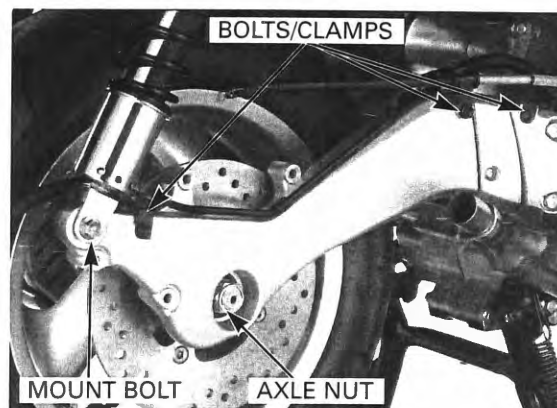
REMOVAL

Remove the muffler (page 2-22, 24).
Remove the parking brake caliper (page 16-30).
Remove the rear brake caliper (page 16-27).

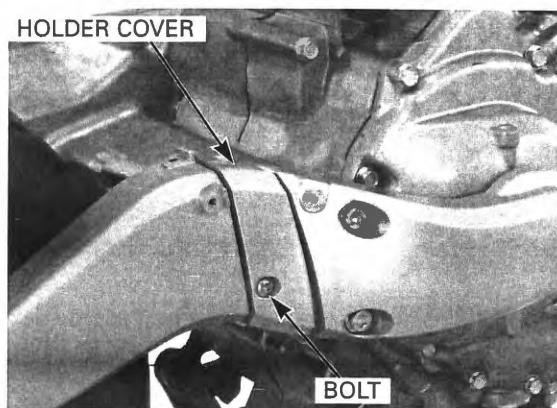
Loosen the rear axle nut.
Support the scooter on its main stand.



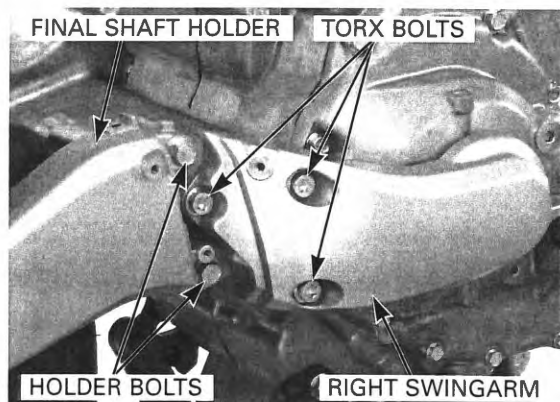
Remove the bolts and brake hose/cable clamps from the final shaft holder and right swingarm.
Remove the rear shock absorber lower mount bolt.
Remove the rear axle nut.



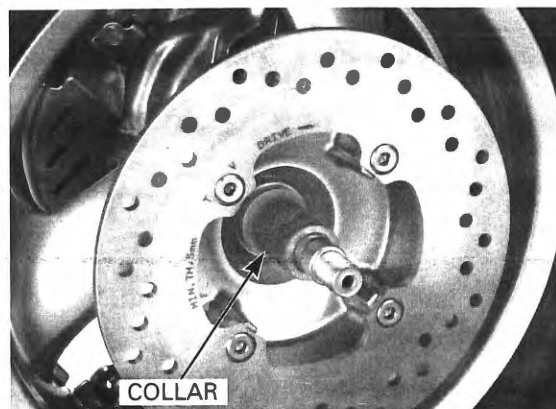
Remove the bolt and final shaft holder cover.



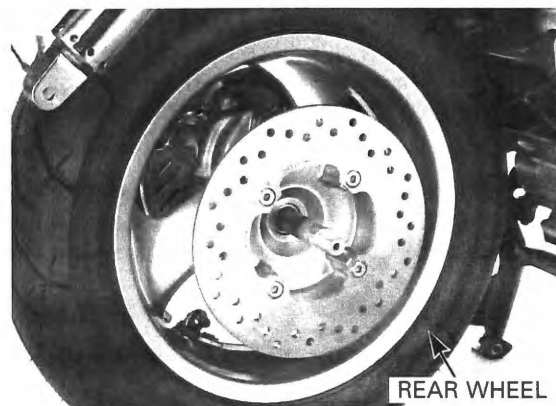
Remove the final shaft holder mount bolts and final shaft holder.
Remove the right swingarm mount torx bolts and right swingarm.



Remove the inner side collar.



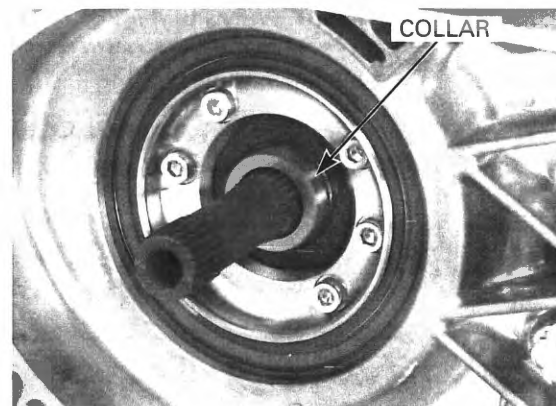
Remove the rear wheel.



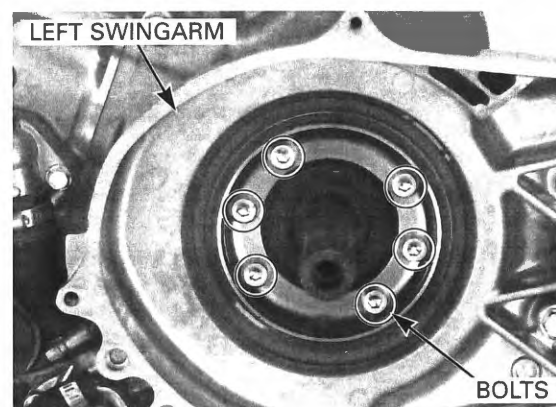
Remove the following:

- Drive pulley/driven pulley/clutch (section 10)
- Left rear shock absorber lower bolt (page 15-13)

Remove the left swingarm pivot collar.

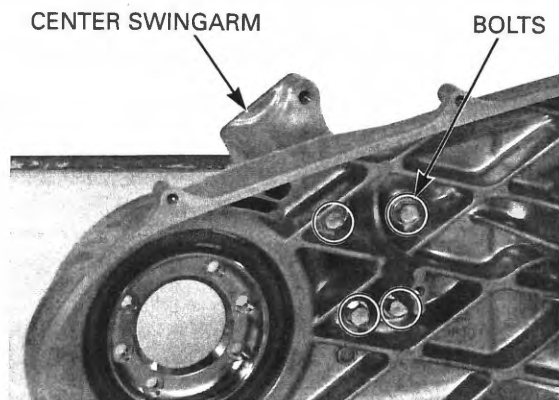


Remove the left swingarm mount bolts and left swingarm from the crankcase.



REAR WHEEL/SUSPENSION

Remove the bolts and center swingarm from the left swingarm.

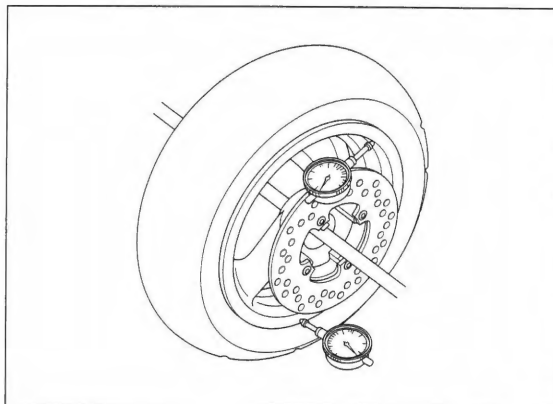


INSPECTION

WHEEL

Check the wheel rim runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

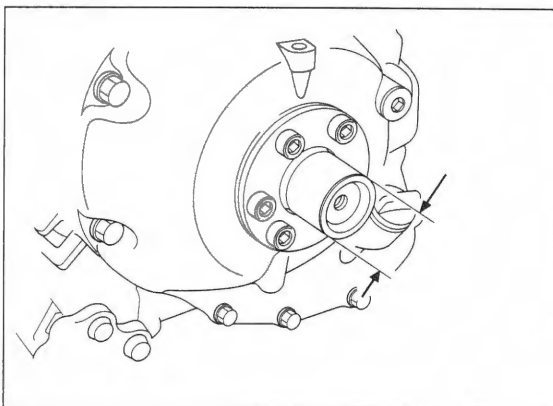
SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



RIGHT SWINGARM PIVOT

Check the right swingarm pivot for wear or damage. Measure the pivot O.D..

SERVICE LIMIT: 34.70 mm (1.366 in)



DISASSEMBLY

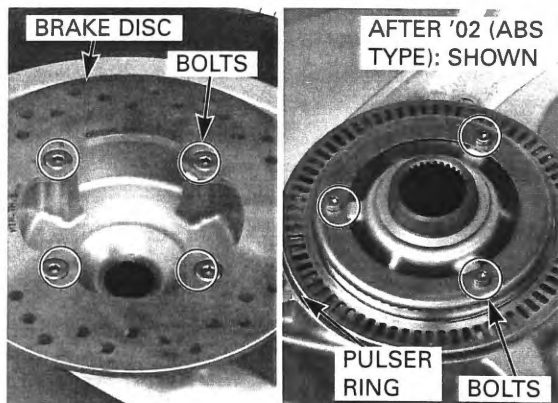
WHEEL

Remove the brake disc bolts and rear brake disc.

Check the brake disc for wear or damage, replace if necessary.

AFTER '02 (ABS
TYPE):

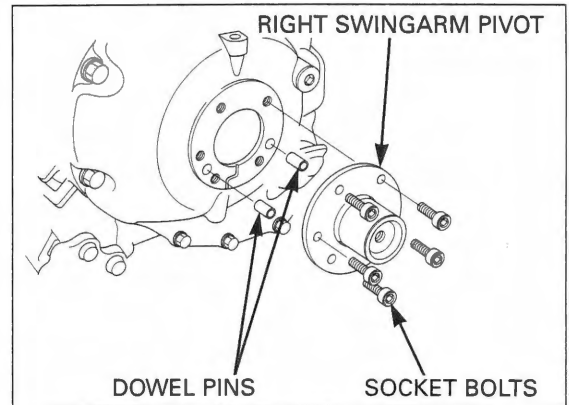
Remove the bolts and pulser ring. Check the pulser ring for damage or cracks, replace if necessary.



RIGHT SWINGARM PIVOT

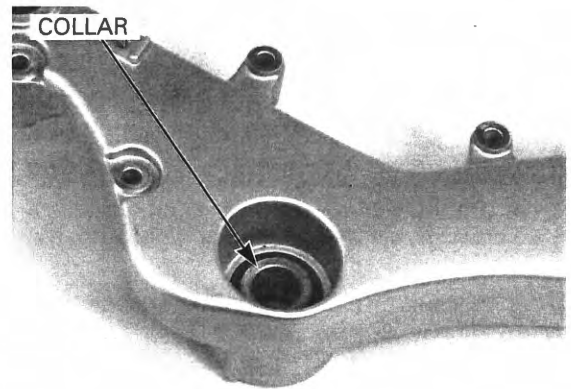
Remove the socket bolts and right swingarm pivot from the right crankcase cover.

Remove the dowel pins from the right crankcase cover.

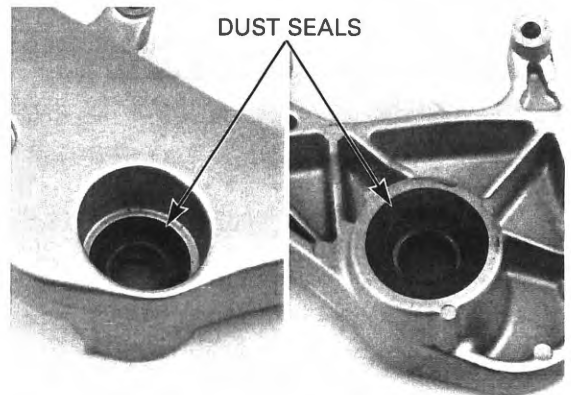


FINAL SHAFT HOLDER BEARING REPLACEMENT

Remove the outer side collar from the final shaft holder.



Remove the outer side dust seal and inner side dust seal from the final shaft holder.

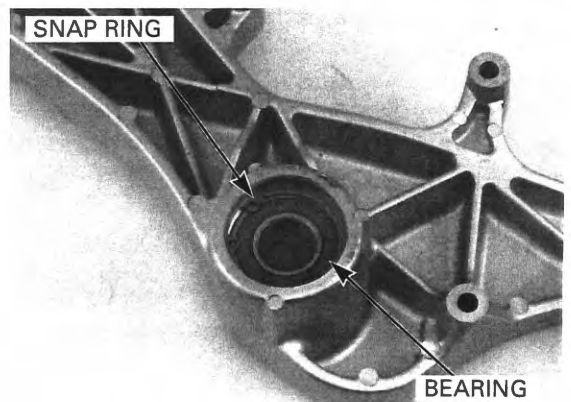


Remove the snap ring.

Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the final shaft holder.

Remove and discard the bearing if the race does not turn smoothly and quietly, or if it fits loosely in the final shaft holder.

Remove the bearing from the final shaft holder.



REAR WHEEL/SUSPENSION

Drive in a new bearing squarely until it is fully seated, using the special tools.

TOOLS:

Driver

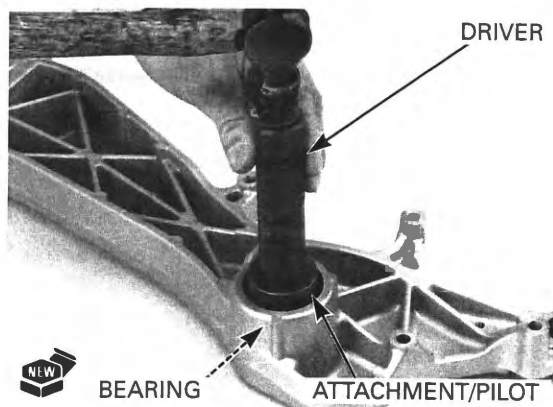
07749-0010000

Attachment, 42 x 47 mm

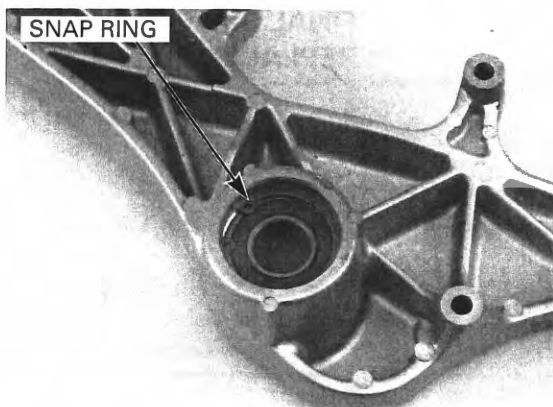
07746-0010300

Pilot, 20 mm

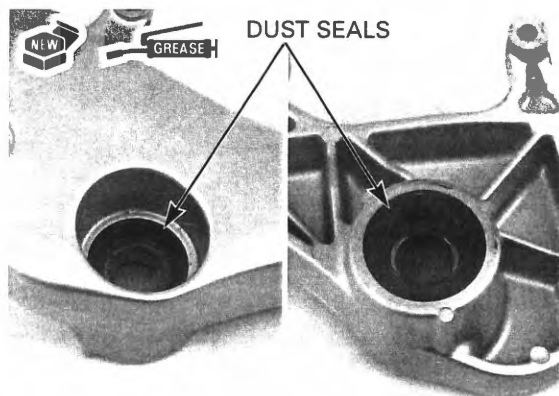
07746-0040500



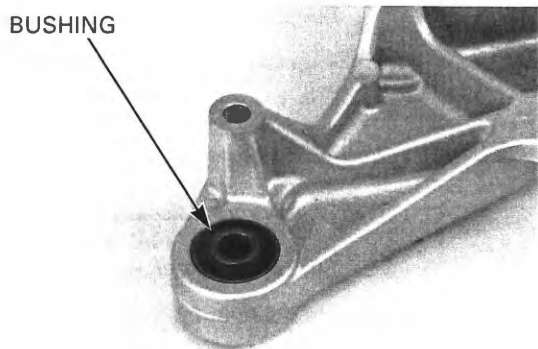
Install the snap ring to the groove of the final shaft holder.



Apply grease to the new dust seal lips and install them to the final shaft holder until they are flush with the swingarm surfaces.



Check the bushing for wear or damage.



SWINGARM PIVOT BEARING REPLACEMENT

RIGHT SWINGARM PIVOT BEARING

Remove the right swingarm pivot bearing using the special tools.

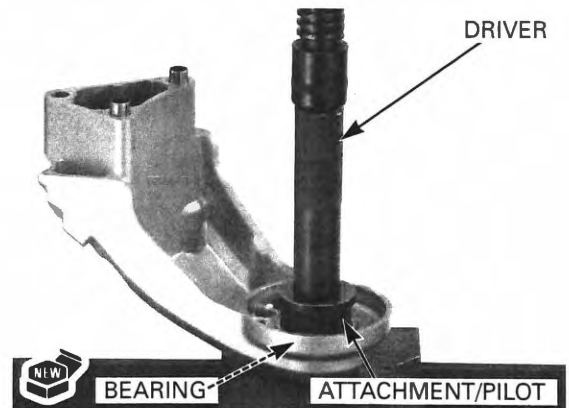
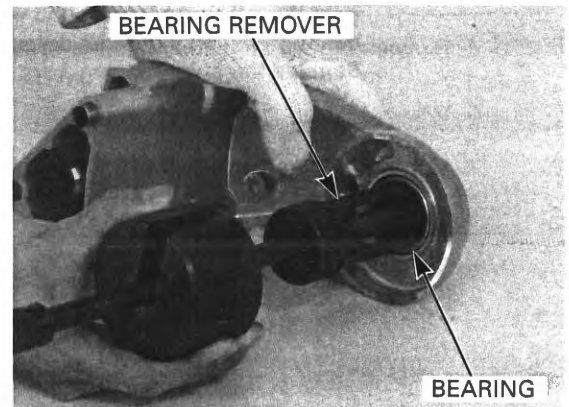
TOOLS:

Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)
Remover handle	07936-3710100
Bearing remover, 35 mm	07936-3710400

Drive in a new bearing squarely until it is fully seated, using the special tools.

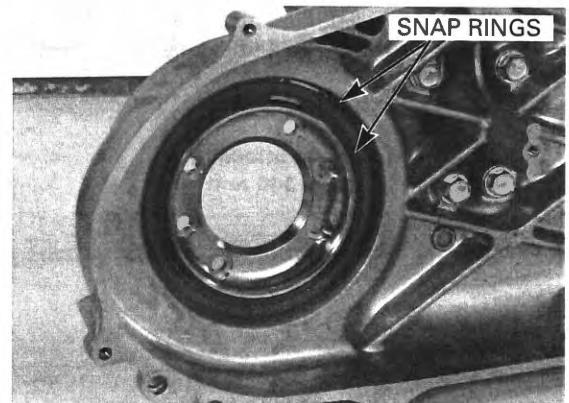
TOOLS:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300



LEFT SWINGARM PIVOT BEARING

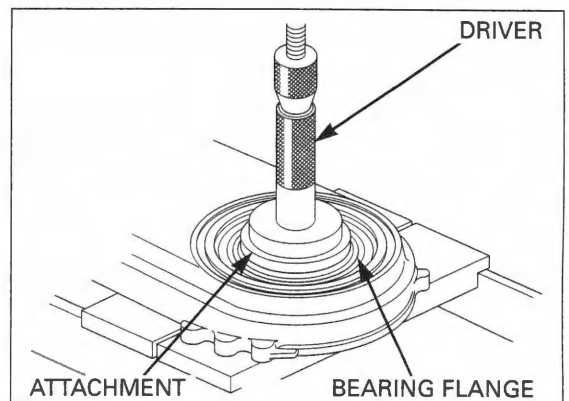
Remove the snap rings from the left swingarm pivot bearing and bearing flange



Remove the left swingarm pivot bearing flange using the special tools.

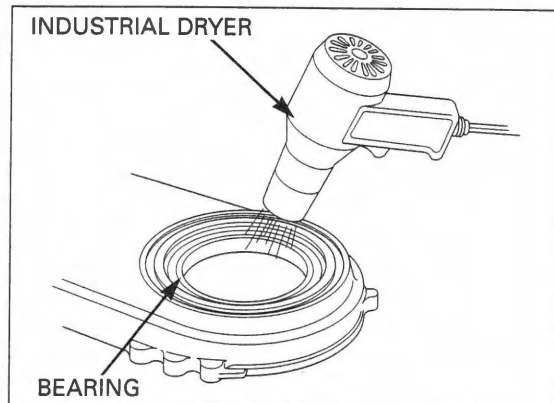
TOOLS:

Driver	07749-0010000
Bearing driver attachment, 78 x 90	07GAD-SD40101



REAR WHEEL/SUSPENSION

Heat the left swingarm around the left swingarm pivot bearing with an industrial dryer.
Remove the pivot bearing from the left swingarm.

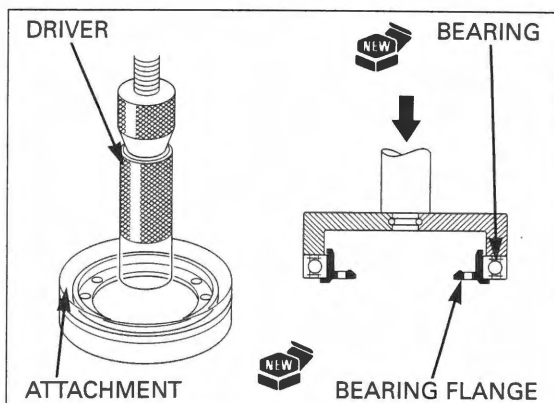


Assemble the new bearing and bearing flange using the special tools.

TOOLS:

Driver
Driver attachment,
110 x 140 mm

07749-0010000
07ZMD-MCT0100 or
07ZMD-MCTA100
(U.S.A. only)

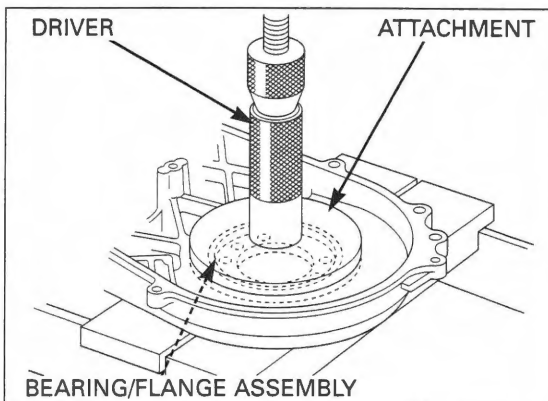


Drive in the bearing and bearing flange assembly squarely until it is fully seated, using the special tools.

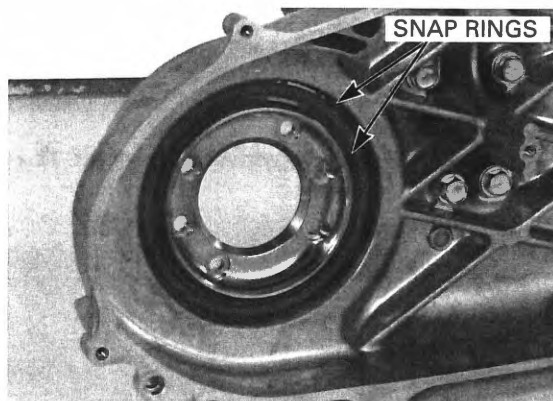
TOOLS:

Driver
Driver attachment,
110 x 140 mm

07749-0010000
07ZMD-MCT0100 or
07ZMD-MCTA100
(U.S.A. only)



Install the snap rings to the left swingarm pivot bearing and bearing flange. Make sure the snap rings are secure.



ASSEMBLY

WHEEL

AFTER '02 (ABS TYPE):

Install the pulser ring and new pulser ring bolts onto the wheel hub with tighten the bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)

Install the brake disc on the wheel hub with the marked side facing out.

Install new brake disc bolts and tighten them to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

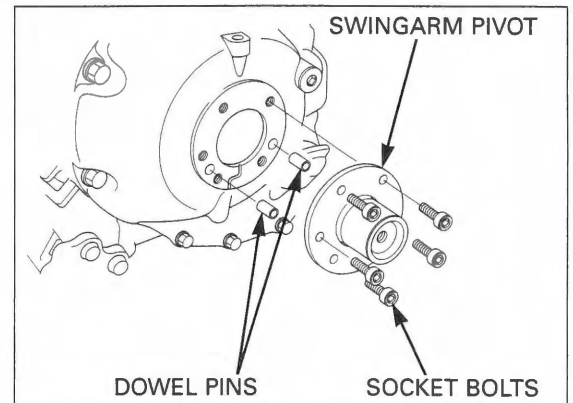
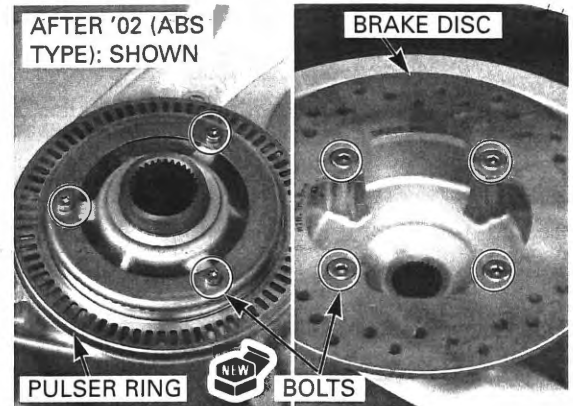
SWINGARM PIVOT

Install the dowel pins to the right crankcase cover.

Install the swingarm pivot aligning its holes with the dowel pins

Tighten the socket bolts to the specified torque.

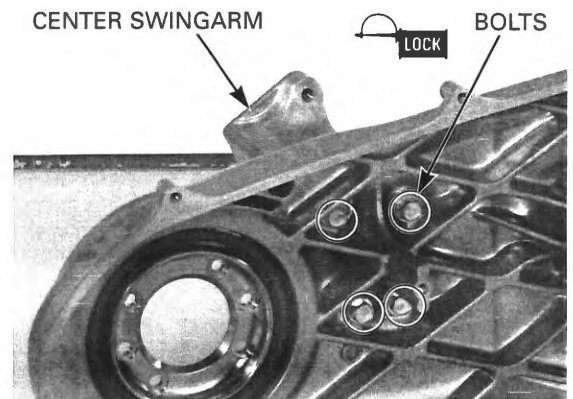
TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)



INSTALLATION

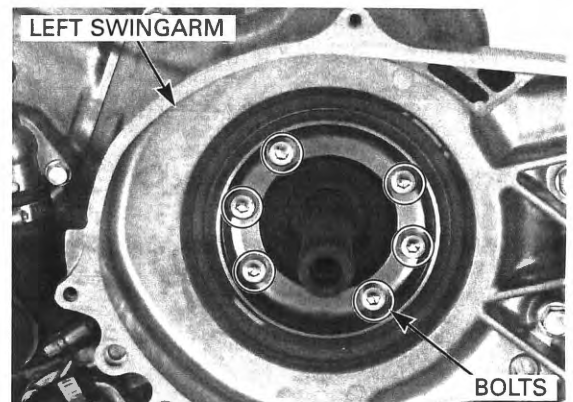
Install the center swingarm to the left swingarm. Apply a locking agent to the swingarm bolt threads. Tighten the bolts to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)



Install the left swingarm to the crankcase. Tighten the socket bolts to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

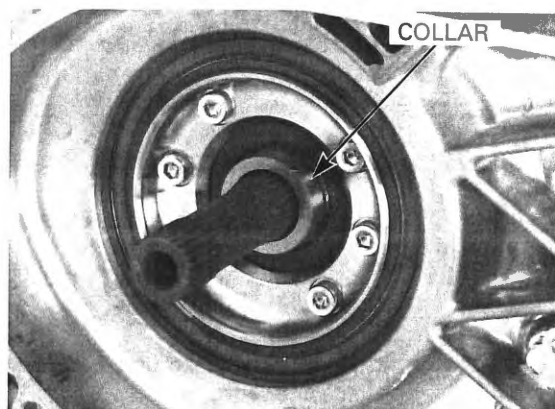


REAR WHEEL/SUSPENSION

Install the left swingarm pivot collar.

Install the following:

- Drive pulley/driven pulley/clutch (section 10)
- Left rear shock absorber lower bolt (page 15-14)

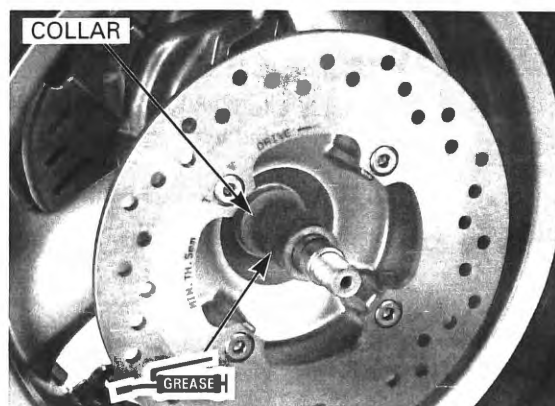


Install the rear wheel onto the final gear shaft, aligning the spline.



Install the inner side collar.

Apply grease to the 3 mm groove in the final gear shaft.

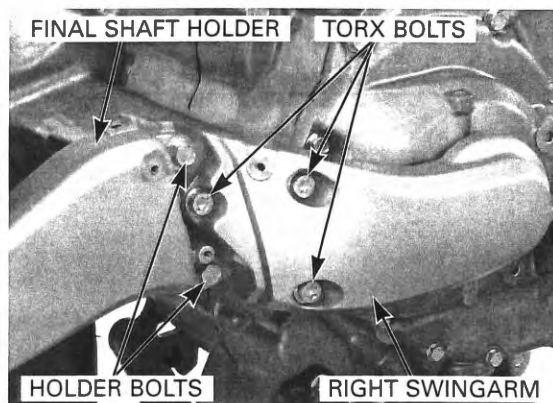


Install the right swingarm and tighten the torx bolts to the specified torque.

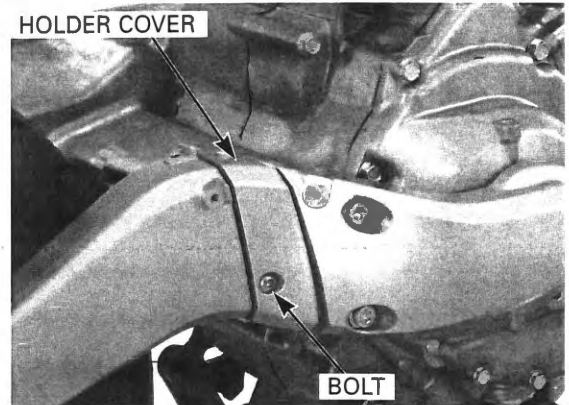
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the final shaft holder and tighten the bolts to the specified torque.

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



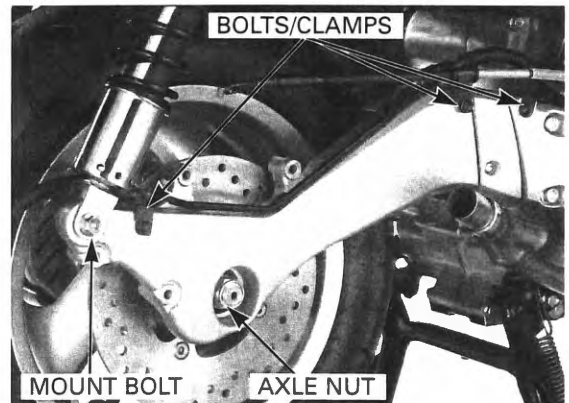
Install the driveshaft holder cover.
Tighten the bolt.



Install and tighten the rear axle nut temporarily.
Install and tighten the rear shock absorber lower mount bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Install the brake hose/cable clamps to the final shaft holder and tighten the bolts.

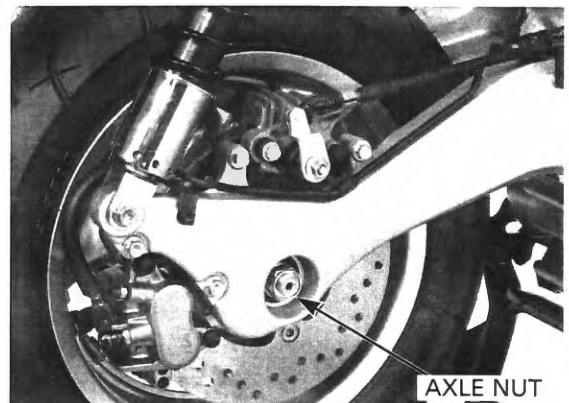


Release the main stand and support the scooter on its sidestand.

Tighten the rear axle nut to the specified torque.

TORQUE: 138 N·m (14.1 kgf·m, 102 lbf·ft)

Install the parking brake caliper (page 16-35).
Install the rear brake caliper (page 16-30).
Install the muffler (page 2-23, 26).



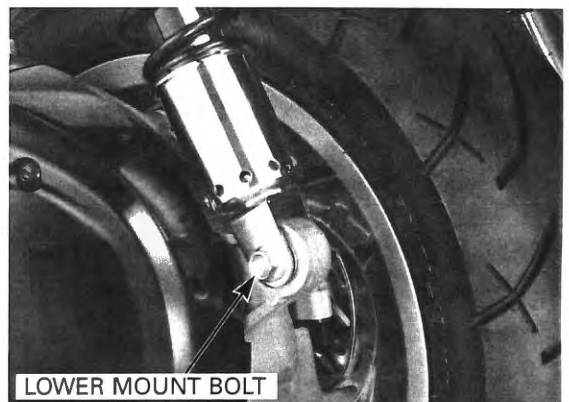
REAR SHOCK ABSORBER

REMOVAL

Remove the luggage box (page 2-10).

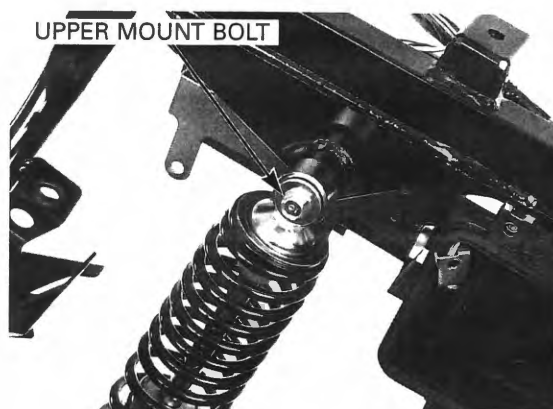
Support the scooter on its centerstand.
Support the swingarm with a hoist or equivalent.

Remove the rear shock absorber lower mount bolt.



REAR WHEEL/SUSPENSION

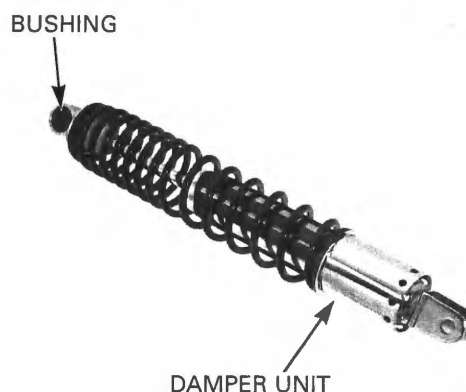
Remove the rear shock absorber upper mount bolt and shock absorber.



INSPECTION

Check the damper unit for leakage or other damage.
Check the upper joint bushing for wear or damage.

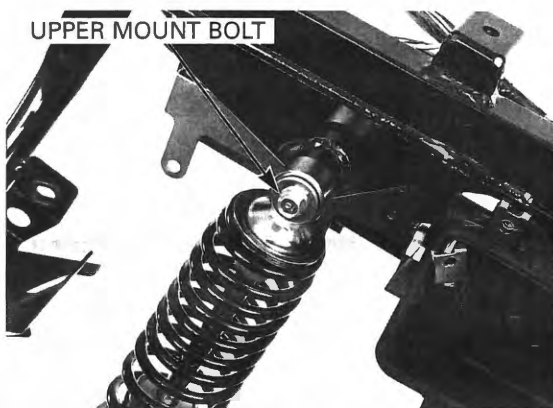
Replace the shock absorber assembly if necessary.



INSTALLATION

Install the rear shock absorber. Tighten the upper mount bolt to the specified torque.

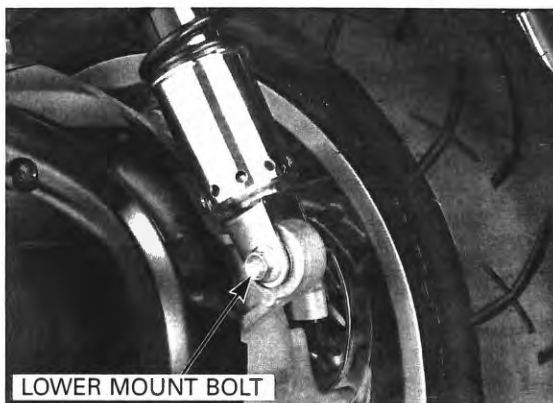
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install and tighten the lower mount bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

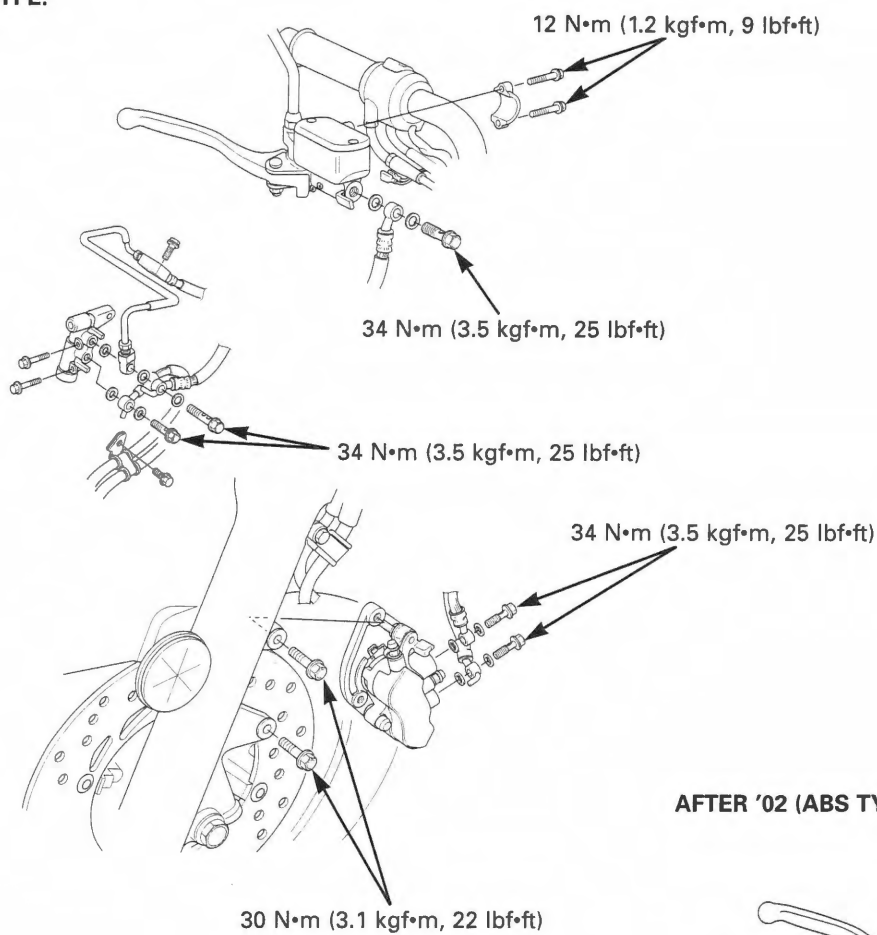
Install the luggage box (page 2-10).



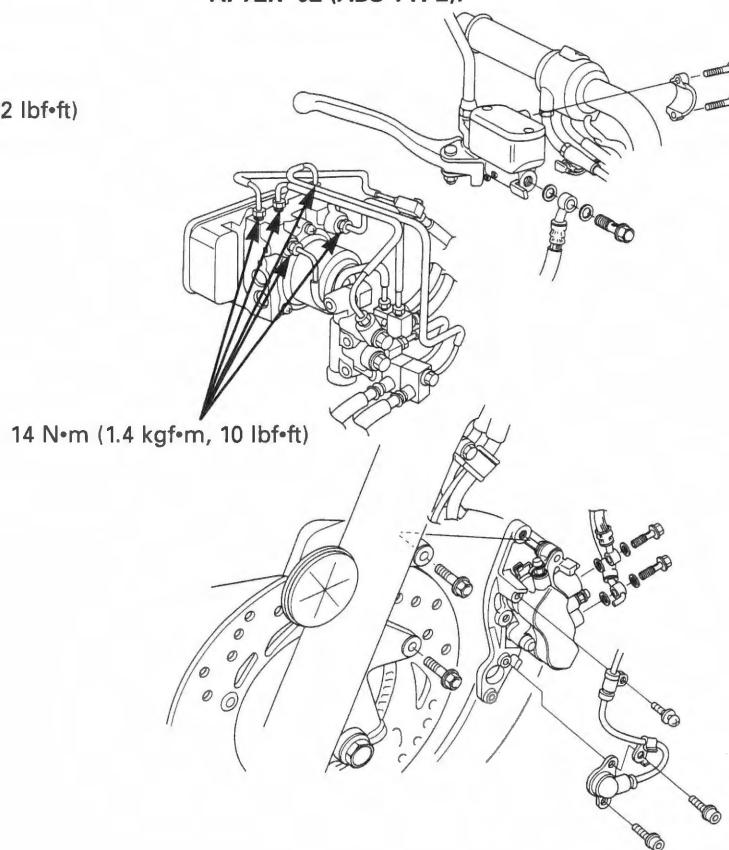
MEMO

BRAKE SYSTEM

STD TYPE:

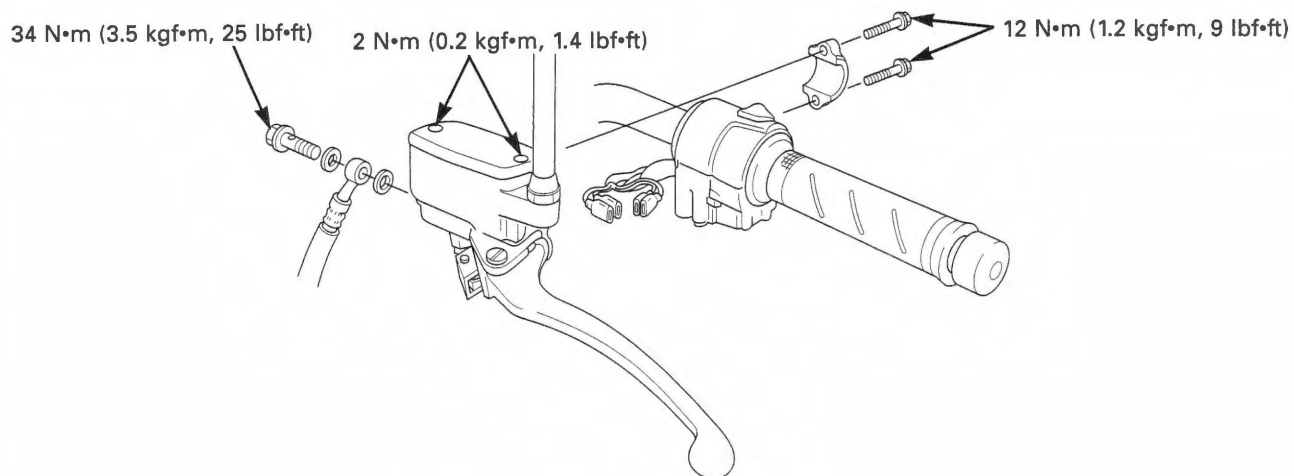


AFTER '02 (ABS TYPE):

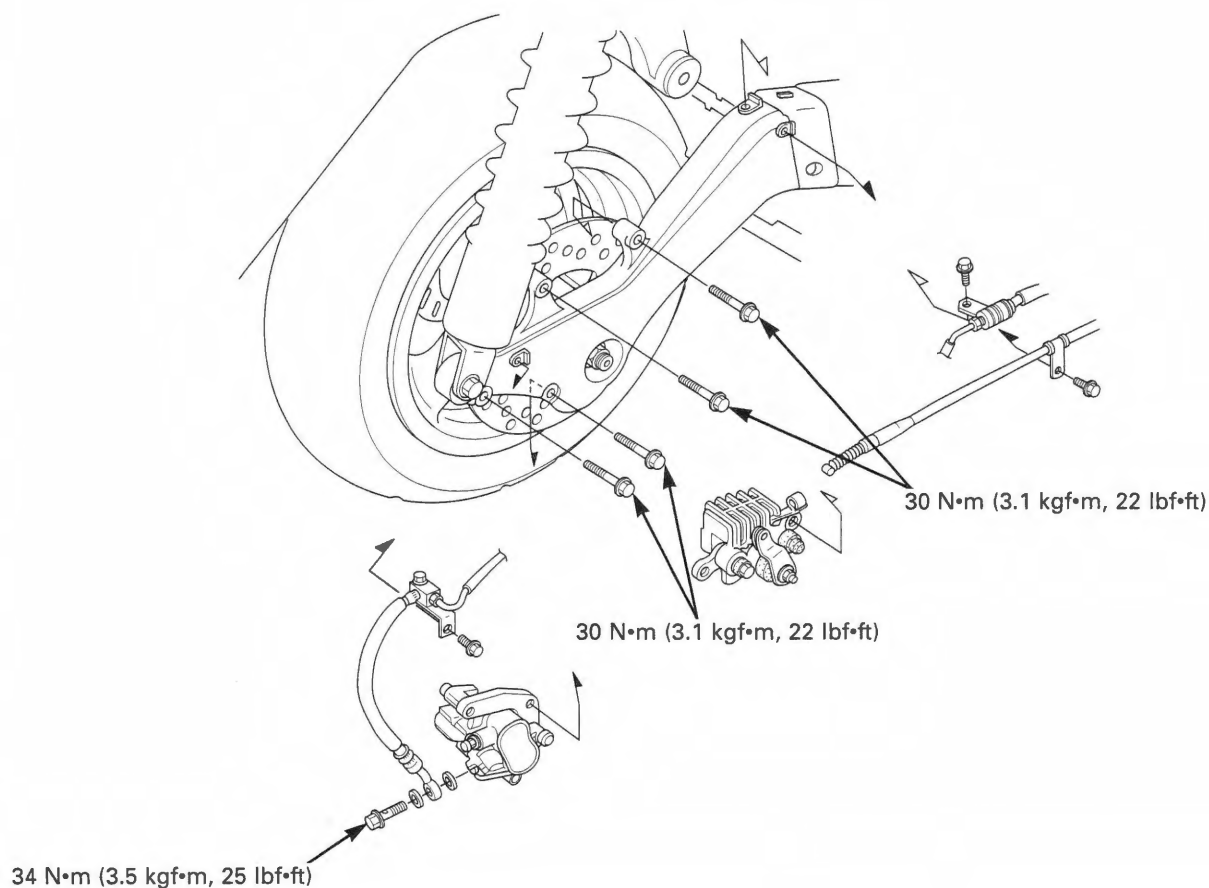


16. BRAKE SYSTEM

SERVICE INFORMATION	16-2	REAR MASTER CYLINDER	16-17
TROUBLESHOOTING	16-3	DELAY VALVE	16-22
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	16-4	FRONT BRAKE CALIPER	16-23
BRAKE PAD/DISC	16-9	REAR BRAKE CALIPER	16-27
FRONT MASTER CYLINDER	16-12	PARKING BRAKE	16-30



16



SERVICE INFORMATION

GENERAL

! CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated parts and clean a contaminated disc with a high quality brake degreasing agent.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- This section covers maintenance of the front and rear hydraulic brake system.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the vehicle.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 4	—
	Brake disc thickness	'02 – '06 standard type	4.8 – 5.2 (0.19 – 0.20)
		After '02 ABS type/ After '06 standard type	5.8 – 6.2 (0.22 – 0.24)
	Brake disc runout	—	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.	Upper	27.000 – 27.050 (1.0630 – 1.0650)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)
		Lower	27.000 – 27.050 (1.0630 – 1.0650)
	Caliper piston O.D.	Upper	26.935 – 26.968 (1.0604 – 1.0617)
Rear	Specified brake fluid	DOT 4	—
	Brake disc thickness	6.3 – 6.7 (0.25 – 0.26)	5.5 (0.22)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
	Caliper piston O.D.	26.935 – 26.968 (1.0604 – 1.0617)	26.910 (1.0594)
	Caliper piston O.D.	26.935 – 26.968 (1.0604 – 1.0617)	26.910 (1.0594)
Parking	Caliper cylinder I.D.	20.00 – 20.05 (0.787 – 0.789)	20.060 (0.790)
	Caliper piston O.D.	19.935 – 19.968 (0.7848 – 0.7861)	19.927 (0.7845)

TORQUE VALUES

Master cylinder reservoir cover screw	2 N•m (0.2 kgf•m, 1.4 lbf•ft)	
Master cylinder holder bolt	12 N•m (1.2 kgf•m, 9 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, 4.3 lbf•ft)	
Brake light switch screw	1 N•m (0.1 kgf•m, 0.7 lbf•ft)	
Brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	ALOC bolt: replace with a new one.
Front brake caliper body B bolt	32 N•m (3.3 kgf•m, 24 lbf•ft)	ALOC bolt: replace with a new one.
Brake caliper bleed valve	6 N•m (0.6 kgf•m, 4.3 lbf•ft)	
Brake pad pin	18 N•m (1.8 kgf•m, 13 lbf•ft)	
Rear caliper pad pin plug	3 N•m (0.3 kgf•m, 2.2 lbf•ft)	
Front caliper main pin bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)	Apply a locking agent to the threads.
Front caliper sub pin bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads.
Rear caliper main pin bolt	28 N•m (2.9 kgf•m, 21 lbf•ft)	Apply a locking agent to the threads.
Rear caliper sub pin bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads.
Parking brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	Apply a locking agent to the threads.
Parking brake caliper pin bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Brake hose oil bolt	34 N•m (3.5 kgf•m, 25 lbf•ft)	
Brake pipe nut	14 N•m (1.4 kgf•m, 10 lbf•ft)	Apply oil to the threads and seating surface.

TOOLS

Snap ring pliers 07914-SA50001

TROUBLESHOOTING

Brake lever soft or spongy

- Air in the hydraulic system
- Low brake fluid level
- Clogged fluid passage
- Contaminated brake disc/pad
- Warped/deformed brake disc
- Worn brake disc/pad
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Contaminated caliper
- Caliper not sliding properly
- Leaking hydraulic system
- Worn caliper piston seal
- Worn master cylinder piston cups
- Bent brake lever

Brake lever hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever

Brake drag

- Contaminated brake disc/pad
- Worn brake disc/pad
- Warped/deformed brake disc
- Caliper not sliding properly

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

NOTE:

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled. When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

BRAKE FLUID DRAINING

Make sure that the master cylinder is parallel to the ground before removing the reservoir cover.

FRONT:

Remove the screws, reservoir cover, diaphragm plate and diaphragm.

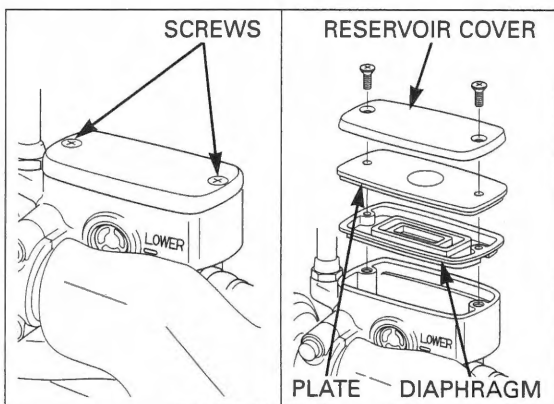
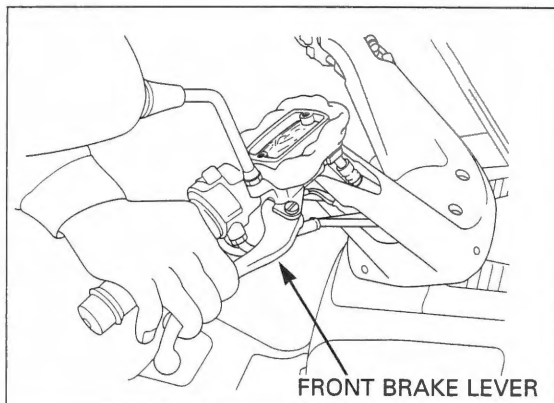
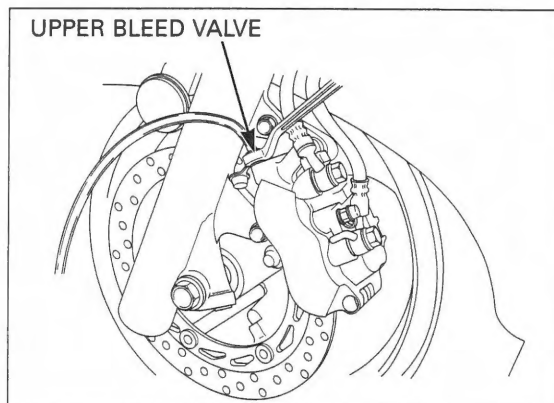
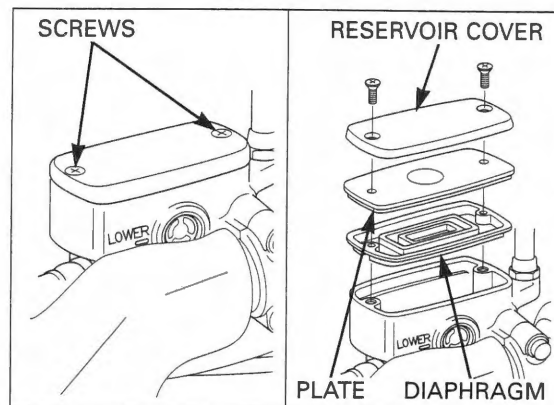
Connect a bleed hose to the upper bleed valve.

Loosen the upper bleed valve and pump the brake lever.

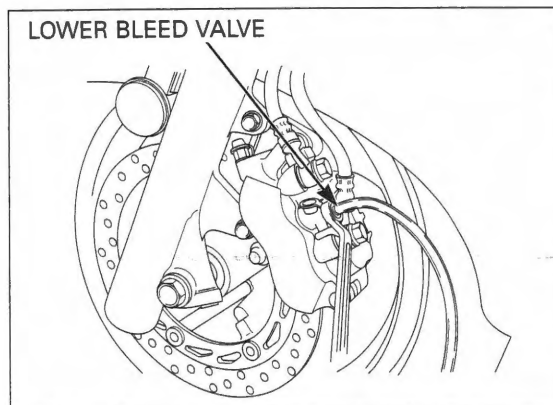
Stop operating the brake when no more fluid flows out of the upper bleed valve.

REAR (COMBINED):

Remove the screws, reservoir cover, diaphragm plate and diaphragm.

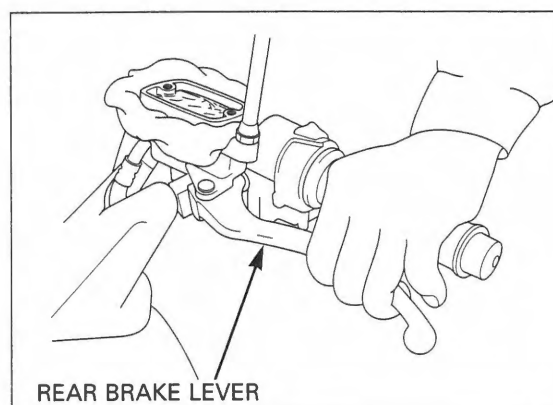


Connect a bleed hose to the front caliper lower bleed valve.



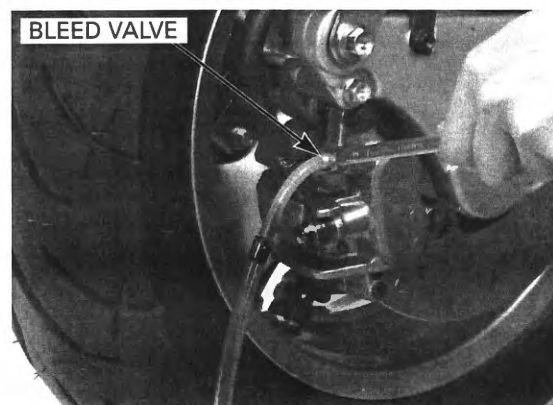
Loosen the front caliper lower bleed valve and pump the brake lever.
Stop operating the brake when no more fluid flows out of the front caliper lower bleed valve.

Tighten the front caliper lower bleed valve.



Connect a bleed hose to the rear caliper bleed valve.

Following the caliper bleed valve procedure above, drain the brake fluid from the rear caliper bleed valve.



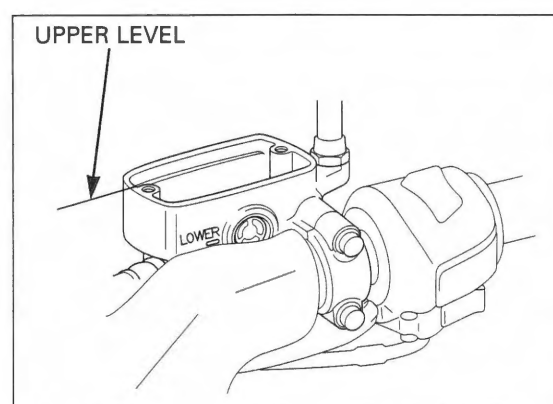
BRAKE FLUID FILLING/AIR BLEEDING

Do not mix different types of fluid since they are not compatible.

Fill the master cylinder with DOT 4 brake fluid to the upper level.

Connect a commercially available brake bleeder to the front caliper upper bleed valve.

Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system. When using a brake bleeding tool, follow the manufacturer's operating instructions.



BRAKE SYSTEM

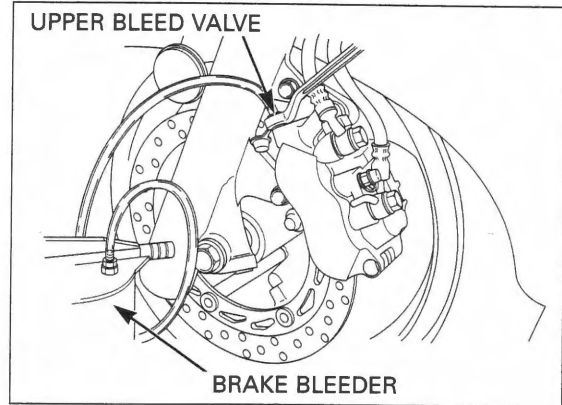
If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Pump the brake bleeder and loosen the front caliper upper bleed valve. Add fluid when the fluid level in the master cylinder is low to prevent drawing air into the system.

Repeat the above procedures until no air bubbles appear in the plastic hose.

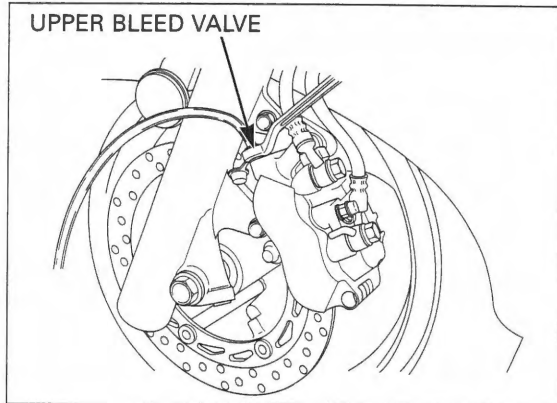
Close the front caliper upper bleed valve and operate the front brake lever.

If it still spongy, bleed the system again.



If the brake bleeder is not available, perform the following procedure.

Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.

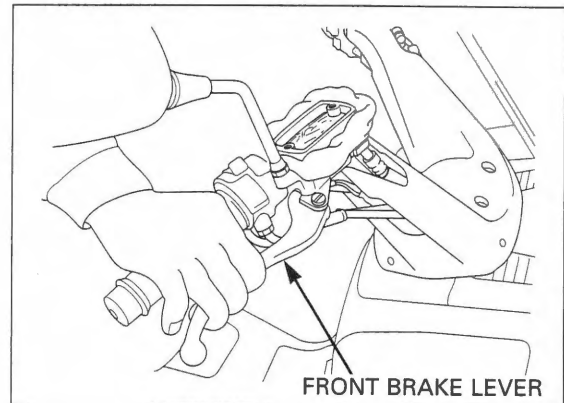


Do not release the brake lever until the bleed valve has been closed.

1. Pump the brake lever several times, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.
2. Release the brake lever slowly until the bleed valve has been closed.
3. Repeat steps 1 – 2 until there are no air bubbles in the bleed hose.

After bleeding air completely, tighten the bleed valves to the specified torque.

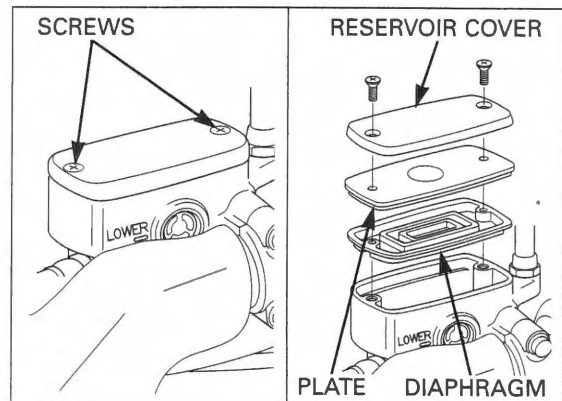
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



Fill the reservoir to the casting ledge with DOT 4 brake fluid to the upper level.

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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

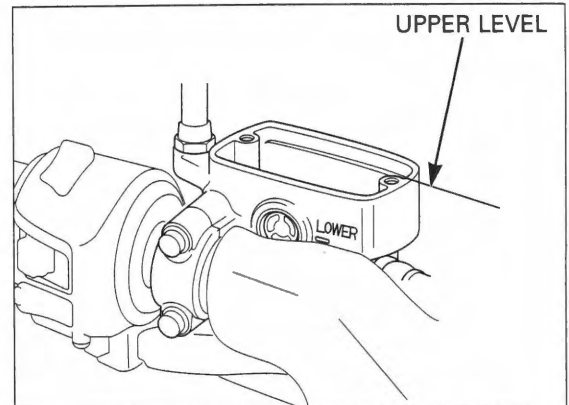


REAR (COMBINED): FLUID FEEDING

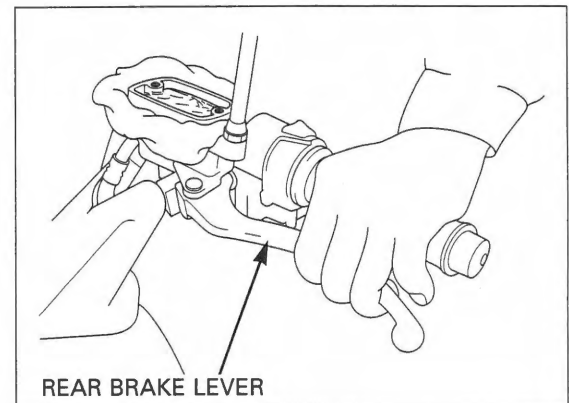
Fill with fluid and bleed air from the rear brake lever line in the sequence as follow:

1. Front caliper lower bleed valve
2. Rear caliper bleed valve

Fill the rear master cylinder with DOT 4 brake fluid to the upper level.



Operate the rear brake lever several times to bleed air from the master cylinder.

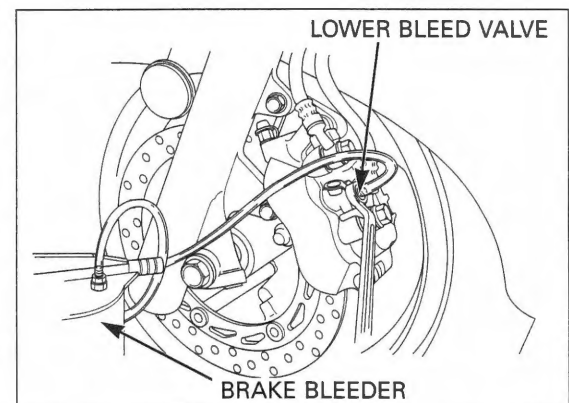


- (1) Connect a commercially available brake bleeder to the front caliper lower bleed valve.

If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.

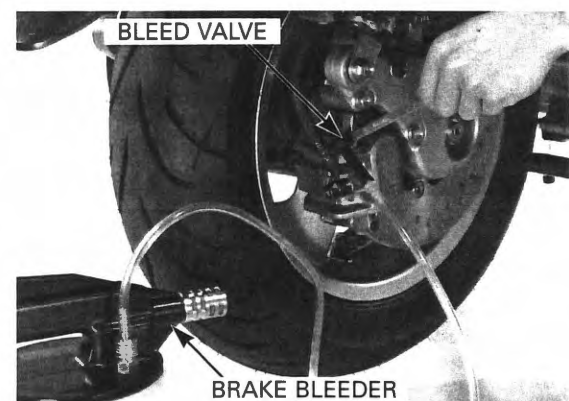
1. Pump the brake bleeder and loosen the front caliper lower bleed valve. Add fluid when the fluid level in the master cylinder is low to prevent drawing air into the system.
2. Repeat the above procedures until a sufficient amount of the fluid flows out of the caliper lower bleed valve.

It is not a problem if the fluid flowing out from the lower bleed valve contains air bubbles because the lines will be bled in later steps.



- (2) Connect a commercially available brake bleeder to the rear caliper bleed valve.
Repeat step 1 and 2 for the rear caliper bleed valve.

Next, bleed air from the system (page 16-5).



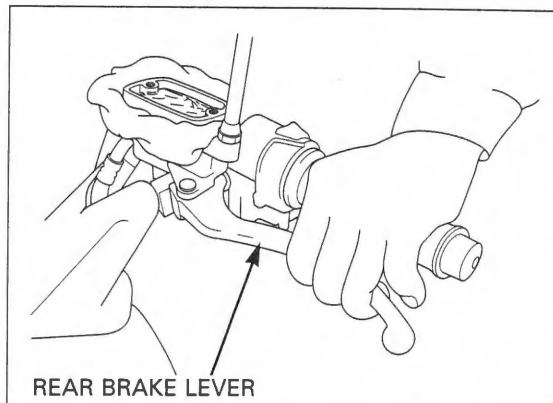
BRAKE SYSTEM

If the brake bleeder is not available, perform the following procedure.

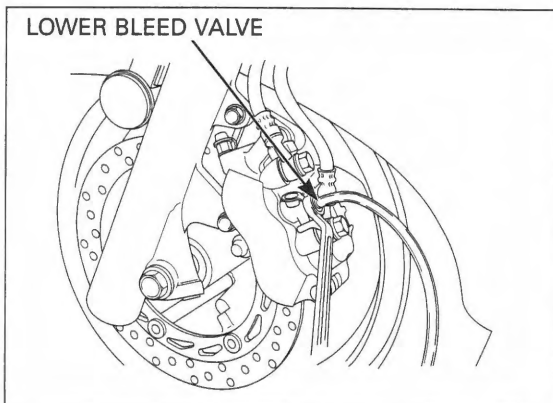
Do not release the brake lever until the bleed valve has been closed.

- (1) Connect a bleed hose to the front caliper lower bleed valve.

1. Pump the rear brake lever several (5–10) times quickly, then operate the rear brake lever all the way and loosen the front caliper lower bleed valve and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.



Release the rear brake lever slowly and wait several seconds after it reaches the end of its travel.



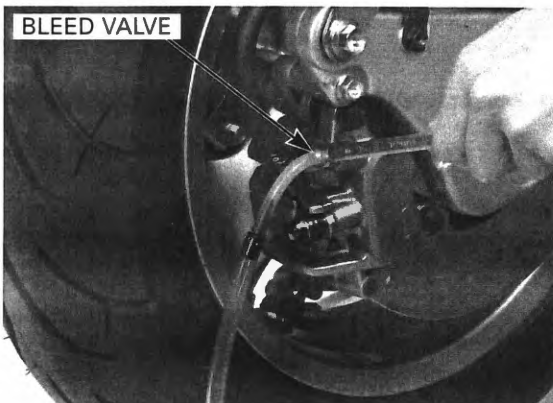
2. Repeat the above procedures until a sufficient amount of the fluid flows out of the caliper lower bleed valve.

It is not a problem if the fluid flowing out from the lower bleed valve contains air bubbles because the lines will be bled in later steps.

- (2) Connect a bleed hose to the rear caliper bleed valve.

Repeat step 1 and 2 for rear caliper bleed valve.

Next, bleed air from the system (see below).

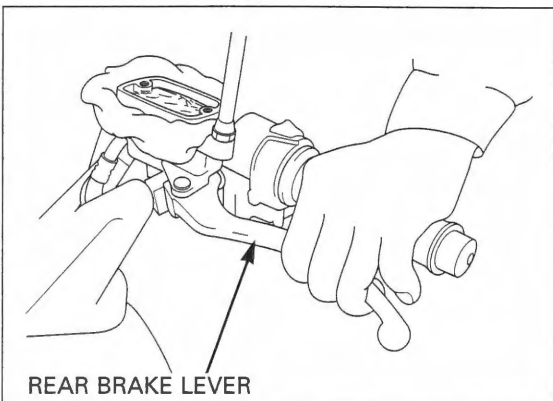


AIR BLEEDING

Connect a bleed hose to the front caliper lower bleed valve (AFTER '02 ABS TYPE).

- (1) Connect a bleed hose to the rear caliper bleed valve.

1. Pump the rear brake lever several (5–10) times quickly, then operate the rear brake lever all the way and loosen the front caliper lower bleed valve and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.



Release the rear brake lever slowly and wait several seconds after it reaches the end of its travel.

2. Repeat the above procedures until air bubbles do not appear in the transparent hose.

Connect a bleed hose to the rear caliper bleed valve (AFTER '02 ABS TYPE).

- (2) Connect a bleed hose to the front caliper lower bleed valve.
Repeat step 1 and 2 for the front caliper upper bleed valve.

Note that you may feel strong resistance on the rear (combined) brake lever during pumping to bleed air from the caliper. This symptom is caused by the delay valve function. Be sure to push the rear brake lever fully in at this point.

Until air bubbles cease to appear in the fluid, repeat the air bleeding procedure about 2 – 3 times at each bleed valve.

Make sure the bleed valves are closed and operate the brake lever. If it still feels spongy, bleed the system again.

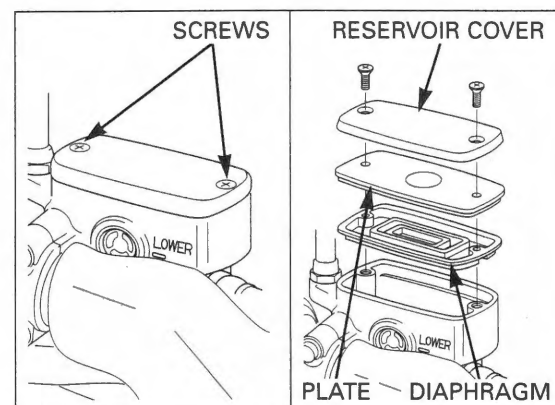
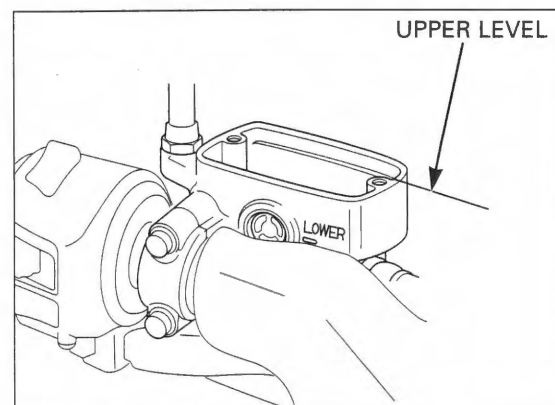
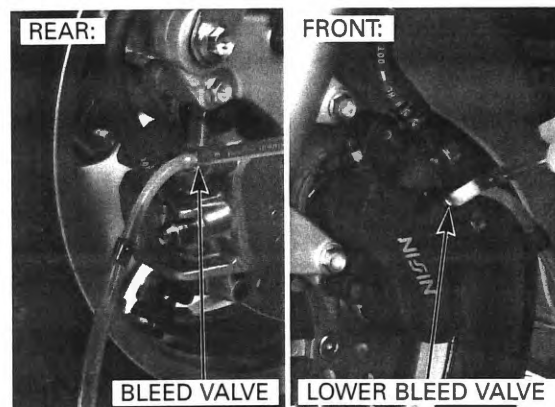
After bleeding the air completely, tighten the bleed valves to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the casting ledge with DOT 4 brake fluid to the upper level.

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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



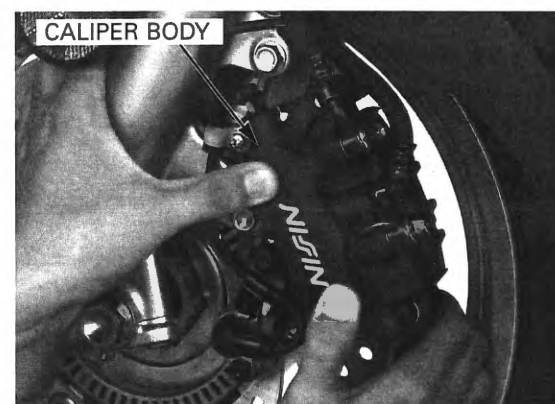
BRAKE PAD/DISC

BRAKE PAD REPLACEMENT

FRONT:

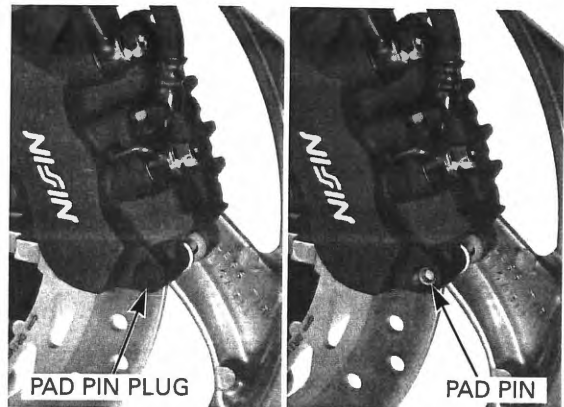
Always replace the brake pads in pairs to ensure even disc pressure.

To provide clearance for new pads, push the caliper pistons all the way in by pushing the caliper body inward.



BRAKE SYSTEM

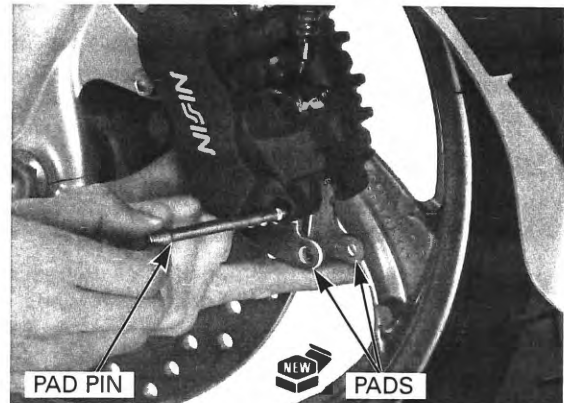
Remove the pad pin plug and loosen the pad pin.



Remove the pad pin and the brake pads.

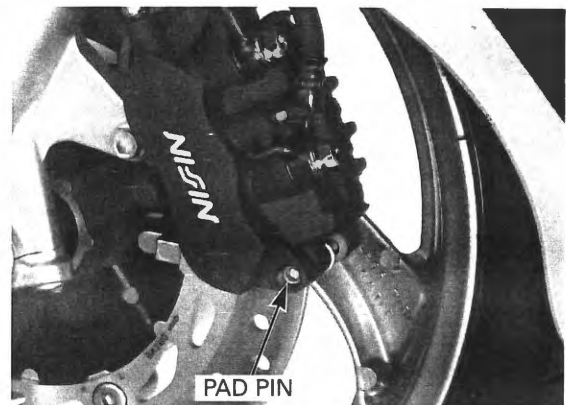
Make sure that the pad spring is installed in position. Install new pads so that their ends rest properly on the pad retainer on the bracket.

Install the pad pin by pushing the pads against the pad spring, aligning the pad pin holes in the pads and caliper.

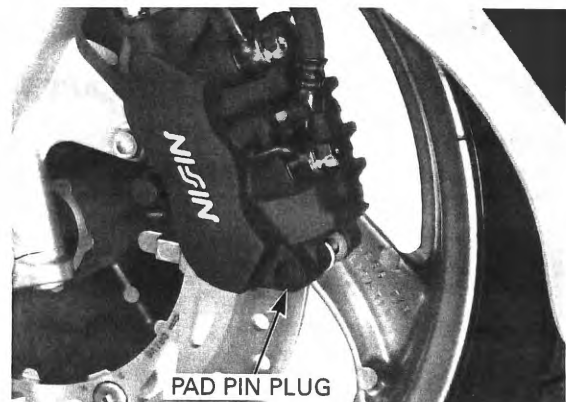


Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



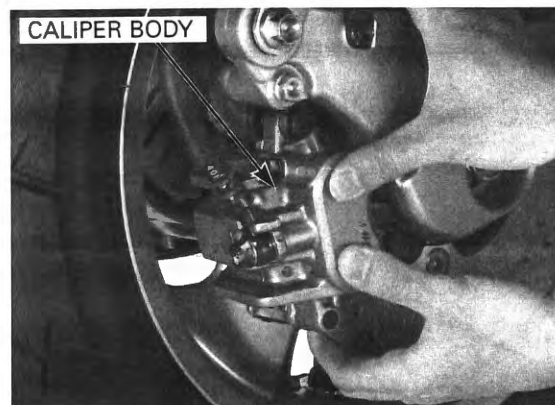
Install the pad pin plug.



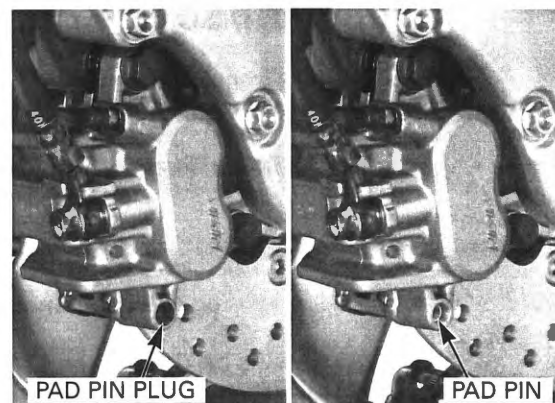
Always replace the brake pads in pairs to ensure even disc pressure.

REAR:

To provide clearance for new pads, push the caliper piston all the way in by pushing the caliper body inward.

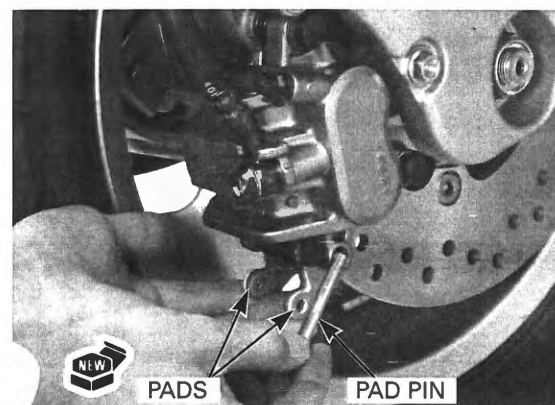


Remove the pad pin plug and loosen the pad pin.



Remove the pad pin and brake pads.

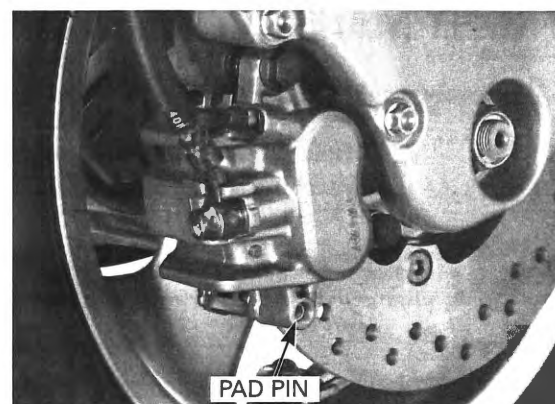
Install new pads so that their ends rest properly on the pad retainer on the bracket.



Install the pad pin by pushing the pads against the pad spring, aligning the pad pin holes in the pads and caliper.

Tighten the pad pin to the specified torque.

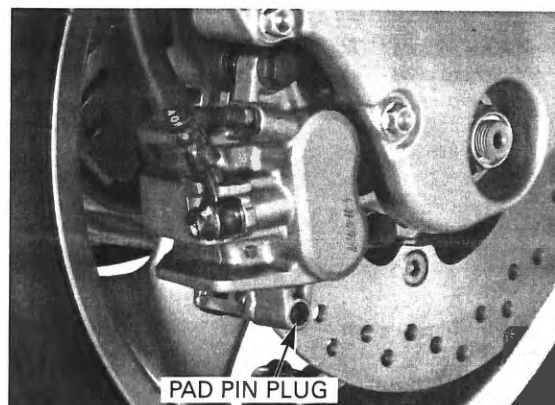
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



BRAKE SYSTEM

Install and tighten the pad pin plug to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



BRAKE DISC INSPECTION

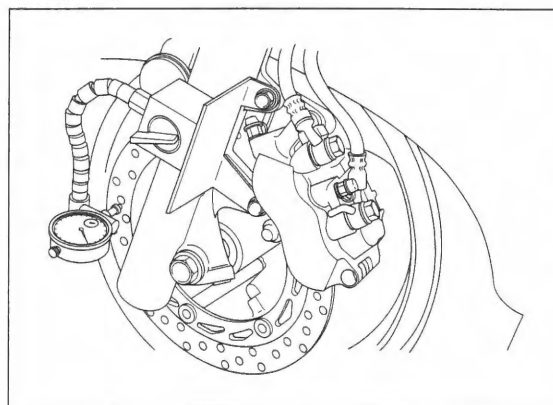
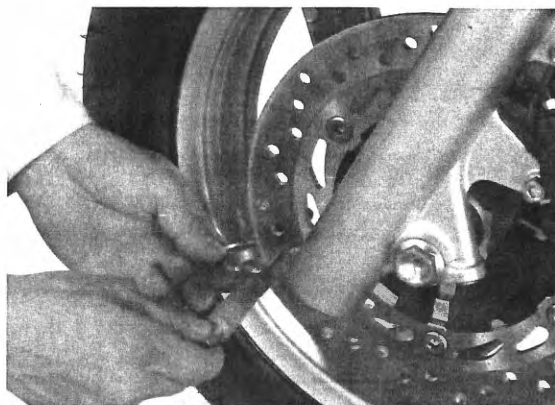
Visually inspect the brake disc for damage or cracks. Measure the brake disc thickness.

SERVICE LIMITS: Front ('02 – '06 standard type):
4.0 mm (0.16 in)
(After '02 ABS type/
After '06 standard type):
5.0 mm (0.20 in)
Rear: 5.5 mm (0.22 in)

Replace the brake disc if the smallest measurement is less than the service limit.

Measure the brake disc runout.

SERVICE LIMIT: 0.30 mm (0.012 in)



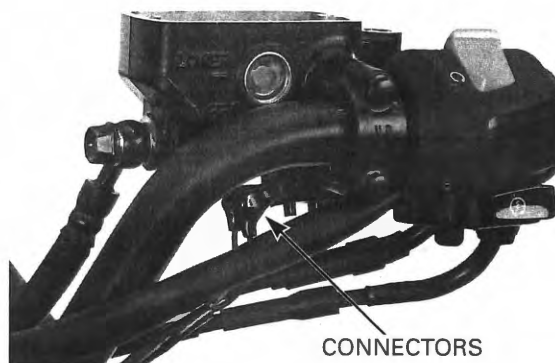
FRONT MASTER CYLINDER

REMOVAL

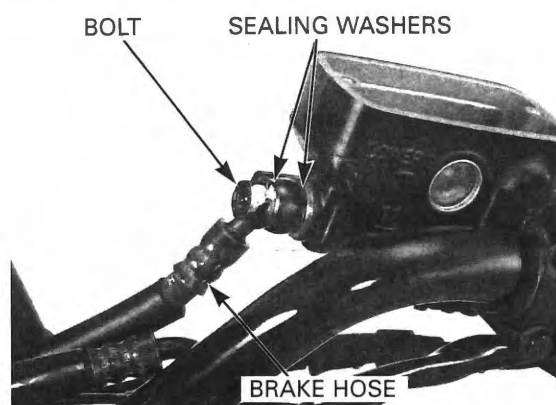
When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the handlebar cover (page 2-14).
Remove the rearview mirror (page 14-18).
Drain the front brake hydraulic system (page 16-4).

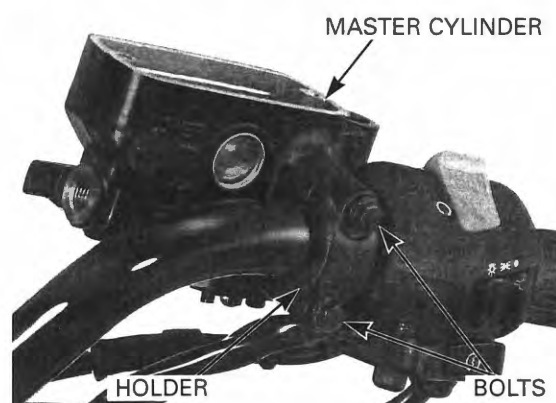
Disconnect the brake light switch connectors.



Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

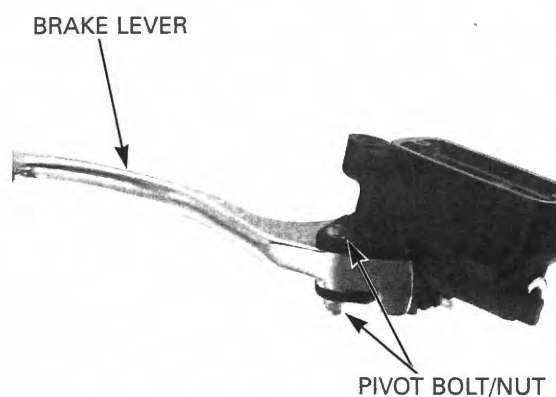


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

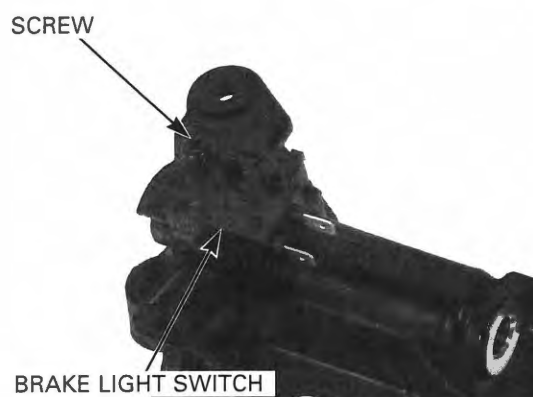


DISASSEMBLY

Remove the brake lever pivot bolt and nut.
Remove the brake lever.

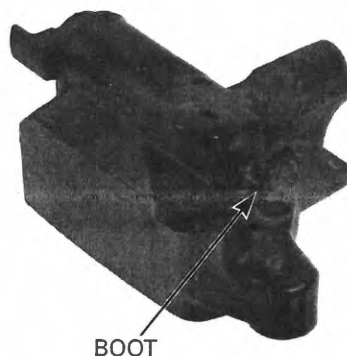


Remove the screw and brake light switch.



BRAKE SYSTEM

Remove the boot.



Remove the snap ring from the master cylinder body using a special tool as shown.

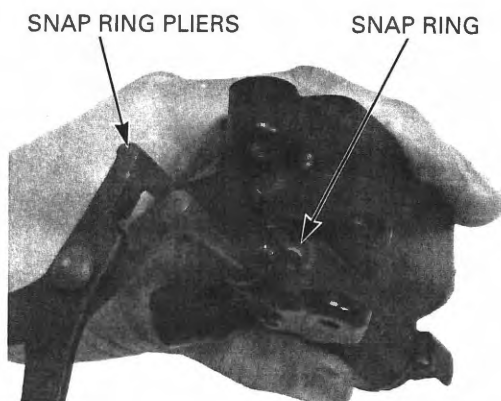
TOOL:

Snap ring pliers

07914-SA50001

Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

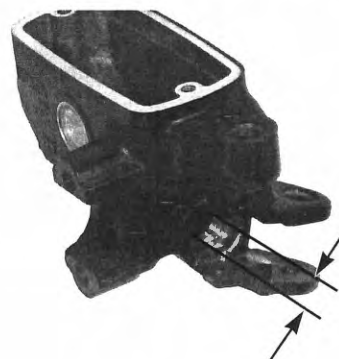


INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.

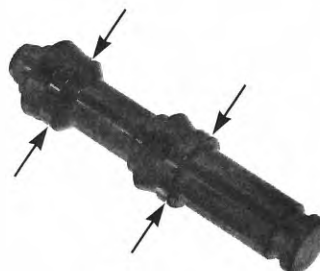
Measure the master cylinder I.D.

SERVICE LIMIT: 11.055 mm (0.4352 in)

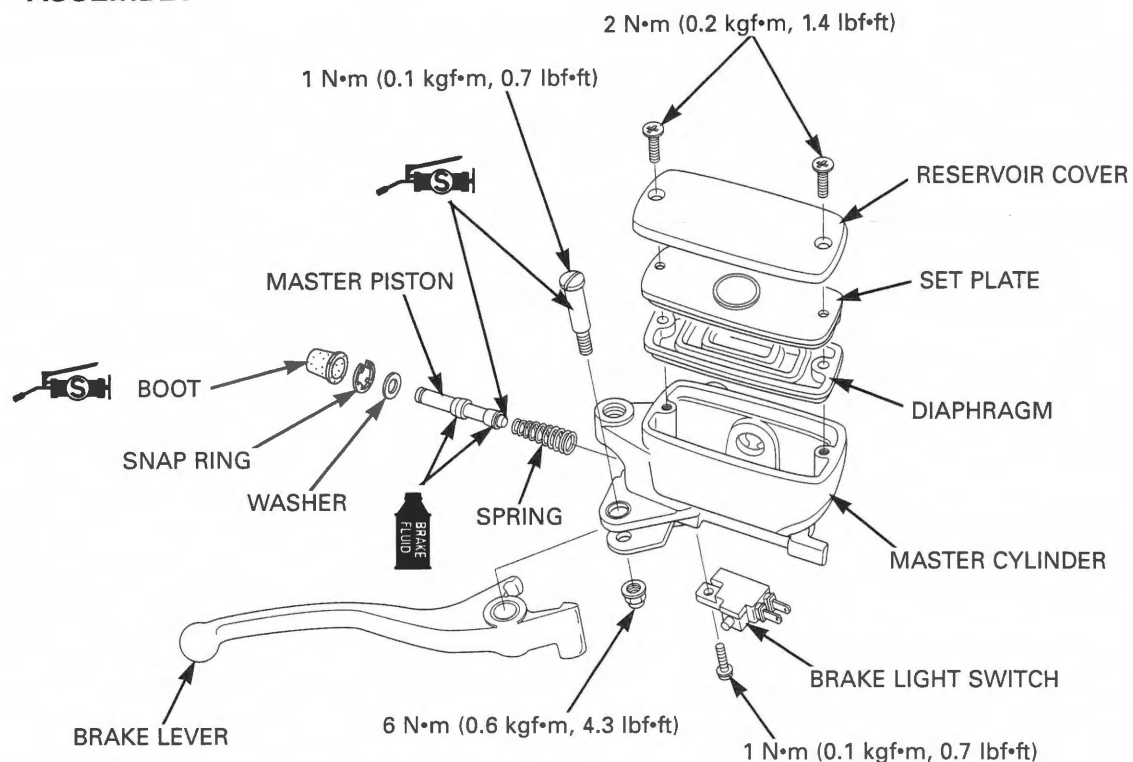


Measure the master cylinder piston O.D.

SERVICE LIMIT: 10.945 mm (0.4309 in)



ASSEMBLY



NOTE:

Keep the piston, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
When installing the cups, do not allow the lips to turn inside out.
Install the piston assembly into the master cylinder.

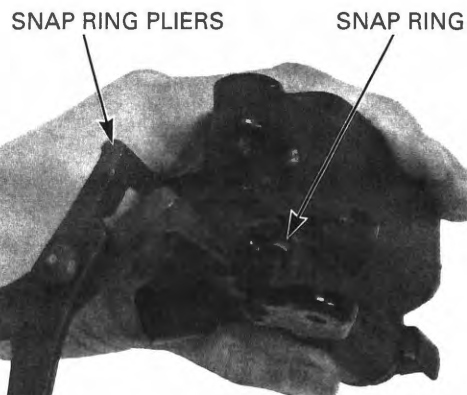


Be certain the snap ring is firmly seated in the groove. Install the snap ring using a special tool.

TOOL:

Snap ring pliers

07914-SA50001



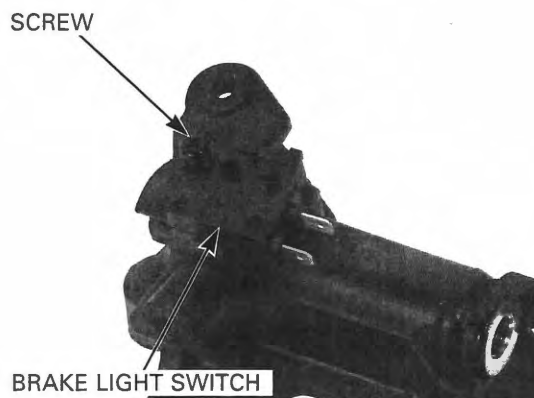
BRAKE SYSTEM

Apply silicone grease to the inside of the boot.
Install the boot.



Install the brake light switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



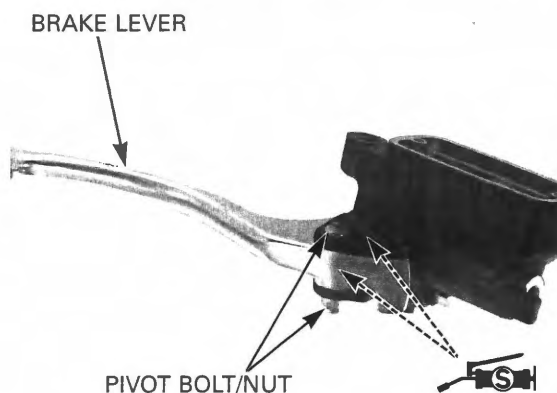
Apply silicone grease to the master piston tip.
Install the brake lever.

Apply silicone grease to the brake lever pivot bolt sliding surface.
Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

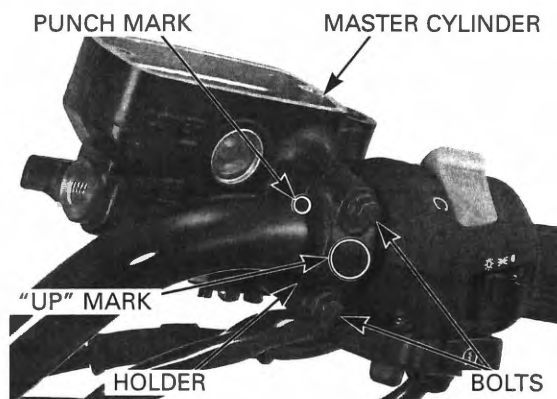


INSTALLATION

Place the master cylinder assembly on the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

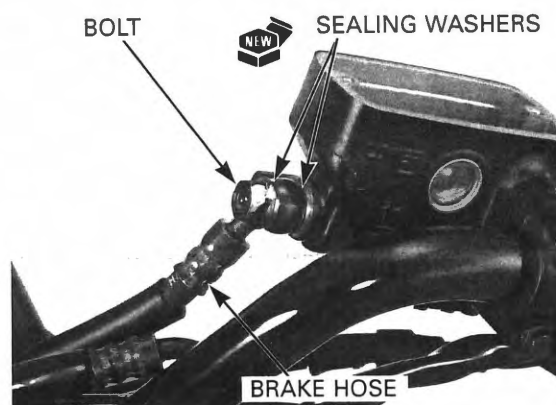
Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Rest the brake hose eyelet against the stopper.
Install the brake hose eyelet with the oil bolt and new sealing washers.
Tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

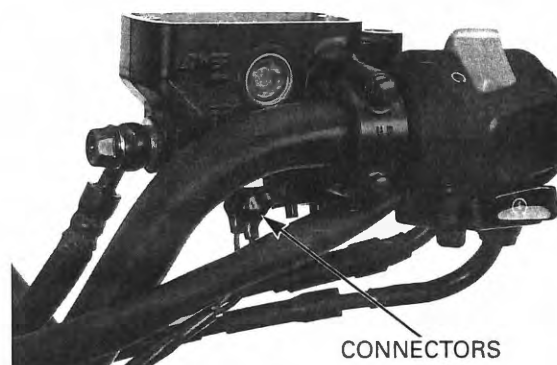


Connect the brake light switch connectors.

Fill the reservoir to the upper level and bleed the brake system (page 16-5).

Install the rearview mirror (page 14-25).

Install the handlebar cover (page 2-14).



REAR MASTER CYLINDER

REMOVAL

When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the handlebar cover (page 2-14).

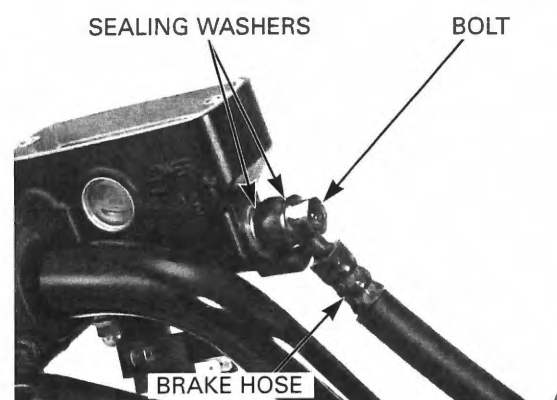
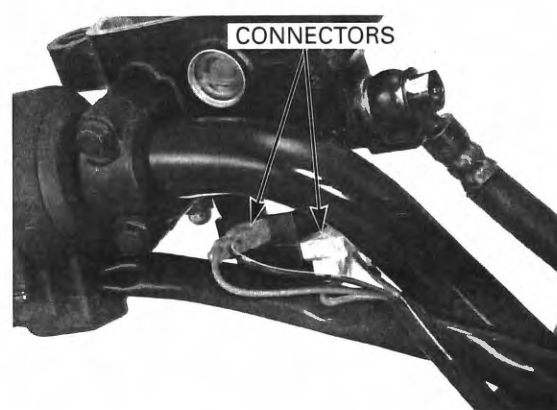
Remove the rearview mirror (page 14-18).

Drain the rear brake hydraulic system (page 16-4).

Disconnect the brake light switch connectors.

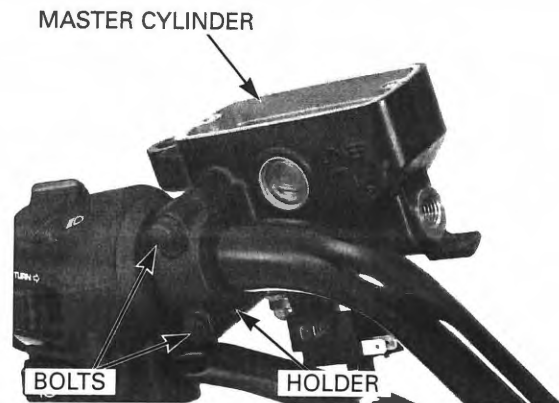
Disconnect the limit switch connectors.

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.



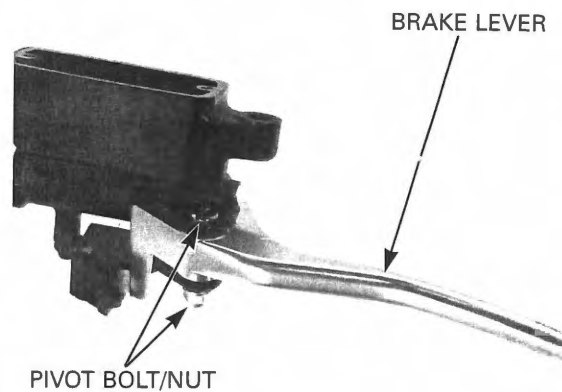
BRAKE SYSTEM

Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

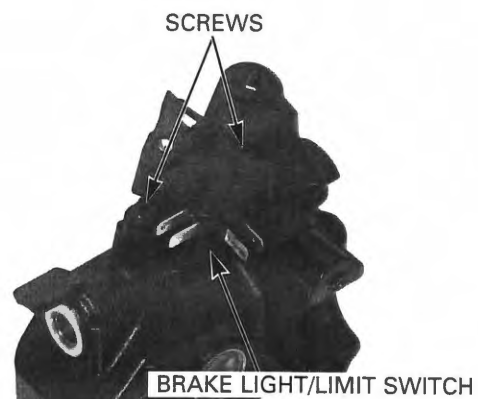


DISASSEMBLY

Remove the brake lever pivot bolt and nut.
Remove the brake lever.



Remove the screws and brake light/limit switch.



Remove the boot.



Remove the snap ring from the master cylinder body using a special tool as shown.

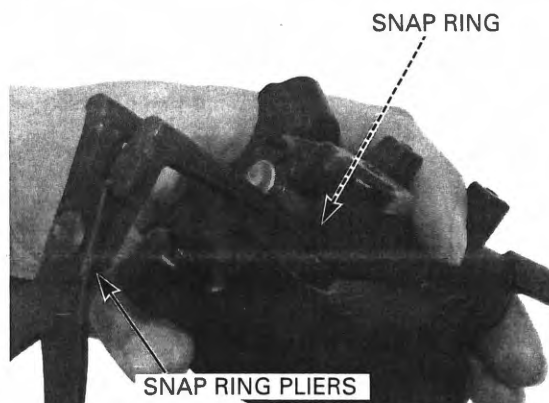
TOOL:

Snap ring pliers

07914-SA50001

Remove the master piston, cup and spring.

Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.

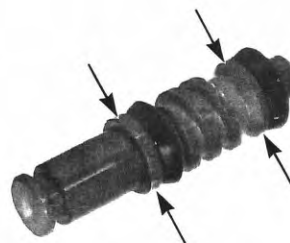
Measure the master cylinder I.D.

SERVICE LIMIT: 12.755 mm (0.5022 mm)

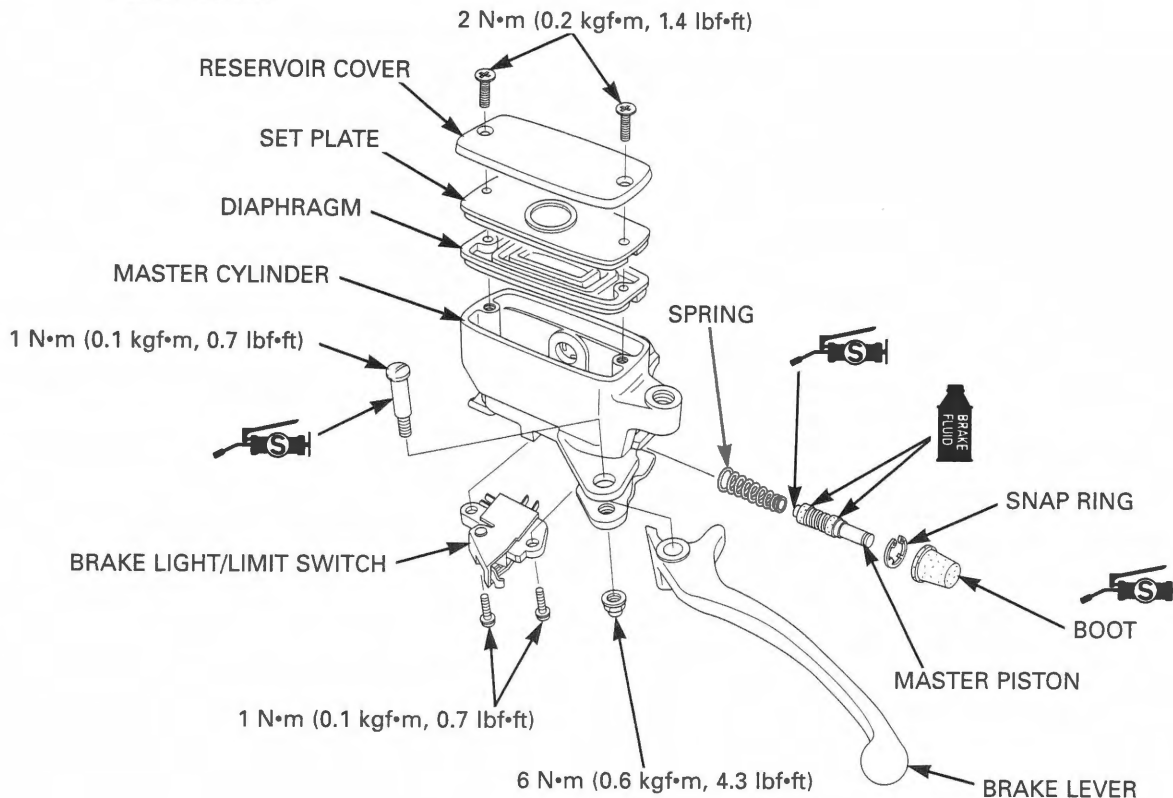


Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



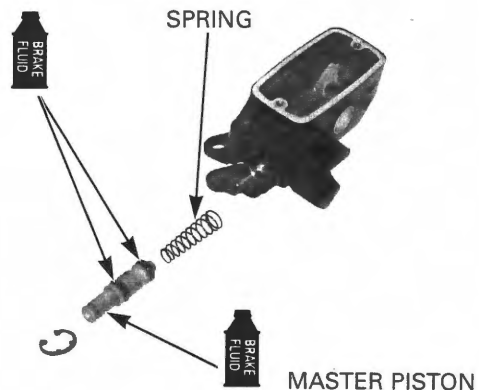
ASSEMBLY



NOTE:

Keep the piston, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring and cup to the piston.
When installing the cups, do not allow the lips to turn inside out.
Install the piston assembly into the master cylinder.

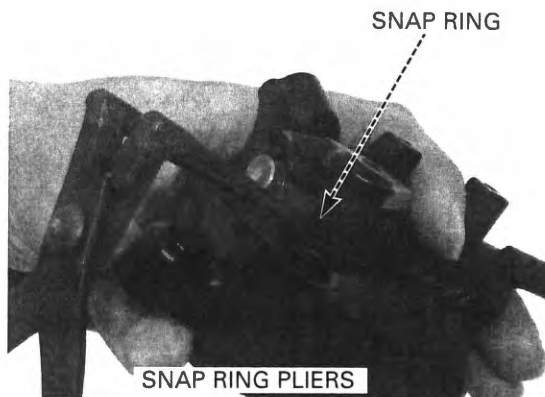


Be certain the snap ring is firmly seated in the groove.
Install the snap ring using a special tool.

TOOL:

Snap ring pliers

07914-SA50001

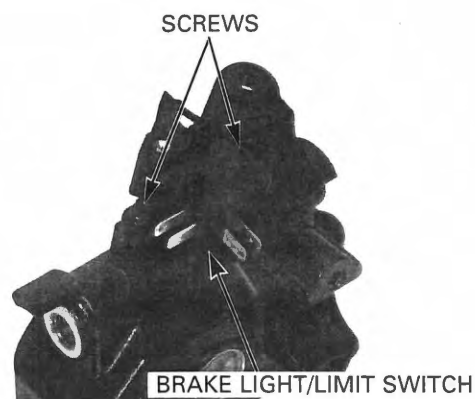


Apply silicone grease to the inside of the boot.
Install the boot.



Install the brake light/limit switch and tighten the screws to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



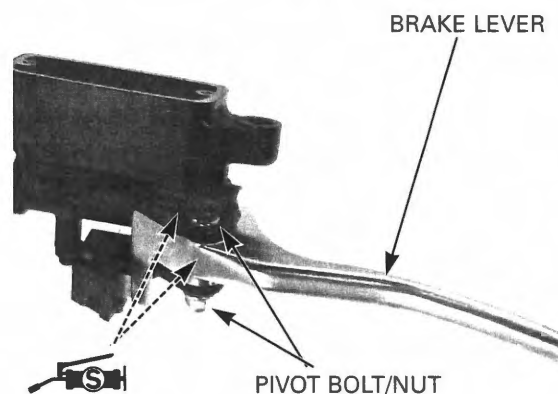
Apply silicone grease to the master piston tip.
Install the brake lever.

Apply silicone grease to the brake lever pivot bolt sliding surface.
Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

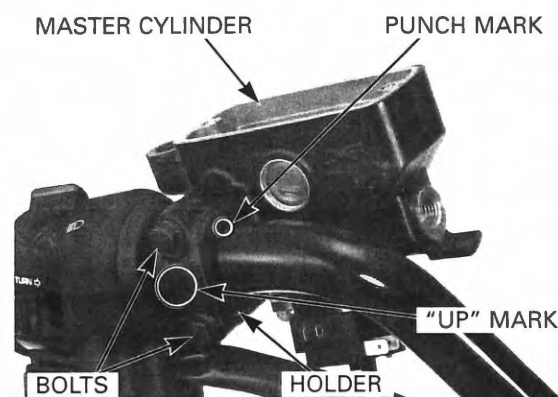


INSTALLATION

Place the master cylinder assembly on the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

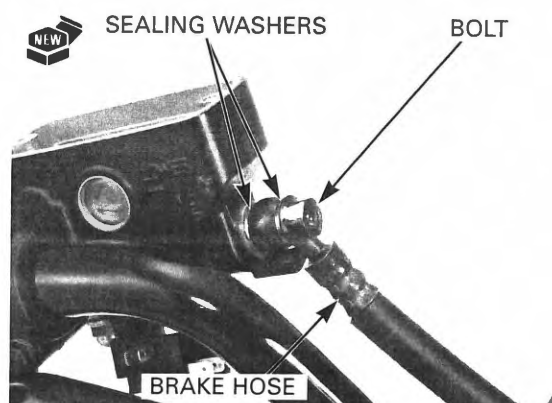
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



BRAKE SYSTEM

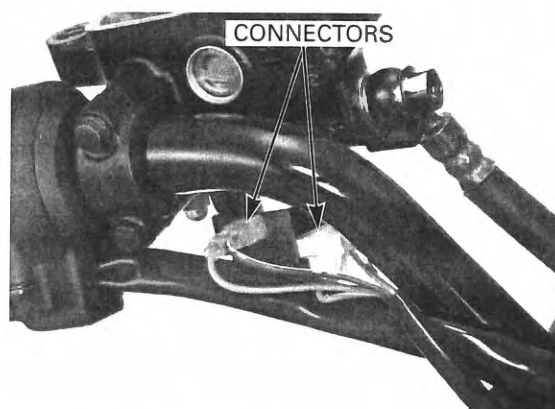
Rest the brake hose eyelet against the stopper.
Install the brake hose eyelet with the oil bolt and new sealing washers.
Tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Connect the brake light switch connectors.
Connect the limit switch connectors.

Fill the reservoir to the upper level and bleed the brake system (page 16-7).
Install the rearview mirror (page 14-25).
Install the handle cover (page 2-14).



DELAY VALVE

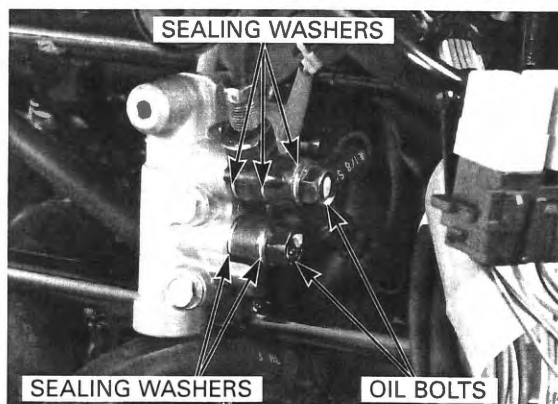
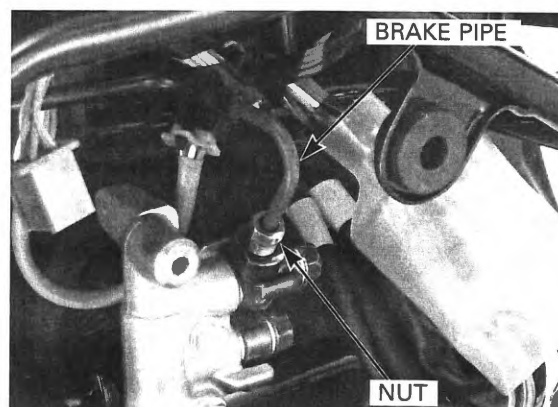
REMOVAL

When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the front cover (page 2-14).
Remove the front airduct cover (page 2-21).
Drain the front brake hydraulic system (page 16-4).

Loosen the brake pipe nut and disconnect the brake pipe from the brake hose eyelet.

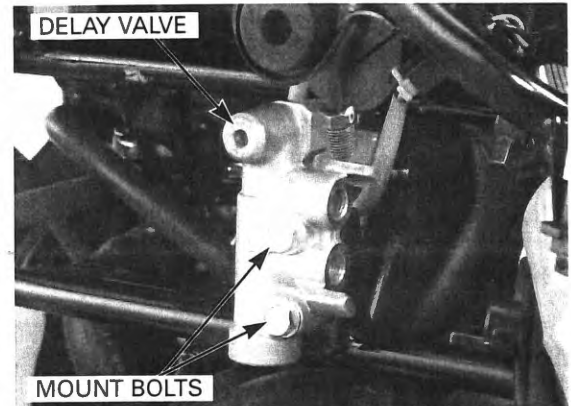
Remove the brake hose oil bolts, sealing washers and brake hose eyelets.



Remove the bolts and delay valve.

INSTALLATION

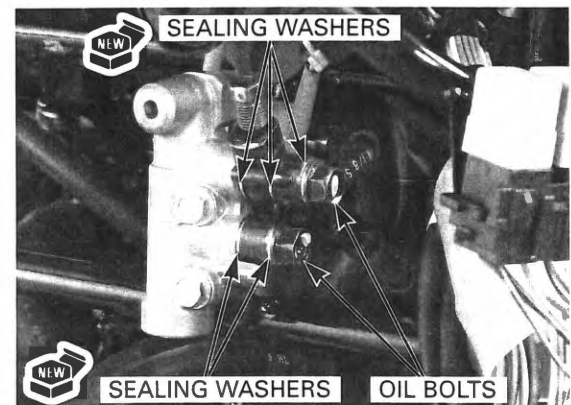
Install the delay valve and tighten the bolts.



Install the brake hose eyelets and new sealing washers.

Tighten the brake hose bolt to the specified torque while resting hose eyelet against the stopper on the delay valve.

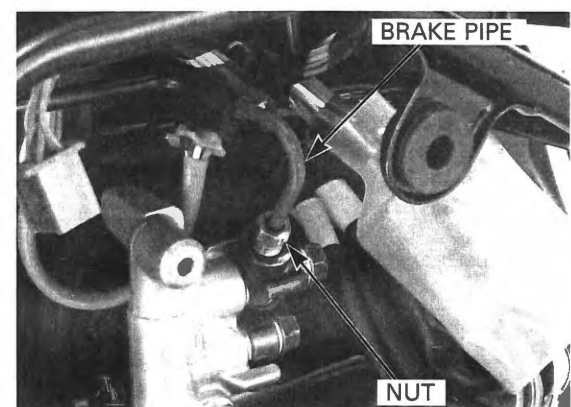
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Connect the brake pipe to the brake hose eyelet. Tighten the brake pipe nut to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Fill the reservoir to the upper level and bleed the brake system (page 16-5).
Install the front airduct cover (page 2-21).
Install the front cover (page 2-14).

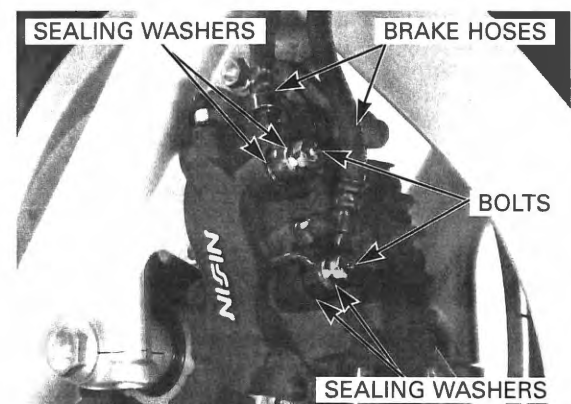


FRONT BRAKE CALIPER

REMOVAL

Drain the front brake hydraulic system (page 16-4).
Remove the brake pad (page 16-9).

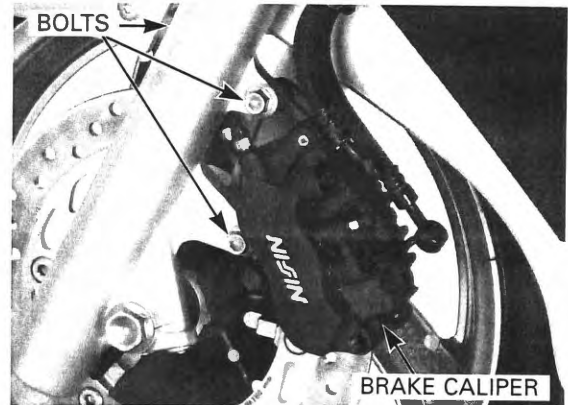
Remove the oil bolts, sealing washers and brake hose from the brake caliper.



BRAKE SYSTEM

Remove the following:

- Bolts and front wheel speed sensor (AFTER '02 ABS TYPE)
- Screw and front wheel speed sensor wire clamp (AFTER '02 ABS TYPE)
- Mount bolts and front brake caliper



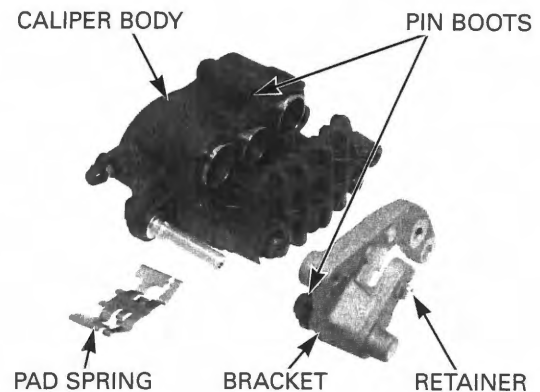
DISASSEMBLY

Do not remove the caliper and bracket pins unless replacement.

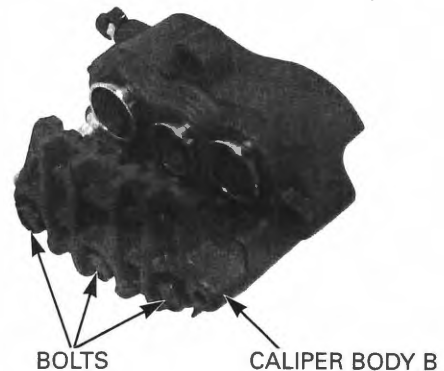
Remove the caliper bracket from the caliper body.

Remove the pin boot and retainer from the bracket.

Remove the pin boot and pad spring from the caliper body.



Remove the bolts and caliper body B.



Do not use high pressure air or bring the nozzle too close to the inlet.

Place a shop towel over the pistons.

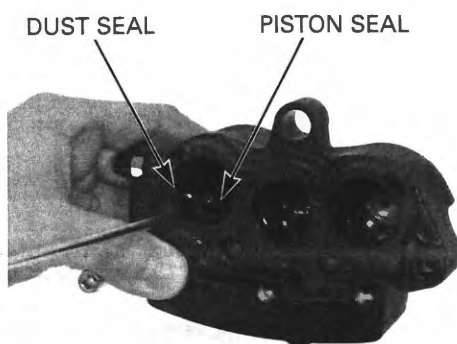
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlets to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves, caliper pistons and caliper piston sliding surfaces with clean brake fluid.



INSPECTION

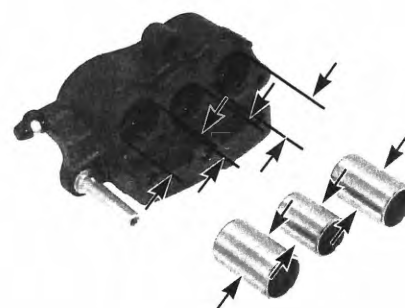
Check the caliper cylinder and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMITS: Upper: 27.060 mm (1.0654 in)
Middle: 22.710 mm (0.8941 in)
Lower: 27.060 mm (1.0654 in)

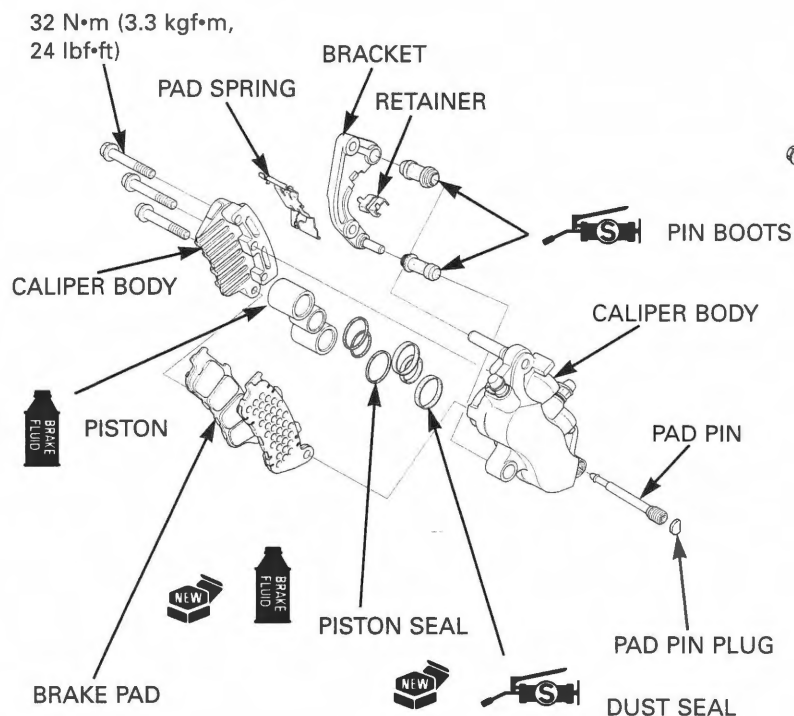
Measure the caliper piston O.D.

SERVICE LIMITS: Upper: 26.910 mm (1.0594 in)
Middle: 22.560 mm (0.8882 in)
Lower: 26.910 mm (1.0594 in)

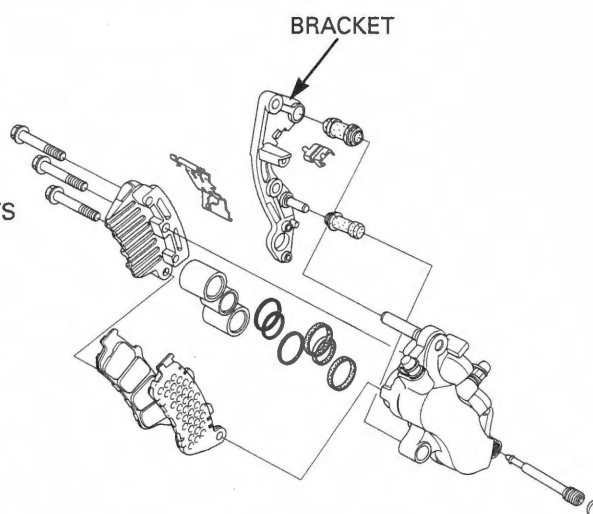


ASSEMBLY

STD TYPE:



AFTER '02 (ABS TYPE):



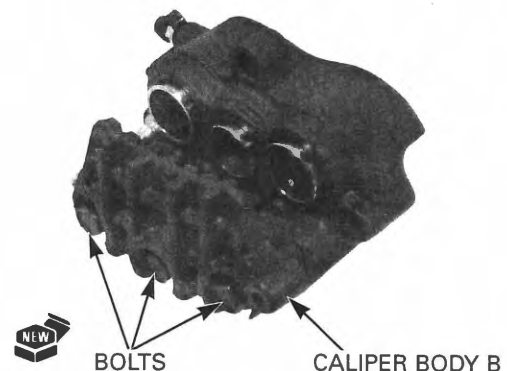
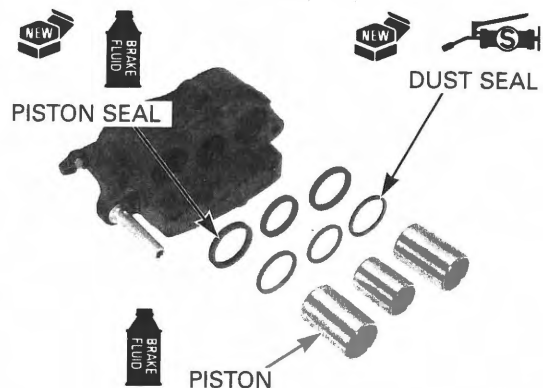
BRAKE SYSTEM

Replace the dust seals and piston seals with new ones.
Replace the caliper and bracket pin boots there it is wear, deterioration or damage.
Apply silicone grease to the boots inner surfaces.
Be sure that each part is free from dust or dirt before reassembly.

Coat new piston seals with clean brake fluid.
Coat new dust seals with silicone grease.
Install the piston seals and dust seals into the grooves of the caliper body.
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their closed ends facing the pad.

Install the caliper body B.
Install and tighten new caliper body B bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



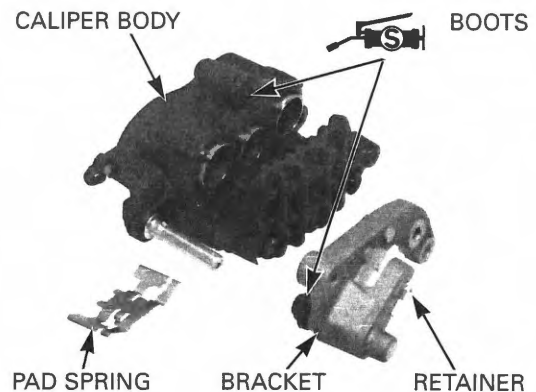
Install the pad spring into the caliper body as shown.

Apply silicone grease to the boot inner surface.
Install the boot to the caliper.

Apply silicone grease to the boot inner surface.
Install the boot to the caliper bracket.

Install the retainer to the caliper bracket.

Install the caliper bracket to the caliper.



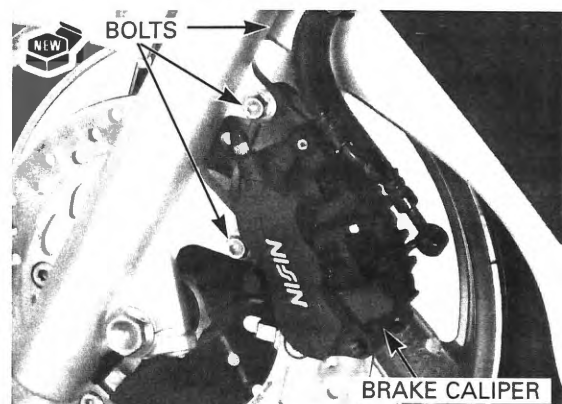
INSTALLATION

Install the front caliper on the fork leg.
Install and tighten the new front caliper mount bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

AFTER '02 (ABS
TYPE):

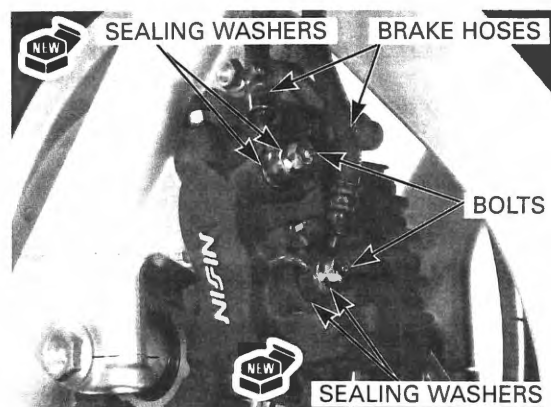
Install the front wheel speed sensor, clamp and bolts to the bracket and tighten the bolts.
Install the clamp and screw to the brake caliper and tighten the screw.



Install the brake hose eyelet to the caliper body with new sealing washers and oil bolts. Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 16-10).
Fill and bleed the hydraulic system (page 16-5).

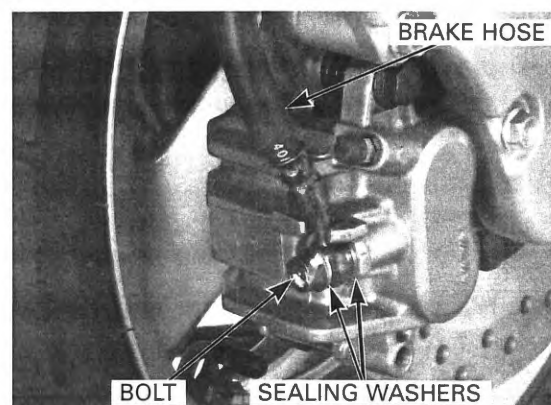


REAR BRAKE CALIPER

REMOVAL

Remove the muffler (page 2-22, 24).
Drain the rear brake hydraulic system (page 16-4).

Remove the oil bolt, sealing washers and brake hose from the brake caliper.

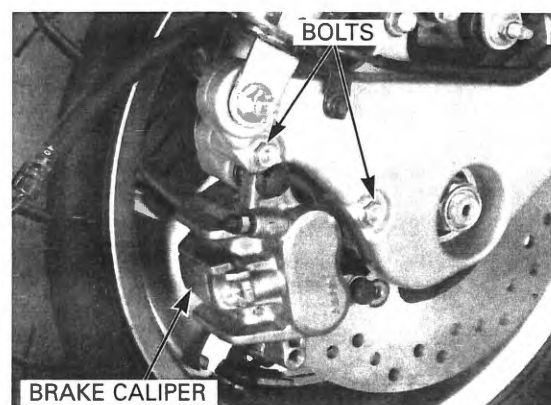


Remove the pad pin plug and loosen the pad pin.

Loosen the caliper bolt and caliper pin bolt.

Remove the mount bolts and rear brake caliper from the final shaft holder.

Remove the rear brake pad (page 16-11).



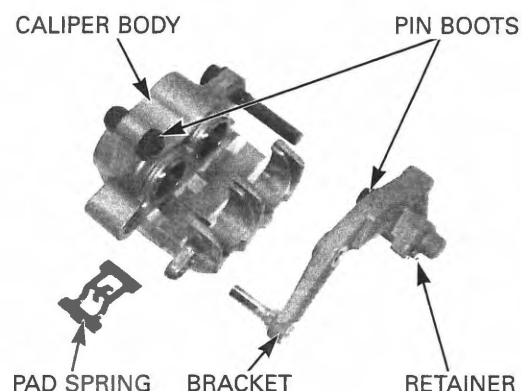
DISASSEMBLY

Do not remove the caliper and bracket pins unless replacement.

Remove the caliper bracket from the caliper body.

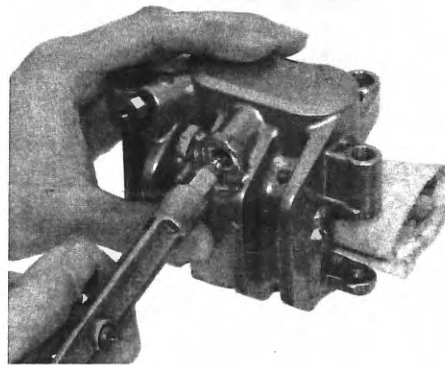
Remove the pin boot and retainer from the bracket.

Remove the pin boot and pad spring from the caliper body.

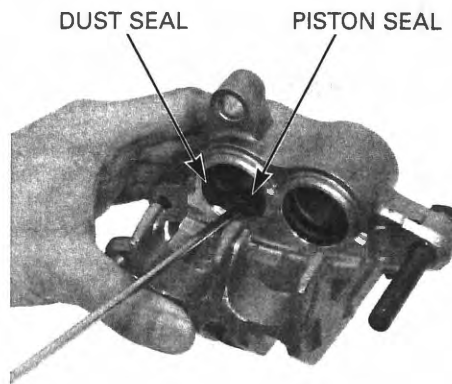


BRAKE SYSTEM

Place a shop towel over the pistons.
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlets to remove the pistons.



Push the dust seals and piston seals in and lift them out.
Clean the seal grooves, caliper pistons and caliper piston sliding surfaces with clean brake fluid.



INSPECTION

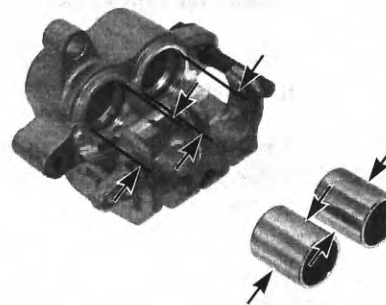
Check the caliper cylinder and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

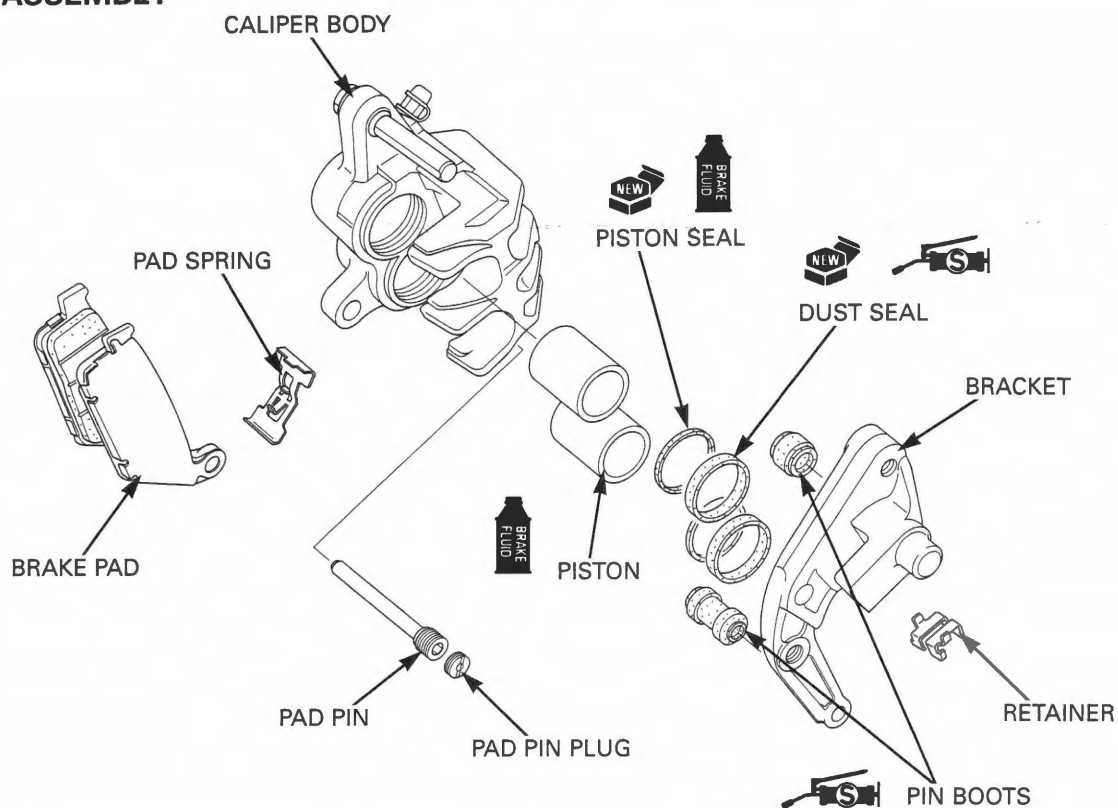
SERVICE LIMIT: 27.060 mm (1.0654 in)

Measure the caliper piston O.D.

SERVICE LIMIT: 26.910 mm (1.0594 in)



ASSEMBLY



Replace the dust seals and piston seals with new ones.
 Replace the caliper and bracket pin boots if there is wear, deterioration or damage.
 Apply silicone grease to the boots inner surfaces.
 Be sure that each part is free from dust or dirt before reassembly.

Coat new piston seals with clean brake fluid.
 Coat new dust seals with silicone grease.
 Install the piston seals and dust seals into the grooves of the caliper body.
 Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their closed ends facing the pad.

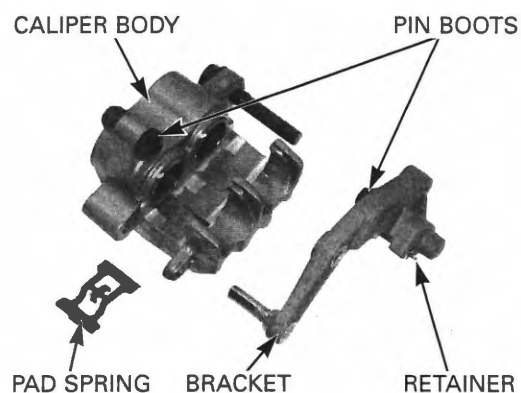
Install the pad spring into the caliper body as shown.

Apply silicone grease to the boot inner surface.
 Install the boot to the caliper.

Apply silicone grease to the boot inner surface.
 Install the boot to the caliper bracket.

Install the retainer to the caliper bracket.

Install the caliper bracket to the caliper.

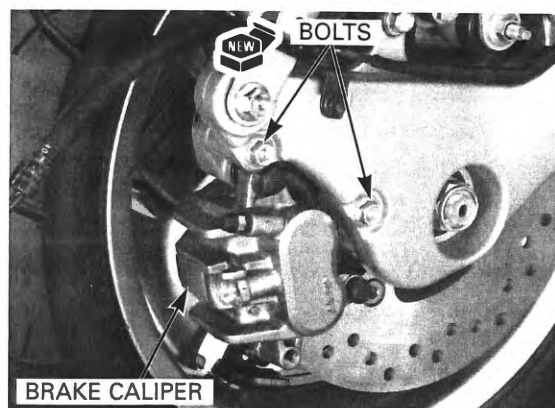


BRAKE SYSTEM

INSTALLATION

Install the rear brake caliper to the final shaft holder. Install and tighten the new rear caliper mounting bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



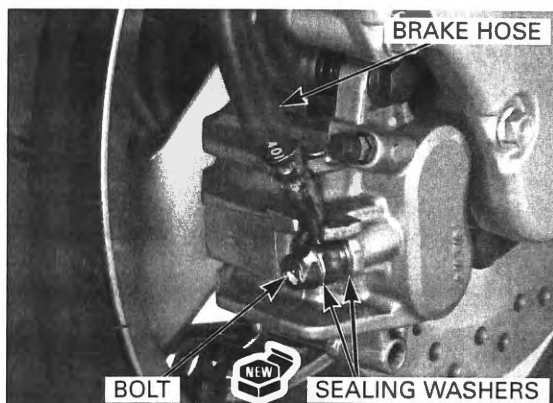
Connect the brake hose to the brake caliper with new sealing washers.

While tightening the brake hose oil bolt, align the brake hose end with the stopper.

Install and tighten the brake hose oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 16-11).
Fill and bleed the hydraulic system (page 16-7).
Install the muffler (page 2-23, 26).

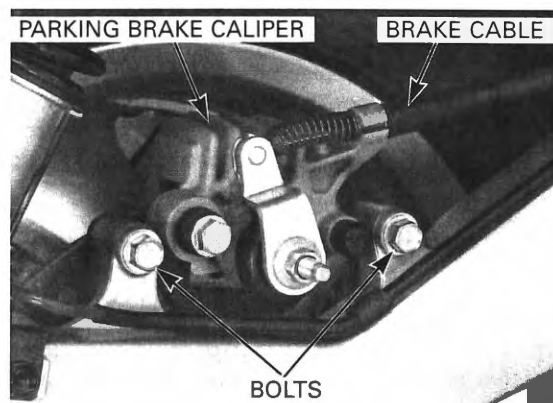


PARKING BRAKE

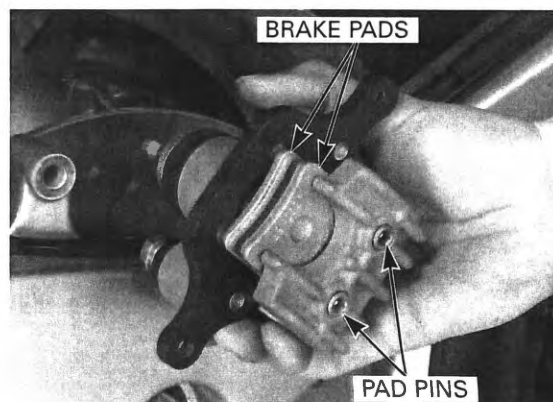
CALIPER REMOVAL/DISASSEMBLY

Remove the muffler (page 2-22, 24).

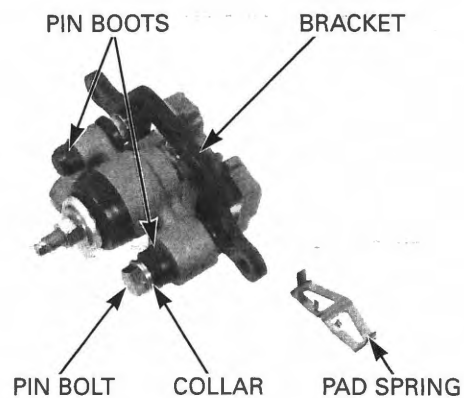
Remove the mount bolts and parking brake caliper from the final shaft holder. Disconnect the parking brake cable from the brake arm.



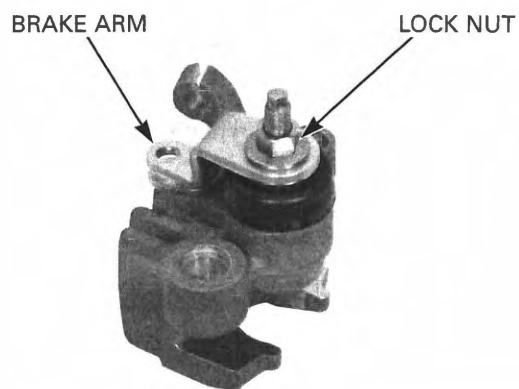
Remove the pad pins and brake pads.



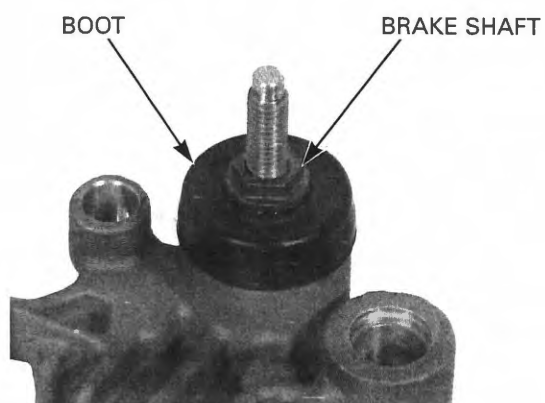
Remove the caliper pin bolt.
Remove the caliper bracket from the caliper body.
Remove the collar and pin boots.
Remove the pad spring.



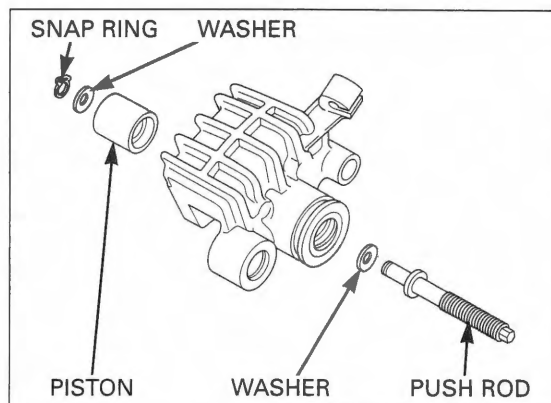
Loosen the lock nut and parking brake arm.



Remove the master cylinder boot and parking brake shaft.



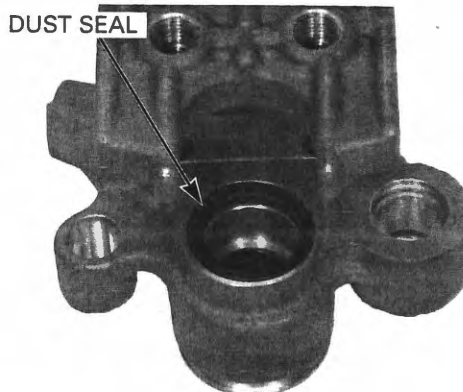
Remove the snap ring and washer.
Remove the push rod, washer and piston from the caliper body.



BRAKE SYSTEM

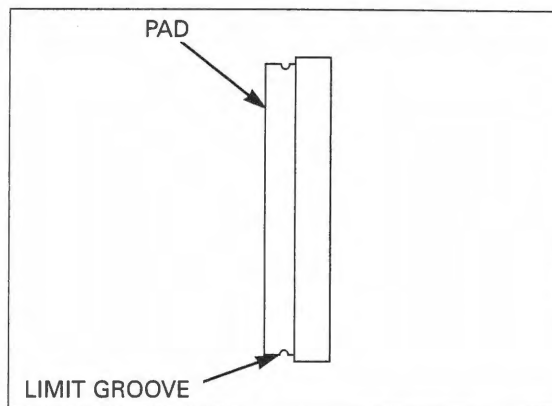
Remove the dust seal and push rod from the caliper.

Clean the inside of the caliper and adjusting bolt sliding surface.



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

If necessary, replace the pads as a set.



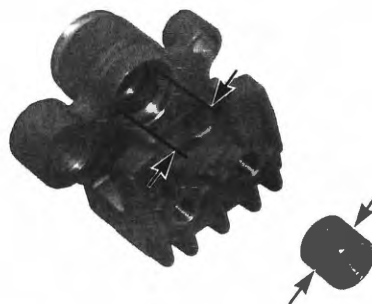
Check the caliper cylinder and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

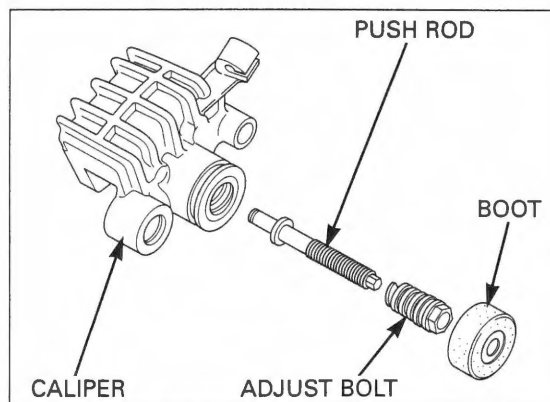
SERVICE LIMIT: 20.060 mm (0.790 in)

Measure the caliper piston O.D.

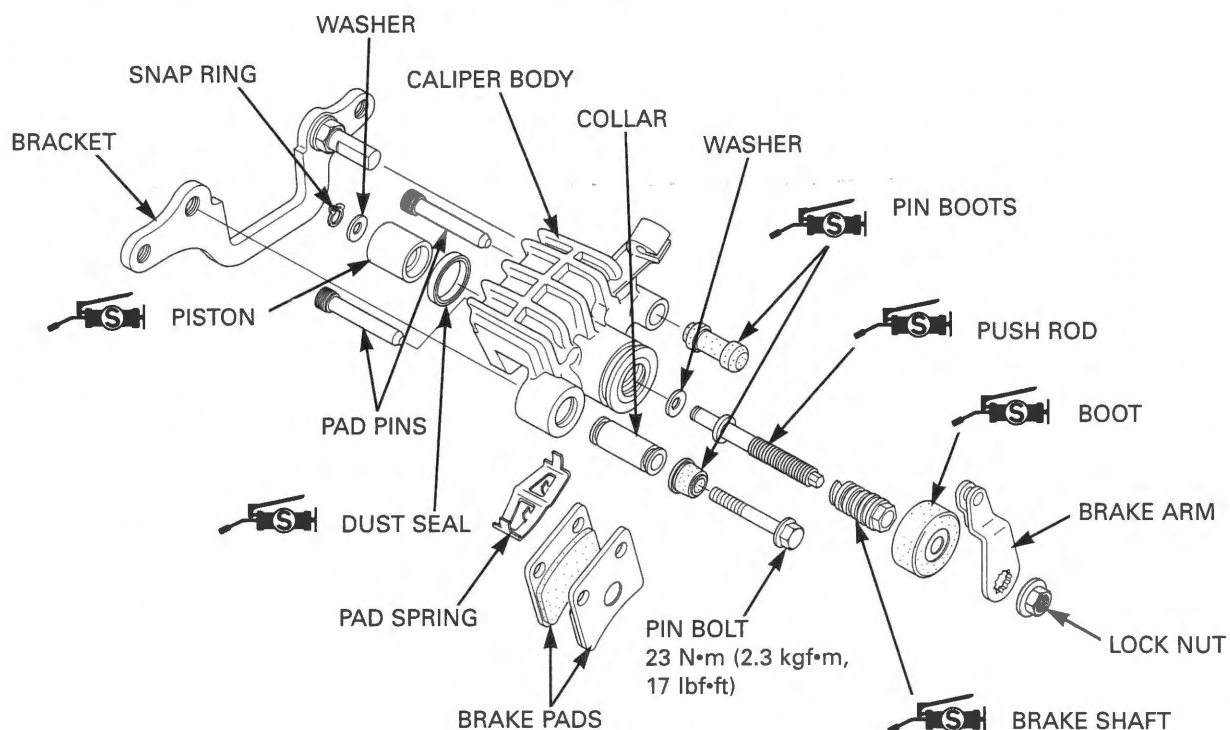
SERVICE LIMITS: 19.927 mm (0.7845 in)



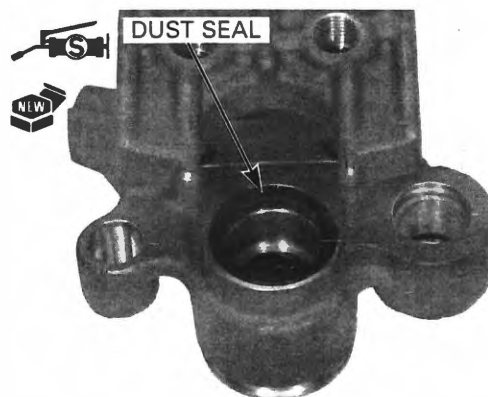
Check the boot for deterioration or damage.
Check the threads of the adjust bolt and caliper body for wear or damage.
Check the push rod for wear or damage.



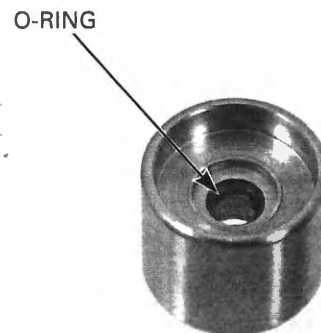
CALIPER ASSEMBLY/INSTALLATION



Apply silicone grease to a new dust seal lips.
Install the dust seal into the caliper body groove.

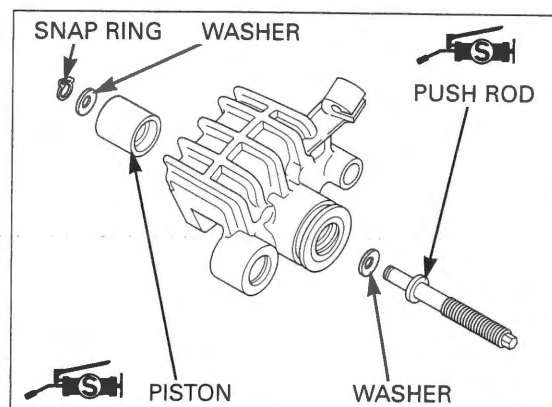


Check the piston O-ring.
Replace if necessary.

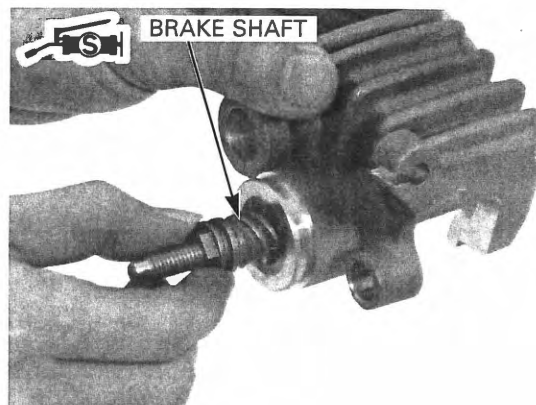


BRAKE SYSTEM

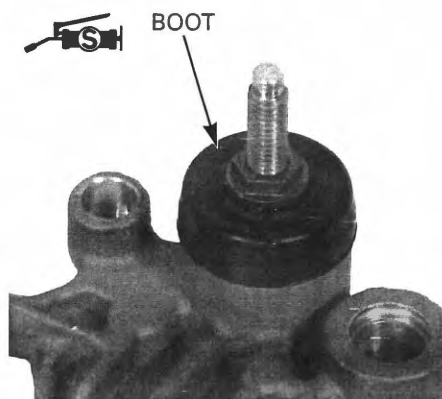
Install the piston into the caliper body.
Apply silicone grease to the push rod rolling surface and piston sliding surface.
Install the washer onto the push rod with its rounded side facing piston side.
Install the push rod and washer into the piston.
Install the washer with its rounded side facing out side.
Install the snap ring into the push rod groove.



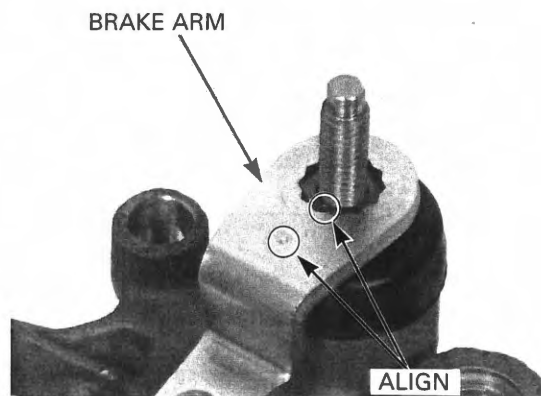
Apply silicone grease to the parking brake shaft rolling surface.
Screw the parking brake shaft to the push rod.



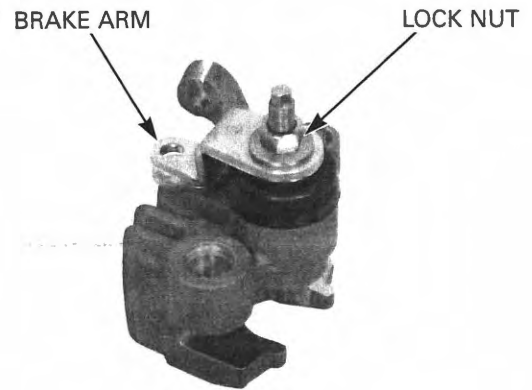
Apply silicone grease to the boot lips.
Install the boot over the shaft and caliper, making sure that the boot is seated in the groove in the shaft and caliper properly.



Install the parking brake arm onto the shaft, aligning the punch marks.



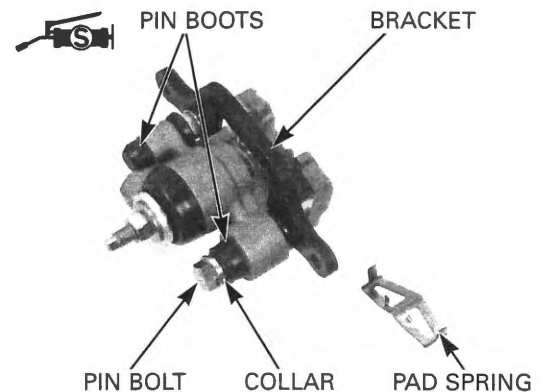
Temporarily install the parking brake adjusting bolt and lock nut.



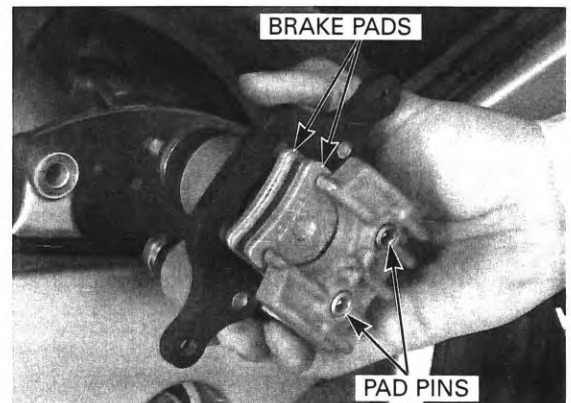
Make sure that the pad spring is installed in position. Apply silicone grease to the boots inside. Install the pin boot and pin bolt boot.

Install the caliper bracket to the caliper body. Install the caliper pin bolt and tighten the bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the pads in the caliper. Align the pad pin bolt holes by depressing the pads against the caliper, and tighten the pad pins.



Connect the parking brake cable to the brake arm.

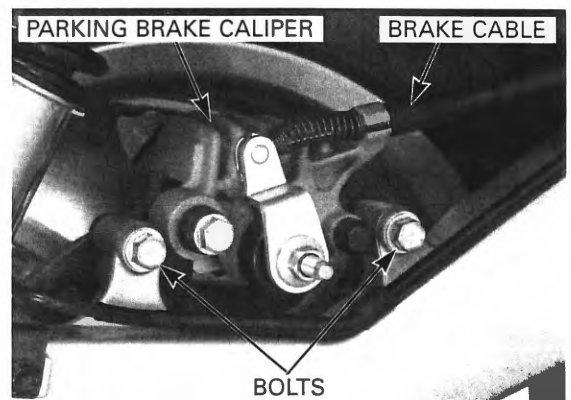
Install the caliper to the final shaft holder so that the disc is positioned between the pads, being careful not to damage the pads.

Apply a locking agent to the parking brake caliper bolt threads.

Install and tighten the parking brake caliper mounting bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the muffler (page 2-23, 26).

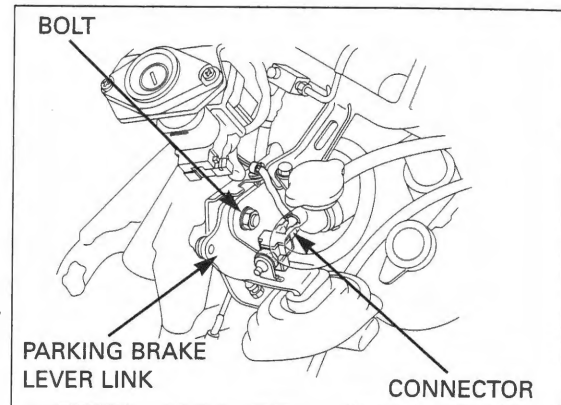


PARKING BRAKE LEVER LINK

Remove the inner cover (page 2-15).

Loosen the lock nut and disconnect the parking brake cable from the parking brake lever link.
Disconnect the parking brake switch connectors.
Remove the bolts and the parking brake lever link.

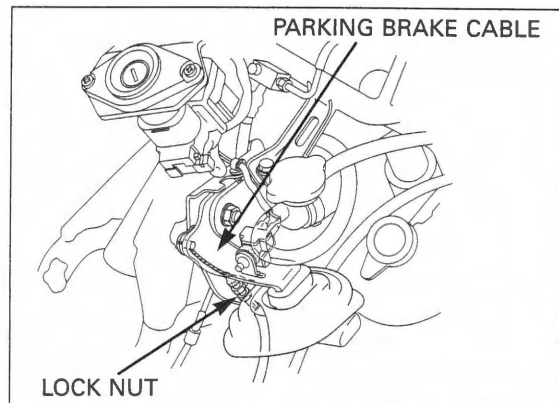
Installation is in the reverse order of removal.



PARKING BRAKE CABLE

Remove the inner cover (page 2-15).
Remove the right floor skirt (page 2-4).

Loosen the lock nut and disconnect the parking brake cable from the parking brake lever link.

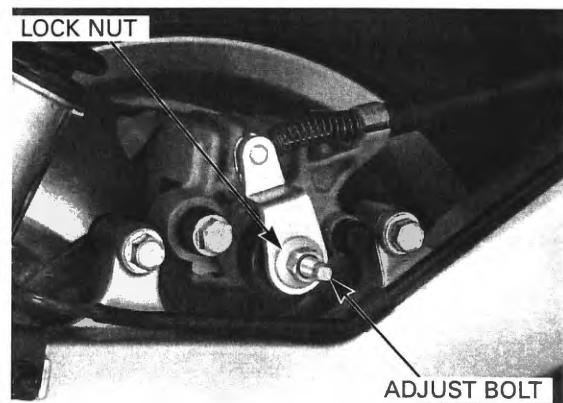


Disconnect the parking brake cable from the parking brake.
Remove the spring.

Remove the parking brake cable from the clamp (page 7-4).

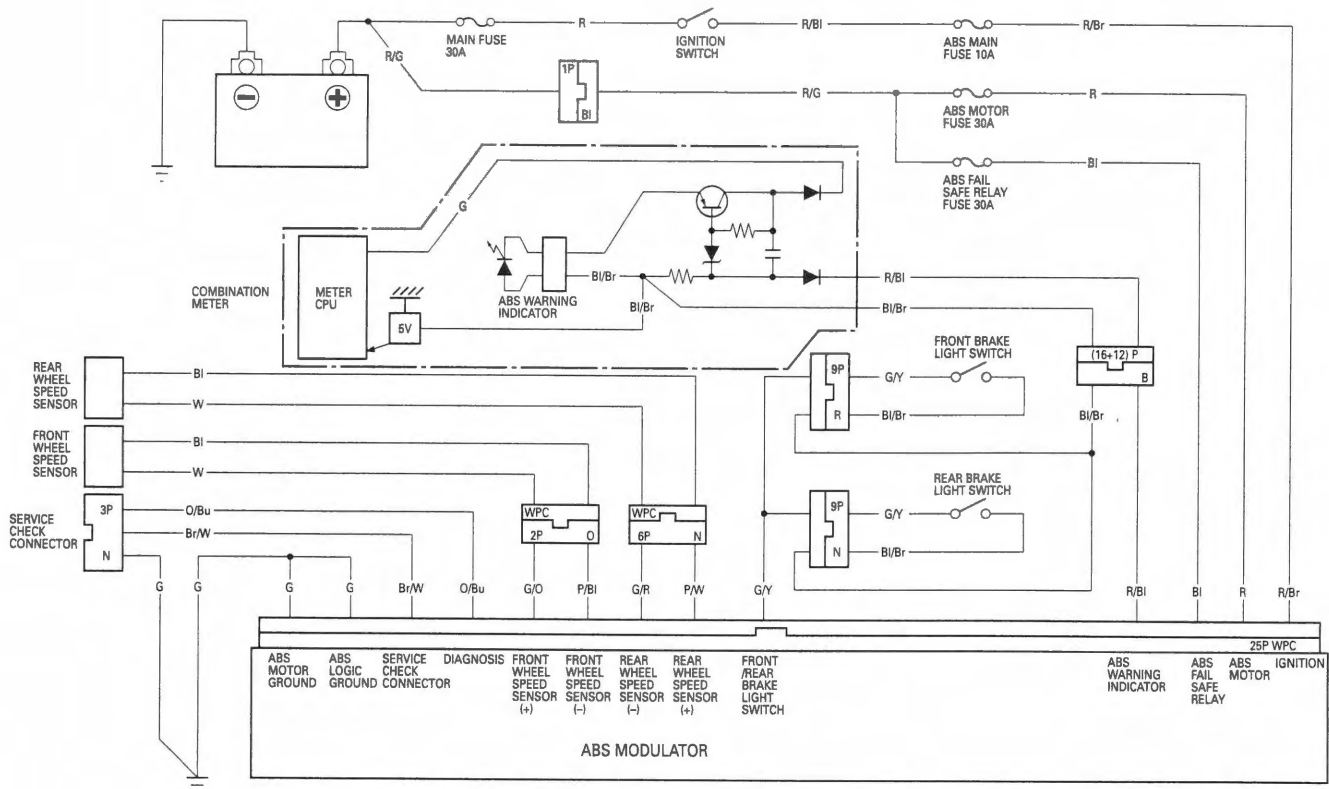
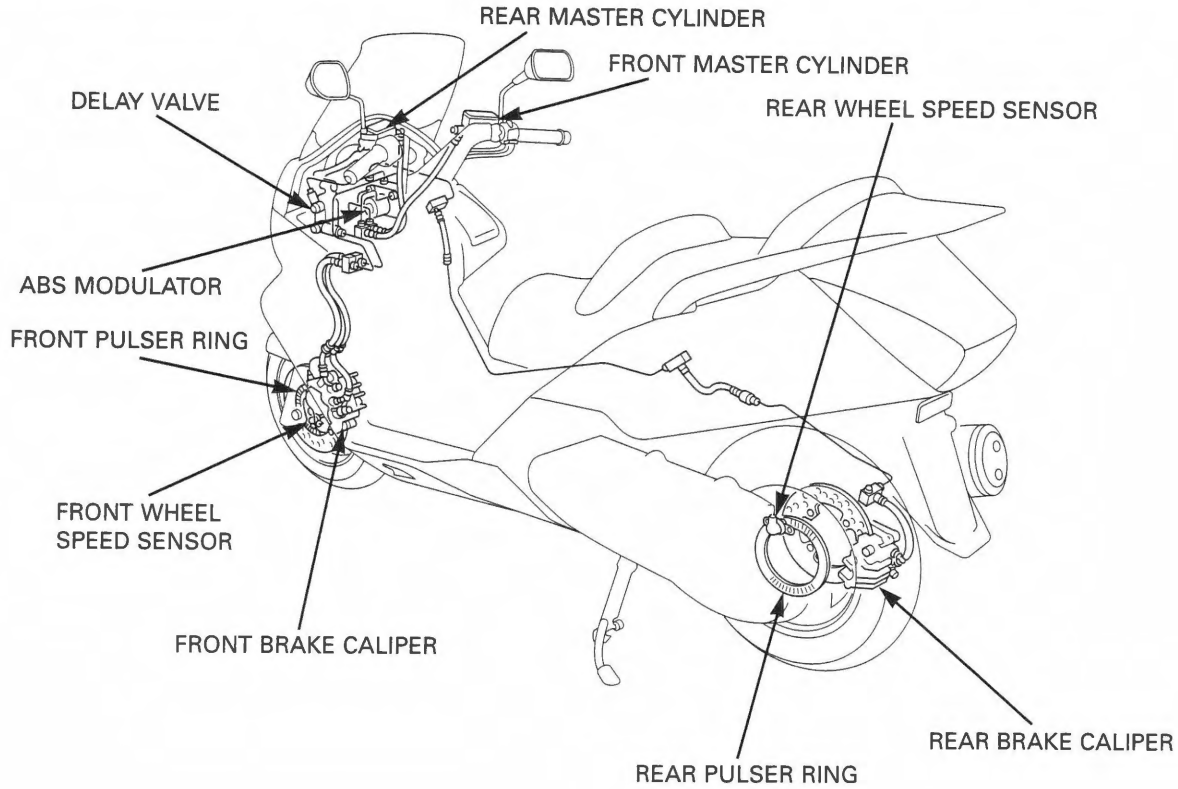
Installation is in the reverse order of removal.

Route the parking brake cable correctly (page 1-28).



MEMO

ANTI-LOCK BRAKE SYSTEM (ABS)



SERVICE INFORMATION	17-1	FRONT PULSER RING	17-20
BEFORE STARTING		REAR WHEEL SPEED SENSOR	17-20
TROUBLESHOOTING	17-2	REAR PULSER RING	17-22
TROUBLESHOOTING	17-7	ABS MODULATOR	17-22
FRONT WHEEL SPEED SENSOR	17-19		

SERVICE INFORMATION

GENERAL

- This section covers service of the Anti-lock Brake System (ABS). For service of the conventional brake system, see page 16-4.
- When the ABS control unit detects a problem, it stops the ABS function and switches back to the conventional brake operation, and the ABS indicator blinks or stays on. Take care during the test ride.
- When the motorcycle is running and the front wheel leaves the ground for a long time (wheelies), the ABS control unit detects difference of the front and rear wheel speeds and then the indicator blinks.
- Troubles not resulting from a faulty ABS (e.g. brake disc squeak, unevenly worn brake pad) cannot be recognized by the ABS diagnosis system.
- Read "Before Starting Troubleshooting" carefully, inspect and troubleshoot the ABS system according to the Diagnostic Troubleshooting Flow Chart. Observe each step of the procedures one by one. Write down the problem code and probable faulty part before starting diagnosis and troubleshooting.
- After troubleshooting, erase the problem code and perform the pre-start self-diagnosis to be sure that the ABS indicator is operating normally.
- Be careful not to damage the wheel speed sensor and pulser ring when removing and installing the wheel or speed sensor.
- The ABS control unit may be damaged if dropped. Also if a connector is disconnected when current is flowing, the excessive voltage may damage the ECU. Always turn off the ignition switch before servicing.
- Do not disassemble the ABS modulator. Replace the modulator as an assembly when it is faulty.
- Refer to the ABS circuit diagram (page 17-0).
- The following color codes are used 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	P = Pink	Y = Yellow

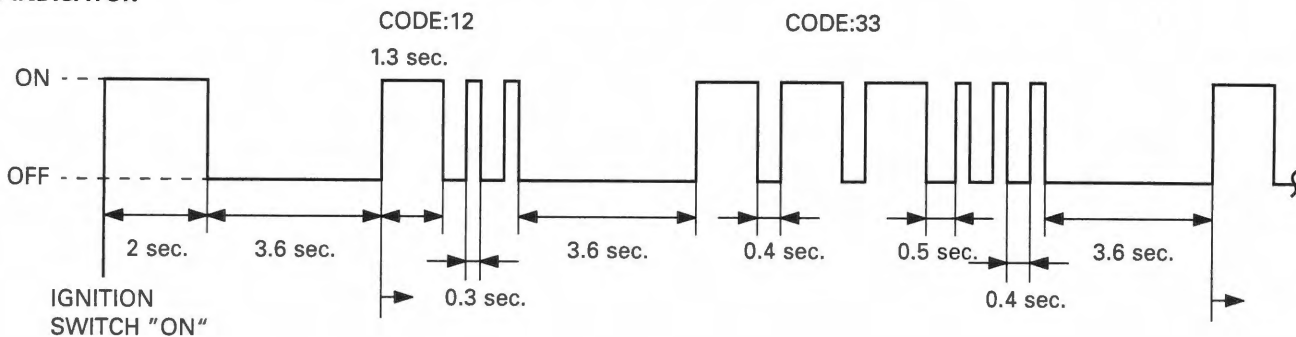
TORQUE VALUES

Front wheel pulser ring mounting bolt	8 N•m (0.8 kgf•m, 5.1 lbf•ft)	ALOC bolt; replace with a new one
Rear wheel pulser ring mounting bolt	8 N•m (0.8 kgf•m, 5.1 lbf•ft)	ALOC bolt; replace with a new one
ABS modulator mounting bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Brake pipe nut	14 N•m (1.4 kgf•m, 10 lbf•ft)	

BEFORE STARTING TROUBLESHOOTING

- ABS (Anti-Lock Brake System) is equipped with the self-diagnostic system described.
- Before checking ABS, turn the ignition switch "ON" and check that the ABS indicator lights. Then, start the engine and ride the scooter and raise the vehicle speed to approximately 10 km/h. The ABS is normal, if the ABS indicator goes out.
- When checking the ABS, always follow the steps in the troubleshooting flow chart (page 17-7 thru 18).
- The ABS indicator light blinks in the following cases.
 - Front or rear wheel turns when other wheel stops
 - Noise pulse
 - The ABS modulator operates for more than 30 seconds.
- When more than one failure occurs, the indicator shows the blinks in the order of lowest number to highest number (for example: see below).
- The ABS indicator denotes the failure codes (the number of blinks from 11 to 81).

ABS INDICATOR



- After troubleshooting, reset the problem code (page 17-3).

SELF-DIAGNOSIS PROCEDURE (After 10km/h running, ABS indicator lights or blinks)

Turn the ignition switch "ON".
Be sure that the ABS indicator lights.
Start the engine and ride the scooter and raise the vehicle speed to approximately 10km/h.

The ABS is normal, if the ABS indicator goes out.

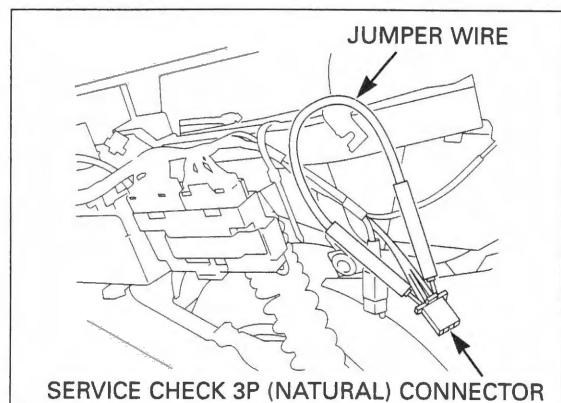
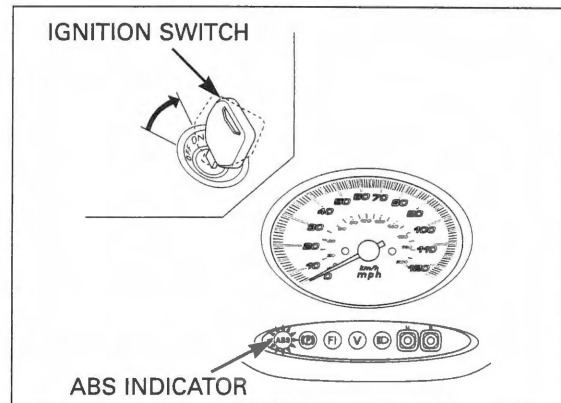
If the ABS indicator does not go out, perform the following:

1. Turn the ignition switch "OFF".

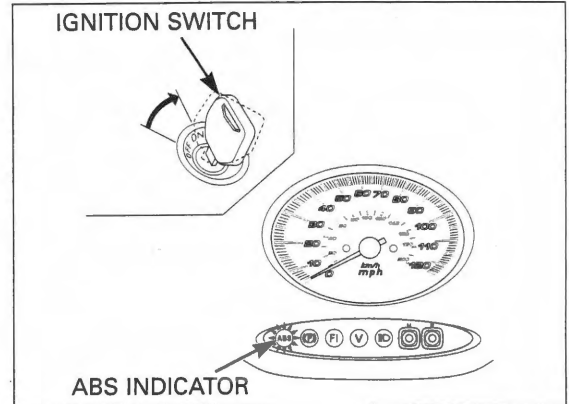
Remove the left side body cover (page 2-6).

Short the ABS service check 3P (Natural) connector terminals with a jumper wire.

TERMINALS: Brown/White – Green

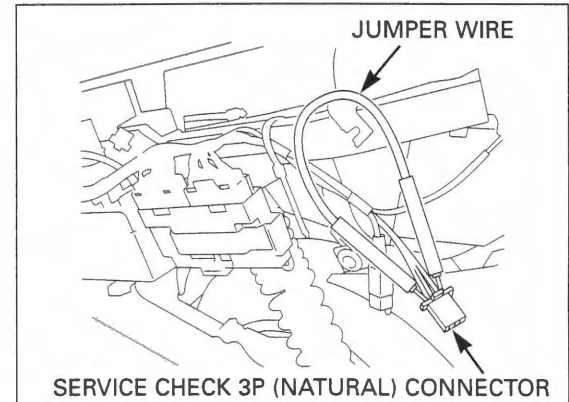


2. Do not squeeze the brake lever.
Turn the ignition switch "ON".
Read and record the how many times indicator blinks, and determine the cause of the problem (page 17-6).



3. Turn the ignition switch "OFF".

Remove a jumper wire from the ABS service check 3P (Natural) connector.



SELF-DIAGNOSIS MEMORY RESET PROCEDURE

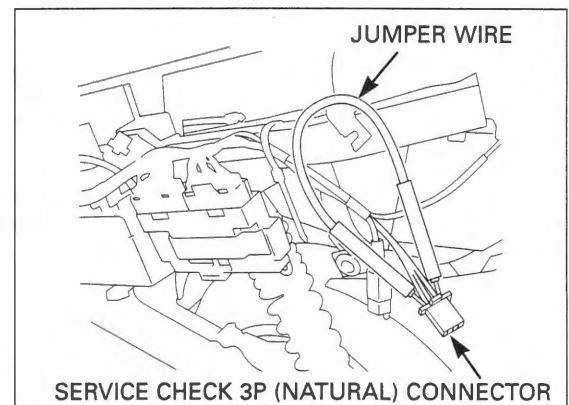
1. Turn the ignition switch "OFF".

Remove the left side body cover (page 2-6).

Short the ABS service check 3P (Natural) connector terminals with a jumper wire.

TERMINALS: Brown/White – Green

2. Squeeze the brake lever and turn the ignition switch "ON".
3. Release the brake lever when the ABS indicator goes out.
4. Squeeze the brake lever when the ABS indicator lights.
5. Release the brake lever when the ABS indicator goes out.

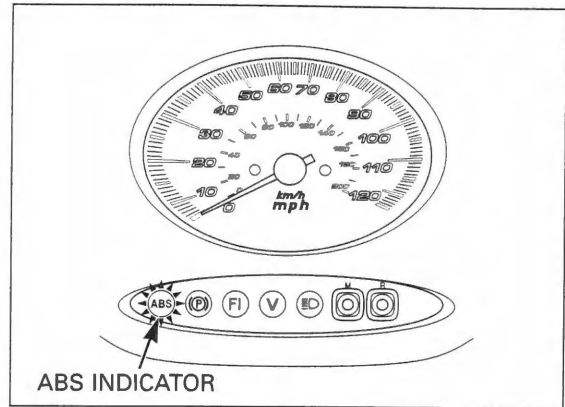


ANTI-LOCK BRAKE SYSTEM (ABS)

6. Check the ABS indicator blinks 2 times.

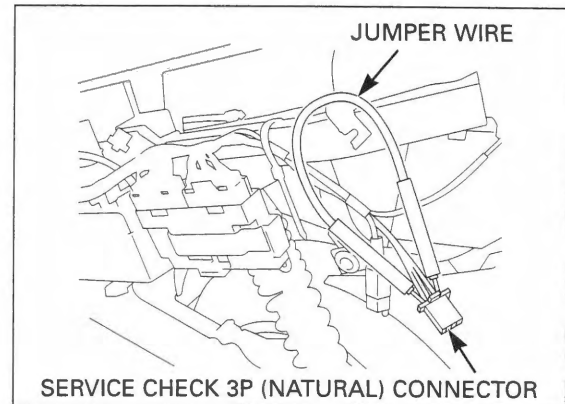
If the ABS indicator does not blink 2 times, the self-diagnostic memory has not been erased.

Repeat the memory reset procedure from step one.



7. Turn the ignition switch "OFF".

Remove a jumper wire from the ABS service check 3P (Natural) connector.



DIAGNOSTIC TROUBLESHOOTING FLOW CHART**NOTICE**

Be careful not to damage the wheel speed sensor and pulser ring when servicing.

- All connector diagrams in the flow charts are viewed from the terminal side.
- Perform inspections with the ignition switch turned to "OFF", unless otherwise specified.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- When the ABS control unit or modulator is detected to be faulty, recheck the wire harness and connector connections closely before replacing it.
- After troubleshooting, erase the problem code and perform the pre-start self-diagnosis to be sure that the ABS Indicator is operating normally.
- The ABS indicator might blink in the following cases.
 - Incorrect tire pressure.
 - Tires not recommended for the motorcycle were installed (incorrect tire size).
- The ABS indicator might blink while riding under the following conditions. Erase the problem code and perform the pre-start self-diagnosis. The ABS is normal if the indicator goes off. Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
 - The motorcycle has continuously run bumpy roads.
 - After riding (after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle placed on the centerstand.

ANTI-LOCK BRAKE SYSTEM (ABS)

ABS INDICATOR FAILURE CODE

Number of ABS indicator blinks	Problem/Symptoms	(1)	(2)	Cause	Refer to page
Does not light	ABS indicator does not light				17-7
Stay lit	ABS indicator stays lit				17-8
Blinks	ABS indicator blinks				17-11
11	Front wheel speed sensor	●	●	• Open or short circuit in wheel speed sensor wire. • Short circuit between the wheel speed sensor wire terminals.	17-12, 14
13	Rear wheel speed sensor	●	●		
12	Front wheel speed sensor		●	• When front or rear wheel speed is over 10 km/h, no pulse at other side speed sensor. • Short circuit between the wheel speed sensor wire terminals. • Input noise pulse.	17-12, 14
14	Rear wheel speed sensor		●		
21	Front pulser ring		●		17-12, 14
23	Rear pulser ring		●	• Pulser ring is damaged or cracked.	
31	Solenoid valve	●	●	• Faulty ABS modulator.	17-16
32					
33					
34					
37					
38					
41	Front wheel lock		●	• The wheel lock while riding the scooter.	17-12, 14
43	Rear wheel lock		●		
51	Motor lock		●	• Faulty ABS modulator.	17-16
52	Motor stuck off		●		
53	Motor stuck on	●	●		
54	Fail safe relay	●		• Faulty fail safe relay	17-17
61	Ignition voltage	●	●	• Ignition voltage is too low	17-18
62	Ignition voltage		●	• Ignition voltage is too high	
71	Tire size		●	• Incorrectly tire size.	
81	CPU	●	●	• Faulty ABS modulator.	

(1) Prestart inspection: While the ignition switch "ON" to the motorcycle starts.

(2) Ordinary inspection : While the prestart inspection stops to the ignition switch "OFF".

TROUBLESHOOTING

ABS INDICATOR DOES NOT LIGHT

ABS INDICATOR INPUT VOLTAGE INSPECTION

Turn the ignition switch "ON" and check the combination meter light comes.

DOES NOT
LIGHT

- Blown the combination meter fuse (10A).
- Open circuit between the combination meter and combination meter fuse (10A).

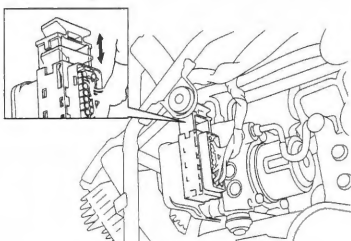
LIGHTS

ABS MODULATOR INSPECTION

Turn the ignition switch "OFF" and disconnect the ABS modulator 25P (Black) connector. Turn the ignition switch "ON" and check that the ABS indicator lights.

LIGHTS

- Loose or poor contact on the ABS modulator 25P (Black) connector.
- Faulty ABS modulator.



DOES NOT LIGHT

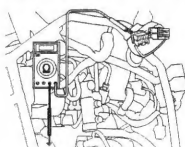
ABS INDICATOR INPUT VOLTAGE LINE INSPECTION

Disconnect the combination meter 28P (Black) connector.

Check for continuity between the Red/Black terminal and Body ground at the combination meter 28P (Black) connector wire harness side.

CONTINUITY

- Short circuit in Red/Black wire between the combination meter 28P (Black) connector and ABS modulator 25P (Black) connector.



STANDARD: No continuity

NO CONTINUITY

ABS INDICATOR GROUND LINE INSPECTION

Connect the combination meter 28P (Black) connector. Short the Green terminal and body ground at the combination meter 28P (Black) connector using a jumper wire.

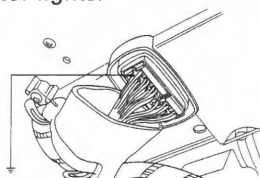
Turn the ignition switch "ON" and check that the ABS indicator lights.

LIGHTS

- Open circuit in Green wire between the combination meter 28P (Black) connector and body ground.

DOES NOT
LIGHT

- Faulty combination meter.



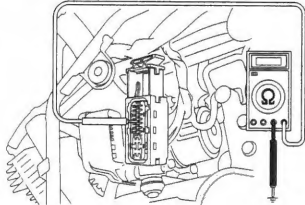
ANTI-LOCK BRAKE SYSTEM (ABS)

ABS INDICATOR STAYS LIT

SERVICE CHECK CONNECTOR SHORT CIRCUIT INSPECTION

Disconnect the ABS modulator 25P (Black) connector.

Check for continuity between the Brown/White terminal and body ground at the ABS modulator 25P (Black) connector wire harness side.



STANDARD: No continuity

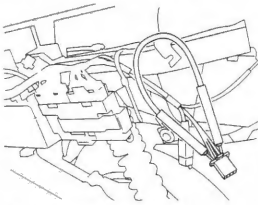
- CONTINUITY** →
- Short circuit in Brown/White wire between the service check connector and ABS modulator 25P (Black) connector.

NO CONTINUITY

SERVICE CHECK CONNECTOR OPEN CIRCUIT INSPECTION

Short the service check 3P (Natural) connector Brown/White terminal and Green terminals using a jumper wire.

Check for continuity between the Brown/White terminal and body ground at the ABS modulator 25P (Black) connector wire harness side.



STANDARD: No continuity

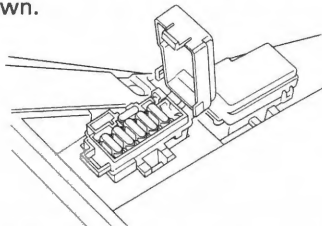
- CONTINUITY** →
- Open circuit in Brown/White wire between the service check 3P (Natural) connector and ABS modulator 25P (Black) connector.
 - Open circuit in ground line.

NO CONTINUITY

FAIL SAFE RELAY FUSE (30A) INSPECTION

Remove a jumper wire from the service check 3P (Natural) connector.

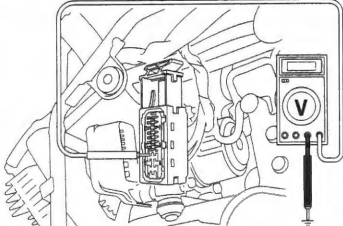
Check fail safe relay fuse (30A) on the fuse box for a blown.



- BLOWN** →
- Replace the fail safe relay (30A) and inspect again.

NORMAL

FAIL SAFE RELAY LINE OPEN CIRCUIT INSPECTION
 Disconnect the ABS modulator 25P (Black) connector.
 Measure the voltage between the Black terminal and body ground at the ABS modulator 25P (Black) connector wire harness side.

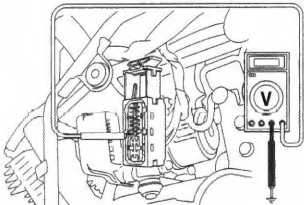


STANDARD: Battery voltage

NO VOLTAGE → • Open circuit in Black wire between the fail safe relay fuse (30A) and ABS modulator 25P (Black) connector.

BATTERY VOLTAGE

ABS MODULATOR INPUT VOLTAGE INSPECTION
 Turn the ignition switch "ON".
 Measure the voltage between the Red/Brown terminal and body ground at the ABS modulator 25P (Black) connector wire harness side.

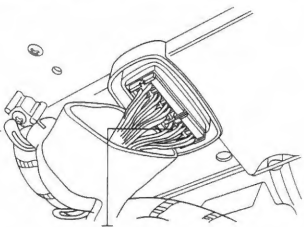


STANDARD: Battery voltage

NO VOLTAGE → • Open circuit in Red/Brown wire between the main fuse box and ABS modulator 25P (Black) connector.

BATTERY VOLTAGE

COMBINATION METER INSPECTION
 Short the Red/Black wire of the combination meter 28P (Black) connector and body ground using a jumper wire.
 Check that the ABS indicator goes out.



DOES NOT GO OUT → • Faulty combination meter.

GOES OUT

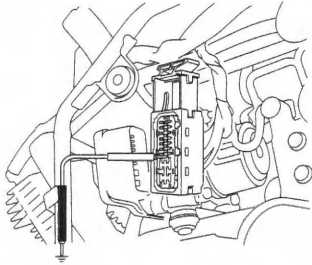
ANTI-LOCK BRAKE SYSTEM (ABS)

ABS MODULATOR INPUT VOLTAGE INSPECTION

Remove a jumper wire from the combination meter 28P (Black) connector.

Short the Red/Black wire of the ABS modulator 25P (Black) connector and body ground using a jumper wire.

Check that the ABS indicator goes out.



DOES NOT
GO OUT

- Faulty combination meter.

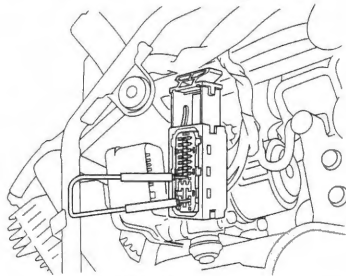
GOES OUT

GROUND LINE OPEN CIRCUIT INSPECTION

Remove a jumper wire from the ABS modulator 25P (Black) connector.

Short the Red/Black wire and Green wire of the ABS modulator 25P (Black) connector using a jumper wire.

Check that the ABS indicator goes out.



DOES NOT
GO OUT

- Open circuit in Green wire between the ABS modulator 25P (Black) connector and body ground.

GOES OUT

- Faulty ABS modulator.

ABS INDICATOR BLINKS

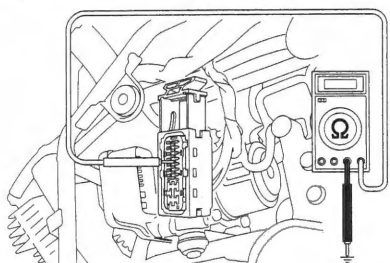
Check for service check 3P (Natural) connector for connection.

NO CONNECTION

SERVICE CHECK CONNECTOR SHORT CIRCUIT INSPECTION

Disconnect the ABS modulator 25P (Black) connector.

Check for continuity between the Brown/White terminal and body ground at the ABS modulator 25P (Black) connector wire harness side.



STANDARD: No continuity

CONTINUITY → • Short circuit in Brown/White wire between the service check connector and ABS modulator 25P (Black) connector.

NO CONTINUITY

• Faulty ABS modulator.

ANTI-LOCK BRAKE SYSTEM (ABS)

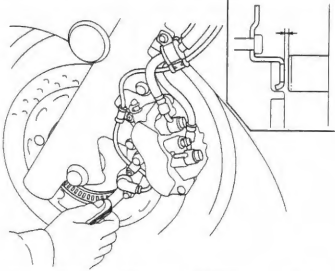
ABS INDICATOR 11, 12, 21 OR 41 BLINKS (FRONT WHEEL SPEED SENSOR AND ABS MODULATOR)

- If the ABS indicator 41 blinks, check for brake drag before troubleshooting.

WHEEL PULSER AIR GAP INSPECTION

Measure the air gap between the speed sensor and pulser ring (page 17-19).

Standard air gap: 0.2 – 1.2 mm (0.008 – 0.050 in)



ABNORMAL →

- Check each part of deformation and looseness and correct accordingly.

NORMAL

WHEEL PULSER INSPECTION

Check for iron or other magnetic deposits between the pulser ring and wheel speed sensor.

Check for loose pulser ring or wheel speed sensor.

Check the pulser ring for deformation or damage (e.g., chipped teeth) and the wheel speed sensor tip for damage.

ABNORMAL →

- Remove any deposits and install properly or replace any faulty parts.

NORMAL

WHEEL SPEED SENSOR LINE SHORT CIRCUIT INSPECTION AT ABS MODULATOR

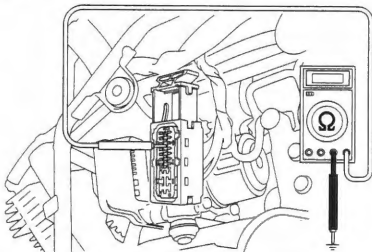
Disconnect the ABS modulator 25P (Black) connector.

Measure for continuity between the ABS modulator 25P (Black) connector wire harness side terminals and body ground.

Connection: Pink /Black – Body ground

Green/Orange – Body ground

Standard: No continuity



CONTINUITY →

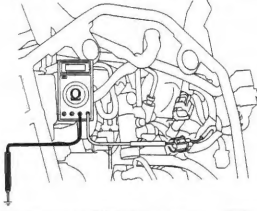
- Go to the WIRE HARNESS CONTINUITY INSPECTION (page 17-13).

NO CONTINUITY

WHEEL SPEED SENSOR LINE SHORT CIRCUIT INSPECTION AT SENSOR CONNECTOR

Check for continuity between the sensor side terminals and body ground.

Connection: Black – Body ground
White – Body ground



CONTINUITY → • Faulty front wheel speed sensor.

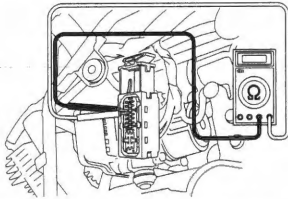
NO CONTINUITY

WIRE HARNESS CONTINUITY INSPECTION

Disconnect the front wheel speed sensor 2P (Orange) connector and short the terminals of the connector with a jumper wire.

Check for continuity between the ABS modulator 25P (Black) connector wire side terminals.

Connection: Pink/Black – Green/Orange
Standard: Continuity



NO CONTINUITY → • Open circuit in wire between the ABS modulator and front wheel speed sensor.

CONTINUITY

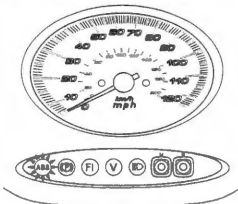
RECHECKING THE INDICATOR FUNCTION

Replace the front wheel speed sensor with a new one (page 17-19).

Connect the ABS modulator 25P (Black) connector.

Reset the self-diagnosis memory (page 17-3).

Test-ride the motorcycle and perform the self-diagnosis and check the ABS indicator.



NOT BLINK → • Faulty original wheel speed sensor.

BLINK

• Faulty ABS modulator.

ANTI-LOCK BRAKE SYSTEM (ABS)

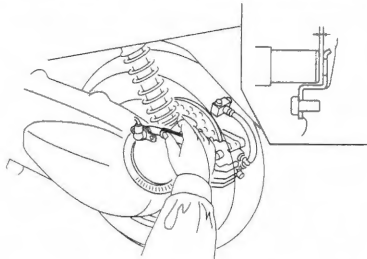
ABS INDICATOR 13, 14, 23 OR 43 BLINKS (REAR WHEEL SPEED SENSOR AND ABS MODULATOR)

- If the ABS indicator 43 blinks, check for brake drag before troubleshooting.

WHEEL PULSER AIR GAP INSPECTION

Measure the air gap between the speed sensor and pulser ring (page 17-20).

Standard air gap: 0.2 – 1.2 mm (0.008 – 0.050 in)



ABNORMAL →

- Check each part of deformation and looseness and correct accordingly.

NORMAL

WHEEL PULSER INSPECTION

Check for iron or other magnetic deposits between the pulser ring and wheel speed sensor.

Check for loose pulser ring or wheel speed sensor.

Check the pulser ring for deformation or damage (e.g., chipped teeth) and the wheel speed sensor tip for damage.

ABNORMAL →

- Remove any deposits and install properly or replace any faulty parts.

NORMAL

WHEEL SPEED SENSOR LINE SHORT CIRCUIT INSPECTION AT ABS MODULATOR

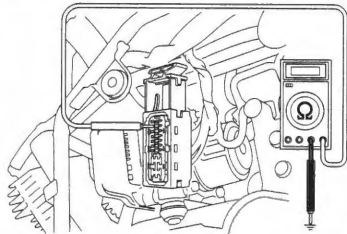
Disconnect the ABS modulator 25P (Black) connector.

Measure for continuity between the ABS modulator 25P (Black) connector wire harness side terminals and body ground.

Connection: Pink/White – Body ground

Green/Red – Body ground

Standard: No continuity



CONTINUITY →

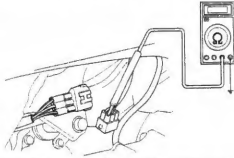
- Go to the WIRE HARNESS CONTINUITY INSPECTION (page 17-15).

NO CONTINUITY

WHEEL SPEED SENSOR LINE SHORT CIRCUIT INSPECTION AT SENSOR CONNECTOR

Check for continuity between the sensor side terminals and body ground

Connection: Black – Body ground
White – Body ground



NO CONTINUITY → • Faulty rear wheel speed sensor.

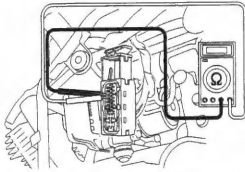
CONTINUITY

WIRE HARNESS CONTINUITY INSPECTION

Disconnect the rear wheel speed sensor/vehicle speed sensor 6P (Natural) connector and short the terminals of the connector with a jumper wire.

Check for continuity between the ABS modulator 25P (Black) connector wire harness side terminals.

Connection: Pink/White – Green/Red
Standard: Continuity



NO CONTINUITY → • Open circuit in wire between the ABS modulator and front wheel speed sensor.

CONTINUITY

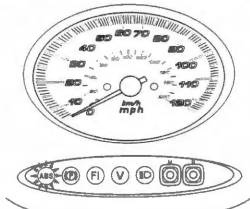
RECHECKING THE INDICATOR FUNCTION

Replace the rear wheel speed sensor and with a new one (page 17-21).

Connect the ABS modulator 25P (Black) connector.

Reset the self-diagnosis memory (page 17-3).

Test-ride the motorcycle and perform the self-diagnosis and check the ABS indicator.



NOT BLINK → • Faulty original wheel speed sensor

BLINK

• Faulty ABS modulator.

ANTI-LOCK BRAKE SYSTEM (ABS)

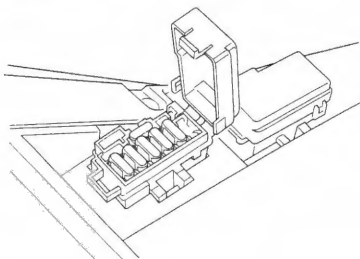
ABS INDICATOR 31, 32, 33, 34, 37 OR 38 BLINKS (SOLENOID VALVE)

- Reset the self-diagnosis memory (page 17-3) and turn the ignition switch "ON". Check that the ABS indicator lights. Operate the self-diagnosis system (page 17-2) and Check that the ABS indicator blinks 31, 32, 33, 34, 37 or 38 times. If the ABS indicator blinks 31, 32, 33, 34, 37 or 38 times, replace the ABS modulator.

ABS INDICATOR 51, 52 OR 53 BLINKS (MOTOR)

ABS MOTOR FUSE (30A) INSPECTION

Check for a blown ABS motor fuse (30A) on the main fuse box.



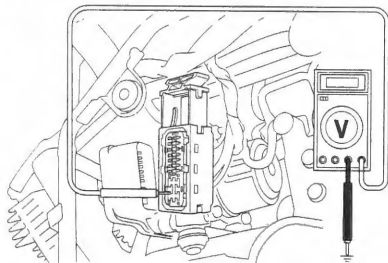
- ABNORMAL → • Replace the ABS motor fuse (30A) and inspect again.

NORMAL

ABS MOTOR LINE OPEN CIRCUIT INSPECTION

Disconnect the ABS modulator 25P (Black) connector.

Measure the voltage between the ABS modulator 25P (Black) connector wire harness side and body ground.



- NO VOLTAGE → • Open circuit in Red wire between the ABS motor fuse (30A) and ABS modulator 25P (Black) connector.

CONNECTION: Red (+) - Body ground (-)
STANDARD: Battery voltage

BATTERY VOLTAGE

RECHECK THE INDICATOR FUNCTION

Reset the self-diagnosis memory (page 17-3). Then test-ride with the vehicle speed 10km/h or more.

Operate the self-diagnosis system (page 17-2) and check the ABS indicator blinks 51, 52 or 53 times.

- 51, 52, OR 53 BLINKS → • Faulty ABS modulator.

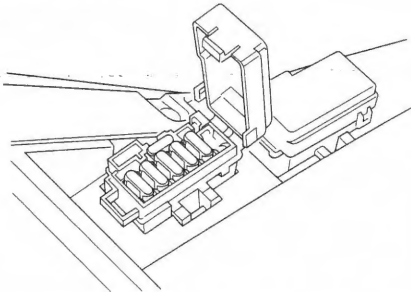
NO BLINK

- ABS is normal.

ABS INDICATOR 54 BLINKS (FAIL SAFE RELAY)

FAIL SAFE RELAY FUSE (30A) INSPECTION

Check for a blown fail safe relay fuse (30A) on the main fuse box.



ABNORMAL →

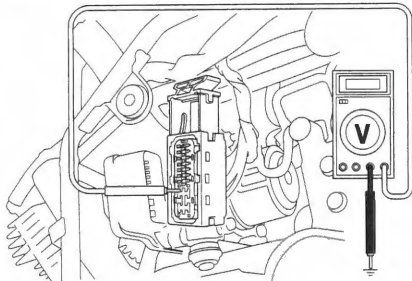
- Replace the fail safe relay fuse (30A) and inspect again.

NORMAL

FAIL SAFE RELAY LINE OPEN CIRCUIT INSPECTION

Disconnect the ABS modulator 25P (Black) connector.

Measure the voltage between the ABS modulator 25P (Black) connector wire harness side and body ground.



CONNECTION: Black (+) – Body ground (–)
STANDARD: Battery voltage

NO VOLTAGE →

- Open circuit in Black wire between the fail safe relay fuse (30A) and ABS modulator 25P (Black) connector.

BATTERY VOLTAGE

RECHECK THE INDICATOR FUNCTION

Reset the self-diagnosis memory (page 17-3). Then test-ride with the vehicle speed 10km/h or more.

Operate the self-diagnosis system (page 17-2) and check the ABS indicator blinks 54 times.

54 BLINKS →

- Faulty ABS modulator.

NO BLINK

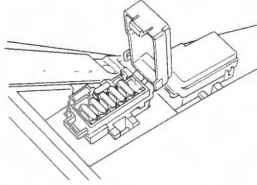
- ABS is normal.

ANTI-LOCK BRAKE SYSTEM (ABS)

ABS INDICATOR 61 OR 62 BLINKS (IGNITION VOLTAGE)

ABS MAIN FUSE INSPECTION

Check for a blown ABS main fuse (10A) on the main fuse box.



ABNORMAL → • Replace the ABS main fuse (10A) and inspect it again.

NORMAL

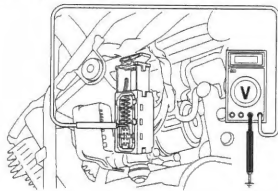
IGNITION VOLTAGE LINE INSPECTION

Disconnect the the ABS modulator 25P (Black) connector.

Measure the voltage between the ABS modulator 25P (Black) connector wire harness side and body ground.

CONNECTION: Red/Brown (+) – Body ground (–)

STANDARD: 10 – 17V at all time



ABNORMAL → • Check the charging system (page 18-5).
• Open circuit in Red/Brown wire.

NORMAL

RECHECK THE INDICATOR FUNCTION

Reset the self-diagnosis memory (page 17-3). Then test-ride with the vehicle speed 10km/h or more.

Operate the self-diagnosis system (page 17-2) and check the ABS modulator.

61 OR 62 BLINKS → • Faulty ABS modulator.

NO BLINK

• ABS is normal.

ABS INDICATOR 71 BLINKS (INCORRECT TIRE SIZE)

- Check that the all tires are the specified size pressure and are inflated to the proper specification.
- Reset the self-diagnosis memory (page 17-3). Then test-ride with the vehicle speed 10km/h or more. Operate the self-diagnosis system (page 17-2) and Check that the ABS indicator blinks 71 times. If the ABS indicator blinks 71 times, replace the ABS modulator.

ABS INDICATOR 81 BLINKS (CPU)

- Reset the self-diagnosis memory (page 17-3). Then test-ride with the vehicle speed 10km/h or more. Operate the self-diagnosis system (page 17-2) and Check that the ABS indicator blinks 81 times. If the ABS indicator blinks 81 times, replace the ABS modulator.

FRONT WHEEL SPEED SENSOR

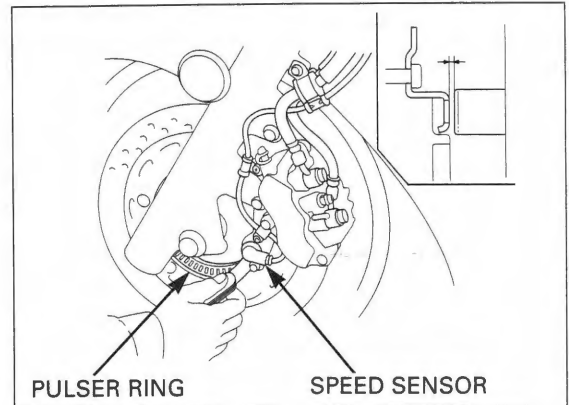
AIR GAP INSPECTION

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.

It must be within specification.

STANDARD: 0.2 – 1.2 mm (0.008 – 0.050 in)

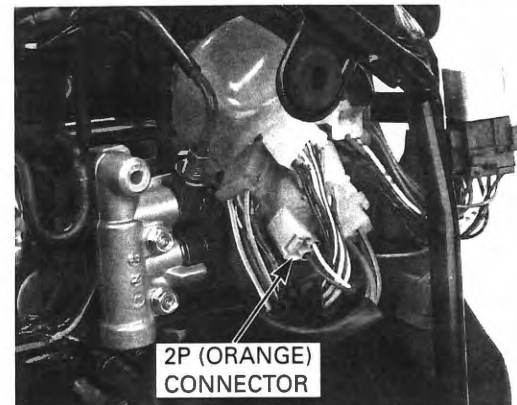
The sensor air gap cannot be adjusted.
If it is not within specification, check each installed part for deformation, looseness and damage.



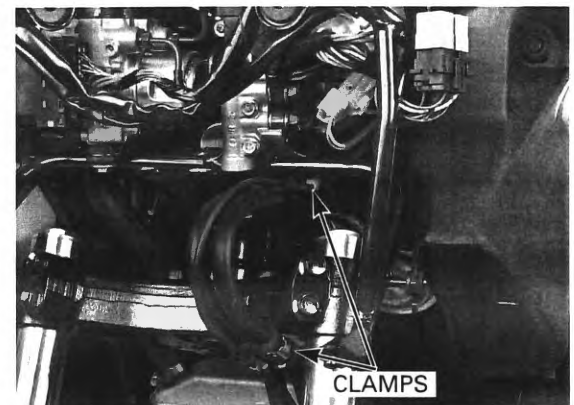
REMOVAL/INSTALLATION

Remove the front cover (page 2-14).

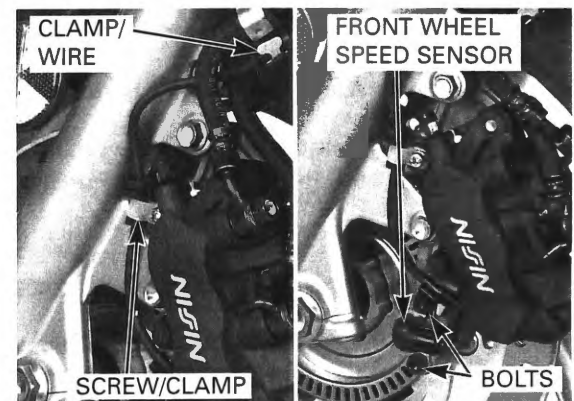
Disconnect the front wheel speed sensor 2P (Orange) connector.



Remove the front wheel speed sensor wire from the wheel speed sensor clamps.



Remove the screw and clamp.
Remove the front wheel speed sensor wire from the clamp.
Remove the bolts and front wheel speed sensor.



ANTI-LOCK BRAKE SYSTEM (ABS)

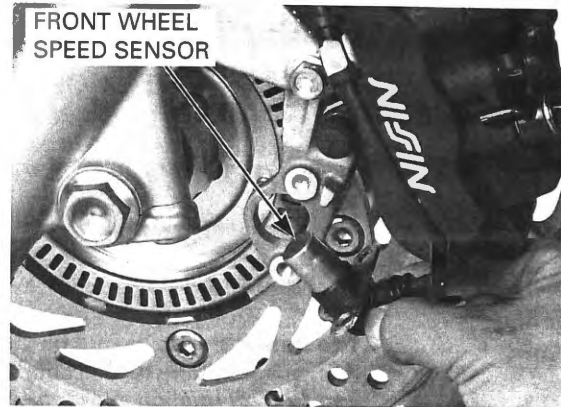
Check the front wheel speed sensor for damage or cracks.

Replace the front wheel speed sensor if necessary (see above).

Route the wire harness properly (page 1-20).

Installation is in the reverse order of removal.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



FRONT PULSER RING

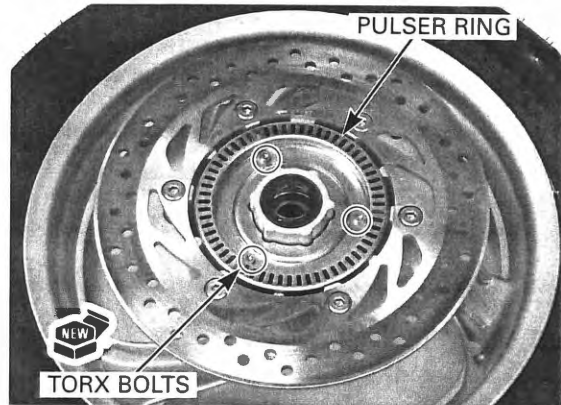
REMOVAL/INSTALLATION

Remove the front wheel (page 14-3).

Remove the torx bolts and pulser ring.

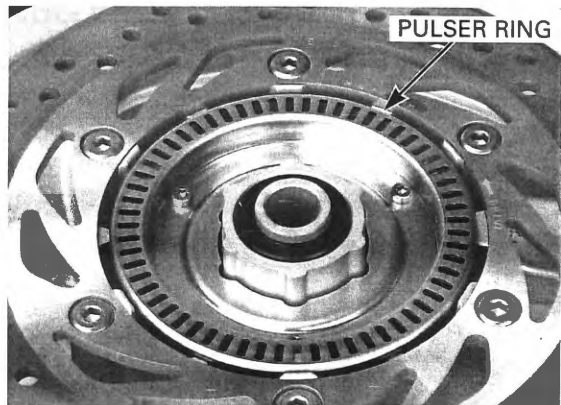
Install the pulser ring and new torx bolts. Tighten the torx bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)



INSPECTION

Check the pulser ring for damage or cracks. Replace the pulser ring if necessary (see above).



REAR WHEEL SPEED SENSOR

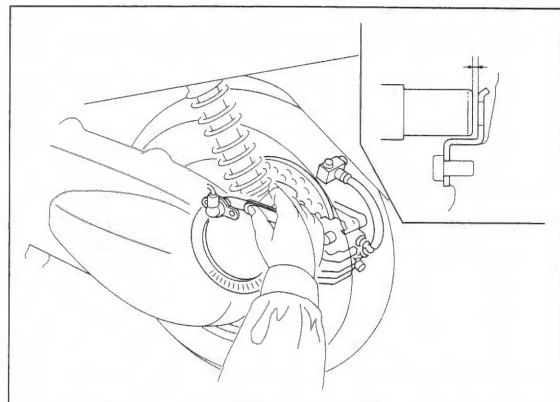
AIR GAP INSPECTION

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.

It must be within specification.

STANDARD: 0.2 – 1.2 mm (0.008 – 0.050 in)

If it is not within specification, check each installed part for deformation, looseness and damage.



REMOVAL/INSTALLATION

Remove the following:

- Rear wheel (page 15-4)
- Left passenger footpeg (page 2-12)
- Left front cover (page 10-3)

Disconnect the speed sensor wire 3P (Natural) connector.

AFTER '02 (ABS TYPE):

Disconnect the rear wheel speed sensor/speed sensor wires 6P (Natural) connector.

Remove the rear wheel speed sensor/speed sensor wires clamp from the frame.

Remove the bolts and speed sensor cord clamp.

Remove the bolts and rear wheel speed sensor protector and speed sensor protector.

Remove the rear wheel speed sensor wire clamp from the protector.

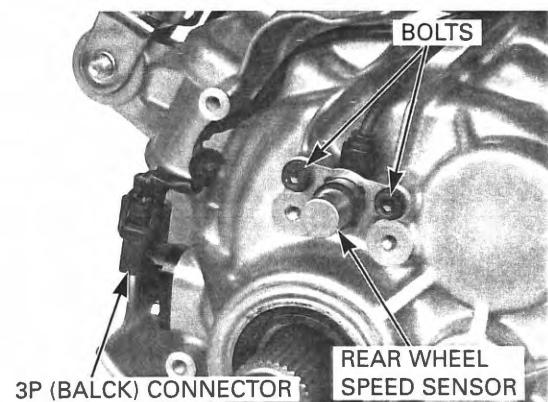
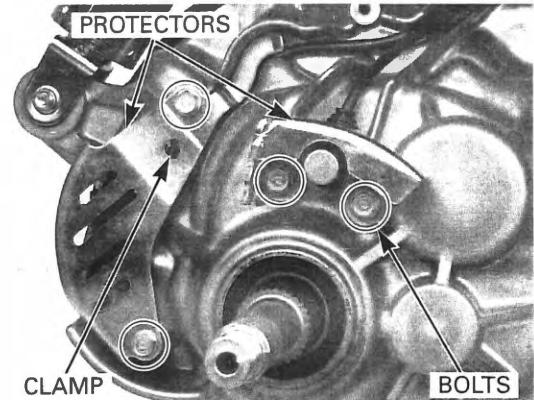
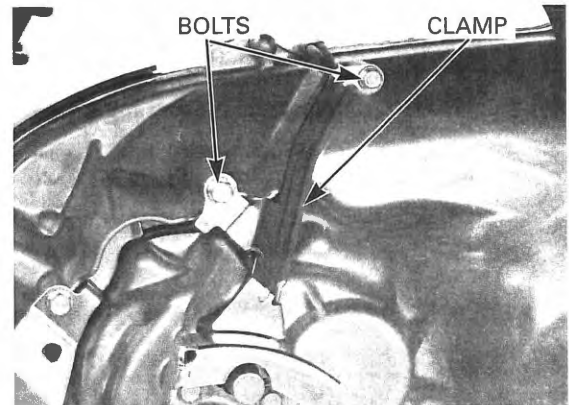
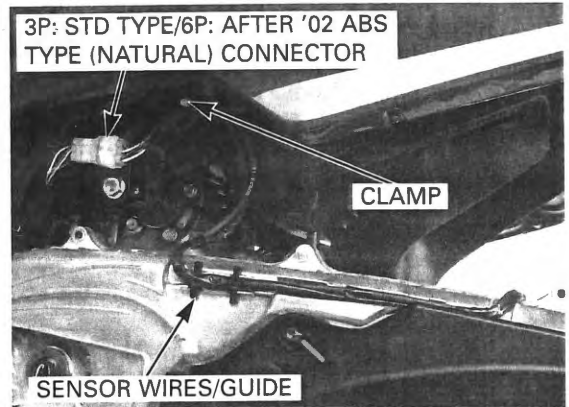
Disconnect the speed sensor 3P (Black) connector. Remove the bolts and rear wheel speed sensor. Check the rear wheel speed sensor for damage or cracks.

Replace the rear wheel speed sensor if necessary (see above).

Installation is in the reverse order of removal.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Route the wire harness properly (page 1-20).



REAR PULSER RING

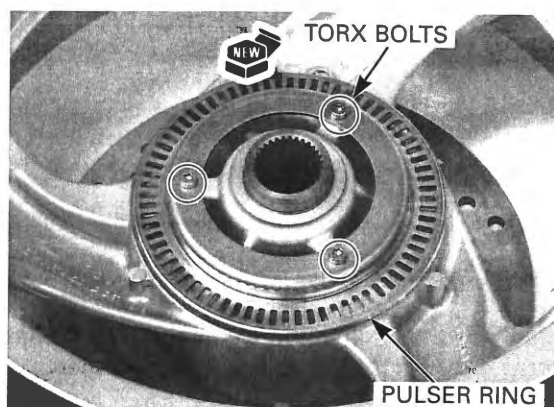
REMOVAL/INSTALLATION

Remove the rear wheel (page 15-4).

Remove the torx bolts and pulser ring.

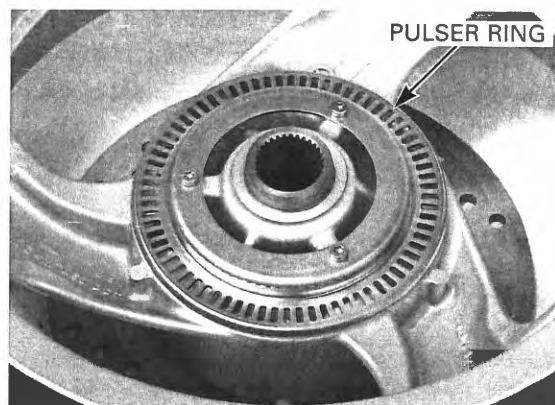
Install the pulser ring and new torx bolts.
Tighten the torx bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)



INSPECTION

Check the pulser ring for damage or cracks.
Replace the pulser ring if necessary (see above).



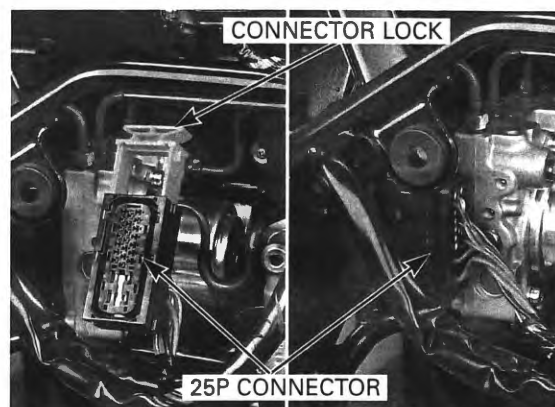
ABS MODULATOR

REMOVAL

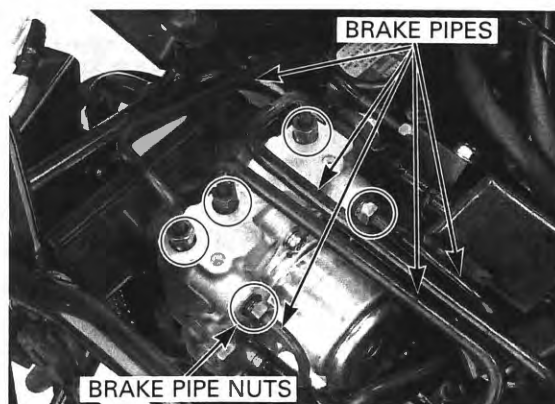
Remove the front cover (page 2-14).

Drain the front brake hydraulic system (page 16-4).

Pull up the ABS modulator 25P (Black) connector lock and disconnect the ABS modulator 25P (Black) connector.

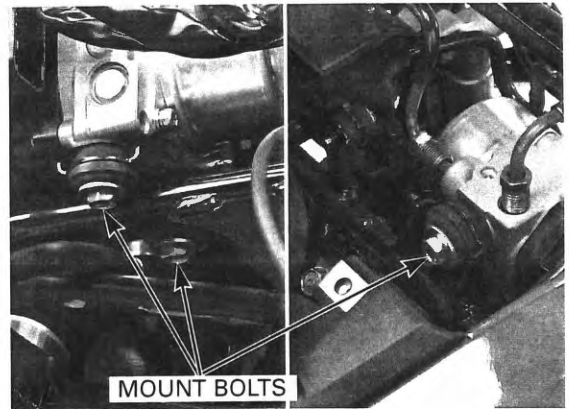


Remove the brake pipe nuts and disconnect the brake pipes from the ABS modulator.

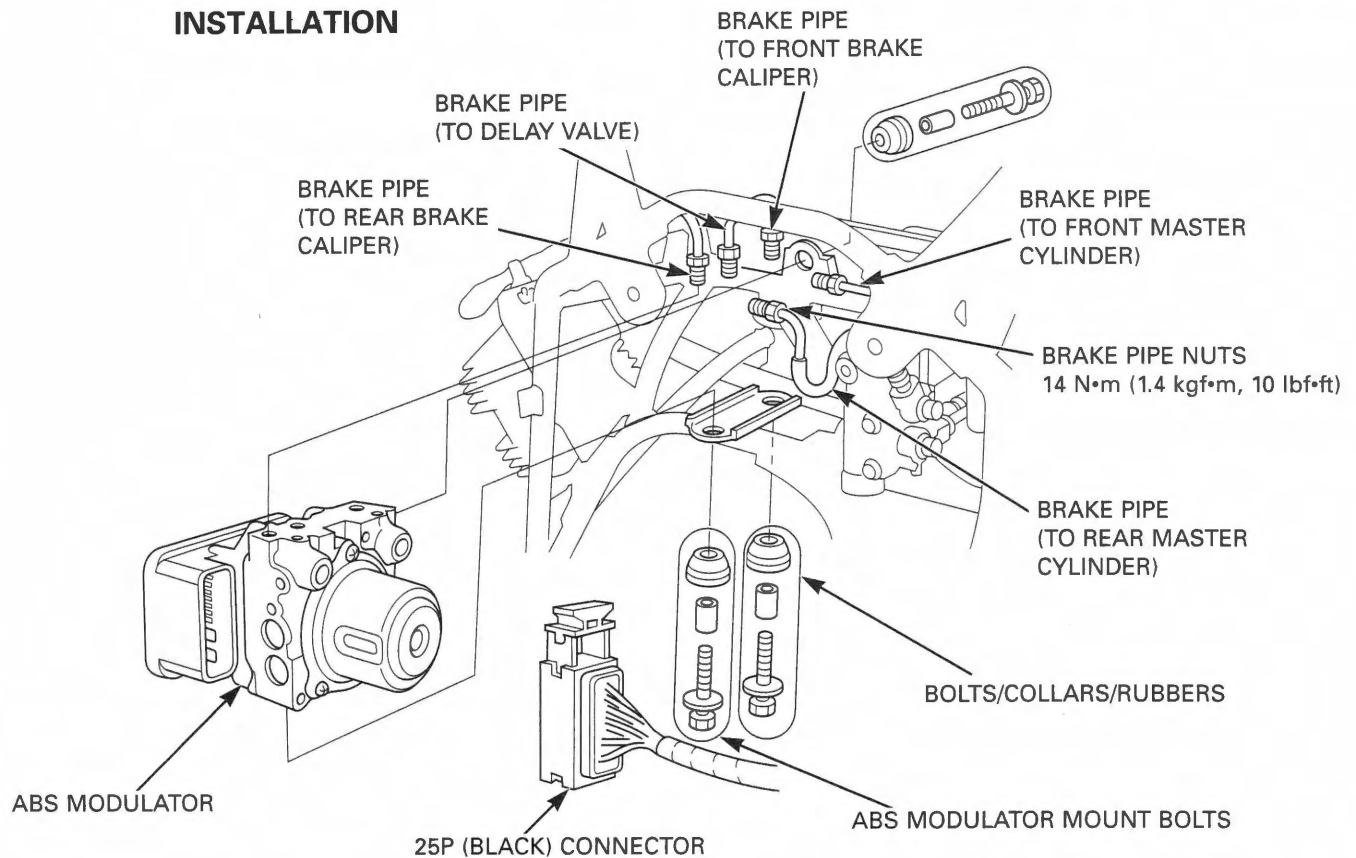


Be careful not to damage the brake pipes.

Remove the ABS modulator mount bolts.
Remove the ABS modulator to the front cover stay.



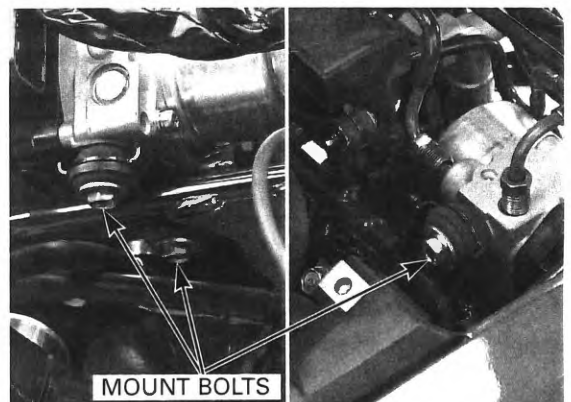
INSTALLATION



Be careful not to damage the brake pipes.

Install the ABS modulator to the front cover stay aligning the hole on the ABS modulator with the mount rubber on the front cover stay.

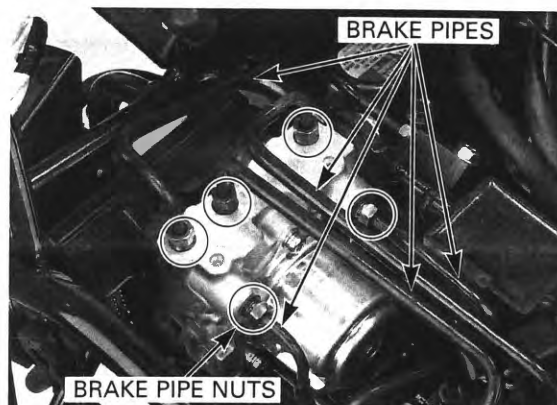
Install the ABS modulator mount bolts.
Tighten the ABS modulator mount bolts.



ANTI-LOCK BRAKE SYSTEM (ABS)

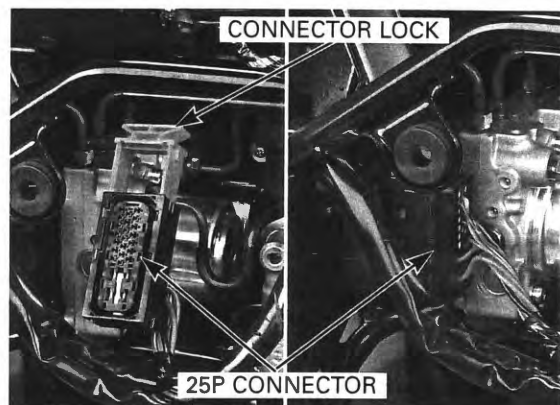
Install the brake pipes to the ABS modulator properly and tighten the nuts to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



Connect the ABS modulator 25P (Black) connector and push down the ABS modulator 25P (Black) connector lock.

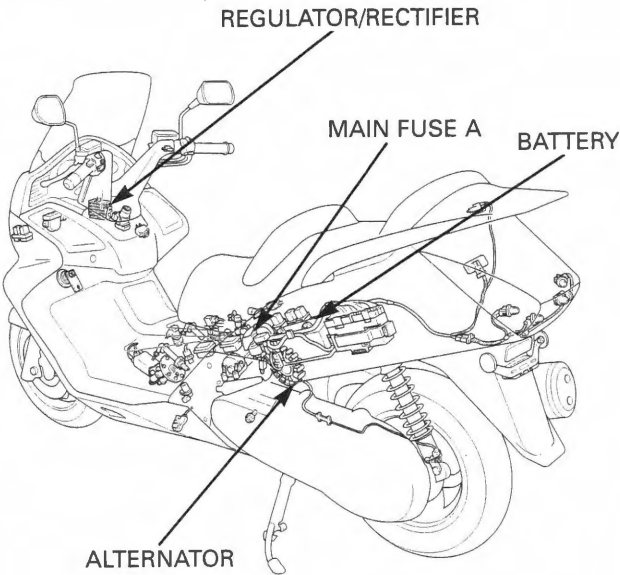
Fill and bleed the hydraulic system (page 16-5).
Install the front cover (page 2-14).



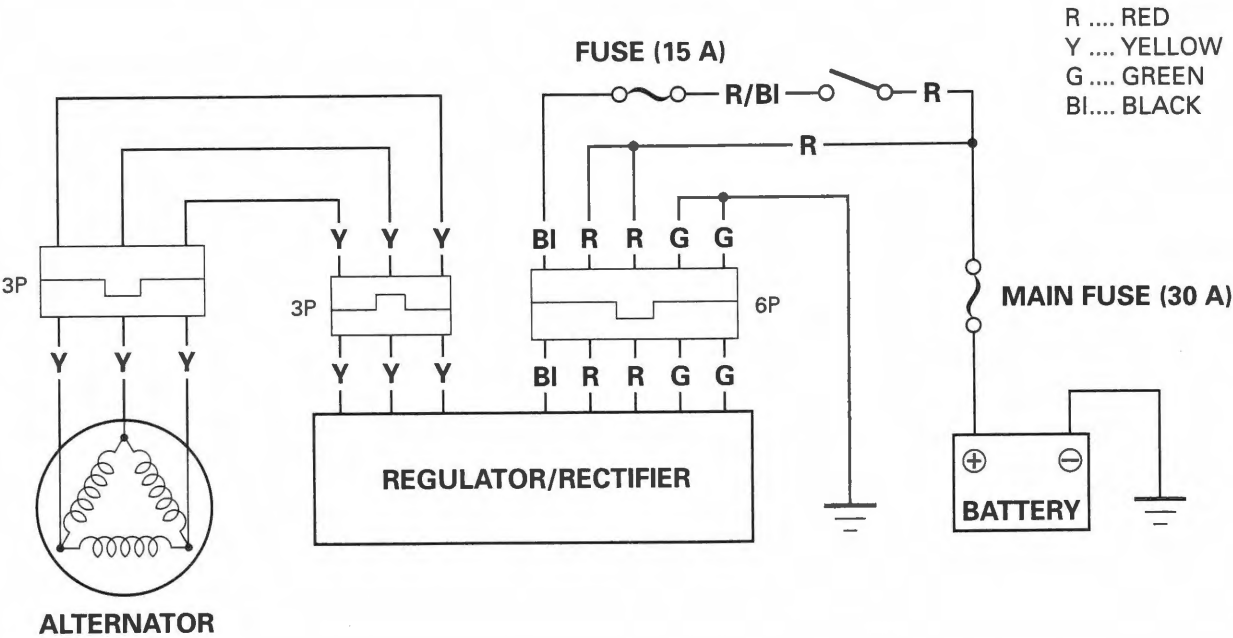
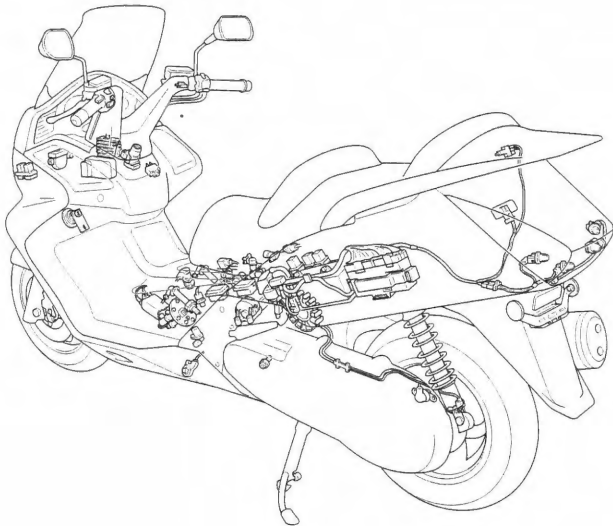
MEMO

SYSTEM DIAGRAM

STD TYPE:



AFTER '02 (ABS TYPE):



18. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	18-0	CHARGING SYSTEM INSPECTION	18-5
SERVICE INFORMATION	18-1	ALTERNATOR CHARGING COIL	18-6
TROUBLESHOOTING	18-3	REGULATOR/RECTIFIER	18-7
BATTERY	18-4		

SERVICE INFORMATION

GENERAL

⚠ CAUTION

- 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 physician immediately, KEEP OUT OF REACH OF CHILDREN.

- 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 place.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for 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 vehicle.
- The battery self-discharges when the vehicle is not in use, for this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 18-3).
- For alternator service, refer to section 12.

BATTERY/CHARGING SYSTEM

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 instructions in the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

Recommended battery tester Micro 404XL (U.S.A. only), BM-210 or equivalent

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 11 (10) Ah
	Current leakage		1.1 mA max
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/0.5 h
Alternator	Capacity		441 W/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 0.5 Ω

TOOL

Christie battery charger
Battery tester

MC1012/2 (U.S.A. only) or equivalent
Micro 404XL (U.S.A. only), BM-210 or equivalent

TROUBLESHOOTING

Battery is damaged or weak

Remove the battery (page 18-4).
Check the battery condition using the recommended battery tester.

RECOMMENDED BATTERY TESTER:
Micro 404XL (U.S.A. only), BM-210 or equivalent

Incorrect → • Faulty battery.

Correct

Install the battery (page 18-4).
Check the battery current leakage (leak test: page 18-7).

SPECIFIED CURRENT LEAKAGE:
1.1 mA max.

Incorrect → Disconnect the regulator/rectifier connectors and recheck the battery current leakage.

Incorrect

Correct

• Faulty regulator/rectifier.

Correct

• Shorted wire harness.
• Faulty ignition switch.

Check the alternator charging coil (page 18-6).

STANDARD: 0.1 – 0.5 Ω (20°C/68°F)

Incorrect → • Faulty charging coil.

Correct

Measure and record the battery voltage using a digital multimeter (page 18-4).
Start the engine.
Measure the charging voltage (page 18-6).
Compare the measurements to the results of the following calculation.

Measured BV < Measured CV < 15.5 V
• BV=Battery Voltage
• CV=Charging Voltage

Correct → • Faulty battery.

Incorrect

Perform the regulator/rectifier wire harness inspection (page 18-7).

Incorrect → • Open circuit in related wire.
• Loose or poor contacts of related terminal.
• Shorted wire harness.

Correct

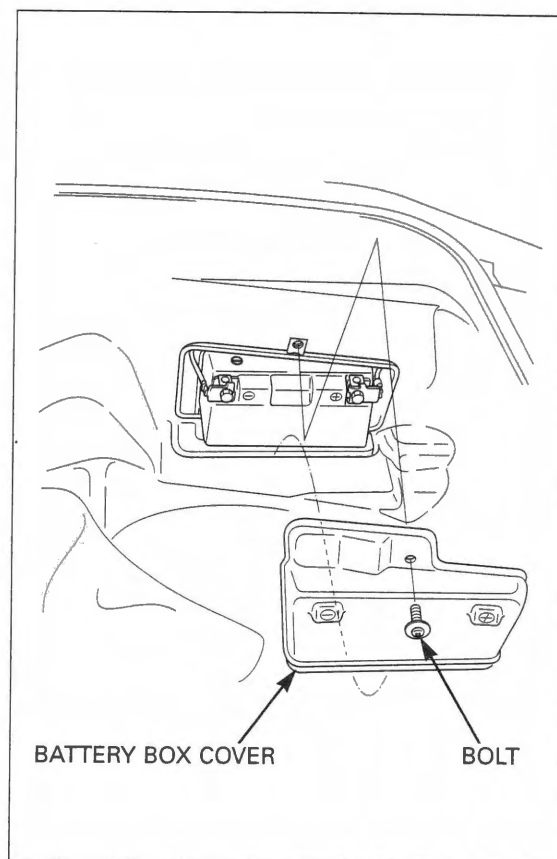
• Faulty regulator/rectifier.

BATTERY

REMOVAL/INSTALLATION

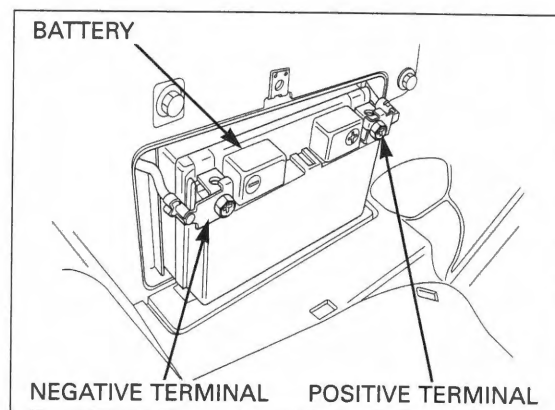
Turn the ignition switch OFF.
Unlock and open the seat (page 2-3).

Remove the special bolt and battery box cover.



With the ignition switch to "OFF", disconnect the negative (-) cable first, then remove the terminal cover and disconnect the positive (+) cable.

Installation is in the reverse order of removal.



VOLTAGE INSPECTION

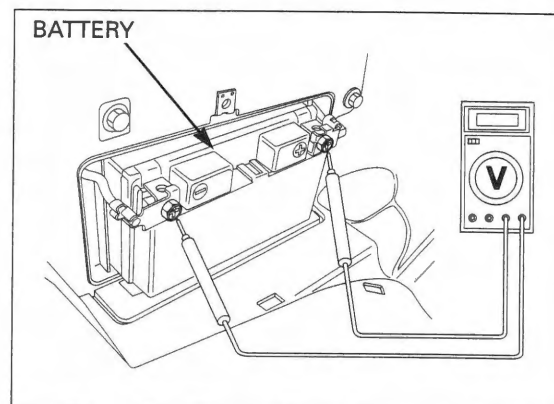
Remove the battery cover (see above).

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F):

Fully charged: 13.0 – 13.2 V

Under charged: Below 12.3 V



BATTERY TESTING

Refer to the instructions that are appropriate to the battery testing equipment available to you.

TOOL:

Battery tester

**Micro 404XL (USA only),
BM-210 or equivalent**

BATTERY CHARGING (U.S.A. ONLY)

Refer to the instructions that are appropriate to the battery charging equipment available to you.

TOOL:

Battery charger

**Christie battery charger
(MC1012/2) or equivalent**

CHARGING SYSTEM INSPECTION

Remove the battery cover (page 18-4).

CURRENT LEAKAGE TEST

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 OFF, check for current leakage.

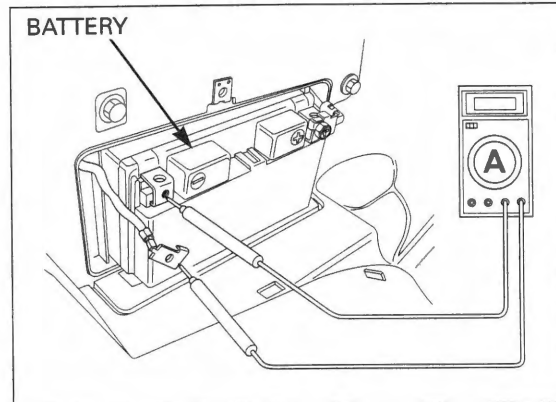
When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.

While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 1.1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



BATTERY/CHARGING SYSTEM

CHARGING VOLTAGE INSPECTION

Be sure that the battery is in good condition before performing this test.

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.

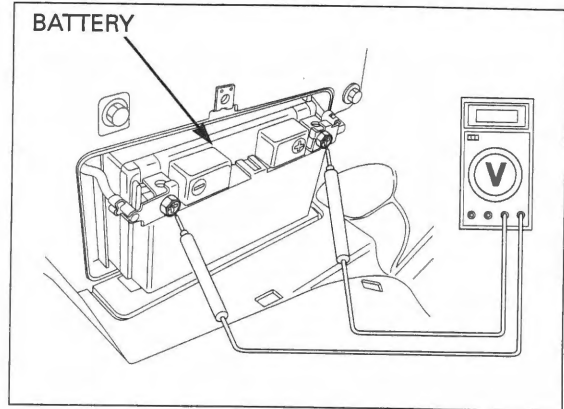
Start the engine and warm it up to the operating temperature; stop the engine.

Connect the multimeter between the positive and negative terminals of the battery.

To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on and turned to the high beam position, restart the engine.

Measure the voltage on the multimeter when the engine runs at 5,000 min⁻¹ (rpm).



STANDARD:

Measured BV < Measured CV < 15.5 V

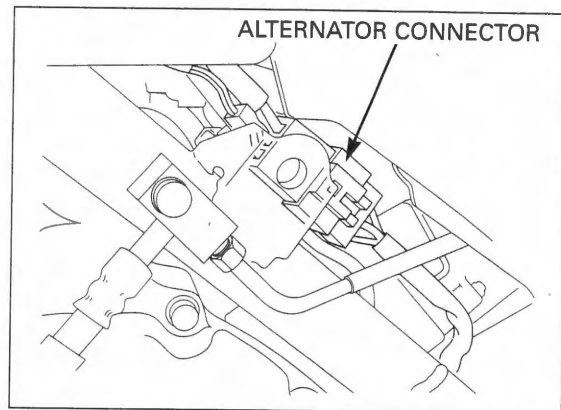
- BV=Battery Voltage
- CV=Charging Voltage

ALTERNATOR CHARGING COIL

INSPECTION

Remove the right passenger footpeg (page 2-12).

Disconnect the alternator 3P white connector.



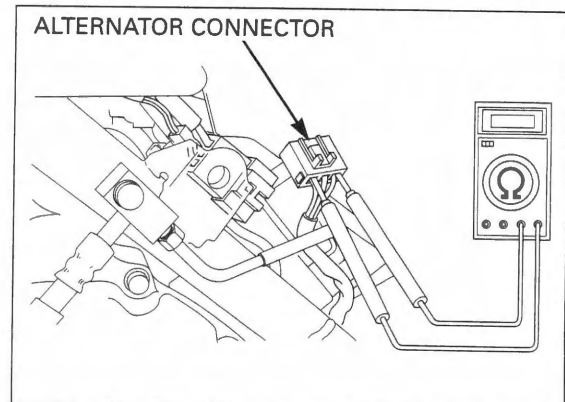
Measure the resistance between the Yellow wire terminals of the alternator side connector.

STANDARD: 0.1 – 0.5 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal of the alternator side connector and ground. There should be continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

Refer to section 12 for alternator stator replacement.



REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Remove the front cover (page 2-14).

Disconnect the regulator/rectifier 6P connector.
Check the connector for loose contacts or corroded terminals.

BATTERY LINE

Measure the voltage between the Red/White wire terminal and ground.
There should be battery voltage at all times.

GROUND LINE

Check the continuity between the Green wire terminal and ground.
There should be continuity at all times.

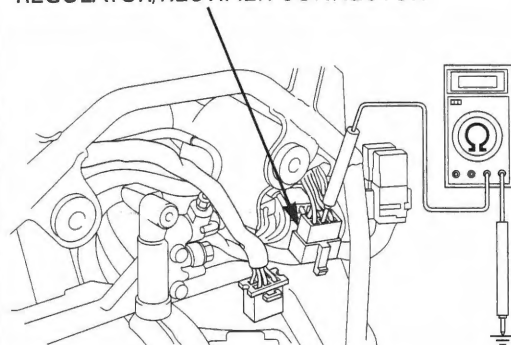
CHARGING COIL LINE

Measure the resistance between the Yellow wire terminals.

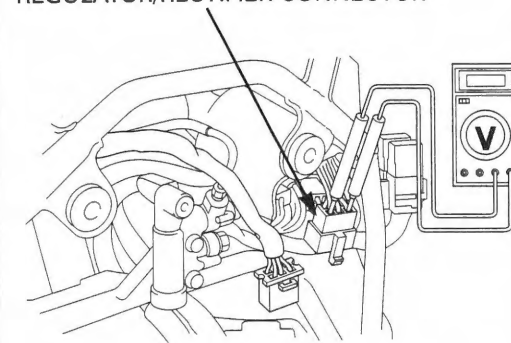
STANDARD: 0.1 – 0.5 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal and ground.
There should be no continuity.

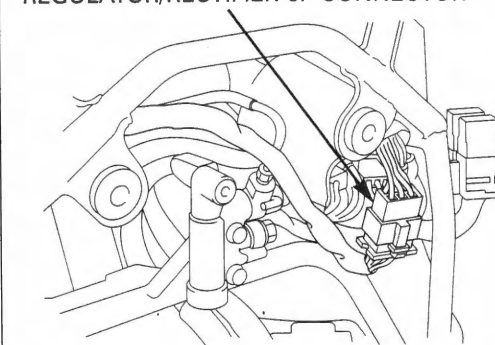
REGULATOR/RECTIFIER CONNECTOR



REGULATOR/RECTIFIER CONNECTOR



REGULATOR/RECTIFIER 6P CONNECTOR



REMOVAL/INSTALLATION

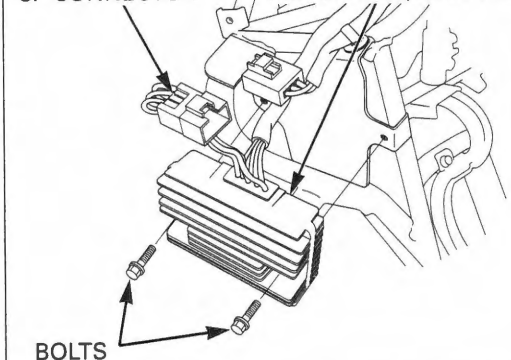
Remove the front cover (page 2-14).

Disconnect the regulator/rectifier 6P connector.

Disconnect the regulator/rectifier 3P connector.
Remove the bolts, regulator/rectifier and stay.

Installation is in the reverse order of removal.

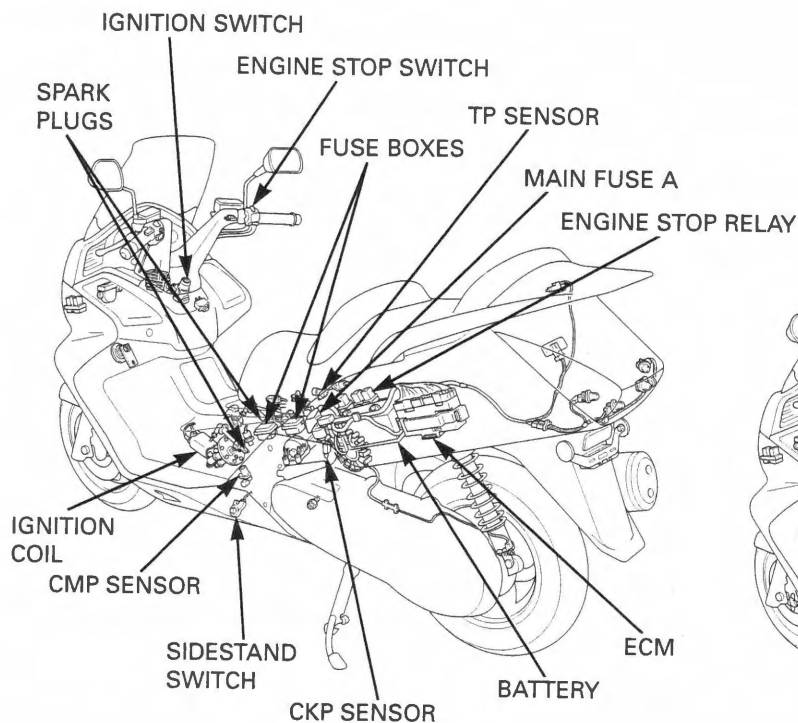
3P CONNECTOR REGULATOR/RECTIFIER



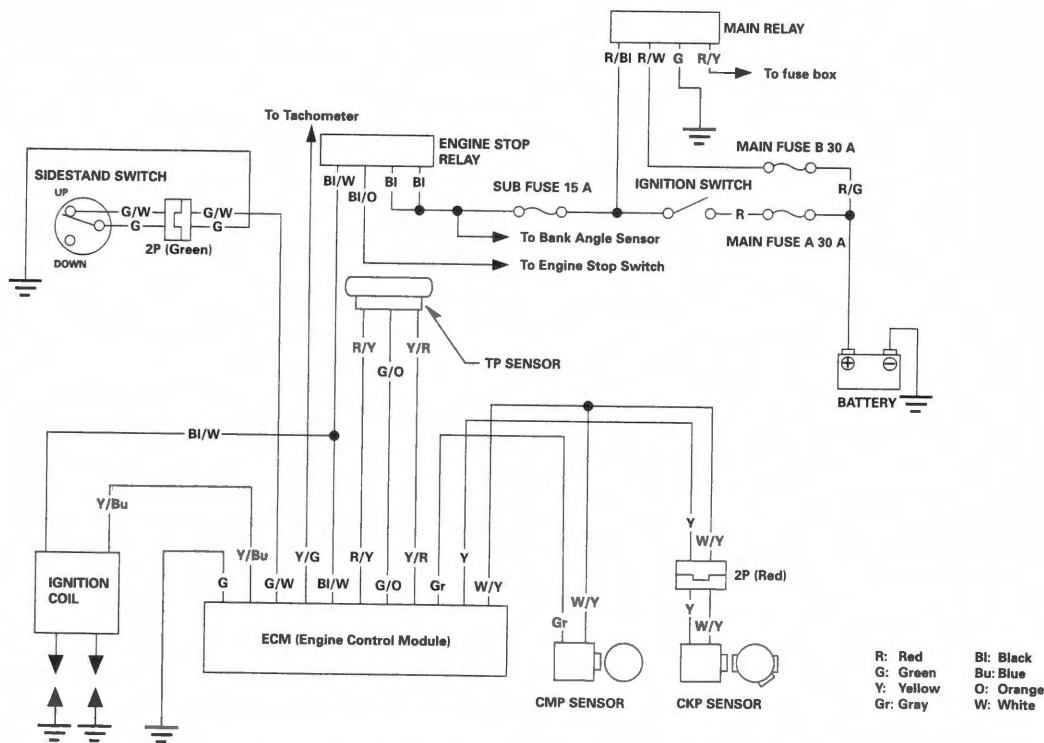
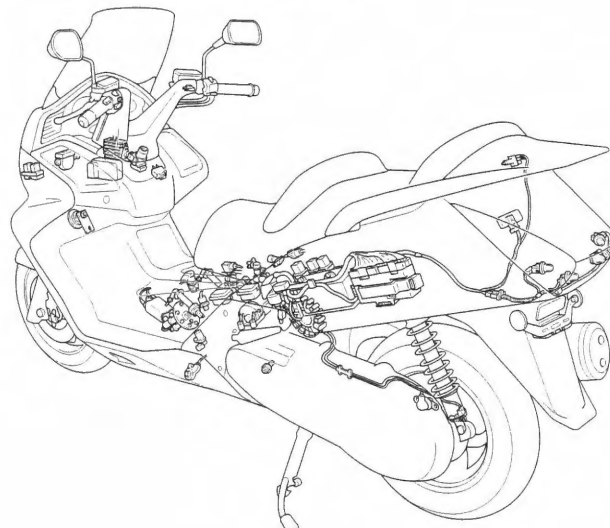
IGNITION SYSTEM

SYSTEM DIAGRAM

STD TYPE:



AFTER '02 (ABS TYPE):



19. IGNITION SYSTEM

SYSTEM DIAGRAM	19-0	IGNITION SYSTEM INSPECTION	19-3
SERVICE INFORMATION	19-1	IGNITION COIL	19-6
TROUBLESHOOTING	19-2	IGNITION TIMING	19-6

SERVICE INFORMATION

GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting on page 19-2.
- This scooter's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- 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 off the ignition switch before servicing.
- 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 plug.
- Use spark plugs of the correct heat range. Using a spark plug with an incorrect heat range can damage the engine.
- Refer to section 5 for Throttle Position (TP) sensor, Camshaft Position (CMP) sensor and ECM inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	NGK	CR8EH-9
	DENSO	U24FER9
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
CKP sensor peak voltage		0.7 V minimum
Ignition timing ("F" mark)		12° BTDC at idle

TORQUE VALUES

Timing hole cap	10 N•m (1.0 kgf•m, 7 lbf•ft)	Apply engine oil to the threads, seating surface and O-ring.
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TOOL

IgnitionMate peak voltage tester
(U.S.A. only) or Peak voltage adaptor

MTP07-0286 or 07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water got into the spark plug cap (leaking the ignition coil secondary voltage)

No spark at spark plug

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches turned to "ON" (other electrical components are normal.)	1. Faulty engine stop switch. 2. An open circuit in Black/White wire between the ignition coil and engine stop switch. 3. Loose primary terminal or an open circuit in primary coil. 4. Faulty ECM (in the case when the initial voltage is normal while disconnecting ECM connector.
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/White (+) and body ground (–) at the ECM multi-connector or loosen ECM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Yellow/Blue wire between the ignition coils and ECM. 6. Short circuit in ignition primary coil. 7. Faulty sidestand switch. 8. An open circuit or loose connection in No.7 related circuit wires (Green/White and Green wires). 9. Faulty CKP sensor (measure the peak voltage). 10. Faulty ECM (in case when above No. 1 – 9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Faulty peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ECM (in case when above No.1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery 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 – 3 are normal).
	Initial and peak voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
CKP sensor	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10MΩ/DCV. 2. Cranking speed is too low (battery 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 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

IGNITION SYSTEM INSPECTION

If no spark jumps at the plug, check all connections for loose or poor contact before measuring each peak voltage.

Use the 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.

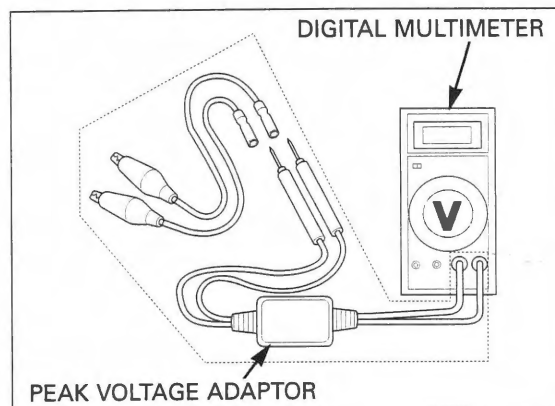
Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or

**Peak voltage adaptor MTP07-0286 or
07HGJ-0020100
(not available in U.S.A.)**

**with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)**



IGNITION COIL PRIMARY PEAK VOLTAGE

Remove the right lower skirt (page 2-4).

Remove the spark plug maintenance lid (page 2-5).

Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.

Check cylinder compression and check that the spark plug is installed correctly in the cylinder.

Disconnect the spark plug cap from the spark plug.

Connect a known-good spark plug to the spark plug cap and ground the spark plug to the cylinder as done in the spark test.

With the ignition coil primary wire connected, connect the peak voltage adaptor to the ignition coil.

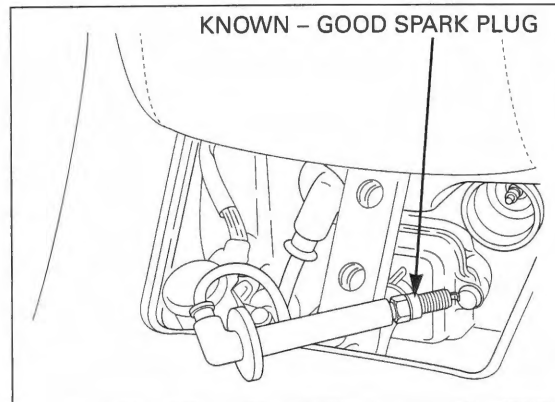
CONNECTION: Black/White (-) – Body ground (+)

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

Check for initial voltage at this time.

The battery voltage should be measured.

If the initial voltage cannot be measured, check the power supply circuit (refer to the troubleshooting, page 19-2).

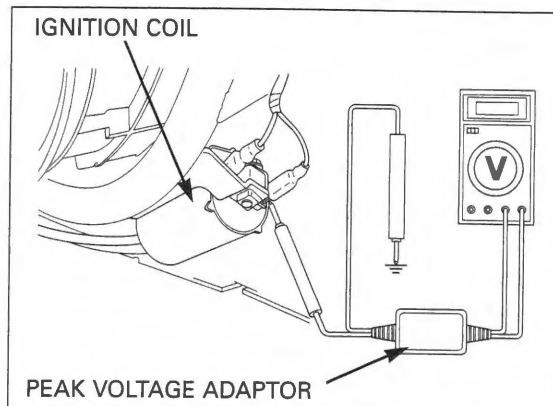


IGNITION SYSTEM

To prevent electric shock, avoid touching the spark plug and tester probes.
Crank the engine with the starter motor and read the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in the Black/White wires.
If no defects are found in the harness, refer to the troubleshooting chart on page 19-2.



CKP SENSOR PEAK VOLTAGE ('02 - '07)

Check cylinder compressions and check that the spark plug is installed correctly.

Remove the right passenger footpeg (page 2-12).
Remove the left side body cover (page 2-6).

Disconnect the ECM 22P (Light gray) connector.
Connect the peak voltage adaptor probes to the connector terminals of the wire harness side.

TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or
Peak voltage adaptor MTP07-0286 or
07HGJ-0020100
(not available in U.S.A.)

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

CONNECTION: White/Yellow (+) - Ground (-)

Retract the sidestand.
Turn the ignition switch ON and engine stop switch to RUN.
Avoid touching the tester probes to prevent electric shock.
Crank the engine with the starter motor and read CKP sensor peak voltage.

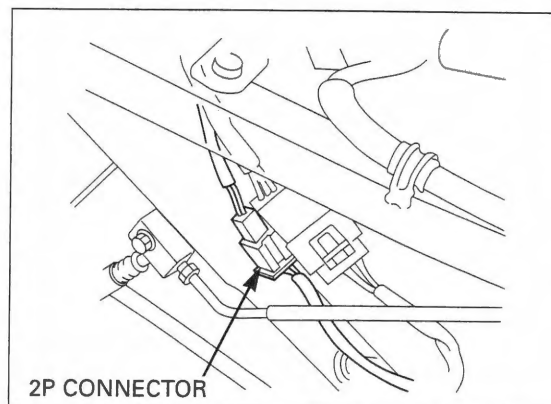
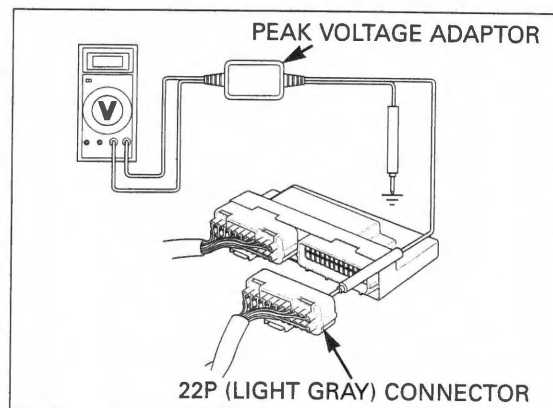
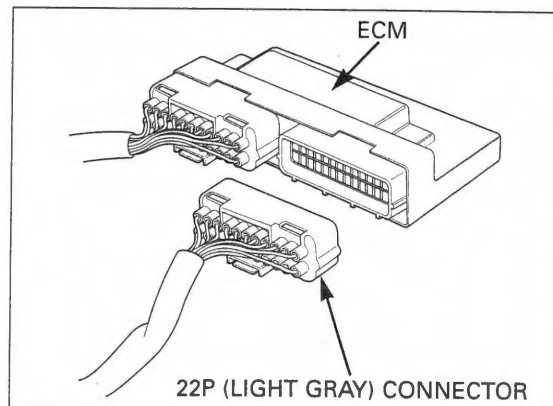
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured is abnormal, recheck the following:

Disconnect the CKP sensor 2P red connector.
Connect the peak voltage adaptor to the terminals of the CKP sensor side and recheck the peak voltage.

If the peak voltage at the ECM 22P (Light gray) connector is abnormal and peak voltage at the CKP sensor 2P red connector is normal, check for poorly connected connectors or a broken wire harness.

If the peak voltage is abnormal at both connectors, follow the checks described in the troubleshooting on page 19-2.



CKP SENSOR PEAK VOLTAGE (After '07)

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compressions and check that the spark plug is installed correctly.

Remove the left side body cover (page 2-6).

Remove the ECM from the stay.
Disconnect the 32P (Black) and 32P (Light gray) connectors from the ECM.
Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or Peak voltage adaptor MTP07-0286 or 07HGJ-0020100 (not available in U.S.A.)
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

Connect the peak voltage adaptor probes to the ECM 32P connector terminals of the wire harness side.

CONNECTION: B11 (Yellow) (+) – A31 (White/yellow) (-)

Retract the sidestand.
Turn the ignition switch to "ON" and engine stop switch to "○".
Crank the engine with the starter motor, and measure the CKP sensor peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ECM connector is abnormal, measure the peak voltage at the CKP sensor connector.

Remove the right passenger footpeg (page 2-12).

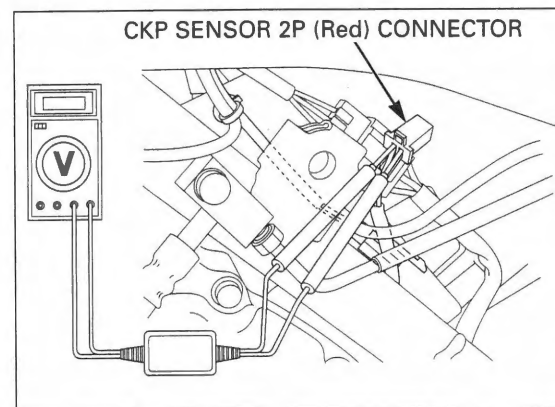
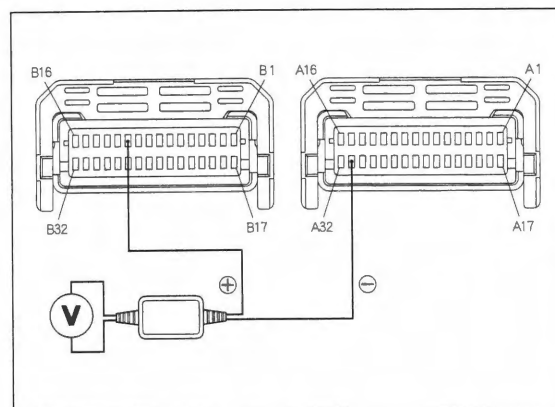
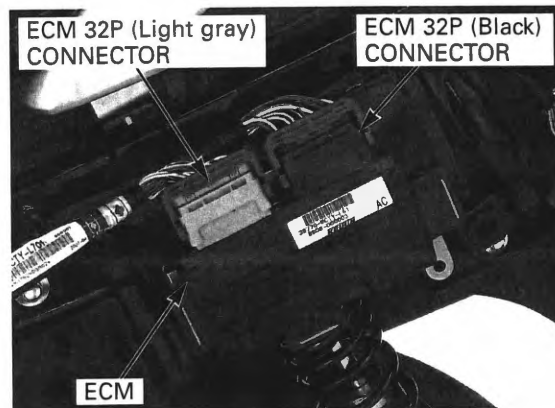
Disconnect the CKP sensor 2P (Red) connector and connect the peak voltage adaptor probes to the CKP sensor side connector terminals.

CONNECTION: Yellow (+) – White/yellow (-)

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, check the 2P (Red) connector for loose connection and the wire harness for an open circuit or loose connection.

If both peak voltage measured are abnormal, check each item in the troubleshooting chart (page 19-2). If all items are normal, the CKP sensor is faulty. Refer to procedure for the CKP sensor replacement (page 12-5).



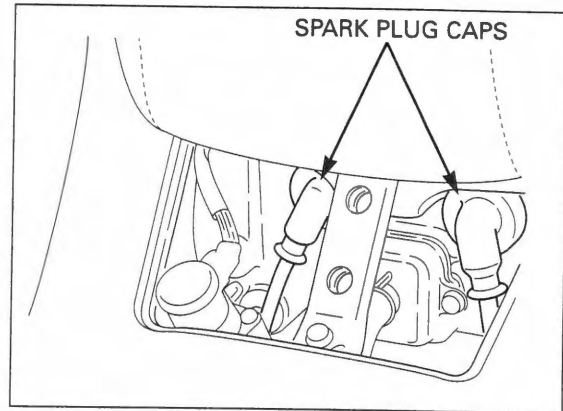
IGNITION SYSTEM

IGNITION COIL

REMOVAL/INSTALLATION

Remove the right lower skirt (page 2-4).
Remove the spark plug maintenance lid (page 2-5).

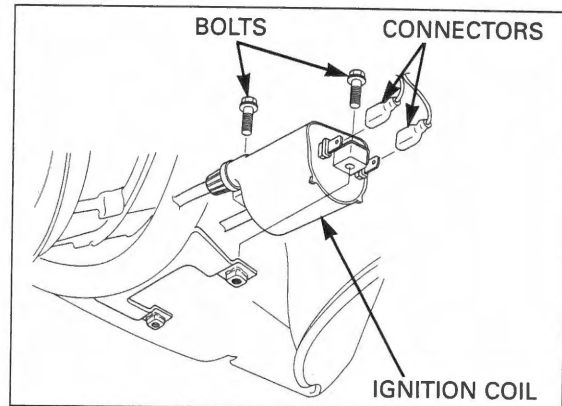
Disconnect the spark plug cap from the spark plug .



Disconnect the ignition coil primary connectors.
Remove the bolts and the ignition coil.

Installation is in the reverse order of removal.

Route the spark plug wire and ignition coil primary connectors properly (page 1-20).

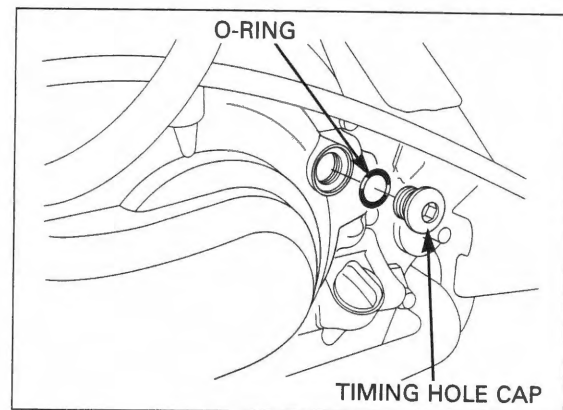


IGNITION TIMING

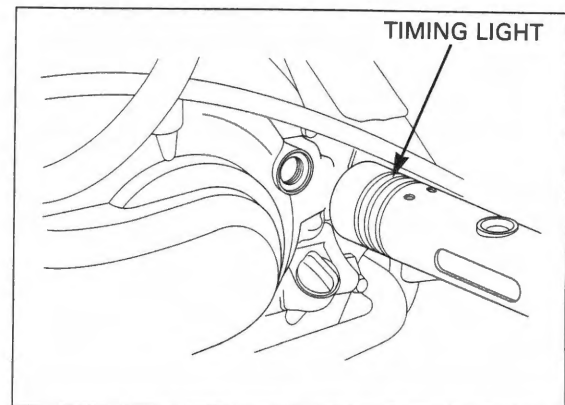
The ignition timing is factory preset and need only be checked when an electrical system component is replaced.

Warm up the engine to normal operating temperature.
Stop the engine.

Remove the timing hole cap and O-ring.



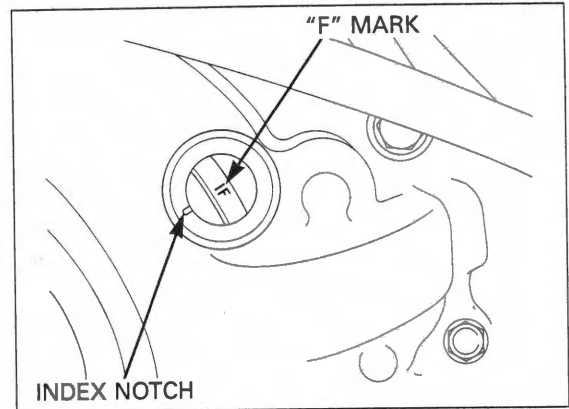
Attach the timing light to the spark plug wire.



Start the engine and let it idle [$1,300 \text{ min}^{-1}$ (rpm)].

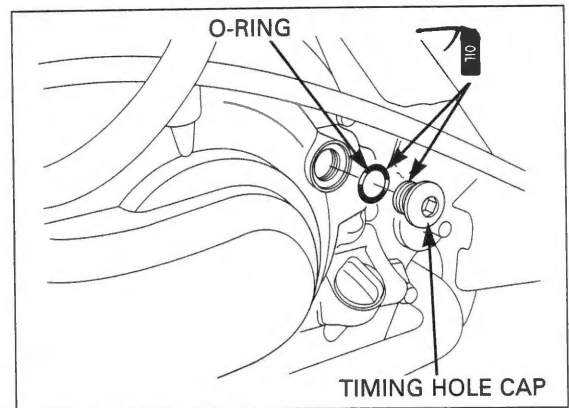
The timing is correct if the "F" mark on the flywheel aligns with the index notch on the left crankcase cover at $1,500 \text{ min}^{-1}$ (rpm).

If the ignition timing is incorrect, inspect the ECM and CKP sensor.



Apply engine oil to the timing hole cap threads, seating surface and O-ring.
Tighten the timing hole cap to the specified torque.

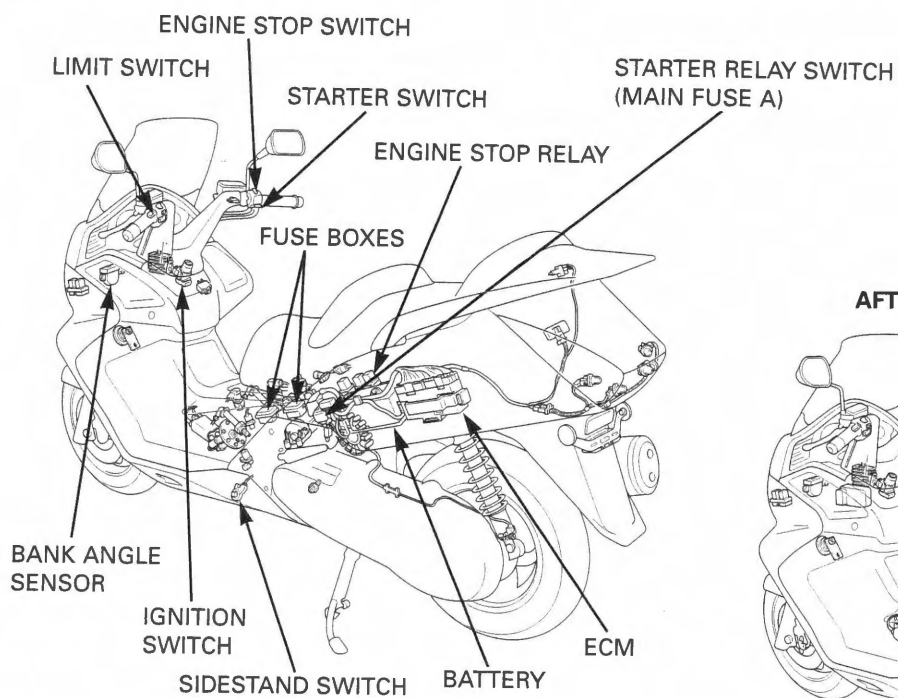
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



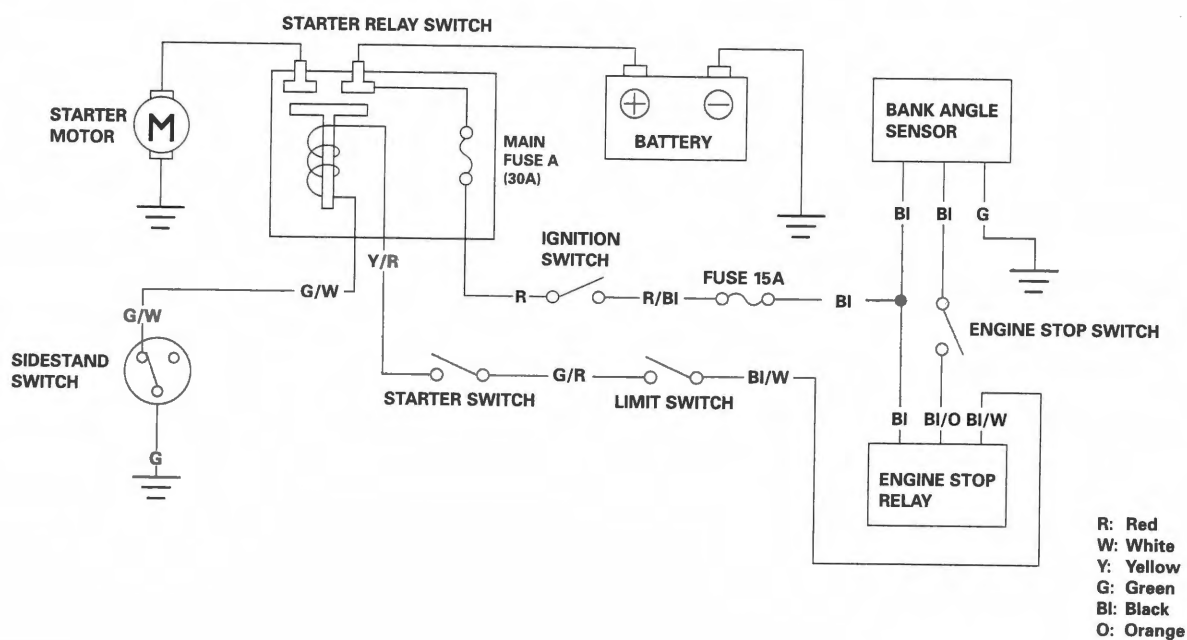
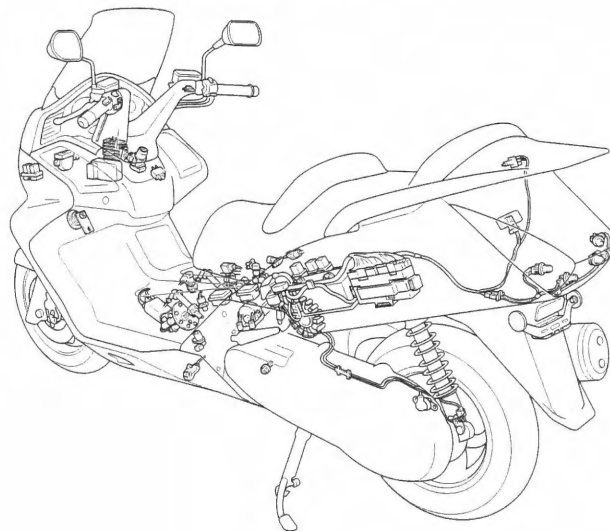
ELECTRIC STARTER

SYSTEM DIAGRAM

STD TYPE:



AFTER '02 (ABS TYPE):



20. ELECTRIC STARTER

SYSTEM DIAGRAM	20-0	STARTER MOTOR	20-4
SERVICE INFORMATION	20-1	STARTER RELAY SWITCH	20-11
TROUBLESHOOTING	20-2		

SERVICE INFORMATION

GENERAL

- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 20-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it but the engine is not cranking over, the starter motor may be damaged.
- See section 12 for starter clutch servicing.
- See section 21 for following components:
 - Ignition switch
 - Starter switch
 - Sidestand switch
 - Limit switch

SPECIFICATIONS

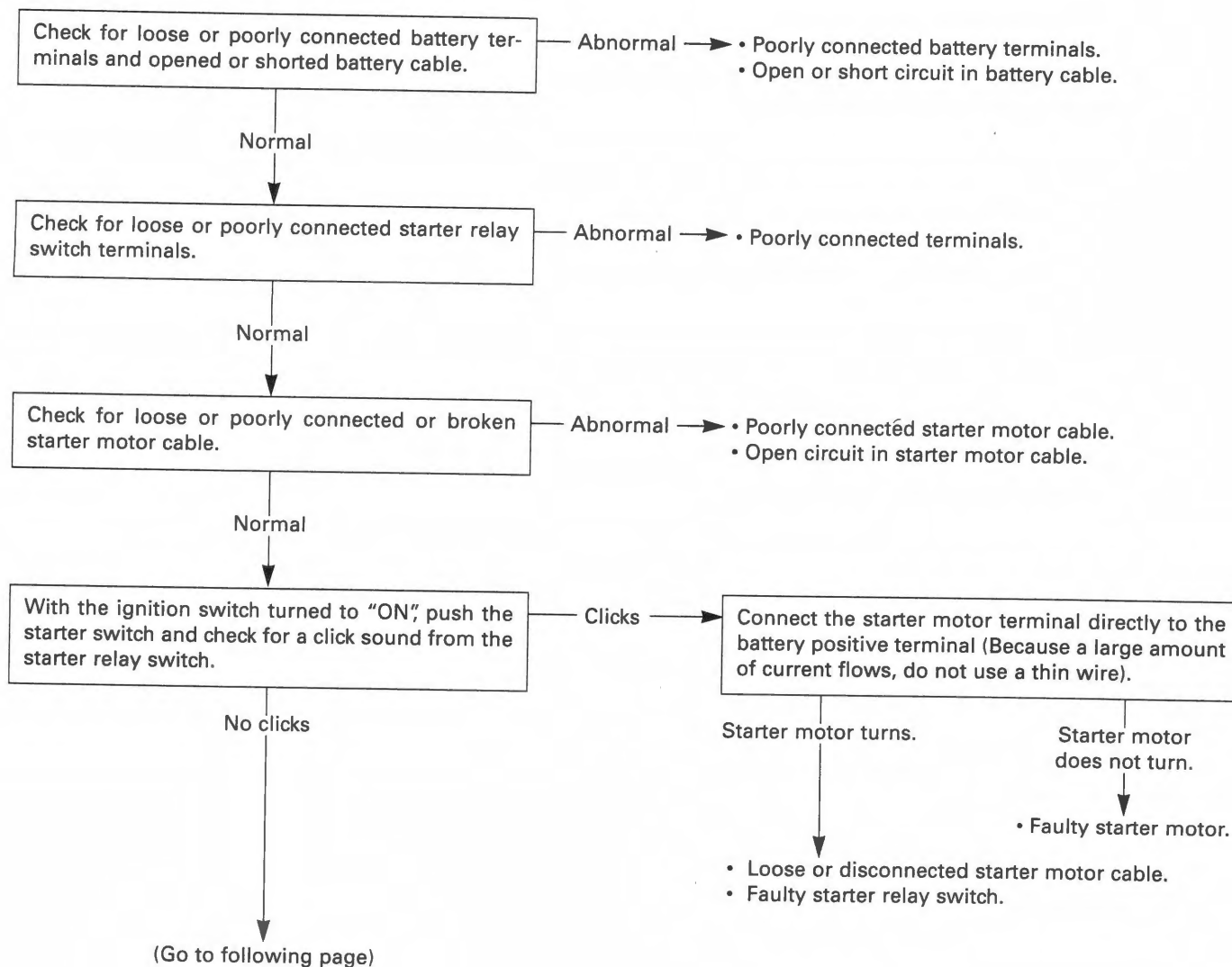
Unit: mm (in)

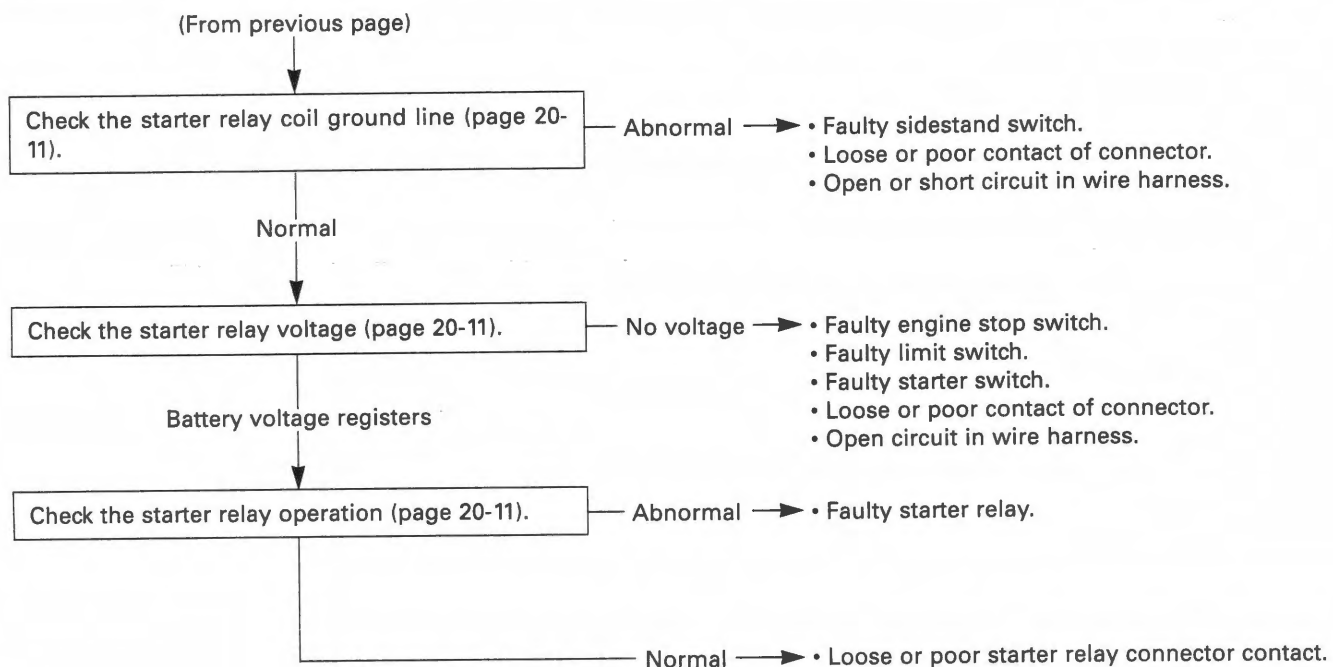
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	8.5 (0.33)

TROUBLESHOOTING

- Check for the following before troubleshooting:
 - Blown main fuse (30 A) and sub fuse (10 A)
 - Loose battery and starter motor cable
 - Discharged battery
- The starter motor can turn with the following conditions:
 - Ignition switch ON
 - Engine stop switch in RUN
 - Rear brake lever fully squeezed
 - Sidestand retracted
 - Starter switch pushed

Starter motor will not turn





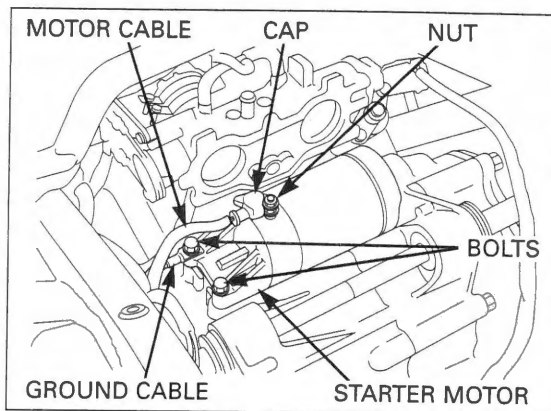
STARTER MOTOR

REMOVAL

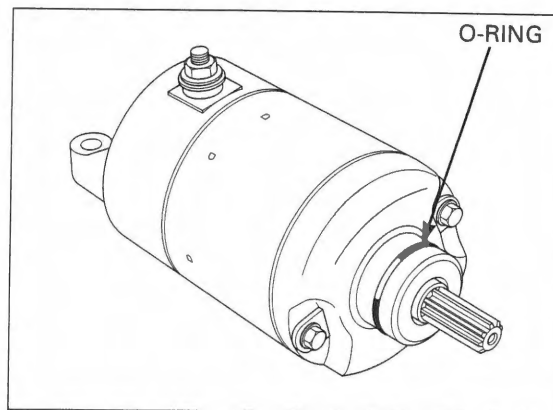
Remove the air cleaner housing/air cleaner chamber (page 5-89).

Turn the ignition switch turned to "OFF".

Release the rubber cap and remove the terminal nut to disconnect the starter motor cable.
Remove the bolts, ground cable and starter motor.

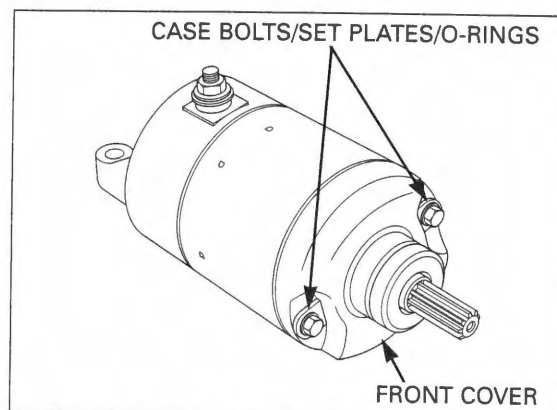


Remove the O-ring from the groove on the starter motor.



DISASSEMBLY

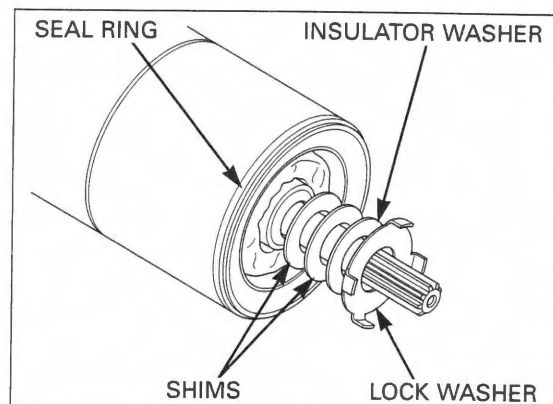
Remove the starter motor case bolts, set plates and O-rings.
Remove the front cover.



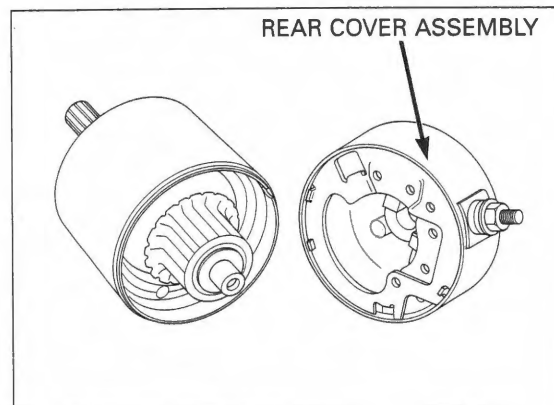
Record the location and number of shims.

Remove the following:

- Lock washer
- Insulator washer
- Shims
- Seal ring

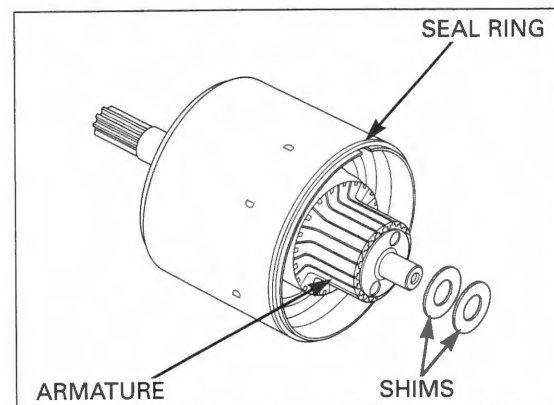


- Rear cover assembly



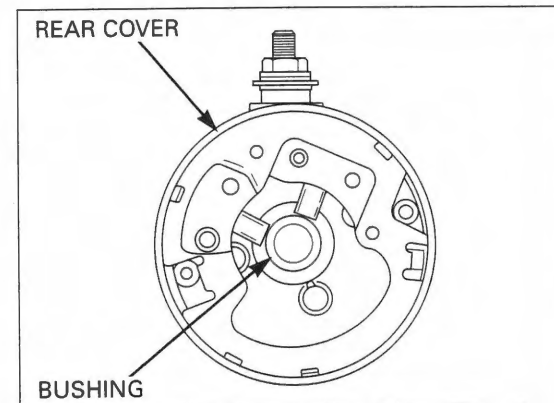
Record the location and number of shims.

- Shims
- Seal ring
- Armature

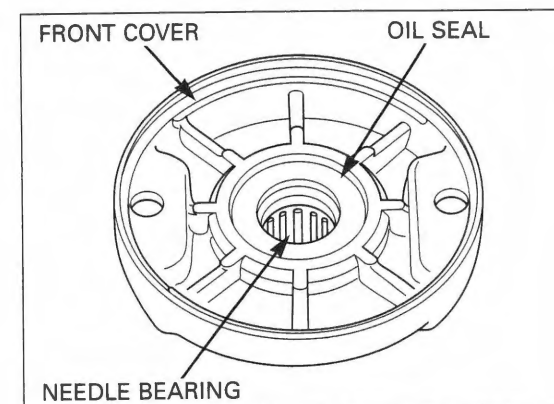


INSPECTION

Check the bushing in the rear cover for wear or damage.



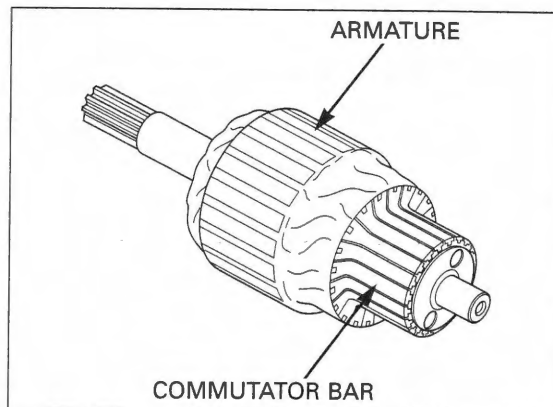
Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.



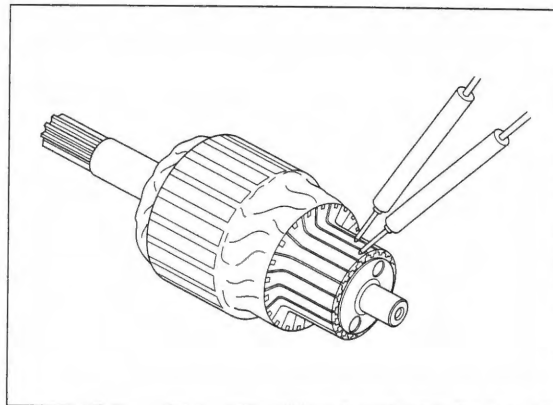
ELECTRIC STARTER

Do not use emery or sand paper on the commutator.

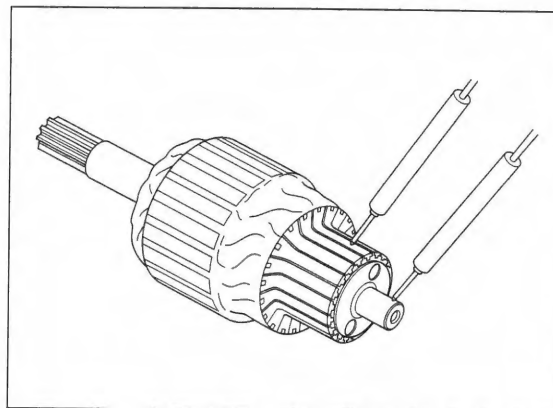
Check the commutator bars of the armature for discoloration.



Check for continuity between pairs of commutator bars.
There should be continuity.

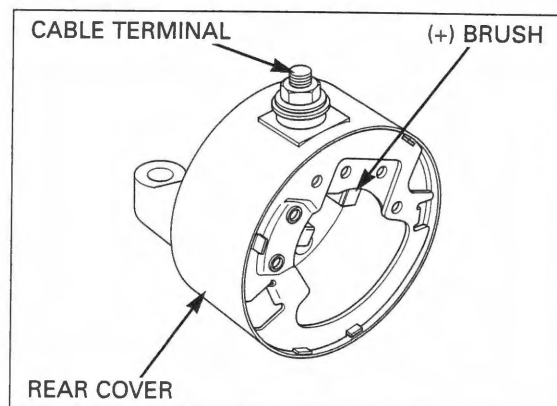


Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.



Check for continuity between the insulated (+) brush and cable terminal.
There should be continuity.

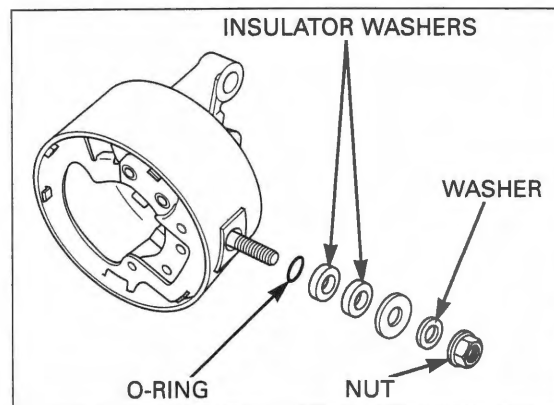
Check for continuity between the insulated (+) brush and rear cover.
There should be no continuity.



REAR COVER DISASSEMBLY

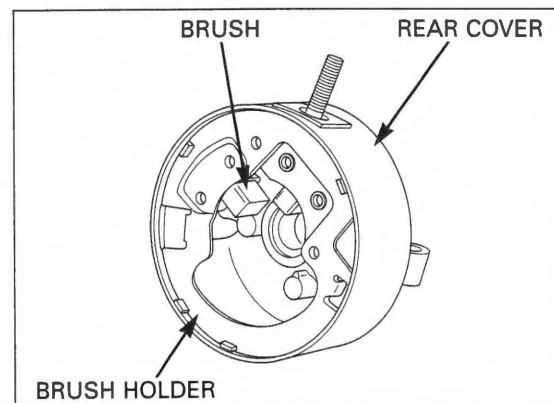
Remove the following:

- Nut
- Washer
- Insulator washers
- O-ring



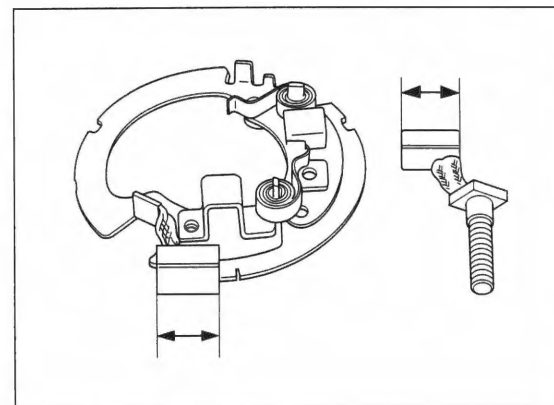
- Brush holder
- Brush

Remove the brushes from the brush holder.



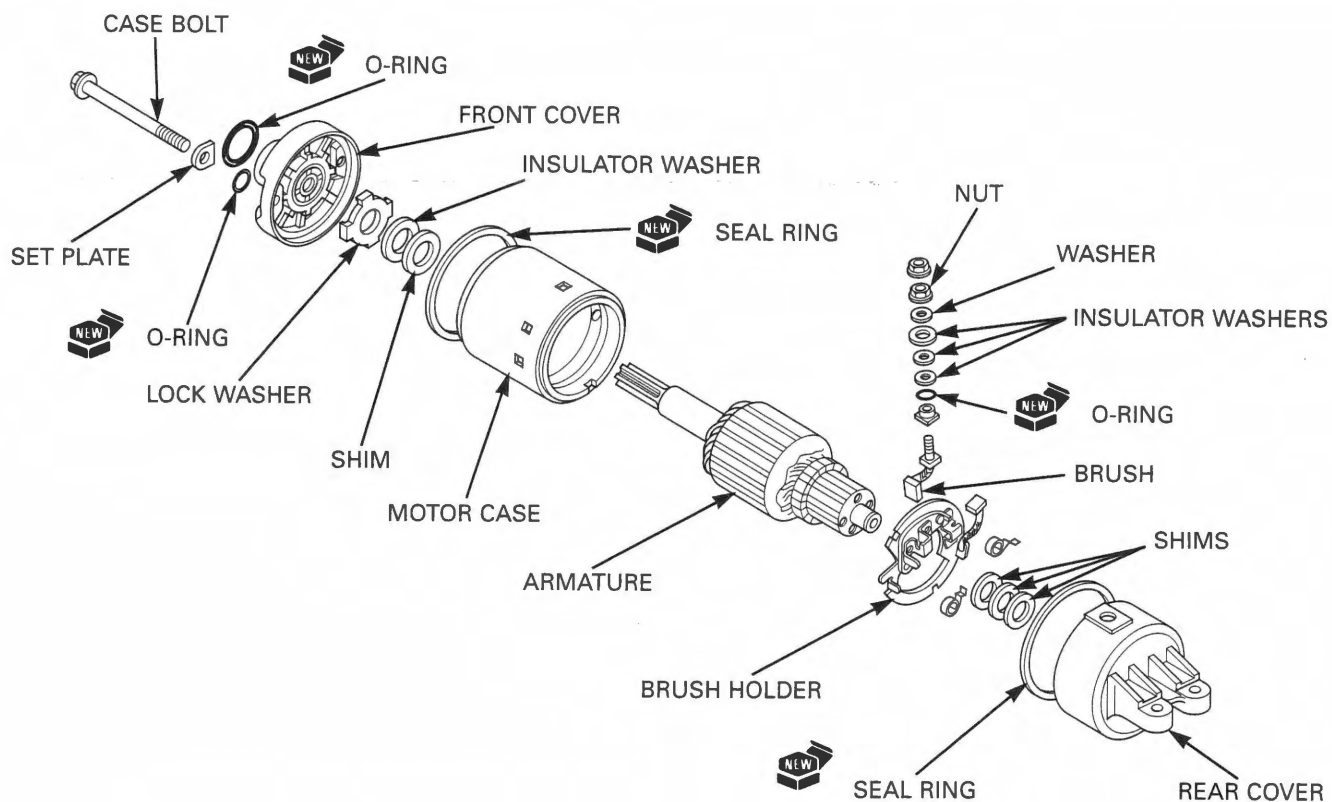
Measure the brush length.

SERVICE LIMIT: 8.5 mm (0.33 in)



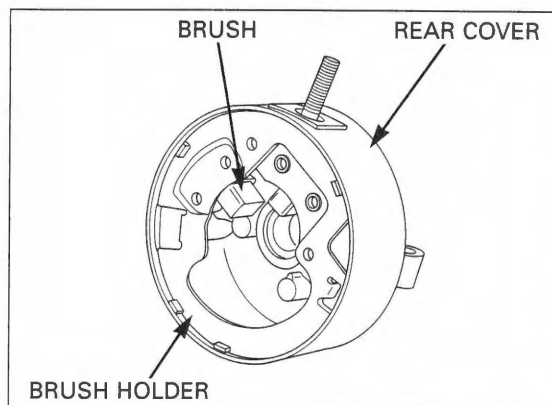
ELECTRIC STARTER

ASSEMBLY



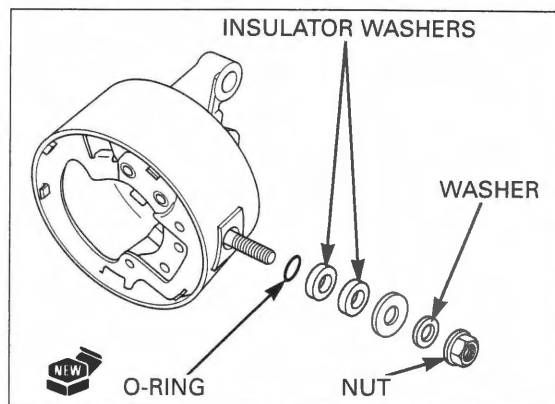
Install the brushes into the brush holder.

Install the brush holder assembly into the rear cover by aligning the tab of the holder with the groove in the rear cover.



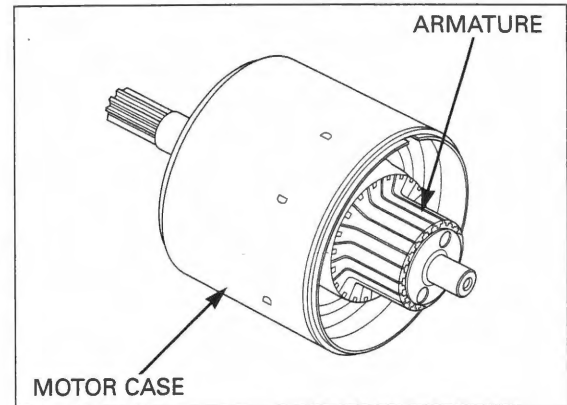
Install the following:

- New O-ring
- Insulator washers
- Washer
- Nut



Hold the armature coil shaft or the armature might be drawn out by the magnetic field.

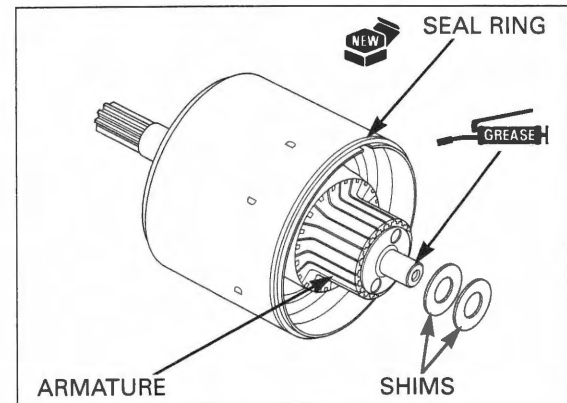
Install the armature in the rear cover.



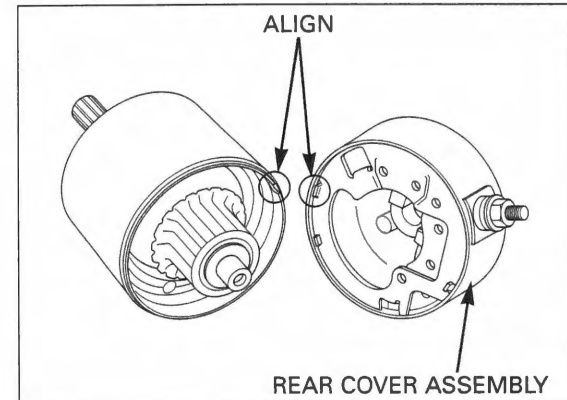
Install the shims to the armature coil in the correct positions as recorded.

Install the seal ring on the motor case.

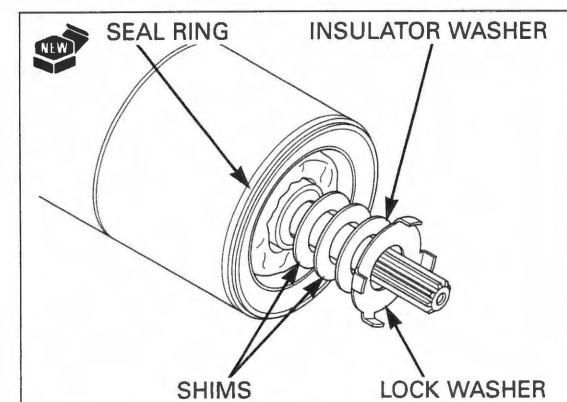
Apply grease to the armature shaft.



Assemble the motor case and rear cover, aligning the tab on the brush holder with the groove on the motor case.

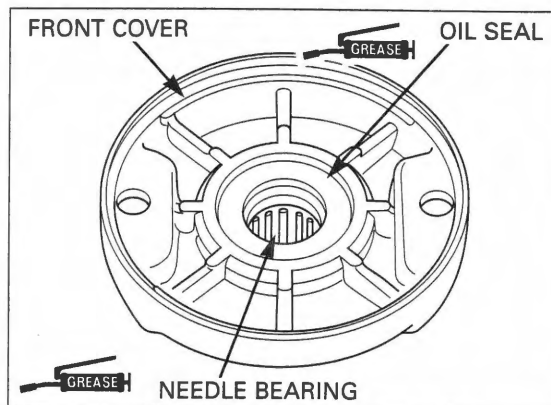


Install the shims, insulator washer and lock washer to the armature coil in the correct positions as recorded.



ELECTRIC STARTER

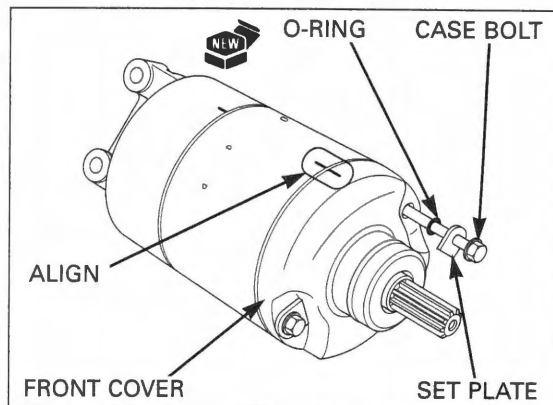
Apply grease to the dust seal lip and needle bearing in the front cover.



Align the index lines on the front cover and motor case.

Install the set plates and new O-rings onto the motor case bolts.

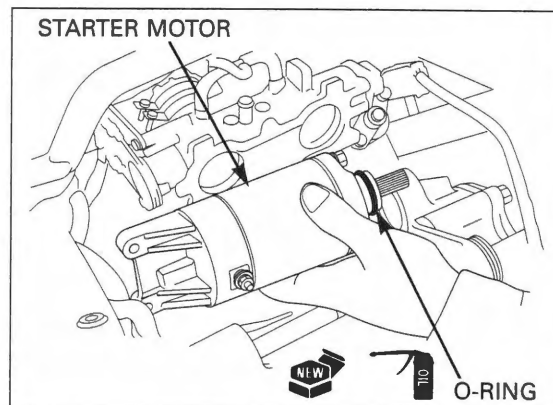
Install the motor case bolts and tighten them.



INSTALLATION

Coat a new O-ring with engine oil and install it into the starter motor groove.

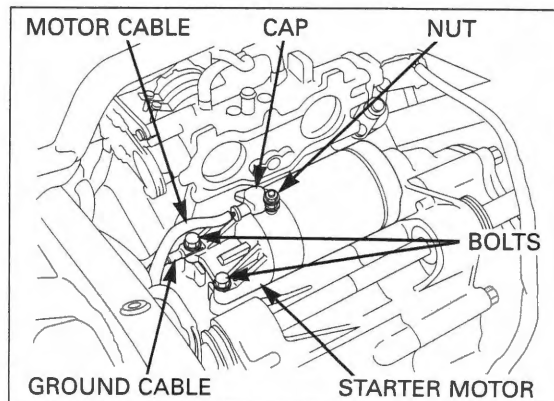
Install the starter motor into the crankcase.



Install the bolts with the ground cable terminal and tighten them.

Connect the starter motor cable to the motor terminal with the terminal nut and tighten it.

Install the air cleaner chamber/air cleaner housing (page 5-90).



STARTER RELAY SWITCH

INSPECTION

Remove the left side body cover (page 2-6).

Retracted the sidestand.

Turn the ignition switch to "ON" and engine stop switch on.

Squeeze the rear brake lever fully and push the starter switch.

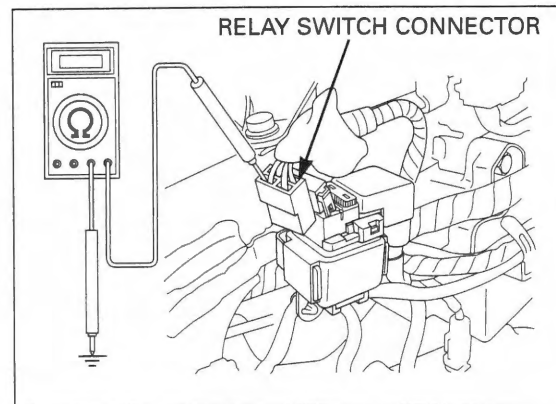
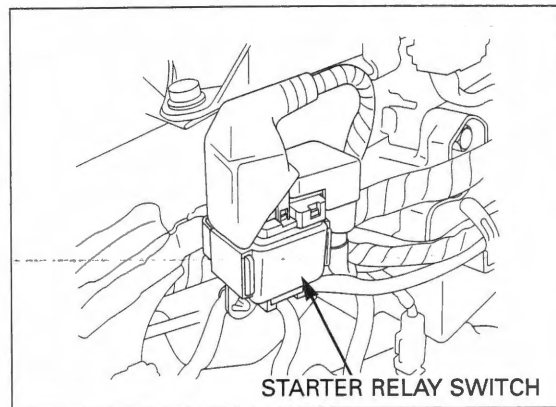
The coil is normal if the starter relay switch clicks.

If you do not hear the switch click, inspect the relay switch using the procedure below.

GROUND LINE INSPECTION

Disconnect the starter relay switch 4P red connector. Check for continuity between the Green/White wire (ground line) terminal and ground.

There should be no continuity with the sidestand lowered, and there should be continuity with the sidestand retracted.

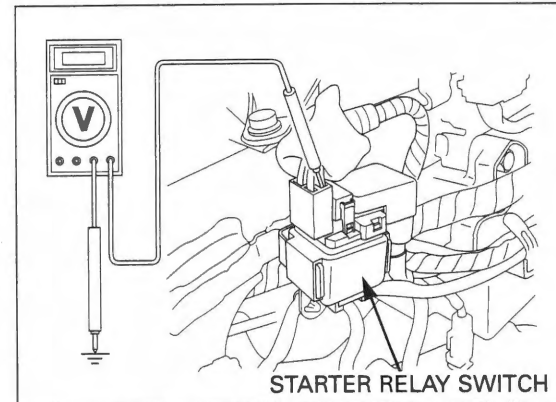


VOLTAGE INSPECTION

Connect the starter relay switch 4P red connector. Turn the ignition switch to "ON" and engine stop switch to RUN.

Measure the starter relay switch Yellow/Red connector (+) and ground.

If the battery voltage appears only when the rear brake lever is squeezed fully and starter switch is pushed, the circuit is normal.

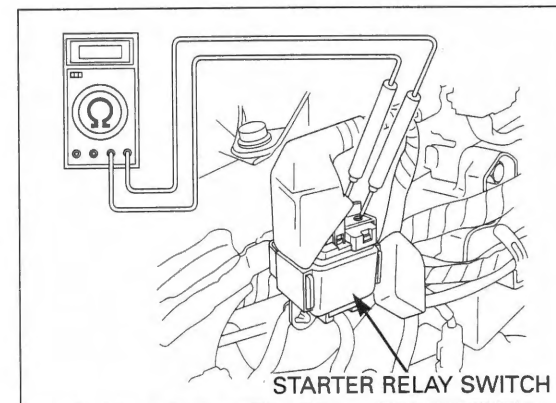


CONTINUITY INSPECTION

Disconnect the starter relay switch 4P red connector and cables.

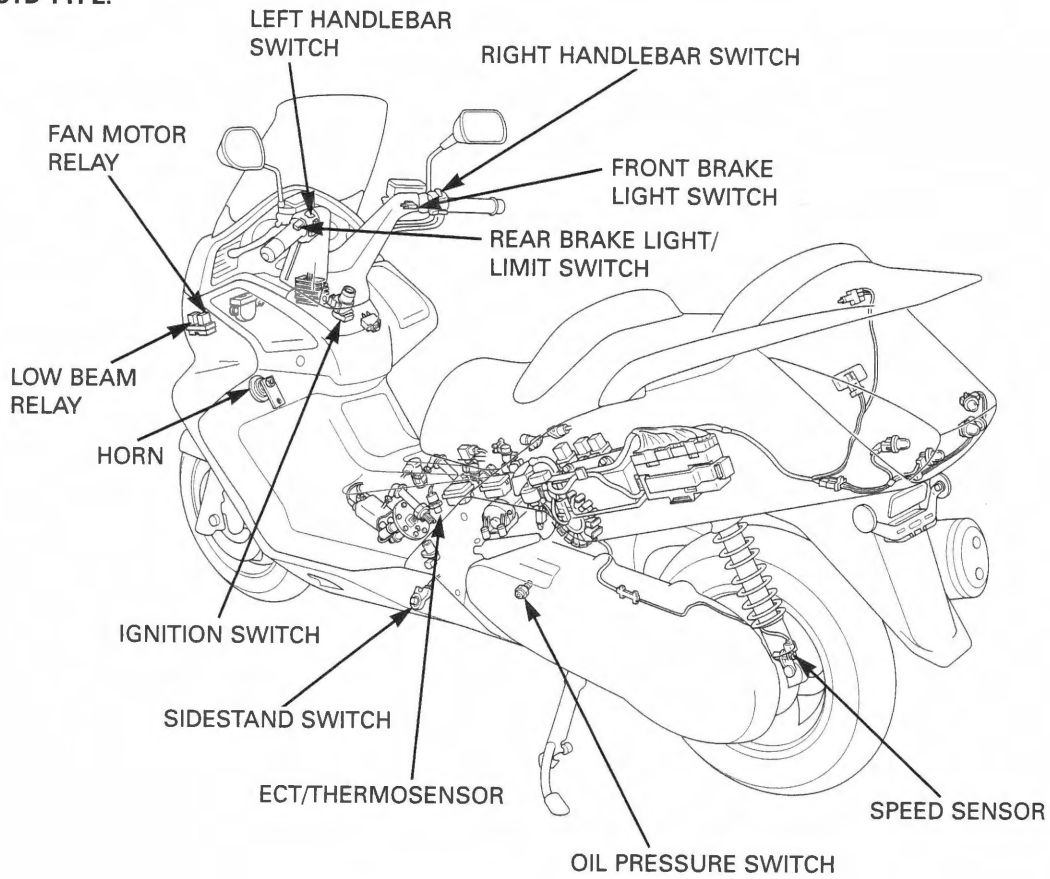
Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Green/White wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.

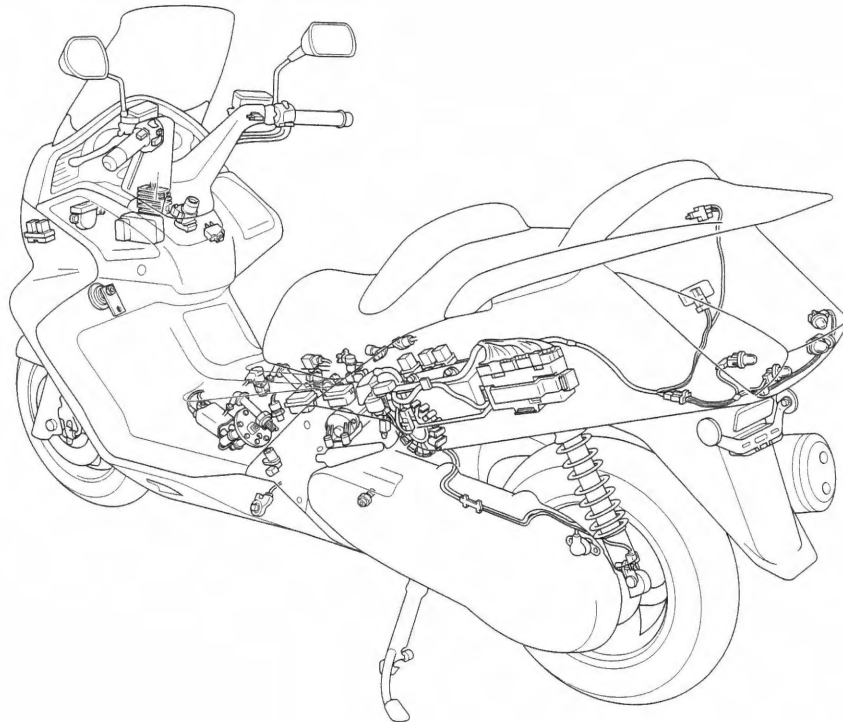


LIGHTS/METERS/SWITCHES

STD TYPE:



AFTER '02 (ABS TYPE):



21. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION	21-1	LUGGAGE BOX LIGHT SWITCH	21-13
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BULB REPLACEMENT	21-5	V-MATIC INDICATOR	21-15
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LIMIT SWITCH	21-10	FUEL UNIT	21-19
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IGNITION SWITCH	21-11	HORN	21-21
HANDLEBAR SWITCHES	21-12	LOW BEAM RELAY	21-22
PARKING SWITCH	21-13	TURN SIGNAL RELAY	21-22

SERVICE INFORMATION

GENERAL

- A halogen head light bulb becomes very hot while the head light is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.
- Note the following when replacing the halogen headlight bulb.
 - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent early failure.
 - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the scooter.
- Route the wires and cables properly after servicing each component (page 1-20).

LIGHTS/METERS/SWITCHES

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Bulbs	Headlight	12 V – 55 W x 2	
	Brake/tail light	12 V – 21/5 W x 2	
	Front turn signal/position light	12 V – 21 W x 2	
	Rear turn signal	12 V – 21 W x 2	
	License light	12 V – 5 W	
	Instrument light	LED	
	Turn signal indicator	LED	
	High beam indicator	LED	
	Parking indicator	LED	
	Oil pressure indicator	LED	
	PGM-FI warning indicator	LED	
	Temp warning indicator	LED	
	V-Matic indicator	LED	
	ABS warning indicator	LED	
	Luggage box instrument light	12 V – 3.4 W	
Fuse	Main fuse	Main A: 30 A, Main B: 30 A	
	Sub fuse (ABS TYPE)	30 A x 2, 15 A x 2, 10 A x 5	
	Sub fuse (STD TYPE)	15 A x 2, 10 A x 4	
Thermosensor resistance		at 80°C/176°F	2.1 – 2.6 kΩ
		at 120°C/248°F	0.65 – 0.73 kΩ

TORQUE VALUES

Oil pressure switch	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply sealant to the threads. (Do not apply to the sensor head.)
ECT/Thermo sensor	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Ignition switch bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	One-way bolt.

TOOL

IgnitionMate peak voltage tester (U.S.A. only) or Peak voltage adaptor	MTP07-0286 or 07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)
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TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operates normally, but the speedometer does not operate

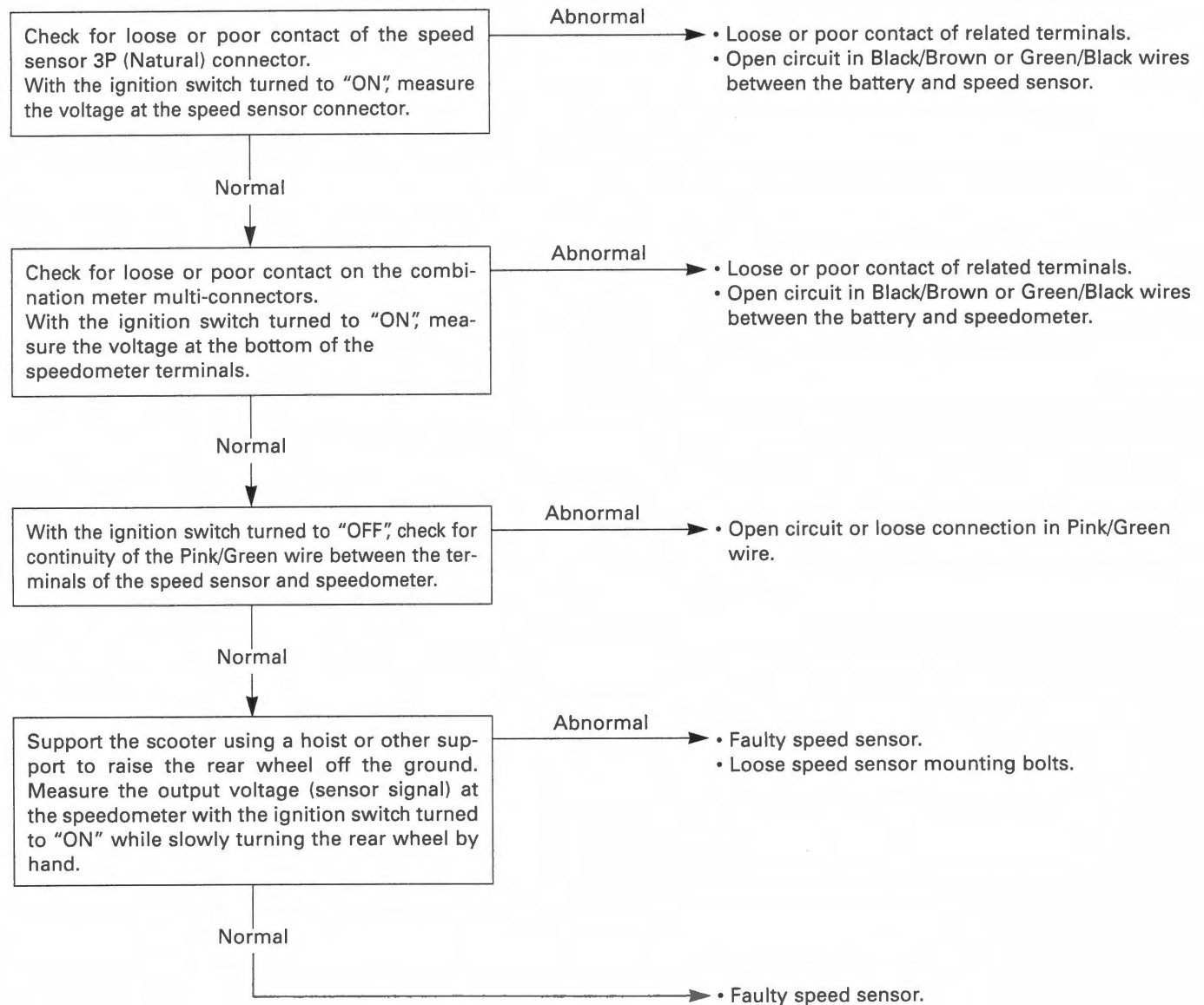
- Faulty speedometer

The speedometer operates normally, but the odometer/trip meter does not operate

- Faulty odometer/trip meter

The speedometer operation is abnormal

- Check for the following before diagnosing.
 - Blown main or sub fuses
 - Loose or corroded terminals or the connectors
 - Discharged battery

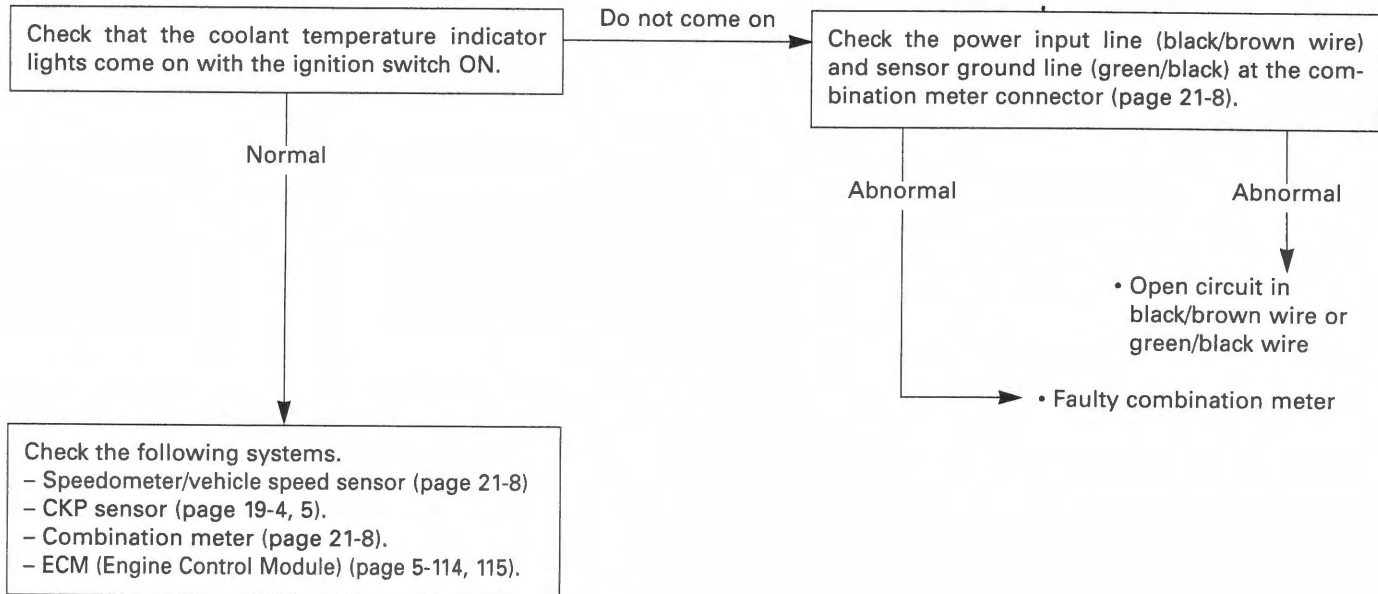


V-MATIC INDICATOR

The V-Matic indicator functions normally, when the V-Matic indicator comes on for approx. Few seconds then it goes off when the ignition switch is turned ON.

V-MATIC INDICATOR DOES NOT COME ON WHEN THE IGNITION SWITCH IS TURNED ON

- Check for a blown main fuse A (30 A), main fuse B (30 A) and sub-fuse (10 A).
- Check for a battery



BULB REPLACEMENT

HEADLIGHT

NOTE:

A halogen head light bulb becomes very hot while the head light is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

Remove the windshield garnish (page 2-12).

Disconnect the headlight 3P connector from the headlight bulb and remove the dust cover.

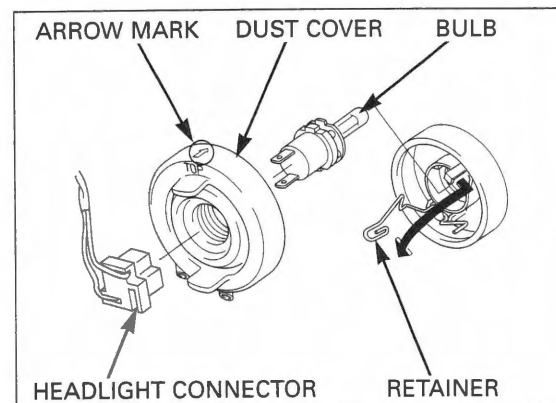
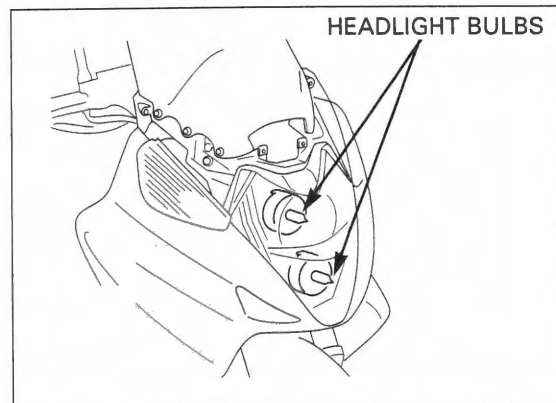
Unhook the retainer and remove the bulb from the headlight case.

Install a new bulb in the headlight case by aligning the bulb tab with the case groove.

Hook the retainer.

Install the dust cover properly on the headlight with the arrow mark facing up and connect the headlight 3P connector.

Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

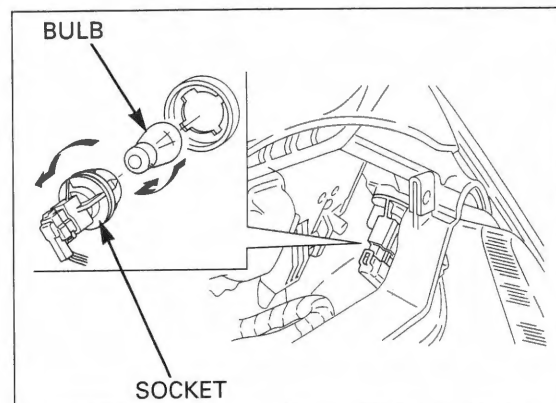


FRONT TURN SIGNAL/POSITION

Remove the windshield garnish (page 2-12).

Turn the bulb socket counterclockwise to remove it. Remove the bulb and replace it with a new one.

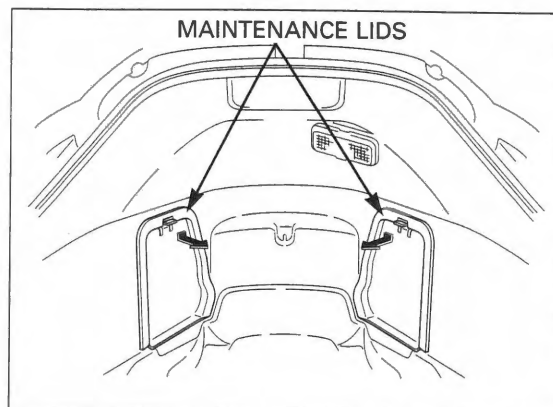
Installation is in the reverse order of removal.



LIGHTS/METERS/SWITCHES

REAR TURN SIGNAL, BRAKE/TAIL LIGHT

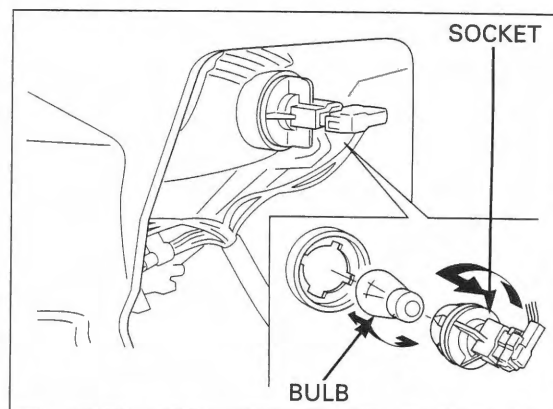
Unlock and open the seat.
Open the maintenance lid.



REAR TURN SIGNAL

Turn the bulb socket counterclockwise to remove it.
Remove the bulb and replace it with a new one.

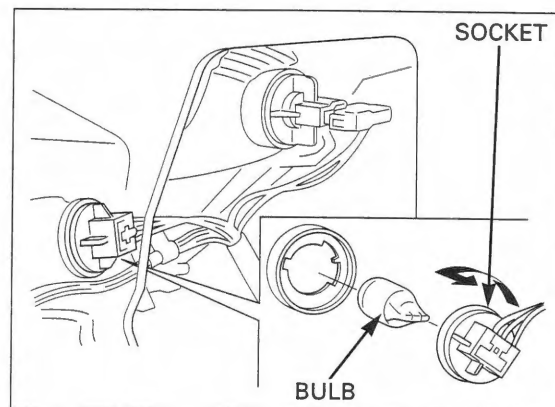
Installation is in the reverse order of removal.



BRAKE/TAIL LIGHT

Turn the bulb socket counterclockwise to remove it.
Remove the bulb and replace it with a new one.

Installation is in the reverse order of removal.

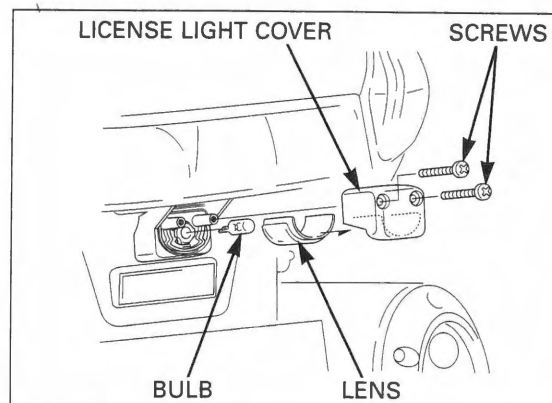


LICENSE LIGHT

Remove the screws.
Remove the license light cover and lens.

Remove the bulb and replace it with a new one.

Installation is in the reverse order of removal.



COMBINATION METER

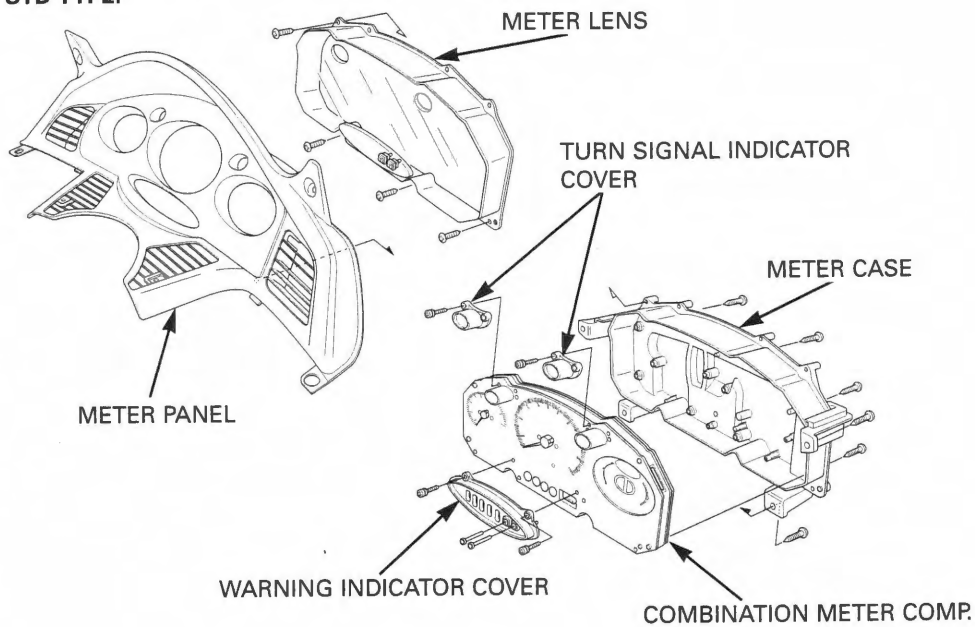
DISASSEMBLY/ASSEMBLY

Remove the meter panel (page 2-15).

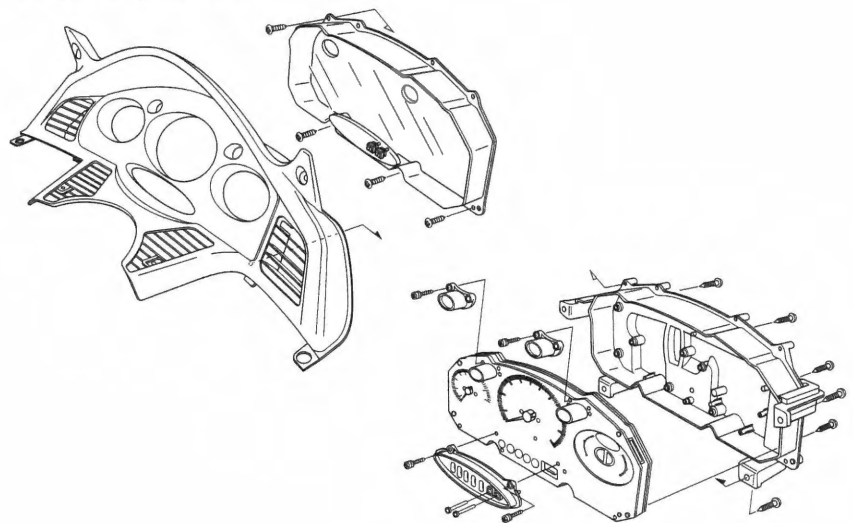
Remove the screws and disassemble the combination meter.

Assembly is in the reverse order of disassembly.

STD TYPE:



AFTER '02 (ABS TYPE):



POWER/GROUND LINE INSPECTION

Disconnect the combination meter 16P and 12P connectors.
Check the following at the wire harness side connector terminals of the combination meter.

Power input line

Measure the voltage between the Black/Brown wire terminal (+) and Ground (-).

There should be battery voltage with the ignition switch ON.

If there is no voltage, check for open circuit in Black/Brown wire.

Back-up voltage line

Measure the voltage between the Light green/Black wire terminal (+) and Ground (-).

There should be battery voltage at all times.

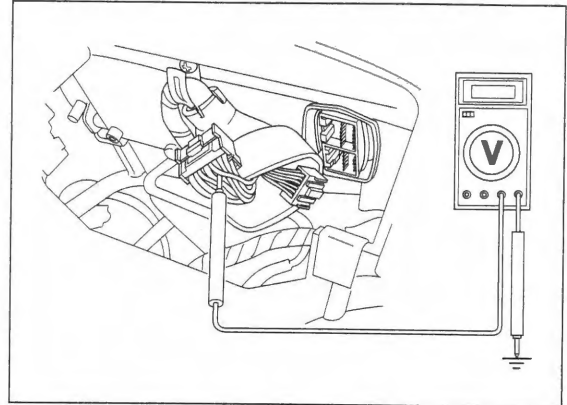
If there is no voltage, check for open circuit in Red/Green wire.

Sensor ground line

Measure the voltage between the Green/Black wire terminal (+) and Ground (-).

There should be battery voltage at all times.

If there is no voltage, check for an open circuit in the Green/Black wire.



SPEEDOMETER/VEHICLE SPEED SENSOR

SYSTEM INSPECTION

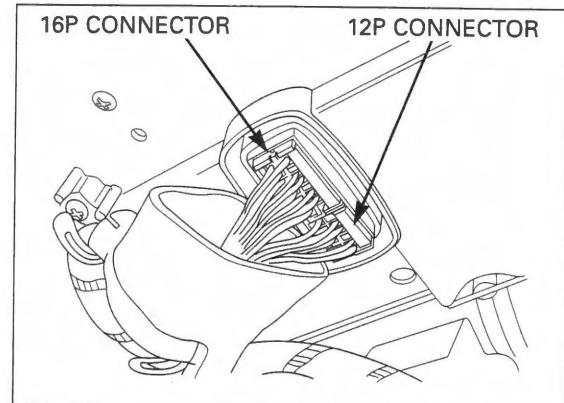
Disconnect the combination meter 16P and 12P connectors and turn the ignition switch to "ON".

Measure the voltage between the Pink/Green (+) and Green/Black (-) wire terminals of the wire harness side connector.

Slowly turn the rear wheel by hand.

There should be 0 to 5 V pulse voltage.

- If pulse voltage appears, replace the combination meter print circuit board.
 - If pulse voltage does not appear, check for open or short circuit in Pink/Green wire.
- If the Pink/Green wire is OK, check the speed sensor (see next page).

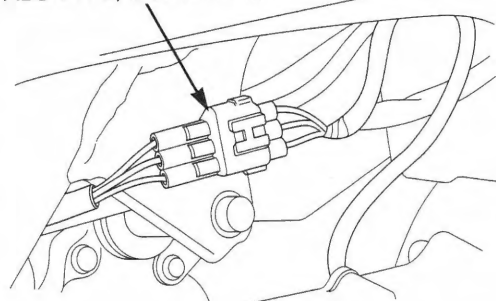


SPEED SENSOR INSPECTION

Remove the left side body cover (page 2-6).
Remove the front cover (page 2-14).

Disconnect the speed sensor 3P (STD TYPE)/6P (AFTER '02 ABS TYPE) connector and check for loose or poor contact on the connector.
Also check for loose or poor contact on the combination meter 16P and 12P connectors.

3P (STD TYPE)/6P (AFTER '02 ABS TYPE) CONNECTOR



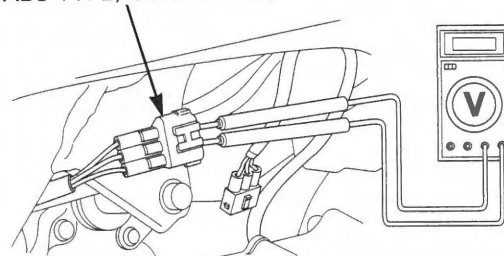
Connect the combination meter 16P and 12P connectors and speed sensor 3P (STD TYPE)/6P (AFTER '02 ABS TYPE) connector.

Turn the ignition switch to "ON" and measure the voltage at the 3P connector with the connector connected.

Connection: Black/Brown (+) – Green/Black (–)
Standard: Battery voltage

If there is no voltage, check for an open circuit in Black/Brown and Green/Black wire and loose contact of the wire harness connectors.

3P (STD TYPE)/6P (AFTER '02 ABS TYPE) CONNECTOR



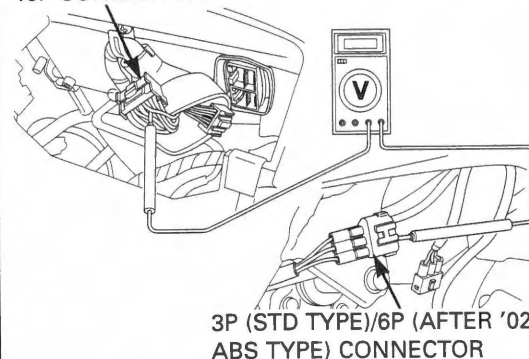
Support the scooter with a main stand and rear wheel off the ground.

Measure the voltage at the sensor connector terminals with the ignition switch to "ON" while slowly turning the rear wheel by hand.

CONNECTION: Pink/Green (+) – Green/Black (–)
STANDARD: Repeat 0 to 5V

If the measurement is out of specification, replace the speed sensor.

16P CONNECTOR

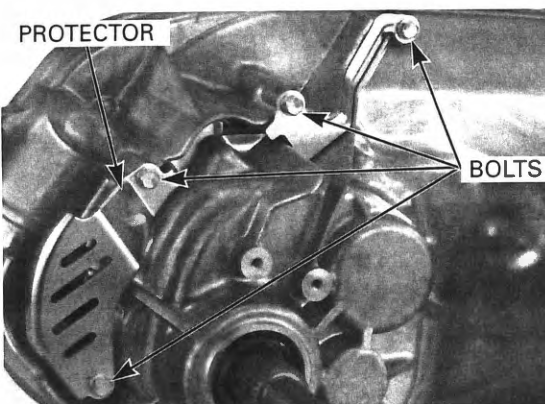


3P (STD TYPE)/6P (AFTER '02 ABS TYPE) CONNECTOR

REMOVAL/INSTALLATION

Remove the rear wheel (page 15-4).

Remove the speed sensor clump from the protector.
Remove the bolts and speed sensor wire protector.



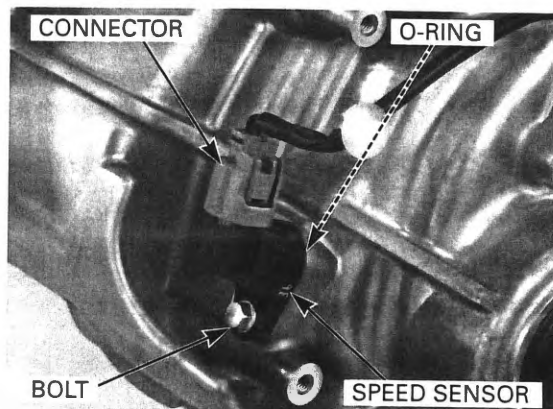
LIGHTS/METERS/SWITCHES

Disconnect the connector from the speed sensor.

Remove the bolts and speed sensor.

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

Installation is in the reverse order of removal.



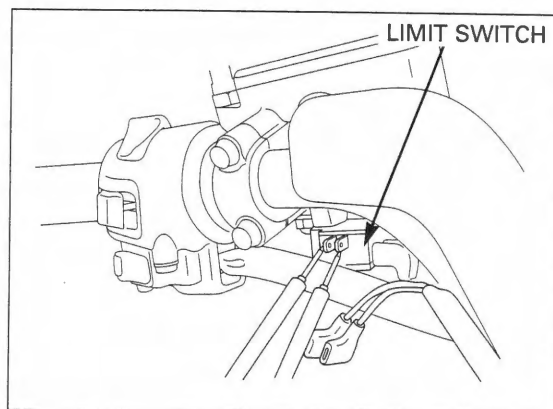
LIMIT SWITCH

Remove the handlebar cover (page 2-14).

Disconnect the limit switch connectors and check for continuity between the switch terminals.

There should be continuity when the rear brake lever is squeezed, and there should be no continuity when the rear brake lever is released.

Install the handle cover (page 2-14).

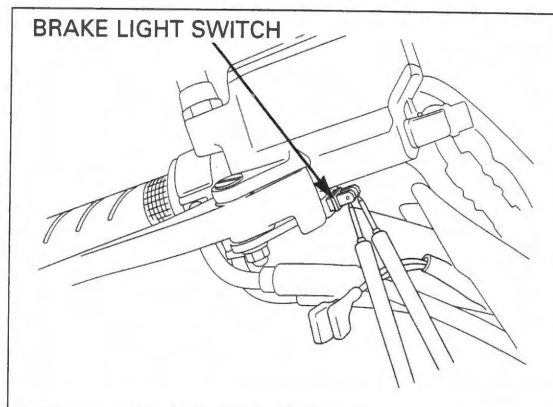


BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the switch terminals.

There should be continuity when the front brake lever is squeezed, and there should be no continuity when the front brake lever is released.



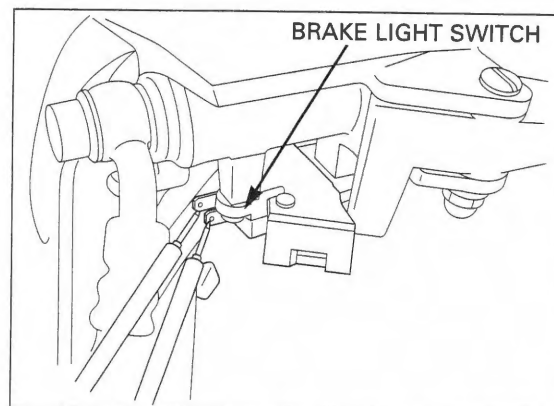
REAR

Remove the handlebar cover (page 2-14).

Disconnect the rear brake light switch connectors and check for continuity between the switch terminals.

There should be continuity when the rear brake lever is squeezed, and there should be no continuity when the rear brake lever is released.

Install the handle cover (page 2-14).



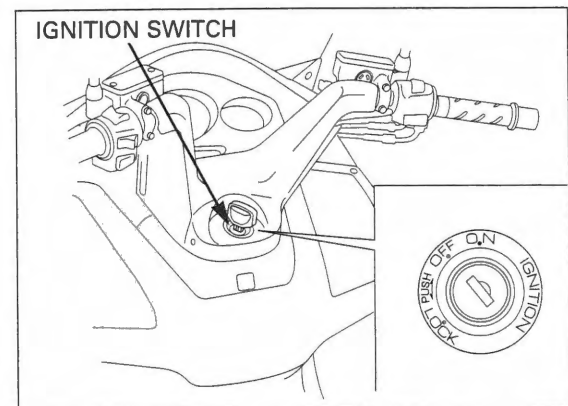
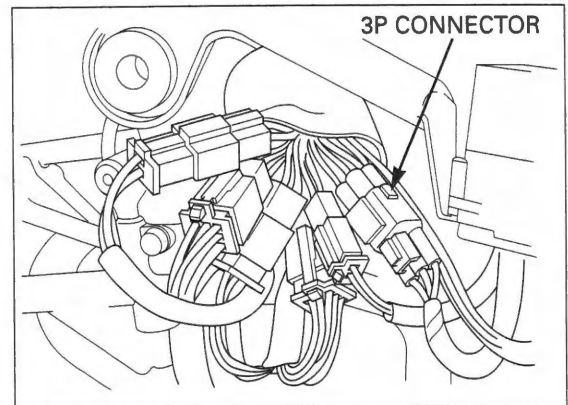
IGNITION SWITCH

INSPECTION

Remove the front cover (page 2-14).

Disconnect the ignition switch 3P connector and check for continuity at the switch side connector terminals. Continuity should exist between the color coded wires as follows:

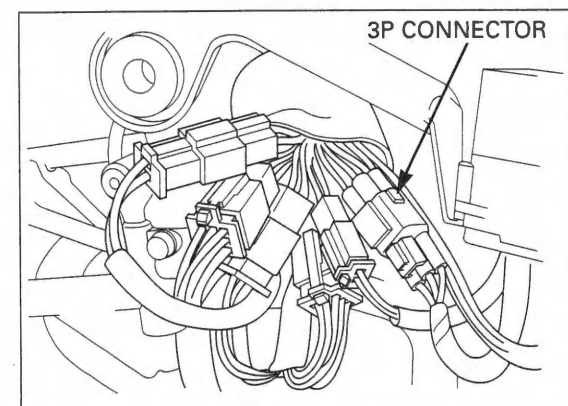
	MA BAT	FAN	IGN BAT1
ON	○	○	○
OFF			
LOCK			
CORD COLOR	R	Bu/O	R/BI



REMOVAL/INSTALLATION

Remove the steering handle (page 14-18).

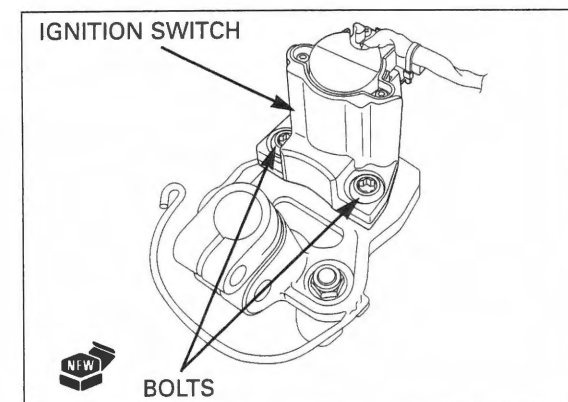
Disconnect the ignition switch 3P connector.



Remove the bolts and ignition switch.

Installation is in the reverse order of removal using new mounting bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



HANDLEBAR SWITCH

INSPECTION

Remove the front cover (page 2-14).

RIGHT HANDLEBAR SWITCH

Disconnect the right handlebar switch 9P red connector and check for continuity at the switch side connector terminals. Continuity should exist between the color code wires as follows:

STARTER SWITCH

	BAT9	HL	ST1	ST2
FREE	O	O		
PUSH			O	O
CORD COLOR	Bl/R	Bu/W	G/R	Y/R

ENGINE STOP SWITCH

	KRLY	KS
OFF		
RUN	O	O
CORD COLOR	Bl/O	R/O

LEFT HANDLEBAR SWITCH

Disconnect the left handlebar switch 6P red and 9P black connectors and check for continuity at the switch side connector terminals. Continuity should exist between the color code wires as follows:

HORN SWITCH

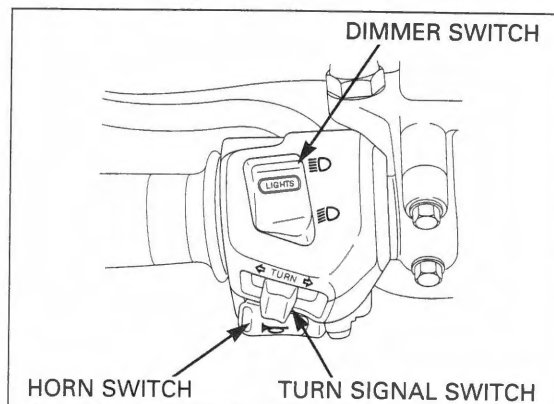
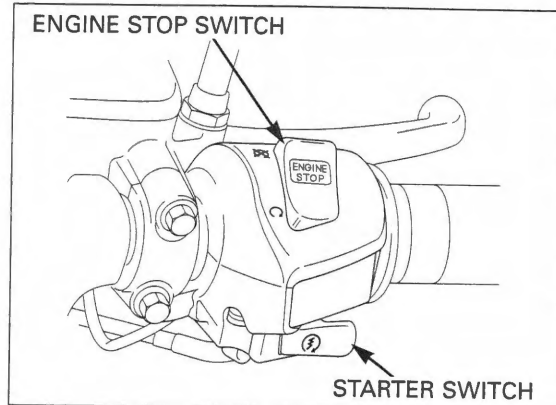
	BAT7	HO
FREE		
PUSH	O	O
CORD COLOR	Bl/Br	Lg

TURN SIGNAL SWITCH

	W	L	R	Po	LPo	RPo
R	O		O	O	O	
N				O	O	O
L	O	O		O		O
PUSH				O	O	O
COLOR	Gr	O	Lb	Bu/Bl	O/W	Lb/W

DIMMER SWITCH

	HI	HL	LO
Lo		O	O
(N)	O	O	O
Hi	O	O	
CORD COLOR	Bu	Bu/W	W



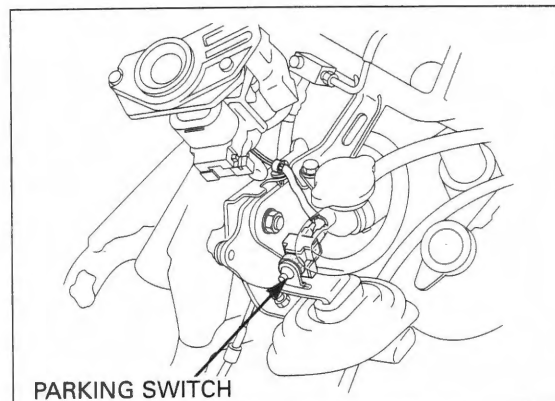
PARKING SWITCH

FRONT

Remove the front cover (page 2-14).

Disconnect the parking switch connectors and check for continuity between the switch terminals.

There should be continuity with the parking lever pulled up, and there should be no continuity with the front brake lever is pushed down.



PARKING SWITCH

PARKING LEVER SWITCH

	GND	PARK
PARK	O	O
(N)		
RUN		
CORD COLOR	G	W/BI

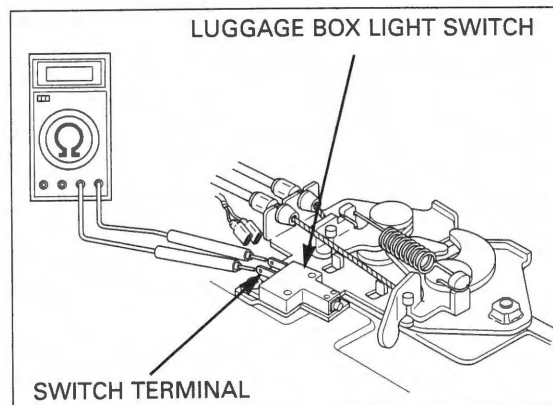
LUGGAGE BOX LIGHT SWITCH

INSPECTION

Remove the left and right side body cover (page 2-6).
Remove the rear body cover (page 2-7).

Disconnect the luggage box light switch connector and check for continuity between the switch terminal.

There should be no continuity with the luggage box light switch pushed, and there should be continuity with the luggage box light switch is released.



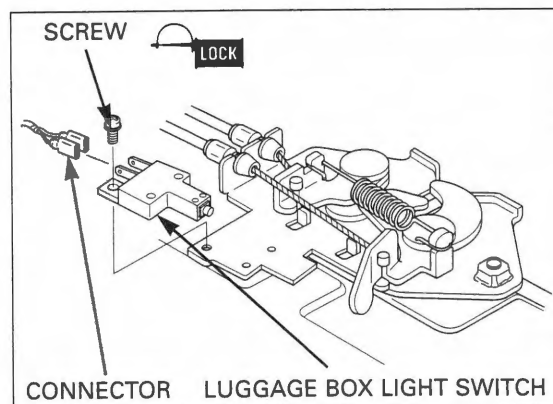
REMOVAL/INSTALLATION

Remove the left and right side body cover (page 2-6).
Remove the rear body cover (page 2-7).
Remove the rear frame (page 2-10).

Disconnect the luggage box light switch connector.

Remove the screw and luggage box light switch.
Apply locking agent to the luggage box light switch screw threads.

Installation is in the reverse order of removal.



TACHOMETER

SYSTEM INSPECTION ('02 – '07)

Check the combination meter power input line (page 21-8).

Disconnect the combination meter 16P and 12P connectors (page 21-8).

Connect the peak voltage adaptor to the tachometer Yellow/Green (+) terminal and Green (-).

TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or
Peak voltage adaptor MTP07-0286 or
07HGJ-0020100
(not available in U.S.A.)
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTION: Yellow/Green (+) and Green (-)

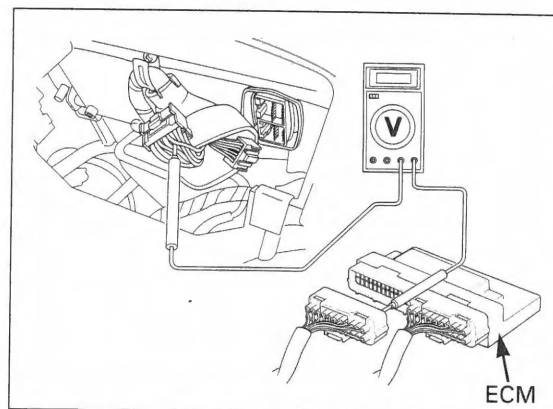
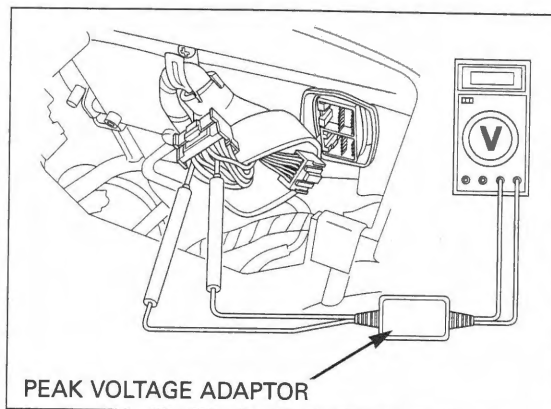
Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

If the value is normal, replace the combination meter printed circuit board (page 21-7).

If the measured value is below 10.5 V, replace the ECM.

If the value is 0 V, check for continuity between the combination meter 16P and 12P connectors terminal and the ECM multi-connector Yellow/Green terminals. If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit. If there is continuity, replace the combination meter printed circuit board (page 21-7).



SYSTEM INSPECTION (After '07)

- Check for loose or poor contact terminals at the combination meter 16P and 12P connectors.
- Check the combination meter power input line (page 21-8).

Disconnect the combination meter 16P and 12P connectors (page 21-8).

Connect the peak voltage adaptor probes to the tachometer Yellow/Green and Green wire terminals.

TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or
Peak voltage adaptor MTP07-0286 or
07HGJ-0020100
(not available in U.S.A.)
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTION: Yellow/green (+) – Green (–)

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

If the peak voltage is normal, replace the combination meter assembly (page 21-7).

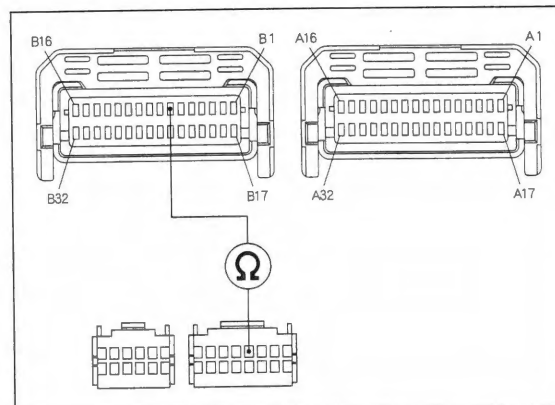
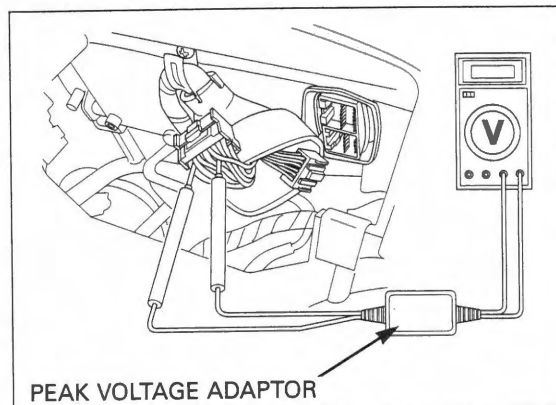
If the measured value is below 10.5 V, replace the ECM.

If the value is 0 V, check for continuity between the combination meter 16P (Black) connector and the ECM 32P (Light gray) connector Yellow/green terminals.

CONNECTION: Yellow/green - B-7 (Yellow/green)

If there is no continuity, check the wire harness between the ECM and combination meter for an open circuit.

If there is continuity, replace the combination meter printed circuit board (page 21-7).

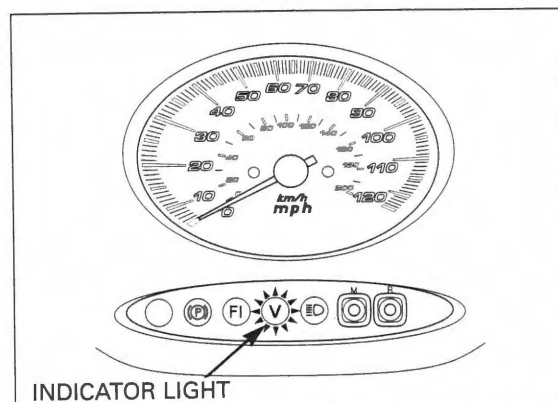


V-MATIC INDICATOR

INSPECTION

The V-Matic indicator functions normally. If the V-Matic indicator comes on for few seconds then goes off when the ignition switch is turned to "ON".

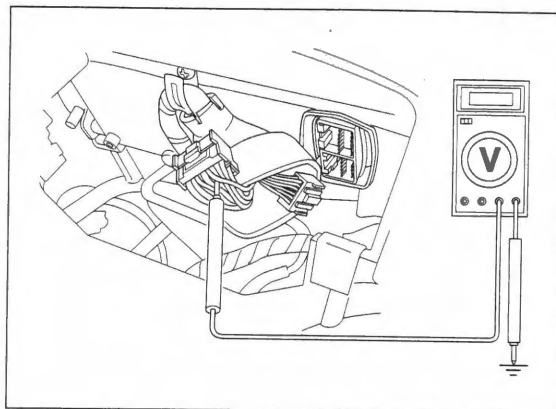
If the indicator does not come on, check that the coolant temperature indicator lights come on with the ignition switch "ON".



If the coolant temperature indicator light does not come on, check the power input line (Black/Brown wire) and sensor ground line (Green/Black) at the combination meter connector (page 21-8).

If the power input line and sensor ground line are normal, check the following systems.

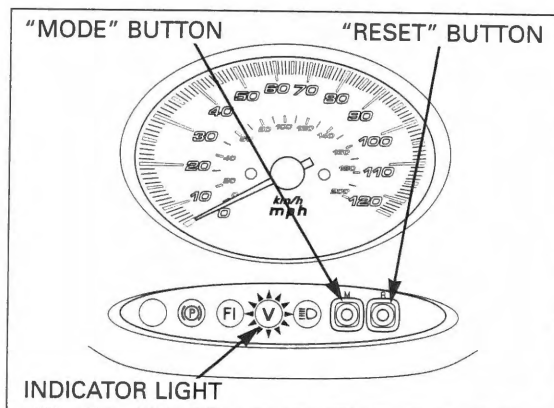
- Speedometer/vehicle speed sensor (page 21-8).
- CKP sensor (page 19-4, 5).
- ECM (Engine Control Module) (page 5-114, 115).



INDICATOR SYSTEM RESET

If the V-Matic indicator light comes on, check and replace the V-Matic system components (section 10) and then reset the V-Matic indicator system as follows.

1. Push the "RESET" button and "MODE" button at the same time then the ignition switch to "ON".
2. Hold the buttons for more than 5 seconds and then check that the indicator light blinks.
3. Release the buttons, check that the indicator light goes off.



COOLANT TEMPERATURE INDICATOR, ECT/THERMOSENSOR

ECT/THERMOSENSOR INSPECTION

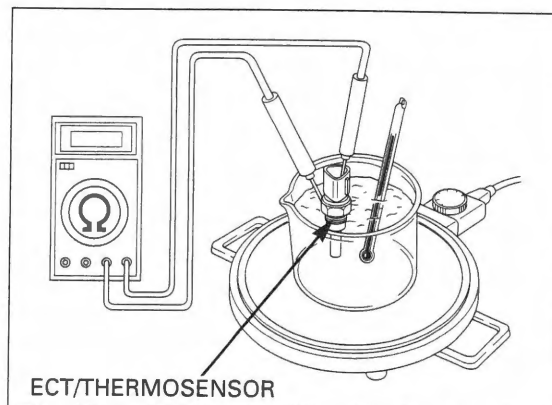
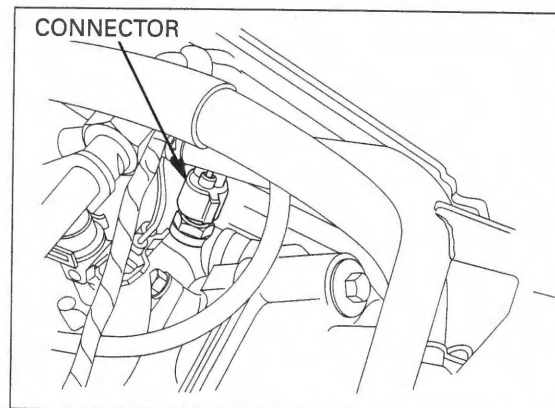
Remove the lower luggage box (page 2-10).
Drain the coolant (page 6-5).

Disconnect the ECT/thermosensor connector and remove the ECT/thermosensor from the cylinder head.

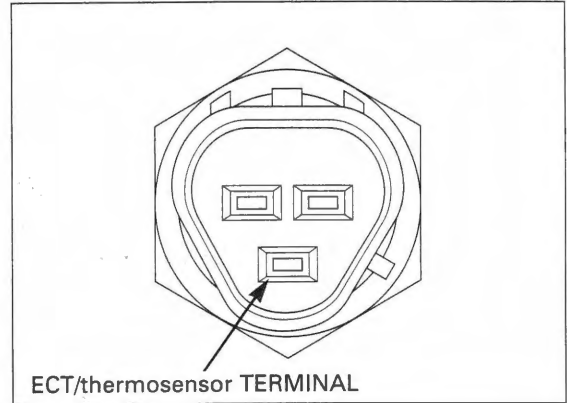
Suspend the ECT/thermosensor in a pan of coolant (50% mixture) on an electric heating element and measure the resistance between the ECT/thermosensor terminals and body as the coolant heats up.

- Soak the ECT/thermosensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in an incorrect reading. Do not let the thermometer or the ECT/thermosensor touch the pan.

STANDARD: 2.1 – 2.6 k Ω (80°C/176°F)
0.65 – 0.73 k Ω (120°C/248°F)

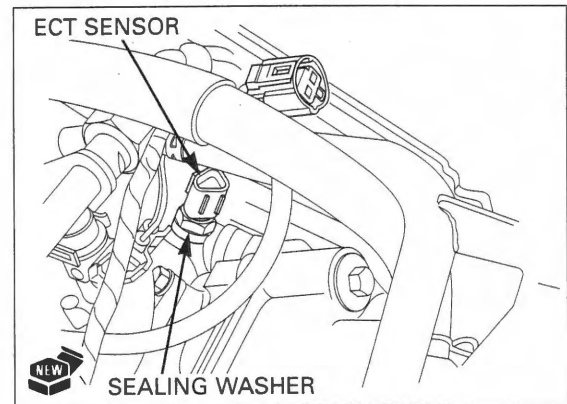


If the resistance is out of above range, replace the ECT/thermosensor.



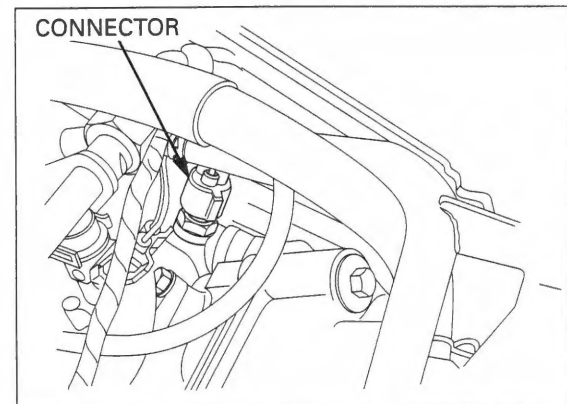
Apply sealant to the ECT/thermosensor threads. Do not apply sealant to the sensor head. Install the new sealing washer and ECT/thermosensor.

TORQUE: 23 N•m (2.3 kgf•m, 17 lbf•ft)



Connect the ECT/thermosensor connector.

Fill and bleed the cooling system (page 6-5).
Install the lower luggage box (page 2-10).

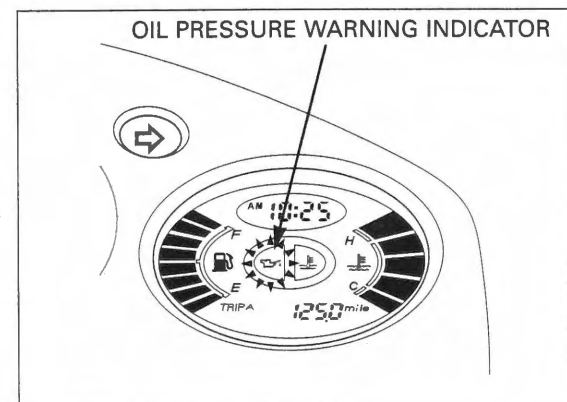


OIL PRESSURE SWITCH

INSPECTION

If the oil pressure warning indicator stays on with the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch "ON".

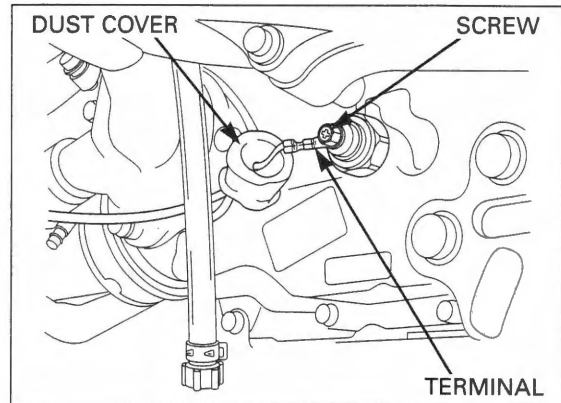


LIGHTS/METERS/SWITCHES

If the indicator does not come on, inspect as follow:

Remove the dust cover.

Remove the screw and oil pressure switch terminal.



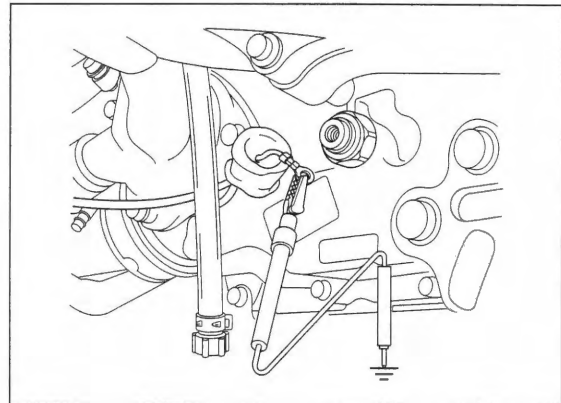
Short the oil pressure switch wire terminal with the ground using a jumper wire.

The oil pressure warning indicator should come on with the ignition switch is "ON".

If the light does not comes on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out. If the light does not go out, check the oil pressure (page 4-3).

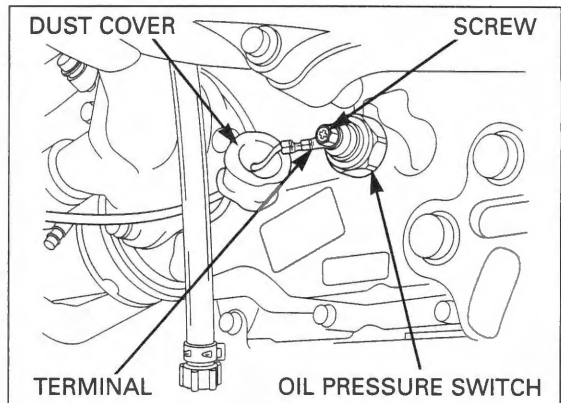
If the oil pressure is normal, replace the oil pressure switch (see below).



REMOVAL/INSTALLATION

Remove the dust cover, terminal screw and wire terminal.

Remove the oil pressure switch from the crankcase.



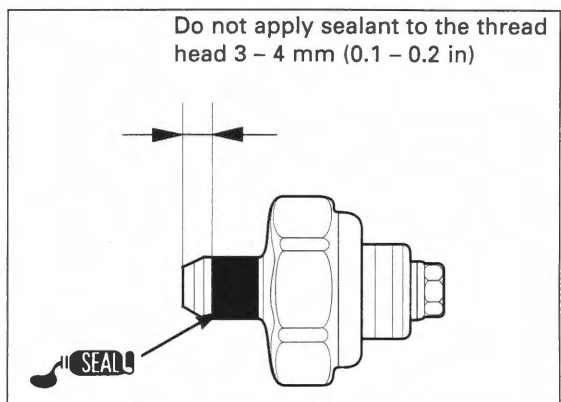
Apply sealant to the oil pressure switch threads as shown.

Install the oil pressure switch onto the crankcase, then tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

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

Install the dust cover.



FUEL UNIT

SYSTEM INSPECTION

Turn the ignition switch is ON and make sure the fuel level indicator comes ON.

If the fuel level indicator does not indicate properly, preform the following:

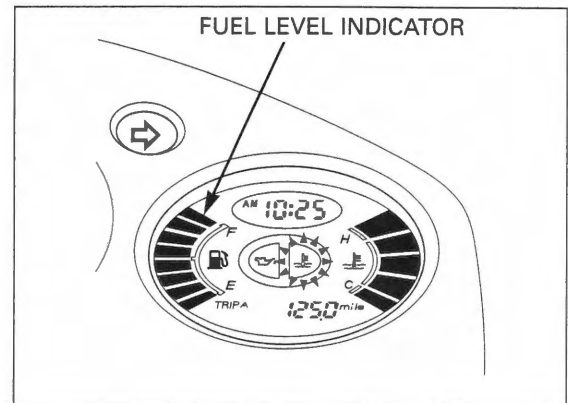
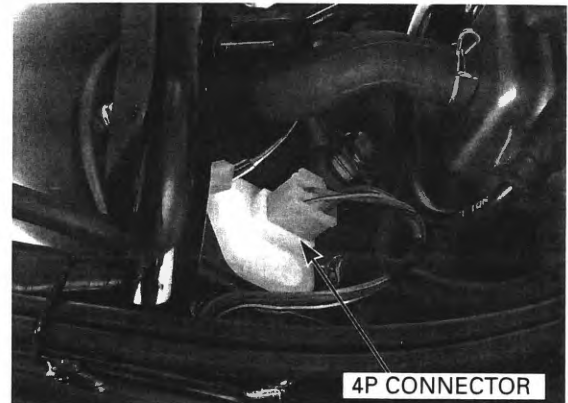
Remove the floorstep (page 2-20).

Disconnect the fuel unit 4P connector.
Short the wire harness side connector Gray/Black and Green/Black terminals with a jumper wire.

Turn the ignition switch ON and make sure the fuel level indicator comes ON.

If the indicator comes ON, replace the fuel pump assembly.

If the indicator still dose not come ON, check for open or short circuit in the wire harness.



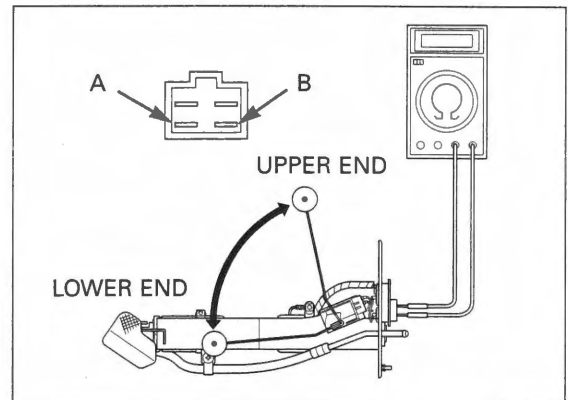
FLOAT LEVEL SENSOR INSPECTION

Remove the fuel pump/unit (page 5-82).
Measure the resistance between the A and B terminals when the float is at upper and lower end position.

Float Position	Upper end	Lower end
Resistance (20°C/68°F)	20 – 24 Ω	93 – 97 Ω

Move the fuel unit float up and down, and make sure the resistance changes smoothly.

If the resistance is out of specification, or the float does not move smoothly, replace the fuel pump/unit with a new one.



SIDESTAND SWITCH

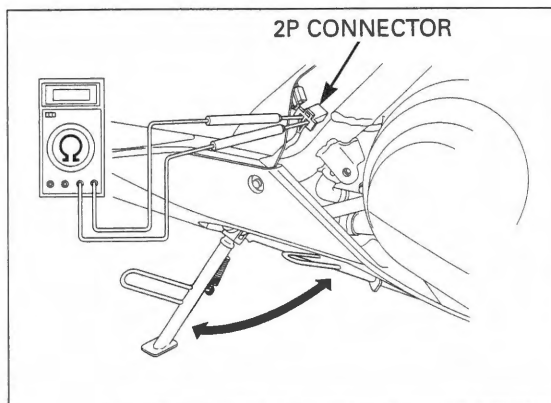
INSPECTION

Remove the left passenger footpeg (page 2-12).

Disconnect the sidestand switch 2P green connector. Check for continuity at the switch side of the 2P green connector.

There should be continuity with the sidestand retracted.

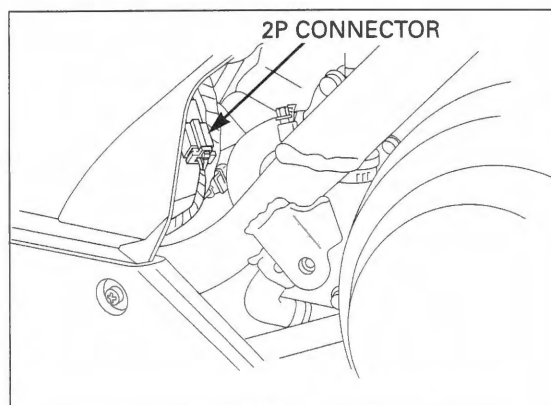
There should be no continuity with the sidestand applied.



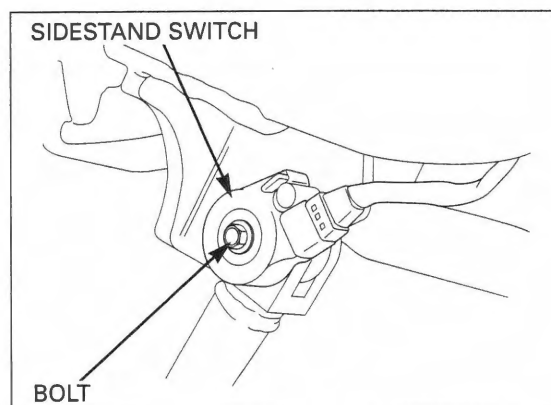
REMOVAL

Remove the left passenger footpeg (page 2-12).

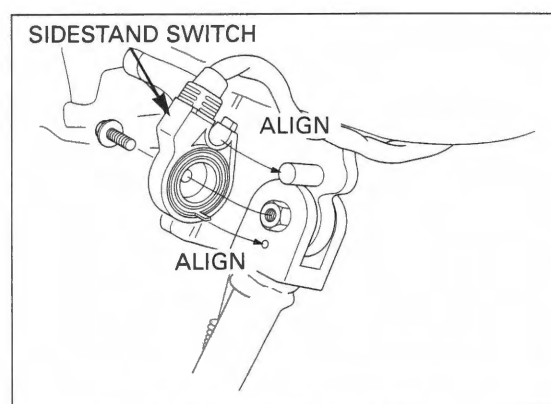
Disconnect the sidestand switch 2P green connector.



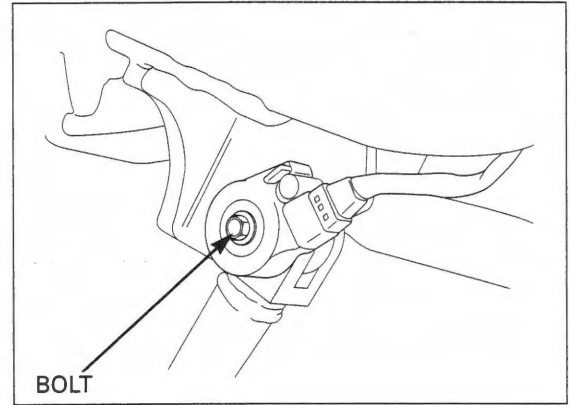
Remove the bolt and sidestand switch from the sidestand pivot.



Install the sidestand switch aligning the switch pin with the sidestand hole and the switch groove with the bracket pin.



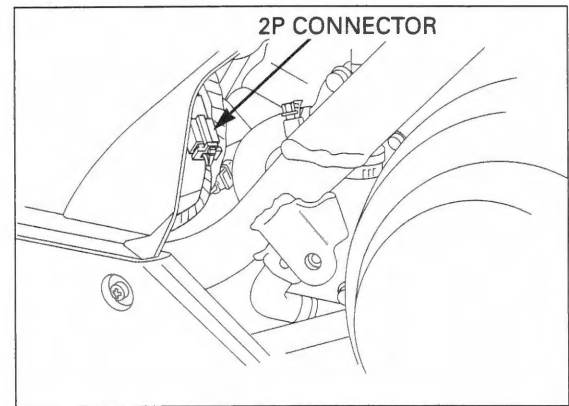
Secure the sidestand switch with the bolt.



Route the side-stand switch wire properly (page 1-20).

Connect the sidestand switch 2P green connector.

Install the left passenger footpeg (page 2-12).

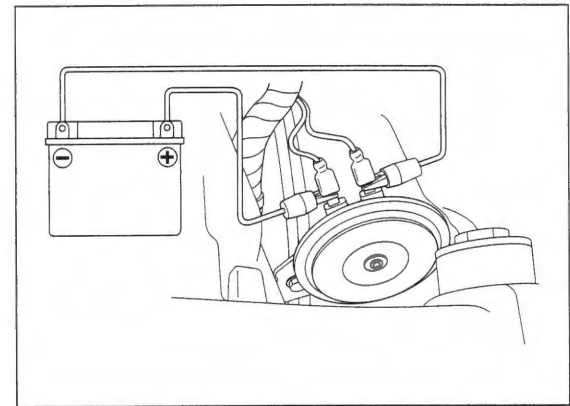


HORN

INSPECTION

Remove the front cover (page 2-14).
Remove the front airduct cover (page 2-21).
Disconnect the horn connectors from the horn.

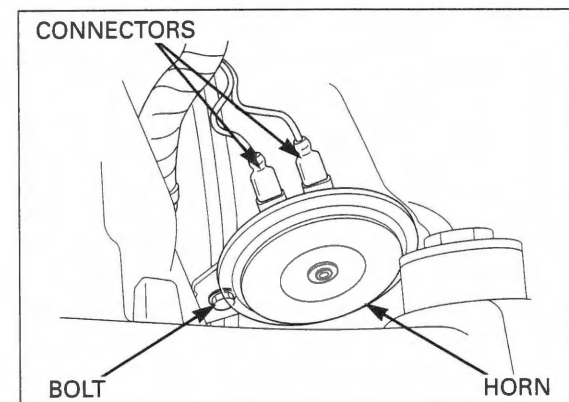
Connect a 12 V battery to the horn terminals.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



REMOVAL/INSTALLATION

Remove the front cover (page 2-14).
Remove the front airduct cover (page 2-21).
Disconnect the horn connectors from the horn.
Remove the bolt from the horn.

Installation is in the reverse order of removal.
Install the front airduct cover (page 2-21).
Install the front cover (page 2-14).



LOW BEAM RELAY

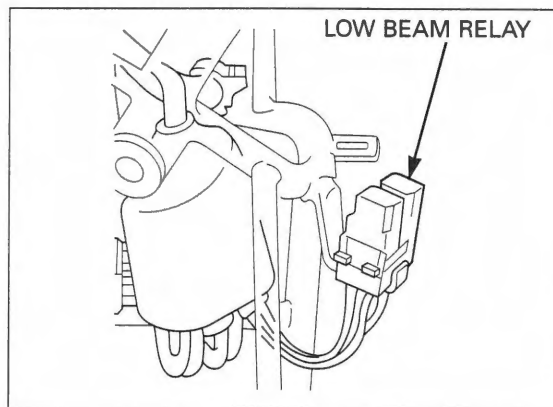
INSPECTION

Remove the front cover (page 2-14).

Remove the low beam relay.

Connect the ohmmeter to the low beam relay connector terminals.

CONNECTION: White – Black/Red

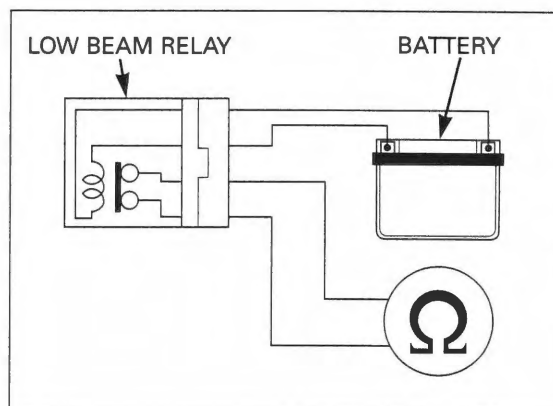


Connect the 12-V battery to the following low beam relay connector terminals.

CONNECTION: Green – Blue

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 low beam relay.



TURN SIGNAL RELAY

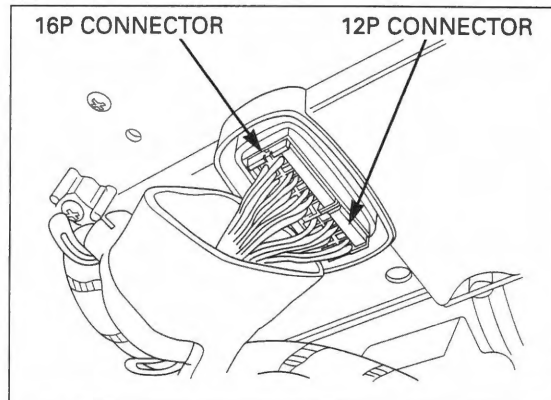
INSPECTION

Remove the front cover (page 2-14).

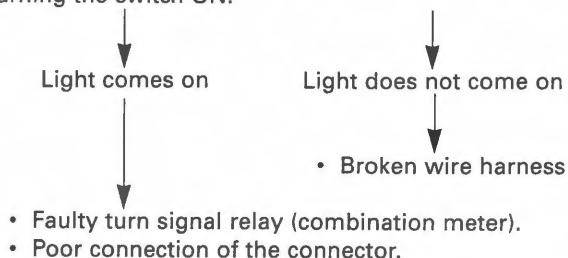
Check for the following:

- Battery condition
- Burned bulbs
- Burned fuse
- Ignition switch and turn signal switch function
- Loose connectors

If the above items are all normal, check the following:
Disconnect the 16P and 12P connectors from the combination meter.

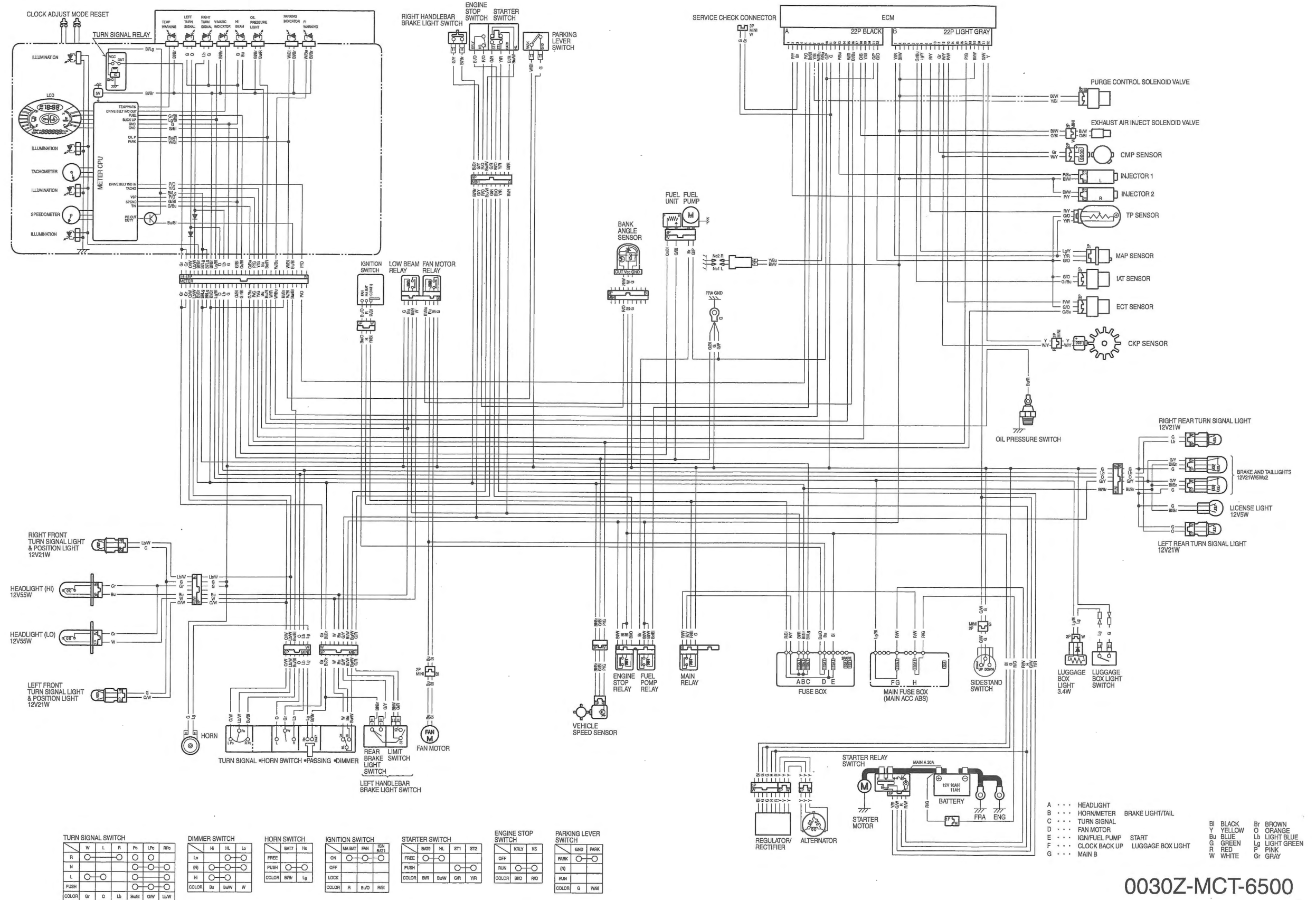


Short the black/light green and gray terminals of the combination meter connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.



22. WIRING DIAGRAMS

'02 - '07 STD TYPE:



0030Z-MCT-6500

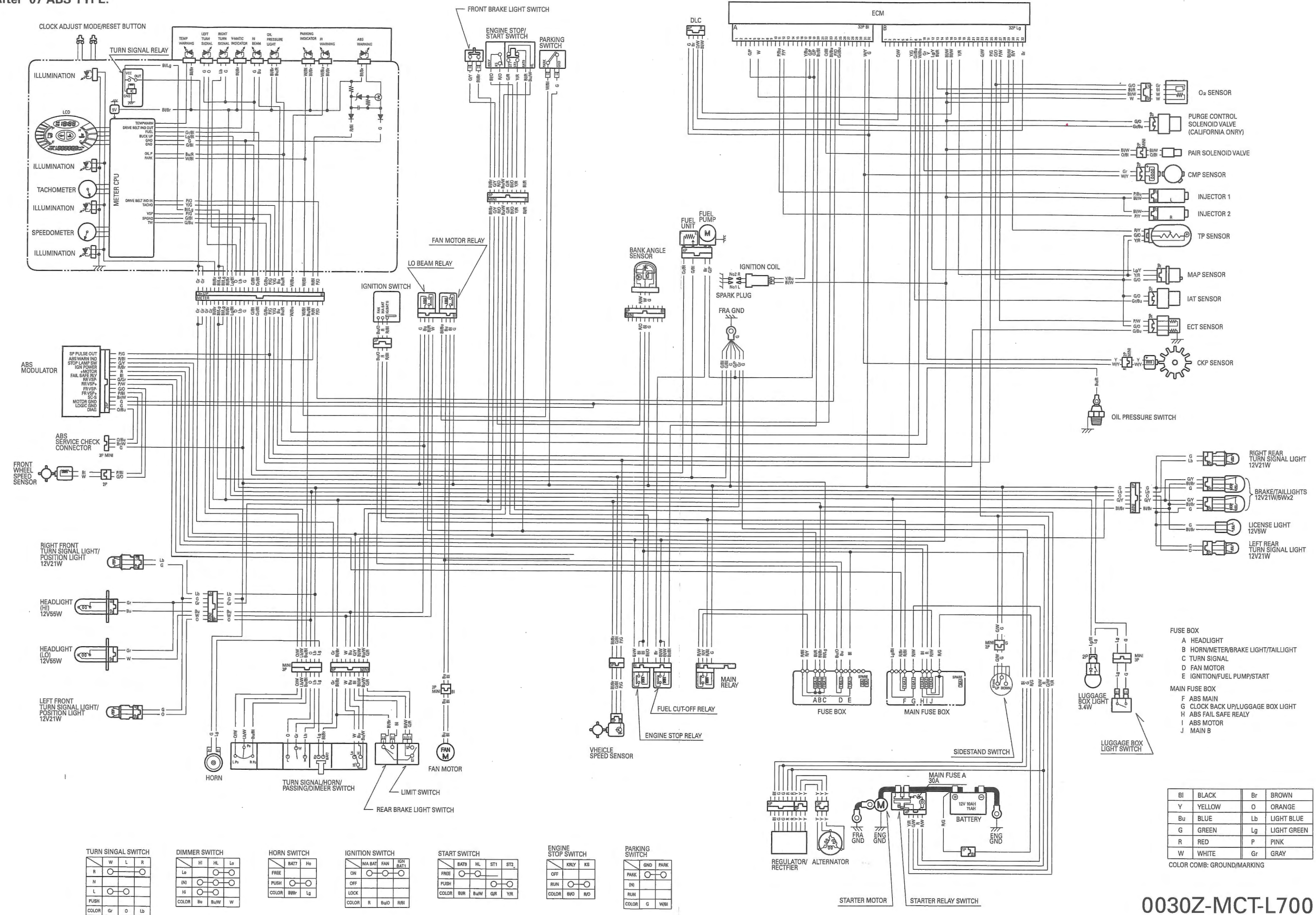
'02 – '07 ABS TYPE:





WIRING DIAGRAMS

After '07 ABS TYPE:



0030Z-MCT-L700

23. TROUBLESHOOTING

**ENGINE DOES NOT START OR IS
HARD TO START**

23-1

ENGINE LACKS POWER

23-2

**POOR PERFORMANCE AT LOW
AND IDLE SPEED**

23-3

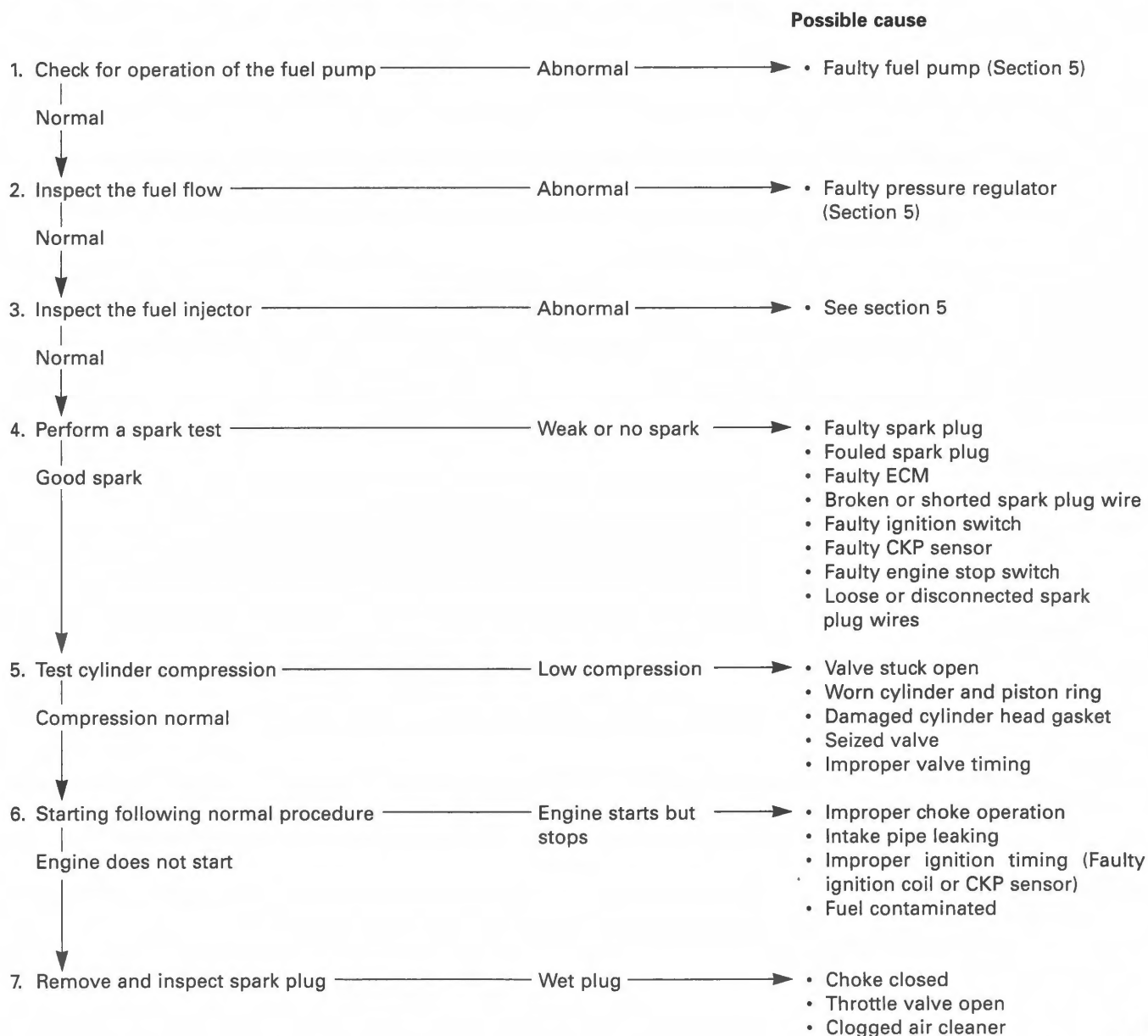
**POOR PERFORMANCE AT
HIGH SPEED**

23-4

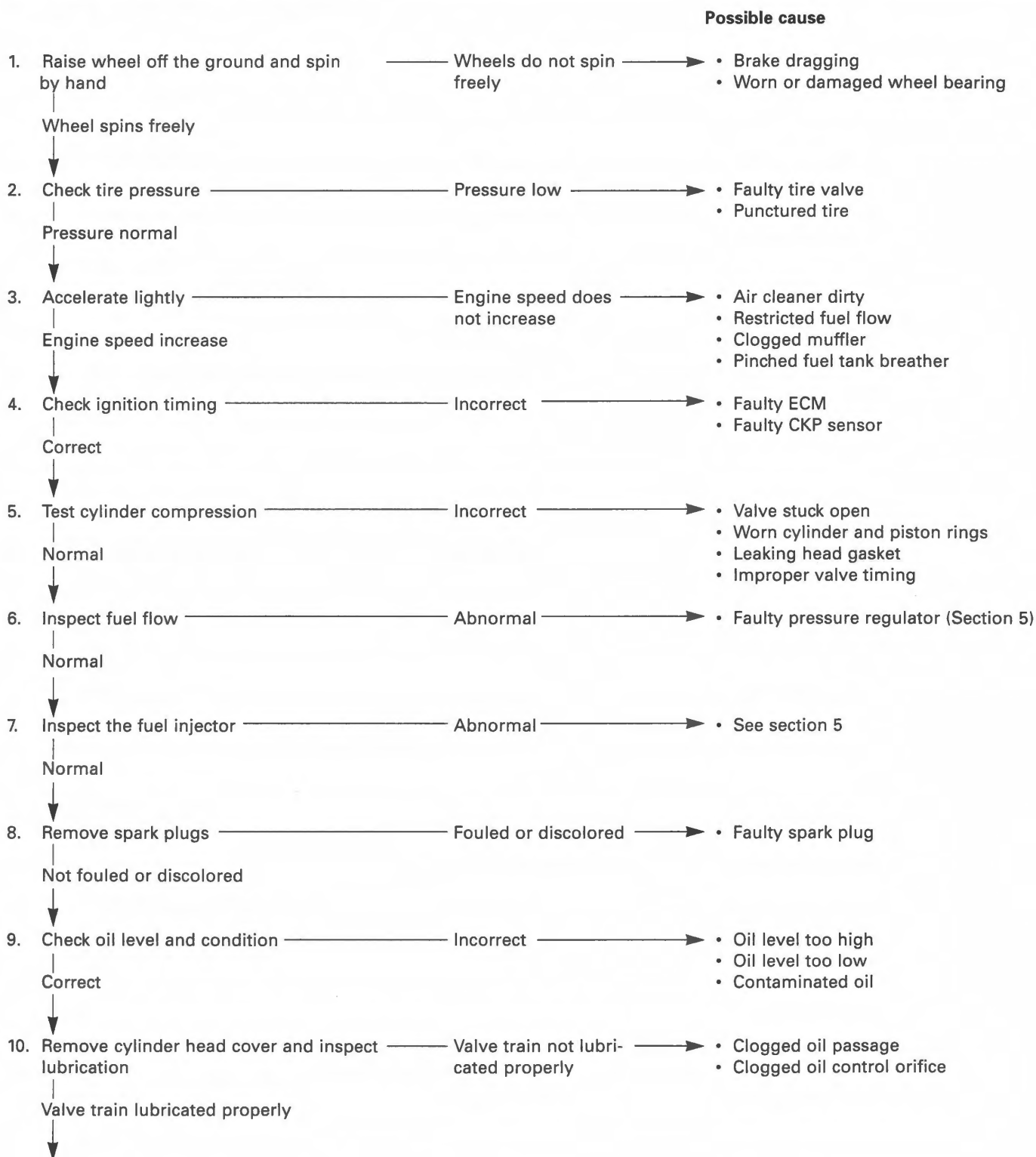
POOR HANDLING

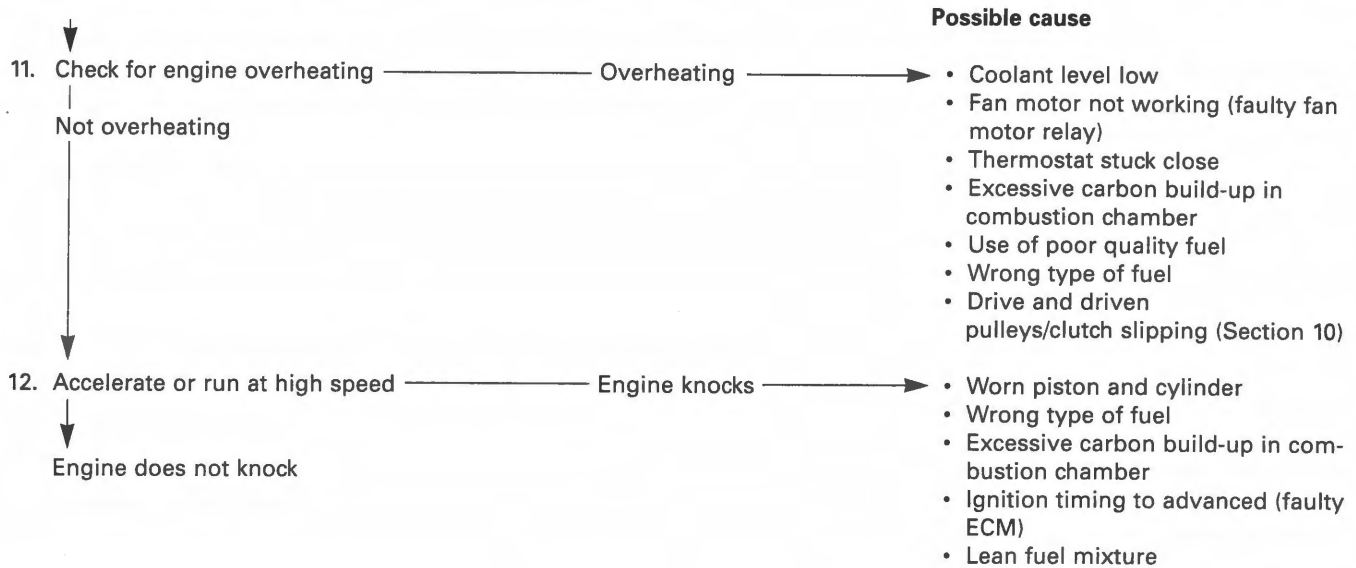
23-4

ENGINE DOES NOT START OR IS HARD TO START

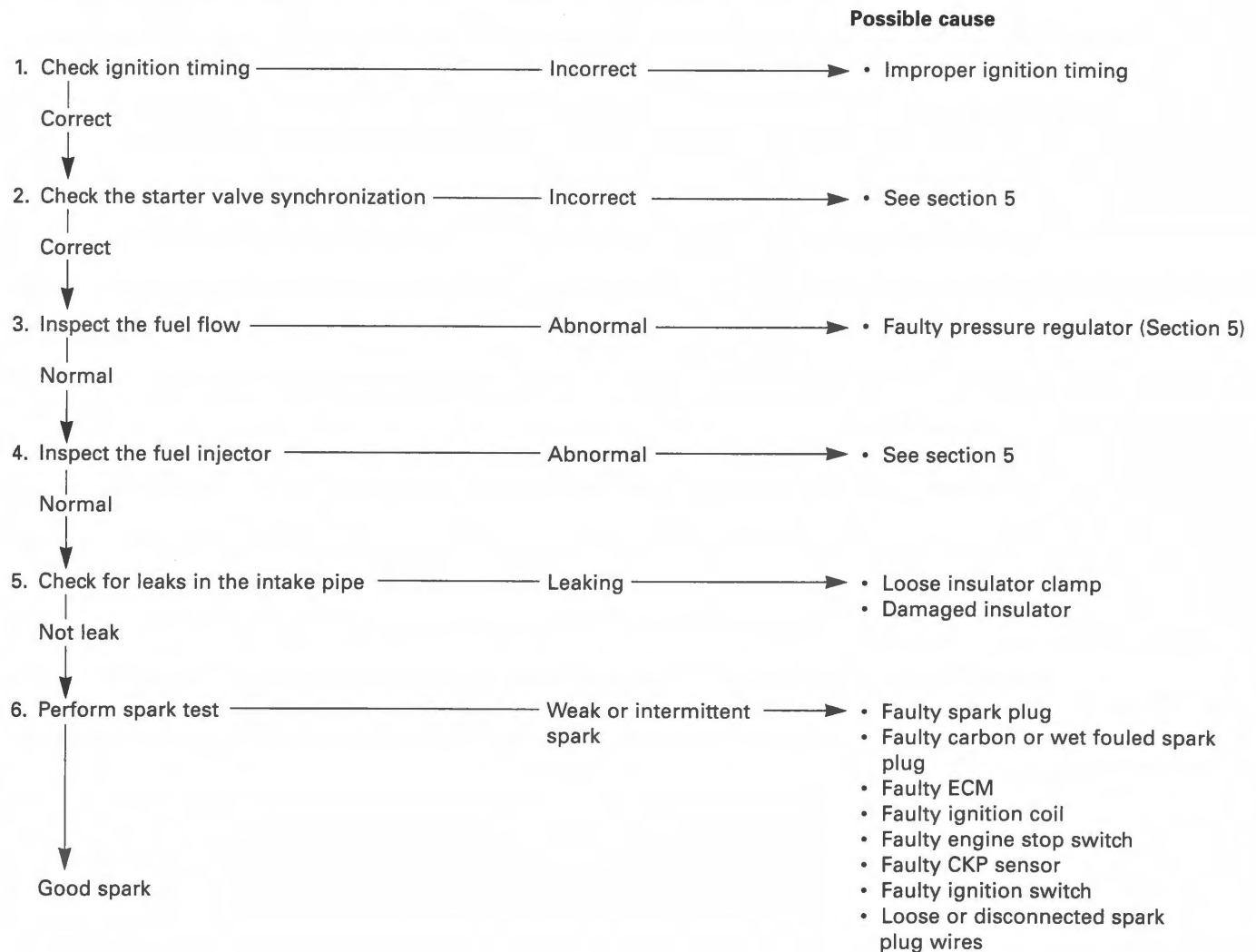


ENGINE LACKS POWER

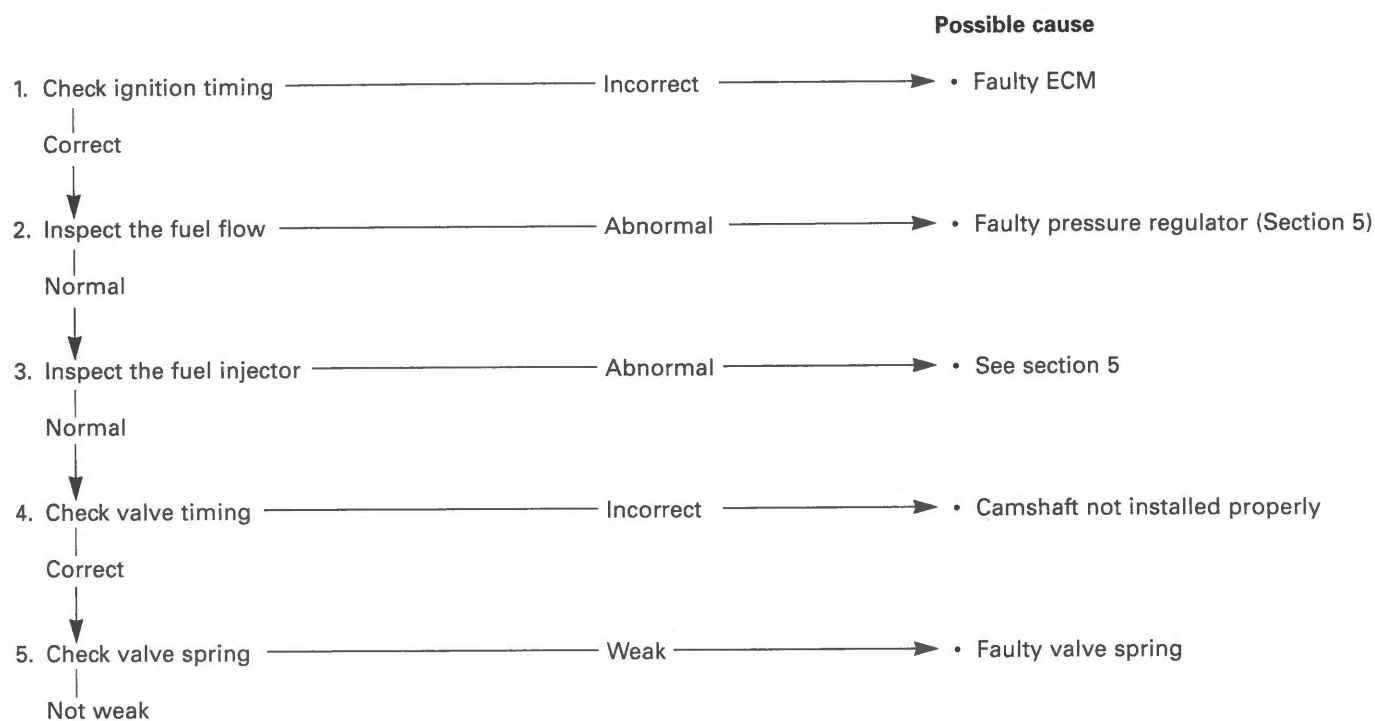




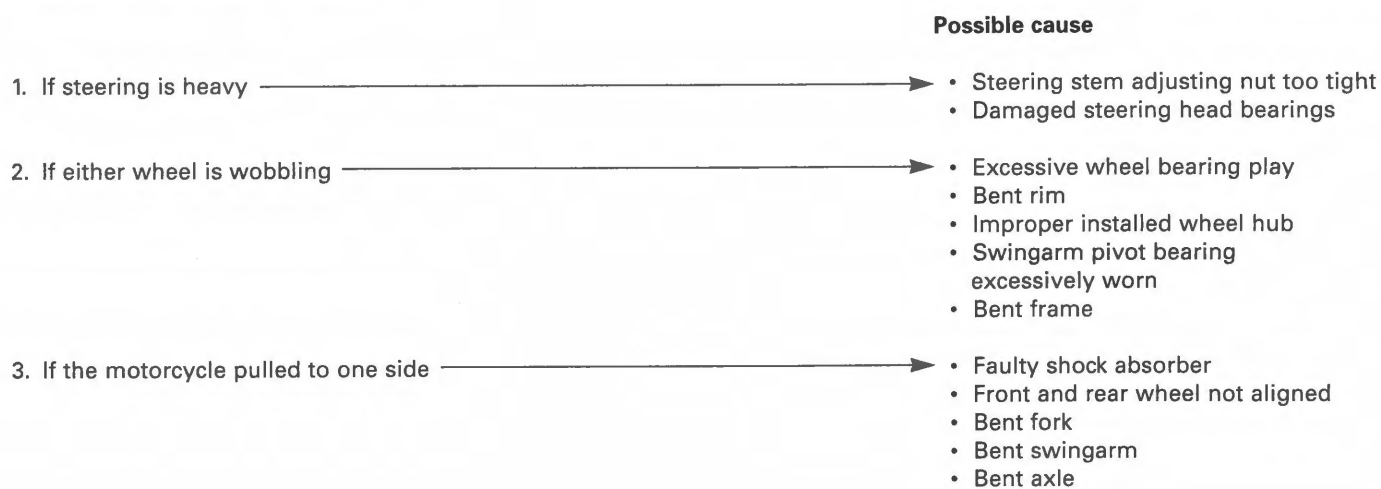
POOR PERFORMANCE AT LOW AND IDLE SPEED



POOR PERFORMANCE AT HIGH SPEED



POOR HANDLING



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WHEELS/TIRES	3-21
WINDSHIELD	2-12
WIRING DIAGRAMS	
('02 - '07 STD TYPE)	22-1
('02 - '07 ABS TYPE)	22-2
(After '07 STD TYPE)	22-3
(After '07 ABS TYPE)	22-4
