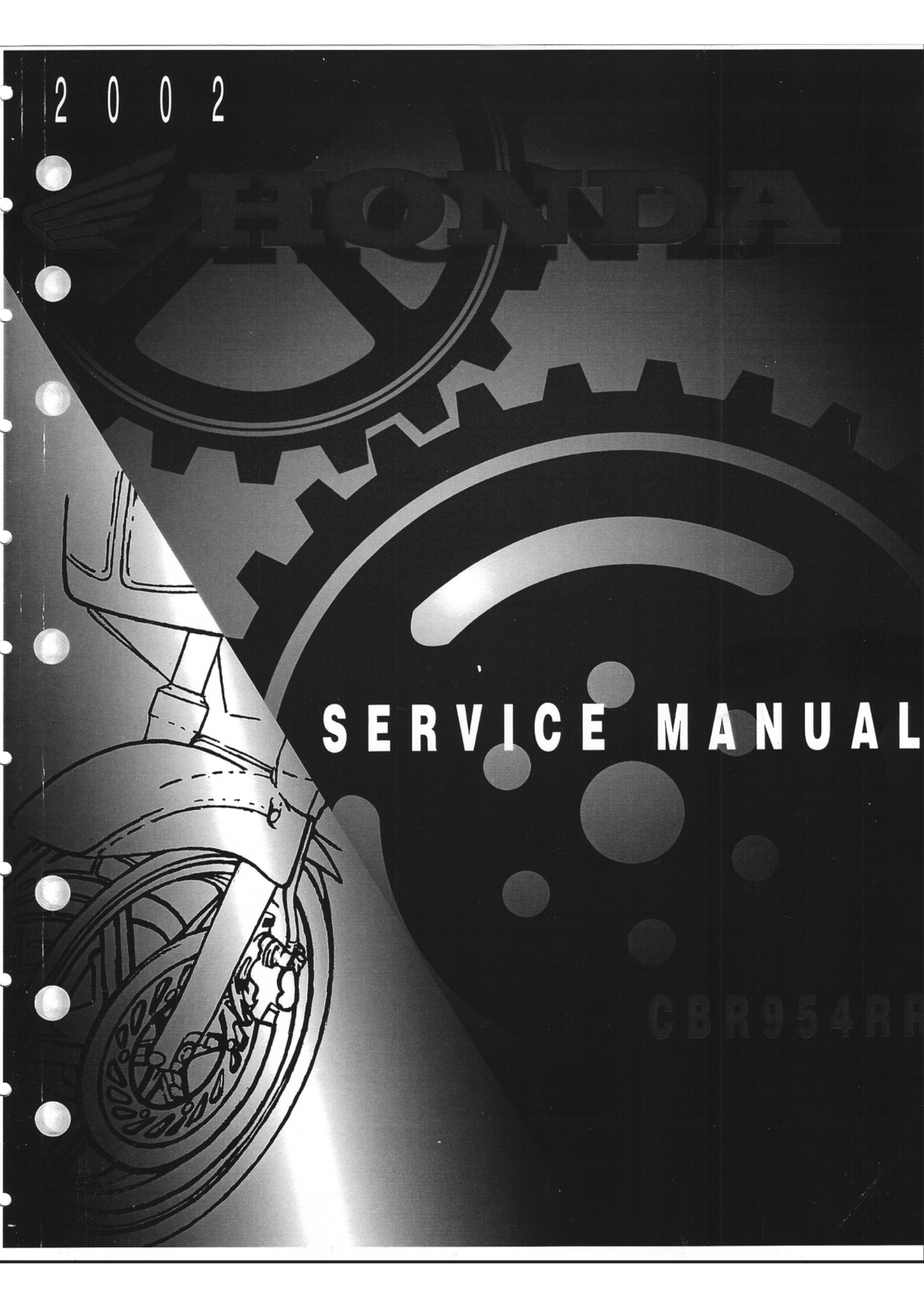


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HONDA

# SERVICE MANUAL

CBR954RR



## HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CBR954RR.

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

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

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

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


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

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

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

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

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

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

These signal words mean:

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

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

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

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

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












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## SYMBOLS

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

	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.

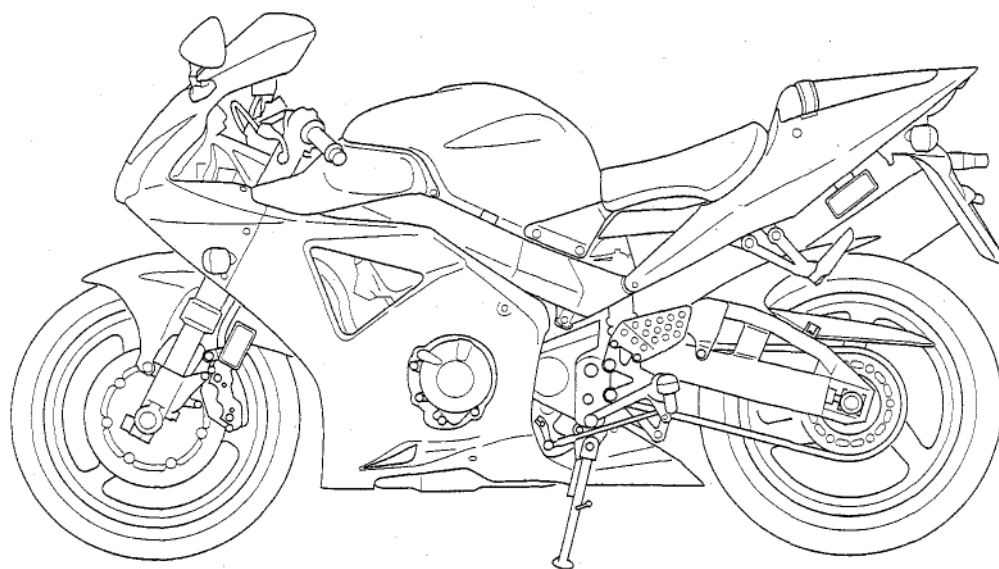
# 1. GENERAL INFORMATION

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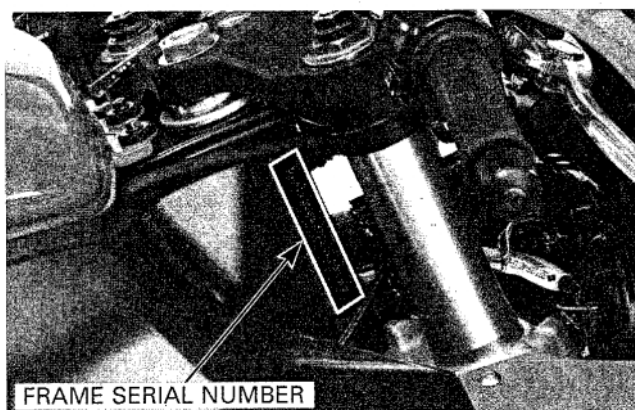
## SERVICE RULES

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 1-23 through 1-36, Cable and Harness Routing.

## MODEL IDENTIFICATION



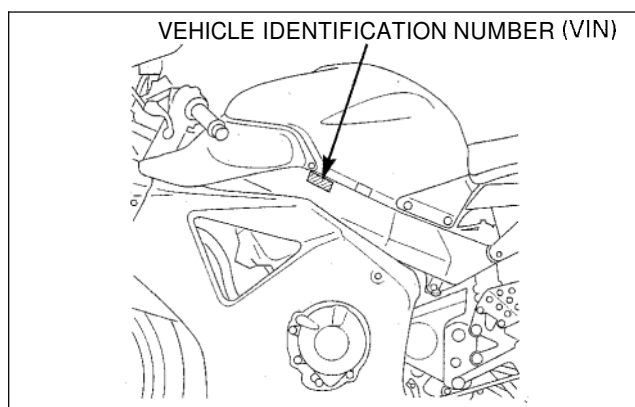
## GENERAL INFORMATION



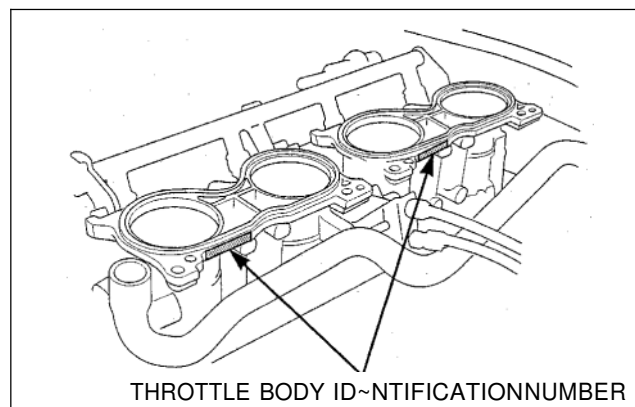
- (1) The frame serial number is stamped on the right side of the steering head.



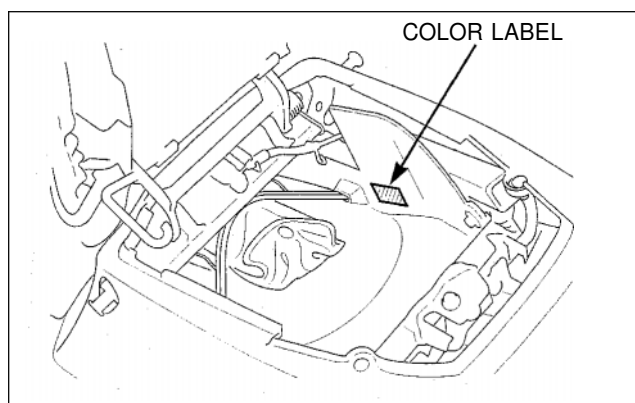
- (2) The engine serial number is stamped on the right side of the upper crankcase.



- (3) The Vehicle Identification Number (VIN) is located on left side of the main frame on the Safety Certification Labels.



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



- (5) 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	2,025 mm (79.7 in)
	Overall width	680 mm (26.8 in)
	Overall height	1,135 mm (44.7 in)
	Wheelbase	1,395 mm (54.9 in)
	Seat height	820 mm (32.3 in)
	Footpeg height	383 mm (15.1 in)
	Ground clearance	130 mm (5.1 in)
	Dry weight	
	49 states, Canada type:	168 kg (370 lbs)
	California type:	170 kg (375 lbs)
	Curb weight	
	49 states, Canada type:	195 kg (430 lbs)
	California type:	197 kg (434 lbs)
	Maximum weight capacity	
	49 states, California type:	160 kg (353 lbs)
	Canada type:	164 kg (362 lbs)
FRAME	Frame type	Diamond
	Front suspension	Inverted telescopic fork
	Front wheel travel	110 mm (4.3 in)
	Rear suspension	Swingarm
	Rear wheel travel	135 mm (5.3 in)
	Rear damper	Nitrogen gas filled damper
	Front tire size	120/70 ZR17 M/C (58W)
	Rear tire size	190/50 ZR17 M/C (73W)
	Tirebrand	
	Bridgestone	Front: BT012F RADIAL G /Rear: BT012R RADIAL G
	Michelin	Front: Pilot SPORT E /Rear: Pilot SPORT E
	Front brake	Hydraulic double disc brake with 4 pots caliper
	Rear brake	Hydraulic single disc brake with 1 pots caliper
	Caster angle	23° 45'
ENGINE	Trail length	97 mm (3.8 in)
	Fuel tank capacity	18.0 liter (4.76 US gal, 3.96 Imp gal)
	Cylinder arrangement	4 cylinders in-line, inclined 30° from vertical
	Bore and stroke	75.0 x 54.0 mm (2.95 x 2.13 in)
	Displacement	954 cm <sup>3</sup> (58.2 cu-in)
	Compression ratio	11.5: 1
	Valve train	Chain driven, DOHC
	Intake valve	opens — at 1 mm
		closes — (0.04 in) lift
	Exhaust valve	opens —
		closes —
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Paper element
	Engine dry weight	61.2 kg (134.9 lbs)
	Firing order	1 - 2 - 4 - 3

## GENERAL INFORMATION

GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURATION	Type Throttle bore	PGM-FI (Programmed Fuel Injection) 42 mm (1.7 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio                   1st 2nd 3rd 4th 5th 6th  Gearshift pattern	Multi-plate, wet Cable operating Constant mesh, 6-speeds 1.520 (73/48) 2.687 (43/16) 2.692 (35/13) 1.933 (29/15) 1.600 (32/20) 1.400 (28/20) 1.285 (27/21) 1.190 (25/21)  Left foot operated return system, 1 - N - 2 - 3 - 4 - 5 - 6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Computer-controlled digital transistorized with electric advance Electric starter motor Triple phase output alternator SCR shorted/triple phase, full wave rectification Battery

## GENERAL INFORMATION

Unit: mm (in)

		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	3.5 liter (3.7 US qt, 3.1 Imp qt)	—
	At oil filter change	3.7 liter (3.9 US qt, 3.3 Imp qt)	—
	At disassembly	4.0 liter (4.2 US qt, 3.5 Imp qt)	—
		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-40	—
		490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 5,400 rpm/(80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

ITEM		SPECIFICATIONS
Throttle body identification number	Except California type	GQ44C
	California type	GQ44B
Starter valve vacuum difference		20 mmHg
Base throttle valve for synchronization		No.1
Idle speed		1,200 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)		1 – 4 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 – 2.6 kΩ
Fuel injector resistance (at 20°C/68°F)		10.5 – 14.5 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		20 – 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle		150 – 250 mmHg
Fuel pressure at idle		343 kPa (3.5 kgf/cm <sup>2</sup> , 50 psi)
Fuel pump flow (at 12 V)		188 cm <sup>3</sup> (6.4 US oz, 6.6 Imp oz) minimum/10 seconds



## GENERAL INFORMATION

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.1 liter (3.3 US qt, 2.7 Imp qt)
	Reserve tank	0.4 liter (0.4 US qt, 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	Begin to open	80.5 – 83.5°C (177 – 182°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 corrosion protection inhibitors
Standard coolant concentration		1:1 mixture of antifreeze and soft water

Unit: mm (in)

Unit: mm (in)

CYLINDER HEAD/VALVES				
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,196 kPa (12.2 kgf/cm <sup>2</sup> , 174 psi) at 350 rpm	—
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.27 ± 0.03 (0.011 ± 0.001)	—
Cam shaft	Cam lobe height	IN	36.74 – 36.98 (1.446 – 1.456)	36.72 (1.446)
		EX	36.45 – 36.69 (1.435 – 1.444)	36.43 (1.434)
	Runout		—	0.04 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
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)
Valve, valve guide	Valve stem O.D.	IN	4.473 – 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/EX	4.500 – 4.512 (0.1722 – 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	14.3 – 14.6 (0.56 – 0.57)	—
		EX	12.4 – 12.7 (0.49 – 0.50)	—
	Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)
Valve spring free length	IN	Inner	34.80 (1.370)	33.1 (1.30)
		Outer	37.97 (1.495)	36.1 (1.42)
	EX		39.60 (1.559)	37.6 (1.48)
Cylinder head warpage			—	0.10 (0.004)

## GENERAL INFORMATION

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE			
ITEM			STANDARD
			SERVICE LIMIT
Clutch lever free play			10 - 20 (3/8 - 13/16)
Clutch spring free length			48.8 (1.92)
Clutch disc thickness			2.92 - 3.08 (0.115 - 0.121)
Clutch plate warpage			0.30 (0.012)
Clutch outer guide	I.D.	25.000 - 25.021 (0.9843 - 0.9851)	25.03 (0.985)
	O.D.	34.975 - 34.991 (1.3770 - 1.3776)	34.97 (1.377)
Mainshaft O.D. at clutch outer guide			24.980 - 24.993 (0.9835 - 0.9840)
Shift fork, forkshaft	Fork	I.D.	12.000 - 12.018 (0.4724 - 0.4731)
		Claw thickness	5.93 - 6.00 (0.233 - 0.236)
	Fork shaft O.D.		11.957 - 11.968 (0.4707 - 0.4712)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 - 51.718 (2.0354 - 2.0361)	51.684 (2.0348)

Unit: mm (in)

CRANKCASE/PISTON/CYLINDER			
ITEM			STANDARD
			SERVICE LIMIT
Piston, piston rings			0.10 (0.004)
	Taper		0.10 (0.004)
	Warpage		0.05 (0.002)
	Piston mark direction		"O" mark facing toward the intake side
	Piston pin O.D.		16.994 - 17.000 (0.6691 - 0.6693)
	Piston-to-piston pin clearance		0.002 - 0.014 (0.0001 - 0.0006)
	Piston ring-to-ring groove clearance	Top	0.030 - 0.065 (0.0012 - 0.0026)
		Second	0.015 - 0.045 (0.0006 - 0.0018)
Piston ring end gap	Top	0.28 - 0.38 (0.011 - 0.015)	0.5 (0.02)
	Second	0.40 - 0.55 (0.016 - 0.022)	0.7 (0.03)
Cylinder-to-piston clearance			0.020 - 0.055 (0.0008 - 0.0022)
Connecting rod small end I.D.			17.016 - 17.034 (0.6699 - 0.6706)
Connecting rod-to-piston pin clearance			0.016 - 0.040 (0.0006 - 0.0016)
Crank pin oil clearance			0.030 - 0.052 (0.0012 - 0.0020)

## GENERAL INFORMATION

CRANKSHAFT/TRANSMISSION			ITEM	STANDARD	SERVICE LIMIT
Crankshaft	Side clearance			0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout				0.03 (0.001)
	Main journal oil clearance			0.017 – 0.035 (0.0007 – 0.0014)	0.045 (0.0018)
Transmission	Gear I.D.	M5, M6		31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1		26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		c2, c3, c4		33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Bushing O.D.	M5, M6		30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		c3, c4		32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Bushing I.D.	M5		27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		c2		29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M5, M6		0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
		c3, c4		0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D.	M5		27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
		Clutch outer guide		24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)
	Countershaft O.D.	C2		29.967 – 29.980 (1.1798 – 1.1803)	29.96 (1.180)
	Bushing-to-shaft clearance	M5		0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
		c2		0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)



Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 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	255.8 (10.07)	250.8 (9.87)
	Spring direction	With the tapered end facing up	—
	Fork pipe runout	—	0.20 (0.008)
	Recommended fork oil	Pro Honda Suspension Fluid SS-8	—
	Fluid level	73 (2.9)	—
	Fluid capacity	513 ± 2.5 cm <sup>3</sup> (17.3 ± 0.08 US oz, 18.1 ± 0.09 Imp oz)	—
	Pre-load adjuster initial setting	7 turns from full soft	—
	Rebound adjuster initial setting	2 turns from full hard	—
	Compression adjuster initial setting	2 turns from full hard	—

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—————	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load		290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—————
	Up to maximum weight capacity		290 kPa (2.90 kgf/cm <sup>2</sup> , 42 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.
Drive chain	Size/link	DID	DID 50VA8 C1/108	—————
		RK	RK GB50HFOZ5/108	—————
	Slack		40 – 50 (1.6 – 2.0)	50 (2.0)
Shock absorber	Spring adjuster standard position		4th groove	—————
	Rebound adjuster initial setting		2 turns from full hard	—————
	Compression adjuster initial setting		2 turns from full hard	—————

## GENERAL INFORMATION

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	Honda DOT 4 Brake Fluid	—
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc runout		0.30 (0.012)
	Master cylinder I.D.	17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.	17.321 – 17.367 (0.6819 – 0.6837)	17.309 (0.6815)
	Caliper cylinder I.D. Upper	32.025 – 32.035 (1.2608 – 1.2612)	32.05 (1.262)
	Lower	30.250 – 30.280 (1.1909 – 1.1921)	30.29 (1.193)
	Caliper piston O.D. Upper	31.965 – 31.998 (1.2585 – 1.2598)	31.953 (1.2580)
Rear	Lower	30.082 – 30.115 (1.1843 – 1.1856)	30.074 (1.1840)
	Specified brake fluid	Honda DOT 4 Brake Fluid	—
	Brake disc thickness	5.0 (0.20)	4.0 (0.16)
	Brake disc runout		0.30 (0.012)
	Master cylinder I.D.	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Master piston O.D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Caliper cylinder I.D.	38.180 – 38.230 (1.5031 – 1.5051)	38.24 (1.506)
	Caliper cylinder O.D.	38.098 – 38.148 (1.4999 – 1.5019)	38.090 (1.4996)

Battery	Capacity		12V – 8.6 Ah
	Current leakage		0.2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.0 A/0.5 h
Alternator	Capacity		0.421 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

## IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	Standard	IMR9C-9H (NGK), VUH27D (DENSO)
	Optional	IMR8C-9H (NGK), VUH24D (DENSO)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		13° BTDC at idle

## GENERAL INFORMATION

Starter motor brush length	10.0 – 10.5 (0.39 – 0.41)	3.5 (0.14)

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12v – 55w X 2
		Lo	12V – 55W
	Brake/tail light		LED
	Front turn signal light		12V – 32/3cp (23/8W) X 2
	Rear turn signal light		12V – 32cp (23W) X 2
	License light		12V – 5W
	Instrument light		LED
	Turn signal indicator		LED X 2
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI warning indicator		LED
	Fuel reserve indicator		LED
Fuse	Main fuse		30 A
	PGM-FI fuse		20 A
	Sub fuse		20A X 2, 10A X 3
Tachometer peak voltage			10.5V minimum
Thermo sensor resistance		80 °C (176°F)	2.1 – 2.6 kΩ
		120 °C (248°F)	0.65 – 0.73 kΩ



## GENERAL INFORMATION

### TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
10 mm hex bolt and nut	34 (3.5, 25)	small flange)	
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)

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

NOTES: 1. Apply sealant to the threads.  
 2. Apply a locking agent to the threads.  
 3. Apply grease to the threads.  
 4. Stake.  
 5. Apply oil to the threads and flange surface.  
 6. Apply clean engine oil to the O-ring.  
 7. U-nut  
 8. ALOC bolt: replace with a new one.  
 9. CT bolt  
 10. Apply molybdenum disulfide oil to the threads and seating surface (after removing anti-rust oil additive).  
 11. One-way bolt

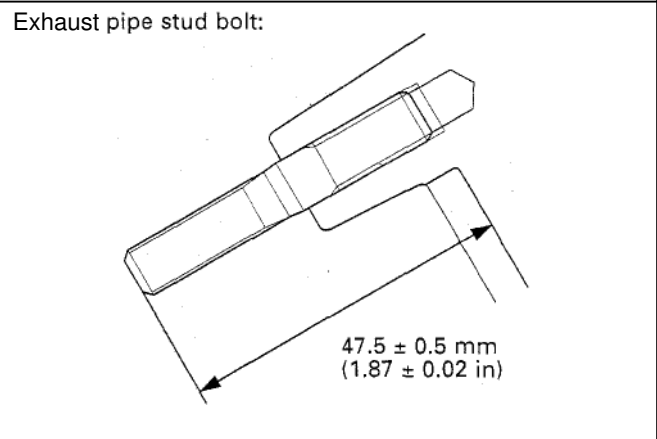
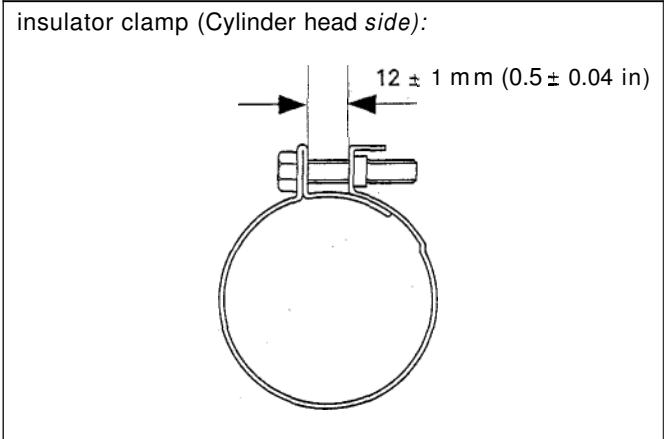
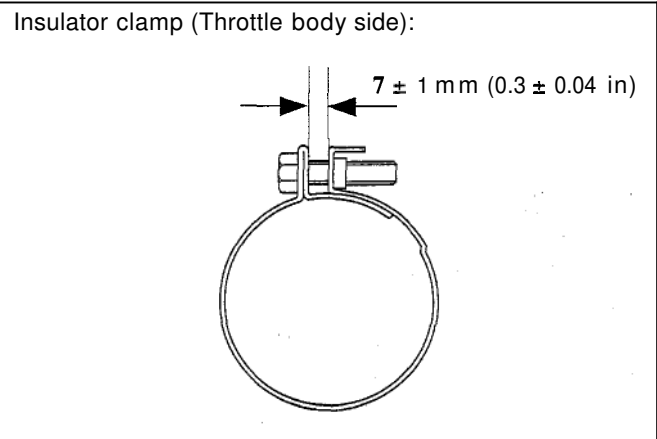
ENGINE				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>MAINTENANCE:</b>				
Spark plug	4	10	12 (1.2, 9)	
Timing hole cap	1	45	18 (1.8, 13)	NOTE 3
Oil drain bolt	1	12	29 (3.0, 22)	
Oil filter cartridge	1	20	26 (2.7, 20)	NOTE 6
<b>LUBRICATION SYSTEM:</b>				
Oil cooler mounting bolt	1	20	74 (7.5, 54)	
Oil pump assembly flange bolt	1	6	8 (0.8, 5.8)	NOTE 9
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
Oil pressure switch wire terminal screw	1	4	2 (0.2, 1.4)	
Lower crankcase 20 mm sealing bolt	1	20	29 (3.0, 22)	NOTE 2
<b>FUEL SYSTEM (Programmed Fuel Injection):</b>				
ECT (Engine Coolant Temperature)/thermo sensor	1	12	23 (2.3, 17)	
Throttle body insulator band screw	8	5	See page 1-14	
Throttle cable bracket mounting bolt	2	5	3 (0.35, 2.5)	
Fuel pipe mounting bolt	3	6	10 (1.0, 7)	
Pressure regulator mounting bolt	2	6	10 (1.0, 7)	
Starter valve synchronization plate screw	4	3	1 (0.09, 0.7)	
Fast idle wax unit link plate screw	1	3	1 (0.09, 0.7)	
Fast idle wax unit mounting screw	2	6	5 (0.5, 3.6)	
Starter valve lock nut	4	10	2 (0.18, 1.3)	
<b>COOLING SYSTEM:</b>				
Water pump cover flange bolt	2	6	12 (1.2, 9)	NOTE 9
Thermostat cover flange bolt	2	6	12 (1.2, 9)	NOTE 9
<b>ENGINE MOUNTING:</b>				
Drive sprocket special bolt	1	10	54 (5.5, 40)	

## GENERAL INFORMATION

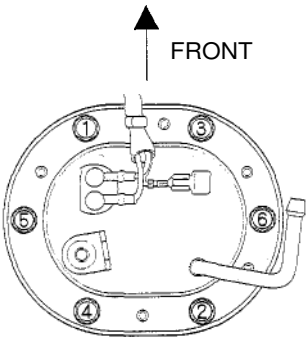
ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N•m (kgf•m, lbf•ft)	REMARKS
<b>CYLINDER HEAD/VALVES:</b>				
Cylinder head cover bolt	4	6	10 (1.0, 7)	
PAIR reed valve cover flange bolt	4	6	12 (1.2, 9)	NOTE 2
Breather plate flange bolt	3	6	12 (1.2, 9)	NOTE 2
Camshaft holder flange bolt	20	6	12 (1.2, 9)	NOTE 5
Cylinder head sealing bolt	1	18	27 (2.8, 20)	NOTE 2
Cylinder head mounting bolt	2	8	25 (2.5, 18)	NOTE 5
Cylinder head mounting bolt/washer	10	9	51 (5.2, 38)	NOTE 10
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
Cam pulse generator rotor bolt	2	6	12 (1.2, 9)	NOTE 2
Cam chain tensioner pivot socket bolt	1	6	10 (1.0, 7)	NOTE 2
Cam chain guide mounting socket bolt	1	6	12 (1.2, 9)	NOTE 2
Cylinder head stud bolt (exhaust pipe stud bolt)	8	8	See page 1-14	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Clutch center lock nut	1	22	127 (13.0, 94)	NOTE 4,5
Clutch spring bolt/washer	5	6	12 (1.2, 9)	
Shift drum center socket bolt	1	8	23 (2.3, 17)	NOTE 2
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	
Gearshift return spring pin	1	8	23 (2.3, 17)	
Shift drum bearing/shift fork retaining bolt/washer	2	6	12 (1.2, 9)	NOTE 2
<b>ALTERNATOR/STARTER CLUTCH:</b>				
Alternator wire clamp bolt	1	6	14 (1.4, 10)	NOTE 9
Flywheel flange bolt	4	10	103 (10.5, 76)	NOTE 5
Stator mounting socket bolt	4	6	12 (1.2, 9)	
Starter one-way clutch torx bolt	6	6	16 (1.6, 12)	NOTE 2
<b>CRANKCASE/PISTON/CYLINDER:</b>				
Mainshaft bearing set plate bolt	3	6	12 (1.2, 9)	NOTE 2
Crankcase bolt, 10 mm	1	10	39 (4.0, 29)	
9 mm (mainjournal bolt)	10	9	20 (2.0, 14) + 150"	See page 11-12 NOTE 5
8 mm	12	8	25 (2.5, 18)	
Connecting rod nut	8	8	35 (3.6, 26)	NOTE 5
Upper crankcase sealing bolt	1	8	22 (2.2, 16)	NOTE 2
Lower crankcase 20 mm sealing bolt	1	20	29 (3.0, 22)	NOTE 2
Lower crankcase 10 mm socket bolt	1	10	12 (1.2, 6.5)	NOTE 2

GENERAL INFORMATION

ENGINE (Cont'd)				
ITEM	Q'TY	DIA. (mm)	N•m (kgf•m, lbf•ft)	REMARKS
IGNITION SYSTEM: Ignition pulse generator rotor mounting bolt	1			NOTE 5
ELECTRIC STARTER: Starter motor terminal nut	2			
LIGHTS/METERS/SWITCHES: Neutral switch	1		1	



## FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N•m (kgf•m, lbf•ft)	REMARKS
<b>FRAME BODY PANELS/EXHAUST SYSTEM:</b>				
Upper cowl stay mounting bolt	2	8	26 (2.720)	
Upper cowl stay mounting SH bolt	3	6	7 (0.751)	
Upper cowl pan screw	4	5	1.5 (0.151, 1)	
Lower cowl pan screw	2	5	1.5 (0.151, 1)	
Rear cowl truss screw	2	5	1.5 (0.151, 1)	
Pillion seat mounting nut	2	6	11 (1.1, 8)	NOTE 7
Pillion seat hinge special screw	2	6	12 (1.2, 9)	
Duct cover pan screw	4	5	1.5 (0.151, 1)	
Windscreen mounting screw	7	5	0.3 (0.03, 0.22)	See page 2-8
Seat rail mounting bolt, 8 mm		8	39 (4.029)	
Seat rail mounting nut, 10 mm	2	10	39 (4.029)	
Pillion step mounting socket bolt	4	8	39 (4.029)	
Exhaust pipe joint nut	8	7	12 (1.29)	
<b>FUEL SYSTEM (Programmed Fuel Injection):</b>				
Fuel filler cap bolt	7	4	2 (0.21, 4)	
Fuel hose banjo bolt (fuel tank side)	1	12	22 (2.216)	
Fuel hose sealing nut (throttle body side)	1	12	22 (2.216)	
Fuel pump mounting nut (see tightening sequence below)	6	6	12 (1.29)	
				
Bank angle sensor mounting screw	2	6	11 (1.18)	
Exhaust valve mounting bolt (front)	4	6	14 (1.410)	
Exhaust valve mounting bolt (rear)	4	6	14 (1.410)	
Exhaust valve cover mounting bolt	2	6	12 (1.29)	
Exhaust valve pulley nut	1	6	12 (1.29)	
Exhaust valve pulley cover mounting bolt	2	6	12 (1.29)	
O <sub>2</sub> sensor (California type only)	1	12	25 (2.619)	
<b>COOLING SYSTEM:</b>				
Cooling fan nut	1	5	3 (0.32, 2)	
Fan motor nut	2	5	5 (0.53, 6)	
Fan motor shroud mounting bolt	3	6	8 (0.85, 8)	
<b>ENGINE MOUNTING:</b>				
Main footpeg bracket mounting socket bolt	4	8	39 (4.029)	
Main footpeg mounting bolt	2	10	44 (4.533)	NOTE 8
Lower bracket mounting nut	2	10	42 (4.331)	See page 7-12
Lower bracket mounting pinch bolt	4	8	26 (2.720)	NOTE 7
Engine hanger bolt (front)	2	10	39 (4.029)	See page 7-7
Engine hanger bolt (middle)	2	12	54 (5.5, 40)	
Engine hanger nut (rear)	1	12	54 (5.5, 40)	
Rear engine hanger pinch bolt	1	8	26 (2.720)	
Side stand bracket bolt	2	10	44 (4.533)	NOTE 8
Side stand pivot bolt	1	10	10 (1.07)	
Side stand pivot lock nut	1	10	29 (3.022)	NOTE 7

## GENERAL INFORMATION

FRAME (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg·m, lbf·ft)	REMARKS
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Gearshift pedal link pinch bolt	1	6	10 (1.0, 7)	NOTE 8
<b>FRONT WHEEL/SUSPENSION/STEERING:</b>				
Handlebar pinch bolt	2	8	26 (2.7, 20)	
Handlebar weight mountign screw	2	6	10 (1.0, 7)	NOTE 8
Steering stem nut	1	24	103 (10.5, 76)	See page 13-30
Steering stem adjusting nut	1	26	20 (2.0, 14)	
Steering stem lock nut	1	26		
Fork top bridge pinch bolt	2	8	23 (2.3, 17)	
Fork bottom bridge pinch bolt	4	8	26 (2.7, 20)	
Front axle bolt	1	18	78 (8.0, 58)	
Front axle holder pinch bolt	4	8	22 (2.2, 16)	
Front brake disc mounting bolt	12	6	20 (2.0, 14)	NOTE 8
Fork bolt	2	42	23 (2.3, 17)	
Fork center bolt	2	10	34 (3.5, 25)	
<b>REAR WHEEL/SUSPENSION:</b>				
Rear axle nut	1	22	113 (11.5, 83)	NOTE 7
Rear brake disc mounting bolt	4	8	42 (4.3, 31)	NOTE 8
Driven sprocket nut	6	10	64 (6.5, 47)	NOTE 7
Rear shock absorber upper mounting nut	1	10	44 (4.5, 33)	NOTE 7
Rear shock absorber upper bracket mounting nut	1	16	93 (9.5, 69)	NOTE 7
Shock arm plate nut	3	10	44 (4.5, 33)	NOTE 7
Shock link nut (frame side)	1	10	44 (4.5, 33)	NOTE 7
Swingarm pivot nut	1	24	118 (12.0, 87)	NOTE 7
Swingarm pivot pinch bolt	2	8	26 (2.7, 20)	
Drive chain slider bolt	3	6	9 (0.9, 6.5)	NOTE 8
<b>HYDRAULIC BRAKE:</b>				
Front brake master cylinder cup mounting nut	1	6	6 (0.6, 4.3)	NOTE 7
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Front brake caliper mounting bolt	4	8	30 (3.1, 22)	NOTE 8
Caliper body assembly torx bolt	8	8	23 (2.3, 17)	NOTE 2
Front caliper pad pin	4	10	18 (1.8, 13)	
Rear caliper pad pin	1	10	18 (1.8, 13)	
Rear caliper pad pin plug	1	10	3 (0.3, 2.2)	
Brake caliper bleeder	3	8	6 (0.6, 4.3)	
Rear brake hose clamp screw	1	5	4 (0.4, 2.9)	NOTE 8
Brake pedal joint nut	1	8	18 (1.8, 13)	
Rear master cylinder push rod lock nut	1	8	18 (1.8, 13)	
Rear master cylinder hose joint screw	1	4	1 (0.15, 1.1)	NOTE 2
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	NOTE 2
Rear brake caliper bolt	1	8	23 (2.3, 17)	NOTE 2
Brake hose oil bolt	5	10	34 (3.5, 25)	
<b>LIGHTS/METERS/SWITCHES:</b>				
Ignition switch mounting one-way bolt	2	8	26 (2.7, 20)	NOTE 11
Side stand switch mounting bolt	1	6	10 (1.0, 7)	

## TOOLS

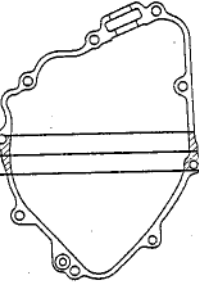
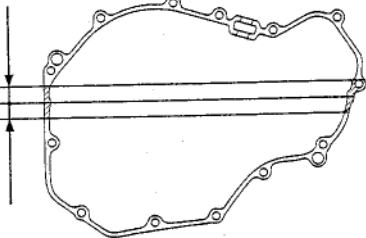
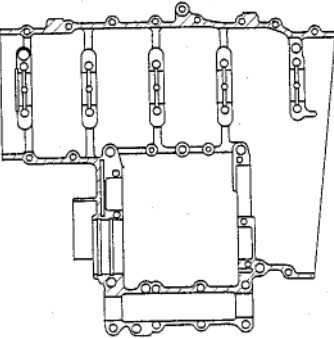
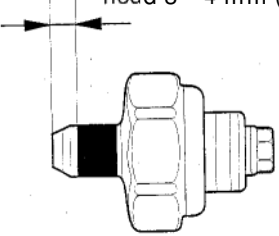
NOTES: 1. Equivalent commercially available in U.S.A.  
 2. Alternative tool.  
 3. Newly designed tool.  
 4. Not available in U.S.A.

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
ECM test harness, 26P	070MZ-0010100		5
Fuel pressure gauge	07406-0040003	NOTE 2: 07406-004000A (U.S.A. only)	5
Oil pressure gauge set	07506-3000001	NOTE 1	4
Oil pressure gauge attachment	07510-MA70000	NOTE 1	4
Clutch center holder	07724-0050002		9
Flywheel holder	07725-0040000	NOTE 1	10
Rotor puller	07733-0020001	NOTE 2: 07933-3950000 (U.S.A. only)	10
Attachment, 42 x 47 mm	07746-0010300		9, 13, 14
Attachment, 52 x 55 mm	07746-0010400		14
Attachment, 22 x 24 mm	07746-0010800		14
Attachment, 40 x 42 mm	07746-0010900		14
inner driver, 40 mm I.D.	07746-0030100		12
Attachment, 25 mm I.D.	07746-0030200		12
Pilot, 17 mm	07746-0040400		14
Pilot, 25 mm	07746-0040600		13, 14
Pilot, 35 mm	07746-0040800		9
Bearing remover shaft	07746-0050100		13, 14
Bearing remover head, 25 mm	07746-0050800		13, 14
Driver	07749-0010000		9, 13, 14
Valve spring compressor	07757-0010000		8
Valve seat cutter		NOTE 1	8
Seat cutter, 24.5 mm (45° EX)	07780-0010100	—	
Seat cutter, 29 mm (45° IN)	07780-0010300	—	
Flat cutter, 28 mm (32° EX)	07780-0012100	—	
Flat cutter, 30 mm (32° IN)	07780-0012200	—	
interior cutter, 26 mm (60° EX)	07780-0014500	—	
Interior cutter, 30 mm (60° IN)	07780-0014000	—	
Cutter holder, 4.5 mm	07781-0010600	—	
Snap ring pliers	07914-SA50001		15
Steering stem socket	07916-3710101	NOTE 2: 07916-3710100 (U.S.A. only)	13
Rod holder, 24 x 27 mm	07930-KA50100		7, 14
Driver attachment, A	07946-KM90100	NOTE 4	13
Driver shaft assembly	07946-KM90300	NOTE 4	13
Bearing remover, A	07946-KM90401	NOTE 4	13
Assembly base	07946-KM90600	NOTE 4	13
Steering stem driver	07946-MB00000		13
Driver shaft	07946-MJ00100		14
Fork seal driver body	07947-KA50100		13
Driver	07949-3710001		14
Valve spring compressor attachment	07959-KM30101		8
Driver shaft	07964-MB00200		12
Oil filter wrench	07HAA-PJ70101	NOTE 2: 07HAA-PJ70100	3, 4
Peak voltage adaptor	07HGJ-0020100	NOTE 4 NOTE 1: IgnitionMate peak voltage tester (U.S.A. only)	5, 17, 19
Tappet hole protector	07HMG-MR70002	NOTE 4	8
Valve guide driver, 4.5 mm	07HMD-ML00101		8
Valve guide reamer, 4.5 mm	07HMH-ML00101	NOTE 1: 07HMH-ML0010A (U.S.A. only)	8
Drive chain tool set	07HMH-MR10103	NOTE 1: 07HMH-MR1010C (U.S.A. only)	3
Needle bearing remover	07LMC-KV30100		14
Vacuum gauge set	07LMJ-001000A		5
Pilot, 32 x 50 mm	07MAD-PR90200		14

## GENERAL INFORMATION

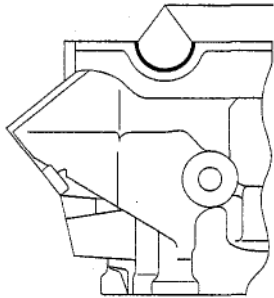
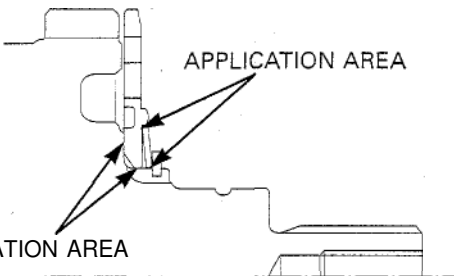
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Race remover	07NMF-MT70110	NOTE 4	13
Driver attachment	07NMF-MT70120	NOTE 4	13
Compression gauge attachment	07RMJ-MY50100		8
Fork damper holder handle	07TMB-001010A		13
Installer attachment, A	07VMF-MAT0100	U.S.A. only	13
Installer attachment, B	07VMF-MAT0200	U.S.A. only	13
Remover attachment, A	07VMF-MAT0300	U.S.A. only	13
Remover attachment, B	07VMF-MAT0400	U.S.A. only	13
Fork damper holder	07YMB-MCF0101		13
Oil seal driver	07YMD-MCF0100	NOTE 1: 07NMD-KZ3010A (U.S.A. only)	13
Driver attachment, 25 x 38.5 mm	07YMD-MCJ0100		14
Installer shaft guide	07YMF-MCJ0100	NOTE 2: 07YMF-MCJA100 (U.S.A. only)	5
Installer shaft	07YMF-MCJ0200	NOTE 2: 07YMF-MCJA200 (U.S.A. only)	5
installer shaft, 14 x 30 mm	07YMF-MCJ0300	NOTE 2: 07YMF-MCJA300 (U.S.A. only)	5
Remover, 14 x 16 mm	07YMF-MCJ0400	NOTE 2: 07YMF-MCJA400 (U.S.A. only)	5
Cam chain tensioner holder	07ZMG-MCAA400	U.S.A. only	3, 8
Battery tester	BM-210-AH	NOTE 2: BM-210 (U.S.A. only)	16

LUBRICATION & SEAL POINTS

LOCATION	MATERIAL	REMARKS
Crankcase mating surface	Liquid sealant (Three Bond 1207B or equivalent)	
<div></div> <p>10 - 15 mm (0.4 - 0.6 in)</p> <p>10 - 15 mm (0.4 - 0.6 in)</p> <p>10 - 15 mm (0.4 - 0.6 in)</p>		
Oil pan mating surface		
Right crankcase cover mating surface		
Oil pressure switch threads	Do not apply sealant to the thread head 3 - 4 mm (0.1 - 0.2 in)	
		



## GENERAL INFORMATION

ENGINE (Cont'd)		
LOCATION	MATERIAL	REMARKS
Cylinder head semi-circular cut-out 	Sealant	
Main journal bearing surface Piston pin sliding surface Connecting rod bearing surface Connecting rod small end inner surface Crankshaft thrust surface Camshaft lobes/journals and thrust surface Valve stem (valve guide sliding surface) Valve lifter outer sliding surface Clutch outer/primary driven gear sliding surface Clutch outer guide sliding surface M3/4, C5, C6 shifter gear (shift fork grooves) Starter reduction gear shaft outer surface Cylinder head special bolt (after removing anti-rust oil additive) Primary sub-gear friction spring sliding surface 	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Piston ring sliding area Oil strainer packing Clutch disc surface Starter one-way clutch sliding surface Connecting rod nut threads Flywheel bolt threads and seating surface Main journal 9 mm bolt threads and seating surface (after removing anti-rust oil additive) Clutch center lock nut threads Oil filter cartridge threads and O-ring Camshaft holder bolt threads and seating surface Oil cooler center bolt threads Each gear teeth and rotating surface Each bearing rotating area Each O-ring Other rotating area and sliding surface	Engine oil	

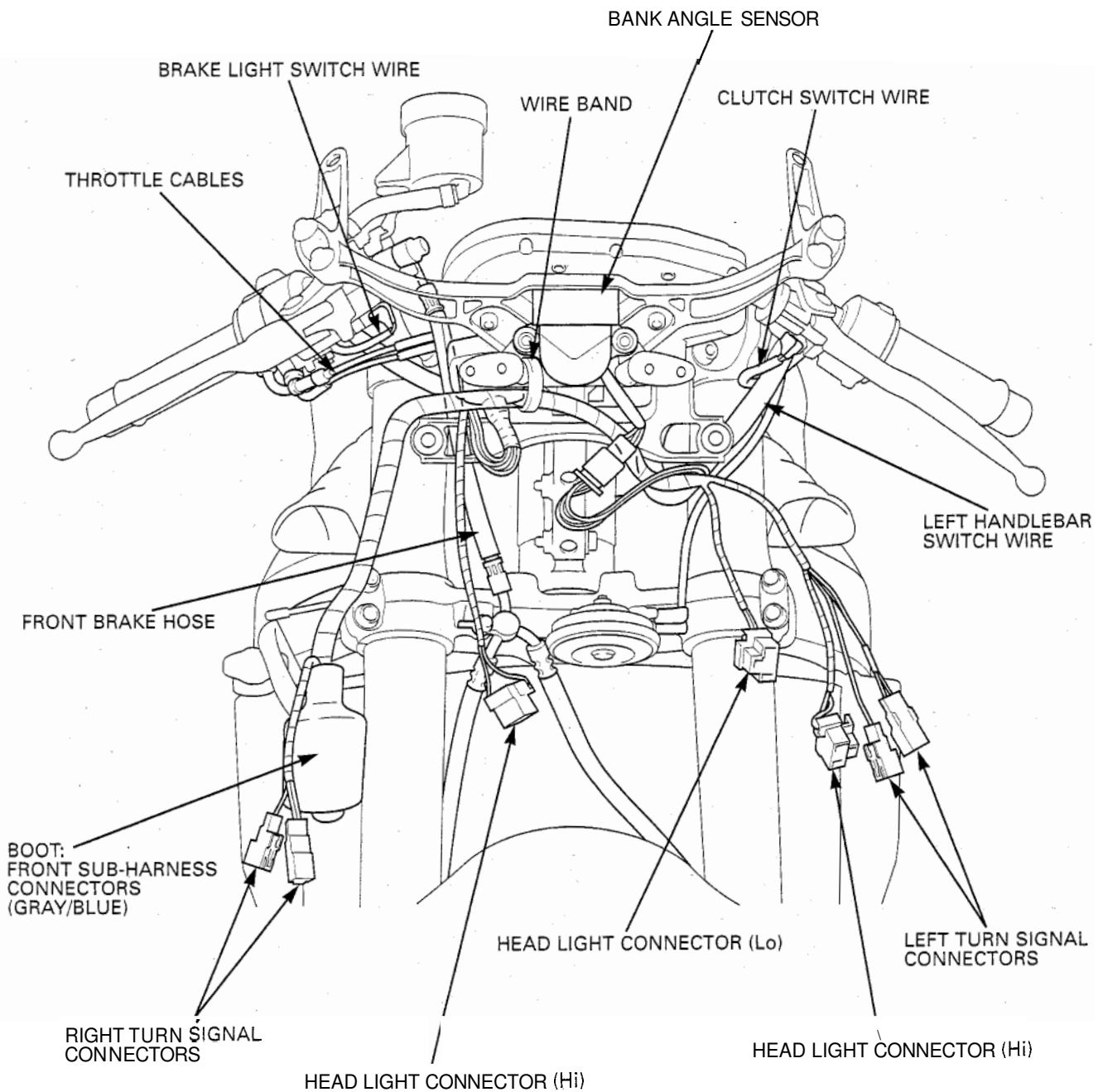
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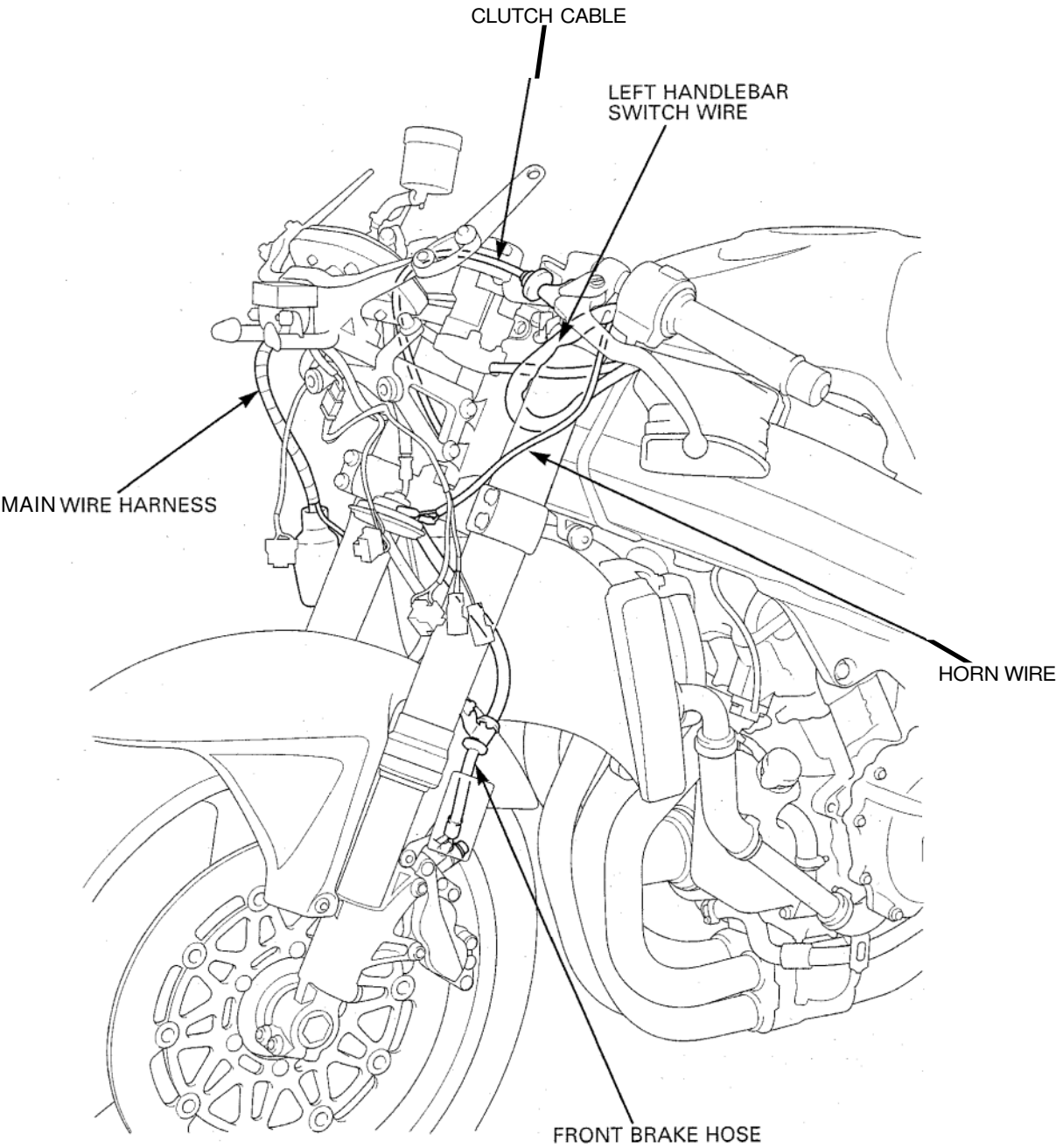
LOCATION	MATERIAL	REMARKS
Timing hole cap threads Each oil seal lip	Multi-purpose grease	
Upper crankcase sealing bolt threads Lower crankcase sealing bolt threads Cam chain guide A mounting bolt threads Cam pulse generator rotor bolt threads Cylinder head sealing bolt threads Cylinder head cover breather joint threads Starter one-way clutch outer bolt threads Oil pump driven sprocket bolt threads Shift drum bearing set plate bolt threads Mainshaft bearing set plate bolt threads Cam sprocket bolt threads Cylinder head cover breather plate bolt threads Shift drum center bolt threads Cam chain tensioner pivot bolt threads Cam chain guide pivot bolt threads Gearshift return spring pin	Locking agent	Coating width: $6.5 \pm 1$ mm

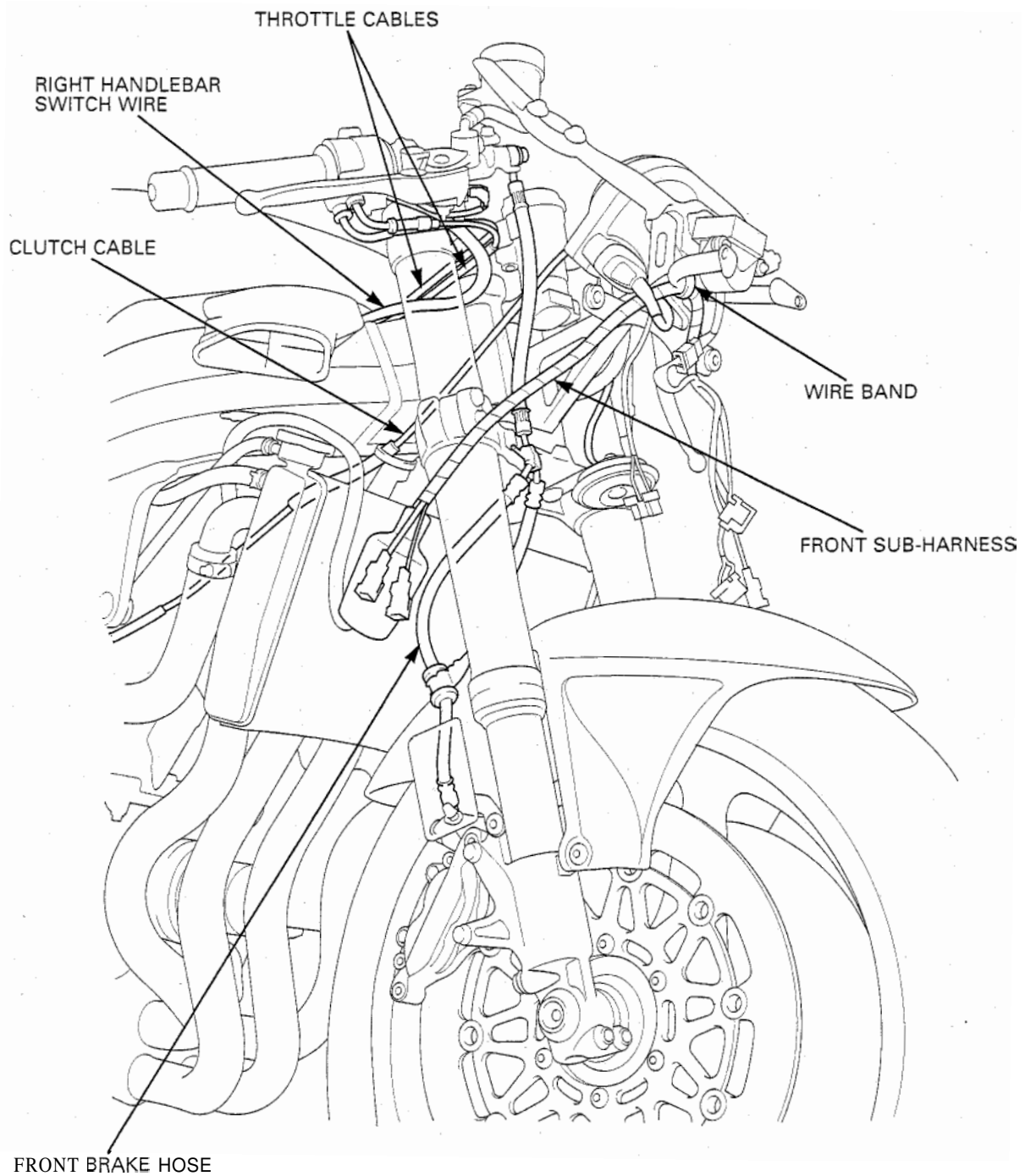
## GENERAL INFORMATION

FRAME		
LOCATION	MATERIAL	REMARKS
Front wheel dust seal lips Rear wheel dust seal lips Rear wheel hub O-ring Footpeg sliding area Pillion footpeg sliding area Rear brake pedal pivot sliding area Gearshift pedal pivot sliding area Gearshift pedal tie-rod ball joint Clutch lever pivot bolt sliding area Throttle pipe sliding area Pillion seat pivot sliding area Pillion seat catch hook Pillion seat spring sliding area Side stand pivot surface Throttle pipe cable sliding surface	Multi-purpose grease	
Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot bearings	Urea based multi-purpose grease for extreme pressure (example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan, Shell Stamina EP2) or equivalent	
Swingarm pivot bearings Swingarm pivot dust seal lips Shock arm and link dust seal lips Shock arm and link needle bearings Shock absorber needle bearing Shock absorber dust seal lips	Multi-purpose grease (Shell Alvania EP2 or equivalent)	
Side stand pivot surface Throttle pipe cable sliding surface	Molybdenum disulfide grease	
Shock absorber spring adjuster cam surface	Molybdenum paste	
Steering stem top thread Brake pipe joint threads	Engine oil	
Throttle cable A, B casing inner Clutch cable casing inner Variable air intake valve cable inner Exhaust gas control valve cable A, B casing inner	Cable lubricant	
Brake master cylinder cups Brake caliper piston seals	DOT 4 brake fluid	
Brake caliper dust seals Front brake lever pivot and piston tips Rear master cylinder boot inside and push rod tips Rear brake caliper slide pin surface	Silicone grease	
Rear brake caliper slide pin threads Rear master cylinder hose joint screw threads Driven sprocket stud bolt threads	Locking agent	
Handlebar grip rubber inside	Honda Bond A	
Fork cap O-ring Fork oil seal lips	Fork fluid	

## CABLE & HARNESS ROUTING

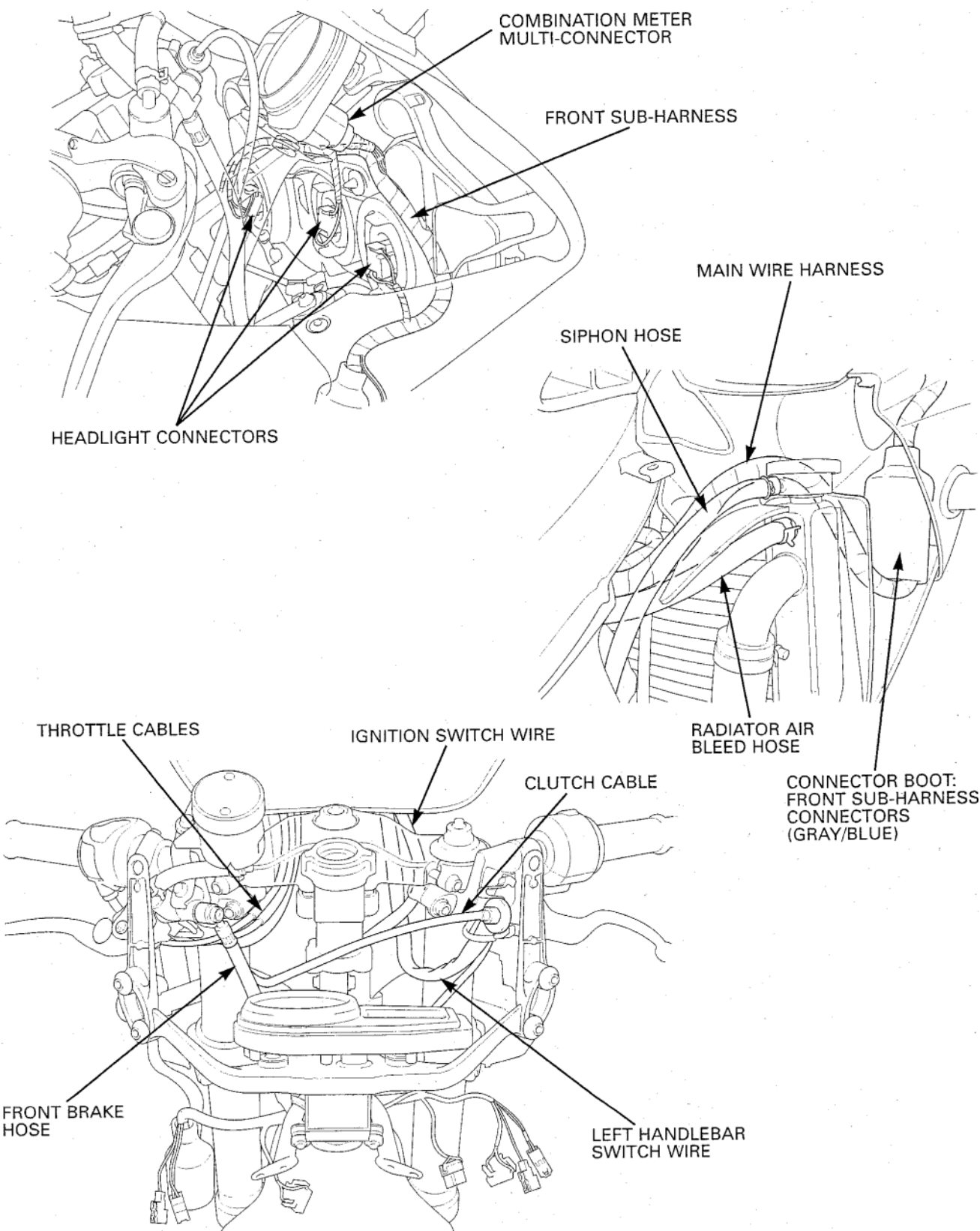




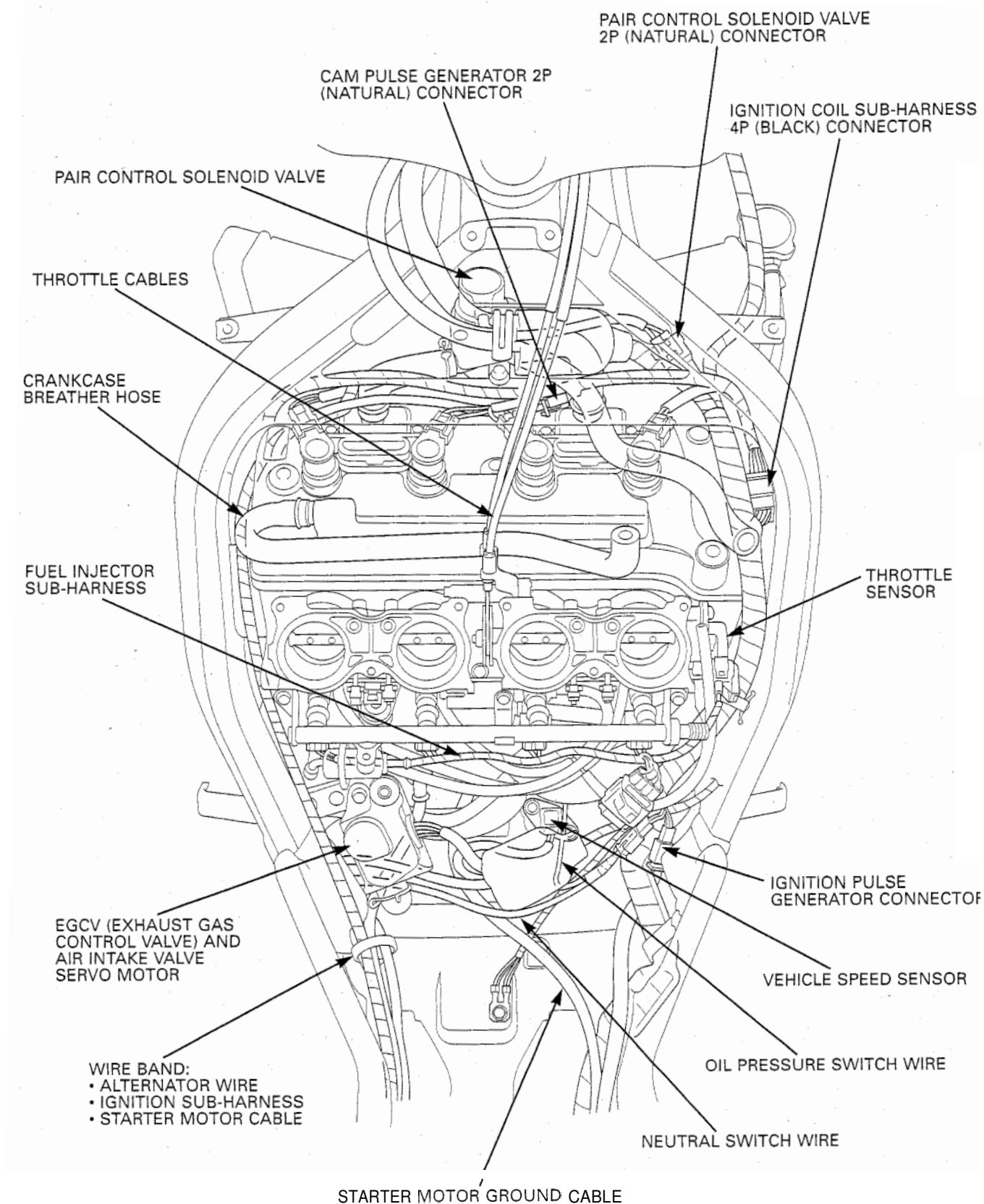


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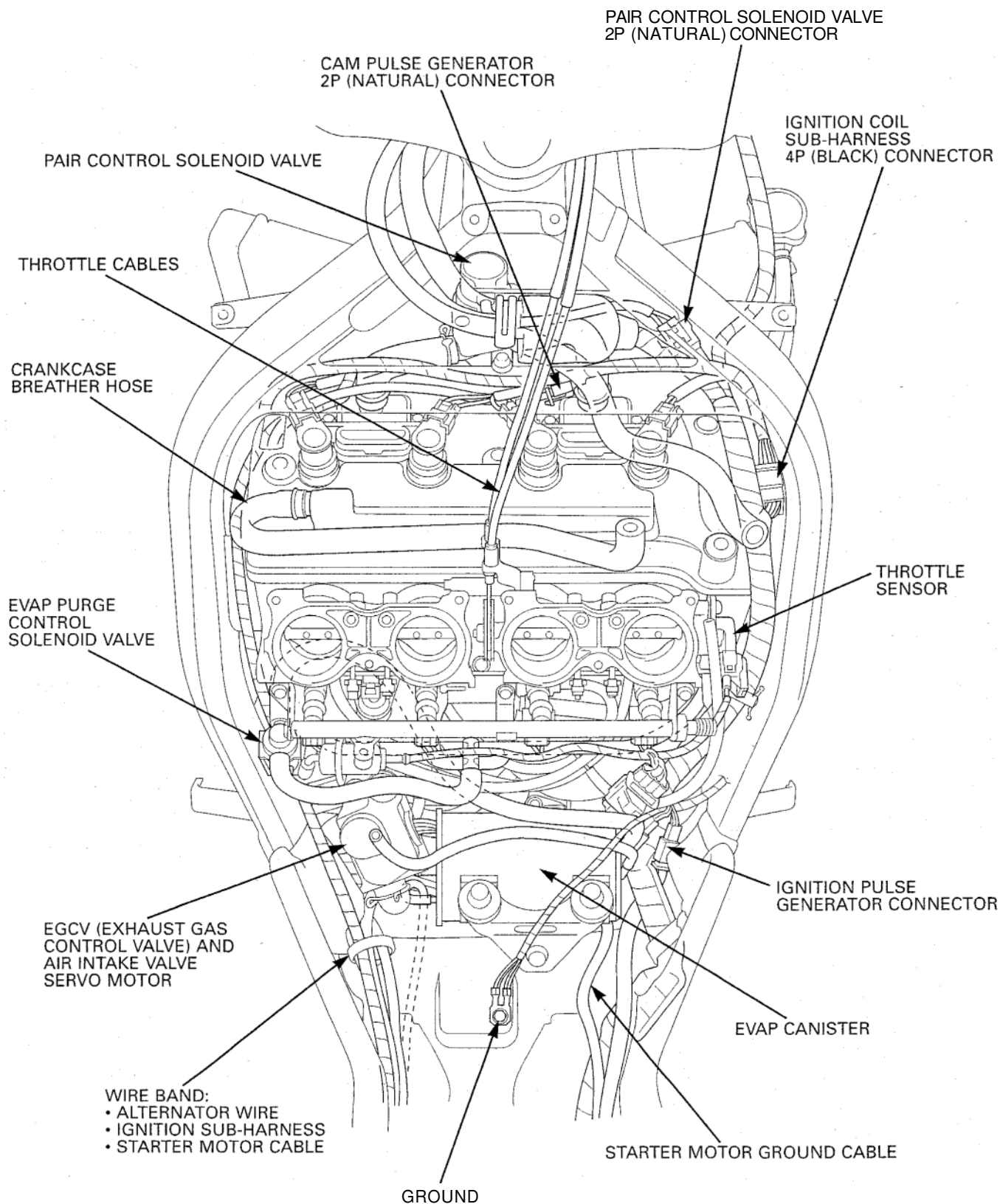
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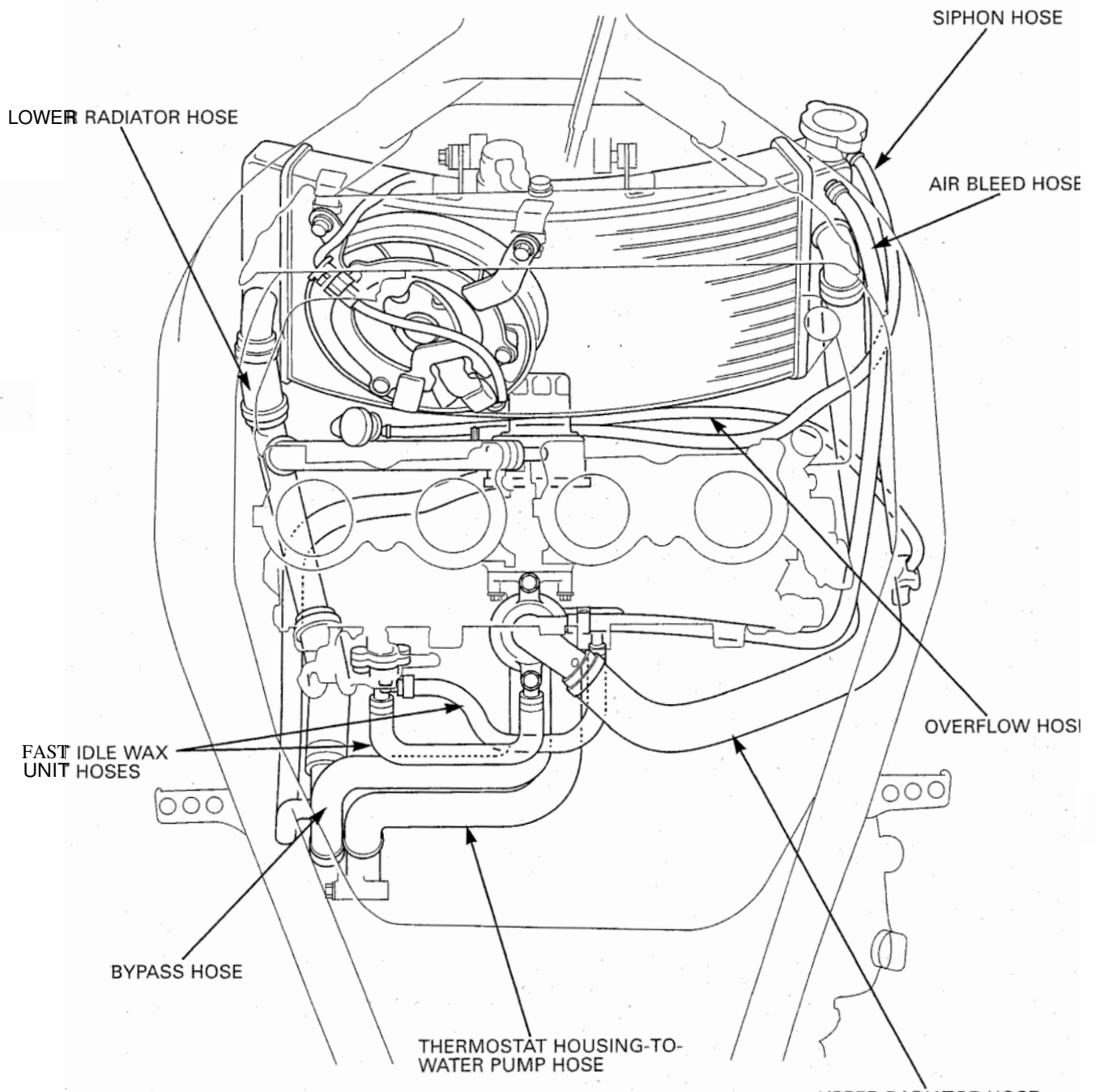




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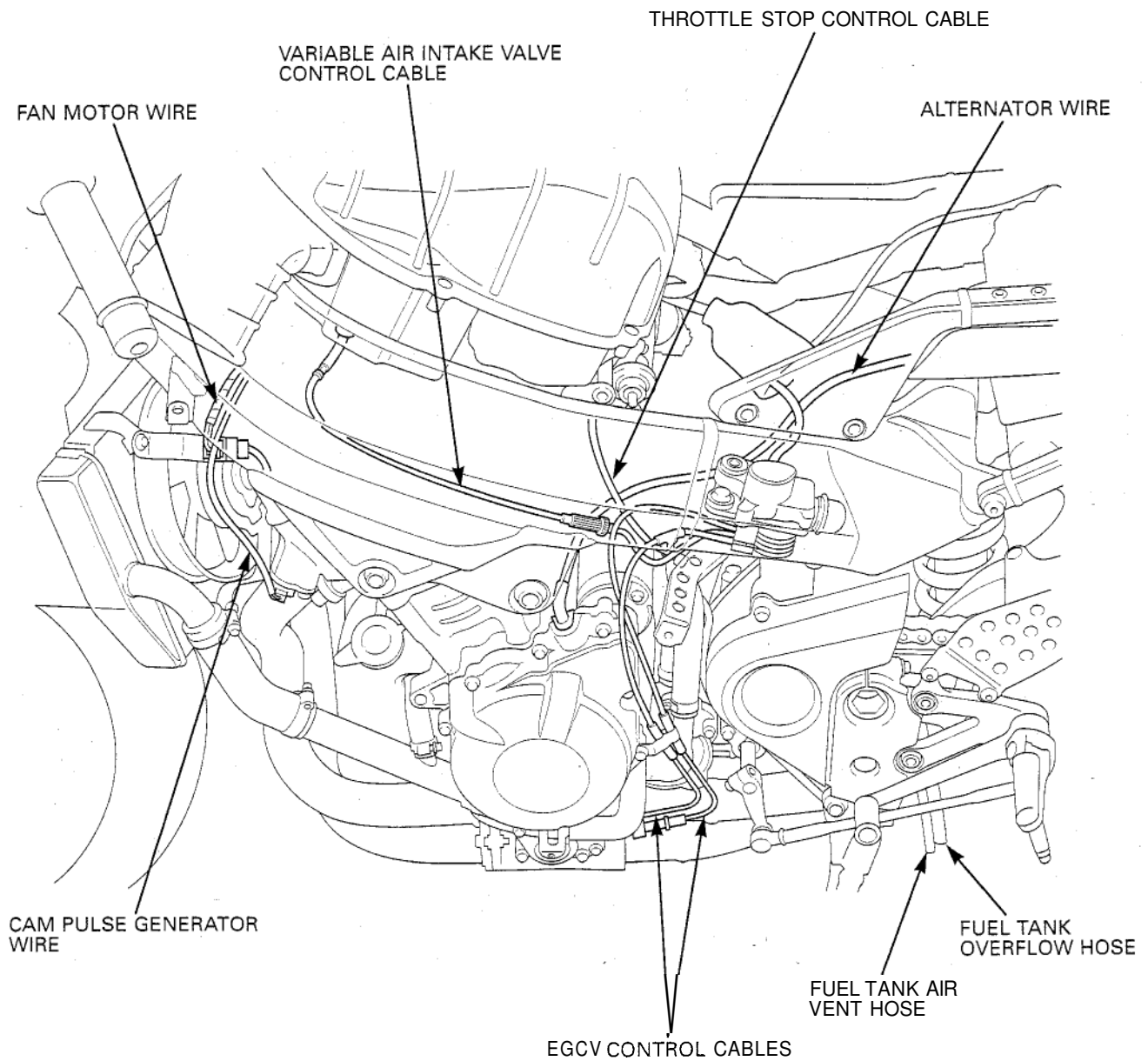
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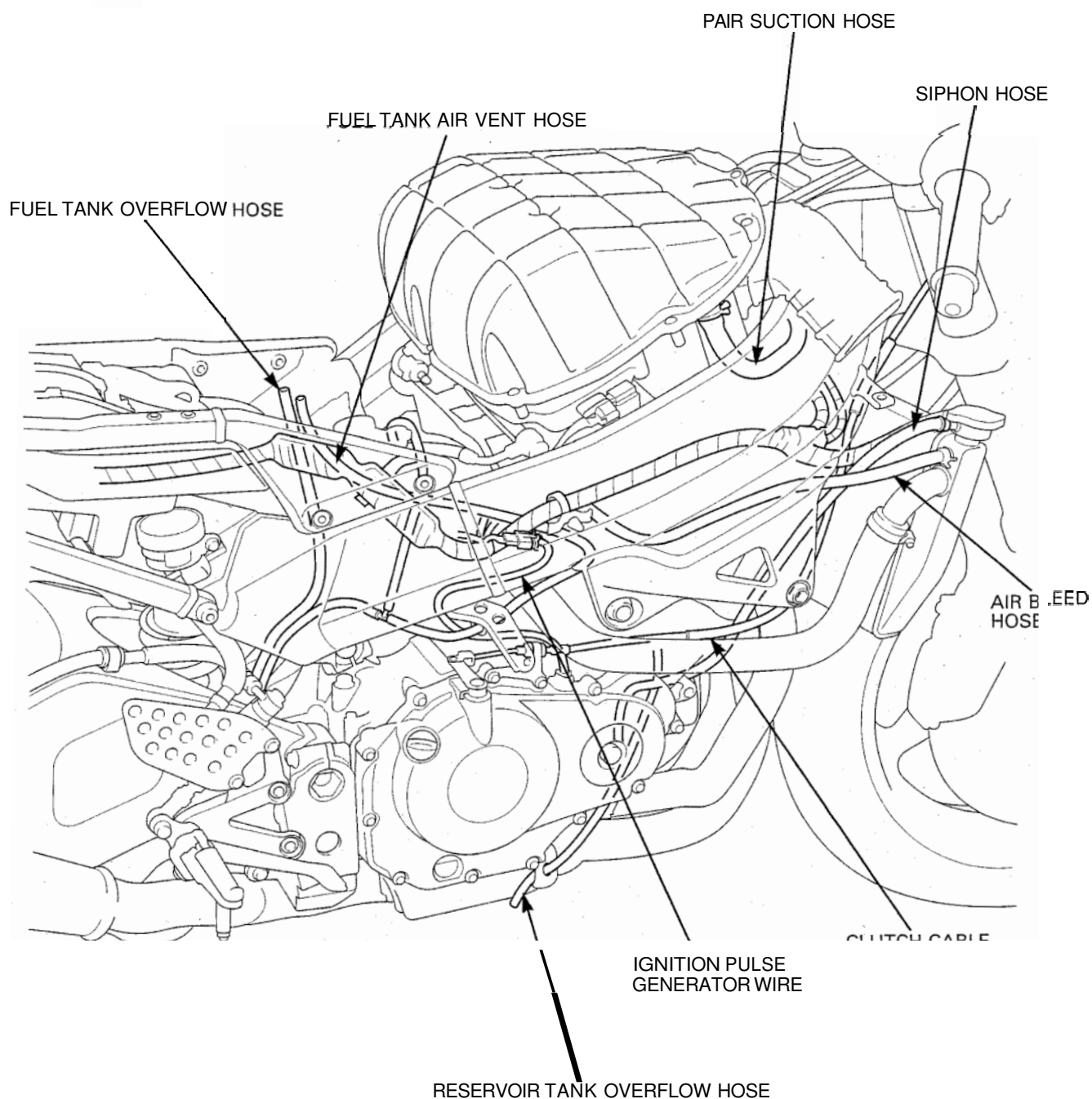


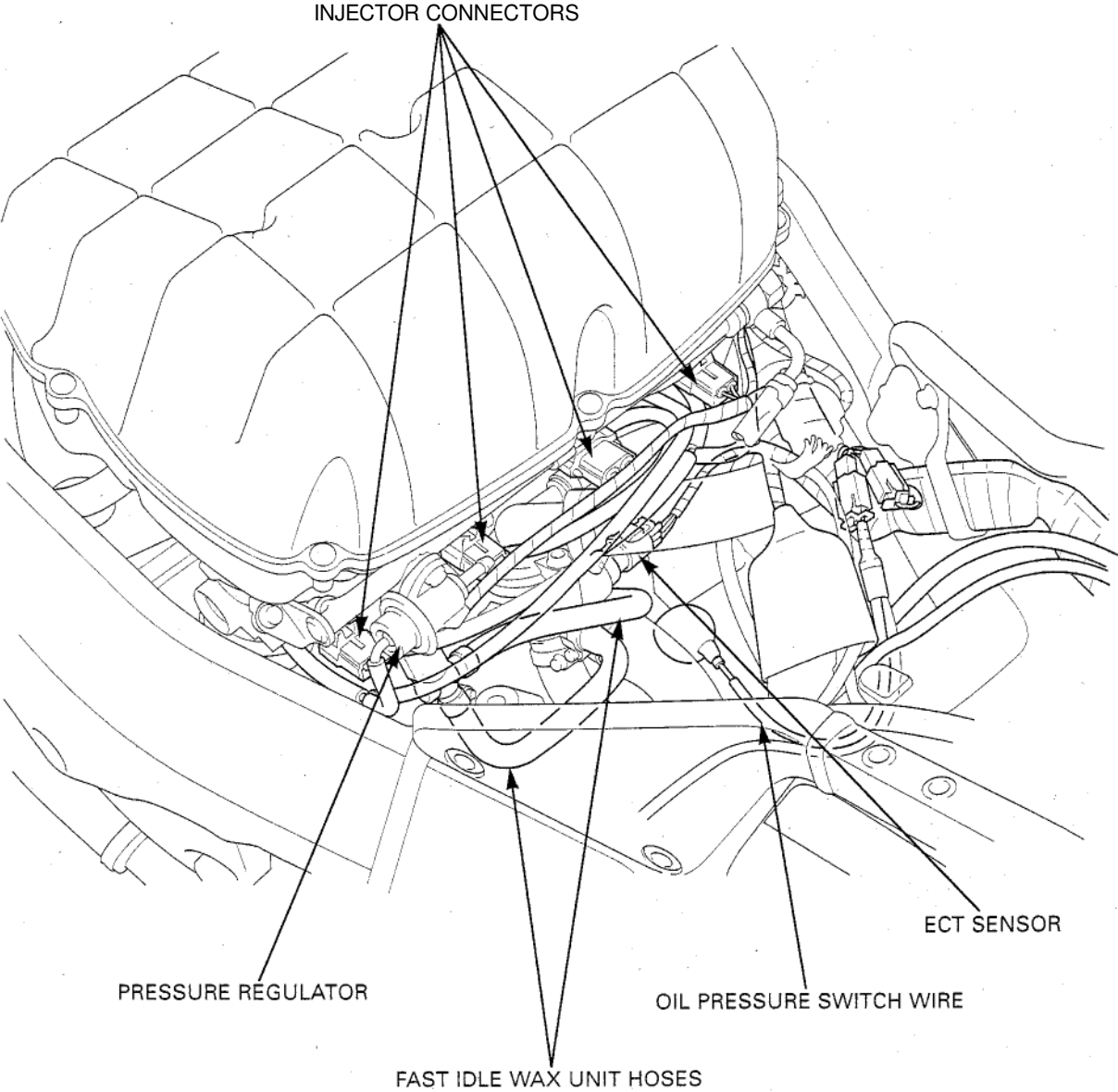


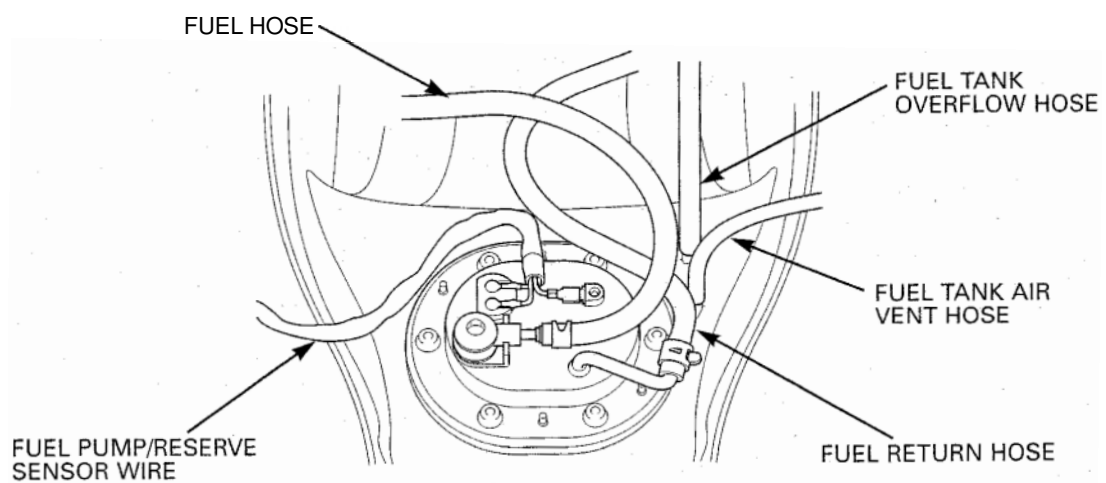
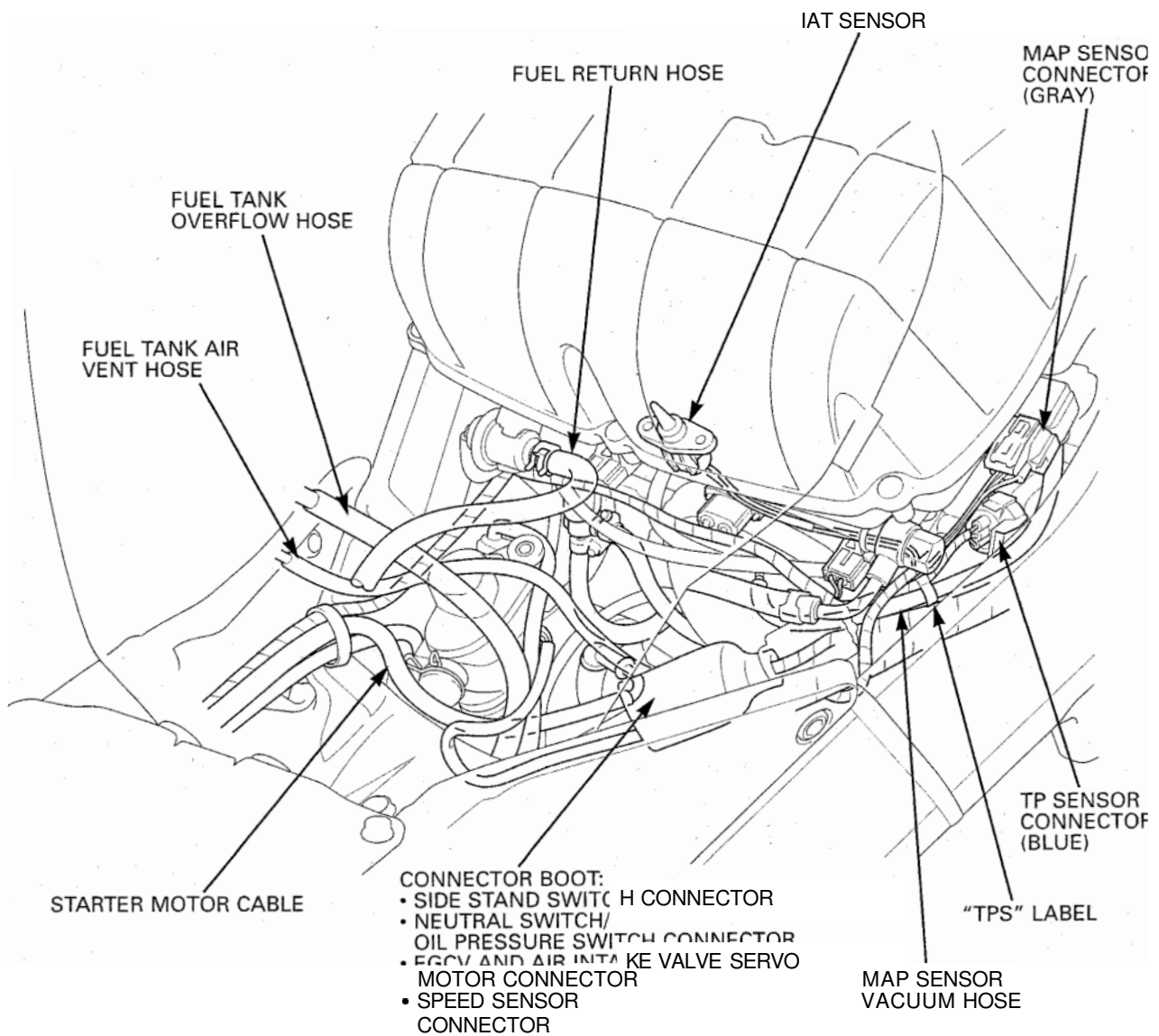
## GENERAL INFORMATION

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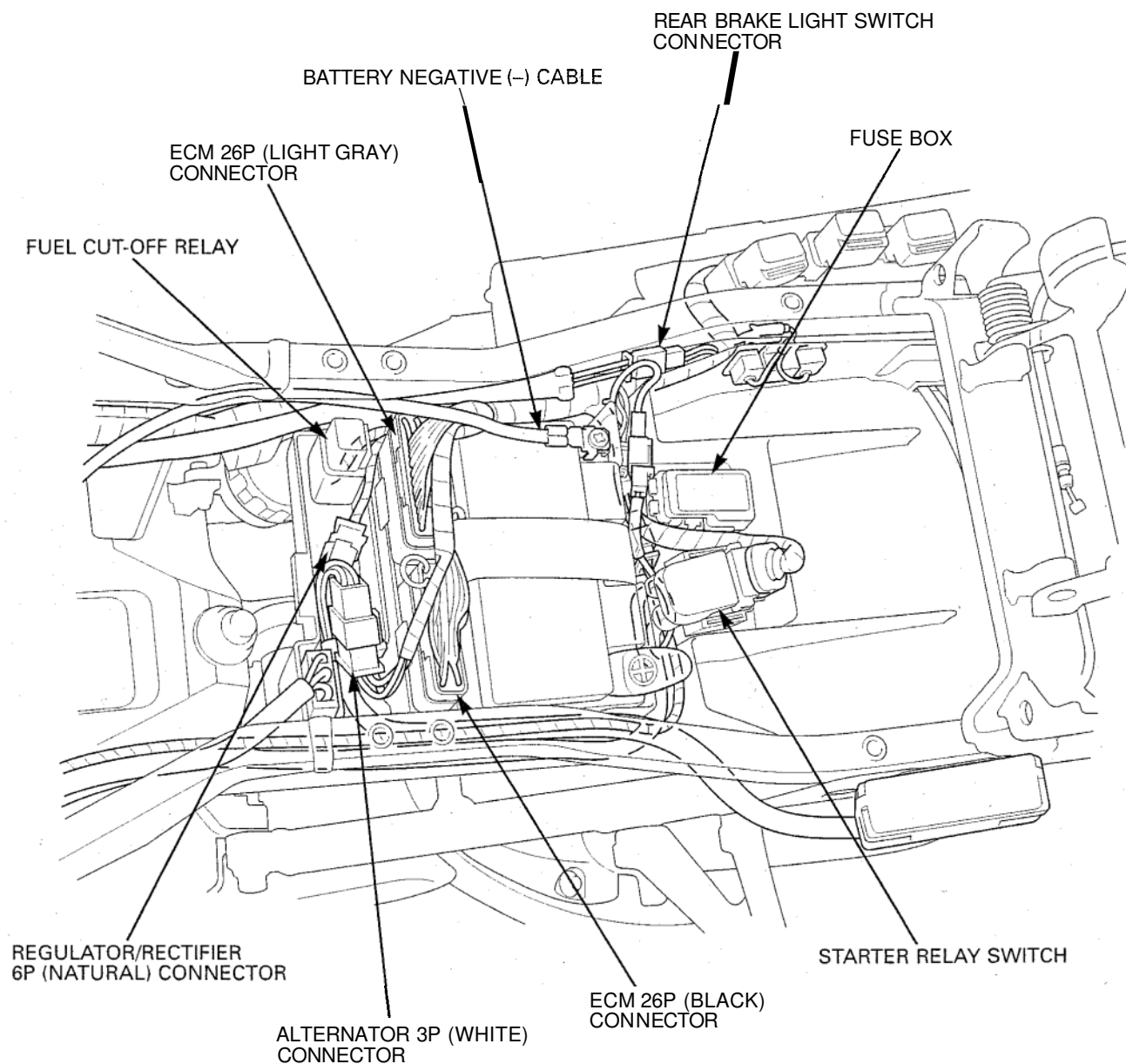


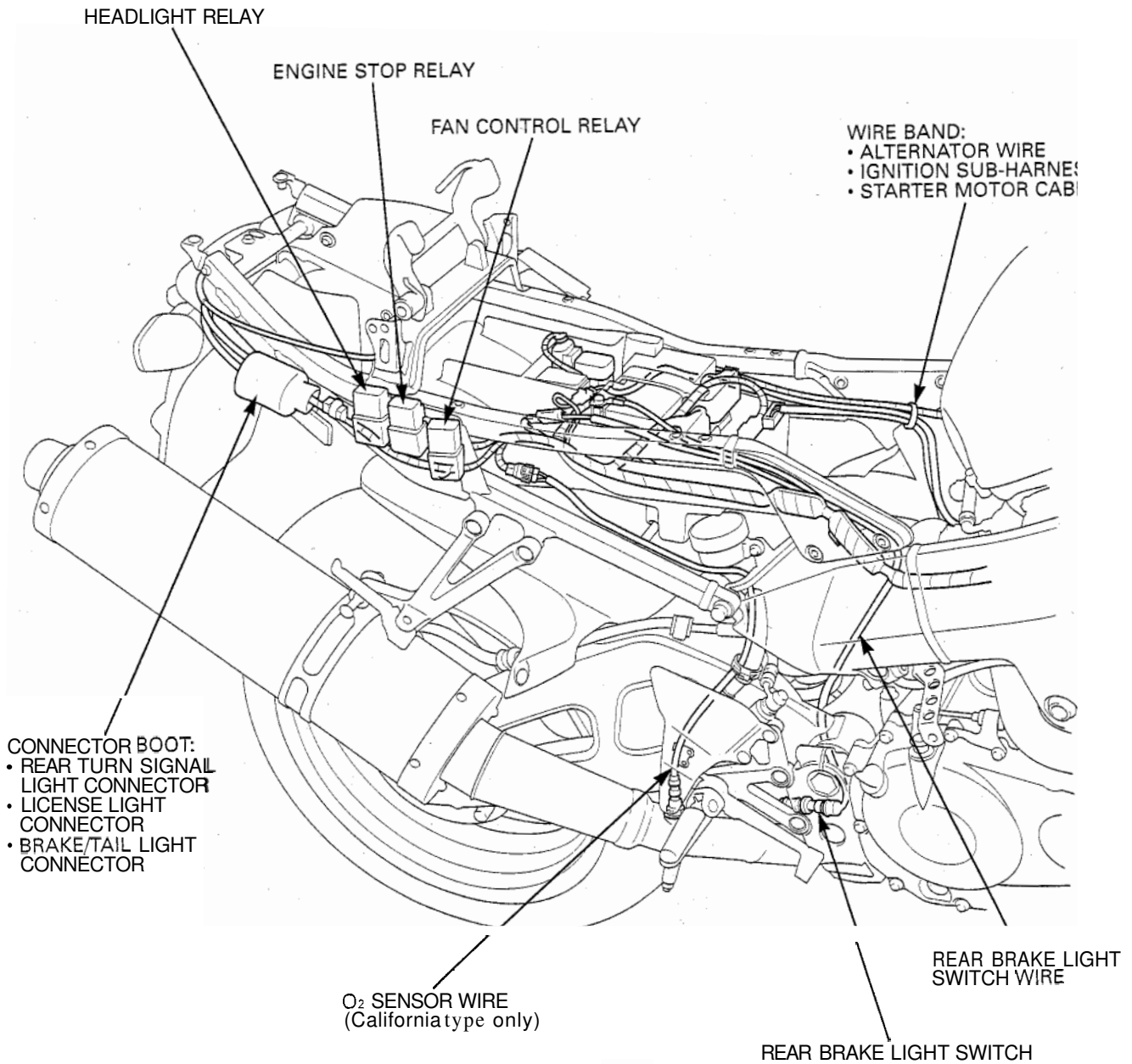




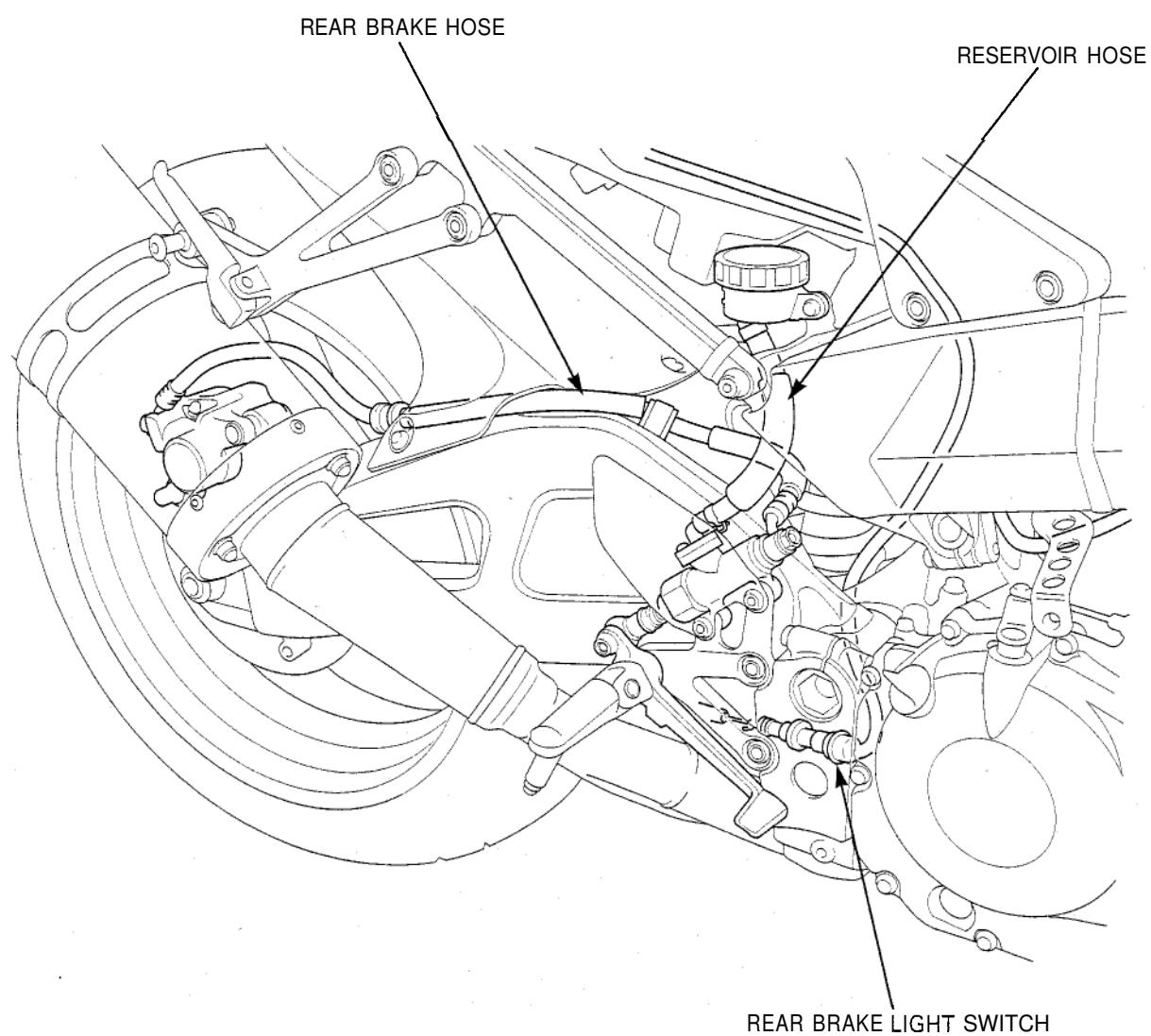
## GENERAL INFORMATION

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## EMISSION CONTROL SYSTEMS

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

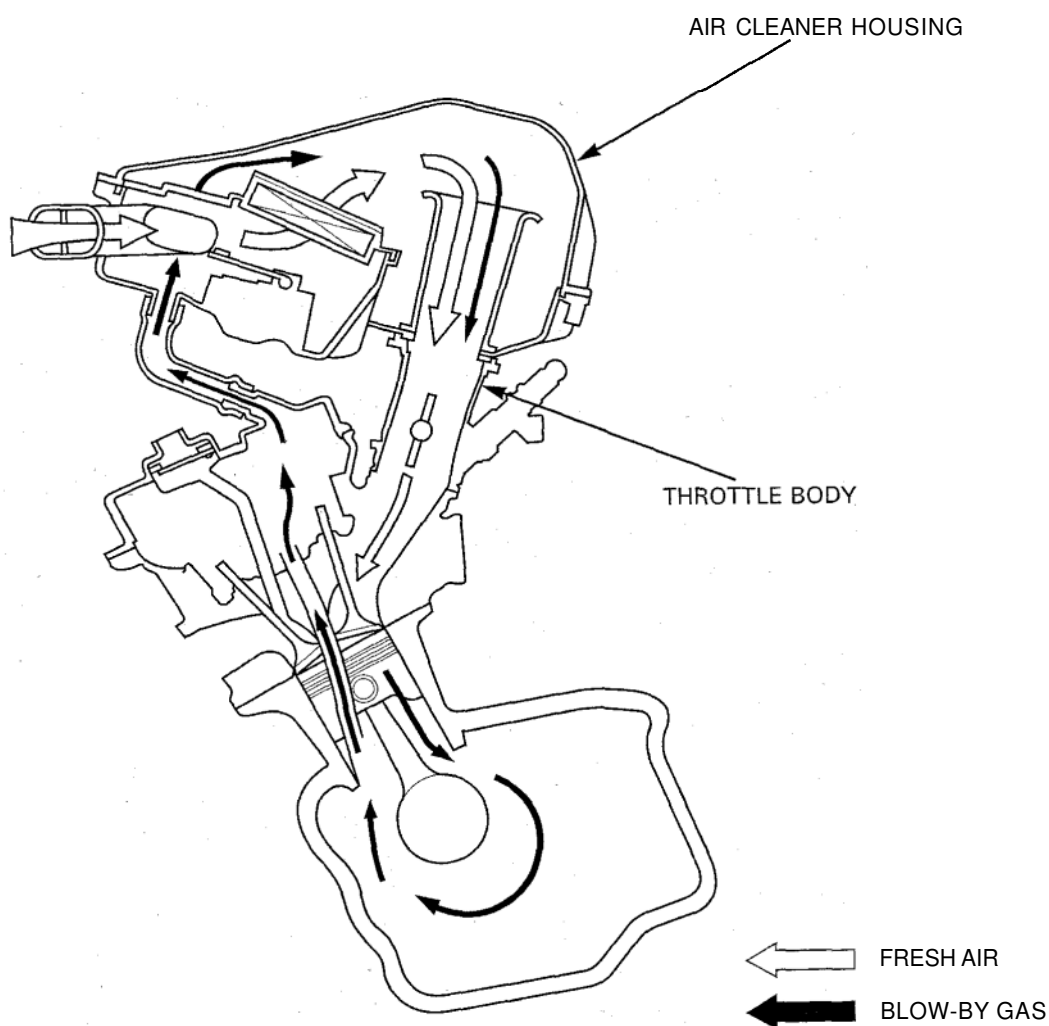
### SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons 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. utilizes lean injection settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

### CRANKCASE EMISSION CONTROL SYSTEM

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



## GENERAL INFORMATION

### EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

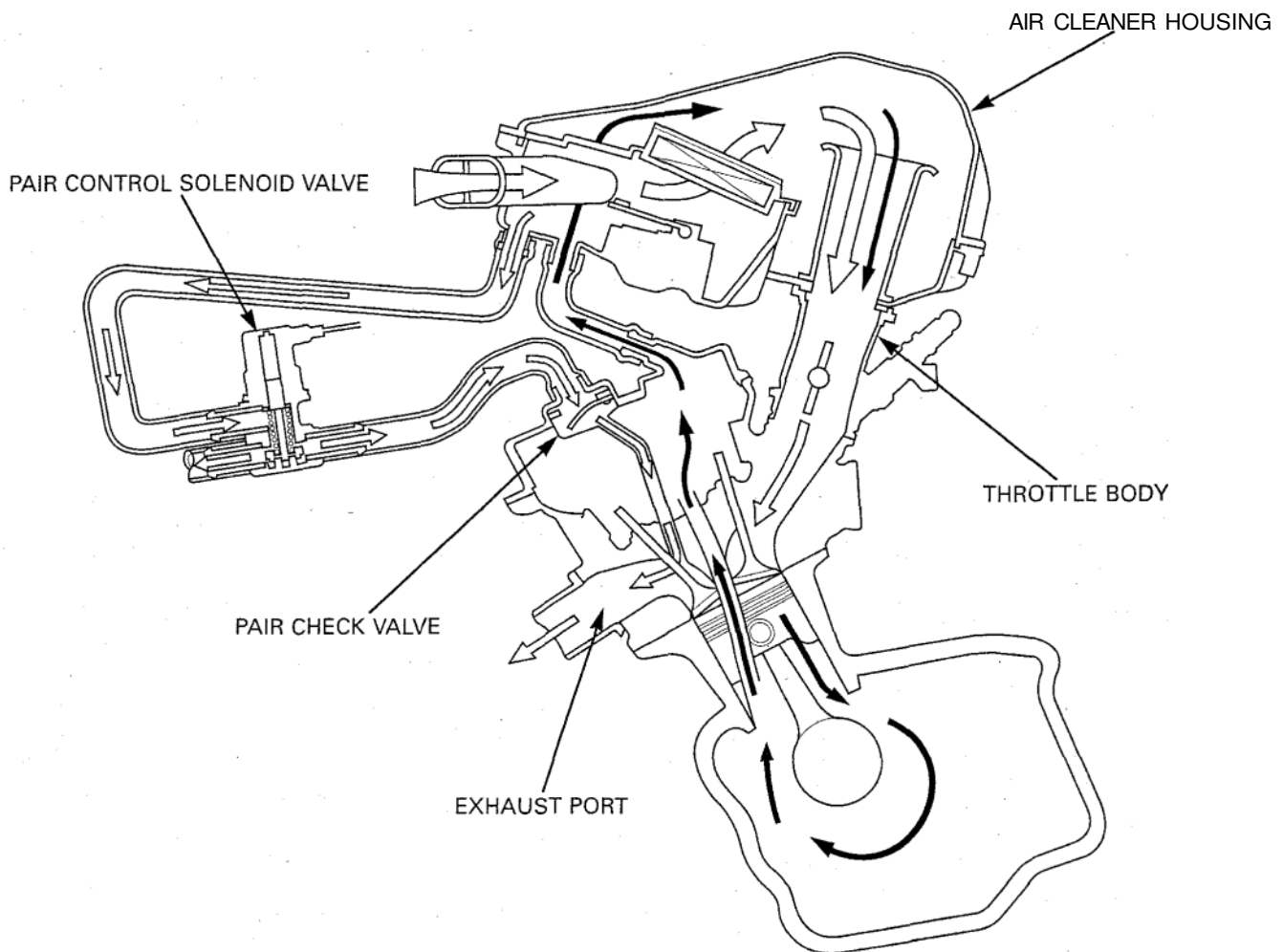
The exhaust emission control system is composed of a lean fuel injection setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

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

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

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

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



#### California type:

The California type is equipped with two three-way warm-up catalytic converters, a three-way catalytic converter, and a heated oxygen sensor.

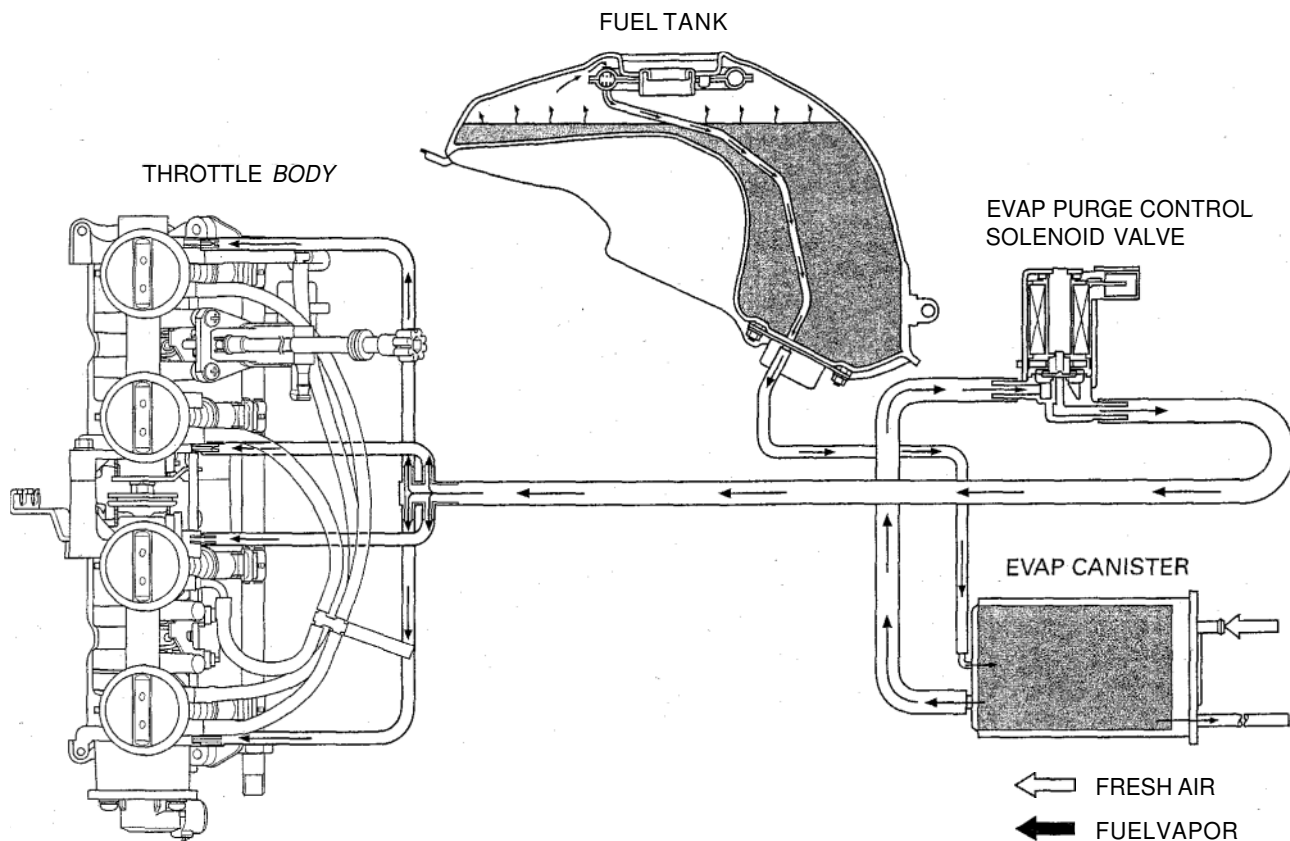
The three-way catalytic converters are in the exhaust system. Through chemical reactions, they convert HC, CO, and NO<sub>x</sub> in the engine's exhaust to carbon dioxide (CO<sub>2</sub>), dinitrogen (N<sub>2</sub>), and water vapor.

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

**EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)**

This model complies with CARB evaporative emission requirements.

Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control solenoid 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 prohibits, or Canadian provincial law prohibits the following acts or the causing there of: (1) The removal or rendering inoperative by any person, other than for the purposes of maintenance, repair or replacement, of any device or element of design incorporated into any vehicle for the purpose of noise control prior to its sale or delivery to the ultimate customer or while it is in use; or (2) the use of any vehicle after such device or element of design has been removed or rendered inoperative by any person.

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

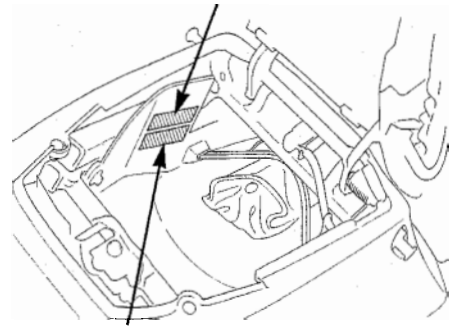
1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system,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

## GENERAL INFORMATION

### EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the storage compartment as shown. The seat must be removed to read it. It gives base tune-up specifications.

EMISSION CONTROL INFORMATION LABEL

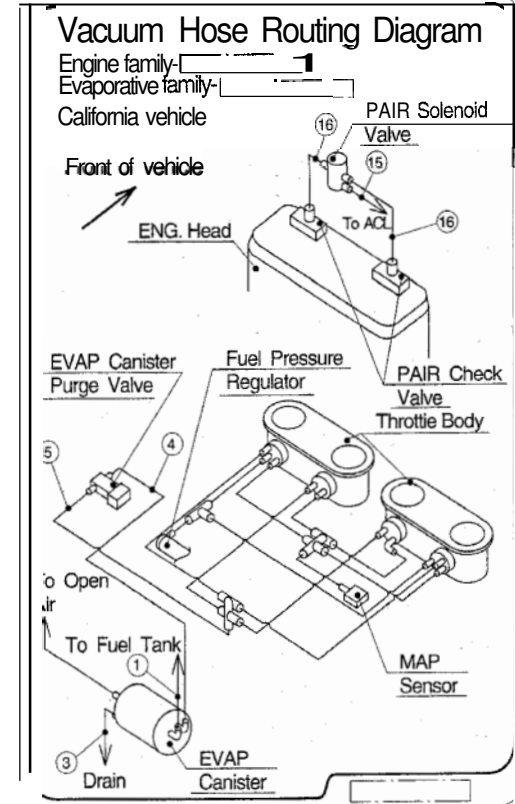
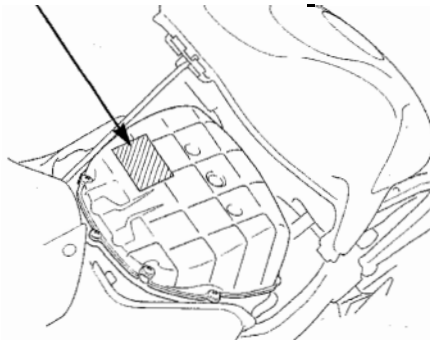


EMISSION CONTROL INFORMATION LABEL (Canada only)

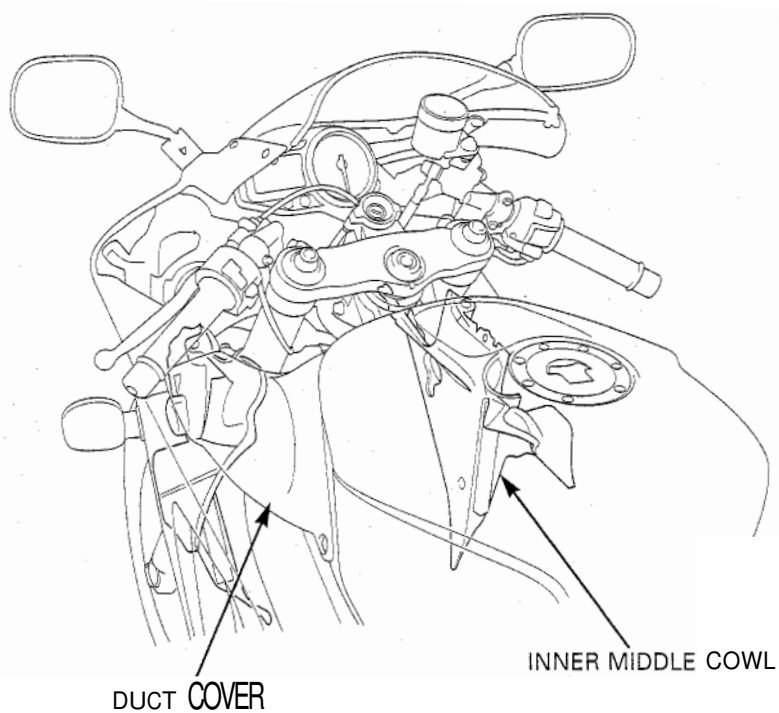
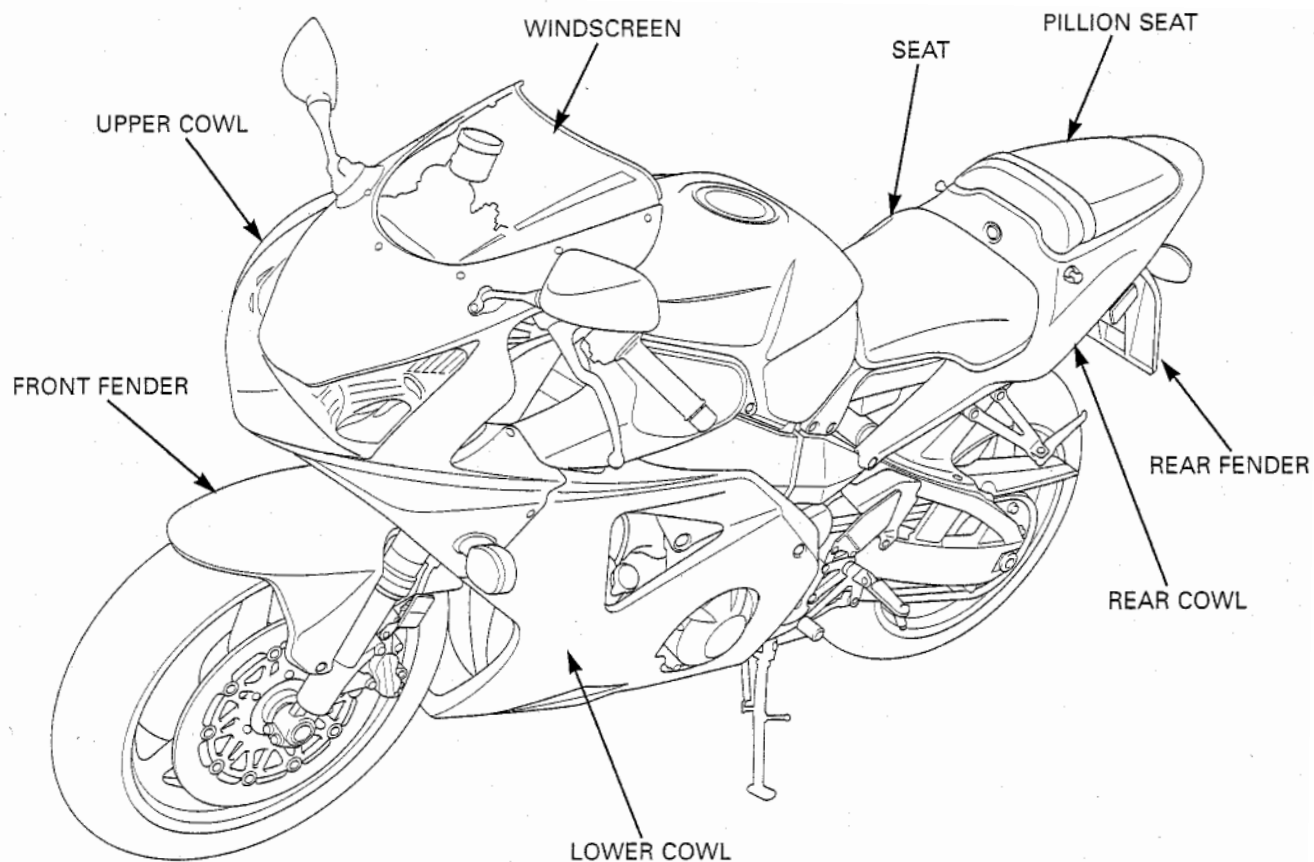
### VACUUM HOSE ROUTING DIAGRAM LABEL (CALIFORNIA TYPE ONLY)

The Vacuum Hose Routing Diagram Label is on the air cleaner housing cover as shown. The fuel tank must be opened to read it. Refer to page 3-4 for fuel tank opening.

VACUUM HOSE ROUTING DIAGRAM LABEL



## BODY PANEL LOCATIONS



# 2, FRAME/BODY PANEL EXHAUST SYSTEM

2

BODY PANEL LOCATIONS	2-0	LOWER COWL	2-7
SERVICE INFORMATION	2-1	INNER MIDDLE COWL	2-7
TROUBLESHOOTING	2-1	WINDSCREEN	2-8
SEAT	2-2	FRONT FENDER	2-8
PILLION SEAT/REAR COWL	2-2	REAR FENDER	2-9
DUCT COVER	2-4	SEAT RAIL	2-11
UPPER COWL	2-5	MUFFLER/EXHAUST PIPE	2-13

## 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 clamps 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

Upper cowl pan screw	1.5 N•m (0.15 kgf•m, 1.1 lbf•ft)	
Lower cowl pan screw	1.5 N•m (0.15 kgf•m, 1.1 lbf•ft)	
Rear cowl truss screw	1.5 N•m (0.15 kgf•m, 1.1 lbf•ft)	
Pillion seat mounting nut	11 N•m (1.1 kgf•m, 8 lbf•ft)	U-nut
Pillion seat hinge special screw	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Duct cover mounting screw	1.5 N•m (0.15 kgf•m, 1.1 lbf•ft)	
Windscreen mounting screw	0.3 N•m (0.03 kgf•m, 0.22 lbf•ft)	
Seat rail mounting bolt, 8 mm	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Seat rail mounting nut, 10 mm	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Pillion step mounting socket bolt	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Exhaust pipe joint nut	12 N•m 1.2 kgf•m, 9 lbf•ft)	
EGCV cover mounting bolt	12 N•m 1.2 kgf•m, 9 lbf•ft)	
EGCV pulley cover mounting bolt	12 N•m 1.2 kgf•m, 9 lbf•ft)	

## TROUBLESHOOTING

### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

### SEAT

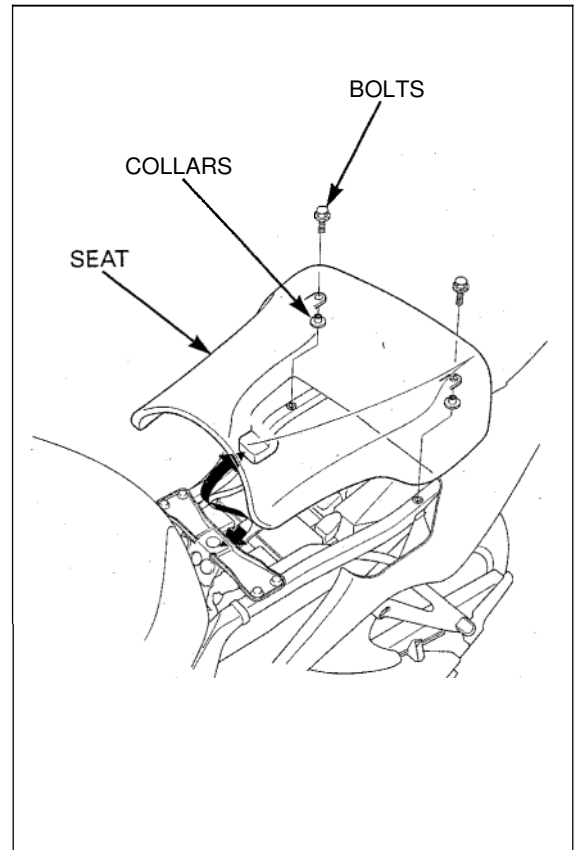
#### REMOVAL

Remove the two seat mounting bolts behind the seat.

Slide the seat back and then off.  
Remove the mounting collars.

#### INSTALLATION

Install the collars into the seat bottom plate as shown.  
Align the seat hook with the fuel tank rear bracket and install the seat.  
Install and tighten the bolts securely.

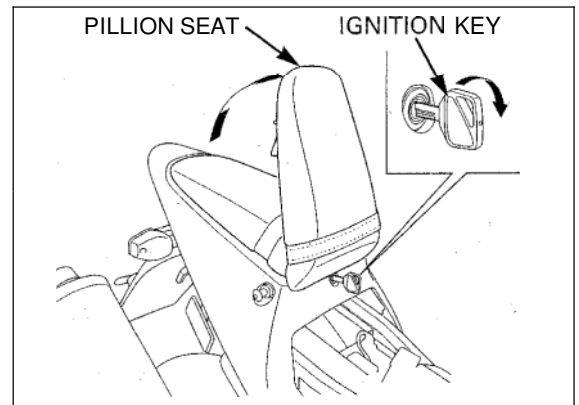


### PILLION SEAT/REAR COWL

#### REMOVAL

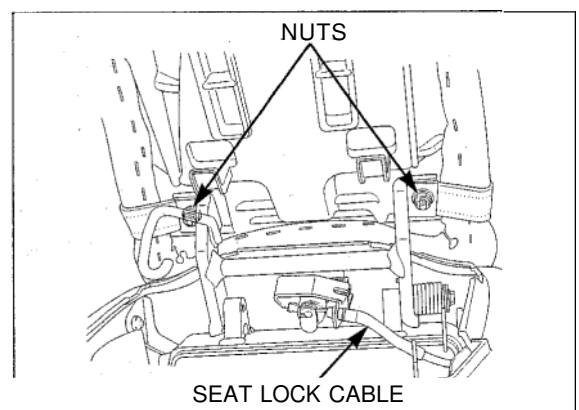
Remove the seat (see above).

Open the pillion seat using the ignition key.



Remove the pillion seat mounting nuts, then remove the seat belt and pillion seat.

Disconnect the seat lock cable from the key cylinder.





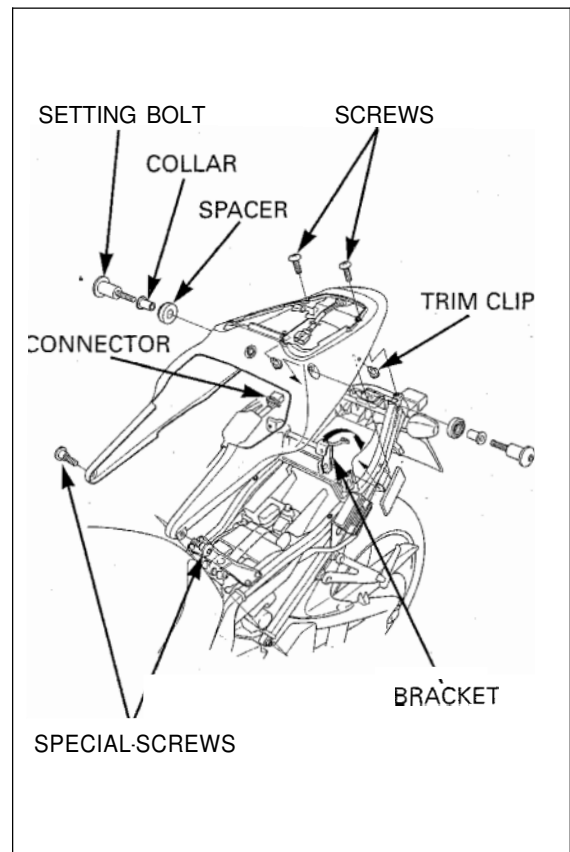
## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the two trim clips.

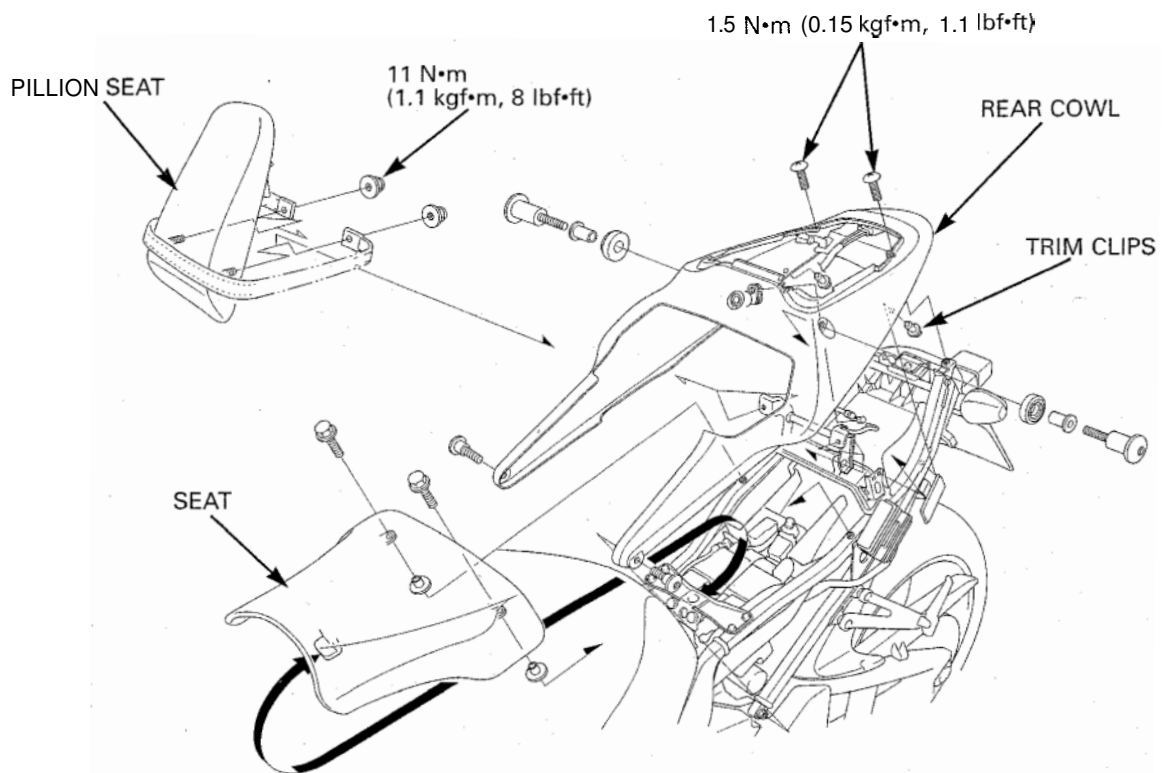
Remove the screws, special screws, setting bolts, collars and spacers.

Push down the pillion seat mounting bracket and carefully spread the bottom of both sides of the rear cowl, then remove it from the seat rail.

Disconnect the tail light connector.



## INSTALLATION



## FRAME BODY PANELS/EXHAUST SYSTEM

Connect the tail light connector.  
Install the rear cowl over the seat rail being careful not to damage the wire harness.

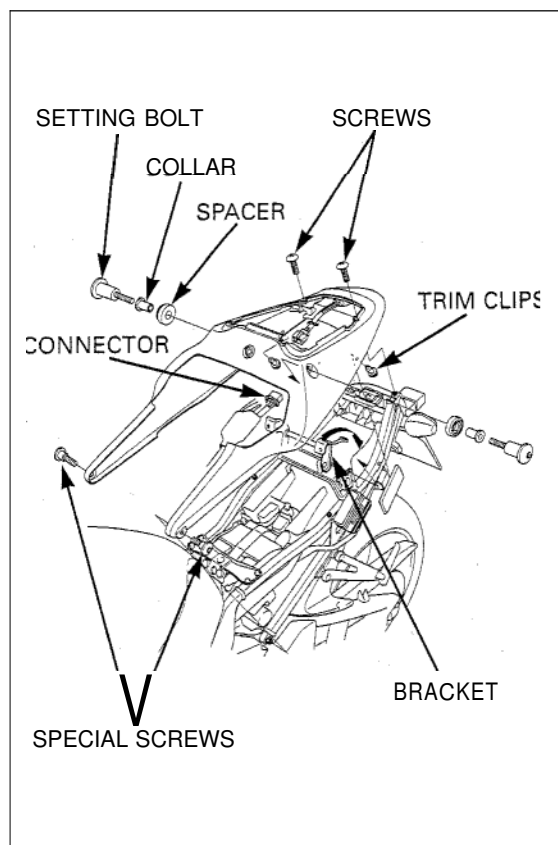
Install the spacers, setting collars and setting bolts.  
Install the special screws and truss screws.  
Install the trim clips.

Tighten the setting bolts and special screws securely.  
Tighten the screws to the specified torque.

### TORQUE:

Rear cowl truss screw:

1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)



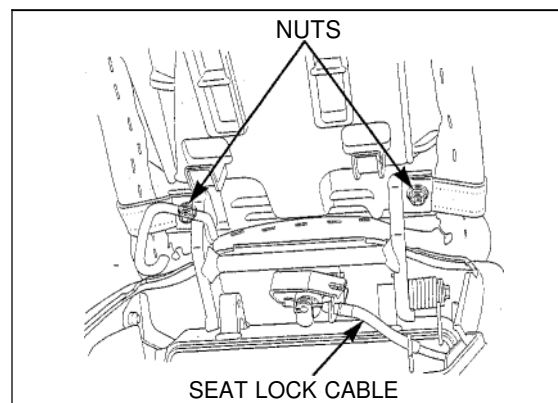
Connect the seat lock cable to the key cylinder.

Install the pillion seat and nuts to the pillion seat bracket.

Tighten the nuts to the specified torque.

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

Push the pillion seat down to lock it.



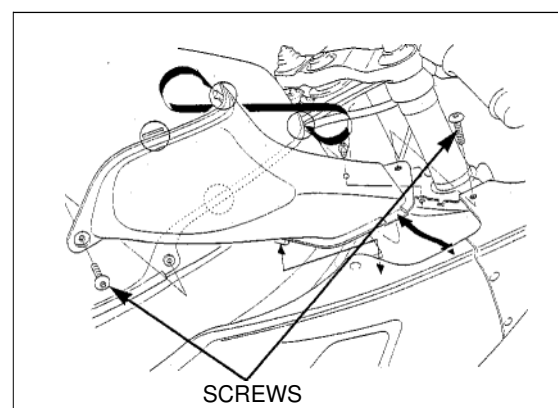
## DUCT COVER

### REMOVAL/INSTALLATION

Remove the screws.  
Release the tab of the duct cover from the fuel tank, then remove the duct cover.

Installation is in the reverse order of removal.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**

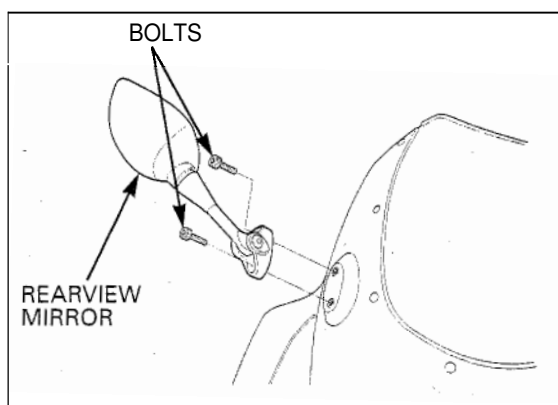


## UPPER COWL

### REMOVAL

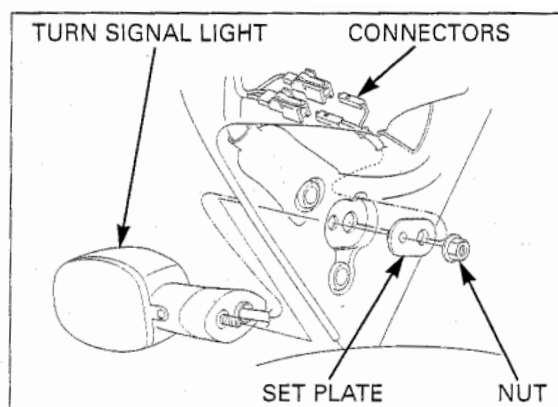
Remove the duct cover (page 2-4).

Remove the socket bolts and rearview mirrors.



Disconnect the turn signal light connectors.

Remove the nuts, set plates and turn signal lights from the inner middle cowl.



Remove the trim clips.

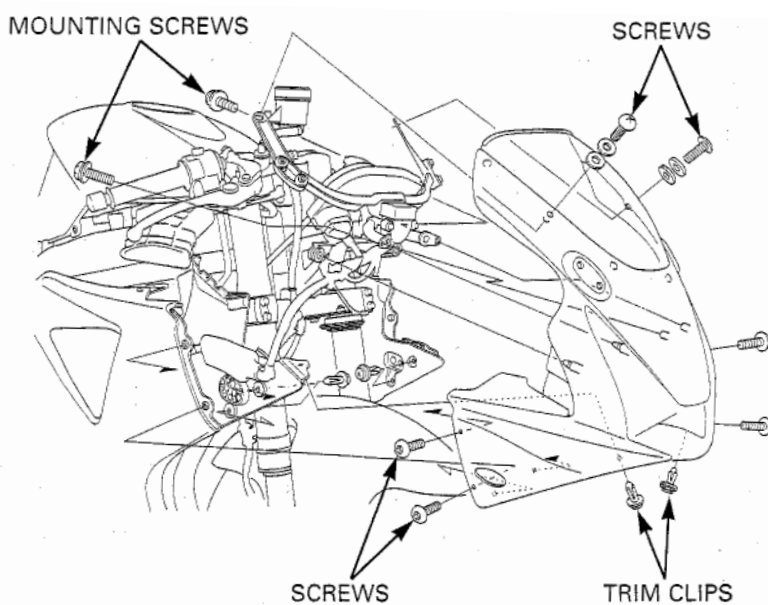
Remove the windscreen-to-upper cowl bracket screws.

Remove the upper cowl-to-lower cowl screws.

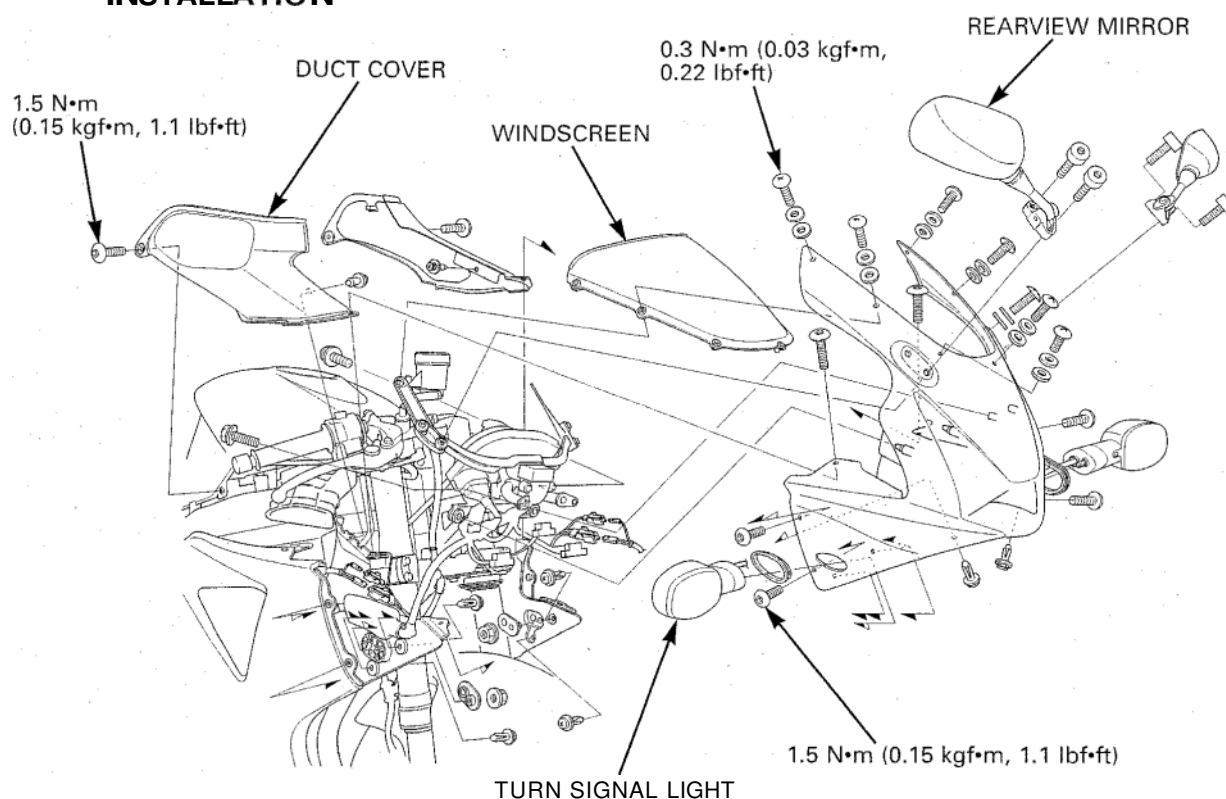
Remove the upper cowl mounting screws.

Pull the upper cowl forward.

Disconnect the headlight connectors, then remove the upper cowl.



### INSTALLATION



Connect the headlight connectors to the headlight sockets on the upper cowl.

Install the upper cowl onto the upper cowl stay while aligning the headlight unit bosses with the upper cowl stay grommets.

Install the removed parts in the reverse order of removal.

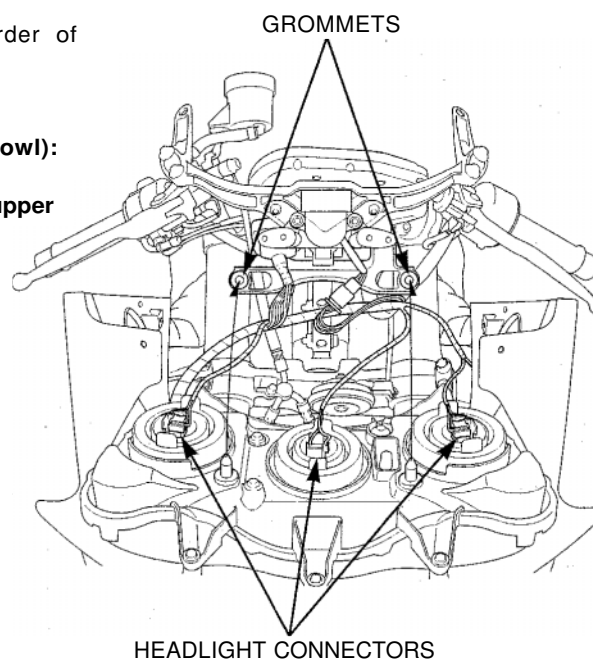
#### TORQUE:

**Upper cowl pan screw (upper cowl-to-lower cowl):**

1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)

**Windscreen mounting screw (windscreen-to-upper cowl bracket):**

0.3 N·m (0.03 kgf·m, 0.22 lbf·ft)



## LOWER COWL

### REMOVAL/INSTALLATION

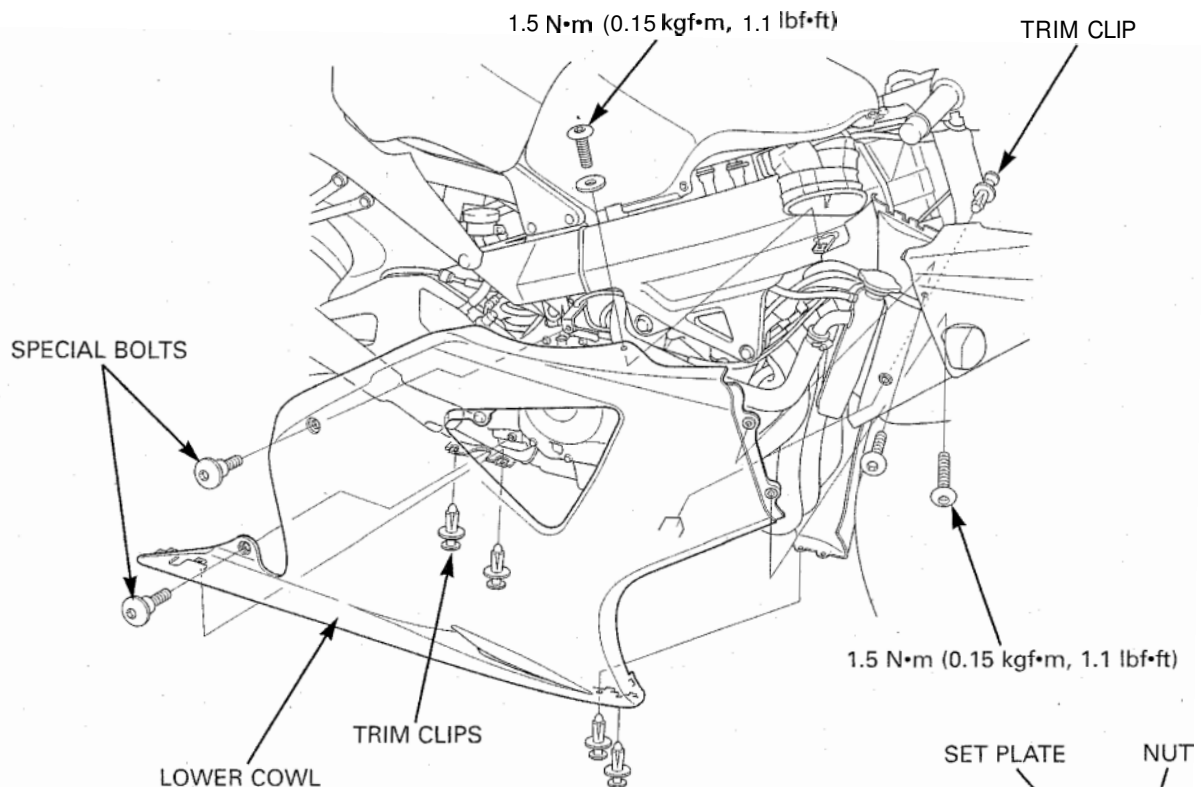
Remove the trim clip from the inner middle cowl.  
Remove the four trim clips from the lower cowl.  
Remove the upper cowl-to-lower cowl screws.  
Remove the lower cowl mounting screw, special bolts and then remove the lower cowl.

Installation is in the reverse order of removal.

#### TORQUE:

Lower cowl pan screw:

1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)



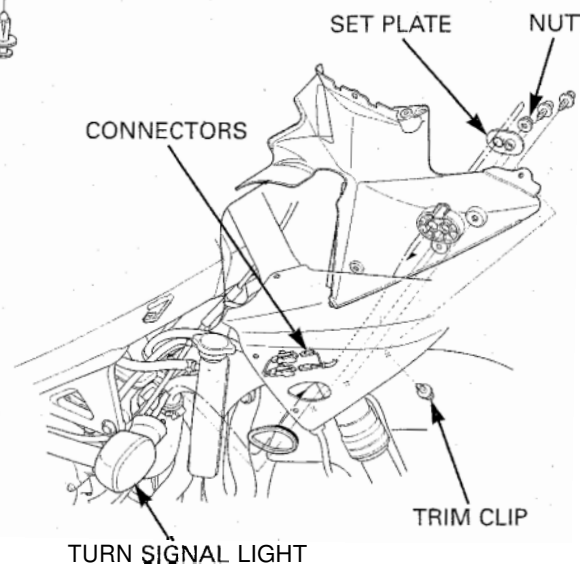
## INNER MIDDLE COWL

### REMOVAL/INSTALLATION

Remove the lower cowl (see above).

Disconnect the turn signal light connectors.  
Remove the trim clips.  
Remove the nut, set plate and turn signal light.  
Remove the inner middle cowl.

Installation is in the reverse order of removal.



### WINDSCREEN

#### REMOVAL/INSTALLATION

Remove the rearview mirrors (page 2-5).

Remove the screws, nylon washers and rubber washers.

Remove the windscreen by pulling out the setting nuts from the upper cowl bracket.

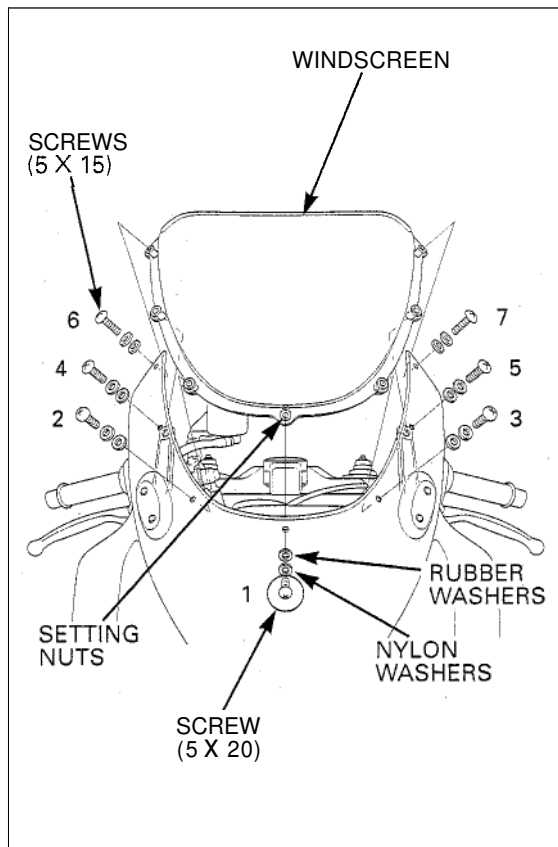
#### NOTICE

*Windscreen mounting fasteners are plastic screws. Do not overtighten the screws.*

*Tighten the screws in numerical order as shown in the illustration*

Installation is in the reverse order of removal.

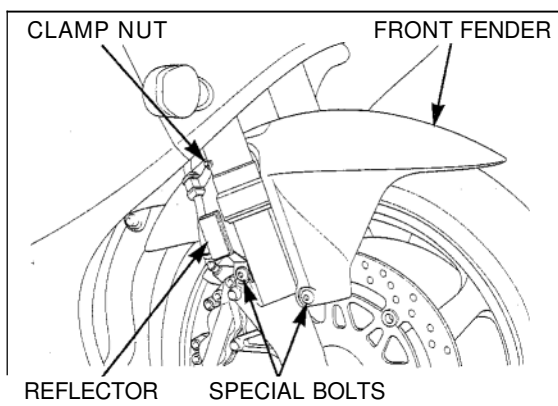
**TORQUE: 0.3 N·m (0.03kgf·m, 0.22 lbf·ft)**



### FRONT FENDER

#### REMOVAL

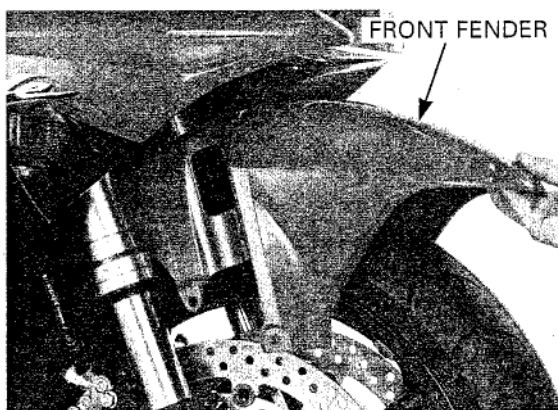
Remove the brake hose clamp mounting nuts.  
Remove the front fender mounting special bolts and reflectors.



Remove the front fender by pulling it forward.

#### INSTALLATION

Installation is in the reverse order of removal.



## REAR FENDER

### REAR FENDER A REMOVAL/ INSTALLATION

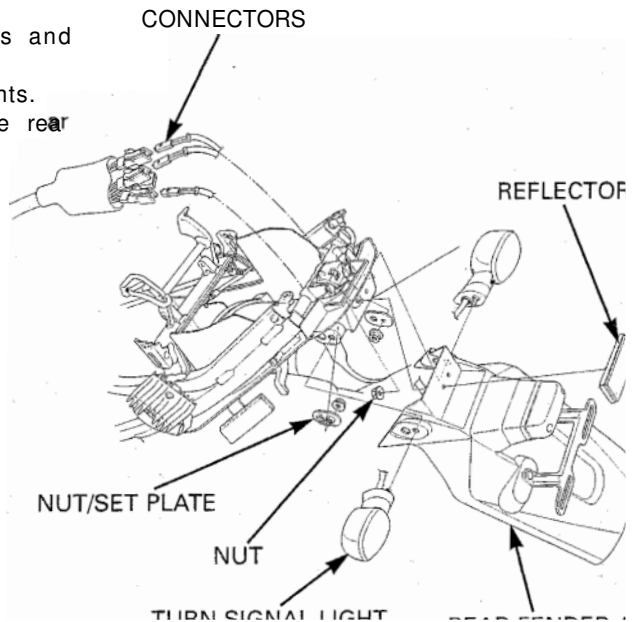
Remove the rear cowl (page 2-2).

Disconnect the turn signal light connectors and license light connector.

Remove the nuts, set plates and turn signal lights.

Remove the nut and reflector, then remove rear fender A.

Installation is in the reverse order of removal.

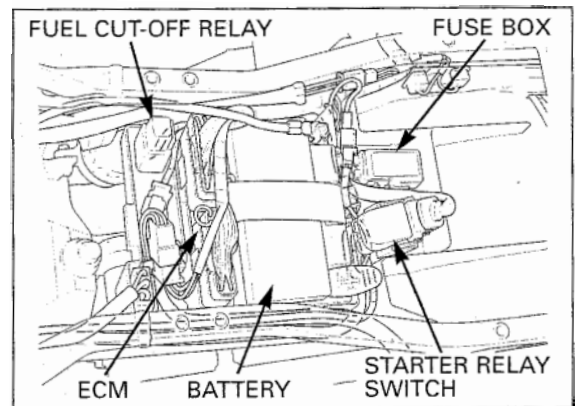


### REAR FENDER REMOVAL

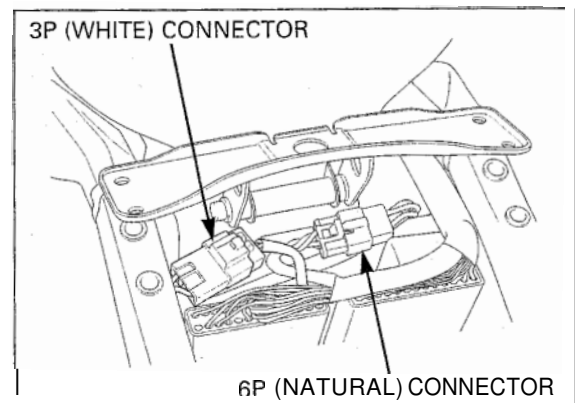
Remove the following:

- Rear cowl (page 2-2)
- Battery (page 16-4)
- ECM (page 5-87)

Unhook the retaining tab and remove the fuse box. Remove the starter relay switch and fuel cut-off relay from the rear fender.

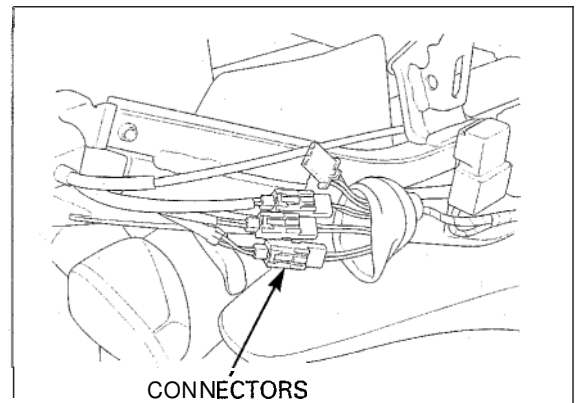


Disconnect the alternator 3P (White) connector and regulator/rectifier 6P (Natural) connector.

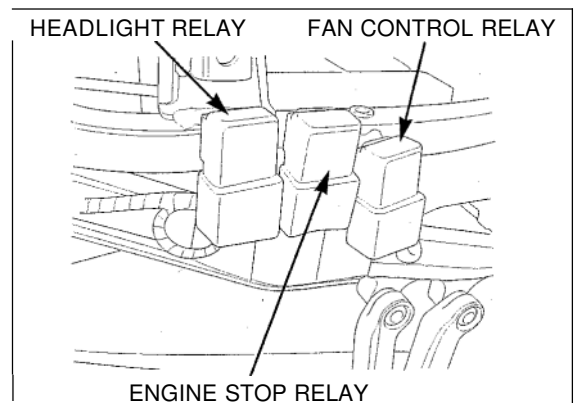


## FRAME/BODY PANELS/EXHAUST SYSTEM

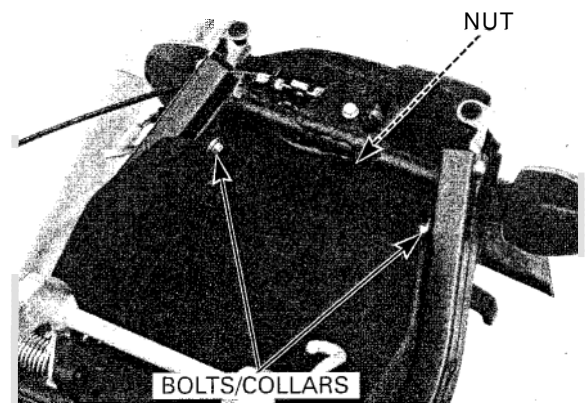
Disconnect the turn signal connectors and license light connector.



Remove the headlight relay, engine stop relay and fan control relay from the rear fender.

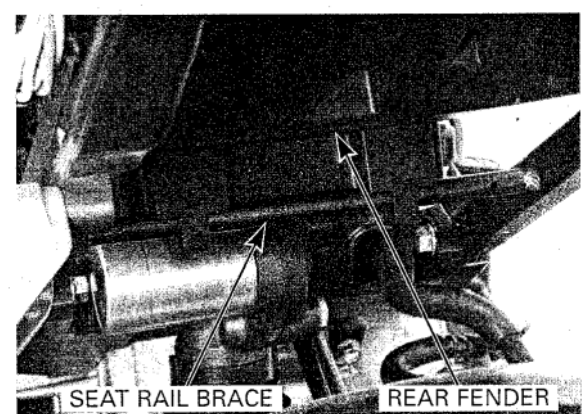


Remove the reflector mounting nut.  
Remove the two rear fender mounting bolts and collars.



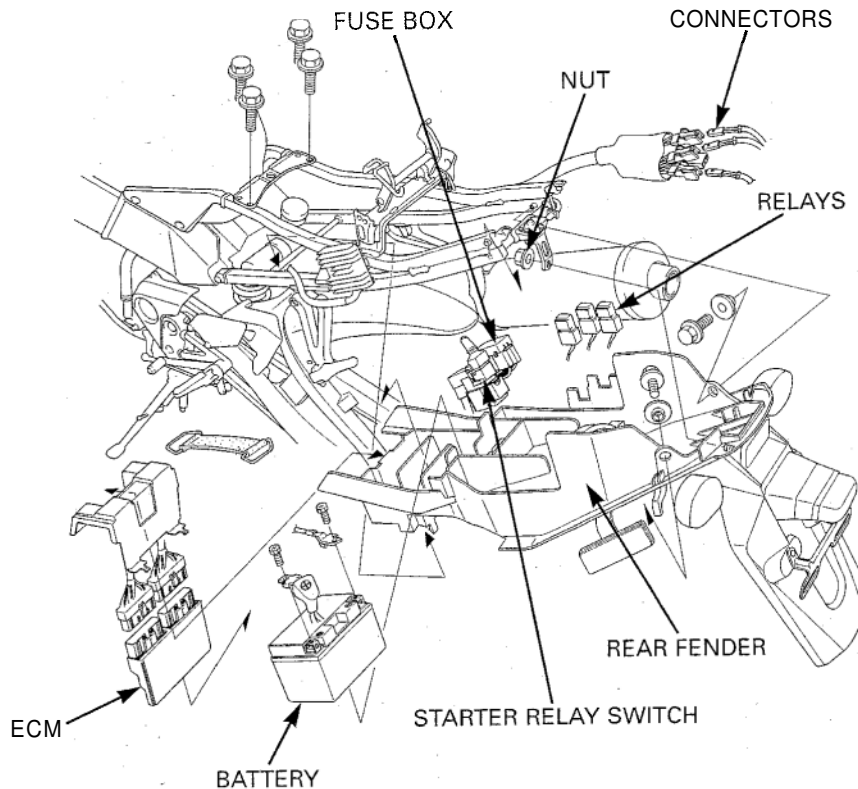
Unhook the rear fender from the seat rail brace, then release the regulator/rectifier wire and main wire harness from the seat rail and rear fender.

Remove the rear fender by pulling it backward.





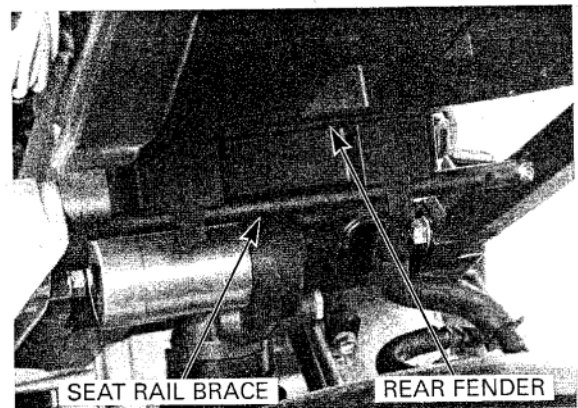
### REAR FENDER INSTALLATION



Install the rear fender aligning its lower groove with the seat rail brace.

Connect the license light connector and turn signal connectors.

Install the removed parts in the reverse order of removal.

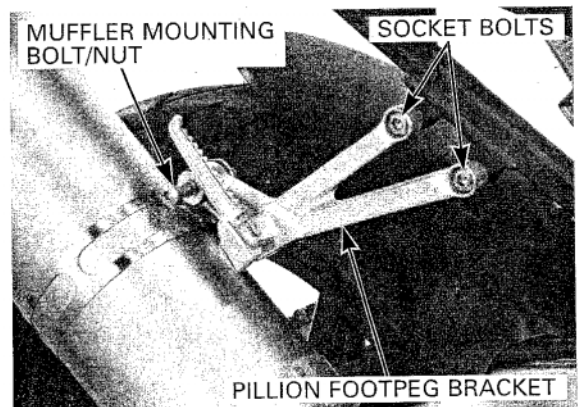


## SEAT RAIL

### REMOVAL

Remove the rear fender (page 2-9).

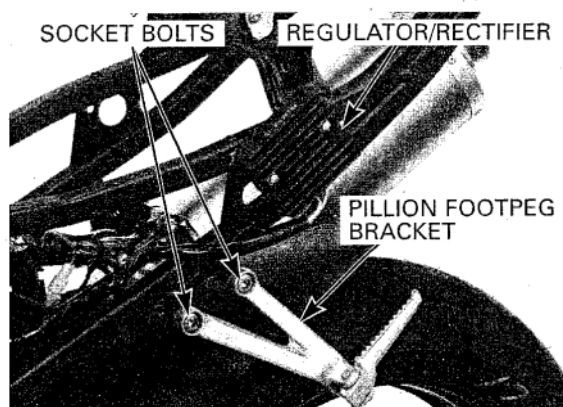
Remove the muffler mounting bolt/nut.  
Remove the socket bolts and right pillion footpeg bracket.



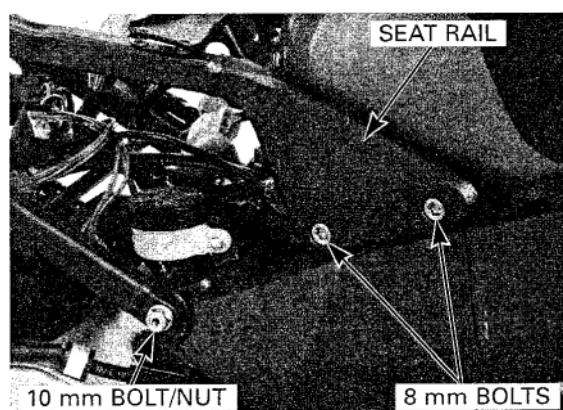
## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the socket bolts and left pillion footpeg bracket.

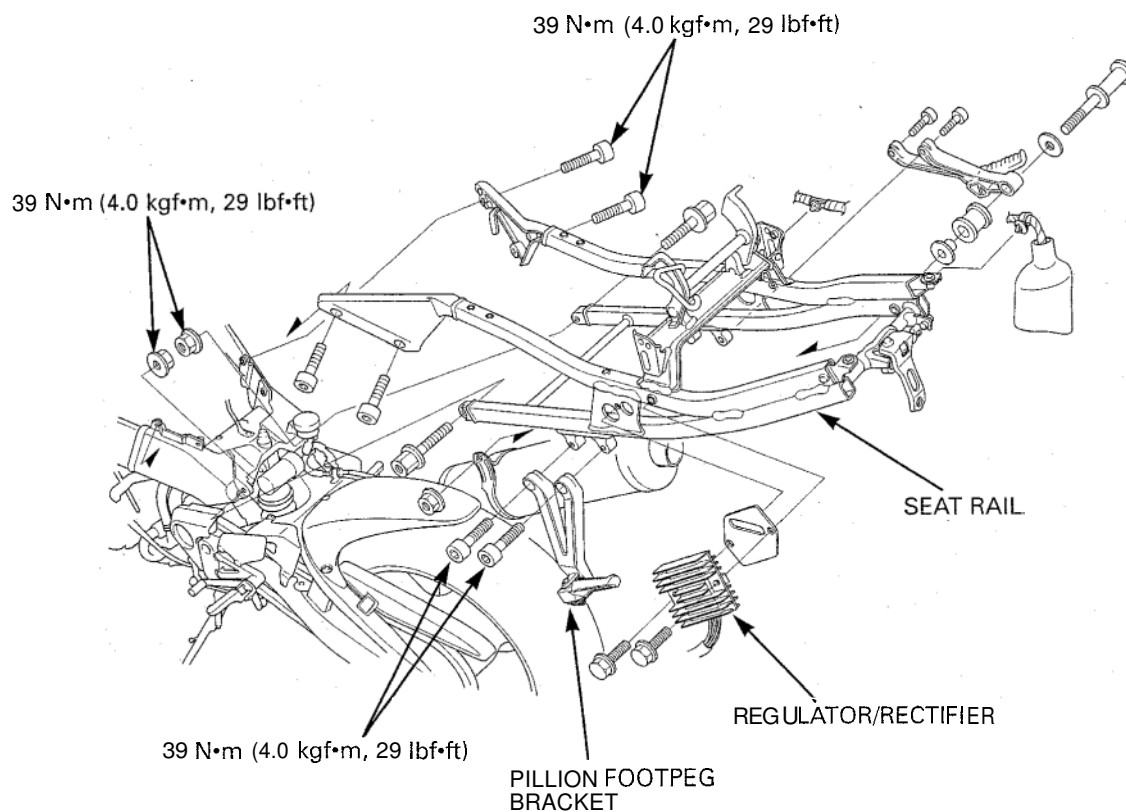
Remove the bolts and regulator/rectifier.



Remove the fuel tank rear bracket bolts.  
Remove the seat rail mounting 8 mm bolts, 10 mm bolts/nuts and seat rail.



## INSTALLATION

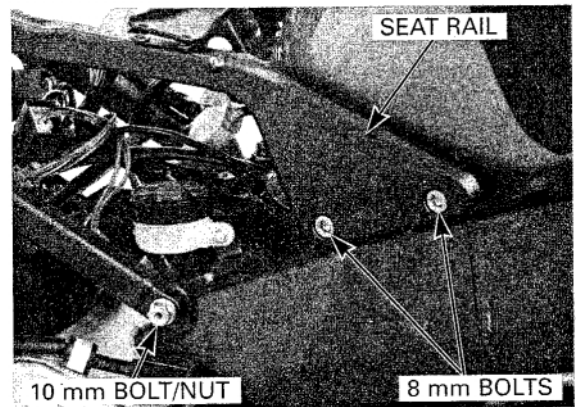


Install the seat rail and tighten the mounting bolts and nuts to the specified torque.

**TORQUE:**

8 mm bolt: 39 N·m (4.0 kgf·m, 29 lbf·ft)

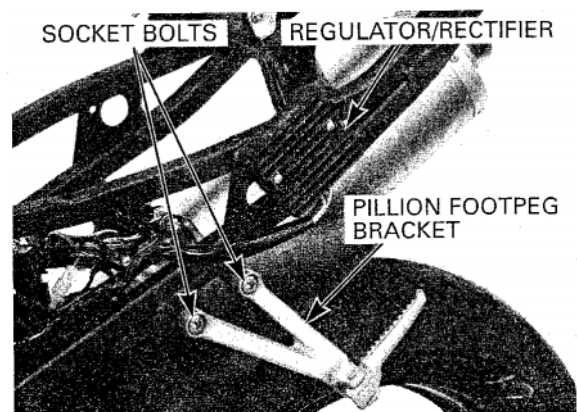
10 mm nut: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Install the regulator/rectifier, tighten the bolts.

Install the left pillion footpeg bracket and tighten the socket bolts to the specified torque.

**TORQUE:** 39 N·m (4.0 kgf·m, 29 lbf·ft)

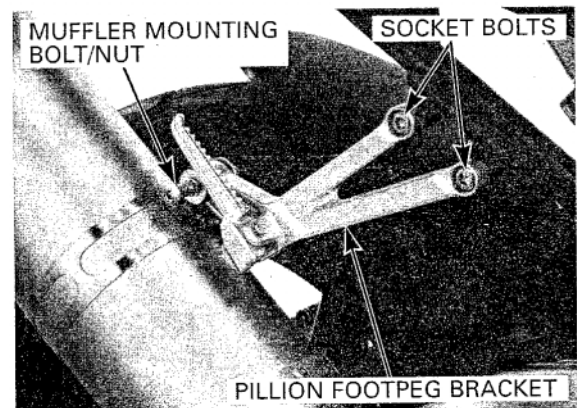


Install the right pillion footpeg bracket and tighten the socket bolts to the specified torque.

**TORQUE:** 39 N·m (4.0 kgf·m, 29 lbf·ft)

Install the muffler mounting bolt, washer and nut, and tighten the nut securely.

Install the removed parts in the reverse order of removal.



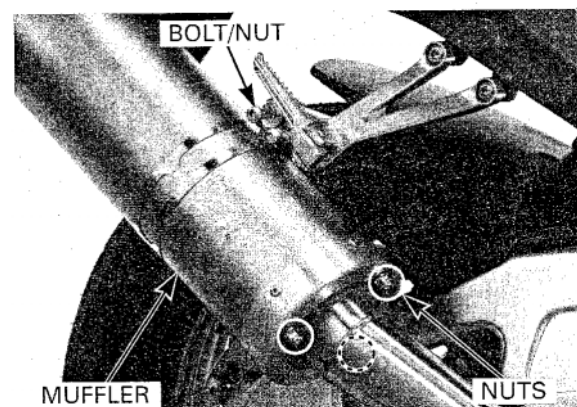
## MUFFLER/EXHAUST PIPE

### REMOVAL

Do not service the exhaust system while it is hot.

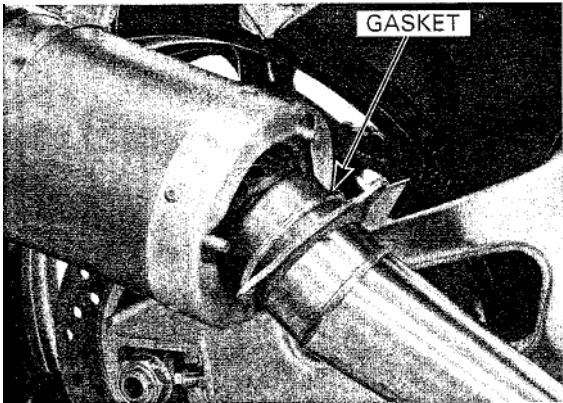
Remove the lower cowl (page 2-7).

Remove the exhaust pipe-to-muffler joint nuts.  
Remove the muffler mounting bolt/nut and washer, then remove the muffler.



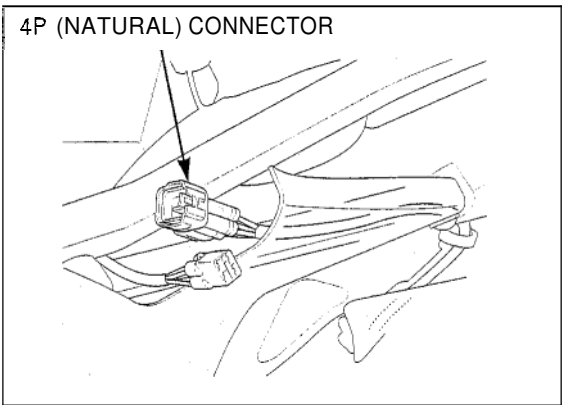
**FRAME/BODY PANELS/EXHAUST SYSTEM**

Remove the gasket.



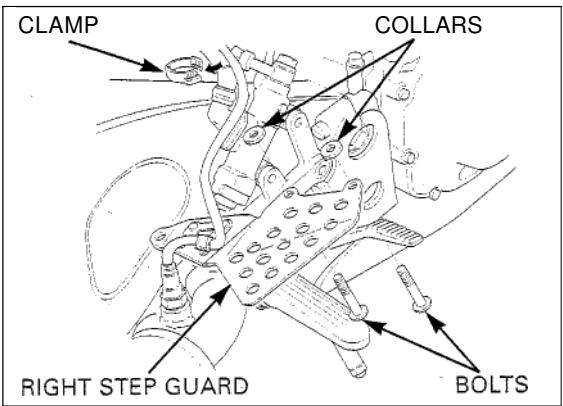
*California type  
only*

Disconnect the O<sub>2</sub> sensor 4P (Natural) connector.  
Remove the O<sub>2</sub> sensor wire from the frame.



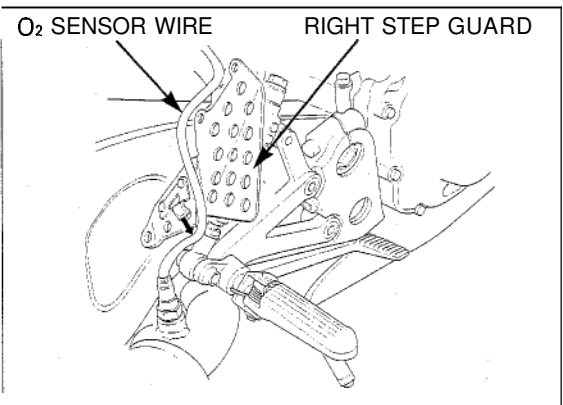
*California type  
only*

Remove the O<sub>2</sub> sensor wire clamp.  
Remove the right step guard mounting bolts and collars.



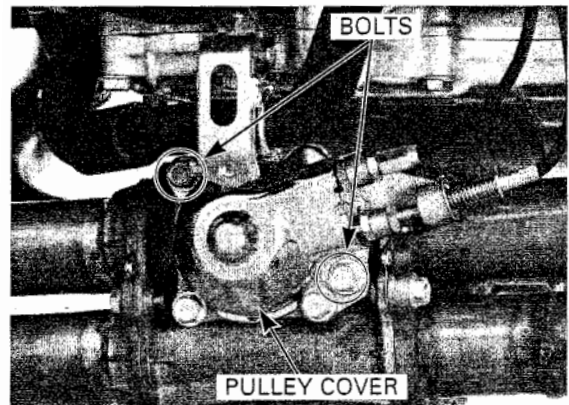
*California type  
only*

Release the O<sub>2</sub> sensor wire from the right step guard.

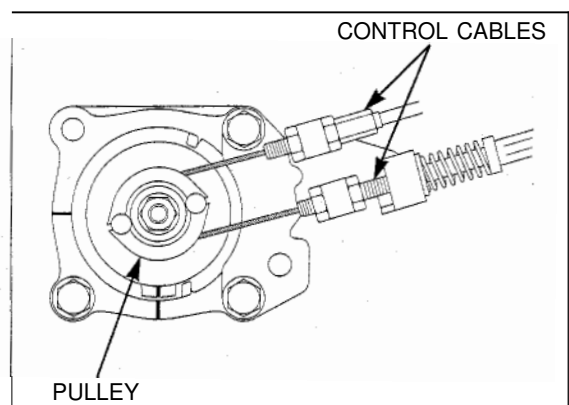


## FRAME/BODY PANELS/EXHAUST SYSTEM

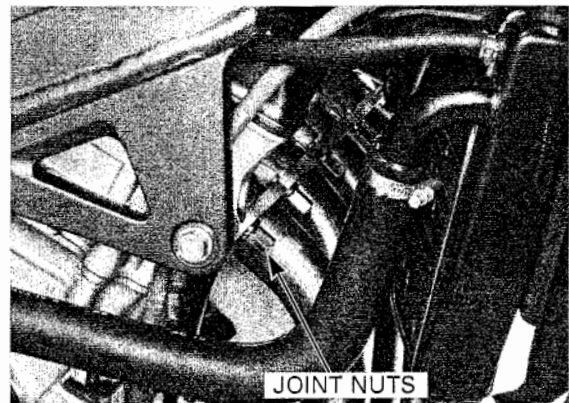
Remove the two bolts and EGCV (Exhaust Gas Control Valve) pulley cover.



Disconnect the EGCV control cables from the pulley.



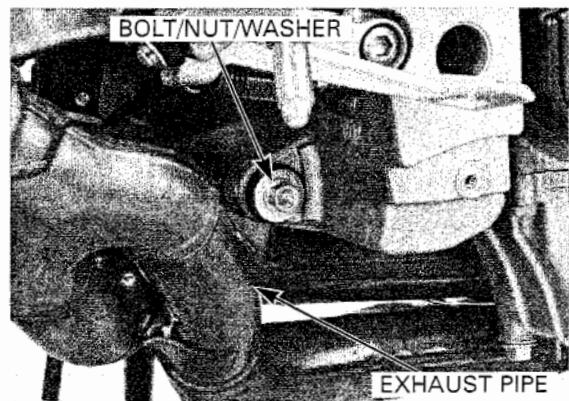
Remove the exhaust pipe joint nuts.



Remove the following:

- Exhaust pipe mounting bolt/nut
- Washer
- Collar
- Exhaust pipe
- Exhaust pipe gaskets

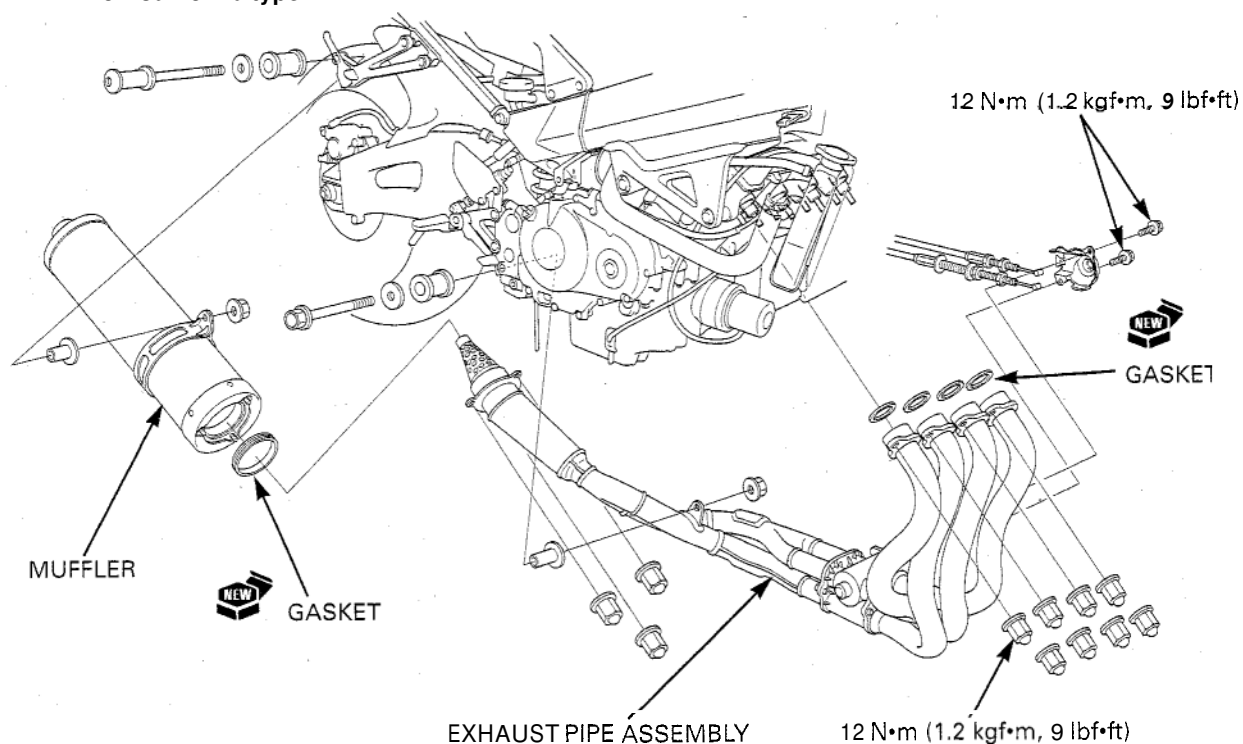
See page 5-97 for EGCV removal/disassembly.



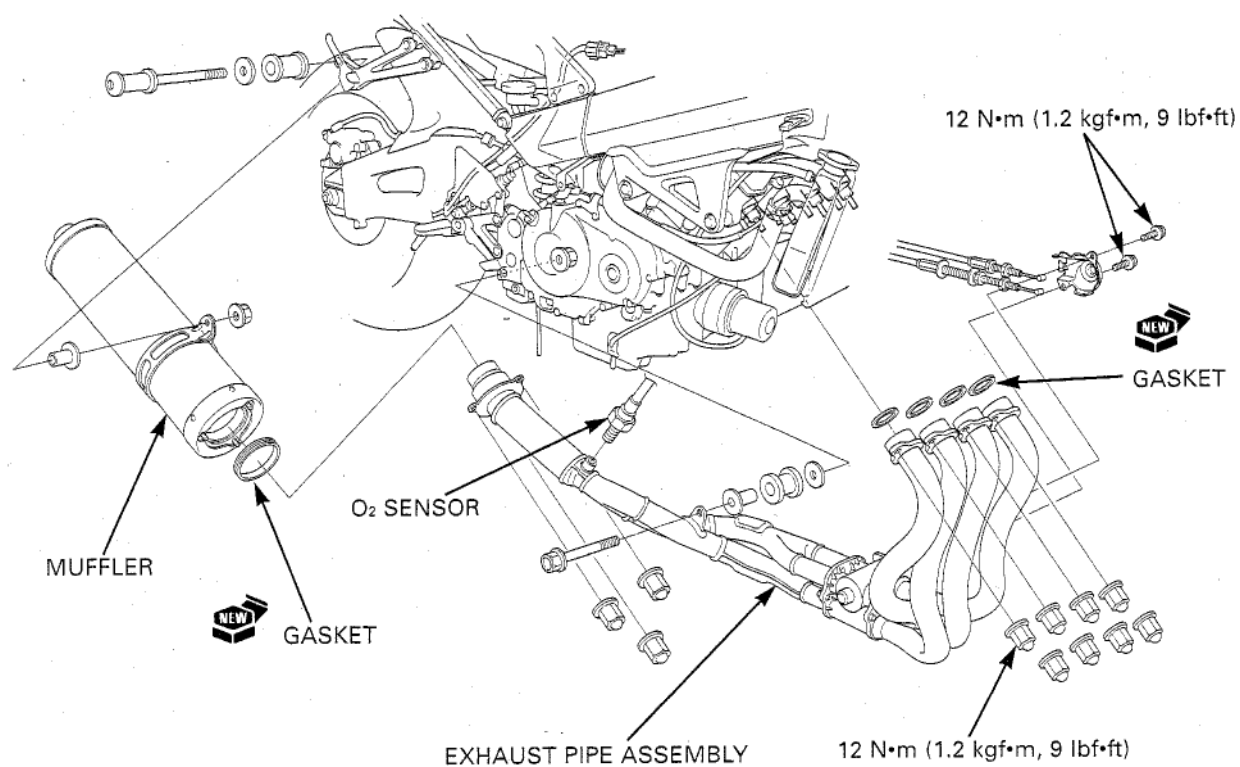
## FRAME/BODY PANELS/EXHAUST SYSTEM

### INSTALLATION

Non-California type:

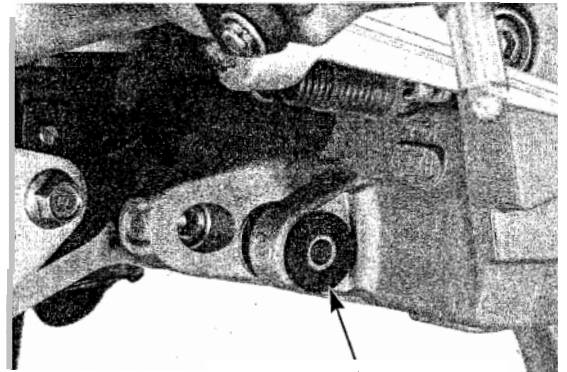


California type:



## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the exhaust pipe mounting rubber and collar into the lower bracket hole.

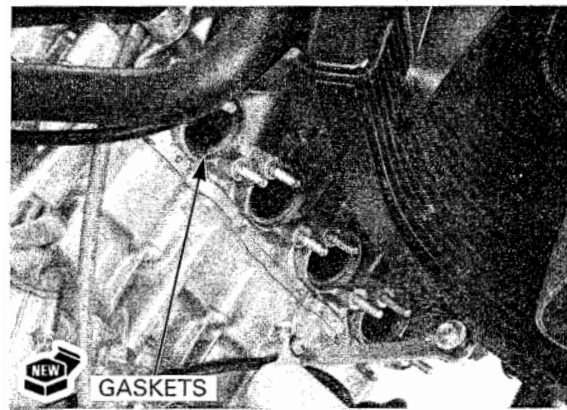


COLLAR/MOUNTING RUBBER

Check the protrusion of the exhaust pipe stud bolt (page 1-14).

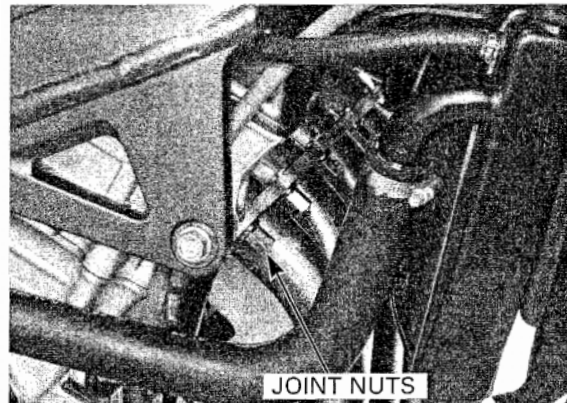
*Always replace the exhaust pipe gaskets with new ones*

Install the new exhaust pipe gaskets onto the exhaust ports of the cylinder head.



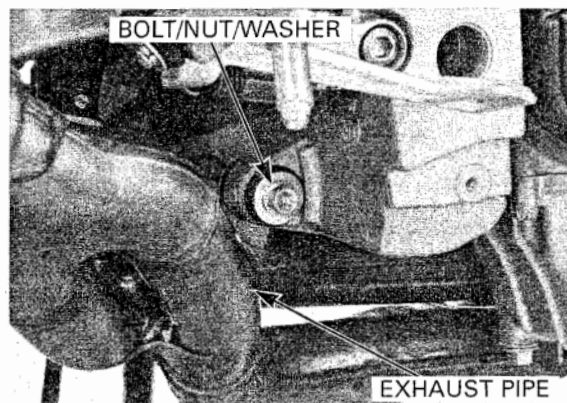
GASKETS

Install the exhaust pipe, and temporarily install the exhaust pipe joint nuts and mounting bolt/nut.



JOINT NUTS

Temporarily tighten the exhaust pipe mounting nut.



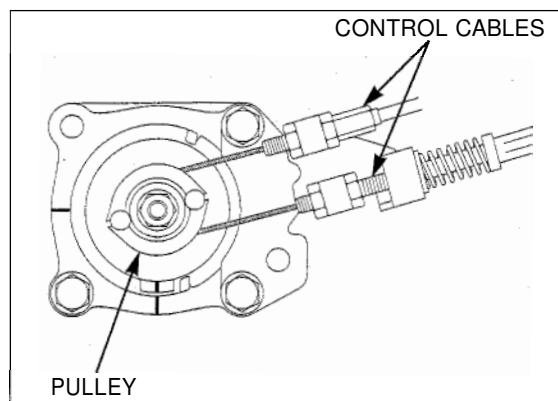
BOLT/NUT/WASHER

EXHAUST PIPE



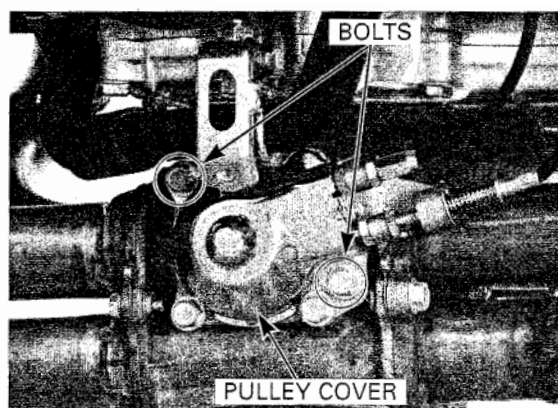
## FRAME/BODY PANELS/EXHAUST SYSTEM

Connect the EGCV control cables to the cable pulley.



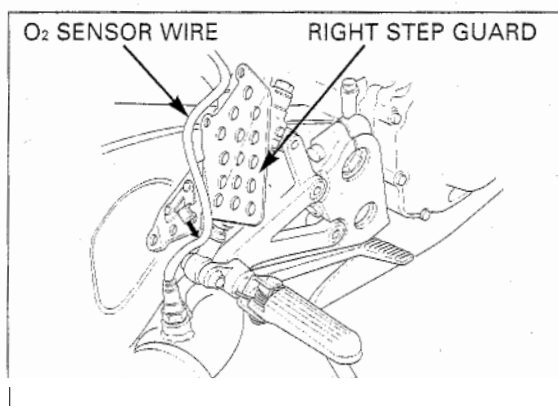
Install the EGCV pulley cover and tighten the bolts to the specified torque.

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



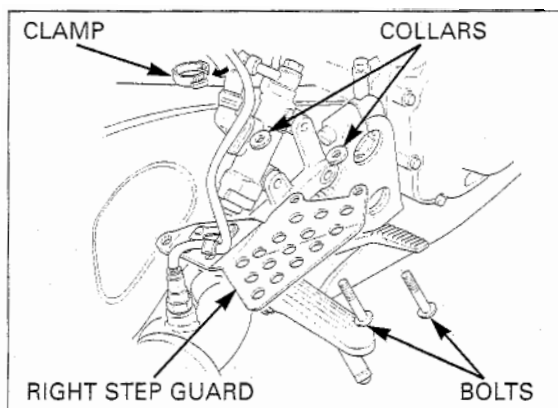
*California type  
only:*

Clamp the O<sub>2</sub> sensor wire to the right step guard.



*California type  
only:*

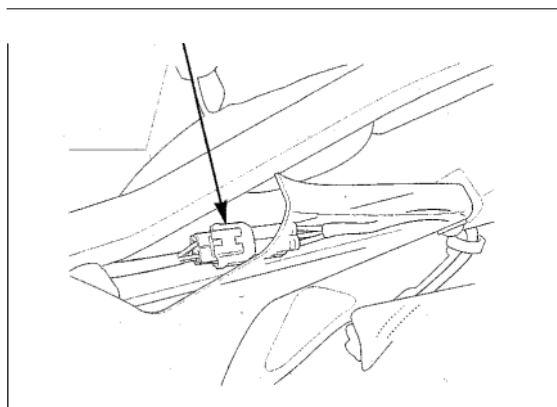
Install the rear master cylinder, collars and right step guard, then tighten the mounting bolts. Clamp the O<sub>2</sub> sensor wire with the rear brake reservoir hose using the hose clamp.





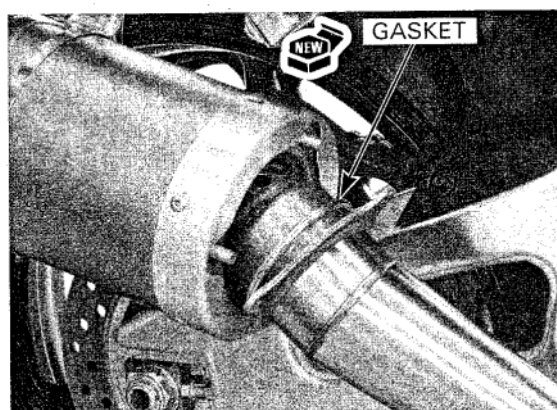
*California type  
only*

Route the O<sub>2</sub> sensor wire into the frame.  
Connect the O<sub>2</sub> sensor 4P (Natural) connector.



Install the new gasket onto the exhaust pipe as shown.

Install the muffler.



Temporarily install the muffler mounting bolt/nut and muffler joint nuts.

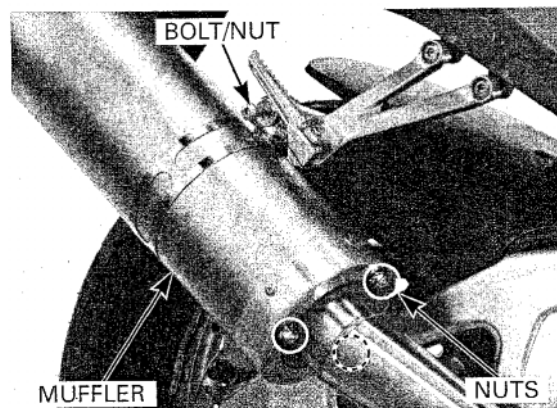
*First tighten the  
exhaust pipe joint  
nuts*

Tighten all of the muffler/exhaust pipe mounting bolts/nuts securely.

### **TORQUE:**

**Exhaust pipe joint nut: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the lower cowl (page 2-7)



# 3. MAINTENANCE

SERVICE INFORMATION	3-1	DRIVE CHAIN	3-20
MAINTENANCE SCHEDULE	3-3	BRAKE FLUID	3-24
FUEL LINE	3-4	BRAKE PAD WEAR	3-25
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ENGINE OIL/OIL FILTER	3-15	SIDE STAND	3-28
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EVAPORATIVE EMISSION CONTROL SYSTEM (California <b>type</b> only)	3-19		

## SERVICE INFORMATION

### GENERAL

- Place the motorcycle on level ground before starting any work.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- 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.

Spark plug		Standard IMR9C-9H (NGK), VUH27D (DENSO)
		Optional IMR8C-9H (NGK), VUH24D (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Valve clearance	IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)
	EX	0.27 ± 0.03 mm (0.011 ± 0.001 in)
Engine oil capacity	At draining	3.5 liter (3.7 US qt, 3.1 Imp qt)
	At oil filter change	3.7 liter (3.9 US qt, 3.3 Imp qt)
Drive chain slack		40 – 50 mm (1.6 – 2.0 in)
Recommended brake fluid		Honda DOT 4 Brake Fluid
	Michelin	Rear BT012R RADIAL G
		Front Pilot SPORT E
		Pilot SPORT E
	load	Rear 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
	Up to maximum weight capacity	Front 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
		Rear 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
Minimum tire tread depth	Front	1.5 mm (0.06 in)
	Rear	2.0 mm (0.08 in)

## TORQUE VALUES

Timing hole cap	18 N•m (1.8 kgf•m, 13 lbf•ft)	Apply grease to the threads.
Spark plug	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Oil drain bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)	
Oil filter cartridge	26 N•m (2.7 kgf•m, 20 lbf•ft)	Apply clean engine oil to the O-ring.
Rear axle nut	113 N•m (11.5 kgf•m, 83 lbf•ft)	U-nut
Drive sprocket special bolt	54 N•m (5.5 kgf•m, 40 lbf•ft)	
Driven sprocket nut	64 N•m (6.5 kgf•m, 47 lbf•ft)	
Rear master cylinder push rod lock nut	18 N•m (1.8 kgf•m, 13 lbf•ft)	

## TOOLS

Oil filter wrench	07HAA-PJ70101 or 07HAA-PJ70100
Drive chain tool set	07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)
Cam chain tensioner holder	07ZMG-MCAA400 (U.S.A. only)

# **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 their authorized Honda dealer.

ITEMS	FREQUENCY	NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
			X 1,000 mi	0.6	4	8	12	16	20	24	
			X 100 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	* FUEL LINE					I		I		I	3-4
	* THROTTLE OPERATION					I		I		I	3-5
	AIR CLEANER	NOTE 2					I			I	3-6
	SPARK PLUGS			EVERY 16,000 mi (25,600 km): I EVERY 32,000 mi (51,200 km): R							3-6
	* VALVE CLEARANCE							I			3-10
	ENGINE OIL			R		R		R		R	3-15
	ENGINE OIL FILTER			R		R		R		R	3-15
				I	I	I	I	I	I	I	3-17
	* ENGINE IDLE SPEED RADIATOR COOLANT	NOTE 3				I		I		R	3-18
	* COOLING SYSTEM					I		I		I	3-18
	* SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-19
	* EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-19
NON-EMISSION RELATED ITEMS	** EGCV (Exhaust Gas Control Valve) CONTROL CABLE			EVERY 16,000 mi (25,600 km): I							5-93
	DRIVE CHAIN			EVERY 500 mi (800 km): I, L							3-20
	BRAKE FLUID	NOTE 3			I	I	R	I	I	R	3-24
	BRAKE PAD WEAR				I	I	I	I	I	I	3-25
	BRAKE SYSTEM			I		I		I		I	3-25
	* BRAKE LIGHT SWITCH					I		I		I	3-26
	* HEADLIGHT AIM					I		I		I	3-27
	CLUTCH SYSTEM			I	I	I	I	I	I	I	3-27
	SIDE STAND					I		I		I	3-28
	* SUSPENSION					I		I		I	3-28
	* NUTS, BOLTS, FASTENERS			I		I		I		I	3-31
	** WHEELS/TIRES					I		I		I	3-31
	** STEERING HEAD BEARINGS			I		I		I		I	3-32

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

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

NOTES: 1. At higher odometer readings, repeat at the frequency interval established here.  
 2. Service more frequently if the motorcycle is ridden in unusually wet or dusty areas.  
 3. Replace every 2 years, or at the indicated odometer intervals, whichever comes first. Replacement requires mechanical skill.  
 4. California type only

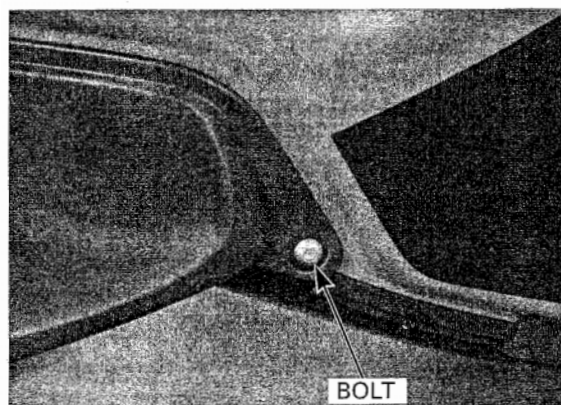
## MAINTENANCE

### FUEL LINE

Remove the front fuel tank mounting bolts and washers.

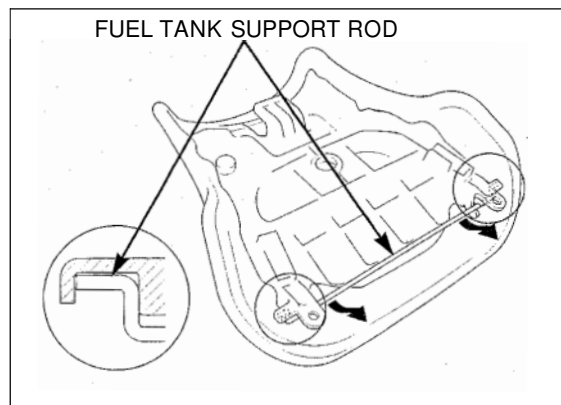


Remove the right and left duct cover mounting bolts.



*After fuel line inspection, install the rod ends into the seat properly as shown*

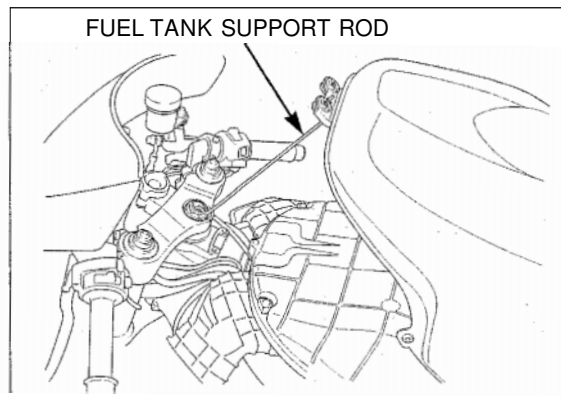
Remove the seat and then remove the fuel tank support rod from the seat.



*Only use the rod to support the fuel tank*

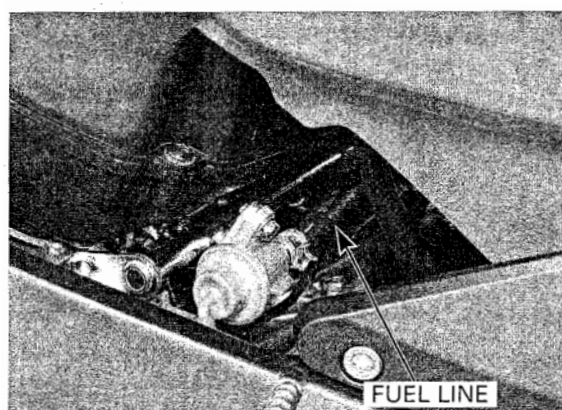
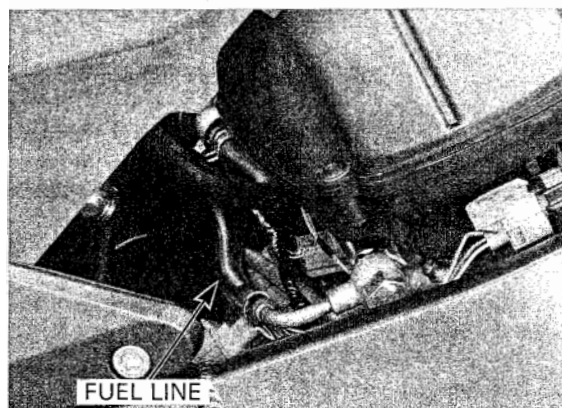
Open and support the front end of fuel tank using the support rod as shown.

Do not lift the front end of fuel tank more than necessary to support it.



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

Install the fuel tank in the reverse order of removal.

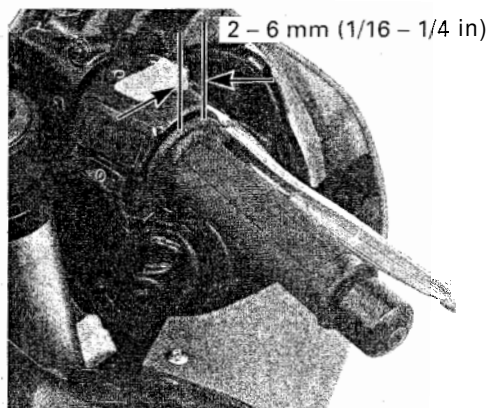


## THROTTLE OPERATION

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.

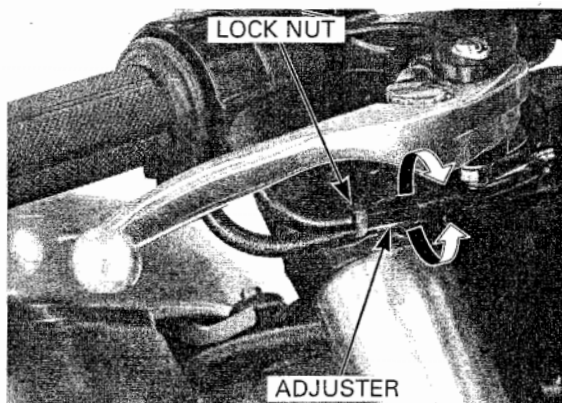
Measure the free play at the throttle grip flange.

**FREE PLAY: 2 - 6 mm (1/16 - 1/4 in)**



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

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



## MAINTENANCE

Major adjustments are made with the lower adjuster.

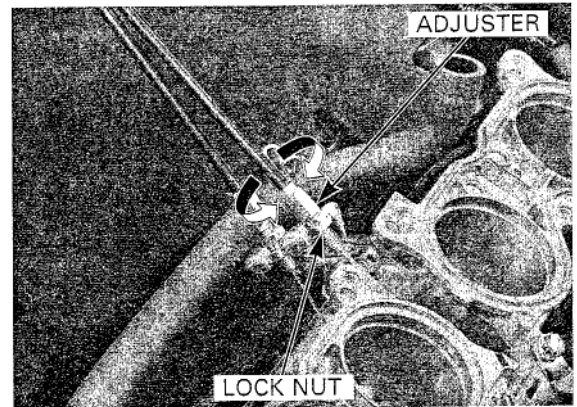
Remove the air cleaner housing (page 5-64).

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

After adjustment, tighten the lock nut securely.

Recheck the throttle operation.

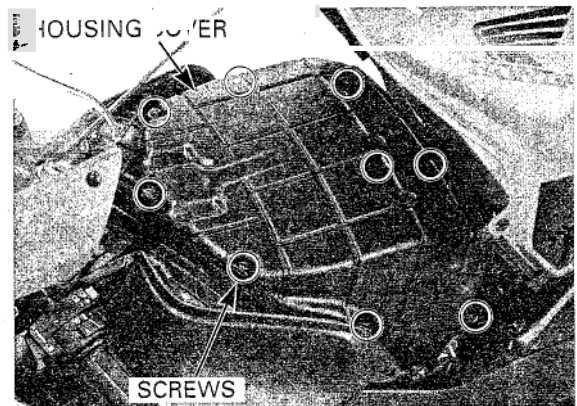
Replace any damaged parts, if necessary.



## AIR CLEANER

Open and support the front end of the fuel tank (page 3-4).

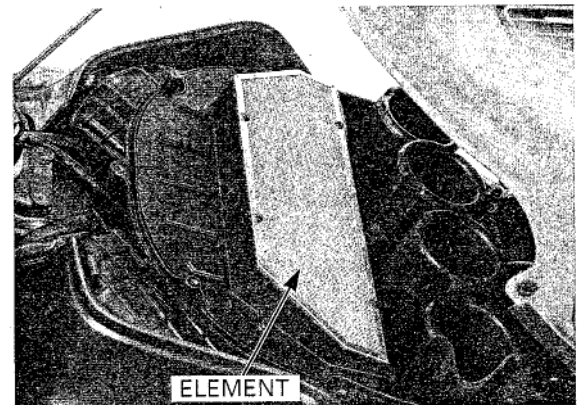
Remove the screws and air cleaner housing cover.



Remove and discard the air cleaner element in accordance with the maintenance schedule (page 3-3).

Also replace the air cleaner element anytime it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.



## SPARK PLUGS

### REMOVAL

#### NOTICE

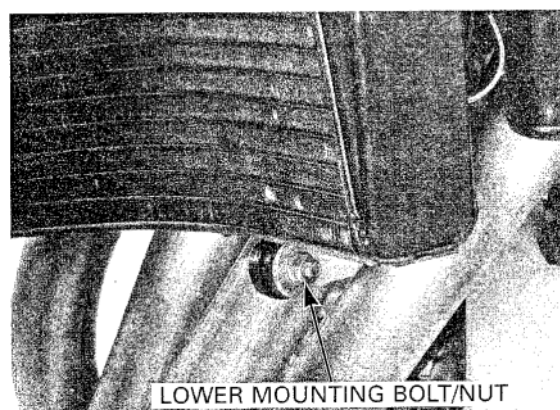
*Be careful not to damage the radiator fins.*

Remove the lower cowl (page 2-7).

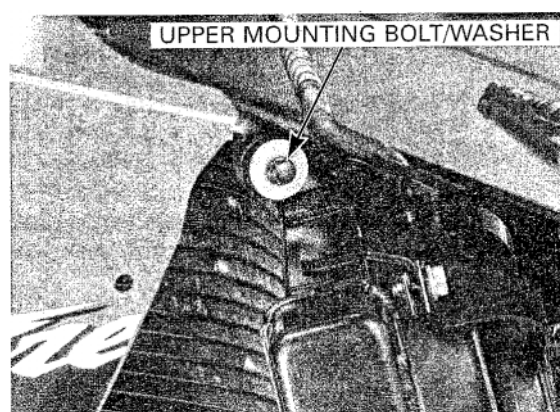
Disconnect the fan motor wire 2P (Black) connector.



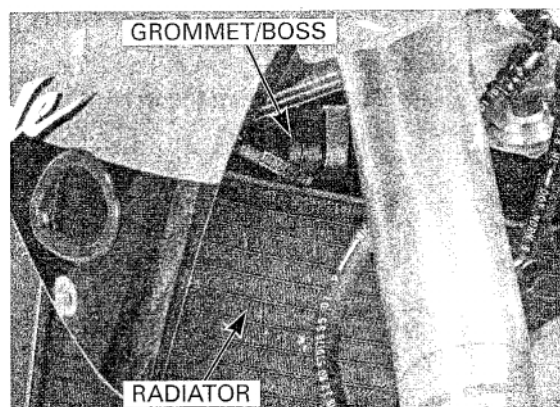
Remove the radiator lower mounting bolt/nut.



Remove the radiator upper mounting bolt and washer.

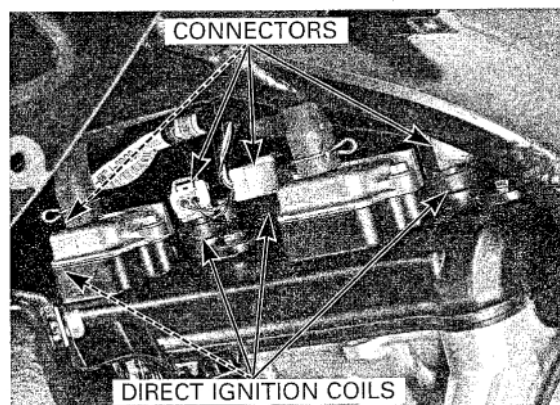


Remove the radiator grommet from the frame boss by moving it to the right, then move the radiator forward.



*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 direct ignition coil connectors. Remove the direct ignition coils from the spark plugs.

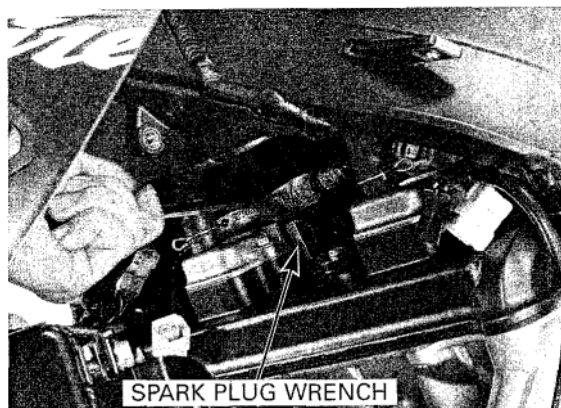




## MAINTENANCE

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

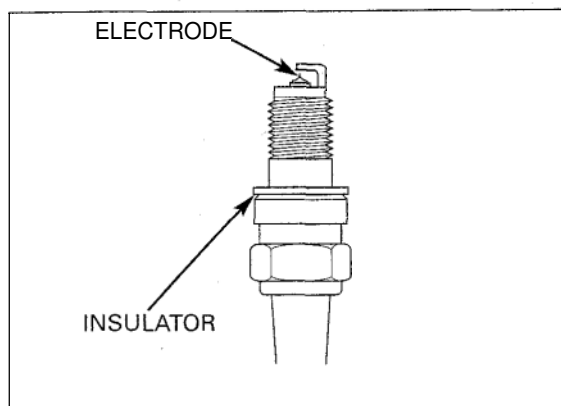
Inspect or replace as described in the maintenance schedule.



## INSPECTION

Check the following and replace if necessary (recommended spark plug: page 3-2)

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

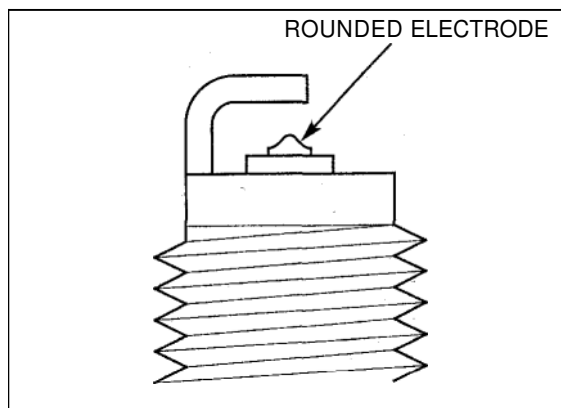


*This motorcycle's spark plugs are equipped with iridium center electrodes*

*Replace any spark plug if the electrode is contaminated*

If the electrodes are contaminated with accumulated objects or dirt, replace the spark plug.

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



**SPECIFIED SPARK PLUG: IMR9C-9H (NGK)  
VUH27D (DENSO)**

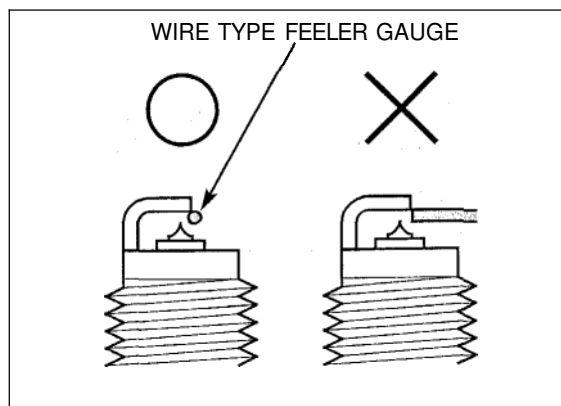
*Always use the specified spark plugs on this motorcycle.*

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

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

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

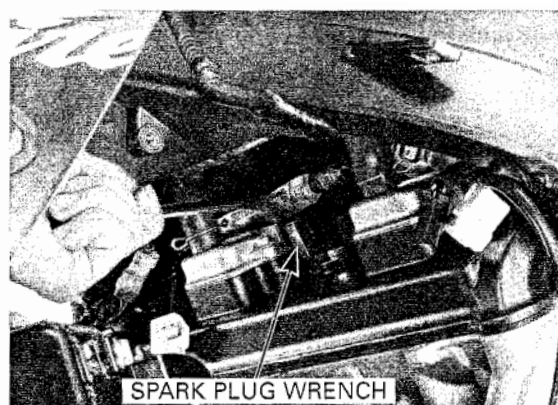
Make sure the 1.0 mm (0.04 in) diameter plug gauge does not insert between the gap. If the gauge can be inserted into the gap, replace the plug with a new one.



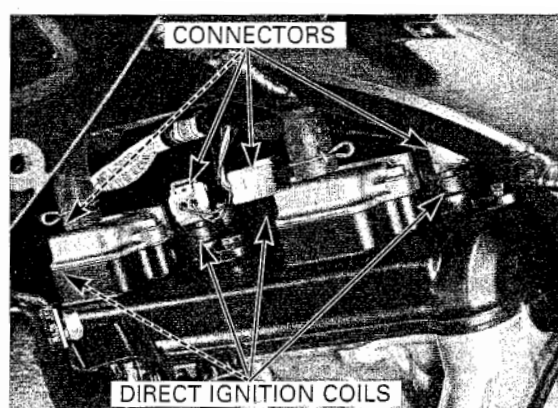
Reinstall the spark plug in the cylinder head and hand tighten, then torque to specification.

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

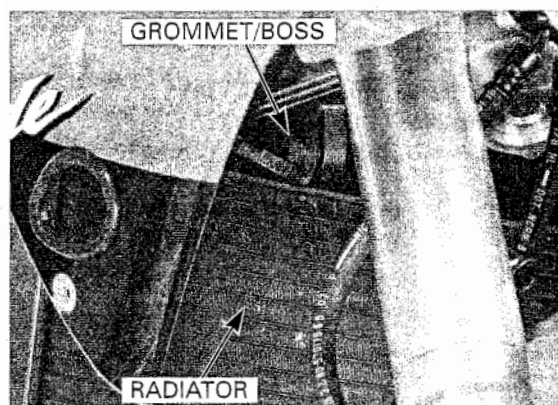
If using the new plug, install as follows:  
Install and hand tighten the new spark plug, then tighten it about 1/2 turn after the sealing washer contacts the seat of the plug hole.



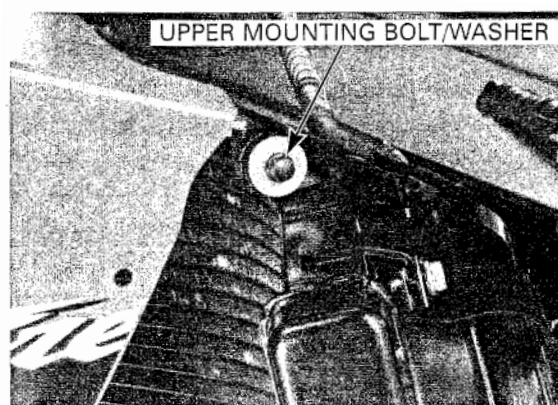
Install the direct ignition coils.  
Connect the direct ignition coil connectors.



Install the radiator grommet onto the frame boss.

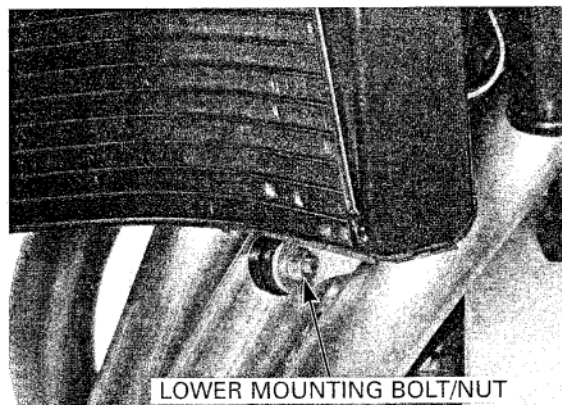


Install the washer and radiator upper mounting bolt, then tighten the bolt.



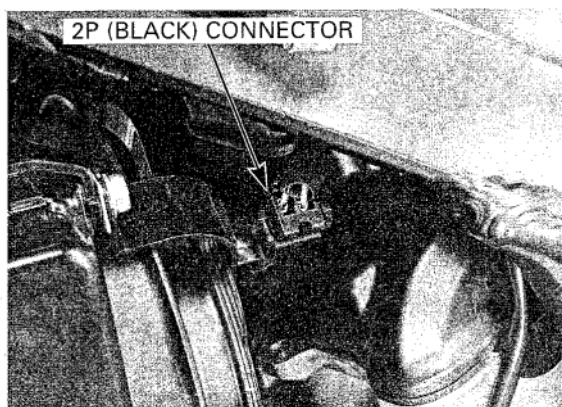
## MAINTENANCE

Install and tighten the radiator lower mounting bolt/nut.



Connect the fan motor wire 2P (Black) connector.

Install the lower cowl (page 2-7).



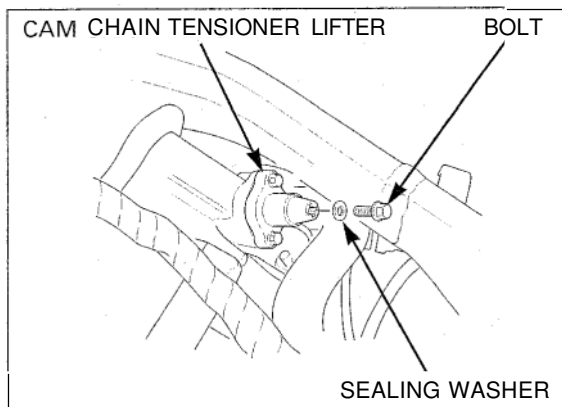
## VALVE CLEARANCE

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

### INSPECTION

Remove the cylinder head cover (page 8-5).

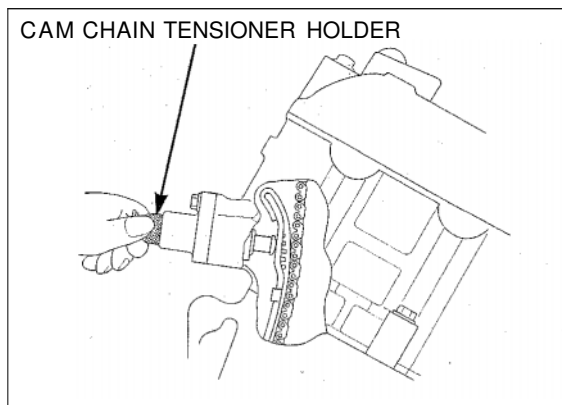
Remove the cam chain tensioner lifter sealing bolt and sealing washer.



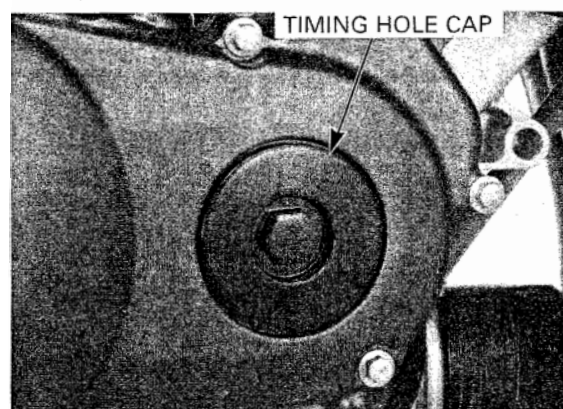
Turn the cam chain tensioner lifter shaft fully in (clockwise) and secure it using the special tool.

#### TOOL:

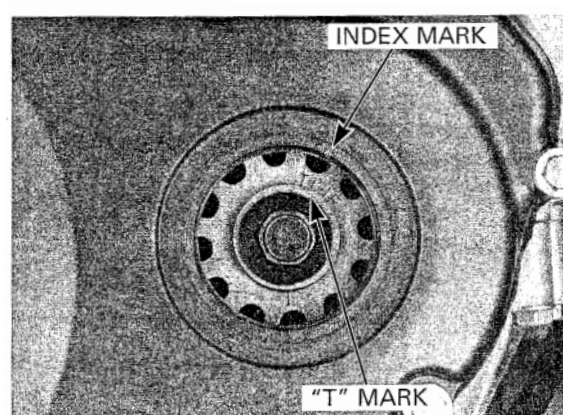
Cam chain tensioner holder 07ZMG-MCAA400  
(U.S.A. only)



Remove the timing hole cap and O-ring.

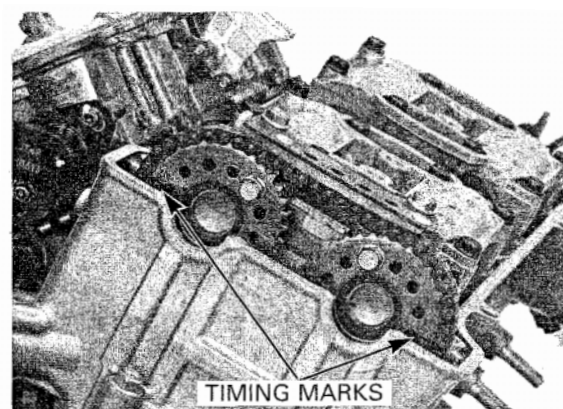


Turn the crankshaft clockwise, and align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



The timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks on the cam sprocket face inward, turn the crankshaft clockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.



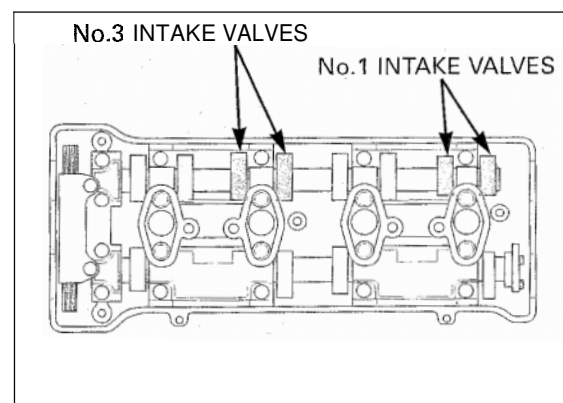
Insert a feeler gauge between the valve lifter and the cam lobe.

Check the valve clearance for the No.1 and No.3 cylinder intake valves using a feeler gauge.

## VALVE CLEARANCE:

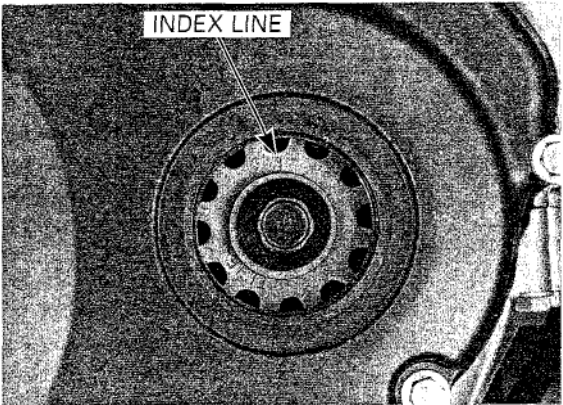
**IN:  $0.16 \pm 0.03\text{mm}$  ( $0.006 \pm 0.001\text{ in}$ )**

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



MAINTENANCE

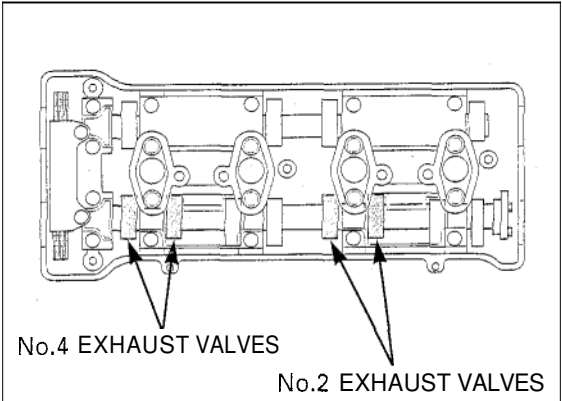
Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the ignition pulse generator rotor so that it is facing up as shown.



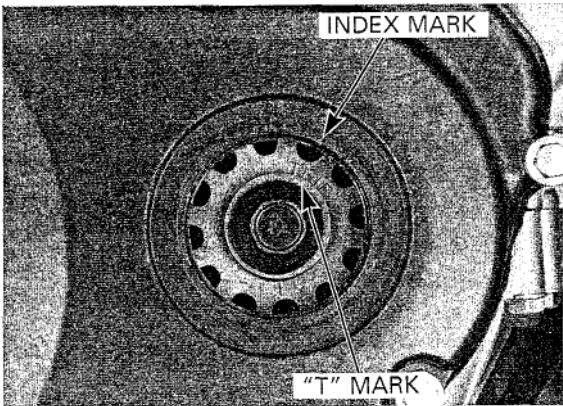
Record the clearance for each valve for reference in shim selection if adjustment is required

Check the valve clearance for the No.2 and No.4 cylinder exhaust valves using a feeler gauge.

VALVE CLEARANCE:  
EX: 0.27 ± 0.03 mm (0.011 ± 0.001 in)



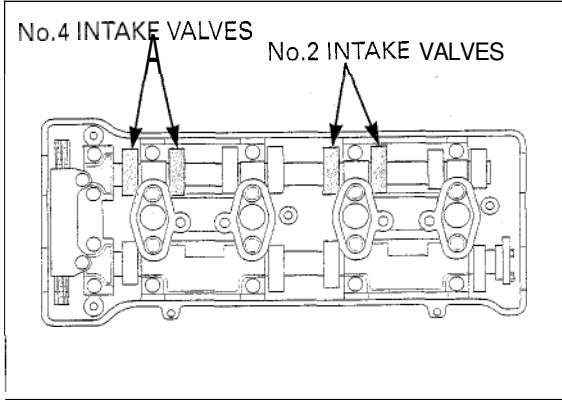
Turn the crankshaft clockwise 1/2 turn (180°), and align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



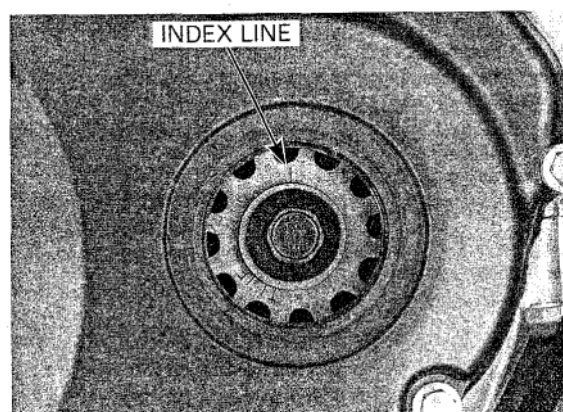
Record the clearance for each valve for reference in shim selection if adjustment is required

Check the valve clearance for the No.2 and No.4 cylinder intake valves using a feeler gauge.

VALVE CLEARANCE:  
IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)



Turn the crankshaft clockwise 1/2 turn (180°), and align the index line on the ignition pulse generator rotor so it is facing up as shown.

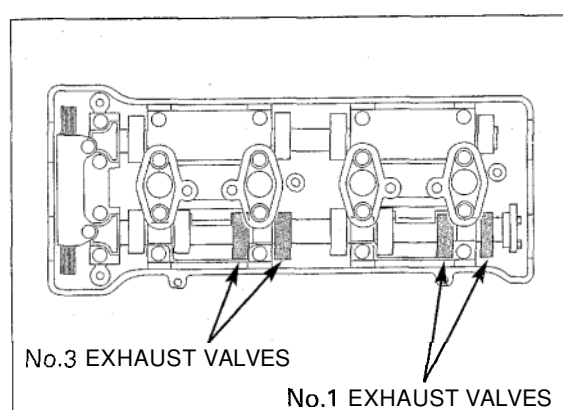


*Record the clearance for each valve for reference in shim selection if adjustment is required*

Check the valve clearance for the No.1 and No.3 cylinder exhaust valves using a feeler gauge.

## VALVE CLEARANCE:

**EX:  $0.27 \pm 0.03$  mm ( $0.011 \pm 0.001$  in)**

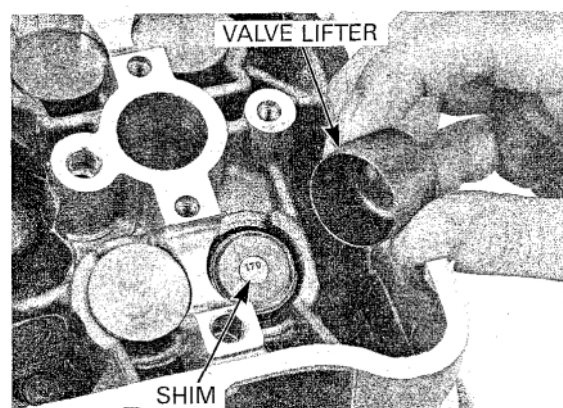


## ADJUSTMENT

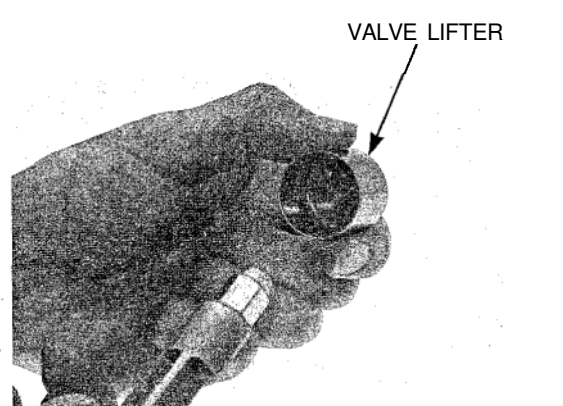
Remove the camshaft (page 8-7).

Remove the valve lifters and shims.

- 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.



## MAINTENANCE

Sixty-five different shim thicknesses are available from 1.200 mm to 2.800 mm in intervals of 0.025 mm

Measure the shim thickness and record it.

Calculate the new shim thickness using the equation below.

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

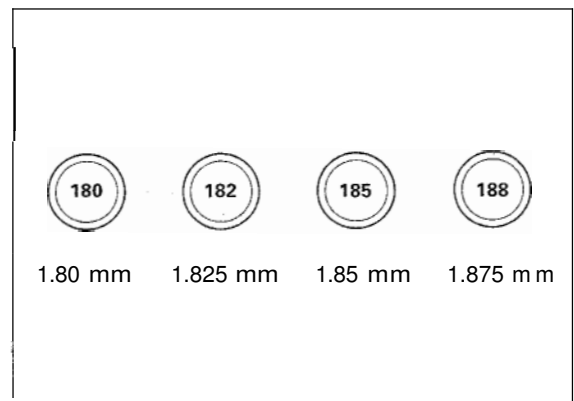
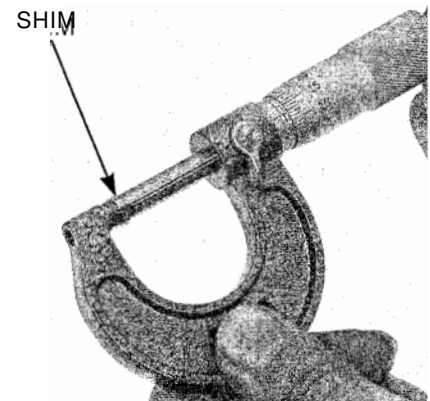
A: New shim thickness

B: Recorded valve clearance

C: Specified valve clearance

D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim with a micrometer.
- Reface the valve seat if carbon deposits result in a calculated dimension of over 2.800 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.

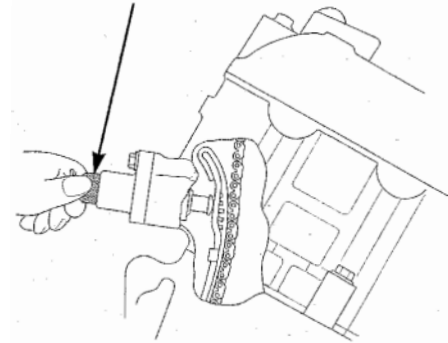
Install the camshafts (page 8-24).

Rotate the camshafts by rotating the crankshaft clockwise several times.

Recheck the valve clearance.

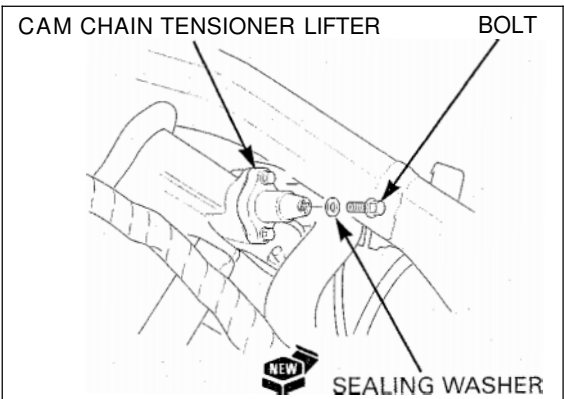
Remove the cam chain tensioner holder.

CAM CHAIN TENSIONER HOLDER



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

Install the removed parts in the reverse order of removal.





## ENGINE OIL/OIL FILTER

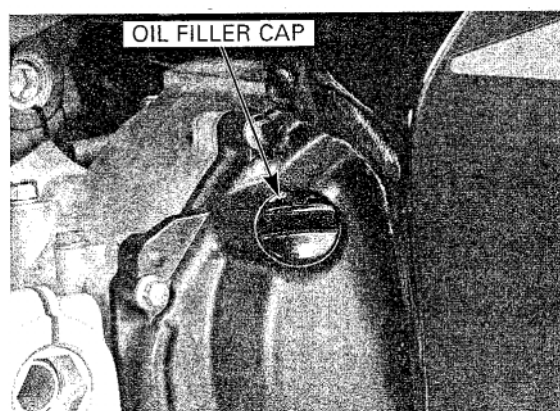
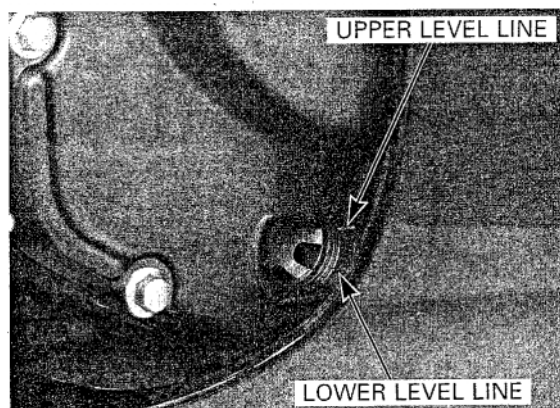
### OIL LEVEL INSPECTION

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

Check the oil level through the inspection window.

If the level is below the lower line, remove the oil filler cap and fill the crankcase with the recommended oil to the upper level line.

Remove the oil filler cap.



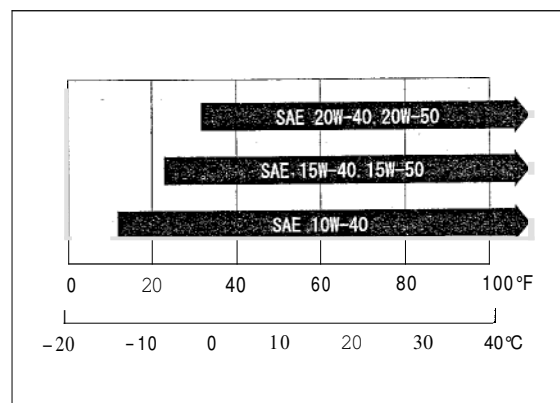
Fill the recommended engine oil up to the upper level line.

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

#### RECOMMENDED ENGINE OIL:

**Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil**  
**API service classification: SG or higher**  
**JASO T 903 standard: MA**  
**Viscosity: SAE 10W-40**

Reinstall the filler cap and dipstick.

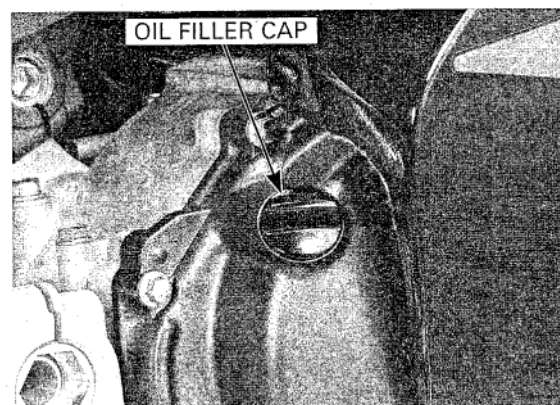


### ENGINE OIL & FILTER CHANGE

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

Warm up the engine.  
Remove the lower cowl (page 2-7).

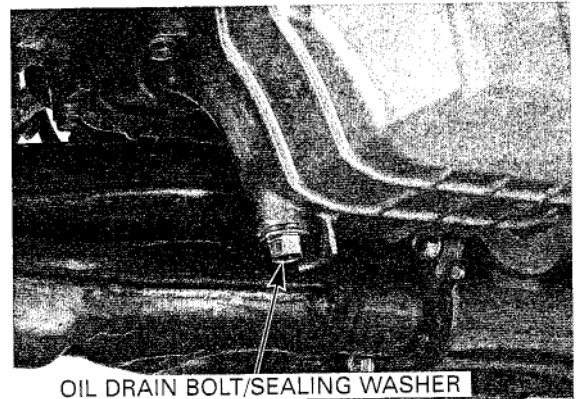
Stop the engine and remove the oil filler cap.





## MAINTENANCE

Remove the drain bolt and drain the oil completely

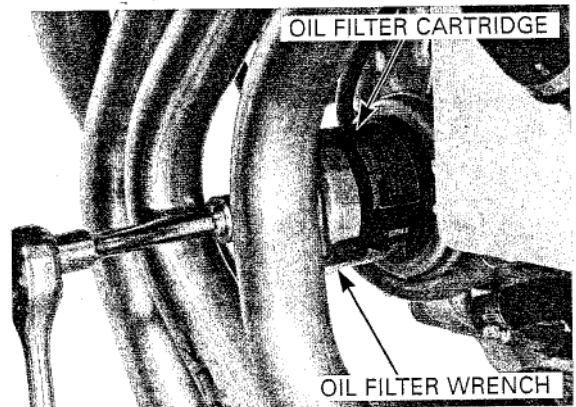


Remove and discard the oil filter cartridge using the special tool.

**TOOL:**

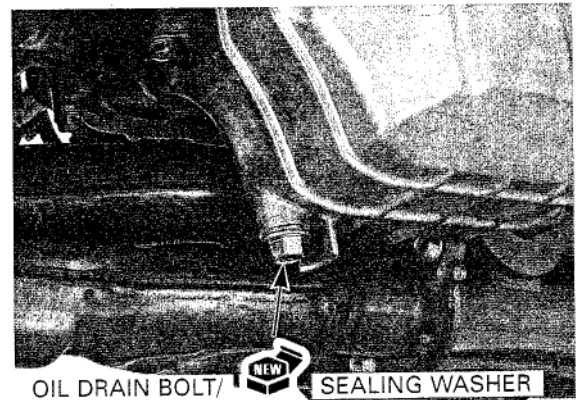
Oil filter wrench

07HAA-PJ70101 or  
07HAA-PJ70100

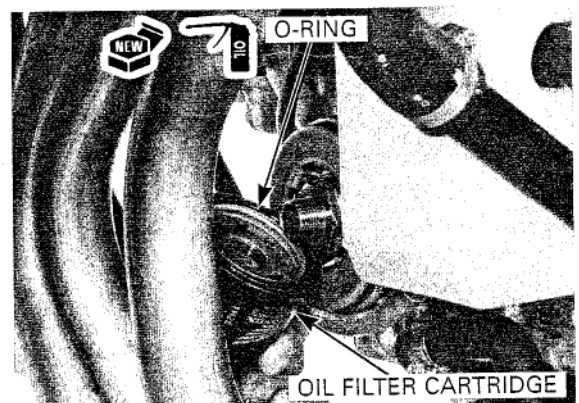


Check that the sealing washer on the drain bolt is in good condition, and replace if necessary. Install and tighten the drain bolt.

**TORQUE : 29 N·m (3.0kgf·m, 22 lbf·ft)**



Apply oil to the new oil filter O-ring.

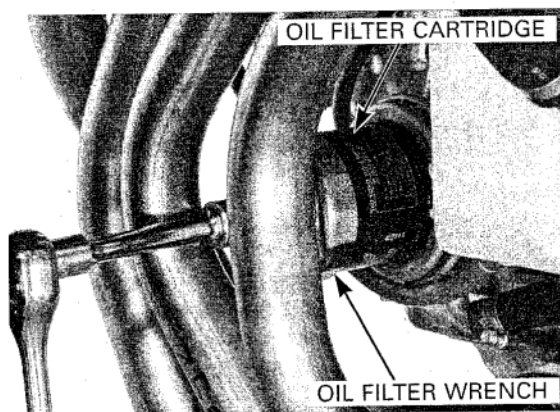


Install the new oil filter and tighten it to the specified torque.

**TOOL:**

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

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



Fill the crankcase with the recommended engine oil.

**OIL CAPACITY:**

**3.5 liter (3.7 US qt, 3.1 Imp qt) at draining**  
**3.7 liter (3.9 US qt, 3.3 Imp qt) at oil filter change**

Install the oil filler cap.

Start the engine and let it idle for 2 to 3 minutes.  
Stop the engine and recheck the oil level.  
Make sure there are no oil leaks.

Install the lower cowl (page 2-7).

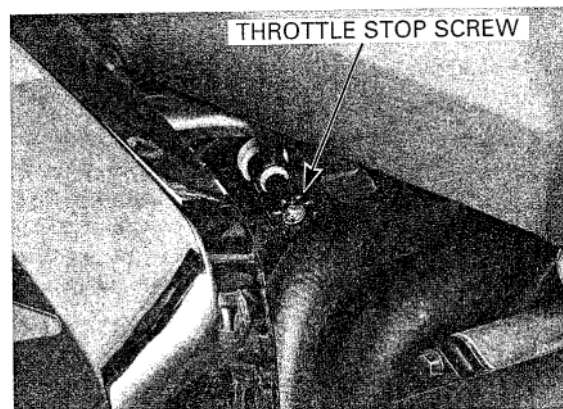


## ENGINE IDLE SPEED

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

Warm up the engine for about 10 minutes.  
Turn the throttle stop screw as required to obtain the specified idle speed.

**IDLE SPEED:** 1,200 ± 100 rpm



## MAINTENANCE

### RADIATOR COOLANT

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

If necessary, add the recommended coolant.

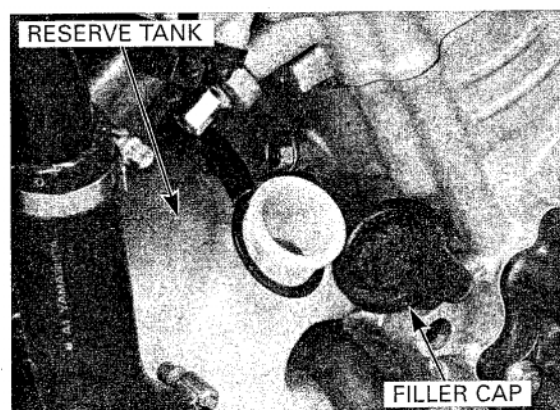
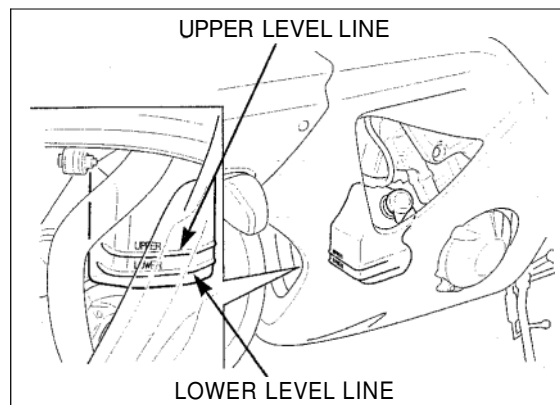
#### RECOMMENDED ANTIFREEZE:

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

Remove the lower cowl (page 2-7).

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

Reinstall the filler cap.

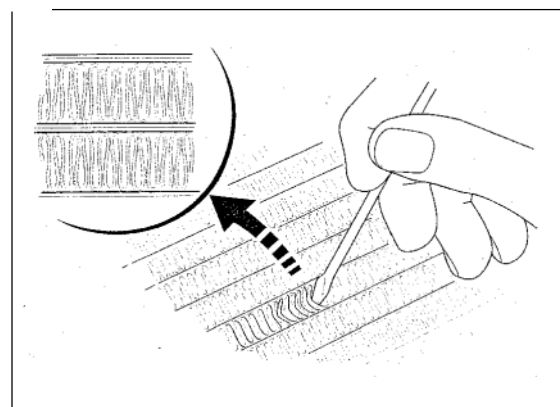


### COOLING SYSTEM

Remove the lower cowl (page 2-7).

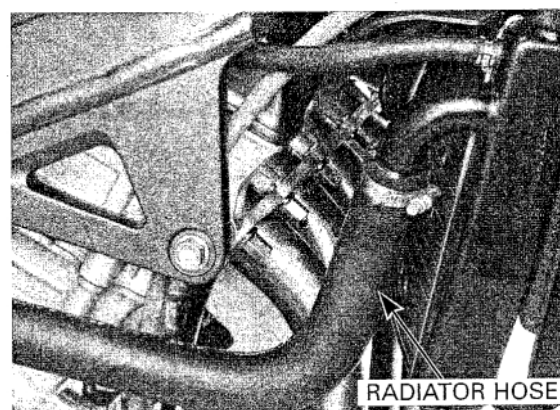
Check the radiator air passages for clogs or damage. Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

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



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

Check the tightness of all hose clamps and fasteners.



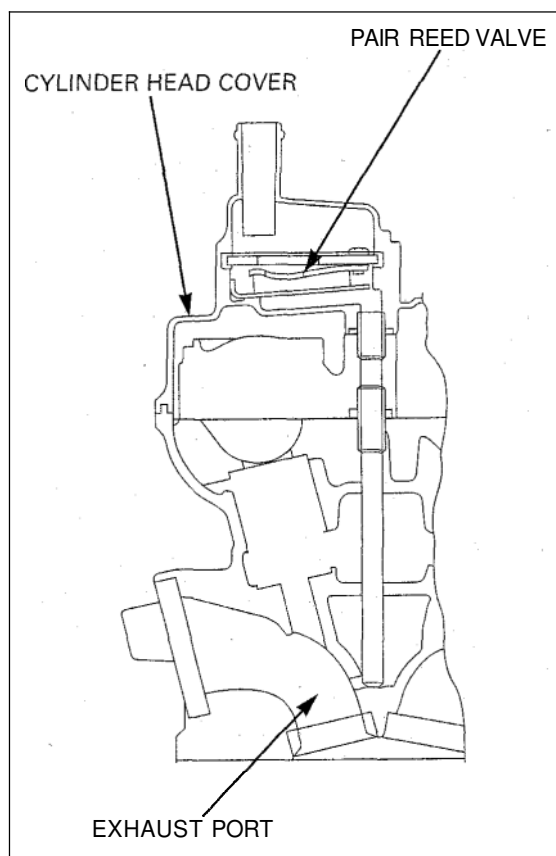
## SECONDARY AIR SUPPLY SYSTEM

- 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 are negative pressure pulses 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.

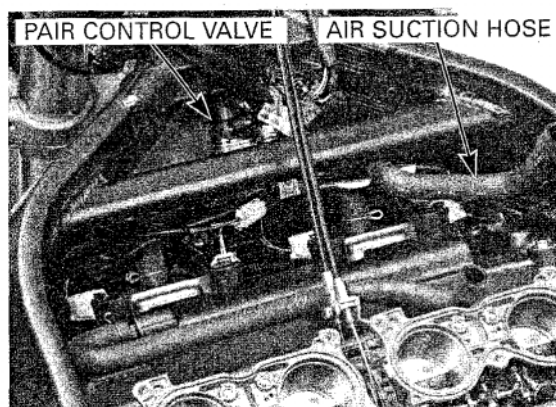
Remove the air cleaner housing (page 5-64).

*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.

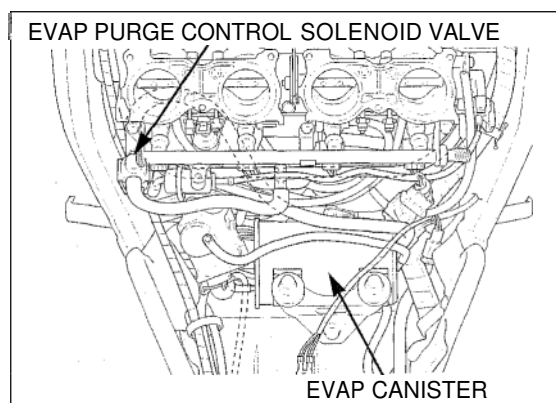


## EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

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

Check the EVAP canister for cracks or other damage.

Refer to the Vacuum Hose Routing Diagram label (page 1-40) and Cable & Harness Routing (page 1-28) for hose connections.



## MAINTENANCE

### DRIVE CHAIN

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

#### DRIVE CHAIN SLACK INSPECTION

Turn the ignition switch to "OFF", place the motorcycle on its side stand and shift the transmission into neutral.

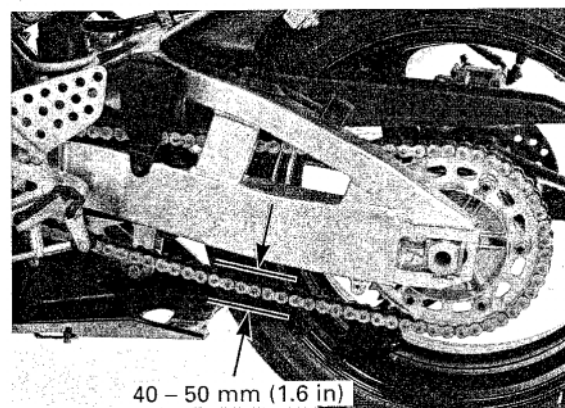
Check the slack in the drive chain lower run midway between the sprockets.

**CHAIN SLACK: 40 - 50 mm (1.6 - 2.0 in)**

#### NOTICE

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

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



#### ADJUSTMENT

Loosen the rear axle nut.

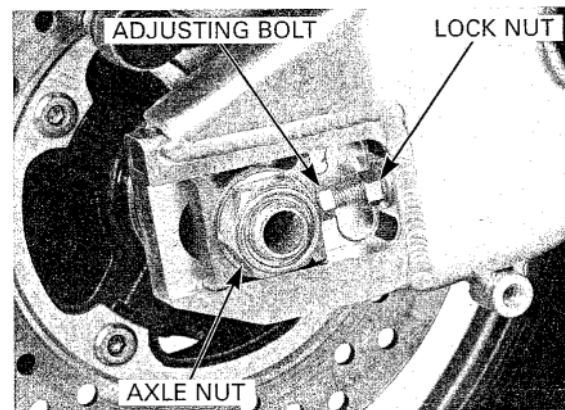
Loosen the drive chain adjust bolt lock nuts and turn both adjusting bolts until the correct drive chain slack is obtained.

Make sure the index marks on both adjusting plates are aligned with the swingarm index mark.

Tighten the rear axle nut to the specified torque.

**TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)**

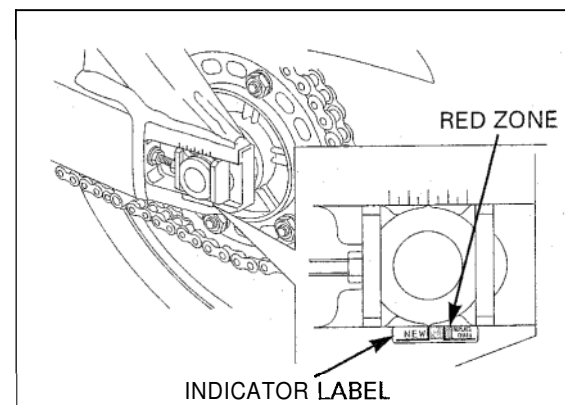
Tighten both drive chain adjusting bolt lock nuts.



Recheck the drive chain slack and free wheel rotation. Lubricate the drive chain with #80 - 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

Check the drive chain wear indicator label attached on the left swingarm.

If the drive chain adjusting plate index mark reaches the red zone of the indicator label, replace the drive chain with a new one (page 3-22).



## CLEANING AND LUBRICATION

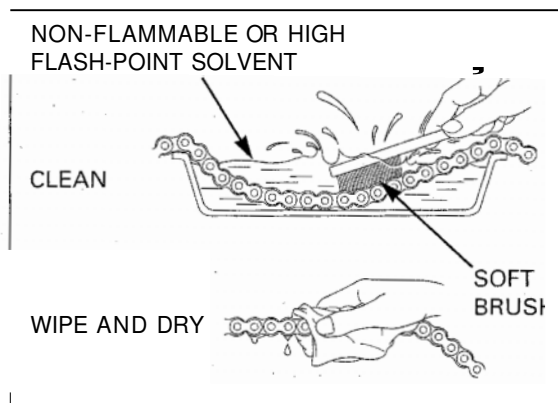
Clean the chain with non-flammable or high flash-point solvent and wipe it dry.

Be sure the chain has dried completely before lubricating.

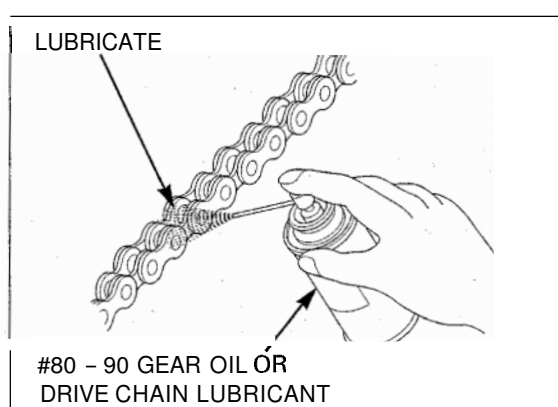
Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace the sprocket as necessary.



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

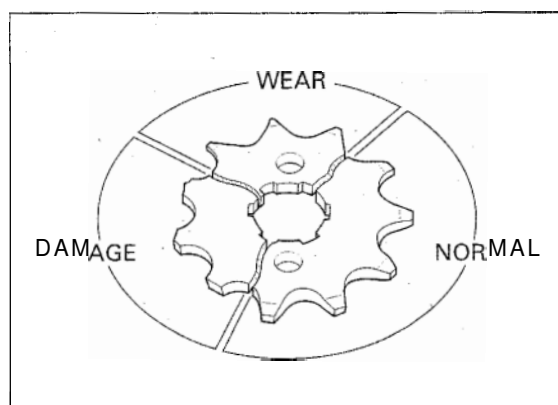


## SPROCKETS INSPECTION

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

Never use a new drive chain on worn sprockets.

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



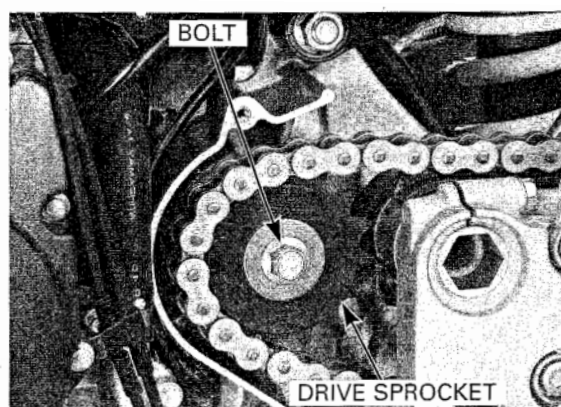
Check the attaching bolts and nuts on the drive and driven sprockets.

If any are loose, torque them.

### TORQUE:

Drive sprocket bolt: 54 N•m (5.5 kgf•m, 40 lbf•ft)

Driven sprocket nut: 64 N•m (6.5 kgf•m, 47 lbf•ft)



## MAINTENANCE

### REPLACEMENT

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

Loosen the drive chain (page 3-20).

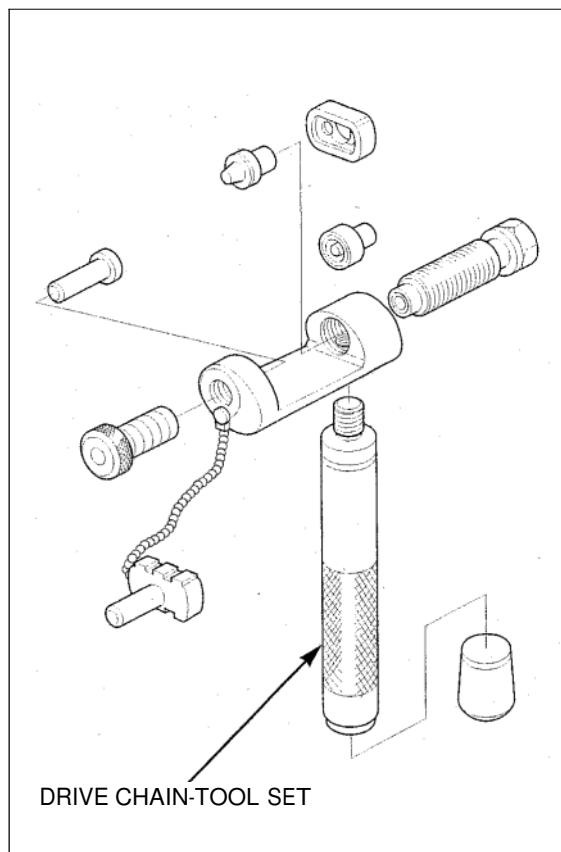
Assemble the special tool as shown.

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

#### TOOL:

**Drive chain tool set**

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



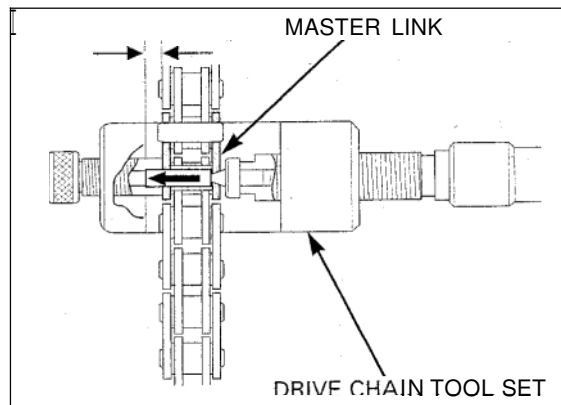
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

#### TOOL:

**Drive chain tool set**

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

Remove the drive chain.



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

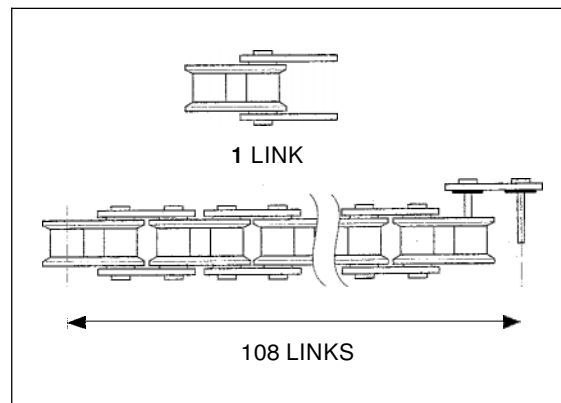
Remove the excess drive chain links from the new drive chain with the drive chain tool set.

**STANDARD LINKS: 108 links**

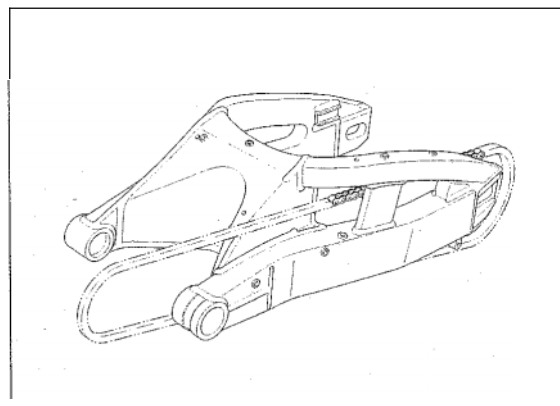
**REPLACEMENT CHAIN:**

**DID: DID 50VA8 C1**

**RK: RK GB50HFOZ5**



Route the drive chain through the swingarm as shown.

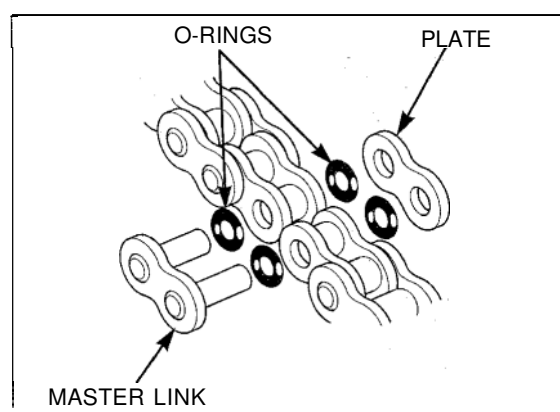


## NOTICE

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

*insert the master link from the inside of the drive chain, and install the plate with the identification mark facing out*

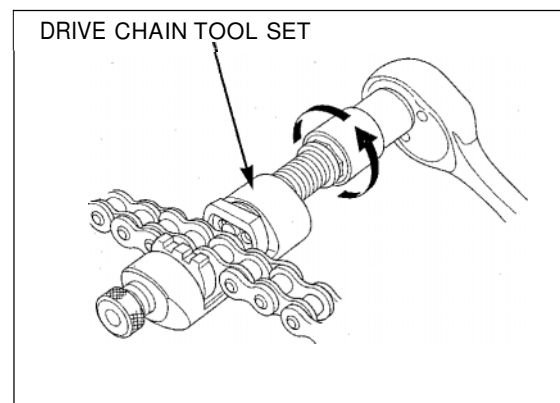
Assemble the new master link, O-rings and plate.



Assemble and set the drive chain tool set.

**TOOL:**  
Drive chain tool set

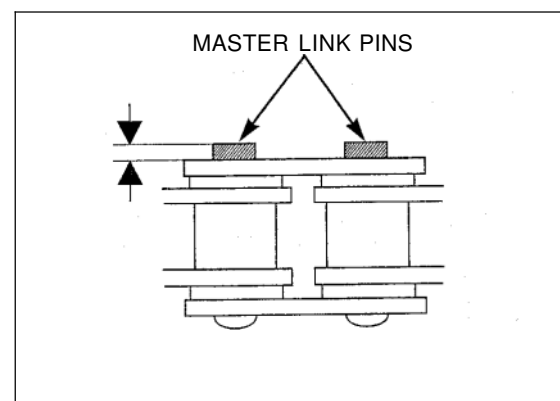
07HMH-MR10103 or  
07HMH-MR1010C  
(U.S.A. only)



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

**STANDARD LENGTH:**  
DID: 1.15 – 1.55 mm (0.045 – 0.061 in)  
RK: 1.2 – 1.4 mm (0.05 – 0.06 in)

Stake the master link pins.





## MAINTENANCE

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

### DIAMETER OF THE STAKED AREA:

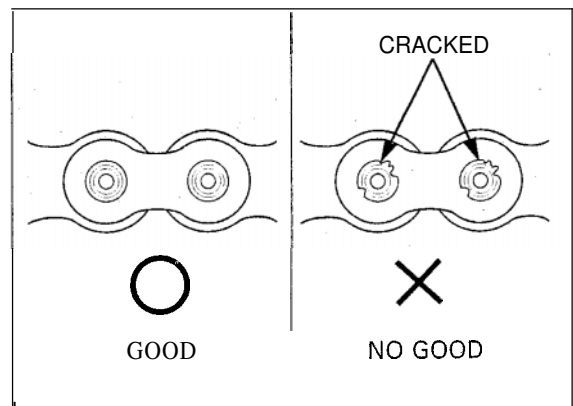
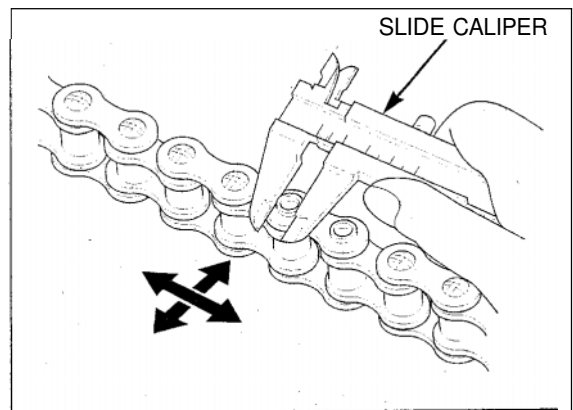
DID: 5.50 – 5.80mm (0.217– 0.228in)

RK: 5.45– 5.85 mm (0.215– 0.230in)

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

After staking, check the staked area of the master link for cracks.

If there is any cracking, replace the master link, O-rings and plate.



## BRAKE FLUID

### NOTICE

- 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 (page 3-25). 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 entire system for leaks (page 3-25).

### FRONT BRAKE

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

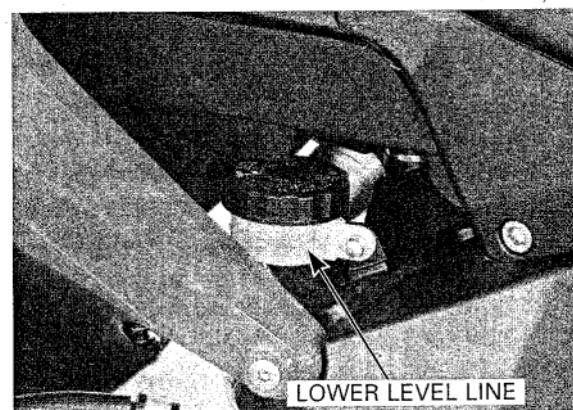
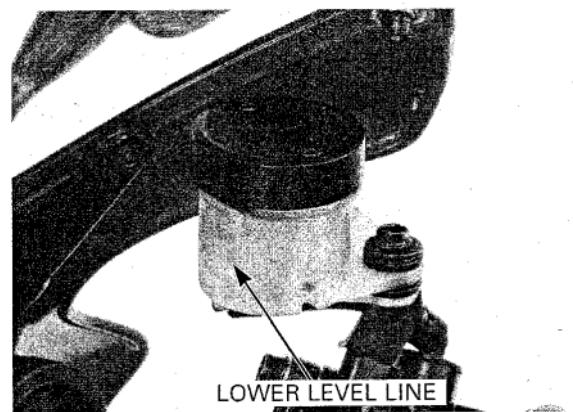
If the level is near the lower level line, check the brake pad wear (page 3-25).

### REAR BRAKE

Place the motorcycle 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 the brake pad wear (page 3-25).

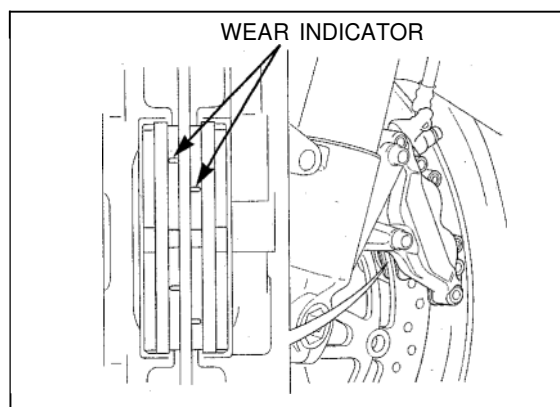


## **BRAKE PAD WEAR**

### **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.

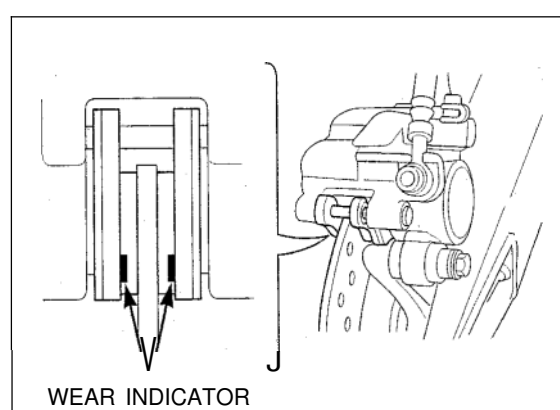
Refer to page 15-8 for brake pad replacement.



### **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 15-10 for brake pad replacement.



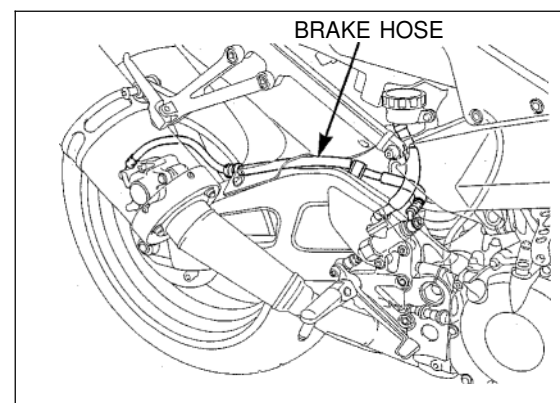
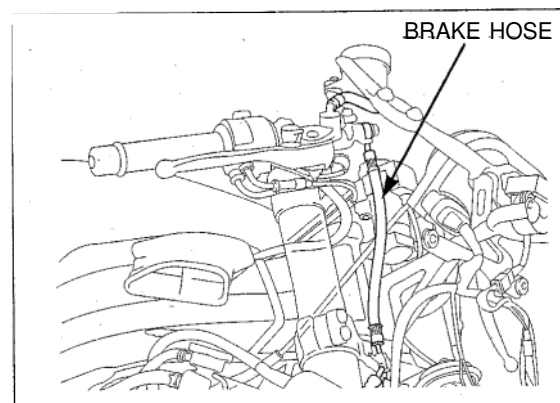
## **BRAKE SYSTEM**

### **INSPECTION**

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

Refer to page 15-5 for brake bleeding procedures.

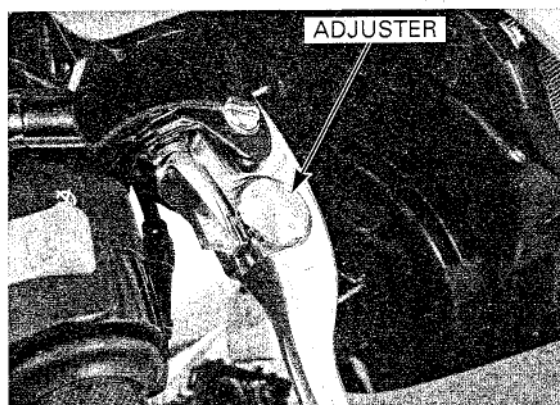


## MAINTENANCE

### BRAKE LEVER ADJUSTMENT

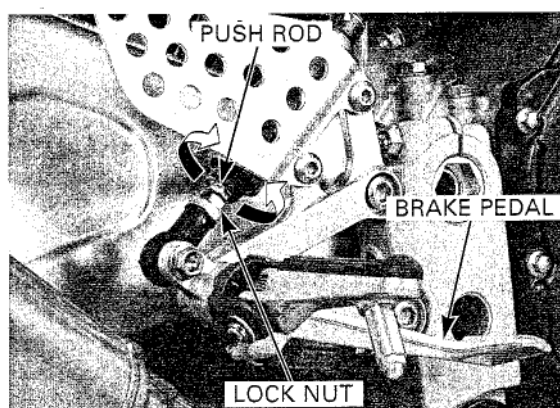
*Align the allowance on the brake lever with the index number on the adjuster.*

The distance between the top of the brake lever and the grip can be adjusted by turning the adjuster.



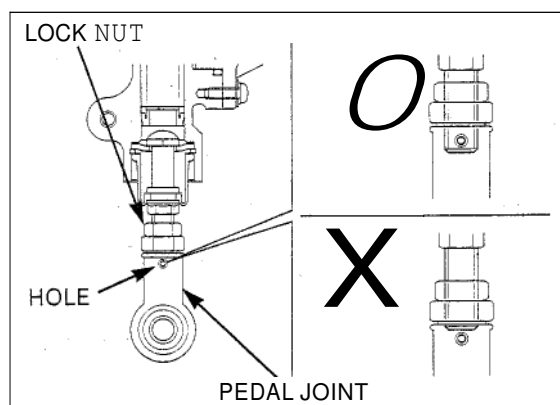
### BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod until the correct pedal height is obtained.



Make sure the push rod threads cannot be seen through the pedal joint hole. After adjustment, tighten the lock nut to the specified torque.

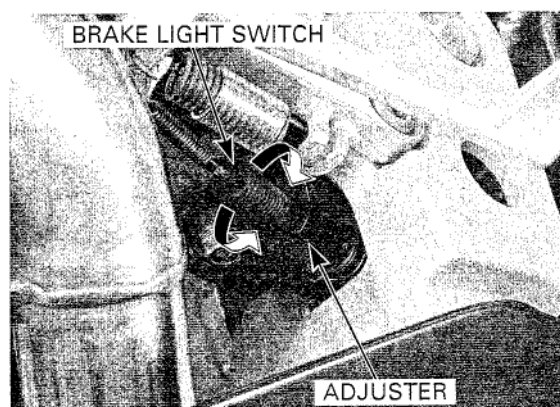
**TORQUE: 18 N·m (1.8kgf·m, 13 lbf·ft)**



### BRAKE LIGHT SWITCH

*The front brake light switch does not require adjustment.*

Adjust the brake light switch so the brake light comes on just prior to the brake actually being engaged. If the light fails to come on, adjust the switch so the light comes on at the proper time. Hold the switch body and turn the adjuster. Do not turn the switch body.



## HEADLIGHT AIM

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

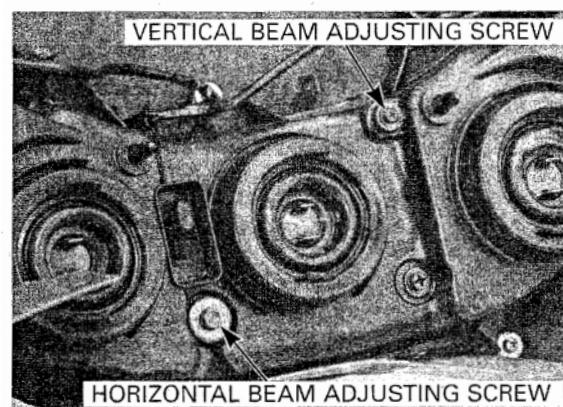
Place the motorcycle on a level surface.

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

A clockwise rotation moves the beam up and counter-clockwise rotation moves the beam down.

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

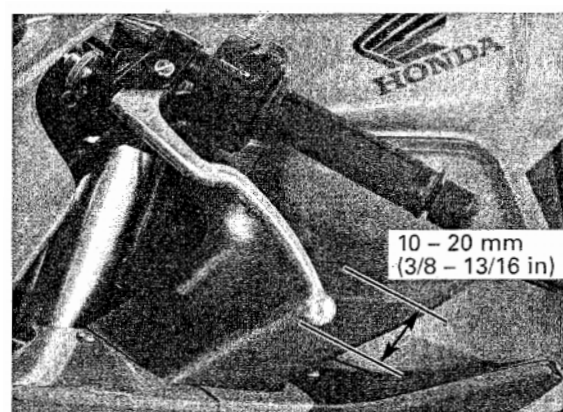
A clockwise rotation moves the beam toward the right side of the rider.



## CLUTCH SYSTEM

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

**FREE PLAY: 10 - 20 mm (3/8 - 13/16 in)**



Minor adjustments are made using the upper adjuster at the clutch lever.

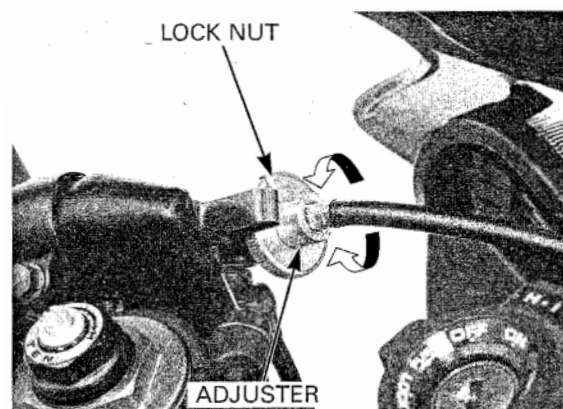
Loosen the lock nut and turn the adjuster.

### NOTICE

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

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

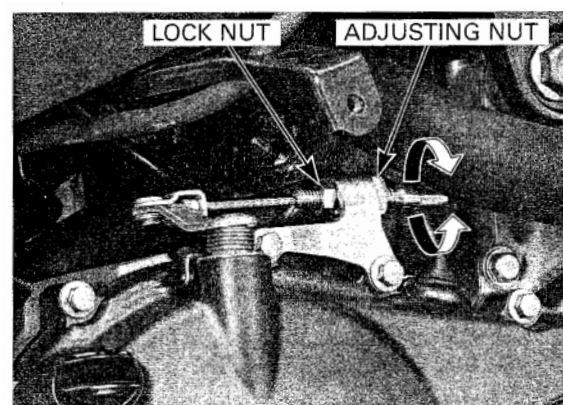
Tighten the lock nut and make a major adjustment as described below.



Major adjustments are performed at the clutch arm. Loosen the lock nut and turn the adjusting nut to adjust free play.

Hold the adjusting nut securely while tightening the lock nut.

If proper free play cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch (see section 9).



## MAINTENANCE

### SIDE STAND

Support the motorcycle on a level surface.

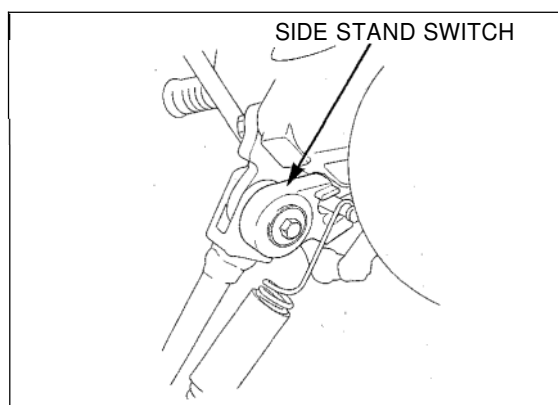
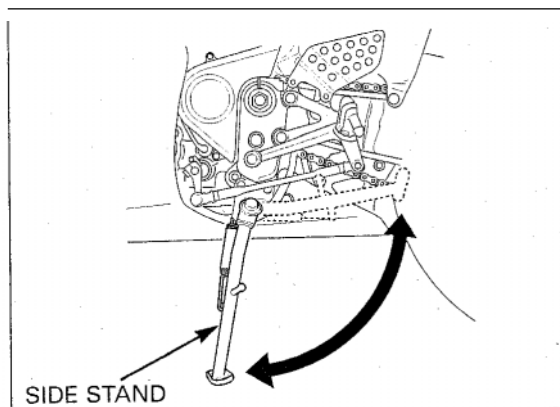
Check the side stand spring for damage or loss of tension.

Check the side stand assembly for smooth movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand completely down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (section 19).



### SUSPENSION

#### FRONT SUSPENSION INSPECTION

*Loose, worn or damaged suspension parts impair motorcycle stability and control.*

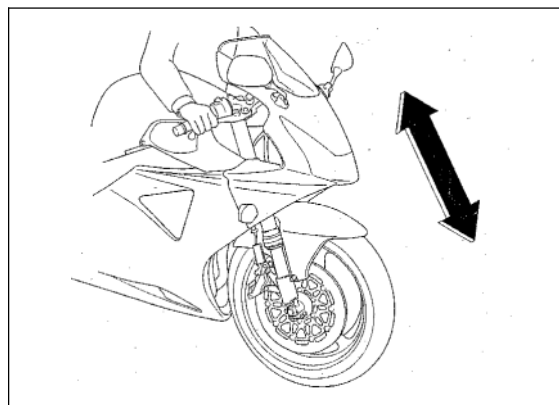
Check the action of the forks by operating the front brakes and compressing the front suspension several times.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 13 for fork service.



#### FRONT SUSPENSION ADJUSTMENT

*To adjust both sides equally, set the right and left damping adjusters to the same position*

##### SPRING PRE-LOAD ADJUSTER

Spring pre-load can be adjusted by turning the adjuster.

##### TURN CLOCKWISE:

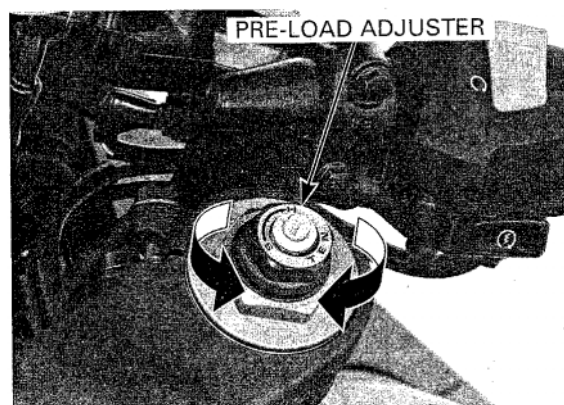
**Increase the spring pre-load**

##### TURN COUNTERCLOCKWISE:

**Decrease the spring pre-load**

##### PRE-LOAD ADJUSTER STANDARD POSITION:

**7 turns from full soft**



## COMPRESSION AND REBOUND DAMPING ADJUSTERS

### NOTICE

*Do not turn the adjuster screws more than the given positions or the adjusters may be damaged.*

Always start on full hard when adjusting the damping. Be sure that the rebound and compression adjusters are firmly located in a detent, and not between positions.

The compression and rebound damping can be adjusted by turning the adjusters.

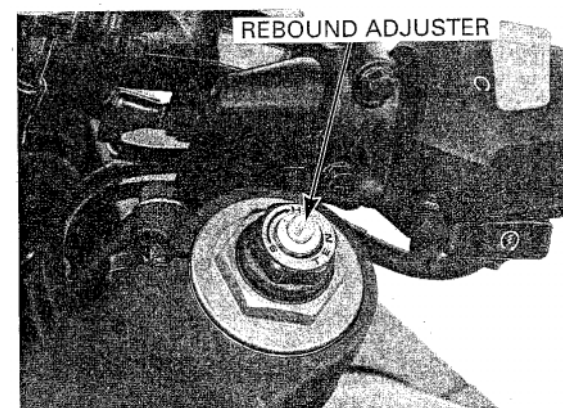
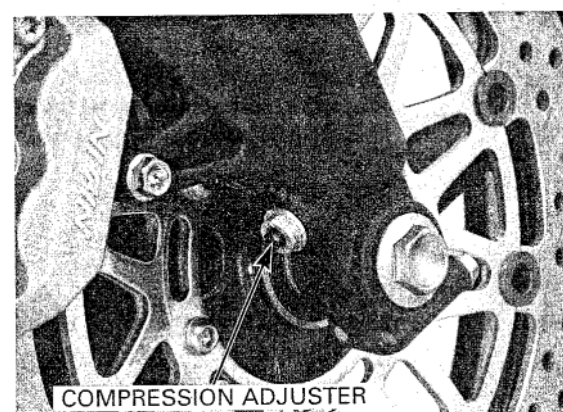
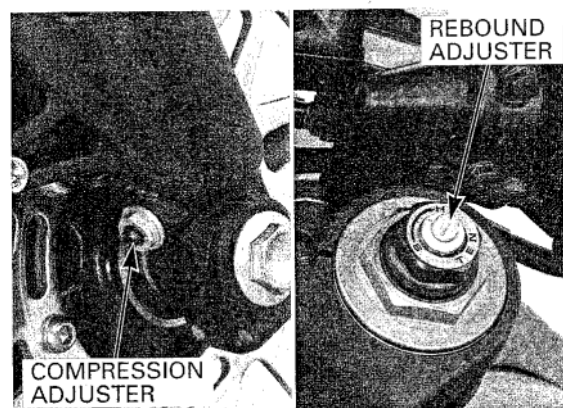
**DIRECTION H:** Increase the damping force  
**DIRECTIONS:** Decrease the damping force

Turn the compression adjuster clockwise until it stops, then turn the adjuster counterclockwise.

**COMPRESSION ADJUSTER STANDARD POSITION:**  
2 turns from full hard

Turn the rebound adjuster clockwise until it stops, then turn the adjuster counterclockwise.

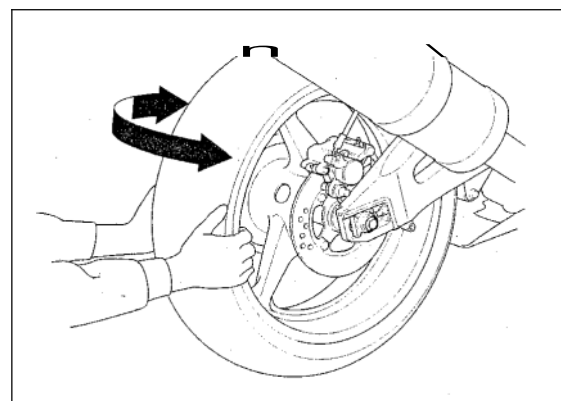
**REBOUND ADJUSTER STANDARD POSITION:**  
2 turns from full hard



## REAR SUSPENSION INSPECTION

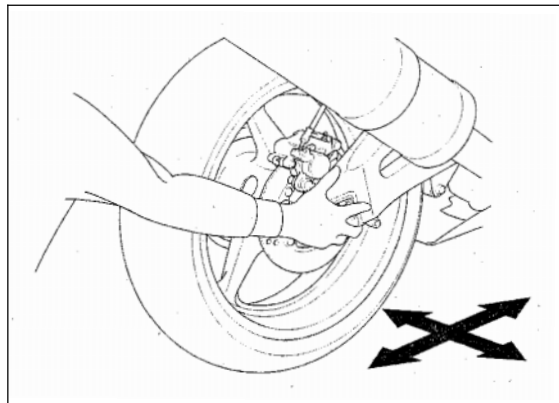
Support the motorcycle securely and raise the rear wheel off the ground.

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



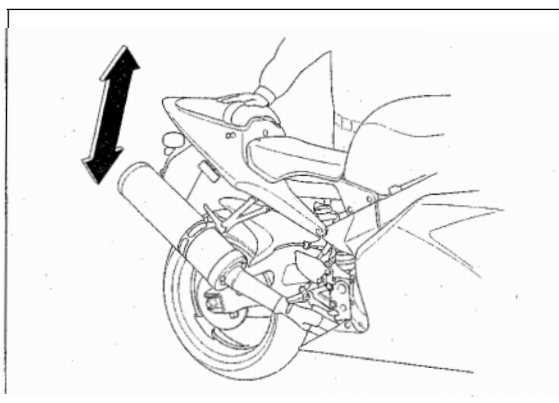
## MAINTENANCE

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 14 for shock absorber service.



## REAR SUSPENSION ADJUSTMENT

### COMPRESSION AND REBOUND DAMPING ADJUSTERS

#### NOTICE

*Do not turn the adjuster screws more than the given positions or the adjusters may be damaged.*

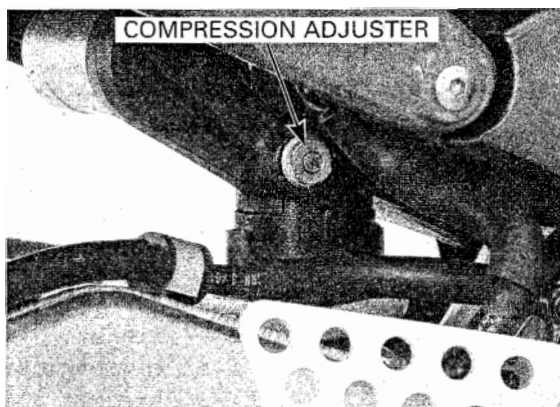
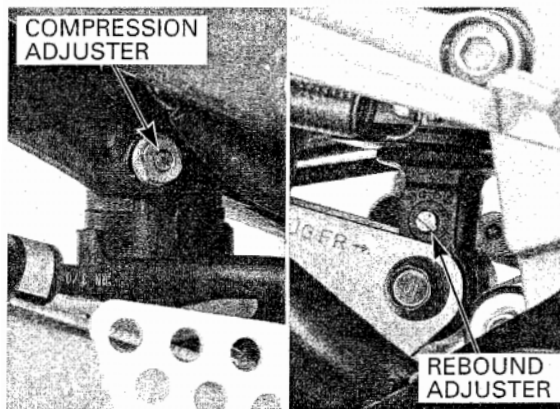
Always start on full hard when adjusting the damping.

The compression and rebound damping can be adjusted by turning the adjusters.

**DIRECTION H:** Increase the damping force  
**DIRECTION S:** Decrease the damping force

Turn the compression adjuster clockwise until it stops, then turn the adjuster counterclockwise.

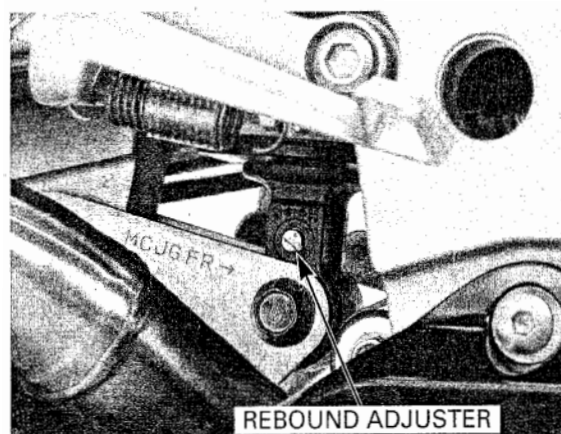
**COMPRESSION ADJUSTER STANDARD POSITION:**  
2 turns from full hard





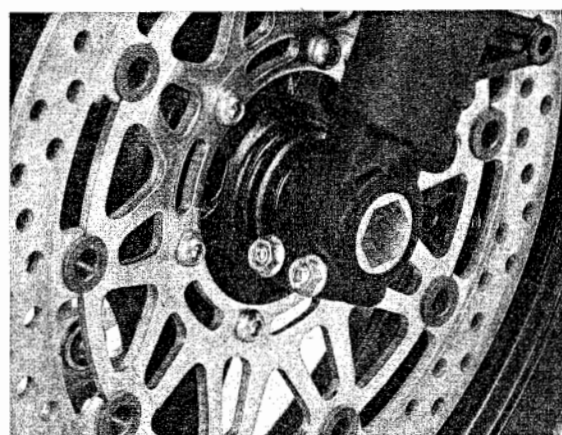
Turn the rebound adjuster clockwise until it stops, then turn the adjuster counterclockwise.

**REBOUND ADJUSTER STANDARD POSITION:**  
2 turns from full hard



## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).  
Check that all safety clips, hose clamps and cable stays are in place and properly secured.



## WHEELS/TIRES

The pressure should be checked when the tires are cold.

**RECOMMENDED TIRE PRESSURE AND TIRE SIZE:**

		FRONT	REAR
Tire pressure kPa (kgf/cm <sup>2</sup> , psi)		250 (2.50, 36)	290 (2.90, 42)
Tire size		120/70 ZR17 M/C (58W)	190/50 ZR17 M/C (73W)
Tire brand	Bridgestone	BT012F RADIAL G	BT012R RADIAL G
	Michelin	Pilot SPORT E	Pilot SPORT E

Check the tires for cuts, embedded nails, or other damage.

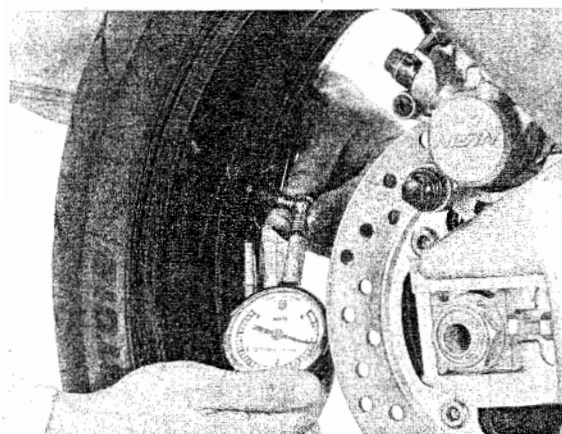
Check the front and rear wheels for trueness (refer to section 13 and 14).

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)





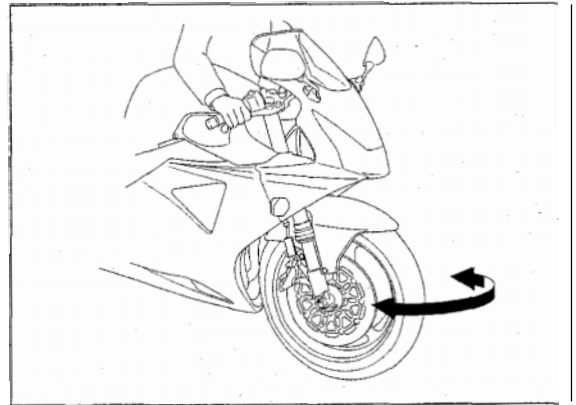
### STEERING HEAD BEARINGS

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

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

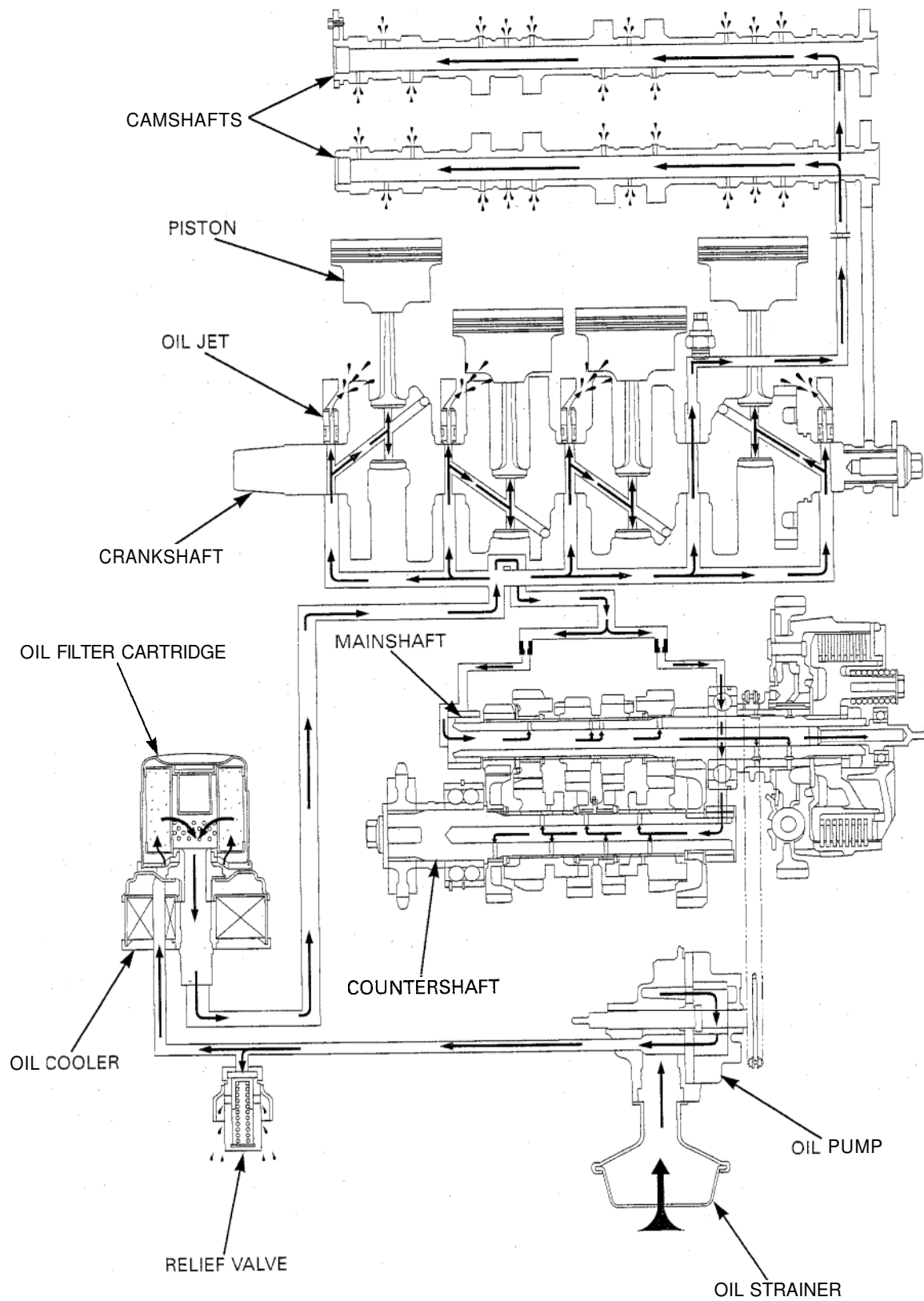
Check that the handlebar moves freely from side to side.

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



## LUBRICATION SYSTEM

### LUBRICATION SYSTEM DIAGRAM



# 4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	OIL STRAINER/PRESSURE RELIEF VALVE	4-3
SERVICE INFORMATION	4-1	OIL PUMP	4-5
TROUBLESHOOTING	4-2	OIL COOLER	4-9
OIL PRESSURE INSPECTION	4-3		

## SERVICE INFORMATION

4

### GENERAL

#### CAUTION

Repeated, prolonged exposure to used motor oil may cause skin cancer.

Wash your hands thoroughly with strong soap as soon as possible after handling used oil.

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

### SPECIFICATIONS

Unit: mm (

		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	3.5 liter (3.7 US qt, 3.1 Imp qt)	—
	At oil filter change	3.7 liter (3.9 US qt, 3.3 Imp qt)	
	At disassembly	4.0 liter (4.2 US qt, 3.5 Imp qt)	
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or higher JASO T 903 standard: MA Viscosity: SAE 10W-40	
Oil pressure at oil pressure switch		490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 5,400 rpm/(80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

LUBRICATION SYSTEM

TORQUE VALUES

Oil drain bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)	
Oil cooler mounting bolt	74 N•m (7.5 kgf•m, 54 lbf•ft)	
Oil pump assembly flange bolt	8 N•m (0.8 kgf•m, 5.8 lbf•ft)	CT bolt
Oil pump driven sprocket bolt	15 N•m (1.5 kgf•m, 11 lbf•ft)	Apply a locking agent to the threads.
Oil filter cartridge	26 N•m (2.7 kgf•m, 20 lbf•ft)	Apply clean engine oil to the O-ring.
Lower crankcase 20 mm sealing bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)	Apply a locking agent to the threads.

TOOLS

Oil pressure gauge set	07506-3000001	Equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07510-MA70000	
Oil filter wrench	07HAA-PJ70101	
		or 07HAA-PJ7O100

TROUBLESHOOTING

Engine oil level too low

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

Low or no oil pressure

- Clogged oil orifice
- Incorrect oil being used

No oil pressure

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

Low oil pressure

- Clogged oil strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Low oil level

High oil pressure

- Plugged oil filter, gallery, or metering orifice
- Incorrect oil being used

Oil contamination

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

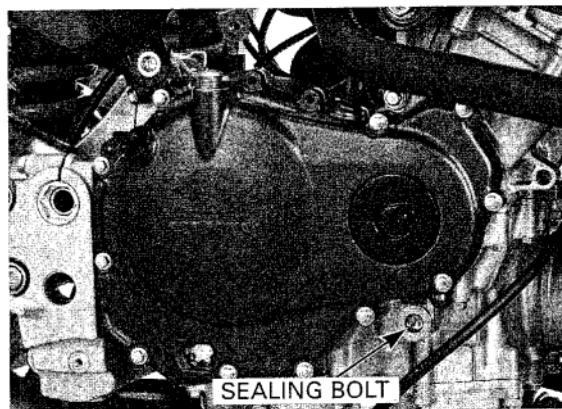
## OIL PRESSURE INSPECTION

*If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.*

Check the oil level (page 3-15).

Warm up the engine to normal operating temperature (approximately 80°C/176°F).

Stop the engine and remove the crankcase sealing bolt.



Connect an oil pressure gauge and attachment to the crankcase.

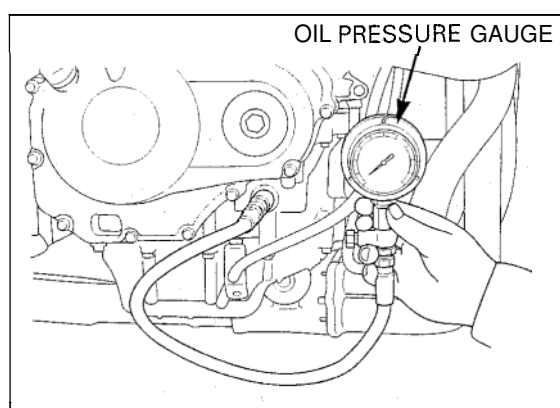
### TOOLS:

Oil pressure gauge set

07506-3000001  
(Equivalent commercially available in U.S.A.)

Oil pressure gauge attachment

07510-MA70000  
(Equivalent commercially available in U.S.A.)



Start the engine and increase the rpm to 5,400 rpm and read the oil pressure.

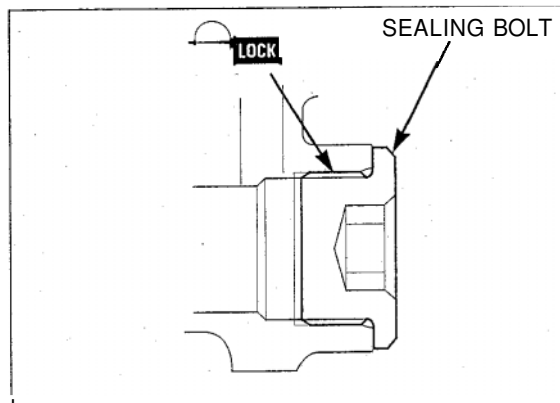
### OIL PRESSURE:

490 kPa (5.0 kgf/cm<sup>2</sup>, 71 psi) at 5,400 rpm/  
(80°C/176°F)

Stop the engine and remove the tools.  
Apply a locking agent to the sealing bolt threads.

Install and tighten the sealing bolt to the specified torque.

**TORQUE:** 29 N·m (3.0 kgf·m, 22 lbf·ft)



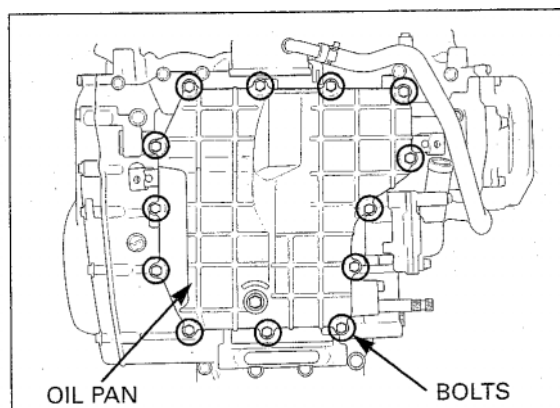
## OIL STRAINER/PRESSURE RELIEF VALVE

### REMOVAL

Drain the engine oil (page 3-15).

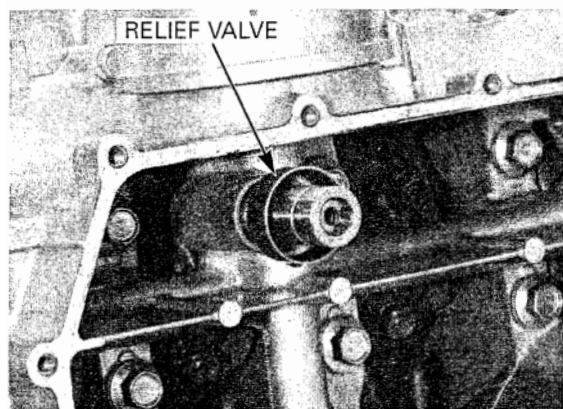
Remove the exhaust pipe (page 2-13)

Remove the oil pan flange bolts and oil pan.



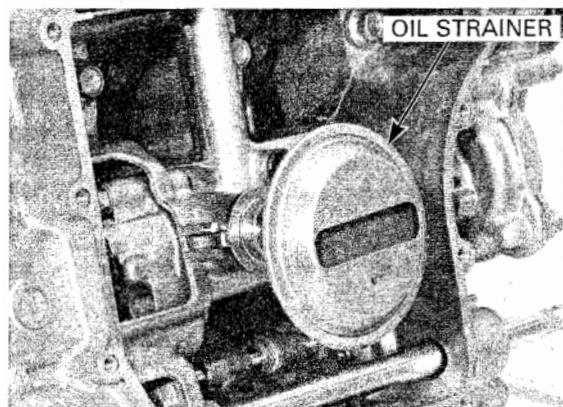
## LUBRICATION SYSTEM

Remove the pressure relief valve and O-ring.



Remove the oil strainer and gasket.

Clean the oil strainer screen.



### INSPECTION

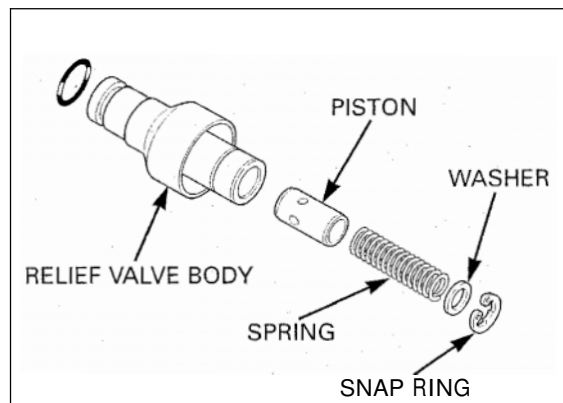
Check the operation of the pressure relief valve by pushing on the piston.

Disassemble the relief valve by removing the snap ring.

Inspect the piston for wear, unsmooth movement or damage.

Inspect the spring for fatigue or damage.

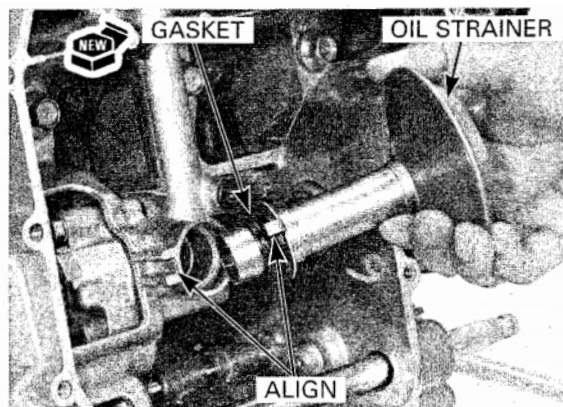
Assemble the relief valve in the reverse order of disassembly.



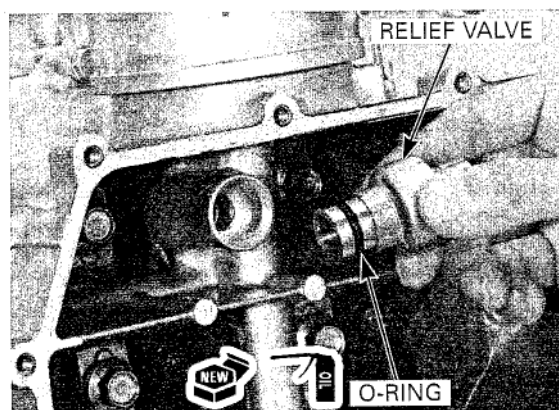
### INSTALLATION

Apply oil to the new gasket and install it onto the oil strainer.

Install the oil strainer into the crankcase while aligning its boss with the groove in the crankcase.

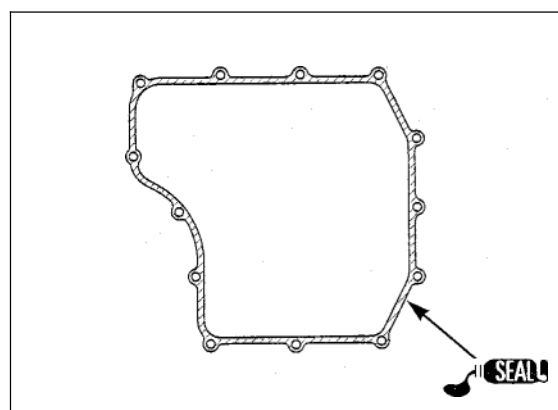


Apply oil to the new O-ring and install it onto the relief valve.  
Install the relief valve into the crankcase.



*Do not apply  
sealant more than  
necessary*

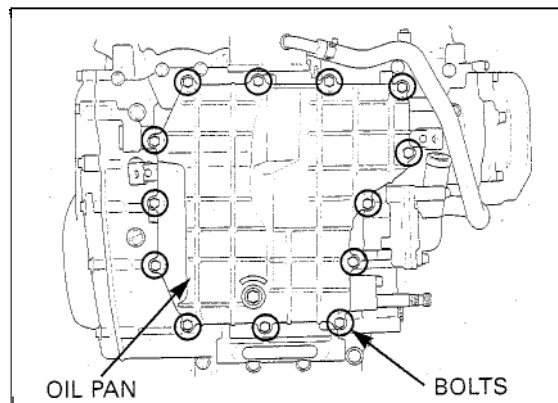
Clean the oil pan mating surface thoroughly.  
Apply Three Bond 1207B or an equivalent to the mating surface.



Install the oil pan onto the lower crankcase.  
Install the oil pan mounting bolts.  
Temporarily tighten the two bolts first, then tighten all the bolts in a crisscross pattern in 2 – 3 steps.

Install the exhaust pipe (page 2-16).  
Fill the crankcase with the recommended oil (page 3-16).

After installation, check that there are no oil leaks.



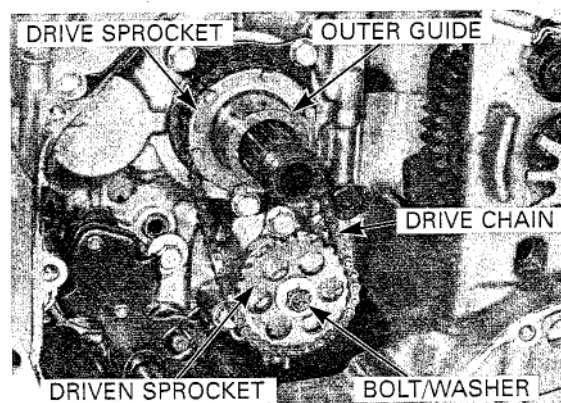
## OIL PUMP

### REMOVAL

Remove the following:

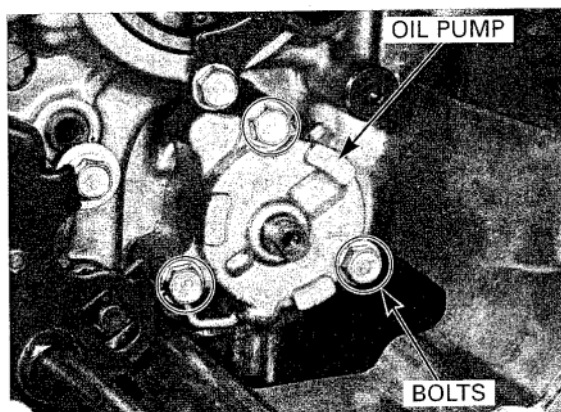
- Clutch assembly (page 9-4)
- Oil strainer and pressure relief valve (page 4-3)

Remove the bolt/washer, then remove the oil pump drive/driven sprocket, clutch outer guide and drive chain as an assembly.



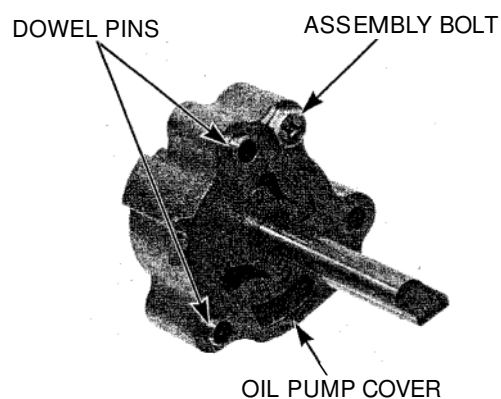
## LUBRICATION SYSTEM

Remove the three flange bolts and oil pump assembly.

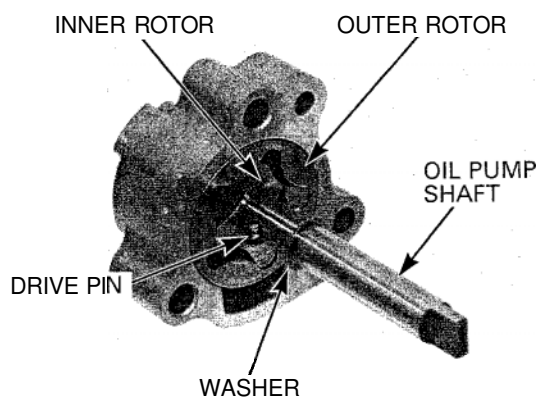


### DISASSEMBLY

Remove the dowel pins.  
Remove the oil pump assembly bolt and oil pump cover.



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

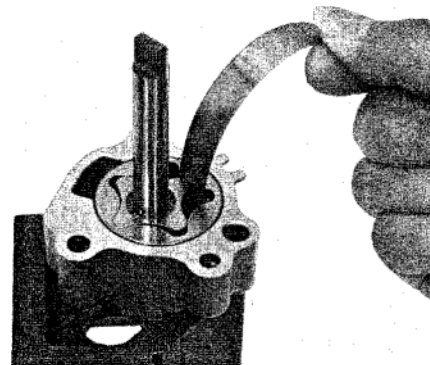


### INSPECTION

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

Measure the tip clearance.

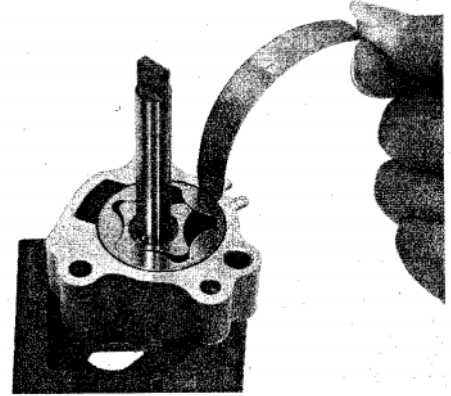
**SERVICE LIMIT: 0.20 mm (0.008 in)**





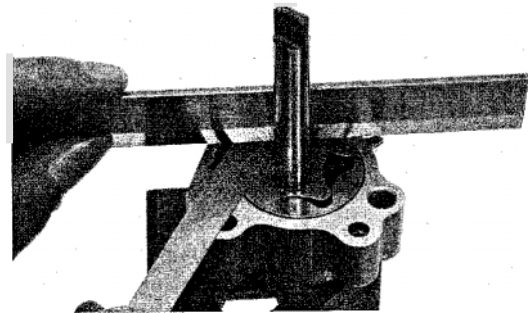
Measure the pump body clearance.

**SERVICE LIMIT: 0.35 mm (0.014 in)**

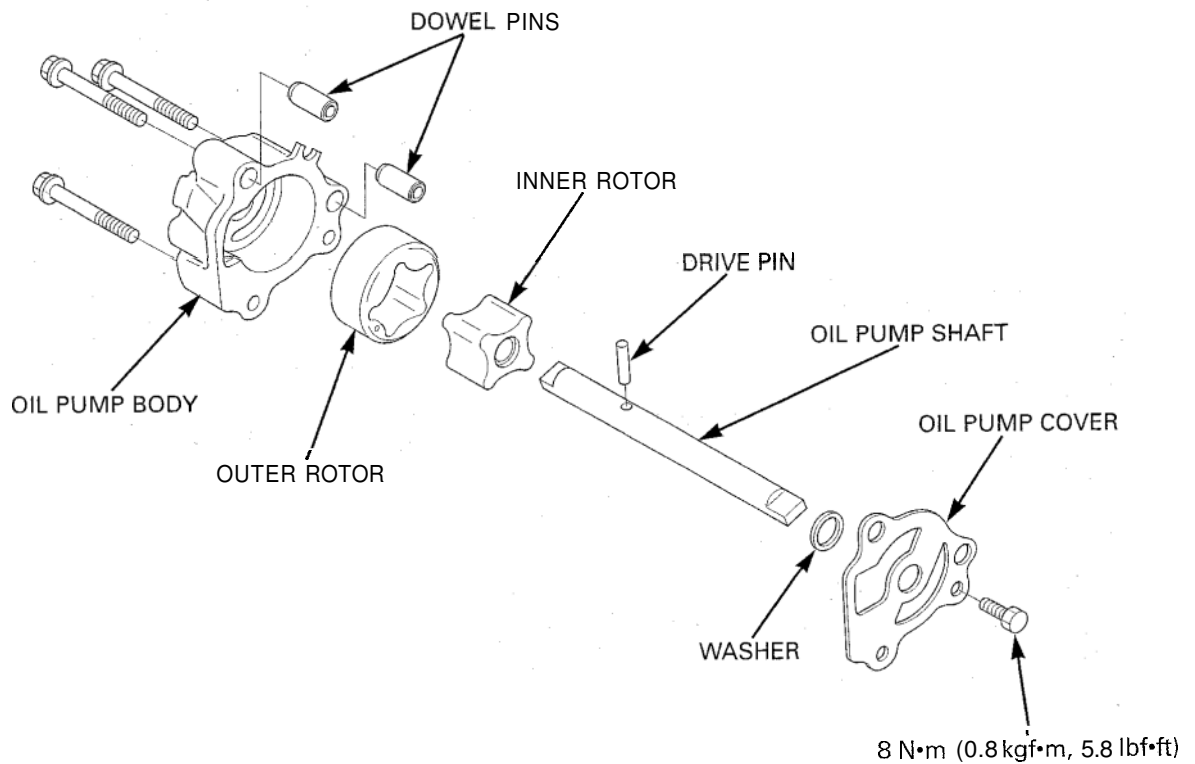


Measure the side clearance using a straight edge and feeler gauge.

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



### ASSEMBLY



## LUBRICATION SYSTEM

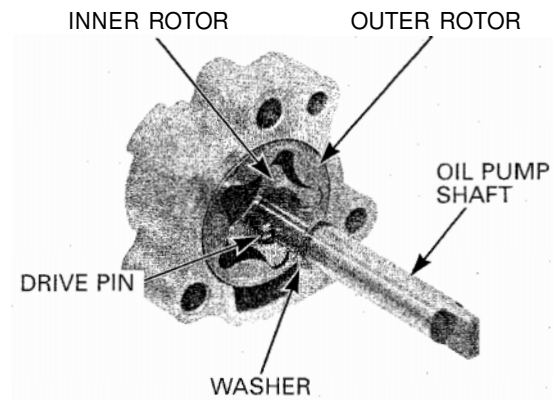
*Install the outer rotor with its punch mark facing the oil pump cover.*

Install the outer and inner rotors into the oil pump body.

Install the oil pump shaft through the inner rotor and oil pump body.

Install the drive pin into the hole in the pump shaft and align the pin with the groove in the inner rotor as shown.

Install the thrust washer.



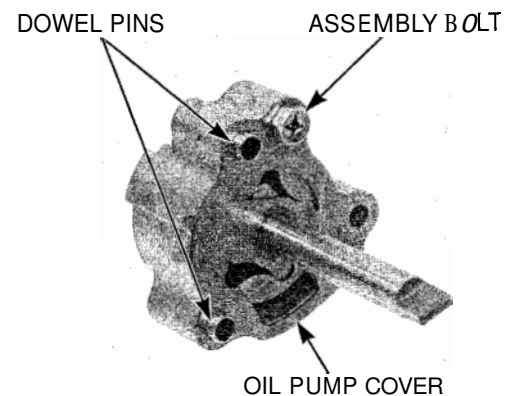
Install the dowel pins.

Install the oil pump cover and tighten the assembly bolt to the specified torque.

**TORQUE: 8 N·m (0.8kgf·m, 5.8lbf·ft)**

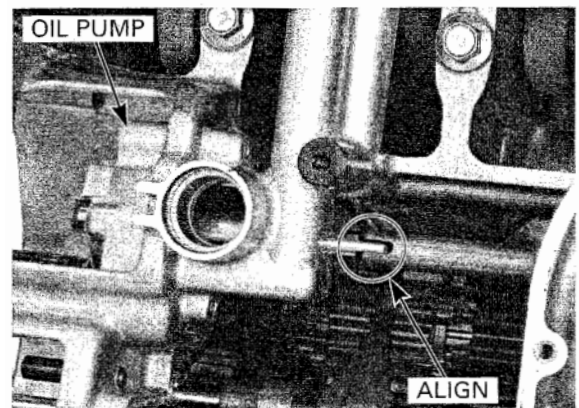
Check the oil pump operation by turning the pump shaft.

If necessary, reassemble the oil pump.

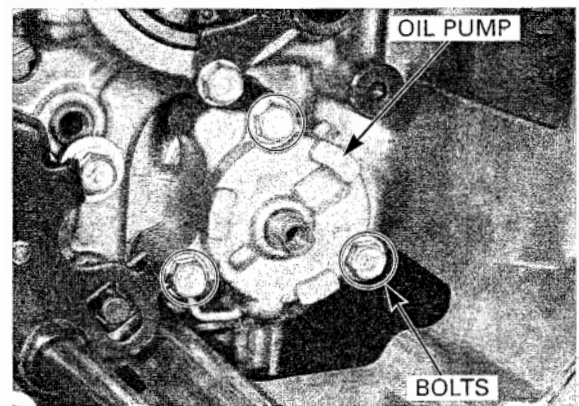


## INSTALLATION

Install the oil pump into the crankcase while aligning the pump shaft lug with the water pump shaft groove.



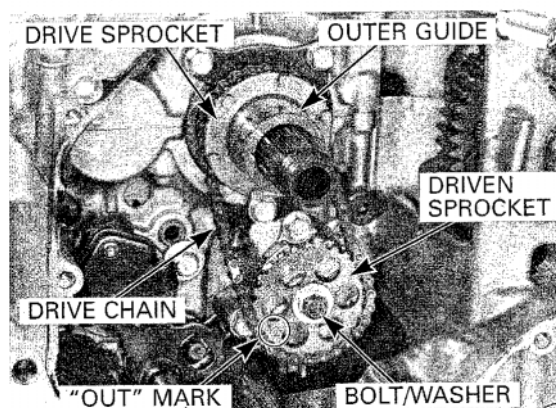
Install and tighten the three flange bolts securely.



Apply oil to the clutch outer guide, oil pump drive sprocket, driven sprocket and drive chain.

*Install the oil pump driven sprocket with its "OUT" mark facing outward*

Install the clutch outer guide, drive/driven sprocket and drive chain as an assembly.



Apply a locking agent to the oil pump driven sprocket bolt threads.

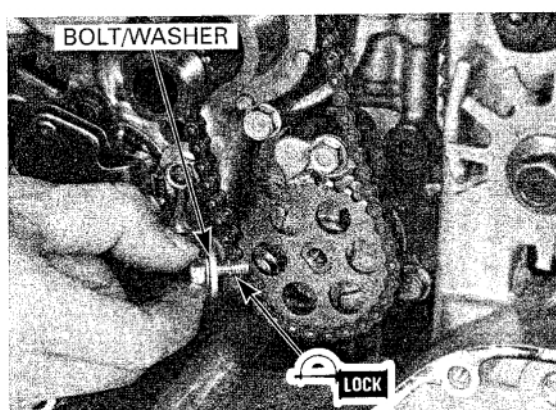
Install and tighten the driven sprocket bolt/washer to the specified torque.

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

Install the following:

- Oil strainer/pressure relief valve/oil pan (page 4-41)
- Clutch assembly (page 9-9)

After installation, fill the crankcase with the recommended oil and check that there is no oil leaks. Check the oil pressure (page 4-31).



## OIL COOLER

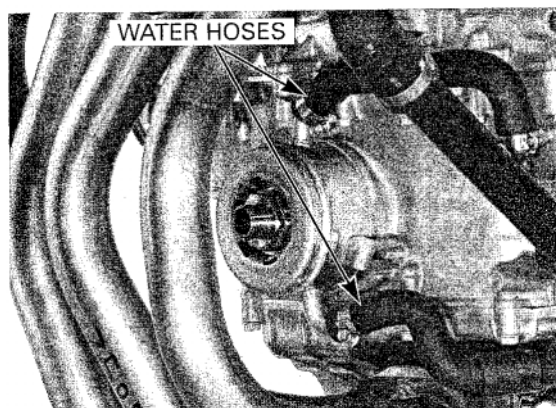
### REMOVAL

Drain the engine oil and remove the oil filter cartridge (page 3-15).

Drain the coolant from the system (page 6-41).

Remove the radiator reserve tank (page 6-16).

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

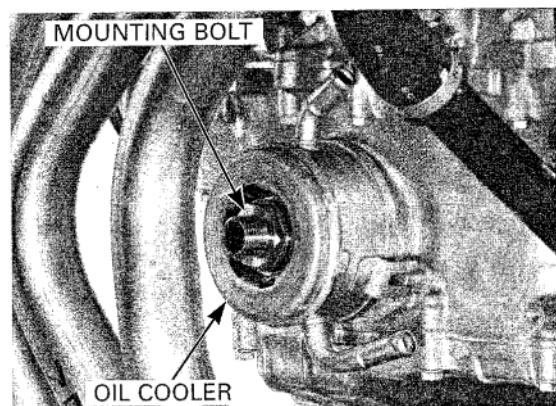


Remove the oil cooler mounting bolt, lock washer and oil cooler.

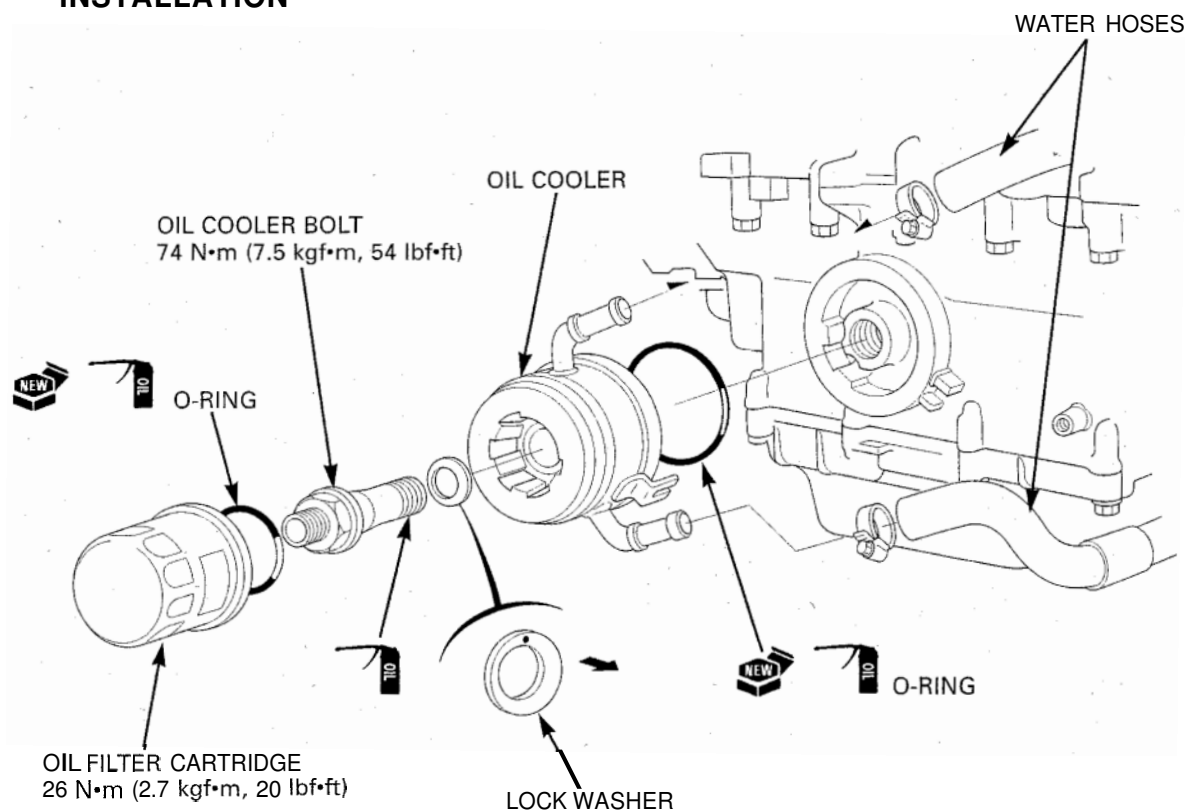
Remove the O-ring.

### INSPECTION

Check the oil cooler for damage.

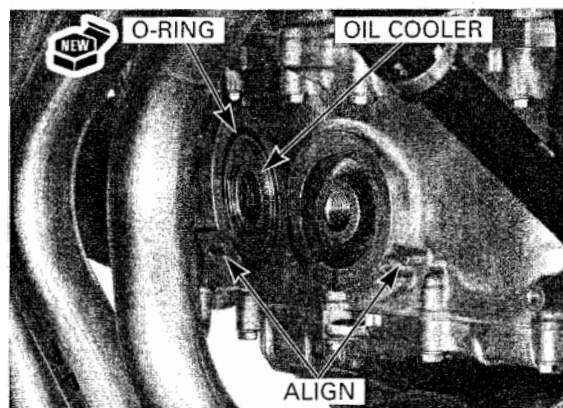


### INSTALLATION



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

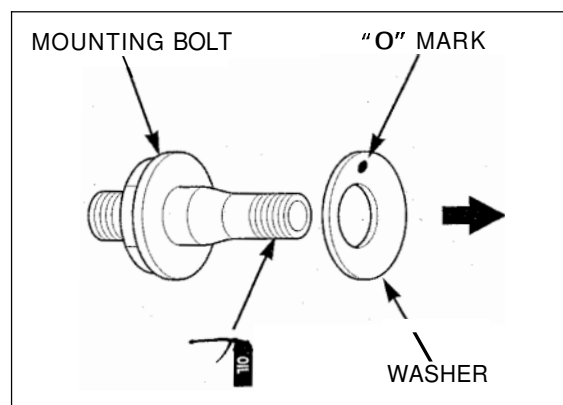
Install the oil cooler aligning its guide groove with the projection on the crankcase.



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

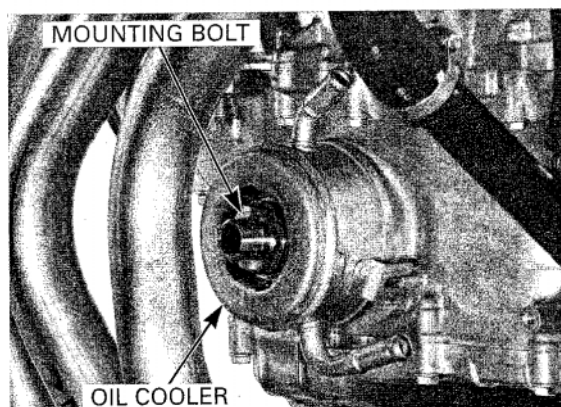
Install the lock washer and oil cooler bolt.

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



Tighten the oil cooler mounting bolt to the specified torque.

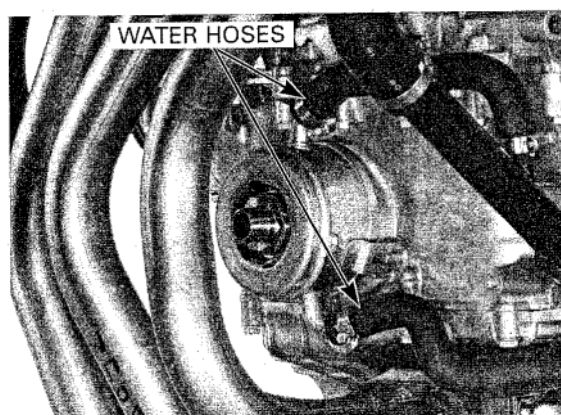
**TORQUE: 74 N·m (7.5kgf·m, 54 lbf·ft)**



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

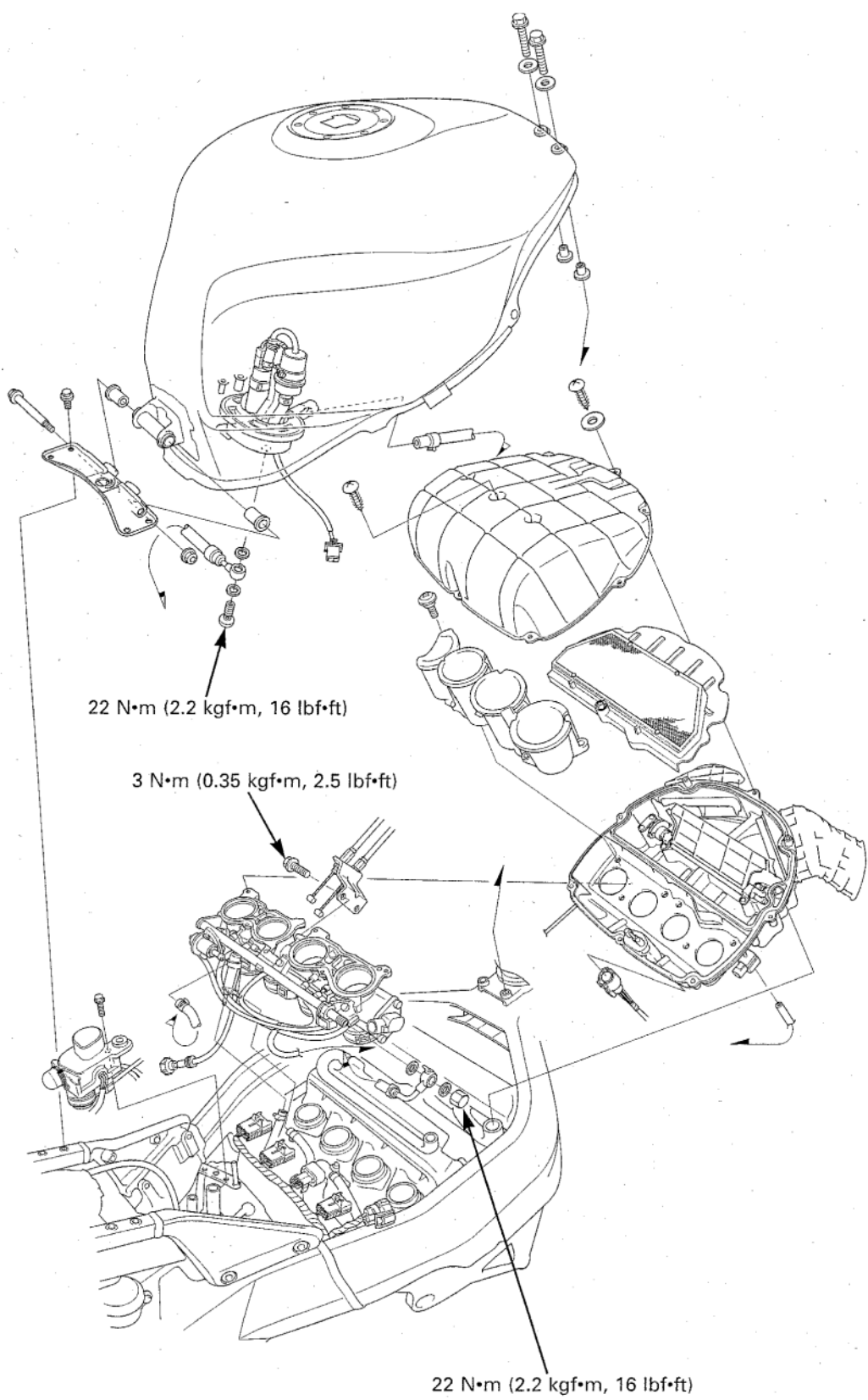
Install the oil filter cartridge and fill the crankcase with the recommended oil (page 3-16).

Fill the cooling system and bleed any air (page 6-5).



**FUEL SYSTEM (Programmed Fuel Injection)**

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# 5. FUEL SYSTEM (Programmed Fuel Injection)

SERVICE INFORMATION	5-1	MAP SENSOR	5-81
TROUBLESHOOTING	5-3	IAT SENSOR	5-82
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FAILURE CODES	5-10	ENGINE STOP RELAY	5-86
FUEL LINE INSPECTION	5-54	ECM (ENGINE CONTROL MODULE)	5-87
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FUEL TANK	5-59	O <sub>2</sub> SENSOR (California type only)	5-90
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FAST IDLE WAX UNIT	5-75		
STARTER VALVE	5-76		
STARTER VALVE SYNCHRONIZATION	5-79		

## SERVICE INFORMATION

### GENERAL

- Be sure to relieve the fuel pressure while the engine is turned to "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 full open to full closed 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 pipe 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 the throttle body 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 5-6. 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 flow chart (page 5-12 through 5-53).
- The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is no 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 the four injectors and/or the ignition and cam pulse generator, the fail safe function stops the engine to protect it from damage.
- For PGM-FI system location, see page 5-4.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- For fuel reserve sensor inspection, see section 19.
- The vehicle speed sensor sends digital pulse signals to the ECM (PGM-FI unit) for computation. For vehicle speed sensor inspection, see section 19.
- 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 hose, release the fuel pressure by loosening the fuel hose 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.
- EGCv is the abbreviation of Exhaust Gas Control Valve.

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	Except California type	GQ44C
	California type	GQ44B
Starter valve vacuum difference		20 mm Hg
Base throttle valve for synchronization		No.1
Idle speed		1,200 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)		1 – 4 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 – 2.6 kΩ
Fuel injector resistance (at 20°C/68°F)		10.5 – 14.5 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		20 – 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle		150 – 250 mm Hg
Fuel pressure at idle		343 kPa (3.5 kgf/cm <sup>2</sup> , 50 psi)



### TORQUE VALUES

ECT (Engine Coolant Temperature)/thermo sensor	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Throttle body insulator band screw	See page 1-14	
Throttle cable bracket mounting screw	3 N•m (0.35 kgf•m, 2.5 lbf•ft)	
Fuel pipe mounting bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	
Pressure regulator mounting bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	
Starter valve synchronization plate screw	1 N•m (0.09 kgf•m, 0.7 lbf•ft)	
Fast idle wax unit link plate screw	1 N•m (0.09 kgf•m, 0.7 lbf•ft)	
Fast idle wax unit mounting screw	5 N•m (0.6 kgf•m, 3.6 lbf•ft)	
Starter valve lock nut	2 N•m (0.18 kgf•m, 1.3 lbf•ft)	
Fuel filler cap bolt	2 N•m (0.2 kgf•m, 1.4 lbf•ft)	
Fuel hose banjo bolt (fuel tank side)	22 N•m (2.2 kgf•m, 16 lbf•ft)	
Fuel hose 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)	See page 5-58 for tightening sequence.
O <sub>2</sub> sensor (California type only)	25 N•m (2.6 kgf•m, 19 lbf•ft)	
EGCV mounting bolt (front)	14 N•m (1.4 kgf•m, 10 lbf•ft)	
(rear)	14 N•m (1.4 kgf•m, 10 lbf•ft)	
EGCV cover mounting bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
EGCV pulley nut	12 N•m (1.2 kgf•m, 9 lbf•ft)	
EGCV pulley cover mounting bolt (lower)	12 N•m (1.2 kgf•m, 9 lbf•ft)	

### TOOLS

Fuel pressure gauge	07406-0040003	or 07406-004000A (U.S.A. only)
IgnitionMate peak voltage tester (U.S.A. only) or Peak voltage adaptor	07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	
ECM test harness, 26P	070MZ-0010100 (two required)	
Vacuum gauge set	07LMJ-001000A	
Installer shaft guide	07YMF-MCJ0100	or 07YMF-MCJA100 (U.S.A. only)
Installer shaft	07YMF-MCJ0200	or 07YMF-MCJA200 (U.S.A. only)
Installer shaft, 14 x 30 mm	07YMF-MCJ0300	or 07YMF-MCJA300 (U.S.A. only)
Remover, 14 x 16 mm	07YMF-MCJ0400	or 07YMF-MCJA400 (U.S.A. only)

### TROUBLESHOOTING

#### Engine won't to 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
- Faulty pressure regulator

#### 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
- Faulty pressure regulator

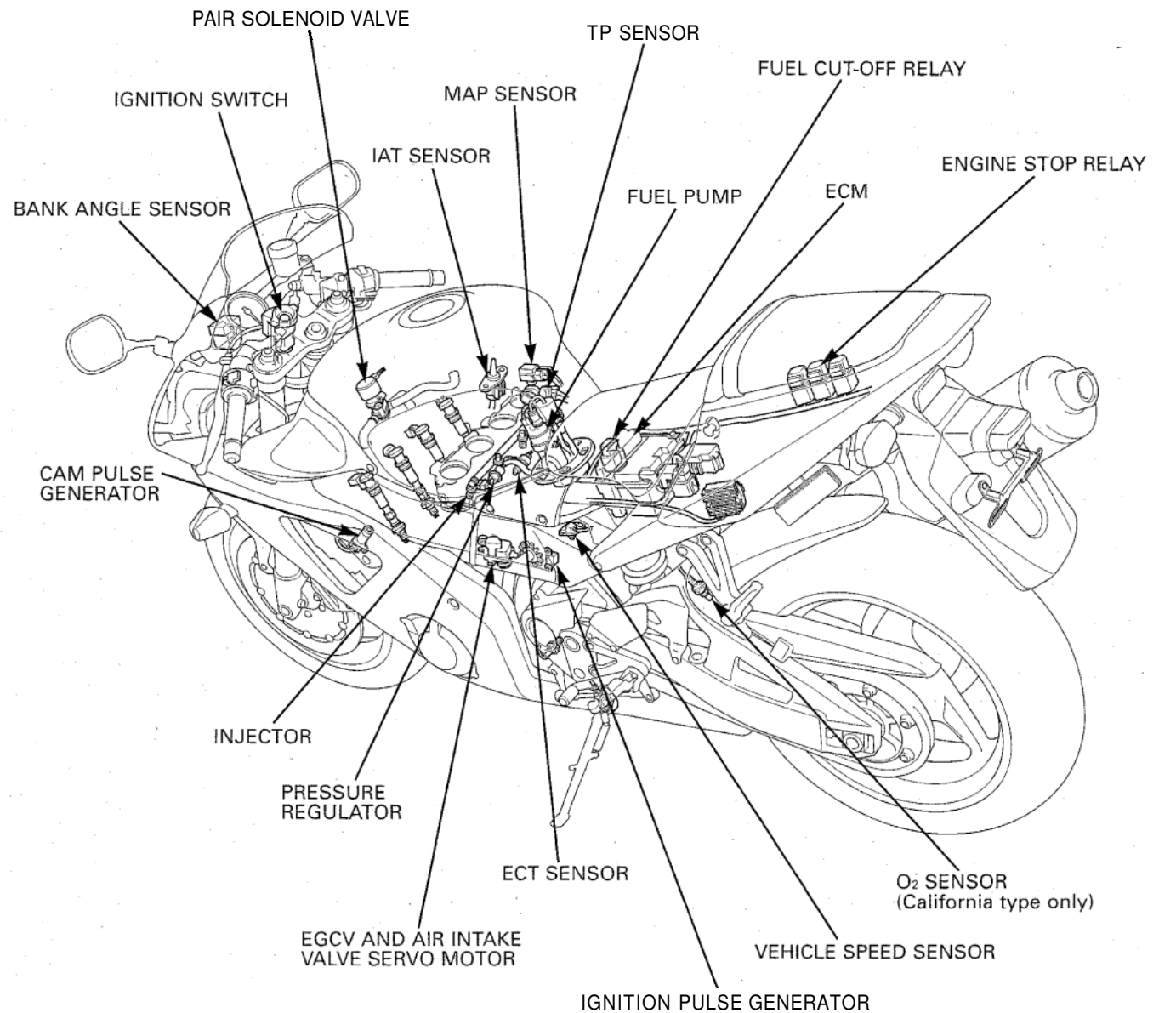
#### Backfiring or misfiring during acceleration

- Ignition system malfunction

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

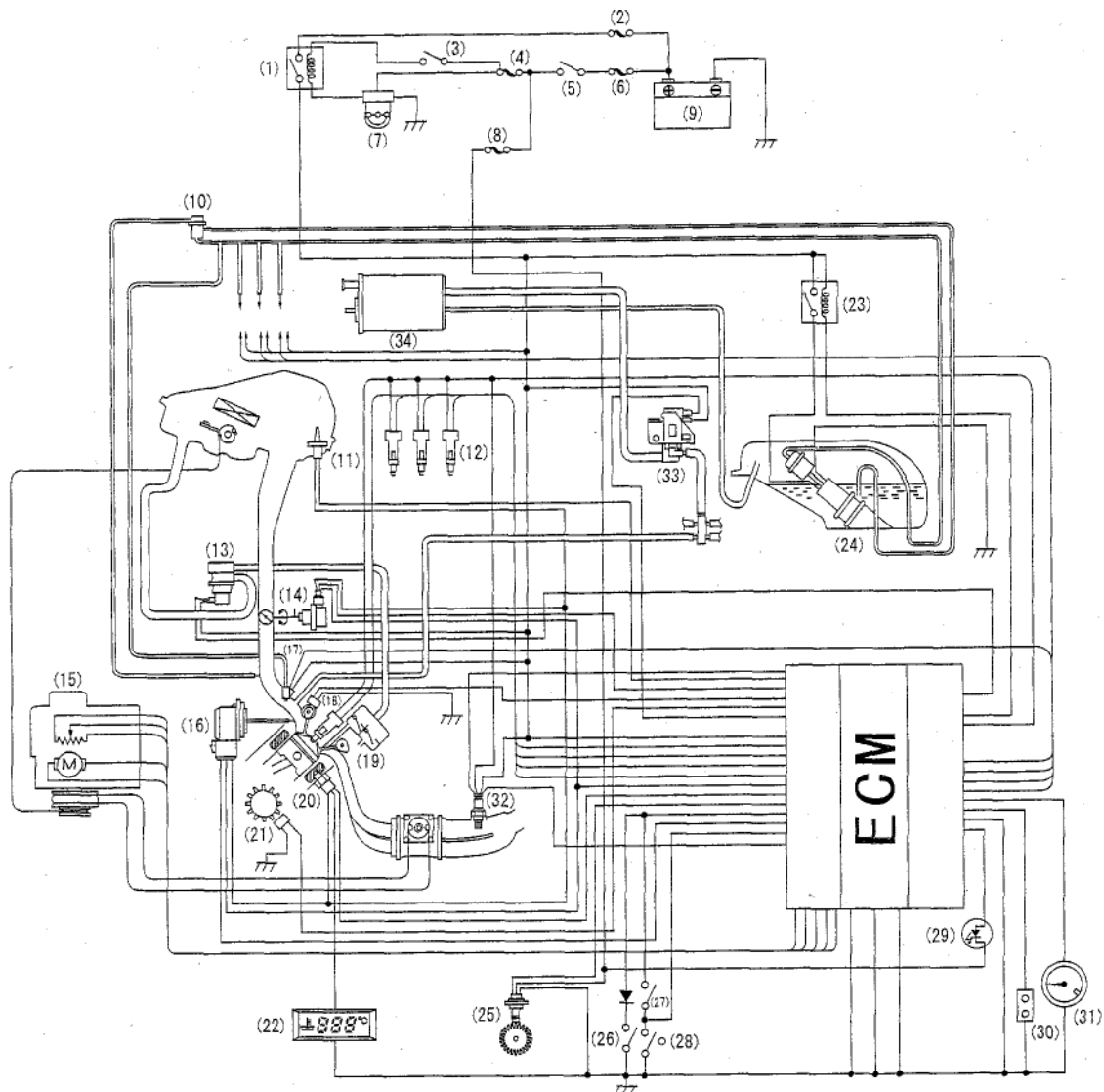
- Pinched or clogged fuel hose
- Faulty pressure regulator

SYSTEM LOCATION



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
Engine control module	ECM

## SYSTEM DIAGRAM



- |  |   |
|--|---|
| (1) Engine stop relay                      | (18) Cam pulse generator                                      |
| (2) Main fuse B (20A)                      | (19) PAIR check valve   |
| (3) Engine stop switch                     | (20) ECT sensor   |
| (4) Sub-fuse (10A)                         | (21) Ignition pulse generator                                 |
| (5) Ignition switch                        | (22) Water temperature LCD                                    |
| (6) Main fuse A (30A)                      | (23) Fuel cut-off relay                                       |
| (7) Bank angle sensor                      | (24) Fuel pump  |
| (8) Sub-fuse (10A)                         | (25) Vehicle speed sensor                                     |
| (9) Battery                                | (26) Neutral switch   |
| (10) Pressure regulator                    | (27) Clutch switch  |
| (11) IAT sensor                            | (28) Side stand switch  |
| (12) Direct ignition coil/spark plug       | (29) Malfunction indicator                                    |
| (13) PAIR solenoid valve                   | (30) Service check connector                                  |
| (14) TP sensor                             | (31) Tachometer   |
| (15) EGCV and air intake valve servo motor | (32) O <sub>2</sub> sensor (California type only)             |
| (16) MAP sensor                            | (33) EVAP purge control solenoid valve (California type only) |
| (17) Injectors                             | (34) EVAP canister (California type only)                     |

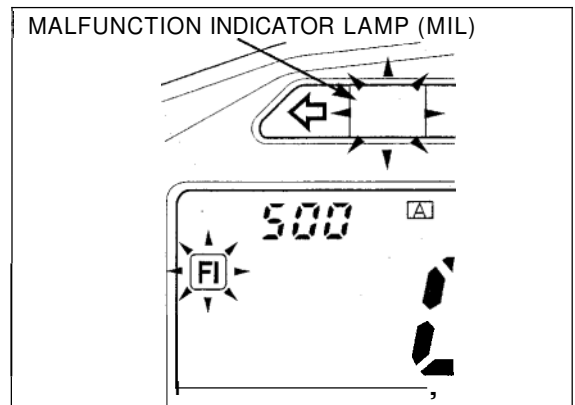
# PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM

### SELF-DIAGNOSTIC PROCEDURES

Place the motorcycle on its side stand.  
Start the engine and let it idle.

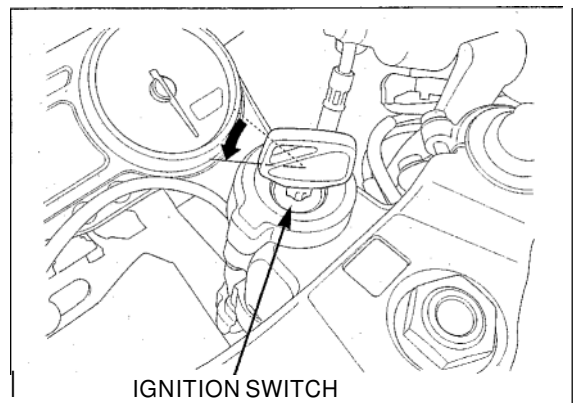
*The malfunction indicator lamp (MIL) will start blinking only with the side stand down and with the engine off (engine stop switch in RUN) or engine revs are below 5,000 rpm. In any other conditions, the MIL will illuminate and stay on.*

If the malfunction indicator lamp (MIL) does not light or blink, the system has no memory of problem data. If the malfunction indicator blinks, note how many times the MIL blinks, and determine the cause of the problem (page 5-10 through 5-53).



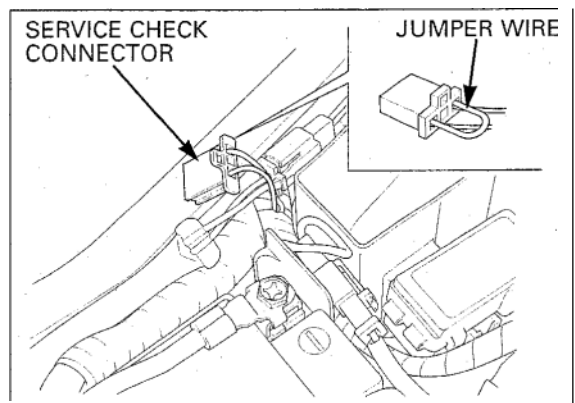
If you wish to read the PGM-FI memory for trouble data, perform the following:

Turn the ignition switch to "OFF".



Remove the seat (page 2-2).

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



## FUEL SYSTEM (Programmed Fuel Injection)

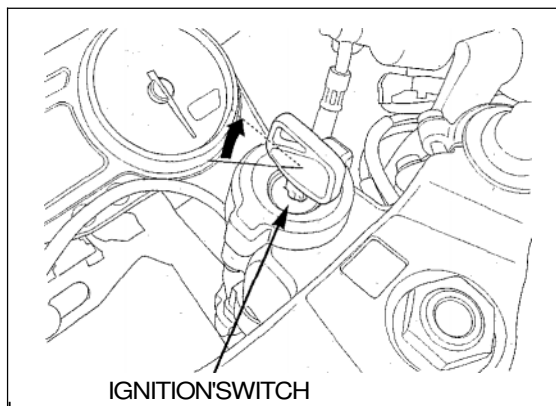
Turn the ignition switch to "ON" and engine stop switch to "RUN".

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

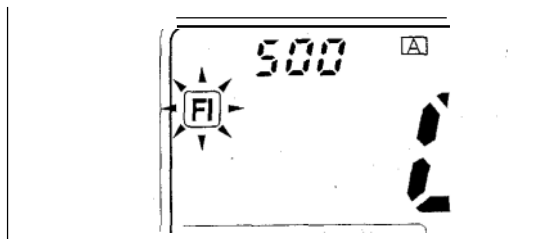
If the ECM has self diagnosis memory data, the MIL will start blinking, when you turn the ignition switch to "ON".

Note how many times the malfunction indicator blinks, and determine the cause of the problem (page 5-10 through 5-53).

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



MALFUNCTION INDICATOR LAMP (MIL)

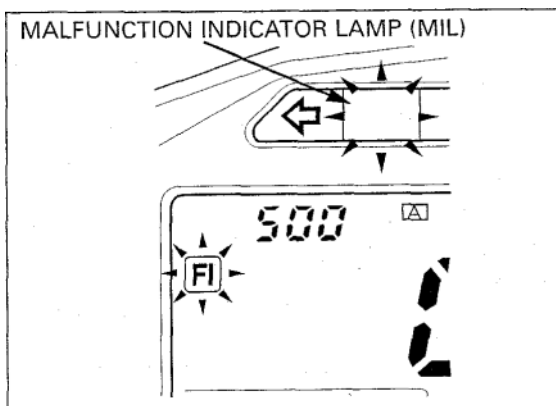
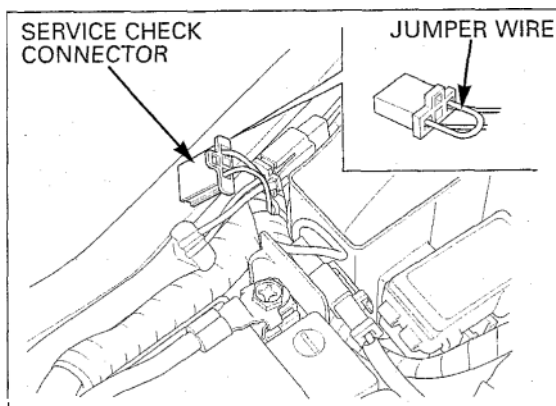


### SELF-DIAGNOSIS RESET PROCEDURE

1. Turn the engine stop switch to "RUN" and 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 about 5 seconds. While the indicator lights, short the service check connector again with the jumper wire.  
Self diagnosis memory data is erased if the MIL turns off and starts blinking.

- The service check connector must be jumped while the indicator lights. 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.



## FUEL SYSTEM (Programmed Fuel Injection)

### PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the ignition pulse generator and cam pulse generator 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 the spark plugs are installed correctly.
- Use the recommended digital multimeter or a commercially available digital multimeter with an impedance of 10 M $\Omega$ /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- Disconnect the fuel pump connector before checking the peak voltage.

Open and support the front end of the fuel tank (page 3-4).

Disconnect the fuel pump 3P (Black) connector.

Connect the peak voltage adaptor to the digital multimeter.

#### TOOLS:

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

**with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)**

### TEST HARNESS CONNECTION

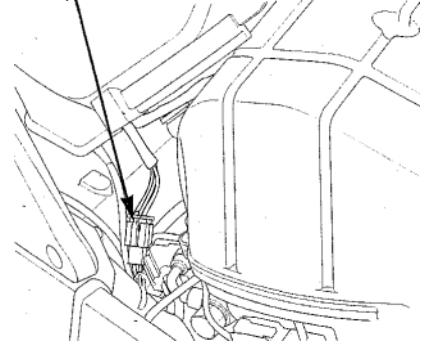
Remove the seat (page 2-2).

Remove the battery (page 16-4).

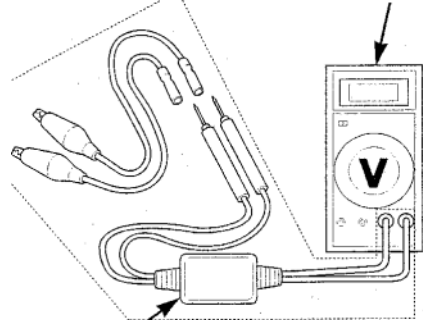
Remove the fuel tank rear bracket mounting bolts and pull up the bracket.

Remove the ECM cover.

3P (BLACK) CONNECTOR

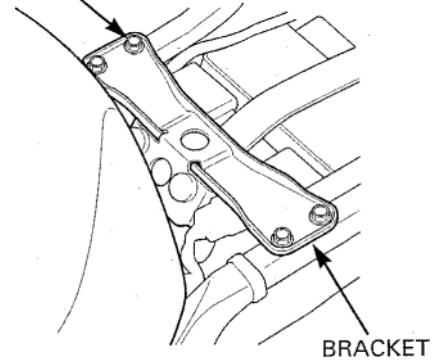


DIGITAL MULTIMETER



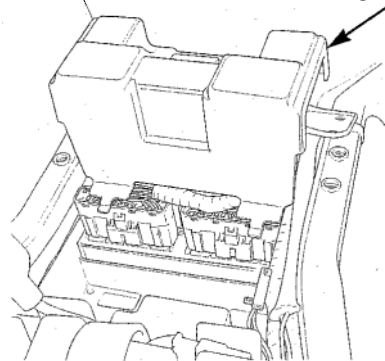
PEAK VOLTAGE ADAPTOR

BOLTS



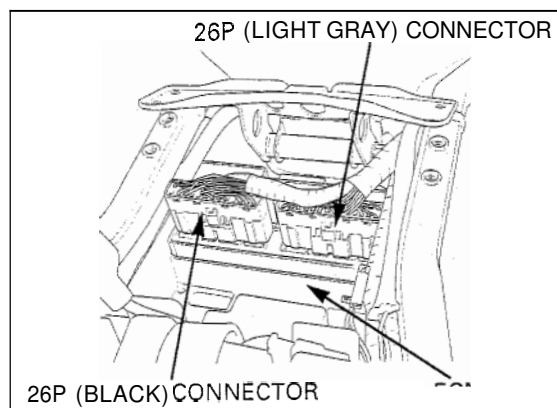
BRACKET

ECM COVER



## FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the ECM 26P (Black) and 26P (Light gray) connectors from the unit.

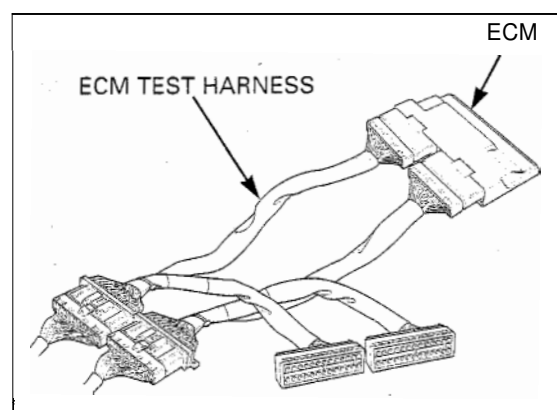


Connect the ECM test harnesses between the main wire harness and the ECM.

**TOOL:**  
ECM test harness, 26P

**070MZ-0010100**  
(two required)

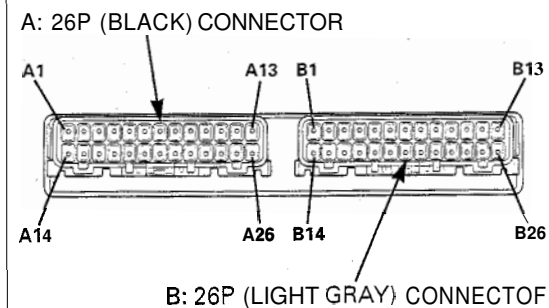
Install the battery and connect the positive terminal, then connect the negative terminal.



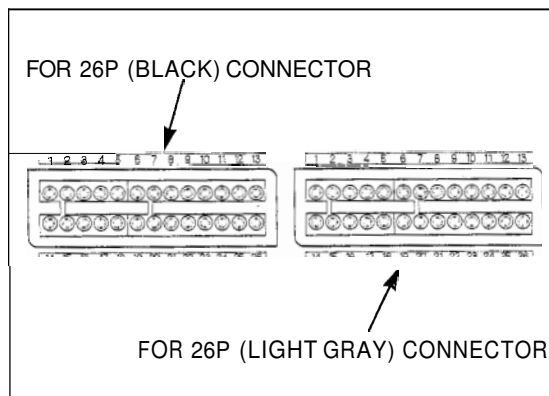
### TEST HARNESS TERMINAL LAYOUT

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

#### VIEW FROM WIRE HARNESS SIDE:











The test harness terminals are 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

- The PGM-FI malfunction indicator lamp (MIL) denotes the failure codes (the number of blinks from 0 to 35). The MIL has two types of blinks, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.5 seconds. When two long blinks occur, and one short blink, that problem code is 21 (two long blinks = 20 blinks, one short blink = 1 blink). Then, go to the flow chart and see problem code 21.
- When the Engine Control Module (ECM) stores some failure codes, the MIL shows the failure codes in the order from the lowest number to highest number. For example, when the MIL blinks once, then blinks seven times, two failures have occurred. Follow the flow chart for failure codes 1 and 7.

Number of PGM-FI MIL blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
0	 No blinks	<ul style="list-style-type: none"> <li>Open circuit at the power input wire of the ECM</li> <li>Faulty bank angle sensor</li> <li>Open circuit in bank angle sensor related circuit</li> <li>Faulty engine stop relay</li> <li>Open circuit in engine stop relay related wires</li> <li>Faulty engine stop switch</li> <li>Open circuit in engine stop switch related wires</li> <li>Faulty ignition switch</li> <li>Faulty ECM</li> <li>Blown PGM-FI fuse (20 A)</li> <li>Open circuit in engine stop switch ground</li> <li>Blown sub-fuse (10 A) (Starter/ignition)</li> </ul>	<ul style="list-style-type: none"> <li>Engine does not start</li> </ul>	—
	 No blinks	<ul style="list-style-type: none"> <li>Open or short circuit in malfunction indicator wire</li> <li>Faulty ECM</li> </ul>	<ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>	—
	 Stays lit	<ul style="list-style-type: none"> <li>Short circuit in service check connector</li> <li>Faulty ECM</li> <li>Short circuit in service check connector wire</li> </ul>	<ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>	—
1	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contacts on MAP sensor connector</li> <li>Open or short circuit in MAP sensor wire</li> <li>Faulty MAP sensor</li> <li>Wrong connection between the MAP sensor and TP sensor connectors</li> </ul>	<ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>	5-12
2	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor connection of the MAP sensor vacuum hose</li> <li>Faulty MAP sensor</li> </ul>	<ul style="list-style-type: none"> <li>Engine operates normally</li> </ul>	5-14
7	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on ECT sensor</li> <li>Open or short circuit in ECT sensor wire</li> <li>Faulty ECT sensor</li> </ul>	<ul style="list-style-type: none"> <li>Hard start at a low temperature (Simulate using numerical values: 90°C/194°F)</li> </ul>	5-16
8	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on TP sensor connector</li> <li>Open or short circuit in TP sensor wire</li> <li>Faulty TP sensor</li> </ul>	<ul style="list-style-type: none"> <li>Poor engine response when operating the throttle quickly (Simulate using numerical values: Throttle opens 0°)</li> </ul>	5-18
9	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on IAT sensor</li> <li>Open or short circuit in IAT sensor wire</li> <li>Faulty IAT sensor</li> </ul>	<ul style="list-style-type: none"> <li>Engine operates normally (Simulate using numerical values: 25°C/77°F)</li> </ul>	5-22

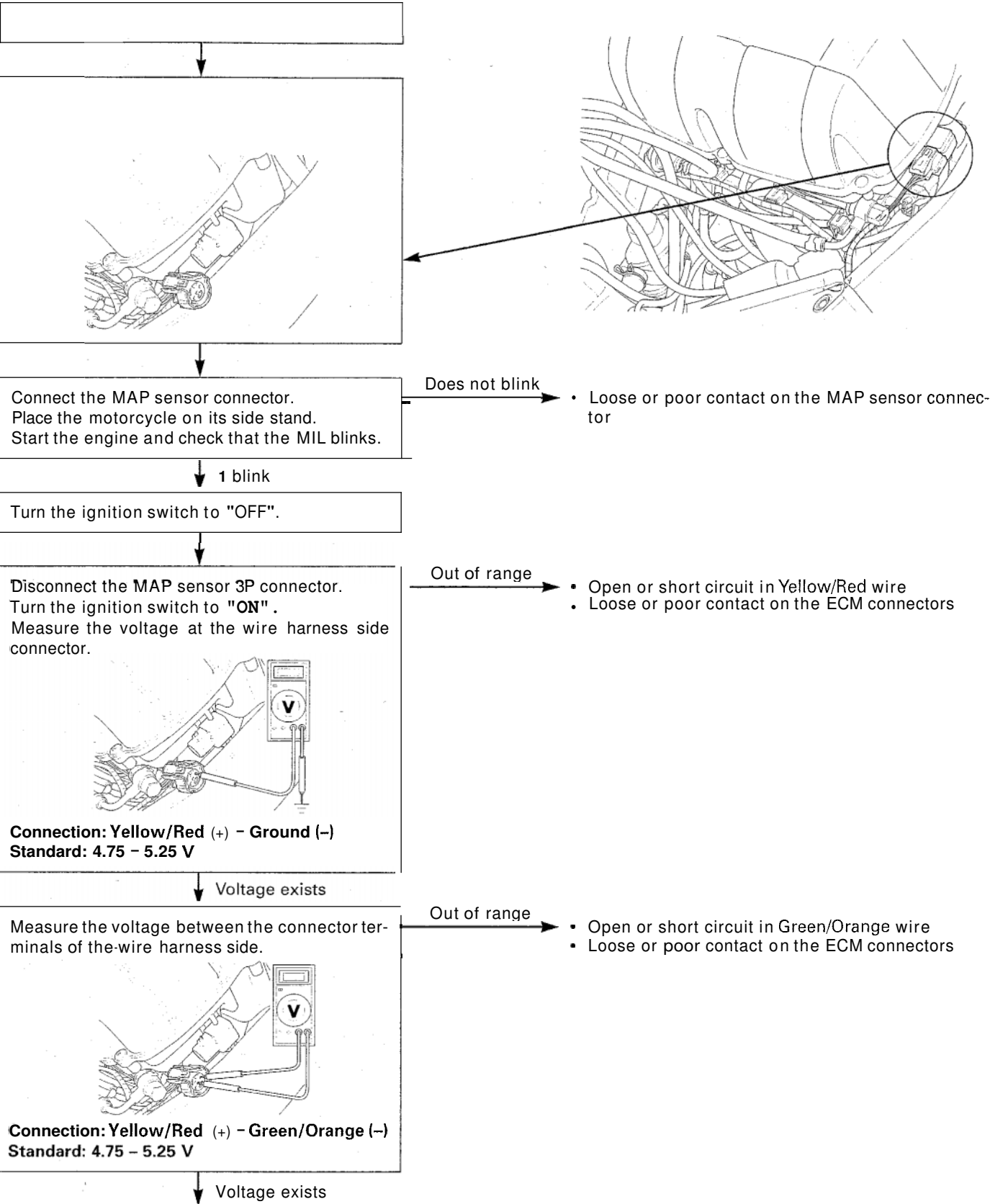


## FUEL SYSTEM (Programmed Fuel Injection)

Number of PGM-FI MIL blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
11	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on vehicle speed sensor connector</li> <li>Open or short circuit in vehicle speed sensor connector</li> <li>Faulty vehicle speed sensor</li> </ul>	• Engine operates normally	5-24
	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on No.1 injector connector</li> <li>Open or short circuit in No.1 injector wire</li> <li>Faulty No.1 injector</li> </ul>	• Engine does not start	5-26
13	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on No.2 injector connector</li> <li>Open or short circuit in No.2 injector wire</li> <li>Faulty No.2 injector</li> </ul>	• Engine does not start	5-29
14	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on No.3 injector connector</li> <li>Open or short circuit in No.3 injector wire</li> <li>Faulty No.3 injector</li> </ul>	• Engine does not start	5-32
15	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on No.4 injector connector</li> <li>Open or short circuit in No.4 injector wire</li> <li>Faulty No.4 injector</li> </ul>	• Engine does not start	
18	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on cam pulse generator</li> <li>Open or short circuit in cam pulse generator</li> <li>Faulty cam pulse generator</li> </ul>	• Engine does not start	5-38
19	 Blinks	<ul style="list-style-type: none"> <li>Loose or poor contact on ignition pulse generator connector</li> <li>Open or short circuit in ignition pulse generator</li> <li>Faulty ignition pulse generator</li> </ul>	• Engine does not start	5-40
21	 Blinks	• Faulty O <sub>2</sub> sensor	• Engine operates normally	5-42
23	 Blinks	• Faulty O <sub>2</sub> sensor heater	• Engine operates normally	5-44
33	 Blinks	• Faulty E <sup>2</sup> -PROM in ECM	<ul style="list-style-type: none"> <li>Engine operates normally</li> <li>Does not hold the self-diagnosis data</li> </ul>	5-48
34	 Blinks	• Faulty EGCV and air intake valve servo motor voltage	• Engine operates normally	5-50
35	 Blinks	• Faulty EGCV and air intake valve servo motor	• Engine operates normally	5-52

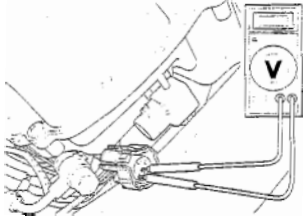
FUEL SYSTEM (Programmed Fuel Injection)

PGM-FI MIL 1 BLINK (MAP SENSOR)



## FUEL SYSTEM (Programmed Fuel Injection)

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



**Connection:**

**Light green/Yellow (+) - Green/Orange (-)**

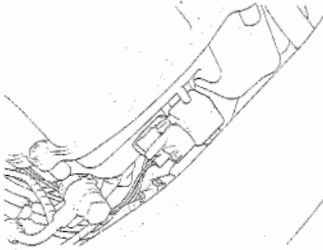
**Standard: 4.75 - 5.25 V**

Out of range

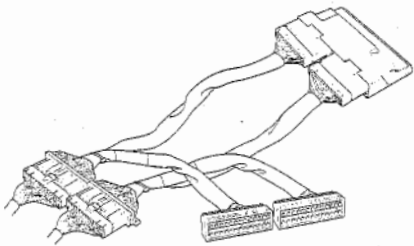
- Open or short circuit in Light green/Yellow wire
- Loose or poor contact on the ECM connectors

↓ Voltage exists

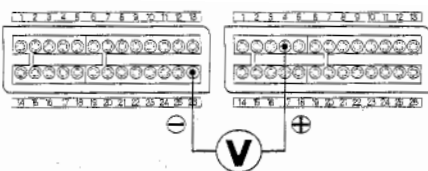
Turn the ignition switch to "OFF".  
Connect the MAP sensor 3P connector.



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 5-9).



**Connection: B4 (+) - A26 (-)**

**Standard: 2.7 - 3.1 V (760 mm Hg/1,013 kPa)**

- Faulty MAP sensor

Voltage exists

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

## FUEL SYSTEM (Programmed Fuel Injection)

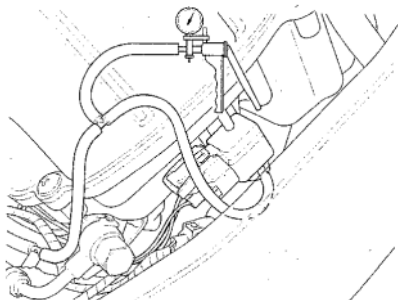
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### PGM-FI MIL 2 BLINKS (MAP SENSOR)

Turn the ignition switch to "OFF".



Disconnect the vacuum hose 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.

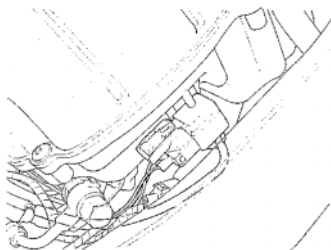


**Standard: 150 - 250 mm Hg**

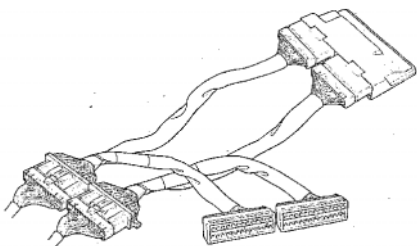
Out of range →

- Check the hose installation

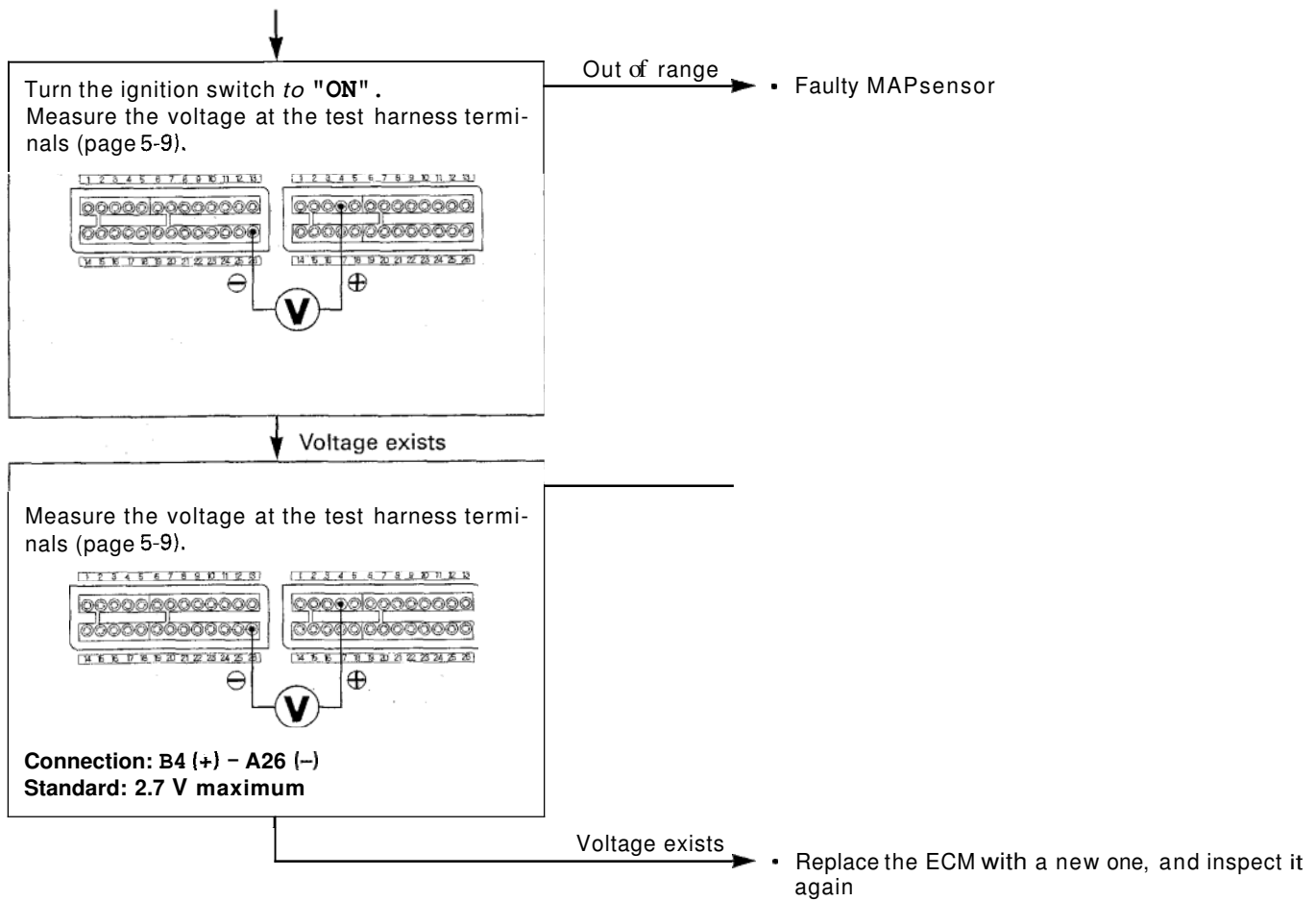
Disconnect the vacuum gauge and connect the hose to the MAP sensor.



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



## FUEL SYSTEM (Programmed Fuel Injection)

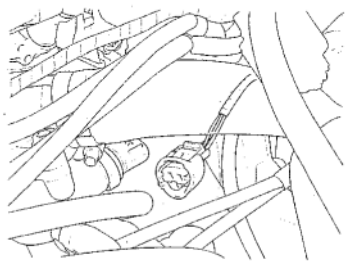


## FUEL SYSTEM (Programmed Fuel Injection)

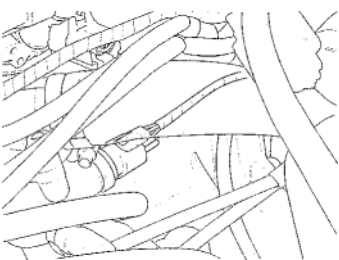
### PGM-FI MIL 7 BLINKS (ECT SENSOR)

Turn the ignition switch to "OFF".

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



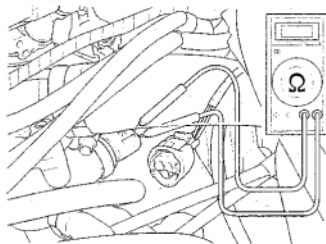
Connect the ECT sensor connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON".



Check that the MIL blinks.

↓ 7 blinks

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 $\Omega$  (20°C/68°F)**

Normal

Does not blink

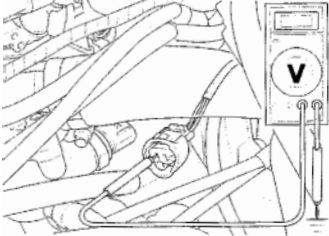
- Loose or poor contact on the ECT sensor connector

Abnormal

- Faulty ECT sensor

## FUEL SYSTEM (Programmed Fuel Injection)

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



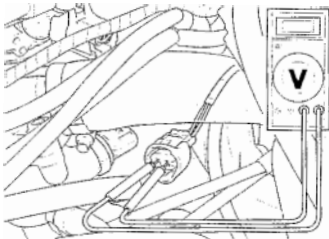
Connection: **Pink/White (+) - Ground (-)**  
Standard: **4.75 - 5.25 V**

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 of 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 →

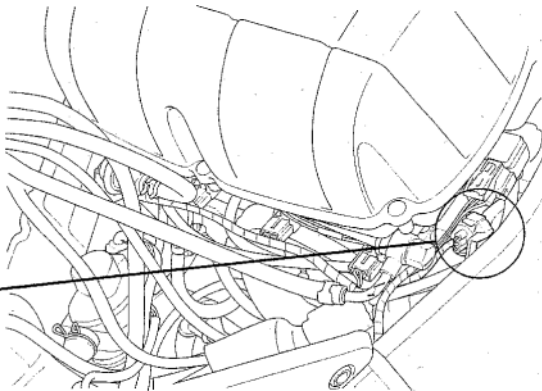
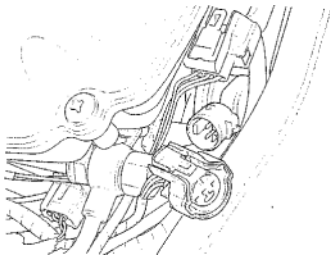
- Replace the ECM with a new one, and inspect it again

FUEL SYSTEM (Programmed Fuel Injection)

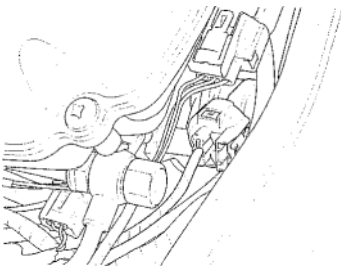
PGM-FI MIL 8 BLINKS (TP SENSOR)

Turn the ignition switch to "OFF".

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



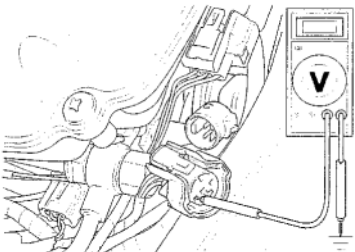
Place the motorcycle on its side stand.  
Start the engine and check that the MIL blinks.



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.



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

Voltage exists

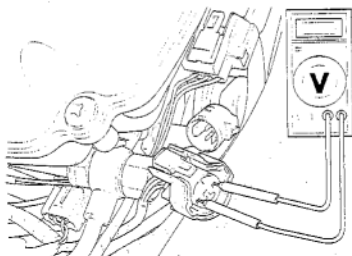
Out of range

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



## FUEL SYSTEM (Programmed Fuel Injection)

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



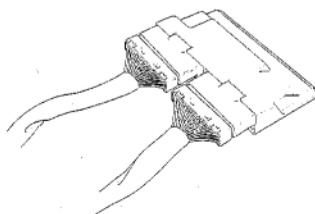
**Connection: Yellow/Red (+) - Green/Orange (-)**  
**Standard: 4.75 - 5.25 V**

Out of range

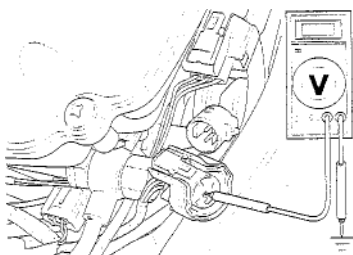
- Open or short circuit in Green/Orange wire
- Loose or poor contact on the ECM connectors

Voltage exists

Turn the ignition switch to "OFF".  
Disconnect the ECM 26P connectors.



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

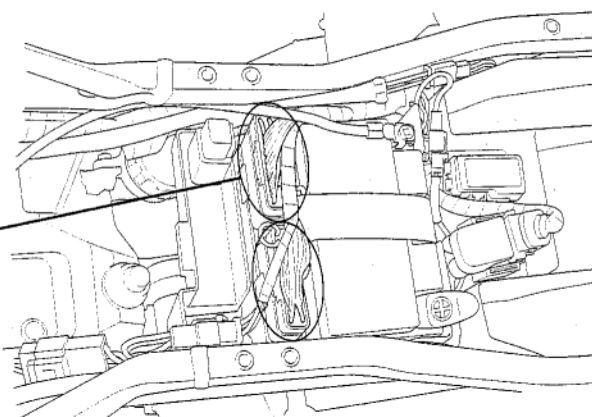


**Connection: Red/Yellow (+) - Ground (-)**  
**Standard: No continuity**

Continuity

- Short circuit in Red/Yellow wire

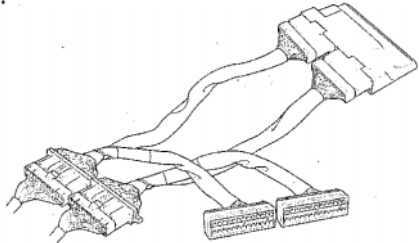
No continuity



FUEL SYSTEM (Programmed Fuel Injection)

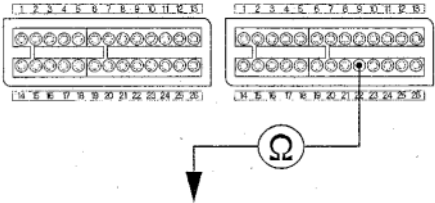
↓

Connect the test harness to the ECM connectors.



↓

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

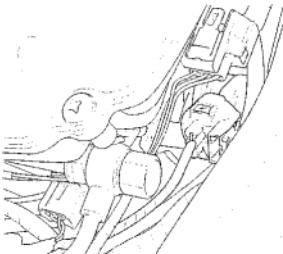


**Connection: Red/Yellow – B22**  
**Standard: Continuity**

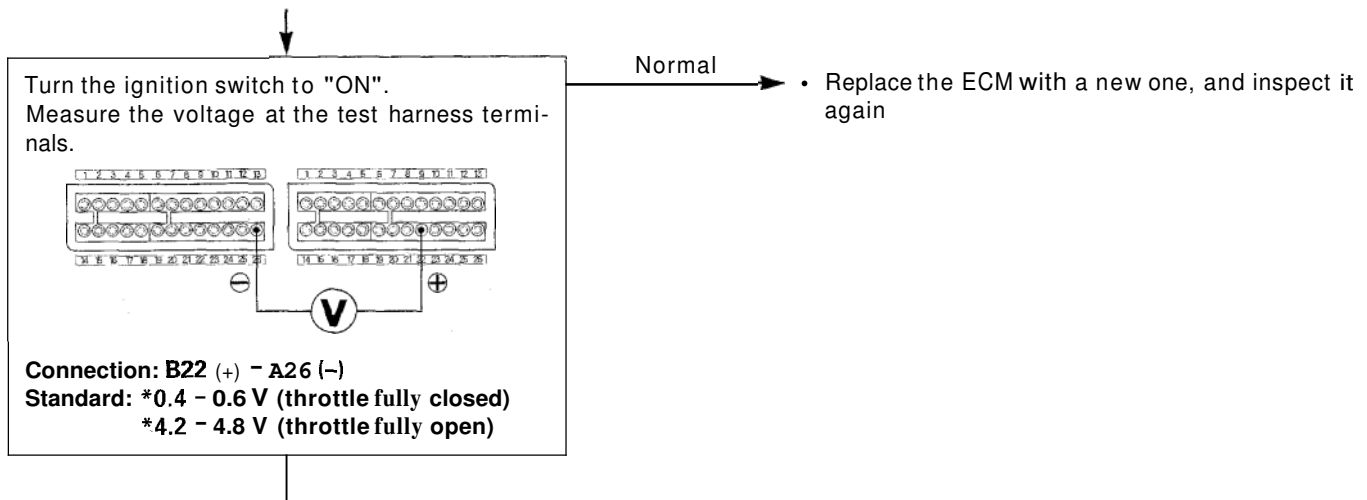
• Open or short circuit in Red/Yellow wire

↓ Continuity

Connect the TP sensor 3P connector.



## FUEL SYSTEM (Programmed Fuel Injection)



A voltage marked \* refers to the value when the voltage reading at the TP sensor 3P connector (page 5-19) 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.

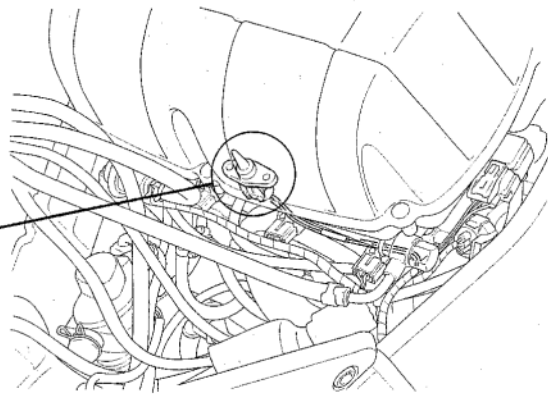
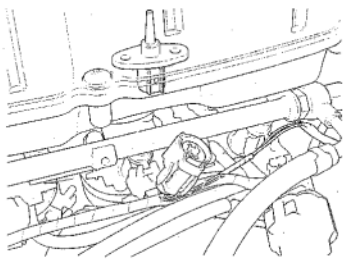
Replace 0.4 and 0.6 with 4.2 and 4.8 respectively, in the above equations to determine the throttle fully open range.

## FUEL SYSTEM (Programmed Fuel Injection)

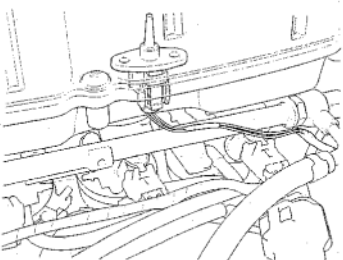
### PGM-FI MIL 9 BLINKS (IAT SENSOR)

Turn the ignition switch to "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 motorcycle on its side stand.  
Turn the ignition switch to "ON".  
Check that the MIL blinks.



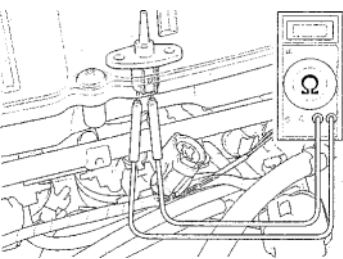
Does not blink

- Loose or poor contact on the IAT sensor connector

9 blinks

Turn the ignition switch to "OFF".

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



Abnormal

- Faulty IAT sensor

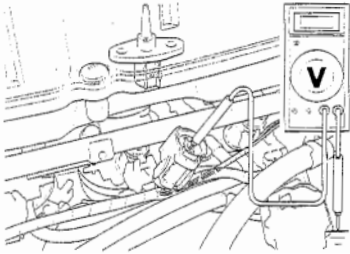
Standard: 1 - 4 k $\Omega$

Normal

Turn the ignition switch to "ON".

## FUEL SYSTEM (Programmed Fuel Injection)

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



**Connection:**

Gray/Blue (+) - Ground (-)

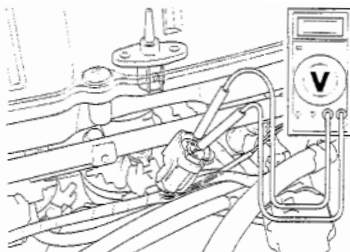
Standard: 4.75 - 5.25 V

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 of the wire harness side.



**Connection:**

Gray/Blue (+) - Green/Orange (-)

Standard: 4.75 - 5.25 V

Out of range →

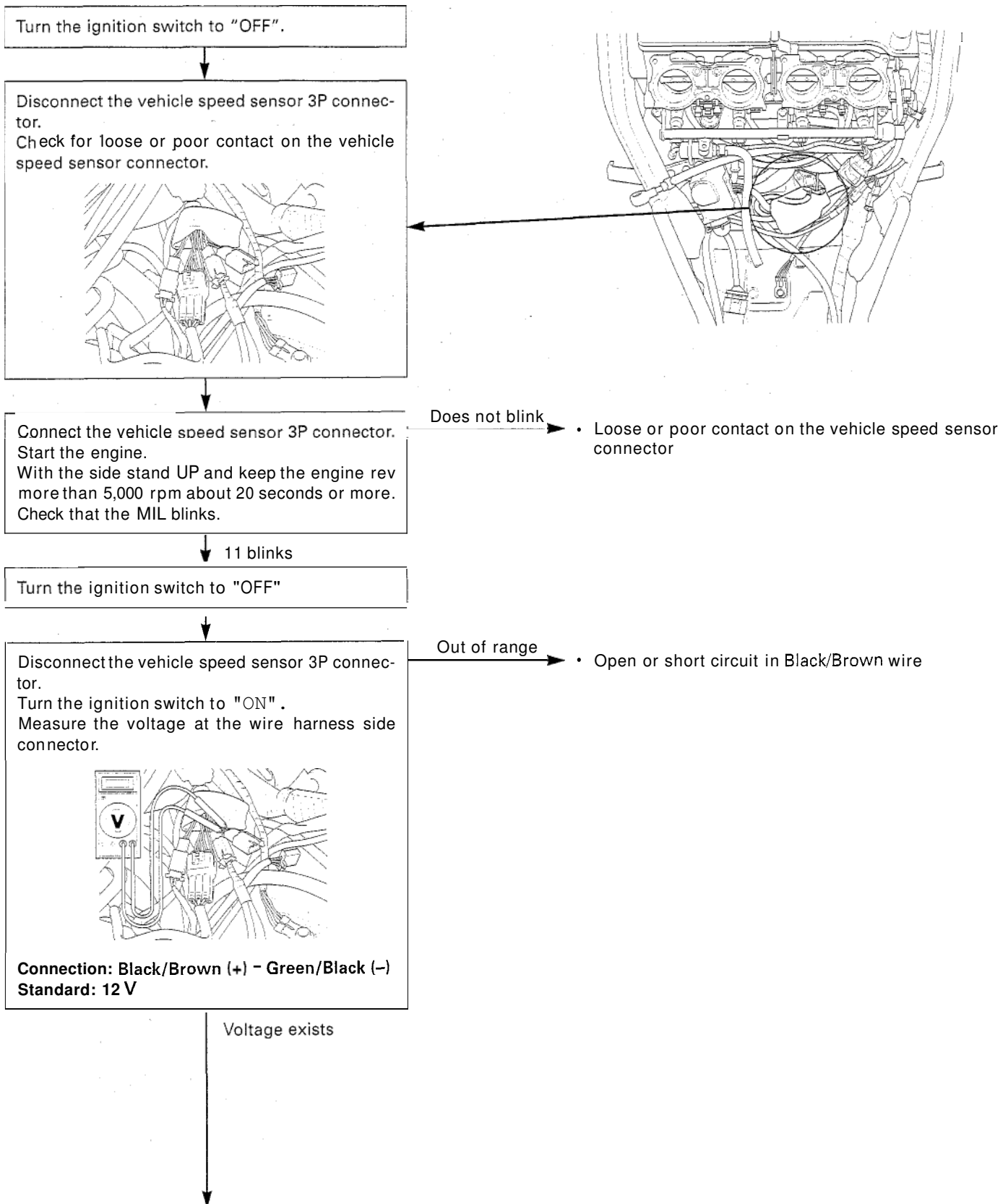
- Open or short circuit in Green/Orange wire
- Loose or poor contact on the ECM connectors

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)

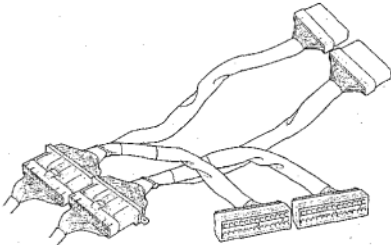


## FUEL SYSTEM (Programmed Fuel Injection)

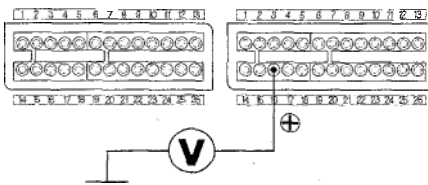
Connect the vehicle speed sensor 3P connector.



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



Support the motorcycle securely and place the rear wheel off the ground.  
Shift the transmission into gear.  
Measure the voltage at the test harness terminals with the ignition switch turned to "ON" while slowly turning the rear wheel by hand.



**CONNECTION:** B16 (+) - Ground (-)  
**STANDARD:** Repeat 0 to 5V

Abnormal

- Open or short circuit in Pink/Green wire

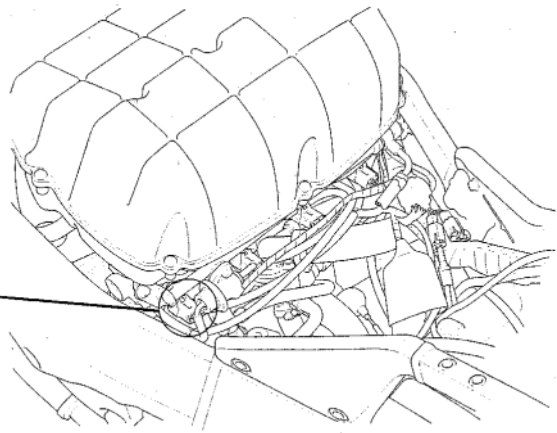
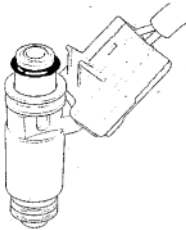
Normal

FUEL SYSTEM (Programmed Fuel Injection)

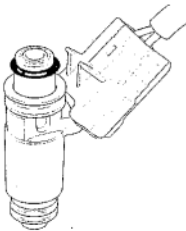
PGM-FI MIL 12 BLINKS (No.1 INJECTOR)

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.



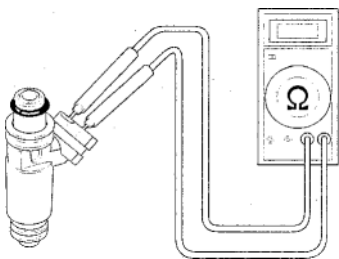
Connect the No.1 injector 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON".  
Check that the MIL blinks.



• 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.



Connection:  
Black/White (+) - Pink/Yellow (-)  
Standard: 10.5 - 14.5  $\Omega$  (20°C/68°F)

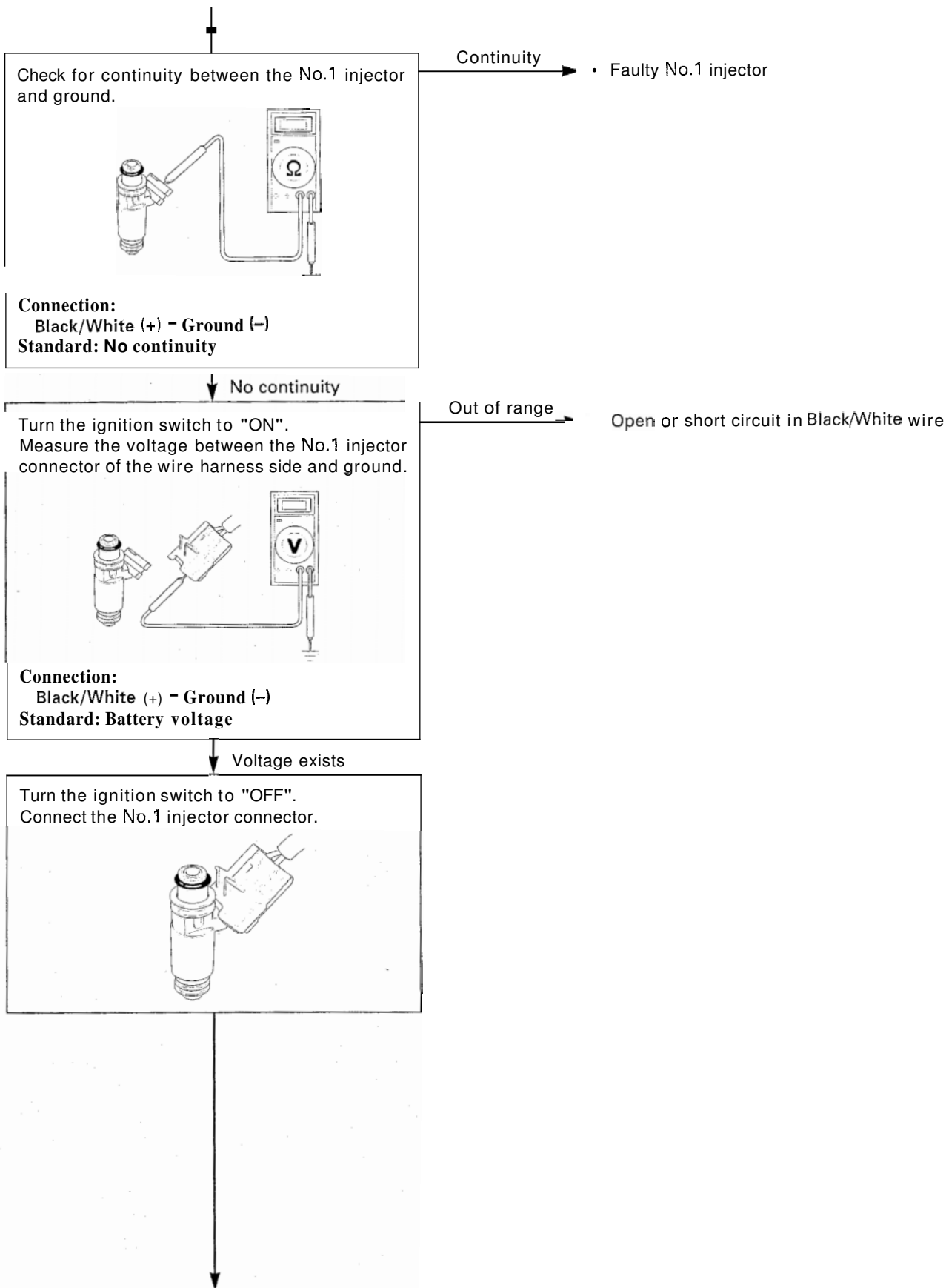
Abnormal

• Faulty No.1 injector

Normal



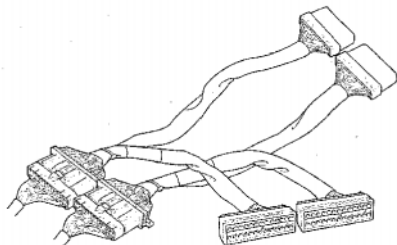
## FUEL SYSTEM (Programmed Fuel Injection)



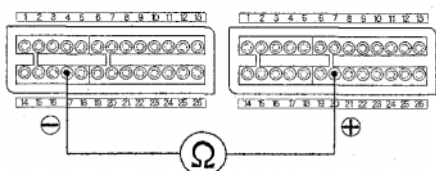
## FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



Measure the resistance at the test harness terminals.



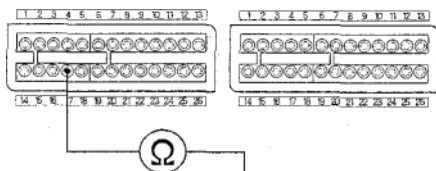
**Connection: A17 (-) - B20 (+)**  
**Standard: 9 - 15  $\Omega$  (20°C/68°F)**

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: A17 - Ground**  
**Standard: No continuity**

Continuity

- Short circuit in Pink/Yellow wire

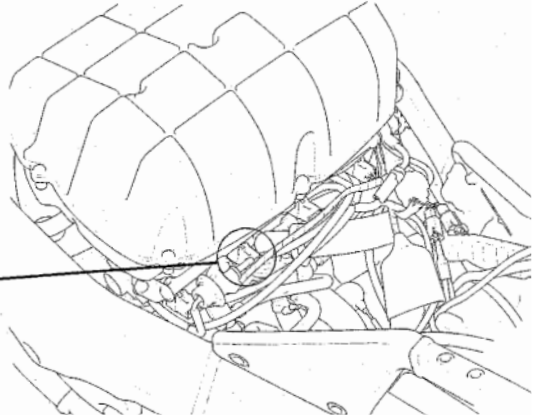
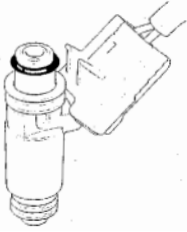
No continuity

- 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 motorcycle on its side stand.  
Turn the ignition switch to "ON".  
Check that the MIL blinks.



Does not blink

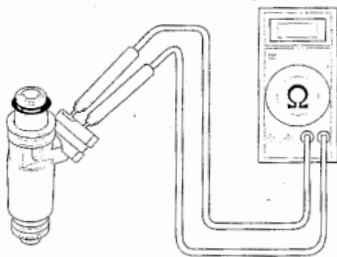
- Loose or poor contact on the No.2 injector connector

13 blinks

Abnormal

- Faulty No.2 injector

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



Connection:

Black/White (+) – Pink/Blue (–)

Standard: 10.5 – 14.5  $\Omega$  (20°C/68°F)

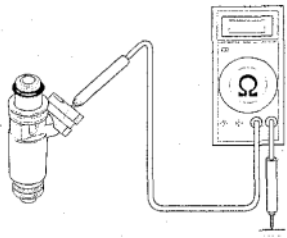
Normal

## FUEL SYSTEM (Programmed Fuel Injection)

---



Check for continuity between the No.2 injector and ground.



**Connection:**

**Black/White (+) - Ground (-)**

**Standard: No continuity**

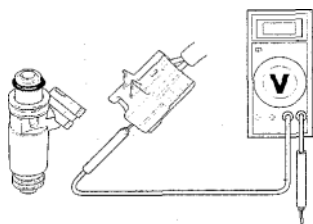
Continuity

- Faulty No.2 injector



No continuity

Turn the ignition switch to "ON".  
Measure the voltage between the No.2 injector connector of the wire harness side and ground.



**Connection:**

**Black/White (+) - Ground (-)**

**Standard: Battery voltage**

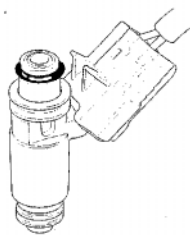
Out of range

- Open or short circuit in Black/White wire

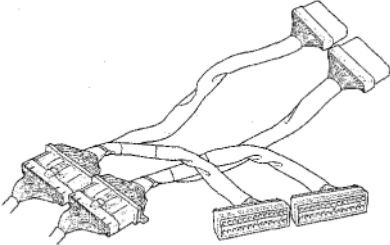


Voltage exists

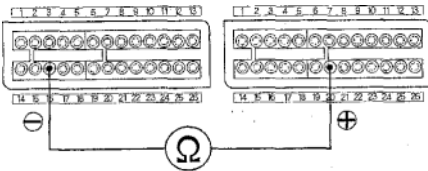
Turn the ignition switch to "OFF".  
Connect the No.2 injector connector.



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



Measure the resistance at the test harness terminals.



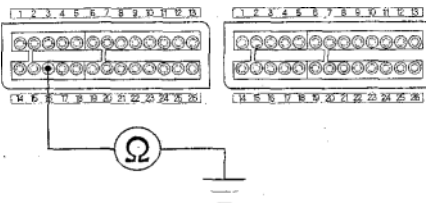
Connection: A16 (-) - B20 (+)  
Standard: 9 - 15 Ω (20°C/68°F)

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: A16 - Ground  
Standard: No continuity

Continuity

- Short circuit in Pink/Blue wire

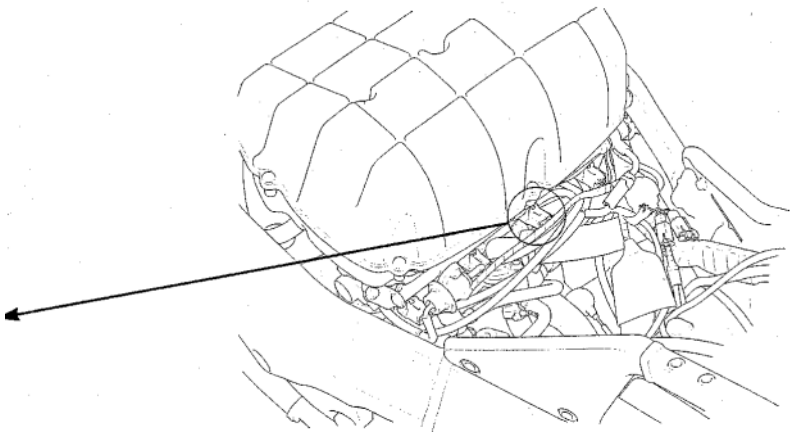
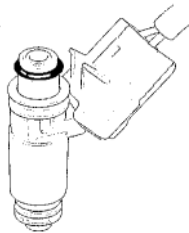
No continuity

FUEL SYSTEM (Programmed Fuel Injection)

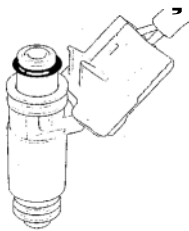
PGM-FI MIL 14 BLINKS (No.3 INJECTOR)

Turn the ignition switch to "OFF".

Disconnect the No.3 injector 2P connector.  
Check for loose or poor contact on the No.3 injector 2P connector.

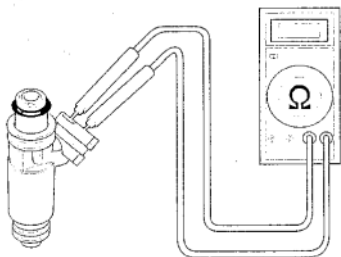


Place the motorcycle on its side stand.  
Turn the ignition switch to "ON".  
Check that the MIL blinks.



14 blinks

Turn the ignition switch to "OFF".  
Disconnect the No.3 injector 2P connector and  
measure the resistance of the No.3 injector.



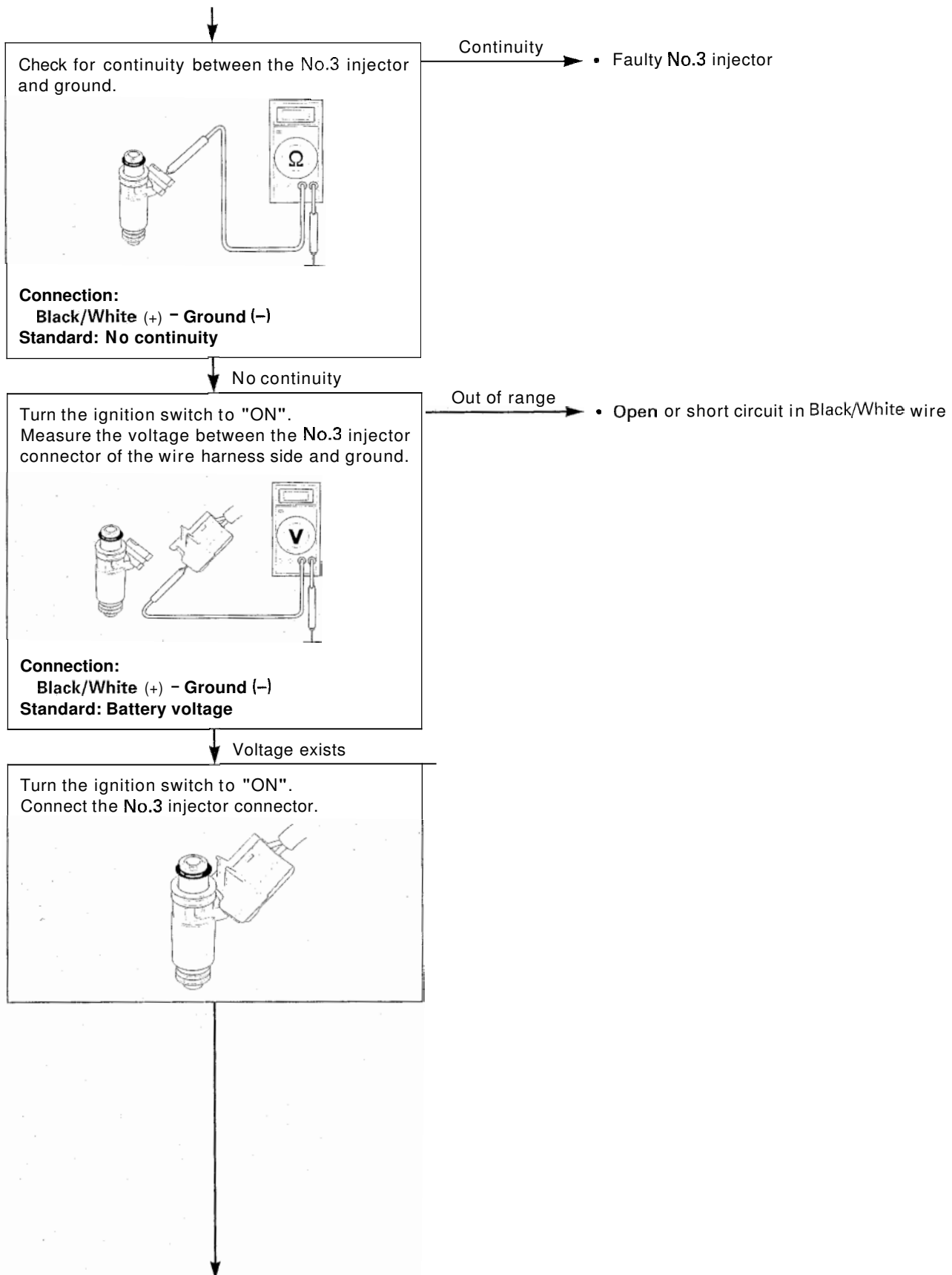
Connection:  
Black/White (+) - Pink/Green (-)  
Standard: 10.5 - 14.5 Ω (20°C/68°F)

Normal

Abnormal

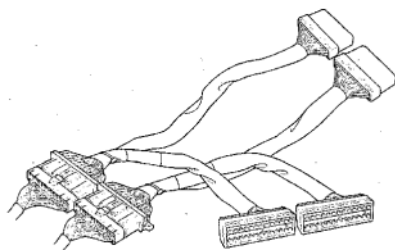
- Faulty No.3 injector

## FUEL SYSTEM (Programmed Fuel Injection)

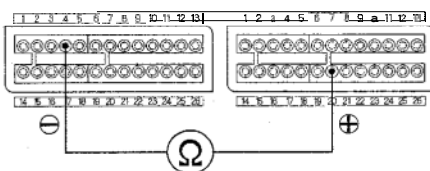


## FUEL SYSTEM (Programmed Fuel Injection)

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



Measure the resistance at the test harness terminals.



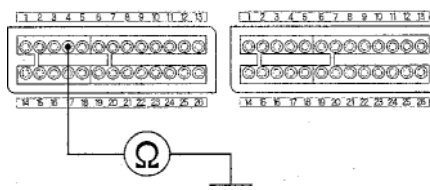
**Connection: A4 (-) - B20 (+)**  
**Standard: 9 - 15  $\Omega$  (20°C/68°F)**

Out of range

- Open circuit in Black/White and/or Pink/Green wire

Normal

Check for continuity between the test harness terminal and ground.



**Connection: A4 - Ground**  
**Standard: No continuity**

Continuity

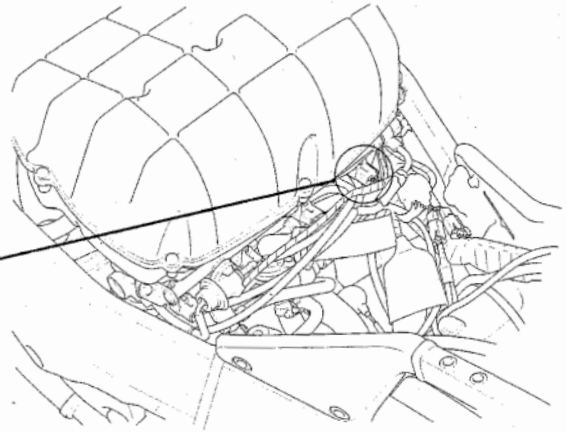
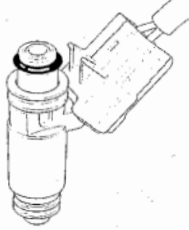
- Short circuit in Pink/Green wire



## PGM-FI MIL 15 BLINKS (No.4 INJECTOR)

Turn the ignition switch to "OFF".

Disconnect the No.4 injector 2P connector.  
Check for loose or poor contact on the No.4 injector 2P connector.



Connect the No.4 injector 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON".  
Check that the **MIL** blinks.

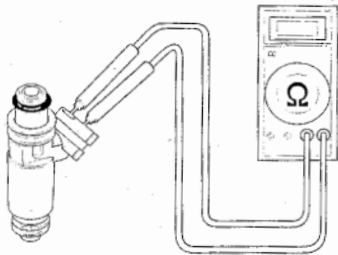


Does not blink

- Loose or poor contact on the No.4 injector connector

15 blinks

Turn the ignition switch to "OFF".  
Disconnect the No.4 injector 2P connector and  
measure the resistance of the No.4 injector.



Abnormal

- Faulty No.4 injector

Connection:

Black/White (+) - Pink/Black (-)

Standard: 10.5 - 14.5  $\Omega$  (20°C/68°F)

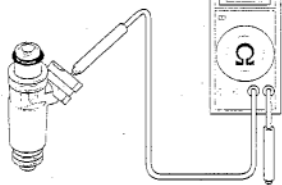
Normal

## FUEL SYSTEM (Programmed Fuel Injection)

---



Check for continuity between the No.4 injector and ground.



**Connection:**  
Black/White (+) - Ground (-)  
**Standard: No continuity**

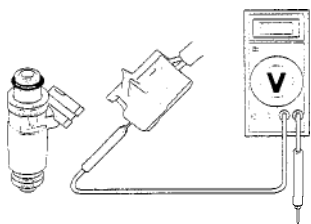
Continuity →

- Faulty No.4 injector



No continuity

Turn the ignition switch to "ON".  
Measure the voltage between the No.4 injector connector of the wire harness side and ground.



**Connection:**  
Black/White (+) - Ground (-)  
**Standard: Battery voltage**

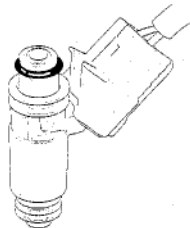
Out of range →

- Open or short circuit in Black/White wire



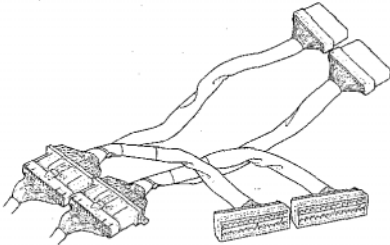
Voltage exists

Turn the ignition switch to "OFF".  
Connect the No.4 injector connector.

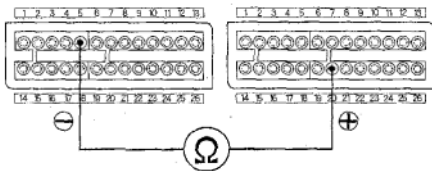


f

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



Measure the resistance at the test harness terminals.



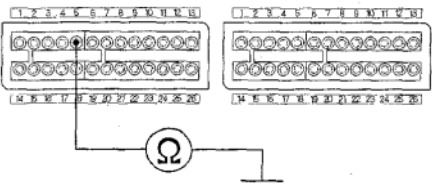
**Connection: A5 (-) - B20 (+)**  
**Standard: 9 - 15 Ω (20°C/68°F)**

Out of range

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

Normal

Check for continuity between the test harness terminal and ground.



**Connection: A5 - Ground**  
**Standard: No continuity**

Continuity

- Short circuit in Pink/Black wire

No continuity

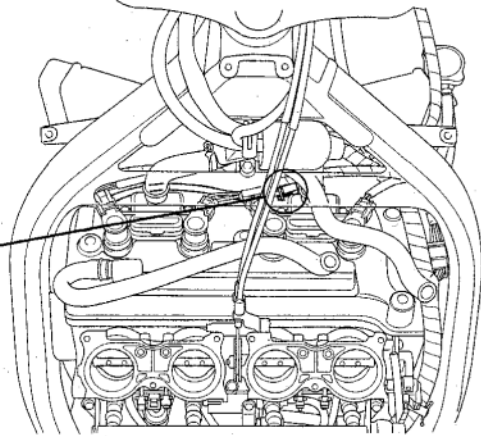
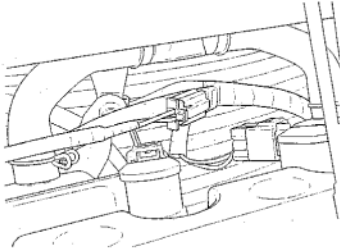
- Replace the ECM with a new one, and inspect it again

## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 18 BLINKS (CAM PULSE GENERATOR)

Turn the ignition switch to "OFF".

Disconnect the cam pulse generator 2P connector.  
Check for loose or poor contact on the cam pulse generator 2P connector.



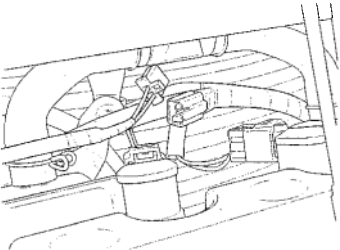
Connect the cam pulse generator 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON" and check that the MIL blinks.

Does not blink

- Loose or poor contact on the cam pulse generator 2P connector

↓ 18 blinks

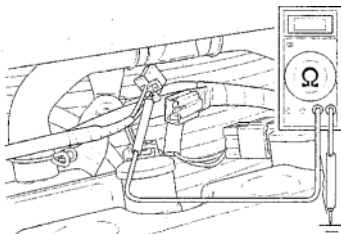
Turn the ignition switch to "OFF" and the engine stop switch to "OFF".  
Disconnect the cam pulse generator 2P connector.



Turn the ignition switch to "OFF".  
Check the continuity between the cam pulse generator connector terminal and ground.

Continuity

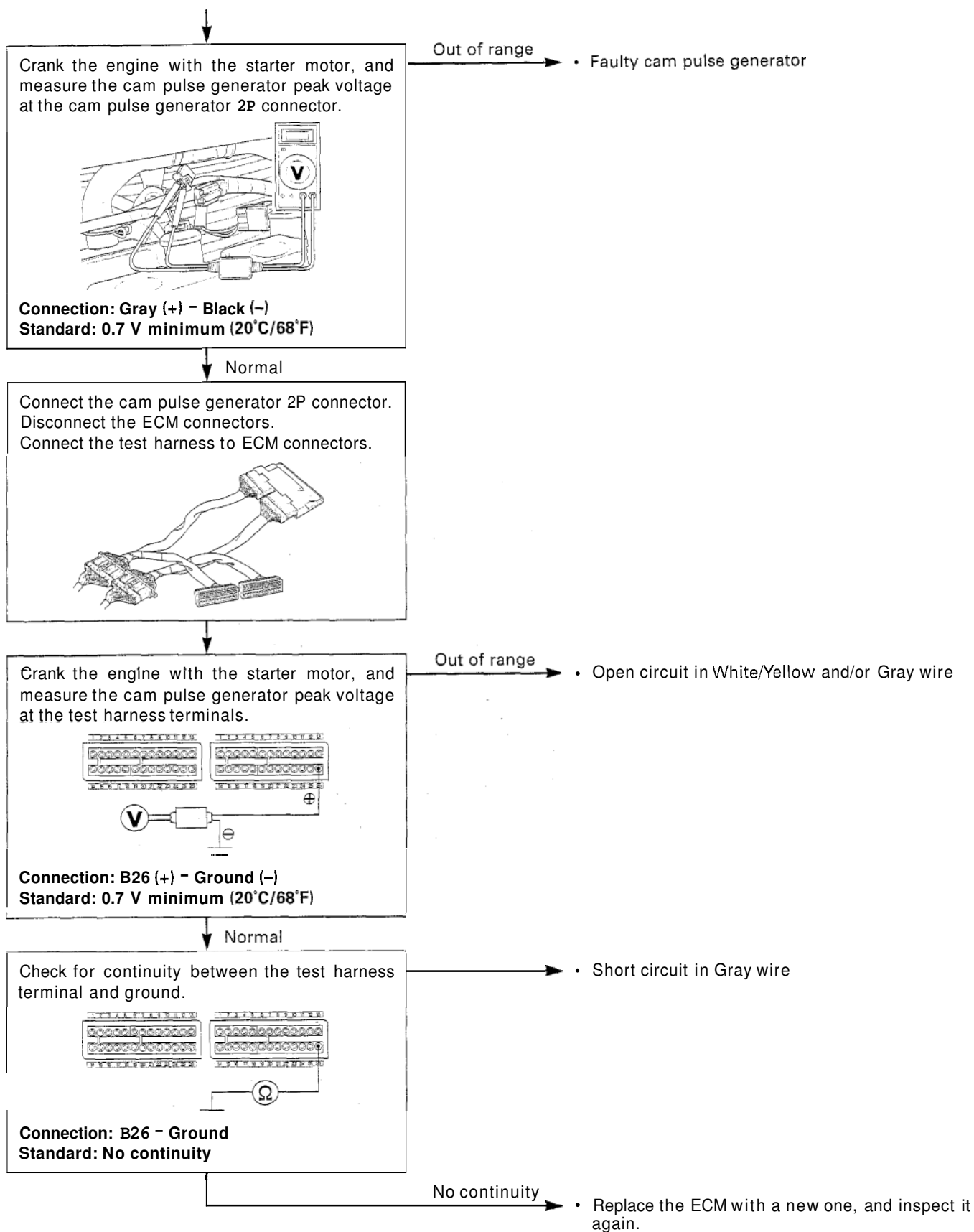
- Faulty cam pulse generator



Connection: Gray - Ground  
Black - Ground  
Standard: No continuity

↓ No continuity

## FUEL SYSTEM (Programmed Fuel Injection)

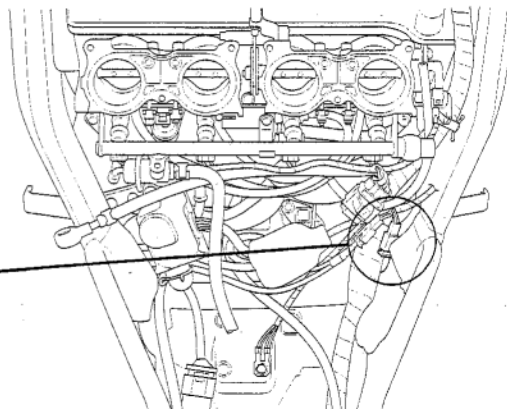
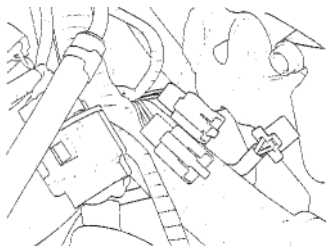


## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 19 BLINKS (IGNITION PULSE GENERATOR)

Turn the ignition switch to "OFF".

Disconnect the ignition pulse generator 2P connector.  
Check for loose or poor contact on the ignition pulse generator 2P connector.



Connect the ignition pulse generator 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON" and check that the MIL blinks.

Does not blink

- Loose or poor contact on the ignition pulse generator 2P connector

↓ 19 blinks

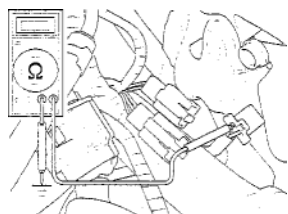
Turn the ignition switch to "OFF" and the engine stop switch to "OFF".  
Disconnect the ignition pulse generator 2P connector.



Turn the ignition switch to "OFF".  
Check the continuity between the ignition pulse generator connector terminal and ground.

Abnormal

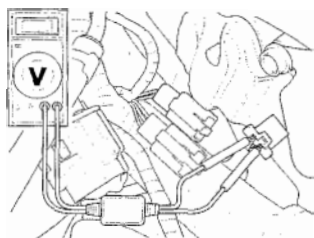
- Faulty ignition pulse generator



Connection: Yellow - Ground  
White/Yellow - Ground  
Standard: No continuity

↓ No continuity

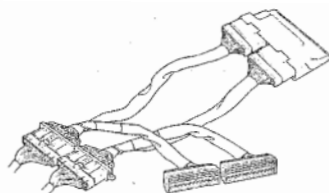
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P connector.



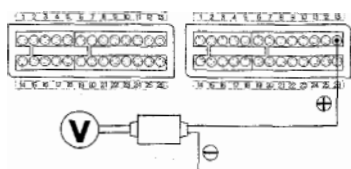
**Connection: Yellow (+) - White/Yellow (-)**  
**Standard: 0.7 V minimum (20°C/68°F)**

↓ Normal

Connect the ignition pulse generator 2P connector.  
 Disconnect the ECM connectors.  
 Connect the test harness to ECM connectors.



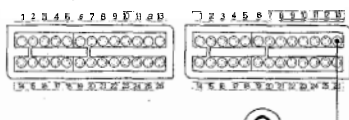
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the test harness terminals.



**Connection: B13 (+) - Ground (-)**  
**Standard: 0.7 V minimum (20°C/68°F)**

↓ Normal

Check for continuity between the test harness terminal and ground.



**Connection: B13 - Ground**  
**Standard: No continuity**

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

Continuity →

- Short circuit in Yellow wire

No continuity →

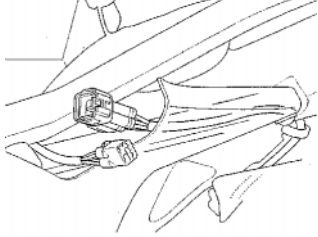
- Replace the ECM with a new one, and inspect it again

FUEL SYSTEM (Programmed Fuel Injection)

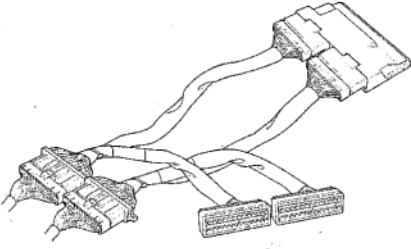
PGM-FI MIL 21 BLINKS ( O<sub>2</sub> SENSOR/CALIFORNIA TYPE ONLY)

Turn the ignition switch to "OFF".

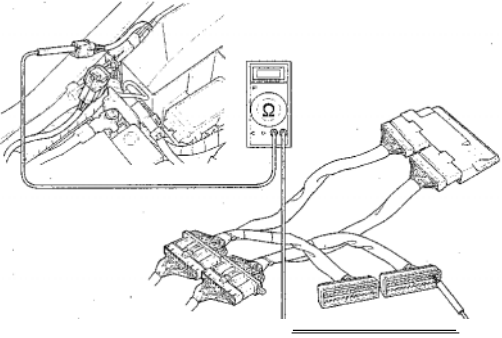
Disconnect the O<sub>2</sub> sensor connector.  
Check for loose or poor contact on the O<sub>2</sub> sensor connector.



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

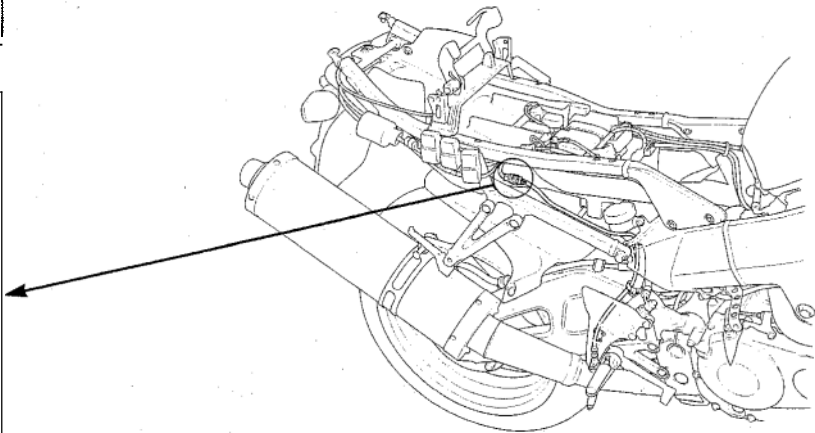


Check the continuity between the test harness terminal and O<sub>2</sub> sensor connector terminal.



Connection: Orange/White - B12  
Standard: Continuity

Continuity

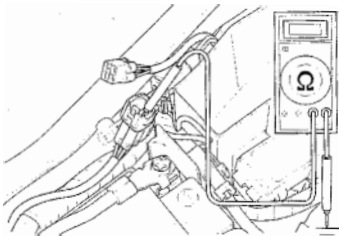


No continuity → • Open circuit in O<sub>2</sub> sensor Orange/White wire



## FUEL SYSTEM (Programmed Fuel Injection)

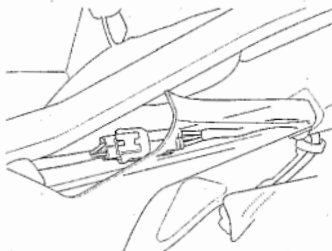
Check the continuity between the O<sub>2</sub> sensor connector terminal and ground.



Continuity →

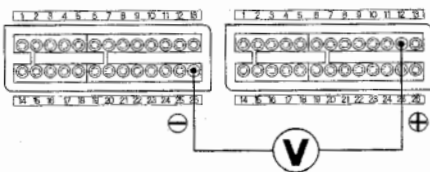
- Short circuit in O<sub>2</sub> sensor Orange/White wire

Connect the O<sub>2</sub> sensor connector.  
Turn the ignition switch to "ON" and warm up the engine until the coolant temperature is 80°C (176°F).



Operate the throttle grip and snap the engine speed from idle to 5,000 rpm.

Check the voltage between the test harness terminals.



Out of range →

- Faulty O<sub>2</sub> sensor

Connection: B1Z (+) - A26 (-)

Standard:

With the throttle fully open:

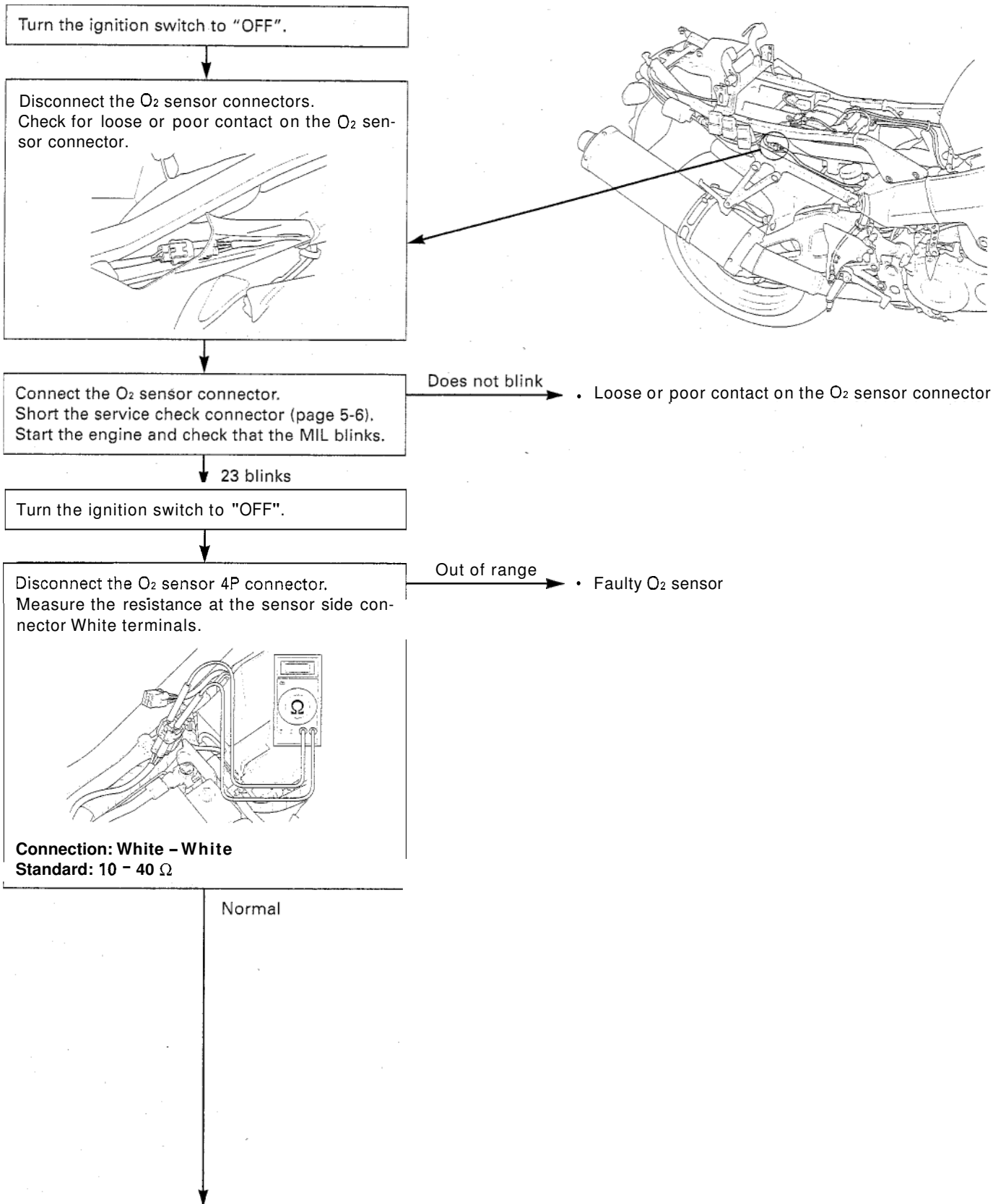
0.6 V minimum

With the throttle quickly closed:

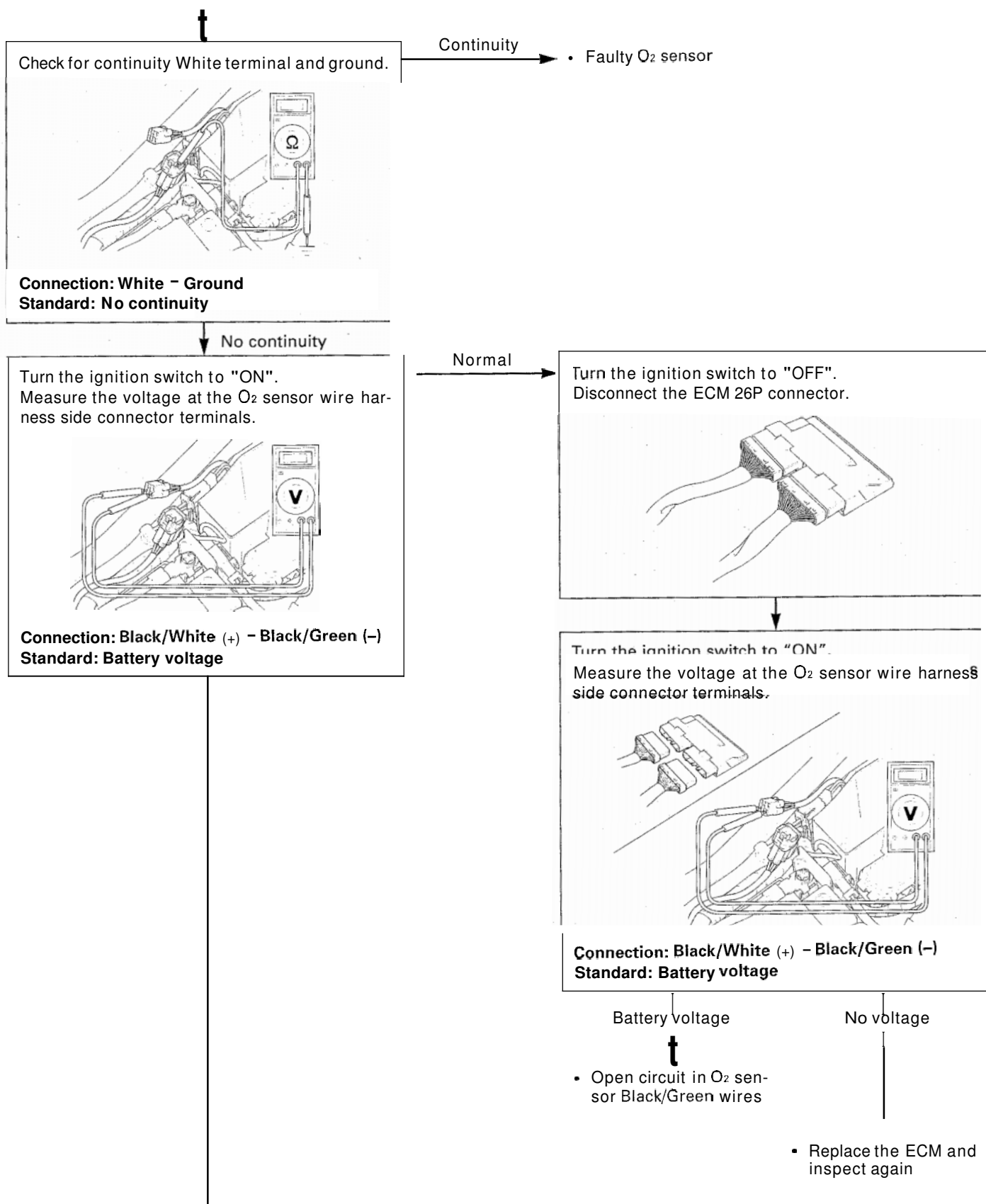
0.4 V maximum

## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 23 BLINKS (O<sub>2</sub> SENSOR HEATER/CALIFORNIA TYPE ONLY)



## FUEL SYSTEM (Programmed Fuel Injection)

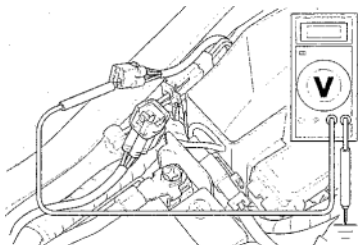


## FUEL SYSTEM (Programmed Fuel Injection)

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Measure the voltage at the O<sub>2</sub> sensor wire harness side connector terminal and ground.



**Connection: Black/White (+) - Ground (-)**  
**Standard: Battery voltage**

No voltage →

- Open circuit in Black/White wire between the O<sub>2</sub> sensor and engine stop relay

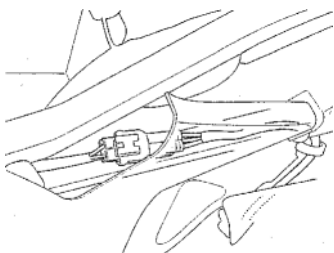


Battery voltage

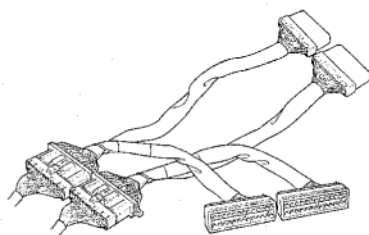
Turn the ignition switch to "OFF".



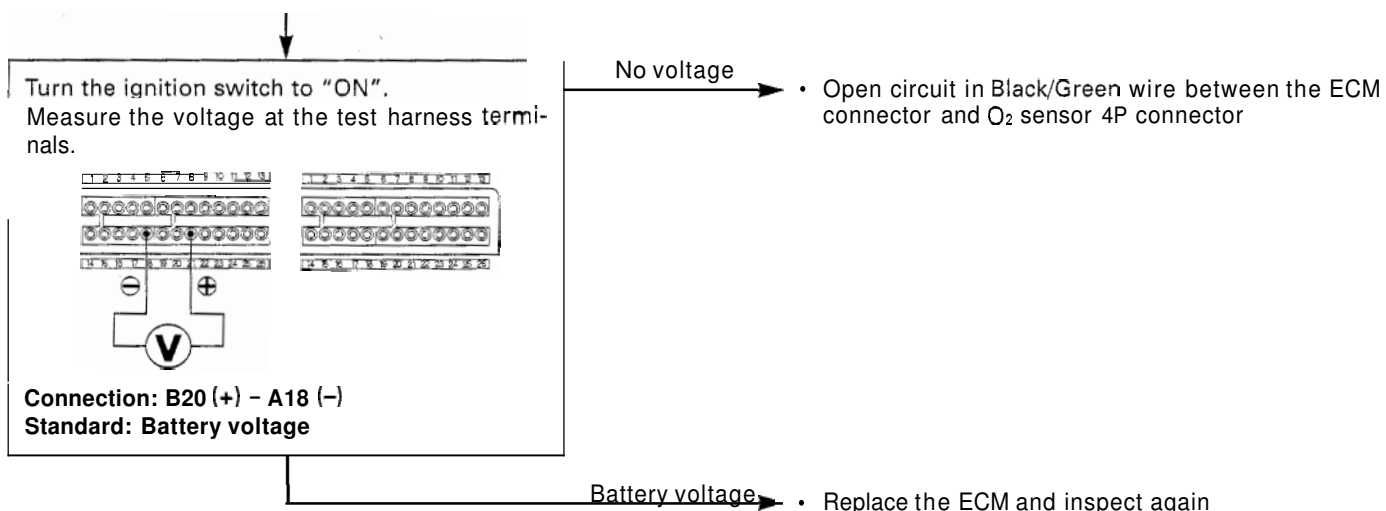
Connect the O<sub>2</sub> sensor **4P** connectors.



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

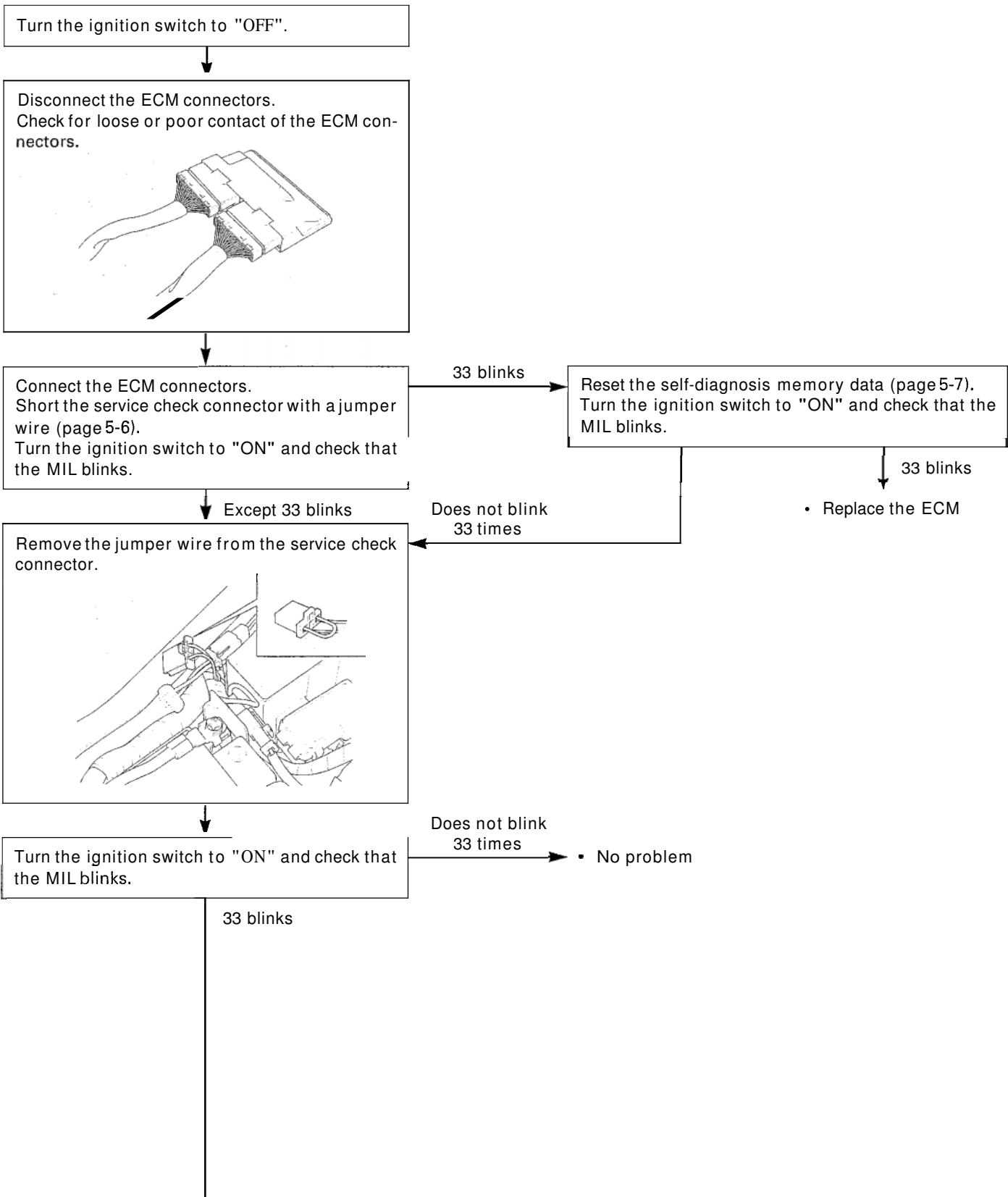


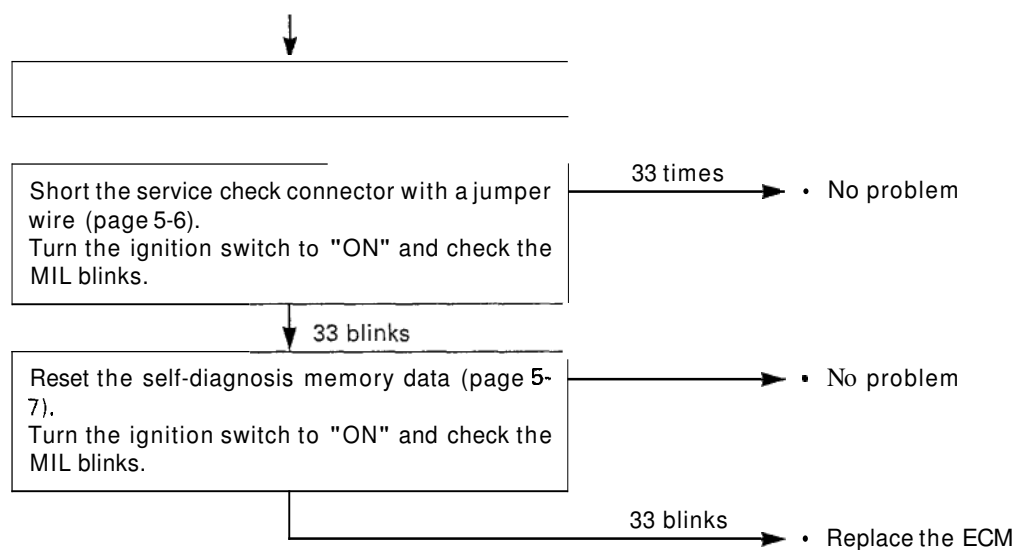
## FUEL SYSTEM (Programmed Fuel Injection)



## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 33 BLINKS (E<sup>2</sup>-PROM)



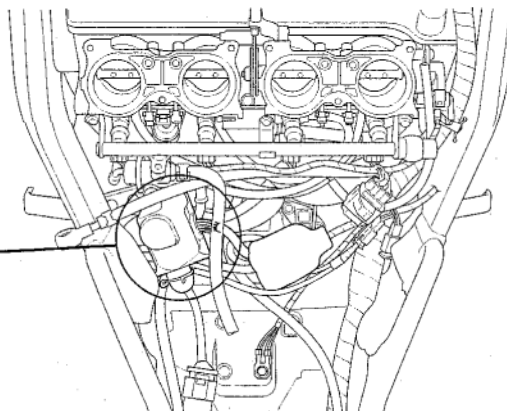


## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 34 BLINKS (EGCV AND AIR INTAKE VALVE SERVO MOTOR VOLTAGE)

Turn the ignition switch to "OFF".

Disconnect the servo motor 6P connector.  
Check for loose or poor contact on the servo motor 6P connector.



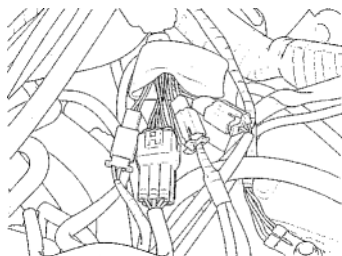
Connect the servo motor 6P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON" and check that the MIL blinks.

Does not blink

- Loose or poor contact on the servo motor 6P connector

↓ 34 blinks

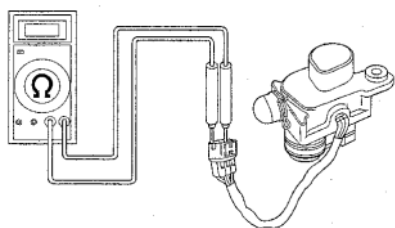
Turn the ignition switch to "OFF" and the engine stop switch to "OFF".  
Disconnect the servo motor 6P connector.



Measure the resistance at the servo motor 6P connector terminals.

Abnormal

- Faulty servo motor



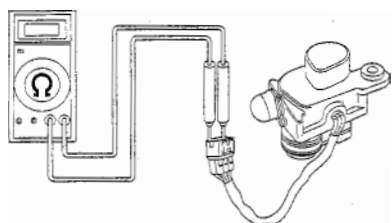
Connection: Yellow/Red (+) - Green/Orange (-)  
Standard: 5 kΩ (20°C/68°F)

Normal



## FUEL SYSTEM (Programmed Fuel Injection)

Measure the resistance at the servo motor 6P connector terminals.



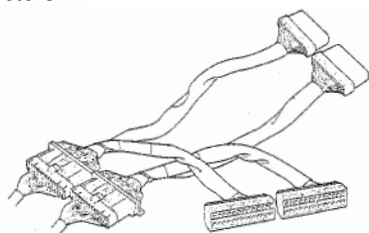
**Connection:** Light green/Pink (+) - Green/Orange (-)  
**Standard:** 0 - 5 k $\Omega$  [20°C/68°F]

Abnormal

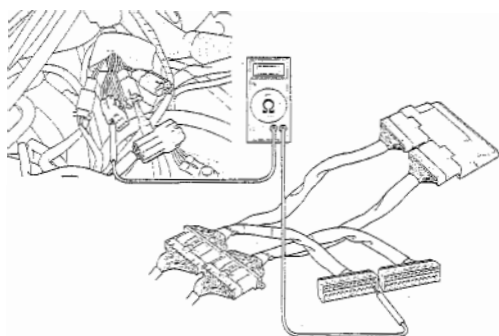
- Faulty servo motor

Normal

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



Check for continuity between the test harness terminal and servo motor 6P connector terminals.



**Connection:** A15 - Red  
A3 - Blue  
A26 - Green/Orange  
B15 - Yellow/Red  
B9 - Light green/Pink  
**Standard:** Continuity

No continuity

- Short circuit in related wire

Continuity

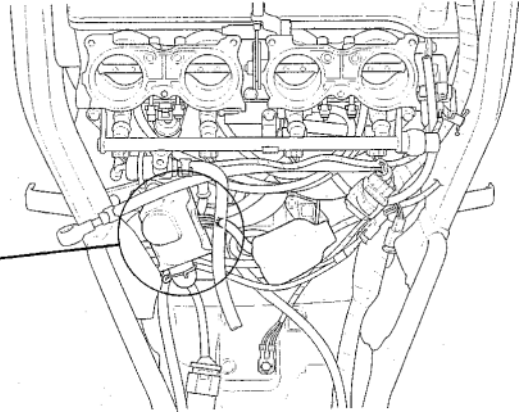
- Replace the ECM with a new one, and inspect it again.

## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 35 BLINKS (EGCV AND AIR INTAKE VALVE SERVO MOTOR)

Turn the ignition switch to "OFF".

Disconnect the servo motor 6P connector.  
Check for loose or poor contact on the servo motor 6P connector.



Connect the servo motor 6P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch to "ON" and check that the MIL blinks.

Does not blink

- Loose or poor contact on the servo motor 6P connector

35 blinks

Turn the ignition switch to "OFF" and the engine stop switch to "OFF".  
Disconnect the servo motor 6P connector.



No blinks

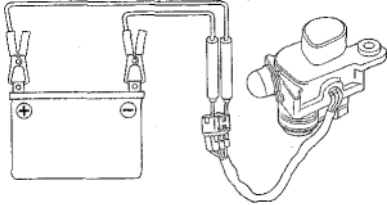
- Check the EGCV, air intake valve and cables.

Disconnect the control cables from the servo motor.  
Turn the ignition switch to "ON" and check that the MIL blinks.

35 blinks



Remove the servo motor (page 5-95).  
Connect the 12 V battery to the servo motor connector terminals and check the servo motor function.



**Connection: Red (+) - Blue (-)**

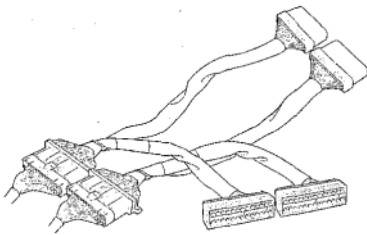
Abnormal

- Faulty servo motor

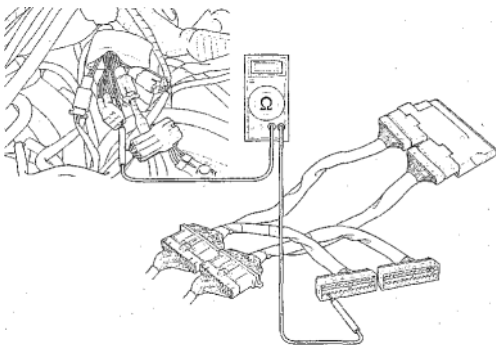


Normal

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



Check for continuity between the test harness terminal and servo motor 6P connector terminals.



**Connection: A15 - Red**  
**A3 - Blue**  
**Standard: Continuity**

No continuity

- Short circuit in related wire

Continuity

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

## FUEL SYSTEM (Programmed Fuel Injection)

### FUEL PRESSURE INSPECTION

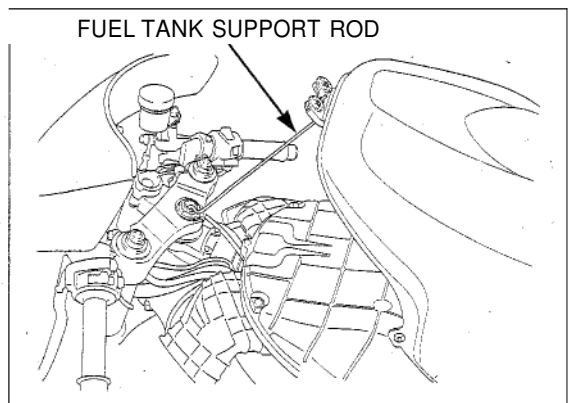
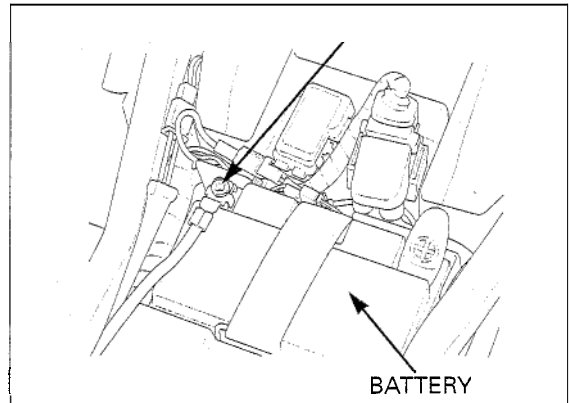
#### NOTICE

- Before disconnecting fuel hoses, release the fuel pressure by loosening the fuel hose banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.

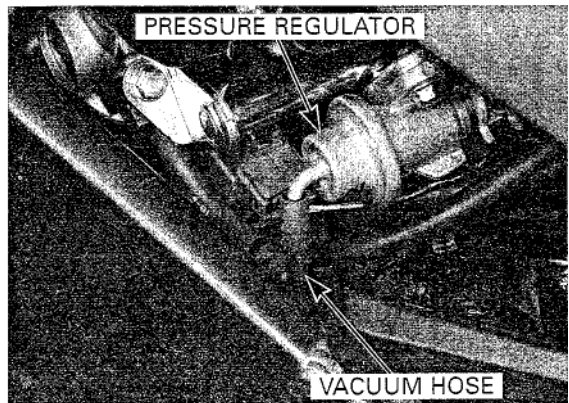
Remove the seat (page 2-2).

Disconnect the battery negative cable from the battery terminal.

Open and support the front end of the fuel tank (page 3-4).

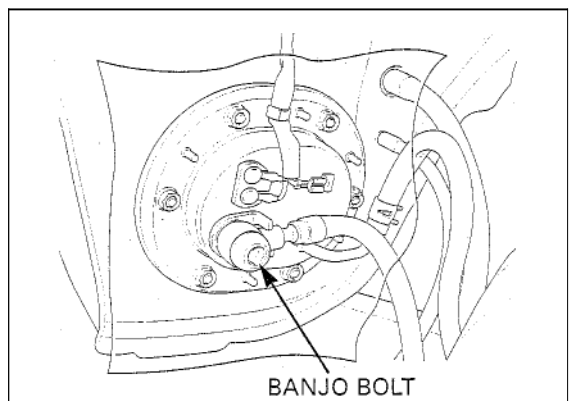


Disconnect the pressure regulator vacuum hose and plug the vacuum hose.



Cover the fuel hose banjo bolt with a rag or shop towel.

Slowly loosen the fuel hose banjo bolt and catch the remaining fuel using a approved gasoline container.



## FUEL SYSTEM (Programmed Fuel Injection)

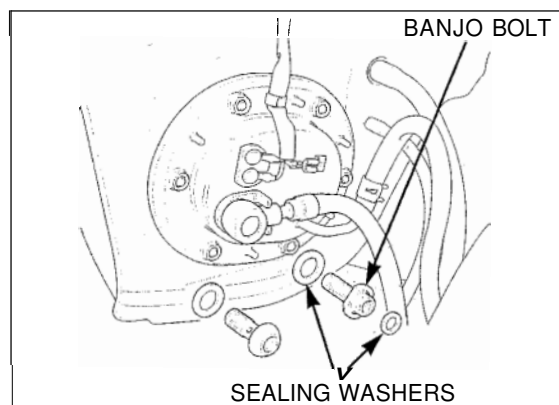
Remove the fuel hose banjo bolt and attach the fuel pressure gauge with the following Honda genuine parts.

Banjo bolt, 12 mm  
Parts No. 90008-PD6-010  
Sealing washer, 12 mm  
Parts No. 90428-PD6-003  
Sealing washer, 6 mm  
Parts No. 90430-PD6-003

**TOOL:**

Fuel pressure gauge

**07406-0040003 or  
07406-004000A  
(U.S.A. only)**



Connect the battery negative cable.  
Start the engine.  
Read the fuel pressure at idle speed.

**IDLE SPEED: 1,200 ± 100 rpm**  
**STANDARD: 343 kPa (3.5 kgf/cm<sup>2</sup>, 50 psi)**

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

- Pinched or clogged fuel return hose
- Pressure regulator
- Fuel pump (page 5-57)

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

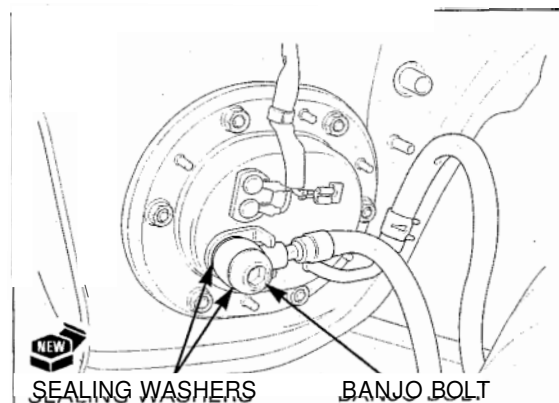
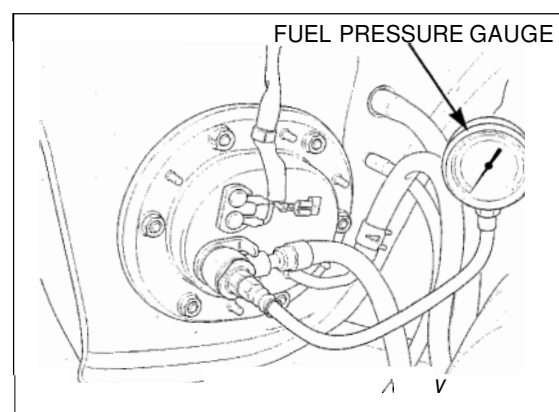
- Fuel line leaking
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 5-57)

After inspection, remove the fuel hose banjo bolt and reinstall and tighten the original fuel hose banjo bolt using the new sealing washers.

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

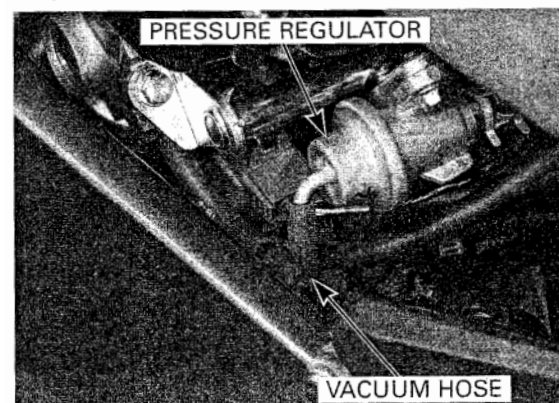
### NOTICE

*Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.*



Connect the pressure regulator vacuum hose.

Install the removed parts in the reverse order of removal.

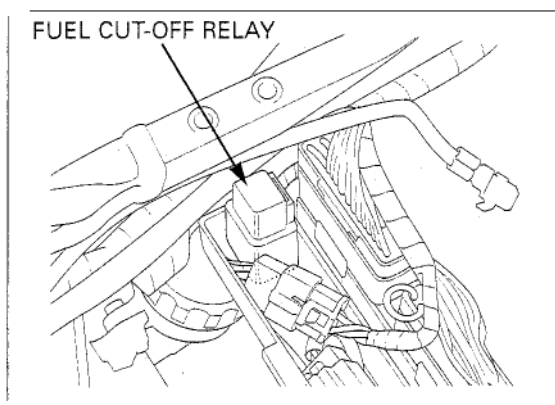


## FUEL SYSTEM (Programmed Fuel Injection)

### FUEL FLOW INSPECTION

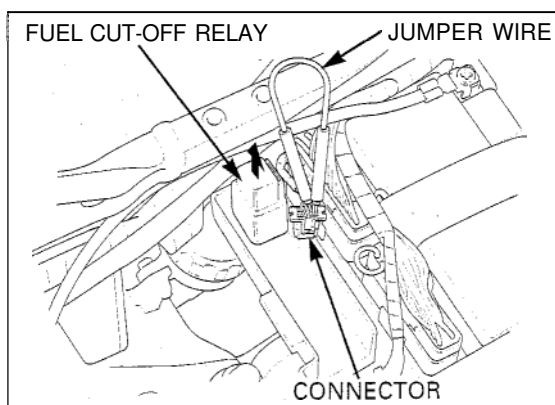
Remove the seat (page 2-2).  
Open and support the front end of the fuel tank (page 3-4).

Remove the ECM cover and disconnect the fuel cut-off relay connector.



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 will spill out of the hose. Place an approved gasoline container under the hose and drain the gasoline.
- Wipe off any spilled out gasoline.



Disconnect the fuel return hose at the pressure regulator, plug the pressure regulator inlet joint.

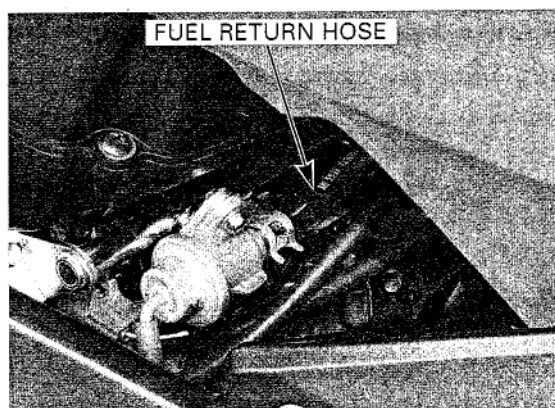
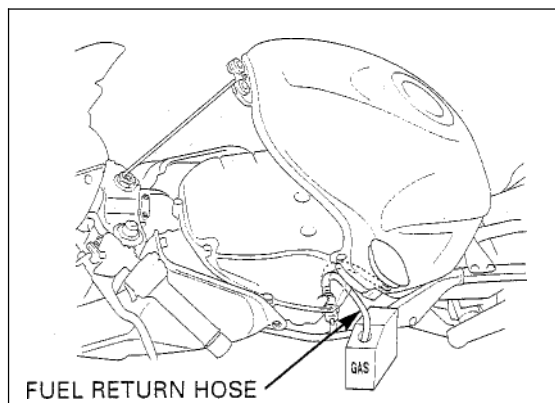
Turn the ignition switch to "ON" for 10 seconds.  
Measure the amount of fuel flow.

**Amount of fuel flow:**  
**188 cm<sup>3</sup> (6.4 US oz, 6.6 Imp oz) minimum/**  
**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 5-57)

After inspection, connect the fuel return hose.  
Start the engine and check for leak.



### 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:

Open and support the front end of the fuel tank (page 3-4).

Disconnect the fuel pump 3P (Black) connector.

Turn the ignition switch to "ON" and measure the voltage between the terminals.

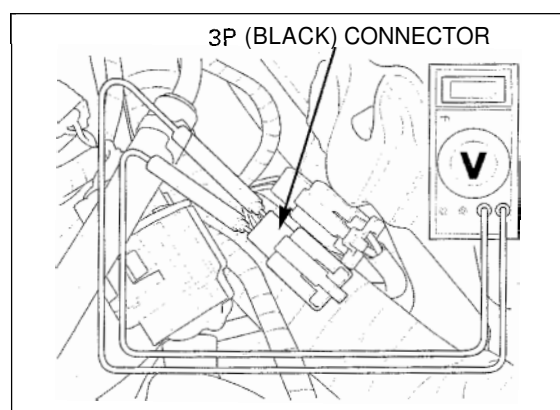
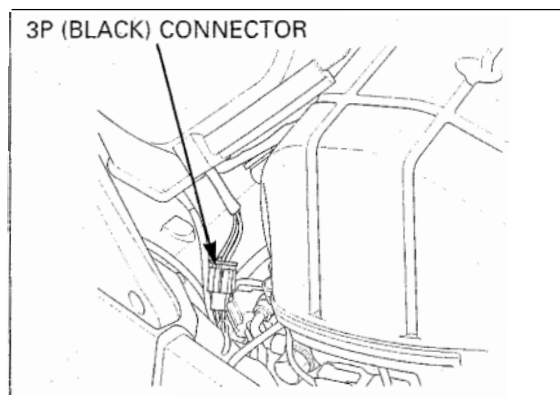
**Connection: Brown (+) - Green (-)**

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.

If there is no battery voltage, inspect the following:

- Main fuel 30A
- Sub fuse 10A, 20A
- Engine stop switch (page 19-17)
- Fuel cut-off relay (page 5-58)
- Bank angle sensor (page 5-85)
- Engine stop relay (page 5-86)
- ECM (page 5-88)



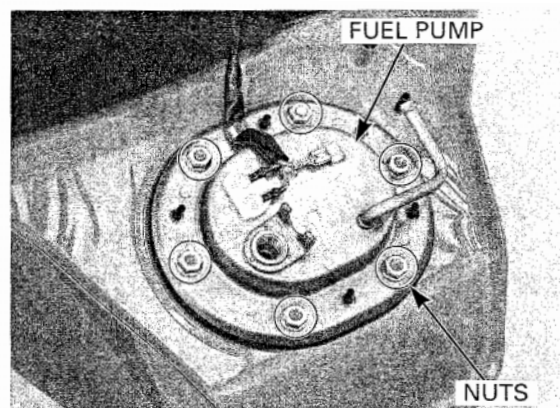
#### REMOVAL

Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt at the fuel tank.

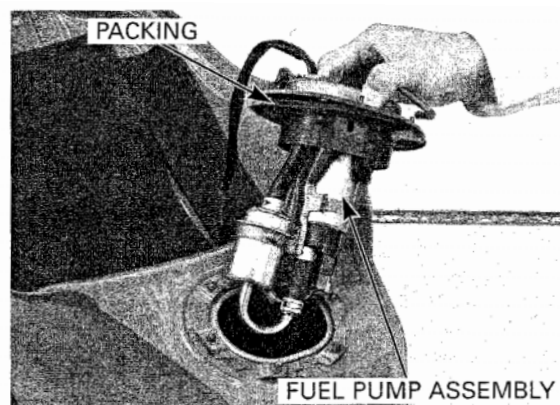
Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.

Remove the fuel tank (page 5-59).

Remove the fuel pump mounting nuts.



Remove the fuel pump assembly and packing



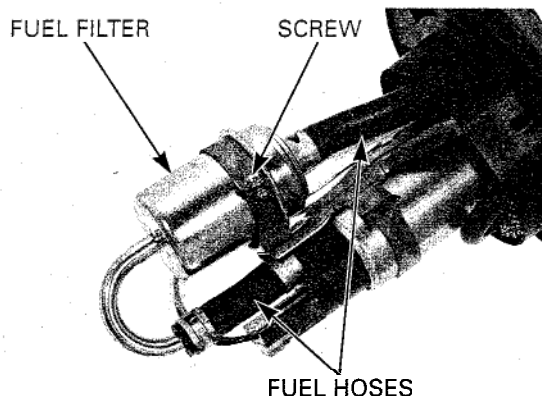
## FUEL SYSTEM (Programmed Fuel Injection)

### FUEL FILTER REPLACEMENT

Disconnect the fuel hoses from the fuel filter.  
Remove the screws and fuel filter.

*Note the direction  
of the fuel filter.*

Install the fuel filter in the reverse order of removal.

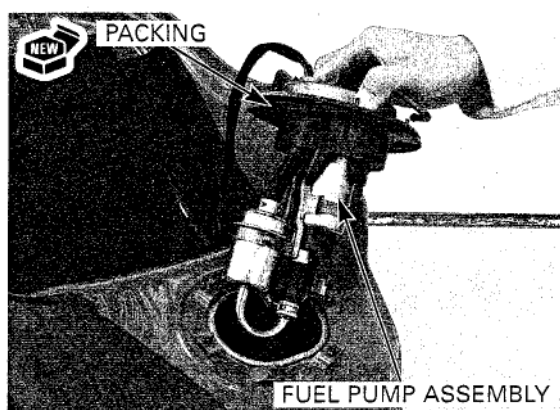


### INSTALLATION

*Always replace  
packing with a  
new one*

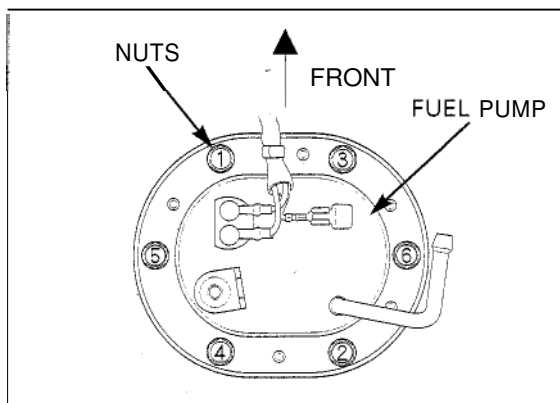
Place a new packing onto the fuel pump.

Install the fuel pump being careful not to damage the  
fuel pump wire.



Install and tighten the fuel pump mounting nuts in the  
sequence shown.

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

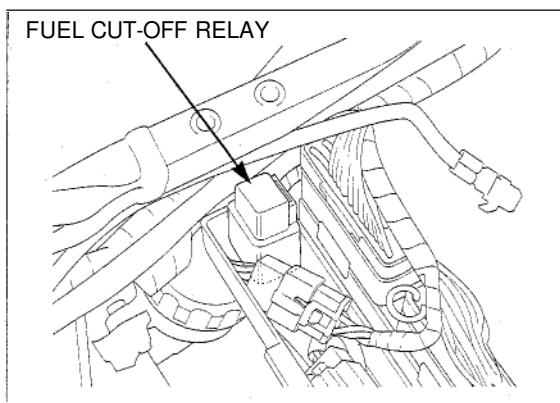


## FUEL CUT-OFF RELAY

### INSPECTION

Remove the ECM cover (page 5-87).

Disconnect the fuel cut-off relay 4P connector, remove  
the fuel cut-off relay.





## FUEL SYSTEM (Programmed Fuel Injection)

Connect the ohmmeter to the fuel cut-off relay connector terminals.

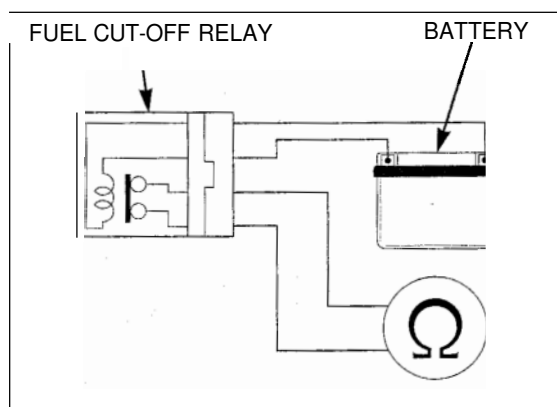
**CONNECTION: Black/White – Brown**

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

**CONNECTION: Brown/Black – Black/White**

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

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

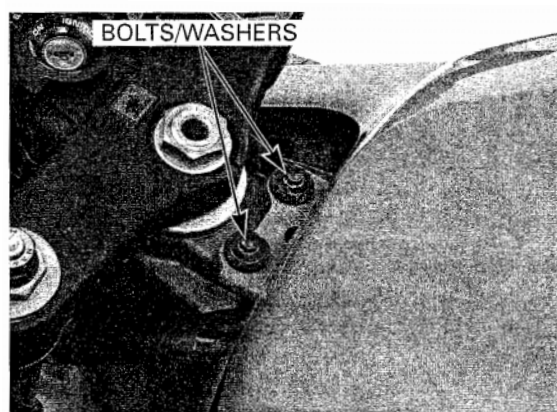


## FUEL TANK

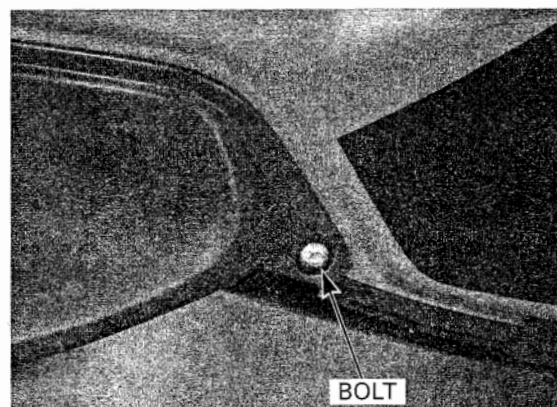
### REMOVAL

Remove the seat (page 2-2).

Remove the fuel tank front mounting bolts and washers.

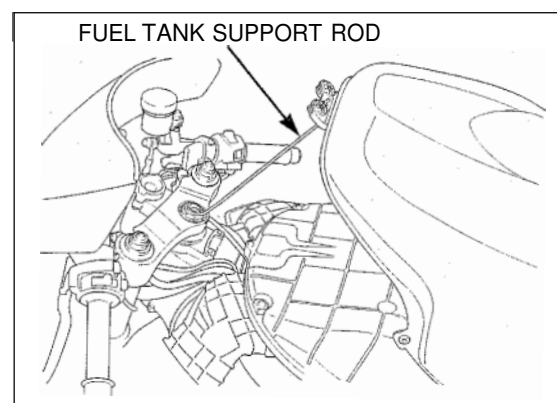


Remove the right and left duct cover mounting bolts.



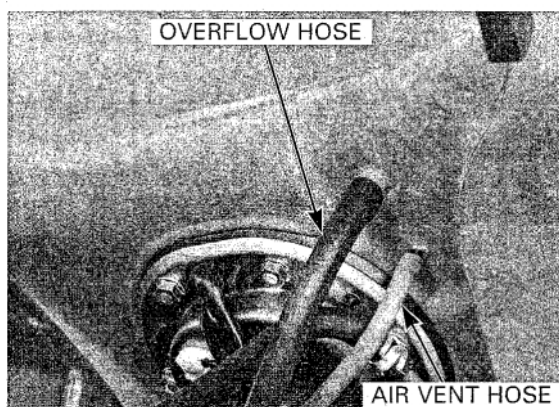
Open and support the front end of the fuel tank (page 3-4).

Release the fuel pressure (page 5-54).



## FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the fuel tank air vent hose and overflow hose.

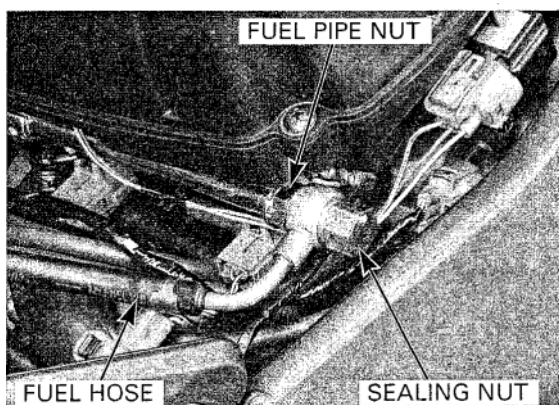


Hold the fuel pipe nut and remove the fuel hose sealing nut and sealing washers, then disconnect the fuel hose.

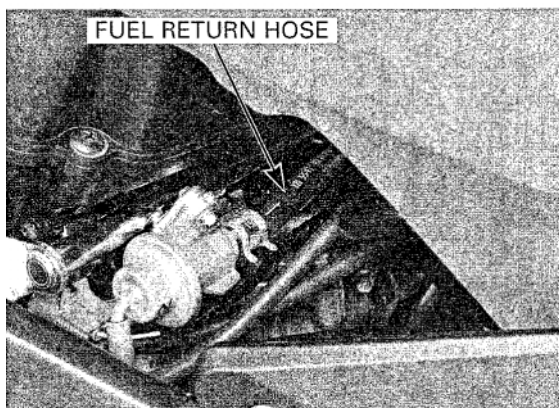
### NOTICE

*Do not apply excessive force to the fuel pipe.*

- Always hold the fuel pipe nut while removing the fuel hose sealing nut.
- Do not disconnect the fuel hose and fuel return hose on the fuel tank side; they must be disconnected on the throttle body side.



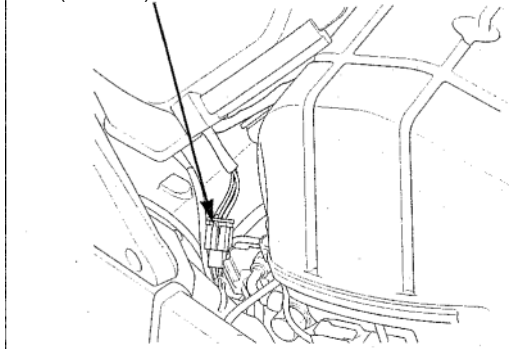
Temporarily install the 12 x 30 mm bolt (pitch 1.25) and sealing washers to the fuel hose banjo, then tighten the sealing nut.



Disconnect the fuel return hose at the pressure regulator.

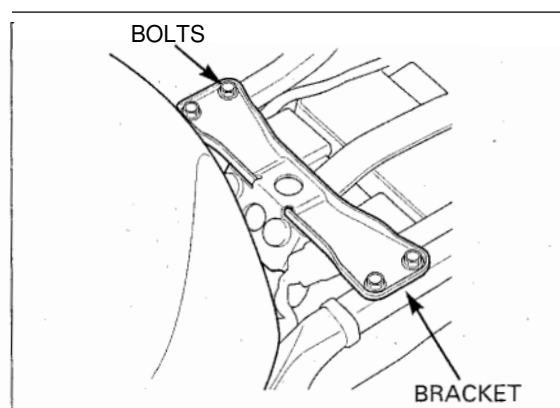
Disconnect the fuel pump/reserve sensor 3P (Black) connector.

3P (BLACK) CONNECTOR



## FUEL SYSTEM (Programmed Fuel Injection)

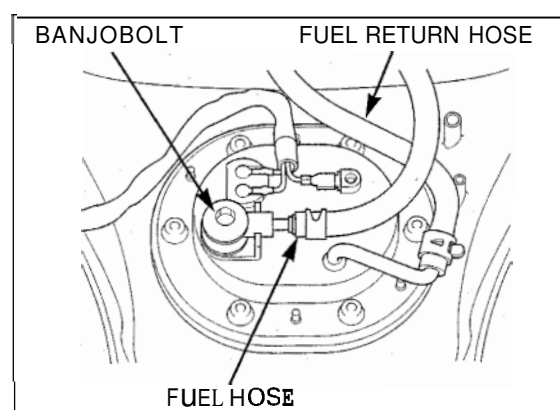
Remove the fuel tank bracket bolts and then remove the fuel tank from the frame.



*Be careful not to damage the fuel tank.*

Place the fuel tank upside down.

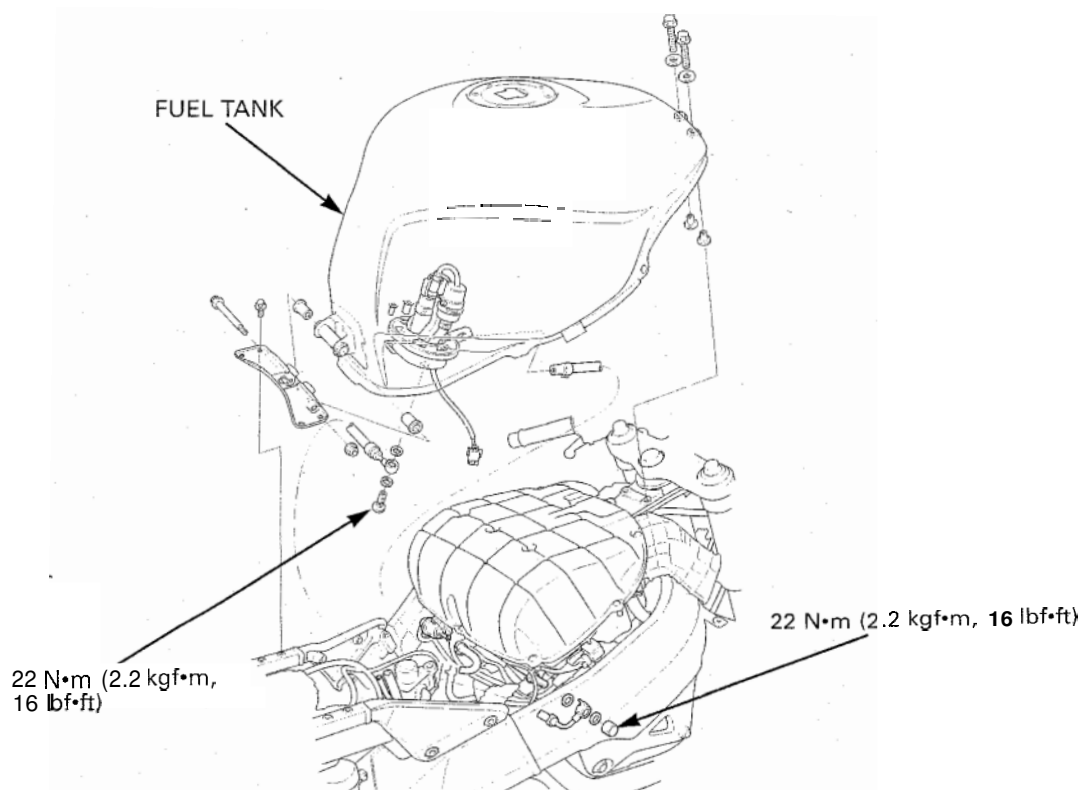
Remove the fuel hose banjo bolt and sealing washers, then remove the fuel hose from the fuel pump. Disconnect the fuel return hose from the fuel pump.



*Disconnect the fuel return hose while supporting the return pipe by hand.*

Refer to page 5-57 for fuel pump removal.

## INSTALLATION



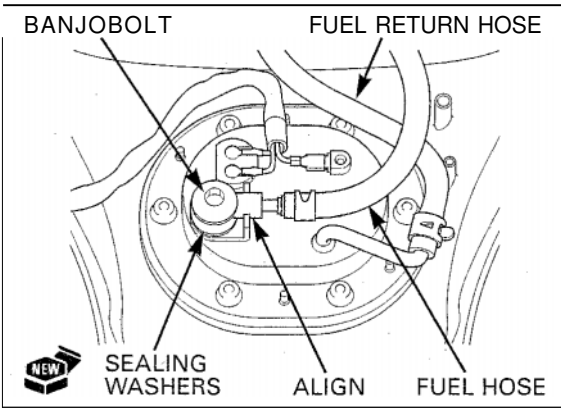
FUEL SYSTEM (Programmed Fuel Injection)

Align the fuel hose eyelet joint with the stopper on the fuel pump

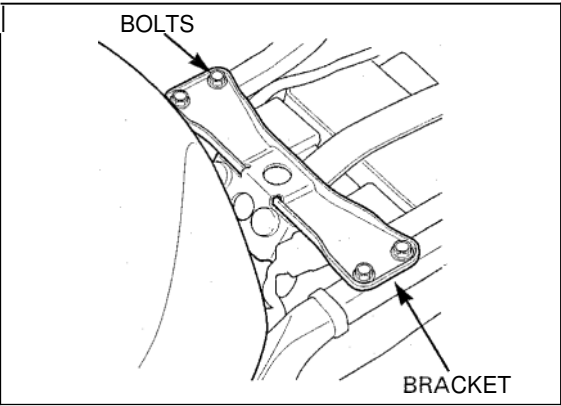
Connect the fuel hose to the fuel pump with new sealing washers. Install and tighten the fuel hose banjo bolt to the specified torque.

TORQUE: 22 N·m (2.2kgf·m, 16 lbf·ft)

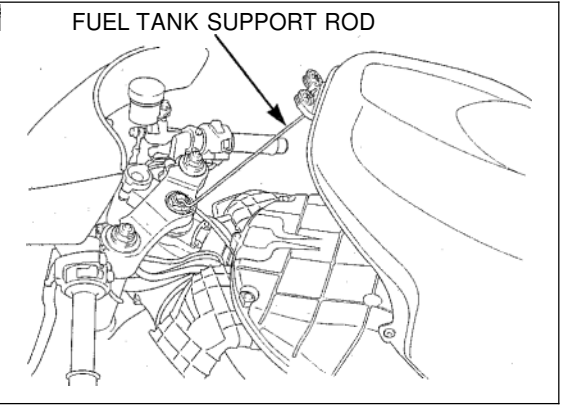
Connect the fuel return hose to the fuel pump.



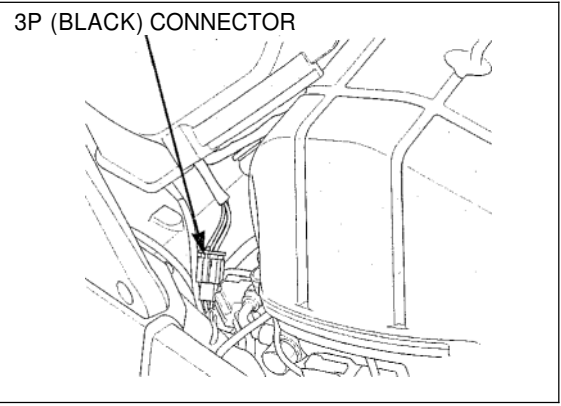
Install the fuel tank onto the frame, temporarily install the fuel tank rear mounting bolt.



Support the front end of the fuel tank (page 3-4).

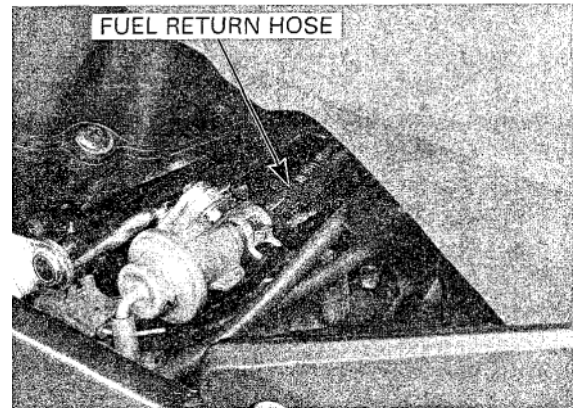


Connect the fuel pump/reserve sensor 3P (Black) connector.



## FUEL SYSTEM (Programmed Fuel Injection)

Connect the fuel return hose to the pressure regulator.



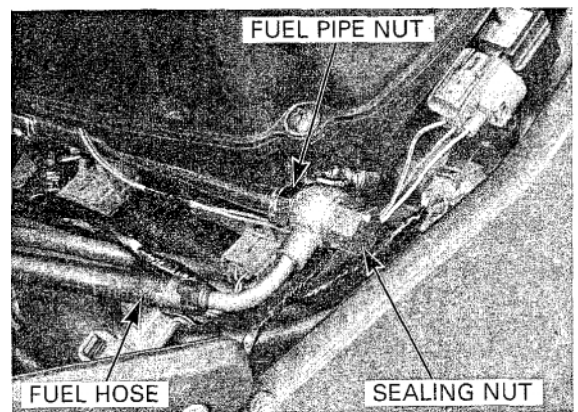
Connect the fuel hose banjo to the throttle body with new sealing washers.

While pushing the fuel hose banjo stopper to the throttle body, install and tighten the sealing nut to the specified torque.

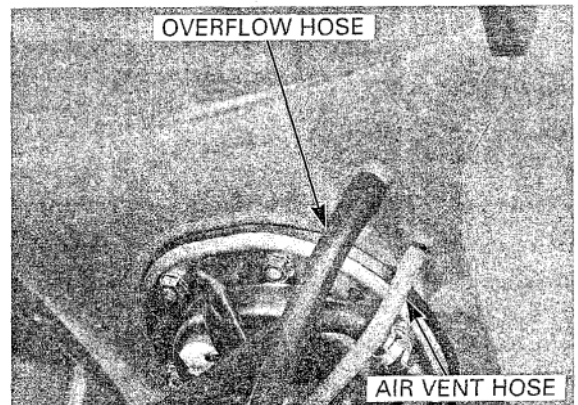
### NOTICE

- Do not apply excessive force to the fuel pipe.
- Always *hold* the fuel pipe nut while tightening the fuel *hose* sealing nut.

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



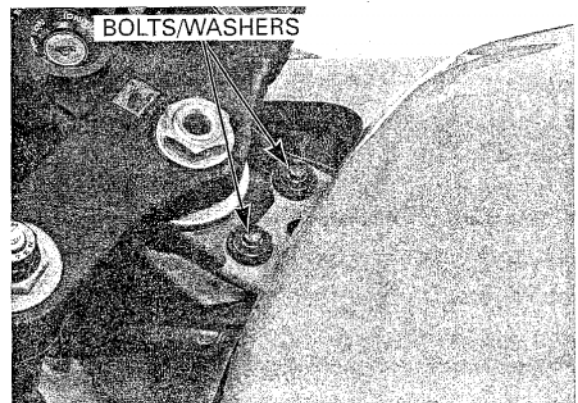
Connect the fuel tank air vent hose and overflow hose to the fuel tank.



*Install the fuel tank support rod into the seat properly (page 3-4)*

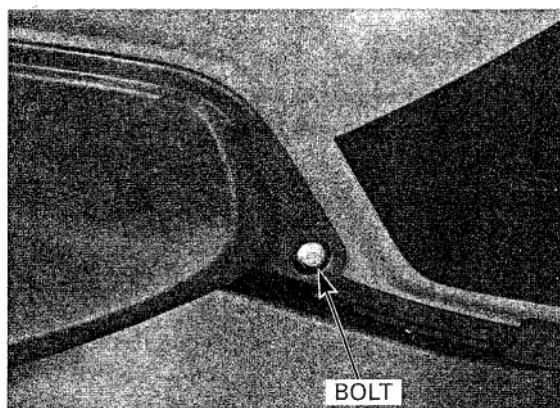
Remove the support rod and close the fuel tank.

**Install** the fuel tank front mounting bolts and washers, then tighten the front and rear fuel tank mounting bolts.



## FUEL SYSTEM (Programmed Fuel Injection)

Install and tighten the duct cover-to-fuel tank bolts.

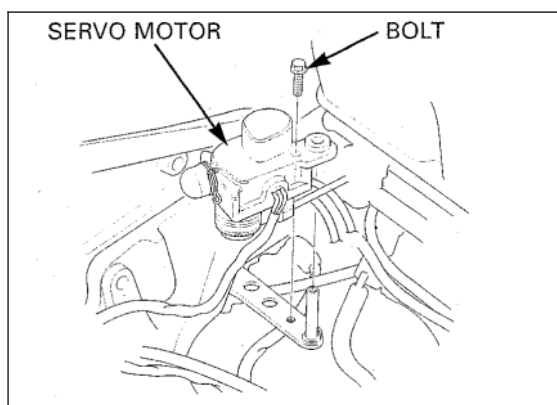


## AIR CLEANER HOUSING

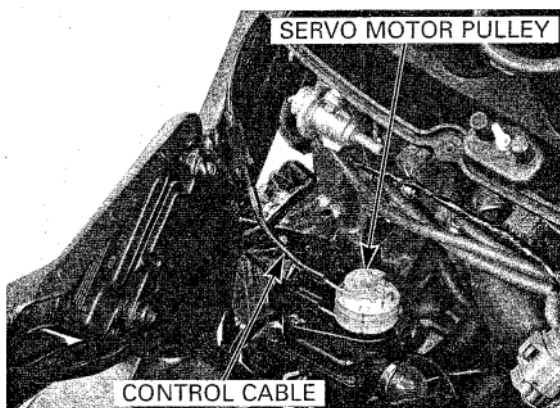
### REMOVAL

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

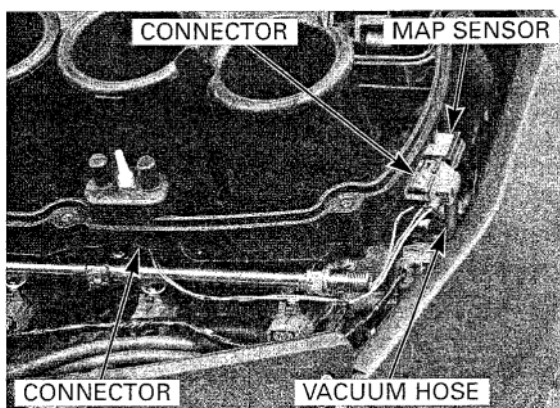
Remove the EGCV and air intake valve servo motor mounting bolt.



Remove the servo motor assembly from the bracket and disconnect the intake valve control cable from the servo motor pulley.

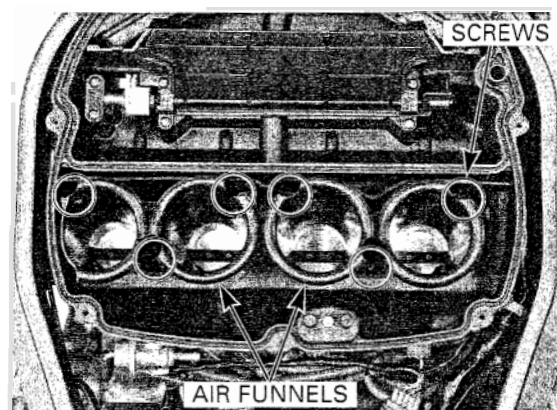


Disconnect the MAP sensor connector and vacuum hose.  
Disconnect the IAT sensor connector.



## FUEL SYSTEM (Programmed Fuel Injection)

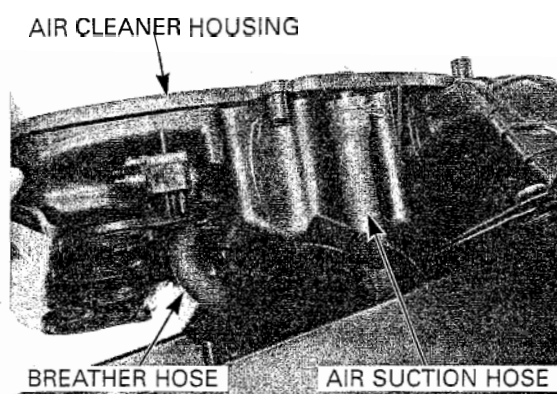
Remove the air funnel/air cleaner housing mounting screws, then remove the air funnels.



Disconnect the crankcase breather hose and PAIR control valve air suction hose from the air cleaner housing.

Remove the air cleaner housing.

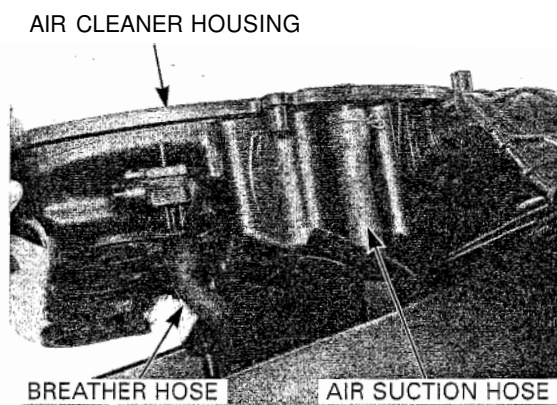
See page 5-104 and 105 for intake air control valve disassembly/assembly.



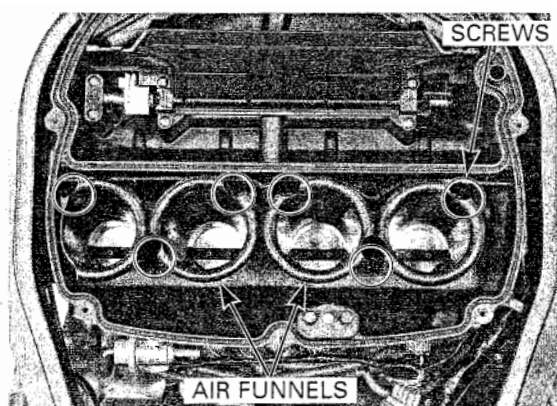
### INSTALLATION

Route the variable intake air control valve wire properly, then install the air cleaner housing onto the throttle body.

Connect the crankcase breather hose and PAIR control valve air suction hose to the air cleaner housing.



Install the air funnels in their proper locations. Install and tighten the air funnel/air cleaner housing mounting screws.

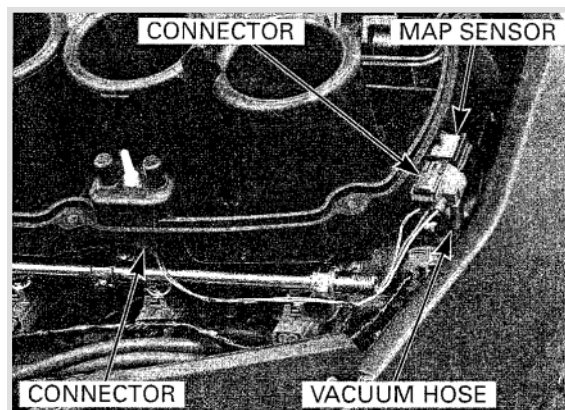




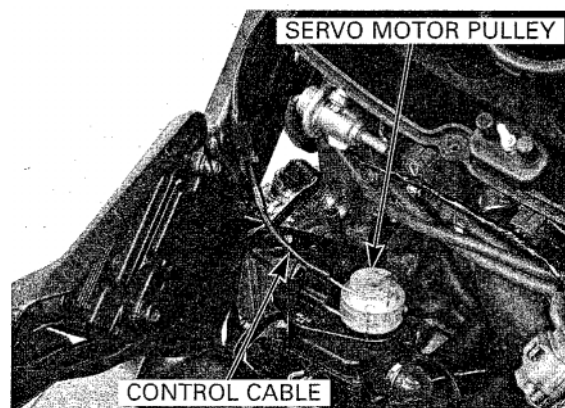
## FUEL SYSTEM (Programmed Fuel Injection)

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Connect the MAP sensor connector and vacuum hose.  
Connect the IAT sensor connector.

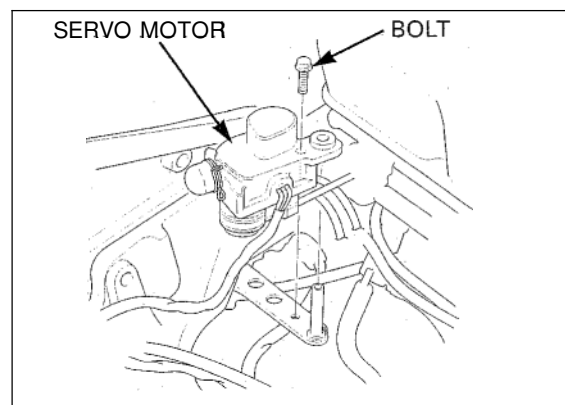


Connect the variable air intake control cable to the servo motor pulley.



Install the servo motor onto the bracket, tighten the bolt securely.

Install the air cleaner element (page 3-6).





### THROTTLE BODY

#### REMOVAL

*Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.*

#### NOTICE

- Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.

Drain the coolant from the cooling system (page 6-4).

Remove the following:

- Fuel tank (page 5-59)
- Air cleaner housing (page 5-64)

Remove the throttle cable guide bracket mounting bolts.

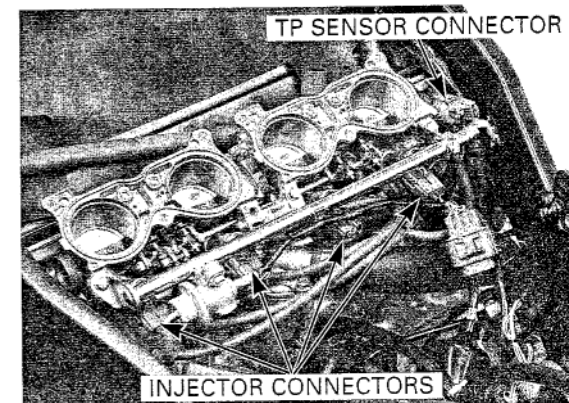
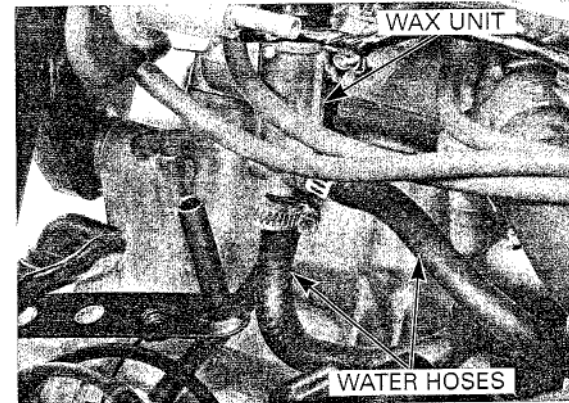
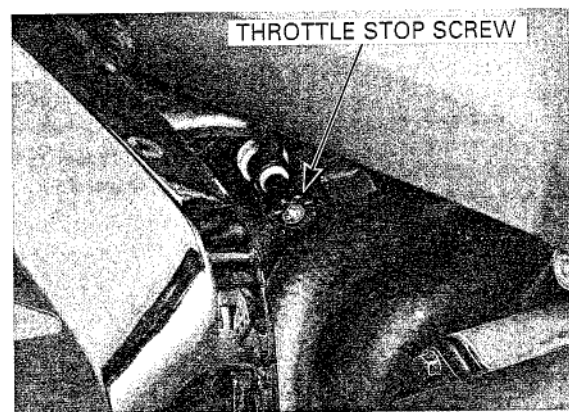
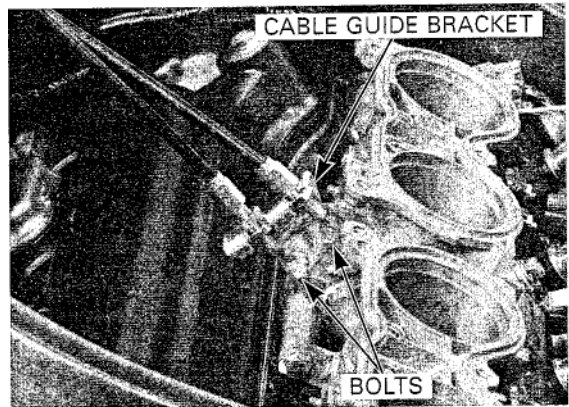
Disconnect the throttle cable ends from the throttle drum.

Remove the throttle stop screw knob from the bracket.

Loosen the hose band screws and disconnect the fast idle wax unit water hoses from the wax unit.

Disconnect the TP sensor connector and fuel injector connectors.

If you will not be disassembling the throttle body, disconnect the throttle body sub-harness multi-connector.



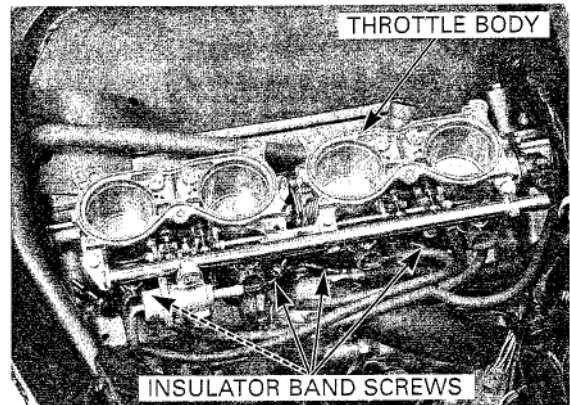
## FUEL SYSTEM (Programmed Fuel Injection)

Loosen the engine side insulator band screws.

Remove the throttle body from the cylinder head.

### NOTICE

*Do not hold the fuel pipe on the throttle body while removing the throttle body.*

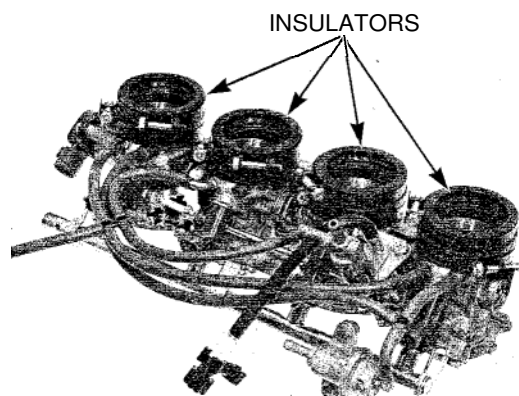


*Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.*

Remove the insulators from the throttle body.

### NOTICE

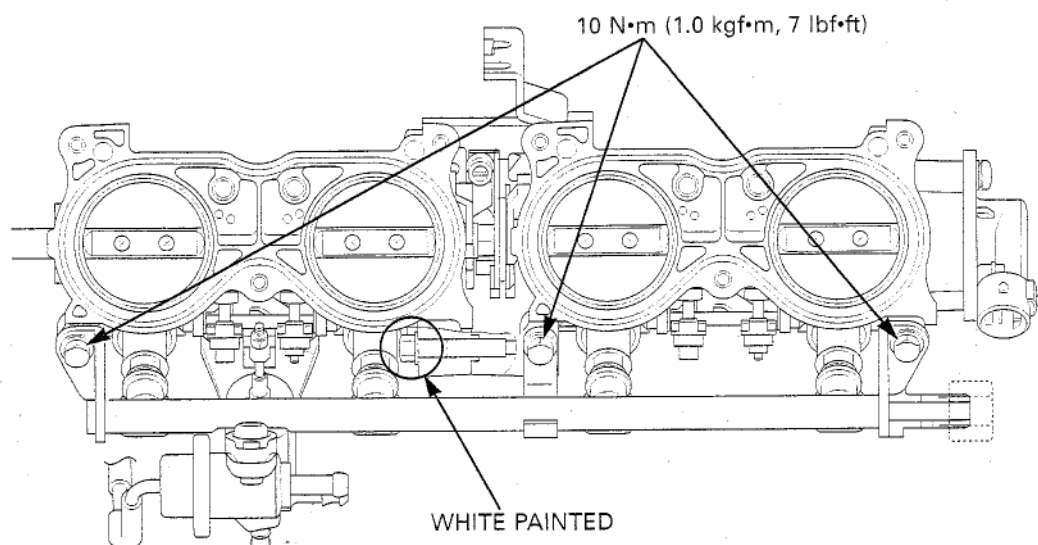
*Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.*



### NOTICE

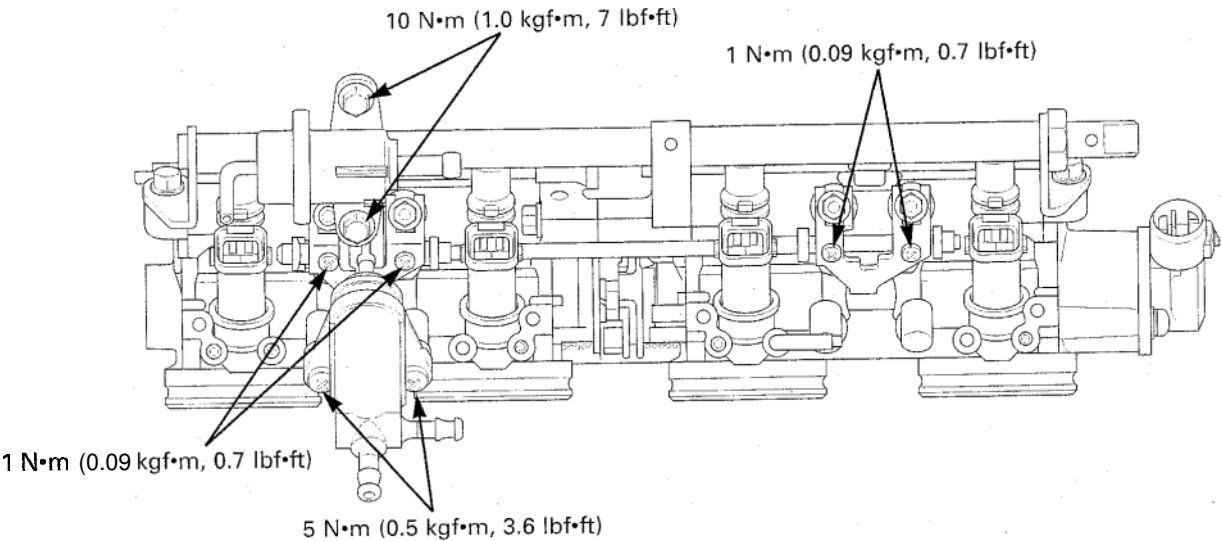
- *Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.*
- *The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.*
- *Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.*

TOP VIEW:

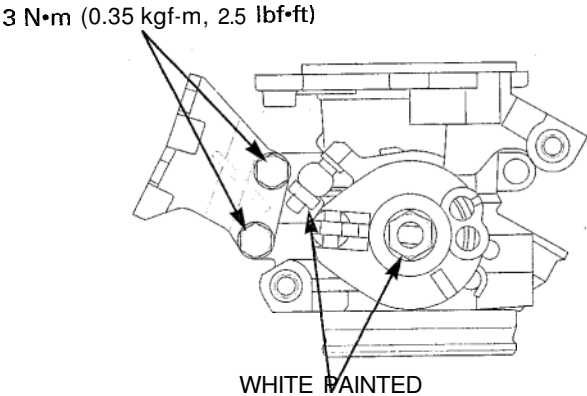


**FUEL SYSTEM (Programmed Fuel Injection)**

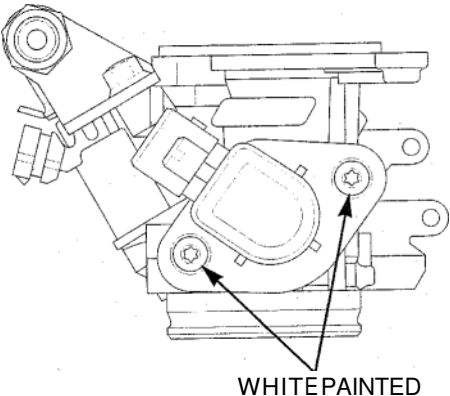
**REAR VIEW:**



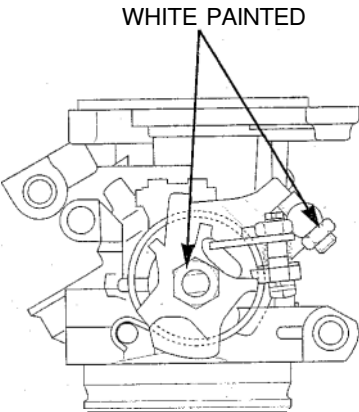
**THROTTLE DRUM VIEW:**



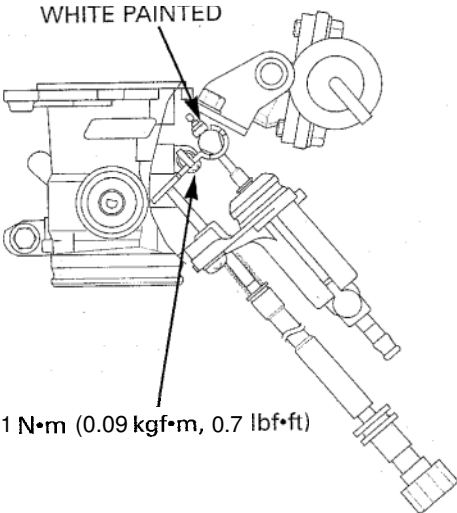
**RIGHT SIDE VIEW:**



**THROTTLE LINK VIEW:**



**STARTER VALVE LINK VIEW:**

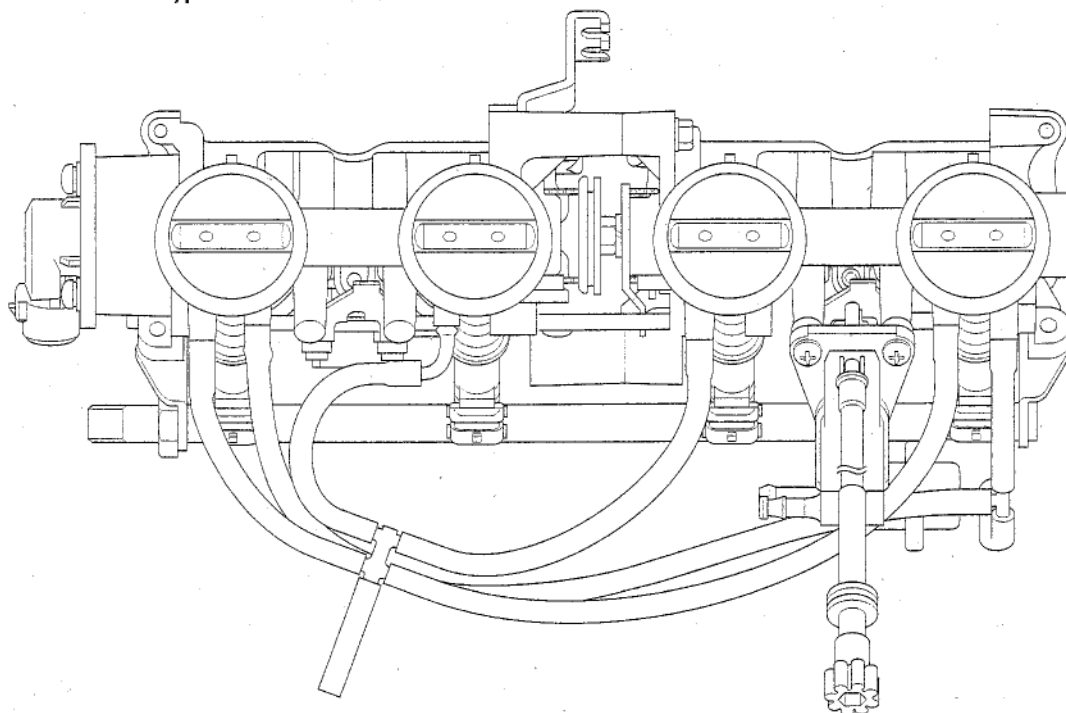


## FUEL SYSTEM (Programmed Fuel Injection)

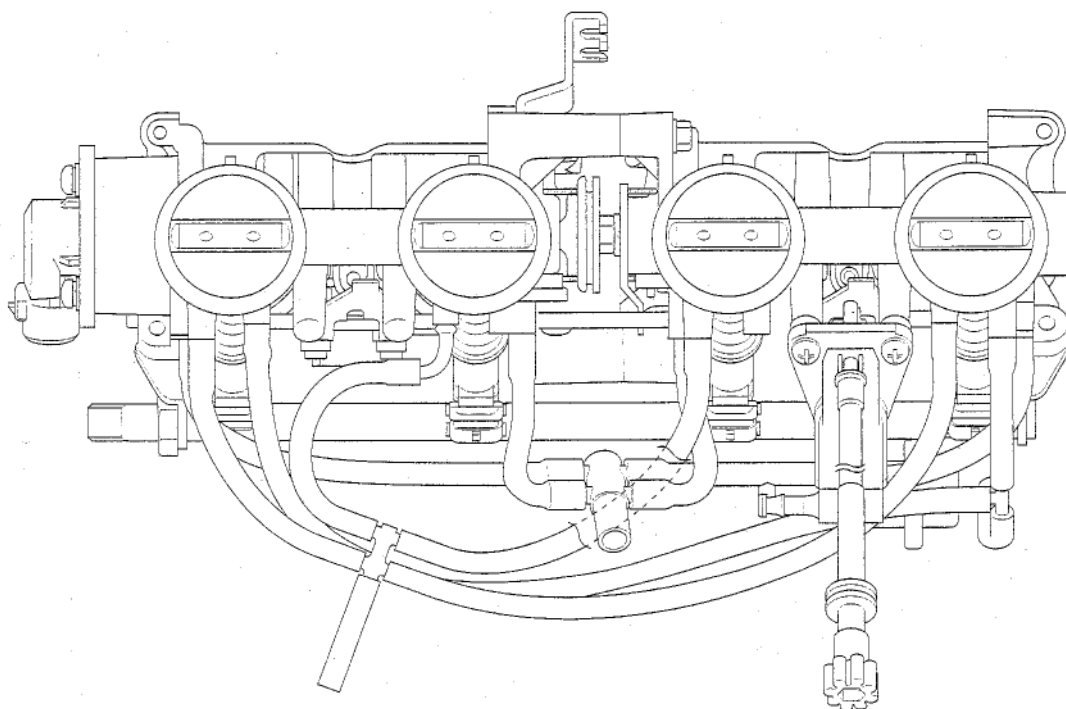
---

### THROTTLE BODY VACUUM HOSE ROUTING

Non-California type:

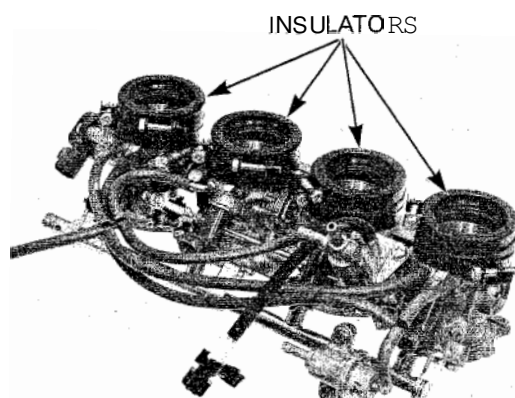


California type:



### INSTALLATION

Check the insulator band angle.

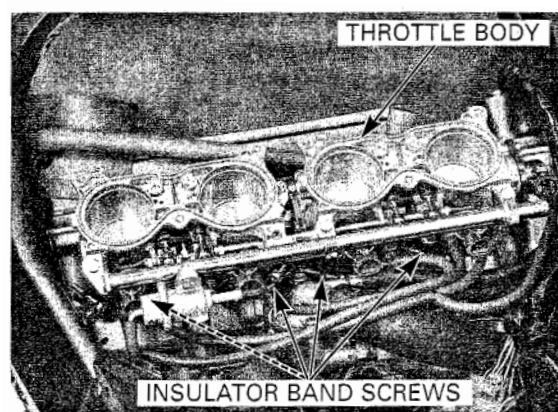


Apply oil to the insulator inside surfaces for ease of throttle body installation.

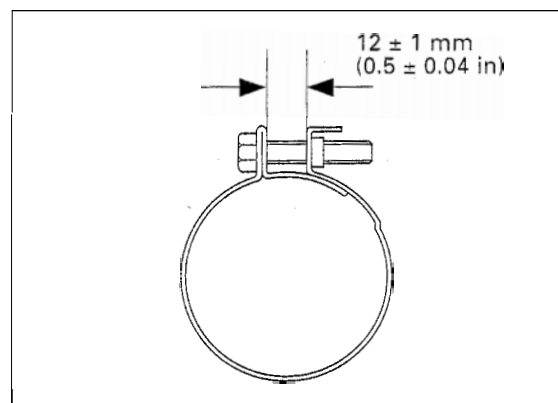
Install the throttle body onto the cylinder head.

#### NOTICE

*Do not hold the fuel pipe on the throttle body while installing the throttle body.*



Tighten the insulator band so that the insulator band distance is  $12 \pm 1$  mm ( $0.5 \pm 0.04$  in).

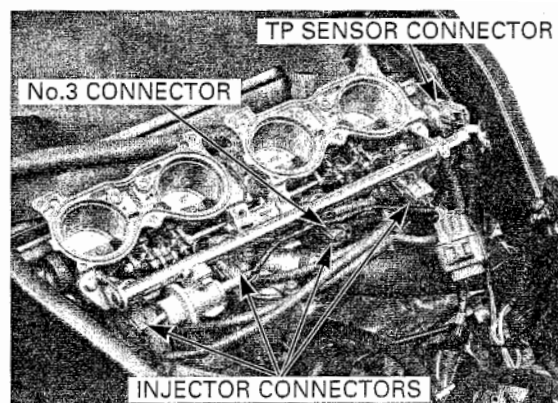
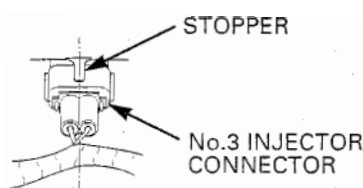


Do not confuse the TP sensor connector and MAP sensor connector; the throttle sensor connector wire is identified by the label "TPS"

Route the injector sub-harness referring the wiring diagram (page 1-27).

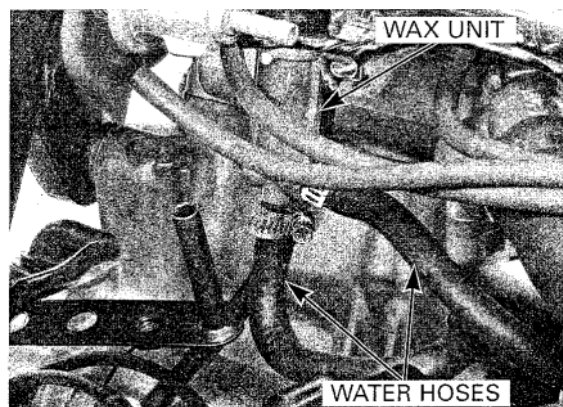
Connect the fuel injector connectors and TP sensor connector.

Connect the No.3 injector connector parallel to the connector stopper.



## FUEL SYSTEM (Programmed Fuel Injection)

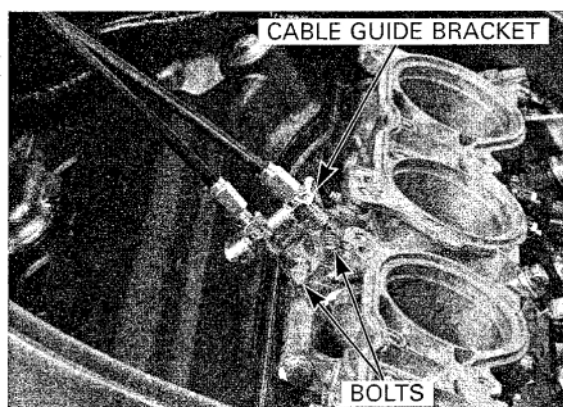
Connect the fast idle wax unit water hoses to the unit, then tighten the hose bands securely.



Connect the throttle cable ends to the throttle drum. Install the throttle cable guide bracket to the throttle body, then tighten the bolts to the specified torque.

**TORQUE:** 3 N·m (0.35kgf·m, 2.5lbf·ft)

Install the removed parts in the reverse order of removal.

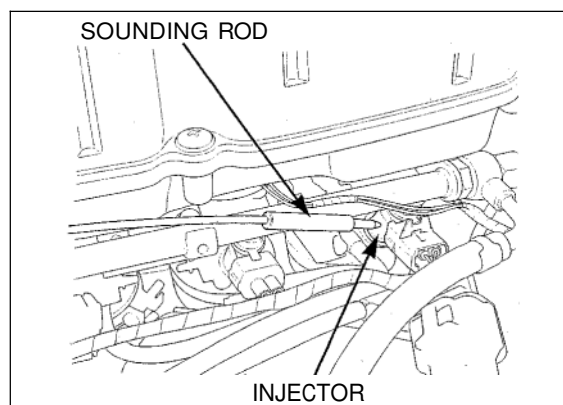


## INJECTORS

### INSPECTION

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

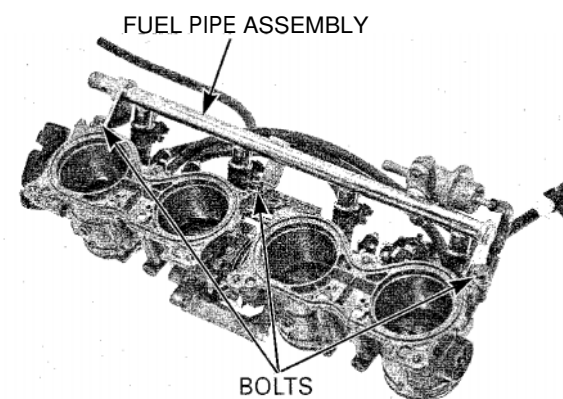
If the injector does not operate, replace it.



### REMOVAL

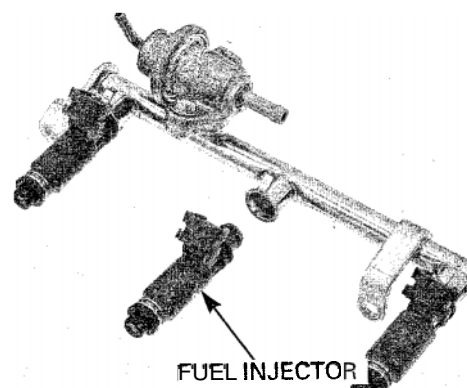
Remove the throttle body (page 5-67).

Remove the bolts and fuel pipe assembly.

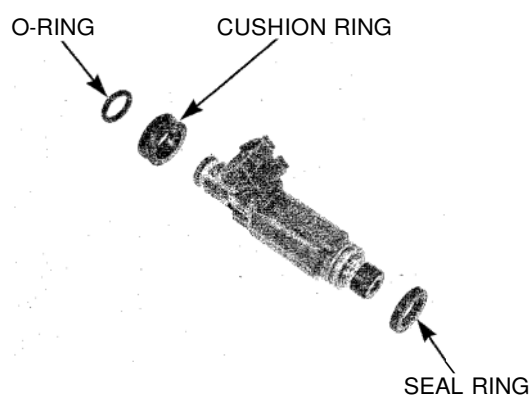


## FUEL SYSTEM (Programmed Fuel Injection)

Remove the injectors from the fuel pipe.



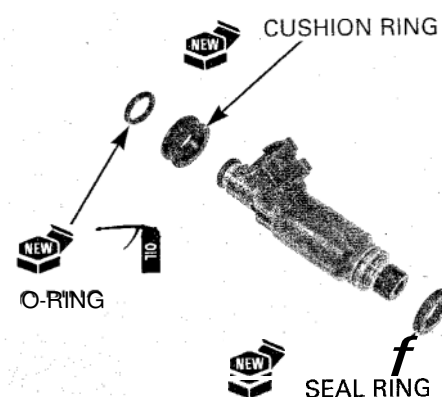
Remove the seal ring, O-ring and cushion ring.



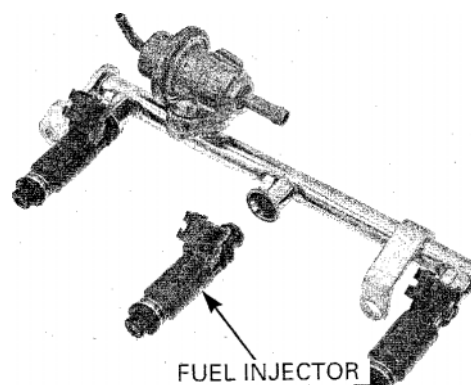
### INSTALLATION

*Replace the seal ring, cushion ring and O-ring with new ones as a set*

Apply oil to the new O-ring.  
Install the new seal ring, cushion ring and O-ring, being careful not to damage the O-ring.

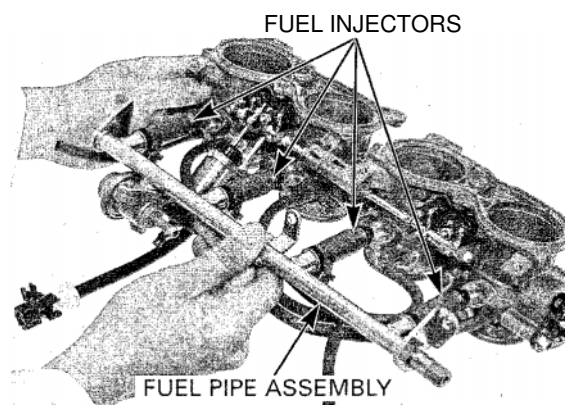


Install the fuel injectors into the fuel pipe, being careful not to damage the O-ring and cushion ring.



## FUEL SYSTEM (Programmed Fuel Injection)

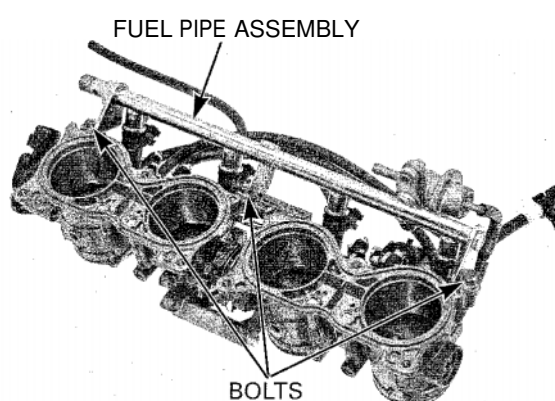
Install the fuel pipe assembly onto the throttle body, being careful not to damage the seal rings.



Install and tighten the fuel pipe mounting bolts to the specified torque.

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

Install the throttle body (page 5-71).



## PRESSURE REGULATOR

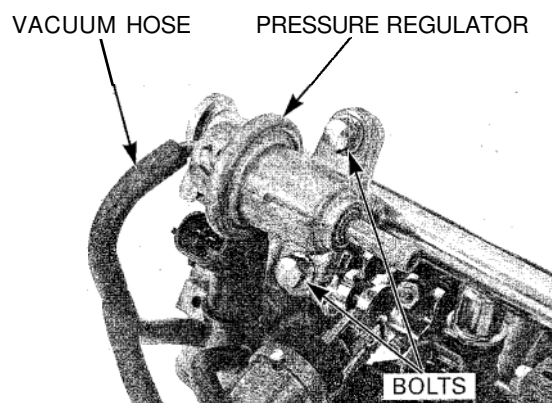
### REMOVAL/INSTALLATION

#### NOTICE

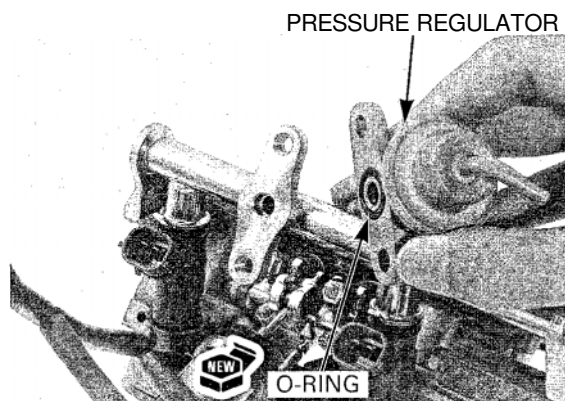
*Do not apply excessive force to the fuel pipe.*

Disconnect the vacuum hose from the pressure regulator.

Hold the fuel pipe securely, remove the pressure regulator mounting bolts, then remove the pressure regulator.



Install a new O-ring into the pressure regulator body. Install the pressure regulator onto the fuel pipe.



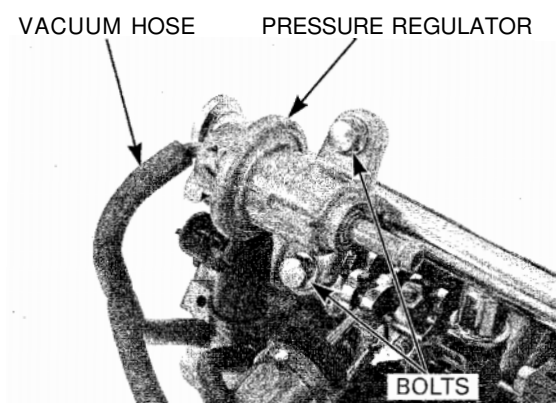


## FUEL SYSTEM (Programmed Fuel Injection)

Hold the fuel pipe securely, tighten the pressure regulator mounting bolts to the specified torque.

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

Connect the vacuum hose to the pressure regulator

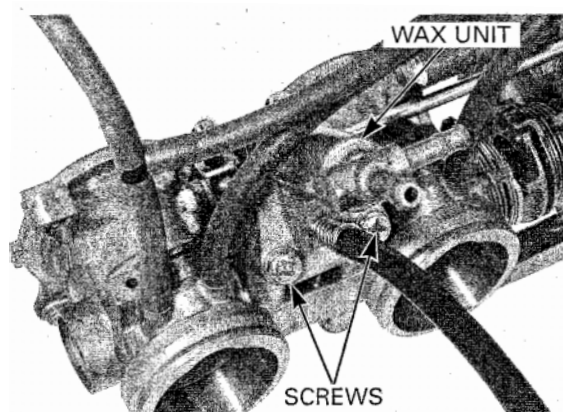


## FAST IDLE WAX UNIT

*Do not loosen or remove the wax unit shaft lock nut and adjusting nut*

### REMOVAL

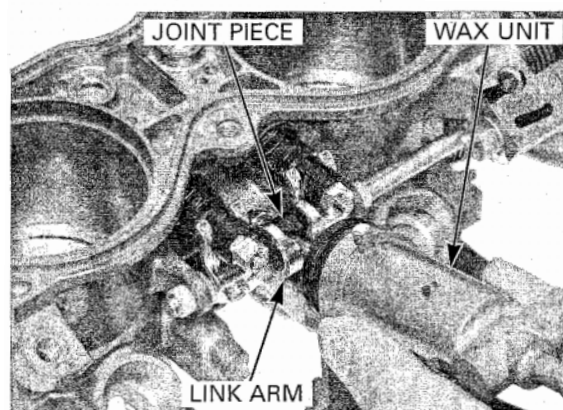
Remove the wax unit mounting screws.



Release the wax unit shaft joint piece from the wax unit link arm, then remove the wax unit assembly.

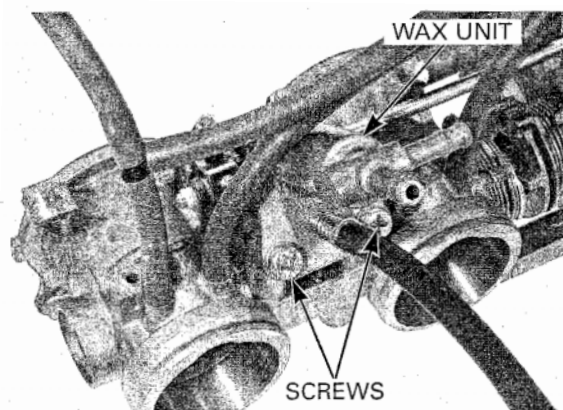
### INSTALLATION

Install the wax unit shaft joint piece to the wax unit link arm.



Install and tighten the wax unit mounting screws to the specified torque.

**TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)**

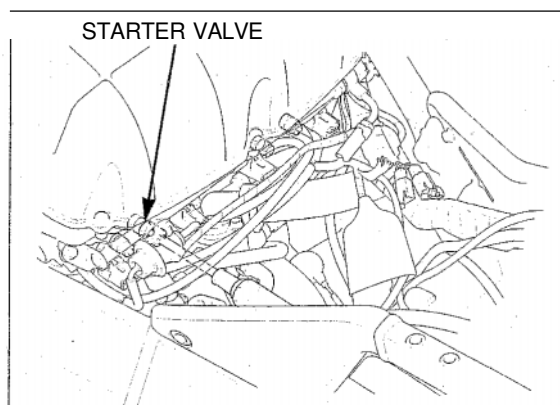


### STARTER VALVE

#### DISASSEMBLY

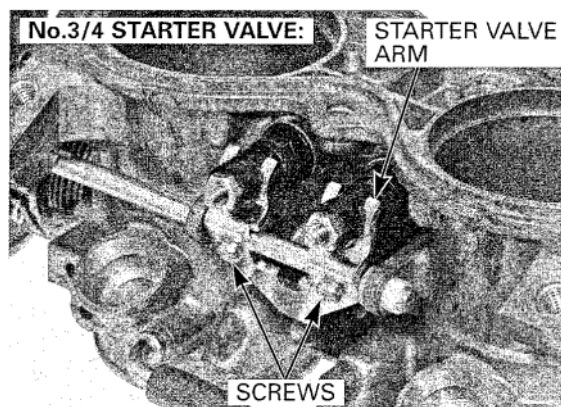
Turn each starter valve adjusting screw in, counting the number of turns until it seats lightly.  
Record the number of turns.

Remove the fuel pipe and injectors (page 5-72).



#### No.3/4 starter valve:

Remove the starter valve arm screws and starter valve arm.

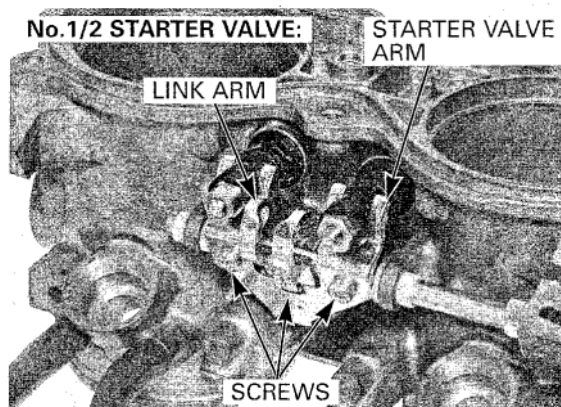


#### No.1/2 starter valve:

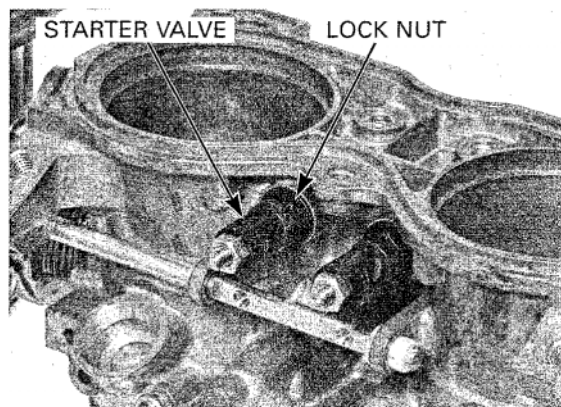
Remove the fast idle wax unit (page 5-75).

Remove the starter valve arm screws and starter valve arms.

Remove the screw and fast idle wax unit link arm.



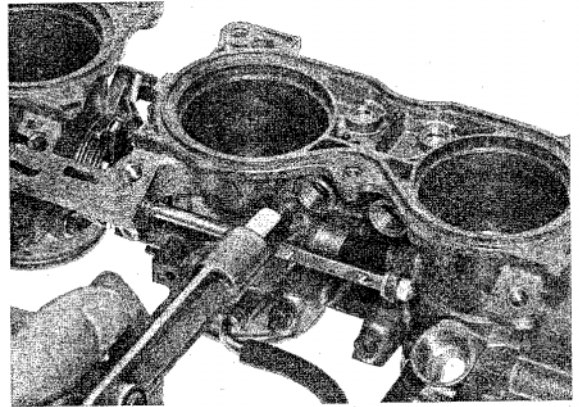
Loosen the lock nut and remove the starter valve assembly.



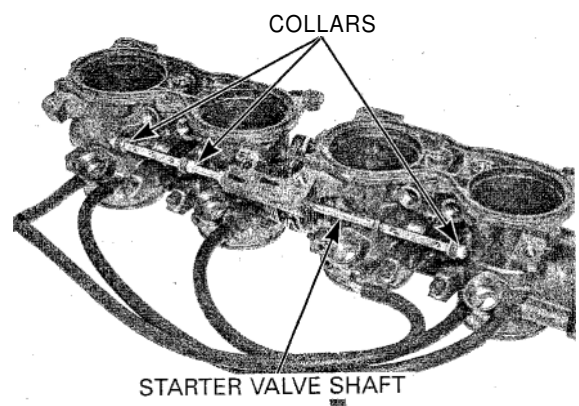
## FUEL SYSTEM (Programmed Fuel Injection)

*Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.*

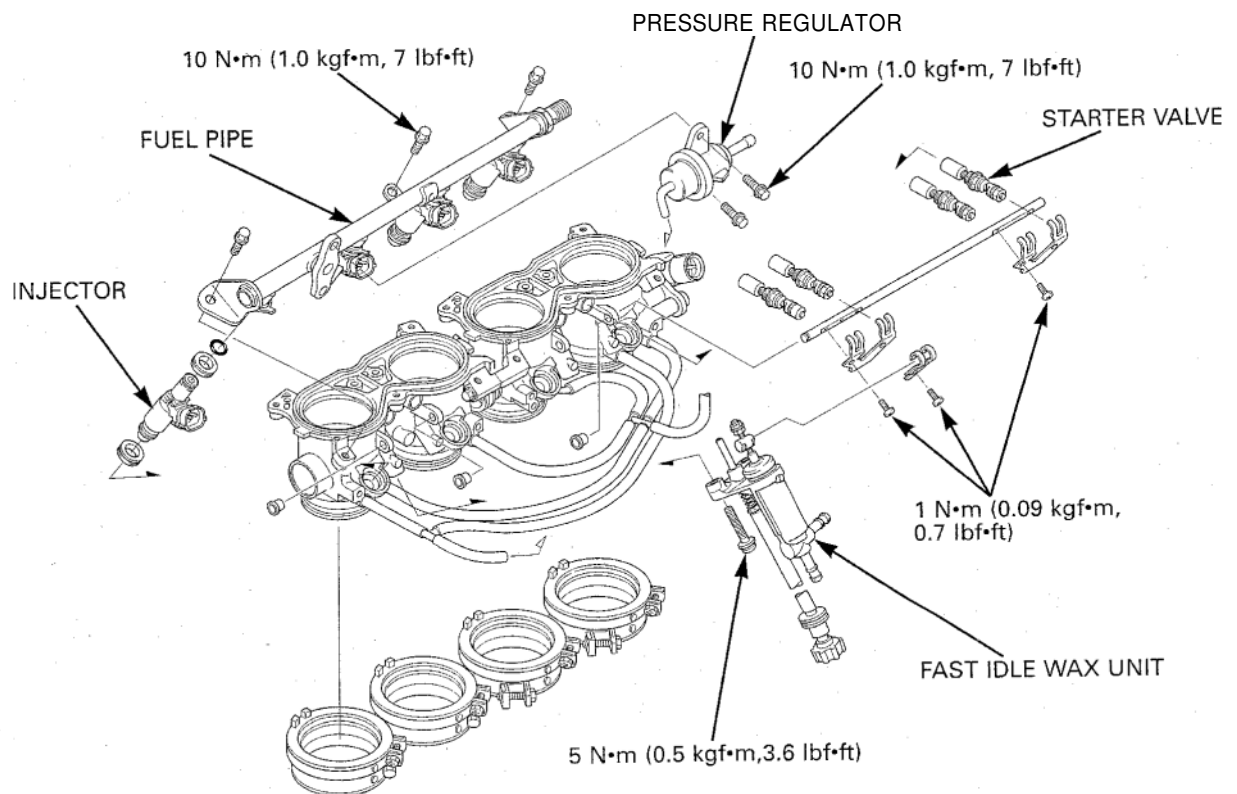
Clean the starter valve bypass using compressed air.



Remove the starter valve shaft and three collars.



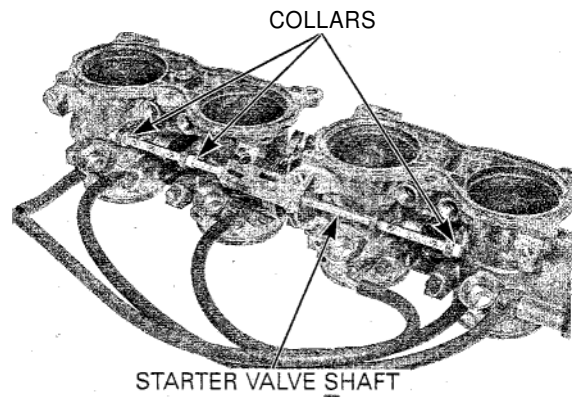
### ASSEMBLY



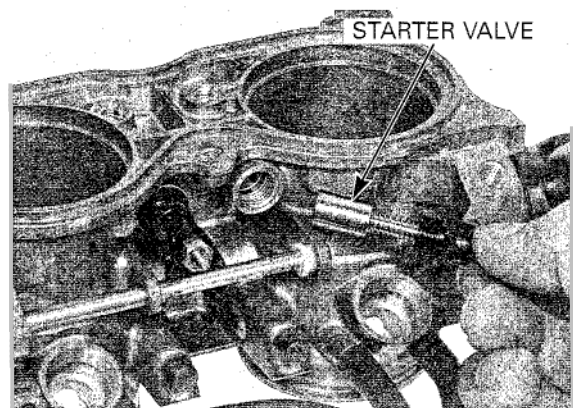
## FUEL SYSTEM (Programmed Fuel Injection)

---

Install the three collars and starter valve shaft.

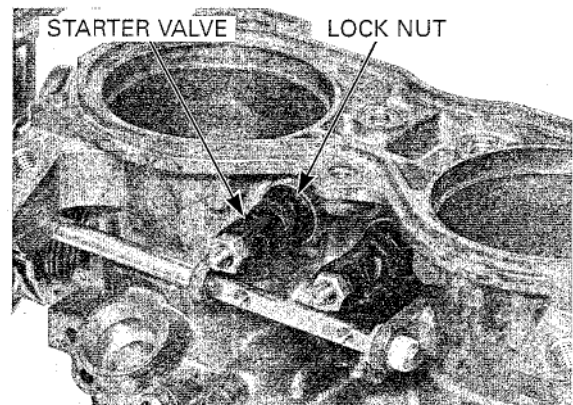


Install the starter valve assembly into the valve hole



Tighten the starter valve lock nut to the specified torque.

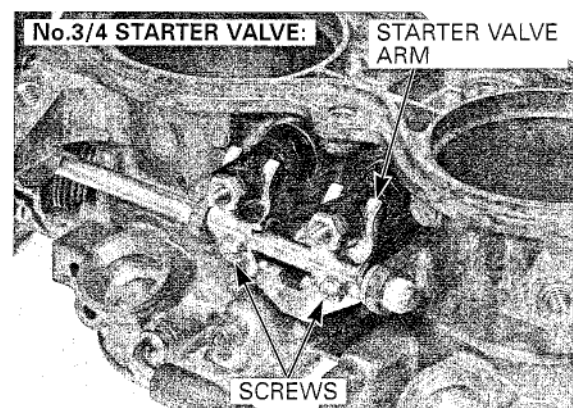
**TORQUE : 2 N·m (0.18 kgf·m, 1.3 lbf·ft)**



### No.3/4 starter valve:

Compress the thrust spring and install the No.3/4 starter valve arm onto the starter valves. Install and tighten the starter valve arm mounting screws to the specified torque.

**TORQUE : 1 N·m (0.09kgf·m, 0.7 lbf·ft)**



## FUEL SYSTEM (Programmed Fuel Injection)

### No.1/2 starter valve:

Install the No.1/2 starter valve arm to the starter valves.

Install and tighten the starter valve arm mounting screws to the specified torque.

**TORQUE: 1 N·m (0.09 kgf·m, 0.7 lbf·ft)**

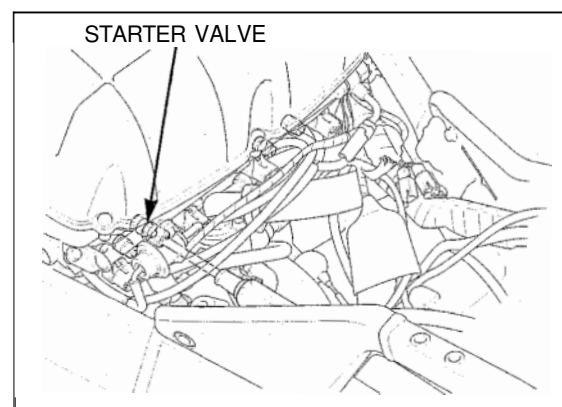
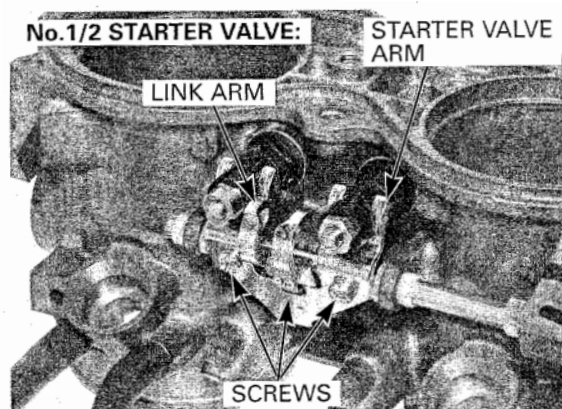
Install the fast idle wax unit link arm and tighten the screw to the specified torque.

**TORQUE: 1 N·m (0.09kgf·m, 0.7 lbf·ft)**

Install the fast idle wax unit (page 5-75).

Turn the starter valve screw until it seats lightly, then back it out as noted during removal.

Install the throttle body (page 5-71).



## STARTER VALVE SYNCHRONIZATION

- Synchronize the starter valve with the engine at the normal operating temperature and with the transmission in neutral.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

Open and support the front end of the fuel tank (page 3-4).

Disconnect the each cylinder vacuum hose from the 5-way joint.

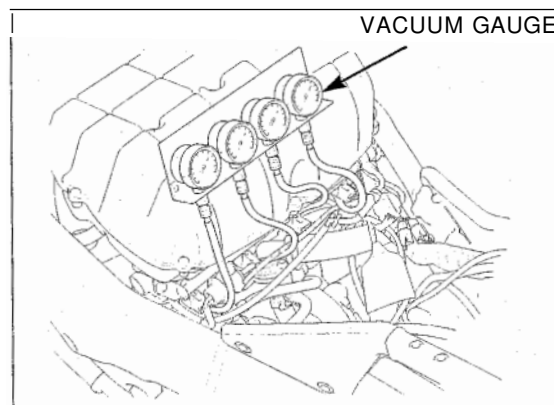
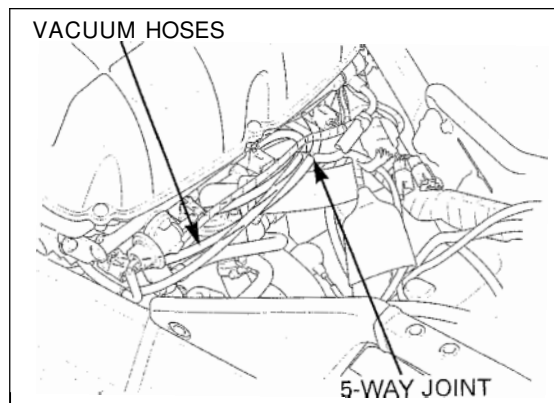
Connect the vacuum gauge adaptors to the vacuum joints, then connect the hoses to the vacuum gauge.

### TOOL:

Vacuum gauge set

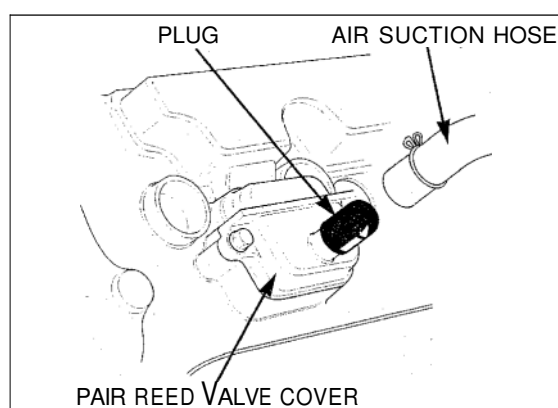
07LMJ-001000A

Connect the tachometer.



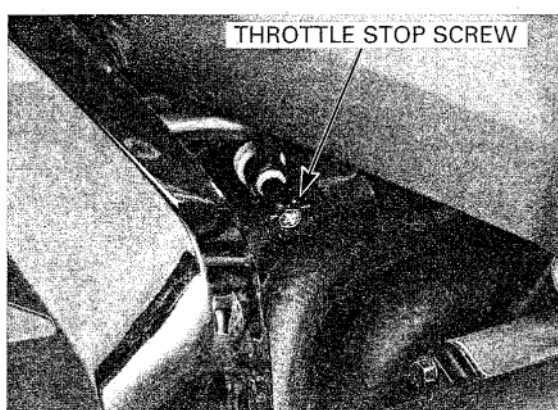
## FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the PAIR air suction hoses from the reed valve covers and plug the cover.



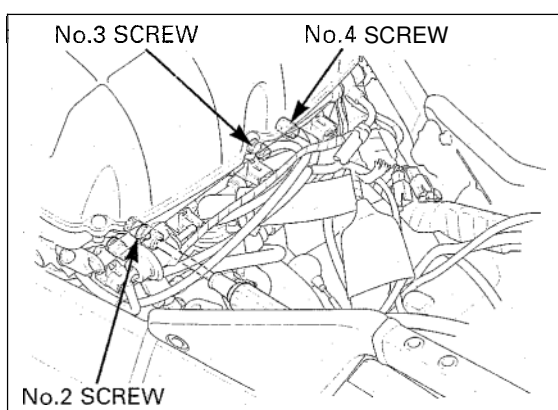
Start the engine and adjust the idle speed.

**IDLE SPEED:  $1,200 \pm 100$  rpm**

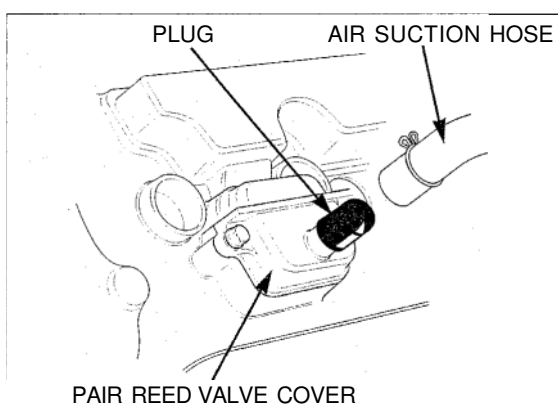


*The No. 7 starter valve cannot be adjusted, it is the base starter valve*

Adjust each intake vacuum pressure with the No.1 cylinder.



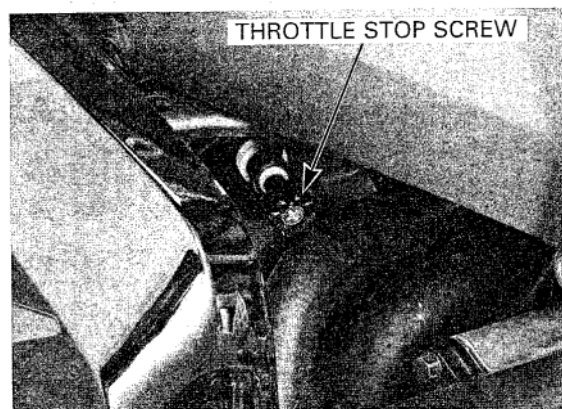
Remove the plugs and connect the PAIR air suction hoses to the reed valve covers.



## FUEL SYSTEM (Programmed Fuel Injection)

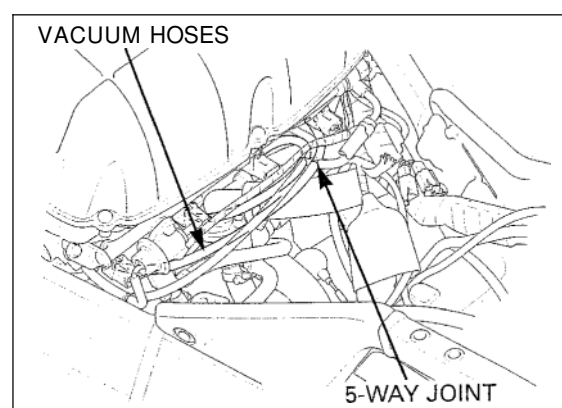
Adjust the idle speed if the idle speed differs from the specified speed.

**IDLE SPEED:  $1,200 \pm 100$  rpm**



Remove the vacuum gauge from the vacuum hoses. Connect the each cylinder vacuum hose to the 5-way joint.

Reset the PGM-FI self-diagnosis system (page 5-7).



## MAP SENSOR

### OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 5-8).

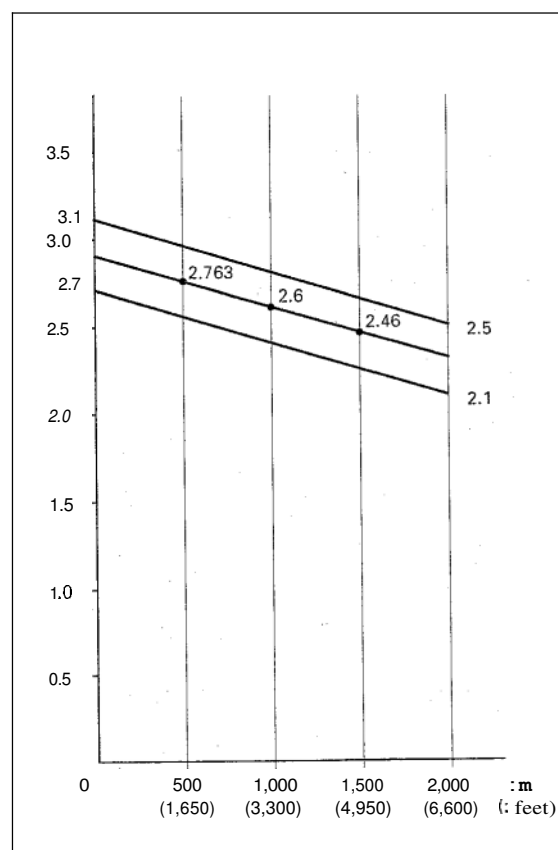
Measure the voltage at the test harness terminals (page 5-9).

**CONNECTION: B4 (+) - A26 (-)**

**STANDARD: 2.7 - 3.1 V**

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 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.





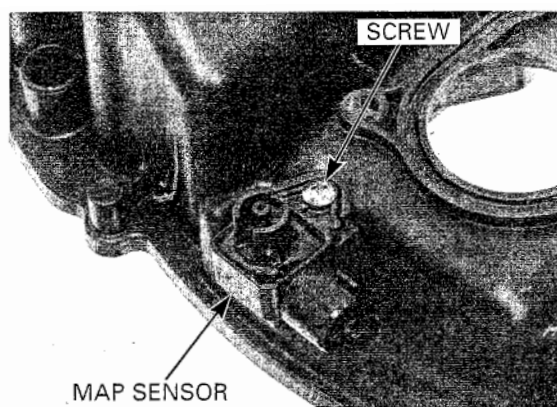
## FUEL SYSTEM (Programmed Fuel Injection)

### MAP SENSOR REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-64).

Remove the screw and MAP sensor from the air cleaner housing.

Installation is in the reverse order of removal.



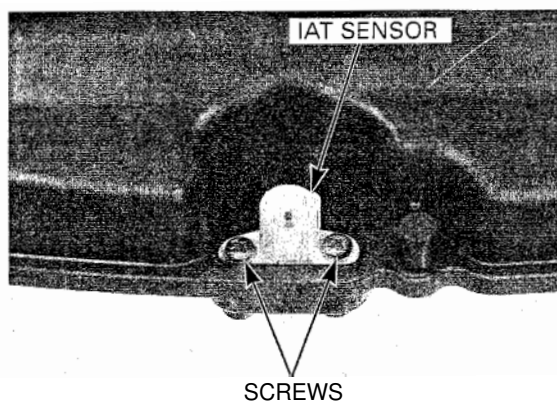
### IAT SENSOR

#### REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-64).

Remove the screws and IAT sensor from the air cleaner housing cover.

Installation is in the reverse order of removal.



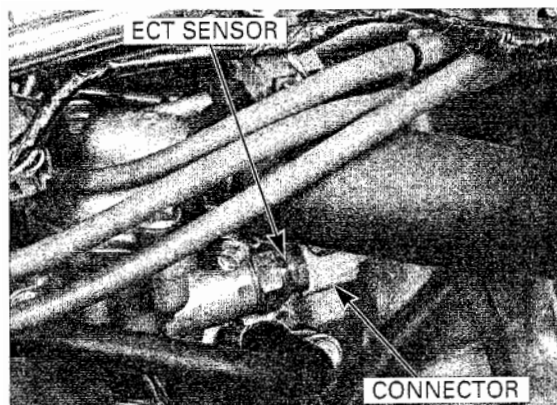
### ECT SENSOR

*Replace the ECT sensor while the engine is cold*

#### REMOVAL/INSTALLATION

Drain the coolant from the system (page 6-4).  
Open and support the front end of the fuel tank (page 3-4).

Disconnect the ECT sensor connector from the sensor.  
Remove the ECT sensor and sealing washer.



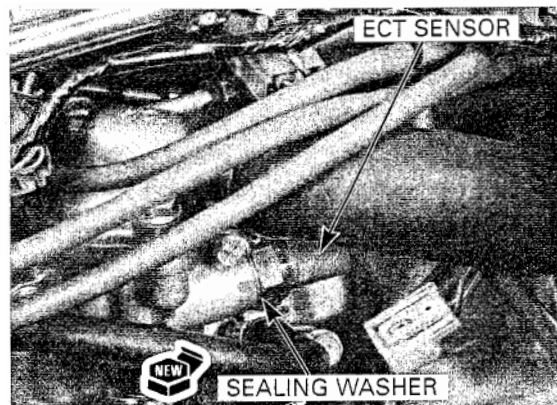
*Always replace a sealing washer with a new one*

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

**TORQUE:** 23 N·m (2.3kgf·m, 17 lbf·ft)

Connect the ECT sensor connector.

Fill the cooling system with recommended coolant (page 6-5).



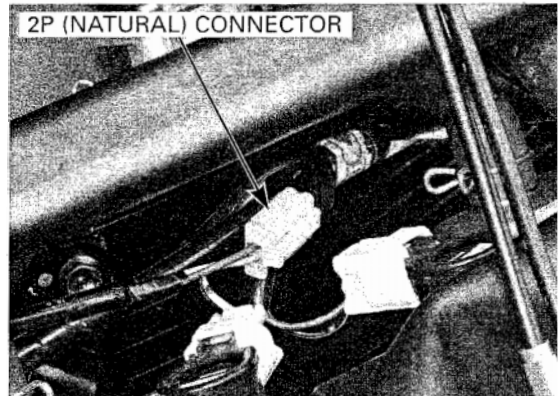


## **CAM PULSE GENERATOR**

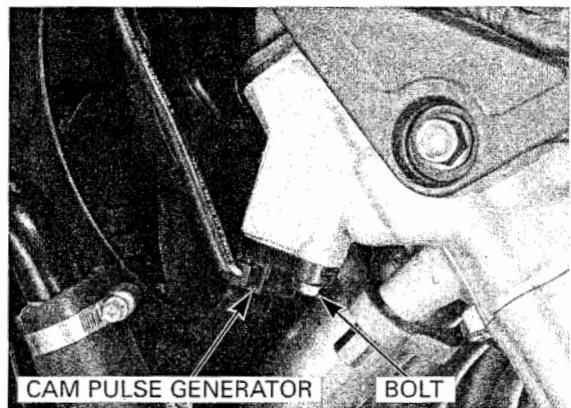
### **REMOVAL/INSTALLATION**

Remove the air cleaner housing (page 5-64).

Disconnect the cam pulse generator 2P (Natural) connector.

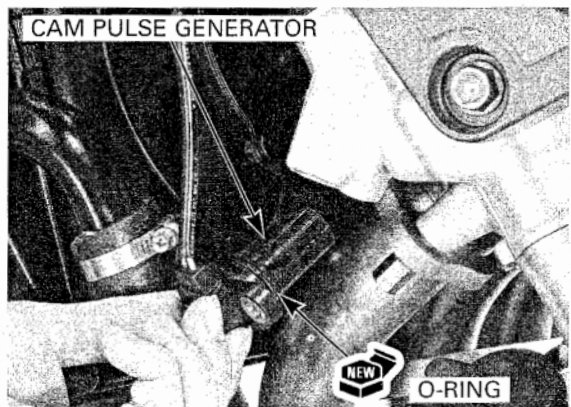


Remove the bolt and cam pulse generator from the cylinder head.



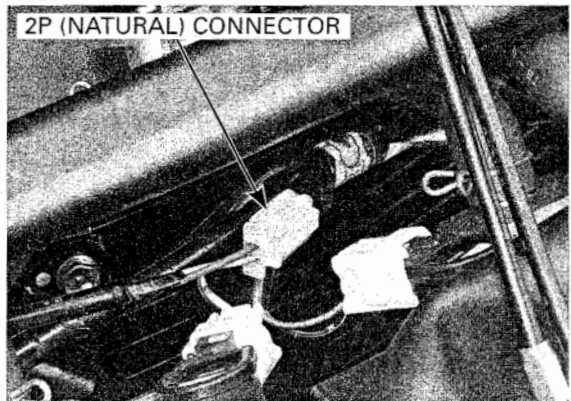
Install the new O-ring onto the cam pulse generator.  
Install the cam pulse generator into the cylinder head.

Install and tighten the mounting bolt securely.



Route the cam pulse generator wire properly, connect the 2P (Natural) connector.

Install the removed parts in the reverse order of removal.



### TP SENSOR

#### INSPECTION

Remove the ECM cover (page 5-87).

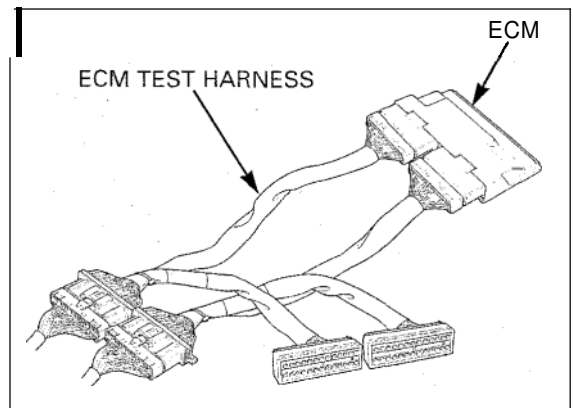
Disconnect the ECM 26P (Black) and 26P (Light gray) connectors.

Check the connector for loose or corroded terminals.  
Connect the ECM test harness between the ECM and main wire harness.

#### TOOL:

ECM test harness, 26P

070MZ-0010100  
(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.

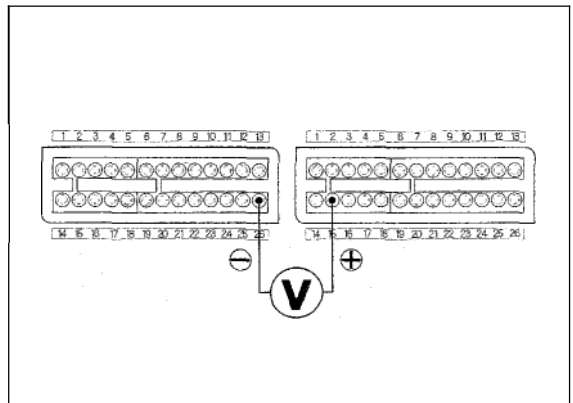
#### CONNECTION:

B15 (+) - A26 (-)

Standard: 4.5 - 5.5V

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 THROTTLE FULLY OPEN

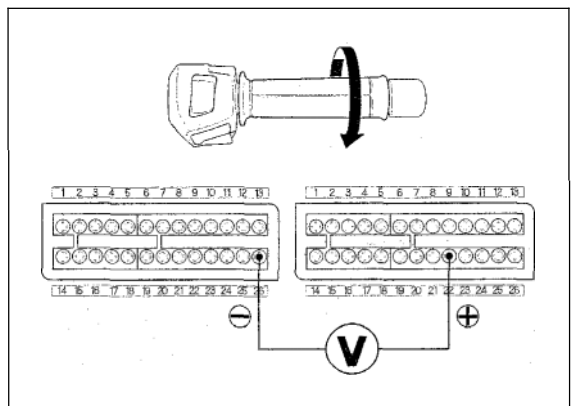
Turn the ignition switch to "ON" and measure and record the output voltage at the test harness terminals.

#### CONNECTION:

B22 (+) - A26 (-)

#### MEASURING CONDITION:

At throttle fully open



#### 3. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

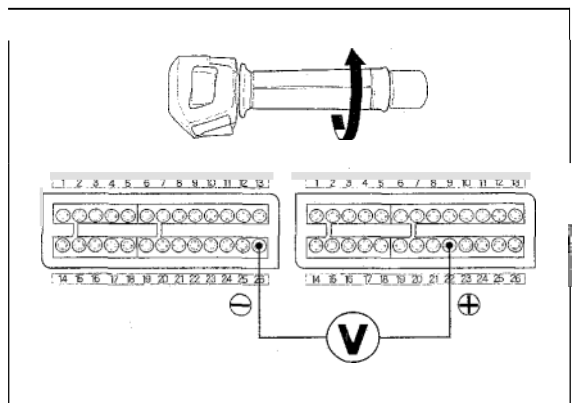
Turn the ignition switch to "ON" and measure and record the output voltage with the throttle fully closed.

#### CONNECTION:

B22 (+) - A26 (-)

#### 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 open:

**Measured input voltage 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 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.

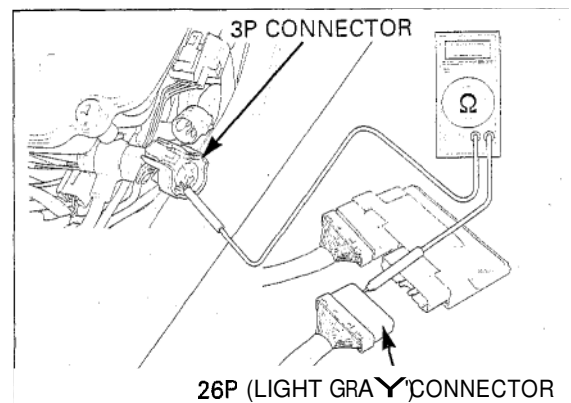
### CONTINUITY INSPECTION

Open and support the front end of the fuel tank (page 3-4).

Disconnect the ECM 26P (Light gray) connector and the TP sensor 3P connector.

Check for continuity between the ECM and TP sensor.

If there is no continuity, check the open or short circuit in wire harness.



## BANK ANGLE SENSOR

### INSPECTION

Support the motorcycle level surface.

Open and support the front end of the fuel tank (page 3-4).

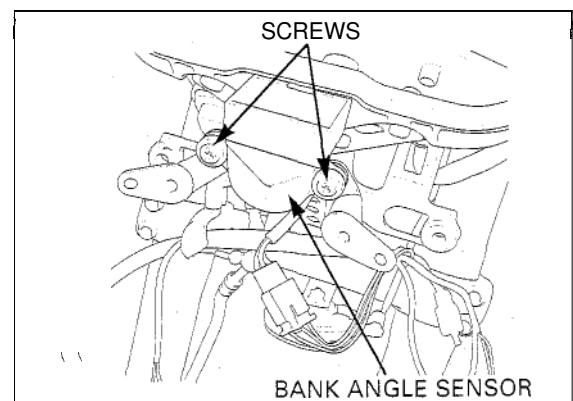
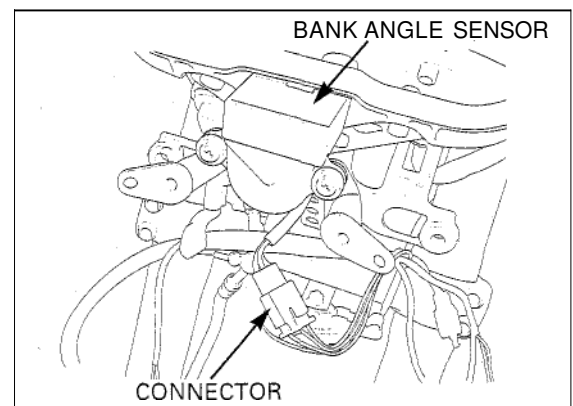
*Do not disconnect the bank angle sensor connector during inspection*

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 and bank angle sensor.



FUEL SYSTEM (Programmed Fuel Injection)

Connect the bank angle sensor 3P (Green) connector and place the bank angle sensor horizontal as shown, and ignition switch to "ON".

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

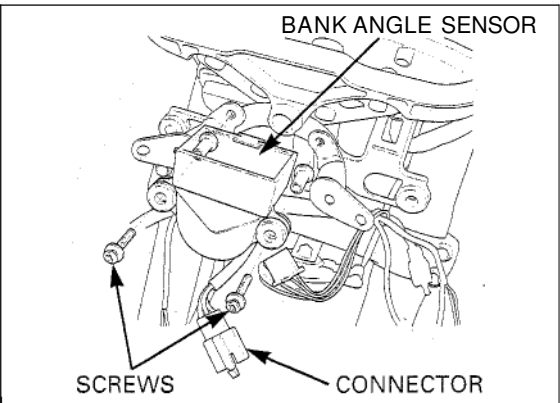
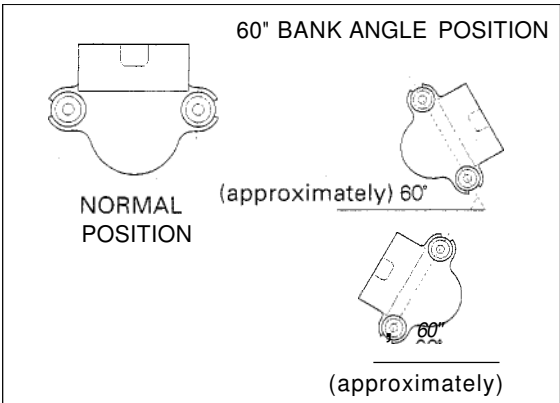
Incline the bank angle sensor approximately 60 degrees to the left or right with the ignition switch turned to "ON".

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

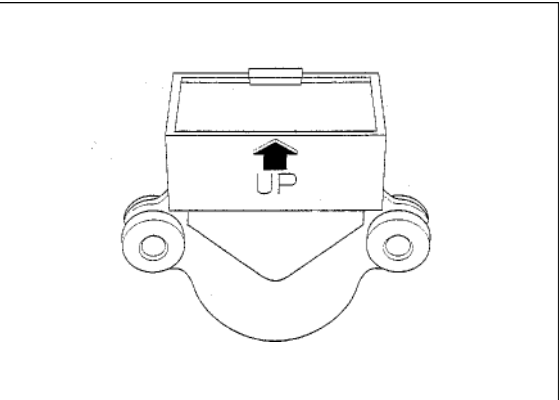
Disconnect the bank angle sensor 3P (Green)connector. Remove the two screws, nuts and bank angle sensor.



install the bank angle sensor with its "UP" mark facing up

Installation is in the reverse order of removal.

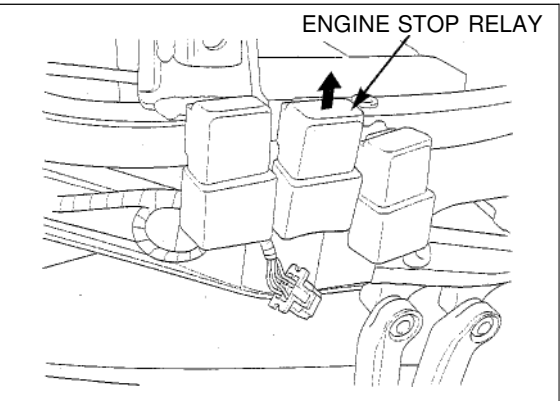
Tighten the mounting screws securely.



ENGINE STOP RELAY

INSPECTION

Disconnect the engine stop relay 4P connector, remove the engine stop relay.



## FUEL SYSTEM (Programmed Fuel Injection)

Connect the ohmmeter to the engine stop relay connector terminals.

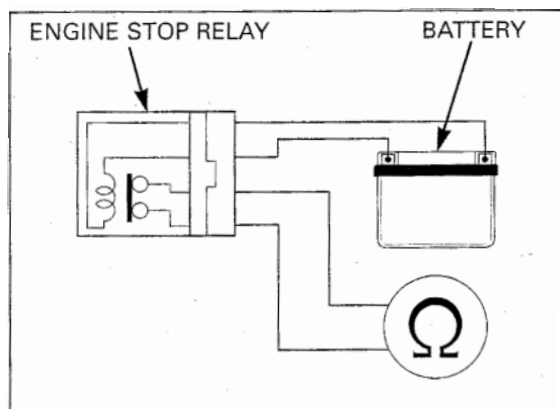
**CONNECTION: Red/White – Black/White**

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

**CONNECTION: Red/Orange – Black**

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

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



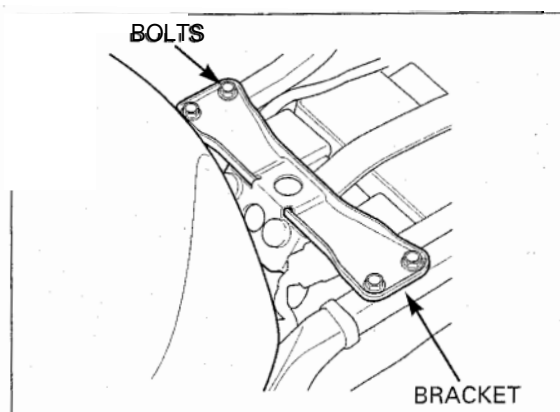
## ECM (ENGINE CONTROL MODULE)

### REMOVAL/INSTALLATION

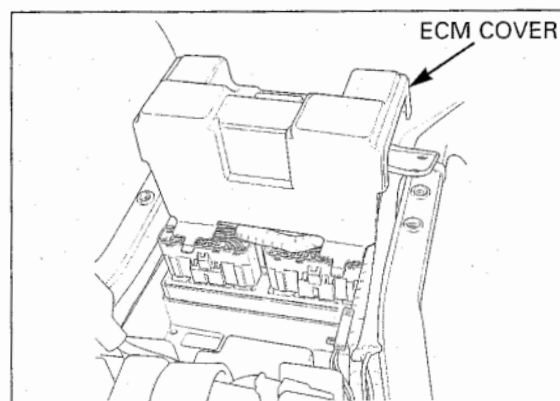
Remove the seat (page 2-2).

Remove the fuel tank rear bracket bolts and pull up the bracket.

Remove the battery (page 16-4).

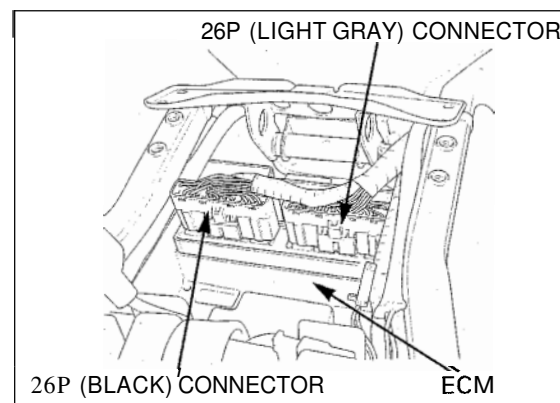


Remove the ECM cover.



Disconnect the ECM 26P (Black) and 26P (Light gray) connectors, then remove the ECM.

Installation is in the reverse order of removal.



## FUEL SYSTEM (Programmed Fuel Injection)

### POWER/GROUND LINE INSPECTION

Connect the test harness between the main wire harness and ECM (page 5-8).

#### TOOL:

ECM test harness, 26P

070MZ-0010100  
(two required)

#### GROUND LINE

Check for continuity between the ECM test harness connector B1 terminal and ground, between the B14 terminal and ground, between the A26 terminal and ground, and between the B2 terminal and ground.

There should be continuity at all times.

If there is no continuity, check for an open circuit in the Green/Pink wire and Green wire.

#### POWER INPUT LINE

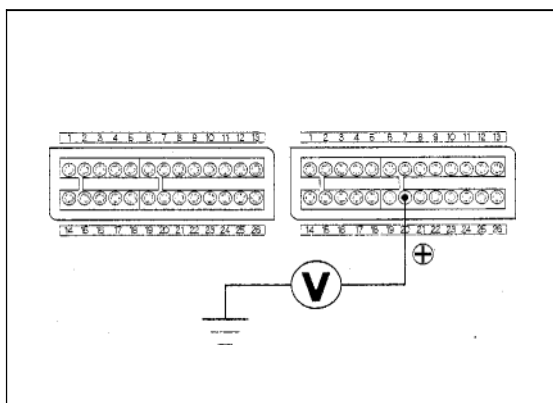
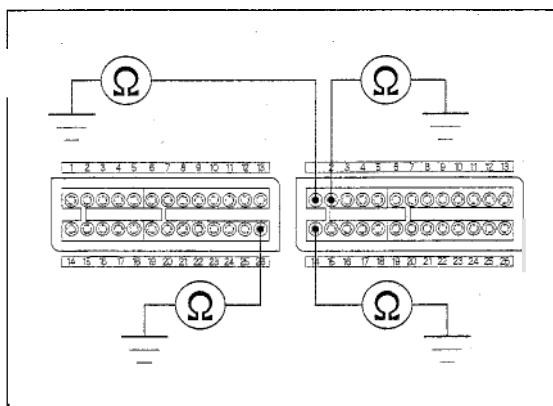
Turn the ignition switch to "ON" with the engine stop switch in the "O" position.

Measure the voltage between the ECM test harness connector B20 terminal (+) and ground.

There should be battery voltage.

If there is no voltage, check for open circuit in Black/White wire between the ECM and bank angle sensor/relay.

If the wire is OK, check for the bank angle sensor/engine stop relay (page 5-85, 86).

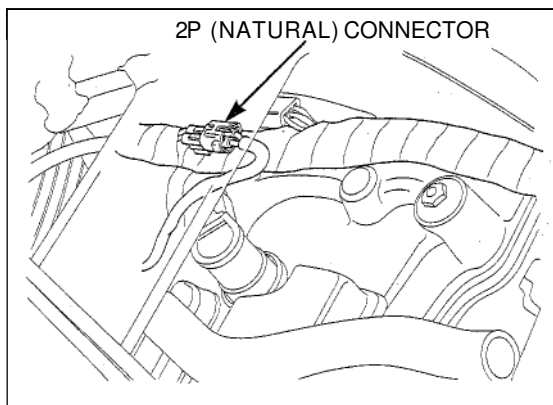


## PAIR SOLENOID VALVE

### REMOVAL/INSTALLATION

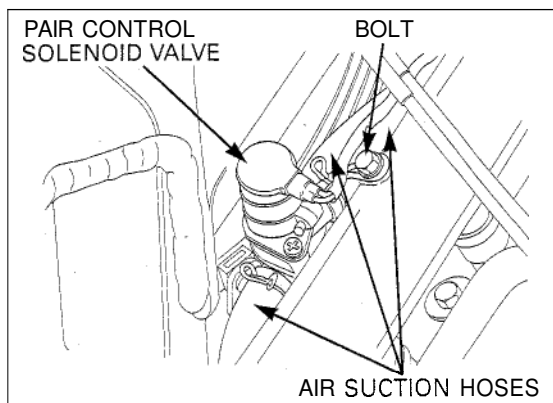
Remove the air cleaner housing (page 5-64).

Disconnect the PAIR solenoid valve 2P (Natural) connector.



Disconnect the PAIR air suction hoses.  
Remove the bolt and PAIR solenoid valve.

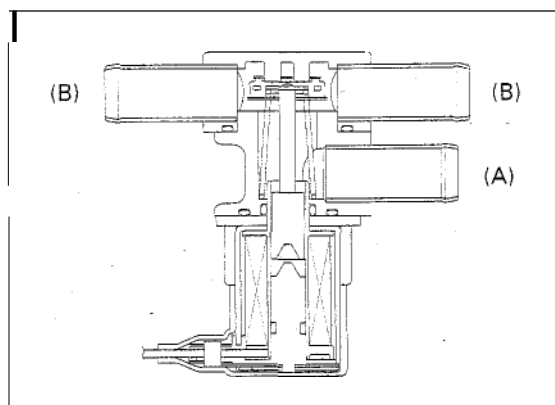
Installation is in the reverse order of removal.



### INSPECTION

Remove the PAIR solenoid valve.

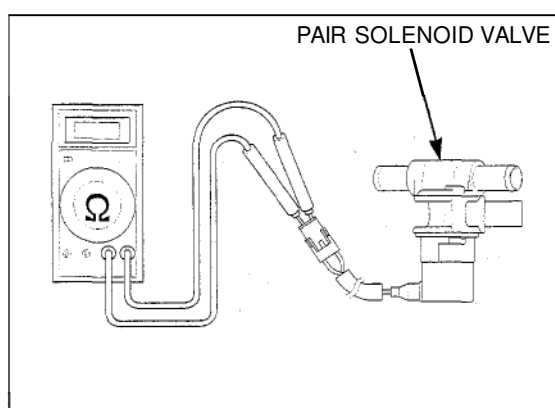
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the PAIR solenoid valve terminals.



Check the resistance between the terminals of the PAIR solenoid valve.

**STANDARD:** 20 - 24  $\Omega$  (20 °C/68 °F)

If the resistance is out of specification, replace the PAIR solenoid valve.



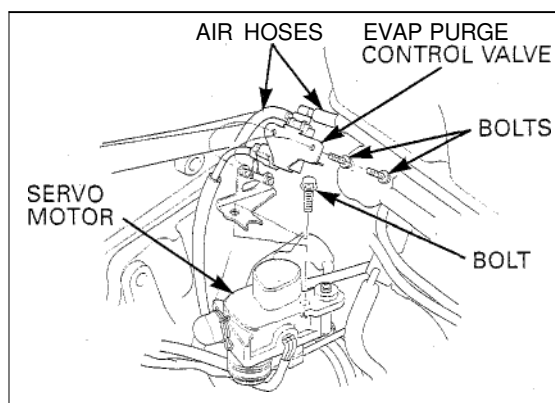
## EVAP PURGE CONTROL SOLENOID VALVE (California type only)

### REMOVAL/INSTALLATION

Remove the fuel tank (page 5-59).

Remove the bolt, then remove the EGCV/air intake valve servo motor and bracket from the frame.

Disconnect the EVAP purge control valve 2P connector. Disconnect the air hoses from the EVAP purge control valve.

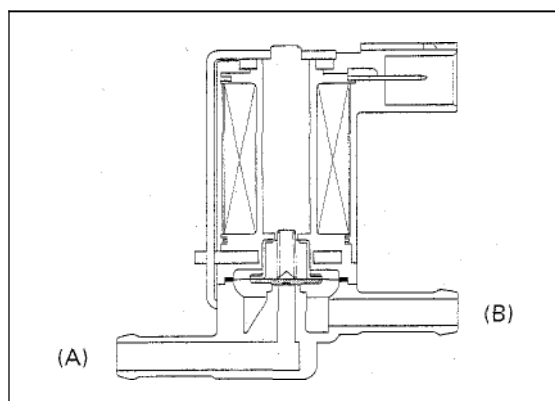


Installation is in the reverse order of removal

### INSPECTION

Remove the EVAP purge control valve.

Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the EVAP purge control valve terminals.

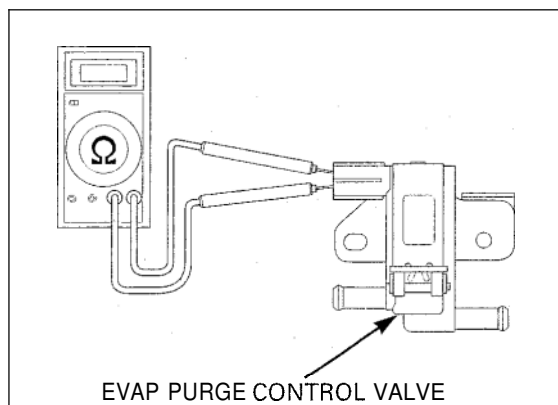


## FUEL SYSTEM (Programmed Fuel Injection)

Check the resistance between the terminals of the EVAP purge control valve.

**STANDARD:** 30 – 40 k $\Omega$  (20°C/68°F)

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



## O<sub>2</sub> SENSOR (California type only)

*Do not service  
the O<sub>2</sub> sensor  
while it is hot*

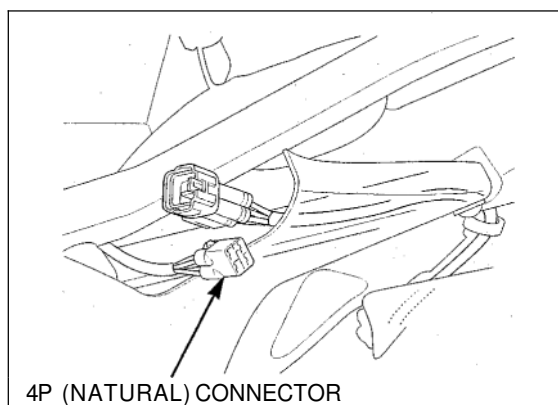
### REMOVAL

#### NOTE:

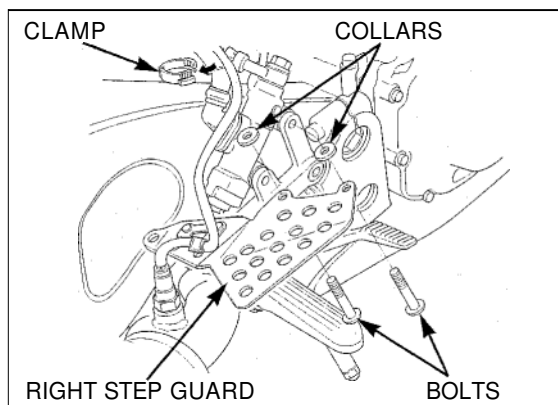
- Handle the O<sub>2</sub> sensor with care.
- Do not get grease, oil or other materials in the O<sub>2</sub> sensor air hole.

Remove the seat (page 2-2).

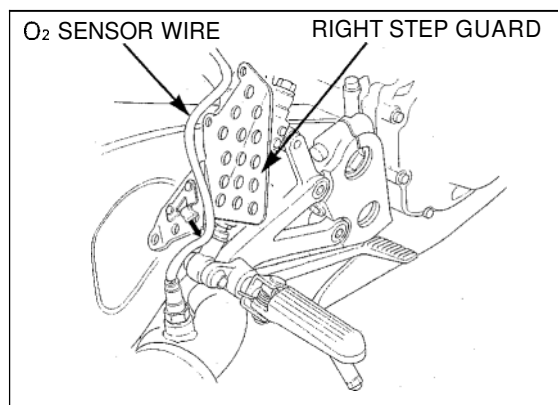
Disconnect the O<sub>2</sub> sensor 4P (Natural) connector.



Remove the O<sub>2</sub> sensor wire clamp.  
Remove the right step guard mounting bolts and collars.



Release the O<sub>2</sub> sensor wire from the right step guard.



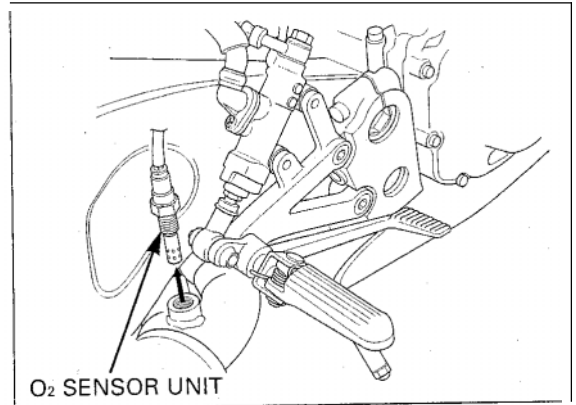


## FUEL SYSTEM (Programmed Fuel Injection)

Remove the O<sub>2</sub> sensor unit.

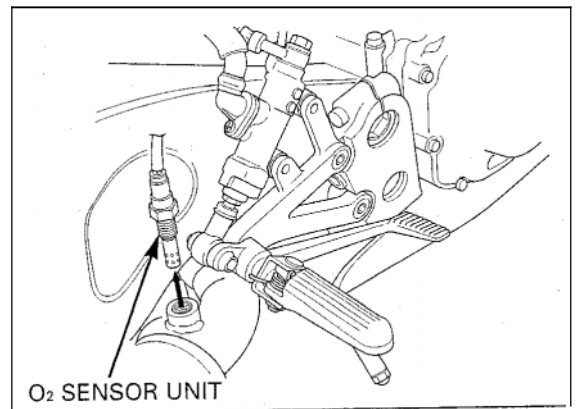
### NOTICE

- Be careful not to damage the sensor wire.
- Do not use an impact wrench to remove or install the O<sub>2</sub> sensor.

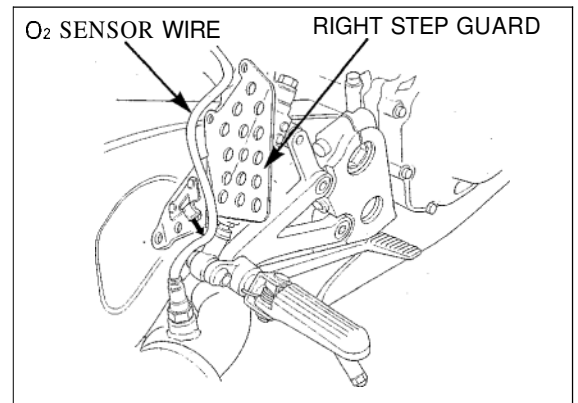


Install the O<sub>2</sub> sensor unit.  
Tighten the unit to the specified torque.

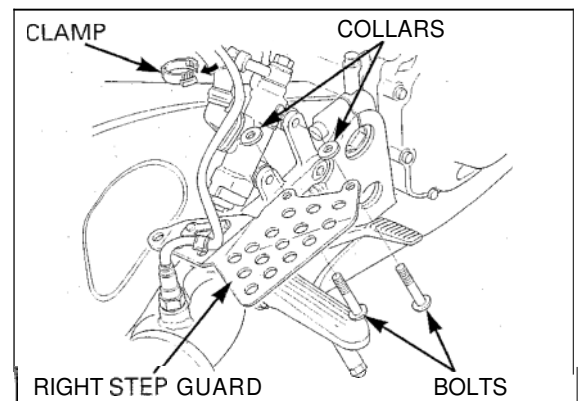
**TORQUE:** 25 N·m (2.4 kgf·m, 19 lbf·ft)



Clamp the O<sub>2</sub> sensor wire to the right step guard.



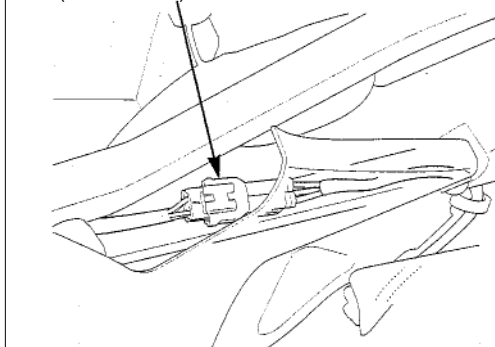
Install the rear master cylinder, collars and right step guard, then tighten the mounting bolts.  
Clamp the O<sub>2</sub> sensor wire with the rear brake reservoir hose using the hose clamp.



## FUEL SYSTEM (Programmed Fuel Injection)

Route the O<sub>2</sub> sensor wire into the frame.  
Connect the O<sub>2</sub> sensor 4P (Natural) connector.

4P (NATURAL) CONNECTOR

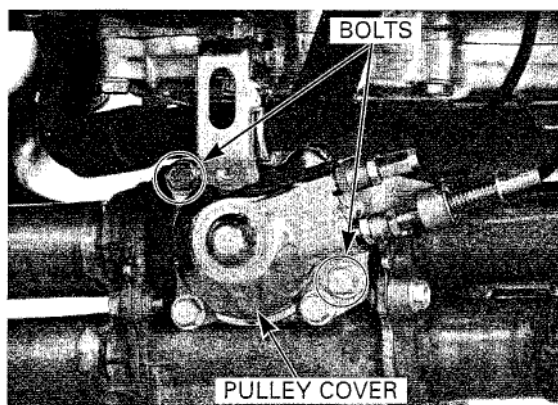


## EGCV AND AIR INTAKE VALVE INSPECTION

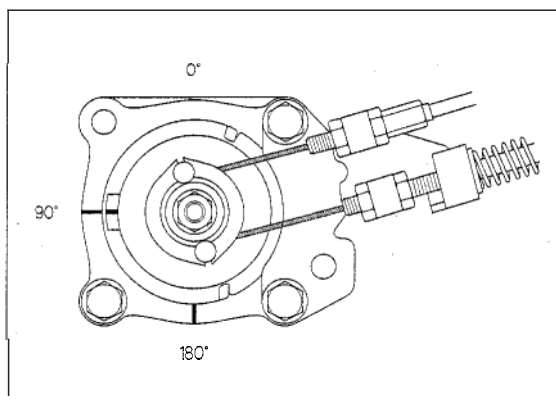
Before operating inspection, check that the PGM-FI MIL does not indicate an EGCV failure.

Remove the lower cowl (page 2-7).  
Remove the air cleaner element (page 3-6).

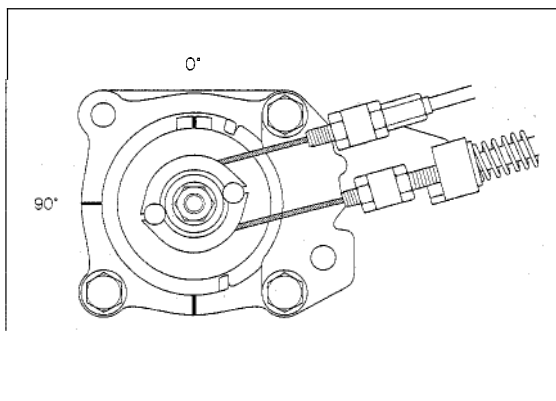
Remove the bolts and EGCV pulley cover.



Turn the ignition switch to "ON" and check for EGCV cable guide pulley position.  
Make sure the pulley index line is positioned 90° (facing forward) as shown.



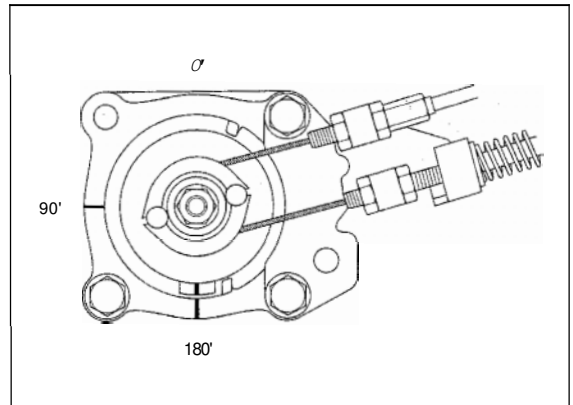
Start the engine, and warm it up to operating temperature.  
Gradually increase the engine rev up.  
Make sure the EGCV cable pulley is moved to 0° (pulley index line facing up) at about 3,000 rpm as shown.



## FUEL SYSTEM (Programmed Fuel Injection)

Check that the EGCV cable pulley is moved to 180° (pulley index line facing down) at about 8,000 rpm. Also check that the intake flap valve is opened at the same time.

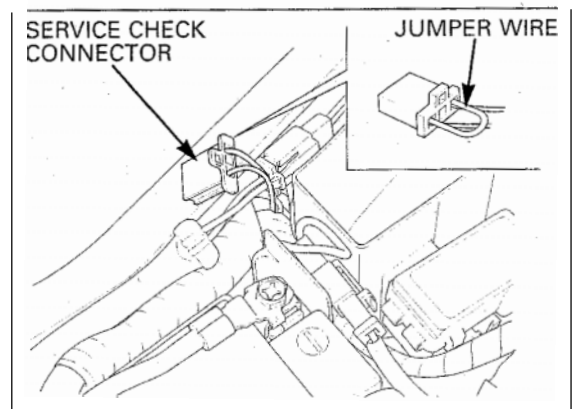
If the intake and EGCV position is incorrect, adjust the cables (see below).  
If the intake and EGCV operation is incorrect, check for each related parts.



### CABLE ADJUSTMENT

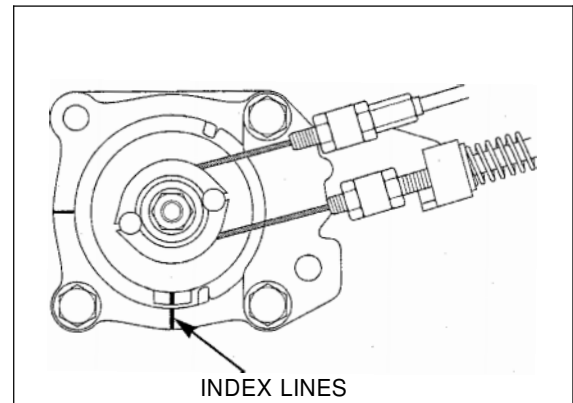
Remove the seat (page 2-2).

Turn the ignition switch to "ON".  
Short the service check connector with a jumper wire.

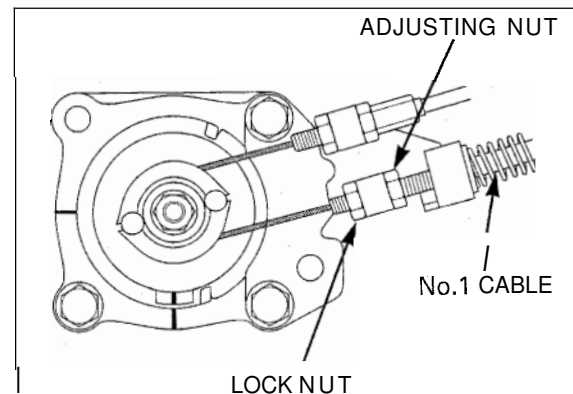


### EGCV CONTROL CABLE ADJUSTMENT

Make sure that the EGCV cable guide pulley index line is aligned with the EGCV cover index line.  
If the index lines do not align, adjust the EGCV control cables.



Fully loosen the No.1 adjusting cable (spring equipped cable) lock nut and adjusting nut.

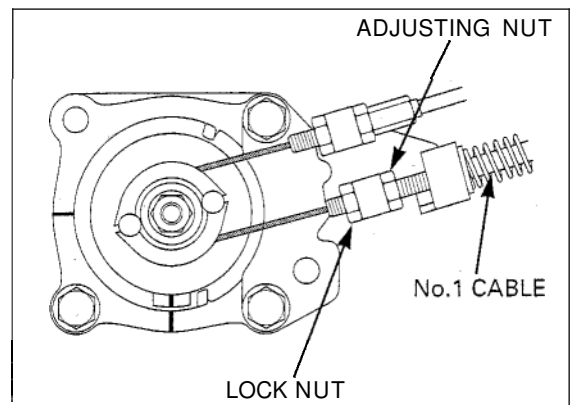


## FUEL SYSTEM (Programmed Fuel Injection)

Adjust the EGCV position by loosening the No.1 adjusting cable lock nut and turning the adjusting nut.

Move the cable several times and recheck the index line.

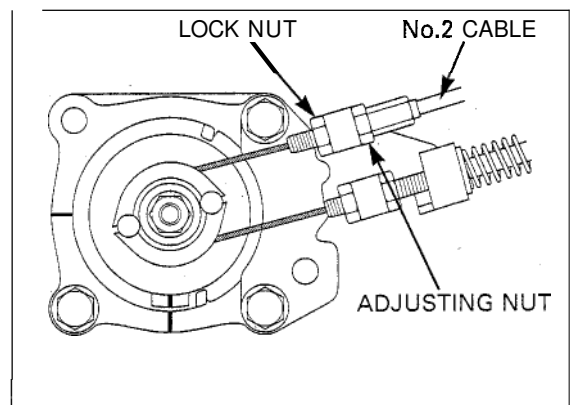
Hold the No.1 cable adjusting nut, then tighten the lock nut securely.



Turn the No.2 cable lock nut and adjust the cable so there is no free play.

Tighten the No.2 cable lock nut securely.

Remove the jumper wire from the service check connector.

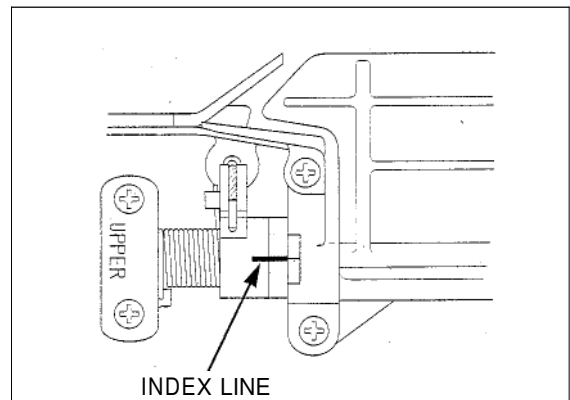


### INTAKE VALVE CONTROL CABLE ADJUSTMENT

Turn the ignition switch to "ON" and short the service check connector with a jumper wire (page 5-93).  
Remove the air cleaner element (page 3-6).

Make sure the index lines between the intake valve shaft pulley and air guide are aligned.

If the index lines are not aligned adjust as follows.

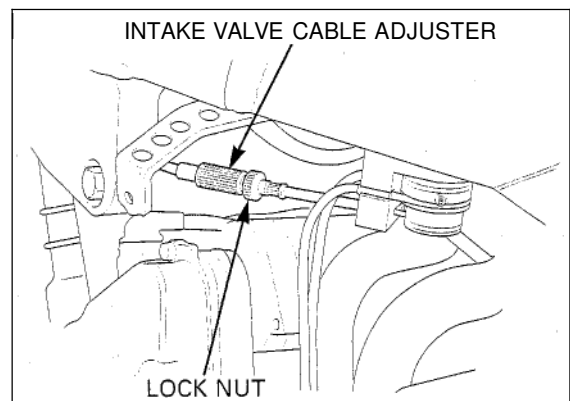


Loosen the intake valve cable adjuster lock nut.

Turn the intake valve cable adjuster, align the intake valve cable guide pulley index line with the index line on the valve shaft.

At this point, turn back the cable adjuster 1/2 turn.  
Tighten the lock nut securely.

Remove the jumper wire from the service check connector.

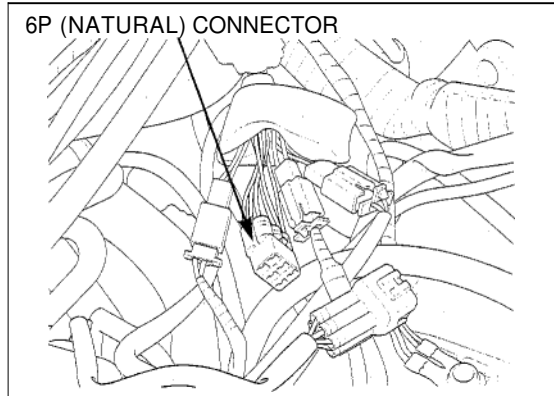


### EGCV AND AIR INTAKE VALVE SERVO MOTOR

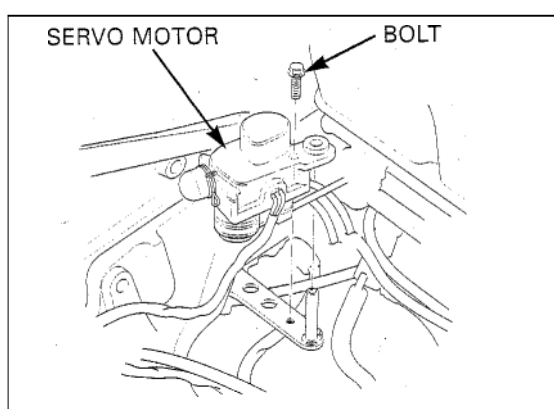
#### REMOVAL

Remove the fuel tank (page 5-59).

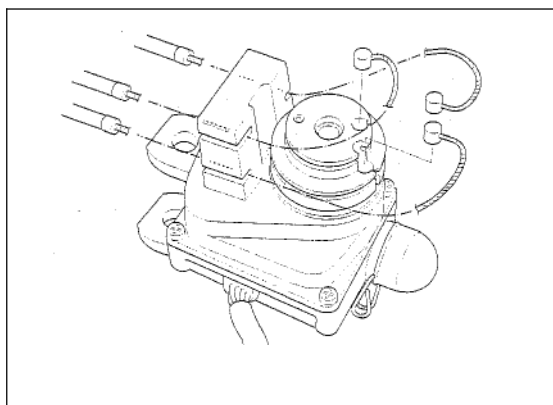
Disconnect the servo motor 6P (Natural) connector.



Remove the servo motor mounting bolt and pull out the servo motor from the bracket.



Disconnect the intake air valve and EGCV control cables from the servo motor pulley, then remove the servo motor.

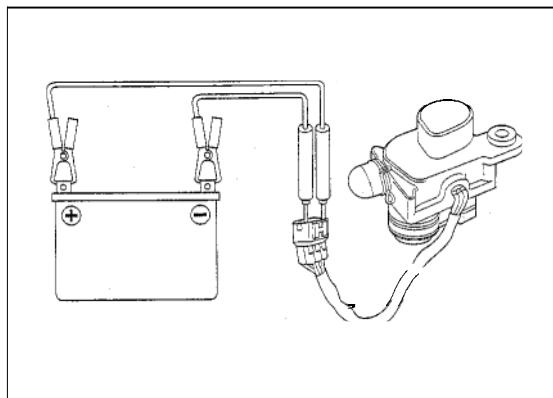


#### INSPECTION

Connect the 12 V battery to the servo motor 6P (Natural) connector terminals and check that the motor operation.

**Connection: Red (+) - Blue (-)**

If the servo motor does not turn, replace the servo motor with a new one.



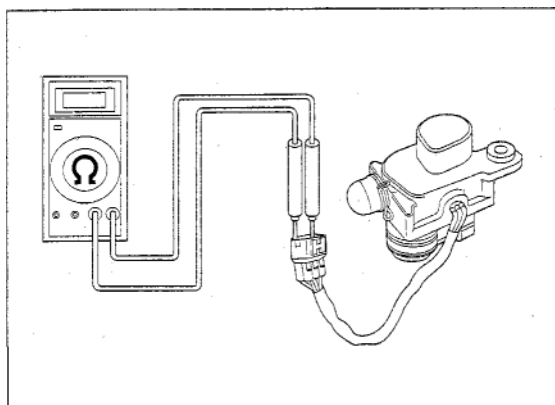
## FUEL SYSTEM (Programmed Fuel Injection)

Measure the resistance between the servo motor 6P (Natural) connector terminals.

**Connection: Yellow/Red - Green/Orange**  
**Standard: 5 k $\Omega$**

**Connection: Light green/Pink - Green/Orange**  
**Standard: 0 - 5 k $\Omega$**

If the resistance is out of range, replace the servo motor.



### INSTALLATION

Connect the servo motor 6P (Natural) connector.

Short the service check connector (page 5-93).

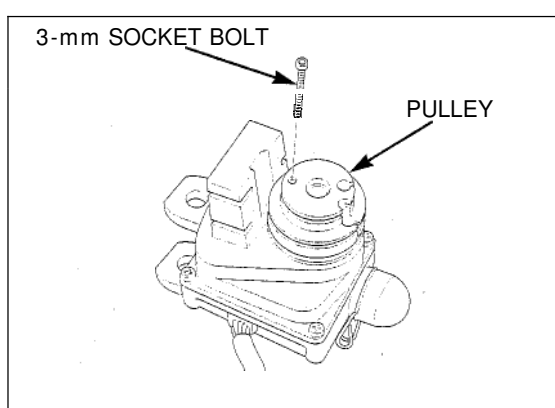
Turn the ignition switch to "ON".

The servo motor turns, then stops.

Secure the servo motor pulley at this position using a 3-mm socket bolt as shown.

**Socket bolt, 3 x 28 mm :**

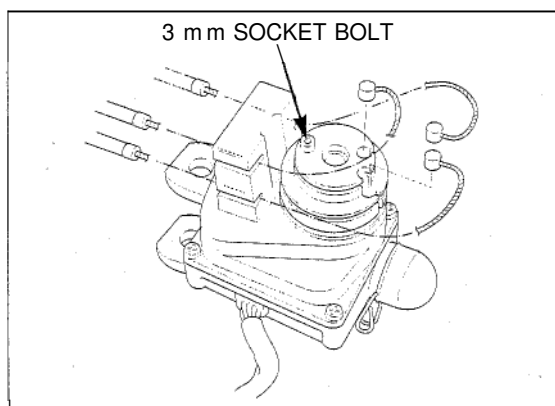
**Parts number: 31420-MCJ-640**



Connect the EGCV control cables to each position, then connect the intake valve control cable.

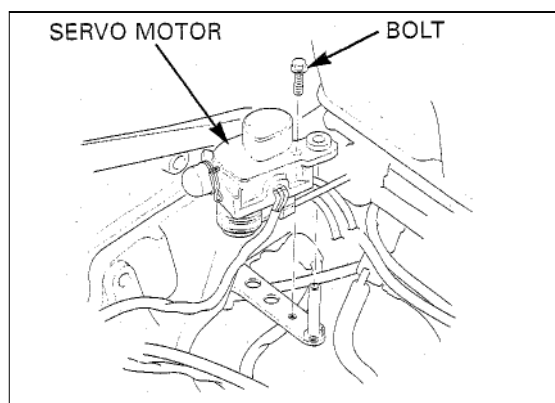
Adjust the EGCV and air intake valve control cables (page 5-93).

Remove the 3-mm socket bolt from the servo motor pulley.



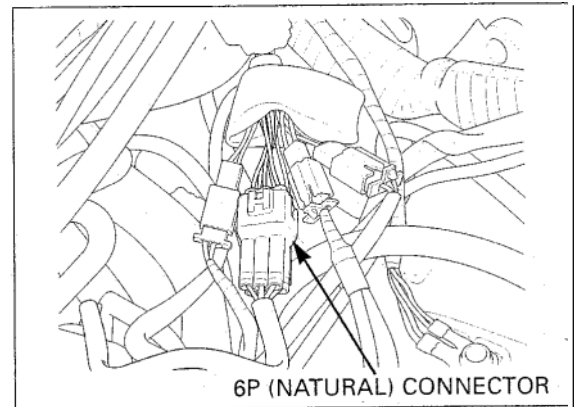
Install the servo motor onto the bracket.

Install and tighten the servo motor mounting bolt.



Connect the servo motor 6P (Natural) connector.

Install the fuel tank (page 5-61).



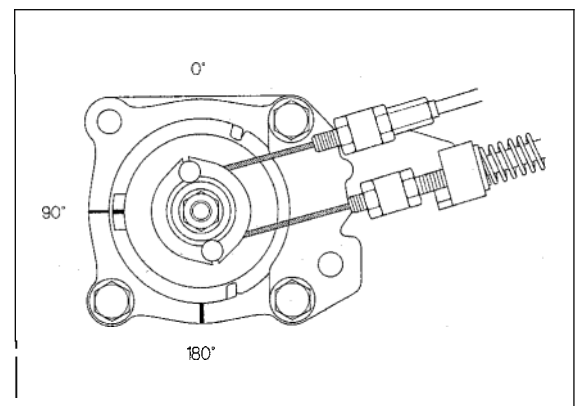
## EGCV

### OPERATING INSPECTION

Disconnect the EGCV control cables (page 2-15).

Turn the EGCV pulley from 0° to 180° and check for smooth operation.

If operation is not smooth, check for carbon deposits in the EGCV and valve body (page 5-99).

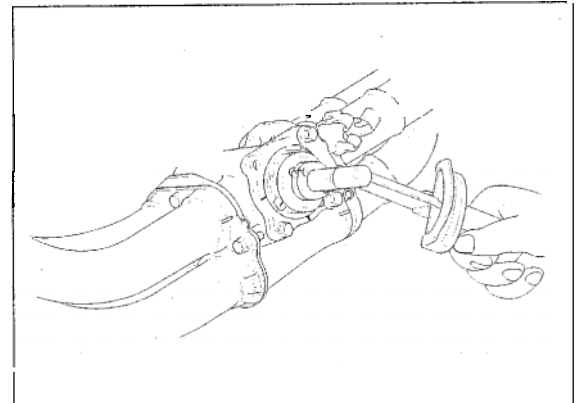


Check the EGCV pre-load using a torque wrench.

#### PRE-LOAD:

**0.34 N·m (0.035 kgf·m, 0.25 lbf·ft) maximum**

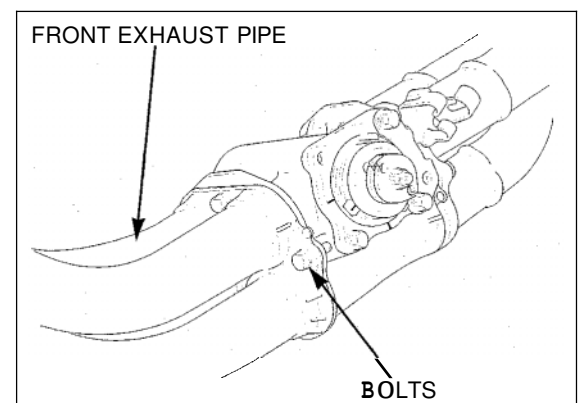
If pre-load is excessive, disassemble and inspect the EGCV.



### REMOVAL

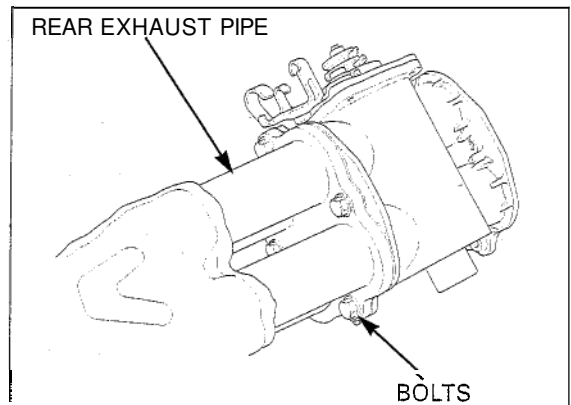
Remove the exhaust pipe assembly (page 2-13).

Remove the bolts, front exhaust pipe and gasket.



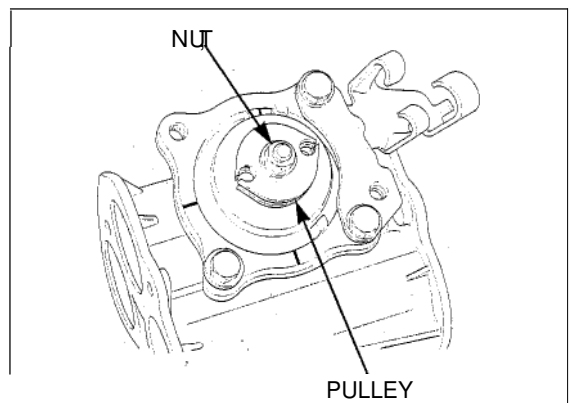
## FUEL SYSTEM (Programmed Fuel Injection)

Remove the bolts, rear exhaust pipe and gasket.



### DISASSEMBLY

Turn the EGCV cable guide pulley counterclockwise, and seat its tab with the stopper on the valve cover. Loosen and remove the nut, then remove the valve cable guide pulley.



### NOTICE

- Be careful not to damage thrust washer B.
- Do not use any cleaning solution to clean thrust washer B.
- Do not apply any lubricant to thrust washer B.

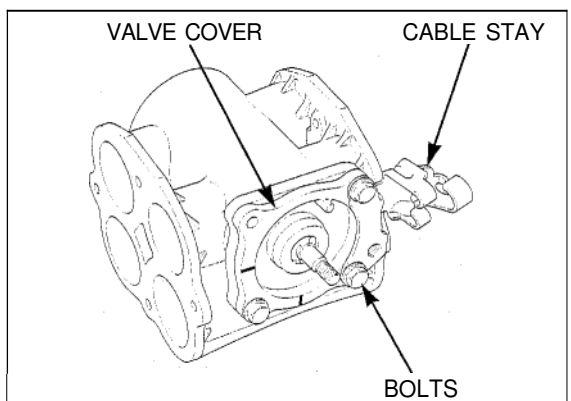
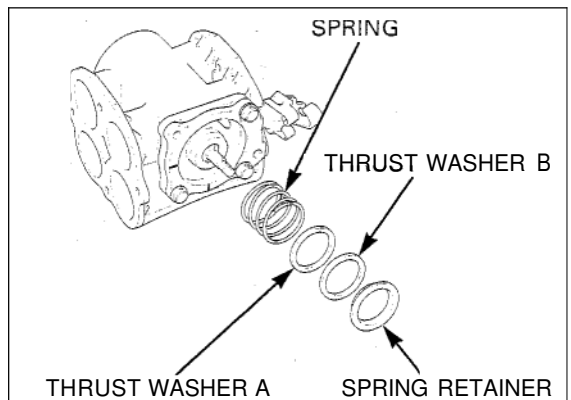
Remove the following:

- Spring retainer
- Thrust washer B
- Thrust washer A
- Thrust spring

Check thrust washer B for wear or damage.

Replace thrust washer B if it is wear or damage.

Remove the EGCV cover mounting bolts, cable stay, EGCV cover and metal gasket.





## FUEL SYSTEM (Programmed Fuel injection)

Remove the EGCV from the valve body.

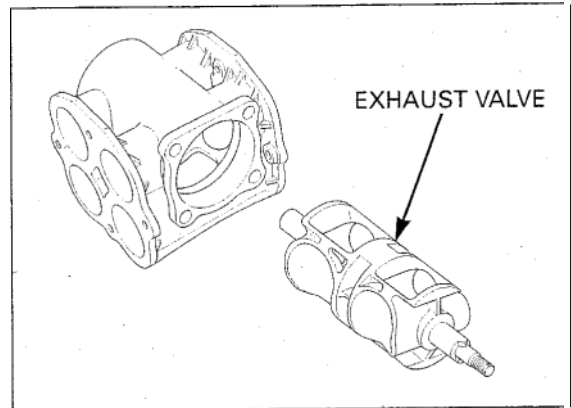
Remove carbon deposits from the EGCV and valve body.

### NOTICE

- Do not use any cleaning solution to clean the EGCV bushings.
- Do not apply any lubricant to the EGCV bushings.

Check that the EGCV for wear or damage.

Check that the EGCV body for wear or damage.



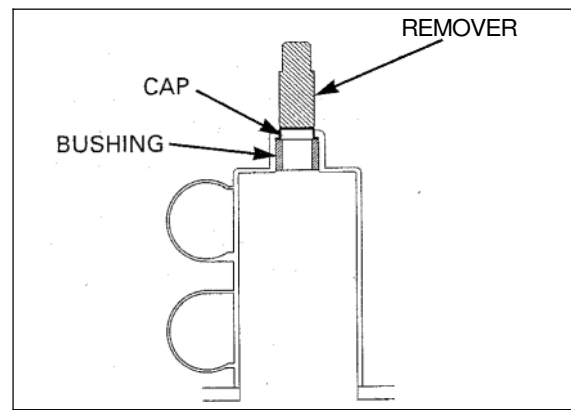
### EGCV SHAFT BUSHING REPLACEMENT

Remove the valve body side EGCV bushing and cap using the following tools.

#### TOOL:

Remover, 14 x 16 mm

07YMF-MCJ0400



Install the EGCV cap into the EGCV body until it seats using the special tool.

#### TOOLS:

Installer shaft guide

07YMF-MCJ0100 or  
07YMF-MCJA100  
(U.S.A. only)  
07YMF-MCJ0200 or  
07YMF-MCJA200  
(U.S.A. only)

Installer shaft

Press the EGCV bushing in using the special tool.

#### TOOLS:

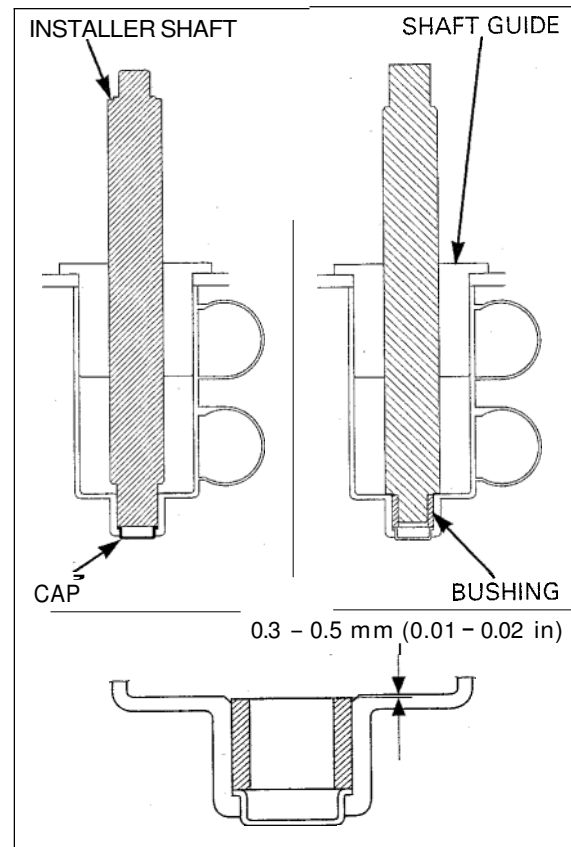
installer shaft guide

07YMF-MCJ0100 or  
07YMF-MCJA100  
(U.S.A. only)

Installer shaft

07YMF-MCJ0200 or  
07YMF-MCJA200  
(U.S.A. only)

Press the EGCV bushing until its end is below 0.3 – 0.5 mm (0.01 – 0.02 in) from the valve body surface as shown



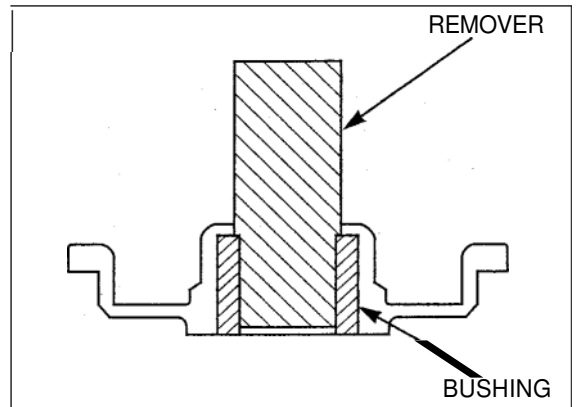
## FUEL SYSTEM (Programmed Fuel Injection)

Press the valve cover side EGCV bushing out using the following tool.

**TOOL:**

Remover, 14 x 16 mm

07YMF-MCJ0400



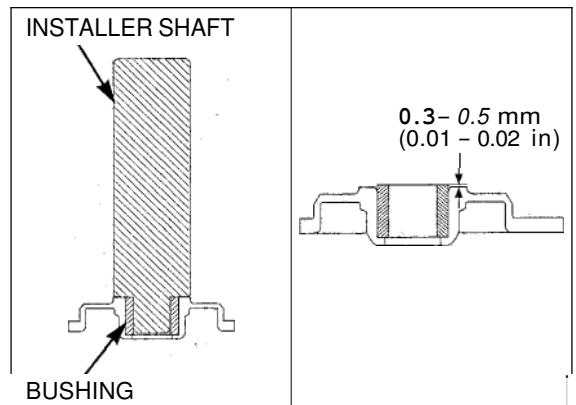
*Press the EGCV bushing until its end is projected 0.3 - 0.5 mm (0.01 - 0.02 in) from the valve cover surface as shown*

Press the EGCV bushing in using the special tool.

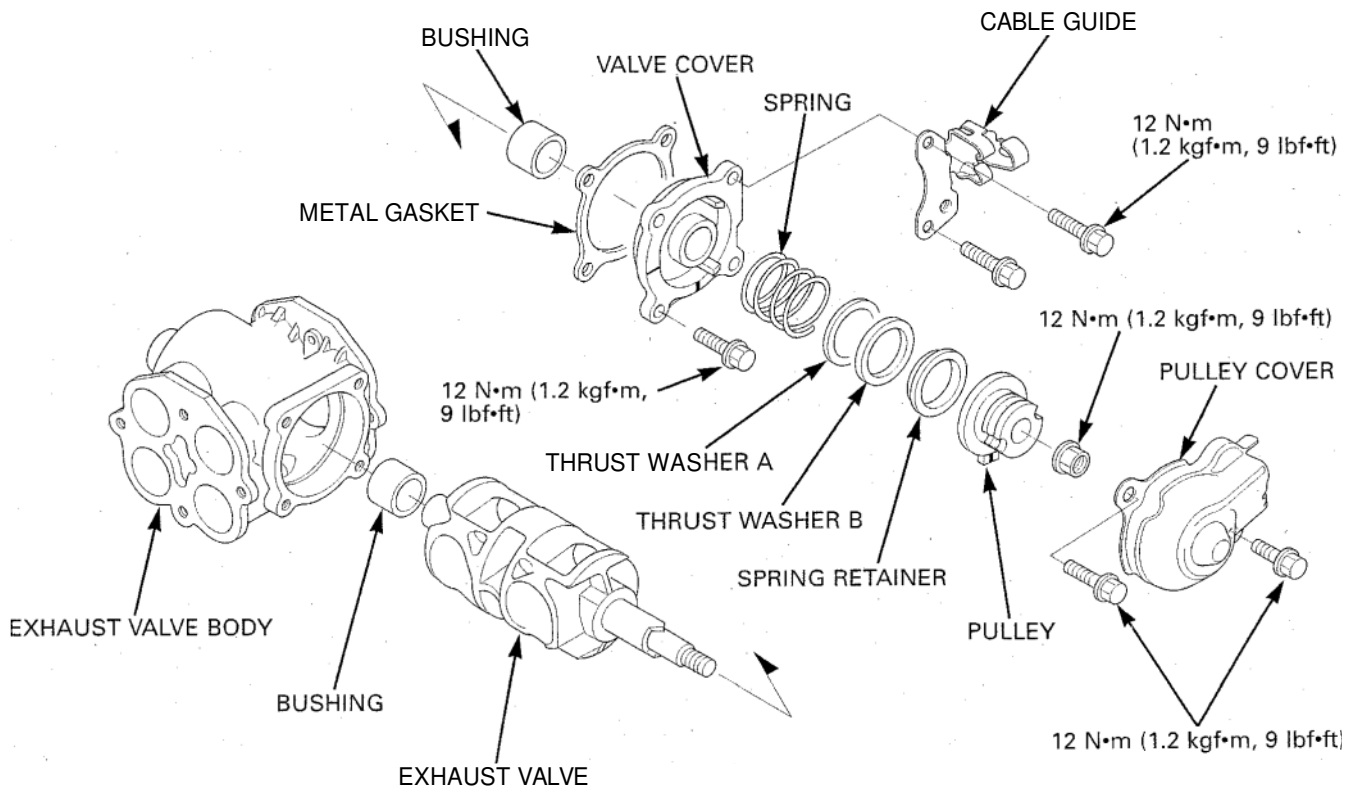
**TOOL:**

Installer shaft, 14 x 30 mm

07YMF-MCJ0300 or  
07YMF-MCJA300  
(U.S.A. only)

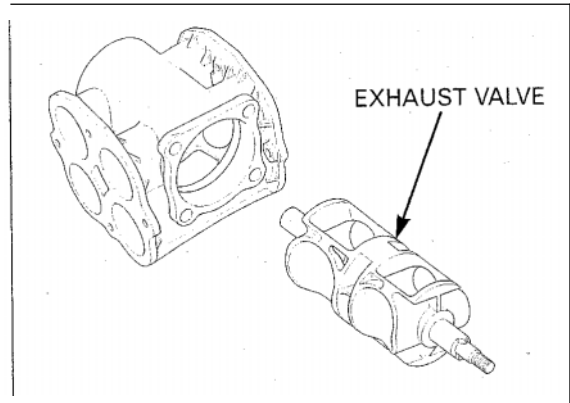


## ASSEMBLY



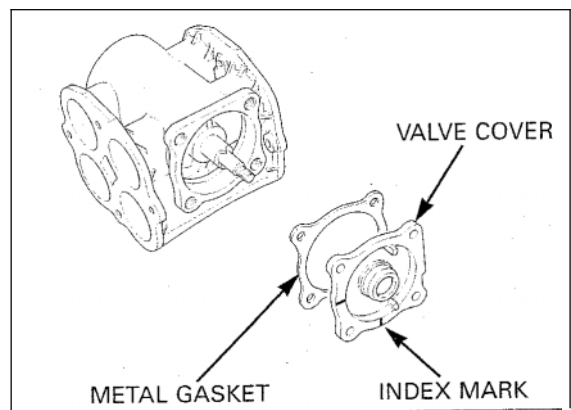
## FUEL SYSTEM (Programmed Fuel Injection)

Install the EGCV into the EGCV body.



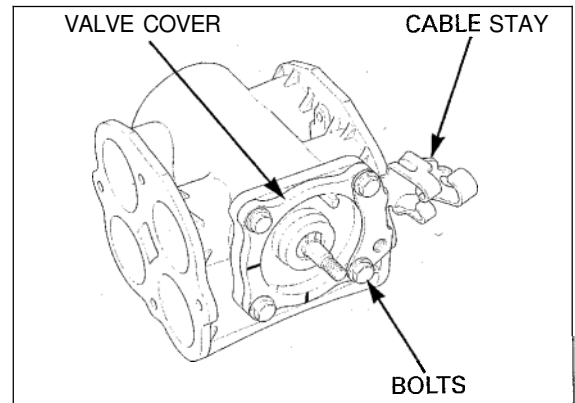
*Install the EGCV cover with its index line facing down*

Install the metal gasket and EGCV cover.



Install the EGCV cable stay and tighten the four EGCV cover mounting bolts to the specified torque.

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

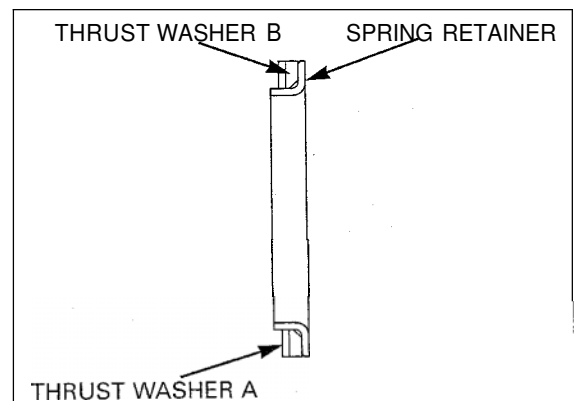


### NOTICE

- Be careful not to damage thrust washer B.
- Do not use any cleaning solution to clean thrust washer B.
- Do not apply any lubricant to thrust washer B.

*Install thrust washer B with its chamfered side facing the spring retainer.*

Install thrust washers B and A onto the spring retainer.

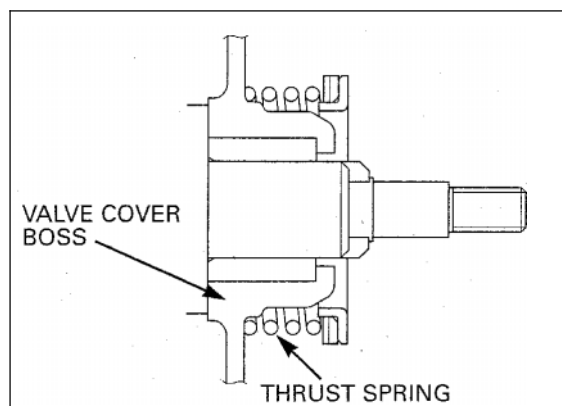


## FUEL SYSTEM (Programmed Fuel Injection)

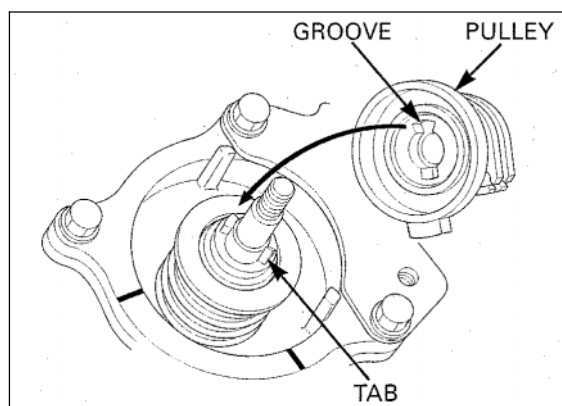
*Make sure the thrust spring is seated on the EGCV cover boss*

Install the thrust spring onto the EGCV cover.

Install the spring retainer assembly onto the thrust spring.

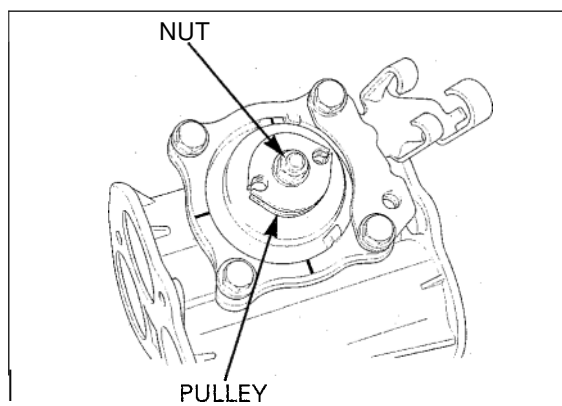


Install the valve cable guide pulley aligning its cut-out with the the valve shaft tab as shown.



Install the valve cable guide pulley flange nut. Turn the valve cable guide pulley clockwise, seat the pulley tab with the stopper on the valve cover. Tighten the nut to the specified torque.

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

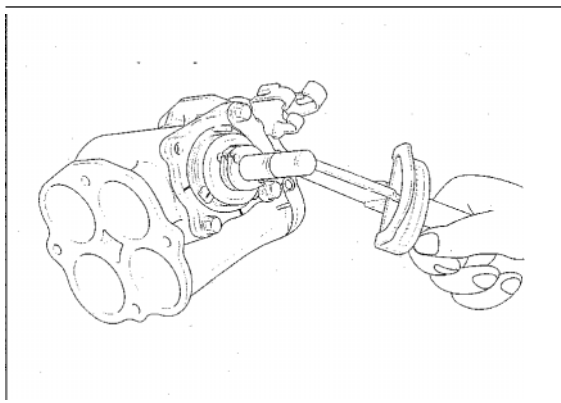


Check the EGCV pre-load using a torque wrench.

**PRE-LOAD:**

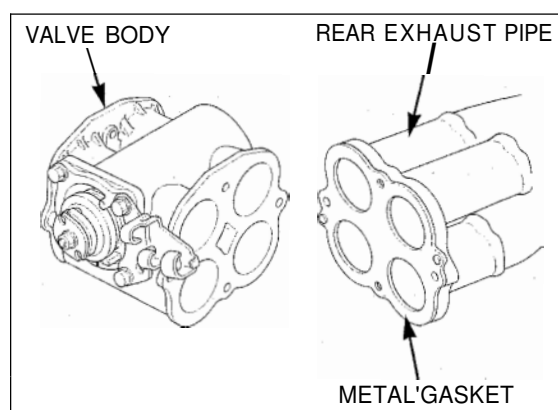
**0.34 N•m (0.035 kgf•m, 0.25 lbf•ft) maximum**

If pre-load is excessive, reassemble the EGCV.



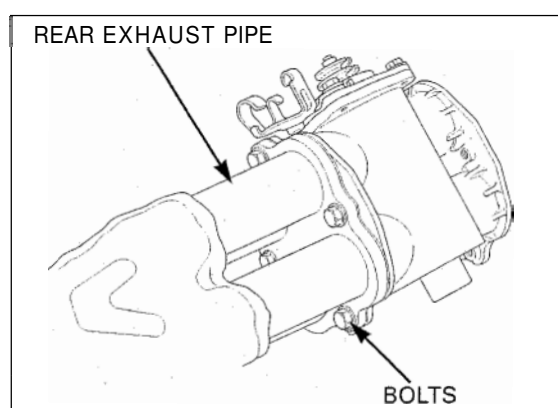
### INSTALLATION

Install the metal gasket and rear exhaust pipe onto the EGCV body.

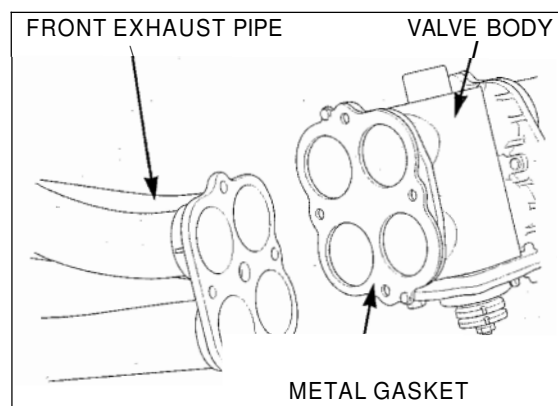


Tighten the EGCV mounting bolt to the specified torque.

**TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)**

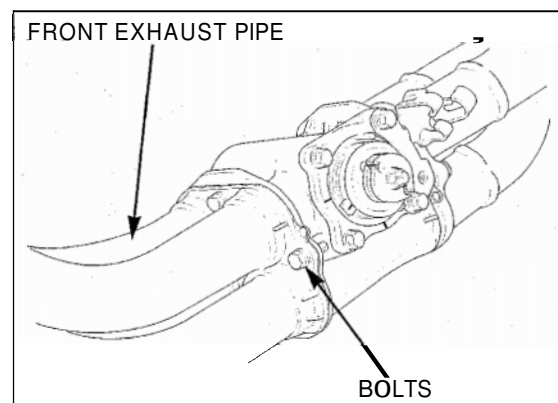


Install the metal gasket and front exhaust pipe onto the EGCV body.



Tighten the EGCV mounting bolt to the specified torque.

**TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)**

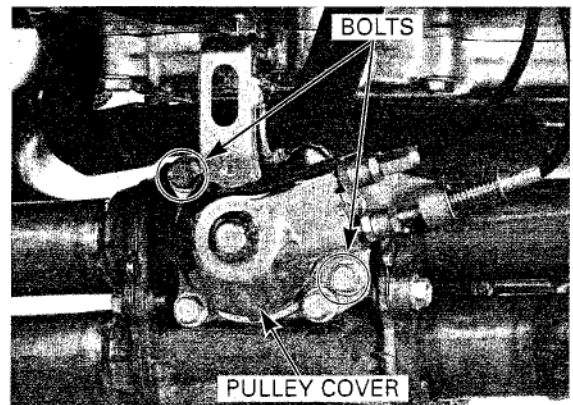


## FUEL SYSTEM (Programmed Fuel Injection)

Install the exhaust pipe assembly (page 2-16).  
Connect the EGCV control cables and adjust the control cables (page 5-93).

Remove the EGCV cover front upper bolt.  
Install EGCV cable guide pulley cover and tighten the bolts to the specified torque.

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

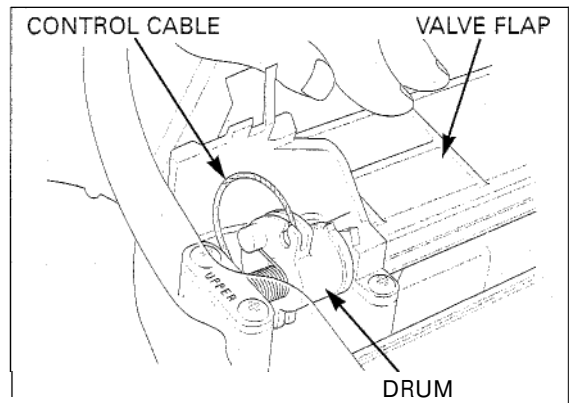


## VARIABLE AIR INTAKE VALVE

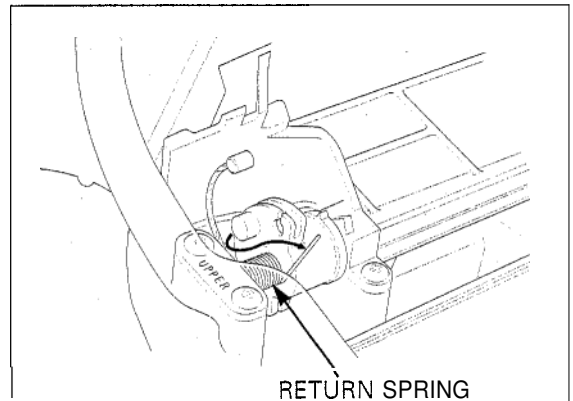
### DISASSEMBLY

Remove the air cleaner housing (page 5-64).

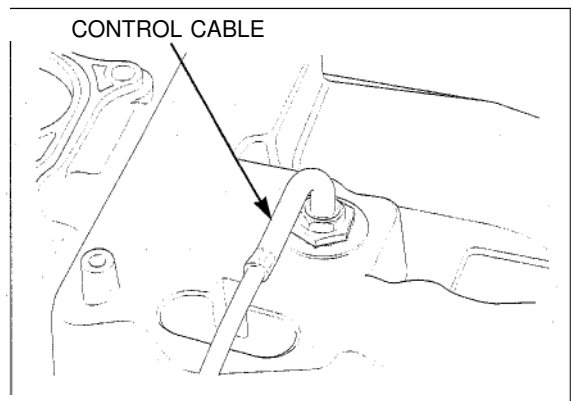
Open the intake valve flap by hand, disconnect the intake valve cable end from the drum.



Unhook the return spring ends from the hooks.



If necessary, loosen the control cable nut and remove the control cable from the air cleaner housing.

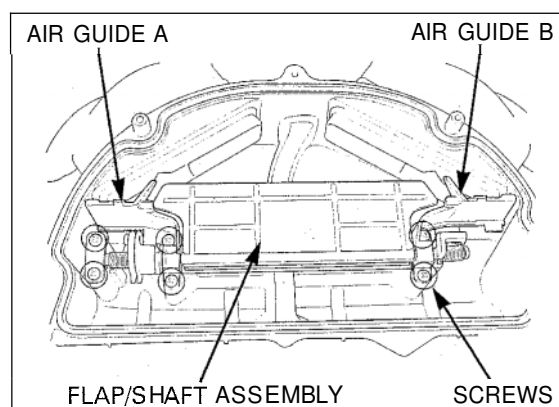


## FUEL SYSTEM (Programmed Fuel Injection)

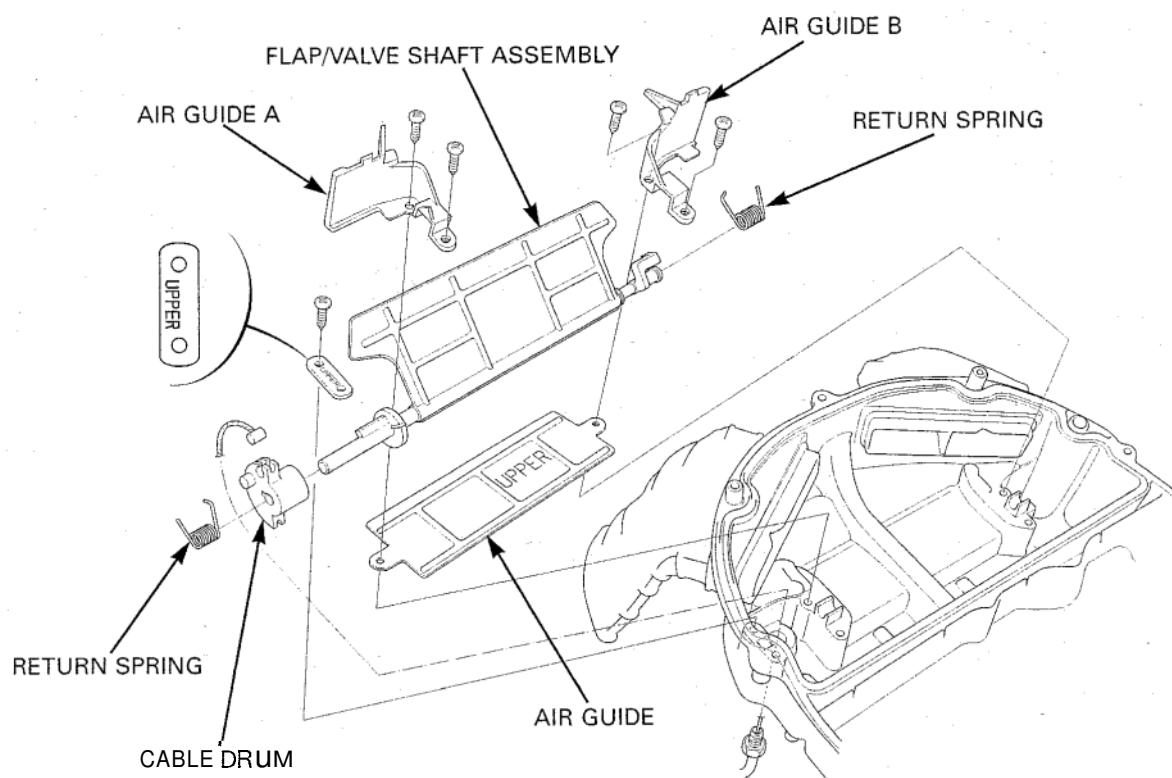
Remove the intake valve shaft holder mounting screws and holder.

Remove air guides A and B mounting screws.

Remove the intake valve flap/shaft assembly, air guides A and B.

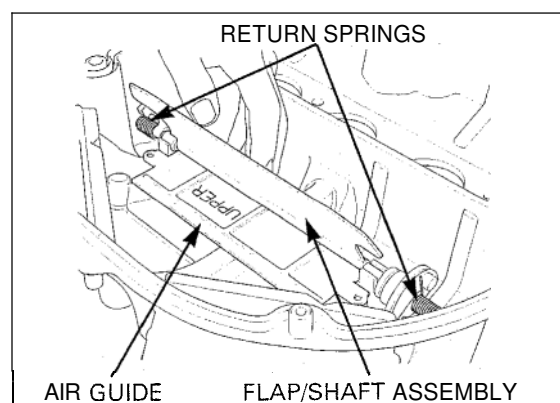


### ASSEMBLY



Install the intake valve drum onto the shaft aligning its groove with the intake valve shaft boss.  
Install the return spring on both sides.

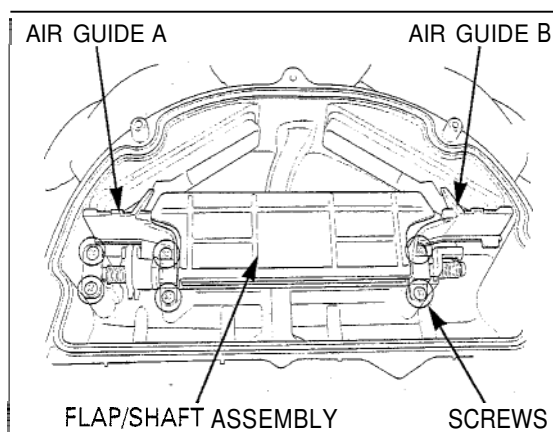
Install the air guide with its "UPPER" mark facing up.  
Install the intake valve flap/shaft assembly onto the air cleaner housing.



## FUEL SYSTEM (Programmed Fuel Injection)

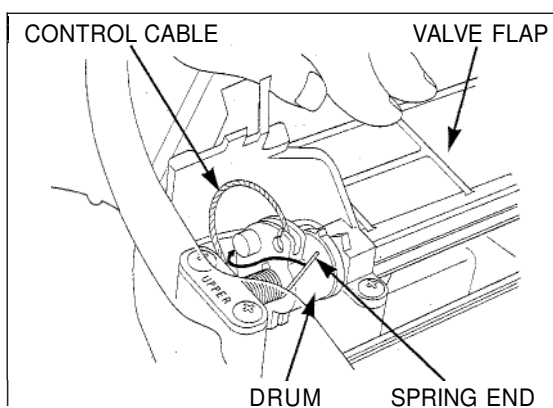
Install air guides A and B, then tighten the mounting screws.

Install the intake valve shaft holder plate with its "UPPER" mark facing up. install and tighten the mounting screws.



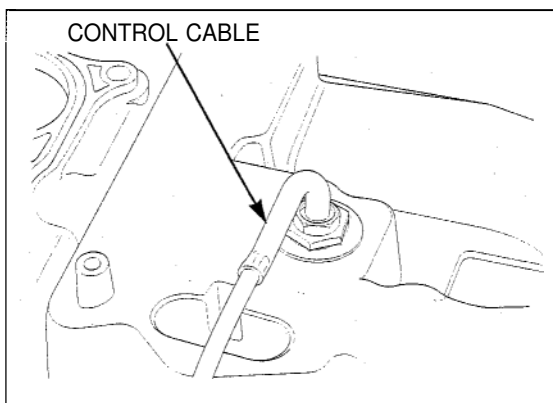
Open the intake valve flap by hand, connect the intake valve control cable end to the drum.

Turn the return spring end counterclockwise turn and then install it onto the hook as shown.



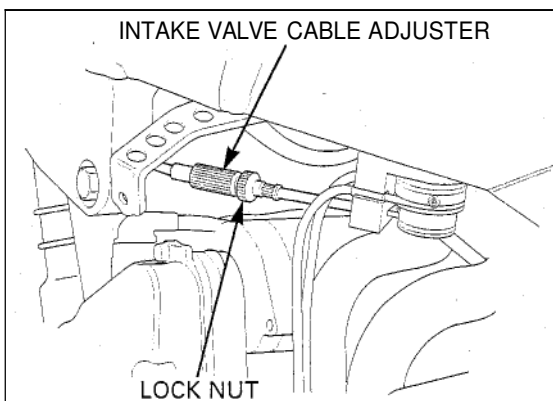
*Face the control cable to the left, then tightening the lock nut*

Tighten the cable lock nut securely if it is removed.



Install the air cleaner housing (page 5-65),

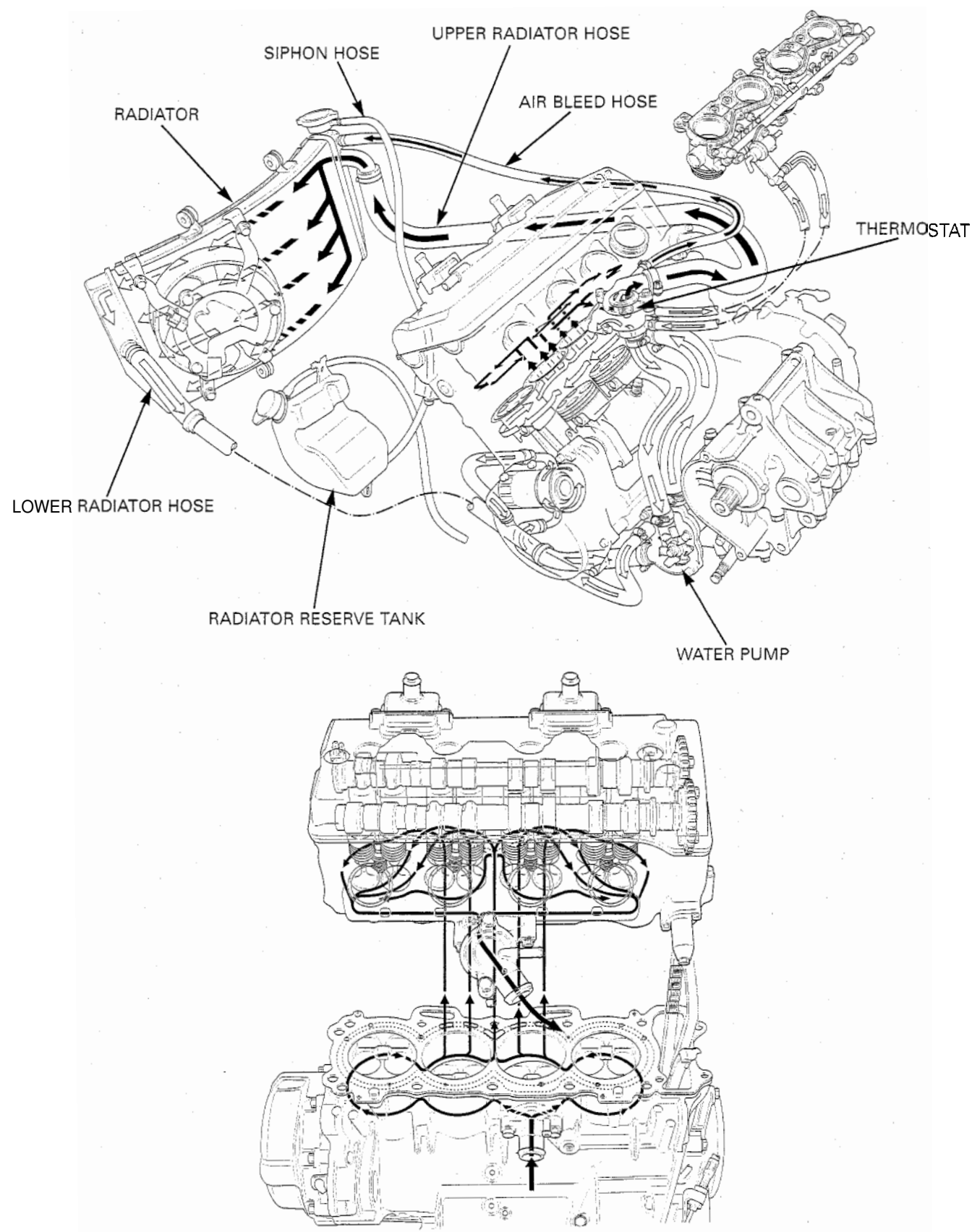
Adjust the variable air intake valve control cable (page 5-94).





COOLING SYSTEM

SYSTEM FLOW PATTERN



# 6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-6
SERVICE INFORMATION	6-1	RADIATOR	6-8
TROUBLESHOOTING	6-2	WATER PUMP	6-13
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-16
COOLANT REPLACEMENT	6-4	FAN CONTROL RELAY	6-17

## SERVICE INFORMATION

### GENERAL

#### WARNING

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

#### NOTICE

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

- Add cooling system 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 19 for coolant temperature sensor inspection.

## COOLING SYSTEM

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### SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.1 liter (3.3 US qt, 2.7 Imp qt)
	Reserve tank	0.4 liter (0.4 US qt, 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	Begin to open	80.5 – 83.5°C (177 – 182°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 corrosion protection inhibitors
Standard coolant concentration		1:1 mixture of antifreeze and soft water

### TORQUE VALUES

Water pump cover bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt
ECT (Engine Coolant Temperature)/thermo sensor	23 N•m (2.3 kgf•m, 17 lbf•ft)	Apply sealant to the threads.
Thermostat cover flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt
Cooling fan nut	3 N•m (0.27 kgf•m, 2.0 lbf•ft)	Apply a locking agent to the threads.
Fan motor nut	5 N•m (0.5 kgf•m, 3.6 lbf•ft)	
Fan motor shroud mounting bolt	8 N•m (0.8 kgf•m, 5.8 lbf•ft)	

## TROUBLESHOOTING

#### Engine temperature too high

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

#### Engine temperature too low

- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck open
- Faulty fan control relay

#### Coolant leak

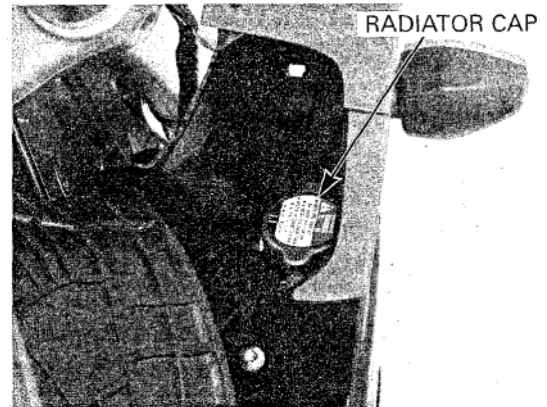
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Damaged or deteriorated gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose
- Faulty radiator cap

## SYSTEM TESTING

### COOLANT (HYDROMETER TEST)

Remove the right duct cover (page 2-4) .

Remove the radiator cap.



Test the coolant specific gravity using a hydrometer (see below for "Coolant gravity chart").  
For maximum corrosion protection, a 1:1 solution of ethylene glycol and distilled water is recommended (page 6-4).  
Look for contamination and replace the coolant if necessary.



### COOLANT GRAVITY CHART

Coolant temperature °C (°F)	0	5	10	15	20	25	30	35	40	45	50
Coolant ratio %	(32)	(41)	(50)	(59)	(68)	(77)	(86)	(95)	(104)	(113)	(122)
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

*Before installing the cap in the tester, wet the sealing surfaces*

Remove the radiator cap (page 6-3).

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:

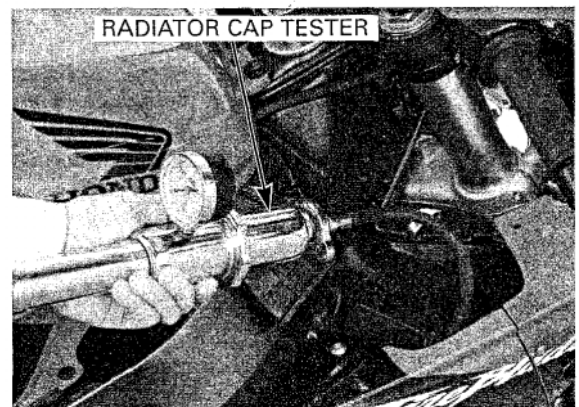
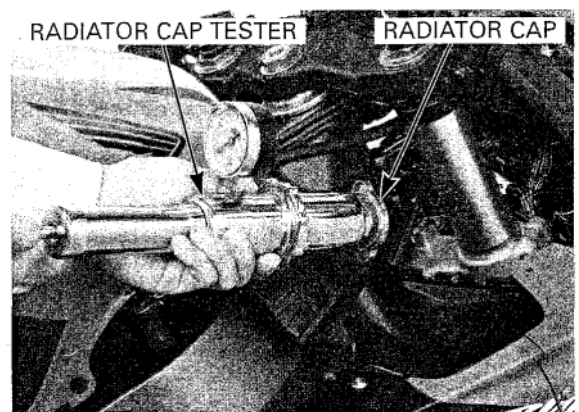
108 – 137 kPa (1.1 – 1.4 kgf/cm<sup>2</sup>, 16 – 20 psi)

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

#### NOTICE

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

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



## COOLANT REPLACEMENT

### PREPARATION

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

#### RECOMMENDED ANTIFREEZE:

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

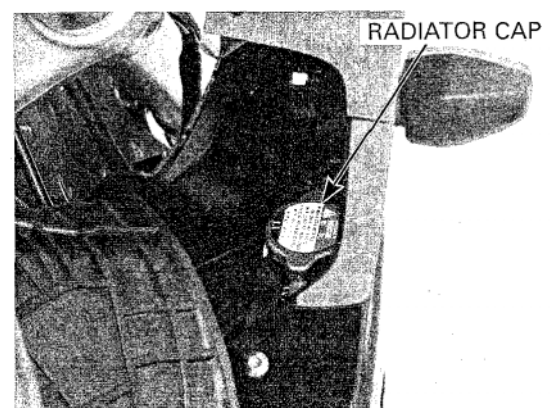
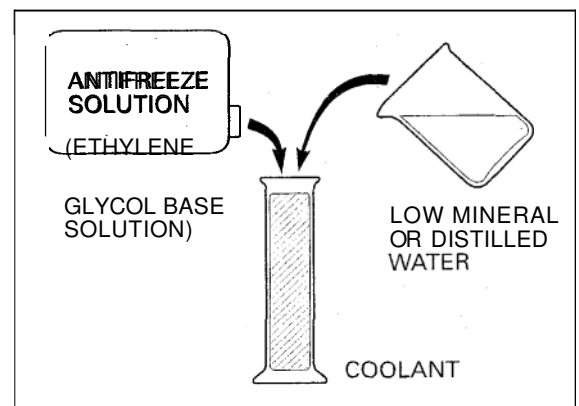
#### RECOMMENDED MIXTURE:

1:1 (Distilled water and antifreeze)

*When filling the system or reserve tank with coolant (checking coolant level), place the motorcycle in a vertical position on a flat, level surface*

### REPLACEMENT/AIR BLEEDING

Remove the radiator cap.

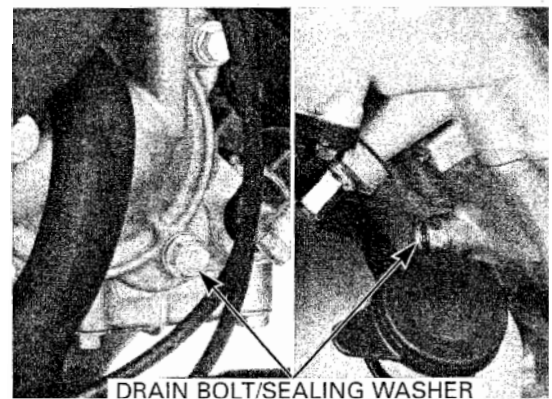


Remove the lower cowl (page 2-7)

Remove the drain bolt on the water pump cover and drain the system coolant.

Remove the cylinder drain bolt and drain the coolant from the cylinder.

Reinstall the drain bolt with a new sealing washer.

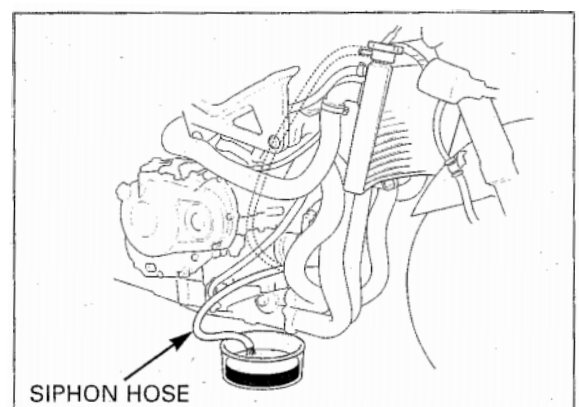


Disconnect the siphon hose from the radiator.

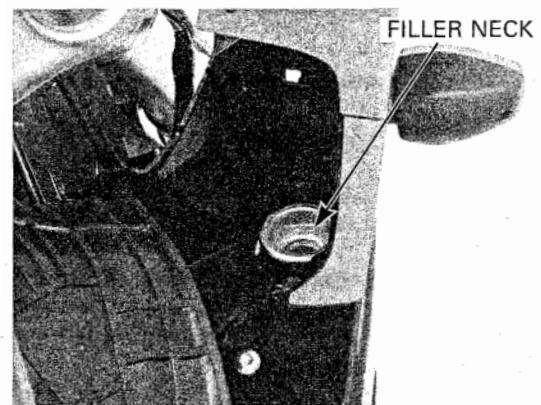
Drain the reserve tank coolant.

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

Reinstall the radiator siphon hose.



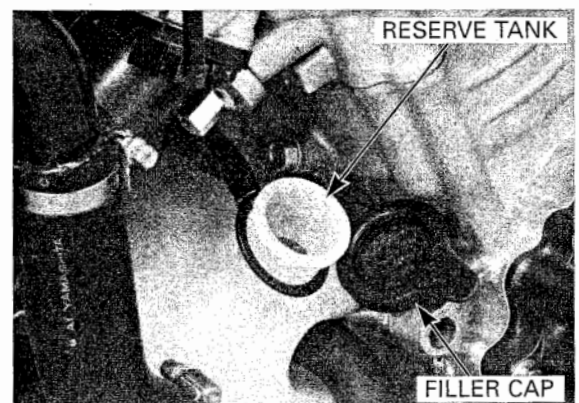
Fill the system with the recommended coolant through the filler opening up to the filler neck.



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

Bleed air from the system as follow:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. **Snap** the throttle three to four times to bleed air from the system.
3. **Stop** the engine and add coolant up to 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.



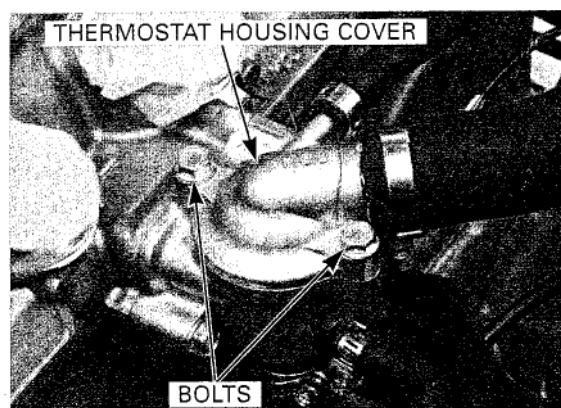
## COOLING SYSTEM

### THERMOSTAT

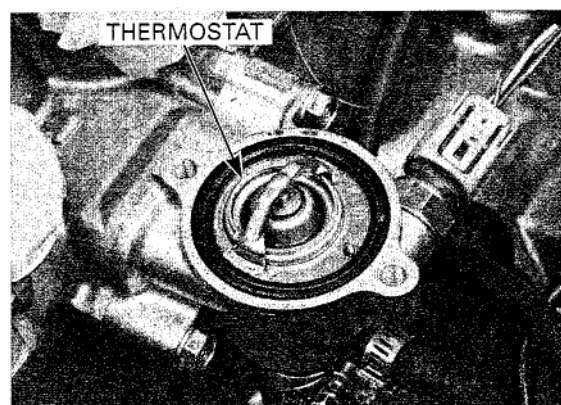
#### THERMOSTAT REMOVAL

Drain the coolant (page 6-4).  
Remove the throttle body (page 5-67).

Remove the bolts and thermostat housing cover.



Remove the thermostat from the housing.



#### INSPECTION

Wear insulated gloves and adequate eye protection.  
Keep flammable materials away from the electric heating element.

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

*Do not let the thermostat or thermometer touch the pan, or you will get false reading*

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

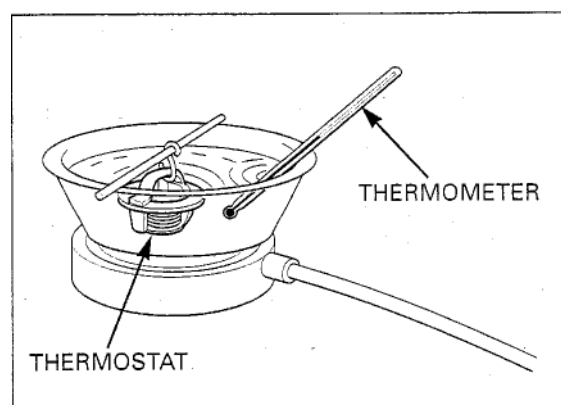
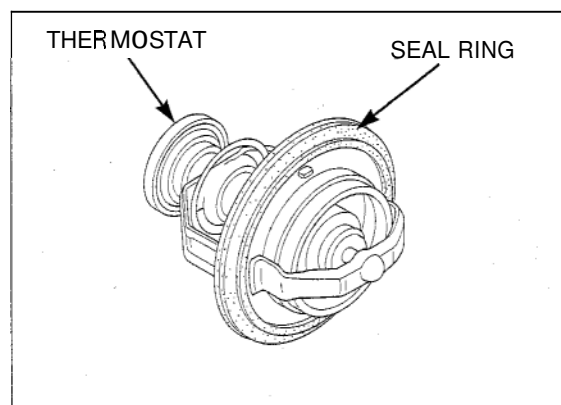
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

#### THERMOSTAT BEGIN TO OPEN:

80.5- 83.5°C (177 - 182 °F)

#### VALVE LIFT:

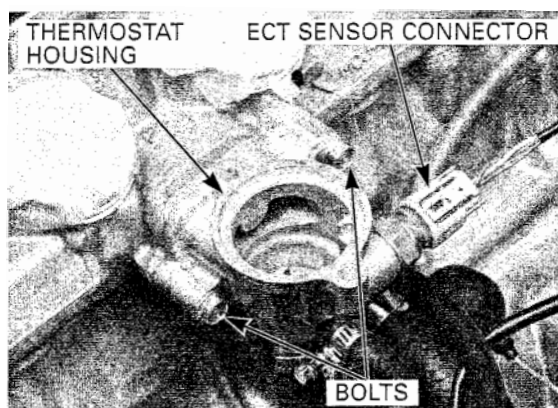
8 mm (0.3 in) minimum at 95 °C (203 °F)



### THERMOSTAT HOUSING REMOVAL

Disconnect the ECT sensor connector.

Remove the bolts and thermostat housing from the cylinder head.

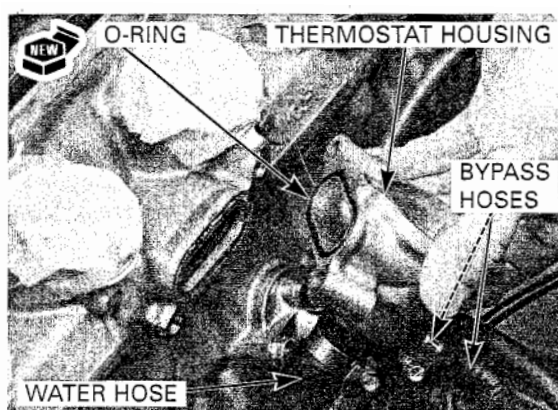


Disconnect the fast idle wax unit water hose and bypass hoses from the thermostat housing.

### THERMOSTAT HOUSING INSTALLATION

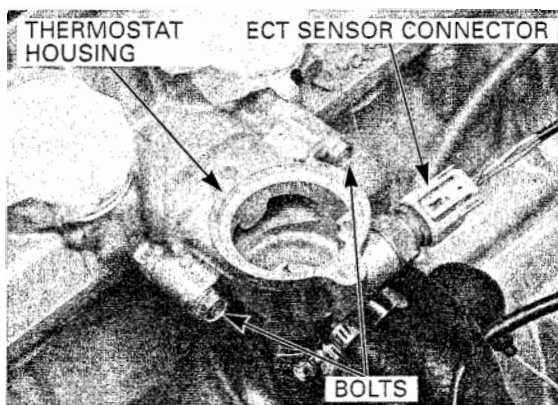
Connect the fast idle wax unit water hose and bypass hoses.

Install a new O-ring into the groove of the thermostat body.  
Install the thermostat housing onto the cylinder head.



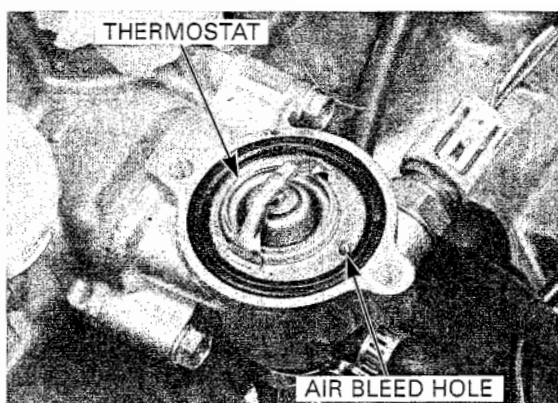
Install and tighten the thermostat housing mounting bolts.

Connect the ECT sensor connector.



### THERMOSTAT INSTALLATION

Install the thermostat into the housing with its air bleed hole facing rearward.

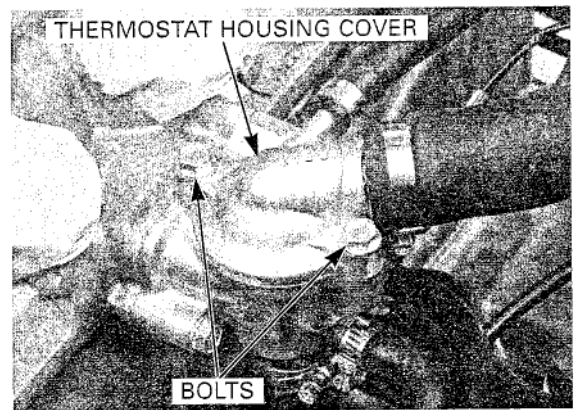




## COOLING SYSTEM

Install the thermostat housing cover onto the housing.  
Install and tighten the housing cover bolts.

Fill the system with the recommended coolant and bleed any air (page 6-5).



## RADIATOR

### REMOVAL

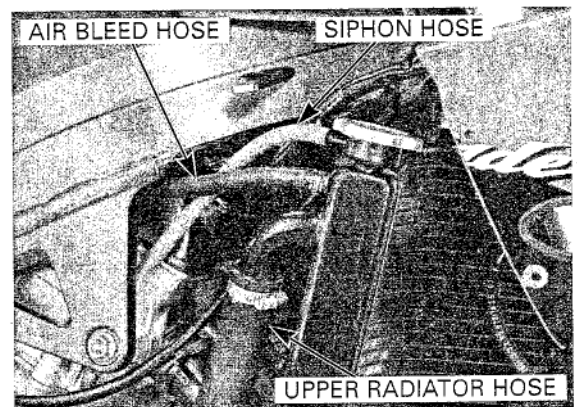
Remove the following:

- Lower cowl (page 2-7)
- Inner middle cowl (page 2-7)

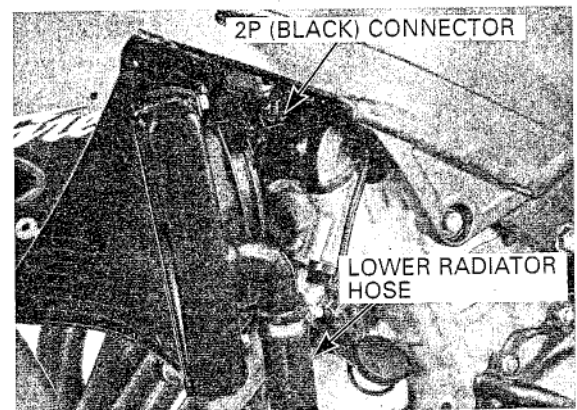
Drain the coolant (page 6-4).

Disconnect the siphon hose and air bleed hose from the radiator.

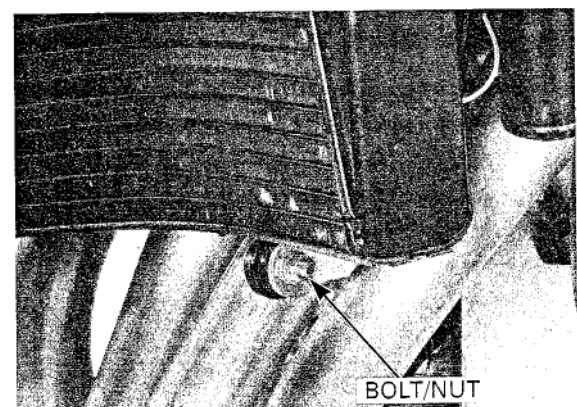
Disconnect the upper radiator hose.



Disconnect the radiator fan motor 2P (Black) connector.  
Disconnect the lower radiator hose.

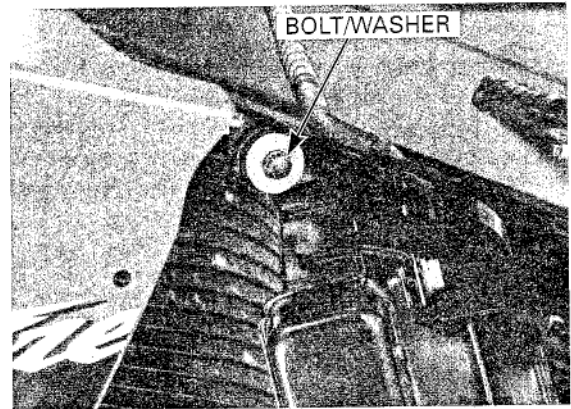


Remove the radiator lower mounting bolt/nut



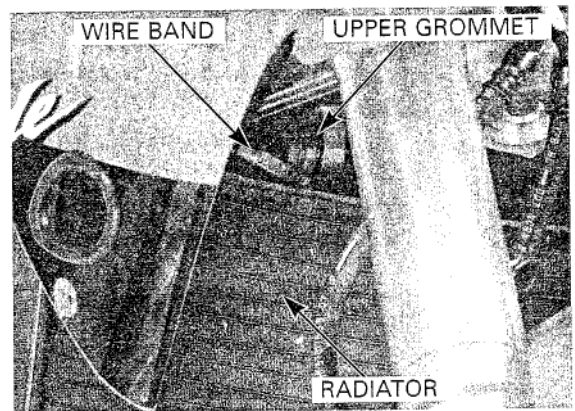
## COOLING SYSTEM

Remove the radiator upper mounting bolt and washer.



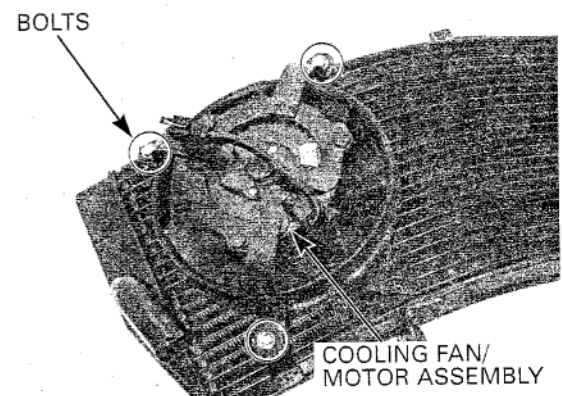
Slide the radiator to the right, then release the upper grommet from the frame boss. Remove the radiator assembly.

*Be careful not to damage the radiator core*

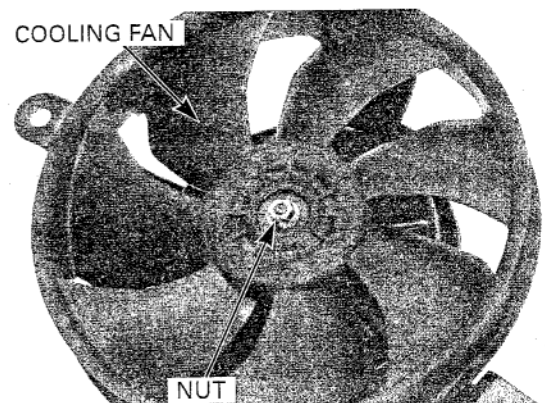


### DISASSEMBLY

Remove the three bolts and cooling fan/motor assembly.

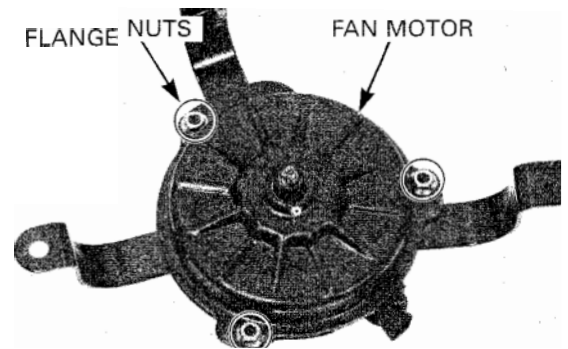


Remove the nut, cooling fan and distance collar.

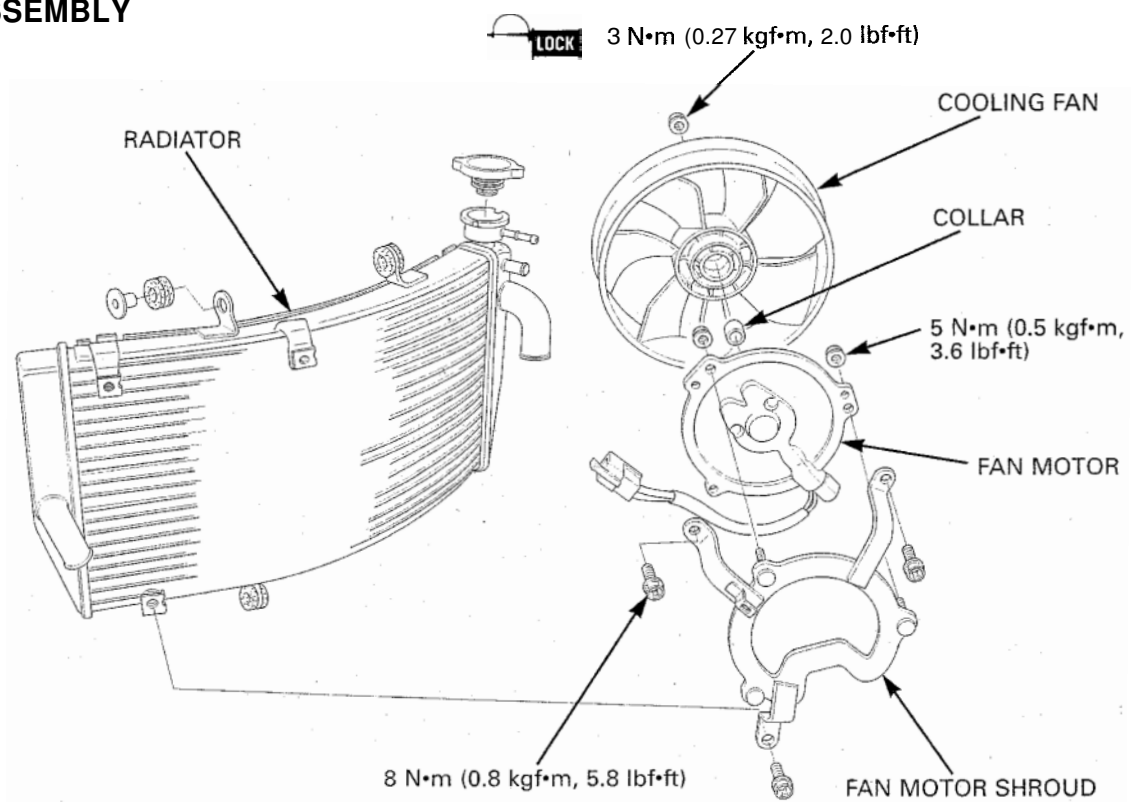


## COOLING SYSTEM

Remove the flange nuts and fan motor from the fan motor shroud.

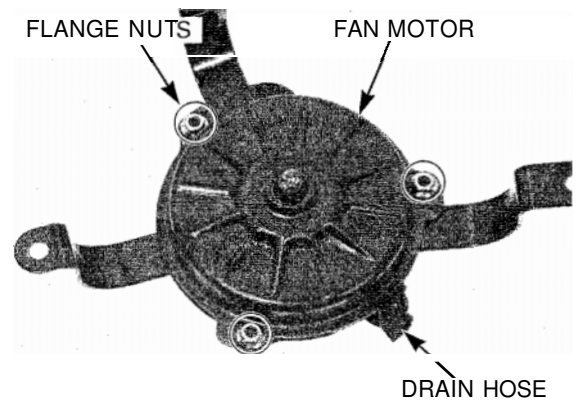


## ASSEMBLY



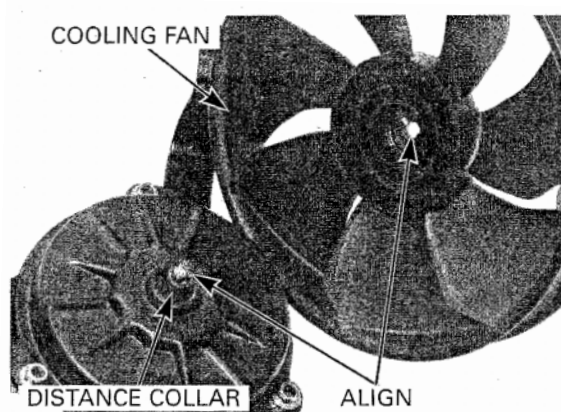
Install the fan motor onto the fan motor shroud with the drain hose facing as shown. Tighten the flange nuts to the specified torque.

**TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)**



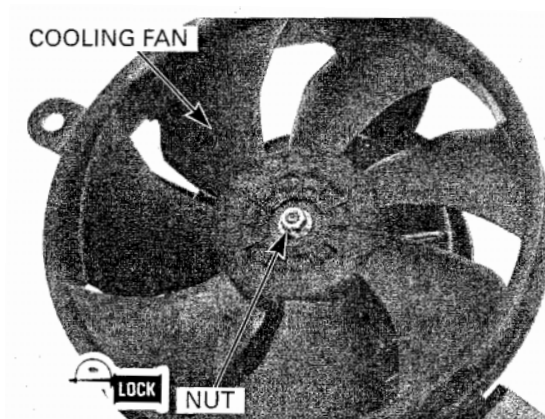
## COOLING SYSTEM

Install the distance collar onto the fan motor shaft.  
Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



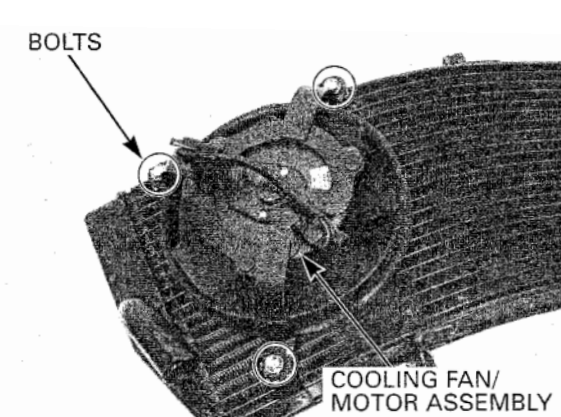
Apply a locking agent to the cooling fan nut threads.  
Install and tighten the nut to the specified torque.

**TORQUE: 3 N·m (0.27 kgf·m, 2.0 lbf·ft)**



Install the cooling fan/motor assembly onto the radiator.  
Install and tighten the bolts to the specified torque.

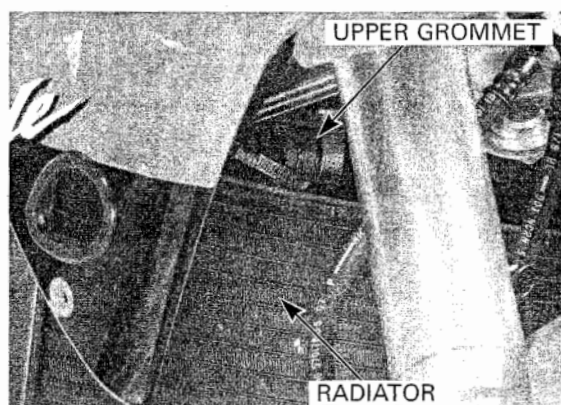
**TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)**



## INSTALLATION

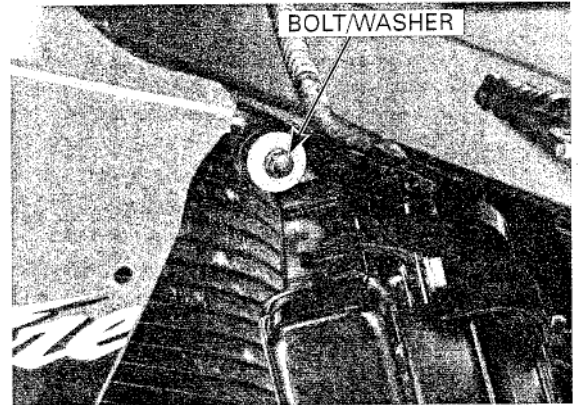
*Be careful not to damage the radiator core.*

install the radiator assembly, aligning its grommet with the frame boss.

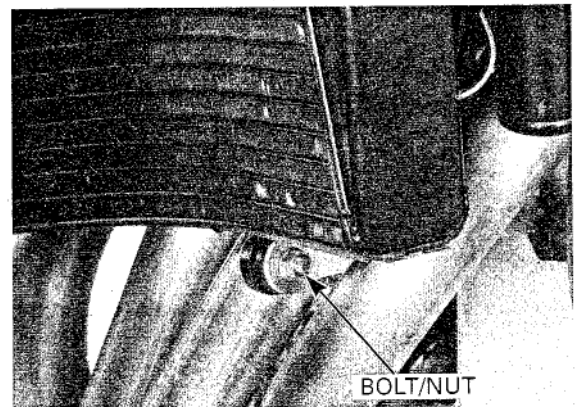


## COOLING SYSTEM

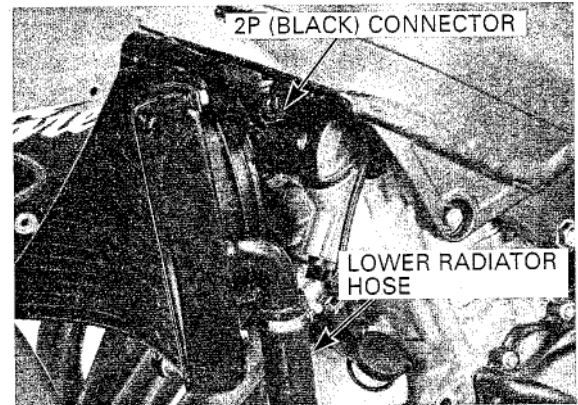
Install the washer and upper mounting bolt, then tighten the bolt.



Install the radiator lower mounting bolt/nut, tighten the nut securely.



Connect the fan motor **2P** (Black) connector.  
Connect the lower radiator hose and tighten the clamp screw securely.

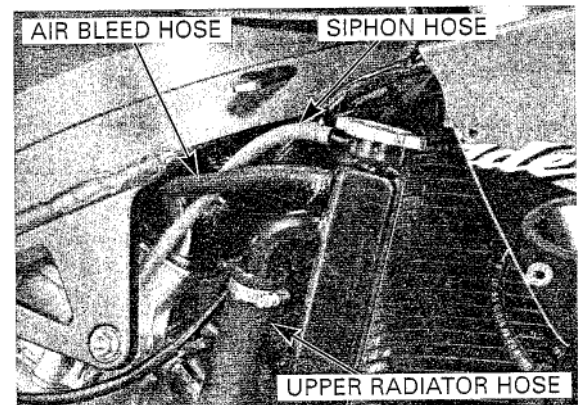


Connect the upper radiator hose and tighten the clamp screw securely.  
Connect the siphon hose and air bleed hose to the radiator.

Fill the system with the recommended coolant (page 6-5).

Install the following:

- Inner middle cowl (page 2-7)
- Lower cowl (page 2-7)



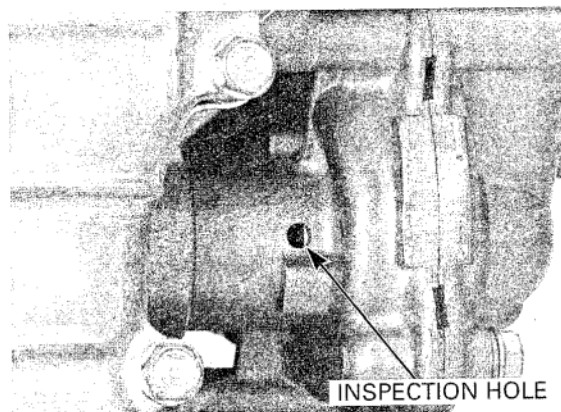
## WATER PUMP

### MECHANICAL SEAL INSPECTION

Remove the lower cowl (page 2-7).

Inspect the inspection hole for signs of coolant leakage.

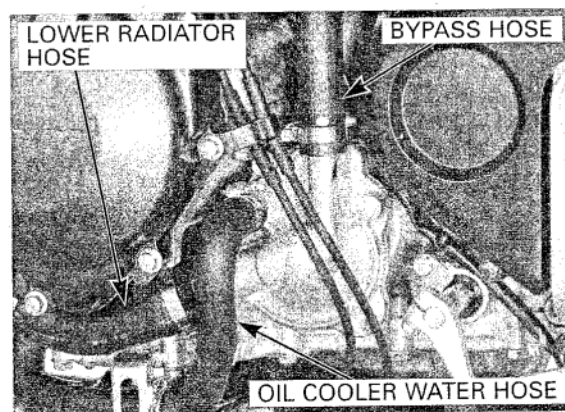
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



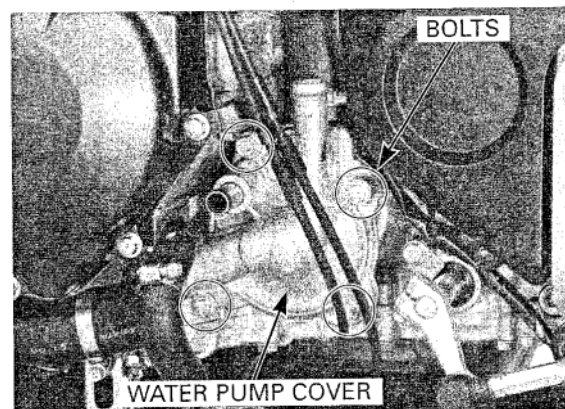
### REMOVAL

Drain the coolant (page 6-4).

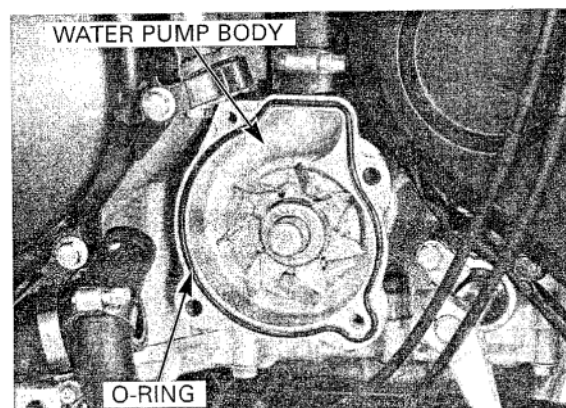
Disconnect the lower radiator hose, bypass hose and oil cooler water hose from the water pump cover.



Remove the two SH bolts, two flange bolts and water pump cover.



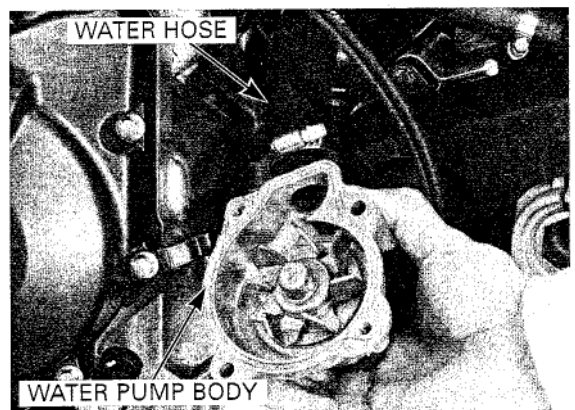
Remove the O-ring from the water pump body.  
Remove the water pump body from the crankcase.



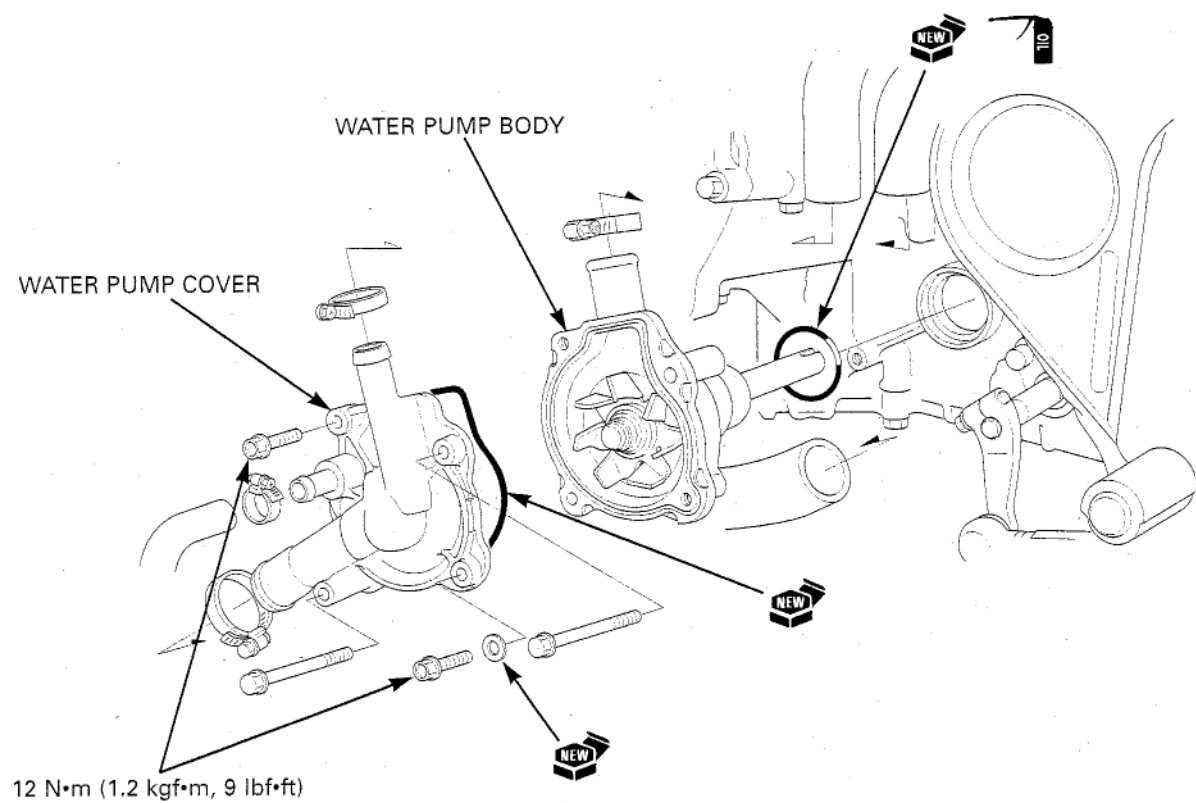


## COOLING SYSTEM

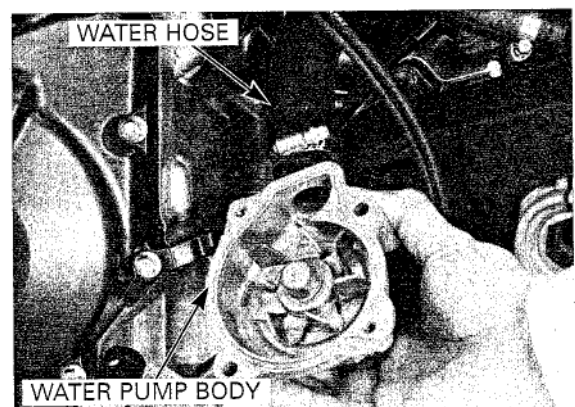
Disconnect the water pump-to-water joint hose from the water pump body.



## INSTALLATION

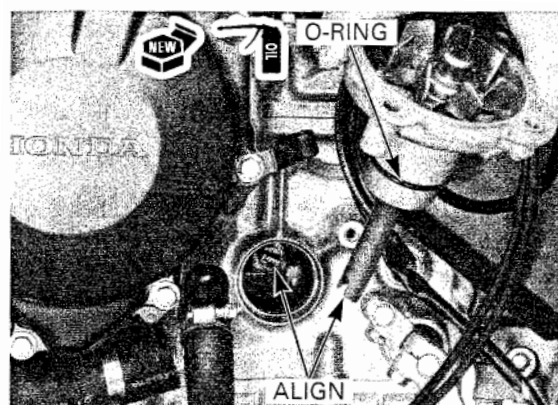


Connect the water pump-to-water joint hose to the water pump and tighten the clamp screw.



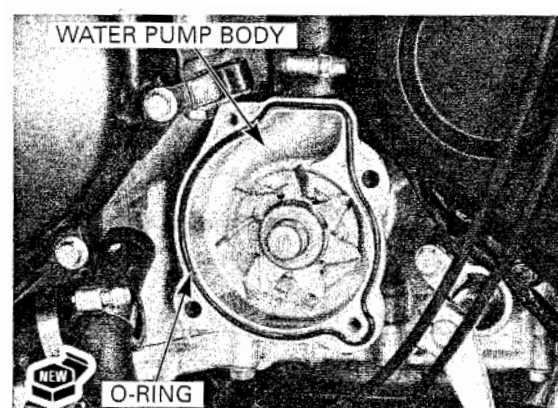
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with the oil pump shaft end.



Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

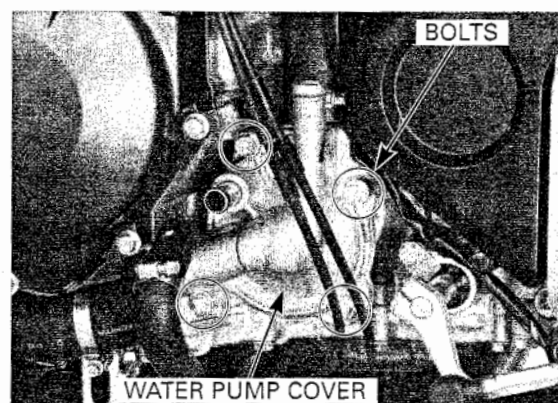
Install a new O-ring into the groove in the water pump body.



Install the water pump cover, two SH bolts and two flange bolts.  
Tighten the flange bolts to the specified torque.

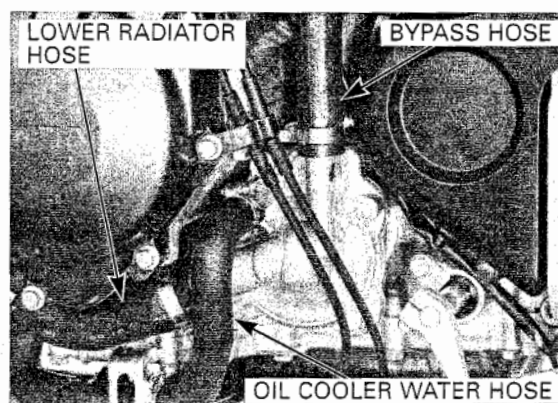
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Tighten the two **SH** bolts.



Connect the lower radiator hose, bypass hose and oil cooler water hose, then tighten the clamp screws.

Fill the system with the recommended coolant (page 6-5).





### RADIATOR RESERVE TANK

#### REMOVAL

Remove the lower cowl (page 2-7).

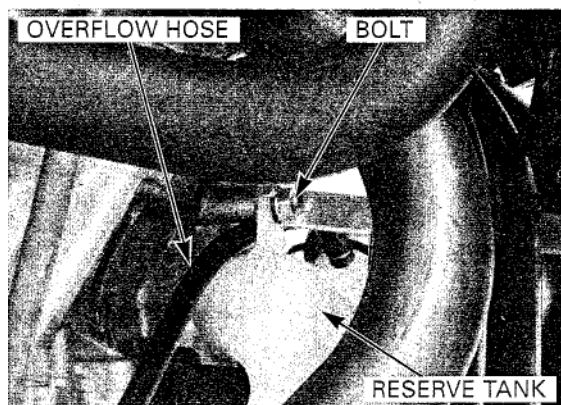
Disconnect the siphon hose and drain coolant from the reserve tank.

Remove the radiator reserve tank lower mounting bolt.

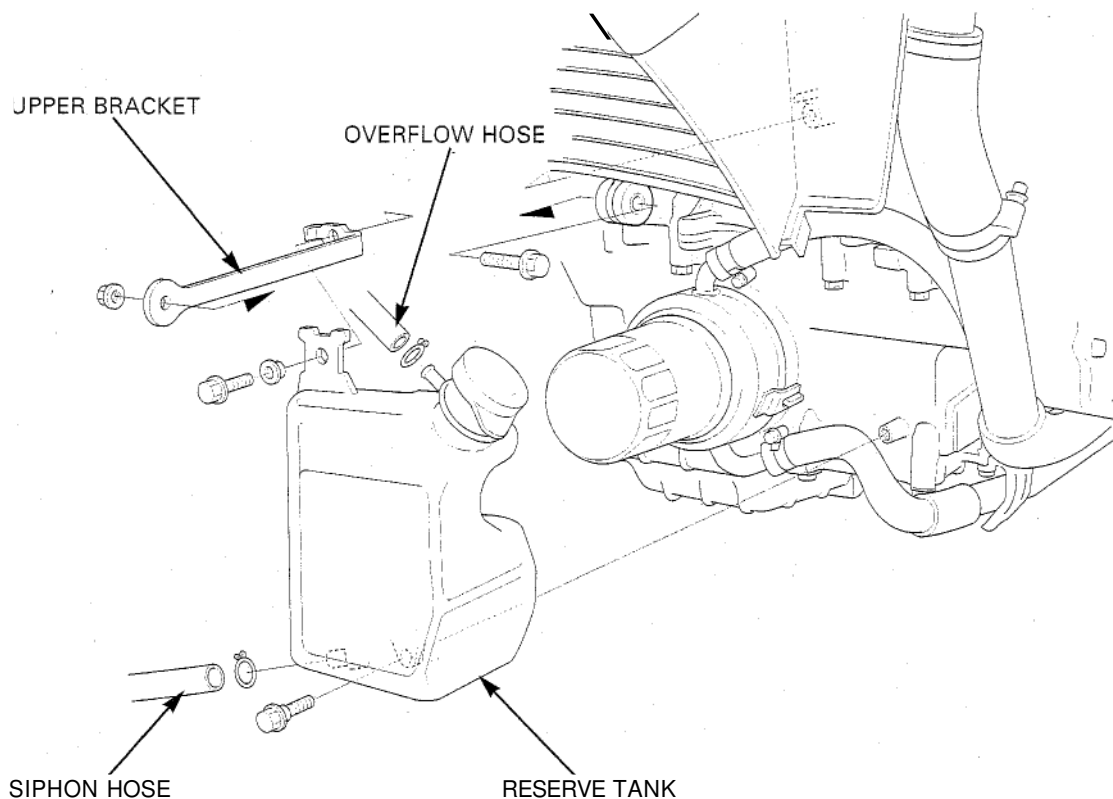


Remove the reserve tank upper mounting bolt and reserve tank.

Disconnect the overflow hose.

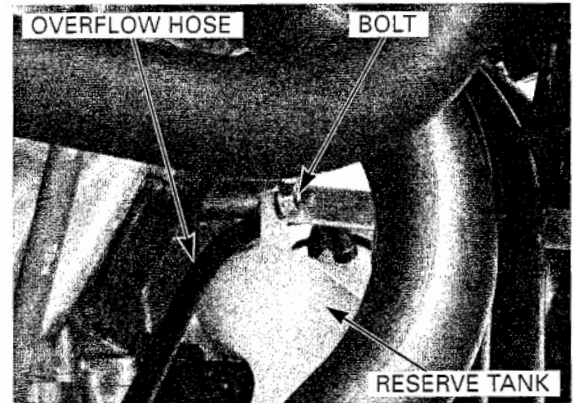


#### INSTALLATION



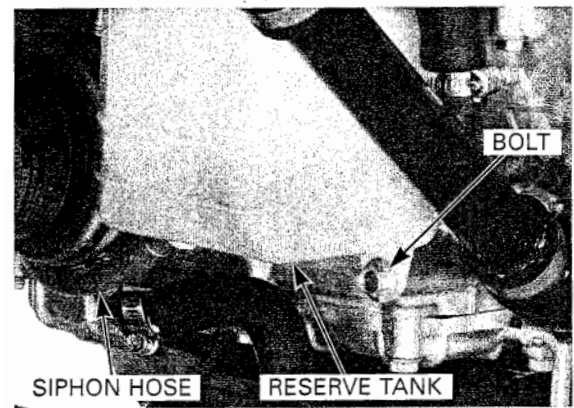
Route the overflow hose properly (page 1-29).

Install and tighten the reserve tank upper mounting bolt.



Install and tighten the lower mounting bolt.  
Connect the siphon hose to the reserve tank

Install the removed parts in the reverse order of removal.

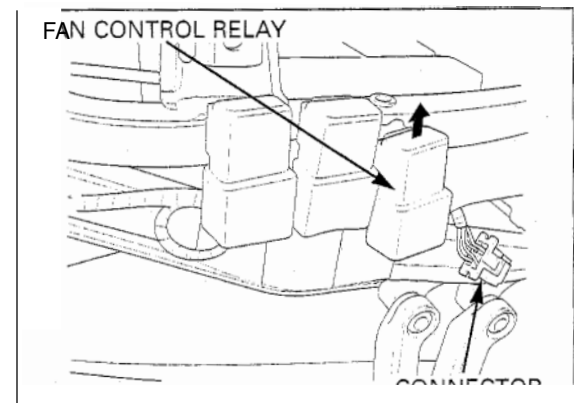


## FAN CONTROL RELAY

### INSPECTION

Remove the rear cowl (page 2-2).

Disconnect the fan control relay connector.  
Remove the fan control relay.



Connect the ohmmeter to the fan control relay connector terminals.

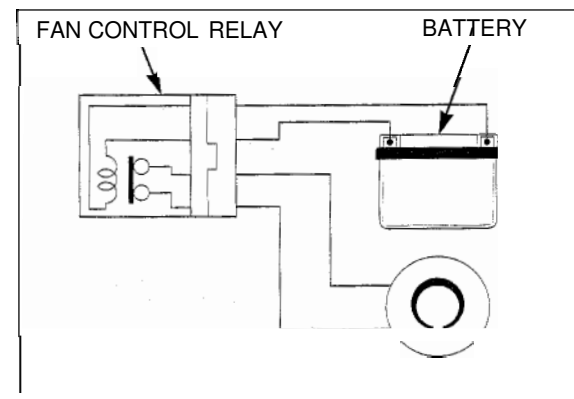
**CONNECTION: Green/Yellow - Black/White**

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

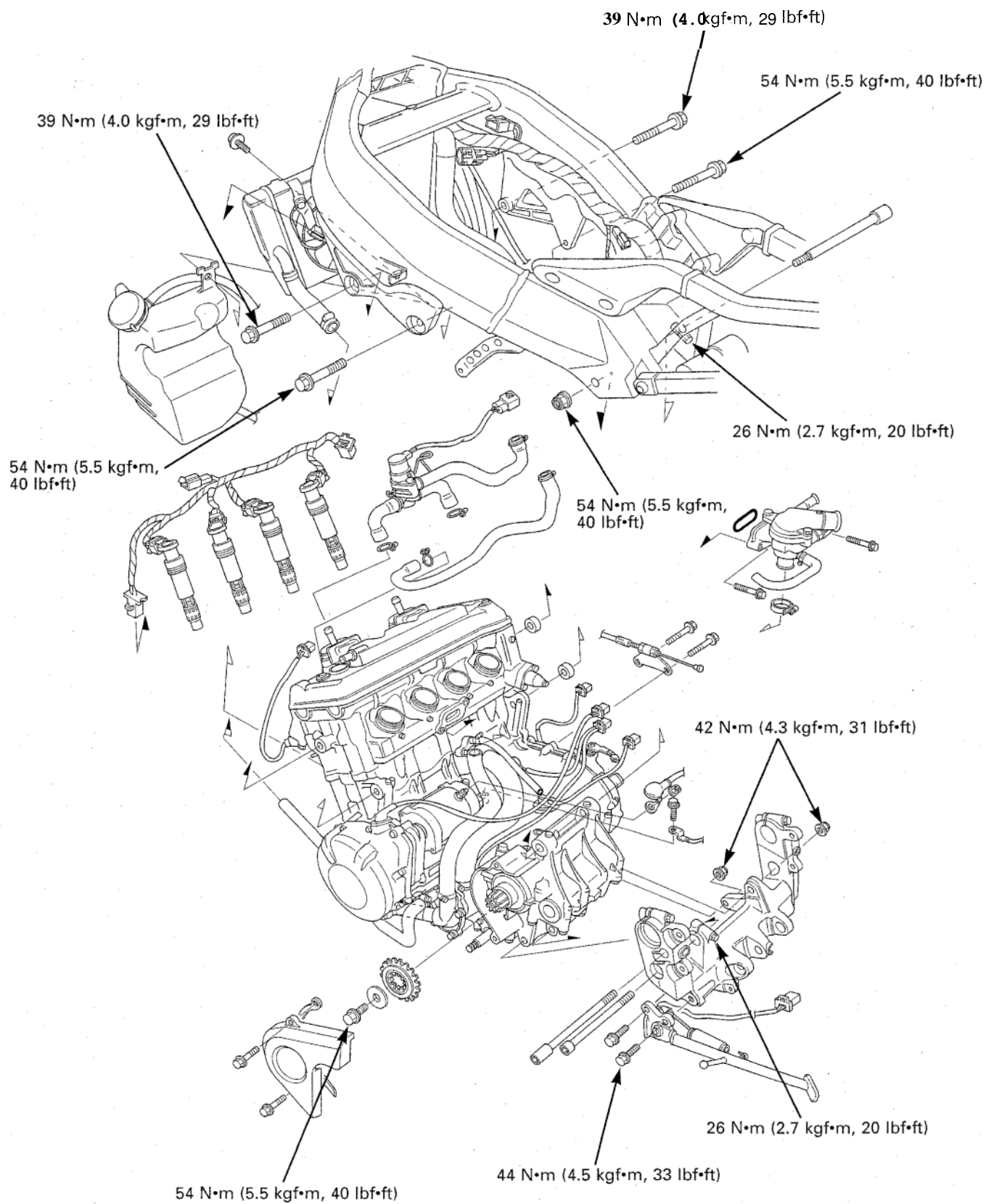
**CONNECTION: Red/Green - Black/Blue**

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

If there is no continuity when the 12V battery is connected, replace the fan control relay.



## ENGINE REMOVAL/INSTALLATION



# 7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE INSTALLATION	7-7
LOWER BRACKET REMOVAL	7-2	LOWER BRACKET INSTALLATION	7-12
ENGINE REMOVAL	7-3		

## SERVICE INFORMATION

### GENERAL

- During engine removal and installation, support the motorcycle using a hoist or equivalent.
- Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

### NOTICE

*Do not use the oil filter as a jacking point.*

7

- The following components can be serviced with the engine installed in the frame.
  - Alternator (Section 10)
  - Camshaft (Section 8)
  - Clutch (Section 9)
  - Gearshift linkage (Section 9)
  - Oil cooler (Section 4)
  - Oil pump (Section 4)
  - Shift forks/shift drum (Section 9)
  - Water pump (Section 6)

ITEM		SPECIFICATIONS
Engine dry weight		61.2 kg (134.9 lbs)
Coolant capacity	Radiator and engine	3.1 liter (3.3 <b>US</b> qt, 2.7 Imp qt)
Engine oil capacity	At disassembly	4.0 liter (4.2 <b>US</b> qt, 3.5 Imp qt)

### TORQUE VALUES

Lower bracket mounting nut, 10 mm	42 N•m (4.3 kgf•m, 31 lbf•ft)	U-nut, see page 7-12
Lower bracket mounting pinch bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	
Engine hanger bolt (front)	39 N•m (4.0 kgf•m, 29 lbf•ft)	See page 7-7
Engine hanger bolt (middle)	54 N•m (5.5 kgf•m, 40 lbf•ft)	
Engine hanger nut (rear)	54 N•m (5.5 kgf•m, 40 lbf•ft)	ALOC bolt
Rear engine hanger pinch bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	
Swingarm pivot nut	118 N•m (12.0 kgf•m, 87 lbf•ft)	
Swingarm pivot pinch bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	
Side stand bracket bolt	44 N•m (4.5 kgf•m, 33 lbf•ft)	
Drive sprocket special bolt	54 N•m (5.5 kgf•m, 40 lbf•ft)	

### TOOL

Rod holder, 24 x 27 mm	07930-KA50100
------------------------	---------------

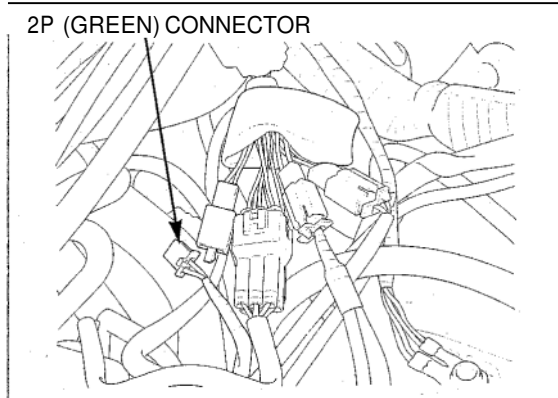
### LOWER BRACKET REMOVAL

Open and support the front end of the fuel tank (page 3-4).

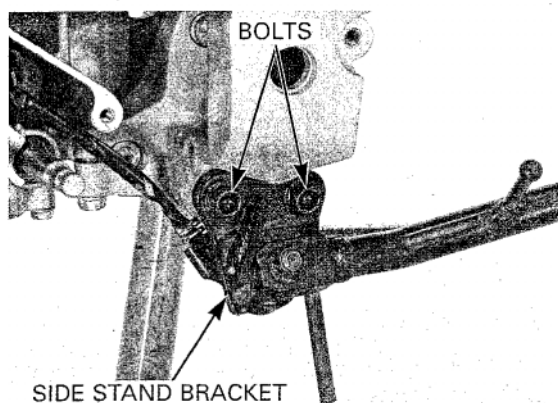
Remove the following:

- Muffler/exhaust pipe (page 2-13)
- Suspension linkage (page 14-9)
- Rear shock absorber (page 14-11)
- Swingarm (page 14-14)

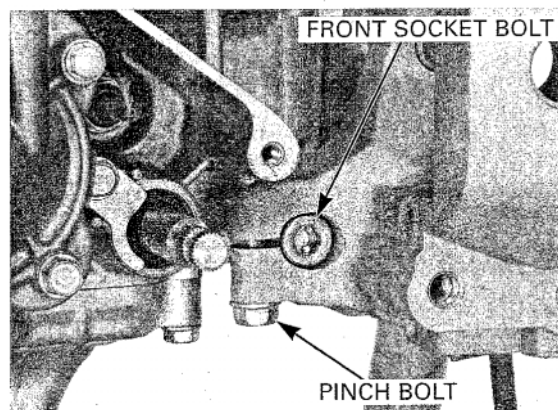
Disconnect the side stand 2P (Green) connector.



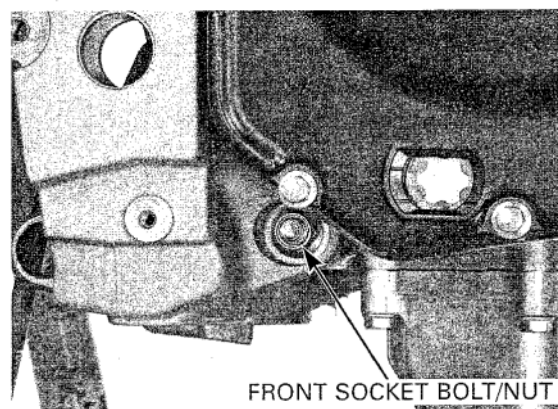
Remove the bolts and side stand bracket assembly.



Loosen the lower bracket front pinch bolt.

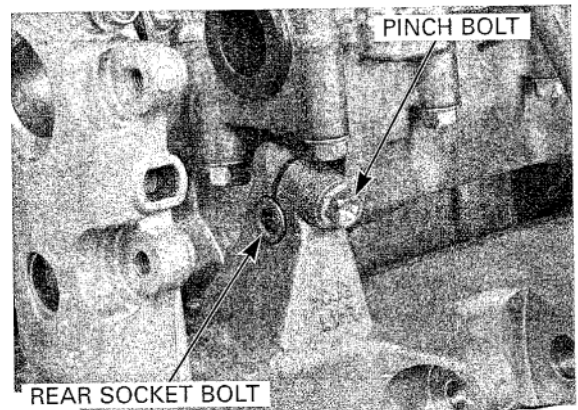


Remove the lower bracket front socket bolt and nut.

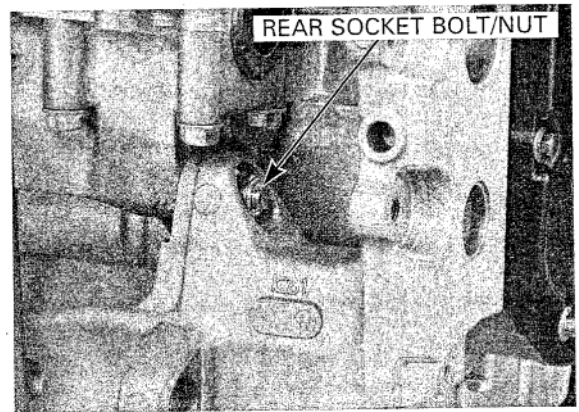


## ENGINE REMOVAL/INSTALLATION

Loosen the lower bracket rear pinch bolt.



Remove the lower bracket rear socket bolt and nut, then remove the lower bracket from the engine.

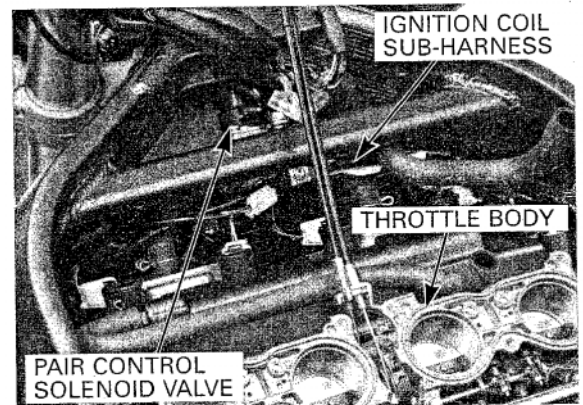


## ENGINE REMOVAL

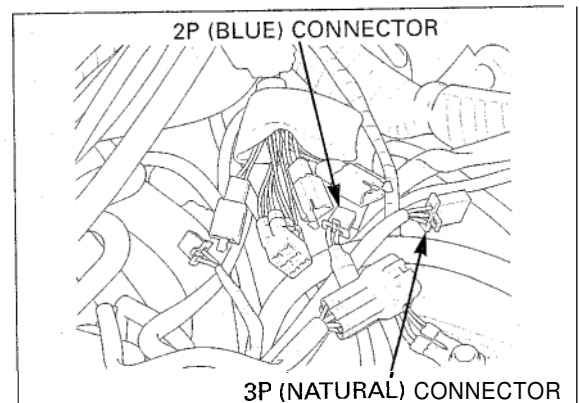
Drain the engine oil (page 3-15).  
Drain the coolant (page 6-4).

Remove the following:

- Fuel tank (page 5-59)
- EGCV and air intake valve servo motor (page 5-95)
- Throttle body (page 5-67)
- Lower bracket (page 7-2)
- PAIR control solenoid valve assembly (page 5-88)
- Ignition coil/spark plug sub-harness

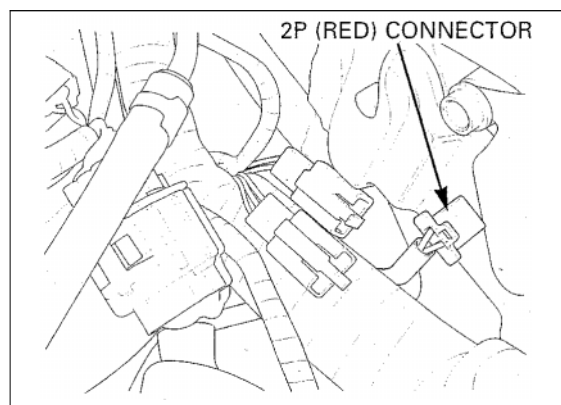


Disconnect the speed sensor 3P (Natural) connector and engine sub-harness 2P (Blue) connector

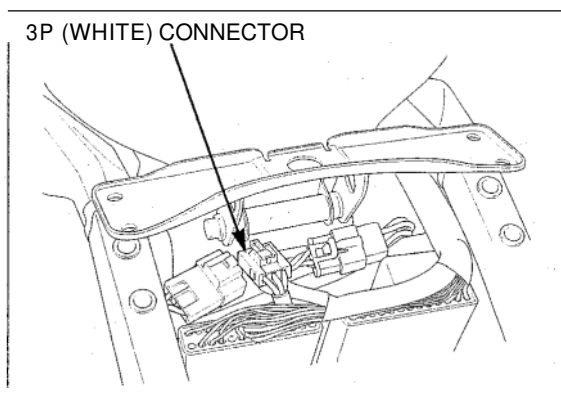


## ENGINE REMOVAL/INSTALLATION

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

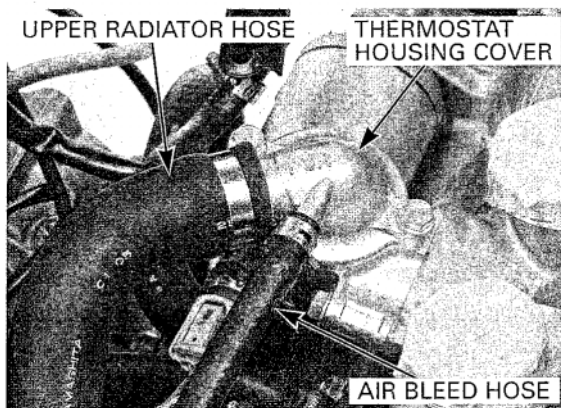


Disconnect the alternator 3P (White) connector.



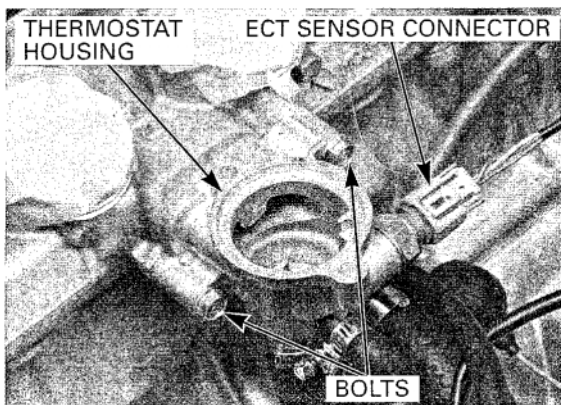
Disconnect the air bleed hose and upper radiator hose from the thermostat housing cover.

Remove the thermostat housing cover and thermostat (page 6-6).



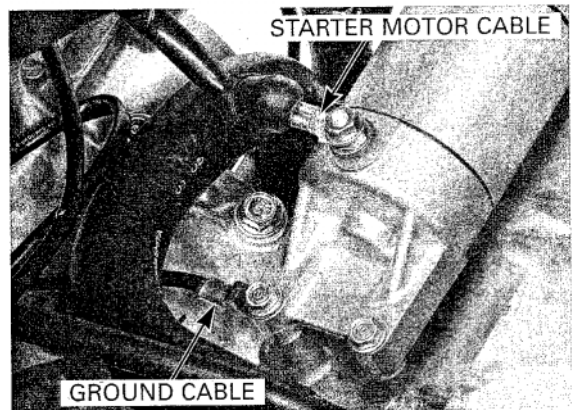
Disconnect the ECT sensor connector.

Remove the bolts and thermostat housing from the cylinder head.

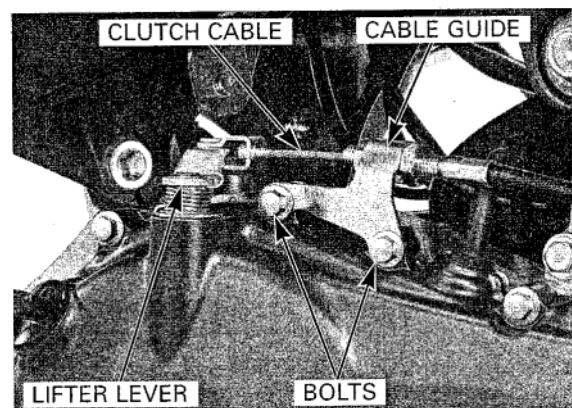


## ENGINE REMOVAL/INSTALLATION

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



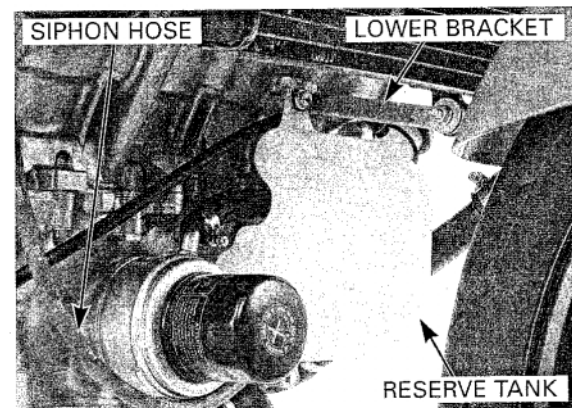
Remove the bolts and clutch cable guide, then disconnect the clutch cable from the clutch lifter lever.



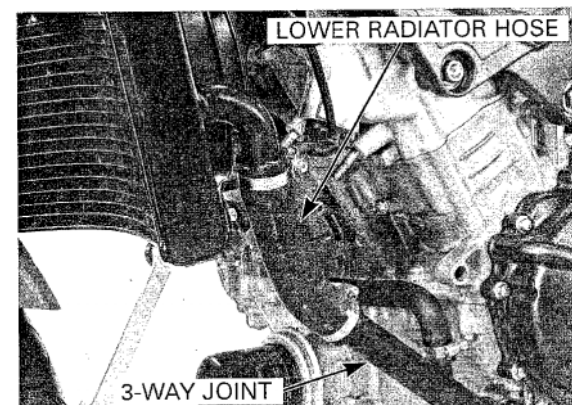
Remove the radiator lower mounting bracket bolt/nut.

Disconnect the siphon hose from the radiator reserve tank.

Remove the bolts, radiator reserve tank and radiator lower mounting bracket.



Disconnect the lower radiator hose from the radiator hose three-way joint.

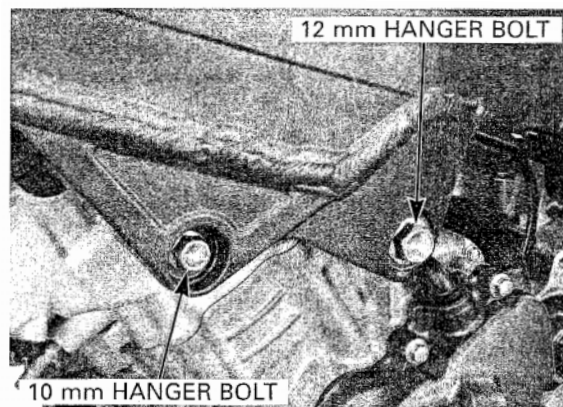




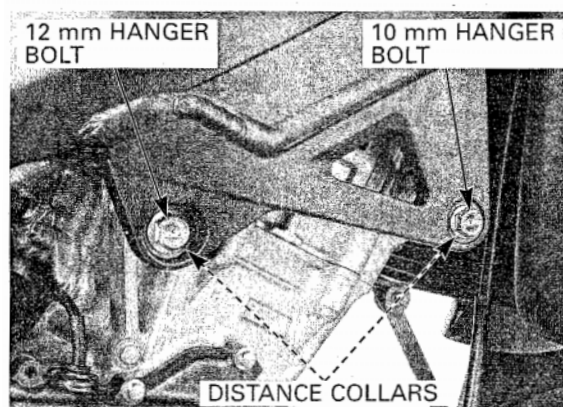
## ENGINE REMOVAL/INSTALLATION

Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

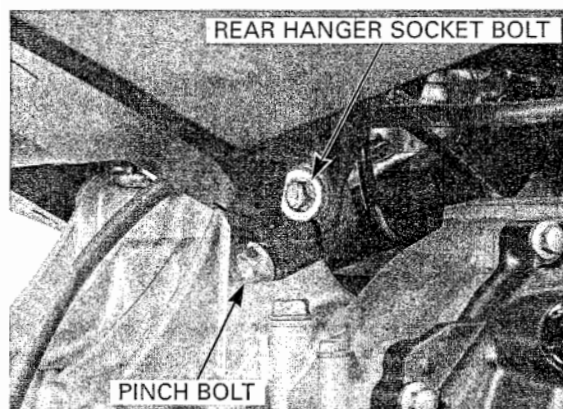
Remove left side of the front (10 mm) and middle (12 mm) engine hanger bolts.



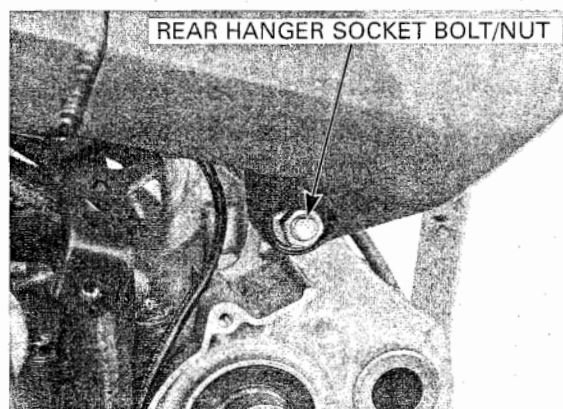
Remove the right side of the front (10 mm) and middle (12 mm) engine hanger bolts and distance collars.



Loosen the rear engine hanger pinch bolt.

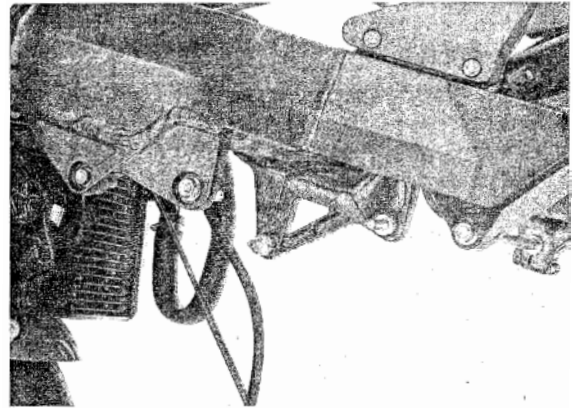


Remove the rear engine hanger socket bolt and nut, then remove the engine from the frame.



## ENGINE INSTALLATION

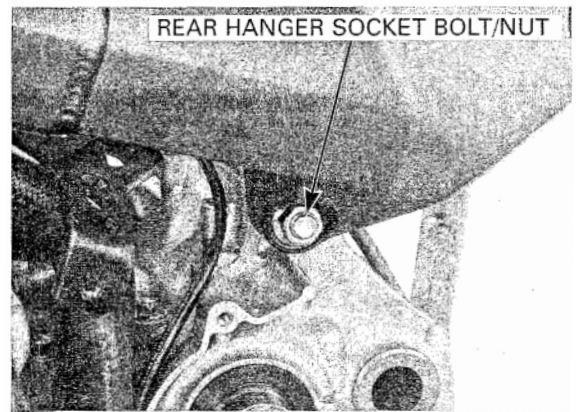
- Note the direction of the hanger bolts.
- Use a floor jack or other adjustable support to carefully maneuver the engine into place.



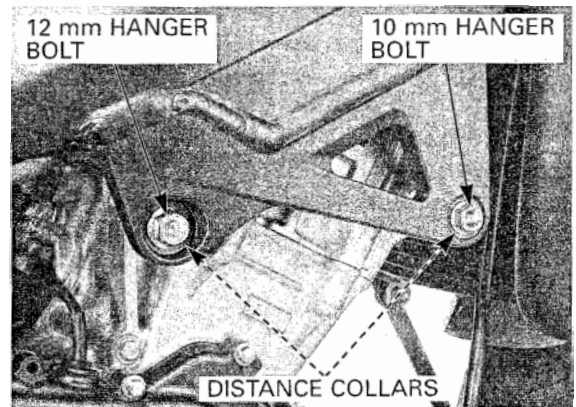
*Be careful not to damage the cam chain tensioner lifter*

Install the engine into the frame.

Install the rear engine hanger socket bolt and nut.



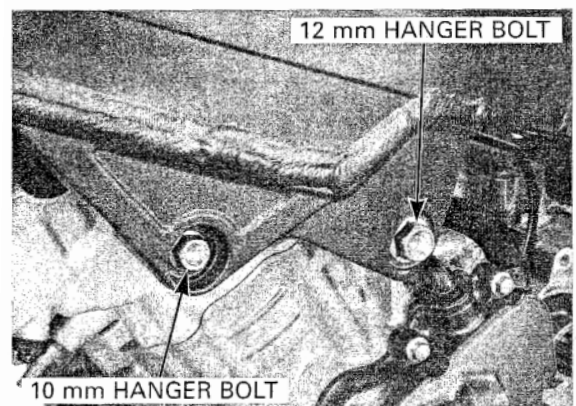
Install the right side of the front (10 mm) and middle (12 mm) engine hanger bolts with the distance collars.



Install the left side of the front (10 mm) and middle (12 mm) engine hanger bolts.

### NOTICE

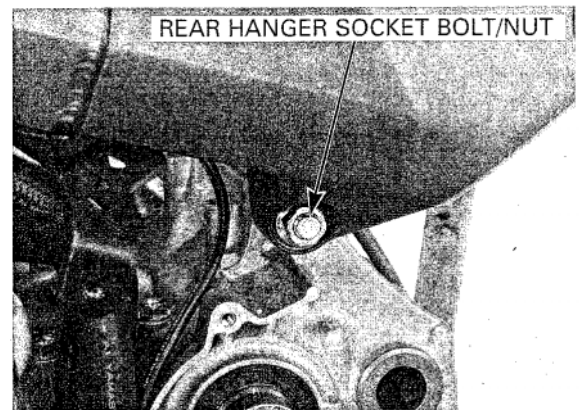
*Install the right and left front engine hanger bolts in their proper locations. Improper installation will damage the cylinder head.*



## ENGINE REMOVAL/INSTALLATION

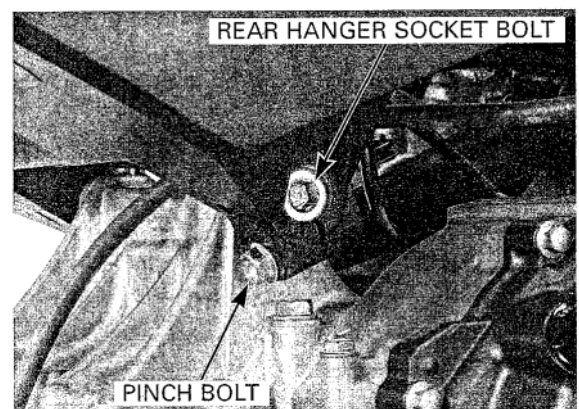
Hold the rear engine hanger socket bolt, then tighten the nut to the specified torque.

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



Tighten the rear engine hanger pinch bolt to the specified torque.

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

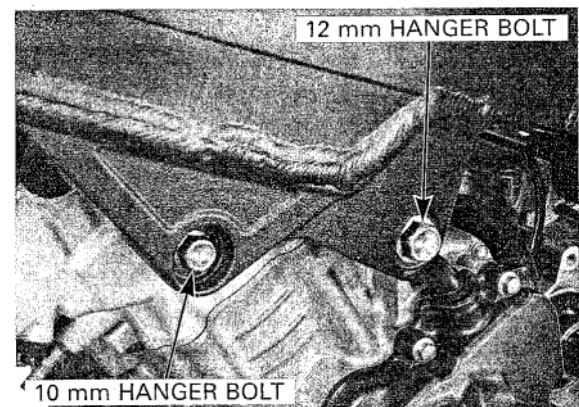


Tighten the left side of the front (10 mm) and middle (12 mm) engine hanger bolt to the specified torque.

**TORQUE:**

**Front (10 mm): 39 N·m (4.0 kgf·m, 29 lbf·ft)**

**Middle (12 mm): 54 N·m (5.5 kgf·m, 40 lbf·ft)**

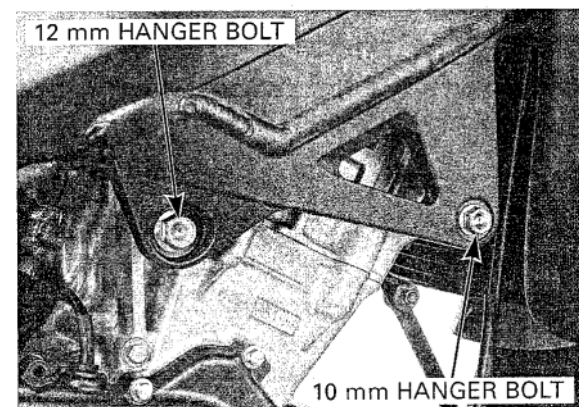


Tighten the right side of the front (10 mm) and middle (12 mm) engine hanger bolt to the specified torque.

**TORQUE:**

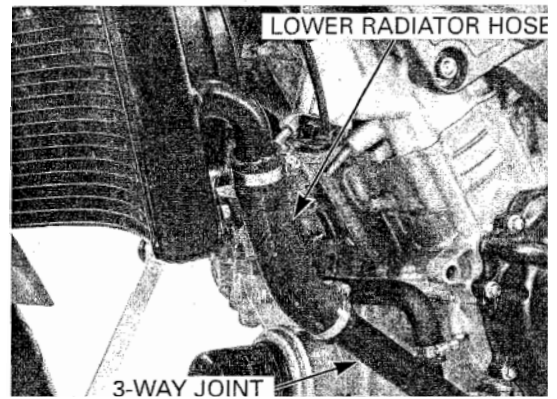
**Front (10 mm): 39 N·m (4.0 kgf·m, 29 lbf·ft)**

**Middle (12 mm): 54 N·m (5.5 kgf·m, 40 lbf·ft)**

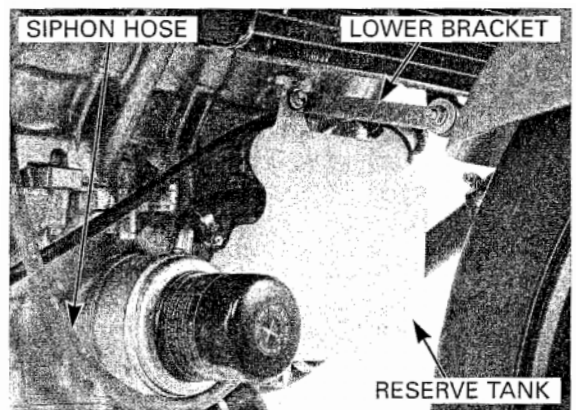


## ENGINE REMOVAL/INSTALLATION

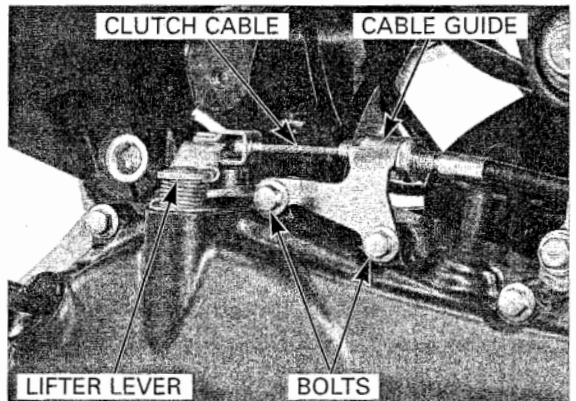
Connect the lower radiator hose to the radiator hose three-way joint and tighten the hose band screw.



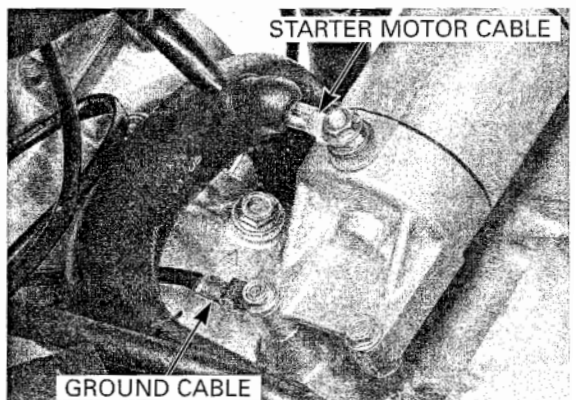
Install the radiator reserve tank and mounting bolts, then tighten the bolts.  
Connect the siphon hose to the reserve tank.  
Install the radiator lower mounting bolt/nut, then tighten the nut securely.



Connect the clutch cable end to the clutch lifter lever.  
Install the clutch cable guide to the right crankcase cover and tighten the mounting bolts securely.

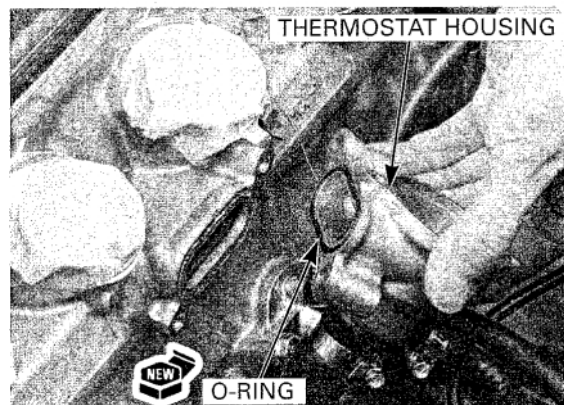


Connect the starter motor ground cable.  
Install and tighten the starter motor mounting bolt.  
Connect the starter motor cable to the motor terminal.  
Install and tighten the terminal nut.



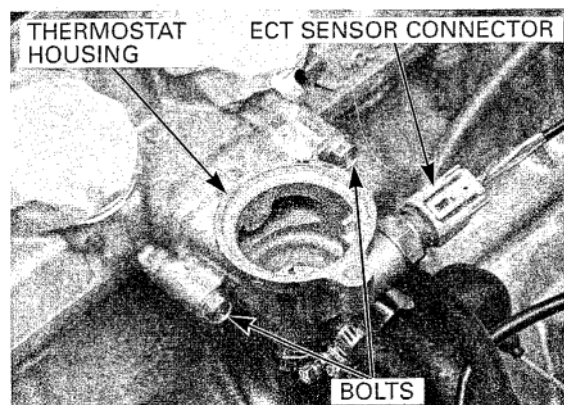
## ENGINE REMOVAL/INSTALLATION

install a new O-ring into the thermostat housing groove.  
Install the thermostat housing to the cylinder head.



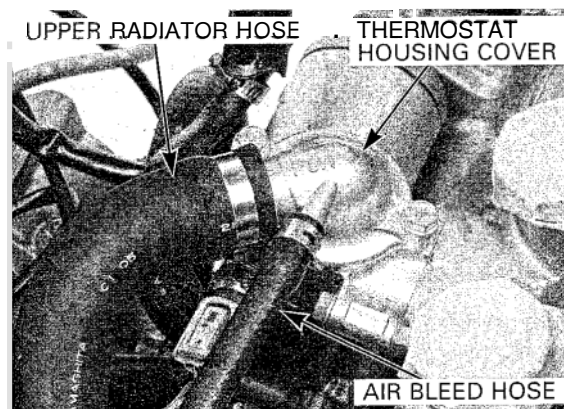
Install and tighten the thermostat housing mounting bolts.

Connect the ECT sensor connector.

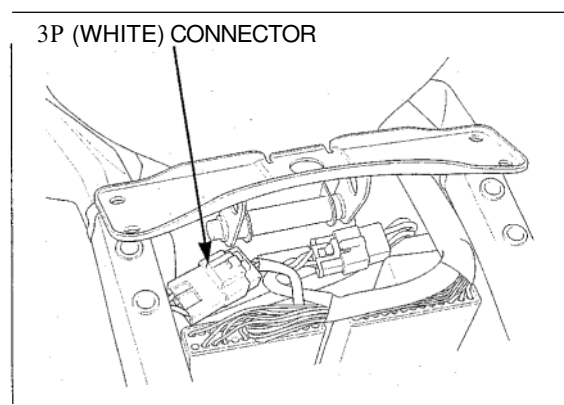


Install the thermostat and thermostat housing cover (page 6-7).

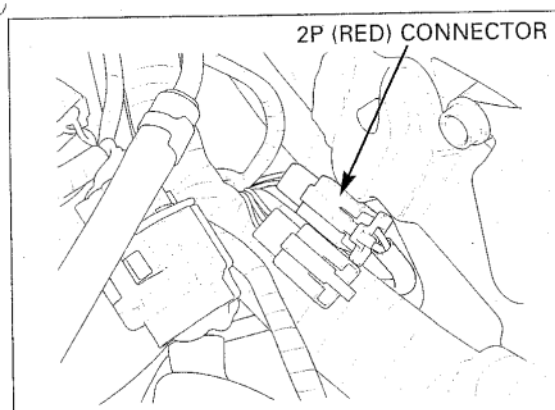
Connect the air bleed hose and upper radiator hose to the thermostat housing cover and tighten the hose band screw.



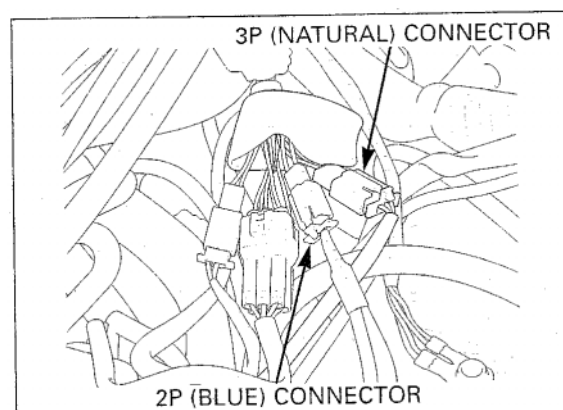
Route the alternator wire and connect the alternator 3P (White) connector.



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



Connect the speed sensor 3P (Natural) connector and engine sub-harness 2P (Blue) connector

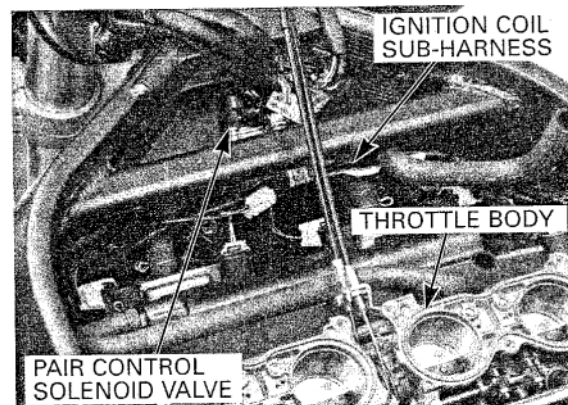


Install the following:

- Ignition coil/spark plug sub-harness
- PAIR control solenoid valve assembly (page 5-88)
- Lower bracket (page 7-12)
- Throttle body (page 5-71)
- EGCV and air intake valve servo motor (page 5-96)
- Fuel tank (page 5-61)

Add the recommended engine oil to the proper level (page 3-16).

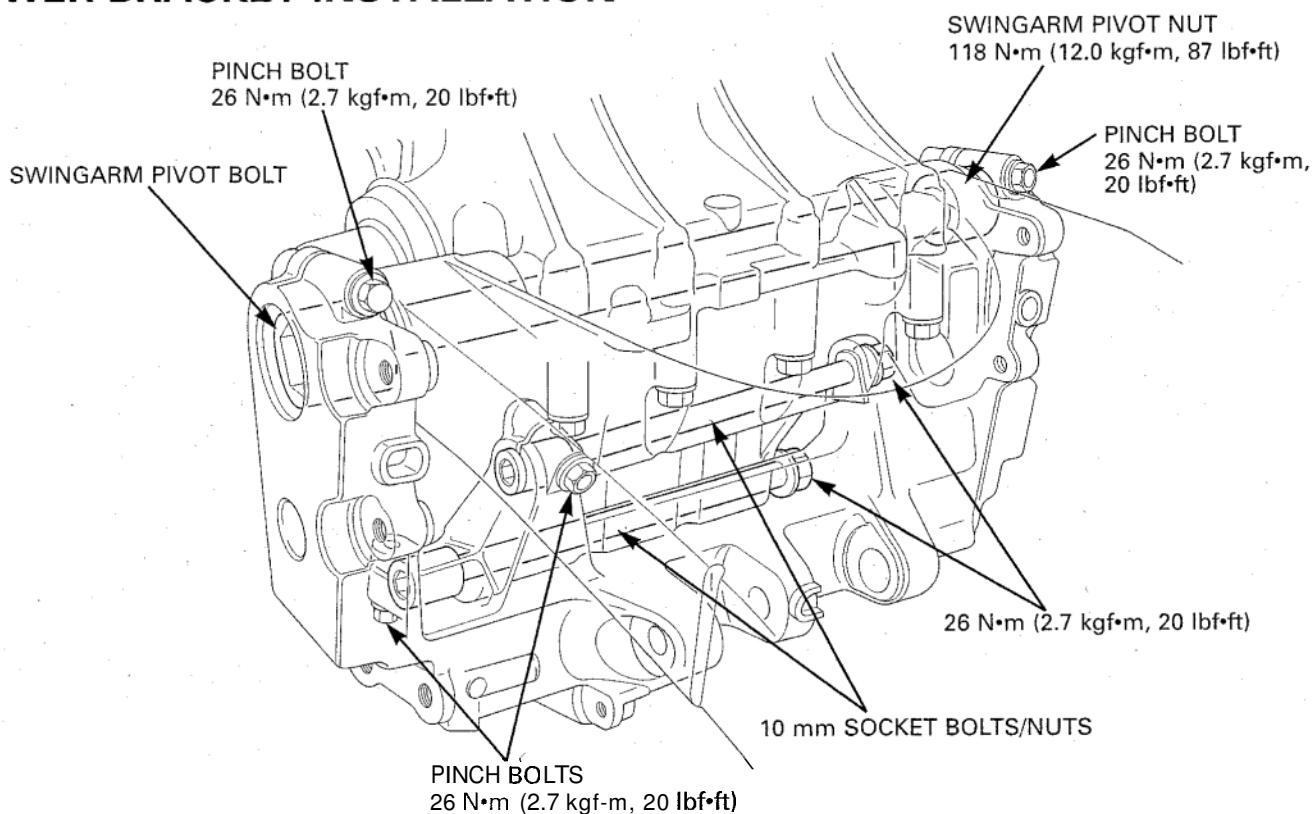
Fill the cooling system with the recommended coolant and bleed any air (page 6-5).



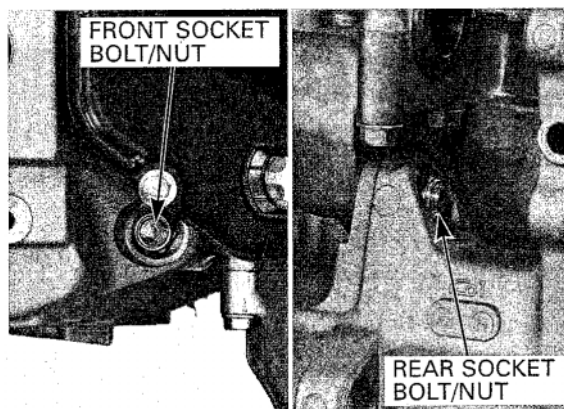


## ENGINE REMOVAL/INSTALLATION

### LOWER BRACKET INSTALLATION



Install the lower bracket onto the engine.  
Temporarily install the front and rear 10 mm bolts and nuts.  
Temporarily tighten the 10 mm nuts.



Install the swingarm (page 14-23).

Hold the swingarm pivot bolt using the special tool, then tighten the pivot nut to the specified torque.

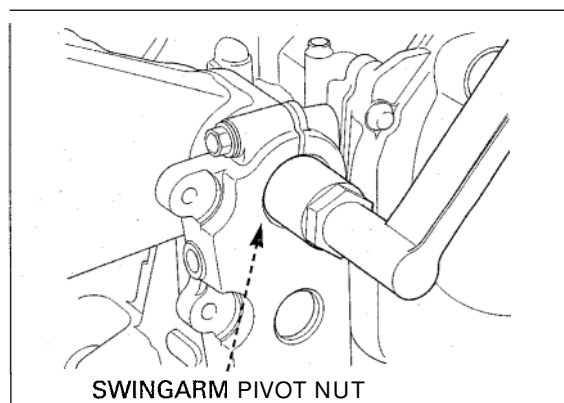
#### TOOL

Rod holder, 24 x 27 mm 07930-KA50100

**TORQUE: 118 N•m (12.0 kgf•m, 87 lbf•ft)**

Tighten the swingarm pivot pinch bolt to the specified torque.

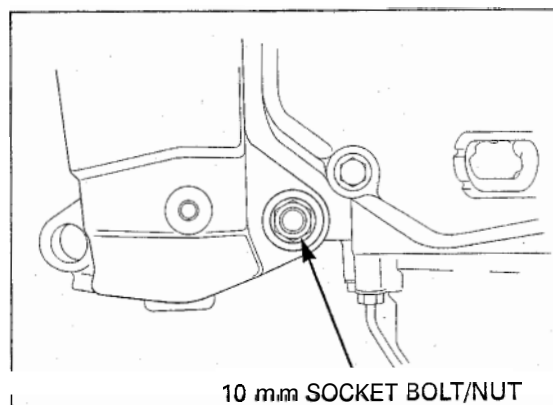
**TORQUE: 26 N•m (2.7 kgf•m, 20 lbf•ft)**



## ENGINE REMOVAL/INSTALLATION

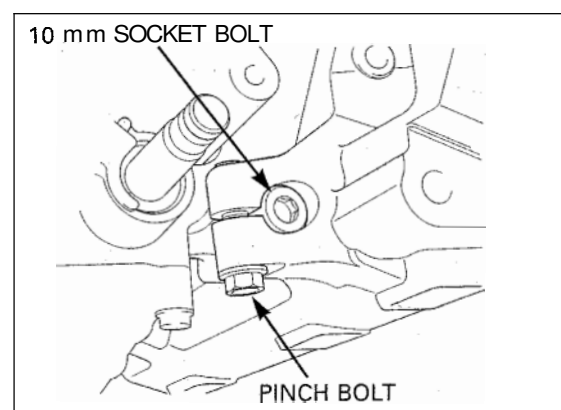
Tighten the front 10 mm socket bolt and nut to the specified torque.

**TORQUE: 42 N•m (4.3 kgf-m, 31 lbf-ft)**



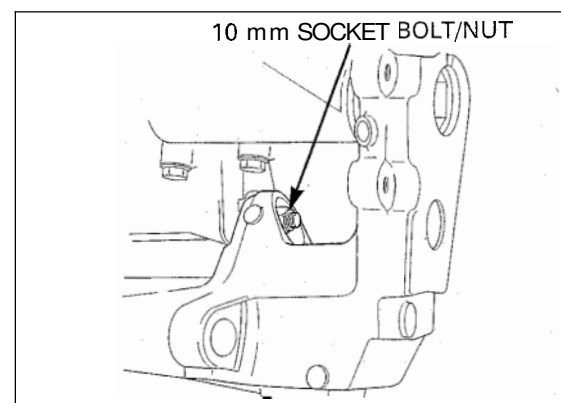
Tighten the front pinch bolt to the specified torque.

**TORQUE: 26 N•m (2.7 kgf-m, 20 lbf-ft)**



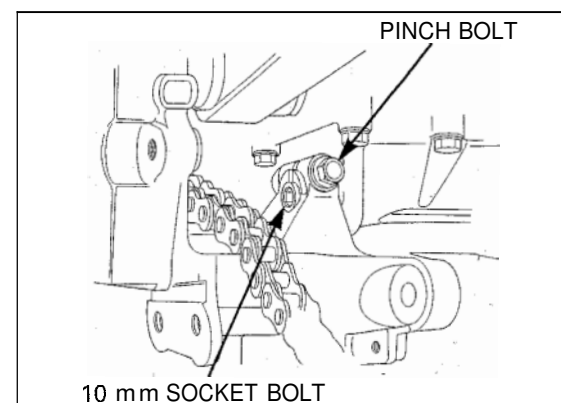
Hold the rear 10 mm socket bolt and tighten the nut to the specified torque.

**TORQUE: 42 N•m (4.3 kgf-m, 31 lbf-ft)**



Tighten the rear pinch bolt to the specified torque.

**TORQUE: 26 N•m (2.7 kgf-m, 20 lbf-ft)**



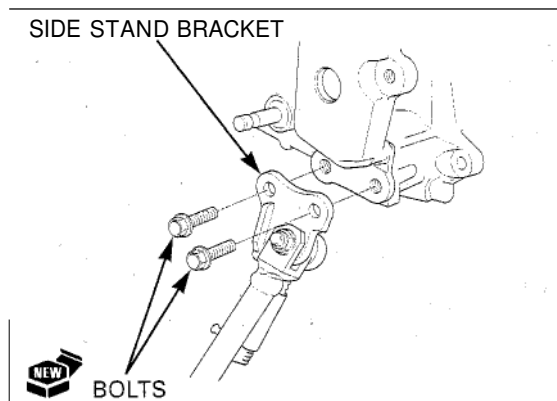


## ENGINE REMOVAL/INSTALLATION

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Install the side stand bracket assembly, tighten the new bolts to the specified torque.

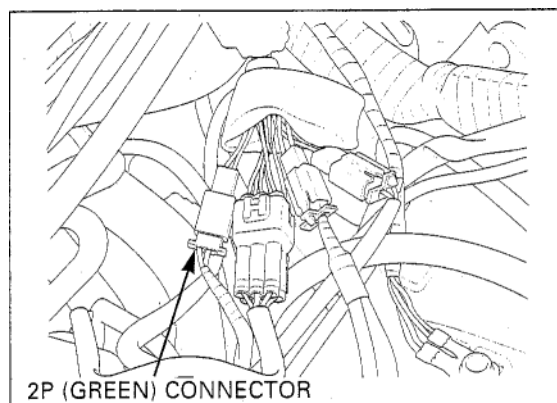
**TORQUE:** 44 N·m (4.5 kgf·m, 33 lbf·ft)



Route the side stand wire properly, connect the side stand switch 2P (Green) connector.

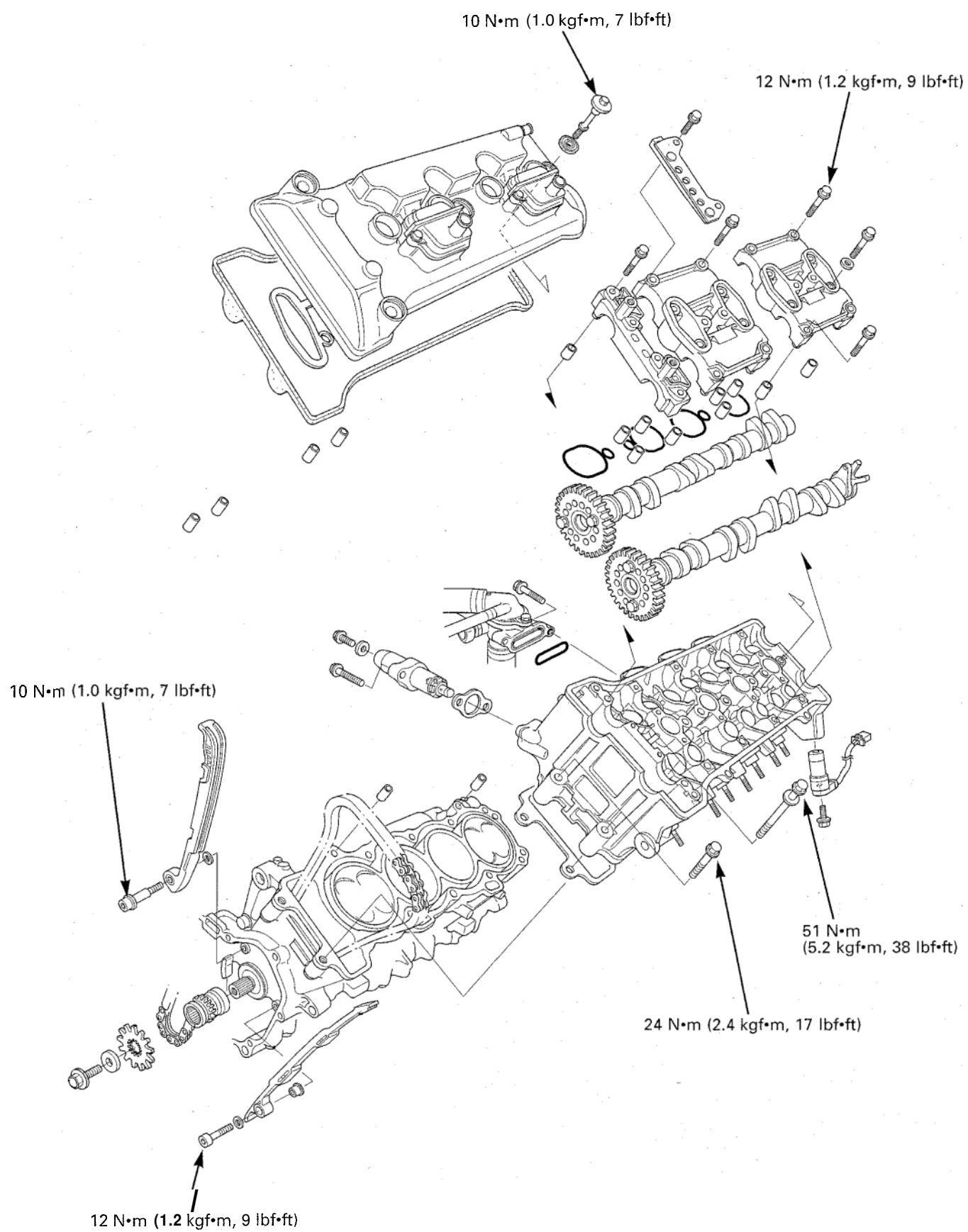
Install the following:

- Rear shock absorber (page 14-13)
- Suspension linkage (page 14-11)
- Muffler/exhaust pipe (page 2-16)



## CYLINDER HEAD/VALVES

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# 8. CYLINDER HEAD/VALVES

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-17
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CYLINDER HEAD REMOVAL	8-12	CYLINDER HEAD COVER INSTALLATION	8-30
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CYLINDER HEAD INSPECTION	8-14		

## SERVICE INFORMATION

8

### GENERAL

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

## CYLINDER HEAD/VALVES

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,196 kPa (12.2 kgf/cm <sup>2</sup> , 174 psi) at 350 rpm	—
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.27 ± 0.03 (0.011 ± 0.001)	—
Cam shaft	Cam lobe height	IN	36.74 – 36.98 (1.446 – 1.456)	36.72 (1.446)
		EX	36.45 – 36.69 (1.435 – 1.444)	36.43 (1.434)
	Runout			0.04 (0.002)
	Oil clearance			0.10 (0.004)
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)
Valve, valve guide	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/EX	4.500 – 4.512 (0.1722 – 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	14.3 – 14.6 (0.56 – 0.57)	—
		EX	12.4 – 12.7 (0.49 – 0.50)	—
	Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)
Valve spring free length	IN	Inner	34.80 (1.370)	33.1 (1.30)
		Outer	37.97 (1.495)	36.1 (1.42)
	EX	39.60 (1.559)		37.6 (1.48)
Cylinder head warpage			—	0.10 (0.004)

### TORQUE VALUES

Cylinder head cover bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	
PAIR reed valve cover flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads
Breather plate flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads
Camshaft holder flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply oil to the threads
Cylinder head sealing bolt	27 N•m (2.8 kgf•m, 20 lbf•ft)	Apply a locking agent to the threads
Cylinder head mounting bolt	51 N•m (5.2 kgf•m, 38 lbf•ft)	Apply molybdenum disulfide oil to the threads and seating surface (after removing anti-rust oil additive)
Cylinder head mounting bolt, 8 mm	24 N•m (2.4 kgf•m, 17 lbf•ft)	Apply oil to the threads
Cam sprocket bolt	20 N•m (2.0 kgf•m, 14 lbf•ft)	Apply a locking agent to the threads
Cam pulse generator rotor dowel bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads
Cam chain tensioner pivot socket bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	Apply a locking agent to the threads
Cam chain guide mounting socket bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads
Cylinder head stud bolt (exhaust pipe stud bolt)	See page 1-14	
Throttle cable guide bracket mounting bolt	3 N•m (0.3 kgf•m, 2.2 lbf•ft)	

## TOOLS

Compression gauge attachment	07RMJ-MY50100	or equivalent commercially available in U.S.A.
Valve spring compressor	07757-0010000	
Valve spring compressor attachment	07959-KM30101	
Tappet hole protector	07HMG-MR70002	not available in U.S.A. or refer to page 8-13 for alternative tool (U.S.A. only)
Valve guide driver, 4.5 mm	07HMD-ML00101	
Valve guide reamer, 4.5 mm	07HMH-ML00101	or 07HMH-ML0010A (U.S.A. only)
Valve seat cutters		
Seat cutter, 24.5 mm (45" EX)	07780-0010100	equivalent commercially available in U.S.A.
Seat cutter, 29 mm (45" IN)	07780-0010300	
Flat cutter, 28 mm (32" EX)	07780-0012100	
Flat cutter, 30 mm (32" IN)	07780-0012200	
Interior cutter, 26 mm (60" EX)	07780-0014500	
Interior cutter, 30 mm (60" IN)	07780-0014000	
Cutter holder, 4.5 mm	07781-0010600	
Cam chain tensioner holder	07ZMG-MCAA400	(U.S.A. only)

## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring (Section 11).

### 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 head gasket
  - Warped or cracked cylinder head
- Worn cylinder, piston or piston rings (section 11)

### Compression too high, overheating or knocking

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

### Excessive smoke

- Cylinder head:
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (section 11)

### 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
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (section 11)

### Rough idle

- Low cylinder compression

### CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.

Stop the engine and remove all the direct ignition coil/spark plug caps and spark plugs (page 3-6).

Open and support the front end of the fuel tank (page 3-4).

Disconnect the fuel pump/reserve sensor 3P (Black) connector.

Install a compression gauge into the spark plug hole.

#### TOOL:

**Compression gauge attachment**

**07RMJ-MY50100**  
(Equivalent commercially available in U.S.A.)

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:

**1,196 kPa (12.2kgf/cm<sup>2</sup>, 174 psi) at 350 rpm**

Low compression can be caused by:

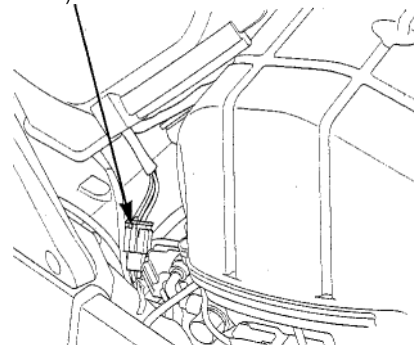
- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

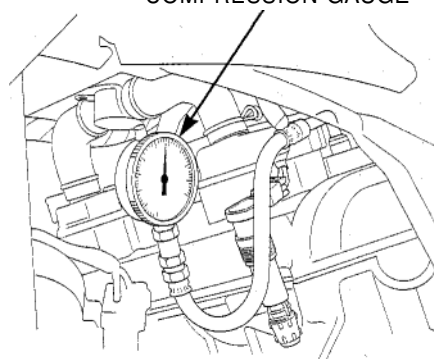
- Carbon deposits in combustion chamber or on piston head

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

3P (BLACK) CONNECTOR



COMPRESSION GAUGE

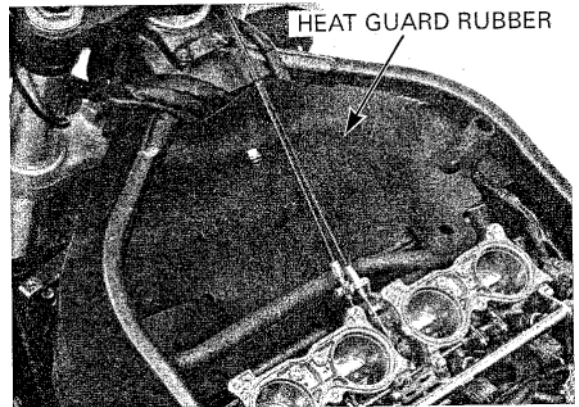


## CYLINDER HEAD COVER REMOVAL

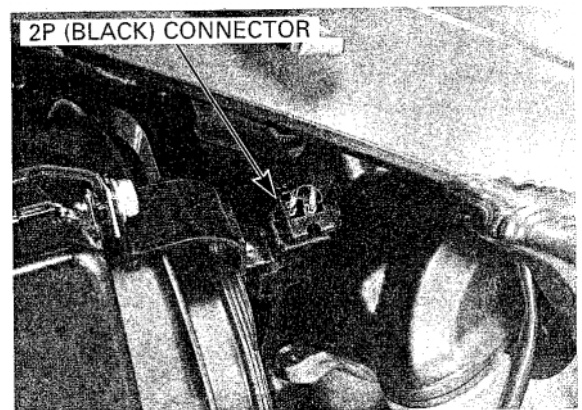
Remove the following:

- Lower cowl (page 2-7)
- Air cleaner housing (page 5-64)

Remove the heat guard rubber.



Disconnect the fan motor 2P (Black) connector.

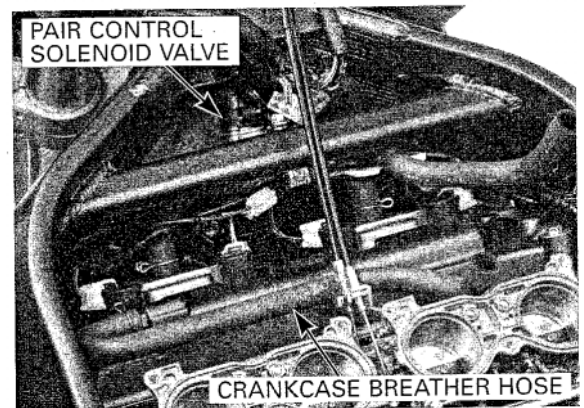


Disconnect the cam pulse generator 2P (natural) connector (page 5-83).

Remove the mounting bolt and PAIR control solenoid valve assembly (page 5-88).

Disconnect the ignition coil sub-harness 4P (Black) connector and sub-harness (page 17-5).

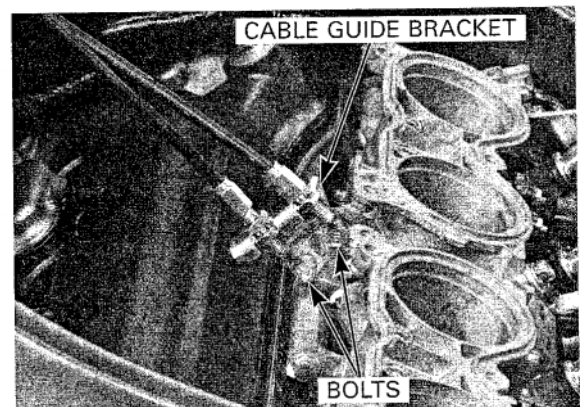
Disconnect the crankcase breather hose.



*Place a cloth underneath the bolts to avoid dropping them into the engine area*

Remove the throttle cable guide bracket mounting bolts.

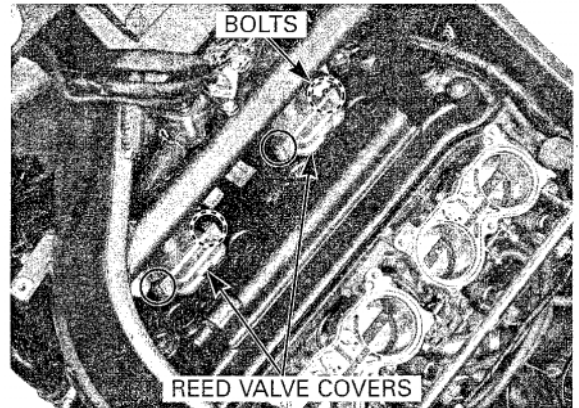
Disconnect the throttle cable ends from the throttle drum.



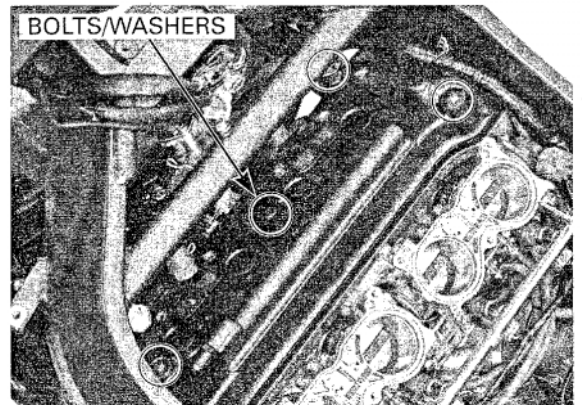
## CYLINDER HEAD/VALVES

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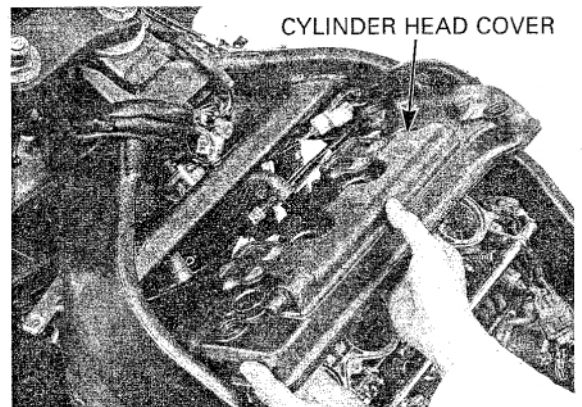
Remove the **SH** bolts and PAIR reed valve covers from the cylinder head.



Remove the cylinder head cover bolts and washers.



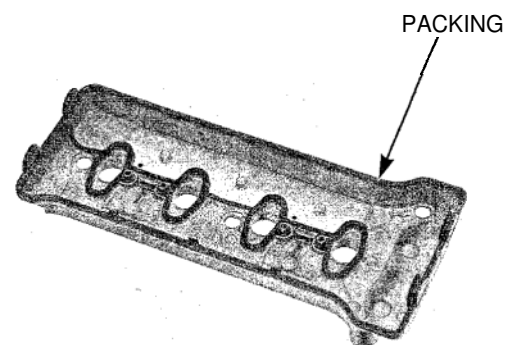
Remove the cylinder head cover rearward.



## CYLINDER HEAD COVER DISASSEMBLY

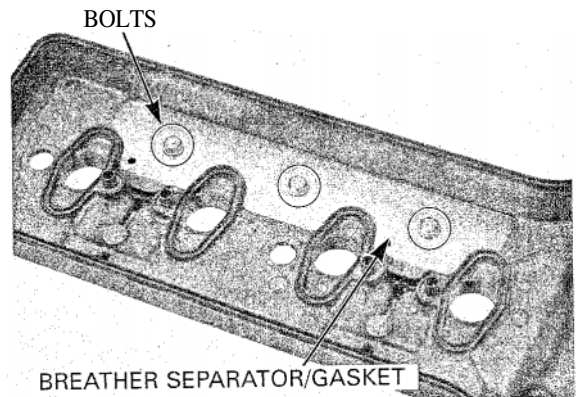
Remove the cylinder head cover (page 8-5).

Remove the cylinder head cover packing.

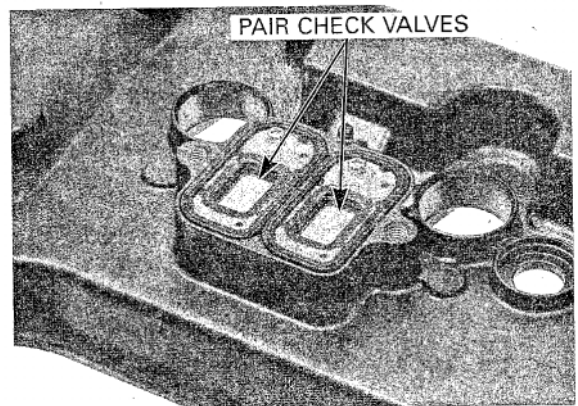




Remove the bolts and breather separator and gasket.



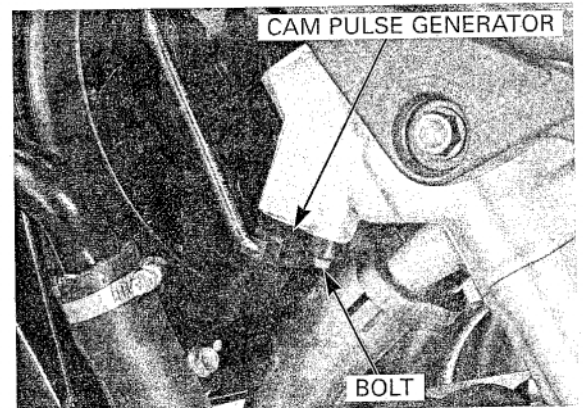
Check the PAIR check valves for wear or damage, replace if necessary.



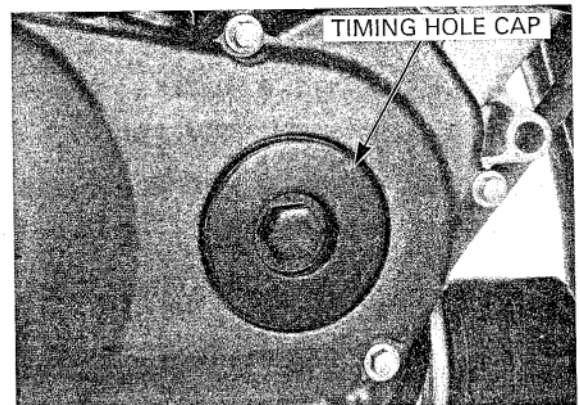
## CAMSHAFT REMOVAL

Remove the cylinder head cover (page 8-5).

Avoid damaging the cam pulse generator while removing the camshafts, remove the bolt and cam pulse generator from the cylinder head.

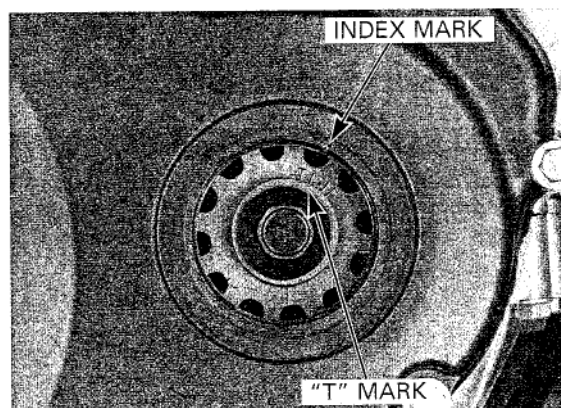


Remove the timing hole cap and O-ring.

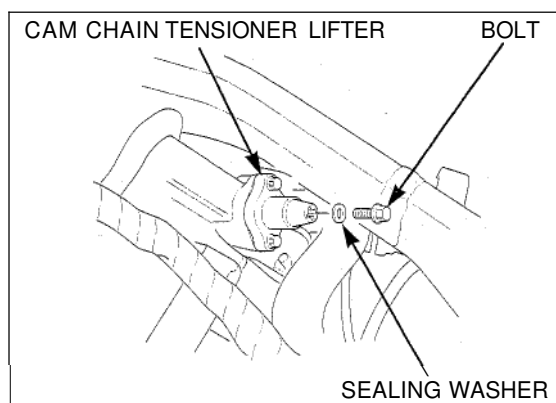


## CYLINDER HEAD/VALVES

Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor 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.

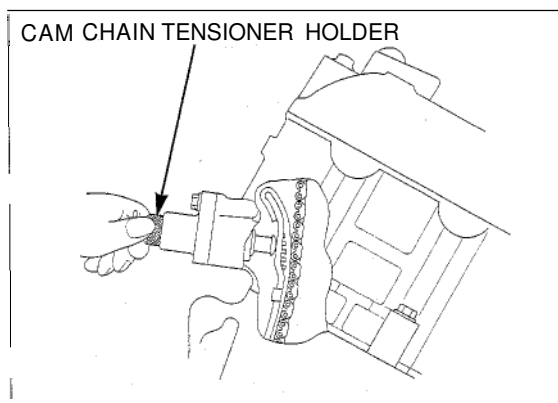


Remove the cam chain tensioner lifter sealing bolt and sealing washer.

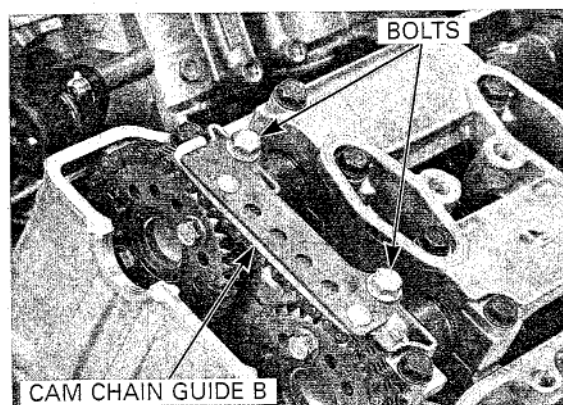


Turn the tensioner lifter shaft fully in (clockwise) and secure it using the cam chain tensioner holder.

**TOOL:**  
Cam chain tensioner holder      07ZMG-MCAA400  
(U.S.A. only)



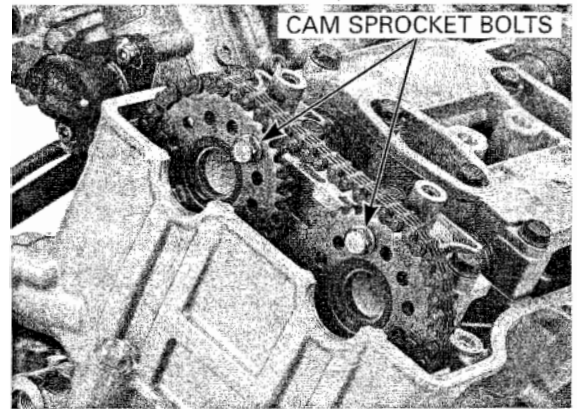
Remove the bolts and cam chain guide B.



## CYLINDER HEAD/VALVES

*It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket*

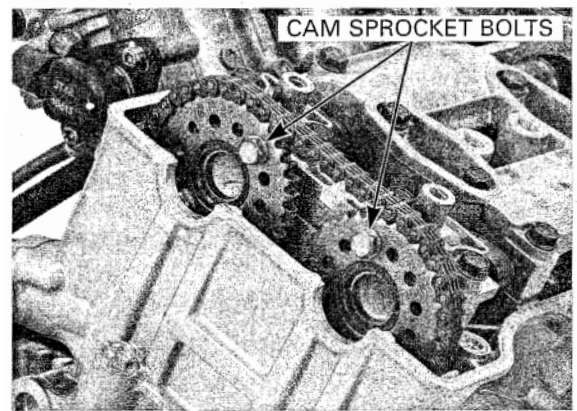
If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follows:



*Be careful not to drop the cam sprocket bolts into the crankcase*

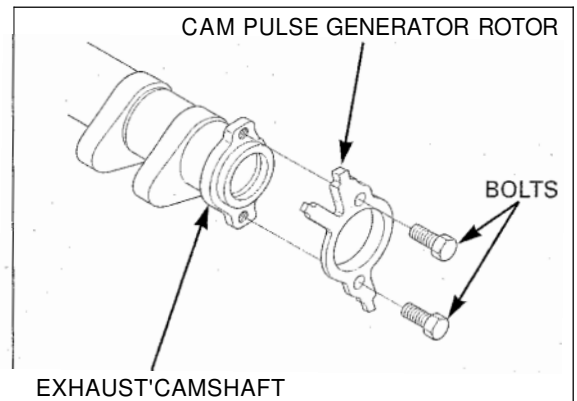
- Remove the cam sprocket bolts from intake and exhaust camshafts.

- Turn the crankshaft one full turn (360°), remove the other cam sprocket bolts from the camshafts.
- Remove the cam sprocket from the camshaft.



*Be careful not to drop the rotor or bolts into the crankcase*

- Remove the bolts and cam pulse generator rotor from the exhaust camshaft.

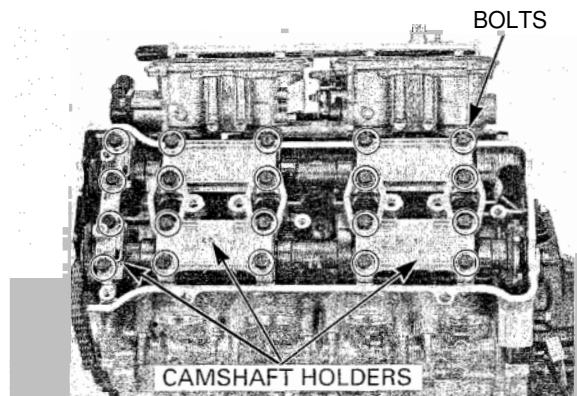


*Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.*

Loosen and remove the camshaft holder bolts, then remove the camshaft holders and camshafts.

### NOTICE

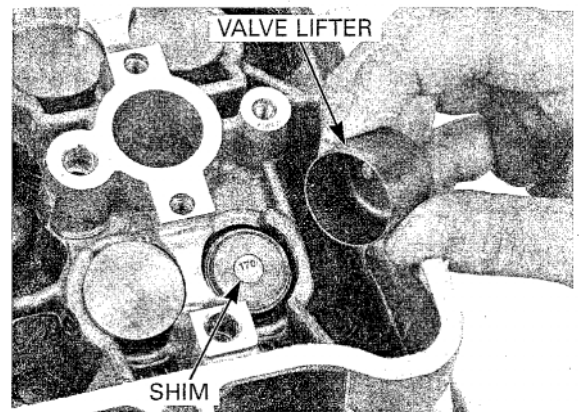
*From outside to inside, loosen the bolts in a crisscross pattern in several steps or the camshaft holder might break.*



## CYLINDER HEAD/VALVES

Remove the valve lifters and shims.

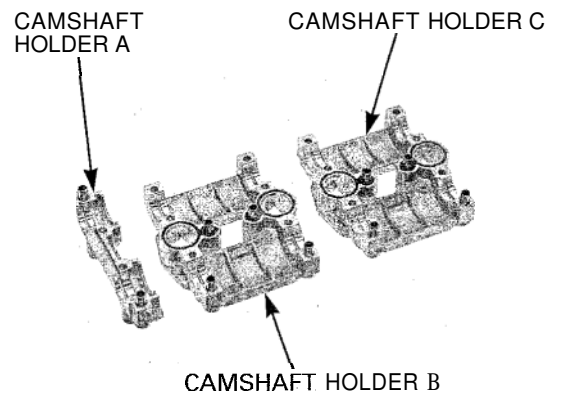
- Be careful not to damage the valve lifter bore.
- Shims may stick to the inside of the valve lifters. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve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



## INSPECTION

### CAMSHAFT HOLDER

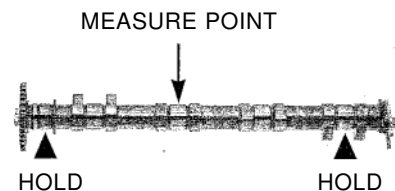
Inspect the bearing surface of each camshaft holder for scoring, scratches, or evidence of insufficient lubrication.



### CAMSHAFT RUNOUT

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

**SERVICE LIMIT: 0.04 mm (0.002 in)**



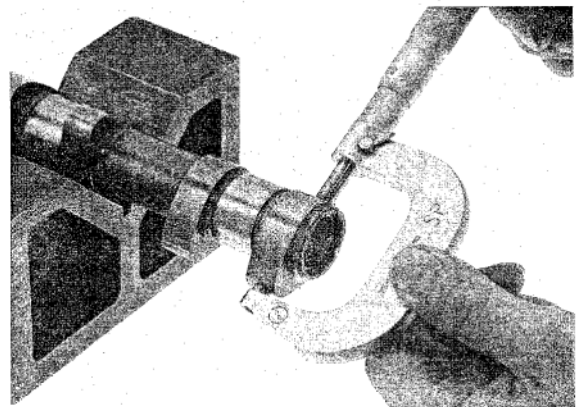
### CAM LOBE HEIGHT

Using a micrometer, measure each cam lobe height.

### SERVICE LIMITS:

**IN: 36.72 mm (1.446 in)**

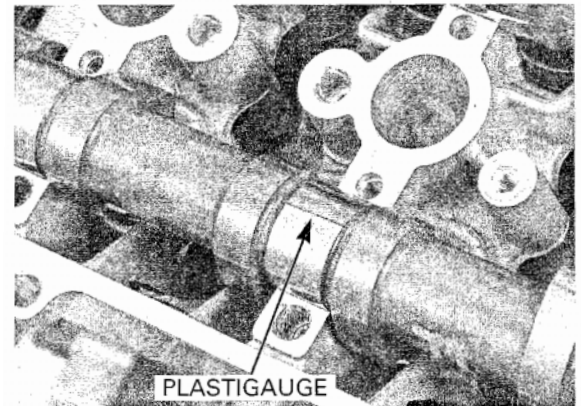
**EX: 36.43 mm (1.434 in)**



*Do not rotate the camshaft during inspection.*

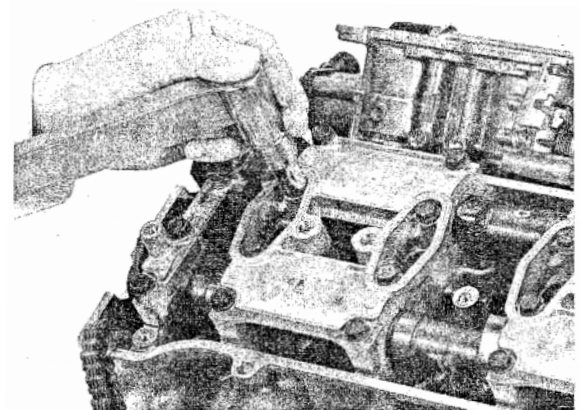
### **CAMSHAFT OIL CLEARANCE**

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.

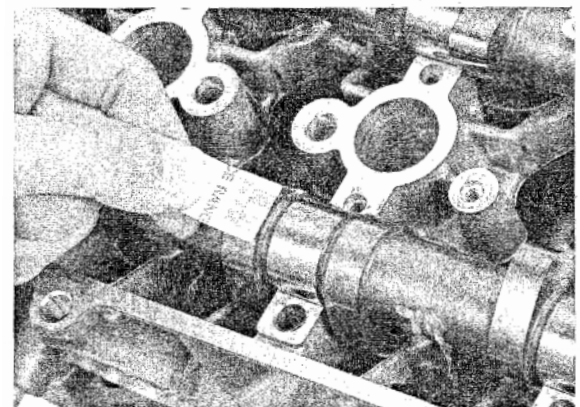
**TORQUE: 12 N·m (1.2kgf·m, 9 lbf·ft)**



Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

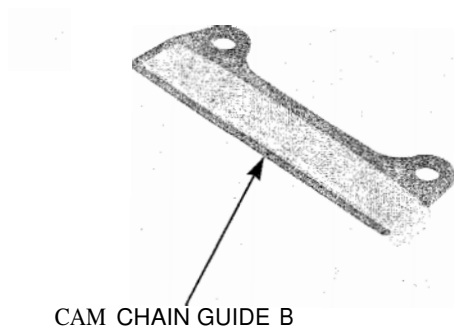
**SERVICE LIMIT: 0.10 mm (0.004 in)**

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.



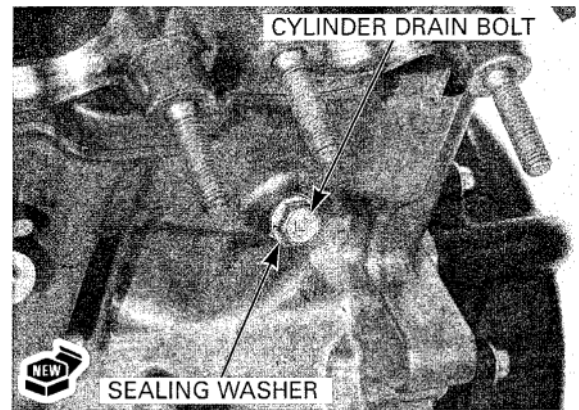
## CYLINDER HEAD/VALVES

### CYLINDER HEAD REMOVAL

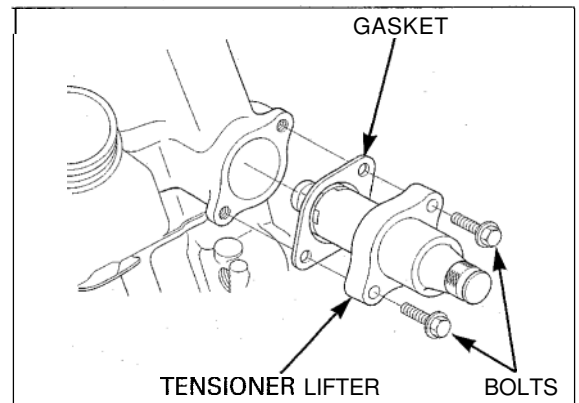
Remove the engine from the frame (page 7-3).  
Remove the camshaft (page 8-7).

Remove the cylinder drain bolt and sealing washer.  
Drain coolant from cylinder head and cylinder block.

Reinstall a new sealing washer and drain bolt.

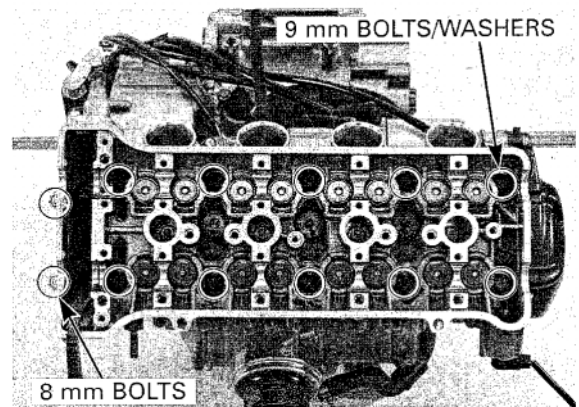


Remove the bolts and cam chain tensioner lifter and gasket.

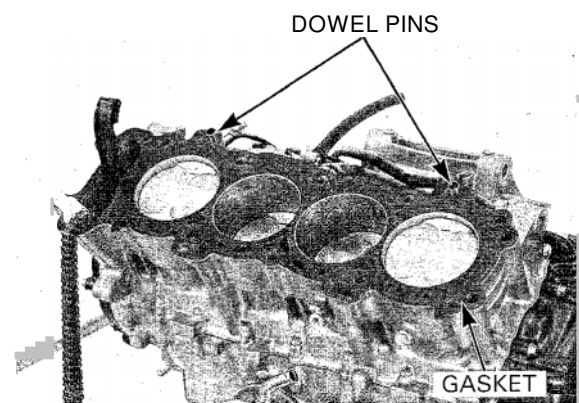


*Loosen the 9 mm bolts in a criss-cross pattern in two or three steps.*

Remove the two 8 mm flange bolts.  
Remove the ten 9 mm bolts/washers.  
Remove the cylinder head.



Remove the dowel pins and cylinder head gasket.

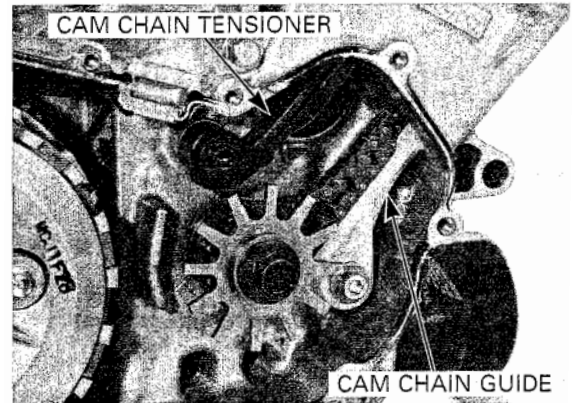


## CYLINDER HEAD/VALVES

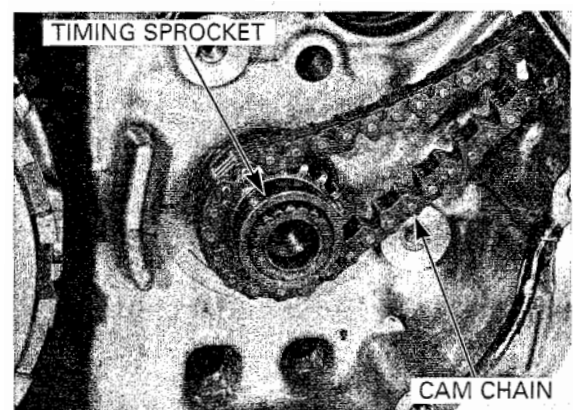
Remove the right crankcase cover and ignition pulse generator rotor (page 17-6).

Remove the socket bolt, washer, cam chain guide and collar.

Remove the socket bolt, cam chain tensioner and washer.



Remove the cam chain and timing sprocket from the crankshaft.



## CYLINDER HEAD DISASSEMBLY

Remove the cylinder head (page 8-12).

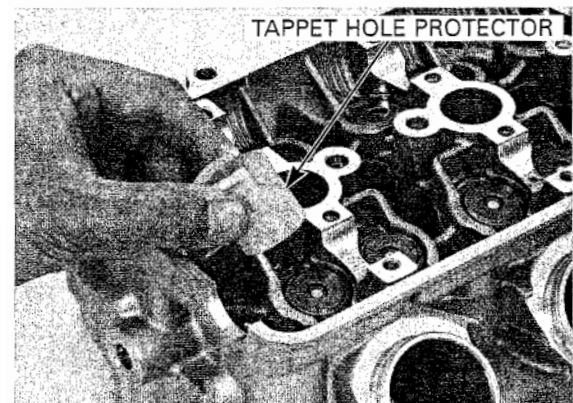
Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

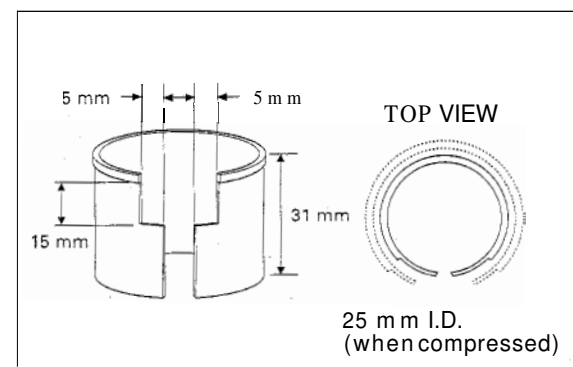
**TOOL:**

Tappet hole protector

07HMG-MR70002  
(Not available in  
U.S.A.)



An equivalent tool can easily be made from a plastic 35 mm film container as shown.





## CYLINDER HEAD/VALVES

Remove the valve spring cotters using the special tools as shown.

### TOOLS:

Valve spring compressor 07757-0010000

Valve spring compressor attachment 07959-KM30101

### NOTICE

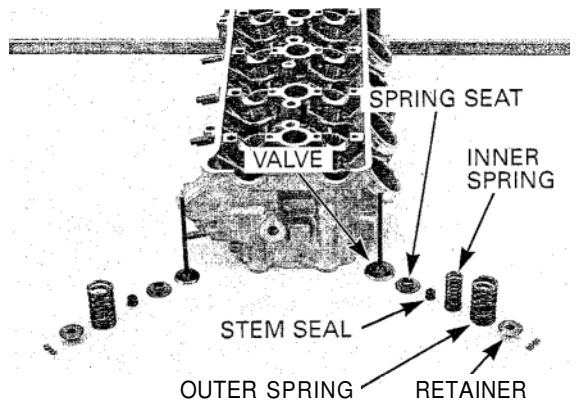
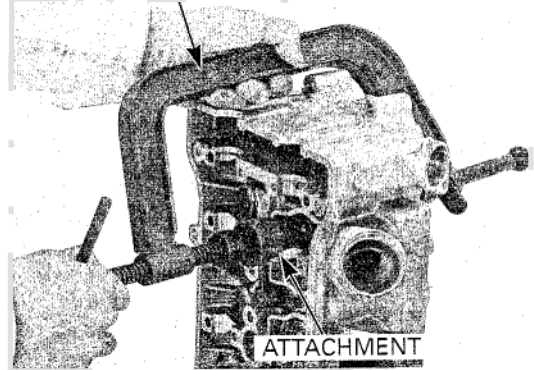
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

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

Remove the following:

- Spring retainer
- Intake valve springs (Orange painted)
- Exhaust valve spring (Pink painted)
- Valve
- Stem seal
- Valve spring seat

VALVE SPRING COMPRESSOR

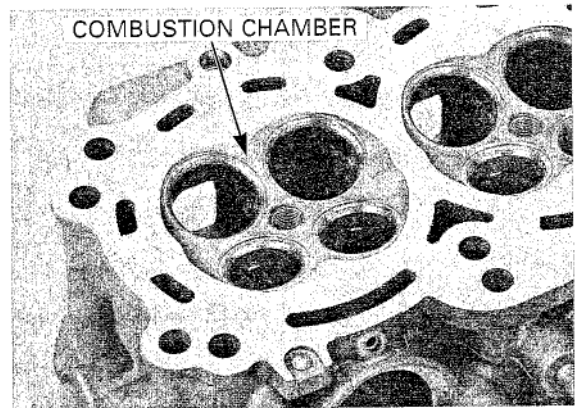


## CYLINDER HEAD INSPECTION

### CYLINDER HEAD

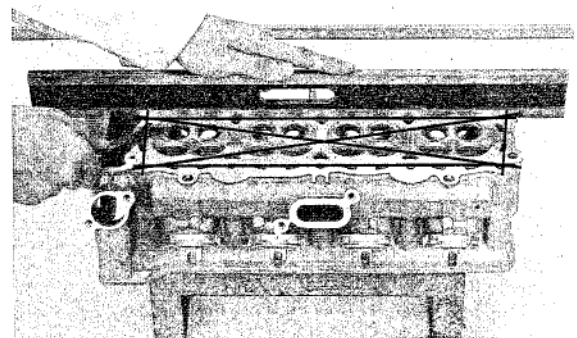
Avoid damaging the gasket surface.

Remove 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: 0.10 mm (0.004 in)**

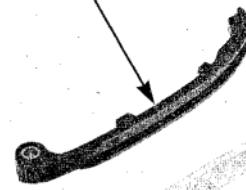




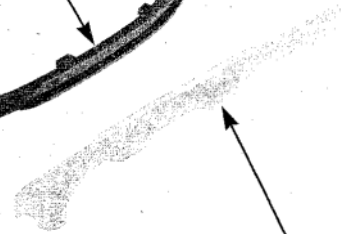
### CAM CHAIN TENSIONER/CAM CHAIN GUIDE

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

CAM CHAIN TENSIONER



CAM CHAIN GUIDE



### VALVE SPRING

Measure the free length of the inner and outer valve springs.

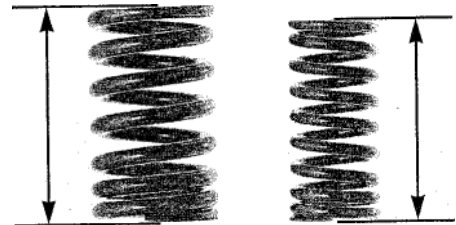
#### SERVICE LIMITS:

**Intake: Inner: 33.1 mm (1.30 in)**

**Outer: 36.1 mm (1.42 in)**

**Exhaust: 37.6 mm (1.48 in)**

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



### VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.

Measure the each valve lifter O.D.

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

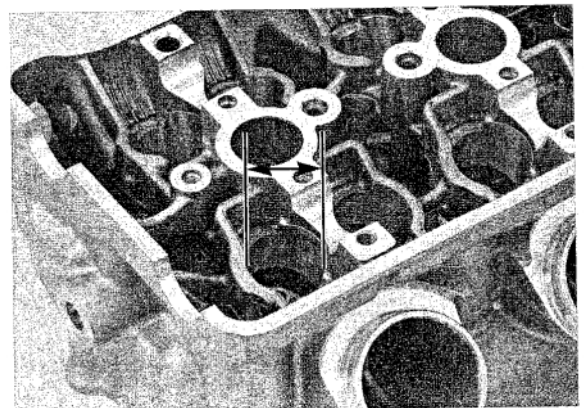


### VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.

Measure the each valve lifter bore I.D.

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



Inspect each valve for bends, burns or abnormal stem wear.  
Check valve movement in the guide, measure and record each valve stem O.D.

**IN: 4.465 mm (0.1758 in)**  
**EX: 4.455 mm (0.1754 in)**

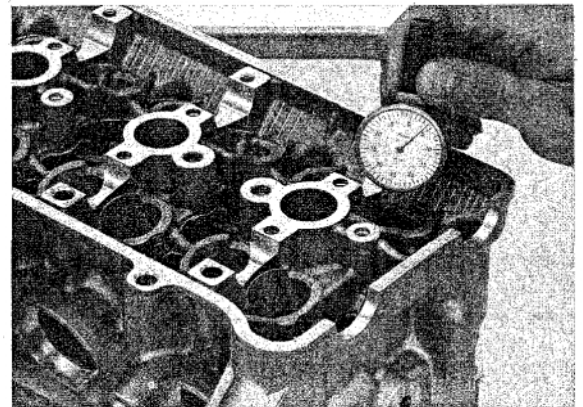
**TOOL:**

VALVE GUIDE REAMER

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

**IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)**  
**EX: 0.020 – 0.047 mm (0.0008 – 0.0019 in)**

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 replacement valve guides in a freezer for about 1 hour.

Heat the cylinder head to 100 – 150°C (212 – 300°F) with a hot plate or oven.

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

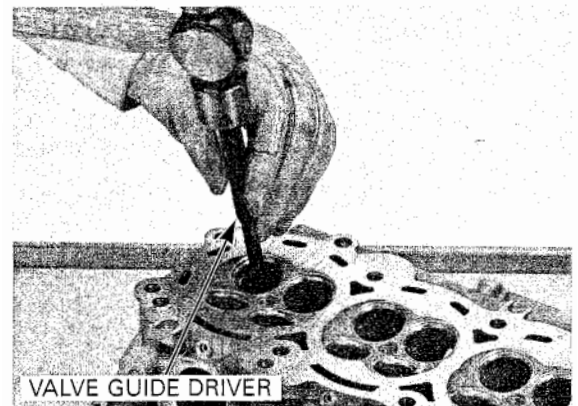
### NOTICE

*Do not use a torch to heat the cylinder head; it may cause warpage.*

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

#### TOOL:

Valve guide driver, 4.5 mm      07HMD-ML00101



Drive in the guide to the specified depth from the top of the cylinder head.

#### SPECIFIED DEPTH:

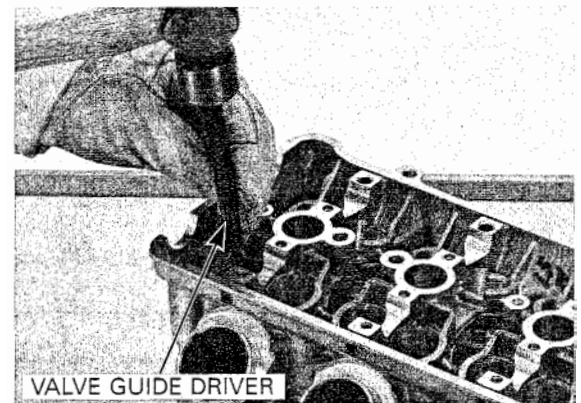
IN: 14.3 – 14.6 mm (0.56 – 0.57 in)

EX: 12.4 – 12.7 mm (0.49 – 0.50 in)

#### TOOL:

Valve guide driver, 4.5 mm      07HMD-ML00101

Let the cylinder head cool to room temperature.



*Use cutting oil on the reamer during this operation.*

Ream the new valve guide after installation.

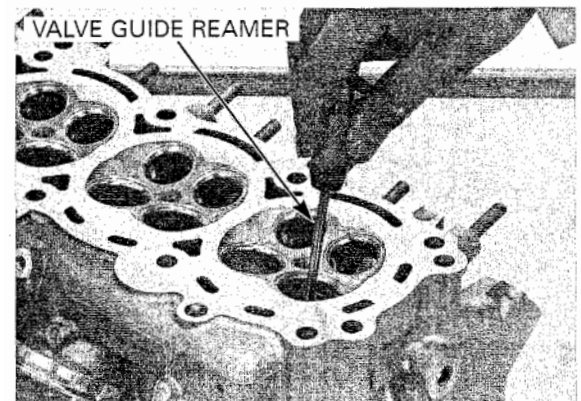
Insert the reamer from the combustion chamber side of the head and also always rotate the reamer clockwise.

#### TOOL:

Valve guide reamer, 4.5 mm      07HMH-ML00101 or  
07HMH-ML0010A  
(U.S.A. only)

Clean the cylinder head thoroughly to remove any metal particles.

Reface the valve seat (page 8-18).



## CYLINDER HEAD/VALVES

### VALVE SEAT INSPECTION/REFACING

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

Apply a light coating of Prussian Blue to the valve seats.

Lap the valves and seats using a rubber hose or other hand-lapping tool.

Remove and inspect the valves.

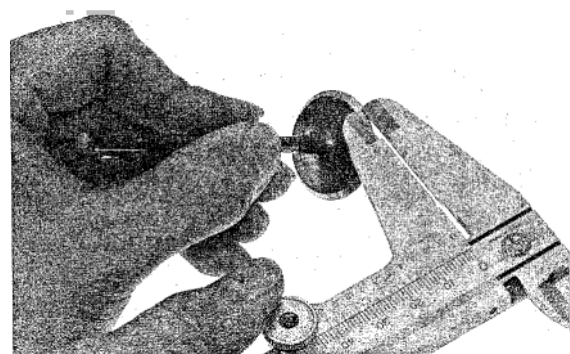
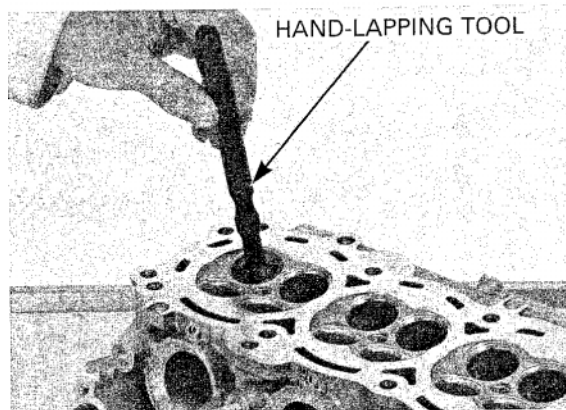
*The valves cannot be ground if a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.*

Inspect the width of each valve seat.

**STANDARD:** 0.90 – 1.10 mm (0.035 – 0.043 in)

**SERVICE LIMIT:** 1.5 mm (0.06 in)

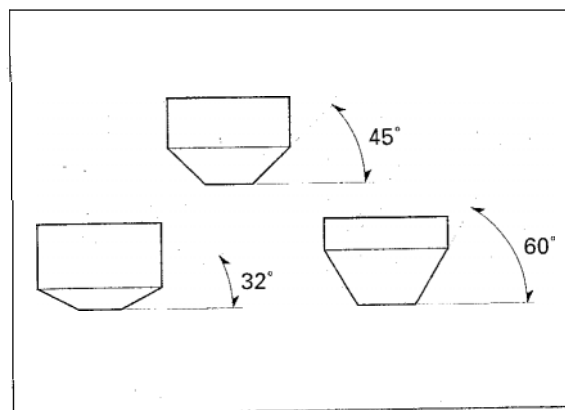
If the seat is too wide, too narrow or has low spots, the seat must be ground.



### VALVE SEAT REFACING

*Follow the valve refacing equipment manufacturer's operating instructions.*

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.



*Reface the seat with a 45-degree cutter whenever a valve guide is replaced*

Use a 45-degree cutter to remove any roughness or irregularities from the seat.

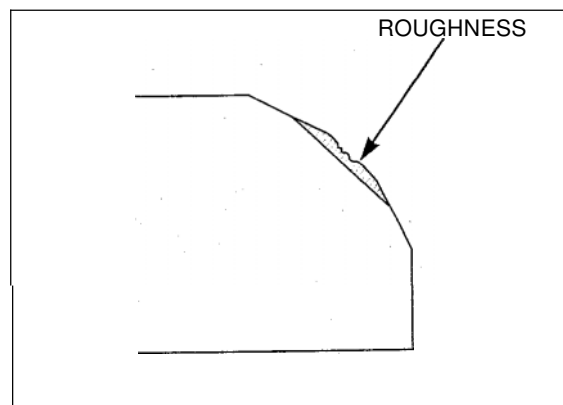
#### TOOLS:

Seat cutter, 29 mm (45° IN) 07780-0010300

Seat cutter, 24.5 mm (45° EX) 07780-0010100

Cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.



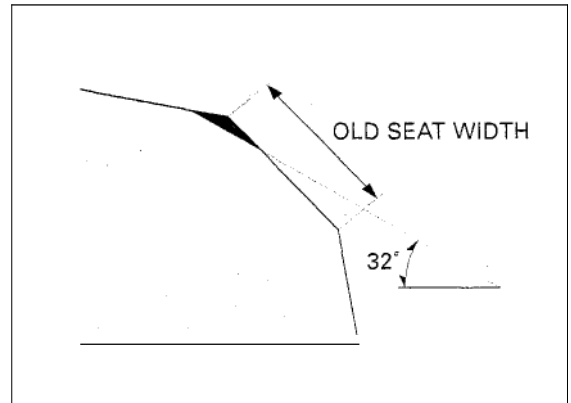
## CYLINDER HEAD/VALVES

Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.

### TOOLS:

Flat cutter, 30 mm (32" IN) 07780-0012200  
 Flat cutter, 28 mm (32" EX) 07780-0012100  
 Cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.



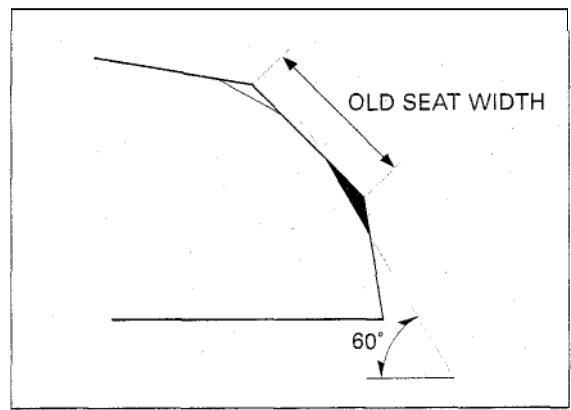
Use a 60-degree cutter to remove the bottom 1/4 of the old seat.

Remove the cutter and inspect the area you have refaced.

### TOOLS:

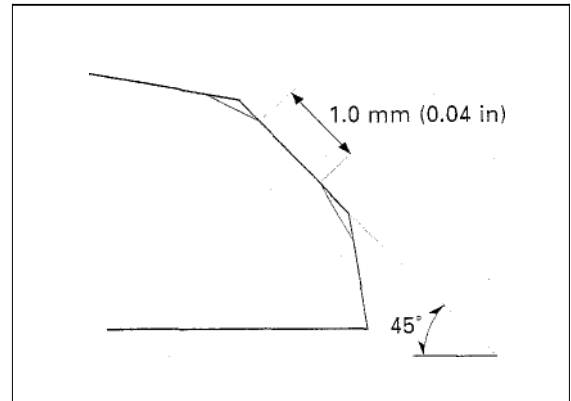
Interior cutter, 30 mm (60° IN) 07780-0014000  
 Interior cutter, 26 mm (60° EX) 07780-0014500  
 Cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.



Install a 45-degree finish cutter and cut the seat to the proper width.

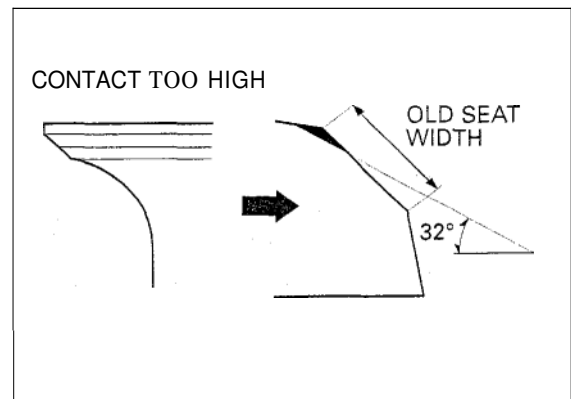
Make sure all pitting and irregularities are removed. Refinish if necessary.



*The location of the valve seat in relation to the valve face is very important for good sealing*

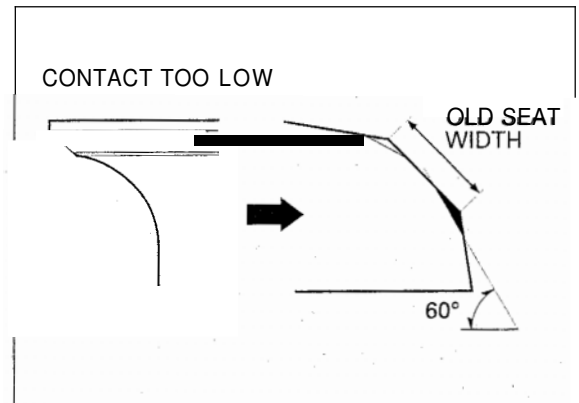
Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

If the contact area is too high on the valve, the seat must be lowered using a 32 degrees flat cutter.



## CYLINDER HEAD/VALVES

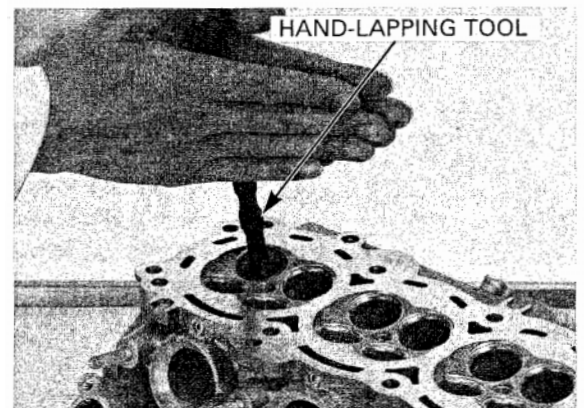
If the contact area is too low on the valve, the seat must be raised using a 60-degree inner cutter.



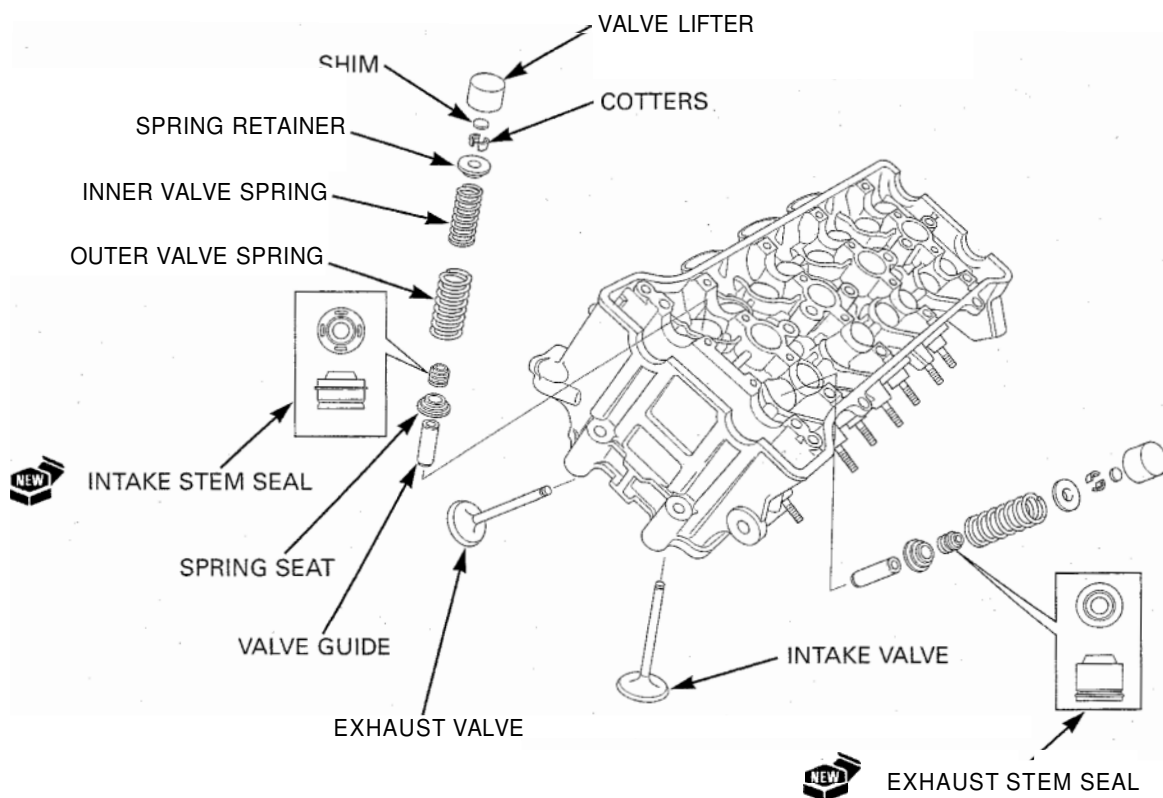
Refinish the seat to specifications, using a 45-degree finish cutter.  
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

*Do not allow lapping compound to enter the guides.*

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



## CYLINDER HEAD ASSEMBLY



## CYLINDER HEAD/VALVES

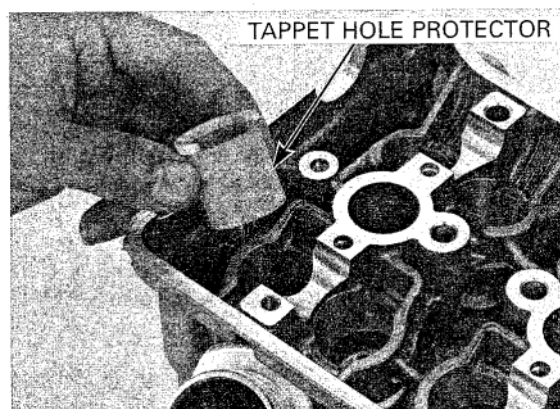
Clean the cylinder head assembly with solvent and blow out all oil passages with compressed air.

Install the tappet hole protector into the valve lifter bore.

**TOOL:**

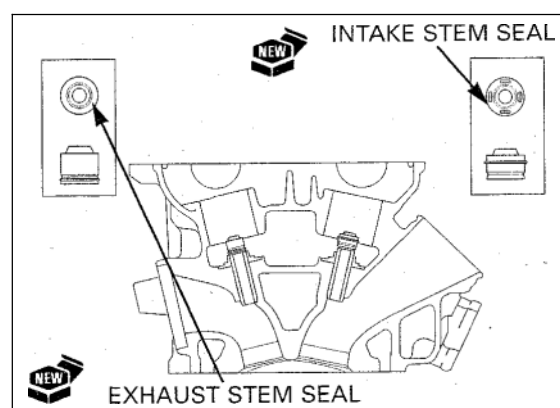
**Tappet hole protector**

**07HMG-MR70002**  
(Not available in  
U.S.A.) or  
refer to page 8-13  
for alternative tool



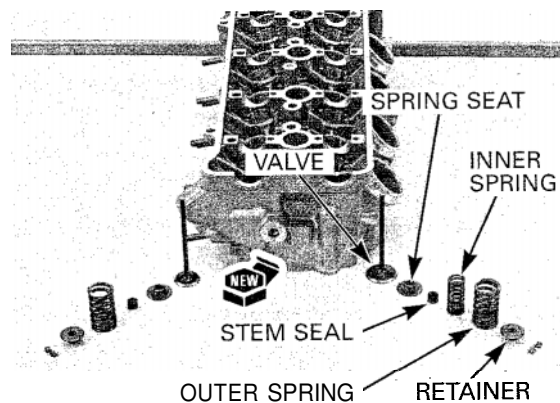
*Do not inter-  
change the inlet  
and exhaust valve  
stem seal.*

Install the valve spring seats.  
Install the new stem seals.



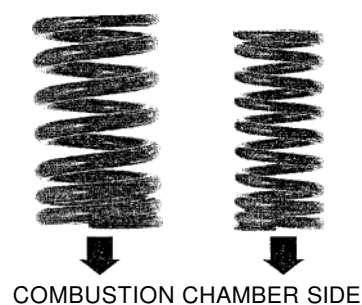
Lubricate the valve stems with molybdenum disulfide oil and insert the valve into the valve guide.

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



*The exhaust valve  
spring has a pink  
paint mark and  
the intake valve  
springs have  
orange paint  
marks*

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



## CYLINDER HEAD/VALVES

Install the valve cotters using the special tool as shown.

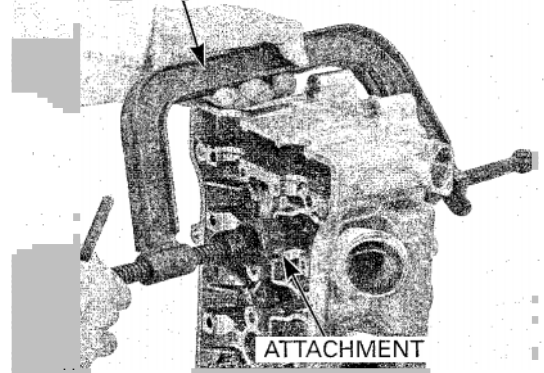
### NOTICE

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

#### TOOLS:

Valve spring compressor 07757-0010000  
Valve spring compressor attachment 07959-KM30101

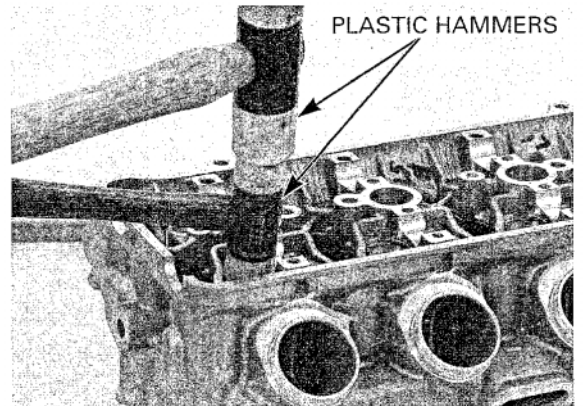
VALVE SPRING COMPRESSOR



*Support the cylinder head above the work bench surface to prevent possible valve damage*

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

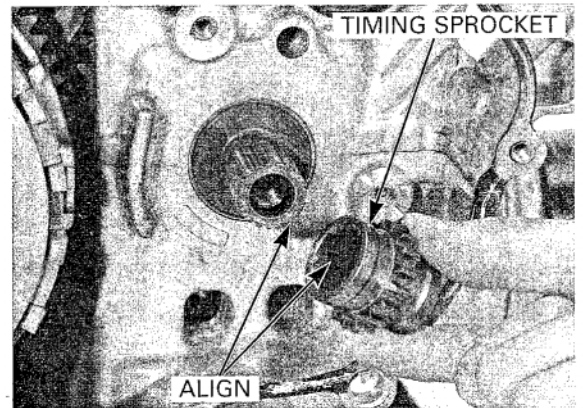
PLASTIC HAMMERS



## CYLINDER HEAD INSTALLATION

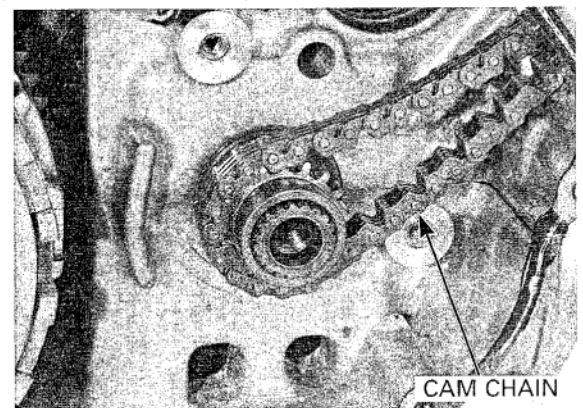
Install the timing sprocket by aligning the wide teeth between the crankshaft and sprocket.

TIMING SPROCKET



Install the cam chain.

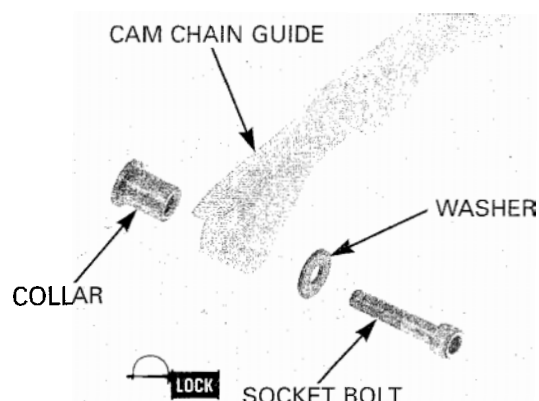
CAM CHAIN





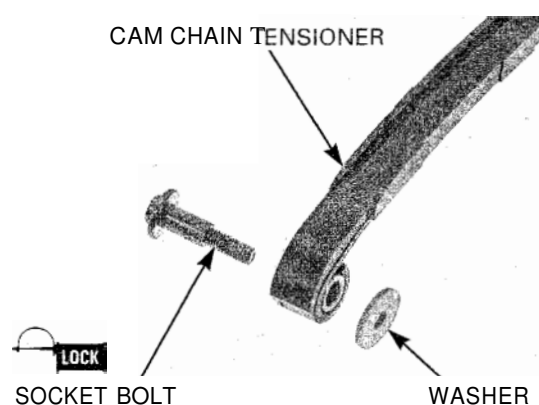
Apply a locking agent to the cam chain guide socket bolt threads.

Install the collar, cam chain guide, washer and socket bolt.



Apply a locking agent to the cam chain tensioner socket bolt threads.

Install the washer, cam chain tensioner and socket bolt.



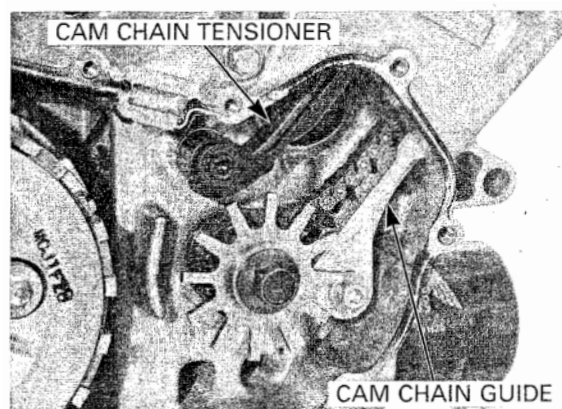
Tighten the cam chain guide and cam chain tensioner socket bolts to the specified torque.

### TORQUE:

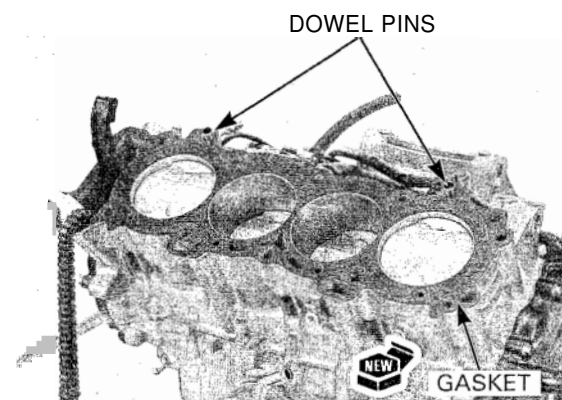
**Cam chain tensioner pivot socket bolt:**  
**10 N·m (1.0 kgf·m, 7 lbf·ft)**

**Cam chain guide mounting socket bolt:**  
**12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the ignition pulse generator rotor and right crankcase cover (page 17-7).



Install the dowel pins and a new cylinder head gasket as shown.



## CYLINDER HEAD/VALVES

Install the cylinder head.

If using a new bolt, remove the anti-rust additive from it.

Apply molybdenum disulfide oil to the threads and seating surface of the 9 mm bolts/washers and install them.

Apply oil to the 8 mm bolt threads and seating surface.

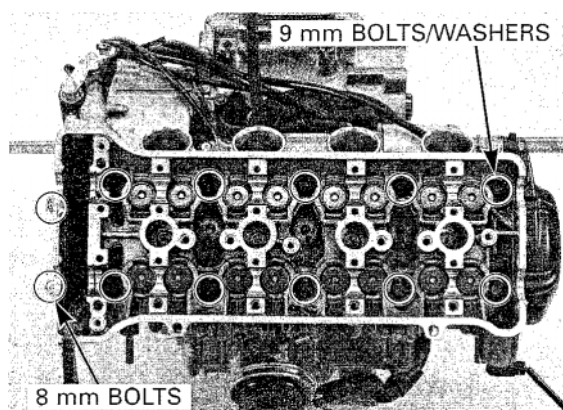
Install the two 8 mm flange bolts.

Tighten the 9 mm bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

**TORQUE: 51 N·m (5.2kgf·m, 38 lbf·ft)**

Tighten the 8 mm flange bolts to the specified torque.

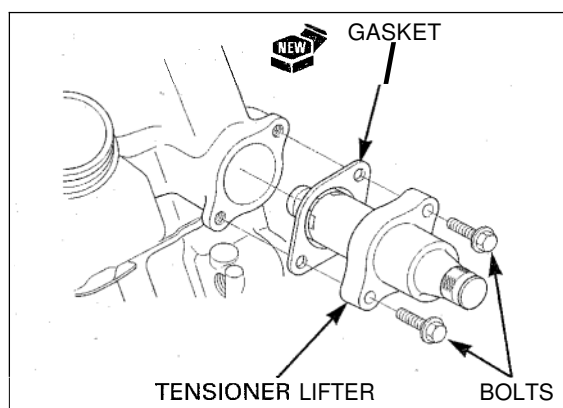
**TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)**



Install the cam chain tensioner lifter onto the cylinder head with new gasket.

Install and tighten the mounting bolts.

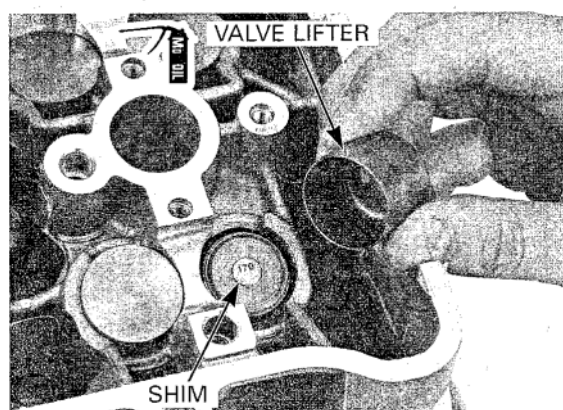
Install the engine into the frame (page 7-7).



## CAMSHAFT INSTALLATION

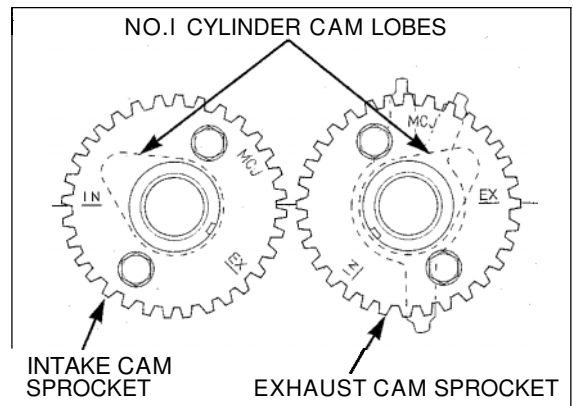
Apply molybdenum disulfide oil to the outer surface of the each valve lifter.

Install the shims and valve lifters into the valve lifter bores.

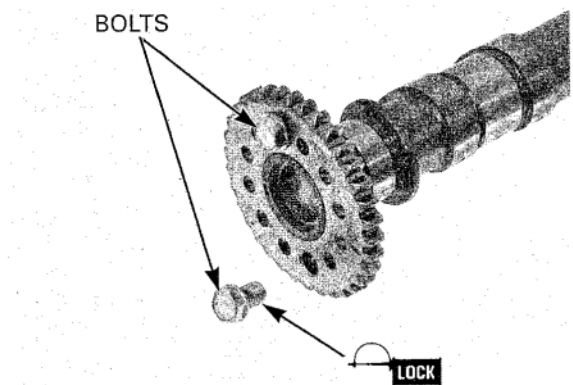


If the cam sprockets are removed, install the cam sprockets onto the camshafts.

- Install the intake cam sprocket with the timing mark (IN) facing outward and the No.1 cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No.1 cam lobes facing up and out as shown.



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

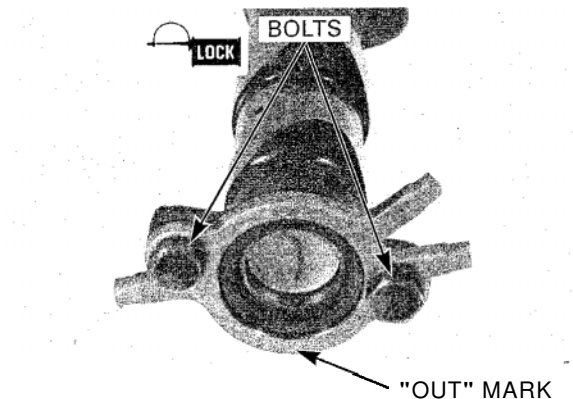


*Exhaust camshaft only:*

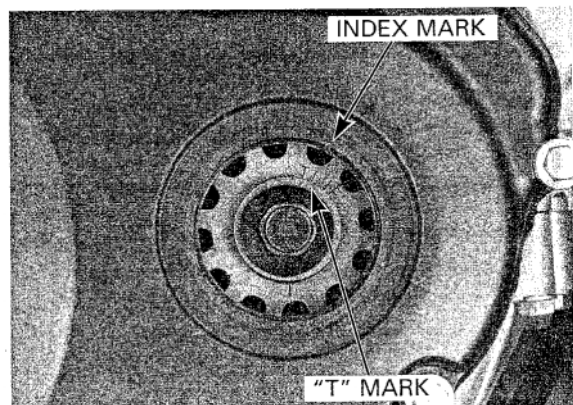
Clean and apply a locking agent to the cam cam pulse generator rotor threads.

*Install the cam pulse generator rotor with the No 1 camshaft lobes facing up and rotor "OUT" mark facing down as shown.*

Install the cam pulse generator rotor and mounting bolts.



Turn the crankshaft clockwise and align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.

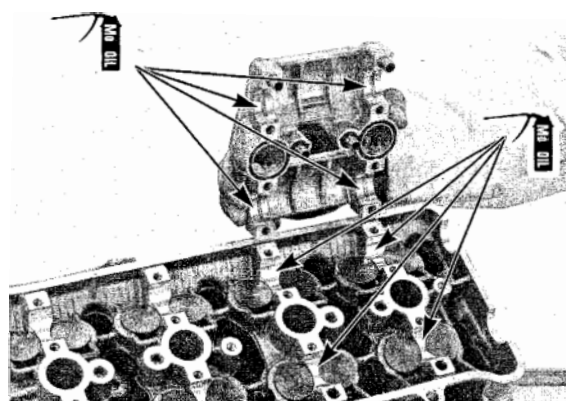
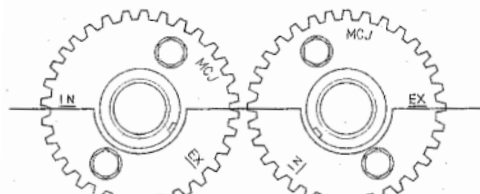


## CYLINDER HEAD/VALVES

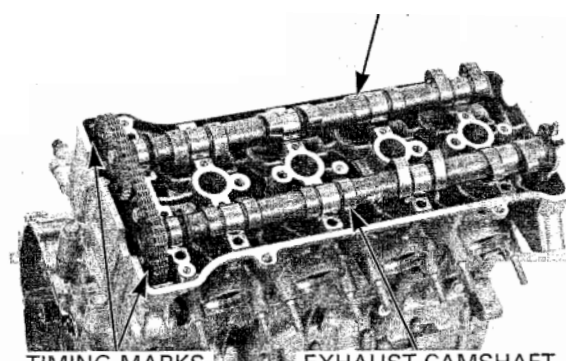
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head and camshaft holder.

Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

- Install each camshaft to the correct location with the identification marks.  
"IN": Intake camshaft  
"EX": Exhaust camshaft
- Make sure the timing marks on the cam sprockets are facing outward and flush with the cylinder head upper surface as shown.



INTAKE CAMSHAFT

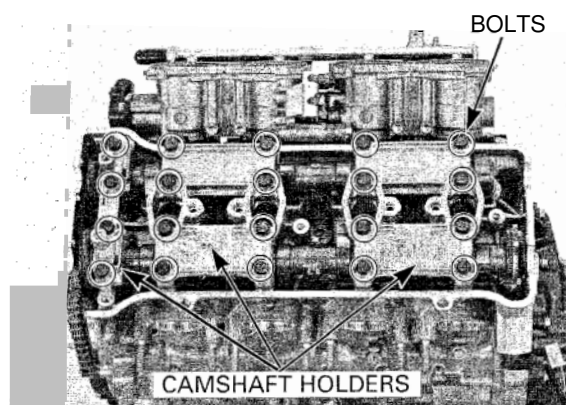


TIMING MARKS EXHAUST CAMSHAFT

Install the each camshaft holder onto the camshafts.

Install the each camshaft holder to the correct locations with the identification marks.

- "A": Right camshaft holder
- "B": Center camshaft holder
- "C": Left camshaft holder



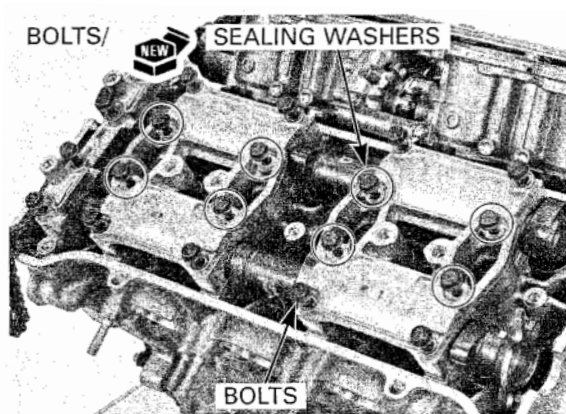
CAMSHAFT HOLDERS

*Install the sealing washers onto camshaft holder 5 and C's center four bolts as shown*

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts.

Install the 20 holder bolts with eight new washers as shown.

Finger tighten the bolts.



BOLTS/ SEALING WASHERS

BOLTS

## CYLINDER HEAD/VALVES

First gradually tighten the four bolts (No.5 – No.6 – No.7 – No.8) in the numerical order casted on the camshaft holders. Gradually tighten the other camshaft holder bolts until the camshaft holders lightly contact the cylinder head surface.

### NOTICE

*Tightening the camshaft holder bolts on only one-side might cause a camshaft holder to break.*

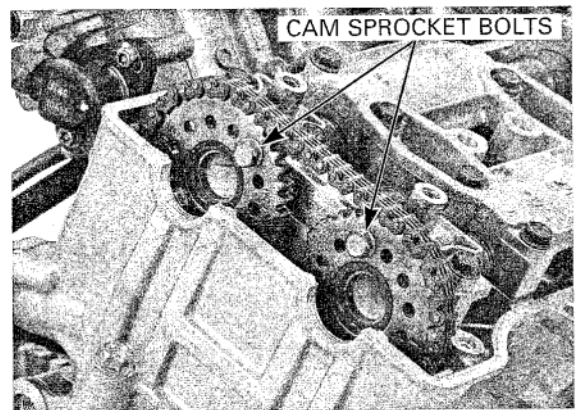
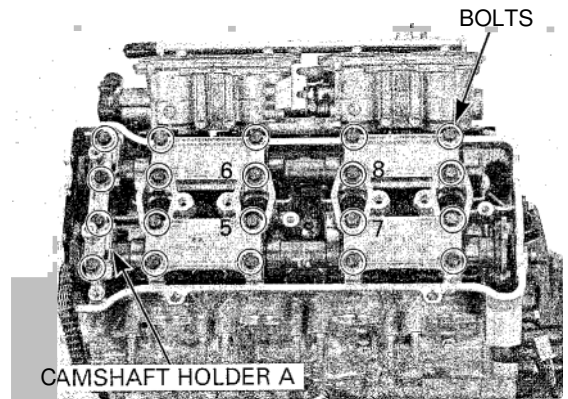
Tighten all camshaft holder bolts in the numerical order casted on the camshaft holders.

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

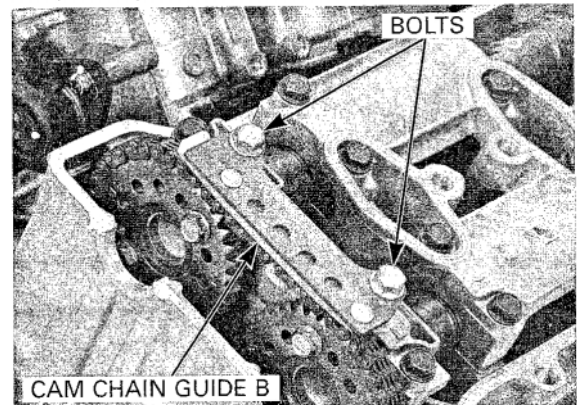
In case the cam sprockets were removed, tighten the cam sprocket bolts to the specified torque.

**TORQUE: 20 N·m (2.0kgf·m, 14 lbf·ft)**

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.

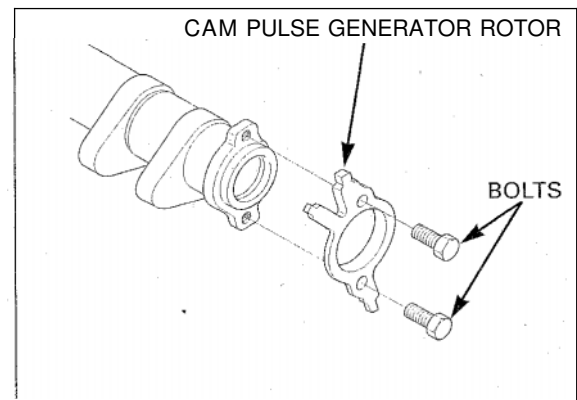


Install cam chain guide B, and tighten the bolts.



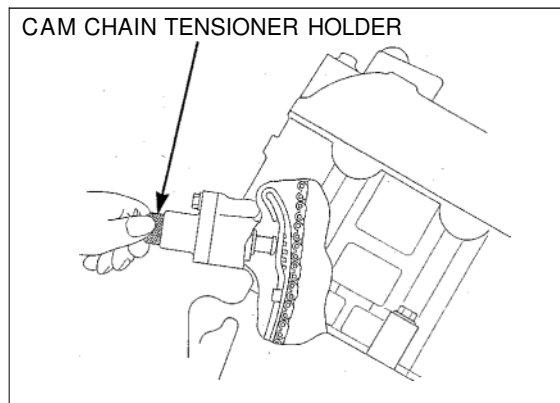
In case the cam pulse generator rotor bolts were removed, tighten the rotor bolts to the specified torque.

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



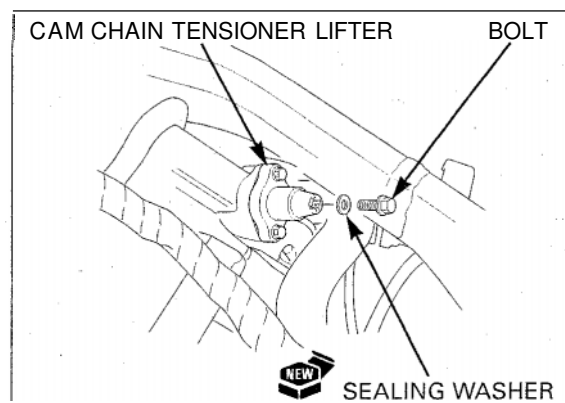
## CYLINDER HEAD/VALVES

Remove the cam chain tensioner holder from the cam chain tensioner lifter.

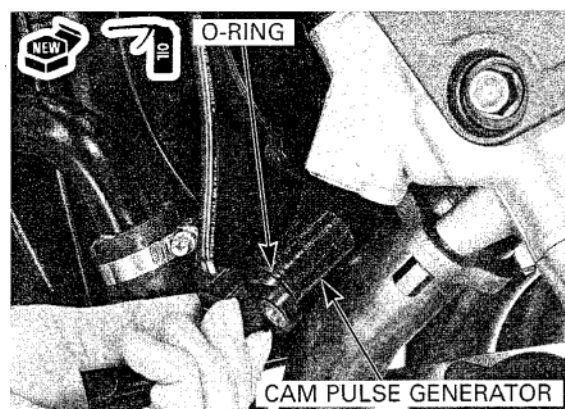


Install a new sealing washer and tighten the sealing bolt.

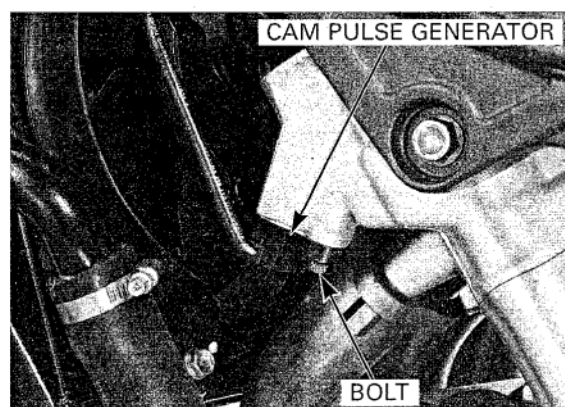
Recheck the valve timing.



Apply oil to the new O-ring, and install it onto the cam pulse generator.  
Install the cam pulse generator into the cylinder head.

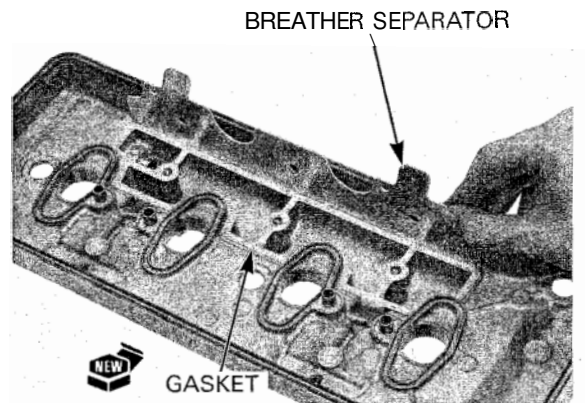


Install and tighten the mounting bolt securely.



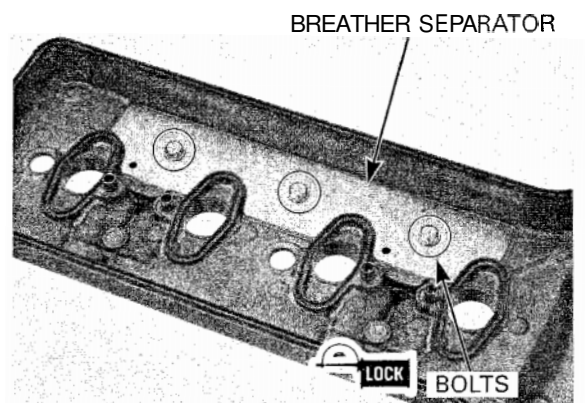
## CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather separator to the cylinder head cover.

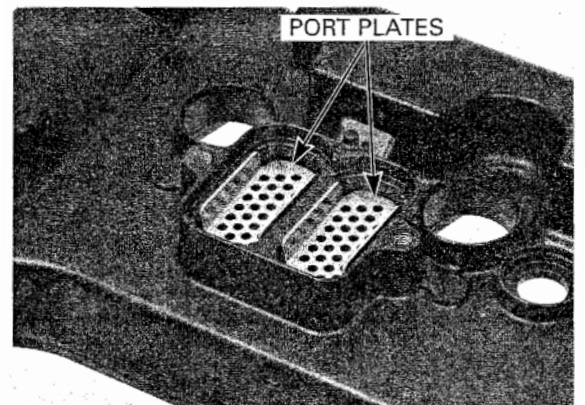


Apply a locking agent to the crankcase breather separator mounting bolt threads. Install and tighten the bolts to the specified torque.

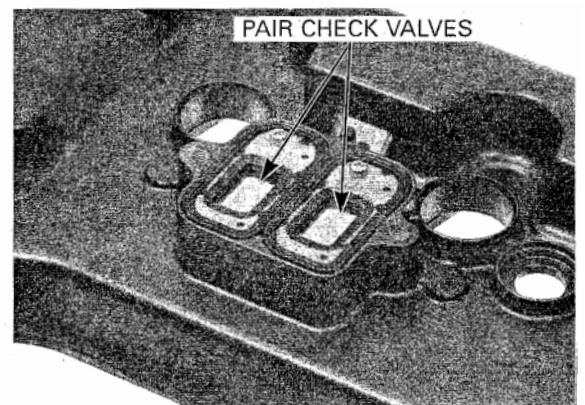
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the PAIR check valve port plates into the cylinder head cover.

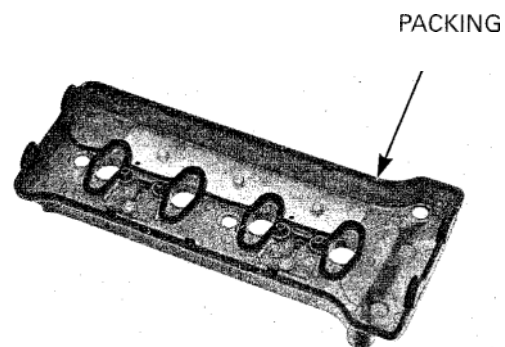


Install the PAIR check valves into the cylinder head cover.

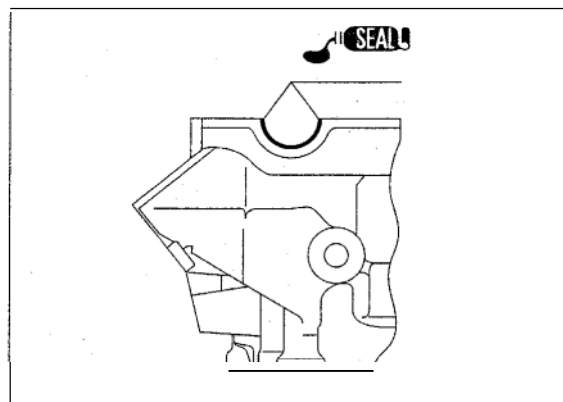


### CYLINDER HEAD COVER INSTALLATION

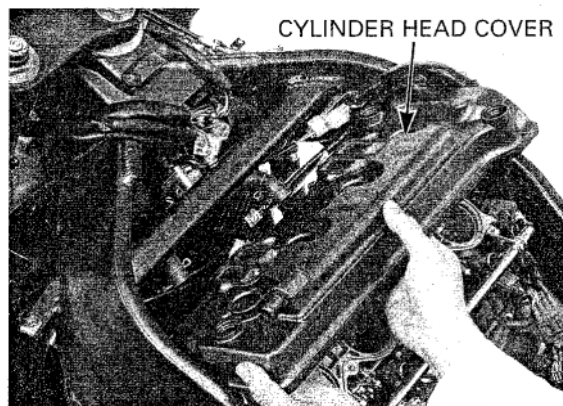
Install the cylinder head packing into the groove of the cylinder head cover.



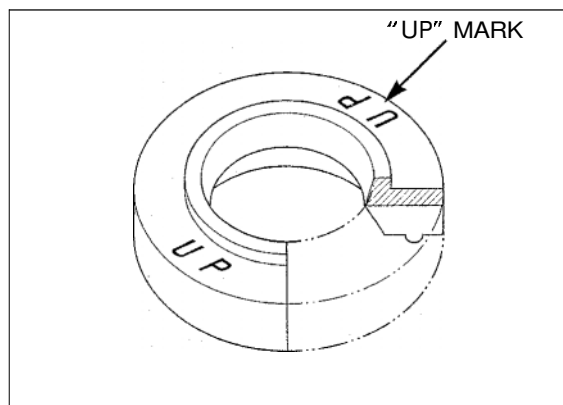
Apply sealant to the cylinder head semi-circular cut-outs as shown.



Install the cylinder head cover onto the cylinder head.



Install the washers with their "UP" mark facing up.

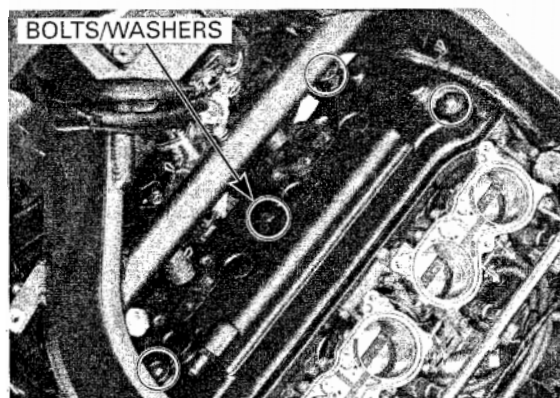




## CYLINDER HEAD/VALVES

Install and tighten the cylinder head cover special bolts to the specified torque.

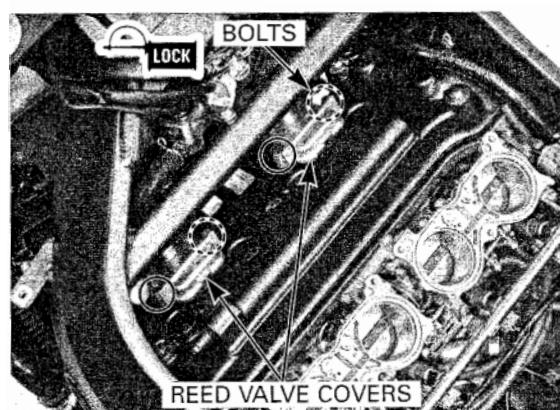
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



Install the PAIR reed valve covers onto the cylinder head cover.  
Apply a locking agent to the PAIR reed valve cover mounting bolt threads.

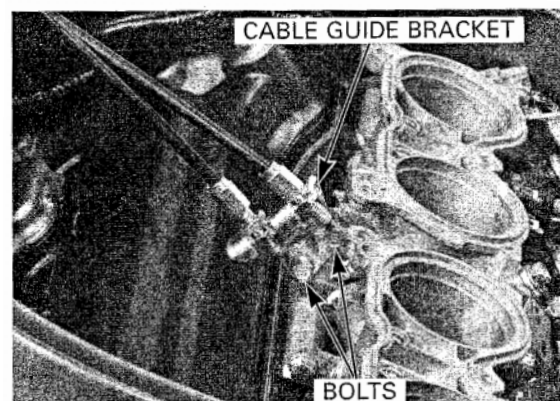
Install and tighten the bolts to the specified torque.

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



Connect the throttle cables from the throttle drum.  
Install and tighten the throttle cable guide bracket mounting bolts to the specified torque.

**TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)**

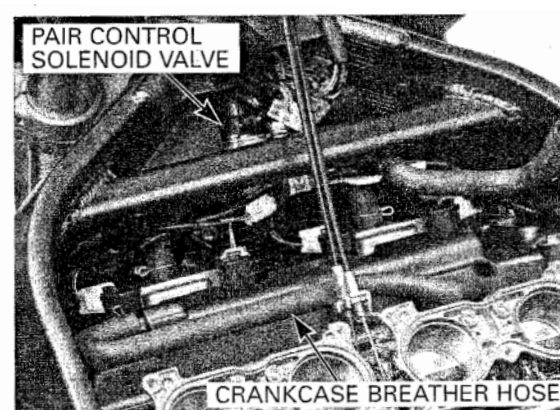


Install the direct ignition coils and spark plug sub-harness (page 17-5).

Connect the cam pulse generator 2P (Natural) connector (page 5-83).

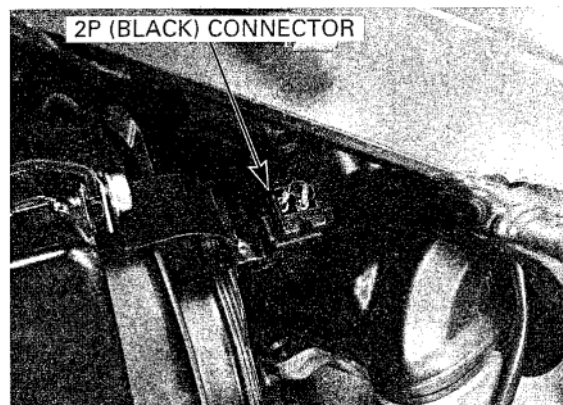
Install the PAIR solenoid valve assembly (page 5-88).  
Install and tighten the PAIR solenoid valve mounting bolt.

Connect the crankcase breather hose.



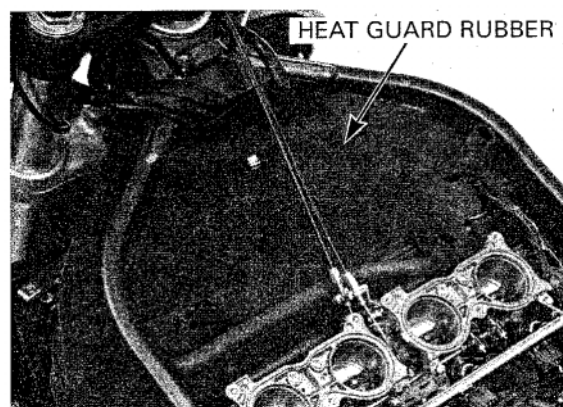
## CYLINDER HEAD/VALVES

Connect the fan motor 2P (Black) connector.



Install the heat guard rubber onto the cylinder head cover.

Install the air cleaner housing (page 5-65).



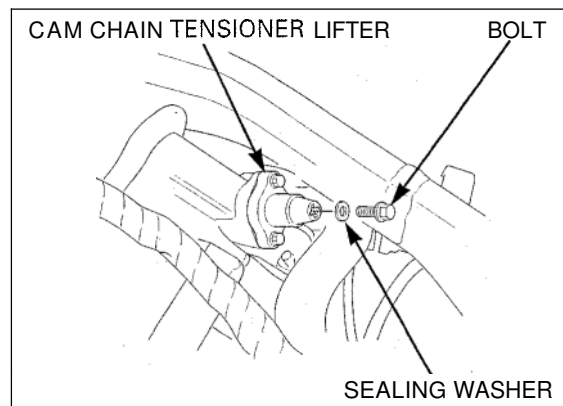
## CAM CHAIN TENSIONER LIFTER

### REMOVAL

Remove the fuel tank (page 5-59).

Remove the throttle body (page 5-67).

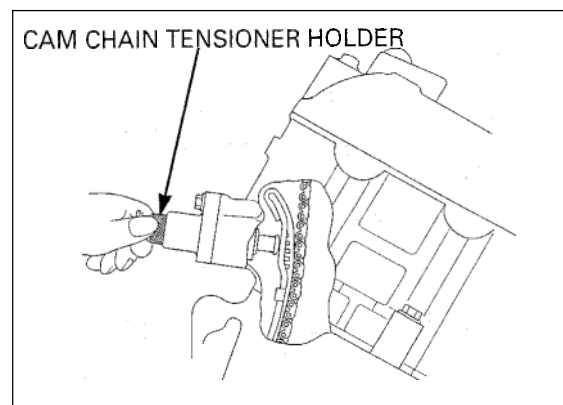
Remove the cam chain tensioner sealing bolt and sealing washer.



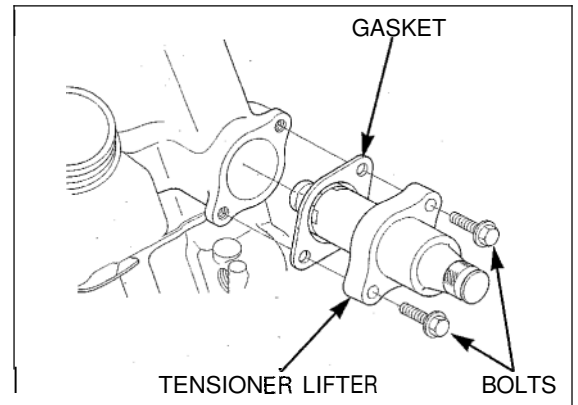
Turn the tensioner shaft fully in (clockwise) and secure it using the cam chain tensioner holder to prevent damaging the cam chain.

### TOOL

Cam chain tensioner holder      **07ZMG-MCAA400**  
(U.S.A. only)

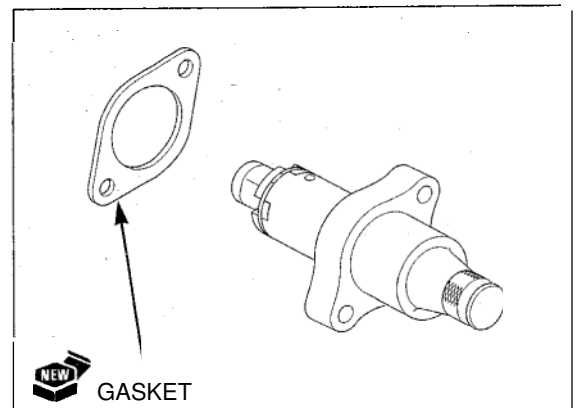


Remove the bolts and cam chain tensioner lifter.  
Remove the gasket.

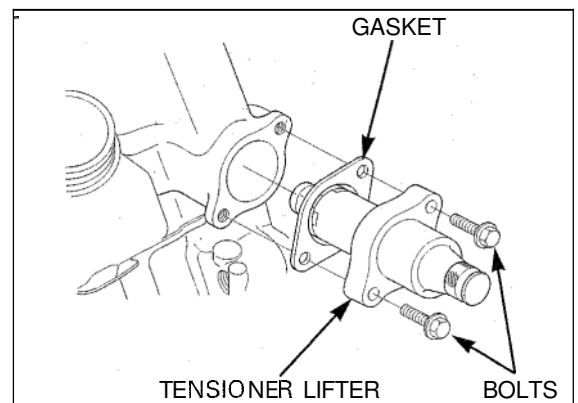


### INSTALLATION

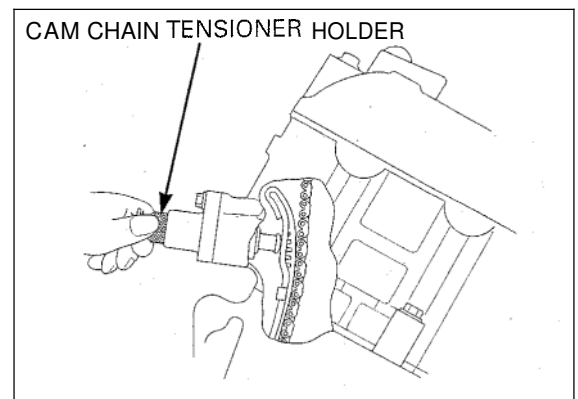
Install the new gasket onto the cam chain tensioner lifter.



Install the cam chain tensioner lifter into the cylinder head.  
Install and tighten the mounting bolts.



Remove the cam chain tensioner holder.



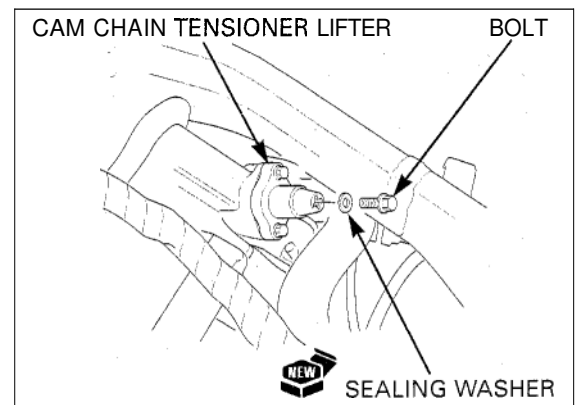
## CYLINDER HEAD/VALVES

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Install a new sealing washer and tighten the sealing bolt securely.

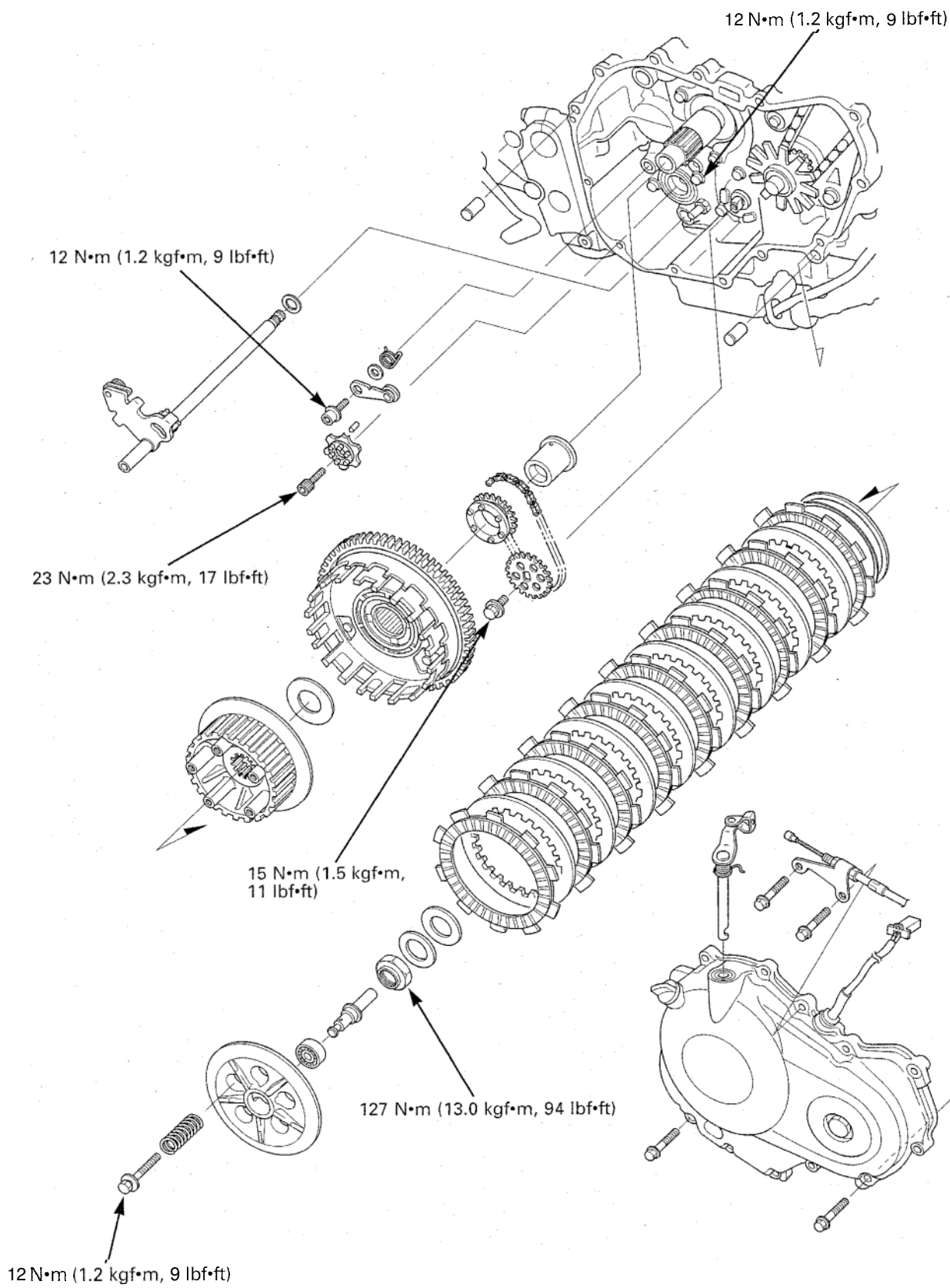
Install the throttle body (page 5-71).

Install the fuel tank (page 5-61).



**CLUTCH/GEARSHIFT LINKAGE**

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# 9. CLUTCH/GEARSHIFT LINKAGE

<b>SERVICE INFORMATION</b>	<b>9-1</b>	<b>CLUTCH</b>	<b>9-4</b>
<b>TROUBLESHOOTING</b>	<b>9-2</b>	<b>GEARSHIFT LINKAGE</b>	<b>9-12</b>
<b>RIGHT CRANKCASE COVER REMOVAL</b>	<b>9-3</b>	<b>RIGHT CRANKCASE COVER INSTALLATION</b>	<b>9-17</b>

## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch, gearshift linkage, shift drum and shift forks. All service can be done with the engine installed in the frame.
- Engine oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motor-cycle creeps with clutch disengaged, inspect the engine oil level before servicing the clutch system.

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (318 – 13/16)	—
Clutch spring free length		48.8 (1.92)	47.4 (1.87)
Clutch disc thickness		2.92 – 3.08 (0.114 – 0.121)	2.6 (0.10)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I.D.	25.000 – 25.021 (0.9843 – 0.9851)	25.03 (0.985)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.97 (1.377)
Mainshaft O.D. at clutch outer guide		24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)
Shift fork, fork shaft	Fork	I.D.	12.000 – 12.018 (0.4724 – 0.4731)
		Claw thickness	5.93 – 6.00 (0.233 – 0.236)
	Fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4712)

9

### TORQUE VALUES

Clutch center lock nut	127 N•m (13.0 kgf•m, 94 lbf•ft)	Apply oil to the threads. Stake the nut.
Clutch spring bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Shift drum center socket bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)	Apply a locking agent to the threads.
Shift drum stopper arm pivot bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Gearshift return spring pin	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Gearshift drum bearing/shift fork shaft retaining bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads.
Gearshift pedal link pinch bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	
Oil pump driven sprocket bolt	15 N•m (1.5 kgf•m, 11 lbf•ft)	Apply a locking agent to the threads.

## CLUTCH/GEARSHIFT LINKAGE

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### TOOLS

Clutch center holder	07724-0050002	or equivalent commercially available in U.S.A.
Driver	07749-0010000	
Attachment, 42 x 47 mm	07746-0010300	
Pilot, 35 mm	07746-0040800	

### TROUBLESHOOTING

#### Clutch lever too hard to pull in

- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

#### Clutch slips when accelerating

- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

#### Clutch will not disengage or motorcycle creeps with clutch disengaged

- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

#### Hard to shift

- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

#### Transmission jumps out of gear

- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

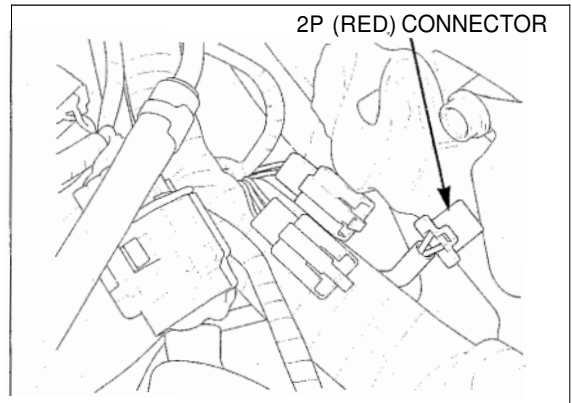
#### Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

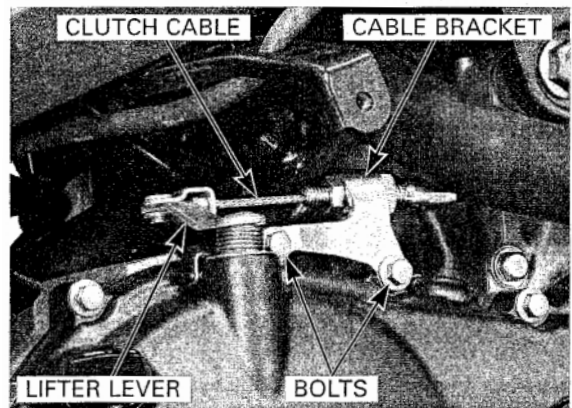
## RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-15).  
Remove the lower cowl (page 2-7).  
Open and support the front end of the fuel tank (page 3-4).

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

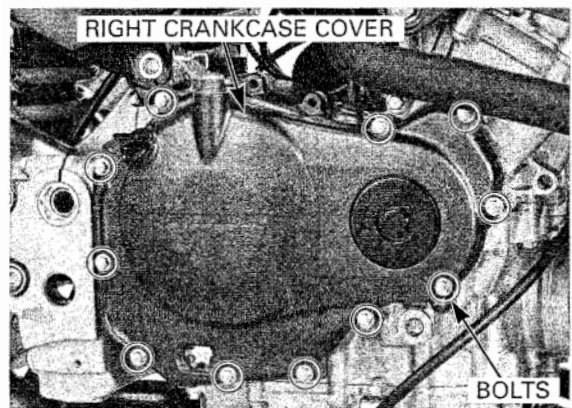


Remove the bolts and clutch cable bracket, then disconnect the clutch cable end from the clutch lifter lever.



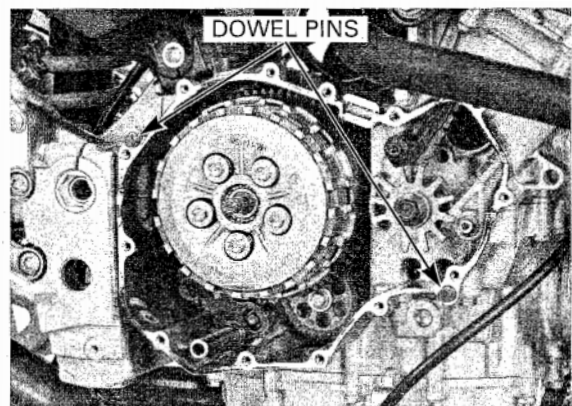
*The lifter arm spindle is engaged with the clutch lifter piece inside the right crankcase cover*

Remove the right crankcase cover SH bolts. Remove the right crankcase cover while turning the clutch lifter arm counterclockwise to disengage the lifter arm spindle from the lifter piece.



Remove the two dowel pins.

Clean any sealant off from the right crankcase cover mating surfaces.



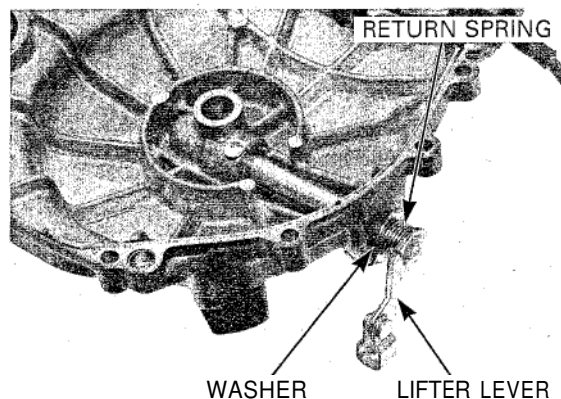


## CLUTCH/GEARSHIFT LINKAGE

### CLUTCH LIFTER LEVER

Remove the clutch lifter lever, return spring and washer from the right crankcase cover.

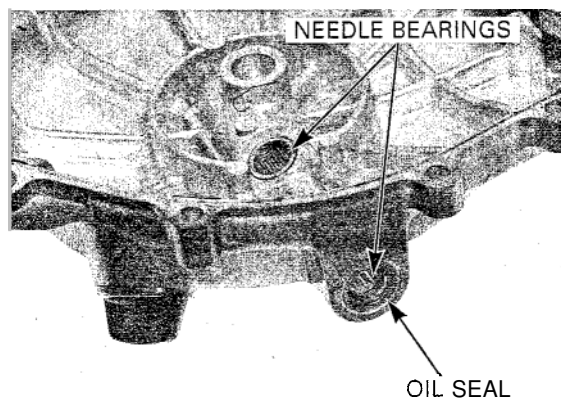
Check the lifter lever spindle for wear or damage.  
Check the return spring for fatigue or damage.



Check the lifter lever oil seal and needle bearings for wear or damage.

Install the clutch lifter lever with the washer and spring in the reverse order of removal.

*Install the hooks of the return spring to the right crankcase cover and clutch lifter lever.*



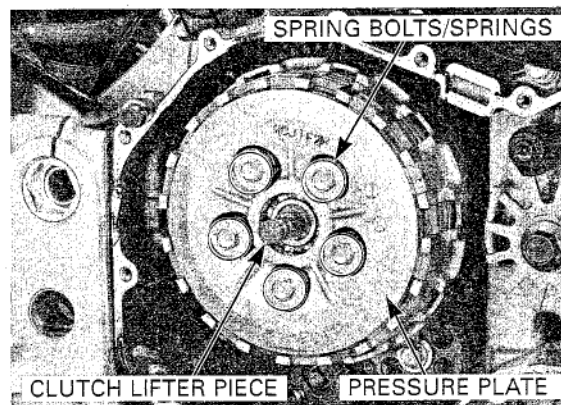
## CLUTCH

### REMOVAL

Remove the right crankcase cover (page 9-3).

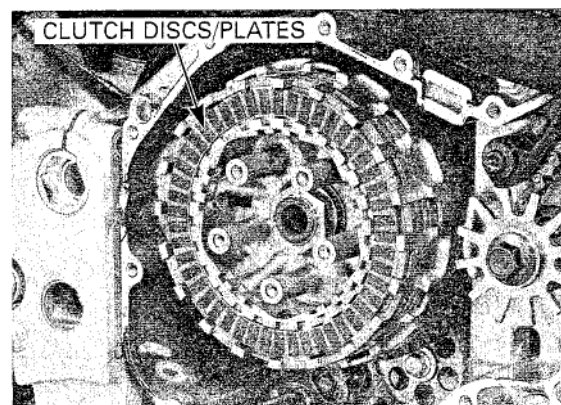
Remove the clutch spring bolts, springs and pressure plate.

Remove the clutch lifter piece from the lifter bearing.



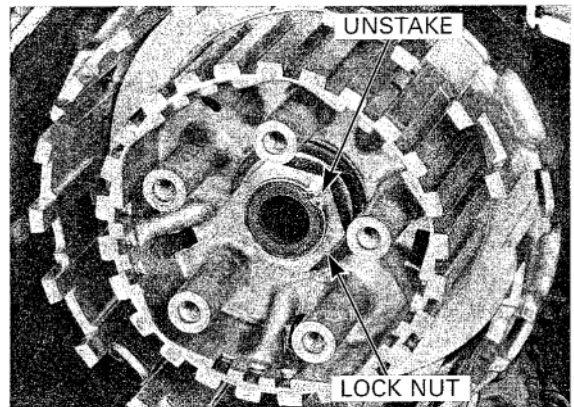
Remove the following:

- Nine clutch discs
- Eight clutch plates
- Judder spring
- Judder spring seat



## CLUTCH/GEARSHIFT LINKAGE

Unstake the clutch center lock nut.



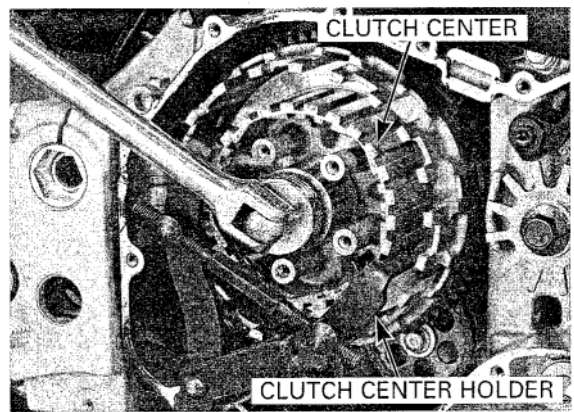
Hold the clutch center with the clutch center holder, then remove the lock nut.

**TOOL:**

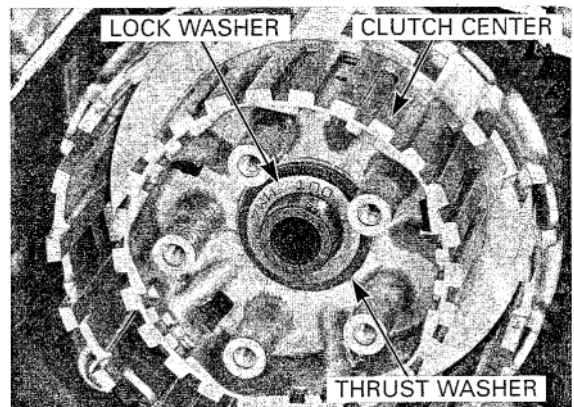
**Clutch center holder**

**07724-0050002**  
(Equivalent commercially available in U.S.A.)

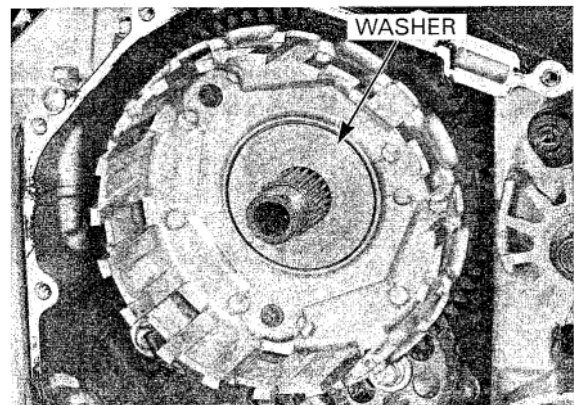
Discard the lock nut.



Remove the lock washer, thrust washer and clutch center.

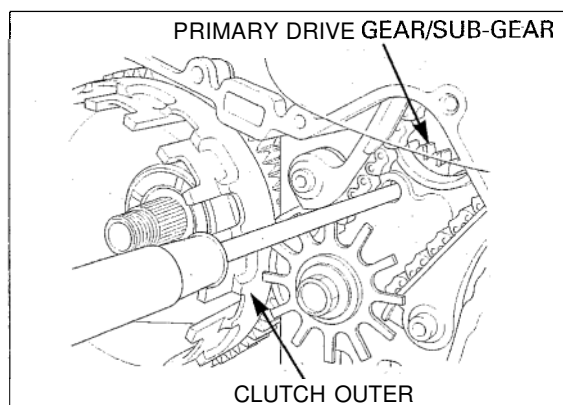


Remove the washer.



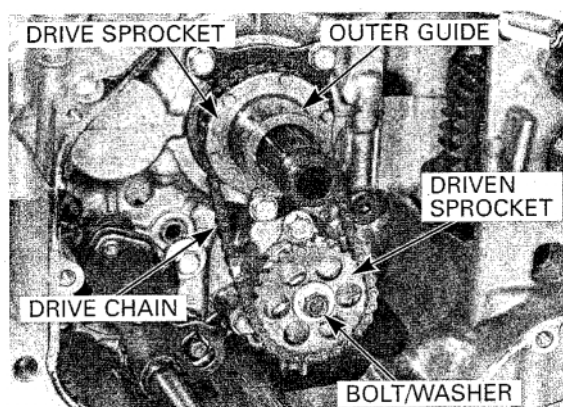
## CLUTCH/GEARSHIFT LINKAGE

Align the primary drive gear and sub-gear teeth with a screwdriver as shown.  
Pull out the clutch outer.



Remove the oil pump driven sprocket bolt/washer.  
Remove the oil pump drive/driven sprocket and drive chain as an assembly.

Remove the clutch outer guide.



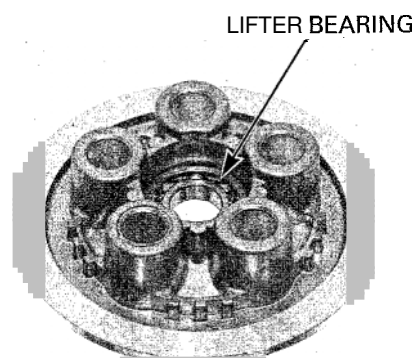
## INSPECTION

### Clutch lifter bearing

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

The bearing should turn smoothly and freely without excessive play.

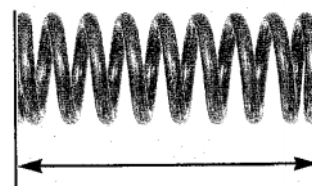
If necessary replace the bearing.



### Clutch spring

Measure the clutch spring free length.

**SERVICE LIMIT: 47.4 mm (1.87 in)**

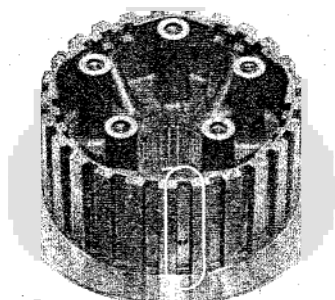


## CLUTCH/GEARSHIFT LINKAGE

---

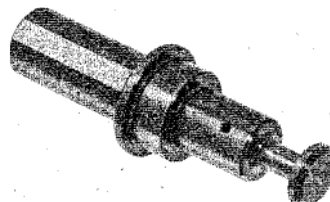
### Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates.  
Replace if necessary.



### Clutch lifter piece

Check the clutch lifter piece for damage or abnormal wear.

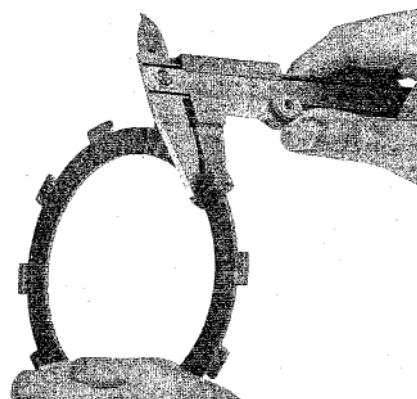


### Clutch disc

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

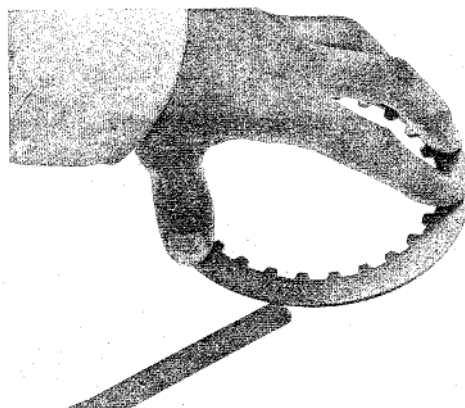
**SERVICE LIMIT: 2.6 mm (0.10 in)**



### Clutch plate

Check each disc plate for warpage on a surface plate using a feeler gauge.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

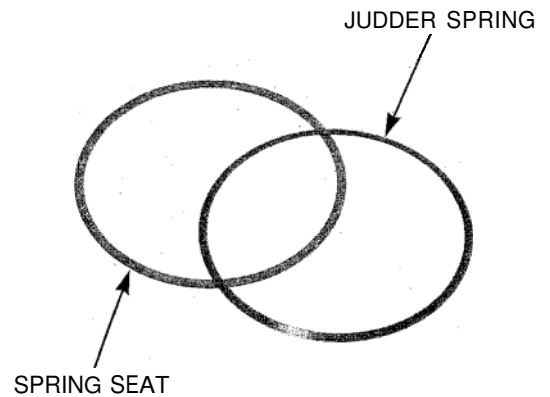


## CLUTCH/GEARSHIFT LINKAGE

### Judder spring/spring seat

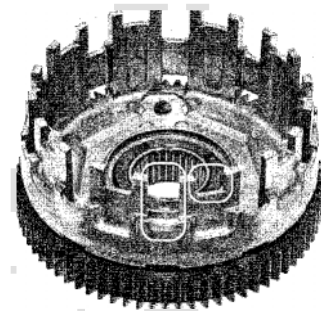
Check the judder spring and spring seat for deformation, warpage or damage; replace as necessary.

- A damaged or warped spring seat will cause the judder spring to be pressed unevenly.
- A damaged judder spring also causes the weak contact between the discs and plates or uneven disc/plate contact.



### Clutch outer/clutch outer guide

Check the slots of the clutch outer for damage or wear caused by the clutch discs. Replace if necessary.

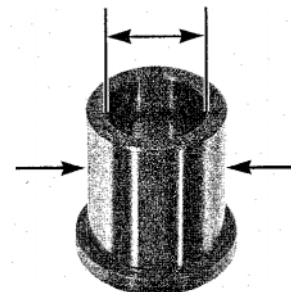


Measure the O.D. and I.D. of the clutch outer guide.

#### SERVICE LIMITS:

O.D.: 34.97 mm (1.377 in)

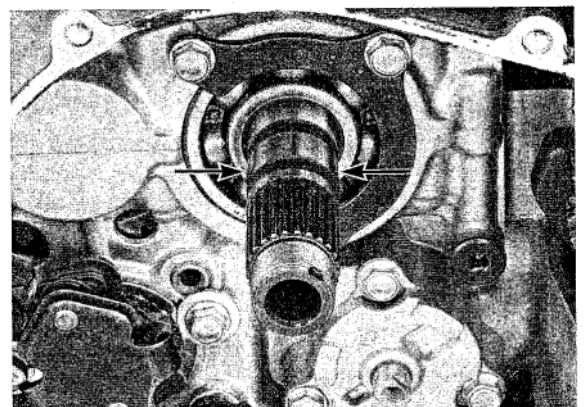
I.D.: 25.03 mm (0.985 in)



### Mainshaft

Measure the mainshaft O.D at clutch outer guide sliding surface.

**SERVICE LIMIT: 24.96 mm (0.983 in)**

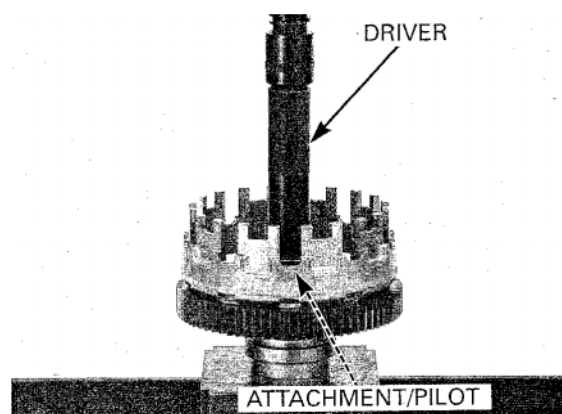


## CLUTCH OUTER NEEDLE BEARING REPLACEMENT

Press the needle bearing out of the clutch outer using the special tools.

### TOOLS:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 35 mm	07746-0040800

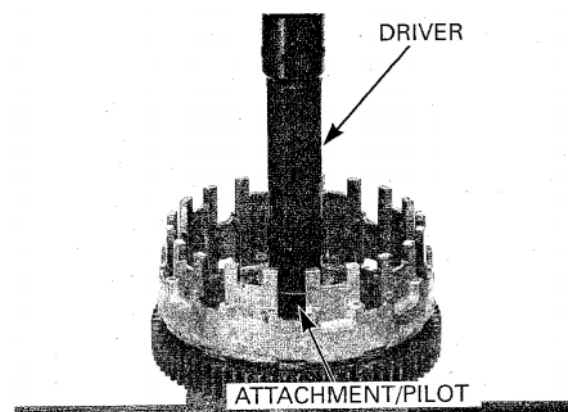


*Press the needle bearing into the clutch outer with the marked side facing up*

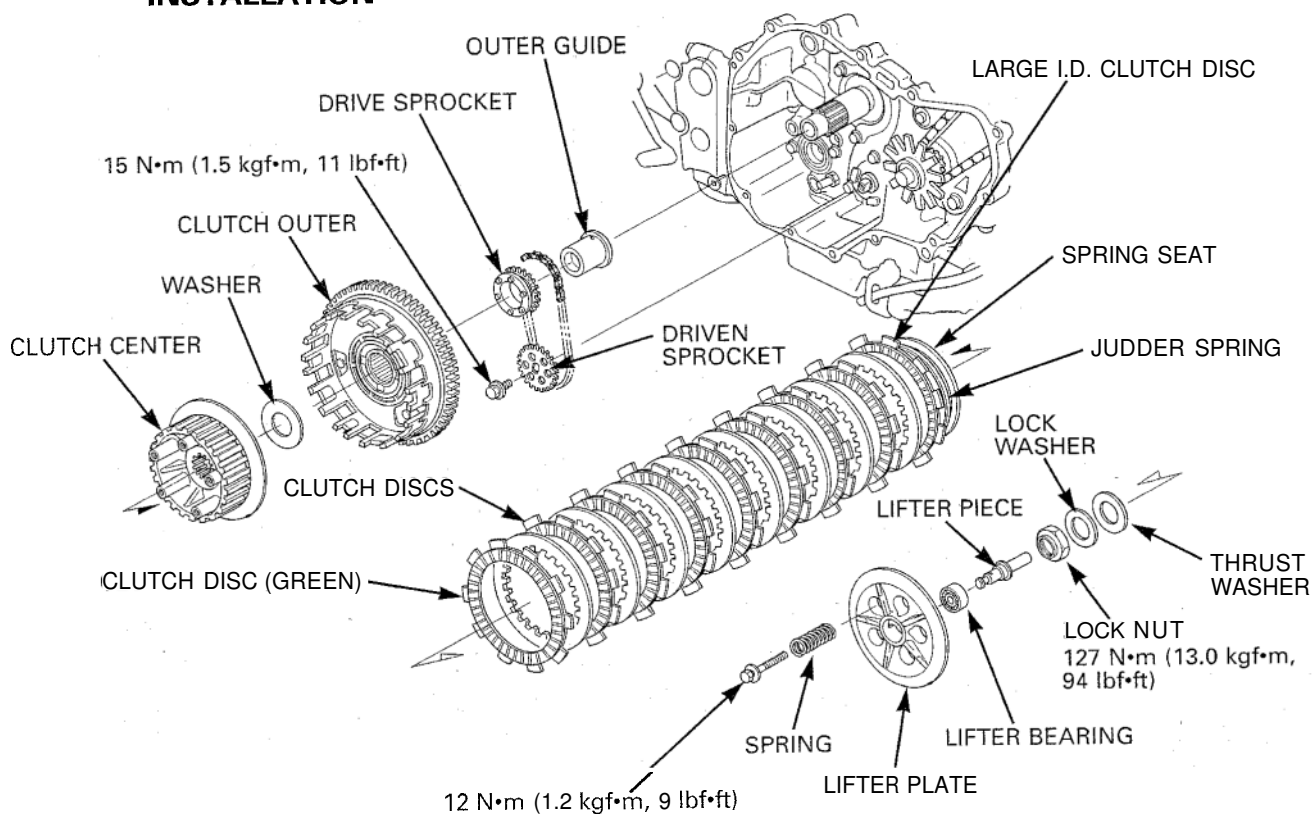
Press a new needle bearing into the clutch outer so that the casing of the needle bearing is flush with the clutch outer surface as shown.

### TOOLS:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 35 mm	07746-0040800



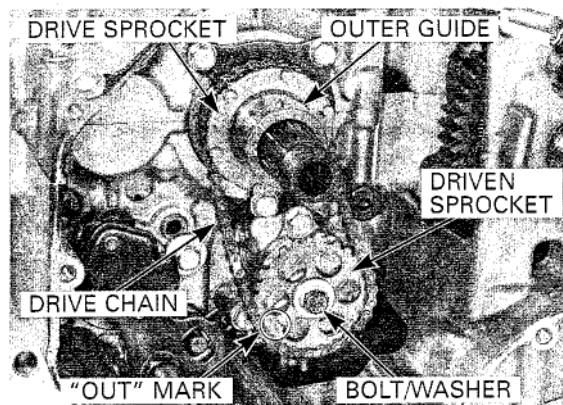
## INSTALLATION



## CLUTCH/GEARSHIFT LINKAGE

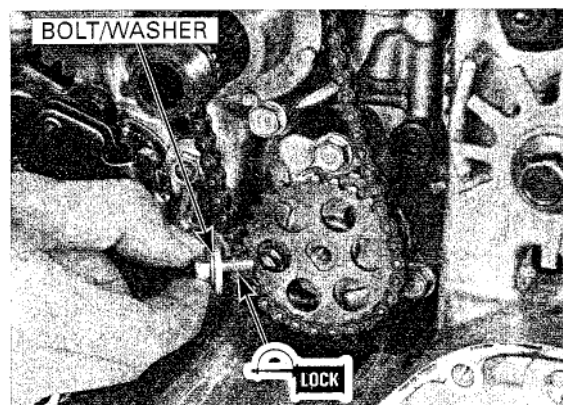
*install the oil pump driven sprocket with its "OUT" mark facing out*

Install the clutch outer guide, and then install the oil pump drive/driven sprocket and drive chain as an assembly.



Apply a locking agent to the threads of the oil pump driven sprocket bolt. Tighten the driven sprocket bolt to the specified torque.

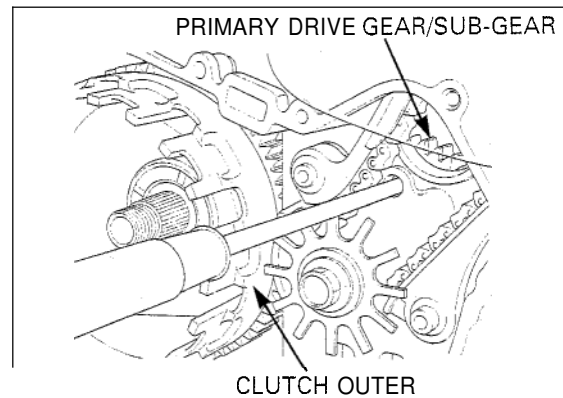
**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**



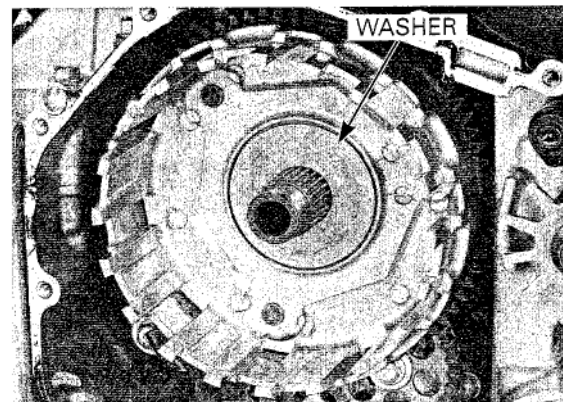
*Be sure the clutch outer sits securely onto the positioning tabs of the oil pump drive sprocket. Rotate the oil pump drive chain while installing the clutch outer to properly seat it.*

Align the primary drive gear and sub-gear teeth with a screwdriver as shown.

Install the clutch outer.



Install the washer onto the clutch outer.



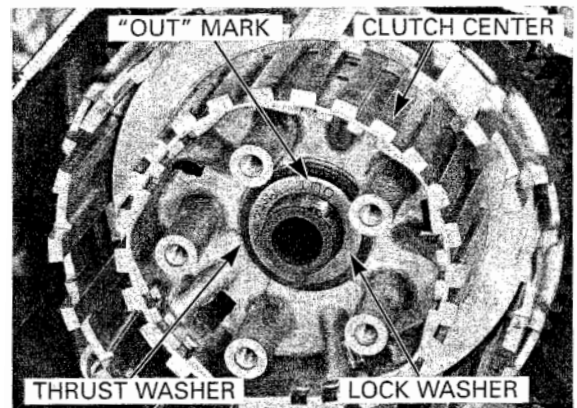


## CLUTCH/GEARSHIFT LINKAGE

Install the clutch center.

Install the thrust washer.

Install the lock washer with its "OUT" mark facing out.



Apply oil to the new lock nut threads, then install it.

Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

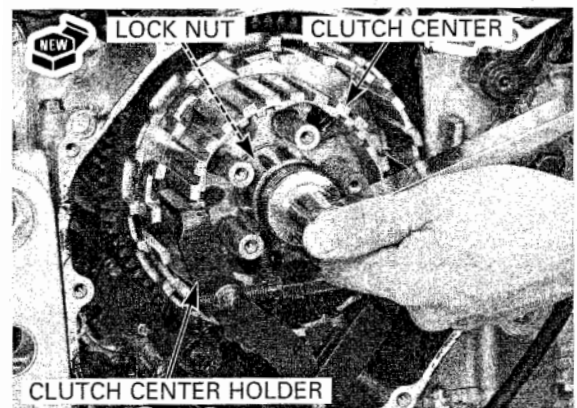
**TOOL:**

**Clutch center holder**

**07724-0050002**

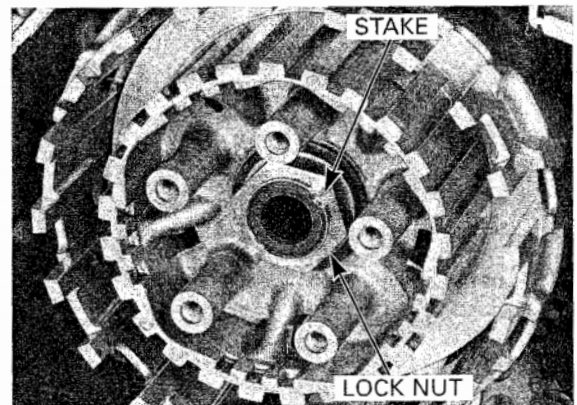
**(Equivalent commercially available in U.S.A.)**

**TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)**



*Be careful not to damage the mainshaft threads.*

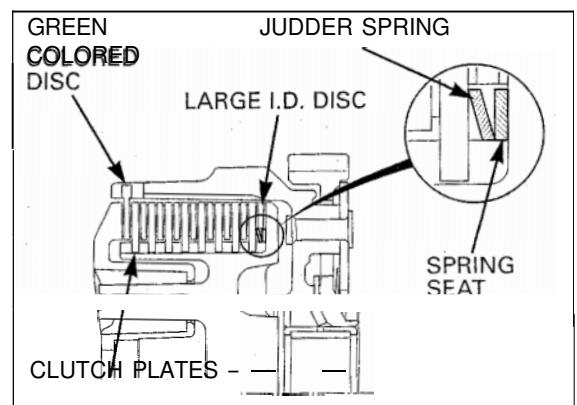
Stake the lock nut into the mainshaft groove with a punch.



Install the judder spring seat and judder spring.

Coat the clutch discs and plates with clean engine oil.  
Install the large I.D. clutch disc.

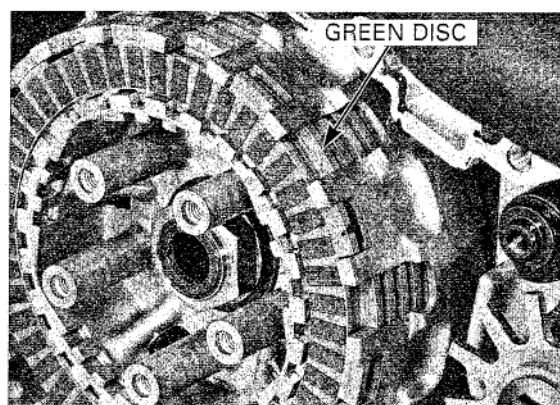
Stack the clutch plates and discs alternately.



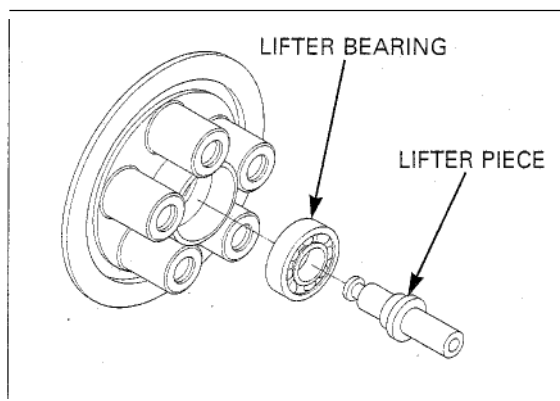


## CLUTCH/GEARSHIFT LINKAGE

Install the green outer clutch disc in the shallow slot on the clutch outer.



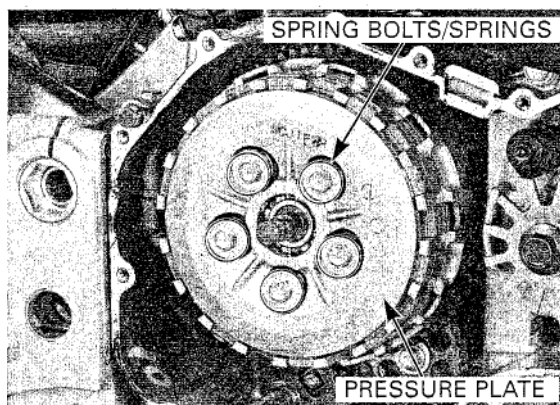
Install the lifter bearing into the pressure plate.  
Install the clutch lifter piece into the lifter bearing.



Install the pressure plate.  
Install the clutch springs and spring bolts.  
Tighten the bolts in a crisscross pattern in two to three steps, then tighten the bolts to the specified torque.

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

Install the right crankcase cover (page 9-17).



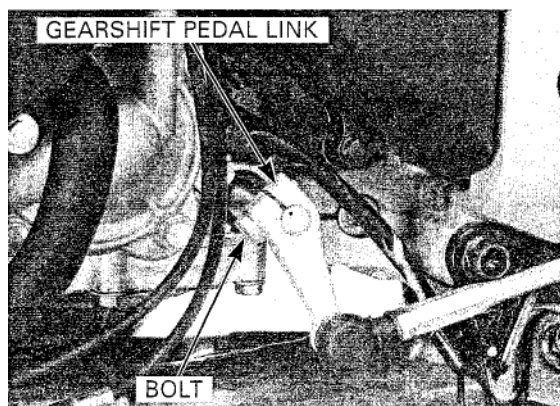
## GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE REMOVAL

Remove the following:

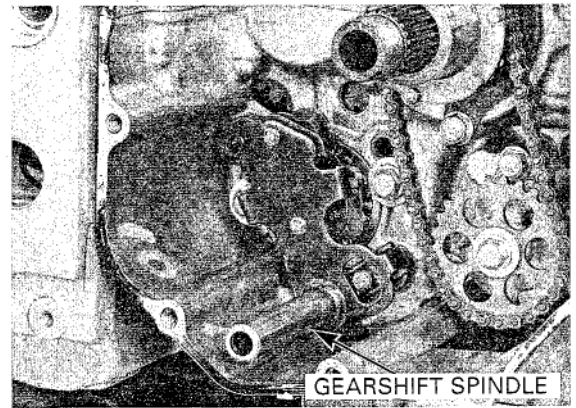
- Right crankcase cover (page 9-3)
- Clutch assembly (page 9-4)

Remove the bolt and gearshift pedal link.



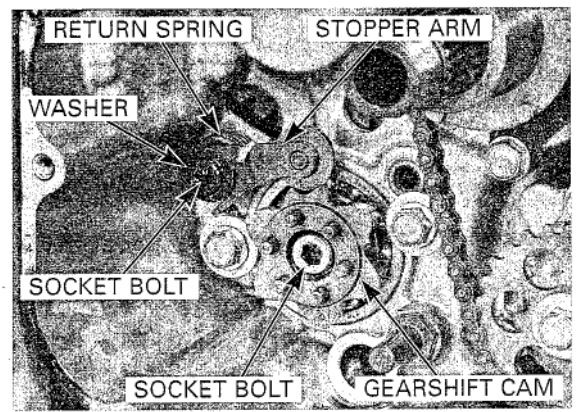
## CLUTCH/GEARSHIFT LINKAGE

Pull the gearshift spindle assembly and thrust washer out of the crankcase.



Remove the following:

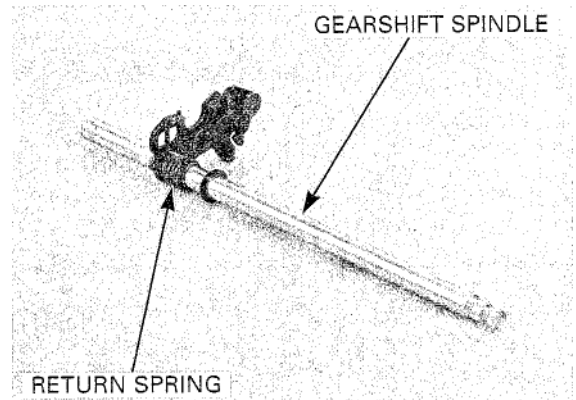
- Stopper arm socket bolt
- Stopper arm
- Return spring
- Washer
- Dowel pins
- Socket bolt
- Gearshift cam



### GEARSHIFT LINKAGE INSPECTION

Check the gearshift spindle for wear, damage or bends.

Check the return spring for fatigue or damage.



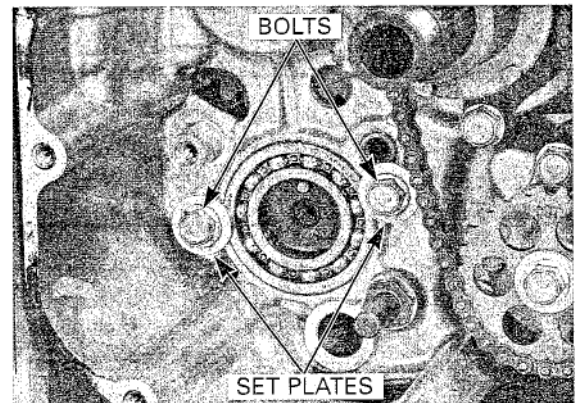
*Shift drum/shift fork service can be done with the engine installed in the frame.*

### SHIFT DRUM/SHIFT FORK REMOVAL

Remove the following:

- Gearshift linkage (page 9-12)
- Oil pan (page 4-3)

Remove the bolts and shift drum bearing set plates.

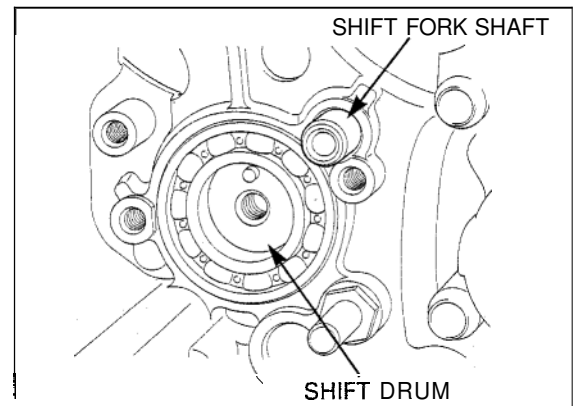


## CLUTCH/GEARSHIFT LINKAGE

---

Remove the shift fork shaft and shift forks.

Remove the shift drum bearing and shift drum.



### SHIFT DRUM/SHIFT FORK INSPECTION

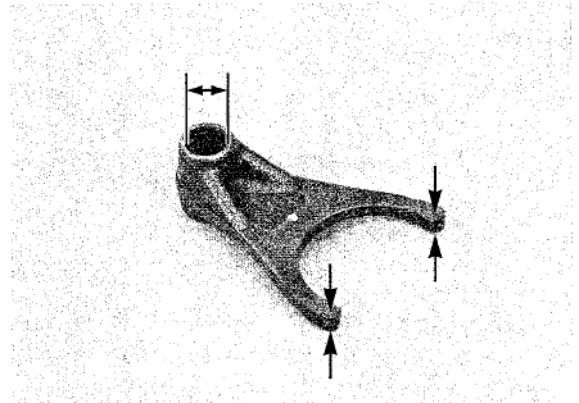
Check the shift fork and fork shaft for wear or damage.

Measure the I.D. of the shift fork.

**SERVICE LIMIT: 12.03 mm (0.474 in)**

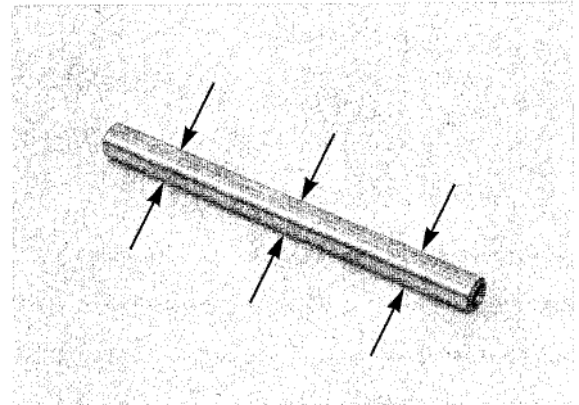
Measure the shift fork claw thickness.

**SERVICE LIMIT: 5.9 mm (0.23in)**

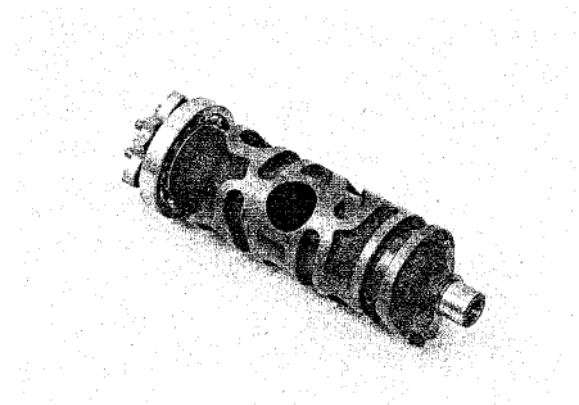


Measure the O.D. of the shift fork shaft.

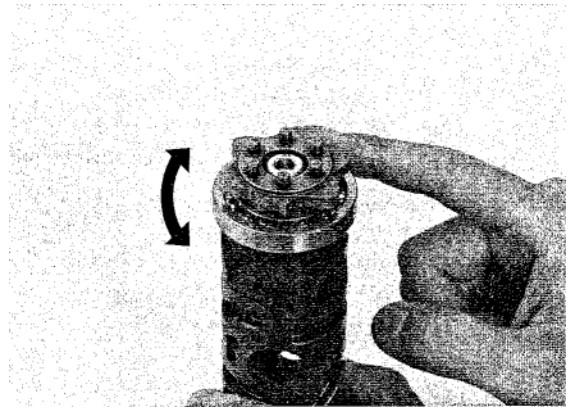
**SERVICE LIMIT: 11.95 mm (0.470in)**



Inspect the shift drum grooves for wear or damage.



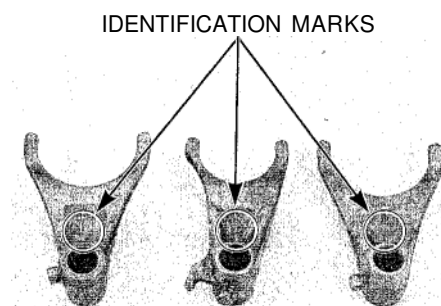
Turn the outer race of the shift drum bearing with your finger.  
The bearing should turn smoothly and freely without excessive play.  
If necessary replace the bearing.



### SHIFT DRUM/SHIFT FORK INSTALLATION

The shift forks have location marks.

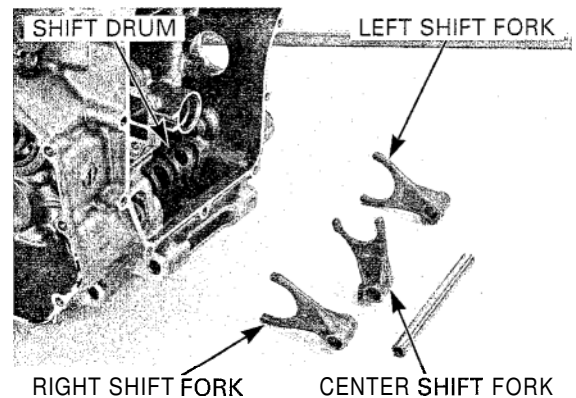
"R" for right  
"C" for center  
"L" for left



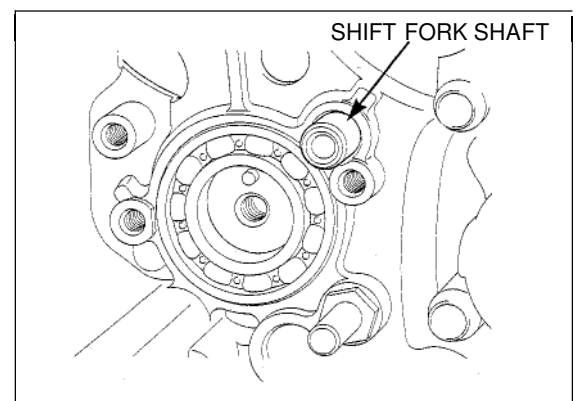
Install the shift drum/shift drum bearing into the crankcase.

Apply molybdenum disulfide oil to the shifter fork groove of the shift gears.

Install the shift forks on the transmission with their identification marks facing to the right.



Install the shift fork shaft.



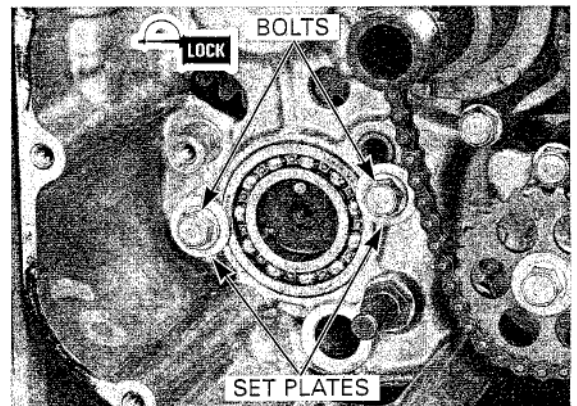
## CLUTCH/GEARSHIFT LINKAGE

Apply a locking agent to the threads of the set plate bolts.

Install and set plates and bolts, tighten the bolts to the specified torque.

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

Install the gearshift linkage (see following steps).



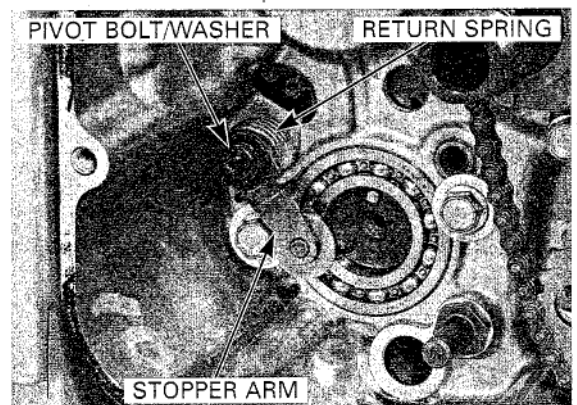
### GEARSHIFT LINKAGE INSTALLATION

Install the following:

- Washer
- Return spring
- Stopper arm
- Socket bolt

Tighten the stopper arm socket bolt to the specified torque.

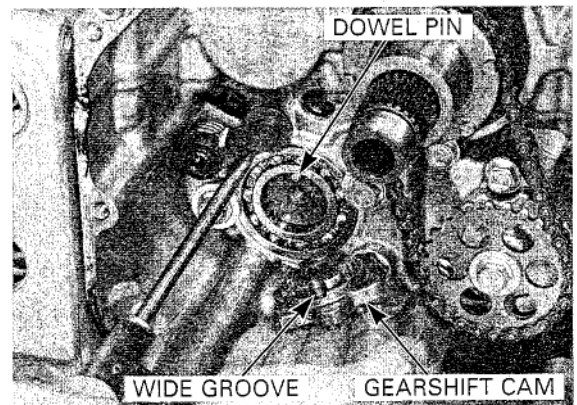
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



*Align the dowel pin on the shift drum center with the wide groove on the gearshift cam*

Install the dowel pin onto the shift drum.

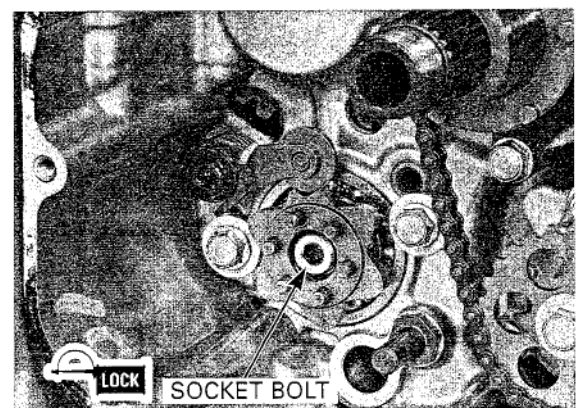
Install the gearshift cam while holding the stopper arm using a screwdriver as shown.



Apply a locking agent to the gearshift cam socket bolt threads.

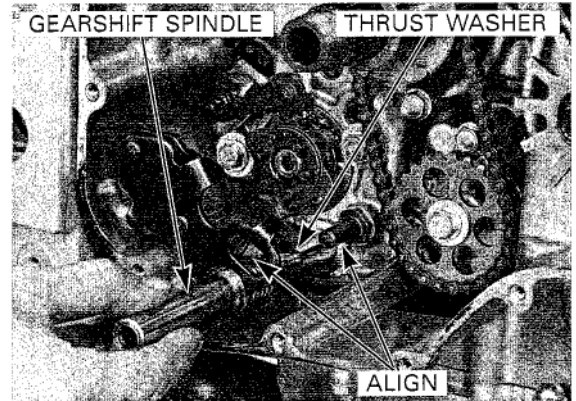
Install and tighten the socket bolt to the specified torque.

**TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)**



## CLUTCH/GEARSHIFT LINKAGE

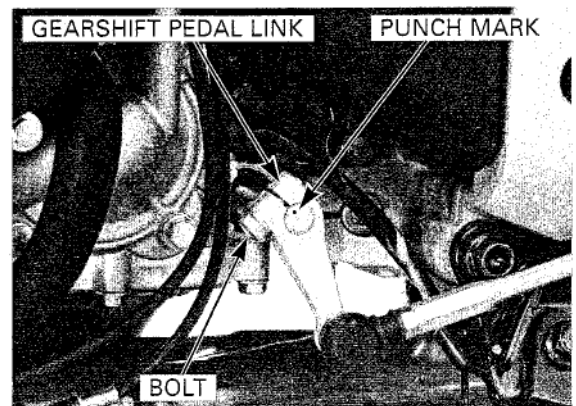
Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.



Install the gearshift pedal link aligning its slit with the punch mark on the gearshift spindle. Install and tighten the pinch bolt to the specified torque.

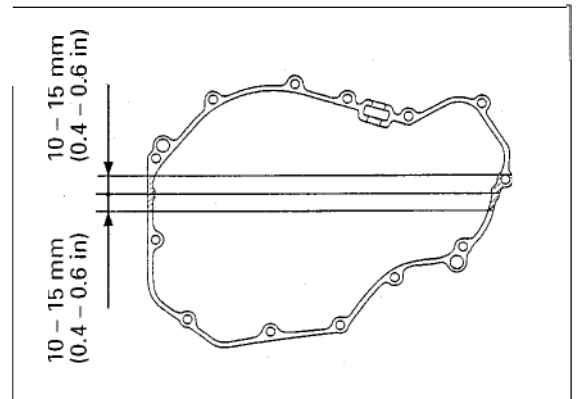
**TORQUE : 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the clutch assembly (page 9-9).

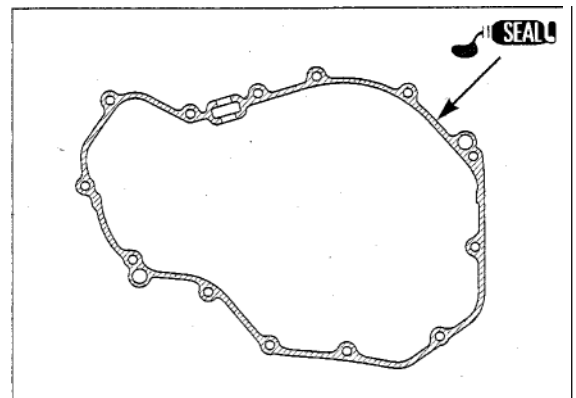


## RIGHT CRANKCASE COVER INSTALLATION

Apply sealant to the mating surfaces of the crankcase as shown.



Apply sealant to the mating surface of the right crankcase cover.

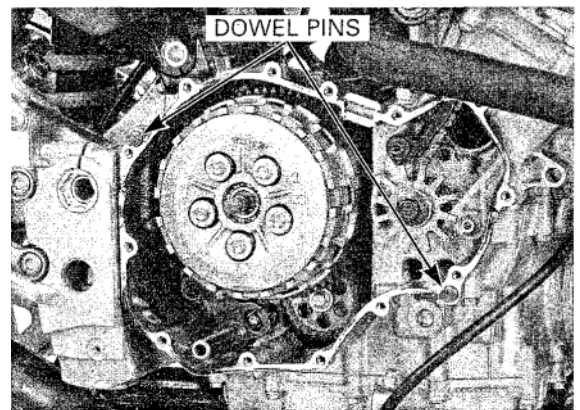




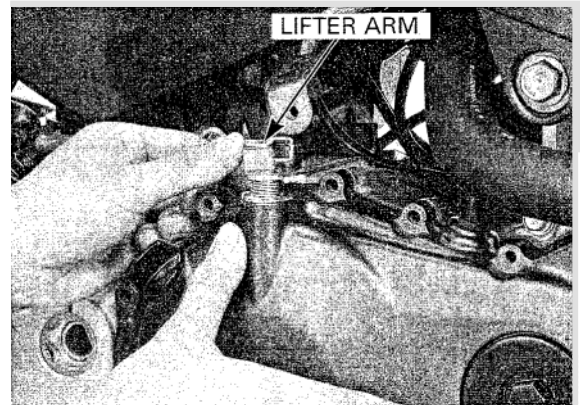
## CLUTCH/GEARSHIFT LINKAGE

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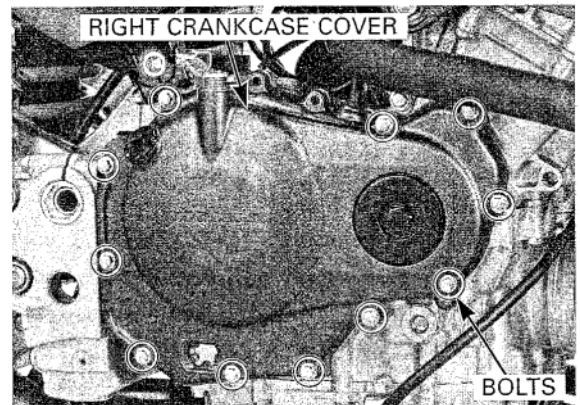
Install the two dowel pins.



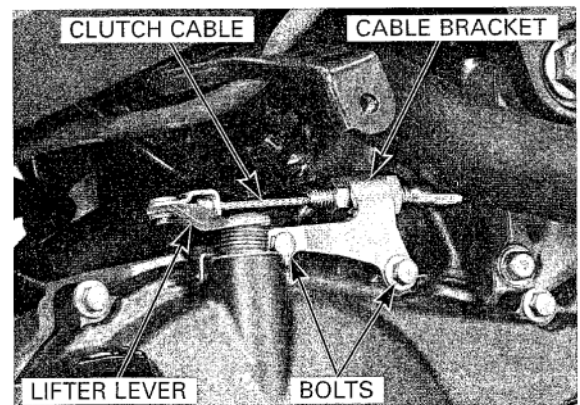
Install the right crankcase cover while turning the lifter arm clockwise to engage the lifter arm groove with the lifter piece flange.



Install the right crankcase cover bolts. Tighten the bolts crisscross pattern in two to three steps securely.

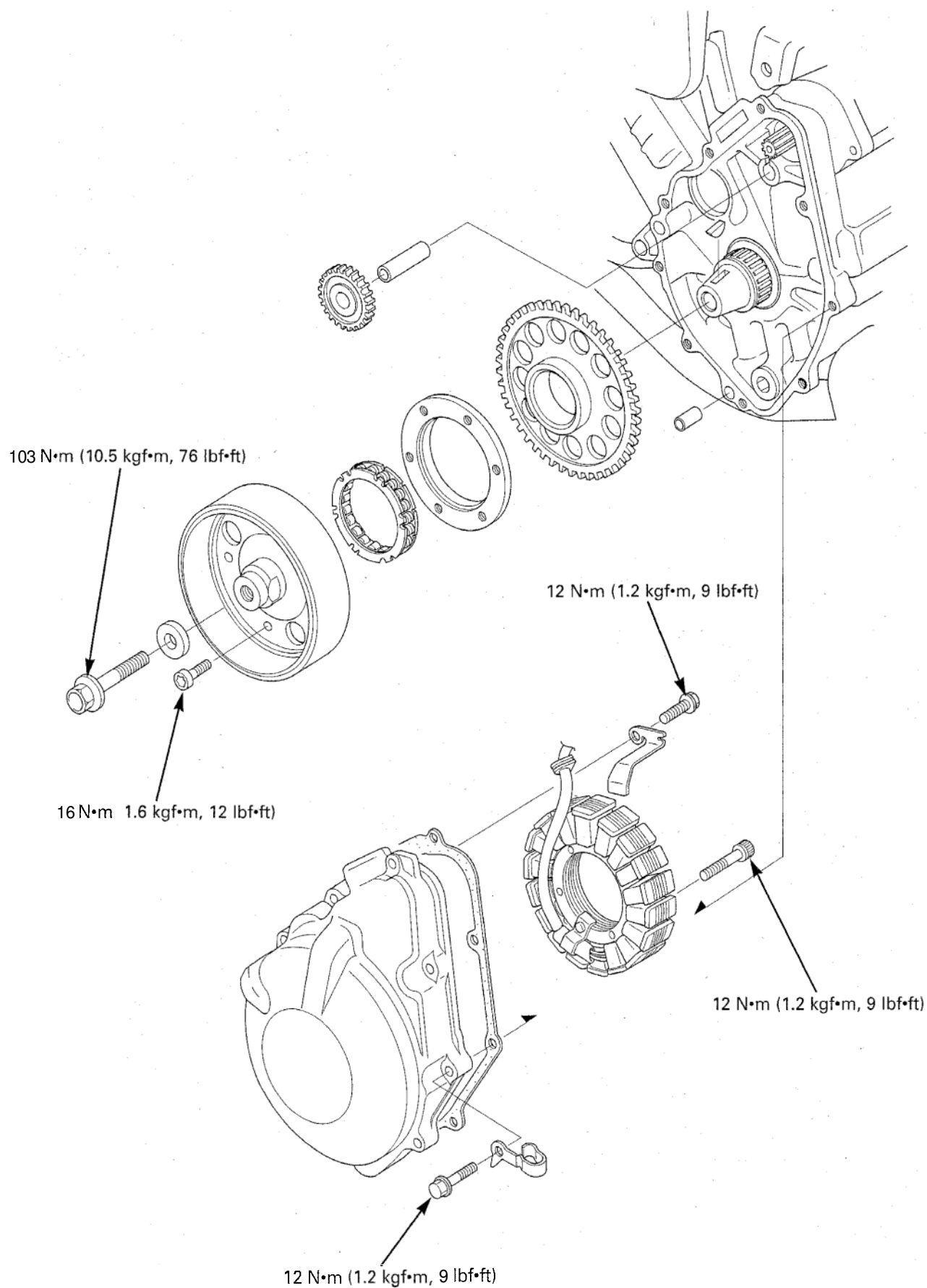


Connect the clutch cable end to the clutch lifter lever, then install the clutch cable bracket with the two bolts. Tighten the bolts securely.



## ALTERNATOR/STARTER CLUTCH

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# 10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTERCLUTCH	10-5
ALTERNATOR COVER REMOVAL	10-2	FLYWHEEL INSTALLATION	10-7
STATOR	10-2	ALTERNATOR COVER INSTALLATION	10-8

## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator, flywheel and starter clutch. If service can be done with the engine installed in the frame.
- Refer to section 16 for alternator stator inspection.

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354–2.0361)	51.684 (2.0348)

10

### TORQUE VALUES

Alternator wire clamp bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt
Flywheel flange bolt	103 N•m (10.5 kgf•m, 76 lbf•ft)	Apply oil to the threads.
Stator mounting socket bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Starter one-way clutch torx bolt	16 N•m (1.6 kgf•m, 12 lbf•ft)	Apply a locking agent to the threads.
Alternator cover mounting bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	

### TOOLS

Flywheel holder	07725-0040000	or equivalent commercially available in U.S.A.
Rotor puller	07733-0020001	or 07933-3950000 (U.S.A. only)

## TROUBLESHOOTING

### Engine does not turn

- Faulty starter clutch
- Damaged idle gear/shaft

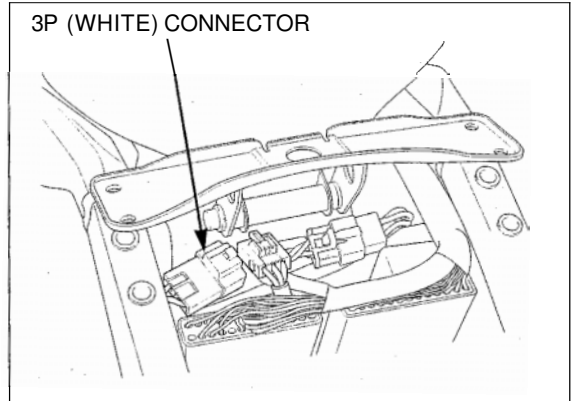
## ALTERNATOR/STARTER CLUTCH

### ALTERNATOR COVER REMOVAL

Remove the ECM cover (page 5-87).  
Remove the lower cowl (page 2-7).

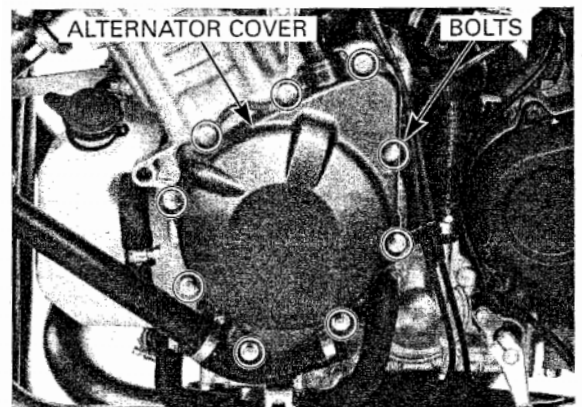
*The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal*

Disconnect the alternator 3P (White) connector.

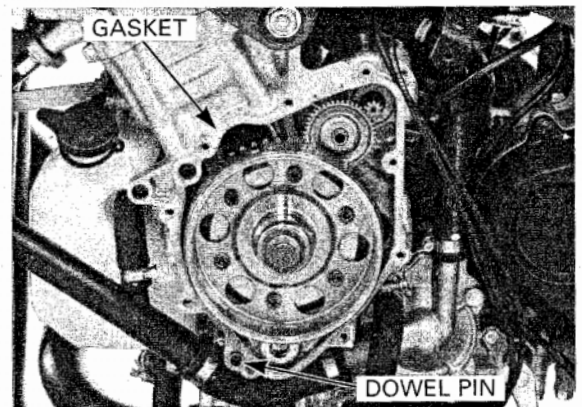


Remove the alternator cover SH bolts and alternator cover.

The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.



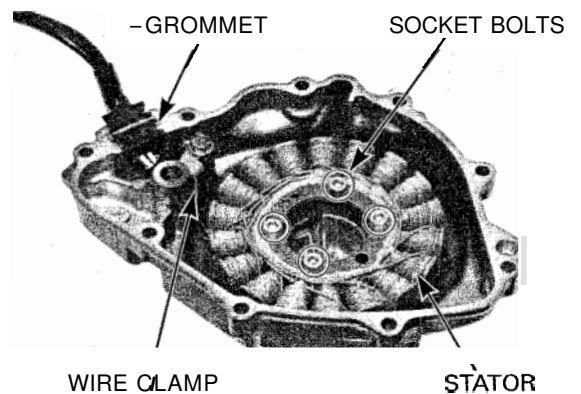
Remove the gasket and dowel pin.



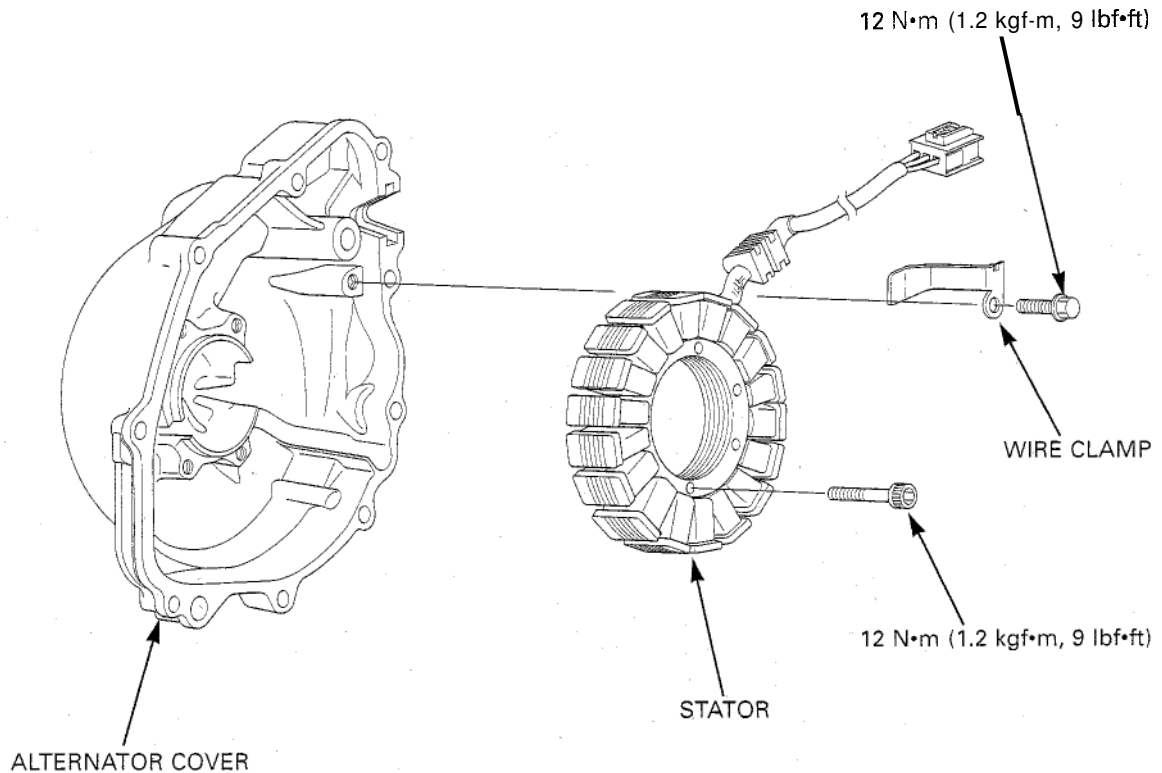
### STATOR

#### REMOVAL

Remove the alternator wire grommet from the alternator cover.  
Remove the bolt and stator wire clamp.  
Remove the socket bolts and stator.



### INSTALLATION



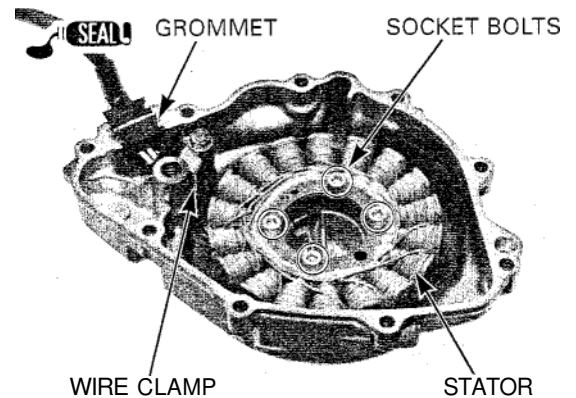
Install the stator into the alternator cover.

Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely. Install and tighten the stator mounting socket bolts to the specified torque.

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

Install the wire clamp and tighten the bolt to the specified torque.

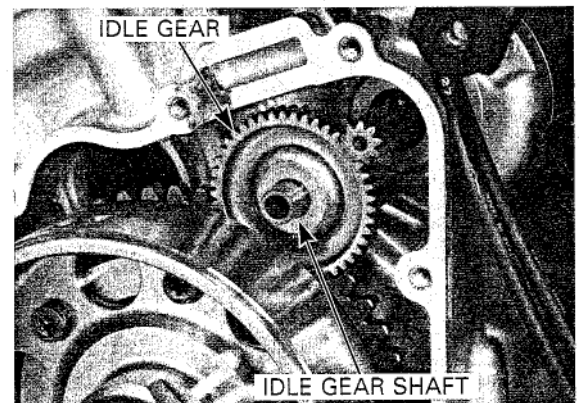
**TORQUE: 12 N•m (1.2 kgf•m, 9 lbf•ft)**



### FLYWHEEL REMOVAL

Remove the alternator cover (page 10-2).

Remove the starter idle gear shaft and idle gear.



## ALTERNATOR/STARTER CLUTCH

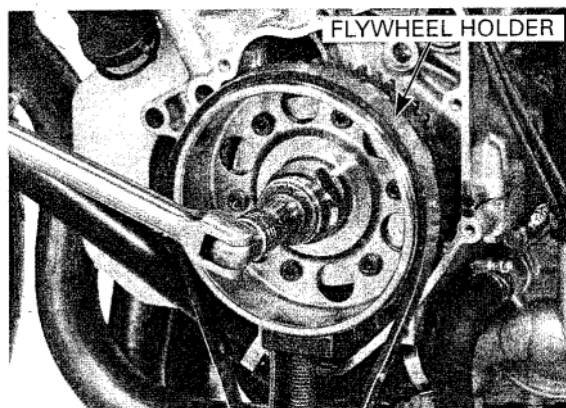
Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

**TOOL:**

**Flywheel holder**

**07725-0040000**  
(Equivalent commercially available in U.S.A.)

Remove the washer.

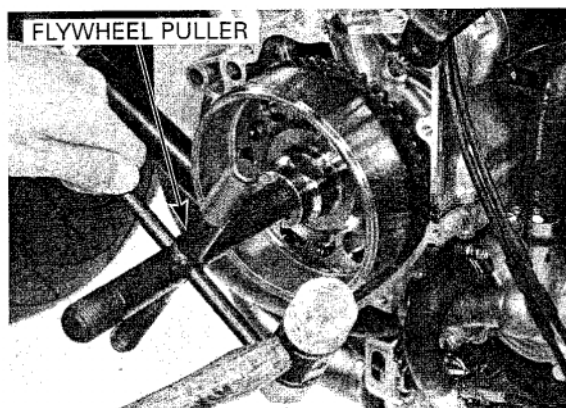


Remove the flywheel using the special tool.

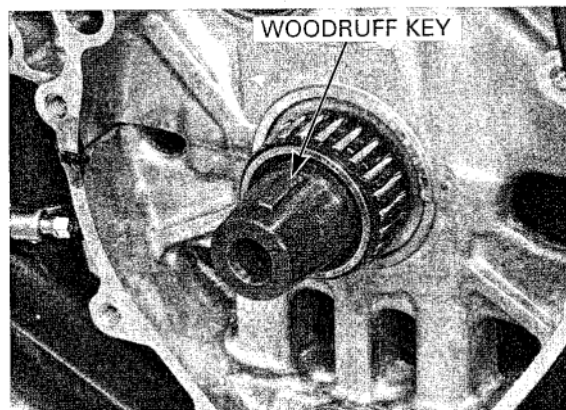
**TOOL:**

**Rotor puller**

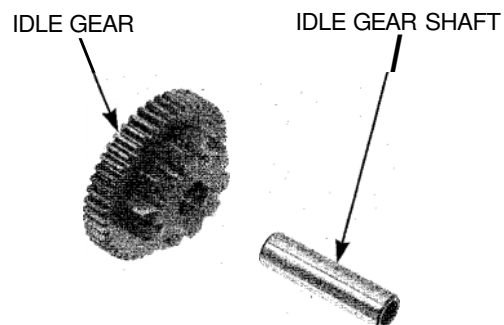
**07733-0020001 or**  
**07933-3950000**  
(U.S.A. only)



Remove the woodruff key.



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



## STARTERCLUTCH

### INSPECTION

Check the operation of the one-way clutch by turning the driven gear.

You should be able to turn the driven gear counter-clockwise smoothly, but the gear should not turn clockwise.

### DISASSEMBLY

Remove the starter driven gear by turning it counter-clockwise.

Hold the flywheel with a flywheel holder, and remove the starter clutch mounting torx bolts.

#### TOOL:

Flywheel holder

07725-0040000  
(Equivalent commercially available in U.S.A.)

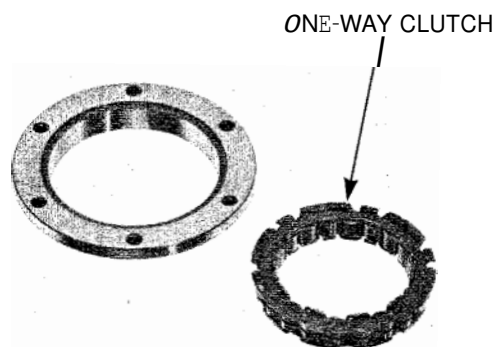
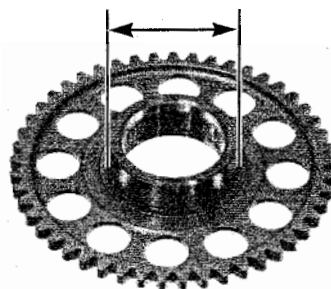
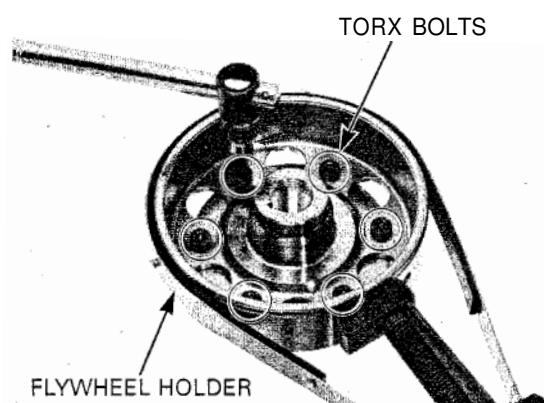
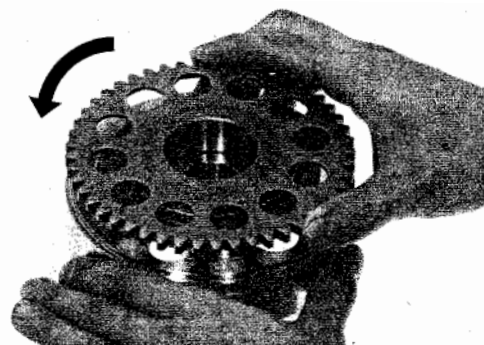
Remove the starter one-way clutch assembly.

Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

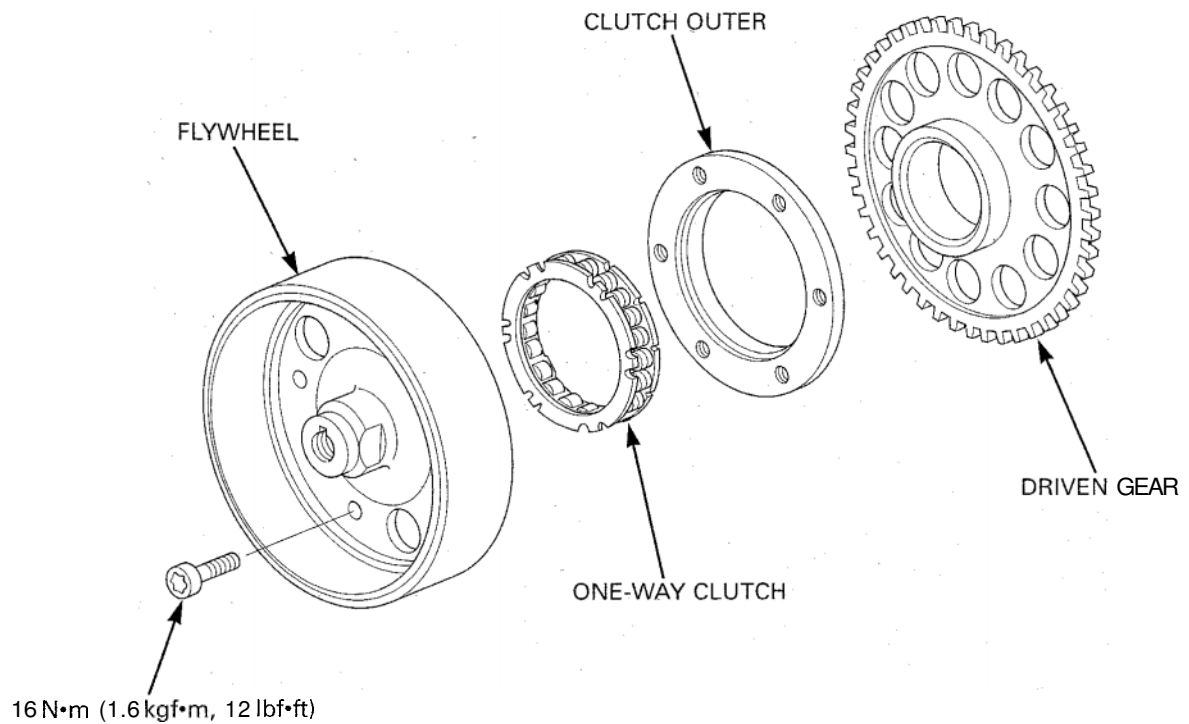
**SERVICE LIMIT:** 51.684 mm (2.0348 in)

Check the one-way clutch for wear or damage and replace if necessary.

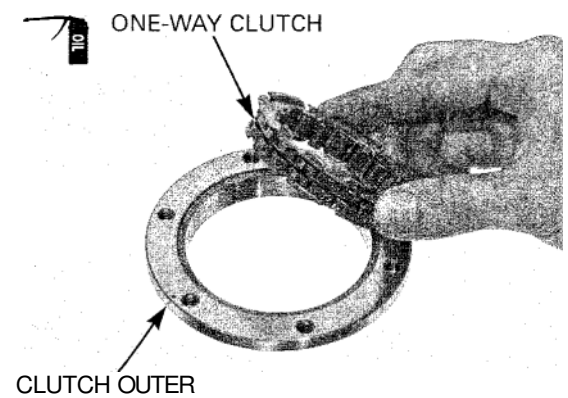


## ALTERNATOR/STARTER CLUTCH

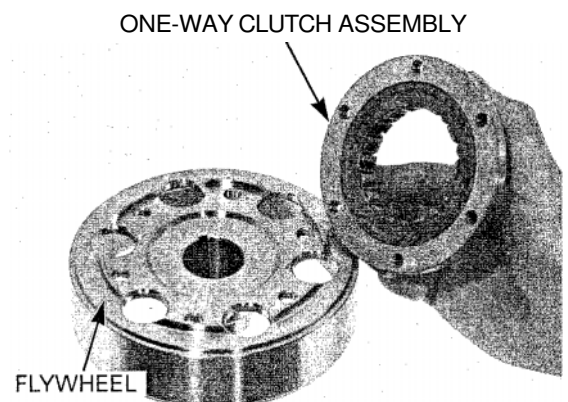
### ASSEMBLY



Apply oil to the starter one-way clutch.  
Install the one-way clutch into the clutch outer with the flange side facing out.



Install the starter one-way clutch assembly onto the flywheel.



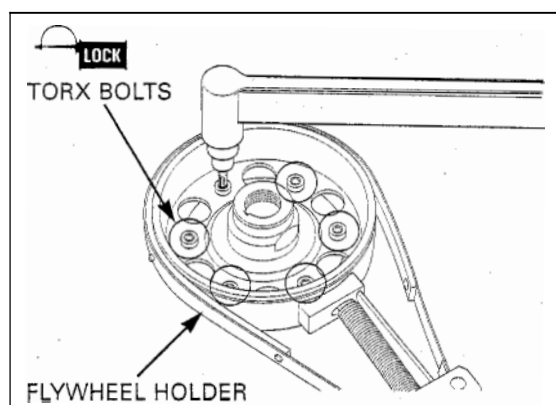
Apply a locking agent to the starter clutch outer mounting bolt threads.  
Hold the flywheel with a flywheel holder, and tighten the starter clutch mounting torx bolts.

**TOOL:**

**Flywheel holder**

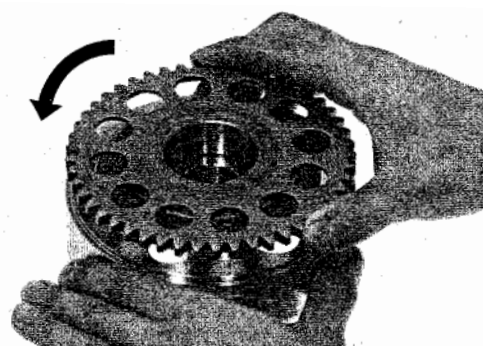
**07725-0040000**  
(Equivalent commercially available in U.S.A.)

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



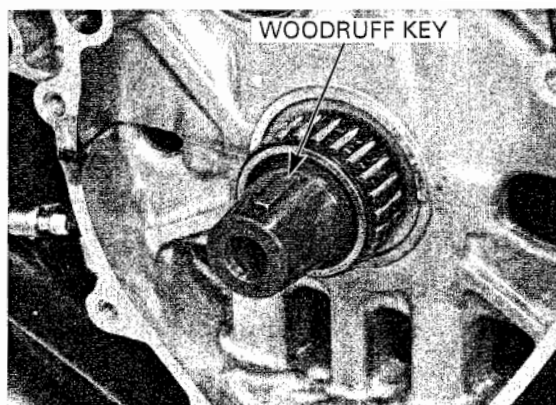
Install the starter driven gear into the one-way clutch.

Recheck the one-way clutch operation (page 10-5).



## FLYWHEEL INSTALLATION

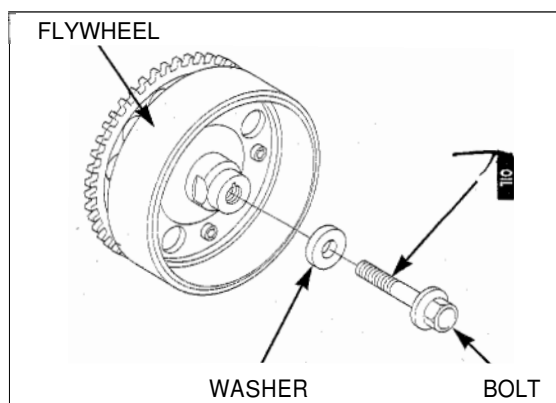
Clean any oil from the crankshaft taper.  
Install the woodruff key on the crankshaft.



Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.

Apply oil to the flywheel bolt threads and seating surface.

Install the washer and flywheel bolt.



## ALTERNATOR/STARTER CLUTCH

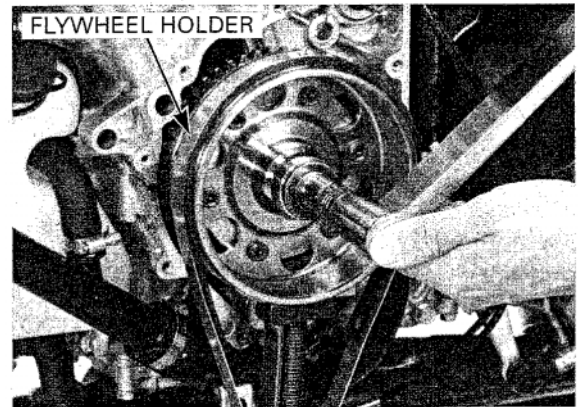
Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

**TOOL:**

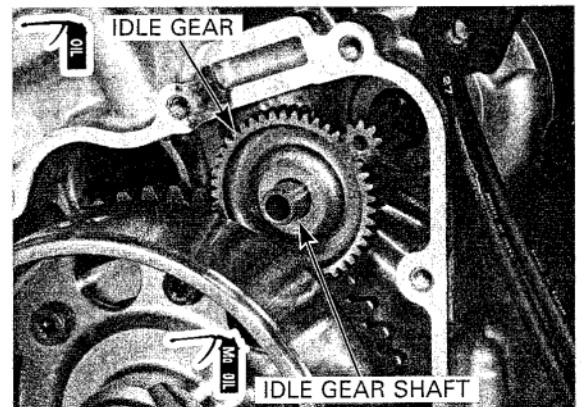
Flywheel holder

07725-0040000  
(Equivalent commercially available in U.S.A.)

**TORQUE:** 103 N·m (10.5 kgf·m, 76 lbf·ft)

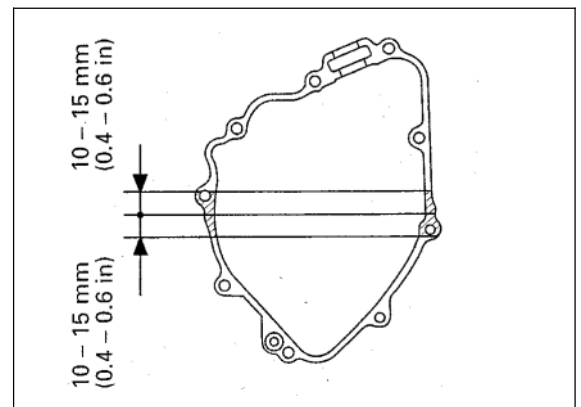


Apply molybdenum disulfide oil to the starter idle gear shaft.  
Apply oil to the starter idle gear.  
Install the starter idle gear and shaft onto the crankcase.

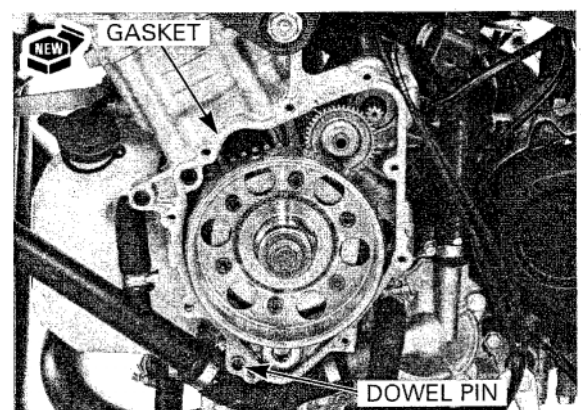


## ALTERNATOR COVER INSTALLATION

Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pin and new gasket.





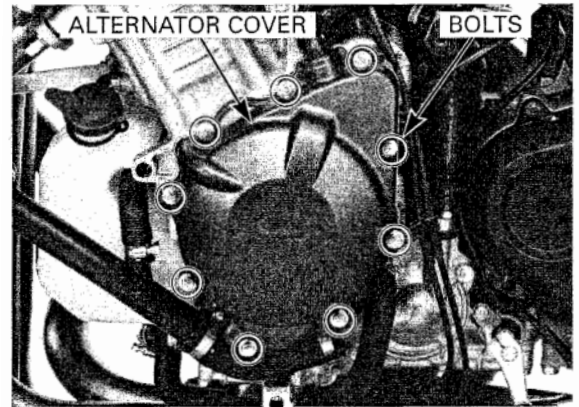
## ALTERNATOR/STARTER CLUTCH

*The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation*

Install the alternator cover.

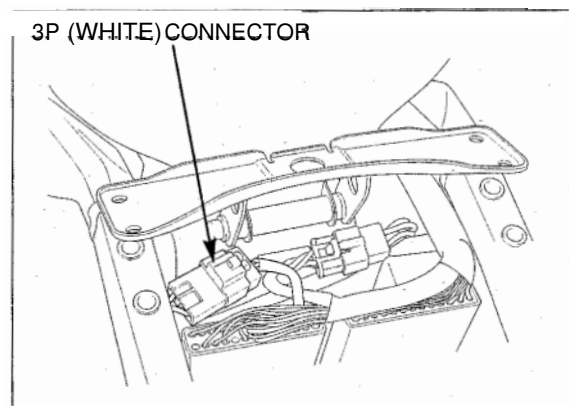
Install and tighten the SH bolts to the specified torque.

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



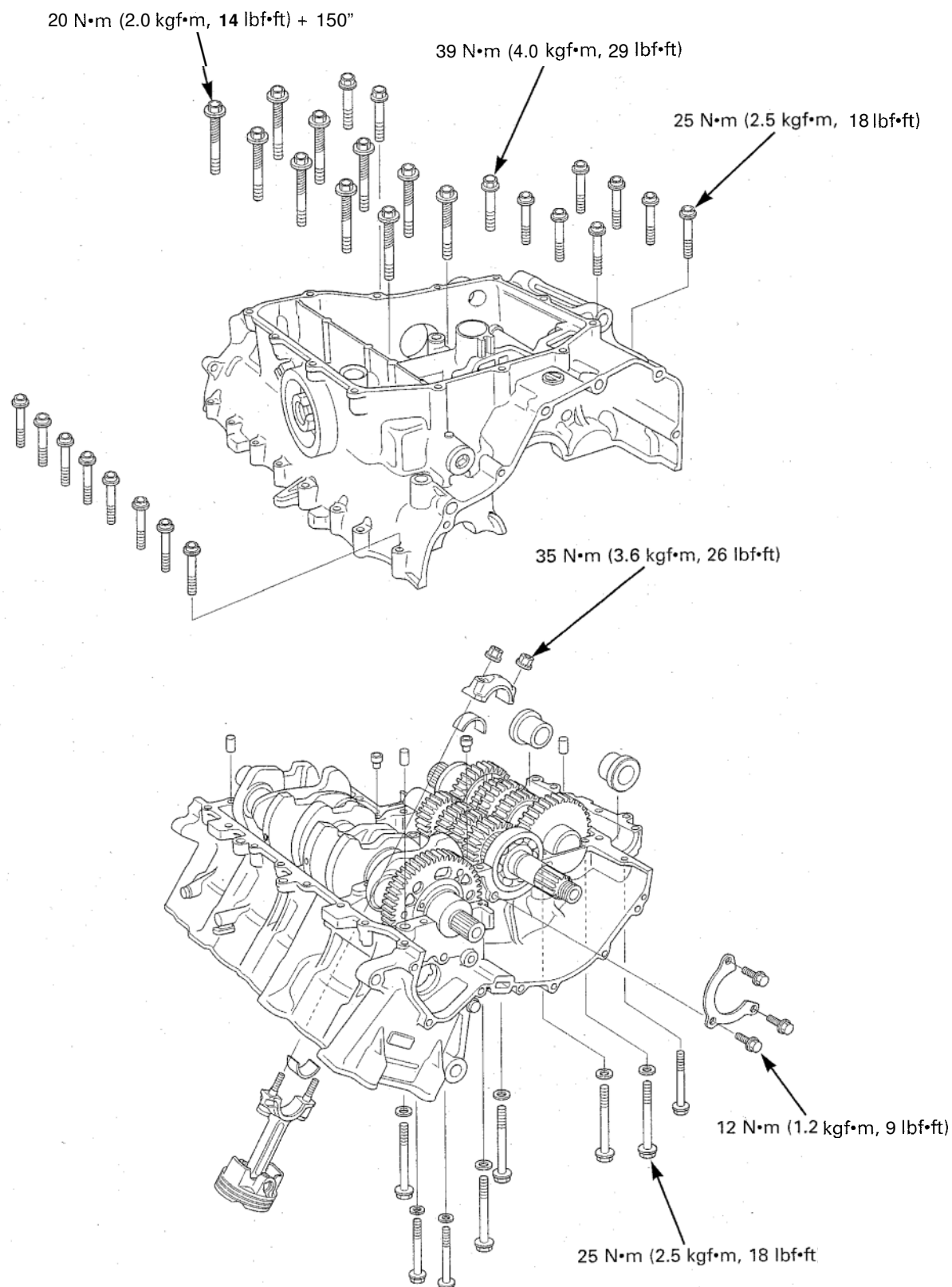
Connect the alternator 3P (White) connector.

install the lower cowl (page 2-7).  
Install the ECM cover (page 5-87).



## CRANKCASE/PISTON/CYLINDER

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# 11. CRANKCASE/PISTON/CYLINDER

SERVICE INFORMATION	11-1	PISTON/CONNECTING ROD	11-4
TROUBLESHOOTING	11-2	CRANKCASE COMBINATION	11-12
CRANKCASE SEPARATION	11-3		

## SERVICE INFORMATION

### GENERAL

#### NOTICE

- The main journal 9-mm bolts tightening method uses the Plastic Region Tightening Method (page 11-12).
- Always use a new main journal 9-mm bolts (page 11-12).
- The main journal 9-mm bolts is pre-coated with an oil additive for axial tension stability. Do not remove the oil additive from the new 9-mm bolt surfaces.
- Be sure to follow the tightening procedure on page 11-12 for crankcase bolt tightening.
- This section covers crankcase separation for service of the crankshaft and pistons.
- The following parts must be removed before separating the crankcase.
  - Alternator/flywheel (Section 10)
  - Clutch/gearshift linkage (Section 9)
  - Cylinder head (Section 8)
  - Engine (Section 7)
  - Oil pump (Section 4)
- Mark and store the disassemble parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to be sure of their correct locations for reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The connecting rod bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance. Apply molybdenum disulfide oil to the crank pin during assembly.

11

## CRANKCASE/PISTON/CYLINDER

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		75.000 – 75.015 (2.9528 – 2.9533)	75.15 (2.959)
	Out-of-round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.05 (0.002)
Piston, piston rings	Piston mark direction		"O" mark facing toward the intake side	—
	Piston O.D.		74.960 – 74.980 (2.9512 – 2.9520)	74.895 (2.949)
	Piston O.D. measurement point		4 mm (0.2 in) from bottom of skirt	—
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.03 (0.670)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.98 (0.669)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	—
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
	Piston ring end gap	Top	0.28 – 0.38 (0.011 – 0.015)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
Oil (side rail)		0.2 – 0.7 (0.01 – 0.03)	0.9 (0.04)	
Cylinder-to-piston clearance			0.020 – 0.055 (0.0008 – 0.0022)	
Connecting rod small end I.D.				
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	—
Connecting rod side clearance			0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
Crankpin oil clearance			0.030 – 0.052 (0.0012 – 0.0020)	0.062 (0.0024)

### TORQUE VALUES

Mainshaft bearing set plate bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads.
Crankcase bolt, 10 mm	39 N•m (4.0 kgf•m, 29 lbf•ft)	
9 mm (main journal bolt)	20 N•m (2.0 kgf•m, 14 lbf•ft) + 150"	See page 11-12.
8 mm	25 N•m (2.5 kgf•m, 18 lbf•ft)	
Connecting rod bearing cap nut	35 N•m (3.6 kgf•m, 26 lbf•ft)	Apply oil to the threads.
Upper crankcase sealing bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)	Apply a locking agent to the threads.
Lower crankcase sealing bolt, 20 mm	30 N•m (3.1 kgf•m, 22 lbf•ft)	Apply a locking agent to the threads.
10 mm	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply a locking agent to the threads.

### TROUBLESHOOTING

#### Cylinder compression is too low, or engine is hard to start

- Blown cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder or piston
- Bent valve, or bent and deteriorated valve seat

#### Cylinder compression is too high, or engine overheats or knocks

- Carbon deposits on the cylinder head and/or piston crown

#### Piston noise

- Worn cylinder, piston and/or piston ring
- Worn piston pin hole and piston pin
- Worn connecting rod small end

#### Excessive smoke

- Worn, stuck or broken piston ring
- Worn valve stem seal

#### Excessive noise

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

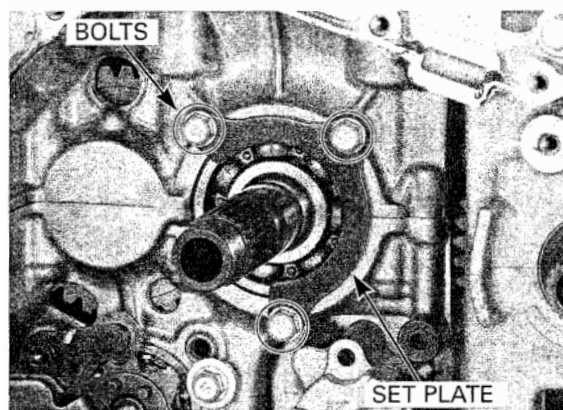
#### Engine vibration

- Excessive crankshaft runout

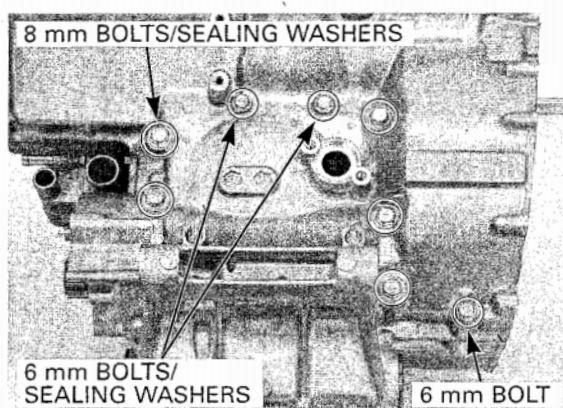
## CRANKCASE SEPARATION

Refer to Service Information (page 11-1) for removal of necessary parts before separating the crankcase.

Remove the mainshaft bearing set plate bolts and plate.

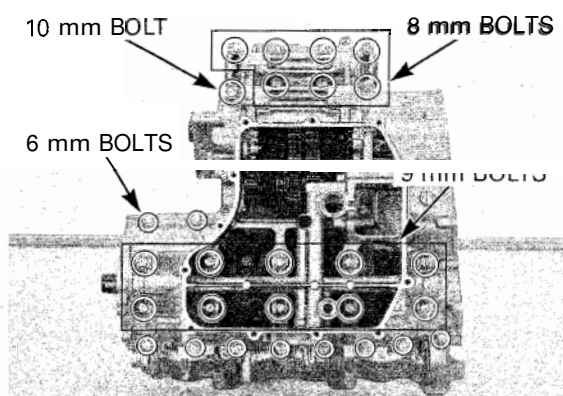


Remove the upper crankcase 8 mm bolts/sealing washers and 6 mm bolt.

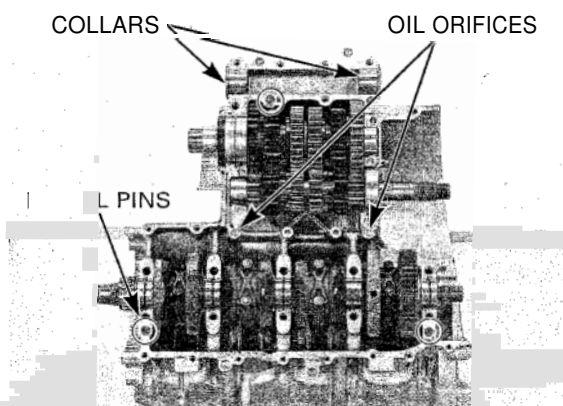


Remove the lower crankcase 6 mm bolts (ten), 8 mm bolts (seven) and 10 mm bolt. Loosen the ten lower crankcase 9 mm bolts in a criss-cross pattern in two to three steps, then remove the bolts.

Separate the lower crankcase from the upper crankcase.



Remove the swingarm pivot collars, dowel pins and oil orifices.



## CRANKCASE/PISTON/CYLINDER

### PISTON/CONNECTING ROD

*Mark all parts during removal so they can be replaced in their original locations*

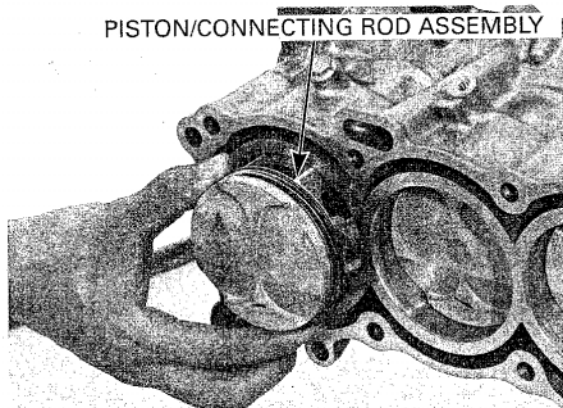
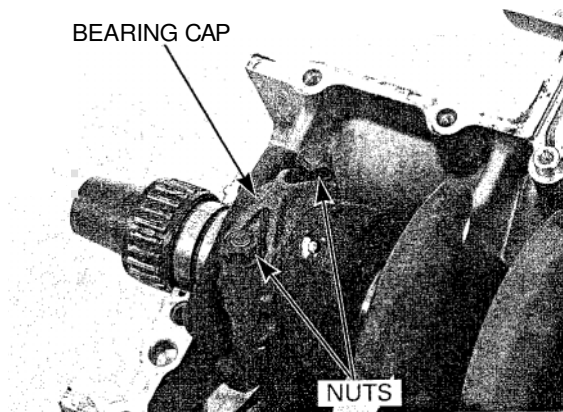
#### PISTON/CONNECTING ROD REMOVAL

##### **NOTICE**

*Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

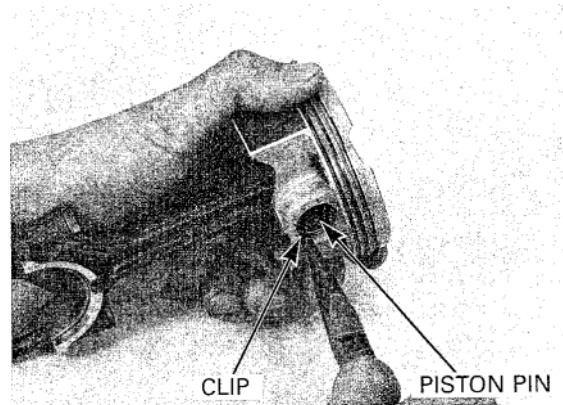
Remove the nuts and connecting rod bearing cap.

Remove the piston/connecting rod assembly from the top of the cylinder.



#### PISTON REMOVAL

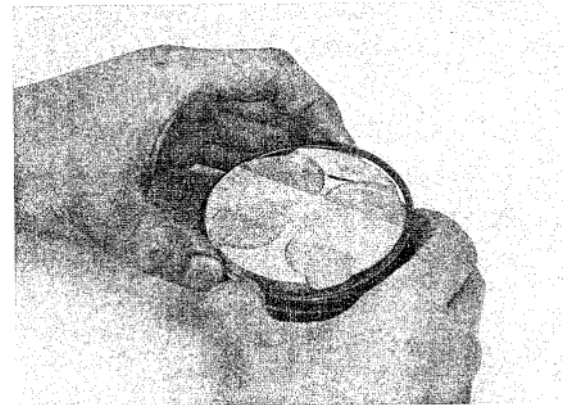
Remove the piston pin clip with pliers.  
Press the piston pin out of the piston and remove the piston from the connecting rod.



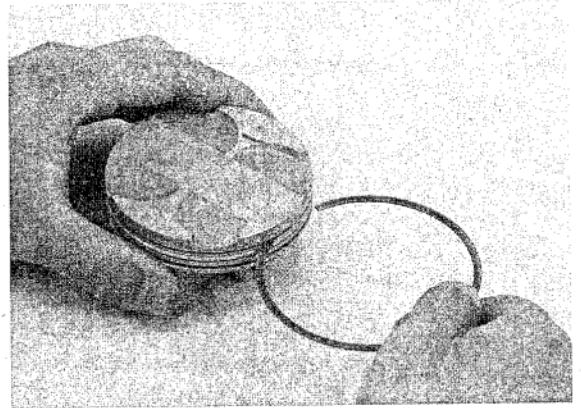
#### PISTON DISASSEMBLY

*Do not damage the piston rings during removal.*

Remove the piston rings.



Remove any carbon deposits from the piston ring grooves, using an old piston ring as shown.



### PISTON INSPECTION

Temporarily install the piston rings to their proper position with the mark facing up.

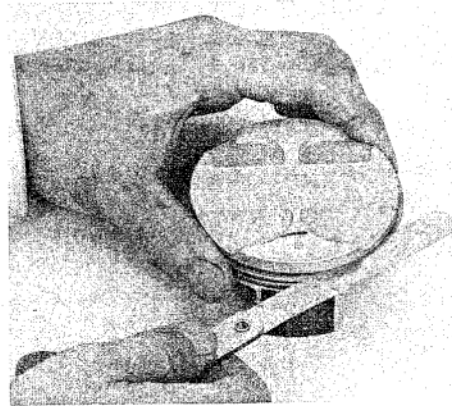
Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

#### SERVICE LIMITS:

**Top: 0.08 mm (0.003 in)**

**Second: 0.06 mm (0.002 in)**

Inspect the piston for wear or damage.



*Push the rings into the cylinder with the top of the piston to be sure they are square in the cylinder.*

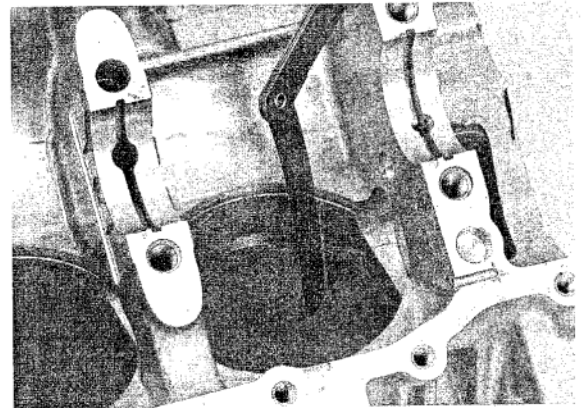
Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

#### SERVICE LIMITS:

**Top: 0.5 mm (0.02 in)**

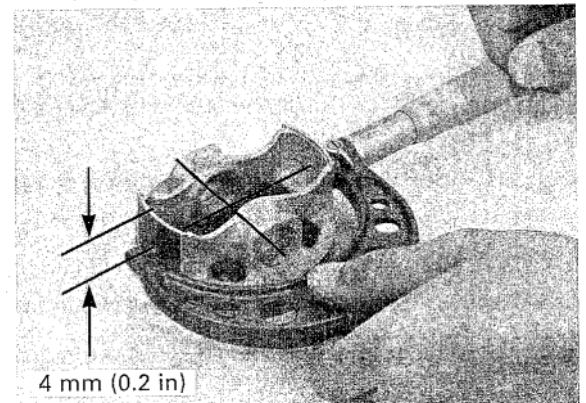
**Second: 0.7 mm (0.03 in)**

**Oil (side rail): 0.9 mm (0.04 in)**



Measure the diameter of the piston at 4 mm (0.2 in) from the bottom and 90 degrees to the piston pin hole.

**SERVICE LIMIT: 74.895 mm (2.949 in)**

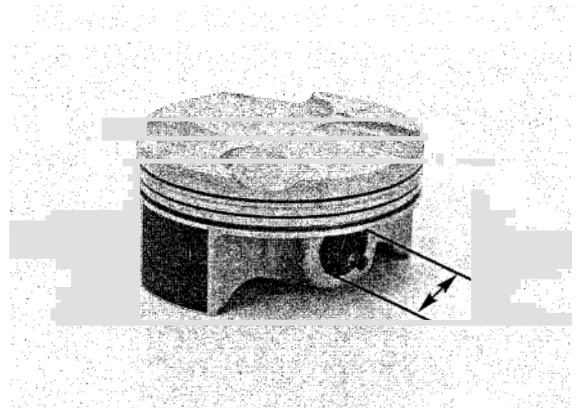


## CRANKCASE/PISTON/CYLINDER

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Measure the piston pin bore.

**SERVICE LIMIT: 17.03 mm (0.670 in)**

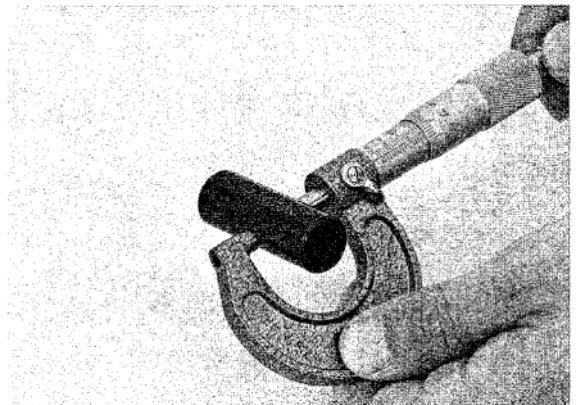


Measure the O.D. of the piston pin.

**SERVICE LIMIT: 16.98 mm (0.669 in)**

Calculate the piston-to-piston pin clearance.

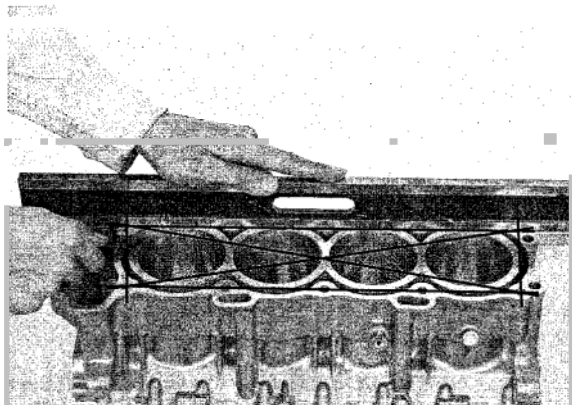
**STANDARD: 0.002 – 0.014 mm (0.0001 – 0.0006 in)**



### CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

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

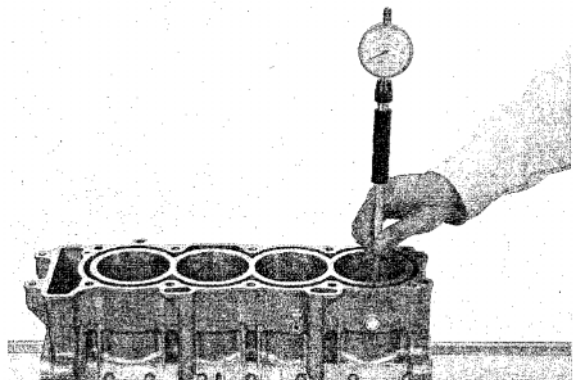


Inspect the cylinder bore for wear or damage.  
Measure the cylinder I.D. in X and Y axis at three levels.  
Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 75.15 mm (2.959 in)**

Calculate the piston-to-cylinder clearance.  
Take a maximum reading to determine the clearance.  
Refer to page 11-5 for measurement of the piston O.D.

**STANDARD: 0.020 – 0.055 mm (0.0008 – 0.0022 in)**





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

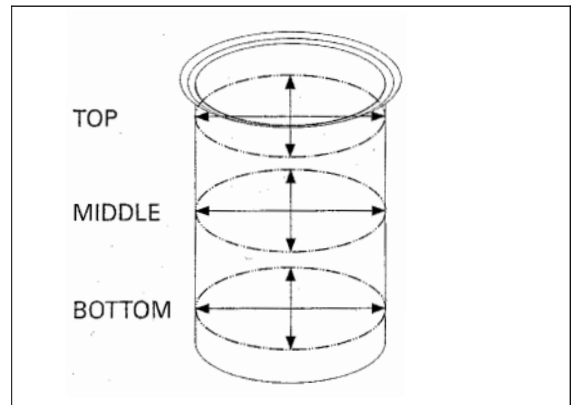
### SERVICE LIMITS:

**Taper:** 0.10 mm (0.004 in)

**Out-of-round:** 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

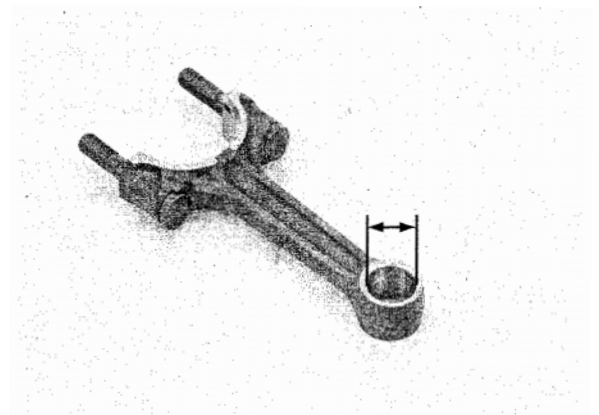
The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).



## CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 17.04 mm (0.671 in)**

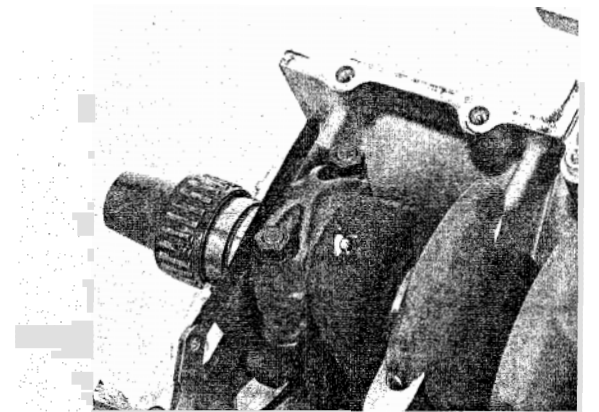


Temporarily install the connecting rod to the crankshaft.

Install the bearing inserts and bearing cap, and tighten the nuts.

Measure the connecting rod side clearance.

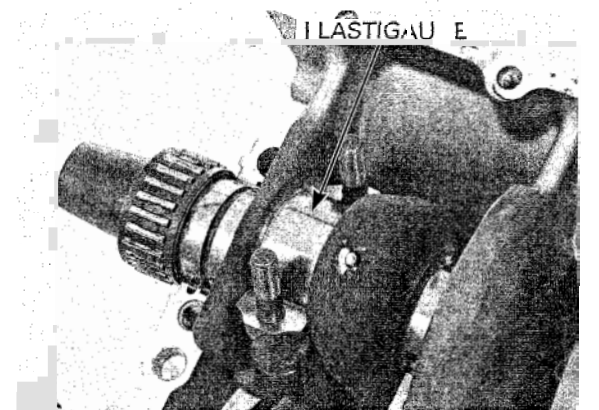
**SERVICE LIMIT: 0.30 mm (0.012 in)**



## CRANKPIN BEARING INSPECTION

Wipe all oil from the bearing inserts and crankpins. Put a piece of plastigauge on each crankpin.

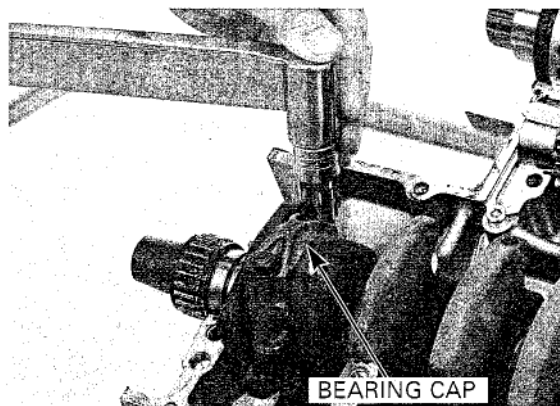
- Do not put the plastigauge over the oil hole in the crankpin.
- Do not rotate the crankshaft during inspection.



## CRANKCASE/PISTON/CYLINDER

Install the bearing caps and connecting rods on a correct crankpins, and tighten the cap nuts to the specified torque.

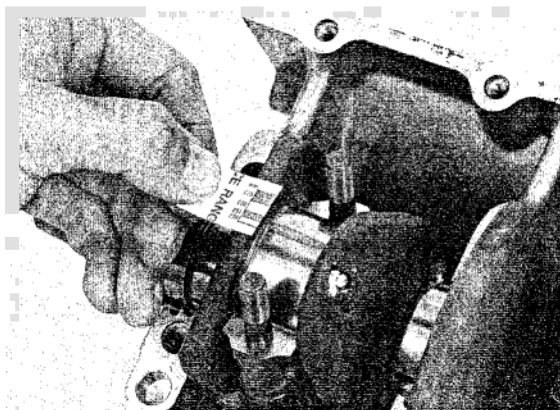
**TORQUE:** 35 N•m (3.6kgf•m, 26 lbf•ft)



Remove the connecting rod caps and measure the compressed plastigauge on each crankpin.

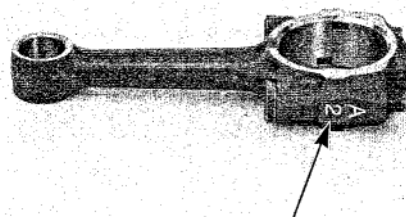
**SERVICE LIMIT:** 0.062mm (0.0024in)

If the connecting rod bearing clearance is beyond tolerance, select replacement bearing.



## CRANKPIN BEARING SELECTION

Record the connecting rod I.D. code number (1, 2 or 3) or measure the I.D. with the bearing cap installed without bearing inserts.

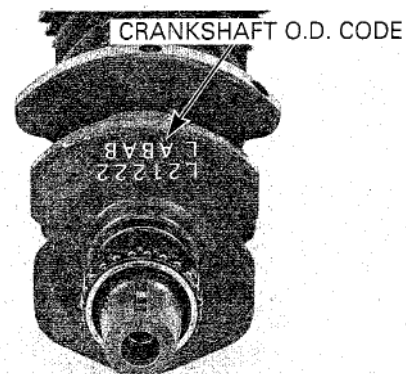


CONNECTING ROD I.D. CODE

*Letters (A, B or C) on the crank weight are the codes for the crankpin O.D.s starting from the left*

If you are replacing the crankshaft, record the corresponding crankpin O.D. code letter (A, B or C).

If you are reusing the crankshaft, measure the crankpin O.D. with the micrometer.



## CRANKCASE/PISTON/CYLINDER

Cross-reference the crankpin and rod codes to determine the replacement bearing color.

### BEARING THICKNESS:

A (Blue): Thick

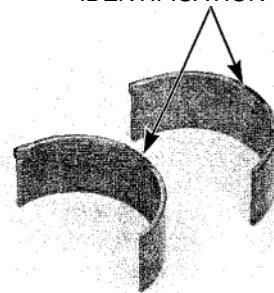
B (Black):

C (Brown):

D (Green)

E (Yellow) Thin

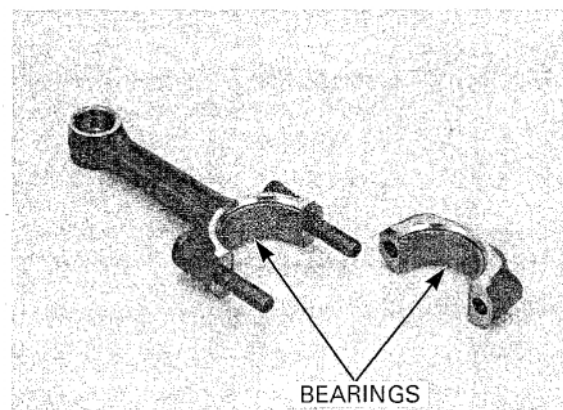
IDENTIFICATION COLOR



			CONNECTING ROD I.D. CODE		
			1	2	3
			39.000 – 39.006 (1.5354 – 1.5357)	39.006 – 39.012 (1.5357 – 1.5359)	39.012 – 39.018 (1.5359 – 1.5361)
CRANK PIN O.D. CODE	A	35.997 – 36.003 (1.4172 – 1.4174)	E (Yellow)	D (Green)	C (Brown)
	B	35.991 – 35.997 (1.4170 – 1.4172)	D (Green)	C (Brown)	B (Black)
	C	35.985 – 35.991 (1.4167 – 1.4170)	C (Brown)	B (Black)	A (Blue)

*Align the bearing  
tabs with the  
groove in the con-  
necting rod and  
bearing cap*

Install the bearing inserts into the connecting rod and bearing cap.



## CRANKCASE/PISTON/CYLINDER

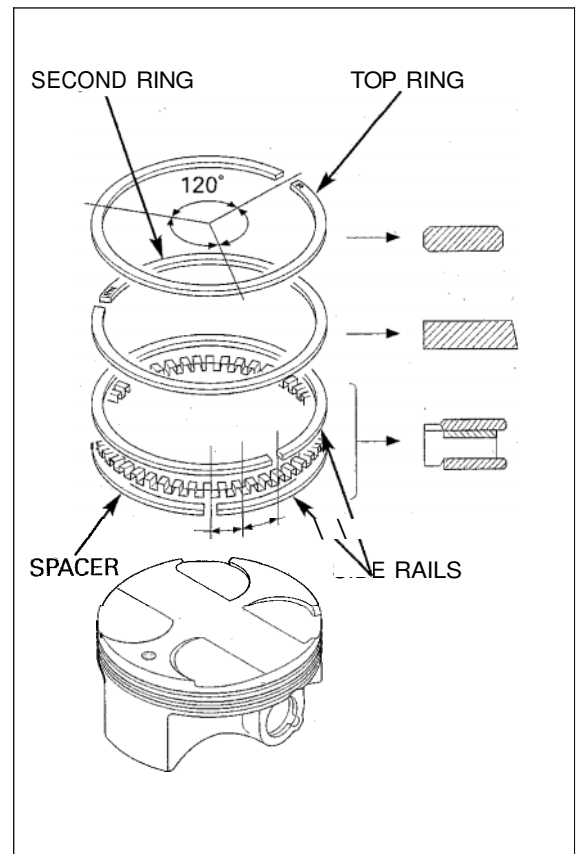
### PISTON ASSEMBLY

Clean the piston ring grooves thoroughly and install the piston rings.

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (R:top ring, RN: second ring) facing up.
- Do not switch the top and second rings; the top ring is narrower than the second ring in width.

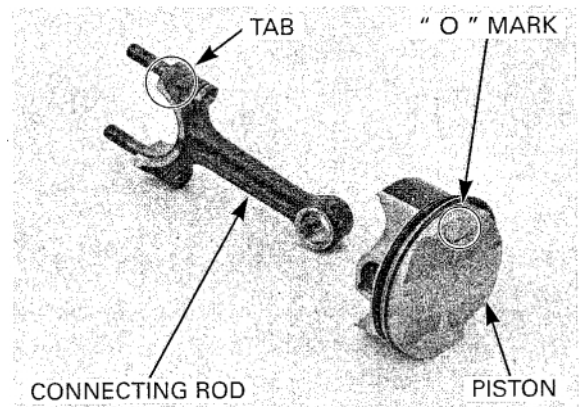
Space the piston ring end gaps 120 degrees apart. Do not align the gaps in the oil rings (side rails).

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



### PISTON INSTALLATION

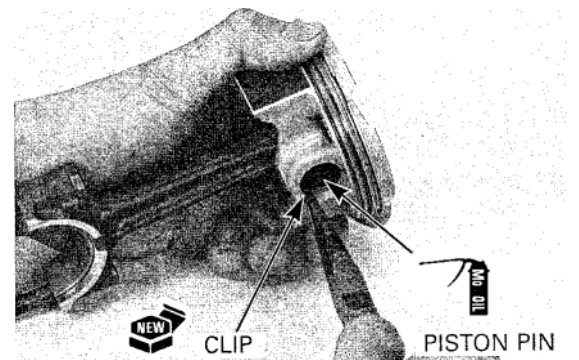
Assemble the piston and connecting rod with the journal bearing tab facing to the piston intake side ("O" mark).



Apply molybdenum disulfide oil to the piston pin outer surface.

Install the piston pin, and secure it using a new piston pin clips.

*Do not align the piston pin clips end gap with the piston cut-out*



Apply oil to the cylinder sleeves and piston rings.

*Install the piston/connecting rod assembly with the piston "O" mark facing to the intake side.*

Install the piston/connecting rod assembly into the cylinder using a commercially available piston ring compressor tool.

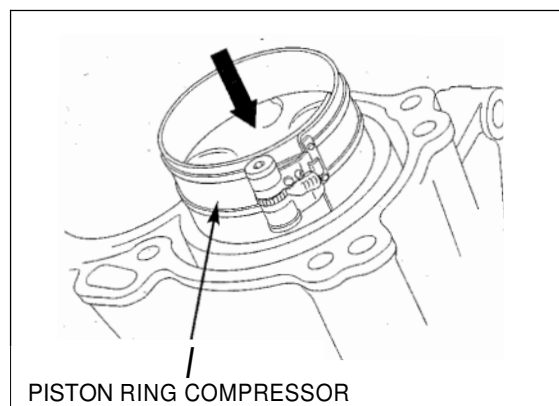
When reusing the connecting rods, they must be installed in their original locations.

### NOTICE

- While installing the piston, being careful not to damage the top surface of the cylinder, especially around the cylinder bore.
- Be careful not to damage the cylinder sleeve and crankpin with the connecting rod bolt threads.

*Make sure the ring compressor tool sits flush with the top surface of the cylinder*

Use the handle of a plastic hammer to tap the piston into the cylinder.

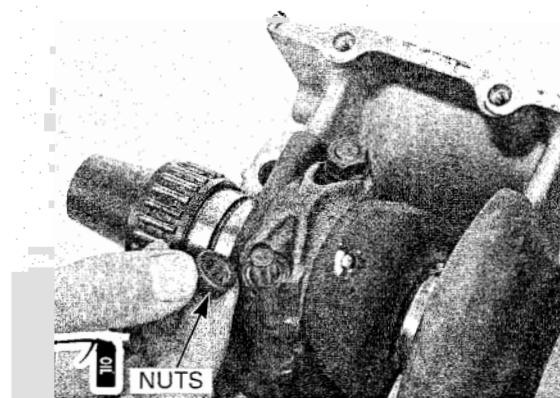


Apply molybdenum disulfide oil to the crankpin bearing surfaces.

Install the bearing cap.

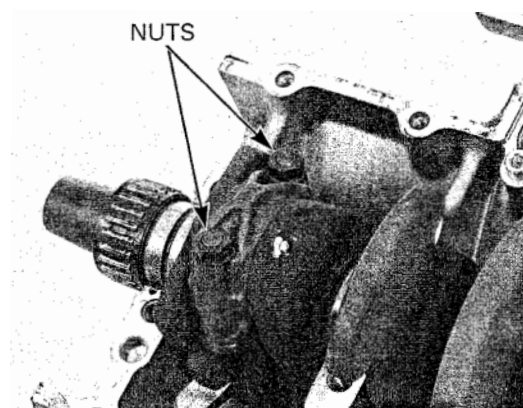
Insure that the marks on the caps are aligned with the marks on the connecting rods.

Apply oil to the connecting rod nut threads and seating surfaces.



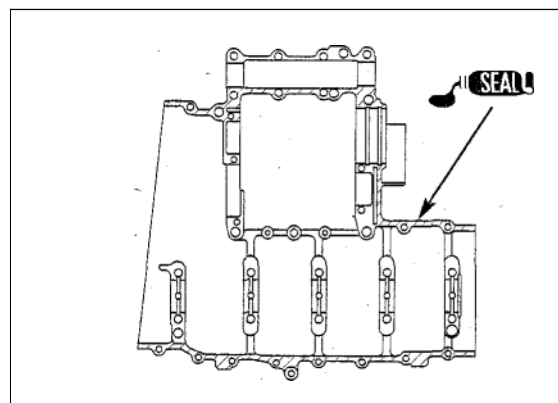
Install the connecting rod bearing cap nuts and tighten the nuts gradually and alternately, then tighten them to the specified torque.

**TORQUE: 35 N•m (3.6 kgf•m, 26 lbf•ft)**



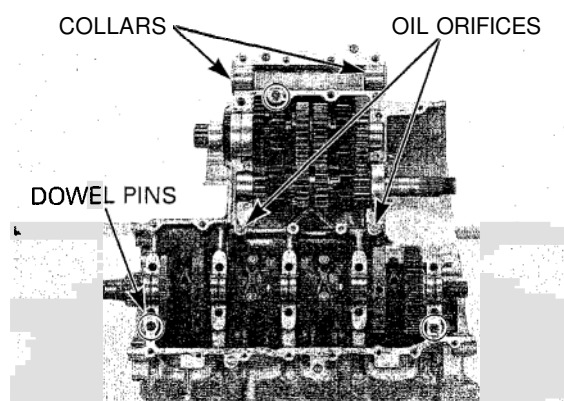
### CRANKCASE COMBINATION

Apply a light, but thorough coating of liquid sealant to the crankcase mating surface except to the main bearing journal bolt (lower crankcase bolt, 9 mm) area and the oil passage area as shown.



Install the three dowel pins.  
Install oil orifices aligning their cut-out with the groove in the upper crankcase.

Install the swingarm pivot collars.



- Tighten the main journal 9 mm bolts using the Plastic Region tightening Method described below.
- Do not reuse the main journal 9 mm bolts, because the correct axial tension will not be obtained.
- The main journal 9 mm bolt is pre-coated with an oil additive for axial tension stability. Do not remove the oil additive from the new 9 mm bolt surface.

Install the lower crankcase onto the upper crankcase.

#### PLASTIC REGION TIGHTENING METHOD:

Install the new main journal 9 mm bolts.  
Loosely install all the lower crankcase bolts.  
Make sure the upper and lower crankcase are seated securely.

Make sure the swingarm pivot collar flanges are seated in the crankcase securely.

Tighten the main journal 9 mm bolts as follow:

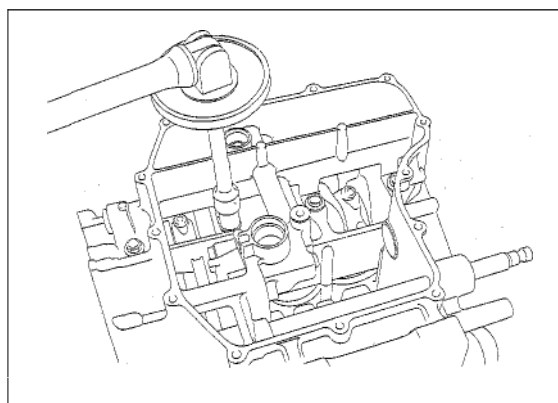
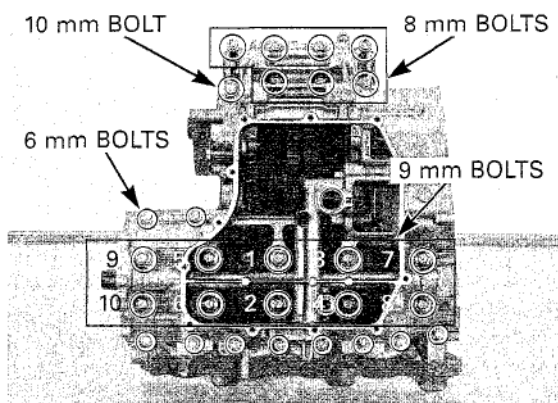
Tighten the 9 mm bolts in numerical order in the illustration to the following torque.

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

Retighten the 9 mm bolts in the same order above to the following torque..

**TORQUE: 20 N•m (2.0 kgf•m, 14 lbf•ft)**

Further tighten the 9 mm bolts 150 degrees.

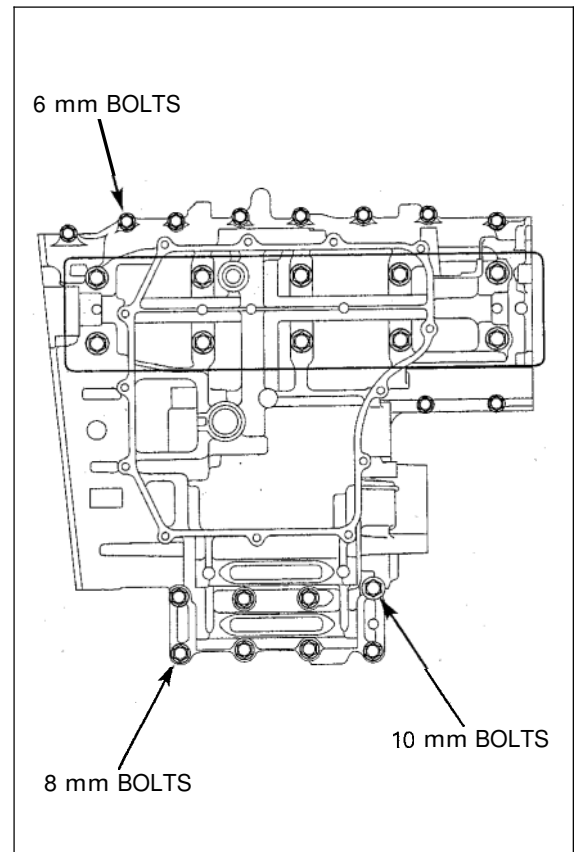


## CRANKCASE/PISTON/CYLINDER

Tighten the 6 mm bolts securely.

Tighten the 10 mm bolt, and then 8 mm bolts to the specified torque.

**TORQUE:** 10 mm bolt: 39 N•m (4.0 kgf•m, 29 lbf•ft)  
8 mm bolt: 25 N•m (2.5 kgf•m, 18 lbf•ft)



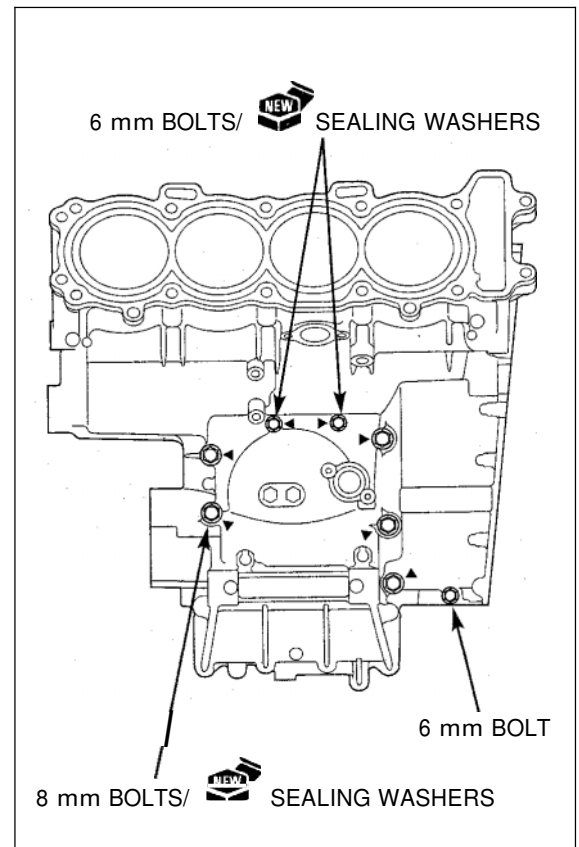
*The sealing washer locations are indicated on the upper crankcase using the "A" mark*

Install the upper crankcase 8 mm bolts, sealing washers and 6 mm bolt.

Tighten the 8 mm bolts to the specified torque.

**TORQUE:** 25 N•m (2.5 kgf•m, 18 lbf•ft)

Tighten the 6 mm bolts securely.



## CRANKCASE/PISTON/CYLINDER

---

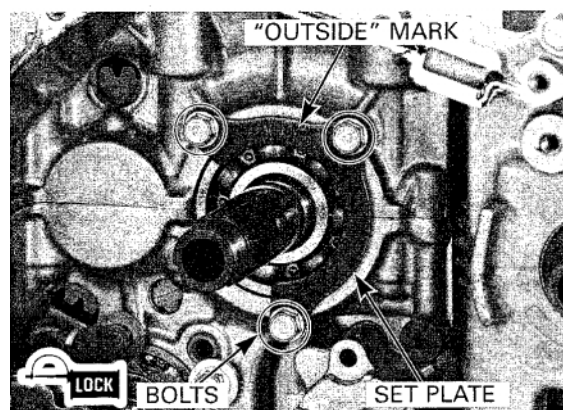
Apply a locking agent to the mainshaft bearing set plate bolt threads.

Install the mainshaft bearing set plate with its "OUTSIDE" mark facing out.

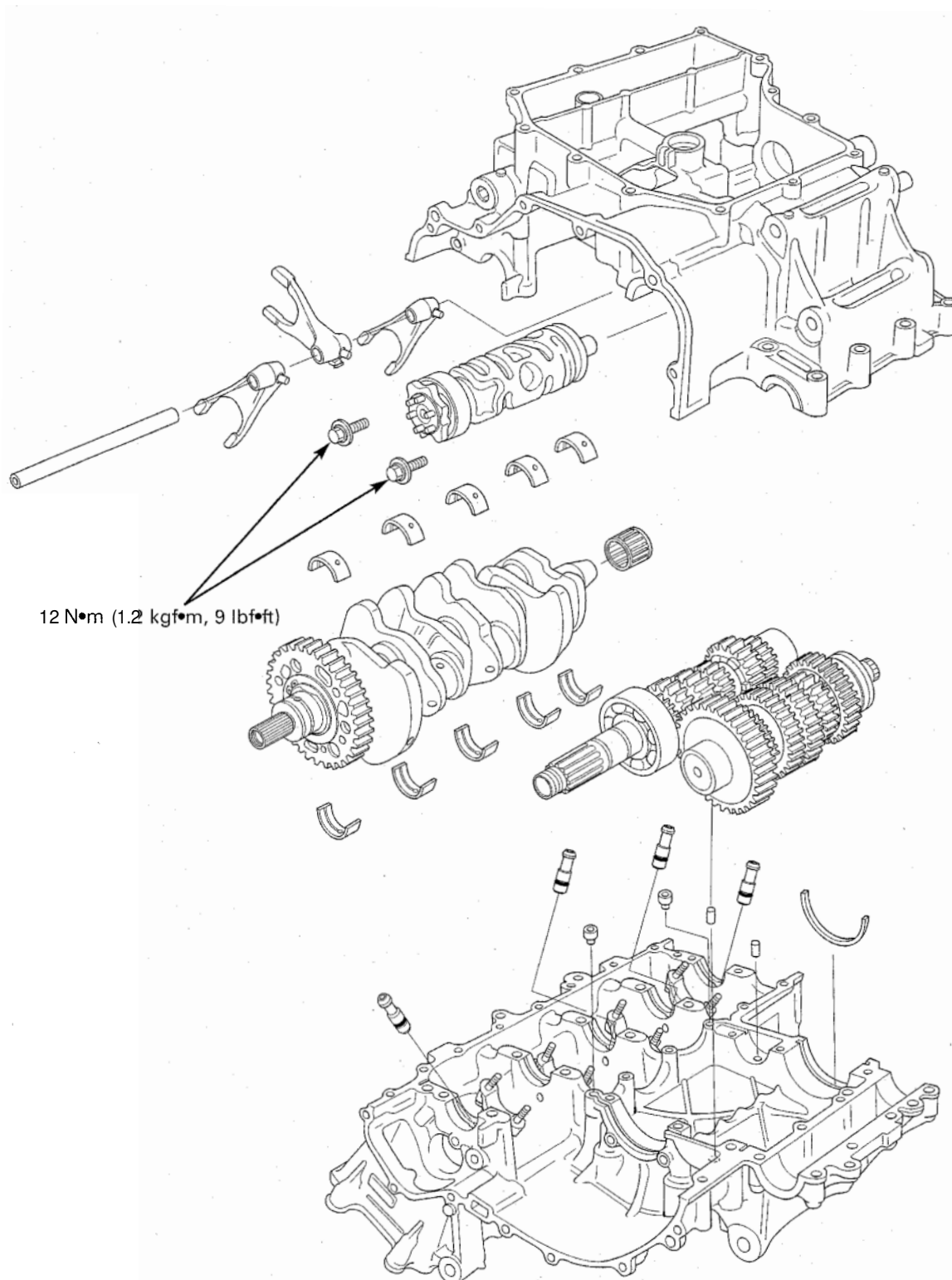
Tighten the mounting bolts to the specified torque.

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

Install the removed parts in the reverse order of removal.







# 12. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	12-1	CRANKSHAFT	12-3
TROUBLESHOOTING	12-2	TRANSMISSION	12-9

## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the crankshaft and transmission. Refer to section 11 for crankcase separation/assembly.
- Be careful not to damage the crankshaft main journal and journal bearing while removing or installing the crankshaft.
- Mark and store the disassembled parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to ensure that the parts are in their correct locations during reassembly. If the inserts are improperly installed, they will block the oil holes, causing insufficient lubrication and eventual engine seizure.
- The main journal bearing inserts are a select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with a plastiguage to verify clearance. Apply molybdenum disulfide oil to the main journal during assembly.

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		—	0.30 (0.012)
	Main journal oil clearance		0.017 – 0.035 (0.0007 – 0.0014)	0.045 (0.0018)
Transmission	Gear I.D.	M5, M6	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		c2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Bushing O.D.	M5, M6	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C3, 4	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M5, M6	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
		c3, c4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D.	M5	27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
		Clutch outer guide	24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)
	Countershaft O.D.	C2	29.967 – 29.980 (1.1798 – 1.1803)	29.96 (1.180)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
		C2	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)

12

## CRANKSHAFT/TRANSMISSION

---

### TORQUE VALUES

Connecting rod bearing cap nut  
Crankcase 9 mm bolt (main journal bolt)

35 N•m (3.6 kgf•m, 26 lbf•ft)    Apply oil to the threads and seating surface  
See page 12-7

### TOOLS

Inner driver, 40 mm I.D.  
Attachment, 25 mm  
Driver shaft

07746-0030100  
07746-0030200  
07964-MB00200

## TROUBLESHOOTING

### Excessive noise

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

### Hard to shift

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

### Transmission jumps out of gear

- Worn gear dogs and slots
- Bent fork shaft
- Broken shift drum stopper
- Worn or bent shift forks
- Broken shift linkage return spring

### Engine vibration

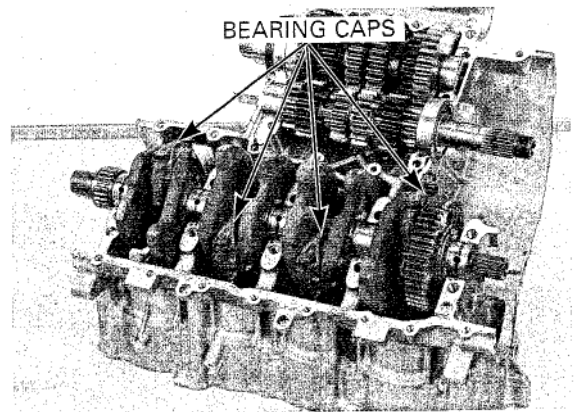
- Excessive crankshaft runout

### CRANKSHAFT

#### REMOVAL

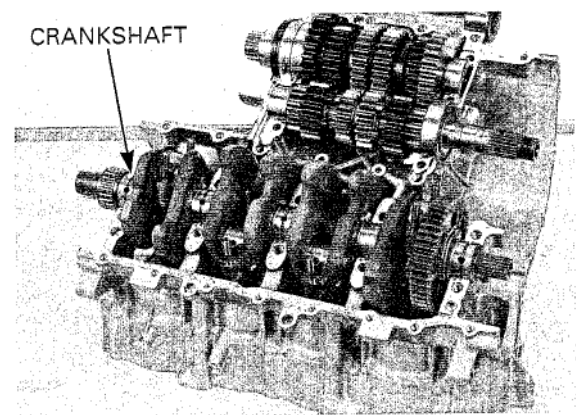
Separate the crankcase halves (page 11-3).

Remove the connecting rod bearing cap nuts and bearing caps.

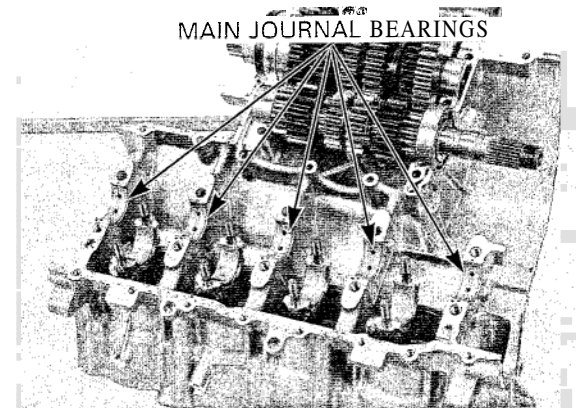


*Before removal position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads*

Remove the crankshaft.



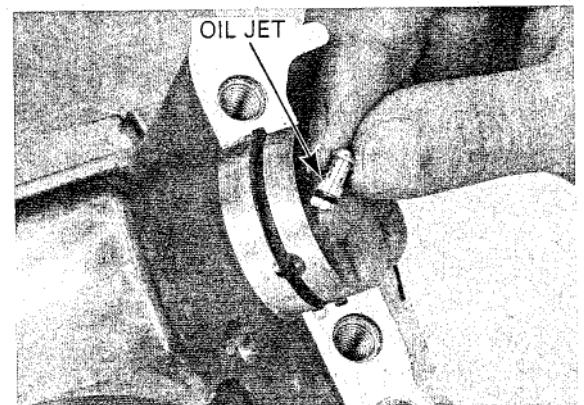
Remove the main journal bearings from both the crankcases.



Remove the crankshaft oil jets from the upper crankcase.

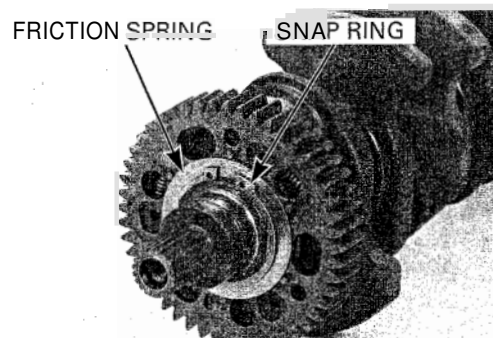
*Always replace the O-ring when the oil jets are removed.*

Inspect the oil jets for clogs, and replace if necessary.

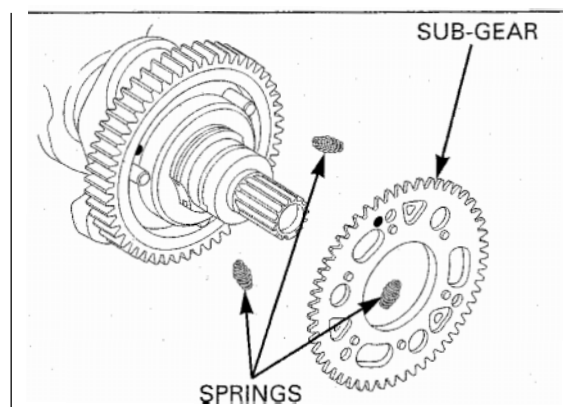


### PRIMARY DRIVE SUB-GEAR REMOVAL

Remove the special snap ring and friction spring.



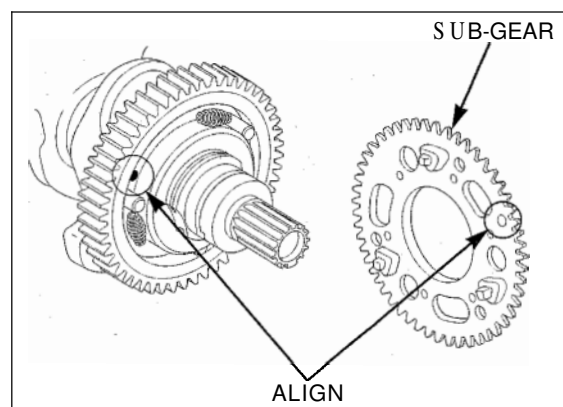
Remove the primary drive sub-gear and springs.



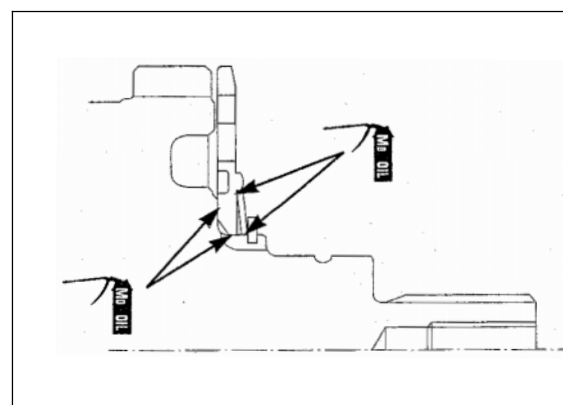
### PRIMARY DRIVE SUB-GEAR INSTALLATION

Install the springs into the primary drive gear as shown.

Install the primary drive sub-gear onto the primary drive gear, aligning the holes between the gear.



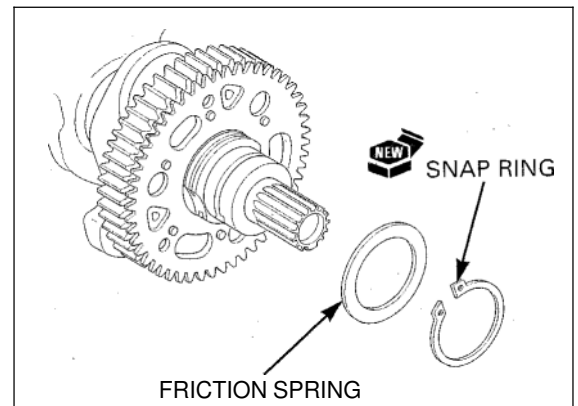
Apply molybdenum disulfide oil to the area shown in the illustration.



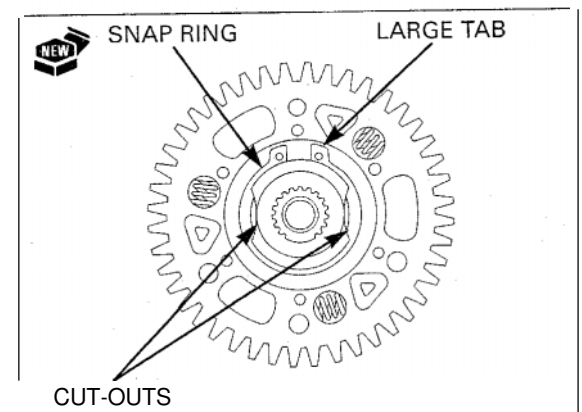
Install the friction spring and new special snap ring.

### NOTICE

*You must use a new special snap ring. Using a snap ring other than specified or reusing the original snap ring can cause severe engine damage.*



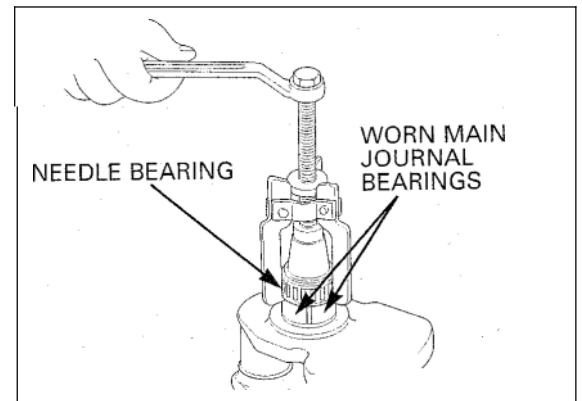
- install a new special snap ring with its large tab facing to the right and the chamfered side facing in.
- Make sure the new special snap ring end gap is aligned with the right angle of the crankshaft cut-outs as shown.



### STARTER CLUTCH NEEDLE BEARING REPLACEMENT

*To protect the crankshaft main journal from the bearing puller claws, cover the main journal properly, worn main journal bearings are usable as protectors*

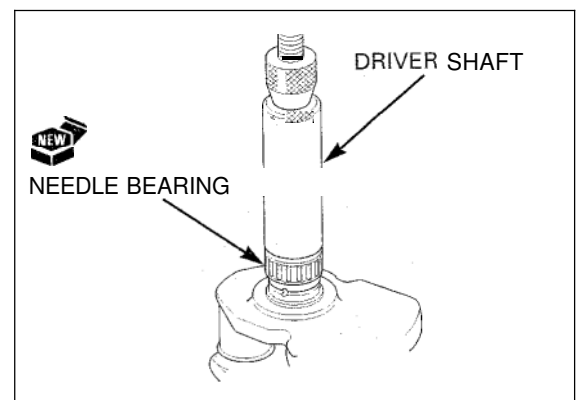
Remove the needle bearing with a commercially available universal bearing puller.



Press a new needle bearing onto the crankshaft using a hydraulic press and special tool.

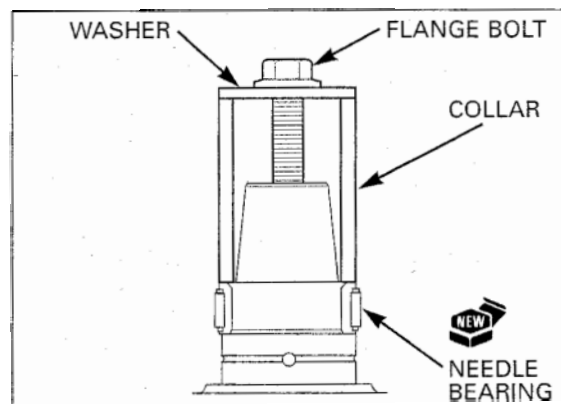
**TOOL:**  
Driver shaft

07964-NIB00200



## CRANKSHAFT/TRANSMISSION

If the special tool is not available, prepare a suitable collar, washer and 10 mm flange bolt (example; fly-wheel bolt) for the bearing installation. Assemble the above items, and screw the bolt gradually, until the new needle bearing is properly installed.

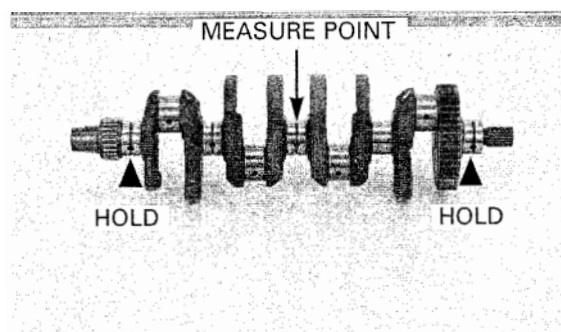


## INSPECTION

### CRANKSHAFT RUNOUT

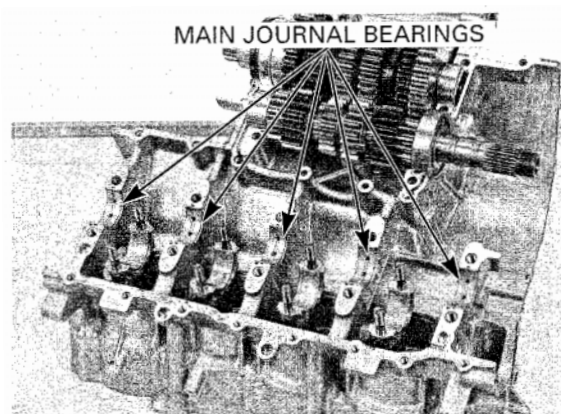
Support the crankshaft on both ends.  
Set a dial indicator on the center main journal of the crankshaft.  
Rotate the crankshaft two revolutions and read runout at the center journal.

**SERVICE LIMIT: 0.30 mm (0.012 in)**



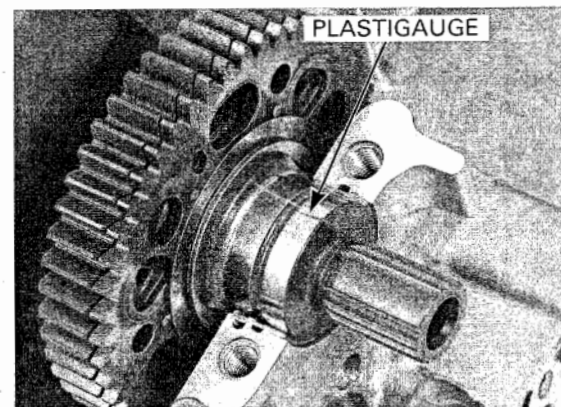
### MAIN JOURNAL BEARING

Inspect the main journal bearing inserts for damage or separation.



Wipe the oil from the bearing inserts and journals.  
Reinstall the upper crankcase's main journal bearing inserts, then carefully lower the crankshaft in place.  
Put a piece of plastigauge on each journal.

- Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.
- Do not rotate the crankshaft during inspection.



## CRANKSHAFT/TRANSMISSION

Assemble the crankcase halves.

### PLASTIC REGION TIGHTENING METHOD:

Install the removed main journal 9 mm bolts.

Tighten the main journal 9 mm bolts as follow:

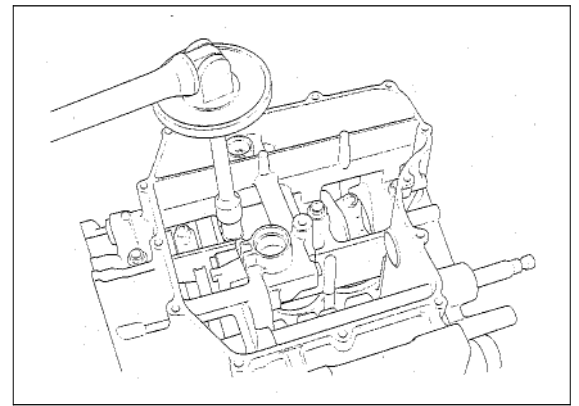
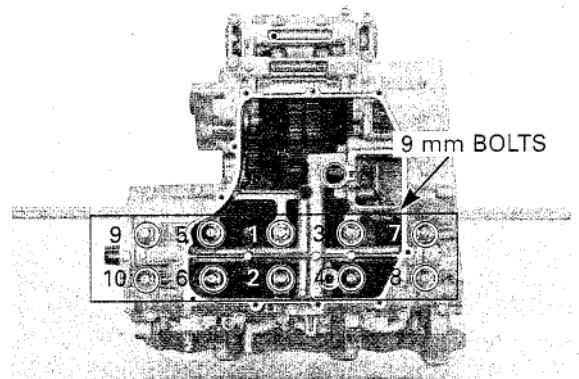
Tighten the 9 mm bolts in numerical order in the illustration to the following torque.

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

Retighten the 9 mm bolts in the same order above to the following torque.

**TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)**

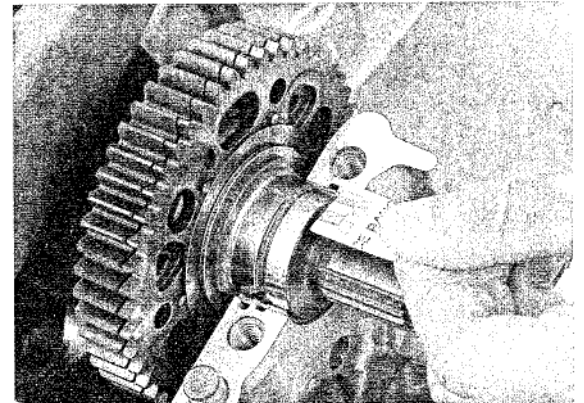
Further tighten the 9 mm bolts 150 degrees.



Remove the 9 mm bolts and lower crankcase. Measure the compressed plastigauge on each journal.

**SERVICE LIMIT: 0.045 mm (0.0018 in)**

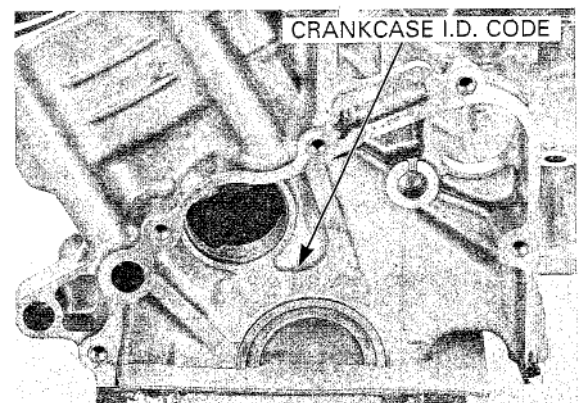
If main bearing clearance is beyond tolerance, select a replacement bearing.



### MAIN JOURNAL BEARING SELECTION

*The letters (A, B or C) on the upper crankcase are the codes for the main journal I D s from left to right*

Record the crankcase I.D. letters from the pad on the left side of the upper crankcase as shown.

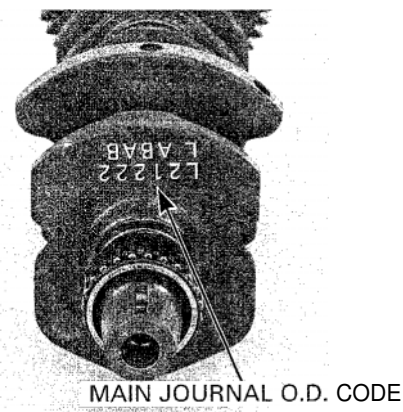




CRANKSHAFT/TRANSMISSION

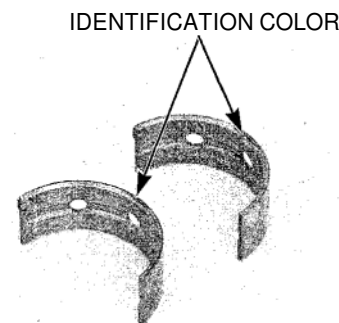
The numbers (0, 1, 2 or 3) on the crank weight are the codes for the main journal O.D.s from left to right

Record the corresponding main journal O.D. code numbers from the crank weight.  
Cross reference the case and journal codes to determine the replacement bearing color codes.



- BEARING THICKNESS:**  
B (Brown): Thick  
C (Green):  
D (Yellow):  
E (Pink):  
F (Red):  
G (White): Thin

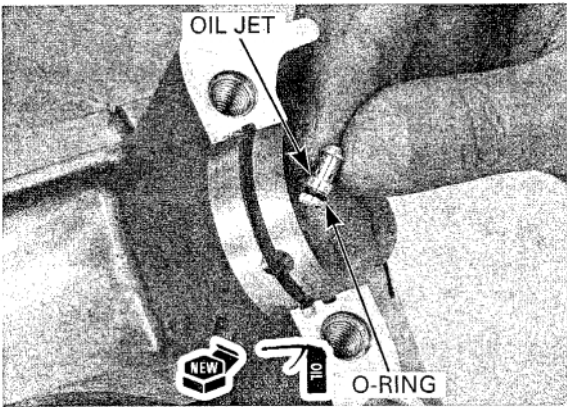
**NOTICE**  
After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.



			B	C
MAIN JOURNAL O.D. CODE	0	(White)	(Red)	
	1	F (Red)	E (Pink)	D (Yellow)
	2	E (Pink)	D (Yellow)	C (Green)
	3	D (Yellow)	C (Green)	B (Brown)

INSTALLATION

Apply engine oil to the new O-ring and install it to the oil jet.  
Install the crankcase oil jets into the lower crankcase main journal.

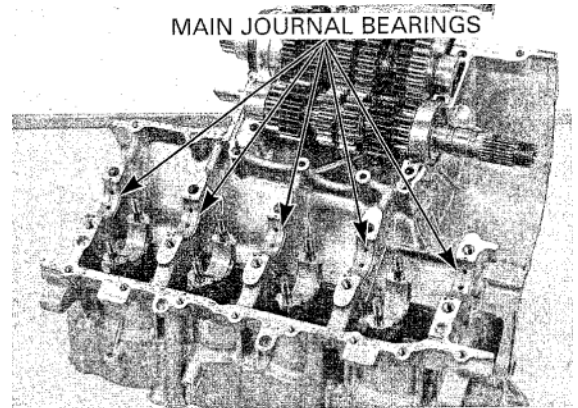


## CRANKSHAFT/TRANSMISSION

*The bearing tabs should be aligned with the grooves in the case.*

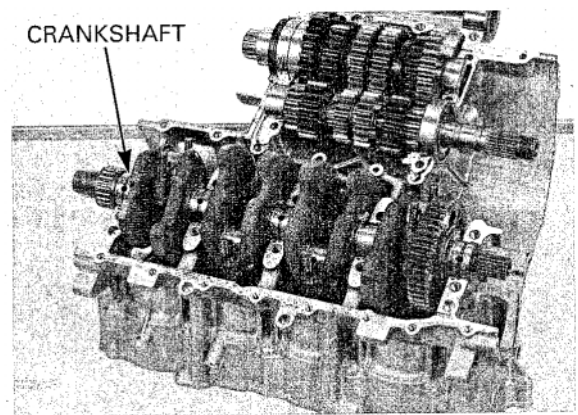
Install the main journal bearings into the upper and lower crankcase.

Apply molybdenum disulfide oil to the upper and lower main journal bearings.



*Before installation, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod threads*

Install the crankshaft.



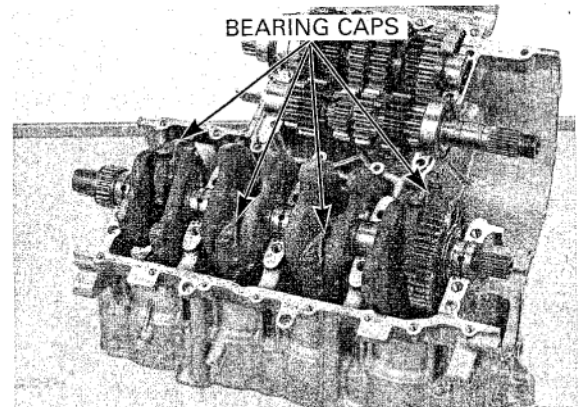
Install the connecting rod bearing caps.

Apply oil to the connecting rod bearing cap nut threads and seating surfaces.

Install and tighten the nuts gradually and alternately.

**TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)**

Assemble the upper and lower crankcase (page 11-12).

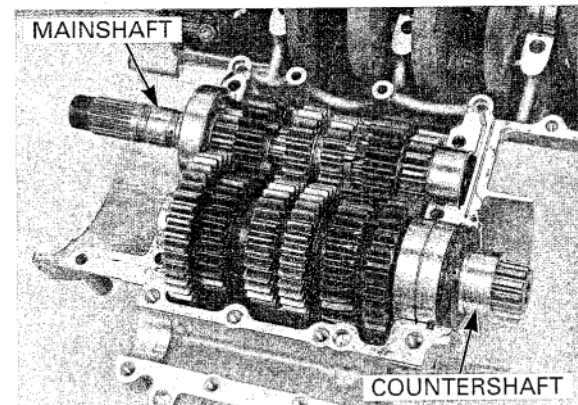


## TRANSMISSION

### REMOVAL/DISASSEMBLY

Separate the crankcase halves (page 11-3).

Remove the mainshaft and countershaft as an assembly.

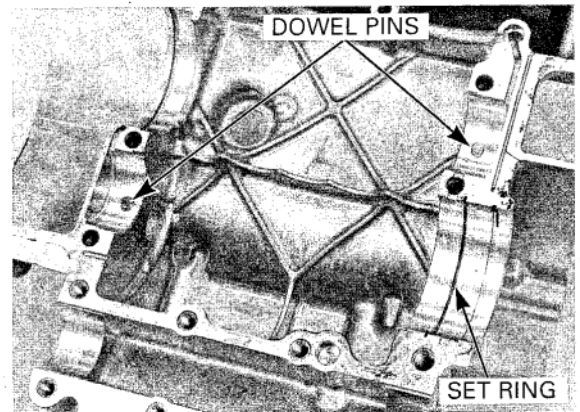


## CRANKSHAFT/TRANSMISSION

---

Remove the dowel pins and countershaft bearing set ring.

Disassemble the mainshaft and countershaft.



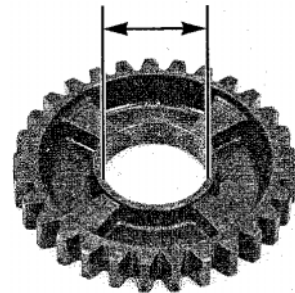
Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.  
Measure the I.D. of each gear.

**SERVICE LIMITS:**

**M5, M6:** 31.04 mm 1.222 in)

**C1:** 26.04 mm 1.025 in)

**C2, C3, C4:** 33.04 mm 1.301 in)



Measure the I.D. and O.D. of each gear bushing.

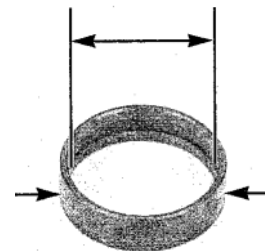
**SERVICE LIMITS:**

**O.D.: M5, M6:** 30.93 mm (1.218 in)

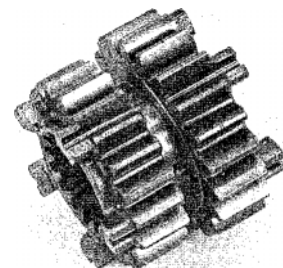
**C3, C4:** 32.93 mm (1.296 in)

**I.D.: M5:** 28.02 mm (1.103 in)

**C2:** 30.02 mm (1.182 in)



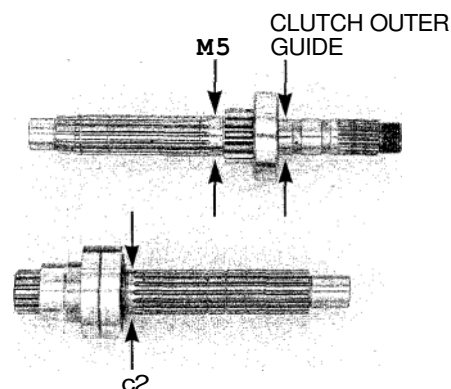
Check the shift fork groove of the shifter gear for excessive wear or damage.



Measure the O.D. of the mainshaft and countershaft.

### SERVICE LIMITS:

**M5:** 27.957 mm (1.1007 in)  
**Clutch outer guide:** 24.96 mm (0.983 in)  
**c2:** 29.96 mm (1.180 in)



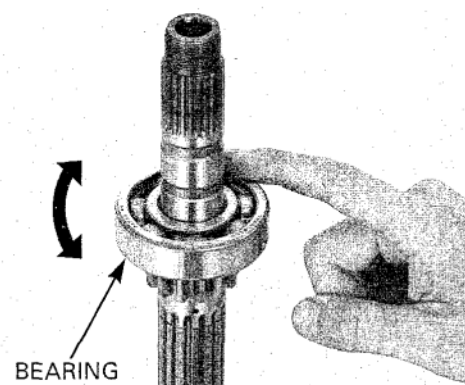
*Do not try to remove the countershaft bearing from the shaft. If the bearing is worn or damaged, replace the countershaft as an assembly.*

### BEARING REPLACEMENT

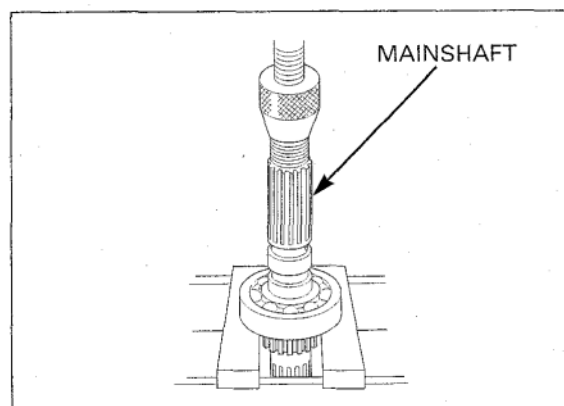
Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the mainshaft.

Remove and discard the mainshaft bearing, if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.

Replace the countershaft, collar, and bearing as an assembly, if the race does not turn smoothly, quietly, or fits loosely on the countershaft.



Press out the mainshaft from the bearing using a hydraulic press.

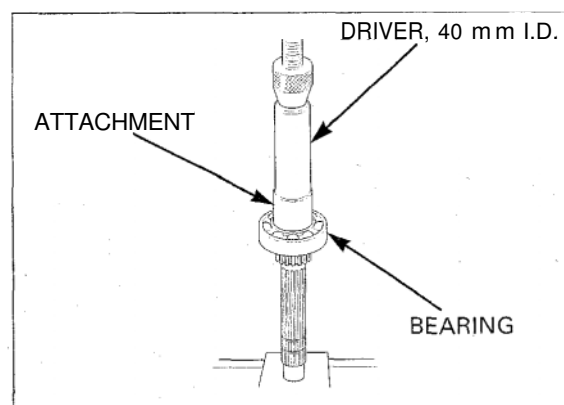


Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tool.

### TOOLS:

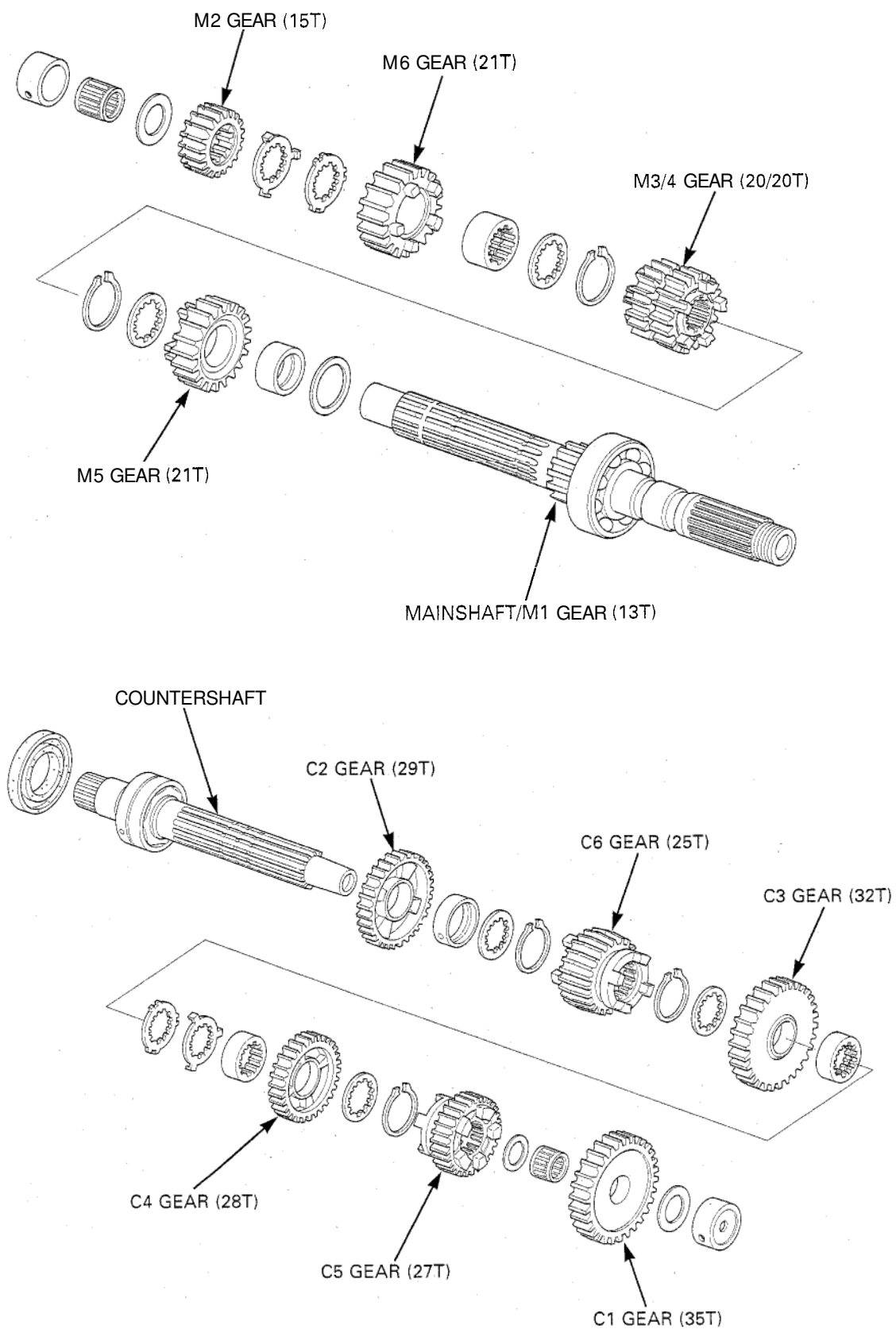
**Inner driver, 40 mm I.D.**  
**Attachment, 25 mm**

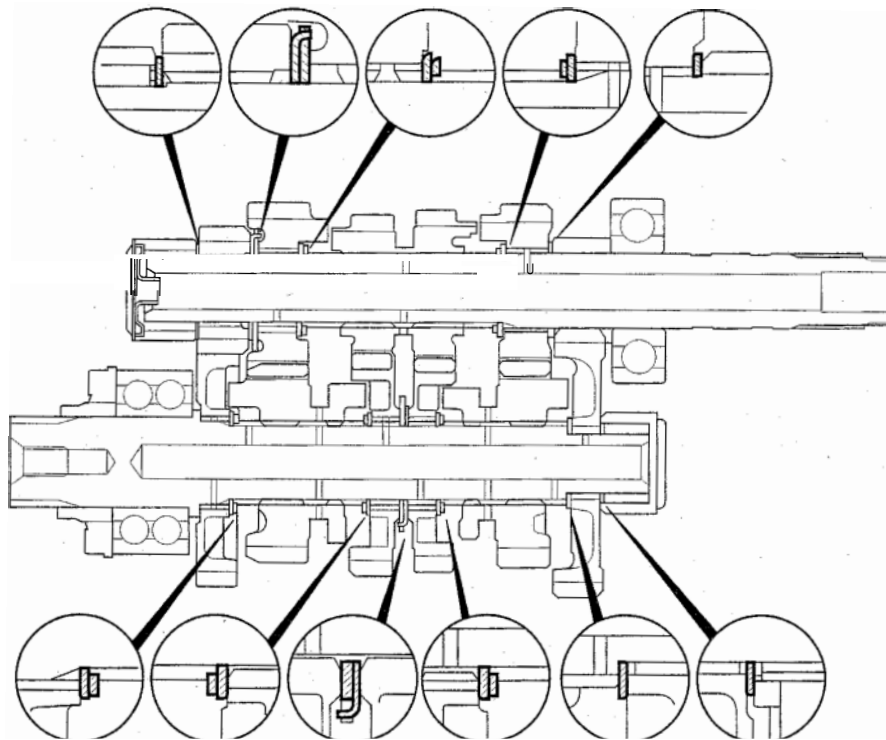
**07746-0030100**  
**07746-0030200**



## CRANKSHAFT/TRANSMISSION

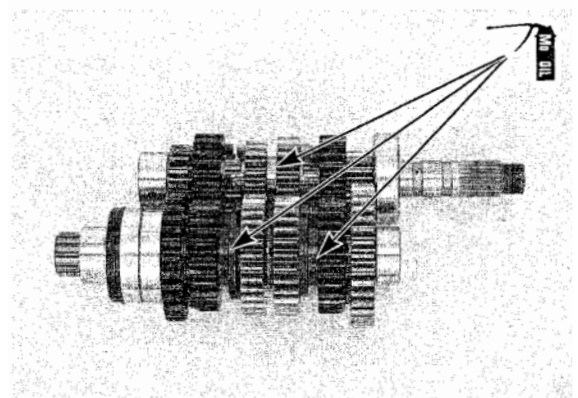
### ASSEMBLY





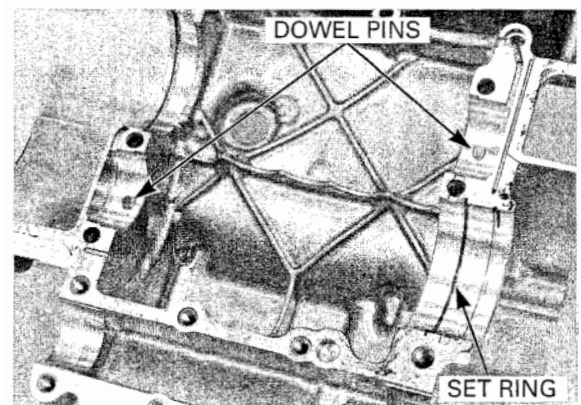
Assemble the transmission gear and shafts.  
Coat each gear with clean engine oil and check for smooth movement.

Apply molybdenum disulfide oil to the shift fork grooves in the M3/4, C5 and C6 gear.



## INSTALLATION

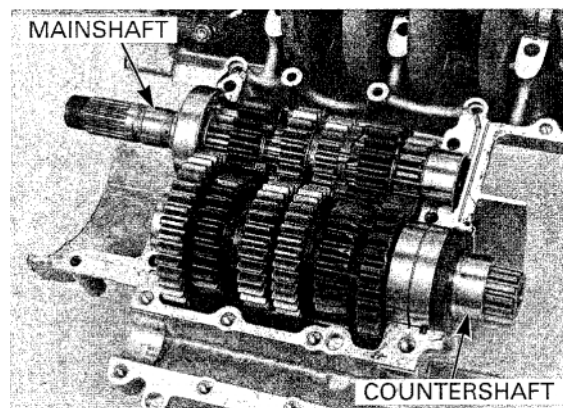
Install the dowel pins in the upper crankcase holes.  
Install the countershaft bearing set ring into the upper crankcase groove.



## CRANKSHAFT/TRANSMISSION

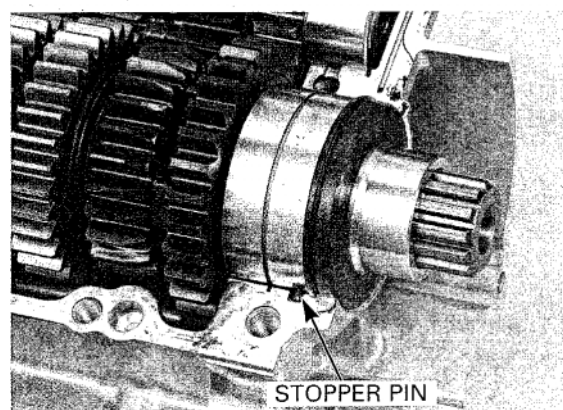
---

Install the mainshaft and countershaft by aligning the countershaft bearing groove with the set ring on the crankcase, and aligning the bearing cap holes with the dowel pins.

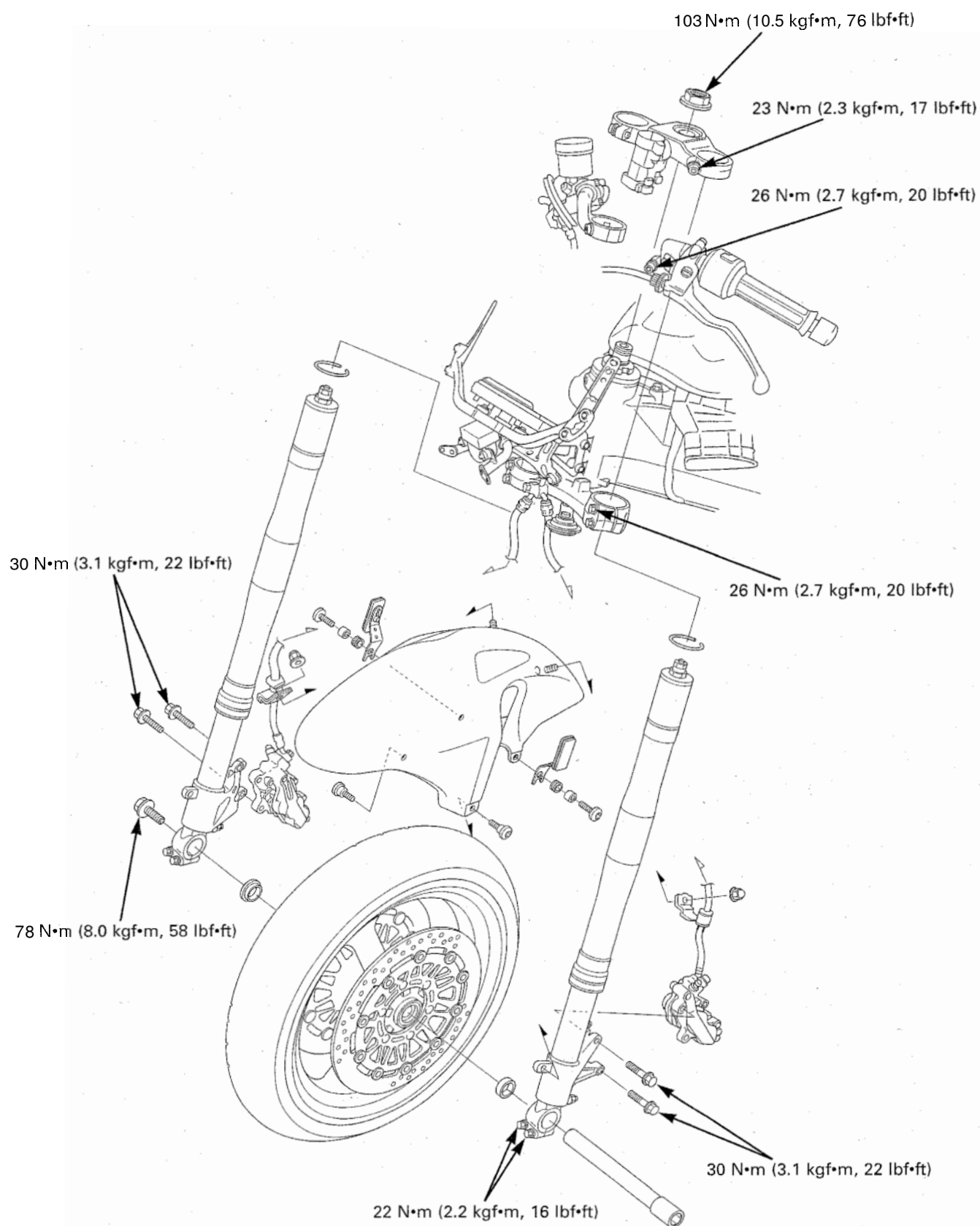


Also align the countershaft bearing stopper pin with the groove in the crankcase.

Assemble the crankcase (page 11-12).



## FRONT WHEEL/SUSPENSION/STEERING





# 13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-9
TROUBLESHOOTING	13-3	FORK	13-15
HANDLEBARS	13-4	STEERING STEM	13-26

## SERVICE INFORMATION

### GENERAL

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After front wheel installation, check the brake operation by applying the brake lever.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rims marked "TUBELESS TIRE APPLICABLE".

### 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	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 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	255.8 (10.07)	250.8 (9.87)
	Spring direction	With the tapered end facing up	—
	Fork pipe runout	—	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	73 (2.9)	—
	Fluid capacity	513 ± 2.5 cm <sup>3</sup> (17.3 ± 0.08 US oz, 18.1 ± 0.09 Imp oz)	—
	Pre-load adjuster initial setting	7 turns from full soft	—
	Tension adjuster initial setting	2 turns from full hard	—
	Compression adjuster initial setting	2 turns from full hard	—
Steering head bearing pre-load		11 – 16 N (1.1 – 1.6 kgf)	—

13

## FRONT WHEEL/SUSPENSION/STEERING

---

### TORQUE VALUES

Handlebar pinch bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	
Handlebar weight mounting screw	10 N•m (1.0 kgf•m, 7 lbf•ft)	ALOC bolt
Front master cylinder holder bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Clutch lever bracket pinch bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Steering stem nut	103 N•m (10.5 kgf•m, 76 lbf•ft)	See page 13-33
Steering stem adjusting nut	—	
Steering stem lock nut	—	
Fork top bridge pinch bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Fork bottom bridge pinch bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	
Front axle bolt	78 N•m (8.0 kgf•m, 58 lbf•ft)	
Front axle holder pinch bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)	
Front brake disc mounting bolt	20 N•m (2.0 kgf•m, 14 lbf•ft)	ALOC bolt
Fork bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)	
Fork socket bolt	34 N•m (3.5 kgf•m, 25 lbf•ft)	Apply a locking agent to the threads.
Damper rod adjust case lock nut	25 N•m (2.6 kgf•m, 19 lbf•ft)	
Front brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	ALOC bolt

### TOOLS

Steering stem socket	07916-3710101	or 07916-3710100 (U.S.A. only)
Driver attachment, A	07946-KM90100	Not available in U.S.A.
Driver attachment, B	07NMF-MT70120	
Driver shaft assembly	07946-KM90300	
Bearing remover, A	07946-KM90401	
Bearing remover, B	07NMF-MT70110	
Assembly base	07946-KM90600	
Steering stem driver	07946-MB00000	
Fork damper holder	07YMB-MCFO101	
Fork damper holder handle	07TMB-001010A	
Oil seal driver	07YMD-MCF0100	or 07NMD-KZ3010A (U.S.A. only)
Driver	07749-0010000	
Attachment, 42 x 47 mm	07746-0010300	
Pilot, 25 mm	07746-0040600	
Bearing remover shaft	07746-0050100	
Bearing remover head, 25 mm	07746-0050800	
Main bearing driver attachment	07946-ME90200	
Fork seal driver body	07947-KA50100	
Oil seal driver	07965-MA60000	
Installer shaft	07VMF-KZ30200	
Installer attachment A	07VMF-MAT0100 (U.S.A. only)	
Installer attachment B	07VMF-MAT0200 (U.S.A. only)	
Remover attachment A	07VMF-MAT0300 (U.S.A. only)	
Remover attachment B	07VMF-MAT0400 (U.S.A. only)	

## TROUBLESHOOTING

### Hard steering

- Faulty or damaged steering head bearings
- Insufficient tire pressure
- Steering head bearing adjustment nut too tight

### Steers to one side or does not track straight

- Unevenly adjusted right and left fork legs
- Bent fork
- Bent axle
- Wheel installed incorrectly
- Faulty steering head bearings
- Bent frame
- Worn wheel bearing
- Worn swingarm pivot components

### Front wheel wobbling

- Bent rim
- Worn front wheel bearings
- Faulty tire
- Unbalanced tire and wheel

### Wheel turns hard

- Faulty wheel bearing
- Bent front axle
- Brake drag

### Soft suspension

- Insufficient fluid in fork
- Weak fork springs
- Tire pressure too low

### Hard suspension

- Incorrect fluid weight
- Bent fork pipes
- Clogged fork fluid passage

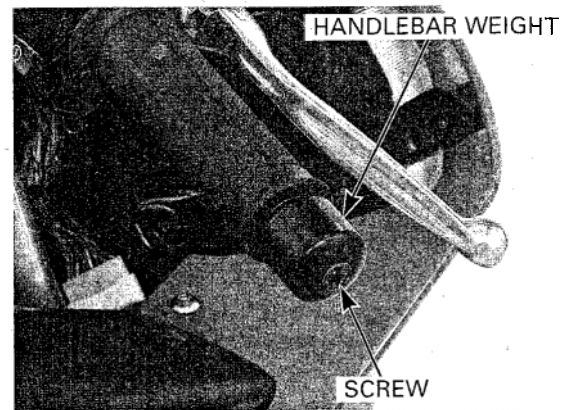
### Front suspension noisy

- Insufficient fluid in fork
- Loose fork fasteners

## HANDLEBARS

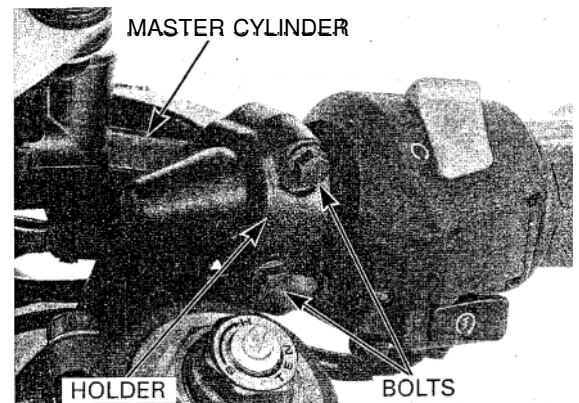
### REMOVAL

Remove the screw and right handlebar weight.

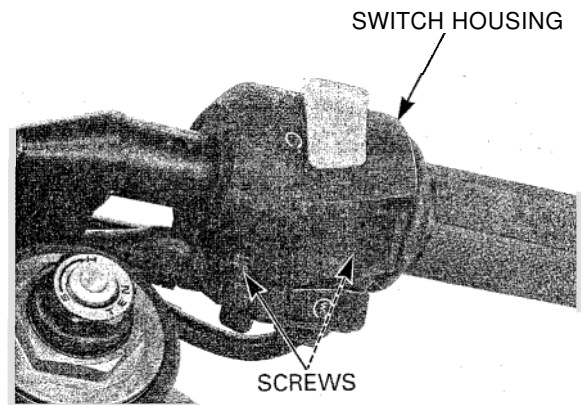


Disconnect the front brake switch wires connectors from the switch.  
Remove the master cylinder holder bolts, holder and master cylinder assembly.

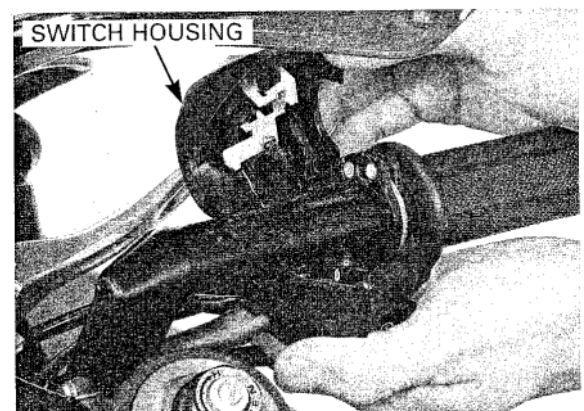
*Keep the brake master cylinder upright*



Remove the right handlebar switch housing screws.

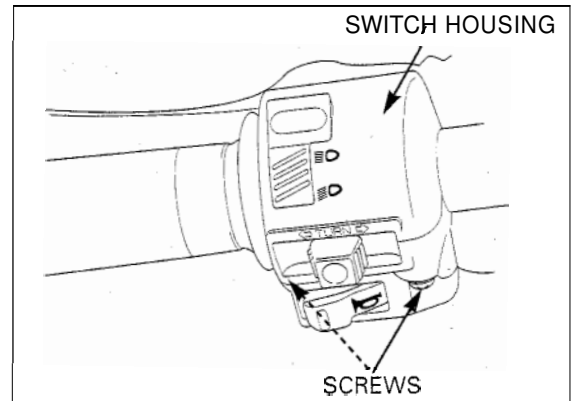


Remove the right handlebar switch housing from the right handlebar.

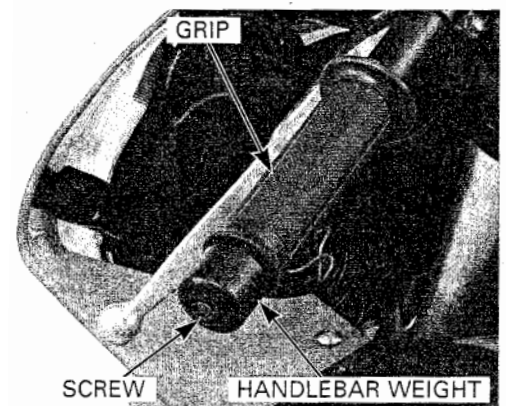


## FRONT WHEEL/SUSPENSION/STEERING

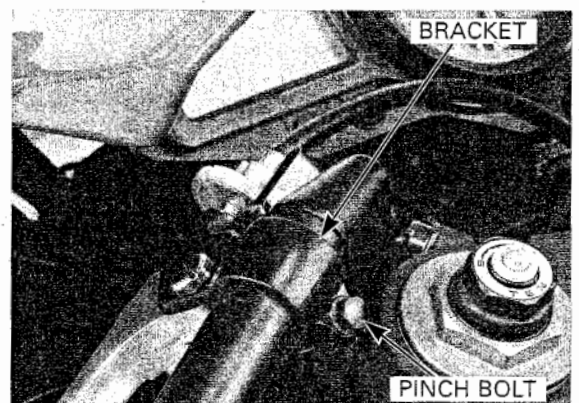
Remove the screws and left handlebar switch housing



Remove the screw and handlebar weight.  
Remove the handle grip from the handlebar.

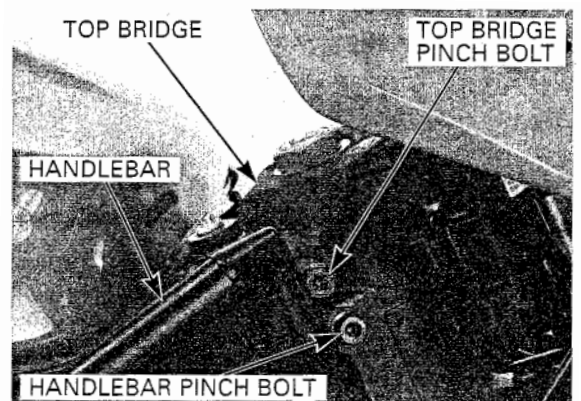


Loosen the clutch lever bracket pinch bolt



Loosen the top bridge pinch bolts and handlebar pinch bolt.  
Remove the steering stem nut and top bridge.  
Remove the handlebars from the fork sliders.

Remove the throttle pipe from the right handlebar,  
and also the clutch lever bracket from the left handlebar.



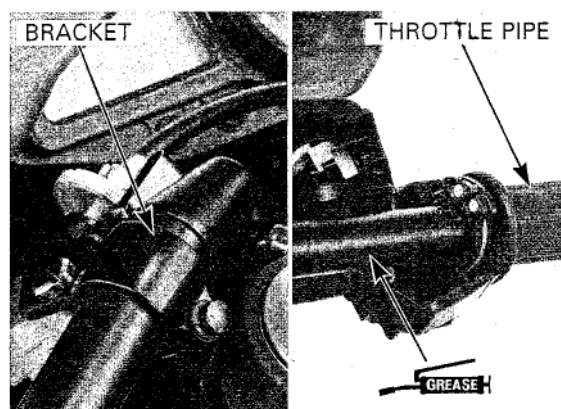
## FRONT WHEEL/SUSPENSION/STEERING

### INSTALLATION

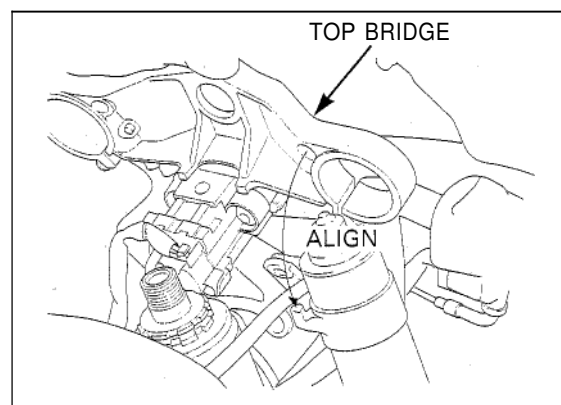
Apply grease to the sliding surface of the throttle pipe.

Install the clutch lever bracket to the left handlebar, and also the throttle pipe to the right handlebar.

Install the handlebars onto the fork sliders.

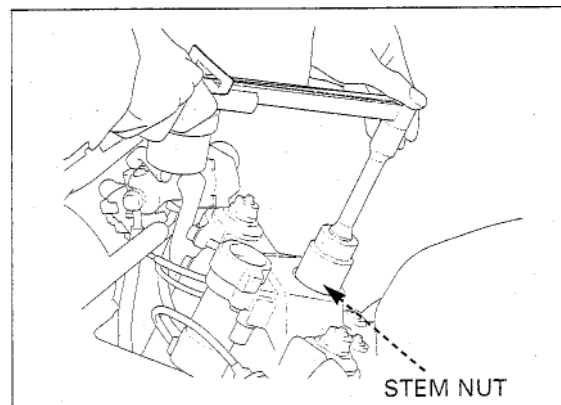


Install the top bridge while aligning its holes with the handlebar stopper pins.



Install and tighten the steering stem nut to the specified torque.

**TORQUE: 103 N•m (10.5 kgf•m, 76 lbf•ft)**

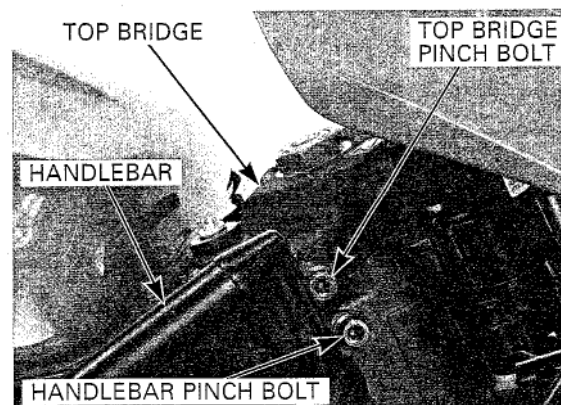


Tighten the top bridge pinch bolts to the specified torque.

**TORQUE: 23 N•m (2.3 kgf•m, 17 lbf•ft)**

Seat the handlebar pivot upper surface with the top bridge lower surface, then tighten the handlebar pinch bolt to the specified torque.

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

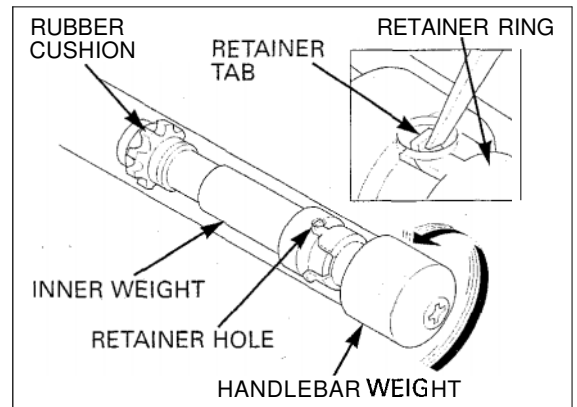


## HANDLEBAR WEIGHT REPLACEMENT

Remove the grip rubber from the handlebar. Straighten the weight retainer tab by the screwdriver or punch.

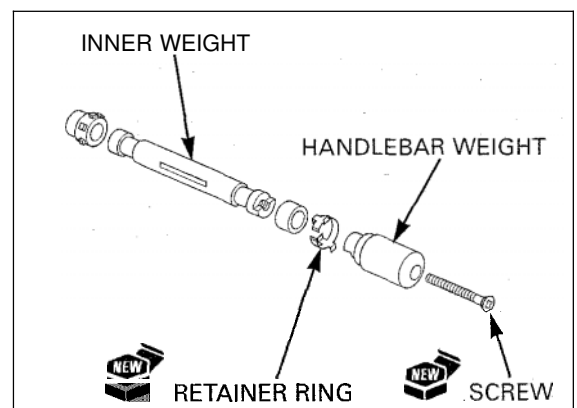
Temporarily install the handlebar weight and screw, then remove the inner weight by turning the handlebar weight.

*Apply lubricant spray through the tab locking hole to the rubber for easy removal*



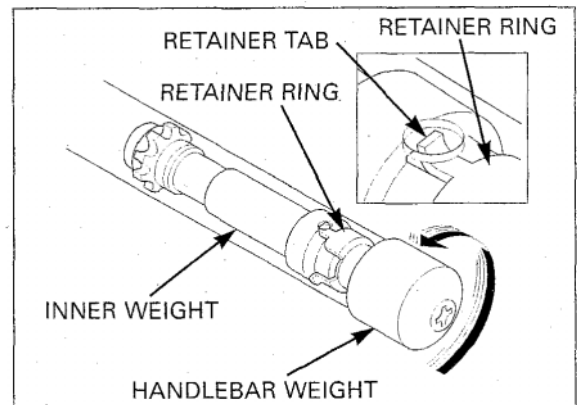
Remove the handlebar weight from the inner weight. Discard the retainer.

Install the new retainer onto the inner weight. Install the handlebar weight onto the inner weight, aligning the bosses and grooves each other. Install a new mounting screw.



Insert the handlebar weight assembly into the handlebar.

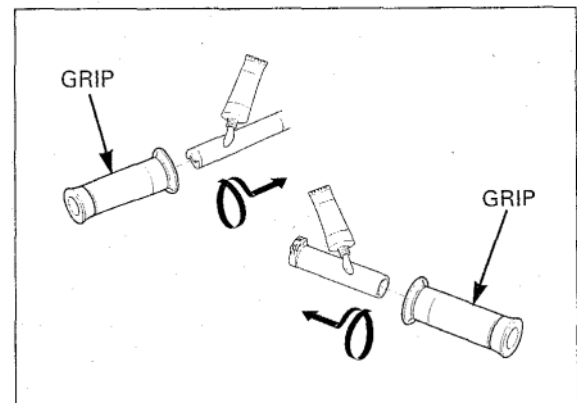
Turn the handlebar weight and hook the retainer tab with the hole in the handlebar.



Apply Honda Bond A to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

Wait 3 - 5 minutes and install the grip. Rotate the grip for even application of the adhesive.

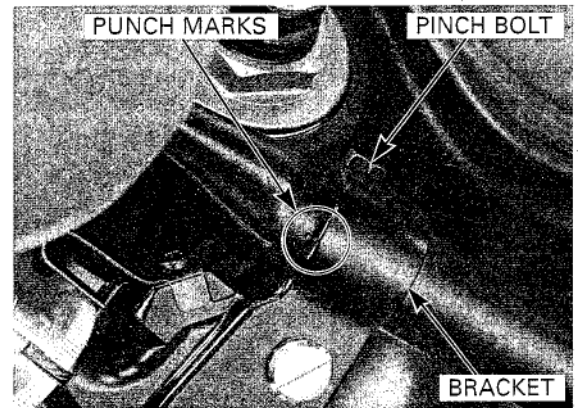
*Allow the adhesive to dry for approximately 1 hour before using*



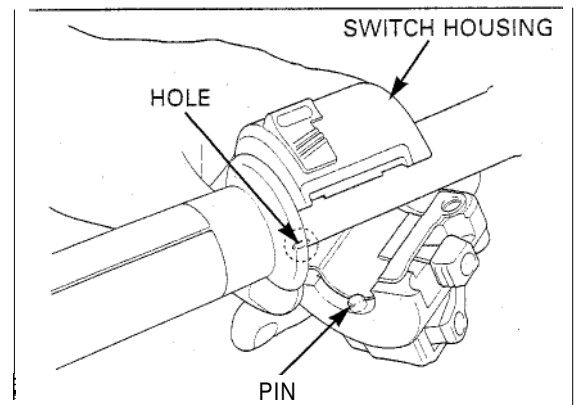
## FRONT WHEEL/SUSPENSION/STEERING

Tighten the clutch lever bracket pinch bolt by aligning the punch marks on the left handlebar and clutch lever bracket.

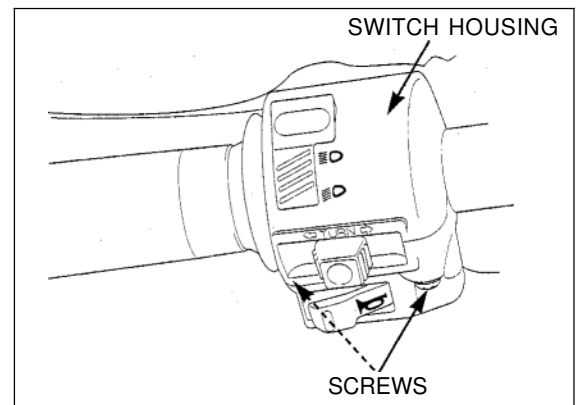
**TORQUE:** 12 N•m (1.2 kgf•m, 9 lbf•ft)



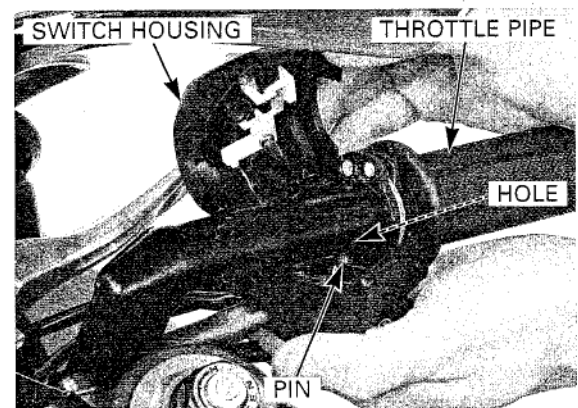
Install the left handlebar switch housing aligning its locating pin with the hole in the handlebar.



Tighten the forward screw first, then the rear screw.



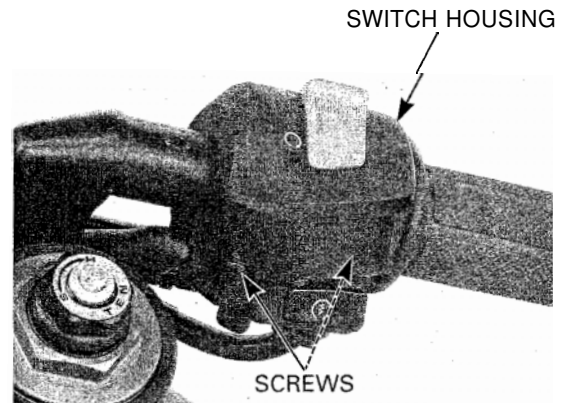
Install the right handlebar switch housing by aligning its locating pin with the hole in the handlebar.





## FRONT WHEEL/SUSPENSION/STEERING

Tighten the forward screw first, then the rear screw.



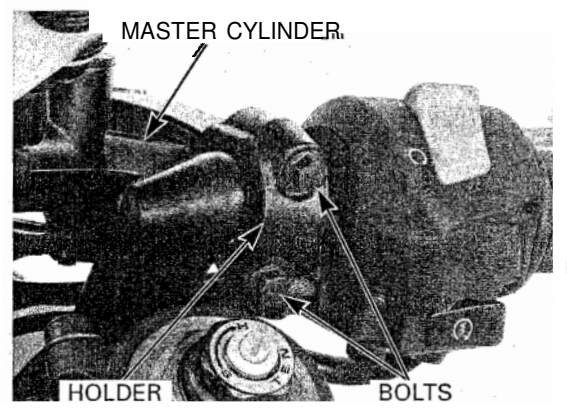
Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

Tighten the upper bolt first, the lower bolt.

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

Connect the brake switch wires.



Install the handlebar weight and tighten the new mounting screw to the specified torque.

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

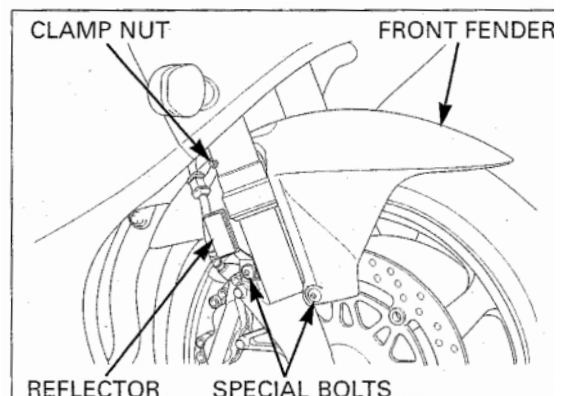


## FRONT WHEEL

### REMOVAL

Support the motorcycle securely and raise the front wheel off the ground using a safety stand or a hoist.

Remove the brake hose clamp nuts, special bolts and front fender (page 2-8).



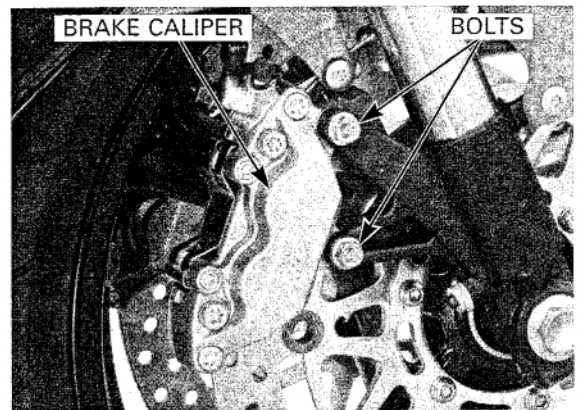
## FRONT WHEEL/SUSPENSION/STEERING

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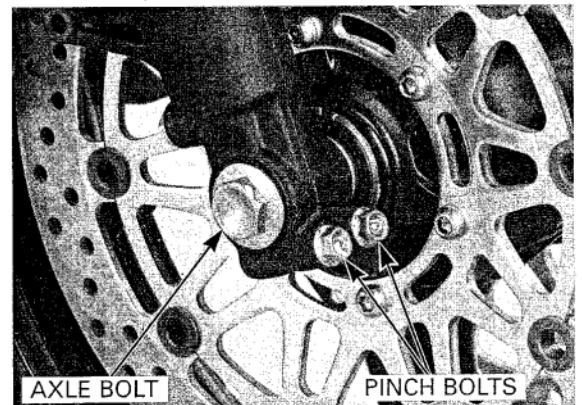
*Do not operate  
the brake lever  
after the brake  
caliper is  
removed*

Remove the mounting bolts and both brake calipers.

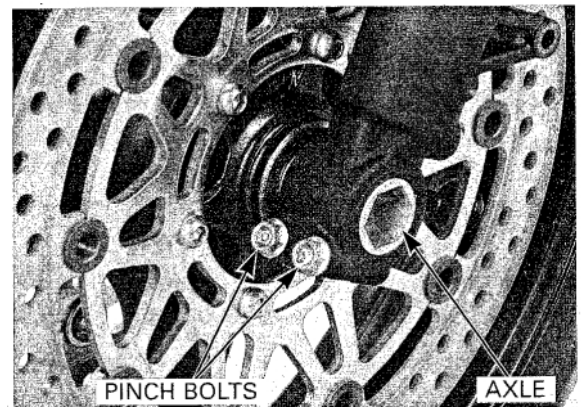
Support the brake caliper with a piece of wire so it does not hang from the brake hose. Do not twist the brake hose



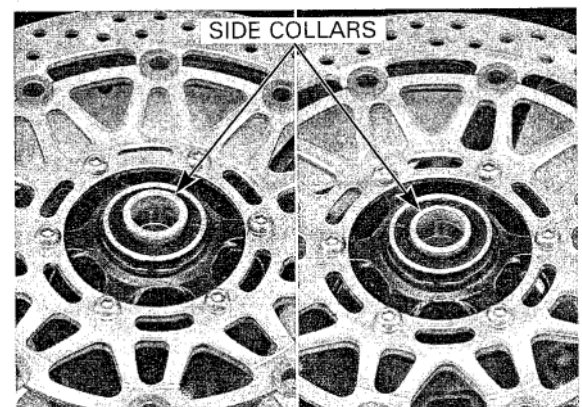
Loosen the right axle pinch bolts.  
Remove the axle bolt.



Loosen the left axle pinch bolts.  
Remove the axle and the front wheel.



Remove the side collars.

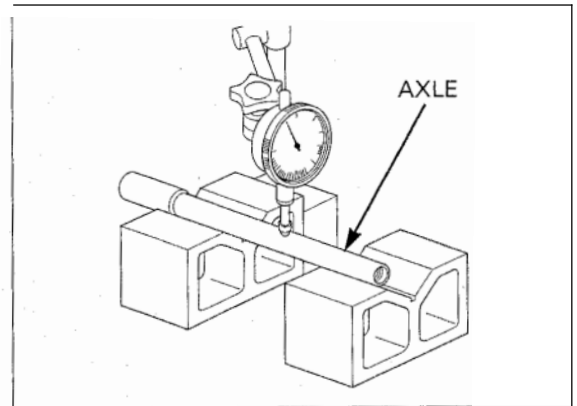


## INSPECTION

### Axle

Set the axle in V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

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



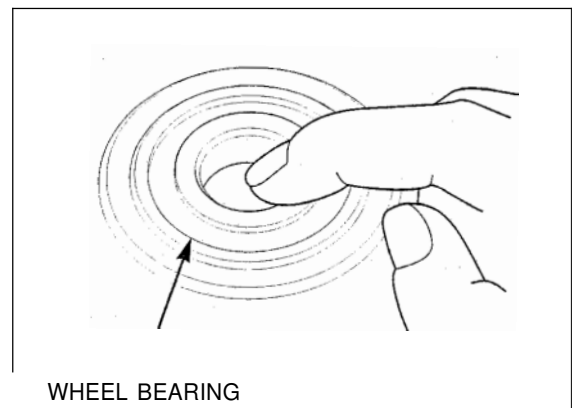
### Wheel bearing

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

*Replace the bearings in pairs.*

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Install the new bearings into the hub using the special tools (page 13-12).



### Wheel rim runout

Check the rim runout by placing the wheel in a trueing stand.

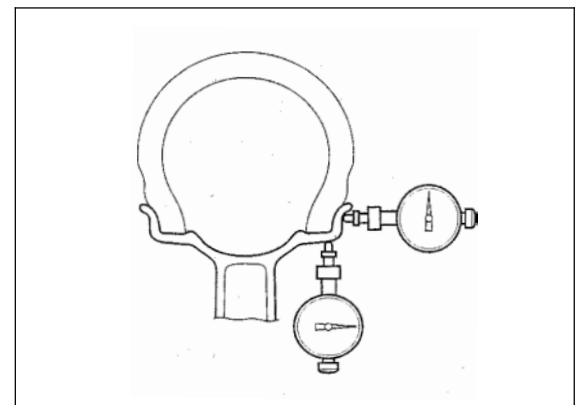
Spin the wheel by hand, and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

### SERVICE LIMITS:

**Radial: 2.0 mm (0.08 in)**

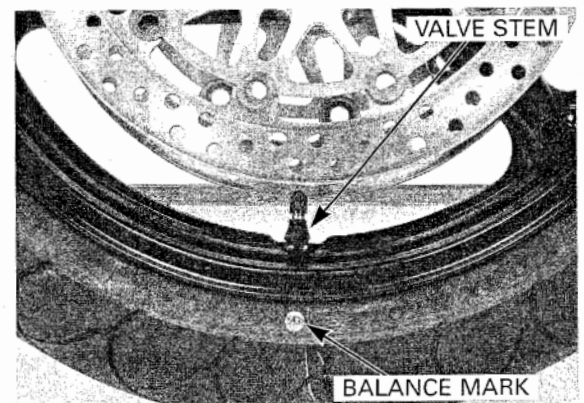
**Axial: 2.0 mm (0.08 in)**



*For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.*

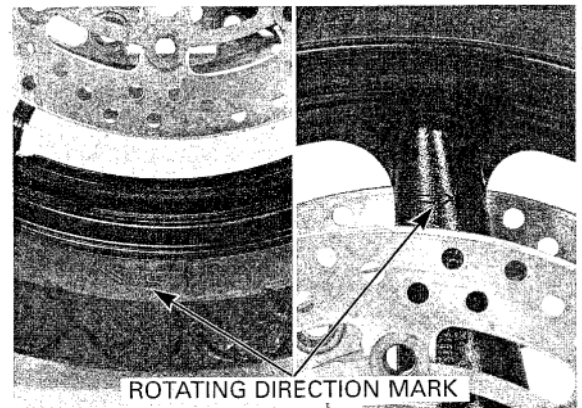
### Wheel balance

Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.



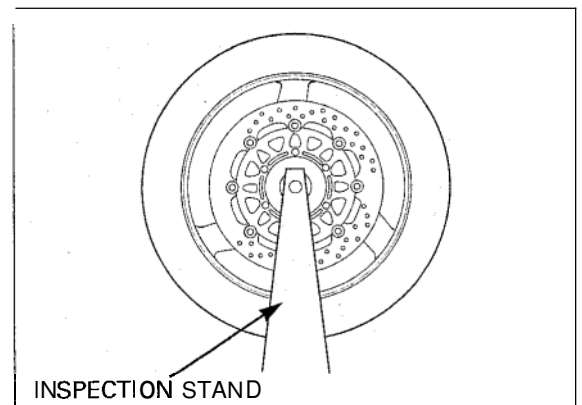
## FRONT WHEEL/SUSPENSION/STEERING

Note the direction of rotation marks on the wheel and tire.



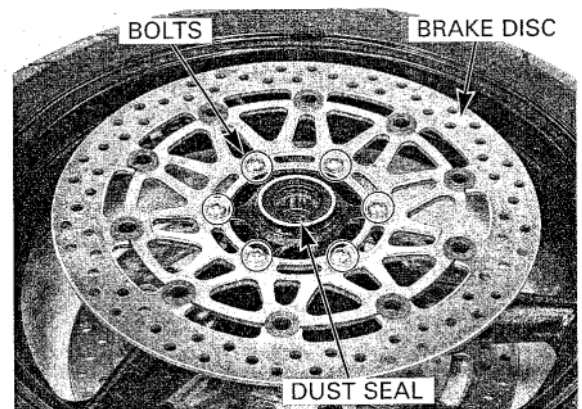
Remove the dust seals from the wheel.  
Mount the wheel, tire and brake discs assembly in an inspection stand.  
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with chalk.  
Do this two or three times to verify the heaviest area.  
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



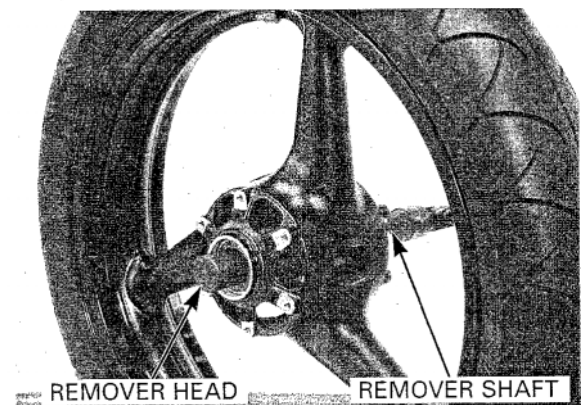
### DISASSEMBLY

Remove the bolts and brake discs.  
Remove the dust seals.

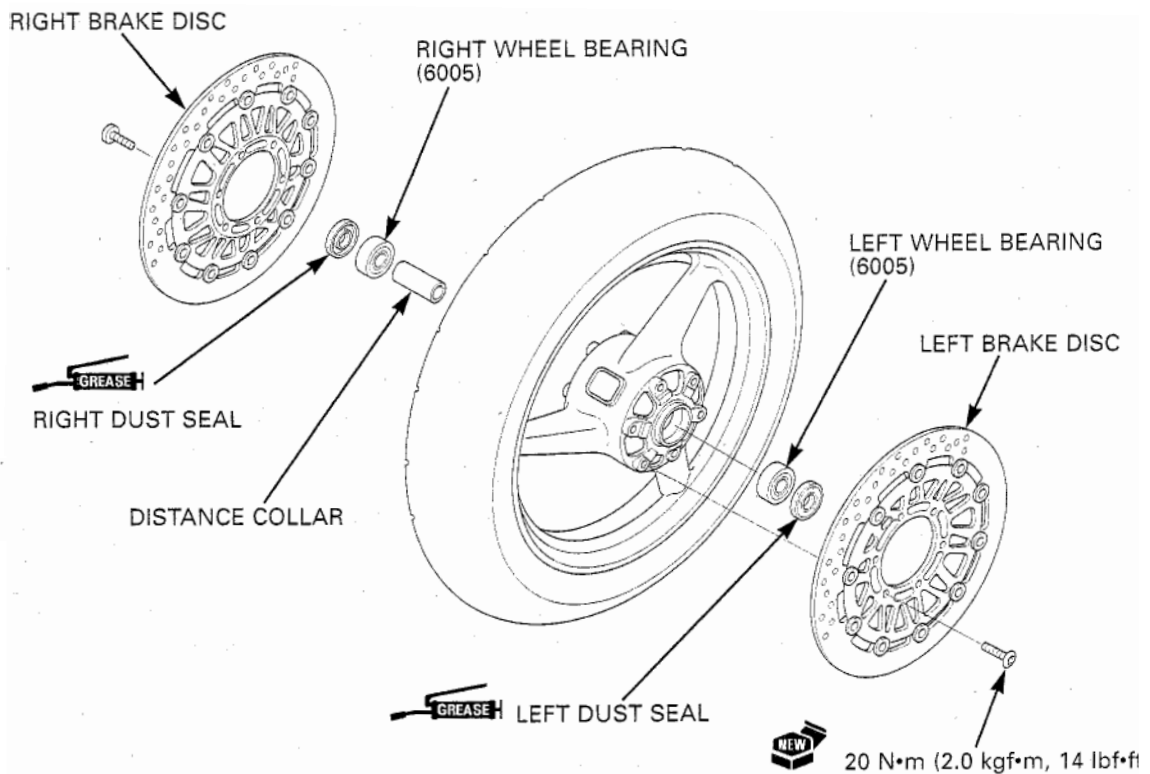


Install the bearing remover head into the bearing.  
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.  
Remove the distance collar and drive out the other bearing.

**TOOLS:**  
Bearing remover head, 25 mm 07746-0050800  
Bearing remover shaft 07746-0050100



## ASSEMBLY



*Never install the old bearings. Once the bearings have been removed, the bearings must be replaced with new ones.*

Drive in a new right bearing squarely. Install the distance collar, then drive in the left bearing using the special tool.

### TOOLS:

**Driver**

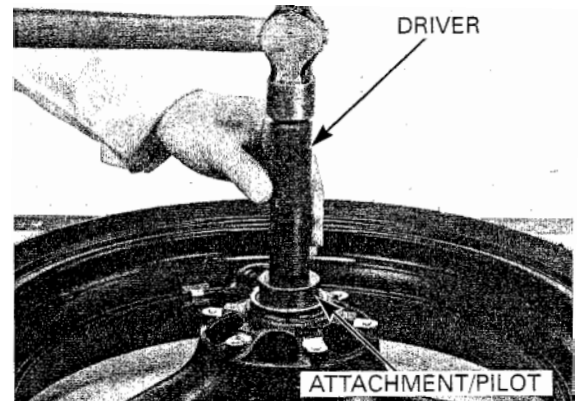
**Attachment, 42 x 47 mm**

**Pilot, 25 mm**

07749-0010000

07746-0010300

07746-0040600



*Do not get grease on the brake discs or stopping power will be reduced.*

Install the brake discs on the wheel hub. Install and tighten the new mounting bolts to the specified torque.

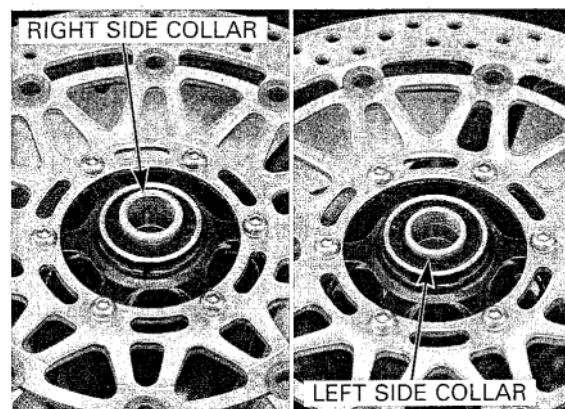
**TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)**

Apply grease to the dust seal lips, then install them into the wheel hub.



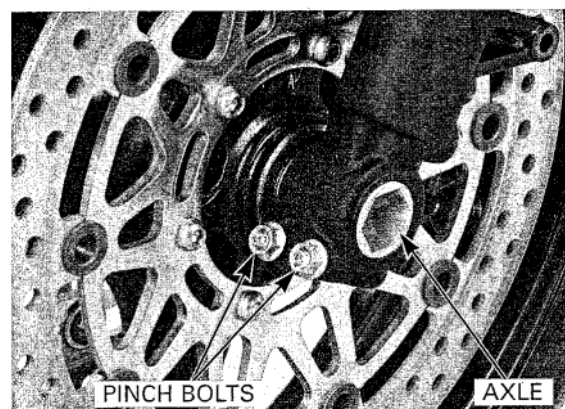
### INSTALLATION

Install the right and left side collars.



Install the front wheel between the fork legs.

Apply a thin layer of grease to the front axle surface.  
Install the front axle from the left side.

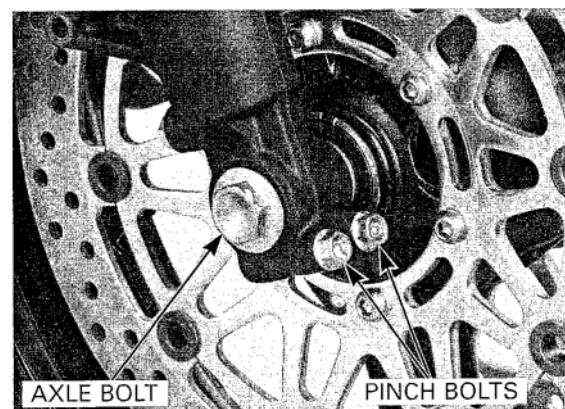


Hold the axle and tighten the axle bolt to the specified torque.

**TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)**

Tighten the right axle pinch bolts to the specified torque.

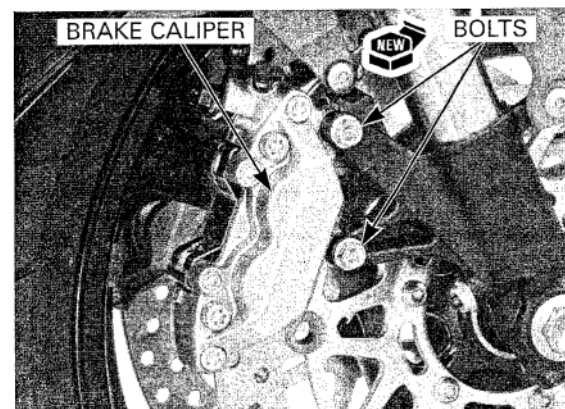
**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Install the both brake caliper and tighten the new mounting bolts to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m 22 lbf·ft)**

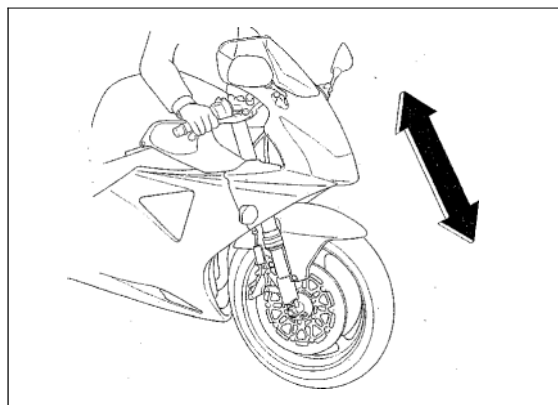
Install the front fender (page 2-8).



## FRONT WHEEL/SUSPENSION/STEERING

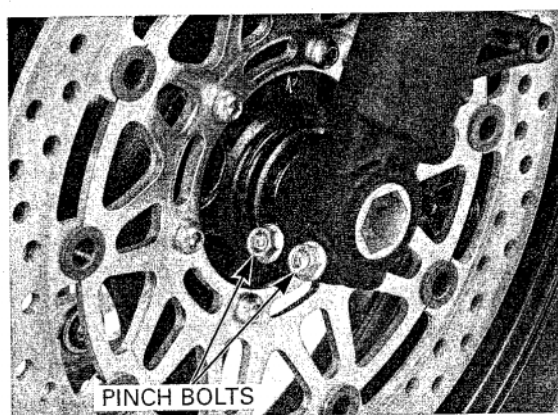
With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.

Check the brake operation by applying the brake lever.

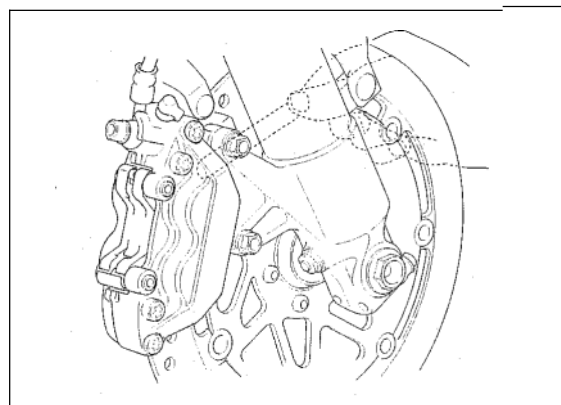


Tighten the left axle pinch bolts to the specified torque.

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



Check the clearance between the brake disc and caliper bracket on each side after installation. The clearance should be at least 0.7 mm (0.03 in).



## FORK

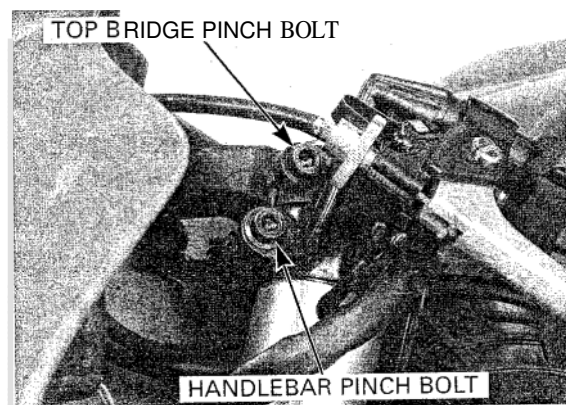
*Keep the brake master cylinder upright*

### REMOVAL

Remove the front wheel (page 13-9).

Loosen the handlebar pinch bolt and top bridge pinch bolt.

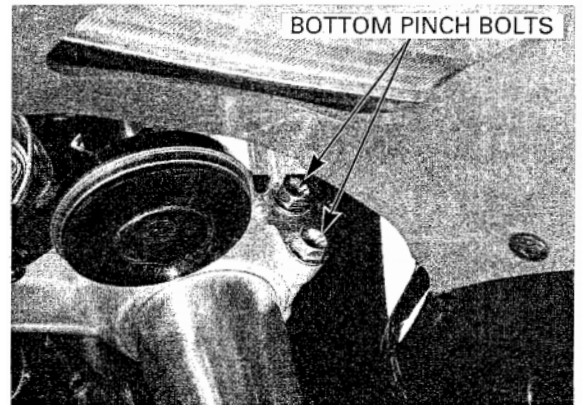
When the fork leg will be disassembled, loosen the fork bolt, but do not remove it yet.





## FRONT WHEEL/SUSPENSION/STEERING

Loosen the fork bottom pinch bolts and remove the fork slider from the fork top bridge and steering stem.

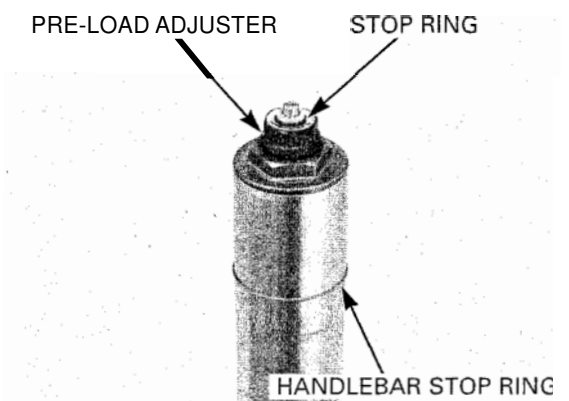


*Be careful not to scratch the fork pipe or damage the dust seal*

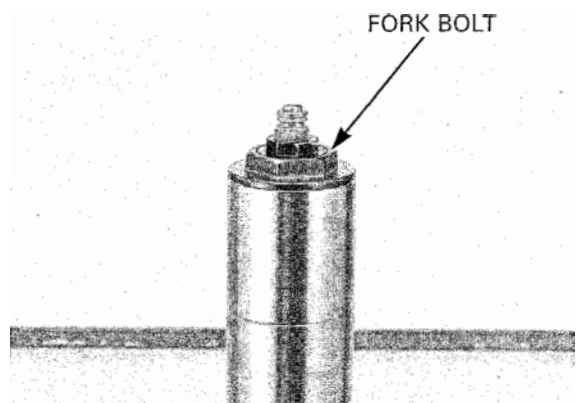
### DISASSEMBLY

Remove the handlebar stop ring.

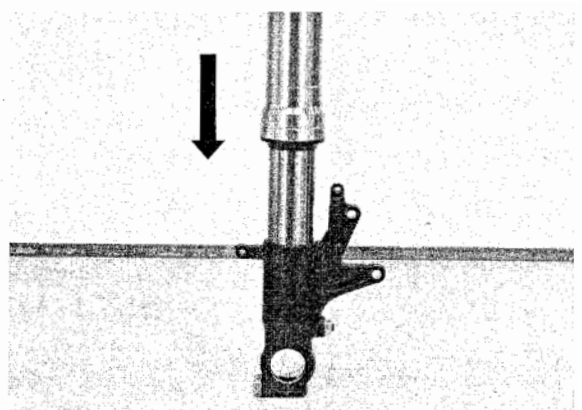
Remove the stopper ring and pre-load adjuster.



Remove the fork bolt from the fork slider.



Push the fork slider slowly down, and gently seat the dust seal onto the axle holder.

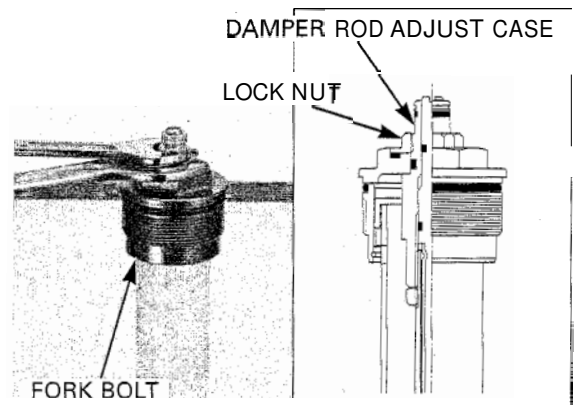




## FRONT WHEEL/SUSPENSION/STEERING

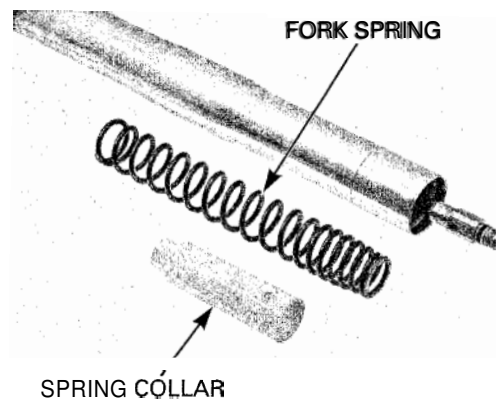
Hold the damper rod adjust case, then loosen the lock nut.

Remove the lock nut and fork bolt from the damper rod.



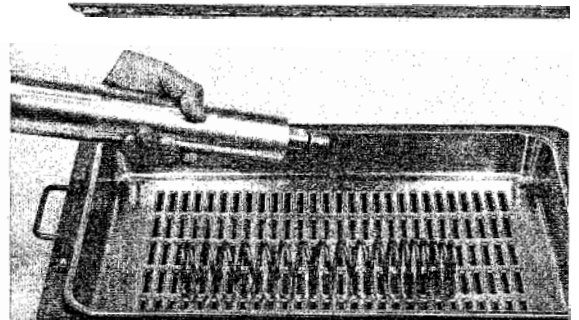
Remove the following:

- Spring collar
- Fork spring



Pour out the fork fluid by pumping the fork pipe several times.

Pour out the fork fluid from the fork damper by pumping the damper rod several times.



Hold the axle holder in a vice with soft jaws or a shop towel.

Hold the fork damper with the fork damper holder, then remove the fork socket bolt and sealing washer.

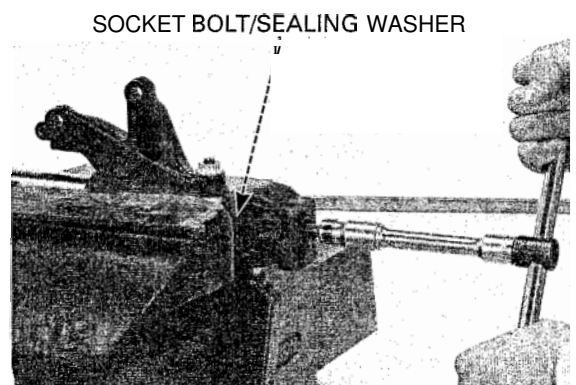
### TOOLS:

Fork damper holder

07YMB-MCF0101

Fork damper holder handle

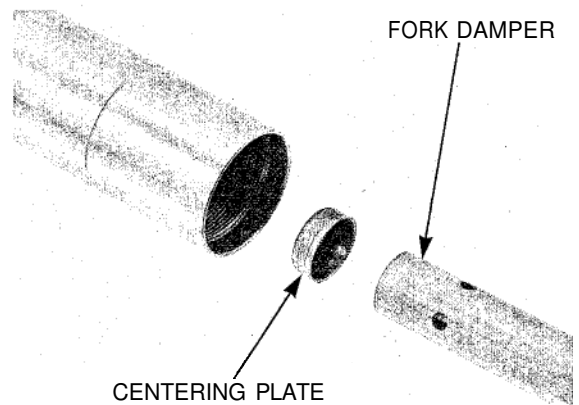
07TMB-001010A



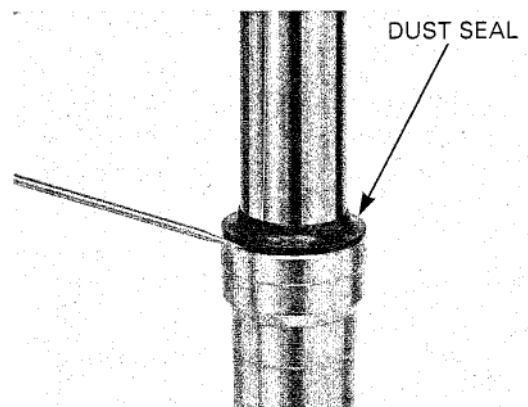
## FRONT WHEEL/SUSPENSION/STEERING

---

Remove the fork damper assembly and centering plate from the fork pipe.

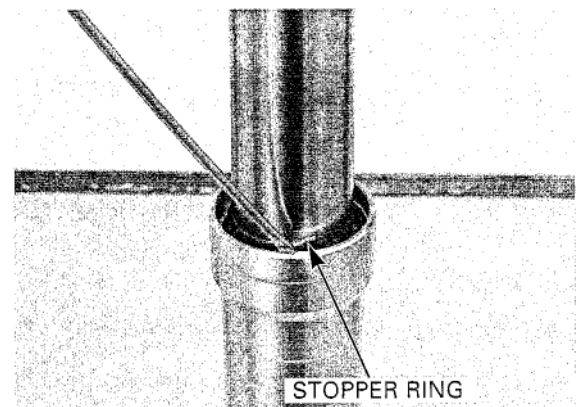


Remove the dust seal.

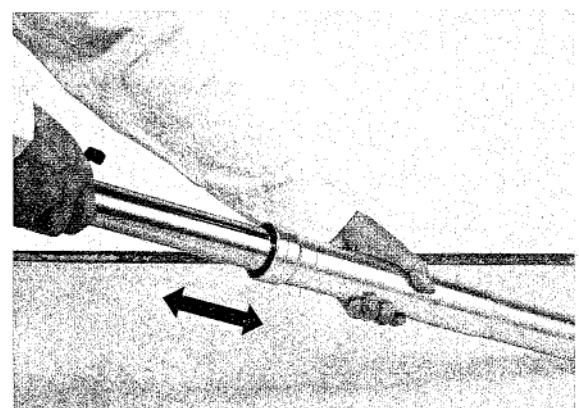


*Do not scratch  
the fork pipe slid-  
ing surface*

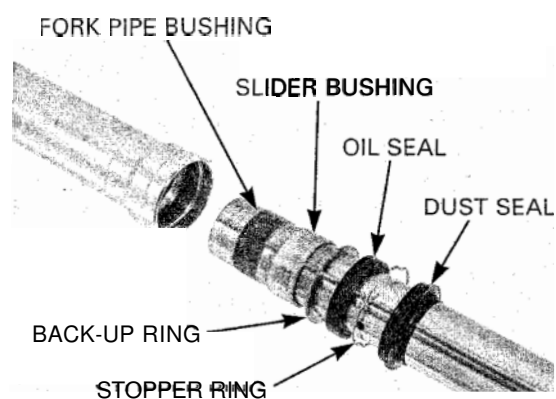
Remove the oil seal stopper ring.



Pull the fork slider out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork pipe separates from the fork slider.  
The slider bushing will be forced out by the fork pipe bushing.



Remove the fork pipe bushing, slider bushing, back-up ring, oil seal, stopper ring and dust seal from the fork pipe.

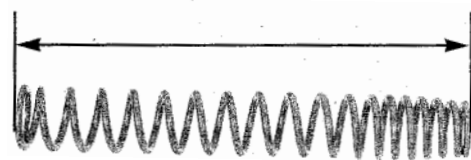


### INSPECTION

#### Fork spring

Measure the fork spring free length.

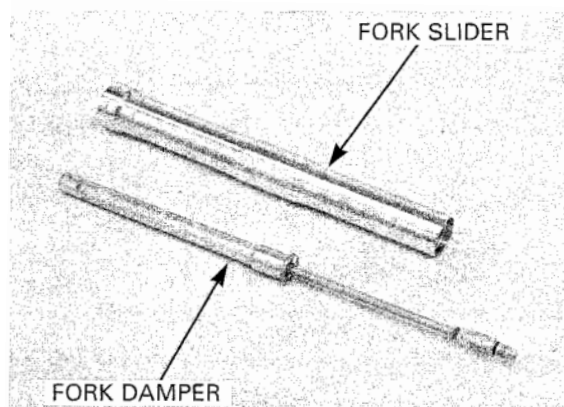
**SERVICE LIMIT: 250.8 mm (9.87in)**



#### Fork pipe/slider/damper

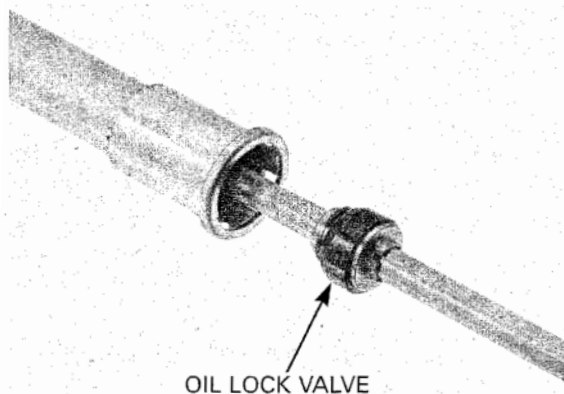
Check the fork pipe and fork slider for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

Check the fork damper for damage.



Check the oil lock valve for wear or damage.

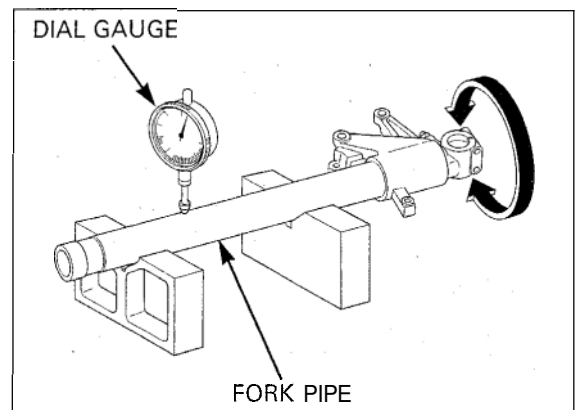
Replace the fork damper assembly, if any components are damaged.



## FRONT WHEEL/SUSPENSION/STEERING

Place the fork pipe in V-blocks and measure the runout.  
Actual runout is 1/2 the total indicator reading.

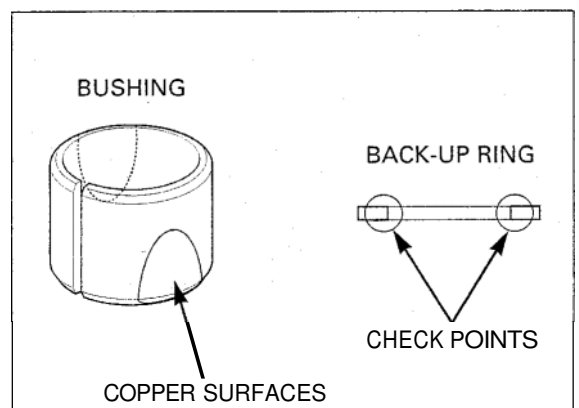
**SERVICE LIMIT: 0.20 mm (0.008 in)**



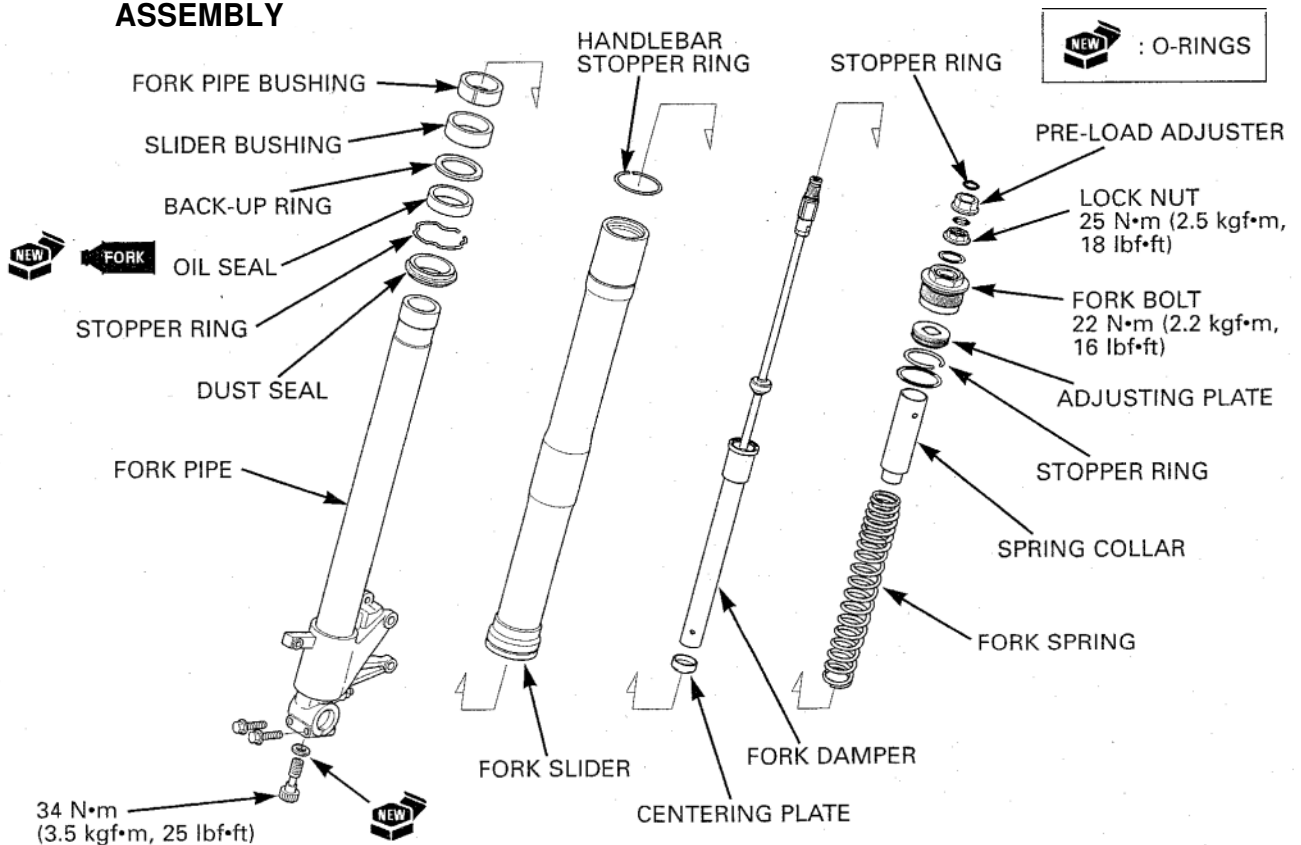
### Fork pipe bushing

Visually inspect the slider and fork pipe 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 than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



## ASSEMBLY



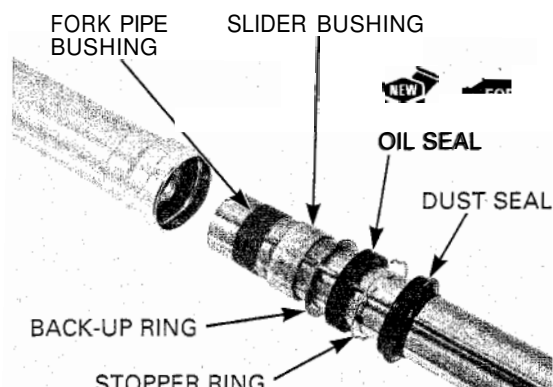
## FRONT WHEEL/SUSPENSION/STEERING

Before assembly, wash all parts with a high flash-point or non-flammable solvent and wipe them dry.

*Install the oil seal with its marked side facing up.*

Install the dust seal, stopper ring, new oil seal, back-up ring, and slider bushing. Install a new fork pipe bushing.

Apply fork fluid to the oil seal lips. Install the fork pipe into the fork slider.

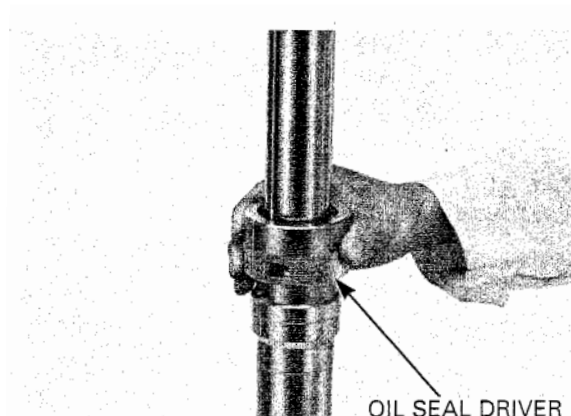


Drive the oil seal in using the special tools.

### TOOL:

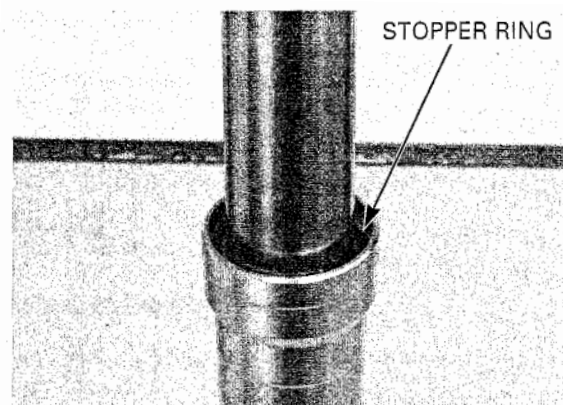
Oil seal driver

07YMD-MCF0100 or  
07NMD-KZ3010A  
(U.S.A. only)

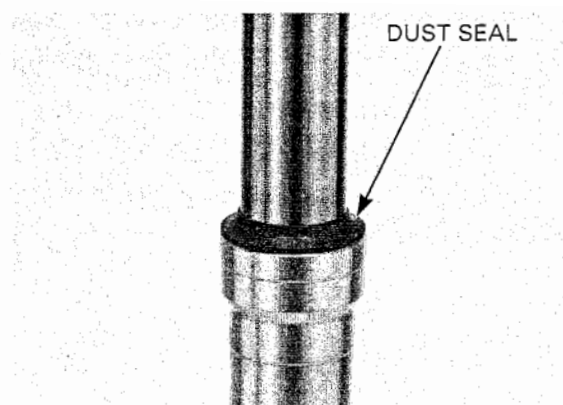


*Do not scratch the fork pipe sliding surface.*

Install the stopper ring into the fork slider groove securely.

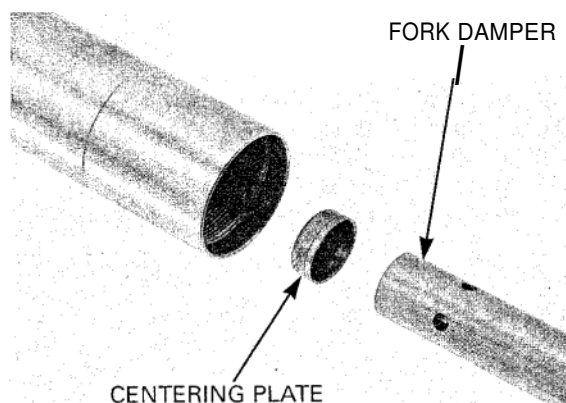


Install the dust seal.

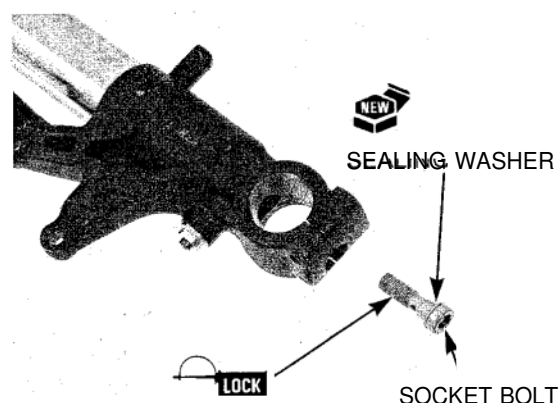


## FRONT WHEEL/SUSPENSION/STEERING

Install the centering plate onto the end of the fork damper.  
Install the fork damper assembly into the fork pipe.



Apply a locking agent to the fork socket bolt threads.  
Install the socket bolt with a new sealing washer.



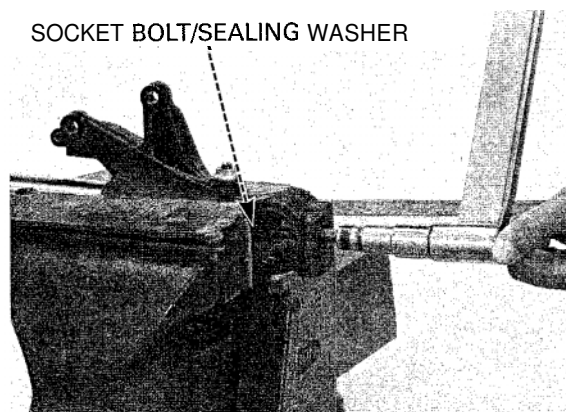
Hold the axle holder in a vise with soft jaws or a shop towel.  
Hold the fork damper with the fork damper holder, then tighten the fork socket bolt to the specified torque.

### TOOLS:

Fork damper holder 07YMB-MCF0101  
Fork damper holder handle 07TMB-001010A

**TORQUE:** 34 N·m (3.5 kgf·m, 25 lbf·ft)

SOCKET BOLT/SEALING WASHER



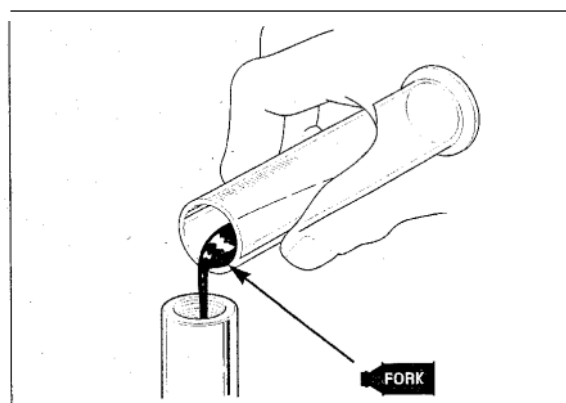
Pour the specified amount of the recommended fork fluid into the fork pipe.

### RECOMMENDED FORK FLUID:

Pro Honda Suspension Fluid SS-8

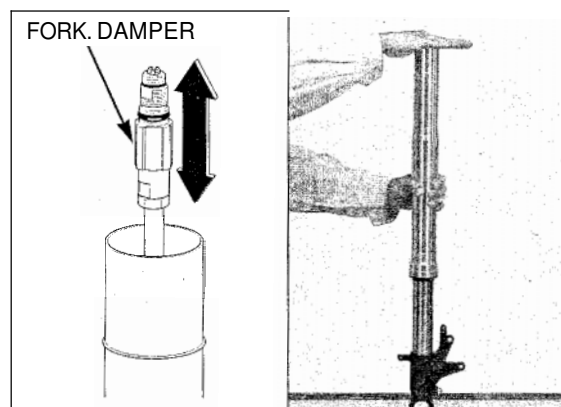
### FORK FLUID CAPACITY:

513 ± 2.5 cm<sup>3</sup> (17.3 ± 0.08 US oz, 18.1 ± 0.09 Imp oz)



Bleed the air as follows:

1. Extend the fork.
2. Cover the top of the fork slider with your hand and compress the fork slowly.
3. Pump the fork pipe and fork damper slowly 8 - 10 times.

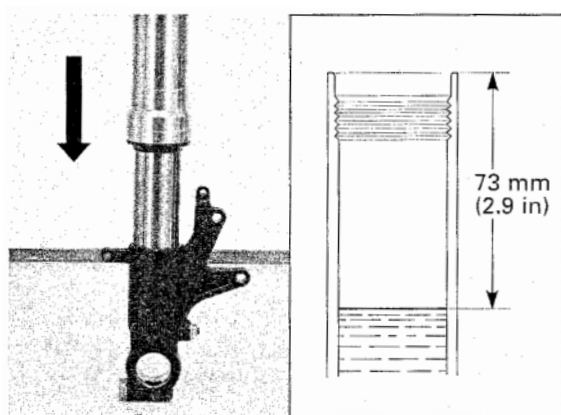


Slowly push down the fork slider, and gently seat the dust seal onto the axle holder and leave it for 5 minutes.

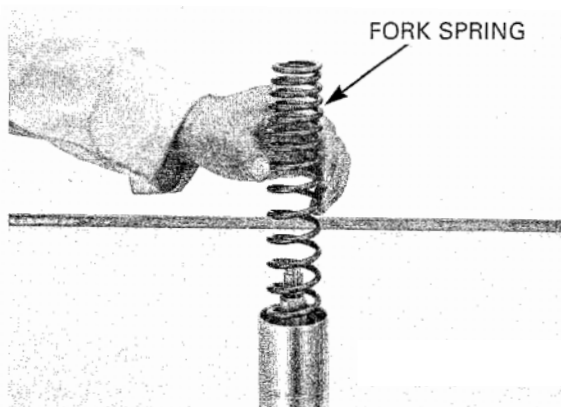
*Be sure the oil level is the same in both forks*

After the oil level stabilizes, measure the oil level from the top of the fork slider.

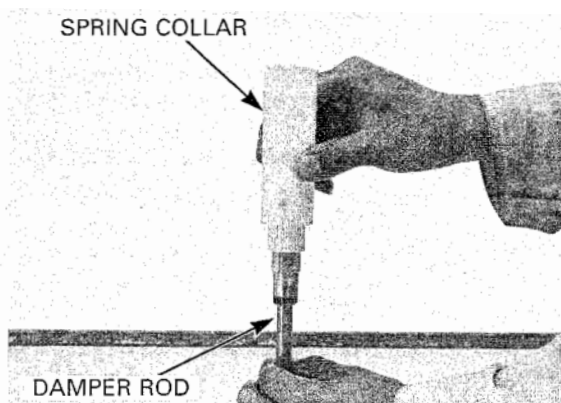
**FORK OIL LEVEL: 73 mm (2.9in)**



Install the fork spring into the fork slider with the tapered end facing up.

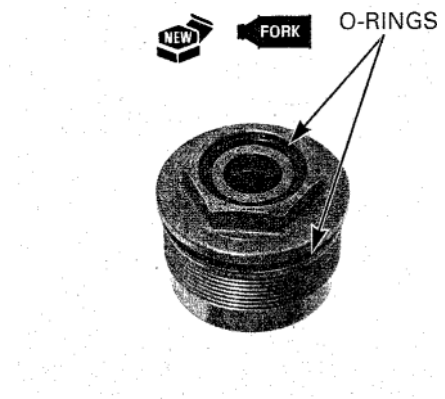


Pull the damper rod up and install the spring collar.

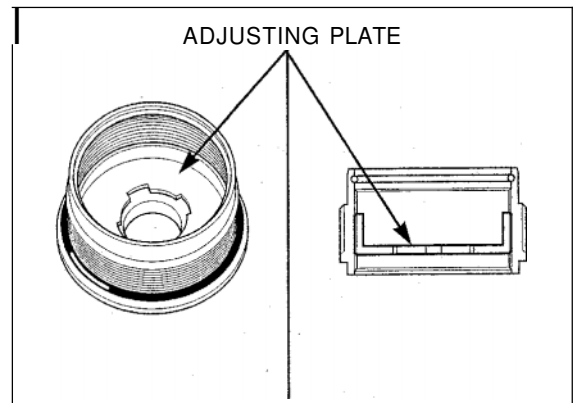


## FRONT WHEEL/SUSPENSION/STEERING

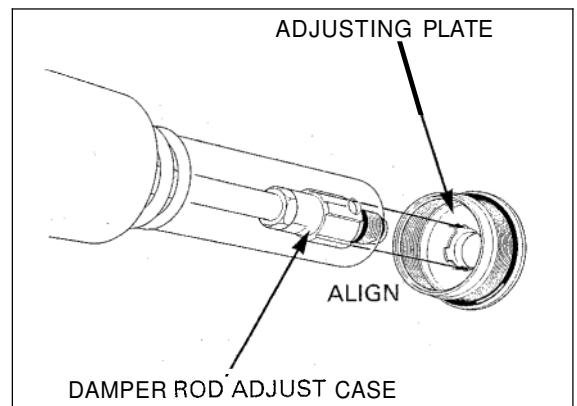
Apply fork fluid to the new O-rings and install them onto the fork bolt.



Turn the adjusting plate clockwise until it seats lightly.



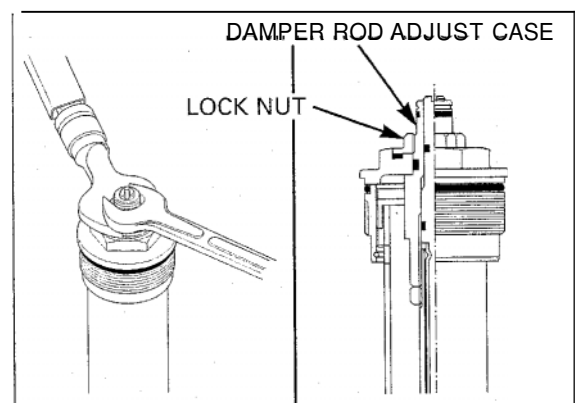
Push down the spring collar, then install the fork bolt to the damper rod adjust case while aligning the groove of the adjusting plate with the damper rod adjust case.



Install the lock nut to the damper rod adjust case.

Hold the damper rod adjuster case, and then tighten the lock nut to the specified torque.

**TORQUE: 25 N·m (2.4kgf·m, 19 lbf·ft)**

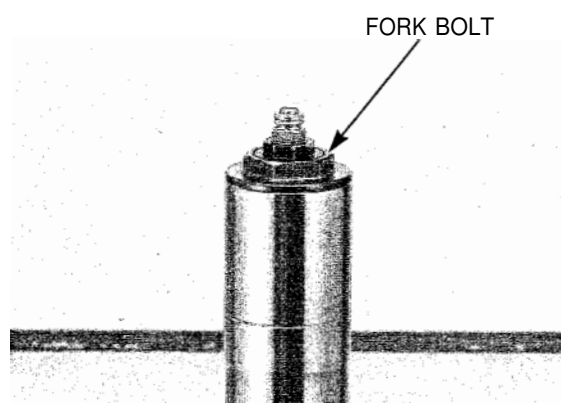




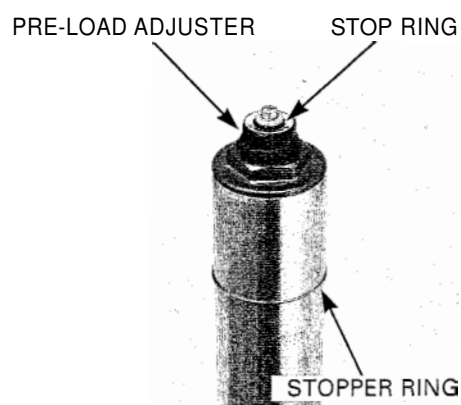
## FRONT WHEEL/SUSPENSION/STEERING

*Tighten the fork bolt after installing the fork slider into the fork bridges*

Install the fork bolt to the fork slider.

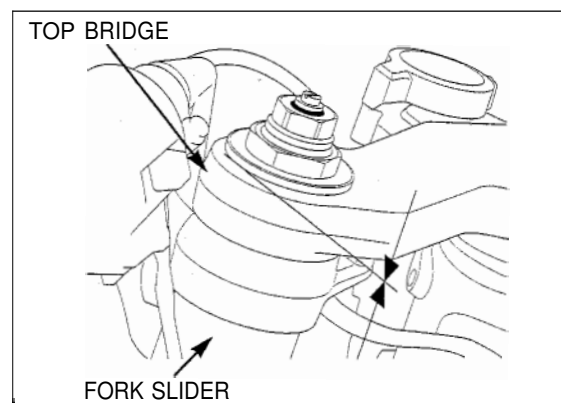


Install the handlebar stopper ring.  
Install the pre-load adjuster and stop ring.



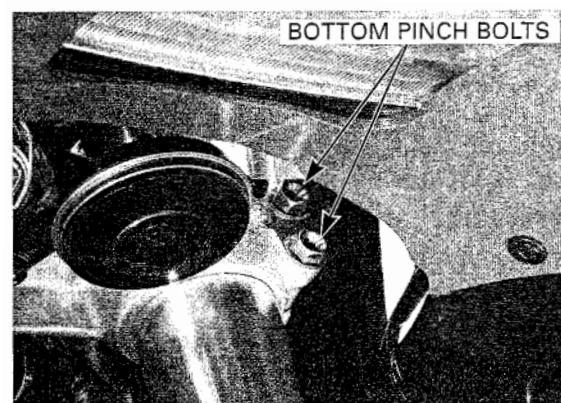
### INSTALLATION

Install the fork leg through the bottom bridge, handlebar and top bridge (page 13-6).  
Position the top end of the fork pipe flush with the upper surface of the top bridge as shown.



Tighten the bottom bridge pinch bolts to the specified torque.

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



## FRONT WHEEL SUSPENSION STEERING

If the fork bolt was loosened, tighten it to the specified torque.

**TORQUE: 22 N·m (2.1 kgf·m, 16 lbf·ft)**

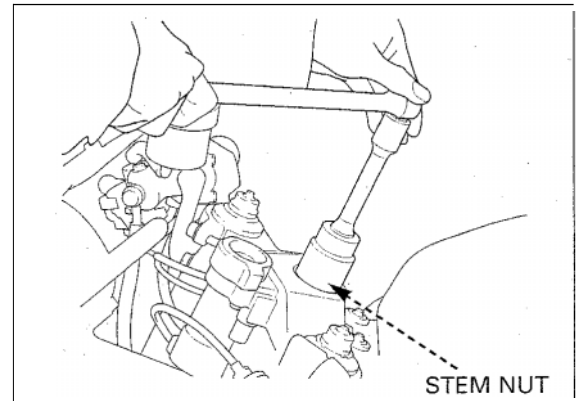
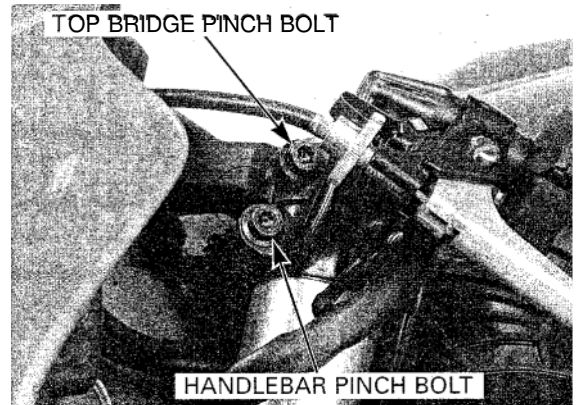
Tighten the handlebar pinch bolt to the specified torque.

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

Tighten the top bridge pinch bolt to the specified torque.

**TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)**

Install the front wheel (page 13-14).  
Adjust the pre-load and rebound/damping adjuster (page 3-28, 29).



## STEERING STEM

### REMOVAL

Remove the following:

- Front wheel (page 13-9)
- Upper cowl (page 2-5)

Remove the steering stem nut.

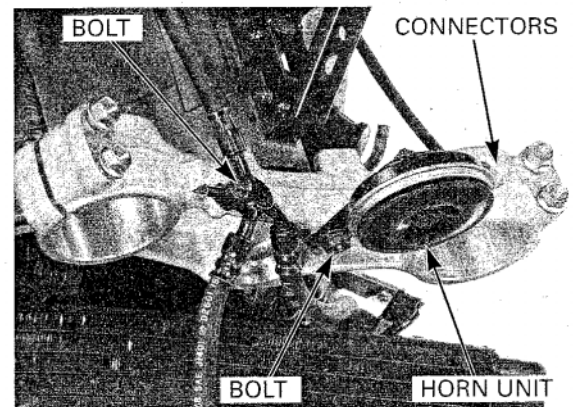
Remove the following:

- Handlebars (page 13-4)
- Fork legs (page 13-15)

Disconnect the horn connectors.

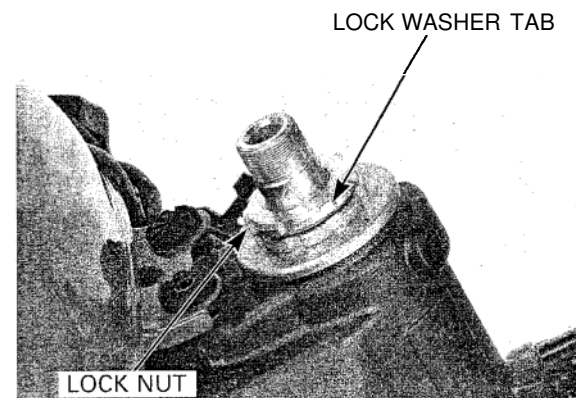
Remove the bolt and horn unit.

Remove the bolt and brake hose joint.



Straighten the tabs of the lock washer.

Remove the lock nut and lock washer.



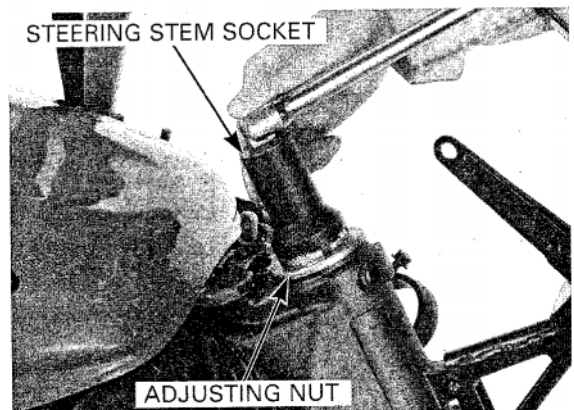
## FRONT WHEEL/SUSPENSION/STEERING

Remove the steering stem adjusting nut using the special tool.

**TOOL:**

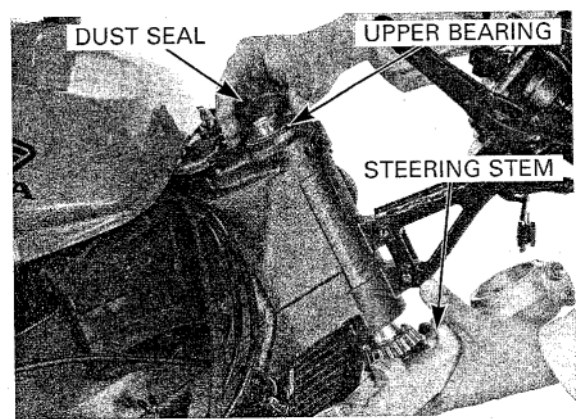
**Steering stem socket**

07916-3710101 or  
07916-3710100  
(U.S.A. only)



Remove the following:

- Dust seal
- Upper bearing
- Steering stem



*Always replace  
the bearings and  
races as a set*

### OUTER RACE REPLACEMENT

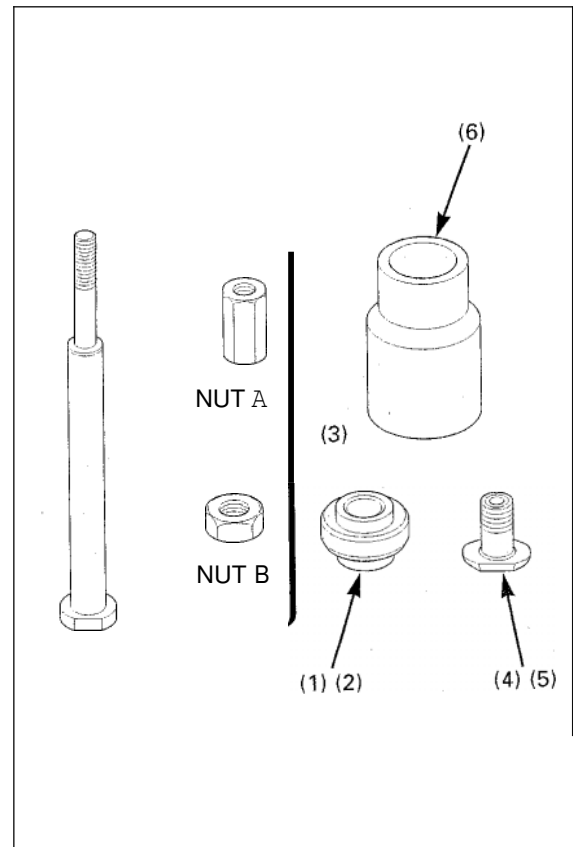
Replace the races using the special tools as described in the following procedure.

*For U.S.A. only  
outer race  
replacement, refer  
to page 13-30*

**TOOLS:**

**Driver attachment, A (1)**  
**Driver attachment, B (2)**  
**Driver shaft assembly (3)**  
**Bearing remover, A (4)**  
**Bearing remover, B (5)**  
**Assembly base (6)**

07946-KM90100  
07NMF-MT70120  
07946-KM90300  
07946-KM90401  
07NMF-MT70110  
07946-KM90600



## FRONT WHEEL/SUSPENSION/STEERING

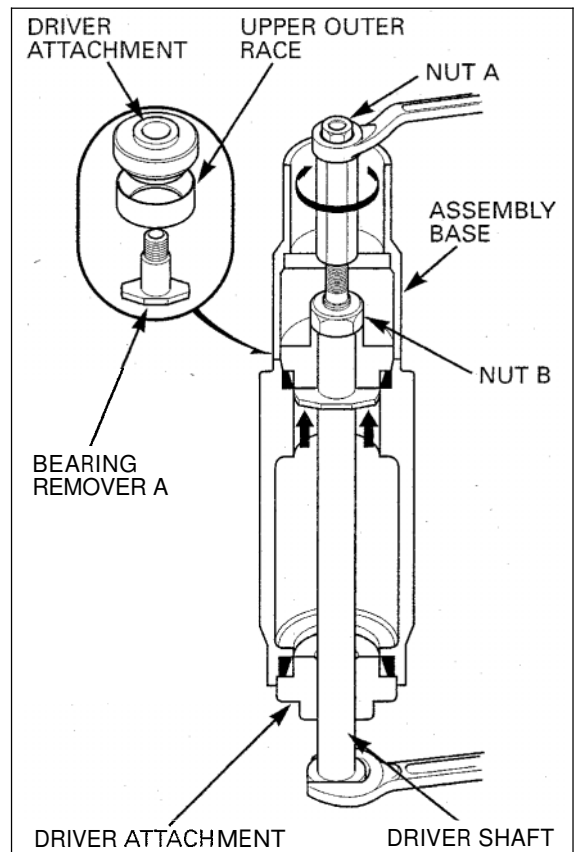
Install the ball race remover into the head pipe as shown.

Align bearing remover A with the groove in the steering head.

Lightly tighten nut B with a wrench.

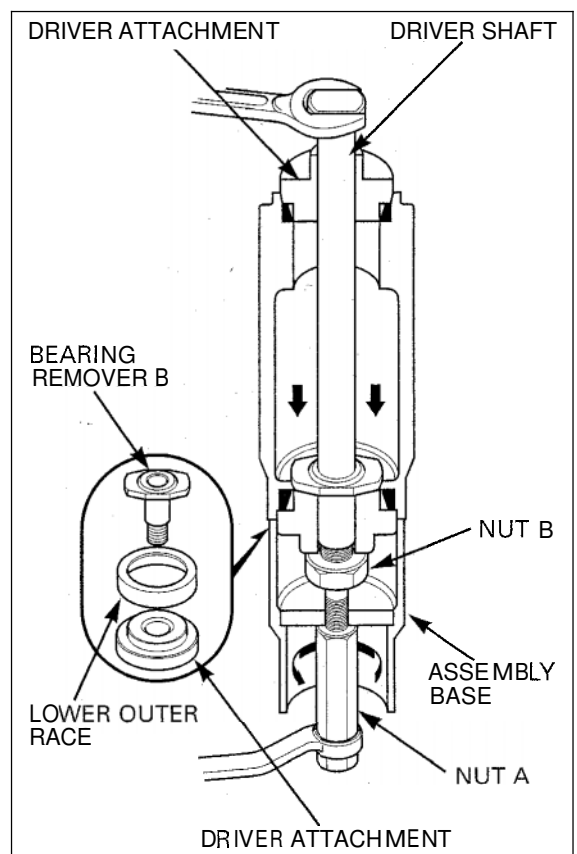
Holding the driver shaft with a wrench, turn nut A gradually to remove the upper outer race.

*Note the installation direction of the assembly base.*



Install ball race remover B as shown and remove the lower outer race using the same procedure as for the upper outer race.

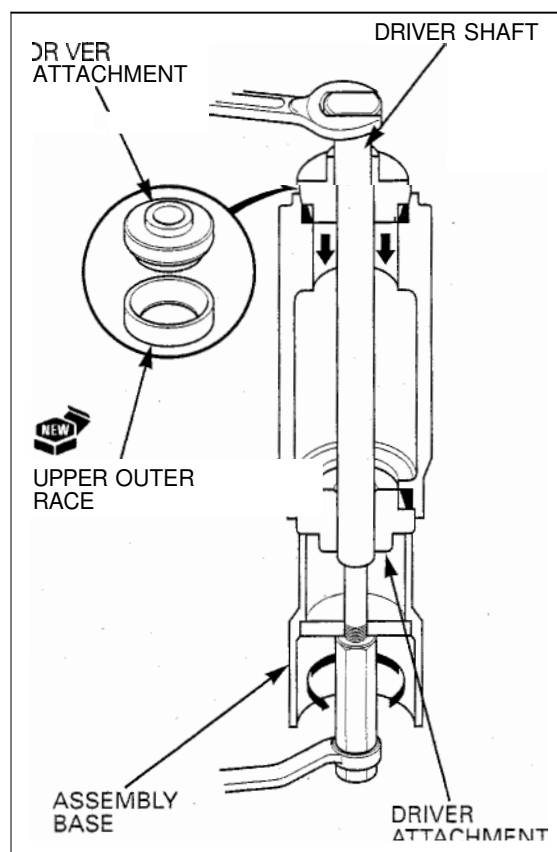
Align the bearing remover with the groove in the steering head.



## FRONT WHEEL/SUSPENSION/STEERING

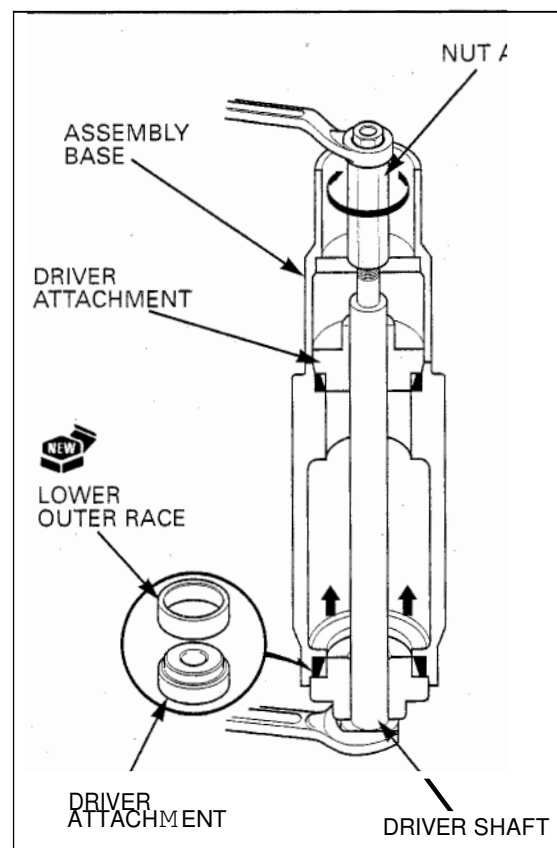
Install a new upper outer race and the ball race remover as shown.

Hold the driver shaft with a wrench and turn nut A gradually until the groove in driver attachment A aligns with the upper end of the steering head. This will allow you to install the upper outer race.



Install a new lower outer race and ball race remover as shown.

Holding the driver shaft with a wrench, turn nut A gradually until the groove in driver attachment B aligns with the upper end of the steering head. This will allow you to install the lower outer race.



## FRONT WHEEL/SUSPENSION/STEERING

### U.S.A. only:

Replace the steering head bearing outer races using the special tools listed below.

### TOOLS:

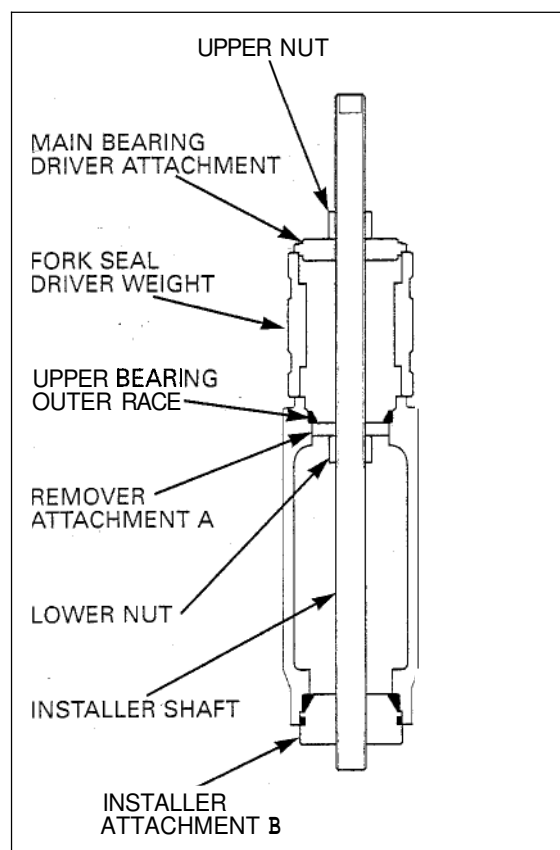
#### Main bearing driver attachment

	07946-ME90200
Fork seal driver body	07947-KA50100
Oil seal driver	07965-MA60000
Installer shaft	07VMF-KZ30200
Installer attachment A	07VMF-MAT0100
Installer attachment B	07VMF-MAT0200
Remover attachment A	07VMF-MAT0300
Remover attachment B	07VMF-MAT0400

Install the special tools into the steering head pipe as shown.

Align remover attachment A with the groove in the steering head.

While holding the installer shaft with the wrench, turn the upper nut gradually to remove the upper bearing outer race.

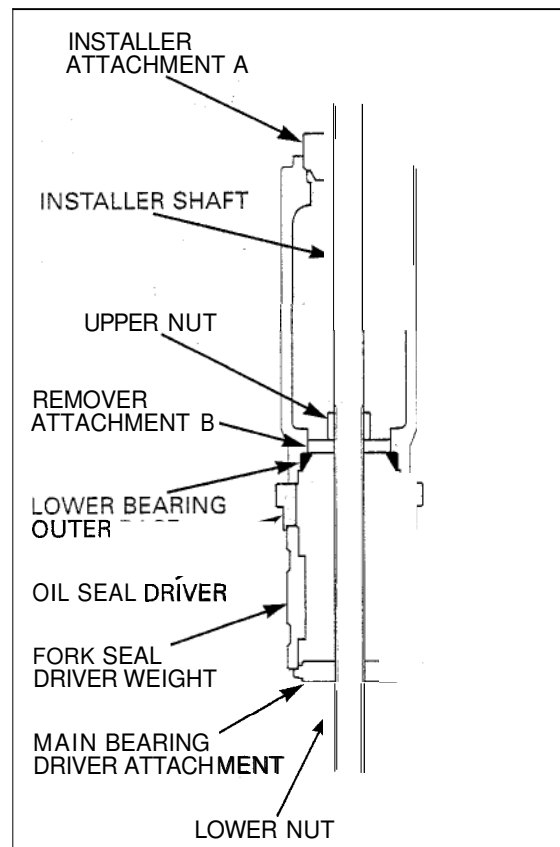


*Be careful not to drop the attachments into the frame*

Install the special tools into the steering head pipe as shown.

Align remover attachment B with the groove in the steering head.

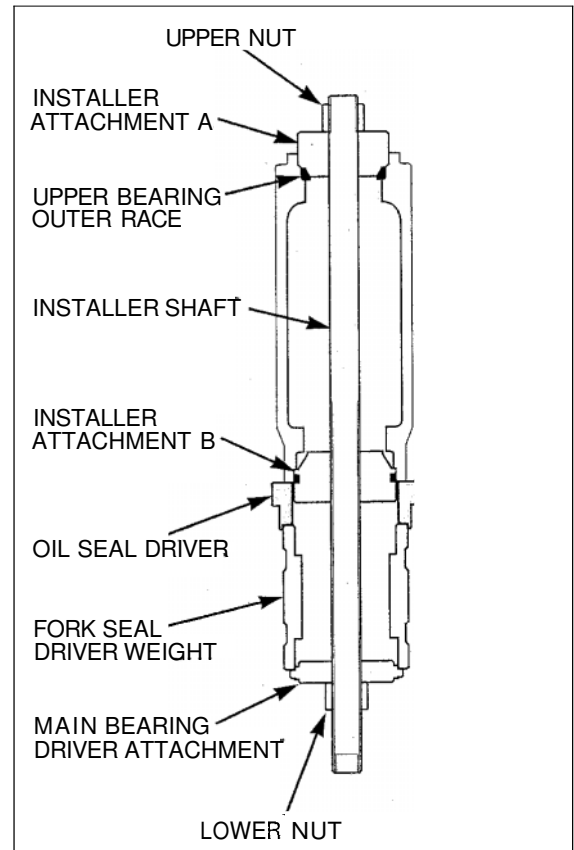
While holding the installer shaft with the wrench, turn the lower nut gradually to remove the lower bearing outer race.



## FRONT WHEEL/SUSPENSION/STEERING

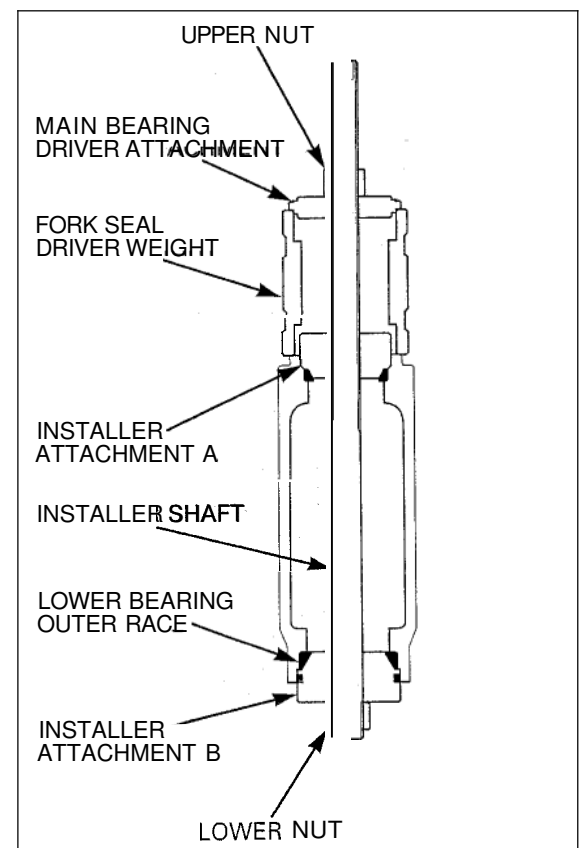
Install a new upper bearing outer race and the special tools as shown.

While holding the installer shaft with the wrench, turn the lower nut gradually until the groove in installer attachment A aligns with the upper end of the steering head. This will allow you to install the upper bearing outer race.



Install a new lower bearing outer race and the special tools as shown.

While holding the installer shaft with the wrench, turn the upper nut gradually until the groove in installer attachment B aligns with the lower end of the steering head. This will allow you to install the lower bearing outer race.

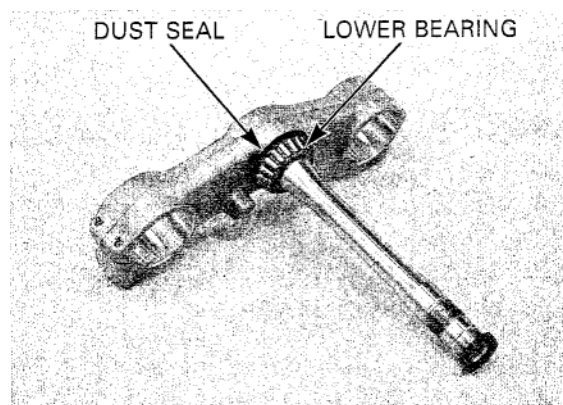


## FRONT WHEEL/SUSPENSION/STEERING

### LOWER BEARING REPLACEMENT

Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing from the stem.

Remove the lower bearing with a chisel or equivalent tool, being careful not to damage the stem.  
Remove the dust seal.

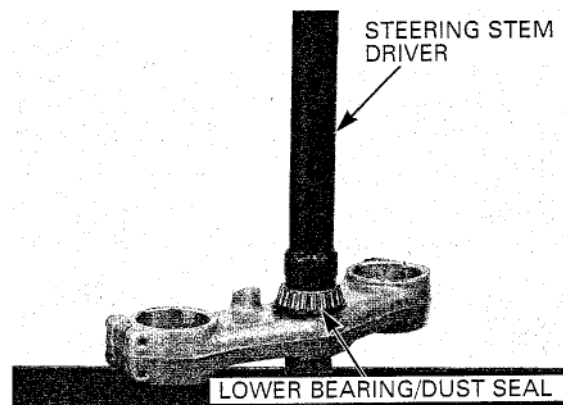


Apply grease to new dust seal lips and install it over the steering stem.  
Install a new lower bearing using a special tool and a hydraulic press.

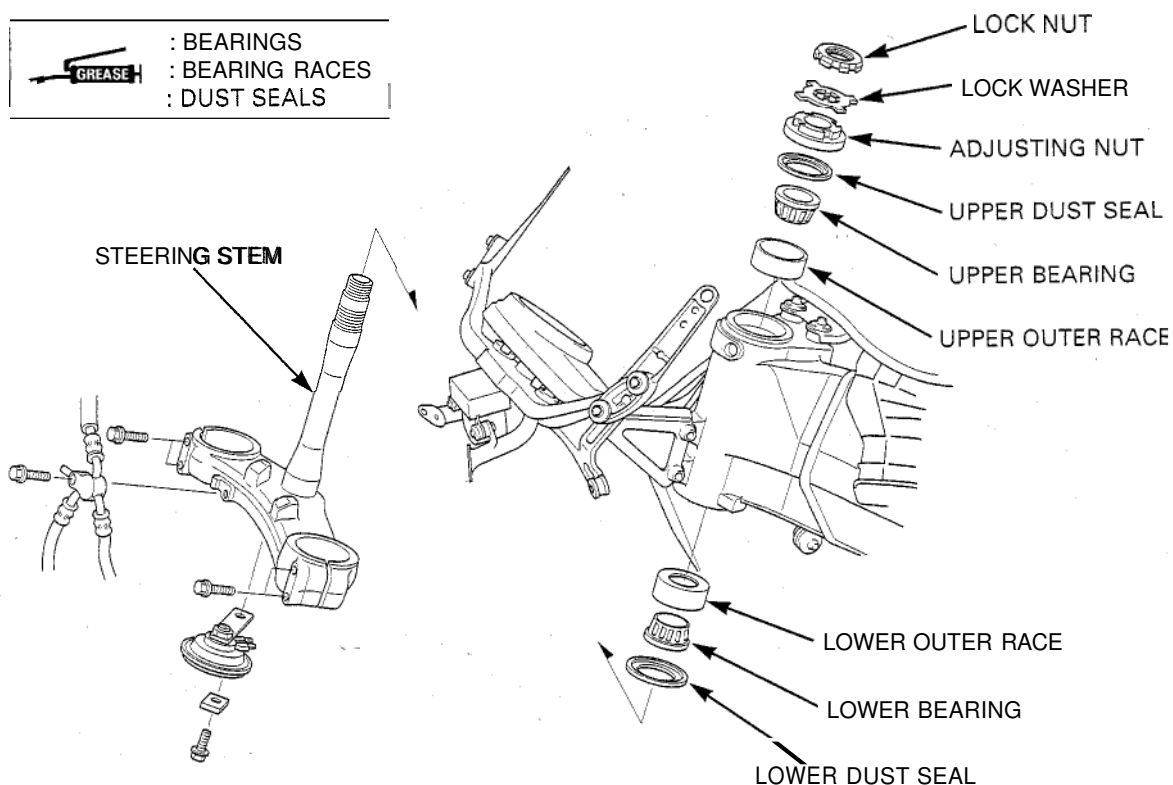
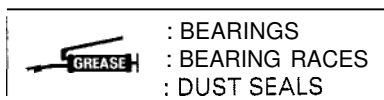
#### TOOL:

Steering stem driver

07946-MB00000



### INSTALLATION



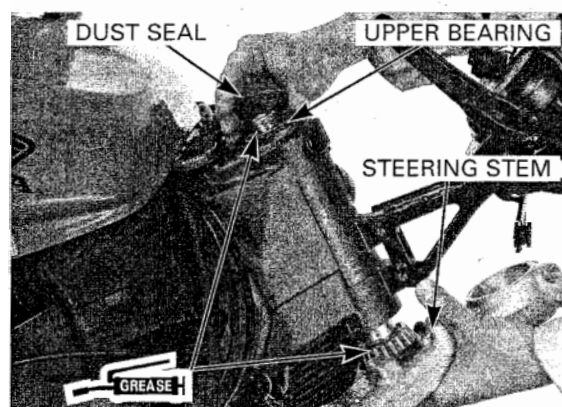


## FRONT WHEEL/SUSPENSION/STEERING

Apply grease to the upper and lower bearings and bearing races.

Insert the steering stem into the steering head pipe.

Install upper bearing and dust seal.



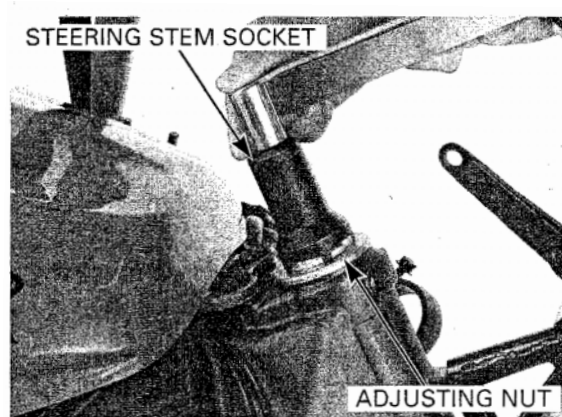
Apply oil to the bearing adjustment nut threads. Install and tighten the stem adjusting nut to the initial torque.

**TOOL:**

**Steering stem socket**

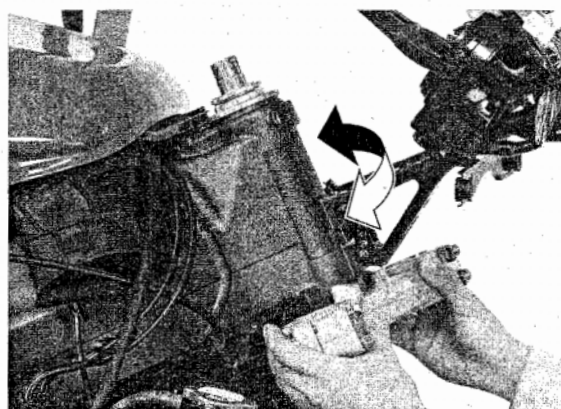
07916-3710101 or  
07916-3710100  
(U.S.A. only)

**TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft)**



Move the steering stem right and left, lock-to-lock, five times to seat the bearings.

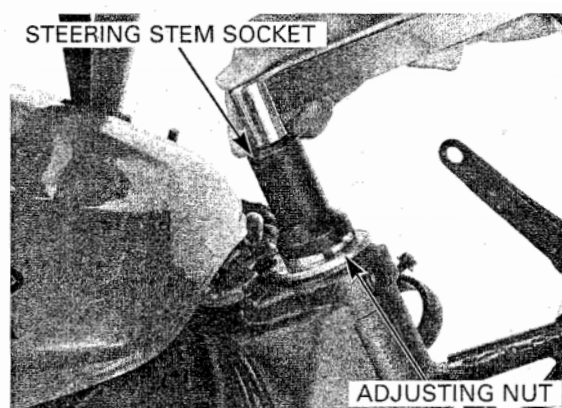
Make sure the steering stem moves smoothly, without play or binding; then loosen the steering stem adjusting nut.



Retighten the steering stem adjusting nut to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

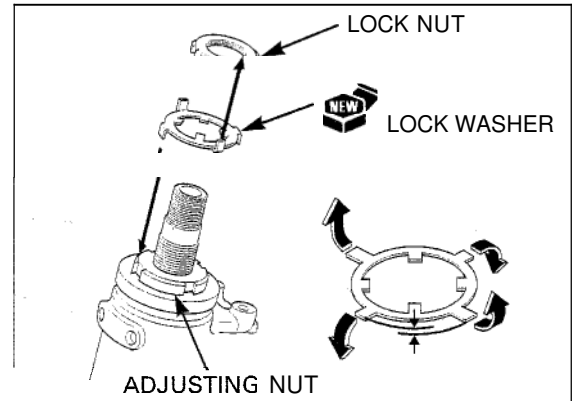
Recheck that the steering stem moves smoothly without play or binding.



## FRONT WHEEL/SUSPENSION/STEERING

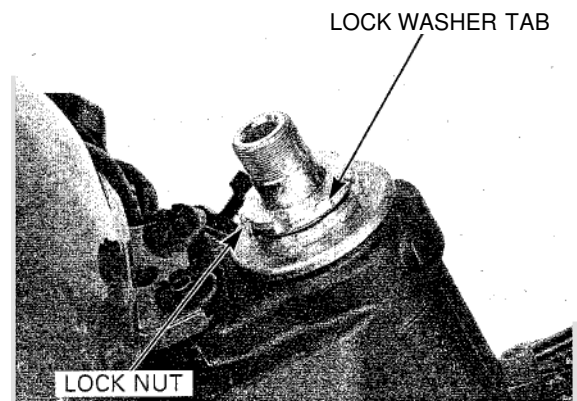
Install the new lock washer onto the steering stem.  
Install and tighten the steering stem lock nut.

Align the tabs of the lock washer with the grooves in the lock nut and bend two opposite tabs (shorter) down into the adjusting nut groove.



Install and finger tighten the lock nut.  
Hold the lock nut and further tighten the lock nut with-  
in 1/4 turn (90°) enough to align its grooves with the  
lock washer tabs.

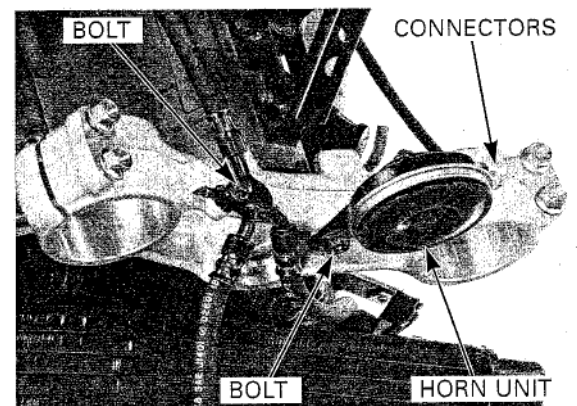
Bend the lock washer tabs up into the lock nut groove.



Install the horn unit assembly and tighten the mount-  
ing bolt.  
Connect the horn unit connectors.  
Install the brake hose joint and tighten the mounting  
bolt.

Install the following:

- Fork legs (page 13-25)
- Handlebar (page 13-6)

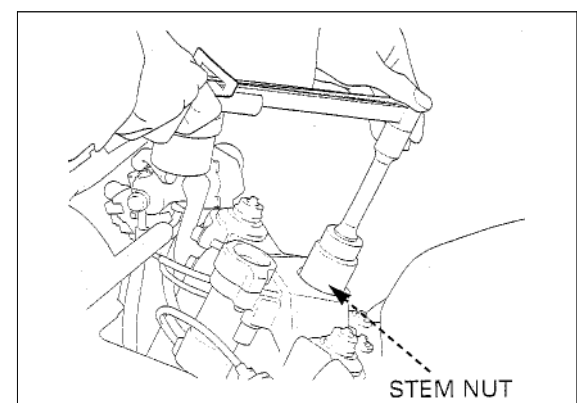


Install the top bridge and steering stem nut.  
Tighten the steering stem nut to the specified torque.

**TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)**

Install the following:

- Front wheel (page 13-14)
- Upper cowl (page 2-6)



### STEERING HEAD BEARING PRE-LOAD

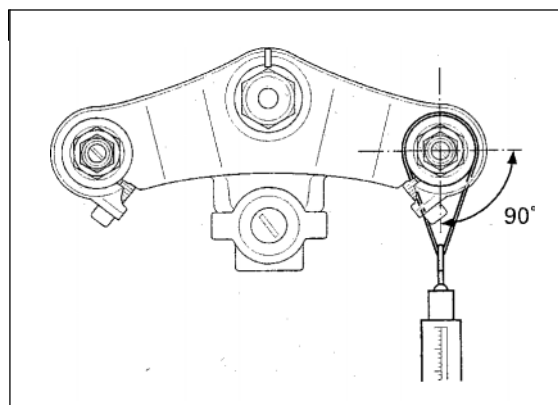
Jack-up the motorcycle to raise the front wheel off the ground.

Position the steering stem straight ahead.

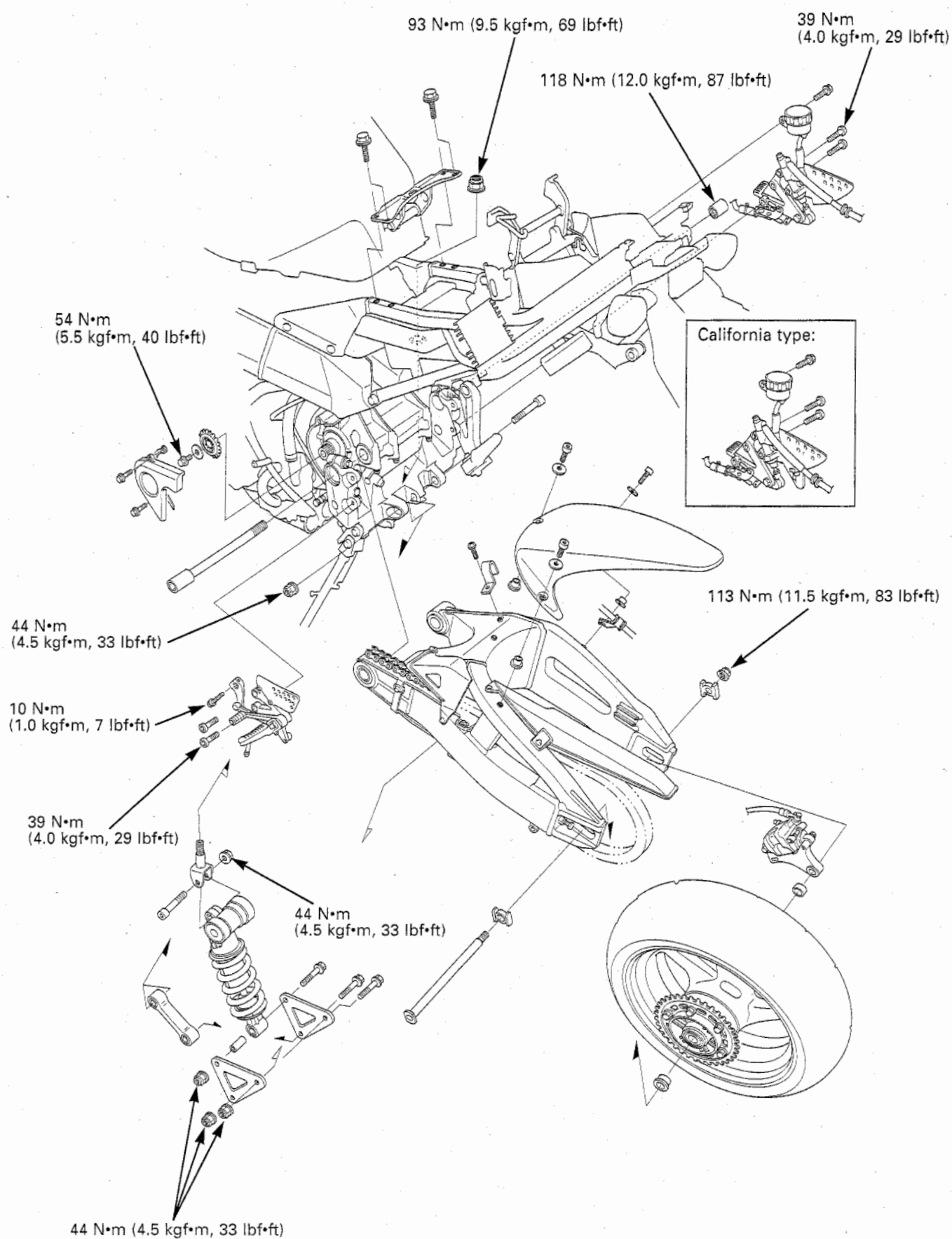
Hook a spring scale to the fork pipe and measure the steering head bearing pre-load.

*Make sure there is no cable or wire harness interference*

The pre-load should be within 11 – 16 N (1.1 – 1.6 kgf). If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.



## REAR WHEEL/SUSPENSION



# 14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SUSPENSION LINKAGE	14-9
TROUBLESHOOTING	14-2	SHOCK ABSORBER	14-11
REAR WHEEL	14-3	SWINGARM	14-14

## SERVICE INFORMATION

### GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After rear wheel installation, check the brake operation by applying the brake pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen (page 74-13).
- When servicing the rear wheel, support the motorcycle using a safety stand or hoist.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rims marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.

### 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	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)		—
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 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.
Drive chain	Size/link	DID	DID 50VA8 C1/108	—
		RK	RK GB50HFOZ5/108	—
	Slack	40 – 50 (1.6 – 2.0)		50 (2.0)
Shock absorber	Spring adjuster standard position	4th groove		—
	Tension adjuster initial setting	2 turns from full hard		—
	Compression adjuster initial setting	2 turns from full hard		—

## REAR WHEEL/SUSPENSION

---

### TORQUE VALUES

Rear axle nut	113 N•m (11.5 kgf-m, 83 lbf•ft)	U-nut
Rear brake disc mounting bolt	42 N•m (4.3 kgf-m, 31 lbf•ft)	ALOC bolt
Driven sprocket nut	64 N•m (6.5 kgf•m, 47 lbf•ft)	U-nut
Shock absorber upper bracket mounting nut	93 N•m (9.5 kgf•m, 69 lbf•ft)	U-nut
Shock absorber upper mounting nut	44 N•m (4.5 kgf-m, 33 lbf•ft)	U-nut
Shock arm plate nut	44 N•m (4.5 kgf-m, 33 lbf•ft)	U-nut
Shock link nut (frame side)	44 N•m (4.5 kgf-m, 33 lbf•ft)	U-nut
Swingarm pivot nut	118 N•m (12.0 kgf-m, 87 lbf•ft)	U-nut
Swingarm pivot pinch bolt	26 N•m (2.7 kgf-m, 20 lbf•ft)	
Drive chain slider bolt	9 N•m (0.9 kgf•m, 6.5 lbf•ft)	Apply a locking agent to the threads.
Main footpeg bracket socket bolt	39 N•m (4.0 kgf-m, 29 lbf•ft)	
Drive sprocket special bolt	54 N•m (5.5 kgf•m, 40 lbf•ft)	
Brake hose guide screw	4 N•m (0.4 kgf-m, 2.9 lbf•ft)	

### TOOLS

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Attachment, 52 x 55 mm	07746-0010400
Attachment, 22 x 24 mm	07746-0010800
Attachment, 40 x 42 mm	07746-0010900
Pilot, 17 mm	07746-0040400
Pilot, 25 mm	07746-0040600
Bearing remover shaft	07746-0050100
Bearing remover head, 25 mm	07746-0050800
Rod holder, 24 x 27 mm	07930-KA50100
Driver shaft	07946-MJ00100
Driver	07949-3710001
Needle bearing remover	07LMC-KV30100
Pilot, 32 x 50 mm	07MAD-PR90200
Driver attachment, 25 x 38.5 mm	07YMD-MCJO100

## TROUBLESHOOTING

### Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Tire pressure too low

### Hard suspension

- Damaged shock absorber mounting bearing
- Bent damper rod
- Damaged suspension linkage bearings
- Damaged swingarm pivot bearings
- Bent swingarm pivot
- Incorrect suspension adjustment
- Tire pressure too high

### Steers to one side or does not track straight

- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

### Rear wheel wobbling

- Bent rim
- Worn rear wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Tire pressure too low
- Faulty swingarm pivot bearings

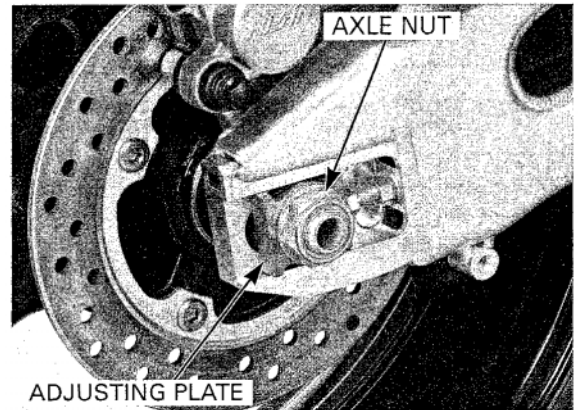
## REAR WHEEL

### REMOVAL

Support the motorcycle using a safety stand or hoist, raise the rear wheel off the ground.

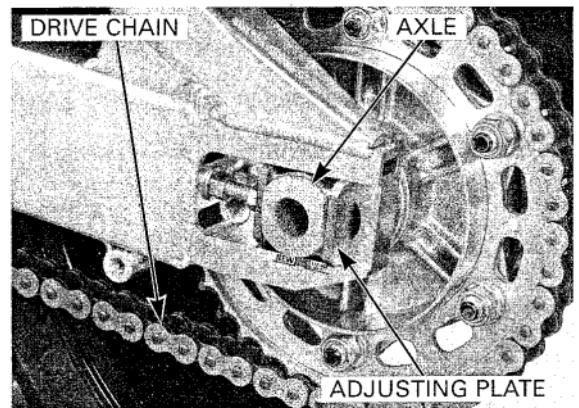
Adjust the drive chain slack fully (page 3-20).

Remove the axle nut and drive chain adjusting plate.

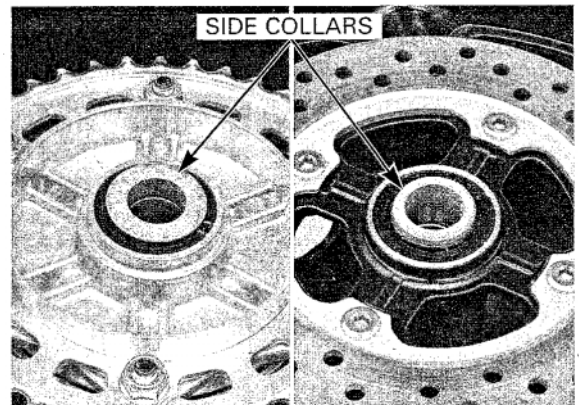


Push the rear wheel forward.  
Remove the drive chain from the driven sprocket.

Remove the axle and drive chain adjusting plate from the left side and remove the rear wheel.



Remove the side collars.

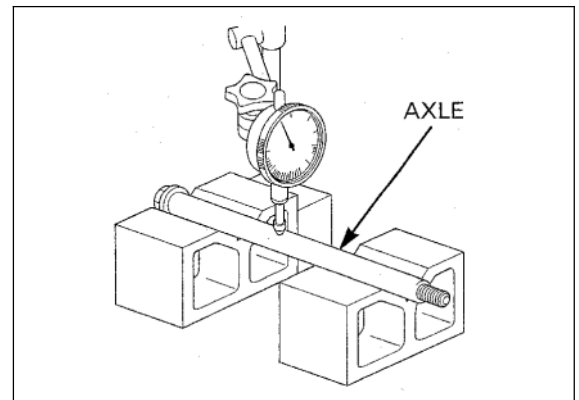


### INSPECTION

#### 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)**



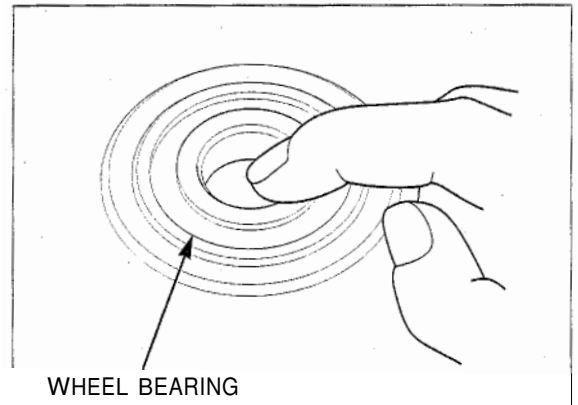
## REAR WHEEL/SUSPENSION

### Wheel bearing

Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

*Replace the wheel bearings in pairs*

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



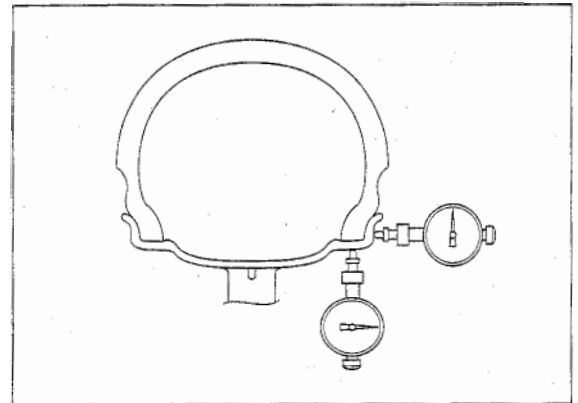
### Wheel rim runout

Check the rim runout by placing the wheel in a trueing stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

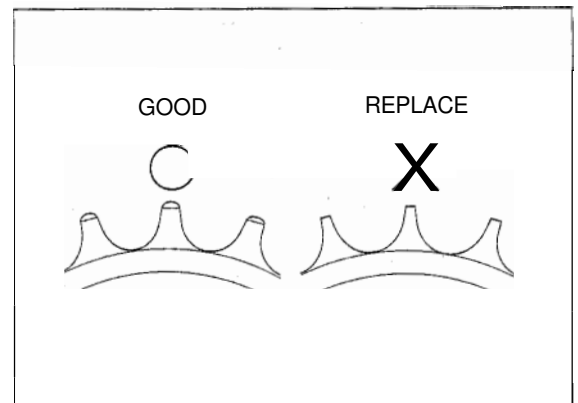
**SERVICE LIMITS:** Radial: 2.0 mm (0.08 in)  
Axial: 2.0 mm (0.08 in)



### Driven sprocket

Check the condition of the final driven sprocket teeth. Replace the sprocket if worn or damaged.

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

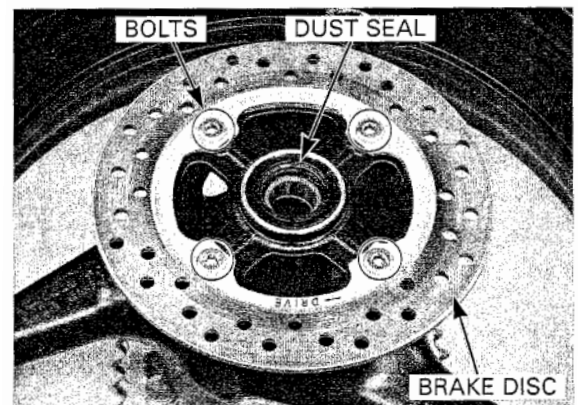


### Wheel balance

See page 13-11 for wheel balance.

## DISASSEMBLY

Remove the bolts and brake disc.  
Remove the right dust seal.

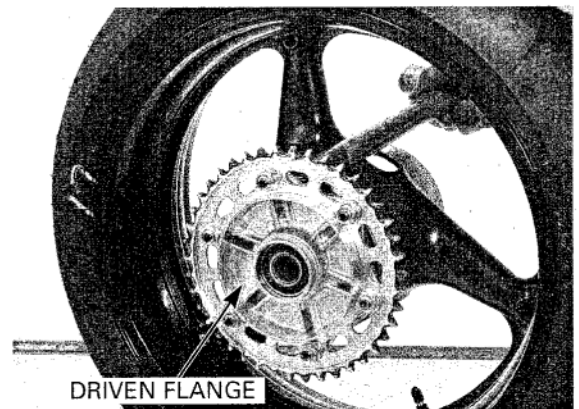




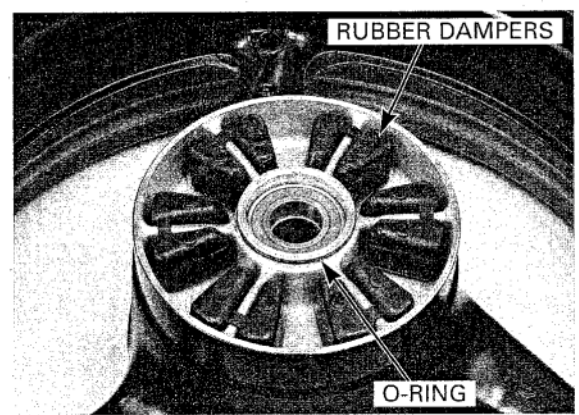
## REAR WHEEL/SUSPENSION

*If you disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.*

Remove the driven flange assembly from the left wheel hub.



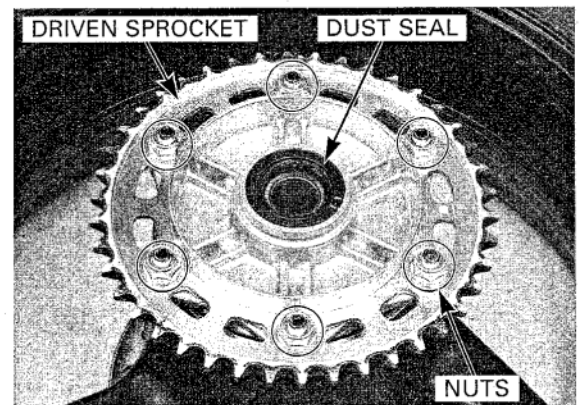
Remove the wheel rubber dampers.  
Remove the O-ring.



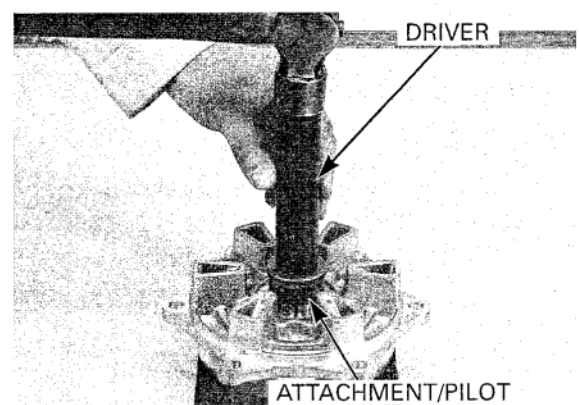
**Driven flange bearing removal**  
Loosen the driven sprocket nuts.

Remove the driven flange from the wheel hub, then remove the driven sprocket nuts and sprocket.

Remove the dust seal.



Remove the driven flange collar.  
Drive out the driven flange bearing.



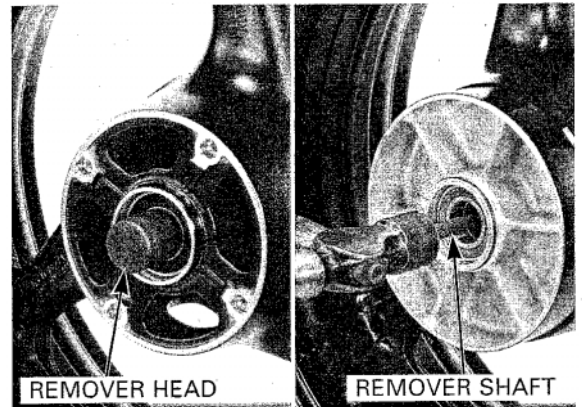
## REAR WHEEL/SUSPENSION

### Wheel bearing removal

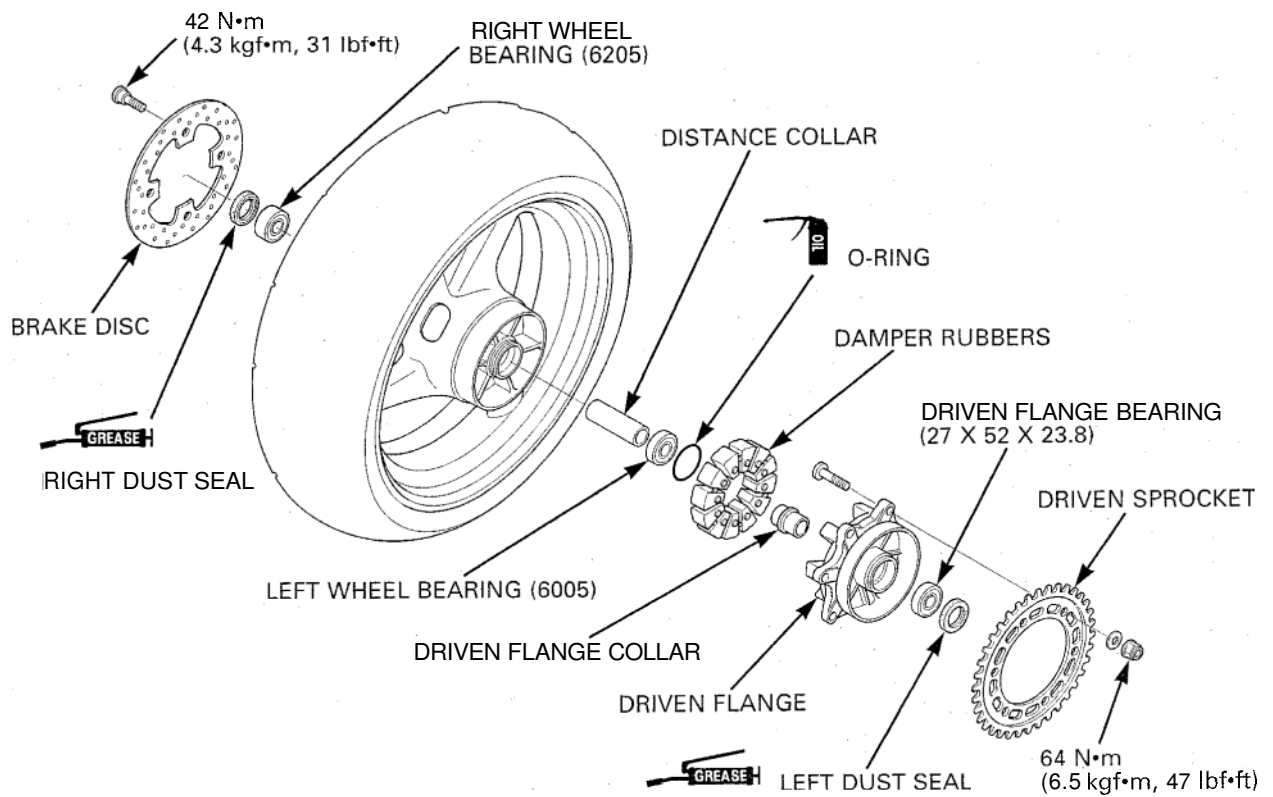
Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

#### TOOLS:

Bearing remover head, 25 mm 07746-0050800  
Bearing remover shaft 07746-0050100



### ASSEMBLY



*Never install the old bearings, once the bearings have been removed, they must be replaced with new ones*

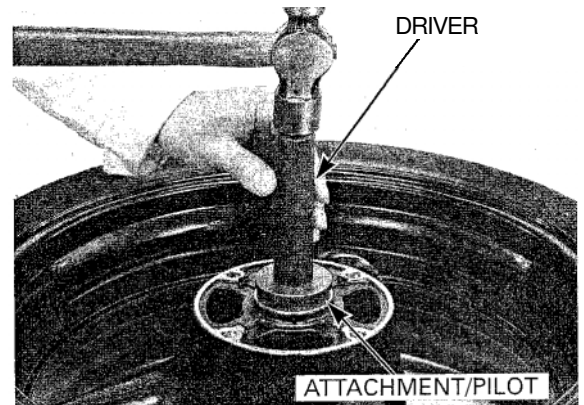
### Wheel bearing installation

Drive in a new right bearing (6205) squarely.

#### TOOLS:

Driver  
Attachment, 52 x 55 mm  
Pilot, 25 mm

07749-0010000  
07746-0010400  
07746-0040600



## REAR WHEEL/SUSPENSION

Install the distance collar

Drive in a new left side bearing using the special tools.

### TOOLS:

Driver

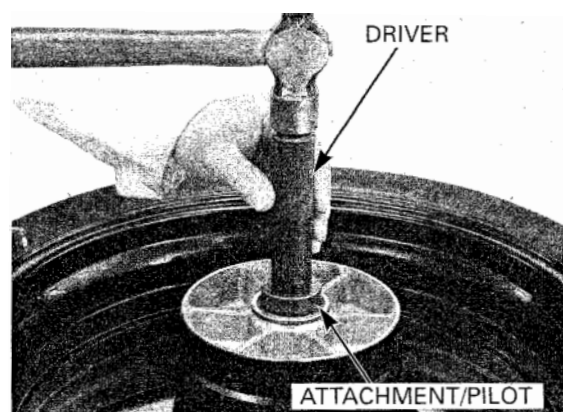
07749-0010000

Attachment, 42 x 47 mm

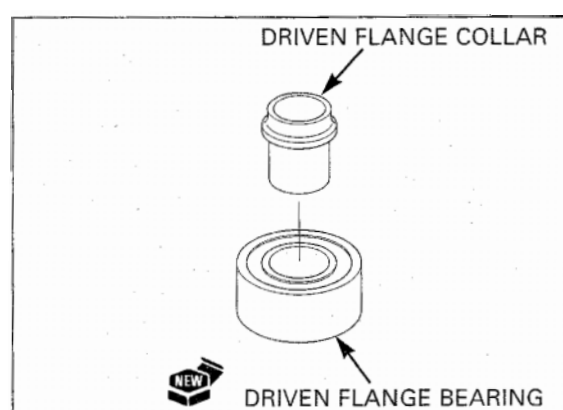
07746-0010300

Pilot, 25 mm

07746-0040600



Install the driven flange collar into a new driven flange bearing (27 x 52 x 23.8).



### Driven flange bearing installation

Drive the new driven flange bearing into the driven flange using the special tools.

### TOOLS:

Driver

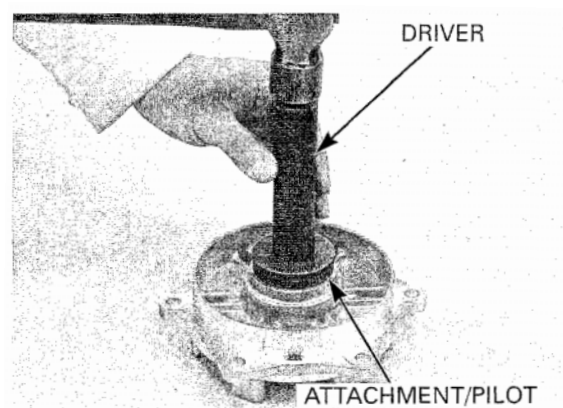
07749-0010000

Attachment, 52 x 55 mm

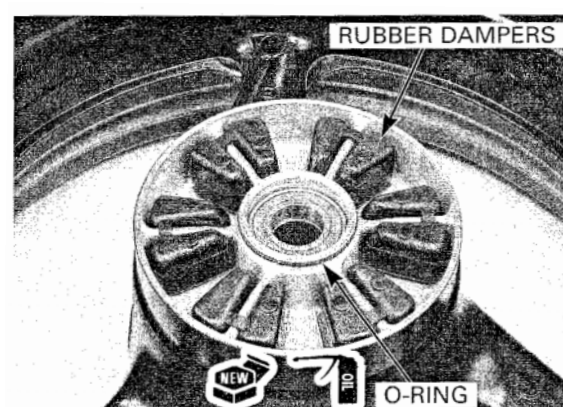
07746-0010400

Pilot, 25 mm

07746-0040600



Install the wheel rubber dampers into the wheel hub. Apply oil to the new O-ring and install it into the groove of the wheel hub.

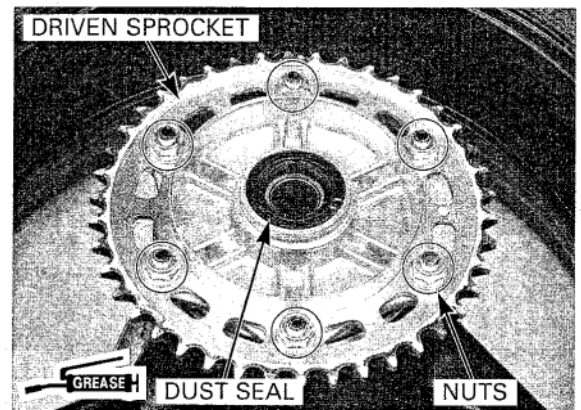


## REAR WHEEL/SUSPENSION

Install the driven flange assembly into the left wheel hub.  
If the driven sprocket was removed, install the driven sprocket and tighten the nuts.

**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**

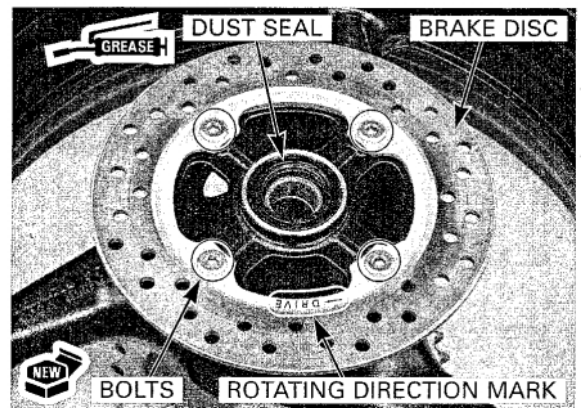
Apply grease to the dust seal lips, then install it into the driven flange.



Install the brake disc with its direction of rotation mark facing out.  
Install and tighten the new bolts to the specified torque.

**TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)**

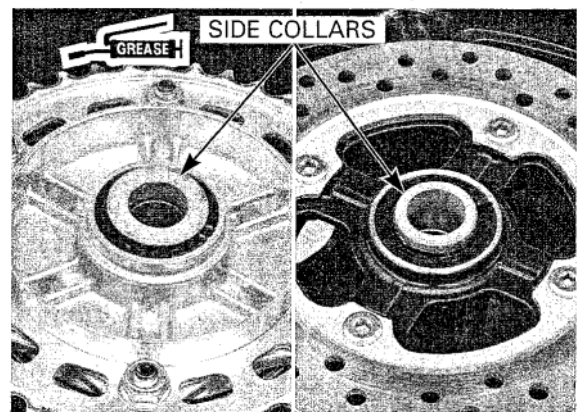
Apply grease to the dust seal lips, then install it into the wheel hub.



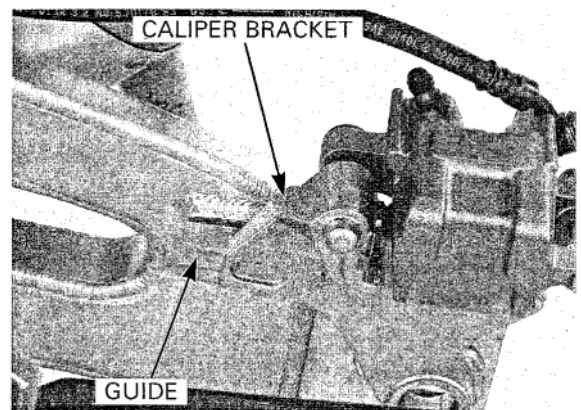
## INSTALLATION

Apply grease to the side collar inside and grooves.

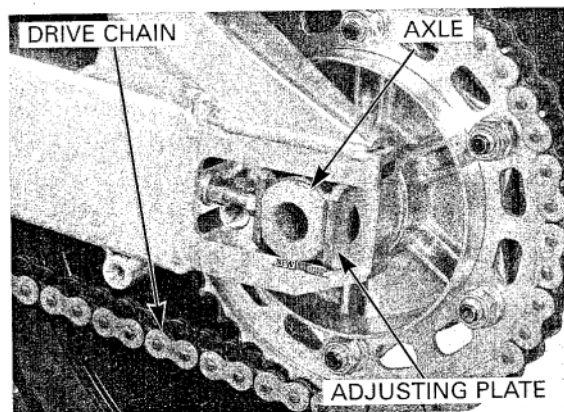
Install the side collars.



Install the rear brake caliper bracket onto the guide of the swingarm.



Place the rear wheel into the swingarm.  
Install the drive chain over the driven sprocket.  
Install the drive chain adjusting plate and axle from the left side.

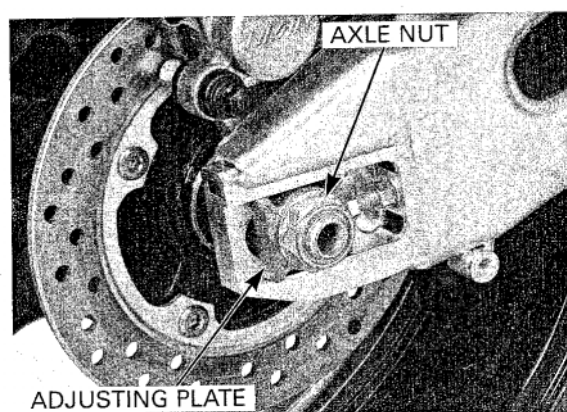


Install the drive chain adjusting plate and axle nut.

Adjust the drive chain stack (page 3-20).

Tighten the axle nut to the specified torque.

**TORQUE: 113 N·m (11.5kgf·m, 83 lbf·ft)**

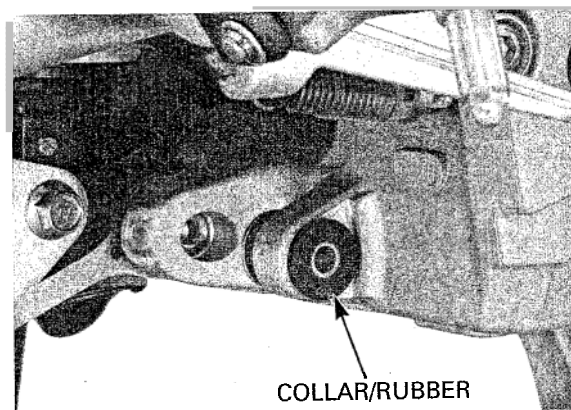


## SUSPENSION LINKAGE

### REMOVAL

Support the motorcycle using a hoist or equivalent, and raise the rear wheel off the ground.  
Remove the muffler and exhaust pipe (page 2-13).

Remove the exhaust pipe mounting collar and mounting rubber.

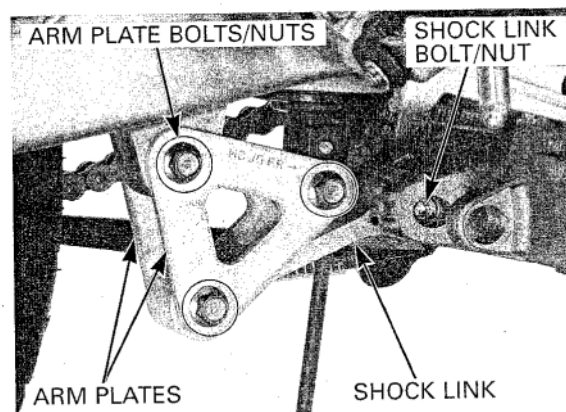


Remove the following:

- Shock arm plate bolts/nuts
- Shock arm plates
- Shock link bolt/nut
- Shock link

### INSPECTION

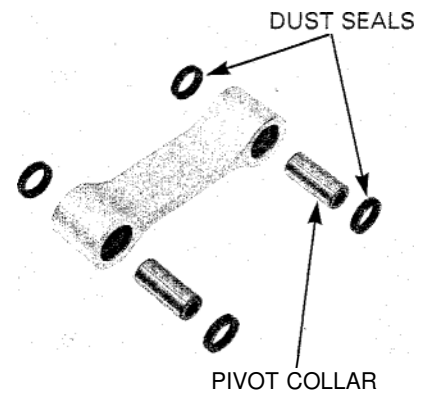
Check that the suspension linkage components for damage, replace any damaged components.



## REAR WHEEL/SUSPENSION

### SHOCK LINK BEARING REPLACEMENT

Remove the pivot collar and dust seals.



Press out the needle bearing out of the shock link using the special tools.

#### TOOLS:

**Driver**

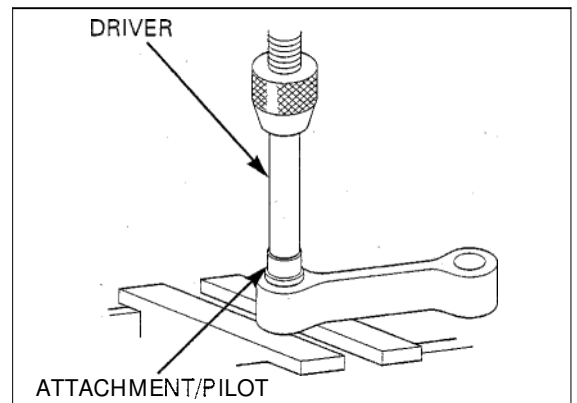
07949-3710001

**Attachment, 22 x 24 mm**

07746-0010800

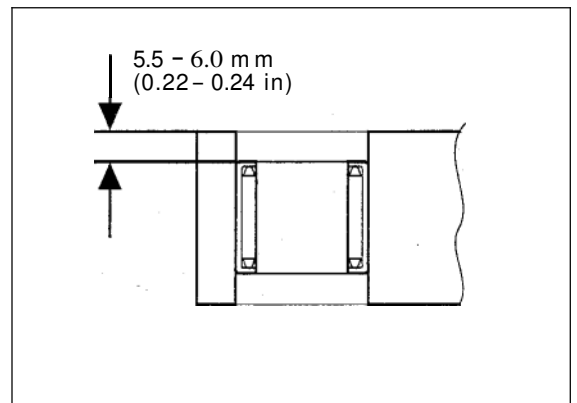
**Pilot, 17 mm**

07746-0040400

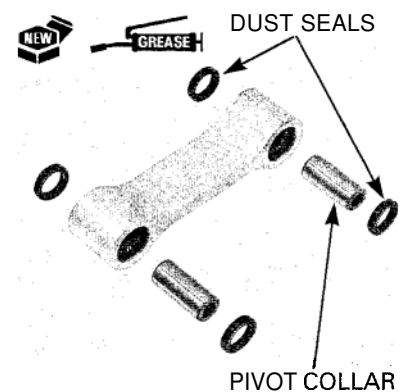


*Press the needle bearing into the shock arm with the marked side facing out*

Press a new needle bearing into the shock arm so the needle bearing surface is lower 5.5 – 6.0 mm (0.22 – 0.24 in) from the end of the shock link using the same tools.



Apply grease to the new dust seal lips, install them into the shock link.  
Install the pivot collar.



### INSTALLATION

Install the shock link into the lower bracket, install the mounting bolt/nut.  
Hold the socket bolt and tighten the nut to the specified torque.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

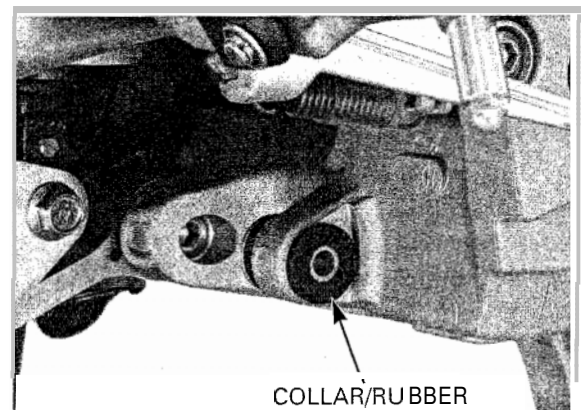
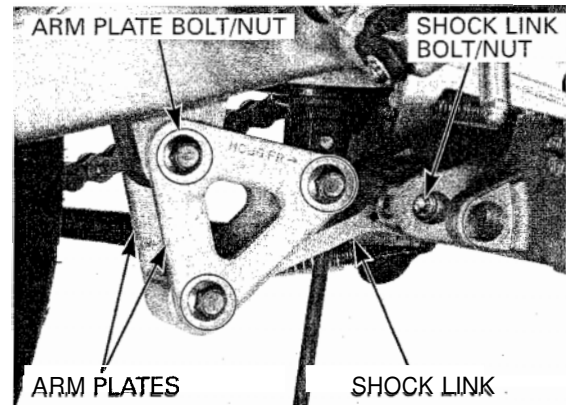
Install the shock arm plates with its "FR" mark facing forward.

Install the shock arm plate bolts/nuts, then tighten the nuts to the specified torque.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

Install the exhaust pipe mounting rubber and collar.

Install the exhaust pipe and muffler (page 2-16).

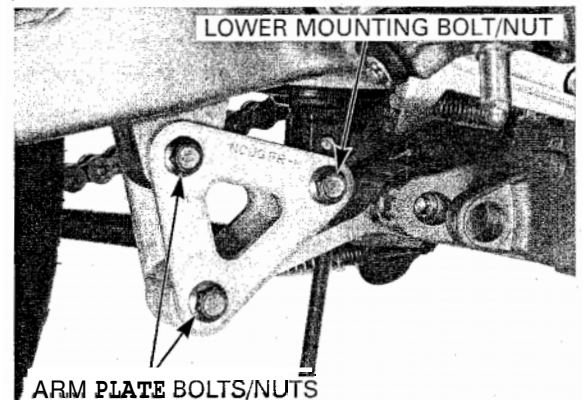


## SHOCK ABSORBER

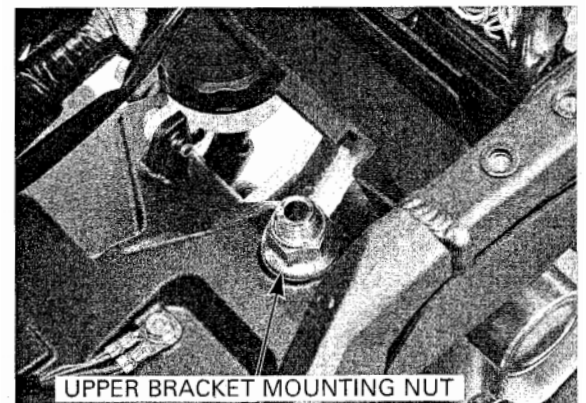
### REMOVAL

Support the motorcycle using a hoist or equivalent.

Remove the shock absorber lower mounting bolt/nut.  
Remove the shock arm plate bolts/nuts and link plates.



Loosen and remove the shock absorber upper mounting nut.  
Lower the shock absorber, then remove.





## REAR WHEEL/SUSPENSION

### INSPECTION

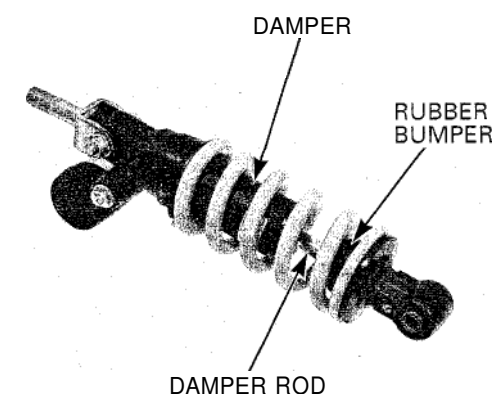
Visually inspect the shock absorber for damage.

Check the:

- Damper rod for bends or damage
- Damper unit for deformation or oil leaks
- Rubber bumper for wear or damage

Inspect all the other parts for wear or damage.

If necessary, replace the shock absorber as an assembly.



### NEEDLE BEARING REPLACEMENT

Remove the pivot collar and dust seals.

Press out the needle bearing out of the shock absorber lower mount using the special tools.

#### TOOLS:

Driver

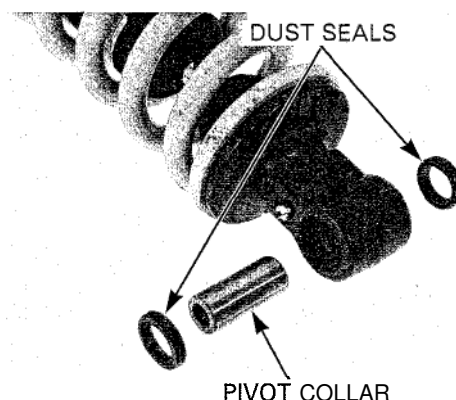
07949-3710001

Attachment, 22 x 24 mm

07746-0010800

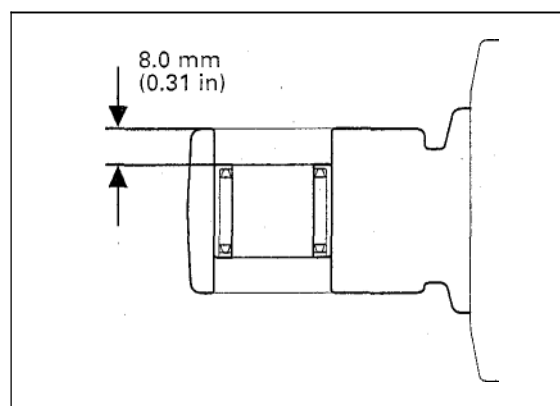
Pilot, 17 mm

07746-0040400

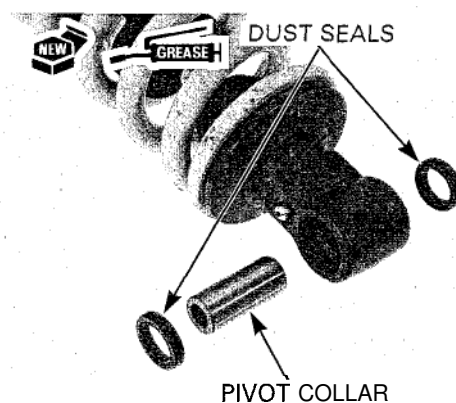


*Press the needle bearing into the lower mount with the marked side facing out.*

Press a new needle bearing into the lower mount so that the needle bearing surface is lower 8.0 mm (0.31 in) from the end of the lower mount using the same tools.



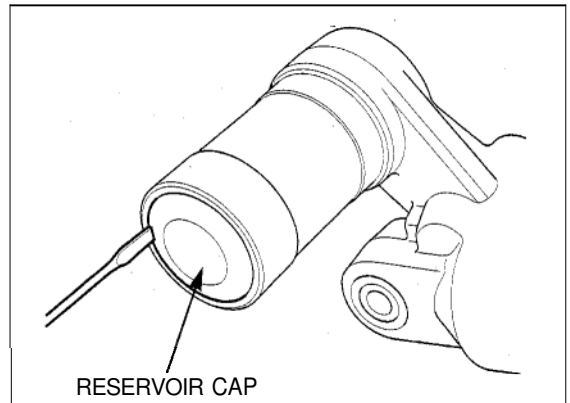
Apply grease to the new dust seal lips, install them into the lower mount.  
Install the pivot collar.





### SHOCK ABSORBER DISPOSAL PROCEDURE

Remove the damper reservoir cap.

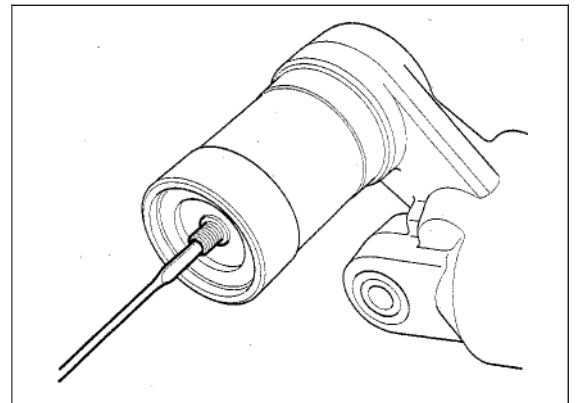


*Do not remove the valve core until pressure is released.*

Put on safety glasses, then release the nitrogen from the reservoir by depressing the valve core.

#### NOTICE

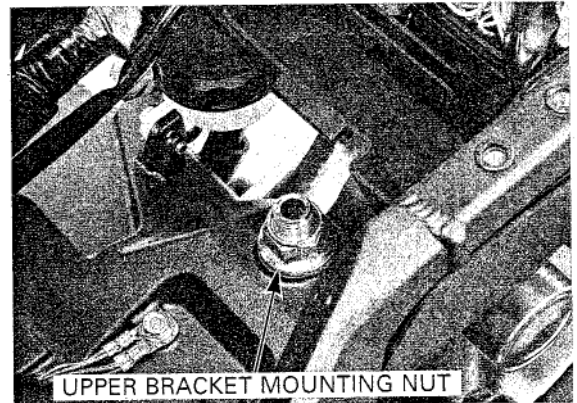
- Point the valve away from you to prevent debris getting in your eyes.
- Before disposing of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber reservoir.



### INSTALLATION

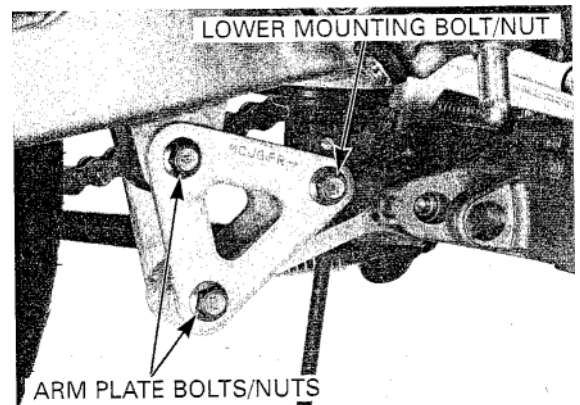
Install the shock absorber into the frame from the bottom, and install the upper mounting bolt/nut. Tighten the nut to the specified torque.

**TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)**



Install the shock arm plates, arm plate bolts/nuts and shock absorber lower mounting bolt/nut. Tighten the nuts to the specified torque.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

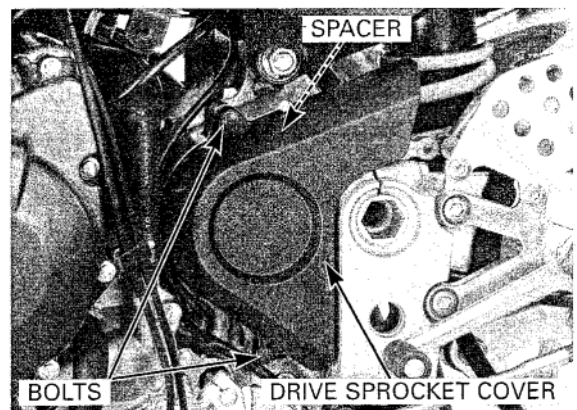


### SWINGARM

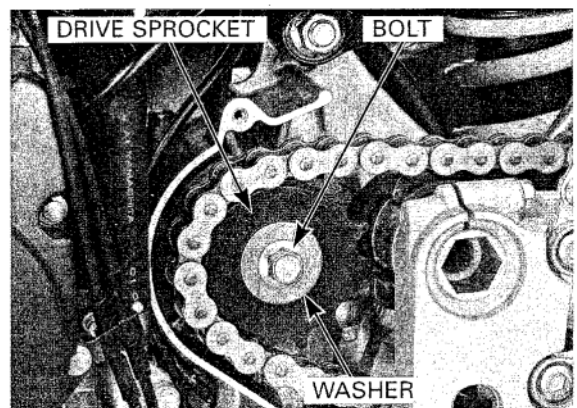
#### REMOVAL

Remove the rear wheel (page 14-3)

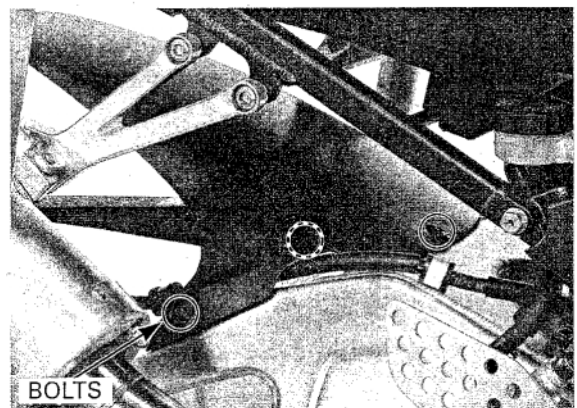
Remove the two SH bolts and drive sprocket cover and spacer.



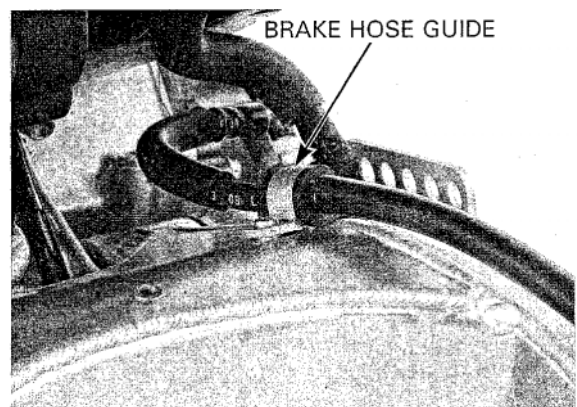
Remove the drive sprocket bolt, washer and drive sprocket.



Remove the bolts and inner fender.

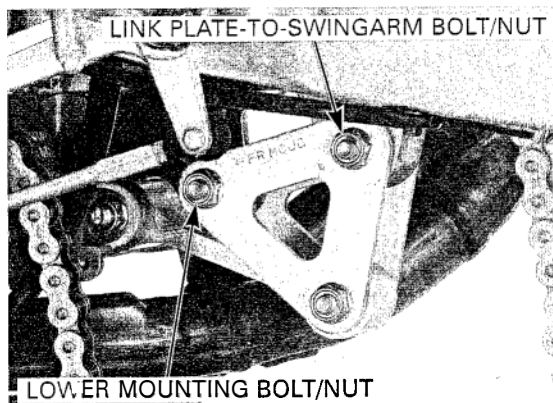


Remove the screws and brake hose guides.



## REAR WHEEL/SUSPENSION

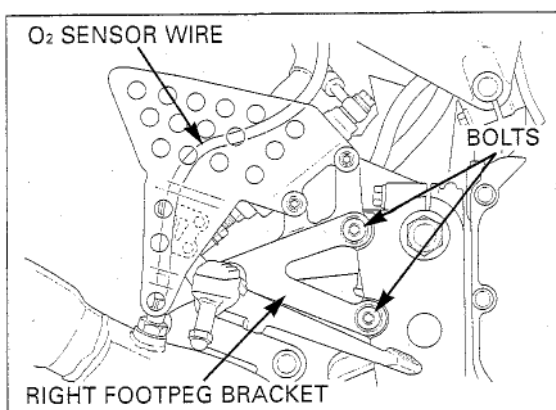
Remove the shock absorber lower mounting bolt/nut.  
Remove the shock arm plate-to-swingarm bolt/nut.



Remove the right main footpeg bracket socket bolts and main footpeg bracket.

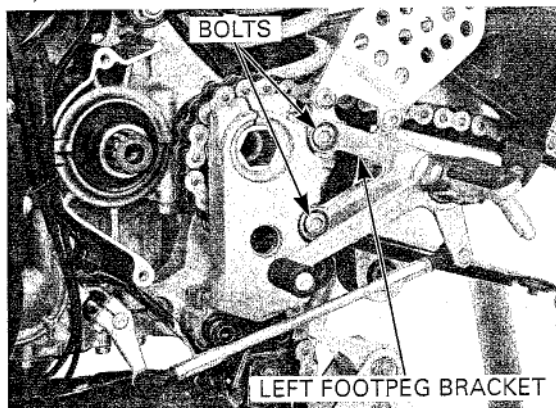
*California type  
only*

Release the O<sub>2</sub> sensor wire from the wire guide behind the right step guard.

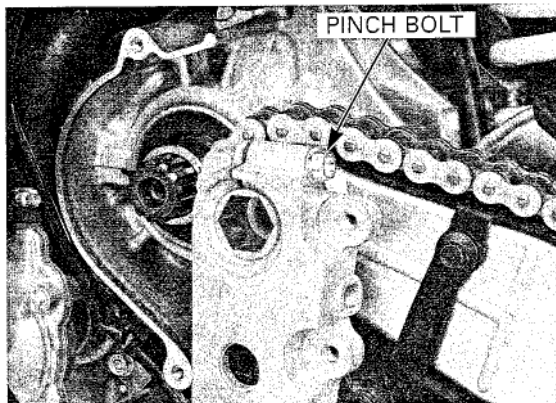


Remove the bolt and gearshift link arm from the gearshift spindle.

Remove the left main footpeg bracket socket bolts and main footpeg bracket.



Loosen the swingarm pivot pinch bolts.



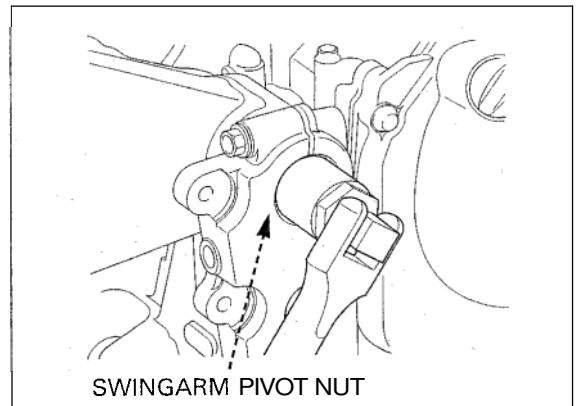
## REAR WHEEL/SUSPENSION

Hold the pivot bolt using a special tool, then loosen and remove the swingarm pivot nut using the same tool.

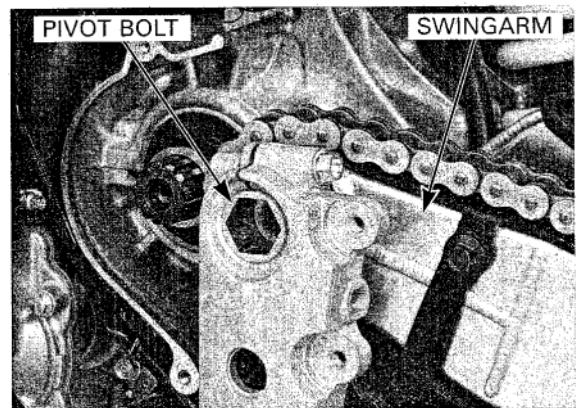
**TOOL:**

Rod holder, 24 x 27 mm

07930-KA50100

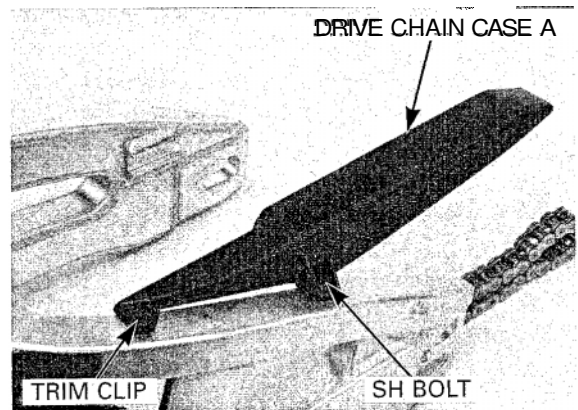


Remove the pivot bolt and then remove the swingarm from the lower bracket and engine.

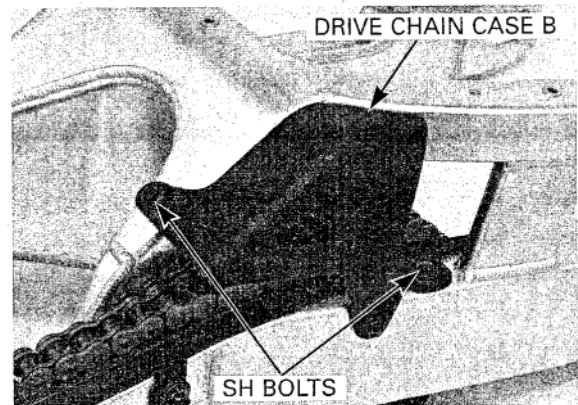


## DISASSEMBLY/INSPECTION

Remove the SH bolt, trim clip and drive chain case A



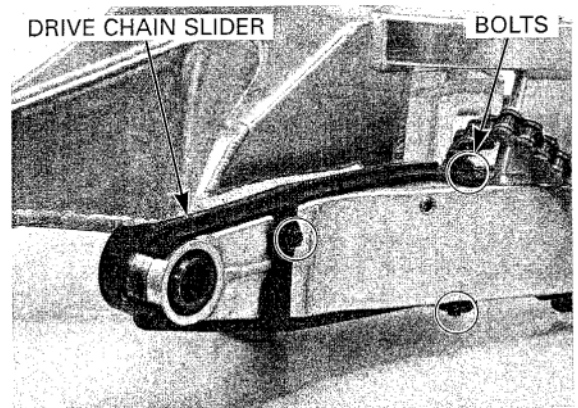
Remove the SH bolts and drive chain case B.



## REAR WHEEL/SUSPENSION

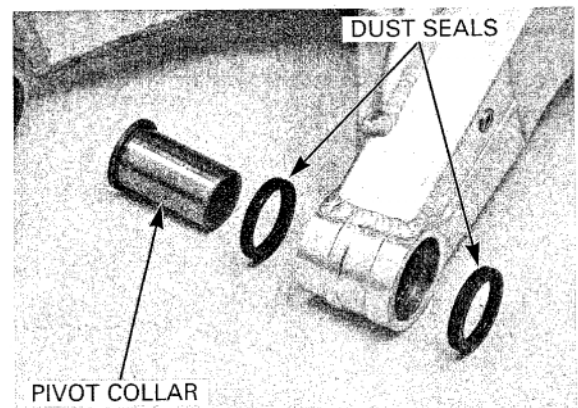
Remove the three SH bolts and drive chain slider.

Check the drive chain slider for wear or damage.



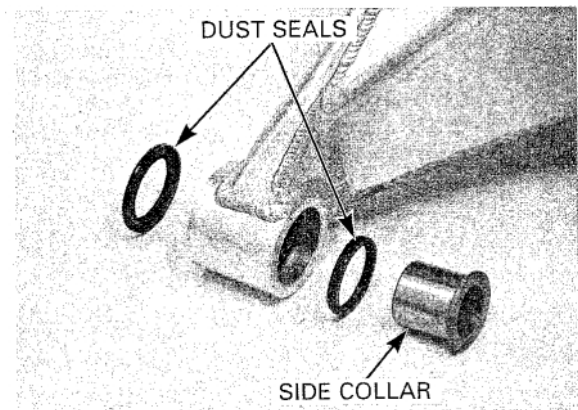
Remove the pivot collar and dust seals from the swingarm left pivot.

Check the dust seals and collar for damage or fatigue.



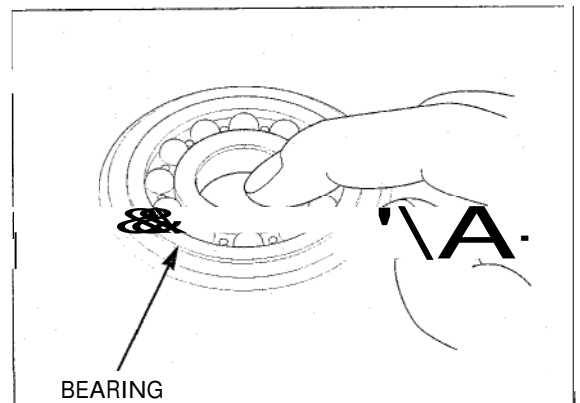
Remove the side collar and dust seals from the swingarm right pivot.

Check the dust seals and side collar for damage or fatigue.



Turn the inner race of right pivot bearings with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

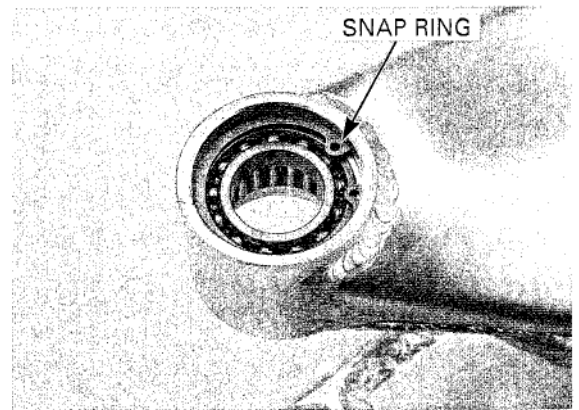
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



## REAR WHEEL/SUSPENSION

### PIVOT BEARING REPLACEMENT

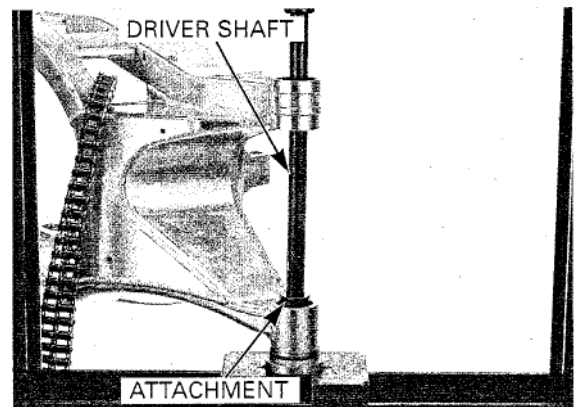
Remove the snap ring from the swingarm right pivot.



Remove the right pivot bearings (radial ball bearing and needle bearing) from the swingarm pivot using the special tools and hydraulic press.

#### TOOLS:

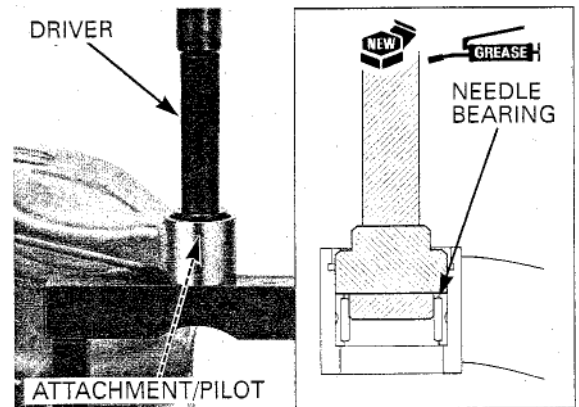
Driver shaft 07946-MJ00100  
Driver attachment, 25 x 38.5 mm 07YMD-MCJ0100



Pack a new needle bearing with grease.  
Press the inner bearing into the swingarm right pivot until it seats using the special tools and hydraulic press.

#### TOOLS:

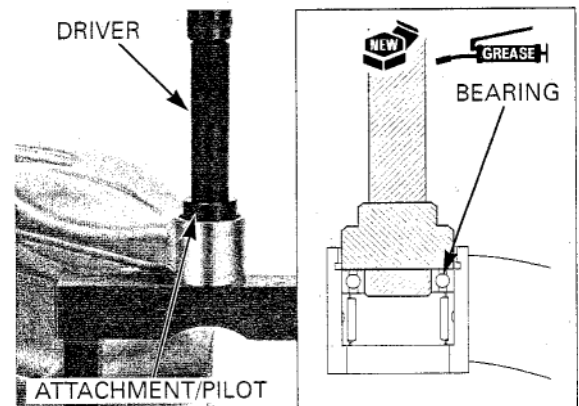
Driver 07749-0010000  
Attachment, 40 x 42 mm 07746-0010900  
Pilot, 25 mm 07746-0040600



Pack a new bearing with grease.  
Install the outer bearing using the special tools.

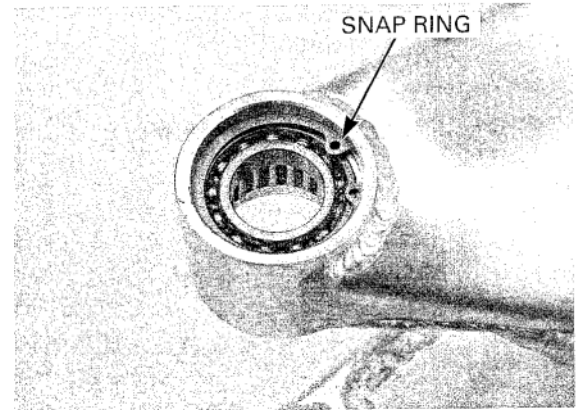
#### TOOLS:

Driver 07749-0010000  
Attachment, 40 x 42 mm 07746-0010900  
Pilot, 25 mm 07746-0040600



## REAR WHEEL/SUSPENSION

Install the snap ring into the groove securely.



Remove the left pivot needle bearing from the swingarm pivot using the special tools.

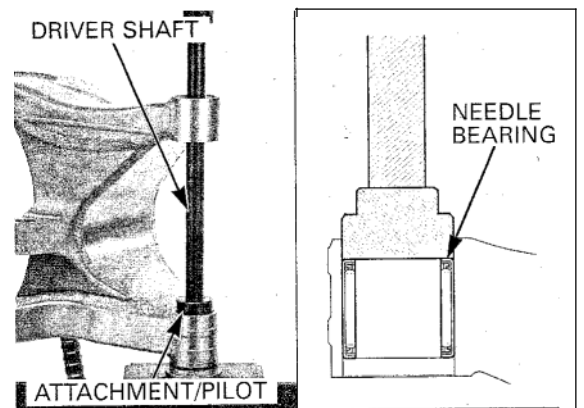
**TOOLS:**

**Driver**

**07749-0010000**

**Attachment, 40 x 42 mm**

**07746-0010900**



*Press the needle bearing into the swingarm with the marked side facing out*

Pack a new needle bearing with grease.

Press a new left pivot needle bearing into the swingarm pivot so that the needle bearing surface is lower 7.0 – 8.0 mm (0.28 – 0.31 in) from the end of the swingarm pivot surface using the special tools.

**TOOLS:**

**Driver**

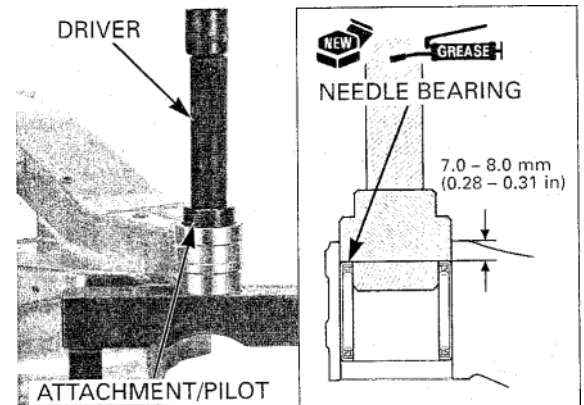
**07749-0010000**

**Attachment, 40 x 42 mm**

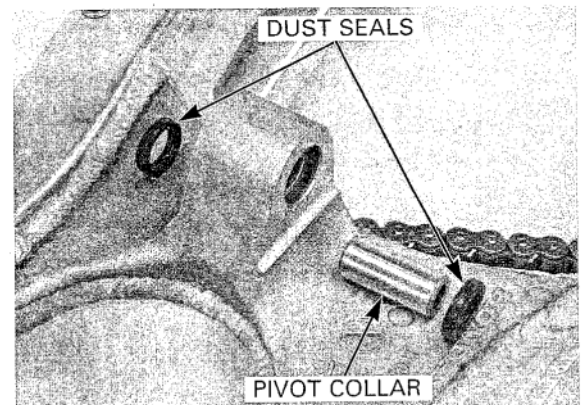
**07746-0010900**

**Pilot, 32 x 50 mm**

**07MAD-PR90200**



Remove the pivot collar and dust seals from the shock arm pivot.

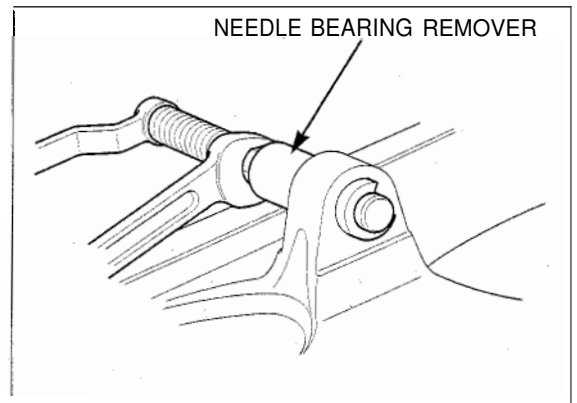




## REAR WHEEL/SUSPENSION

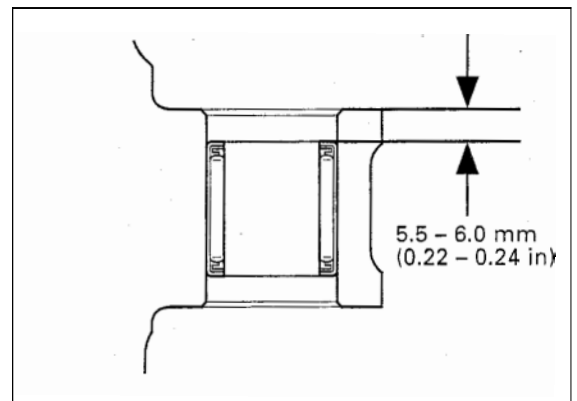
Remove the shock arm pivot needle bearing using the special tool.

**TOOL:**  
**Needle bearing remover** 07LMC-KV30100

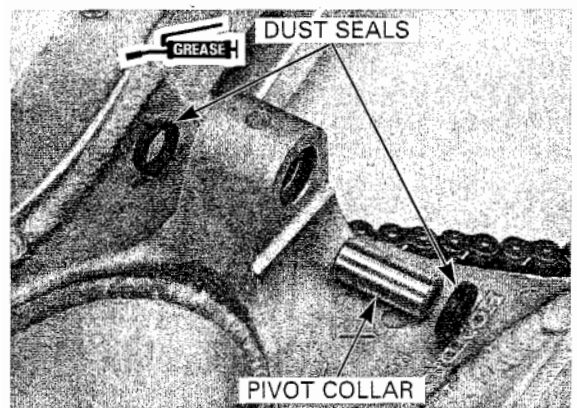


Install the shock arm pivot needle bearing into the swingarm so the needle bearing surface is lower 5.5 – 6.0 mm (0.22 – 0.24 in) from the end of the pivot surface using the same tool.

**TOOL:**  
**Needle bearing remover** 07LMC-KV30100

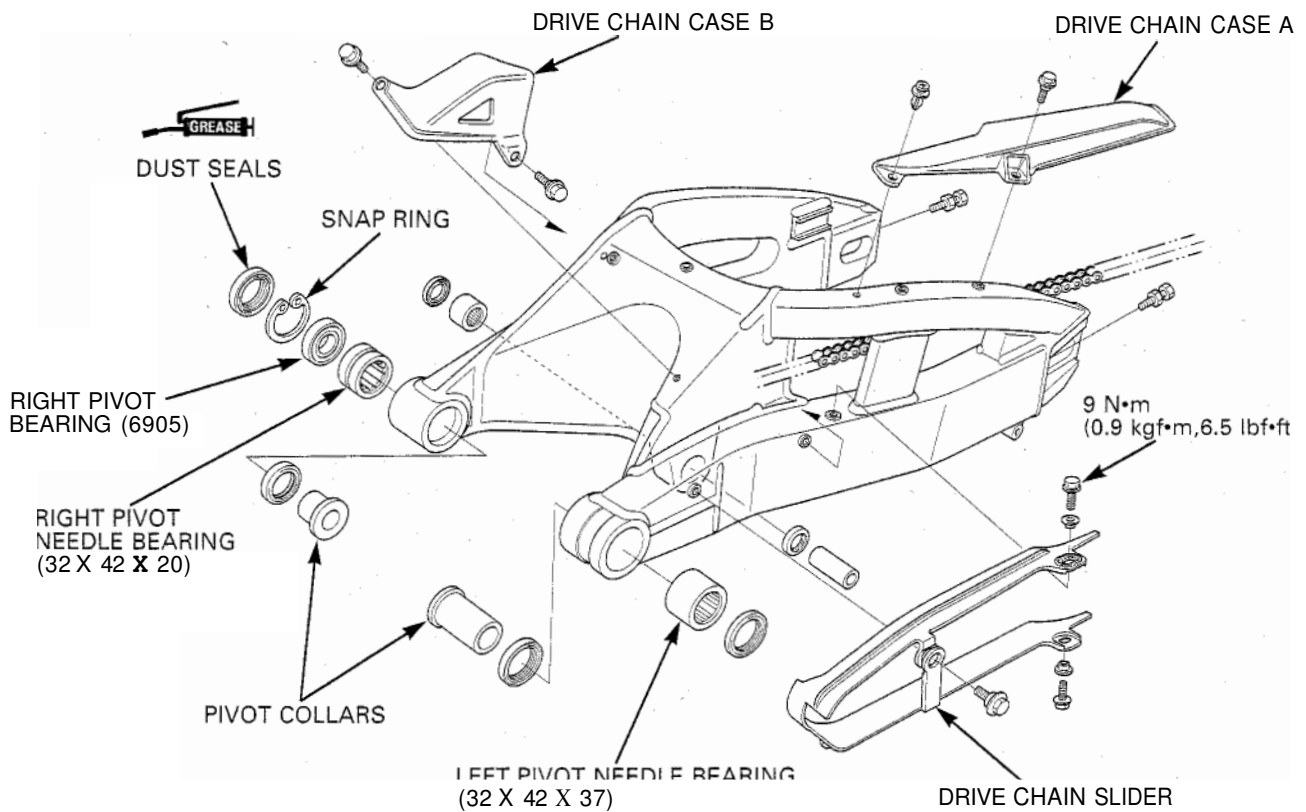


Apply grease to the dust seal lips, then install the dust seals and pivot collar into the swingarm.

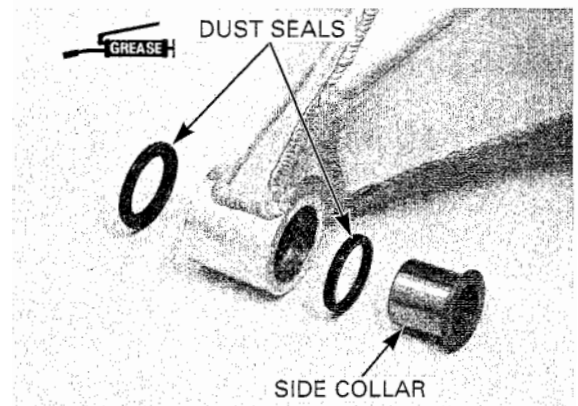




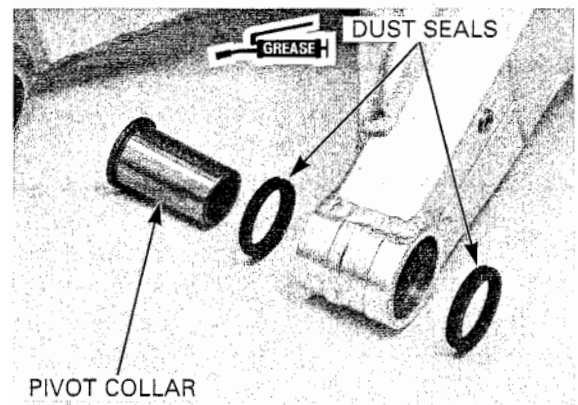
## ASSEMBLY



Apply grease to the dust seal lips, then install the dust seals and side collar into the right swingarm pivot.

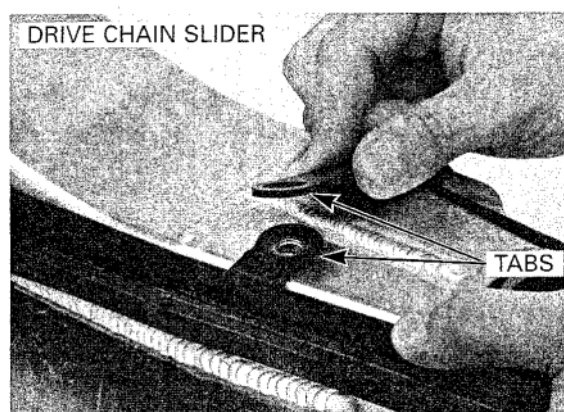


Apply grease to the dust seal lips, then install the dust seals and pivot collar into the left swingarm pivot.



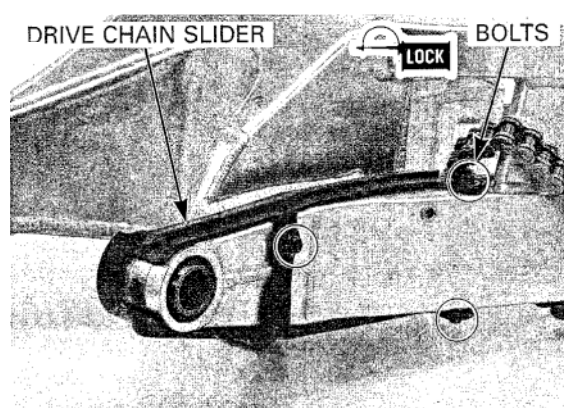
## REAR WHEEL/SUSPENSION

Install the drive chain slider aligning its tabs with the boss on the swingarm as shown.

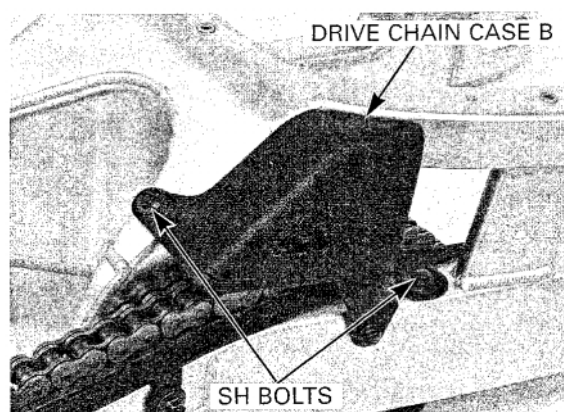


Apply a locking agent to the drive chain slider bolt threads. Install the collars and bolts, then tighten the bolts to the specified torque.

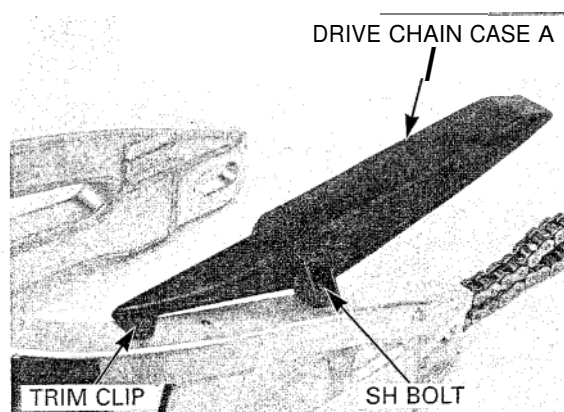
**TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)**



Install drive chain case B and tighten the SH bolt securely.



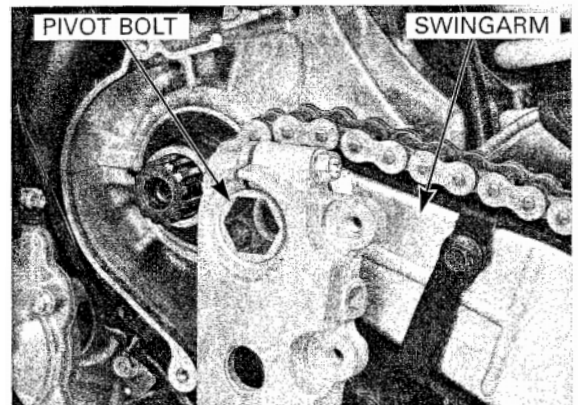
Install drive chain case A and secure it with a SH bolt and trim clip.



### INSTALLATION

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

Install the swingarm between the lower bracket and engine, then install the pivot bolt from the left side.



Install the swingarm pivot nut.

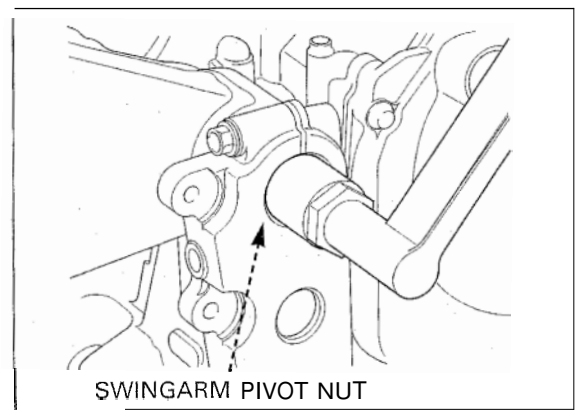
Hold the pivot bolt using a special tool, tighten the swingarm pivot nut to the specified torque using the same tool.

**TOOL:**

Rod holder, 24 x 27 mm

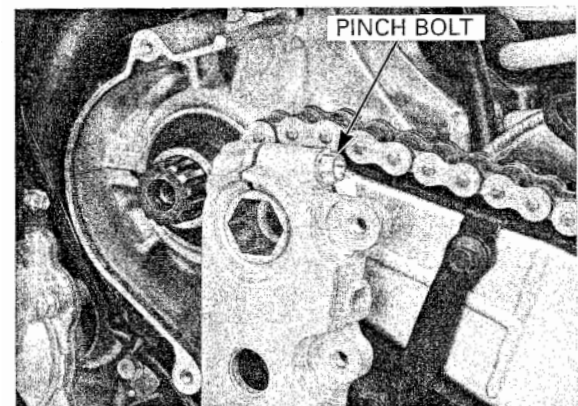
07930-KA50100

**TORQUE: 118 N·m (12.0 kgf·m, 87 lbf·ft)**



Tighten the swingarm pivot pinch bolts to the specified torque.

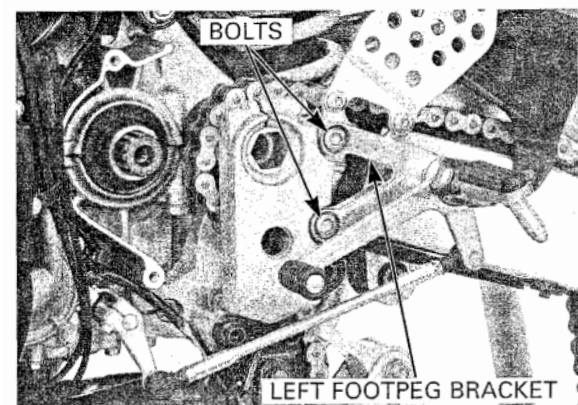
**TORQUE : 26 N·m (2.7 kgf·m, 20 lbf·ft)**



Install the left main footpeg bracket onto the lower bracket and tighten the socket bolts to the specified torque.

**TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)**

Install the gearshift pedal link (page 9-17).



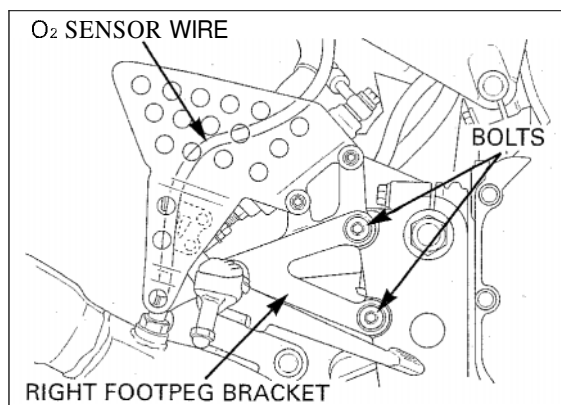
## REAR WHEEL/SUSPENSION

*California type  
only*

Clamp the O<sub>2</sub> sensor wire to the wire guide behind the right step guard.

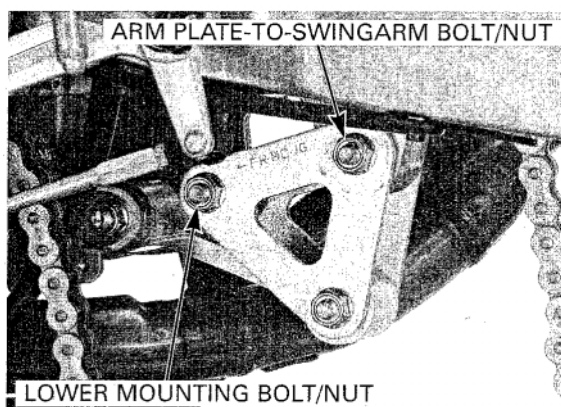
Install the right main footpeg bracket onto the lower bracket and tighten the socket bolts to the specified torque.

**TORQUE: 39 N•m (4.0 kgf•m, 29 lbf•ft)**



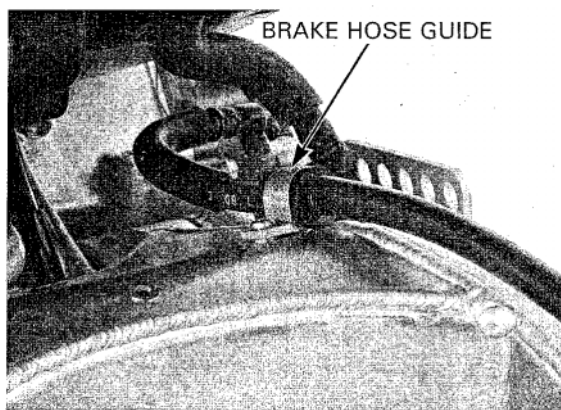
Install the shock arm plate-to-swingarm bolt/nut, then tighten the nut to the specified torque.

**TORQUE: 44 N•m (4.5 kgf•m, 33 lbf•ft)**



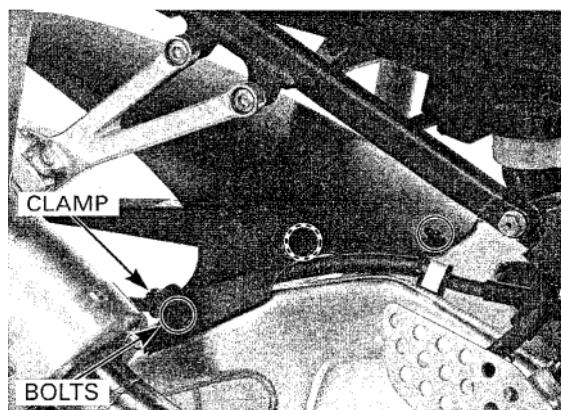
Install the brake hose guide and tighten the screw to the specified torque.

**TORQUE: 4 N•m (0.4 kgf•m, 2.9 lbf•ft)**



*Tighten the right  
rear mounting bolt  
with a brake hose  
clamp*

Install the inner fender and tighten the mounting bolts.

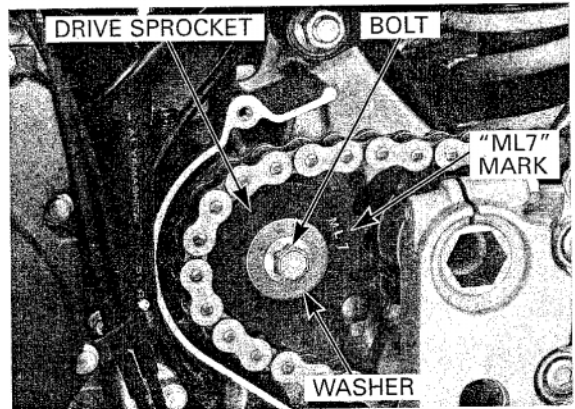


## REAR WHEEL/SUSPENSION

Install the drive sprocket with its "ML7" mark facing out.

Install the washer and special bolt, then tighten the bolt to the specified torque.

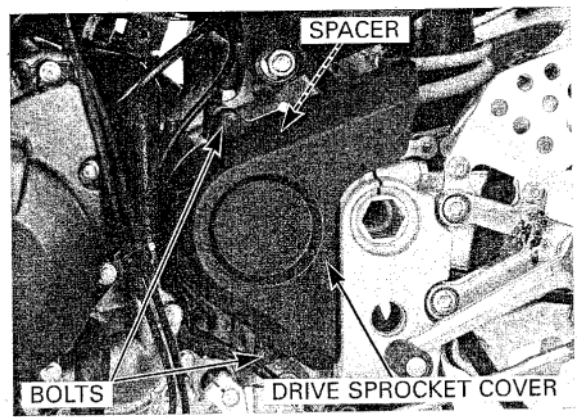
**TORQUE: 54 N•m (5.5kgf•m, 40 lbf•ft)**



Install the spacer and drive sprocket cover, tighten the SH bolts.

Install the rear wheel (page 14-8).

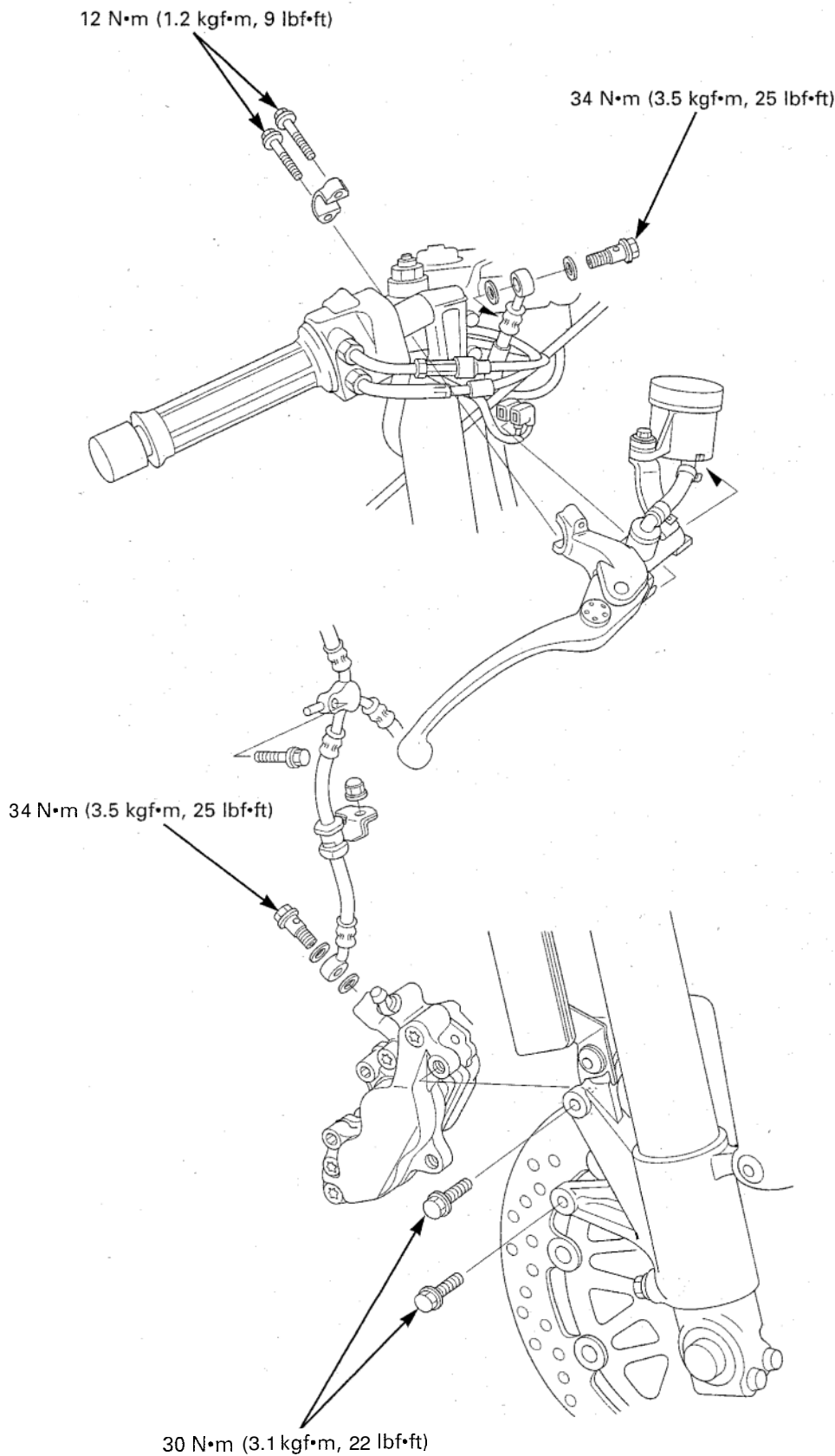
Install the removed parts in the reverse order of removal.



**HYDRAULIC BRAKE**

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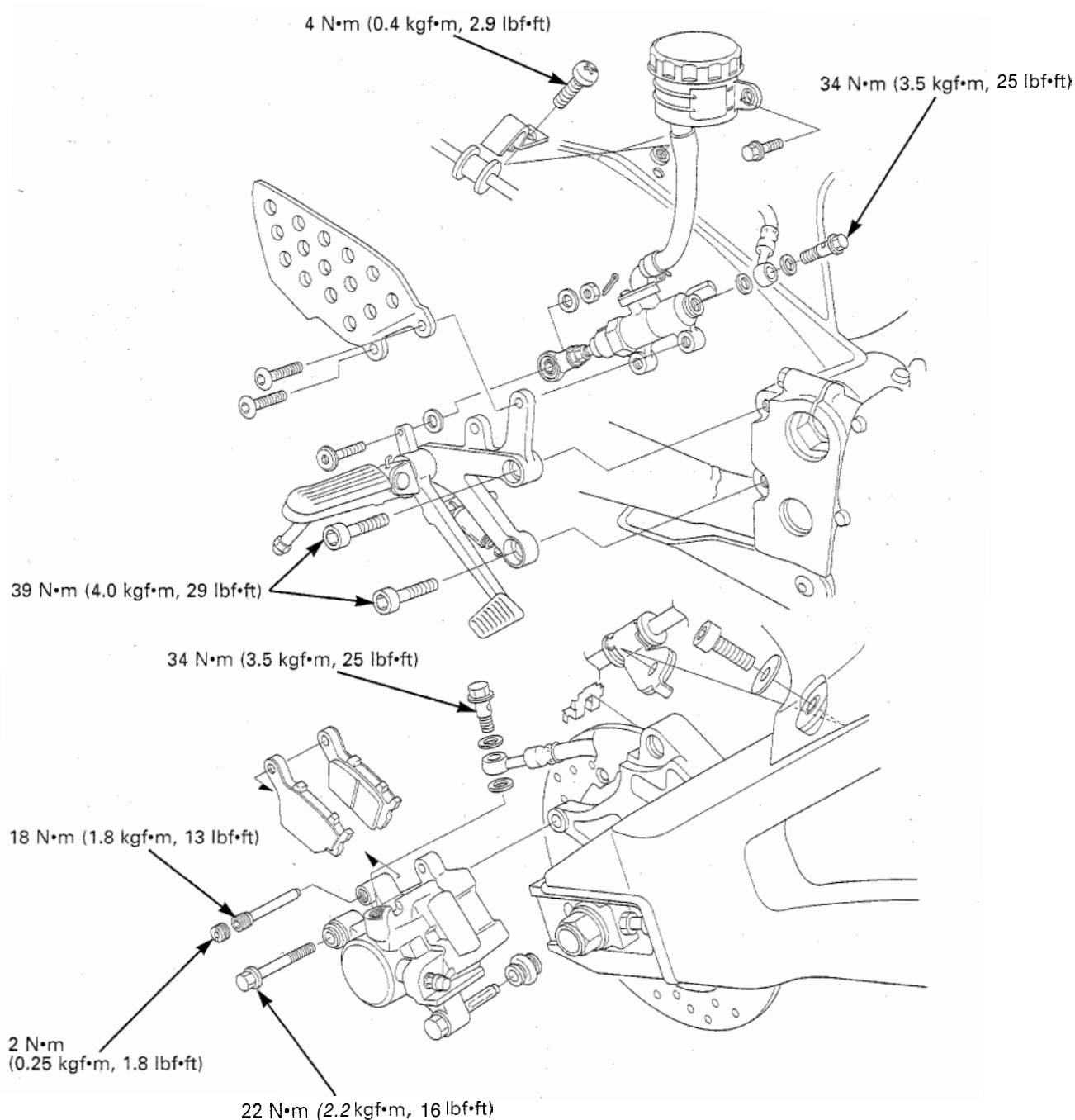
**FRONT:**



# 15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-2	REAR MASTER CYLINDER	15-17
TROUBLESHOOTING	15-3	FRONT BRAKE CALIPER	15-21
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-4	REAR BRAKE CALIPER	15-25
BRAKE PAD/DISC	15-8	BRAKE PEDAL	15-28
FRONT MASTER CYLINDER	15-12		

## REAR:



## HYDRAULIC BRAKE

### SERVICE INFORMATION

#### GENERAL

#### CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake lever or pedal after the air bleeding.
- Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.
- Always check brake operation before riding the motorcycle.

#### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	Honda DOT 4 Brake Fluid	—
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.	17.321 – 17.367 (0.6819 – 0.6837)	17.309 (0.6815)
	Caliper cylinder I.D.	Upper (Cylinder A)	32.025 – 32.035 (1.2608 – 1.2612)
		Lower (Cylinder B)	30.250 – 30.280 (1.1909 – 1.1921)
	Caliper piston O.D.	Upper (Piston A)	31.965 – 31.998 (1.2585 – 1.2598)
		Lower (Piston B)	30.082 – 30.115 (1.1843 – 1.1856)
Rear	Specified brake fluid	Honda DOT 4 Brake Fluid	—
	Brake disc thickness	5.0 (0.20)	<b>4.0 (0.16)</b>
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Master piston O.D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Caliper cylinder I.D.	38.180 – 38.230 (1.5031 – 1.5051)	38.24 (1.506)
	Caliper cylinder O.D.	38.098 – 38.148 (1.4999 – 1.5019)	38.090 (1.4996)



## TORQUE VALUES

Front brake master cylinder cup mounting nut	6 N•m (0.6 kgf•m, 4.3 lbf•ft)	U-nut
Front master cylinder bracket bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Brake lever pivot bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	
Brake lever pivot nut	6 N•m (0.6 kgf•m, 4.3 lbf•ft)	
Front brake light switch screw	1 N•m (0.12 kgf•m, 0.9 lbf•ft)	
Front brake caliper mounting bolt	30 N•m (3.1 kgf•m, 22 lbf•ft)	ALOC bolt
Caliper body assembly torx bolt	23 N•m (2.3 kgf•m, 17 lbf•ft)	ALOC bolt
Pad pin	18 N•m (1.8 kgf•m, 13 lbf•ft)	
Pad pin plug	2 N•m (0.25 kgf•m, 1.8 lbf•ft)	
Brake caliper bleed valve	6 N•m (0.6 kgf•m, 4.3 lbf•ft)	
Rear brake hose clamp screw	4 N•m (0.4 kgf•m, 2.9 lbf•ft)	ALOC bolt
Rear master cylinder push rod nut	18 N•m (1.8 kgf•m, 13 lbf•ft)	
Rear master cylinder hose joint screw	1 N•m (0.15 kgf•m, 1.1 lbf•ft)	Apply a locking agent to the threads.
Rear brake caliper mounting bolt	27 N•m (2.8 kgf•m, 20 lbf•ft)	Apply a locking agent to the threads.
Rear brake caliper slide pin bolt	22 N•m (2.2 kgf•m, 16 lbf•ft)	Apply a locking agent to the threads.
Brake hose oil bolt	34 N•m (3.5 kgf•m, 25 lbf•ft)	
Main footpeg bracket socket bolt	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Main footpeg mounting bolt	44 N•m (4.5 kgf•m, 33 lbf•ft)	ALOC bolt

## TOOL

Snap ring pliers	07914-SA50001
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## TROUBLESHOOTING

### Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly (rear)
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

### Brake lever/pedal hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly (rear)
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

### Brake drags

- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly (rear)
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

### BRAKE FLUID REPLACEMENT/AIR BLEEDING

#### NOTICE

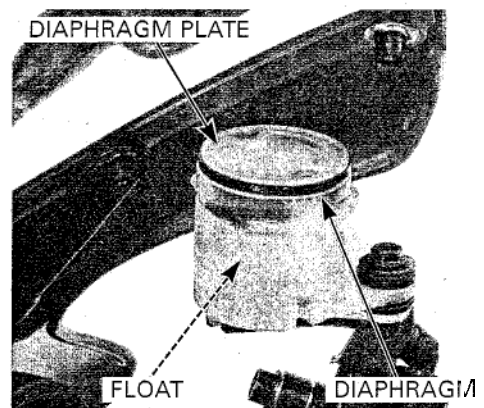
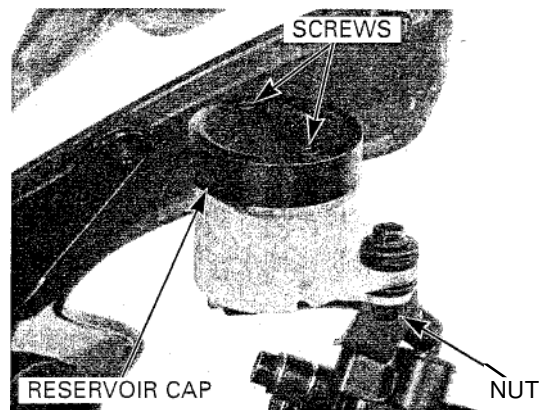
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

#### BRAKE FLUID DRAINING

For the front brake, turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

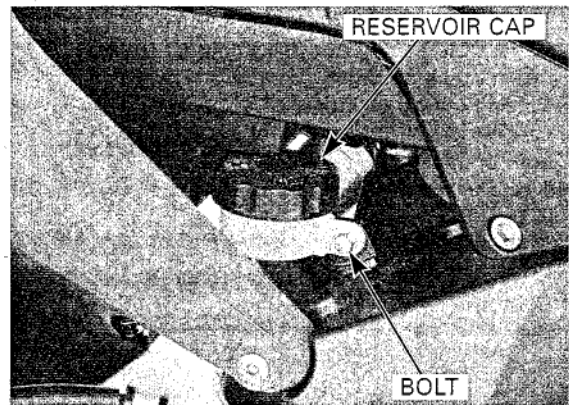
Loosen the master cylinder reservoir mounting nut. Remove the screws and reservoir cap.

Remove the diaphragm plate, diaphragm and float.

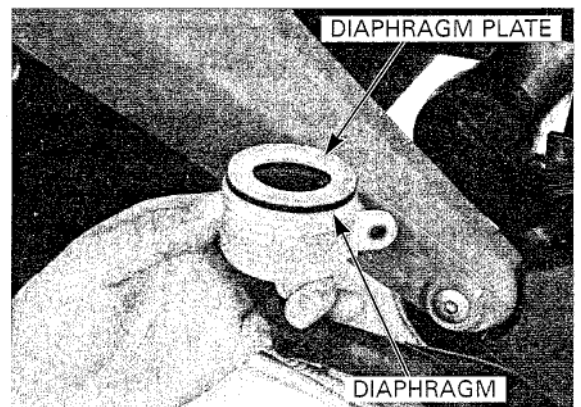


For the rear brake, remove the rear brake reservoir mounting bolt.

Remove the reservoir cap.



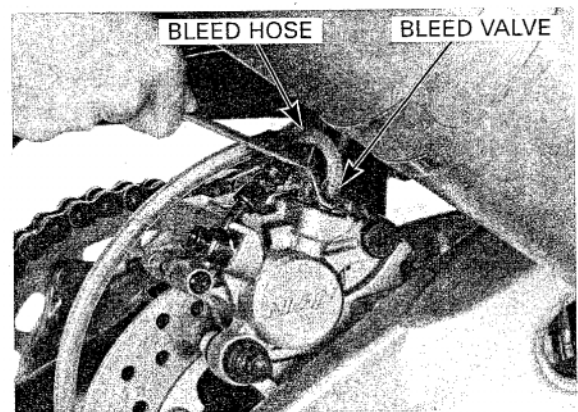
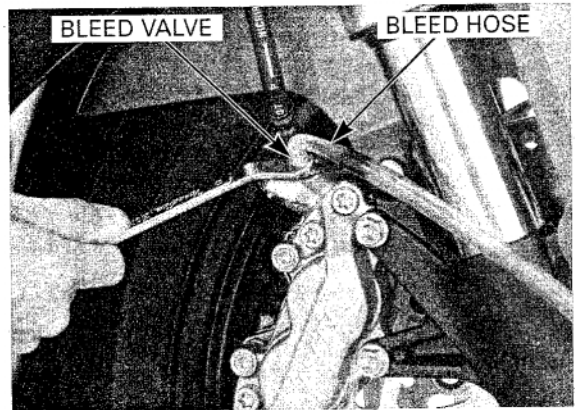
Remove the diaphragm plate and diaphragm.



Connect a bleed hose to the caliper bleed valve.

Loosen the bleed valve and pump the brake lever or pedal.

Stop pumping the lever or pedal when no more fluid flows out of the bleed valve.

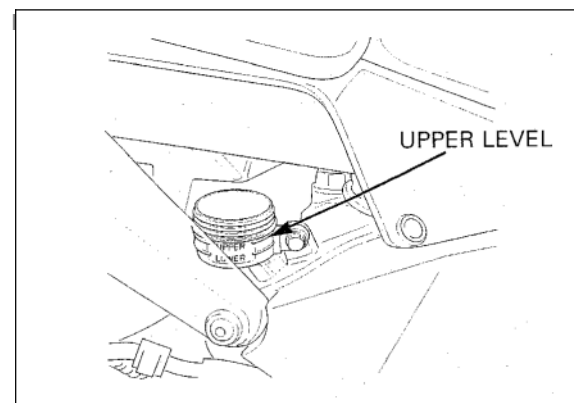
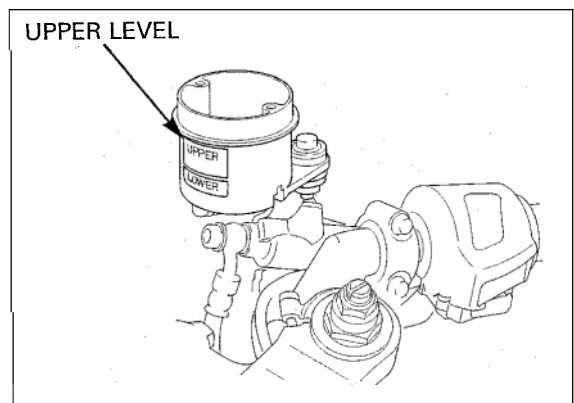


### BRAKE FLUID FILLING/AIR BLEEDING

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

**NOTE:**

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.



## HYDRAULIC BRAKE

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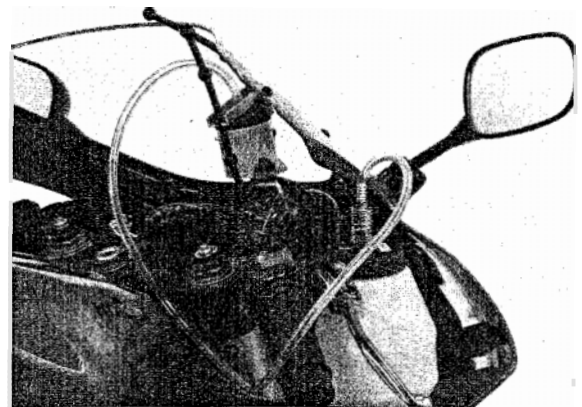
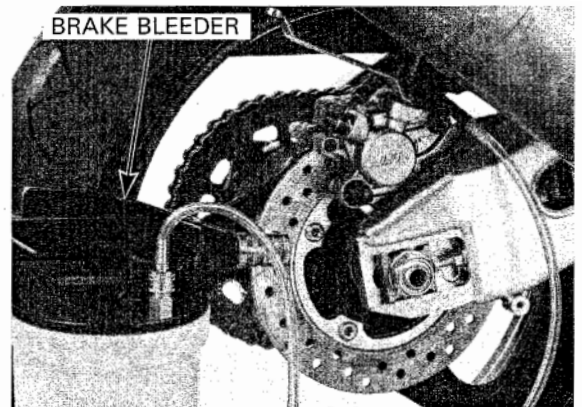
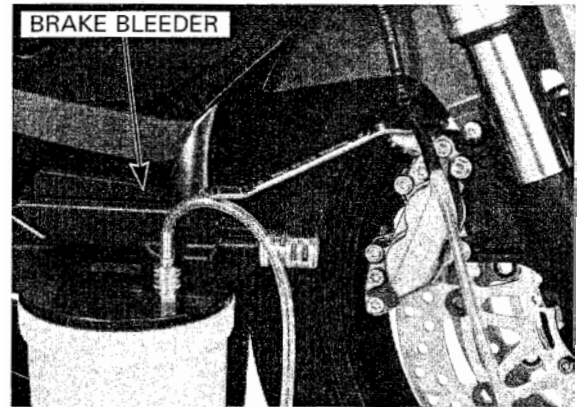
Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

If an automatic refill system is not used, add fluid when the fluid level in the reservoir is low.

Perform the bleeding procedure until the system is completely flushed/bled.

Close the bleed valve and operate the brake lever or pedal. If it still feels spongy, bleed the system again.



If the brake bleeder is not available, perform the following procedure.

Pressurize the system with the lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.



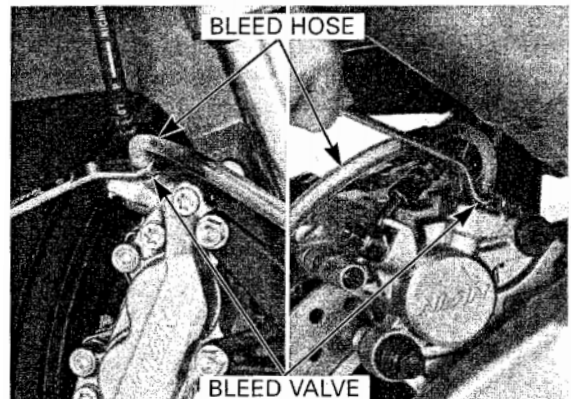
## HYDRAULIC BRAKE

*Do not release the brake lever or pedal until the bleed valve has been closed*

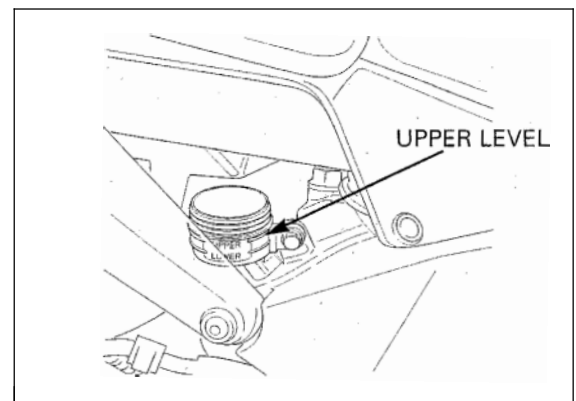
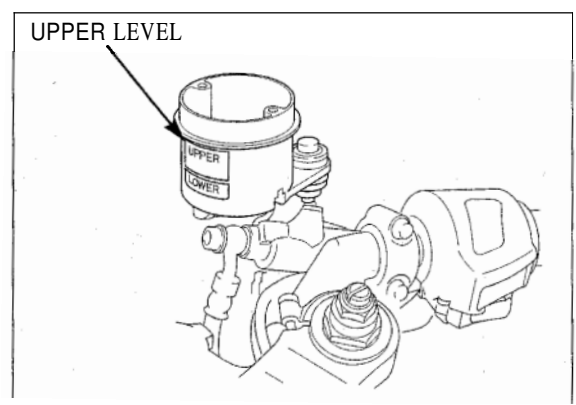
1. Squeeze the brake lever or push the brake pedal, open the bleed valve 1/2 turn and then close the valve.
2. Release the brake lever or pedal until the bleed valve has been closed.

Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleed valve.  
Tighten the bleed valve.

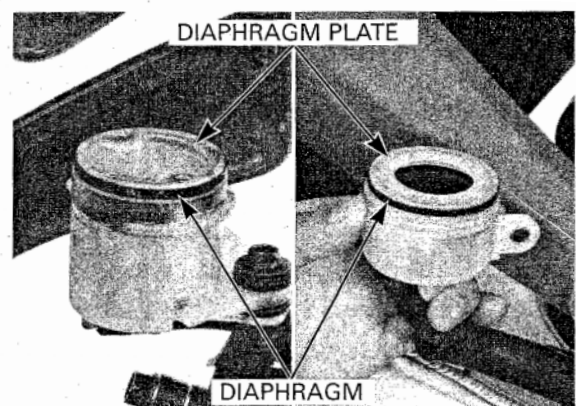
**TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)**



Fill the fluid reservoir to the upper level.

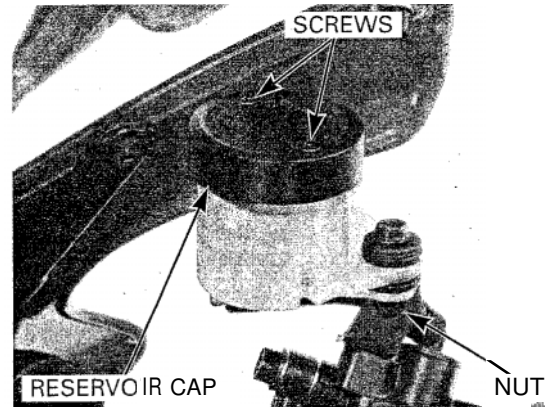


Reinstall the diaphragm and diaphragm plate.

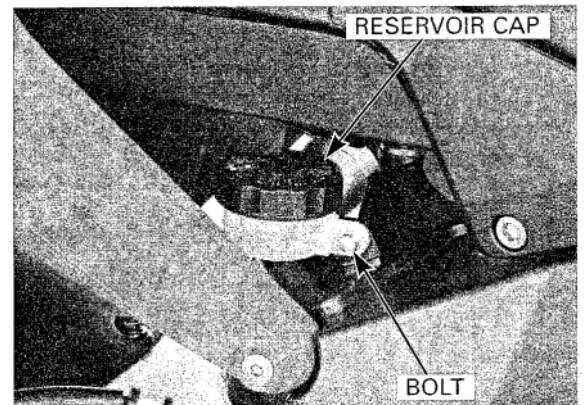


## HYDRAULIC BRAKE

On the front brake, install the reservoir cap, and tighten the screws.  
Tighten the master cylinder reservoir mounting nut securely.



On the rear brake, install the reservoir cap securely, then install the reservoir onto the frame and tighten the mounting bolt.

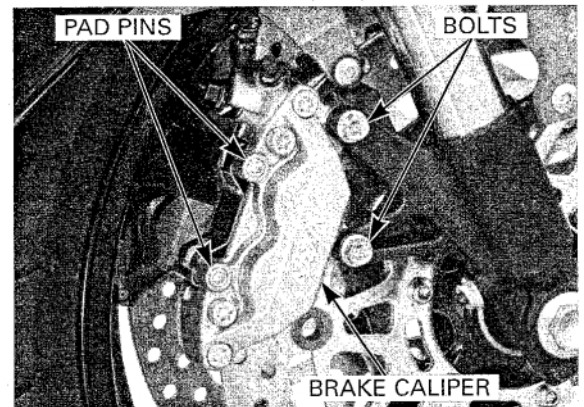


## BRAKE PAD/DISC

*Always replace the brake pads in pairs to assure even disc pressure*

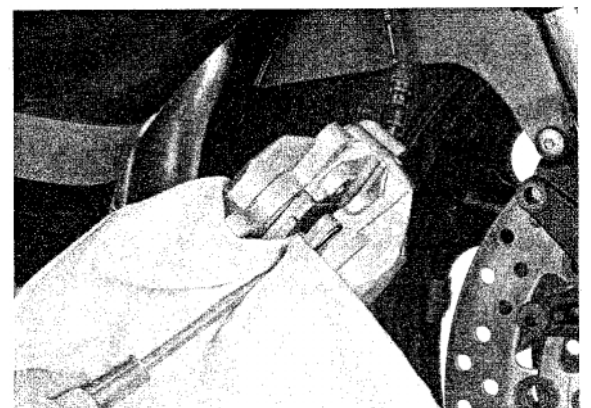
### FRONT BRAKE PAD REPLACEMENT

Loosen the pad pins.  
Remove the bolts and brake caliper.



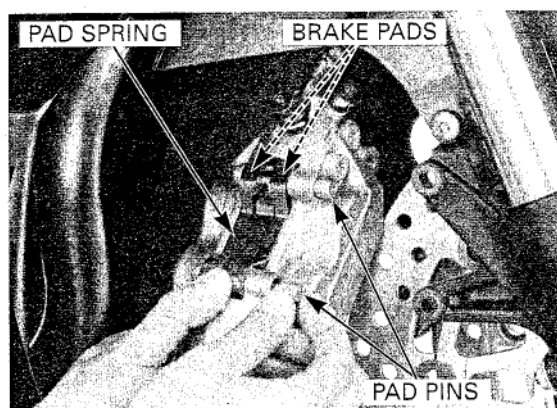
*Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise*

Push the caliper pistons all the way in to allow installation of new brake pads.



## HYDRAULIC BRAKE

Remove the pad pins, pad spring and brake pads.

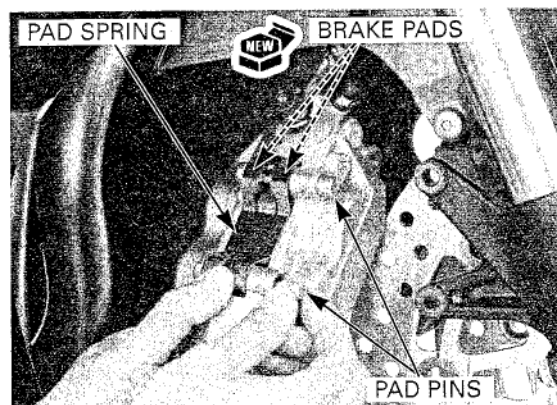


Clean the inside of the caliper especially around the caliper pistons.



Install the new brake pads.  
Install the pad spring with its arrow mark facing up (page 15-23).

Push the pad spring, then install the pad pin.



*Be careful not to damage the pads.*

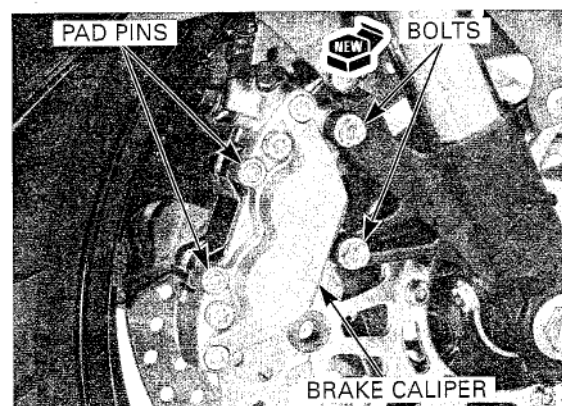
Install the brake caliper to the fork leg so the disc is positioned between the pads.

Install and tighten the new brake caliper mounting bolts.

**TORQUE: 30 N•m (3.1 kgf•m, 22 lbf•ft)**

Tighten the pad pins.

**TORQUE: 18 N•m (1.8 kgf•m, 13 lbf•ft)**





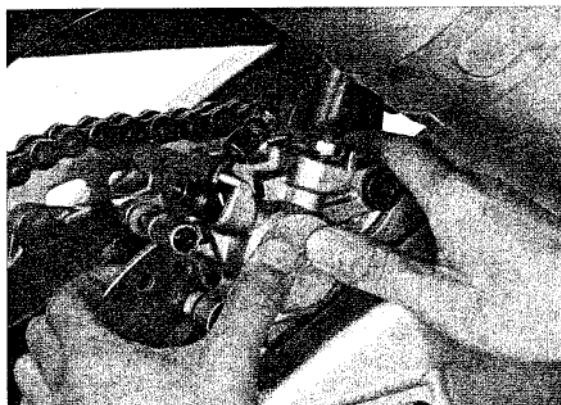
## HYDRAULIC BRAKE

*Always replace the brake pads in pairs to assure even disc pressure*

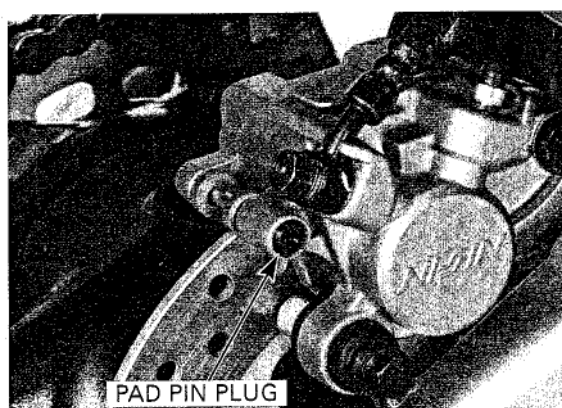
### REAR BRAKE PAD REPLACEMENT

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

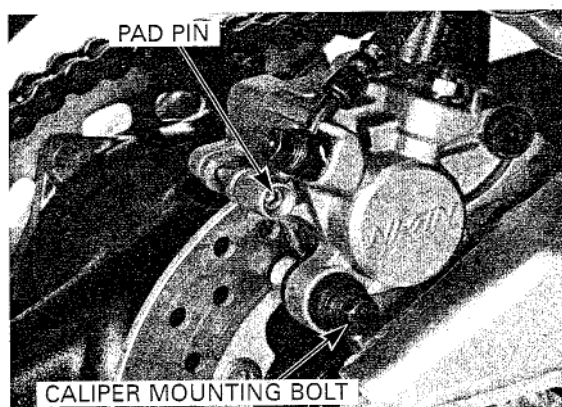


Remove the pad pin plug.

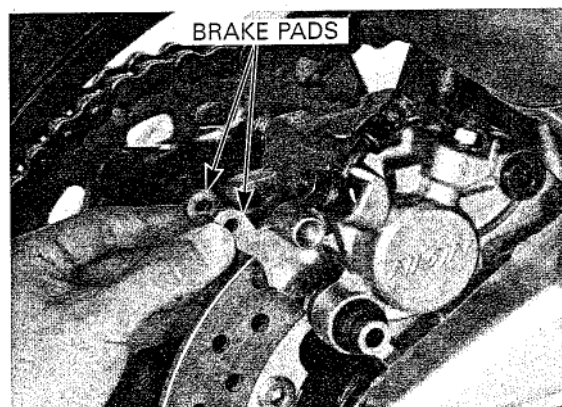


Loosen the pad pin.

Remove the caliper mounting bolt.



Pivot the caliper up.  
Remove the pad pin and brake pads.

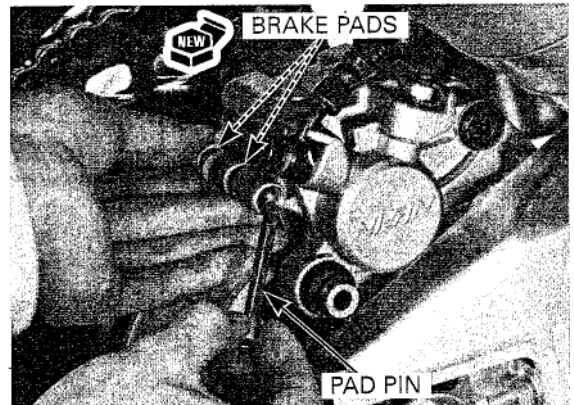




Make sure the brake pad spring is in place.  
Install the new brake pads.

Lower the caliper while pushing the pads against the pad spring so the pad ends are positioned onto the retainer on the caliper bracket.

Install the pad pin.

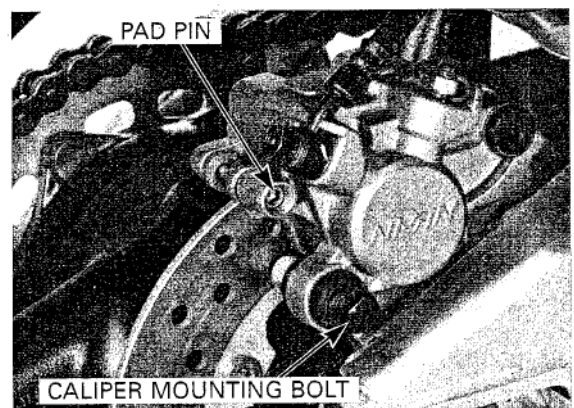


Install and tighten the caliper mounting bolt.

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

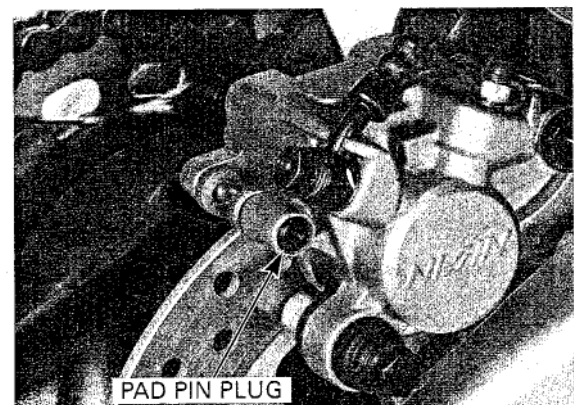
Tighten the pad pin.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



Install and tighten the pad pin plug.

**TORQUE: 2 N·m (0.25 kgf·m, 1.8 lbf·ft)**



### BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or crack.

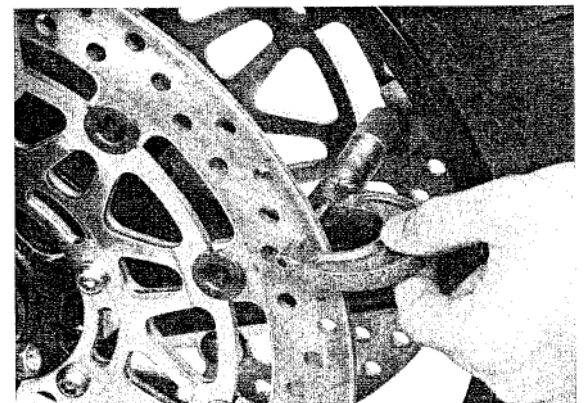
Measure the brake disc thickness with a micrometer.

#### SERVICE LIMITS:

**FRONT: 3.5 mm (0.14 in)**

**REAR: 4.0 mm (0.16 in)**

Replace the brake disc if the smallest measurement is less than the service limit.



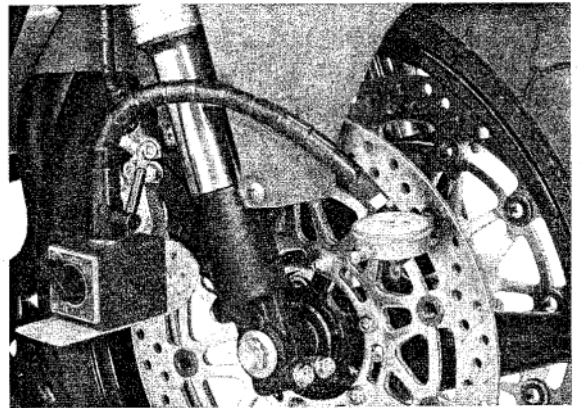
## HYDRAULIC BRAKE

Measure the brake disc warpage with a dial indicator.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



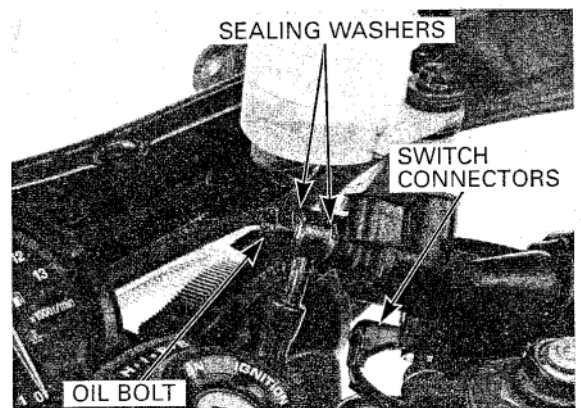
## FRONT MASTER CYLINDER

### REMOVAL

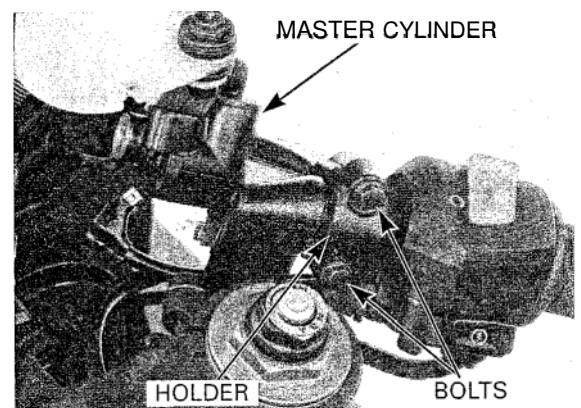
Drain the front hydraulic system (page 15-4).

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Disconnect the brake light switch wire 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 dust cover and snap ring.

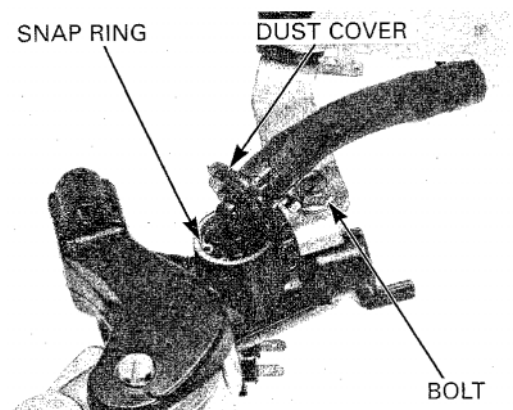
#### TOOL:

**Snap ring pliers**

**07914-SA50000**

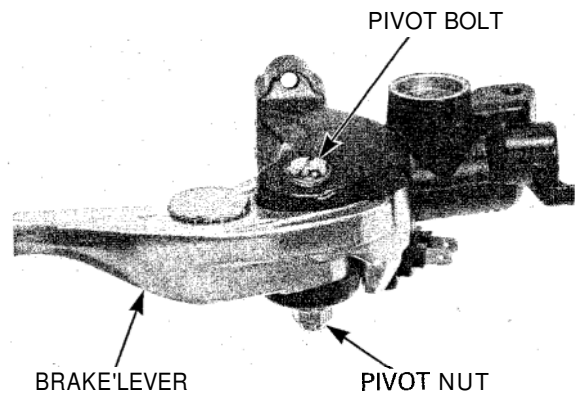
Remove the bolt and brake reservoir from the master cylinder.

Remove the O-ring.

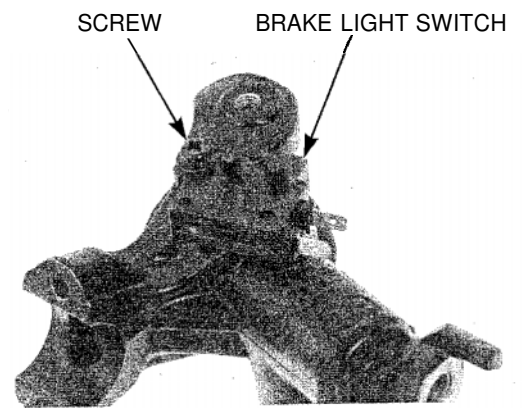


## HYDRAULIC BRAKE

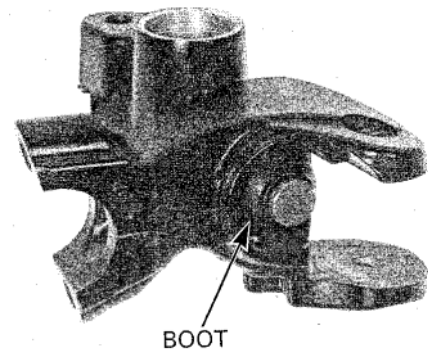
Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.



Remove the boot.



Remove the snap ring from the master cylinder body using the special tool as shown.

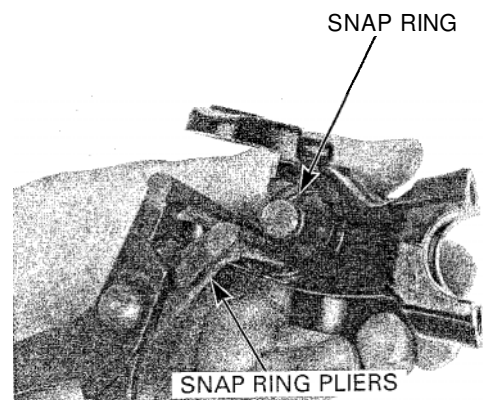
**TOOL:**

**Snap ring pliers**

**07914-SA50000**

Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

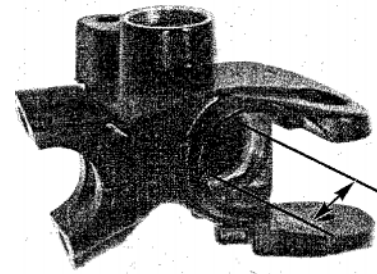


## HYDRAULIC BRAKE

### INSPECTION

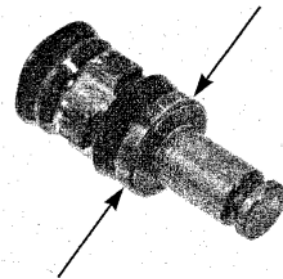
Check the piston boot, primary cup and secondary cup for fatigue or damage.  
Check the master cylinder and piston for abnormal scratches.  
Measure the master cylinder I.D.

**SERVICE LIMIT: 17.515 mm (0.6896 in)**

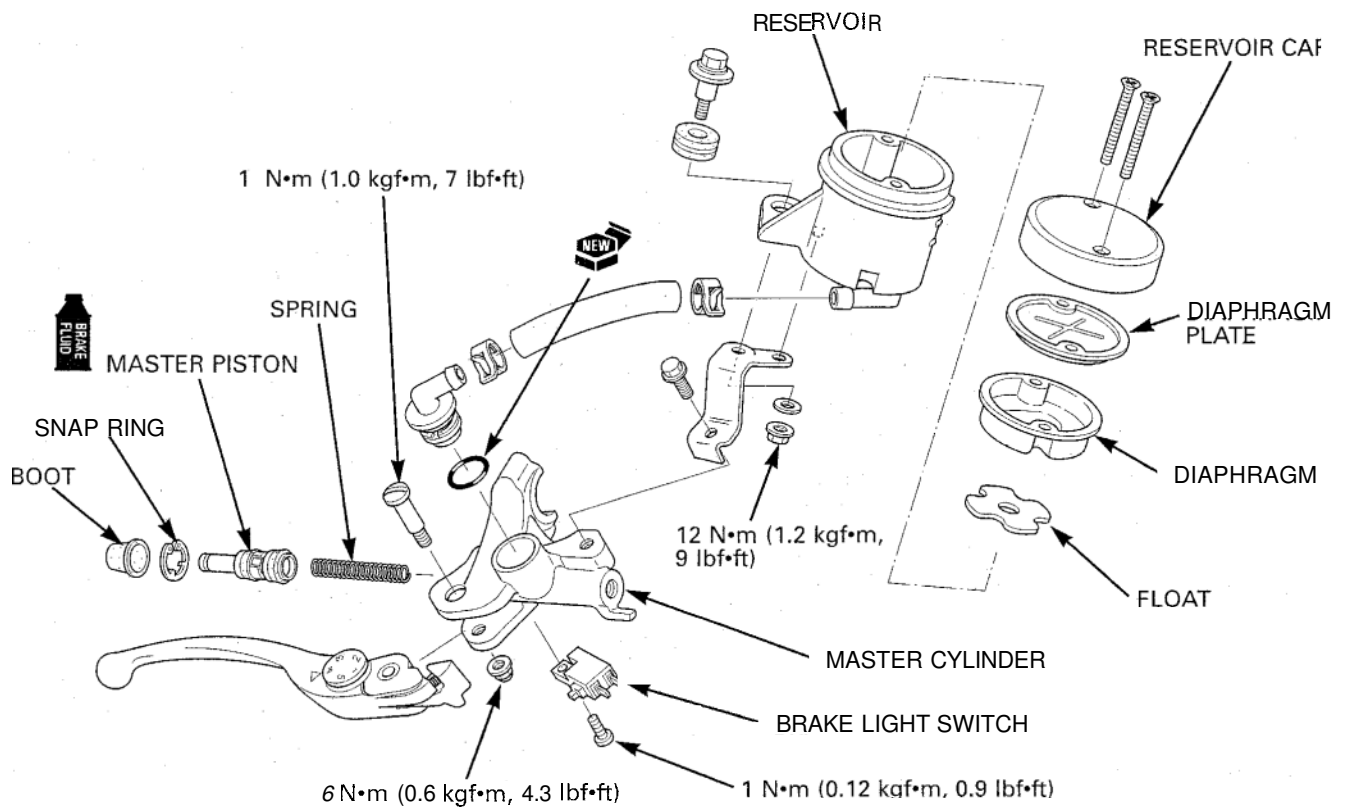


Measure the master cylinder piston O.D.

**SERVICE LIMIT: 17.309 mm (0.6815 in)**



### ASSEMBLY



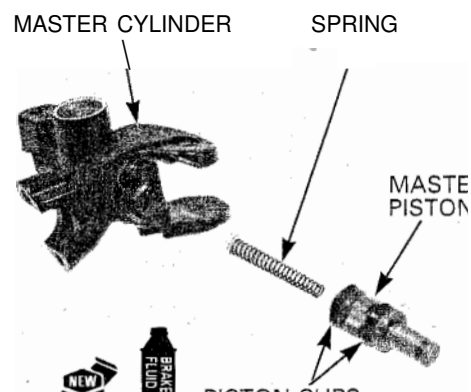
## HYDRAULIC BRAKE

Keep the piston, cups, spring, snap ring and boot as a set do not substitute individual parts

When installing the cups, do not allow the lips to turn inside out

Coat all parts with clean brake fluid before assembly.

Dip the piston in brake fluid.  
Install the spring into the piston.  
Install the piston assembly into the master cylinder.



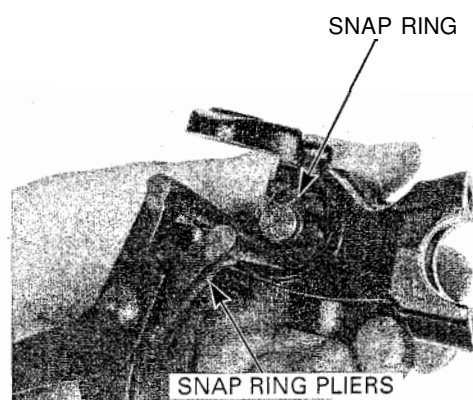
Be certain the snap ring is firmly seated in the groove

Install the snap ring.

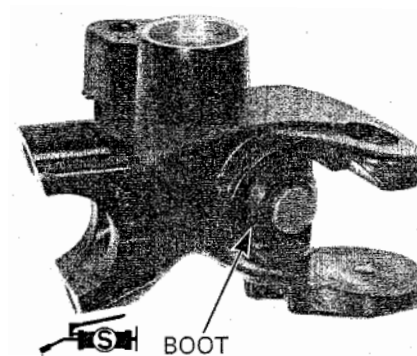
### TOOL:

Snap ring pliers

07914-SA50000

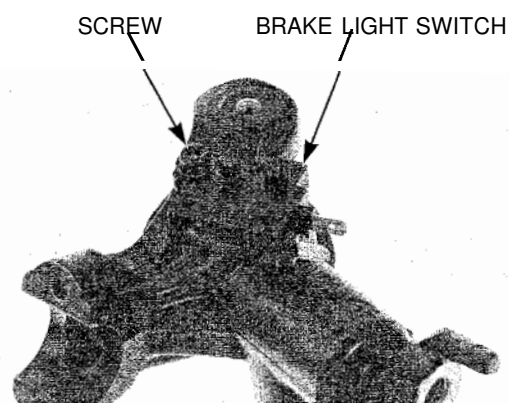


Install the boot.



Install the brake light switch and tighten the screw to the specified torque.

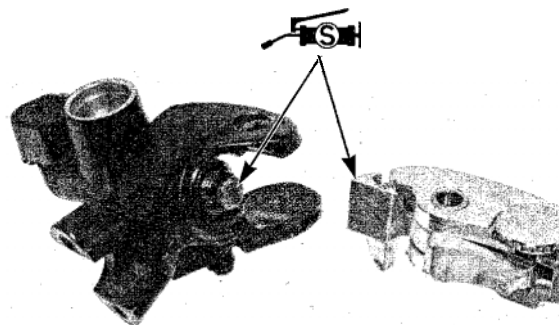
**TORQUE: 1 N·m (0.12 kgf·m, 0.9 lbf·ft)**



## HYDRAULIC BRAKE

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Apply silicone grease to the contact surfaces of the brake lever and piston tip.

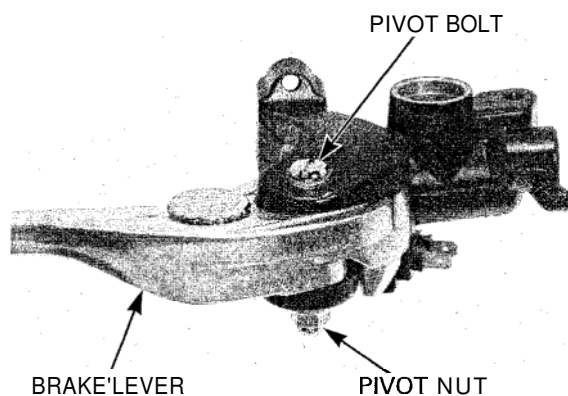


Install the brake lever assembly, tighten the pivot bolt to the specified torque.

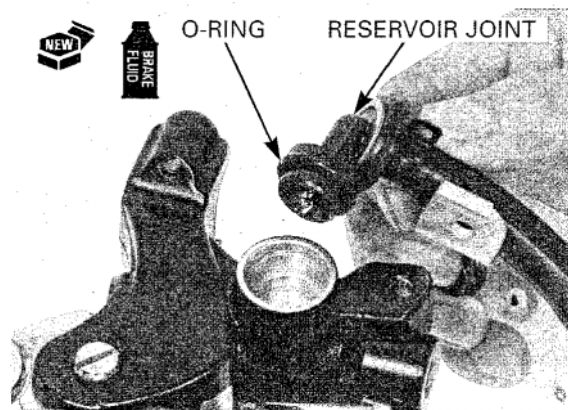
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Hold the pivot bolt and tighten the pivot nut to the specified torque.

**TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)**



Apply brake fluid to the new reservoir joint O-ring.



Install the master cylinder reservoir joint into the master cylinder and secure the joint with a snap ring.

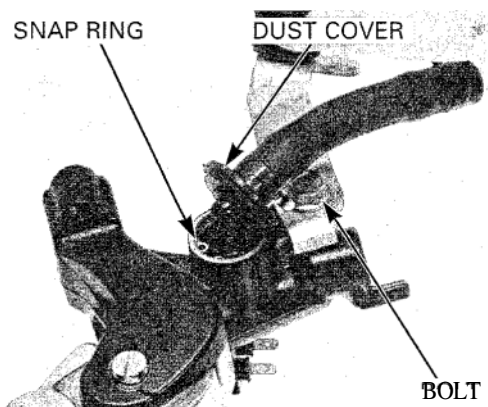
**TOOL:**

**Snap ring pliers**

**07914-SA50000**

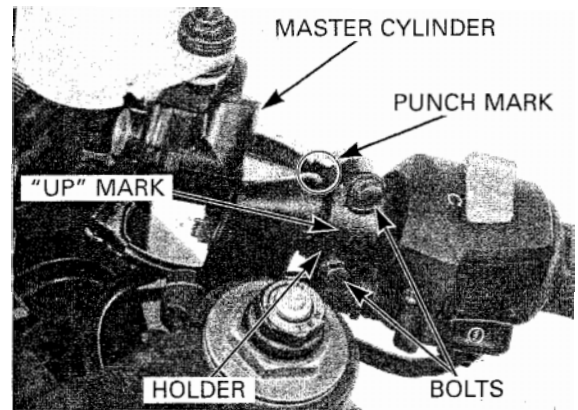
Install the dust cover.

Install and tighten the reservoir mounting bolt.



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.

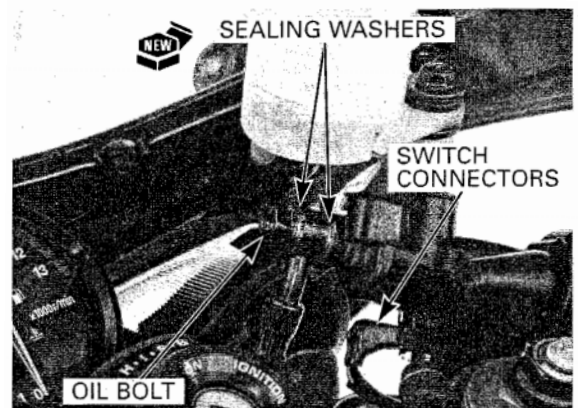


Install the brake hose eyelet with the oil bolt and new sealing washers. Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

**TORQUE: 34 N•m (3.5 kgf•m, 25 lbf•ft)**

Connect the brake light switch wire connectors.

Fill the reservoir to the upper level and bleed the brake system (page 15-5).

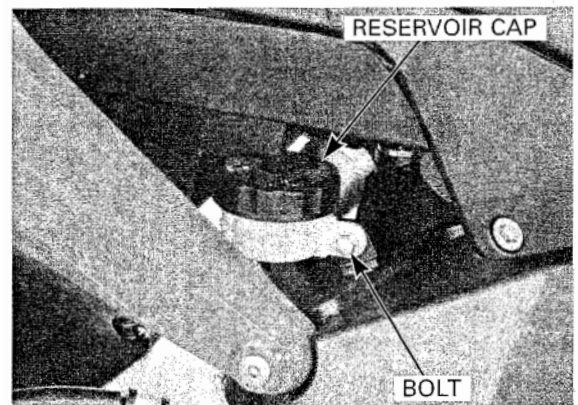


## REAR MASTER CYLINDER

### REMOVAL

Drain the rear hydraulic system (page 15-4).

Remove the rear master cylinder reservoir mounting bolt.



*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over*

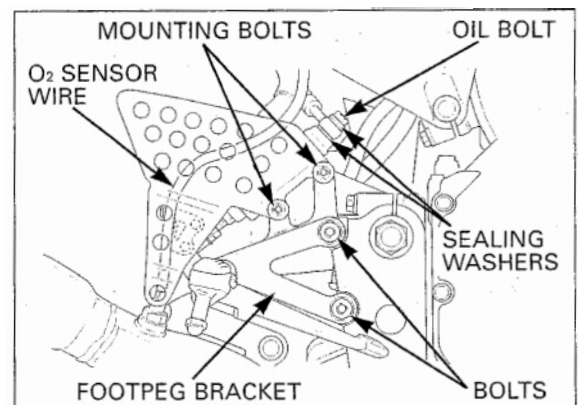
*these parts whenever the system is serviced*

*California type only*

Remove the brake hose oil bolt, sealing washers and brake hose.

Loosen the rear master cylinder mounting bolts. Remove the main footpeg bracket socket bolts and main footpeg bracket assembly.

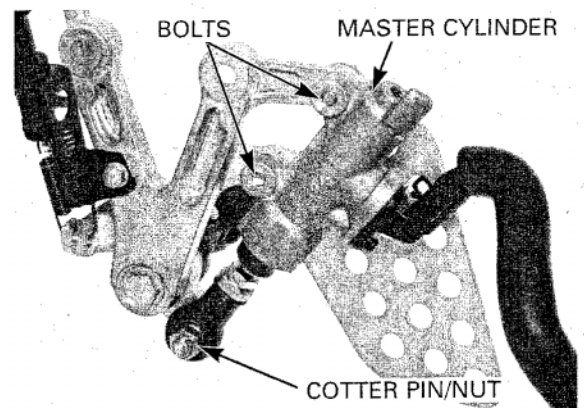
Release the  $O_2$  sensor wire from the wire guide behind the right step guard.



## HYDRAULIC BRAKE

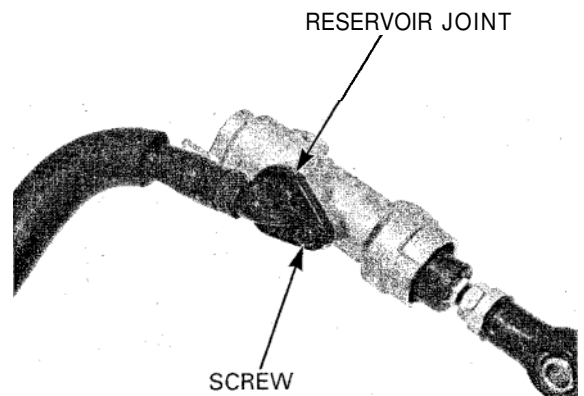
Remove and discard the brake pedal joint cotter pin.  
Remove the joint pin.

Remove the master cylinder mounting bolts, collars (California type only), step guard and master cylinder.



### DISASSEMBLY

Remove the screw and reservoir hose joint from the master cylinder.



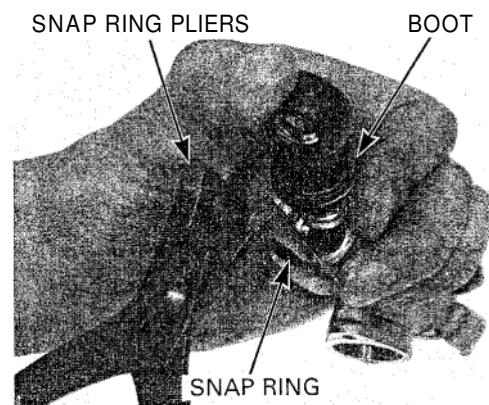
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

**TOOL:**

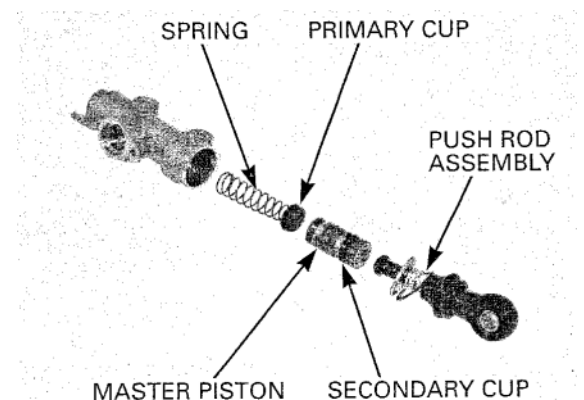
Snap ring pliers

07914-SA50000



Remove the push rod, master piston and spring.

Clean the inside of the cylinder with brake fluid.





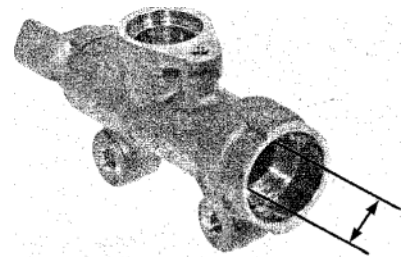
## INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.

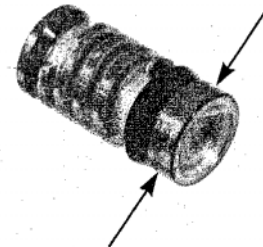
Measure the master cylinder I.D.

**SERVICE LIMIT: 15.925 mm (0.6270 in)**

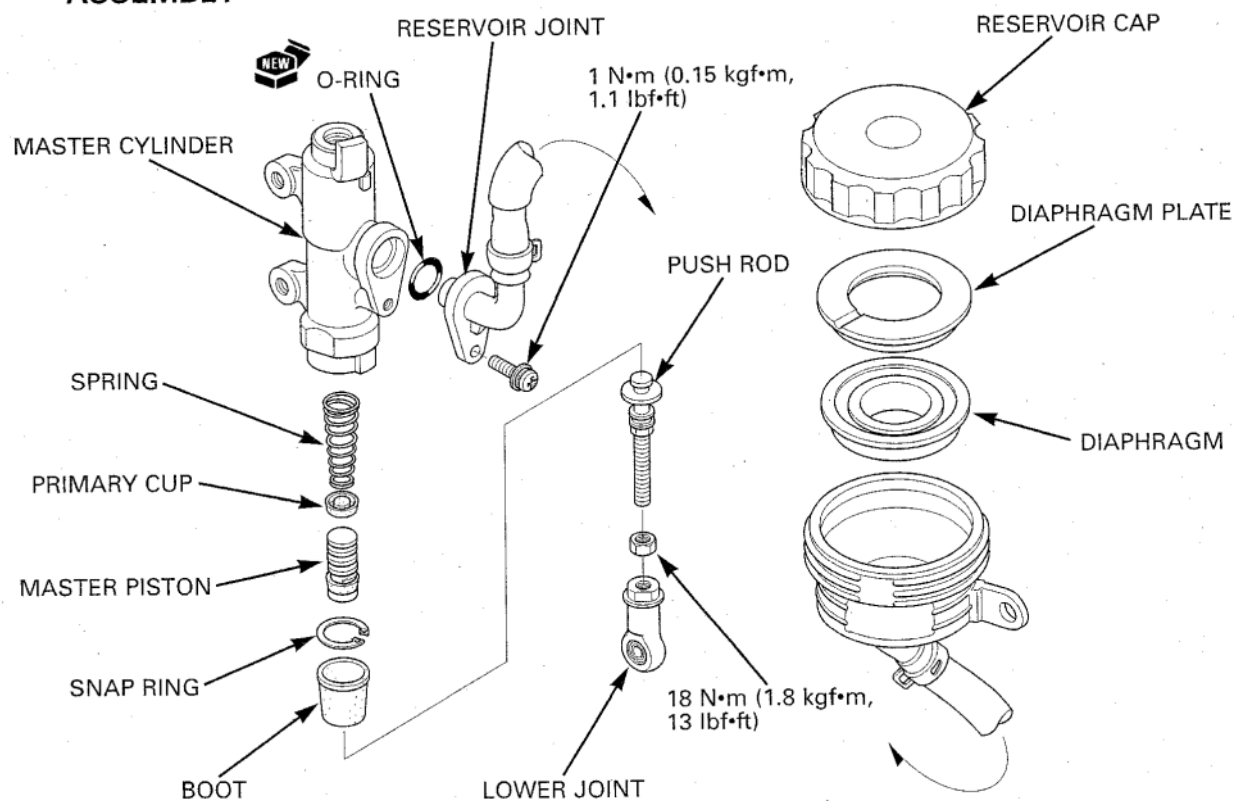


Measure the master cylinder piston O.D.

**SERVICE LIMIT: 15.815 mm (0.6226 in)**



## ASSEMBLY



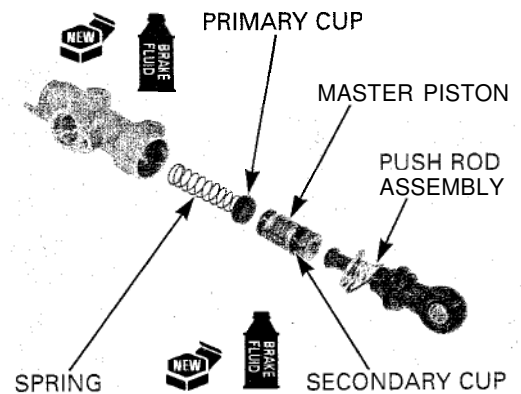
## HYDRAULIC BRAKE

Keep the piston cups, spring, snap ring and boot as a set, do not substitute individual parts.

When installing the cups, do not allow the lips to turn inside out.

Coat all parts with clean brake fluid before assembly.

Dip the piston in brake fluid.  
Install the spring to the primary cup.  
Install the spring/primary cup and master piston assembly.  
Apply silicone grease to the piston contact area of the push rod.



If the push rod is disassembled, refer to page 3-26 for push rod length adjustment.

Install the push rod into the master cylinder.

Be certain the snap ring is firmly seated in the groove.

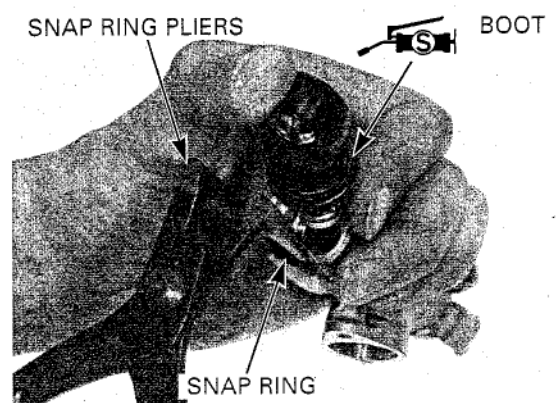
Install the snap ring.

**TOOL:**

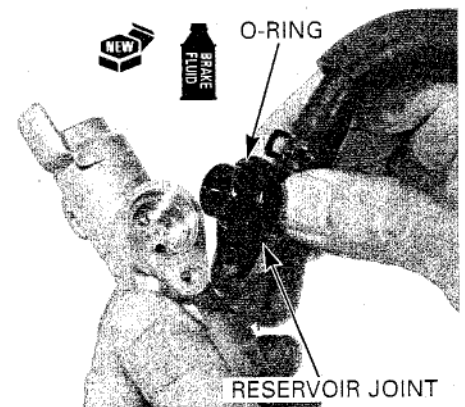
**Snap ring pliers**

**07914-SA50000**

Install the boot.

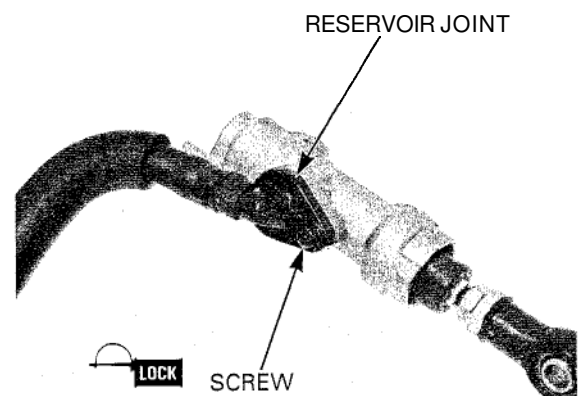


Apply brake fluid to a new O-ring and install it onto the reservoir joint.  
Install the reservoir joint into the master cylinder.



Apply a locking agent to the reservoir joint screw threads.  
Install and tighten the screw to the specified torque.

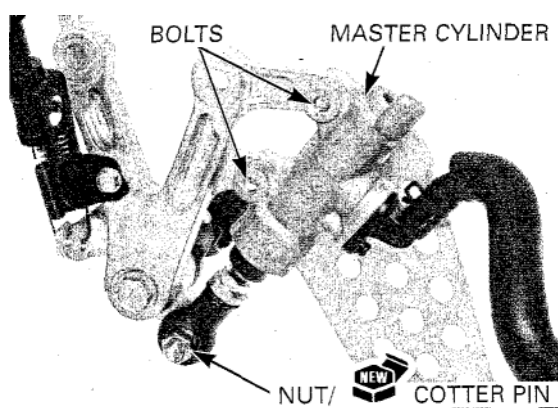
**TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)**



## INSTALLATION

Place the master cylinder onto the main footpeg bracket, install the collars (California type only), step guard and master cylinder mounting bolts.

Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.



*California type only*

Clamp the O<sub>2</sub> sensor wire to the wire guide behind the right step guard.

Install the main footpeg bracket onto the lower bracket, tighten the socket bolts to the specified torque.

**TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)**

Tighten the master cylinder mounting bolts.

Install the brake hose with the oil bolt and new sealing washers.

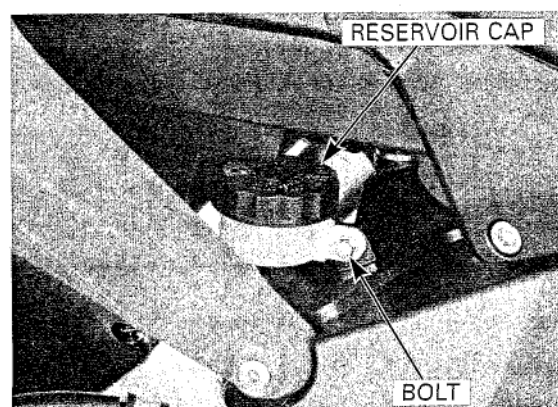
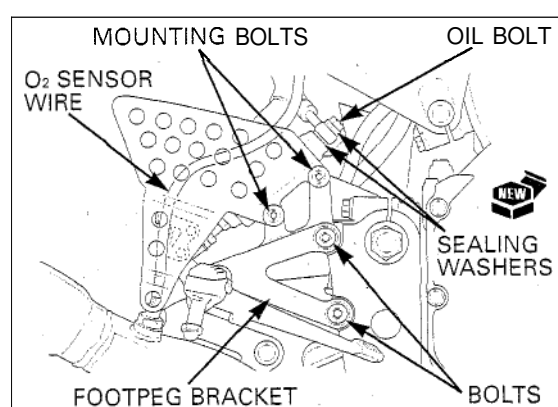
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Install and tighten the brake reservoir mounting bolt.

Fill the reservoir to the upper level and bleed the brake system (page 15-5).

Adjust the brake pedal height (page 3-26).



## FRONT BRAKE CALIPER

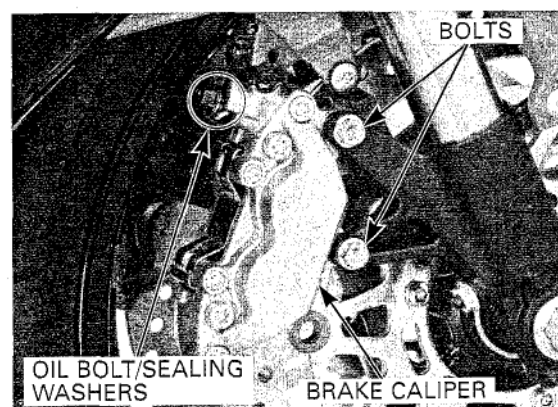
### REMOVAL

Drain the front brake hydraulic system (page 15-4).

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Remove the oil bolt, sealing washers and brake hose eyelet joint.

Remove the caliper mounting bolts, caliper and the brake pads (page 15-8).

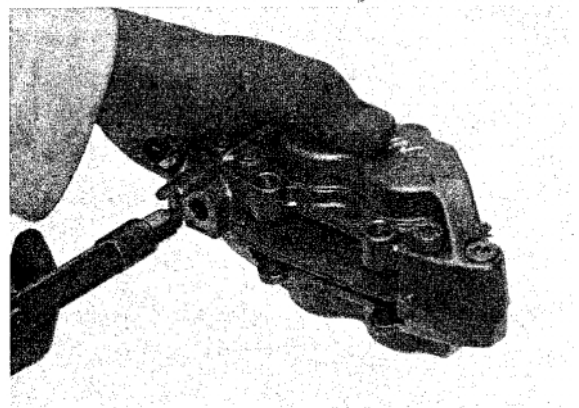


## HYDRAULIC BRAKE

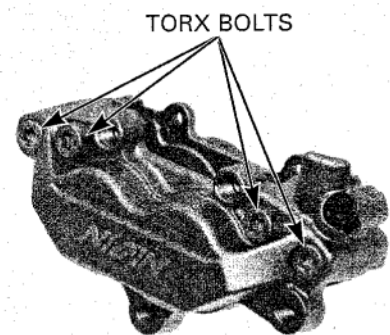
### DISASSEMBLY

*Do not use high pressure air or bring the nozzle too close to the inlet*

Install corrugated cardboard or equivalent between the pistons.  
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



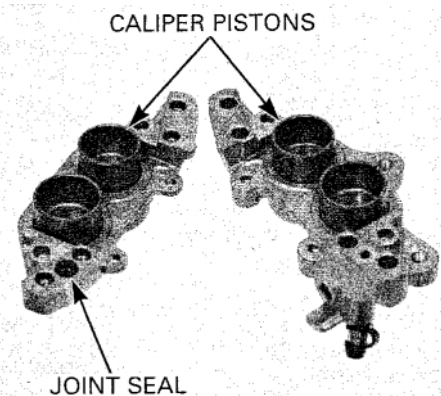
Remove the four caliper assembly torx bolts and separate the caliper halves.



*Mark the pistons to ensure correct reassembly.*

Remove the following:

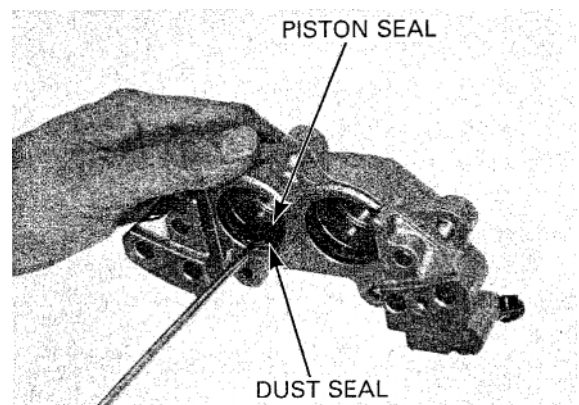
- Joint seals
- Caliper piston A
- Caliper piston B



*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 with clean brake fluid.



## INSPECTION

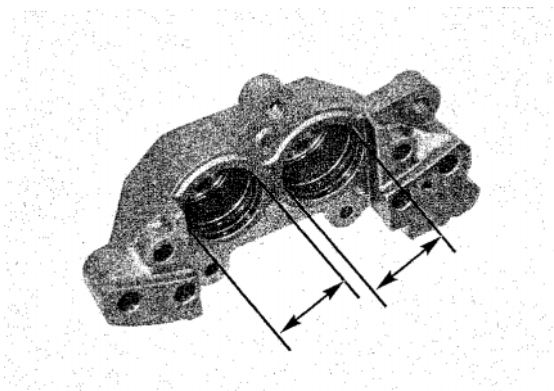
Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

### SERVICE LIMITS:

Cylinder A (Upper): 32.05 mm (1.262 in)

Cylinder B (Lower): 30.29 mm (1.193 in)



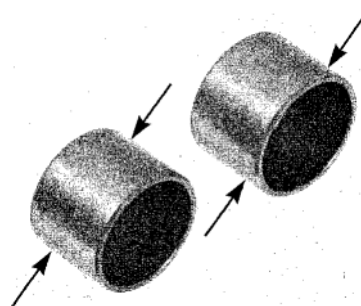
Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

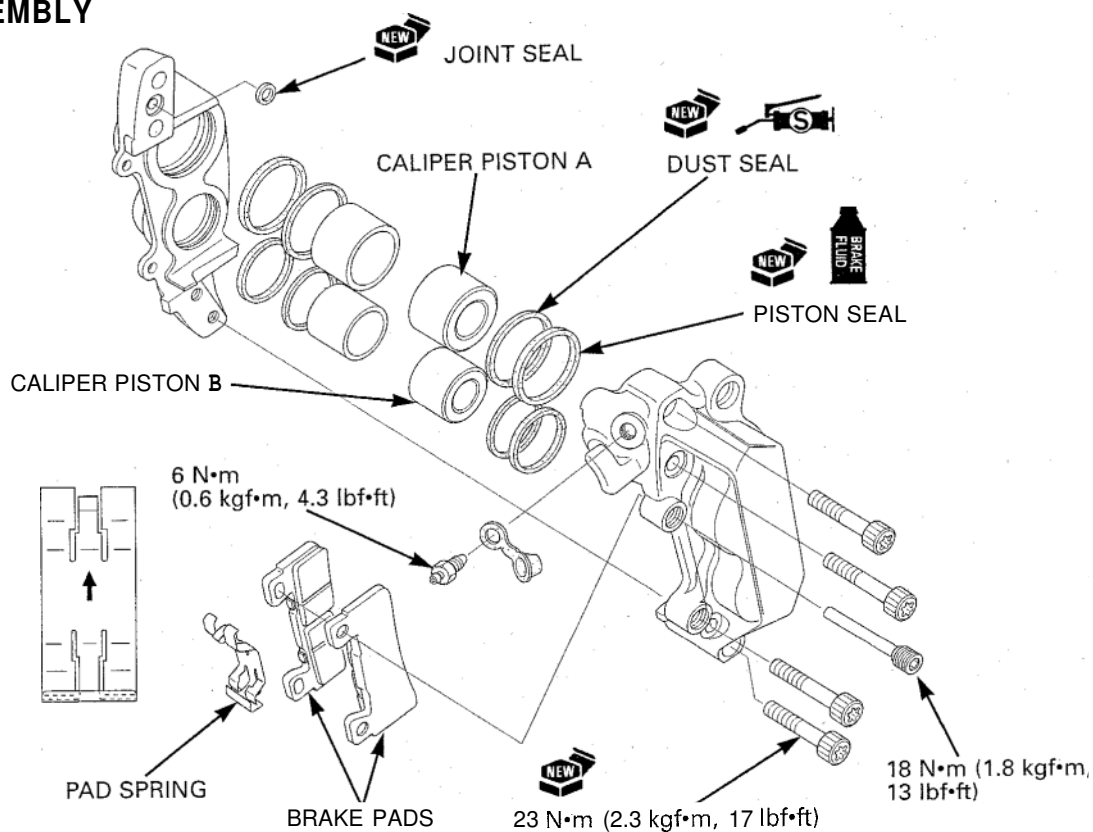
### SERVICE LIMITS:

Piston A (Upper): 31.953 mm (1.2580 in)

Piston B (Lower): 30.074 mm (1.1840 in)



## ASSEMBLY

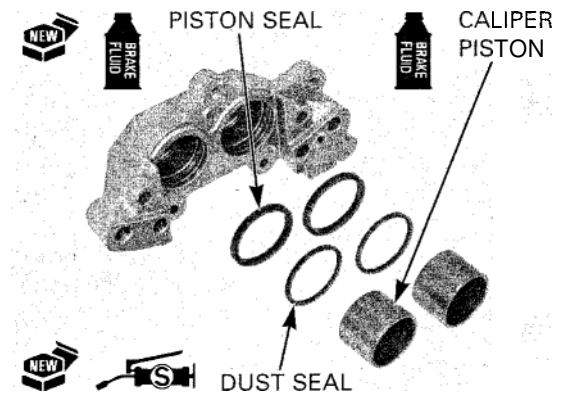


## HYDRAULIC BRAKE

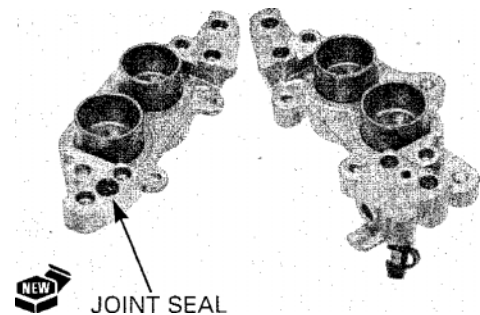
Coat the new piston seals with clean brake fluid.  
Coat the new dust seals with silicone grease.

Install the piston and dust seal into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.

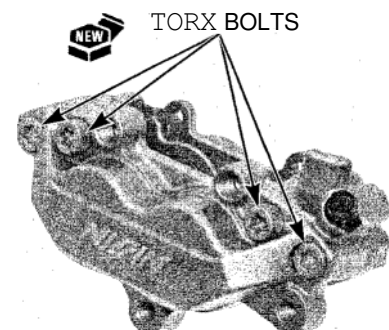


Install the new joint seal into the fluid passage on the caliper.



Assemble the caliper halves and install and tighten the new caliper assembly torx bolts to the specified torque.

**TORQUE: 23 N•m (2.3kgf•m, 17 lbf•ft)**



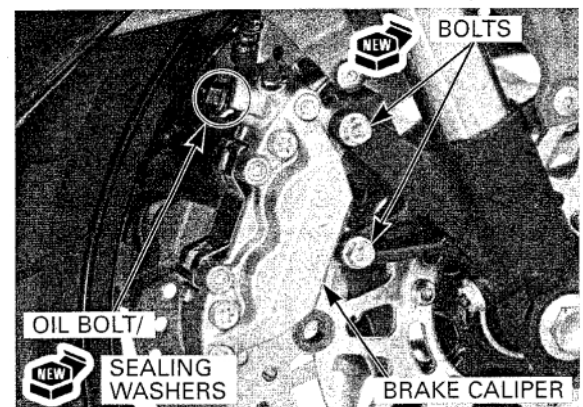
## INSTALLATION

Install the brake pads and caliper onto the fork leg (page 15-9).

Install and tighten the new caliper mounting bolts to the specified torque.

**TORQUE: 30 N•m (3.1kgf•m, 22 lbf•ft)**

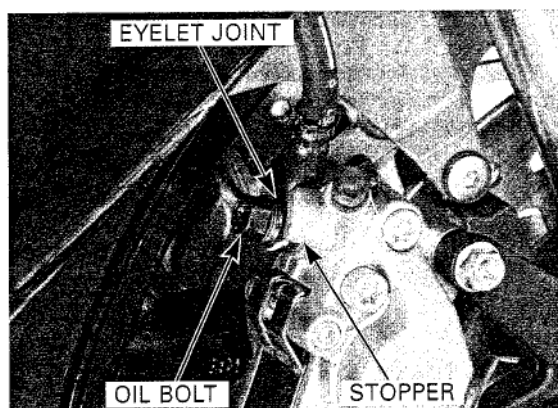
Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt.



Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

**TORQUE : 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill and bleed the front brake hydraulic system (page 15-5).



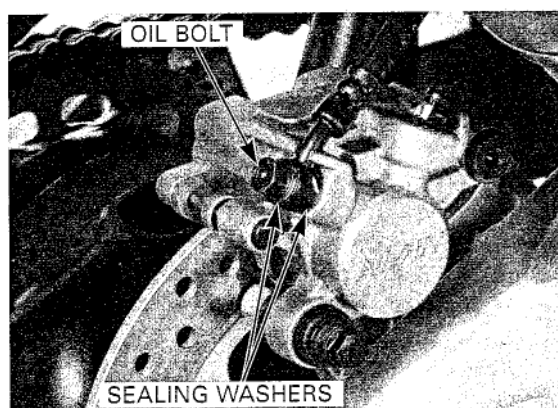
## REAR BRAKE CALIPER

### REMOVAL

Drain the rear brake hydraulic system (page 15-4).

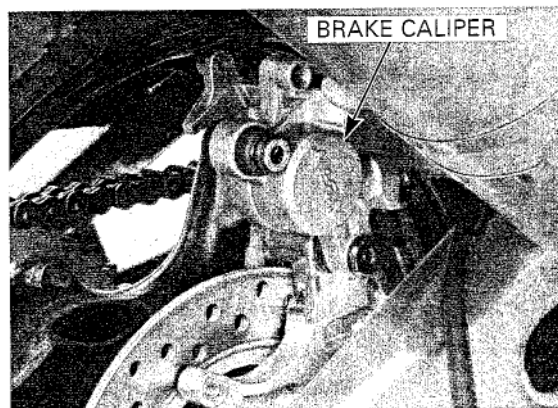
*Avoid spilling fluid  
on painted, plastic,  
or rubber parts  
Place a rag over  
these parts when-  
ever the system  
is serviced*

Remove the oil bolt, sealing washers and brake hose eyelet joint.



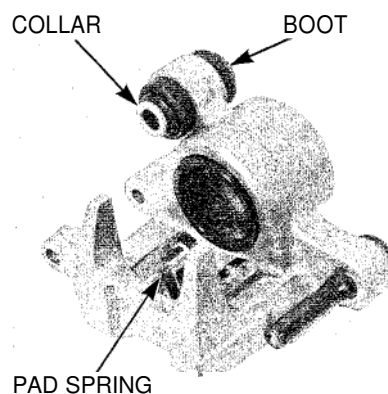
Remove the caliper bracket bolts and the brake pads (page 15-10).

Pivot the caliper up and remove it.



### DISASSEMBLY

Remove the pad spring, collar and boot from the caliper body.

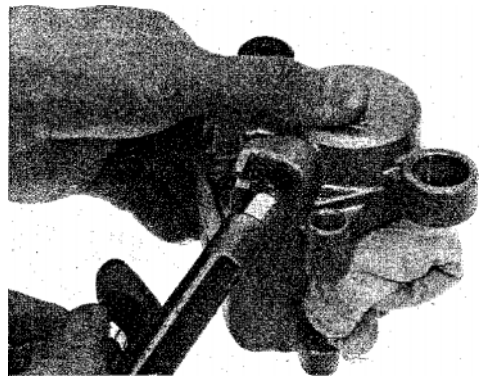


## HYDRAULIC BRAKE

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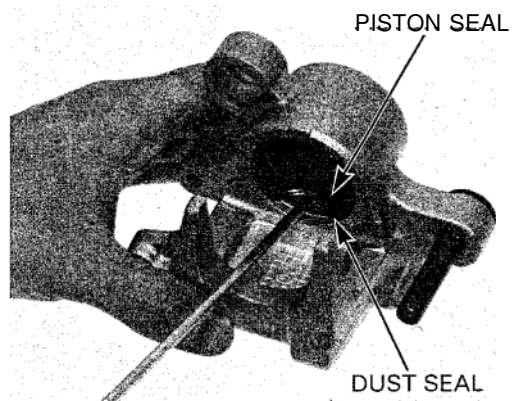
*Do not use high pressure air or bring the nozzle too close to the inlet*

Place a shop towel over the piston.  
Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.



*Be careful not to damage the piston sliding surface*

Push the dust seal and piston seal in and lift them out.  
Clean the seal grooves with clean brake fluid.



### INSPECTION

Check the caliper cylinder for scoring or other damage.

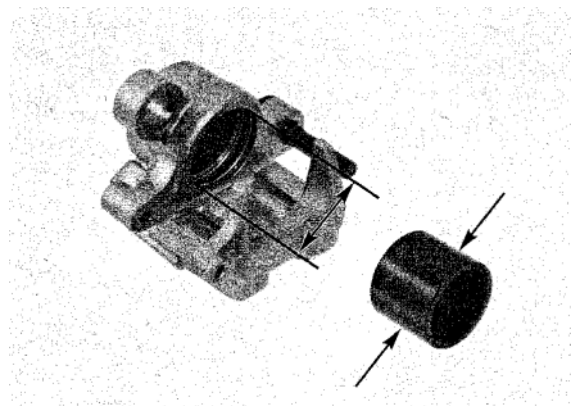
Measure the caliper cylinder I.D.

**SERVICE LIMIT: 38.24 mm (1.506 in)**

Check the caliper pistons for scratches, scoring or other damage.

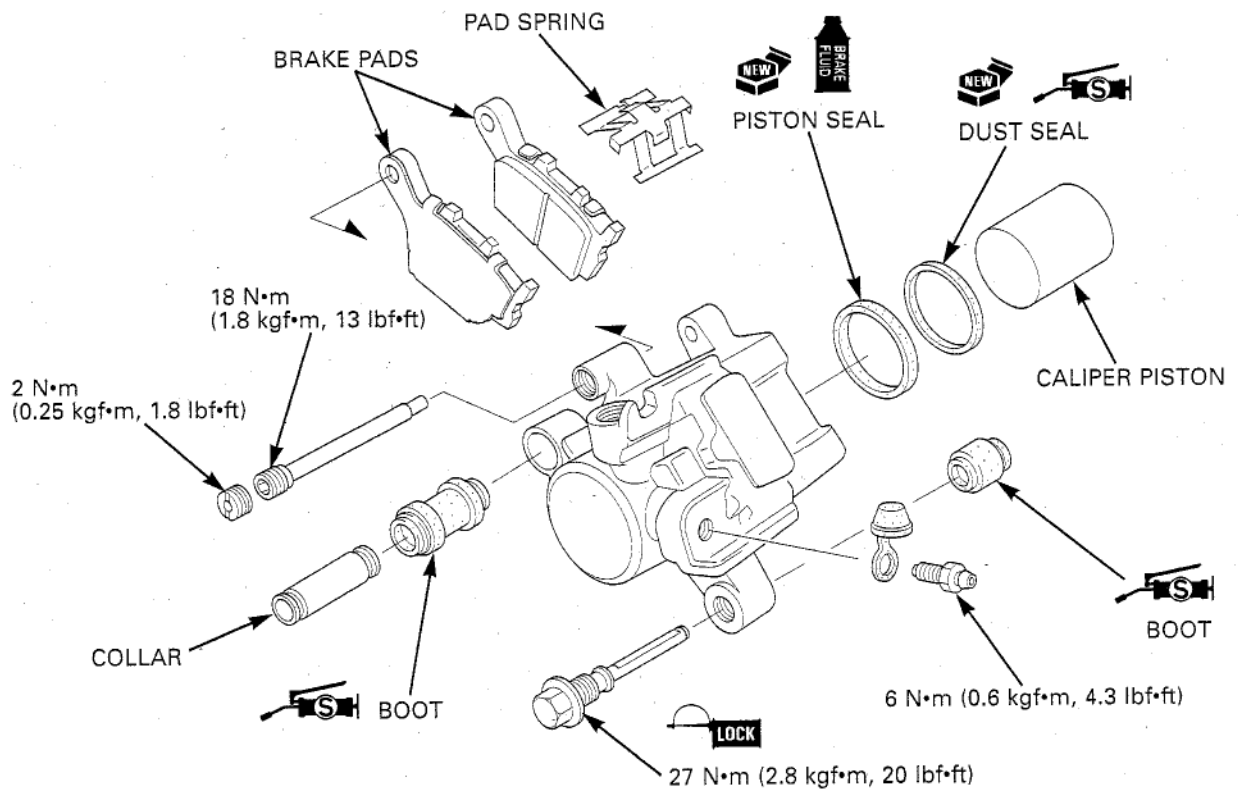
Measure the caliper piston O.D.

**SERVICE LIMIT: 38.090 mm (1.4996 in)**





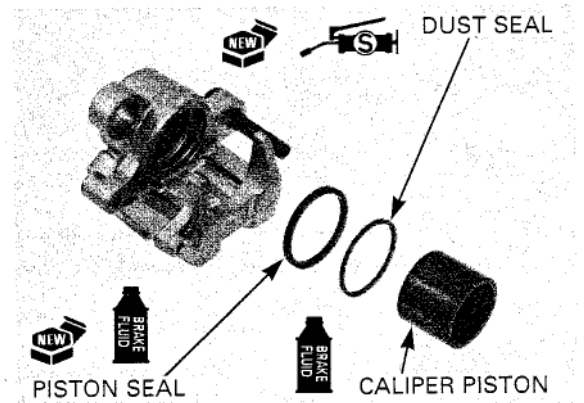
## ASSEMBLY



Coat the new piston seal with clean brake fluid.  
Coat the new dust seal with silicone grease.

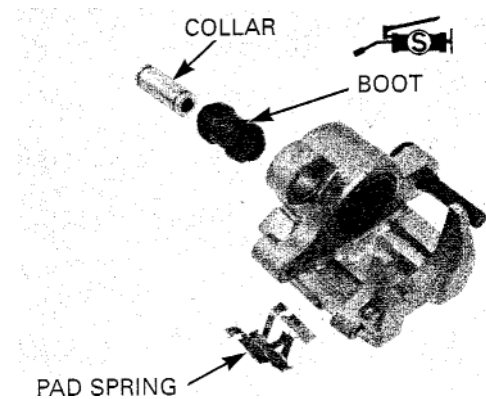
Install the piston seal and dust seal into the groove of the caliper body.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with its opening end toward the pad.



Install the pad spring into the caliper body.  
If the caliper and bracket pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the inside of the bracket pin boot.  
Install the bracket pin boot and collar into the caliper.



## HYDRAULIC BRAKE

Install the pad retainer into the bracket.

### INSTALLATION

Apply silicone grease to the caliper pin and install the caliper onto the bracket.

Install the rear brake pads (page 15-11).

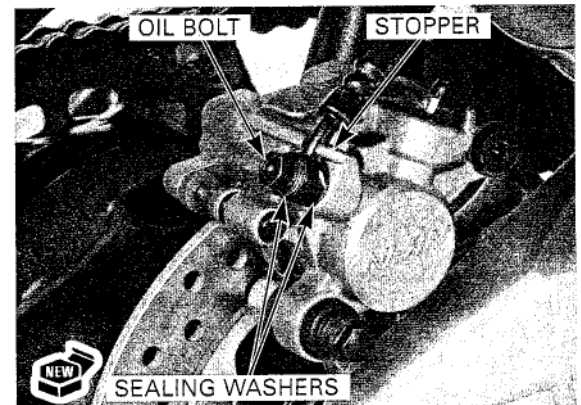
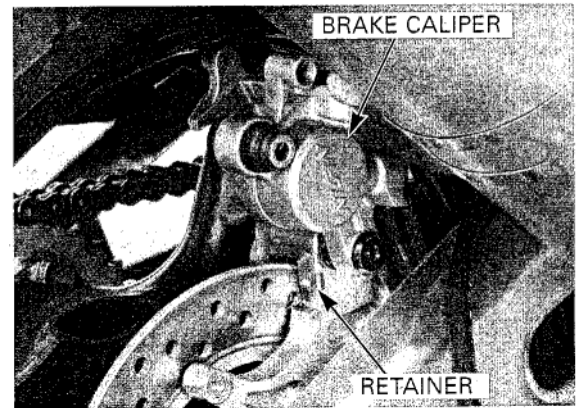
Install and tighten the caliper mounting bolt to the specified torque.

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

Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt. Align the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5kgf·m, 25 lbf·ft)**

Fill and bleed the rear brake hydraulic system (page 15-5).



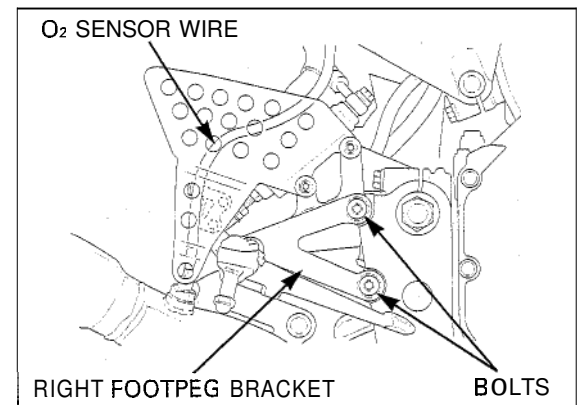
## BRAKE PEDAL

### REMOVAL

*California type  
only*

Release the O<sub>2</sub> sensor wire from the wire guide behind the right step guard.

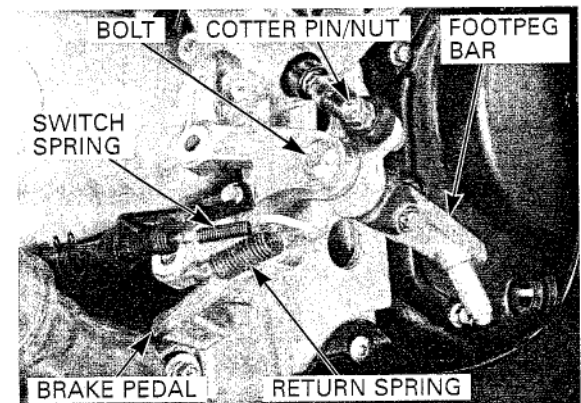
Remove the main footpeg bracket mounting bolts and bracket assembly from the lower bracket.



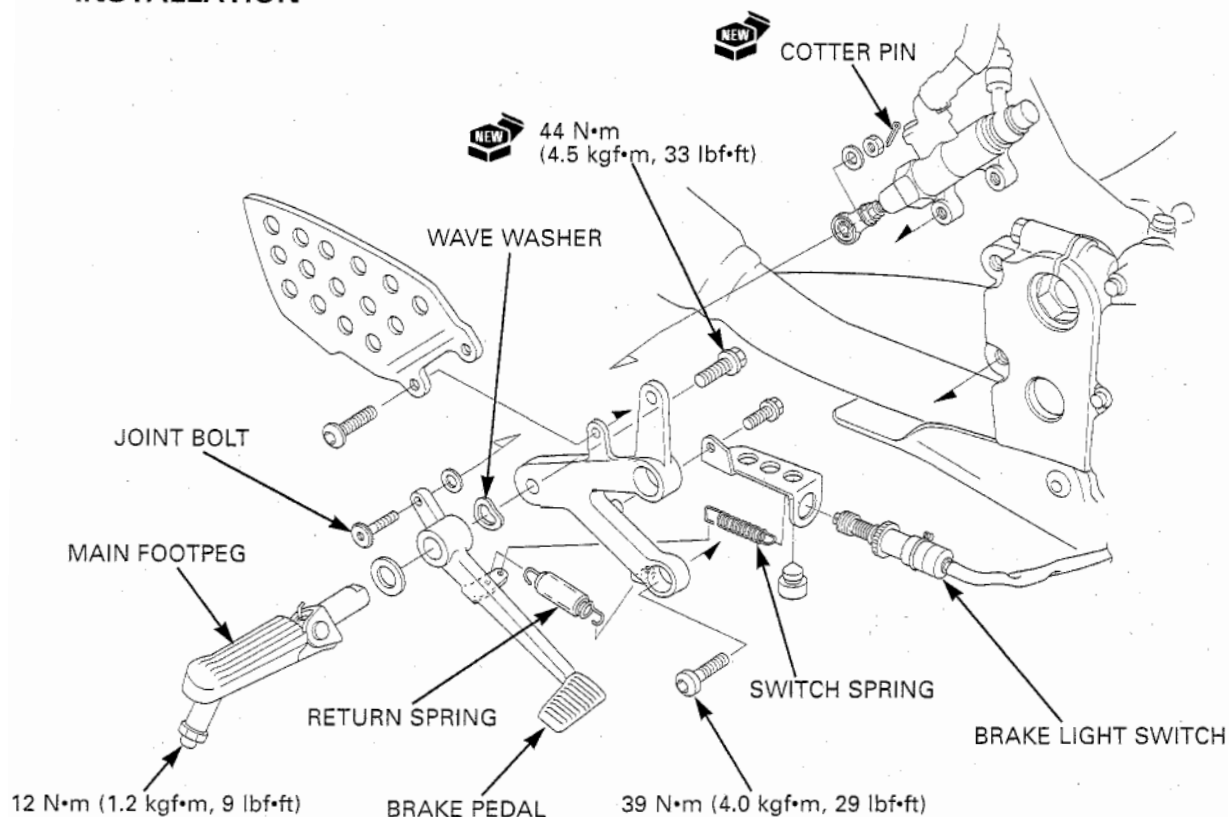
Remove and discard the brake pedal joint cotter pin. Remove the joint pin.

Unhook the return spring and remove the brake light switch from the step holder. Unhook the brake pedal return spring.

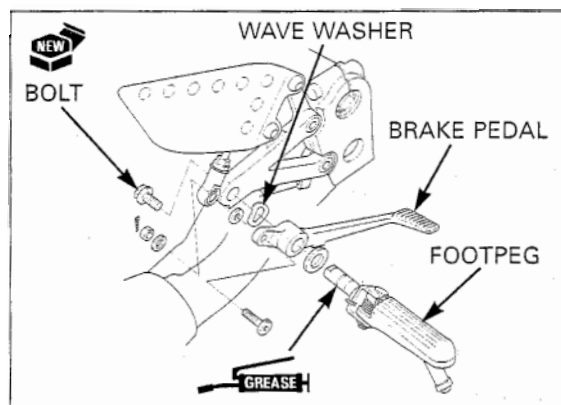
Remove the footpeg mounting bolt, footpeg, brake pedal and wave washer.



## INSTALLATION



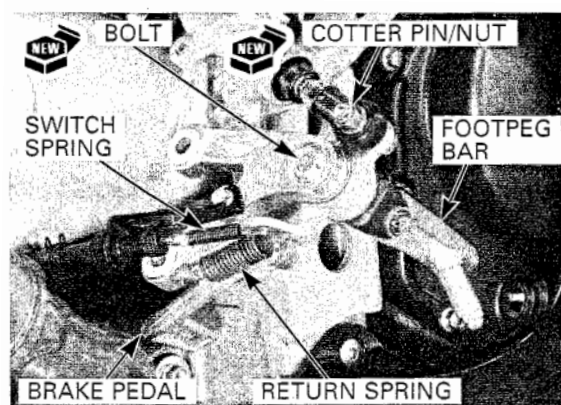
Apply grease to the sliding surface of the brake pedal and footpeg.  
Assemble the brake pedal, footpeg and wave washer.



Install a new footpeg mounting bolt and tighten it to the specified torque.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

Attach the brake pedal return spring.  
Install the brake light switch and attach the switch spring.  
Connect the brake pedal to the push rod lower joint.  
Install the joint pin and secure it with a new cotter pin.



## HYDRAULIC BRAKE

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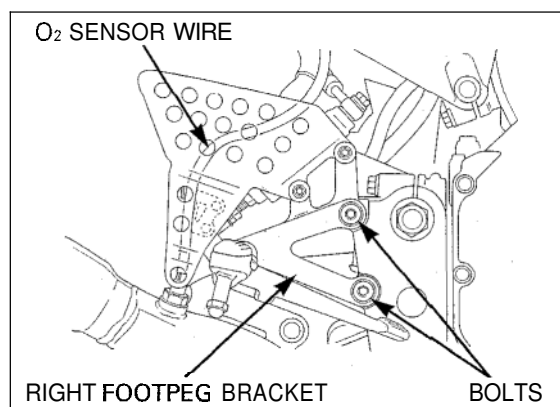
*California type  
only*

Clamp the O<sub>2</sub> sensor wire to the wire guide behind the right step guard.

Install the right main footpeg bracket assembly onto the lower bracket.

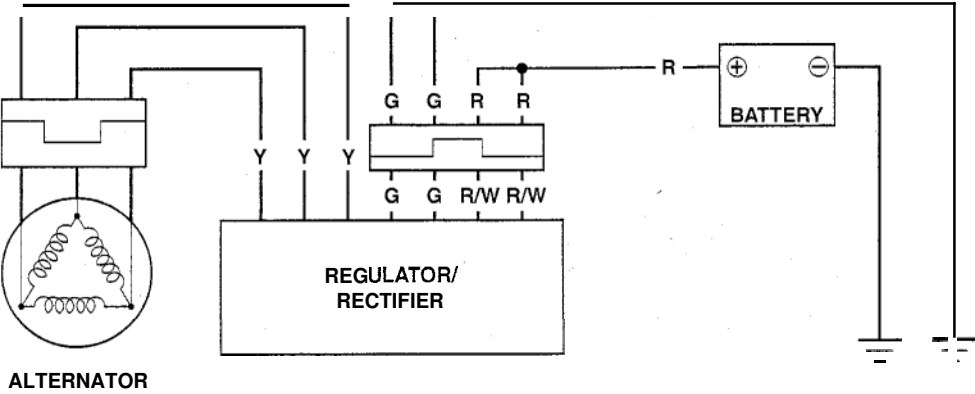
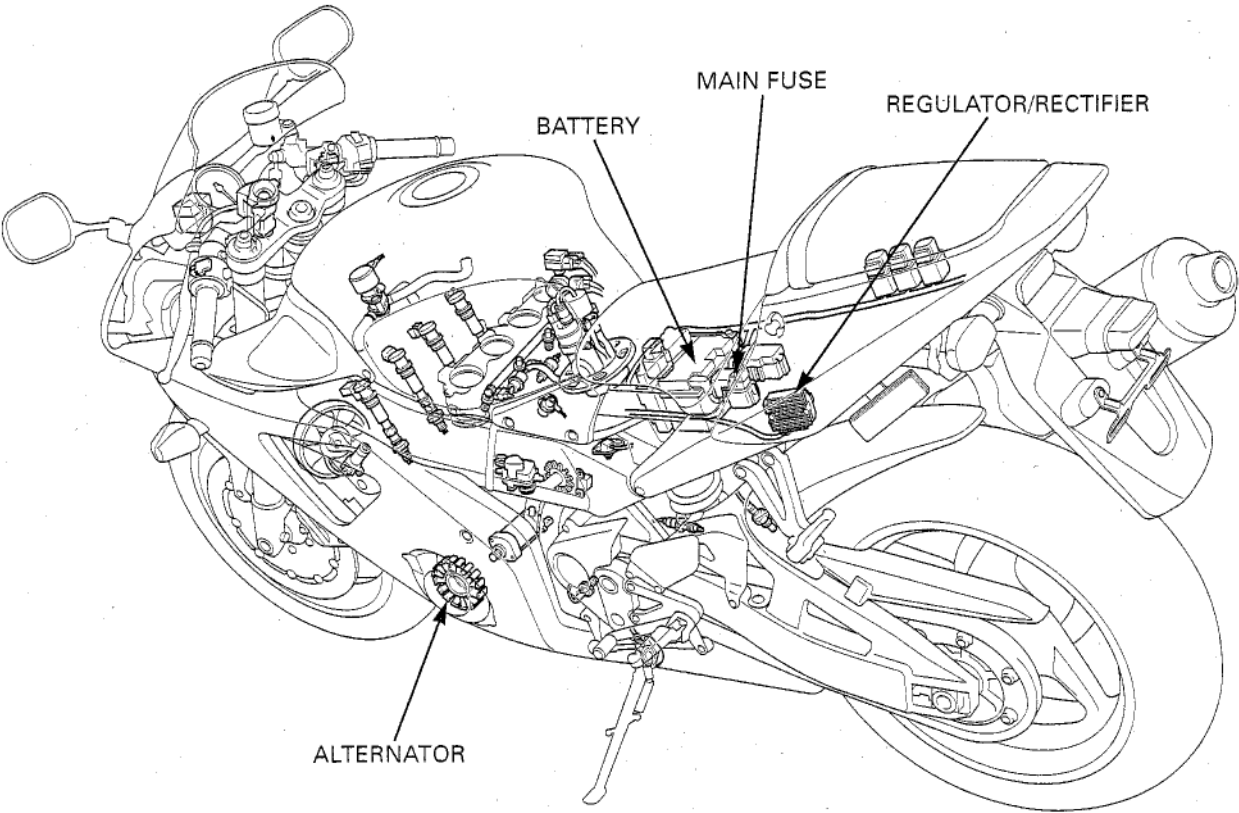
Install and tighten the right main footpeg bracket socket bolts to the specified torque.

**TORQUE : 39 N·m (4.0kgf·m, 29 lbf·ft)**



**BATTERY/CHARGING SYSTEM**

**SYSTEM DIAGRAM**



- Y.....YELLOW
- Bl.....BLACK
- Bu.....BLUE
- G.....GREEN
- R.....RED

# 16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM INSPECTION	16-6
SERVICE INFORMATION	16-1	ALTERNATOR CHARGING COIL	16-7
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-7
BATTERY	16-4		

## SERVICE INFORMATION

### GENERAL

#### WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.
- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch turned to "ON" and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- 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 or overcharged or undercharged, or left to discharge for long periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and tail light on for long periods of time without riding the motorcycle.

**16**

## BATTERY/CHARGING SYSTEM

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- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.

### BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

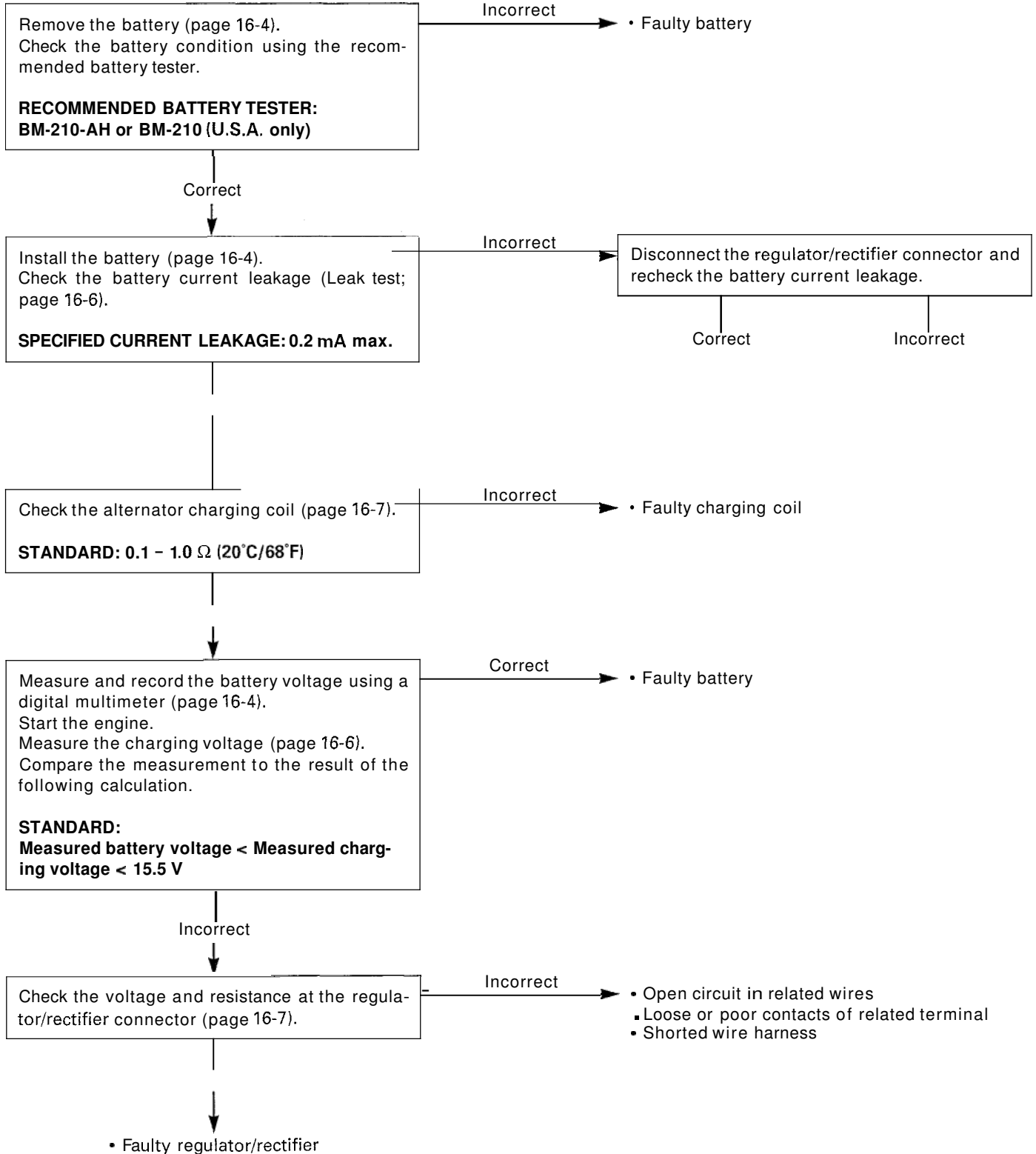
**Recommended battery tester**      **BM-210-AH or BM-210 (U.S.A. only)**

### SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 8.6 Ah
	Current leakage		0.2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.0 A/0.5 h
Alternator	Capacity		0.421 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

# TROUBLESHOOTING

## BATTERY IS DAMAGED OR WEAK





### BATTERY

#### REMOVAL/INSTALLATION

*Always turn the ignition switch to "OFF" before removing the battery*

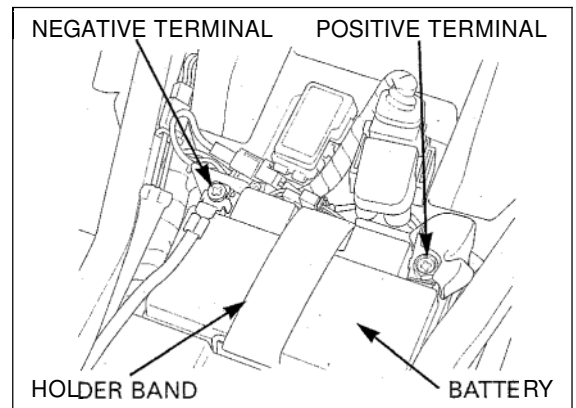
Remove the seat (page 2-2).

Remove the battery holder band.  
Disconnect the negative cable and then the positive cable, and remove the battery.

*Connect the positive terminal first and then the negative cable*

Install the battery in the reverse order of removal with the proper wiring as shown.

After installing the battery, coat the terminals with clean dielectric grease.



#### VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

##### VOLTAGE:

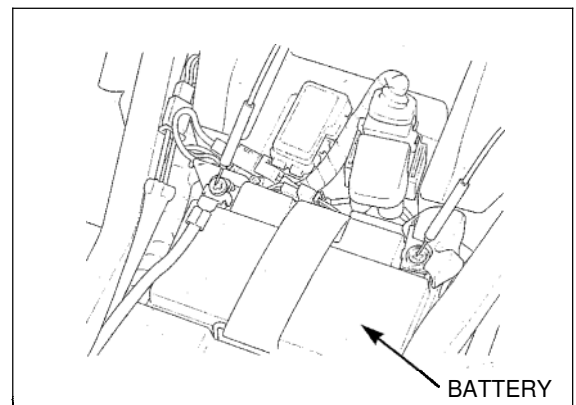
Fully charged: 13.0 - 13.2V

Under charged: Below 12.3V

##### TOOL:

Digital multimeter

Commercially available



#### BATTERY TESTING

- Always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels when operating the tester, the heat generated by the tester may cause a fire.

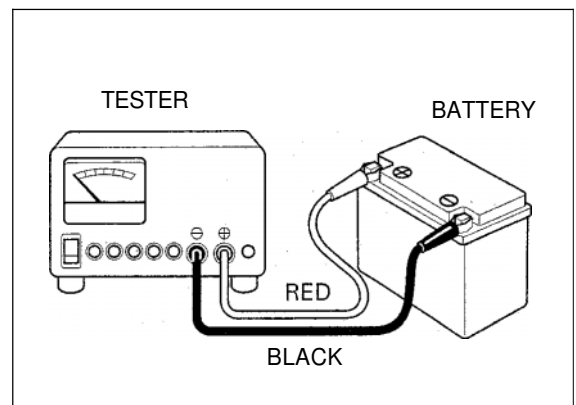
Remove the battery (see above)

Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

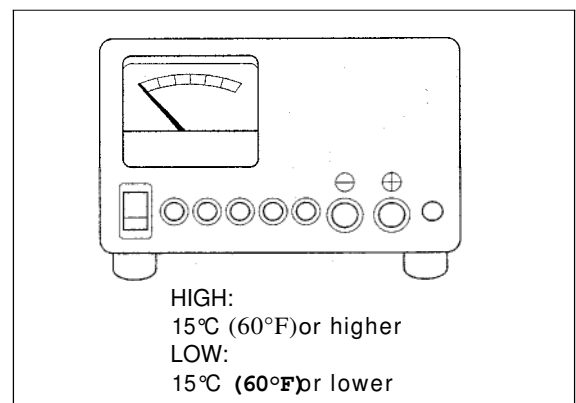
##### TOOL:

Battery tester

BM-210-AH or BM-210  
(U.S.A. only)



Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

Tester damage can result from overheating when:

- The test button is pushed in for more than 3 seconds.
- The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.
- More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.

The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any battery reading in the green zone is ok. Batteries should only be charged if they register in the YELLOW or RED zone.

### BATTERY CHARGING

Remove the battery (page 16-4).

- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place the battery below the charger – gases from the battery may corrode and damage the charger.
- Do not place the battery on top of the charger. Be sure the air vents are not blocked.

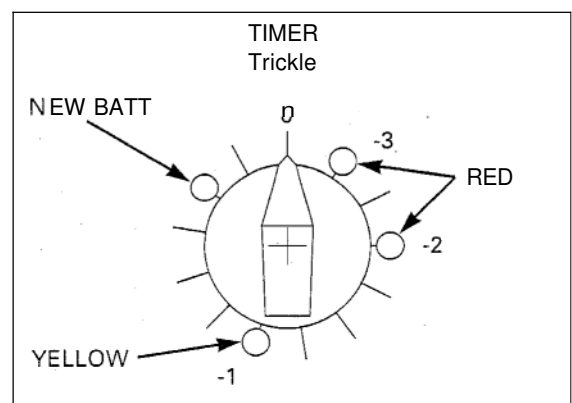
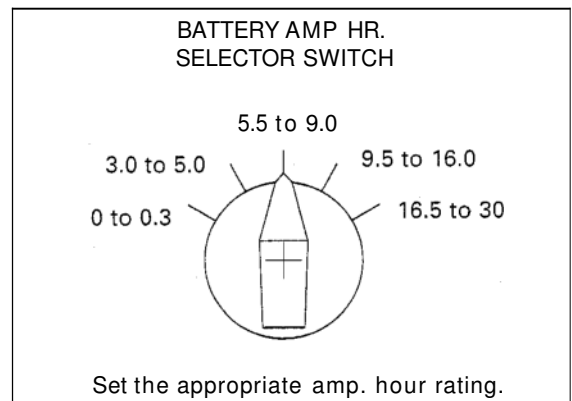
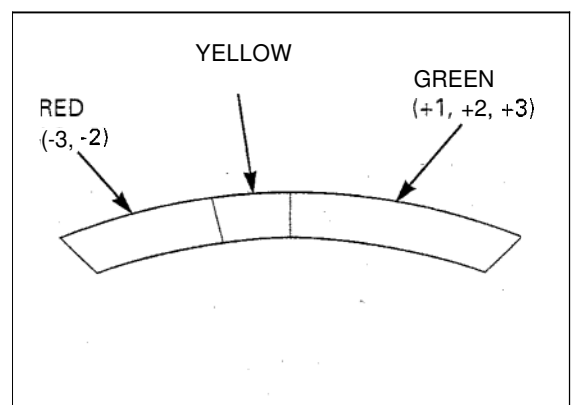
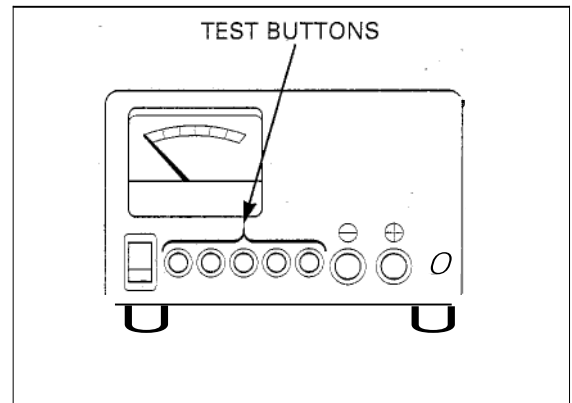
#### TOOL:

**Christie battery charger MC1012/2 (U.S.A. only)**

1. Turn the "POWER" switch to "OFF".
2. Set the "BATTERY AMP HR. SELECTOR SWITCH" for the size of the battery being charged.
3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED-3, RED-2 or YELLOW 1. If you are charging a new battery, set the switch to the "NEW BATT" position.
4. Attach the clamps to the battery terminals: red to positive, black to negative.

Connect the battery cables only when the Power Switch is OFF.

5. Turn the "POWER" switch to "ON".
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" switch to "OFF" and disconnect the clamps.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Retest the battery using the Honda battery tester and recharge if necessary using the above steps.



### CHARGING SYSTEM INSPECTION

#### CURRENT LEAKAGE INSPECTION

Turn the ignition switch off and disconnect the negative battery cable from the battery.

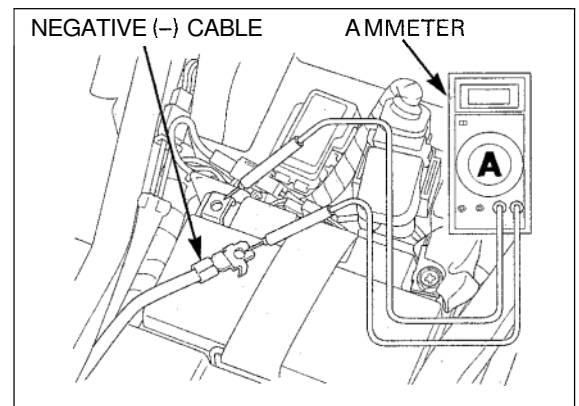
Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal. With the ignition switch off, check for current leakage.

- 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 on. A sudden surge of current may blow out the fuse in the tester.

**SPECIFIED CURRENT LEAKAGE: 0.2 mA max.**

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



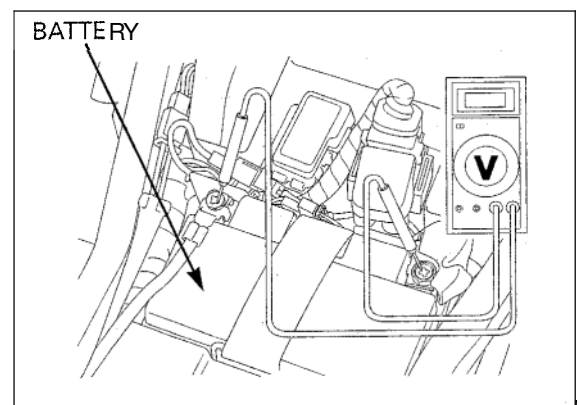
#### CHARGING VOLTAGE INSPECTION

- To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

Restart the engine.

With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

**Standard: Measured battery voltage (page 16-4) < Measured charging voltage (see above) < 15.5 V at 5,000 rpm**



## ALTERNATOR CHARGING COIL

### INSPECTION

*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.*

Remove the ECM cover (page 5-87).

Disconnect the alternator 3P (White) connector.

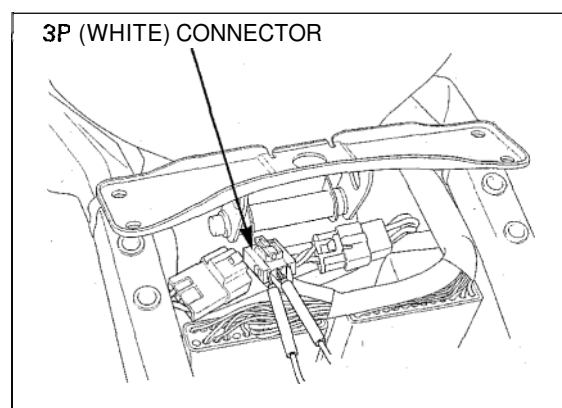
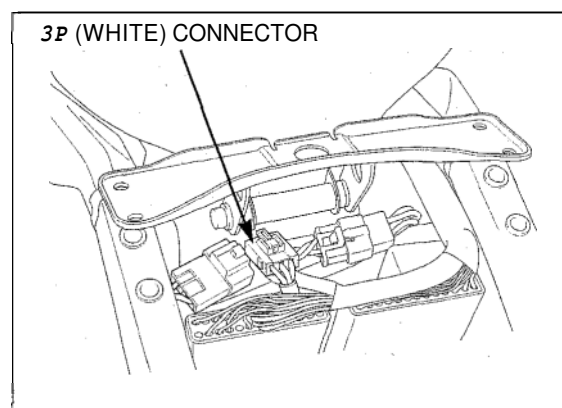
Check the resistance between all three Yellow terminals.

**STANDARD: 0.1 – 1.0  $\Omega$  (at 20°C/68°F)**

Check for continuity between all three Yellow terminals and Ground.

There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the alternator stator. Refer to section 10 for stator removal.



## REGULATOR/RECTIFIER

*It is not necessary to remove the stator coil to perform this test.*

### SYSTEM INSPECTION

Remove the ECM cover (page 5-87).

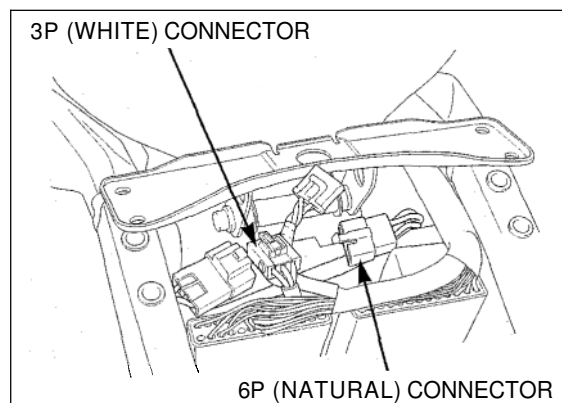
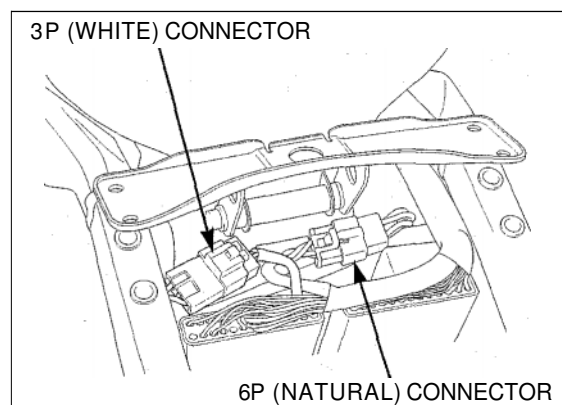
Disconnect the regulator/rectifier 6P (Natural) connector and alternator 3P (White) connector.

Check it for loose contact or corroded terminals.

If the regulated voltage reading (see page 16-6) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (–)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 – 1.0 $\Omega$ (at 20°C/68°F)
Ground line	Green and ground	Continuity should exist

If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.



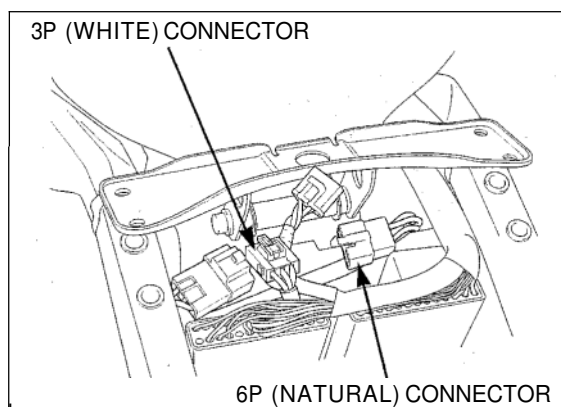
## BATTERY/CHARGING SYSTEM

---

### REMOVAL/INSTALLATION

Remove the rear cowl (page 2-2).  
Remove the ECM cover (page 5-87).

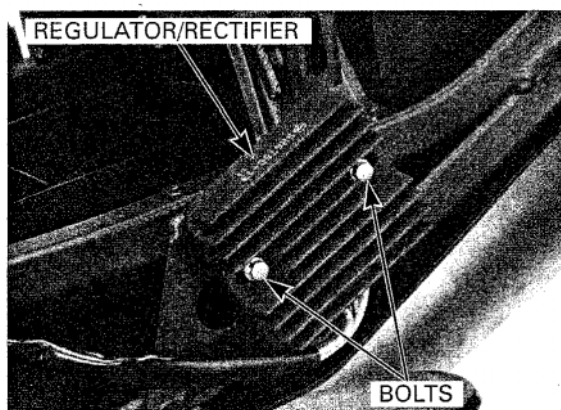
Disconnect the alternator 3P (White) connector.  
Disconnect the regulator/rectifier 6P (Natural) connector.



Remove the regulator/rectifier unit mounting SH bolts and regulator/rectifier.

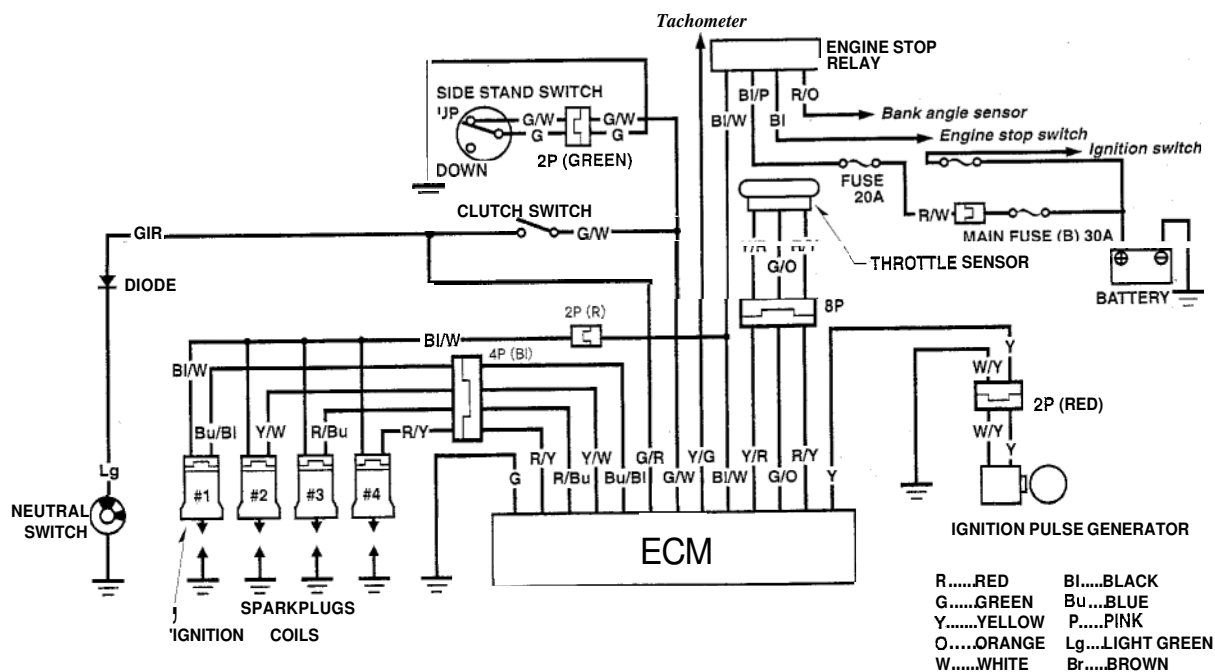
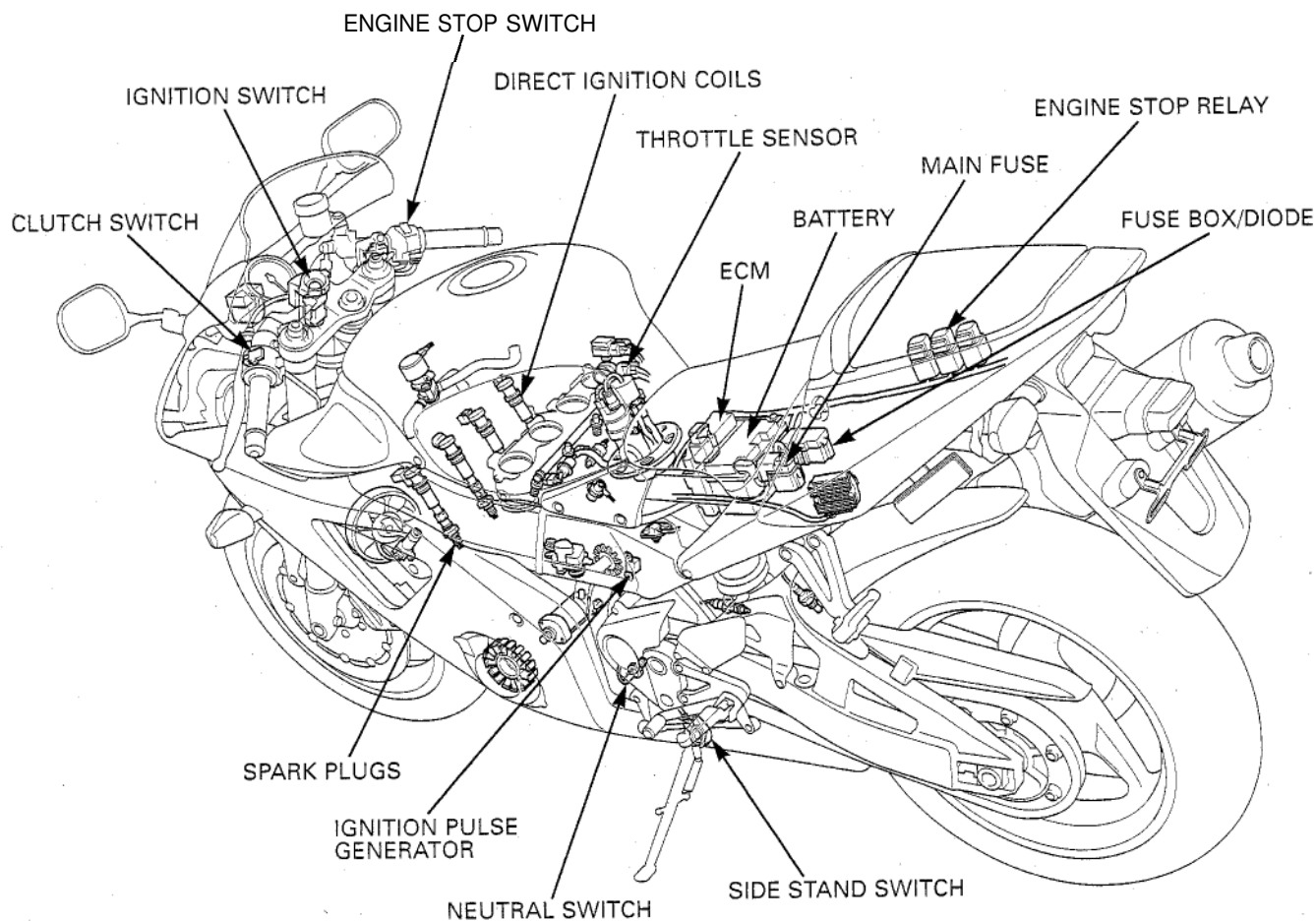
*Route the  
regulator/rectifier  
wire in the  
seat rail properly  
(page 1-34)*

Install the regulator/rectifier unit in the reverse order of removal.



## IGNITION SYSTEM

### SYSTEM DIAGRAM



# 17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION SYSTEM INSPECTION	17-4
SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-6
TROUBLESHOOTING	17-3	IGNITION TIMING	17-8

## SERVICE INFORMATION

### GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- This motorcycle'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 spark plugs with an incorrect heat range can damage the engine.
- The direct ignition coil that the ignition coil and spark plug cap are integrated, is adopted in this motorcycle.
- Refer to section 5 for Throttle Position (TP) sensor, cam pulse generator and ECM inspection.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	IMR9C-9H (NGK), VUH27D (DENSO)
	Optional	IMR8C-9H (NGK), VUH24D (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		13° BTDC at idle

IGNITION SYSTEM

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TORQUE VALUES

Timing hole cap	18 N•m (1.8kgf•m, 13 lbf•ft)	Apply grease to the threads.
Spark plug	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Ignition pulse generator rotor special bolt	59 N•m (6.0 kgf•m, 43 lbf•ft)	Apply oil to the threads.

TOOLS

IgnitionMate peak voltage tester (U.S.A. only) or Peak voltage adaptor	07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)
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## TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the direct ignition coil (leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the direct ignition coil with a known-good one and perform the spark test. If there is spark, the exchanged direct ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned to "ON" and engine stop switch at RUN (The engine is not cranked by the starter motor).

### No spark at all plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches on. (Other electrical components are normal)	1. Faulty engine stop switch and/or engine stop relay. 2. An open circuit in <b>Black/White</b> wire between the direct ignition coil and engine stop relay. 3. Loose or poor connect of the direct ignition coil primary wire terminal, or an open circuit in primary coil (Check at the ECM connector). 4. Faulty ECM (in 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 <b>Black/White (+)</b> 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 <b>Blue/Black, Yellow/White, Red/Blue</b> and <b>Red/Yellow</b> wires between the direct ignition coils and ECM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No.7 related circuit wires. • Side stand switch line: <b>Green/White</b> wire • Neutral switch line: <b>Light Green and Green/Red</b> wire 9. Faulty ignition pulse generator (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 M $\Omega$ /DCV. 2. Cranking speed is too low (battery under-charged). 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 (s).
Ignition pulse generator	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too low (battery under charged). 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 ignition pulse generator.

## IGNITION SYSTEM INSPECTION

With the ignition coil sub-harness 4P (Black) connector connected, connect the peak voltage adaptor or Imrie tester to the 4P (Black) connector primary wire terminal and ground.

### CONNECTION:

**No.1 coil:**

**Blue/Black terminal (+) - Body ground (-)**

**No.2 coil:**

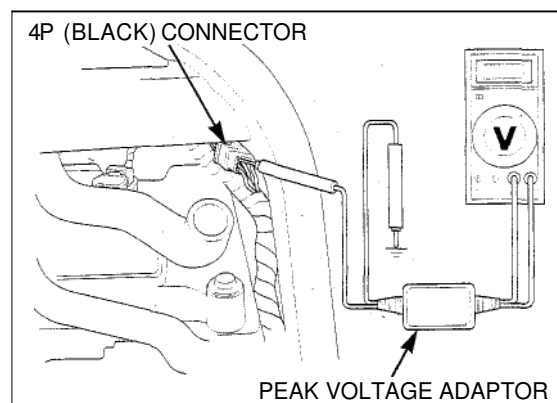
**Yellow/White terminal (+) - Body ground (-)**

**No.3 coil:**

**Red/Blue terminal (+) - Body ground (-)**

**No.4 coil:**

**Red/Yellow terminal (+) - Body ground (-)**



*Avoid touching the sparkplugs and tester probes to prevent electric shock*

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

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 17-3).

Crank the engine with the starter motor and read the ignition coil primary peak voltage.

**PEAK VOLTAGE: 100V minimum**

If the peak voltage is abnormal, check for an open circuit or poor connection in Blue/Black, Yellow/White, Red/Blue and Red/Yellow wires.

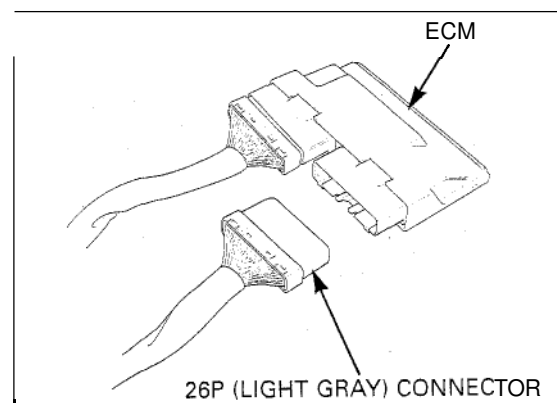
If no defects are found in the harness, refer to the troubleshooting chart on page 17-3.

### IGNITION PULSE GENERATOR PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the ECM cover (page 5-87).

Disconnect the 26P (Light gray) connector from the ECM.



## IGNITION SYSTEM

Connect the peak voltage tester or peak voltage adaptor probes to the connector terminal of the wire harness side and ground.

### TOOLS:

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

**with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)**

### CONNECTION:

**Yellow terminal (+) – Ground (–)**

*Avoid touching  
the spark plugs  
and tester probes  
to prevent electric  
shock.*

Crank the engine with the starter motor and read the peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**

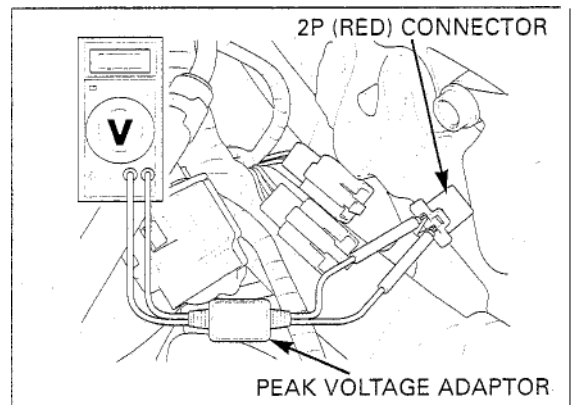
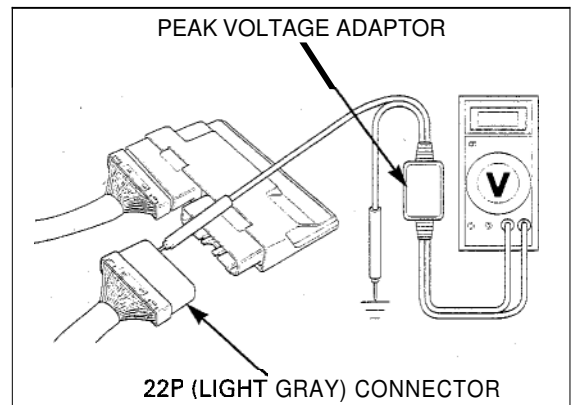
If the peak voltage measured at the ECM multi-connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Open and support the front end of the fuel tank (page 3-4).

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and 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 ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages are abnormal, check each item in the troubleshooting chart. If all items are normal, the ignition pulse generator is faulty. See following steps for ignition pulse generator replacement.

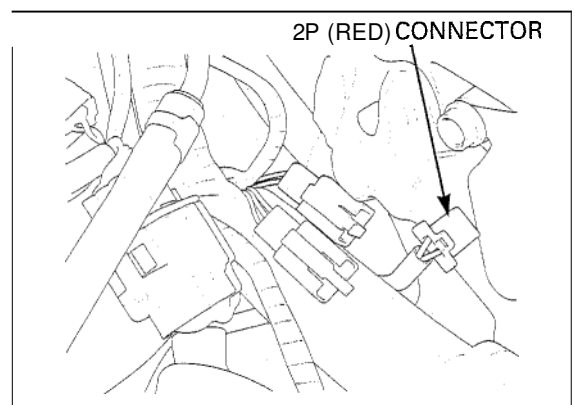


## IGNITION PULSE GENERATOR

### REMOVAL

Open and support the front end of the fuel tank (page 3-4).

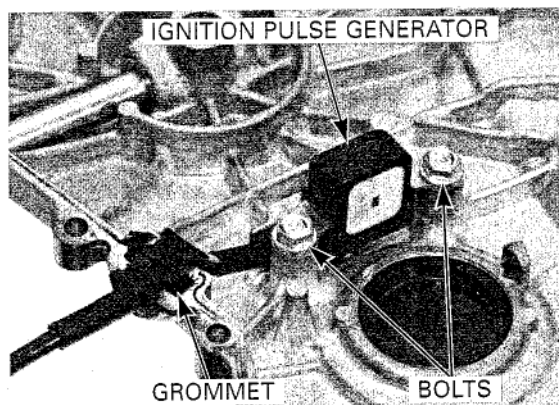
Disconnect the ignition pulse generator 2P (Red) connector.



## IGNITION SYSTEM

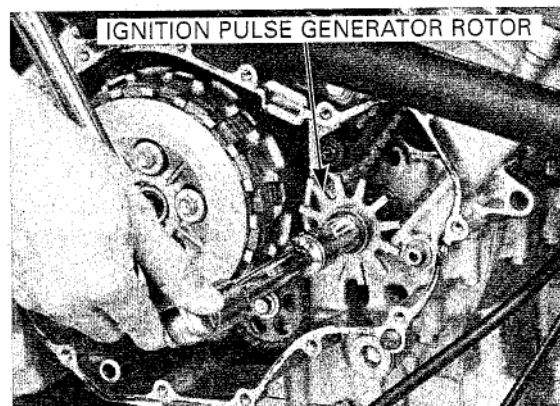
Remove the right crankcase cover (page 9-3).

Remove the wire grommet from the cover.  
Remove the bolts and ignition pulse generator.



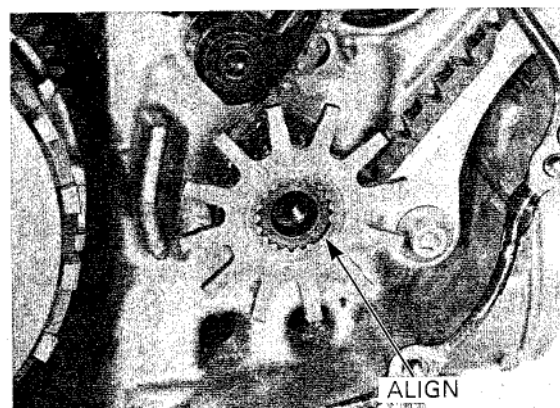
*if the engine is out of the frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000), then remove the bolt.*

Shift the transmission into 6th gear and apply the rear brake.  
Remove the ignition pulse generator rotor special bolt.

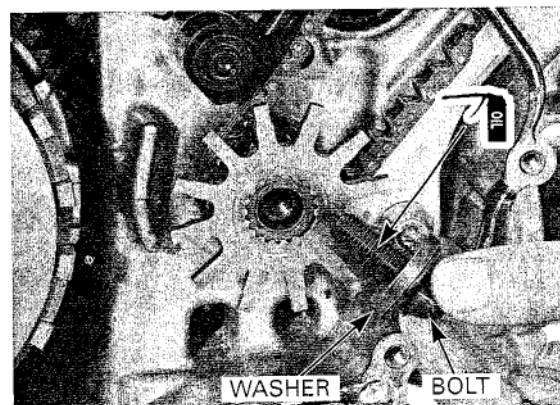


## INSTALLATION

Install the ignition pulse generator rotor by aligning the wide groove with the wide teeth of the crankshaft.



Apply oil to the ignition pulse generator rotor bolt threads, then install the washer and rotor bolt.



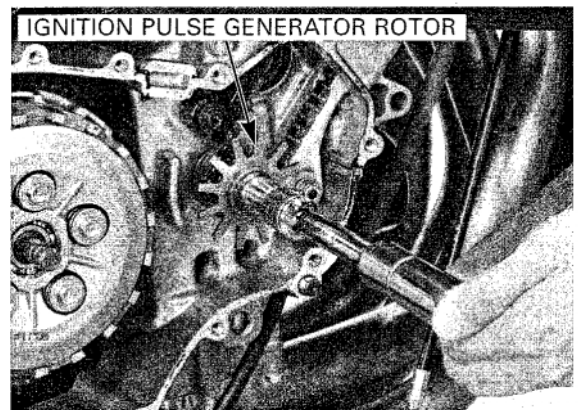
## IGNITION SYSTEM

*if the engines  
out of the frame,  
hold the flywheel  
with the  
flywheel holder  
(07725-0040000),  
then tighten the  
bolt*

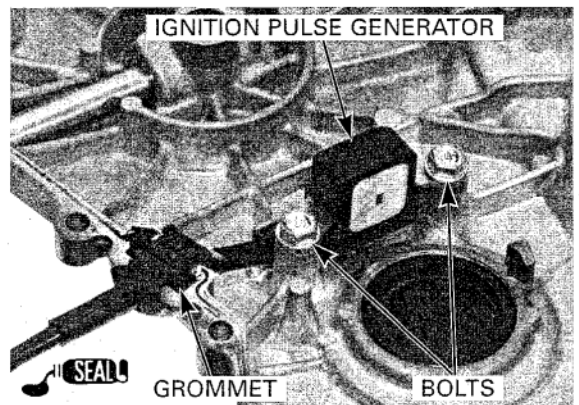
Shift the transmission into 6th gear and apply rear brake.

Tighten the ignition pulse generator rotor special bolt to the specified torque.

**TORQUE: 59 N·m (6.0kgf·m, 43 lbf·ft)**



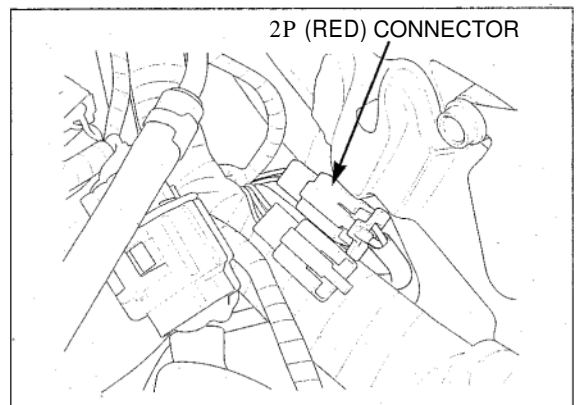
Install the ignition pulse generator into the cover.  
Apply sealant to the wire grommet, then install it into the groove of the cover.  
Install and tighten the ignition pulse generator bolts.



Install the right crankcase cover (page 9-17)

Route the ignition pulse generator wire properly, connect the 2P (Red) connector.

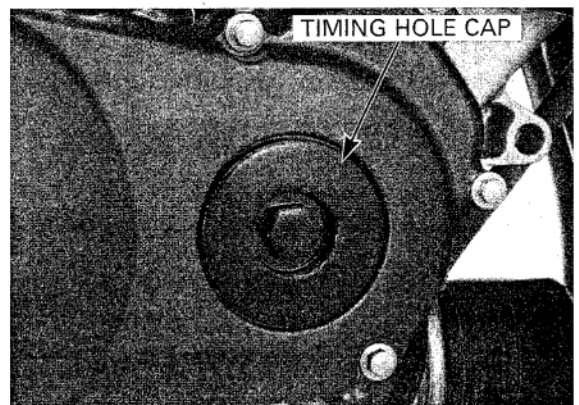
Install the removed parts in the reverse order of removal.



## IGNITION TIMING

Remove the lower cowl (page 2-7).

Warm up the engine.  
Stop the engine and remove the timing hole cap.



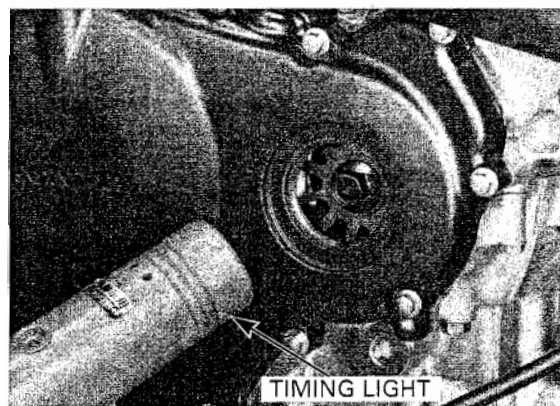
## IGNITION SYSTEM

*Read the instructions for timing light operation*

Connect the timing light to the No.1 direct ignition coil wire.

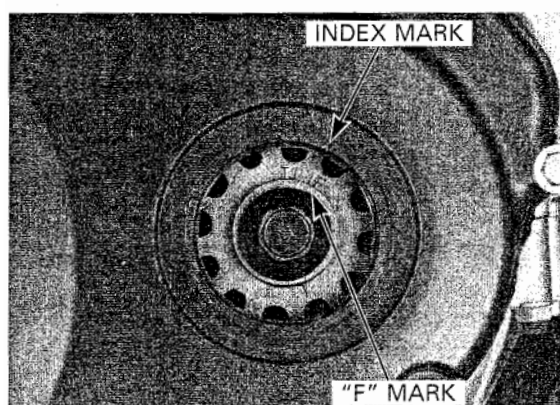
Start the engine and let it idle.

**IDLE SPEED:  $1,200 \pm 100$  rpm**



The ignition timing is correct if the "F" mark aligns with the index mark on the ignition pulse generator rotor cover.

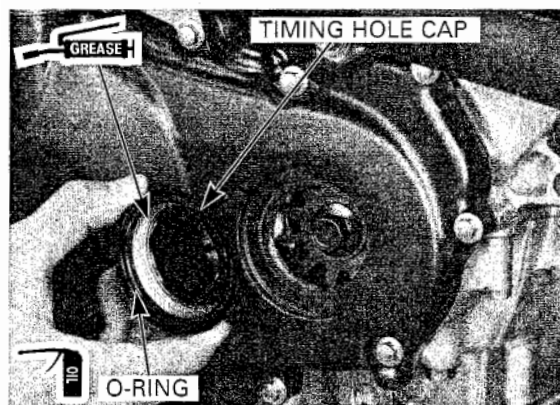
Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise when the engine speed at approximately 1,500 rpm.



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

Apply oil to the O-ring.

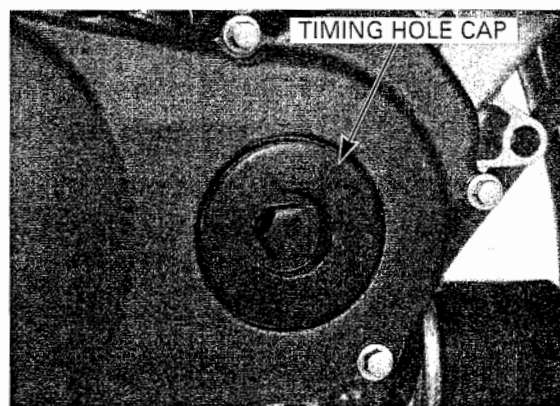
Apply grease to the timing hole cap threads and install the O-ring and timing hole cap.



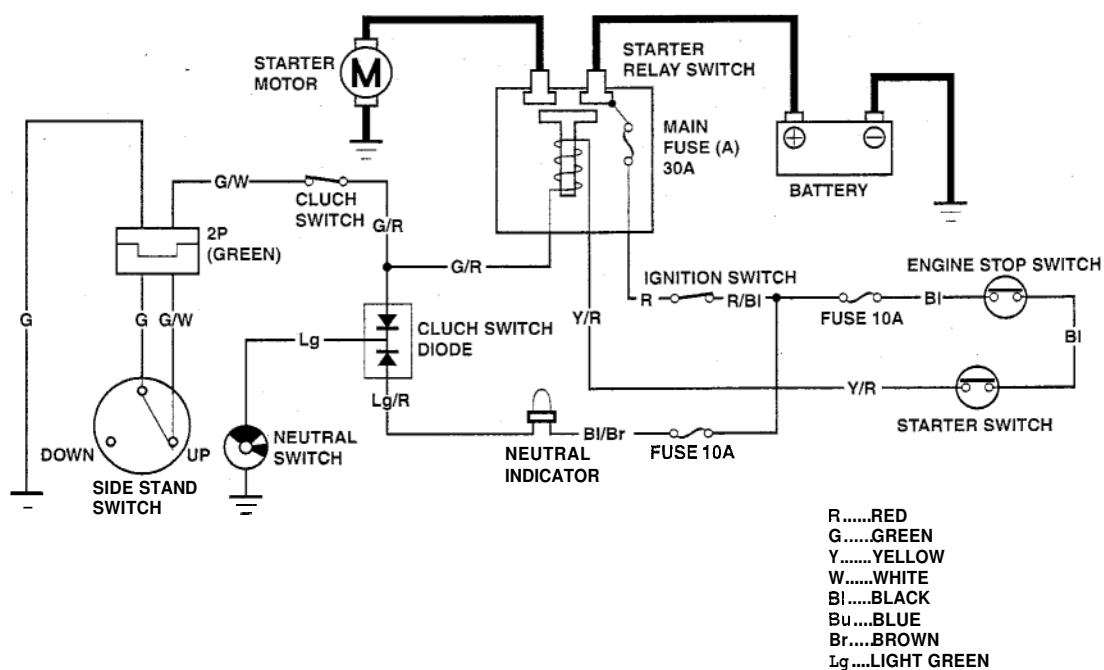
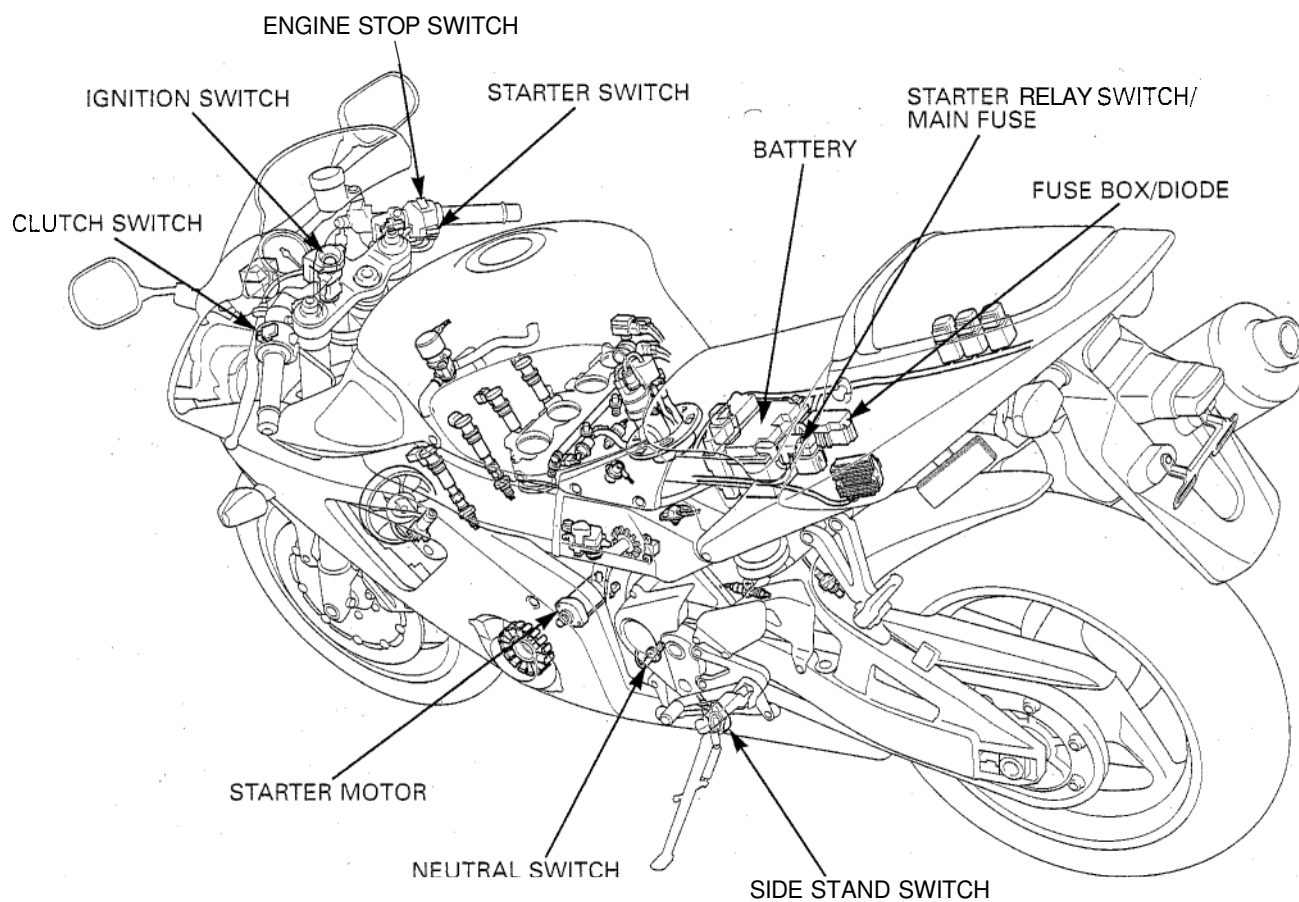
Tighten the timing hole cap to the specified torque.

**TORQUE: 18 N·m (1.8kgf·m, 13 lbf·ft)**

Install the lower cowl (page 2-7).



## SYSTEM DIAGRAM





# 18. ELECTRIC STARTER

SYSTEM DIAGRAM	18-0	STARTER MOTOR	18-4
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	DIODE	18-11

## SERVICE INFORMATION

### GENERAL

- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2).
- 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 while the engine is not cranking over, the starter motor may be damaged.
- See section 10 for starter clutch servicing.
- See section 19 for following components:
  - Ignition switch
  - Engine stop switch
  - Starter switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

### SPECIFICATION

Unit: mm (in)		
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.0 – 10.5 (0.39 – 0.41)	3.5 (0.14)

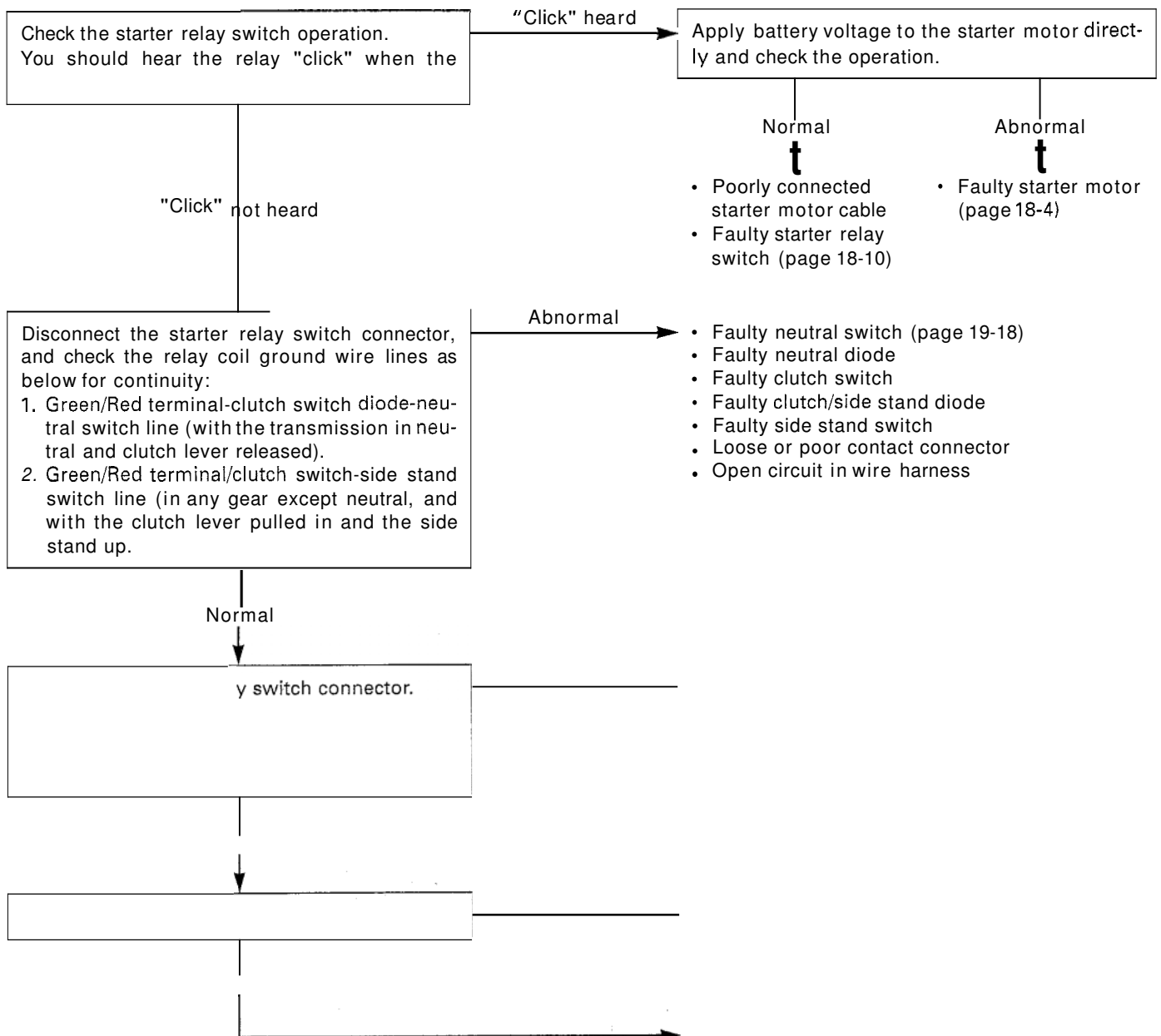
### TORQUE VALUE

Starter motor terminal nut                      12 N•m (1.2 kgf•m, 9 lbf•ft)

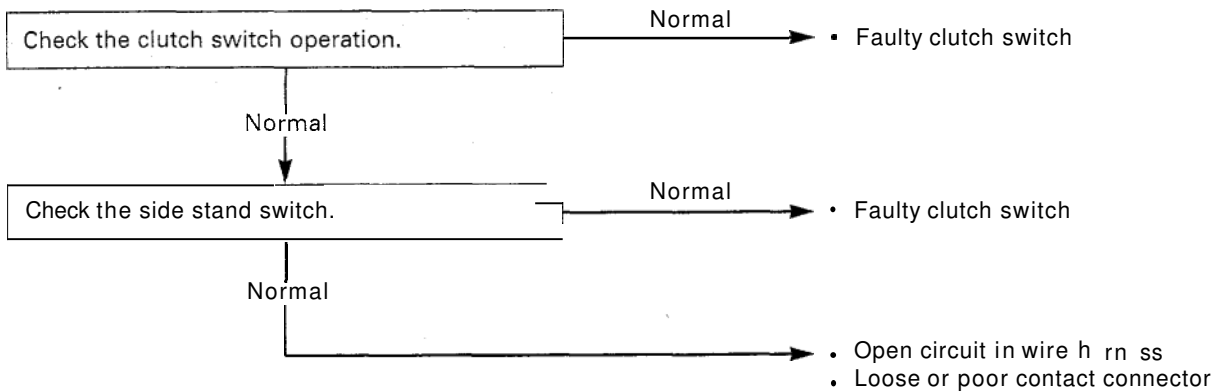
### TROUBLESHOOTING

#### Starter motor does not turn

- Check for blown main or sub fuses before servicing.
- Make sure the battery is fully charged and in good condition.



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



### **Starter motor turns engine slowly**

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poor connected battery ground cable

### **Starter motor turns, but engine does not turn**

- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

### **Starter relay switch "clicks", but engine does not turn over**

- Crankshaft does not turn due to engine problems

### STARTER MOTOR

#### REMOVAL

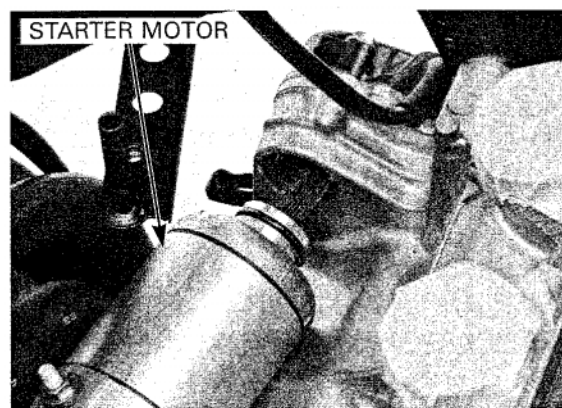
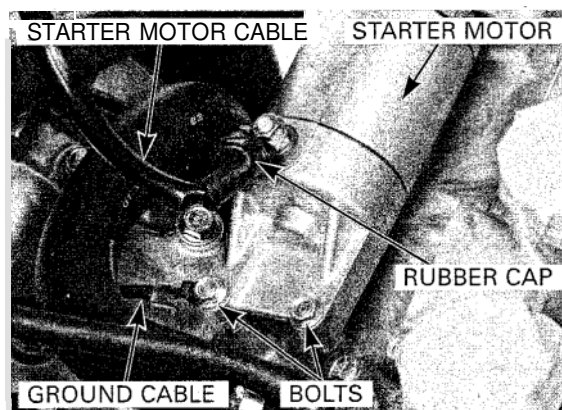
Drain the coolant (page 6-4).  
Remove the throttle body (page 5-67).  
Remove the thermostat housing (page 6-7).

With the ignition switch turned to "OFF", remove the negative cable at the battery before servicing the starter motor.

*Be careful not to damage the water hose.*

Remove the rubber cap.  
Remove the nut and the starter motor cable from the starter motor.  
Remove the starter motor mounting bolts and ground cable.

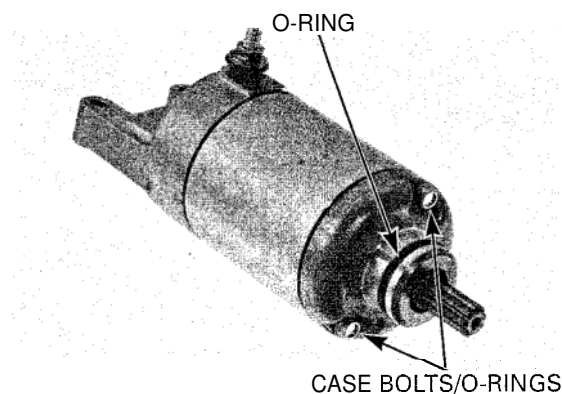
Pull the starter motor out of the crankcase.



#### DISASSEMBLY

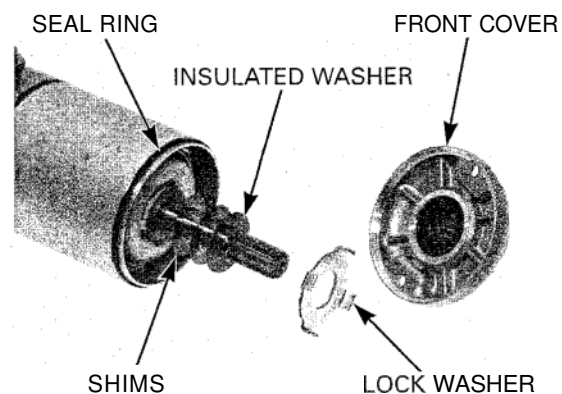
Remove the following:

- O-ring
- Starter motor case bolts/O-rings



- Front cover
- Seal ring
- Lockwasher
- Insulated washer
- Shim(s)

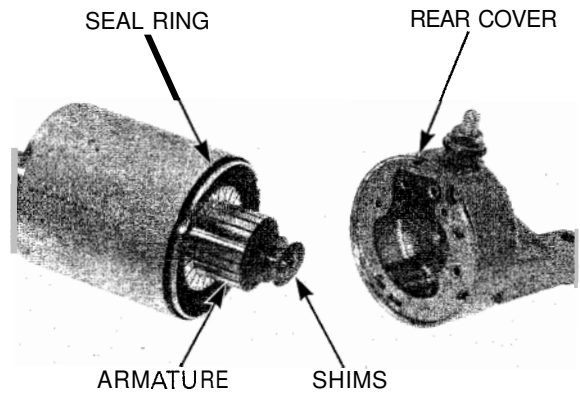
*Record the location and number of shims.*



Remove the following:

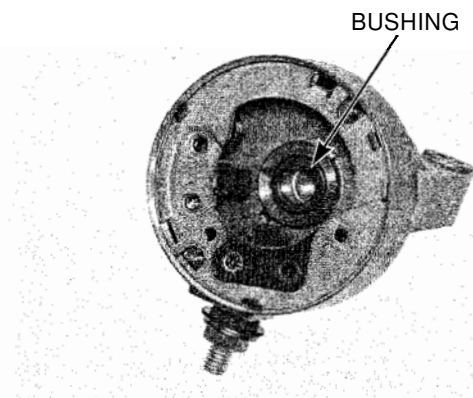
- Rear cover assembly
- Seal ring
- Shims
- Armature

*Record the location and number of shims*

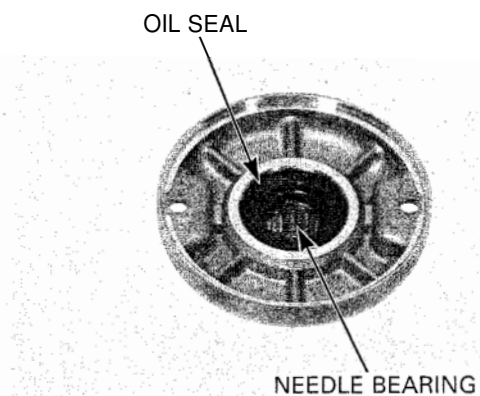


### INSPECTION

Check the bushing in the rear cover for wear or damage.

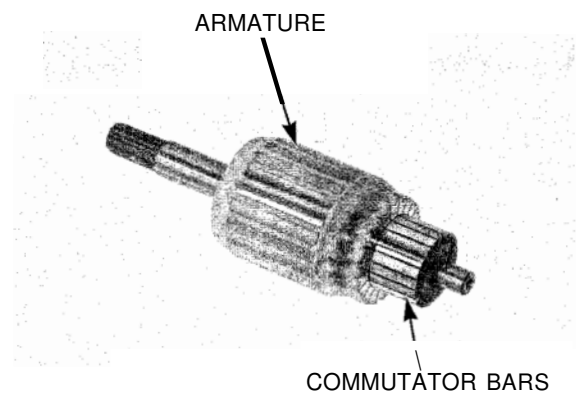


Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.



*Do not use emery or sandpaper on the commutator*

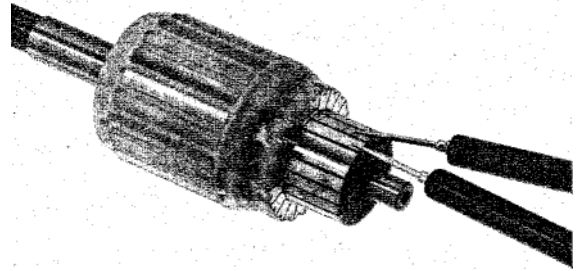
Check the commutator bars of the armature for discoloration.



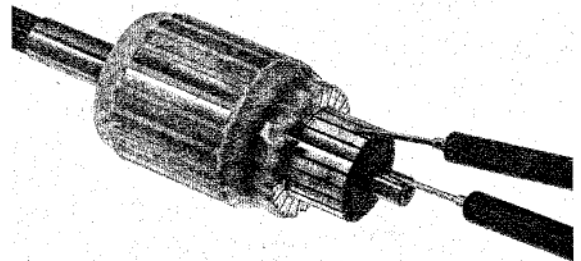
## ELECTRIC STARTER

---

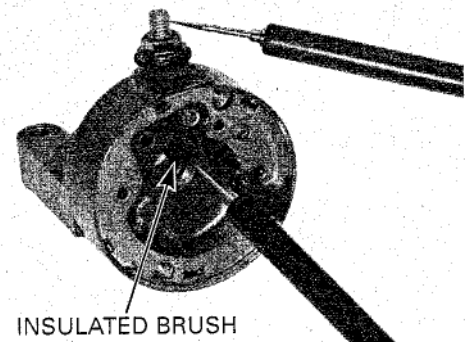
Check for continuity between pairs of commutator bars.  
There should be continuity.



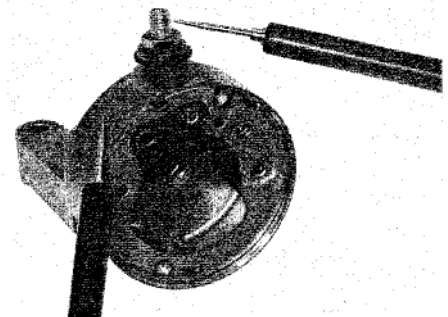
Check for continuity between each commutator bar and the armature shaft.  
There should be no continuity.



Check for continuity between the insulated brush and cable terminal (the indigo colored wire or the insulated brush holder).  
There should be continuity.



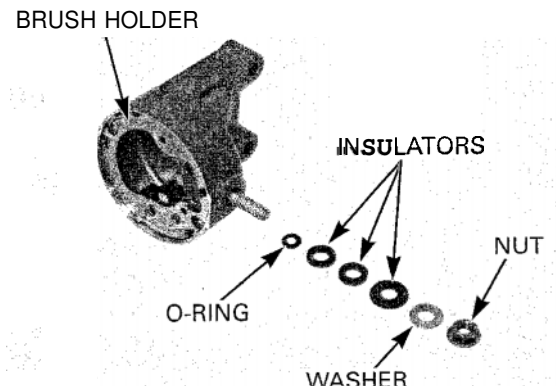
Check for continuity between the cable terminal and the rear cover.  
There should be no continuity.



## ELECTRIC STARTER

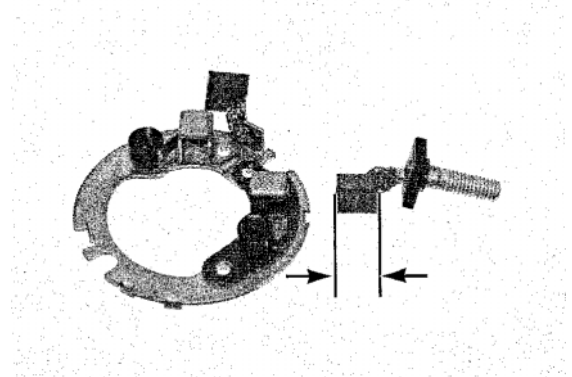
Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal

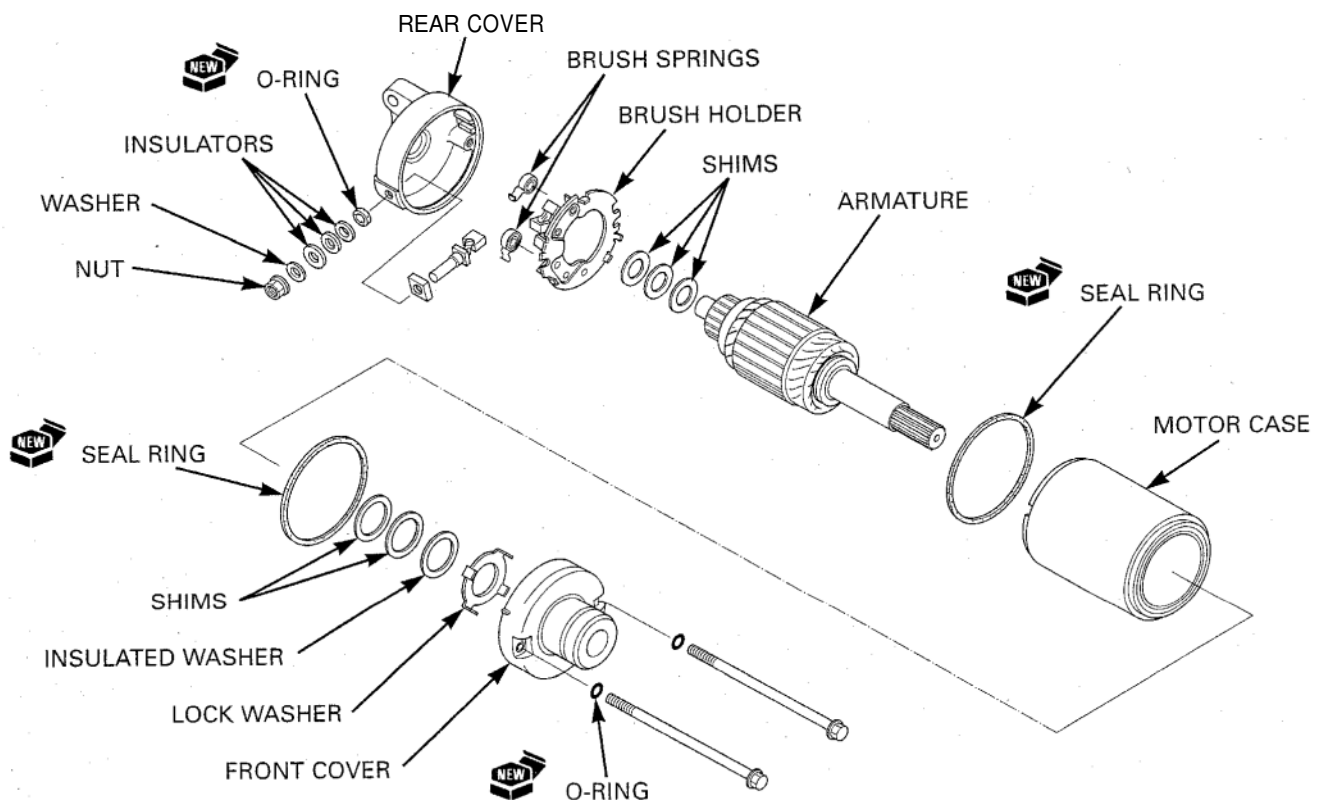


Inspect the brushes for damage and measure the brush length.

**SERVICE LIMIT: 3.5 mm (0.14 in)**



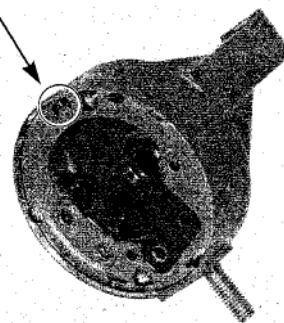
## ASSEMBLY



## ELECTRIC STARTER

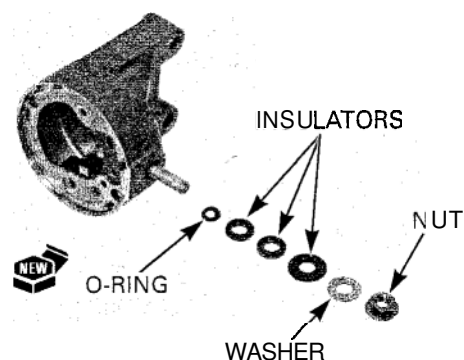
Install the brushes into the brush holder.  
Install the cable terminal and brush holder into the rear cover, aligning the holder tab with the rear cover groove.

ALIGN



Install the following:

- New O-ring
- Insulators
- Washer
- Nut

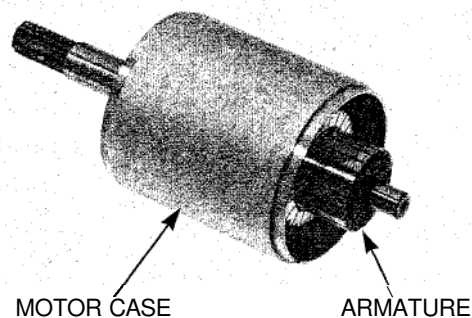


Install the armature in the motor case.

When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

### NOTICE

*The coil may be damaged if the magnet pulls the armature against the case.*

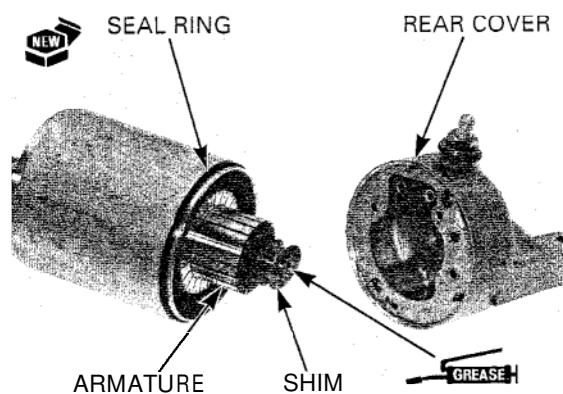


Install the same number of shims in the same location as noted during disassembly.

Install a new seal ring onto the motor case.

Apply a thin coat of grease to the armature shaft end.

Install the rear cover, while pushing in the brushes into the brush holder and aligning the brush holder tab with the motor case groove.





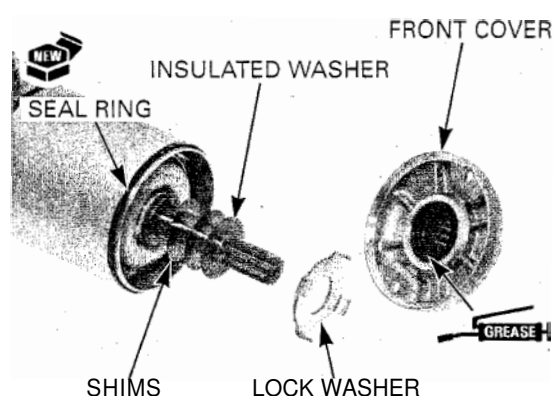
## ELECTRIC STARTER

*Install the insulators properly as noted during removal.*

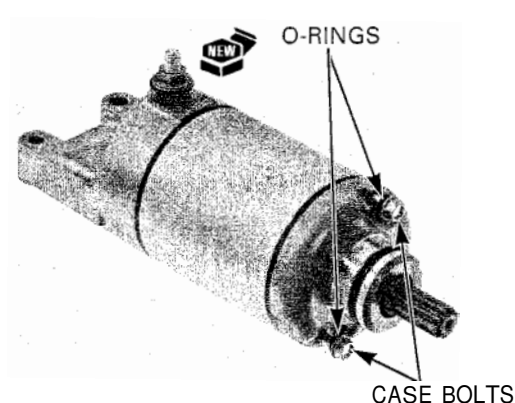
Install the shims and insulated washer onto the armature shaft.

Install a new seal ring onto the motor case. Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover. Install the front cover.



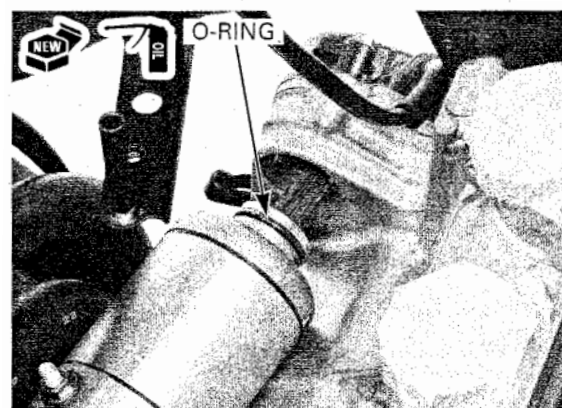
Install the new O-rings onto the motor case bolts. Install and tighten the case bolts securely.



### INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.

Install the starter motor into the crankcase.

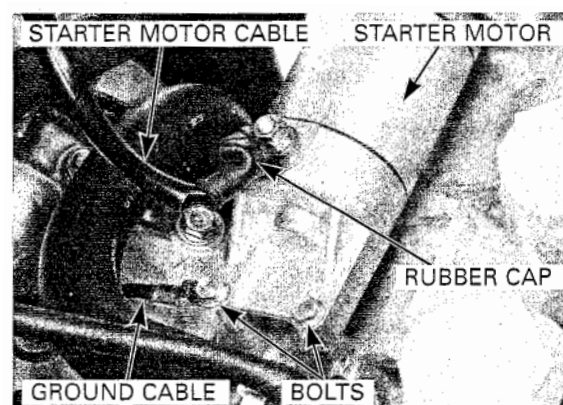


*Be careful not to damage the water hose.*

Route the starter motor cable and ground cable. Install the ground cable and mounting bolts, and tighten the bolts securely. Install the starter motor cable, then tighten the terminal nut to the specified torque

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

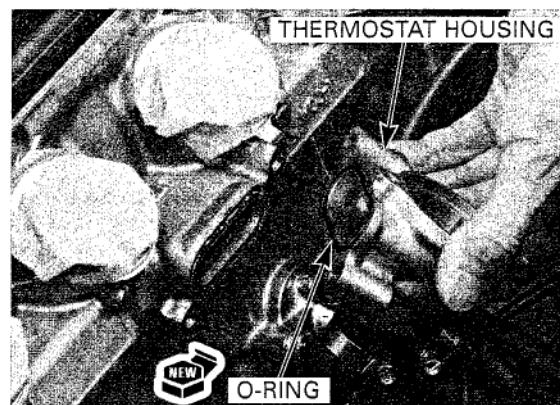
Install the rubber cap securely.



## ELECTRIC STARTER

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

Install the thermostat housing to the cylinder head.

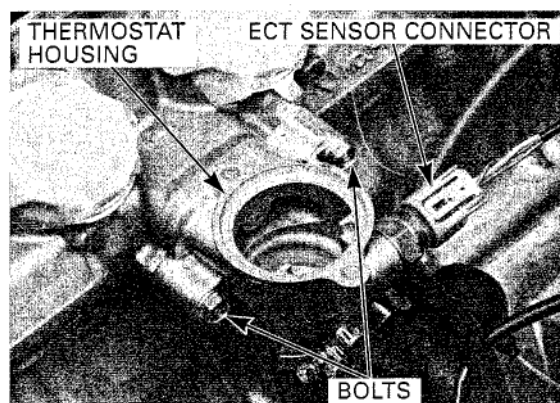


Install and tighten the mounting bolts.

Install the following:

- Thermostat housing/thermostat (page 6-7).
- Throttle body (page 5-71).

Fill the system with the recommended coolant (page 6-5).



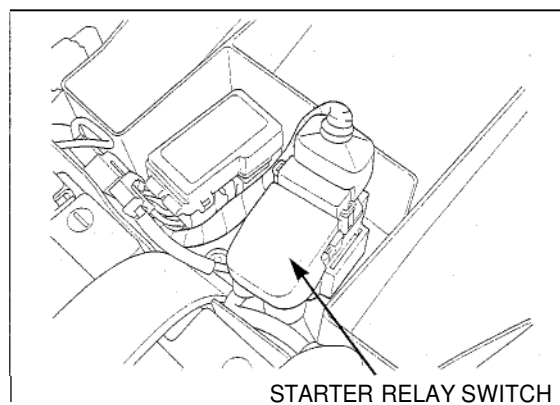
## STARTER RELAY SWITCH

### OPERATION INSPECTION

Remove the seat (page 2-2).

Shift the transmission into neutral.  
Turn the ignition switch to "ON" and engine stop switch to "RUN".  
Push the starter switch button.  
The coil is normal if the starter relay switch clicks.

If you don't hear the switch "click", inspect the relay switch using the procedure below.

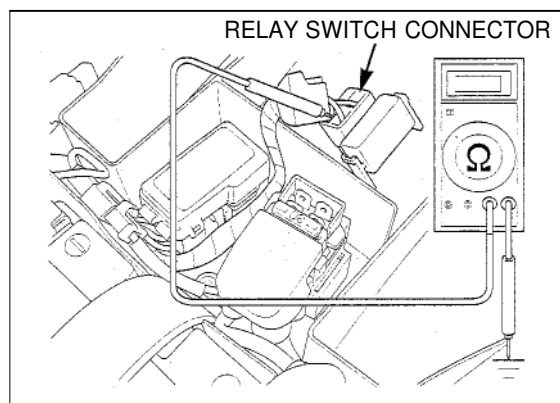


### GROUND LINE INSPECTION

Disconnect the relay switch connector.

Check for continuity between the Green/Red wire (ground line) terminal and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is retracted, the ground circuit is normal (in neutral, there is a slight resistance due to the diode).

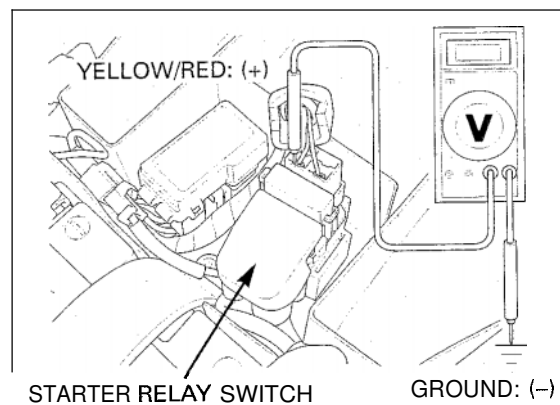


## STARTER RELAY VOLTAGE INSPECTION

Connect the starter relay switch connector.

Shift the transmission into neutral.  
Measure the voltage between the Yellow/Red wire terminal (+) and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch to "ON" and engine stop switch at "RUN", it is normal.

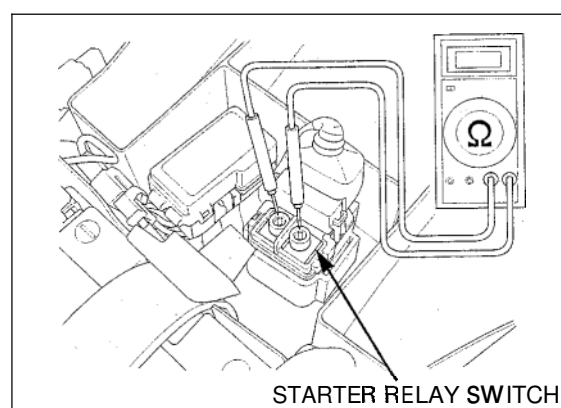


## CONTINUITY INSPECTION

Disconnect the starter relay cables.

Connect an ohmmeter to the starter relay switch large terminals.  
Turn the ignition switch to "ON" and the engine stop switch to "RUN".  
Check for continuity between the starter relay switch terminals.

There should be continuity while the starter switch is pushed and should be no continuity when the starter switch is released.

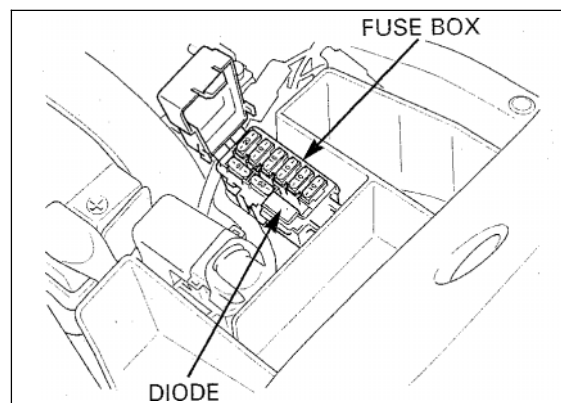


## DIODE

### REMOVAL

Remove the seat (page 2-2).

Open the fuse box and remove the diode.



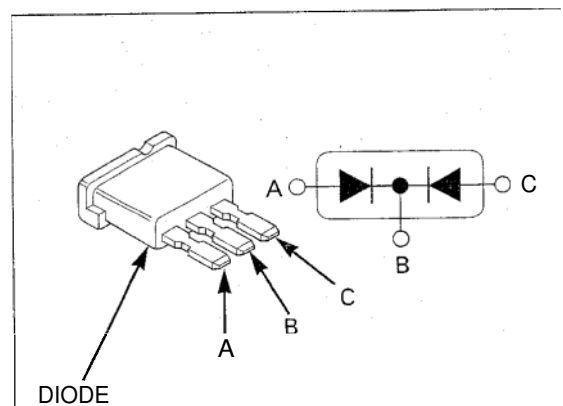
### INSPECTION

Check for continuity with an ohmmeter.

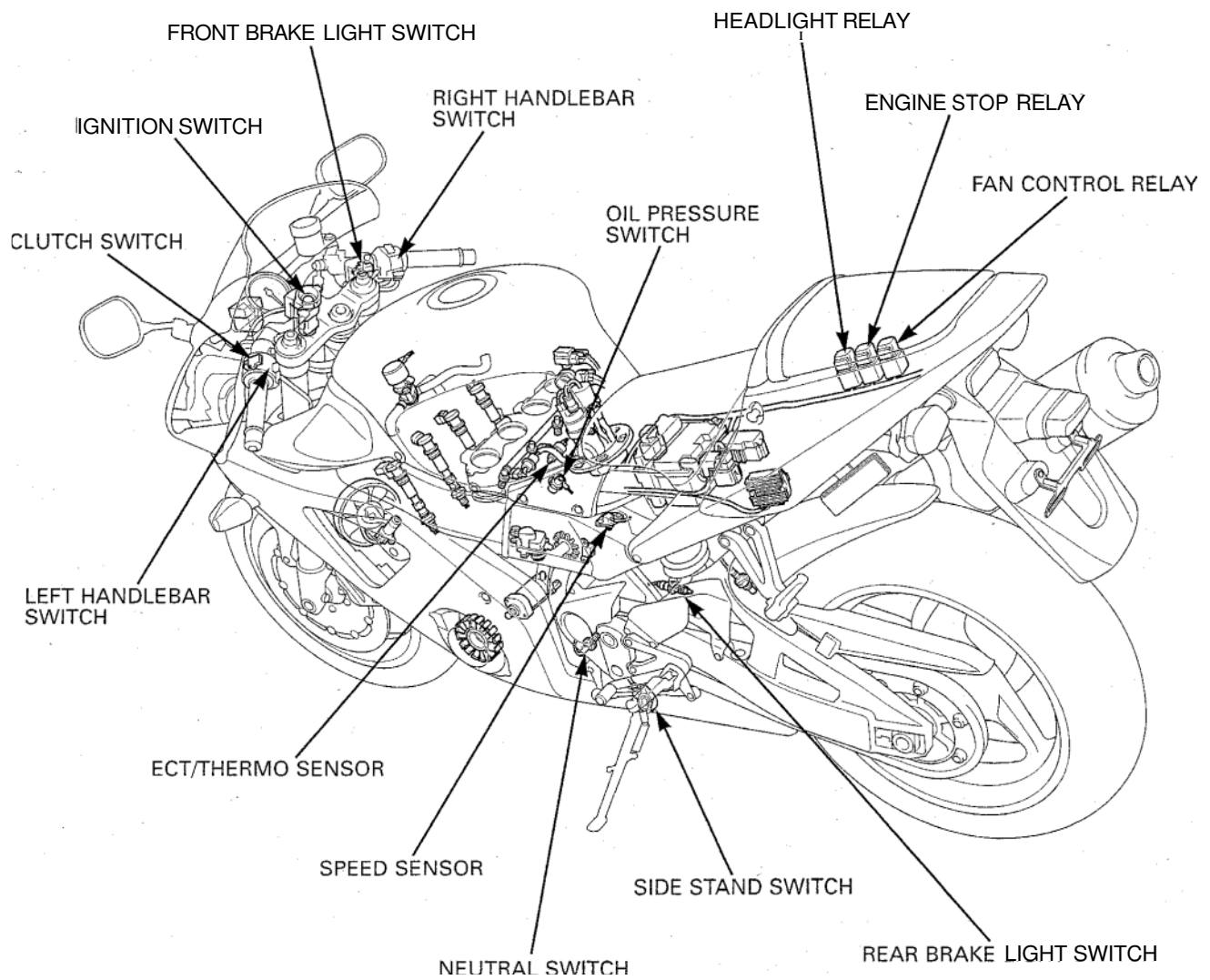
**Normal direction: Continuity**  
**Reverse direction: No continuity**

### INSTALLATION

Install the diode in the reverse order of removal.



## SYSTEM LOCATION



# 19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION	19-0	OIL PRESSURE SWITCH	19-14
SERVICE INFORMATION	19-1	FUEL RESERVE SENSOR	19-15
TROUBLESHOOTING	19-3	IGNITION SWITCH	19-16
HEADLIGHT	19-4	HANDLEBAR SWITCHES	19-17
TURN SIGNAL	19-6	BRAKE LIGHT SWITCH	19-18
BRAKE/TAIL LIGHT	19-6	CLUTCH SWITCH	19-18
LICENSE LIGHT	19-7	NEUTRAL SWITCH	19-18
COMBINATION METER	19-7	SIDE STAND SWITCH	19-19
SPEEDOMETER/VEHICLE SPEED SENSOR	19-9	HORN	19-20
TACHOMETER	19-12	TURN SIGNAL RELAY	19-21
ECT/THERMO SENSOR	19-12		

## SERVICE INFORMATION

### GENERAL

#### NOTICE

- A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.
- 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 its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Use an electric heating element to heat the water/coolant mixture for the ECT/thermo sensor inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes 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

## LIGHTS/METERS/SWITCHES

### SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12v – 55w x 2
		Lo	12V – 55W
	Brake/tail light		LED
	Front turn signal light		12V – 32/3cp (23/8W) x 2
	Rear turn signal light		12V – 32cp (23W) x 2
	License light		12V – 5W
	Instrument light		LED
	Turn signal indicator		LED x 2
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	Malfunction indicator lamp		LED
	Fuel reserve indicator		LED
	Main fuse		30 A
	PGM-FI fuse		20 A
Sub fuse		20A x 2, 10A x 3	
Tachometer peak voltage			10.5V minimum
Thermo sensor resistance		80 °C (176 °F)	2.1 – 2.6 kΩ
		120 °C (248 °F)	0.65 – 0.73 kΩ

### TORQUE VALUES

Ignition switch mounting one-way bolt	26 N•m (2.7 kgf•m, 20 lbf•ft)	
Side stand switch mounting bolt	10 N•m (1.0 kgf•m, 7 lbf•ft)	ALOC bolt
ECT/thermo sensor	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Oil pressure switch	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply sealant to the threads.
Oil pressure switch wire terminal screw	2 N•m (0.2 kgf•m, 1.4 lbf•ft)	
Neutral switch	12 N•m (1.2 kgf•m, 9 lbf•ft)	

### TOOLS

IgnitionMate peak voltage tester (U.S.A. only) or	07HGJ-0020100 (not available in U.S.A.)
Peak voltage adaptor	with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

## TROUBLESHOOTING

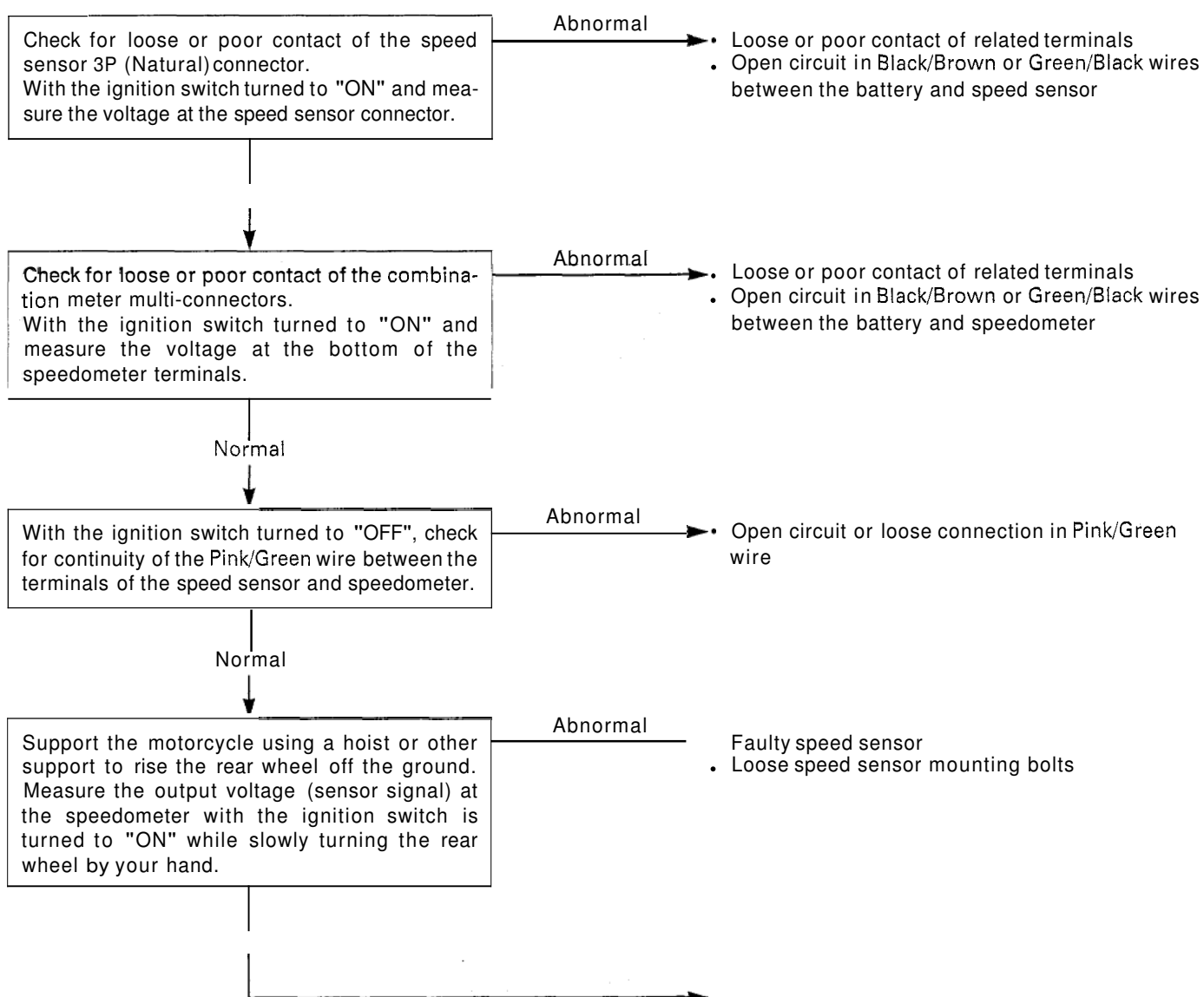
### SPEED SENSOR/SPEEDOMETER

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

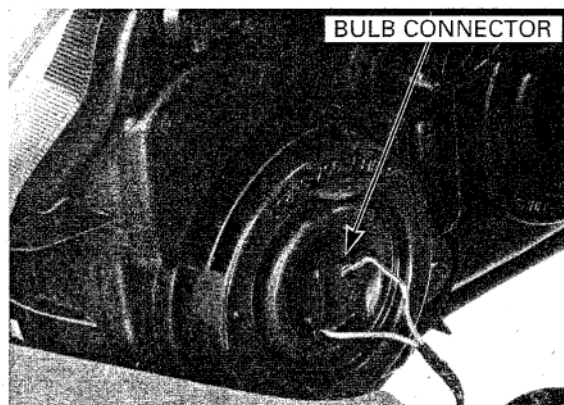
- Faulty odometer/trip meter



### HEADLIGHT

#### BULB REPLACEMENT

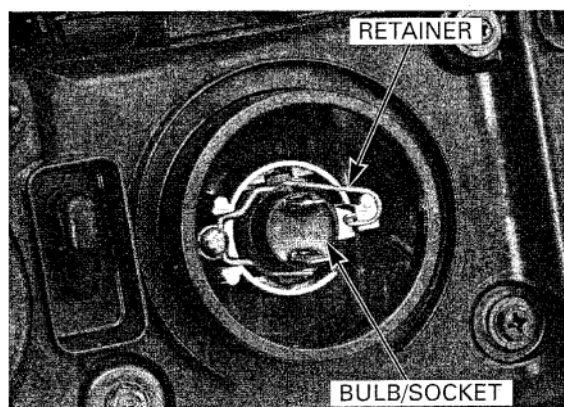
Disconnect the headlight bulb connector.  
Remove the dust cover.



*Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.*

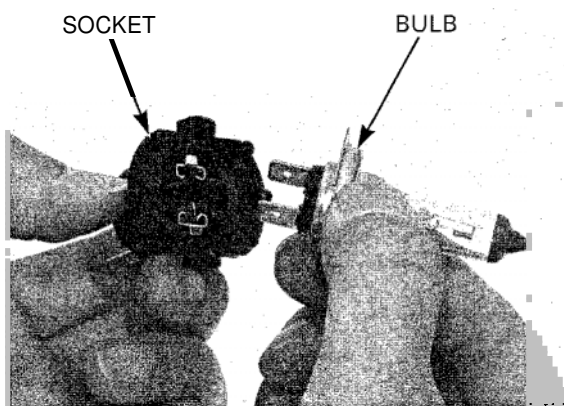
Unhook the bulb retainer and remove the headlight bulb/socket.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

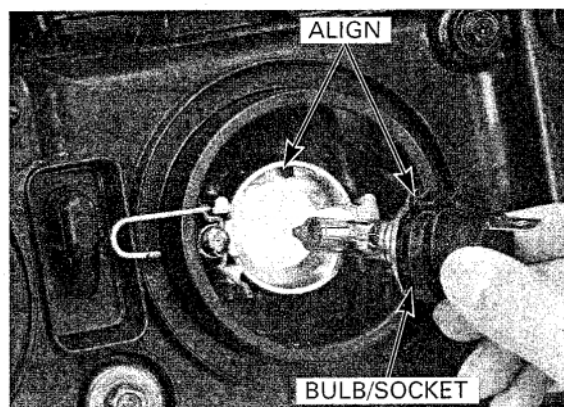


Remove the headlight bulb from the socket.

Install a new bulb into the socket.

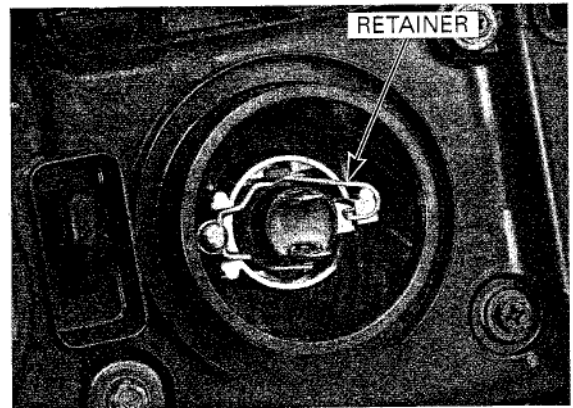


Install the new headlight bulb/socket aligning its tabs with the groove in the headlight unit.

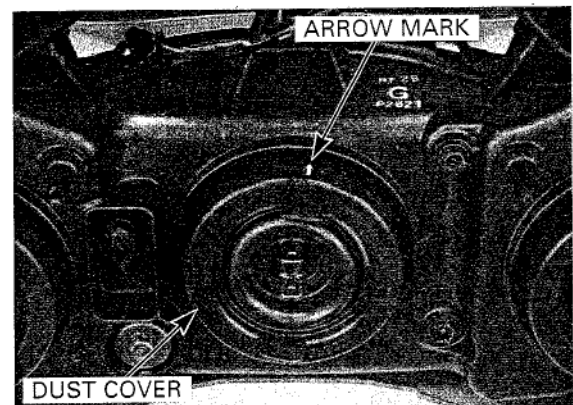




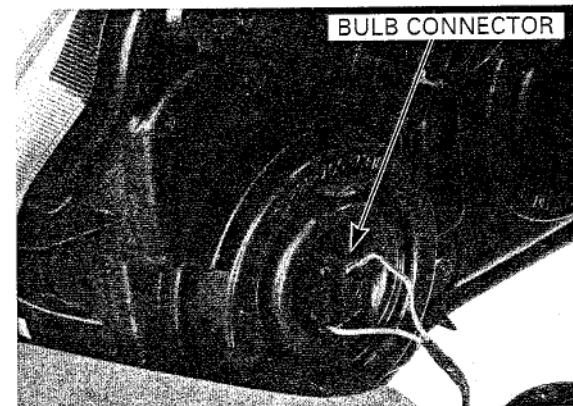
Hook the bulb retainer into the headlight unit groove.



Install the dust cover tightly against the headlight unit with its arrow mark facing up.



Connect the headlight connector.

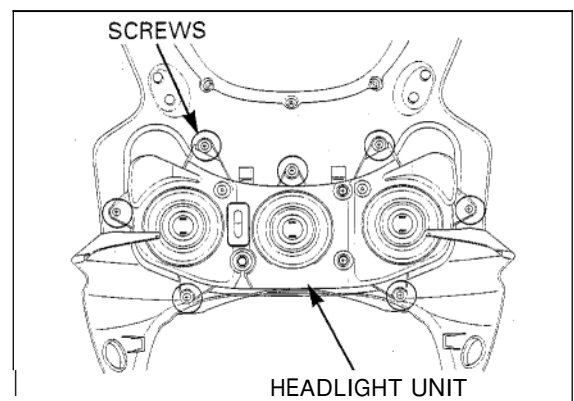


### REMOVAL/INSTALLATION

Remove the upper cowl (page 2-5).

Remove the seven screws and headlight unit.

Install the headlight unit in the reverse order of removal.

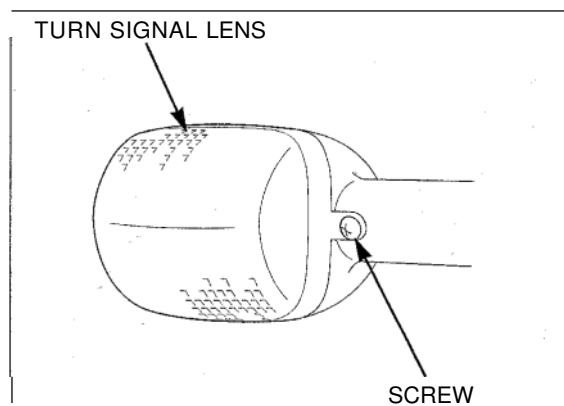


### TURN SIGNAL

*For turn signal  
light unit  
removal/installa-  
tion, see page 2-5  
and 2-9*

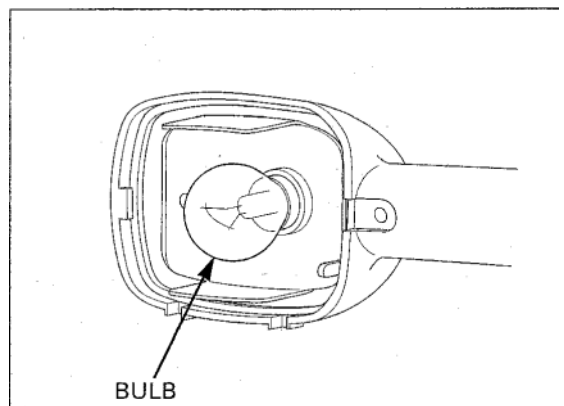
#### BULB REPLACEMENT

Remove the screw and turn signal lens.



While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Install the turn signal lens in the reverse order of removal.



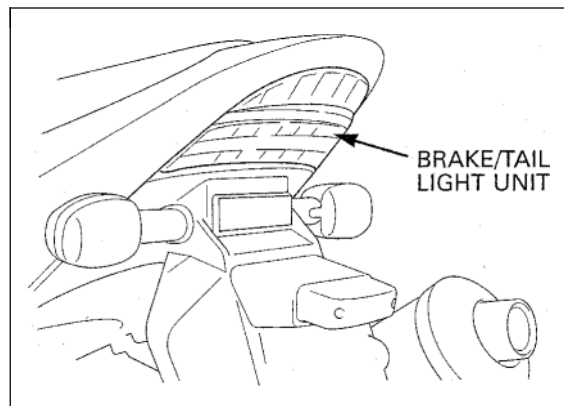
### BRAKE/TAIL LIGHT

#### INSPECTION

Turn the ignition switch to "ON", and check the tail light operation.

Check that all LED in the brake/tail light unit light on with the front brake lever and/or rear brake pedal applied.

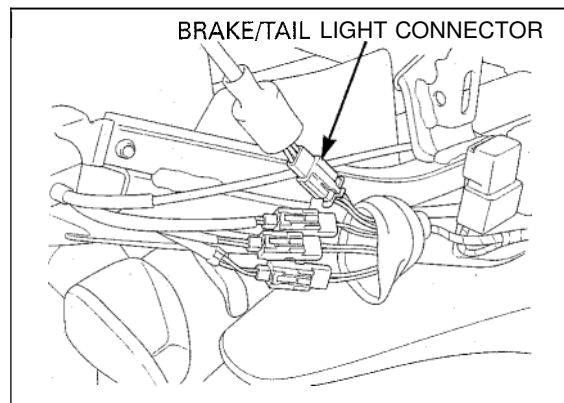
When even any one diode does not turn on, replace the brake/tail light assembly (refer to next procedure).



#### REMOVAL/INSTALLATION

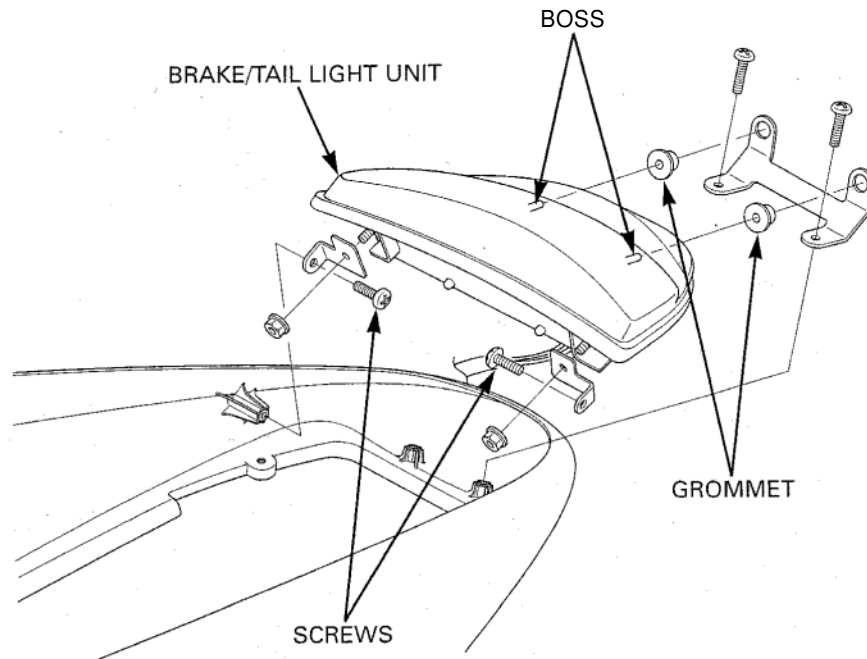
Remove the rear cowl (page 2-2).

Disconnect the brake/tail light 3P connector.



Remove the brake/tail light unit mounting screws.  
Pull out the bosses from the grommet, then remove the brake/tail light unit.

Installation is in the reverse order of removal.



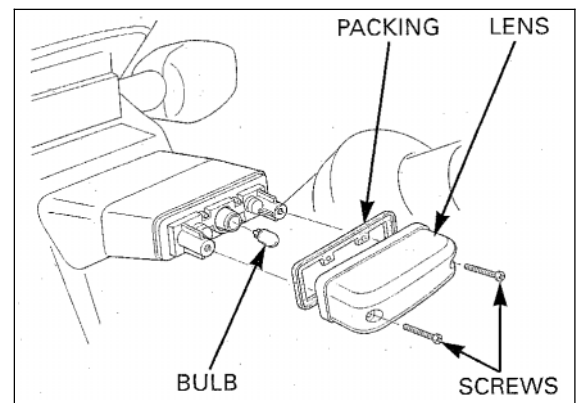
## LICENSE LIGHT

### BULB REPLACEMENT

Remove the screws, packing and lens.

Pull out the license light bulb and replace it with a new one.

Install the license light assembly in the reverse order of removal.

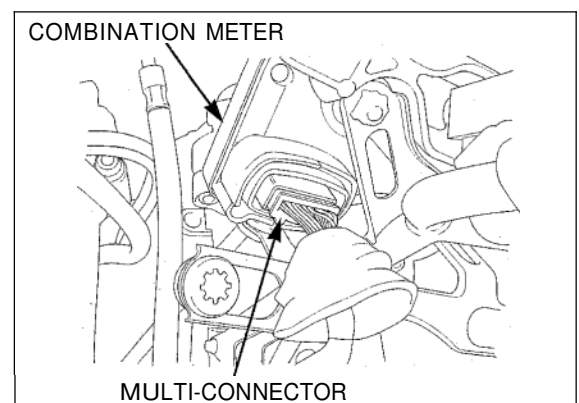


## COMBINATION METER

### REMOVAL

Remove the upper cowl (page 2-5).  
Remove the bank angle sensor (page 5-86).

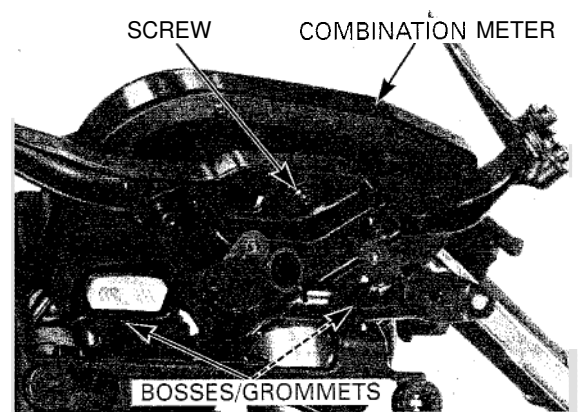
Disconnect the combination meter multi-connector.



## LIGHTS/METERS/SWITCHES

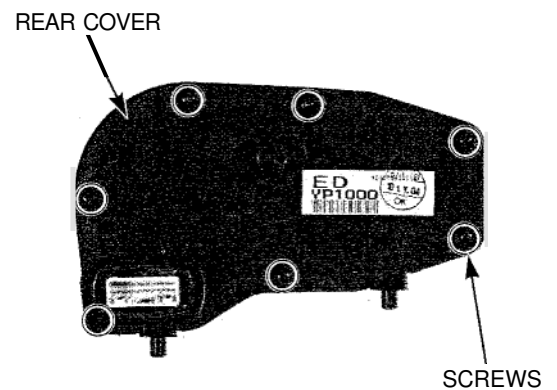
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Remove the combination meter mounting screw.  
Release the combination meter case bosses from the bracket grommets, then remove the combination meter.



### DISASSEMBLY

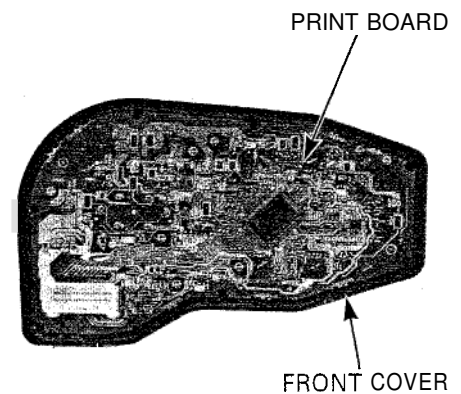
Remove the screws and combination meter rear cover.



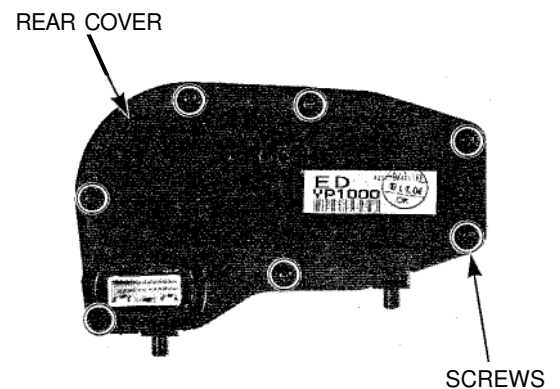
Remove the combination meter print board assembly from the front cover.

### ASSEMBLY

Install the print board assembly into the front cover.



Install the rear cover and tighten the screws securely.

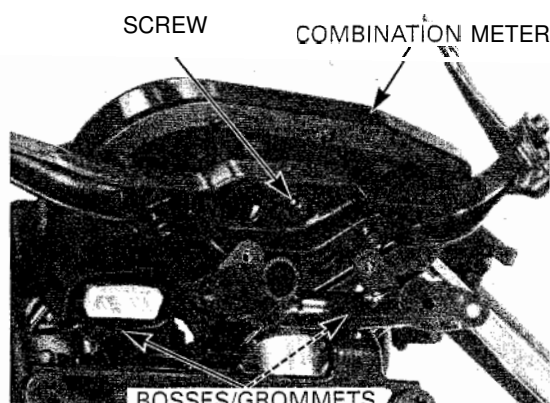


## INSTALLATION

*Align the combination meter case bosses with the grommets on the meter bracket.*

Install the combination meter onto the bracket.

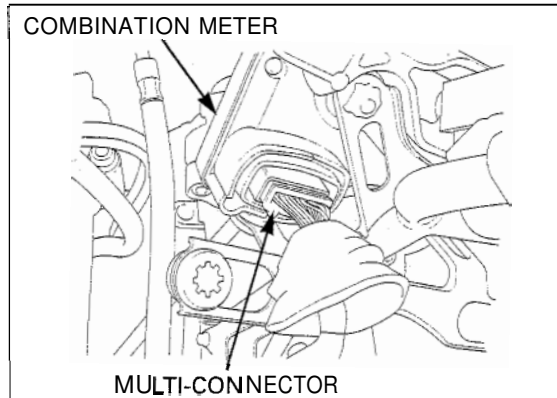
Install and tighten the mounting screw.



Connect the combination meter multi-connector.

Install the bank angle sensor (page 5-86)

Install the upper cowl (page 2-6).

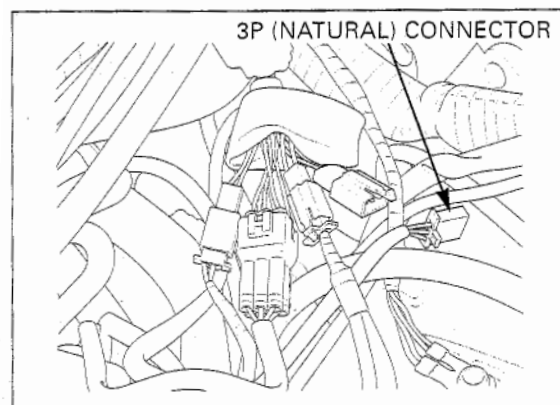


## SPEEDOMETER/VEHICLE SPEED SENSOR

### VOLTAGE INSPECTION

Open and support the front end of the fuel tank (page 3-4).

Disconnect the speed sensor 3P (Natural) connector and check for loose or poor contact of the connector.

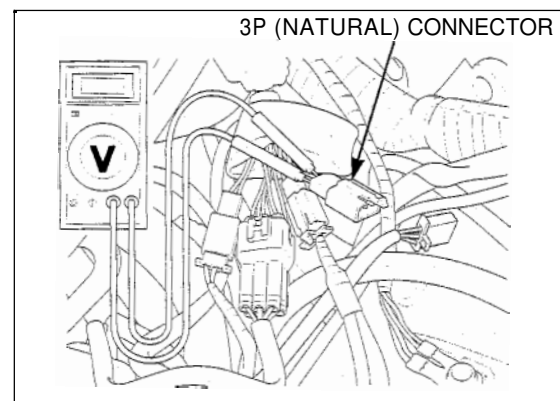


With the ignition switch turned to "ON" and measure the voltage at the 3P (Natural) connector of the wire harness side.

**Connection:** Black/Brown (+) - Green/Black (-)

**Standard:** Battery voltage

If there is no voltage, repair or replace the wire harness.



## LIGHTS/METERS/SWITCHES

Remove the upper cowl (page 2-5).

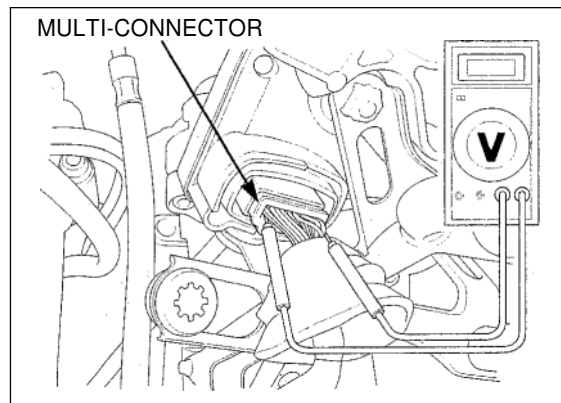
Check for loose or poor connection of the combination meter multi-connector.

With the ignition switch turned to "ON" and measure the voltage at the multi-connector terminals.

**Connection:** Black/Brown (+) - Green/Black (-)

**Standard:** Battery voltage

If there is no voltage, repair or replace the wire harness.

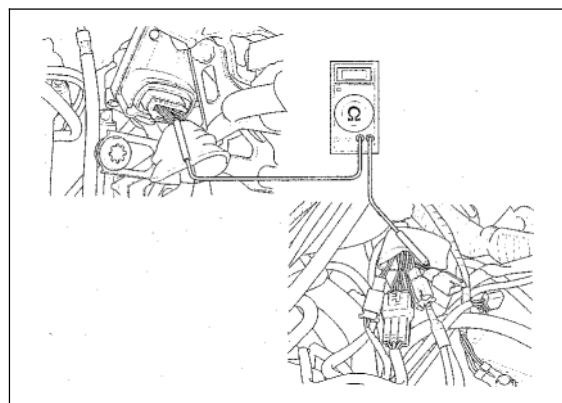


### OUTPUT SIGNAL INSPECTION

With the ignition switch is OFF, check for continuity of the Pink/Green wire between the speed sensor connector and combination meter multi-connector.

There should be continuity

If there is no continuity, repair or replace the wire harness.



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

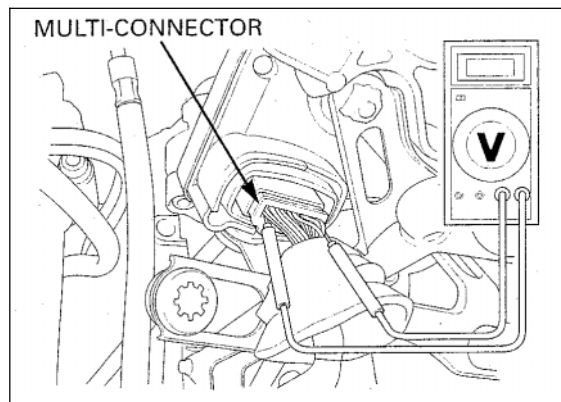
Shift the transmission into neutral.

Connect the speed sensor 3P (Natural) connector. Measure the voltage at the combination meter terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

**CONNECTION:** Pink/Green (+) - Green/Black (-)

**STANDARD:** Repeat 0 to 5V

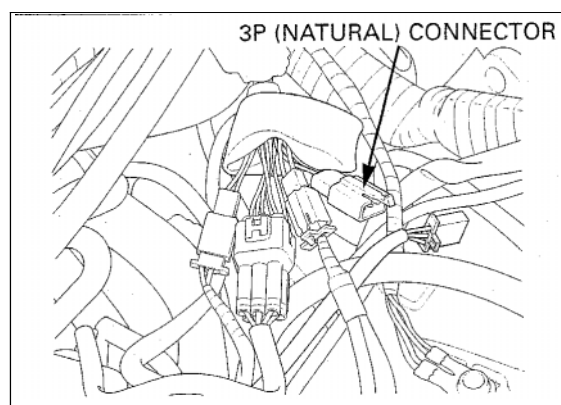
If the measurement is out of specification, inspect the open circuit in wire harness.



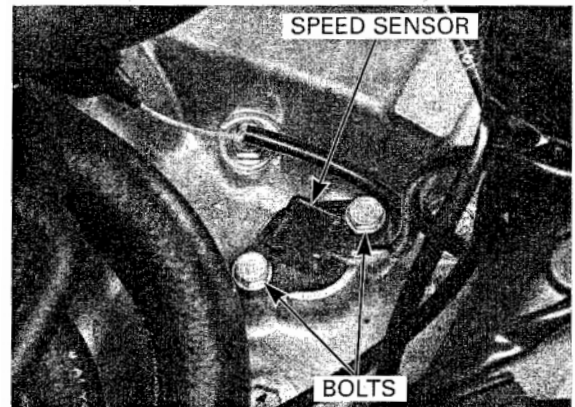
### REMOVAL/INSTALLATION

Remove the fuel tank (page 5-59).

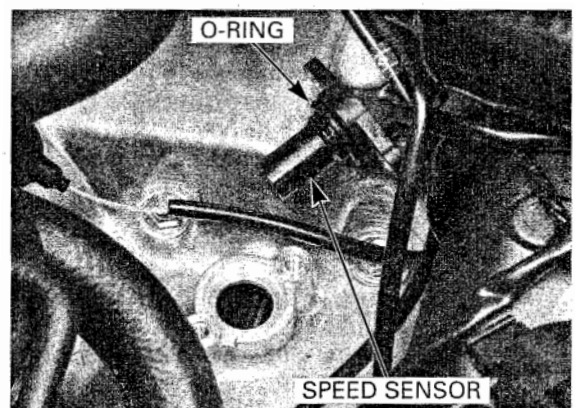
Disconnect the speed sensor 3P (Natural) connector.



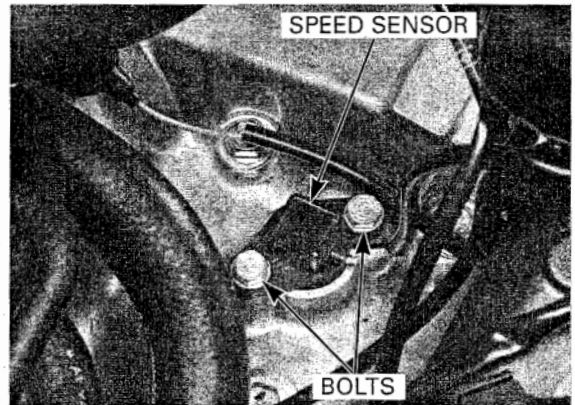
Remove the bolts and speed sensor.



Check the O-ring is in good condition, replace if necessary.  
Install the speed sensor into the upper crankcase.

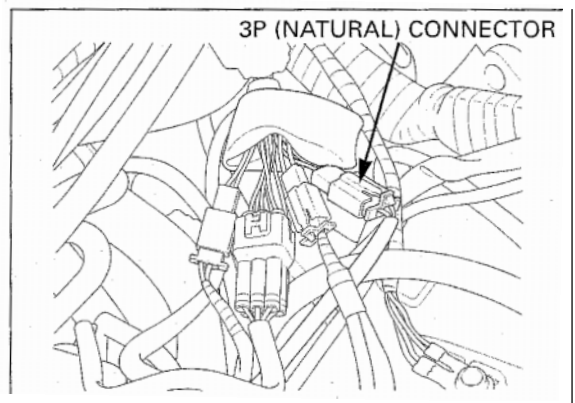


Install and tighten the mounting bolts securely.



Route the sensor wire.

Connect the speed sensor 3P (Natural) connector.



### TACHOMETER

#### INSPECTION

Remove the upper cowl (page 2-5).

Check for loose or poor contact terminals of the combination meter multi-connector.

Connect the peak voltage adaptor to the tachometer Black/Yellow terminal and ground.

#### TOOLS:

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

with commercially available digital multimeter  
(impedance **10 M $\Omega$ /DCV** minimum)

CONNECTION: **Yellow/Green (+)** and Ground (-)

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: **10.5 V** minimum

If the value is normal, replace the tachometer.

If the measured value is below 10.5 V, replace the ECM.

If the value is 0 V, perform the following:

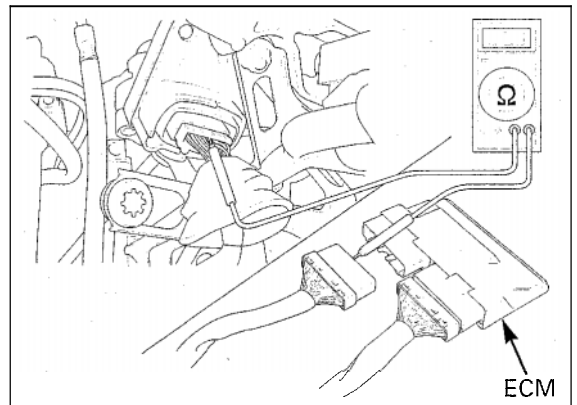
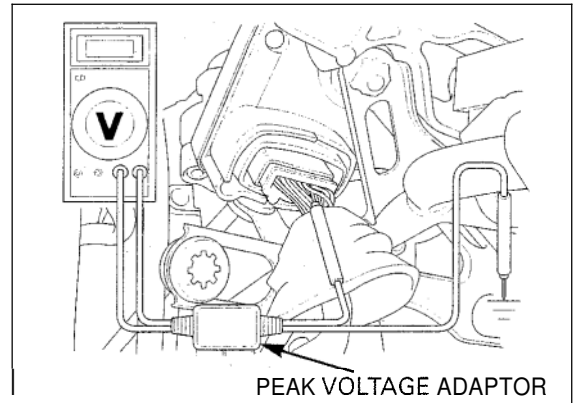
Remove the ECM cover (page 5-87) and disconnect the ECM multi-connector.

Check for continuity between the tachometer terminal and the ECM (26P/Black) connector Yellow/Green terminals.

If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the combination meter print board.

For tachometer replacement, see page 19-8; combination meter disassembly and assembly.



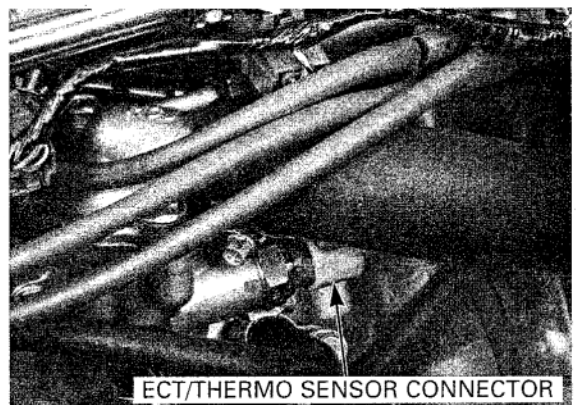
### ECT/THERMO SENSOR

#### INSPECTION

Remove the fuel tank (page 5-59).

Drain the coolant (page 6-4).

Disconnect the wire connector from the ECT/thermo sensor and remove the sensor.



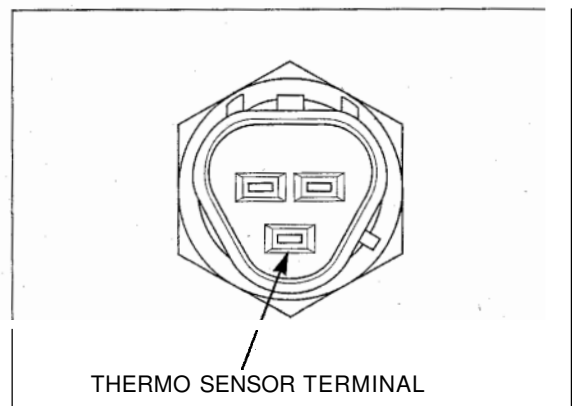
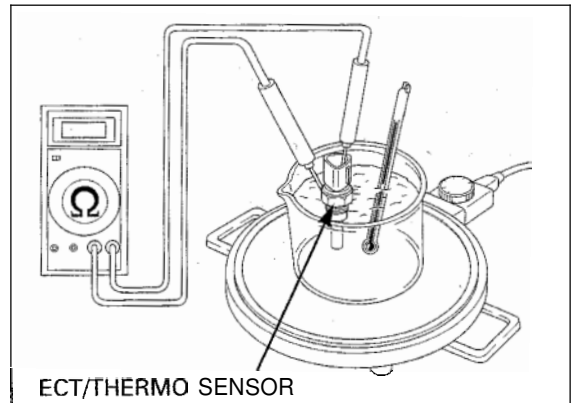


Suspend the ECT/thermo sensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT/thermo sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT/thermo sensor touch the pan.

Temperature	80°C (68°F)	120°C (248°F)
Resistance	2.1 – 2.6 kΩ	0.65 – 0.73 kΩ

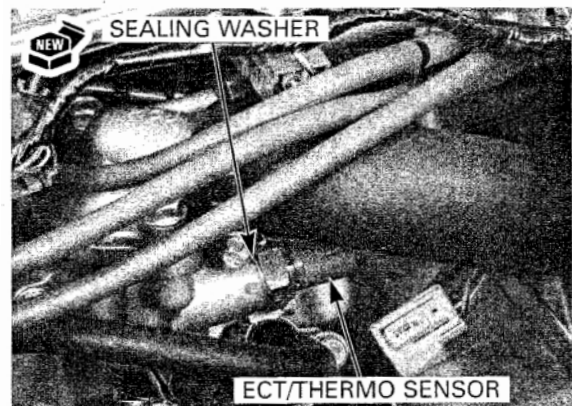
Replace the sensor if it is out of specification by more than 10% at any temperature listed.



*Always replace the sealing washer with a new one.*

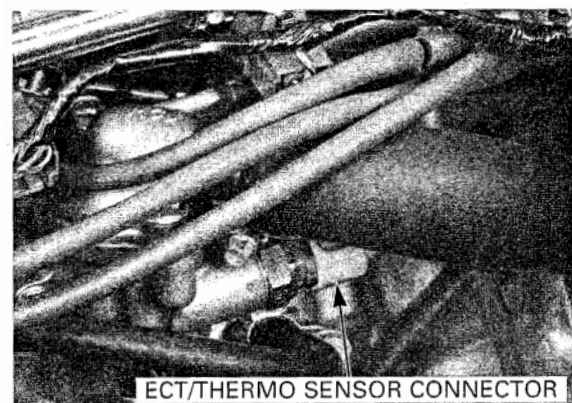
Install and tighten the ECT/thermo sensor to the specified torque.

**TORQUE: 23 N•m (2.3kgf•m, 17 lbf•ft)**



Connect the ECT/thermo sensor connector.

Fill the system with recommended coolant and bleed the air (page 6-5).

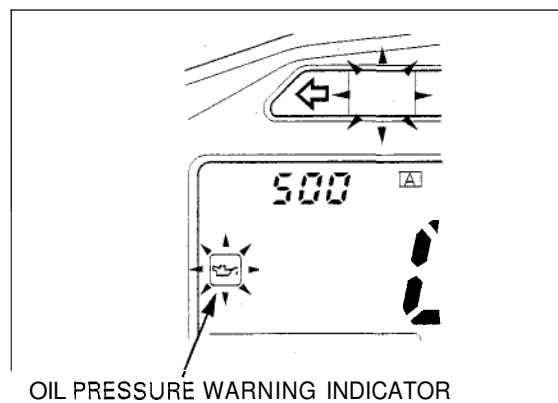


### OIL PRESSURE SWITCH

#### INSPECTION

If the oil pressure warning indicator stays on while the engine is running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator comes on with the ignition switch turned to "ON".



If the indicator does not come on, inspect as follows:  
Remove the fuel tank (page 5-59).

Remove the dust cover.  
Remove the screw and oil pressure switch terminal.



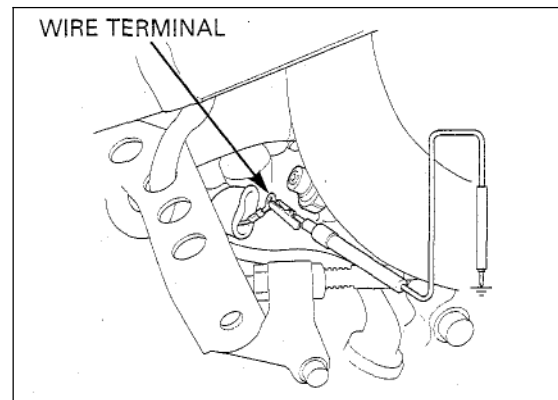
Short the oil pressure switch wire terminal with the ground using a jumper wire.

The oil pressure warning indicator comes on with the ignition switch turned to "ON".

If the indicator does not come on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure the indicator goes out.  
If the indicator does not go out, check the oil pressure (page 4-3).

If the oil pressure is normal, replace the oil pressure switch (see below).



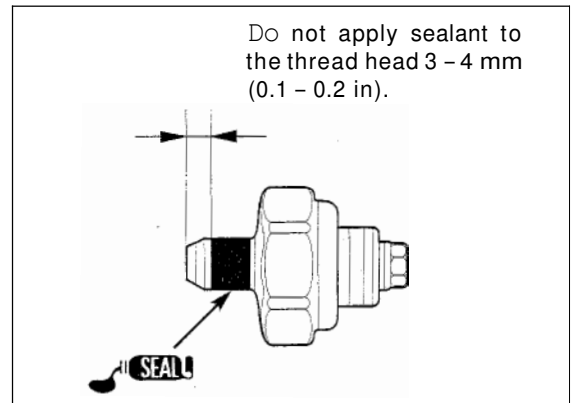
#### REMOVAL/INSTALLATION

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.



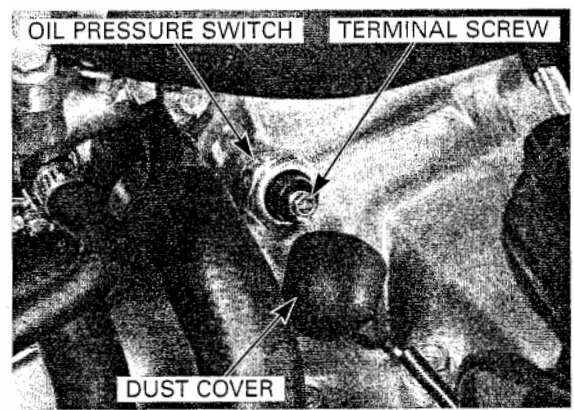
Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

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

Connect the oil pressure switch terminal to the switch and tighten the screw to the specified torque.

**TORQUE: 2 N•m (0.2 kgf•m, 1.4 lbf•ft)**

Install the dust cover.



## FUEL RESERVE SENSOR

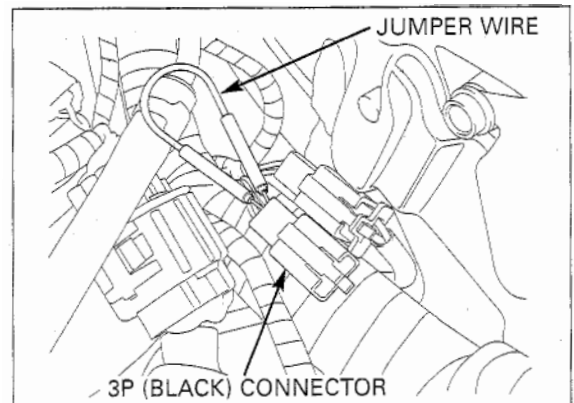
### INSPECTION

If the fuel reserve indicator does not indicate properly, check for the following.

Open and support the front end of the fuel tank (page 3-4).

Disconnect the fuel reserve sensor 3P (Black) connector.

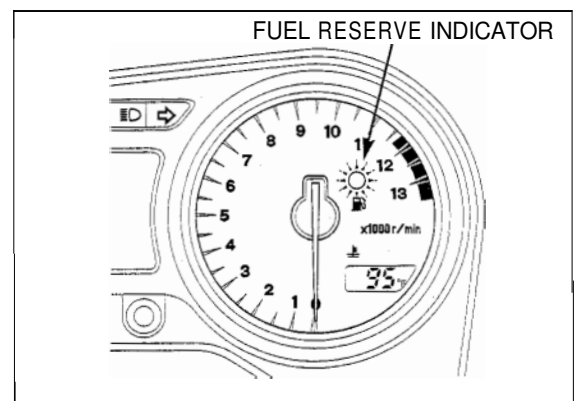
Short the wire harness side connector Brown/Black and Green/Black terminals with a jumper wire.



Turn the ignition switch to "ON" and make sure the fuel reserve indicator comes on.

If the indicator comes on, replace the fuel pump assembly.

If the indicator still does not come on, check for an open or short circuit in the wire harness.



IGNITION SWITCH

INSPECTION

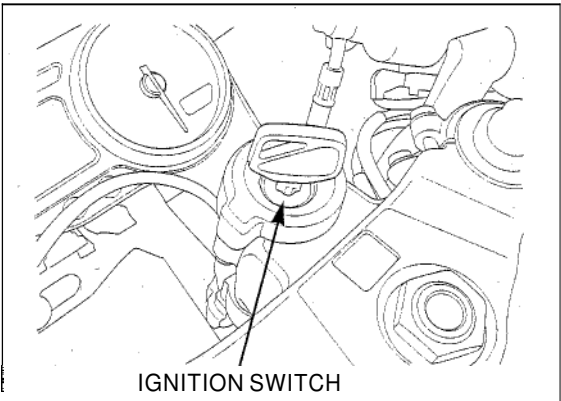
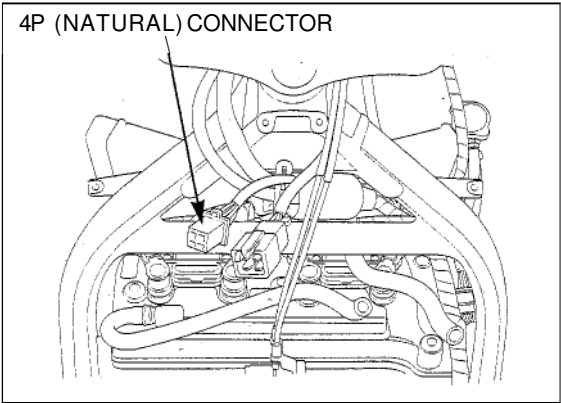
Remove the air cleaner housing (page 5-64).

Disconnect the ignition switch wire 4P (Natural) connector.

Check for continuity between the wire terminals of the ignition switch 4P (Natural) connector in each switch position.

Continuity should exist between the color coded wires as follows:

	FAN	IG	BAT1	KEY
ON				KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN
LEADCOLOR	P	R/BI	R	—



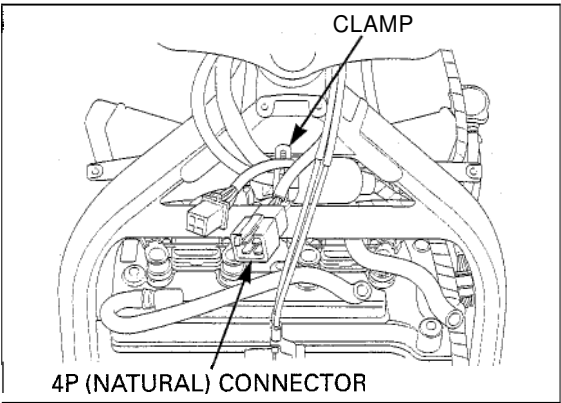
REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-64).

Release the connector boot from the wire clamp.

Disconnect the ignition switch wire 4P (Natural) connector.

Remove the top bridge (page 13-5).

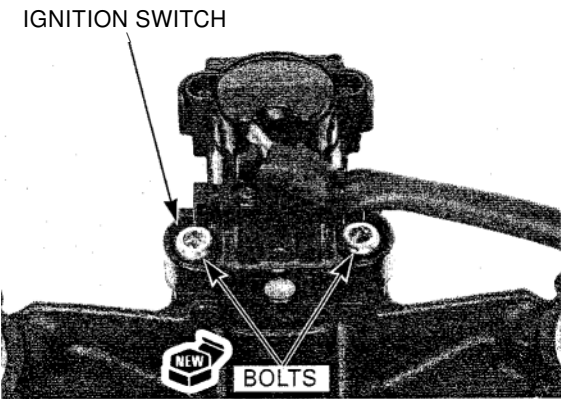


Remove the bolts and ignition switch.

Install the ignition switch to the top bridge.

Install the new main switch mounting bolts and tighten the bolts to the specified torque.

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



HANDLEBAR SWITCHES

Remove the air cleaner housing (page 5-64).

Disconnect the handlebar switch connectors.

Check for continuity between the wire terminals of the handlebar switch connector.

Continuity should exist between the color coded wire terminals as follows:

OFF		

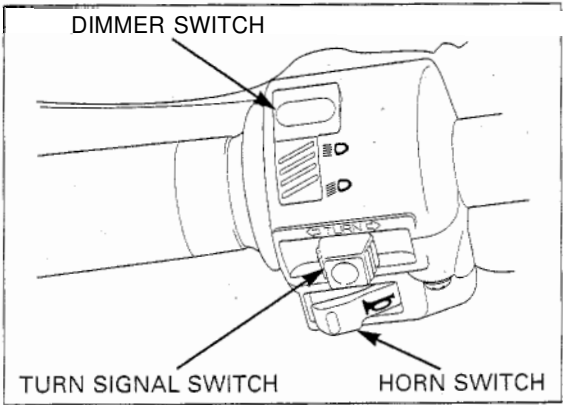
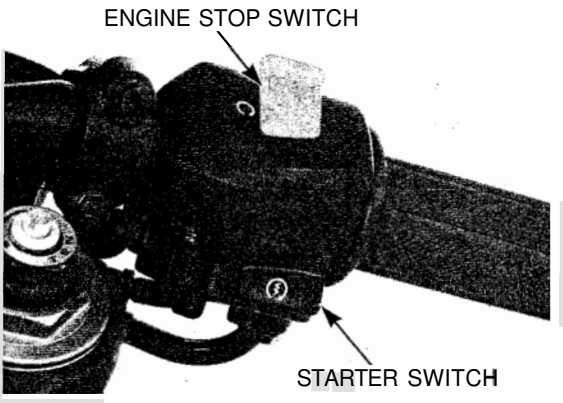
	ST	IG	BAT3	HL
FREE				
PUSH				
LEAD COLOR	Y/R	Bl	Bl/Br	W

	HL	Lo	Hi
Lo			
(N)			
Hi	O		O
LEADCOLOR	W		Bu

HORN SWITCH

	Ho	BAT5
FREE		
PUSH		
LEAD COLOR	Lg	Bl/Br

	W	R	L	BAT5	PR	PL
R						
N						
L						
LEADCOLOR	Gr	Lb	O	Bl/Br	Lb/W	O/W

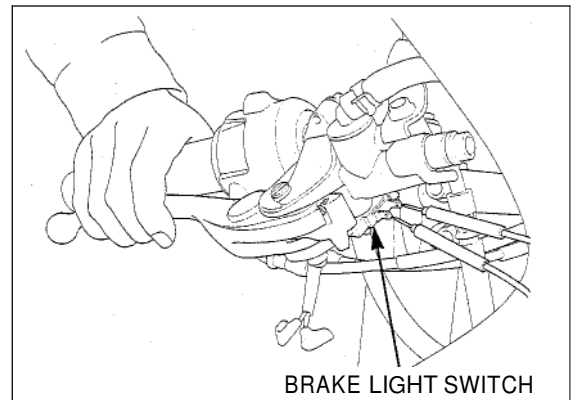


### BRAKE LIGHT SWITCH

#### FRONT

Disconnect the front brake light switch connectors and check for continuity between the terminals.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever released.

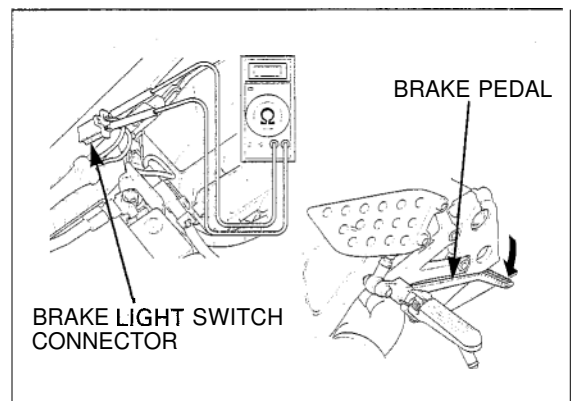


#### REAR

Remove the seat (page 2-2).

Disconnect the rear brake light switch connector and check for continuity between the terminals.

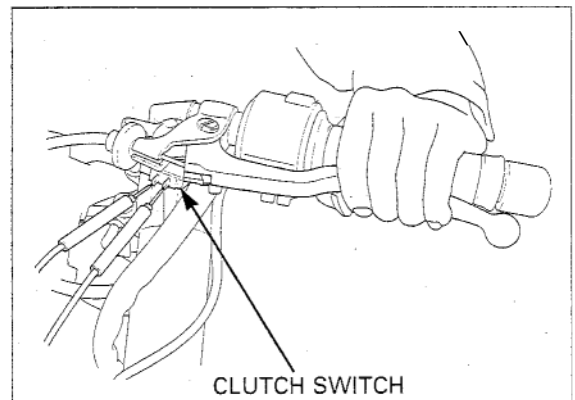
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal released.



### CLUTCH SWITCH

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever released.



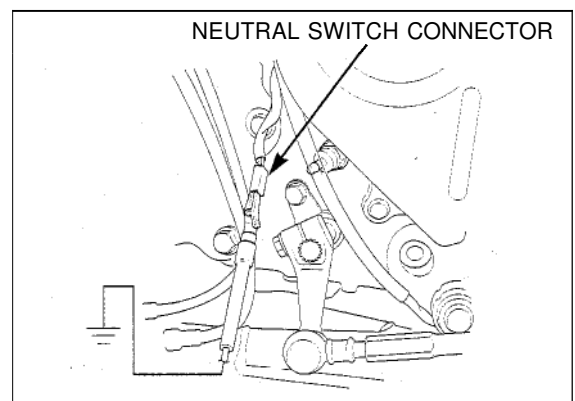
### NEUTRAL SWITCH

Remove the lower cowl (page 2-7).

Disconnect the neutral switch connector from the switch.

Shift the transmission into neutral and check for continuity between the Light green wire terminal and ground.

There should be continuity with the transmission in neutral, and no continuity when the transmission is into gear.



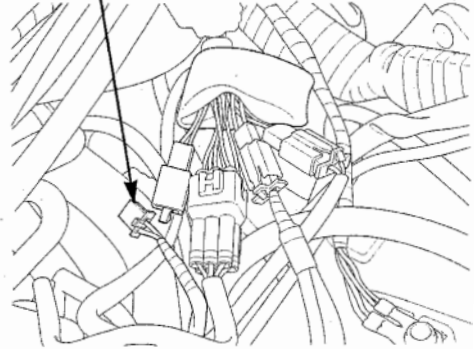
## SIDE STAND SWITCH

### INSPECTION

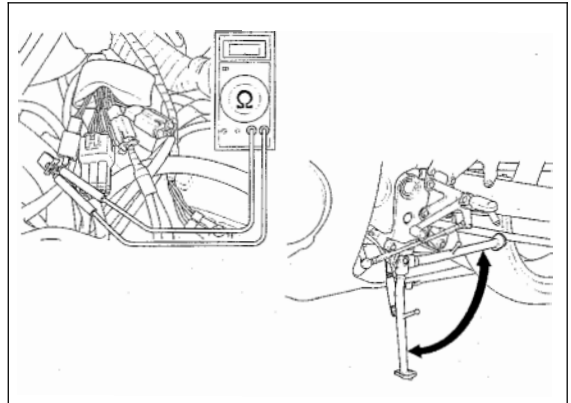
Open and support the front end of the fuel tank (page 3-4).

Disconnect the side stand switch 2P (Green) connector.

2P (GREEN) CONNECTOR



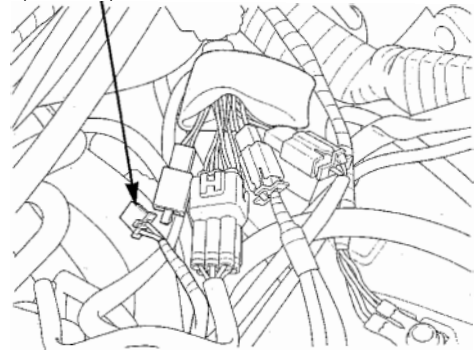
Check for continuity between the wire terminals of the side stand switch 2P (Green) connector. Continuity should exist only when the side stand is up.



### REMOVAL

Disconnect the side stand switch 2P (Green) connector.

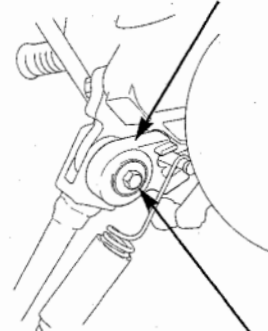
2P (GREEN) CONNECTOR



Remove the bolt and side stand switch.

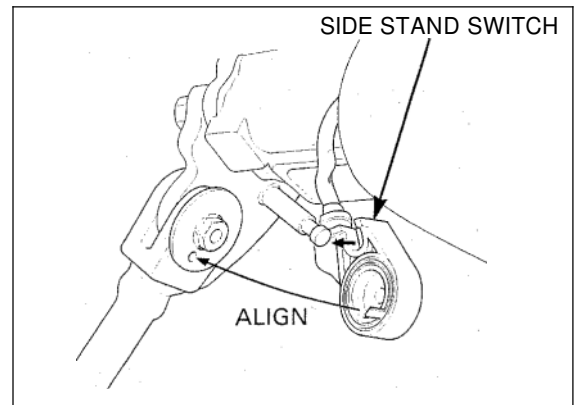
SIDE STAND SWITCH

BOLT



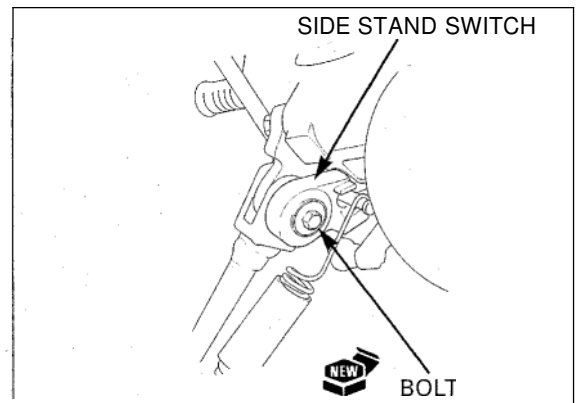
### INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.

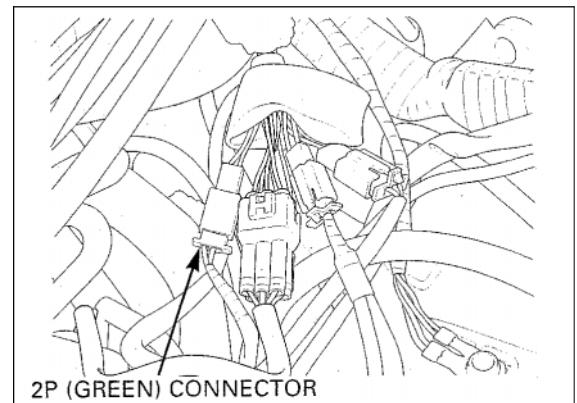


Secure the side stand switch with a new bolt.

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



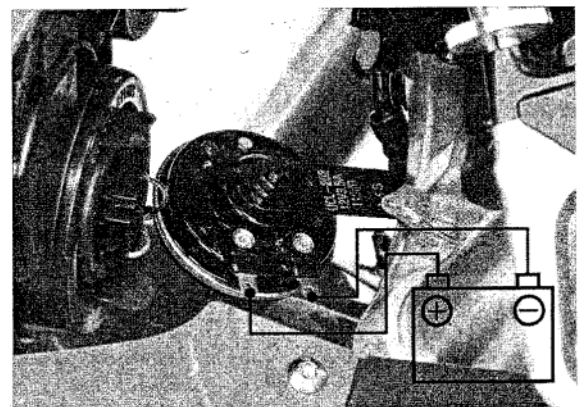
Connect the side stand switch 2P (Green) connector.



### HORN

Disconnect the wire connectors from the horn.

Connect the 12V battery to the horn terminal directly. The horn is normal if it sounds when the 12V battery is connected across the horn terminals.





## TURN SIGNAL RELAY

### INSPECTION

Remove the upper cowl (page 2-5).

Check the following:

- Battery condition
- Burned bulbs or non-specified wattage
- Burned fuse
- Ignition switch and turn signal switch function
- Loose connectors

If the above items are all normal, check the following:  
Disconnect the combination meter multi-connector from the combination meter.

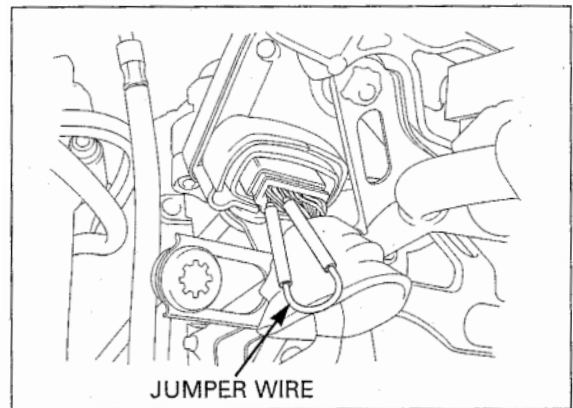
Short the White/Green and Gray terminals of the combination meter connector with a jumper wire.  
Start the engine and check the turn signal light by turning the switch on.

↓  
Light comes on

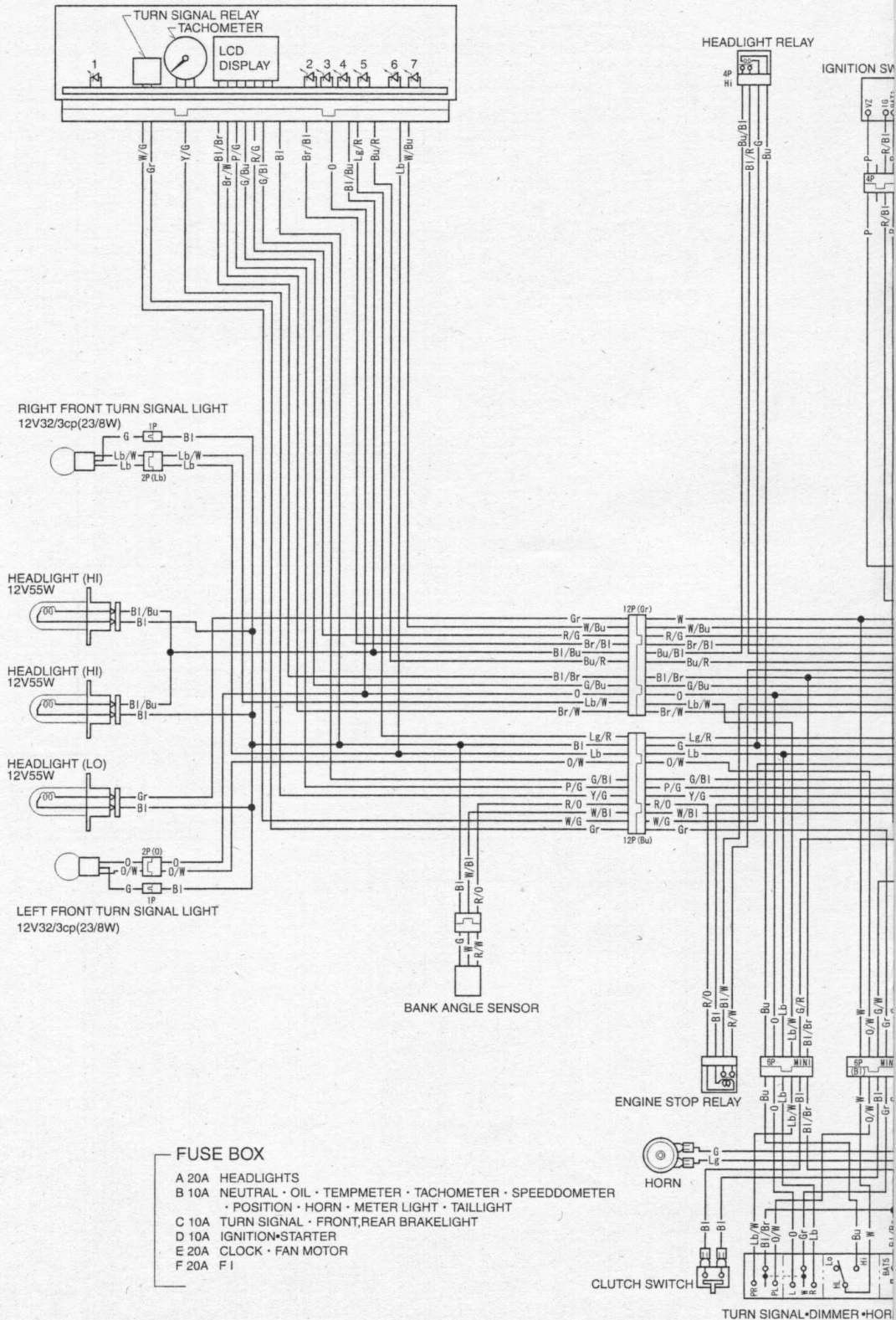
- Faulty turn signal relay (combination meter).
- Poor connection of the connector.

↓  
Light does not come on

- Broken wire harness



- 1 ILLUMINATION  
2 FUEL RESERVE INDICATOR  
3 LEFT TURN SIGNAL INDICATOR  
4 HIGH BEAM INDICATOR  
5 NEUTRAL INDICATOR  
6 RIGHT TURN SIGNAL INDICATOR  
7 MALFUNCTION INDICATOR



## SWITCH CONTINUITY

## TURN SIGNAL SWITCH

	W	R	L	BAT5	PR	PL
R						
N						
L						

## DIMMER SWITCH

	HL	Lo	Hi
Lo			
(N)			
Hi			

## HORN SWITCH

	Ho	BAT5
FREE		
PUSH		

## ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN		

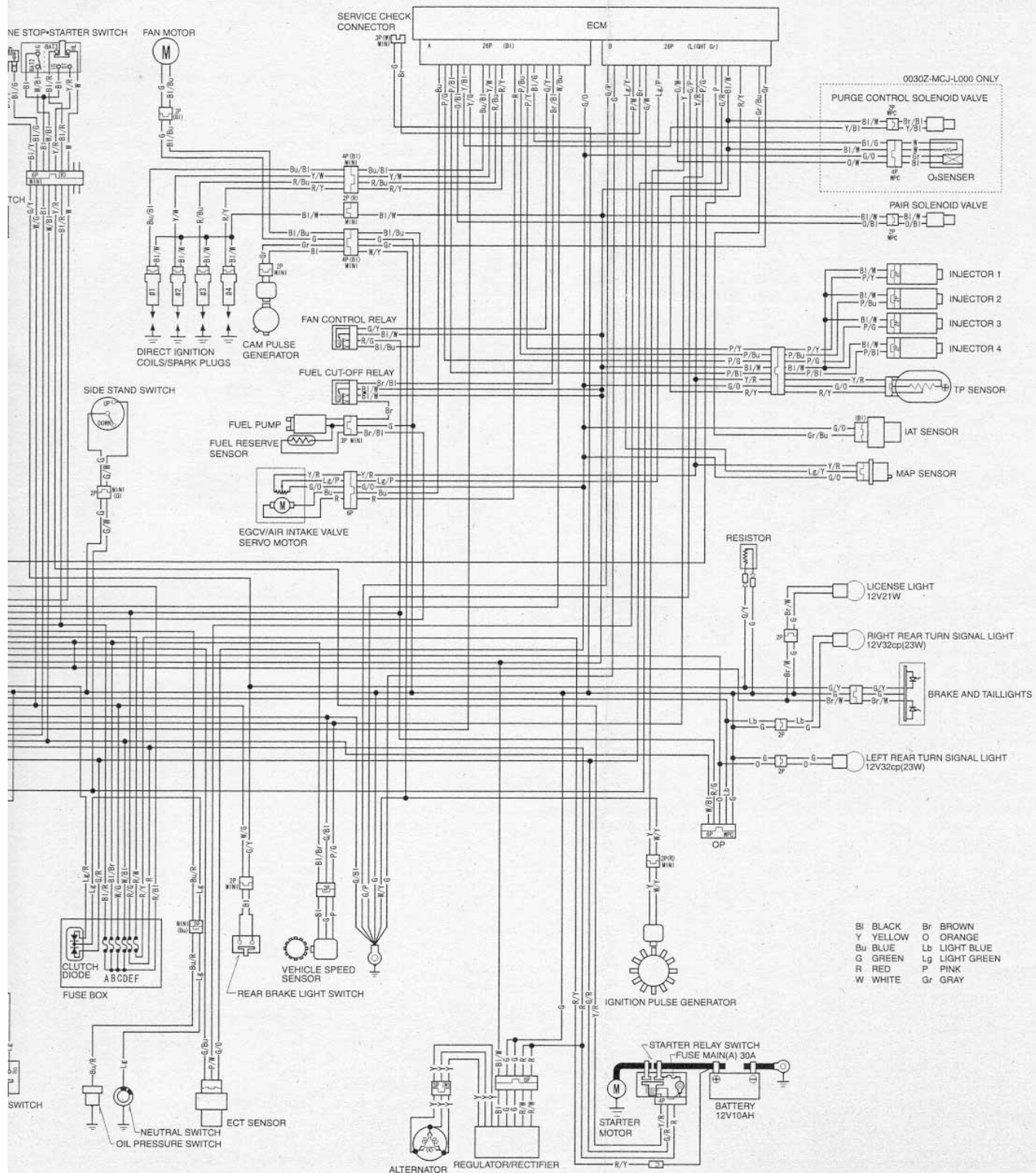
## STARTER SWITCH

	ST	IG	BAT3	HL
FREE				
PUSH				

## IGNITION SWITCH

	FAN	IG	BAT1	KEY
ON				KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN

# 20. WIRING DIAGRAM



0030Z-MCJ-A000  
0030Z-MCJ-L000

# 21. TROUBLESHOOTING

**ENGINE DOES NOT START OR IS HARD TO START**

**21-1**

**POOR PERFORMANCE AT HIGH SPEED**

**21-4**

**ENGINE LACKS POWER**

**21-2**

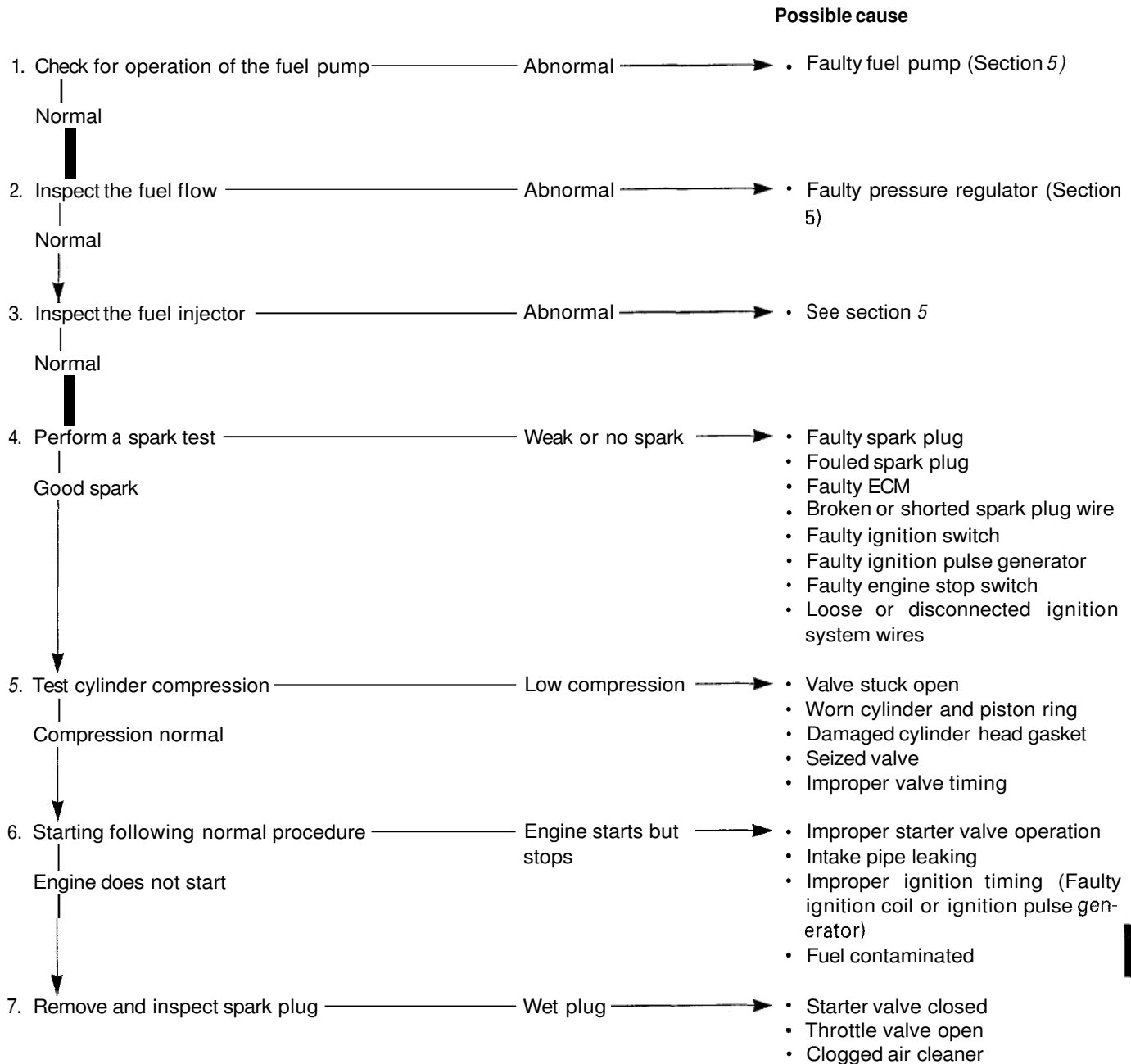
**POOR HANDLING**

**21-4**

**POOR PERFORMANCE AT LOW AND IDLE SPEED**

**21-3**

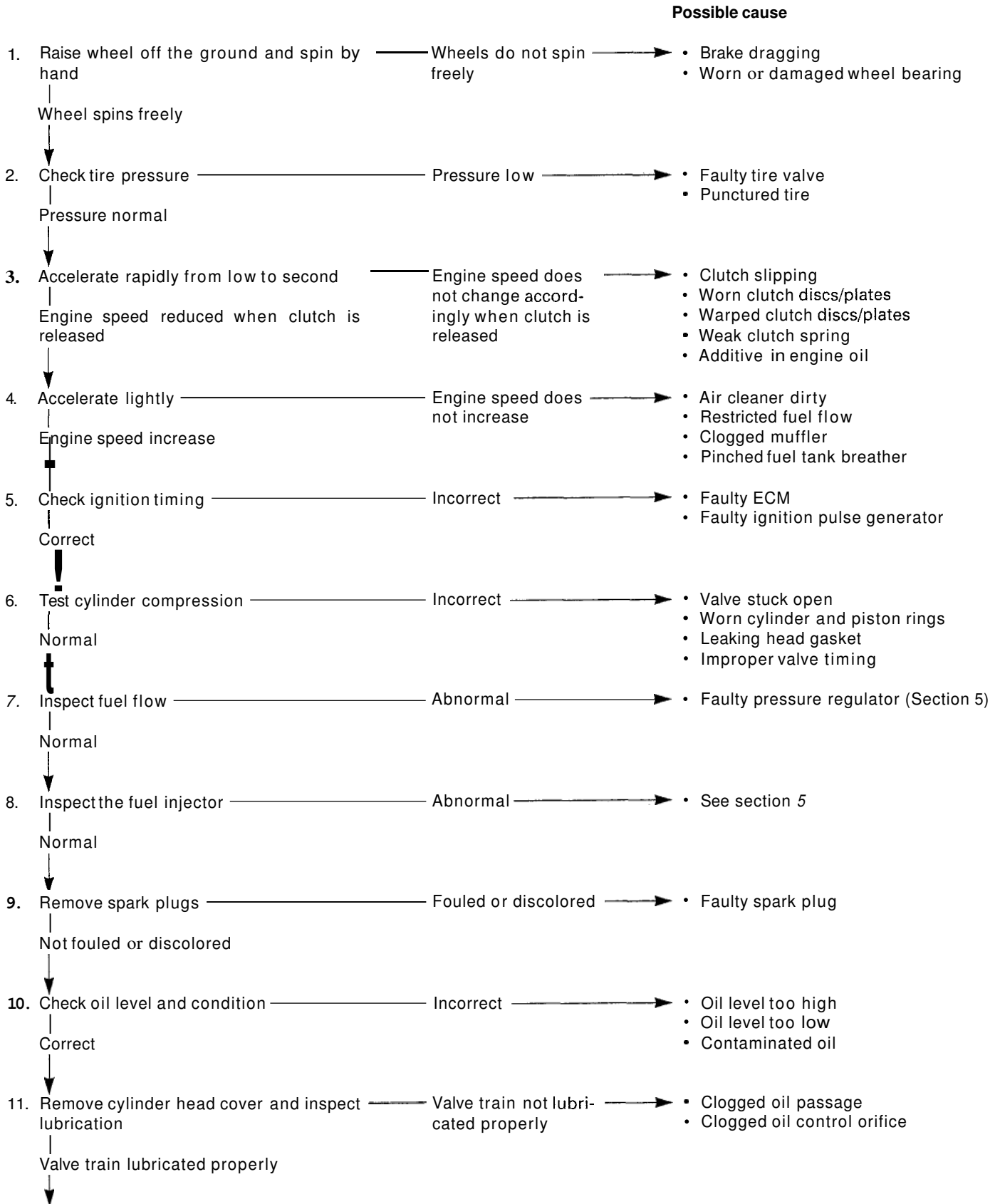
## ENGINE DOES NOT START OR IS HARD TO START

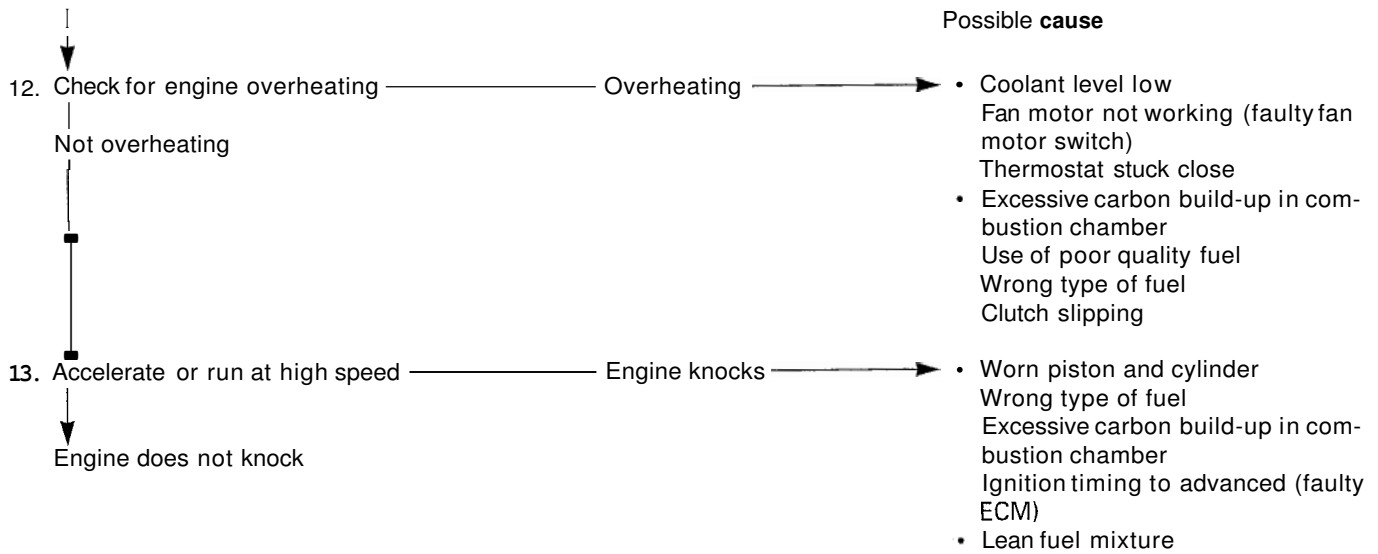


**21**

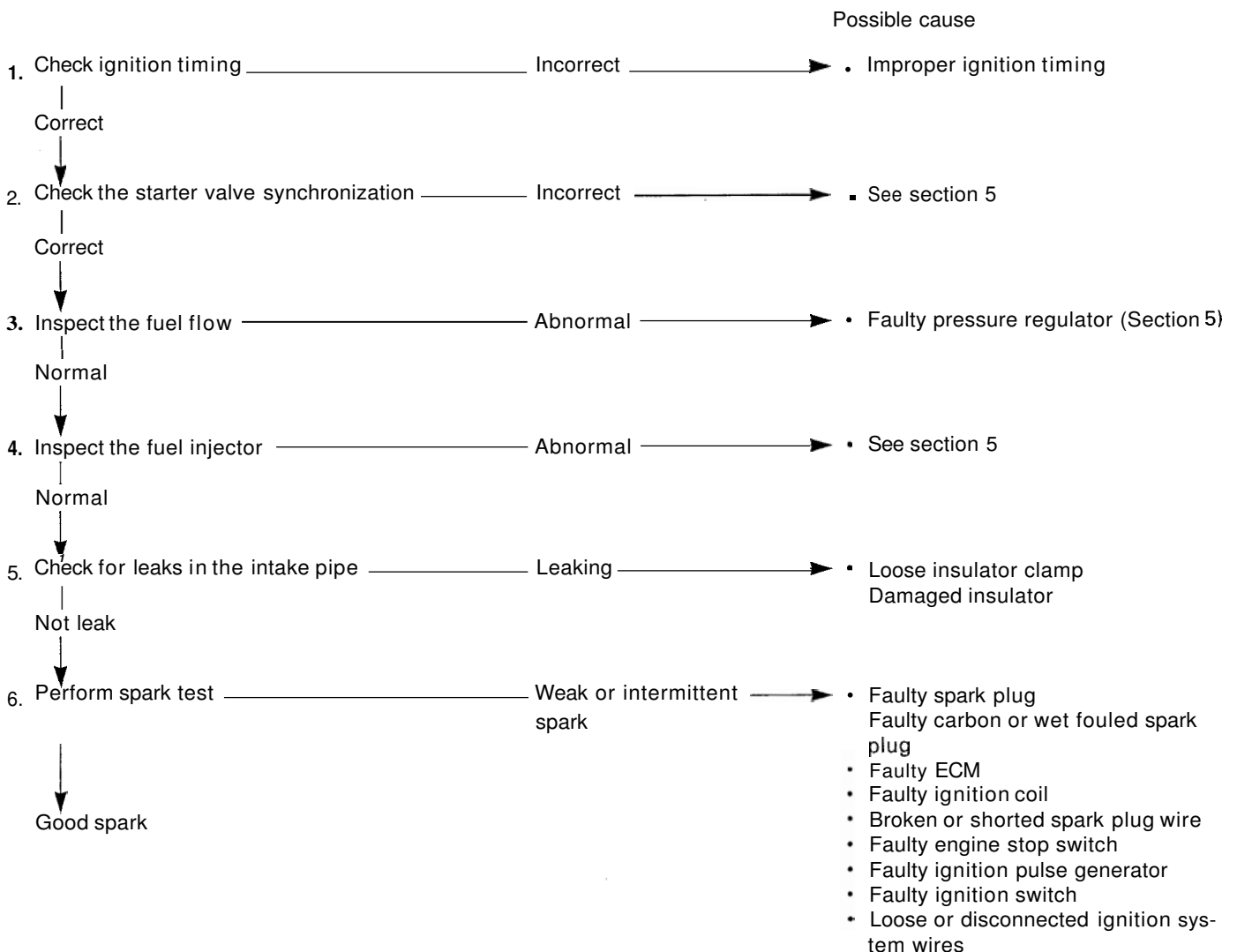
## TROUBLESHOOTING

### ENGINE LACKS POWER





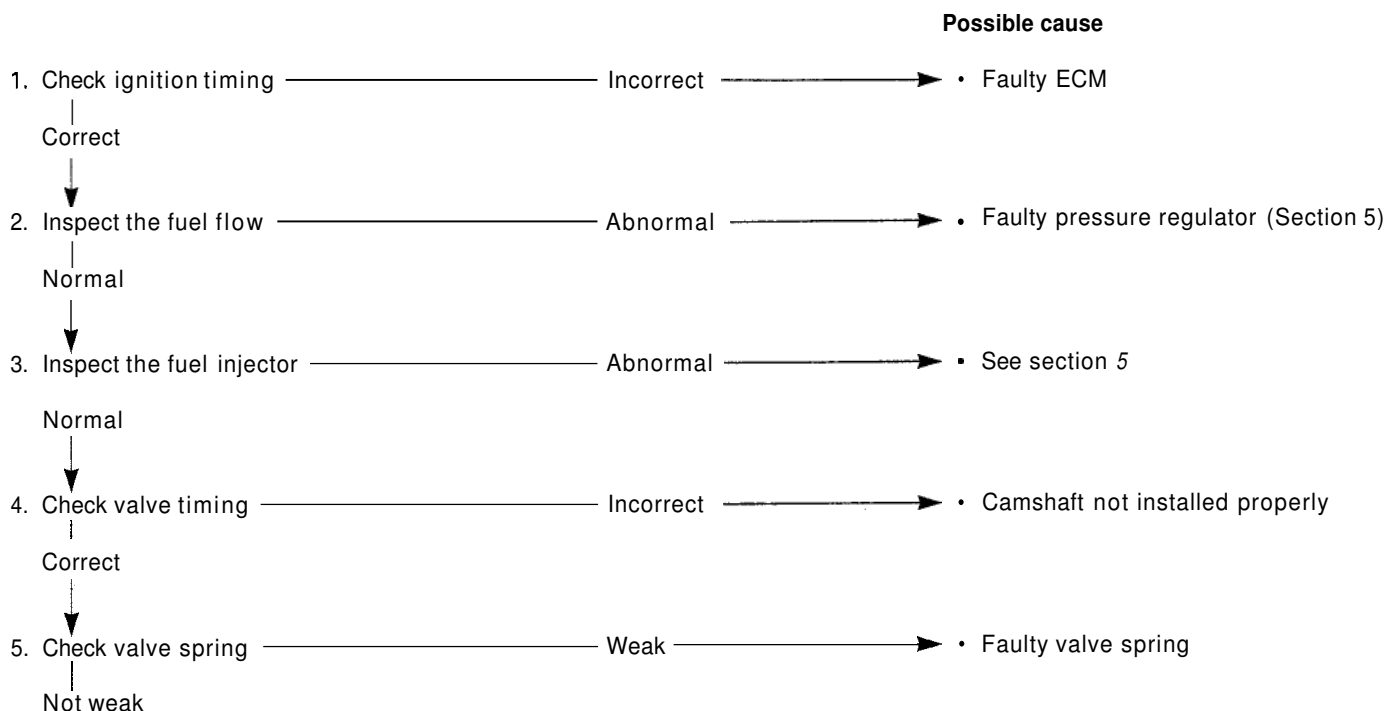
## POOR PERFORMANCE AT LOW AND IDLE SPEED



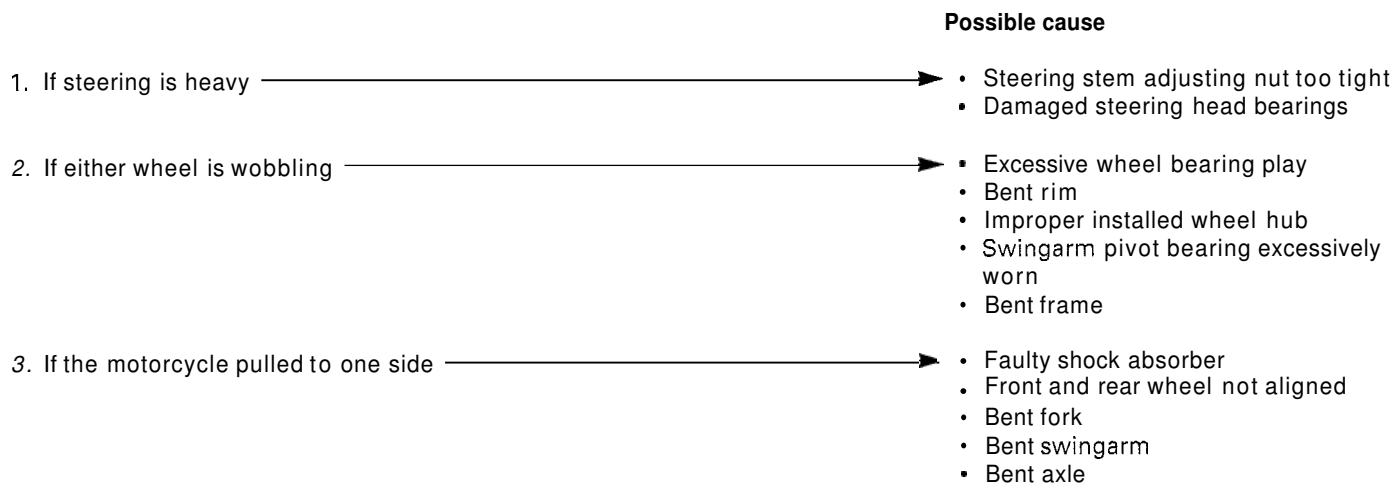
## TROUBLESHOOTING

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### POOR PERFORMANCE AT HIGH SPEED



### POOR HANDLING



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SEAT RAIL	2-11	(COOLING SYSTEM)	6-2
SERVICE RULES	1-1	(CRANKCASE/PISTON/CYLINDER)	11-2
SECONDARY AIR SUPPLY SYSTEM	3-19	(CRANKSHAFT/TRANSMISSION)	12-2
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(ALTERNATOR/STARTER/CLUTCH)	10-1	(ELECTRIC STARTER)	18-2
(BATTERY/CHARGING SYSTEM)	16-1	(ENGINE DOES NOT START OR IS HARD TO START)	21-1
(CLUTCH/GEARSHIFT LINKAGE)	9-1	(ENGINE LACKS POWER)	21-2
(COOLING SYSTEM)	6-1	(FRAME/BODY PANELS/EXHAUST SYSTEM)	2-1
(CRANKCASE/PISTON/CYLINDER)	11-1	(FRONT WHEEL/SUSPENSION/STEERING)	13-3
(CRANKSHAFT/TRANSMISSION)	12-1	(FUEL SYSTEM)	5-3
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(ELECTRIC STARTER)	18-1	(IGNITION SYSTEM)	17-3
(ENGINE REMOVAL/INSTALLATION)	7-1	(LIGHTS/METERS/SWITCHES)	19-3
(FRAME/BODY PANELS/EXHAUST SYSTEM)	2-1	(LUBRICATION SYSTEM)	4-2
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