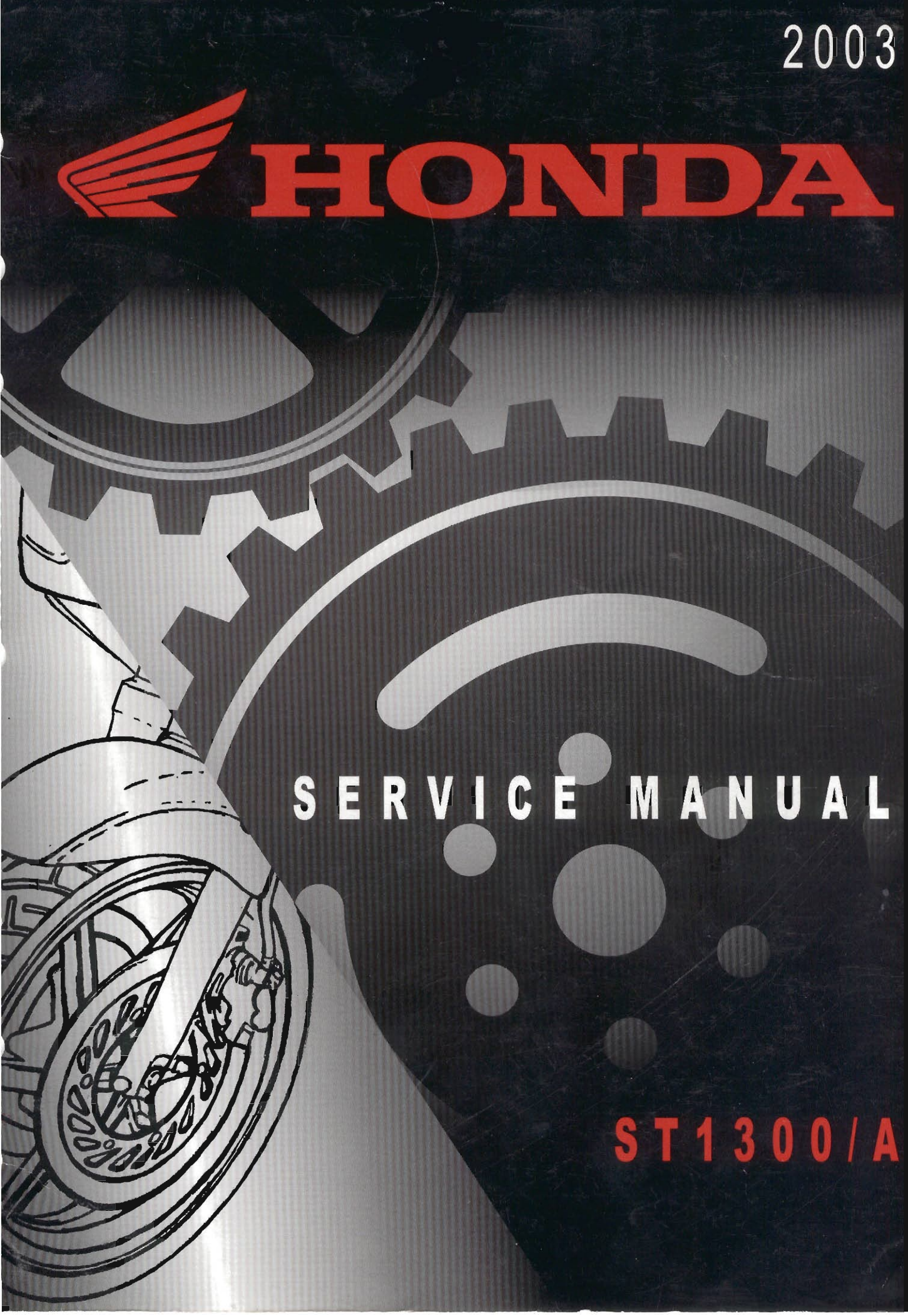
2003

HONDA



SERVICE MANUAL

ST1300/A

A Few Words About Safety

Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

⚠WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts–wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommended that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

⚠WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the ST1300/ ST1300A.

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

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 4 through 23 describe parts of the motorcycle, grouped according to location.

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

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

If you are not familiar with this motorcycle, read Technical Features in Section 24.
If you don't know the source of the trouble, go to section 25 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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Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

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

1. GENERAL INFORMATION

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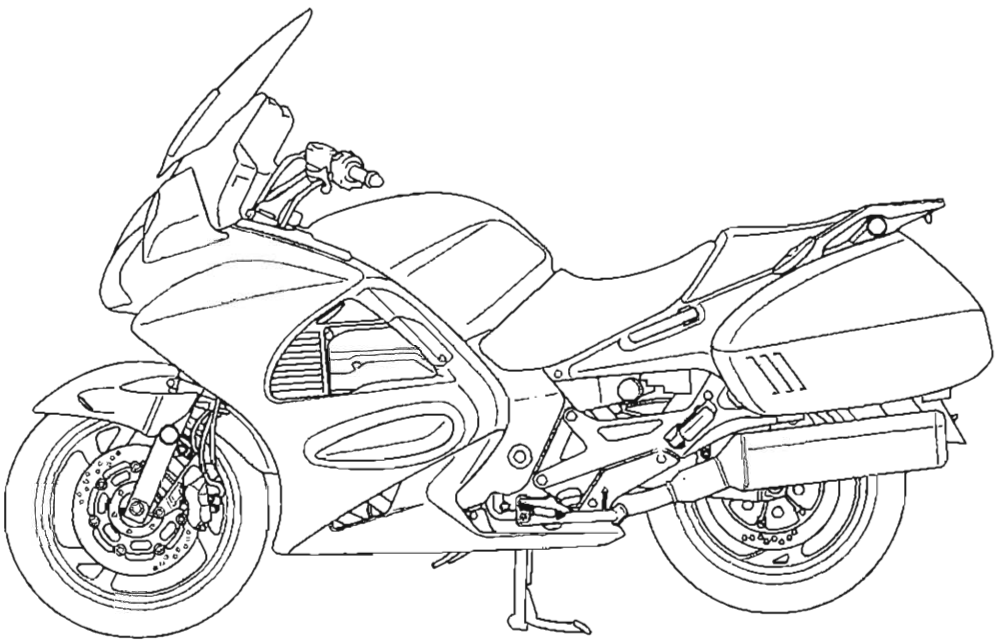
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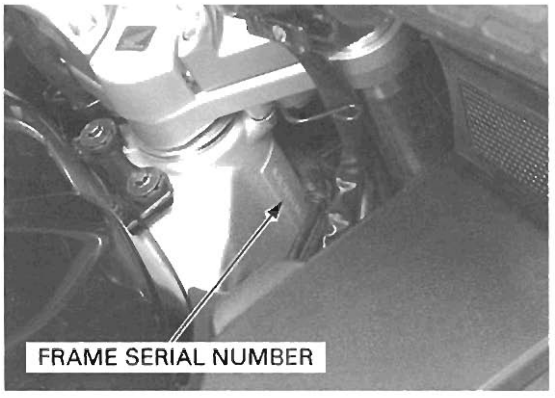
SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show in the Cable and Harness Routing (page 1-27).

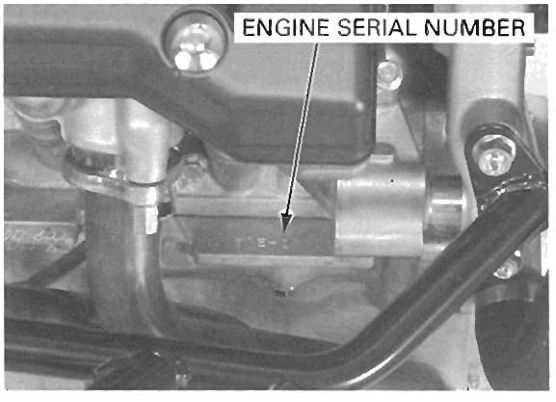
MODEL IDENTIFICATION



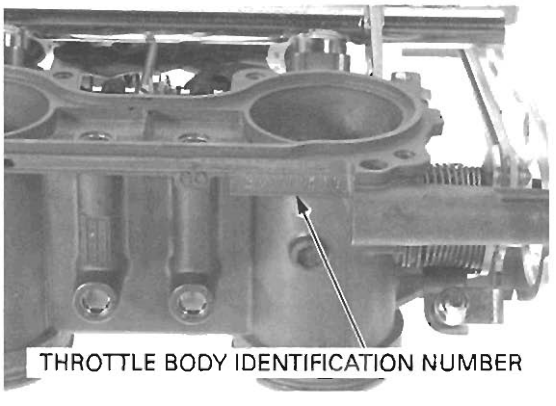
The frame serial number is stamped on the right side of the steering head.



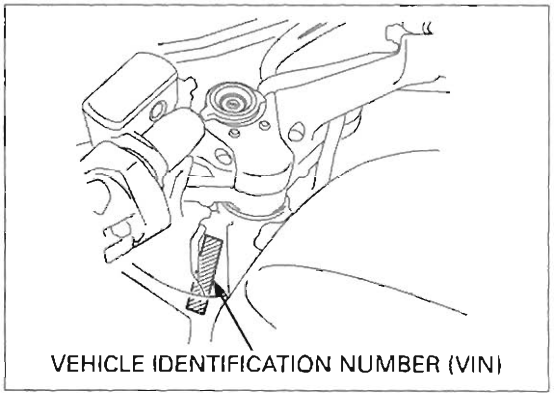
The engine serial number is stamped on the lower right side of the cylinder block.



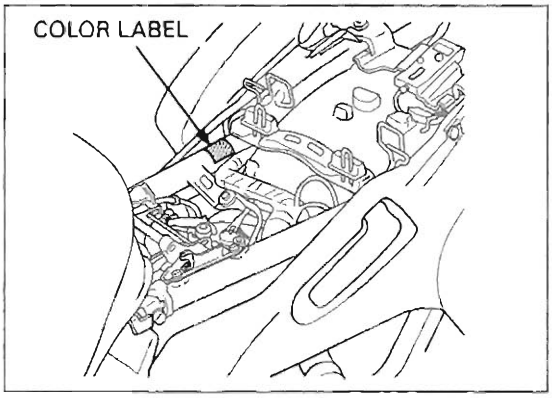
The throttle body identification number is stamped on the front side of the throttle body as shown.



The Vehicle Identification Number (VIN) is located on left side of the steering head on the Safety Certification Labels.



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



GENERAL SPECIFICATIONS

ITEM			SPECIFICATIONS
DIMENSIONS	Overall length		2,270 mm (89.4 in)
	Overall width		860 mm (33.9 in)
	Overall height	Deluxe type	1,390 mm (54.7 in)/initial position is low and electric slide is lowest
			1,575 mm (62.0 in)/initial position is low and electric slide is highest
			1,630 mm (64.2 in)/initial position is high and electric slide is highest
		Standard type	1,485 mm (58.5 in)
	Wheelbase		1,490 mm (58.7 in)
	Seat height		790 ± 15 mm (31.1 ± 0.6 in)
	Footpeg height		286 mm (11.3 in)
	Ground clearance		135 mm (5.3 in)
	Dry weight	Deluxe type	289 kg (637 lbs)
		Standard type	283 kg (624 lbs)
	Curb weight	Deluxe type	325 kg (716 lbs)
		Standard type	319 kg (703 lbs)
	Maximum weight capacity		182 kg (401 lbs)
FRAME	Frame type		Diamond
	Front suspension		Telescopic fork
	Front axle travel		108 mm (4.25 in)
	Rear suspension		Swingarm
	Rear axle travel		123 mm (4.84 in)
	Front tire size		120/70 ZR 18 M/C (59W)
	Rear tire size		170/60 ZR 17 M/C (72W)
	Front tire brand		BT020F F (Bridgestone)
			D220FST L (Dunlop)
	Rear tire brand		BT020R F (Bridgestone)
			D220ST L (Dunlop)
	Front brake		Hydraulic double disc
	Rear brake		Hydraulic single disc
	Caster angle		26°
	Trail length		98 mm (3.9 in)
	Fuel tank capacity		29 liter (7.7 US gal, 6.4 Imp gal)

ITEM			SPECIFICATIONS
ENGINE	Cylinder arrangement		90° V
	Bore and stroke		78.0 X 66.0 mm (3.07 X 2.60 in)
	Displacement		1261 cm^3 (76.9 cu-in)
	Compression ratio		10.8 : 1
	Valve train		Chain driven, DOHC
	Intake valve opens	at 1 mm (0.04 in) lift	5° BTDC
	Intake valve closes	at 1 mm (0.04 in) lift	35° ABDC
	Exhaust valve opens	at 1 mm (0.04 in) lift	35° BBDC
	Exhaust valve closes	at 1 mm (0.04 in) lift	5° ATDC
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Oiled paper element
	Engine dry weight		96.2 kg (212.1 lbs)
	Firing order		No.1 - 90° - No.4 - 270° - No.3 - 90° - No.2- 270° - No.1
FUEL DELIV-ERY SYSTEM	Type		PGM-FI (Programmed Fuel Injection)
	Throttle bore		36 mm (1.4 in)
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Hydraulic operating
	Transmission		Constant mesh, 5-speeds
	Primary reduction		1.785 (75/42)
	Secondary reduction		0.925 (37/40)
	Final reduction		2.833 (34/12)
	Gear ratio	1st	2.571 (36/14)
		2nd	1.722 (31/18)
		3rd	1.285 (27/21)
		4th	1.041 (25/24)
		5th	0.862 (25/29)
	Gearshift pattern		Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system		Computer-controlled digital transistorized with electric advance
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		Triple phase full-wave rectification with field coil
	Lighting system		Battery

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity	After draining		3.6 liter (3.8 US qt, 3.2 Imp qt)	–
	After draining/filter change		3.9 liter (4.1 US qt, 3.4 Imp qt)	–
	After disassembly		4.7 liter (5.0 US qt, 4.1 Imp qt)	–
Recommended engine oil			Honda GN4 or HP4 (Without Moly) 4-stroke oil (U.S.A. and Canada) or Honda 4-stroke oil (Canada only), or equivalent motor oil API service classification SE, SF or Higher JASO 4T service classification: MA Viscosity: SAE 10W-40	–
Oil pressure at oil pressure switch			490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm/(80°C/176°F)	–
Oil pump rotor	Feed pump	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 – 0.09 (0.008 – 0.004)	0.10 (0.039)
	Cooler pump	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 – 0.09 (0.008 – 0.004)	0.10 (0.039)

FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ35B
Starter valve vacuum difference	20mm Hg
Base throttle valve for synchronization	No.1
Idle speed	1,000 ± 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 Ω
Fuel injection resistance (at 20°C/68°F)	11.1 – 12.3 Ω
Bypass solenoid valve resistance (at 20°C/68°F)	28 – 32 Ω
PAIR solenoid valve resistance (at 20°C/68°F)	20 – 24 Ω
Purge control solenoid valve resistance (at 20°C/68°F)	30 – 34 Ω
Cam pulse generator peak voltage	0.7 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Manifold absolute pressure at idle	200 – 250 mm Hg
Fuel pressure at idle	343 kPa (3.5 kgf/cm², 50 psi)
Fuel pump flow (at 12V)	180 cm³ (6.1 US oz, 6.3 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.66 liter (2.81 US qt, 2.34 Imp qt)
	Reserve tank	0.865 liter (0.91 US qt, 0.76 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		50 % mixture with soft water

CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			981 – 1,373 kPa (10.0 – 14.0 kgf/cm², 142 – 178psi) at 300 rpm	–
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	–
		EX	0.25 ± 0.03 (0.010 ± 0.001)	–
Camshaft	Cam lobe height	IN	36.48 – 36.64 (1.436 – 1.443)	36.45 (1.435)
		EX	36.37 – 36.53 (1.432 – 1.438)	36.34 (1.431)
	Runout		–	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.		25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.		26.010 – 26.026 (1.024 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1959)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.025 – 0.052 (0.0010 – 0.0020)	0.090 (0.0035)
	Valve guide projection above cylinder head	IN	15.6 – 15.8 (0.61 – 0.62)	–
		EX	15.8 – 16.0 (0.62 – 0.63)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN	43.4 (1.71)	42.5 (1.67)
		EX	43.4 (1.71)	42.5 (1.67)
Cylinder head warpage			–	0.10 (0.004)

CLUTCH/PRIMARY SHAFT SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		Honda DOT 4 brake fluid	–
Clutch master cylinder	Cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
Clutch	Spring free length	55.1 (2.17)	54.0 (2.13)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide I.D.		27.989 – 28.006 (1.1019 – 1.1026)	28.016 (1.1030)
Primary shaft O.D. at clutch outer guide		27.974 – 27.987 (1.1013 – 1.1018)	27.964 (1.1009)
Primary shaft spring free length		58.4 (2.30)	56 (2.2)

TRANSMISSION/FINAL OUTPUT SHAFT SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M4, M5	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	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Gear bushing O.D.	M4, M5	30.950 – 30.975 (1.2185 – 1.1295)	30.93 (1.219)
		C2, C3	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.297)
	Gear-to-bushing clearance	M4, M5	0.025 – 0.075 (0.0010 – 0.0030)	–
		C2, C3	0.020 – 0.070 (0.0008 – 0.0028)	–
	Gear bushing I.D.	M4	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)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Countershaft O.D.	at 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)	–
		C2	0.005 – 0.039 (0.0002 – 0.0015)	–
Shift fork, fork shaft	Fork I.D.		12.000 – 12.018 (0.4724 – 0.4731)	12.03 (0.474)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Shift fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.471)

ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354 – 2.0361)	51.59 (2.031)
Alternator slip ring O.D.	14.4 (0.57)	12 (0.5)

CRANKSHAFT/PISTON/CYLINDER SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.10 – 0.30 (0.004 – 0.012)	0.40 (0.016)
	Runout		–	0.05 (0.002)
	Main journal bearing oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.05 (0.002)
Cylinder	I.D.		78.000 – 78.015 (3.0709 – 3.0715)	78.10 (3.075)
	Out of round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.10 (0.004)
Piston, piston rings	Piston O.D. at 8 mm (0.3 in) from bottom		77.965 – 77.985 (3.0695 – 3.0703)	77.90 (3.067)
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.02 (0.749)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.98 (0.747)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.05 (0.002)
		Second	0.32 – 0.47 (0.013 – 0.019)	0.06 (0.002)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.11 (0.004)
		Second	0.020 – 0.055 (0.0008 – 0.0022)	0.10 (0.004)
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.06 (0.750)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	0.077 (0.0030)
Crankpin bearing oil clearance			0.036 – 0.054 (0.0014 – 0.0021)	0.074 (0.0029)

FINAL DRIVE

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	after draining	155 cm^3 (5.2 US oz, 5.5 Imp oz)	–
	after disassembly	175 cm^3 (5.9 US oz, 6.2 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurement		–	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–
Final drive gear assembly preload		0.2 – 0.4 N·m (2 – 4 kgf·cm^2, 1.7 – 3.5 lbf·ft)	–

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	290 kPa (2.90 kgf/cm^2, 42 psi)	–
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm^2, 42 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	249.6 (9.83)	244.6 (9.63)
	Pipe runout	–	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	–
	Fluid level	62 (2.4)	–
	Fluid capacity	638 ± 2.5 cm^3 (21.6 ± 0.08 US oz, 22.5 ± 0.09 Imp oz)	–
Steering head bearing pre-load		1.6 – 2.1 kgf (3.5 – 4.6 lbf)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	290 kPa (2.90 kgf/cm^2, 42 psi)	–
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm^2, 42 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.
Shock absorber	Pre-load adjuster dial standard position	7 clicks out from lower position	–
	Rebound adjuster initial setting	1 turn out from full hard	–

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		Honda DOT 4 brake fluid	–
	Brake disc thickness		5.0 (0.20)	4.0 (0.16)
	Brake disc warpage		–	0.20 (0.008)
	Master cylinder I.D.		12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Secondary master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Secondary master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Left caliper cylinder I.D.	Upper	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Lower	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Left caliper piston O.D.	Upper	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
		Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
		Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
	Right caliper cylinder I.D.	Upper	27.000 – 27.050 (1.0630 – 1.0650)	27.062 (1.0654)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Lower	27.000 – 27.050 (1.0630 – 1.0650)	27.062 (1.0654)
	Right caliper piston O.D.	Upper	26.935 – 26.968 (1.0604 – 1.0617)	26.923 (1.0600)
		Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
		Lower	26.935 – 26.968 (1.0604 – 1.0617)	26.923 (1.0600)
Rear	Specified brake fluid		Honda DOT 4 brake fluid	–
	Brake pedal height		87.0 (3.43)	–
	Brake disk thickness		7.0 (0.28)	6.0 (0.24)
	Brake disc warpage		–	0.30 (0.012)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Center	25.400 – 25.450 (1.0000 – 1.0020)	25.462 (1.0024)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Center	25.335 – 25.368 (0.9974 – 0.9987)	25.323 (0.9970)
		Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 11Ah
	Current leakage		2.5 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	4.5 A/0.5 h
Alternator	Capacity		0.742 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	CR7EH-9 (NGK)
		W22FER9 (DENSO)
	Optional	CR8EH-9 (NGK)
		W24FER9 (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)		8° BTDC at idle

ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 45 W X 2
		Lo	12V – 45 W X 2
	Position light		12V – 5 W X 2
	Brake/tail light		12V – 21/5 W X 2
	Front turn signal/running light		12V – 21/5 W X 2
	Rear turn signal light		12V – 21 W X 2
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI malfunction indicator		LED
	Low fuel indicator		LED
Fuse	Main fuse A		30 A
	Main fuse B		65 A
	PGM-FI fuse		20 A
	Sub fuse (Standard type)		10 A X 5, 15 A X 2, 30A X 1
	Sub fuse (Deluxe type)		10 A X 6, 15 A X 2, 20A X 1, 30A X 3
Coolant temperature sensor resistance		(80°C/176°F)	2.1 – 2.6 kΩ
		(120°C/248°F)	0.65 – 0.75 kΩ
Open air temperature sensor resistance (25°C/77°F)			4.8 – 5.2 Ω
Fan motor switch	Start to close (ON)		98 – 102 °C (208 – 216 °F)
	Stop to open		93 – 97 °C (199 – 207 °F)

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm hex bolt and nut	34 (3.5, 25)		
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
		6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

ENGINE & FRAME TORQUE VALUES

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

NOTE:

1. Apply sealant to the threads.
2. Apply a locking agent to the threads.
3. Stake.
4. Apply oil to the threads and flange surface.
5. U-nut.
6. ALOC bolt/screw: replace with a new one.
7. Apply grease to the threads.
8. CT bolt.
9. Left hand threads.

ENGINE

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	10	16 (1.6, 12)	
Timing hole cap	1	14	10 (1.0, 7)	NOTE 7
Crankshaft hole cap	1	30	12 (1.2, 9)	NOTE 7
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 4
Engine oil drain bolt	1	14	29 (3.0, 22)	

LUBRICATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil cooler bolt	1	20	74 (7.5, 54)	NOTE 4
Oil pump driven sprocket bolt/washer	1	6	15 (1.5, 11)	NOTE 2
Oil pump assembly bolt	1	6	12 (1.2, 9)	NOTE 8

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ECT (Engine Coolant Temperature) sensor	1	12	23 (2.3, 17)	
Vehicle speed sensor mounting bolt	1	6	12 (1.2, 9)	
Knock sensor assembly	2	12	31 (3.2, 23)	
Throttle body insulator band screw	8	–	See page 1-14	
Throttle cable bracket screw	2	5	3 (0.35, 2.5)	
Starter valve synchronization plate screw	4	3	1 (0.09, 0.7)	
Starter valve lock nut	4	10	2 (0.18, 1.3)	
SE thermal valve link plate screw	2	3	1 (0.09, 0.7)	
SE thermal valve mounting screw	2	6	5 (0.5, 3.6)	
Pressure regulator	1	18	27 (2.8, 20)	
Fuel rail mounting bolt	4	6	10 (1.0, 7)	

CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head flange bolt	12	10	69 (7.0, 51)	NOTE 4
Camshaft holder flange bolt	40	6	12 (1.2, 9)	NOTE 4
Cylinder head cover bolt	8	6	10 (1.0, 7)	
Breather plate flange bolt	4	6	12 (1.2, 9)	NOTE 2, 8
PAIR check reed valve cover SH bolt	4	6	12 (1.2, 9)	NOTE 8
Cam sprocket flange bolt	8	7	20 (2.0, 14)	NOTE 2
Cam chain tensioner pivot bolt	2	6	12 (1.2, 9)	NOTE 2
Cam chain guide bolt/washer	2	6	12 (1.2, 9)	NOTE 2
Cylinder head stud bolt (exhaust pipe stud bolt)	8	6	See page 1-14	

CLUTCH/PRIMARY SHAFT

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Primary drive gear flange bolt	1	12	93 (9.5, 69)	NOTE 4
Primary bearing set plate bolt	3	6	12 (1.2, 9)	NOTE 2
Clutch center lock nut	1	25	127 (13.0, 94)	NOTE 3, 4
Clutch spring bolt/washer	6	6	12 (1.2, 9)	
Clutch slave cylinder bleeder	1	8	9 (0.9, 6.5)	

TRANSMISSION/FINAL OUTPUT SHAFT

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear crankcase cover sealing bolt	1	20	29 (3.0, 22)	NOTE 2
Final drive gear special nut	1	22	186 (19.0, 137)	NOTE 3, 4, 9
Final driven gear nut	1	30	186 (19.0, 137)	NOTE 3, 4
Transmission bearing holder mounting bolt	9	8	30 (3.1, 22)	
Countershaft bearing set plate bolt	2	6	12 (1.2, 9)	NOTE 2
Shift drum bearing set plate bolt	2	6	12 (1.2, 9)	NOTE 2
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 spindle return spring pin	1	8	23 (2.3, 17)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter clutch outer flange bolt	1	12	93 (9.5, 69)	NOTE 4
Alternator drive gear socket bolt	10	6	16 (1.6, 12)	NOTE 2
Alternator damper shaft lock nut	1	16	86 (8.8, 64)	NOTE 2
Alternator idle gear case mounting bolt	6	10	57 (5.8, 42)	

CRANKCASE/BALANCER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Main journal bolt	6	10	48 (4.9, 35)	NOTE 4
Crankcase bolt	10	8	26 (2.7, 20)	
Cylinder block sealing bolt	3	20	29 (3.0, 22)	NOTE 2
Lower crankcase sealing bolt	1	20	29 (3.0, 22)	NOTE 2

CRANKSHAFT/PISTON/CYLINDER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Connecting rod bearing cap nut	8	9	35 (3.6, 26)	NOTE 4

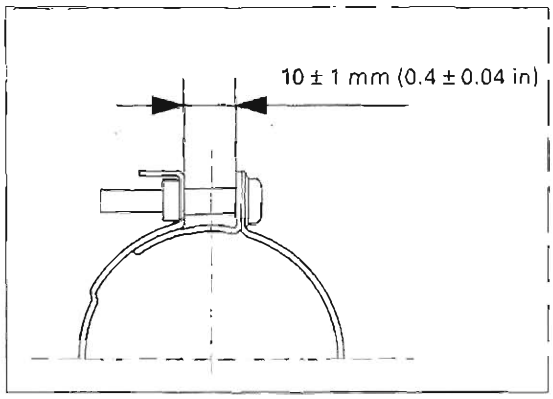
IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Ignition pulse generator flange bolt	1	6	12 (1.2, 9)	

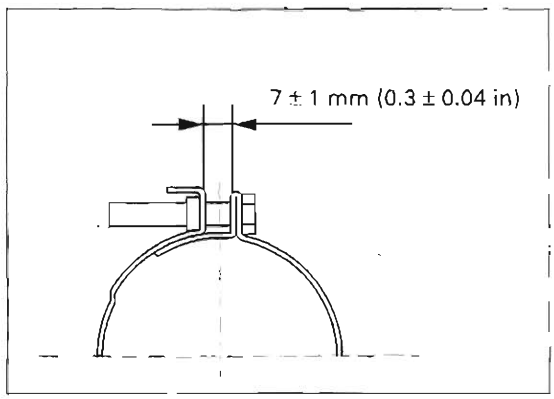
LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
Neutral switch	1	10	12 (1.2, 9)	
Neutral switch terminal nut	1	4	2 (0.18, 1.3)	

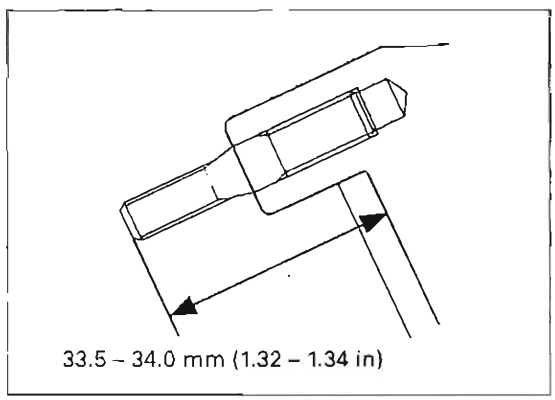
Insulator clamp (Cylinder head side):



Insulator clamp (Throttle body side):



Exhaust pipe stud bolt:



FRAME

FRAME BODY PANELS/EXHAUST SYSTEM

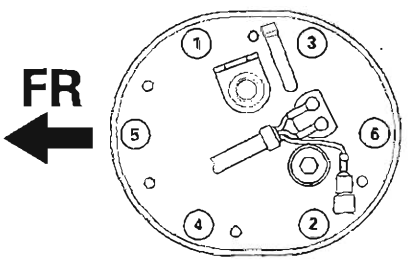
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Middle cowl mounting bolt	4	6	10 (1.0, 7)	NOTE 6
Saddle bag holder pivot bolt	2	8	16 (1.6, 12)	
Exhaust pipe flange nut	8	7	17 (1.7, 12)	
Muffler band bolt	5	8	22 (2.2, 16)	
Seat rail upper mounting flange bolt	2	10	39 (4.0, 29)	
Seat rail lower mounting socket bolt	4	10	42 (4.3, 31)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Air cleaner housing cover screw	9	5	1 (0.1, 0.7)	
Final drive case drain bolt	1	14	20 (2.0, 14)	
Final drive oil filler cap	1	30	12 (1.2, 9)	

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel filler cap bolt	3	4	2 (0.18, 1.3)	
Fuel hose banjo bolt (lower fuel tank side)	1	12	22 (2.2, 16)	
Fuel hose sealing nut (throttle body side)	1	12	22 (2.2, 16)	
Fuel pump mounting nut	6	6	12 (1.2, 9)	
Fuel pump unit drain bolt	1	10	23 (2.3, 17)	
O_2 sensor	2	12	25 (2.6, 19)	

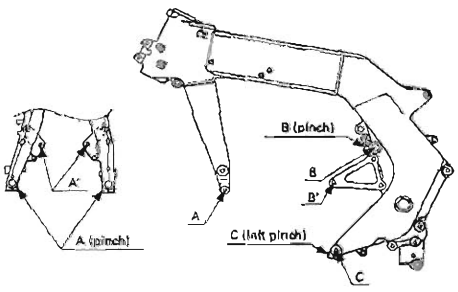


COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Thermostat housing cover SH flange bolt	2	6	13 (1.3, 9)	
Cooling fan nut	1	5	2.7 (0.28, 2.0)	NOTE 2
Fan motor mounting nut	3	5	5 (0.5, 3.6)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine hanger bolt (front; A)	2	12	64 (6.5, 47)	
Engine hanger bolt (front bracket; A')	2	8	26 (2.7, 20)	
Engine hanger nut (middle; B)	1	10	39 (4.0, 29)	
Engine hanger bolt (middle bracket; B')	2	10	39 (4.0, 29)	
Engine hanger bolt (lower; C)	2	12	59 (6.0, 43)	
Engine hanger pinch bolt (A, B, C pinch)	3	8	26 (2.7, 20)	



CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch master cylinder holder bolt	2	6	12 (1.2, 9)	
Clutch master cylinder reservoir cap screw	2	4	2 (0.15, 1.1)	
Clutch lever pivot bolt	1	6	1 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6 (0.6, 4.3)	
Clutch switch screw	1	4	1 (0.1, 0.7)	
Clutch hose oil bolt	2	10	34 (3.5, 25)	

FINAL DRIVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Final gear assembly mounting UBS nut	4	10	44 (4.5, 33)	
Pinion gear bearing retainer	1	70	147 (15.0, 108)	
Pinion gear bearing retainer lock plate bolt	1	6	10 (1.0, 7)	
Final gear cover bolt	6	8	25 (2.6, 19)	NOTE 2
Final gear cover bolt	2	10	62 (6.3, 46)	NOTE 2
Pinion gear nut	1	16	108 (11.0, 80)	NOTE 2
Dust guard plate mounting bolt	3	6	10 (1.0, 7)	

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar weight mounting screw	2	6	10 (1.0, 7)	NOTE 6
Handlebar mounting bolt	6	8	22 (2.2, 16)	
Handlebar rubber mounting nut	2	8	26 (2.7, 20)	
Front axle bolt	1	18	78 (8.0, 58)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Front brake disc bolt	12	6	20 (2.0, 14)	NOTE 6
Fork cap	2	42	23 (2.3, 17)	
Fork damper rod lock nut	2	10	20 (2.0, 14)	
Fork socket bolt	2	8	20 (2.0, 14)	NOTE 2
Steering stem nut	1	24	103 (10.5, 76)	
Steering bearing adjusting nut	1	26	29 (3.0, 22)	See page 15-36
Steering bearing adjusting nut lock nut	1	26	–	
Fork top bridge pinch bolt	2	8	26 (2.7, 20)	
Fork bottom bridge pinch bolt	4	8	26 (2.7, 20)	

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	18	108 (11.0, 80)	
Rear brake disc bolt	6	8	42 (4.3, 31)	NOTE 6
Final driven flange nut	4	14	150 (15.3, 111)	NOTE 5
Rear shock absorber upper mounting bolt/nut	1	10	42 (4.3, 31)	NOTE 6
Rear shock absorber lower mounting bolt/nut	1	10	42 (4.3, 31)	NOTE 5
Swingarm right pivot bolt	1	36	108 (11.0, 80)	
Swingarm left pivot bolt	1	36	See page 16-18	NOTE 4
Swingarm left pivot bolt lock nut	1	36	108 (11.0, 80)	

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front master cylinder reservoir cap screw	2	4	2 (0.15, 1.1)	
Front brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Front brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Right front brake caliper mounting bolt	2	8	31 (3.2, 23)	NOTE 6
Left front brake caliper pivot bolt	1	8	31 (3.2, 23)	NOTE 6
Left front brake caliper bolt (second master joint)	1	8	31 (3.2, 23)	NOTE 6
Caliper body B bolt	9	8	32 (3.3, 24)	NOTE 6
Front caliper main slide pin	2	8	23 (2.3, 17)	
Front caliper sub slide pin	2	8	13 (1.3, 9)	NOTE 2
Rear caliper main slide pin	1	12	27 (2.8, 20)	
Rear caliper sub slide pin	1	8	23 (2.3, 17)	NOTE 2
Pad pin	3	10	18 (1.8, 13)	
Brake caliper bleed valve	6	8	6 (0.6, 4.3)	
Secondary master cylinder push rod nut	1	8	18 (1.8, 13)	NOTE 2
Secondary master cylinder connector	2	6	10 (1.0, 7)	NOTE 2
Rear master cylinder mounting bolt	2	6	12 (1.2, 9)	NOTE 6
Rear master cylinder reservoir mounting bolt	1	6	12 (1.2, 9)	
Rear master cylinder push rod joint nut	1	8	18 (1.8, 13)	
Rear master cylinder reservoir hose joint screw	1	4	2 (0.15, 1.1)	NOTE 2
Rear brake caliper stopper bolt	1	18	69 (7.0, 51)	NOTE 6
Proportional control valve mounting bolt	2	6	12 (1.2, 9)	
Delay valve mounting bolt	2	6	12 (1.2, 9)	
Brake hose oil bolt	10	10	34 (3.5, 25)	
Brake pipe joint	–	10	17 (1.7, 12)	
Front brake hose clamp bolt	2	6	12 (1.2, 9)	
Front brake hose stay mounting bolt	2	6	12 (1.2, 9)	
Rear brake hose stay mounting nut	1	8	22 (2.2, 16)	NOTE 5
Rear brake hose stay mounting nut	1	6	12 (1.2, 9)	NOTE 5

ABS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front wheel pulser ring mounting bolt	3	5	8 (0.8, 5.1)	NOTE 6
Rear wheel pulser ring mounting bolt	4	5	8 (0.8, 5.1)	NOTE 6
Front modulator body mounting bolt	3	6	12 (1.2, 9)	
Rear modulator body mounting bolt	2	6	12 (1.2, 9)	
Modulator oil bolt	8	10	34 (3.5, 25)	

LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Side stand switch bolt	1	6	10 (1.0, 7)	NOTE 6
Ignition switch mounting bolt	2	8	25 (2.5, 18)	

OTHERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Center stand pivot stopper bolt	2	6	12 (1.2, 9)	NOTE 6
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot lock nut	1	10	29 (3.0, 22)	
Side stand bracket bolt	2	10	44 (4.5, 33)	
Step holder mounting bolt	4	12	64 (6.5, 47)	
Bank sensor	2	8	22 (2.2, 16)	

TOOLS

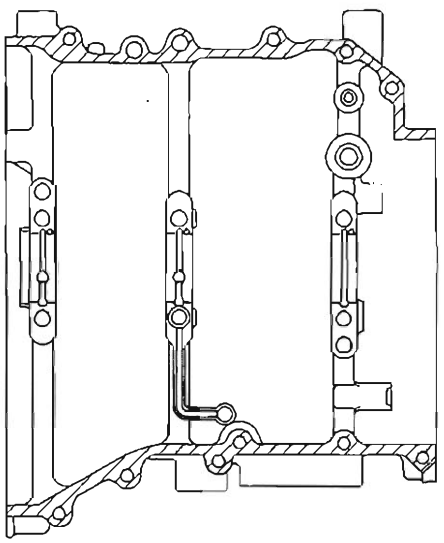
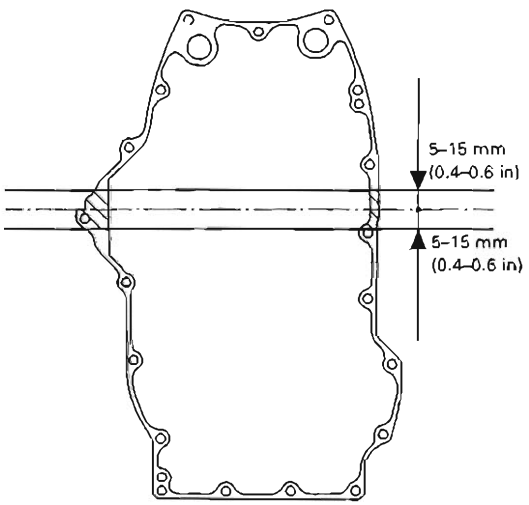
1. Equivalent commercially available in U.S.A.
2. Not available in U.S.A.
3. U.S.A. only.
4. Newly designed tool.
5. Alternative tool.

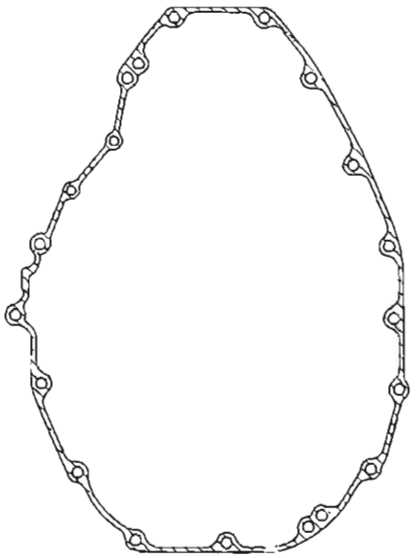
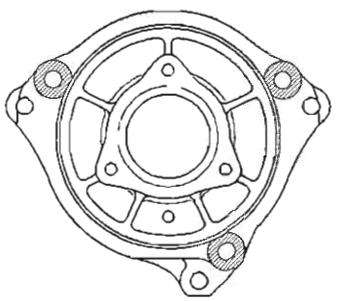
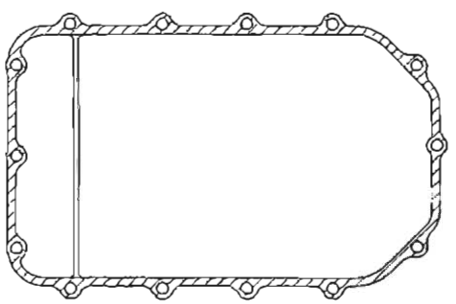
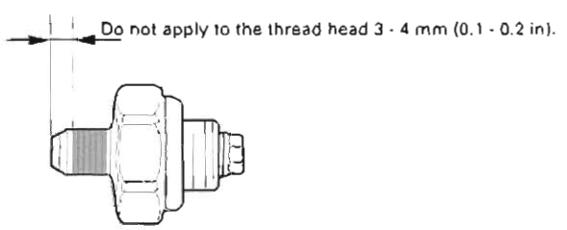
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Pinion holder plate	070MB-0010110	NOTE 4	14
Pinion holder attachment, 41.5	070MB-0010120	NOTE 4	14
Spline holder, 26 x 25 x 1	070MB-MCS0100	NOTE 4	10
ECM test harness 26P	070MZ-0010100	NOTE 4: Two required	5, 20
Oil pressure gauge attachment	07406-0030001	NOTE 1	4
Fuel pressure gauge	07406-0040003	NOTE 5: 07406-0040002 NOTE 3: 07406-004000A	5
Oil pressure gauge set	07506-3000001	NOTE 1	4
Universal bearing puller	07631-0010000	NOTE 1	14
Gear holder	07724-0010100	NOTE 3, 5: 07724-001A100	9, 11
Clutch center holder	07724-0050002	NOTE 1	9
Remover weight	07741-0010201	NOTE 1	6, 10
Attachment, 32 x 35 mm	07746-0010100		9
Attachment, 42 x 47 mm	07746-0010300		11, 16
Attachment, 52 x 55 mm	07746-0010400		10, 14, 15
Attachment, 62 x 68 mm	07746-0010500		9, 10, 14
Attachment, 72 x 75 mm	07746-0010600		14
Driver, 22 mm I.D.	07746-0020100		11
Attachment, 15 mm (I.D.)	07746-0020200		11
Inner driver C	07746-0030100		14
Attachment, 30 mm I.D.	07746-0030300		14
Pilot, 10 mm	07746-0040100		6
Pilot, 17 mm	07746-0040400		9
Pilot, 20 mm	07746-0040500		16
Pilot, 25 mm	07746-0040600		11, 15
Pilot, 30 mm	07746-0040700		9, 10
Pilot, 35 mm	07746-0040800		14
Pilot, 22 mm	07746-0041000		10
Pilot, 28 mm	07746-0041100		10
Bearing remover shaft	07746-0050100		16
Bearing remover head, 20 mm	07746-0050600		16
Bearing remover head, 25 mm	07746-0050800		15
Driver	07749-0010000		6, 9, 10, 11, 14, 15, 16
Valve spring compressor	07757-0010000		8
Valve seat cutter		NOTE 1	8
– Seat cutter, 29 mm (45° EX)	07780-0010300		
– Seat cutter, 33 mm (45° IN)	07780-0010800		
– Flat cutter, 30 mm (32° EX)	07780-0012200		
– Flat cutter, 33 mm (32° IN)	07780-0012900		
– Interior cutter, 30 mm (60° EX)	07780-0014000		
– Interior cutter, 34 mm (60° IN)	07780-0014700		
– Cutter holder, 5 mm	07781-0010400		
Retainer wrench	07910-4630100		14
Snap ring pliers	07914-SA50001		9, 17
Steering stem socket	07916-3710101		15
Lock nut wrench, 30/64 mm	07916-MB00002		10
Shaft puller	07931-ME40000		14
Remover shaft	07936-GE00100	NOTE 1	6
Remover head, 10 mm	07936-GE00200	NOTE 1	6
Valve guide driver, 5.0 mm	07942-MA60001	NOTE 3, 5: 07942-MA60000	8
Mechanical seal driver attachment	07945-4150400		6
Attachment, 28 X 30 mm	07946-1870100		6, 16
Spherical bearing driver	07946-KA30200	NOTE 2	6
Needle bearing remover	07946-KA50000		15

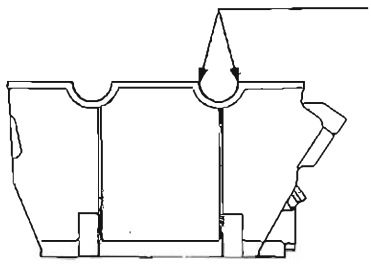
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Driver attachment, A	07946-KM90100		15
Driver attachment, B	07946-KM90200		15
Driver shaft assembly	07946-KM90300		15
Bearing remover, A	07946-KM90401		15
Bearing remover, B	07946-KM90500		15
Assembly base	07946-KM90600		15
Steering stem driver	07946-MB00000		15
Oil seal remover	07948-4630100		14
Piston base	07958-MG90000		14
Valve spring compressor attachment	07959-KM30101		8
Mechanical seal installer	07965-415000A	NOTE 3	6
Oil seal driver	07965-MC70100		14
Oil seal driver	07965-MC70101		14
Valve guide reamer, 5.0 mm	07984-MA60001	NOTE 3, 5: 07984-MA6000D	8
Bearing remover shaft	07GGD-0010100		15
Oil filter wrench	07HAA-PJ70101	NOTE 5: 07HAA-PJ70100	3
Peak voltage adaptor	07HGJ-0020100		5, 20, 22
Pinion puller base	07HMC-MM80110		14
Tappet hole protector	07HMG-MR70002		8
Drive chain tool set	07HMH-MR10103		3
Rotor puller remover	07JAC-PH80100		10
Bearing remover shaft assembly	07JAC-PH80200		10
Fork seal driver	07KMD-KZ30100		15
O_2 sensor wrench	07LAA-PT50101		5
Bearing remover set	07LMC-KV30100		16
Vacuum gauge set	07LMJ-001000A	NOTE 3	5
Bushing driver	07NAD-SS00101		9
Race remover	07NMF-MT70110		15
Driver attachment	07NMF-MT70120		15
Compression gauge attachment	07RMJ-MY50100	NOTE 1	8
Gauge joint adaptor	07RMK-MW40100		4
Lock nut wrench	07ZMA-MCA0100	NOTE 3, 5: 07ZMA-MCAA101	16

LUBRICATION & SEAL POINTS

ENGINE

LOCATION	MATERIAL	REMARKS
Upper/lower crankcase mating surface 	Liquid sealant (Three Bond 1207B or equivalent)	
Upper/lower crankcase mating surface (front side) 		

LOCATION	MATERIAL	REMARKS
Rear crankcase mating surface 	Liquid sealant (Three Bond 1207B or equivalent)	
Alternator base mating surface 		
Oil pan mating surface 		
Oil pressure switch threads 		

LOCATION	MATERIAL	REMARKS
Cylinder head semi-circular cut-out 	Sealant	
Main journal bearing surface Connecting rod bearing surface Valve stem (valve guide sliding surface) M3, C4, C5 shifter gear (shift fork grooves) Piston pin bore Connecting rod small end inner surface Valve lifter outer sliding surface Camshaft lobes and journals Clutch outer/primary driven gear sliding surface, friction spring Primary drive gear sliding surface Flywheel B (alternator damper shaft contact area) Starter reduction gear shaft outer surface Water pump drive sprocket (primary drive gear contact surface)	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Piston sliding area Piston ring surface Clutch disc surface Each bearing Each gear teeth and rotating surface Starter one-way clutch sliding lock surface Gearshift fork shaft outer surface Gearshift drum shaft Gearshift spindle Camshaft holder bolt threads and seating surface Main journal tightening bolt threads and seating surface Cylinder head bolt threads and seating surface Connecting rod nut threads and seating surface Clutch center lock nut threads and seating Ignition pulse generator rotor/primary drive gear bolt threads and seating surface Oil pump drive sprocket bolt threads and seating surface Final drive gear bolt threads and seating surface Final driven gear bolt threads and seating surface Oil cooler center bolt threads and seating surface Oil filter cartridge threads and mating surface Engine case inside Each O-ring Other rotating area and sliding surface	Engine oil	
Crankshaft hole cap threads Timing hole cap threads Balancer damper rubber fitting area Each oil seal lip	Multi-purpose grease	

LOCATION	MATERIAL	REMARKS
Cylinder head cover breather plate bolt threads	Locking agent	
Alternator drive gear bolt threads		Coating width: 6.5 ± 1 mm
Alternator damper shaft nut threads		Coating width: 6.5 ± 1 mm
Primary shaft bearing holder bolt threads		Coating width: 6.5 ± 1 mm
Breather plate bolt threads		Coating width: 6.5 ± 1 mm
Oil pump driven sprocket bolt threads		Coating width: 6.5 ± 1 mm
Cylinder block/lower crankcase sealing bolt threads		Coating width: 6.5 ± 1 mm
Cam sprocket bolt threads		Coating width: 6.5 ± 1 mm
Cam chain tensioner bolt threads		Coating width: 6.5 ± 1 mm
Cam chain guide bolt threads		Coating width: 6.5 ± 1 mm
Countershaft bearing set plate bolt threads		Coating width: 6.5 ± 1 mm
Shift drum bearing set plate bolt threads		Coating width: 6.5 ± 1 mm
Shift drum center bolt threads		Coating width: 6.5 ± 1 mm

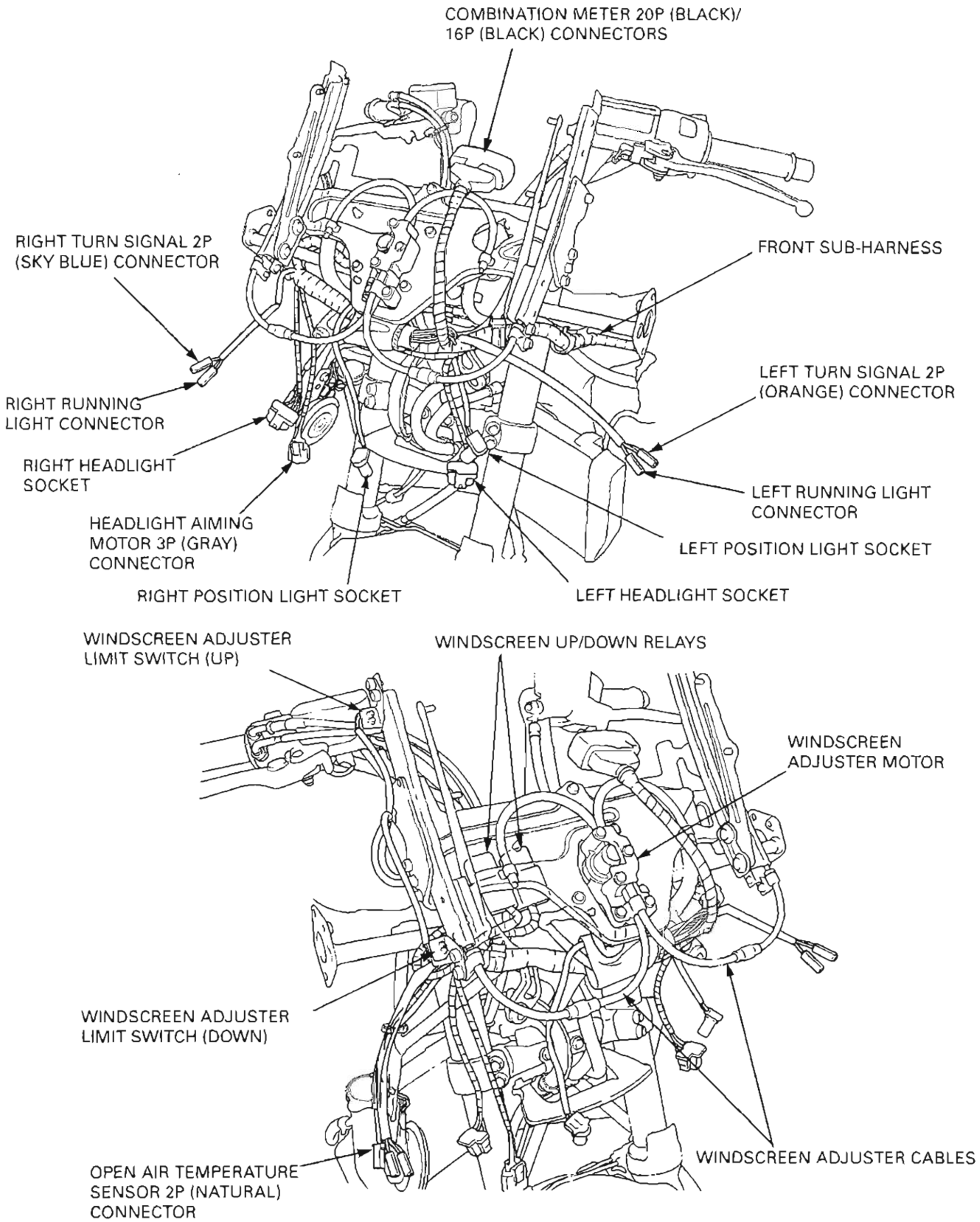
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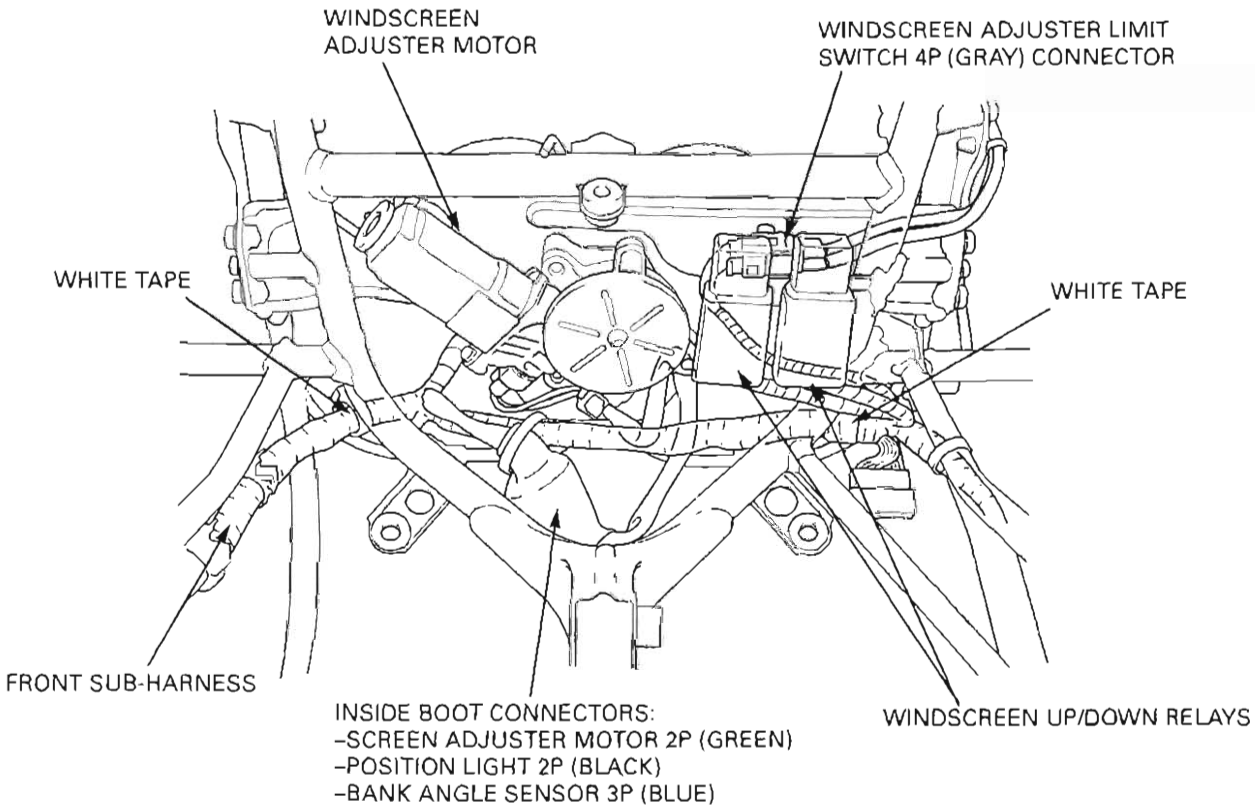
LOCATION	MATERIAL	REMARKS
Front wheel dust seal lips	Multi-purpose grease	
Rear wheel dust seal lips		
Final gear case O-ring		2 places
Final gear case oil seal lips		4 places
Drive shaft yoke bearing and dust seal		Fill up
Steering head upper/lower bearing sliding surface	Urea based multi-purpose grease with extreme pressure (example: EXCELIGHT EP2 manufactured by KYODO YUSHI, Japan), Shell Stamina EP2 or equivalent	3 - 5 g (each)
Steering head dust seal lips		
Left fork needle bearing	Multi-purpose grease (Shell Alvania EP2 or equivalent)	
Left fork needle bearing dust seal lips		
Swingarm pivot bearing		1 - 1.5 g (each)
Swingarm pivot dust seal lips		
Shock absorber needle bearing		
Shock absorber dust seal lips		
Center stand pivot sliding surface		
Side stand pivot sliding surface		
Main footpeg sliding surface		
Pillion footpeg sliding surface		
Throttle pipe sliding surface/throttle cable sliding surface		
Rear brake pedal pivot sliding surface		
Gearshift pedal rod ball joint		
Gearshift pedal pivot		
Windscreen rail/slider sliding surface		
Saddle bag lock plate sliding surface		
Rear wheel end face (driven flange side)	Molybdenum paste	3 g min.
Rear wheel O-ring groove		3 g min.
Final driven flange O-ring groove		3 g min.
Final drive pinion joint spline		2 g min.
Final drive ring gear spline		5 g min.
Drive shaft dust seal lips and oil seal lips	Molybdenum grease	0.5 g
Drive shaft yoke joint spline (engine side)		1 g
Drive shaft yoke joint spline (drive shaft side)		1 g
Front brake lever-to-master piston contacting area	Silicone grease	0.1 g
Front brake lever pivot		0.1 g
Front brake lever push rod sliding surface		0.1 g
Front brake lever pivot joint collar sliding surface		0.1 g
Rear master cylinder push rod boot fitting area and piston contact area		0.1 g
Brake caliper main slide pin boot inside		0.4 g min.
Brake caliper sub slide pin boot inside		0.4 g min.
Brake caliper dust seal surface		
Secondary master cylinder push rod boot fitting area and piston contact area		
Clutch lever-to-master piston contacting area		
Clutch lever pivot		0.1 g
Clutch lever push rod sliding surface		0.1 g
Clutch lever pivot joint collar sliding surface		0.1 g
Final drive gear case mating surface	Sealant	
Steering bearing adjustment nut threads	Engine oil	
Fuel feed hose O-ring		
Final drive gear case inside	Hypoid gear oil #80	175 cm^3 (Full)
Brake master piston and cups	Honda DOT 4 brake fluid	
Brake caliper piston and piston seals		

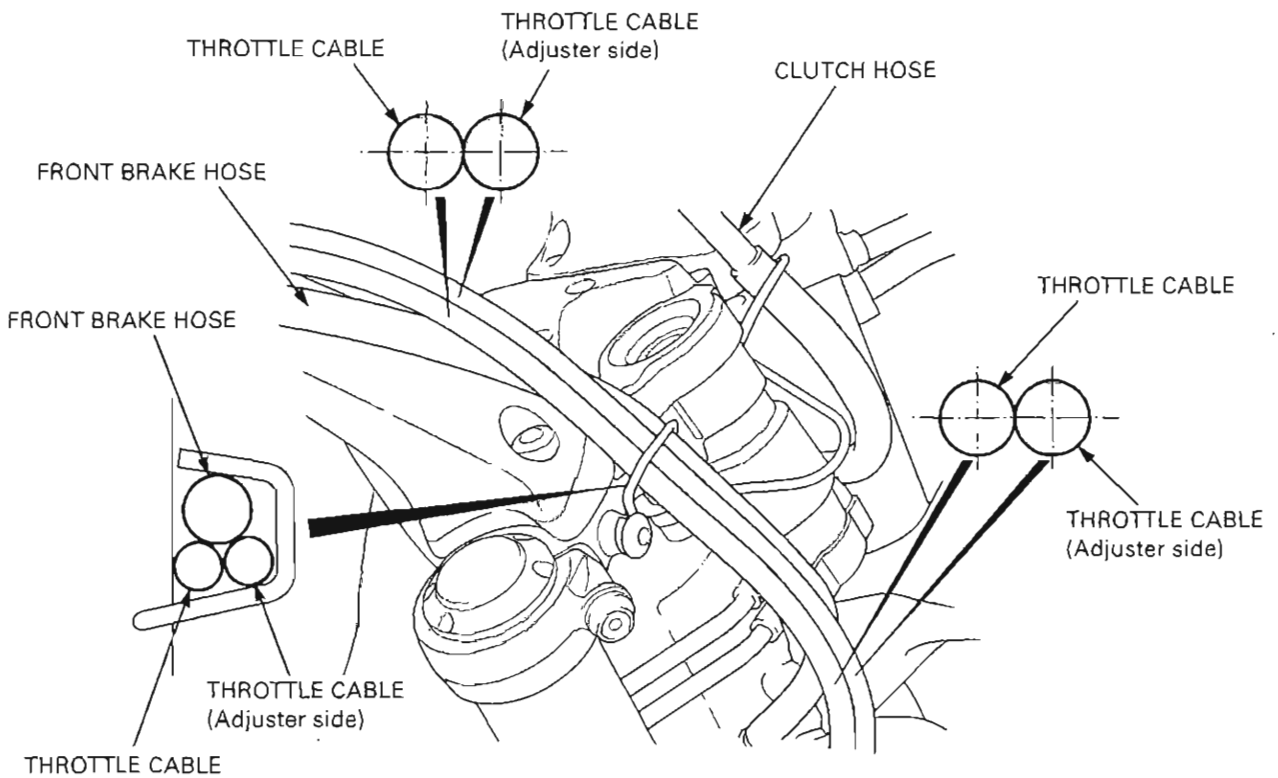
LOCATION	MATERIAL	REMARKS
Fork cap O-ring Fork inside Fork dust seal and oil seal lips	Pro Honda Suspension Fluid SS-8	
Throttle cable A, B outer inside	Cable lubricant	
Handlebar grip rubber inside	Honda bond A or Honda hand Grip Cement (U.S.A. only)	
Brake caliper bracket retainer	Adhesive (Three bond 1521) or equivalent	
Brake caliper sub slide pin threads Secondary master cylinder connector bolt threads Final driven flange stud bolt threads Final gear case cover 8 mm bolt threads Final gear case cover 10 mm bolt threads Pinion gear nut threads Final gear case stud bolt threads Fork socket bolt threads	Locking agent	 6 places 2 places

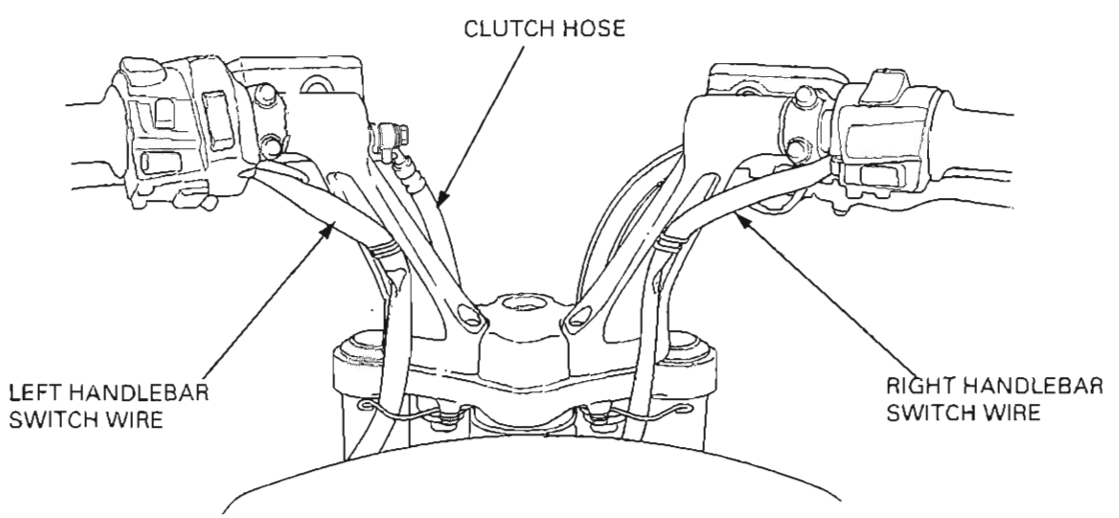
CABLE & HARNESS ROUTING

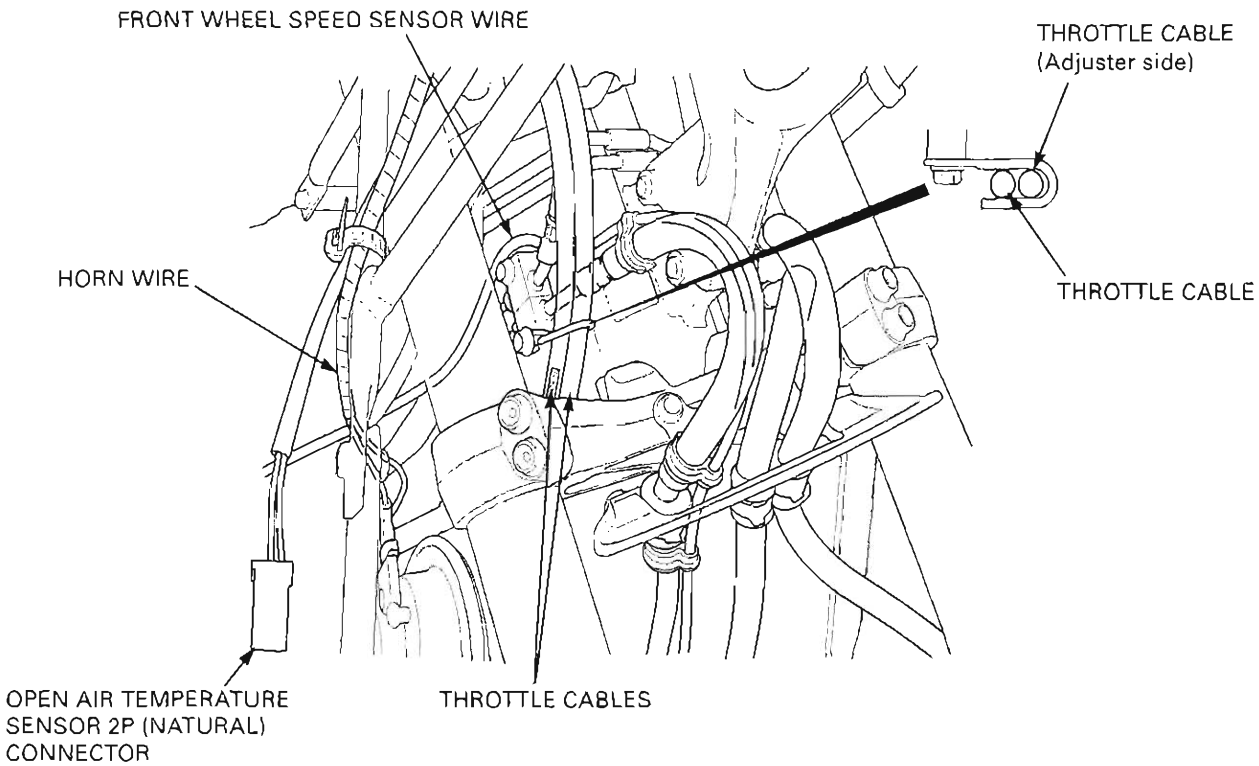
Deluxe type shown. A different part of standard type is illustrated later.

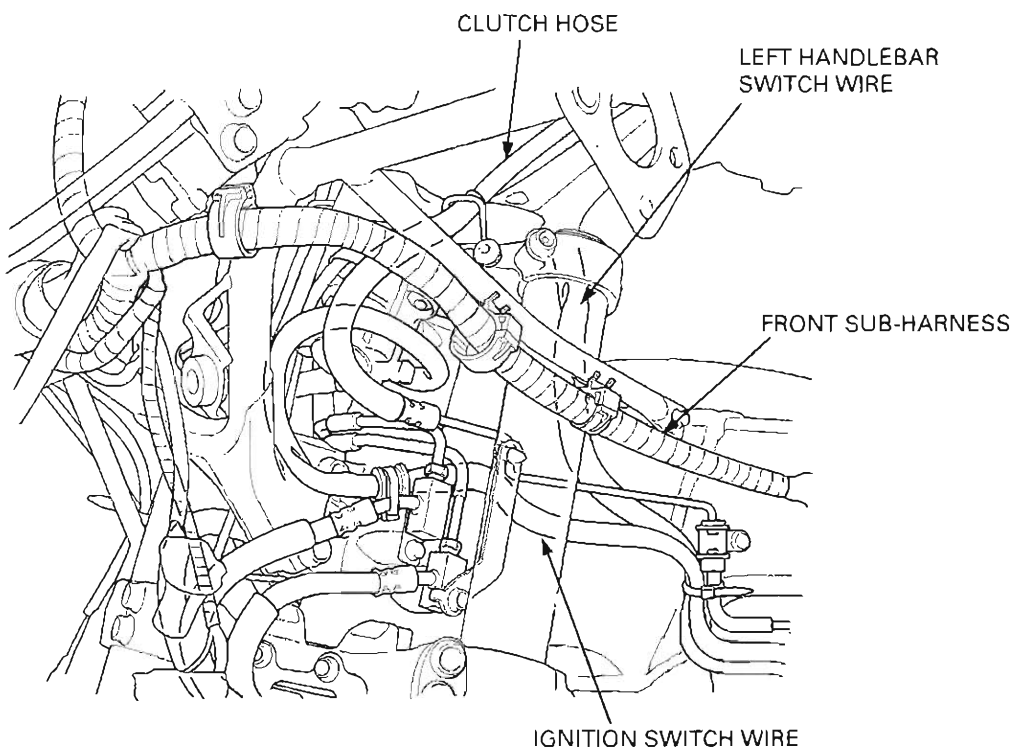


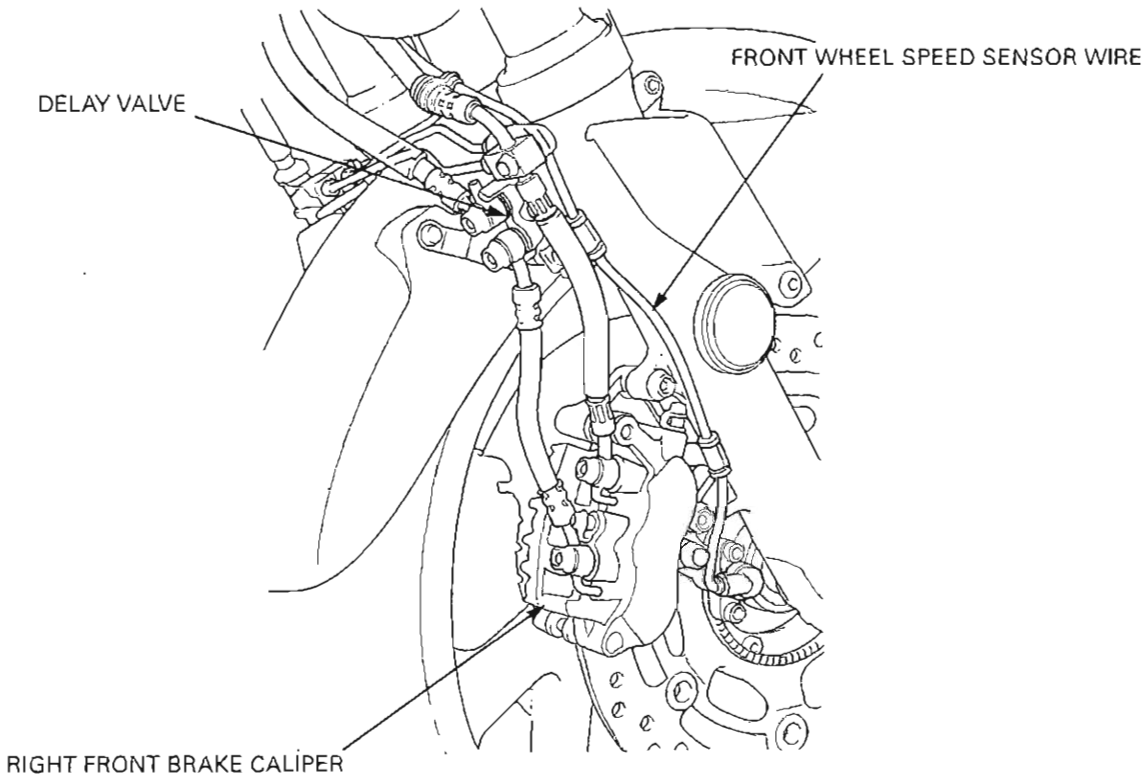

WINDSCREEN
ADJUSTER MOTOR
WINDSCREEN ADJUSTER LIMIT
SWITCH 4P (GRAY) CONNECTOR
WHITE TAPE
WHITE TAPE
FRONT SUB-HARNESS
INSIDE BOOT CONNECTORS:
-SCREEN ADJUSTER MOTOR 2P (GREEN)
-POSITION LIGHT 2P (BLACK)
-BANK ANGLE SENSOR 3P (BLUE)
WINDSCREEN UP/DOWN RELAYS

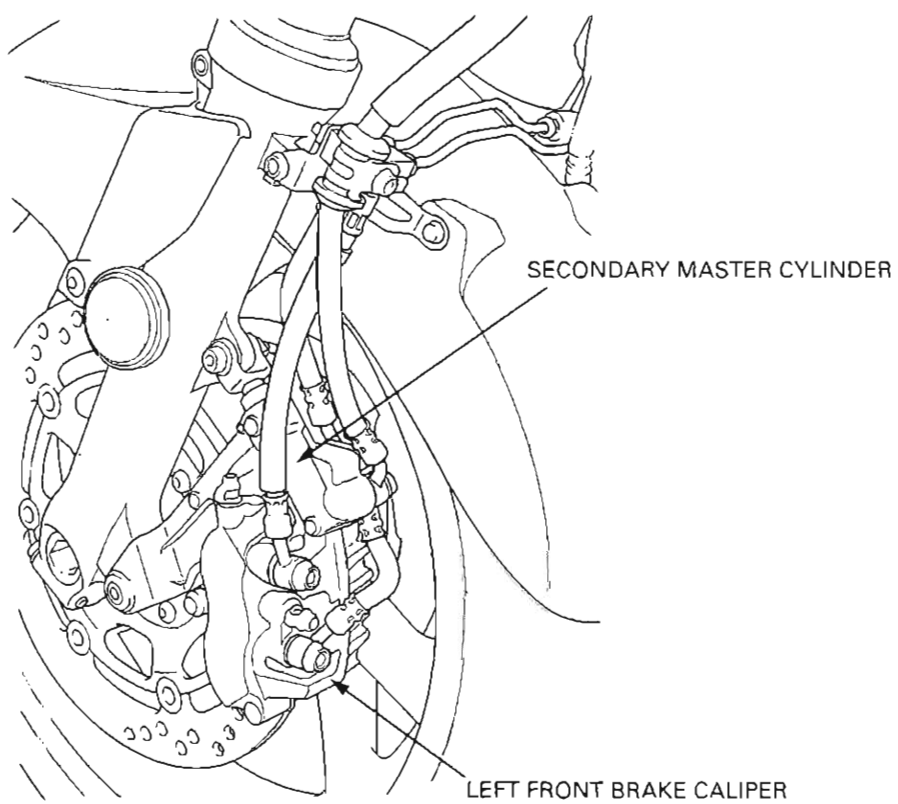

THROTTLE CABLE
THROTTLE CABLE
(Adjuster side)
CLUTCH HOSE
FRONT BRAKE HOSE
FRONT BRAKE HOSE
THROTTLE CABLE
THROTTLE CABLE
(Adjuster side)
THROTTLE CABLE
(Adjuster side)
THROTTLE CABLE

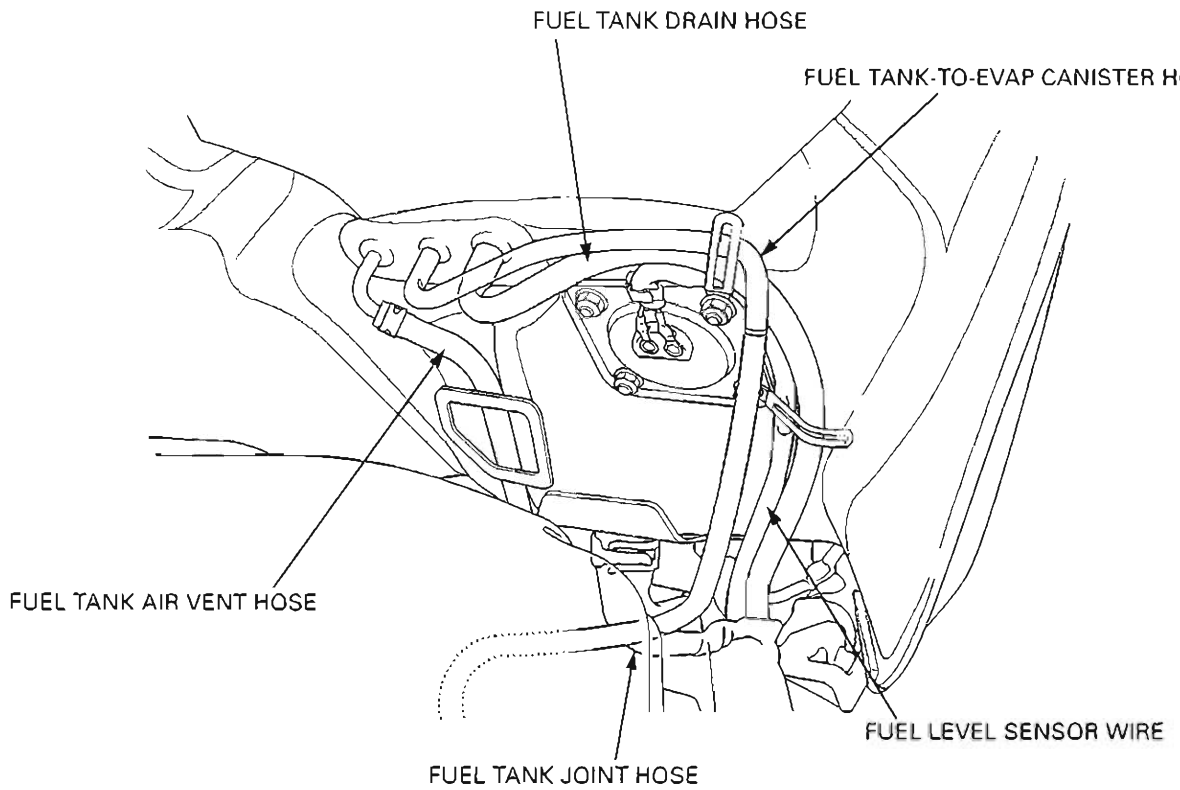

CLUTCH HOSE
LEFT HANDLEBAR
SWITCH WIRE
RIGHT HANDLEBAR
SWITCH WIRE

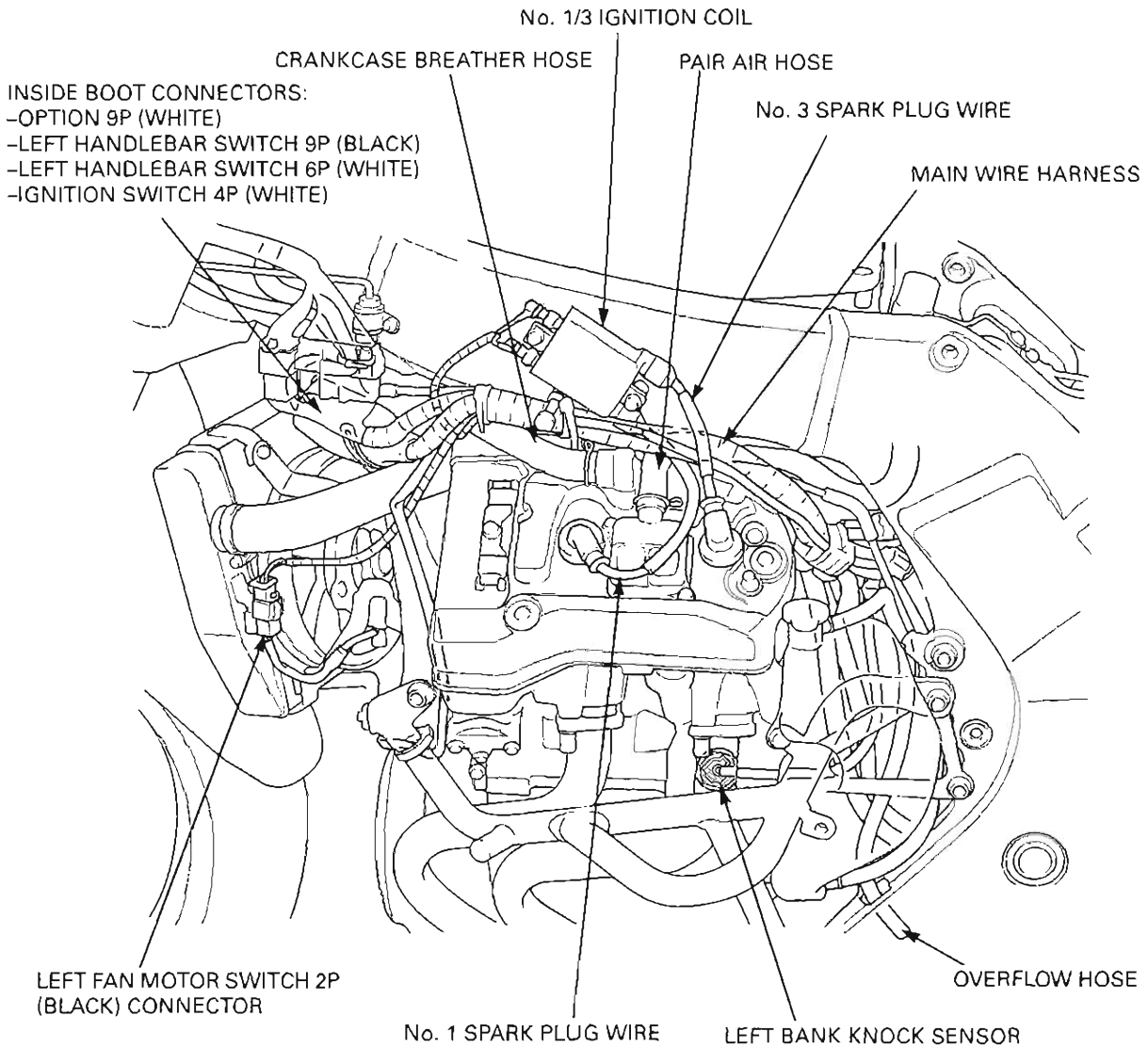

FRONT WHEEL SPEED SENSOR WIRE
THROTTLE CABLE
(Adjuster side)
HORN WIRE
THROTTLE CABLE
OPEN AIR TEMPERATURE
SENSOR 2P (NATURAL)
CONNECTOR
THROTTLE CABLES

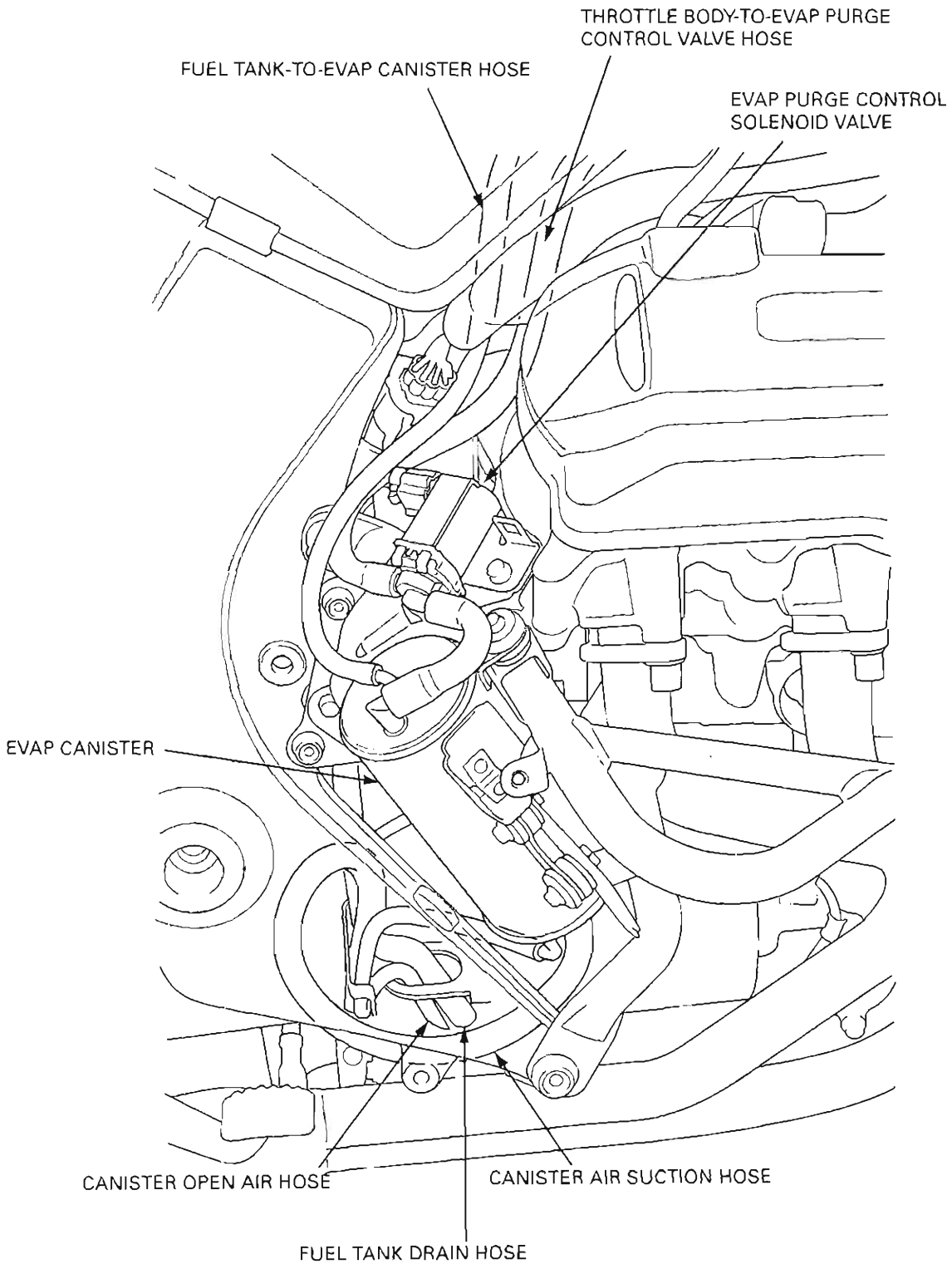

CLUTCH HOSE
LEFT HANDLEBAR
SWITCH WIRE
FRONT SUB-HARNESS
IGNITION SWITCH WIRE

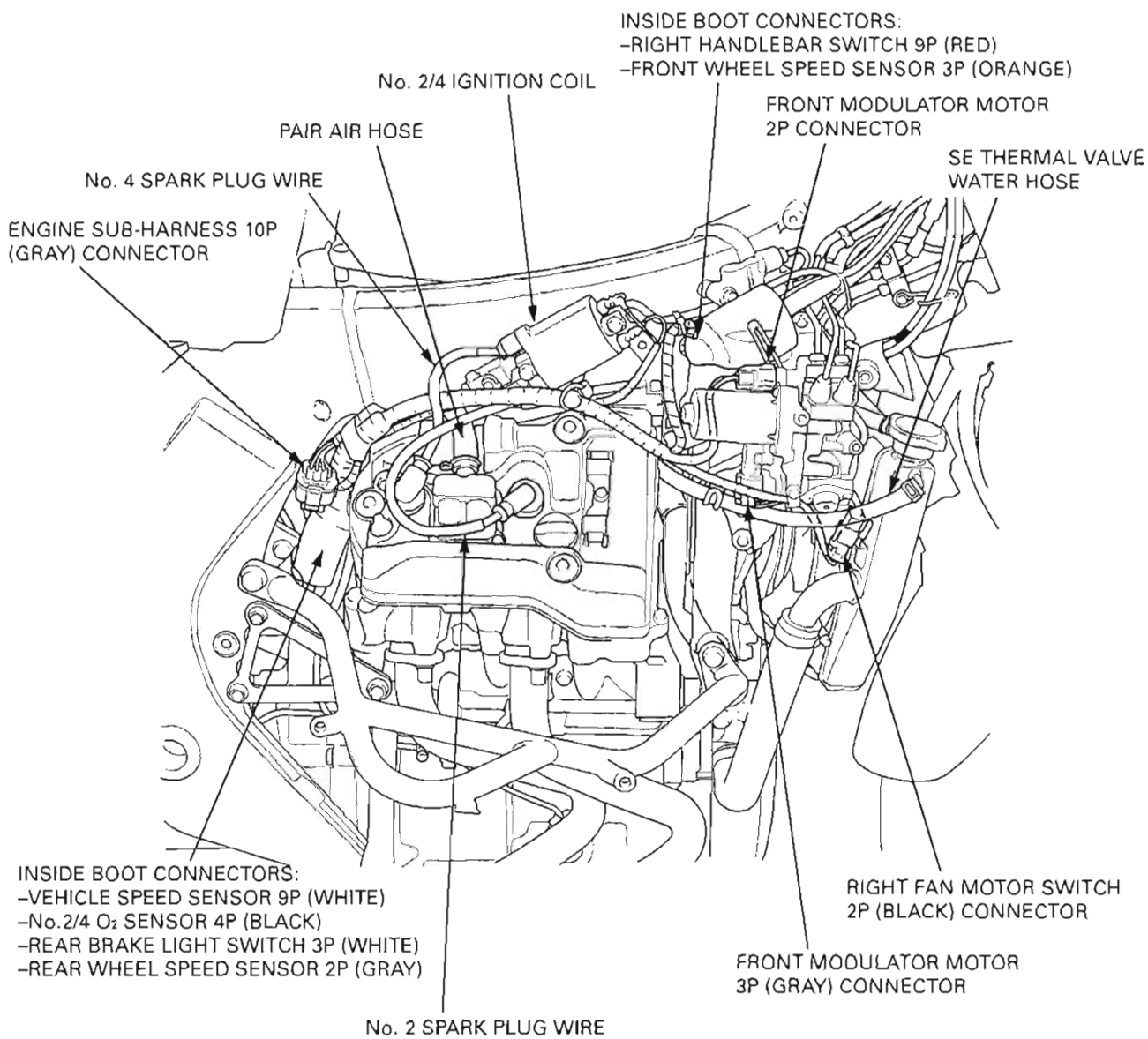

FRONT WHEEL SPEED SENSOR WIRE
DELAY VALVE
RIGHT FRONT BRAKE CALIPER

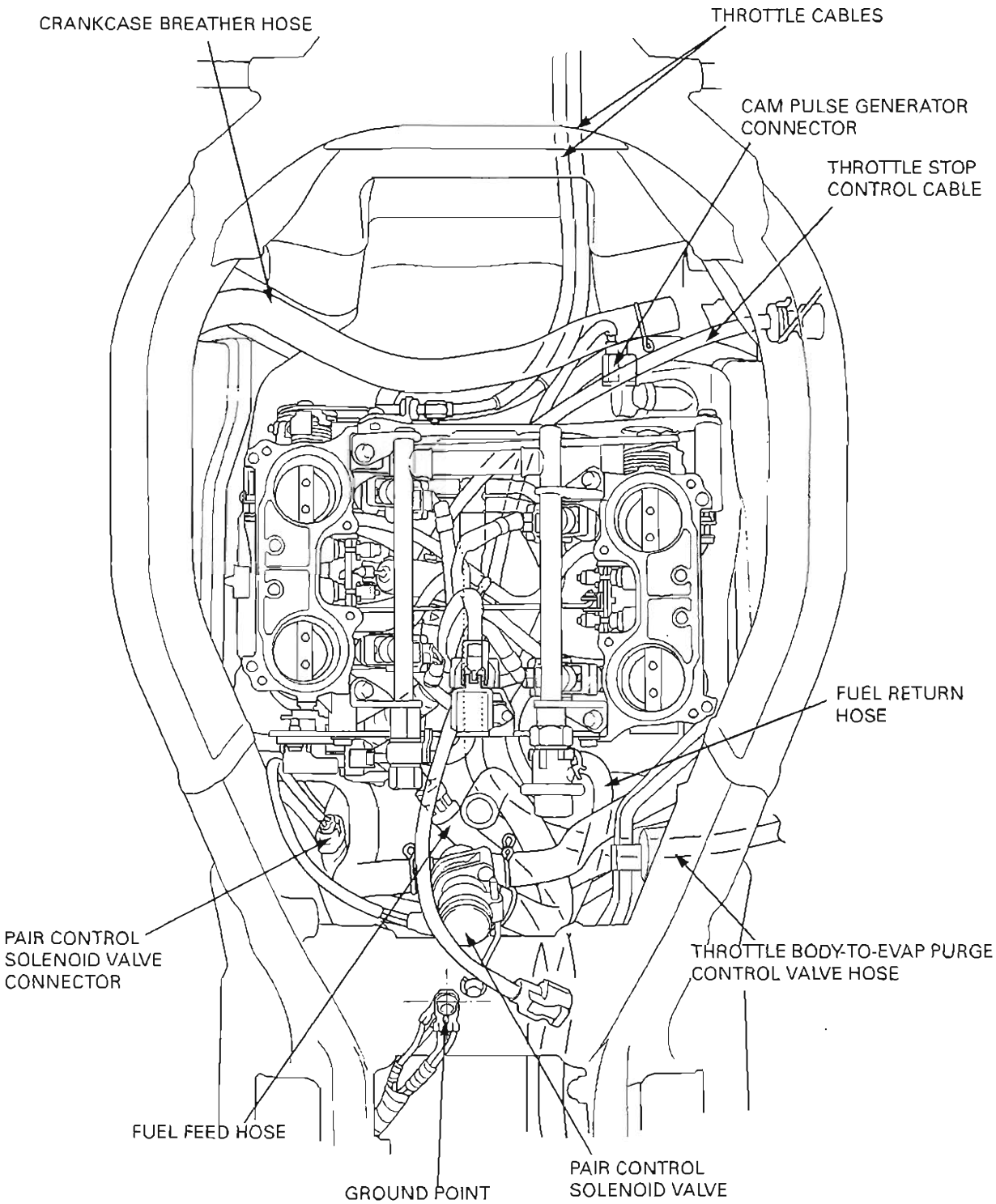

SECONDARY MASTER CYLINDER
LEFT FRONT BRAKE CALIPER

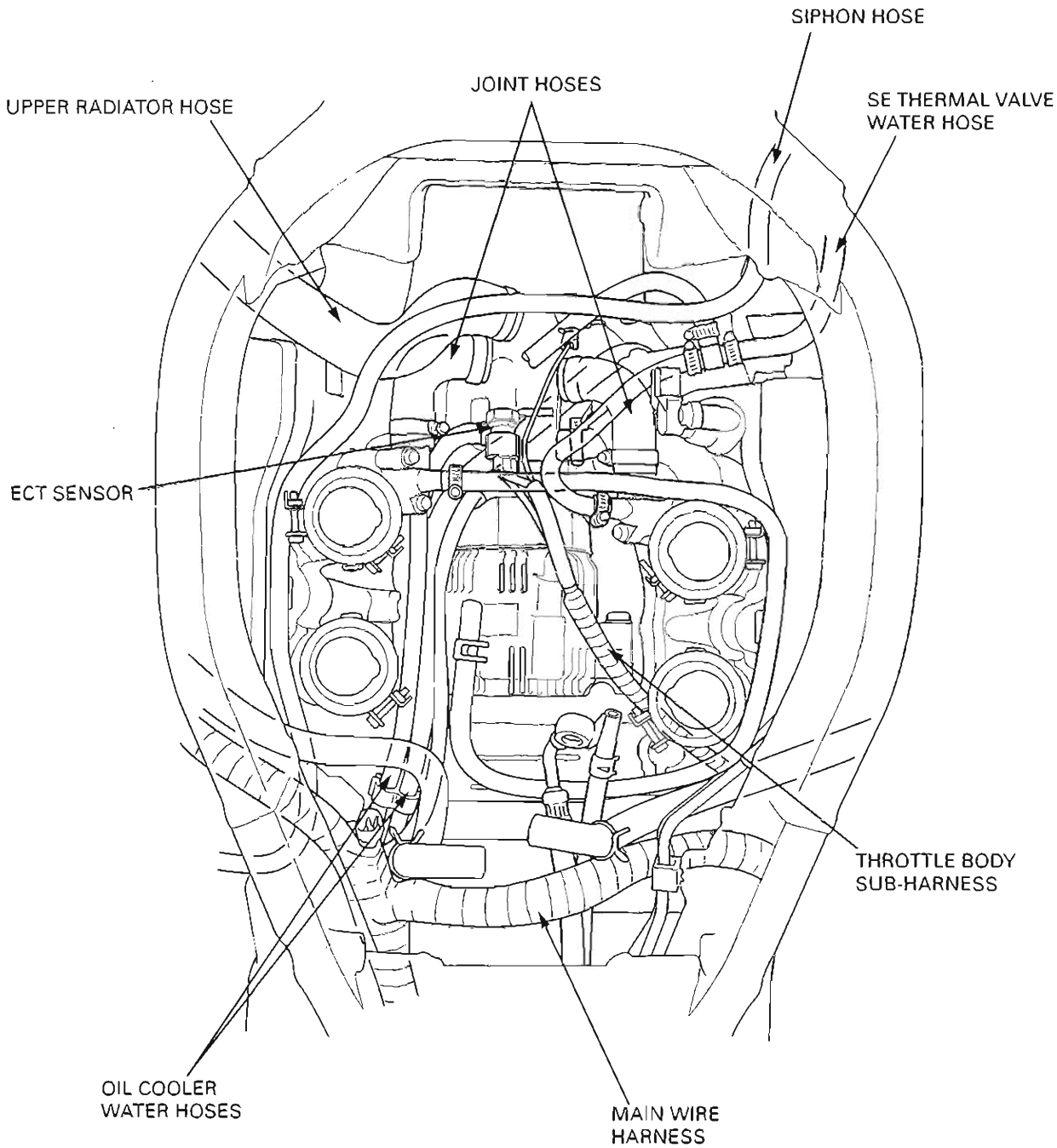

FUEL TANK DRAIN HOSE
FUEL TANK-TO-EVAP CANISTER HOSE
FUEL TANK AIR VENT HOSE
FUEL LEVEL SENSOR WIRE
FUEL TANK JOINT HOSE

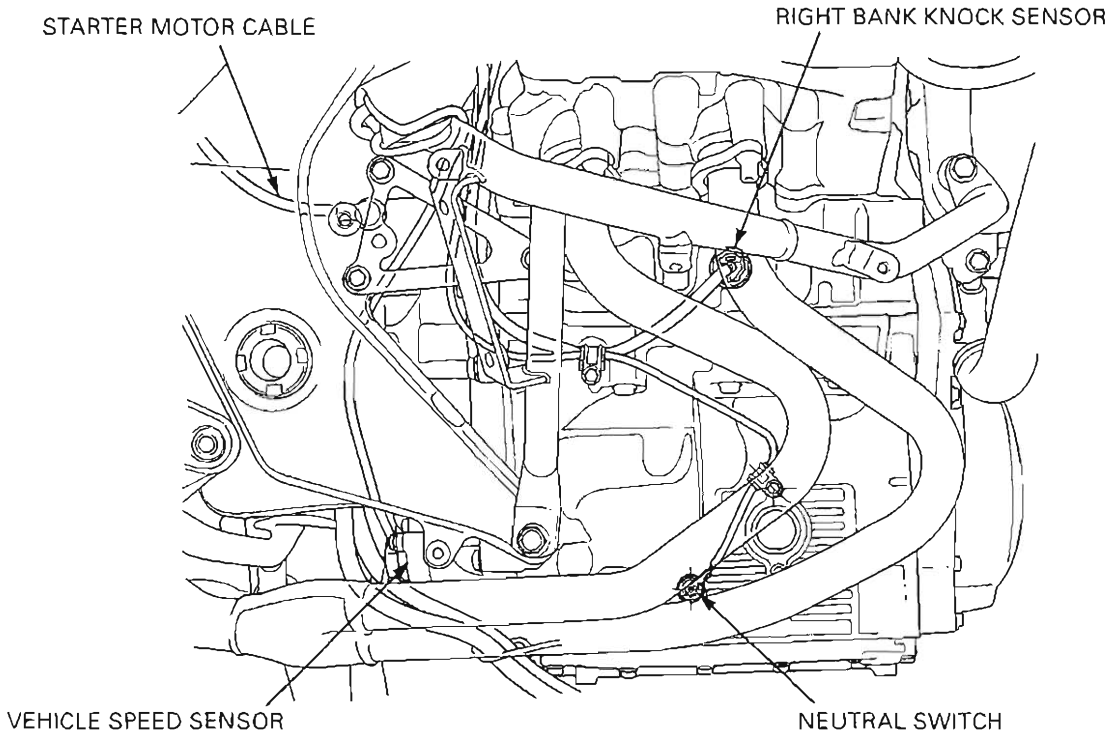

No. 1/3 IGNITION COIL
CRANKCASE BREATHER HOSE
PAIR AIR HOSE
INSIDE BOOT CONNECTORS:
-OPTION 9P (WHITE)
-LEFT HANDLEBAR SWITCH 9P (BLACK)
-LEFT HANDLEBAR SWITCH 6P (WHITE)
-IGNITION SWITCH 4P (WHITE)
No. 3 SPARK PLUG WIRE
MAIN WIRE HARNESS
LEFT FAN MOTOR SWITCH 2P (BLACK) CONNECTOR
No. 1 SPARK PLUG WIRE
LEFT BANK KNOCK SENSOR
OVERFLOW HOSE

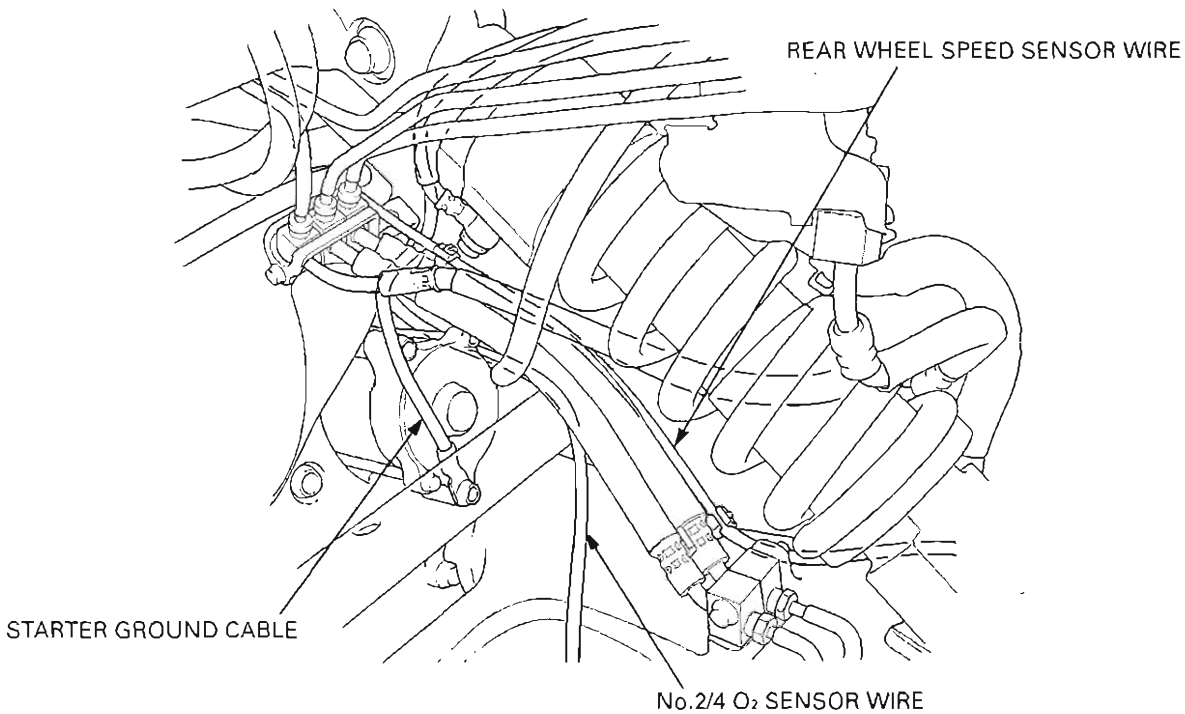

THROTTLE BODY-TO-EVAP PURGE CONTROL VALVE HOSE
FUEL TANK-TO-EVAP CANISTER HOSE
EVAP PURGE CONTROL SOLENOID VALVE
EVAP CANISTER
CANISTER OPEN AIR HOSE
CANISTER AIR SUCTION HOSE
FUEL TANK DRAIN HOSE

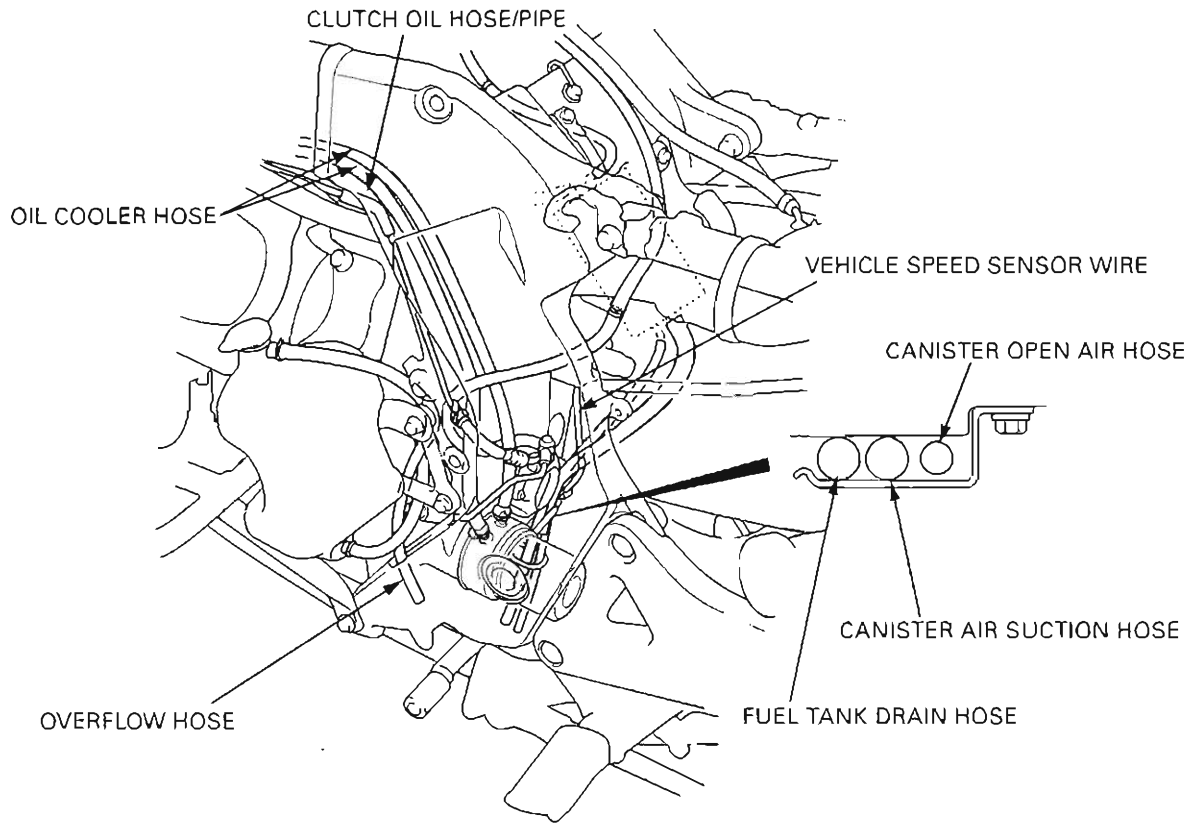

INSIDE BOOT CONNECTORS:
–RIGHT HANDLEBAR SWITCH 9P (RED)
–FRONT WHEEL SPEED SENSOR 3P (ORANGE)
No. 2/4 IGNITION COIL
FRONT MODULATOR MOTOR
2P CONNECTOR
PAIR AIR HOSE
SE THERMAL VALVE
WATER HOSE
No. 4 SPARK PLUG WIRE
ENGINE SUB-HARNESS 10P
(GRAY) CONNECTOR
INSIDE BOOT CONNECTORS:
–VEHICLE SPEED SENSOR 9P (WHITE)
–No.2/4 O2 SENSOR 4P (BLACK)
–REAR BRAKE LIGHT SWITCH 3P (WHITE)
–REAR WHEEL SPEED SENSOR 2P (GRAY)
RIGHT FAN MOTOR SWITCH
2P (BLACK) CONNECTOR
FRONT MODULATOR MOTOR
3P (GRAY) CONNECTOR
No. 2 SPARK PLUG WIRE

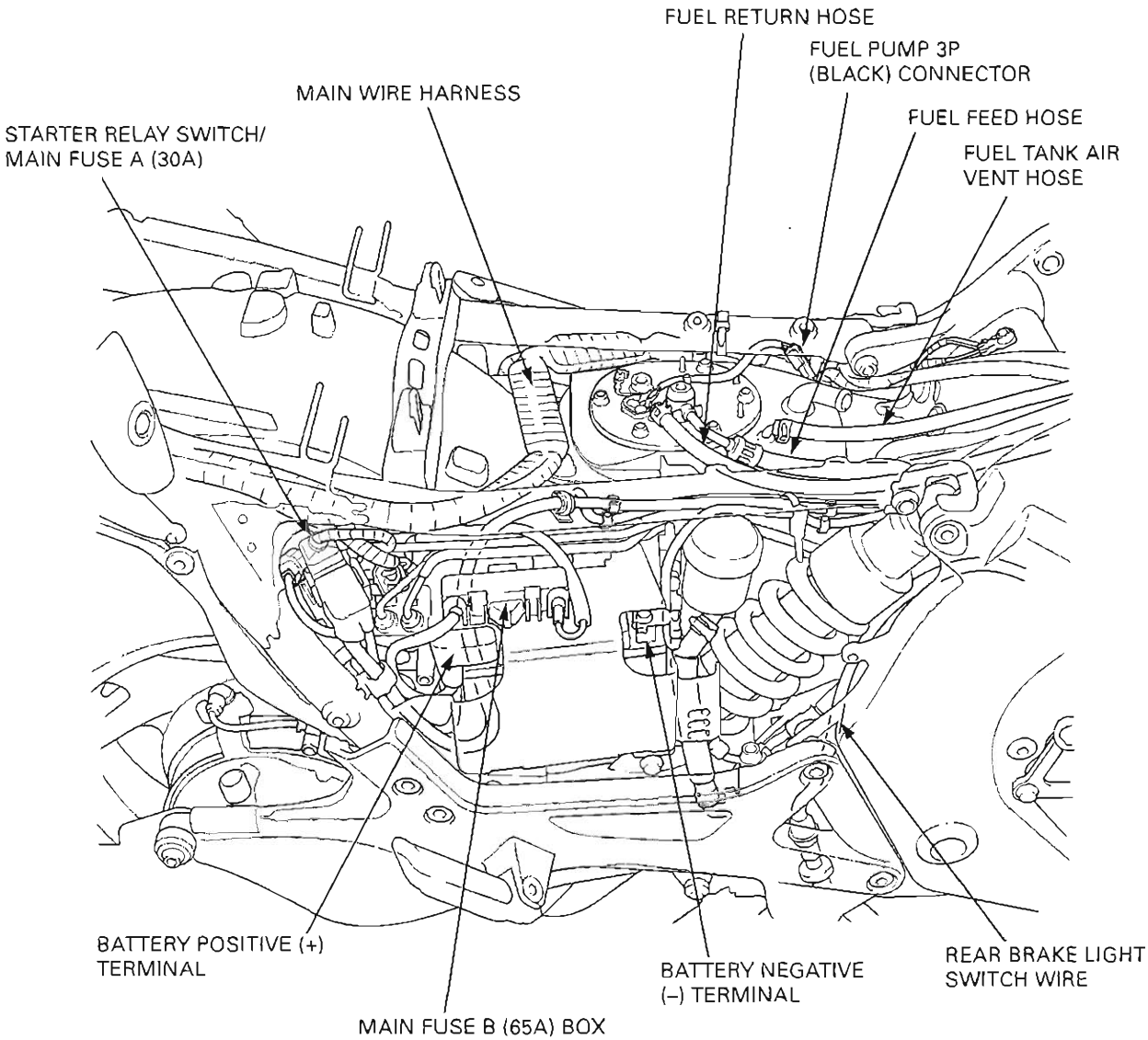

CRANKCASE BREATHER HOSE
THROTTLE CABLES
CAM PULSE GENERATOR CONNECTOR
THROTTLE STOP CONTROL CABLE
FUEL RETURN HOSE
PAIR CONTROL SOLENOID VALVE CONNECTOR
THROTTLE BODY-TO-EVAP PURGE CONTROL VALVE HOSE
FUEL FEED HOSE
GROUND POINT
PAIR CONTROL SOLENOID VALVE

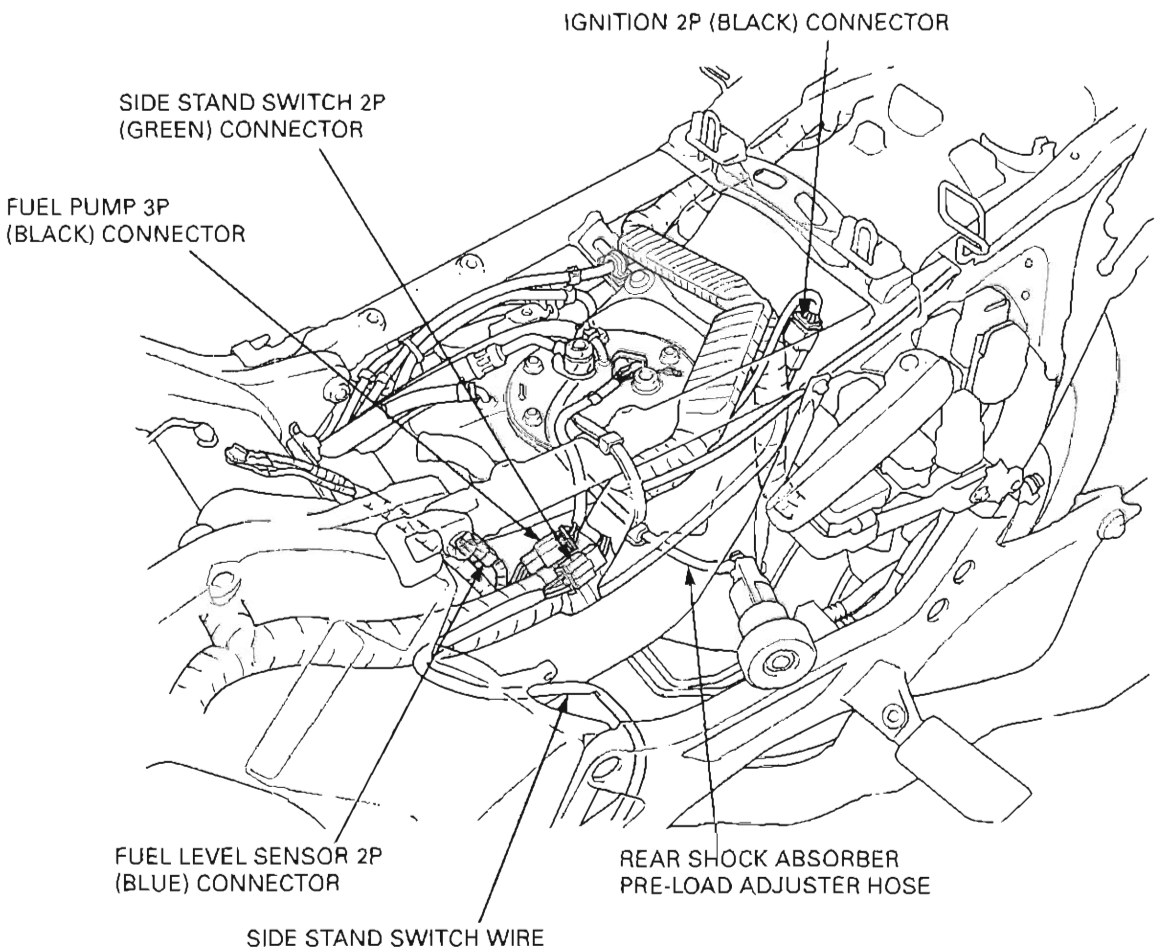

SIPHON HOSE
JOINT HOSES
UPPER RADIATOR HOSE
SE THERMAL VALVE
WATER HOSE
ECT SENSOR
THROTTLE BODY
SUB-HARNESS
OIL COOLER
WATER HOSES
MAIN WIRE
HARNESS

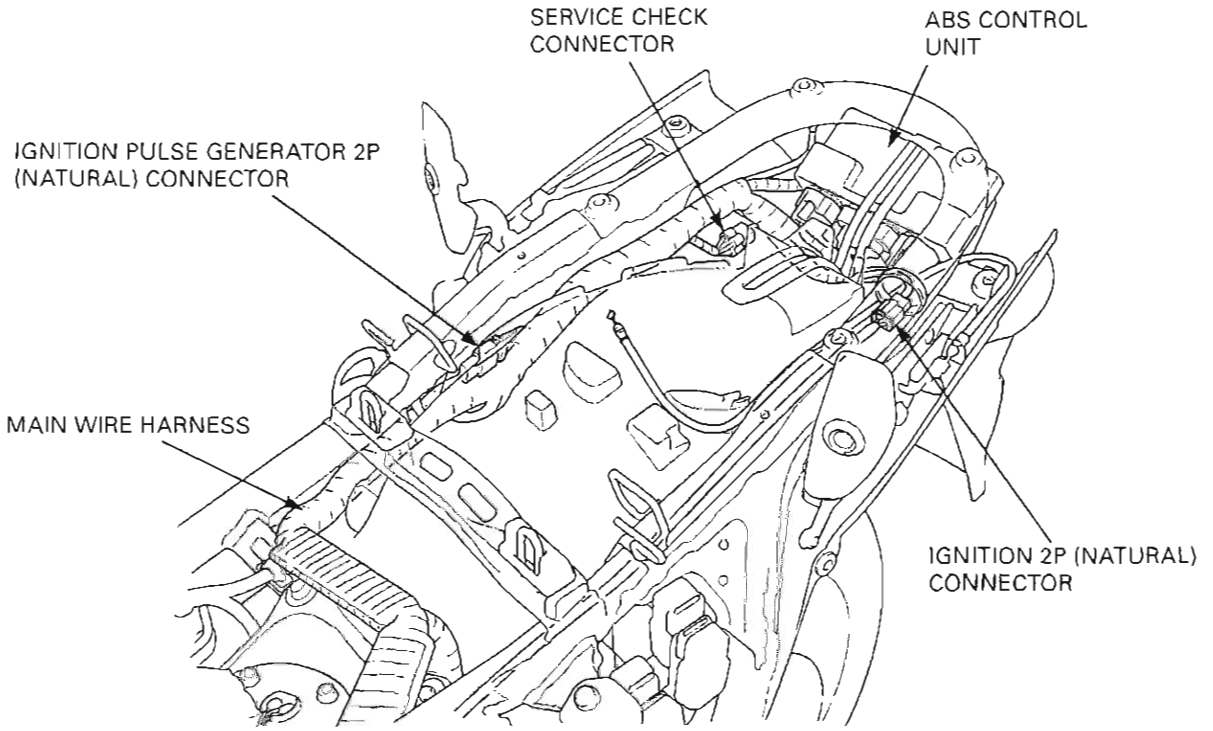

STARTER MOTOR CABLE
RIGHT BANK KNOCK SENSOR
VEHICLE SPEED SENSOR
NEUTRAL SWITCH

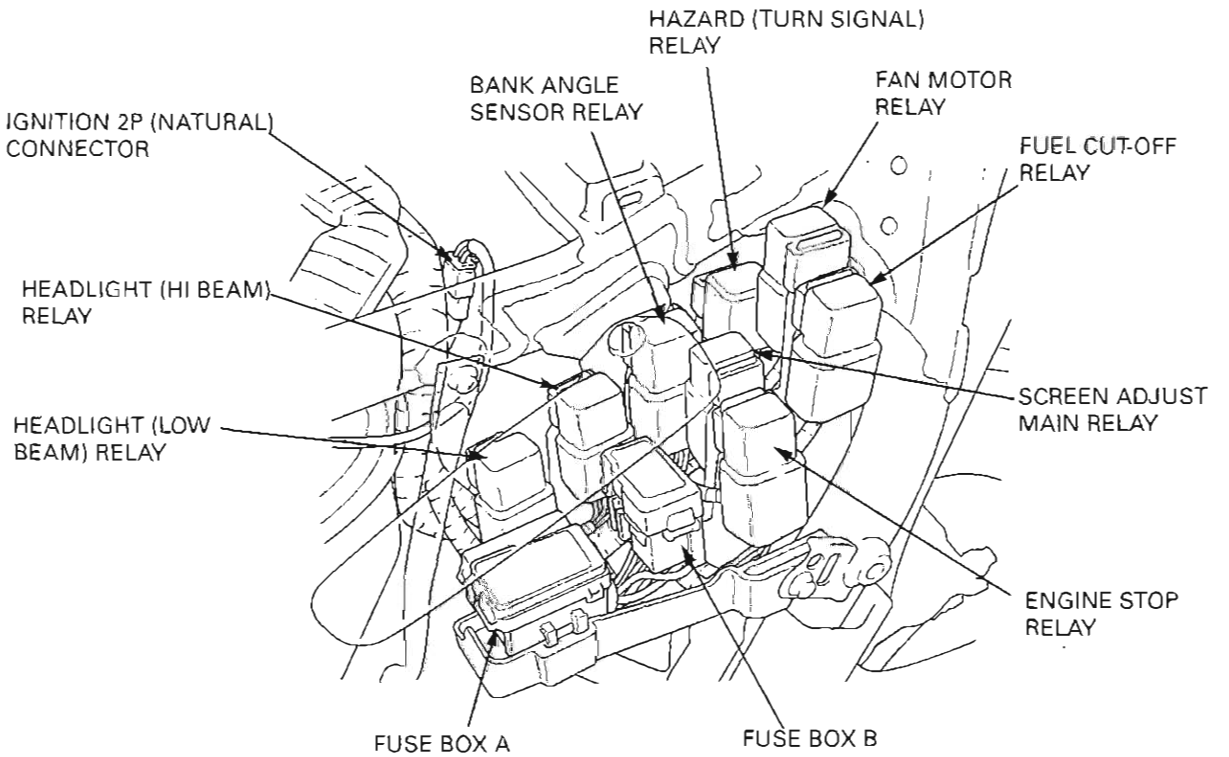

REAR WHEEL SPEED SENSOR WIRE
STARTER GROUND CABLE
No.2/4 O2 SENSOR WIRE

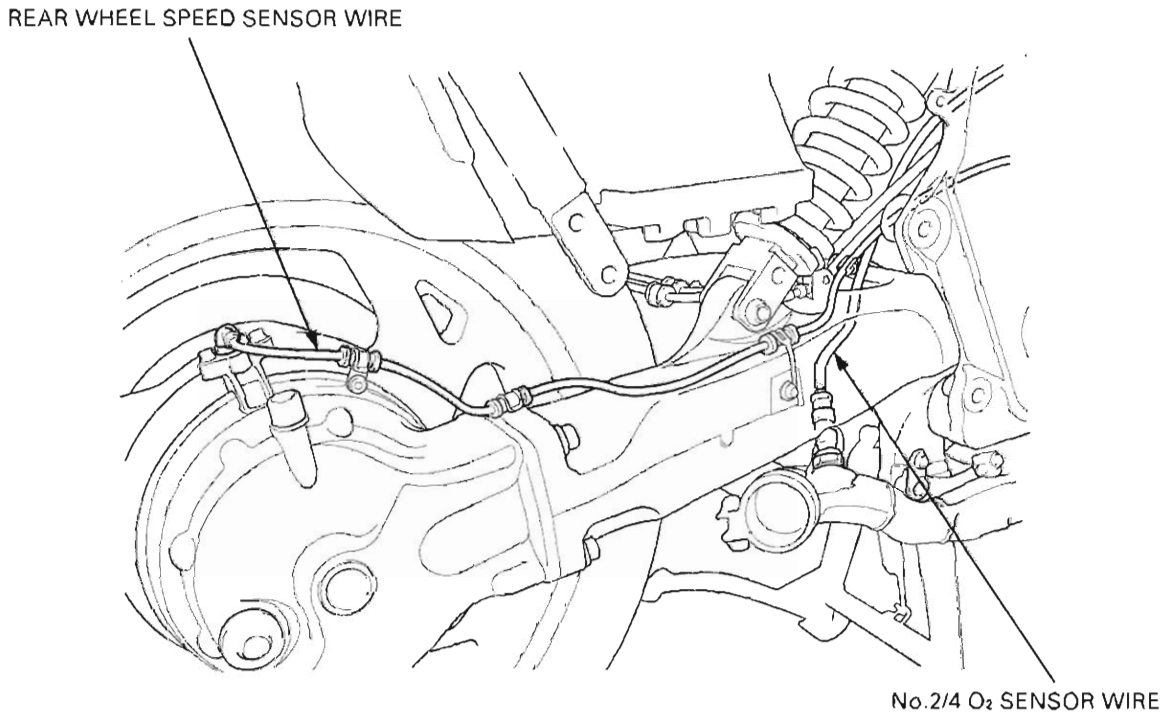

CLUTCH OIL HOSE/PIPE
OIL COOLER HOSE
VEHICLE SPEED SENSOR WIRE
CANISTER OPEN AIR HOSE
CANISTER AIR SUCTION HOSE
OVERFLOW HOSE
FUEL TANK DRAIN HOSE

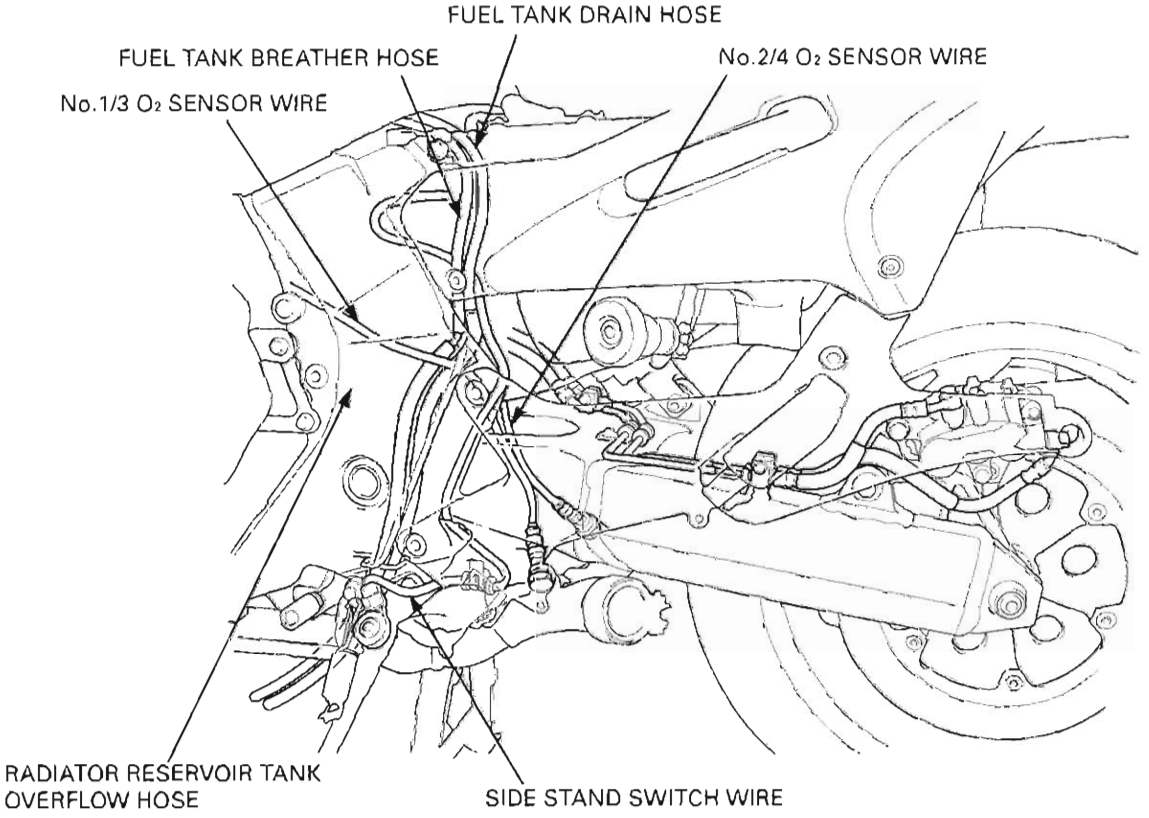

FUEL RETURN HOSE
FUEL PUMP 3P (BLACK) CONNECTOR
MAIN WIRE HARNESS
FUEL FEED HOSE
STARTER RELAY SWITCH/ MAIN FUSE A (30A)
FUEL TANK AIR VENT HOSE
BATTERY POSITIVE (+) TERMINAL
BATTERY NEGATIVE (–) TERMINAL
REAR BRAKE LIGHT SWITCH WIRE
MAIN FUSE B (65A) BOX


IGNITION 2P (BLACK) CONNECTOR
SIDE STAND SWITCH 2P (GREEN) CONNECTOR
FUEL PUMP 3P (BLACK) CONNECTOR
FUEL LEVEL SENSOR 2P (BLUE) CONNECTOR
SIDE STAND SWITCH WIRE
REAR SHOCK ABSORBER PRE-LOAD ADJUSTER HOSE

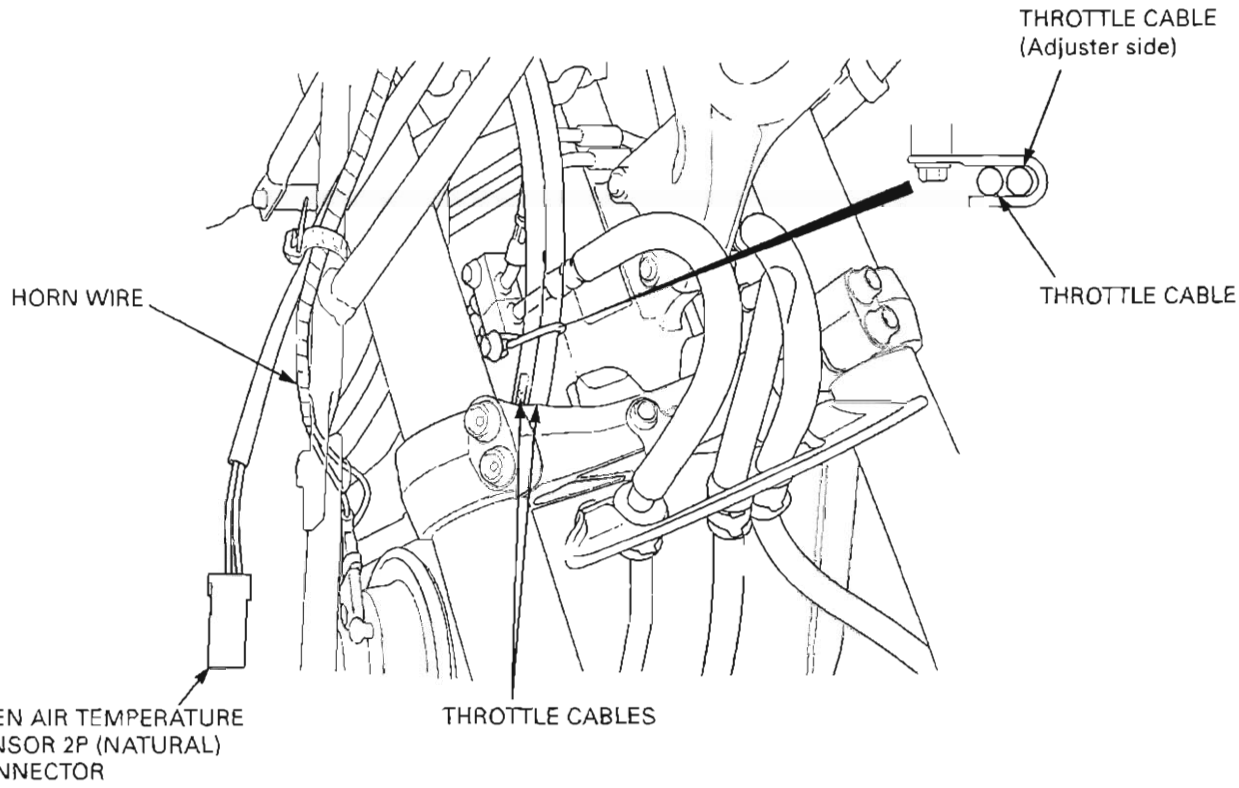

SERVICE CHECK CONNECTOR
ABS CONTROL UNIT
IGNITION PULSE GENERATOR 2P (NATURAL) CONNECTOR
MAIN WIRE HARNESS
IGNITION 2P (NATURAL) CONNECTOR

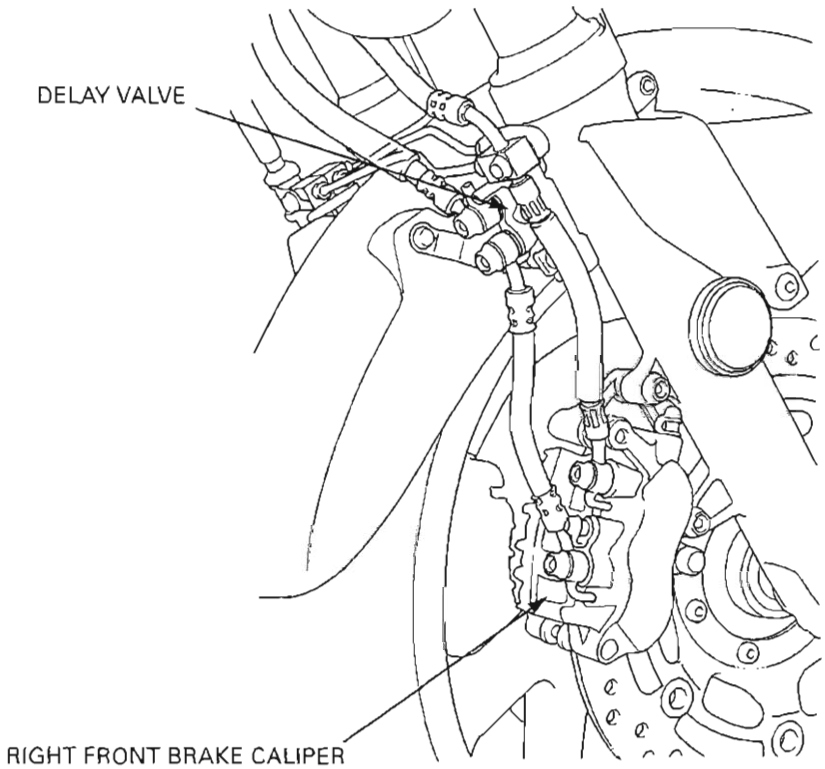

HAZARD (TURN SIGNAL) RELAY
BANK ANGLE SENSOR RELAY
FAN MOTOR RELAY
IGNITION 2P (NATURAL) CONNECTOR
FUEL CUT-OFF RELAY
HEADLIGHT (HI BEAM) RELAY
SCREEN ADJUST MAIN RELAY
HEADLIGHT (LOW BEAM) RELAY
ENGINE STOP RELAY
FUSE BOX A
FUSE BOX B

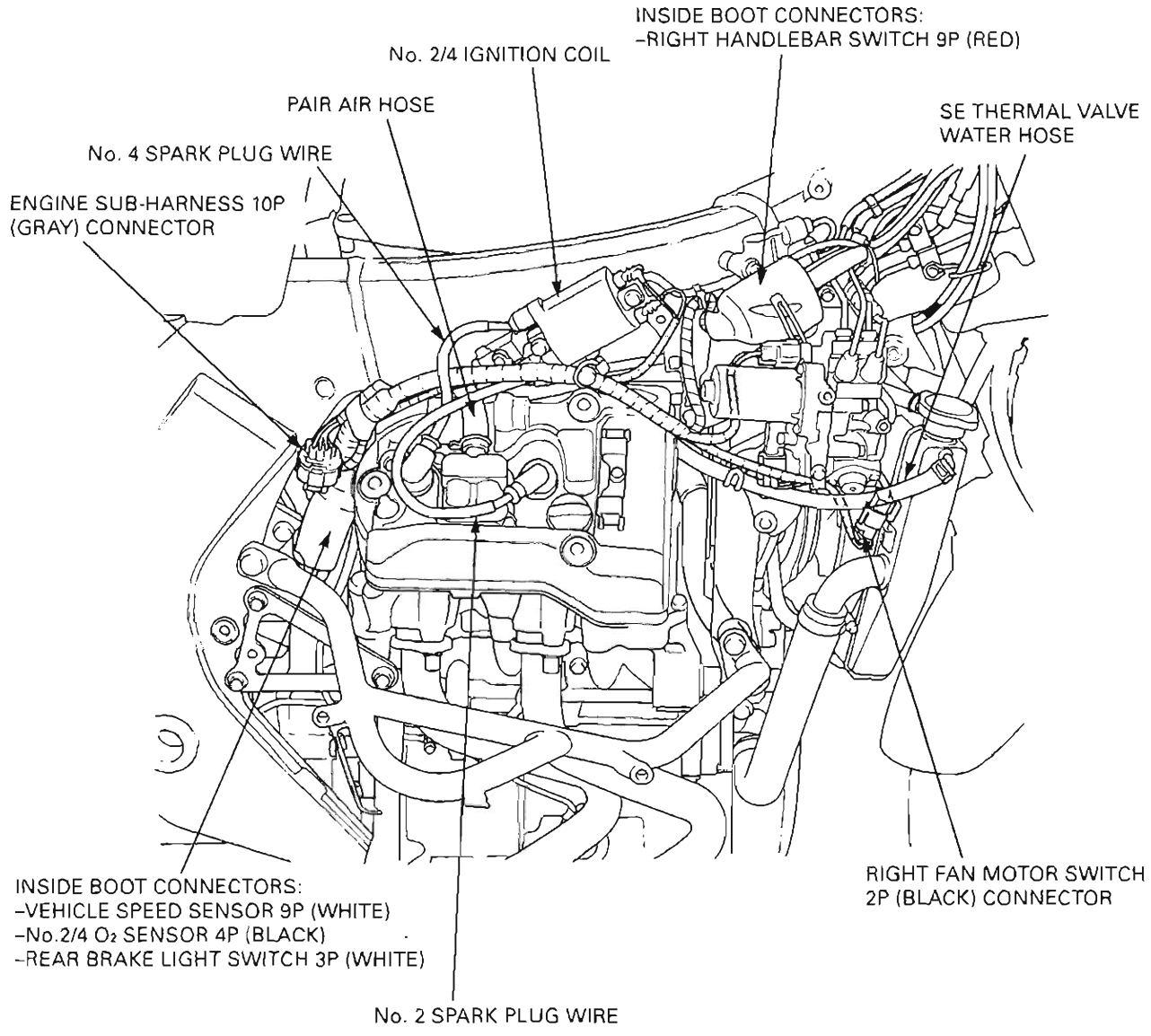

REAR WHEEL SPEED SENSOR WIRE
No.2/4 O2 SENSOR WIRE

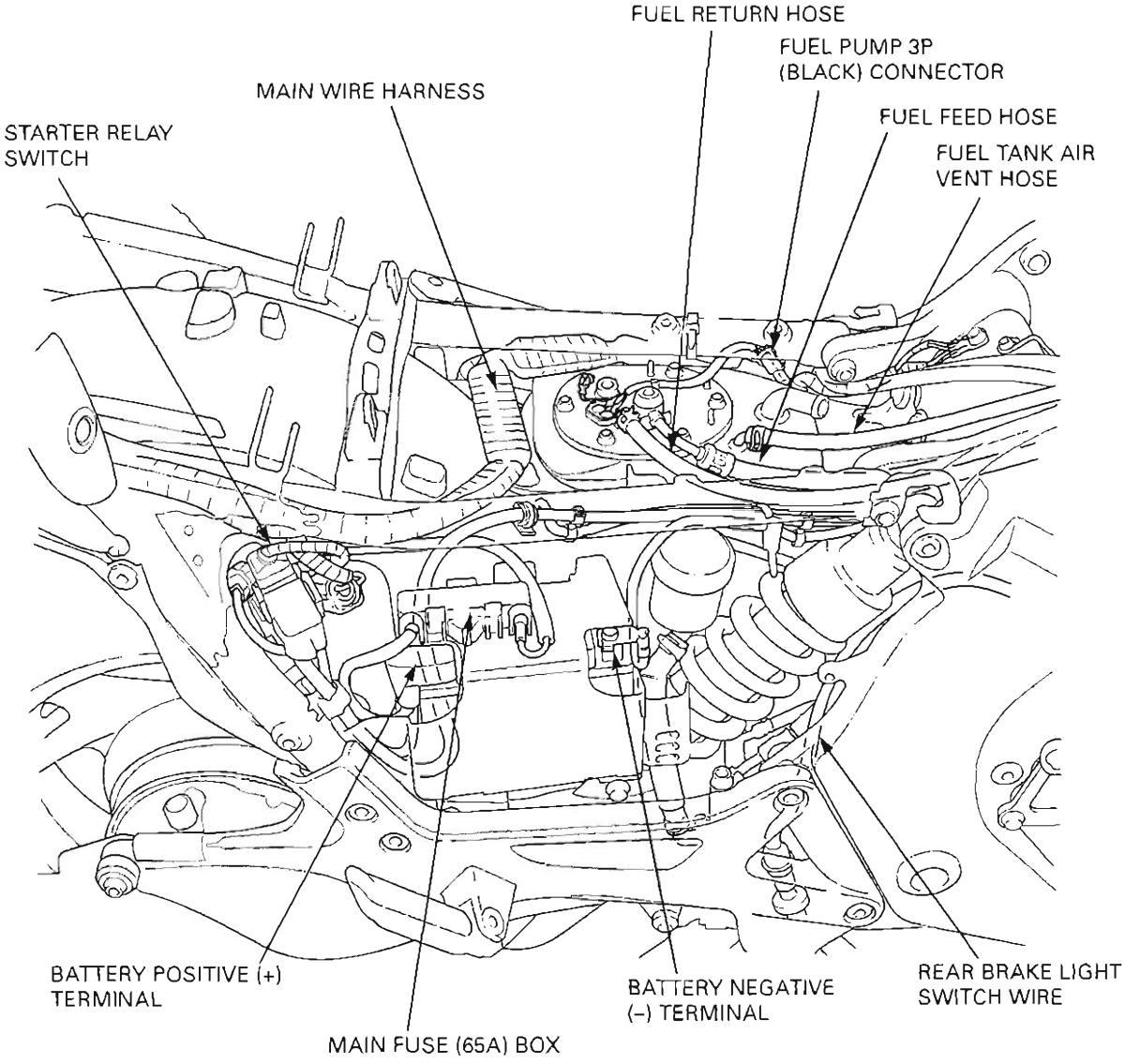

FUEL TANK DRAIN HOSE
FUEL TANK BREATHER HOSE
No.2/4 O2 SENSOR WIRE
No.1/3 O2 SENSOR WIRE
RADIATOR RESERVOIR TANK OVERFLOW HOSE
SIDE STAND SWITCH WIRE

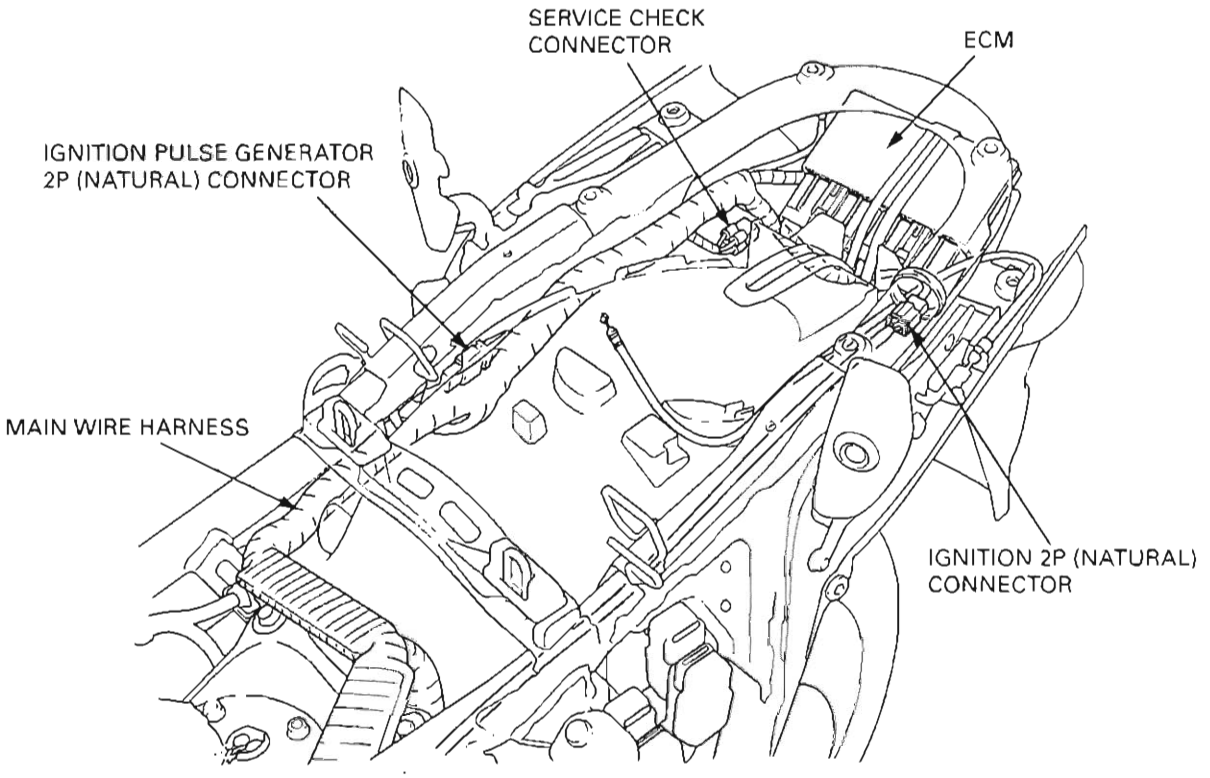
STANDARD TYPE WIRING





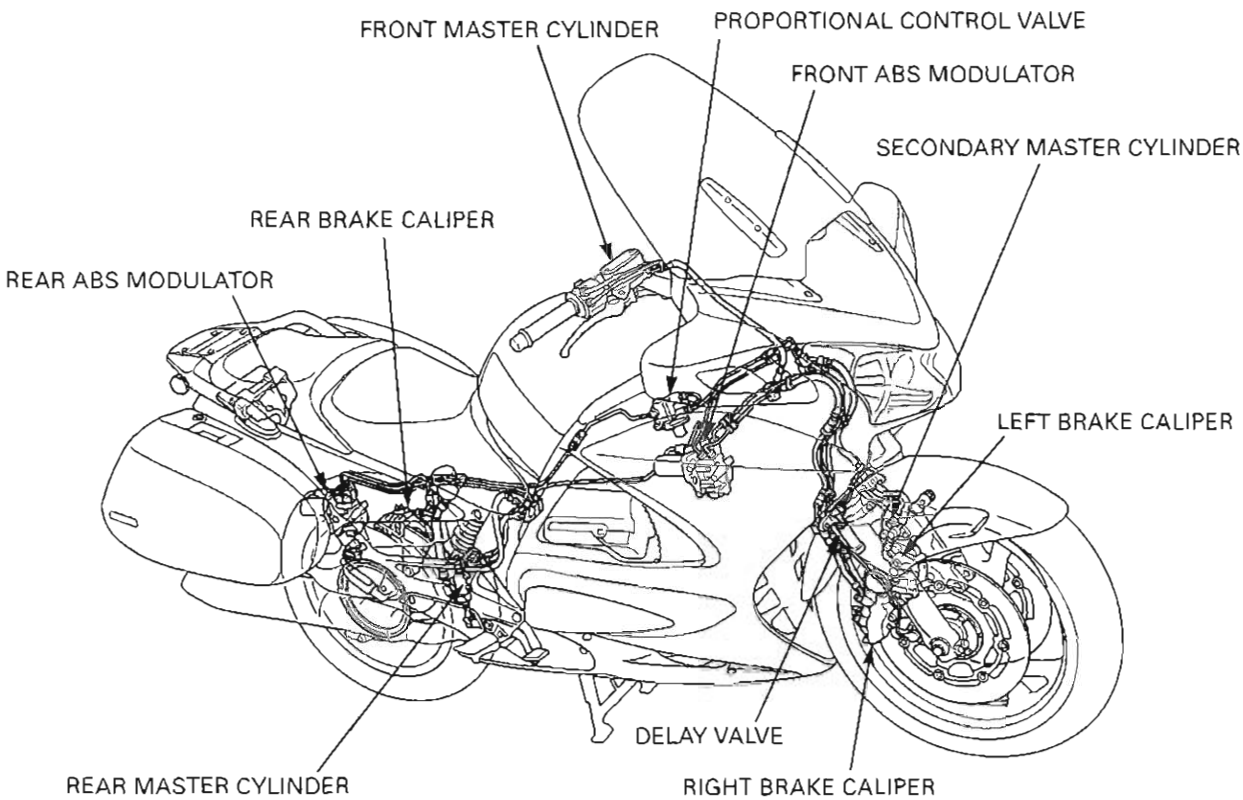

INSIDE BOOT CONNECTORS:
-RIGHT HANDLEBAR SWITCH 9P (RED)
No. 2/4 IGNITION COIL
PAIR AIR HOSE
SE THERMAL VALVE
WATER HOSE
No. 4 SPARK PLUG WIRE
ENGINE SUB-HARNESS 10P
(GRAY) CONNECTOR
INSIDE BOOT CONNECTORS:
-VEHICLE SPEED SENSOR 9P (WHITE)
-No.2/4 O2 SENSOR 4P (BLACK)
-REAR BRAKE LIGHT SWITCH 3P (WHITE)
RIGHT FAN MOTOR SWITCH
2P (BLACK) CONNECTOR
No. 2 SPARK PLUG WIRE


FUEL RETURN HOSE
FUEL PUMP 3P (BLACK) CONNECTOR
MAIN WIRE HARNESS
FUEL FEED HOSE
STARTER RELAY SWITCH
FUEL TANK AIR VENT HOSE
BATTERY POSITIVE (+) TERMINAL
MAIN FUSE (65A) BOX
BATTERY NEGATIVE (–) TERMINAL
REAR BRAKE LIGHT SWITCH WIRE

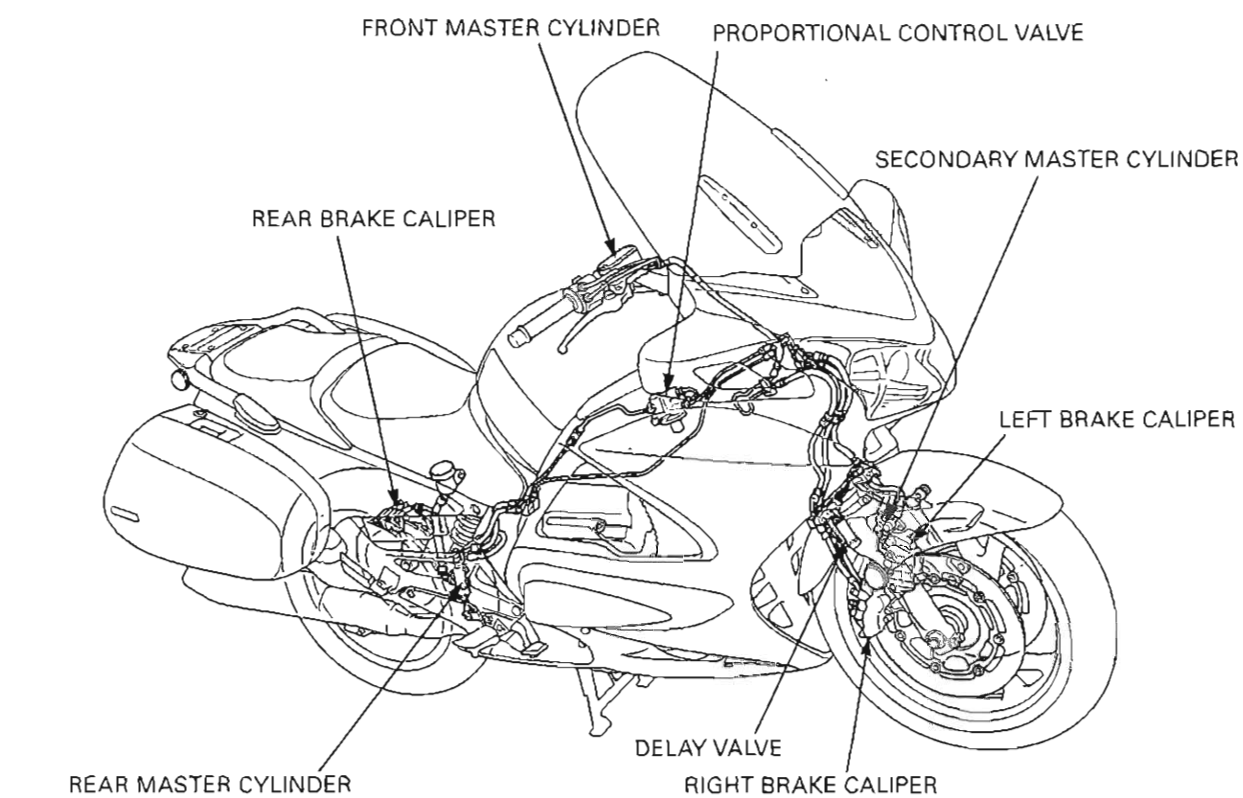

SERVICE CHECK
CONNECTOR
ECM
IGNITION PULSE GENERATOR
2P (NATURAL) CONNECTOR
MAIN WIRE HARNESS
IGNITION 2P (NATURAL)
CONNECTOR

BRAKE PIPE ROUTING

DELUXE TYPE:



STANDARD TYPE:



EMISSION CONTROL SYSTEMS

SOURCE OF EMISSIONS

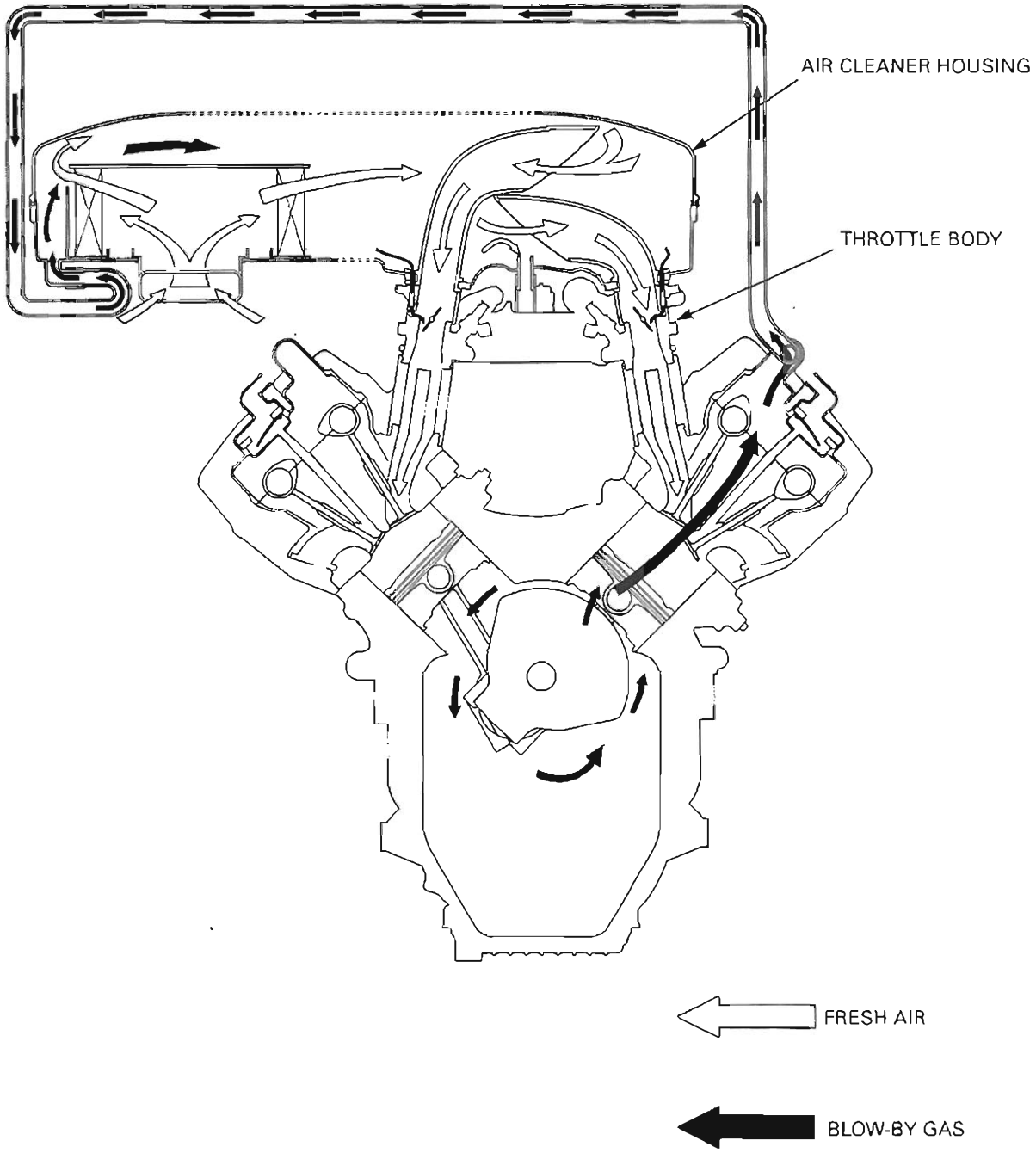
The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subject to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

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.



EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

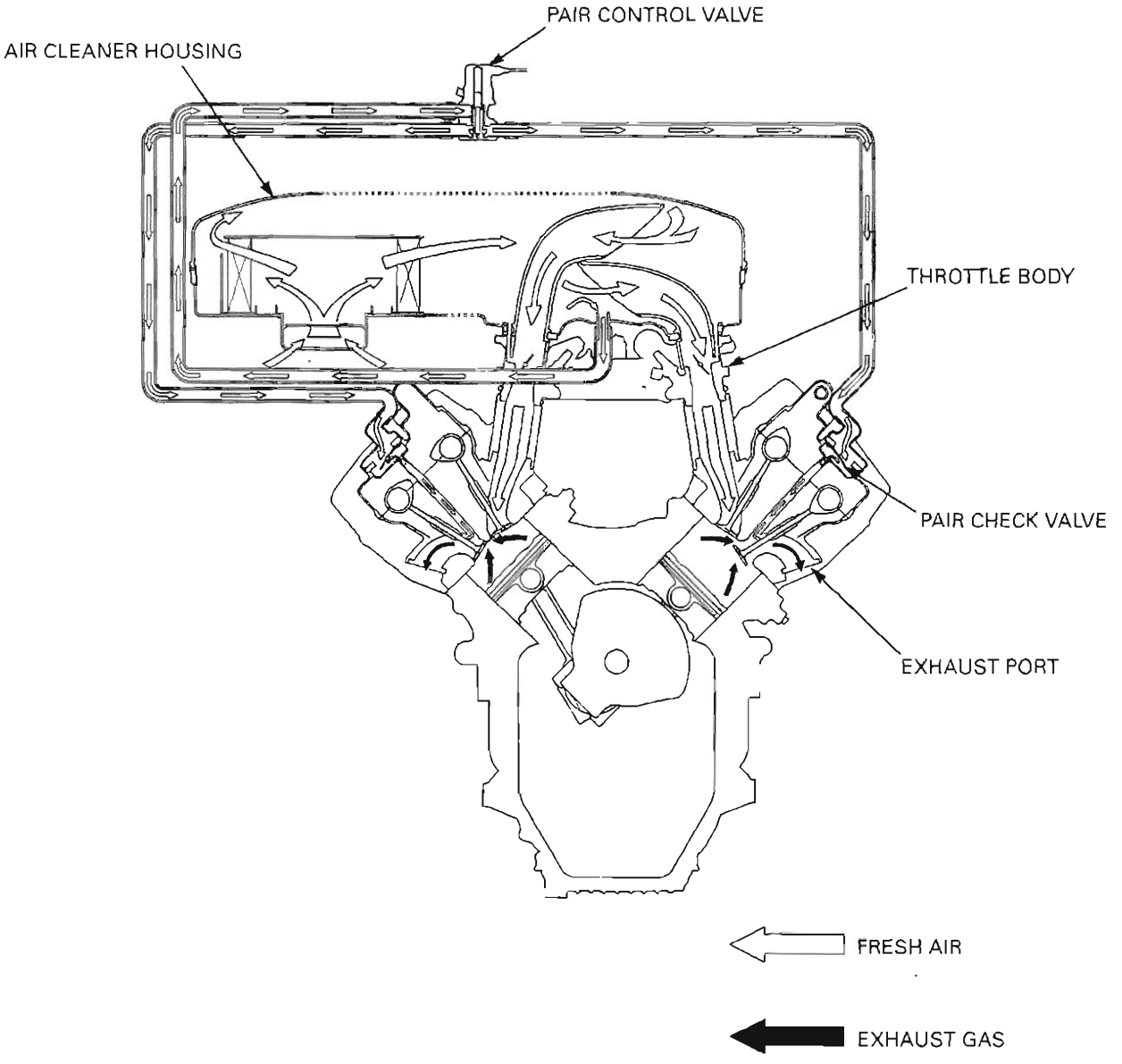
The exhaust emission control system is composed of a lean fuel injection setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crank case emission control system.

The exhaust emission control system consists of 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 to 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.



This motorcycle is also equipped with two two-way warm-up catalytic converters, a two-way catalytic converter, and a heated oxygen sensor.

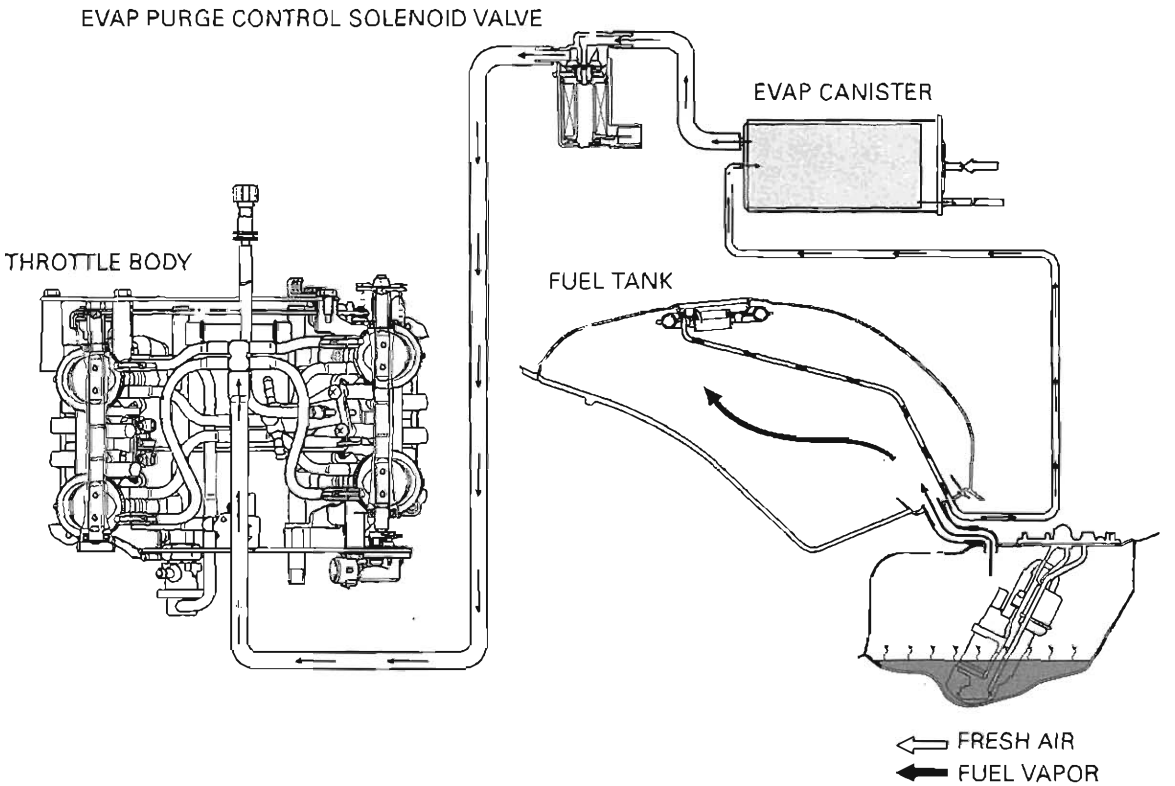
The three-way catalytic converters are in the exhaust system. Through chemical reactions, they convert HC, CO, and NOx in the engine's exhaust to carbon dioxide (CO_2), dinitrogen (N_2), and water vapor.

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

EVAPORATIVE EMISSION CONTROL SYSTEM

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

Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is 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: US Federal Law prohibits, or Canadian Provincial Law may prohibit, the following acts or the causing there of: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

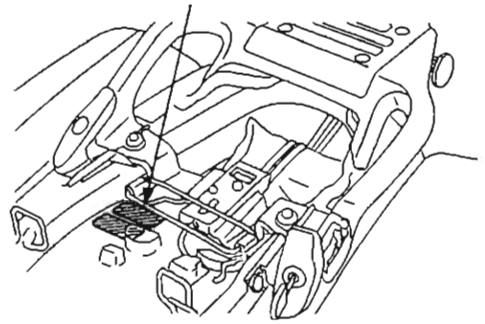
AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

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

EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the air cleaner housing as shown.
The fuel tank must be opened to read it. Refer to page 3-4 for fuel tank opening.

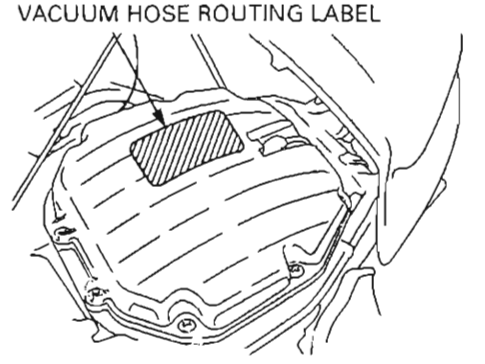
EMISSION CONTROL INFORMATION LABEL

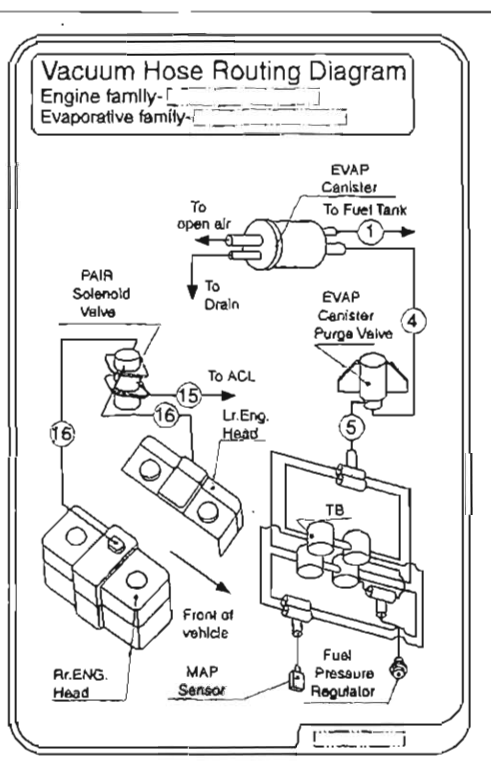


VACUUM HOSE ROUTING DIAGRAM LABEL

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 LABEL

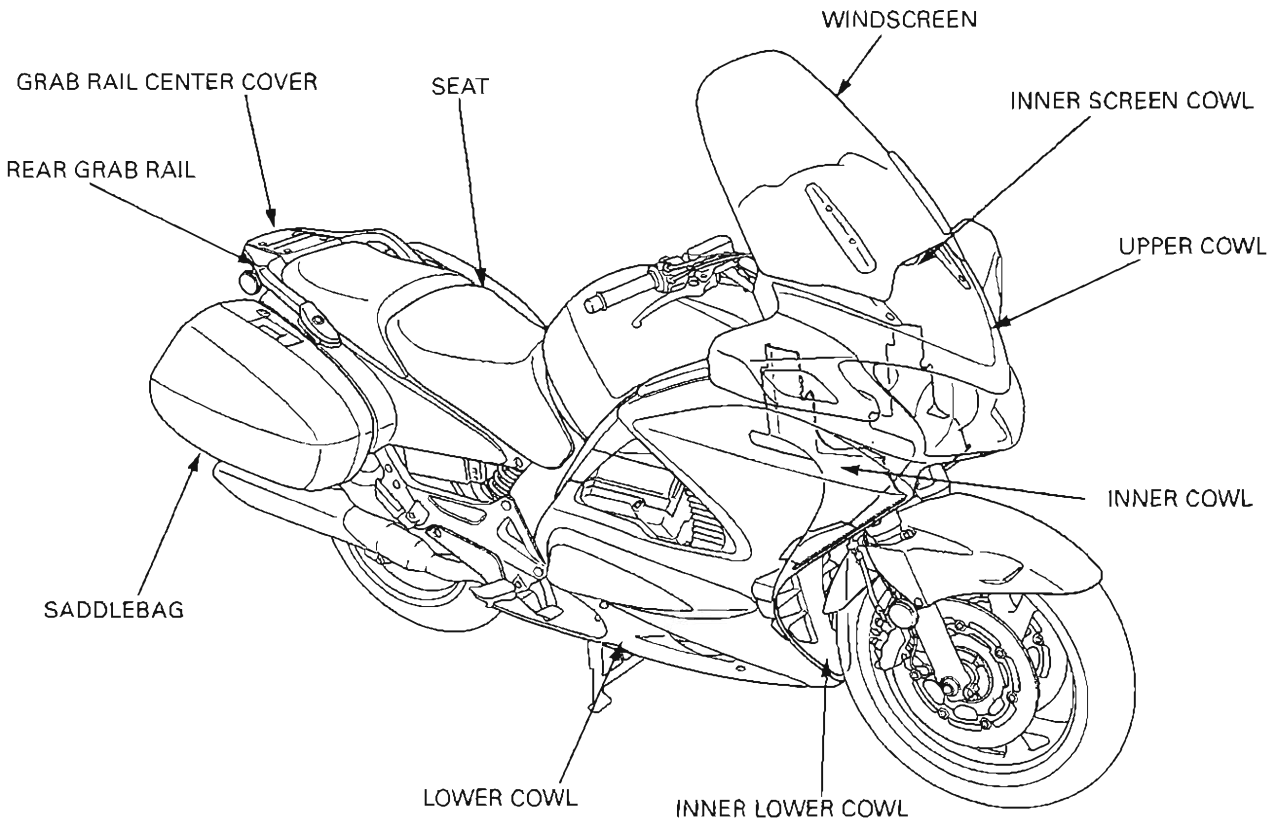


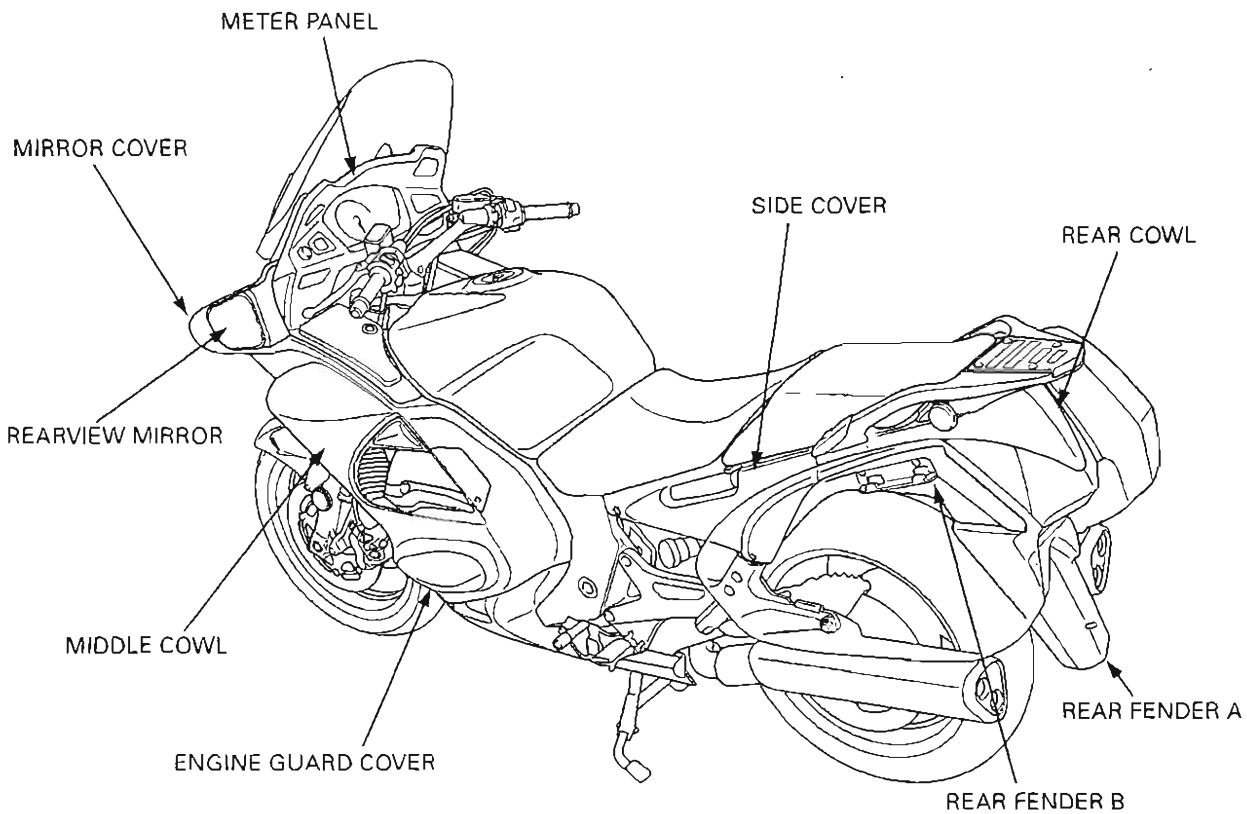


2. FRAME/BODY PANELS/EXHAUST SYSTEM

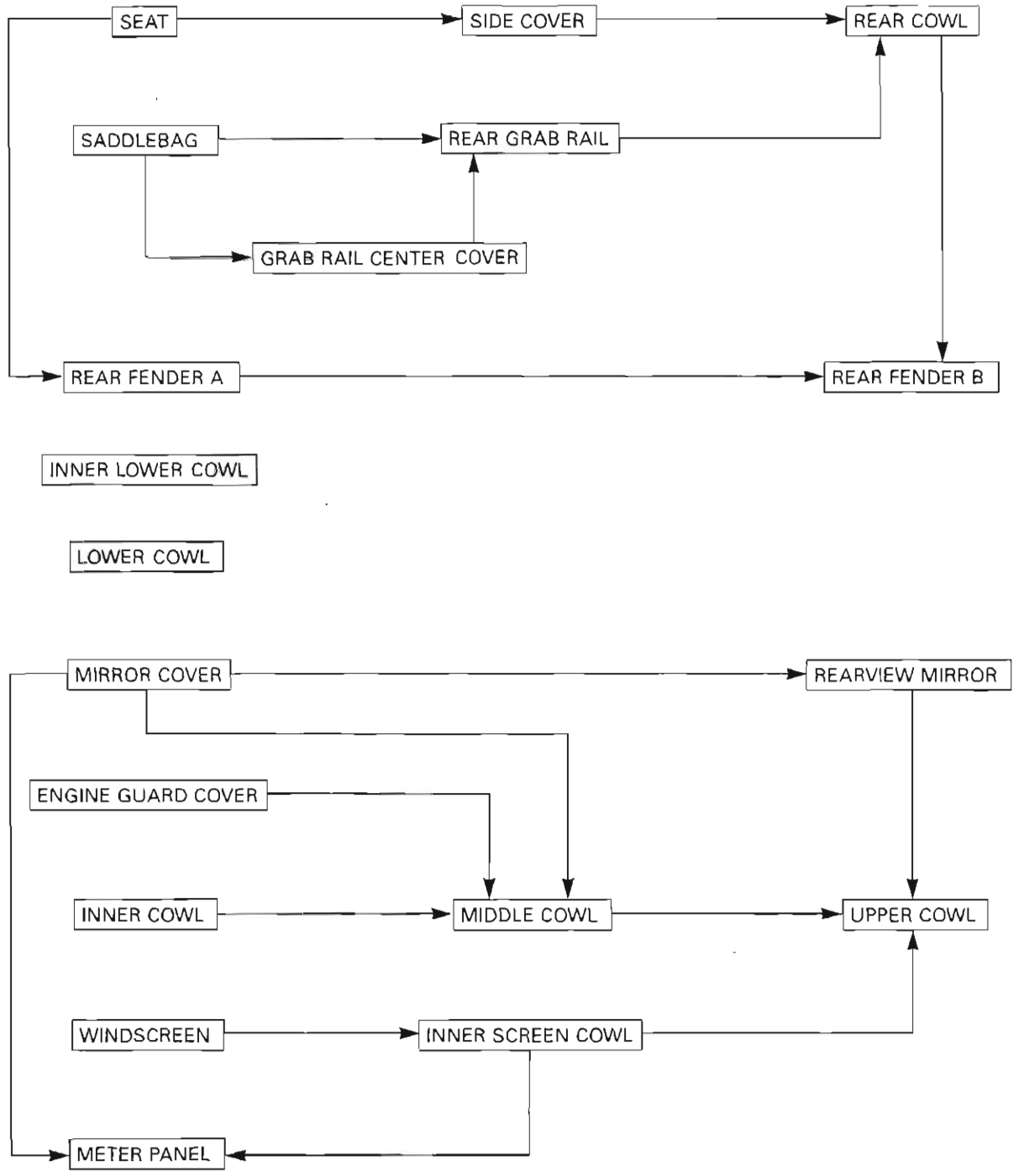
BODY PANEL LOCATIONS 2-2
SERVICE INFORMATION 2-4
TROUBLESHOOTING 2-4
TRIM CLIPS 2-5
SEAT 2-5
SADDLEBAG 2-6
SIDE COVER 2-6
REAR COWL 2-7
REAR FENDER 2-8
LOWER COWL 2-9
MIRROR COVER 2-11
MIDDLE COWL 2-12
WINDSCREEN 2-14
UPPER COWL 2-16
METER PANEL 2-17
MUFFLER/EXHAUST PIPE 2-18
SEAT RAIL 2-19

BODY PANEL LOCATIONS





BODY PANEL REMOVAL CHART



SERVICE INFORMATION

GENERAL

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

Middle cowl bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt; replace with a new one
Seat rail upper mounting flange bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Seat rail lower mounting socket bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	
Step holder mounting bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Exhaust pipe flange nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Muffler band bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Saddle bag holder pivot bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

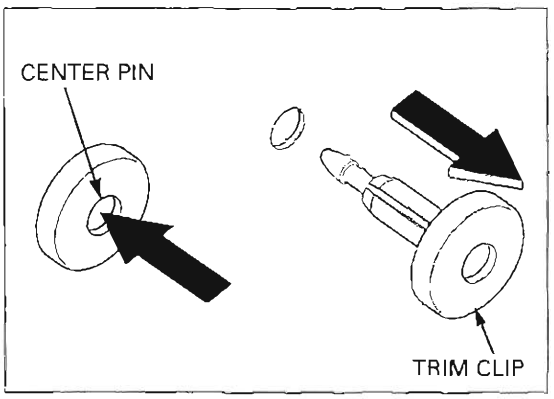
Poor performance
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

TRIM CLIPS

REMOVAL

Push the center of the trim clip pin.

Remove the trim clip.

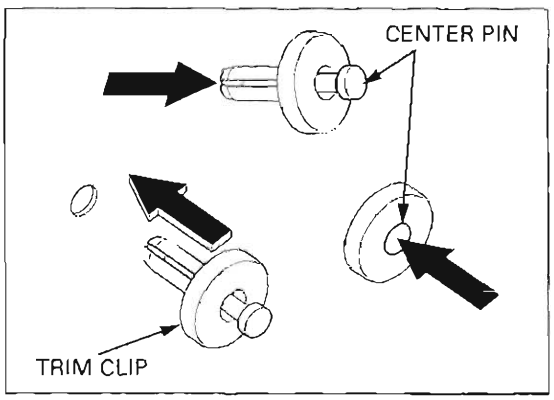


INSTALLATION

Raise the center pin by pushing the center pin back.

Install the trim clip.

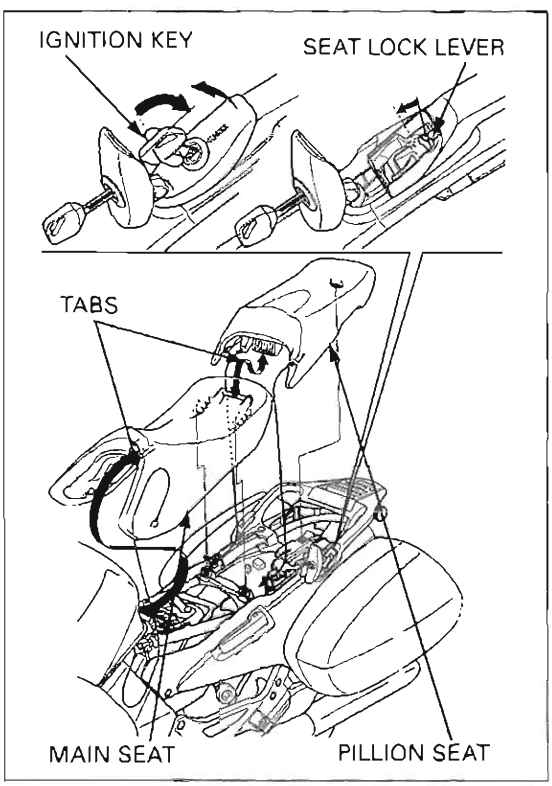
Push the center pin until the pin is flush with the outer casing.



SEAT

Unlock the left saddlebag lock lever with the ignition key.
Release the pillion seat by pulling the seat lock lever.
Remove the main seat by pulling it rearward.

Install the main seat by aligning the front tab to the adjuster bar on the front cross plate.
Install the pillion seat by aligning the front tabs to the set pipe on the main seat.
Lock the pillion seat by pushing it down securely.

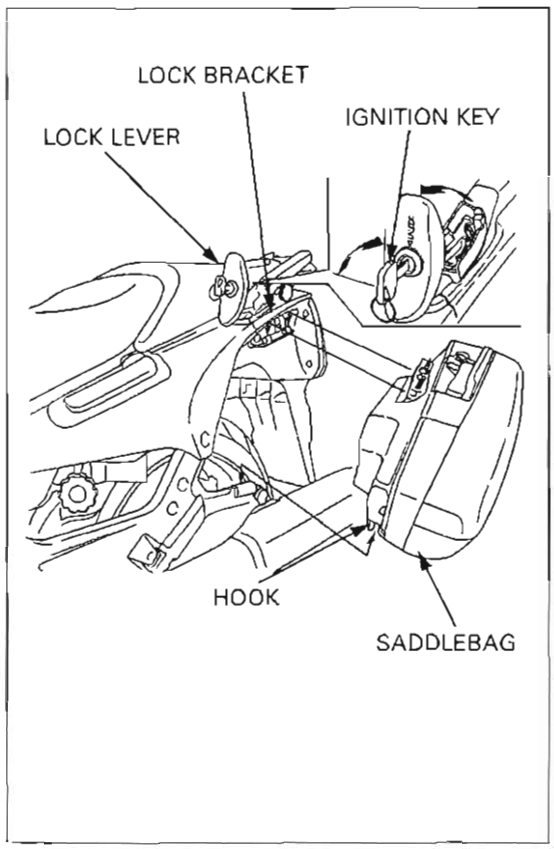


SADDLEBAG

Unlock the saddlebag lock lever with the ignition key.
Remove the saddlebag.

Align the hook on the saddlebag to the step holder. Install the saddlebag aligning the holes on the saddlebag to the tabs on the saddlebag lock bracket by pushing down the saddlebag.
Lock the saddlebag lock lever with the ignition key.

After installation, check the installation of the saddlebag hook and step holder.



SIDE COVER

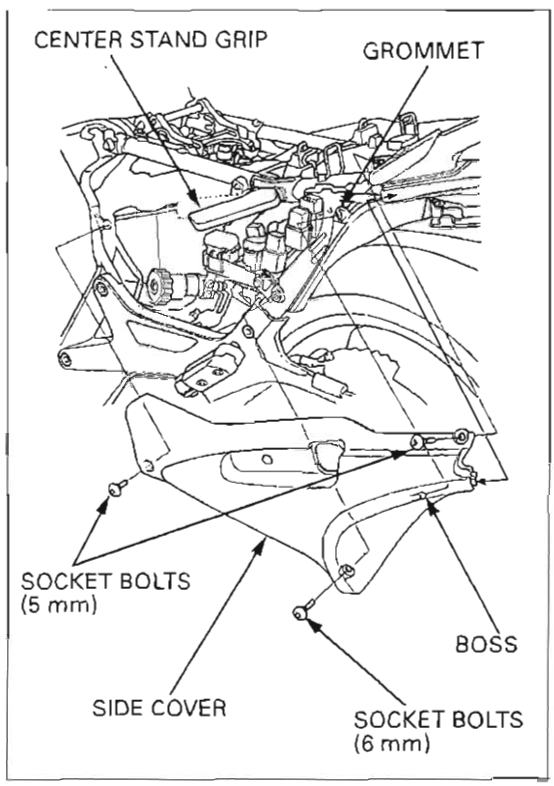
Remove the seat (page 2-5).

Remove the three socket bolts (5 mm and 6 mm).

On the left side cover, pull the center stand grip when removing the cover

Release the boss from the grommet being careful not to damage the tab, then remove the side cover.

Installation is in the reverse order of removal.



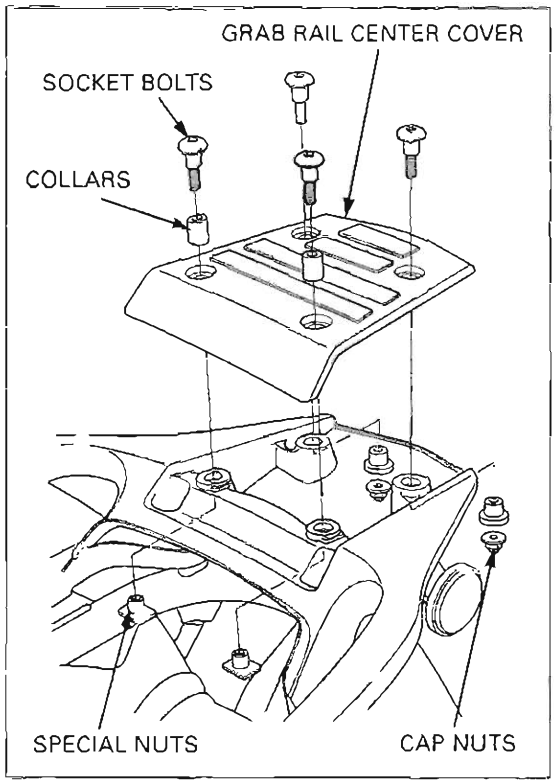
REAR COWL

GRAB RAIL CENTER COVER

Remove the seat (page 2-5).

Remove the two socket bolts, collars and special nuts.
Remove the two cap nuts, collars and socket bolts.
Remove the grab rail center cover.

Installation is in the reverse order of removal.

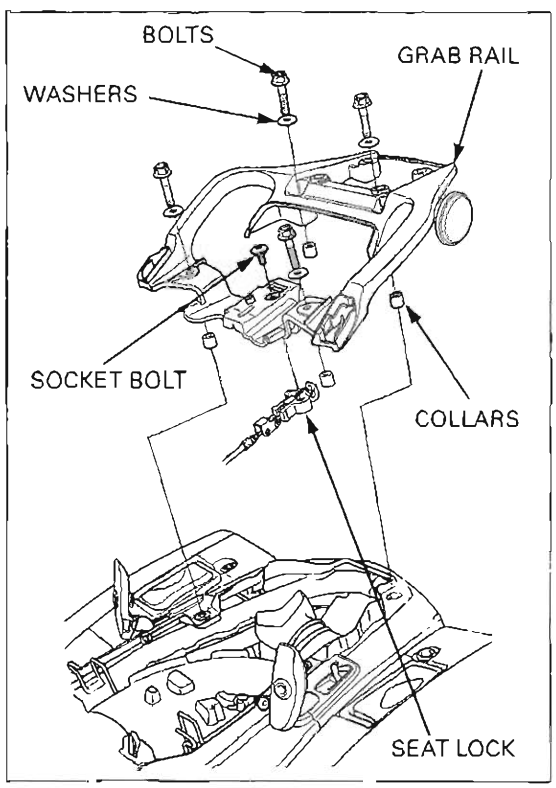


REAR GRAB RAIL

Remove the seat (page 2-5).
Remove the grab rail center cover (page 2-7).
Remove the saddlebags (page 2-6).

Remove the socket bolt and the seat lock.
Remove the four bolts, washers and collars.
Release the seat lock cable from the groove and remove the rear grab rail.

Installation is in the reverse order of removal.



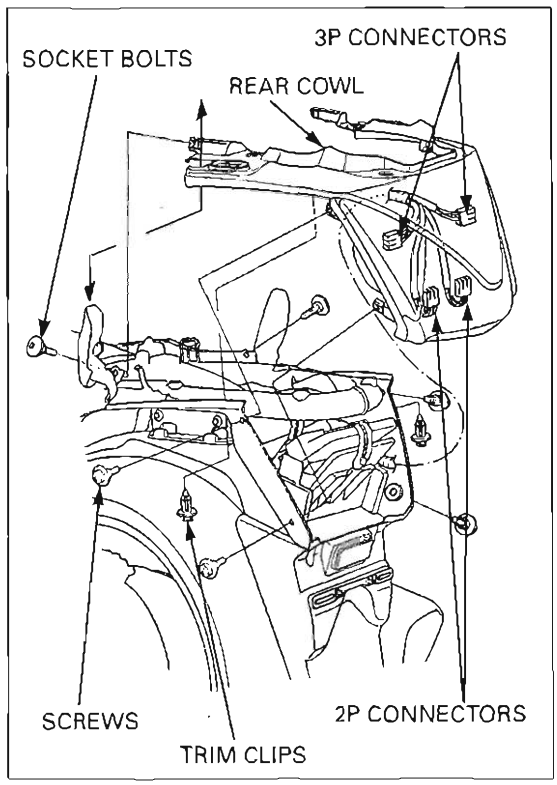
REAR COWL

Remove the following:

- Grab rail center plate (page 2-7)
- Rear grab rail (page 2-7)
- Side cover (page 2-6)

Remove the four screws, two socket bolts and two trim clips.
Remove the rear cowl and disconnect the rear turn signal 2P connectors and tail/brake light 3P connectors.

Installation is in the reverse order of removal.



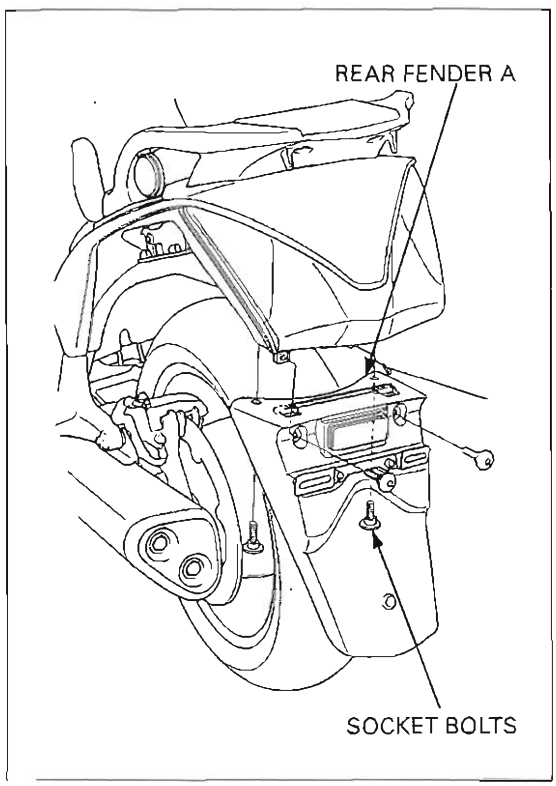
REAR FENDER

REAR FENDER A

Remove the saddlebags (page 2-6).

Remove the four socket bolts and rear fender A.

Installation is in the reverse order of removal.



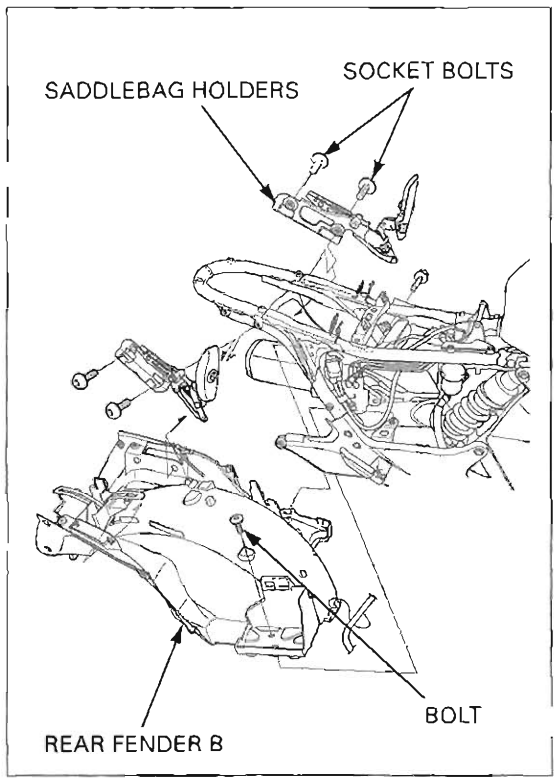
REAR FENDER B

Remove the following:

- Rear wheel (page 16-5)
- Battery (page 19-5)
- Rear fender A (page 2-8)
- Rear cowl (page 2-7)

Remove the relays from the tabs on the rear fender B.
Remove the socket bolts and saddlebag holders.
Remove the bolt and rear fender B.

Installation is in the reverse order of removal.

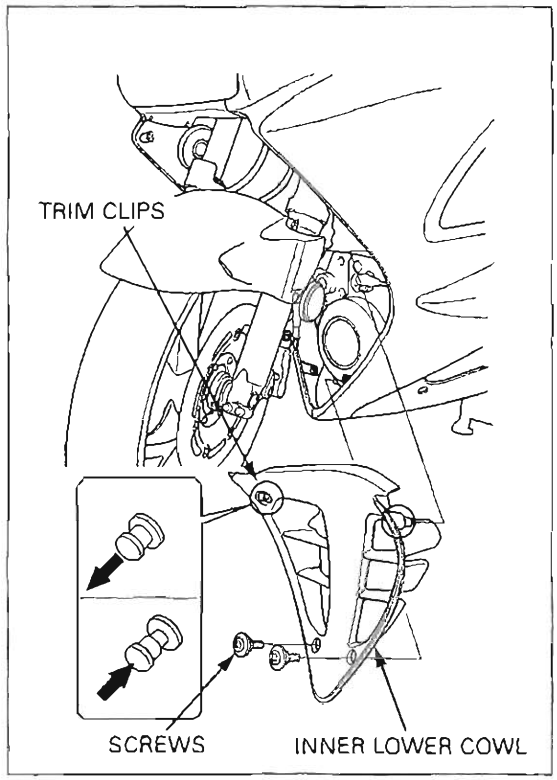


LOWER COWL

INNER LOWER COWL

Remove the two screws and two trim clips.
Remove the inner lower cowl.

Installation is in the reverse order of removal.

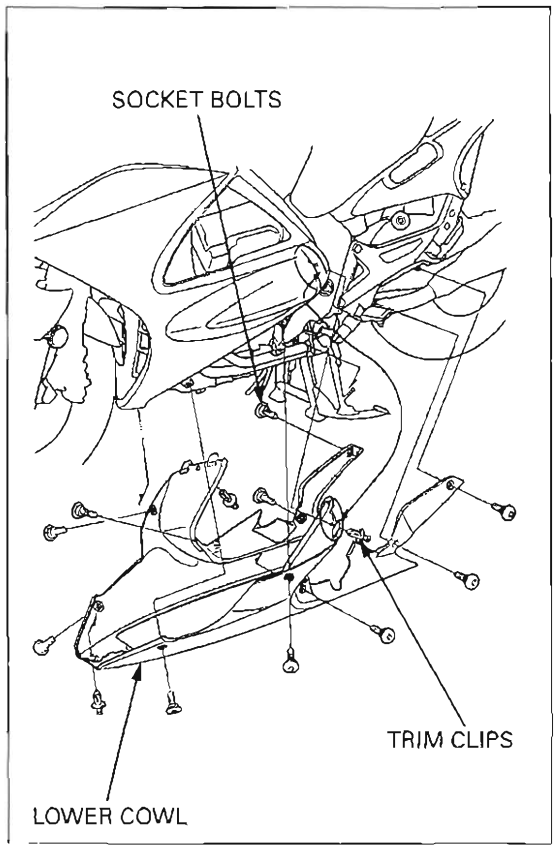


LOWER COWL

REMOVAL/INSTALLATION

Remove the ten socket bolts and three trim clips. Remove the lower cowl.

Installation is in the reverse order of removal.

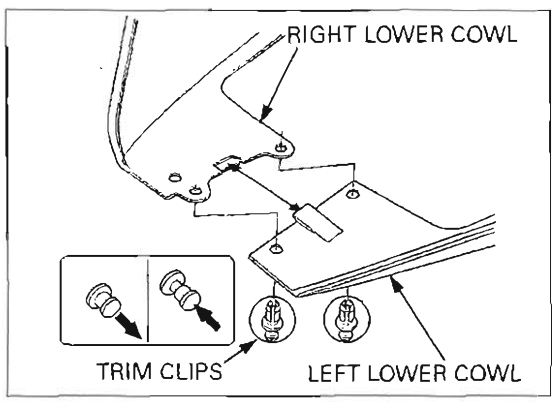


DISASSEMBLY/ASSEMBLY

Remove the lower cowl (page 2-10).

Remove the two trim clips and disassemble the right lower cowl and left lower cowl.

Assembly is in the reverse order of disassembly.



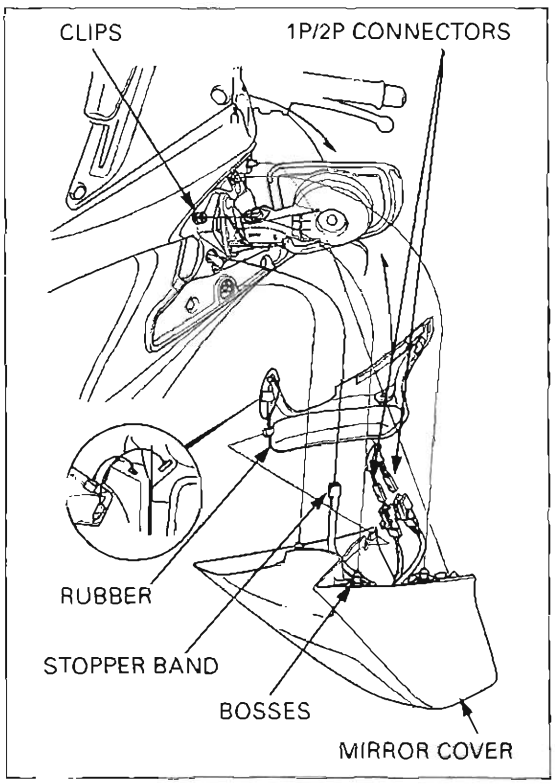
MIRROR COVER

MIRROR COVER

Remove the mirror cover by carefully releasing the three bosses from the clips of the upper cowl.
Disconnect the front turn signal 2P and 1P connectors.
Remove the stopper band from the groove on the upper cowl.

Remove tabs on the mirror cover rubber from the grooves on the upper cowl and meter panel.

Installation is in the reverse order of removal.

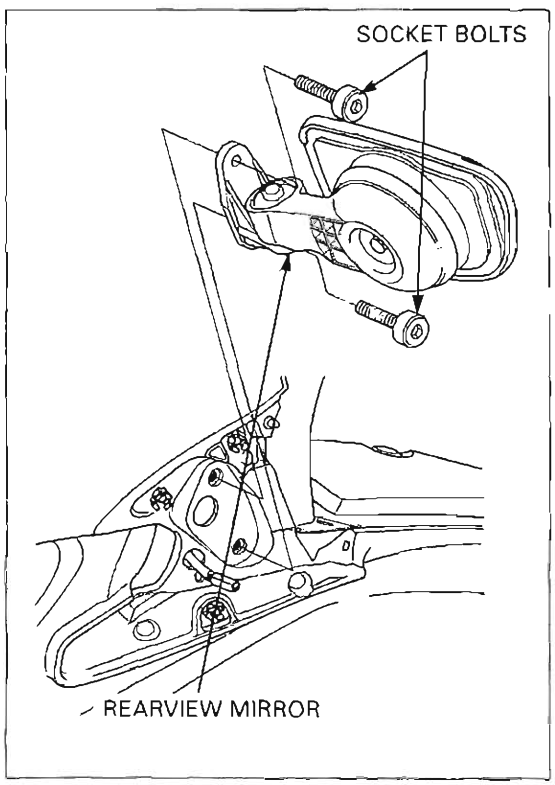


REARVIEW MIRROR

Remove the mirror cover (page 2-11).

Remove the socket bolts and rearview mirror.

Installation is in the reverse order of removal.

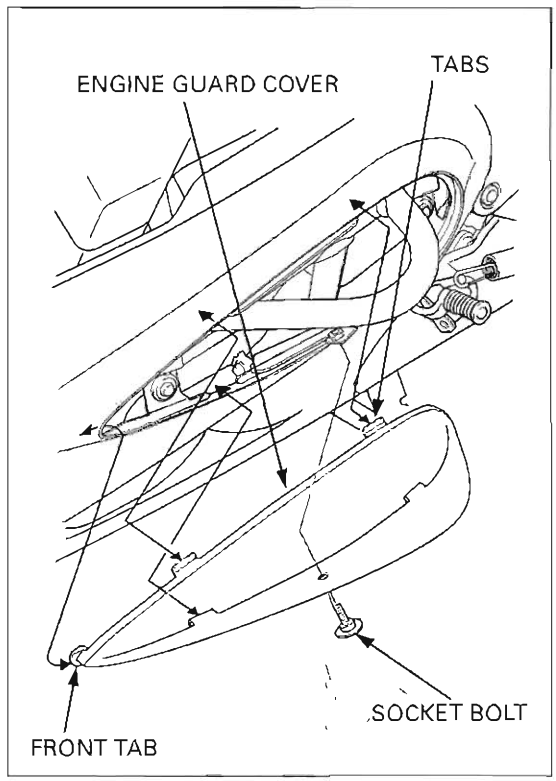


MIDDLE COWL

ENGINE GUARD COVER

Remove the socket bolt.
Release the five tabs on the engine guard cover from the grooves on the middle cowl and remove the engine guard cover.

Install the front tab on the engine guard cover to the middle cowl, then install the four tabs to the middle cowl.



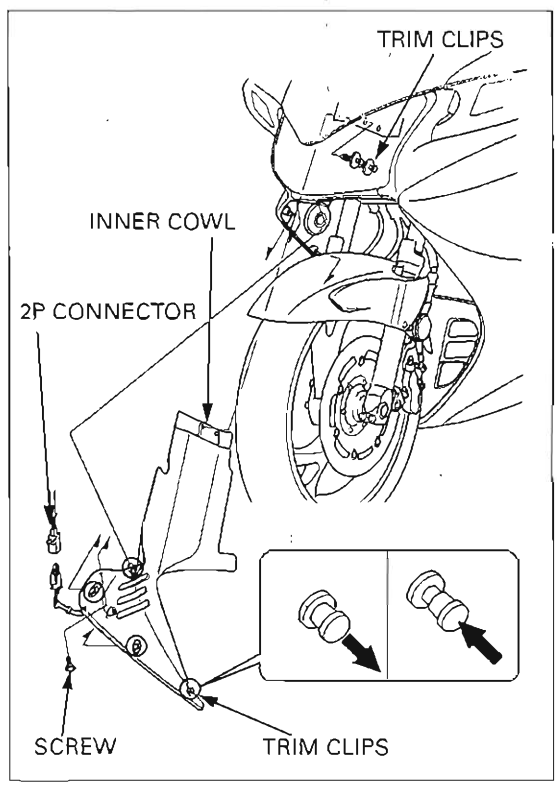
INNER COWL

Remove the two trim clips.

Remove the four trim clips and one screw.
Remove the inner cowl.

Right side only: Disconnect the open air temperature sensor 2P connector.

Installation is in the reverse order of removal.



MIDDLE COWL

REMOVAL/INSTALLATION

Remove the following:

- Remove the mirror cover (page 2-11)
- Remove the lower cowl (page 2-9)
- Remove the inner cowl (page 2-12)

Remove the two middle cowl bolts, collars and one socket bolt.

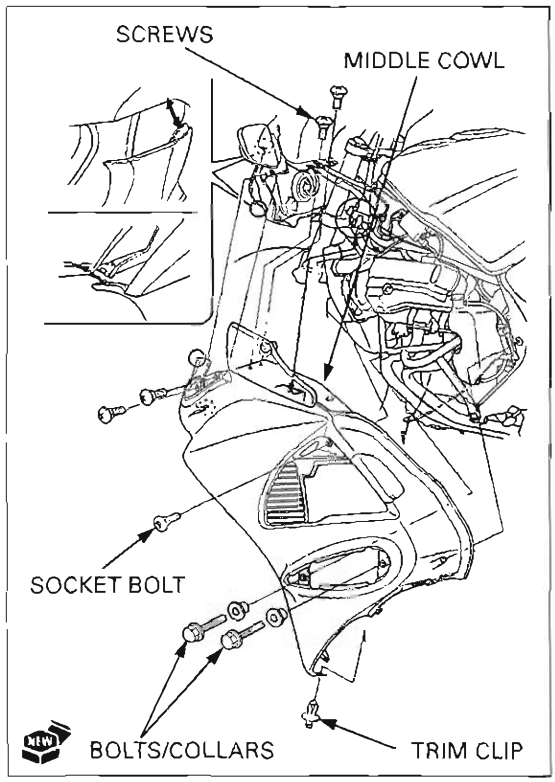
Remove the four screws, trim clip, then remove the middle cowl.

Left side only: Remove the sub-harness 24P (White) connector from the groove on the left cowl pocket.

Install the middle cowl aligning the tabs on the middle cowl with the grooves on the upper cowl and tab on the middle cowl with the grommet on the engine guard.

Installation is in the reverse order of removal.
Install the new middle cowl bolts to the specified torque.

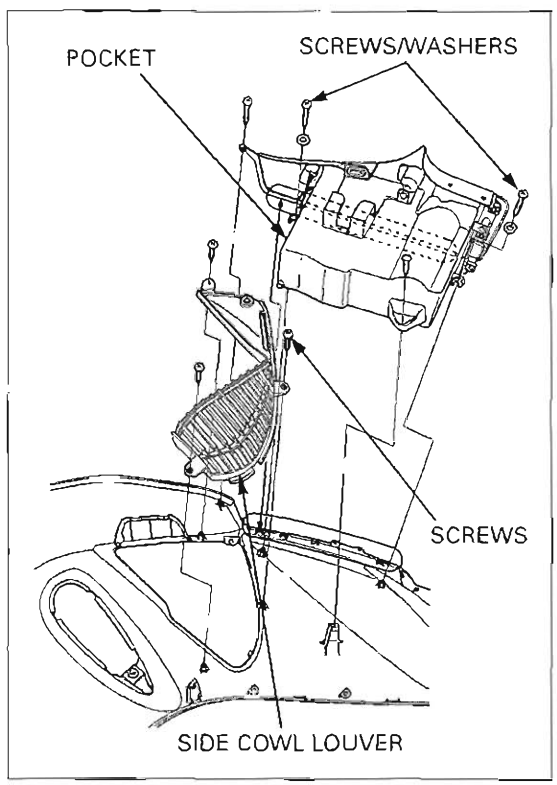
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



LEFT MIDDLE COWL DISASSEMBLY/ASSEMBLY

Remove the screws and washers.
Remove the pocket and side cowl louver from the left middle cowl.

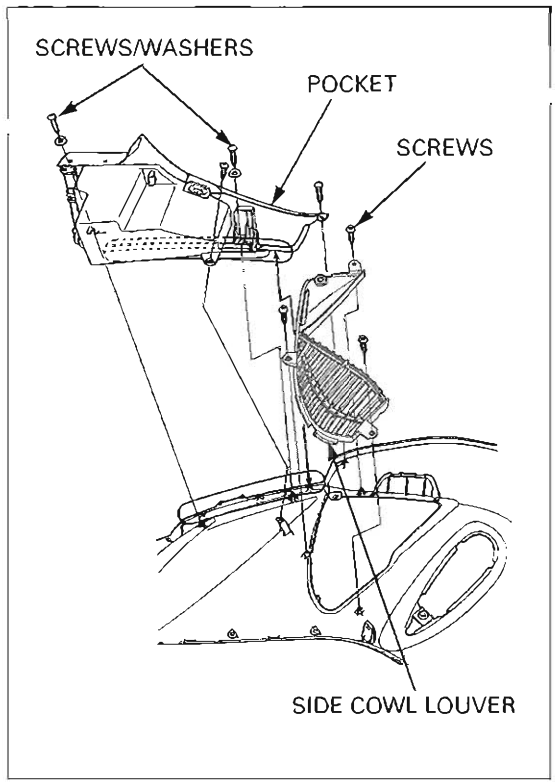
Assembly is in the reverse order of disassembly.



RIGHT MIDDLE COWL DISASSEMBLY/ASSEMBLY

Remove the screws and washers.
Remove the pocket and side cowl louver from the right middle cowl.

Assembly is in the reverse order of disassembly.

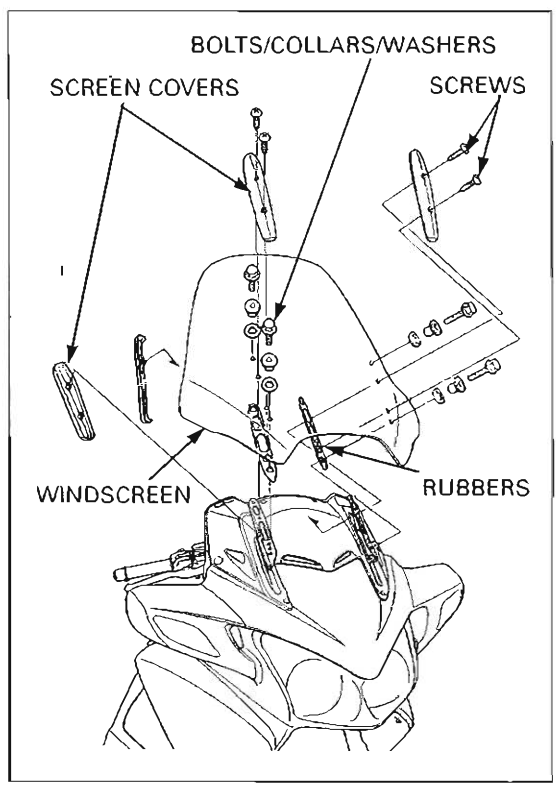


WINDSCREEN

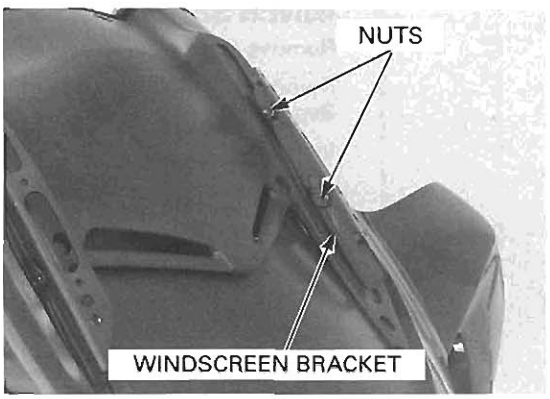
WINDSCREEN

REMOVAL

Remove the four screws and windscreen covers.
Remove the four bolts, collars and plastic washers.
Remove the windscreen and rubbers.



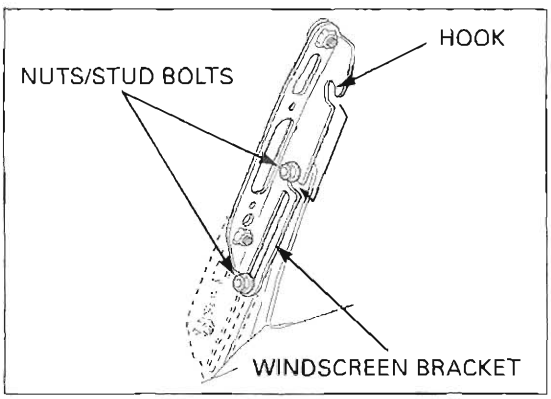
Remove the four nuts and windscreen brackets.



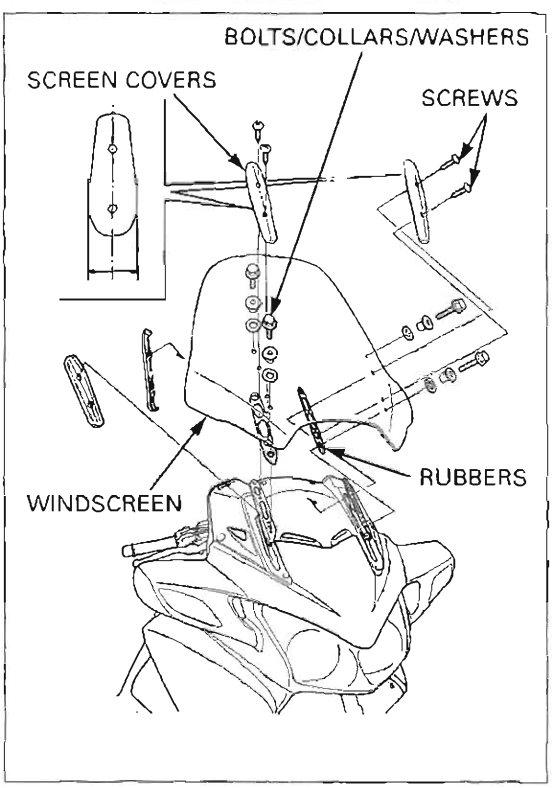
INSTALLATION

Install the windscreen bracket aligning its groove and hook with the stud bolts on the windscreen stay.
Tighten the nuts securely.

When the windscreen height is ready to be adjusted, exchange the hooks on windscreen bracket to the stud bolt.



Install the rubbers and windscreen being careful not to damage the windscreen.
Install the bolts, collars and plastic washers, then tighten the bolts.
Install the windscreen covers with its wide side facing down and tighten the screws securely.

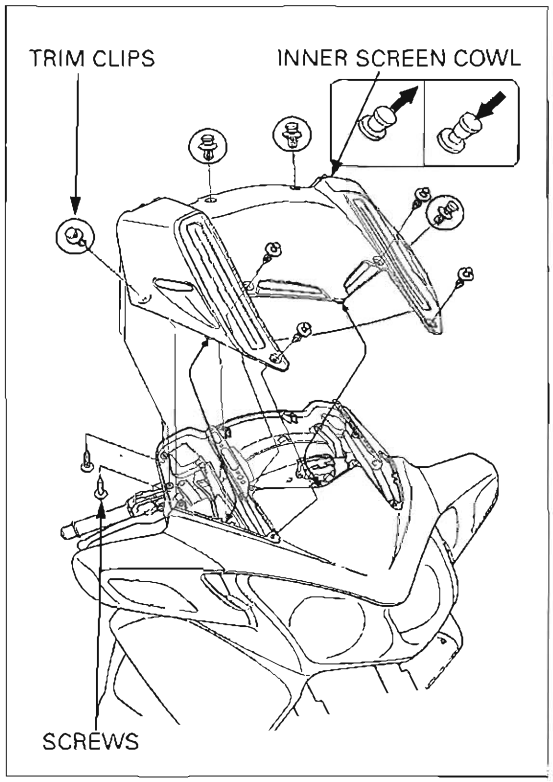


INNER SCREEN COWL

Remove the windscreen (page 2-14).

Remove the eight trim clips and four screws.
Remove the inner screen cowl.

Installation is in the reverse order of removal.

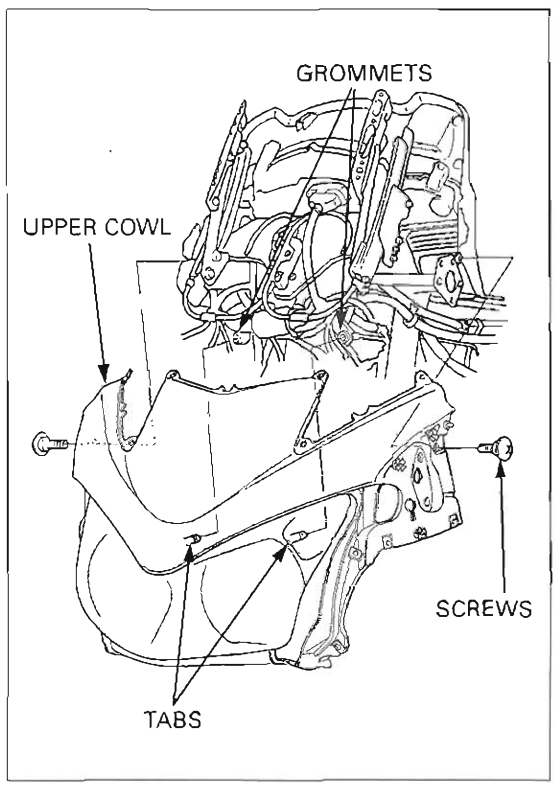


UPPER COWL

Remove the following:

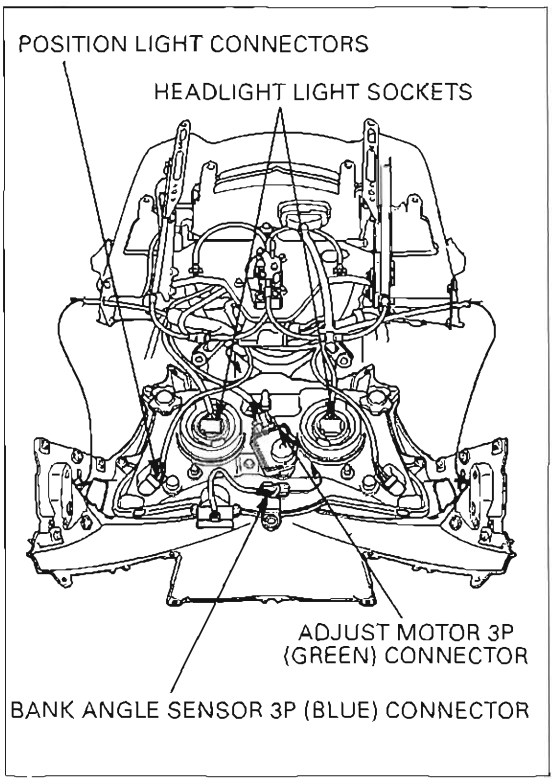
- Inner screen cowl (page 2-16)
- Middle cowl (page 2-12)
- Rearview mirror (page 2-11)

Remove the two screws.
Remove the tabs on the upper cowl from the grommets on the frame.



Disconnect the headlight 3P sockets and position light connectors.
Disconnect the headlight aiming adjust motor 3P (Green) connector.
Disconnect the bank angle sensor 3P (Blue) connector.
Remove the front turn signal wires from the holes on the upper cowl and remove the upper cowl.

Installation is in the reverse order of removal.

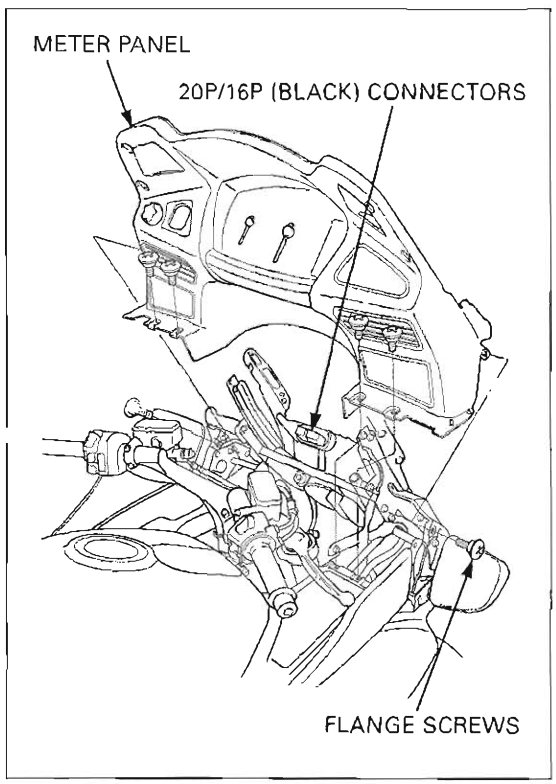


METER PANEL

Remove the inner screen cowl (page 2-16).
Remove the mirror cover (page 2-11).

Open the right and left pocket using the ignition key.
Remove the six flange screws.
Disconnect the combination meter 20P (Black) and 16P (Black) connectors.
Remove the meter panel.

Installation is in the reverse order of removal.



MUFFLER/EXHAUST PIPE

MUFFLER

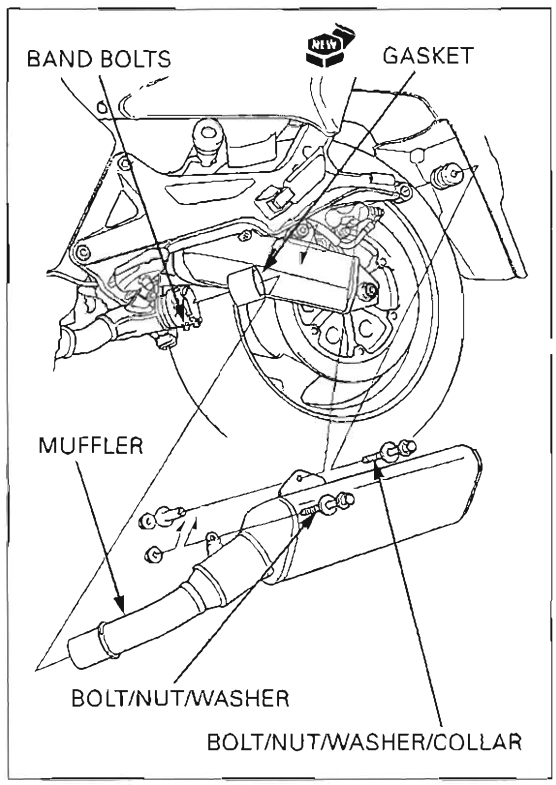
Loosen the muffler band bolts.
Remove the nuts, bolts/washers, collar and muffler.
Remove the gasket.

Always replace the gasket with a new one.

Installation is in the reverse order of removal.

Tighten the muffler band bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



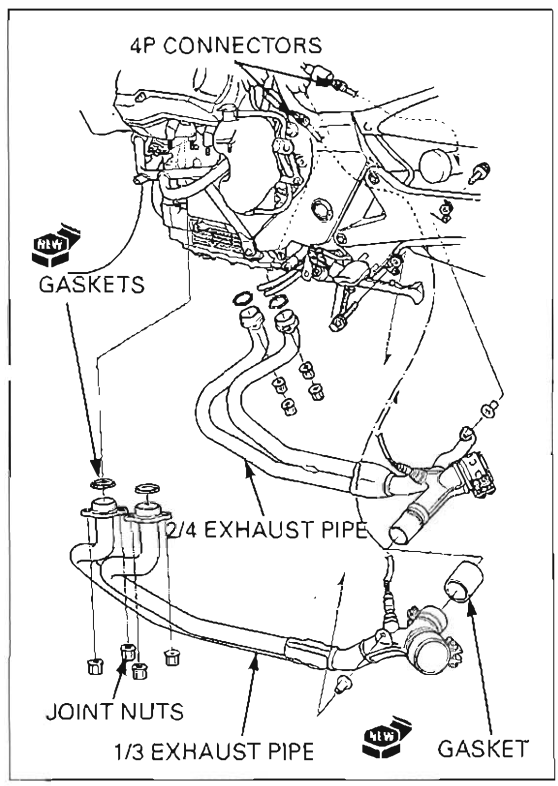
EXHAUST PIPE

Remove the right and left muffler (page 2-18).
Remove the side covers (page 2-6).

Disconnect the O_2 sensor 4P connectors.
Loosen the exhaust pipe band bolts.
Remove the #2/4 exhaust pipe joint nuts.
Remove the exhaust pipe bolt/washer and collar.
Remove the #2/4 exhaust pipe from the #1/3 exhaust pipe.
Remove the gaskets.
Remove the #1/3 exhaust pipe joint nuts.
Remove the exhaust pipe bolt/washer and collar.
Remove the #1/3 exhaust pipe.
Remove the gaskets.

Always replace the gaskets with new ones.

Installation is in the reverse order of removal.



LEFT STEP HOLDER

Remove the bolt, washer, nut, mounting bolts and seat rail lower mounting socket bolts.
Remove the left step holder.

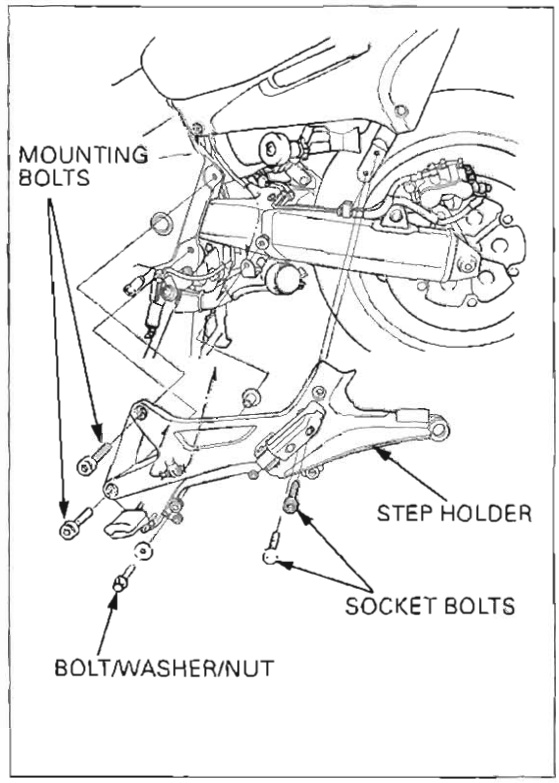
Installation is in the reverse order of removal.

Tighten the seat rail lower mounting socket bolts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Tighten the step holder mounting bolts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

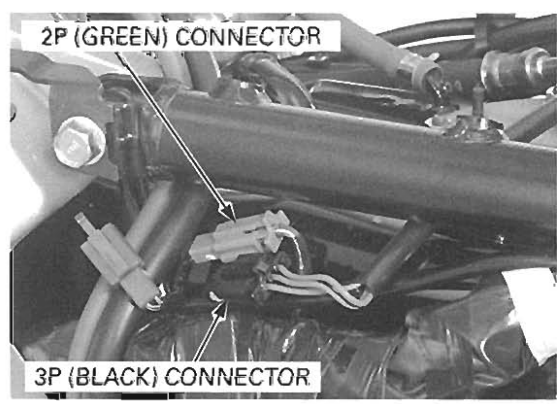


SEAT RAIL

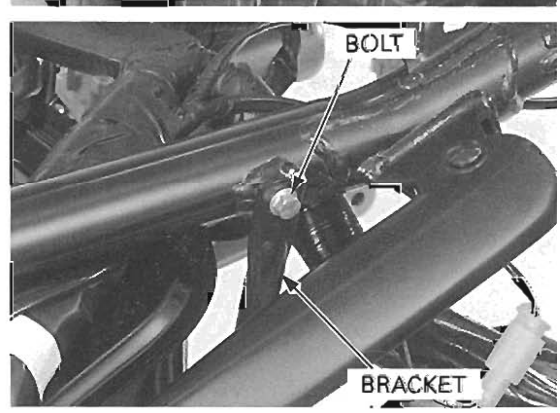
Remove the following:

- Seat (page 2-5)
- Rear fender B (page 2-9)
- Upper fuel tank (page 5-56)

Disconnect the side stand switch 2P (Green) and fuel pump 3P (Black) connectors.

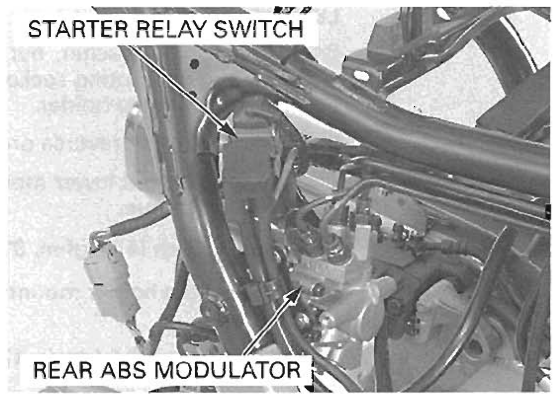


Remove the bolt and the shock absorber reservoir bracket.

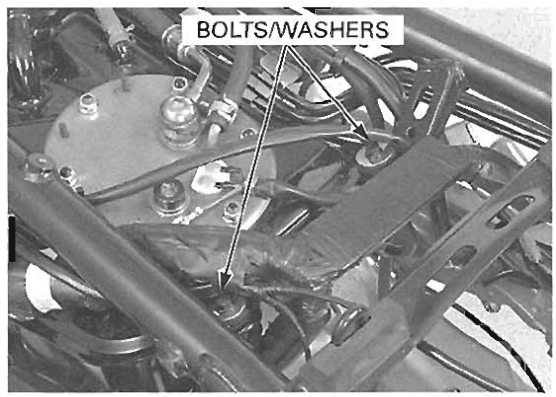


Remove the starter relay switch from the seat rail.

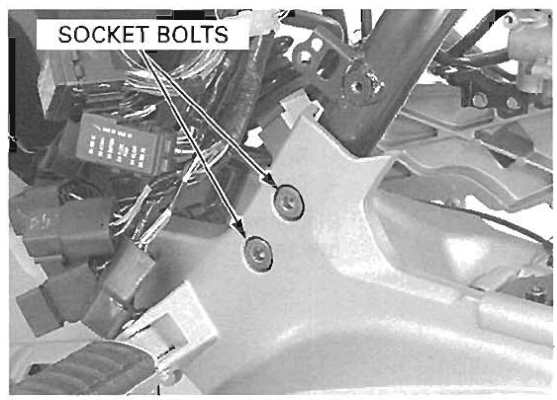
Deluxe type only: Remove the bolts and the rear ABS modulator.



Remove the lower fuel tank mounting bolts and washers.



Remove the seat rail lower mounting socket bolts.



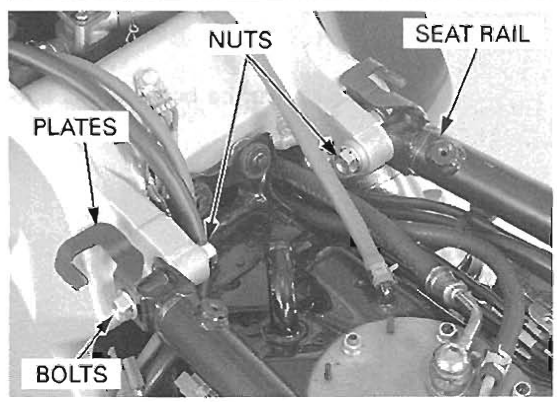
Remove the mounting nuts, plates and bolts, then remove the seat rail.

Installation is in the reverse order of removal.

Install all the seat rail mounting bolts, then tighten the seat rail mounting bolts to the specified torque while lifting the seat rail end.

TORQUE:

Upper flange bolt:	39 N·m (4.0 kgf·m, 29 lbf·ft)
Lower mounting socket bolt:	42 N·m (4.3 kgf·m, 31 lbf·ft)



3. MAINTENANCE

SERVICE INFORMATION 3-2

MAINTENANCE SCHEDULE 3-3

FUEL LINE 3-4

THROTTLE OPERATION 3-5

AIR CLEANER 3-6

SPARK PLUG 3-6

VALVE CLEARANCE 3-8

ENGINE OIL/OIL FILTER 3-11

ENGINE IDLE SPEED 3-14

RADIATOR COOLANT 3-14

COOLING SYSTEM 3-15

SECONDARY AIR SUPPLY SYSTEM 3-16

EVAPORATIVE EMISSION CONTROL SYSTEM 3-16

FINAL DRIVE OIL 3-17

BRAKE FLUID 3-18

BRAKE PAD WEAR 3-19

BRAKE SYSTEM 3-20

BRAKE LIGHT SWITCH 3-21

HEADLIGHT AIM 3-22

CLUTCH SYSTEM/CLUTCH FLUID 3-22

SIDE STAND 3-23

SUSPENSION 3-23

NUTS, BOLTS, FASTENERS 3-25

WHEELS/TIRES 3-25

STEERING HEAD BEARINGS 3-26

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip free play			2 – 6 mm (1/16 – 1/4 in)
Spark plug	NGK (optional)		CR7EH-9 (CR8EH-9)
	DENSO (optional)		W22FER9 (W24FER9)
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance		IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)
		EX	0.25 ± 0.03 mm (0.010 ± 0.001 in)
Engine oil capacity	After draining		3.6 liter (3.8 US qt, 3.2 Imp qt)
	After draining/oil filter change		3.9 liter (4.1 US qt, 3.4 Imp qt)
Recommended engine oil			Honda GN4 or HP4 (Without Moly) 4-stroke oil (U.S.A. and Canada) or Honda 4-stroke oil (Canada only), or equivalent motor oil API service classification SE, SF or Higher JASO 4T service classification: MA Viscosity: SAE 10W-40
Engine idle speed			1,000 ± 100 rpm
Recommended brake fluid			DOT 4 brake fluid
Tire size		Front	120/70 ZR 18 M/C (59W)
		Rear	170/60 ZR 17 M/C (72W)
Tire brand	Bridgestone	Front	BT020F F
		Rear	BT020R F
	Dunlop	Front	D220FST L
		Rear	D220ST L
Tire air pressure	Driver only	Front	290 kPa (2.90 kgf/cm², 42 psi)
		Rear	290 kPa (2.90 kgf/cm², 42 psi)
	Driver and passenger	Front	290 kPa (2.90 kgf/cm², 42 psi)
		Rear	290 kPa (2.90 kgf/cm², 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	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Crankshaft hole cap	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply grease to the threads
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the threads and flange surface
Air cleaner housing cover screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Final gear case drain bolt	20 N·m (2.0 kgf·m, 19 lbf·ft)	
Rear master cylinder push rod joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	

TOOLS

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

MAINTENANCE SCHEDULE

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

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

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

		FREQUENCY	NOTE	ODOMETER READING (NOTE 1)								REFER
			⇩	X1,000 mi	0.6	4	8	12	16	20	24	TO PAGE
ITEMS				X100 km	10	64	128	192	256	320	384	
EMSSION RELATED ITEMS	*	FUEL LINE					I		I		I	3-4
	*	THROTTLE OPERATION					I		I		I	3-5
		AIR CLEANER	NOTE2					R			R	3-6
		SPARK PLUG					I		R		I	3-6
	*	VALVE CLEARANCE							I			3-8
		ENGINE OIL			R		R		R		R	3-11
		ENGINE OIL FILTER			R		R		R		R	3-12
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-14
		RADIATOR COOLANT	NOTE3				I		I		R	3-14
	*	COOLING SYSTEM					I		I		I	3-15
	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-16
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-16
NON-EMSSION RELATED ITEMS		FINAL DRIVE OIL					I		I		R	3-17
		BRAKE FLUID	NOTE3			I	I	R	I	I	R	3-18
		BRAKE PAD WEAR				I	I	I	I	I	I	3-19
		BRAKE SYSTEM			I		I		I		I	3-20
	*	BRAKE LIGHT SWITCH					I		I		I	3-21
	*	HEADLIGHT AIM					I		I		I	3-22
		CLUTCH SYSTEM					I		I		I	3-22
		CLUTCH FLUID	NOTE 3			I	I	R	I	I	R	3-22
		SIDE STAND					I		I		I	3-23
	*	SUSPENSION					I		I		I	3-23
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-25
	**	WHEELS/TIRES					I		I		I	3-25
	**	STEERING HEAD BEARINGS			I		I		I		I	3-26

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

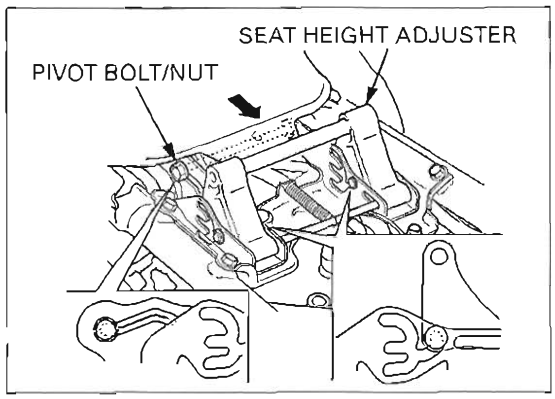
** In the interest of safety, we recommended these items be serviced only by an authorized Honda dealer

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 indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
4. California type only.

FUEL LINE

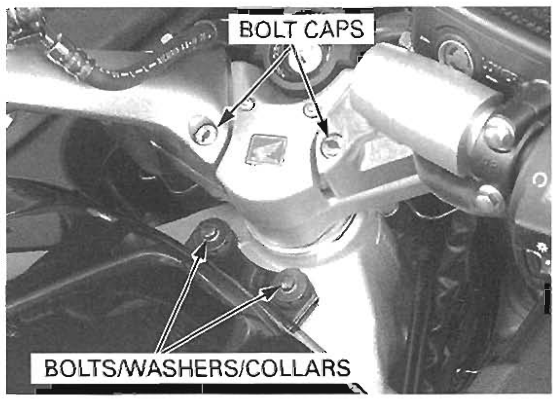
Remove the seat (page 2-5).

Set the seat height adjuster to the middle position.
Loosen the fuel tank rear pivot bolt/nut.



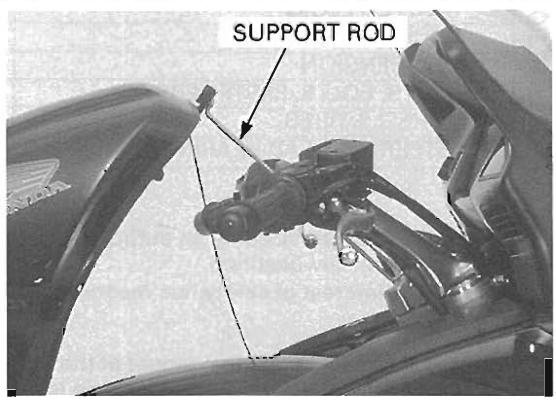
Remove the two fuel tank front mounting bolts, washers and collars.

Remove either of the handlebar mounting bolt caps.
Pull the fuel tank rearward fully.



Install the support rod into the handlebar socket bolt head and fuel tank mounting bolt hole.

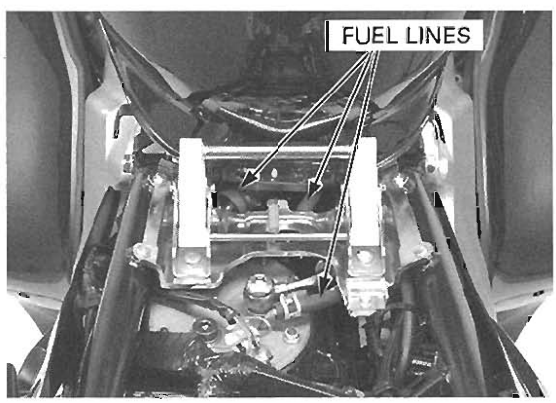
Lift the fuel tank and support it using the support rod that is located on the rear fender.



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

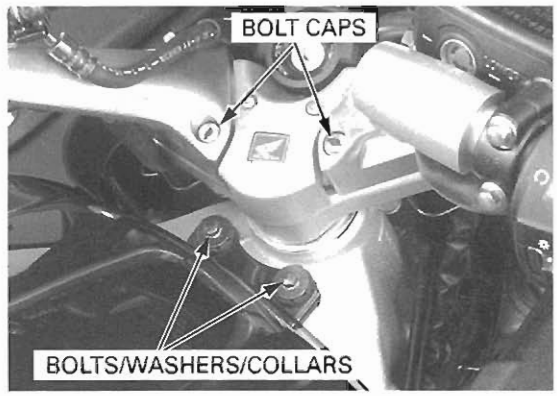
Be careful not to pinch the air vent and overflow hoses.

Remove the support rod, then close the fuel tank.



Push the fuel tank forward fully.
Install the fuel tank mounting collars, washers and bolts.
Tighten the bolts securely.

Install the removed parts in the reverse order of removal.

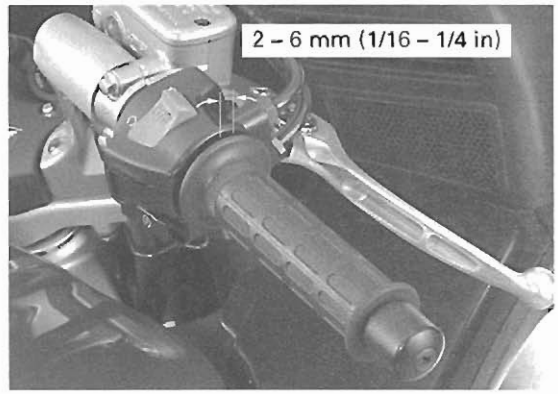


THROTTLE OPERATION

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.

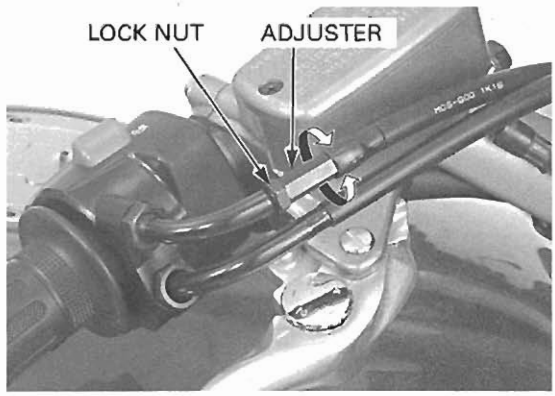
Measure the free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/16 – 1/4 in)



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

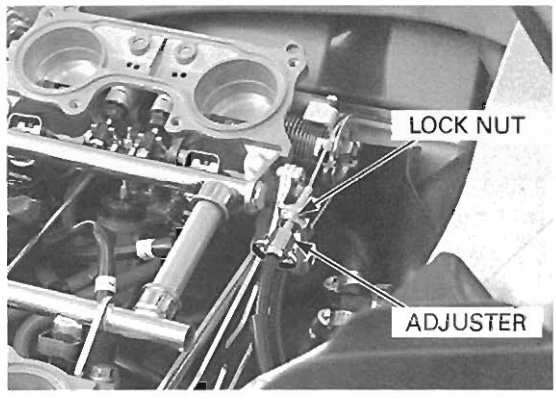
Minor adjustment are made with the upper adjuster.
Adjust the free play by loosening the lock nut and turning the adjuster.



Major adjustments are made with the lower adjuster on the throttle body.

Remove the air cleaner housing (page 5-60).

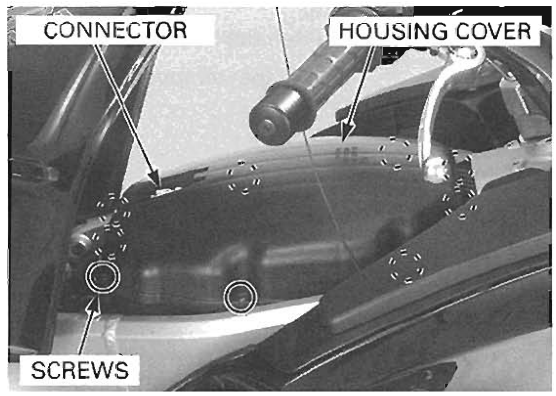
Adjust the free play by loosening the lock nut and turning the adjuster.
After adjustment, tighten the lock nut securely.
Recheck the throttle operation.
Replace any damaged parts, if necessary.



AIR CLEANER

Open and support the fuel tank using the equipped support rod (page 3-4).

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

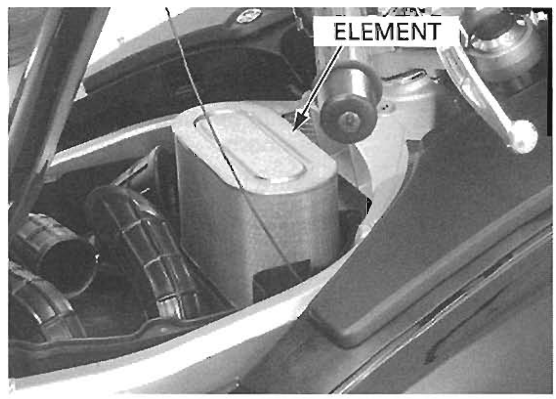


Remove and discard the air cleaner element in accordance with the maintenance schedule (page 3-3).
Also replace the air cleaner element any time it is excessively dirty or damage.

Install the removed parts in the reverse order of removal.

Tighten the air cleaner housing cover screws securely.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



SPARK PLUG

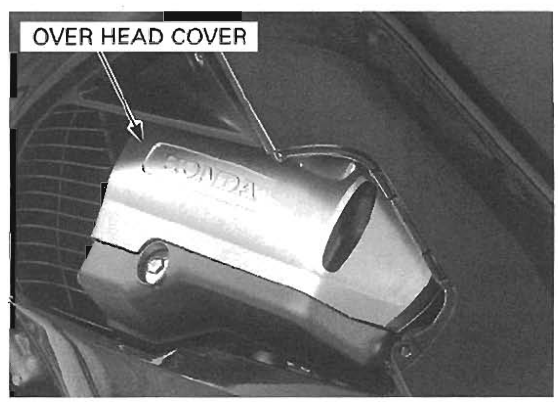
REMOVAL

Push the maintenance lid trim clip center, then remove the trim clip.

Remove the maintenance lid.

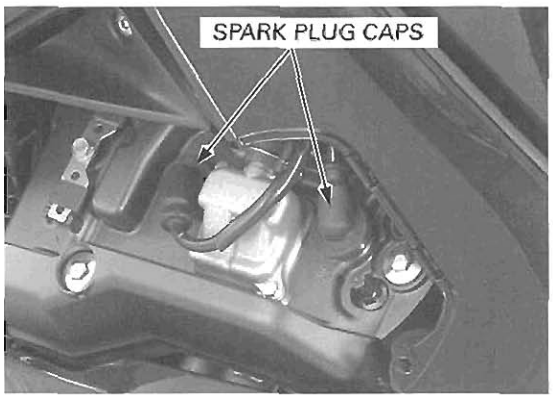


Remove the cylinder head over head cover.



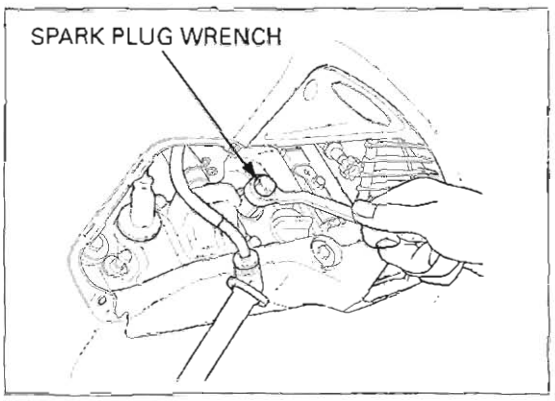
Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plug caps from the spark plugs.



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

Inspect or replace as described in the maintenance schedule (page 3-3).

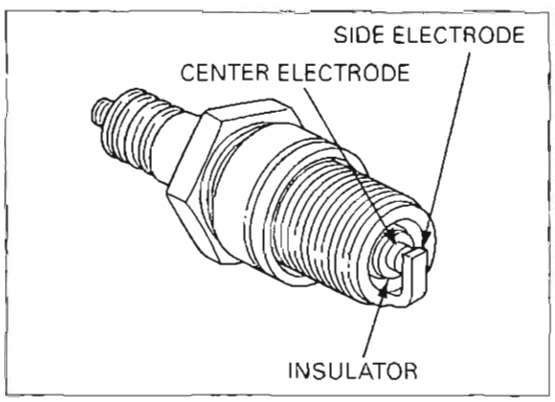


INSPECTION

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

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

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

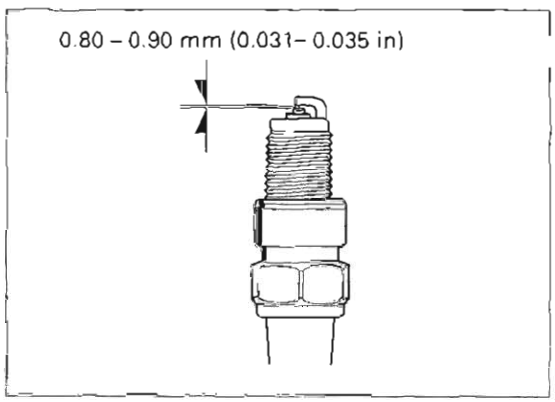


REUSING A SPARK PLUG

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

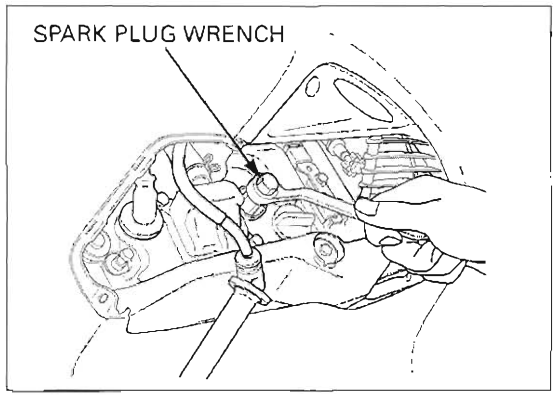
Check the gap between the center and side electrodes with a wire-type feeler gauge.
If necessary, adjust the gap by bending the side electrodes carefully.

SPARK PLUG GAP:0.80 – 0.90 mm (0.031 – 0.035 in)



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

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



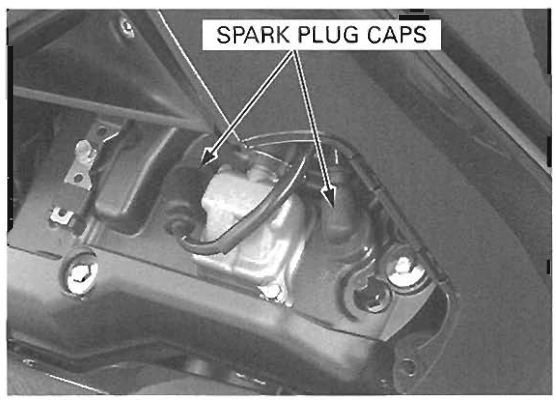
REPLACING A SPARK PLUG

Set the plug gap to specification with a wire-type feeler gauge (page 3-7).

Do not overtighten the plug.

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 spark plug caps.

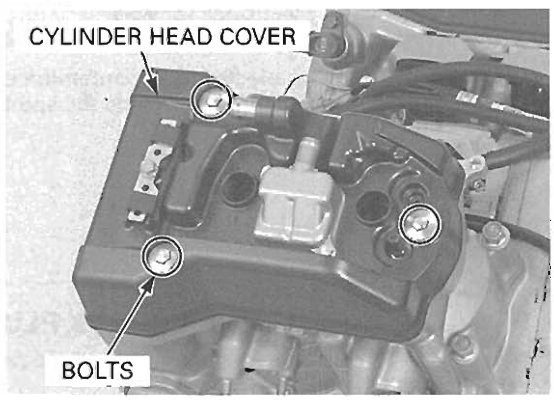


VALVE CLEARANCE

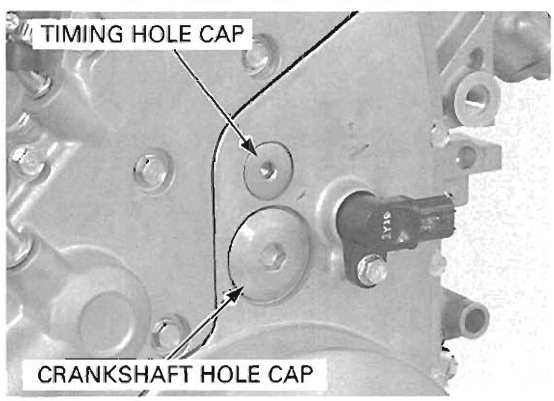
INSPECTION

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

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

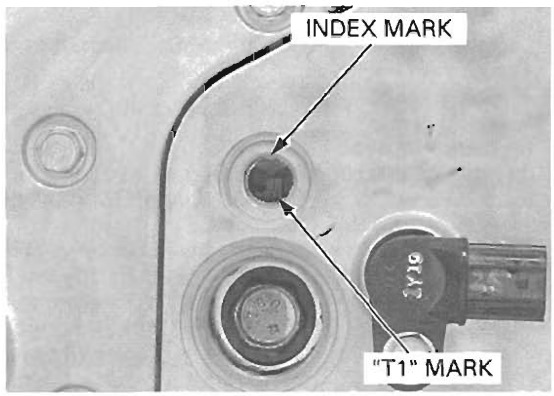


Remove the timing hole cap, crankshaft hole cap and O-rings.



Turn the crankshaft counterclockwise, align the "T1" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.

Make sure that the No.1 piston is at TDC (Top Dead Center) on the compression stroke.



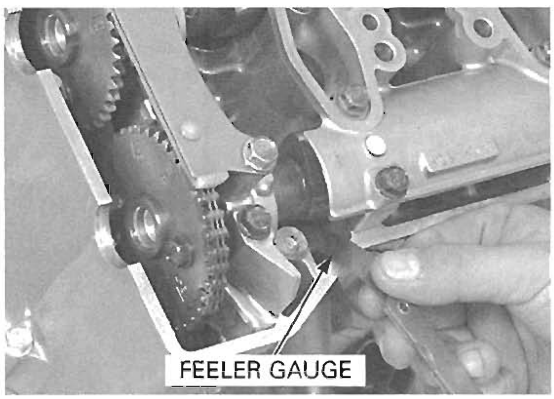
Insert the feeler gauge between the valve lifter and the cam lobe.

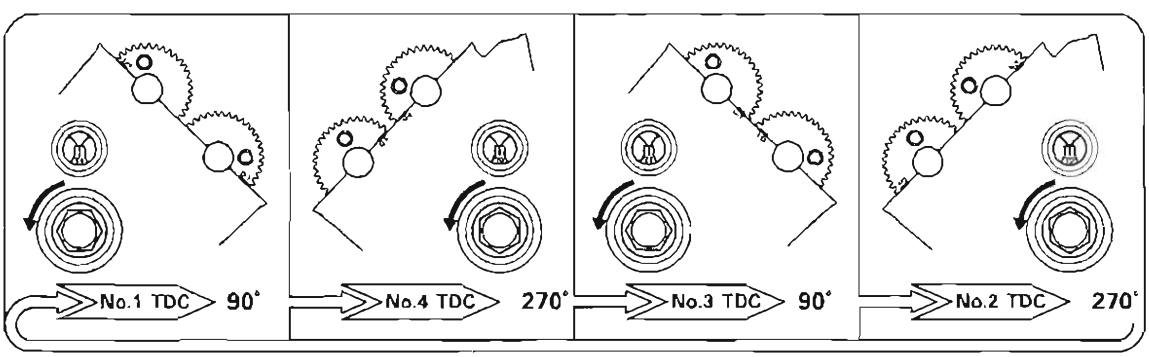
Record the clearance for each valve for reference in shim selection if adjustment is required.

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

VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)
EX: 0.25 ± 0.03 mm (0.010 ± 0.001 in)

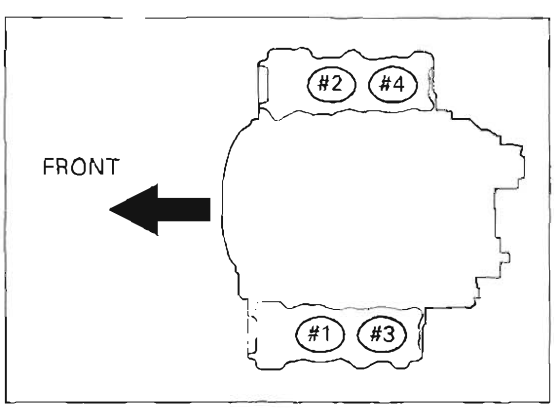




Turn the crankshaft counterclockwise 1/4 turn (90°), align the "T2" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.
Check the valve clearance for the No.4 cylinder.

Turn the crankshaft counterclockwise 3/4 turn (270°), align the "T1" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.
Check the valve clearance for the No.3 cylinder.

Turn the crankshaft counterclockwise 1/4 turn (90°), align the "T2" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.
Check the valve clearance for the No.2 cylinder.



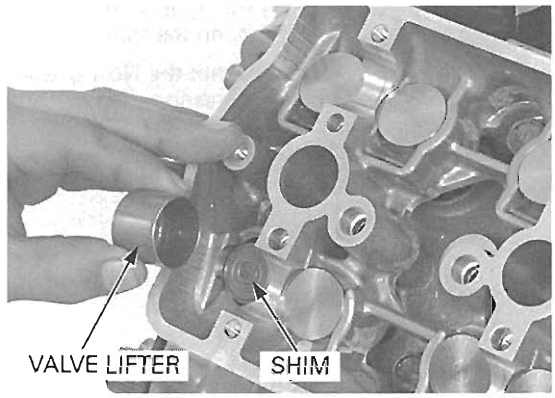
ADJUSTMENT

Sixty-five different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.800 mm thickness shim in intervals of 0.025 mm.

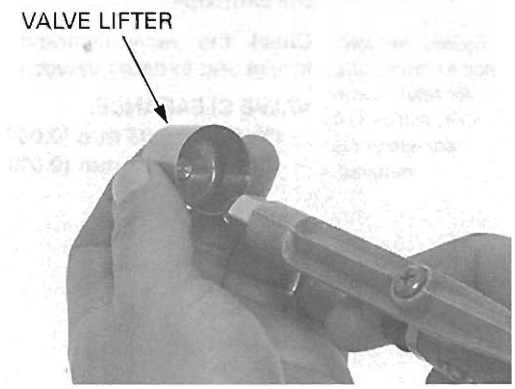
Remove the right camshaft and left camshaft (page 8-8).

Remove the valve lifters and shims from the valve lifter bores.

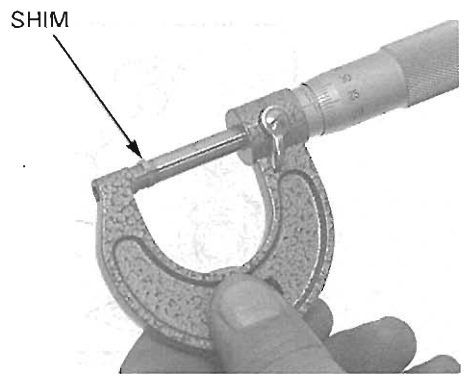
- The shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily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



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



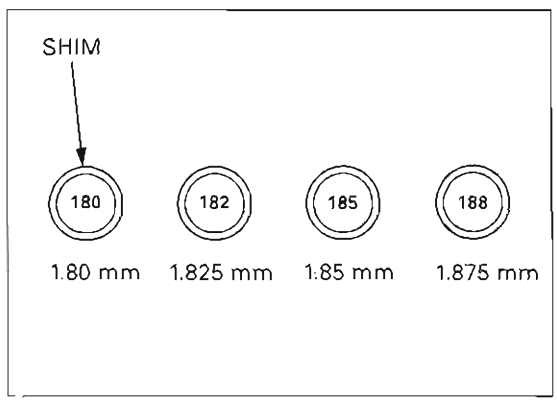
Measure the shim thickness and record it.



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 by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.800 mm.



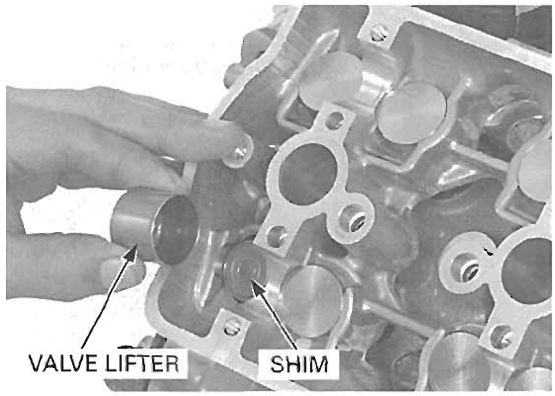
Install the shims and valve lifters in their original locations

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 camshaft (page 8-27).

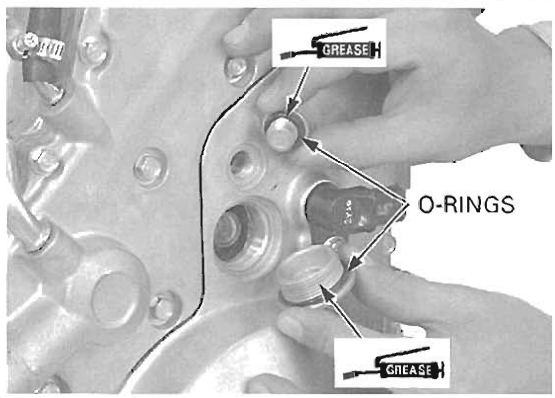
Rotate the camshafts by rotating the crankshaft counterclockwise several times.
Recheck the valve clearance.

Install the removed parts in the reverse order of removal.



Check that the O-rings are in good condition, replace if necessary.

Apply grease to the timing hole cap and crankshaft hole cap threads.

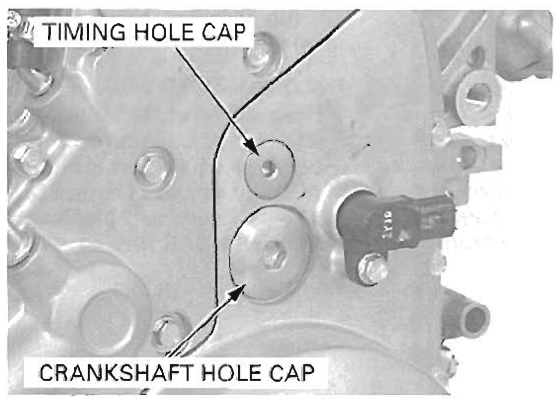


Tighten the timing hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Tighten the crankshaft hole cap to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



ENGINE OIL/OIL FILTER

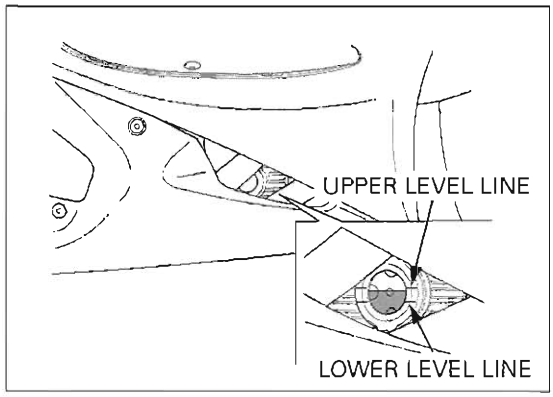
OIL LEVEL INSPECTION

Start the engine and let it idle for 3 – 5 minutes.
Turn off the engine and support the motorcycle on a level surface.

Wait 2 - 3 minutes and check the oil level through the inspection window.

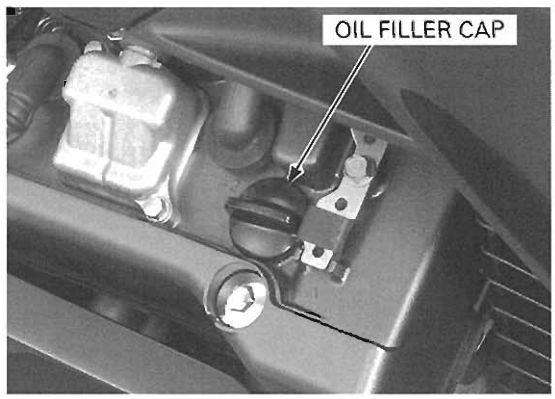


If the level is below the lower line, remove the oil filler cap and fill the crankcase with recommended oil up to the upper level line.



Remove the right cylinder head over head cover (page 3-6).

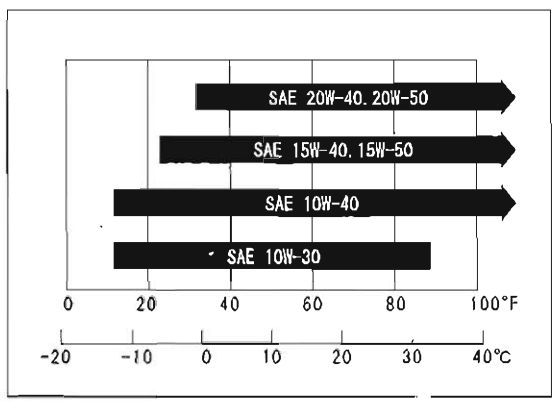
Remove the oil filler cap on the right cylinder head cover.



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:
Honda GN4 or HP4 (Without Moly) 4-stroke oil (U.S.A. and Canada) or Honda 4-stroke oil (Canada only), or equivalent motor oil
API service classification SE, SF or Higher
JASO 4T service classification: MA
Viscosity: SAE 10W-40



Reinstall the filler cap.

ENGINE OIL & FILTER CHANGE

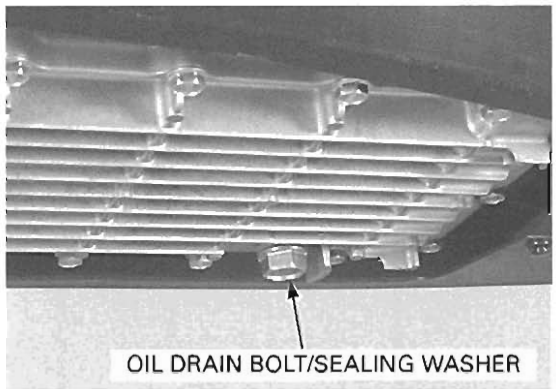
Warm up the engine.
Remove the lower cowl (page 2-9).

Change the engine oil while it is warm and the motorcycle is on level ground to assure complete draining

Stop the engine and remove the oil filler cap.



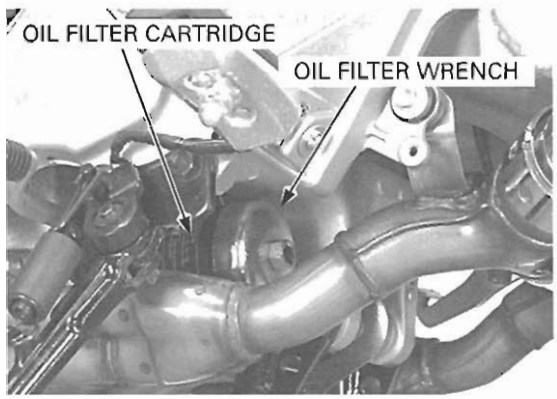
Remove the drain bolt and drain the oil completely.



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

TOOL:

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

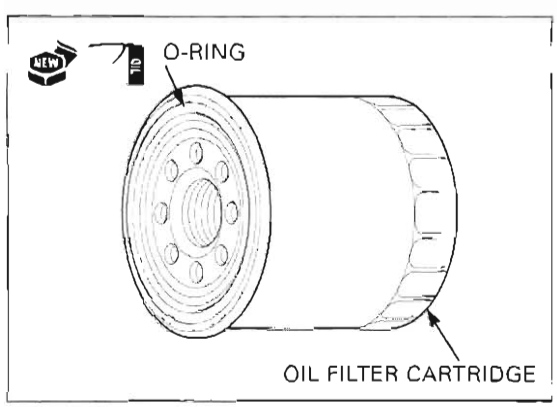


Check that the sealing washer on the drain bolt is in good condition, and replace if necessary.
Install and tighten the drain bolt.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



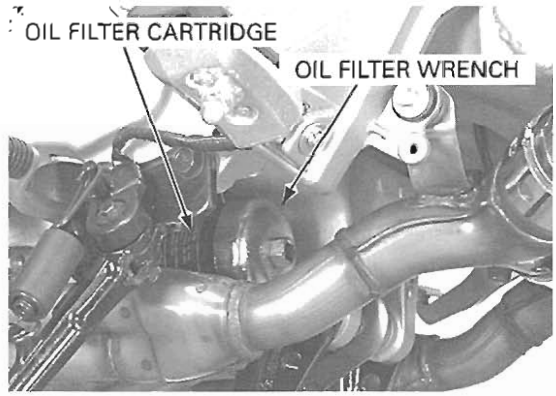
Apply clean engine oil to the new oil filter O-ring.



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)



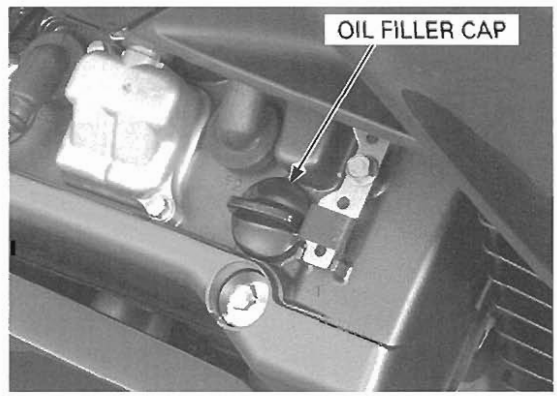
Fill the crankcase with recommended engine oil.

OIL CAPACITY:
3.6 liter (3.8 US qt, 3.2 Imp qt) after draining
3.9 liter (4.1 US qt, 3.4 Imp qt) after draining/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 2-9).



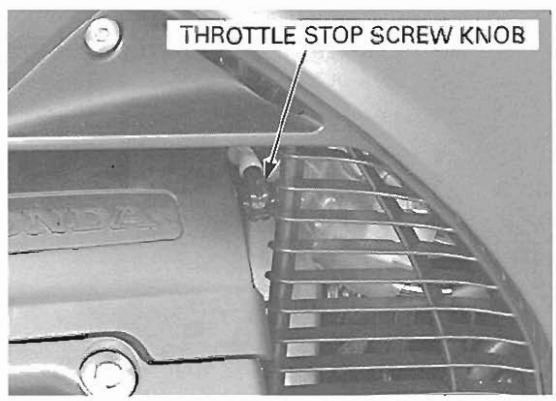
ENGINE IDLE SPEED

- 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 ten minutes.

Turn the throttle stop screw knob as required to obtain the specified idle speed using a screwdriver.

IDLE SPEED: 1,000 ± 100 rpm



RADIATOR COOLANT

Remove the engine guard cover (page 2-12).

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

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

If necessary, add recommended coolant.

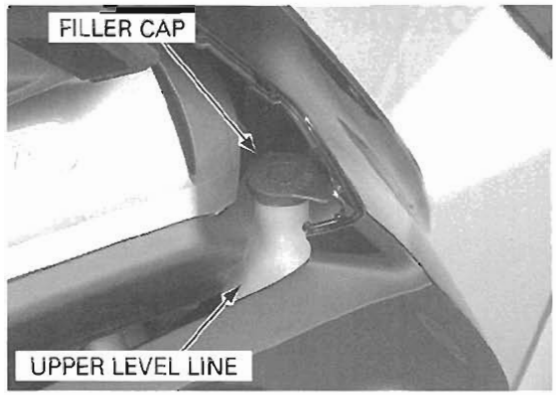
RECOMMENDED ANTIFREEZE:
High quality ethylene glycol antifreeze containing corrosion protection inhibitors.



Remove the maintenance lid (page 3-6).

Remove the reserve tank filler cap and fill to the "UPPER" level line with 50/50 mixture of distilled water and antifreeze.

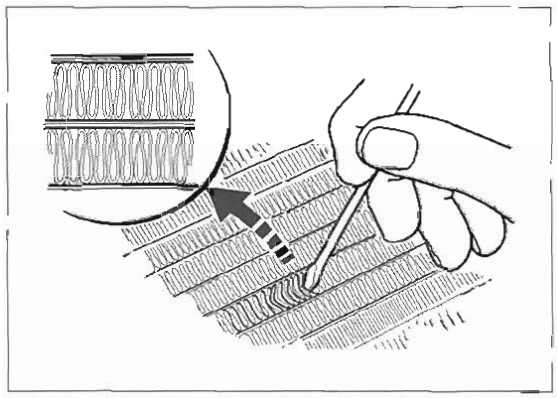
Reinstall the filler cap.



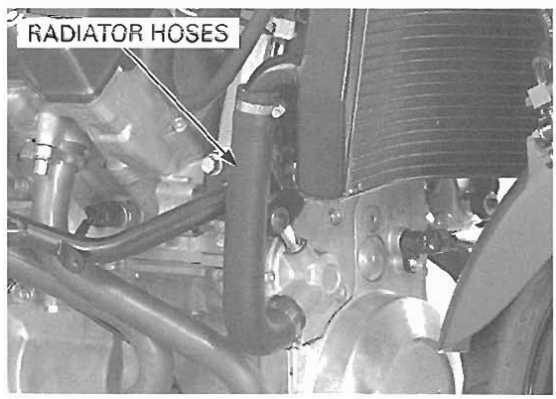
COOLING SYSTEM

Remove the middle cowl and inner lower cowl (page 2-12).

Check the radiator air passages for clogging or damage.
Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiator surface.

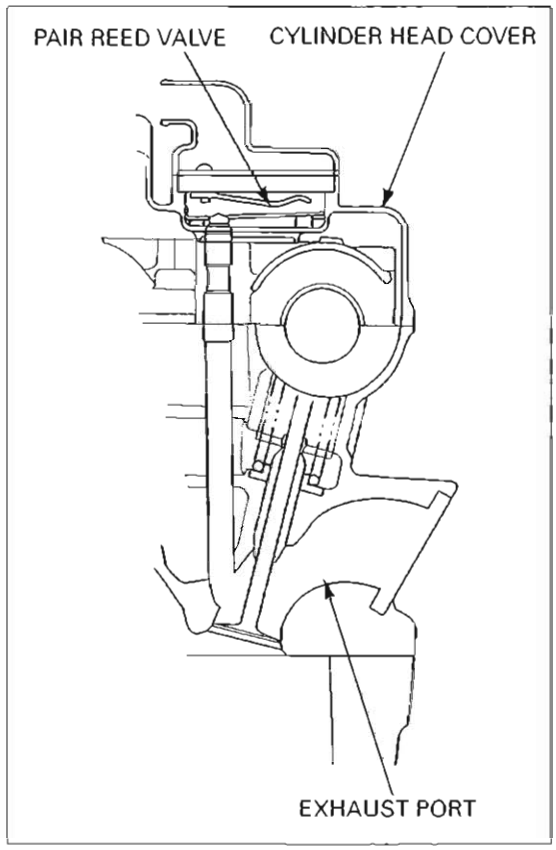


Inspect the radiator hoses for cracks or deterioration, and replace if necessary.
Check the tightness of all hose clamps and fasteners.



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 is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

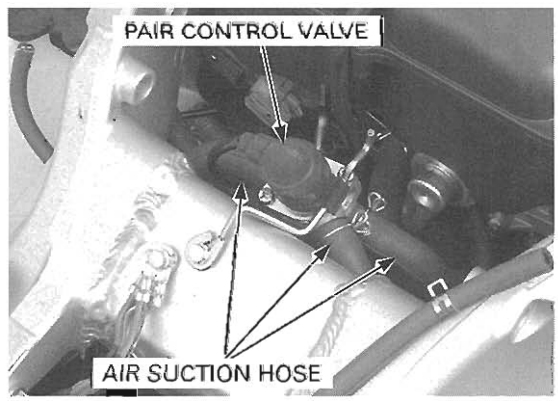


Open and support the fuel tank using the equipped support rod (page 3-4).

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) tubes between the PAIR control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

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

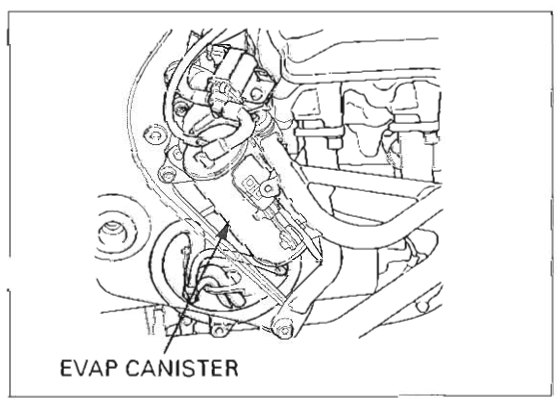


EVAPORATIVE EMISSION CONTROL SYSTEM

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 1-52) and Cable & Harness Routing (page 1-27) for hose connections.

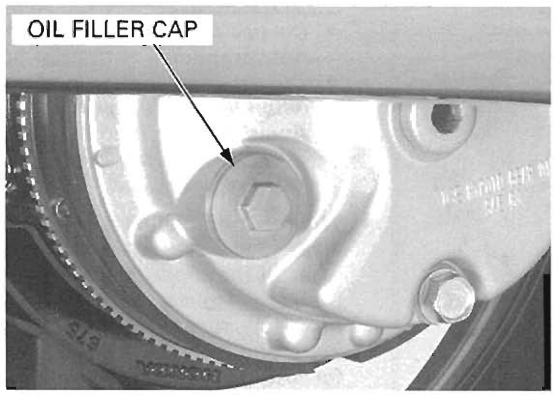


FINAL DRIVE OIL

OIL LEVEL CHECK

Place the motorcycle on its center stand.

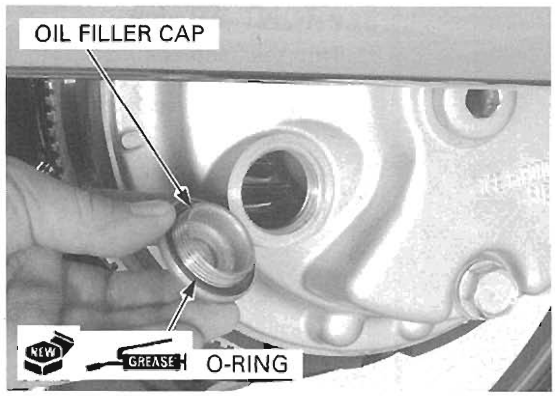
Remove the final drive oil filler cap.



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

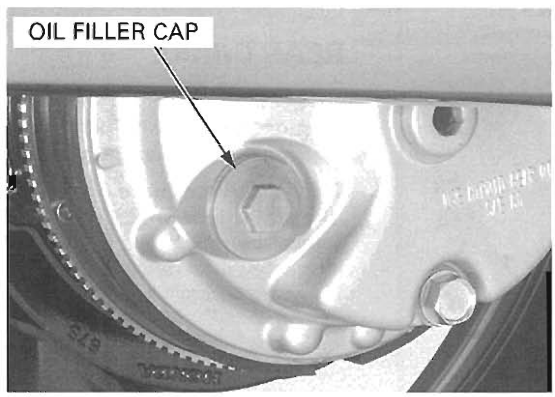
RECOMMENDED OIL:Hypoid gear oil, SAE #80

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



Install and tighten the final drive oil filler cap to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



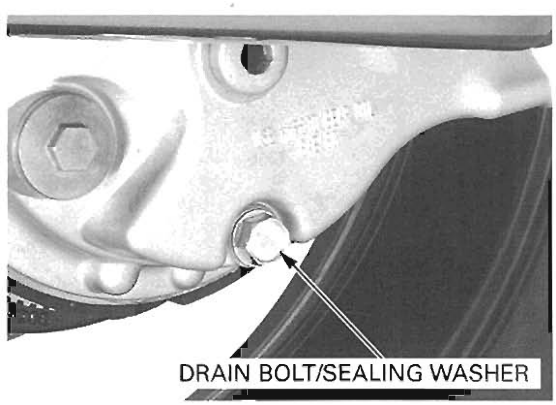
OIL CHANGE

Remove the oil filler cap and drain bolt, slowly turn the rear wheel and drain the oil.
When the oil is completely drained, clean the drain bolt, replace the sealing washer and tighten it to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Fill the gear case with recommended oil to the lower edge of the filler hole.

OIL CAPACITY:
155 cm³ (5.2 US oz, 5.5 Imp oz) after draining
175 cm³ (5.9 US oz, 6.2 Imp oz) after disassembly



BRAKE FLUID

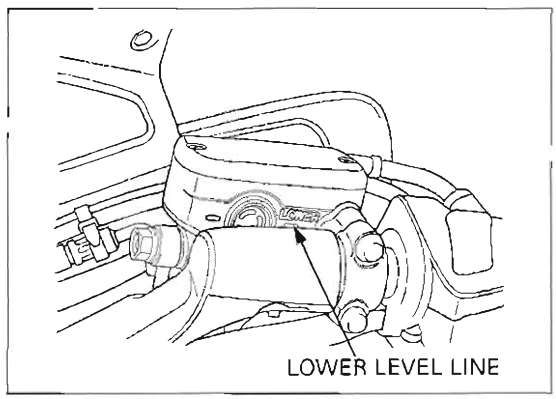
NOTICE

- *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 3-19). 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 3-19).

FRONT BRAKE

Turn the handlebar to the left so that 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 3-19).

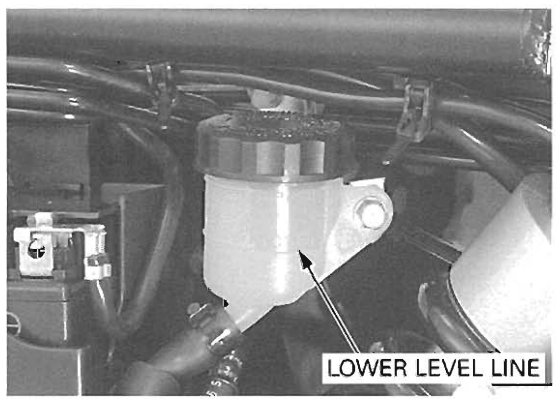


REAR BRAKE

Remove the following:

- Right saddlebag (page 2-6)
- Right side cover (page 2-6)

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 3-19).

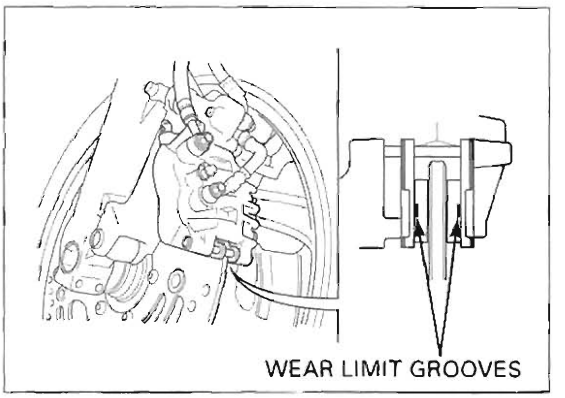


BRAKE PAD WEAR

FRONT BRAKE PADS

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

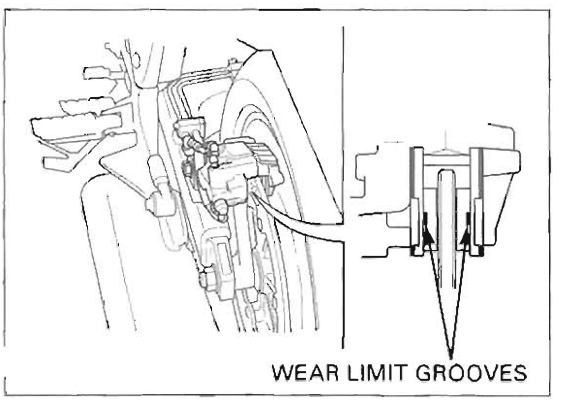
Refer to brake pad replacement (page 17-14).



REAR BRAKE PADS

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

Refer to brake pad replacement (page 17-15).

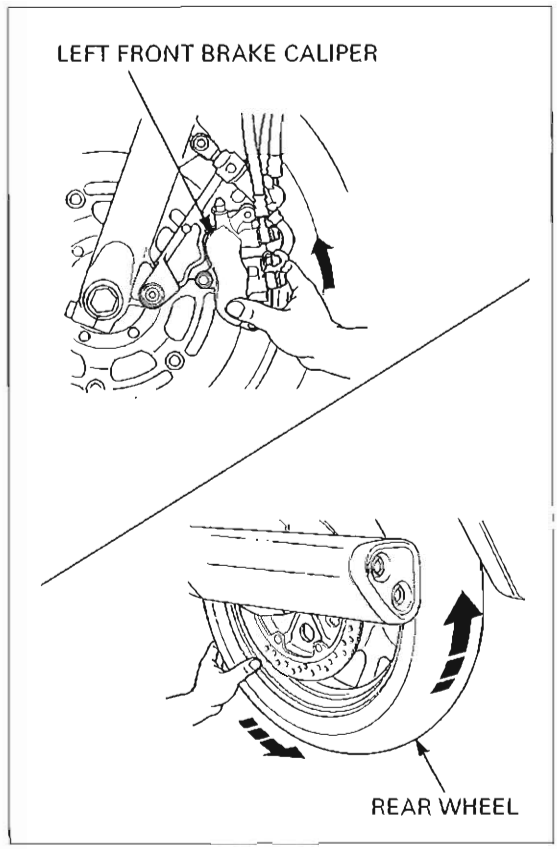


BRAKE SYSTEM

INSPECTION

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

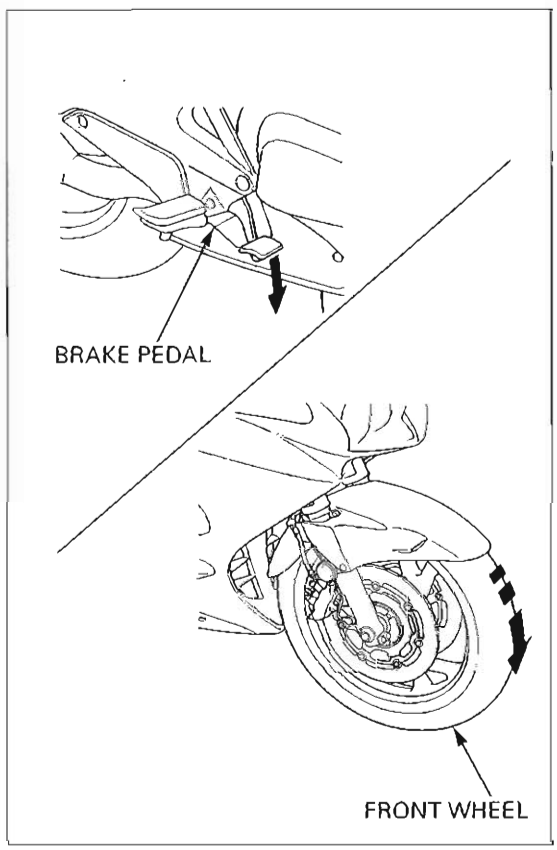
- Place the motorcycle on its center stand and shift the transmission into neutral.
  Push the left front brake caliper upward by hand.
  Make sure the rear wheel does not turn while the left front brake caliper is pushed.



Do not use the oil filter as a jack point.

- Jack-up the motorcycle to raise the front wheel off the ground.

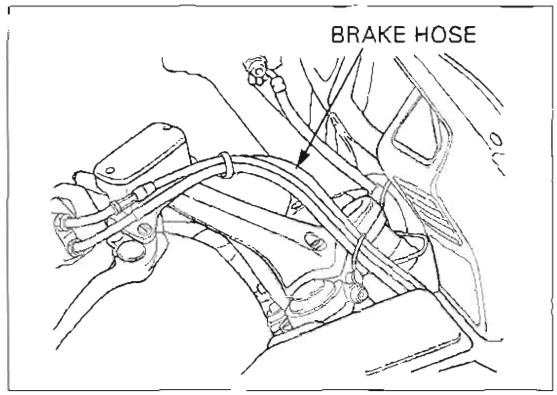
  Apply the rear brake pedal.
  Make sure the front wheel does not turn while the rear brake pedal is applied



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.

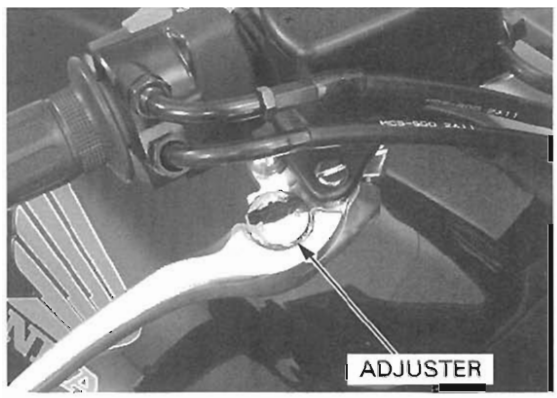
Refer to the procedure for brake bleeding (page 17-7).



BRAKE LEVER ADJUSTMENT

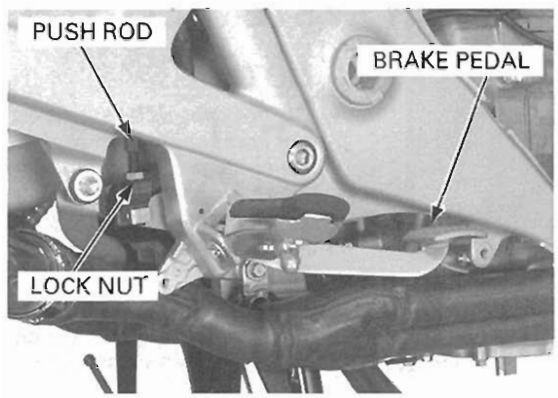
Align the allowance on the brake lever with the index number on the adjuster.

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



BRAKE PEDAL HEIGHT ADJUSTMENT

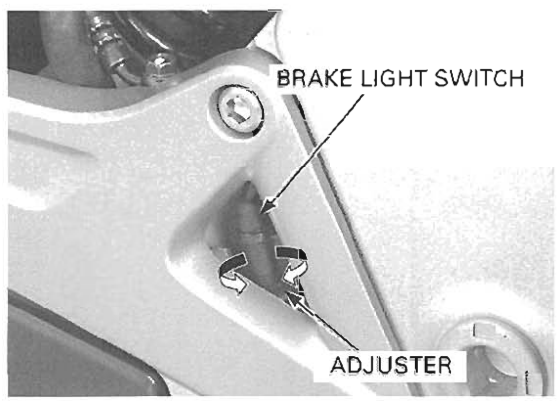
Loosen the lock nut and turn the push rod until the correct pedal height is obtained.



BRAKE LIGHT SWITCH

The front brake light switch does not require adjustment.

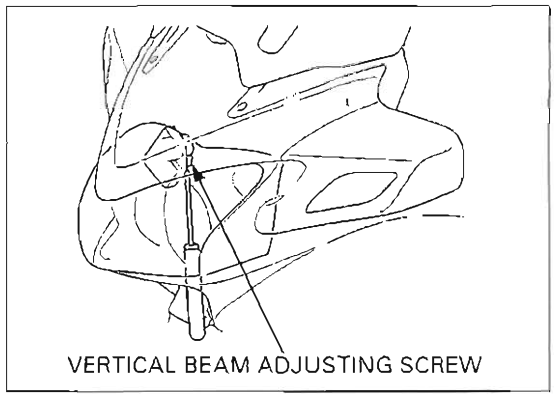
Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged.
If the light fails to come on, adjust the switch so that the light comes on at the proper time.
Hold the switch body and turn the adjuster. Do not turn the switch body.



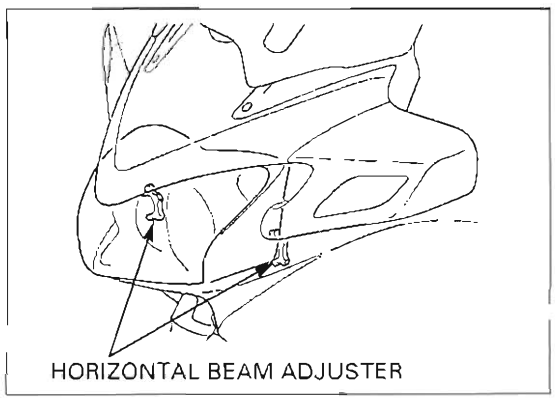
HEADLIGHT AIM

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 adjusting screw from the bottom of upper cowl.
A clockwise rotation moves the beam up and counterclockwise rotation moves the beam down.


VERTICAL BEAM ADJUSTING SCREW

Adjust the headlight beam horizontally by turning the horizontal beam adjuster.
A clockwise rotation moves the beam toward the right side of the rider.


HORIZONTAL BEAM ADJUSTER

CLUTCH SYSTEM/CLUTCH FLUID

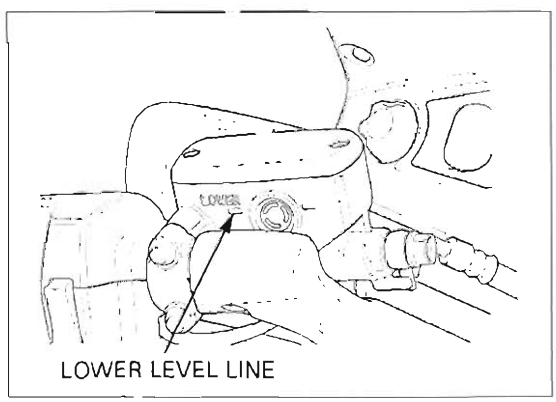
NOTICE

- *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 entire system for leaks.

Turn the handlebar to the right so that the reservoir is level and check the clutch fluid reservoir level through the sight glass.

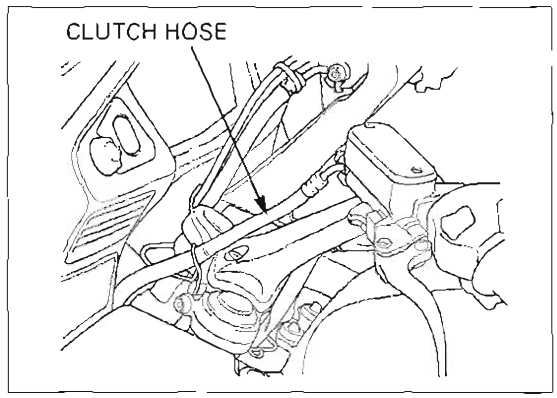
Firmly apply the clutch lever, and check that no air has entered the system.
If the lever feels soft or spongy when operated, bleed the air from the system.



LOWER LEVEL LINE

Inspect the clutch hose and fittings for deterioration, cracks and signs of leakage.
Tighten any loose fittings.

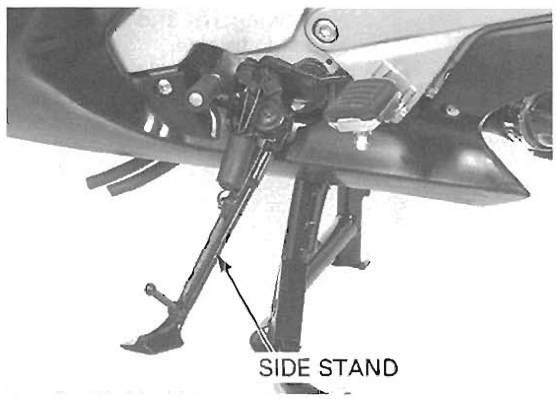
Replace hoses and fittings as required.
Refer to page 9-6 for hydraulic clutch bleeding procedures.



SIDE STAND

Support the motorcycle on a level surface.

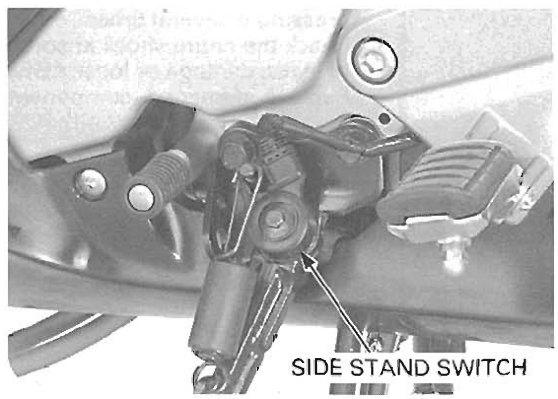
Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.



Check the side stand ignition cut-off system:

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

If there is a problem with the system, check the side stand switch (page 22-27).



SUSPENSION

FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes and compressing the front suspension several times.
Check the entire assembly for signs of leaks, damage or loose fasteners.

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

Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.
Refer to the fork service (page 15-20).



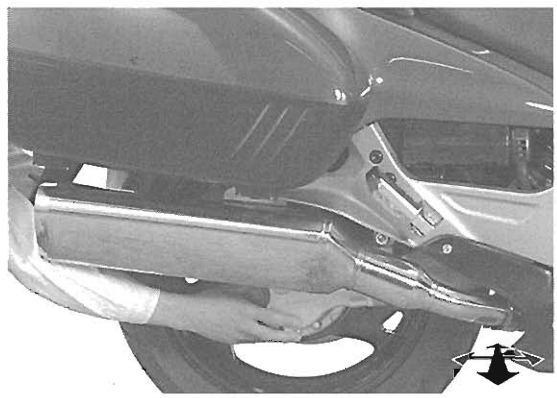
REAR SUSPENSION INSPECTION

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 axle bearings are worn.



Check for worn swingarm bearings by grabbing the rear swingarm and attempting to move the swingarm side to side.
Replace the bearings if any are 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 the shock absorber service (page 16-12).



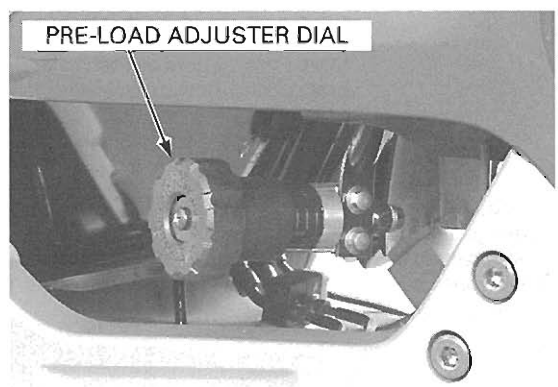
REAR SUSPENSION ADJUSTMENT

SPRING PRE-LOAD ADJUSTER

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

TURN CLOCKWISE:
Increase the spring pre-load (High)
TURN COUNTERCLOCKWISE:
Decrease the spring pre-load (Low)

PRE-LOAD ADJUSTER ADJUSTABLE RANGE:
35 – 40 clicks
PRE-LOAD ADJUSTER STANDARD POSITION:
7 clicks out from lower position



REBOUND DAMPING ADJUSTER

NOTICE

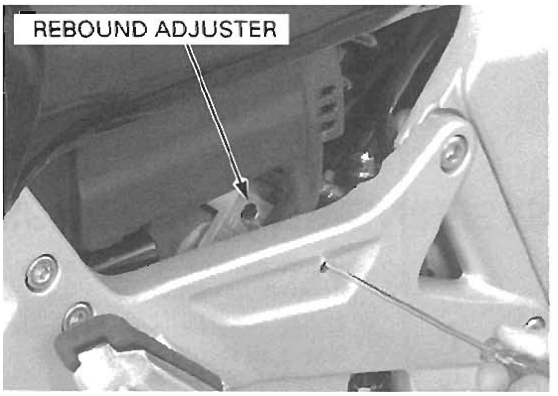
- *Always start on full hard when adjusting the damping.*
- *Do not turn the adjuster screw more than the given positions or the adjuster may be damaged.*

The rebound damping can be adjusted by turning the adjuster.

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

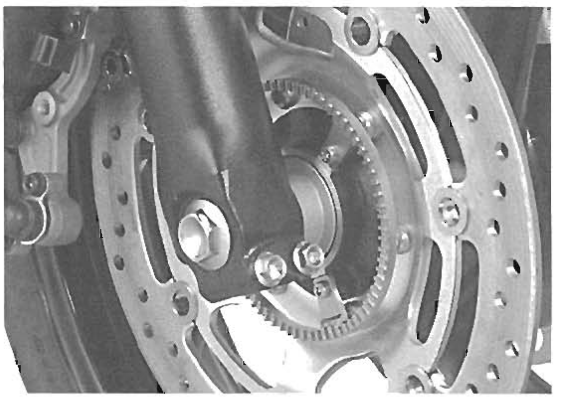
Turn the rebound adjuster through the right step holder hole clockwise until it stops, then turn the adjuster counterclockwise.

REBOUND ADJUSTER STANDARD POSITION:
1 turn out 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

Tire pressure should be checked when the tires are COLD.

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Tire pressure kPa (kgf/cm², psi)		290 (2.90, 42)	290 (2.90, 42)
Tire size		120/70 ZR 18 M/C (59W)	170/60 ZR 17 M/C (72W)
Tire bland	Bridgestone	BT020F F	BT020R F
	Dunlop	D220FST L	D220ST L

Check the tires for cuts, embedded nails, or other damage.
Check the front wheel (page 15-13) and rear wheel (page 16-5) for trueness.



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

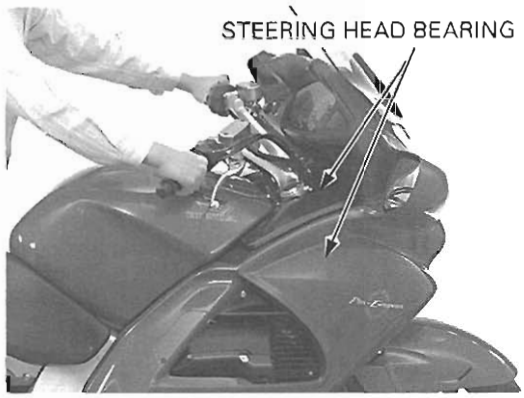
MINIMUM TREAD DEPTH:
FRONT: 1.5 mm (0.06 in)
REAR: 2.0 mm (0.08 in)



STEERING HEAD BEARINGS

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

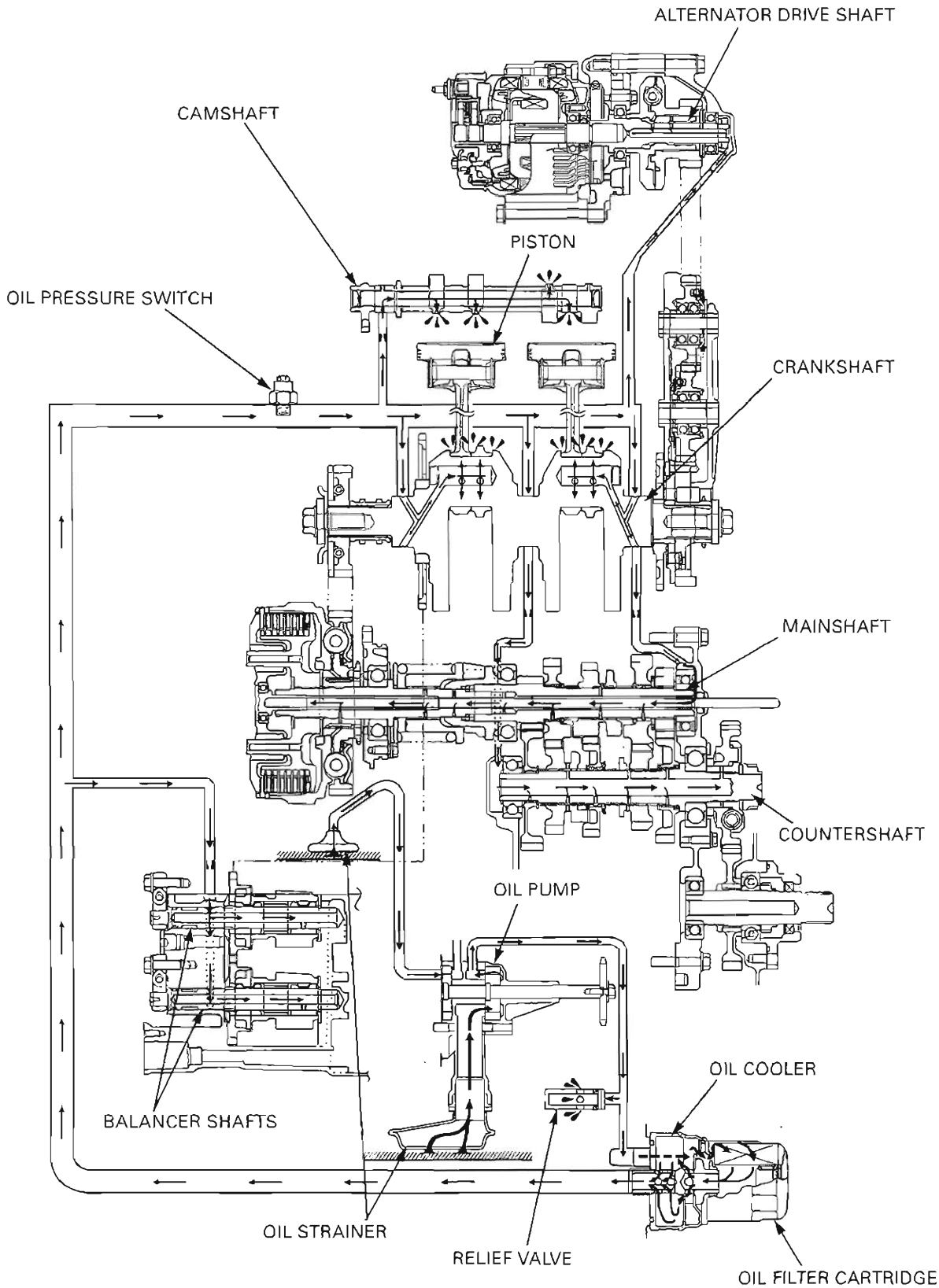
Support the motorcycle securely and raise the front wheel off the ground.
Check that the handlebar moves freely from side to side.
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 15-31).



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM 4-2
SERVICE INFORMATION 4-3
TROUBLESHOOTING 4-4
OIL PRESSURE INSPECTION 4-5
OIL STRAINER/PRESSURE RELIEF VALVE 4-6
OIL PUMP 4-9
OIL COOLER 4-13

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠CAUTION

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

- The oil pump service requires engine removal.
- 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 (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity	After draining		3.6 liter (3.8 US qt, 3.2 Imp qt)	–
	After draining/filter change		3.9 liter (4.1 US qt, 3.4 Imp qt)	–
	After disassembly		4.7 liter (5.0 US qt, 4.1 Imp qt)	–
Recommended engine oil			Honda GN4 or HP4 (Without Moly) 4-stroke oil (U.S.A. and Canada) or Honda 4-stroke oil (Canada only), or equivalent motor oil API service classification SE, SF or Higher JASO 4T service classification: MA Viscosity: SAE 10W-40	–
Oil pressure at oil pressure switch			490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm/(80°C/176°F)	–
Oil pump rotor	Feed pump	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 – 0.09 (0.008 – 0.004)	0.10 (0.039)
	Cooler pump	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 – 0.09 (0.008 – 0.004)	0.10 (0.039)

TORQUE VALUES

Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply oil to the threads and seating surface
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Oil cooler bolt	74 N·m (7.5 kgf·m, 54 lbf·ft)	Apply oil to the threads and seating surface
Oil pump driven sprocket bolt/washer	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply a locking agent to the threads
Oil pump assembly bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads

TOOLS

Oil pressure gauge set	07506-3000001	Equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07406-0030001	Equivalent commercially available in U.S.A.
Gauge joint adaptor	07RMK-MW40100	Equivalent commercially available in U.S.A.
Oil filter wrench	07HAA-PJ70101	or 07HAA-PJ70100

TROUBLESHOOTING

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

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

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

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

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

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

OIL PRESSURE INSPECTION

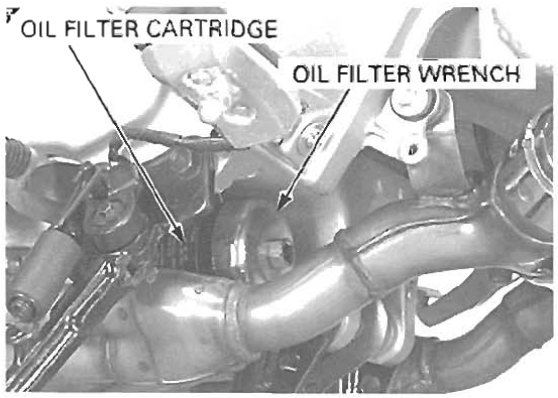
If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.

Remove the lower cowl (page 2-9).

Remove the oil filter cartridge using the special tool.

TOOL:

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



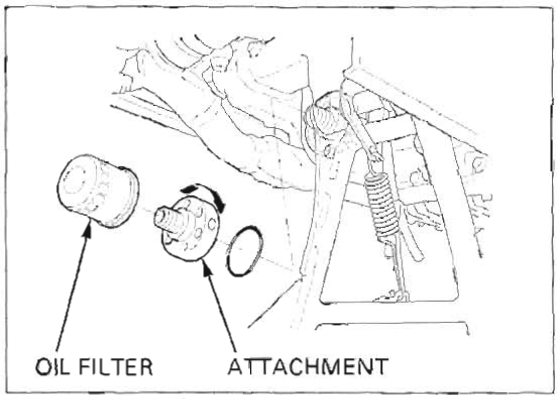
Apply oil to the oil pressure gauge joint attachment O-ring.

Install the oil pressure gauge joint attachment to the engine block, then tighten the nut.

TOOL:

Gauge joint attachment	**07RMK-MW40100**

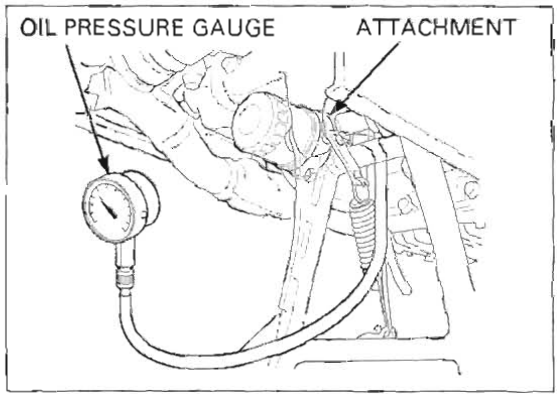
Reinstall the oil filter (page 3-12).



Install the oil pressure gauge attachment and oil pressure gauge to the gauge joint attachment.

TOOLS:

Oil pressure gauge	**07506-3000001 Equivalent commercially available in U.S.A.**
Oil pressure gauge attachment	**07406-0030001 Equivalent commercially available in U.S.A.**



Check the oil level.

Warm up the engine to normal operating temperature (approximately 80°C/176 F) and increase the rpm to 6,000 rpm and read the oil pressure.

OIL PRESSURE:

490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm/ (80°C/176°F)

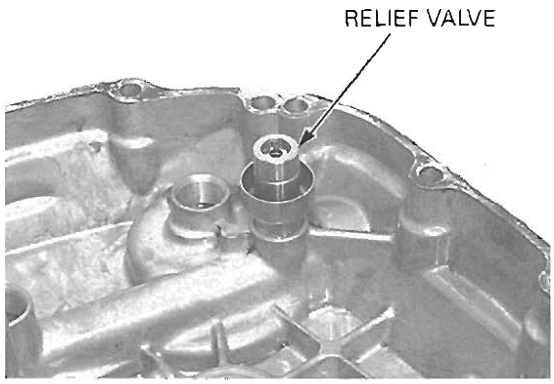
OIL STRAINER/PRESSURE RELIEF VALVE

REMOVAL

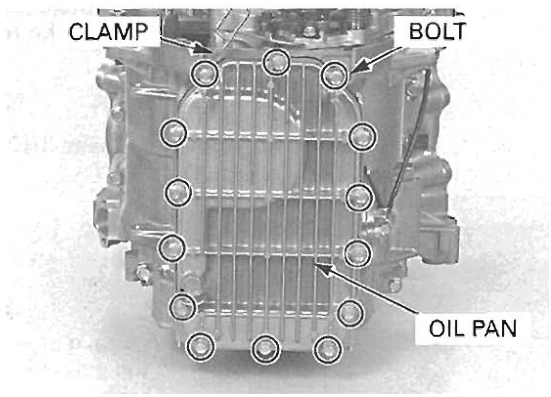
Remove the following:

- Engine from the frame (page 7-4)
- Clutch assembly (page 9-15)
- Rear crankcase cover (page 10-6)

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

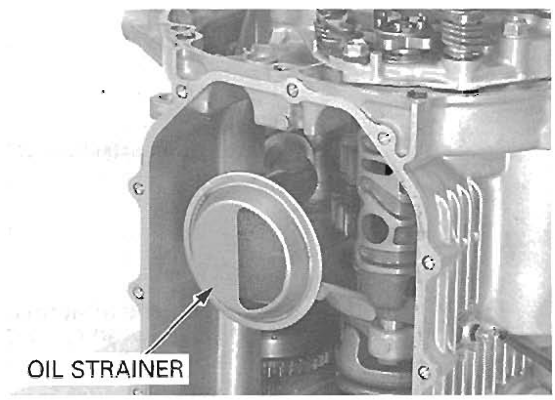


Remove the oil pan flange bolts, hose clamp and oil pan.

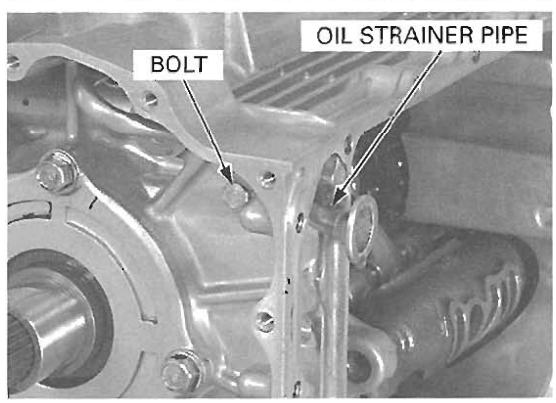


Remove the oil strainer and packing from the lower crankcase.

Clean the oil strainer screen.



Remove the bolt and oil strainer pipe from the front side of the lower crankcase.



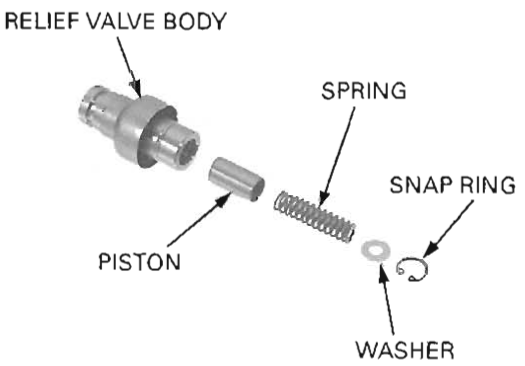
INSPECTION

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, sticking or damage.
Inspect the spring for weakness or damage.

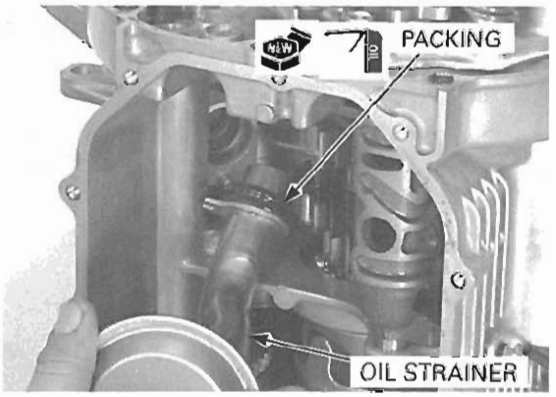
Assemble the relief valve in the reverse order of disassembly.



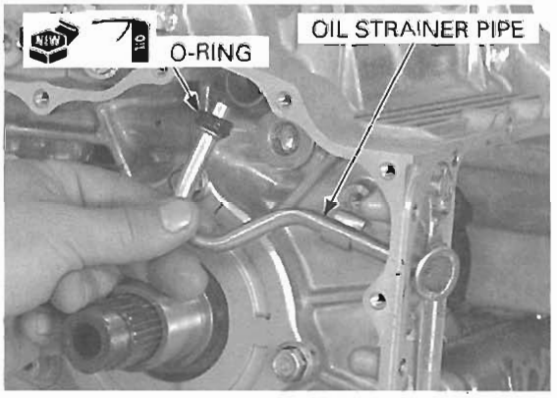
INSTALLATION

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

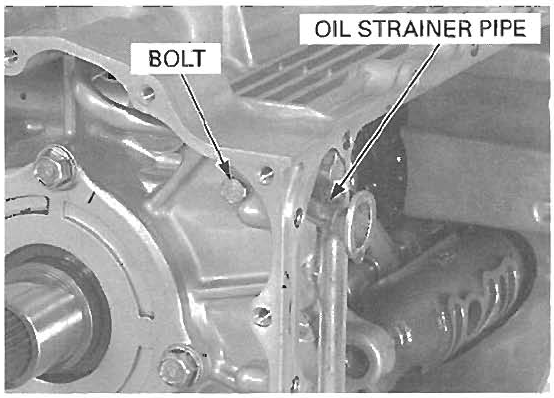
Install the oil strainer into the crankcase while aligning its grooves with the boss on the oil pump body.



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



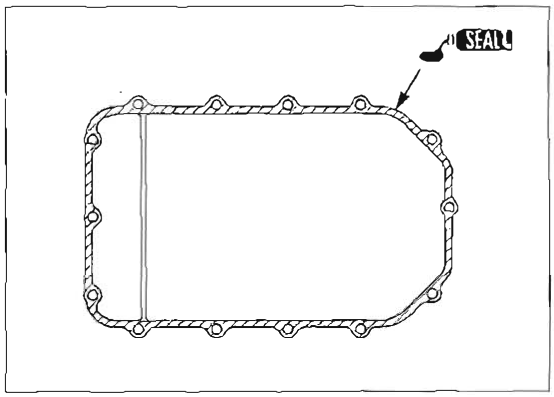
Install and tighten the oil strainer pipe mounting bolt securely.



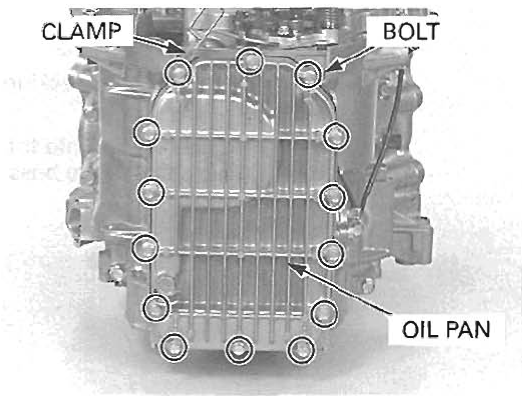
Clean the oil pan mating surface thoroughly.

Do not apply more sealant than necessary.

Apply sealant (Three Bond 1207B or an equivalent) to the mating surface.



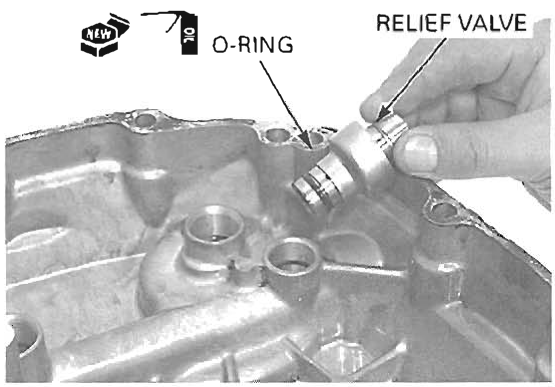
Carefully install the oil pan onto the lower crankcase.
Install the hose clamp and oil pan mounting bolts.
Tighten all bolts in a crisscross pattern in 2 – 3 steps.



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

Install the removed parts in the reverse order of removal.

After installation, check that there are no oil leaks.

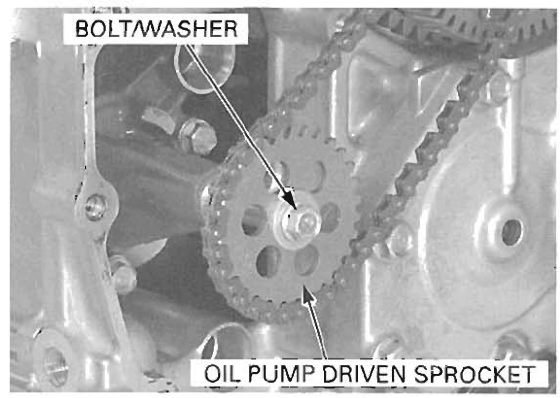


OIL PUMP

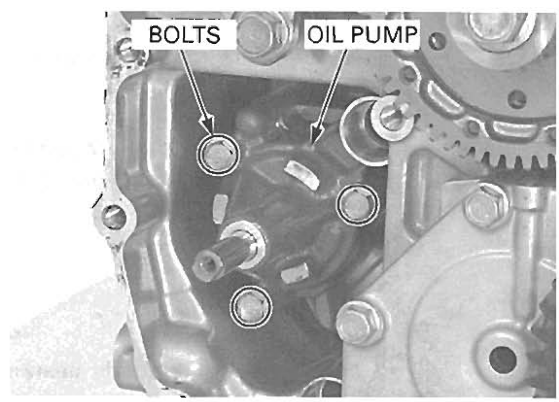
REMOVAL

Remove the rear crankcase cover (page 10-6).

Remove the bolt/washer, then remove the oil pump drive/driven sprocket.



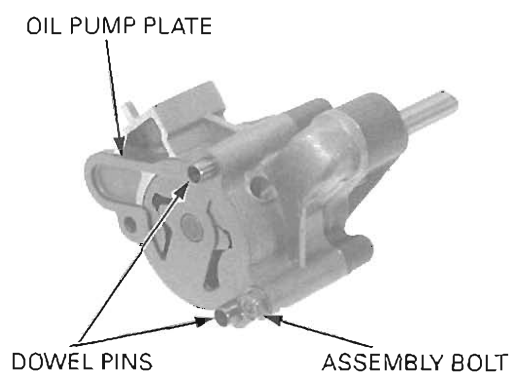
Remove the three flange bolts and oil pump assembly.



DISASSEMBLY

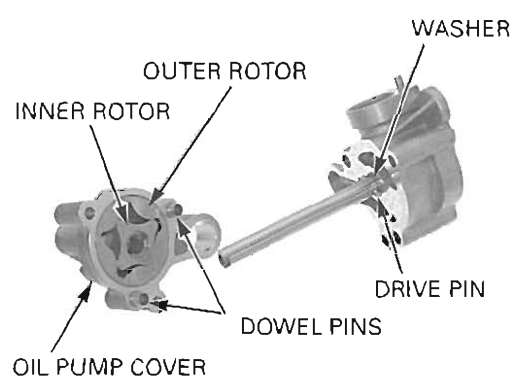
Remove the dowel pins.

Remove the oil pump assembly bolt and oil pump plate.



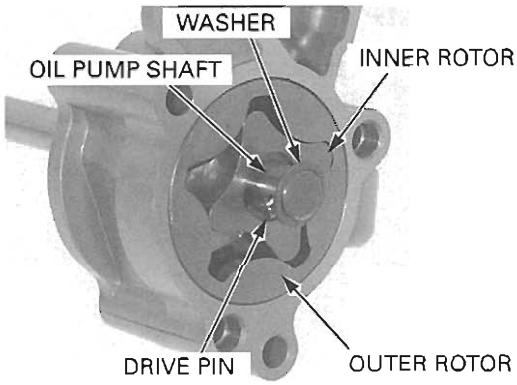
Remove the oil pump cover and dowel pins.

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



Remove the thrust washer and drive pin from the oil pump shaft, then remove the oil pump shaft.

Remove the sub pump inner rotor and outer rotor from the oil pump body.



INSPECTION

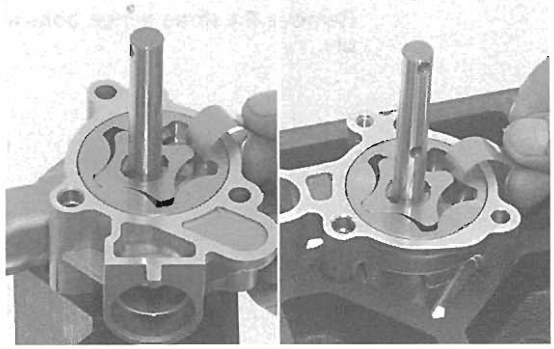
If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.

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

Measure the rotor tip clearance for the main and sub pump.

SERVICE LIMITS:
Main pump: 0.20 mm (0.008 in)
Sub pump: 0.20 mm (0.008 in)

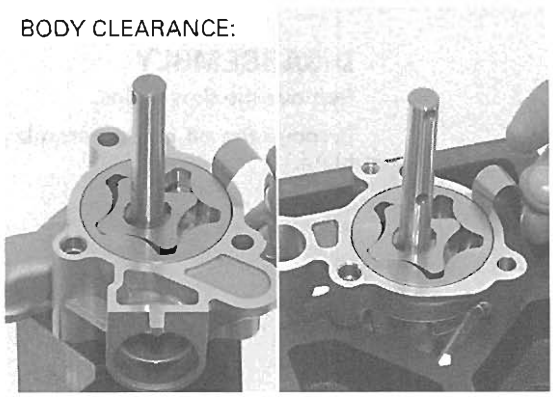
TIP CLEARANCE:



Measure the pump body clearance for the main and sub pump.

SERVICE LIMITS:
Main pump: 0.35 mm (0.014 in)
Sub pump: 0.35 mm (0.014 in)

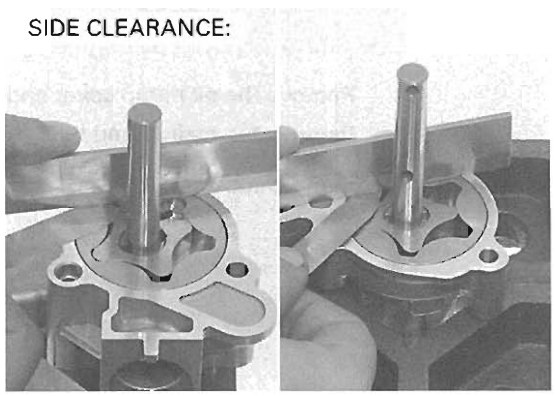
BODY CLEARANCE:



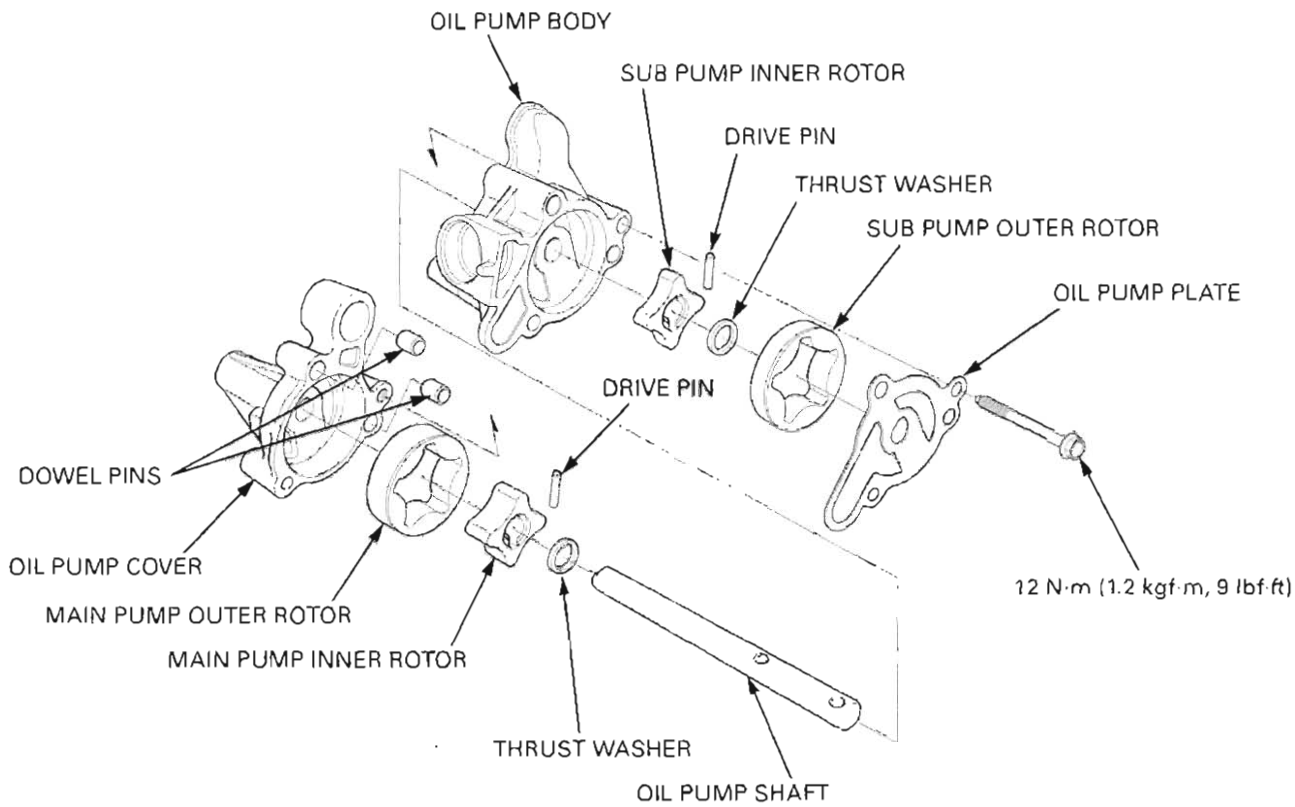
Measure the side clearance for the main and sub pump using a straight edge and feeler gauge.

SERVICE LIMITS:
Main pump: 0.10 mm (0.039 in)
Sub pump: 0.10 mm (0.039 in)

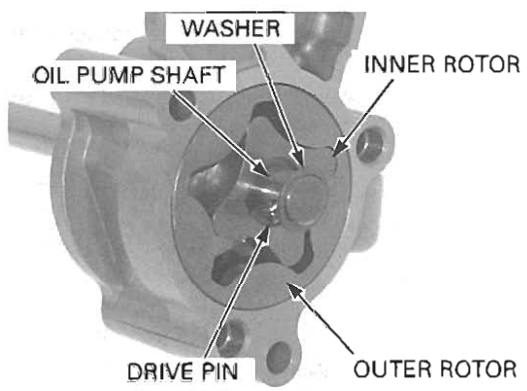
SIDE CLEARANCE:



ASSEMBLY



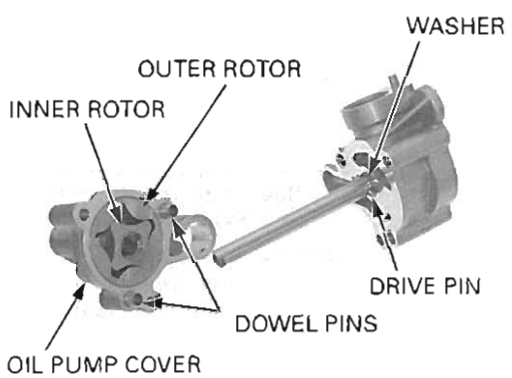
Install the sub pump outer and inner rotors into the oil pump body.
Install the oil pump shaft into the sub pump inner rotor and oil pump body.
Install the drive pin into the hole in the pump shaft and align the pin with the groove in the inner rotor as shown.
Install the thrust washer onto the shaft.



Install the thrust washer and drive pin onto the oil pump shaft.

Install the main pump outer rotor and inner rotor into the oil pump cover.

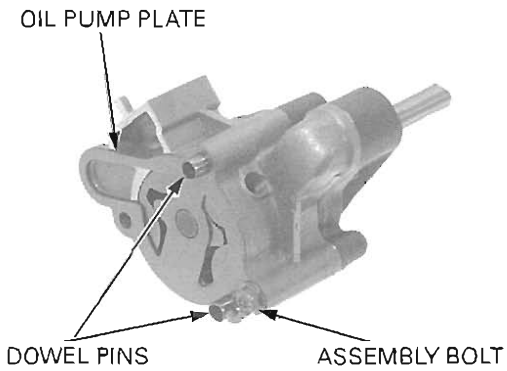
Install the dowel pins to the oil pump cover.
Install the oil pump cover assembly onto the oil pump body.



Install the dowel pins and oil pump plate onto the oil pump body.

Install and tighten the assembly bolt to the specified torque.

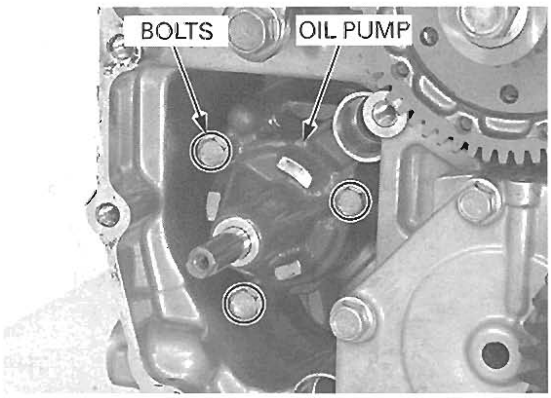
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



INSTALLATION

Install the oil pump into the crankcase.

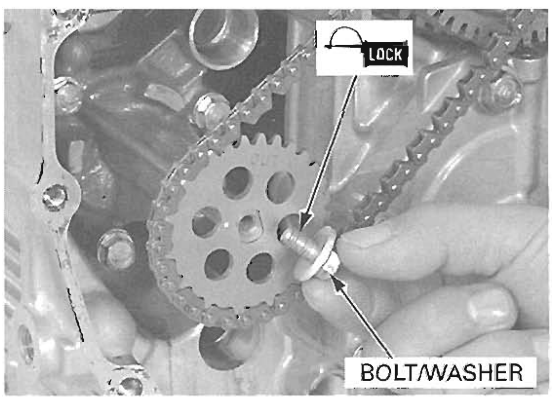
Install and tighten the three flange bolts securely.



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

Install the driven sprocket with its "OUT" mark facing out.

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



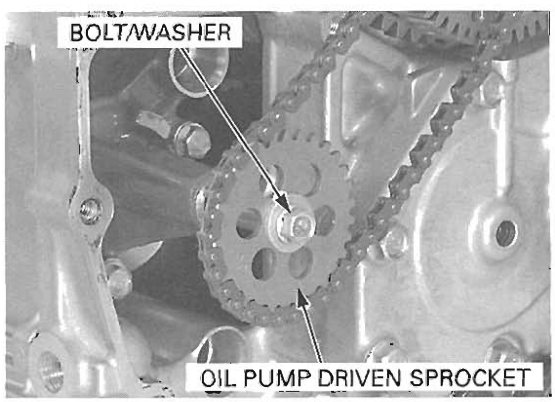
Install and tighten the driven sprocket bolt/washer to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the following:

- Oil strainer, oil strainer pipe and oil pan (page 4-7)
- Front crankcase cover (page 9-30)
- Rear crankcase cover (page 10-8)
- Engine into the frame (page 7-8)

Fill the crankcase with the recommended engine oil, and check for oil leaks (page 3-11).
Check the oil pressure (page 4-5).



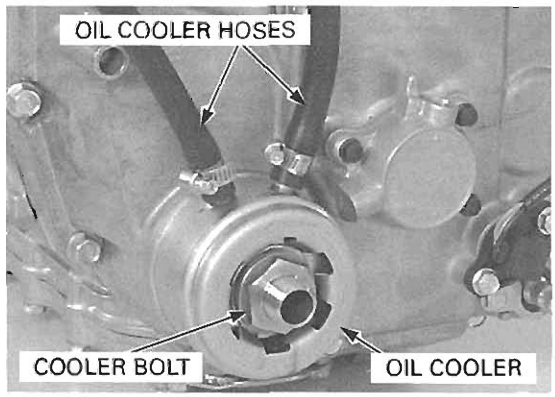
OIL COOLER

REMOVAL

Drain the coolant from the system (page 6-6).
Drain the engine oil (page 3-12).
Remove the oil filter cartridge (page 3-12).

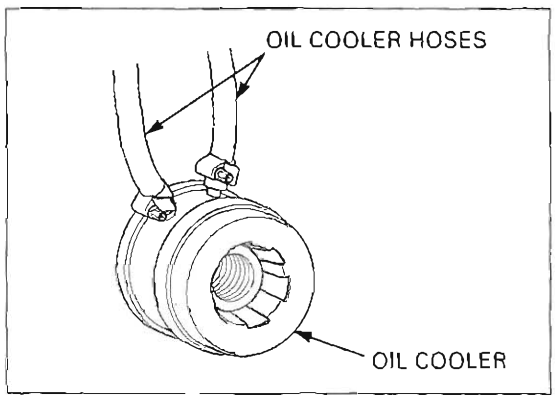
Remove the oil cooler bolt and oil cooler assembly from the engine.

Loosen the hose band screws and remove the oil cooler hoses from the oil cooler.



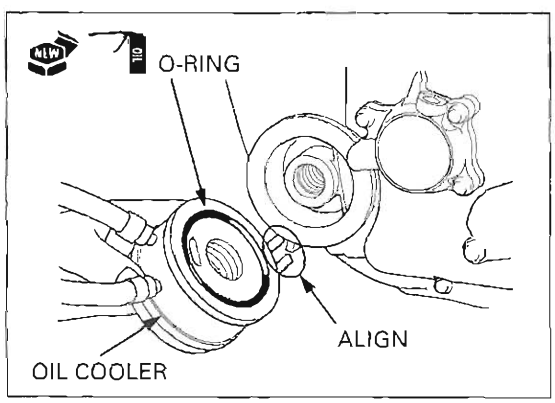
INSTALLATION

Install the oil cooler hoses and tighten the hose band screws securely.

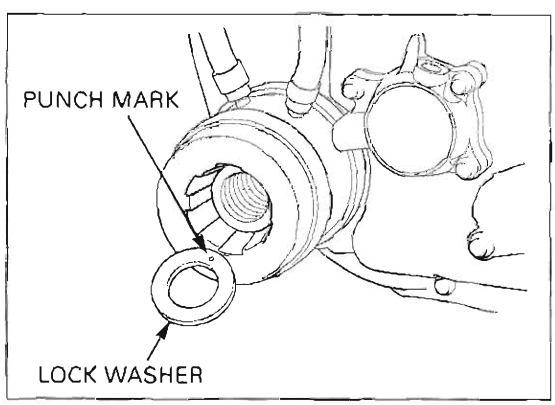


Apply oil to a new O-ring and install it into the groove of the oil cooler.

Install the oil cooler assembly while aligning its tab with the crankcase boss.



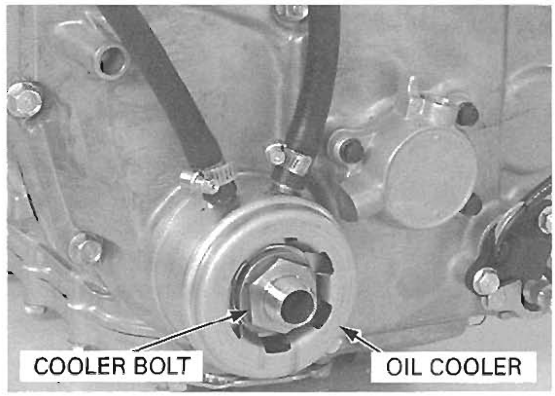
Install the lock washer with its punch mark facing the oil cooler.



Apply oil to the oil cooler bolt threads and seating surface.
Install the oil cooler and tighten the oil cooler bolt to the specified torque.

TORQUE: 75 N·m (7.5 kgf·m, 54 lbf·ft)

Install the oil filter cartridge (page 3-12).
Fill the crankcase with the recommended engine oil, and check for oil leaks (page 3-11).
Fill the cooling system with the recommended coolant (page 6-6).



5. FUEL SYSTEM (Programmed Fuel Injection)

COMPONENT LOCATION 5-2

SERVICE INFORMATION 5-3

TROUBLESHOOTING 5-4

SYSTEM LOCATION 5-5

SYSTEM DIAGRAM 5-6

PGM-FI (Programmed Fuel Injection) SYSTEM 5-7

PGM-FI SELF-DIAGNOSIS MALFUNCTION INDICATOR LAMP (MIL) FAILURE CODES 5-11

PGM-FI TROUBLESHOOTING 5-14

FUEL TANK DRAIN 5-50

FUEL LINE INSPECTION 5-51

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FUEL CUT-OFF RELAY 5-56

FUEL TANK 5-56

AIR CLEANER HOUSING 5-60

THROTTLE BODY 5-64

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PRESSURE REGULATOR 5-73

SE THERMAL VALVE 5-74

STARTER VALVE 5-75

STARTER VALVE SYNCHRONIZATION 5-78

MAP SENSOR 5-80

IAT SENSOR 5-81

ECT SENSOR 5-81

CAM PULSE GENERATOR 5-82

TP SENSOR 5-82

BANK ANGLE SENSOR 5-84

ENGINE STOP RELAY 5-85

KNOCK SENSOR 5-86

ECM (ENGINE CONTROL MODULE) 5-86

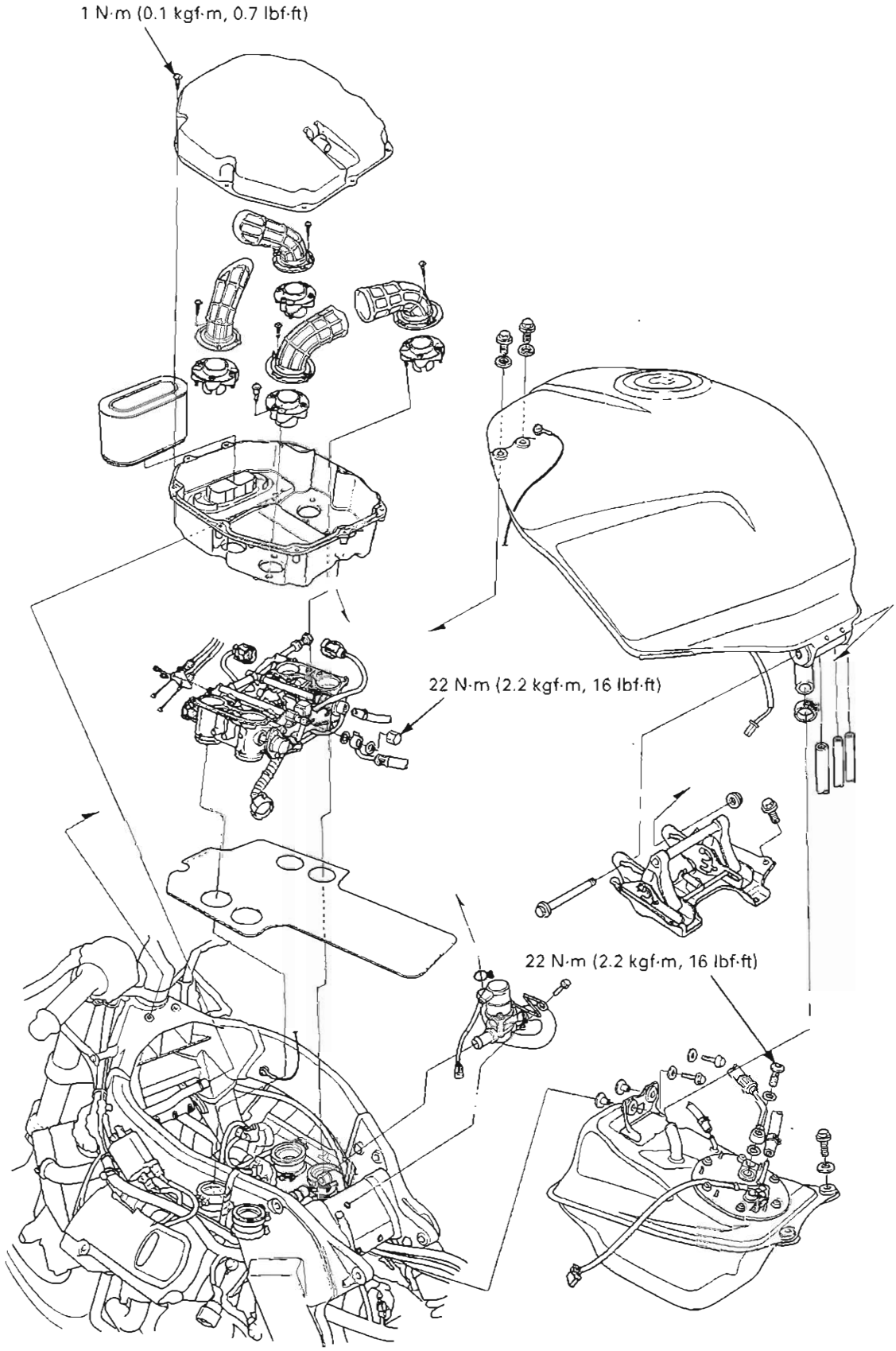
PAIR SOLENOID VALVE 5-87

EVAP PURGE CONTROL SOLENOID VALVE 5-88

EVAP CANISTER 5-89

O_2 SENSOR 5-90

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Be sure to relieve the fuel pressure while the engine is 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.
- 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 close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel 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 in a way other than shown in this manual.
- 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 a Self-Diagnostic System (page 5-7). 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 5-11).
- The PGM-FI system is provided with a fail-safe function to ensure a minimum running capability, even if there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is ensured 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 injectors and/or the ignition and cam pulse generator, the fail safe function stops the engine from the standpoint of protecting it.
- Refer to PGM-FI system location (page 5-5).
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- Refer to procedures for fuel level sensor inspection (page 22-23).
- The vehicle speed sensor sends a digital pulse signal to the ECM (PGM-FI unit) for computation. Refer to procedures for vehicle speed sensor inspection (page 22-12).
- 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.

SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ35B
Starter valve vacuum difference	20mm Hg
Base throttle valve for synchronization	No.1
Idle speed	1,000 ± 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 Ω
Fuel injection resistance (at 20°C/68°F)	11.1 – 12.3 Ω
Bypass solenoid valve resistance (at 20°C/68°F)	28 – 32 Ω
PAIR solenoid valve resistance (at 20°C/68°F)	20 – 24 Ω
Purge control solenoid valve resistance (at 20°C/68°F)	30 – 34 Ω
Cam pulse generator peak voltage	0.7 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Manifold absolute pressure at idle	200 – 250 mm Hg
Fuel pressure at idle	343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12V)	180 cm^3 (6.1 US oz, 6.3 Imp oz) minimum/10 seconds

TORQUE VALUES

ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Vehicle speed sensor mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Knock sensor assembly	31 N·m (3.2 kgf·m, 23 lbf·ft)	
Throttle body insulator band screw	See page 1-14	
Throttle cable bracket screws	3 N·m (0.35 kgf·m, 2.5 lbf·ft)	
Starter valve synchronization plate screw	1 N·m (0.09 kgf·m, 0.7 lbf·ft)	
Starter valve lock nut	2 N·m (0.18 kgf·m, 1.3 lbf·ft)	
SE thermal valve link plate screw	1 N·m (0.09 kgf·m, 0.7 lbf·ft)	
SE thermal valve mounting screw	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Pressure regulator	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Fuel rail mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fuel filler cap bolt	2 N·m (0.18 kgf·m, 1.3 lbf·ft)	
Fuel hose banjo bolt (lower 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 5-55 for tightening sequence
Fuel pump unit drain bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
O_2 sensor	25 N·m (2.6 kgf·m, 19 lbf·ft)	
Air cleaner housing cover screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	

TOOLS

Fuel pressure gauge	07406-0040003	or 07406-0040002 or 07406-004000A (U.S.A. only)
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) or Ignition Mate peak voltage tester, MTP-08-0193 (U.S.A. only)	
ECM test harness 26P	070MZ-0010100	(two required)
O_2 sensor wrench	07LAA-PT50101	
Vacuum gauge set	07LMJ-001000A	(U.S.A. only)

TROUBLESHOOTING

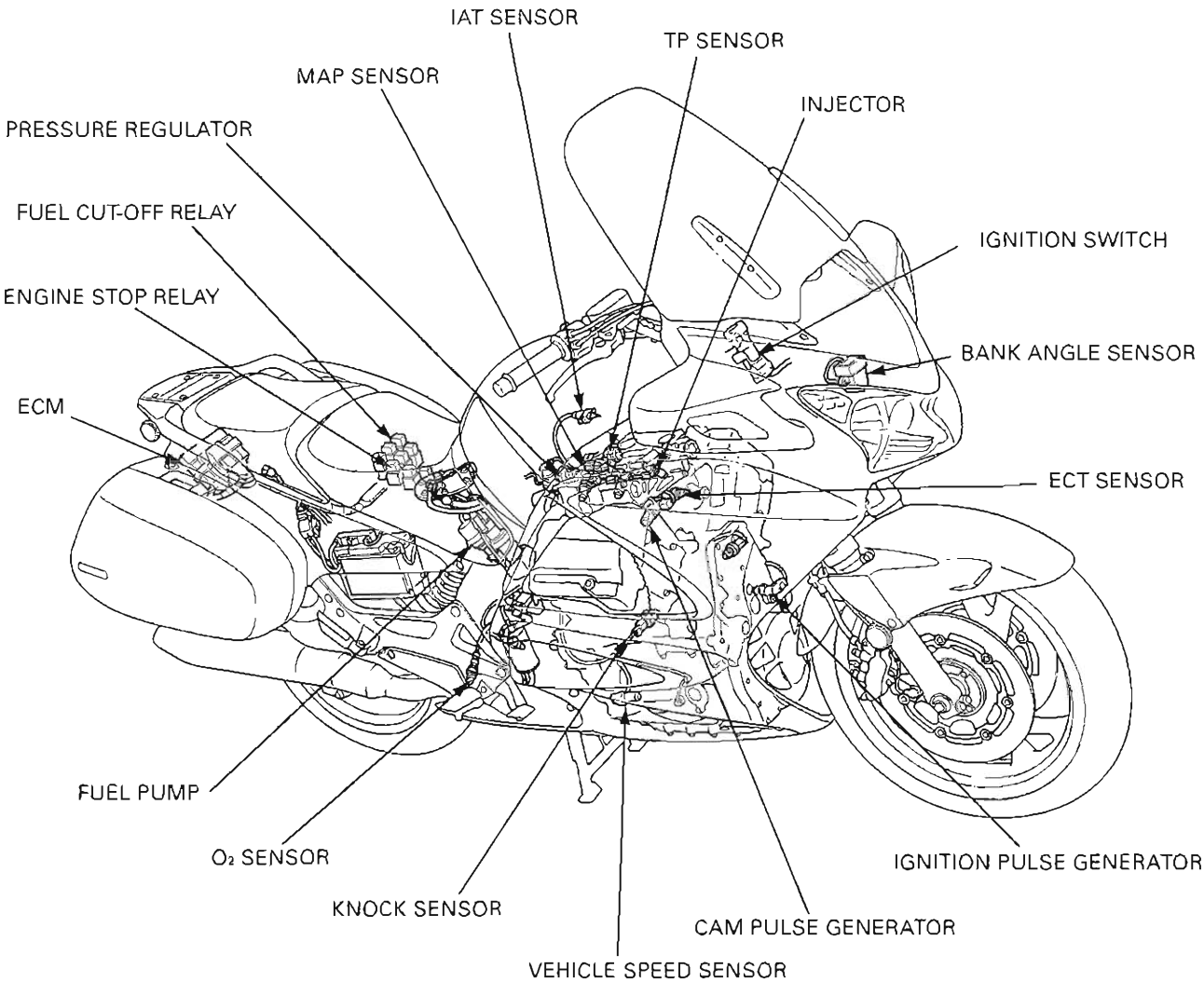
Engine won't start
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Faulty fuel pump
- Clogged fuel filter
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

Engine stall, hard to start, rough idling
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted
- Starter valve synchronization misadjusted

Backfiring or misfiring during acceleration
- Ignition system malfunction

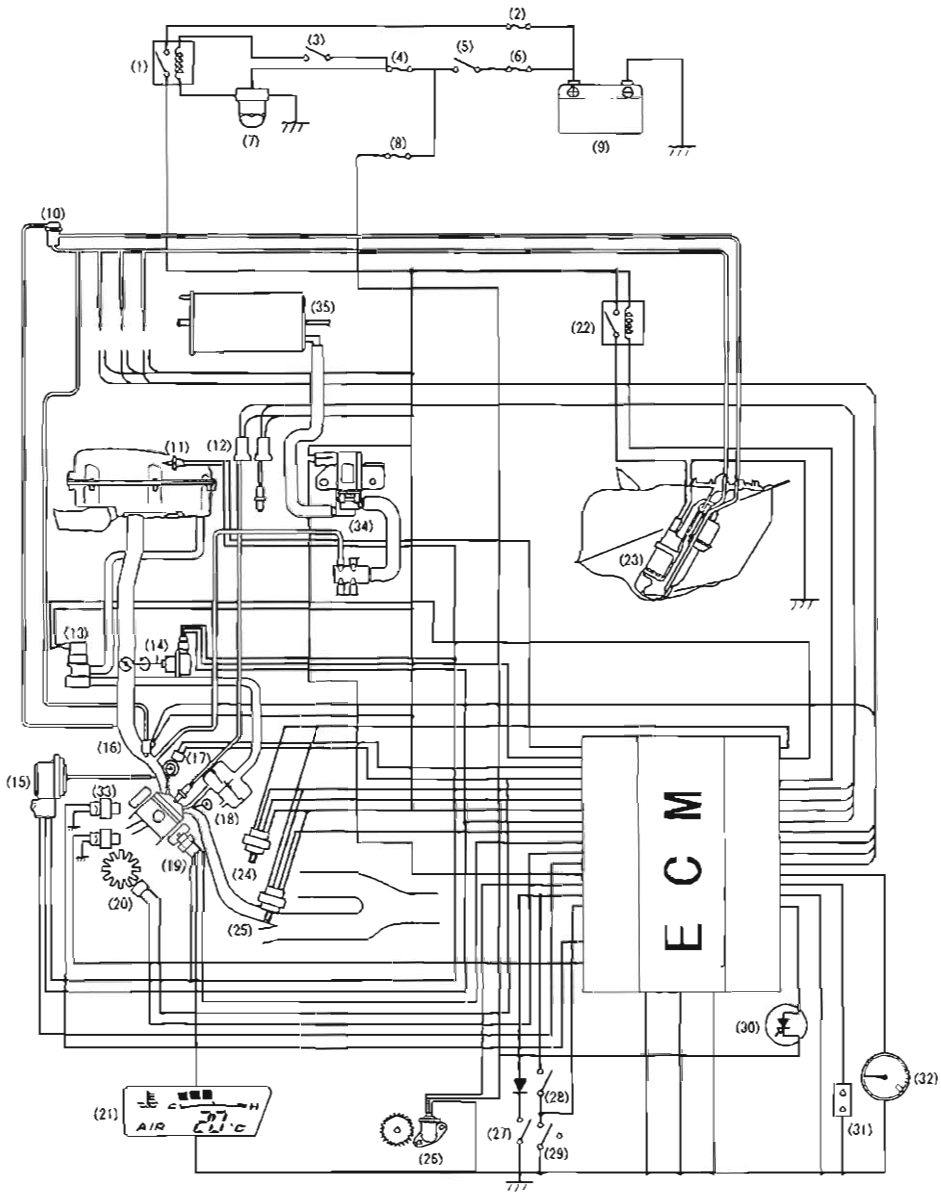
Poor performance (driveability) and poor fuel economy
- Pinched or clogged fuel hose
- Faulty pressure regulator

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	(19)	ECT sensor
(2)	Main fuse B (30A)	(20)	Ignition pulse generator
(3)	Engine stop switch	(21)	Coolant temperature indicator
(4)	Sub-fuse (10A)	(22)	Fuel cut-off relay
(5)	Ignition switch	(23)	Fuel pump
(6)	Main fuse A (30A)	(24)	No.1 O_2 sensor
(7)	Bank angle sensor	(25)	No.2 O_2 sensor
(8)	Sub-fuse (10A)	(26)	Vehicle speed sensor
(9)	Battery	(27)	Neutral switch
(10)	Pressure regulator	(28)	Clutch switch
(11)	IAT sensor	(29)	Side stand switch
(12)	Ignition coil	(30)	PGM-FI malfunction indicator
(13)	PAIR solenoid valve	(31)	Service check connector
(14)	TP sensor	(32)	Tachometer
(15)	MAP sensor	(33)	Knock sensor
(16)	Injector	(34)	EVAP purge control valve
(17)	Cam pulse generator	(35)	EVAP canister
(18)	PAIR check valve		

PGM-FI (Programmed Fuel Injection) SYSTEM

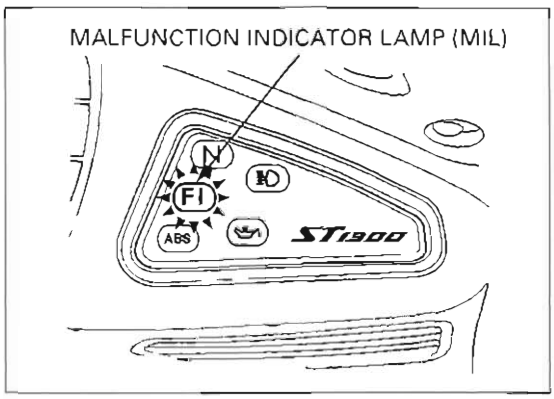
SELF-DIAGNOSTIC PROCEDURE

Place the motorcycle on its center stand.

Start the engine and let it idle.

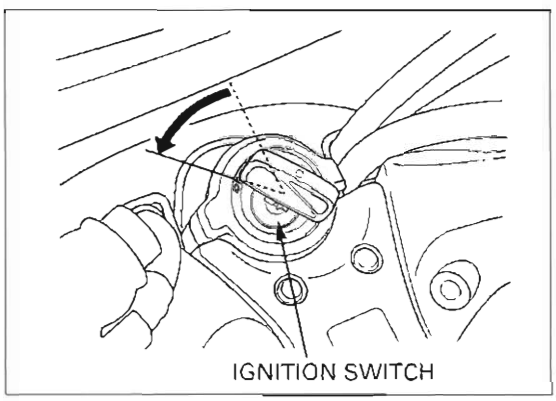
The malfunction indicator lamp (MIL) will only blink with the side stand down, the engine off and the engine stop switch set to RUN or when engine revs are below 5,000 min⁻¹ (rpm). If any problems are present the MIL will illuminate and stay on.

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 5-11).



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

Turn the ignition switch OFF.

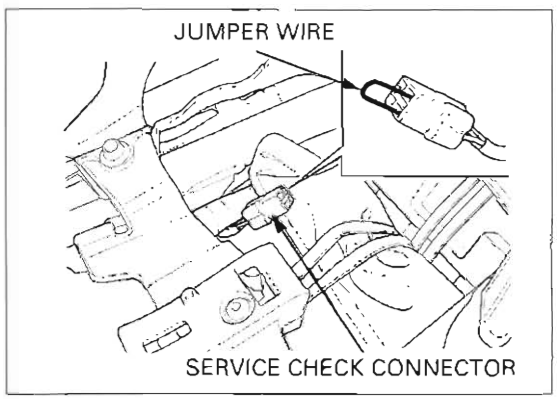


Remove the seat (page 2-5).

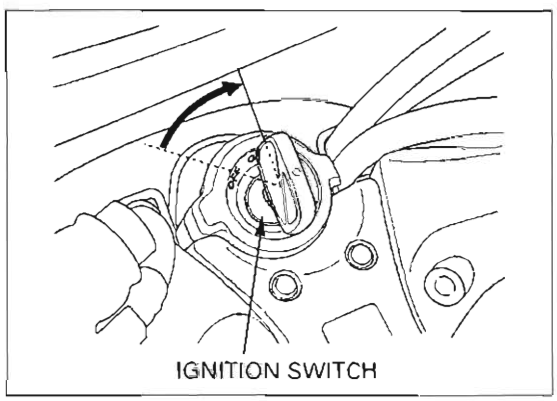
Do not short the other terminals except specified.

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

CONNECTION: Brown – Green/pink



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

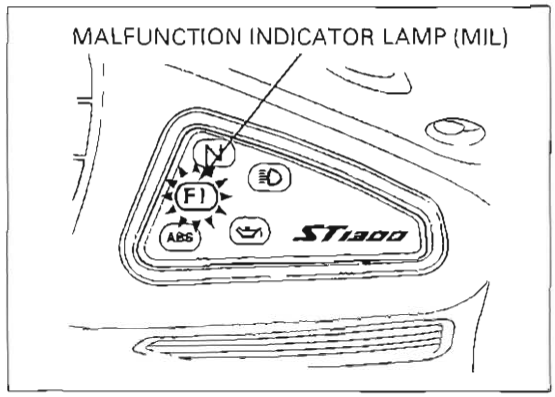


Even if the PGM-FI has memory data, the MIL does not blink when the engine is running

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

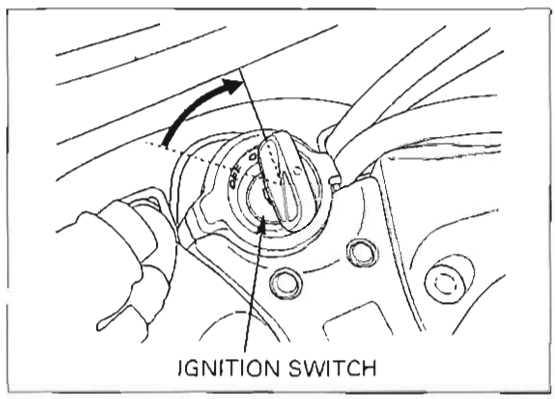
If the ECM has self diagnosis memory data, the MIL will start blinking when you turn the ignition switch ON.

Note how many times the MIL blinks, and determine the cause of the problem (page 5-11)



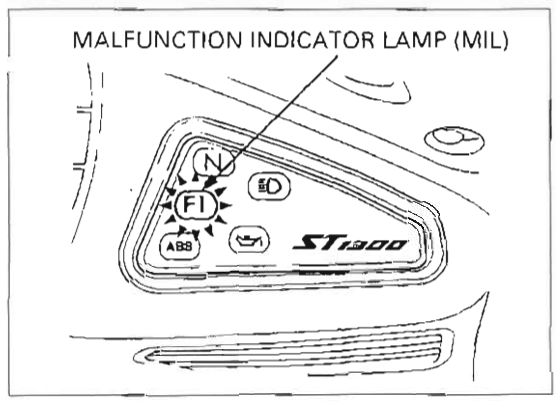
SELF-DIAGNOSIS RESET PROCEDURE

1. Turn the engine stop switch to RUN and ignition switch OFF.
2. Short the service check connector of the PGM-FI system using a jumper wire (page 5-7).
3. Turn the ignition switch 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.

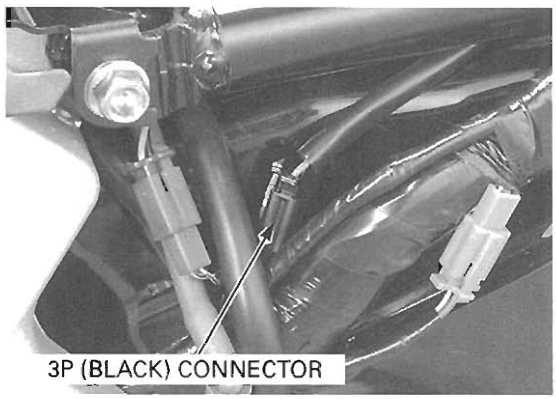


PEAK VOLTAGE INSPECTION PROCEDURE

- 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 a recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- If the Peak voltage tester (U.S.A. only) is used, follow the manufacturer's instruction.
- The display value differs depending upon the internal impedance of the multimeter.
- Disconnect the fuel pump connector before checking the peak voltage.

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

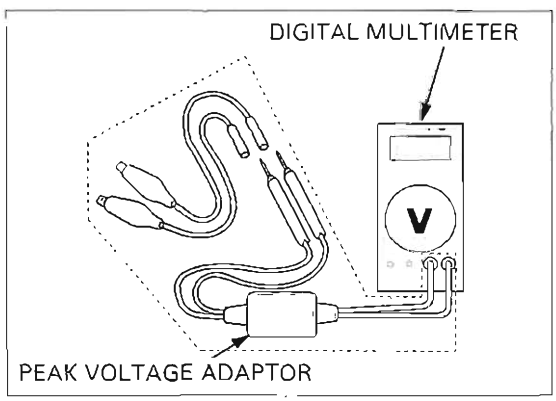
Disconnect the fuel pump 3P (Black) connector.



Avoid touching the tester probes to prevent electric shock.

Connect the peak voltage adaptor to the digital multimeter.

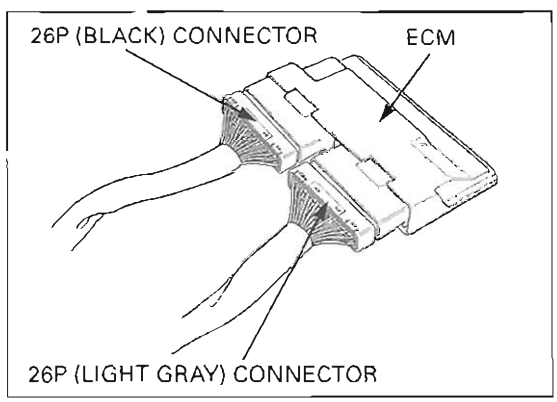
TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor **07HGJ–0020100 (Not available in U.S.A.)**
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum) or Ignition Mate peak voltage tester, MTP-08-0193 (U.S.A. only)



TEST HARNESS CONNECTION

Remove the rear cowl (page 2-8).

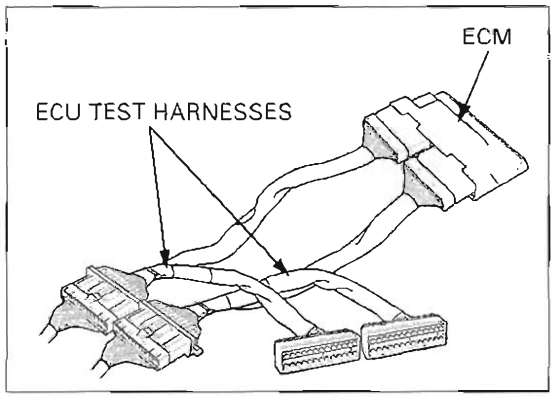
Disconnect the ECM 26P (Black) and 26P (Light gray) connectors from the unit.



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

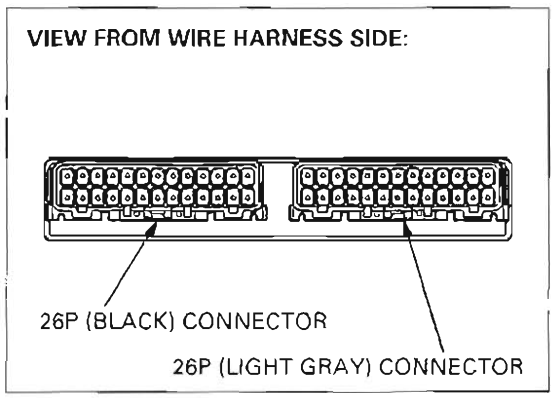
TOOLS:

ECU test harness 26P	**070MZ-0010100 (two required)**

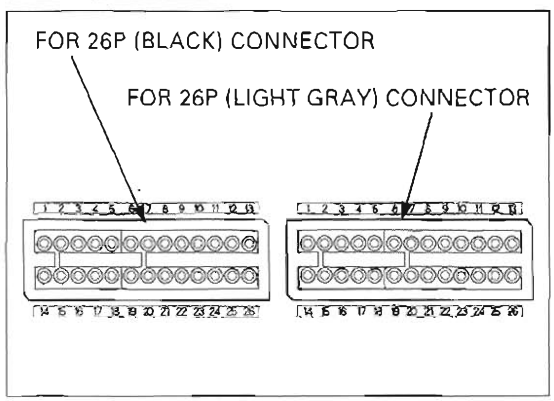


TEST HARNESS TERMINAL LAYOUT

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



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



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

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 33). When the indicator lights for 1.3 seconds it is equivalent to ten blinks. For example, a 1.3 second illumination and two blinks (0.5 second X 2) of the indicator equals 12 blinks. Follow code 12 troubleshooting (page 5-24).
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example; if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 (page 5-14) and 2 (page 5-16) troubleshooting.

Number of PGM-FI MIL blinks		Causes	Symptoms	Refer to
0	○ No blinks	• Open circuit at the power input wire of the ECM • Faulty bank angle sensor • Open circuit in bank angle sensor related circuit • Faulty engine stop relay • Open circuit in engine stop relay related wires • Faulty engine stop relay • Faulty engine stop switch • Open circuit in engine stop switch related wires • Faulty ignition switch • Faulty ECM • Blown PGM-FI fuse (30 A) • Open circuit in engine stop switch ground • Blown sub-fuse (10 A) (Starter/ignition)	• Engine does not start	5-86
	○ No blinks	• Open or short circuit in MIL wire • Faulty ECM	• Engine operates normally	5-7
	☼ Stay lit	• Short circuit in service check connector • Faulty ECM • Short circuit in service check connector wire	• Engine operates normally	–
1	☼ Blink	• Loose or poor contacts on MAP sensor connector • Open or short circuit in MAP sensor wire • Faulty MAP sensor	• Engine operates normally	5-14
2	☼ Blinks	• Loose or poor connection of the MAP sensor vacuum hose • Faulty MAP sensor	• Engine operates normally	5-16
7	☼ Blinks	• Loose or poor contact on ECT sensor • Open or short circuit in ECT sensor wire • Faulty ECT sensor Open or short circuit in ECT sensor wire	• Hard start at a low temperature (Simulate using numerical values; 90 °C/194 °F)	5-17
8	☼ Blinks	• Loose or poor contact on TP sensor connector • Open or short circuit in TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°)	5-19
9	☼ Blinks	• Loose or poor contact on IAT sensor Open or short circuit in IAT sensor wire • Faulty IAT sensor	• Engine operates normally (Simulate using numerical values; 25 °C/77 °F)	5-21

Number of PGM-FI MIL blinks		Causes	Symptoms	Refer to
11	 Blinks	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor connector Faulty vehicle speed sensor	• Engine operates normally	5-23
12	 Blinks	• Loose or poor contact on No.1 injector connector • Open or short circuit in No.1 injector wire • Faulty No.1 injector	• Engine does not start	5-24
13	 Blinks	• Loose or poor contact on No.2 injector connector • Open or short circuit in No.2 injector wire • Faulty No.2 injector	• Engine does not start	5-26
14	 Blinks	• Loose or poor contact on No.3 injector connector • Open or short circuit in No.3 injector wire • Faulty No.3 injector	• Engine does not start	5-28
15	 Blinks	• Loose or poor contact on No.4 injector connector • Open or short circuit in No.4 injector wire • Faulty No.4 injector	• Engine does not start	5-30
18	 Blinks	• Loose or poor contact on cam pulse generator • Open or short circuit in cam pulse generator • Faulty cam pulse generator	• Engine does not start	5-32
19	 Blinks	• Loose or poor contact on ignition pulse generator • Open or short circuit in ignition pulse generator • Faulty ignition pulse generator	• Engine does not start	5-34
21	 Blinks	• Faulty No.1/3 O_2 sensor	• Engine operates normally	5-36
22	 Blinks	• Faulty No.2/4 O_2 sensor	• Engine operates normally	5-37
23	 Blinks	• Faulty No.1/3 O_2 sensor heater	• Engine operates normally	5-39
24	 Blinks	• Faulty No.2/4 O_2 sensor heater	• Engine operates normally	5-42

Number of PGM-FI MIL blinks		Causes	Symptoms	Refer to
25	 Blinks	• Loose or poor contact on left knock sensor connector • Open or short circuit in left knock sensor • Faulty left knock sensor	• Engine operates normally	5-45
26	 Blinks	• Loose or poor contact on right knock sensor connector • Open or short circuit in right knock sensor • Faulty right knock sensor	• Engine operates normally	5-46
33	 Blinks	• Faulty E^2-PROM in ECM	• Engine operates normally • Does not hold the self-diagnosis data	5-48

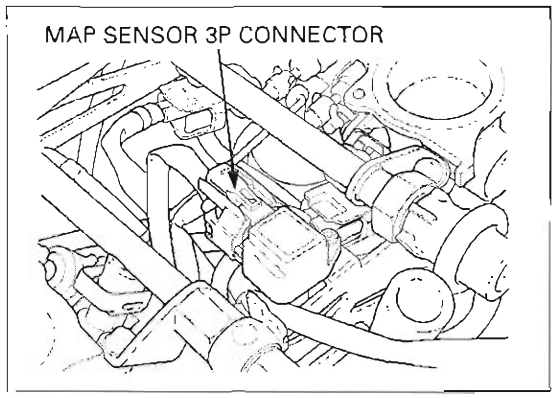
PGM-FI TROUBLESHOOTING

PGM-FI MIL 1 BLINK (MAP SENSOR)

1. **MAP Sensor Connection Inspection**

   Turn the ignition switch OFF.

   Disconnect the MAP sensor 3P connector.



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

   Connect the MAP sensor connector.

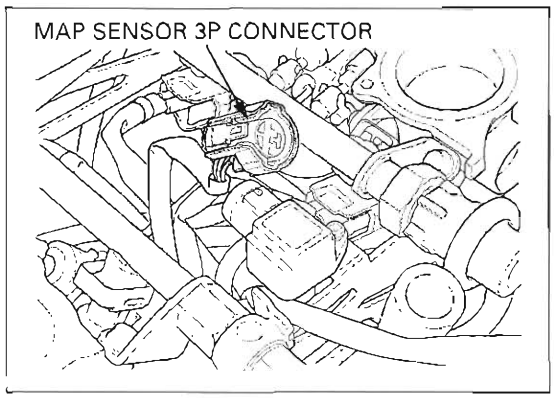
   Place the motorcycle on its center stand.

   Start the engine.

   Is the MIL blinking?

   NO – Loose or poor contact on the MAP sensor connector.

   YES – GO TO STEP 2.



2. **MAP Sensor Power Input Line Voltage Inspection**

   Turn the ignition switch OFF.

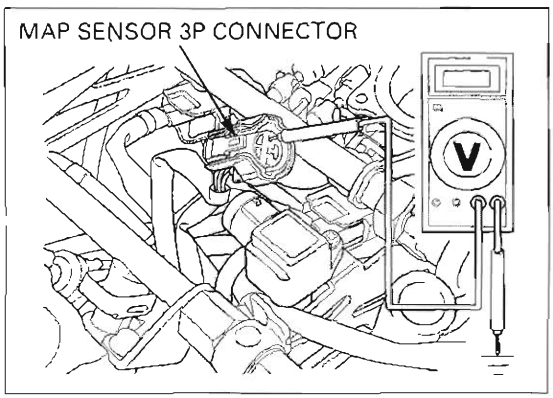
   Disconnect the MAP sensor 3P connector.
   Measure the voltage at the wire harness side.

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

   Is the voltage within 4.75 – 5.25 V?

   NO – • Open or short circuit in Yellow/red wire.
   • Loose or poor contact on the ECM connectors.

   YES – GO TO STEP 3.



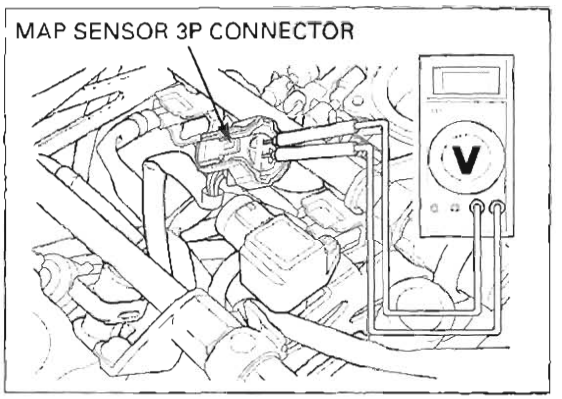
3. **MAP Sensor Ground Line Inspection**

Measure the voltage at the wire harness side.
Connection: Yellow/red (+) – Green/orange (–)
Standard: 4.75 – 5.25 V

Is the voltage within 4.75 – 5.25 V?

YES – • Open or short circuit in Green/orange.
• Loose or poor contact on the ECM connectors.

NO – GO TO STEP 4.



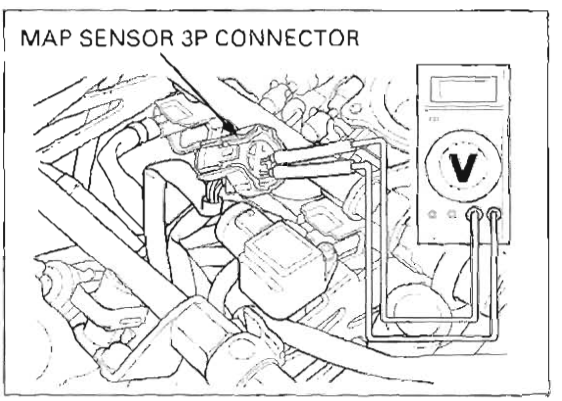
4. **MAP Sensor Output Line Inspection**

Measure the voltage at the wire harness side.
Connection: Light green/white (+) – Green/orange (–)
Standard: 4.75 – 5.25 V

Is the voltage within 4.75 – 5.25 V?

YES – • Open or short circuit in Light green/white wire.
• Loose or poor contact on the ECM connectors.

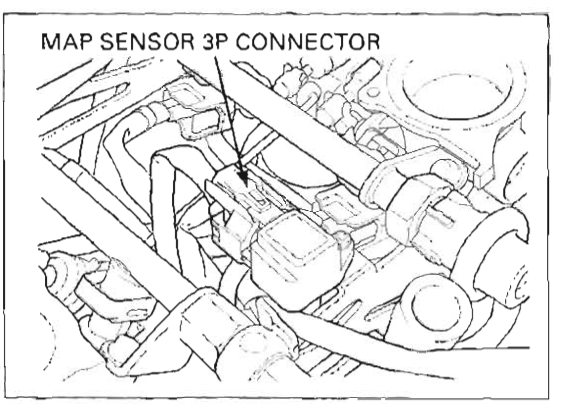
NO – GO TO STEP 5.



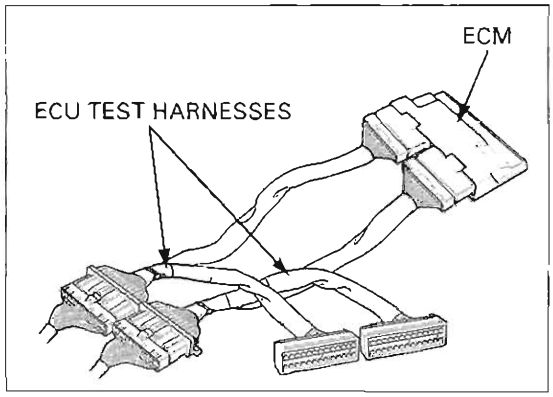
5. **MAP Sensor Signal Line Inspection**

Turn the ignition switch OFF.

Connect the MAP sensor 3P connector.



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



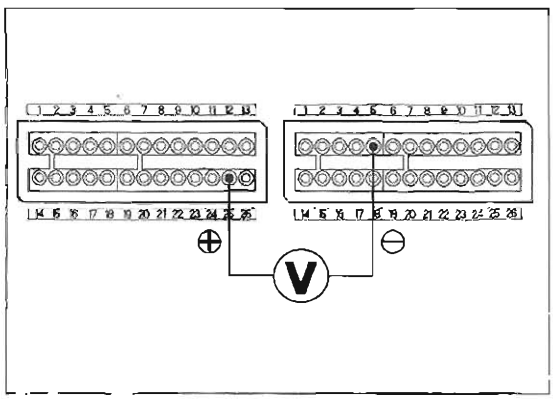
Measure the voltage at the test harness terminals.

Connection: A25 (+) – B5 (–)
Standard: 2.7 – 3.1 V

Is the voltage within 2.7 – 3.1 V?

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

NO – Faulty MAP sensor.



PGM-FI MIL 2 BLINKS (MAP SENSOR)

1. MANIFOLD ABSOLUTE PRESSURE TEST

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector.

Connect the vacuum gauge between the throttle body and the MAP sensor using a 3-way joint.

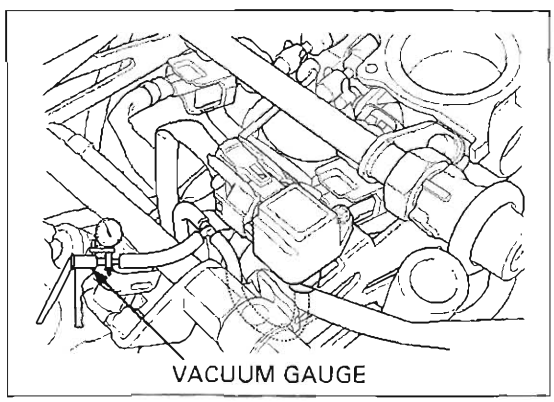
Start the engine and measure the manifold absolute pressure at idle speed.

Standard: 200 – 250 mm Hg

Is the manifold absolute pressure within 200 – 250 mm Hg?

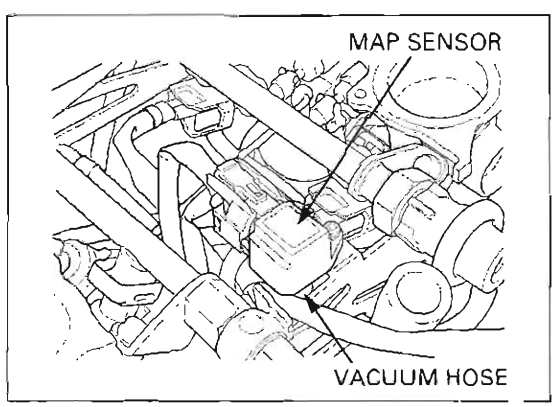
NO – Check the hose connection.

YES – GO TO STEP 2.

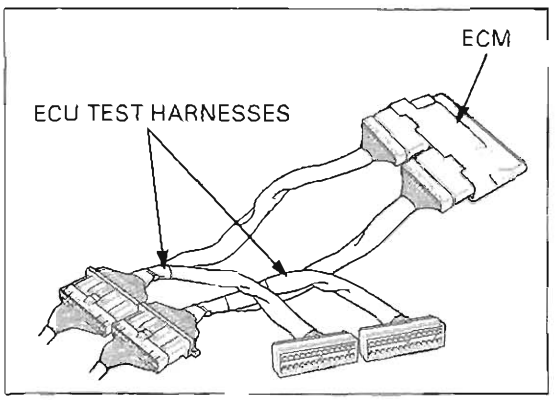


2. MAP Sensor Signal Inspection

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



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



Turn the ignition switch ON.

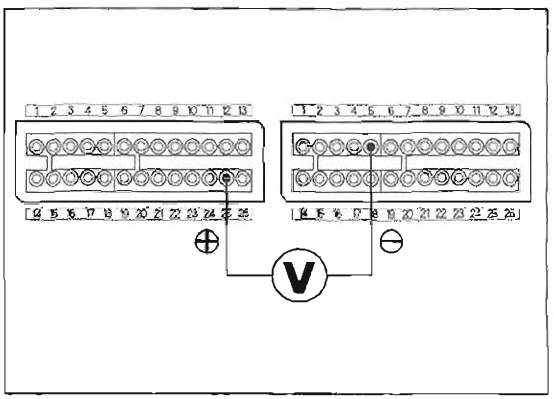
Measure the voltage at the test harness terminals.

Connection: A25 (+) – B5 (–)
Standard: 2.7 – 3.1 V
(1,013 kPa/760 mmHg)

Is the voltage within 2.7 – 3.1 V?

NO – Faulty MAP sensor.

YES – GO TO STEP 3.



3. MAP Sensor Signal Inspection at Idle

Start the engine.

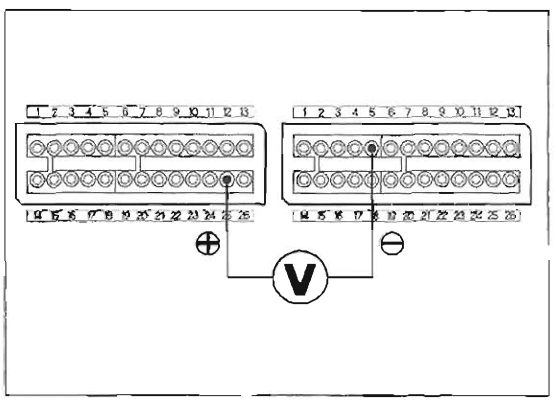
Measure the voltage at the test harness terminals (page 5-10).

Connection: A25 (+) – B5 (–)
Standard: 2.7 V maximum

Is the voltage at the standard value?

NO – Faulty MAP sensor.

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

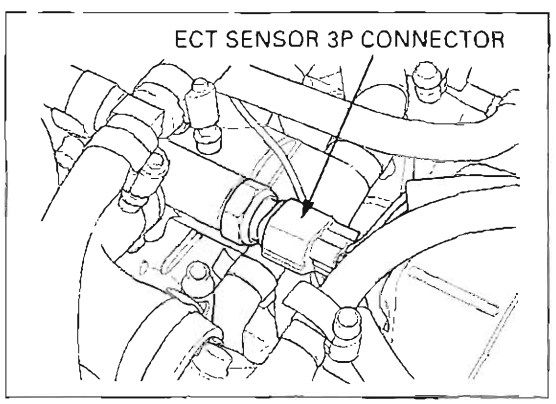


PGM-FI MIL 7 BLINKS (ECT SENSOR)

1. ECT Sensor Connection Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P connector.



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

Place the motorcycle on its center stand.

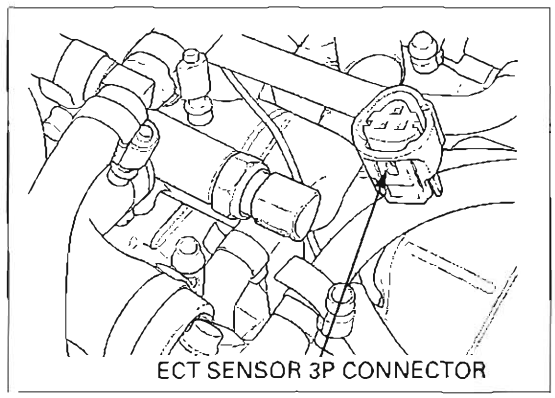
Connect the ECT sensor 3P connector.

Turn the ignition switch ON.
Check the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the ECT sensor connector.

YES – GO TO STEP 2.



2. **ECT Sensor Resistance Inspection**

Turn the ignition switch OFF.

Disconnect the ECT sensor connector.

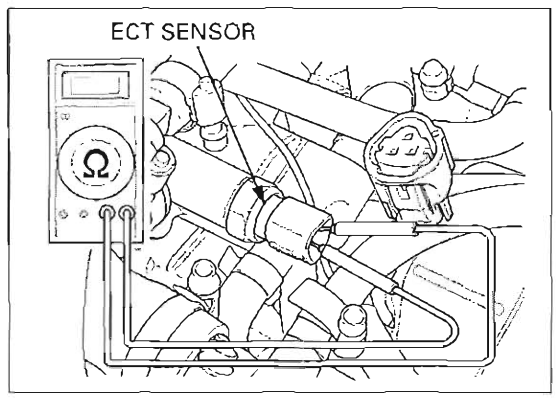
Measure the resistance at the ECT sensor terminals.

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

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

NO – Faulty ECT sensor.

YES – GO TO STEP 3.



3. **ECT Sensor Power Input Line Voltage Inspection**

Turn the ignition switch ON.

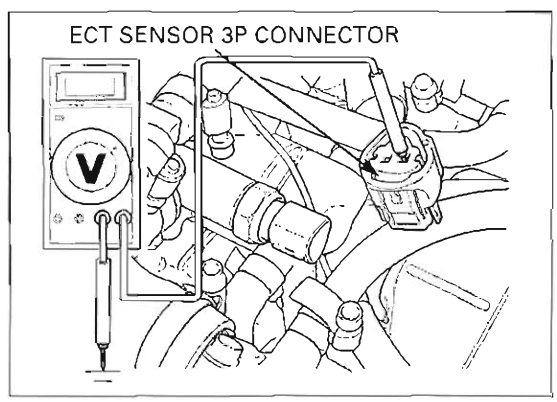
Measure the voltage between the ECT sensor connector terminal of the wire harness side and ground.

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

Is the voltage within 4.75 – 5.25 V?

NO – • Open or short circuit in Yellow/blue wire.
• Loose or poor contact on the ECM connectors.

YES – GO TO STEP 4.



4. **ECT Sensor Signal Line Voltage Inspection**

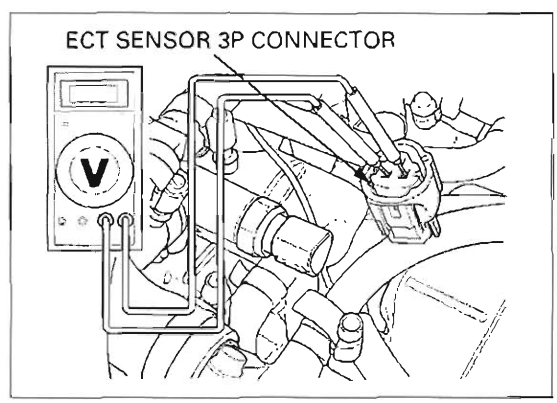
Measure the voltage at the ECT sensor connector of the wire harness side.

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

Is the voltage within 4.75 – 5.25 V?

NO – • Open or short circuit in Green/orange wire.
• Loose or poor contact on the ECM connectors.

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

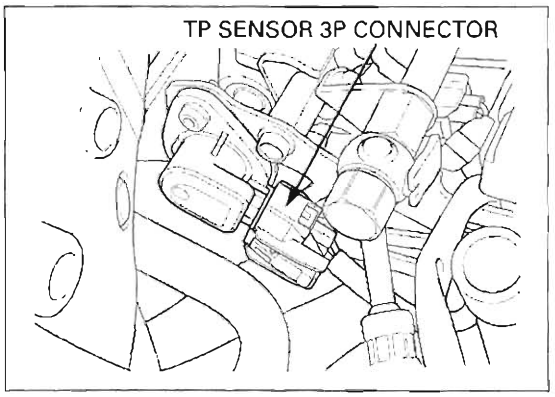


PGM-FI MIL 8 BLINKS (TP SENSOR)

1. **TP Sensor Connection Inspection**

Turn the ignition switch OFF.

Disconnect the TP sensor 3P (Blue) connector.



Check for loose or poor contact on the TP sensor connector.
Connect the TP sensor connector.

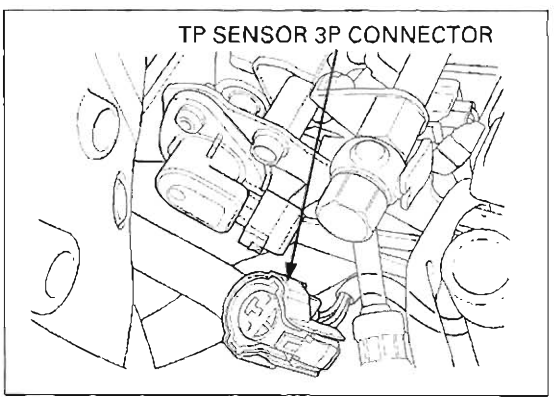
Place the motorcycle on its side stand.

Start the engine and check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the TP sensor connector.

YES – GO TO STEP 2.



2. **TP Sensor Input Voltage Inspection**

Turn the ignition switch OFF.

Disconnect the TP sensor 3P connector.

Turn the ignition switch ON.

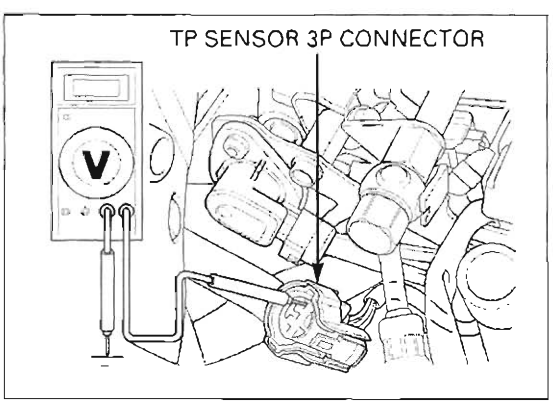
Measure the voltage between the wire harness side connector terminal and ground.

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

Is the voltage within 4.75 – 5.25 V?

NO – • Open or short circuit in the Yellow/red wire.
• Loose or poor contact on the ECM connectors.

YES – GO TO STEP 4.



3. **TP Sensor Power Input Line Voltage Inspection**

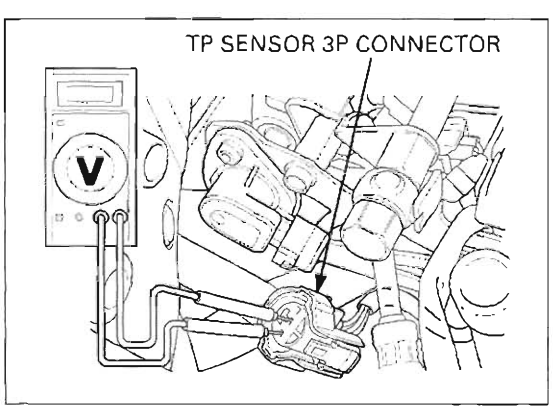
Measure the voltage between at the TP sensor terminal of the wire harness side.

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

Is the voltage within 4.75 – 5.25 V?

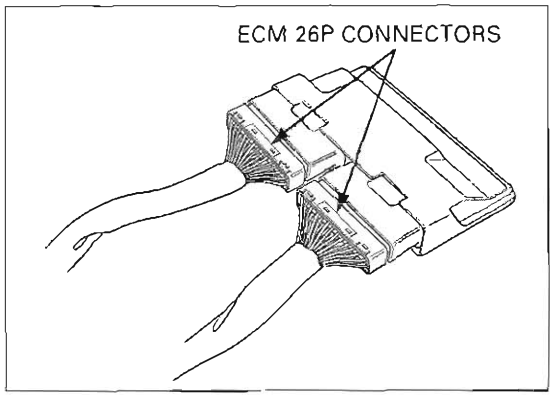
NO – • Open or short circuit in Light green wire
• Loose or poor contact on the ECM connectors.

YES – GO TO STEP 4.



4. **TP Sensor Line Short Circuit Inspection**

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



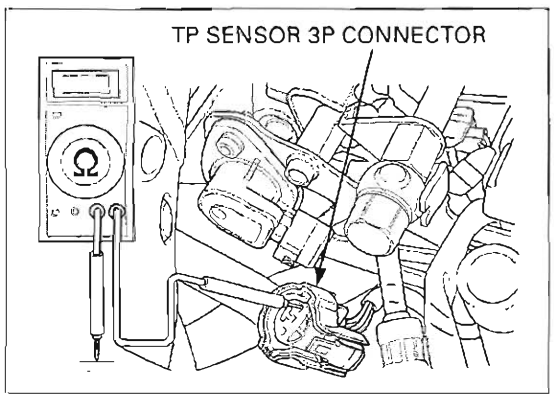
Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

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

Is there continuity?

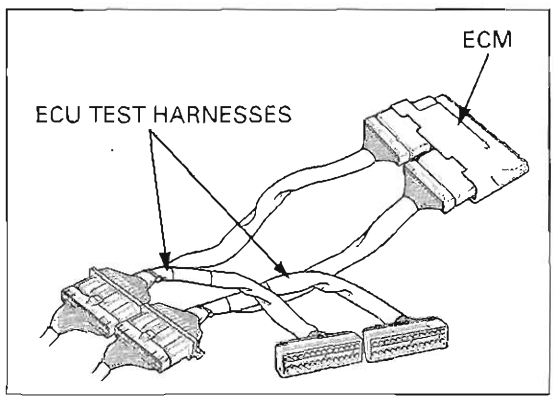
YES – Short circuit in Yellow/red wire.

NO – GO TO STEP 5.



5. **TP Sensor Input Line Inspection**

Connect the test harness to ECM connectors.



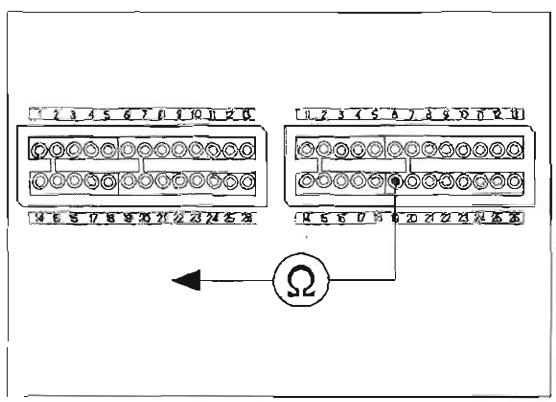
Check for continuity between the test harness terminal and the TP sensor connector terminal.

Connection: Light green – B19

Is there continuity?

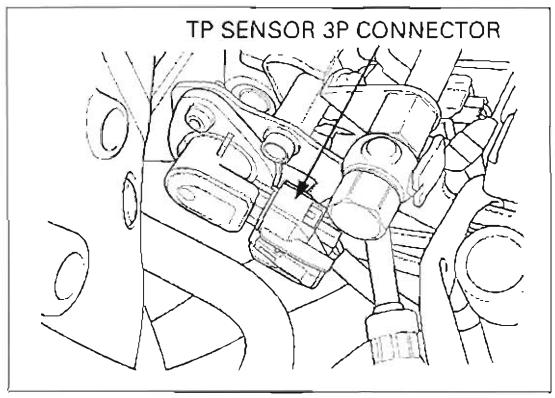
NO – Open or short circuit in Light green wire.

YES – GO TO STEP 6.



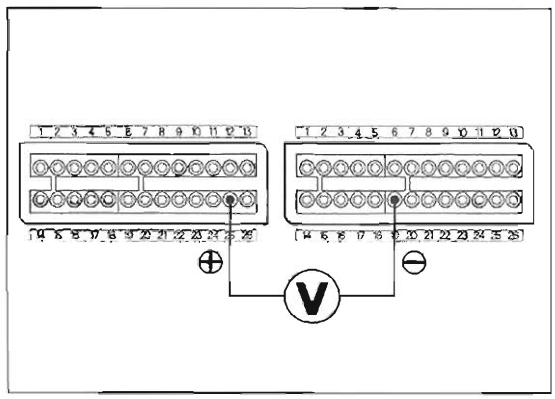
6. **TP Sensor Voltage at ECM**

Connect the TP sensor 3P connector.



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

Connection: A25 (+) – B19 (–)
Standard: *0.4 – 0.6 V (throttle fully closed)
***4.2 – 4.8 V (throttle fully open)**



- 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 X 4.75/5.0 = 0.38 V
  0.6 X 4.75/5.0 = 0.57 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.

Is the voltage within standard value?

NO – Faulty TP sensor.

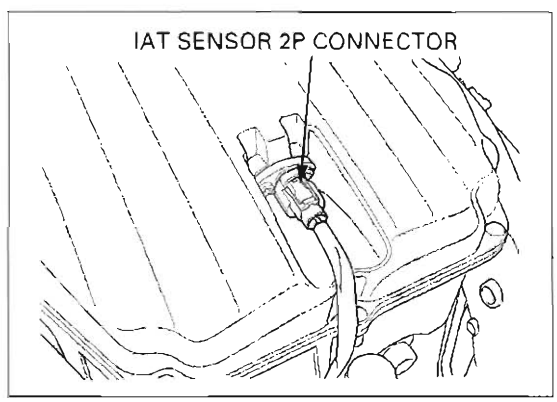
YES – Replace the ECM with a new one, and inspect it again.

PGM-FI MIL 9 BLINKS (IAT SENSOR)

1. **IAT Sensor Connection Inspection**

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.



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

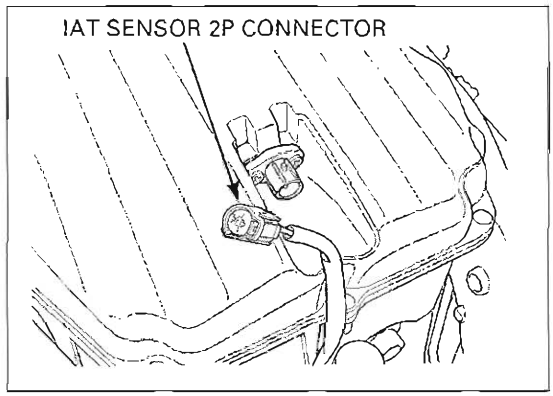
Connect the IAT sensor 2P connector.

Turn the ignition switch ON.
Check the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the IAT sensor connector.

YES – GO TO STEP 2.



2. IAT Sensor Resistance Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.

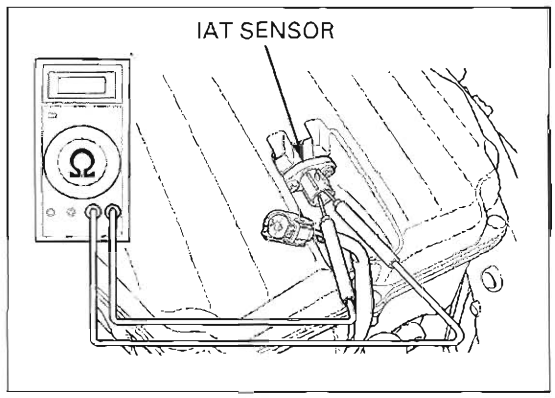
Measure the resistance at the IAT sensor terminals (at 20 – 30 °C/68 – 86 °F).

Standard: 1 – 4 kΩ (20 - 30 °C/68 - 86 °F)

Is the resistance within 1 – 4 kΩ?

NO – Faulty IAT sensor.

YES – GO TO STEP 3.



3. IAT Sensor Power Input Line Voltage Inspection

Turn the ignition switch ON.

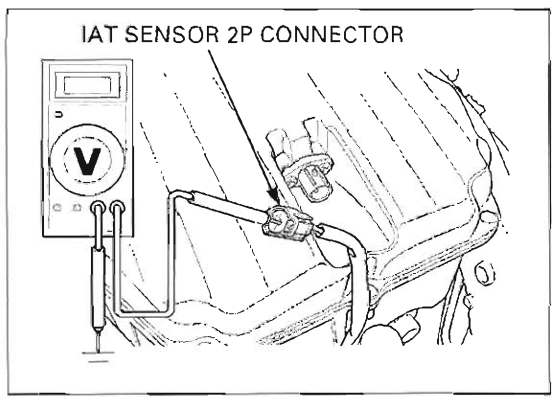
Measure the voltage between the IAT sensor connector terminal of the wire harness side and ground.

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

Is the voltage within 4.75 – 5.25 V?

NO – • Open or short circuit in Gray/blue wire.
• Loose or poor contact on the ECM connectors.

YES – GO TO STEP 4.



4. IAT Sensor Signal Line Voltage Inspection

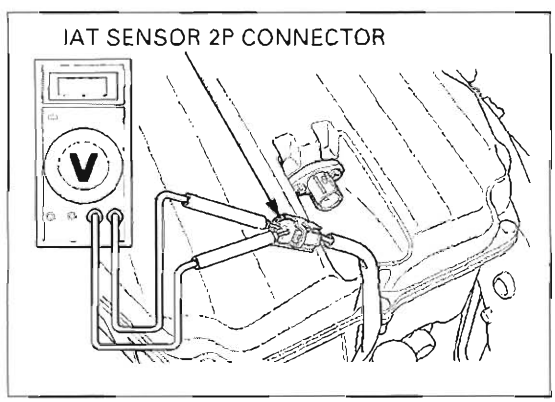
Measure the voltage at the IAT sensor connector of the wire harness side.

Connection: Gray/blue (+) – Green/orange (–)
Standard: 4.75 – 5.25 V

Is the voltage within 4.75 – 5.25 V?

NO – • Open or short circuit in Green/orange wire.
• Loose or poor contact on the ECM connectors.

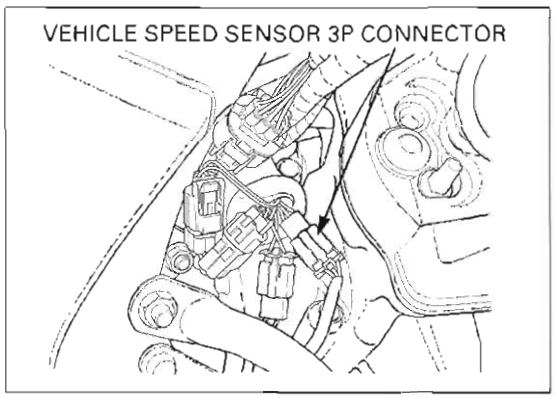
YES – Replace the ECM with a new one, and inspect it again.



PGM-FI MIL 11 BLINKS (VEHICLE SPEED SENSOR)

1. **Vehicle Speed Sensor Connection Inspection**

Turn the ignition switch OFF.
Disconnect the vehicle speed sensor 3P (Black) connector.



Check for loose or poor contact on the vehicle speed sensor connector.

Connect the vehicle speed sensor connector.

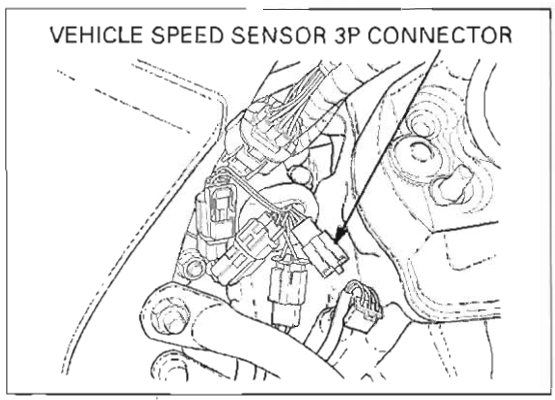
Ride the motorcycle and keep the engine rev more than 5,000 rpm about 20 seconds or more.

Put the side stand down, and check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the vehicle speed sensor connector.

YES – GO TO STEP 2.



2. **Vehicle Speed Sensor Power Input Line Voltage Inspection**

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P connector.

Turn the ignition switch ON.

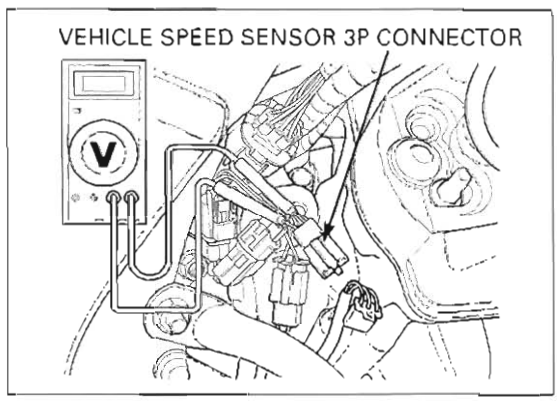
Measure the voltage at the wire harness side.

Connection: Black/brown (+) – Green/black (–)
Standard: Battery voltage

Does battery voltage exist?

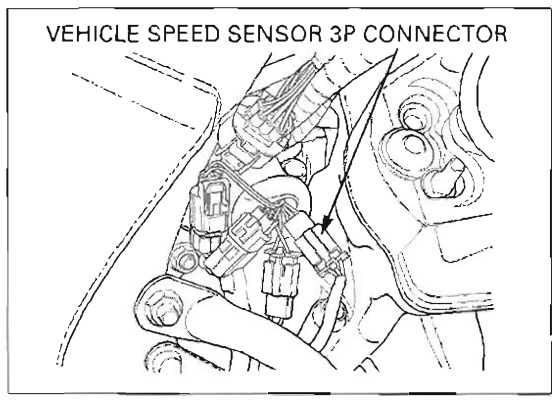
No – • Open or short circuit in Black/brown wire of wire harness.
• Open or short circuit in Green/black wire of wire harness.

YES – GO TO STEP 3.



3. **Vehicle Speed Sensor Pulse Signal Voltage Inspection**

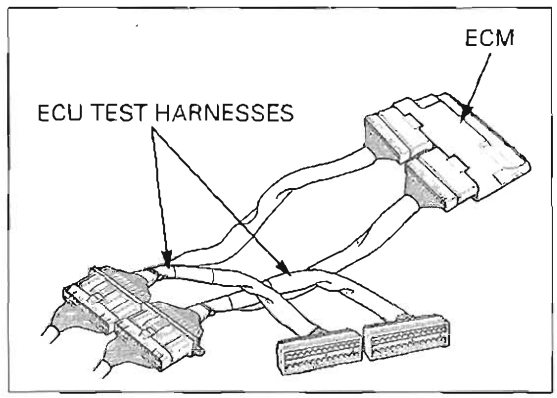
Connect the vehicle speed sensor 3P (Black) connector.



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.



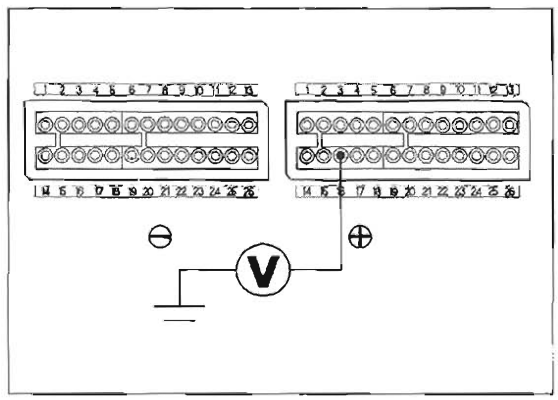
Measure the voltage at the test harness terminals with the ignition switch ON while slowly turning the rear wheel by hand.

Connection: B16 (+) – Ground (–)
Standard: Repeat 0 to 5 V

Is there standard voltage?

YES – Open or short circuit in Pink/green wire of the wire harness.

NO – Replace the ECM with a new one, and inspect it again.



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

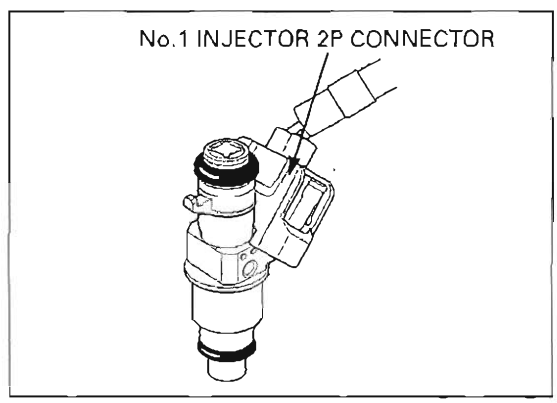
1. **Injector Connection Inspection**

Turn the ignition switch OFF.
Disconnect the No. 1 injector 2P (Black) connector.
Check for loose or poor contact on the No.1 injector 2P (Black) connector.
Connect the No.1 injector 2P (Black) connector.
Turn the ignition switch ON.
Check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the No.1 injector connector.

YES – GO TO STEP 2.



2. **No.1 Injector Resistance Inspection**

Turn the ignition switch OFF.

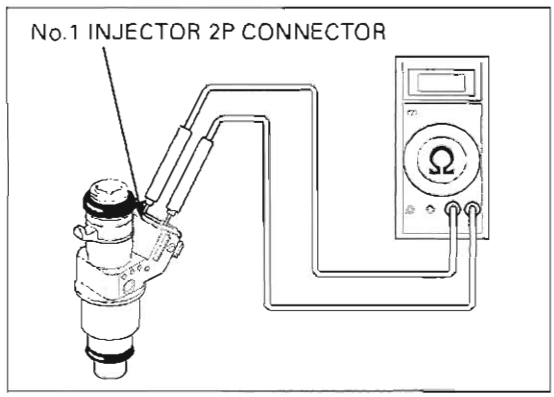
Disconnect the No.1 injector 2P connector and measure the resistance of the No.1 injector 2P connector terminals.

Connection: Black/white (+) – Pink/blue (–)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Faulty No.1 injector.

YES – GO TO STEP 3.



3. **No.1 Injector Short Circuit Inspection**

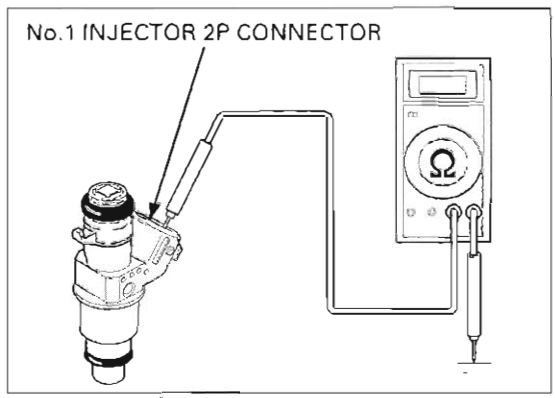
Check for continuity between the No.1 injector and ground.

Connection: Black/white (+) – Ground (–)

Is there continuity?

YES – Faulty No.1 injector.

NO – GO TO STEP 4.



4. **No.1 Injector Power Input Line Inspection**

Turn the ignition switch ON.

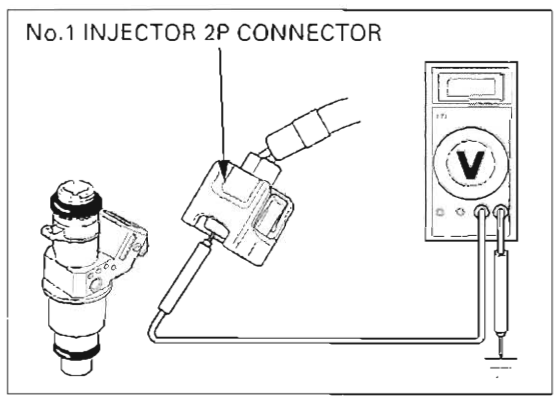
Measure the voltage between the No. 1 injector connector of the wire harness side and ground.

Connection: Black/white (+) – Ground (–)
Standard: Battery voltage

Does battery voltage exist?

NO – Open or short circuit in Black/white wire.

YES – GO TO STEP 5.



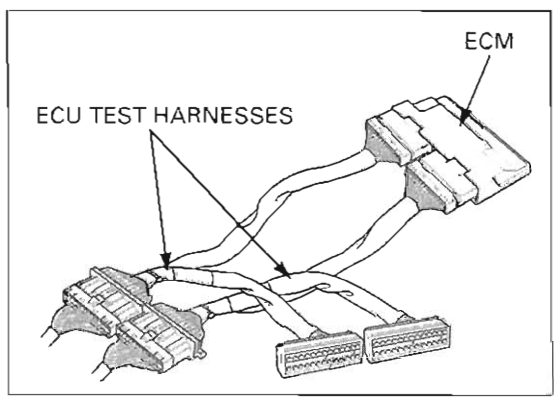
5. **No.1 Injector Resistance Inspection at ECM**

Turn the ignition switch OFF.

Connect the No. 1 injector connector.

Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



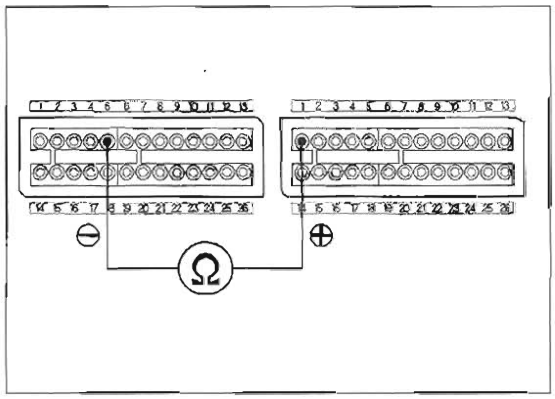
Measure the resistance at the test harness terminals.

Connection: A5 (–) – B1 (+)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Open or short circuit in Black/white and/or Pink/blue wire.

YES – GO TO STEP 6.



6. **No.1 Injector Control Line Short Circuit Inspection**

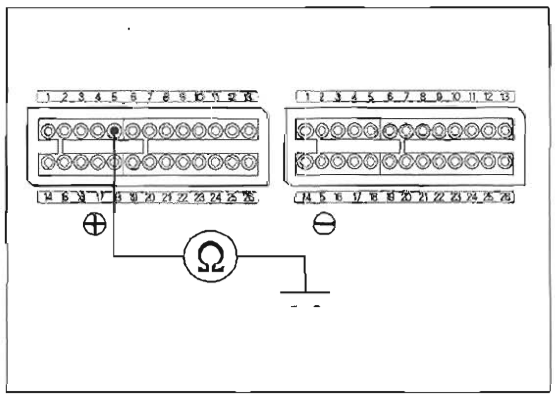
Check for continuity between the test harness terminal and ground.

Connection: A5 (+) – Ground (–)

Is there continuity?

YES – Short circuit in Pink/blue wire.

NO – Replace the ECM with a new one, and inspect it again.



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

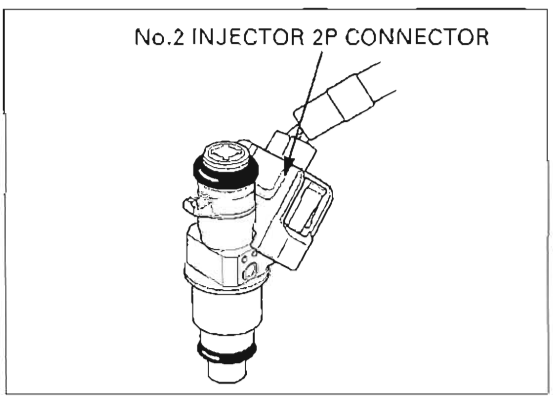
1. **Injector Connection Inspection**

Turn the ignition switch OFF.
Disconnect the No. 2 injector 2P (Black) connector.
Check for loose or poor contact on the No.2 injector 2P (Black) connector.
Connect the No.2 injector 2P (Black) connector.
Turn the ignition switch ON.
Check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the No.2 injector connector.

YES – GO TO STEP 2.



2. **No.2 Injector Resistance Inspection**

Turn the ignition switch OFF.

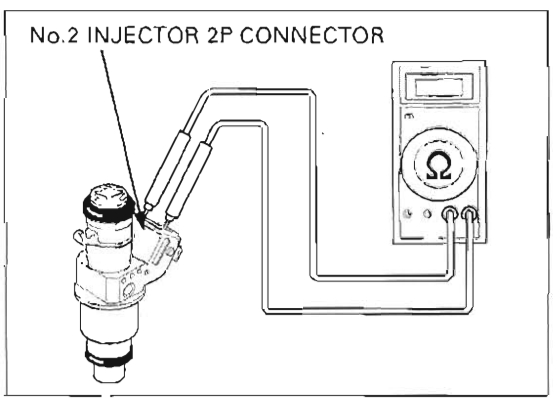
Disconnect the No.2 injector 2P connector and measure the resistance of the No.2 injector 2P connector terminals.

Connection: Black/white (+) – Red/yellow (–)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Faulty No.2 injector.

YES – GO TO STEP 3.



3. **No.2 Injector Short Circuit Inspection**

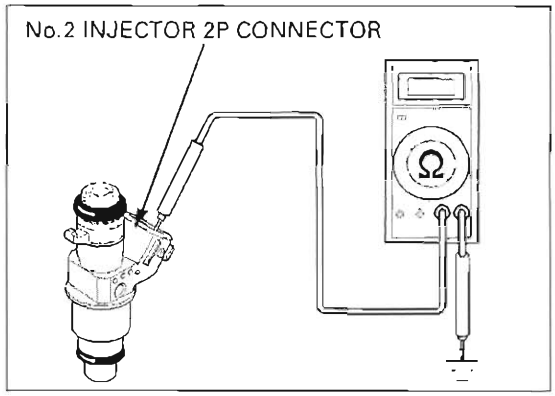
Check for continuity between the No.2 injector and ground.

Connection: Black/white (+) – Ground (–)

Is there continuity?

YES – Faulty No.2 injector.

NO – GO TO STEP 4.



4. **No.2 Injector Power Input Line Inspection**

Turn the ignition switch ON.

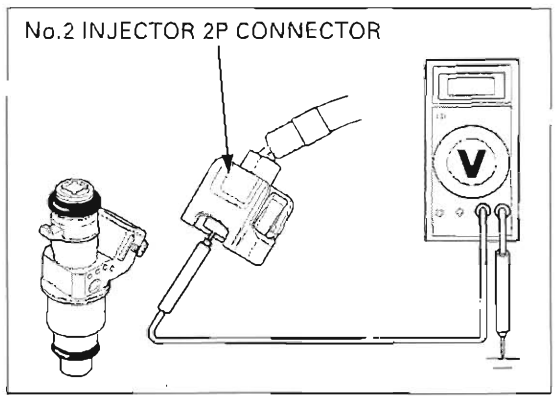
Measure the voltage between the No. 2 injector connector of the wire harness side and ground.

Connection: **Black/white (+) – Ground (–)**
Standard: **Battery voltage**

Does battery voltage exist?

NO – Open or short circuit in Black/white wire.

YES – GO TO STEP 5.



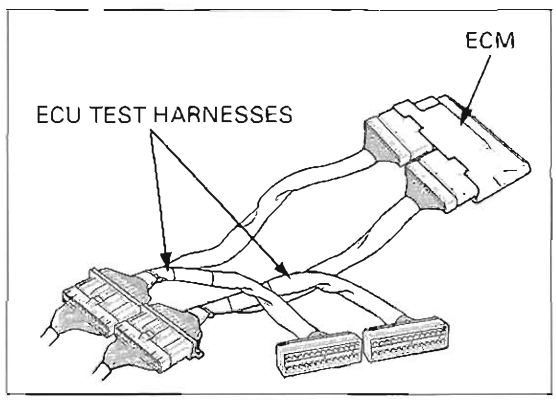
5. **No.2 Injector Resistance Inspection at ECM**

Turn the ignition switch OFF.

Connect the No. 2 injector connector.

Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



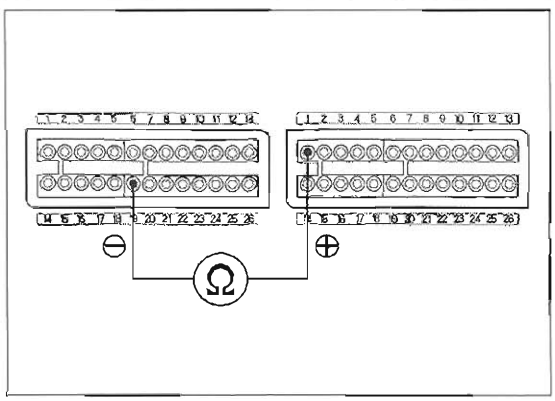
Measure the resistance at the test harness terminals.

Connection: A19 (–) – B1 (+)
Standard: **11.1 – 12.3 Ω (20 °C/68 °F)**

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

NO – Open or short circuit in Black/white and/or Red/yellow wire.

YES – GO TO STEP 6.



6. **No.2 Injector Control Line Short Circuit Inspection**

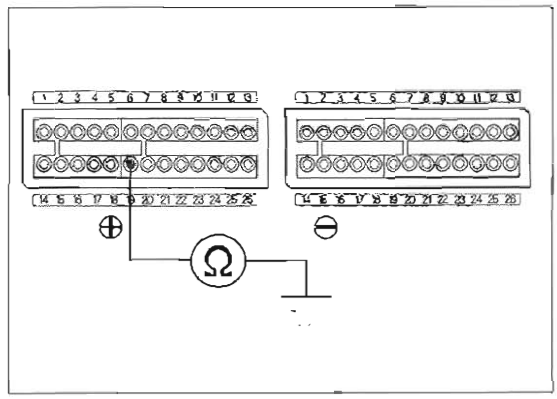
Check for continuity between the test harness terminal and ground.

Connection: A19 (+) – Ground (–)

Is there continuity?

YES – Short circuit in Red/yellow wire.

NO – Replace the ECM with a new one, and inspect it again.



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

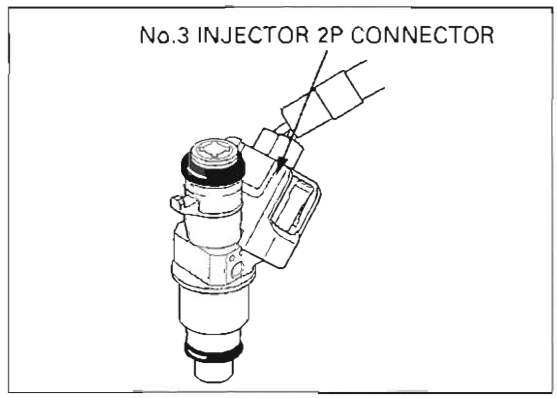
1. **Injector Connection Inspection**

Turn the ignition switch OFF.
Disconnect the No. 3 injector 2P (Black) connector.
Check for loose or poor contact on the No.3 injector 2P (Black) connector.
Connect the No.3 injector 2P (Black) connector.
Turn the ignition switch ON.
Check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the No.3 injector connector.

YES – GO TO STEP 2.



2. **No.3 Injector Resistance Inspection**

Turn the ignition switch OFF.

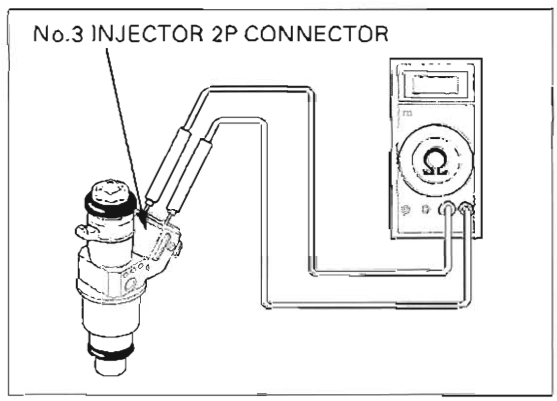
Disconnect the No.3 injector 2P connector and measure the resistance of the No.3 injector 2P connector terminals.

Connection: Black/white (+) – Pink/green (–)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Faulty No.3 injector.

YES – GO TO STEP 3.



3. **No.3 Injector Short Circuit Inspection**

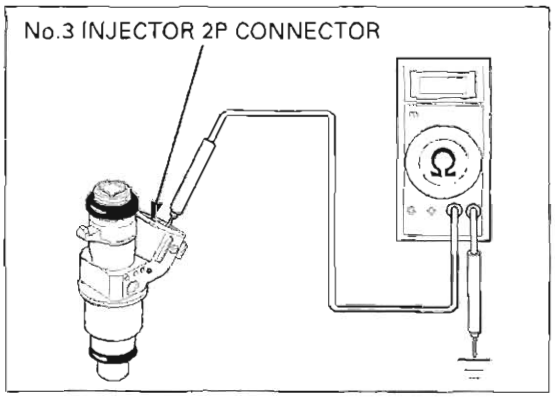
Check for continuity between the No.3 injector and ground.

Connection: Black/white (+) – Ground (–)

Is there continuity?

YES – Faulty No.3 injector.

NO – GO TO STEP 4.



4. **No.3 Injector Power Input Line Inspection**

Turn the ignition switch ON.

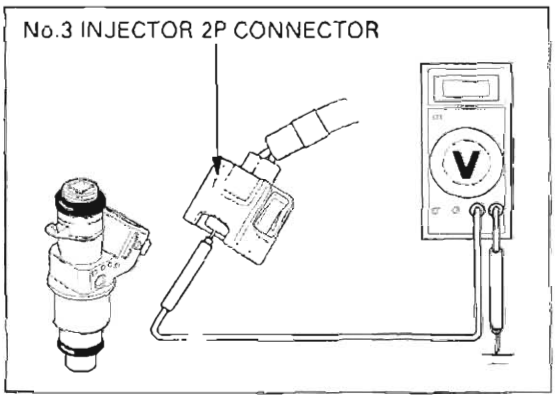
Measure the voltage between the No. 3 injector connector of the wire harness side and ground.

Connection: Black/white (+) – Ground (–)
Standard: Battery voltage

Does battery voltage exist?

NO – Open or short circuit in Black/white wire.

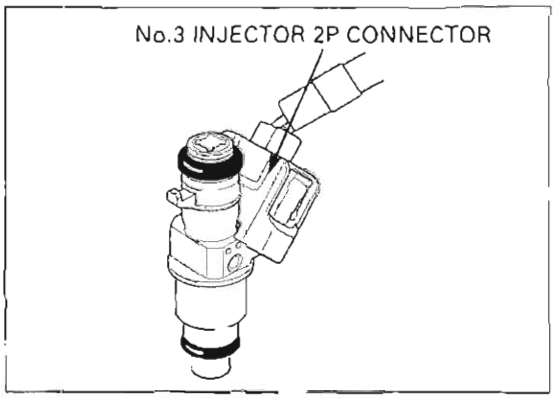
YES – GO TO STEP 5.



5. **No.3 Injector Resistance Inspection at ECM**

Turn the ignition switch OFF.

Connect the No. 3 injector connector.



Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.

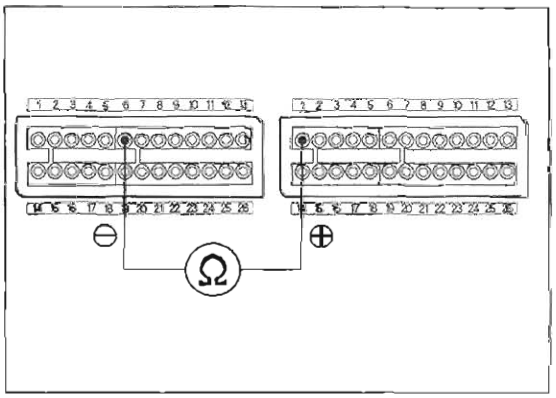
Measure the resistance at the test harness terminals.

Connection: A6 (–) – B1 (+)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Open or short circuit in Black/white and/or Pink/green wire.

YES – GO TO STEP 6.



6. No.3 Injector Control Line Short Circuit Inspection

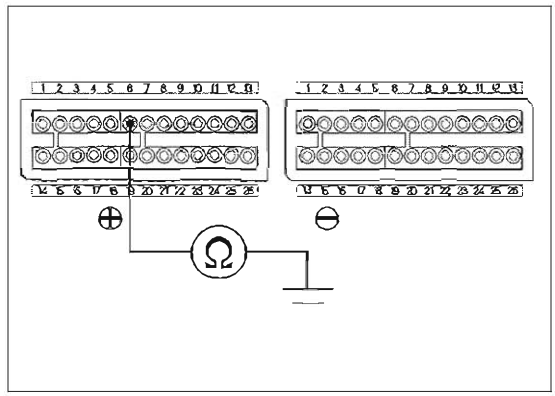
Check for continuity between the test harness terminal and ground.

Connection: A6 (+) – Ground (–)

Is there continuity?

YES – Short circuit in Pink/green wire.

NO – Replace the ECM with a new one, and inspect it again.



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

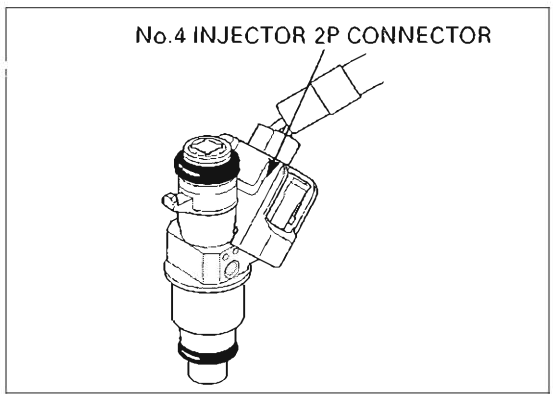
1. Injector Connection Inspection

Turn the ignition switch OFF.
Disconnect the No. 4 injector 2P (Black) connector.
Check for loose or poor contact on the No.4 injector 2P (Black) connector.
Connect the No.4 injector 2P (Black) connector.
Turn the ignition switch ON.
Check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the No.4 injector connector.

YES – GO TO STEP 2.



2. No.4 Injector Resistance Inspection

Turn the ignition switch OFF.

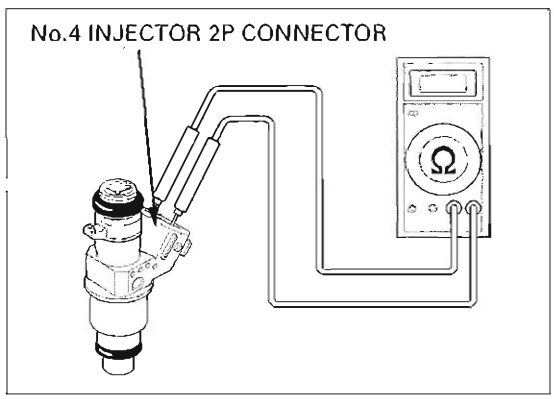
Disconnect the No.4 injector 2P connector and measure the resistance of the No.4 injector 2P connector terminals.

Connection: Black/white (+) – Pink/black (–)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Faulty No.4 injector.

YES – GO TO STEP 3.



3. **No.4 Injector Short Circuit Inspection**

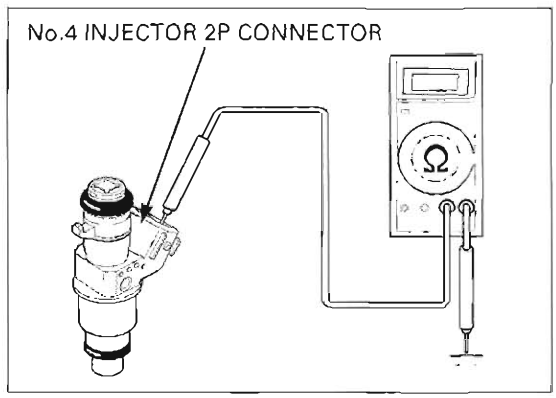
Check for continuity between the No.4 injector and ground.

Connection: Black/white (+) – Ground (–)

Is there continuity?

YES – Faulty No.4 injector.

NO – GO TO STEP 4.



4. **No.4 Injector Power Input Line Inspection**

Turn the ignition switch ON.

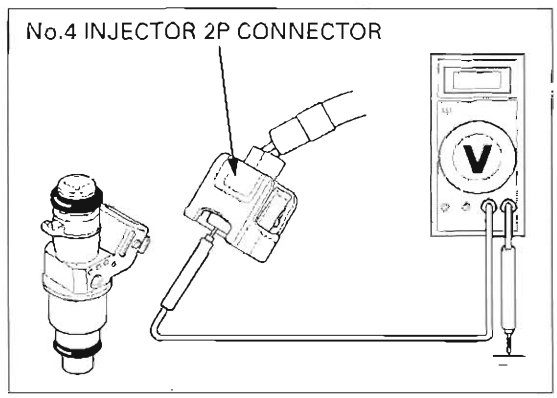
Measure the voltage between the No. 4 injector connector of the wire harness side and ground.

Connection: Black/white (+) – Ground (–)
Standard: Battery voltage

Does battery voltage exist?

NO – Open or short circuit in Black/white wire.

YES – GO TO STEP 5.



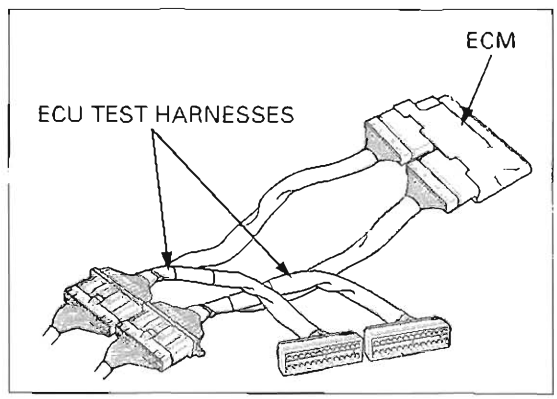
5. **No.4 Injector Resistance Inspection at ECM**

Turn the ignition switch OFF.

Connect the No. 4 injector connector.

Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



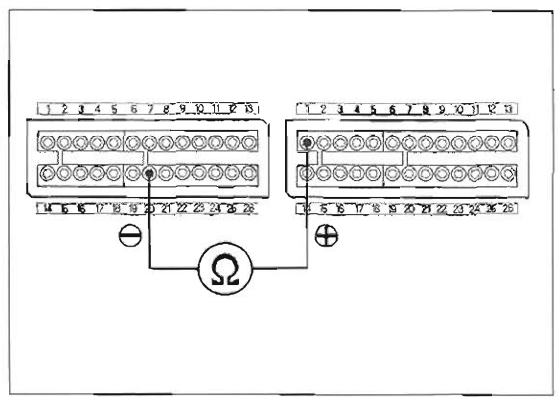
Measure the resistance at the test harness terminals.

Connection: A20 (–) – B1 (+)
Standard: 11.1 – 12.3 Ω (20 °C/68 °F)

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

NO – Open or short circuit in Black/white and/or Pink/black wire.

YES – GO TO STEP 6.



6. **No.4 Injector Control Line Short Circuit Inspection**

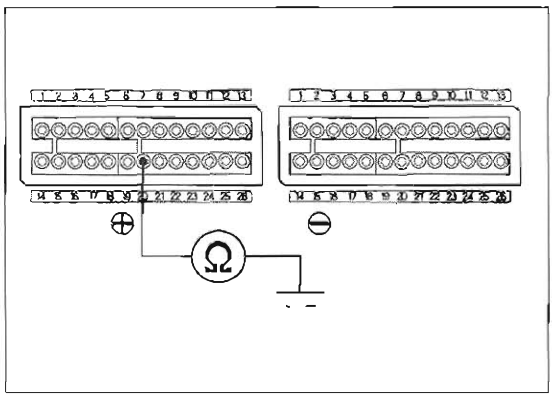
Check for continuity between the test harness terminal and ground.

Connection: A20 (+) – Ground (–)

Is there continuity?

YES – Short circuit in Pink/black wire.

NO – Replace the ECM with a new one, and inspect it again.

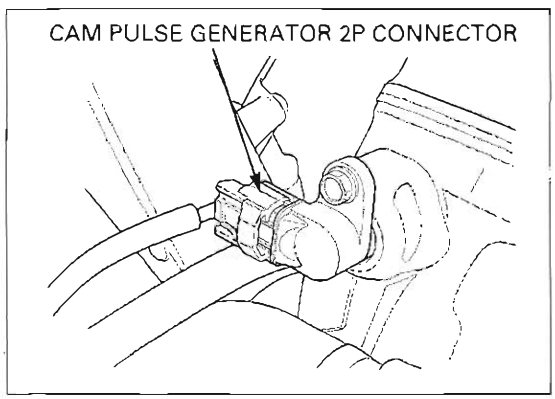


PGM-FI MIL 18 BLINKS (CAM PULSE GENERATOR)

1. **Cam Pulse Generator Connection Inspection**

Turn the ignition switch OFF.

Disconnect the cam pulse generator 2P connector.

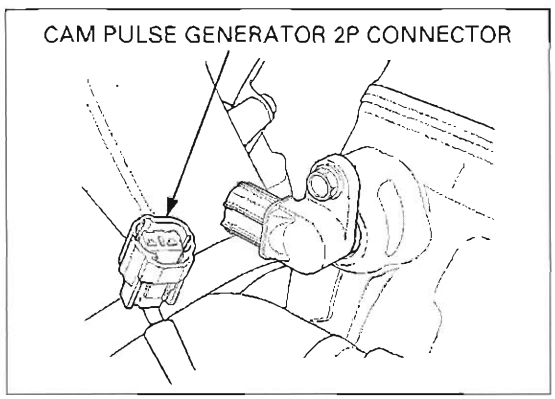


Check for loose or poor contact on the cam pulse generator 2P connector.

Connect the cam pulse generator 2P connector.

Place the motorcycle on its side stand.

Turn the ignition switch ON.
Turn the starter motor more than 10 seconds and then check that the MIL blinks.
Check that the MIL blinks.



Is the MIL blinking?

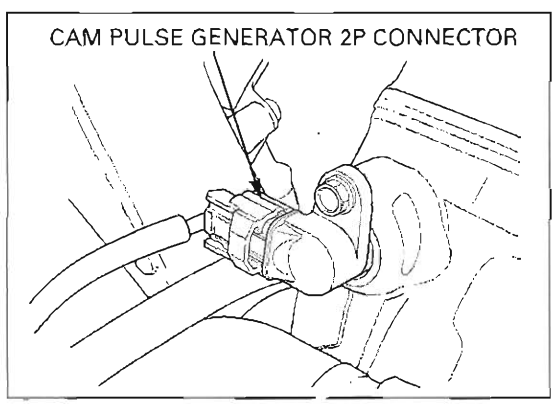
NO – Loose or poor contact on the cam pulse generator 2P connector.

YES – GO TO STEP 2.

2. **Cam Pulse Generator Short Circuit Inspection**

Turn the ignition switch OFF and the engine stop switch OFF.

Disconnect the cam pulse generator 2P connector.



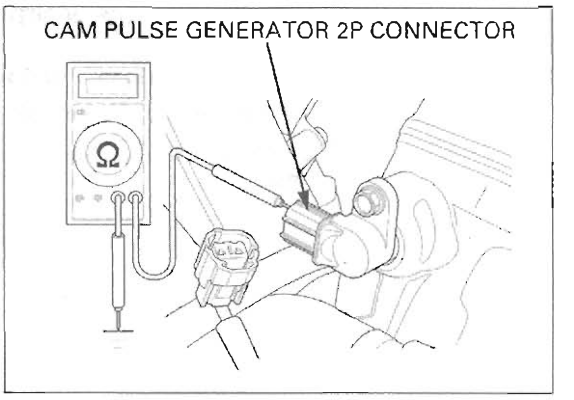
Check the continuity between the cam pulse generator connector terminal and ground.

Connection: White/yellow (+) – Ground (–)

Is there continuity?

YES – Faulty cam pulse generator.

NO – GO TO STEP 3.



3. **Cam Pulse Generator Peak Voltage Inspection**

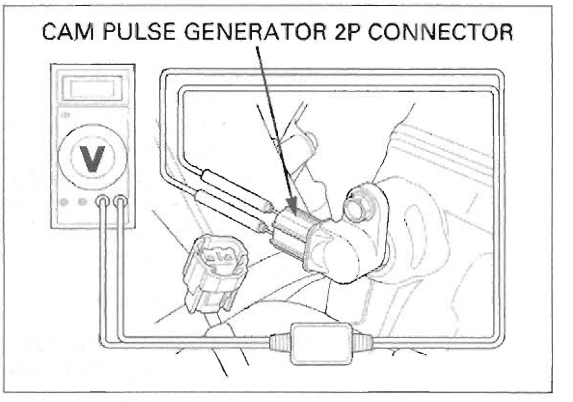
Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the cam pulse generator 2P connector.

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

Is the voltage at the standard value?

NO – Faulty cam pulse generator.

YES – GO TO STEP 4.



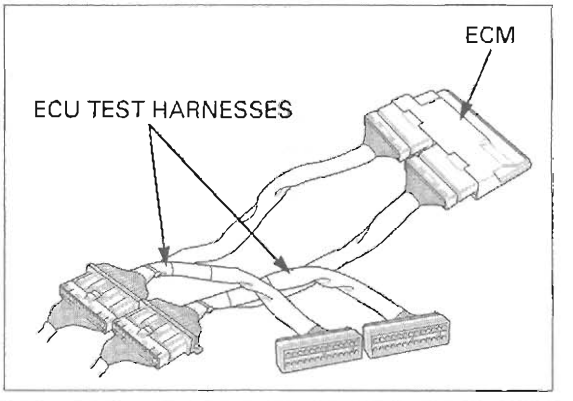
4. **Cam Pulse Generator Peak Voltage Inspection at ECM**

Turn the ignition switch OFF.

Connect the cam pulse generator 2P connector.

Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



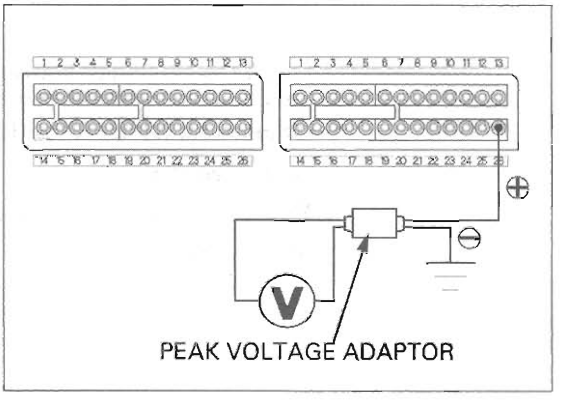
Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the test harness terminals.

Connection: B26 (+) – ground (–)
Standard: 0.7 V minimum (20 °C/68 °F)

Is the voltage at the standard value?

NO – Open or short circuit in White/yellow and/or Gray wire.

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

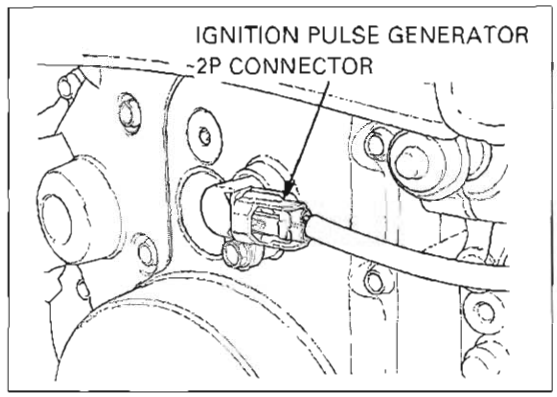


PGM-FI MIL 19 BLINKS (IGNITION PULSE GENERATOR)

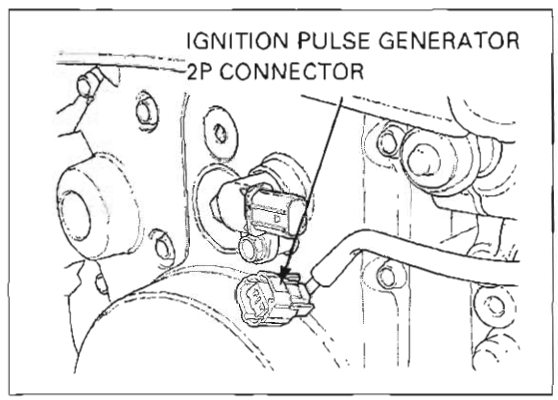
1. **Ignition Pulse Generator Connection Inspection**

Turn the ignition switch OFF.

Disconnect the ignition pulse generator 2P connector.



Check for loose or poor contact on the cam pulse generator 2P connector.
Place the motorcycle on its side stand.
Connect the cam pulse generator 2P connector.
Turn the ignition switch ON.
Turn the starter motor more than 10 seconds and then check that the MIL blinks.



Check that the MIL blinks.

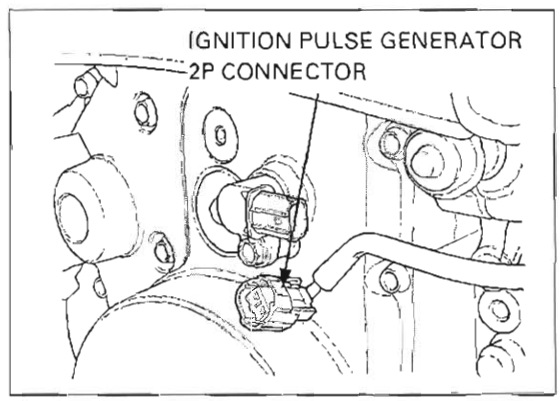
Is the MIL blinking?

NO – Loose or poor contact on the cam pulse generator 2P connector.

YES – GO TO STEP 2.

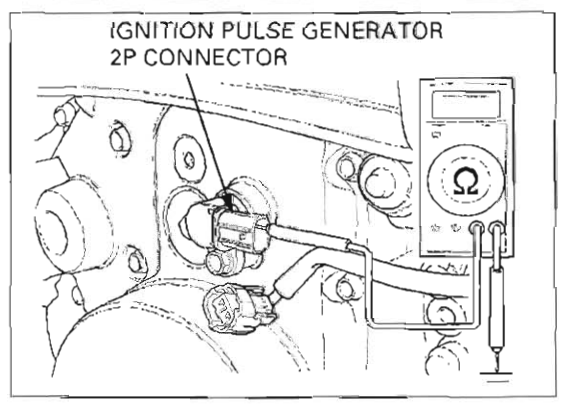
2. **Ignition Pulse Generator Short Circuit Inspection**

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



Check the continuity between the ignition pulse generator connector terminal and ground.

Connection: White/yellow (+) – Ground (–)



Is there continuity?

YES – Faulty ignition pulse generator.

NO – GO TO STEP 3.

3. **Ignition Pulse Generator Peak Voltage Inspection**

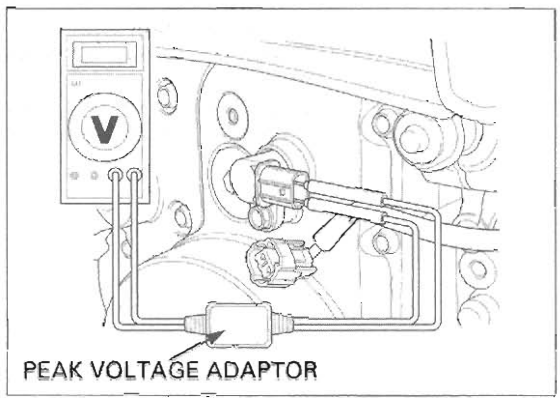
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P connector.

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

Is the voltage at the standard value?

NO – Faulty ignition pulse generator.

YES – GO TO STEP 4.



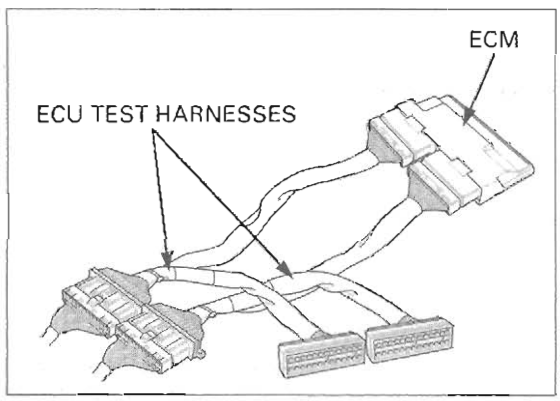
4. **Ignition Pulse Generator Peak Voltage Inspection at ECM**

Turn the ignition switch OFF.

Connect the ignition pulse generator 2P connector.

Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



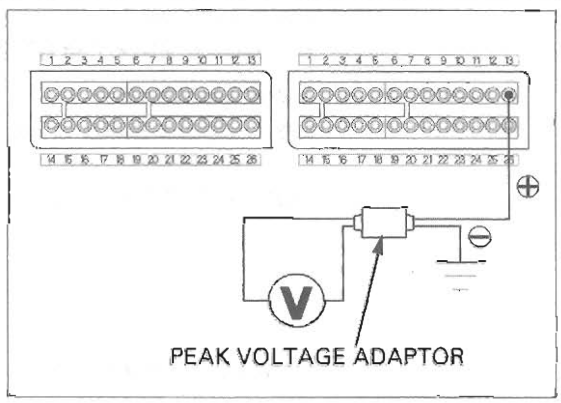
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the test harness terminals.

Connection: B13 (+) – ground (–)
Standard: 0.7 V minimum (20 °C/68 °F)

Is the voltage at the standard value?

NO – Open or short circuit in White/yellow and/or Yellow wire.

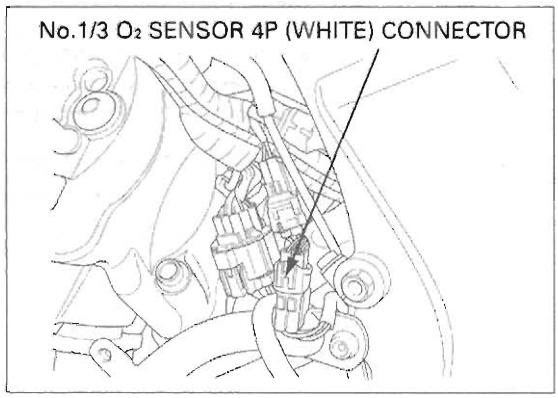
YES – Replace the ECM with a new one, and inspect it again.



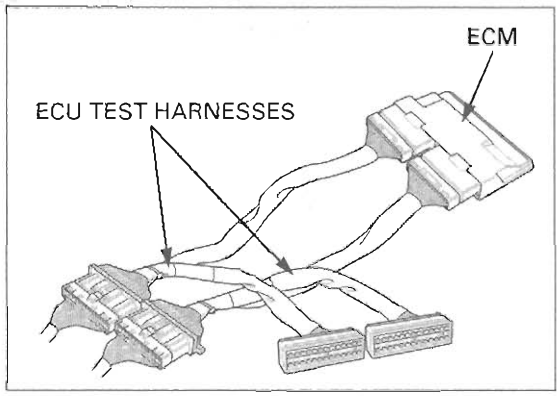
PGM-FI MIL 21 BLINKS (No.1/3 O_2 SENSOR)

1. No.1/3 O_2 Sensor Signal Line Inspection

Turn the ignition switch OFF.
Disconnect the No.1/3 O_2 sensor 4P (White) connector.
Check for loose or poor contact on the No.1/3 O_2 sensor 4P (White) connector.



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



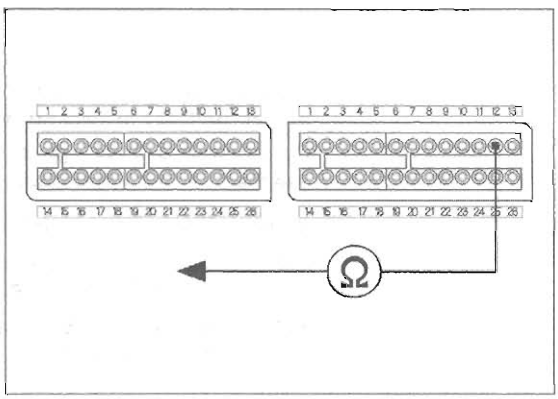
Check the continuity between the test harness terminal and No.1/3 O_2 sensor 4P (White) connector terminal.

Connection: Black/Red (+) – B12 (–)

Is there continuity?

NO – Open circuit in No.1/3 O_2 sensor Black/red wire.

YES – GO TO STEP 2.



2. No.1/3 O_2 Sensor Short Circuit Inspection

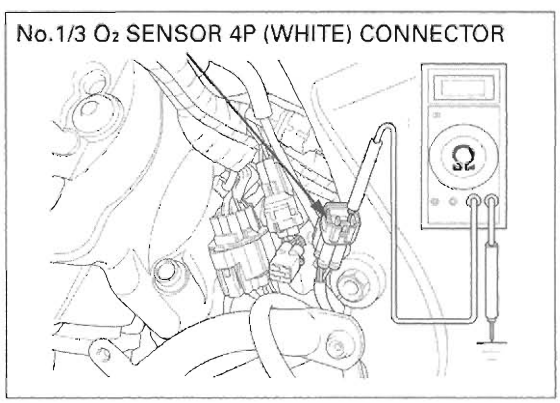
Check the continuity between the No.1/3 O_2 sensor 4P (White) connector terminal and ground.

Connection: Black/red (+) – Ground (–)

Is there continuity?

YES – Short circuit in O_2 sensor Black/red wire.

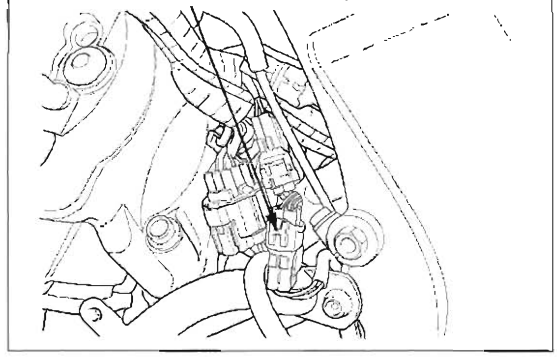
NO – GO TO STEP 3.



3. **No.1/3 O_2 Sensor Output Voltage Inspection**

Connect the No.1/3 O_2 sensor 4P (White) connector.

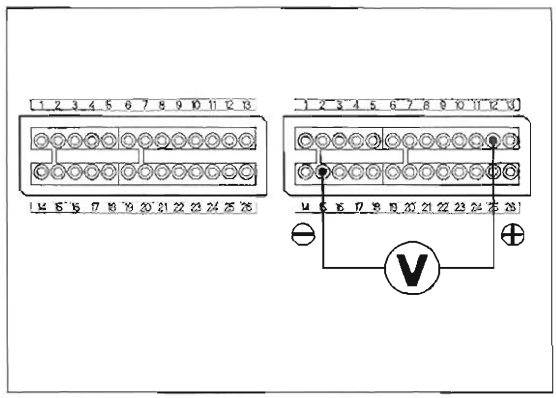
No.1/3 O_2 SENSOR 4P (WHITE) CONNECTOR



Turn the ignition switch ON and warm up the engine until 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.

Connection: B12 (+) – B15 (–)
Standard:
With the throttle open:
0.6 V minimum
With the throttle quickly closed:
0.4 V minimum



Is the voltage within the standard values?

NO – Faulty No.1/3 O_2 sensor.

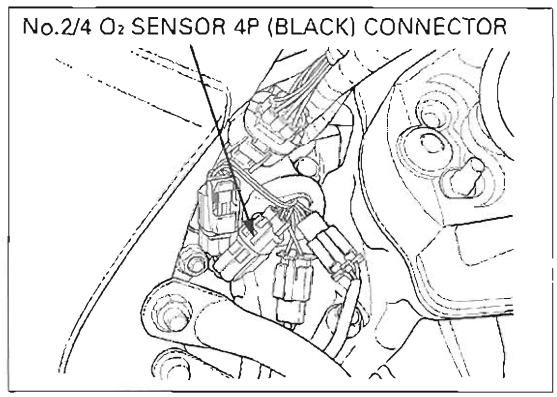
YES – Check the fuel supply system, if the system is correct, replace the ECM with a new one, and inspect it again.

PGM-FI MIL 22 BLINKS (No.2/4 O_2 SENSOR)

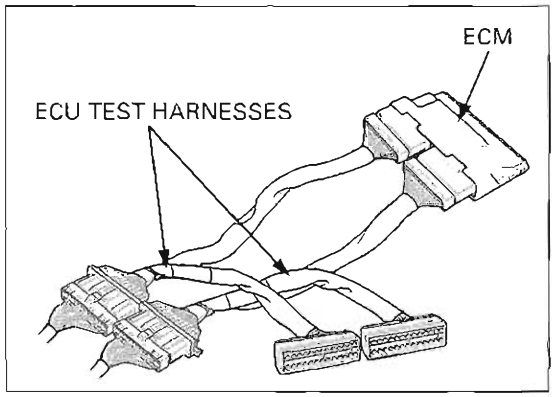
1. **No.2/4 O_2 Sensor Signal Line Inspection**

Turn the ignition switch OFF.
Disconnect the No.2/4 O_2 sensor 4P (Black) connector.
Check for loose or poor contact on the O_2 sensor 4P (Black) connector.

No.2/4 O_2 SENSOR 4P (BLACK) CONNECTOR



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



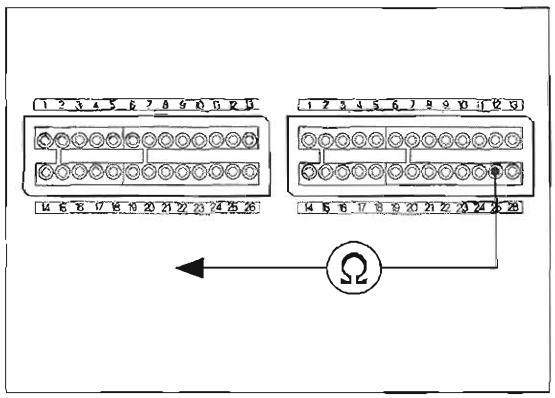
Check the continuity between the test harness terminal and No.2 O_2 sensor connector terminal.

Connection: Black/orange (+) – B25 (–)

Is there continuity?

NO – Open circuit in No.2/4 O_2 sensor Black/orange wire.

YES – GO TO STEP 2.



2. **No.2/4 O_2 Sensor Short Circuit Inspection**

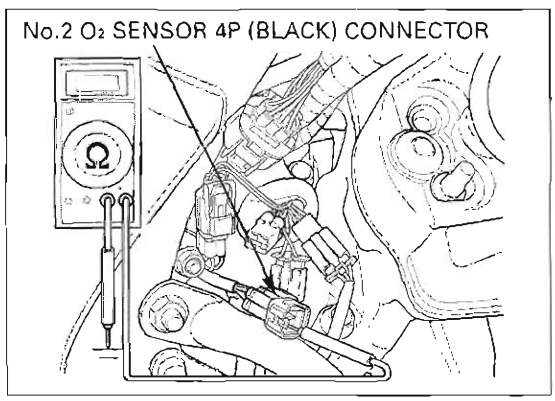
Check the continuity between the No.2/4 O_2 sensor 4P (Black) connector terminal and ground.

Connection: Black/orange (+) – Ground (–)

Is there continuity?

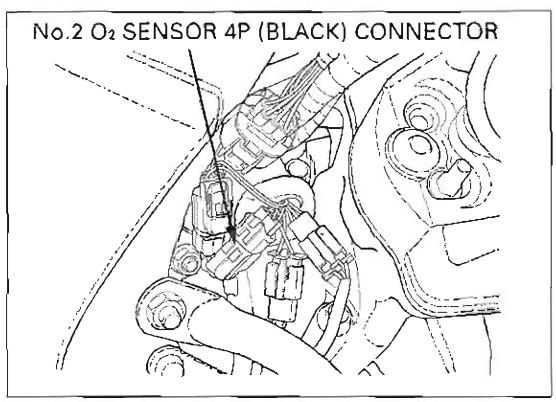
YES – Short circuit in O_2 sensor Black/orange wire.

NO – GO TO STEP 3.



3. **No.2/4 O_2 Sensor Output Voltage Inspection**

Connect the No.2/4 O_2 sensor 4P (Black) connector.



Turn the ignition switch ON and warm up the engine until coolant temperature is 80 °C (176 °F).

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

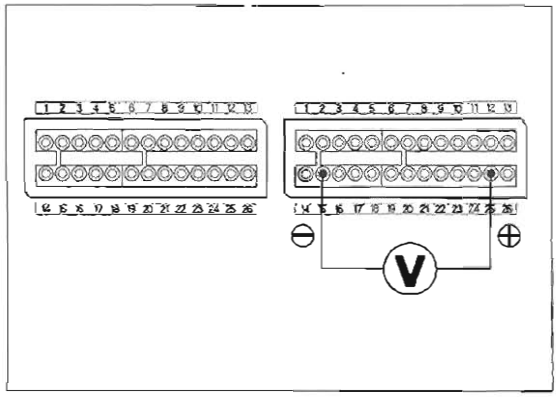
Check the voltage between the test harness terminals.

Connection: B25 (+) – B15 (–)

Standard:

With the throttle open:
0.6 V minimum

With the throttle quickly closed:
0.4 V minimum



Is the voltage within the standard values?

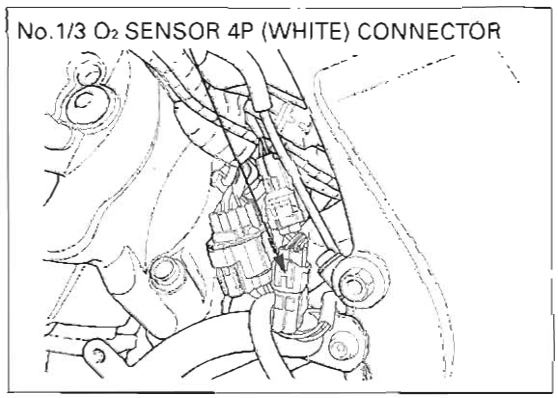
NO – Faulty No.2/4 O_2 sensor.

YES – Check the fuel supply system, if the system is correct, replace the ECM with a new one, and inspect it again.

PGM-FI MIL 23 BLINKS (No.1/3 O_2 SENSOR HEATER)

1. No.1/3 O_2 Sensor Connection Inspection

Turn the ignition switch OFF.
Disconnect the No.1/3 O_2 sensor 4P (White) connector.



Check for loose or poor contact on the No.1/3 O_2 sensor 4P (White) connector.

Connect the No.1/3 O_2 sensor 4P (White) connector.

Place the motorcycle on its center stand.

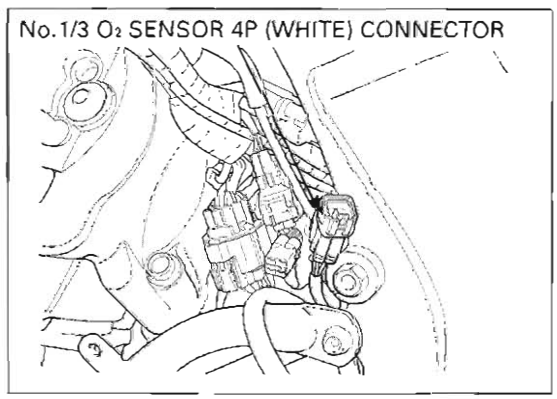
Check that the MIL blinks.

Start the engine and check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the No.1/3 O_2 sensor connector.

YES – GO TO STEP 2.



2. **No.1/3 O_2 Sensor Heater Resistance Inspection**

   Turn the ignition switch OFF.

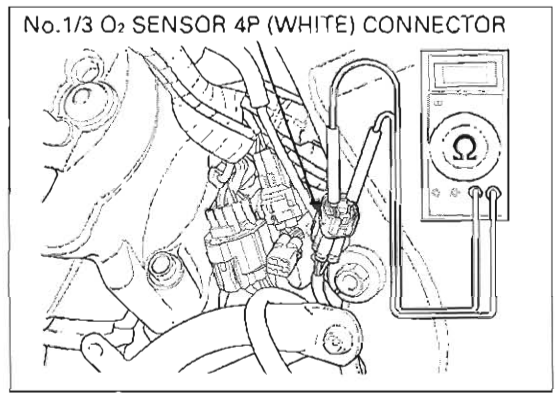
   Disconnect the No.1/3 O_2 sensor 4P (White) connector and measure the resistance at the sensor side connector white terminals.

   Connection: White (+) – White (–)
   Standard: 10 – 40 Ω (20 °C/68 °F)

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

   NO – Faulty No.1/3 O_2 sensor.

   YES – GO TO STEP 3.



3. **No.1/3 O_2 Sensor Heater Short Circuit Inspection**

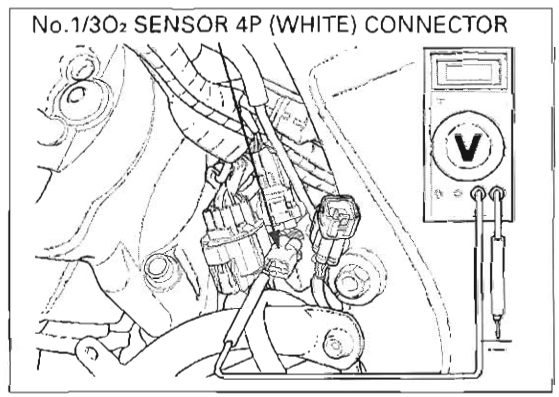
   Check for continuity between the white terminal and ground.

   Connection: White (+) – Ground (–)

   Is there continuity?

   YES – Faulty No.1/3 O_2 sensor.

   NO – GO TO STEP 4.



4. **No.1/3 O_2 Sensor Heater Power Input Line Inspection**

   Turn the ignition switch ON.

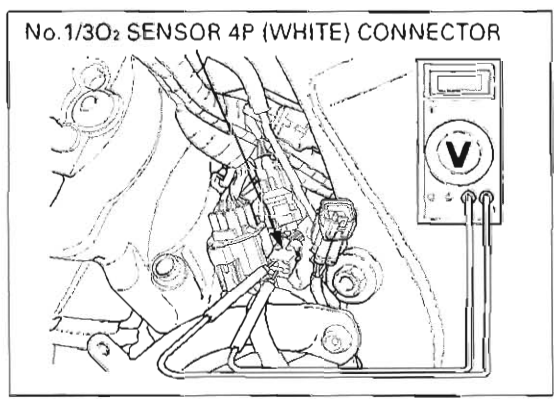
   Measure the voltage at the No.1/3 O_2 sensor wire harness side connector terminals.

   Connection: Black/white (+) – White (–)
   Standard: Battery voltage

   Does battery voltage exist?

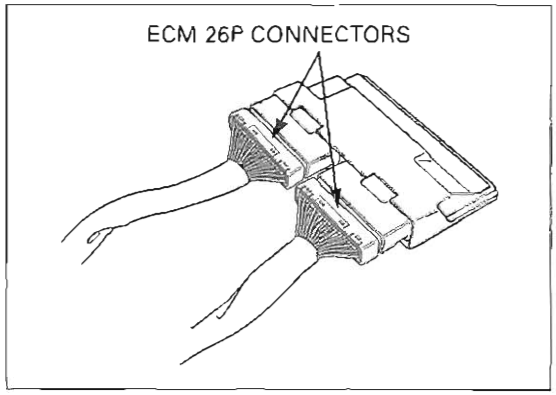
   NO – GO TO STEP 6.

   YES – GO TO STEP 5.



5. **No.1/3 O_2 Sensor Heater Power Input Line Short Circuit Inspection**

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



Turn the ignition switch ON.

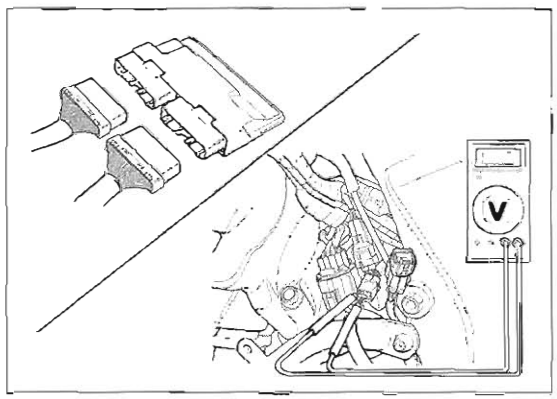
Measure the voltage at the No.1/3 O_2 sensor wire harness side connector terminals.

Connection: Black/white (+) – White (–)

Does battery voltage exist?

YES – Open circuit in No.1/3 O_2 sensor Black/white wires.

NO – Replace the ECM with a new one, and inspect again.



6. **No.1/3 O_2 Sensor Heater Power Input Voltage Inspection**

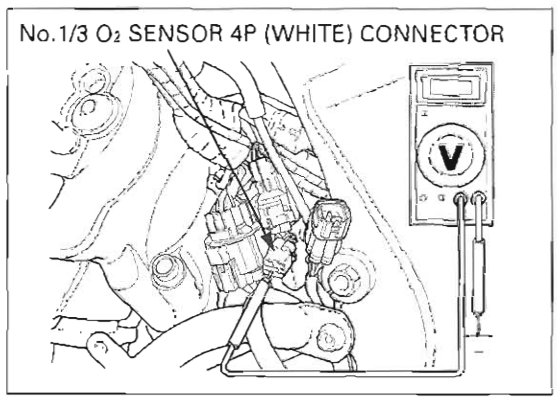
Measure the voltage at the O_2 sensor wire harness side connector terminal and ground.

Connection: Black/white (+) – Ground (–)
Standard: Battery voltage

Does battery voltage exist?

NO – Open circuit in Black/white wire between the No.1/3 O_2 sensor and engine stop relay.

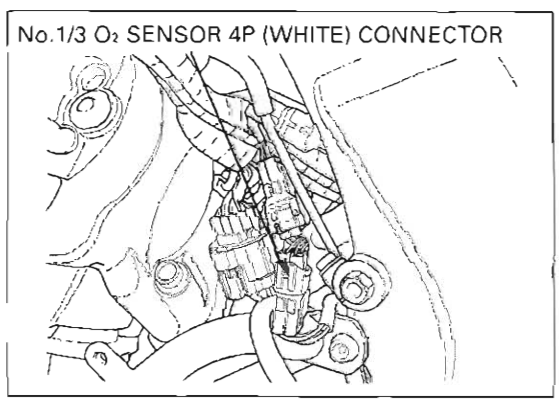
YES – GO TO STEP 7.



7. **No.1/3 O_2 Sensor Heater Power Input Voltage Inspection at ECM**

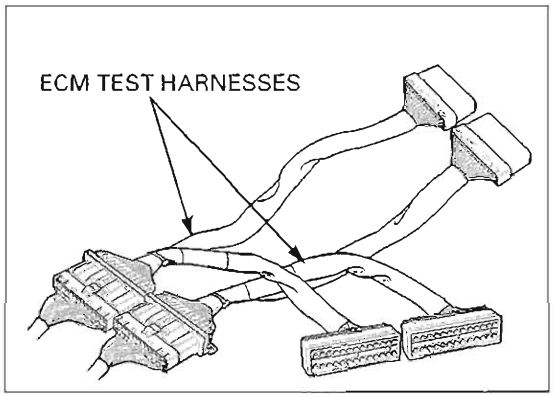
Turn the ignition switch OFF.

Connect the No.1/3 O_2 sensor 4P (White) connector.



Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



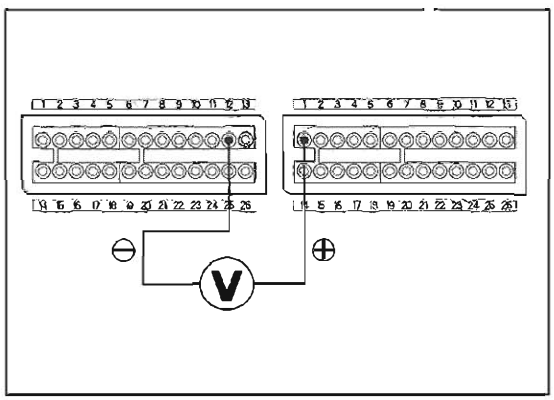
Measure the voltage at the test harness terminals.

Connection: B1 (+) – A12 (–)
Standard: Battery voltage

Does battery voltage exist?

NO – Open circuit in Black/white wire between the ECM connector and No.1/3 O_2 sensor 4P connector.

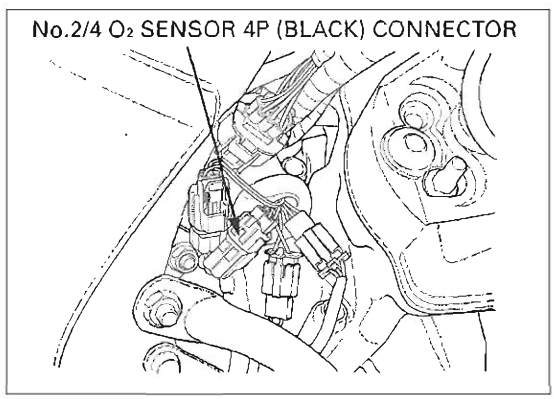
YES – Replace the ECM with a new one, and inspect it again.



PGM-FI MIL 24 BLINKS (No.2/4 O_2 SENSOR HEATER)

1. **NO.2/4 O_2 Sensor Connection Inspection**

Turn the ignition switch OFF.
Disconnect the No.2/4 O_2 sensor 4P (Black) connectors.



Check for loose or poor contact on the No.2/4 O_2 sensor 4P (Black) connector.

Connect the No.2/4 O_2 sensor 4P (Black) connector.

Place the motorcycle on its center stand.

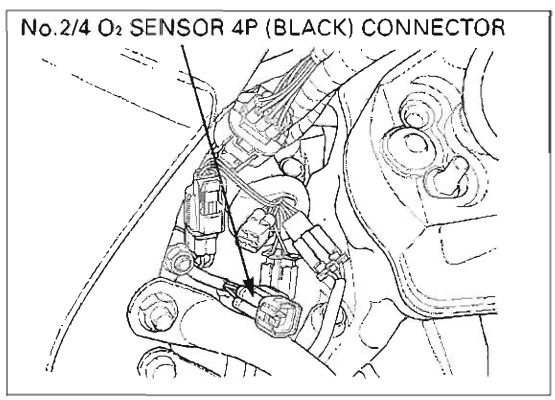
Check that the MIL blinks.

Start the engine and check that the MIL blinks.

Is the MIL blinking?

NO – Loose or poor contact on the No.2/4 O_2 sensor connector.

YES – GO TO STEP 2.



2. **No.2/4 O_2 Sensor Heater Resistance Inspection**

   Turn the ignition switch OFF.

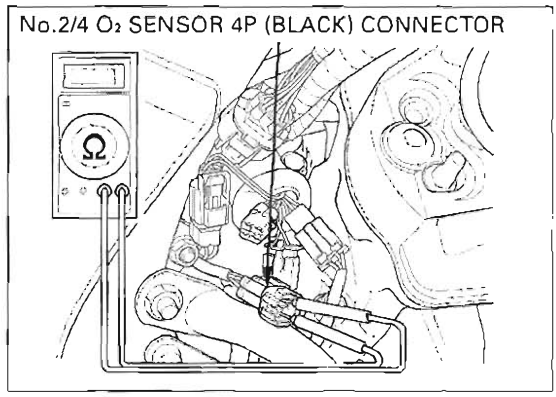
   Disconnect the No.2/4 O_2 sensor 4P (Black) connector and measure the resistance at the sensor side connector white terminals.

   Connection: White (+) – White (–)
   Standard: 10 – 40 Ω (20 °C/68 °F)

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

   NO – Faulty No.2/4 O_2 sensor.

   YES – GO TO STEP 3.



3. **No.2/4 O_2 Sensor Heater Short Circuit Inspection**

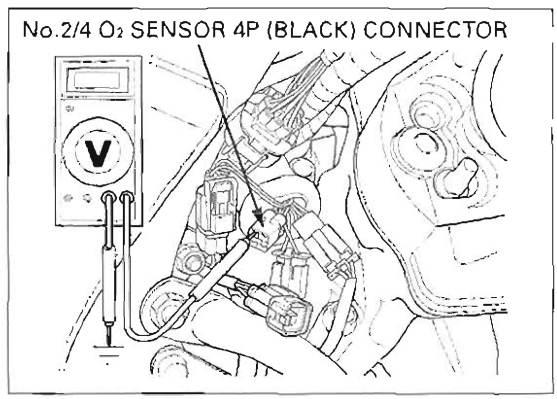
   Check for continuity between the white terminal and ground.

   Connection: White (+) – Ground (–)

   Is there continuity?

   YES – Faulty No.2/4 O_2 sensor.

   NO – GO TO STEP 4.



4. **No.2/4 O_2 Sensor Heater Power Input Line Inspection**

   Turn the ignition switch ON.

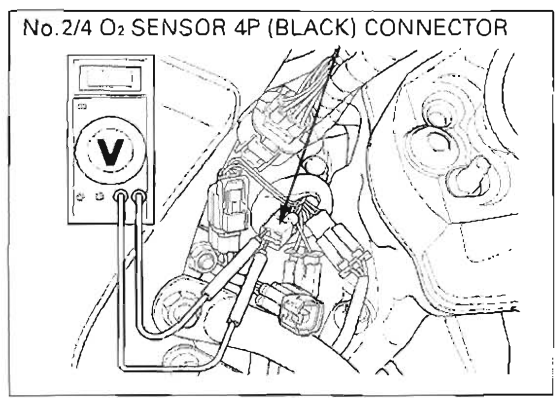
   Measure the voltage at the No.2/4 O_2 sensor wire harness side connector terminals.

   Connection: Black/white (+) – White/yellow (–)
   Standard: Battery voltage

   Does battery voltage exist?

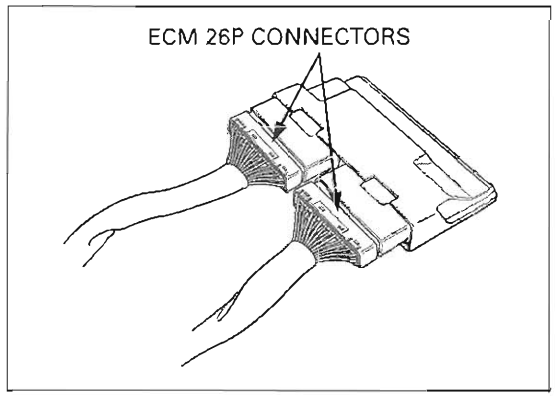
   NO – GO TO STEP 6.

   YES – GO TO STEP 5.



5. **No.2/4 O_2 Sensor Heater Power Input Line Short Circuit Inspection**

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



Turn the ignition switch ON.

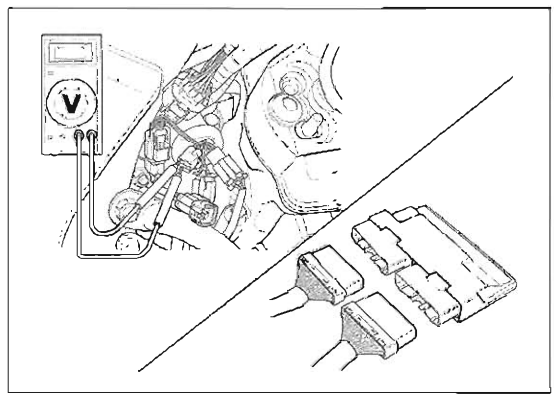
Measure the voltage at the No.2/4 O_2 sensor wire harness side connector terminals.

Connection: Black/white (+) – White/yellow (–)

Does battery voltage exist?

YES – Open circuit in No.2/4 O_2 sensor Black/white wires.

NO – Replace the ECM with a new one, and inspect again.



6. **No.2/4 O_2 Sensor Heater Power Input Voltage Inspection**

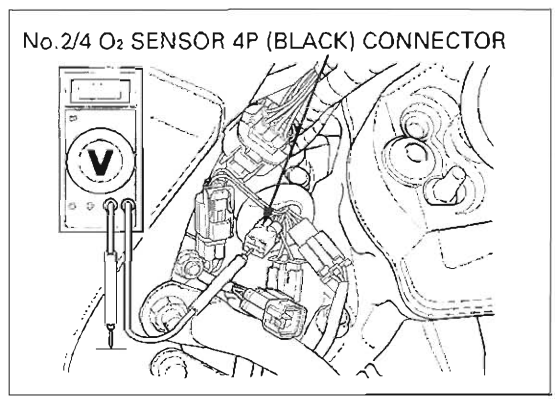
Measure the voltage at the No.2/4 O_2 sensor wire harness side connector terminal and ground.

Connection: Black/white (+) – Ground (–)
Standard: Battery voltage

Does battery voltage exist?

NO – Open circuit in Black/white wire between the No.2/4 O_2 sensor and engine stop relay.

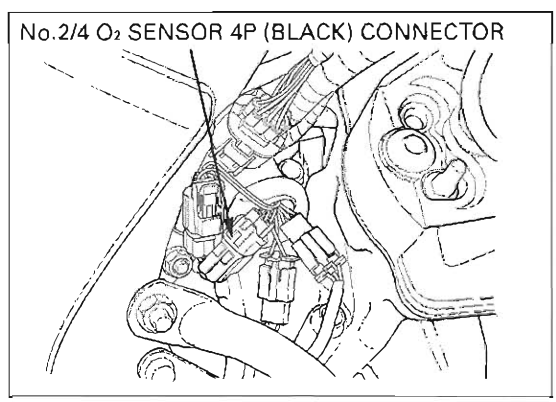
YES – GO TO STEP 7.



7. **No.2/4 O_2 Sensor Heater Power Input Voltage Inspection at ECM**

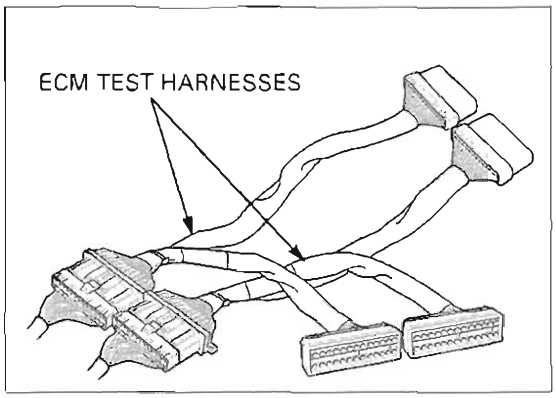
Turn the ignition switch OFF.

Connect the No.2/4 O_2 sensor 4P (Black) connector.



Disconnect the ECM connectors.

Connect the test harness to the wire harness connectors.



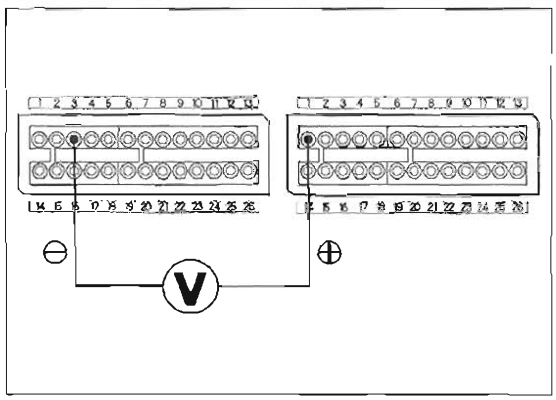
Measure the voltage at the test harness terminals.

Connection: B1 (+) – A3 (–)
Standard: Battery voltage

Is the battery voltage exist?

NO – Open circuit in Black/white wire between the ECM connector and No.2/4 O_2 sensor 4P (Black) connector.

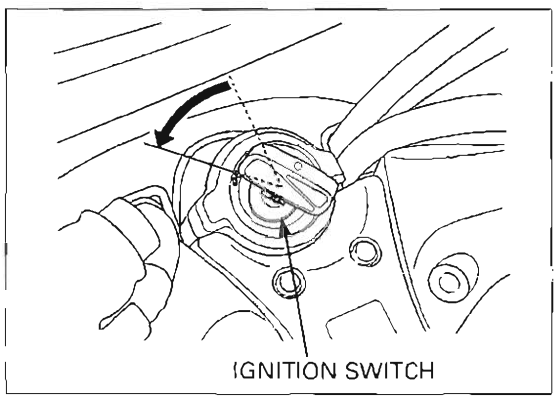
YES – Replace the ECM with a new one, and inspect it again.



PGM-FI MIL 25 BLINKS (LEFT KNOCK SENSOR)

1. **Left Knock Sensor Connection Inspection**

Turn the ignition switch OFF.



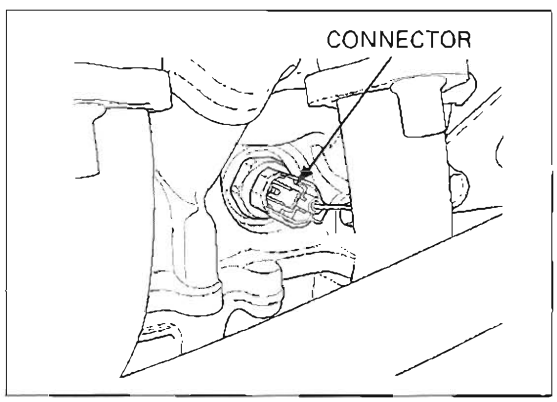
Disconnect the left knock sensor 1P connector.
Check for loose or poor contact on the left knock sensor connector.
Connect the left knock sensor 1P connector.
Place the motorcycle on its center stand.
Start the engine and hold the engine speed above 3,900 rpm for 10 seconds or more.

Check that the MIL blinks.

Is the MIL blinking?

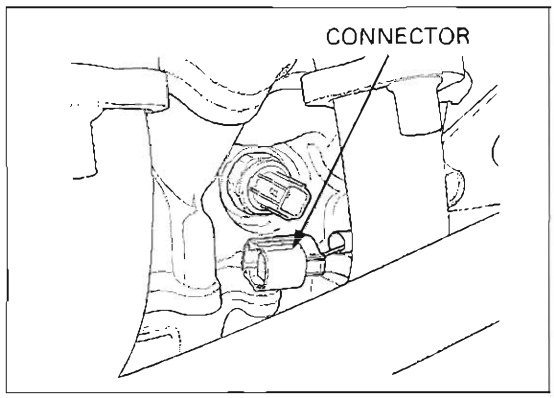
NO – Temporary failure; the system is normal.

YES – GO TO STEP 2.



2. **Left Knock Sensor Short Circuit Inspection**

Turn the ignition switch OFF.
Disconnect the left knock sensor 1P connector and ECM 26P (Light gray) connector.



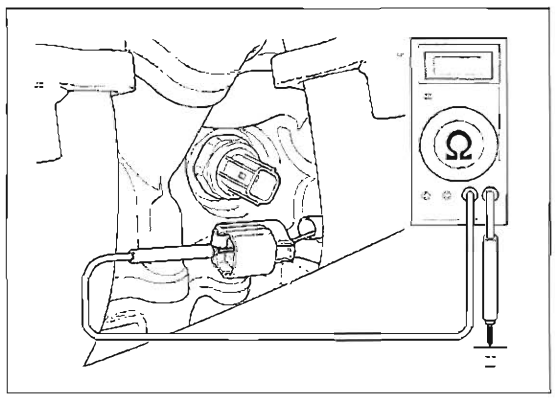
Check the continuity between the left knock sensor 1P connector terminal and ground.

Connection: Blue – Ground

Is there continuity?

YES – Short circuit in the Blue wire.

NO – GO TO STEP 3.



3. **Left Knock Sensor Open Circuit Inspection**

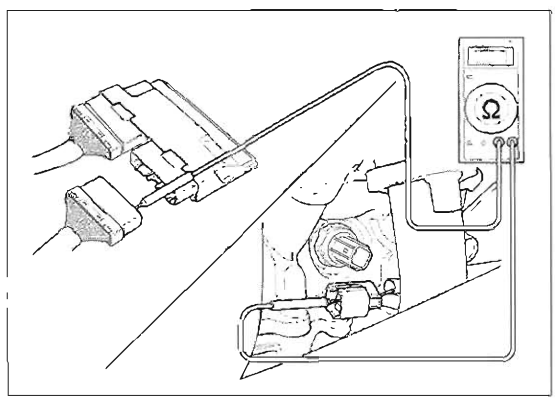
Check the continuity between the left knock sensor 1P connector terminal and ECM connector.

Connection: Blue – Blue

Is there continuity?

YES – Open circuit in the Blue wire.

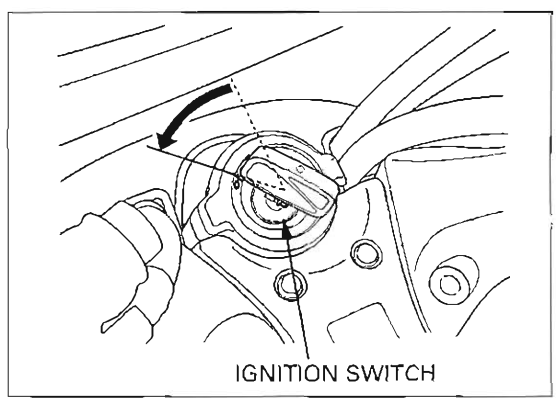
NO – Faulty left knock sensor.



PGM-FI MIL 26 BLINKS (RIGHT KNOCK SENSOR)

1. **Right Knock Sensor Connection Inspection**

Turn the ignition switch OFF.



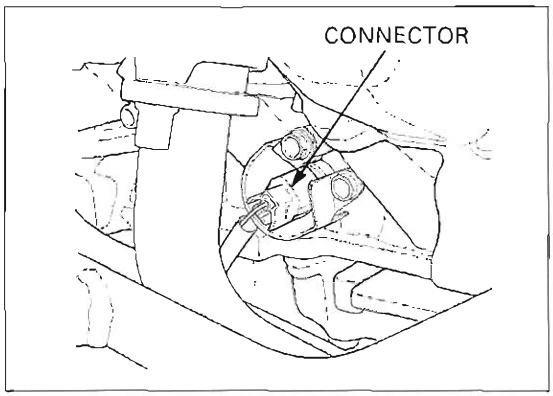
Disconnect the right knock sensor 1P connector.
Check for loose or poor contact on the right knock sensor connector.
Connect the right knock sensor 1P connector.
Place the motorcycle on its center stand.
Start the engine and hold the engine speed above 3,900 rpm for 10 seconds or more.

Check that the MIL blinks.

Is the MIL blinking?

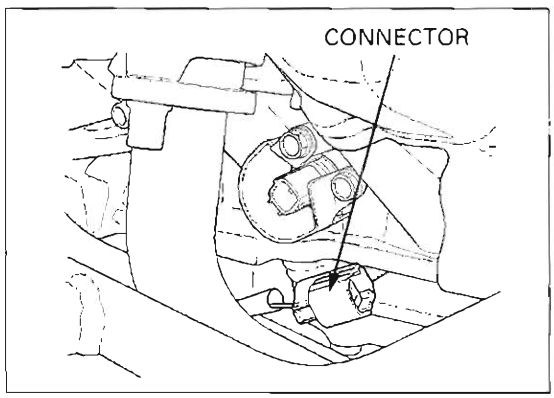
NO – Temporary failure; the system is normal.

YES – GO TO STEP 2.



2. Right Knock Sensor Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the right knock sensor 1P connector and ECM 26P (Light gray) connector.



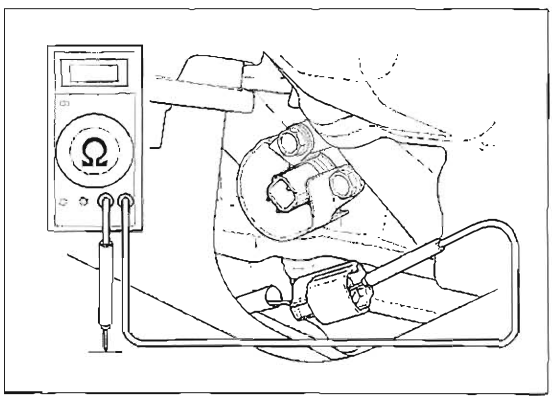
Check the continuity between the right knock sensor 1P connector terminal and ground.

Connection: Red/blue – Ground

Is there continuity?

YES – Short circuit in the Red/blue wire.

NO – GO TO STEP 3.



3. Right Knock Sensor Open Circuit Inspection

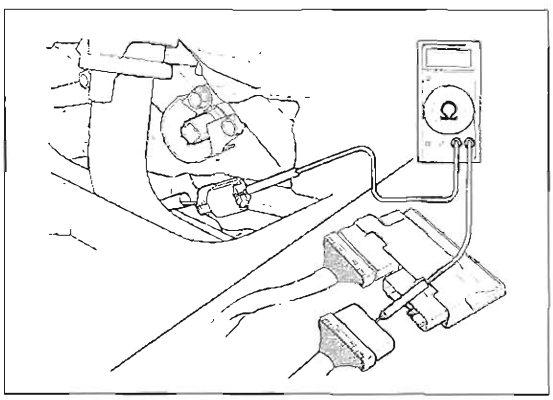
Check the continuity between the right knock sensor 1P connector terminal and ECM connector.

Connection: Red/blue – Red/blue

Is there continuity?

YES – Open circuit in the Red/blue wire.

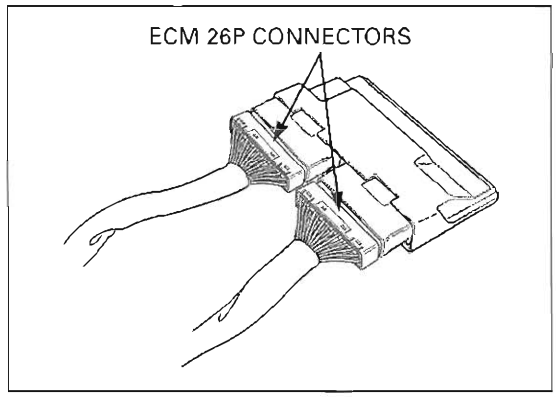
NO – Faulty right knock sensor.



PGM-FI MIL 33 BLINKS (E^2-PROM)

1. **ECM Connectors Connection Inspection**

Turn the ignition switch OFF.
Disconnect the ECM connectors.

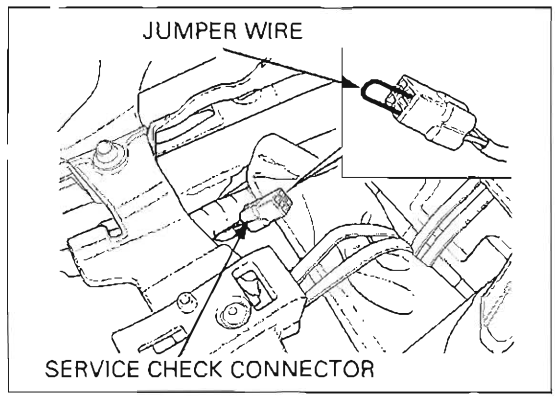


Check for loose or poor contact on the ECM connectors.
Connect the ECM connectors.
Short the service check connector with a jumper wire (page 5-7).
Turn the ignition switch ON and check that the MIL blinks.
Start the engine and check that the MIL blinks.

Does the MIL blink 33 times?

YES – GO TO STEP 2.

NO – GO TO STEP 3.



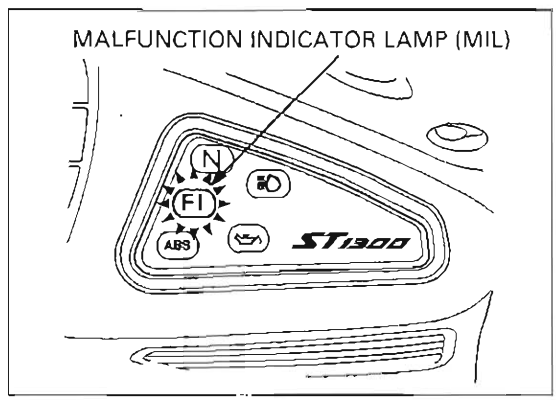
2. **Recheck MIL Blinks 1**

Reset the self-diagnosis memory data (page 5-8).
Turn the ignition switch ON and check that the MIL blinks.

Does the MIL blink 33 times?

YES – Replace the ECM.

NO – GO TO STEP 3.



3. **Recheck MIL Blinks 2**

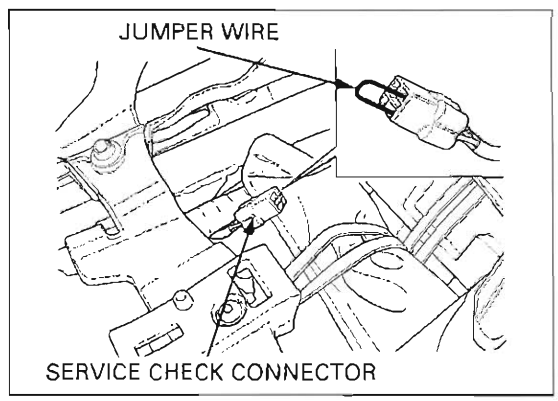
Remove the jumper wire from the service check connector (page 5-7).

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

Does the MIL blink 33 times?

NO – No problem.

YES – GO TO STEP 4.



4. **Recheck MIL Blinks 3**

   Turn the ignition switch OFF.

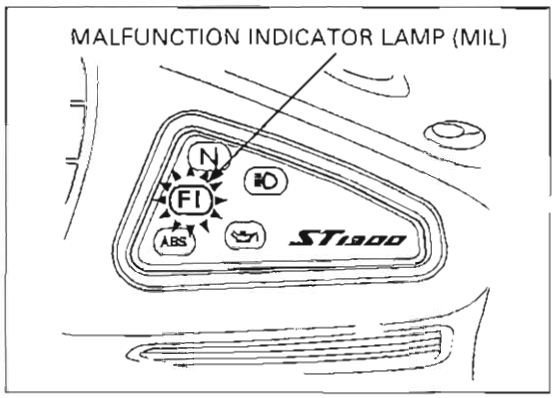
   Short the service check connector with a jumper wire (page 5-7).

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

   Does the MIL blink 33 times?

   NO – No problem.

   YES – GO TO STEP 5.



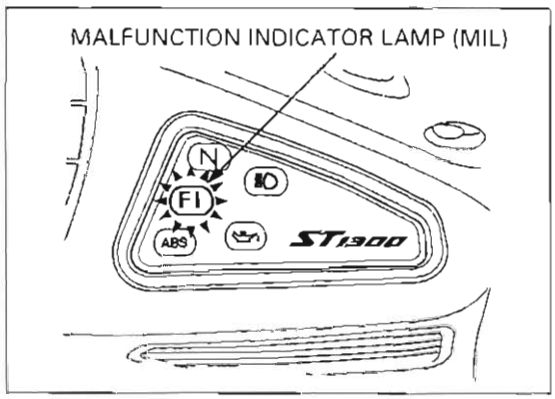
5. **Recheck MIL Blinks 4**

   Reset the self-diagnosis memory data (page 5-8). Turn the ignition switch ON and check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – Replace the ECM.

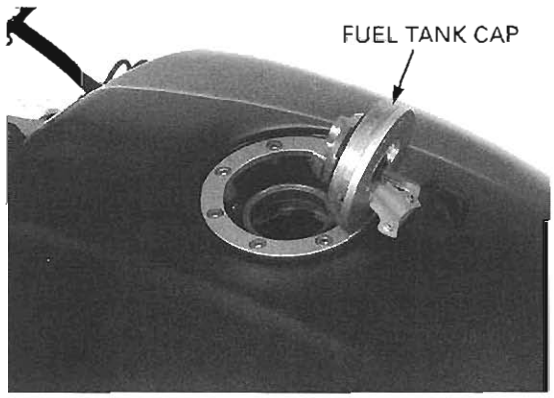
   NO – No problem.



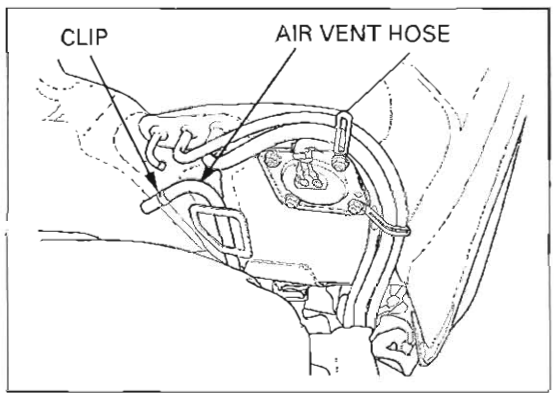
FUEL TANK DRAIN

Open and support the fuel tank using the equipped tools (page 3-4).

Open the fuel tank cap and pump the fuel from the upper fuel tank into an approved gasoline container.



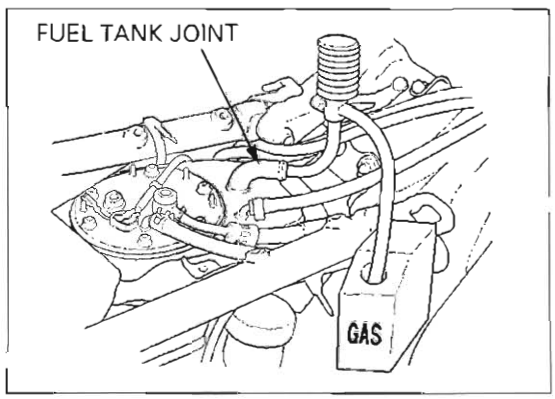
Disconnect the fuel tank air vent hose from the upper fuel tank.
Remove the air vent hose clip from the hose.
Pinch the air vent end, then remove the hose from the fuel tank hose guide.
Drain the remaining fuel from the upper fuel tank into an approved gasoline container.



Always replace the hose clips and joint hose with new ones.

Disconnect the upper and lower fuel tank joint hose and remove the upper fuel tank (page 5-56).

Pump the fuel from the lower fuel tank from the fuel tank joint hose hole.



FUEL LINE INSPECTION

FUEL PRESSURE INSPECTION

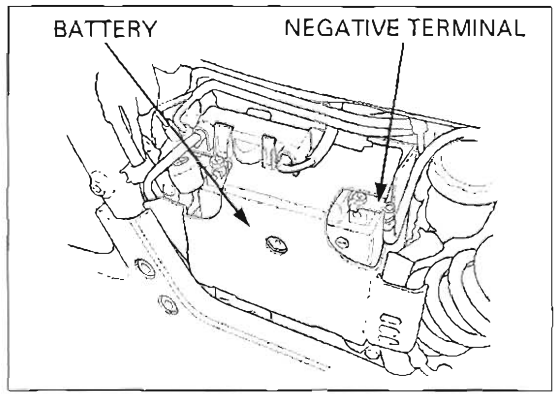
NOTICE

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

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

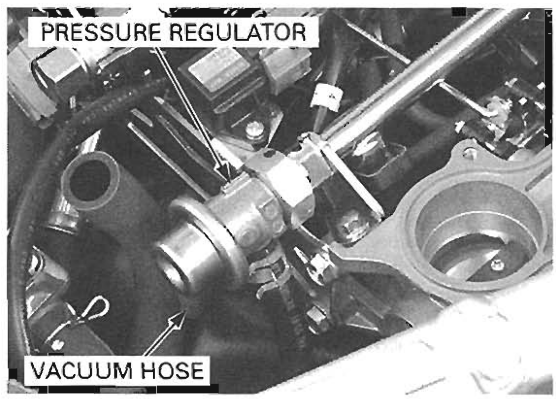
Disconnect the battery negative cable from the battery terminal.

Drain the fuel from the upper fuel tank (page 5-50).



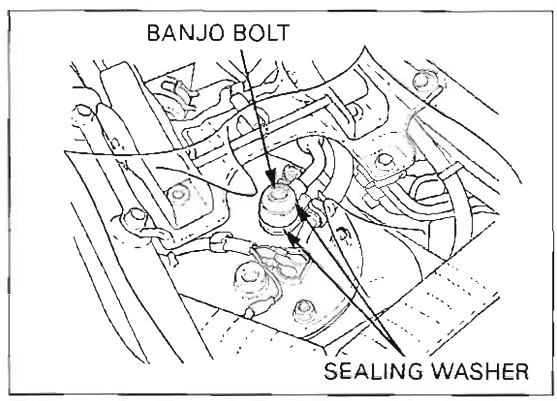
Remove the air cleaner housing (page 5-60).

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



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

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

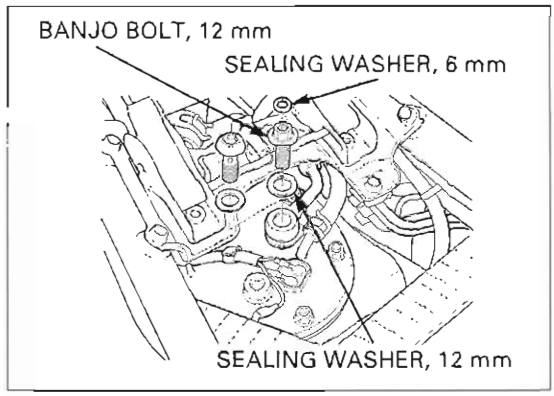


Remove the fuel feed hose banjo bolt and attach the fuel pressure gauge with the following Honda Genuine parts.

Banjo bolt, 12 mm
Part No. 90008-PP4-E02
Sealing washer, 12 mm
Part No. 90428-PD6-003
Sealing washer, 6 mm
Part No. 90430-PD6-003

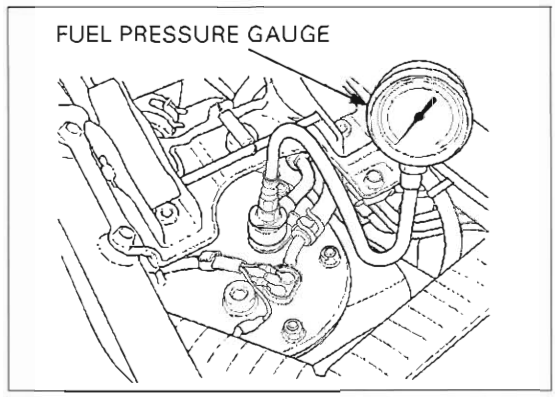
TOOL:

Fuel pressure gauge	**07406–0040003 or 07406–0040002 or 07406-004000A (U.S.A. only)**



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

IDLE SPEED: 1,000 ± 100 rpm
STANDARD: 343 kPa (3.5 kgf/cm², 50 psi)



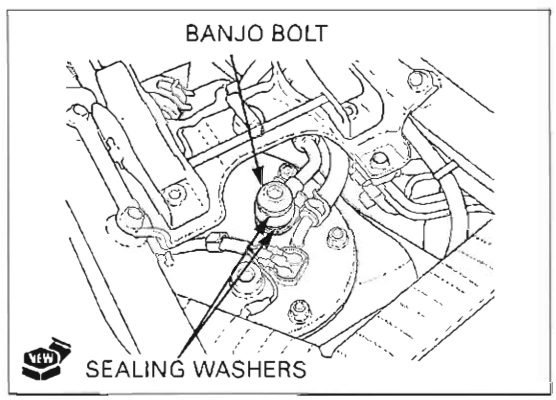
If the fuel pressure is higher than specified, inspect the following:
- Pinched or clogged fuel return hose
- Pressure regulator
- Fuel pump (page 5-54)

If the fuel pressure is lower than specified, inspect the following:
- Fuel line leaking
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 5-54)

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

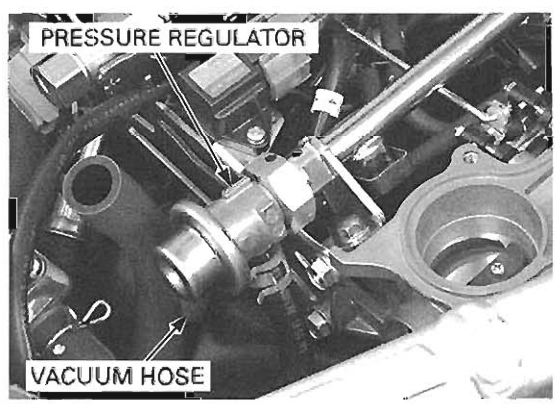
After inspection, remove the banjo bolt and reinstall and tighten the fuel feed hose banjo bolt using the new sealing washers.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Connect the pressure regulator vacuum hose.

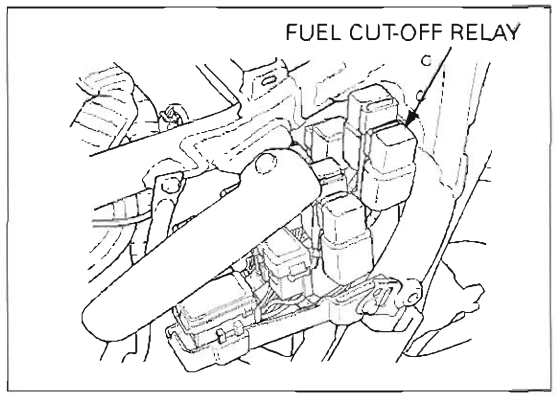
Install the removed parts in the reverse order of removal.



FUEL FLOW INSPECTION

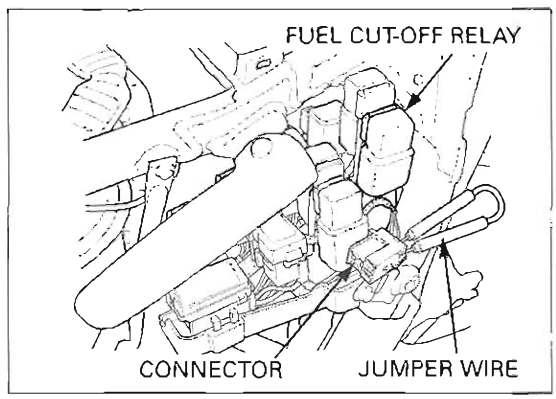
Drain the fuel from the upper fuel tank (page 5-50).
Remove the left side cover (page 2-6).

Remove the fuel cut-off relay and disconnect the 4P 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 from the hose. Use an approved gasoline container to drain the gasoline.
- Wipe off spilled gasoline.

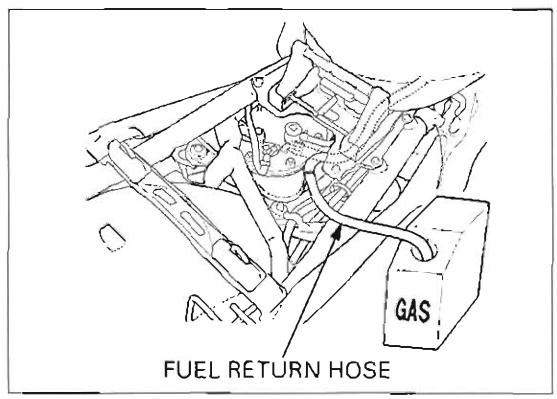


Disconnect the fuel return hose at the lower fuel tank, plug the fuel tank inlet joint.

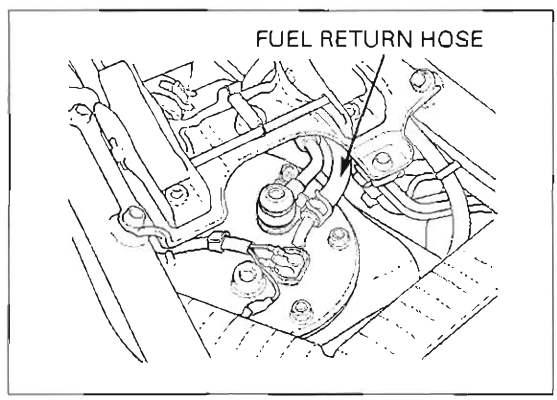
Turn the ignition switch ON for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:
180 cm³ (6.1 US oz, 6.3 Imp oz) minimum /10 seconds at 12 V

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 5-54)



After inspection, connect the fuel return hose to the lower fuel tank.
Start the engine and check for leaks.



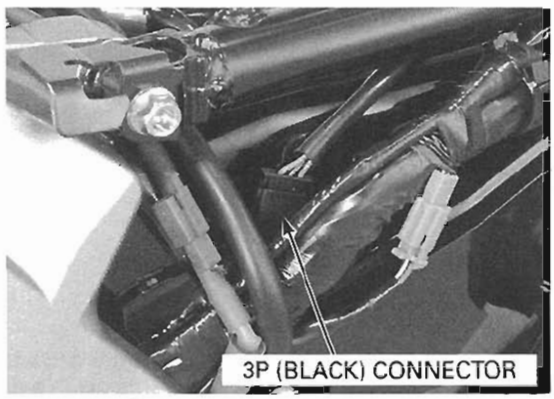
FUEL PUMP

INSPECTION

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

Remove the seat (page 2-5) and left side cover (page 2-6).

Disconnect the fuel pump 3P (Black) connector.



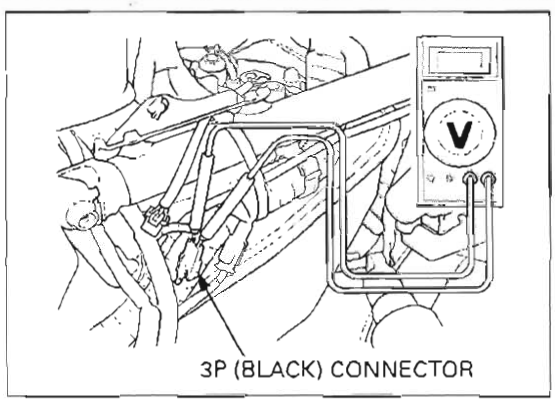
Turn the ignition switch ON and measure the voltage between the terminals.

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 fuse 30A
- Sub fuse 10A
- Engine stop switch (page 22-25)
- Fuel cut-off relay (page 5-56)
- Engine stop relay (page 5-85)
- Bank angle sensor (page 5-84)
- ECM (page 5-87)



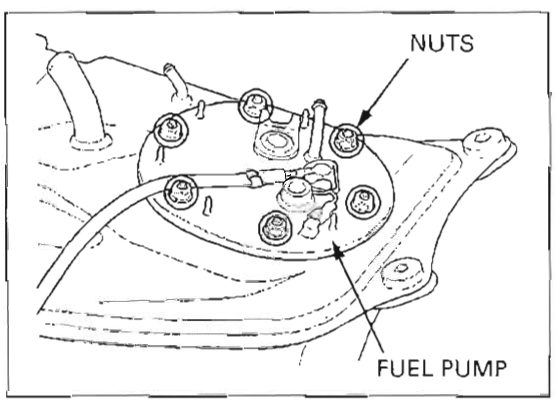
REMOVAL

NOTICE

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

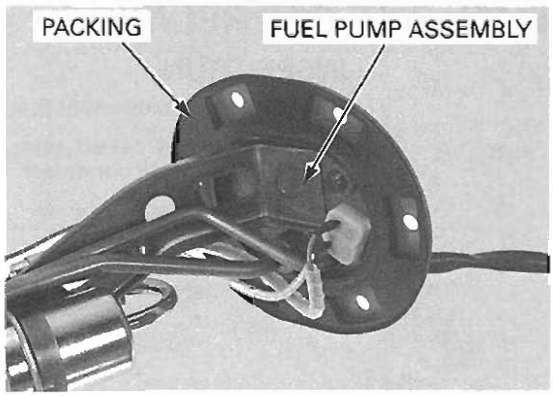
Remove the lower fuel tank (page 5-57).

Remove the fuel pump mounting nuts.



Be careful not to damage the pump rubber and pump wire.

Remove the fuel pump assembly and packing.

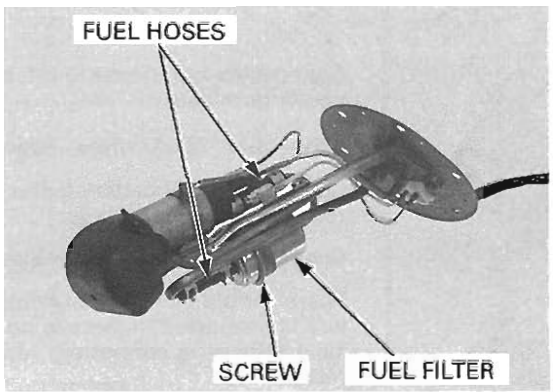


FUEL FILTER REPLACEMENT

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.

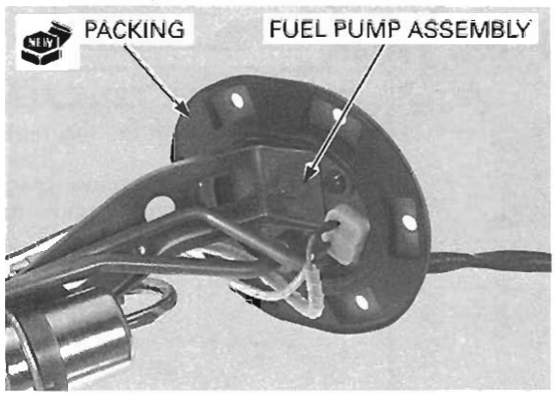


INSTALLATION

Always replace packing with a new one.

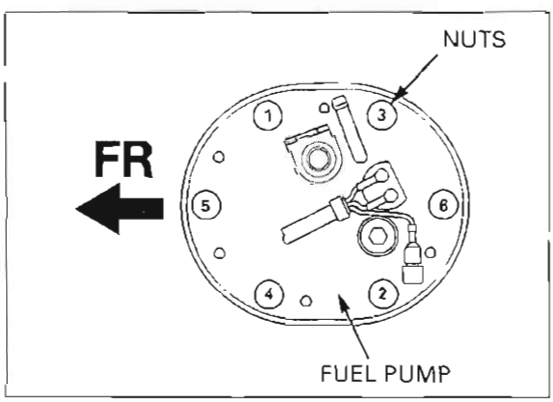
Place a new packing onto the fuel pump.

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



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

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

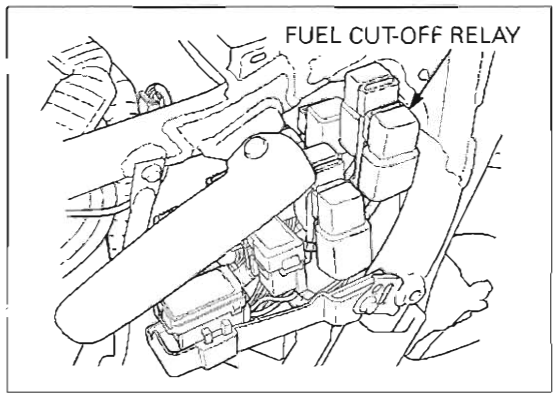


FUEL CUT-OFF RELAY

INSPECTION

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

Remove the fuel cut-off relay and disconnect the fuel cut-off relay 4P connector.



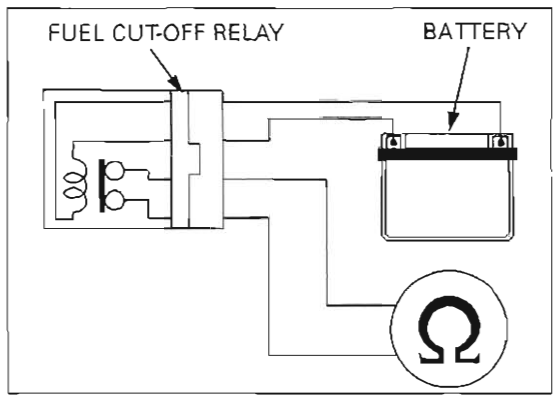
Connect the ohmmeter to the fuel cut-off relay connector terminals.

Connection: Black/white – Brown

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

Connection: Brown/black – Black/white

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

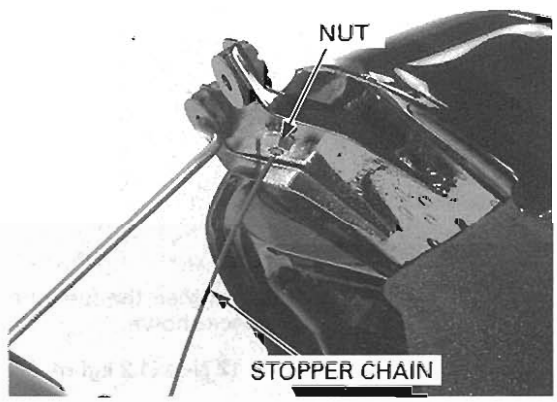


FUEL TANK

UPPER FUEL TANK REMOVAL

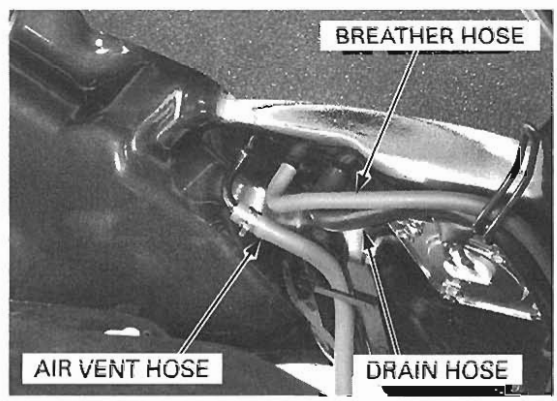
Open and support the fuel tank using the equipped tools (page 3-4).
Remove the left side cover (page 2-6).
Drain the fuel from the upper fuel tank (page 5-50).

Remove the nut and fuel tank stopper chain from the fuel tank.

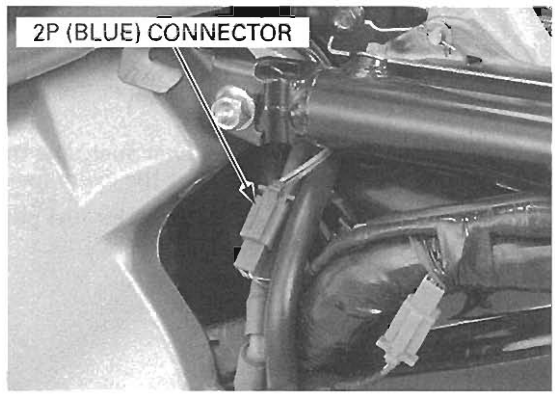


Disconnect the fuel tank breather hose and drain hose.

Release the hose clip and disconnect the fuel tank air vent hose.
Remove the hose clip and remove the air vent hose from the upper fuel tank hose guide and drain the remaining fuel into an approved gasoline container.

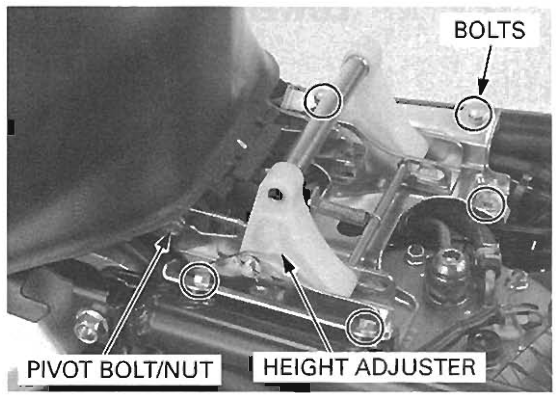


Disconnect the fuel level sensor 2P (Blue) connector.



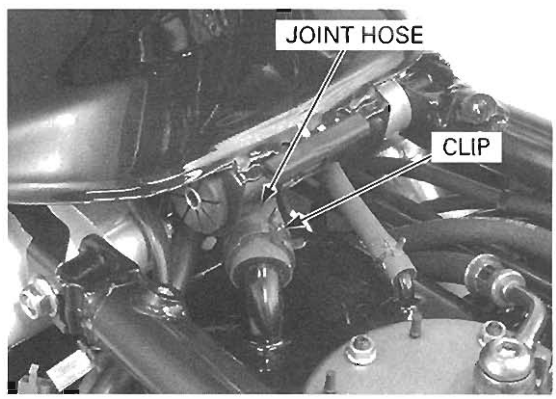
Close the fuel tank then remove the fuel tank rear pivot bolt/nut.

Remove the bolts and seat height adjuster.



Disconnect the fuel tank joint hose at the lower fuel tank.
Discard the joint hose clips and joint hose.

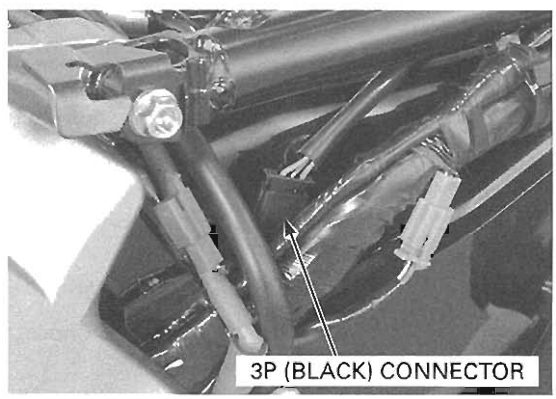
Refer to procedures for fuel level sensor removal (page 22-23).



LOWER FUEL TANK REMOVAL

Remove the seat rail (page 2-19).

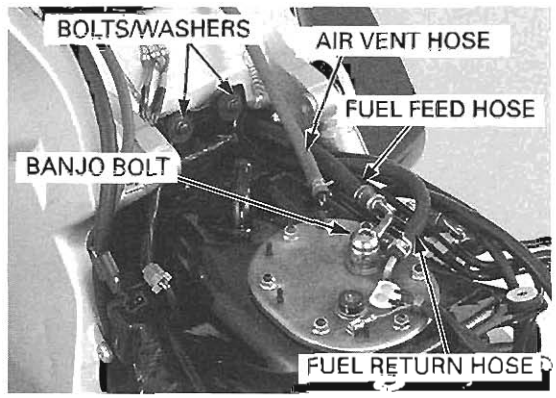
Disconnect the fuel pump 3P (Black) connector.



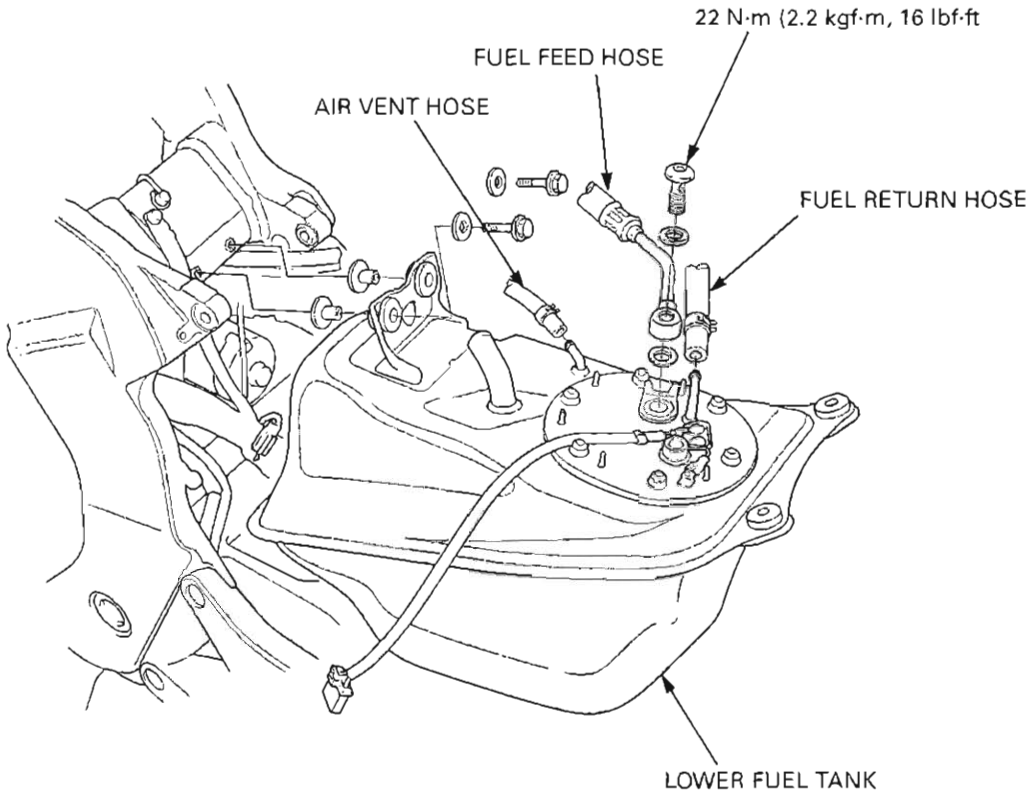
Disconnect the air vent hose and fuel return hose from the fuel pump.
Remove the fuel feed hose banjo bolt and sealing washers, then remove the fuel feed hose from the fuel pump.

Remove the lower fuel tank mounting bolts/washers, then remove the lower fuel tank assembly.

Refer to procedures for fuel pump removal (page 5-54).



LOWER FUEL TANK INSTALLATION



Install the lower fuel tank onto the frame, install and tighten the washers and mounting bolts.
Tighten the mounting bolt securely.

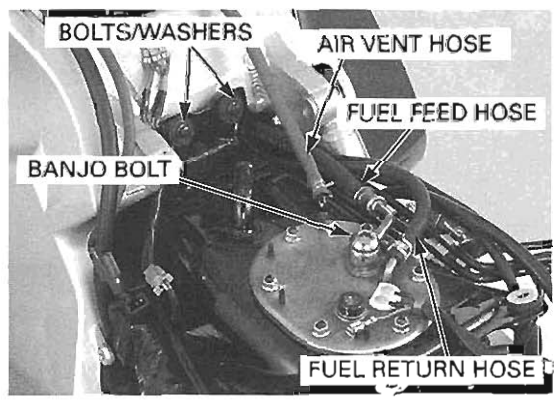
Align the fuel hose eyelet joint with the stopper on the fuel pump.

Connect the fuel feed hose to the fuel pump with new sealing washers.

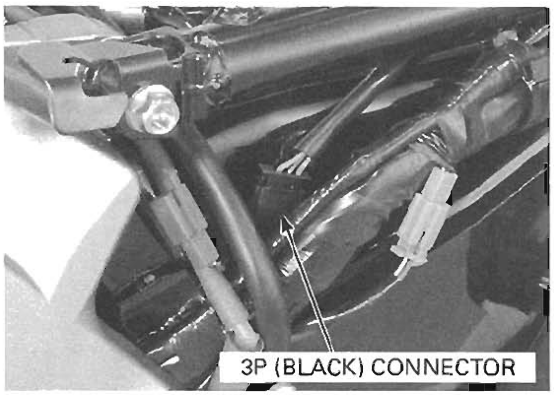
Install and tighten the fuel feed hose banjo bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Connect the fuel return hose and air vent hose to the fuel pump.



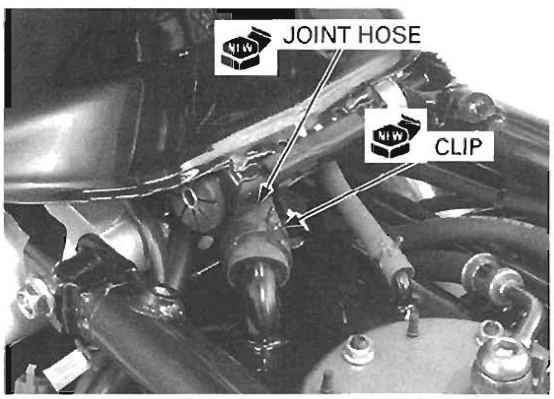
Connect the fuel pump 3P (Black) connector.



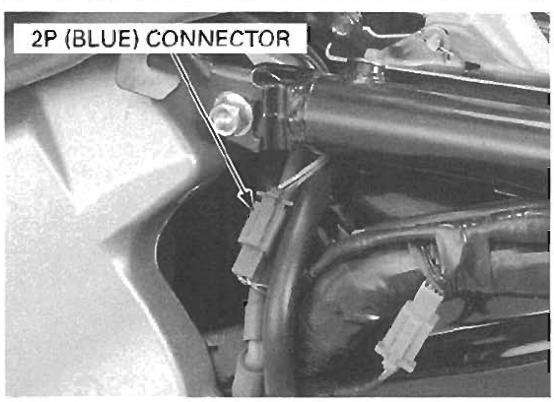
UPPER FUEL TANK INSTALLATION

Always replace the hose clips and joint hose with new ones.

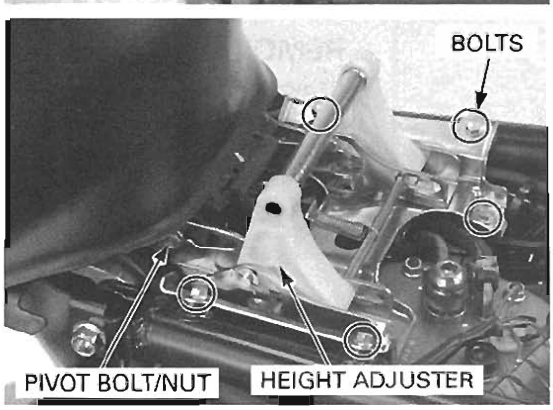
Place the fuel tank onto the frame and connect the new fuel joint hose to the lower fuel tank, then secure it with new fuel hose clips.



Connect the fuel level sensor 2P (Blue) connector.



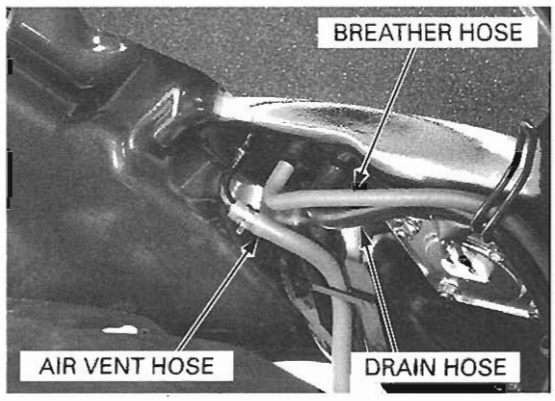
Install the seat height adjuster onto the seat rail and install and tighten the bolts.
Install the upper fuel tank rear pivot bolt/nut and tighten the nut.



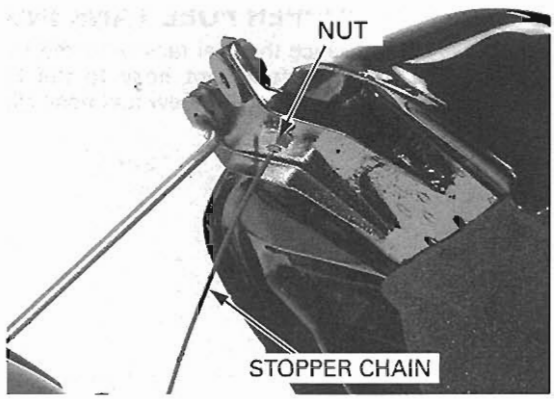
Open and support the fuel tank using the equipped tools (page 3-4).

Route the fuel tank air vent hose into the hose guide and connect the hose to the upper fuel tank.
Secure the air vent hose with a hose clip.

Connect the fuel tank breather hose and drain hose.

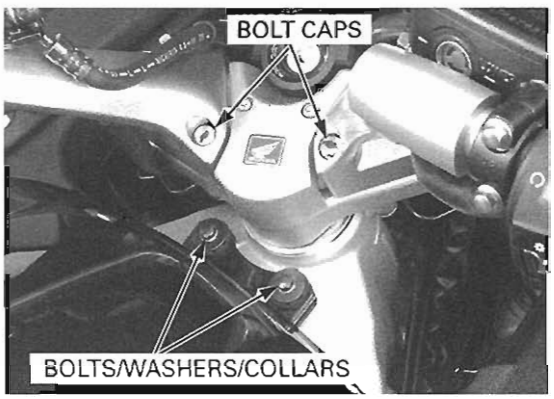


Install the fuel tank stopper chain eyelet to the fuel tank, then install and tighten the nut securely.



Close the fuel tank.
Install the collars, washers and mounting bolts, tighten the bolts securely.

Install the handlebar mounting bolt cap.

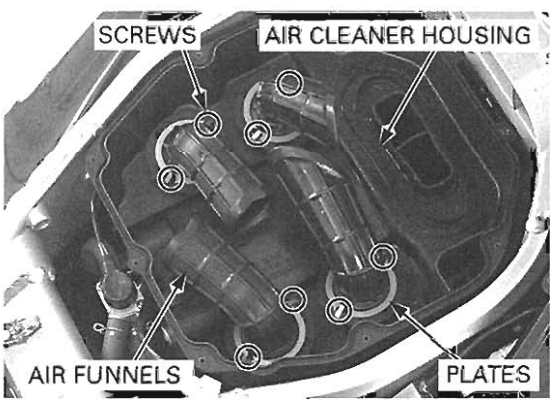


AIR CLEANER HOUSING

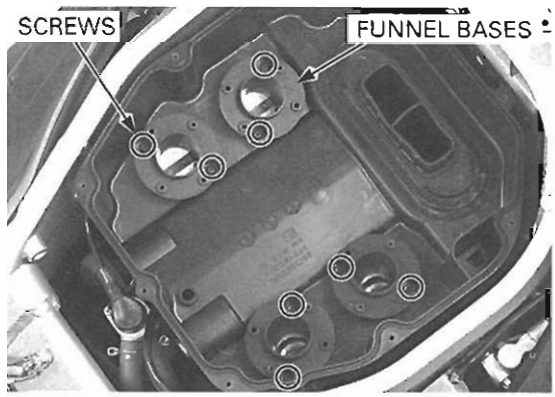
REMOVAL

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

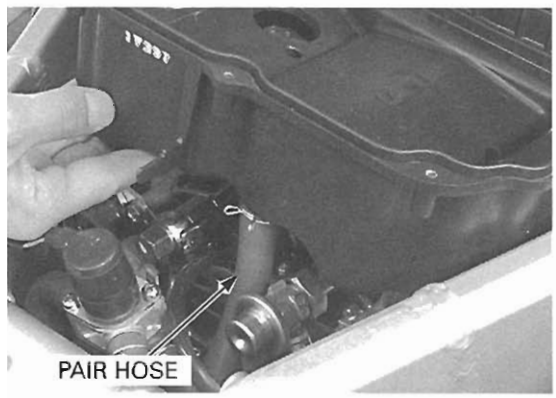
Pull up the retaining plate tabs from the air funnel mounting screws.
Remove the air funnel/air cleaner housing mounting screws, then remove the air funnels and retaining plates.



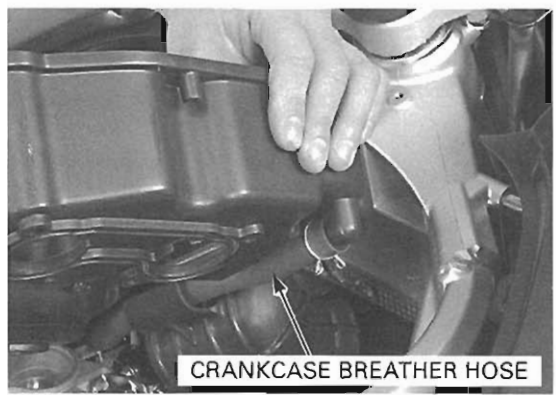
Remove the air funnel bases/air cleaner housing mounting screws.



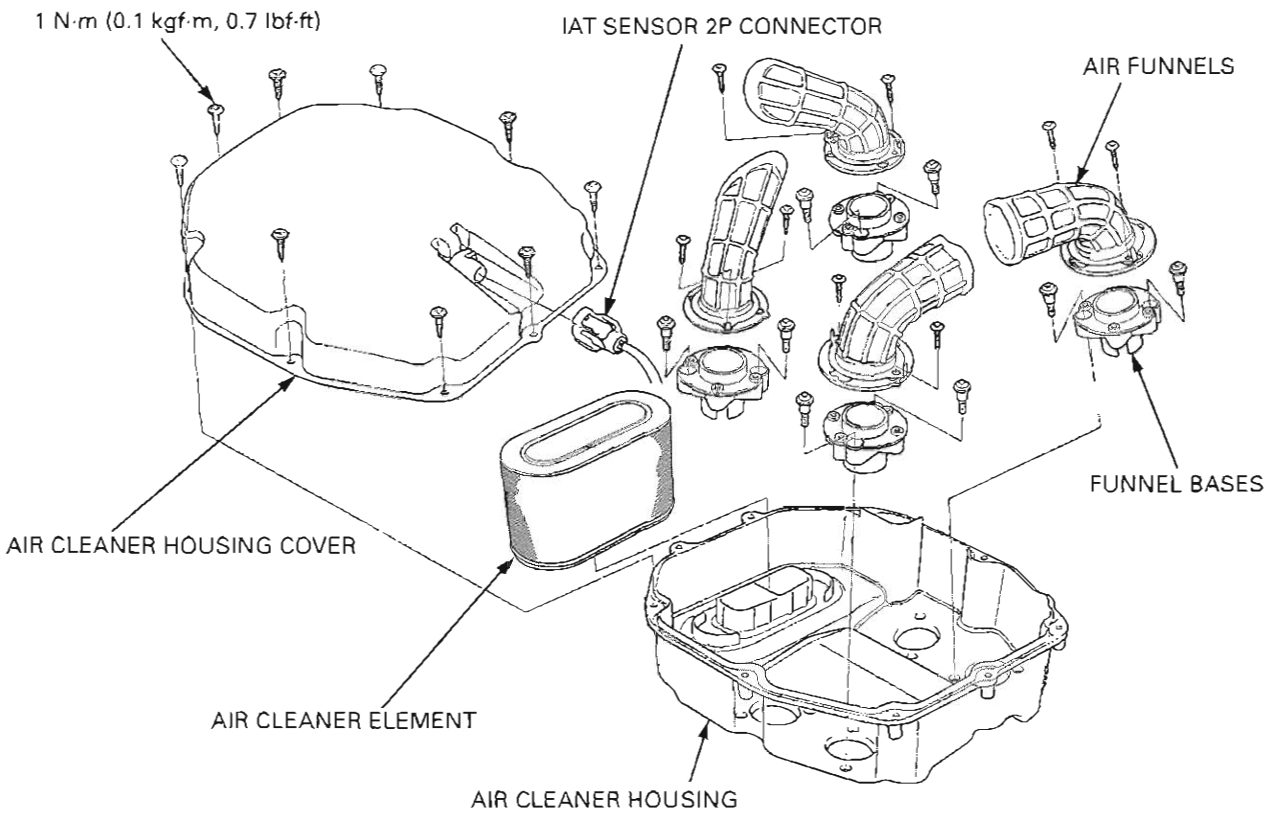
Pull up the air cleaner housing and disconnect the PAIR solenoid valve hose from the air cleaner housing.



Disconnect the crankcase breather hose and remove the air cleaner housing.

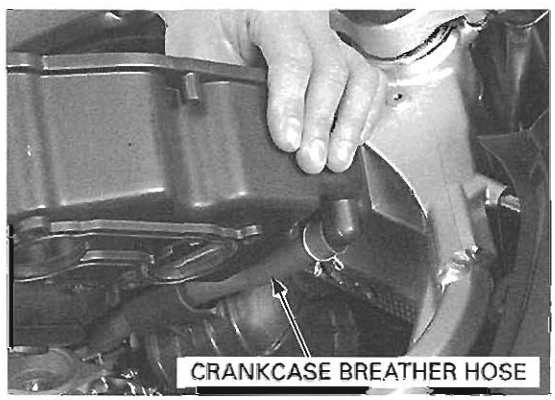


INSTALLATION

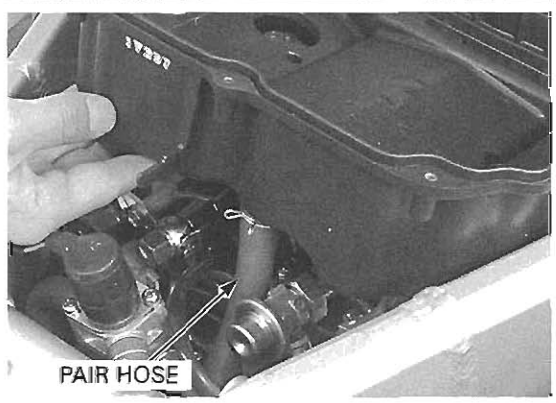


Route the crankcase breather hose to the air intake rubber hose guide.

Install the breather hose to the air cleaner housing and secure it with clip.

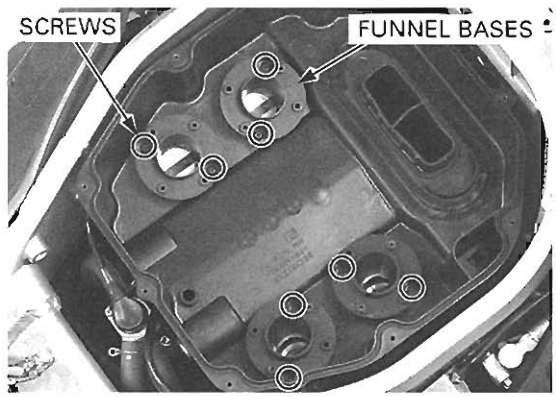


Connect the PAIR solenoid valve hose to the air cleaner housing and secure it with clip.



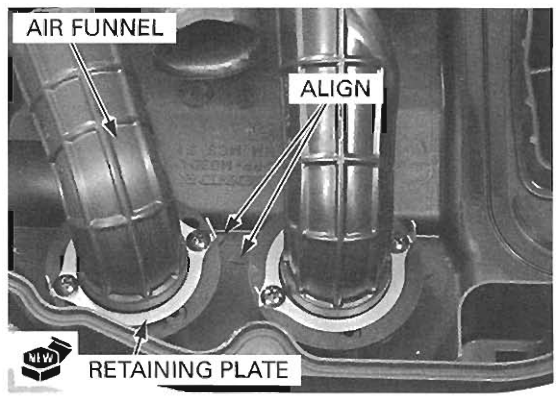
Set the air cleaner housing to the throttle body.

Install the air funnel bases and tighten the screws securely.



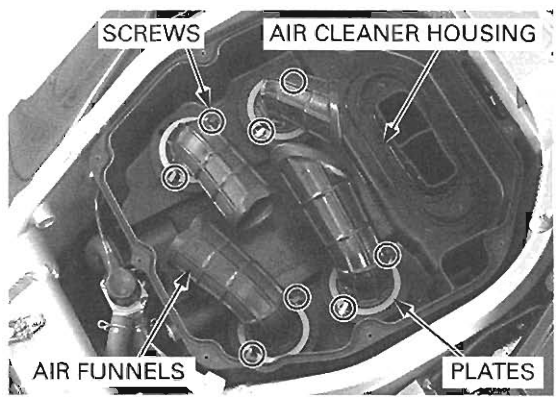
Install each air funnel with their proper positions with the new retaining plates.

Align the air funnel flange tabs with the air cleaner housing "△" marks as shown.



Bend the retainer plate tabs against the air funnel mounting screws securely.

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



THROTTLE BODY

REMOVAL

NOTICE

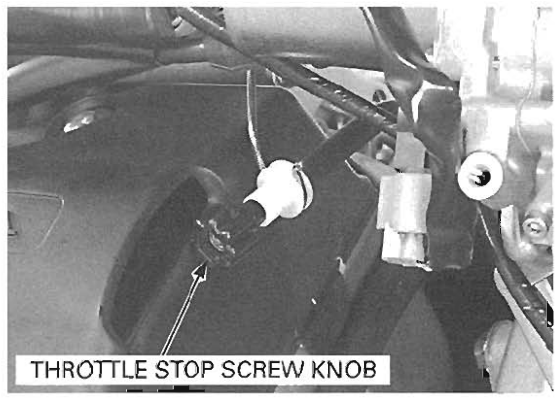
- *Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.*
- *Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt.*
- *Always replace the sealing washer when the fuel hose banjo bolt is removed or loosened.*

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

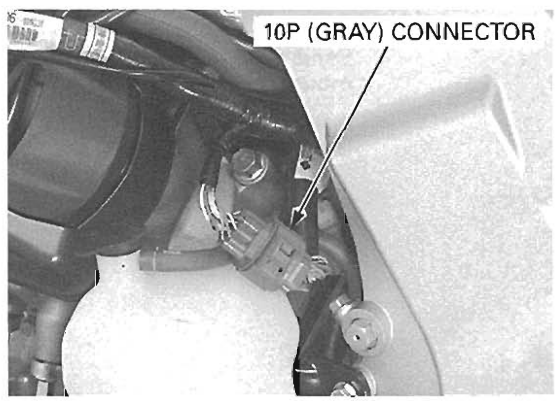
Remove the following:

- Upper fuel tank (page 5-56)
- Air cleaner housing (page 5-60)

Remove the throttle stop screw knob from the cable stay.

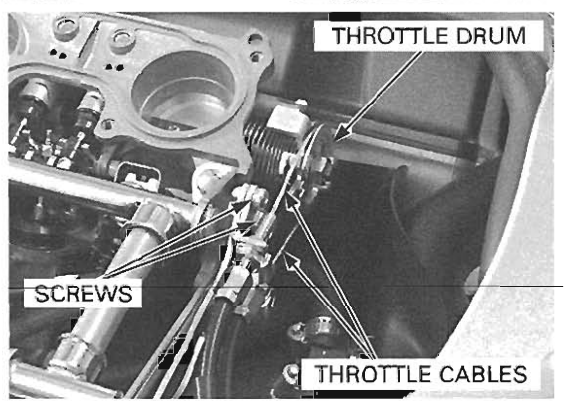


Disconnect the throttle body sub-harness 10P (Gray) connector.

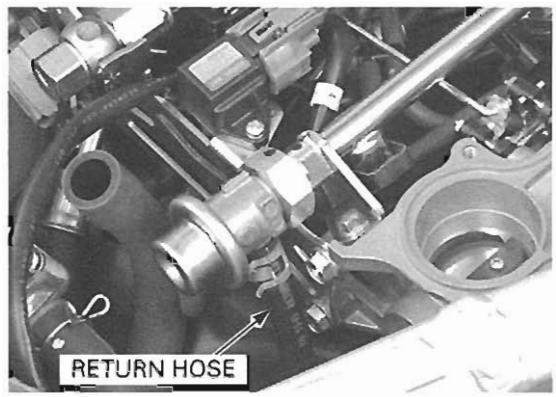


Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.

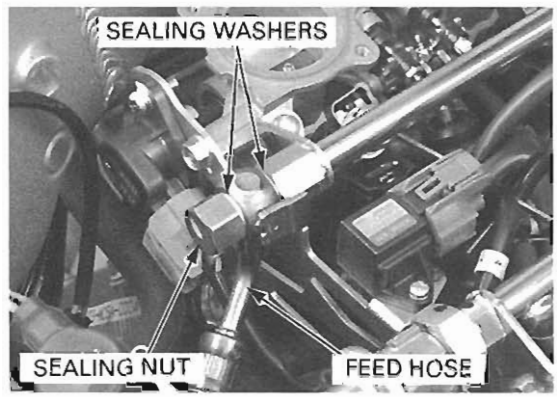
Remove the throttle cable bracket screws and disconnect the throttle cable ends from the throttle drum.



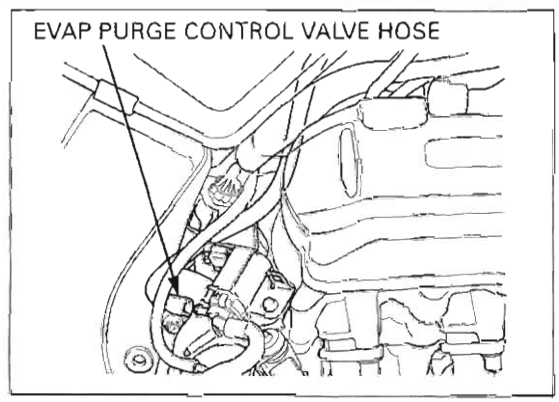
Disconnect the fuel return hose from the pressure regulator.



Remove the sealing nut, sealing washers and fuel feed hose from the fuel rail.



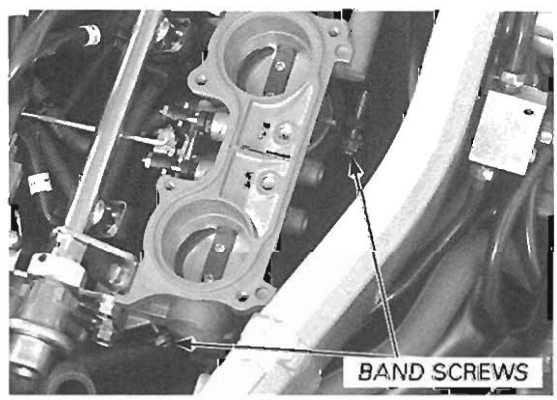
Disconnect the EVAP purge control valve hose from the control valve.



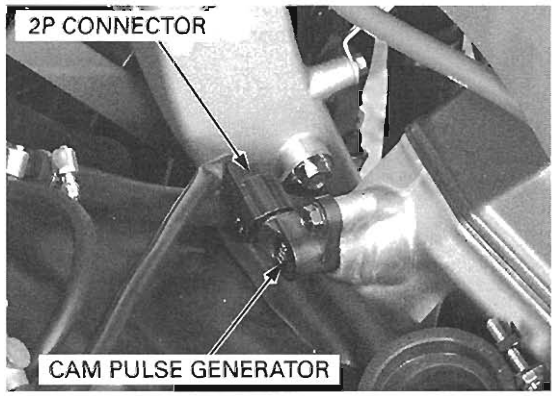
Loosen the throttle body side insulator band screws.

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

Remove the throttle body from the insulators.



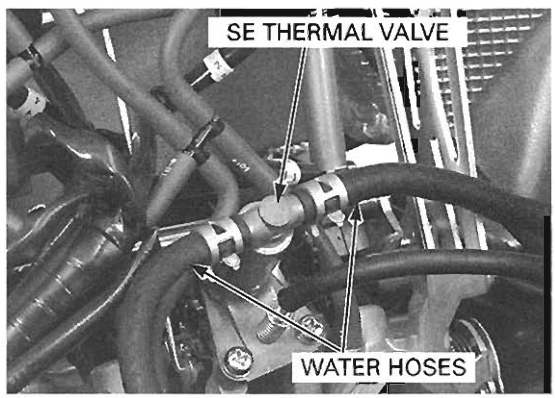
Disconnect the cam pulse generator 2P connector.



Remove the hose band clips and disconnect the SE thermal valve water hoses from the SE thermal valve, then remove the throttle body.

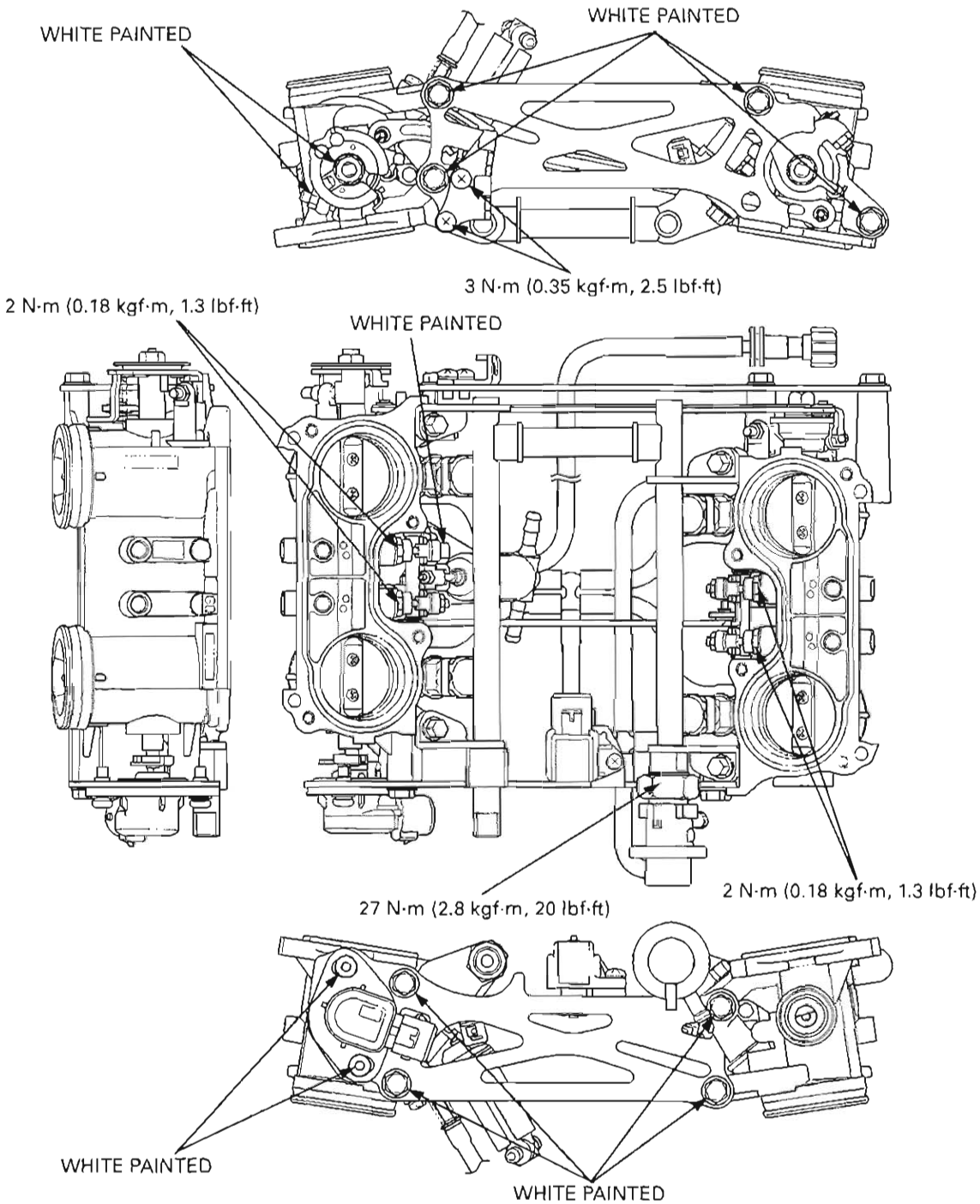
NOTICE

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.

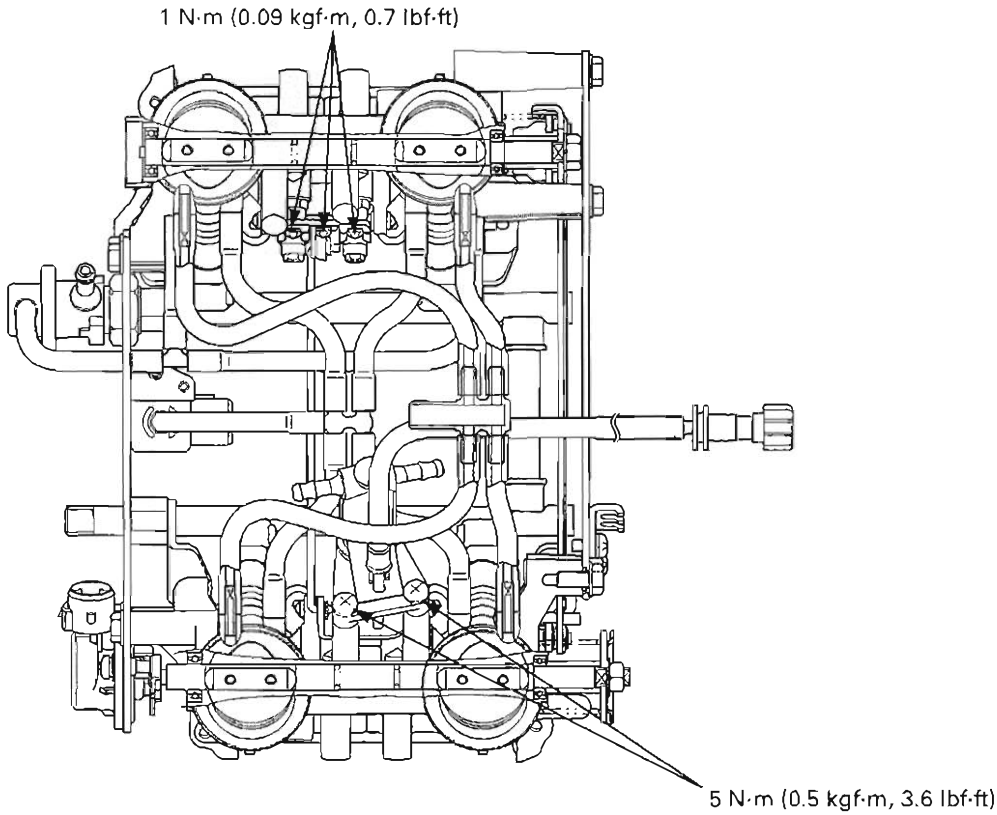


NOTICE

- *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.*



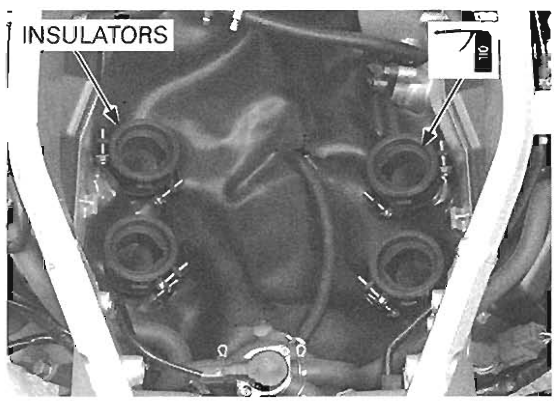
THROTTLE BODY VACUUM HOSE ROUTING



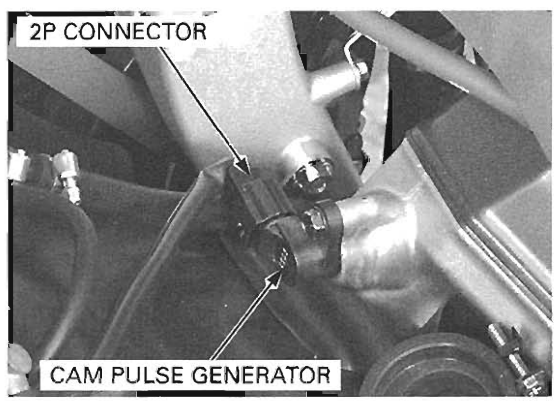
INSTALLATION

Check the insulator band angle.

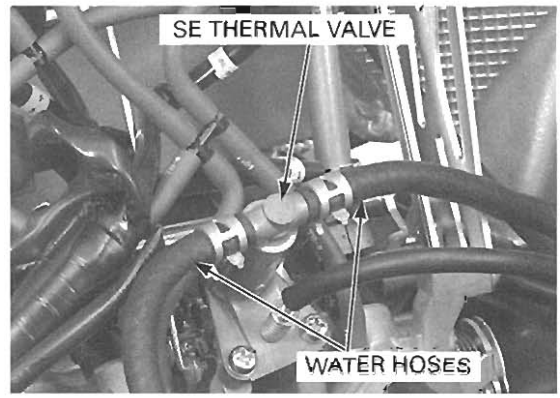
Apply oil to the insulator inside surfaces for ease of the throttle body installation.



Connect the cam pulse generator 2P connector.

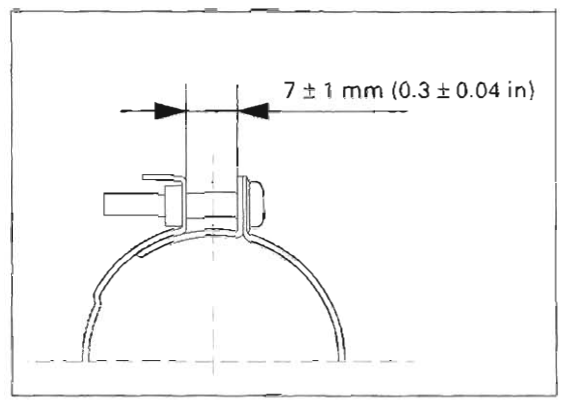


Connect the SE thermal valve water hoses to the unit, secure them with hose clips.

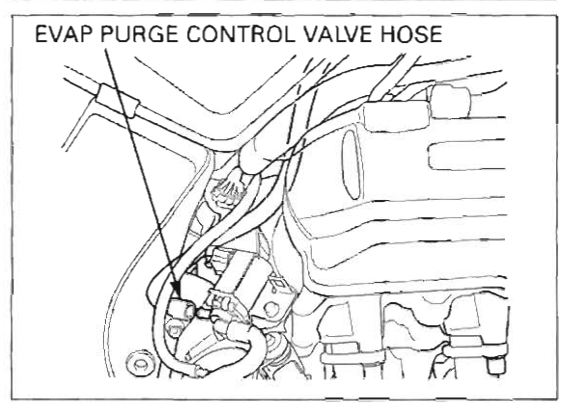


Do not hold the fuel pipe on the throttle body while installing the throttle body.

Install the throttle body into the insulators, tighten the throttle body side insulator band so that the insulator band distance is 7 ± 1 mm (0.3 ± 0.04 in).



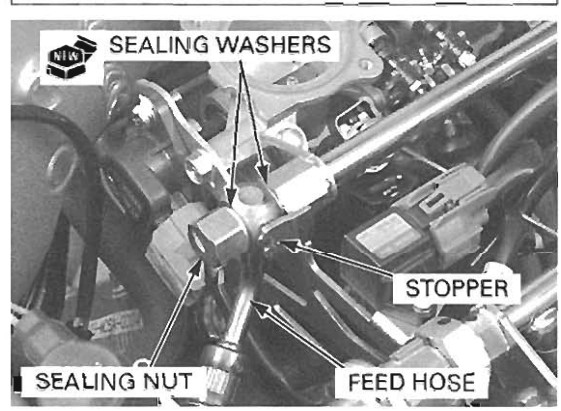
Connect the EVAP purge control valve hose to the control valve.



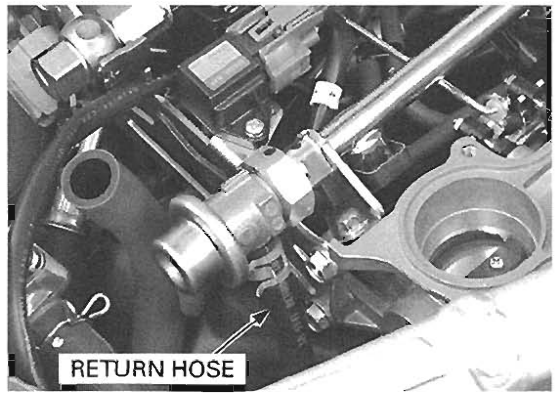
Connect the fuel feed hose to the fuel rail with new sealing washers while aligning its stopper with the fuel rail nut.
Install the sealing nut.

Tighten the sealing nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



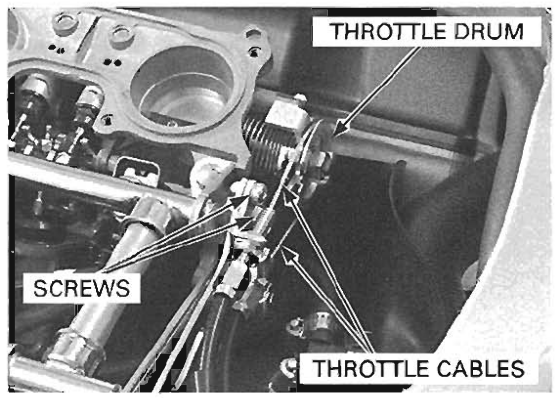
Connect the fuel return hose to the pressure regulator and secure it with a clip.



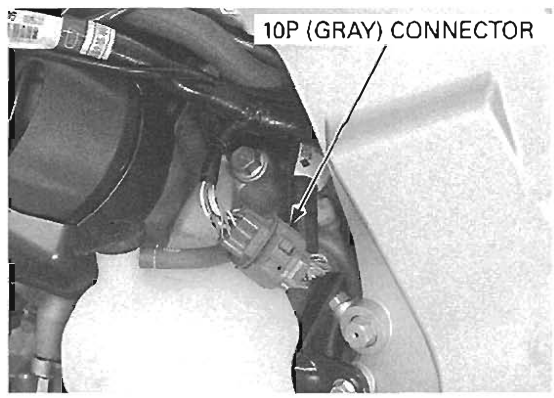
Route the throttle cables properly (page 1-27).

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

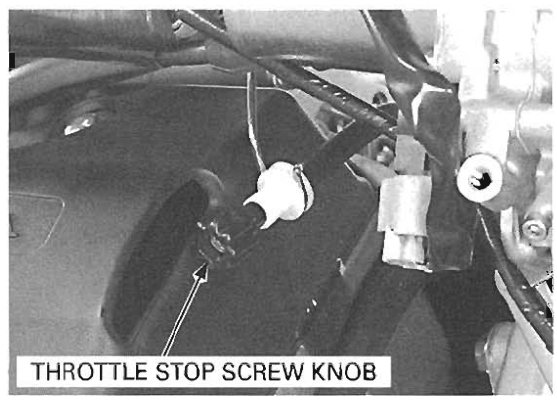
TORQUE: 3 N·m (0.35 kgf·m, 2.5 lbf·ft)



Route the throttle body sub-harness properly, connect the 10P (Gray) connector.



Route the throttle stop control cable properly, install the control knob to the clamp on the cable stay.

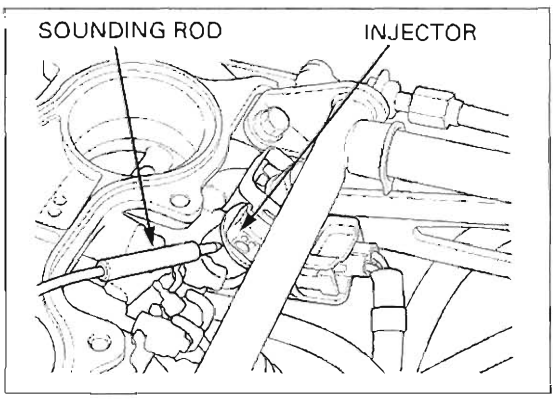


INJECTOR

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 the injector.



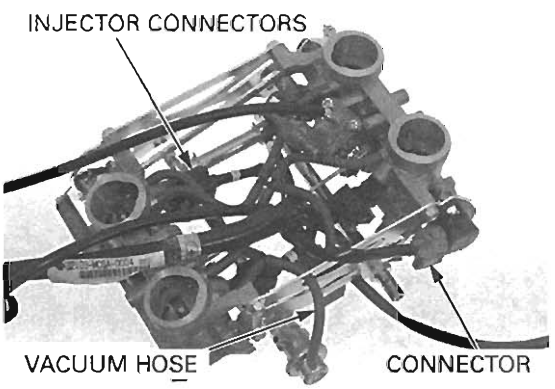
REMOVAL

Remove the throttle body (page 5-64).

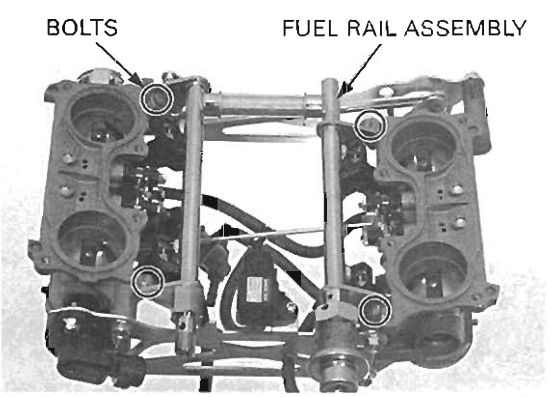
Disconnect the vacuum hose from the pressure regulator.

Disconnect the TP sensor connector.
Disconnect the injector connectors from each injector.

Remove the throttle body sub-harness from the throttle body.

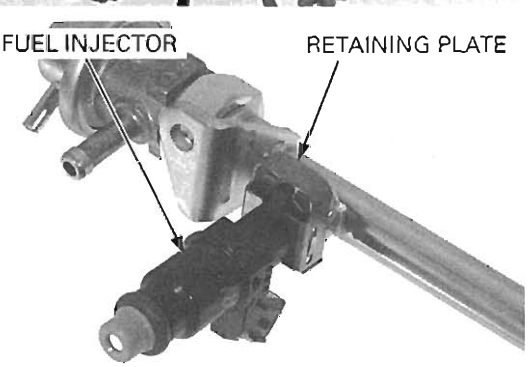


Remove the four bolts and fuel rail assembly.



Remove the retaining plates and then remove the injectors from the fuel rails.

Remove the O-ring and cushion ring.

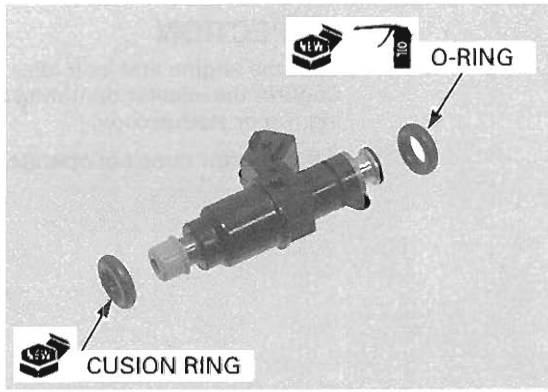


INSTALLATION

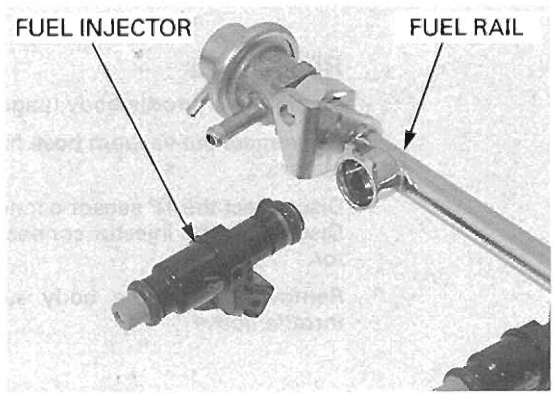
Apply oil to the new O-ring.

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

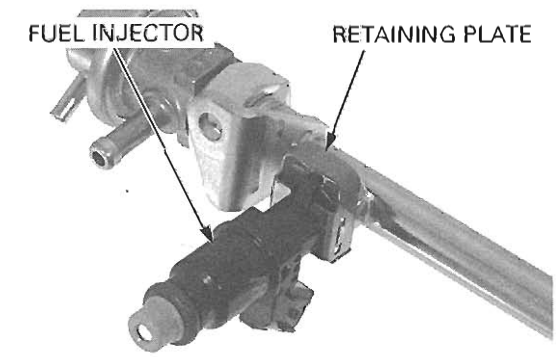
Install the new cushion ring and O-ring, being careful not to damage the O-ring.



Install the fuel injectors into the fuel rail, being careful not to damage the O-rings.

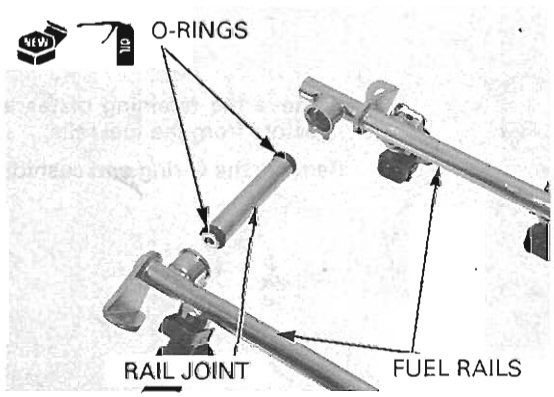


Secure the injectors with the retaining plates.



Apply oil to the new O-ring and install them onto the rail joint flange.

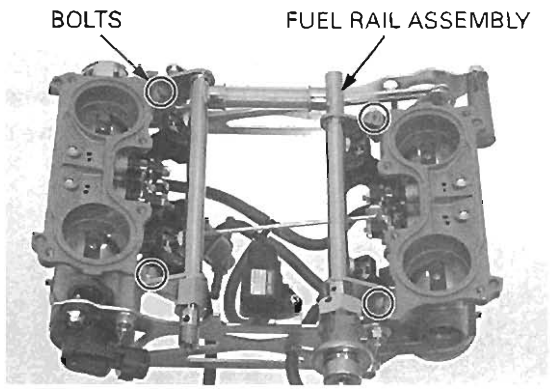
Assemble the fuel rails and rail joint.



Install the fuel rail over the injectors, being careful not to damage the cushion rings.

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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



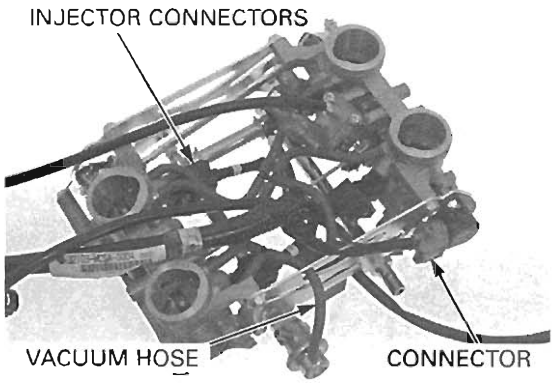
Route the throttle body sub-harness into the throttle body.

The throttle body sub-harness has identification marks for the injector connector connection. Install the injector connectors in their proper locations

Connect the injector connectors to each injector. Connect the TP sensor connector.

Connect the vacuum hose to the pressure regulator.

Install the throttle body (page 5-68).



PRESSURE REGULATOR

REMOVAL/INSTALLATION

Do not apply excessive force to the fuel rail.

Remove the air cleaner housing (page 5-60).

Disconnect the vacuum hose and fuel return hose from the pressure regulator.

Hold the fuel rail bracket nut securely, loosen the pressure regulator lock nut, then remove the pressure regulator.

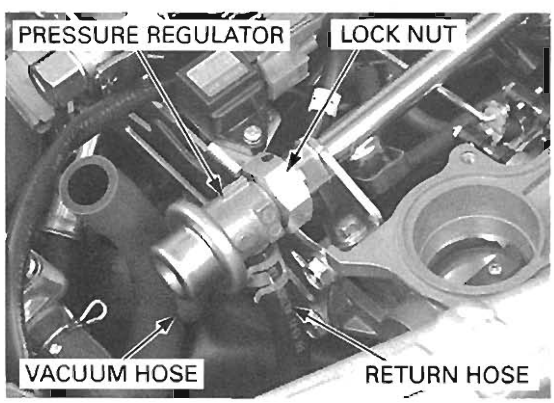
Install the pressure regulator onto the fuel rail.

Hold the fuel rail bracket nut securely, tighten the pressure regulator lock nut to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Connect the vacuum hose and fuel return hose to the pressure regulator.

Install the air cleaner housing (page 5-62).



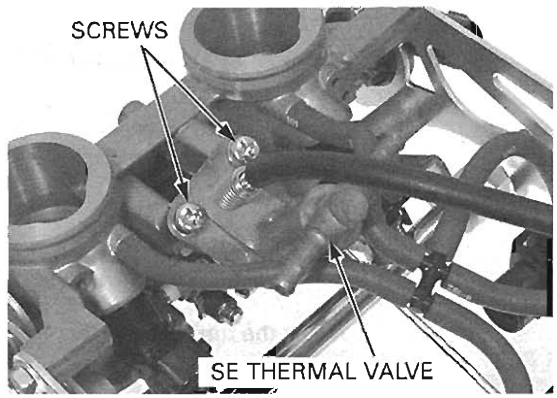
SE THERMAL VALVE

REMOVAL

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

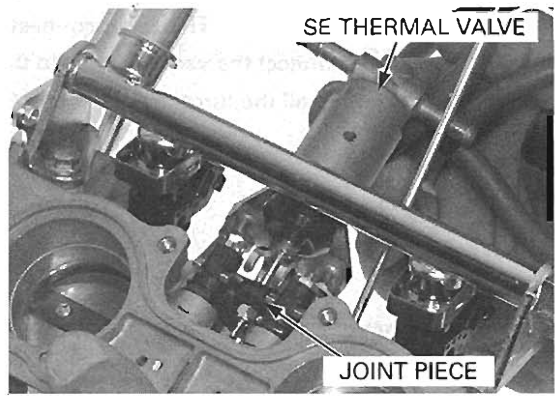
Remove the throttle body (page 5-64).

Remove the SE thermal valve mounting screws.



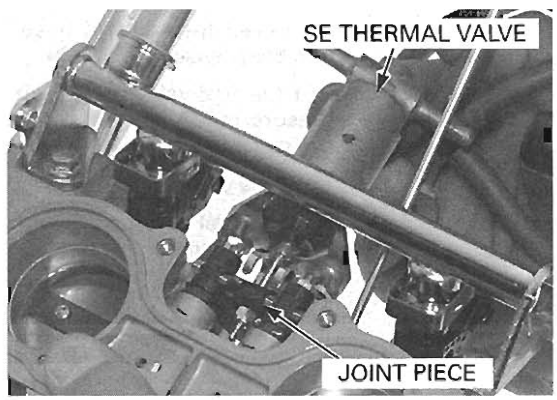
Do not disassemble the SE thermal valve.

Release the SE thermal valve shaft joint piece from the SE thermal valve link arm, then remove the SE thermal valve assembly.



INSTALLATION

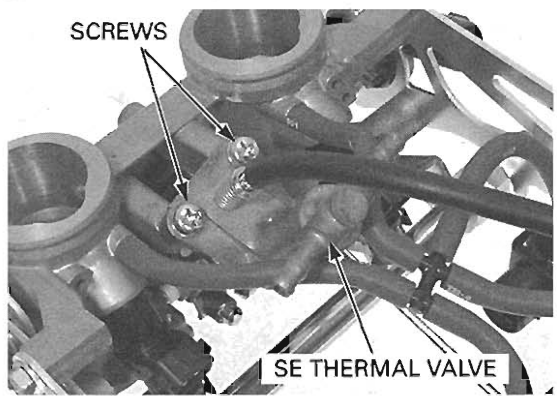
Install the SE thermal valve shaft joint piece to the SE thermal valve link arm.



Install and tighten the SE thermal valve mounting screws to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the throttle body (page 5-68).

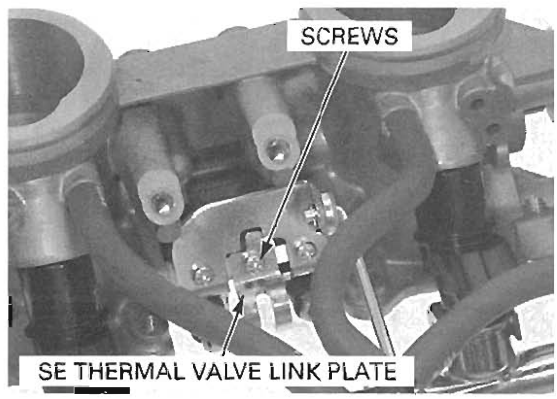


STARTER VALVE

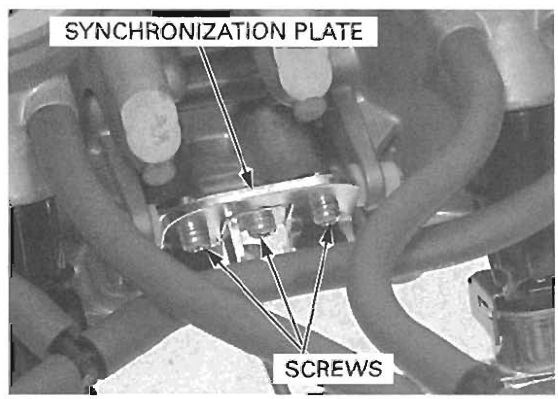
DISASSEMBLY

Remove the SE thermal valve (page 5-74).

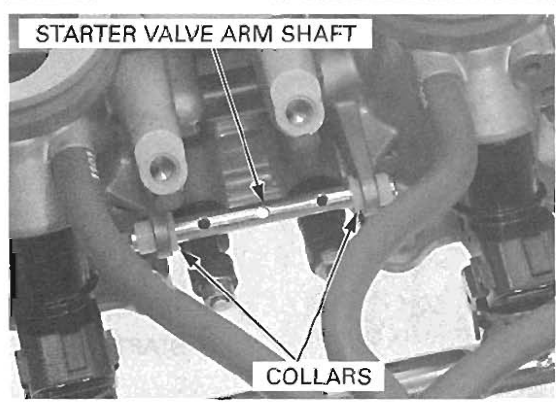
Remove the screw and SE thermal valve link plate.



Remove the screws and starter valve synchronization plate from the starter valve shaft.

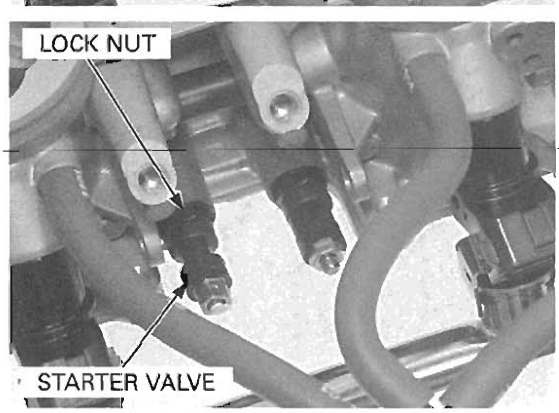


Remove the starter valve shaft and collars.



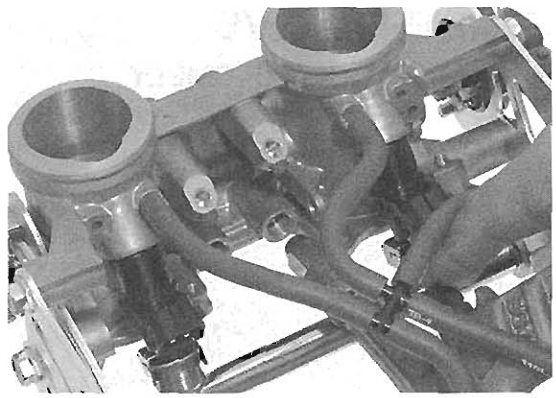
Turn each starter valve adjusting screw in, counting number of turns until it seats lightly.
Record the number of turns.

Loosen each lock nut and remove each starter valve.

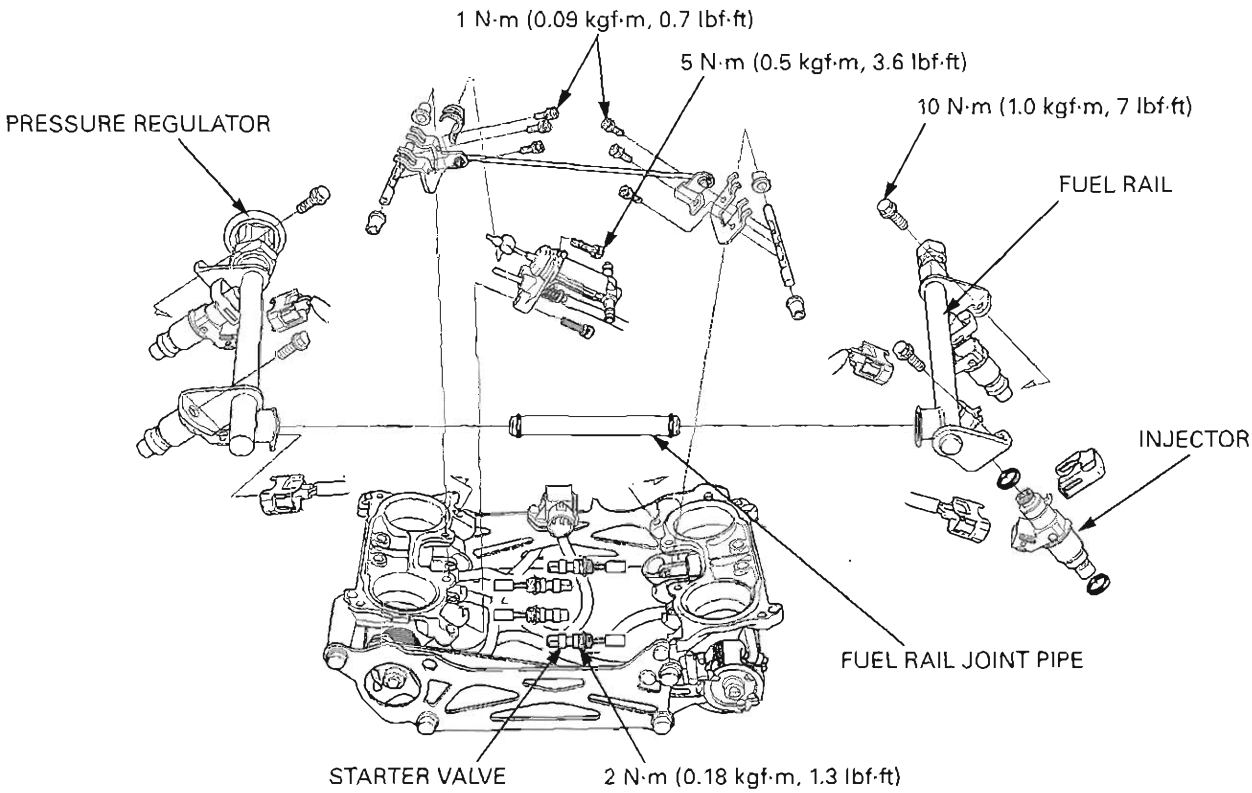


Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.

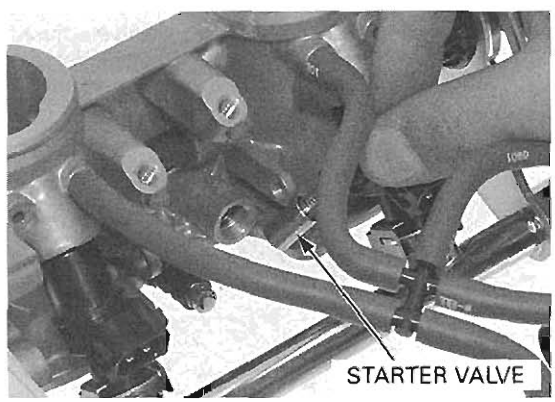
Clean the starter valve bypass using compressed air.



ASSEMBLY



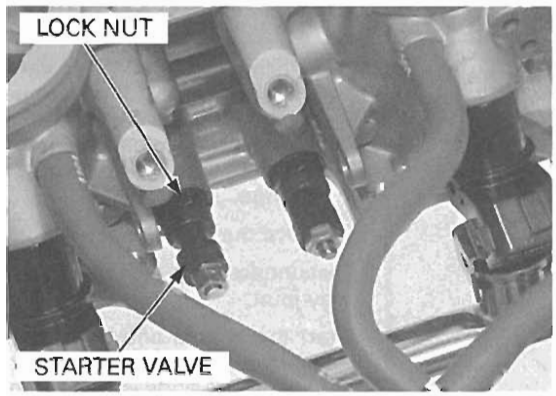
Install the starter valve assembly into the valve hole.



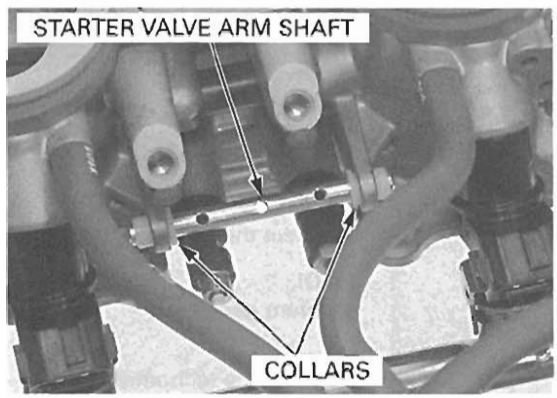
Tighten the starter valve lock nut to the specified torque.

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

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

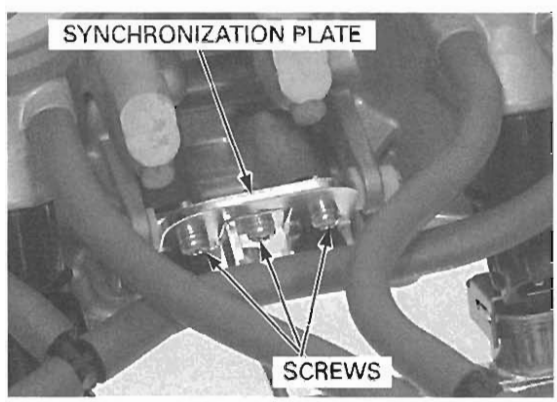


Install the collars and starter valve link shaft.



Install the starter valve synchronization plate to the starter valve arm shaft and tighten the screws to the specified torque.

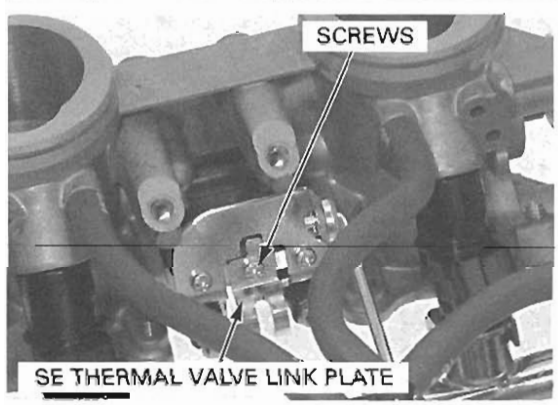
TORQUE: 1 N·m (0.09 kgf·m, 0.7 lbf·ft)



Install the SE thermal valve link plate and tighten the screw to the specified torque.

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

Install the SE thermal valve (page 5-74).



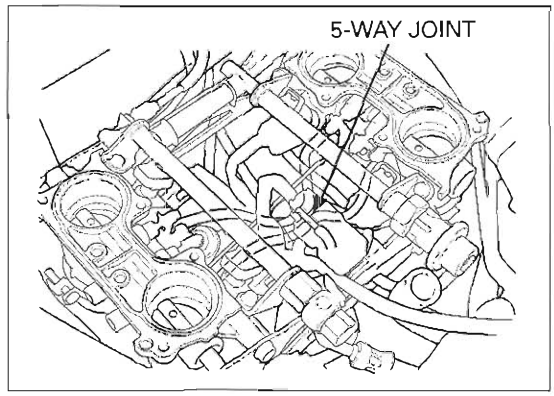
STARTER VALVE SYNCHRONIZATION

- 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.

Remove the air cleaner housing (page 5-60).

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

Start the engine and hold the engine speed above 2,000 rpm for 5 seconds or more, so that the MAP sensor failure code is input into the ECM.

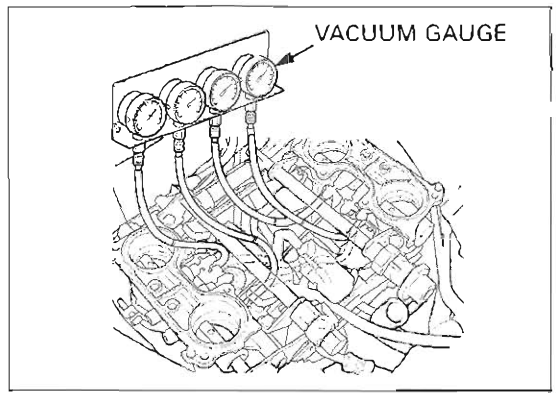


Connect the hoses to the vacuum gauge.

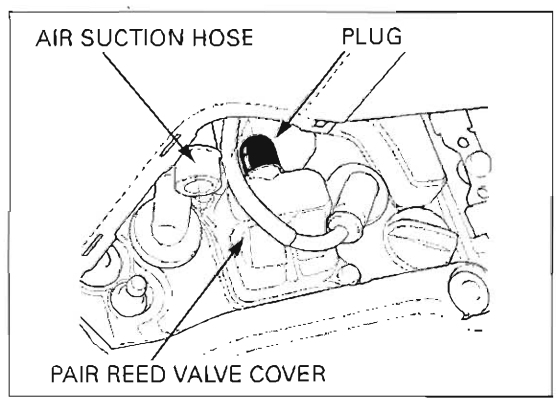
TOOL:

Vacuum gauge set	**07LMJ-001000A (U.S.A. only)**

Connect the tachometer.

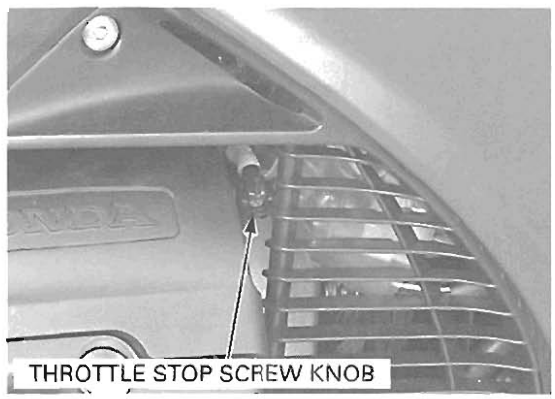


Disconnect each PAIR suction hose from the reed valve cover and plug the cover.



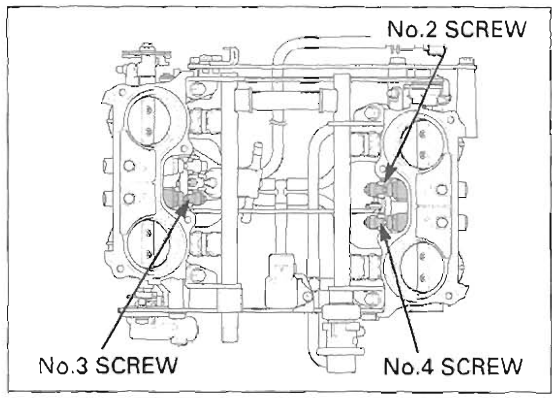
Start the engine and adjust the idle speed.

IDLE SPEED: 1,000 ± 100 rpm

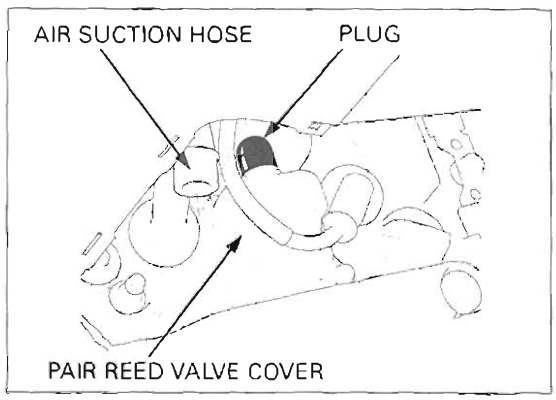


The No.1 starter valve cannot be adjusted, it is the base starter valve.

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



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



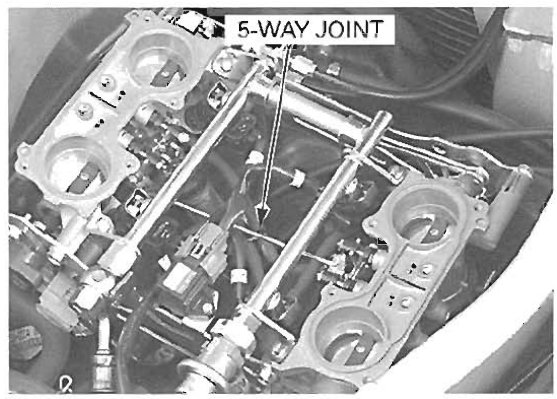
Adjust the idle speed if the idle speed differs from the specified speed.

IDLE SPEED: 1,000 ± 100 rpm



Remove the vacuum gauge from the vacuum hoses.
Connect each cylinder vacuum hose to the 5-way joint.
Reset the ECM failure code (page 5-8).

Install the air cleaner housing (page 5-62).



MAP SENSOR

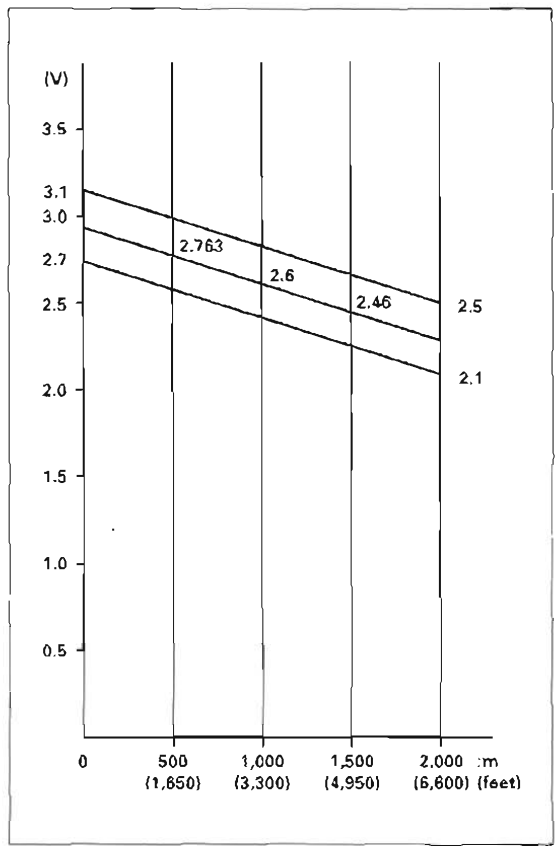
OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 5-9).

Measure the voltage at the test harness terminals (page 5-10).

Connection: A25 (+) – B5 (–)
STANDARD: 2.7 – 3.1 V

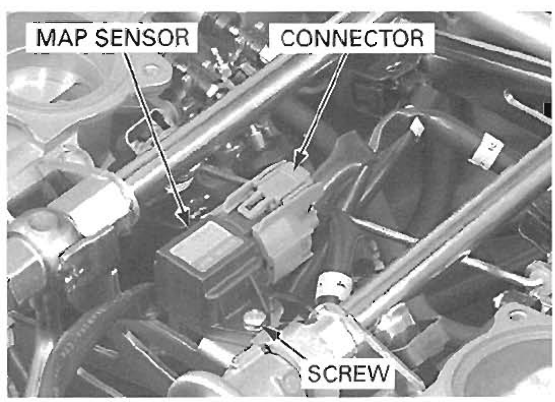
The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa).
The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.
Check the sea level measurement and be sure that the measured voltage falls within the specified value.



REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-60).

Disconnect the MAP sensor connector.
Remove the screw and MAP sensor from the throttle body.
Installation is in the reverse order of removal.



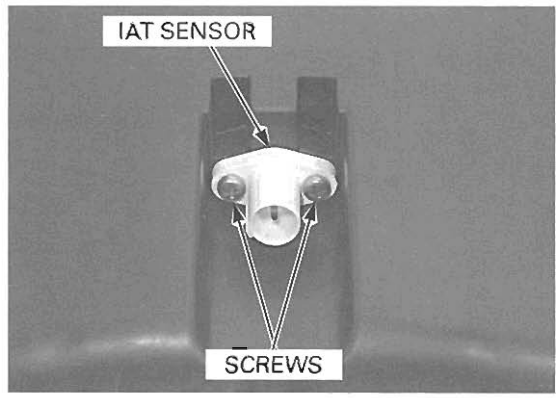
IAT SENSOR

REMOVAL/INSTALLATION

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

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

Installation is in the reverse order of removal.



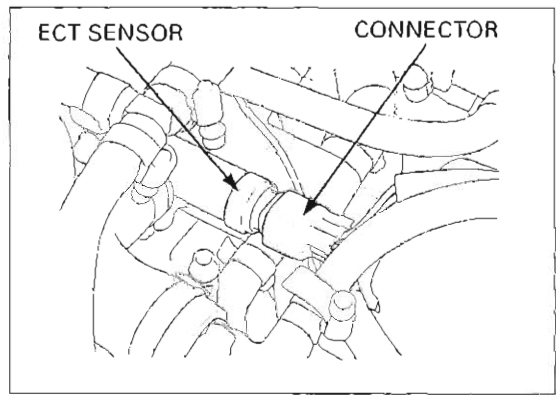
ECT SENSOR

REMOVAL/INSTALLATION

Replace the ECT sensor while the engine is cold.

Drain the coolant from the system (page 6-6).
Remove the throttle body (page 5-64).

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



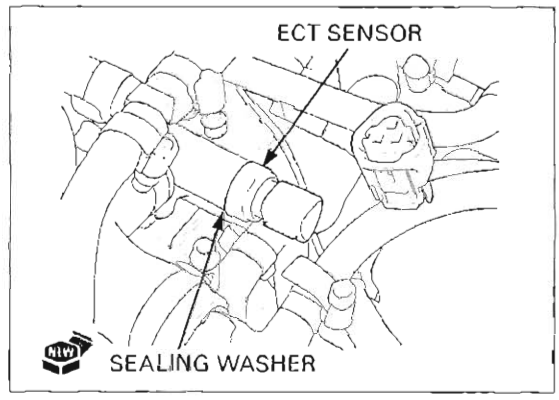
Always replace a sealing washer with a new one.

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

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Connect the ECT sensor connector.

Install the throttle body (page 5-68).
Fill the cooling system with recommended coolant (page 6-6).

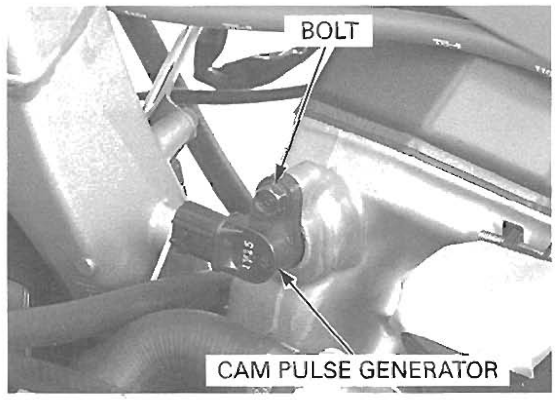


CAM PULSE GENERATOR

REMOVAL/INSTALLATION

Remove the throttle body (page 5-64).

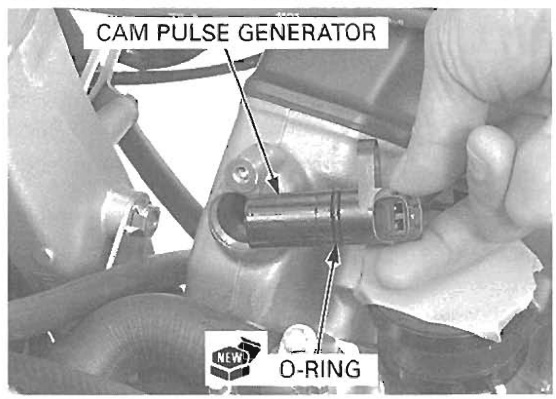
Remove the bolt and cam pulse generator from the right cylinder head.



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

Install and tighten the mounting bolt securely.

Install the removed parts in the reverse order of removal.



TP SENSOR

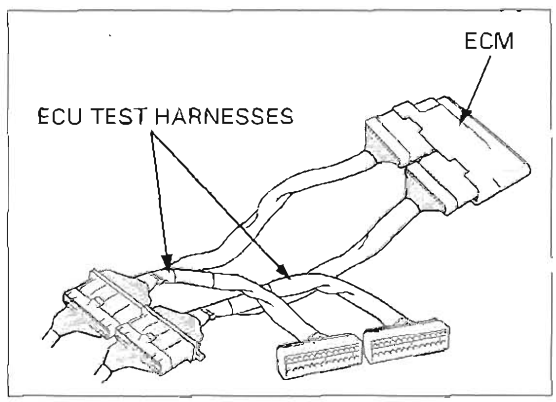
INSPECTION

Remove the rear cowl (page 2-7).

Disconnect the ECM 26P (Black) and 26P (Light gray) connectors.
Check the connector for loose or corroded terminals.
Connect the ECU test harness between the ECM and main wire harness.

TOOL:

ECU test harness 26P	070MZ-0010100 (two required)

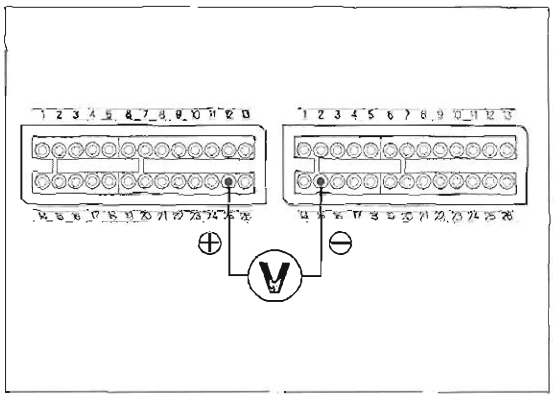


INPUT VOLTAGE INSPECTION

Turn the ignition switch ON and measure and record the input voltage at the test harness terminals using a digital multimeter.

Connection: A25 (+) – B15 (–)
Standard: 4.5 – 5.5 V

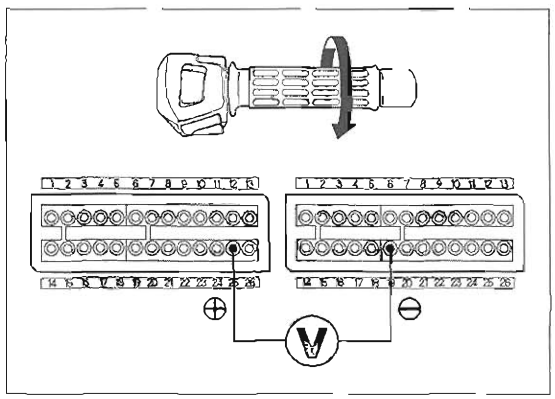
If the measurement is out of specification, check the following:
- Loose connection of the ECM multi-connector
- Open circuit in wire harness.



OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

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

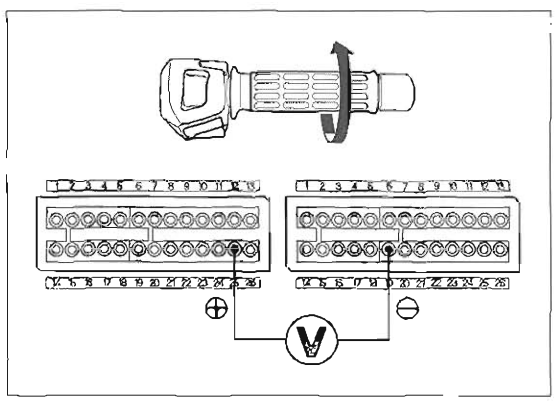
Connection:
A25 (+) – B19 (–)
MEASURING CONDITION:
At throttle fully open



OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

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

Connection:
A25 (+) – B19 (–)
MEASURING CONDITION:
At throttle fully close



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 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 is within 10%of Vc.

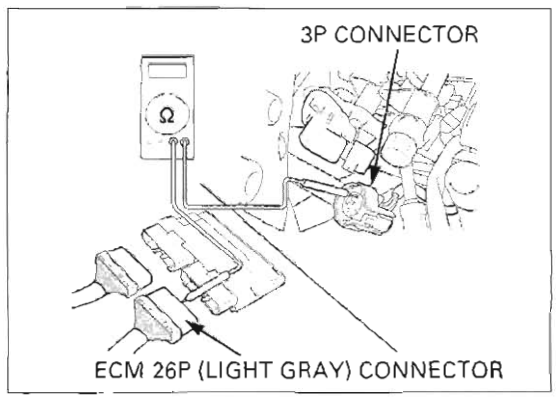
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

CONTINUITY INSPECTION

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

Disconnect the ECM 26P (Black) and 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.

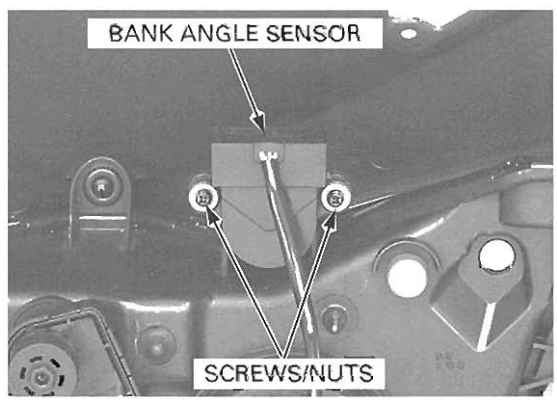


BANK ANGLE SENSOR

INSPECTION

Support the motorcycle level surface.
Remove the upper cowl (page 2-16).

Remove the screws, nuts and bank angle sensor.

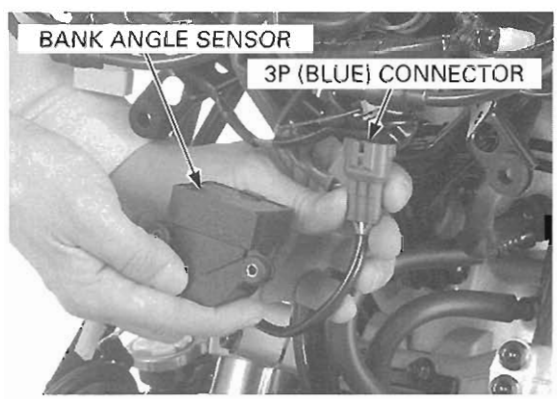


Connect the bank angle sensor 3P (Blue) connector.

Place the bank angle sensor with its arrow mark facing up.

Turn the ignition switch ON and measure the voltage between the following terminals of the bank angle sensor connector with the connector connected.

TERMINAL	STANDARD
White/black (+) – Green (-)	Battery voltage
Red/orange (+) – Green (-)	0 – 1 V



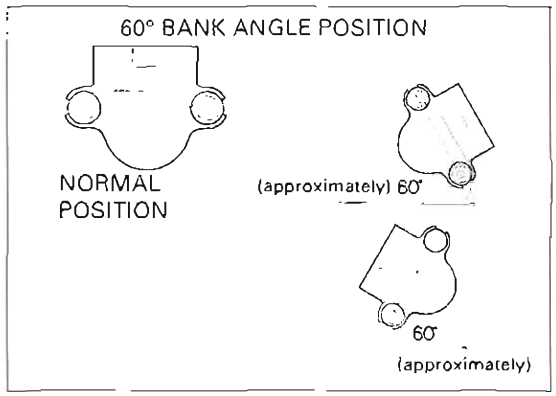
Turn the ignition switch OFF.

Place the bank angle sensor horizontal as shown, and ignition switch 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 ON.
The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

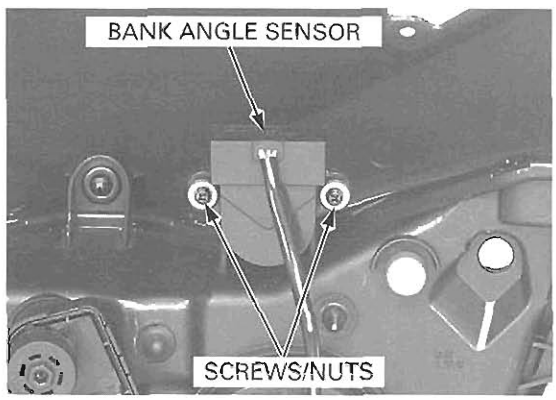
If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.



REMOVAL/INSTALLATION

Remove the upper cowl (page 2-16).

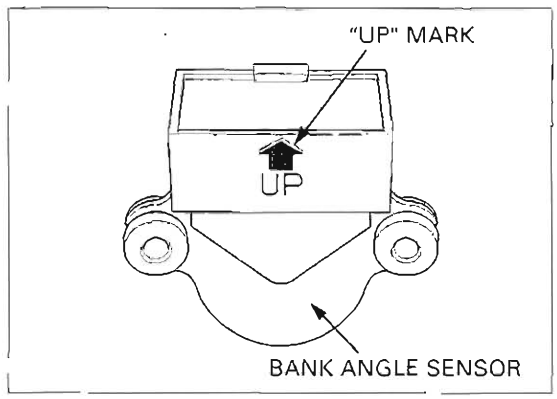
Remove the two screws, nuts and bank angle sensor.



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

Installation is in the reverse order of removal.

Tighten the mounting screws/nuts securely.

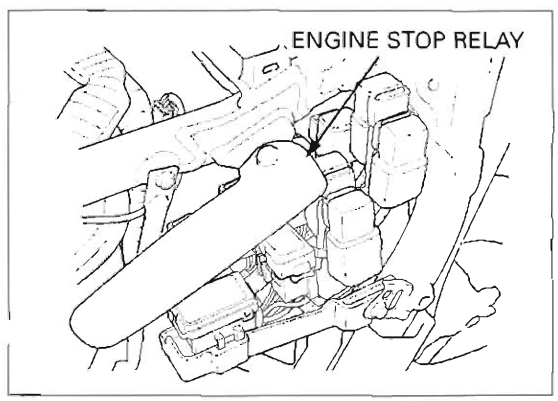


ENGINE STOP RELAY

INSPECTION

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

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



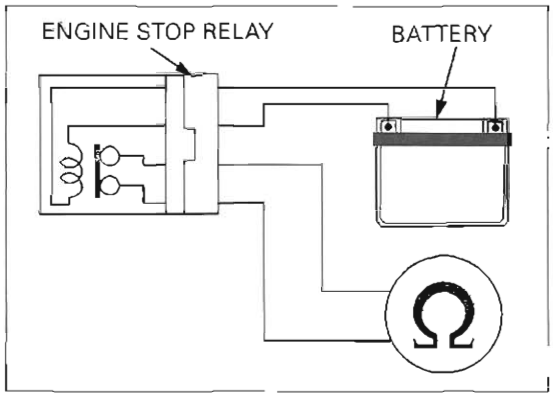
Connect the ohmmeter to the engine stop relay connector terminals.

Connection: Black/pink – 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 12 V battery is connected.
If there is no continuity when the 12 V battery is connected, replace the engine stop relay.

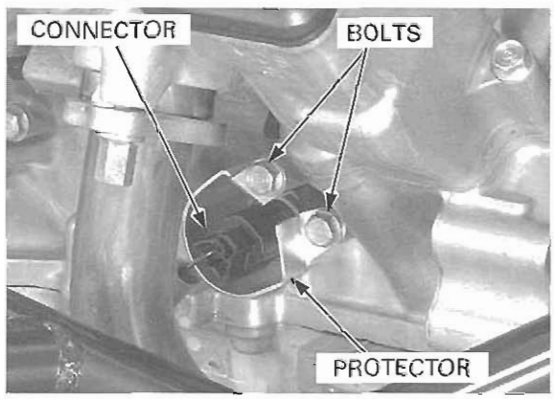


KNOCK SENSOR

REMOVAL/INSTALLATION

Remove the middle cowl (page 2-12).

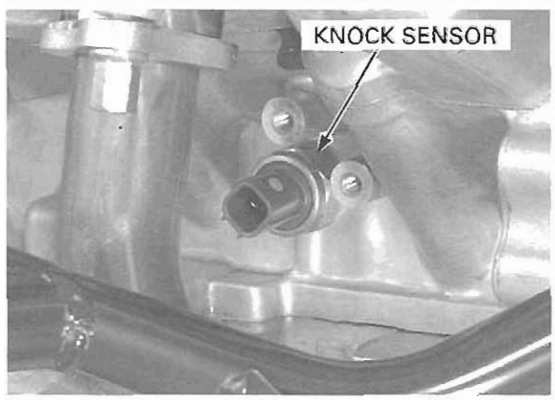
Disconnect the knock sensor connector.
For the right knock sensor removal, remove the bolts and knock sensor protector.



Remove the knock sensor from the cylinder block.

Installation is in the reverse order of removal.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

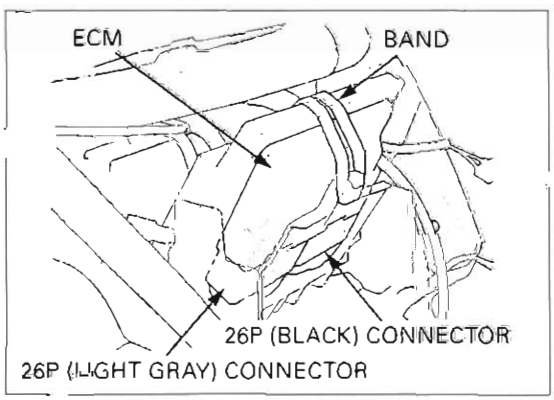


ECM (ENGINE CONTROL MODULE)

REMOVAL/INSTALLATION

Remove the rear cowl (page 2-7).

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

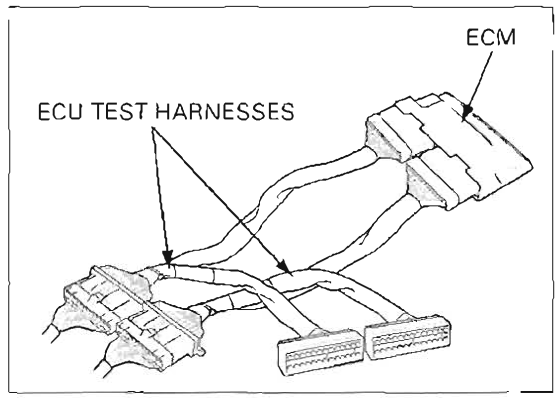


POWER/GROUND LINE INSPECTION

Connect the test harness between the main wire harness and ECM (page 5-9).

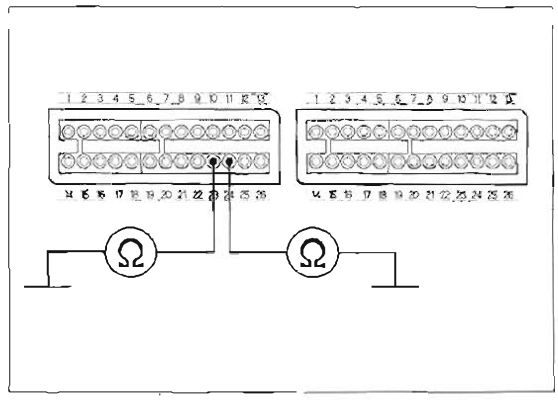
TOOL:

ECU test harness 26P	070MZ-0010100 (two required)



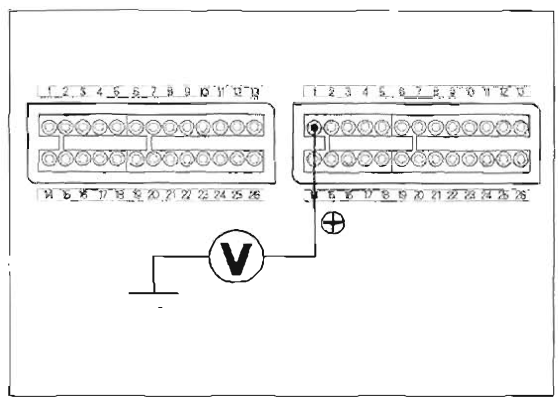
GROUND LINE

Check for continuity between the ECM test harness connector A23 terminal and ground, between the A24 terminal and ground.
There should be continuity at all times.
If there is no continuity, check for open circuit in Green/pink wire.



POWER INPUT LINE

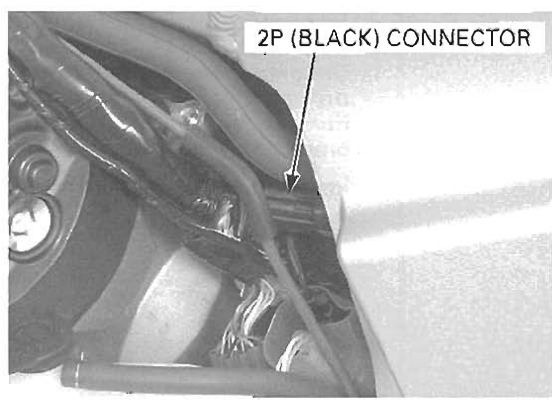
Turn the ignition switch ON with the engine stop switch in RUN position.
Measure the voltage between the ECM test harness connector B1 terminal (+) and ground.
There should be battery voltage.
If there is no voltage, check for open circuit in Black/white wire between the ECM and bank angle sensor/relay.
If the wire is OK, check for the bank angle sensor/relay (page 5-84).



PAIR SOLENOID VALVE

REMOVAL/INSTALLATION

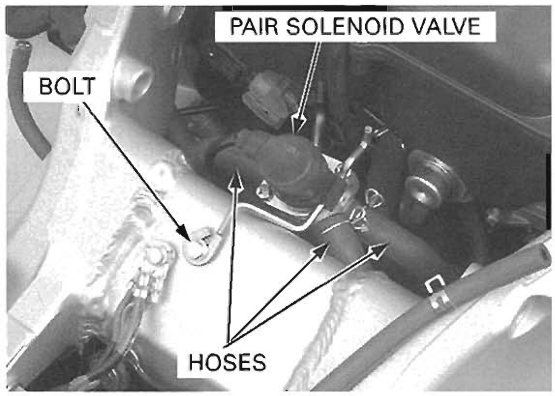
Disconnect the PAIR solenoid valve 2P (Black) connector.



Disconnect the PAIR suction hoses.

Remove the bolt and PAIR solenoid valve.

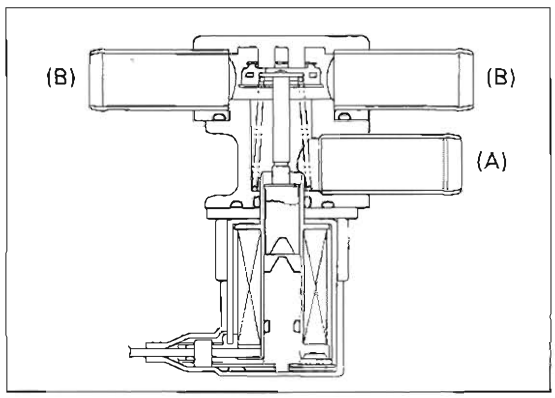
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR solenoid valve.

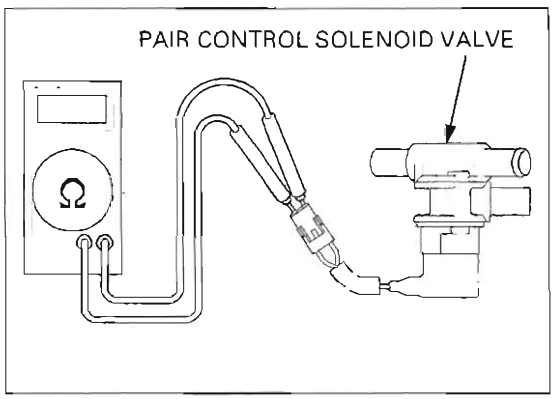
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the PAIR solenoid valve terminals.



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

STANDARD: 20 – 24 Ω (20 °C/68 °F)

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



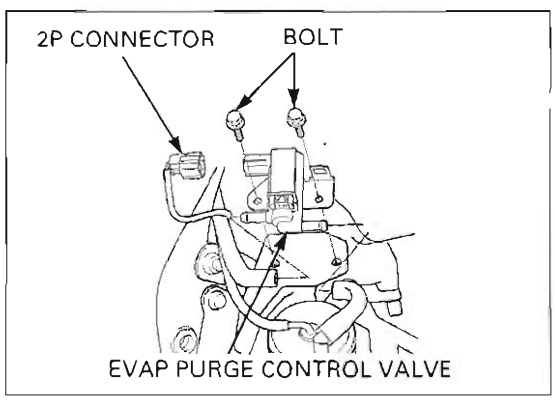
EVAP PURGE CONTROL SOLENOID VALVE

REMOVAL

Remove the middle cowl (page 2-12).

Disconnect the EVAP purge control solenoid valve 2P connector.
Disconnect the air hoses from the EVAP purge control valve.
Remove the bolt and EVAP purge control valve bracket assembly.

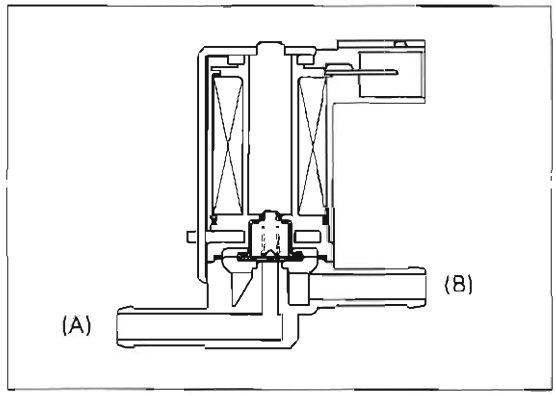
Installation is in the reverse order of removal.



INSPECTION

Remove the EVAP purge control valve.

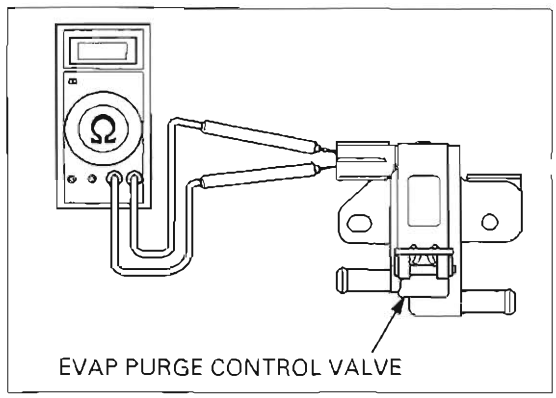
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the EVAP purge control valve terminals.



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

STANDARD: 30 – 34 Ω (20°C/68°F)

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



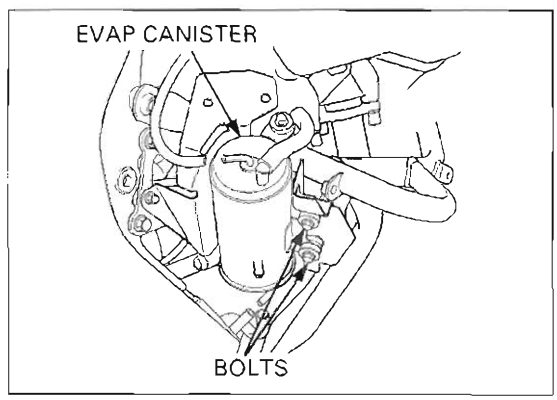
EVAP CANISTER

Remove the middle cowl (page 2-12).

Remove the EVAP purge control solenoid valve (page 5-88).

Remove the bolts and EVAP canister from the heat guard bracket.

Installation is in the reverse order of removal.



O_2 SENSOR

REMOVAL

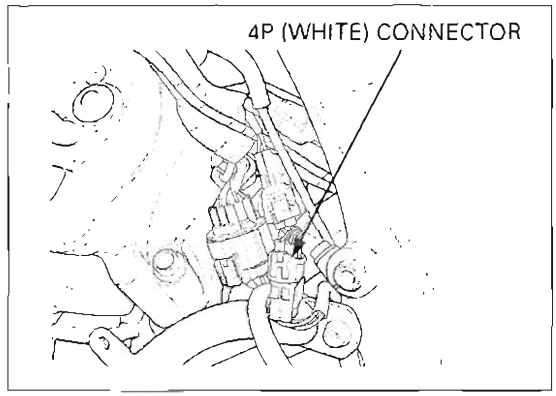
NOTICE

- *Handle the O_2 sensor with care.*
- *Do not get grease, oil or other materials in the O_2 sensor air hole.*

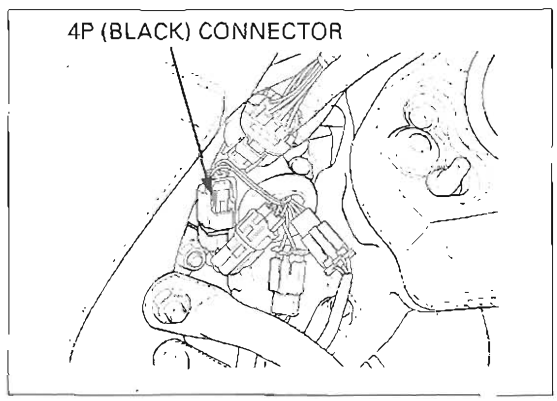
Do not service the O_2 sensor while it is hot

Remove the middle cowls (page 2-12).

Disconnect the No.1/3 O_2 sensor 4P (White) connectors.
Release the O_2 sensor wire from the frame and swingarm.



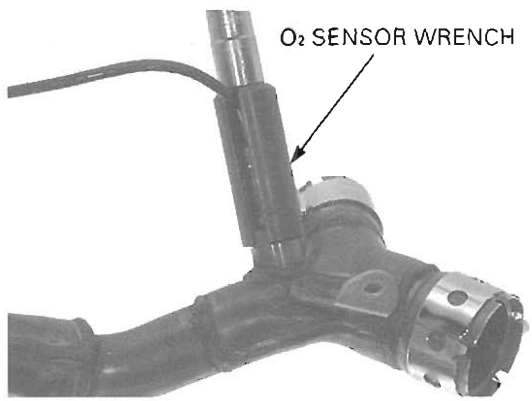
Disconnect the No.2/4 O_2 sensor 4P (Black) connector.
Release the O_2 sensor wire from the frame and swingarm.



Remove the exhaust pipe (page 2-18)

Remove the O_2 sensor units using the special tool.

TOOL:
O_2 sensor wrench 07LAA-PT50101



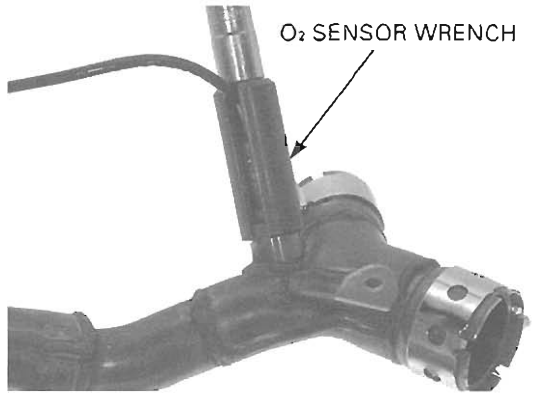
NOTICE

- *Be careful not to damage the sensor wire.*
- *Do not use an impact wrench while removing or installing the O_2 sensor.*

Install the O_2 sensor unit.
Tighten the unit to the specified torque using the special tool.

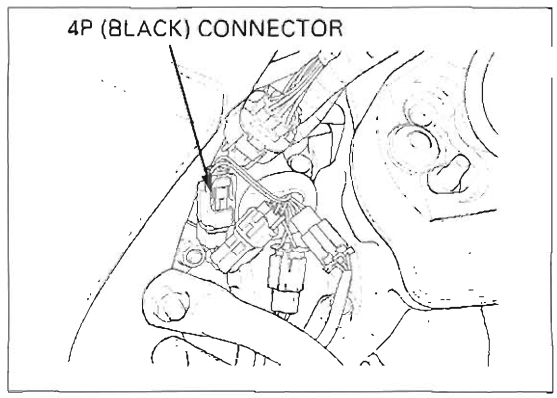
TOOL:
O_2 sensor wrench **07LAA-PT50101**

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)



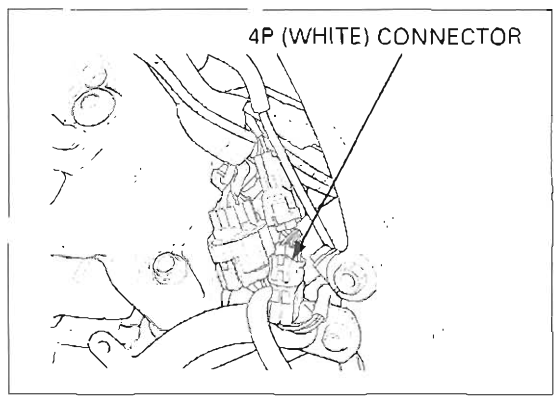
Install the exhaust pipe (page 2-18)
Route the O_2 sensor wire properly (page 1-27).

Connect the No.2/4 O_2 sensor 4P (Black) connector.



Connect the No.1/3 O_2 sensor 4P (White) connector.

Install the middle cowl (page 2-12).



6. COOLING SYSTEM

6

SYSTEM FLOW PATTERN 6-2

SERVICE INFORMATION 6-3

TROUBLESHOOTING 6-4

SYSTEM TESTING 6-5

COOLANT REPLACEMENT 6-6

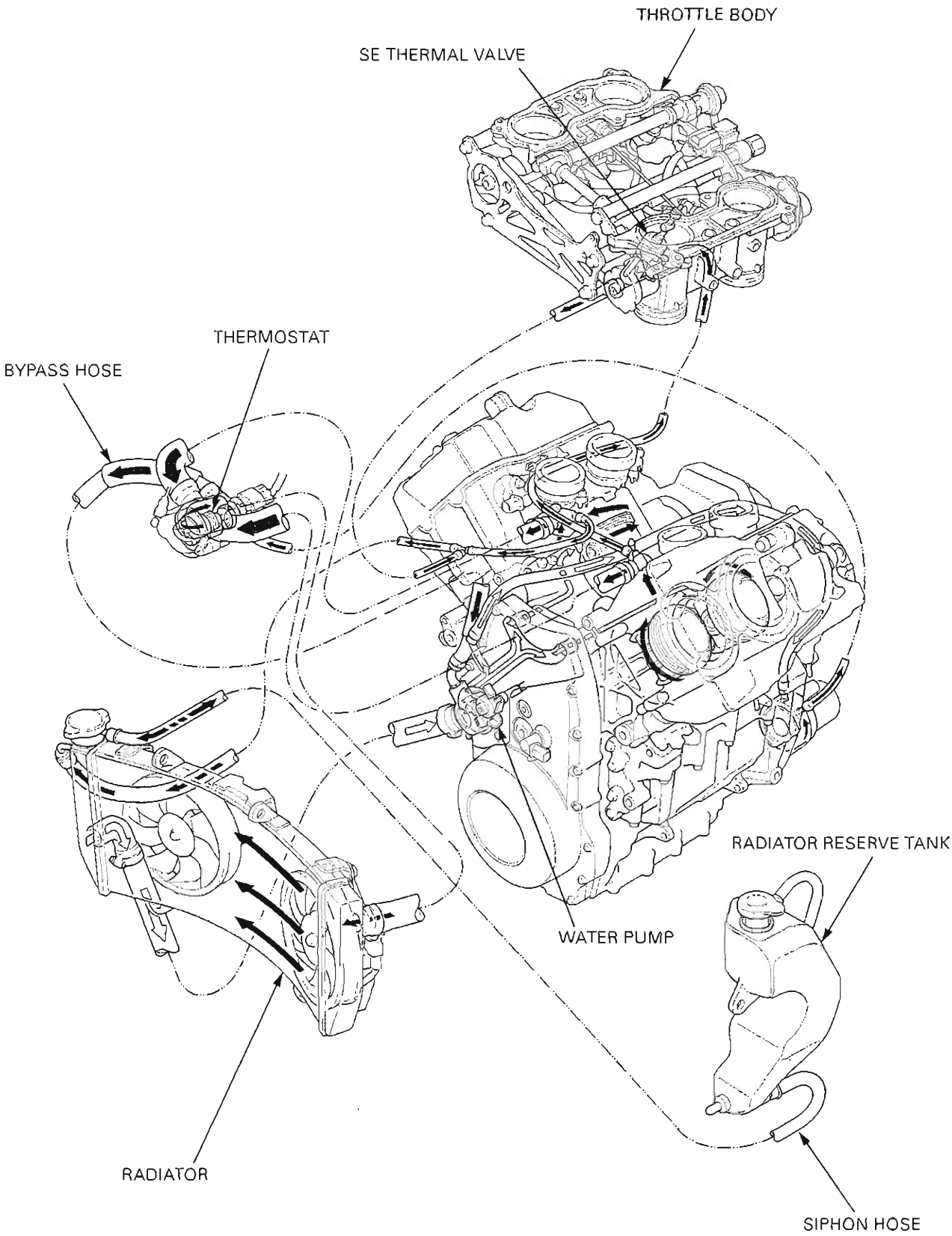
THERMOSTAT 6-8

RADIATOR 6-13

RADIATOR RESERVE TANK 6-17

WATER PUMP 6-18

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠WARNING

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

NOTICE

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to the fan motor relay inspection (page 22-21) and coolant temperature sensor inspection (page 22-15).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.66 liter (2.81 US qt, 2.34 Imp qt)
	Reserve tank	0.865 liter (0.91 US qt, 0.76 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		50 % mixture with soft water

TORQUE VALUES

Thermostat housing cover SH flange bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Cooling fan nut	2.7 N·m (0.28 kgf·m, 2.0 lbf·ft)	Apply a locking agent to the threads
Fan motor mounting nut	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	

TOOLS

Driver	07749-0010000	
Attachment, 28 X 30 mm	07946-1870100	
Pilot, 10 mm	07746-0040100	
Remover shaft	07936-GE00100	Equivalent commercially available in U.S.A.
Remover head, 10 mm	07936-GE00200	Equivalent commercially available in U.S.A.
Remover weight	07741-0010201	Equivalent commercially available in U.S.A.
Mechanical seal driver attachment	07945-4150400	
Spherical bearing driver	07946-KA30200	Not available in U.S.A.
Mechanical seal installer	07945-415000A	U.S.A. only

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature gauge or ECT sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or ECT sensor
- Thermostat stuck open
- Faulty cooling fan motor switch

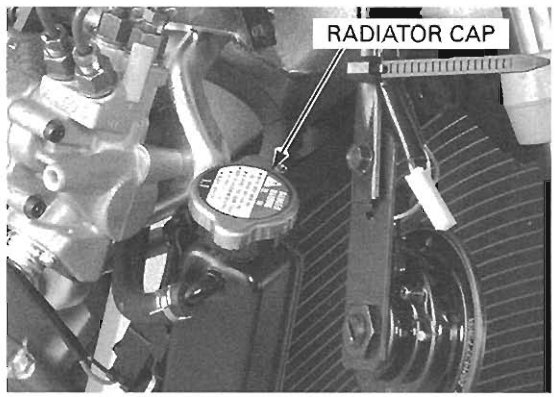
Coolant leak
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

SYSTEM TESTING

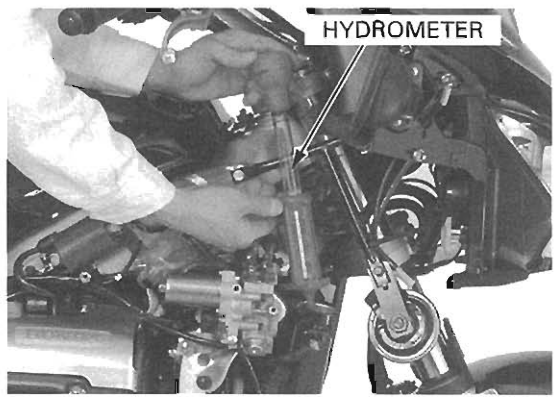
COOLANT (HYDROMETER TEST)

Remove the middle cowl (page 2-12).

Remove the radiator cap.



Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").
For maximum corrosion protection, a 50 – 50% solution of ethylene glycol and distilled water is recommended (page 6-6).
Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

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

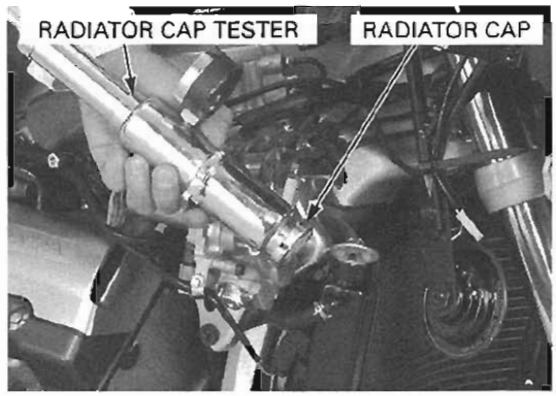
RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Before installing the cap in the tester, wet the sealing surfaces.

Remove the radiator cap (page 6-5).

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

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

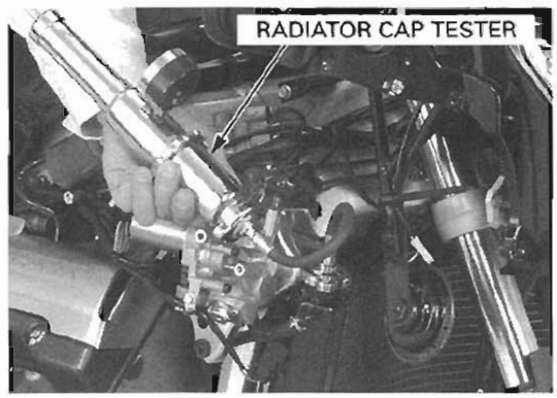


Pressure test the radiator, engine and hoses, and check for leaks.

NOTICE

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

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



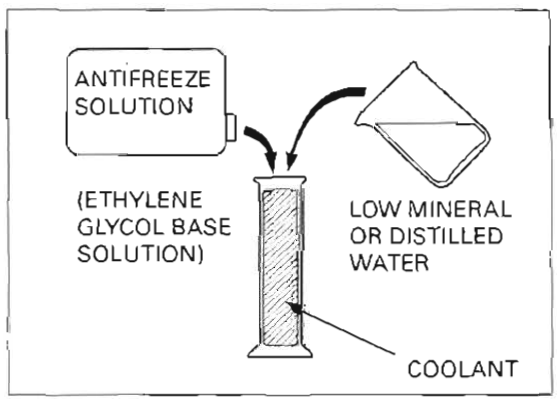
COOLANT REPLACEMENT

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 antifreeze.

RECOMMENDED ANTIFREEZE:
High quality ethylene glycol antifreeze containing corrosion protection inhibitors

RECOMMENDED MIXTURE:
50 – 50 (Distilled water and antifreeze)

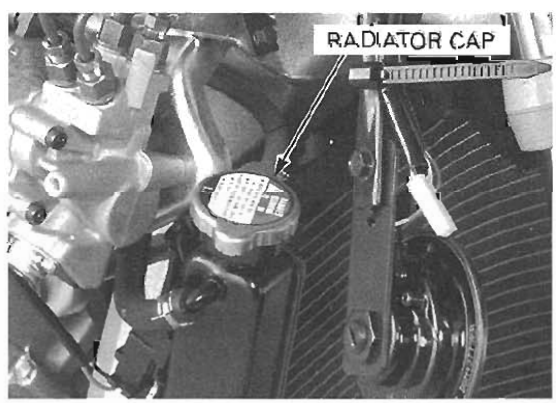


REPLACEMENT/AIR BLEEDING

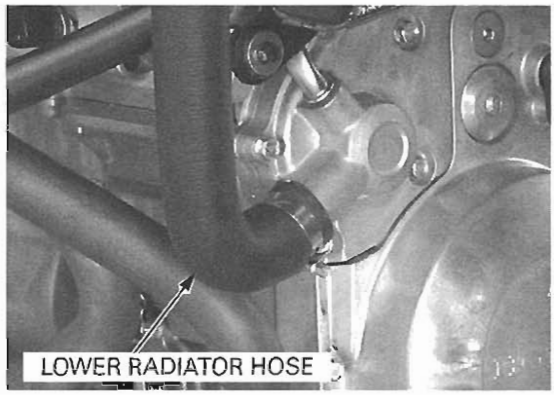
When filling the system or reserve tank with a coolant (checking coolant level), place the motorcycle in a vertical position on a flat, level surface.

Remove the middle cowl (page 2-12).

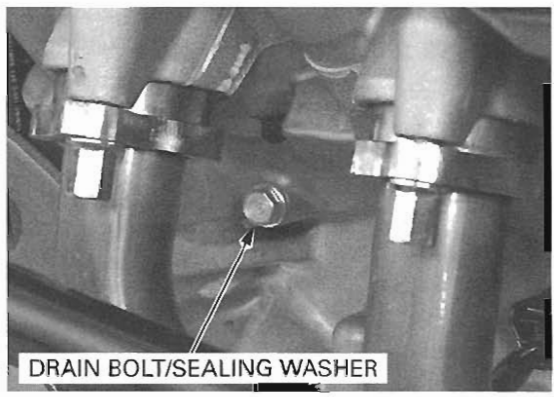
Remove the radiator cap.



Disconnect the lower radiator hose at the water pump cover and drain the system coolant.

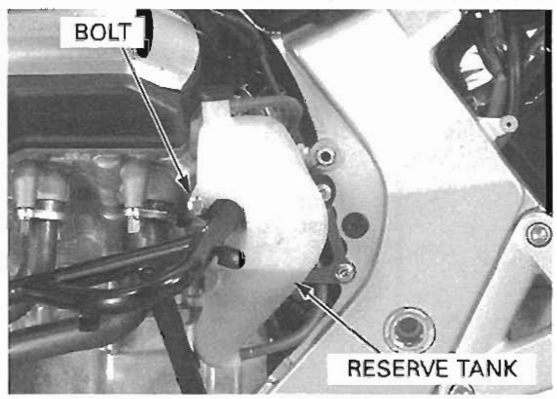


Remove the cylinder drain bolt and drain the coolant from the cylinder.

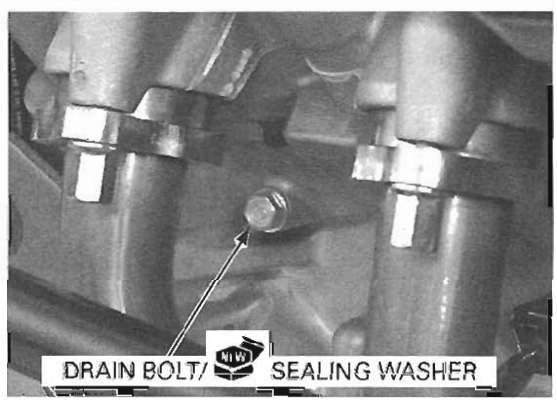


Remove the radiator reserve tank mounting bolt. Drain the reserve tank coolant from the filler neck. Empty the coolant and rinse the inside of the reserve tank with water.

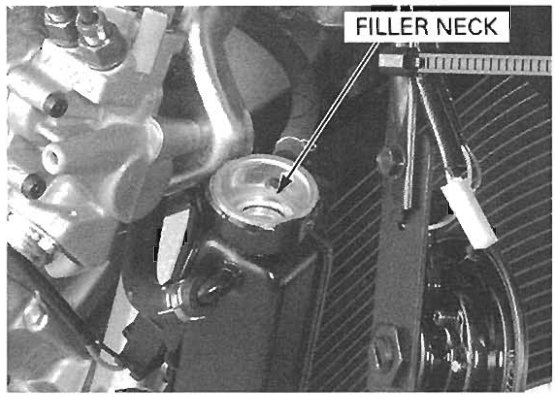
Reinstall the radiator reserve tank.



Install the cylinder drain bolt with a new sealing washer, and tighten the bolt securely.



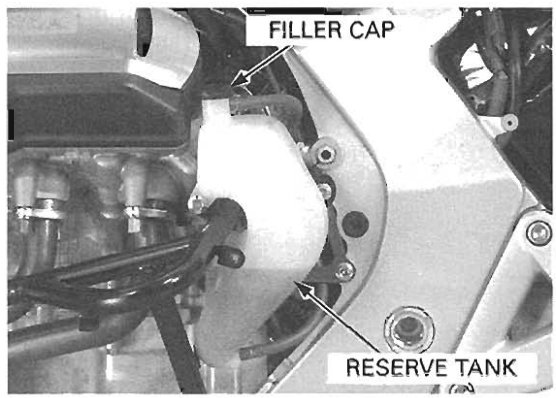
Fill the system with the recommended coolant through the filler opening up to filler neck.



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

Bleed air from the system as follows:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle 3 – 4 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.

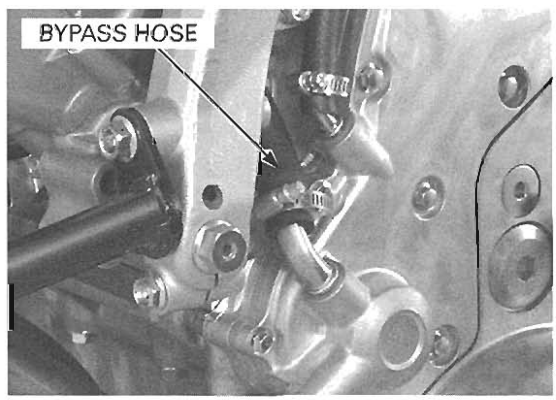


THERMOSTAT

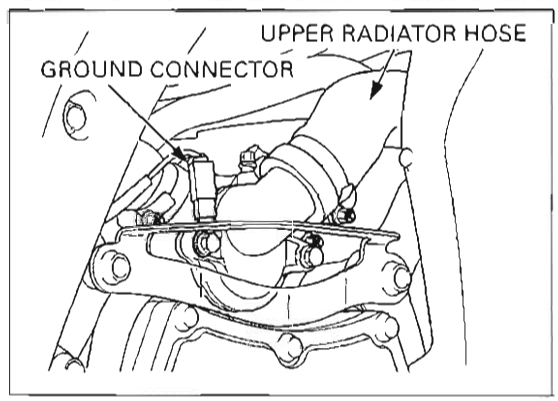
REMOVAL

Drain the coolant (page 6-6).
Remove the radiator (page 6-13).
Remove the throttle body (page 5-64).

Loosen the clamp screw and disconnect the bypass hose from the water pump cover.



Disconnect the ground connector.
Loosen the clamp screw and disconnect the upper radiator hose from the thermostat housing cover.

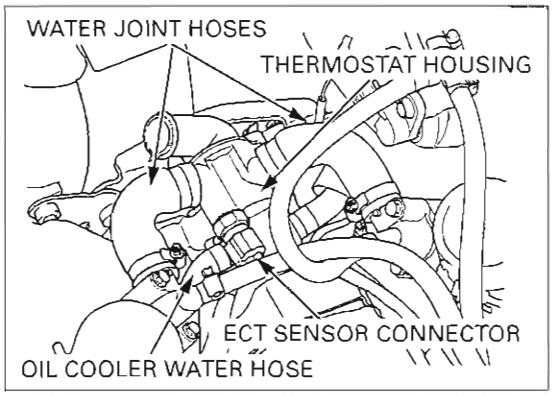


Disconnect the ECT sensor connector.

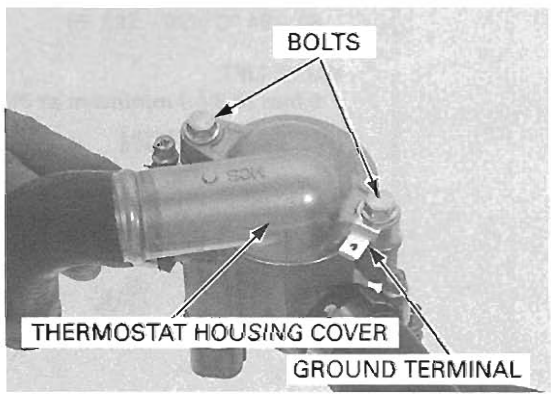
Disconnect the water joint hoses from the cylinder head water joints.

Lift the thermostat housing and loosen the oil cooler water hose clamp screws and then disconnect the hose.

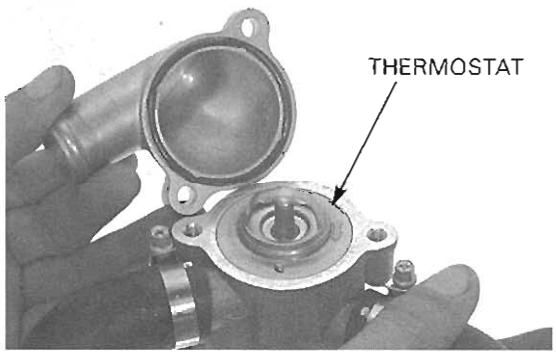
Remove the thermostat housing assembly



Remove the bolts, ground terminal, thermostat housing cover and O-ring.

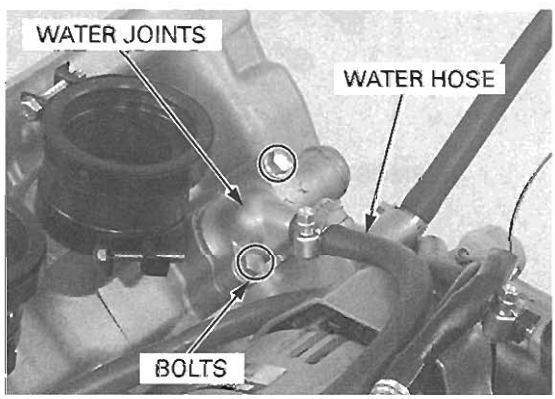


Remove the thermostat from the housing.



Loosen the hose band screw and disconnect the SE thermal valve water hose from the water joint.

Remove the bolts and water joint.



INSPECTION

Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element.

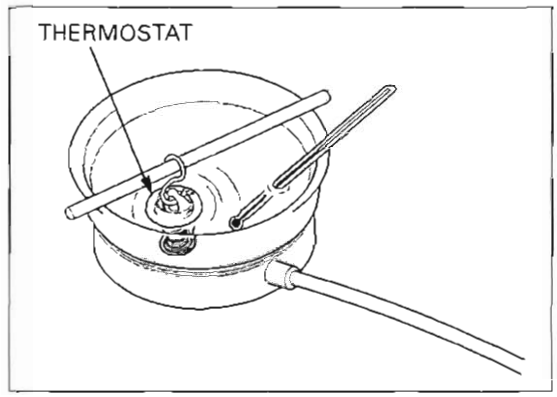
Visually inspect the thermostat for damage.

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

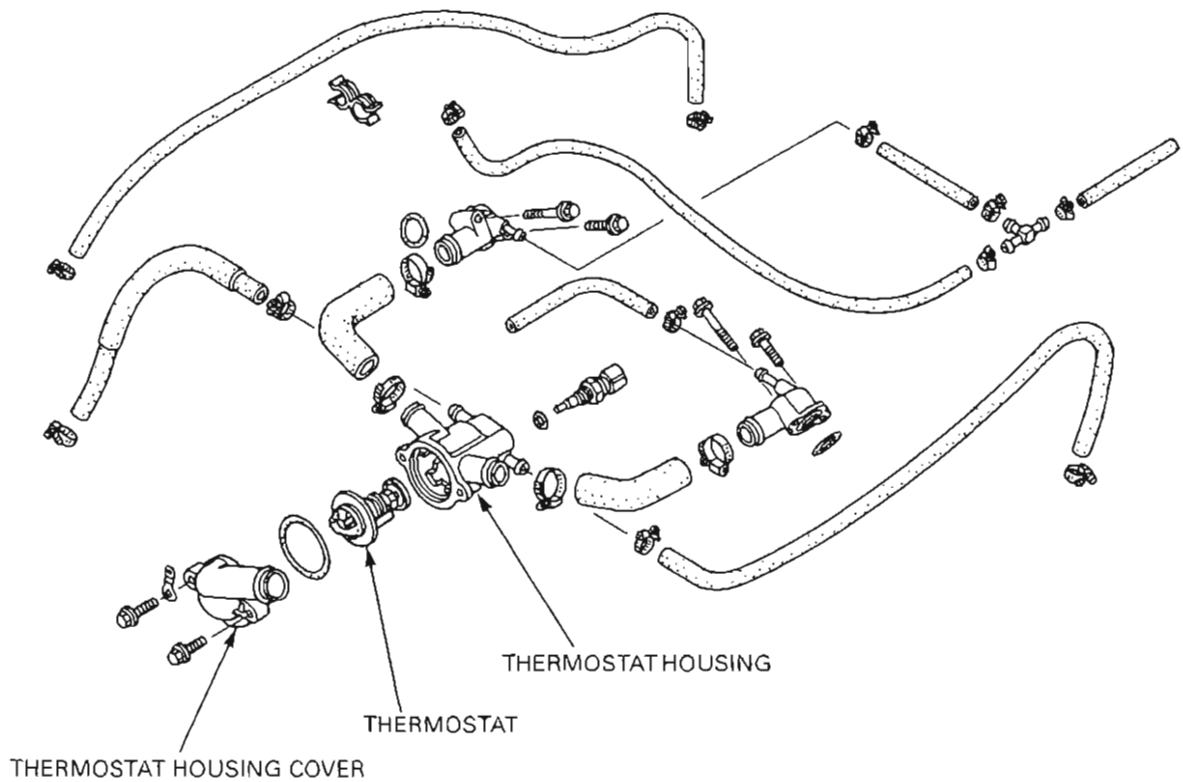
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.



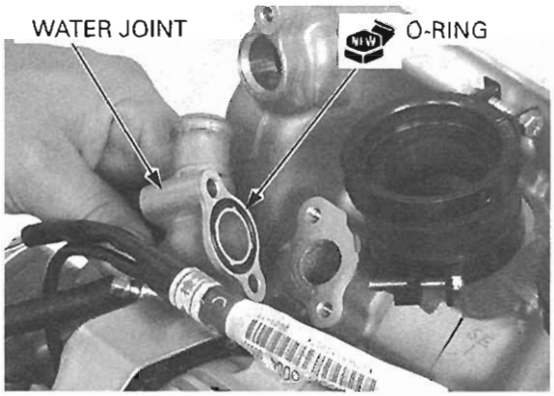
THERMOSTAT BEGIN TO OPEN:
80 – 84 °C (176 – 183 °F)

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

INSTALLATION

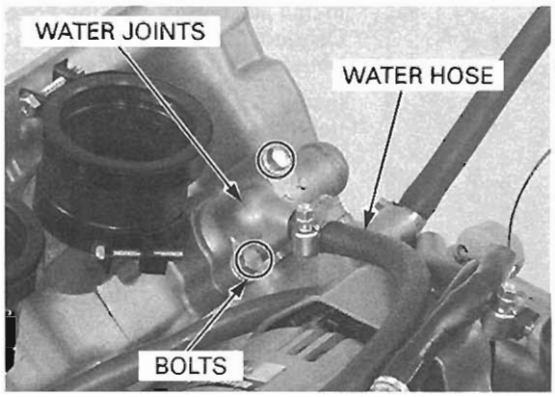


Install new O-rings into each water joint groove.

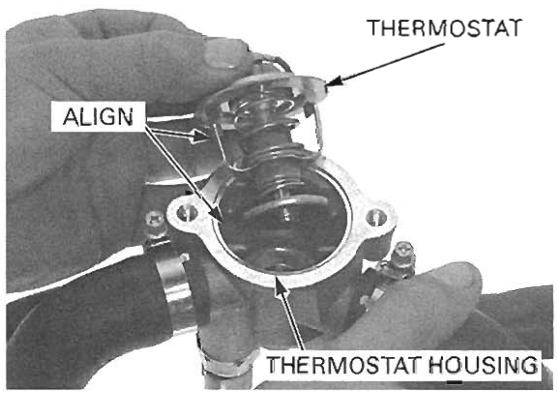


Install the water joints and tighten the bolts.

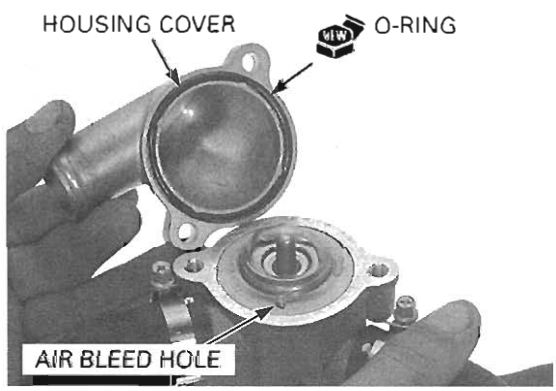
Connect the SE thermal valve water hose to the water joints and tighten the hose band screws securely.



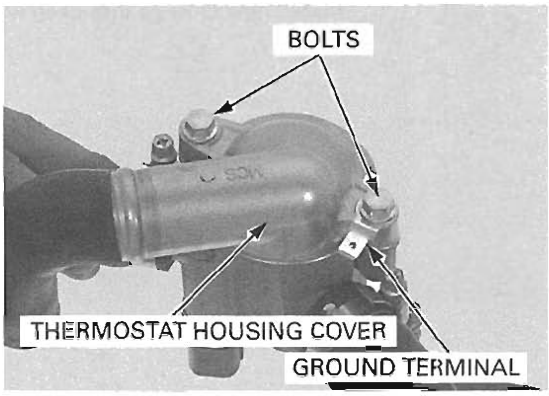
Install the thermostat into the housing by aligning the body with the groove in the housing.



Make sure the thermostat air bleed hole is facing up.
Install the new O-ring into the thermostat housing cover groove.
Install the thermostat housing cover onto the housing.



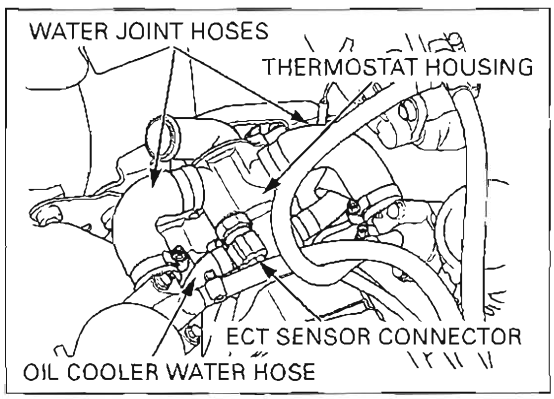
Install the ground eyelet and housing cover bolts, then tighten the bolts.



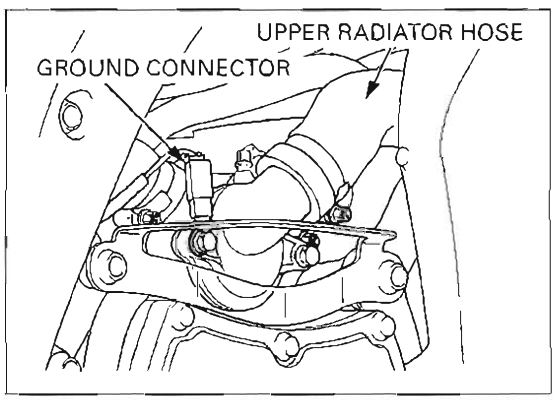
Install all clamps onto the hoses.
Connect the oil cooler water hose to the thermostat housing and tighten the clamp screw.

Install the thermostat housing assembly onto the engine and connect the water hoses to the water joints.
Tighten the water hose clamps.

Connect the ECT sensor connector.

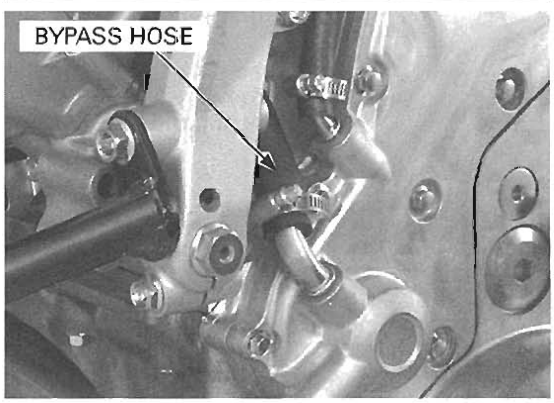


Connect the upper radiator hose to the thermostat housing.
Tighten the upper radiator hose clamp screw securely.
Connect the ground connector.



Connect the bypass hose to the water pump cover, tighten the clamp screw.

Install the radiator (page 6-17)
Install the throttle body (page 5-68).
Fill the system with recommended coolant and bleed the air (page 6-6).

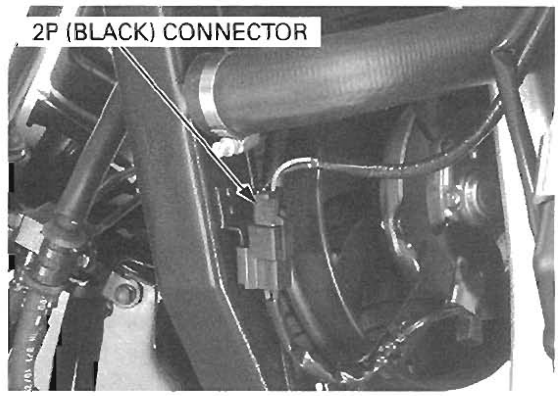


RADIATOR

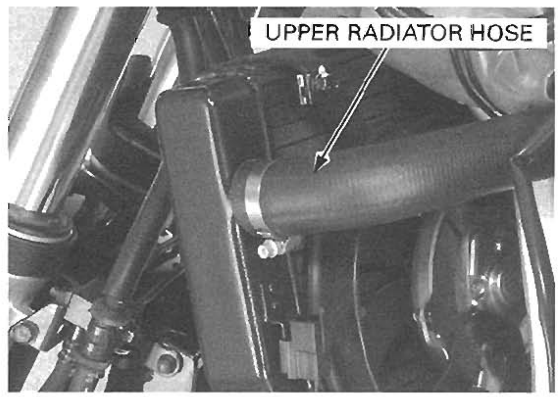
REMOVAL

Remove the middle cowl (page 2-13).
Drain the coolant (page 6-6).

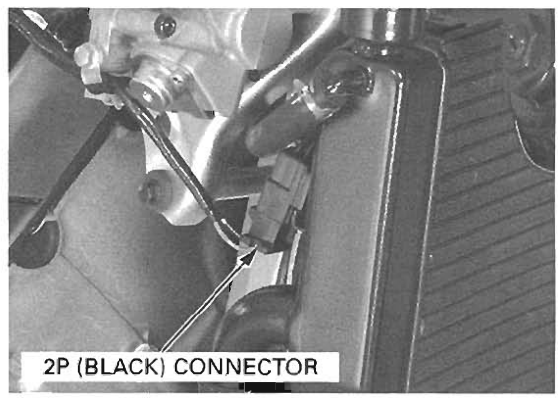
Disconnect the left fan motor 2P (Black) connector.



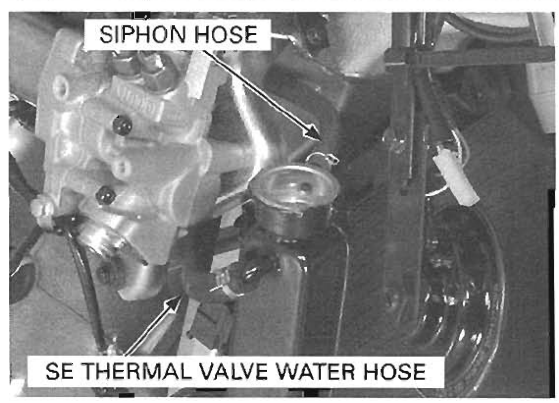
Loosen the hose band screw and disconnect the upper radiator hose.



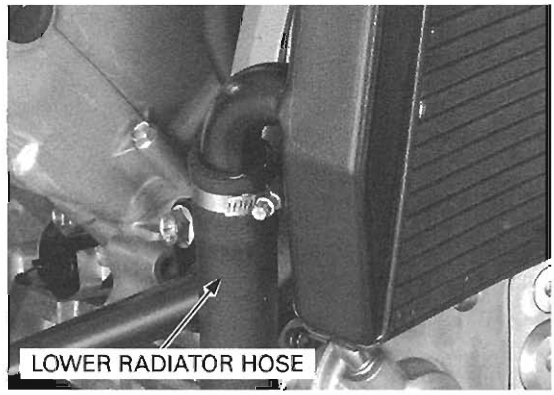
Disconnect the right fan motor 2P (Black) connector.



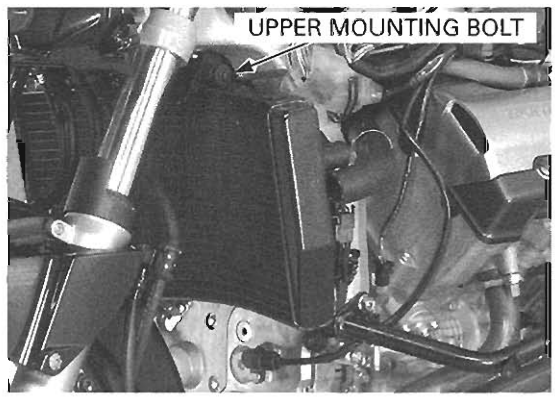
Disconnect the siphon hose and SE thermal valve water hose.



Loosen the hose band screw and disconnect the lower radiator hose.

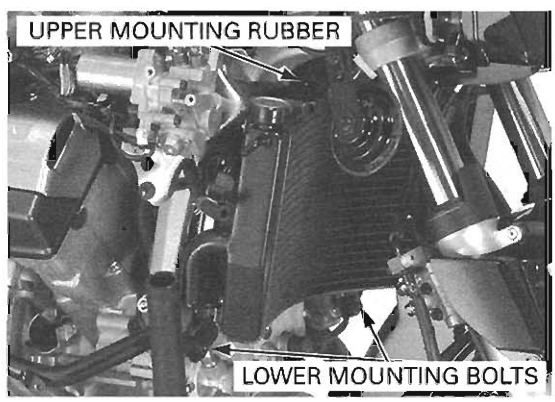


Remove the radiator upper mounting bolt.



Remove the radiator lower mounting bolts and washers

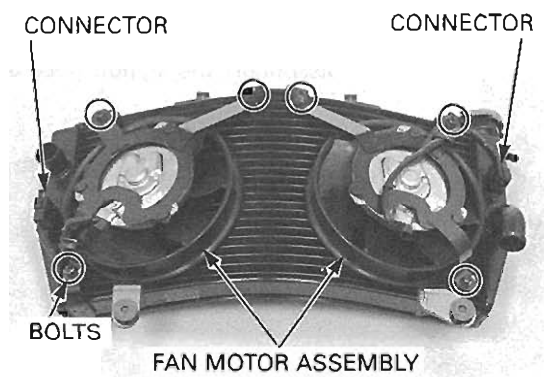
Unhook the upper mounting rubber from the frame boss, then remove the radiator assembly.



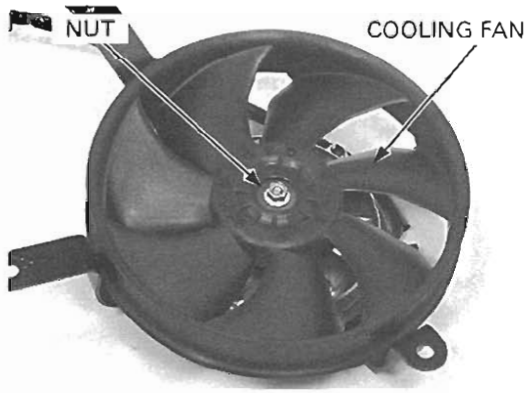
DISASSEMBLY

Release the fan motor connectors from the radiator hooks.

Remove the bolts and cooling fan motor assemblies.

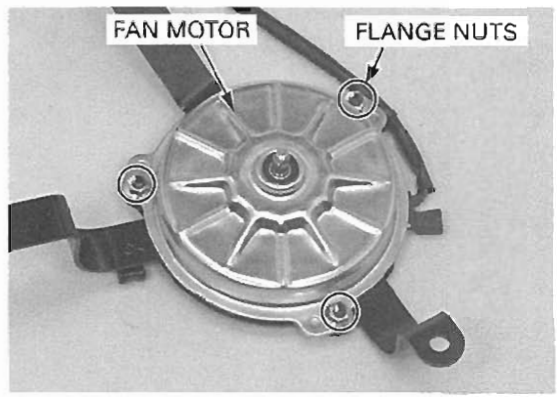


Remove the nut and cooling fan.

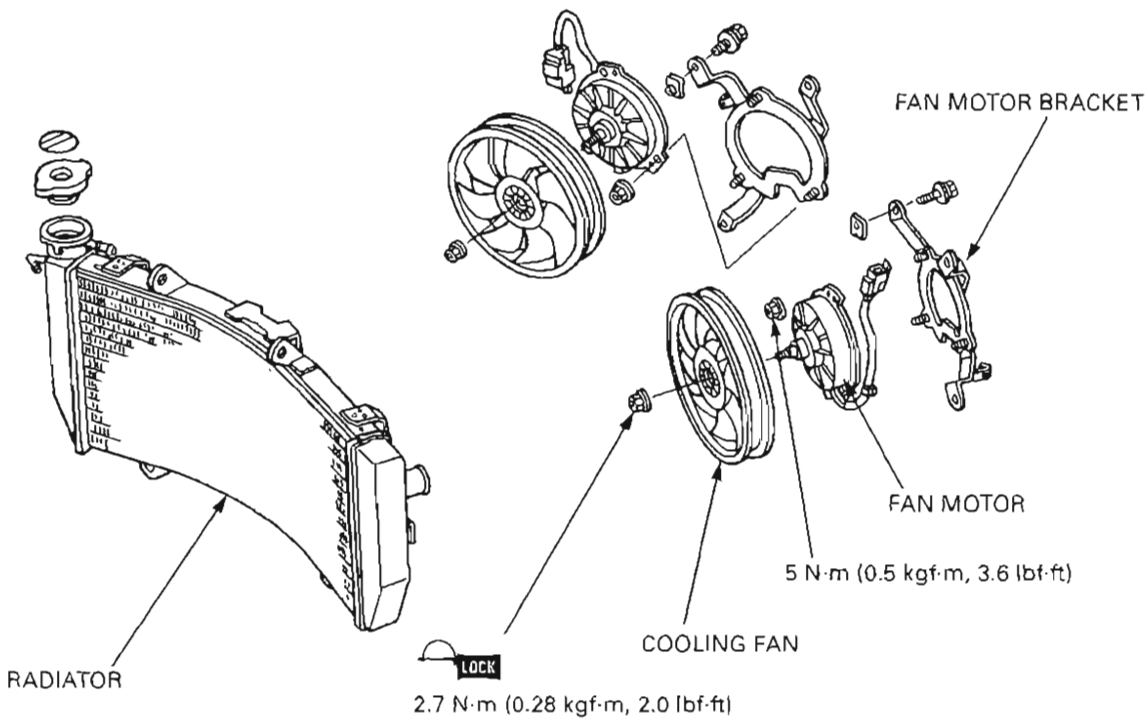


Remove the flange nuts and fan motor from the fan motor bracket.

Refer to the fan motor operation information (page 22-21).

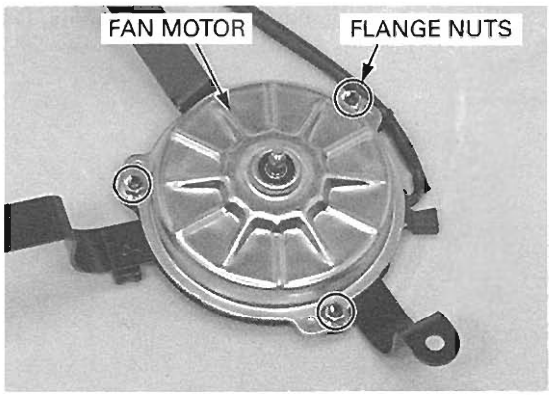


ASSEMBLY

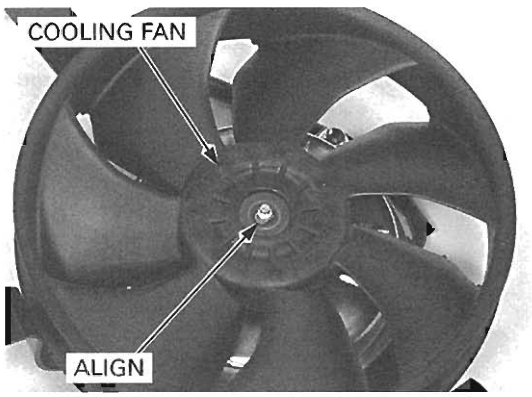


Install the fan motor onto the fan motor bracket and tighten the flange nuts to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

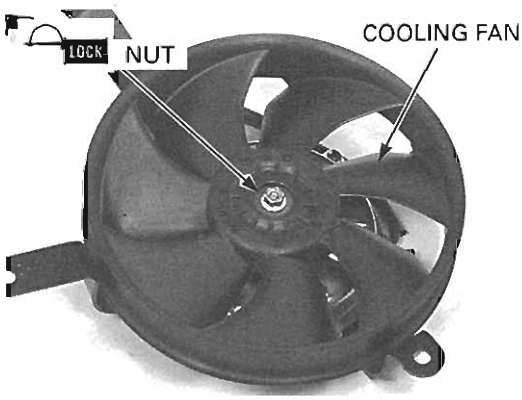


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



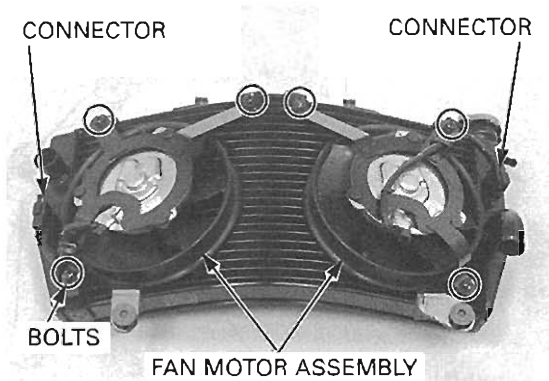
Apply a locking agent to the cooling fan nut threads.
Install and tighten the nut to the specified torque.

TORQUE: 2.7 N·m (0.28 kgf·m, 2.0 lbf·ft)



Install the cooling fan motor assemblies onto the radiator.
Install and tighten the radiator mounting bolts.

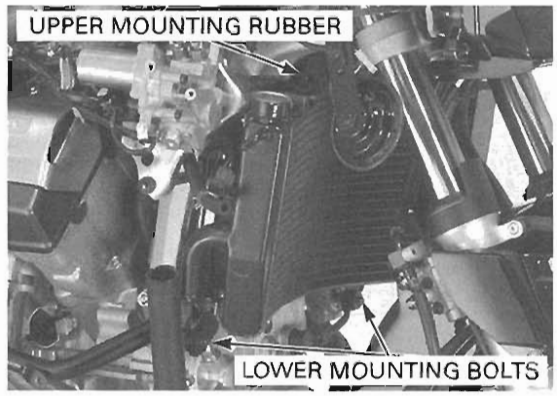
Install the fan motor connectors to the radiator hooks.



INSTALLATION

Be careful not to damage the radiator core.

Place the radiator onto the frame and hook the radiator upper mounting rubber with the frame boss.
Install the radiator lower mounting bolts.

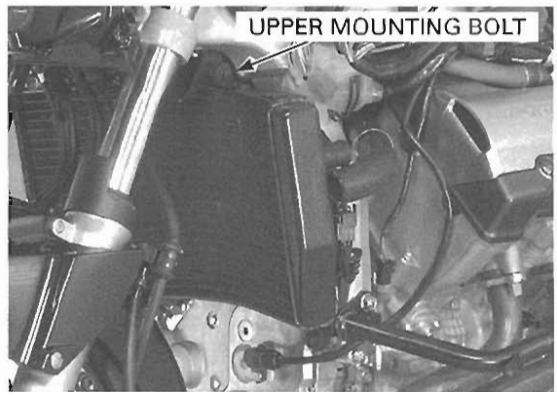


Install and tighten the radiator upper mounting bolt.

Tighten the lower mounting bolts.

Install the removed parts in the reverse order of removal.

Fill the system with recommended coolant (page 6-6).
Install the middle cowl (page 2-13).



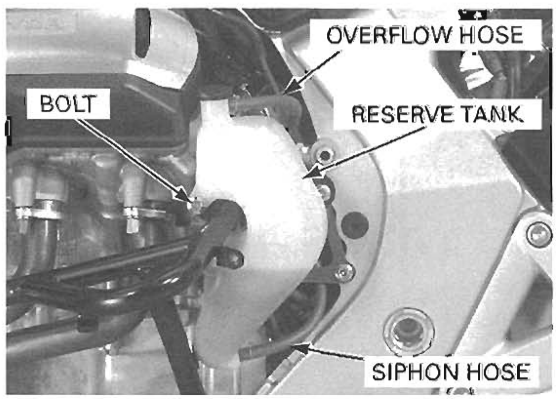
RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

Remove the middle cowl (page 2-13).

Remove the radiator reserve tank mounting bolt.
Remove the reserve tank from the frame, drain the coolant from the filler neck.

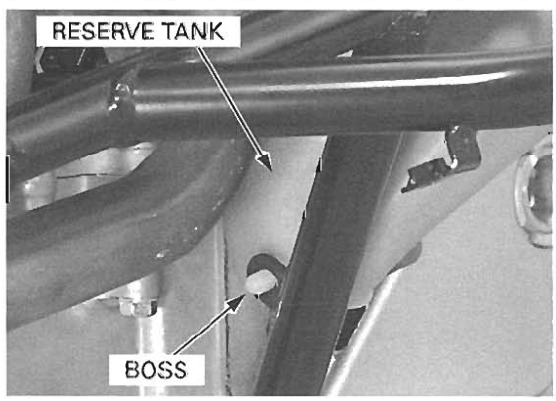
Disconnect the overflow and siphon hose from the reserve tank.



Installation is in the reverse order of removal.

When installing the reserve tank, align the tank boss with the engine guard hole as shown.

Fill the system with recommended coolant (page 6-6).
Install the middle cowl (page 2-12).

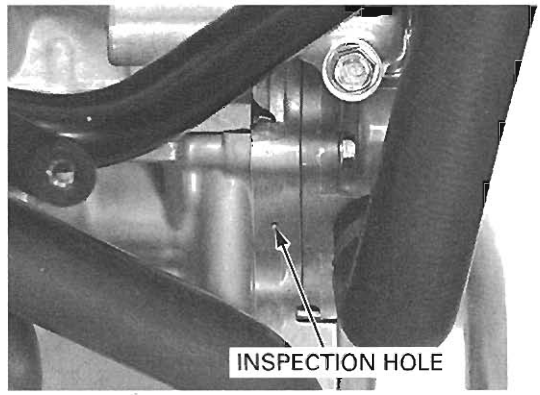


WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the middle cowl (page 2-13).

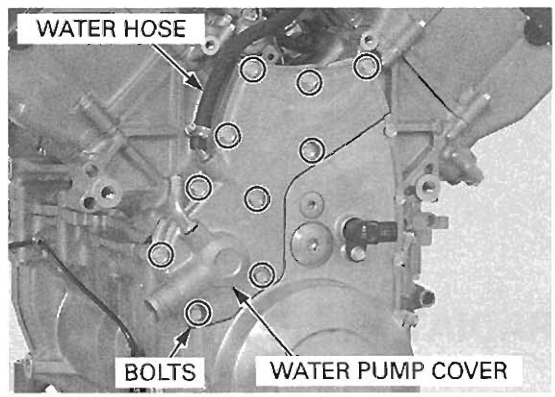
Inspect the inspection hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective and you need to replace the water pump as an assembly.



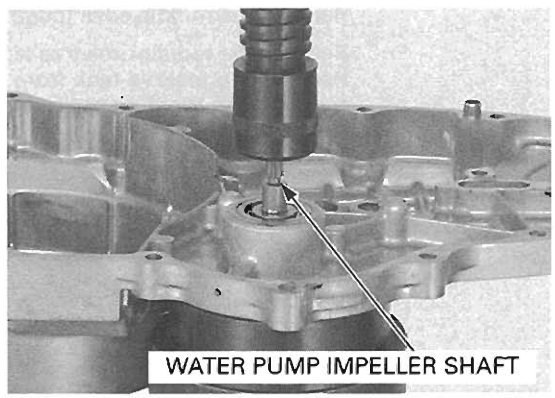
MECHANICAL SEAL REPLACEMENT

Drain the coolant (page 6-6).
Remove the radiator (page 6-13).
Disconnect the bypass hose from the water pump cover (page 6-8).

Loosen the clamp screw and disconnect the oil cooler water hose from the water pump cover.
Remove the bolts, water pump cover, O-ring and dowel pins.



Press out the water pump impeller using a hydraulic press.

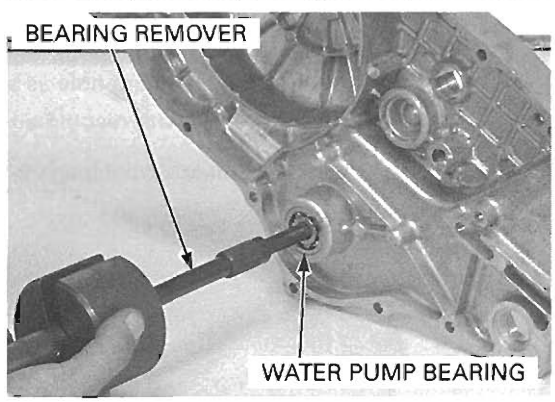


Remove the water pump bearing using the special tools.

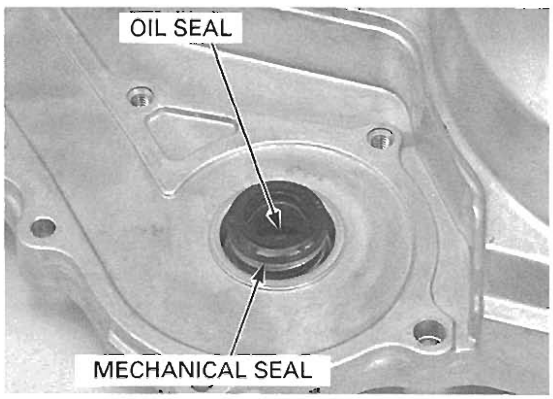
TOOLS:

Remover shaft	07936-GE00100
Remover head, 10 mm	07936-GE00200
Remover weight	07741-0010201

(Equivalent commercially available in U.S.A.)



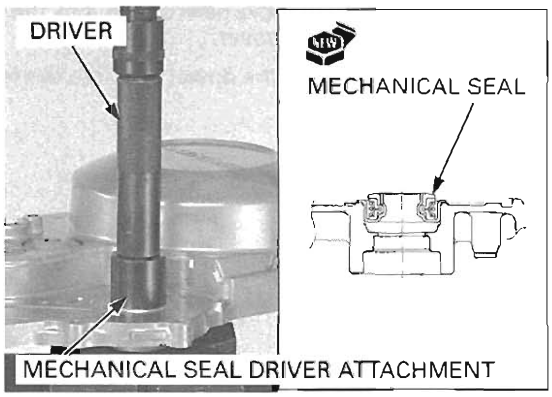
Remove the mechanical seal and oil seal.



Install the new mechanical seal into the water pump cover using the special tools and a hydraulic press.

TOOLS:

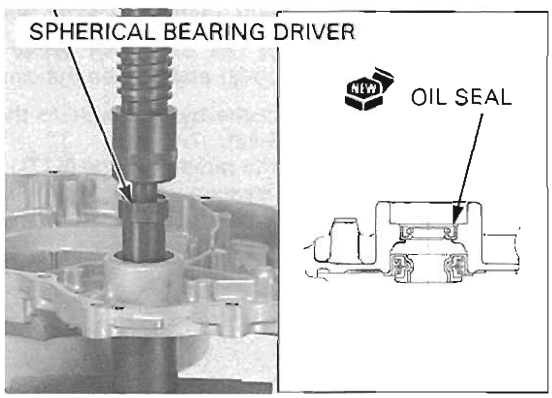
Driver	**07749-0010000**
Mechanical seal installer	**07965-415000A (U.S.A. only)**
Mechanical seal driver attachment	**07945-4150400**



Install the new oil seal into the water pump cover using the special tools and a hydraulic press.

TOOL:

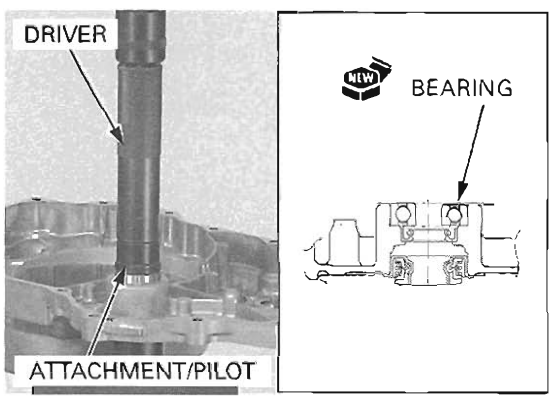
Spherical bearing driver	**07946-KA30200 (Not available in U.S.A.)**



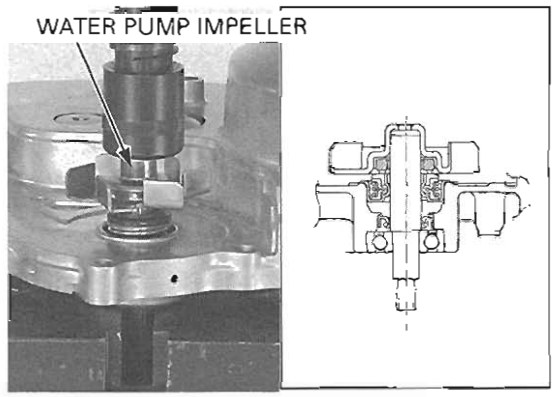
Install the new water pump bearing into the water pump cover using the special tools and a hydraulic press.

TOOL:

Driver	**07749-0010000**
Attachment, 28 X 30 mm	**07746-1870100**
Pilot, 10 mm	**07946-0040100**

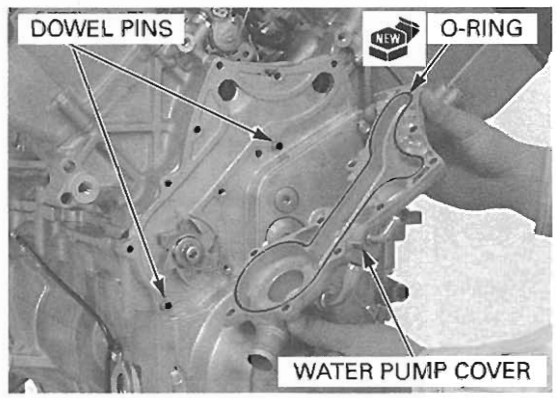


Install the water pump shaft into the water pump bearing while holding the bearing inner race.



Install the new O-ring into the groove of the water pump cover.

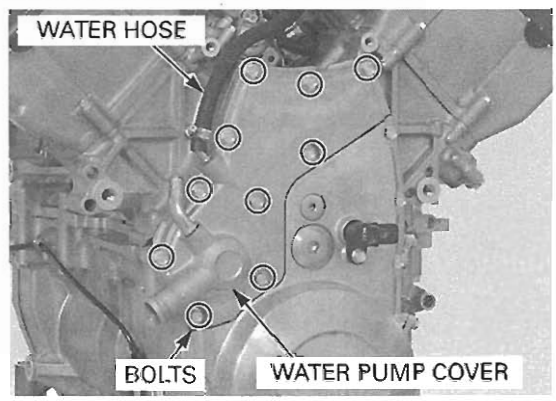
Install the dowel pins into the front crankcase cover.



Install and tighten the water pump cover bolt.

Connect the oil cooler water hose to the water pump cover and tighten the clamp screw securely.

Connect the bypass hose to the water pump cover (page 6-12).
Install the radiator (page 6-17).
Fill the system with recommended coolant (page 6-6).



7. ENGINE REMOVAL/INSTALLATION

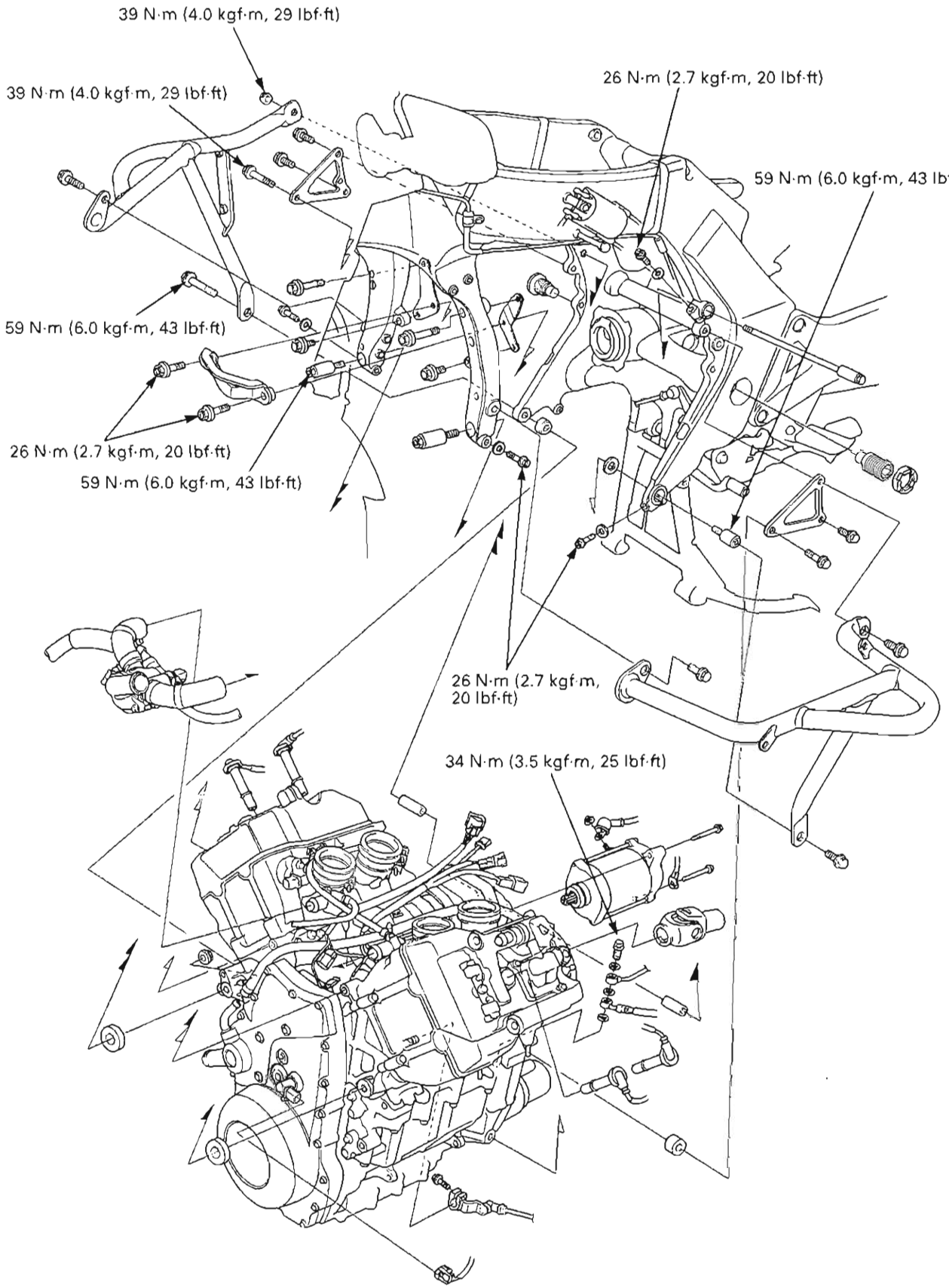
COMPONENT LOCATION 7-2

SERVICE INFORMATION 7-3

ENGINE REMOVAL 7-4

ENGINE INSTALLATION 7-8

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.

NOTICE

Do not use the oil filter as a jacking point.

- The following components can be serviced with the engine installed in the frame.
  - Alternator (page 11-3)
  - Clutch (page 9-4)
  - Water pump (page 6-3)
- The following components require engine removal for service.
  - Crankcase/balancer (page 12-3)
  - Crankshaft/piston/cylinder (page 13-3)
  - Cylinder head/valves (page 8-3)
  - Gearshift linkage (page 12-3)
  - Oil cooler (page 4-3)
  - Oil pump (page 4-3)
  - Transmission (page 10-3)

SERVICE DATA

ITEM		SPECIFICATIONS
Engine dry weight		96.2 kg (212.1 lbs)
Engine oil capacity	After disassembly	4.7 liter (5.0 US qt, 4.1 Imp qt)
Coolant capacity	Radiator and engine	2.66 liter (2.81 US qt, 2.34 Imp qt)

TORQUE VALUES

Engine hanger bolt (front)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Engine hanger bolt (front bracket)	26 N·m (2.7 kgf·m, 20 lbf·ft)
Engine hanger nut (middle)	39 N·m (4.0 kgf·m, 29 lbf·ft)
Engine hanger bolt (middle bracket)	39 N·m (4.0 kgf·m, 29 lbf·ft)
Engine hanger bolt (lower)	59 N·m (6.0 kgf·m, 43 lbf·ft)
Engine hanger pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Clutch slave cylinder oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)

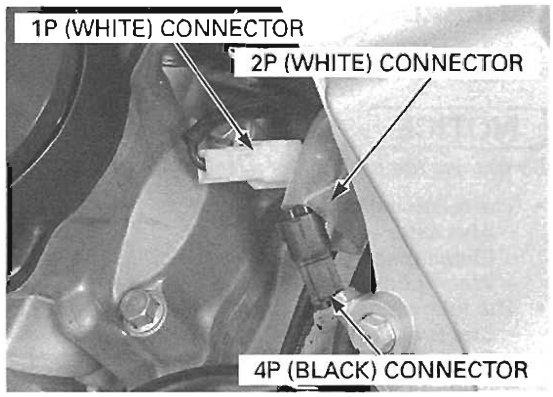
ENGINE REMOVAL

Remove the following:

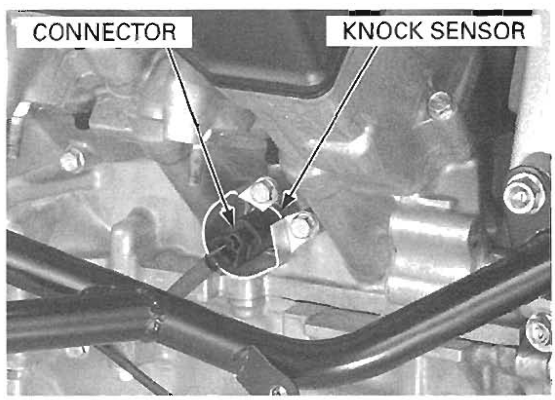
- EVAP purge control valve (page 5-88)
- EVAP canister (page 5-89)
- Throttle body (page 5-64)
- Radiator (page 6-13)
- Lower fuel tank (page 5-57)

Disconnect the alternator 1P (White) connector, alternator 2P (White) connector and No.1/3 O_2 sensor 4P (Black) connector.

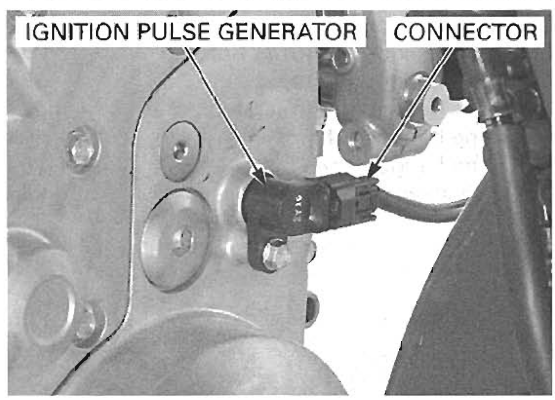
Remove the muffler and exhaust pipe (page 2-18).



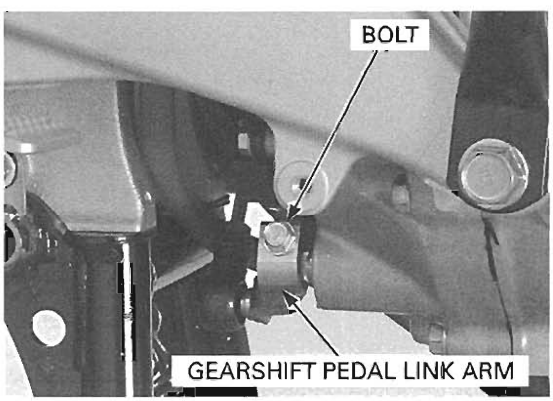
Disconnect the knock sensor connectors from the sensor.



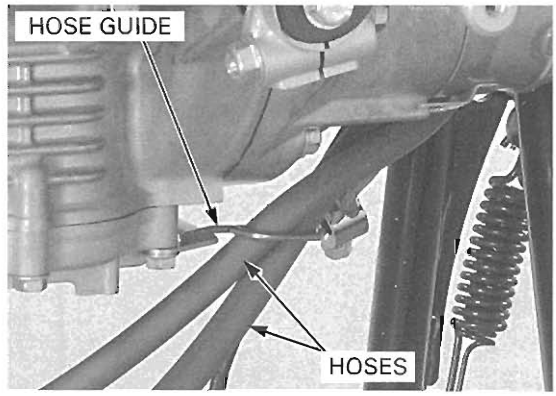
Disconnect the ignition pulse generator connector.



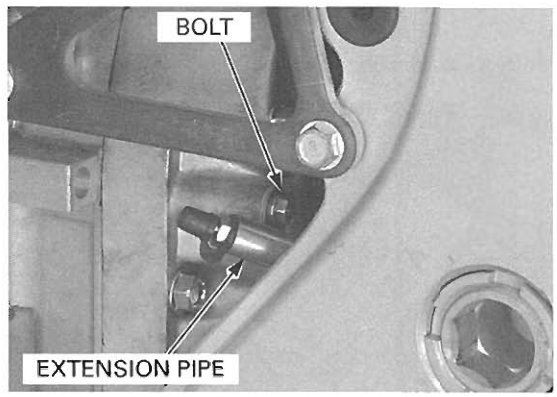
Remove the gearshift pedal link arm pinch bolt, then remove the link arm from the gearshift spindle.



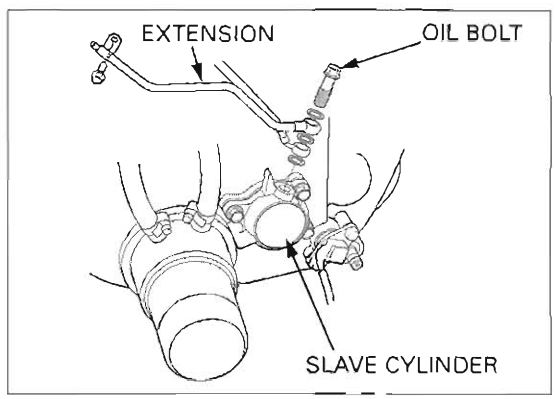
Remove the fuel tank breather hose and drain hose from the hose guide.



Remove the clutch air bleed extension pipe mounting bolt.

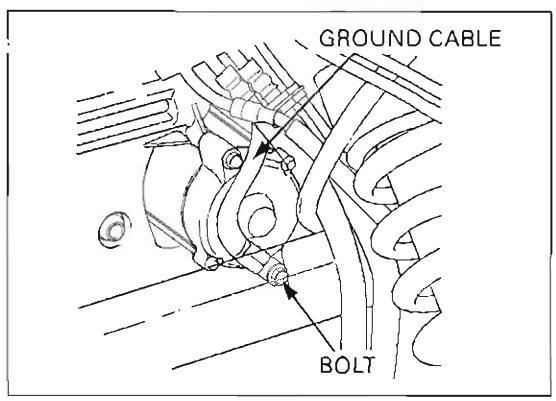


Remove the clutch slave cylinder oil bolt, sealing washers and clutch bleeder extension.

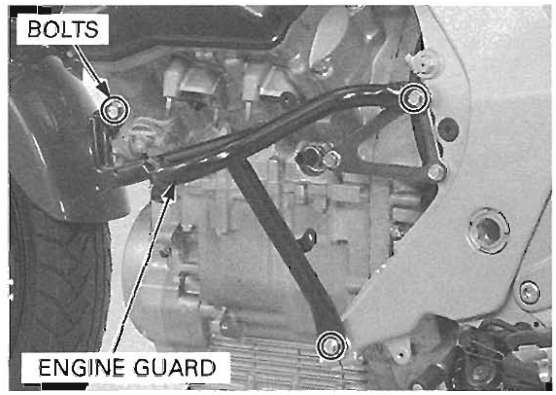


Remove the nut and disconnect the starter motor cable (page 11-4).

Remove the starter motor mounting bolt and ground cable.

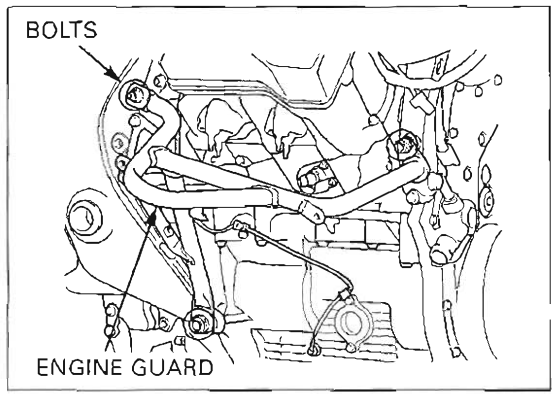


Remove the bolts and left engine guard.

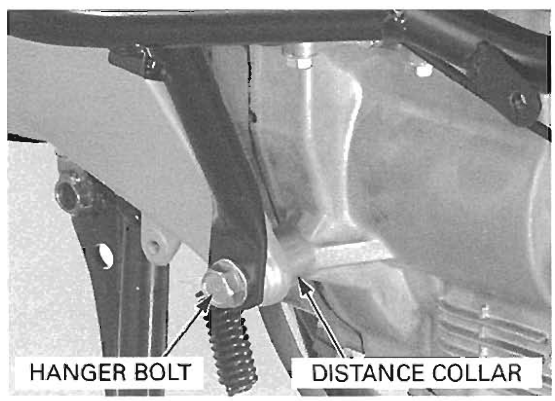


Remove the middle engine hanger nut.

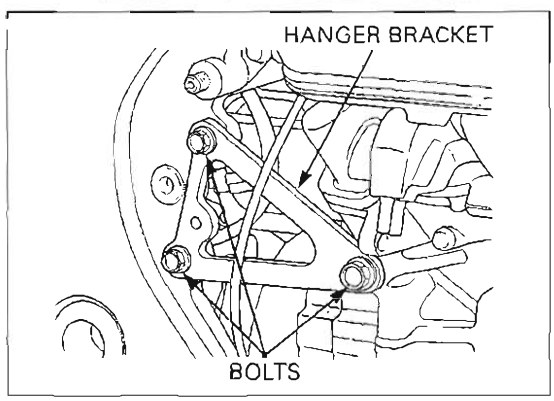
Remove the right engine guard mounting bolt.



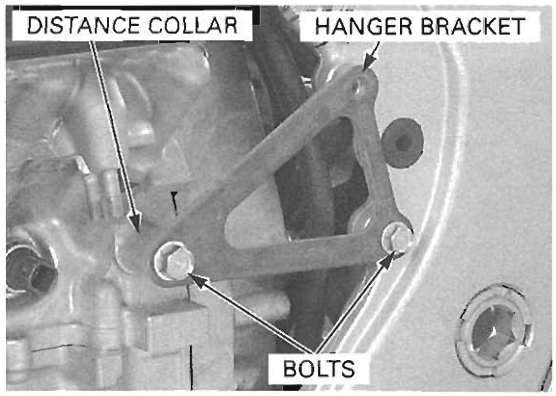
Remove the right lower engine hanger bolt, distance collar and right engine guard.



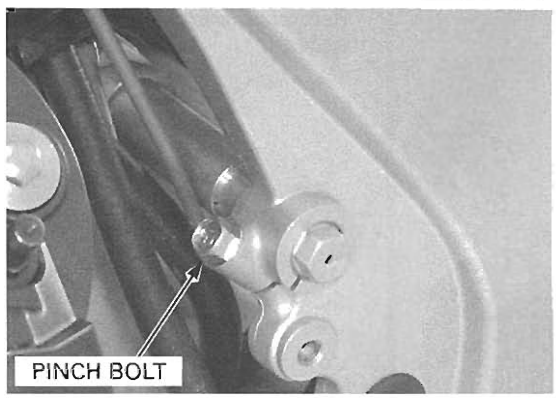
Remove the bolts and right rear engine hanger bracket.



Remove the bolts, left rear engine hanger bracket and distance collar.

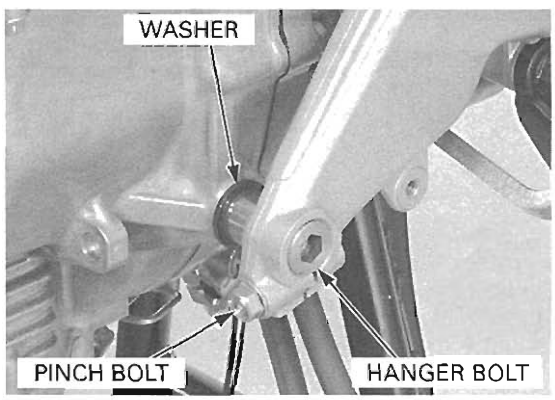


Loosen the middle engine hanger pinch bolt.

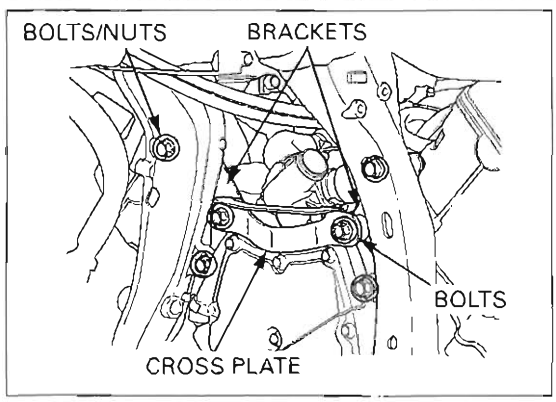


Loosen the lower engine hanger pinch bolt.

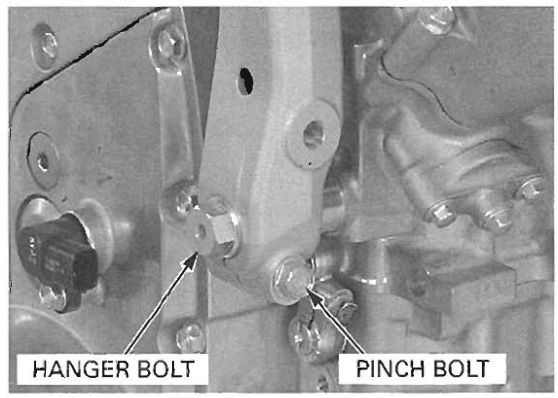
Remove the lower engine hanger bolt and washer.



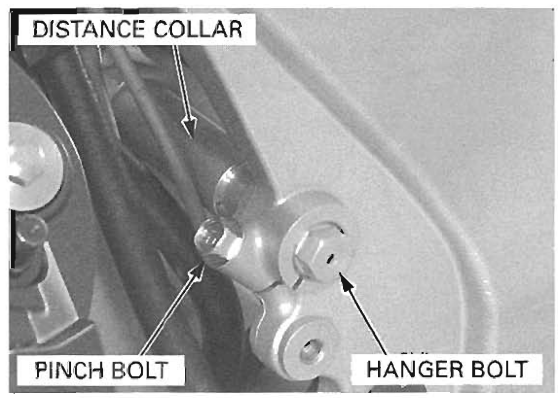
Remove the bolts/nuts, cross plate and front engine hanger brackets.



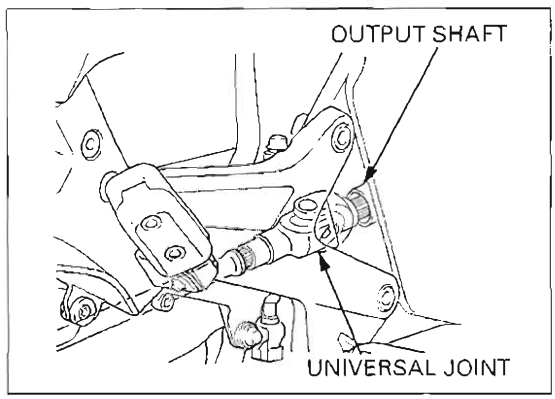
Loosen the front engine hanger pinch bolts.
Remove the front engine hanger bolts.



Remove the middle engine hanger bolt and distance collar.



Carefully lower the engine and release the final output shaft spline from the universal joint, then remove the engine from the frame.



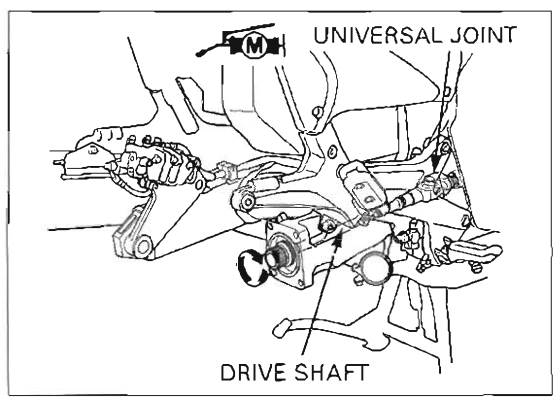
ENGINE INSTALLATION

- Note the direction of the hanger bolts.
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.

Install the engine into the frame.

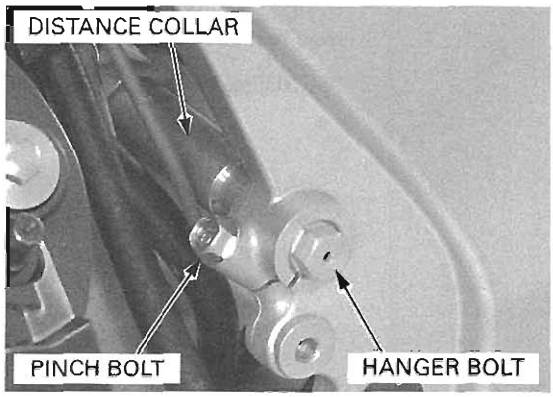
Apply molybdenum disulfide grease to the universal joint spline of the engine side and install the universal joint to the final output shaft.

Securely engage the universal joint splines with the output driven gear shaft splines while turning the drive shaft as shown.

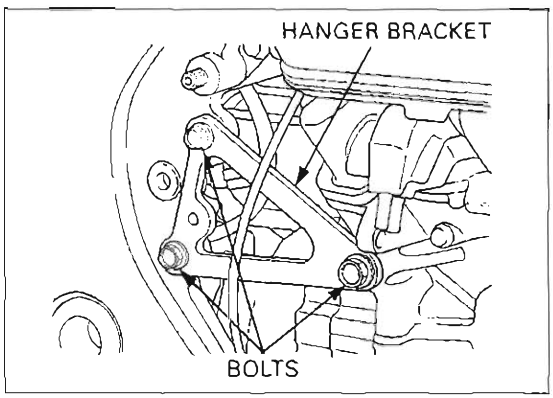


Install the following:

- Middle engine hanger distance collars and bolt
- Front engine hanger bolts
- Left lower engine hanger washer and bolt



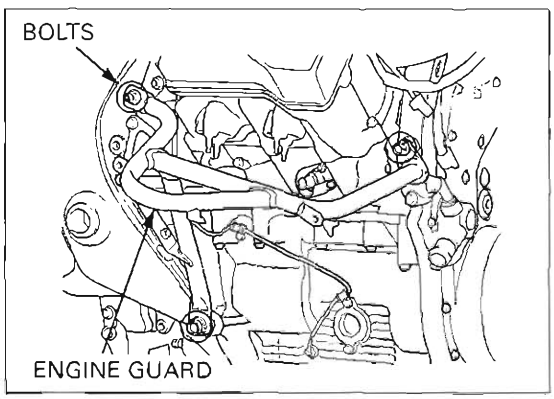
Install the right rear engine hanger bracket and mounting bolts.



Install the right engine guard onto the frame.

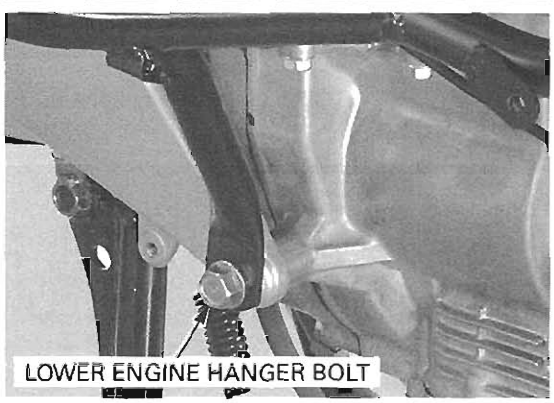
Install the middle engine hanger nut and engine guard mounting bolt.

Install the right lower engine hanger distance collar and hanger bolt.



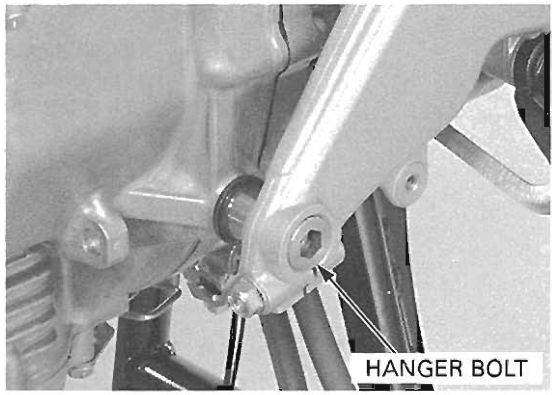
Tighten the right lower engine hanger bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



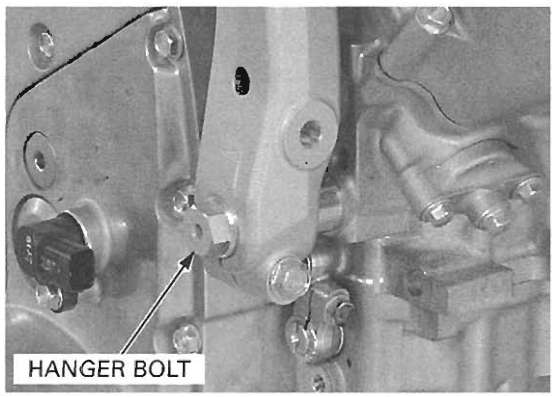
Tighten the left lower engine hanger bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



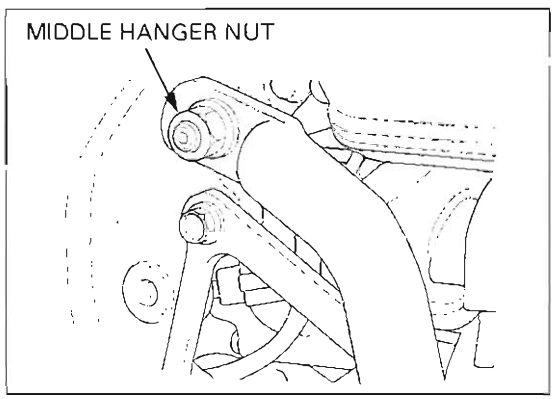
Tighten the front engine hanger bolts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



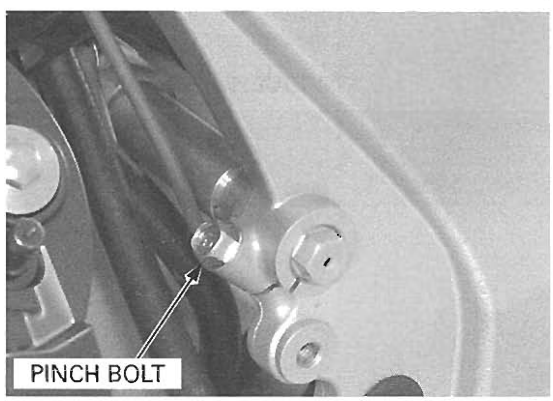
Tighten the middle engine hanger nut to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



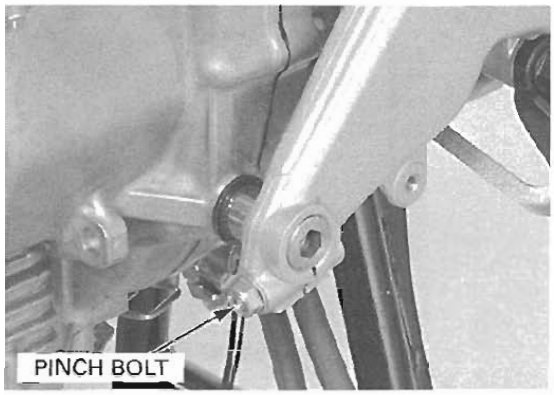
Tighten the middle engine hanger pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



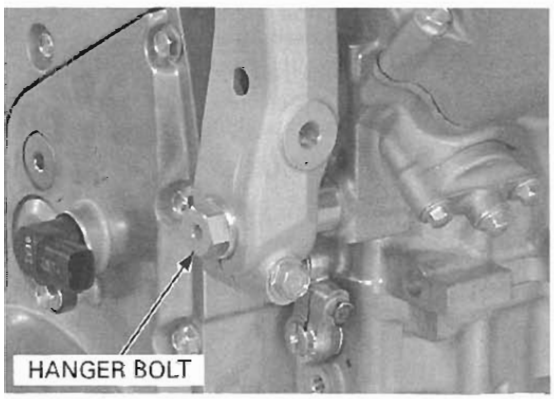
Tighten the lower engine hanger pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Tighten the front engine hanger bolts to the specified torque.

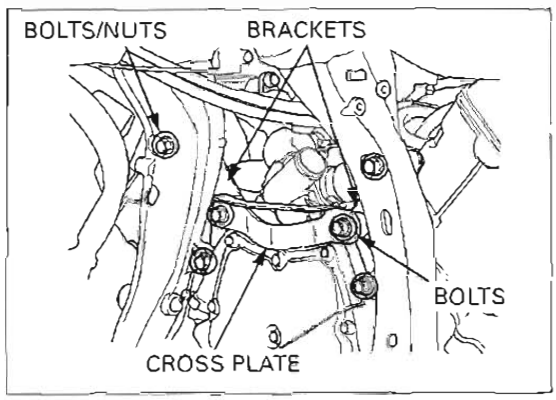
TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Install the front engine hanger brackets, cross plate and bolts/nuts.
Tighten the frame side bracket bolts/nuts securely.

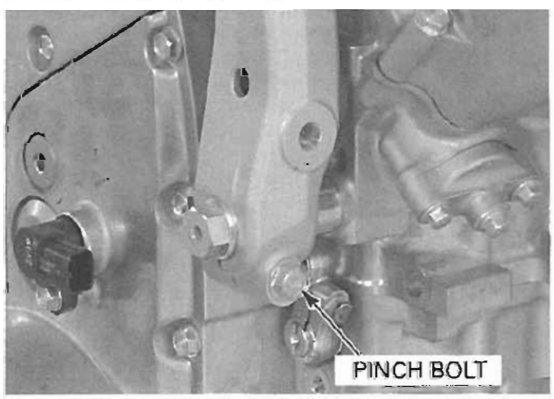
Tighten the engine side bracket bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

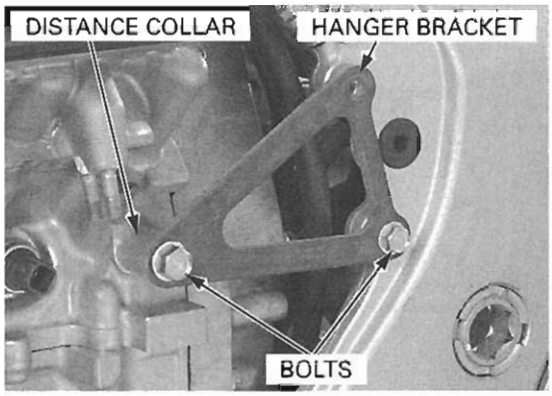


Tighten the front engine hanger pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



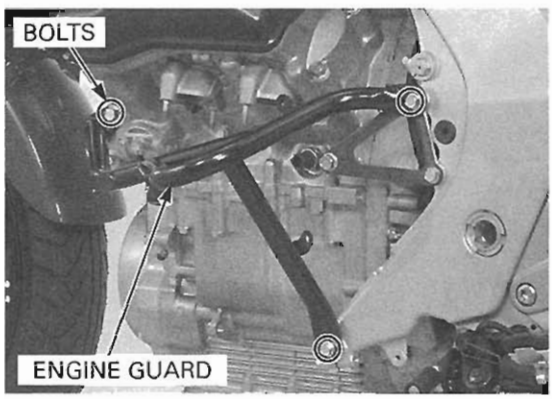
Install the distance collar, left rear engine hanger bracket and bolts.



Install the left engine guard and mounting bolts, tighten the mounting bolt and middle engine hanger bracket bolt (frame side) securely.

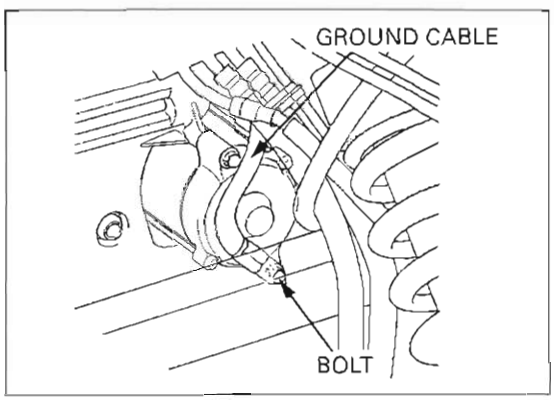
Tighten the middle engine hanger bracket bolts (engine side) to the specified torque.

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

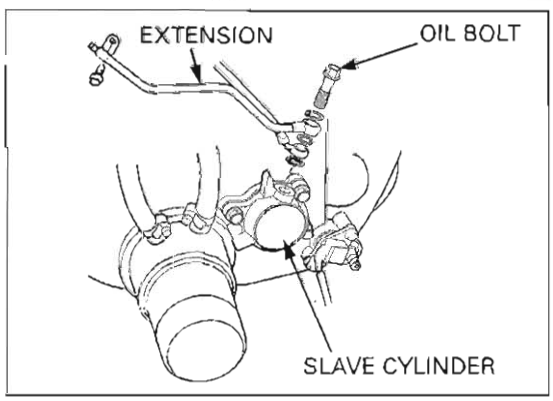


Route the starter motor ground cable and secure it with a starter motor mounting bolt.

Route the starter motor cable and tighten the terminal nut (page 21-11).



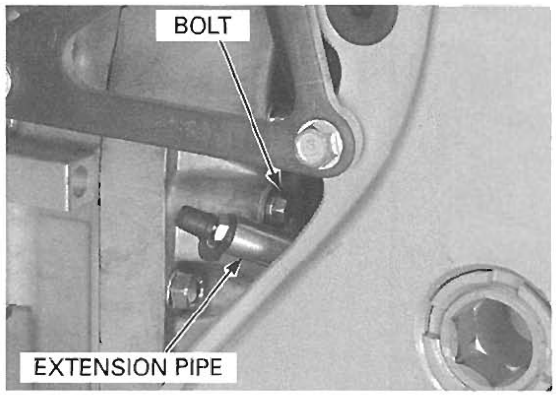
Install the clutch bleeder extension and clutch hose to the clutch slave cylinder with new three sealing washers and oil bolt.



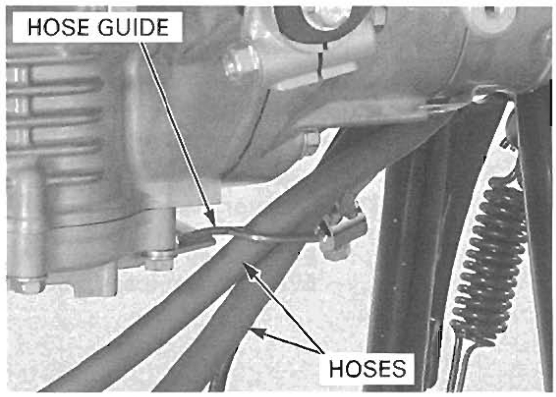
Install the clutch air bleed extension pipe mounting bolt.

Tighten the clutch slave cylinder oil bolt to the specified torque.

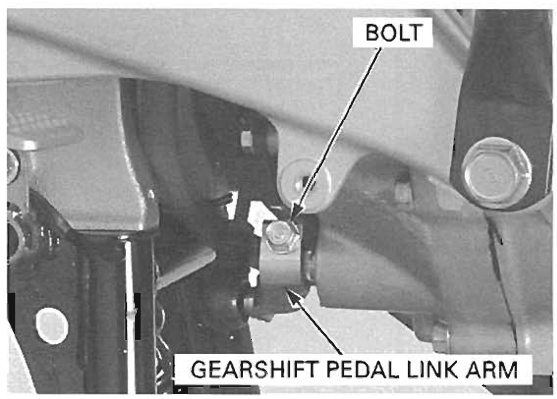
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



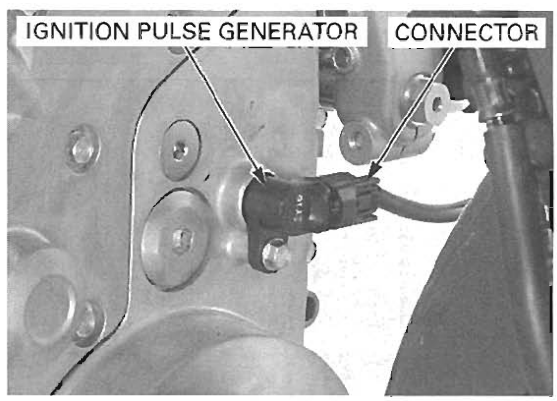
Route the fuel tank breather hose and drain hose and install them into the hose guide.



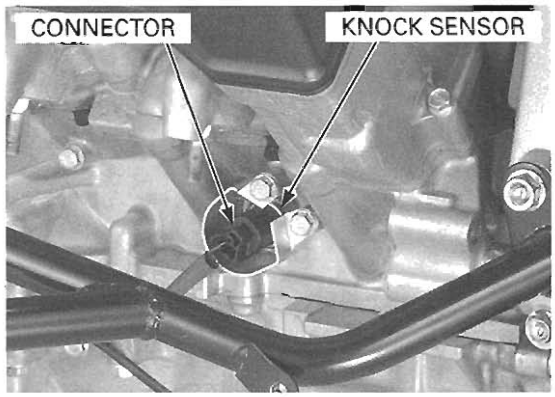
Install the gearshift pedal link arm to the gearshift spindle aligning the link arm slit with a punch mark on the gearshift spindle.



Connect the ignition pulse generator connector.



Connect the knock sensor connectors from the sensor.

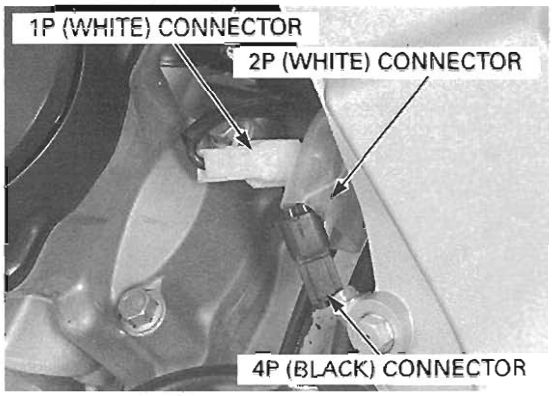


Install the muffler and exhaust pipe (page 2-18).

Connect the alternator 1P (White) connector, alternator 2P (White) connector and No.1/3 O_2 sensor 4P (Black) connector.

Install the following:

- Lower fuel tank (page 5-58)
- Radiator (page 6-17)
- Throttle body (page 5-68)
- EVAP purge control valve (page 5-88)
- EVAP canister (page 5-89)



8. CYLINDER HEAD/VALVES

COMPONENT LOCATION 8-2

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TROUBLESHOOTING 8-5

CYLINDER COMPRESSION TEST 8-6

CYLINDER HEAD COVER REMOVAL 8-6

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VALVE SEAT INSPECTION/REFACING 8-19

CYLINDER HEAD ASSEMBLY 8-23

CYLINDER HEAD INSTALLATION 8-25

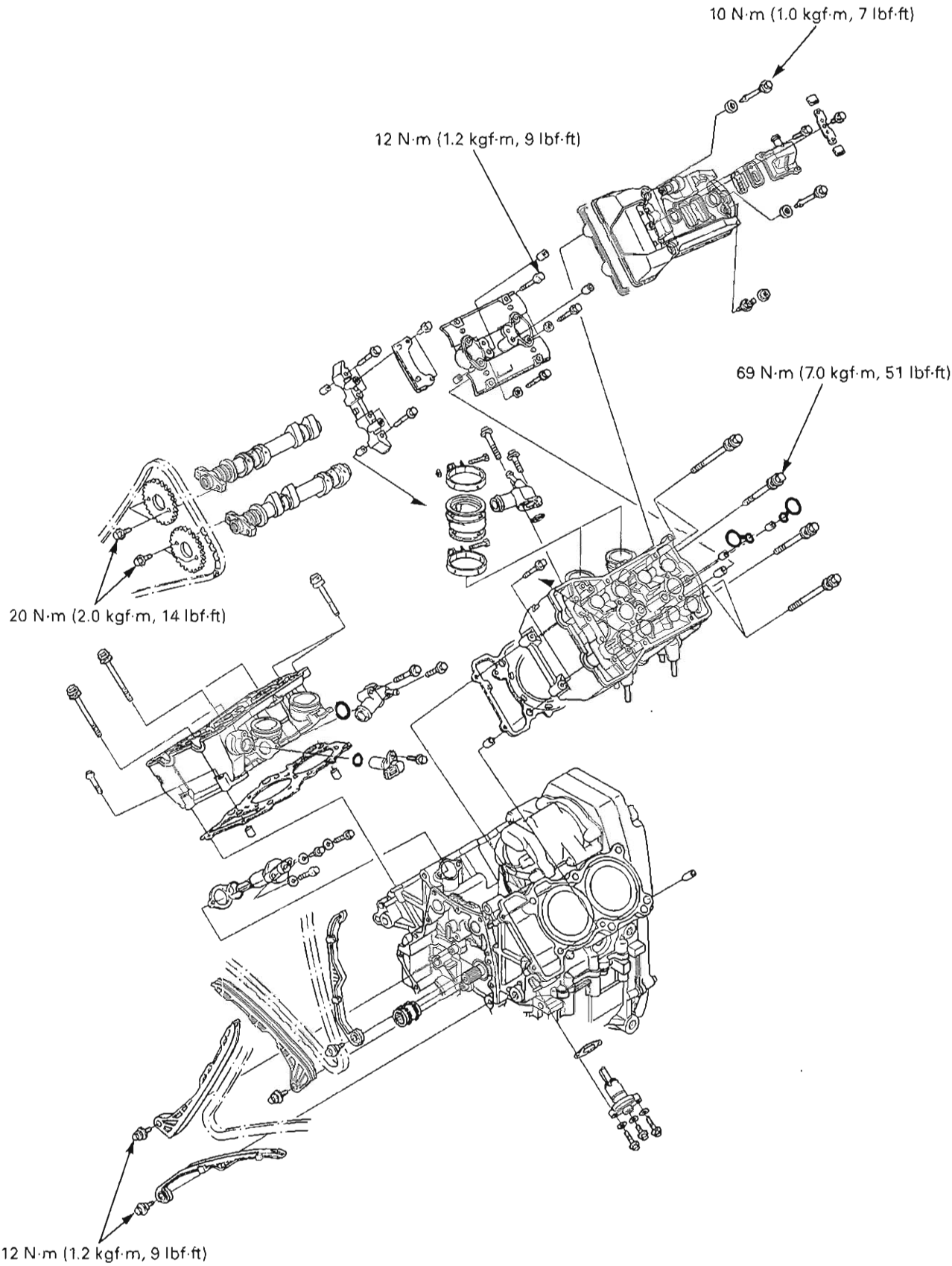
CAMSHAFT INSTALLATION 8-27

CYLINDER HEAD COVER ASSEMBLY 8-31

CYLINDER HEAD COVER INSTALLATION 8-32

CAM CHAIN TENSIONER LIFTER 8-34

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

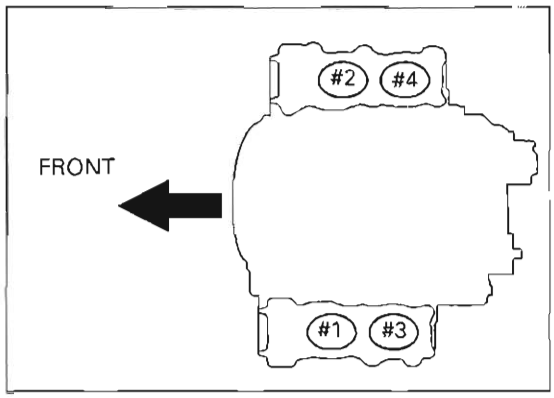
- This section covers service of the cylinder head, valves and camshaft.
- The camshaft and cylinder head services can be done with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all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

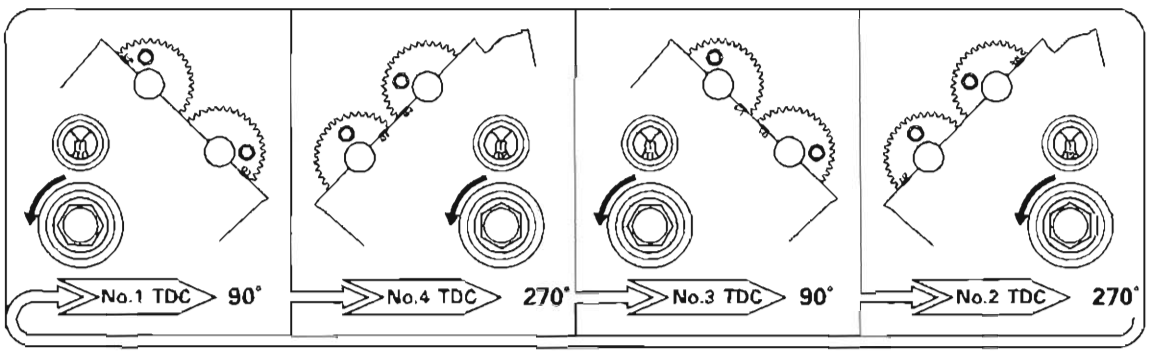
SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			981 – 1,373 kPa (10.0 – 14.0 kgf/cm², 142 – 178psi) at 300 rpm	–
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	–
		EX	0.25 ± 0.03 (0.010 ± 0.001)	–
Camshaft	Cam lobe height	IN	36.48 – 36.64 (1.436 – 1.443)	36.45 (1.435)
		EX	36.37 – 36.53 (1.432 – 1.438)	36.34 (1.431)
	Runout		–	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.		25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.		26.010 – 26.026 (1.024 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1959)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.025 – 0.052 (0.0010 – 0.0020)	0.090 (0.0035)
	Valve guide projection above cylinder head	IN	15.6 – 15.8 (0.61 – 0.62)	–
		EX	15.8 – 16.0 (0.62 – 0.63)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN	43.4 (1.71)	42.5 (1.67)
		EX	43.4 (1.71)	42.5 (1.67)
Cylinder head warpage			–	0.10 (0.004)

VALVE TIMING/CYLINDER NUMBER





TORQUE VALUES

Cylinder head flange bolt	69 N·m (7.0 kgf·m, 51 lbf·ft)	Apply oil to the threads and flange surface
Camshaft holder flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the threads and flange surface
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Breather plate flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads CT bolt
PAIR check reed valve cover SH bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Cam sprocket flange bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Cam chain tensioner pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Cam chain guide bolt/washer	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	
Primary drive gear flange special bolt	93 N·m (9.5 kgf·m, 69 lbf·ft)	Apply oil to the threads and flange surface
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	

TOOLS

Compression gauge attachment	07RMJ-MY50100	Equivalent commercially available in U.S.A.
Valve spring compressor	07757-0010000	
Valve spring compressor attachment	07959-KM30101	
Tappet hole protector	07HMG-MR70002	
Valve guide driver, 5.0 mm	07942-MA60001	or 07942-MA60000 (U.S.A. only)
Valve guide reamer, 5.0 mm	07984-MA60001	or 07984-MA6000D (U.S.A. only)
Valve seat cutters		-these are commercially available in U.S.A.
Seat cutter, 29 mm (45° EX)	07780-0010300	
Seat cutter, 33 mm (45° IN)	07780-0010800	
Flat cutter, 30 mm (32° EX)	07780-0012200	
Flat cutter, 33 mm (32° IN)	07780-0012900	
Interior cutter, 30 mm (60° EX)	07780-0014000	
Interior cutter, 34 mm (60° IN)	07780-0014700	
Cutter holder, 5 mm	07781-0010400	

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 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 (page 13-11).

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 (page 13-11)

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 (page 13-11)

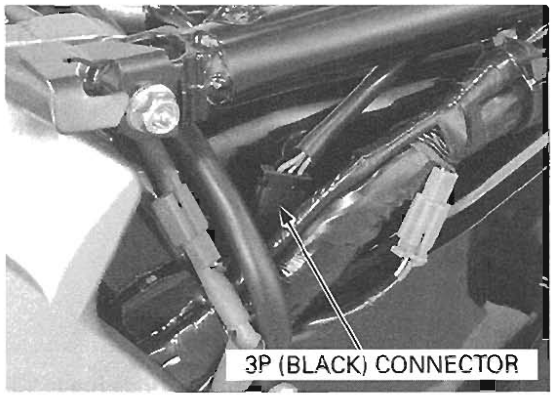
Excessive noise
- Cylinder head:
  - Incorrect valve adjustment
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (page 13-11)

Rough idle
- Low cylinder compression

CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.
Stop the engine and remove all the spark plug caps and spark plugs (page 3-6).
Remove the left side cover (page 2-6).

Disconnect the fuel pump 3P (Black) connector.

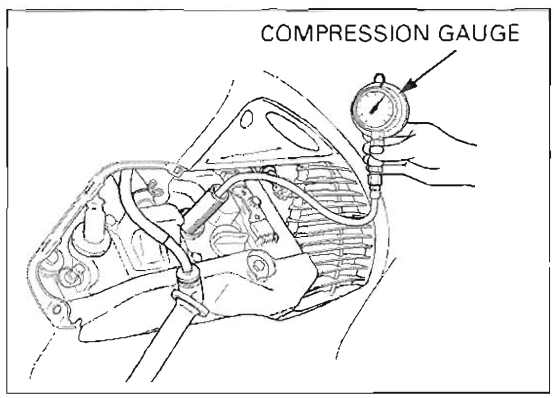


Install a compression gauge into the spark plug hole.

TOOL:

Compression gauge attachment	**07RMJ-MY50100 (Equivalent commercially available)**

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



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

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

Compression pressure:
981 - 1,373 kPa (10.0 - 14.0 kgf/cm², 142 - 178 psi) at 300 rpm

Low compression can be caused by:
- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

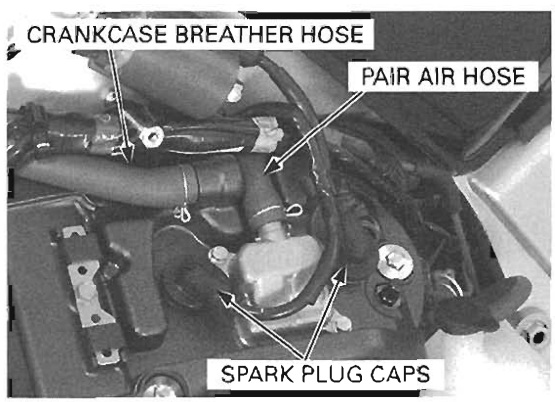
High compression can be caused by:
- Carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

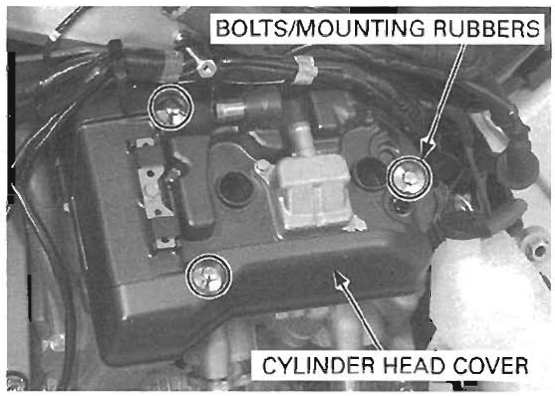
Remove the middle cowl (page 2-12).
Remove the cylinder head over head cover (page 3-6).

Remove the spark plug caps from the cylinder head cover.

Disconnect the PAIR air hose from the PAIR air check reed valve cover.
Disconnect the crankcase breather hose from the left cylinder head cover.

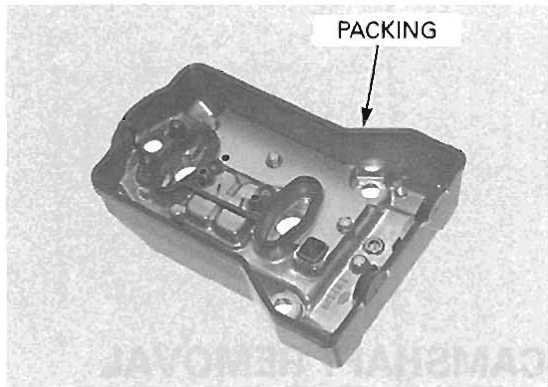


Remove the bolts, mounting rubbers and cylinder head cover.

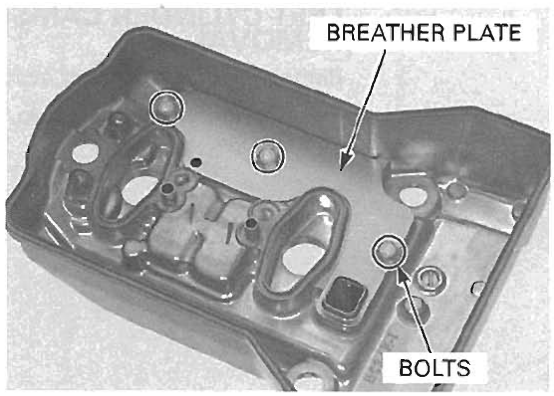


CYLINDER HEAD COVER DISASSEMBLY

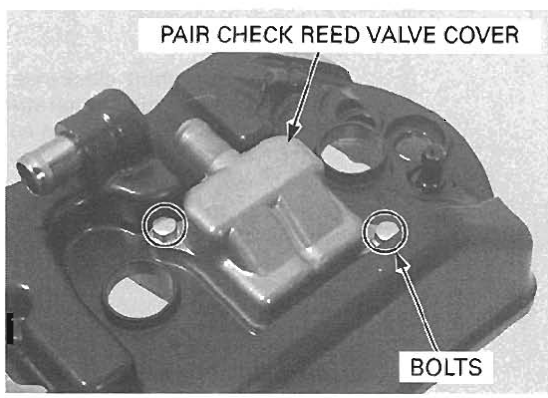
Remove the cylinder head cover packing.



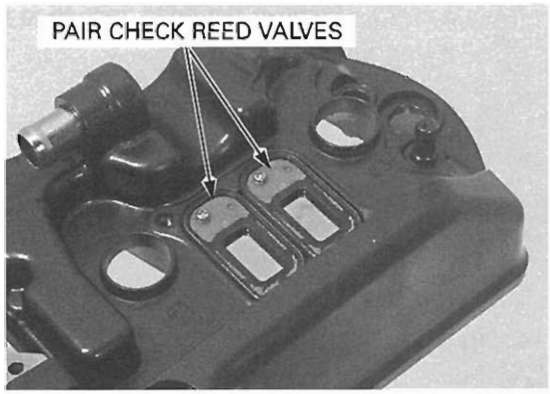
Remove bolts and breather plate and gasket from the rear cylinder head cover.



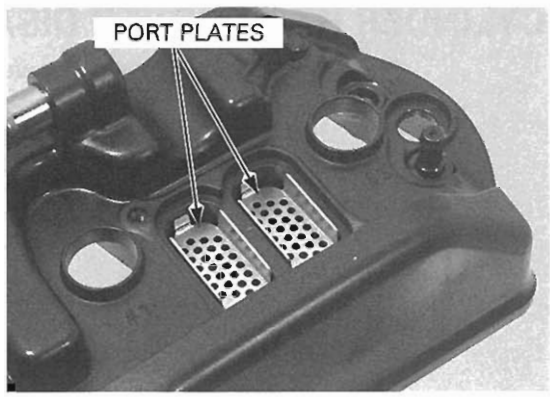
Remove the bolts and PAIR check reed valve cover.



Check the PAIR check reed valve for wear or damage, replace if necessary.



Remove the port plates.

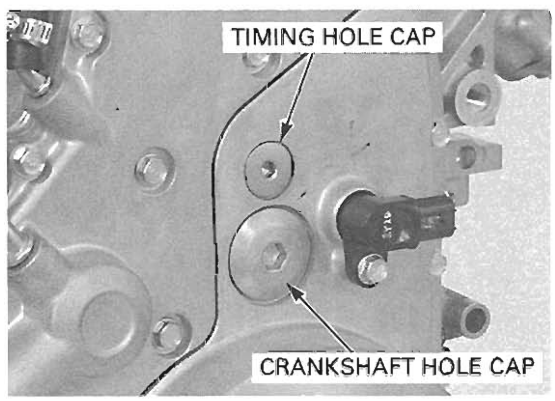


CAMSHAFT REMOVAL

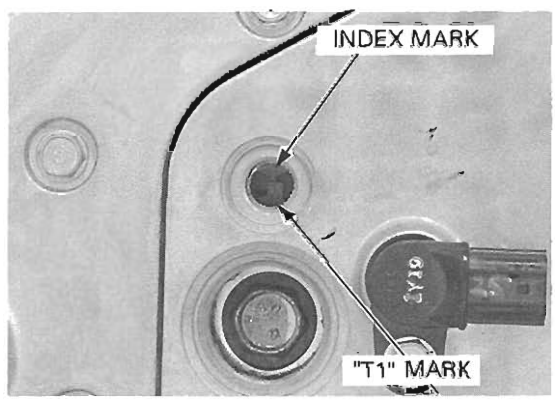
LEFT CYLINDER CAMSHAFT REMOVAL

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

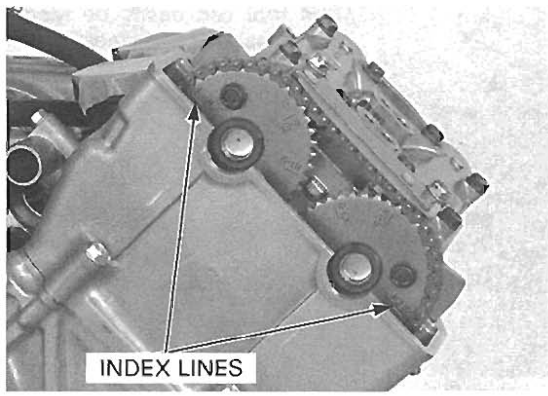
Remove the timing hole cap, crankshaft hole cap and O-rings.



Turn the crankshaft clockwise, align the "T1" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.



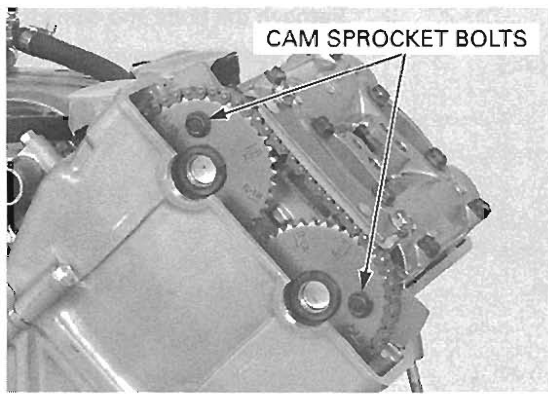
Make sure that the index lines on the left cylinder cam sprocket are facing outward and that the No.1 piston is at TDC (Top Dead Center) on the compression stroke.



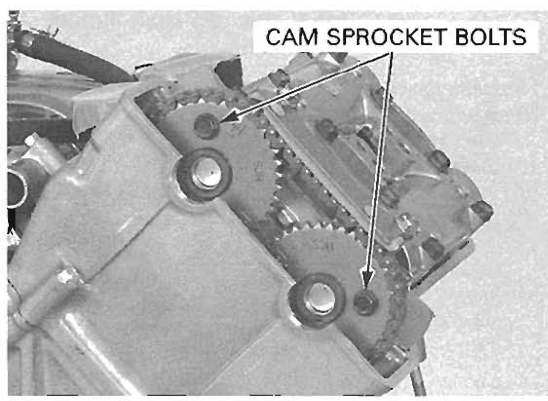
It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts.

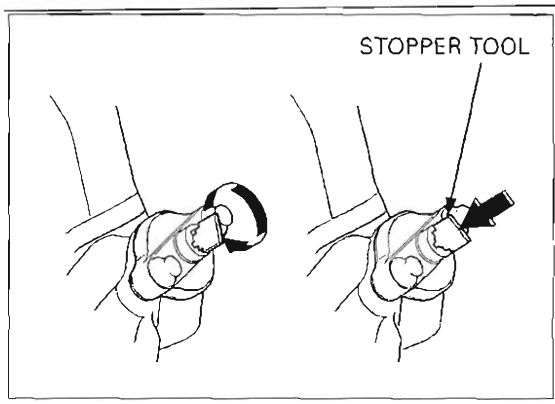
Remove the cam sprocket bolts from the intake and exhaust camshafts, being careful not to drop the cam sprocket bolts into the crankcase.



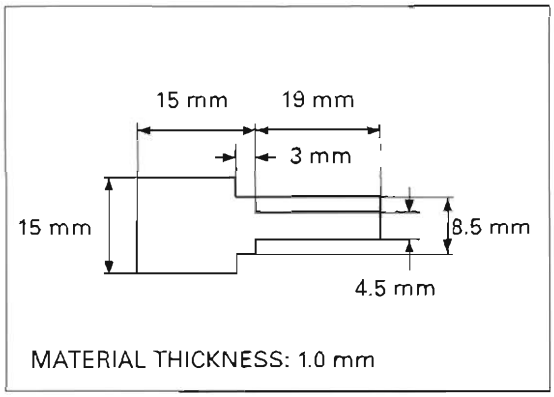
Turn the crankshaft one full turn (360°), remove the other cam sprocket bolts from the camshafts.



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

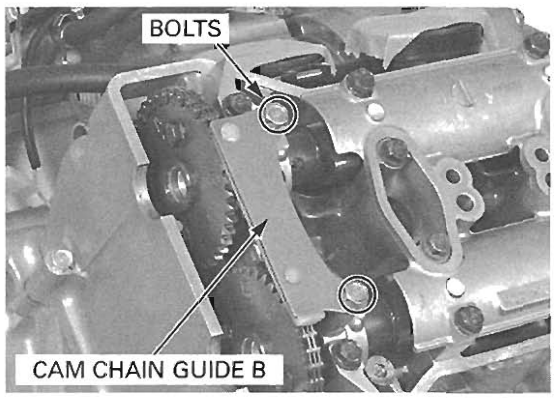


This tool can easily be made from a thin (1 mm thickness) piece of steel.



Remove the bolts and cam chain guide B.

If necessary, remove the cam sprocket from the camshaft.

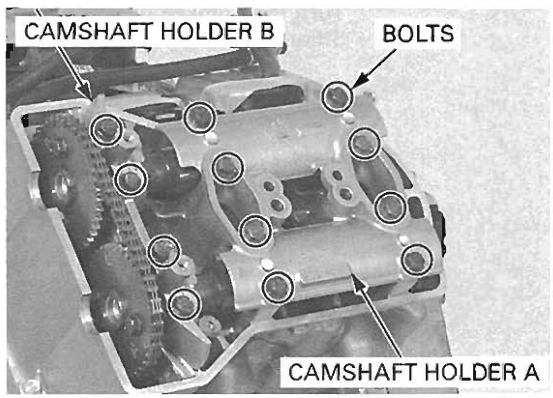


Mark the camshaft holder A for identification at installation.

Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.

Loosen and remove the camshaft holder B bolts gradually in several steps and remove the camshaft holder B.

Loosen the camshaft holder A bolts and then remove the camshaft holder A.



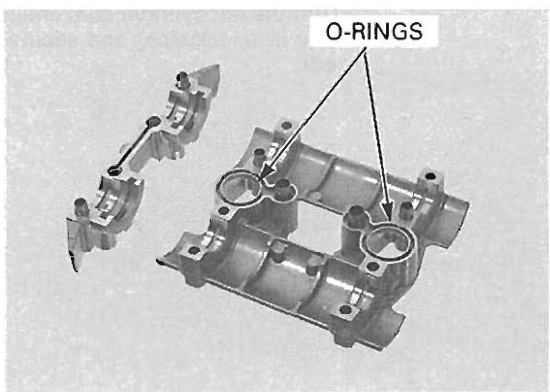
NOTICE

From outside to inside, loosen the bolts in a criss-cross pattern in several steps or the camshaft holder might break.

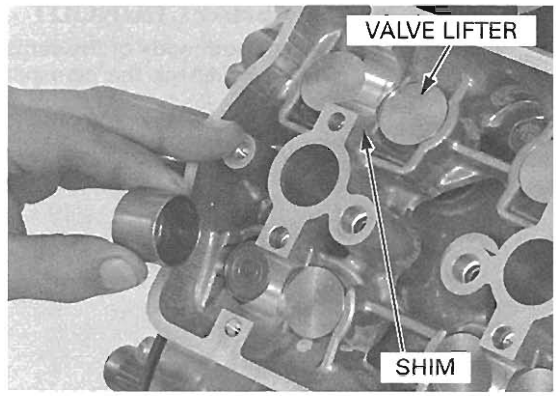
Do not forcibly remove the dowel pins from the camshaft holder.

Remove the O-rings from the camshaft holder A.

Remove the left cylinder camshafts.



Remove the valve lifters and shims from the valve lifter bore.

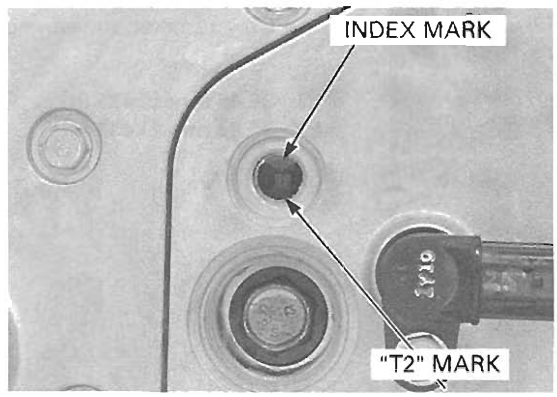


NOTICE

- *Be careful not to damage the valve lifter bore.*
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall.
- 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 a tweezers or a magnet.

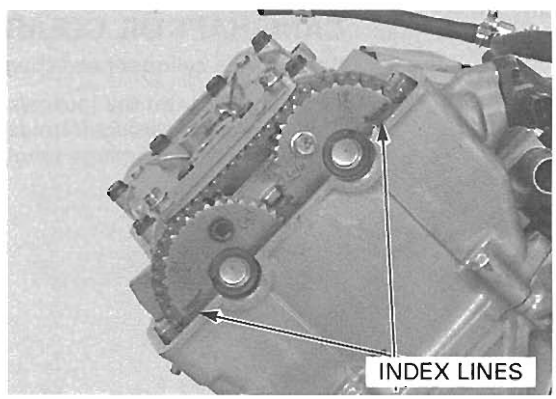
RIGHT CYLINDER CAMSHAFT REMOVAL

Turn the crankshaft clockwise, align the "T2" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.



Make sure that the index lines on the right cylinder cam sprocket are facing outward and that the No.2 piston is at TDC (Top Dead Center) on the compression stroke.

Remove the right cylinder camshafts following the same procedure as for the left cylinder head camshaft (page 8-8).

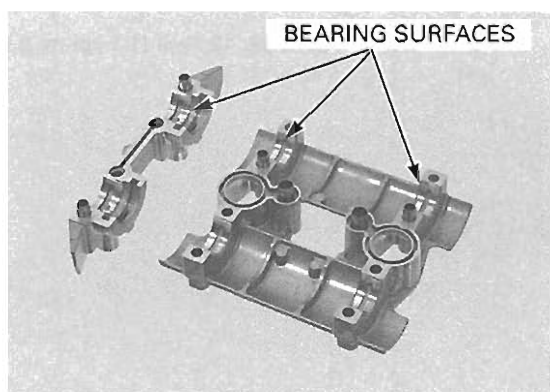


CAMSHAFT INSPECTION

CAMSHAFT HOLDER

Inspect the bearing surface of the camshaft holder for scoring, scratches, evidence of insufficient lubrication.

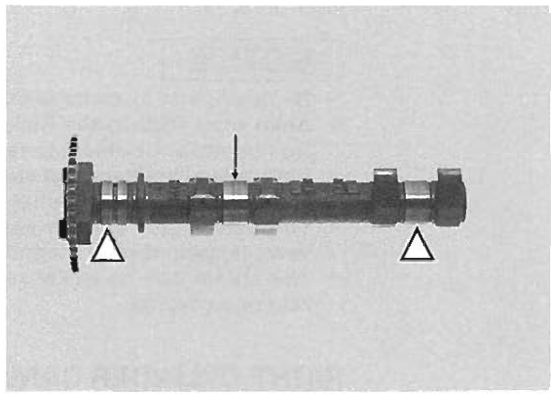
Inspect the oil orifices of the holders for clogging.



CAMSHAFT RUNOUT

Support both ends of the camshaft journals with V-blocks and check the camshaft runout with a dial gauge.

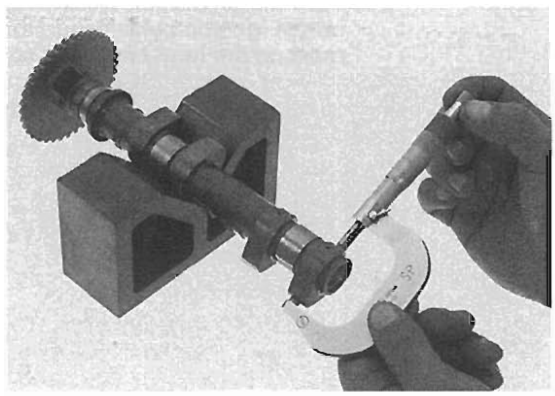
SERVICE LIMIT: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

Using a micrometer, measure each cam lobe height.

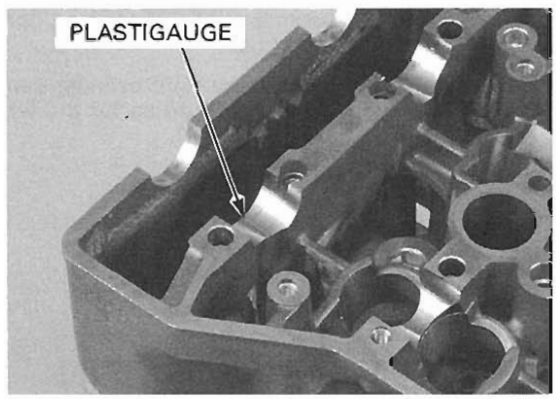
SERVICE LIMITS:
IN: 36.45 mm (1.435 in)
EX: 36.34 mm (1.431 in)



CAMSHAFT OIL CLEARANCE

Remove the cylinder head (page 8-13).

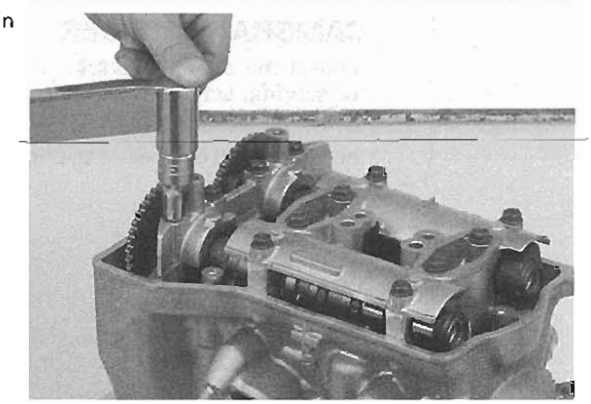
Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.
Lay a strip of plastigauge lengthwise on top of each camshaft journal.



Do not rotate the camshaft when using plastigauge.

Install the camshaft holders and tighten the bolts in a crisscross pattern in 2 - 3 steps.

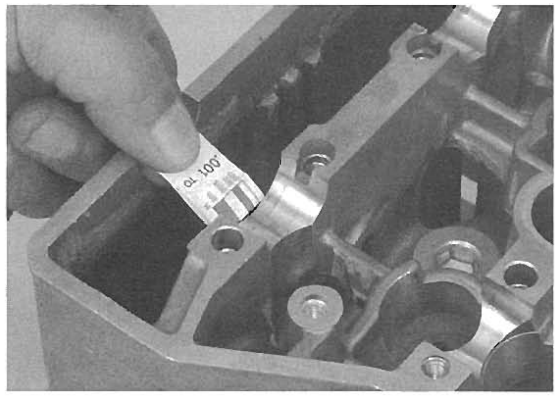
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Remove the camshaft holders and measure the width of each plastigauge.
The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

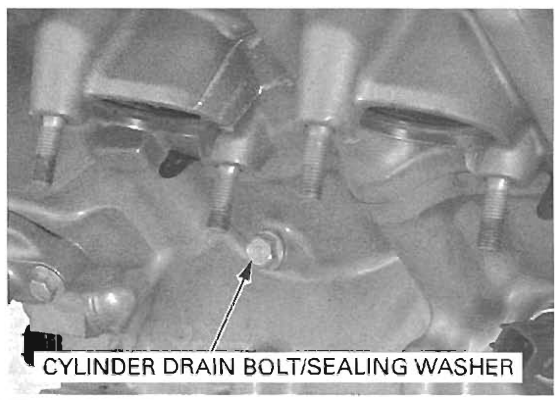
If the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



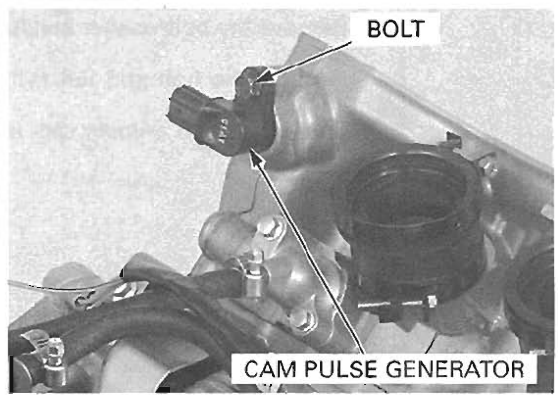
CYLINDER HEAD REMOVAL

Remove the engine from the frame (page 7-4).
Remove the camshaft (page 8-8).

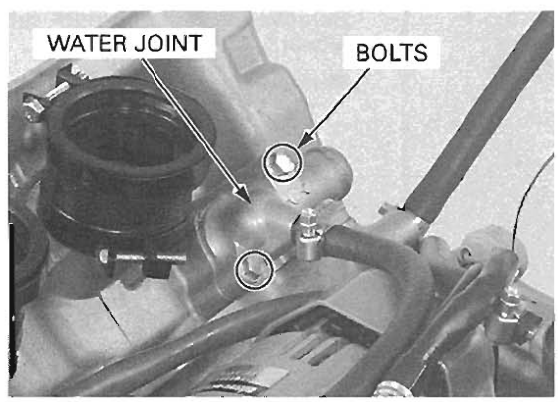
Remove the cylinder drain bolts and sealing washers.
Drain coolant from the left and right cylinder.



For the right cylinder head removal, remove the bolt and cam pulse generator from the right cylinder head.



Remove the SH bolts and water joints from the left and right cylinder heads.

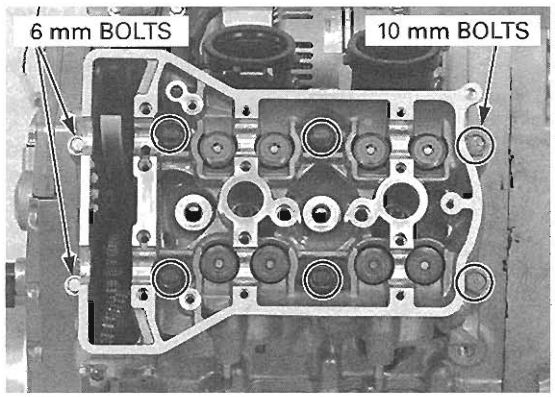


Remove the two 6 mm flange bolts.

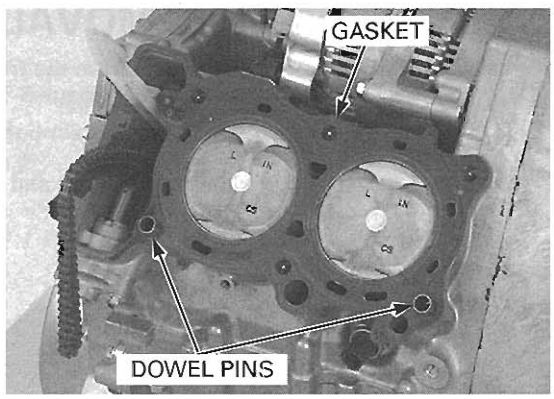
Loosen the 10 mm bolts in a criss-cross pattern in 2 – 3 steps.

Remove the six 10 mm special bolts/washers.

Remove the cylinder head.

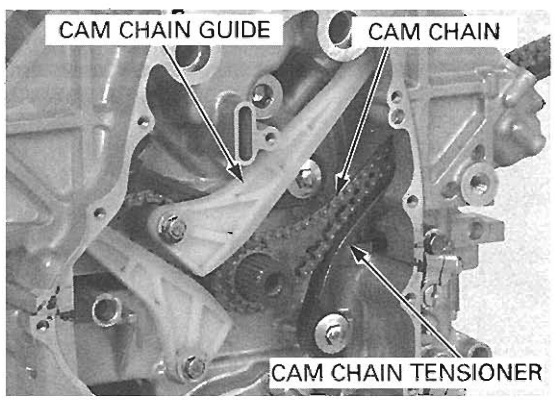


Remove the gasket and dowel pins.



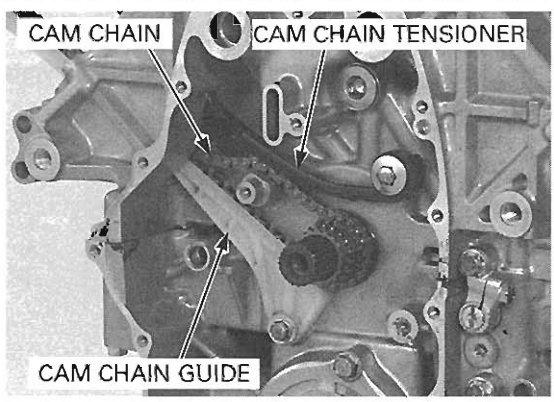
Remove the front crankcase cover (page 9-14) and primary drive gear (page 9-23).

Remove the bolt/washer and left cylinder cam chain guide.
Remove the bolt and left cylinder cam chain tensioner.
Remove the left cylinder cam chain.

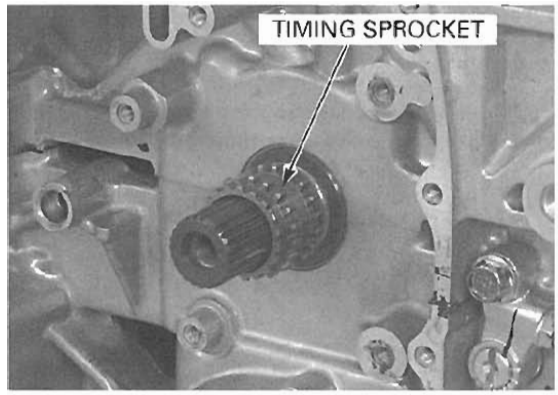


Remove the bolt/washer and right cylinder cam chain guide.
Remove the bolt and right cylinder cam chain tensioner.

Remove the right cylinder cam chain.



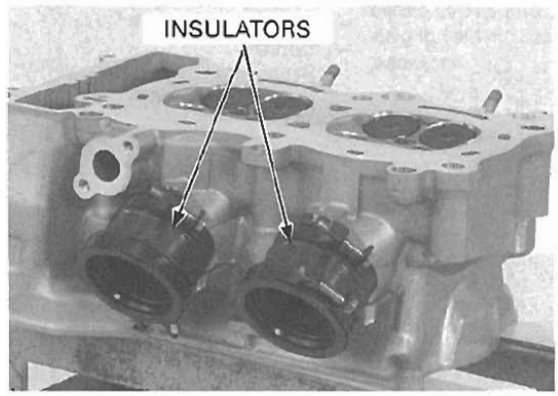
Remove the timing sprocket from the crankshaft.



CYLINDER HEAD DISASSEMBLY

Loosen the screws and remove the insulators from the left and right cylinder head.

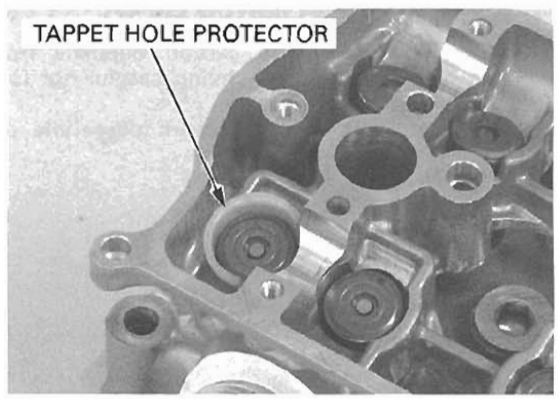
Remove the spark plugs from the cylinder head.



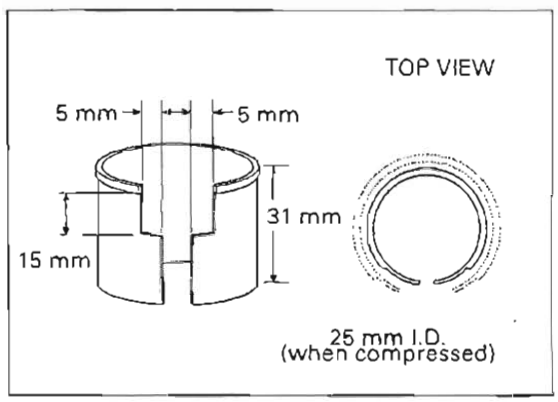
Install the tappet hole protector into the valve lifter bore.

TOOL:

Tappet hole protector	**07HMG-MR70002**



An equivalent tool can easily be made from a plastic 35 mm film container as shown.

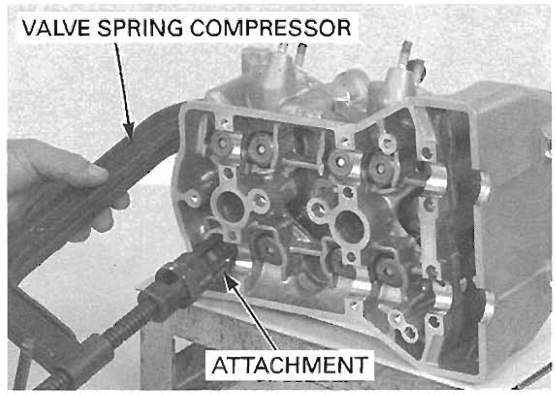


To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

Remove the valve spring cotters using the special tools as shown.

TOOLS:

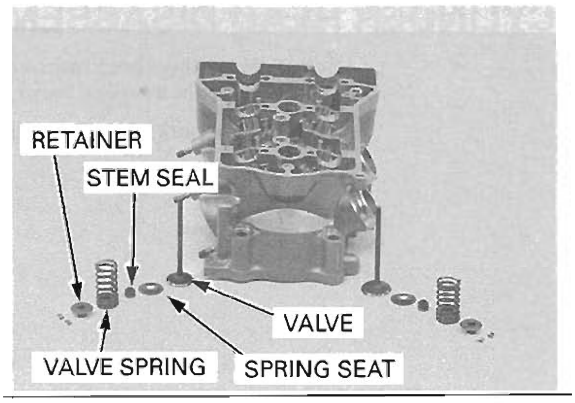
Valve spring compressor	**07757-0010000**
Valve spring compressor attachment	**07959-KM30101**



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

Remove the following:

- Spring retainer
- Valve spring
- Valve
- Stem seal
- Valve spring seat



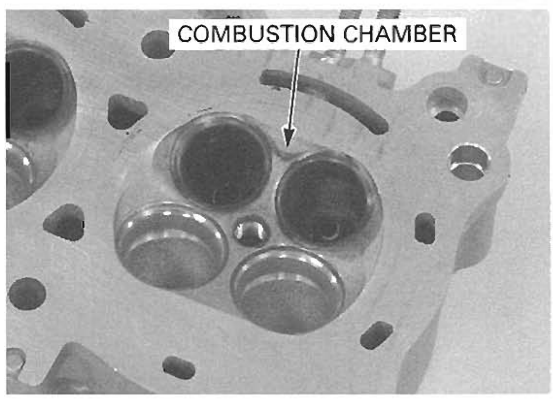
CYLINDER HEAD INSPECTION

CYLINDER HEAD

Avoid damaging the gasket surface

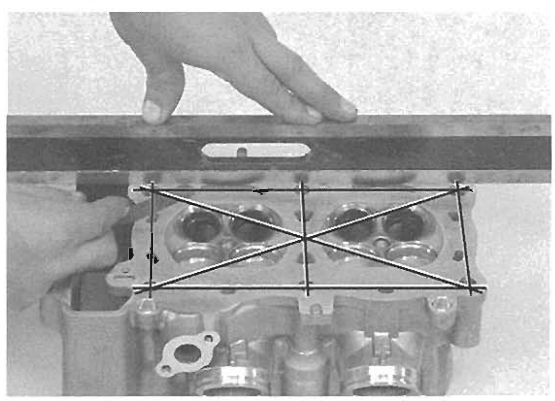
Remove carbon deposits from the combustion chamber, being careful not to damage the gasket surface.

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)

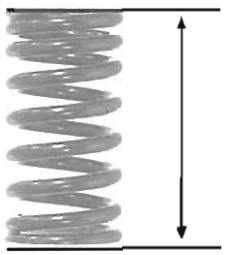


VALVE SPRING

Measure the valve spring free length.

SERVICE LIMIT: 42.5 mm (1.67 in)

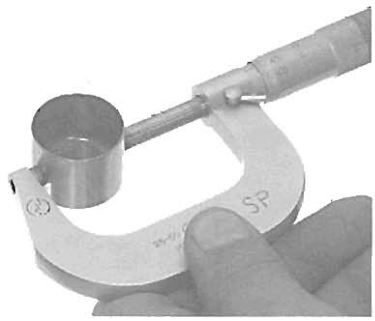
Replace the springs if they are shorter than the service limits.



VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.
Measure the each valve lifter O.D.

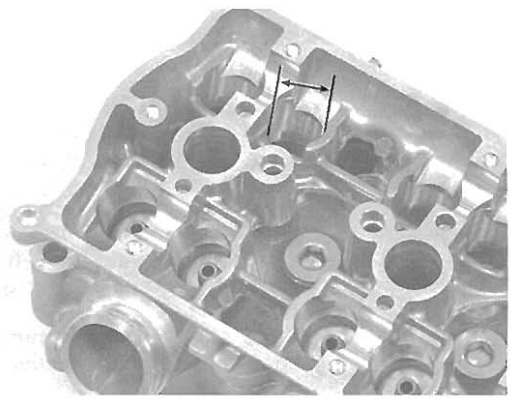
SERVICE LIMIT: 25.97 mm (1.022 in)



VALVE LIFTER BORE

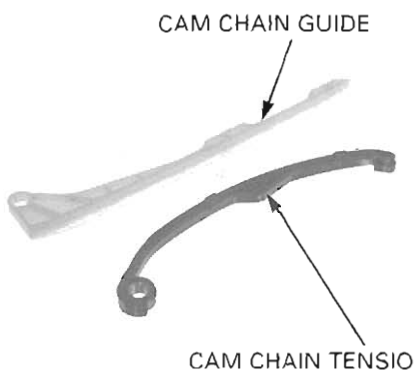
Inspect each valve lifter bore for scratches or abnormal wear.
Measure each valve lifter bore I.D.

SERVICE LIMIT: 26.04 mm (1.025 in)



CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Inspect the cam chain tensioner and cam chain guide for excessive wear or damage, replace if necessary.



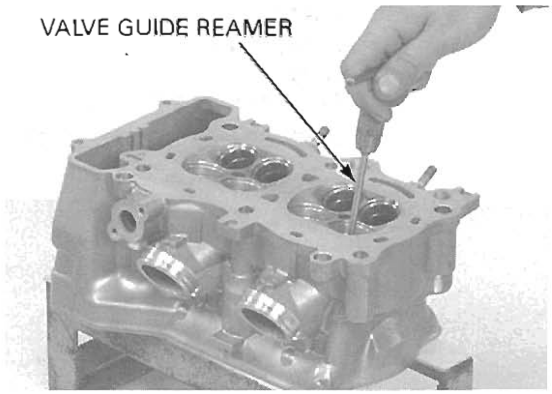
VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide.
Inspect each valve for bending, burning or abnormal stem wear.
Measure and record each valve stem O.D.



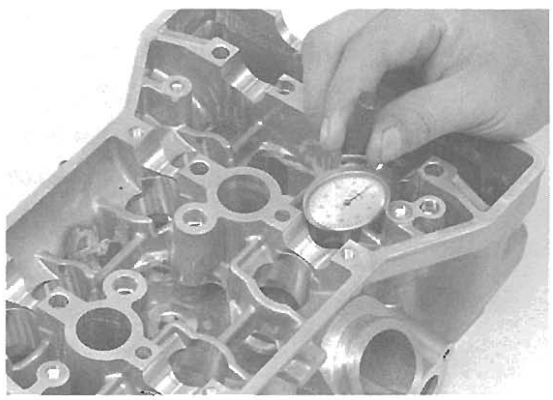
SERVICE LIMITS:
IN: 4.965 mm (0.1959 in)
EX: 4.950 mm (0.1949 in)

Ream the guides to remove any carbon deposits before checking clearances.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.



TOOL:
Valve guide reamer, 5.0 mm **07984-MA60001 or 07984-MA6000D (U.S.A. only)**

Measure and record each valve guide I.D.



SERVICE LIMIT: IN/EX:5.040 mm (0.1984 in)

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

SERVICE LIMITS:
IN: 0.075 mm (0.0030 in)
EX: 0.090 mm (0.0035 in)

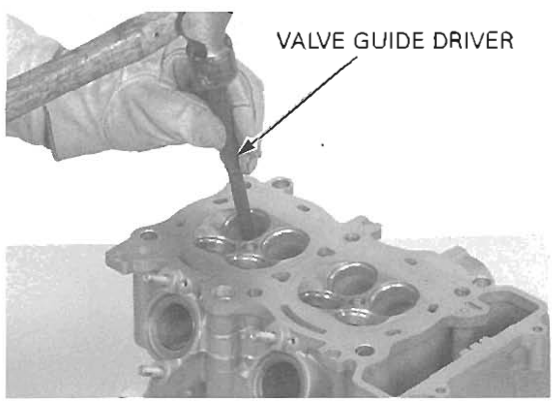
Reface the valve seats whenever the valve guides are replaced (page 8-20).

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

VALVE GUIDE REPLACEMENT

Do not use a torch to heat the cylinder head; it may cause warping.

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 100 – 150°C (212 – 300°F) with a hot plate or oven.



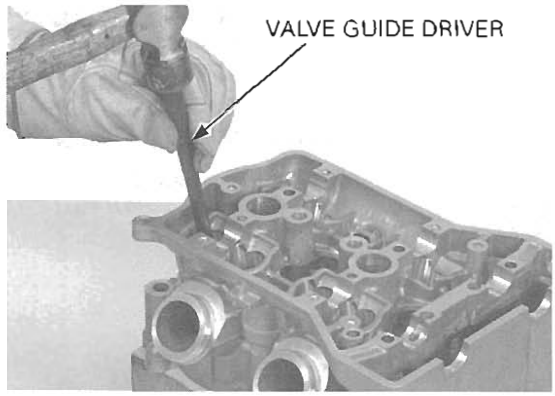
Support the cylinder head and drive out the valve guides from combustion chamber side of the cylinder head.

TOOL:
Valve guide driver, 5.0 mm **07942-MA60001 or 07942-MA60000 (U.S.A. only)**

Drive in the guide to the specified depth from the top of the cylinder head.

TOOL:

Valve guide driver, 5.0 mm	**07942-MA60001 or 07942-MA6000D (U.S.A. only)**

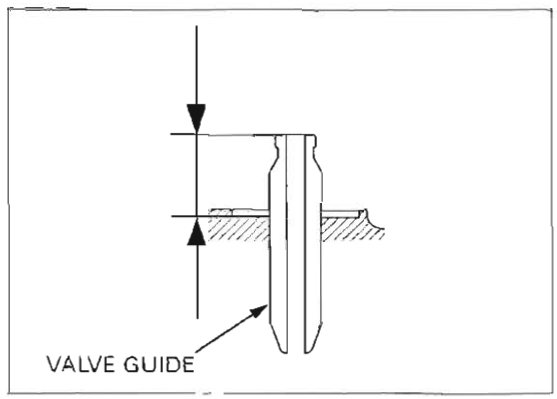


Install the valve guide while measuring the valve guide height from the cylinder head.

SPECIFIED DEPTH:

IN: 15.6 – 15.8 mm (0.61 – 0.62 in)
EX: 15.8 – 16.0 mm (0.62 – 0.63 in)

Let the cylinder head cool to room temperature.



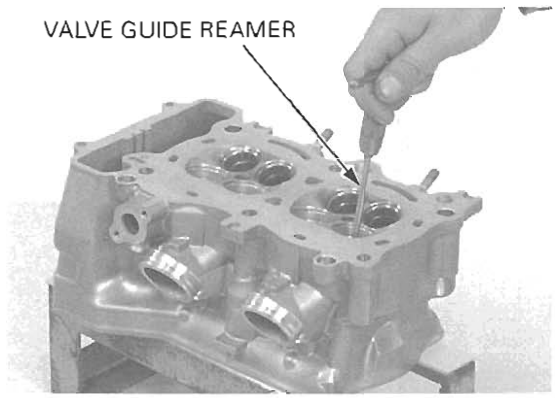
Use cutting oil on the reamer during this operation

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:

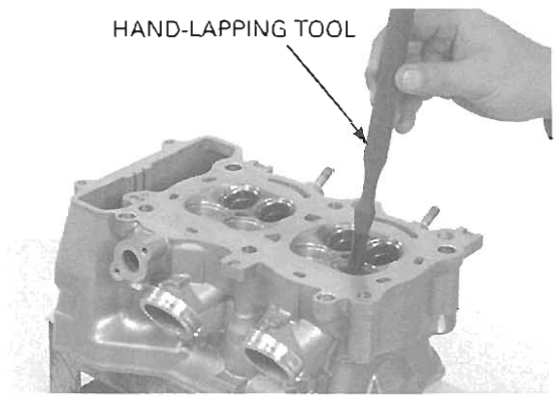
Valve guide reamer, 5.0 mm	**07984-MA60001 or 07984-MA6000D (U.S.A. only)**

Clean the cylinder head thoroughly to remove any metal particles.
Reface the valve seats (page 8-20).



VALVE SEAT INSPECTION/REFACING

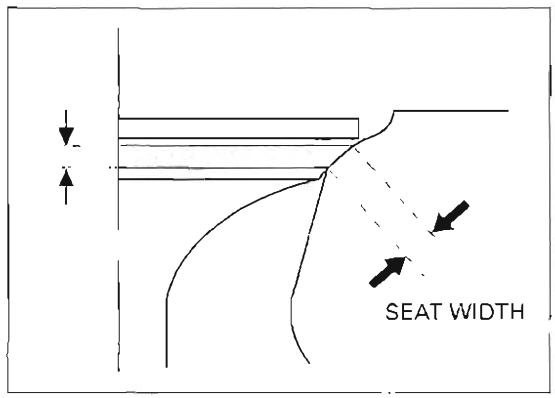
Clean the intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seats.
Tap the valves and seats using a rubber hose or other hand-lapping tool.



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

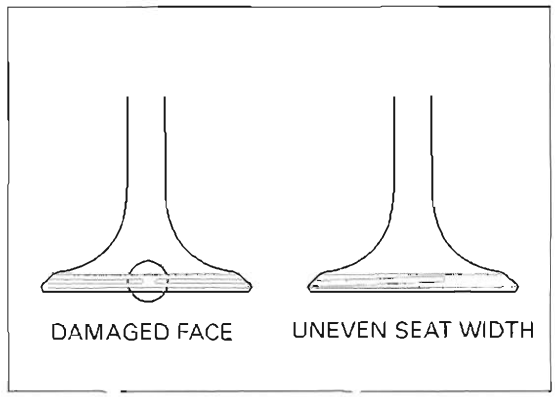
STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

If the seat width is not within specification, reface the valve seat (page 8-20).



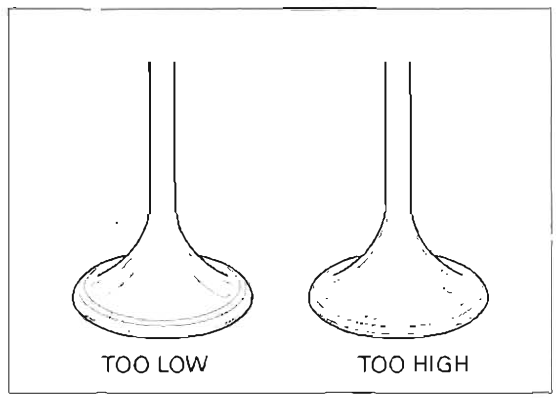
Inspect the valve seat face for:

- Uneven seat width:
  – Replace the valve and reface the valve seat.
- Damaged face:
  – Replace the valve and reface the valve seat.



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

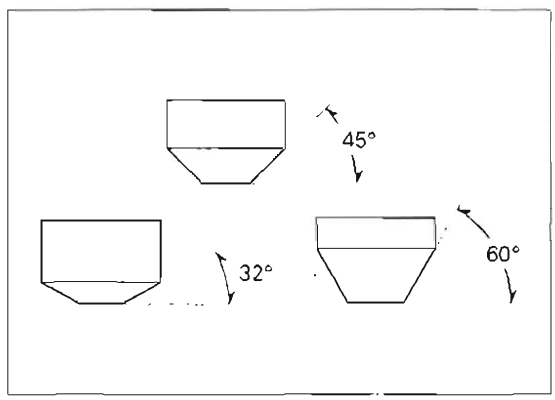
- Contact area (too high or too low)
  – Reface the valve seat.



VALVE SEAT REFACING

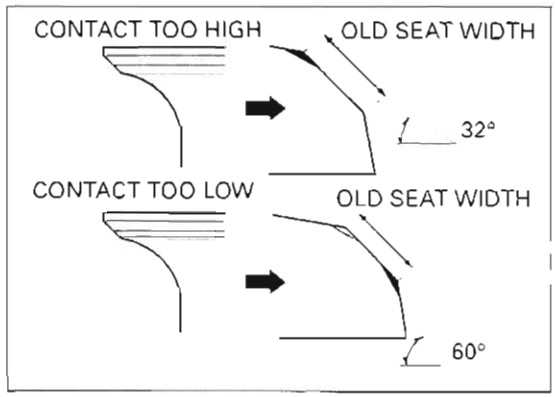
Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.

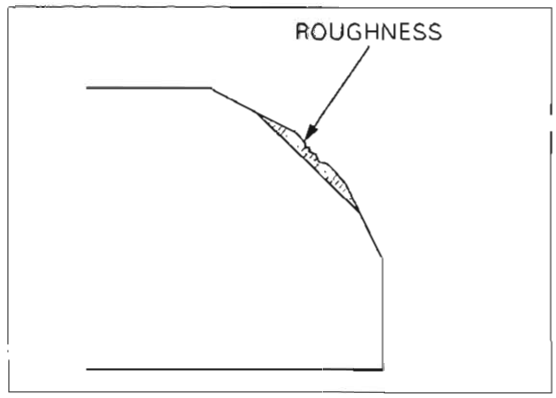


Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

Use a 45° seat cutter to remove any roughness or irregularities from the seat.

TOOLS:

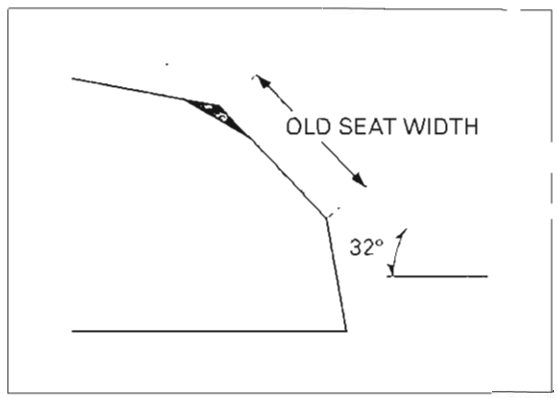
Seat cutter, 33 mm (IN)	**07780-0010800**
Seat cutter, 29 mm (EX)	**07780-0010300**
Cutter holder, 5 mm	**07781-0010400 or equivalent commercially available in U.S.A.**



Use a 32° flat cutter to remove the top 1/4 of the existing valve seat material.

TOOLS:

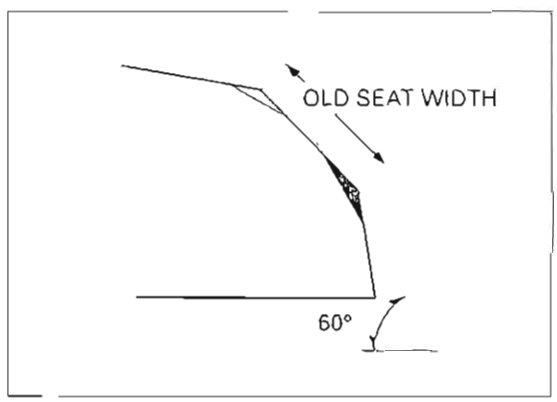
Flat cutter, 33 mm (IN)	07780-0012900
Flat cutter, 30 mm (EX)	07780-0012200
Cutter holder, 5 mm	07781-0010400 or equivalent commercially available in U.S.A.



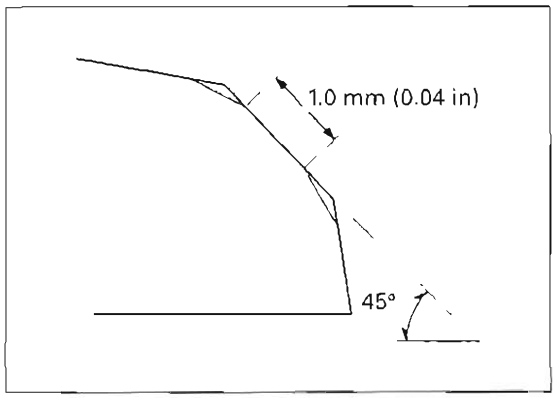
Use a 60° interior cutter to remove the bottom 1/4 of the old seat.

TOOLS:

Interior cutter, 34 mm (IN)	**07780-0014700**
Interior cutter, 30 mm (EX)	**07780-0014000**
Cutter holder, 5 mm	**07781-0010400 or equivalent commercially available in U.S.A.**



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

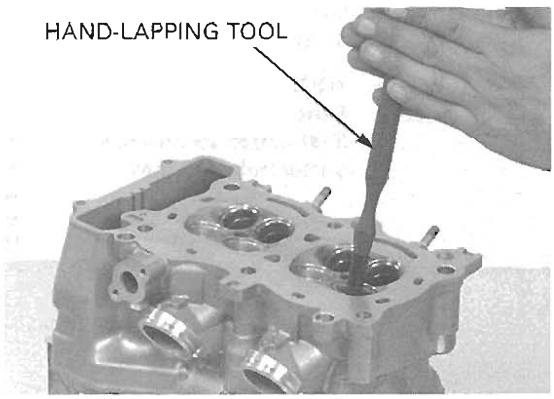


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

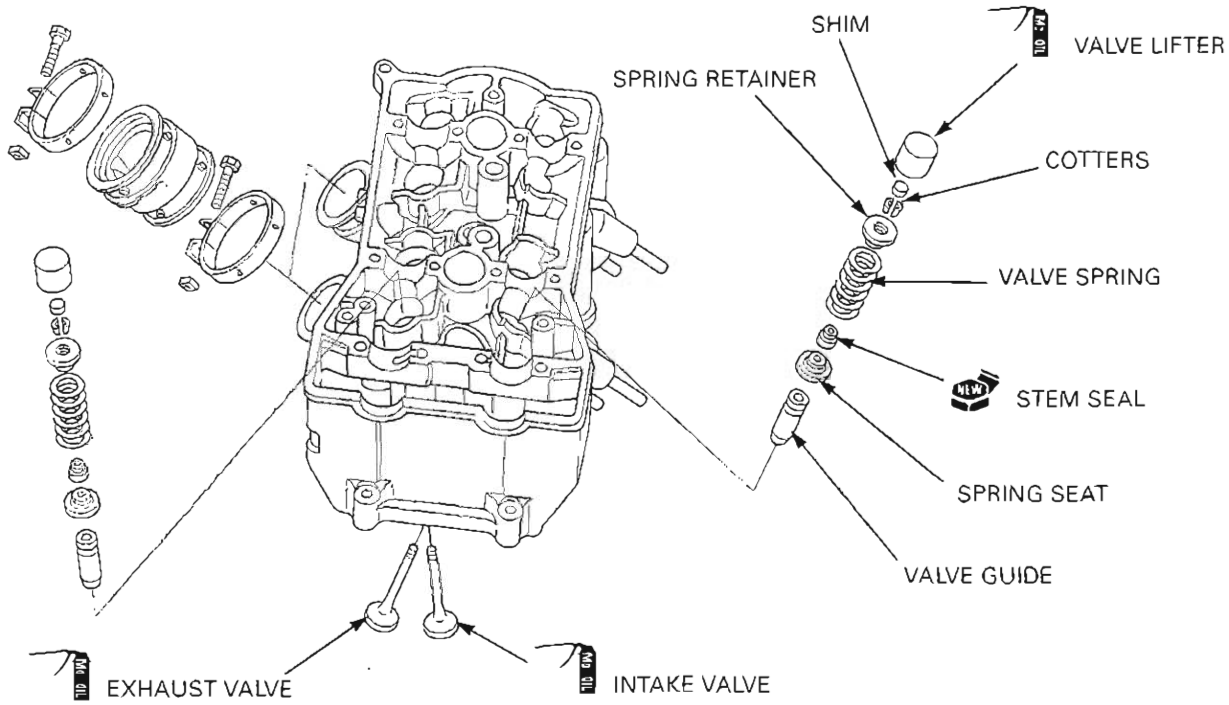
NOTICE

- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of the lapping tool frequently to prevent uneven seat wear.*
- *Do not allow lapping compound to enter the guides.*

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



CYLINDER HEAD ASSEMBLY



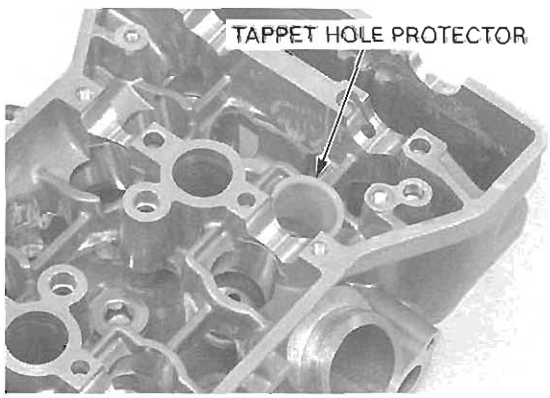
Blow through all oil passages in the cylinder head with compressed air.

Refer to page 8-15 on how to make this tool.

Install the tappet hole protector into the valve lifter bore.

TOOL:

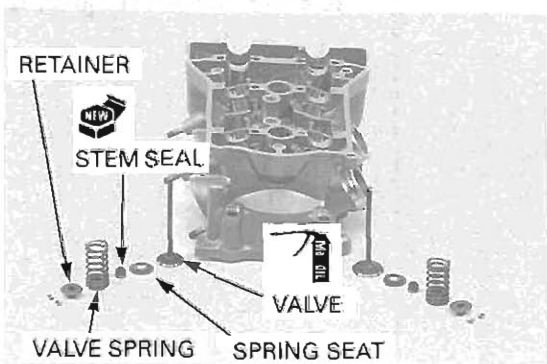
Tappet hole protector **07HMG-MR70002**



Install the valve spring seats and new stem seals.

Lubricate the valve stems with molybdenum oil solution.

Insert the valve into the valve guide while turning it slowly to avoid damage to the stem seal.



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



COMBUSTION CHAMBER SIDE

Grease the cotters to ease installation.

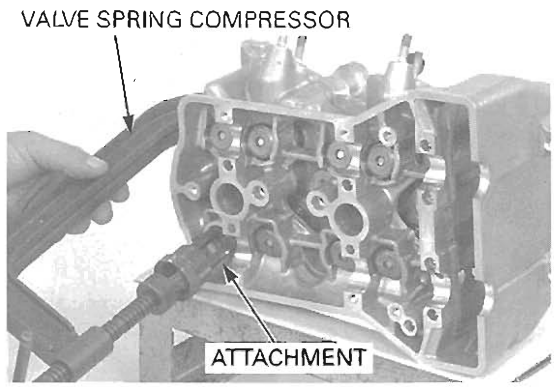
Install the valve cotters using the special tool as shown.

NOTICE

To prevent loss of tension, do not compress the valve spring more than necessary.

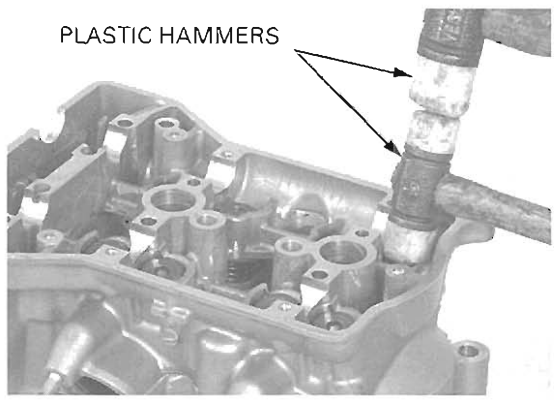
TOOLS:

Valve spring compressor	**07757-0010000**
Valve spring compressor attachment	**07959-KM30101**



Support the cylinder head above the work bench surface to prevent possible valve damage.

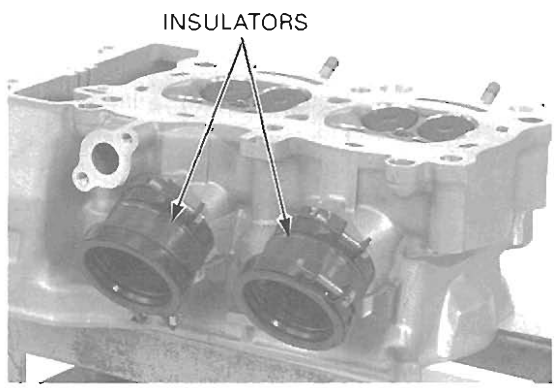
Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.



Install the insulators and tighten the band screws (page 1-14).

Install and tighten the spark plugs.

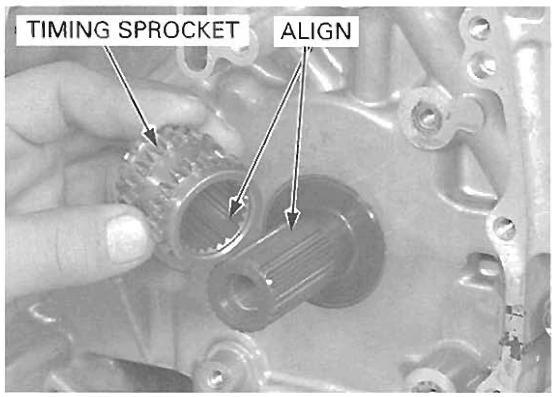
TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



CYLINDER HEAD INSTALLATION

Note the installation direction of the timing sprocket

Install the timing sprocket by aligning the wide teeth between the crankshaft and sprocket.

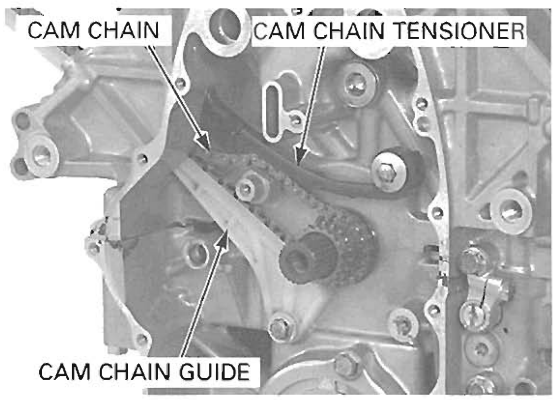


Install the right cylinder cam chain onto the timing sprocket.

Install the right cylinder cam chain guide and bolt/washer.
Install the right cylinder cam chain tensioner and bolt.

Tighten the cam chain guide and cam chain tensioner bolts to the specified torque.

TORQUE:
Cam chain tensioner pivot bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)
Cam chain guide bolt/washer:
12 N·m (1.2 kgf·m, 9 lbf·ft)

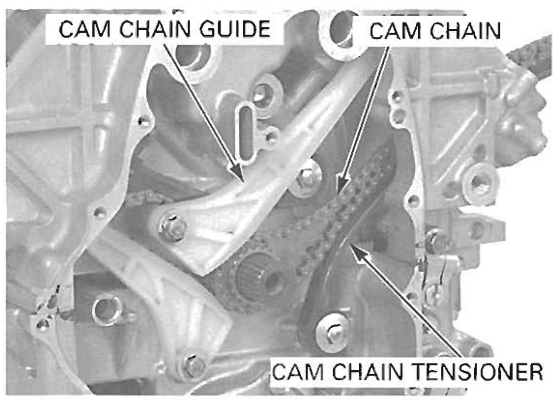


Install the left cylinder cam chain onto the timing sprocket.

Install the left cylinder cam chain guide and bolt/washer.
Install the left cylinder cam chain tensioner and bolt.

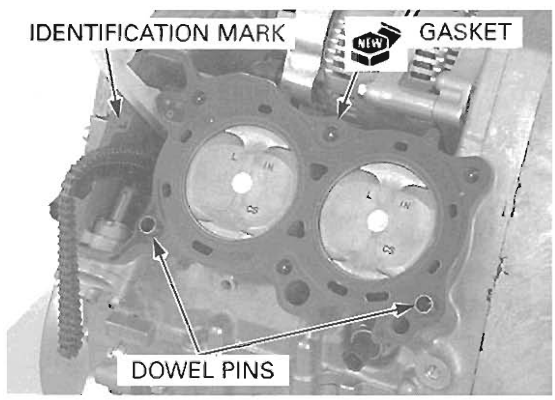
Tighten the cam chain guide and cam chain tensioner bolts to the specified torque.

TORQUE:
Cam chain tensioner pivot bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)
Cam chain guide bolt/washer:
12 N·m (1.2 kgf·m, 9 lbf·ft)



The cylinder head gaskets have identification mark. At installation, install each gasket in their proper position.

Install the new gasket and dowel pins.



Install the cylinder head onto the cylinder block.

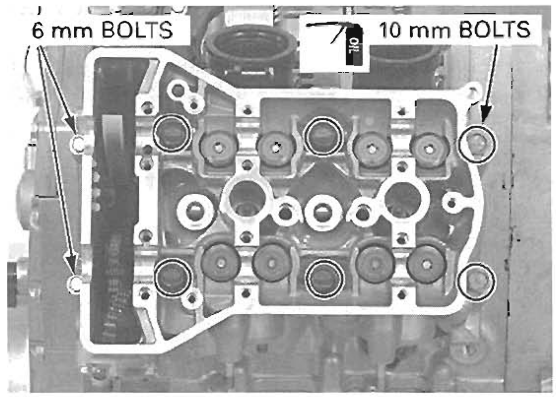
Apply oil to the threads and seating surface of the 10 mm bolts/washers and install them.

Install the two 6 mm flange bolts.

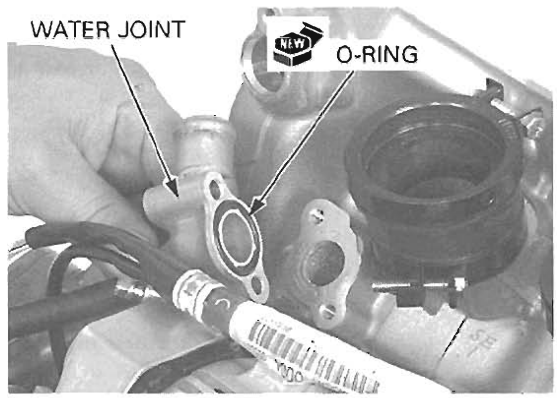
Tighten the 10 mm bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

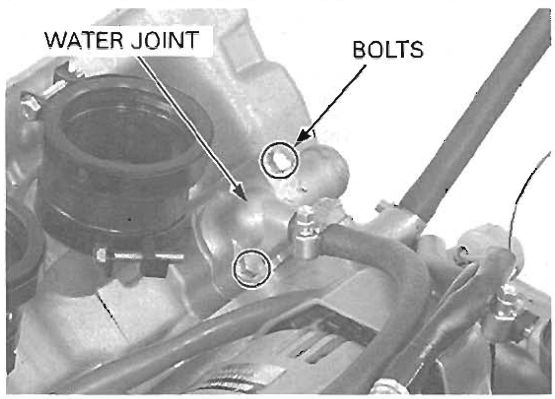
Tighten the 6 mm flange bolts.



Install new O-rings into the grooves of the water joints.



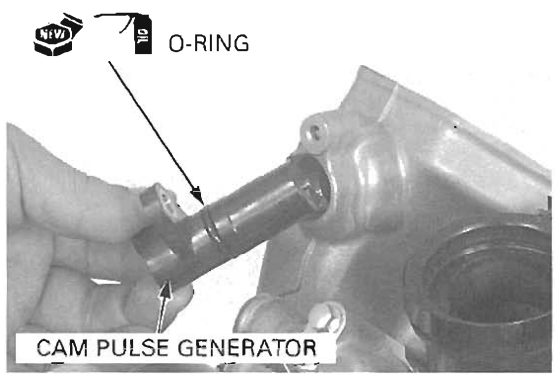
Install the water joint to the cylinder head, then install and tighten the SH bolts.



For the right cylinder head, apply oil to the new O-ring and install it into the groove of the cam pulse generator.

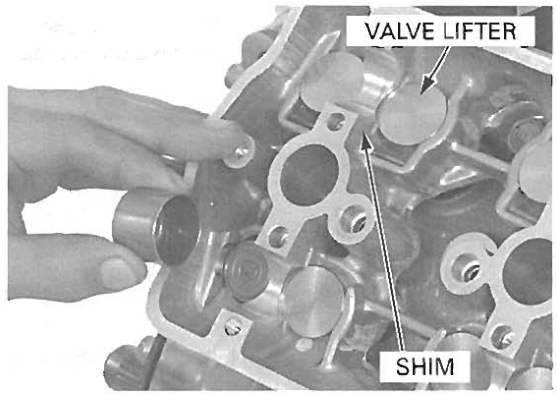
Install the cam pulse generator, tighten the bolt.

Install the engine into the frame (page 7-8).

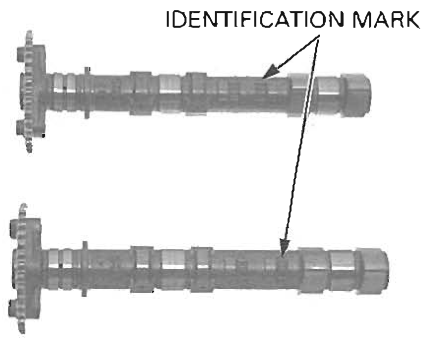


CAMSHAFT INSTALLATION

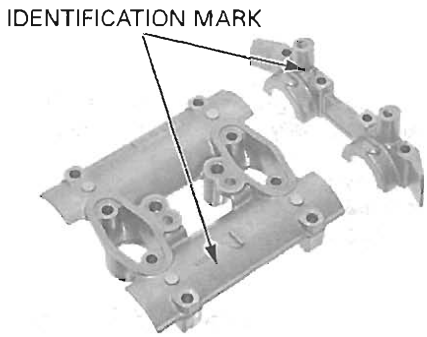
Install the shims and valve lifters into the valve lifter bore.



- If the camshaft holder replacement is required, replace the holder and cylinder head as an assembly.
- Follow this procedure from beginning to end, even if you are only servicing one cylinder head camshafts.
- Check the camshaft marks so that you install each camshaft in its correct location.
- The marks on the camshaft have the following meanings.
  LH: Left cylinder camshaft
  RH: Right cylinder camshaft
  IN: Intake camshaft
  EX: Exhaust camshaft
- Apply molybdenum oil solution to the cam lobes and journals.

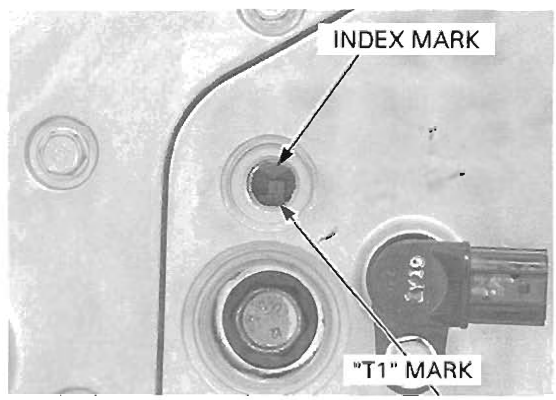


- Check the camshaft holder marks as noted during removal, so that you install each camshaft holder in its correct location.



WHEN BOTH THE LEFT AND RIGHT CYLINDER CAMSHAFTS ARE REMOVED:

Turn the crankshaft counterclockwise and align the "T1" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.
Make sure that the No.1 piston is at TDC (Top Dead Center) on the compression stroke.

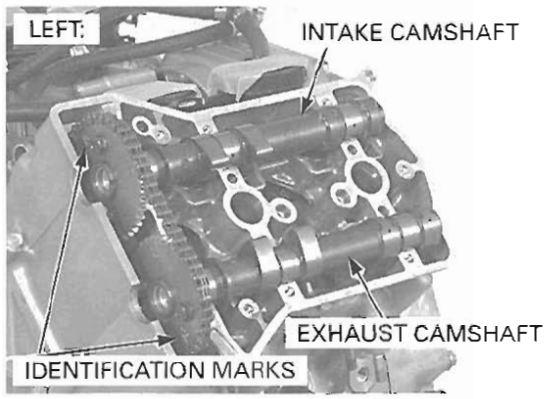


Apply molybdenum oil solution to the camshaft journals of the cylinder head and camshaft holder.

Make sure that the index lines on the cam sprockets are facing outward and are flush with the cylinder head.

Install the left cylinder intake and exhaust camshafts with the index lines on the cam sprocket facing outward.

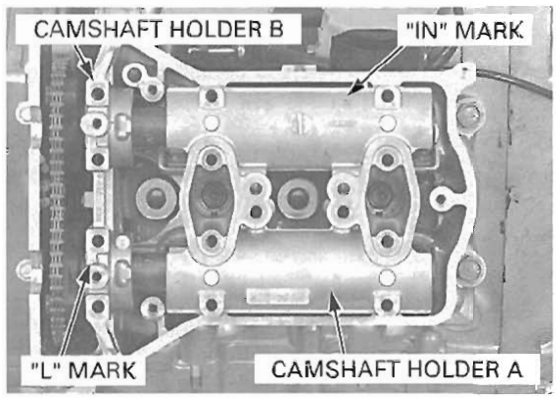
Install the cam chain onto the cam sprockets.



Install the camshaft holder A in the proper location as noted during removal.

Install the camshaft holder A with the "IN" mark facing to the intake side.

Install the "L" marked camshaft holder B.

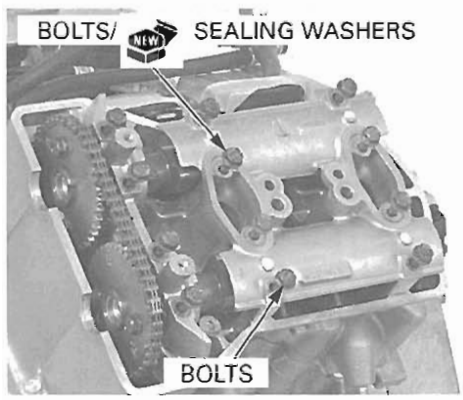


Apply clean engine oil to the threads and seating surfaces of the camshaft holder flange bolts.

Install new sealing washers and flange bolts. Tighten the camshaft holder A flange bolts in a crisscross pattern, in two or more steps until the holder rests lightly on the cylinder head surface.

Tighten the camshaft holder bolts, starting with the bolts at the dowel pins, in two or more steps.

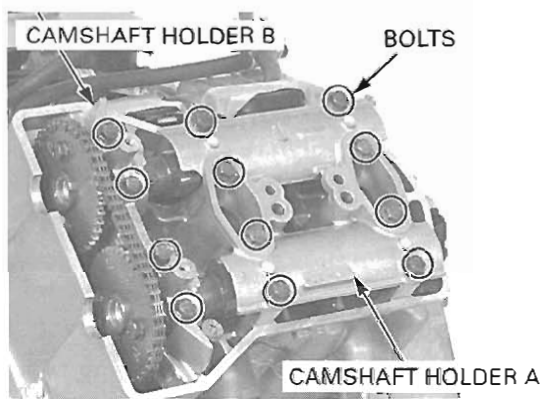
Tighten the camshaft holder B flange bolts gradually in two or more steps.



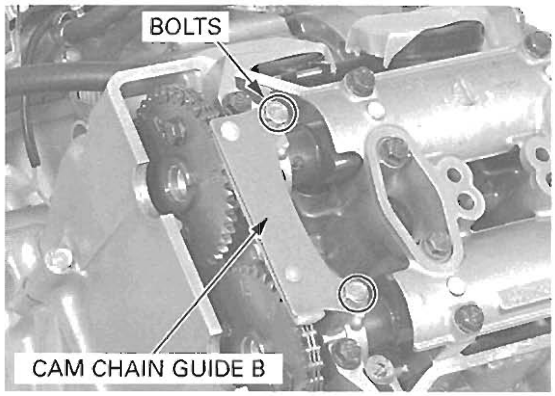
Tighten the camshaft holder bolts in a crisscross pattern in 2 or 3 steps

Tighten the camshaft holder A bolts to the specified torque, then the camshaft holder B bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

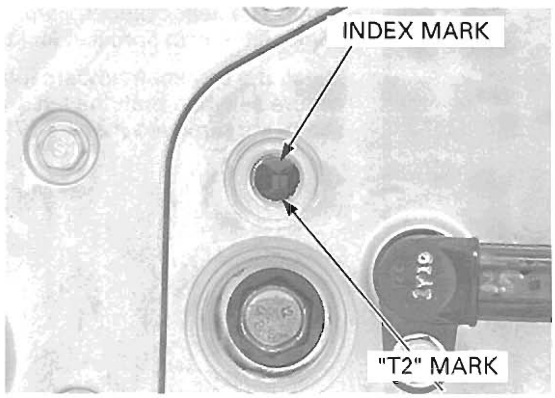


Install the cam chain guide B and tighten the bolts.



Turn the crankshaft counterclockwise 1-1/4 turn (450°) and align the "T2" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.
Make sure that the No.2 piston is at TDC (Top Dead Center) on the compression stroke.

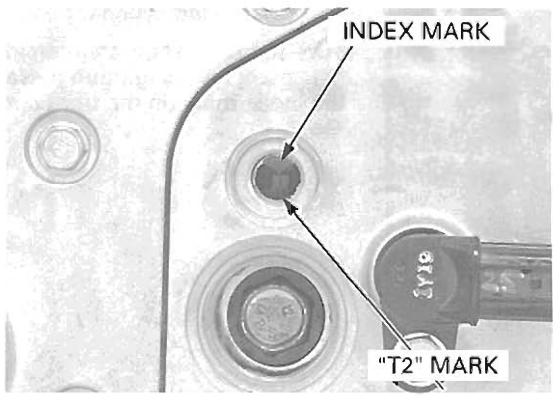
Install the right cylinder camshafts following the same procedure as installation of the left cylinder camshafts (page 8-27).



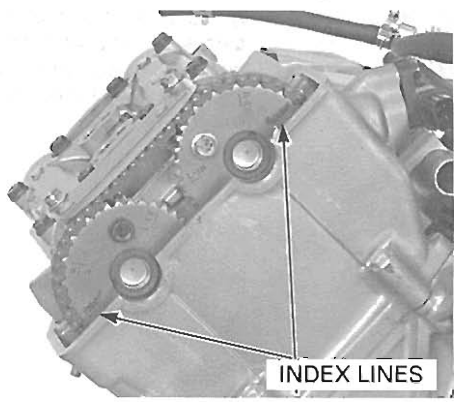
IF THE LEFT CYLINDER CAMSHAFT ONLY IS REMOVED:

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

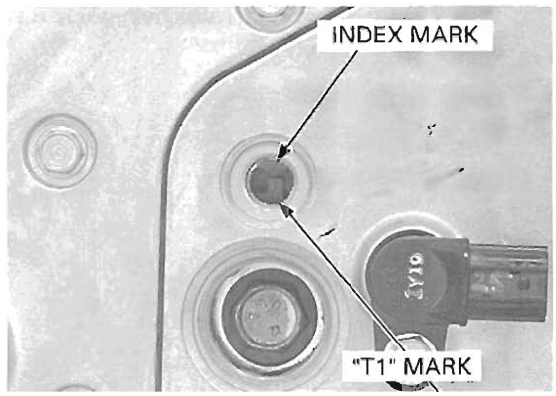
Turn the crankshaft counterclockwise and align the "T2" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.



Make sure that the index lines on the right cylinder cam sprockets are facing outward.
If they are not, turn the crankshaft counterclockwise one full turn (360°) and realign the "T2" mark with the index mark.

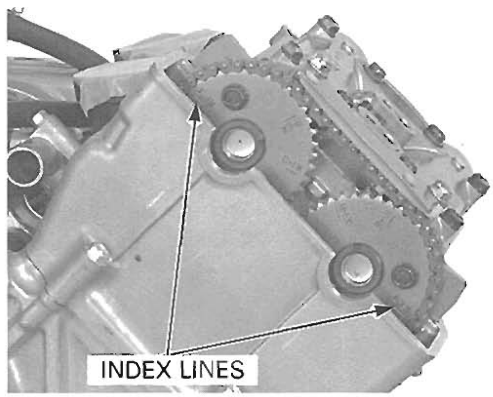


Turn the crankshaft counterclockwise 3/4 turn (270°) and align the "T1" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.



Install the left cylinder camshafts with the index lines on the cam sprocket facing outward.

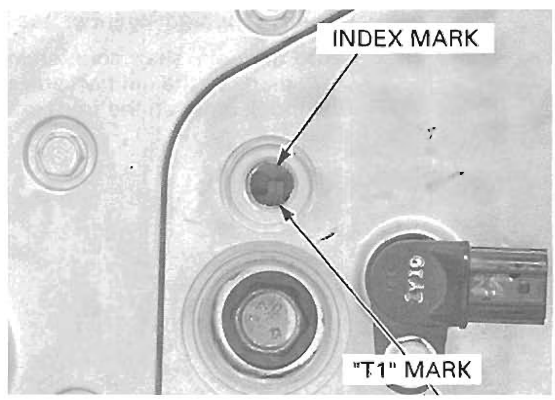
Install the camshaft holders following the same procedure as when both the left and right cylinder camshafts are removed (page 8-27).



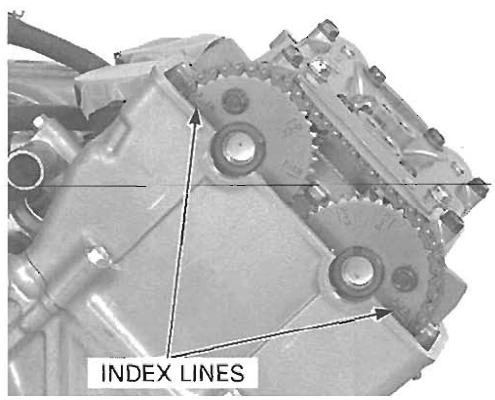
IF THE RIGHT CYLINDER CAMSHAFT ONLY IS REMOVED:

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

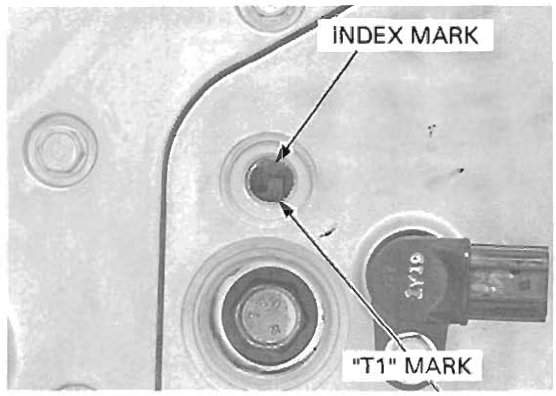
Turn the crankshaft counterclockwise and align the "T1" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.



Make sure that the index lines on the left cylinder cam sprockets are facing outward.
If they are not, turn the crankshaft counterclockwise one full turn (360°) and realign the "T1" mark with the index mark.

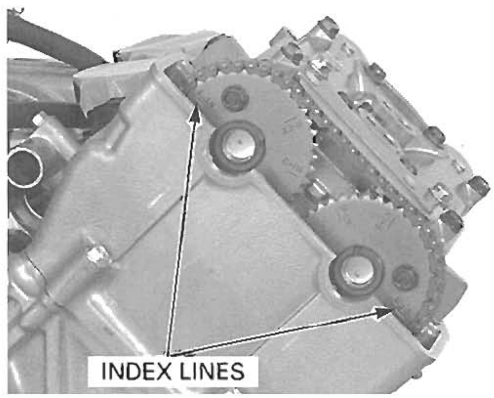


Turn the crankshaft counterclockwise 1-1/4 turn (450°) and align the "T2" mark on the ignition pulse generator rotor with the index mark on the front crankcase cover.



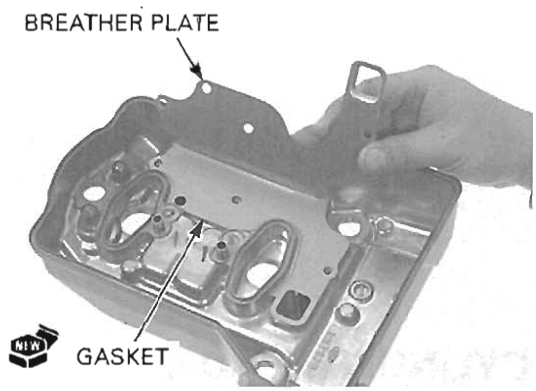
Install the right cylinder camshafts with the index lines on the cam sprocket facing outward.

Install the camshaft holders following the same procedure as when both the left and right cylinder camshafts are removed (page 8-27).



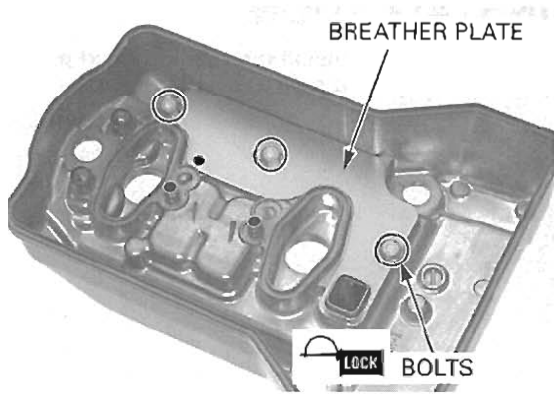
CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather plate to the rear cylinder head cover.

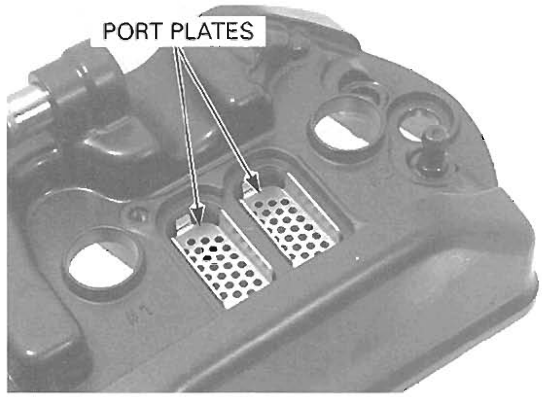


Apply a locking agent to the crankcase breather plate flange bolt threads.
Tighten the bolts to the specified torque.

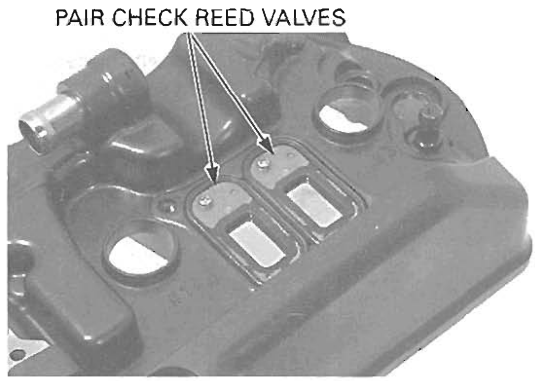
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the port plates into the cylinder head cover.

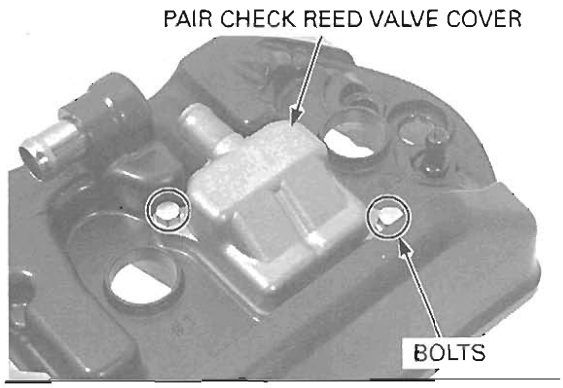


Install the PAIR check reed valves into the cylinder head cover.



Install the PAIR reed valve covers and tighten the SH bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

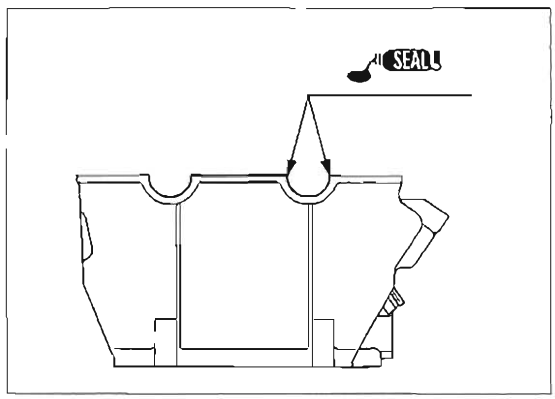


CYLINDER HEAD COVER INSTALLATION

Install the cylinder head packing into the groove of the cylinder head cover.

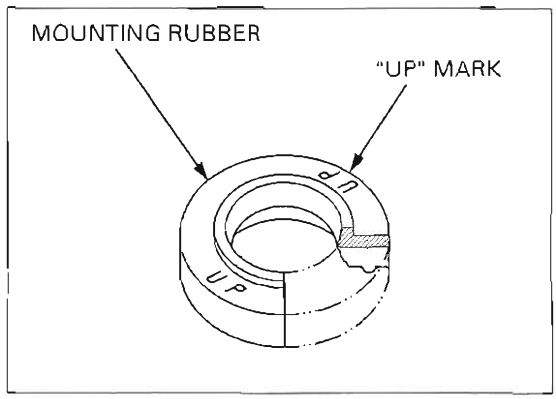


Apply sealant to the cylinder head semi-circular cut-outs as shown.



Install the cylinder head cover onto the cylinder head.

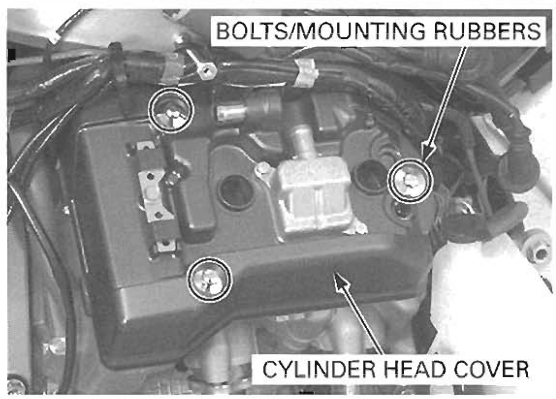
Install the mounting rubbers with their "UP" mark facing up.



Tighten the "△" marked side bolts first.

Install and tighten the cylinder head cover special bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

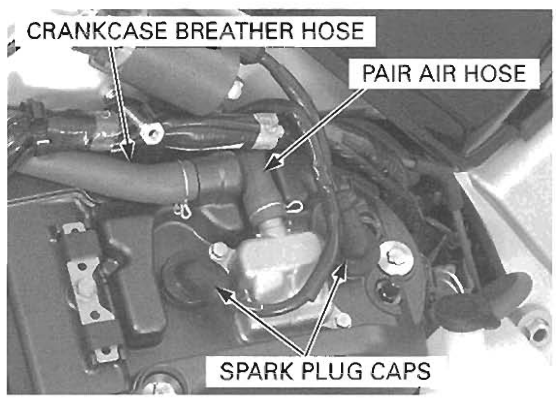


Install the spark plug caps.

Connect the PAIR air hose to the PAIR check reed valve cover.
Connect the crankcase breather hose to the left cylinder head cover.

Install the following:

- Over head cover (page 3-6)
- Middle cowl (page 2-12)



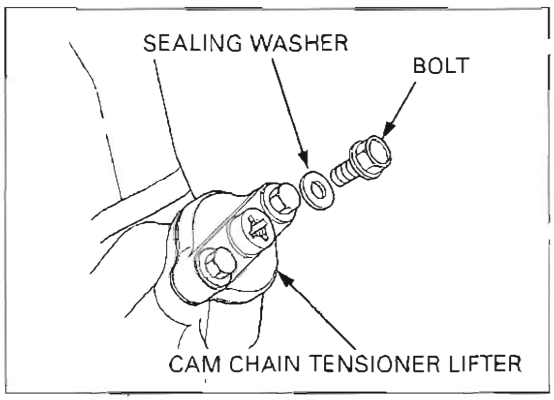
CAM CHAIN TENSIONER LIFTER

REMOVAL

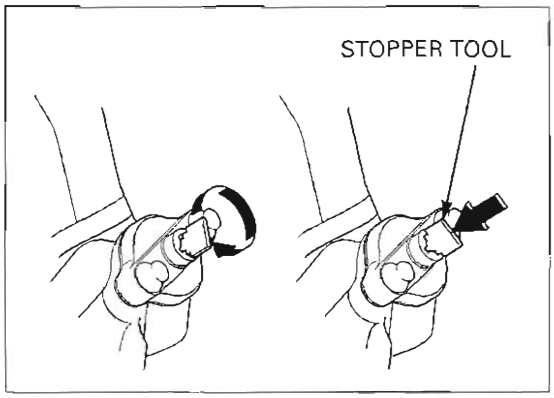
For the right cam chain tensioner lifter removal, remove the throttle body (page 5-64).

For the left cam chain tensioner lifter removal, remove the middle cowl (page 2-12).

Remove the cam chain tensioner sealing bolt and sealing washer.

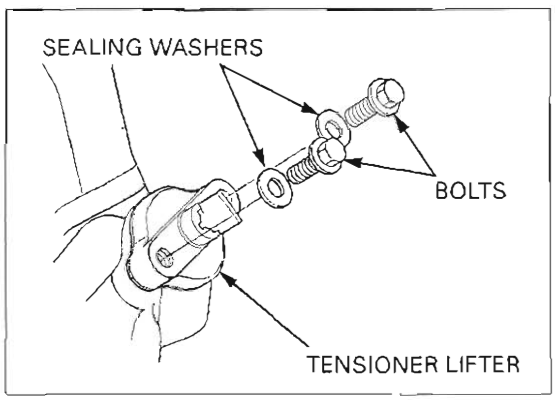


Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool (page 8-9) to prevent damaging the cam chain.



Be careful not to let dust and dirt enter the cylinder head.

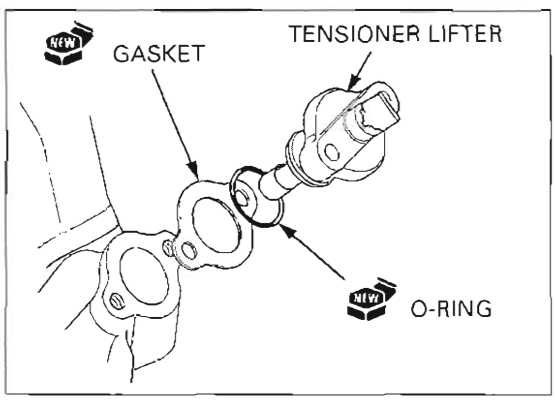
Remove the bolts, sealing washers and cam chain tensioner lifter.
Remove the gasket.



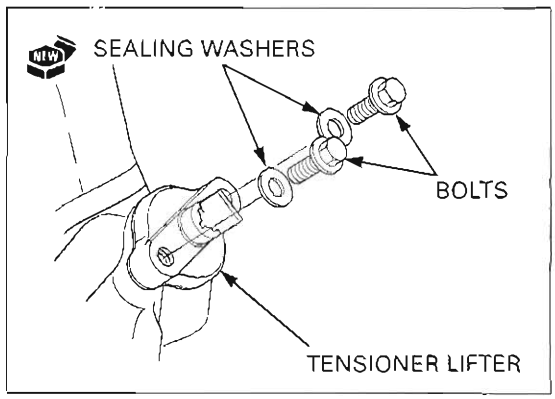
INSTALLATION

Install a new O-ring onto the right cylinder cam chain tensioner lifter.

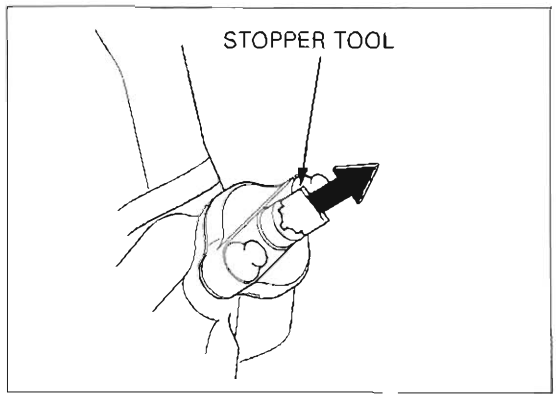
Install the new gasket onto the cam chain tensioner lifter.



Install the cam chain tensioner lifter into the cylinder head.
Install sealing washers and mounting bolts, tighten the bolts.

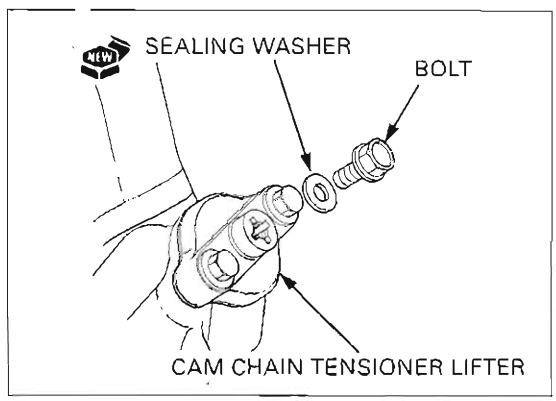


Remove the stopper tool.



Install a new sealing washer and tighten the sealing bolt securely.

Install the removed parts in the reverse order of removal.



9. CLUTCH/PRIMARY SHAFT

COMPONENT LOCATION 9-2

SERVICE INFORMATION 9-4

TROUBLESHOOTING 9-5

CLUTCH FLUID REPLACEMENT/AIR BLEEDING 9-6

CLUTCH MASTER CYLINDER 9-7

CLUTCH SLAVE CYLINDER 9-12

FRONT CRANKCASE COVER REMOVAL 9-14

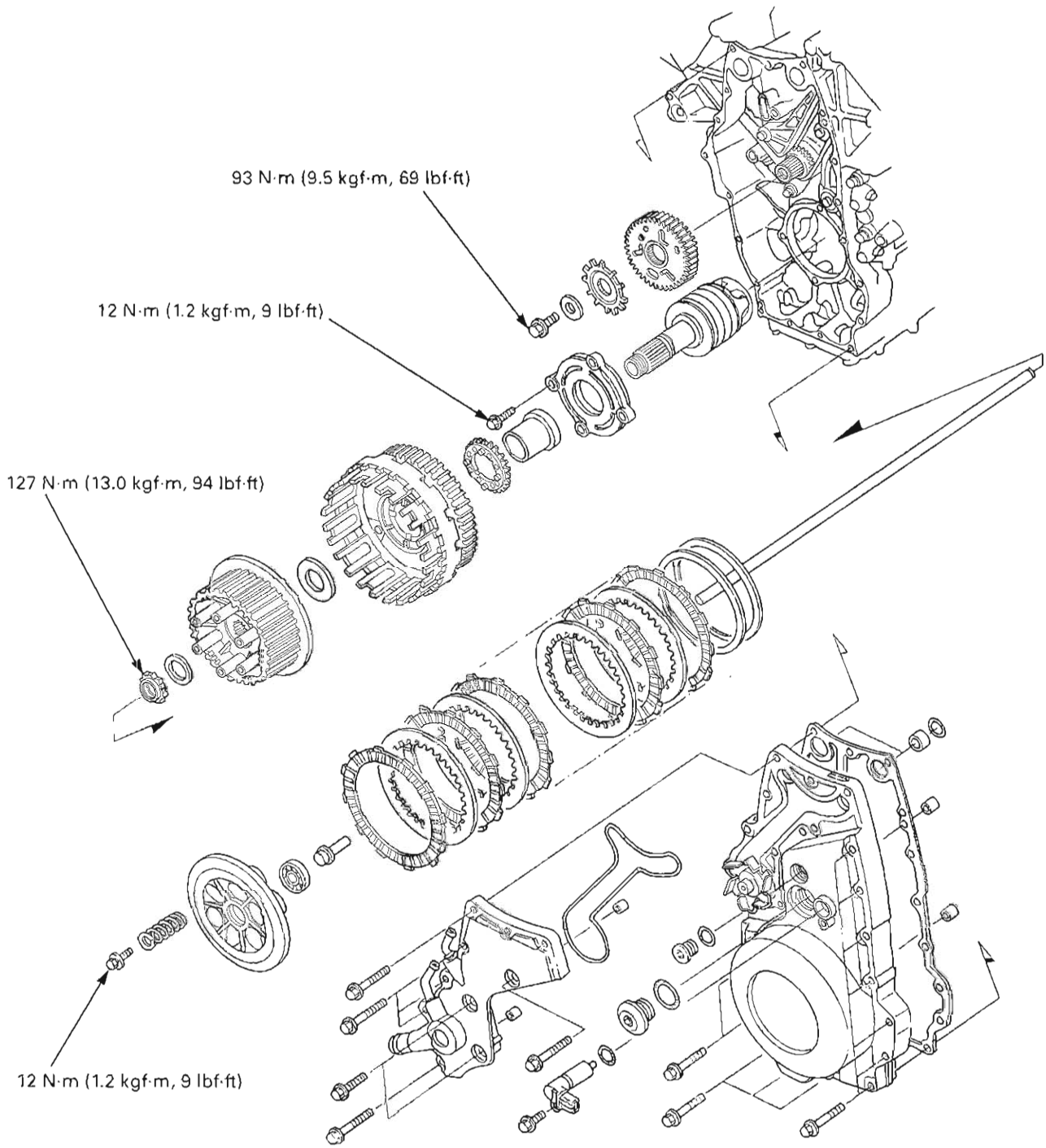
CLUTCH 9-15

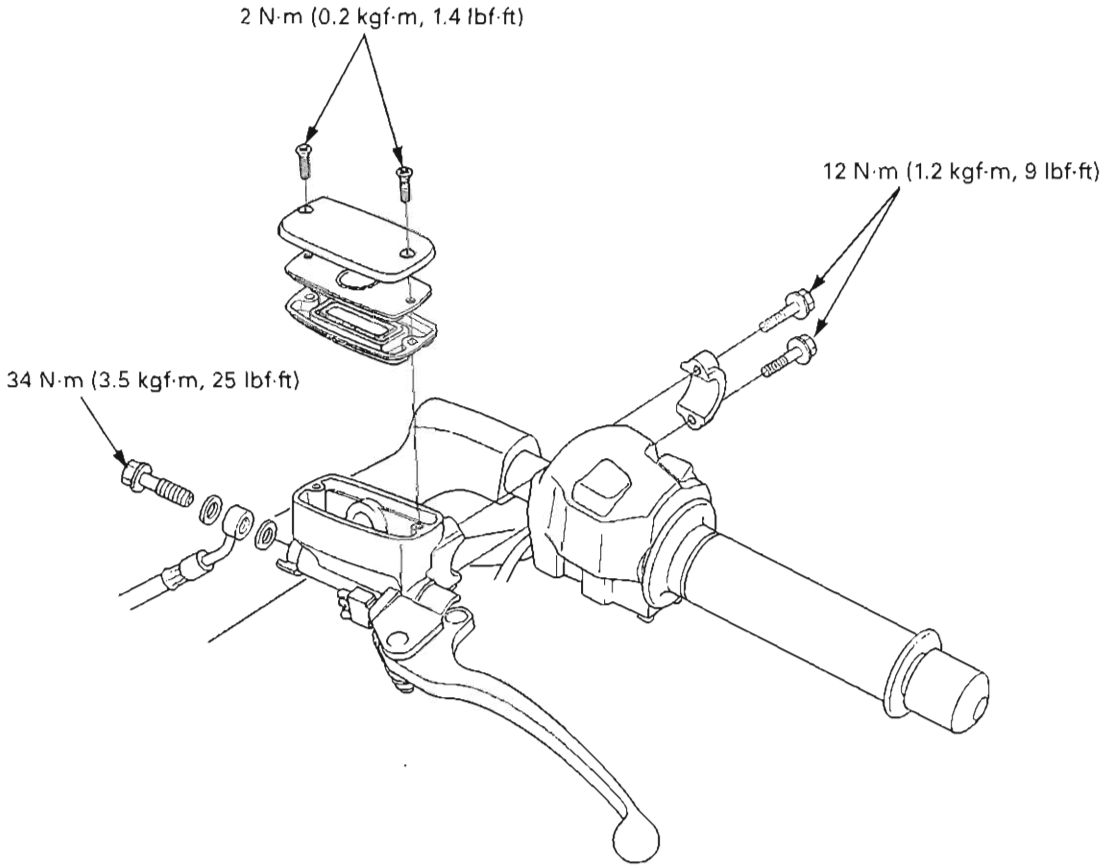
PRIMARY DRIVE GEAR 9-23

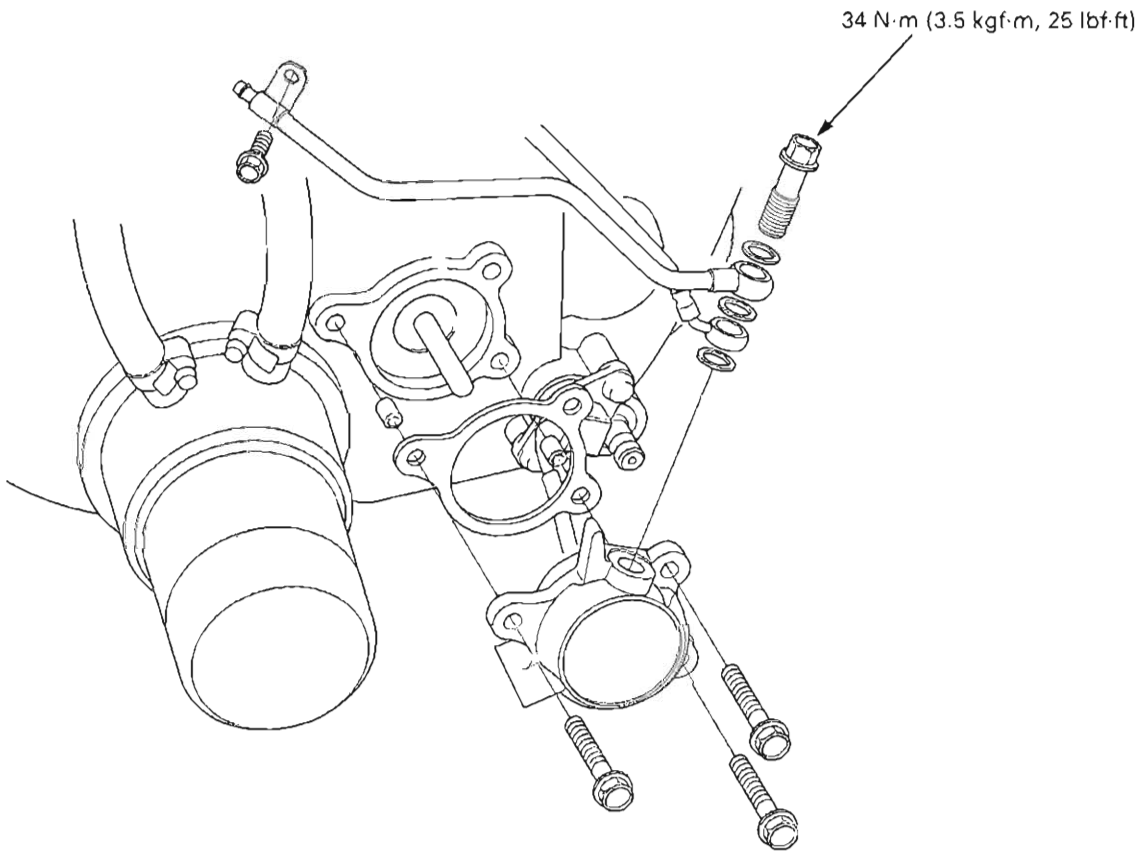
PRIMARY DAMPER SHAFT 9-25

FRONT CRANKCASE COVER INSTALLATION 9-30

COMPONENT LOCATION




2 N·m (0.2 kgf·m, 1.4 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)


34 N·m (3.5 kgf·m, 25 lbf·ft)

SERVICE INFORMATION

GENERAL

- This section covers service of the clutch and primary drive gear. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		Honda DOT 4 brake fluid	–
Clutch master cylinder	Cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
Clutch	Spring free length	55.1 (2.17)	54.0 (2.13)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide I.D.		27.989 – 28.006 (1.1019 – 1.1026)	28.016 (1.1030)
Primary shaft O.D. at clutch outer guide		27.974 – 27.987 (1.1013 – 1.1018)	27.964 (1.1009)
Primary shaft spring free length		58.4 (2.30)	56 (2.2)

TORQUE VALUES

Primary drive gear flange bolt	93 N·m (9.5 kgf·m, 69 lbf·ft)	Apply oil to the threads and flange surface
Primary bearing set plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Clutch center lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	Apply oil to the thread and flange surface Stake the nut
Clutch spring bolt/washer	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch slave cylinder bleeder	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Clutch master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Clutch hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Clutch lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Clutch switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	

TOOLS

Gear holder, 2.5	07724–0010100	or 07724-001A100 (U.S.A. only)
Clutch center holder	07724–0050002	Equivalent commercially available in U.S.A.
Driver	07749–0010000	
Attachment, 32 X 35 mm	07746–0010200	
Attachment, 62 X 68 mm	07746–0010500	
Pilot, 17 mm	07749–0040400	
Pilot, 30 mm	07749–0040700	
Bushing driver	07NAD–SS00101	
Snap ring pliers	07914–SA50001	

TROUBLESHOOTING

Clutch lever soft or spongy
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

Clutch lever hard to pull in
- Sticking master cylinder piston
- Sticking slave cylinder piston
- Clogged hydraulic system
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

Clutch slips when accelerating
- Hydraulic system sticking
- Worn clutch disc
- Weak clutch spring
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking or clogged
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

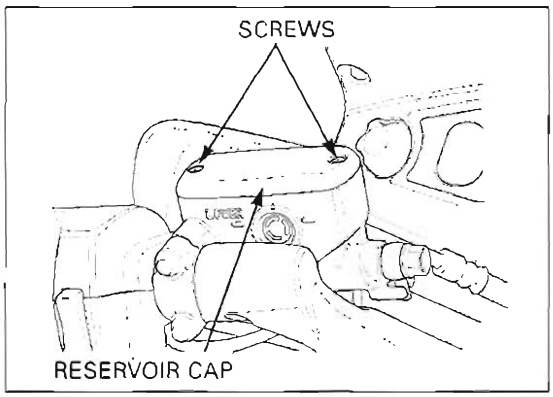
Hard to shift
- Improper clutch operation
- Improper oil viscosity

CLUTCH FLUID REPLACEMENT/AIR BLEEDING

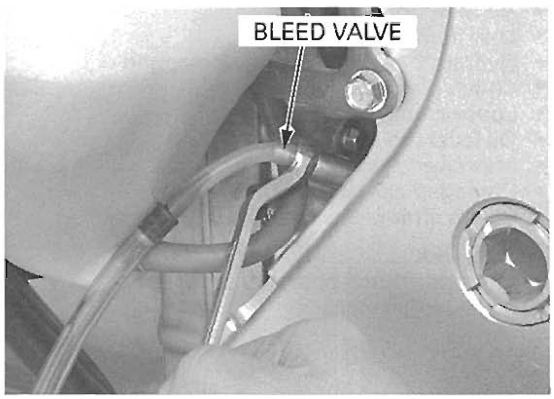
CLUTCH FLUID DRAINING

Support the motorcycle on its center stand.
Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the bleed valve of the clutch slave cylinder.
Loosen the bleed valve and pump the clutch lever until fluid stops flowing out off the bleed valve.

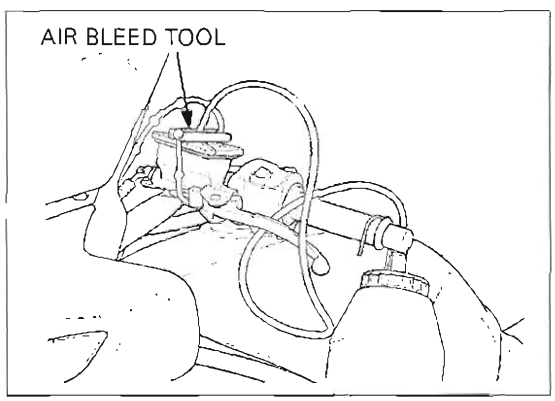


CLUTCH FLUID FILLING/BLEEDING

Close the bleed valve.
Fill the reservoir with Honda DOT 4 Brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve.
Add brake fluid when the fluid level in the reservoir is low.

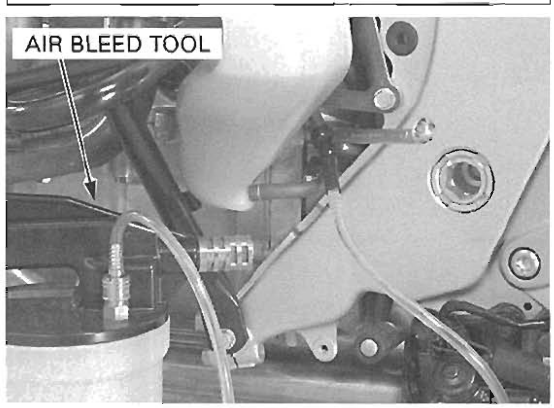
- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instruction.



If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Repeat the above procedures until new fluid flows out of the bleed valve and air bubbles do not appear in the plastic hose.

Close the bleed valve.

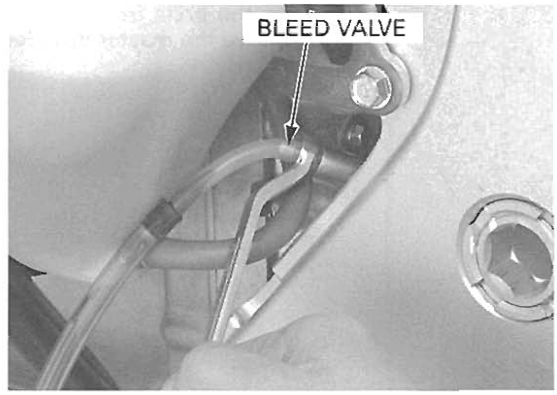


If a brake bleeder is not available, use the following procedure.
Pump the clutch lever until lever resistance is felt.

Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the clutch lever, open the bleed valve 1/4 of a turn and then close it. Do not release the clutch lever until the bleed valve has been closed.
2. Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

   Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.



Tighten the bleed valve to the specified torque.

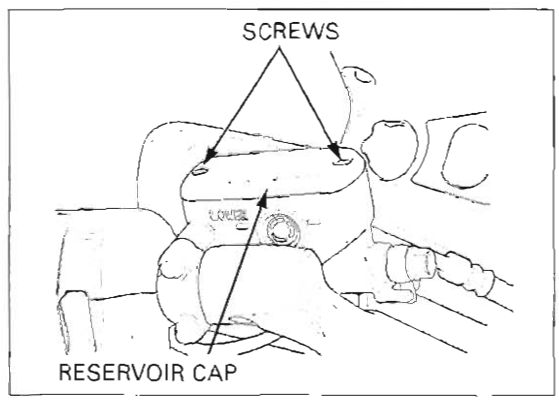
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

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

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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Check the clutch operation (page 3-22).

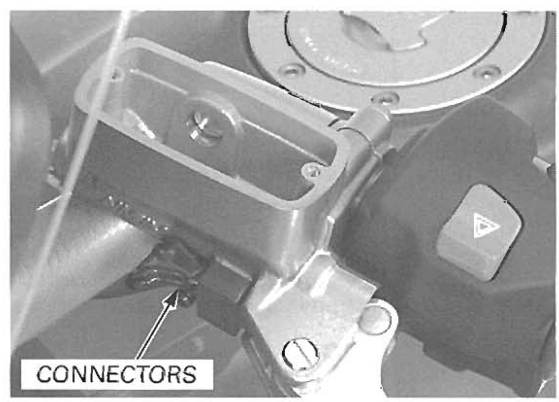


CLUTCH MASTER CYLINDER

REMOVAL

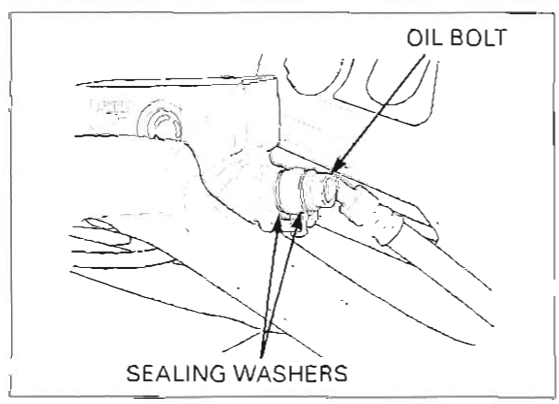
Drain the clutch hydraulic system (page 9-6).

Disconnect the clutch switch wire connectors.

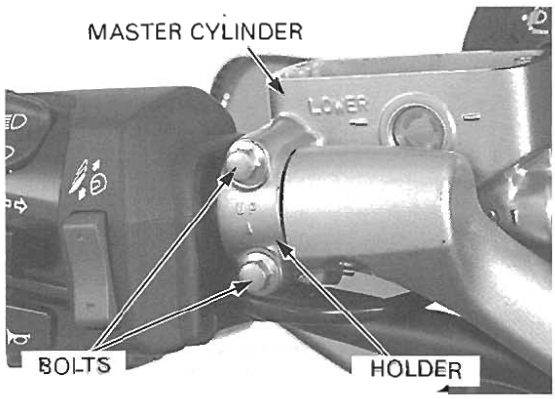


Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the clutch hose oil bolt, sealing washers and clutch hose eyelet.



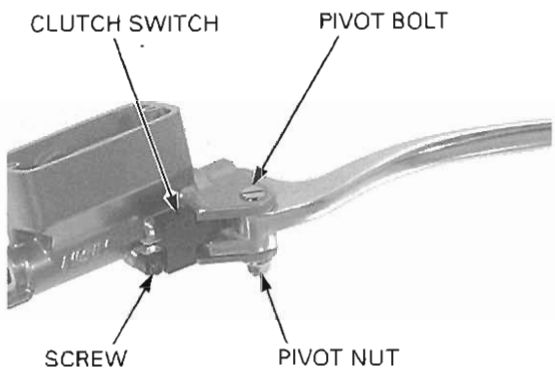
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



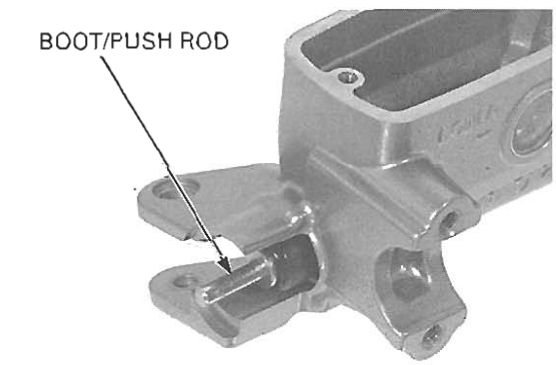
DISASSEMBLY

Remove the pivot bolt/nut and clutch lever assembly.

Remove the screw and clutch switch.



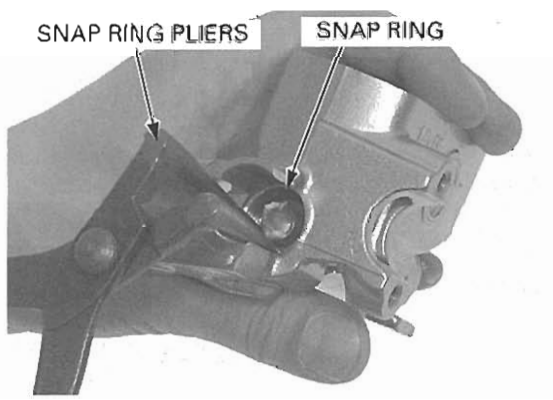
Remove the boot and push rod



Remove the snap ring from the master cylinder body using the special tool as shown.

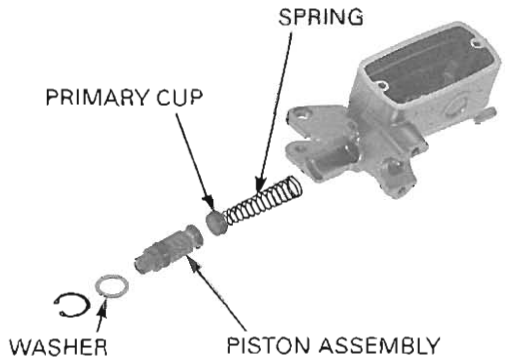
TOOL:

Snap ring pliers	**07914–SA50001**



Remove the washer, master piston assembly, primary cup and spring.

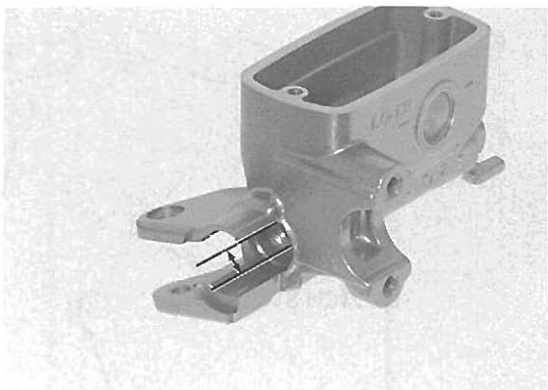
Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

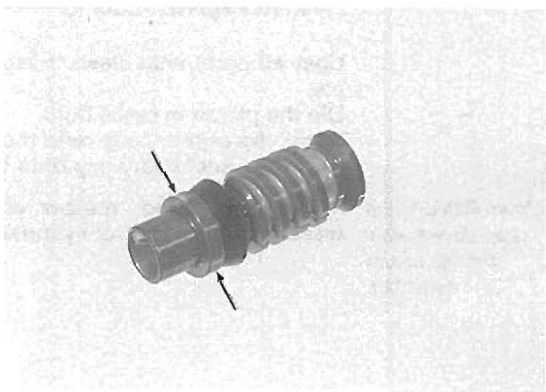
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 14.055 mm (0.5533 in)

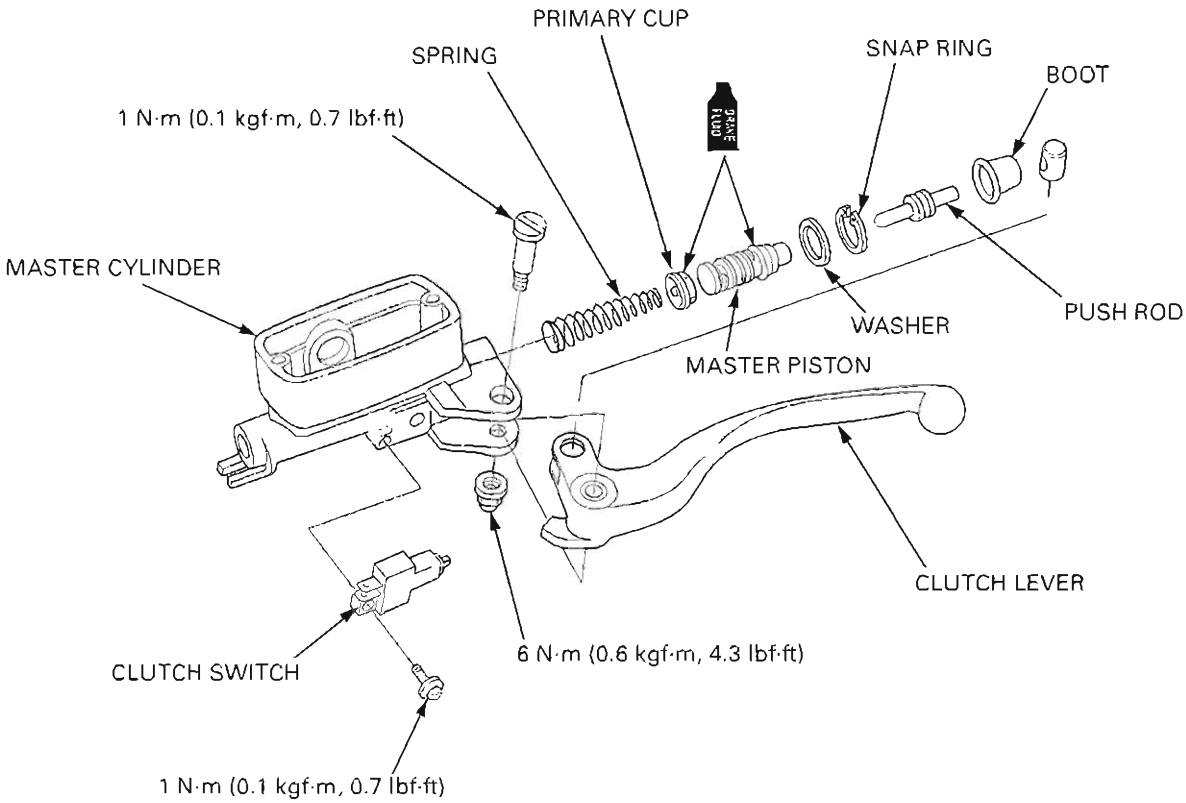


Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



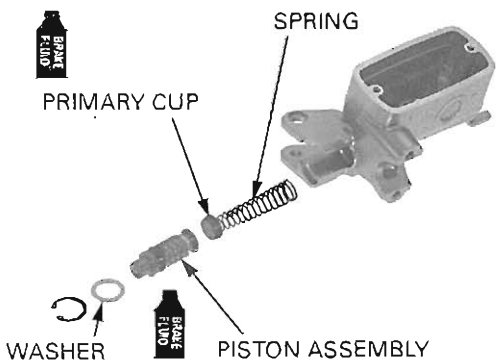
ASSEMBLY



Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the primary cup onto the tip of the spring.
Install the secondary cup onto the master piston.

When installing the cups, do not allow the lips to turn inside out.

Install the spring, master piston assembly and washer into the master cylinder.

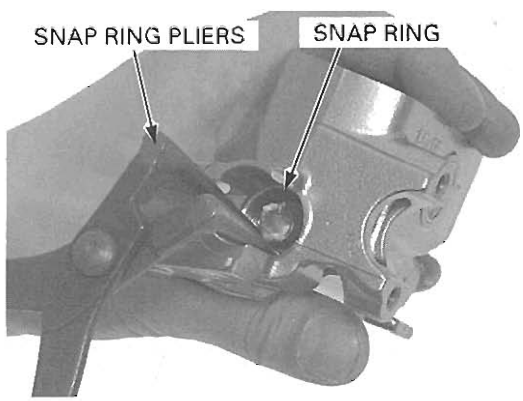


Be certain the snap ring is firmly seated in the groove.

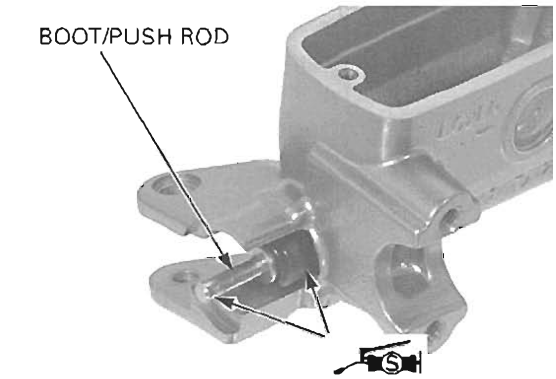
Install the snap ring using the special tool.

TOOL:

Snap ring pliers	**07914-SA50001**

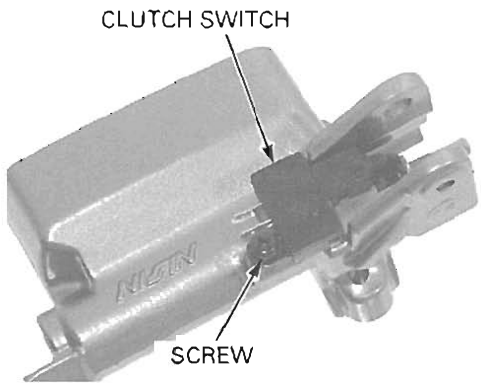


Apply silicone grease to the boot inside and tip of the push rod.
Install the push rod and boot.



Install the clutch switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



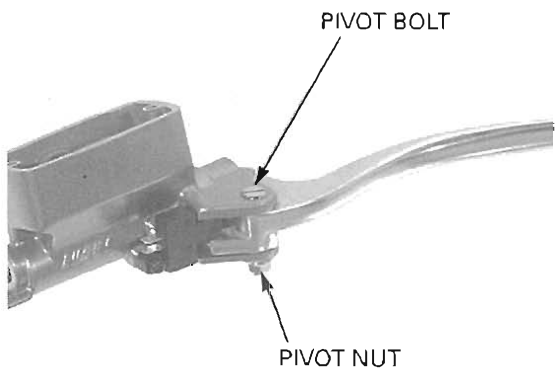
Install the clutch lever assembly by aligning the hole of the joint piece with the tip of the push rod.

Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

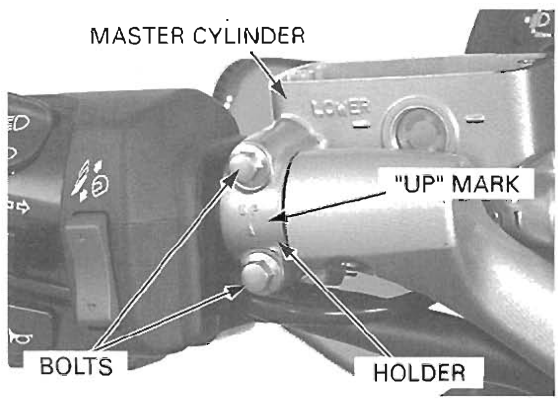
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



INSTALLATION

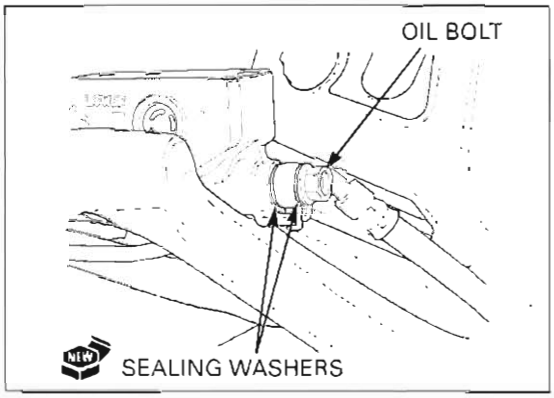
Place the master cylinder assembly onto the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.



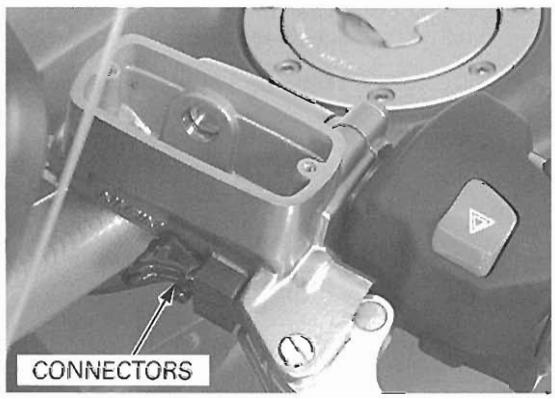
Install the clutch hose eyelet with the oil bolt and new sealing washers.
While pushing the clutch hose against the stopper, tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Connect the clutch switch connectors.

Fill the reservoir to the upper level and bleed the hydraulic system (page 9-6).

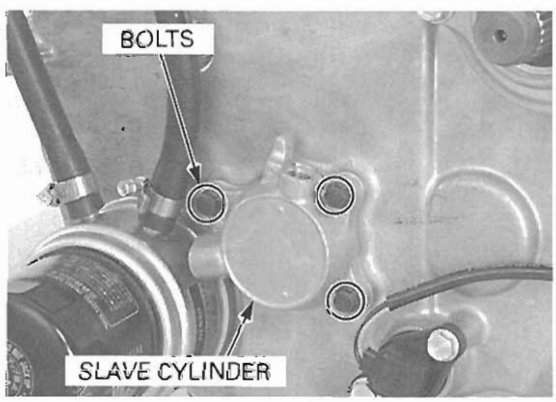


CLUTCH SLAVE CYLINDER

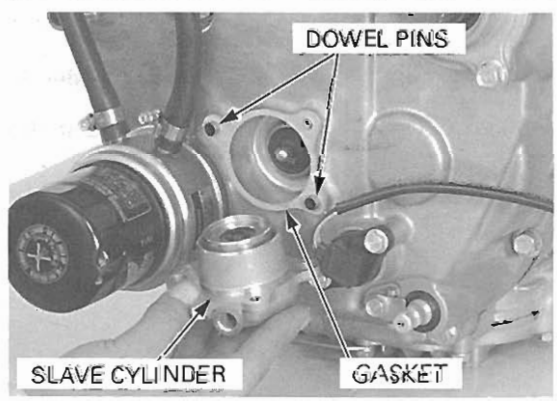
REMOVAL

Drain the clutch hydraulic system (page 9-6).
Remove the engine from the frame (page 7-4).

Remove the clutch slave cylinder mounting bolts.



Remove the clutch slave cylinder, gasket and dowel pins.

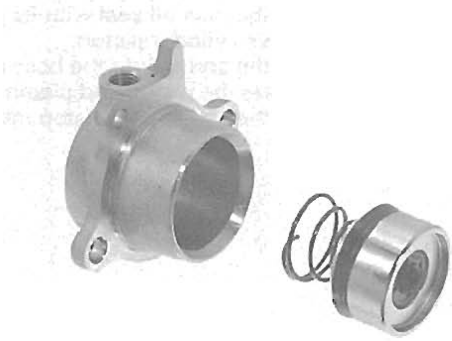


DISASSEMBLY

Remove the slave cylinder piston and spring.
If the piston is hard to remove, do the following:
Place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

Do not use high pressure air or bring the nozzle too close to the inlet.

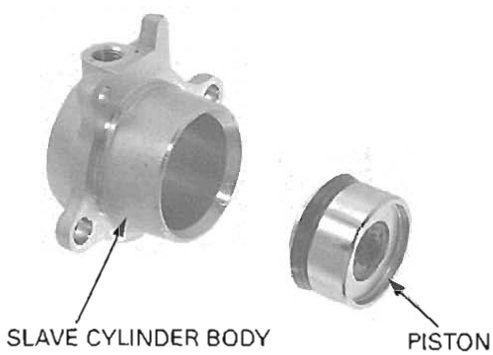
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



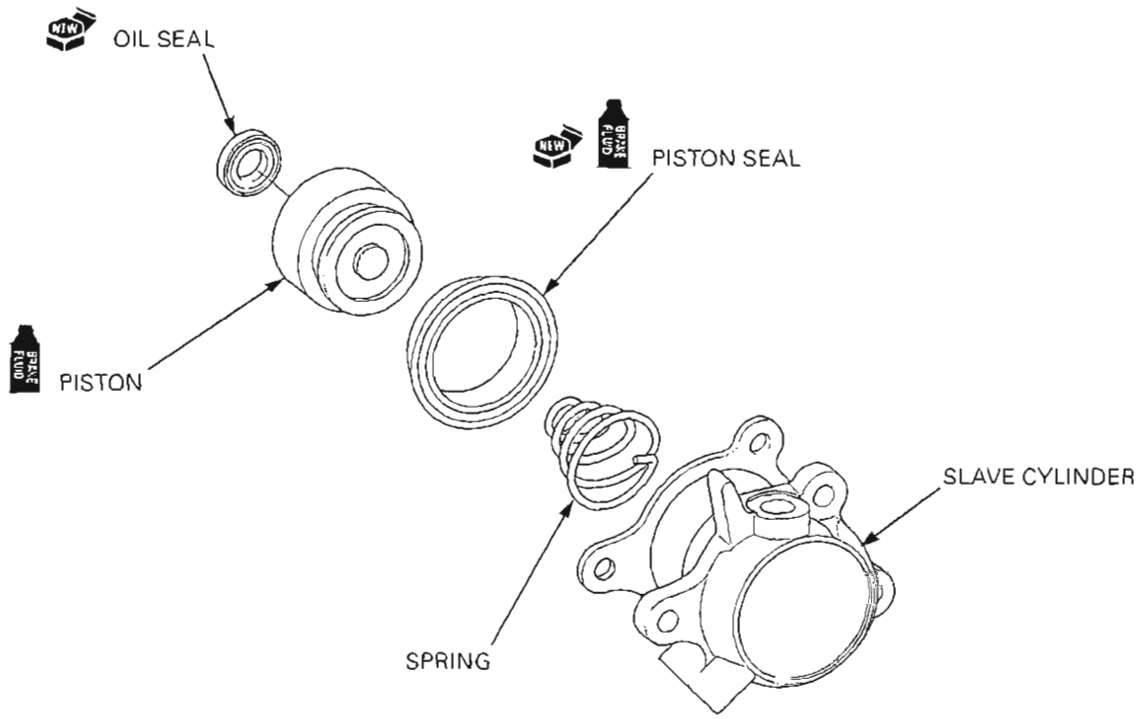
INSPECTION

Check the piston spring for weakness or damage.
Inspect the oil and piston seals for damage or deterioration.
Replace the oil seal and piston seal if necessary.
Clean the seal grooves with clean brake fluid.

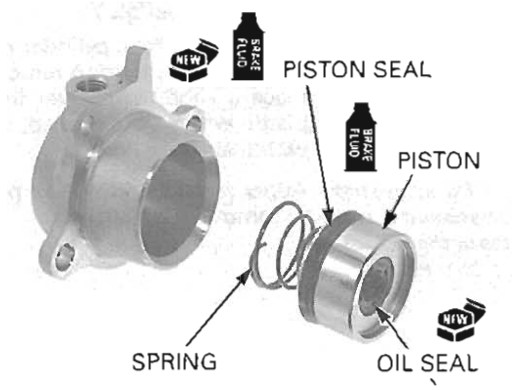
Check the slave cylinder for scoring or other damage.
Check the slave cylinder piston for scratches, scoring or other damage.



ASSEMBLY

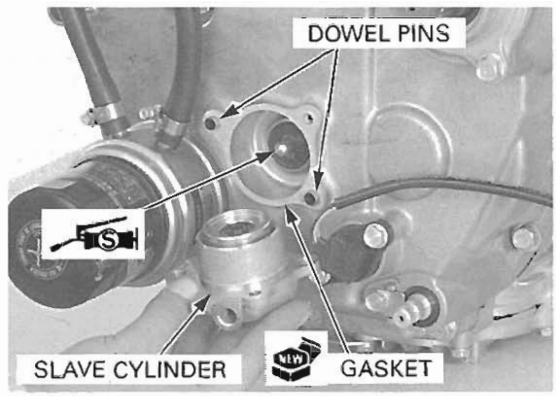


Install the new piston seal with its groove side facing to the slave cylinder.
Install the new oil seal with its groove side facing to the slave cylinder piston.
Install the spring into the boss of the piston.
Lubricate the piston and piston seal with brake fluid.
Install the spring and piston into the slave cylinder



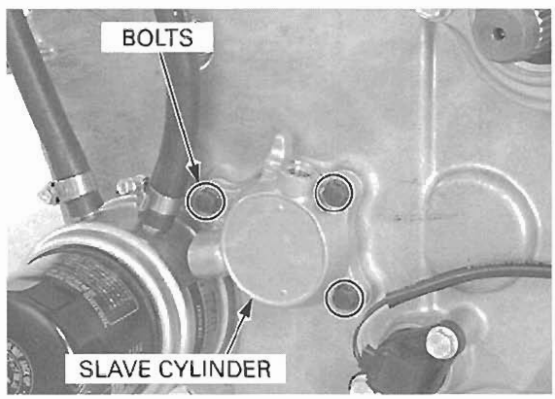
INSTALLATION

Install the dowel pins and new gasket.
Apply silicone grease to the top of the push rod.
Install the slave cylinder onto the rear crankcase cover.



Install and tighten the SH bolts.

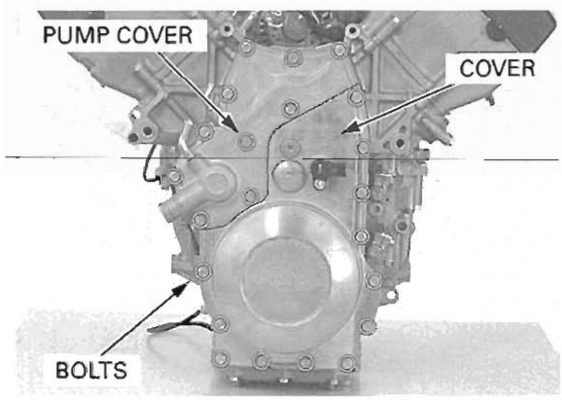
Install the engine into the frame (page 7-8).
Fill the reservoir to the upper level and bleed the hydraulic system (page 9-6).



FRONT CRANKCASE COVER REMOVAL

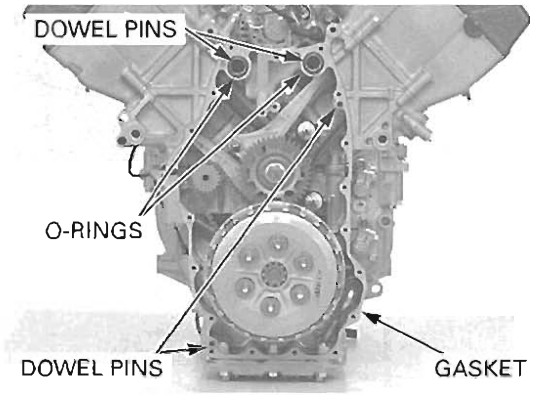
Drain the engine oil (page 3-12).
Remove the engine from the frame (page 7-4).

Remove the front crankcase cover mounting bolts, water pump cover and front crankcase cover.



Remove the water joint dowel pins and O-rings. Remove the gasket and dowel pins.

See page 20-7 ignition pulse generator removal/ installation.

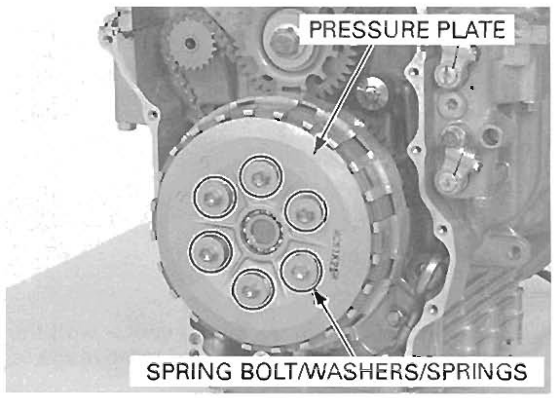


CLUTCH

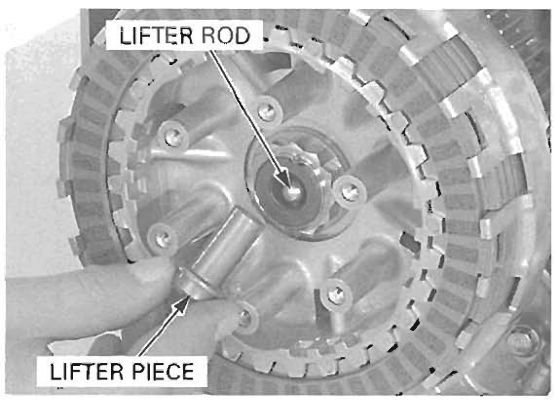
REMOVAL

Remove the front crankcase cover (page 9-14).

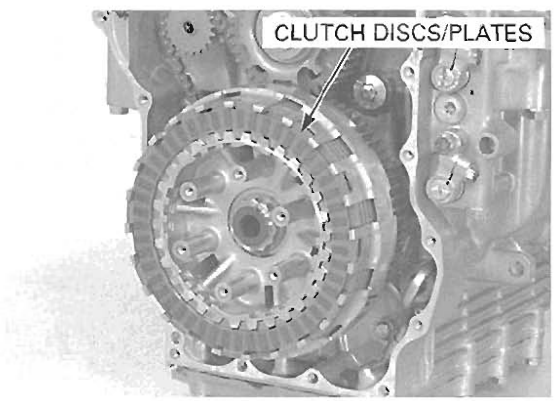
Remove the clutch spring bolt/washers, springs and pressure plate.



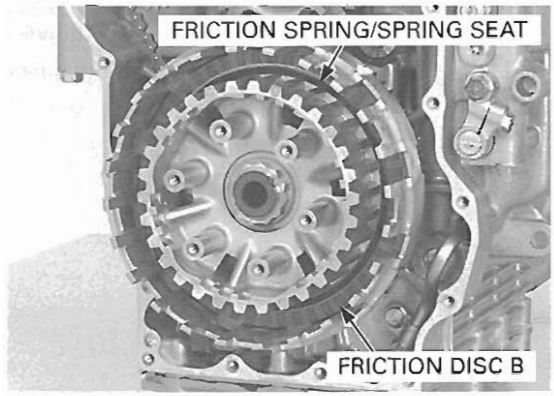
Remove the clutch lifter piece and lifter rod.



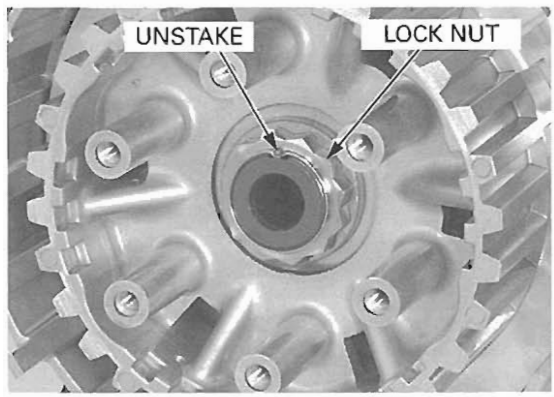
Remove the seven clutch friction discs and seven clutch plates.



Remove the clutch friction disc B, friction spring and spring seat.



Unstake the clutch center lock nut.

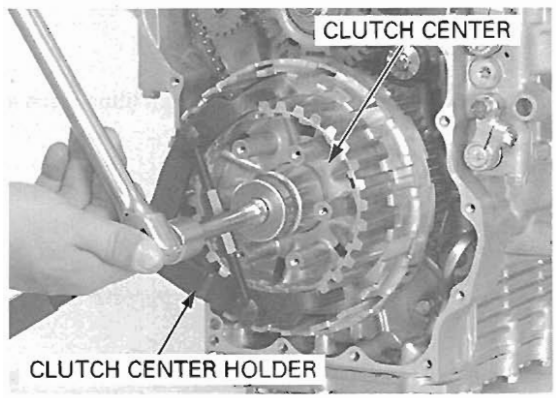


Hold the clutch center with the clutch center holder, then loosen and remove the lock nut.

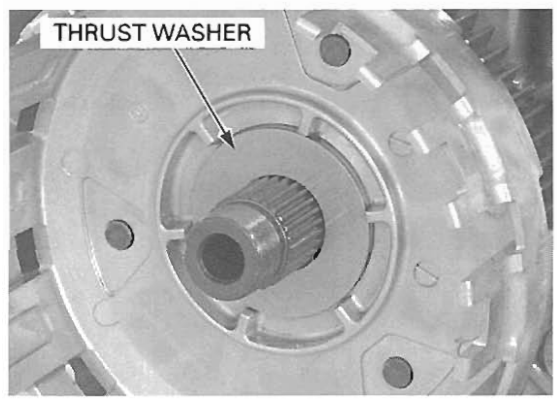
TOOL:

Clutch center holder	07724–0050002 (Equivalent commercially available in U.S.A.)

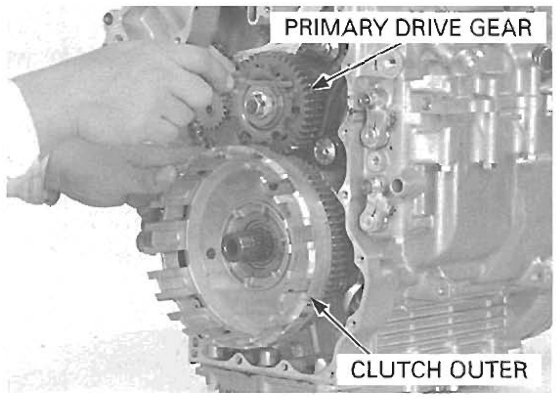
Discard the lock nut.
Remove the lock washer and clutch center.



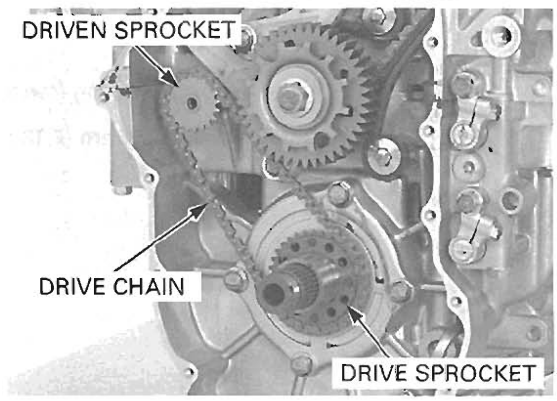
Remove the thrust washer from the clutch outer.



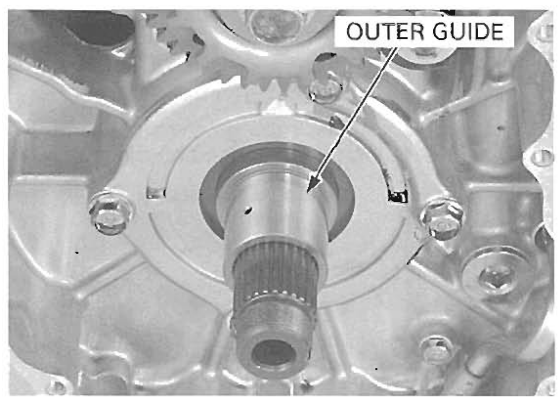
Align the primary drive gear and sub-gear teeth with a screwdriver, then remove the clutch outer.



Remove the water pump drive sprocket, driven sprocket and drive chain as an assembly.



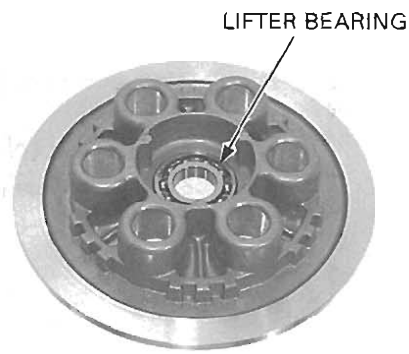
Remove the clutch outer guide from the primary damper shaft.



INSPECTION

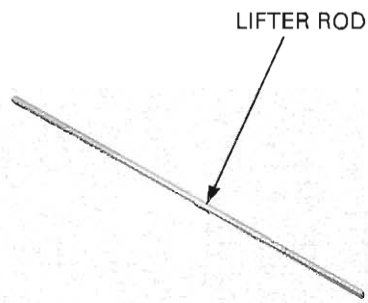
Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the pressure plate.
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the pressure plate.



Clutch lifter rod

Check the clutch lifter rod for wear and trueness.

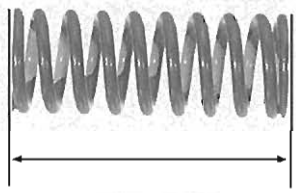


Clutch spring

Replace the clutch spring as a set.

Measure the clutch spring free length.

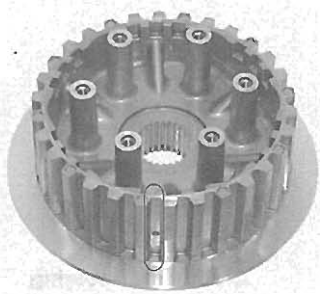
SERVICE LIMIT: 54.0 mm (2.13 in)



Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates.

Replace if necessary.



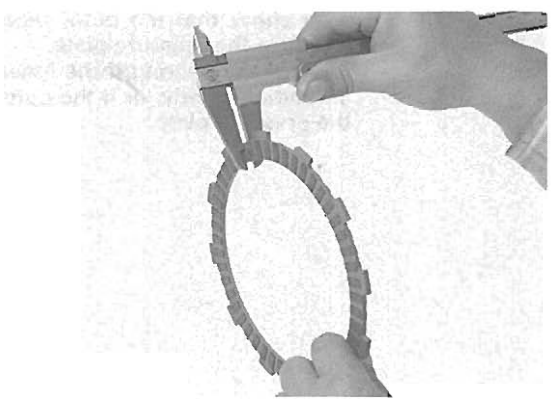
Clutch disc

Replace the clutch discs and plates as a set.

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the thickness of each disc.

SERVICE LIMIT: 3.5 mm (0.14 in)

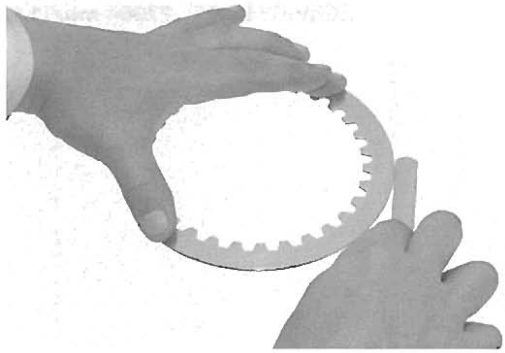


Clutch plate

Replace the clutch discs and plates as a set.

Check each disc plate for warpage on a surface plate using a feeler gauge.

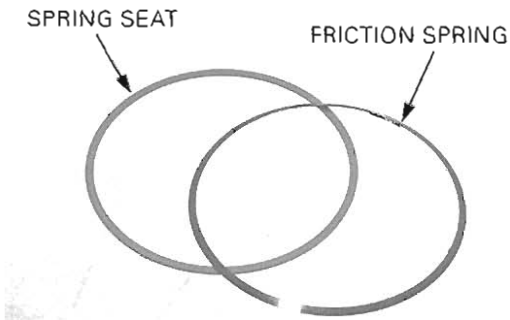
SERVICE LIMIT: 0.30 mm (0.012 in)



Friction spring/spring seat

Check the friction spring and spring seat for wear or other damage, replace if necessary.

Replace if necessary.

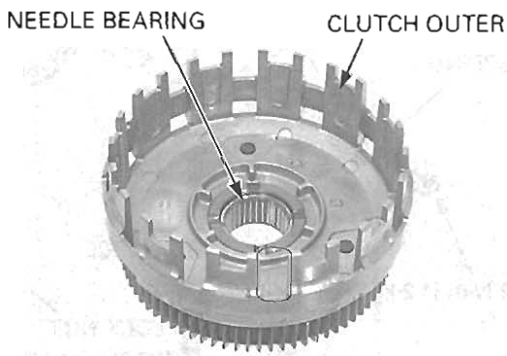


Clutch outer

Check the slots of the clutch outer for damage or wear caused by the clutch discs.

Replace if necessary.

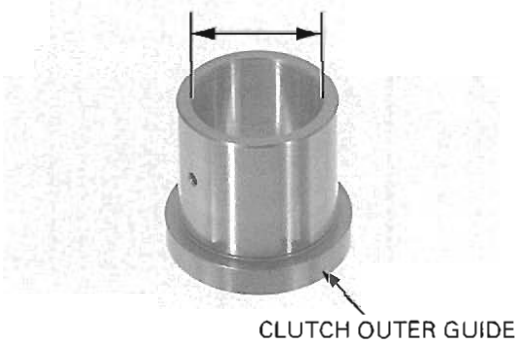
Check the clutch outer needle bearing for wear or damage, replace if necessary.



Clutch outer guide

Measure the I.D. of the clutch outer guide.

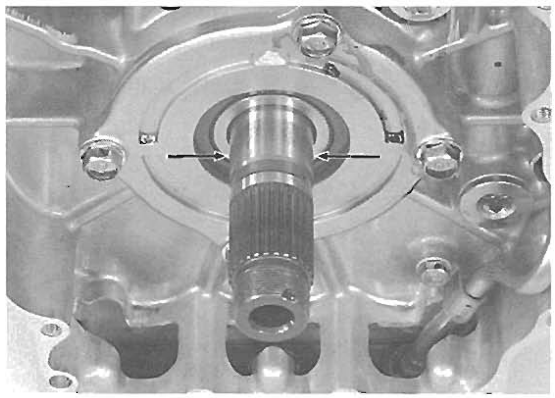
SERVICE LIMIT: 28.016 mm (1.1030 in)



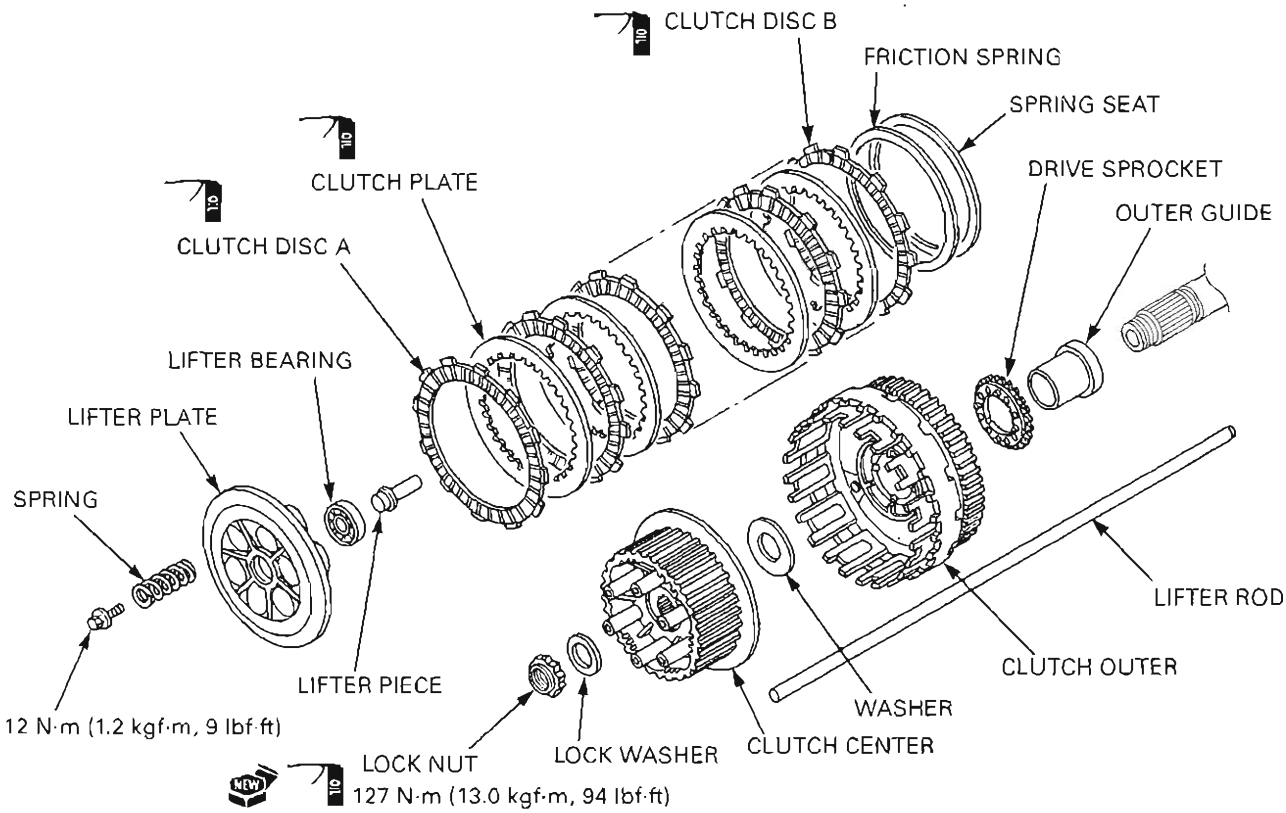
Primary damper shaft

Measure the O.D. of the primary damper shaft.

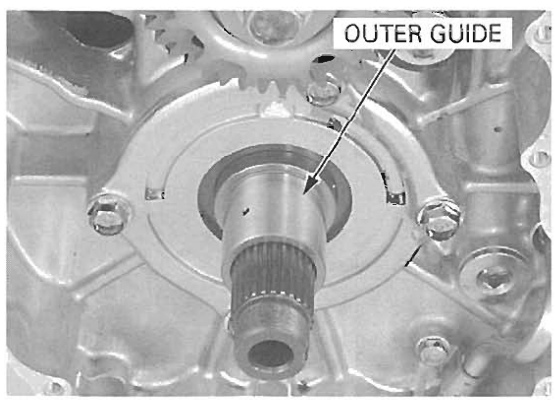
SERVICE LIMIT: 27.964 mm (1.1009 in)



INSTALLATION

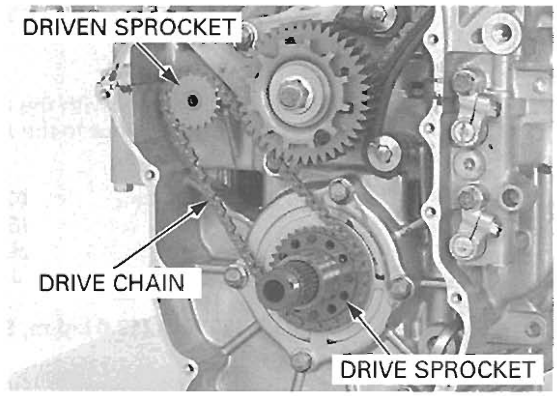


Install the clutch outer guide onto the primary damper shaft.



Make sure that the 4 bosses on the water pump drive sprocket face toward the clutch outer.

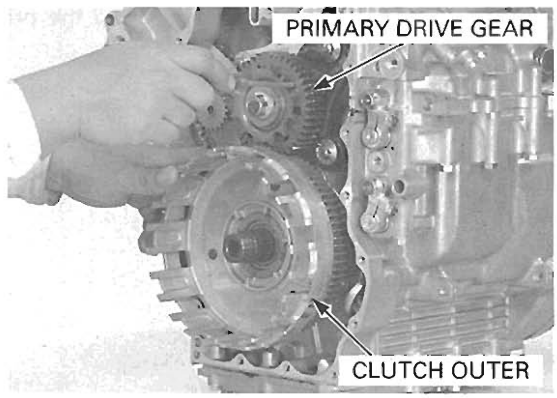
Install the clutch outer guide, water pump drive/driven sprocket and drive chain as an assembly.



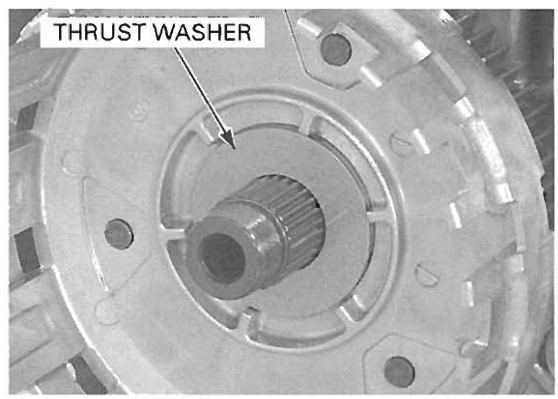
Align the primary drive gear and sub-gear teeth with a screwdriver as shown.

Align the bosses on the water pump drive sprocket with the holes in the clutch outer by turning the driven sprocket with your finger.

Install the clutch outer.

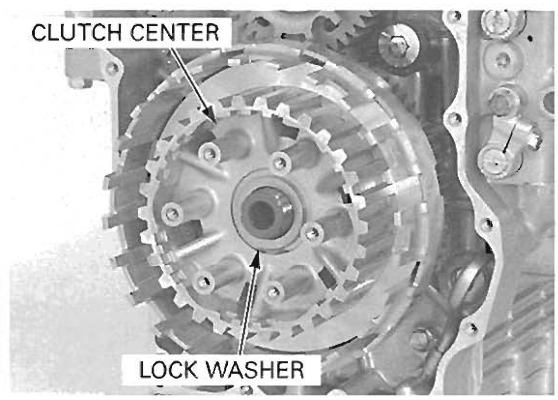


Install the thrust washer onto the clutch outer.



Install the clutch center.

Install the lock washer with its chamfered side facing out.



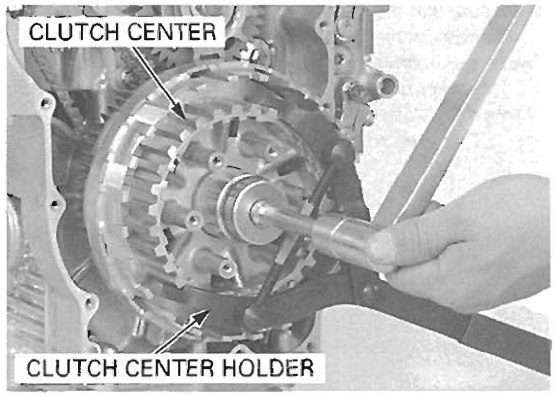
Apply oil to the new clutch center lock nut threads and seating surface.
Install the new lock nut.

Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

TOOL:

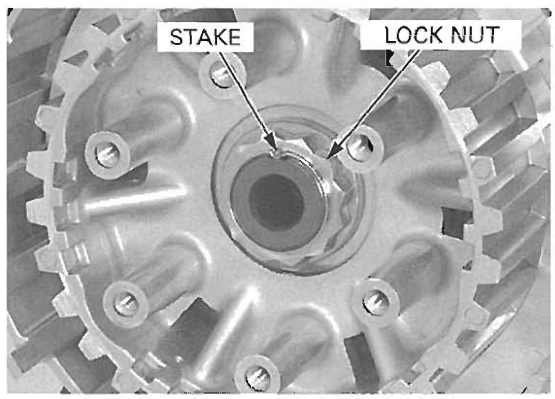
Clutch center holder	07724–0050002 (Equivalent commercially available in U.S.A.)

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)



Be careful not to damage the primary damper shaft threads.

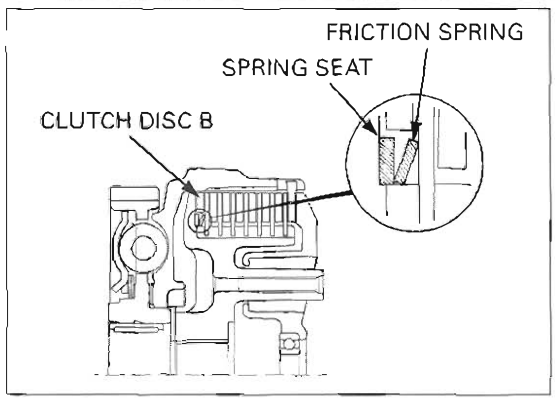
Stake the lock nut into the primary damper shaft groove with a punch.



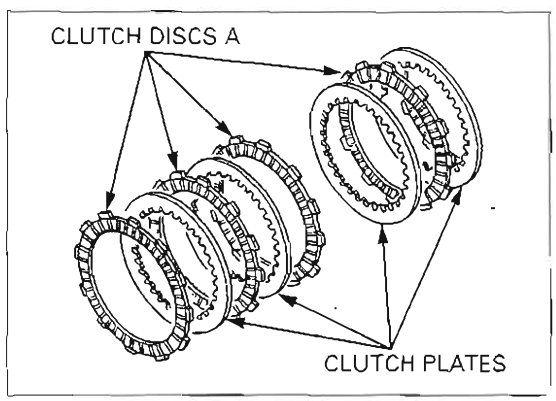
Install the spring seat and friction spring onto the clutch center as shown.

Coat the clutch discs and plates with clean engine oil.

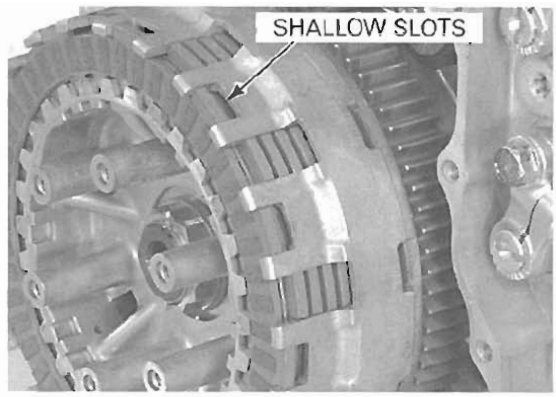
Install the clutch disc B (lager I.D. disc) into the clutch outer.



Stack the seven clutch plates and seven clutch discs A alternately.

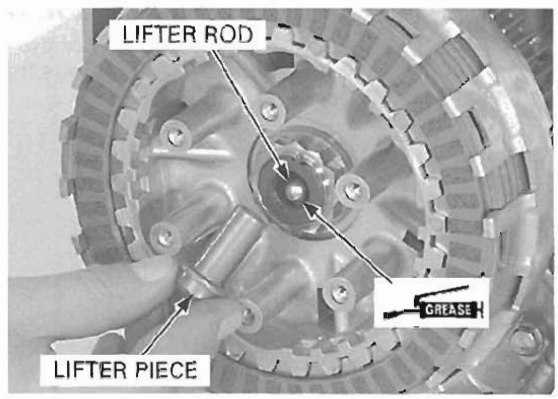


Install the outer clutch disc in the shallow slot on the clutch outer.



Install the clutch lifter rod into the primary damper shaft.

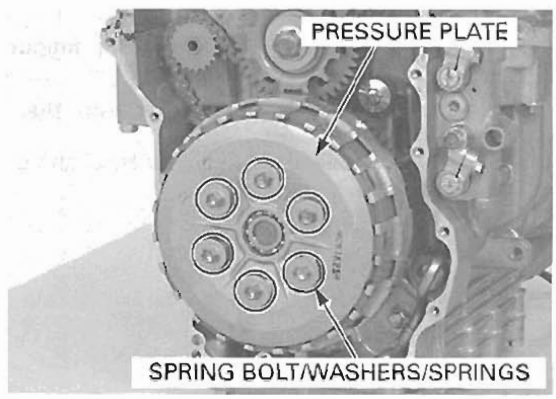
Apply grease to the tip of the lifter rod and install the clutch lifter piece into the primary damper shaft.



Install the lifter bearing into the pressure plate.
Install the pressure plate.
Install the clutch springs and spring bolts.
Tighten the bolts in a crisscross pattern in 2 – 3 steps, then tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the front crankcase cover (page 9-30).



PRIMARY DRIVE GEAR

REMOVAL

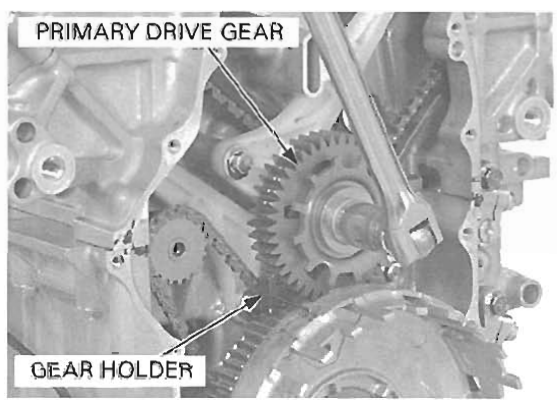
Remove the clutch assembly (page 9-15).

Temporarily install the clutch outer guide and clutch outer onto the primary damper shaft.

Hold the primary drive gear and driven gear with the special tool, then loosen the primary drive gear bolt.

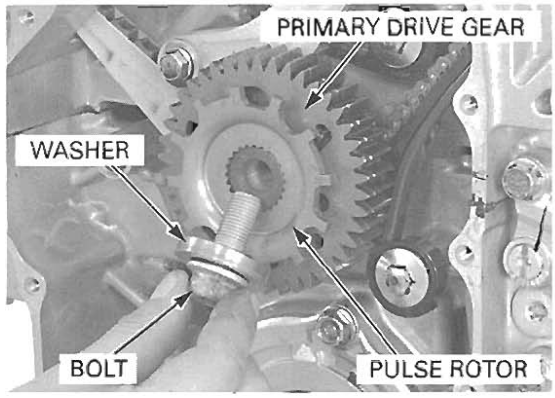
TOOL:

Gear holder, 2.5	07724-0010100 or 07724-001A100 (U.S.A.only



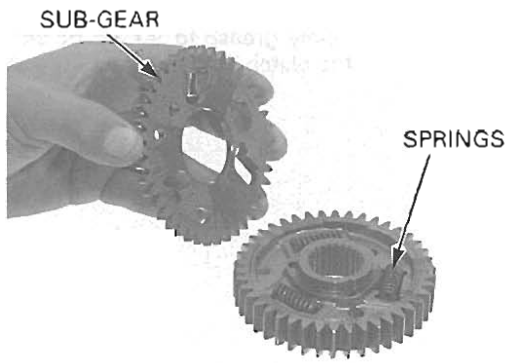
Remove the clutch outer.

Remove the primary drive gear bolt, washer, ignition pulse generator rotor and primary drive gear assembly.



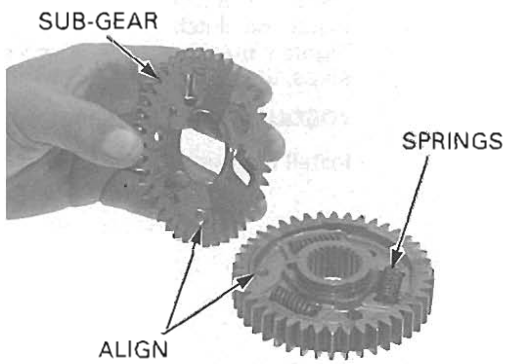
DISASSEMBLY/ASSEMBLY

Remove the sub-gear from the primary drive gear.
Remove the damper springs from the primary drive gear.



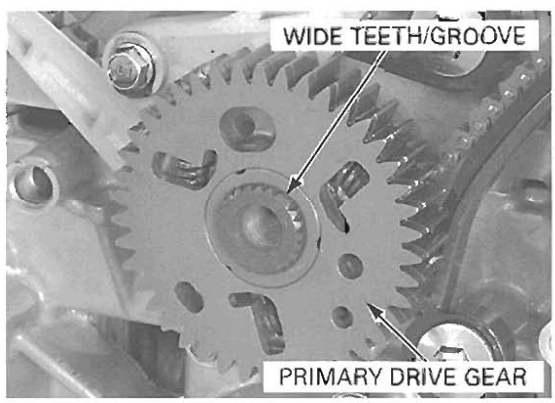
Inspect the spring for fatigue or other damage, replace if necessary.

Install the springs into the primary drive gear grooves.
Install the sub-gear by aligning the holes.

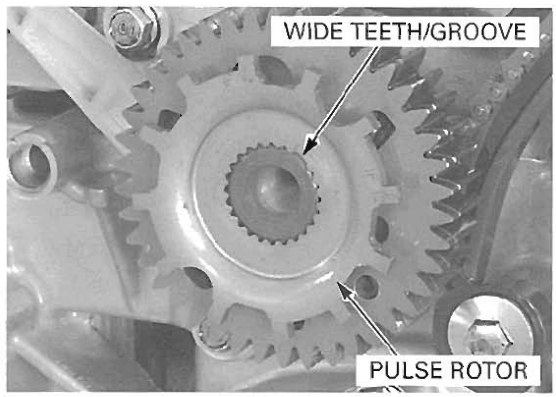


INSTALLATION

Install the primary drive gear by aligning its wide groove with the wide teeth on the crankshaft.

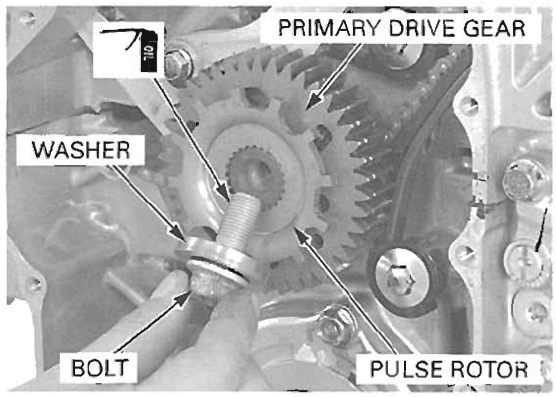


Install the ignition pulse generator rotor by aligning its wide groove with the wide teeth on the crankshaft.



Apply oil to the primary drive gear bolt threads.

Install the washer and primary drive gear bolt.



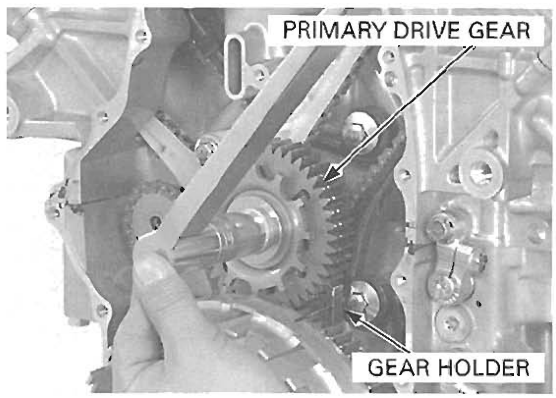
Install the clutch outer guide onto the primary damper shaft.
Install the clutch outer while aligning the sub-gear teeth with the primary drive gear teeth with a screwdriver.

Hold the primary drive gear and driven gear with the gear holder, then tighten the primary drive gear bolt to the specified torque.

TOOL:

Gear holder, 2.5	07724-0010100 or 07724-001A100 (U.S.A. only)

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)



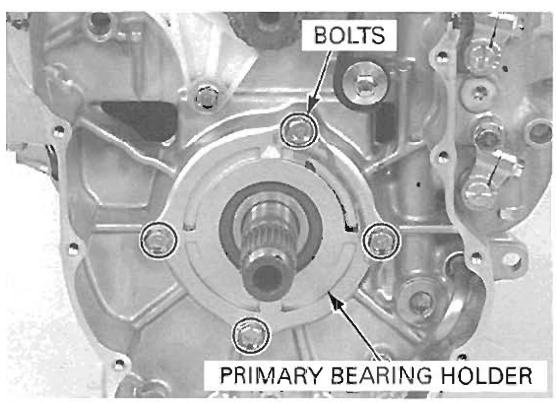
Install the clutch (page 9-20).

PRIMARY DAMPER SHAFT

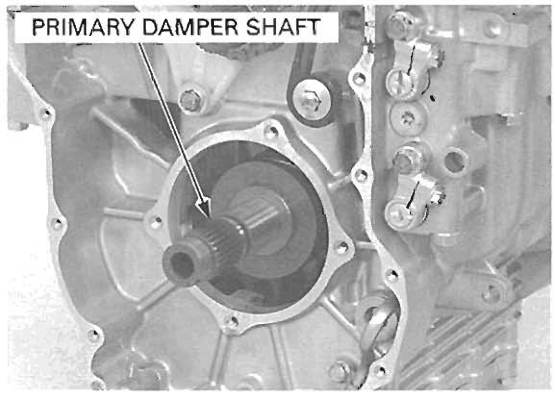
REMOVAL

Remove the clutch (page 9-15).

Remove the bolts and primary damper shaft bearing holder.

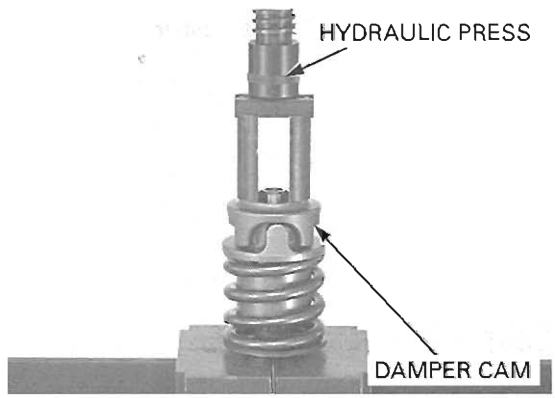


Remove the primary damper shaft assembly.



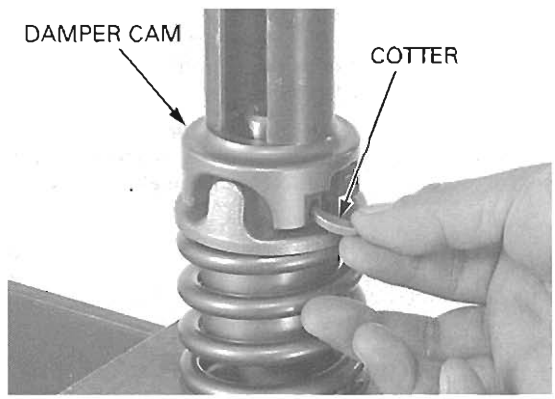
DISASSEMBLY

Press the damper cam using a hydraulic press until the spring stop cotters can be removed from the damper cam holes.



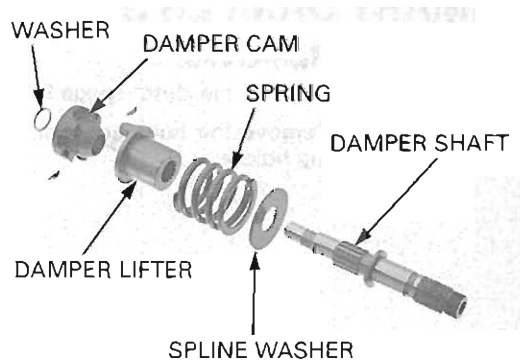
Remove the spring stop cotters from the damper cam holes.

Release the hydraulic press and disassemble the primary damper shaft.



INSPECTION

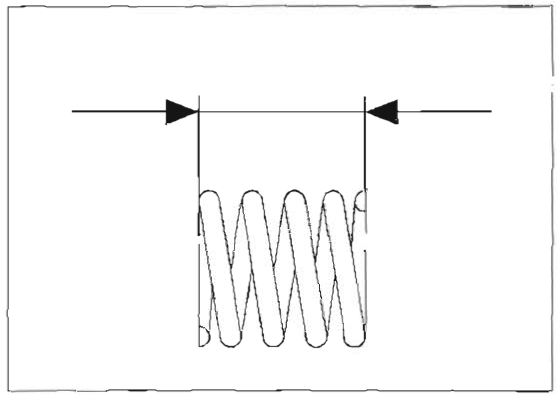
Check the damper cam and primary damper lifter contact surface for wear or other damage.
Check the damper spring for fatigue or damage.



Measure the damper spring free length.

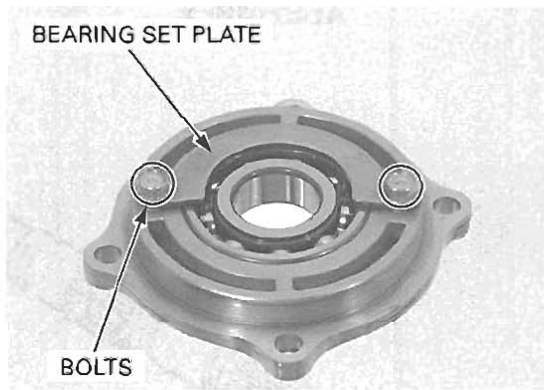
SERVICE LIMIT: 56 mm (2.2 in)

Replace the damper spring if it is shorter than the service limit.



Damper shaft holder bearing replacement

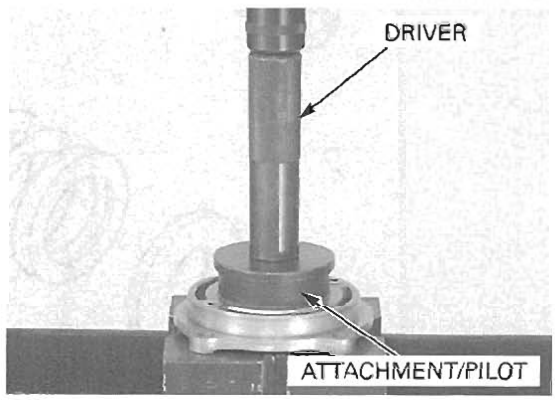
Remove the bolts and bearing set plate.



Press the holder bearing into the damper shaft holder using the special tools.

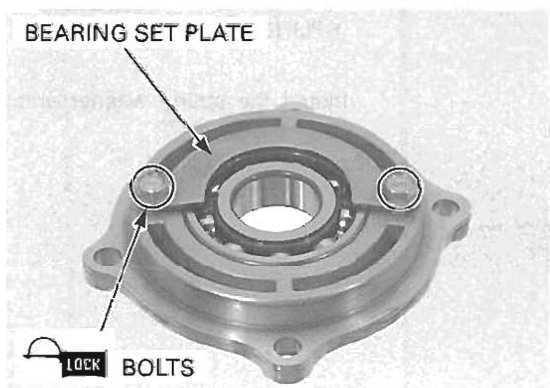
TOOLS:

Driver	**07749-0010000**
Attachment, 62 X 68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**



Apply a locking agent to the bearing set plate bolt threads.
Install the bearing set plate and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Damper shaft bearing replacement

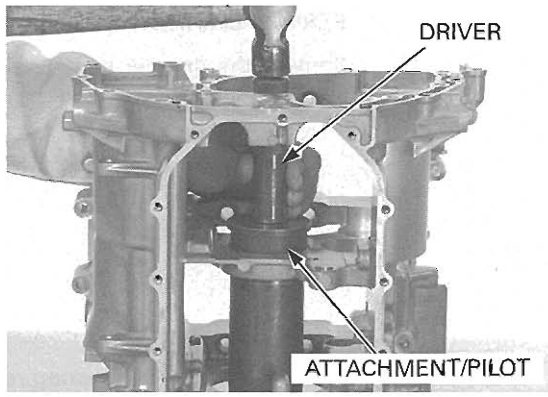
Separate the crankcase halves (page 12-4).

Remove the damper shaft bearing from the lower crankcase.

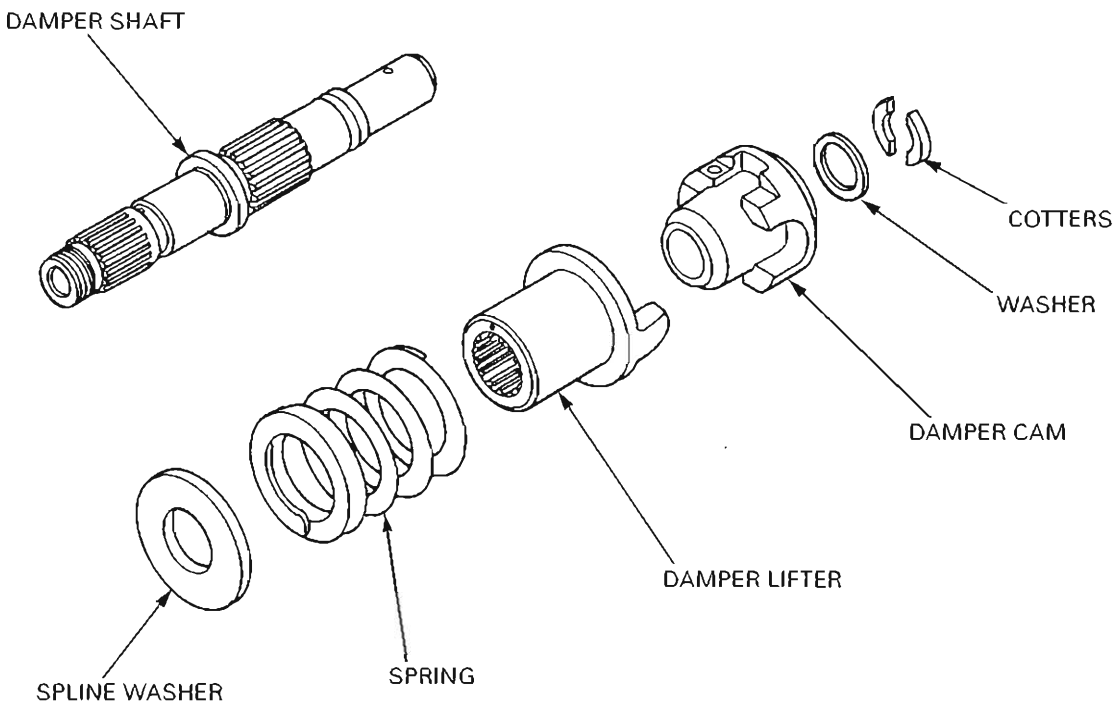
Hold the crankcase rib with a suitable tool, then drive the bearing into the crankcase using the special tools.

TOOLS:

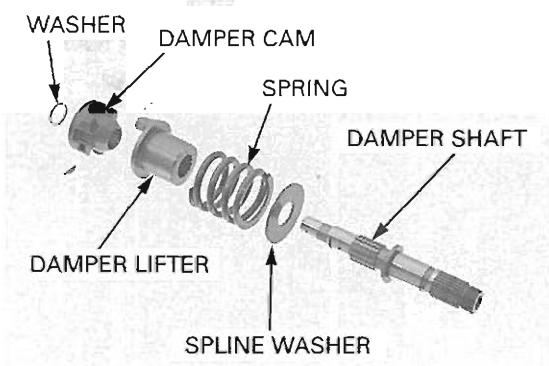
Driver	07749-0010000
Attachment, 62 X 68 mm	07746-0010500
Pilot, 30 mm	07746-0040700



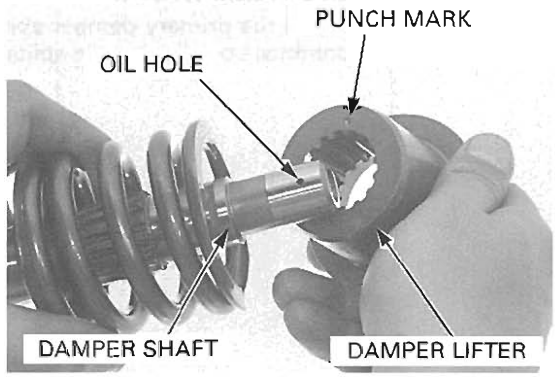
ASSEMBLY



Install the spline washer and damper spring onto the damper shaft.

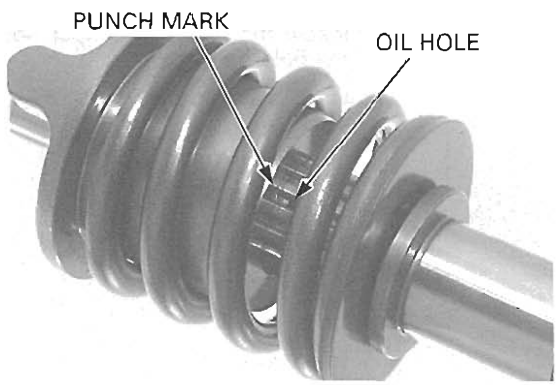


Install the damper lifter while aligning its punch mark with the damper shaft oil hole.



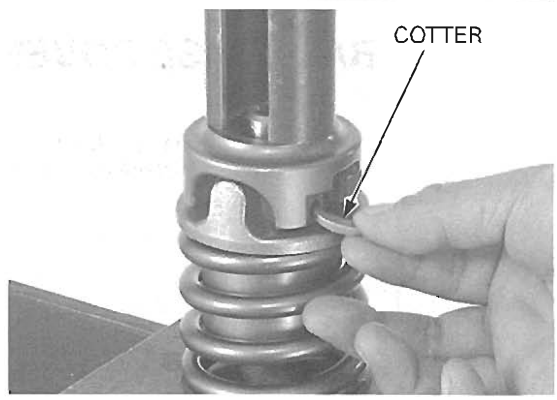
Recheck that the damper cam punch mark aligns with the oil hole on the damper shaft spline as shown.

Install the washer into the groove of the damper cam.



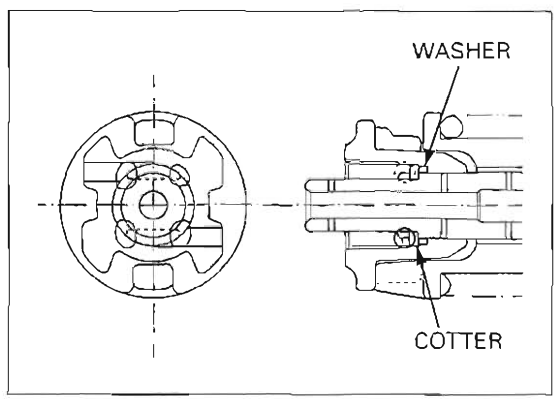
Note the direction of the cotters.

Press the damper spring using a hydraulic press, then install the spring stop cotters through the damper cam holes.



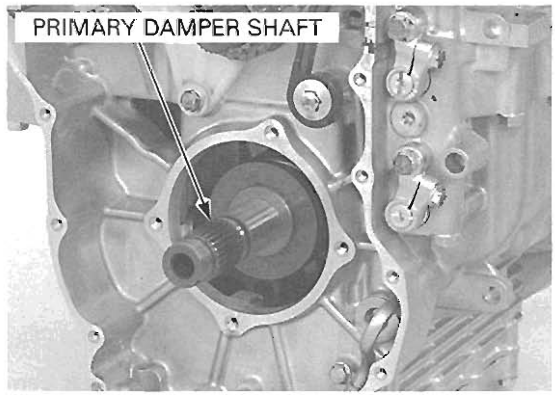
Place the spring stop cotters into the groove of the damper cam as shown.

Release the hydraulic press and check that the spring cotters are securely seated in the groove.



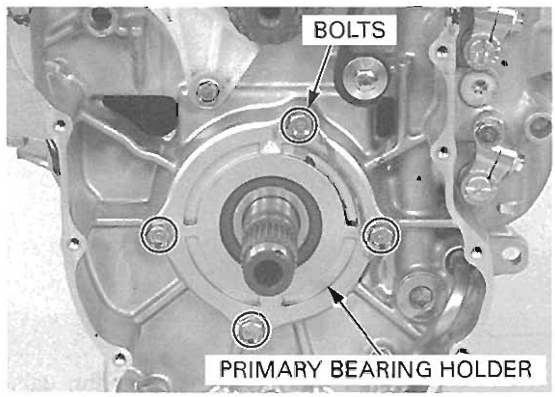
INSTALLATION

Install the primary damper shaft assembly into the crankcase by aligning the spline with the mainshaft.



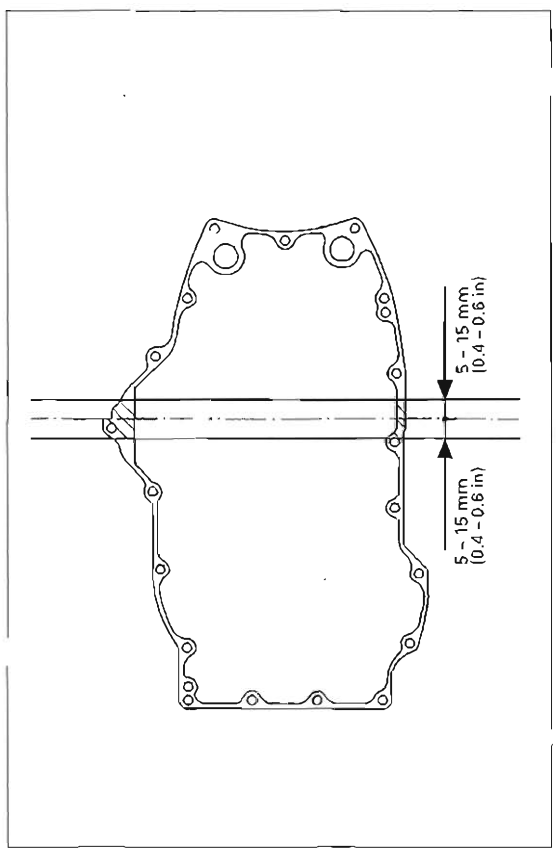
Install the primary damper bearing holder, tighten the bolts securely.

Install the removed parts in the reverse order of removal.

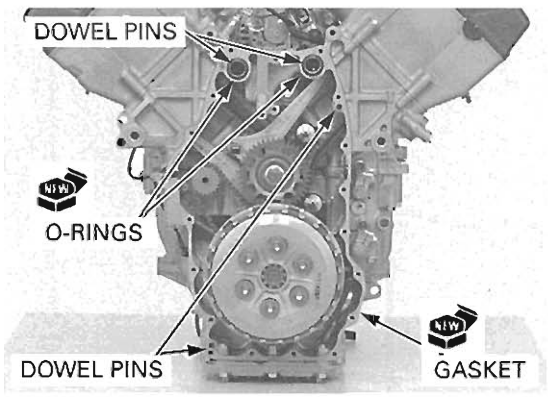


FRONT CRANKCASE COVER INSTALLATION

Apply sealant (Three Bond 1207B or an equivalent) to the mating surfaces of the crankcase as shown.



Install the two dowel pins and new gasket.
Install the water joint dowel pins and new O-rings.

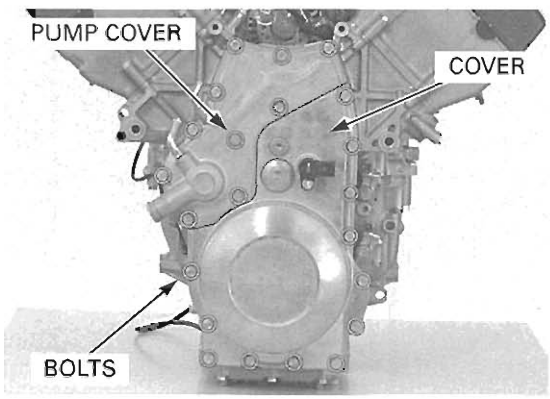


Install the front crankcase cover.

Install the water pump cover (page 6-18).

Install the front crankcase cover/water pump cover bolts.
Tighten the bolts in a crisscross pattern 2 - 3 steps.

Install the engine into the frame (page 7-8).
Pour the recommended engine oil (page 3-11).



10. TRANSMISSION/FINAL OUTPUT SHAFT

COMPONENT LOCATION 10-2

SERVICE INFORMATION 10-3

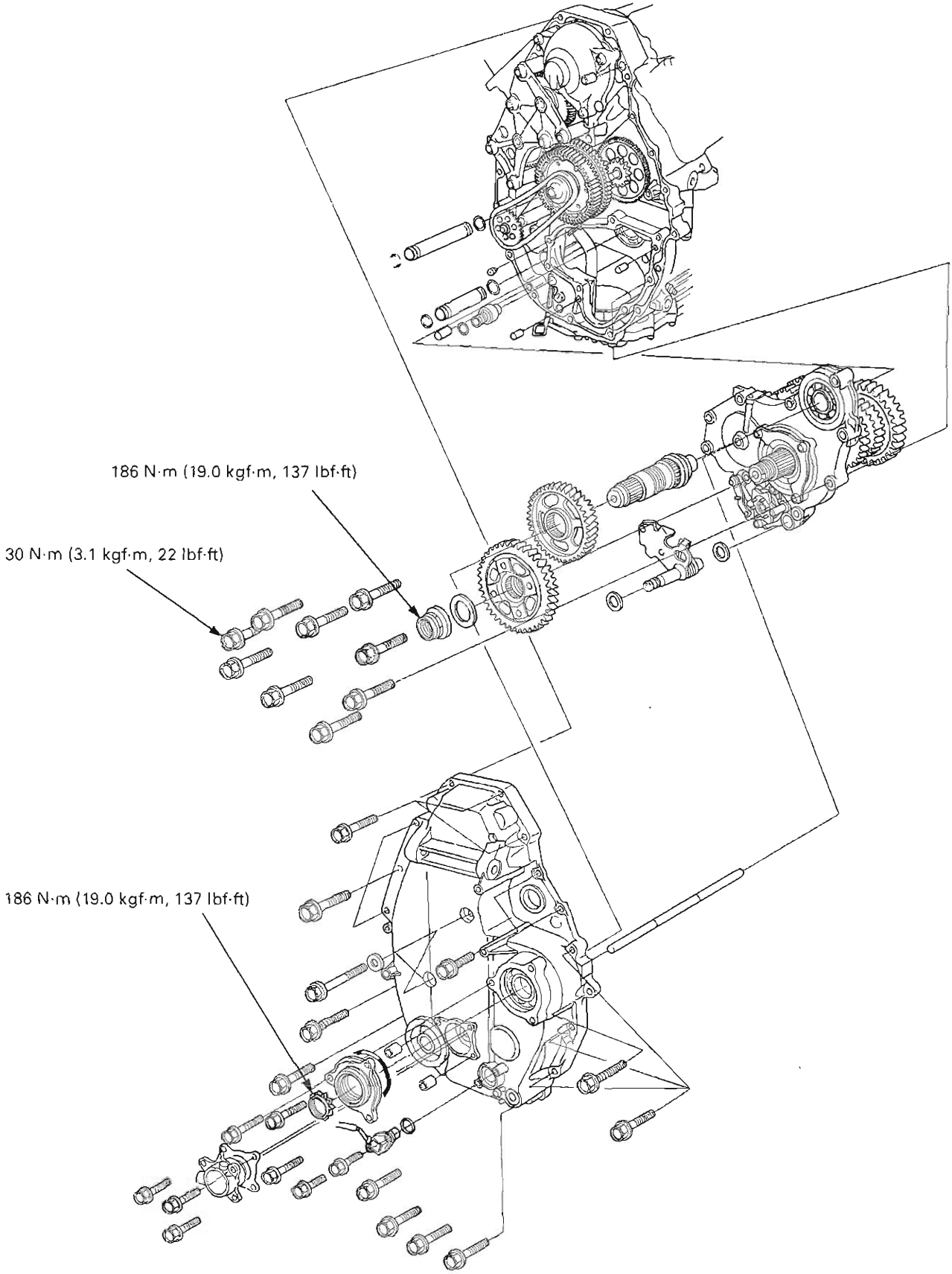
TROUBLESHOOTING 10-4

GEARSHIFT PEDAL 10-5

FINAL OUTPUT SHAFT 10-6

TRANSMISSION 10-10

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Transmission and final output shaft service require engine removal.
- When using the lock nut wrench, use a 20-inch long deflecting beam type torque wrench. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given below is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives both the actual and indicated torque.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M4, M5	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	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Gear busing O.D.	M4, M5	30.950 – 30.975 (1.2185 – 1.1295)	30.93 (1.219)
		C2, C3	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.297)
	Gear-to-bushing clearance	M4, M5	0.025 – 0.075 (0.0010 – 0.0030)	–
		C2, C3	0.020 – 0.070 (0.0008 – 0.0028)	–
	Gear bushing I.D.	M4	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)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Countershaft O.D.	at 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)	–
		C2	0.005 – 0.039 (0.0002 – 0.0015)	–
Shift fork, fork shaft	Fork I.D.		12.000 – 12.018 (0.4724 – 0.4731)	12.03 (0.474)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Shift fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.471)

TORQUE VALUES

Rear crankcase cover sealing bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply a locking agent to the threads
Final drive gear special nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Stake Apply oil to the threads and seating surface Left hand thread
Final driven gear nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Stake Apply oil to the threads and seating surface
Transmission bearing holder mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Countershaft bearing set plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Shift drum bearing set plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
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 spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads

TOOLS

Spline holder, 26 X 25 X 1	070MB-MC50100
Remover weight	07741-0010210
Attachment, 52 X 55 mm	07746-0010400
Attachment, 62 X 68 mm	07746-0010500
Pilot, 30 mm	07746-0040700
Pilot, 22 mm	07746-0041000
Pilot, 28 mm	07746-0041100
Driver	07749-0010000
Lock nut wrench, 30/64 mm	07916-MB00002
Rotor puller remover	07JAC-PH80100
Bearing remover shaft assembly	07JAC-PH80200

TROUBLESHOOTING

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

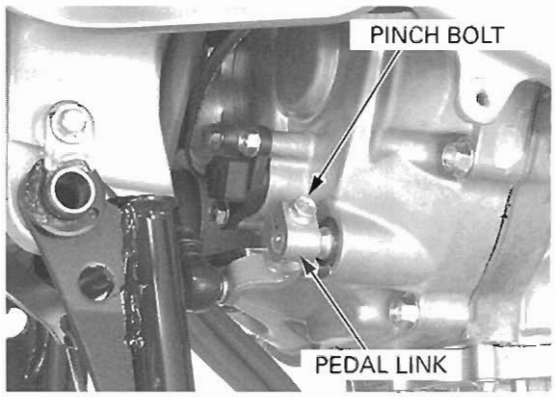
Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

GEARSHIFT PEDAL

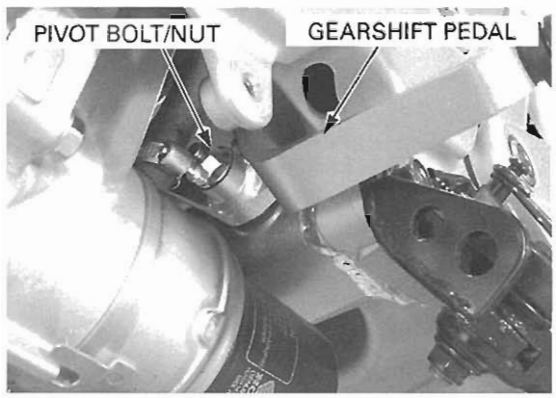
REMOVAL

Remove the muffler and exhaust pipe (page 2-18).

Remove the gearshift pedal link pinch bolt and gearshift pedal link from the gearshift spindle.



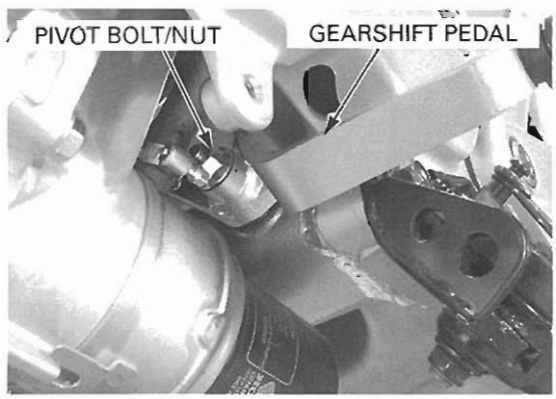
Remove the gearshift pedal pivot bolt and nut, then remove the gearshift pedal.



INSTALLATION

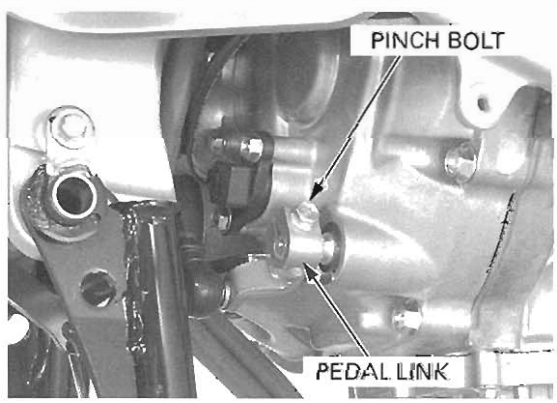
Install the gearshift pedal onto the frame brace, installing the pivot bolt from the rear.

Install and tighten the pivot nut while holding the pivot bolt.



Install the gearshift pedal link to the gearshift spindle while aligning its slit with the punch mark on the gearshift spindle.

Install and tighten the gearshift pedal link pinch bolt securely.



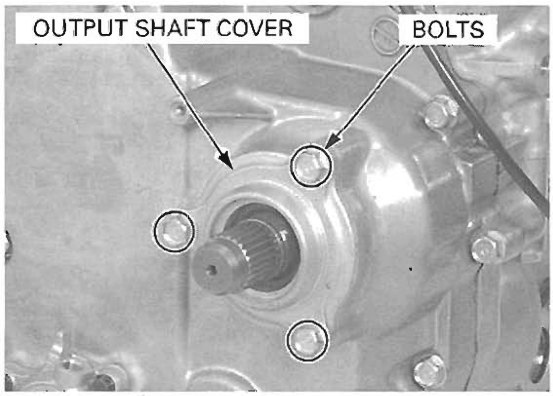
FINAL OUTPUT SHAFT

REMOVAL

Remove the following:

- Engine (page 7-4)
- Clutch slave cylinder (page 9-12)
- Oil cooler (page 4-13)
- Speed sensor (page 22-13)
- Starter motor (page 11-4)

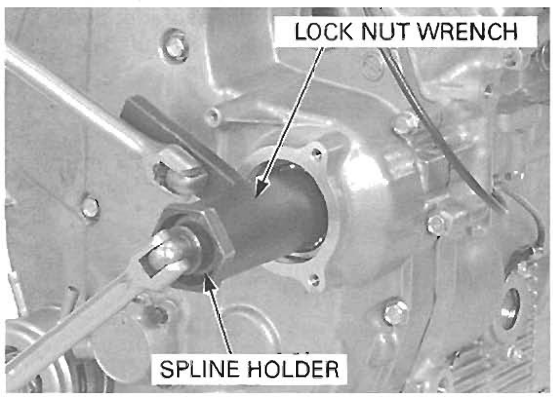
Remove the bolts and final output shaft cover.



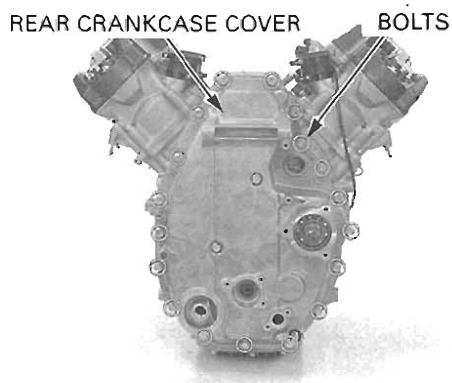
Hold the final output shaft using the spline holder and loosen the final output shaft lock nut using the special tools.

TOOLS:

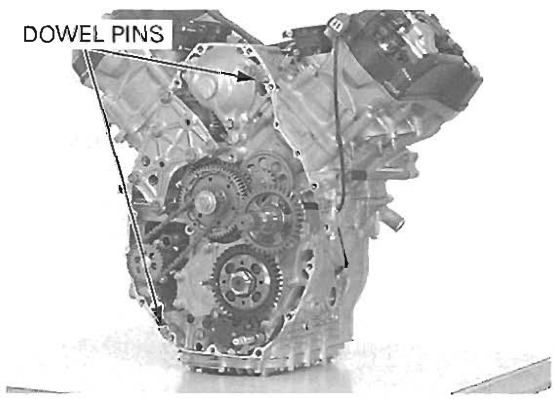
Spline holder, 26 X 25 X 1	**070MB-MCS0100**
Lock nut wrench, 30/64 mm	**07916-MB00002**



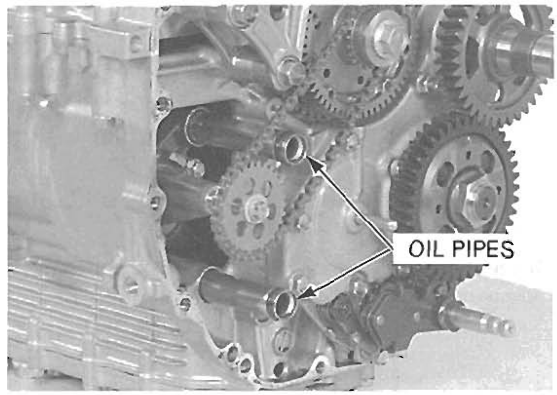
Remove the bolts and rear crankcase cover.



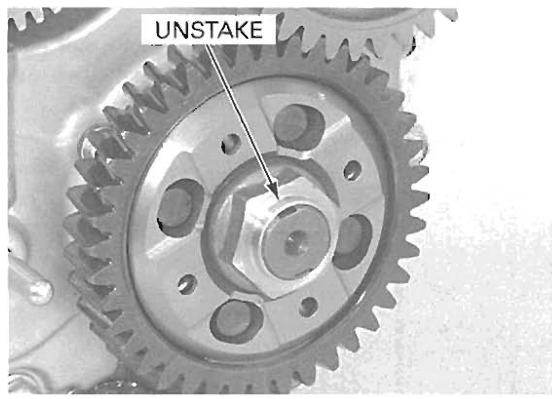
Remove the dowel pins.



Remove the oil pass pipes and O-rings.



Unstake the final drive gear special nut, being careful not to damage the countershaft threads.

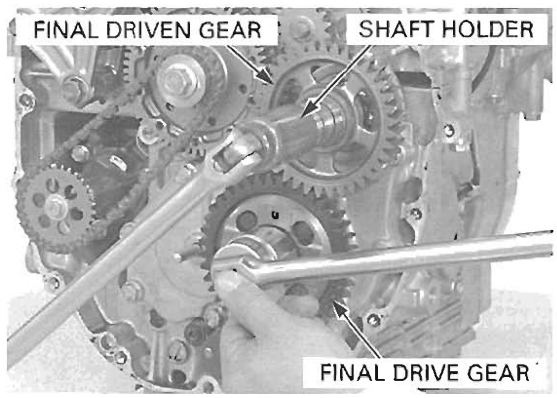


The final drive gear special nut has left hand threads.

Hold the final output shaft with the spline holder, loosen the final drive gear special nut.

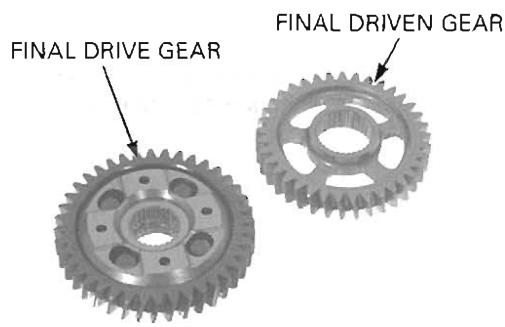
TOOL:
Spline holder, 26 X 25 X 1 070MB-MCS0100

Remove the lock nut, lock washer and final output drive gear.
Remove the final driven gear and shaft.



INSPECTION

Check the final drive and driven gear for wear or damage.



INSTALLATION

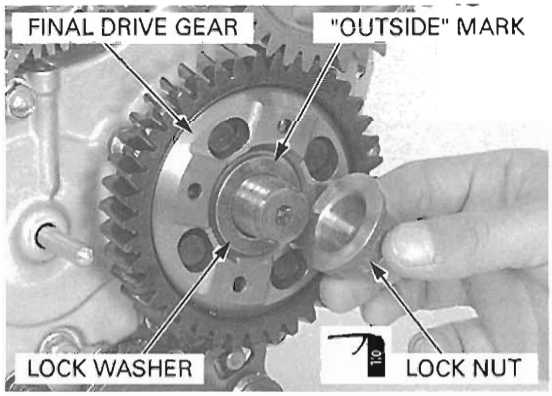
Install the final drive gear onto the countershaft. Install the final drive gear shaft/gear assembly into the bearing.

Install the lock washer with the "OUTSIDE" mark facing out.

Apply oil to the final drive gear special nut threads and seating surface.

The final drive gear special nut has left hand threads.

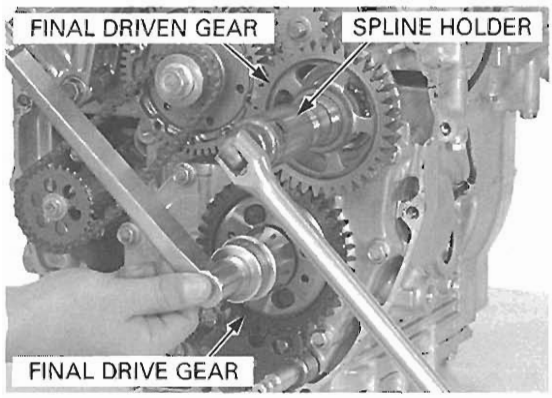
Install the special nut onto the countershaft.



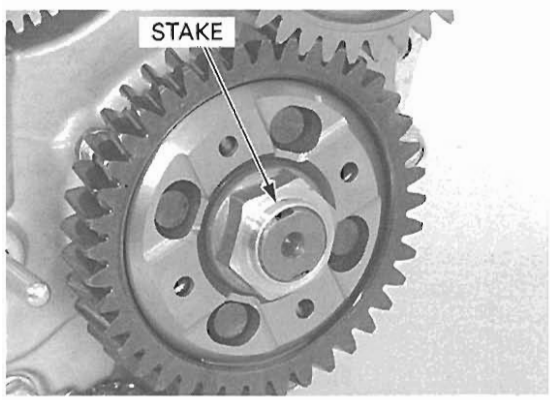
Hold the final output shaft using the spline holder, then tighten the final drive gear special nut to the specified torque.

TOOL:
Spline holder, 26 X 25 X 1 070MB-MCS0100

TORQUE: 186 N·m (19.0 kgf·m, 137 lbf·ft)



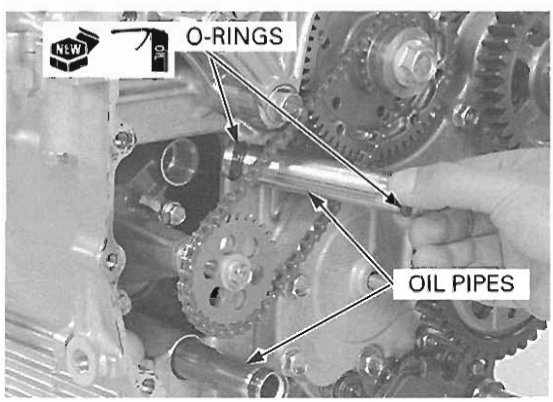
Stake the final drive gear special nut against the countershaft groove, being careful not to damage the countershaft threads.



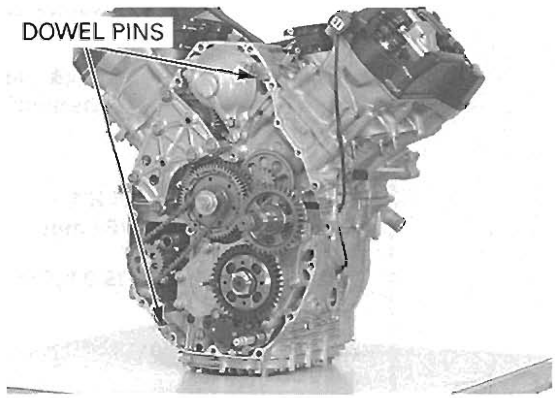
Apply oil to the new O-rings and install them onto the oil pass pipe grooves.

Install the long pass pipe to the oil pump body.

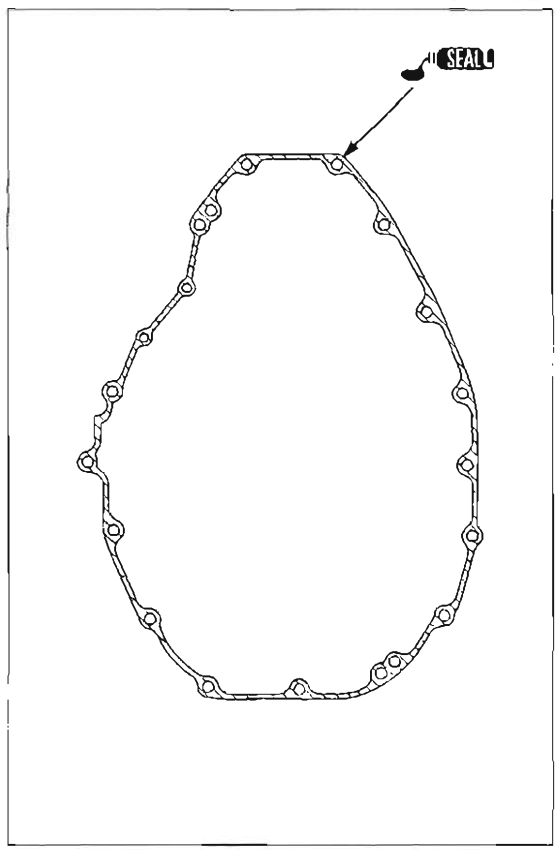
Install the oil pass pipes into the crankcase oil gallery and oil pump body.



Install the dowel pins.

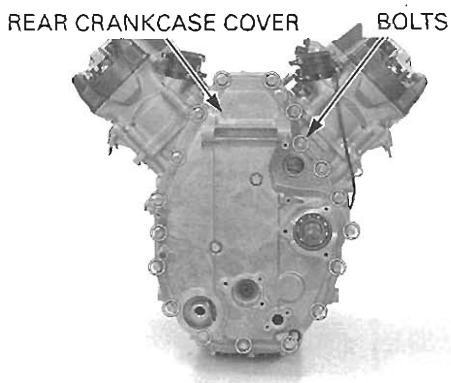


Apply sealant to the mating surface of the rear crankcase cover.



Install the rear crankcase cover and bolts.

Tighten the bolts in a crisscross pattern in 2-3 steps.



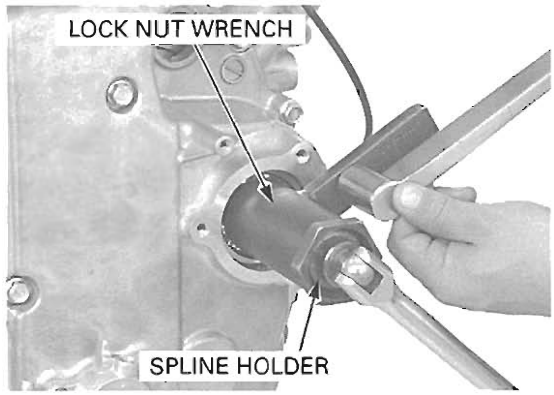
Apply oil to the final output shaft lock nut threads and seating surface.

Hold the final output shaft with the spline holder, tighten the lock nut to the specified torque using the special tools.

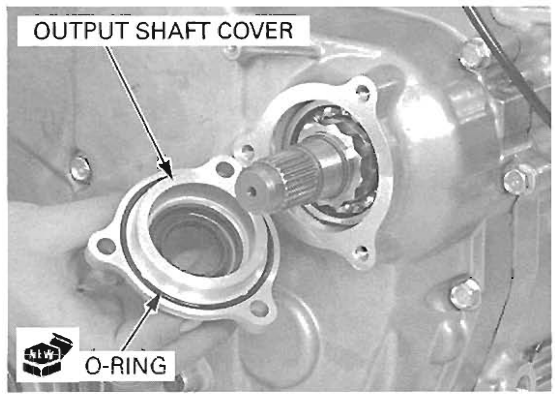
TOOLS:

Spline holder, 26 X 25 X 1	070MB-MCS0100
Lock nut wrench, 30/64 mm	07916-MB00002

TORQUE: 186 N·m (19.0 kgf·m, 137 lbf·ft)

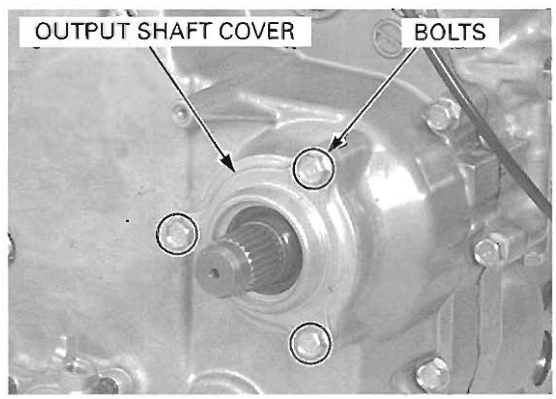


Install a new O-ring into the groove of the final output shaft cover.
Install the final output shaft cover onto the rear crankcase cover.



Install and tighten the final output shaft cover bolt securely.

Install the removed parts in the reverse order of removal.

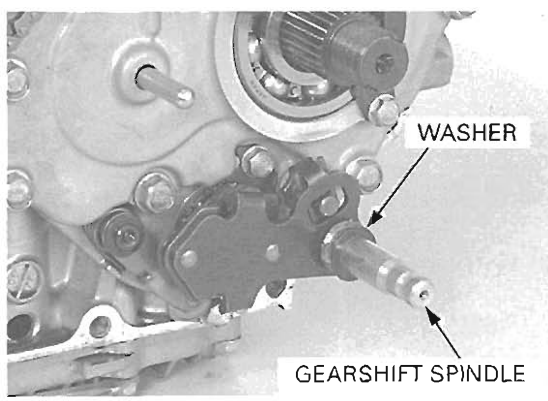


TRANSMISSION

REMOVAL

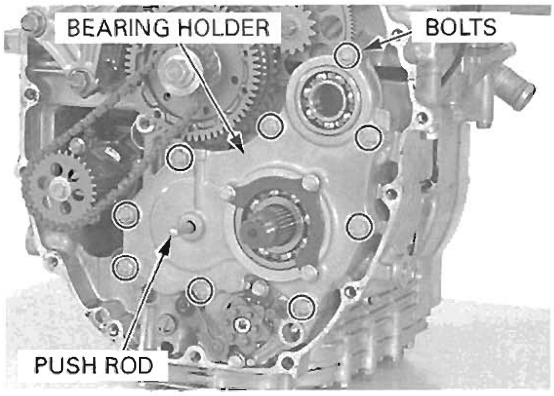
Remove the final output drive/driven gears (page 10-6).

Remove the gearshift spindle and thrust washers.

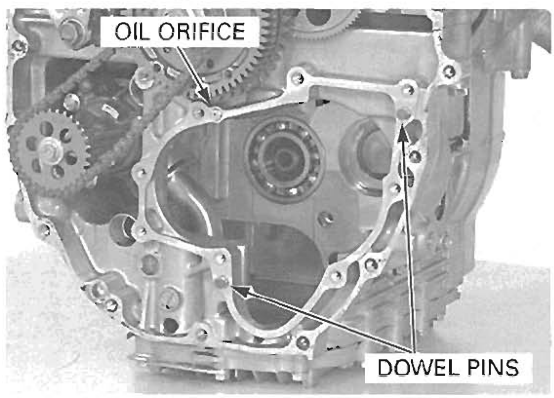


Remove the clutch lifter push rod.

Loosen and remove the transmission bearing holder bolts.
Remove the transmission bearing holder assembly from the crankcase.

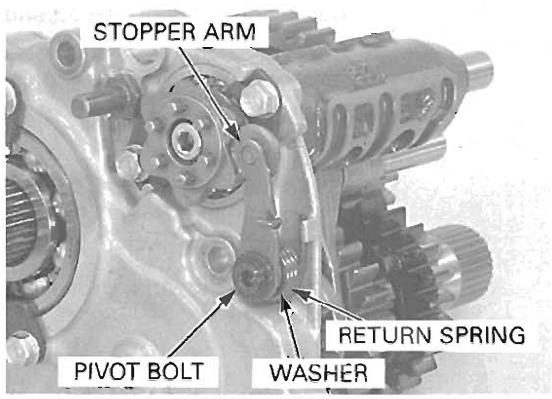


Remove the dowel pins and oil orifice.

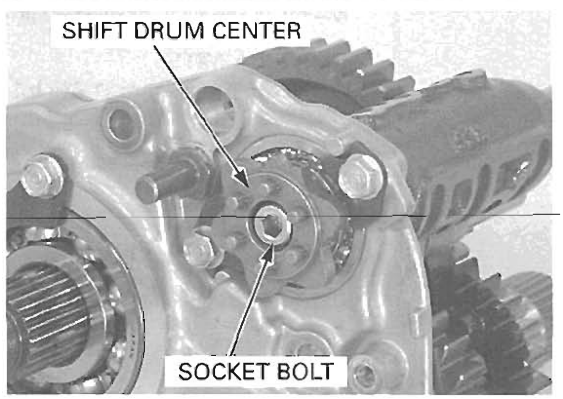


DISASSEMBLY

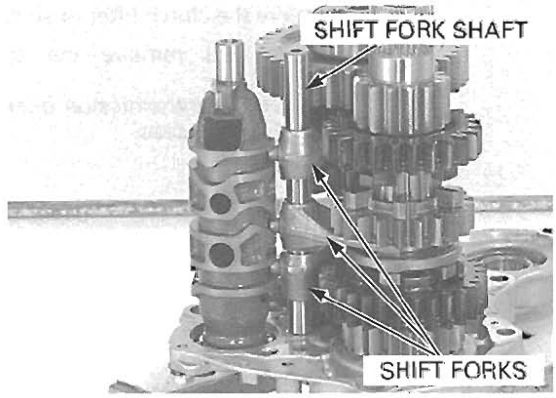
Remove the pivot bolt, shift drum stopper arm, washer and return spring.



Remove the shift drum center socket bolt and shift drum center.



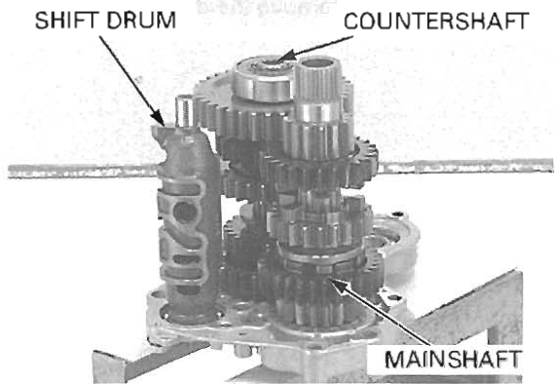
Remove the shift fork shaft and shift forks.



Remove the shift drum.

Remove the mainshaft/countershaft assembly from the transmission bearing holder.

Disassemble the mainshaft and countershaft.



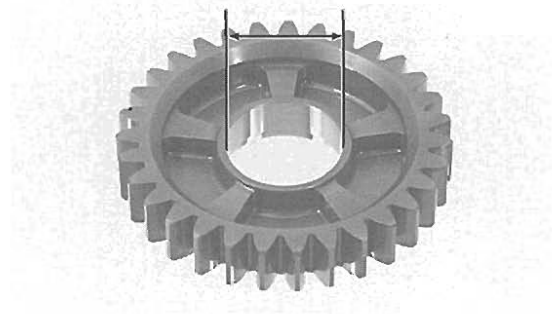
INSPECTION

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.

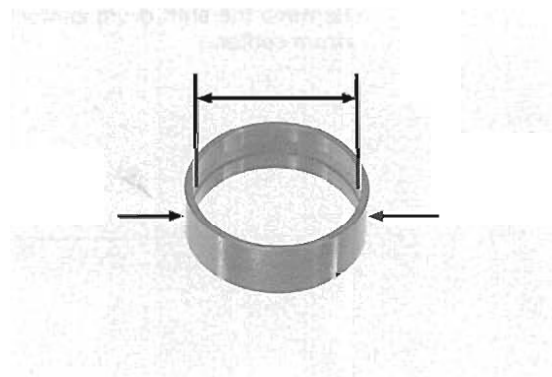
SERVICE LIMITS:
M4, M5: 31.04 mm (1.222 in)
C1: 26.04 mm (1.025 in)
C2, C3: 33.04 mm (1.301 in)



Check the shift fork groove of the shifter gear for excessive wear or damage.

Measure the O.D. of each gear bushing.

SERVICE LIMITS:
M4, M5: 30.93 mm (1.219 in)
C2, C3: 32.93 mm (1.297 in)



Measure the I.D. of each gear bushing.

SERVICE LIMITS:
M4: 28.02 mm (1.103 in)
C2: 30.02 mm (1.182 in)

Calculate the gear-to-bushing clearance.

SERVICE LIMITS:
M4, M5: 0.025 – 0.075 mm (0.0010 – 0.0030 in)
C2, C3: 0.020 – 0.070 mm (0.0008 – 0.0028 in)

Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O.D. at the M5 gear.

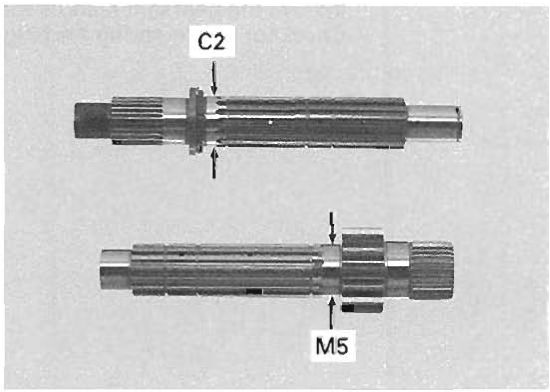
SERVICE LIMIT: 27.96 mm (1.101 in)

Measure the countershaft O.D. at the C2 gear.

SERVICE LIMIT: 29.96 mm (1.180 in)

Calculate the gear bushing-to-shaft clearance.

STANDARDS:
M5: 0.005 – 0.039 mm (0.0002 – 0.0015 in)
C2: 0.005 – 0.039 mm (0.0002 – 0.0015 in)



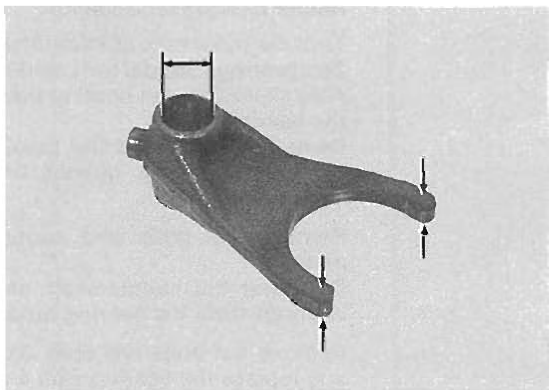
Check the shift fork guide pin for abnormal wear or damage

Measure the shift fork I.D.

SERVICE LIMIT: 12.03 mm (0.474 in)

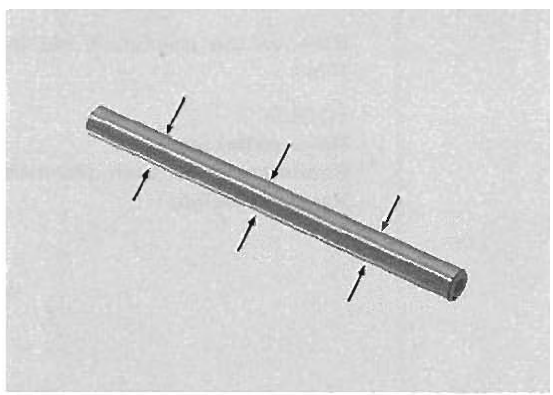
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)

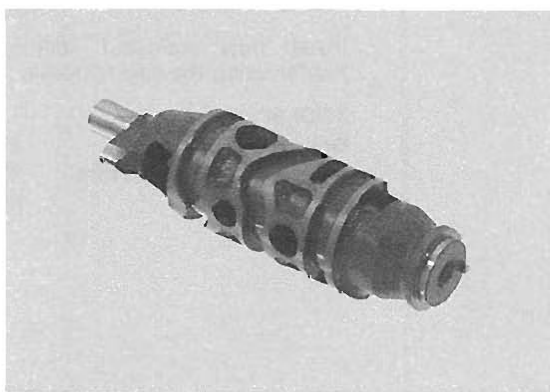


Measure the shift fork shaft O.D.

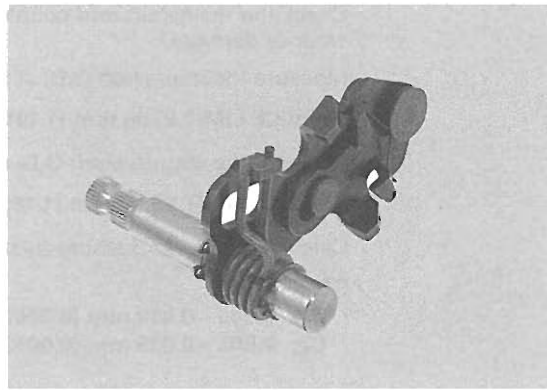
SERVICE LIMIT: 11.95 mm (0.471 in)



Inspect the shift drum grooves for wear or damage.



Inspect the gearshift spindle for damage.
Check for return spring for fatigue or damage.

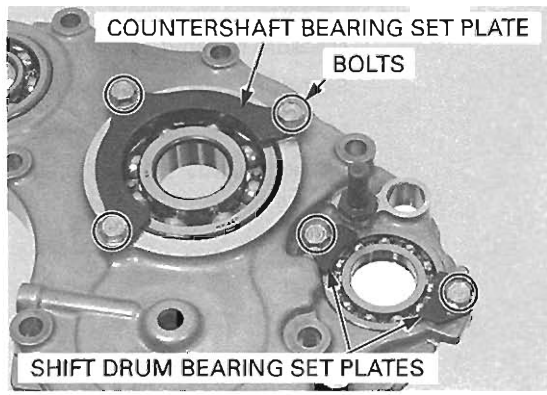


Holder bearing replacement

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 on the bearing holder.
Remove and discard the bearing, if the race does not turn smoothly, quietly, or fits loosely on the bearing holder.

Remove the bolts and countershaft bearing set plate.
Drive out the countershaft and final output shaft bearings from the bearing holder.

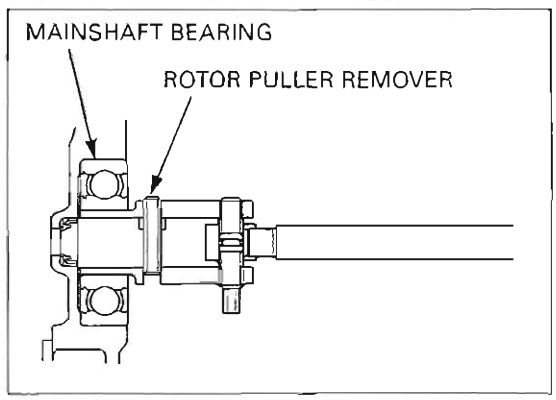
Remove the bolts and shift drum bearing set plate and replace the bearing with a new one.



Remove the mainshaft bearing using the special tools.

TOOLS:

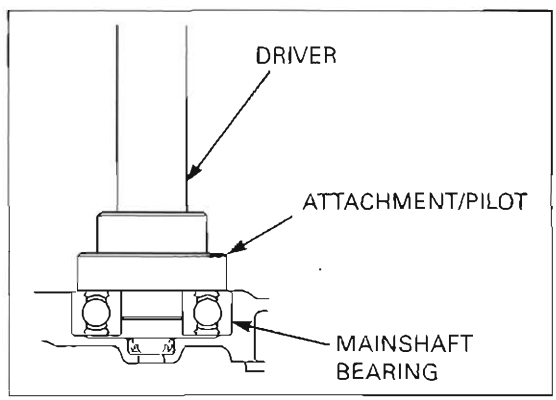
Rotor puller remover	**07JAC-PH80100**
Bearing remover shaft assembly	**07JAC-PH80200**
Remover weight	**07741-0010400**



Install new mainshaft bearing into the bearing holder using the special tools.

TOOLS:

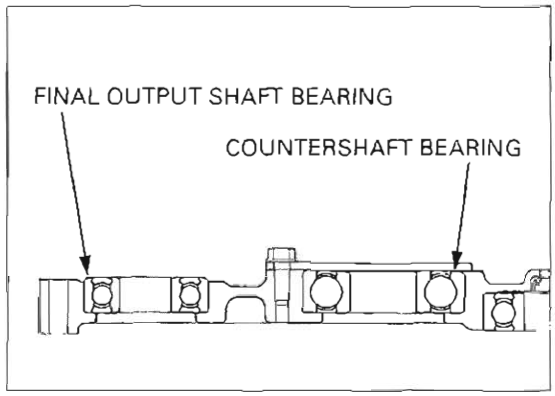
Driver	**07749-0010000**
Attachment, 52 X 55 mm	**07746-0010400**
Pilot, 22 mm	**07746-0041000**



Install the new countershaft and output shaft bearings into the bearing holder using the special tools.

TOOLS:

Countershaft bearing:	
Driver	**07749-0010000**
Attachment, 62 X 68 mm	**07746-0010500**
Pilot, 28 mm	**07746-0041100**
Final output shaft bearing:	
Driver	07749-0010000
Attachment, 52 X 55 mm	**07746-0010400**
Pilot, 22 mm	**07746-0041000**



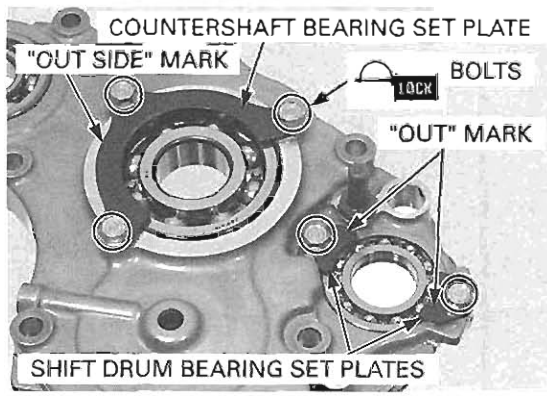
Apply a locking agent to the countershaft bearing and shift drum bearing set plate bolt threads.

Install the countershaft bearing set plate with its "OUT SIDE" mark facing out.
Tighten the bearing set plate bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

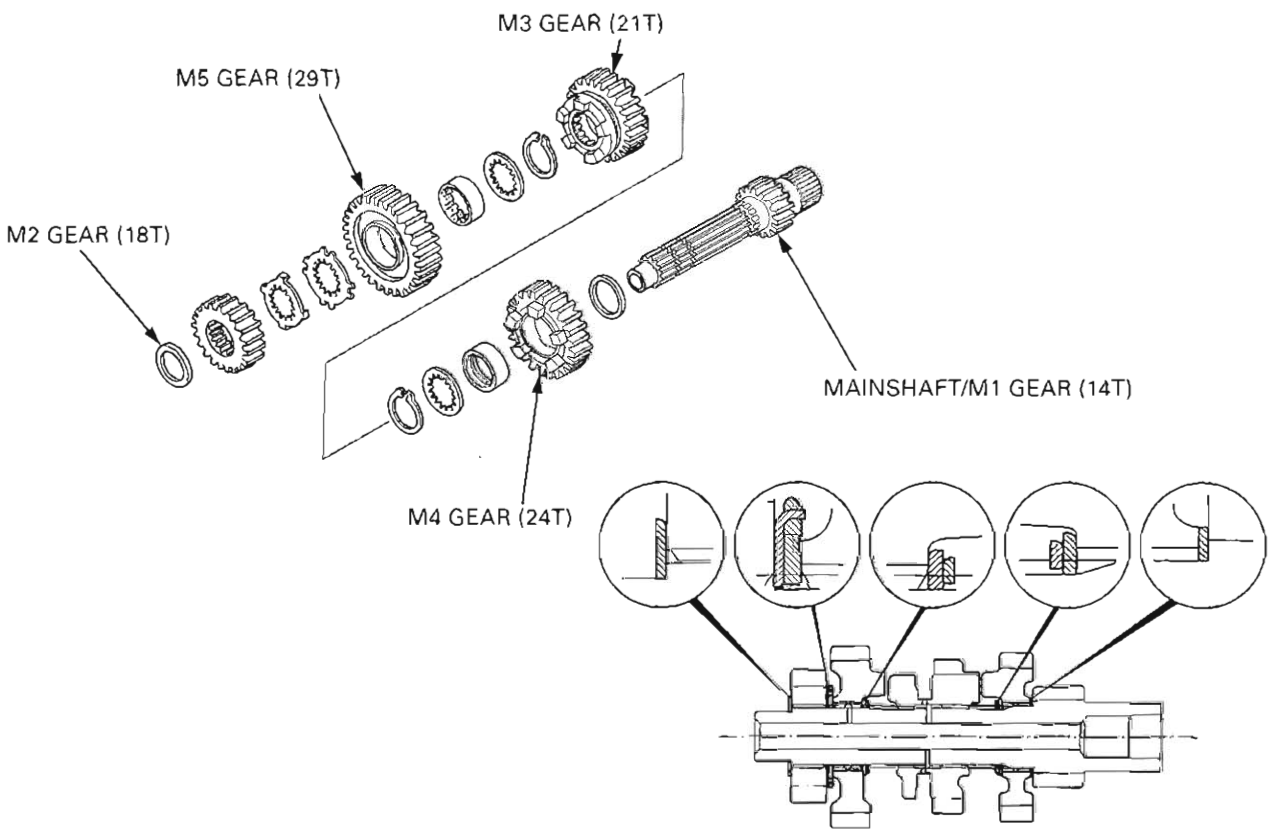
Install the shift drum bearing set plates with their "OUT" mark facing out.
Tighten the bearing set plate bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

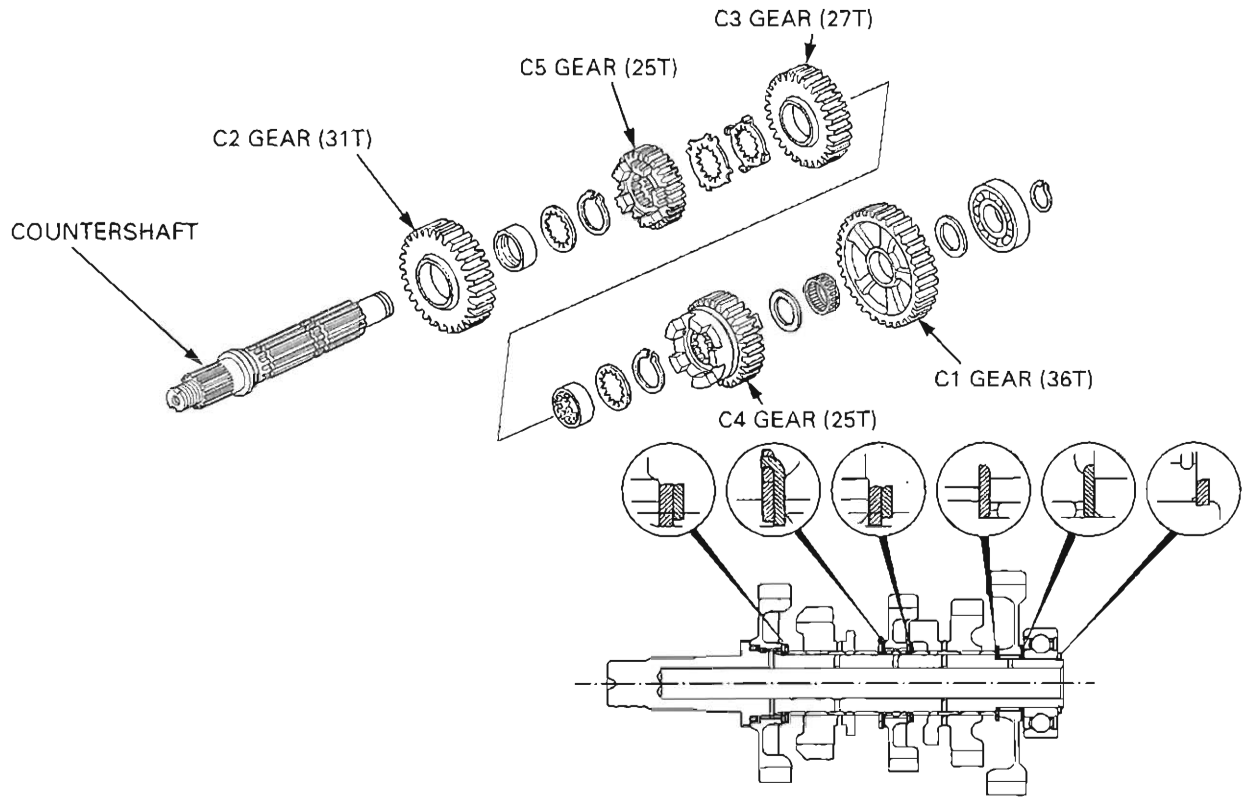


ASSEMBLY

Mainshaft:



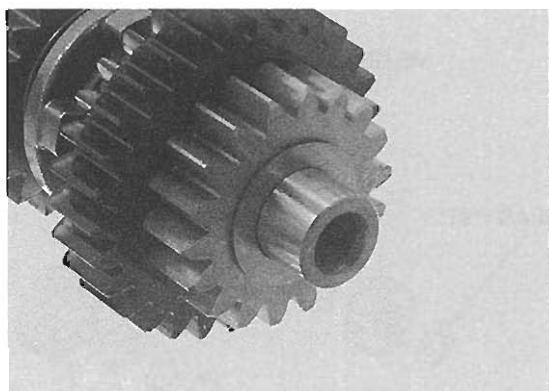
Countershaft:



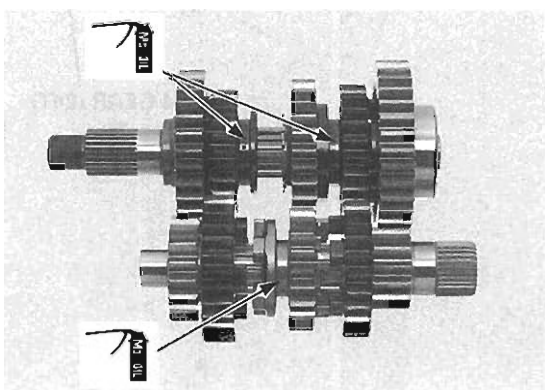
The mainshaft end washer is slightly harder to install, because it is the end stopper washer.

Assemble the transmission gear and shafts.

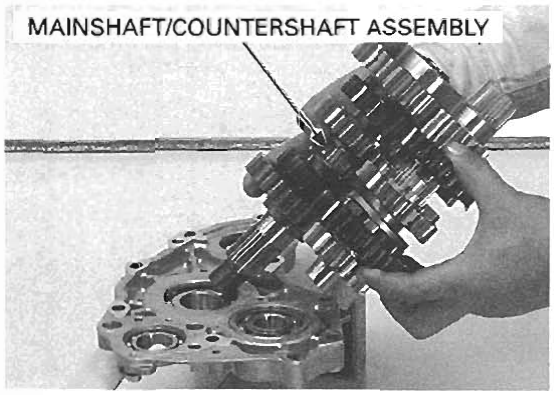
Coat each gear with clean engine oil and check for smooth movement.



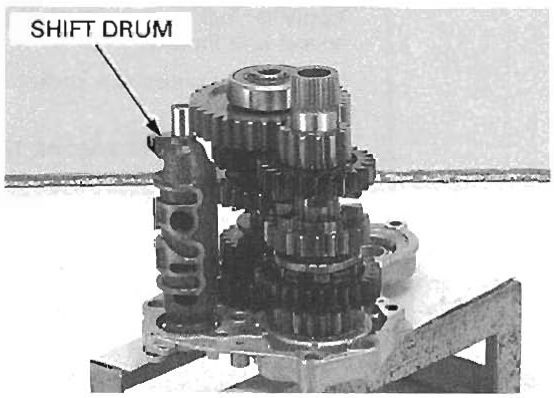
Apply molybdenum oil solution to the shift fork grooves in the M3, C4 and C5 gear.



Install the mainshaft/countershaft assembly into the bearing holder.

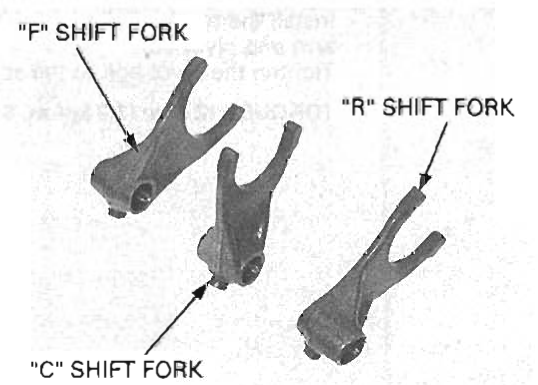


Install the shift drum.



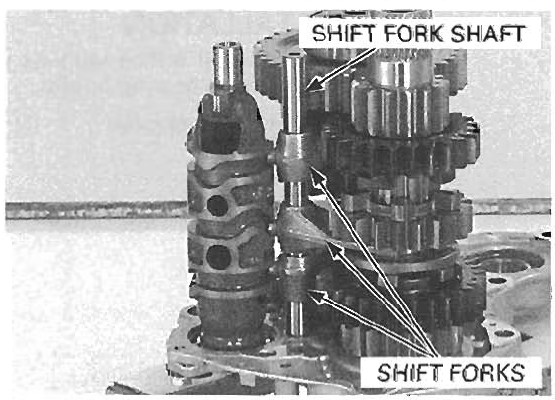
The shift forks have location marks.

- "F" for front
- "C" for center
- "R" for rear

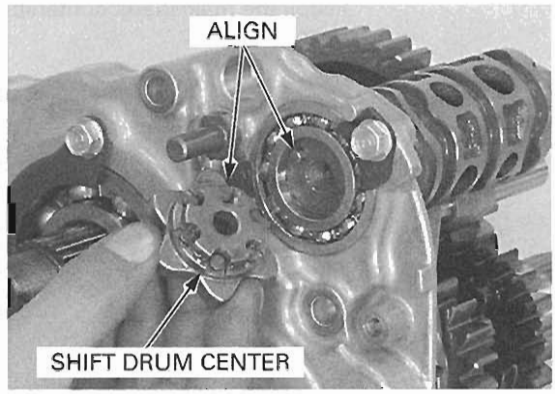


Face the rear shift fork identification mark to the crankcase side and front and center shift forks facing the bearing holder.

Install the shift forks and shift fork shaft.



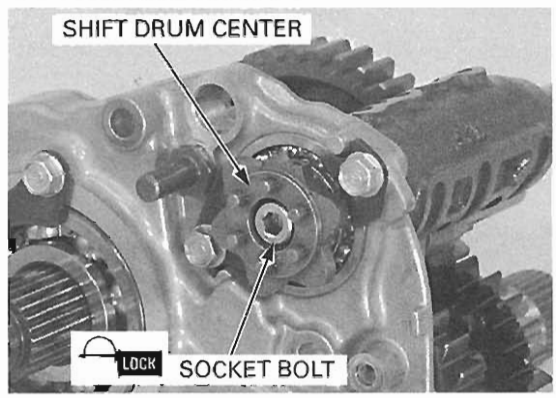
Install the shift drum center, aligning its wide cutout with the dowel pin on the shift drum.



Apply a locking agent to the shift drum center socket bolt threads.

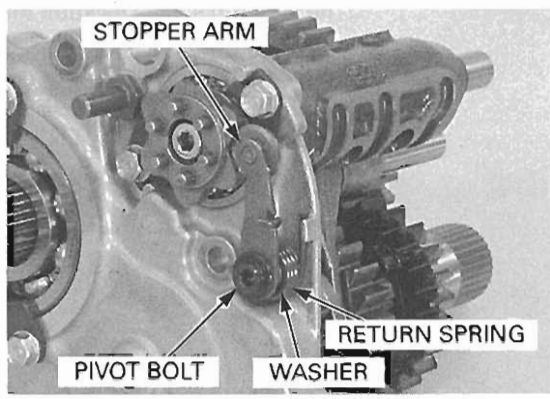
Install and tighten the socket bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the return spring, washer, shift drum stopper arm and pivot bolt.
Tighten the pivot bolt to the specified torque.

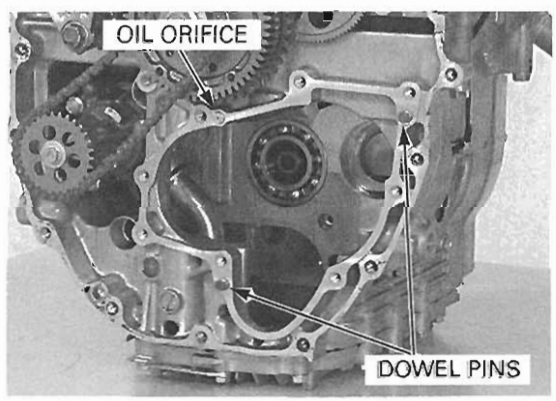
TORQUE: **12 N·m (1.2 kgf·m, 9 lbf·ft)**



INSTALLATION

Install the oil orifice with its small I.D. facing the transmission bearing holder.

Install the dowel pins.

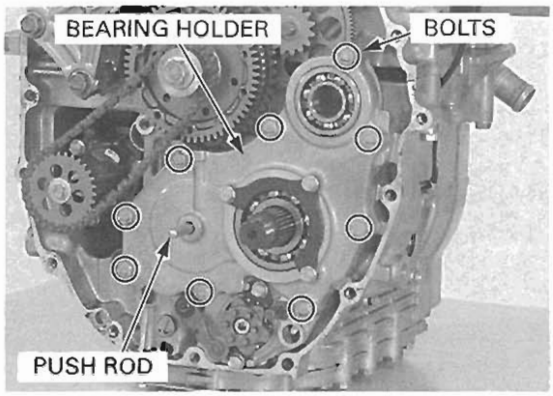


Install the transmission bearing holder assembly into the crankcase while aligning the mainshaft spline with the primary shaft spline by rotating the countershaft.
Next align the shift drum with the crankcase hole by moving the shift drum center.

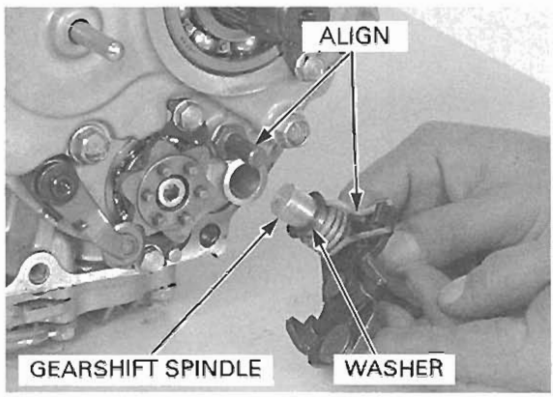
Install and tighten the transmission bearing holder bolt to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the clutch lifter push rod.



Install the gearshift spindle, aligning the return spring end with the return spring pin on the bearing holder.



11. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION 11-2

SERVICE INFORMATION 11-3

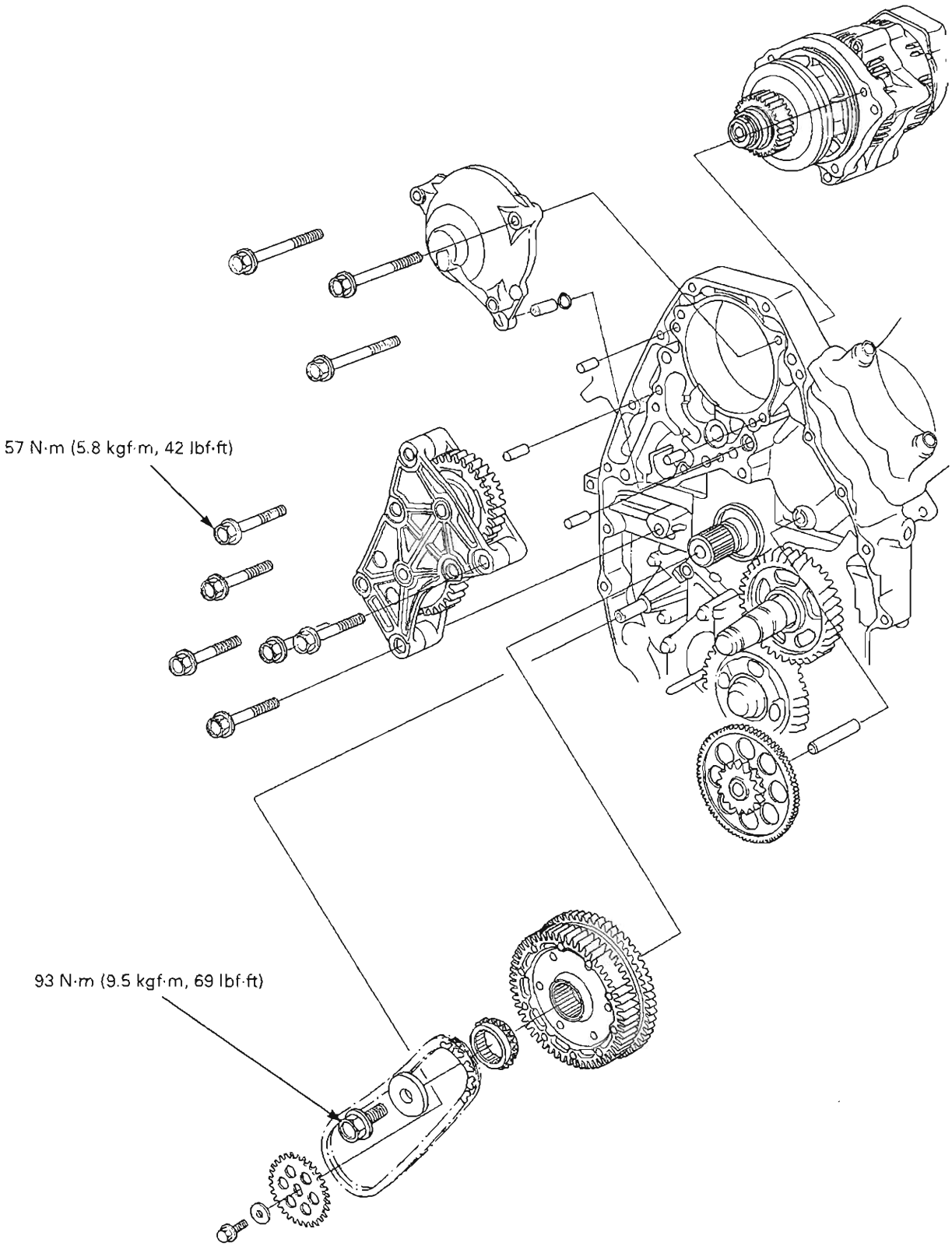
TROUBLESHOOTING 11-3

ALTERNATOR 11-4

ALTERNATOR DRIVEN GEAR 11-11

ALTERNATOR DRIVE GEAR/STARTER CLUTCH 11-18

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The alternator service can be done with the engine installed in the frame. Other services require engine removal.
- For charging system inspection see page 19-8.

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354 – 2.0361)	51.59 (2.031)
Alternator slip ring O.D.	14.4 (0.57)	12 (0.5)

TORQUE VALUES

Starter drive gear flange bolt	93 N·m (9.5 kgf·m, 69 lbf·ft)	Apply oil to the threads and flange surface
Alternator drive gear socket bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply a locking agent to the threads
Alternator damper shaft lock nut	86 N·m (8.8 kgf·m, 64 lbf·ft)	Apply a locking agent to the threads
Alternator idle gear case mounting bolt	57 N·m (5.8 kgf·m, 42 lbf·ft)	

TOOLS

Gear holder, 2.5	07724–0010100	or 07724-001A100 (U.S.A. only)
Driver	07749–0010000	
Attachment, 42 X 47 mm	07746–0010300	
Pilot, 25 mm	07749–0040600	
Driver, 22mm I.D.	07746–0020100	
Attachment, 15 mm (I.D.)	07749–0020200	

TROUBLESHOOTING

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

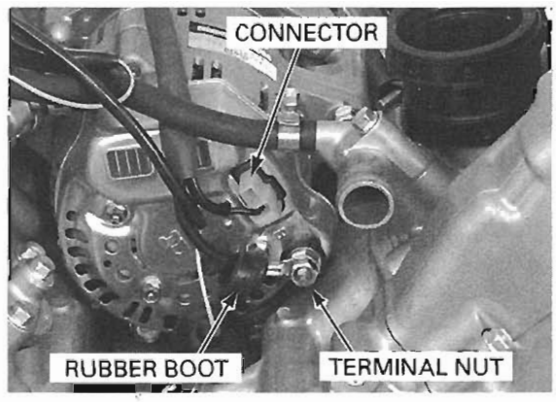
ALTERNATOR

REMOVAL

Remove the following:

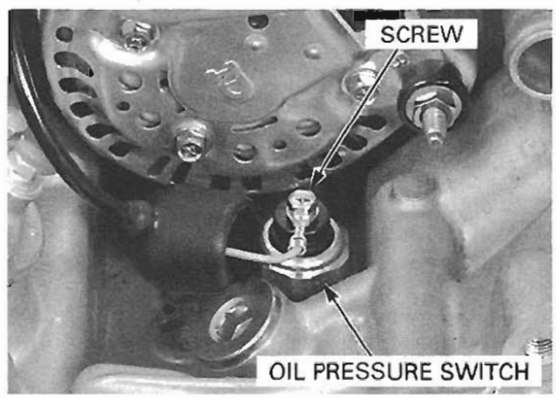
- Throttle body (page 5-64)
- Radiator (page 6-13)
- Thermostat housing (page 6-8)

Remove the rubber boot and terminal nut.
Remove the alternator connector and terminal eyelet.

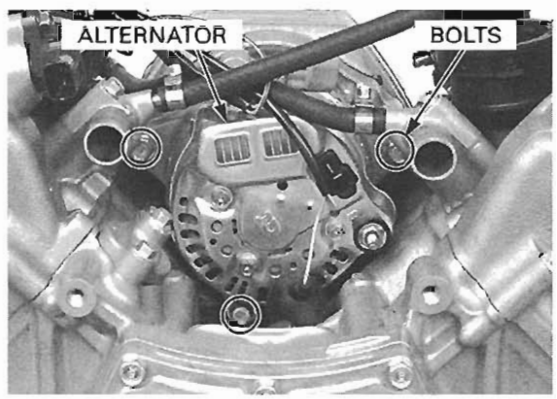


Remove the screw and oil pressure switch terminal from the switch.

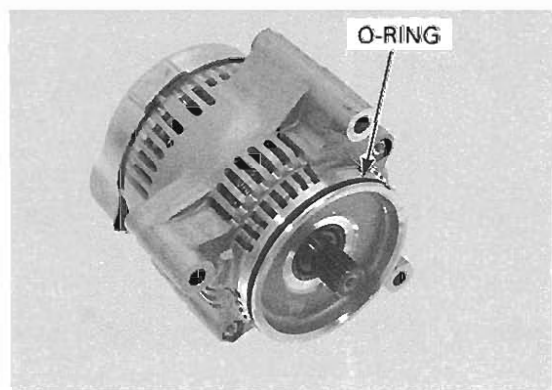
Remove the oil pressure switch (page 22-21).



Remove the alternator mounting bolts.



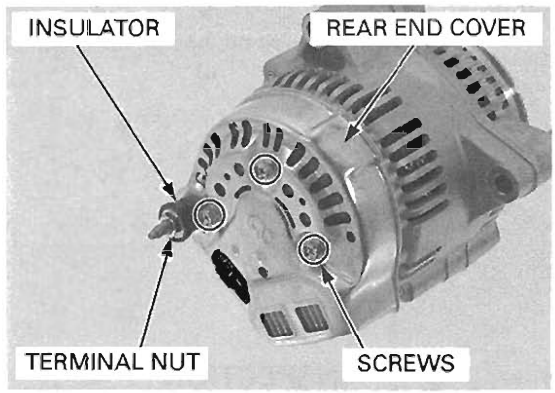
Remove the O-ring from the front cover.



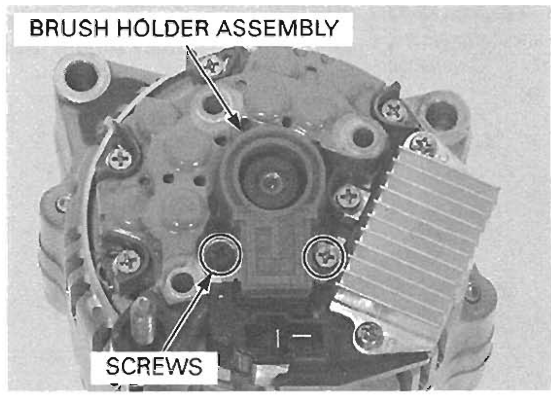
DISASSEMBLY

Remove the terminal nut terminal insulator.

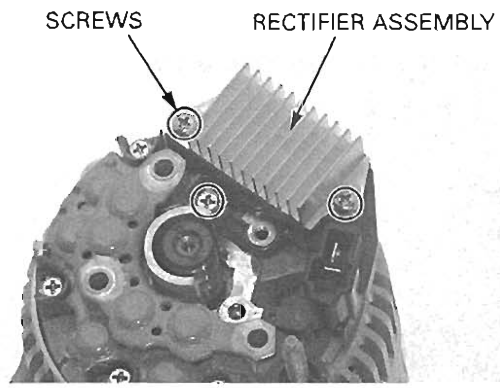
Remove the screws and rear end cover.



Remove the screws and brush holder assembly.

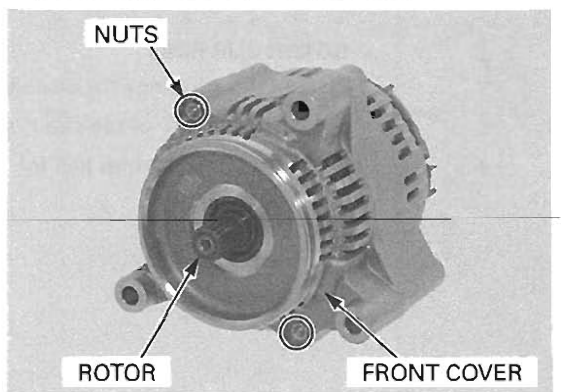


Remove the screws and rectifier assembly.



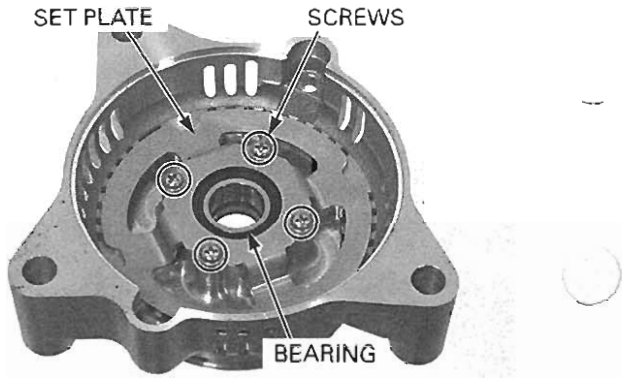
Remove the nuts and front cover.

Remove the rotor assembly from the alternator housing.



Remove the screw and bearing set plate from the front cover.

Remove the bearing and spacer.

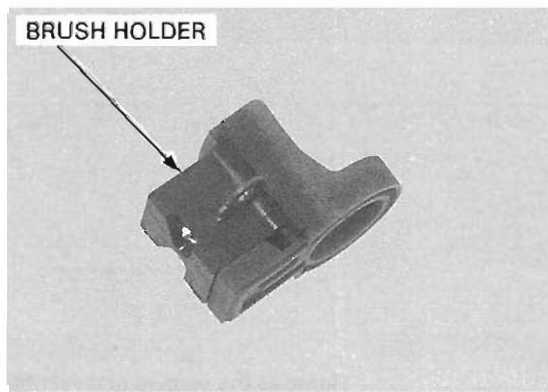


INSPECTION

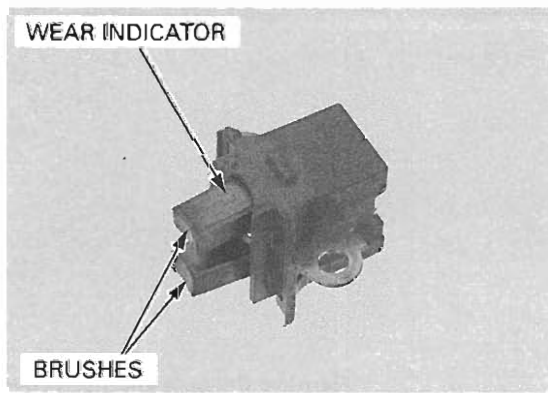
See page 19-9 for alternator electrical inspection.

BRUSH

Remove the brush holder from the brush holder assembly.



Replace the brush holder assembly if the brushes are worn to near the wear indicators.

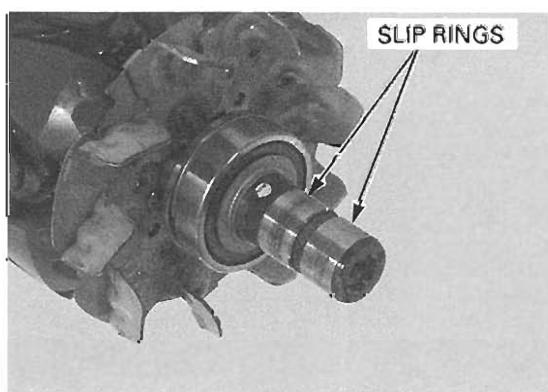


ROTOR SLIP RING

Inspect the slip rings for discoloration.

Measure the O.D. of the slip rings.

SERVICE LIMIT: 12 mm (0.5 in)

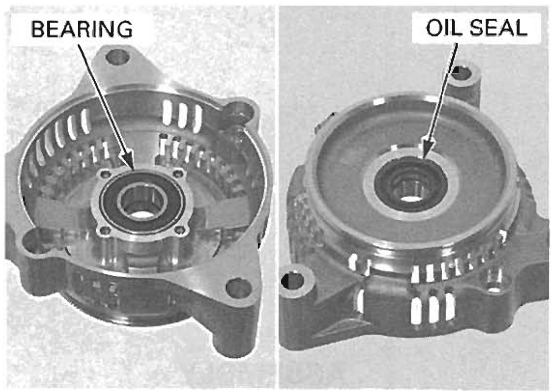


ROTOR SHAFT BEARING/OIL SEAL

Turn the front rotor bearing inner race with your finger.
The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the front cover.

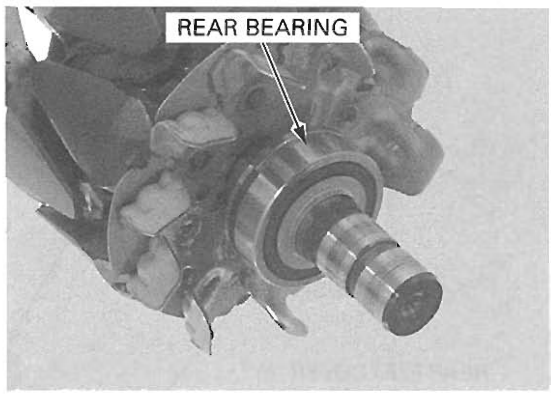
Replace the bearing if the races do not turn smoothly, quietly, or they fit loosely in the cover.

Check the oil seal in the front cover for damage, replace it if necessary.



Turn the rear rotor bearing outer race with your finger.
The bearing should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the rotor shaft.

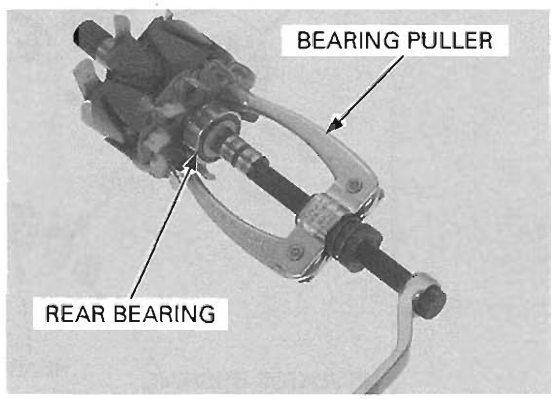
Replace the bearing if the races do not turn smoothly, quietly, or they fit loosely on the shaft.



REAR ROTOR SHAFT BEARING REPLACEMENT

Be careful not to damage the rotor shaft end.

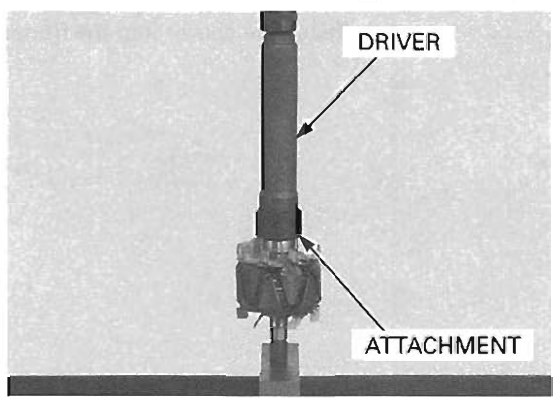
Remove the rear rotor shaft bearing with insulator bushing using a universal bearing puller.



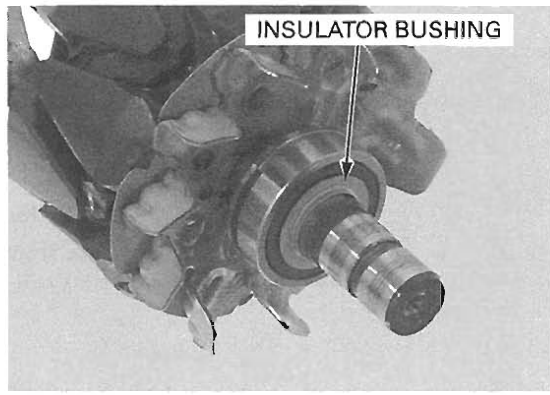
Drive a new front bearing onto the rotor shaft using the special tools.

TOOLS:

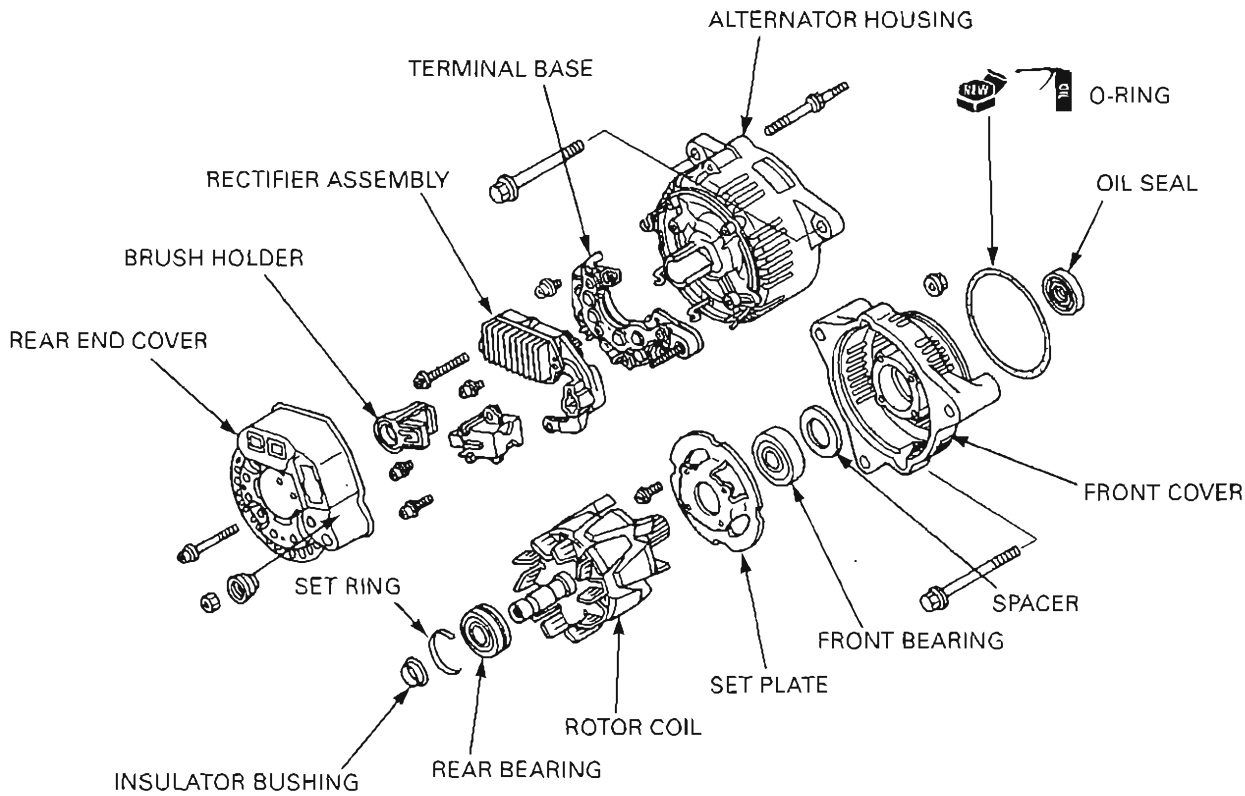
Driver, 22 mm I.D.	**07746-0020100**
Attachment, 15 mm (I.D.)	**07746-0020200**



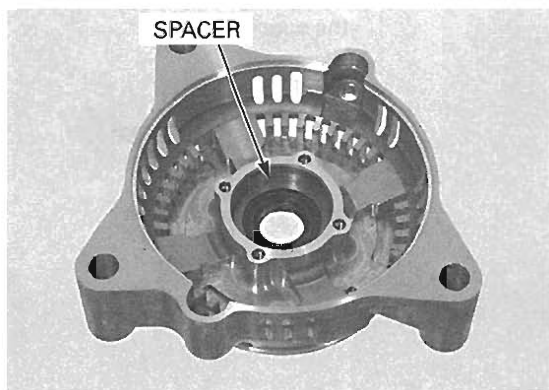
Install the insulator bushing.



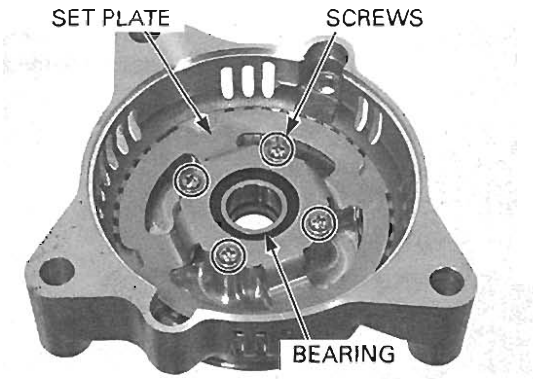
ASSEMBLY



Install the spacer into the front cover.

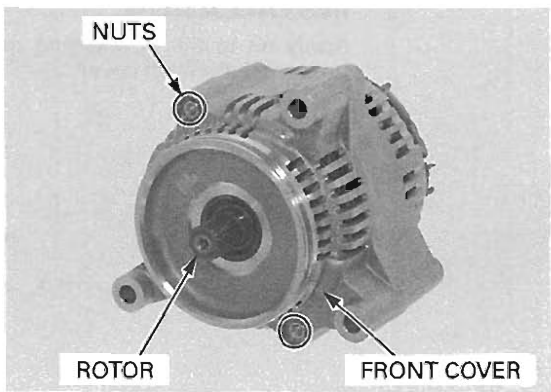


Install the bearing set plate and tighten the screws securely.

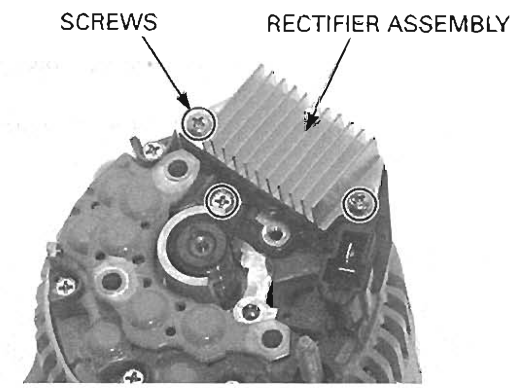


Install the rotor assembly into the alternator housing.

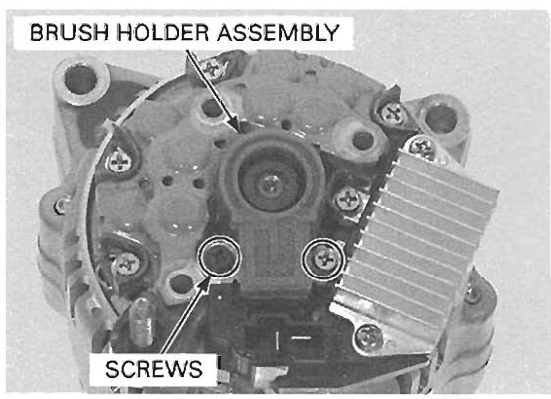
Install the front cover and tighten the nuts securely.



Install the rectifier assembly onto the alternator housing and tighten the screws securely.

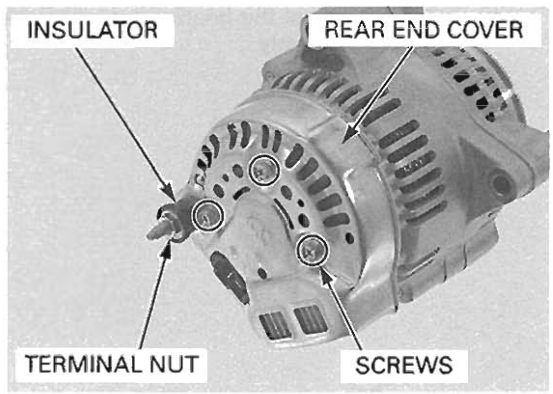


Install the brush holder assembly and tighten the screws securely.



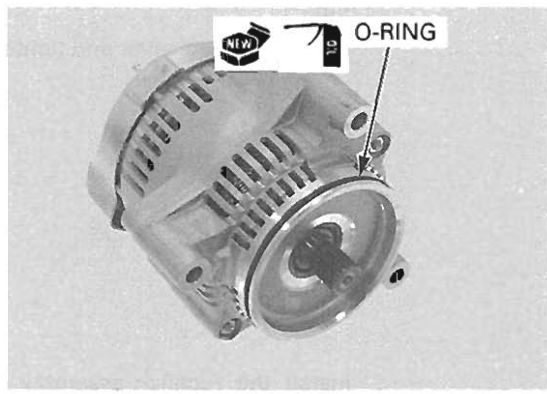
Install the rear end cover and tighten the screw securely.

Install the terminal insulator and tighten the terminal nut.



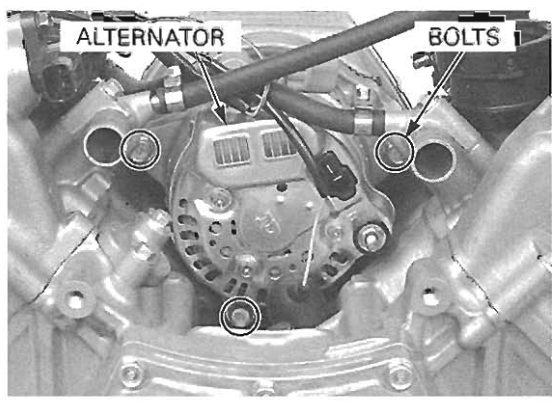
INSTALLATION

Apply oil to the new O-ring and install it into the groove of the front cover.



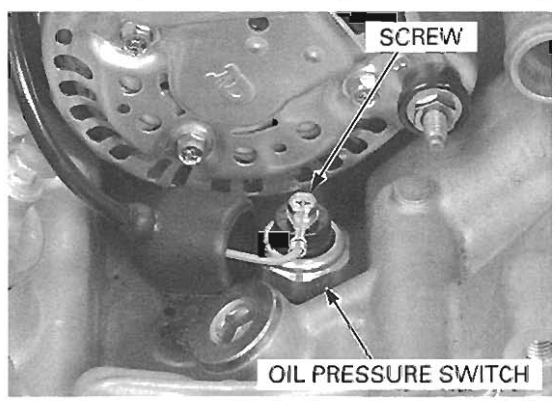
Install the alternator assembly into the alternator base while aligning the rotor shaft spline with the damper shaft.

Install and tighten the alternator mounting bolts.



Install the oil pressure switch (page 22-21).

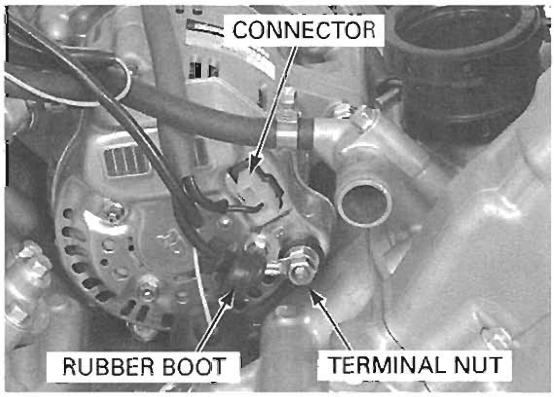
Install the oil pressure switch terminal to the switch and tighten the terminal screw securely.



Install the alternator connector and terminal eyelet.
Tighten the terminal nut securely.
Install the rubber boot to the terminal.

Install the following:

- Thermostat housing (page 6-10)
- Radiator (page 6-17)
- Throttle body (page 5-68)

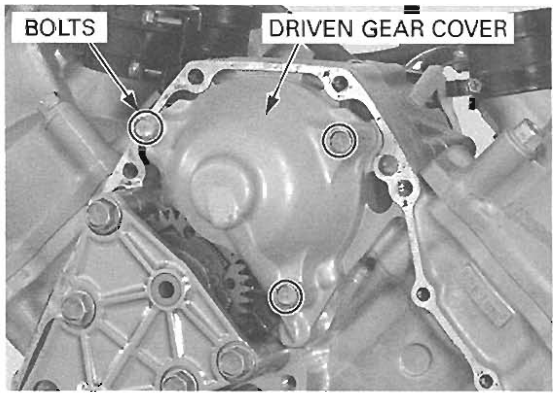


ALTERNATOR DRIVEN GEAR

REMOVAL

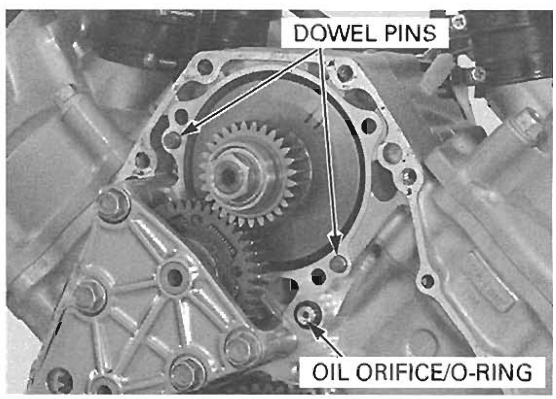
Remove the rear crankcase cover (page 10-6).

Remove the bolts and driven gear cover.



Remove the following:

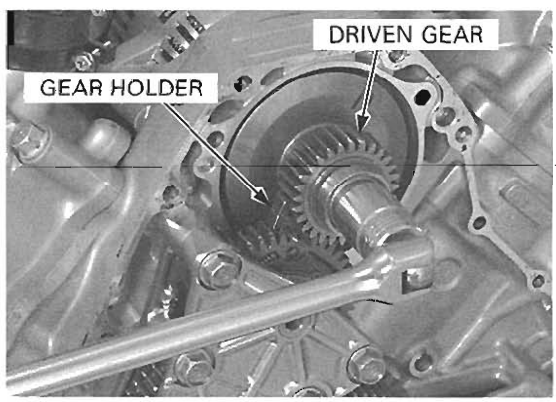
- Dowel pins
- Oil orifice
- O-ring



Hold the alternator driven gear and idle gear A with a gear holder, loosen the alternator driven gear lock nut.

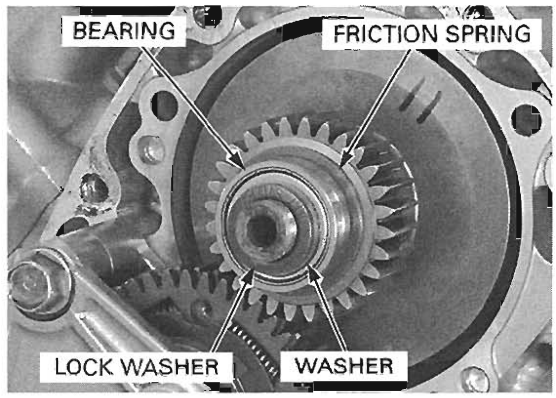
TOOL:

Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**



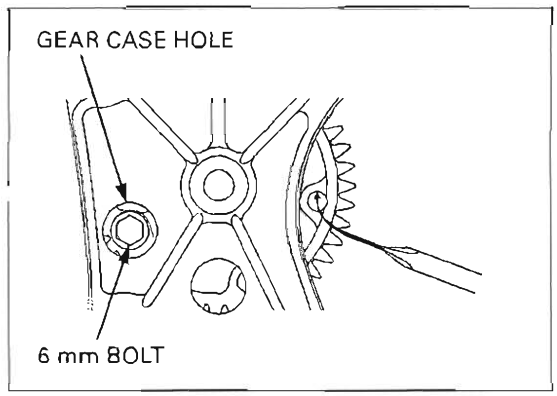
Remove the following:

- Lock washer
- Washer
- Bearing
- Friction spring collar
- Friction spring

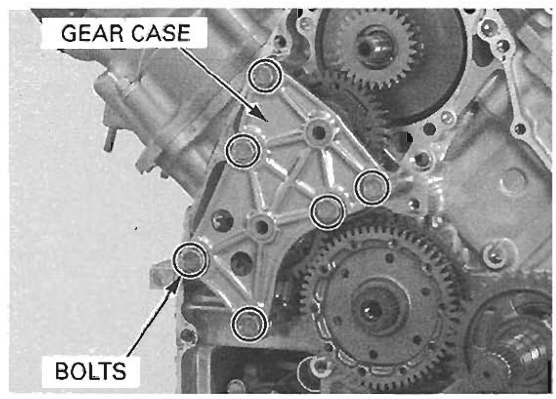


Turn the crankshaft and align the alternator drive gear train case hole with the alternator idle gear B bolt hole.

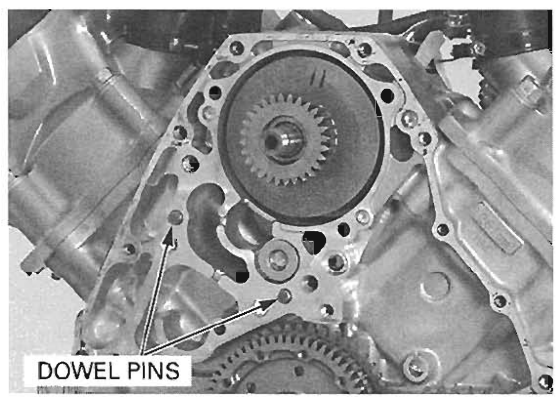
Align the alternator idle gear B and sub-gear teeth with a screwdriver and secure them with a 6 X 16 mm bolt as shown.



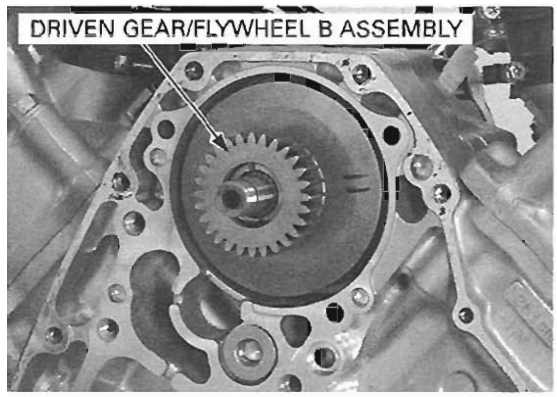
Remove the alternator drive gear case mounting bolts and gear case assembly.



Remove the dowel pins.

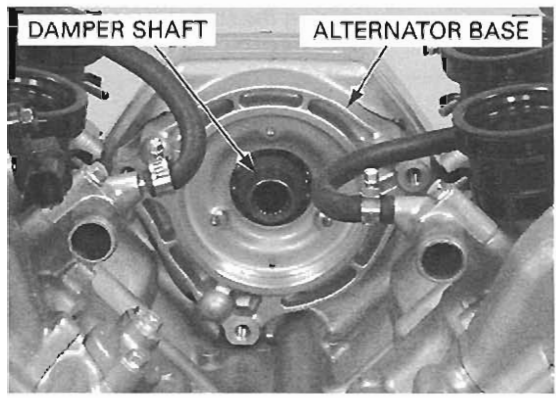


Remove the alternator driven gear/flywheel B assembly from the alternator damper shaft.



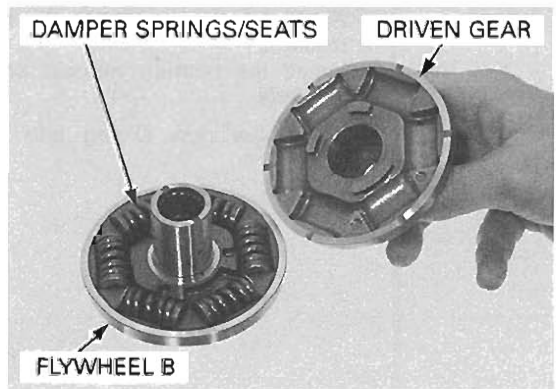
Remove the alternator assembly (page 11-4).

Remove the alternator damper shaft and alternator base from the cylinder block.



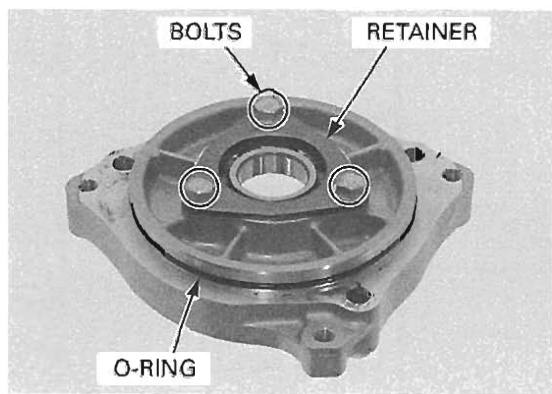
Remove the alternator driven gear from the flywheel B.

Remove the damper springs and spring seats from the flywheel B.

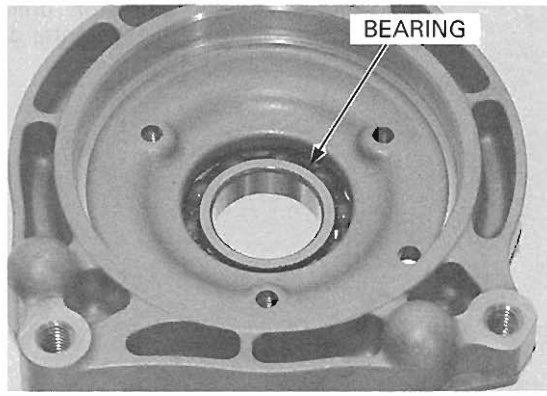


DAMPER SHAFT BEARING REPLACEMENT

Remove the O-ring from the alternator base.
Remove the bolts and damper shaft bearing retainer.



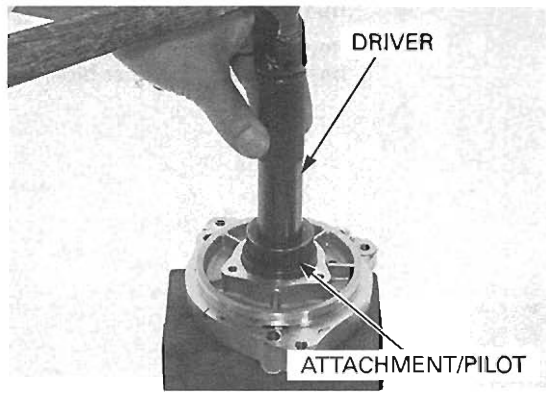
Drive the bearing out of the alternator base.



Using the special tools, drive the damper shaft bearing into the alternator base until it seats.

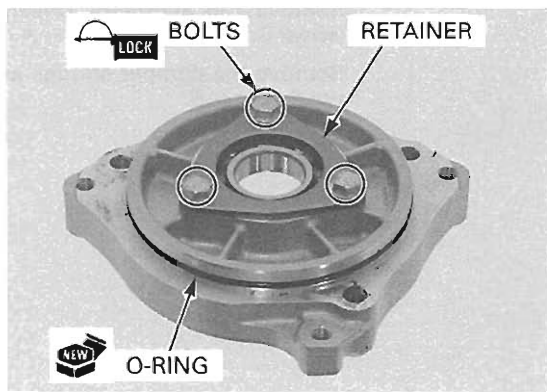
TOOLS:

Driver	**07749-0010000**
Attachment, 42 X 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

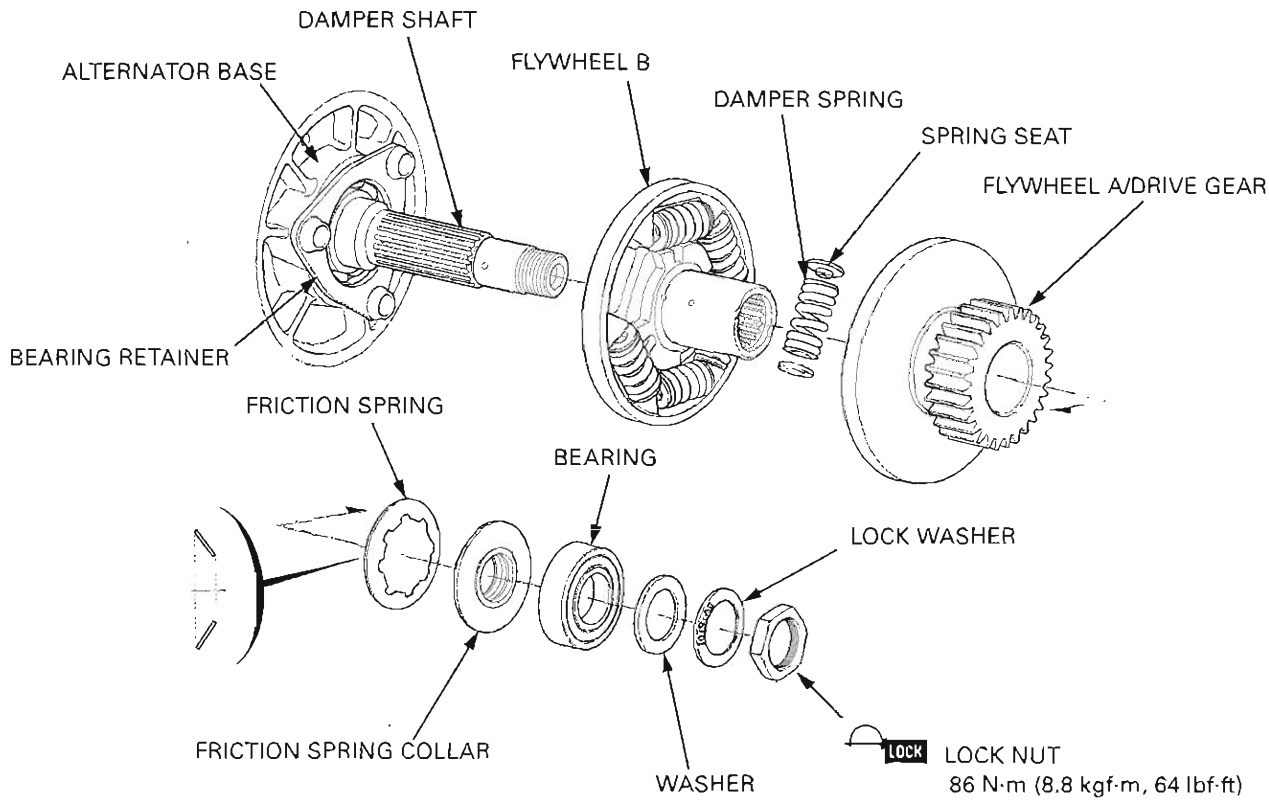


Apply a locking agent to the bearing retainer bolt threads.
Install the bearing retainer and tighten the bolts securely.

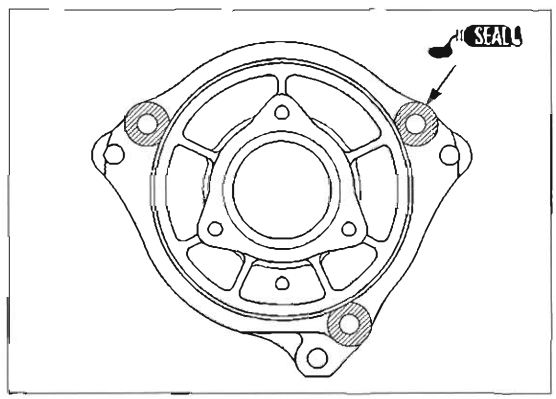
Install the new O-ring into the alternator base groove.



INSTALLATION

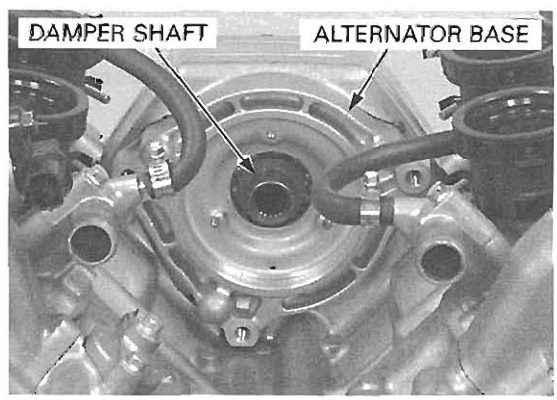


Apply sealant to the alternator base mounting bolt area as shown.



Install the alternator base into the cylinder block.

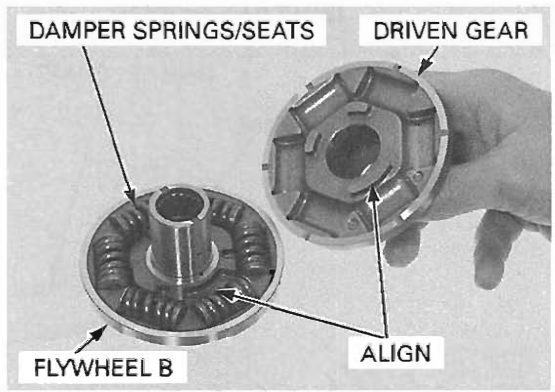
Install the alternator damper shaft into the bearing.



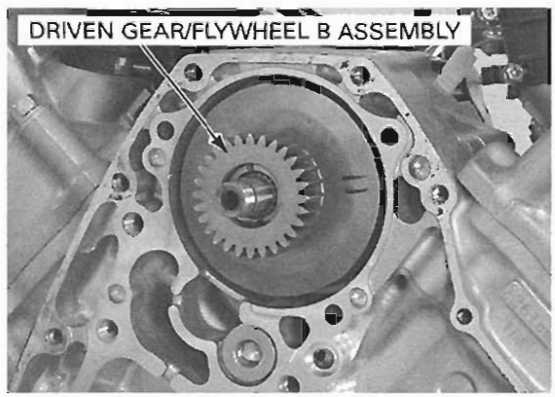
Install the damper springs and spring seats into the flywheel B grooves.

Assemble the alternator driven gear and the flywheel B aligning the wide boss and groove as shown.

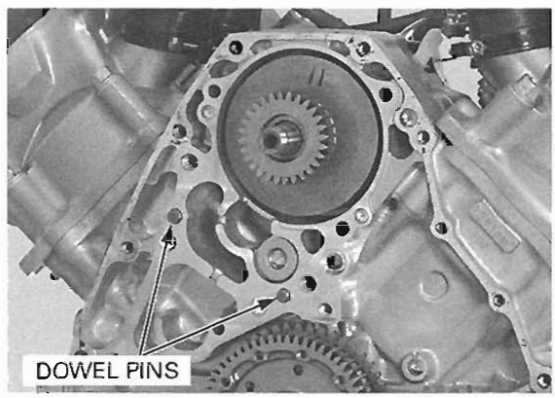
Install the alternator assembly (page 11-10).



Install the alternator driven gear/flywheel B assembly onto the alternator damper shaft.

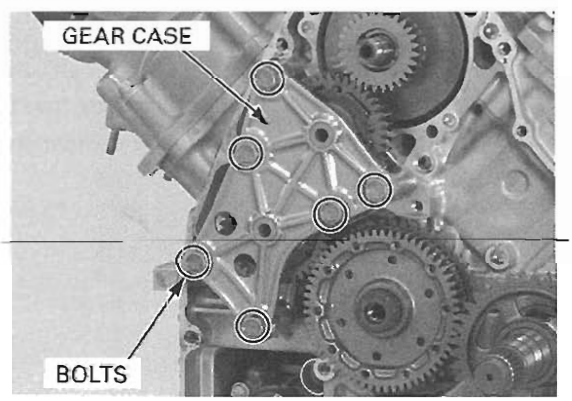


Install the dowel pins.

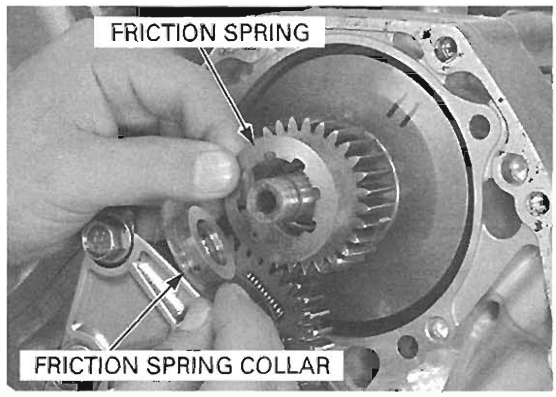


Install the alternator drive gear case assembly while aligning the idle gear A and sub gear teeth with a screwdriver.
Install and tighten the gear case mounting bolt to the specified torque.

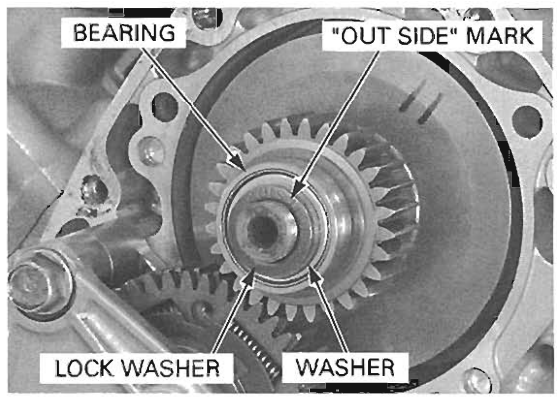
TORQUE: 57 N·m (5.8 kgf·m, 42 lbf·ft)



Install the friction spring with its dished side facing in.
Install the friction spring collar.



Install the bearing with its sealed side facing out.
Install the washer.
Install the lock washer with it "OUT SIDE" mark facing out.



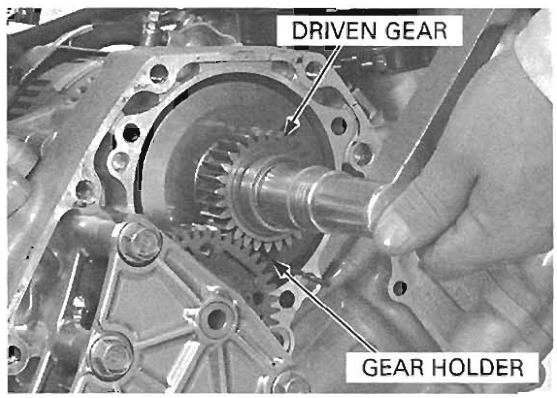
Apply a locking agent to the alternator damper shaft lock nut threads.
Install the lock nut onto the damper shaft.

Hold the alternator driven gear and idle gear A with a gear holder, tighten the alternator damper shaft lock nut to the specified torque.

TOOL:

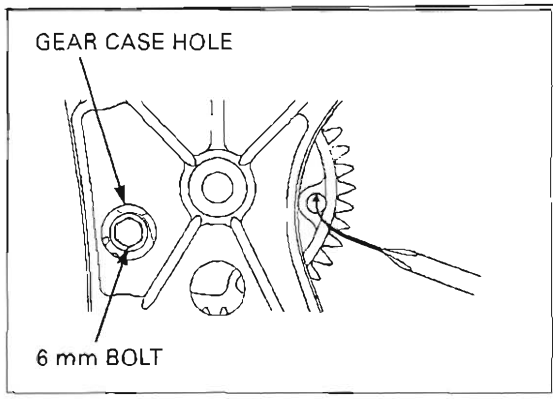
Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

TORQUE: 86 N·m (8.8 kgf·m, 64 lbf·ft)



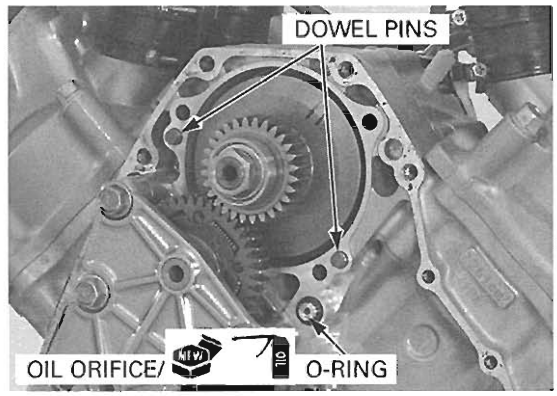
Turn the crankshaft and align the alternator drive gear train case hole with the 6 mm bolt that was installed while removing the gear case.

Remove the 6 mm bolt from the idle gear B while holding the gear hole with a screwdriver.



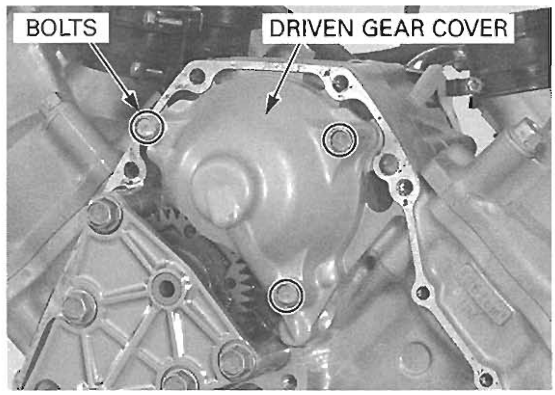
Install the dowel pins.

Install the oil orifice with its small I.D. side facing the drive gear cover.
Apply engine oil to the new O-ring and install it onto the oil orifice.



Install the driven gear cover and tighten the bolts securely.

Install the rear crankcase cover (page 10-8).

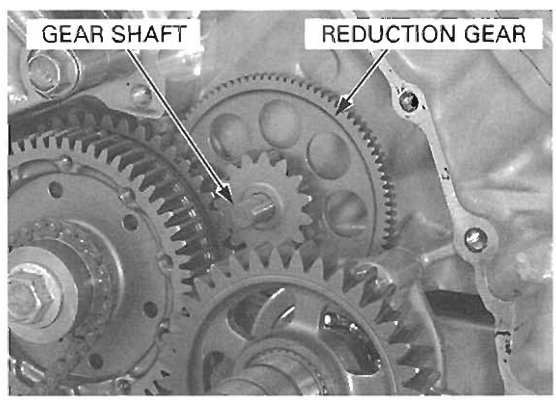


ALTERNATOR DRIVE GEAR/STARTER CLUTCH

REMOVAL

Remove the rear crankcase cover (page 10-6).

Remove the starter reduction gear shaft and starter reduction gear.

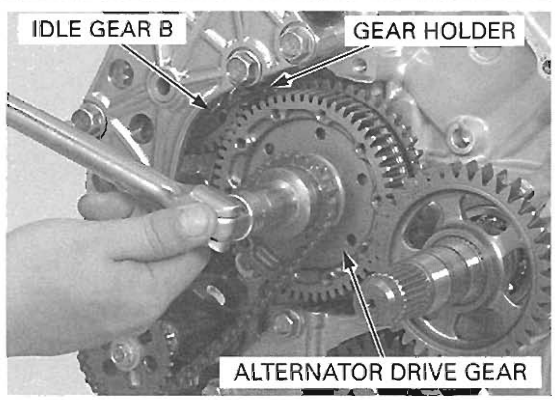


Hold the alternator drive gear and idle gear B with the gear holder, loosen the alternator drive/starter clutch bolt.

TOOL:

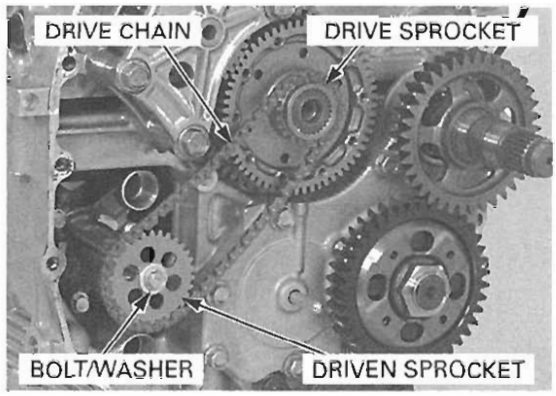
Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

Remove the bolt and washer.



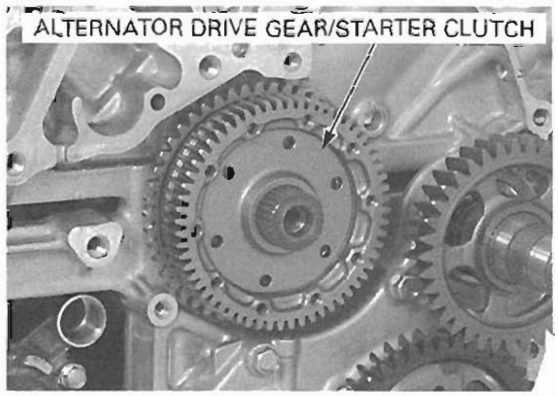
Remove the oil pump driven sprocket bolt/washer.

Remove the oil pump drive sprocket, driven sprocket and drive chain.



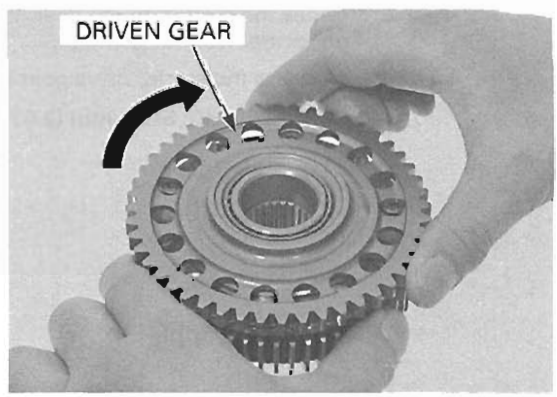
Remove the alternator idle gear case assembly (page 11-12).

Remove the alternator drive gear/starter clutch assembly from the crankshaft.

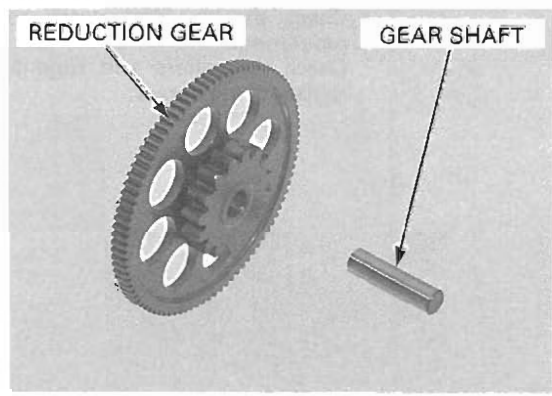


INSPECTION

Check the operation of the one-way clutch by turning the starter driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.



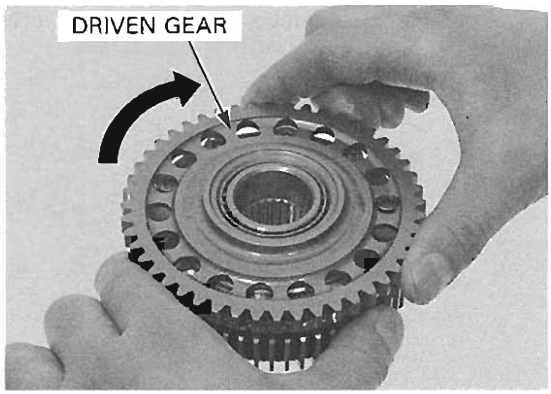
Check the starter reduction gear and shaft for wear or other damage.



DISASSEMBLY

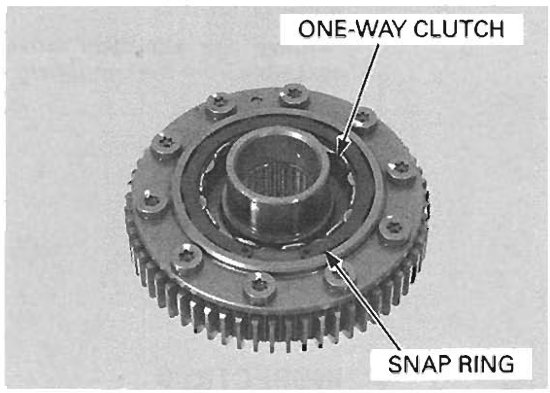
Remove the starter driven gear while rotating it clockwise.

Remove the needle bearing.



Remove the snap ring.

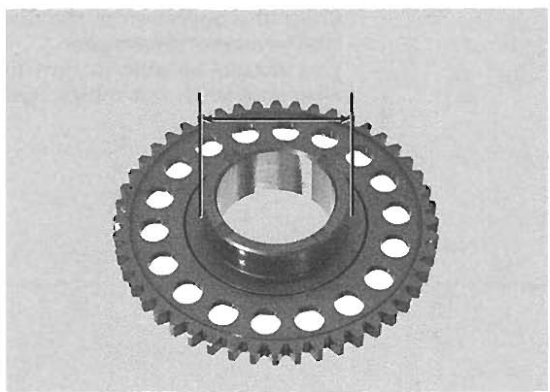
Remove the one-way clutch from the clutch outer by turning it counterclockwise.



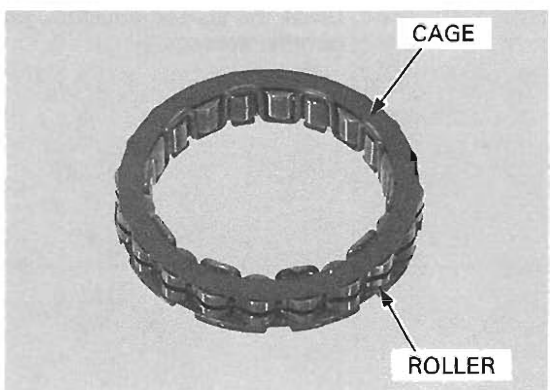
Check the starter driven gear and needle bearing for abnormal wear or damage.

Measure the starter drive gear boss O.D.

SERVICE LIMIT: 51.59 mm (2.031 in)

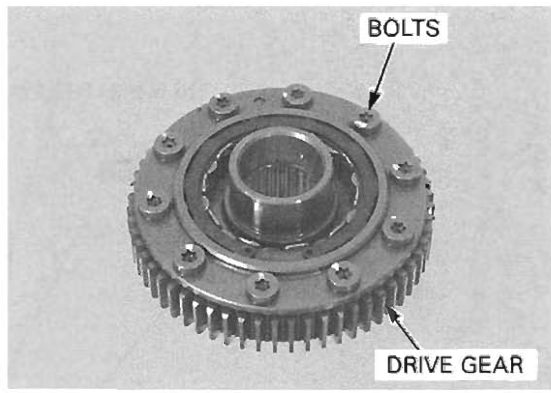


Check the one-way clutch roller for freedom of movement.
Check the rollers and cage for wear or damage, replace if necessary.

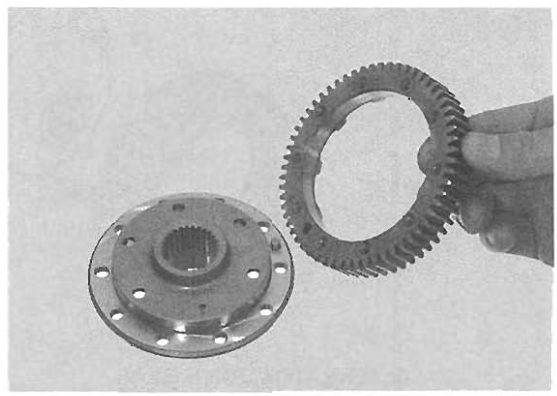


ALTERNATOR DRIVE GEAR REPLACEMENT

Remove the alternator drive gear mounting torx bolts.
Remove the alternator drive gear from the starter clutch outer.

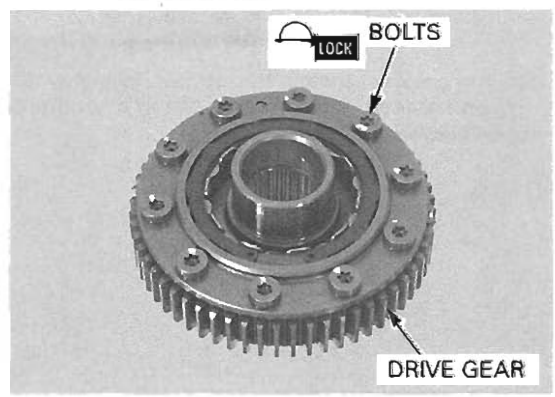


Install the alternator drive gear onto the starter clutch outer while aligning its dowel pin hole with the dowel pin on the starter clutch outer.

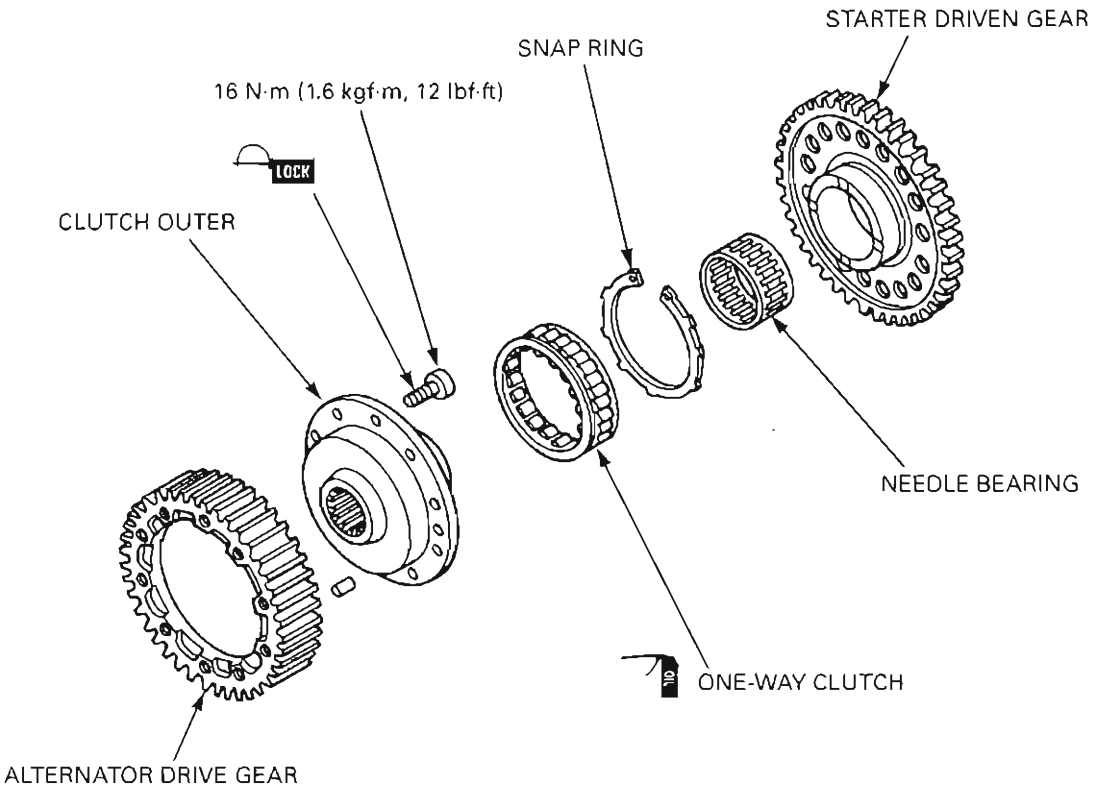


Apply a locking agent to the alternator drive gear mounting bolt threads.
Install and tighten the bolts to the specified torque.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



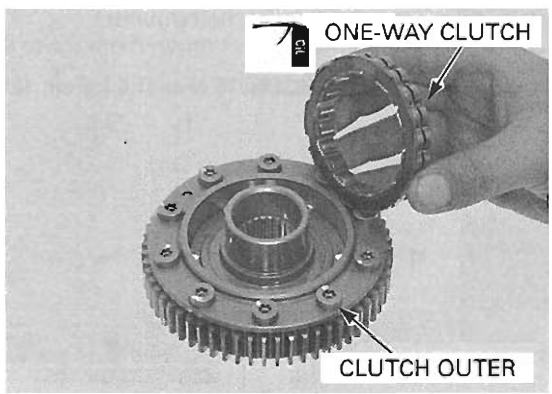
ASSEMBLY



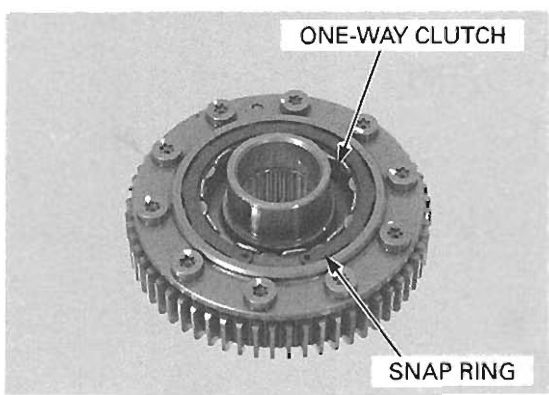
Apply clean engine oil to the starter one-way clutch.

Install the one-way clutch with its flange side facing in

Install the starter one-way clutch into the clutch outer while rotating it counterclockwise.

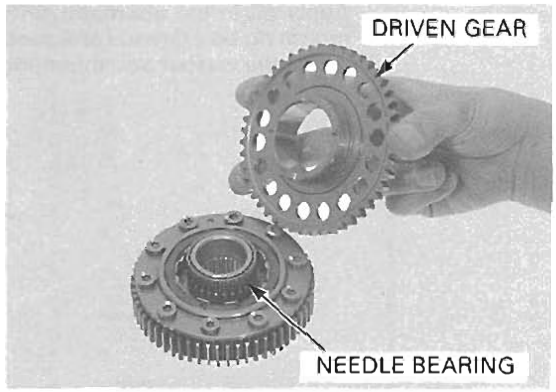


Install the snap ring into the clutch outer groove securely.

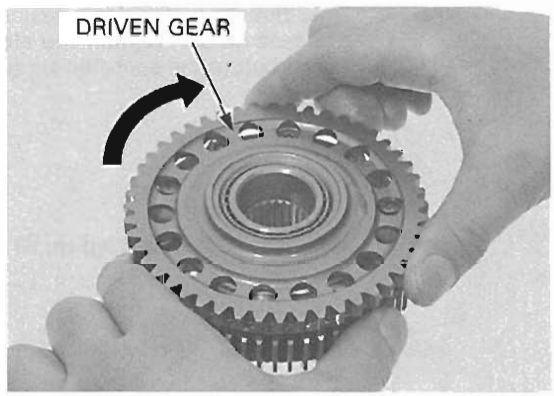


Install the needle bearing.

Install the starter driven gear while rotating it clockwise.



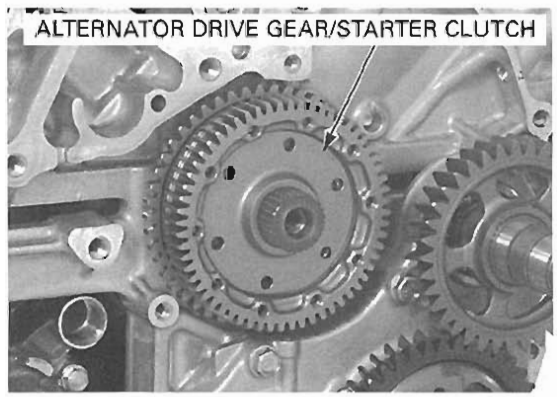
Recheck the one-way clutch operation.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.



INSTALLATION

Install the alternator drive gear/starter clutch assembly onto the crankshaft.

Install the alternator idle gear case assembly (page 11-16).

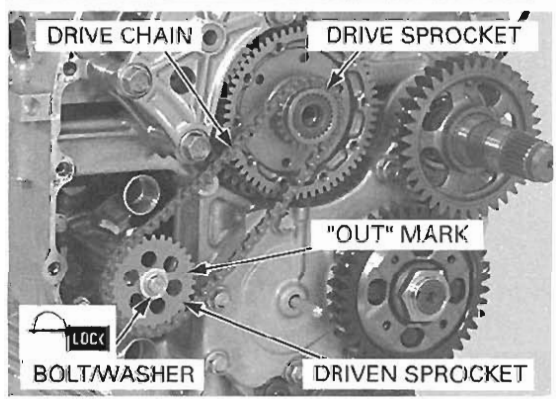


Install the oil pump driven sprocket with its "OUT" mark facing out.

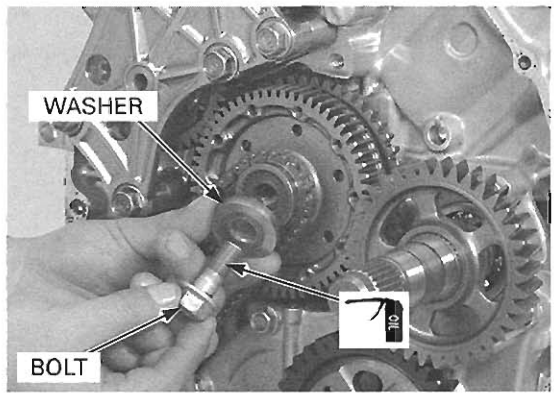
Install the oil pump drive sprocket, driven sprocket and drive chain.

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

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



Apply oil to the alternator drive gear/starter clutch mounting bolt threads and seating surface.
Install the washer and mounting bolt.

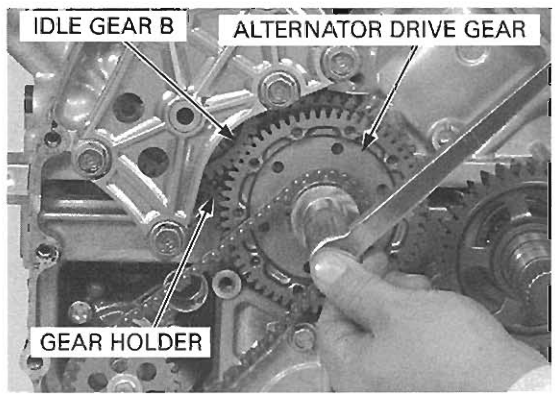


Hold the alternator drive gear and idle gear B with the gear holder, tighten the alternator drive/starter clutch bolt to the specified torque.

TOOL:

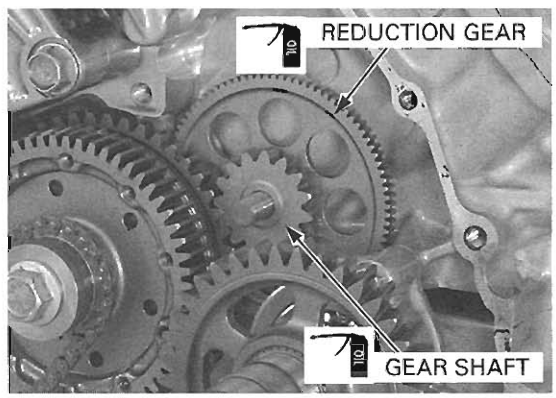
Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)



Apply oil to the starter reduction gear and shaft.
Install the starter reduction gear and starter reduction gear shaft.

Install the rear crankcase cover (page 10-8).



12. CRANKCASE/BALANCER

COMPONENT LOCATION 12-2

SERVICE INFORMATION 12-3

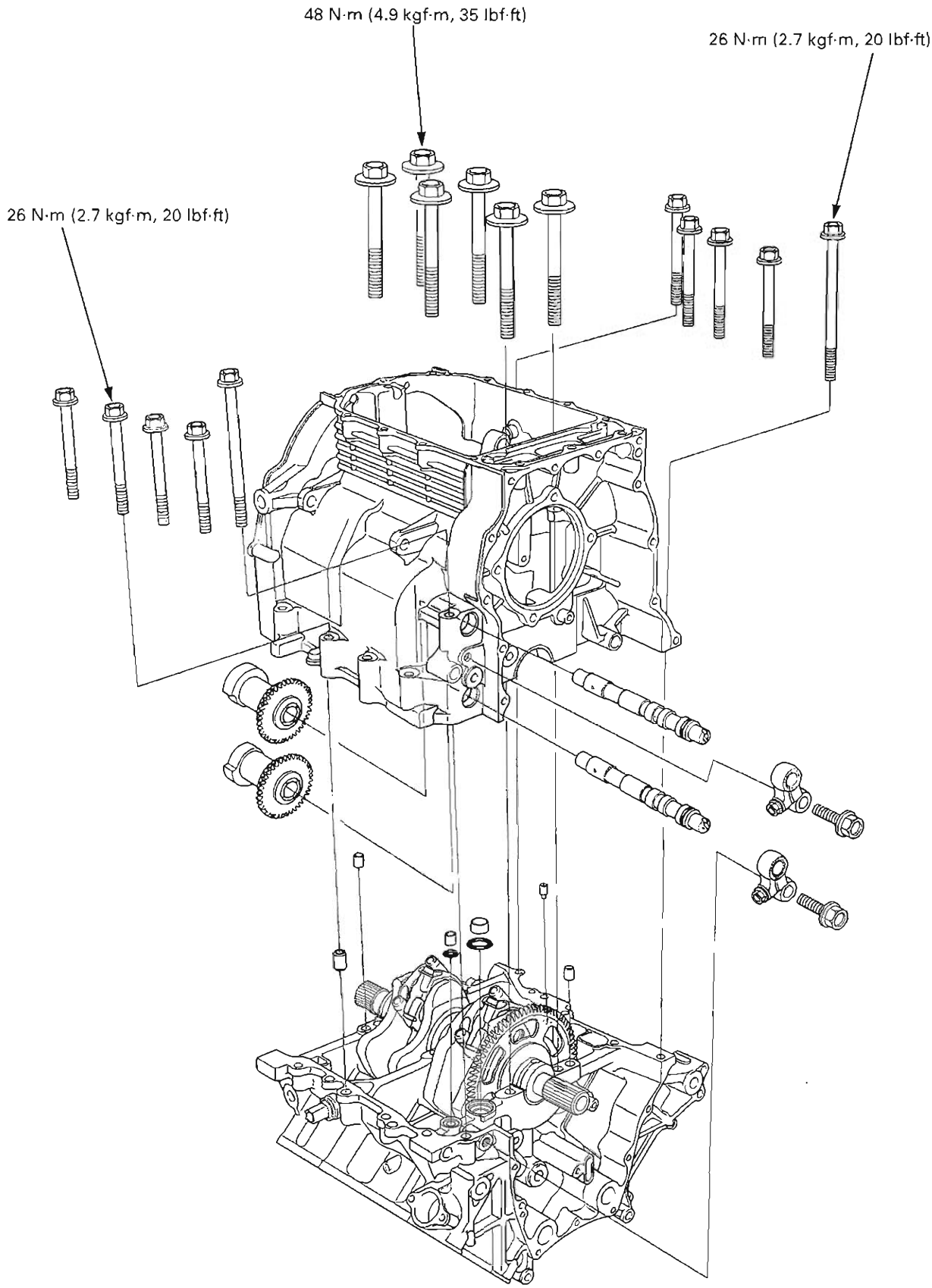
TROUBLESHOOTING 12-3

CRANKCASE SEPARATION 12-4

BALANCER 12-5

CRANKCASE ASSEMBLY 12-13

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
  - Balancer (page 12-5)
  - Crankshaft (page 13-4)
  - Piston/connecting rod (page 13-11)
- The following components must be removed before separating the crankcase:
  - Alternator/starter clutch (page 11-4)
  - Clutch/primary damper shaft (page 9-15)
  - Cylinder head (page 8-13)
  - Engine (page 7-4)
  - Oil pump (page 4-9)
  - Starter motor (page 11-4)
  - Transmission (page 10-10)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces, Wipe off excess sealant thoroughly.

TORQUE VALUES

Main journal bolt	48 N·m (4.9 kgf·m, 35 lbf·ft)	Apply oil to the threads and seating surface
Crankcase bolt, 8 mm	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Cylinder block sealing bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply a locking agent to the threads
Lower crankcase sealing bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply a locking agent to the threads

TROUBLESHOOTING

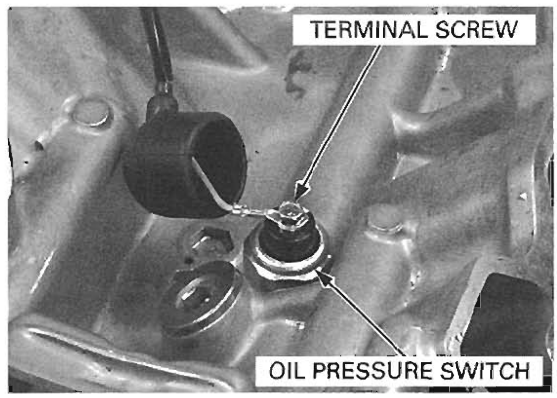
Excessive vibration

- Excessive crankshaft runout
- Incorrect balancer timing

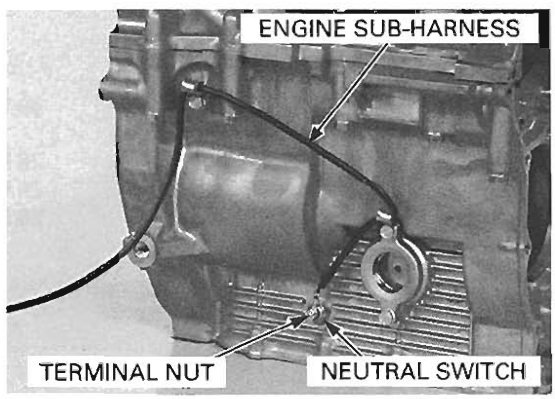
CRANKCASE SEPARATION

Refer to Service Information (page 12-3) for removal of necessary parts before separating the crankcase.

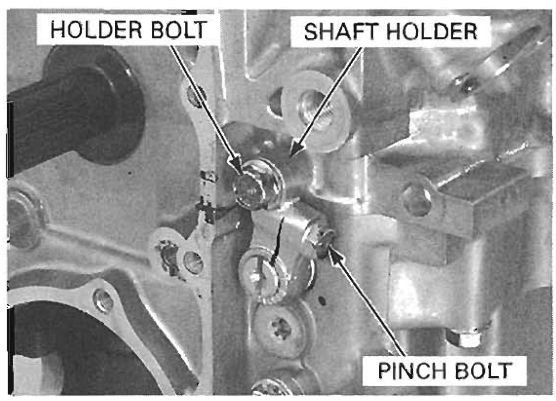
Remove the oil pressure switch terminal screw.



Remove the neutral switch terminal nut, then remove the engine sub-harness.

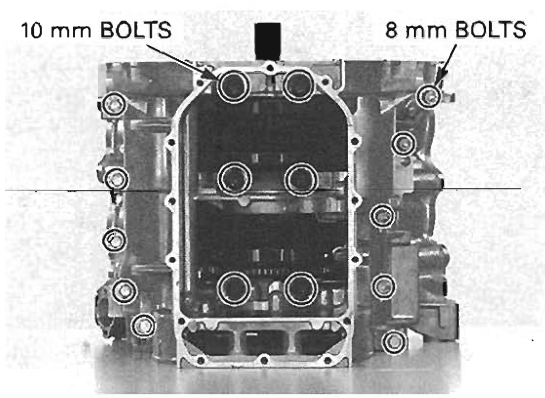


Remove the upper balancer shaft holder bolt and pinch bolt, then remove the upper balancer holder.



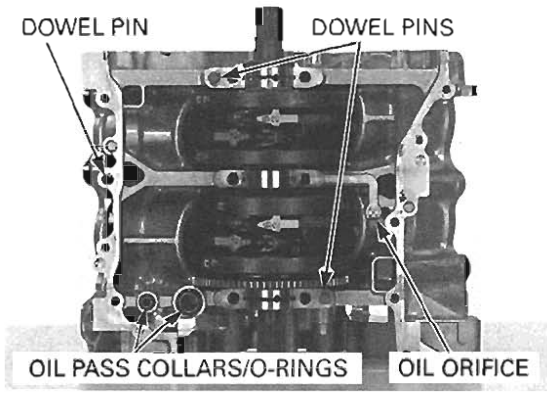
Remove the lower crankcase 8 mm bolts.
Loosen the main journal 10 mm bolts in a crisscross pattern in 2 or 3 steps.

Remove the lower crankcase from the cylinder block.



Remove the following:

- Dowel pins (solid)
- Dowel pin (collar)
- Oil pass collars/O-rings
- Oil orifice

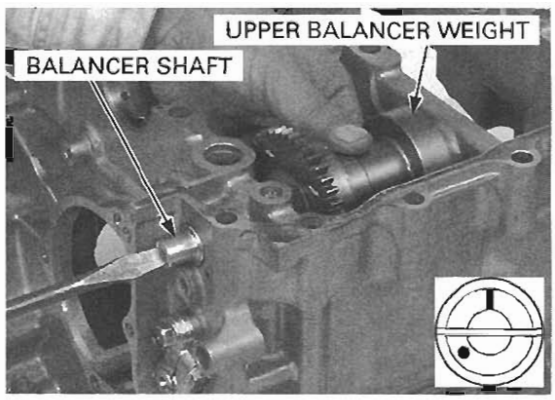


BALANCER

REMOVAL

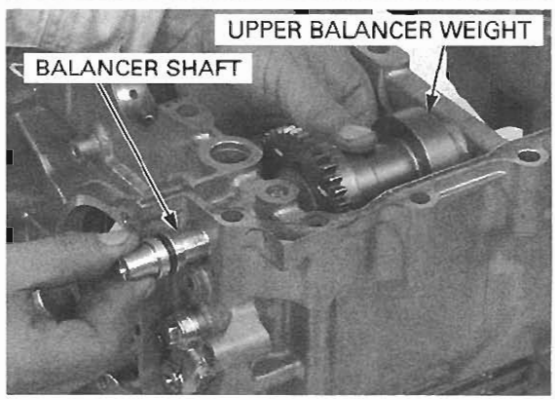
Separate the crankcase halves (page 12-4).

Rotate the upper balancer shaft and place the index line on the shaft facing up.

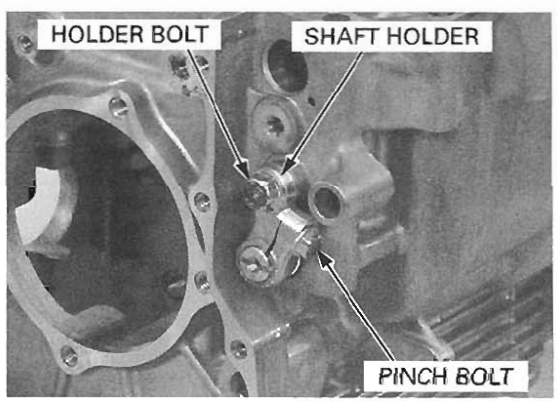


The balancer shaft will only come out from one particular position. Rotate it until it comes out easily; do not force it out.

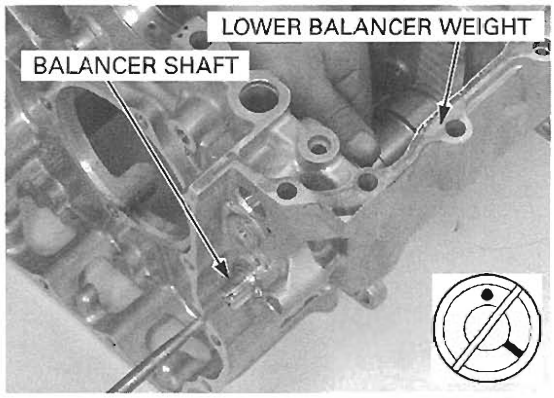
Pull the upper balancer shaft out and remove the upper balancer weight/gear assembly.



Remove the lower balancer shaft holder bolt and pinch bolt, then remove the lower balancer holder.

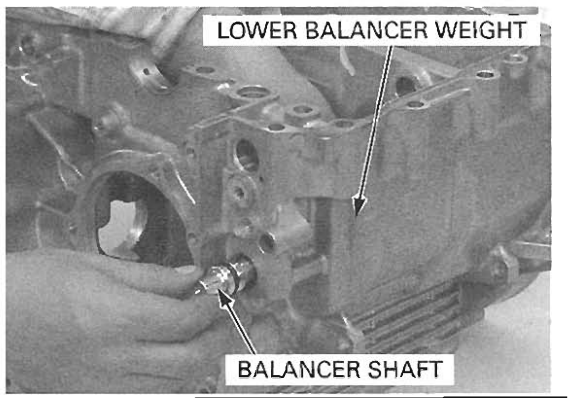


Rotate the lower balancer shaft counterclockwise and place the punch mark on the shaft facing up.



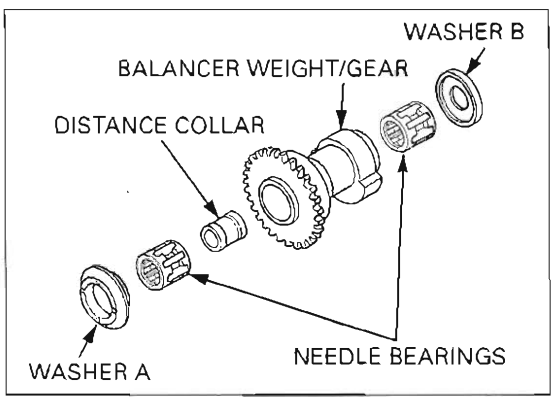
The balancer shaft will only come out from one particular position. Rotate it until it comes out easily; do not force it out.

Pull the lower balancer shaft out and remove the lower balancer weight/gear assembly.

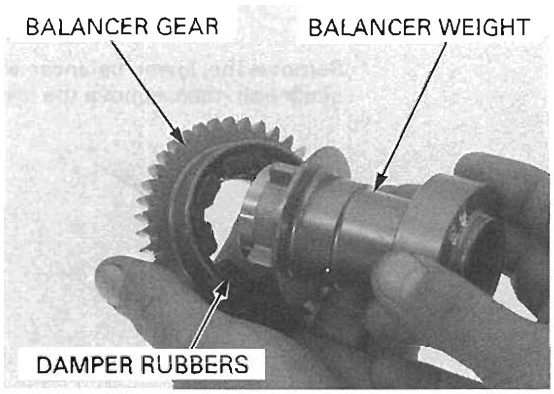


DISASSEMBLY

Remove the side washer A, B, needle bearings and distance collar from the balancer weight.



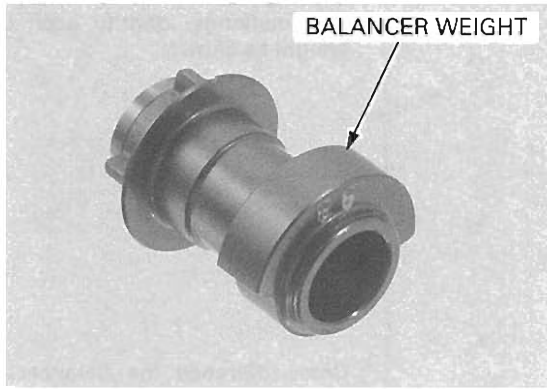
Remove the balancer gear and damper rubbers from the balancer weight.



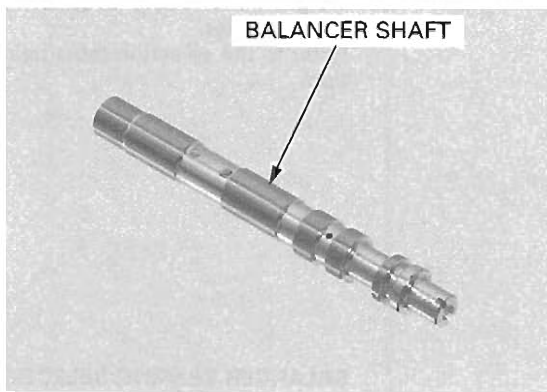
INSPECTION

Replace the balancer weight, shaft and needle bearings as an assembly.

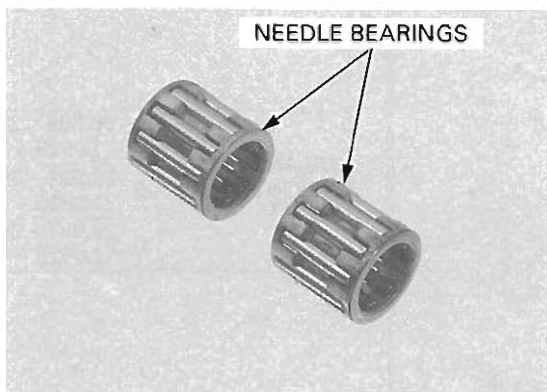
Check the needle bearing sliding surfaces of the balancer weight for wear, damage or excessive scratches.



Check the needle bearing sliding surfaces of the balancer shaft for wear, damage or excessive scratches.



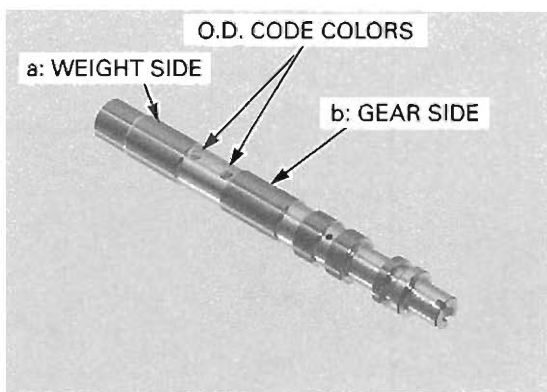
Check the needle bearings for smooth operation.



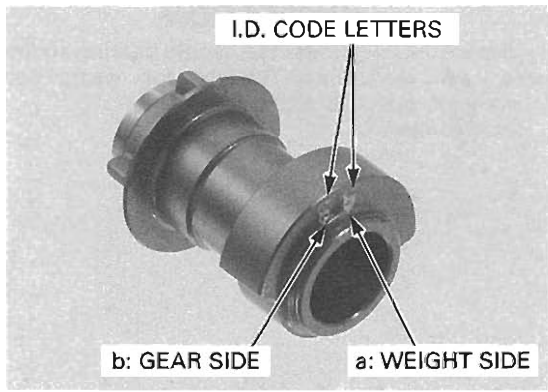
BALANCER BEARING SELECTION

The balancer weight, shaft and needle bearings are select fitted (selection table; page 12-8)

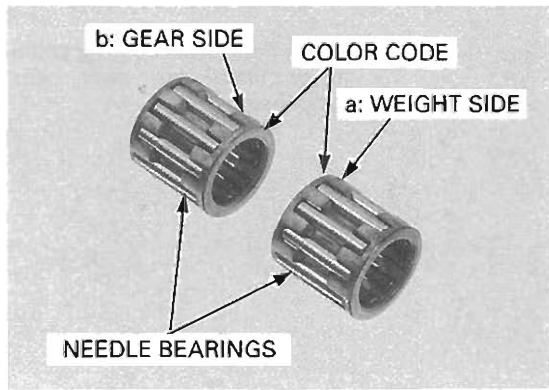
The balancer shaft has a O.D. color.



The balancer weight has two I.D. code letters as shown.
The markings identify each I.D. of the balancer weight as shown.



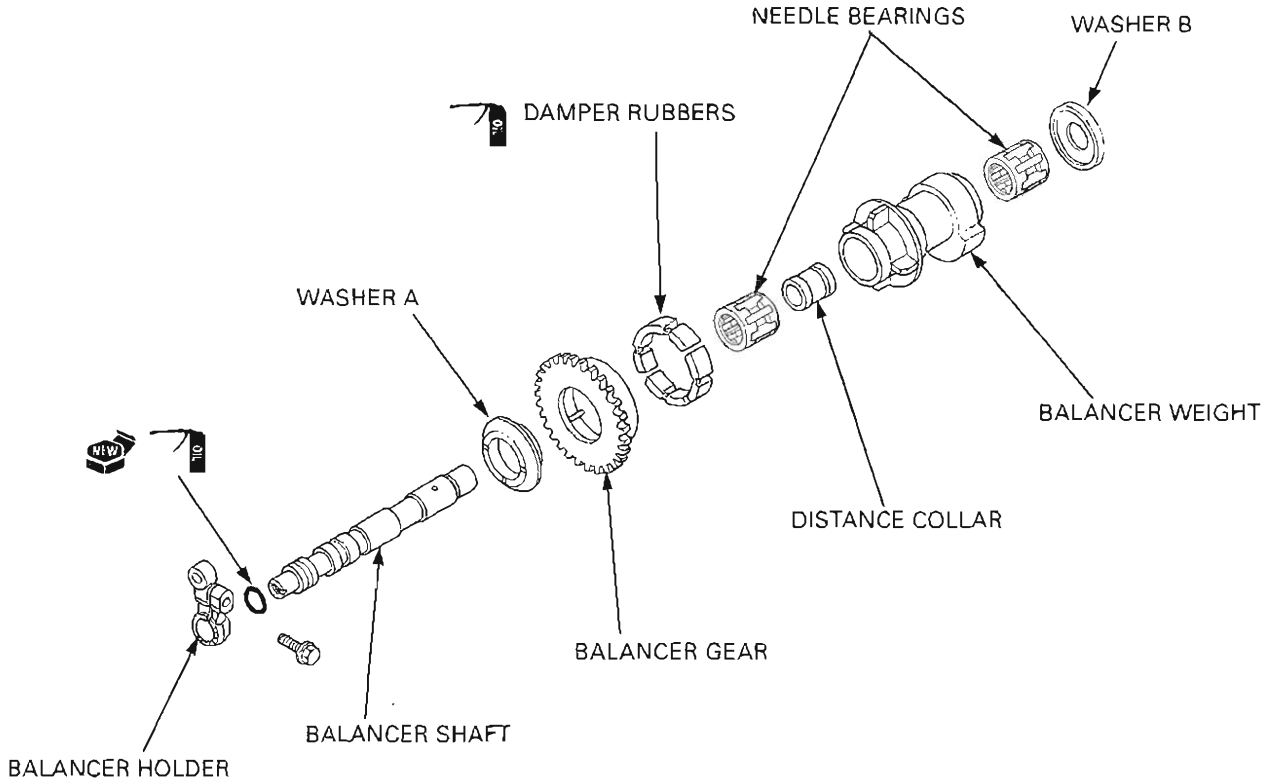
Cross-reference the balancer shaft and balancer weight code letters to determine the replacement bearing color.
Refer to the selection table below for bearing selection.



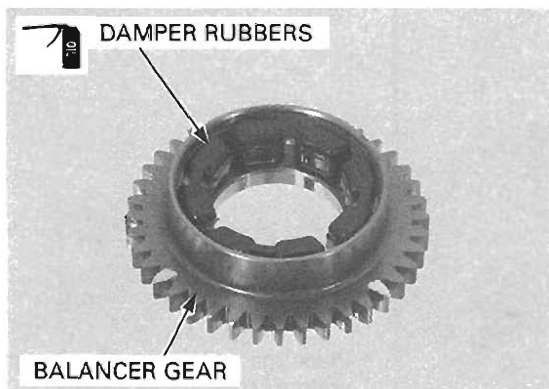
BALANCER BEARING SELECTION TABLE:

			BALANCER SHAFT O.D.CODE		
			Blue	Black	Red
			17.996 – 18.000 mm (0.7085 – 0.7087 in)	17.991 – 17.996 mm (0.7083 – 0.7085 in)	17.987 – 17.991 mm (0.7081 – 0.7283 in)
BALANCER WEIGHT I.D. CODE	A	26.996 – 27.000 mm (1.0628 – 1.0630 in)	C (White)	B (Blue)	A (Red)
	B	26.991 – 26.996 mm (1.0626 – 1.0628 in)	D (Green)	C (White)	B (Blue)
	C	26.987 – 26.991 mm (1.0625 – 1.0626 in)	E (Yellow)	D (Green)	C (White)

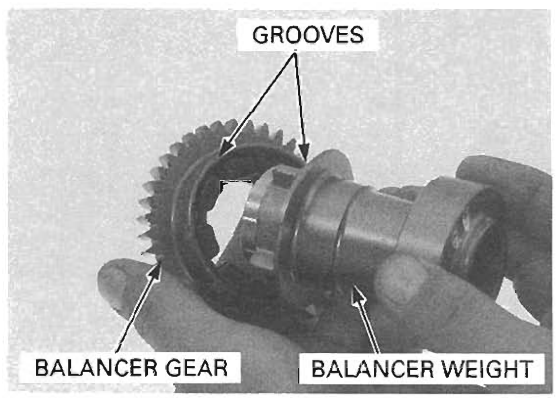
ASSEMBLY



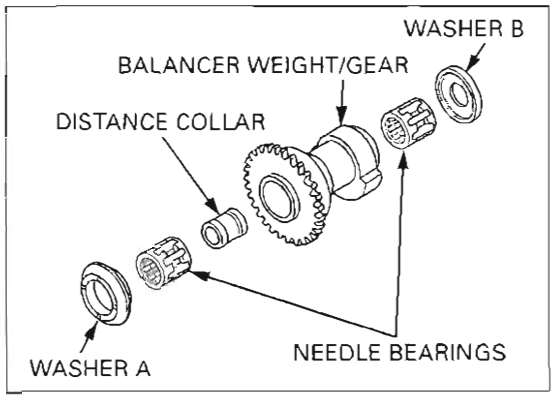
Apply clean engine oil to the damper rubbers. install the damper rubbers into the groove of the balancer gear.



Install the balancer gear onto the balancer weight while aligning the grooves.



Install the distance collar and needle bearings into the balancer weight.
Install the side washers A and B.



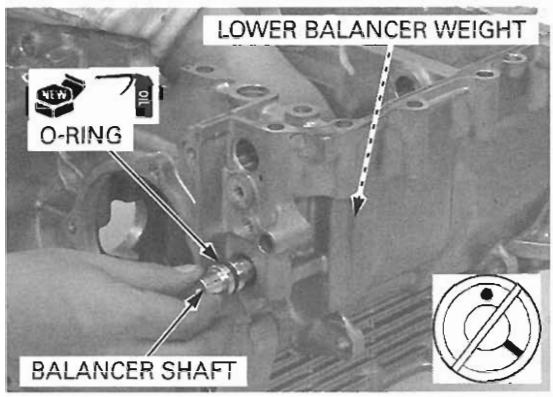
INSTALLATION

Always adjust the backlash after the balancer installation.

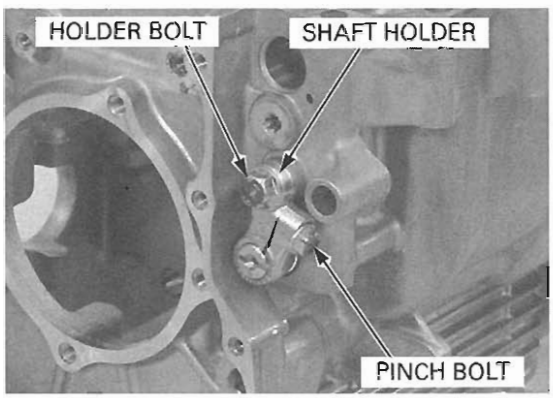
Install a new O-ring into the groove of the lower balancer shaft groove.
Apply a small amount of oil to the O-ring.

The balancer shaft will only install in one particular position. Rotate it until it installs easily; do not force it in.

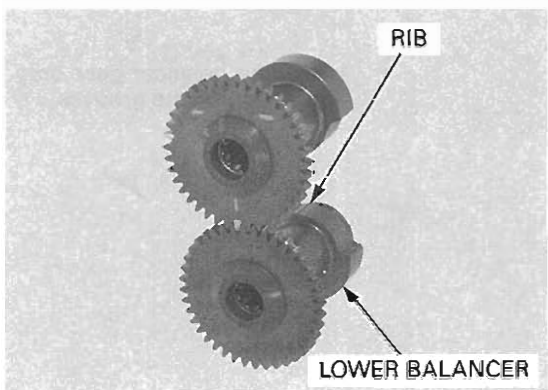
Install the lower balancer assembly into the lower crankcase, then install the lower balancer shaft with its punch mark facing up.



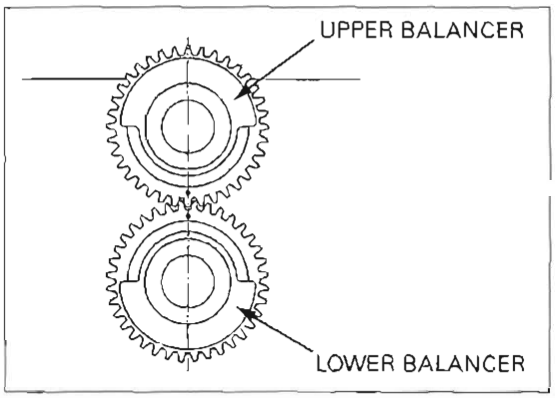
Install the lower balancer shaft holder, holder bolt and pinch bolt.
Tighten the lower balancer shaft holder bolt.



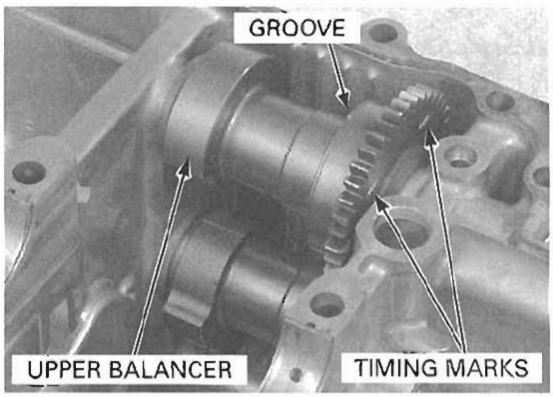
Place the lower balancer weight with its rib on the weight facing up as shown.



Install the upper balancer assembly while aligning the punch marks between the lower balancer gear and upper balancer gear.



Place the upper balancer assembly with its groove facing up and the balancer gear timing marks flush with the crankcase mating surface as shown.

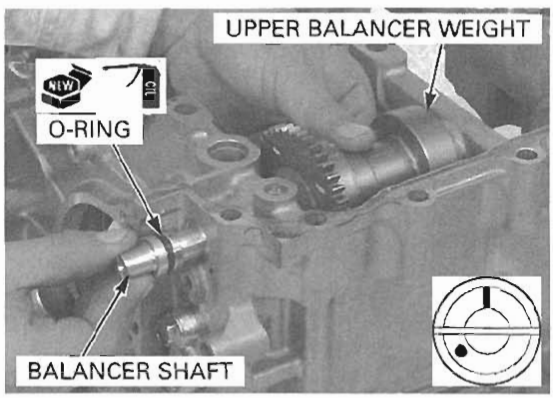


Always adjust the backlash after the balancer installation.

Install a new O-ring into the groove of the upper balancer shaft groove.
Apply small amount of oil to the O-ring.

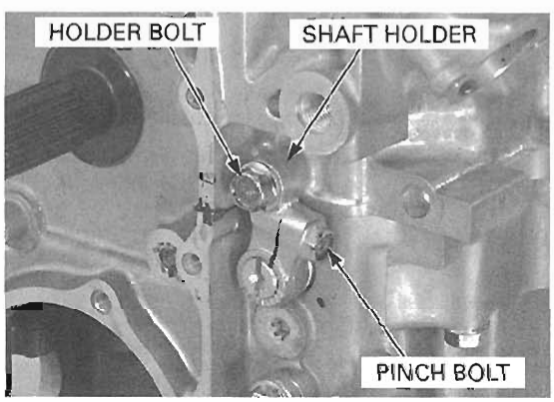
The balancer shaft will only install in one particular position. Rotate it until it installs easily; do not force it in.

Install the upper balancer shaft with its index line facing up.



Assemble the crankcase (page 12-13).

Install the upper balancer shaft holder, then install the holder bolt and pinch bolt.
Tighten the upper balancer shaft holder bolt.

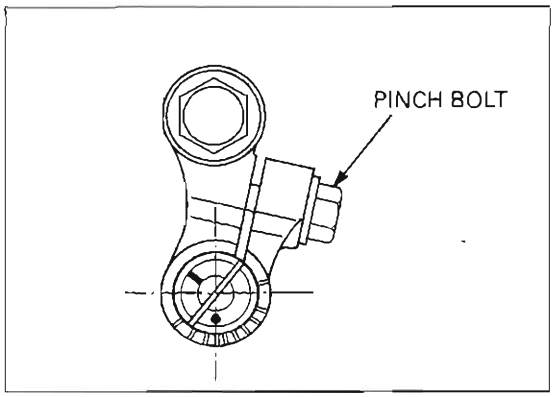


BACKLASH ADJUSTMENT

Install the engine into the frame (page 7-8).

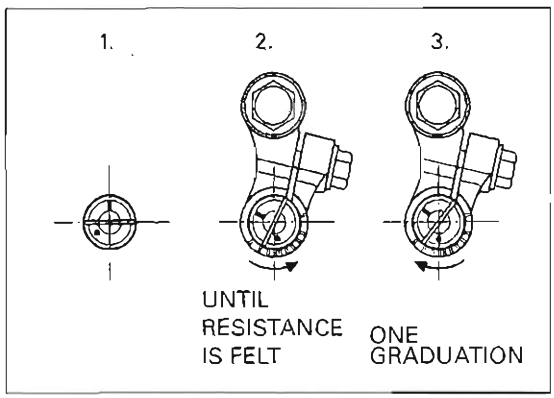
Adjust the backlash while the engine is cold (below 35°C/95°F) and the engine is not running.

Loosen the upper and lower balancer shaft holder pinch bolts.

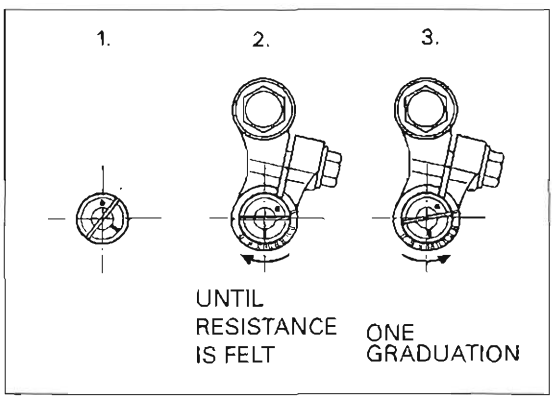


Excessive force can cause balancer gear, bearing and shaft damage. Do not turn the shaft more than necessary.

Turn the upper balancer shaft counterclockwise until resistance is felt, then back it off one graduation using the punch mark as a measure.



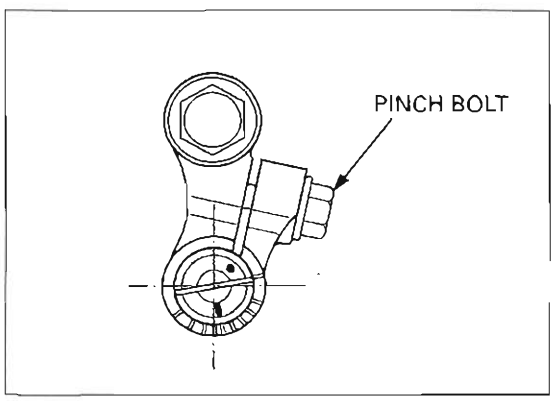
Turn the lower balancer shaft clockwise until resistance is felt, then back it off one graduation using the index line as a measure.



Warm up the engine and let it idle.

If the balancer gear noises are excessive, adjust the balancer backlash as follows:

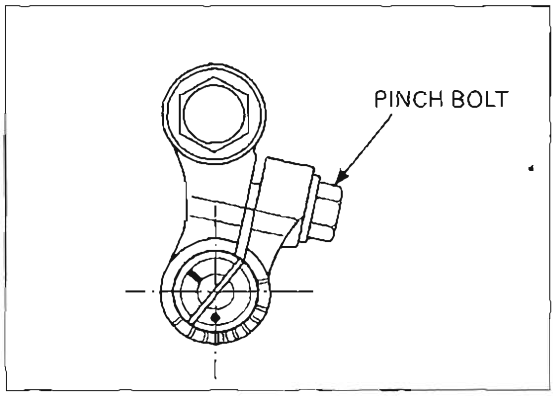
1. Turn the upper balancer gear shaft counterclockwise until the gears begin to make a "whining" noise. Then turn the gear shaft clockwise until the gear "whining" noise disappears.
   Tighten the upper balancer shaft pinch bolt.



2. Turn the lower balancer gear shaft clockwise until the gears begin to make a "whining" noise. Then turn the gear shaft counterclockwise until the gear "whining" noise disappears.
   Tighten the lower balancer shaft pinch bolt.

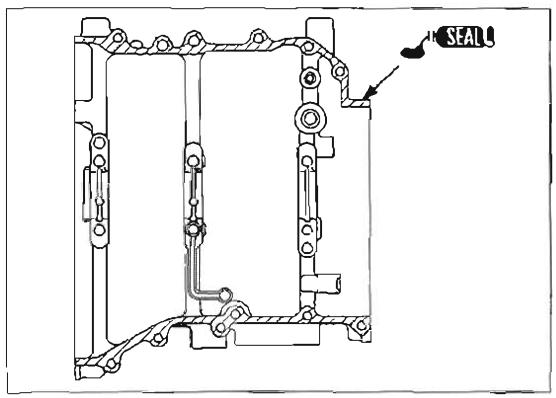
After all gear backlash adjustments are done, snap the throttle and make sure the gear noises are not excessive.

If the gear "whine" noise is excessive, the backlash is too small.
If the gear "rattling" noise is excessive, the backlash is excessive.

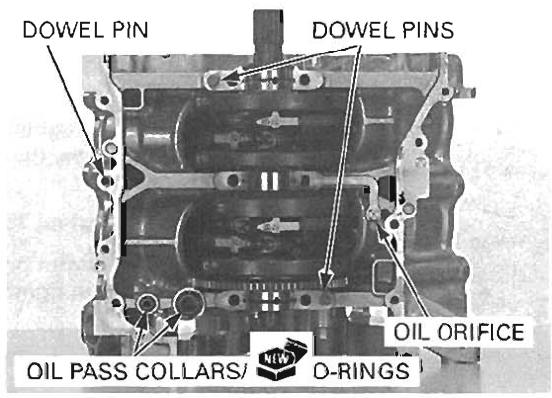


CRANKCASE ASSEMBLY

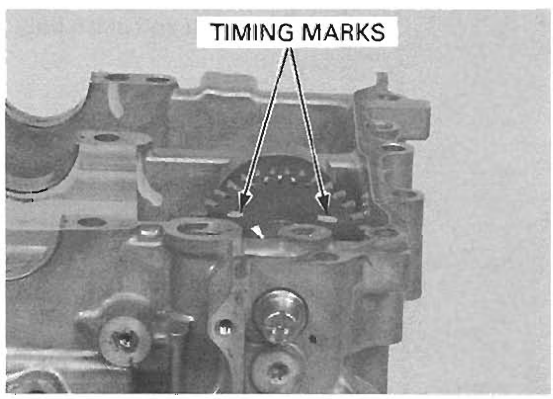
Apply a light, but thorough, coating of liquid sealant (Three Bond 1207B or equivalent) to the crankcase mating surface except to the main bearing journal bolt area and the oil passage area as shown.



Install the two dowel pins (solid).
Install the dowel pin (collar).
Install the oil pass collars and new O-rings.
Install the oil orifice with it small I.D. side facing the lower crankcase.

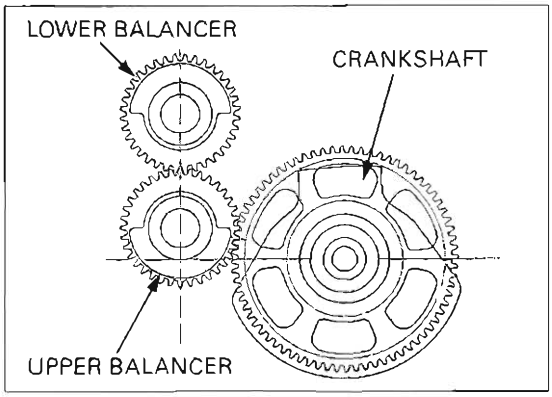


Make sure the upper balancer timing marks are flush with the crankcase mating surface.



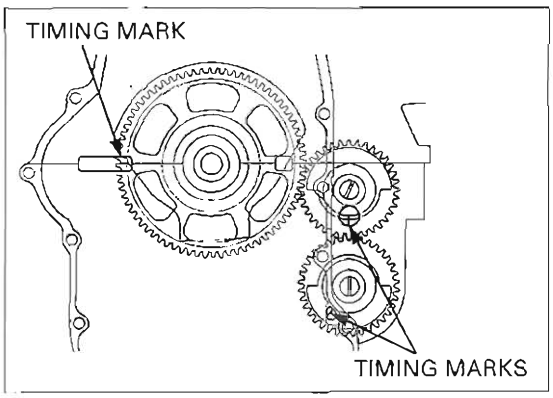
Turn the crankshaft and place the crankpin facing up and the balancer drive gear timing marks flush with the mating surface of the crankcase.

Install the lower crankcase onto the cylinder block while aligning the balancer drive gear with the upper balancer gear.



Remove the lower crankcase sealing bolt.

Recheck the balancer timing marks through the crankcase holes as shown.



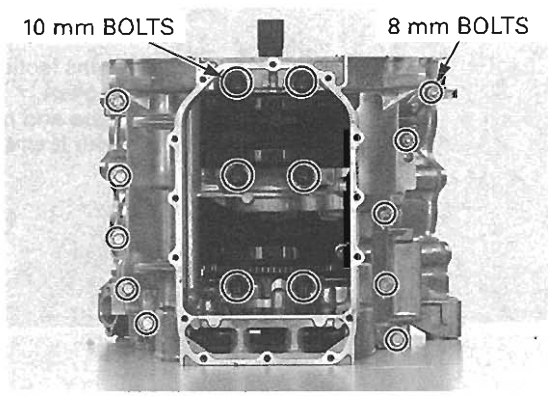
Apply oil to the main journal bolt threads and seating surface.
Install the main journal 10 mm bolts and crankcase 8 mm bolts.
Make sure the upper and lower crankcase are seated securely.

From inside to out side, tighten the main journal 10 mm bolts in several steps, then tighten them to the specified torque.

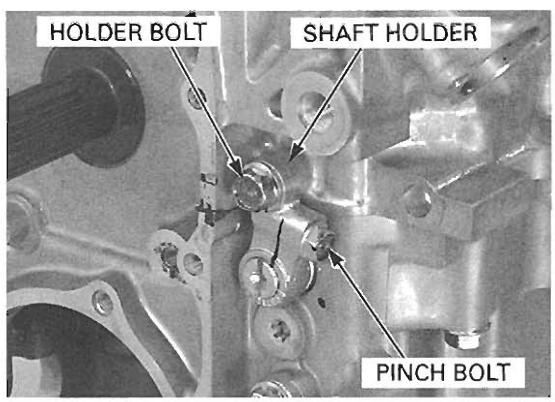
TORQUE: 48 N·m (4.9 kgf·m, 35 lbf·ft)

Tighten the crankcase 8 mm bolt in a crisscross pattern in 2 or 3 steps, then tighten them to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

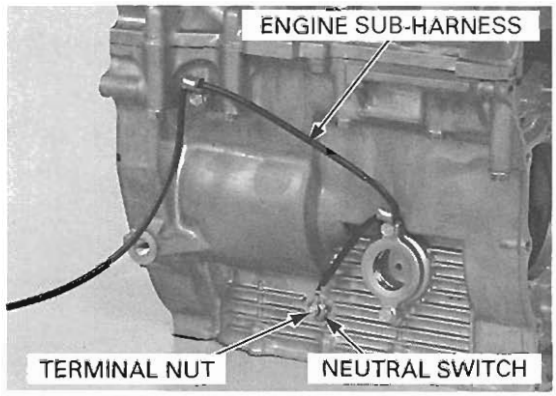


Install the upper balancer shaft holder, then install the holder bolt and pinch bolt.



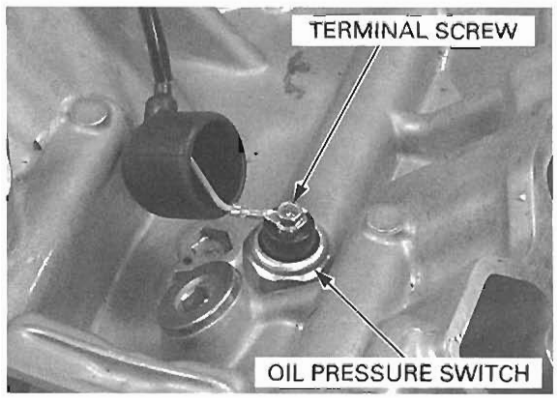
Route the engine sub-harness, install the neutral switch terminal to the switch.
Tighten the switch terminal nut to the specified torque.

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



Route the engine sub-harness to the oil pressure switch terminal.
Install and tighten the terminal screw.

Install the removed parts in the reverse order of removal.



13. CRANKSHAFT/PISTON/CYLINDER

COMPONENT LOCATION 13-2

SERVICE INFORMATION 13-3

TROUBLESHOOTING 13-3

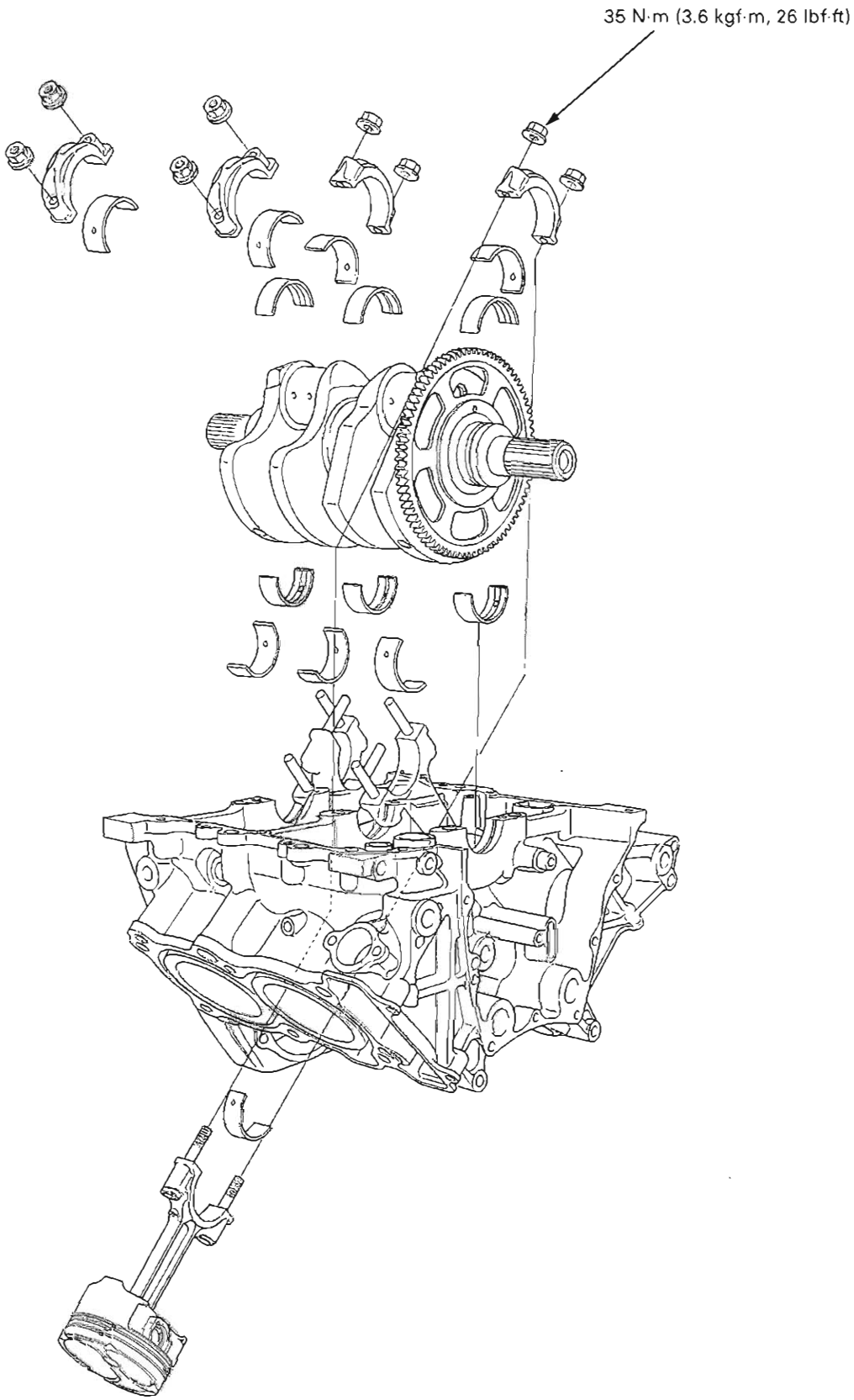
CRANKSHAFT 13-4

MAIN JOURNAL BEARING 13-6

CRANKPIN BEARING 13-9

PISTON/CYLINDER 13-11

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the crankshaft and piston/connecting rod. Refer to procedures for crankcase separation (page 12-4) and assembly (page 12-13).
- Mark and store the connecting rods, bearing caps, pistons and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.10 – 0.30 (0.004 – 0.012)	0.40 (0.016)
	Runout		–	0.05 (0.002)
	Main journal bearing oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.05 (0.002)
Cylinder	I.D.		78.000 – 78.015 (3.0709 – 3.0715)	78.10 (3.075)
	Out of round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.10 (0.004)
Piston, piston rings	Piston O.D. at 8 mm (0.3 in) from bottom		77.965 – 77.985 (3.0695 – 3.0703)	77.90 (3.067)
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.02 (0.749)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.98 (0.747)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.05 (0.002)
		Second	0.32 – 0.47 (0.013 – 0.019)	0.06 (0.002)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.11 (0.004)
		Second	0.020 – 0.055 (0.0008 – 0.0022)	0.10 (0.004)
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.06 (0.750)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	0.077 (0.0030)
Crankpin bearing oil clearance			0.036 – 0.054 (0.0014 – 0.0021)	0.074 (0.0029)

TORQUE VALUES

Connecting rod bearing cap nut	35 N·m (3.6 kgf·m, 26 lbf·ft)	Apply oil to the threads and seating surface

TROUBLESHOOTING

Cylinder compression is too low, hard to start, or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Cylinder compression too high, overheats or knocks
- Carbon deposits on the cylinder head and/or piston crown

Excessive smoke
- Worn cylinder, piston or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

Engine vibration
- Excessive crankshaft runout

CRANKSHAFT

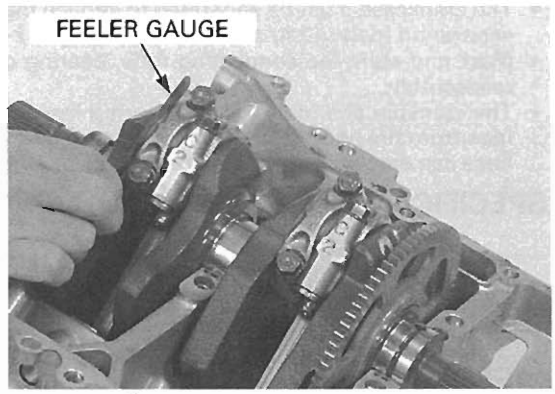
SIDE CLEARANCE INSPECTION

Separate the crankcase halves (page 12-4).

Measure the connecting rod side clearance.

SERVICE LIMIT: **0.40 mm (0.016 in)**

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if still out of limit, replace the crankshaft.



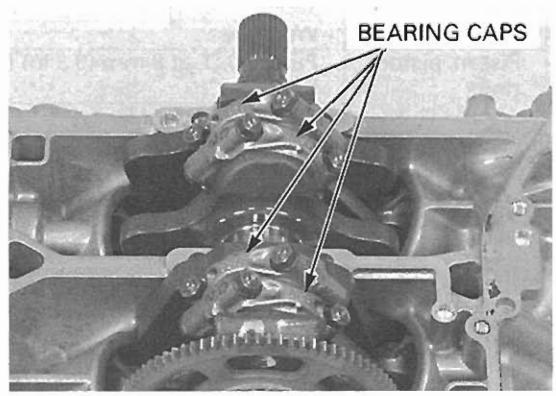
REMOVAL

Separate the crankcase halves (page 12-4).

Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

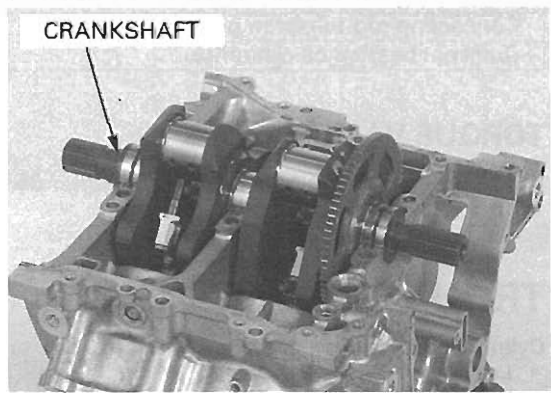
Be careful not to damage the crankpin, main journal and bearing inserts.

Remove the connecting rod bearing cap nuts and bearing caps.
Tap the side of the cap lightly if the bearing cap is hard to remove.

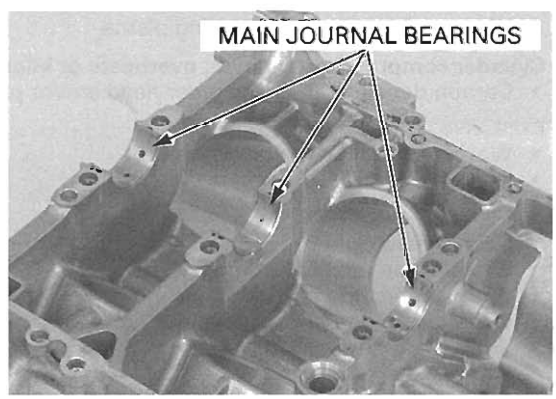


Position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.

Remove the crankshaft.



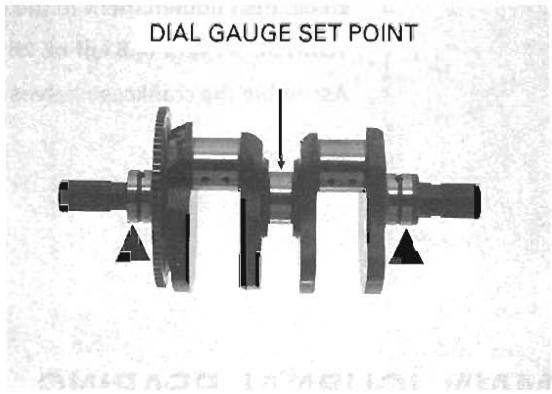
Remove the main journal bearings from both the crankcases.



INSPECTION

Hold the crankshaft at both ends.
Set a dial gauge on the center main journal of the crankshaft.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.05 mm (0.002 in)

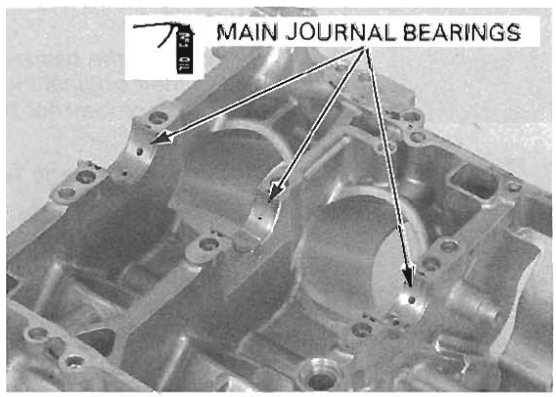


INSTALLATION

The bearing tabs should be aligned with the grooves in the case.

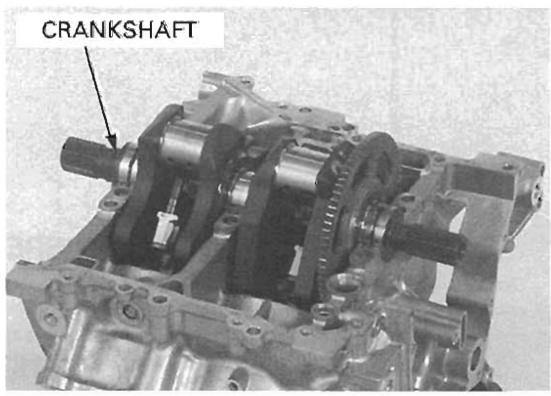
Install the main journal bearings into the upper and lower crankcase.

Apply molybdenum oil solution to the upper and lower main journal bearings.



Position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.

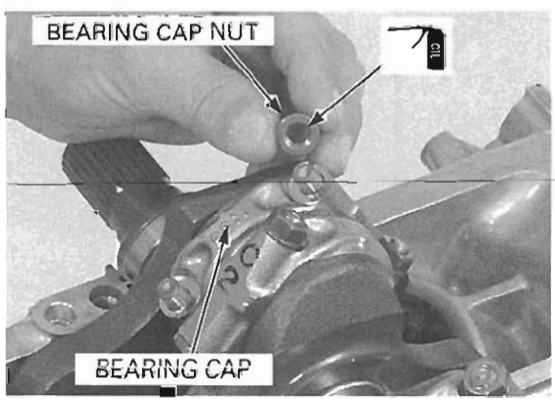
Install the crankshaft.



Apply engine oil to the crankpin bearing sliding surfaces on the bearing caps.

Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap.

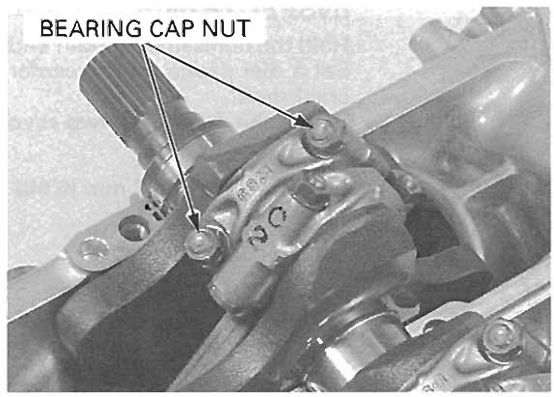
Apply oil to the connecting rod bearing cap nut threads and seating surface.



Tighten the bearing cap nuts alternately 2 or 3 steps, then tighten them to the specified torque.

TORQUE: **35 N·m (3.6 kgf·m, 26 lbf·ft)**

Assemble the crankcase halves (page 12-13).



MAIN JOURNAL BEARING

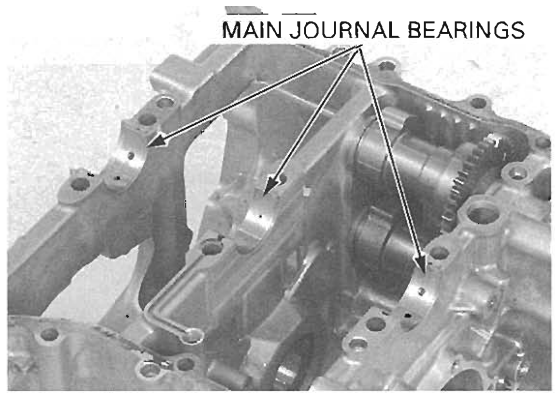
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 13-4).

BEARING INSPECTION

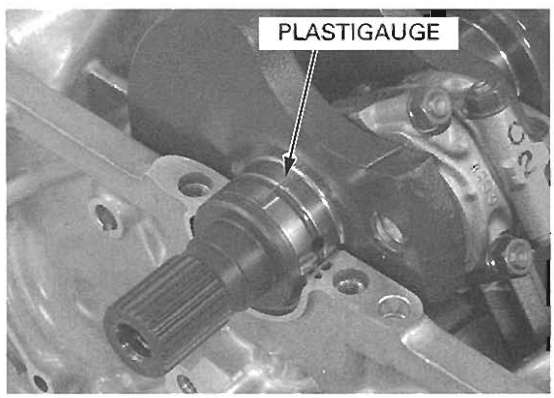
Inspect the main journal bearing inserts on the upper and lower crankcase for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE INSPECTION

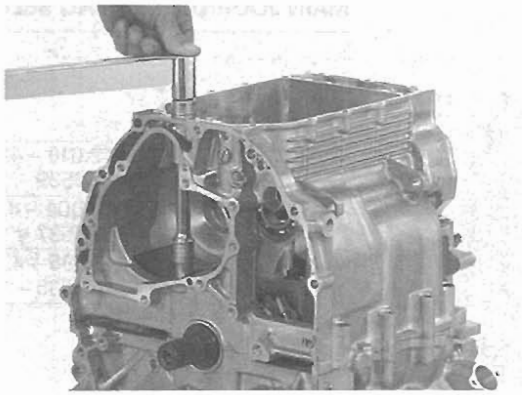
Do not rotate the crankshaft during inspection.

Clean off any oil from the bearing inserts and main journals.
Install the crankshaft onto the upper crankcase.
Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.



Install the dowel pins.
Carefully install the lower crankcase on the cylinder block.
Apply oil to the main journal bolt threads and seating surfaces and install them.
Tighten the main journal bolts in several steps, then tighten them to the specified torque.

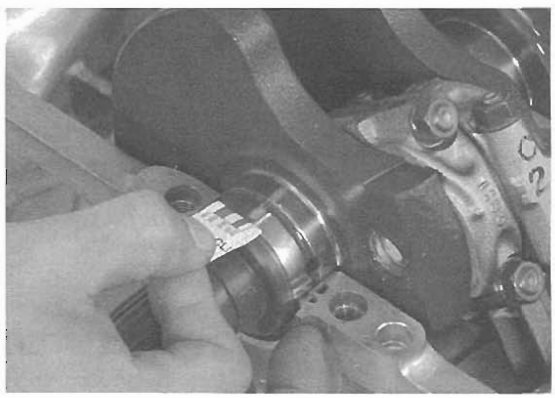
TORQUE: 48 N·m (4.9 kgf·m, 35 lbf·ft)



Remove the main journal bolts and lower crankcase.

SERVICE LIMIT: 0.05 mm (0.002 in)

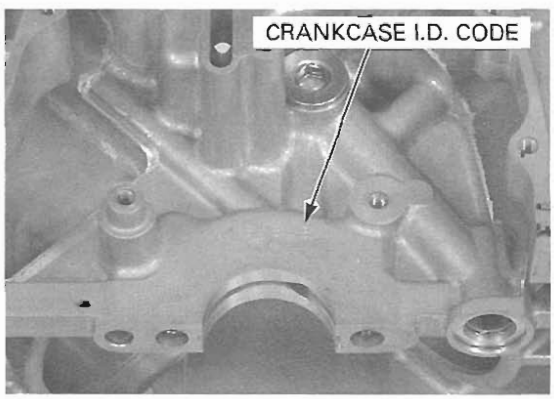
If the main bearing clearance is beyond tolerance, select a replacement bearing.



BEARING SELECTION

Letters (A, B or C) on the front side of upper crankcase are the codes for the bearing support I.D.s from left to right.

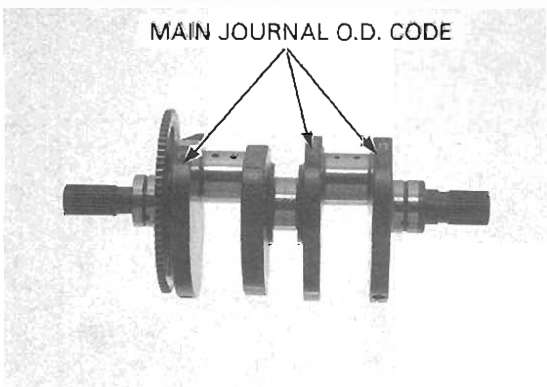
Record the crankcase bearing support I.D. code letters from the pad on the front side of the upper crankcase as shown.



Numbers (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 main journal and bearing support codes to determine the replacement bearing color code.

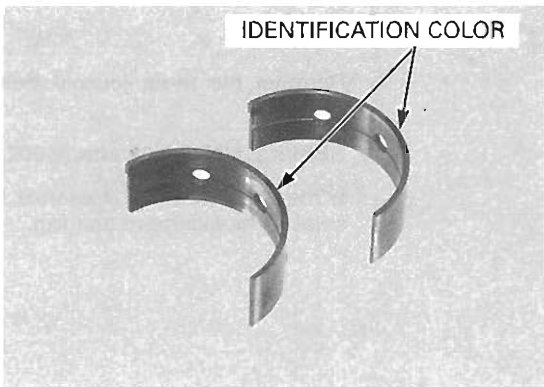


MAIN JOURNAL BEARING SELECTION TABLE:

			BEARING SUPPORRT I.D.CODE		
			A	B	C
			44.994 – 45.000 mm (1.7714 – 1.7717 in)	45.000 – 45.006 mm (1.7717 – 1.7719 in)	45.006 – 45.012 mm (1.7719 – 1.7721 in)
MAIN JOURNAL O.D. CODE	1	42.010 – 42.016 mm (1.6539 – 1.6542 in)	E (Yellow)	D (Green)	C (Brown)
	2	42.004 – 42.010 mm (1.6537 – 1.6539 in)	D (Green)	C (Brown)	B (Black)
	3	41.998 – 42.004 mm (1.6535 – 1.6537 in)	C (Brown)	B (Black)	A (Blue)

BEARING THICKNESS:

A (Blue) **Thick**
B (Black): ↑
C (Brown): **Middle**
D (Green) ↓
E (Yellow) **Thin**



NOTICE

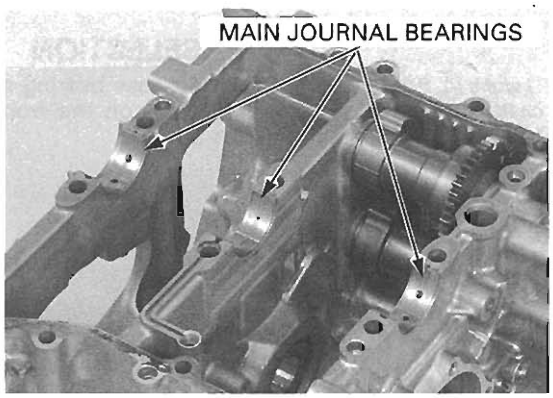
After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces and crankcase bearing supports.

Install the small oil hole bearing into the center bearing support.

Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each grooves.



CRANKPIN BEARING

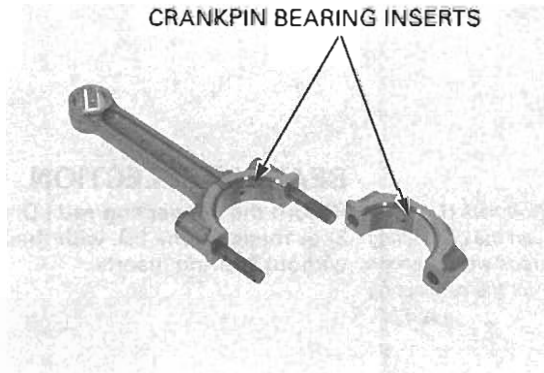
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 13-4).

BEARING INSPECTION

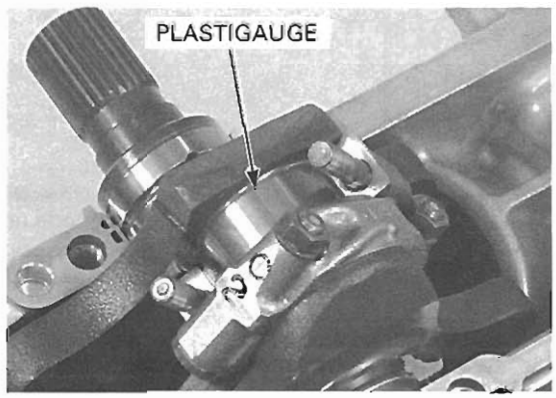
Check the bearing inserts for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE INSPECTION

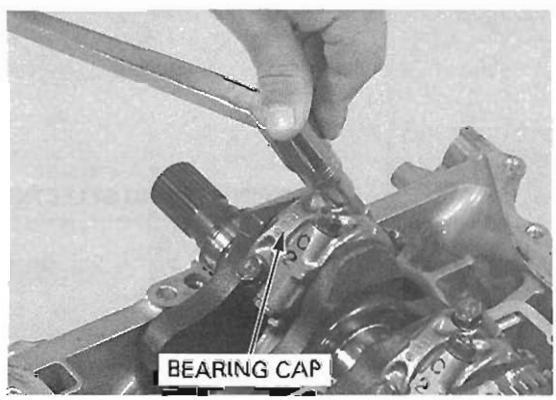
Do not rotate the crankshaft during inspection.

Clean off any oil from the bearing inserts and crankpin.
Carefully install the crankshaft onto the upper crankcase.
Set the connecting rods onto the crankpin.
Put a strip of plastigauge lengthwise on the crankpin avoiding the oil hole.



Carefully install the bearing caps by aligning the I.D. code.
Apply engine oil to the connecting rod bearing cap nut threads and seating surfaces and install them.
Tighten the cap nuts in 2 or 3 steps.

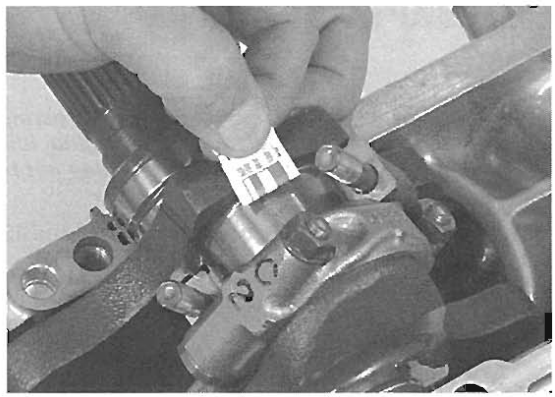
TORQUE: 35 N·m (3.6 kgf·m, 25 lbf·ft)



Remove the nuts and bearing cap.
Measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.074 mm (0.0029 in)

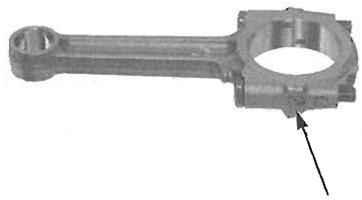
If the oil clearance exceeds the service limit, select the correct replacement bearings.



BEARING SELECTION

Numbers (1, 2 or 3) on the connecting rods are the codes for the connecting rod I.D.

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.



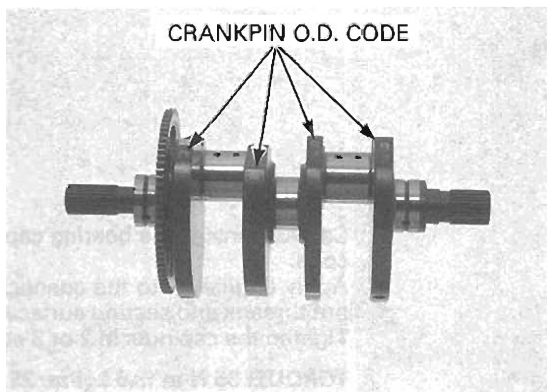
CONNECTING ROD I.D. CODE

Letters (A, B or C) on the crank weight are the codes for the crankpin O.D.s from left to right.

If you are replacing the crankshaft, record the corresponding crankpin O.D. code number (A, B or C).

If you are reusing the crankshaft, measure the crankpin O.D. with the micrometer.

Cross-reference the crankpin and rod codes to determine the replacement bearing color.



CRANKPIN BEARING SELECTION TABLE:

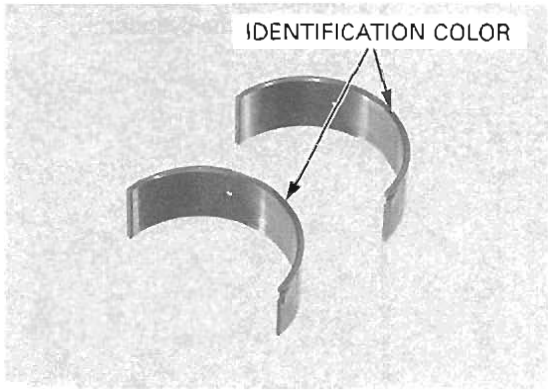
			CONNECTING ROD I.D.CODE		
			1	2	3
			45.000 – 45.006 mm (1.7717 – 1.7719 in)	45.006 – 45.012 mm (1.7719 – 1.7721 in)	45.012 – 45.018 mm (1.7721 – 1.7724 in)
CRANK PIN O.D. CODE	A	42.000 – 42.006 mm (1.6535 – 1.6538 in)	E (Yellow)	D (Green)	C (Brown)
	B	42.006 – 42.012 mm (1.6538 – 1.6540 in)	D (Green)	C (Brown)	B (Black)
	C	42.012 – 42.018 mm (1.6540 – 1.6542 in)	C (Brown)	B (Black)	A (Blue)

BEARING THICKNESS:

A (Blue)	Thick
B (Black):	↑
C (Brown):	Middle
D (Green)	↓
E (Yellow)	Thin

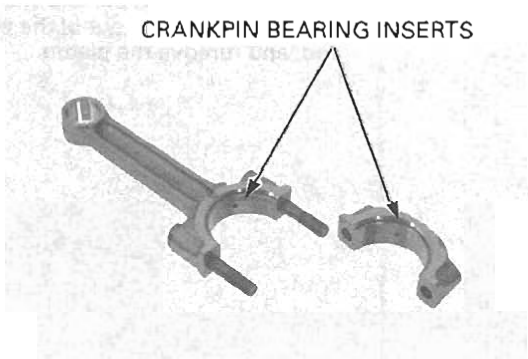
NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.



BEARING INSTALLATION

Clean the bearing outer surfaces, bearing cap and connecting rod.
Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.



PISTON/CYLINDER

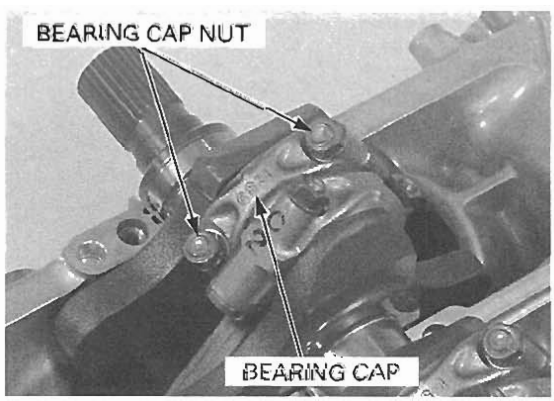
PISTON/CONNECTING ROD REMOVAL

NOTICE

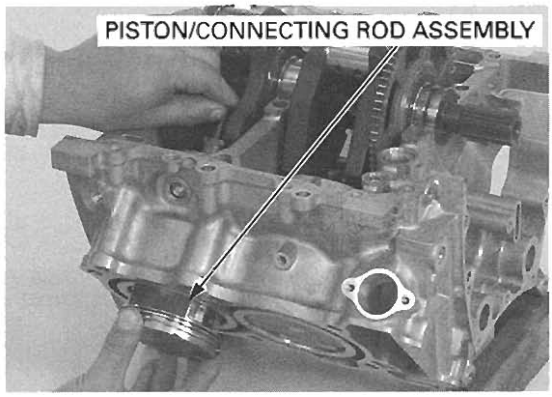
- *This motorcycle is equipped with aluminum cylinder sleeves. Before piston removal, place a clean shop towel around the connecting rod to prevent damaging the cylinder sleeve.*
- *Do not try to remove the piston/connecting rod assembly from bottom of the cylinder; the assembly will get stuck in the gap between the cylinder liner and the upper crankcase.*
- *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.*

Mark the all the parts as you remove them to indicate the correct cylinder for reassembly.

Remove the nuts and connecting rod bearing cap.

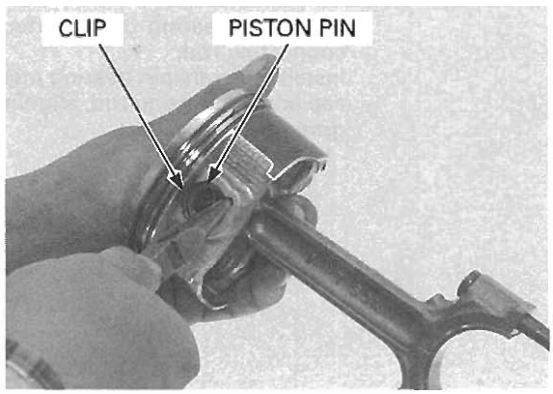


Remove the piston/connecting rod assembly from the top of the cylinder.



PISTON REMOVAL

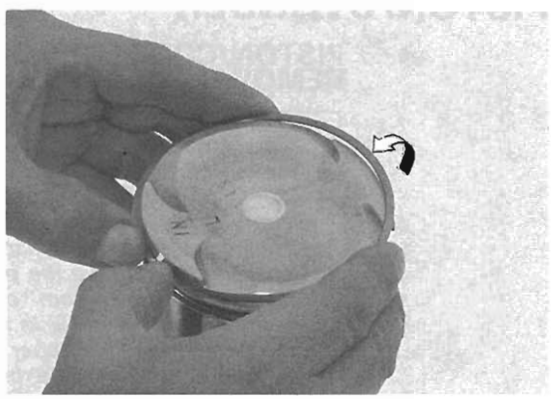
Remove the piston pin clip with pliers.
Push the piston pin out of the piston and connecting rod, and remove the piston.



PISTON DISASSEMBLY

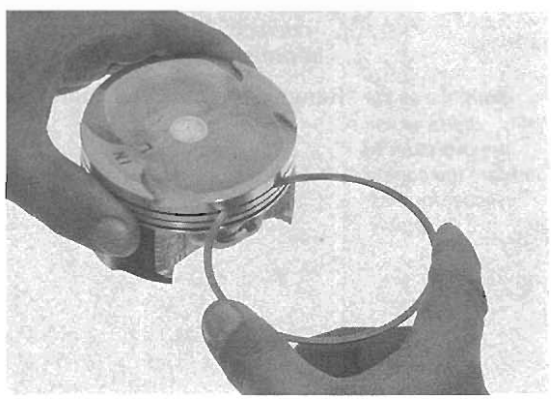
Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up at a point opposite the gap.



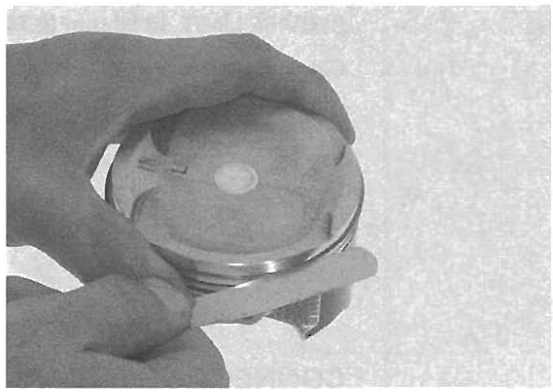
Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.

Remove any carbon deposits from the piston ring grooves.



PISTON INSPECTION

Temporarily install the piston rings to their proper position with the mark facing up.

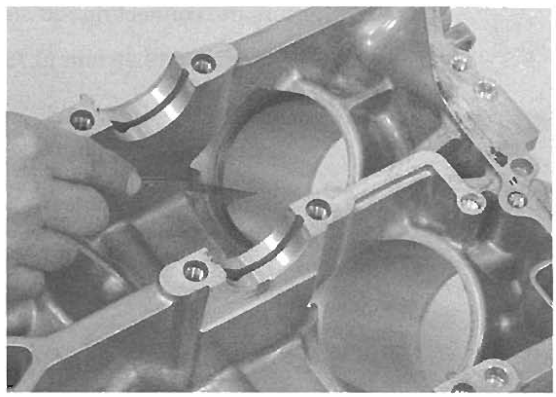


Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:

Top:	0.11 mm (0.004 in)
Second:	0.10 mm (0.004 in)

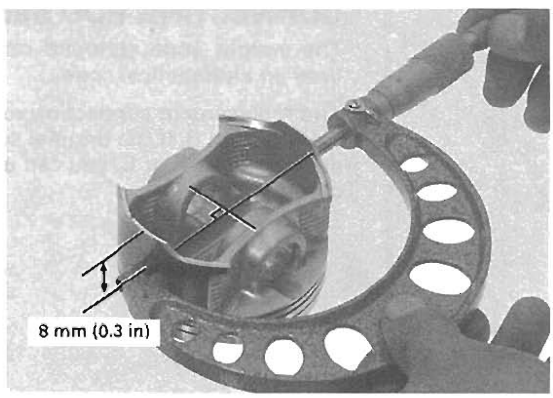
Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.



SERVICE LIMITS:

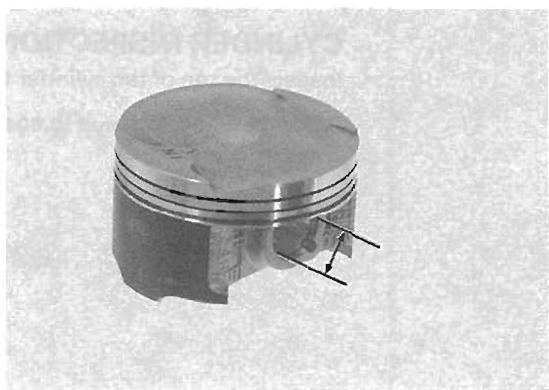
Top:	0.05 mm (0.002 in)
Second:	0.06 mm (0.002 in)
Oil (side rail):	0.9 mm (0.04 in)

Measure the diameter of the piston at 8 mm (0.3 in) from the bottom and 90 degrees to the piston pin hole.



SERVICE LIMIT: 77.90 mm (3.067 in)

Measure the piston pin bore.



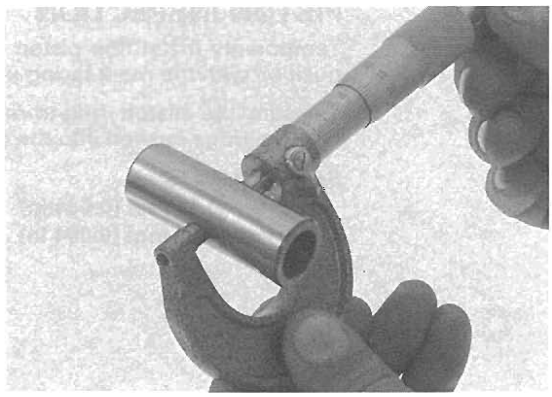
SERVICE LIMIT: 19.02 mm (0.749 in)

Measure the O.D. of the piston pin.

SERVICE LIMIT: 18.98 mm (0.747 in)

Calculate the piston-to-piston pin clearance.

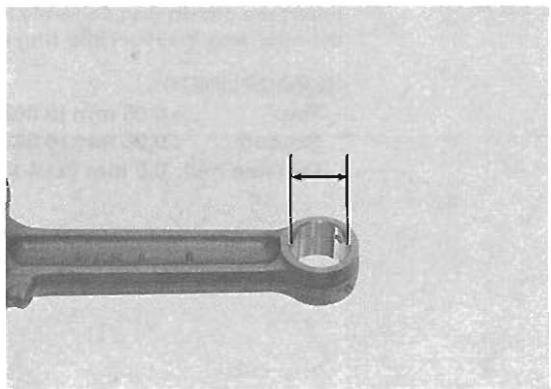
SERVICE LIMIT: 0.04 mm (0.002 in)



CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

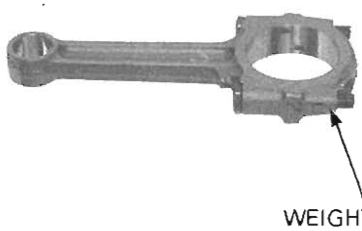
SERVICE LIMIT: 19.06 mm (0.750 in)



CONNECTING ROD SELECTION

The weight code stamped on the connecting rod uses an alphabetical code.

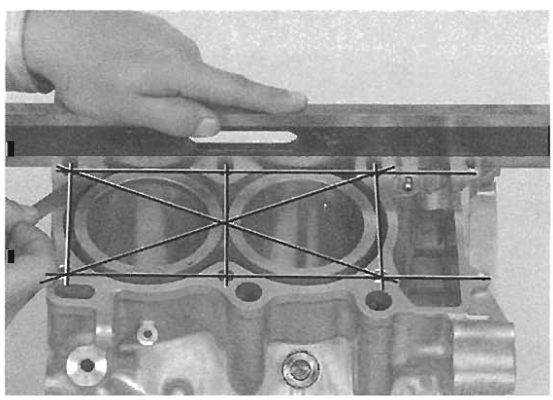
The replacement connecting rod is available only in weight code B. If the original connecting rod weight code is either A or C, you can use the weight code B connecting rod.



CYLINDER INSPECTION

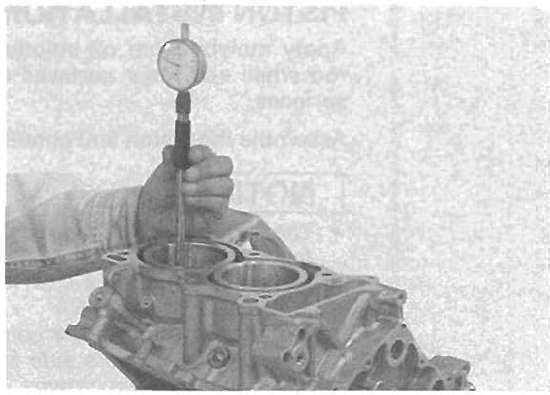
Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 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: 78.10 mm (3.075 in)

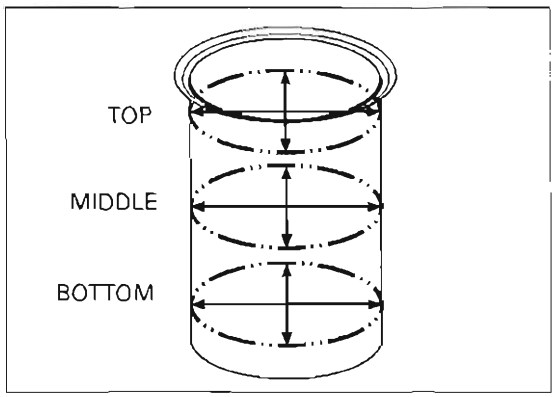


Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.
Refer to procedures for measurement of the piston O.D (page 13-13).

SERVICE LIMIT: 0.10 mm (0.004 in)

Calculate the taper and out of round at three levels in X and Y axis, using 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 following oversize pistons are available:
0.25 mm (0.010 in)
0.50 mm (0.020 in)

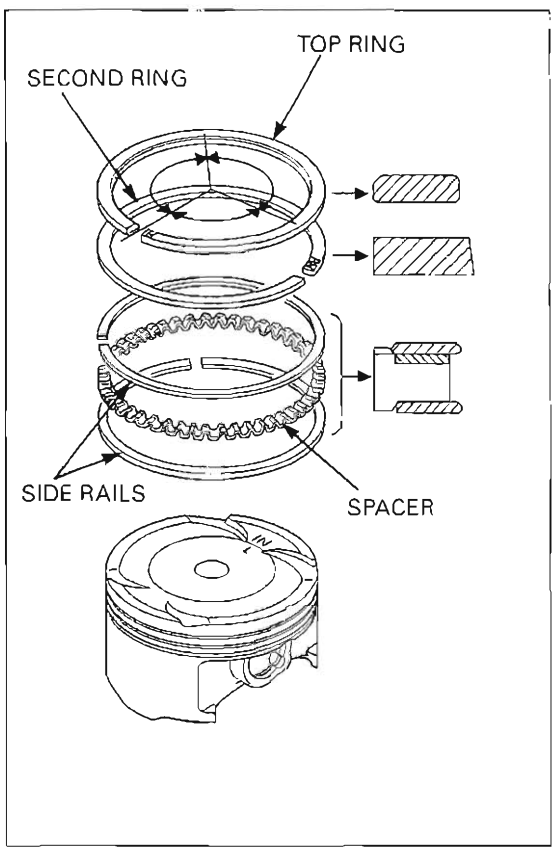
The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).

PISTON ASSEMBLY

Carefully install the piston rings into the piston ring grooves, with their markings facing up.

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (R or RN) facing up.
- Do not mix the top and second rings; the top ring is narrower than the second ring in width.

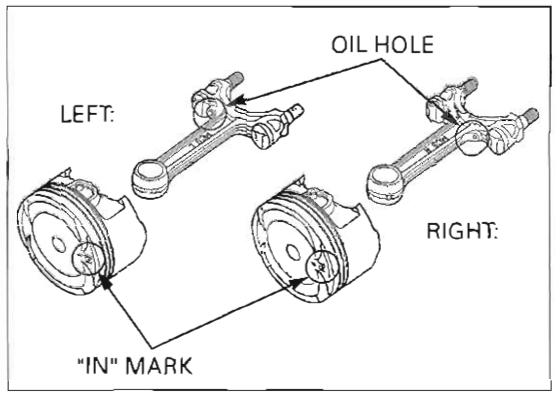
Stagger the piston ring end gaps 120° apart from each other.
Stagger the side rail end gaps as shown.



PISTON INSTALLATION

Apply molybdenum oil solution to the connecting rod small end inner surfaces and piston pin outer surfaces.

Assemble the piston and connecting rod.

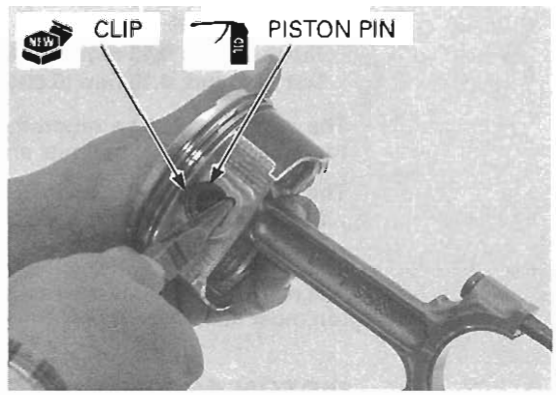


NOTICE

- *The piston has an identification mark on the piston crown (L or R)*
- *The connecting rod has an identification mark on the rod surface (L or R)*
- *Install the right cylinder connecting rod (marked "R") with its oil hole side facing the "IN and R" mark on the piston crown.*
- Install the left cylinder connecting rod (marked "L") with its oil hole side facing the opposite side of the "IN and L" mark on the piston crown.

Apply oil to the piston pin outer surface.

Install the piston pin, and secure it using a new piston pin clip.



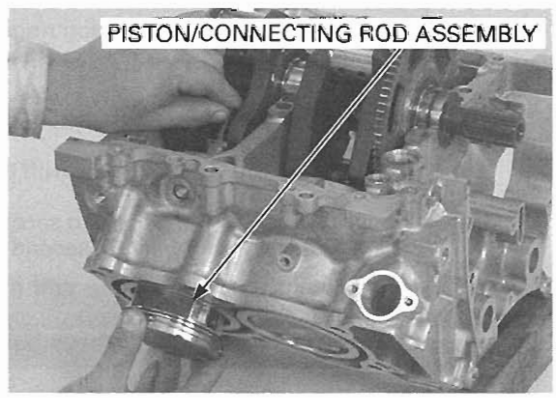
NOTICE

- *Make sure that the piston pin clips are seated securely.*
- Do not align the piston pin clip end gap with the piston cut-out.

Apply engine oil to the cylinder wall, piston and piston rings.

Install the piston/connecting rod assembly with the piston "IN" mark facing to the intake side.

Install the piston/connecting rod assembly into the cylinder using a commercially available piston ring compressor tool.

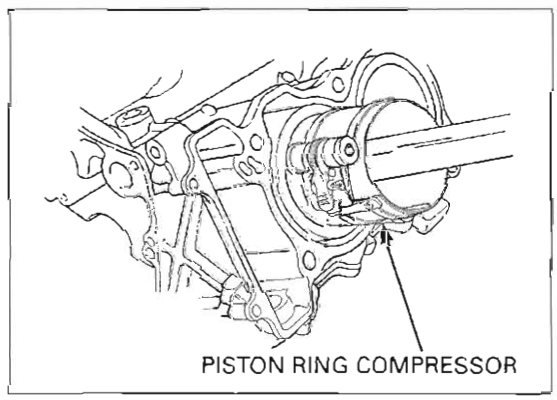


NOTICE

- *While installing the piston, be 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.*

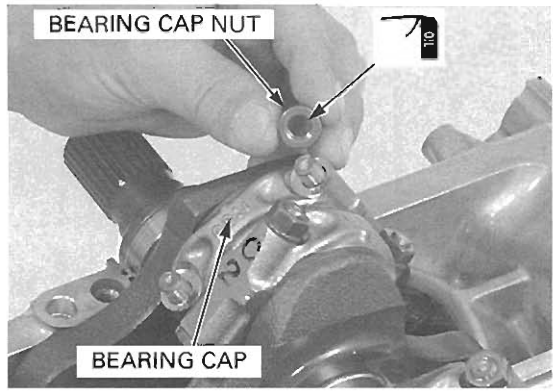
Make sure the ring compressor tool sits flush with the top surface of the cylinder.

Use the handle of a plastic hammer to tap the piston into the cylinder.



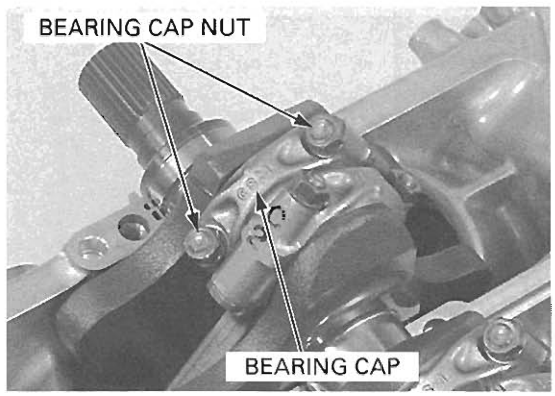
Apply engine oil to the crankpin bearing surfaces.
Install the bearing cap.
Ensure that the marks on the caps are aligned with the marks on the connecting rods.

Apply oil to the connecting rod bearing cap nut threads and seating surfaces.



Install the connecting rod nuts and tighten the nuts gradually and alternately, then tighten them to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m, 25 lbf·ft)



14. FINAL DRIVE

COMPONENT LOCATION 14-2

SERVICE INFORMATION 14-3

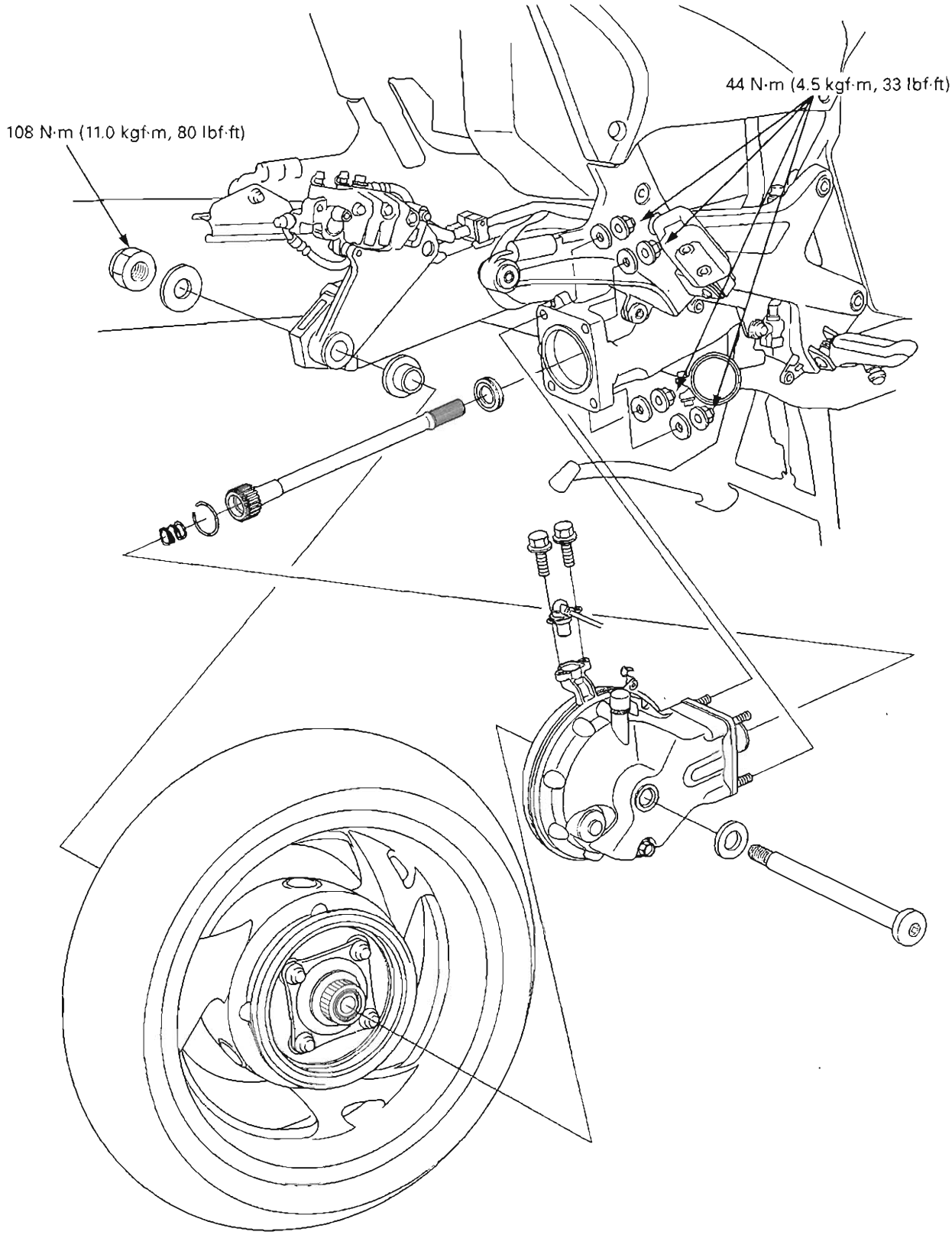
TROUBLESHOOTING 14-4

FINAL DRIVE REMOVAL 14-5

FINAL DRIVE GEAR 14-7

FINAL DRIVE INSTALLATION 14-21

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The final drive gear assembly and final drive shaft must be removed together.
- Replace the ring and pinion gears as a set.
- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gears or gear case. The extension lines from the gear engagement surfaces should intersect at one point.
- Protect the gear case with a shop towel or soft jaws while holding it in a vise. Do not clamp the gear case too tightly or it could be damaged.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	at draining	155 cm^3 (5.2 US oz, 5.5 Imp oz)	–
	at disassembly	175 cm^3 (5.9 US oz, 6.2 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurement		–	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–
Final drive gear assembly preload		0.2 – 0.4 N·m (2 – 4 kgf·m, 1.7 – 3.5 lbf·ft)	–

TORQUE VALUES

Final gear assembly mounting UBS nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Final drive oil drain bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	
Pinion gear bearing retainer	147 N·m (15.0 kgf·m, 108 lbf·ft)	
Pinion gear bearing retainer lock plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Gear case cover bolt (8 mm)	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply a locking agent to the threads.
Gear case cover bolt (10 mm)	62 N·m (6.3 kgf·m, 46 lbf·ft)	Apply a locking agent to the threads.
Pinion gear nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply a locking agent to the threads.
Dust guard plate mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Rear axle nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	

TOOLS

Pinion holder plate	070MB-0010110	
Pinion holder attachment	070MB-0010120	
Universal bearing puller	07631-0010000	or equivalent commercially available
Attachment 52 x 55 mm	07746-0010400	
Attachment 62 x 68 mm	07746-0010500	
Attachment 72 x 75 mm	07746–0010600	
Driver, 40 mm I.D.	07746–0030100	
Attachment, 30 mm I.D.	07746-0030300	
Pilot, 35 mm.	07746-0040800	
Driver	07910-4830100	
Retainer wrench	07916-4630100	
Shaft puller	07931-ME40000	07931-ME4010B and 07931-HB3020A (U.S.A. only)
Oil seal remover	07948-4630100	
Piston base	07958-MG90000	
Oil seal driver	07965-MC70100	
Oil seal driver	07965-MC70101	
Pinion puller base	07HMC-MM80110	

TROUBLESHOOTING

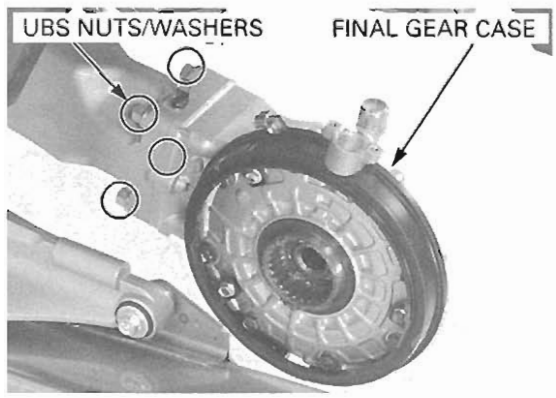
Excessive noise
- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gear
- Oil level too low

Oil leak
- Clogged breather
- Oil level too high
- Seals damaged

FINAL DRIVE REMOVAL

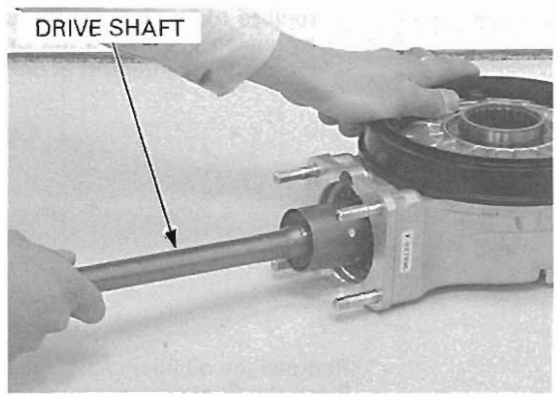
Drain the final drive oil (page 3-17).
Remove the rear wheel (page 16-5).

Support the swingarm and remove the final gear assembly mounting UBS nuts and washers.
Remove the final gear case.



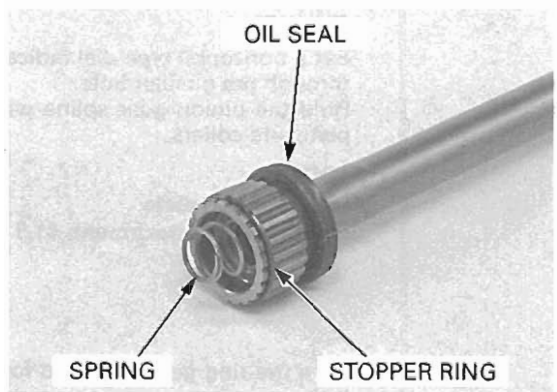
DRIVE SHAFT REMOVAL/DISASSEMBLY

Separate the drive shaft from the gear case by gently turning the drive gear shaft and pulling.



Remove the spring, oil seal and stopper ring from the drive shaft.

Check the splines of the drive shaft for damage or wear.
If the splines of the drive shaft are damaged, check the universal joint splines also.

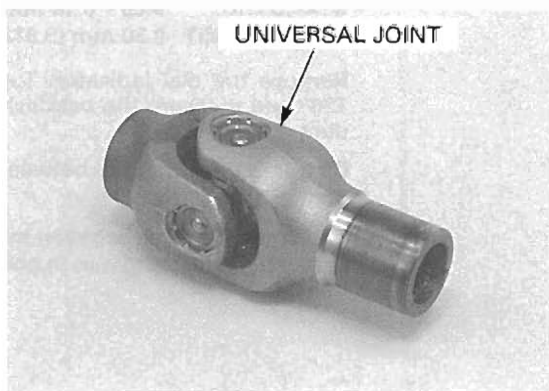


UNIVERSAL JOINT REMOVAL

Remove the swingarm (page 16-14).

Remove the universal joint from the swingarm.

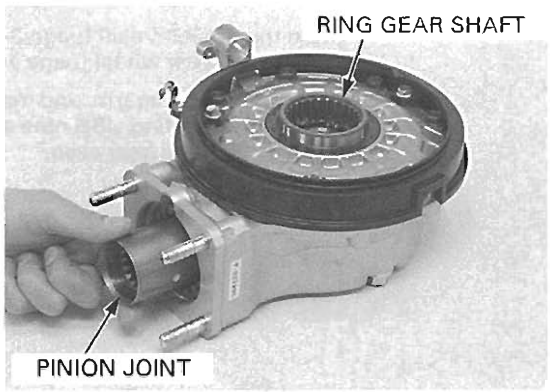
Check that the universal joint moves smoothly without binding or noise.
Check the splines for wear or damage.



FINAL DRIVE INSPECTION

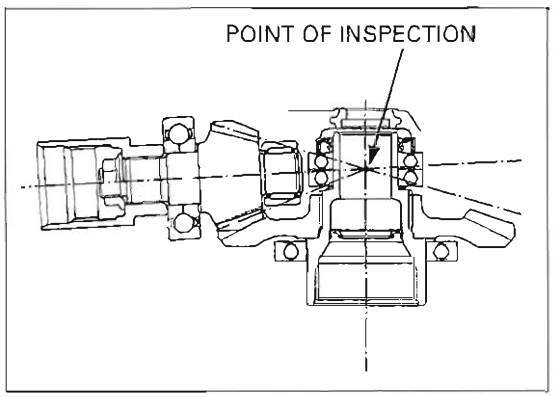
Turn the pinion joint and check that the ring gear turns smoothly and quietly without binding.

If the gears do not turn smoothly or quietly, the bearings and/or gears may be damaged or faulty. They must be checked after disassembly; replace them if necessary.



BACKLASH INSPECTION

- Perform the backlash inspection and tooth contact pattern check (page 14-12) whenever you replace the gear set, bearings or gear case. The extension lines from the gear engagement surfaces should intersect at one point.

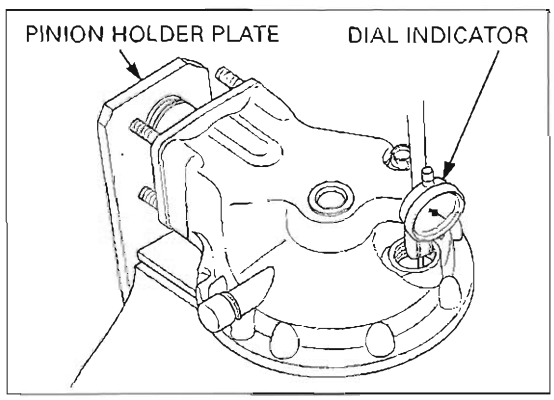


Remove the oil filler cap.
Place the final gear assembly into a jig or vise with soft jaws.

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Hold the pinion gear spline with the pinion holder plate and collars.

TOOLS:

Pinion holder plate	**070MB-0010110**
Pinion holder attachment, 41.5	**070MB-0010120**



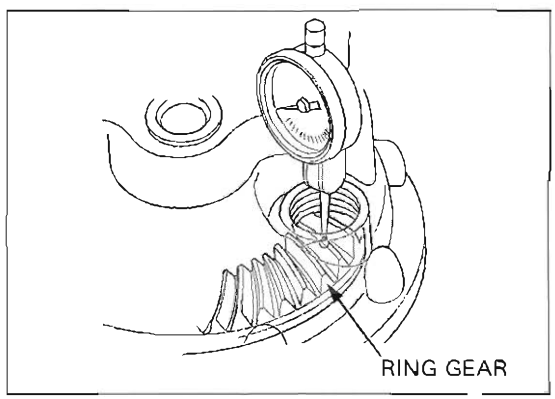
Turn the ring gear back and forth to read the backlash.

STANDARD: 0.05 – 0.15 mm (0.002 – 0.006 in)
SERVICE LIMIT: 0.30 mm (0.012 in)

Remove the dial indicator. Turn the dial indicator 120° and measure the backlash. Repeat this procedure once more.

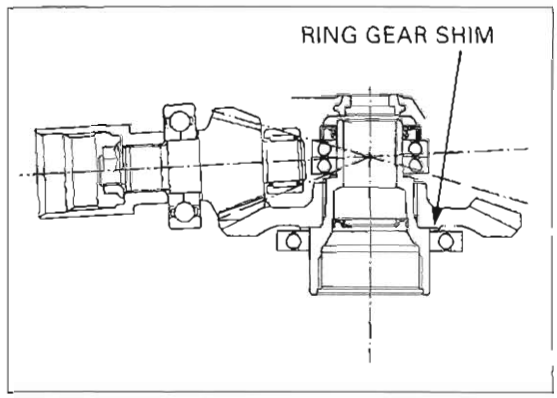
Compare the difference between the three measurements.

Backlash difference between measurements:
SERVICE LIMIT: 0.10 mm (0.004 in)



If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and install if necessary.

If backlash is excessive, replace the ring gear shim with a thicker one.
If backlash is too small, replace the ring gear shim with a thinner one.



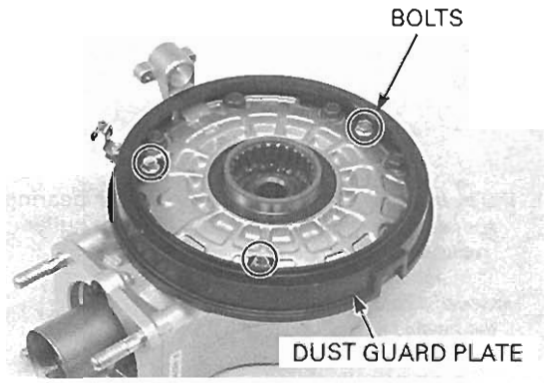
Ring gear shims:

A:	1.82 mm (0.072 in)	J:	2.09 mm (0.082 in)
B:	1.85 mm (0.073 in)	K:	2.12 mm (0.083 in)
C:	1.88 mm (0.074 in)	L:	2.15 mm (0.085 in)
D:	1.91 mm (0.075 in)	M:	2.18 mm (0.086 in)
E:	1.94 mm (0.076 in)	N:	2.21 mm (0.087 in)
F:	1.97 mm (0.078 in)	O:	2.24 mm (0.088 in)
G:	2.00 mm (0.079 in)	P:	2.27 mm (0.089 in)
H:	2.03 mm (0.080 in)	Q:	2.30 mm (0.091in)
I:	2.06 mm (0.081 in)		

FINAL DRIVE GEAR

RING GEAR REMOVAL/SHIM REPLACEMENT

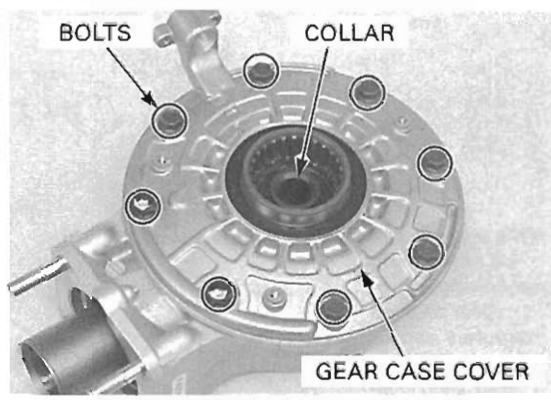
Remove the dust guard plate bolts and remove the dust guard plate by turning it counterclockwise.



Remove the distance collar.

Remove the wave washer if it remains in the gear case.

Remove the case cover bolts and gear case cover.

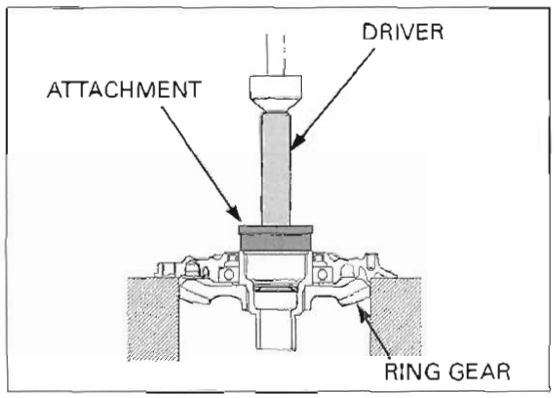


If the ring gear stays in the cover, perform the following procedure.

Support the cover horizontally with the ring gear facing down and press the gear out using the special tools and hydraulic press.

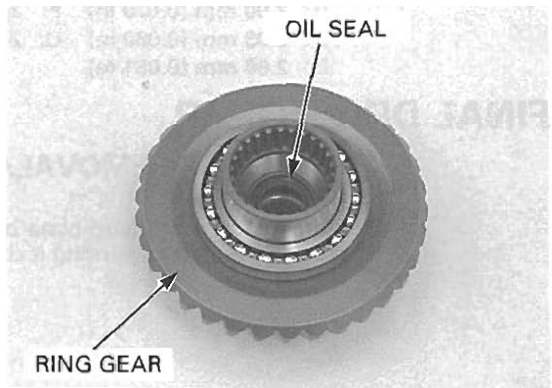
TOOLS:

Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**



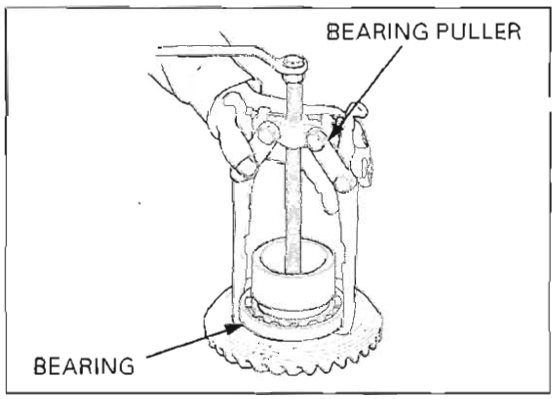
Remove the ring gear from the gear case.

Remove the oil seal from the ring gear.



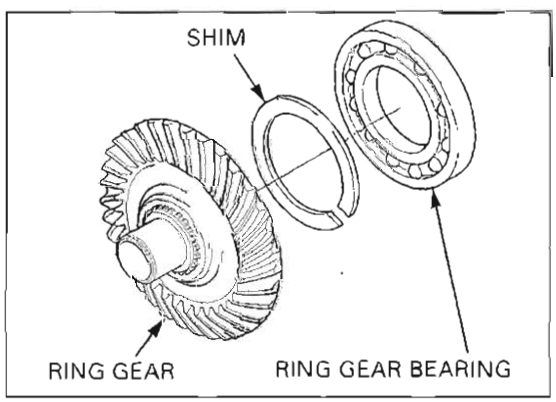
This bearing may not need to be replaced after removal. However, inspect the bearing for noise and/or excessive play after removal.

Remove the ring gear bearing using the commercially available bearing puller.



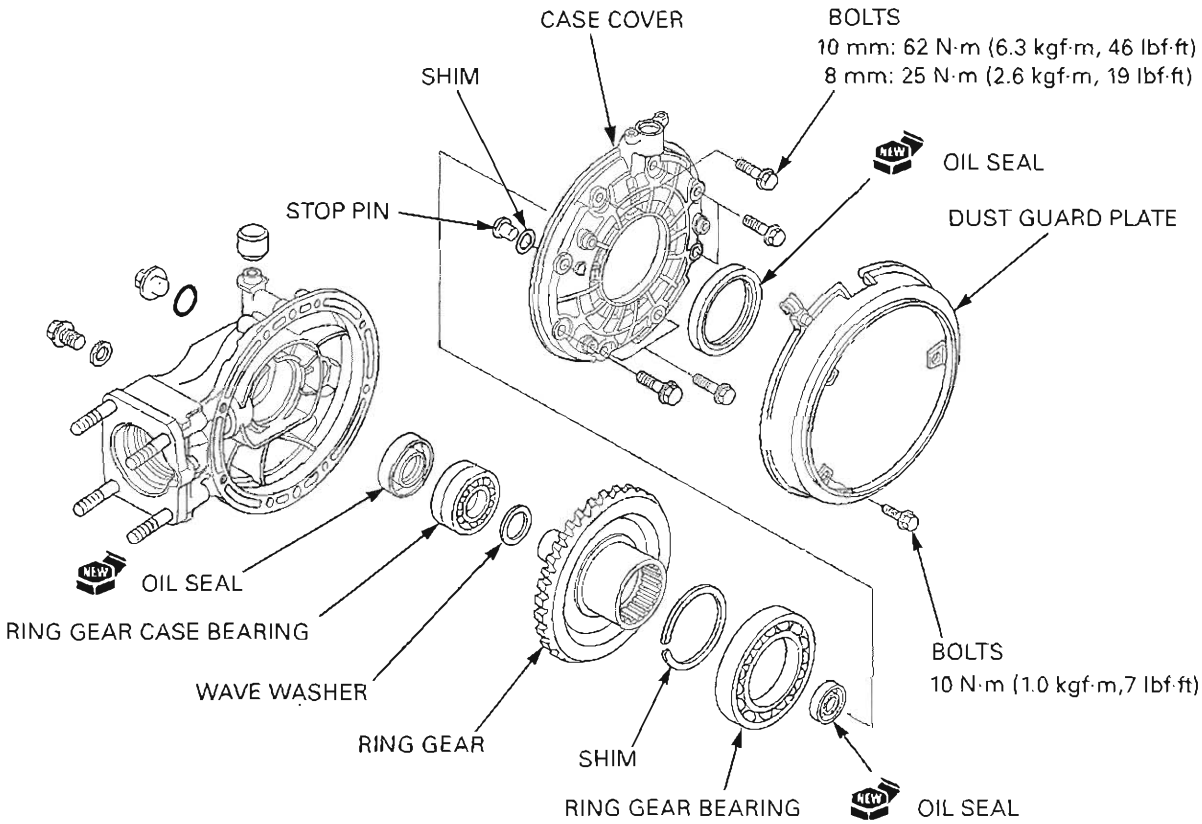
If the gear set, pinion bearing, ring gear bearing and /or gear case are removed, install a 2.00 mm (0.079 in) thick shim (standard).

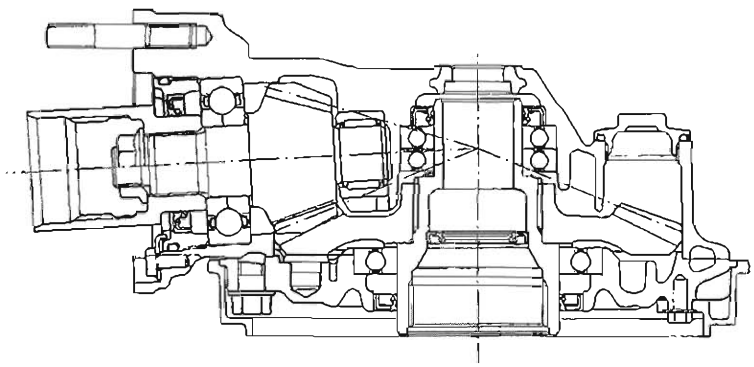
Replace the ring gear shim.



RING GEAR INSTALLATION

For the case bearing replacement and breather hole cleaning, see page 14-19.



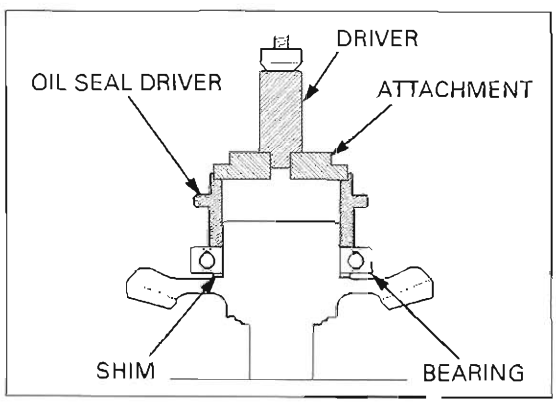


If the ring gear assembly was loose against the cover (if it did not stay in the cover), do the following:

Place the ring gear shim onto the ring gear.
Press the bearing onto the shaft.

TOOLS:

Oil seal driver	**07965-MC70101**
Attachment, 72 x 75 mm	**07746-0010600**
Driver	**07749-0010000**

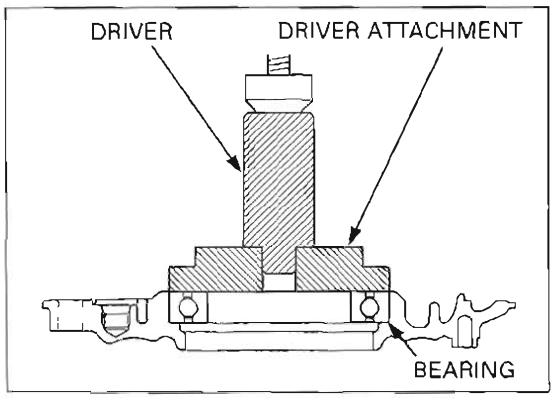


If the ring gear remained in the cover, do the following:

Remove the case cover oil seal (see below).
Press the ring gear bearing into the cover using the special tools.

TOOLS:

Driver	07749-0010000
Bearing driver attachment	07GAD-SD40101

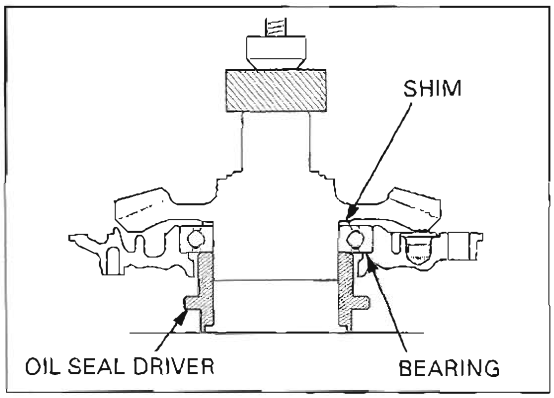


Install the shim onto the ring gear.

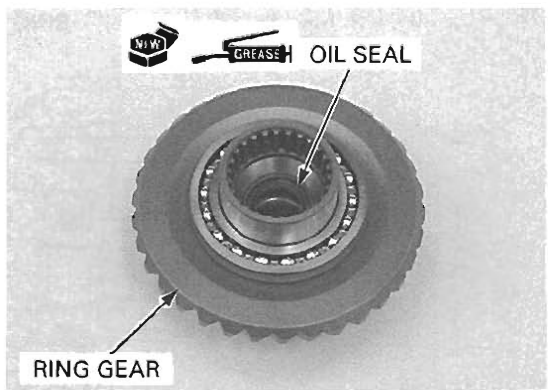
Support the bearing inner race with the special tool, and press the ring gear into the bearing.

TOOL:

Oil seal driver	07965-MC70101



Coat a new oil seal with grease and install it into the ring gear.



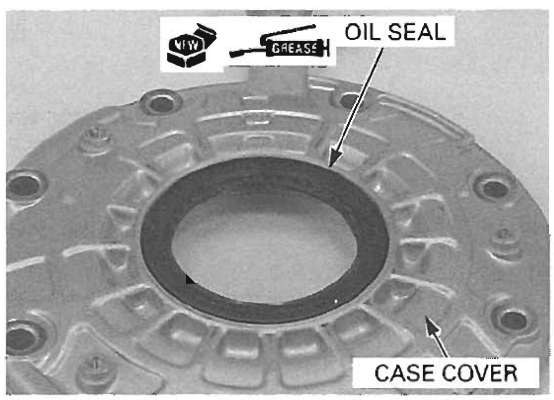
Remove and discard the case cover oil seal.

Install a new oil seal using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 52 X 55 mm	07746-0010400

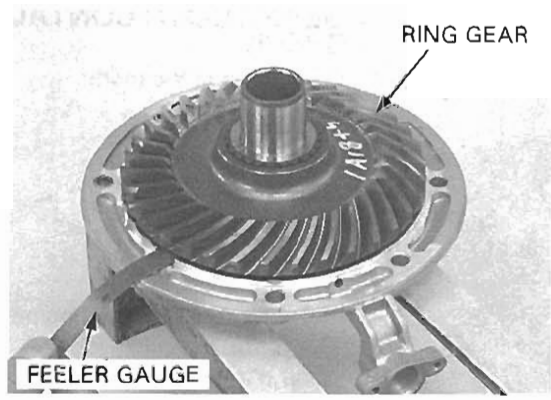
Apply grease to the seal lips.



Install the ring gear into the gear case cover.

Measure the clearance between the ring gear and the ring gear stopper pin with a feeler gauge.

CLEARANCE: 0.30 – 0.60 mm (0.012 – 0.024 in)



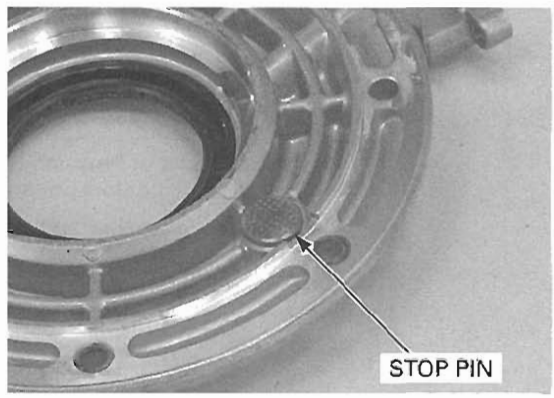
Always wear insulated gloves when handling the heated gear case cover.

Remove the ring gear if the clearance exceeds the service limit. Heat the gear case cover to approximately 80°C (176°F). Heat the case cover evenly and slowly to prevent warpage.

Do not heat small areas individually. When the gear case cover is heated to the proper temperature, remove the stop pin by tapping the cover.

NOTICE

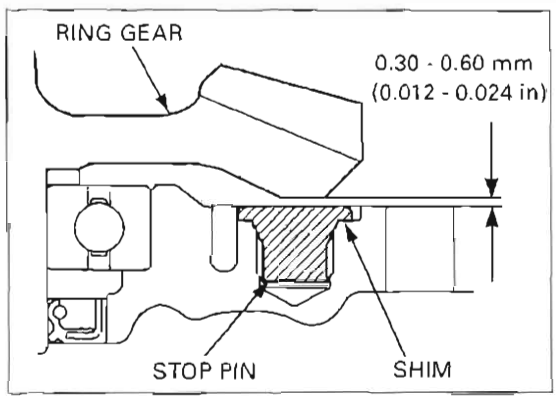
Case cover warpage can occur if the cover is not heated properly.



Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

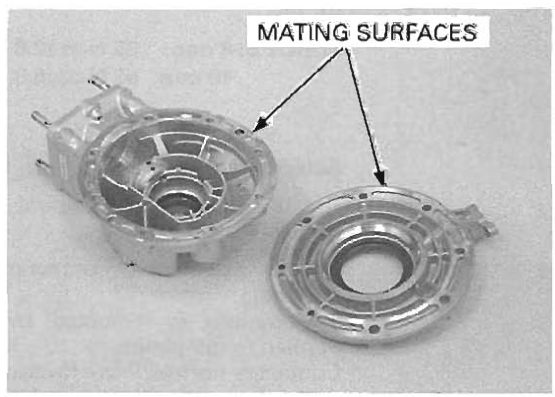
Install the shim and drive the stop pin into the case cover.



Clean all sealing material off the mating surfaces of the gear case and cover.

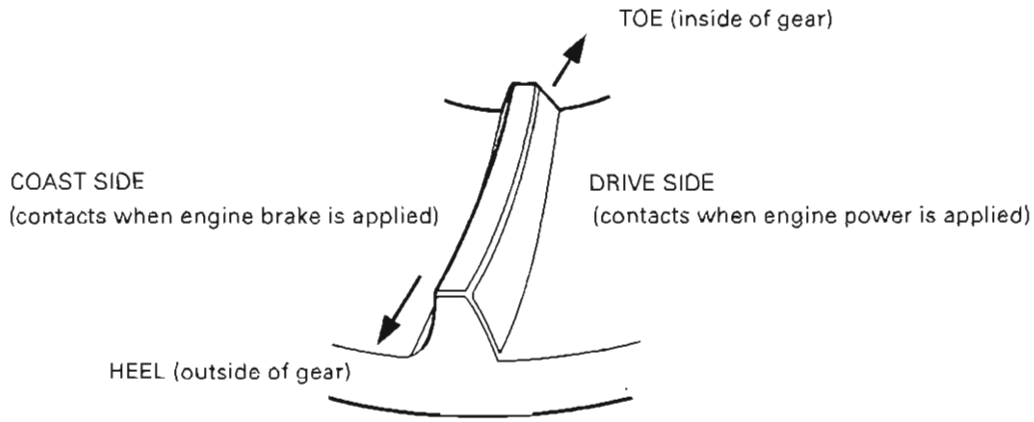
- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

Check the gear tooth contact pattern after the ring gear shim has been replaced (page 14-12).



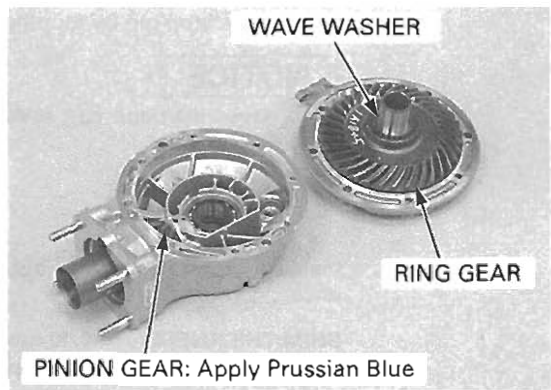
GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:



Apply a thin coat of Prussian Blue to the pinion gear teeth for a tooth contact pattern check.

Place the wave washer and ring gear into the gear case.



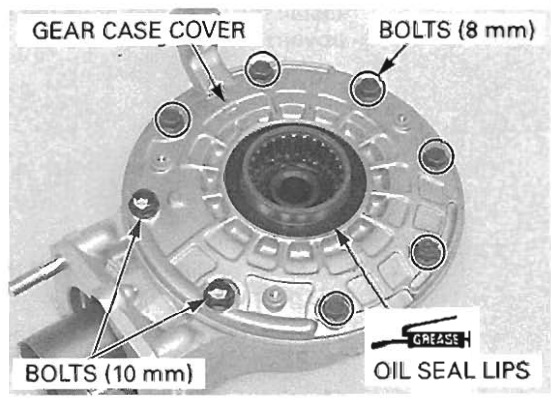
Pack grease into the seal lip cavity of the case cover oil seal and install the gear case cover.

Apply a locking agent to the cover bolt threads.

Tighten the cover bolts in two or three steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a criss-cross pattern in two or more steps.

Next tighten the 10 mm bolts to the specified torque.

TORQUE: 8 mm: 25 N·m (2.6 kgf·m, 19 lbf·ft)
10 mm: 62 N·m (6.3 kgf·m, 46 lbf·ft)

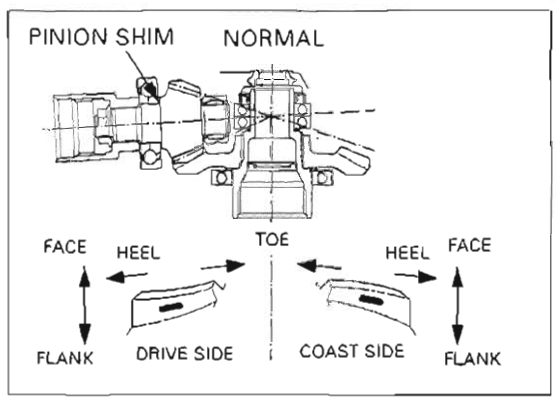


Remove the oil filler cap from the final gear case.

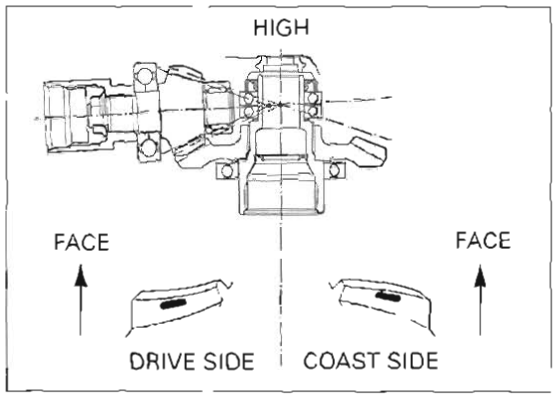
Rotate the ring gear several times in the normal direction of rotation.

Check the gear tooth contact pattern through the oil filler hole.
The pattern is indicated by the Prussian Blue applied to the pinion.
Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.

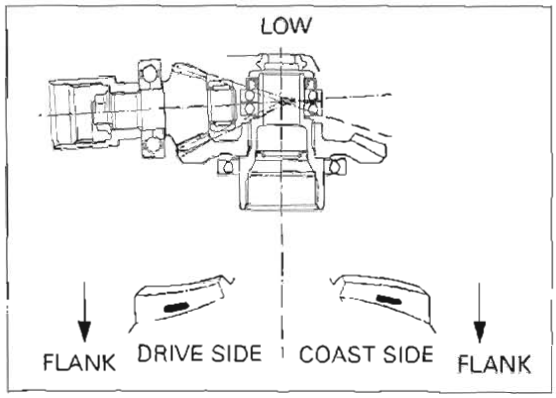
If the pattern is not correct, remove and change the pinion shim.



Replace the pinion shim with a thicker one if the contact pattern is too high.



Replace the pinion shim with a thinner one if the contact pattern is too low.



The patterns will shift about 1.32 – 1.68 mm (0.052 – 0.066 in) when the thickness of the shim is changed by 0.03 mm (0.001 in).

Pinion gear shims:

A:	**1.32 mm (0.052 in)**	**H:**	**1.53 mm (0.060 in)**
B:	**1.35 mm (0.053 in)**	**I:**	**1.56 mm (0.061 in)**
C:	**1.38 mm (0.054 in)**	**J:**	**1.59 mm (0.062 in)**
D:	**1.41 mm (0.056 in)**	**K:**	**1.62 mm (0.063 in)**
E:	**1.44 mm (0.057 in)**	**L:**	**1.65 mm (0.065 in)**
F:	**1.47 mm (0.058 in)**	**M:**	**1.68 mm (0.066 in)**
G:	**1.50 mm (0.059 in)**		

Assemble the gear case (page 14-19).

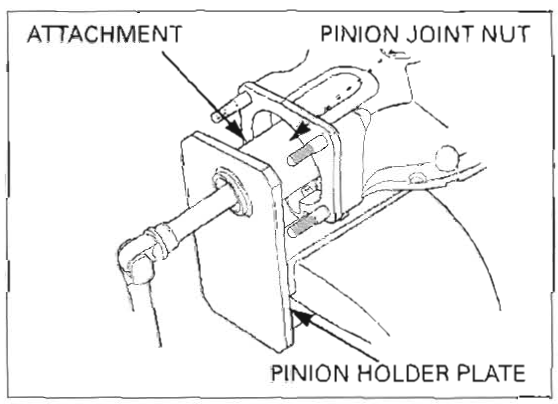
PINION GEAR REMOVAL/SHIM REPLACEMENT

Place the final gear case in a vise with soft jaws.

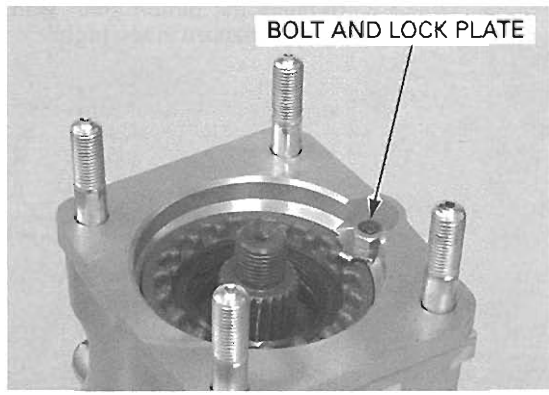
Assemble the pinion holder plate and collars and install them onto the gear case to avoid damaging the gear case.
Remove the pinion joint nut.

TOOLS:

Pinion holder plate	**070MB-0010110**
Pinion holder attachment, 41.5	**070MB-0010120**



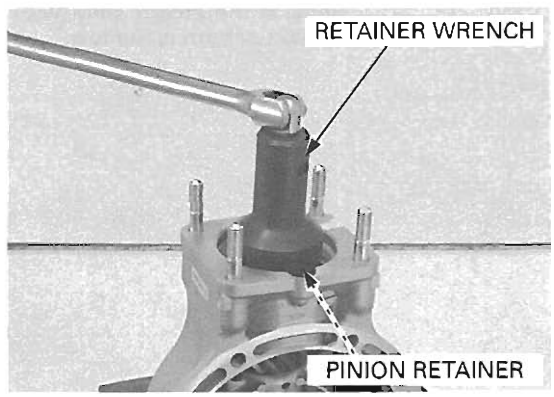
Remove the bolt and retainer lock plate.



Remove the pinion retainer with the retainer wrench.

TOOL:

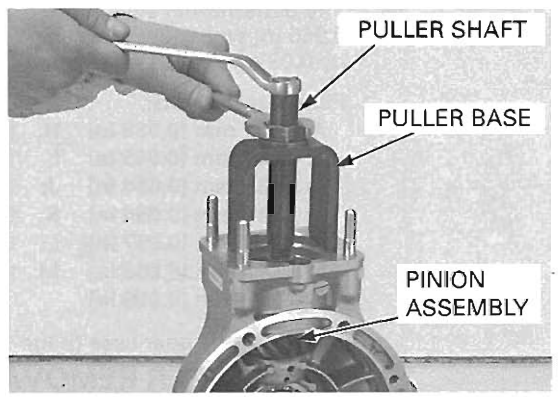
Retainer wrench	**07916-4630100**



Assemble the pinion puller set as shown.
Pull out the pinion assembly with the pinion holder.

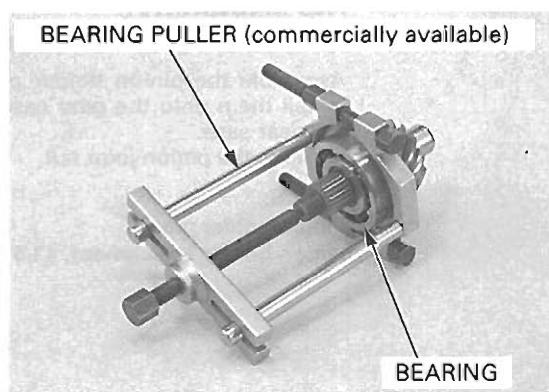
TOOLS:

Puller shaft	**07931-ME40000**
Pinion puller base	**07HMC-MM80110**
Piston base	**07958-MG90000**



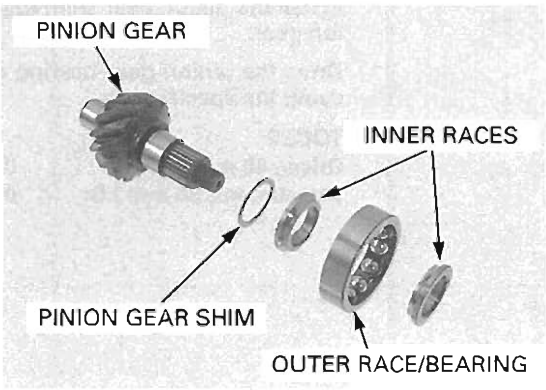
Pull the bearing outer and inner races from the shaft with the bearing puller.

This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.

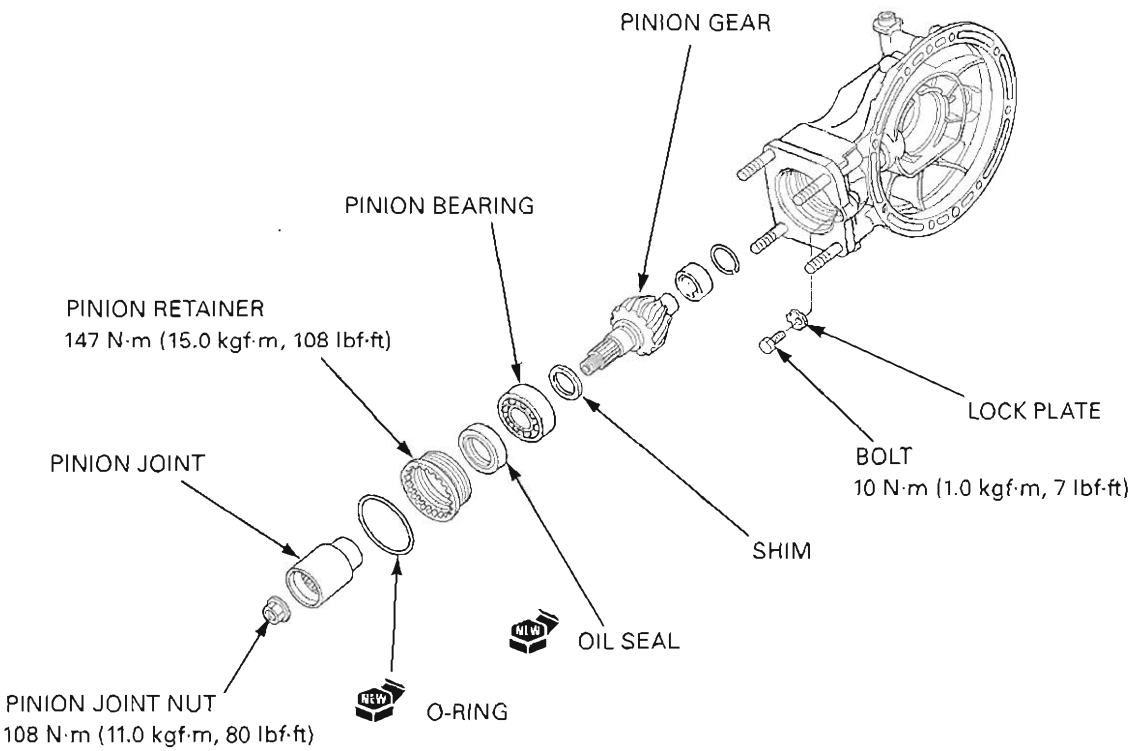


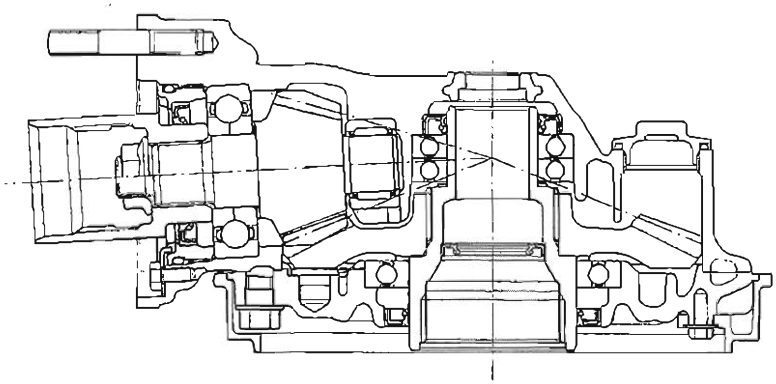
Remove the pinion gear shim.

If the gear set, pinion bearing, gear bearing and/or gear case are replaced, install a 2.00 mm (0.79 in) thick shim (standard) for initial reference.



PINION GEAR INSTALLATION



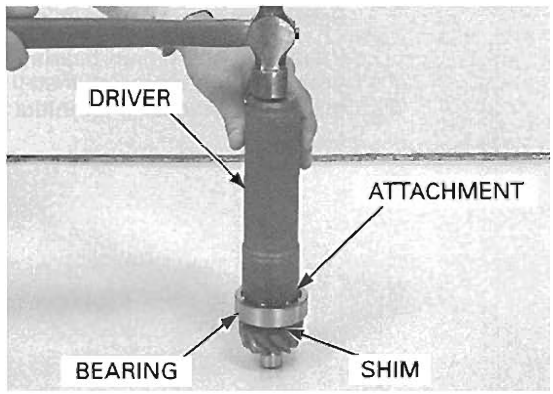


Install the pinion gear shim (page 14-15) on the pinion gear.

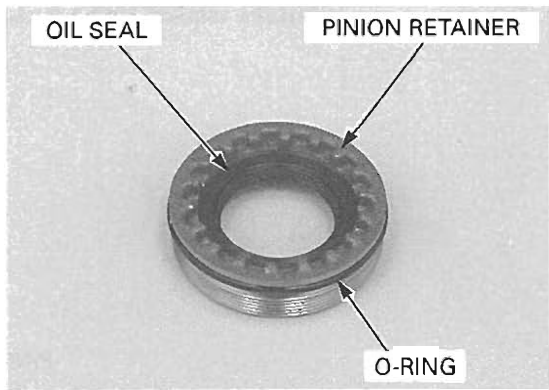
Drive the pinion gear bearing onto the pinion gear using the special tools.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**



Remove the O-ring and oil seal from the pinion retainer.

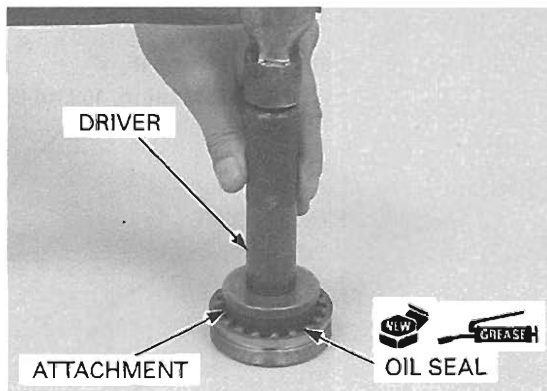


Drive a new oil seal into the retainer using the special tools.

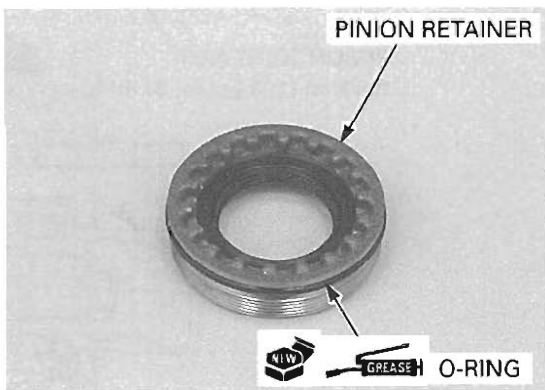
TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**

Apply grease into the seal lip cavity.



Coat a new O-ring with grease and install it into the retainer groove.

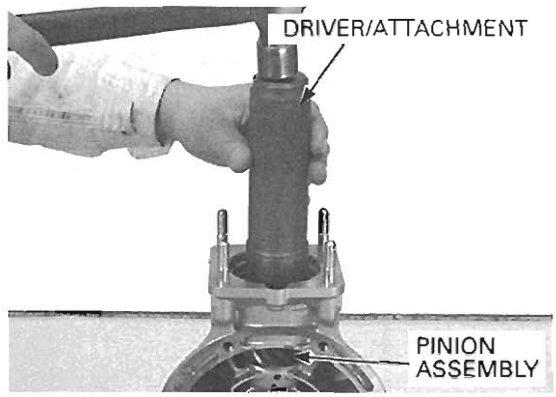


Place the gear case in a vise with soft jaws.

Drive the pinion assembly into the gear case until enough threads are visible to accept the pinion retainer to avoid damaging the gear case.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**

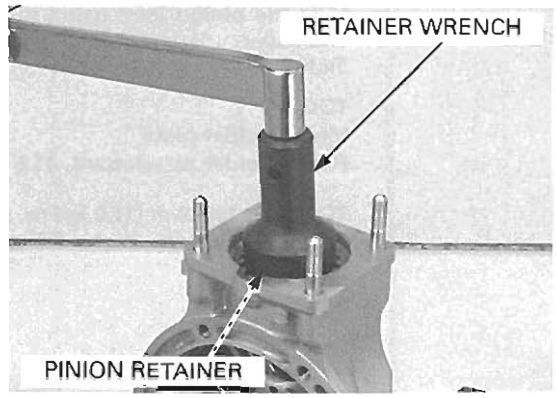


Screw the pinion retainer in, pressing the pinion bearing in place, then tighten retainer to the specified torque.

TOOL:

Retainer wrench	**07916-4630100**

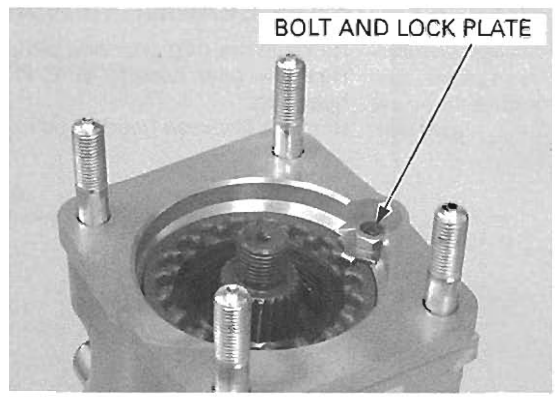
TORQUE: 147 N·m (15.0 kgf·m, 108 lbf·ft)



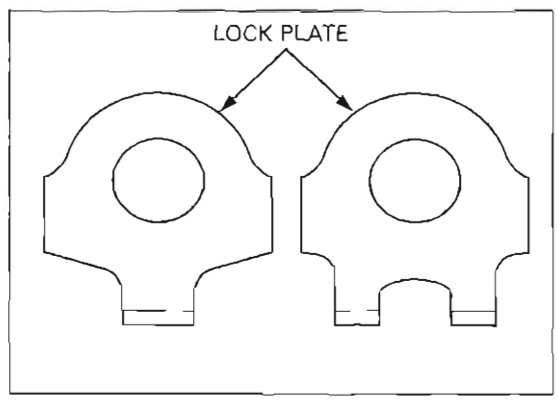
Install a lock plate, depending on the position of the pinion retainer grooves in relation to the lock tabs.

Install and tighten the lock tab bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

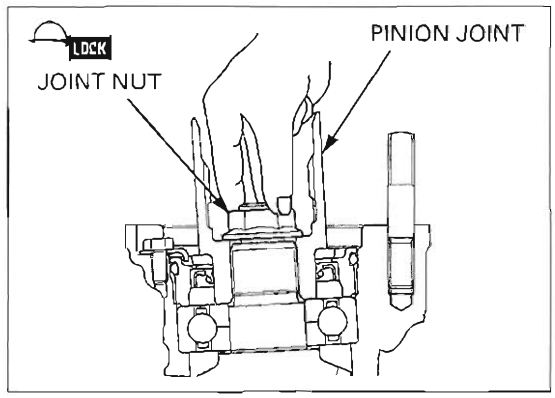


The lock plate is available in the two types shown.



Install the pinion joint to the pinion gear shaft.

Apply locking agent to the threads of the pinion joint nut and screw it in by hand as far as it goes.

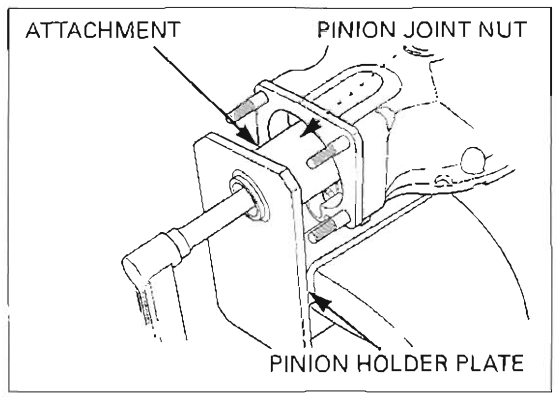


Hold the pinion joint using the pinion holder plate and collar.
Tighten the pinion gear nut to the specified torque.

TOOLS:

Pinion holder plate	**070MB-0010110**
Pinion holder attachment, 41.5	**070MB-0010120**

TORQUE: **108 N·m (11.0 kgf·m, 80 lbf·ft)**



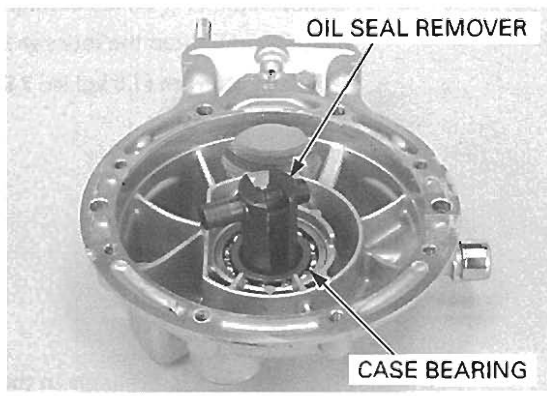
CASE BEARING REPLACEMENT

Always wear insulated gloves when handling the heated gear case

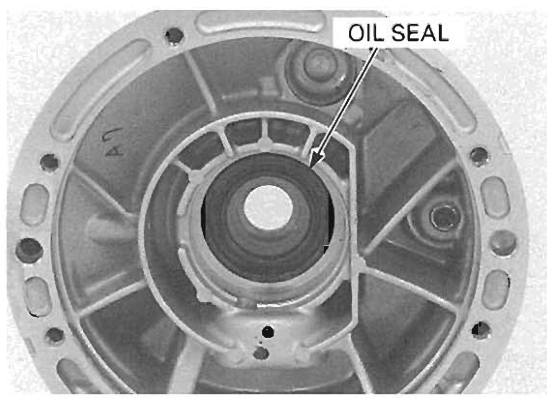
Remove the ring gear and pinion gear.
Heat the gear case to 80°C (176°F) evenly using a heat gun.
Remove the case bearing using the special tool.

TOOL:

Oil seal remover	**07948-4630100**



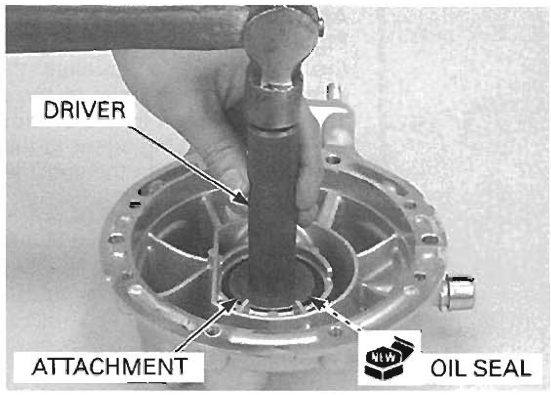
Remove the oil seal and discard it.



Drive a new oil seal into the gear case using the special tools.

TOOLS:

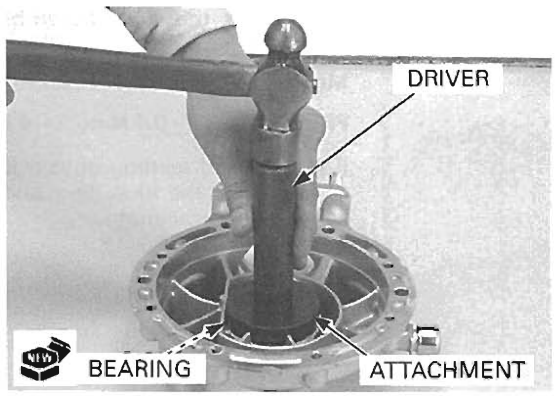
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400



Drive a new ring gear bearing into the gear case using the special tools.

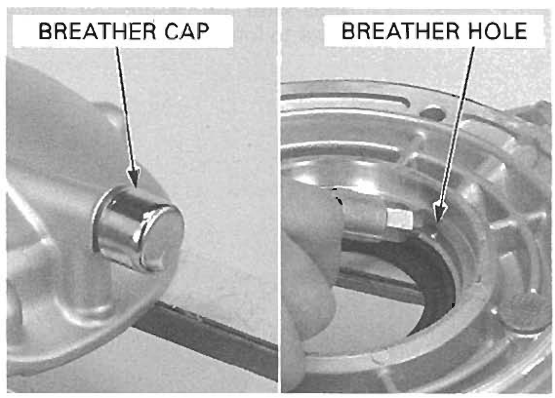
TOOLS:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 35 mm	07746-0040800



BREATHER HOLE CLEANING

To avoid damaging the breather cap, remove it before blowing compressed air through the breather hole.

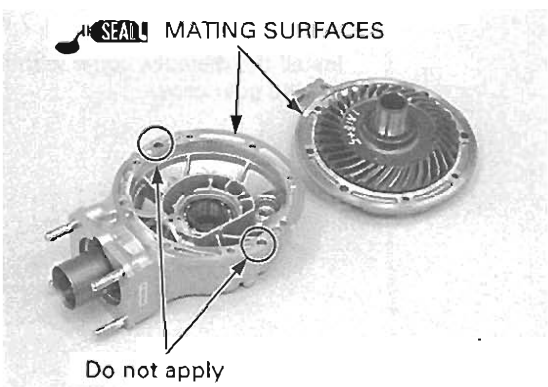


GEAR CASE ASSEMBLY

Clean all sealing material of the mating surfaces of the gear case cover.

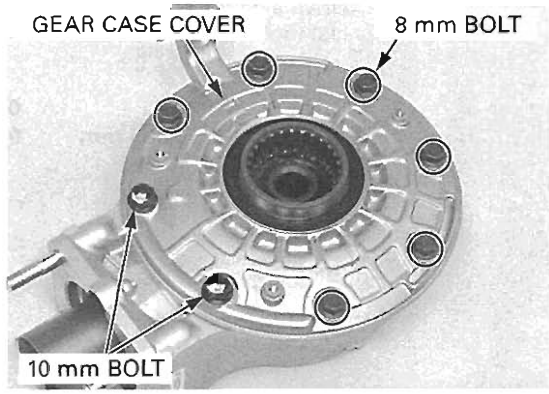
Apply liquid sealant to the mating surface of the gear case and cover. Do not apply sealant around the dowel holes.

Install the ring gear and gear case cover with the wave washer (page 14-12).



Apply a locking agent to the case cover bolt threads. Tighten the cover bolts in two or three steps until the cover evenly touches the gear case, Then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.
Next, apply locking agent to the 10 mm bolt threads and tighten them to the specified torque.

TORQUE: 8 mm: 25 N·m (2.6 kgf·m, 19 lbf·ft)
10 mm: 62 N·m (6.3 kgf·m, 46 lbf·ft)

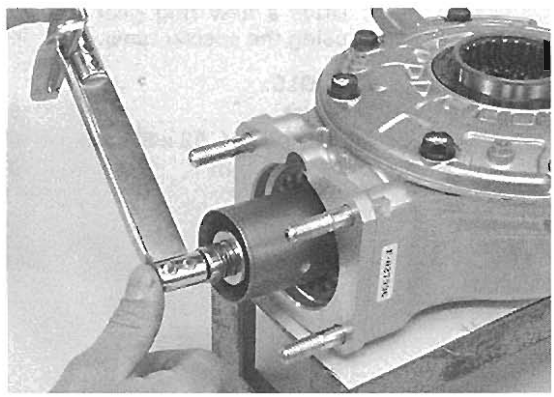


Make sure the gear assembly rotates smoothly without binding.

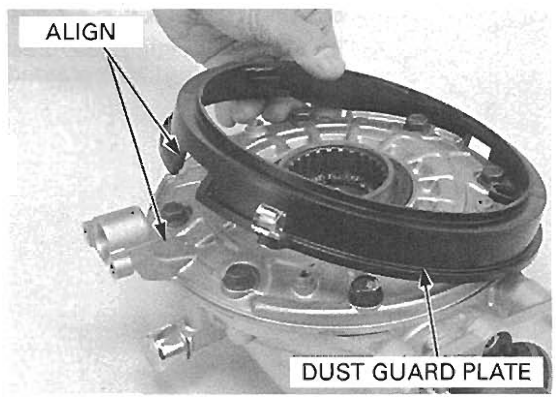
Measure the final gear assembly preload.

PRELOAD: 0.2 – 0.4 N·m (2 – 4 kgf·m, 1.7 – 3.5 lbf·ft)

If the preload reading does not fall within the limit, disassemble the final gear and check the bearings for proper installation.



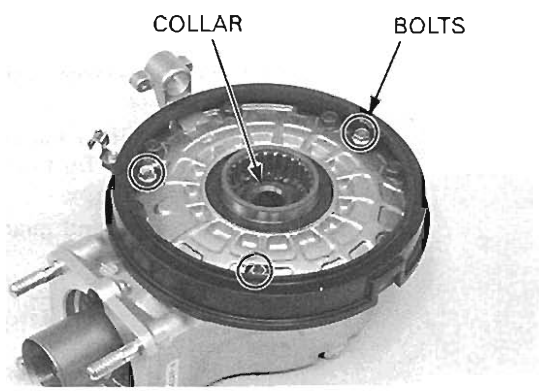
Install the dust guard plate by aligning the plate tabs with the case cover grooves and turn it clockwise to lock.



Tighten the guard plate bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the distance collar with the polished side facing the gear case.

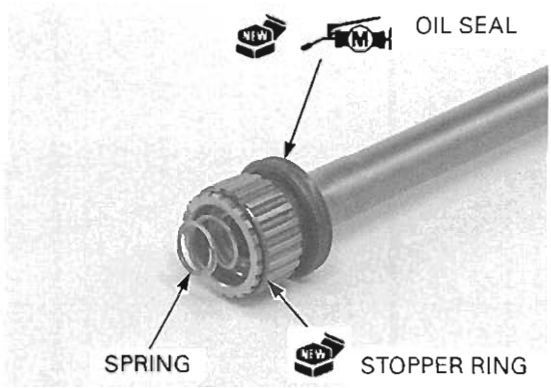


FINAL DRIVE INSTALLATION

DRIVE SHAFT ASSEMBLY/INSTALLATION

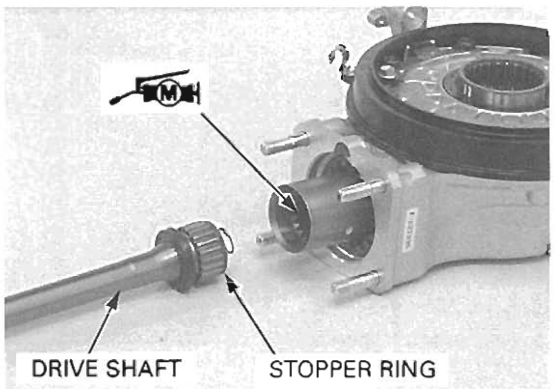
Install a new stopper ring.
Install the spring and new oil seal and pack 0.5 g (0.02 oz) of molybdenum disulfide grease into seal lip cavity.

Pack 2 g (0.08 oz) of molybdenum disulfide grease into the pinion joint spline.



Install the drive shaft into the pinion joint until the stopper ring seats in the pinion joint spline groove.

Pack 1 g (0.04 oz) of molybdenum disulfide grease into the drive shaft spline.



Insert the final drive assembly into the swingarm and align the splines with the universal joint by holding the swingarm.

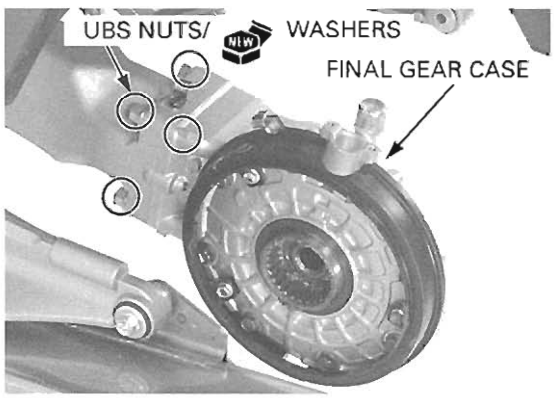
Install the final gear assembly mounting UBS nuts with new washers.

Tighten the final gear assembly mounting UBS nuts to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Install the rear wheel (page 16-11).
Fill the gear case with the recommended final drive oil (page 3-17).

OIL CAPACITY: 175 cm³ (5.9 US oz, 6.2 Imp oz) at disassembly



15. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION 15-2

SERVICE INFORMATION 15-3

TROUBLESHOOTING 15-4

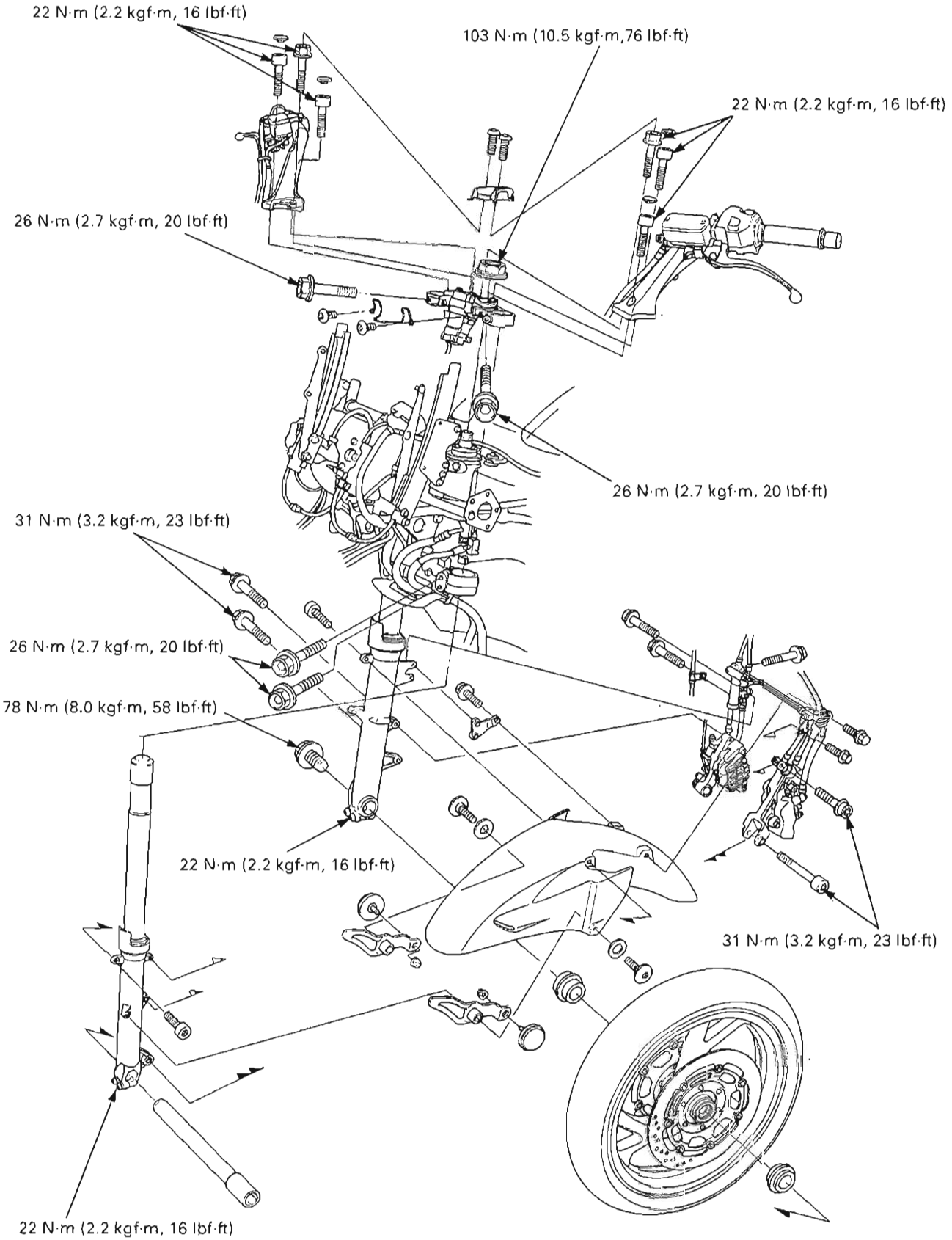
HANDLEBARS 15-5

FRONT WHEEL 15-13

FORK 15-20

STEERING STEM 15-31

COMPONENT LOCATION



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 the front wheel installation, check the brake operation by applying the brake lever and pedal.
- Refer to the brake system information (page 17-4).
- Use only tires marked "TUBELESS" and tubeless valve stems 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	Driver only	290 kPa (2.90 kgf/cm², 42 psi)	–
	Driver and passenger	290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	249.6 (9.83)	244.6 (9.63)
	Pipe runout	–	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension fluid SS-8	–
	Fluid level	62 (2.4)	–
	Fluid capacity	638 ± 2.5 cm³ (21.6 ± 0.08 US oz, 22.5 ± 0.09 Imp oz)	–
Steering head bearing pre-load		1.6 - 2.1 kgf (3.5 - 4.6 lbf)	–

TORQUE VALUES

Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC screw; replace with a new one
Handlebar mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Handlebar rubber mounting 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 pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt; replace with a new one
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Fork cap	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork damper rod lock nut	20 N·m (2.0 kgf·m, 14 lbf·ft)	
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Steering bearing adjusting nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply oil to the threads and seating surface See page 15-36
Steering bearing adjusting nut lock nut	–	See page 15-36
Fork top bridge pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Fork bottom bridge pinch flange bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Right front brake caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one
Front wheel pulser ring mounting bolt (Deluxe type)	8 N·m (0.8 kgf·m, 5.1 lbf·ft)	ALOC bolt; replace with a new one
Left front brake caliper pivot bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one
Left front brake caliper bolt (second master joint)	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one

TOOLS

Bearing remover shaft	07GGD-0010100	
Bearing remover head, 25 mm	07746-0050800	
Driver	07749-0010000	
Attachment, 52 X 55 mm	07746-0010400	
Pilot, 25 mm	07746-0040600	
Fork seal driver, 45 mm	07KMD-KZ30100	07KMD-KZ3010A (U.S.A. only)
Needle bearing remover	07946-KA50000	
Steering stem socket	07916-3710101	07916-3710100 (U.S.A. only)
Ball race remover set	07946-KM90001	
– Driver attachment, A	07946-KM90100	
– Driver attachment, B	07946-KM90200	
– Driver shaft assembly	07946-KM90300	
– Bearing remover, A	07946-KM90401	
– Bearing remover, B	07946-KM90500	
– Assembly base	07946-KM90600	
Steering stem driver	07946-MB00000	
Race remover	07NMF-MT70110	
Driver attachment	07NMF-MT70120	

TROUBLESHOOTING

Hard steering
- Steering head bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

Steers to one side or does not track straight
- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

Front wheel wobbling
- Bent rim
- Worn or damaged front wheel bearings
- Faulty tire
- Unbalanced front tire and wheel

Difficult to turn front wheel
- Faulty front wheel bearing
- Bent front axle
- Front brake drag

Soft suspension
- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

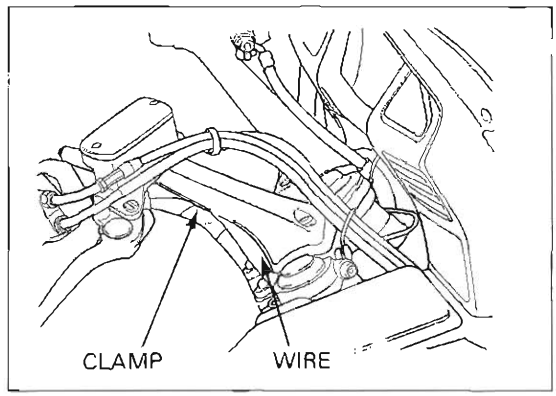
Stiff suspension
- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

Front suspension noise
- Insufficient fluid in fork
- Loose fork fasteners

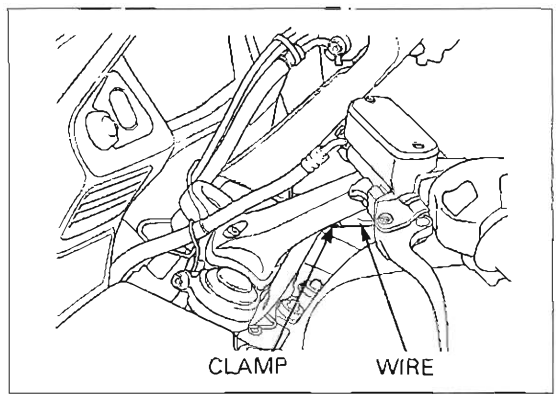
HANDLEBARS

REMOVAL

Release the wire from the right handlebar clamp.



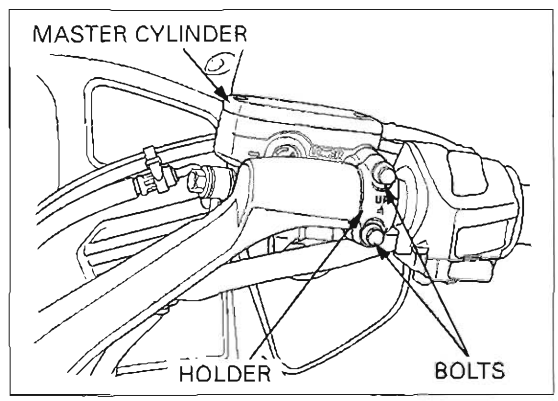
Release the wire from the left handlebar clamp.



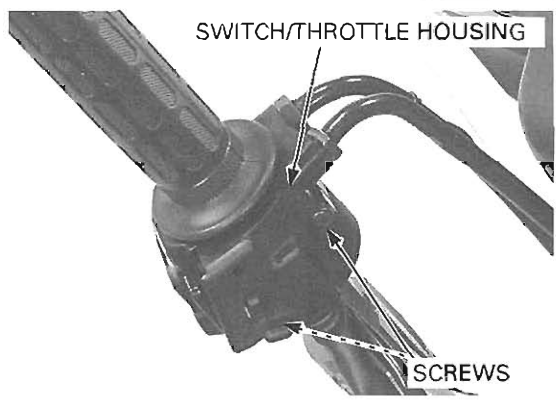
Disconnect the front brake switch wire connectors from the switch.

Keep the brake master cylinder upright to prevent air from entering the hydraulic system.

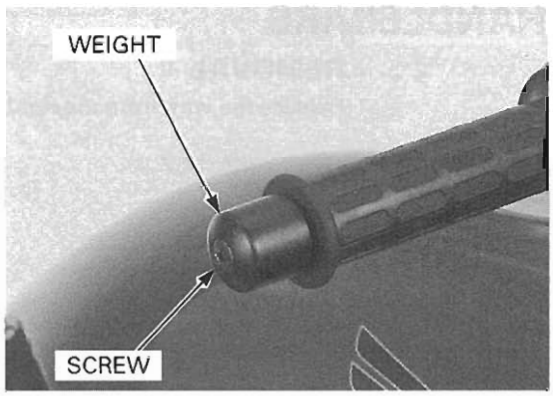
Remove the master cylinder holder bolts, holder and master cylinder assembly.



Remove the right handlebar switch/throttle housing screws.



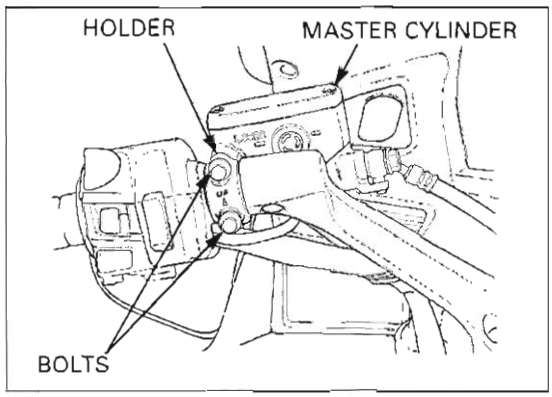
Hold the handlebar weight and remove the mounting screw and the weight.



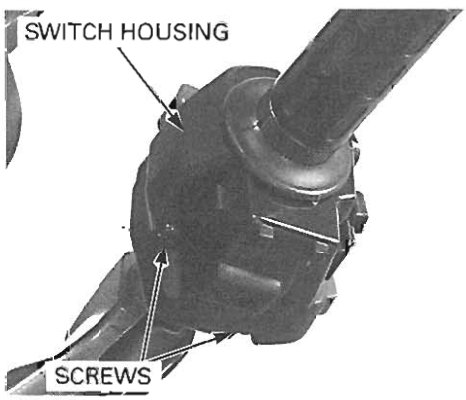
Disconnect the clutch switch wire connectors from the switch.

Keep the clutch master cylinder upright to prevent air from entering the hydraulic system.

Remove the clutch master cylinder holder bolts, holder and clutch master cylinder assembly.

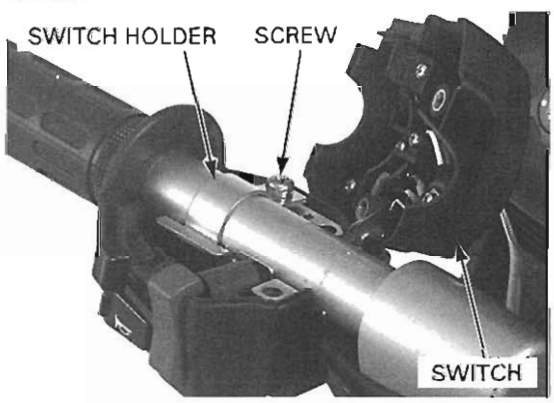


Remove the left handlebar switch housing screws.

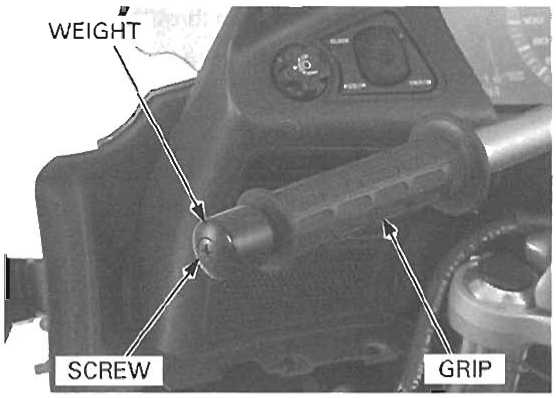


Remove the screw and left handlebar switch holder.

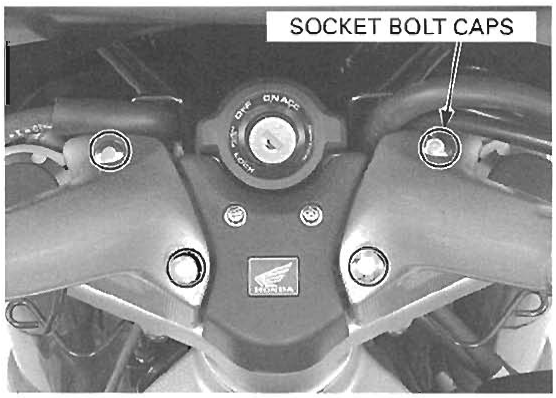
Remove the left handlebar switch.



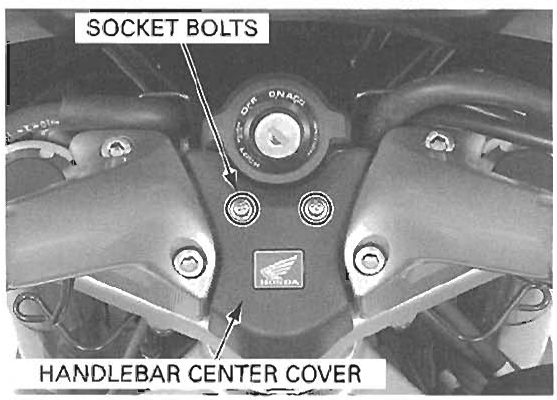
Hold the handlebar weight and remove the mounting screw and the weight.
Remove the handle grip from the handlebar.



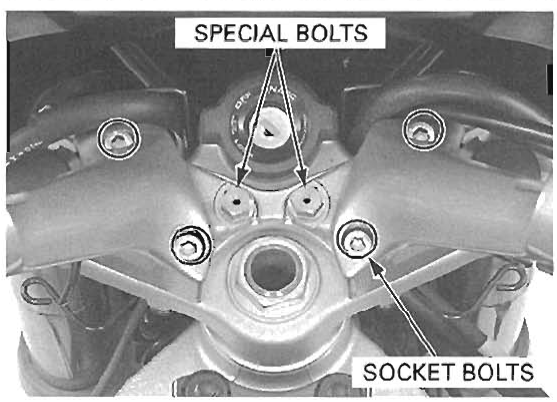
Remove the four socket bolt caps.



Remove the two socket bolts and handlebar center cover.

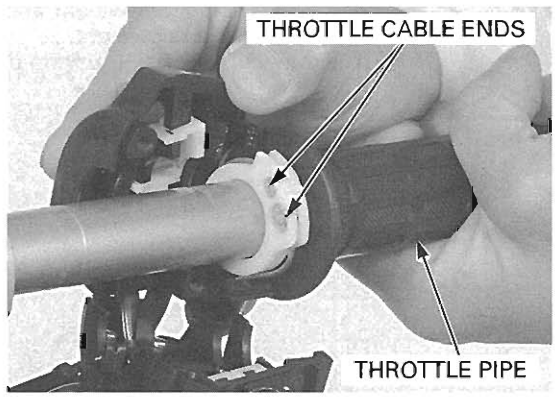


Remove the four socket bolts and two special bolts, then remove the right and left handlebars.



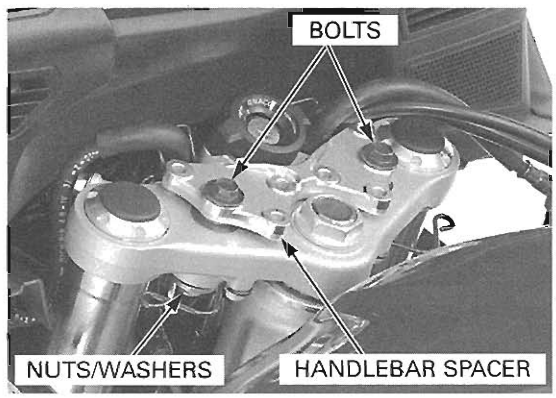
Remove the throttle pipe from the right handlebar.

Disconnect the throttle cable ends from the throttle pipe and remove the housing.



Hold the handlebar spacer mounting bolts and remove the nuts, washers and spacer.

Check the bushing for wear or damage.
Replace the bushing if necessary.

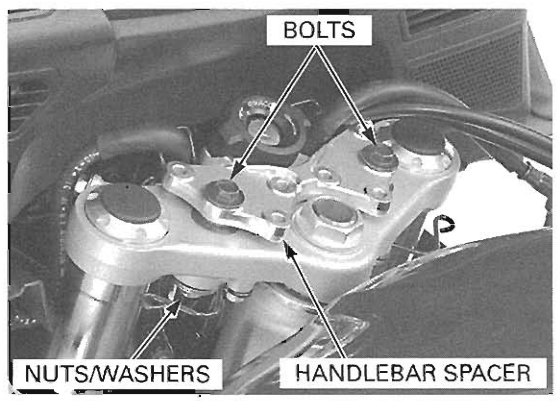


INSTALLATION

Install the handlebar spacer onto the top bridge.
Install the two bolts, washers and nuts.
Hold the bolts and tighten the nuts securely.

NOTICE

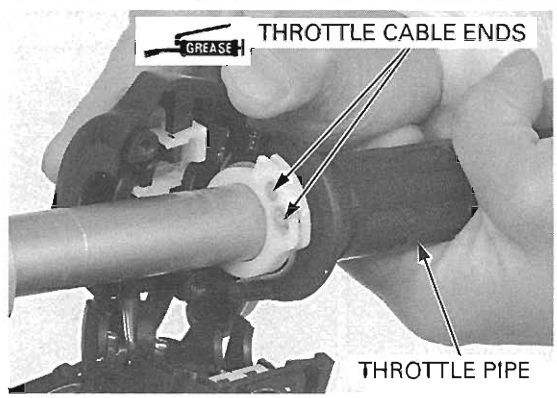
At installation, do not twist or cross the throttle cable. Route the wire harness properly (page 1-27).



Apply grease to the throttle cable sliding surface of the throttle pipe.
Connect the throttle cables to the throttle pipe.

Install the throttle pipe into the right handlebar switch housing/throttle housing.

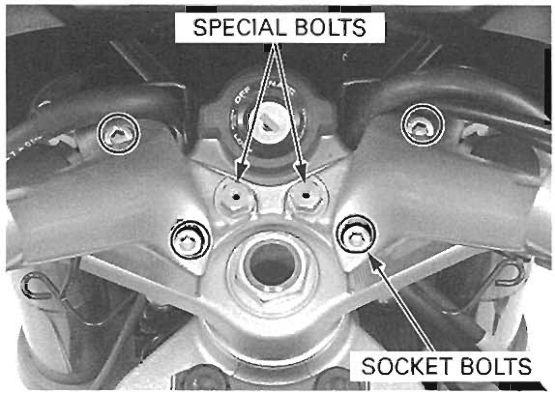
Apply grease to the sliding surface of the throttle pipe.
Install the throttle pipe on the right handlebar.



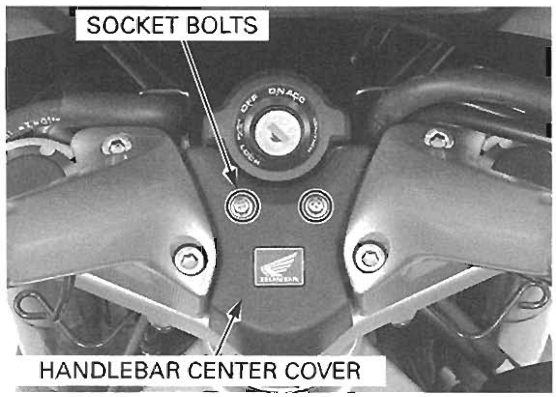
Install the right and left handlebars.

Tighten the handlebar socket bolts and special bolts to the specified torque.

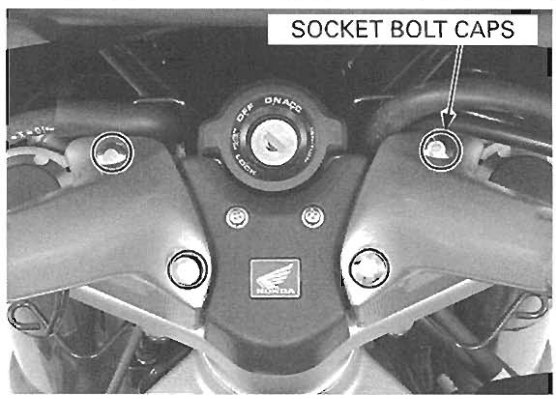
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the handlebar center cover and tighten the socket bolts securely.



Install the four socket bolt caps to the socket bolts securely.

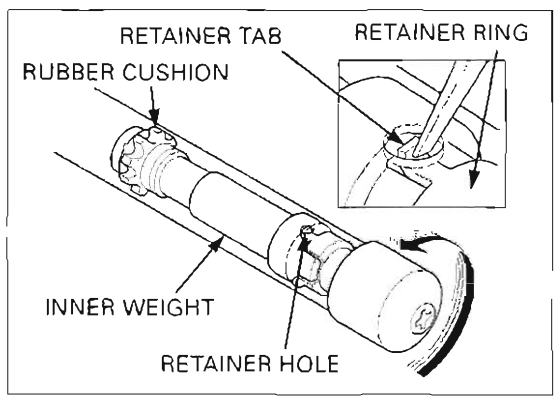


HANDLEBAR WEIGHT REPLACEMENT

Remove the grip from the handlebar.
Straighten the weight retainer tab with a screwdriver or punch.

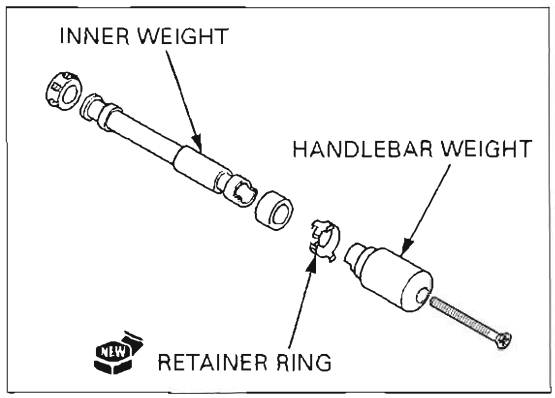
Apply lubricant spray through the tab locking hole to the rubber for easy removal.

Temporarily install the grip end and screw, then remove the handlebar weight by turning the grip end.

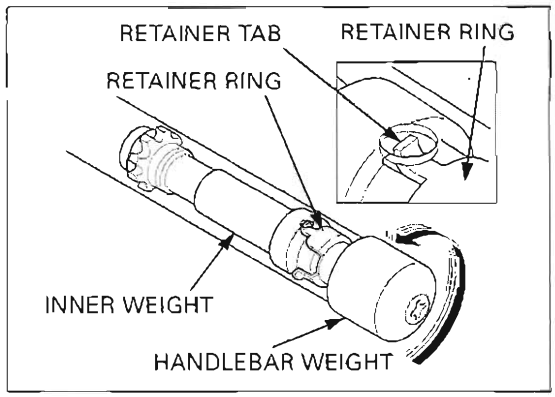


Remove the grip end from the handlebar weight. Discard the retainer ring.

Install the new retainer ring onto the handlebar weight.
Install the grip end onto the handlebar weight aligning its boss with the slot in the handlebar weight.
Install a new mounting screw.



Insert the handlebar weight assembly into the handlebar.
Turn the handlebar weight and hook the retainer ring tab with the hole in the handlebar.

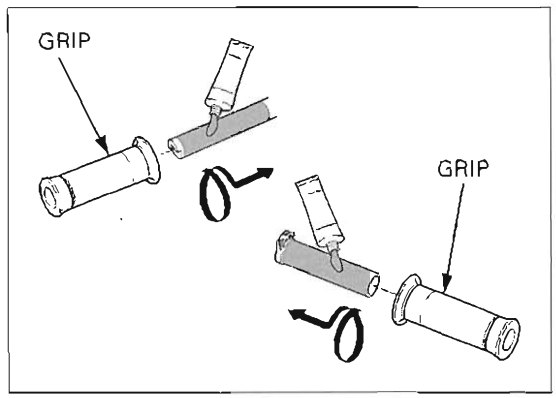


Apply Honda Hand grip Cement or equivalent adhesive to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

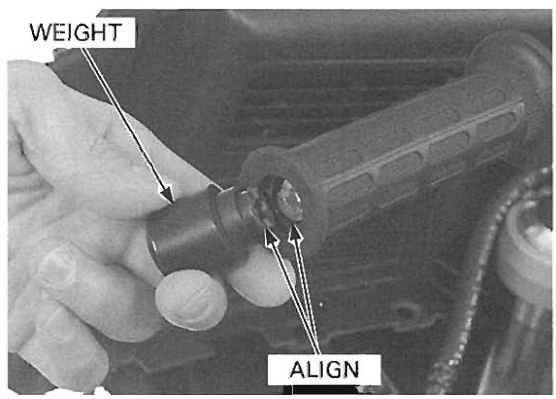
Wait 3 – 5 minutes and install the grip.

Allow the adhesive to dry for an hour before using.

Rotate the grip for even application of the adhesive.

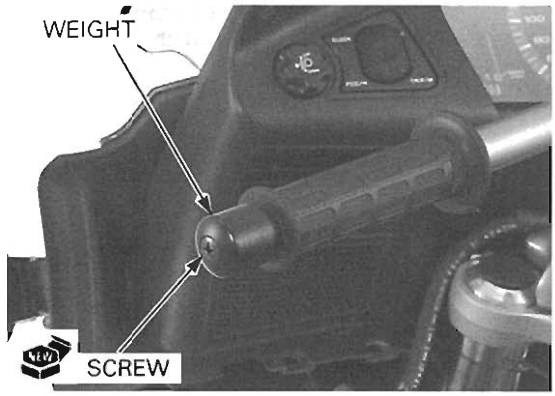


Install the left handlebar weight, aligning the tab on the weight to the groove on the handlebar.

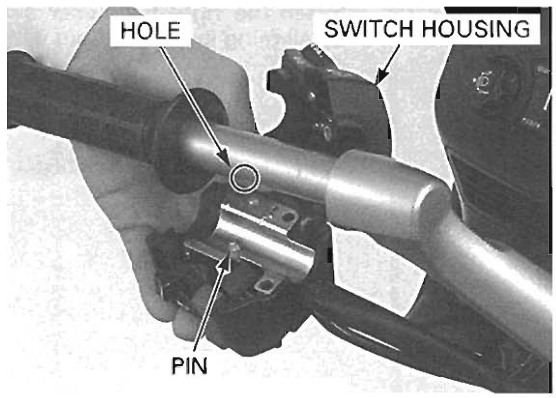


Install the left handlebar weight and tighten the new screw to the specified torque.

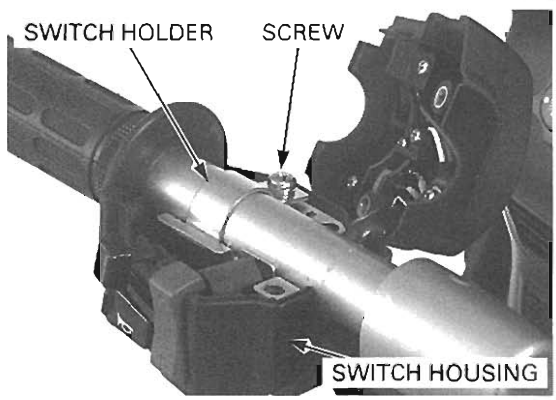
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



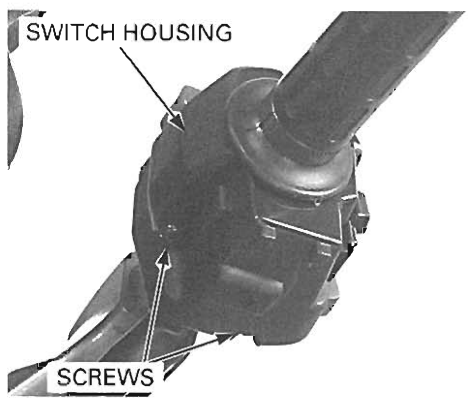
Install the left handlebar switch housing aligning its locating pin with the hole in the handlebar.



Install the left handlebar switch holder and tighten the screw securely.

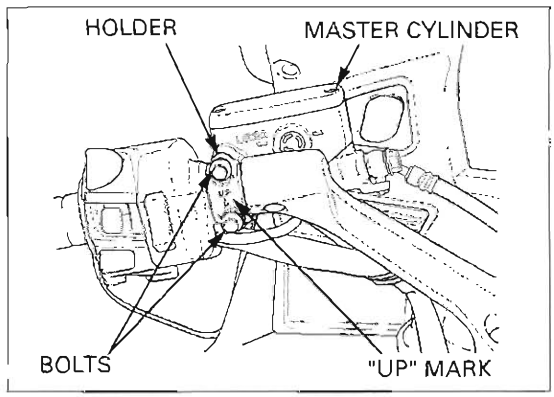


Install the left handlebar switch screws, tighten the forward screw first, then the rear screw.

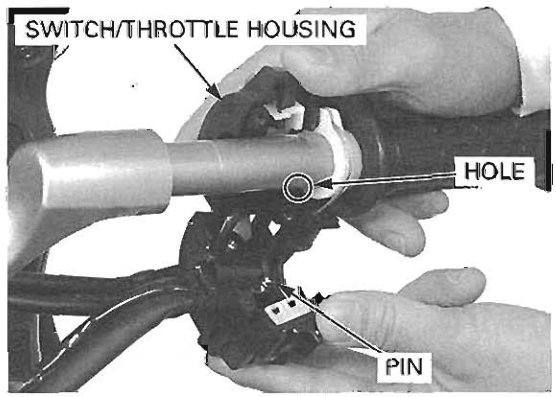


Install the clutch master cylinder assembly by aligning the end of the clutch master cylinder with the punch mark on the handlebar.
Install the clutch master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

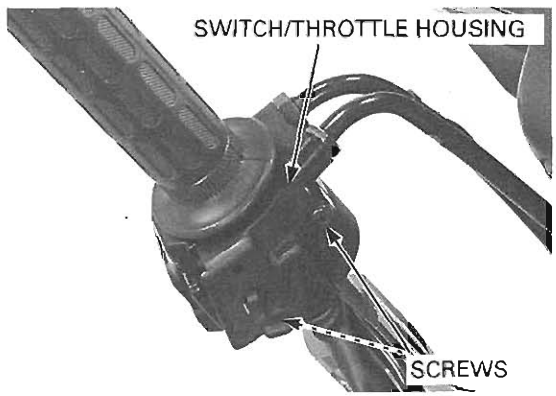
Connect the clutch switch wire connectors.



Install the right handlebar switch/throttle housing by aligning its locating pin with the hole in the handlebar.

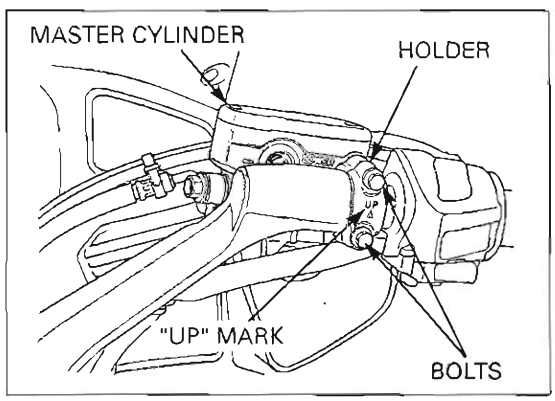


Install the right handlebar switch screws, tighten the forward screw first, then the rear screw.

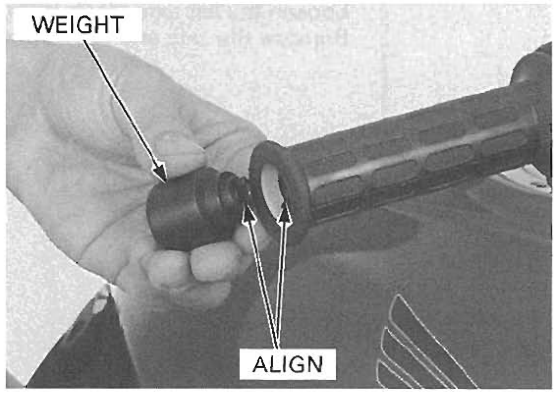


Install the brake master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.
Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

Connect the brake switch wire connectors.



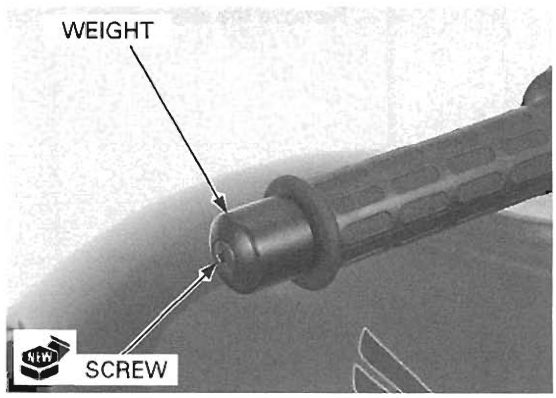
Install the right handlebar weight, aligning the tab on the weight to the groove on the handlebar.



Install the right handlebar weight and tighten the new screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

After installation, turn the handlebar to the left and check the throttle cables routing (page 1-27).



FRONT WHEEL

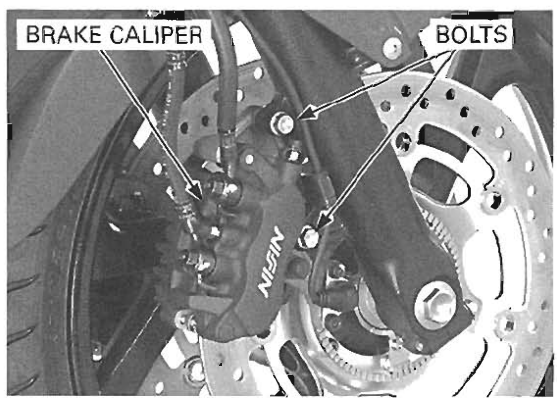
REMOVAL

Support the motorcycle securely using a safety stand or a hoist.

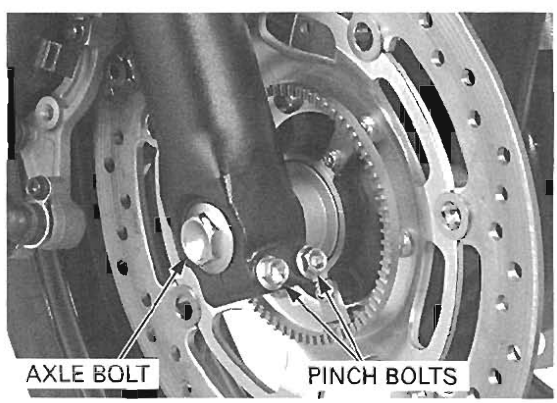
Remove the mounting bolts and right and left brake caliper.

Do not operate the brake lever or pedal after the brake caliper is removed.

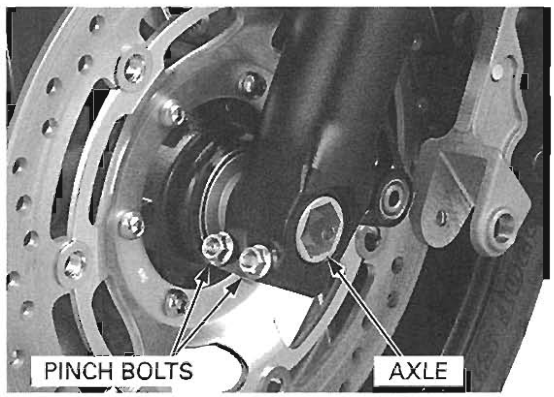
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.



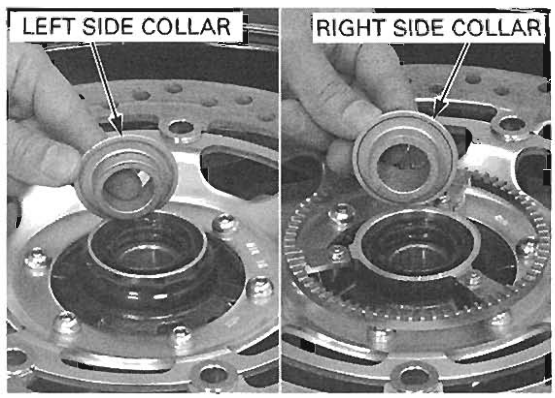
Loosen the right axle pinch bolts.
Remove the axle bolt.



Loosen the left axle pinch bolts.
Remove the axle and the front wheel.



Remove the side collars.

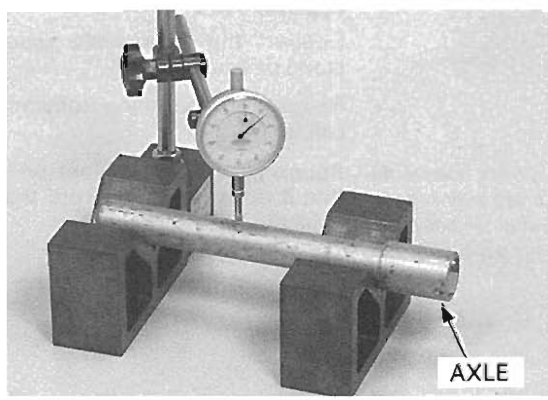


INSPECTION

Axle

Set the axle in a V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



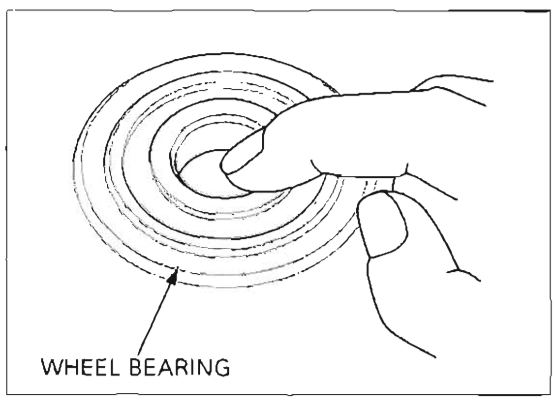
Wheel bearing

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.

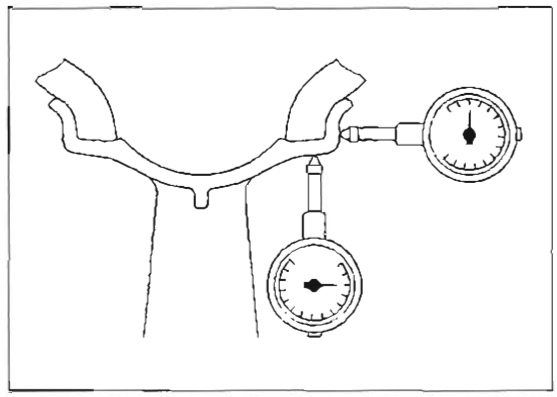
Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace with new bearings, if necessary (page 15-15).



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.

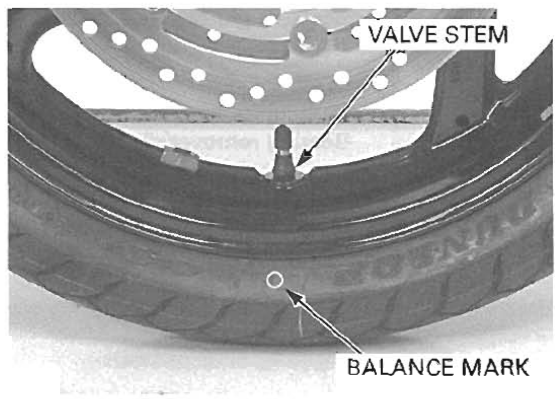


SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

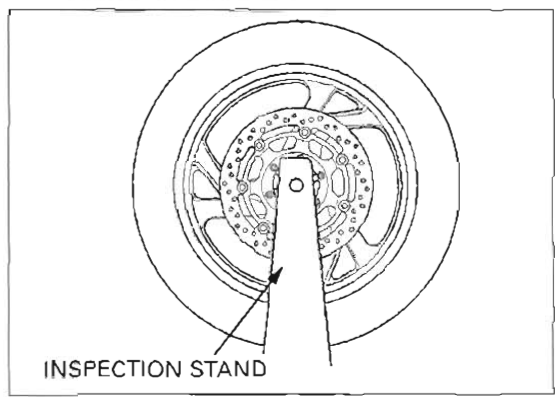
Wheel balance

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

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.



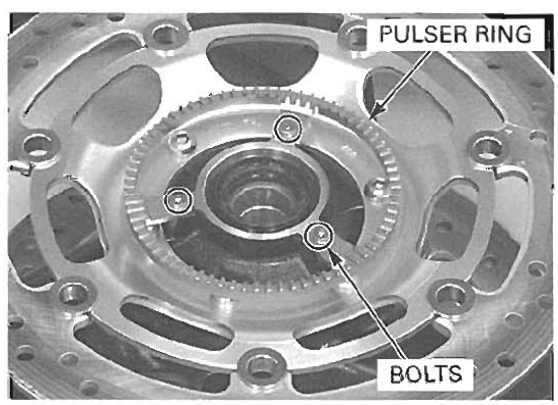
Note the rotating direction marks on the wheel and tire.
Remove the dust seals from the wheel.
Mount the wheel, tire and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.



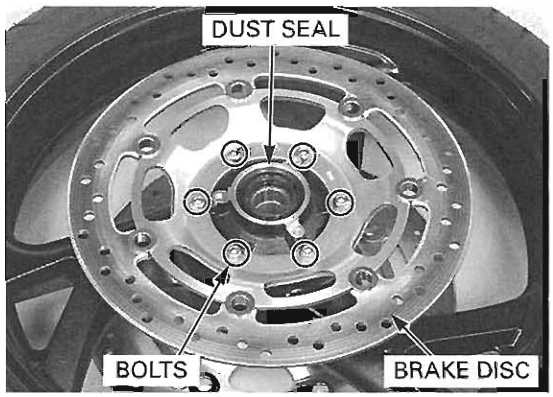
To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.

DISASSEMBLY

Deluxe type only: Remove the bolts and front pulser ring from the right wheel hub.



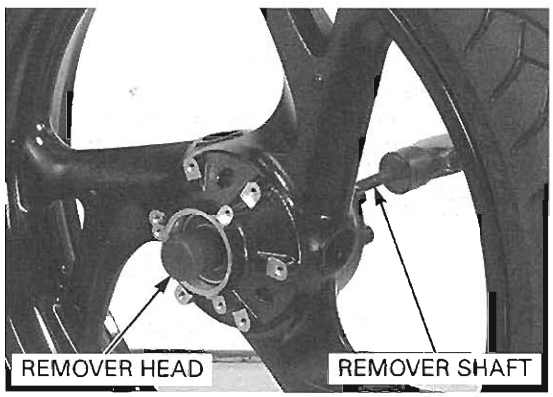
Remove the bolts and brake discs.
Remove the dust seals.



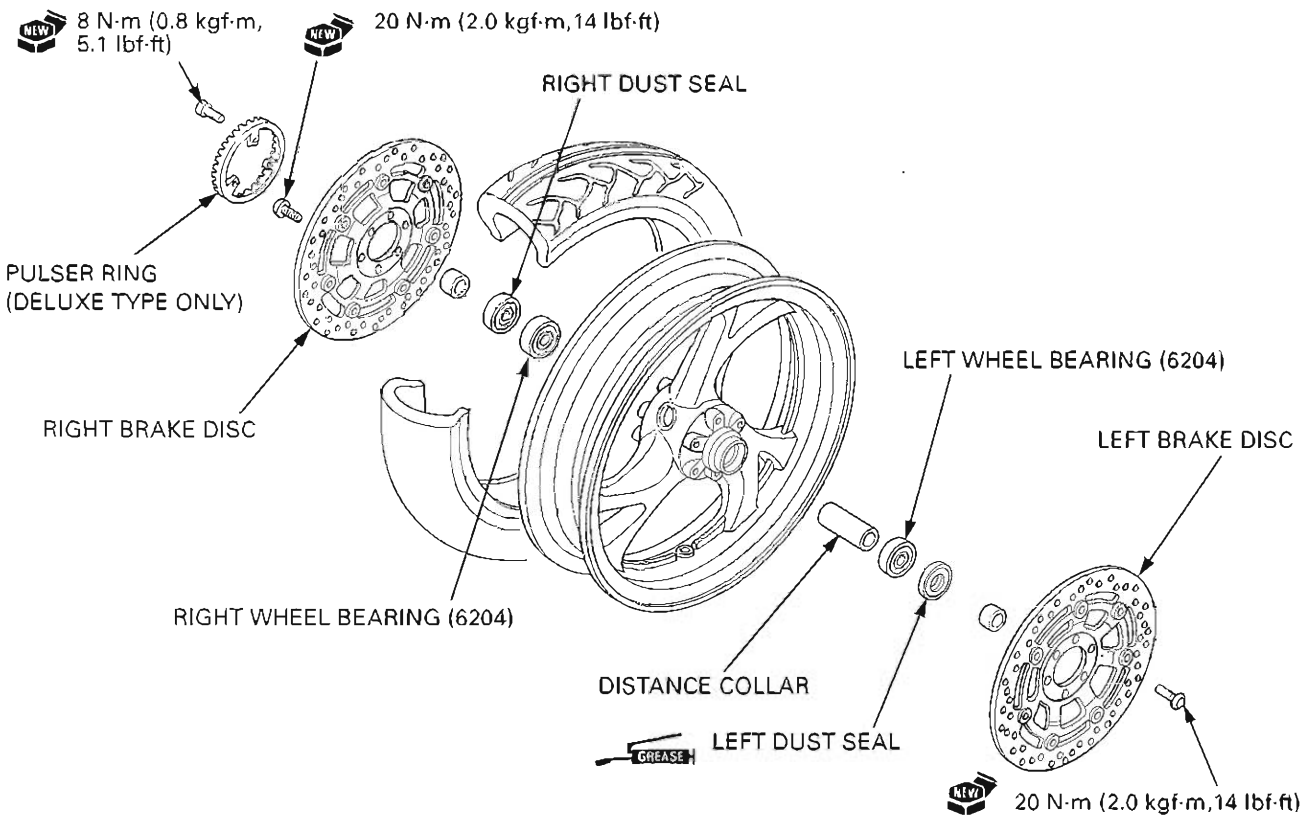
Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

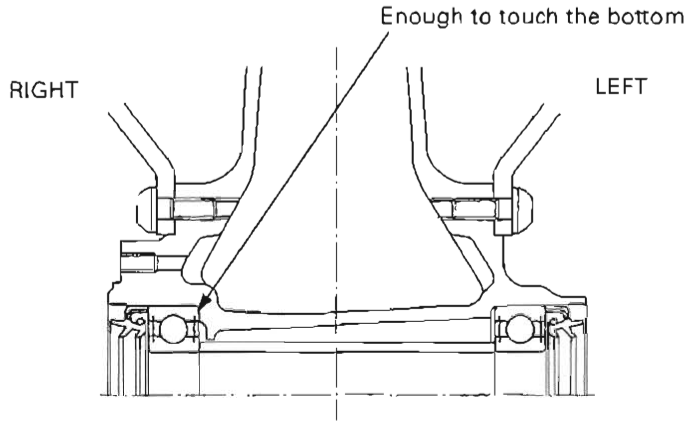
TOOLS:

Bearing remover head, 25 mm	**07746-0050800**
Bearing remover shaft	**07GGD-0010100**



ASSEMBLY



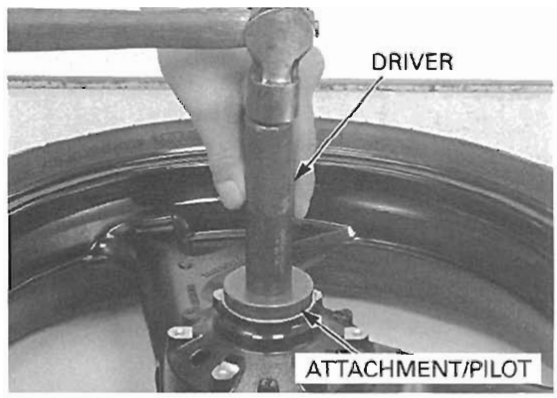


Never install the old bearings. Once the bearings have been removed, the bearings must be replaced with new ones.

Drive in a new right bearing squarely.
Install the distance collar, then drive in the left bearing using the special tool.

TOOLS:

Driver	**07749-0010000**
Attachment, 52 X 55 mm	**07746-0010400**
Pilot, 25 mm	**07746-0040600**

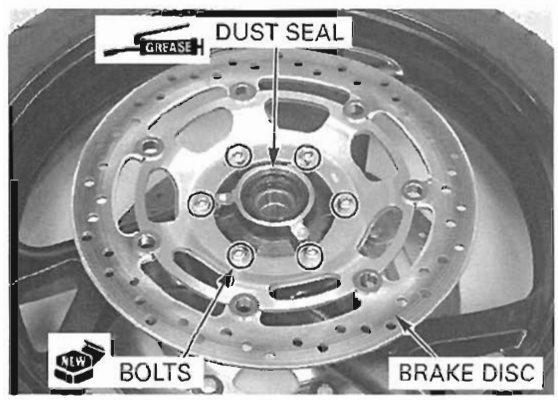


Do not get grease on the brake discs or stopping power will be reduced.

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)

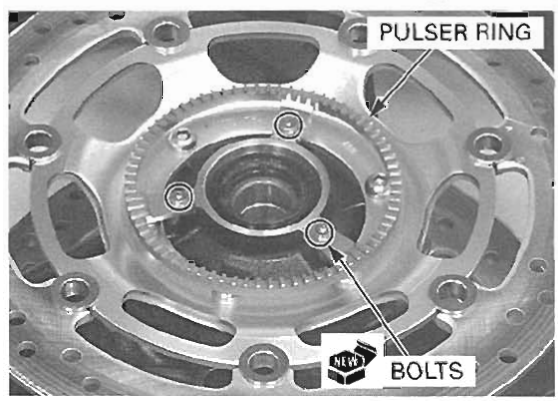
Apply grease to the dust seal lips, then install them into the wheel hub.



Deluxe type only:

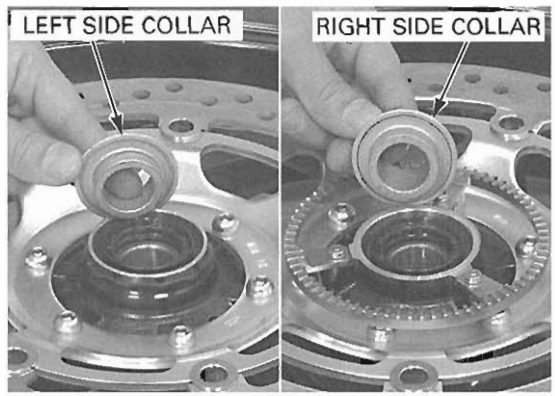
Install the new front pulser ring onto the right wheel hub, then tighten the bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.1 lbf·ft)



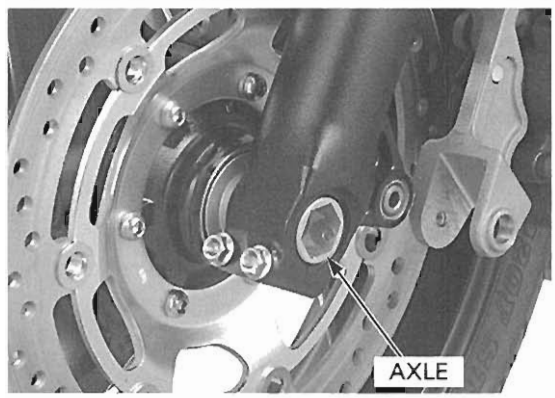
INSTALLATION

Install the 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.

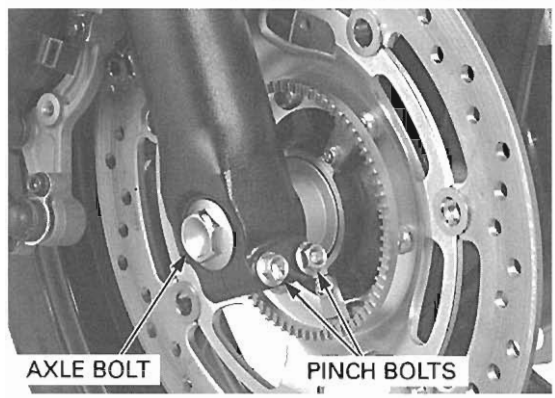


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)

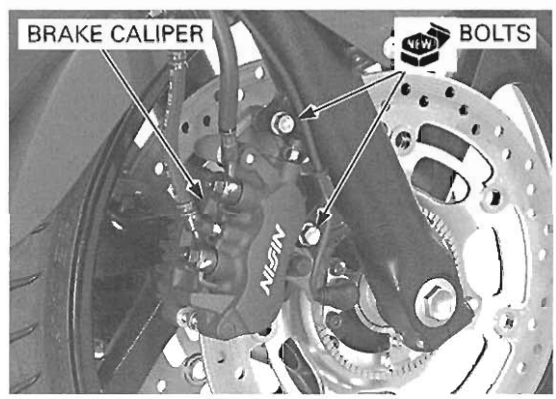
Tighten the right axle pinch bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

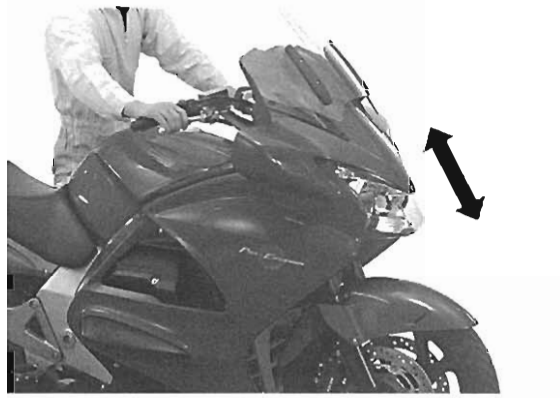


Install the right and left brake caliper and tighten the new mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

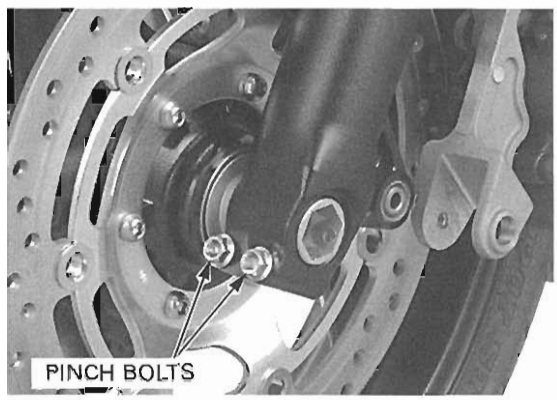


With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation by applying the brake lever and pedal.

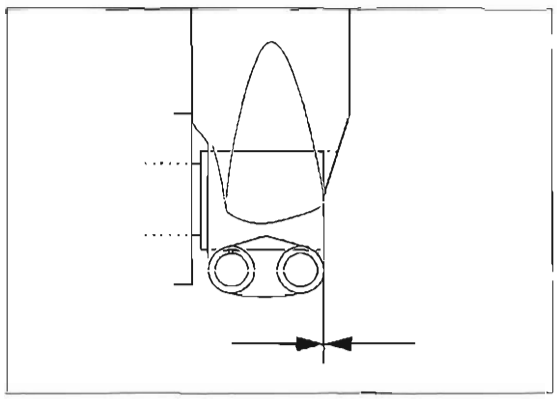


Tighten the left axle pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



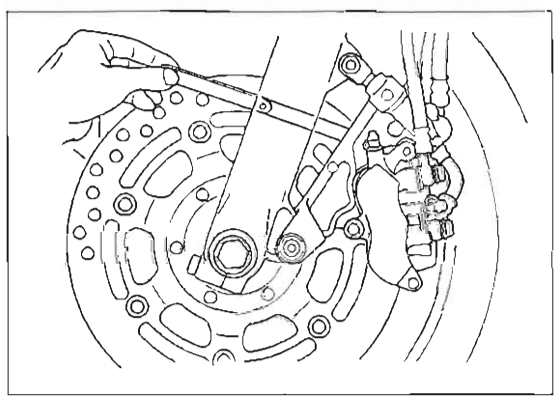
Make sure the axle end is flush with the fork leg outer surface as shown.



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).

NOTICE

After installing the wheel, apply the front and rear brakes several times and recheck the caliper clearances between each surface of the brake disc and the brake caliper. Failure to provide clearance will damage the brake disc and affect braking efficiency.



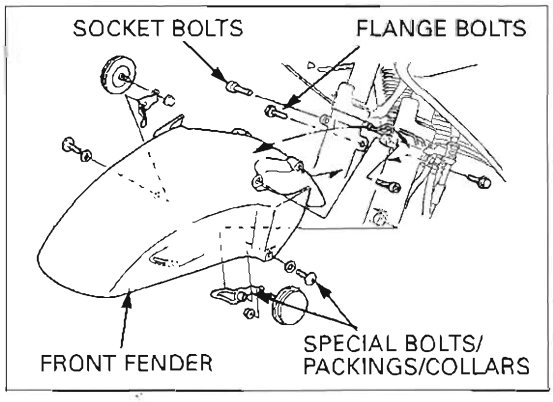
Deluxe type: Inspect the wheel speed sensor air gap (page 18-31).

FORK

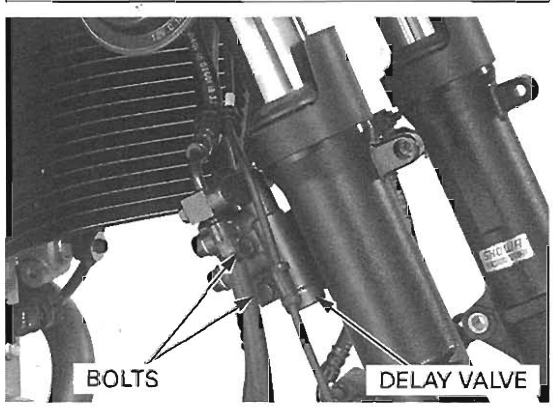
REMOVAL

Remove the front wheel (page 15-13).

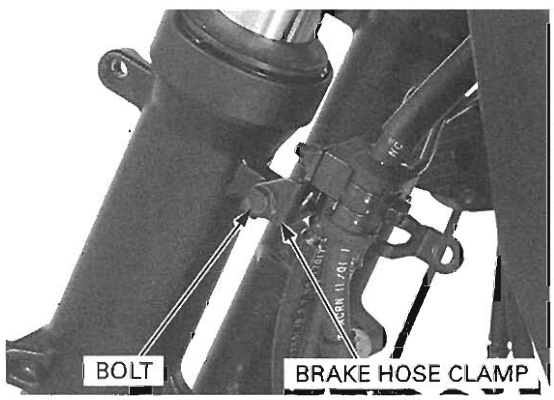
Remove the two special bolts, packings, collars, socket bolts, flange bolts and front fender.



For the right fork leg removal, remove the two bolts and delay valve from the right fork leg.

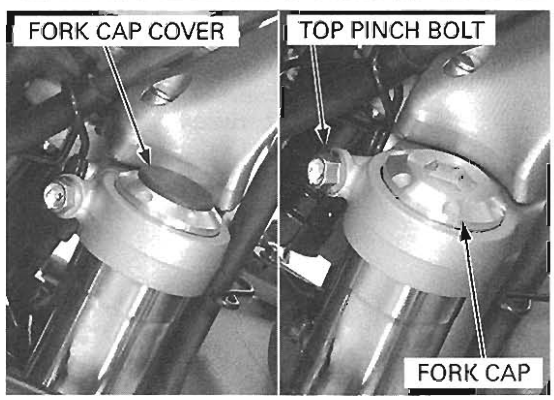


For the left fork leg removal, remove the bolt and brake hose clamp from the left fork leg.

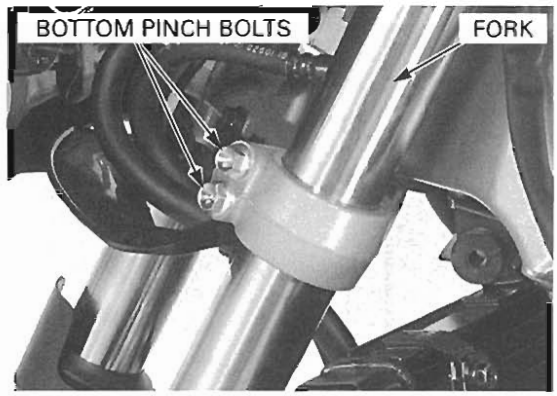


Loosen the fork top pinch bolt.

When the fork is ready to be disassembled, remove the fork cap cover and loosen the fork cap, but do not remove it yet.



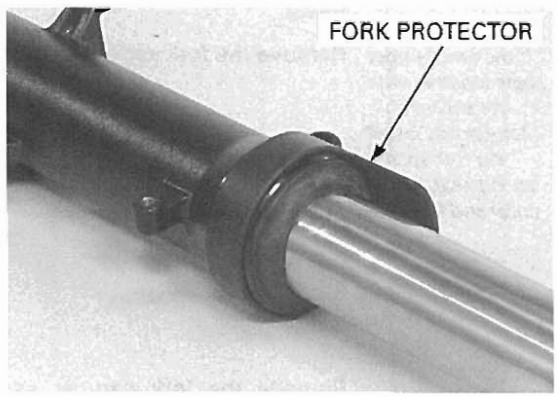
Loosen the fork bottom pinch bolts and remove the fork from the fork top bridge and steering stem.



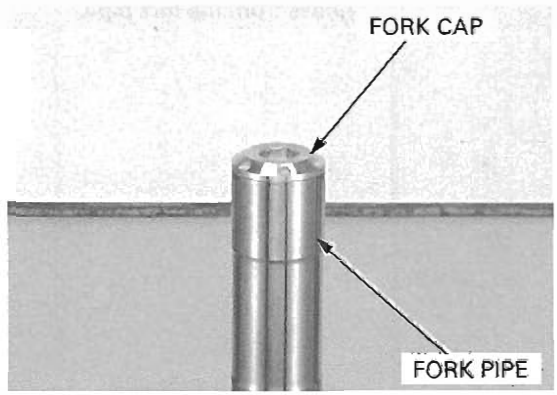
DISASSEMBLY

Be careful not to scratch the fork pipe or damage the dust seal.

Remove the fork protector by prying carefully with a screwdriver.

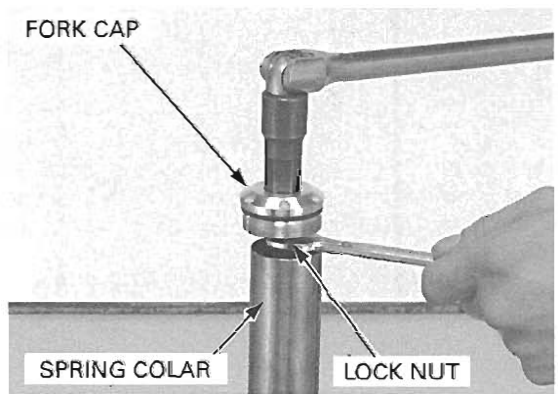


Remove the fork cap from the fork pipe.

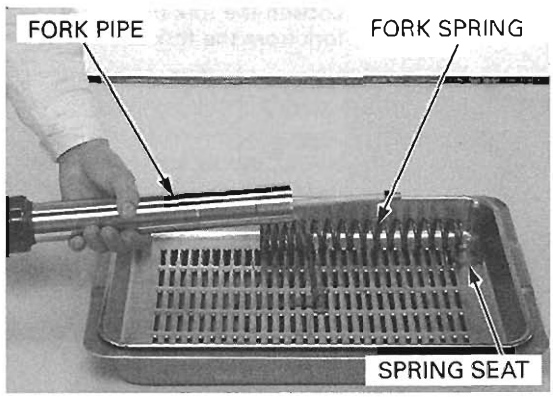


Hold the damper rod with a 14 mm open end wrench, then loosen the damper rod lock nut and remove the fork cap from the damper rod.

Remove the spring collar.



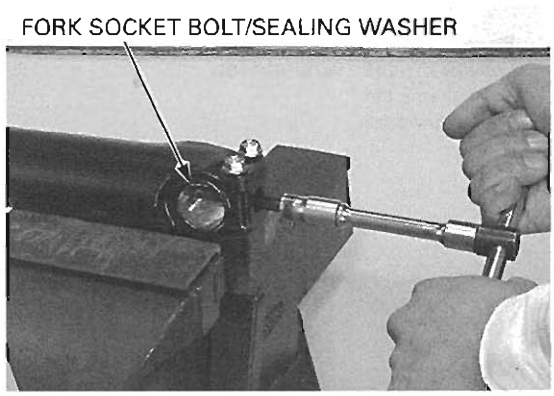
Remove the spring seat and fork spring
Pour out the fork fluid by pumping the fork pipe several times.
Pour out the fork fluid from the fork damper by pumping the damper rod several times.



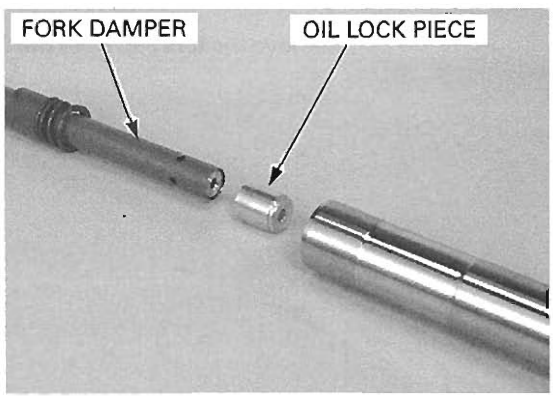
Hold the fork slider in a vice with soft jaws or a shop towel.

If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring seat, spring collar and fork cap.

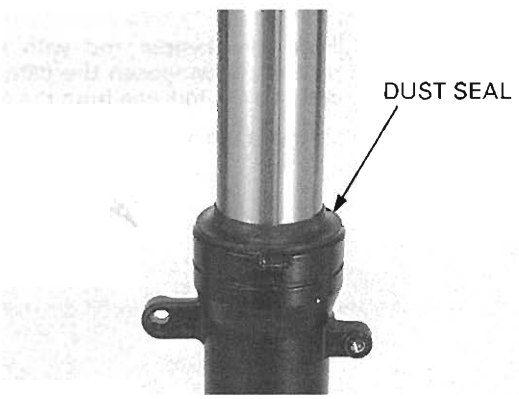
Remove the fork socket bolt and sealing washer.



Remove the fork damper assembly and oil lock piece from the fork pipe.

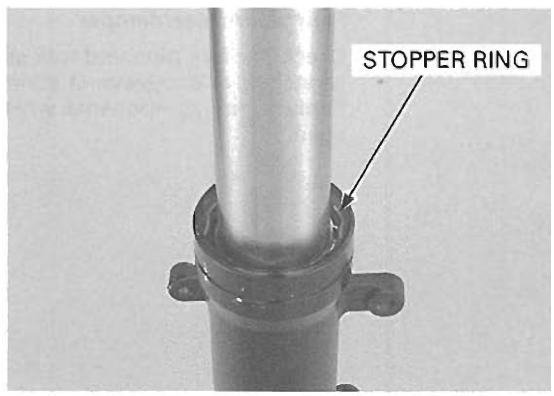


Remove the dust seal.

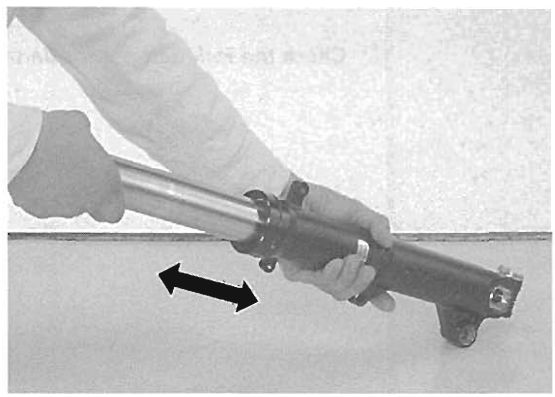


Do not scratch the fork pipe sliding surface.

Remove the oil seal stopper ring.



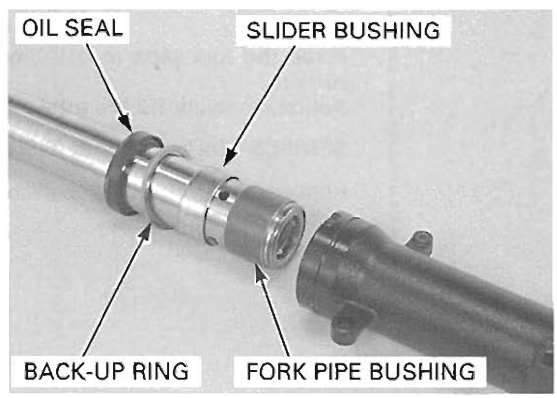
Pull the fork pipe out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork pipe separates from the fork slider.
The slider bushing will be forced out by the fork pipe bushing.



Remove the stopper ring, oil seal, back-up ring and slider bushing from the fork pipe.

Do not remove the fork pipe bushing unless it is necessary to replace it with a new one

Carefully remove the pipe bushing by prying the slit with a screwdriver until the bushing can be pulled off by hand.

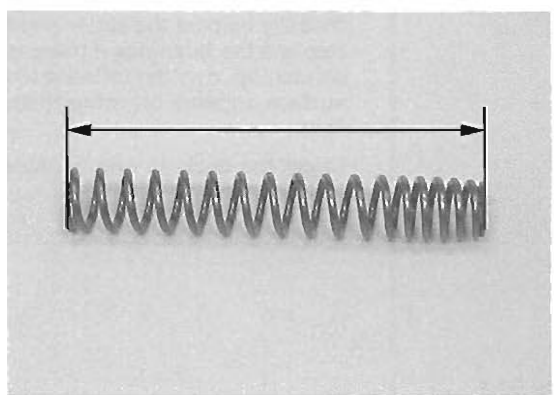


INSPECTION

Fork spring

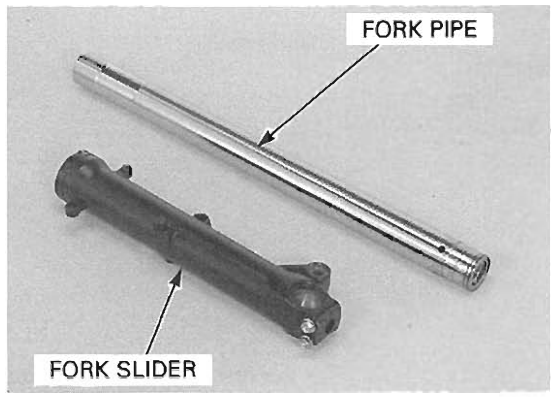
Measure the fork spring free length.

SERVICE LIMIT: 244.6 mm (9.63 in)

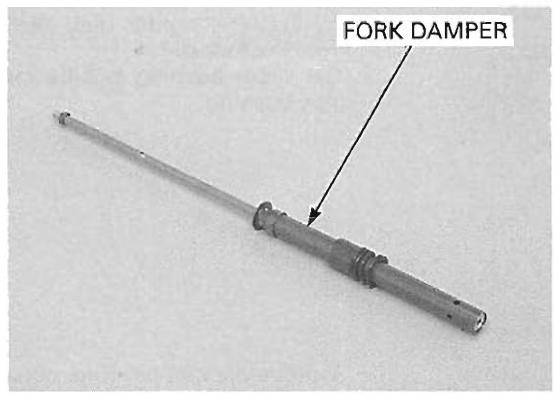


Fork pipe/slider/damper

Check the fork pipe and fork slider for score marks, scratches, or excessive or abnormal wear.
Replace any components which are worn or damaged.



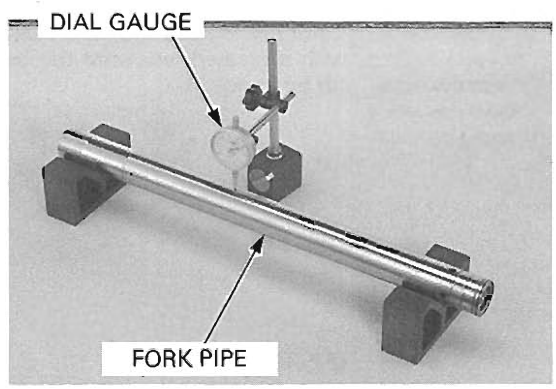
Check the fork damper for damage.



Place the fork pipe in a V-block and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

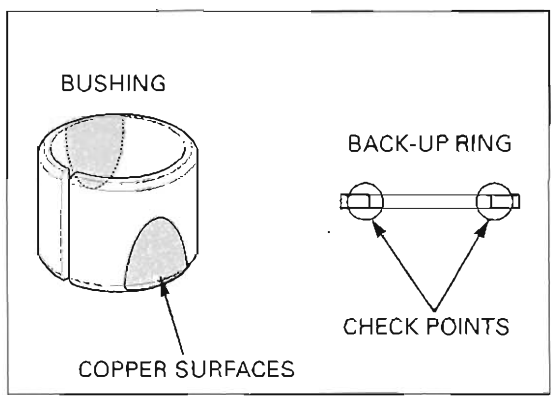
Replace the fork damper assembly if any component is damaged.



Fork pipe bushing

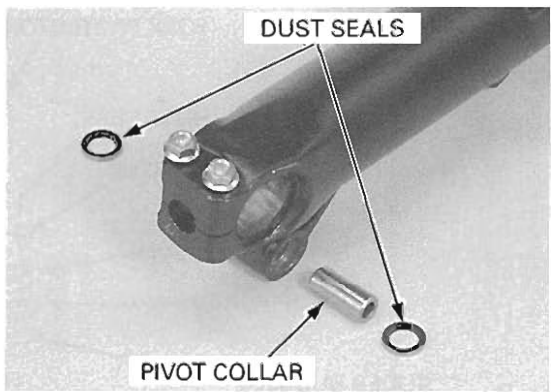
Visually inspect the slider and fork pipe bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



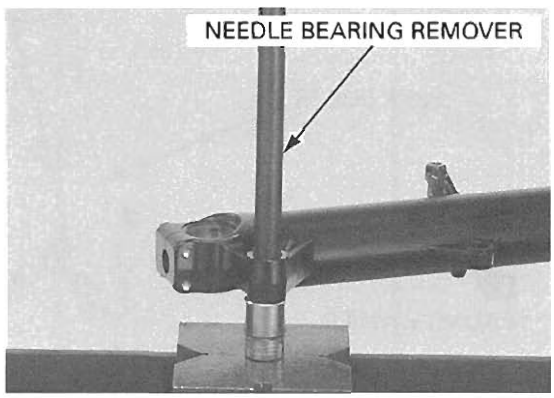
Brake caliper pivot bearing replacement

Remove the dust seals and pivot collar.



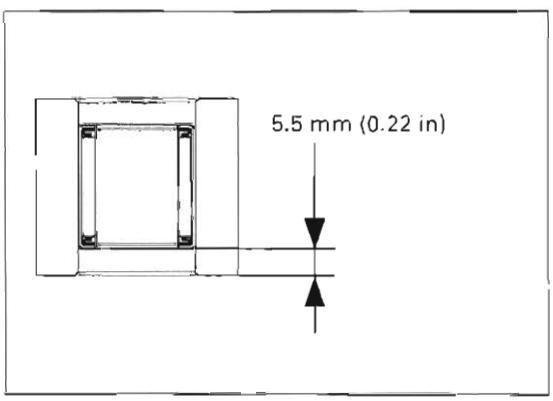
Press out the pivot bearings using the special tool.

TOOL:
Needle bearing remover **07946-KA50000**

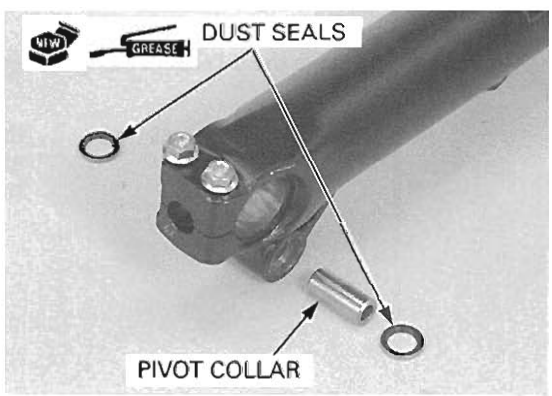


Apply grease to the pivot bearing.

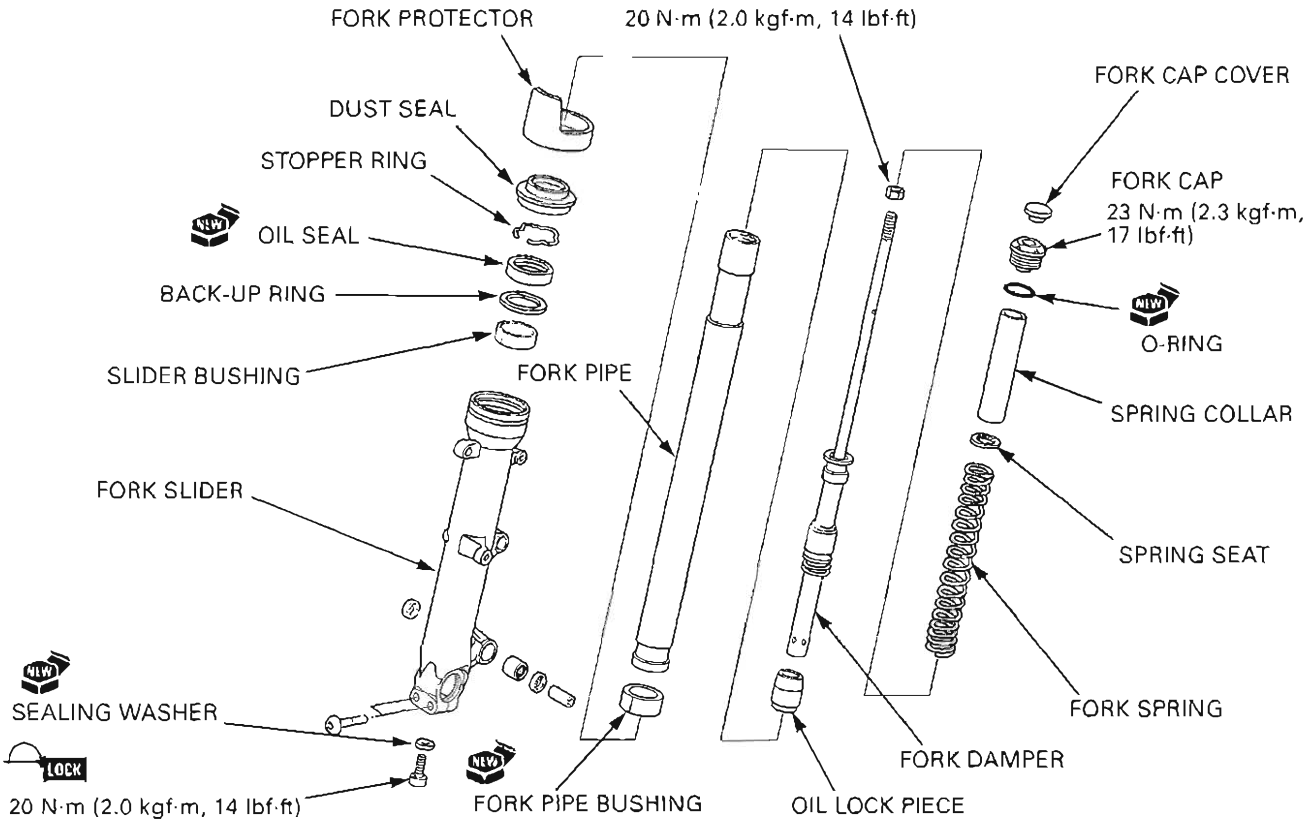
Press the needle bearing into the fork slider using the removal tool so that the bearing cage is 5.5 mm (0.22 in) from the pivot surface.



Apply grease to the new dust seal lips.
Install the dust seal and pivot collar.



ASSEMBLY



Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.

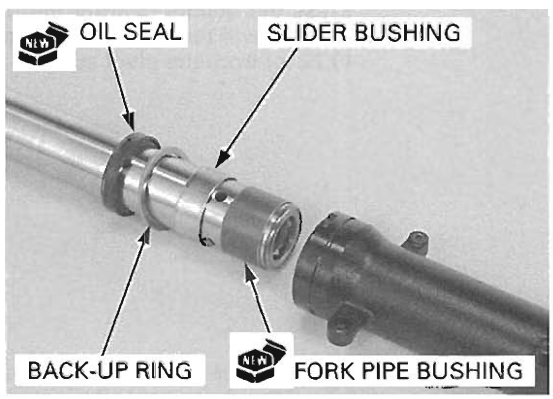
Do not open the bushing slit more than necessary.

Install the new fork pipe bushing, being careful not to damage the coating of the bushing if it has been removed.

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the oil seal with its marked side facing up.

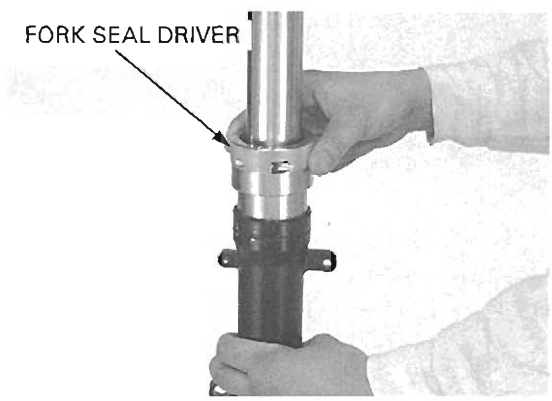
Install the slider bushing, back-up ring and new oil seal onto the fork slider.



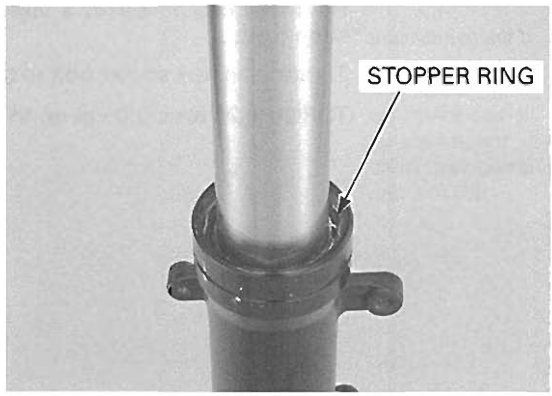
Drive the oil seal in using the special tools.

TOOL:

Fork seal driver, 45 mm	**07KMD-KZ30100 or 07KMD-KZ3010A (U.S.A. only)**



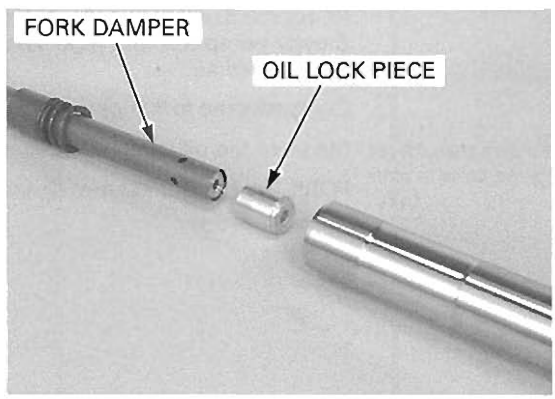
Install the stopper ring into the fork slider groove securely.



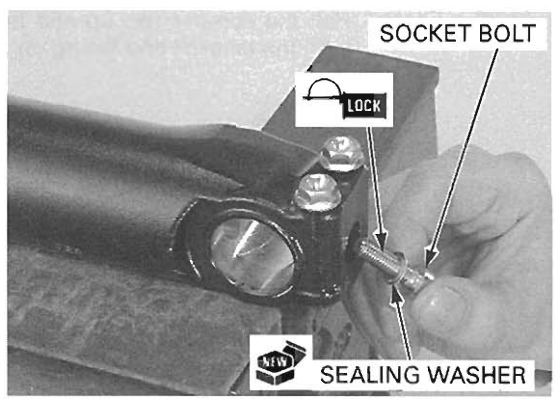
Install the dust seal.



Install the oil lock piece and 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.

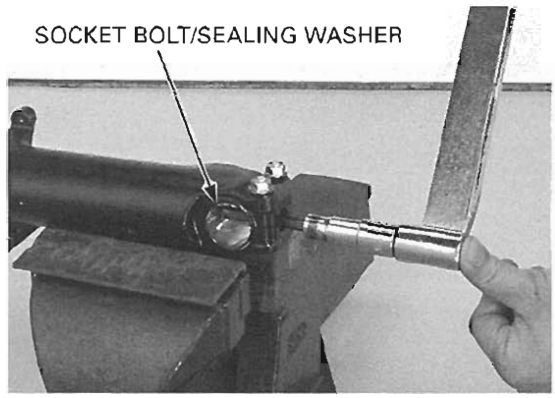


If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring seat, collar, and fork cap.

Hold the axle holder in a vise with soft jaws or a shop towel.

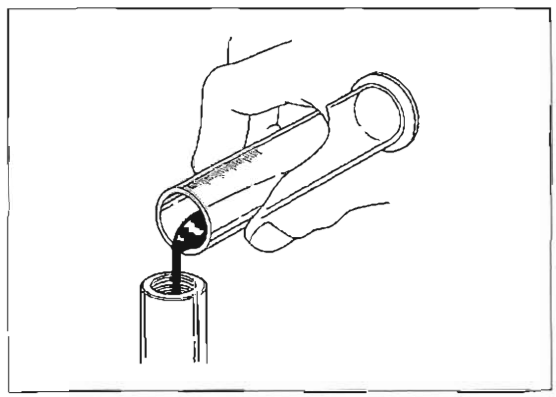
Tighten the fork socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



Pour the specified amount of recommended fork fluid into the fork pipe.

RECOMMENDED FORK FLUID:
Pro Honda suspension fluid SS-8
FORK FLUID CAPACITY:
638 ± 2.5 cm³ (21.6 ± 0.08 US oz, 22.5 ± 0.09 Imp oz)



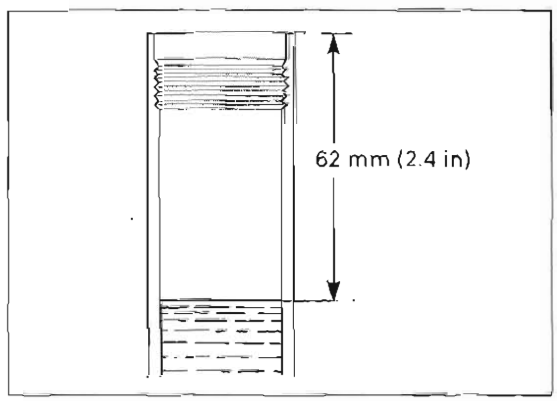
Pump the damper rod several times.
Slowly pump the fork pipe several times to remove the trapped air.

Compress the fork pipe slowly.

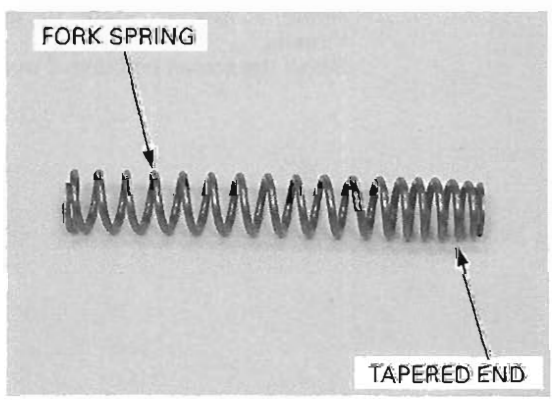
Be sure the oil level is the same in both forks.

Measure the oil level from the top of the fork pipe.

FORK OIL LEVEL: 62 mm (2.4 in)

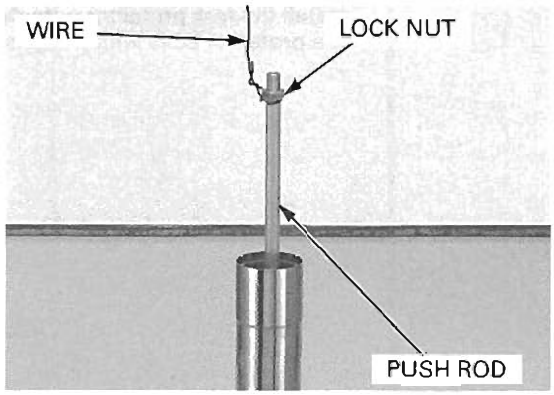


Pull the damper rod up and install the fork spring with the tapered end facing up.



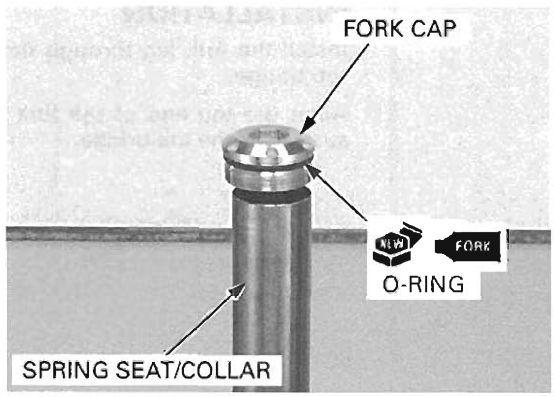
Screw the damper rod lock nut in fully by hand.

Pull up the fork damper rod using a piece of wire.



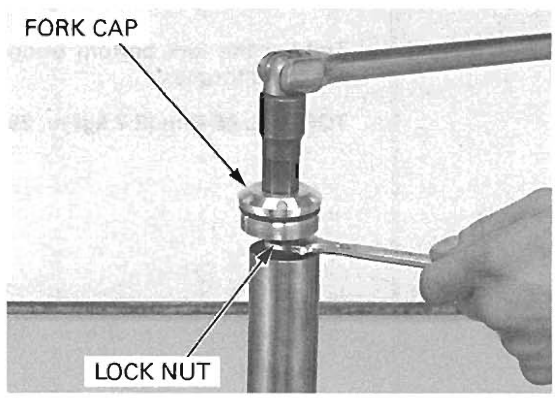
Install the spring seat and collar.
Install a new O-ring onto the fork cap.
Apply fork fluid to the new O-ring.

Hold the damper rod and screw the fork cap onto the damper rod until it seats on the damper rod lock nut.

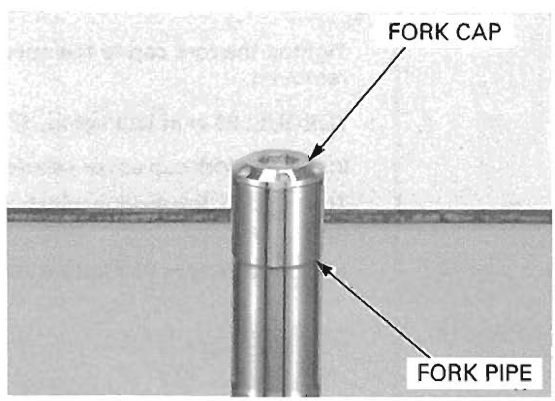


Hold the fork bolt and tighten the damper rod lock nut to the specified torque.

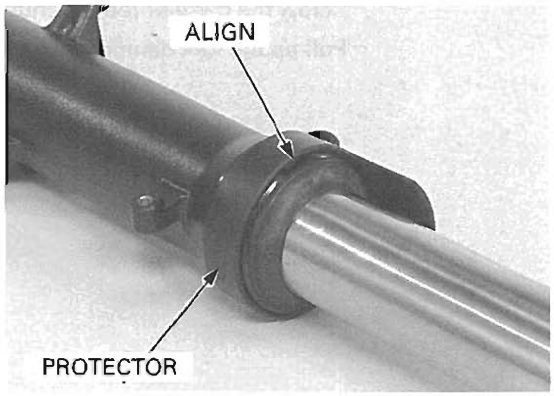
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



Screw the fork cap into the fork pipe.



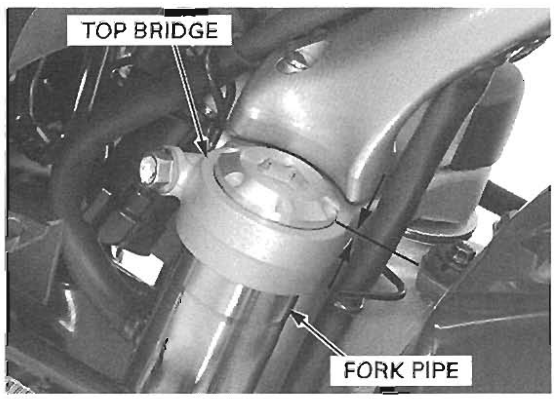
Install the fork protector onto the fork slider aligning the protector boss with the groove in the fork slider.



INSTALLATION

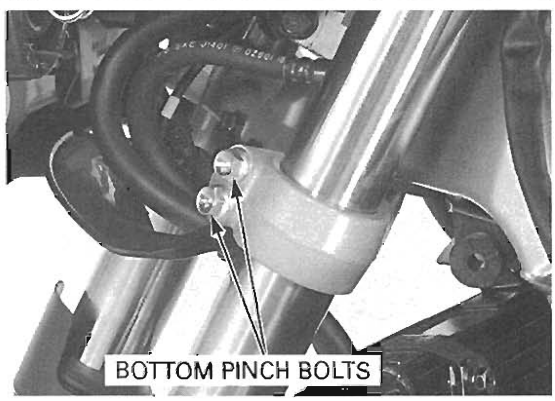
Install the fork leg through the bottom bridge and top bridge.

Align the top end of the fork pipe with the upper surface of the top bridge.



Tighten the fork bottom bridge pinch bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



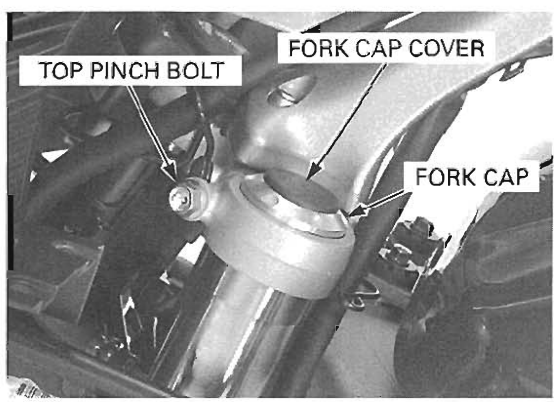
Tighten the fork cap to the specified torque if it was removed.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the fork cap cover securely.

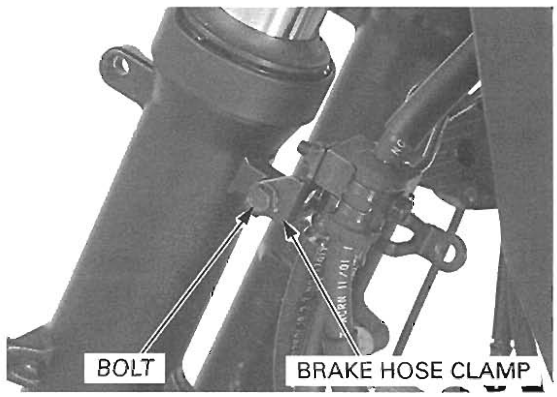
Tighten the top bridge pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



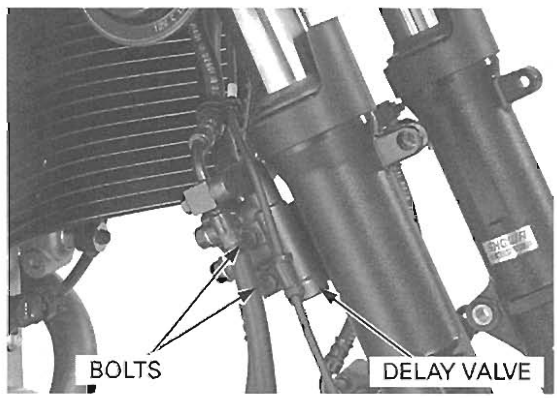
For the left fork leg installation, install the brake hose clamp to the left fork leg with the stopper on the clamp against the fork leg and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



For the right fork leg installation, install the delay valve to the right fork leg and tighten the bolts to the specified torque.

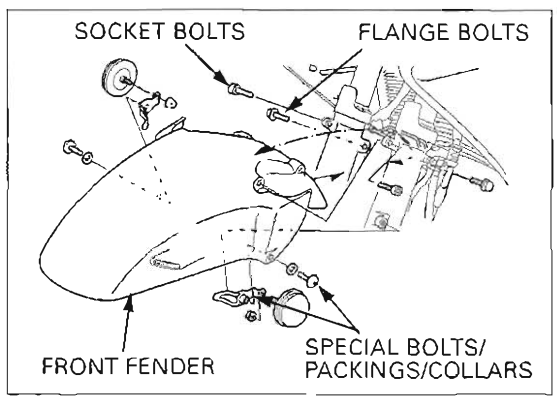
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the front fender.

Install and tighten the two special bolts, collars, packings, socket bolts and flange bolts securely.

Install the front wheel (page 15-18).



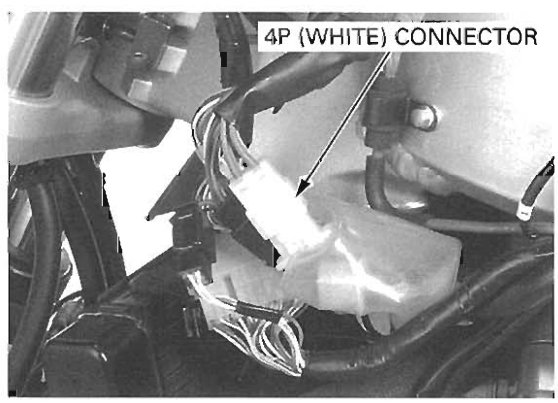
STEERING STEM

REMOVAL

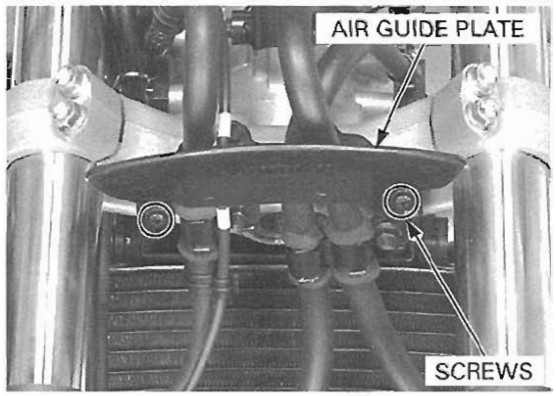
Remove the following:

- Front wheel (page 15-13)
- Upper cowl (page 2-16)
- Handlebars (page 15-5)

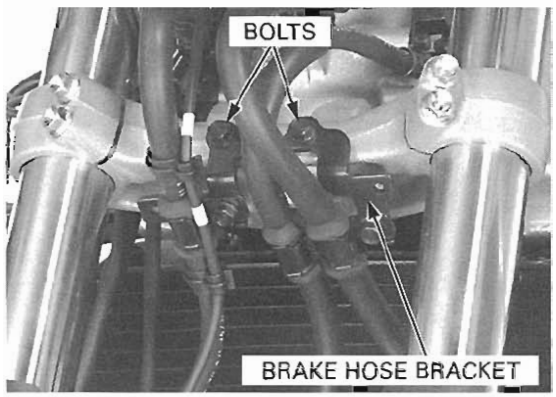
Release the wire band and disconnect the ignition switch 4P (White) connector and immobilizer 4P (White) connector.



Remove the screws and air guide plate.



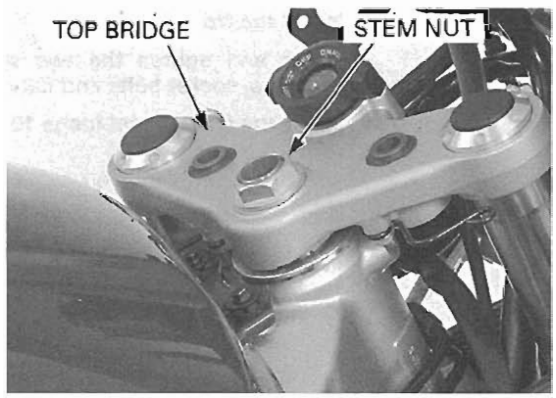
Remove the bolts and front brake hose bracket.



Remove the stem nut.

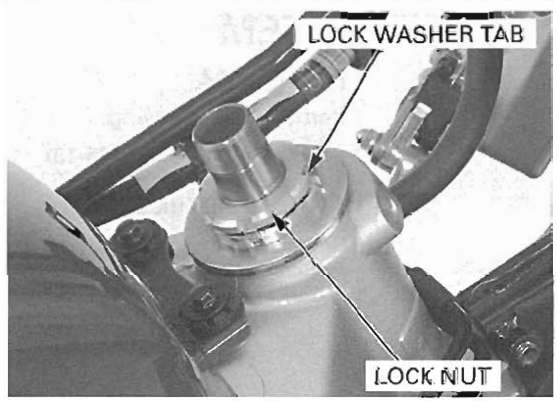
Remove the fork legs (page 15-20).

Remove the top bridge.



Straighten the tabs of the lock washer.

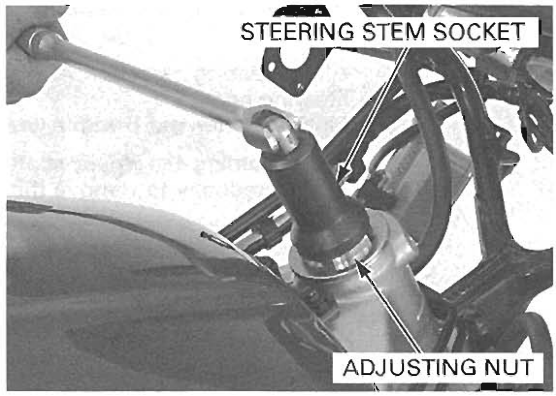
Remove the steering bearing adjusting nut lock nut and lock washer.



Remove the steering stem bearing adjusting nut using the special tool.

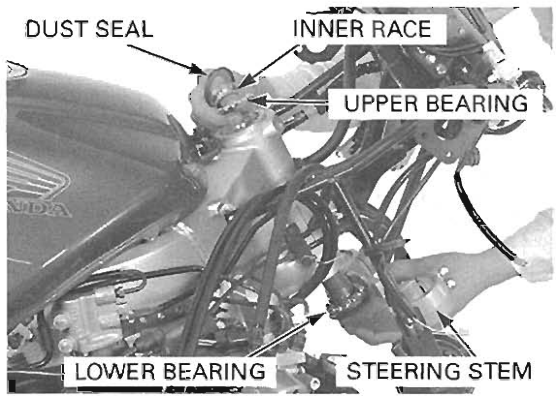
TOOL:

Steering stem socket	**07916-3710101 or 07916-3710100 (U.S.A. only)**



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



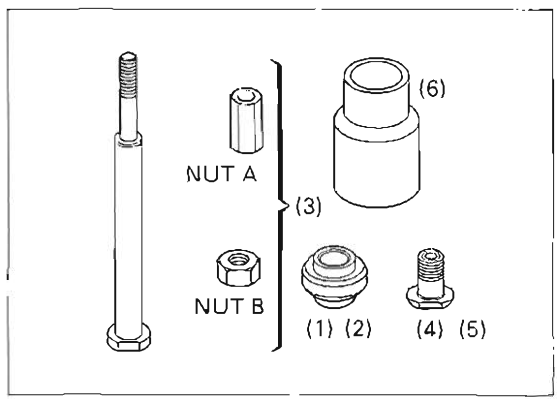
BEARING REPLACEMENT

Always replace the bearings and races as a set.

Replace the races using the Ball Race Remover Set as described in the following procedure.

TOOLS:

Ball race remover set	**07946-KM90001**
– Driver attachment, A (1)	**07946-KM90100**
– Driver attachment, B (2)	**07946-KM90200**
– Driver shaft assembly (3)	**07946-KM90300**
– Bearing remover, A (4)	**07946-KM90401**
– Bearing remover, B (5)	**07946-KM90500**
– Assembly base (6)	**07946-KM90600**

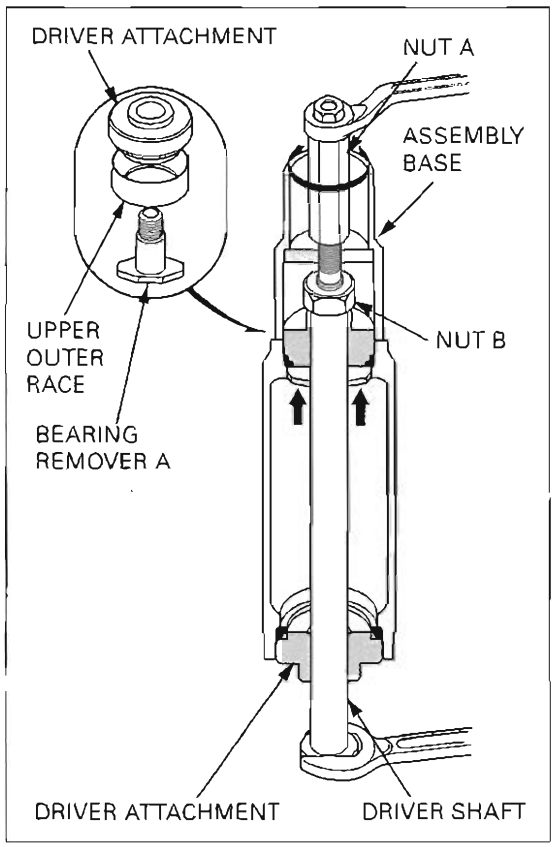


Note the installation direction of the assembly base.

Install the ball race remover into the head pipe as shown.

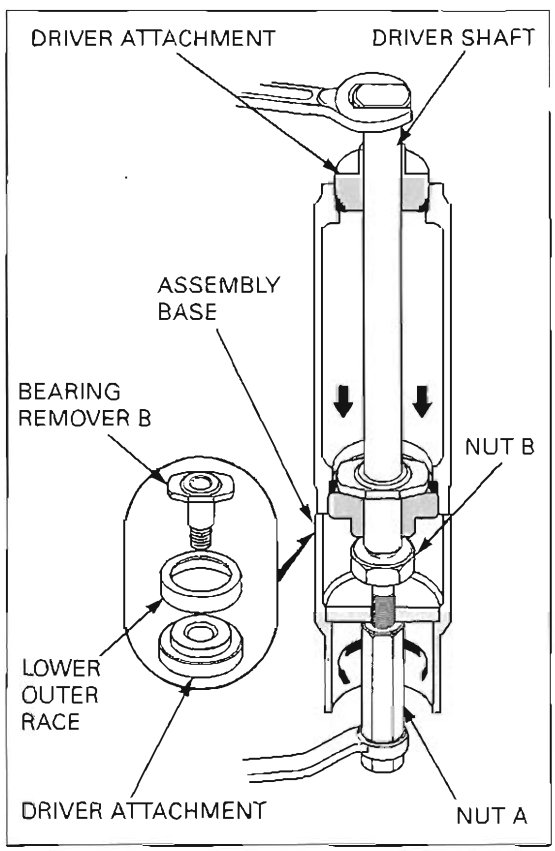
Align bearing remover A with the groove in the steering head.
Lightly tighten nut B with a wrench.

While holding the driver shaft with a wrench, turn nut A gradually to remove the upper bearing outer race.

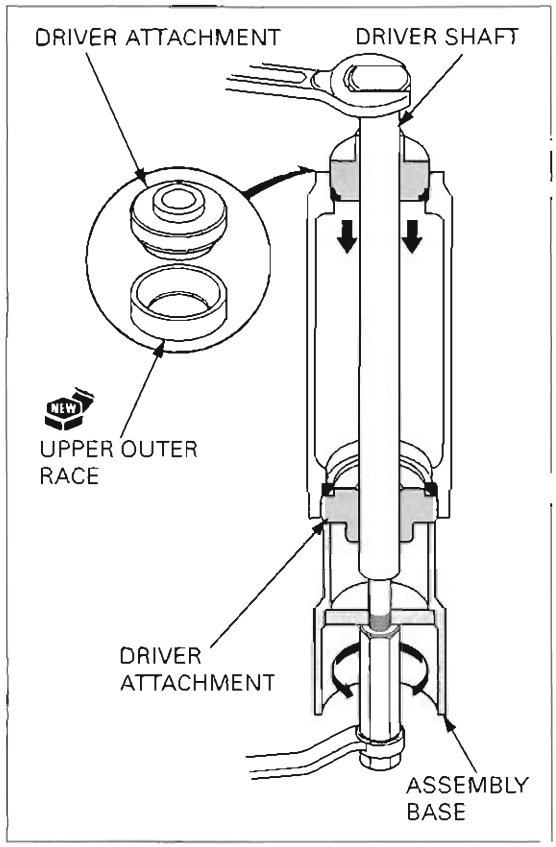


Note the installation direction of the assembly base.

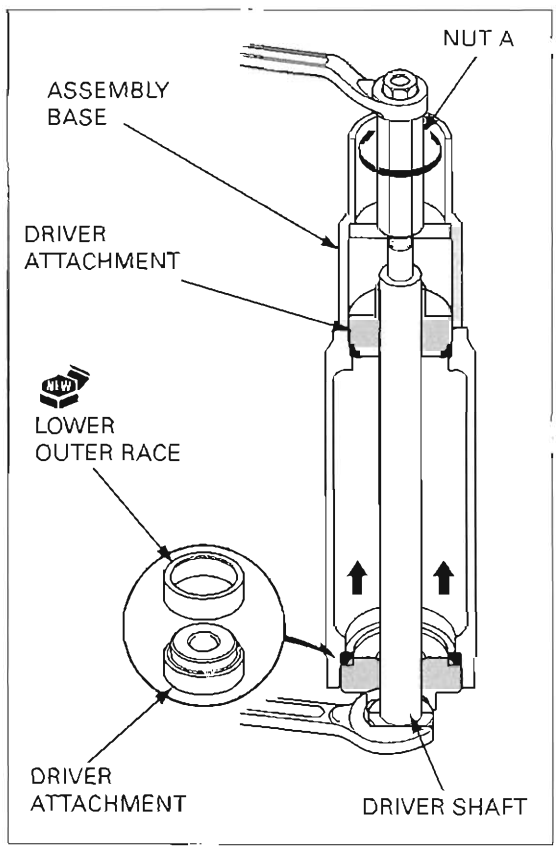
Install the ball race remover into the steering head pipe as shown.
Align bearing remover B with the groove in the steering head.
Lightly tighten nut B.
While holding the driver shaft, turn nut A gradually to remove the lower bearing outer race.



Install a new upper outer race and the ball race remover as shown.
While holding the driver shaft with a wrench 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 bearing outer race.



Install a new lower outer race and ball race remover as shown.
While holding the driver shaft with a wrench, turn nut A gradually until the groove in driver attachment B aligns with the lower end of the steering head. This will allow the installation of the lower bearing outer race.



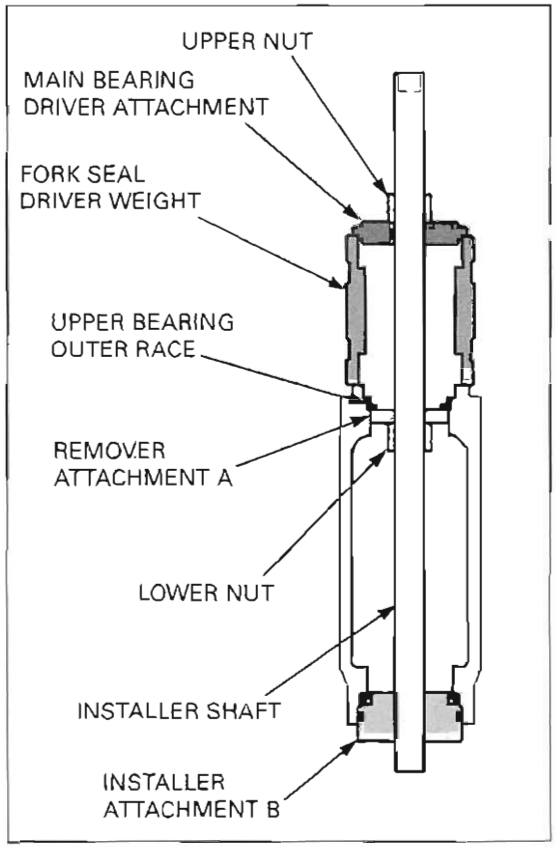
U.S.A. only:

Place the steering head bearing outer races using the special tools listed below.

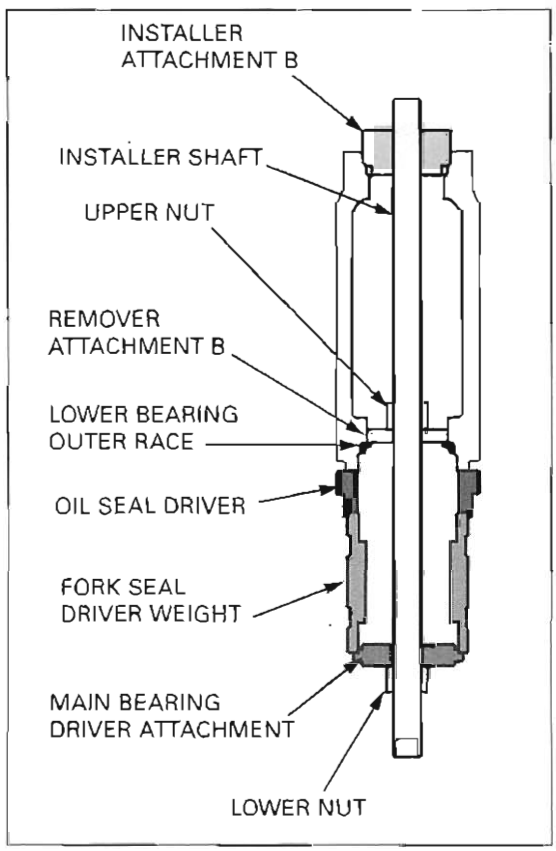
TOOLS:

Main bearing driver attachment	**07946-ME90200**
Fork seal driver weight	**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**

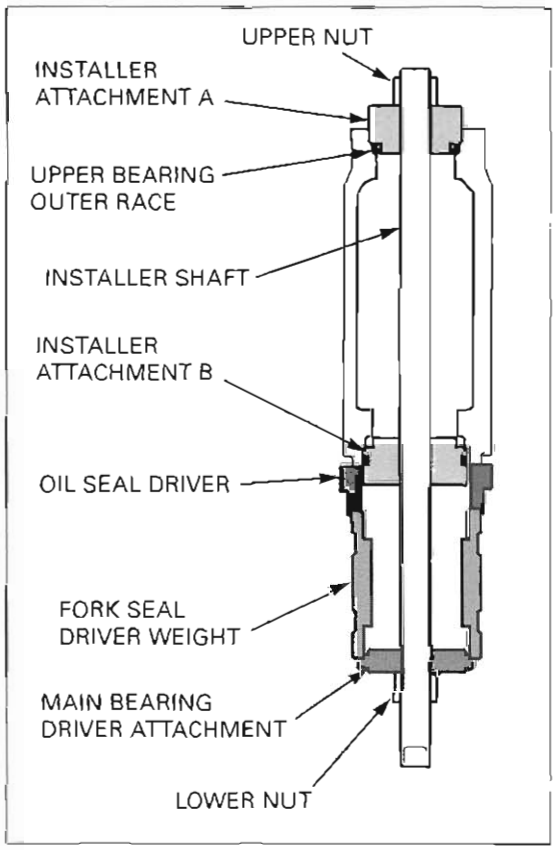
Install the special tools into the steering head pipe as shown.
Align remover attachment A with the groove in the steering head.
While holding the installer shaft with the wrench, turn the upper nut gradually to remove the upper bearing outer race.



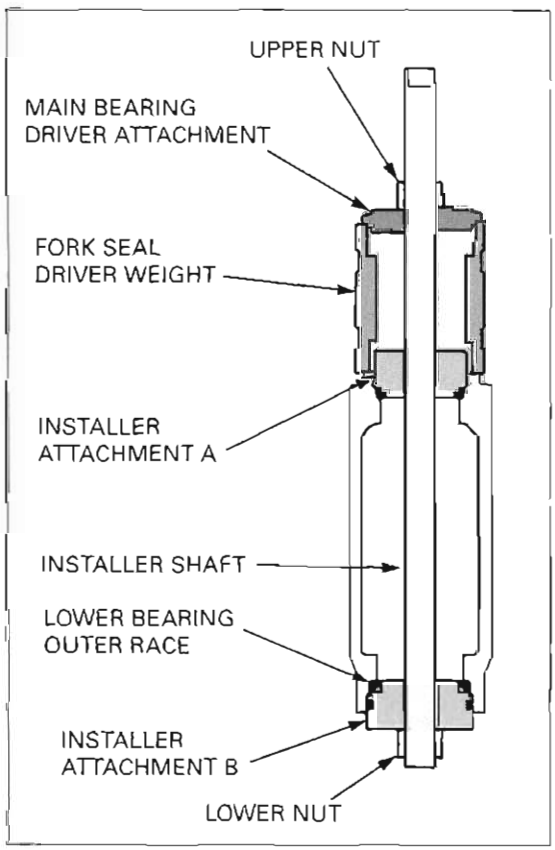
Install the special tools into the steering head pipe as shown.
Align remover attachment B with the groove in the steering head.
While holding the installer shaft with the wrench, turn the lower nut gradually to remove the lower bearing outer race.



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.

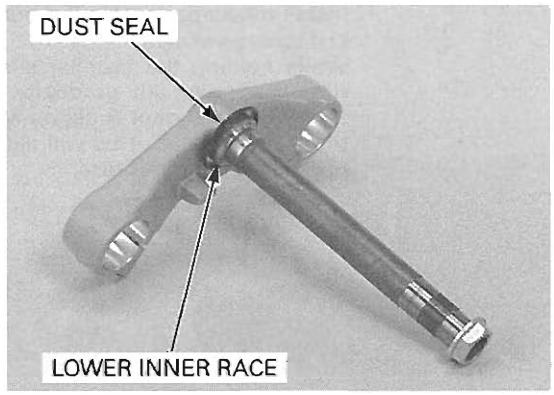


Install a new lower bearing outer race and the special tools as shown.
While holding the installer shaft with the wrench, turn the upper nut gradually until the groove in installer attachment B aligns with the lower end of the steering head. This will allow the installation of the lower bearing outer race.



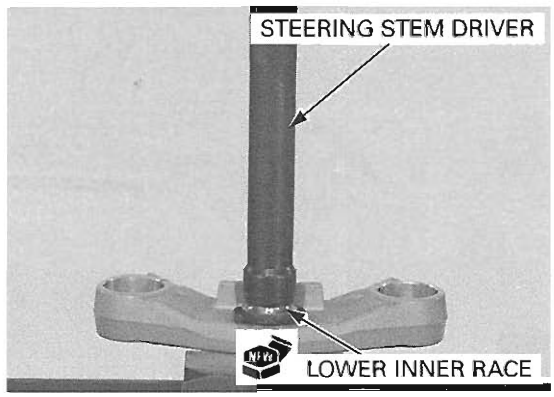
Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



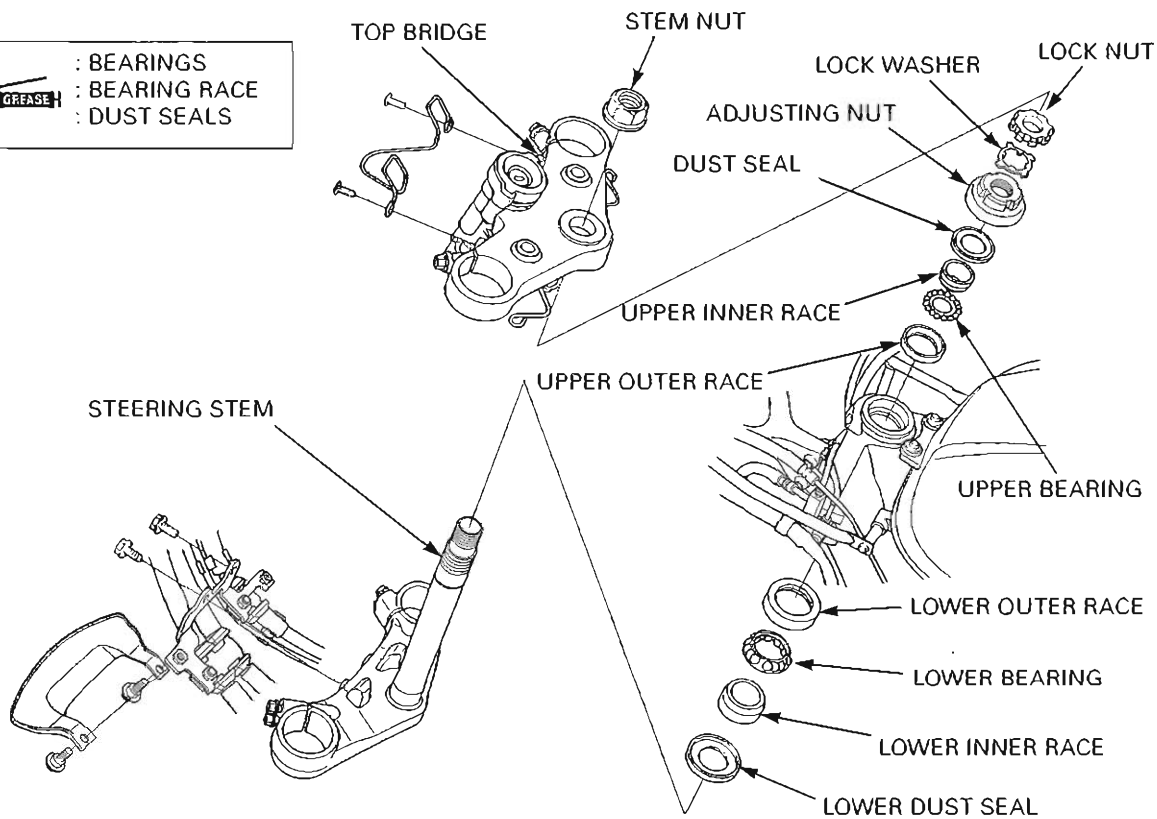
Apply grease to the new dust seal lips and install it over the steering stem.
Install a new lower bearing inner race using a special tool and a hydraulic press.

TOOL:
Steering stem driver 07946-MB00000



INSTALLATION

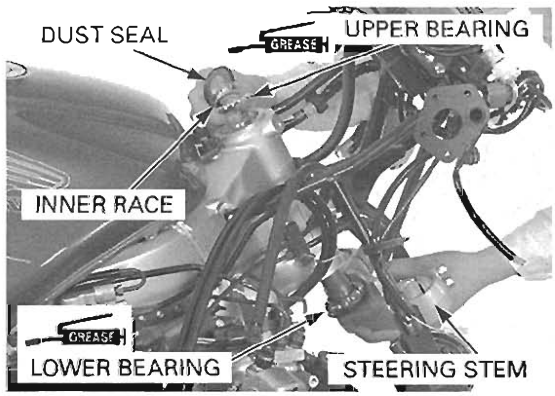
GREASE : BEARINGS
: BEARING RACE
: DUST SEALS



Apply specified grease to upper and lower bearings and bearing races.

Install the lower bearing onto the steering stem.
Insert the steering stem into the steering head pipe.

Install upper bearing, inner race and dust seal.

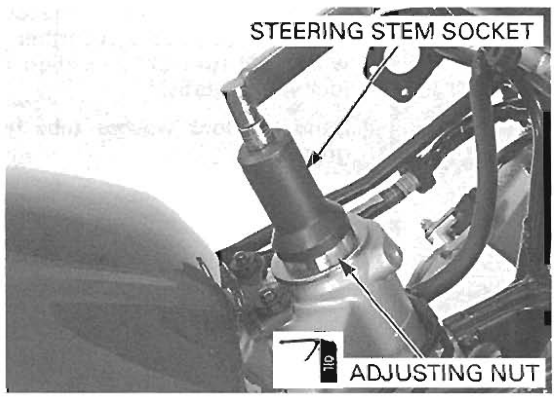


Apply oil to the bearing adjusting nut threads.
Install and tighten the stem bearing adjusting nut to the initial torque.

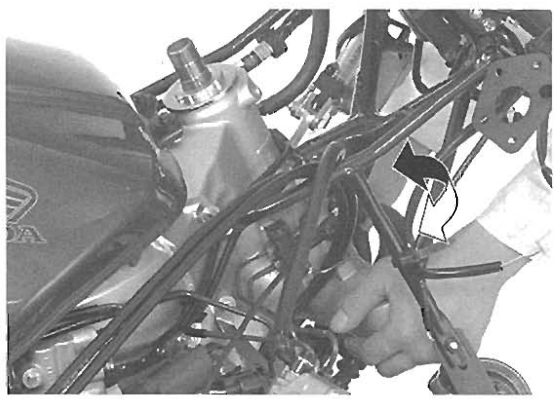
TOOL:

Steering stem socket	**07916-3710101 or 07916-3710100 (U.S.A. only)**

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



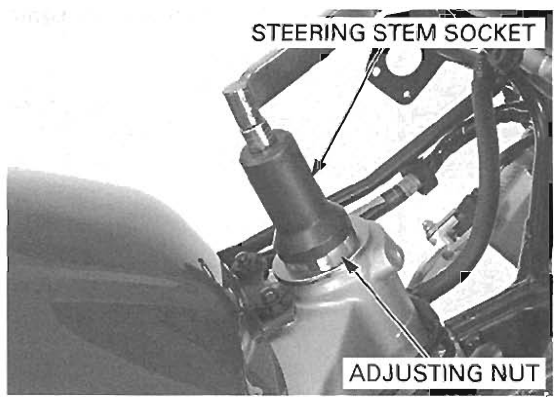
Move the steering stem right and left, lock-to-lock, five times to seat the bearings.
Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.



Retighten the bearing adjusting nut to the specified torque.

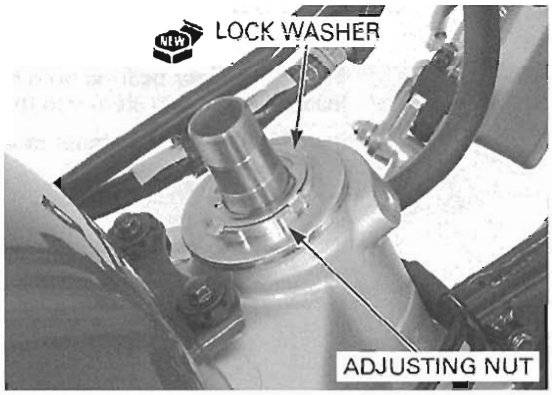
TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.



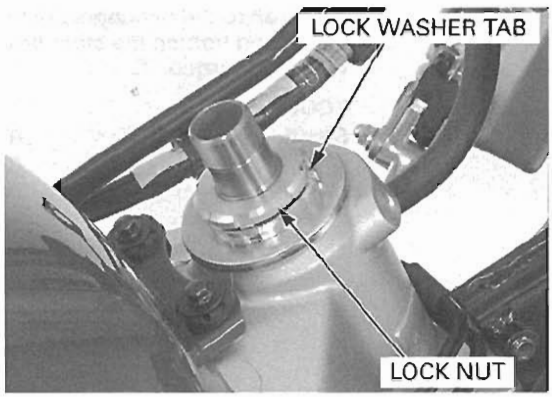
Install the new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjusting 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 within 1/4 turn (90°) to align its grooves with the lock washer tabs.

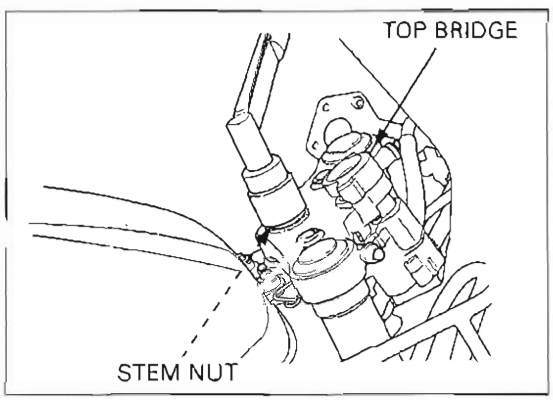
Bend the lock washer tabs up into the lock nut groove.



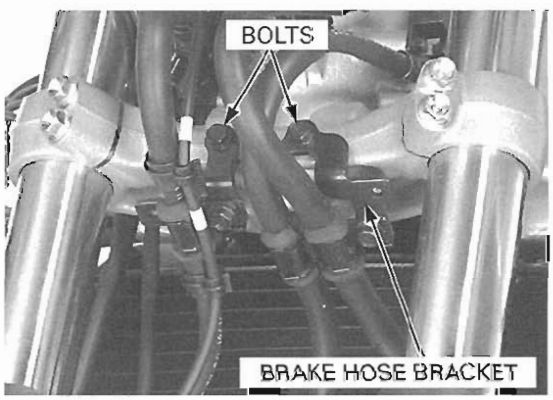
Install the fork legs (page 15-30).

Install the top bridge and steering stem nut.
Tighten the steering stem nut to the specified torque.

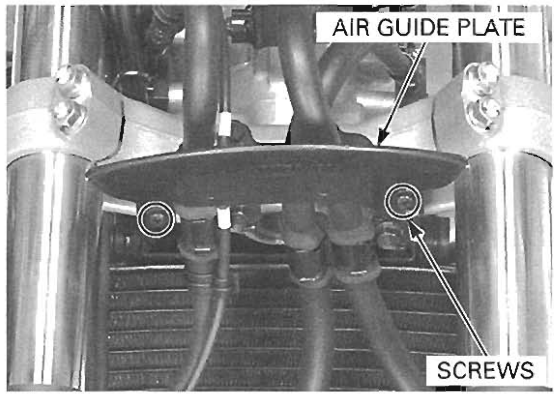
TORQUE: **103 N·m (10.5 kgf·m, 76 lbf·ft)**



Install the front brake hose bracket, tighten the bolts securely.

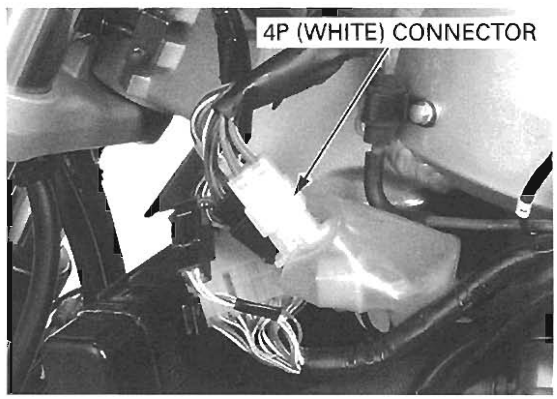


Install the air guide plate and tighten the screws securely.



Connect the ignition switch 4P (White) connector and immobilizer 4P (White) connector and secure the wires with the wire band (page 1-27).

Install the following:
- Front wheel (page 15-18)
- Upper cowl (page 2-16)



STEERING HEAD BEARING PRE-LOAD

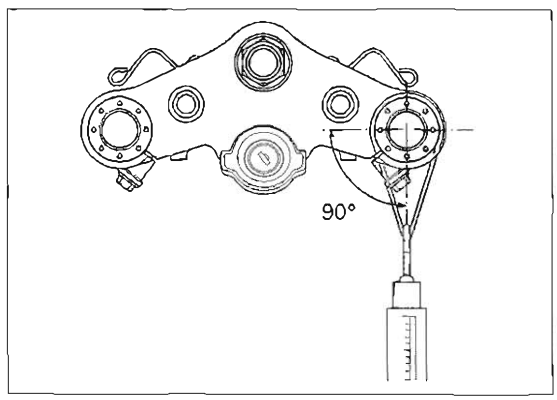
Jack-up the motorcycle to raise the front wheel off the ground.

Position the steering stem to the straight ahead position.

Make sure that there is no cable or wire harness interference.

Hook a spring scale to the fork tube and measure the steering head bearing pre-load.

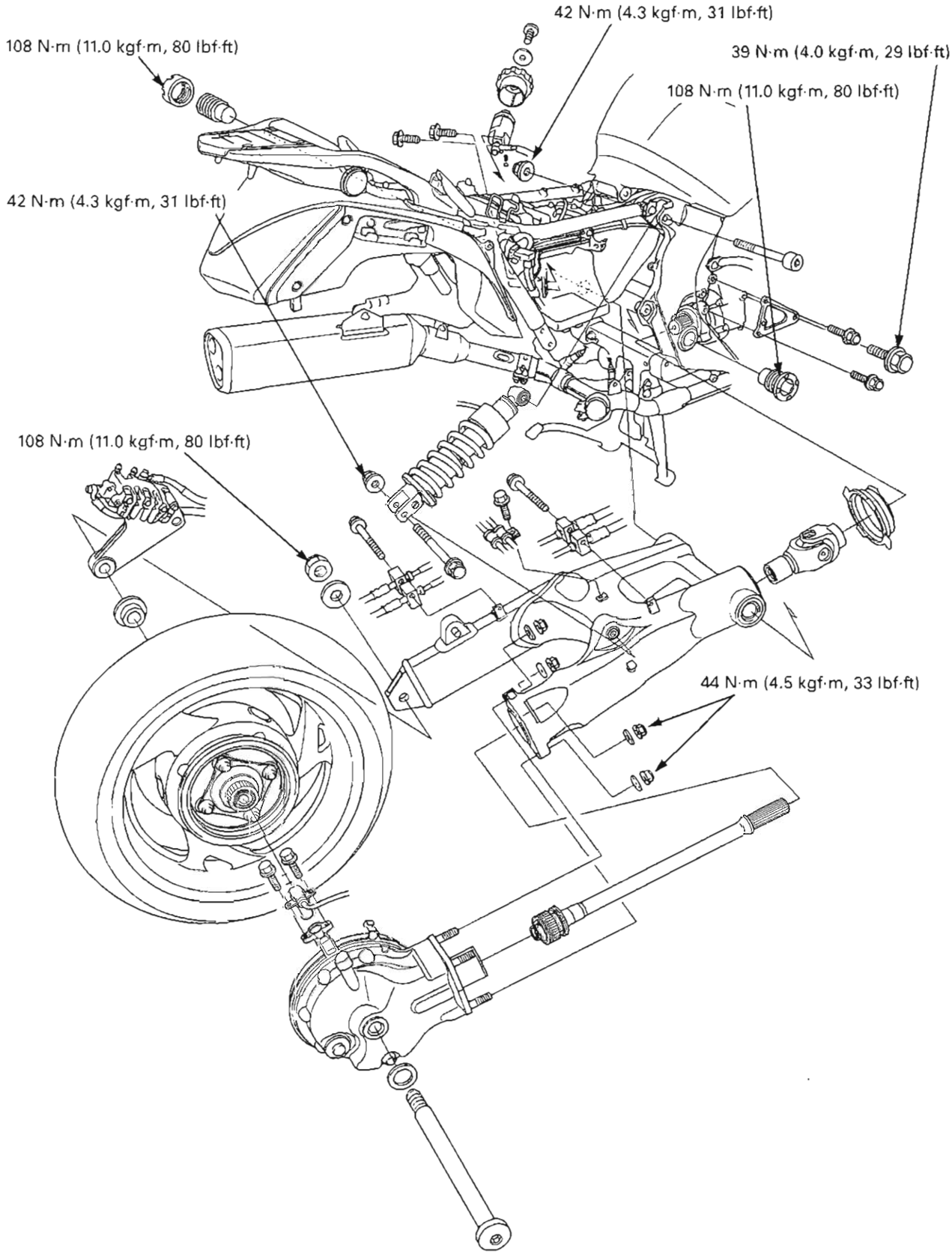
The pre-load should be within 1.6 – 2.1 kgf (3.5 – 4.6 lbf).
If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.



16. REAR WHEEL/SUSPENSION

COMPONENT LOCATION 16-2
SERVICE INFORMATION 16-3
TROUBLESHOOTING 16-4
REAR WHEEL 16-5
SHOCK ABSORBER 16-12
SWINGARM 16-14

COMPONENT LOCATION



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 brake operation by applying the brake lever and pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- When using the lock nut wrench, use a 20-inch long deflecting beam type torque wrench. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given on this page is actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives the actual and indicated torque.
- Use only tires marked "TUBELESS" and tubeless valve stems on rims marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to the brake system information (page 17-4).

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm², 42 psi)	–
	Driver and passenger	290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.
Shock absorber	Pre-load adjuster dial standard position	7 clicks out from lower position	–
	Rebound adjuster initial setting	1 turn out from full hard	–

TORQUE VALUES

Rear axle nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Rear brake disc nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Final gear assembly mounting UBS nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	
Rear shock absorber upper mounting bolt/nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one
Rear shock absorber lower mounting bolt/nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Swingarm right pivot bolt	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Swingarm left pivot bolt	See page 16-19	Apply oil to the threads and flange surface
Swingarm left pivot bolt lock nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Rear wheel pulser ring mounting bolt	8 N·m (0.8 kgf·m, 5.1 lbf·ft)	ALOC bolt; replace with a new one
Rear brake caliper stopper pin bolt	69 N·m (7.0 kgf·m, 51 lbf·ft)	ALOC bolt: replace with a new one
Muffler band bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Engine hanger bolt (middle bracket/ engine side)	39 N·m (4.0 kgf·m, 29 lbf·ft)	

TOOLS

Driver	07749-0010000	
Attachment, 32 X 35 mm	07746-0010200	
Attachment, 42 X 47 mm	07746-0010300	
Pilot, 20 mm	07746-0040500	
Bearing remover shaft	07746--0050100	
Bearing remover head, 20 mm	07746-0050600	
Attachment, 28 X 30 mm	07946-1870100	
Bearing remover set	07LMC-KV30100	
Lock nut wrench, 6 X 46 mm	07ZMA-MCA0100	or 07ZMA-MCAA101 (U.S.A. only)

TROUBLESHOOTING

Soft suspension
- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

Stiff suspension
- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Incorrect swingarm pivot fasteners torque
- Tire pressure too high

Rear wheel wobbling
- Bent rim
- Worn or damaged rear axle bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

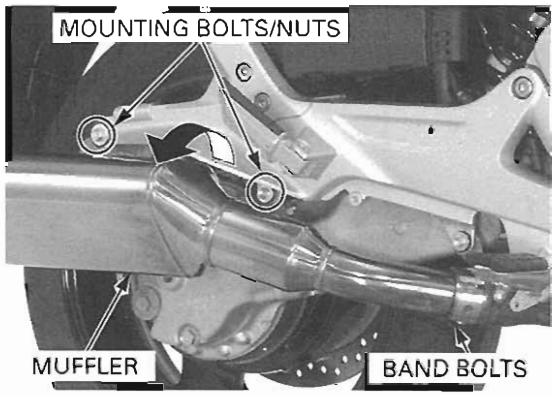
Steers to one side or does not track straight
- Bent rear axle

REAR WHEEL

REMOVAL

Support the motorcycle securely on its center stand.
Loosen the muffler band bolts.
Remove the muffler mounting nuts and swing the muffler away from the wheel.

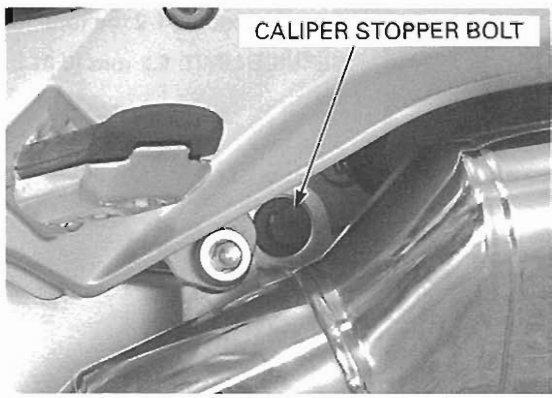
Remove the rear fender A (page 2-8).
Remove the rear brake pad (page 17-15).



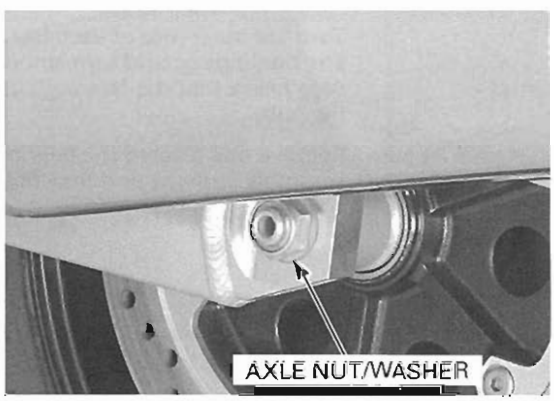
Do not hang the caliper from the brake hose. Do not twist the brake hose.

Remove the rear caliper stopper bolt.

Remove the rear caliper from the rear brake disc.



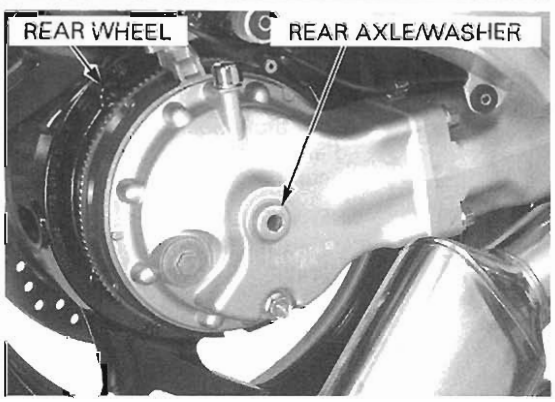
Remove the rear axle nut and washer.



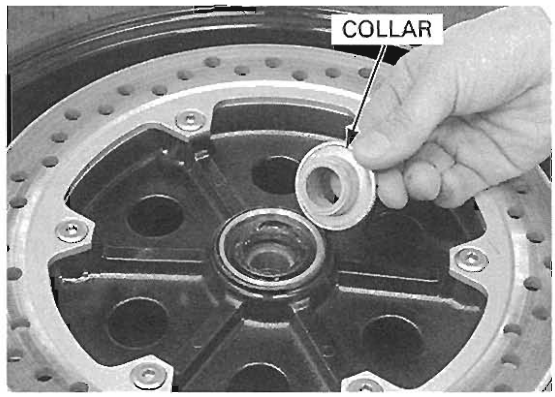
Do not operate the brake lever and pedal after removing the wheel.

Pull out the rear axle and washer.

Move the rear wheel to the left to separate it from the final gear case and remove the rear wheel.



Remove the collar from the left side of the rear wheel.

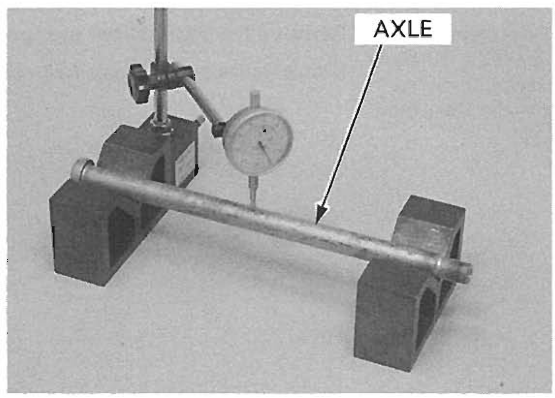


INSPECTION

Axle

Set the axle in a V-block and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



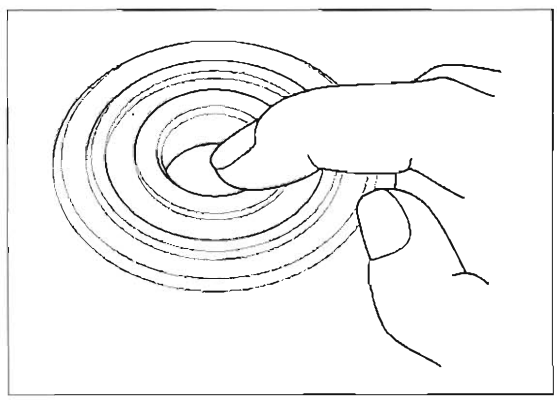
Wheel bearing

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.

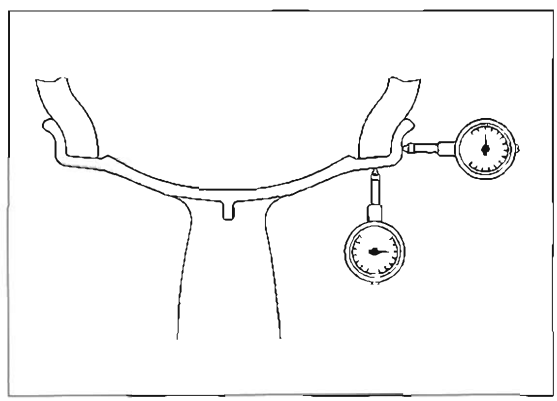
Replace with new bearings, if necessary.



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)

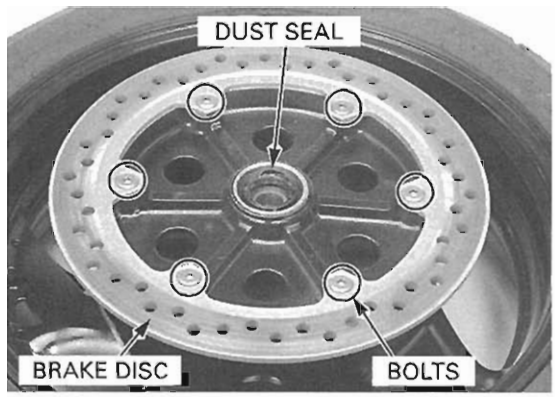


Wheel balance

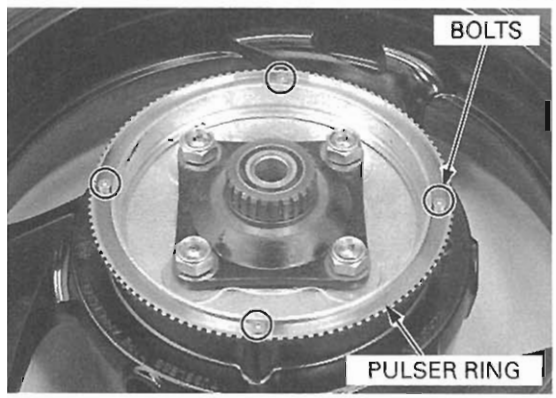
Refer to wheel balance servicing (page 15-15).

DISASSEMBLY

Remove the bolts and brake disc.
Remove the dust seal.

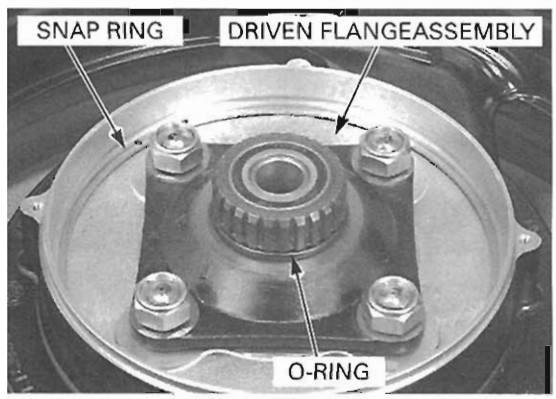


Deluxe type only: Remove the bolts and rear pulser ring from the right wheel hub.

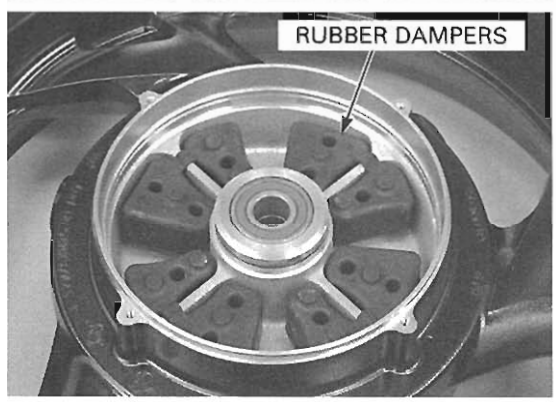


Remove the O-ring from the final driven flange.

Remove the snap ring from the right wheel hub, then remove the final driven flange assembly.



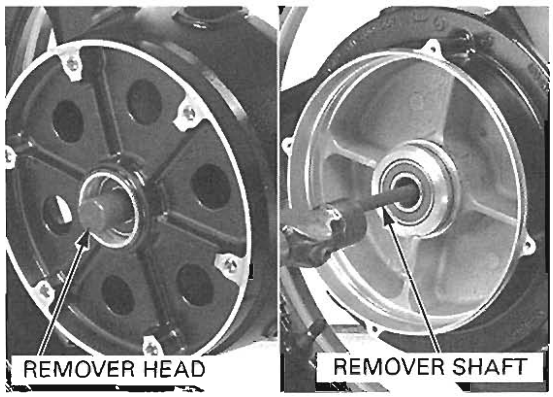
Remove the rear wheel rubber dampers.



Install the bearing remover head into the bearing.
From the opposite side of wheel, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

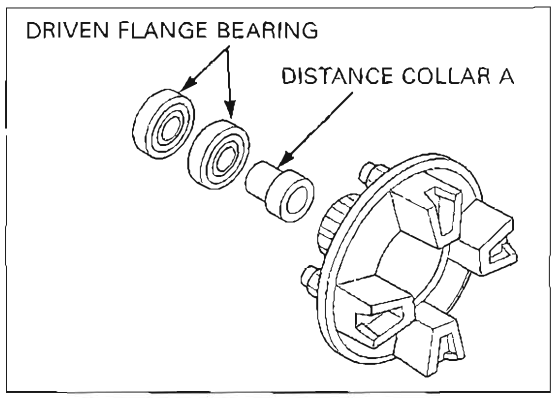
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600



FINAL DRIVEN FLANGE DISASSEMBLY/ASSEMBLY

Drive out the rear axle distance collar A from the final driven flange.

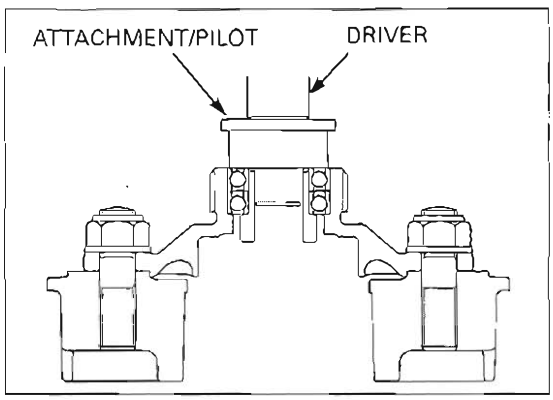
Drive out the final driven flange bearing (6905RS) from the final driven flange.



Drive in the rear axle distance collar A to the final driven bearing (6905RS).

TOOLS:

Driver	07749-0010000
Attachment, 28 X 30 mm	07946-1870100
Pilot, 20 mm	07746-0040500

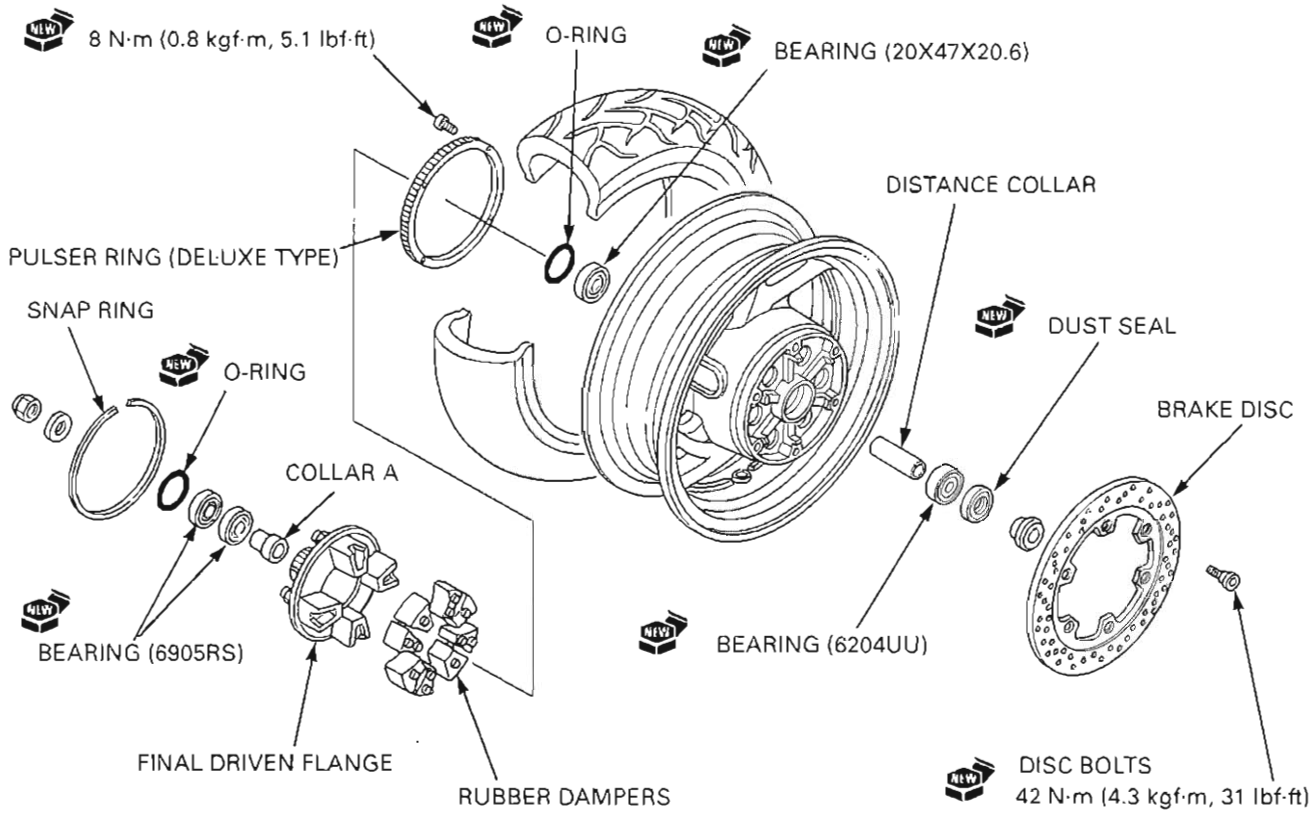


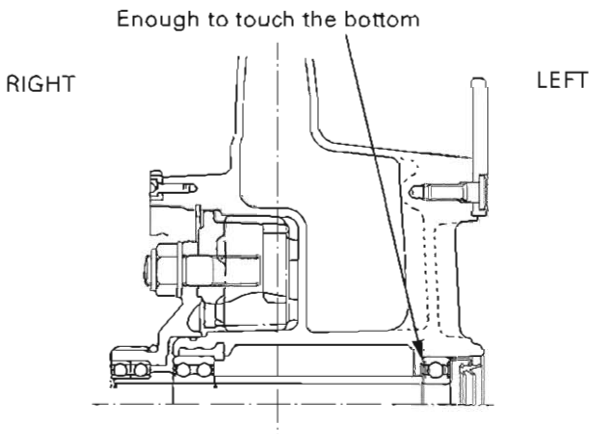
Drive in the final driven flange bearing (6905RS) to the final driven flange until it is fully seated.

TOOLS:

Driver	07749-0010000
Attachment, 42 X 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500

ASSEMBLY





Drive in a new left bearing (6204 UU) securely with the mark facing up until it is seated.

TOOLS:

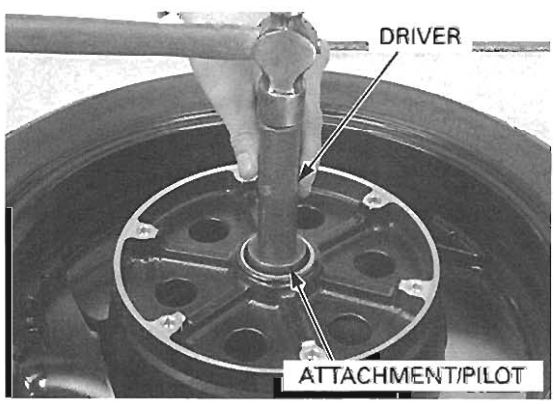
Driver	**07749-0010000**
Attachment, 42 X 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**

Install the distance collar.

Drive in a new left bearing (20 X 47 X 20.6 mm) securely with the mark facing up until it is seated.

TOOLS:

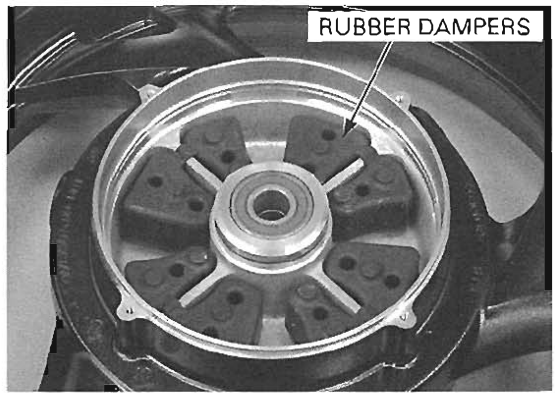
Driver	**07749-0010000**
Attachment, 42 X 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**



Replace the rubber dampers as a set.

Check the rubber dampers for deterioration or damage and replace the rear wheel assembly with a new one if necessary.

Install the rubber dampers into the left wheel hub.

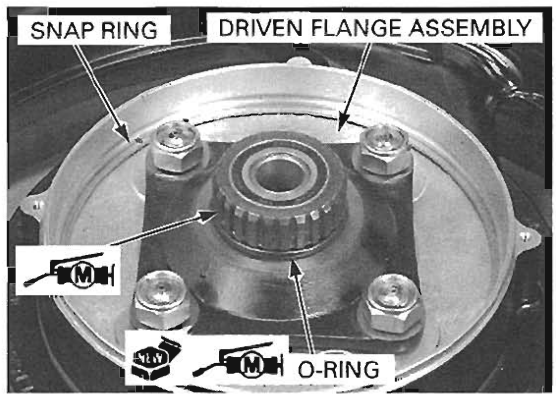


Install the driven flange assembly to the right wheel hub.

Install the snap ring to the groove on the right wheel hub.

Apply 3g (0.11oz) of molybdenum disulfide paste to the mating surface of the rear wheel hub end and final driven flange A.

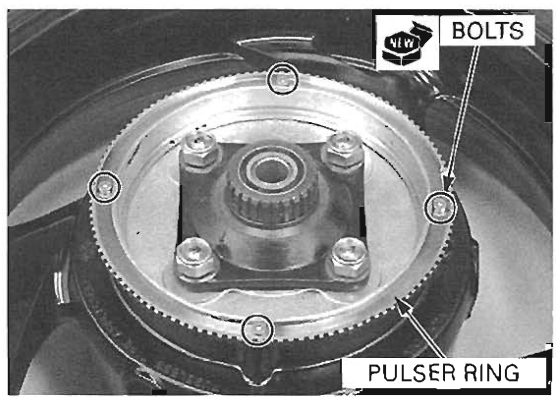
Coat a new O-ring with molybdenum disulfide paste and install it into the groove.



Deluxe type only:

Install new the rear wheel pulser ring and tighten the bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.1 lbf·ft)



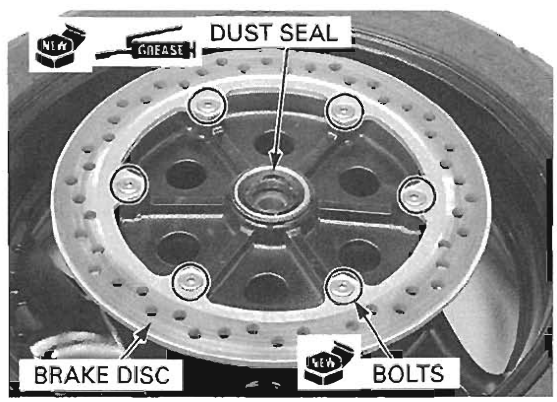
Do not get grease on the brake disc or stopping power will be reduced.

Install the brake disc onto the wheel hub.

Install and tighten the new brake disc bolts to the specified torque.

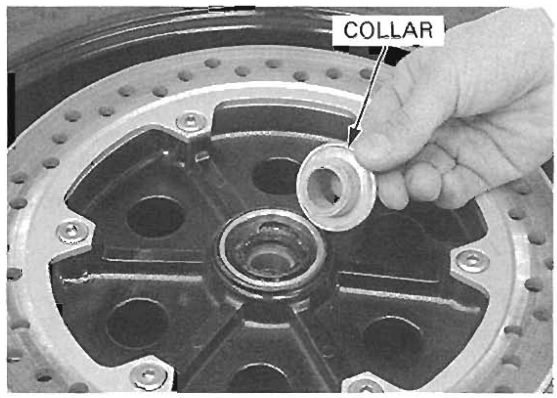
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Apply grease to a new dust seal lip and install the dust seal into the wheel hub.



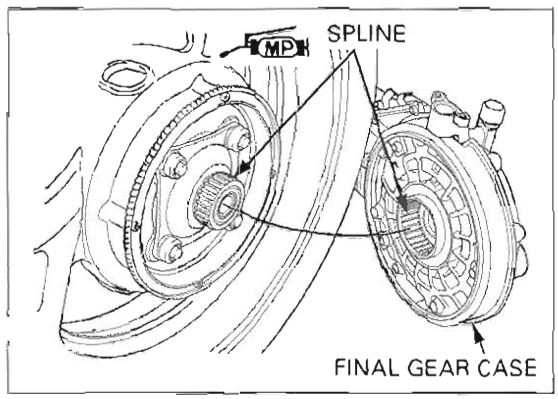
INSTALLATION

Install the collar to the left side of the rear wheel.



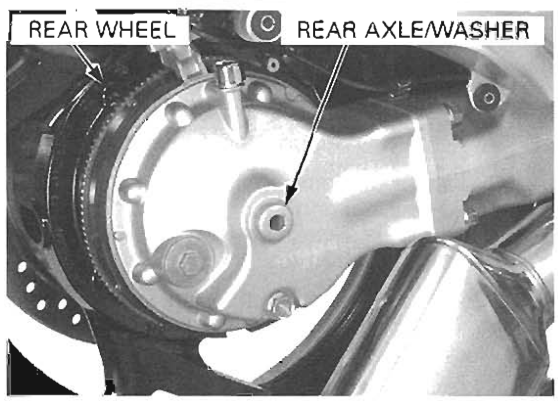
Apply 5 g (0.18 oz) of molybdenum disulfide paste to the joint surface of the final gear case splines and driven flange.

Engage the rear wheel with the final gear case, marking sure the splines are correctly aligned.



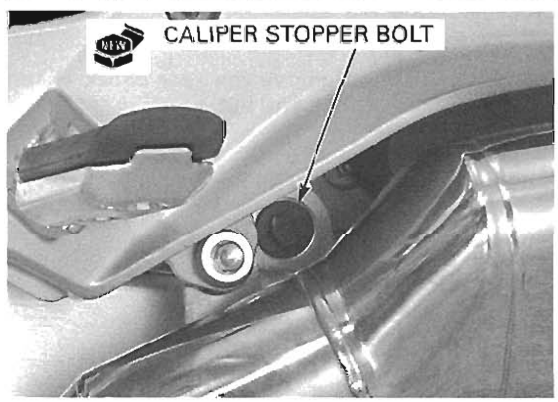
Install the rear brake caliper onto the brake disc.

Install the rear axle and washer through the swingarm, rear brake caliper bracket, collar, hub and final gear case (from the right side).



Install and tighten the new rear caliper stopper pin bolt to the specified torque.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)



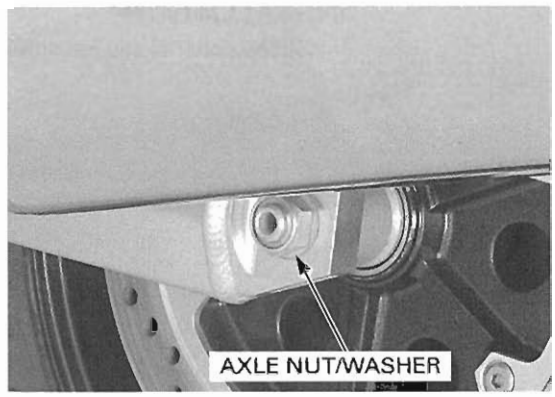
Install the washer and tighten the rear axle nut to the specified torque.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

Operate the brake pedal several times.

If the final gear case was removed, tighten the gear case mounting nuts to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



Swing the muffler to the original position.

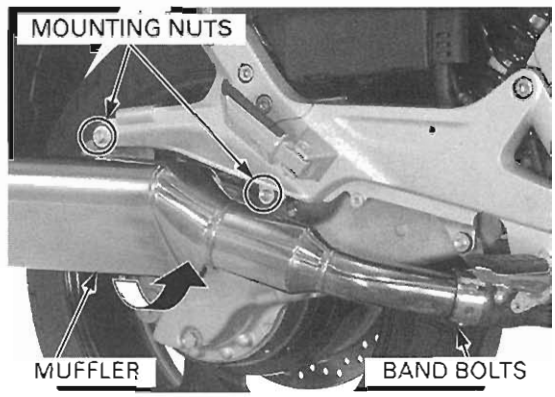
Install and tighten the muffler mounting nuts securely.

Tighten the muffler band bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install the rear fender A (page 2-8).
Install the rear brake pad (page 17-15).

Deluxe type: Inspect the wheel speed sensor air gap (page 18-31).



SHOCK ABSORBER

REMOVAL

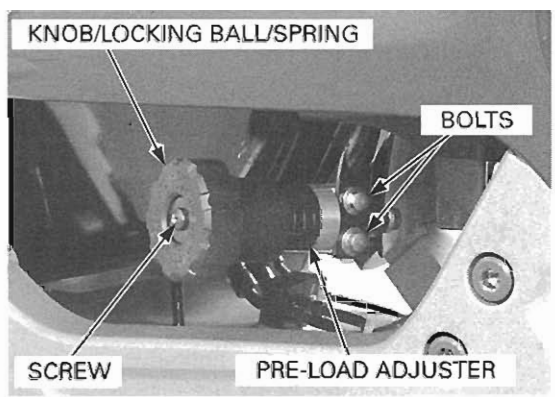
Remove the right side cover (page 2-6).
Remove the right step holder (page 17-25).

Support the motorcycle securely on its center stand.

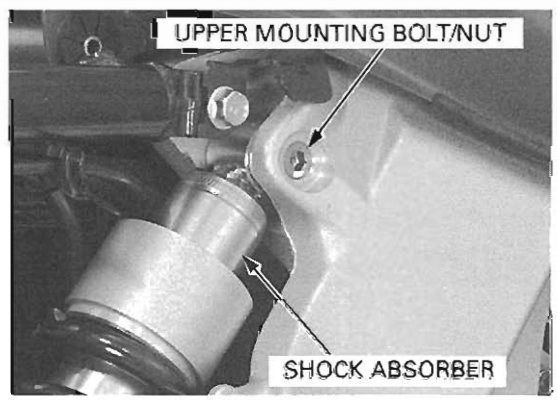
Be careful not to lose the locking ball and spring.

Remove the screw, adjuster knob, locking ball and spring.
Remove the bolts and pre-load adjuster from the frame.

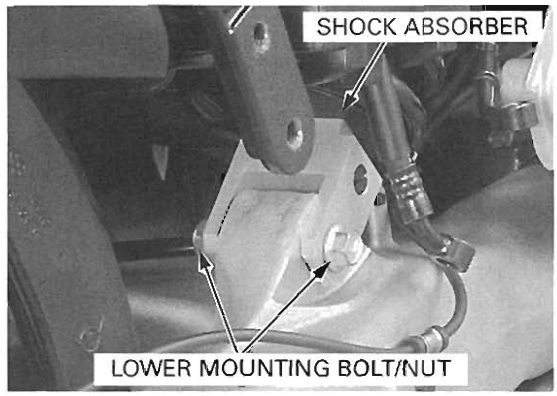
Remove the bands and remove the shock absorber hose from the frame.



Remove the rear shock absorber upper mounting bolt and nut.

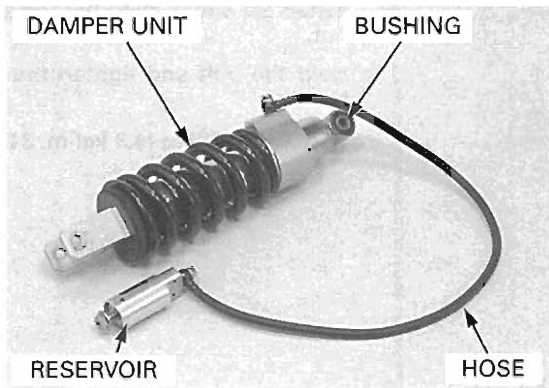


Remove the rear shock absorber lower mounting bolt, nut and shock absorber.



INSPECTION

Check the damper unit, reservoir hose and reservoir for leakage or other damage.
Check the upper joint bushing for wear or damage.
Replace the shock absorber assembly if necessary.



SHOCK ABSORBER DISPOSAL PROCEDURE

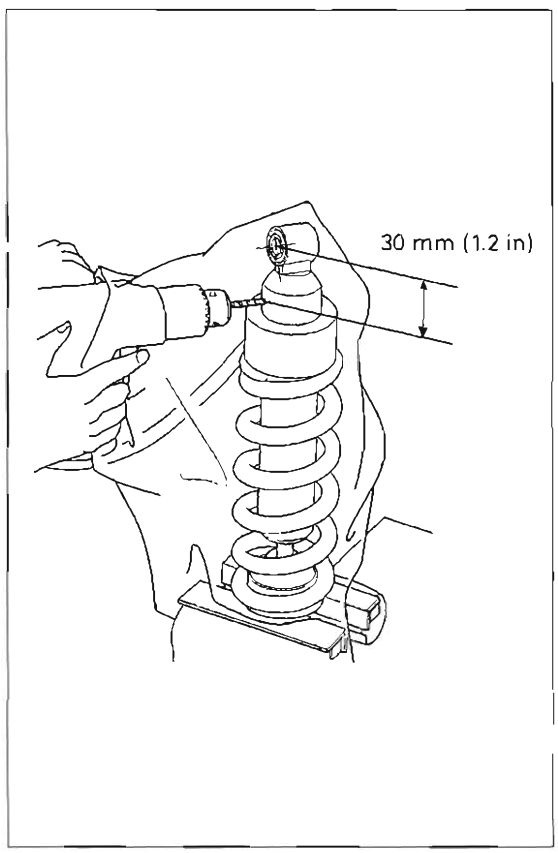
Center punch the damper case to mark the drilling point.

Wrap the shock absorber inside a plastic bag.
Support the shock absorber upright in a vise as shown.
Through the open end of the bag, insert a drill motor with a sharp 2 - 3 mm (5/64 - 1/8 in) drill bit.

NOTICE

Point the valve away from you to prevent debris getting in your eyes.

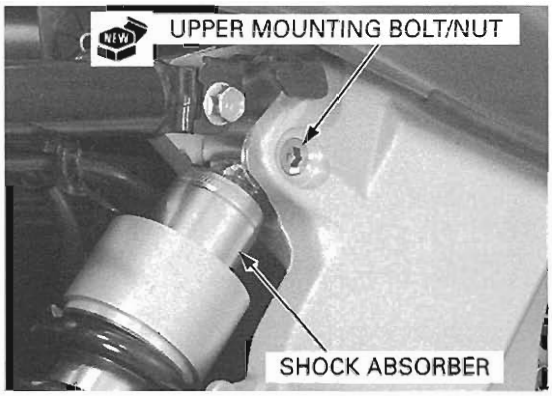
Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.



INSTALLATION

Install the shock absorber.
Install the new shock absorber upper mounting bolt and nut.
Hold the nut and tighten the bolt to the specified torque

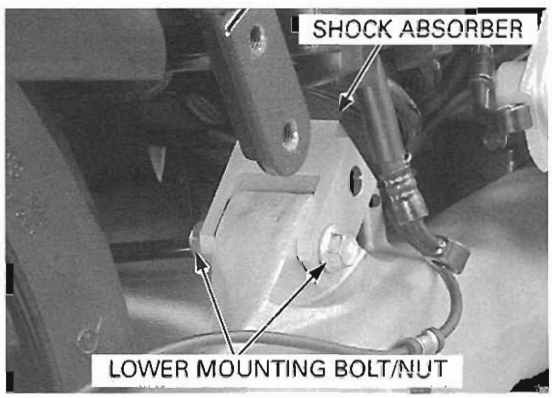
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Install the shock absorber lower mounting bolt and nut.

Hold the bolt and tighten the nut to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Route the pre-load adjuster hose into the frame (page 1-27).

Hold the pre-load adjuster hose using the bands.

Install the spring and lock ball into the pre-load adjuster body.

Be careful not to lose the locking ball and spring.

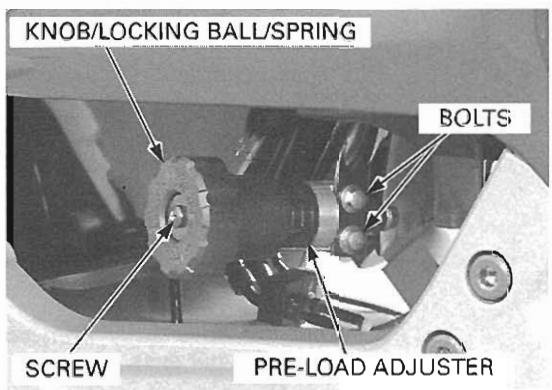
Install the pre-load adjuster knob while pushing the lock ball.

Install and tighten the pre-load adjuster knob screw.

Install the pre-load adjuster cover and tighten the screw.

Install the pre-load adjuster onto the frame.

Install and tighten the bolts securely.



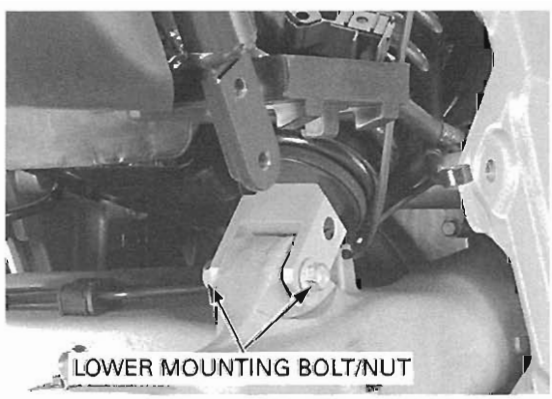
SWINGARM

REMOVAL

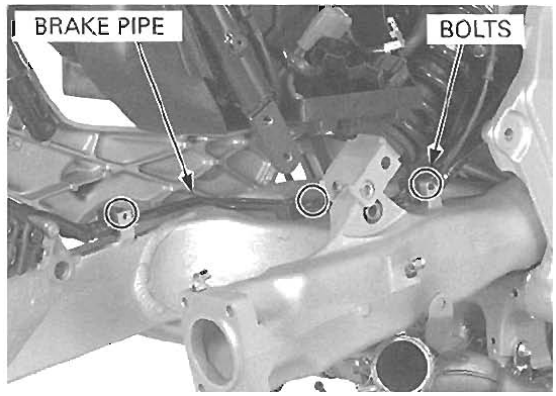
Remove the following:

- Muffler (page 2-18)
- Right step holder (page 17-25)
- Rear wheel (page 16-5)
- Final gear case (page 14-5)
- EVAP canister

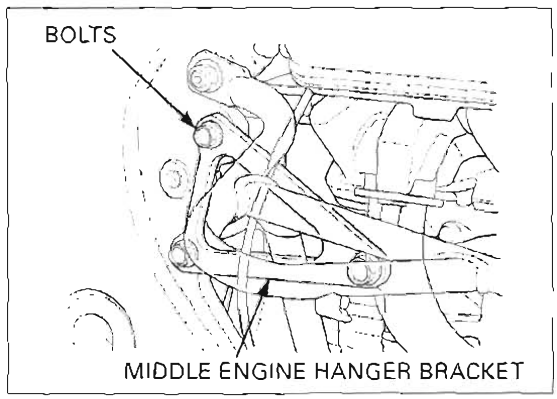
Remove the shock absorber lower mounting bolt and nut.



Remove the bolts and brake pipes from the swingarm.



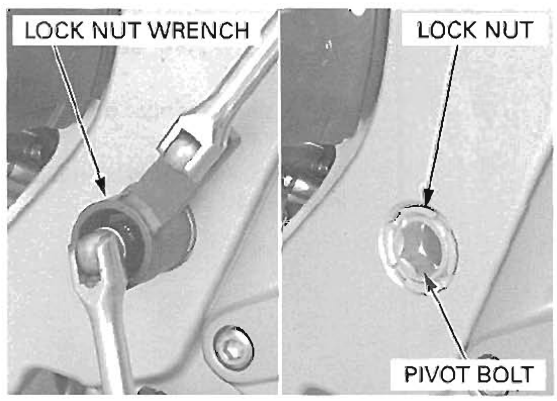
Remove the bolts and middle engine hanger bracket.



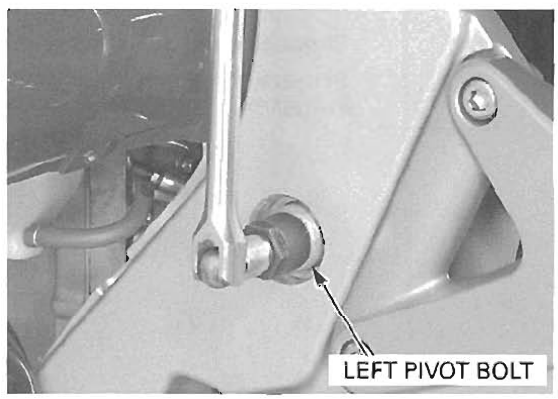
Hold the swingarm left pivot bolt and loosen and remove the swingarm left pivot bolt lock nut.

TOOLS:

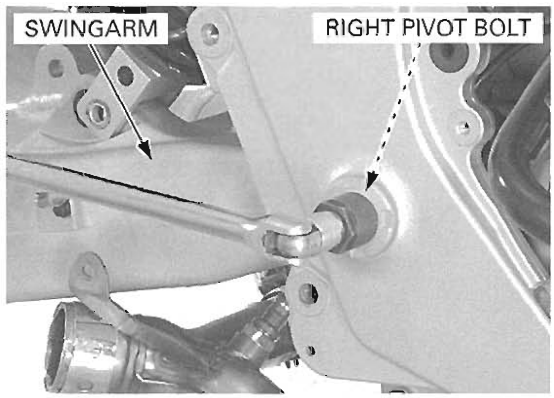
Lock nut wrench, 6 X 46 mm 07ZMA-MCA0100 or 07ZMA-MCAA101 (U.S.A. only)



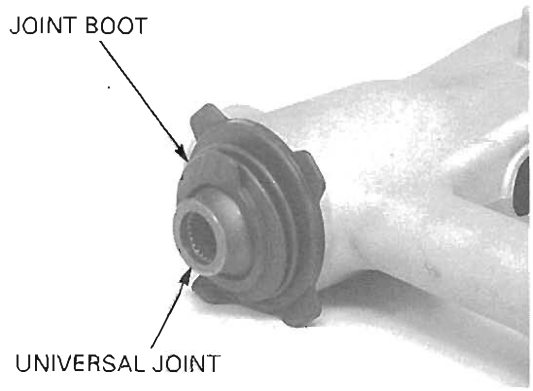
Remove the swingarm left pivot bolt, using a 19 mm Allen wrench.



Remove the swingarm right pivot bolt, then remove the swingarm assembly.



Remove the joint boot and the universal joint from the swingarm.

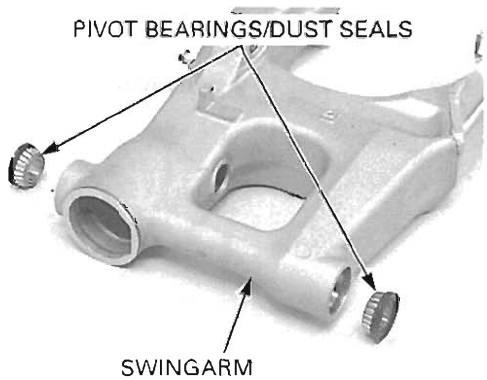


DISASSEMBLY/INSPECTION

Remove the pivot bearings from the swingarm pivots.

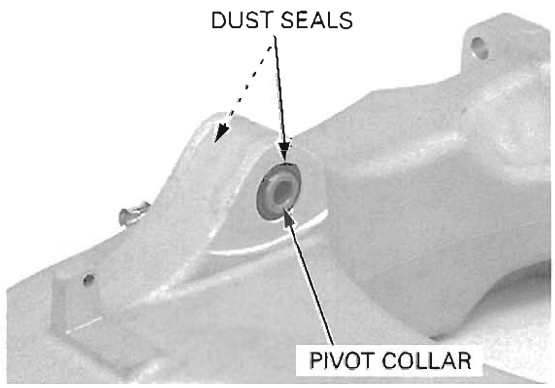
Check the bearings, dust seals and outer races for wear or damage.

Both bearings must be replaced as a set if any part is damaged or worn.



Shock absorber lower pivot bearing replacement

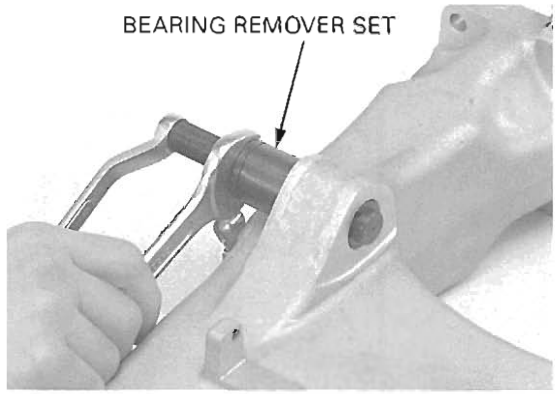
Remove the pivot collar and dust seals from the swingarm.



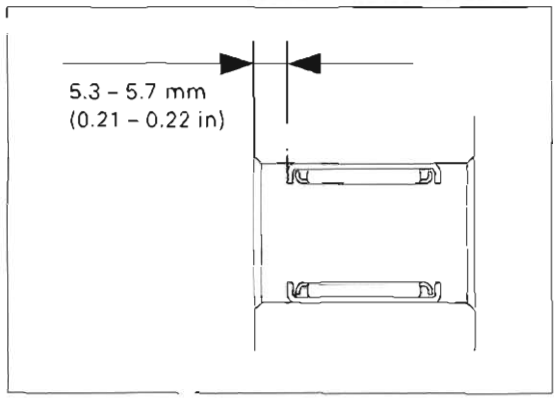
Draw the needle bearing out of the swingarm using the special tool.

TOOL:

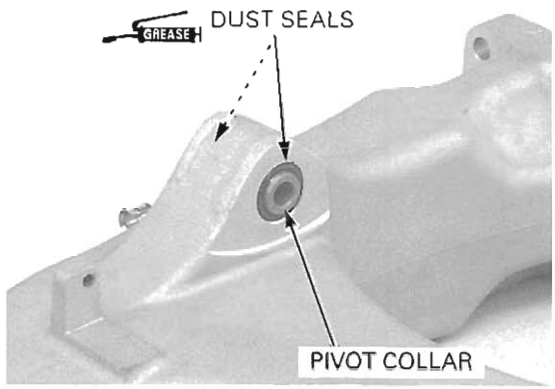
Bearing remover set	**07LMC-KV30100**



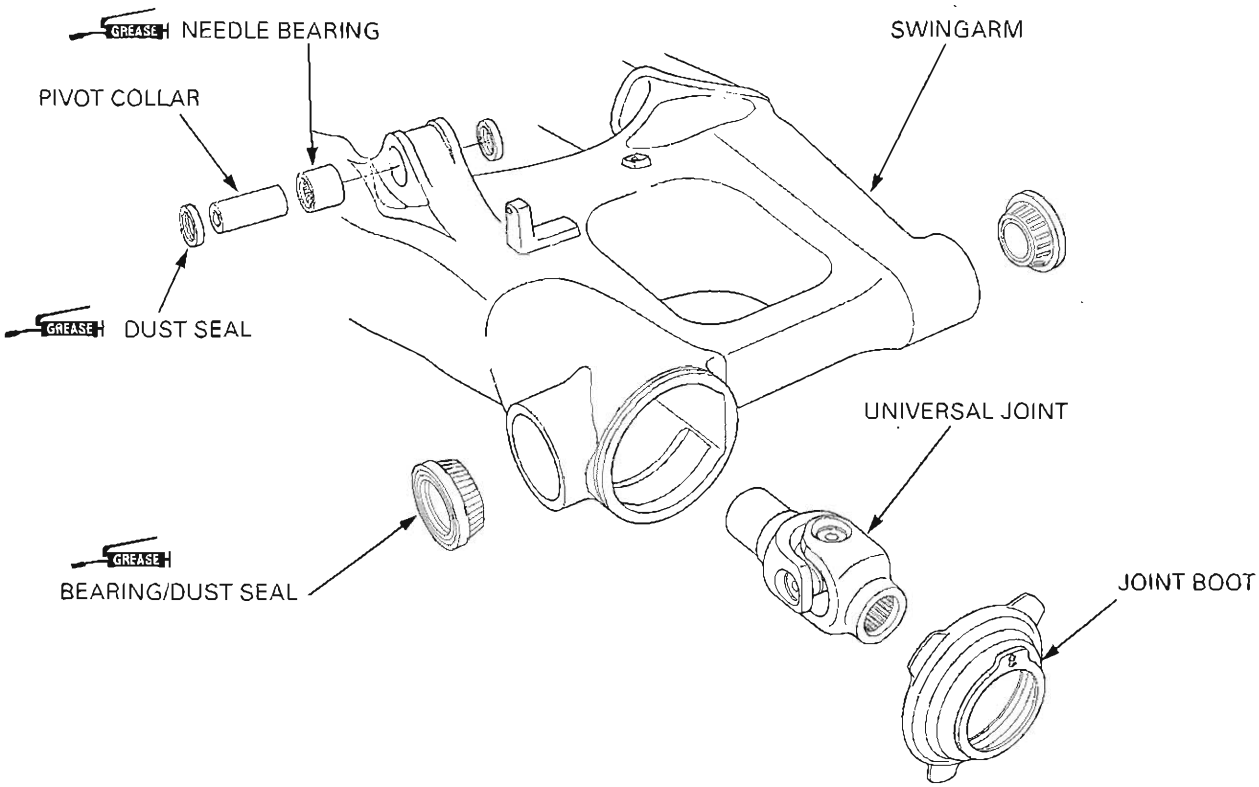
Apply grease to the needle rollers of the new bearing.
Install the needle bearing into the pivot until the depth from the swingarm outer surface is 5.3 – 5.7 mm (0.21 – 0.22 in), using the same tool.



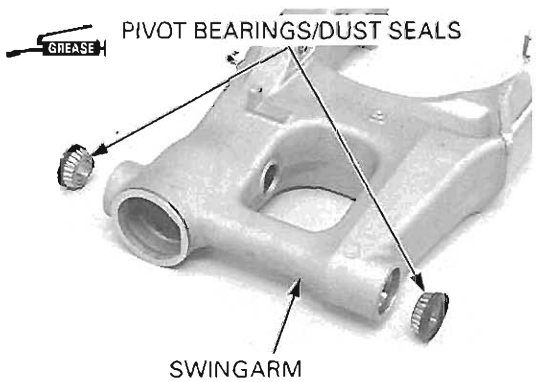
Apply grease to the dust seal lips, then install the dust seals and pivot collar into the swingarm.



ASSEMBLY



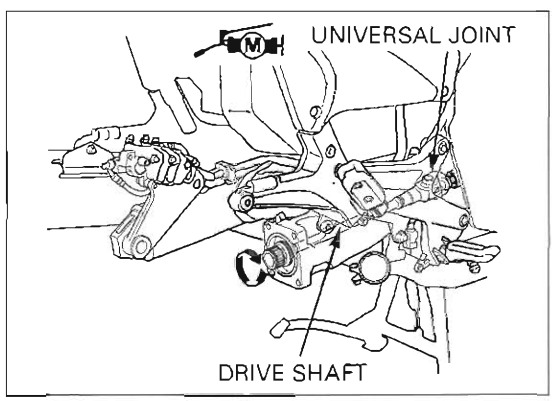
Pack grease to the bearing rollers and dust seal lips. Install the bearings/dust seals into the swingarm pivot.



INSTALLATION

Apply molybdenum disulfide grease to the universal joint spline of the engine side and install the universal joint to the final output shaft.

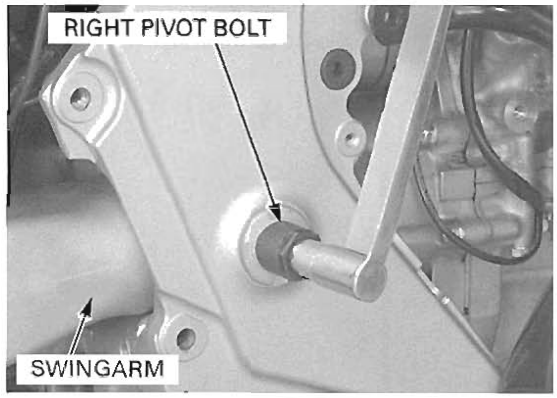
Install the joint boot to the engine groove.
Install the swingarm into the frame.
Remove the drive shaft from the final gear case.
Securely engage the universal joint splines with the output driven gear shaft splines while turning the drive shaft as shown.
Reinstall the drive shaft into the final gear case.
Install the joint boot to the swingarm groove.



Apply oil to the swingarm left pivot bolt threads and flange surface.
Align the frame pivot bolt hole with the hole in the swingarm.
Install the right and left pivot bolt and left pivot lock nut but do not tighten them yet.

Tighten the right pivot bolt to the specified torque.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



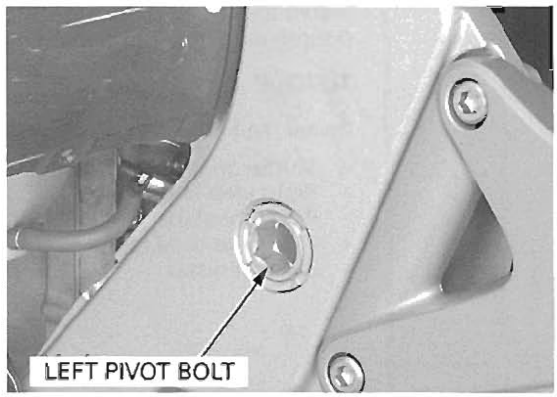
First tighten the left pivot bolt to the primary torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Then loosen the left pivot bolt 90 degree.

Retighten the left pivot bolt to the specified torque.

TORQUE: 41 N·m (4.2 kgf·m, 30 lbf·ft)

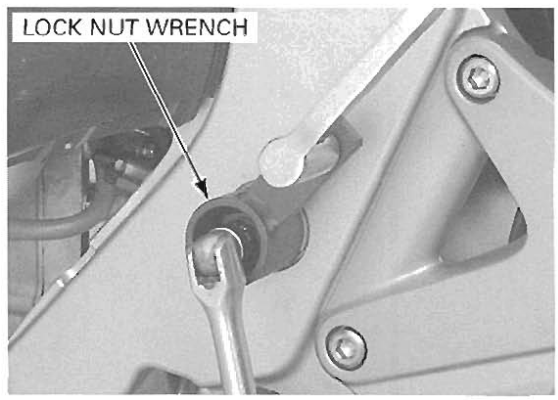


Refer to torque wrench reading information on page 16-3 "Service Information".

Tighten the swingarm left pivot bolt lock nut while holding the swingarm left pivot bolt.

TOOL:
Lock nut wrench, 6 X 46 mm **07ZMA-MCA0100** or **07ZMA-MCAA101** (U.S.A. only)

TORQUE:
Actual: 108 N·m (11.0 kgf·m, 80 lbf·ft)
Indicate: 98 N·m (10.0 kgf·m, 72 lbf·ft)

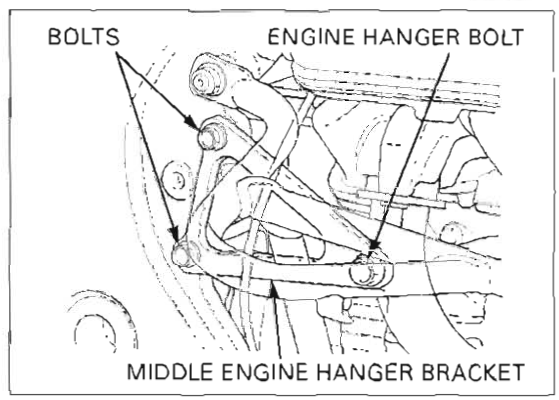


Check the joint boot installation for engine and swingarm securely.

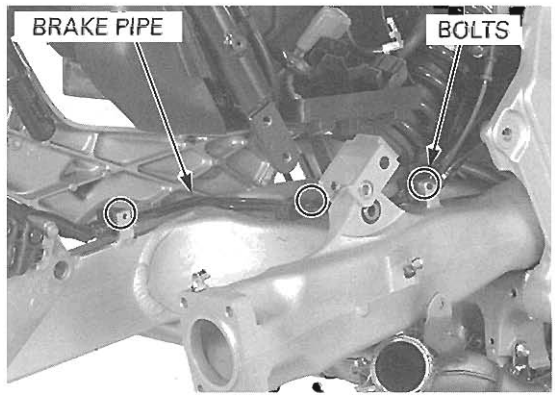
Install the middle engine hanger bracket and tighten the bolts (frame side) securely.

Install and tighten the engine hanger bolt (middle bracket/engine side) to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Install the brake pipes to the swingarm and tighten the bolts securely.

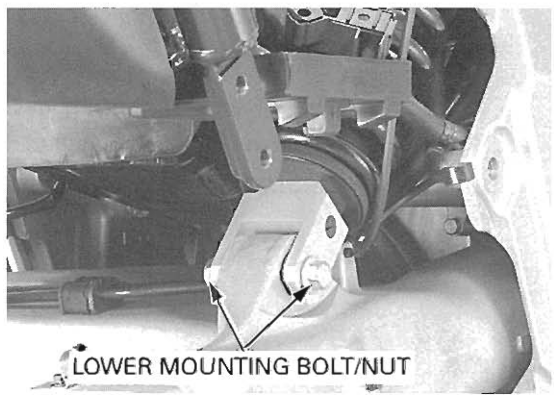


Install the shock absorber lower mounting bolt and tighten the nut to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Install the following:

- Muffler (page 2-18)
- Right step holder (page 17-30)
- Rear wheel (page 16-11)
- Final gear case (page 14-21)
- EVAP canister



17. HYDRAULIC BRAKE

COMPONENT LOCATION 17-2

SERVICE INFORMATION 17-4

TROUBLESHOOTING 17-6

BRAKE FLUID REPLACEMENT/AIR BLEEDING 17-7

BRAKE PAD/DISC 17-14

FRONT MASTER CYLINDER 17-17

SECONDARY MASTER CYLINDER 17-22

REAR MASTER CYLINDER 17-25

PROPORTIONAL CONTROL VALVE 17-31

DELAY VALVE 17-31

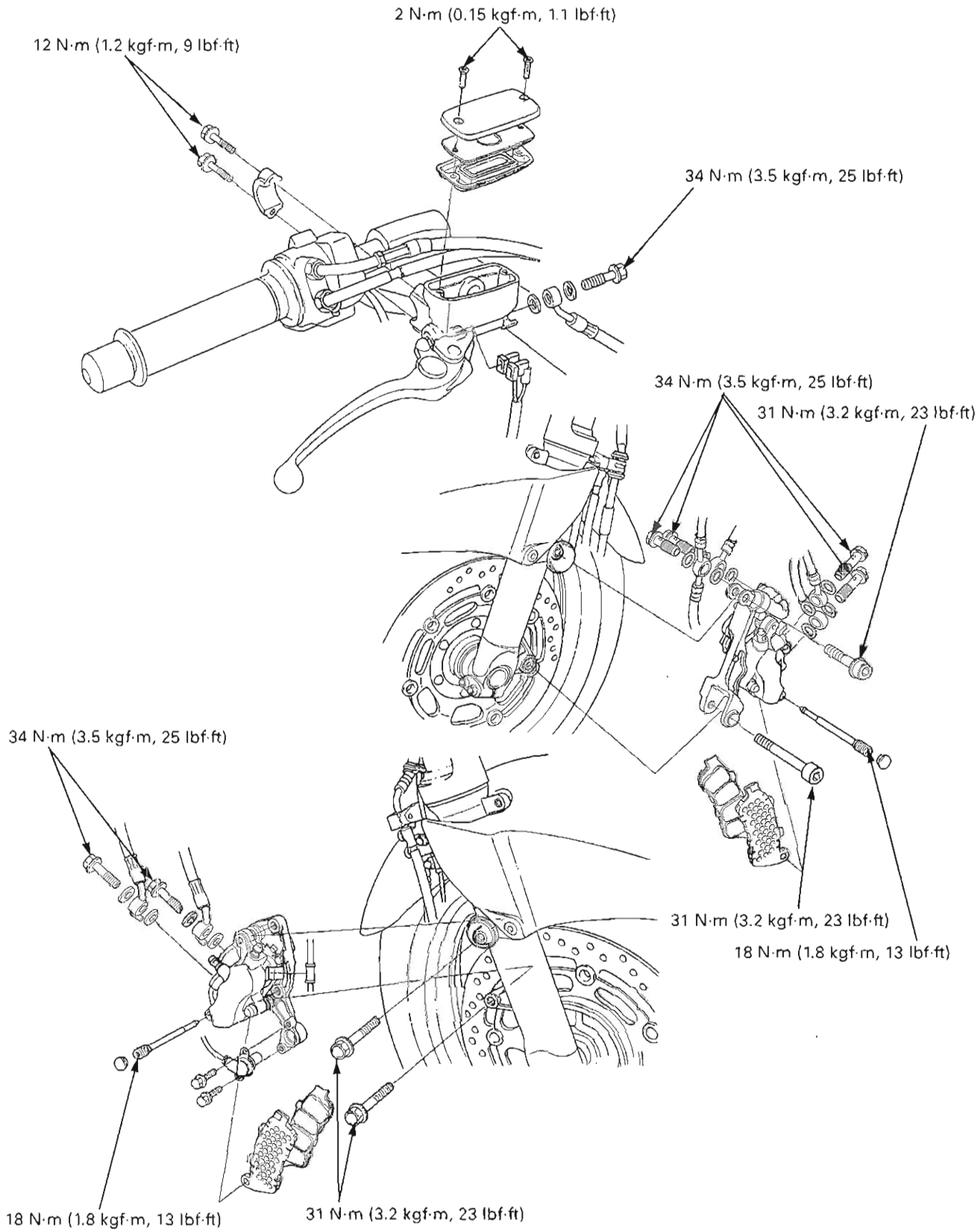
FRONT BRAKE CALIPER 17-32

REAR BRAKE CALIPER 17-37

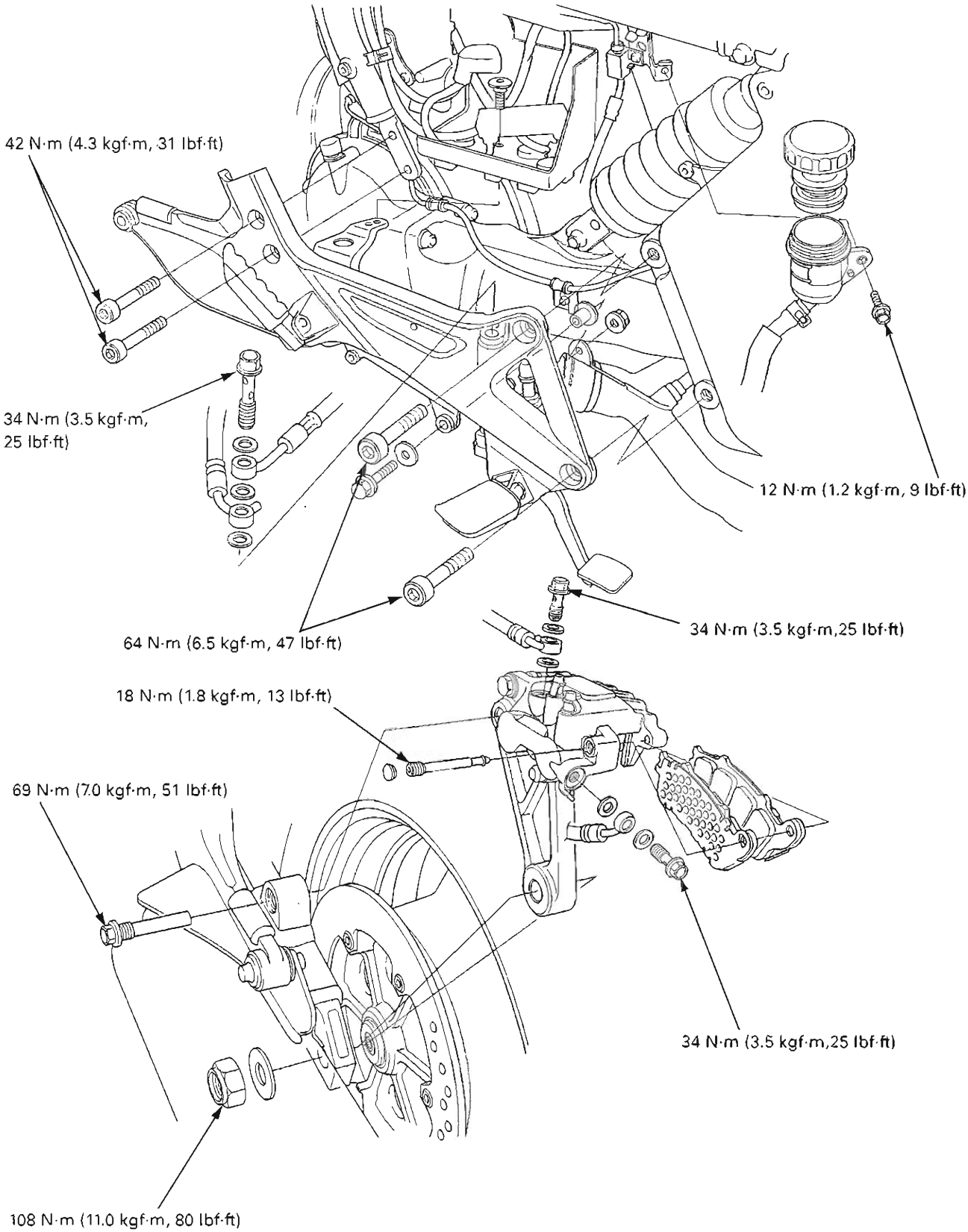
BRAKE PEDAL 17-41

COMPONENT LOCATION

FRONT:



REAR:


42 N·m (4.3 kgf·m, 31 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
64 N·m (6.5 kgf·m, 47 lbf·ft)
34 N·m (3.5 kgf·m,25 lbf·ft)
18 N·m (1.8 kgf·m, 13 lbf·ft)
69 N·m (7.0 kgf·m, 51 lbf·ft)
34 N·m (3.5 kgf·m,25 lbf·ft)
108 N·m (11.0 kgf·m, 80 lbf·ft)

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.

- This model is equipped with a Dual Combined Brake System. The system air bleeding procedure on page 17-9 must be followed.
- Do not disassemble the secondary master cylinder push rod or the correct brake performance will not be obtained.
- 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 contaminates (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.
- This section covers service of the standard brake components (including CBS) of the brake system. See page 18-3 for ABS service.
- The brake fluid replacement procedure for the ABS model should be performed in the same manner as in the standard model. Note that there is no brake fluid in the ABS modulator (except in the modulator head), because the modulator is the motor-driven hydraulic pressure type. Therefore, brake fluid replacement and bleeding air from the modulator body is not necessary.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		Honda DOT 4 brake fluid	–
	Brake disc thickness		5.0 (0.20)	4.0 (0.16)
	Brake disc warpage		–	0.20 (0.008)
	Master cylinder I.D.		12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Secondary master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Secondary master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Left caliper cylinder I.D.	Upper	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Lower	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Left caliper piston O.D.	Upper	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
		Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
		Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
	Right caliper cylinder I.D.	Upper	27.000 – 27.050 (1.0630 – 1.0650)	27.062 (1.0654)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Lower	27.000 – 27.050 (1.0630 – 1.0650)	27.062 (1.0654)
	Right caliper piston O.D.	Upper	26.935 – 26.968 (1.0604 – 1.0617)	26.923 (1.0600)
		Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.573 (0.8887)
		Lower	26.935 – 26.968 (1.0604 – 1.0617)	26.923 (1.0600)
Rear	Specified brake fluid		Honda DOT 4 brake fluid	–
	Brake pedal height		87.0 (3.43)	–
	Brake disk thickness		7.0 (0.28)	6.0 (0.24)
	Brake disc warpage		–	0.30 (0.012)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Center	25.400 – 25.450 (1.0000 – 1.0020)	25.462 (1.0024)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Center	25.335 – 25.368 (0.9974 – 0.9987)	25.323 (0.9970)
		Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)

TORQUE VALUES

Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front master cylinder reservoir cap screw	2 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Front brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Front brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Front brake light switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Right front brake caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one
Left front brake caliper pivot bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one
Left front brake caliper bolt (second master joint)	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one
Caliper body B bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	ALOC bolt; replace with a new one
Front caliper main slide pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Front caliper sub slide pin	13 N·m (1.3 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Rear caliper main slide pin	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Rear caliper sub slide pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Brake caliper bleed valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Secondary master cylinder push rod nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply a locking agent to the threads
Secondary master cylinder connector	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply a locking agent to the threads
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt; replace with a new one
Rear master cylinder reservoir mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Rear master cylinder push rod joint lock nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Rear master cylinder reservoir hose joint screw	2 N·m (0.15 kgf·m, 1.1 lbf·ft)	Apply a locking agent to the threads
Rear brake caliper stopper pin bolt	69 N·m (7.0 kgf·m, 51 lbf·ft)	ALOC bolt; replace with a new one
Proportional control valve mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Delay valve mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake pipe joint	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Front brake hose clamp bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Brake hose stay mounting nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	U-nut
Front brake hose stay mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake hose stay mounting nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Brake hose stay mounting nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	U-nut
Seat rail lower mounting socket bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	
Step holder mounting bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)	

TOOLS

Snap ring pliers	07914-SA50001

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
- 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

If the above items are normal but the brake system still has poor performance, check for nose dive during braking. If the nose dive is excessive, check for secondary master cylinder hydraulic system.

Brake lever/pedal hard
- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake drags
- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

Rear wheel locks when only the brake lever is applied/Front wheel locks when only the brake pedal is applied (in the case that all items are normal in "Poor lever/pedal brake performance")
- Improper secondary master cylinder push rod installed length
- Faulty proportional control valve

BRAKE FLUID REPLACEMENT/AIR BLEEDING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

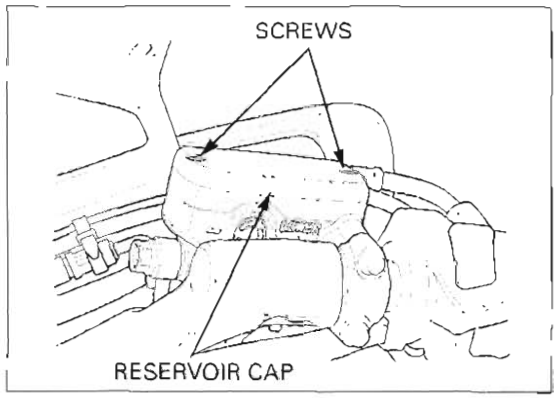
Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.

When using a commercially available air brake bleeder, follow the manufacturer's operating instructions.

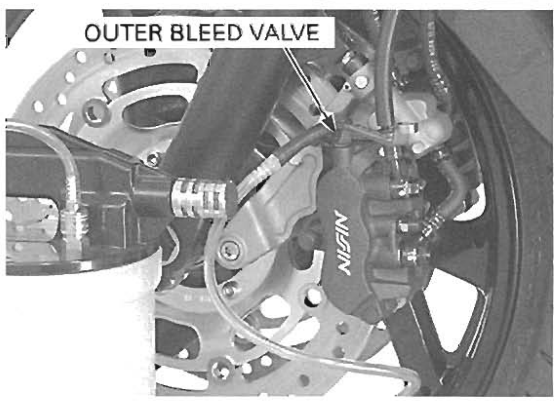
BRAKE FLUID DRAINING

Lever brake line:

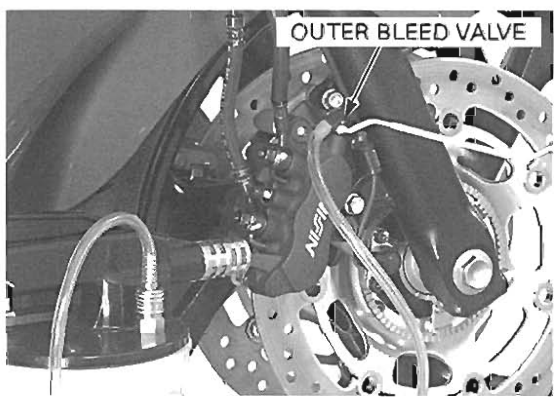
Turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.
Remove the screws and reservoir cap.
Remove the diaphragm plate and diaphragm.



Connect a commercially available air bleed tool to the left front brake caliper outer bleed valve.
Loosen the outer bleed valve and operate the air bleed tool.
Drain the brake fluid.



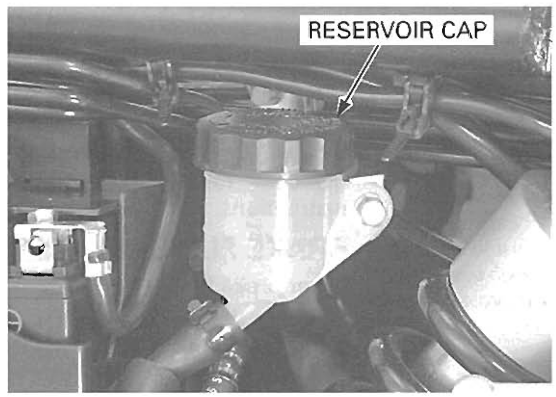
Connect a commercially available air bleeding tool to the right front brake caliper bleed valve.
Loosen the outer bleed valve and operate the air bleed tool.
Drain the brake fluid.



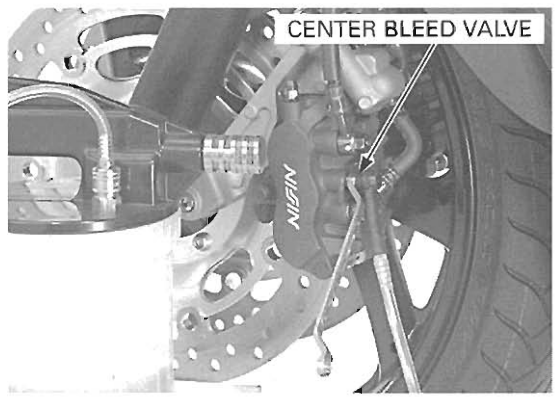
Pedal brake line:

Remove the side cover (page 2-6).

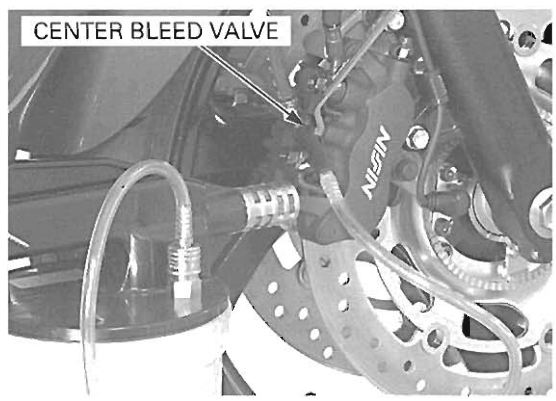
Remove the reservoir cap.
Remove the diaphragm plate and diaphragm.



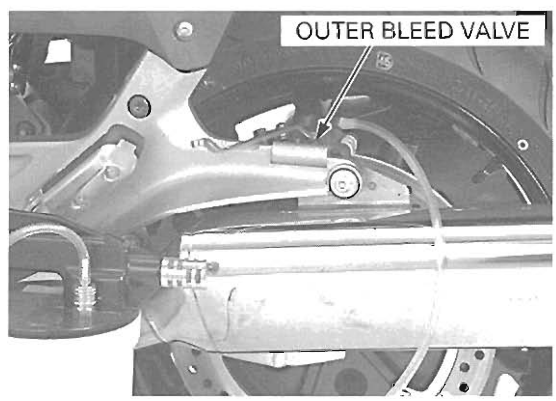
Connect a commercially available air bleed tool to the left front brake caliper center bleed valve.
Loosen the bleed valve and operate a air bleed tool.
Drain the brake fluid.



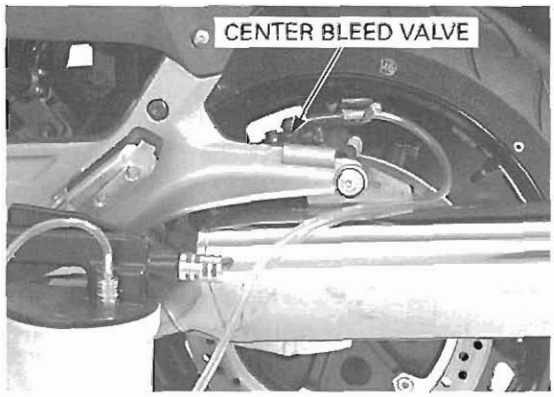
Connect a commercially available air bleed tool to the right front brake caliper center bleed valve.
Loosen the bleed valve and operate the air bleed tool.
Drain the brake fluid.



Connect a commercially available air bleed tool to the rear brake caliper outer bleed valve.
Loosen the outer bleed valve and operate the air bleed tool.
Drain the brake fluid.

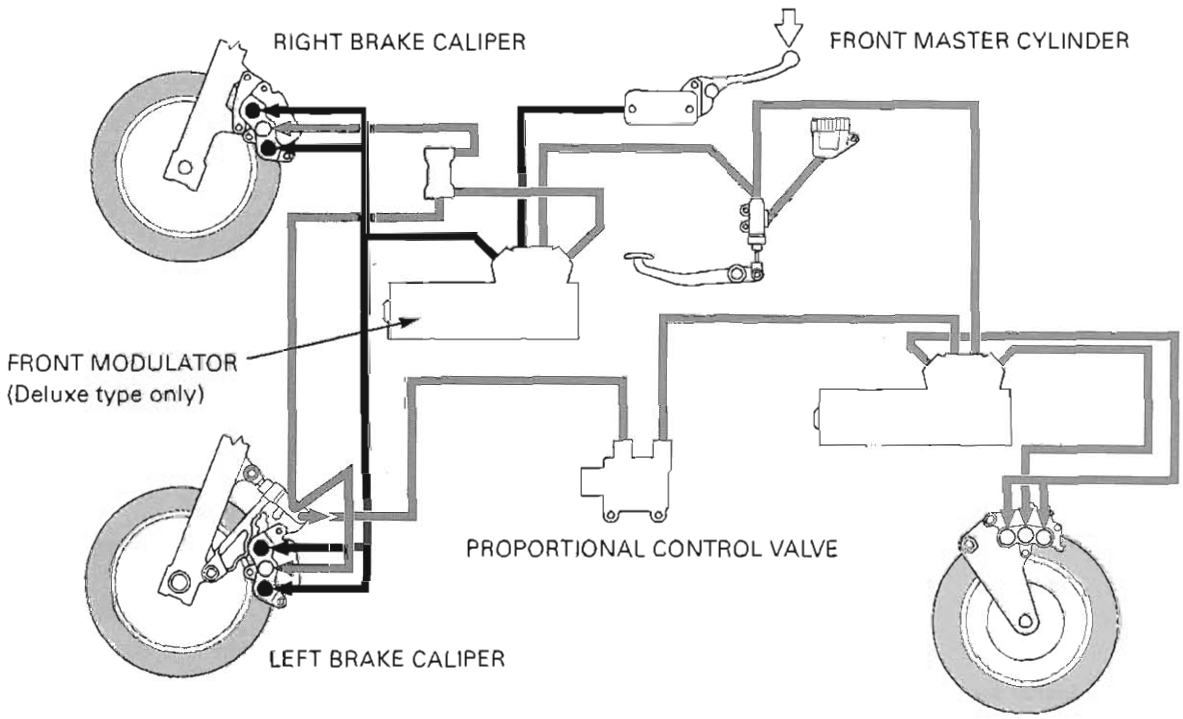


Connect a commercially available air bleeding tool to the rear brake caliper center bleed valve.
Loosen the center bleed valve and operate the air bleed tool.
Drain the brake fluid.



BRAKE FLUID FILLING/AIR BLEEDING

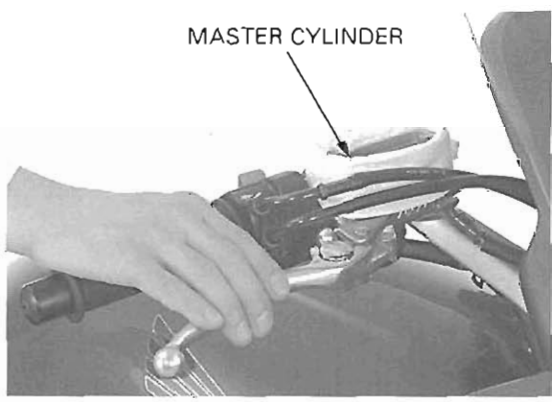
Lever brake line (master cylinder-to-front brake caliper)



Fill the reservoir with Honda DOT 4 brake fluid from a sealed container.

Use only DOT 4 brake fluid from a sealed container. Do not mix different types of fluid. They are not compatible.

Operate the brake lever several times to bleed air from the master cylinder.



If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

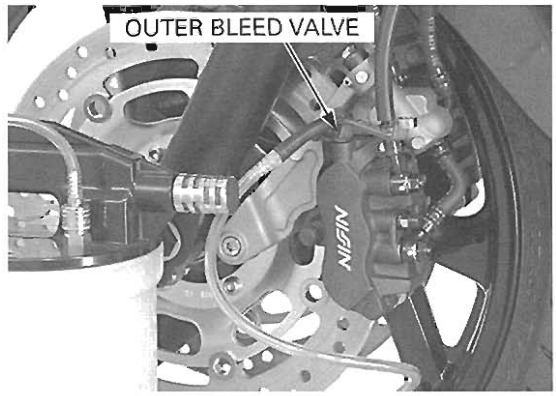
Connect a commercially available air bleed tool to the left front brake caliper outer bleed valve.

Operate the air bleed tool and loosen the outer bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Close the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

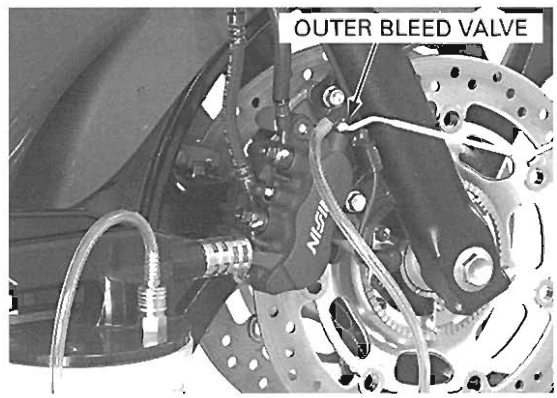


Connect a commercially available air bleed tool to the right front brake caliper outer bleed valve.

Operate the air bleed tool and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

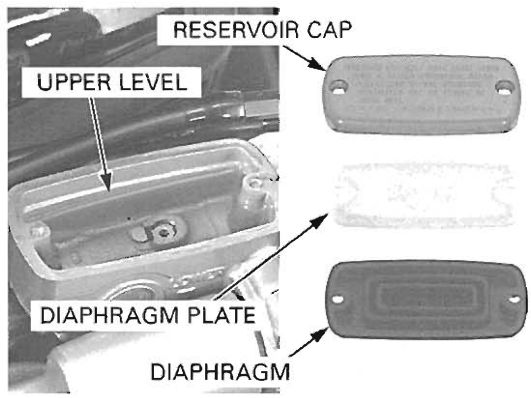
Close the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



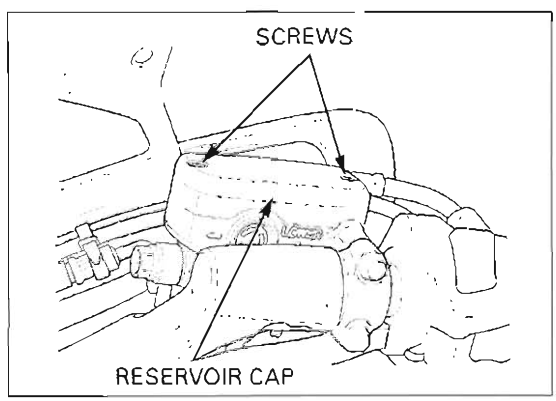
Fill the fluid reservoir to the upper level.

Reinstall the diaphragm and diaphragm plate.

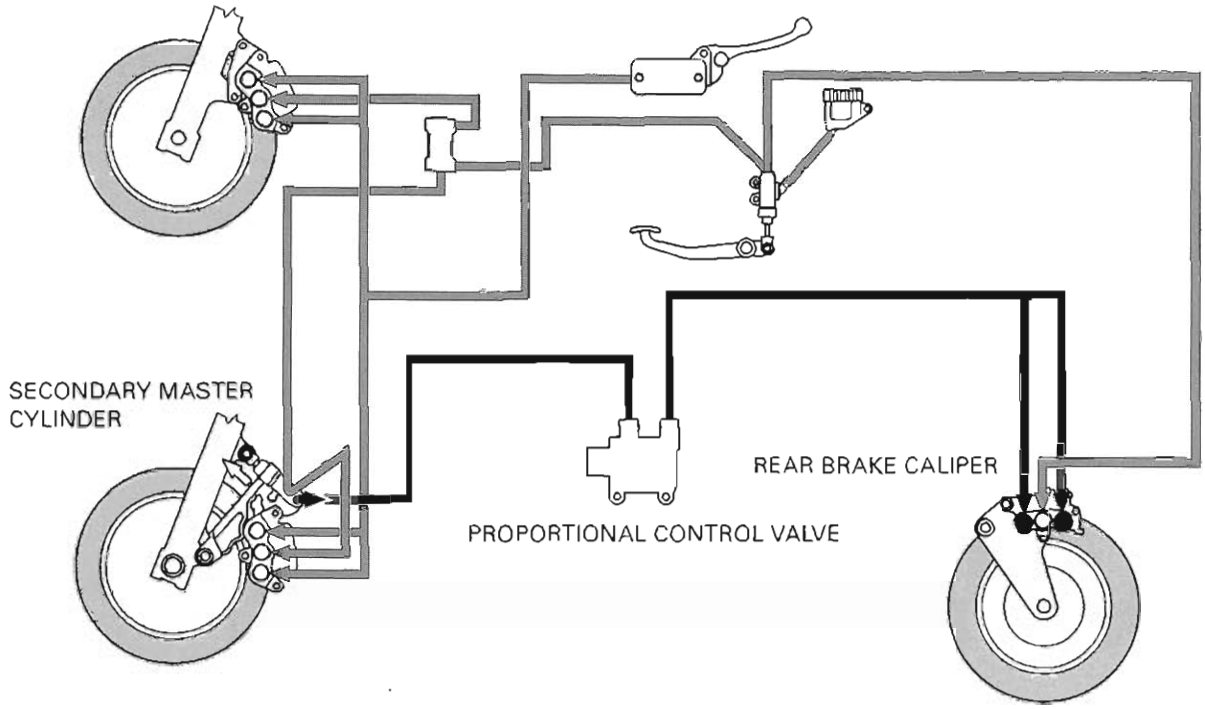


Install the reservoir cap, and tighten the screws to the specified torque.

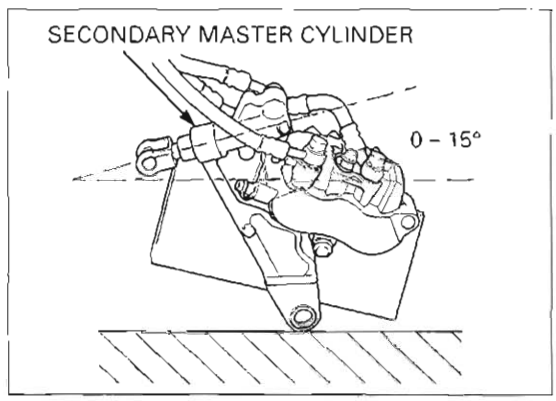
TORQUE: 2 N·m (0.15 kgf·m, 1.1 lbf·ft)



Servo brake line



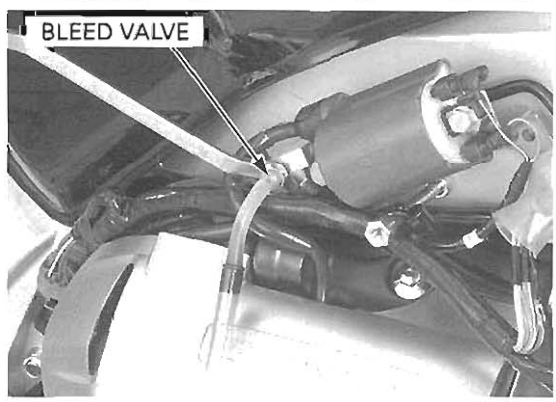
Remove the left front brake caliper, tilt the caliper about 0 - 15 degree from the ground line as shown.



Connect a commercially available air bleed tool to the proportioning control valve air bleed valve.
Operate the air bleed tool and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

Close the bleed valve.

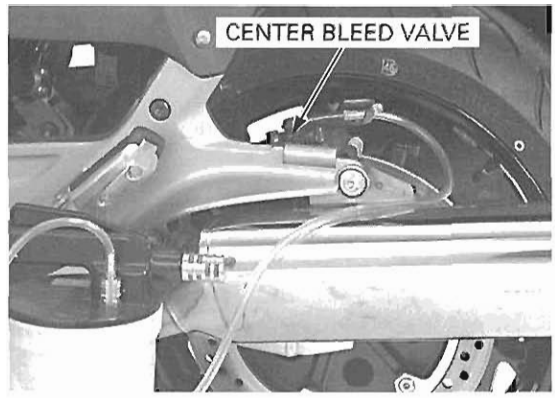
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



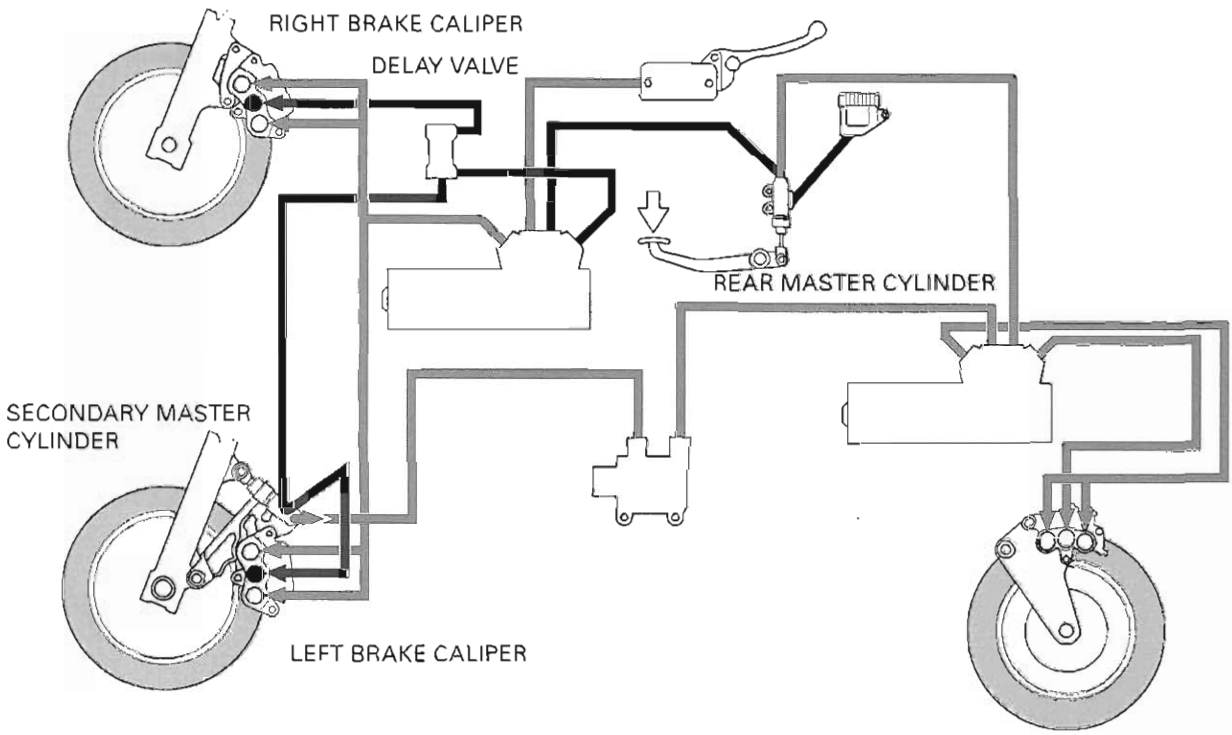
Connect the commercially available air bleed tool to the rear brake caliper center bleed valve.
Operate the air bleed tool and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

Close the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



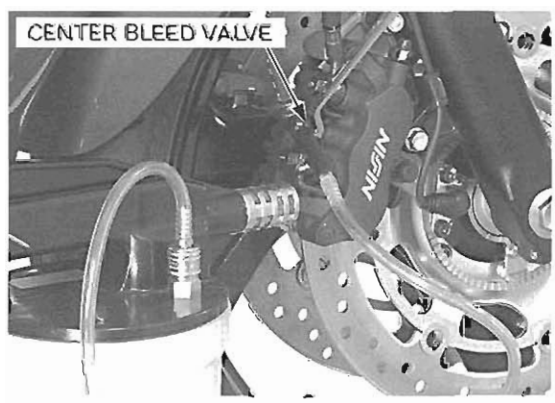
Pedal brake line (Rear master cylinder-to-front brake caliper)



Connect the commercially available air bleed tool to the right front brake caliper center bleed valve.
Operate the air bleed tool and loosen the center bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

Close the bleed valve.

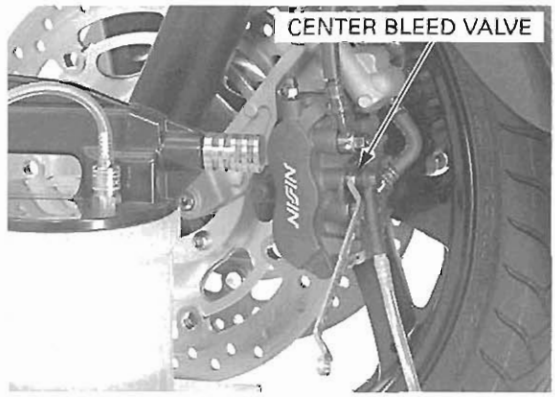
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



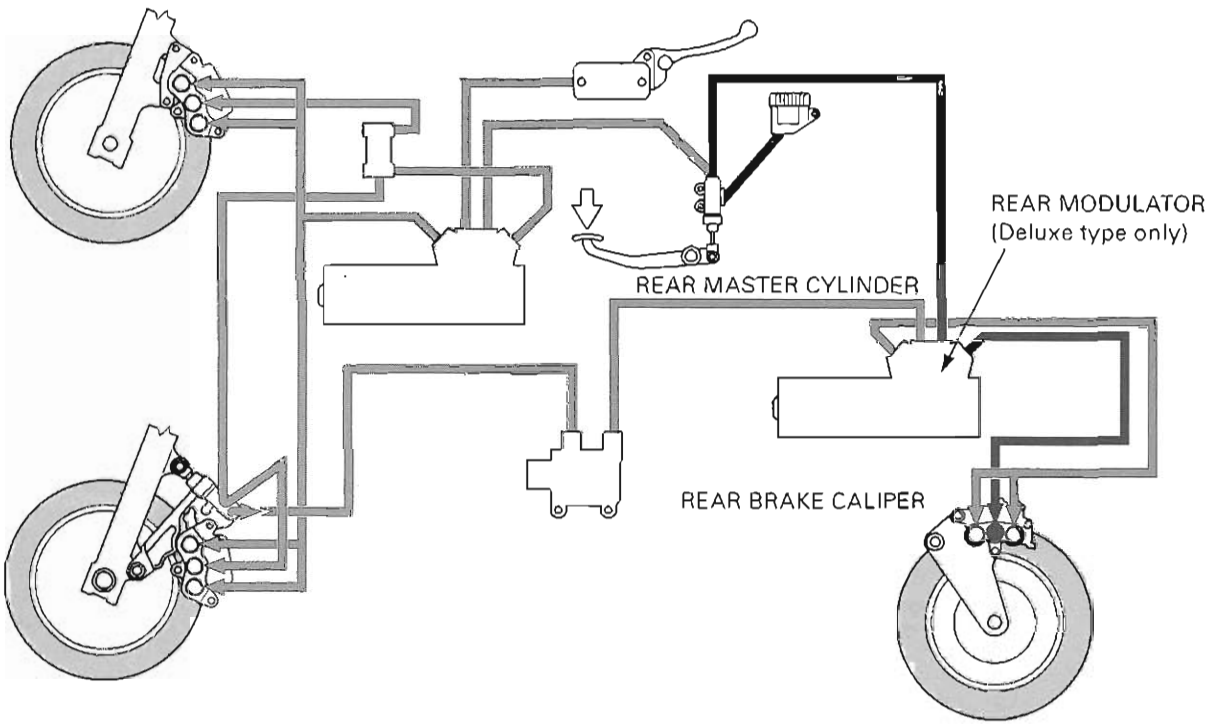
Connect the commercially available air bleed tool to the left front brake caliper center bleed valve.
Operate the air bleed tool and loosen the center bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

Close the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



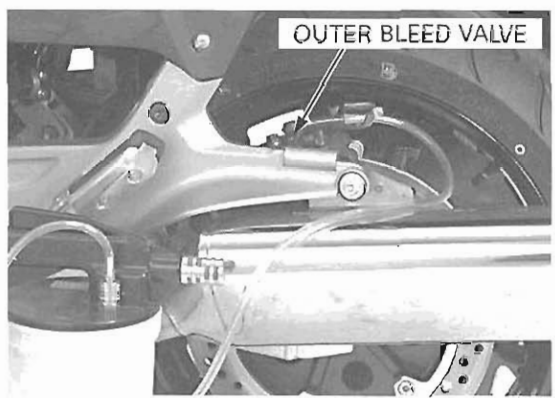
Pedal brake line (rear master cylinder-to-rear brake caliper)



Connect the commercially available air bleed tool to the rear brake caliper outer bleed valve.
Operate the air bleed tool and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

Close the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

NOTICE

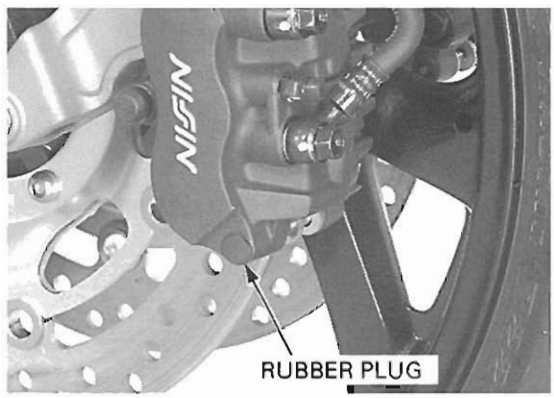
After the brake pad replacement, check the brake operation by applying the brake lever or pedal.

Always replace the brake pads in pairs to assure even disc pressure.

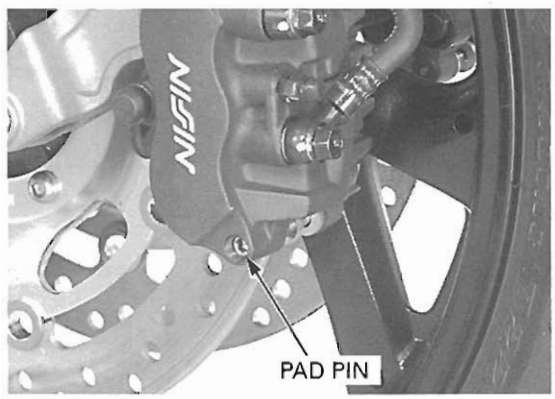
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Push the caliper pistons all the way in to allow installation of new brake pads.

Remove the pad pin rubber plug.

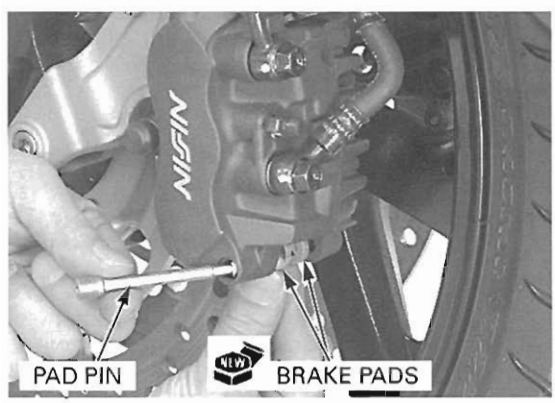


Remove the pad pin and brake pads.



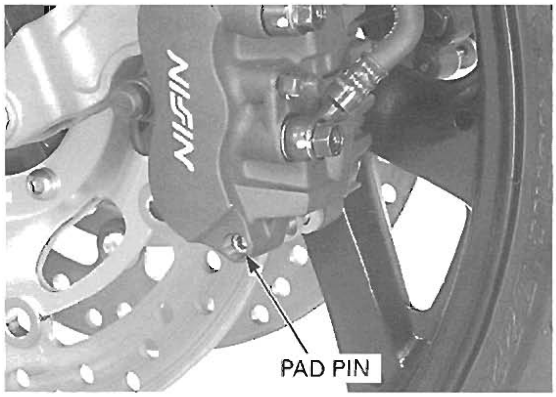
Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place.
Push the new brake pads against the pad spring, then install the pad pin.



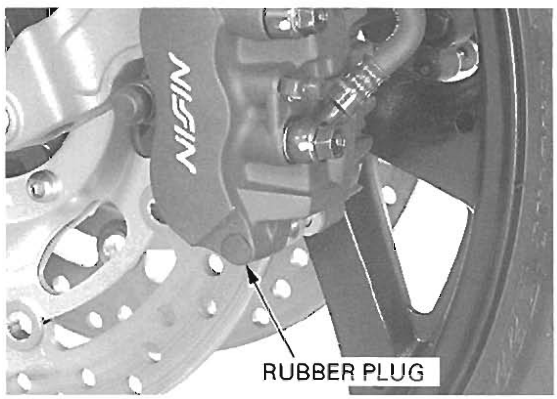
Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



After the brake pad replacement, check the brake operation by applying the brake lever or pedal.

Install the pad pin rubber plug.



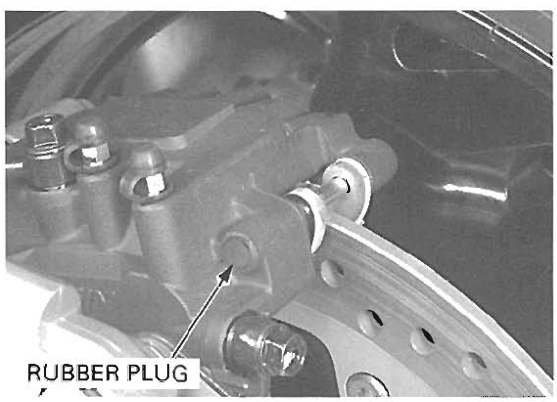
REAR BRAKE PAD REPLACEMENT

Always replace the brake pads in pairs to assure even disc pressure.

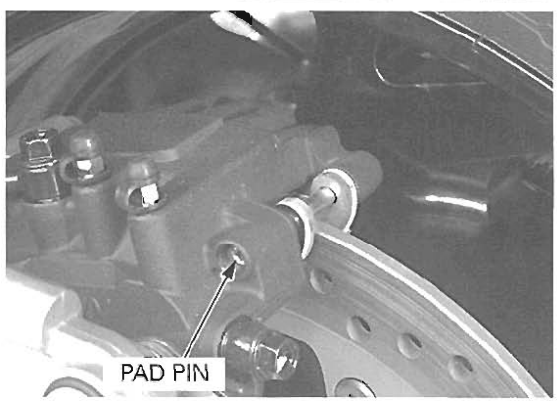
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

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 rubber plug.

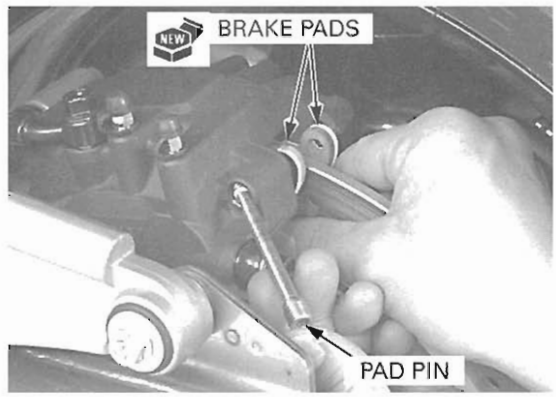


Remove the pad pin and brake pads.



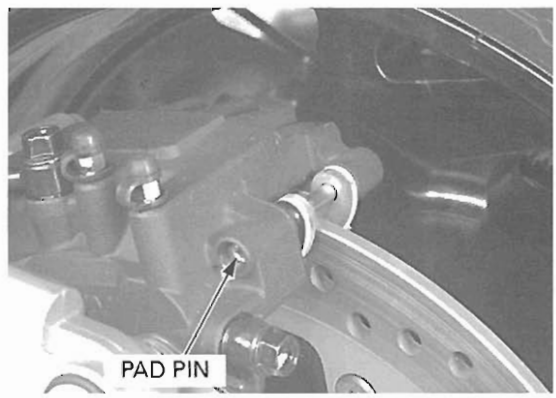
Clean the inside of the caliper, especially around the caliper pistons.

Make sure the new brake pad spring is in place. Push the brake pads against the pad spring, then install the pad pin.

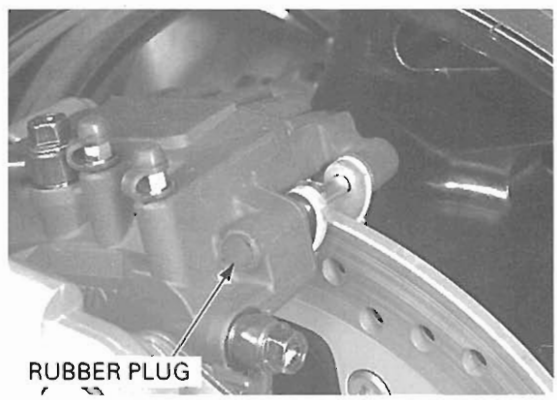


Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Install the pad pin rubber plug.



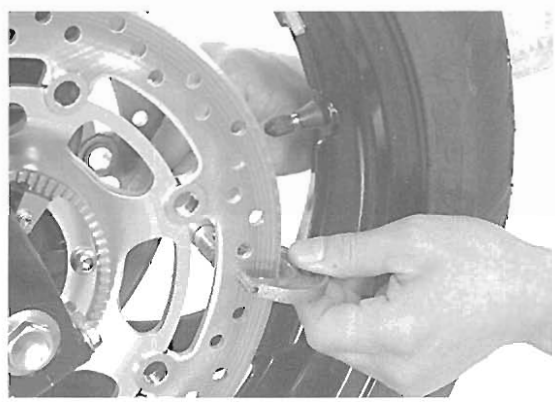
BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:
FRONT: 4.0 mm (0.16 in)
REAR: 6.0 mm (0.24 in)

Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warpage with a dial indicator.

SERVICE LIMITS:
FRONT: 0.20 mm (0.008 in)
REAR: 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.



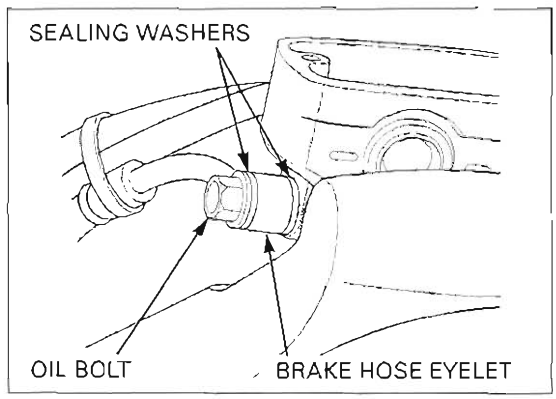
FRONT MASTER CYLINDER

REMOVAL

Drain the front hydraulic system (page 17-7).

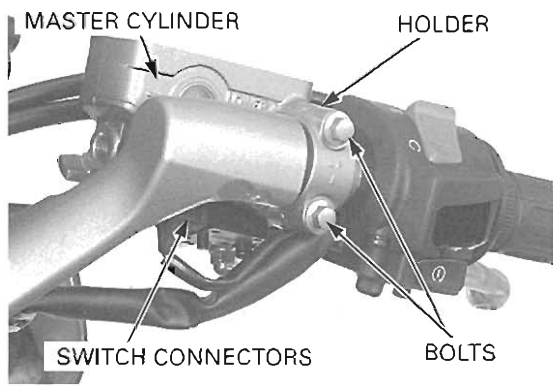
Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.



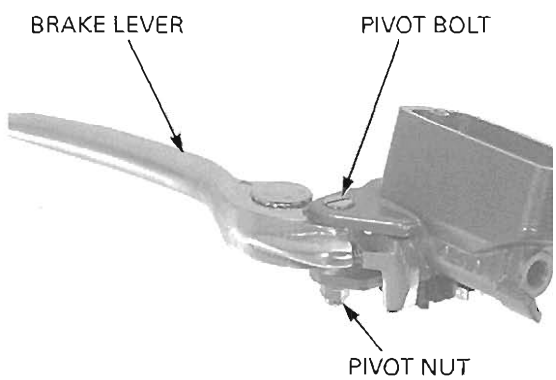
Disconnect the brake light switch wire connectors.

Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

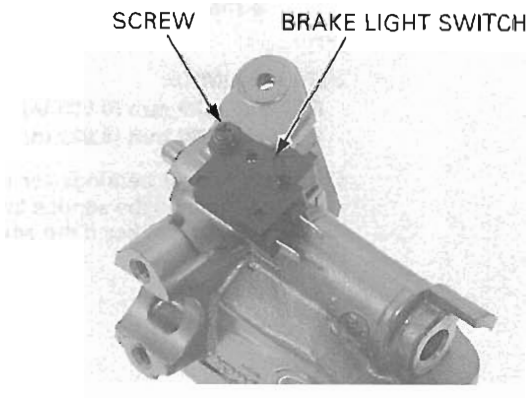


DISASSEMBLY

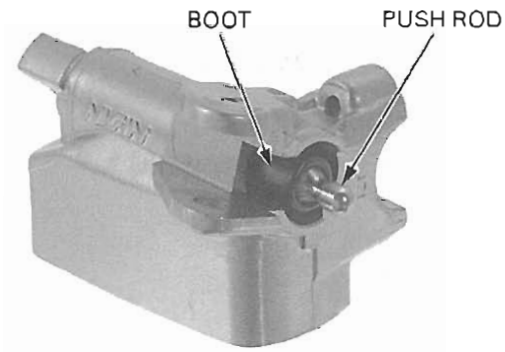
Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.



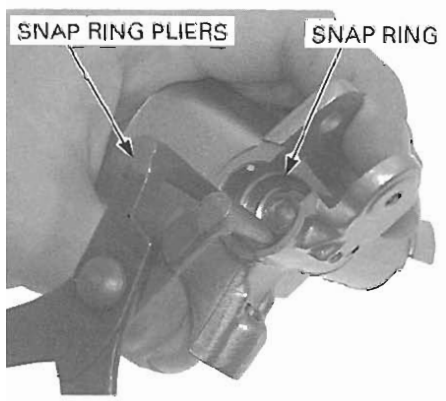
Remove the boot and push rod.



Remove the snap ring from the master cylinder body using the special tool as shown.

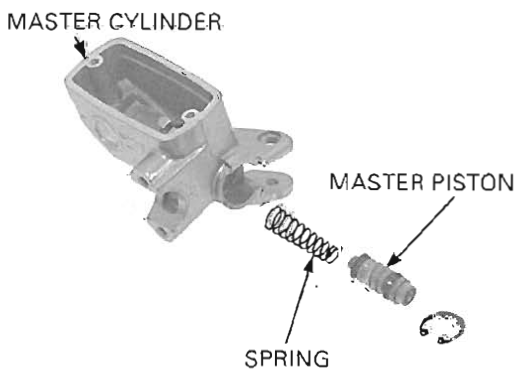
TOOL:

Snap ring pliers	07914-SA50001



Remove the master piston and spring.

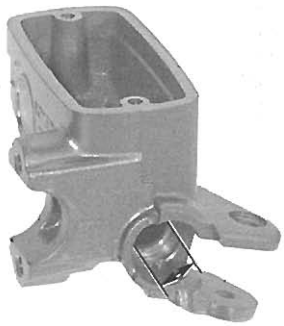
Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

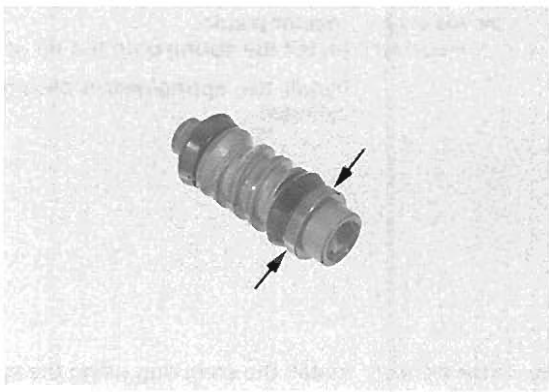
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 12.755 mm (0.5022 in)

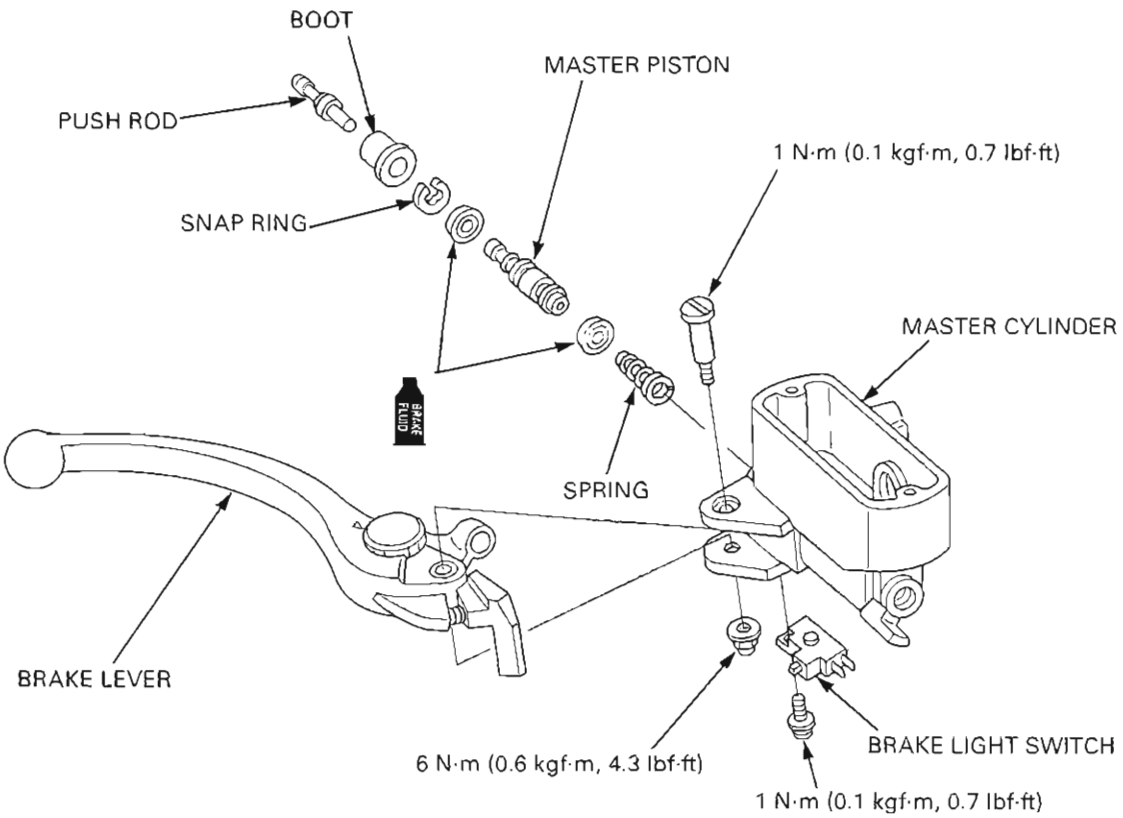


Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)

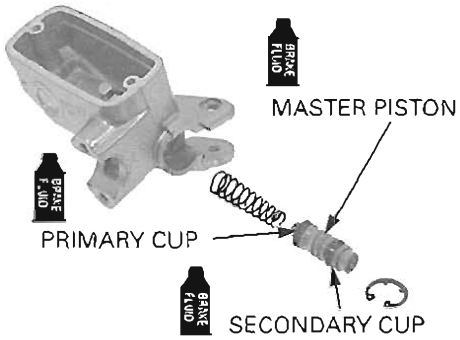


ASSEMBLY



Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

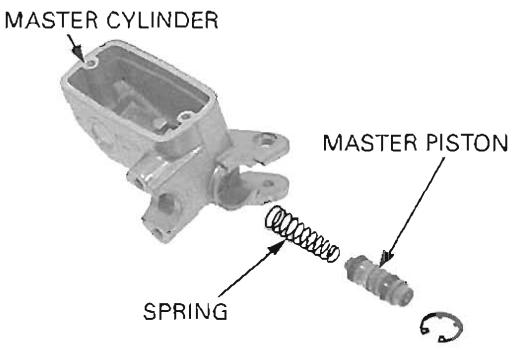
Coat all parts with clean brake fluid before assembly.



When installing the cups, do not allow the lips to turn inside out

Dip the piston in brake fluid.
Install the primary and secondary cups onto the master piston.
Install the spring onto the tip of the master piston.

Install the spring/piston assembly into the master cylinder.

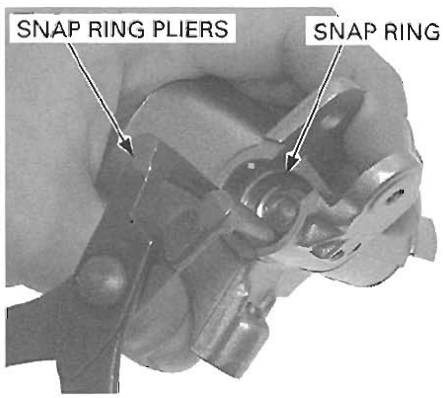


Be certain the snap ring is firmly seated in the groove.

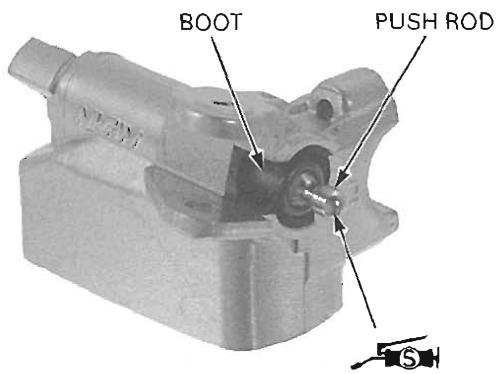
Install the snap ring using the special tool.

TOOL:

Snap ring pliers	**07914-SA50001**

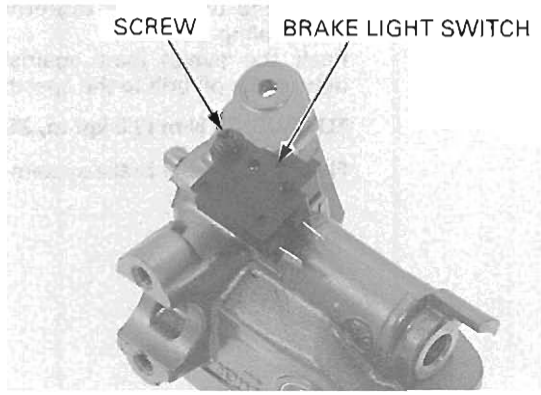


Apply silicone grease to the inside of the boot and master piston tip.
Install the boot and push rod.



Install the brake light switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



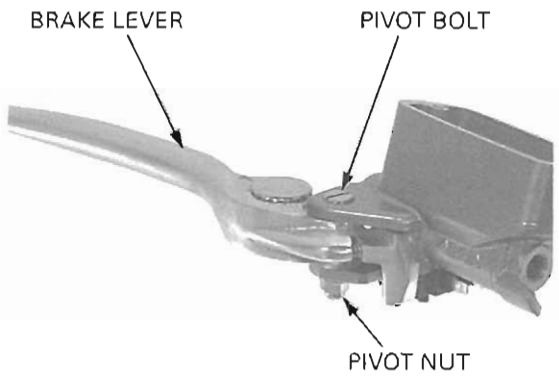
Apply silicone grease to the contact surfaces of the brake lever and push rod tip.

Install the brake lever assembly, tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

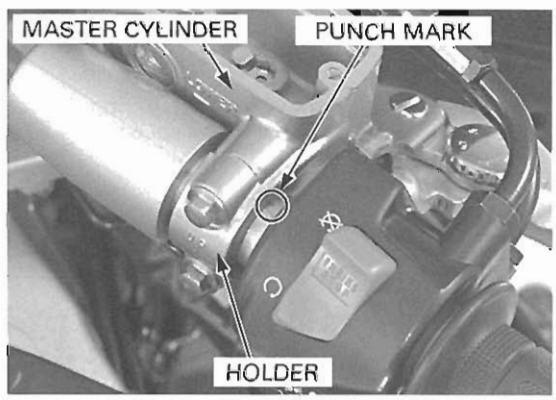
Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



INSTALLATION

Place the master cylinder assembly on the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

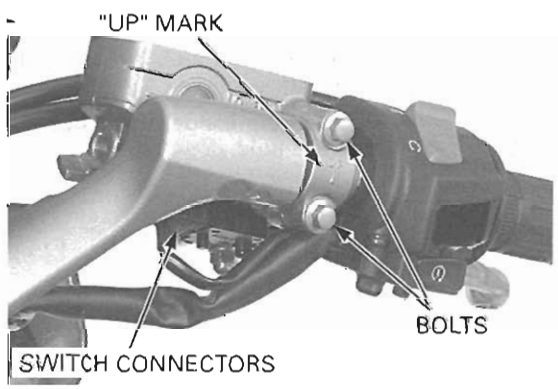


Install the master cylinder holder with the "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

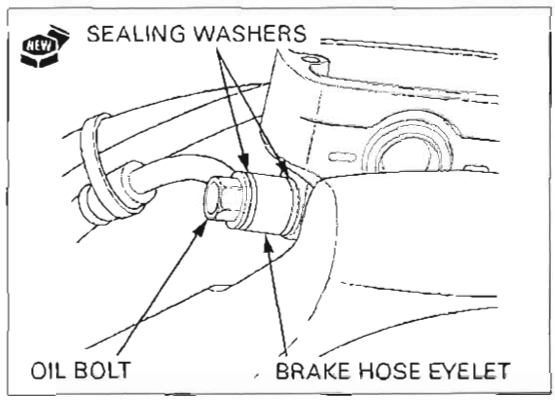
Connect the brake light switch wire connectors.



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)

Fill and bleed the brake system (page 17-7).



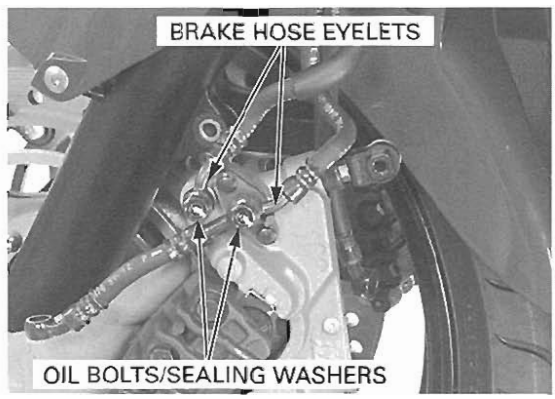
SECONDARY MASTER CYLINDER

REMOVAL

Drain the pedal brake hydraulic system (page 17-7).
Remove the left front brake caliper (page 17-32).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced

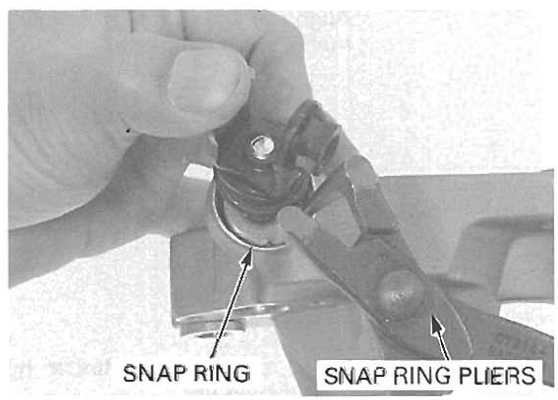
Remove the brake hose oil bolts, sealing washers, brake hose eyelet and left caliper bracket/secondary master cylinder assembly.



Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

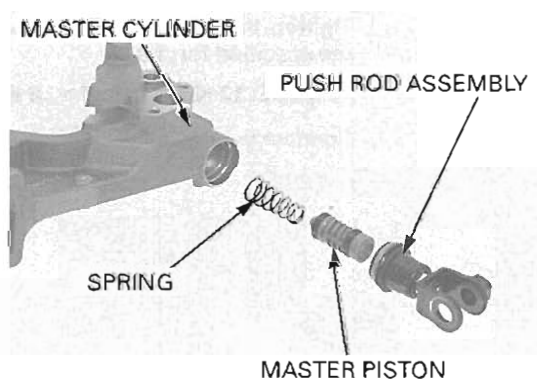
TOOL:
Snap ring pliers **07914-SA50001**



Do not disassemble the secondary master cylinder push rod or the correct brake performance will not be obtained.

Remove the push rod assembly, master piston and spring.

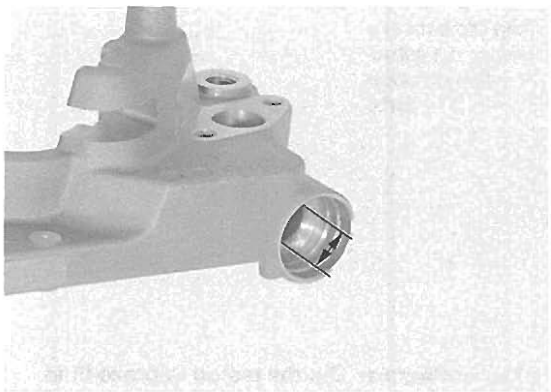
Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

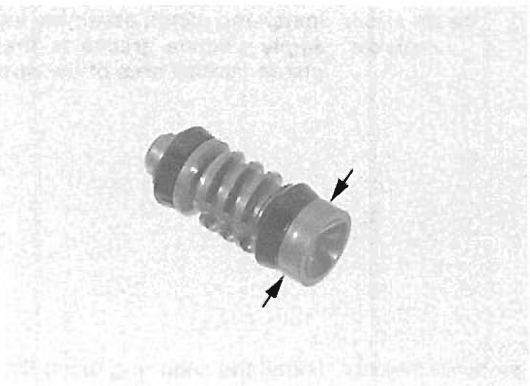
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 14.055 mm (0.5533 in)

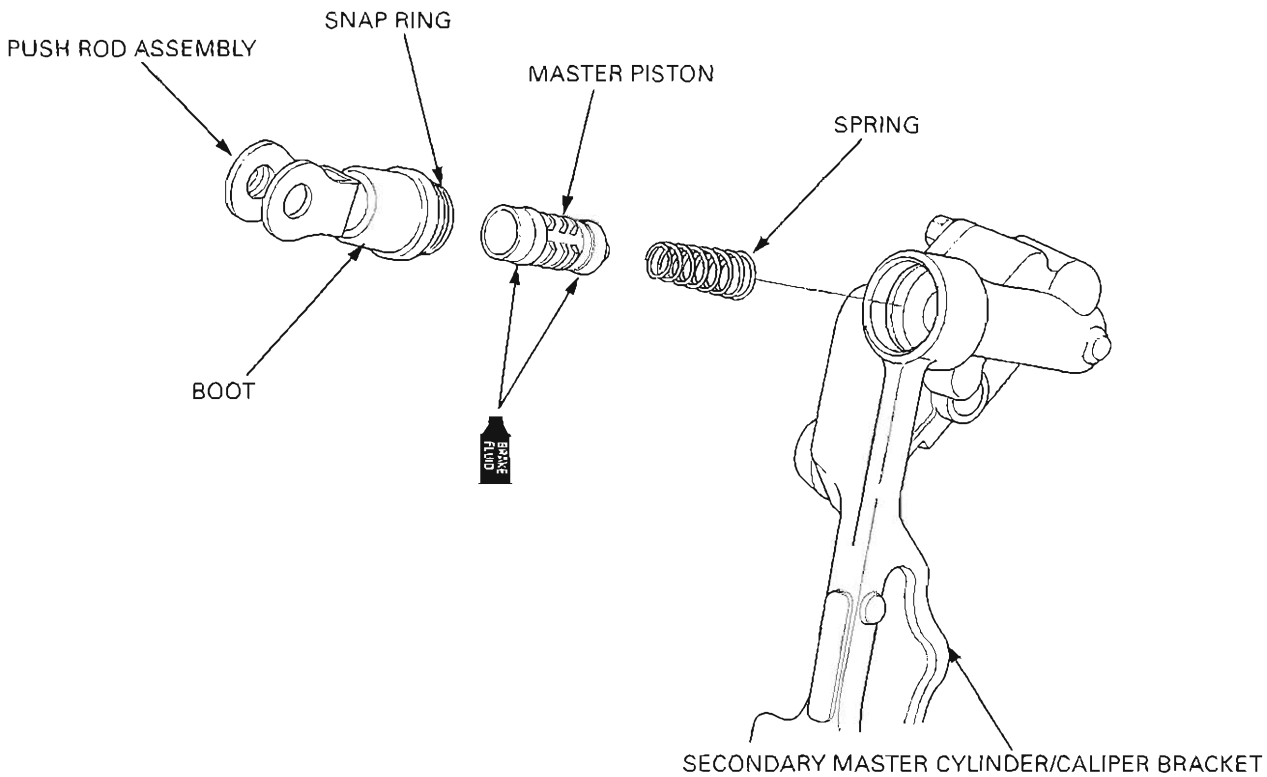


Measure the master cylinder piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)

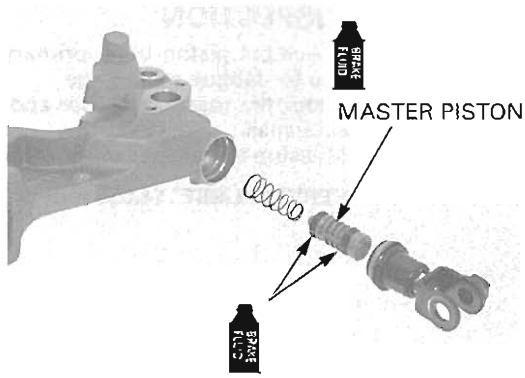


ASSEMBLY



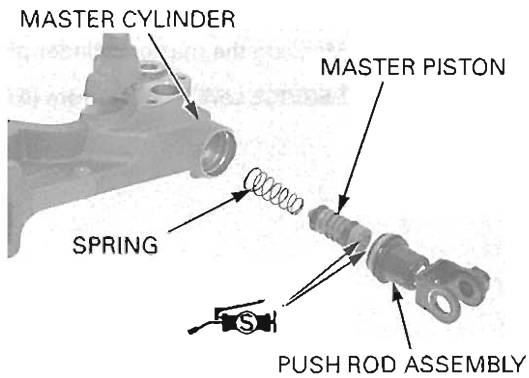
Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts

Coat all parts with clean brake fluid before assembly.



When installing the cups, do not allow the lips to turn inside out.

Dip the piston in brake fluid.
Install the spring onto the tip of the piston.
Install the piston assembly into the master cylinder.
Apply silicone grease to the boot fitting area and piston contact area of the push rod.

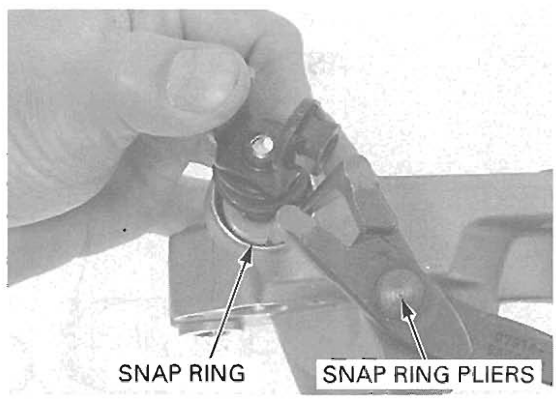


Be certain the snap ring is firmly seated in the groove.

Install the snap ring using the special tool.

TOOL:
Snap ring pliers 07914-SA50001

Install the boot.

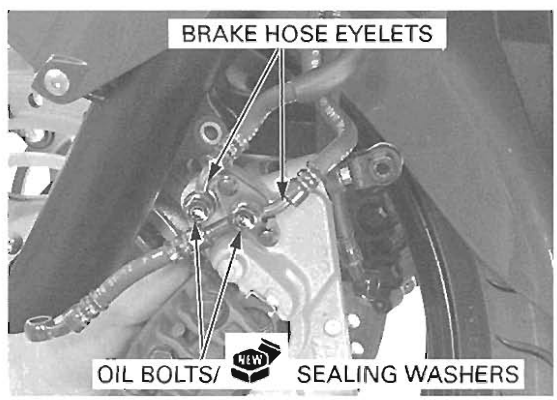


Install the brake hose eyelets with the oil bolts and new sealing washers.
Tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the left front brake caliper (page 17-37).

Fill and bleed the air from the lever and pedal brake line (page 17-7).

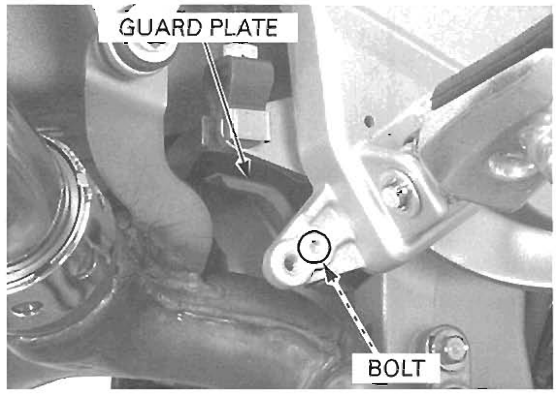


REAR MASTER CYLINDER

REMOVAL

Remove the bolt and guard plate.

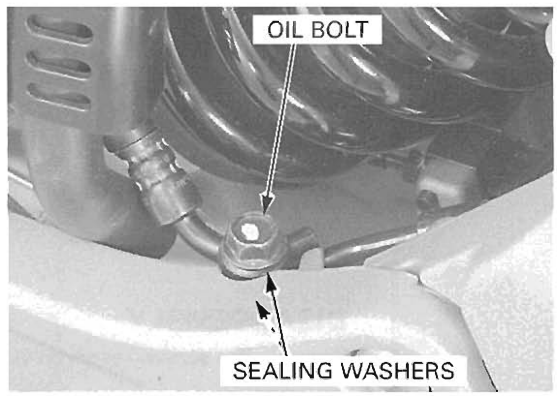
Remove the right muffler (page 2-18).



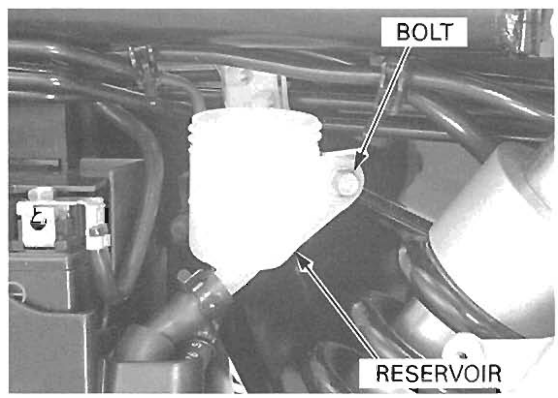
Drain the rear hydraulic system (page 17-7).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

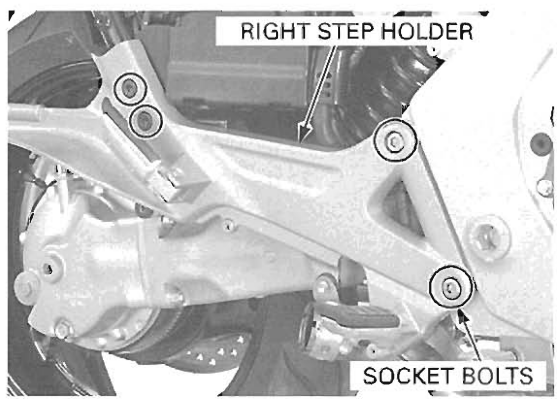
Remove the brake hose oil bolt, sealing washers and brake hoses.



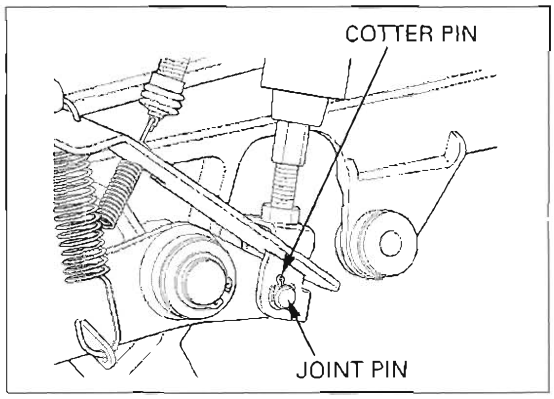
Remove the bolt and the rear master cylinder reservoir.



Remove the socket bolts and the right step holder.

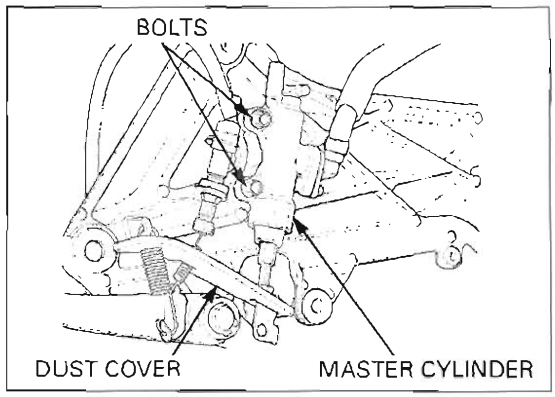


Remove the cotter pin and joint pin.



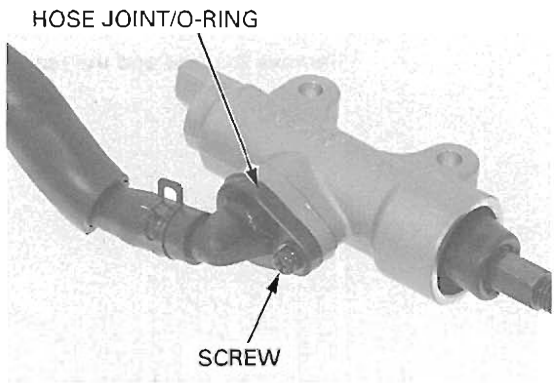
Remove the bolts and the rear master cylinder assembly.

Remove the lower joint from the dust cover groove.



DISASSEMBLY

Remove the screw, reservoir hose joint and O-ring.

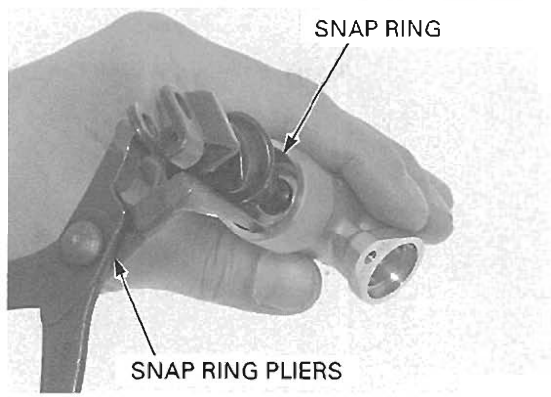


Remove the boot.

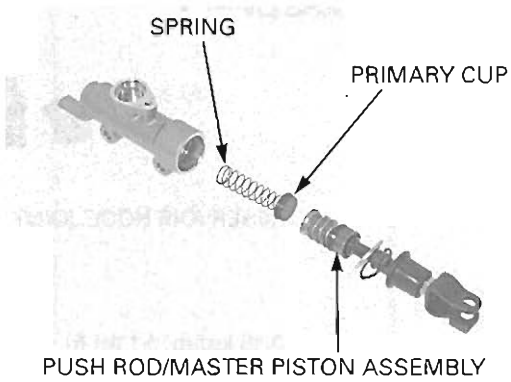
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

Snap ring pliers	**07914-SA50001**



Remove the push rod/master piston, primary cup and spring.
Clean the inside of the cylinder with brake fluid.



INSPECTION

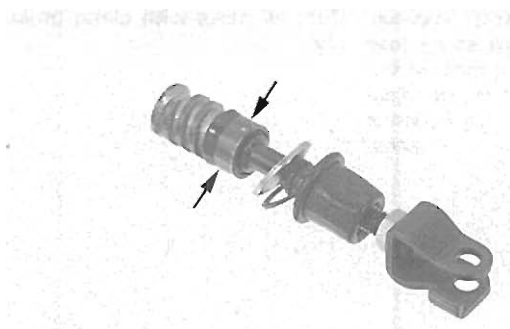
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 17.515 mm (0.6896 in)

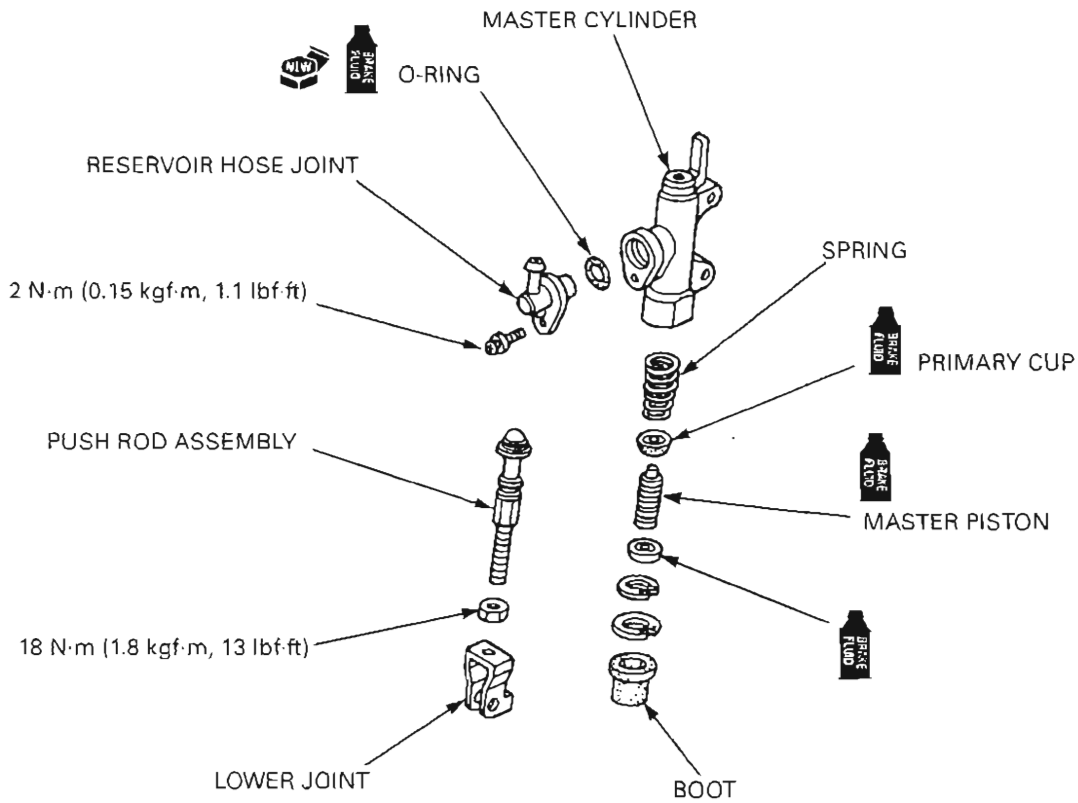


Measure the master cylinder piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)

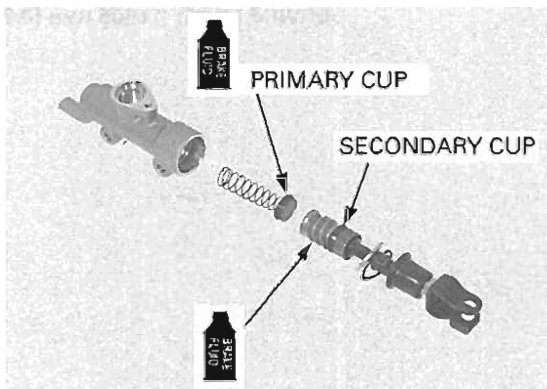


ASSEMBLY



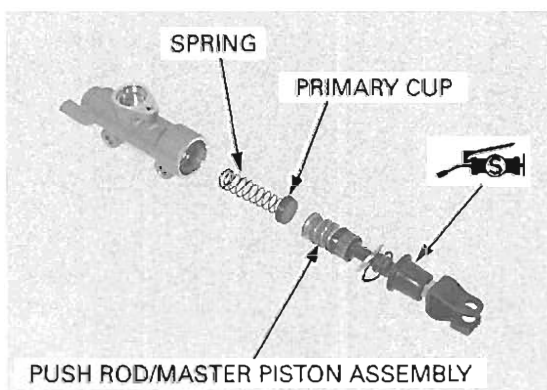
Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.



When installing the cups, do not allow the lips to turn inside out.

Dip the piston in brake fluid.
Install the primary cup onto the tip of the spring.
Install the spring/primary cup and master piston/push rod assembly.
Apply silicone grease to the push rod boot fitting area.

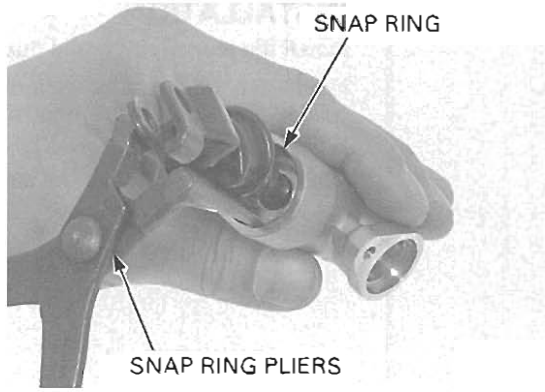


Be certain the snap ring is firmly seated in the groove.

Install the snap ring using the special tool.

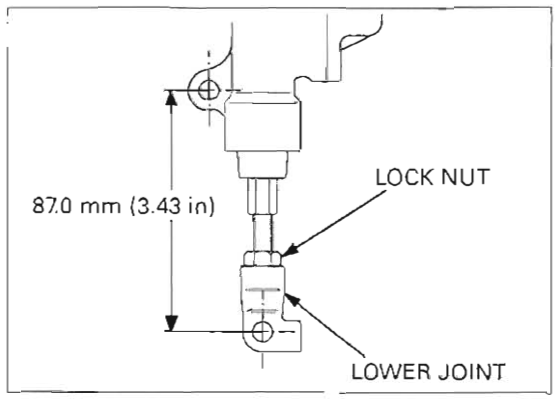
TOOL:
Snap ring pliers 07914-SA50001

Install the boot.



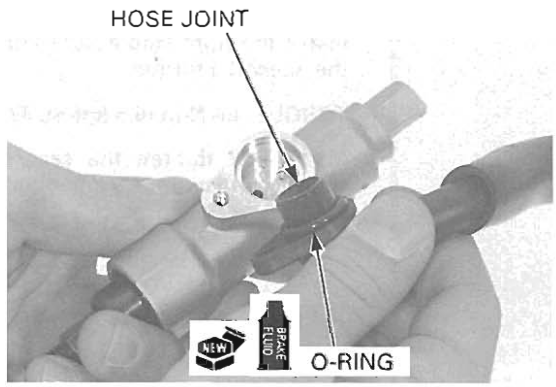
If the push rod is disassembled, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.

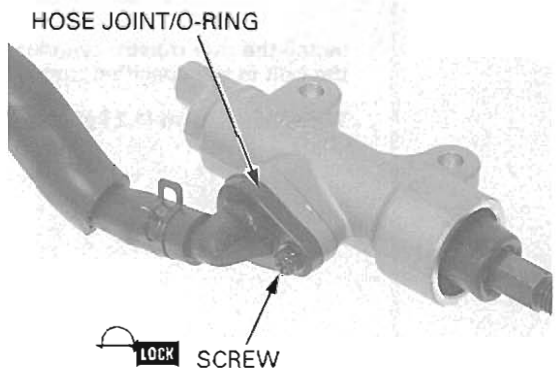
Install the reservoir hose joint into the master cylinder.



Apply a locking agent to the reservoir hose joint screw threads.

Install and tighten the screw to the specified torque.

TORQUE: 2 N·m (0.15 kgf·m, 1.1 lbf·ft)

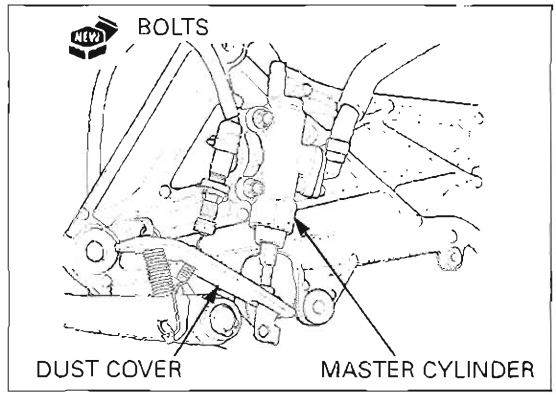


INSTALLATION

Install the lower joint to the dust cover groove.

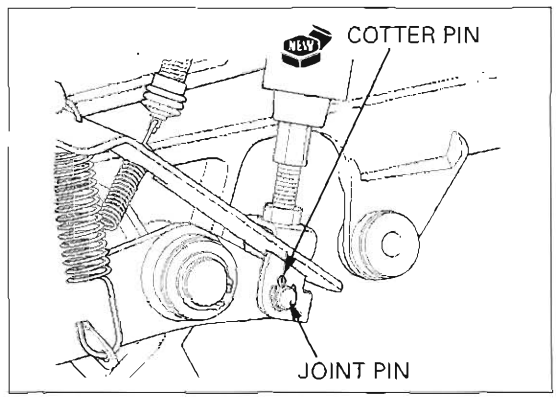
Install the rear master cylinder to the right step holder and tighten the new bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the joint pin.

Secure the joint pin using a new cotter pin.

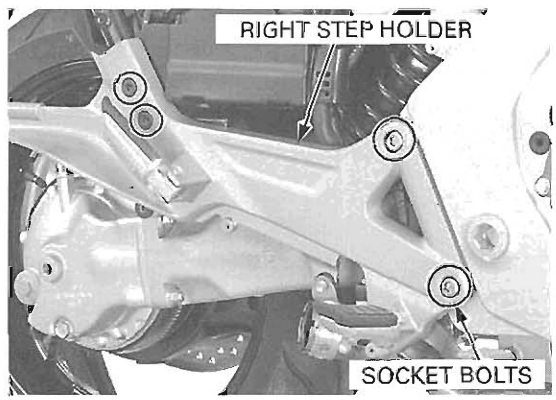


Install the right step holder and tighten the bolts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

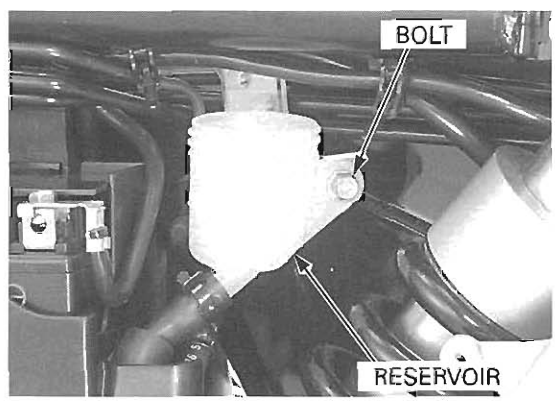
Install and tighten the seat rail lower mounting socket bolts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Install the rear master cylinder reservoir and tighten the bolt to the specified torque.

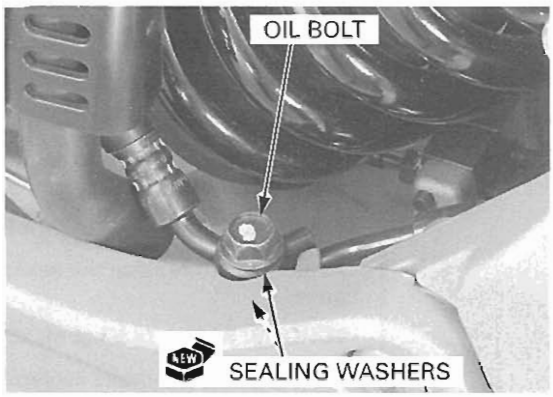
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



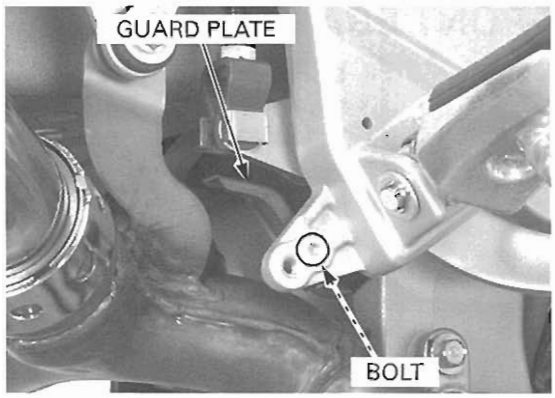
Install the brake hose with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the brake system (page 17-7).



Install the guard plate and tighten the bolt securely.



PROPORTIONAL CONTROL VALVE

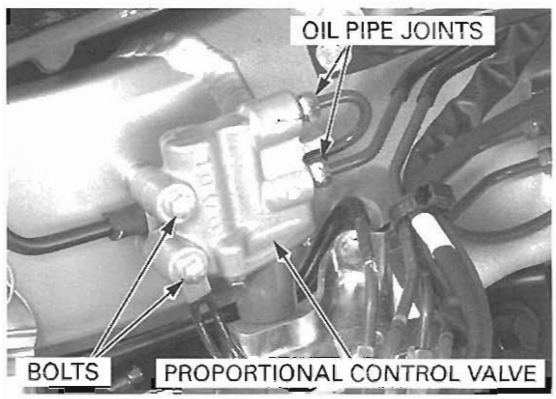
Drain the pedal and servo line hydraulic system (page 17-7).
Remove the middle cowl (page 2-13).

Remove the oil pipe joints from the proportional control valve.
Remove the bolts and proportional control valve.

Installation is in the reverse order of removal.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

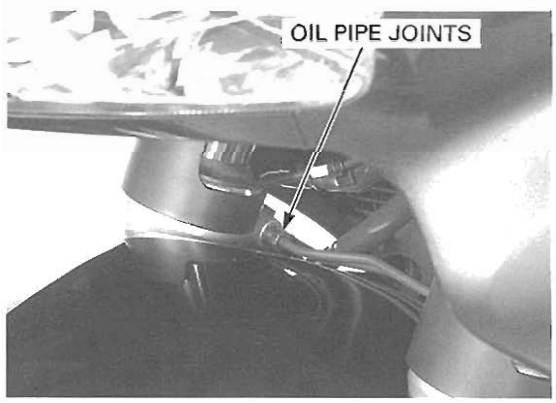
Fill and bleed the brake system (page 17-7).
Install the middle cowl (page 2-13).



DELAY VALVE

Drain the pedal and servo line hydraulic system (page 17-7).

Remove the brake pipe joint nut.
Remove the bolts and proportional control valve.



Remove the oil bolts, sealing washers and brake hose eyelets from the delay valve.

Remove the bolts and delay valve.

Installation is in the reverse order of removal.

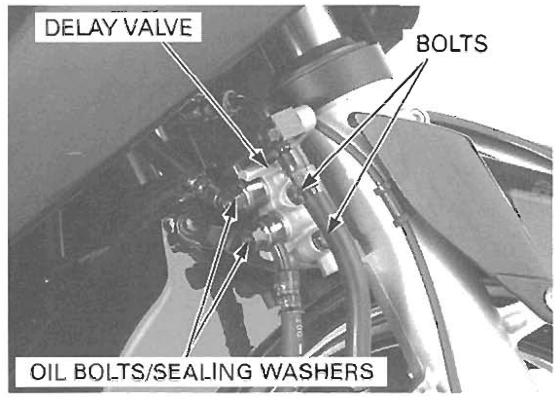
Tighten the delay valve mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

At installation replace the sealing washers with new ones.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the brake system (page 17-7).



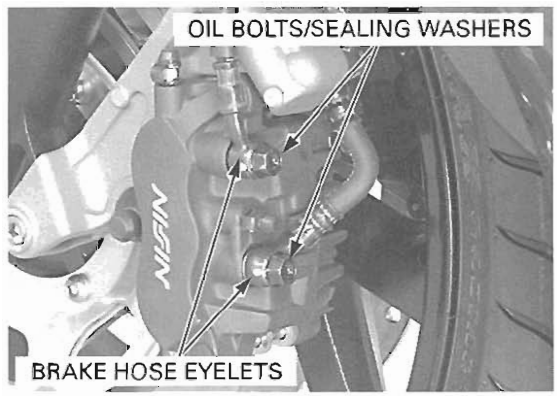
FRONT BRAKE CALIPER

LEFT CALIPER REMOVAL

Drain the lever and pedal brake line hydraulic system (page 17-7).

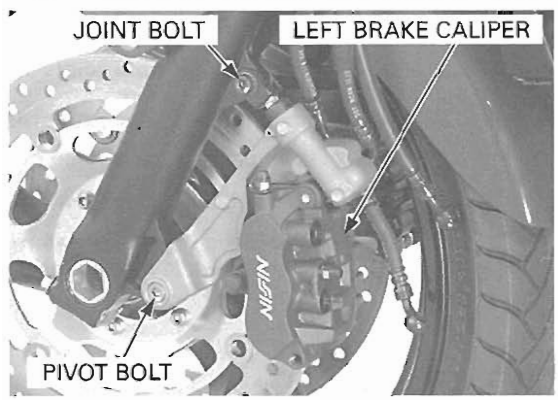
Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

Remove the oil bolts, sealing washers and brake hose eyelets.



Remove the secondary master cylinder joint bolt and caliper pivot bolt.

Remove the caliper from the bracket.

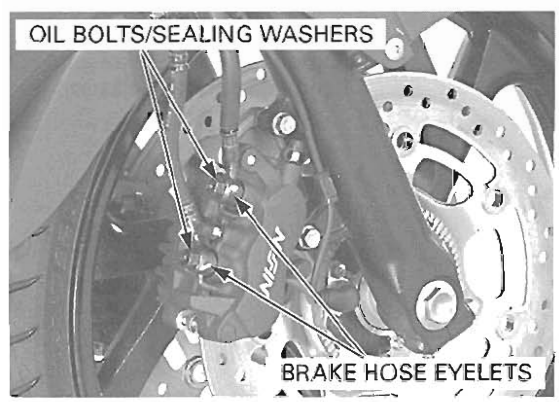


RIGHT CALIPER REMOVAL

Deluxe type only: Remove the front wheel speed sensor (page 18-31).

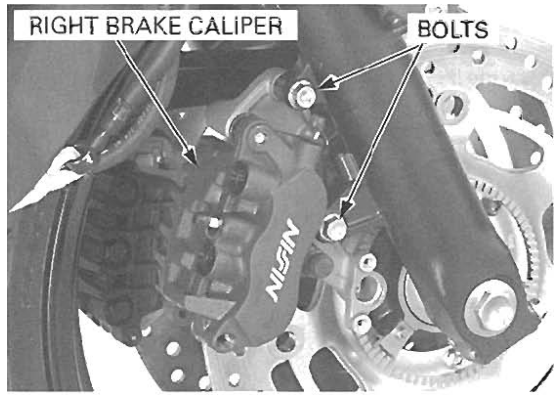
Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

Remove the oil bolt, sealing washers and brake hose eyelets.



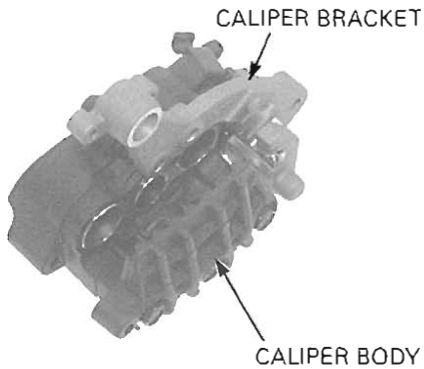
Remove the brake pads (page 17-14).

Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.

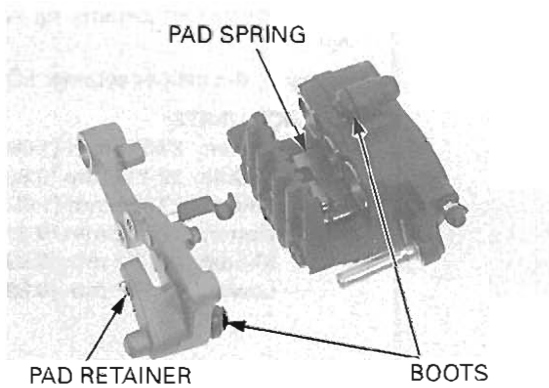


DISASSEMBLY

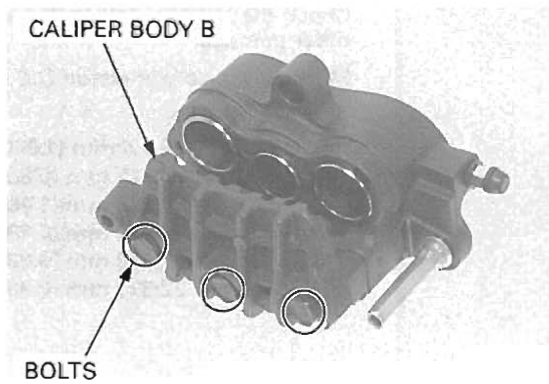
Right side only: Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.
Remove the boots from the caliper body and caliper bracket.



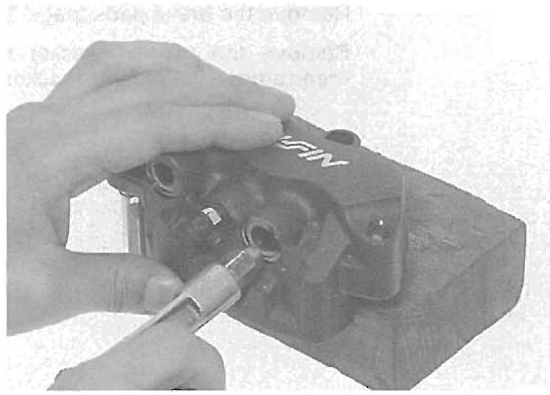
Remove the bolts and caliper body B.



Place a piece of wood sheet under the caliper pistons.

Mark the pistons to ensure correct reassembly.

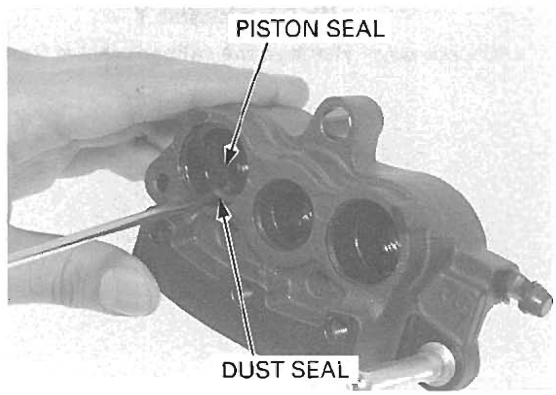
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.



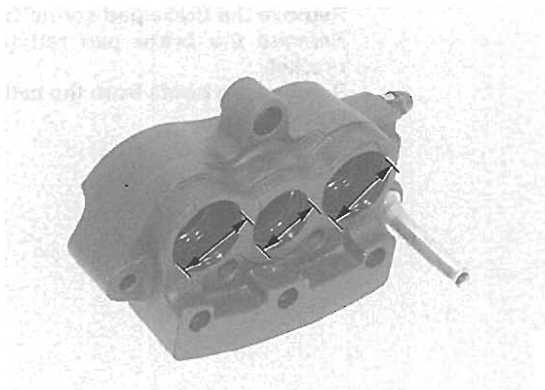
INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

SERVICE LIMITS:

Right:	**Upper:**	**27.062 mm (1.0654 in)**
	Middle:	**22.712 mm (0.8942 in)**
	Lower:	**27.062 mm (1.0654 in)**
Left:	**Upper:**	**22.712 mm (0.8942 in)**
	Middle:	**22.712 mm (0.8942 in)**
	Lower:	**22.712 mm (0.8942 in)**

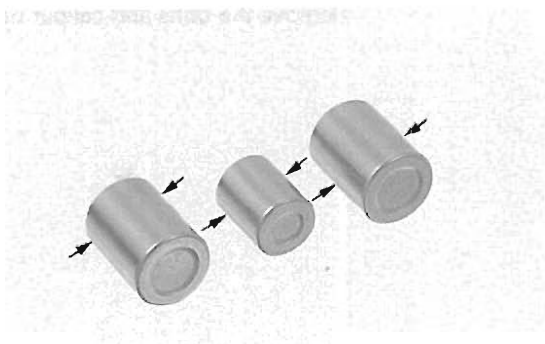


Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

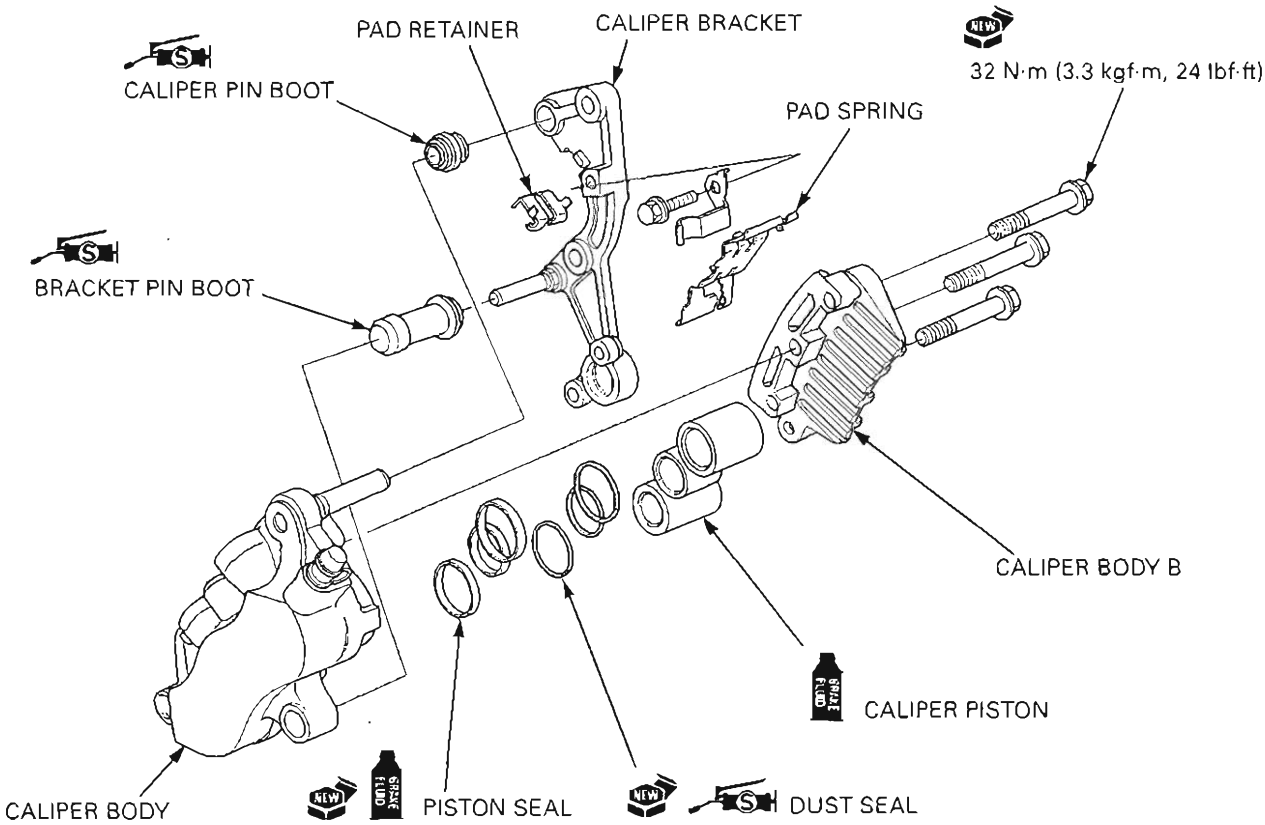
SERVICE LIMITS:

Right:	**Upper:**	**26.923mm (1.0600 in)**
	Middle:	**22.573 mm (0.8887 in)**
	Lower:	**26.923 mm (1.0600 in)**
Left:	**Upper:**	**22.573 mm (0.8887 in)**
	Middle:	**22.573 mm (0.8887 in)**
	Lower:	**22.573 mm (0.8887 in)**

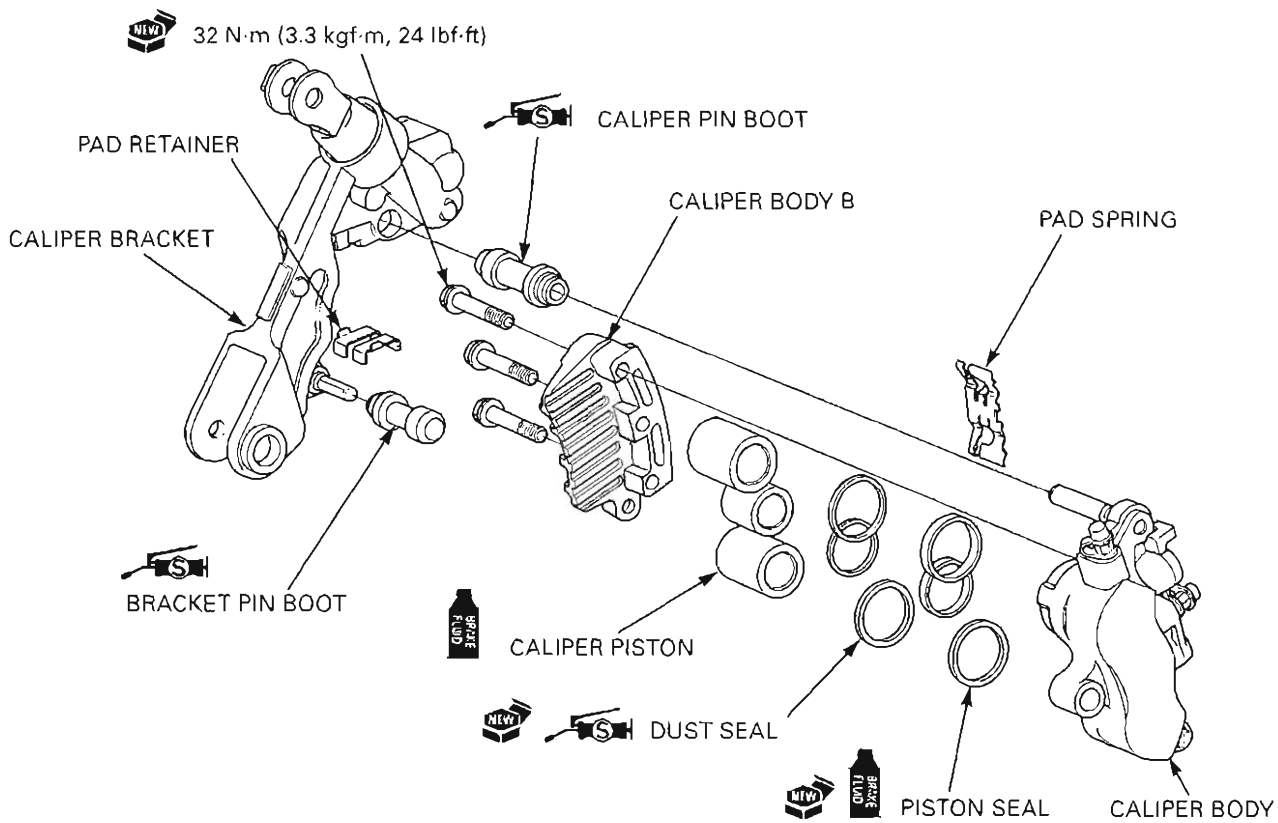


ASSEMBLY

Right:



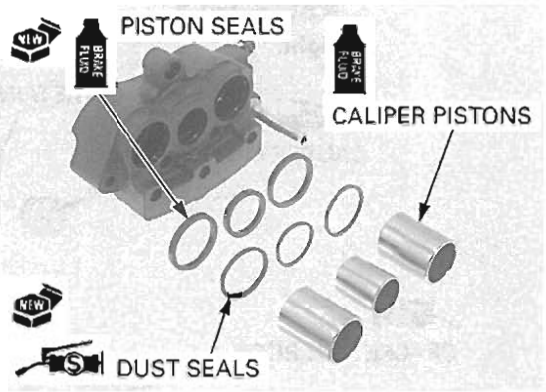
Left:



Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

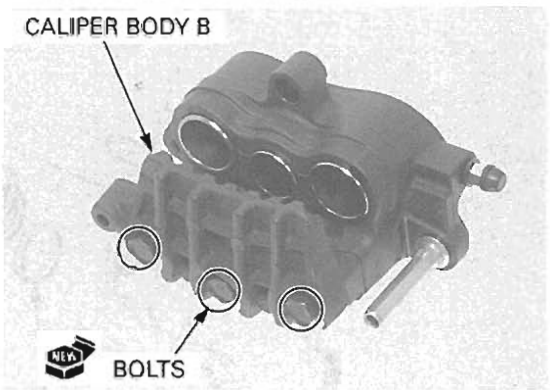
Install the piston and dust seal into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



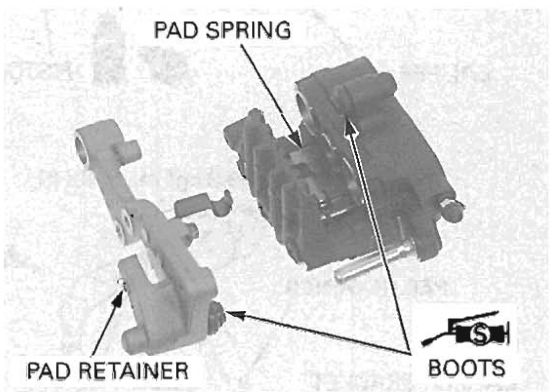
Install the brake pad retainer onto the caliper bracket.

Note the installation direction of the pad spring.

Install the pad spring into the caliper body.

Apply silicone grease to the boot inside, then install them.

Assemble the caliper and bracket.

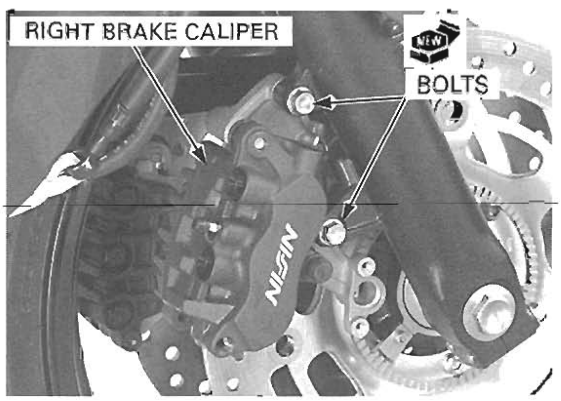


RIGHT CALIPER INSTALLATION

Install the caliper onto the fork leg.

Install the right brake caliper/bracket assembly over the brake disc.
Install and tighten the new caliper mounting bolts.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



Install the brake hose eyelets to the caliper body with new sealing washers and oil bolt.

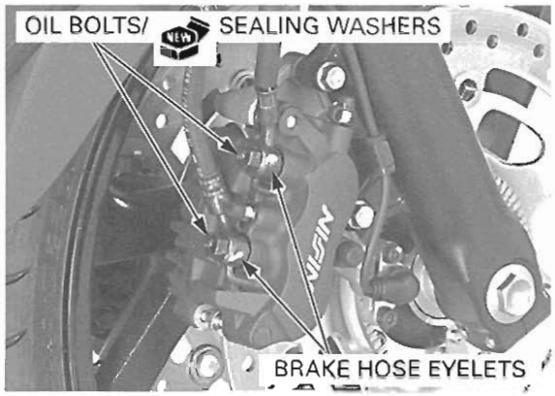
Push the brake hose eyelet stopper against the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pad (page 17-14).

Fill and bleed the front brake hydraulic system (page 17-7).

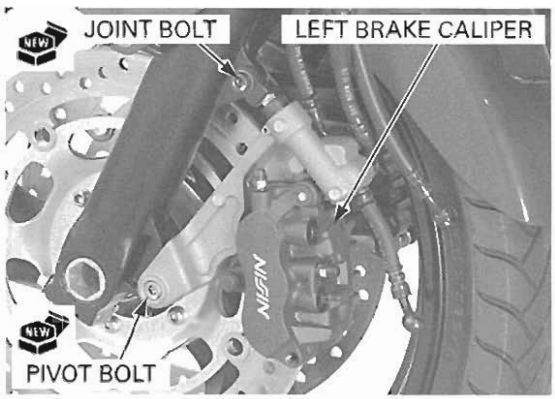
Deluxe type only: Install the front wheel speed sensor (page 18-31).



LEFT CALIPER INSTALLATION

Install the left brake caliper onto the bracket.
Install the left brake caliper/bracket assembly over the brake disc.
Install the new caliper pivot bolt and secondary master cylinder joint bolt.
Tighten the bolts to the specified torque.

TORQUE:
Pivot bolt: 31 N·m (3.2 kgf·m, 23 lbf·ft)
Joint bolt: 31 N·m (3.2 kgf·m, 23 lbf·ft)

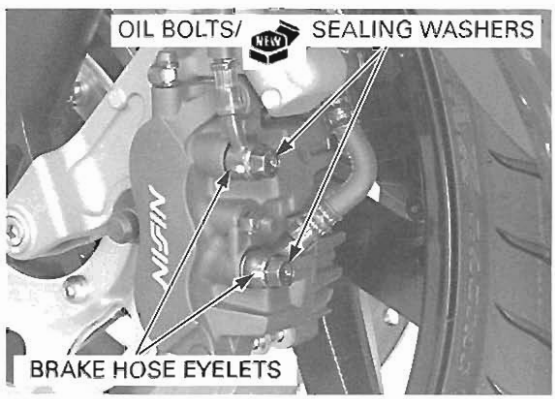


Install the brake hose eyelets to the caliper body with new sealing washers and oil bolts.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 17-14).
Fill and bleed the front brake hydraulic system (page 17-7).



REAR BRAKE CALIPER

REMOVAL

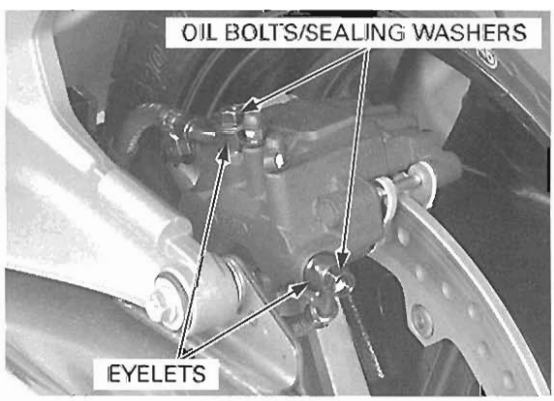
Drain the rear brake hydraulic system (page 17-7).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced

Remove the oil bolts, sealing washers and brake hose eyelets.

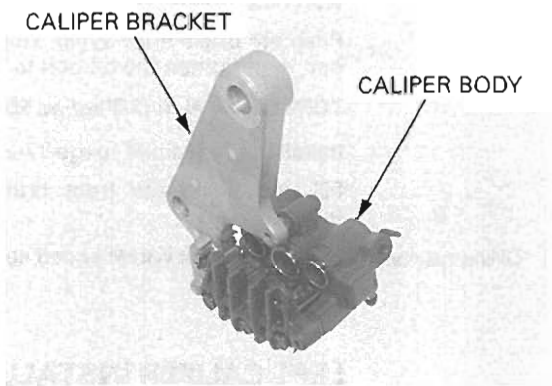
Remove the rear wheel (page 16-5).
Remove the brake pads (page 17-15).

Remove the rear brake caliper.

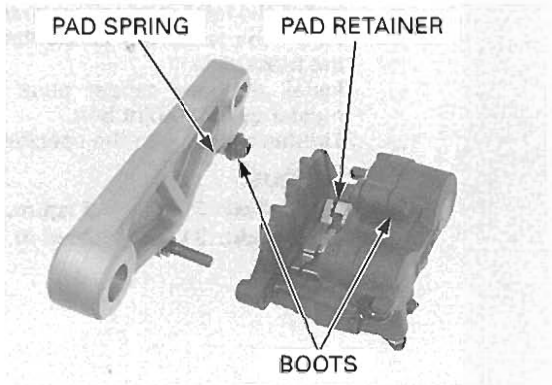


DISASSEMBLY

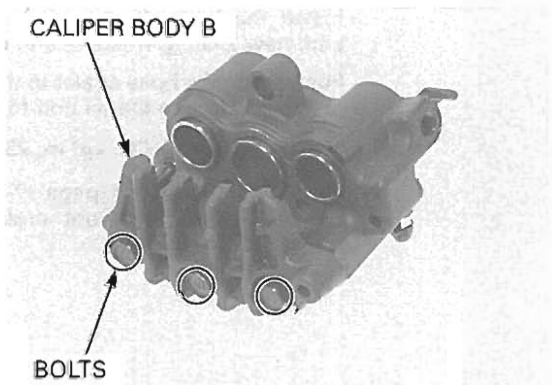
Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.



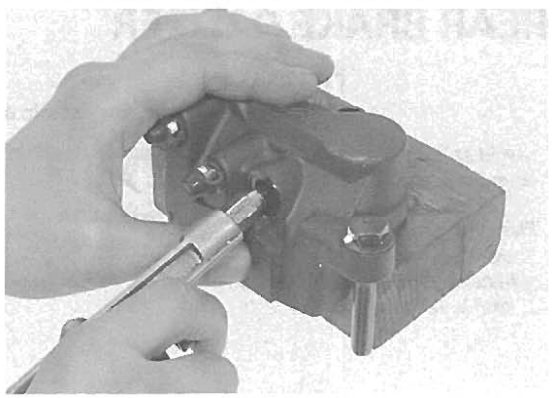
Remove the bolts and caliper body B.



Place the piece of wood sheet under the caliper pistons.

Mark the pistons to ensure correct reassembly.

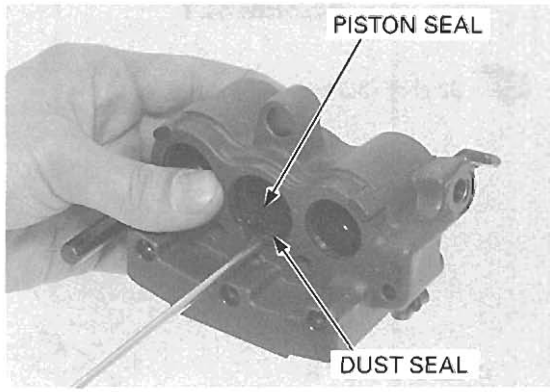
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.



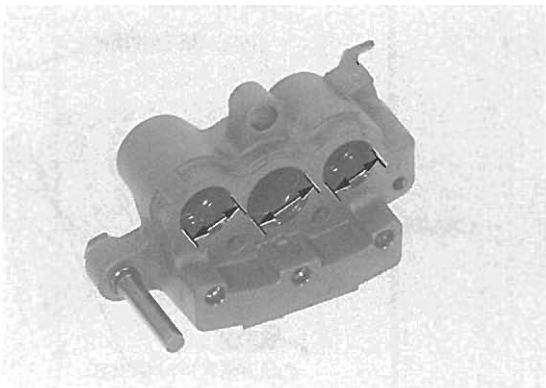
INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

SERVICE LIMITS:

Front: 22.712 mm (0.8942 in)
Center: 25.462 mm (1.0024 in)
Rear: 22.712 mm (0.8942 in)

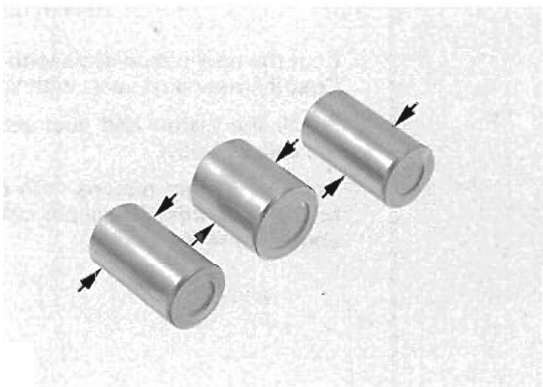


Check the caliper pistons for scratches, scoring or other damage.

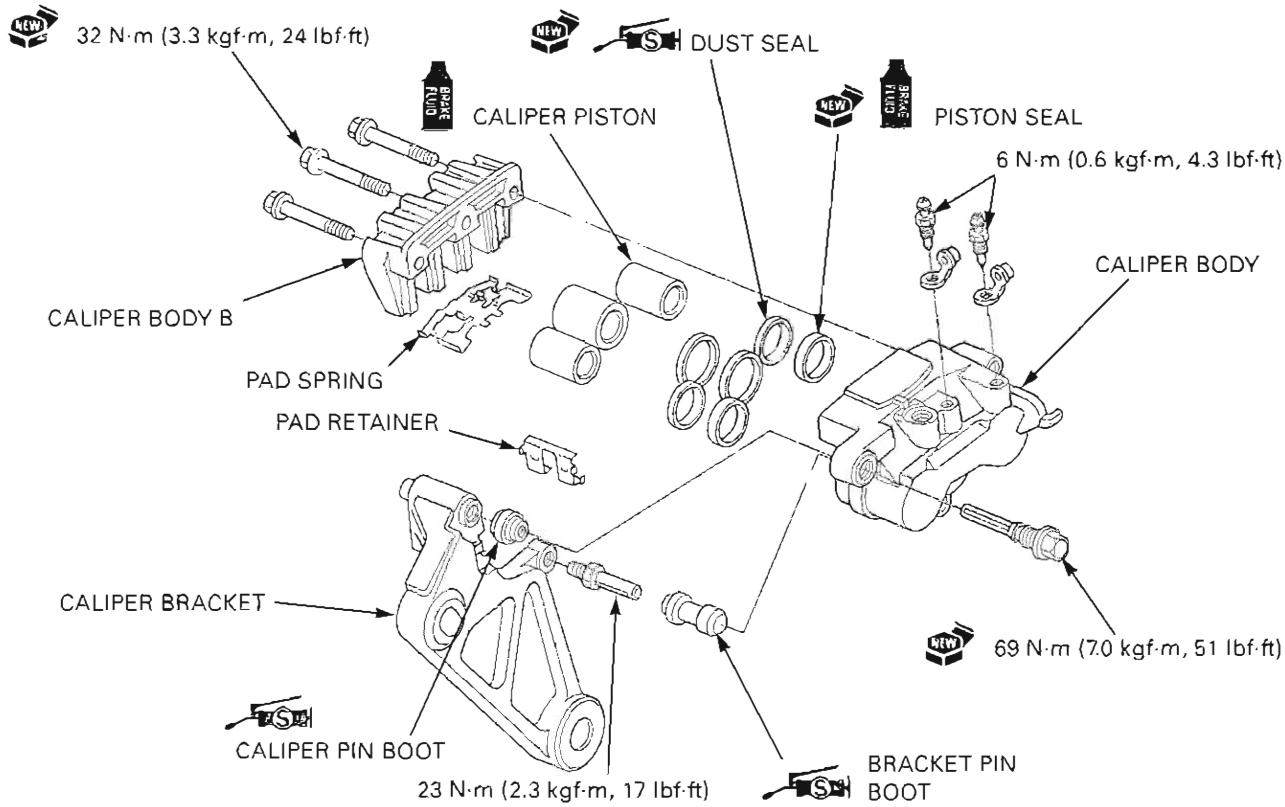
Measure the caliper piston O.D.

SERVICE LIMITS:

Front: 22.560 mm (0.8882 in)
Center: 25.323 mm (0.9970 in)
Rear: 22.560 mm (0.8882 in)



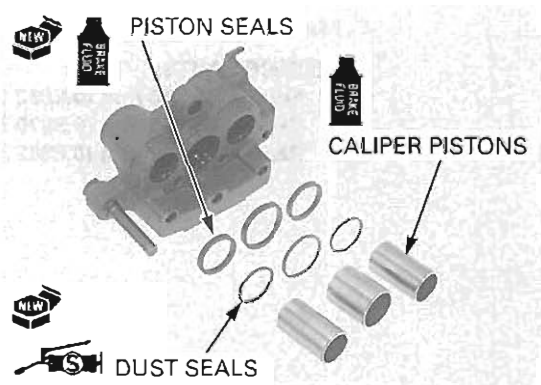
ASSEMBLY



Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

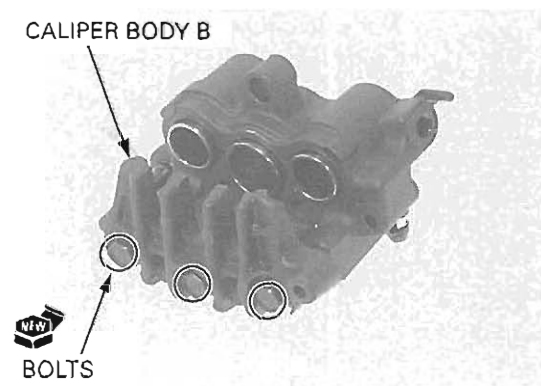
Install the piston and dust seal into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

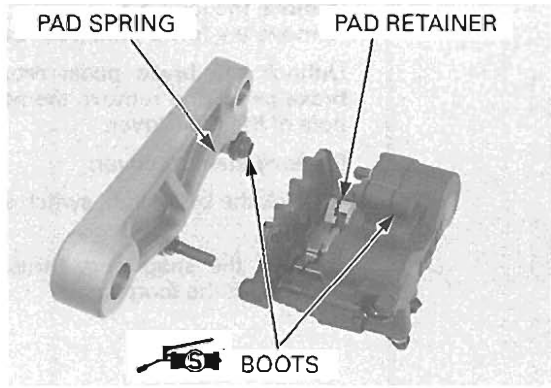


Install the brake pad retainer onto the caliper bracket.

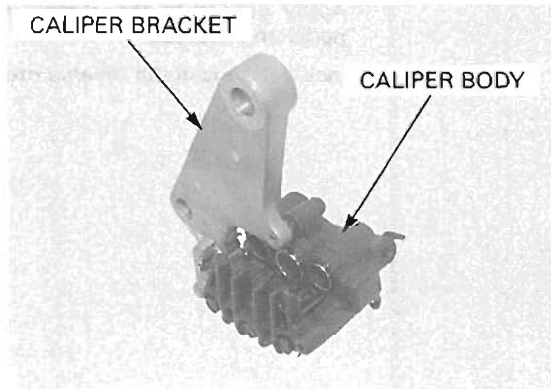
Note the installation direction of the pad spring.

Install the pad spring into the caliper body.

Apply silicone grease to the boot inside, then install them.



Assemble the caliper and bracket.



INSTALLATION

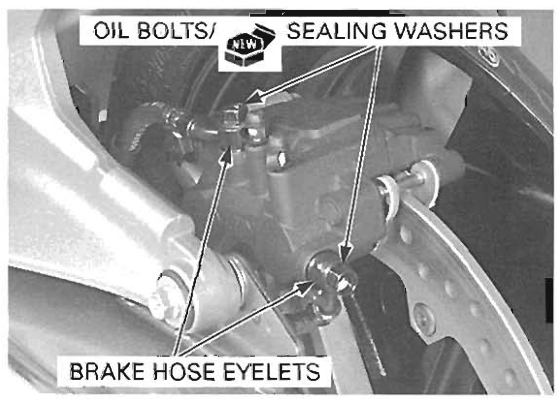
Install the rear wheel (page 16-11).

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the rear brake pads (page 17-14).

Fill and bleed the rear brake hydraulic system (page 17-7).

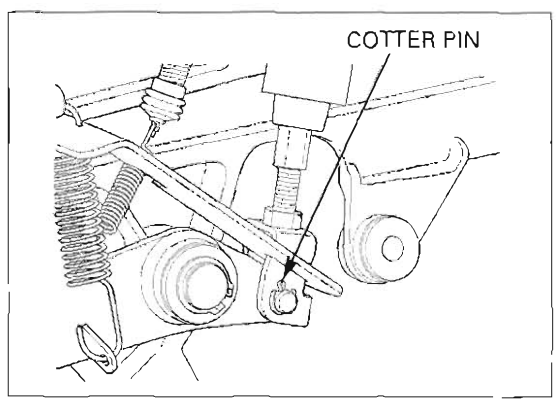


BRAKE PEDAL

REMOVAL/INSTALLATION

Remove the right step holder assembly (page 17-25).

Remove and discard the brake pedal joint cotter pin.



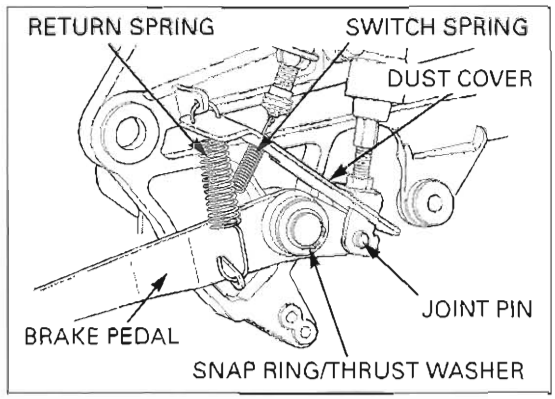
Remove the joint pin.
Remove the lower joint from the dust cover groove.

Unhook the brake pedal return spring from the brake pedal and remove the return spring from the hole of the dust cover.

Remove the dust cover.

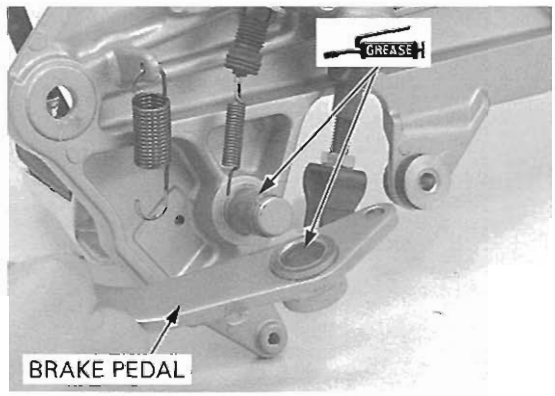
Unhook the brake light switch spring from the brake pedal.

Remove the snap ring, thrust washer and brake pedal from the footpeg.



Apply grease to the sliding surface of the brake pedal and footpeg.

Installation is in the reverse order of removal.



18. ANTI-LOCK BRAKE SYSTEM (ABS)

SYSTEM DIAGRAM 18-2

SERVICE INFORMATION 18-3

BEFORE STARTING TROUBLESHOOTING 18-4

BEFORE TROUBLESHOOTING 18-7

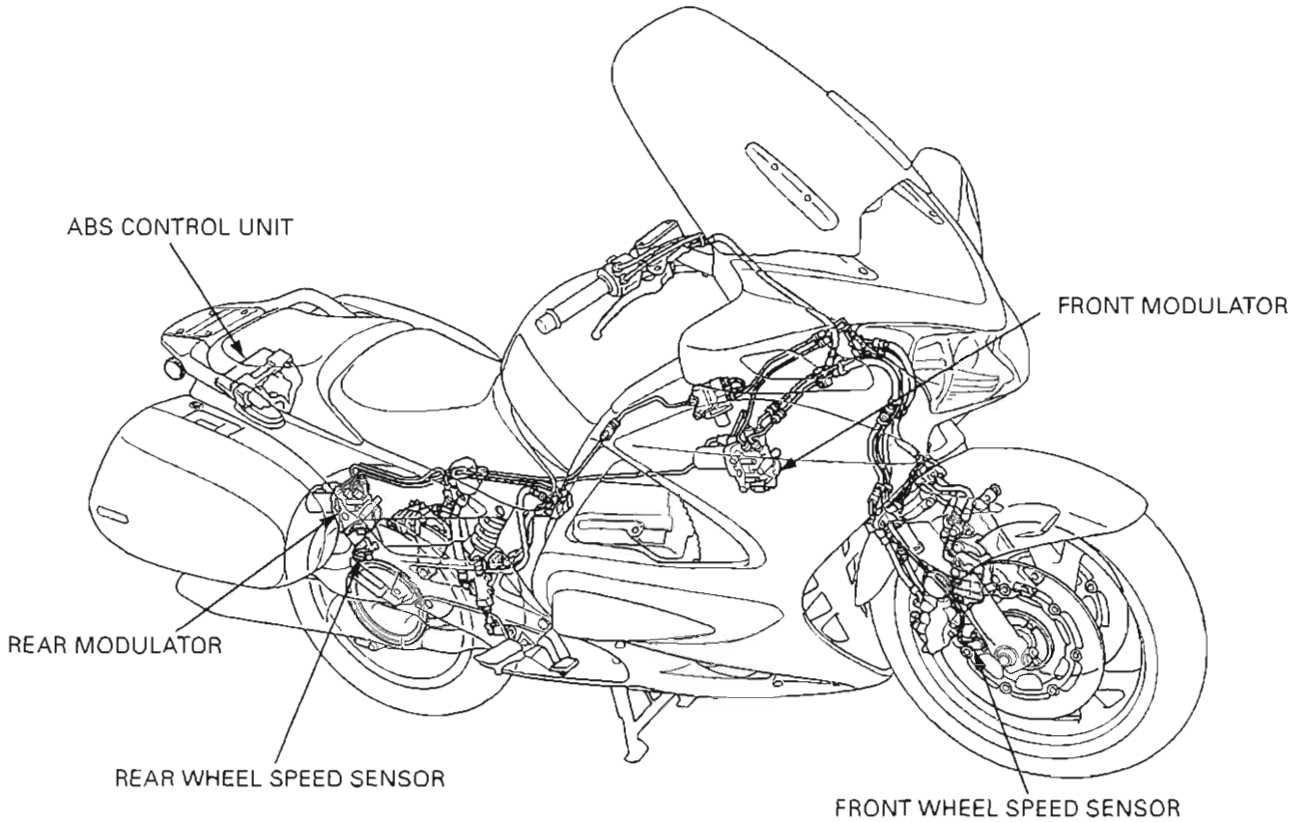
TROUBLESHOOTING 18-9

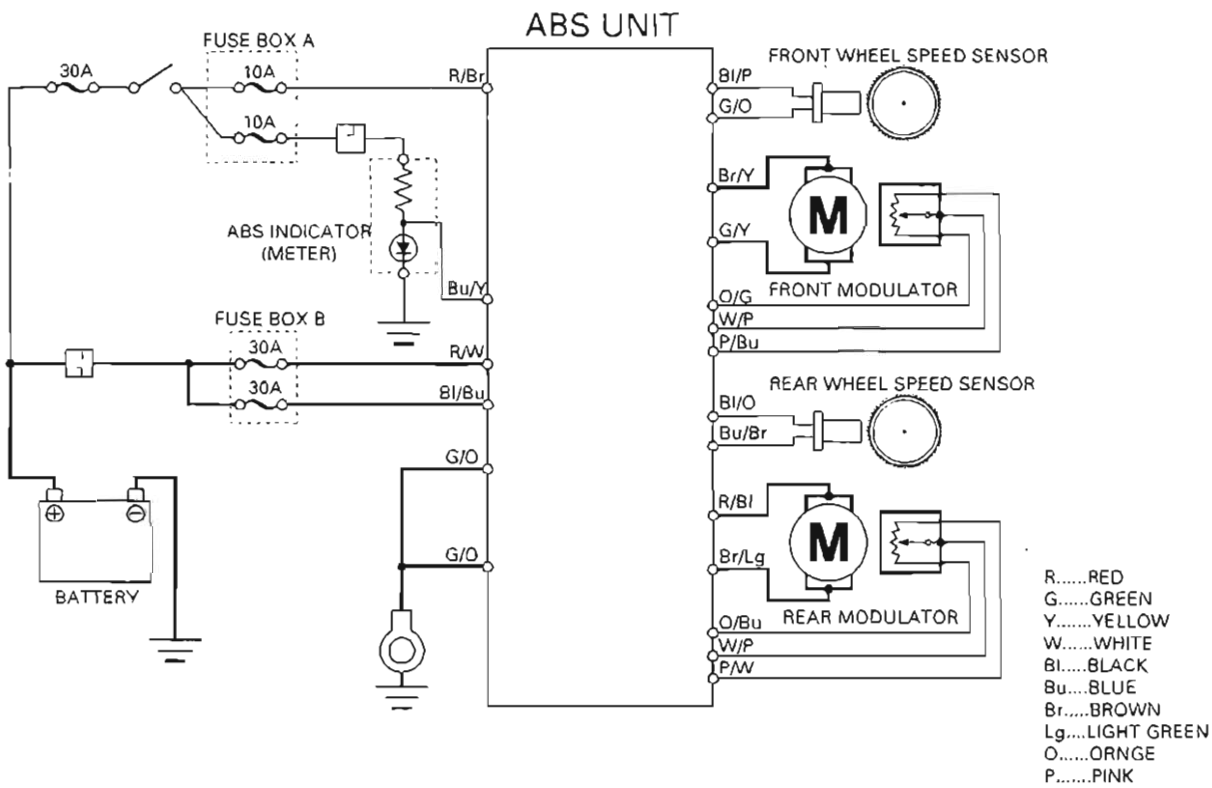
WHEEL SPEED SENSOR 18-31

ABS MODULATOR 18-33

ABS CONTROL UNIT 18-37

SYSTEM DIAGRAM





SERVICE INFORMATION

GENERAL

- This section covers service of the Anti-lock Brake System (ABS). For service of the conventional brake system, see page 17-4.
- When the ABS control unit detects a problem, it stops the ABS function and switches back to the conventional brake operation, and the ABS indicator blinks or stays on. Take care during the test ride.
- When the motorcycle is running and the front wheel leaves the ground for a long time (wheelies), the ABS control unit detects difference of the front and rear wheel speeds and then the indicator blinks.
- Troubles not resulting from a faulty ABS (e.g. brake disc squeak, unevenly worn brake pad) cannot be recognized by the ABS diagnosis system.
- Read "Before Starting Troubleshooting" carefully, inspect and troubleshoot the ABS system according to the Diagnostic Troubleshooting Flow Chart. Observe each step of the procedures one by one. Write down the problem code and probable faulty part before starting diagnosis and troubleshooting.
- After troubleshooting, erase the problem code and perform the pre-start self-diagnosis to be sure that the ABS indicator is operating normally.
- Be careful not to damage the wheel speed sensor and pulser ring when removing and installing the wheel or speed sensor.
- When the wheel speed sensor and/or pulser ring is replaced, check the clearance (air gap) between both components.
- The ABS control unit may be damaged if dropped. Also if a connector is disconnected when current is flowing, the excessive voltage may damage the ECU. Always turn off the ignition switch before servicing.
- Do not disassemble the ABS modulator. Replace the modulator as an assembly when it is faulty.
- Refer to circuit diagram of ABS (page 18-2).
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

TORQUE VALUES

Front wheel pulser ring mounting bolt	8 N·m (0.8 kgf·m, 5.1 lbf·ft)	ALOC bolt; replace with a new one
Rear wheel pulser ring mounting bolt	8 N·m (0.8 kgf·m, 5.1 lbf·ft)	ALOC bolt; replace with a new one
Front modulator body mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear modulator body mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

BEFORE STARTING TROUBLESHOOTING

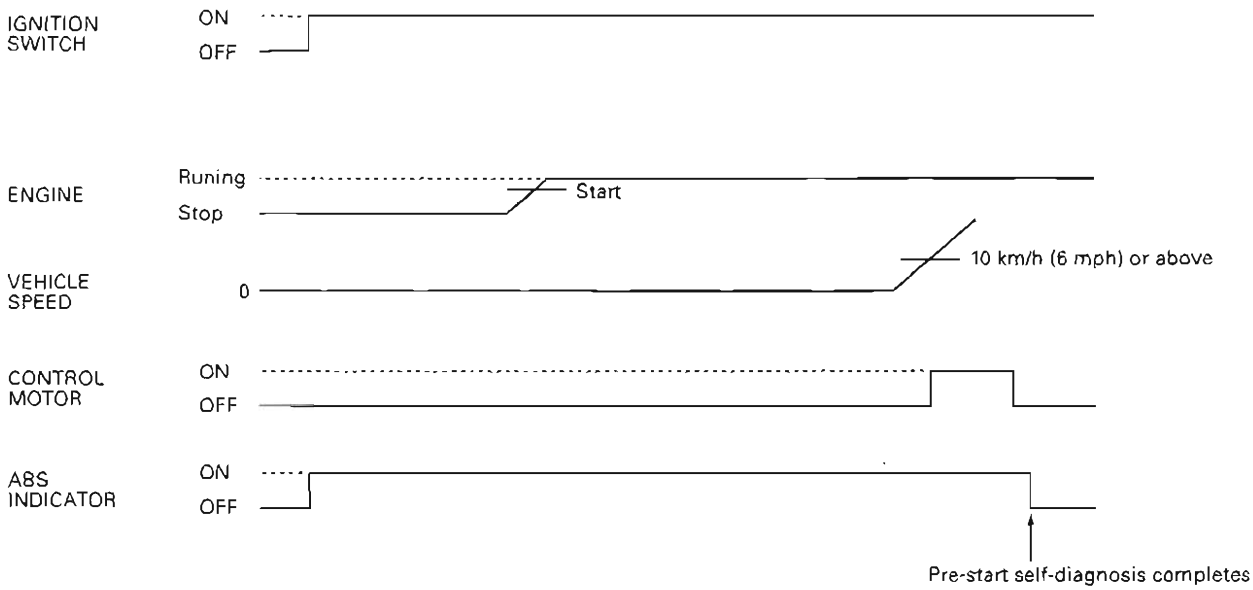
SUMMARY OF ABS PRE-START SELF-DIAGNOSIS SYSTEM

The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the modulator. When there is any abnormality, the problem and the problematic part can be detected by outputting the problem code.

When the vehicle is moving approximately 10 km/h (6 mph) or more, the wheel speed sensor signal is sent to the ABS control unit (ECU), then the ABS pre-start self-diagnosis system operates the control motor on the modulator, checks the crank angle condition with the ABS control unit and this detects whether the modulator operation is normal, and it completes the pre-start self-diagnosis.

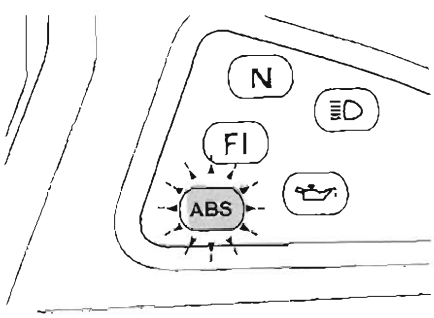
When the ABS is normal, the ABS indicator goes off just after a road speed of 10 km/h (6 mph) is reached, indicating that the diagnosis is completed.
If a problem is detected, the ABS indicator blinks or comes on and stays on to notify the rider of the problem. The self-diagnosis is also made while the motorcycle is running, and the indicator blinks when a problem is detected.
When the indicator blinks, the cause of the problem can be identified by retrieving the problem code following the specified retrieval procedure (page 18-5).

Pre-start self-diagnosis when normal:



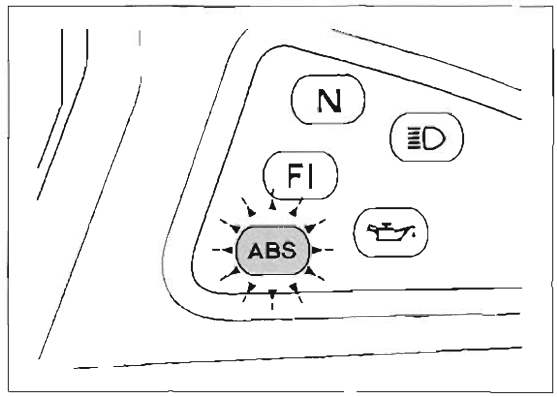
PRE-START SELF-DIAGNOSIS PROCEDURE (Daily check)

1. Turn the ignition switch to "ON".
2. Make sure the ABS indicator comes on.
3. Start the engine.
4. Ride the motorcycle and increase the vehicle speed to approximately 10 km/h (6 mph) (pre-start self-diagnosis completed).
5. The ABS is normal if the ABS indicator goes off.



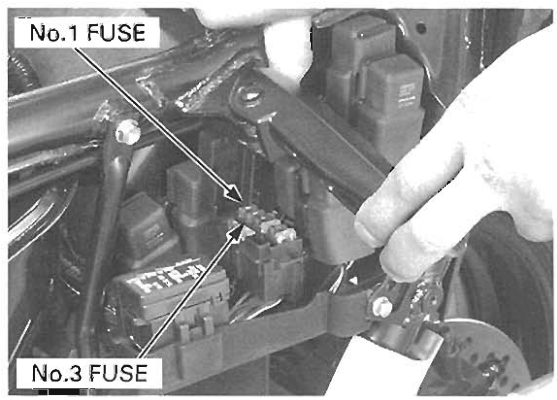
RETRIEVAL/ERASURE OF PROBLEM CODE

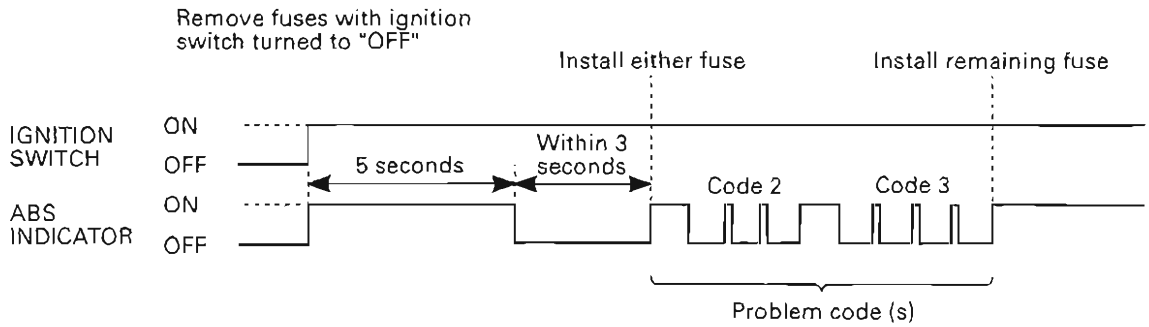
- After retrieval, the ABS indicator indicates the problem code by blinking a specified number of times.
- The problem code is not erased by turning the ignition switch to "OFF" while the problem code is being output. Note that turning the ignition switch to "ON" again does not indicate the problem code. To show the problem code again, repeat the problem code retrieval procedures from the beginning.
- The ABS control unit stores up to two problem codes and indicates the latest problem code first, and then the earlier code alternately. When the two problem codes are indicated, begin diagnostic troubleshooting, beginning with the code that was indicated first.
- Be sure to make a note of the retrieval problem code(s).
- After diagnostic troubleshooting, erase the problem code(s) and perform the pre-start self-diagnosis to be sure that there is no problem in the ABS indicator (indicator is operating normally).



RETRIEVAL:

1. Remove the No.1 and 3 control motor fuses with the ignition switch turned to "OFF" to be sure that each fuse is not burned out.
   If either fuse is burned out, perform the troubleshooting of problem code "4" (No.1 fuse) or "5" (No.3 fuse) without installing the fuse.
2. Turn the ignition switch to "ON". The ABS indicator should come on.
3. Wait four seconds and the ABS indicator goes off.
4. Install either the No.1 or the No.3 fuse immediately after the ABS indicator is off (within 3 seconds).
5. The problem code is indicated by the number of times the ABS indicator blinks.

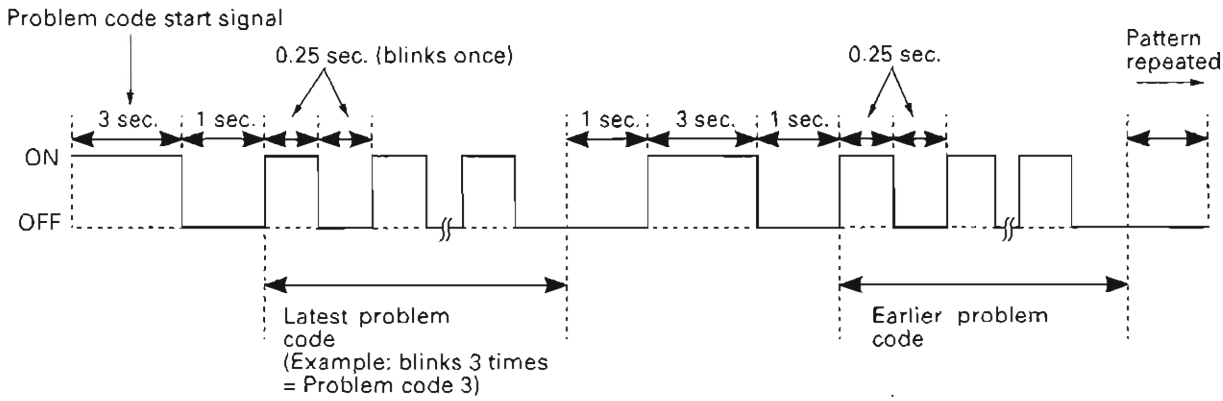




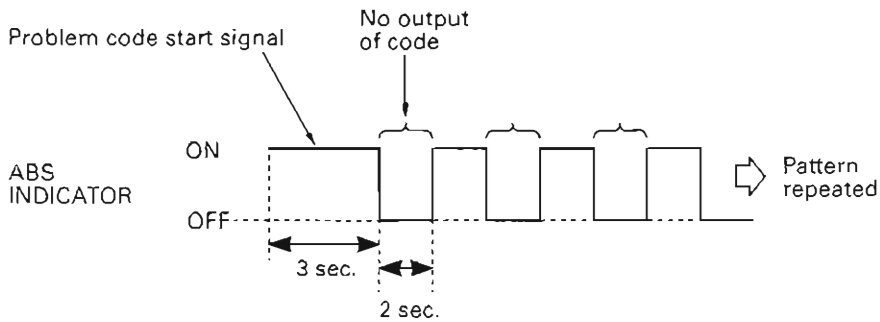
TO ERASE THE PROBLEM CODE:

1. Install the remaining fuse (No.1 or No.3) while the problem code is being indicated (i.e., the ABS indicator is blinking).
2. When code erasure is complete, the ABS indicator stays on.

PROBLEM CODE INDICATION PATTERN



When no problem code is stored:



BEFORE TROUBLESHOOTING

SYMPTOM-TO-SYSTEM CHART

- Before performing any ABS troubleshooting, check the pre-start self-diagnosis (page 18-4)

Problem code	Check part and system	Probable faulty part																				Reference page
		Fuse			Modulator				Wheel speed sensor		Pulser ring		Power circuit (charging)	Wire harness	ABS control unit	ABS indicator	Tire		Wheel		Riding conditions (NOTE)	
		ABS main	Modulator control motor		Control motor		Crank angle sensor															
			Front	Rear	Front	Rear	Front	Rear	Front	Rear	Front	Rear					Front	Rear	Front	Rear		
2	Front wheel speed sensor system								O		O			O	O		O		O		O	18-9
3	Rear wheel speed sensor system									O		O		O	O			O		O	O	18-11
4	Front control motor system		O		O		O							O	O							18-13
5	Rear control motor system			O		O		O						O	O							18-15
6	Front crank angle sensor system						O							O	O							18-17
7	Rear crank angle sensor system							O						O	O							18-20
8	ABS control unit: Front control circuit		O		O		O		O		O			O	O		O		O		O	18-9
9	ABS control unit: Rear control circuit			O		O		O		O		O		O	O			O		O	O	18-11
10	ABS control unit: Front relay circuit		O		O		O							O	O							18-23
11	ABS control unit: Rear relay circuit			O		O		O						O	O							18-25
12	ABS control unit: Front motor driver circuit		O		O									O	O							18-26
13	ABS control unit: Rear motor driver circuit			O		O								O	O							18-26
14	Power circuit												O	O	O							18-27
-	Problems not detected by ABS control unit	O											O	O	O	O						18-28

- The ABS indicator might blink in the following cases:
  - The motorcycle has continuously run on bumpy roads.
  - After riding (after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle placed on the center stand.
  - The ABS control unit is disrupted by extremely powerful radio waves (electromagnetic interference). This is a temporary failure. Erase the problem code and perform the pre-start self-diagnosis. The ABS is normal if the ABS indicator goes off.

DIAGNOSTIC TROUBLESHOOTING FLOW CHART

NOTICE

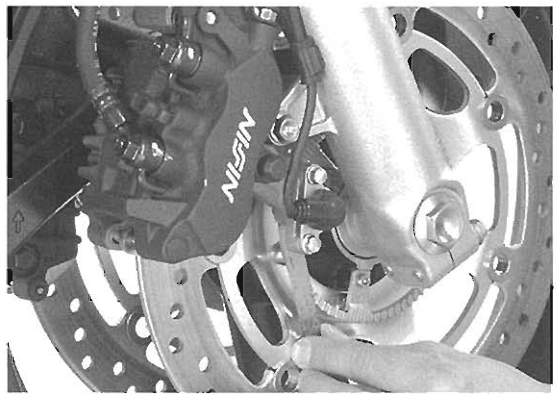
Be careful not to damage the wheel speed sensor and pulser ring when servicing.

- All connector diagrams in the flow charts are viewed from the terminal side.
- Perform inspection with the ignition switch turned to "OFF", unless otherwise specified.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- When the ABS control unit or modulator is detected to be faulty, recheck the wire harness and connector connections closely before replacing it.
- After troubleshooting, erase the problem code and perform the pre-start self-diagnosis to be sure that the ABS indicator is operating normally.
- The ABS indicator might blink in the following cases.
  - Incorrect tire pressure.
  - Tires not recommended for the motorcycle were installed (incorrect tire size).
- The ABS indicator might blink while riding under the following conditions. Erase the problem code and perform the pre-start self-diagnosis. The ABS is normal if the indicator goes off. Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
  - The motorcycle has continuously run bumpy roads.
  - After riding (after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds) with the motorcycle placed on the center stand.
- If the pulser ring or wheel speed sensor is replaced, perform the air gap inspection (page 18-31).

TROUBLESHOOTING

Problem code 2 and 8: Front wheel speed sensor system and ABS control unit

1. Wheel Pulser Air Gap Inspection



Check the area around the front wheel speed sensor.

Measure the air gap between the speed sensor and pulser ring.

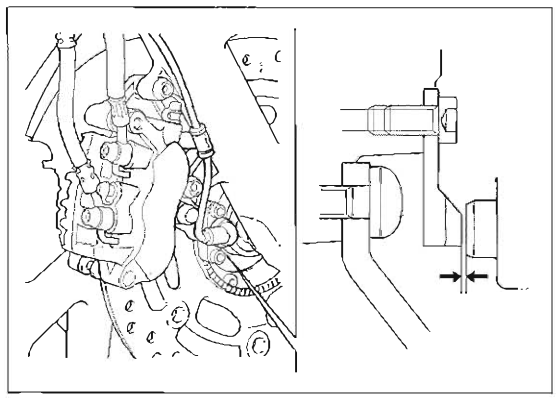
Standard air gap: 0.4 - 1.2 mm (0.02 - 0.05 in)

Is the air gap correct?

NO – Check each part for deformation and looseness and correct accordingly.

YES – GO TO STEP 2.

2. Wheel Pulser Magnetic Deposits Inspection



Check for iron or other magnetic deposits between the pulser ring and wheel speed sensor.

Check for a loose pulser ring or wheel speed sensor.

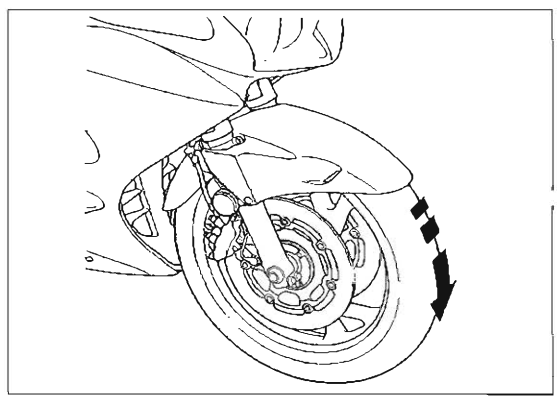
Check the pulser ring for deformation or damage (e.g., chipped teeth) and the wheel speed sensor tip for damage.

Are there any deposits between the gap?

YES – Remove any deposits and install properly or replace any faulty part.

NO – GO TO STEP 3.

3. The ABS Indicator Function Inspection



Retrieve the problem code and erase it.

With the ignition switch turned to "ON" (do not operate the ignition switch after erasing the problem code), turn the front wheel by hand (vehicle speed; approximately 4 km/h (2.5 mph) or above) and check that the ABS indicator blinks.

Is the indicator blinking?

YES – • The ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for loose connection.

NO – GO TO STEP 4.

4. **Wheel Speed Sensor Line Short Circuit Inspection at ABS Control Unit**

   Disconnect the ABS control unit 12P (Black) connector.

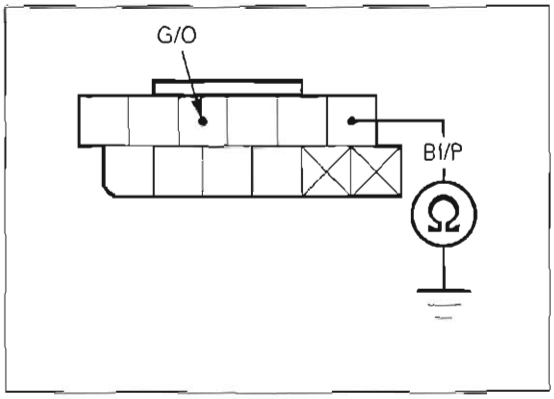
   Measure for continuity between the ABS control 12P (Black) connector wire harness side terminals and ground.

   Connection: **Black/pink - ground**
   Green/orange - ground
   Standard: **No continuity**

   Is there continuity?

   YES – GO TO STEP 5.

   NO – GO TO STEP 6.



5. **Wheel Speed Sensor Line Short Circuit Inspection at Sensor Connector**

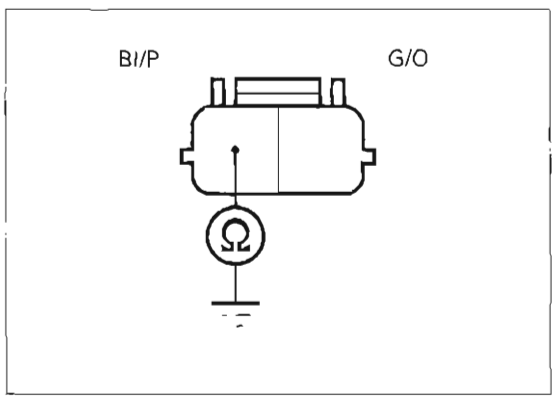
   Check for continuity between the sensor side terminals and ground.

   Connection: **Black/pink - ground**
   Green/orange - ground

   Is there continuity?

   NO – Short circuit in the wire harness between the ABS control unit and wheel speed sensor.

   YES – Faulty front wheel speed sensor.



6. **Wire Harness Continuity Inspection**

   Disconnect the front wheel speed sensor 2P connector.
   Short the terminals of the connector with a jumper wire.

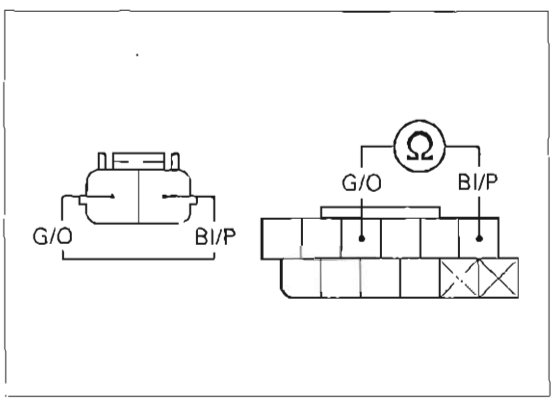
   Check for continuity between the ABS control unit 12P (Black) connector wire harness side terminals.

   Connection: **Black/pink - Green/orange**
   Standard: **Continuity**

   Is there continuity?

   YES – GO TO STEP 7.

   NO – Open or short circuit in wire between the ABS control unit and front wheel speed sensor.



7. **Rechecking Indicator Function**

Remove the front wheel speed sensor and replace it with a new one.

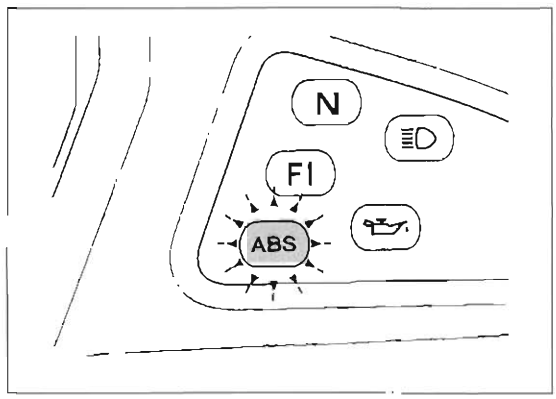
Connect the ABS control unit 12P (Black) connector.

Perform the pre-start self-diagnosis and check the ABS indicator.

Is the indicator blinking?

YES – Faulty ABS control unit.

NO – Faulty removed wheel speed sensor.



Problem code 3 and 9: Rear wheel speed sensor system and ABS control unit

1. **Wheel Pulser Air Gap Inspection**

Check the area around the rear wheel speed sensor.

Measure the air gap between the speed sensor and pulser ring.

Standard air gap: 0.7 - 1.2 mm (0.03 - 0.05 in)

Is the air gap correct?

NO – Check each part for deformation and looseness and correct accordingly.

YES – GO TO STEP 2.



2. **Wheel Pulser Magnetic Deposits Inspection**

Check for iron or other magnetic deposits between the pulser ring and wheel speed sensor.

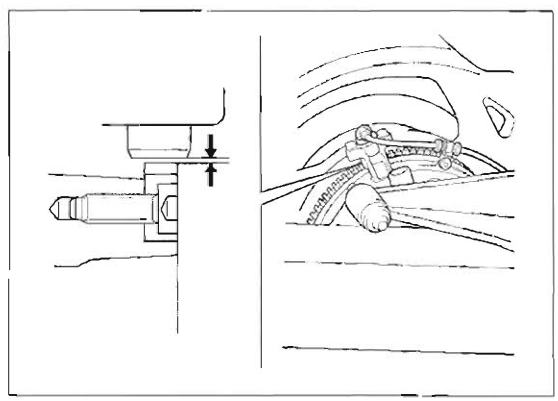
Check for a loose pulser ring or wheel speed sensor.

Check the pulser ring for deformation or damage (e.g., chipped teeth) and the wheel speed sensor tip for damage.

Are there any deposits between the gap?

YES – Remove any deposits and install properly or replace any faulty part.

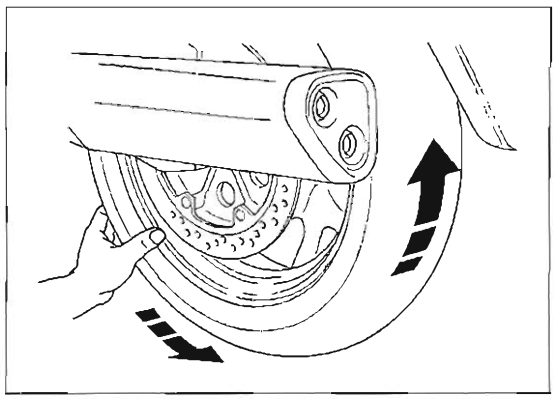
NO – GO TO STEP 3.



3. **The ABS Indicator Function Inspection**

   Retrieve the problem code and erase it.

   With the ignition switch turned to "ON" (do not operate the ignition switch after erasing the problem code), turn the rear wheel by hand (vehicle speed; approximately 4 km/h (2.5 mph) or above) and check the ABS indicator blinks.



   Is the indicator blinking?

   YES – • The ABS control unit has been disrupted by an extremely powerful radio wave.
   • Check the connector and wire harness of the wheel speed sensor system for loose connection.

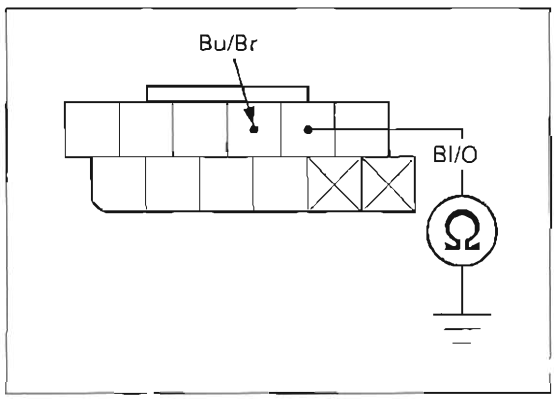
   NO – GO TO STEP 4.

4. **Wheel Speed Sensor Line Short Circuit Inspection at ABS Control Unit**

   Disconnect the ABS control unit 12P (Black) connector.

   Measure for continuity between the ABS control 12P (Black) connector wire harness side terminals and ground.

   Connection: Black/orange - ground
   Blue/brown - ground
   Standard: No continuity



   Is there continuity?

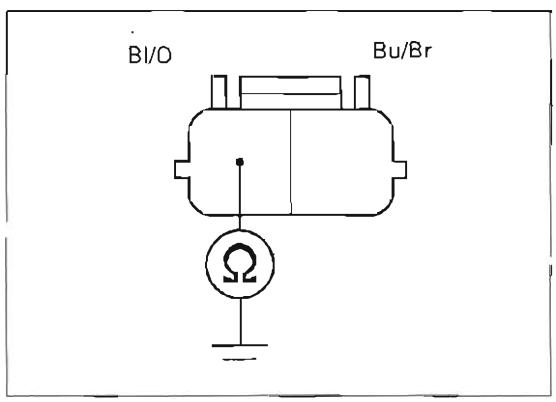
   YES – GO TO STEP 5.

   NO – GO TO STEP 6.

5. **Wheel Speed Sensor Line Short Circuit Inspection at Sensor Connector**

   Check for continuity between the sensor side terminals and ground.

   Connection: Black/orange - ground
   Blue/brown - ground



   Is there continuity?

   NO – Short circuit in the wire harness between the ABS control unit and wheel speed sensor.

   YES – Faulty rear wheel speed sensor.

6. Wire Harness Continuity Inspection

Disconnect the rear wheel speed sensor 2P connector.
Short the terminals of the connector with a jumper wire.

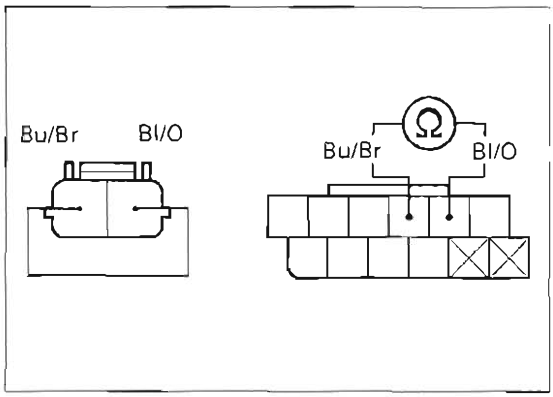
Check for continuity between the ABS control unit 12P (Black) connector wire harness side terminals.

Connection: Black/orange - Blue/brown
Standard: Continuity

Is there continuity?

YES – GO TO STEP 7.

NO – Open or short circuit in wire between the ABS control unit and rear wheel speed sensor.



7. Rechecking Indicator Function

Remove the rear wheel speed sensor and replace it with a new one.

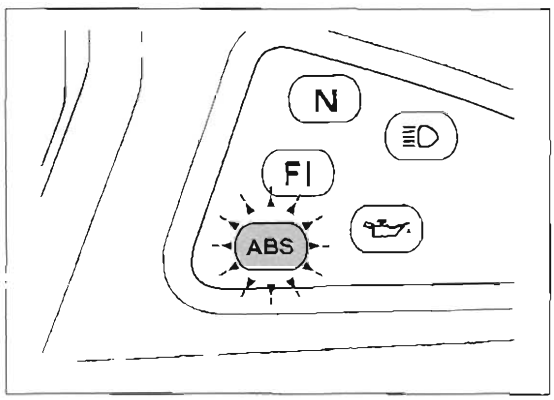
Connect the ABS control unit 12P (Black) connector.

Perform the pre-start self-diagnosis and check the ABS indicator.

Is the indicator blinking?

YES – Faulty ABS control unit.

NO – Faulty rear wheel speed sensor.



Problem code 4: Front modulator control motor system

1. ABS Indicator Function Rechecking

Before troubleshooting, check for the following:

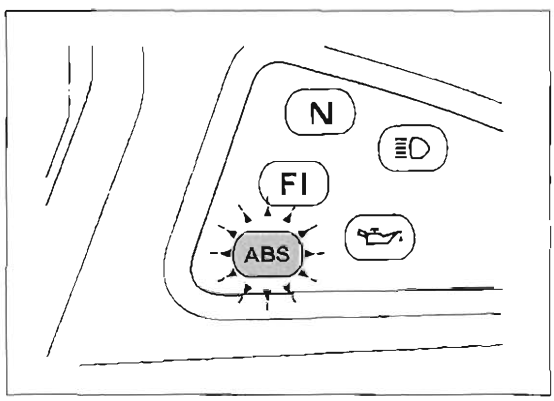
- Front ABS fuse 30A connection.
- Short or open circuit in wire harness between the fuse box and ABS control unit.

Retrieve the problem code and erase it.
Perform the pre-start self-diagnosis and check the ABS indicator.

Is the indicator still blinking?

NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for loose connection.

YES – GO TO STEP 2.



2. **ABS Control Unit Battery Voltage Inspection**

   Disconnect the ABS control unit 5P (Black) connector.

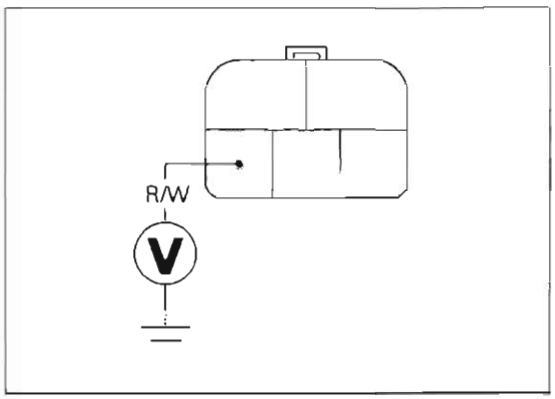
   Measure the voltage between the ABS control unit 5P (Black) connector wire harness side terminal and ground.

   Connection: Red/white - ground
   Standard: Battery voltage

   Is there battery voltage?

   NO – Open or short circuit in wire harness between the fuse box and ABS control unit.

   YES – GO TO STEP 3.



3. **Modulator Motor Ground Circuit Inspection at ABS Control Unit**

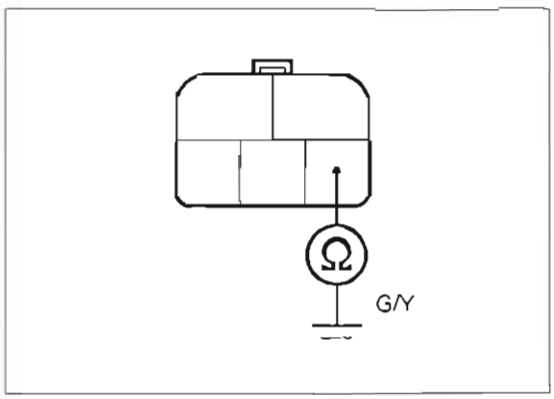
   Check for continuity between the ABS control unit 5P (Black) wire harness side connector terminals and ground.

   Connection: Green/yellow - ground

   Is there continuity?

   NO – Open circuit in Green wire.

   YES – GO TO STEP 4.



4. **Modulator Motor Short Circuit Inspection at Modulator Connector**

   Disconnect the front ABS modulator 2P connector.

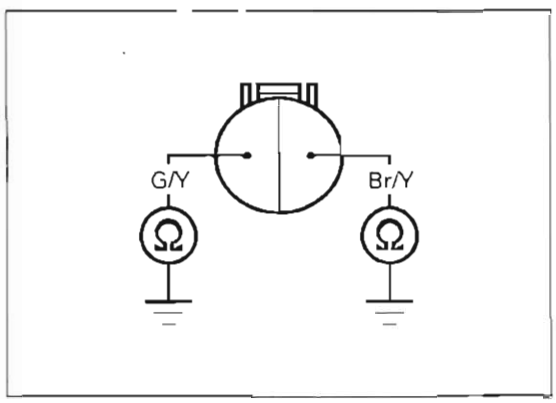
   Check for continuity between the ABS modulator side 2P connector terminals and ground.

   Connection: Brown/yellow - ground
   Green/yellow - ground

   Is there continuity?

   YES – Short circuit in wire harness between the ABS control unit and modulator.

   NO – GO TO STEP 5.

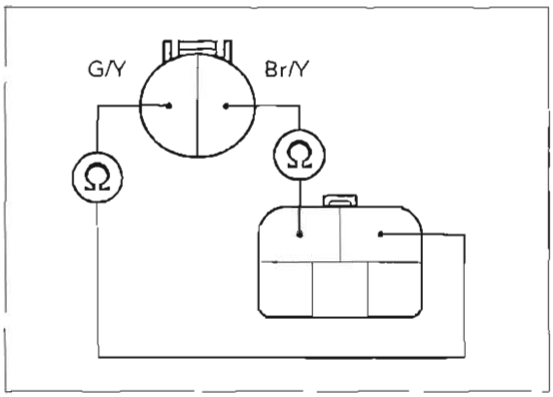


5. **Wire Harness Open Circuit Inspection Between the Modulator and Control Unit**

Disconnect the ABS control unit 5P (Black) connector

Check for continuity between the ABS modulator 2P wire harness side connector and ABS control unit 5P (Black) wire harness side connector.

Connection: Brown/yellow - Brown/yellow
Green/yellow - Green/yellow



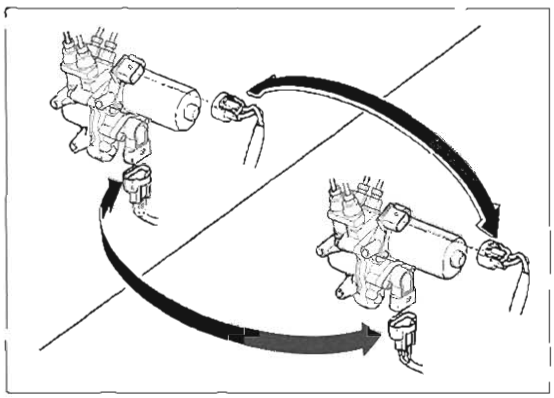
Is there continuity?

NO – Open circuit in wire harness between the ABS control unit and modulator.

YES – GO TO STEP 6.

6. **Modulator Motor Inspection by Replacing Front and Rear Modulators**

Connect the ABS control unit 5P (Black) connector.
Remove the front and rear modulators and interchange them.
Connect the front modulator 3P (Gray) and 2P connectors to the rear modulator.
Connect the rear modulator 3P (Gray) and 2P connectors to the front modulator.



Perform the pre-start self-diagnosis and retrieve the problem code, and record it.

Is any problem code indicated?

5 blinks–Faulty front ABS modulator.

4 blinks–Faulty ABS control unit.

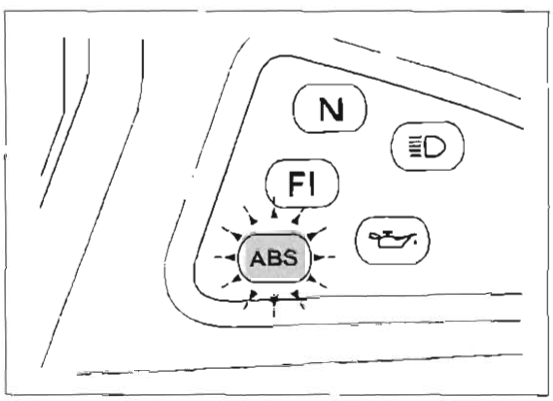
Problem code 5: Rear modulator control motor system

1. **ABS Indicator Function Rechecking**

Before troubleshooting check for the following:

- Rear ABS fuse 30A connection.
- Short or open circuit in wire harness between the fuse box and ABS control unit.

Retrieve the problem code and erase it.
Perform the pre-start self-diagnosis and check the ABS indicator.



Is the indicator still blinking?

NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for a loose connection.

YES – GO TO STEP 2.

2. **ABS Control Unit Battery Voltage Inspection**

Disconnect the ABS control unit 5P (Brown) connector.

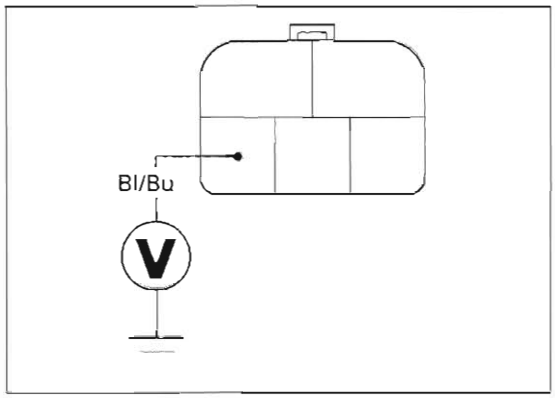
Measure the voltage between the ABS control unit 5P (Black) connector wire harness side terminal and ground.

Connection: Black/blue - ground
Standard: Battery voltage

Is there battery voltage?

NO – Open or short circuit in wire harness between the fuse box and ABS control unit.

YES – GO TO STEP 3.



3. **Modulator Motor Ground Circuit Inspection at ABS Control Unit**

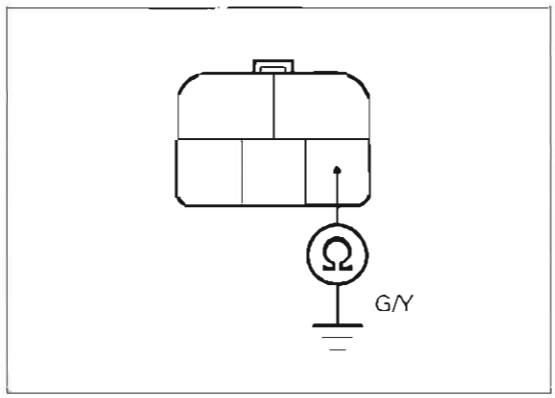
Check for continuity between the ABS control unit 5P (Brown) wire harness side connector terminals and ground.

Connection: Green/yellow - ground

Is there continuity?

NO – Open circuit in Green wire.

YES – GO TO STEP 4.



4. **Modulator Motor Short Circuit Inspection at Modulator Connector**

Disconnect the rear ABS modulator 2P connector.

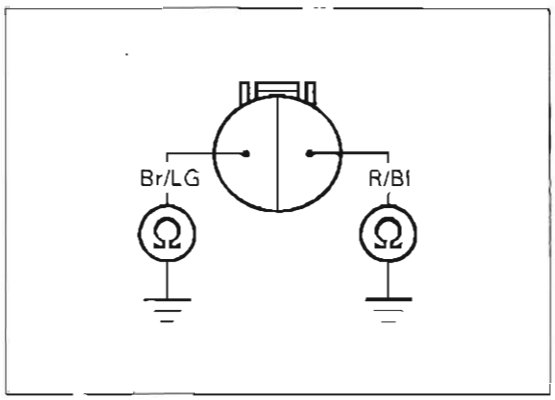
Check for continuity between the ABS modulator side 2P connector terminals and ground.

Connection: Brown/light green - ground
Red/black - ground

Is there continuity?

YES – Short circuit in wire harness between the ABS control unit and modulator.

NO – GO TO STEP 5.



5. **Wire Harness Open Circuit Inspection Between the Modulator and Control Unit**

   Disconnect the ABS control unit 5P (Brown) connector

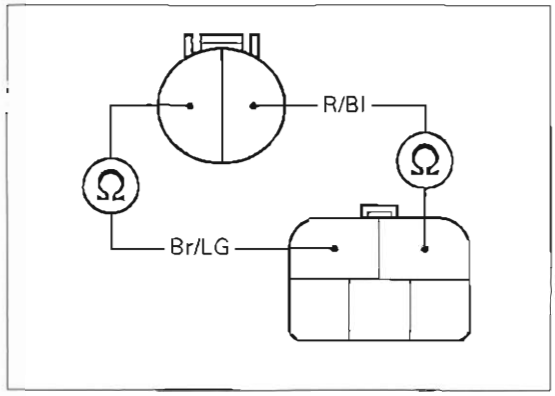
   Check for continuity between the ABS modulator 2P wire harness side connector and ABS control unit 5P (Black) wire harness side connector.

   Connection: Brown/light green - Brown/light green
   Red/black - Red/black

   Is there continuity?

   NO – Open circuit in wire harness between the ABS control unit and modulator.

   YES – GO TO STEP 6.



6. **Modulator Motor Inspection by Replacing Front and Rear Modulators**

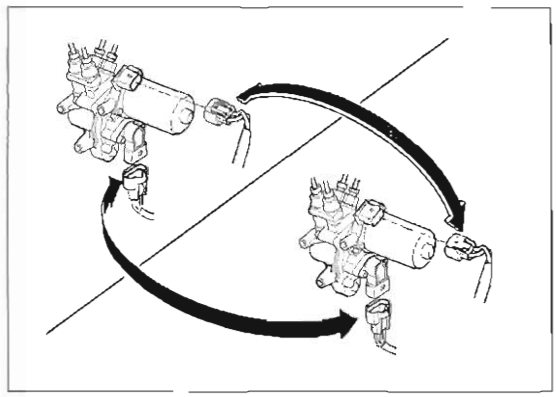
   Connect the ABS control unit 5P (Brown) connector.
   Remove the front and rear modulators and interchange them.
   Connect the front modulator 3P (Gray) and 2P connectors to the rear modulator.
   Connect the rear modulator 3P (Gray) and 2P connectors to the front modulator.

   Perform the pre-start self-diagnosis, retrieve the problem code and record it.

   Is any problem code indicated?

   4 blinks–Faulty rear ABS modulator.

   5 blinks–Faulty ABS control unit.



Problem code 6: Front modulator crank angle sensor system inspection

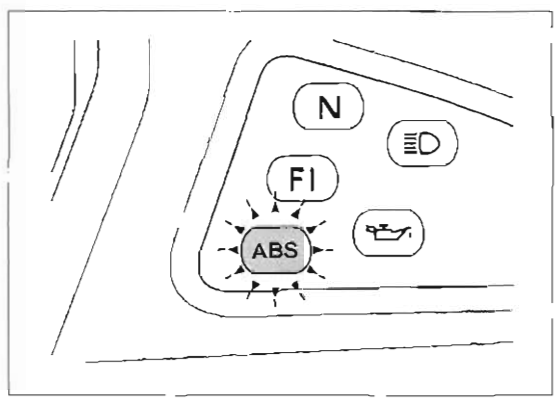
1. **ABS Indicator Checking**

   Turn the ignition switch to "ON" and check the ABS indicator.

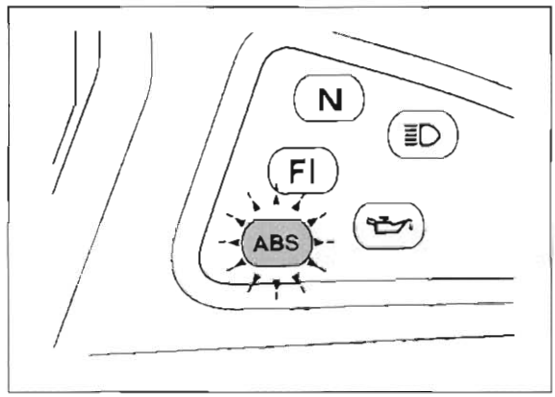
   Is the indicator blinking?

   NO – GO TO STEP 2.

   YES – GO TO STEP 3.



2. **ABS Indicator Function Rechecking**



Retrieve the problem code and erase it.

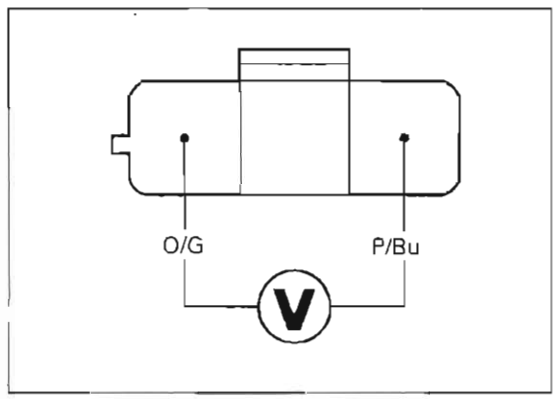
Perform the pre-start self-diagnosis and check the ABS indicator.

Is the indicator still blinking?

NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for loose connection.

YES – GO TO STEP 3.

3. **Crank Angle Sensor Input Voltage Inspection**



Disconnect the front ABS modulator 3P (Light gray) connector.

Measure the voltage between the 3P (Light gray) connector wire harness side terminals with the ignition switch turned to "ON".

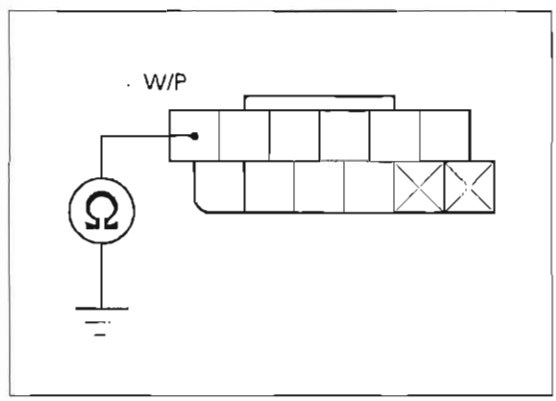
Connection: Orange/green (+) - Pink/blue (-)
Standard: 4.5 - 5.5 V

Is the voltage within standard value?

NO – GO TO STEP 8.

YES – GO TO STEP 4.

4. **Crank Angle Sensor Short Circuit Inspection at ABS Control Unit Connector**



Disconnect the ABS control unit 12P (Black) connector.

Connect the front ABS modulator 3P (Light gray) connector.

Check for continuity between the ABS control unit 12P (Black) wire harness side connector and ground.

Connection: White/pink - ground

Is there continuity?

YES – GO TO STEP 5.

NO – GO TO STEP 6.

5. **Crank angle sensor short circuit inspection at modulator connector**

   Disconnect the front ABS modulator 3P (Light gray) connector.

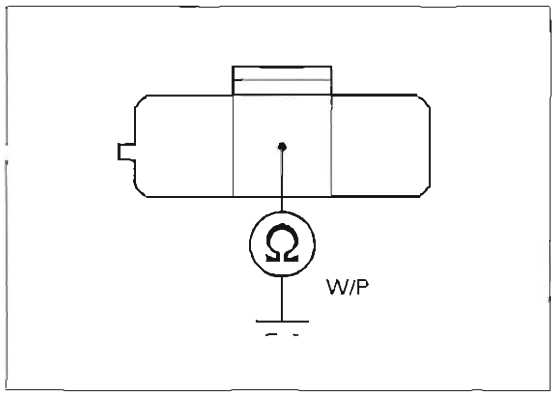
   Check for continuity between the front ABS modulator 3P (Light gray) connector and ground.

   Connection: White/pink - ground

   Is there continuity?

   YES – Short circuit in wire harness between the front ABS modulator and the ABS control unit.

   NO – GO TO STEP 7.



6. **Wire harness continuity inspection**

   Disconnect the front ABS modulator 3P (Light gray) connector.

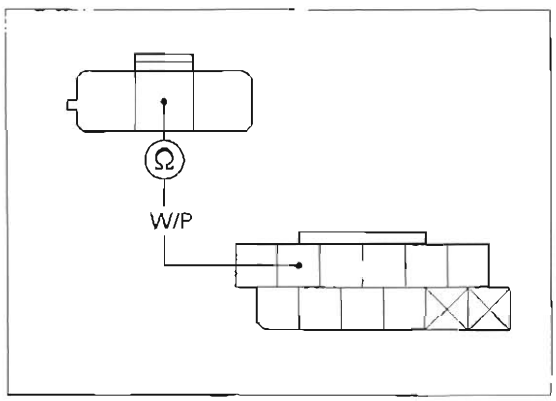
   Check for continuity between the ABS control unit 12P (Black) connector and front modulator 3P (Light gray) connector.

   Connection: White/pink - White/pink

   Is there continuity?

   NO – Open circuit in wire harness between the front ABS modulator and the ABS control unit.

   YES – GO TO STEP 7.



7. **Modulator inspection by replacing the front and rear modulators**

   Connect the ABS control unit 5P (Black) connector.

   Remove the front and rear modulators and interchange them.

   Connect the front modulator 3P (Gray) and 2P connectors to the rear modulator.

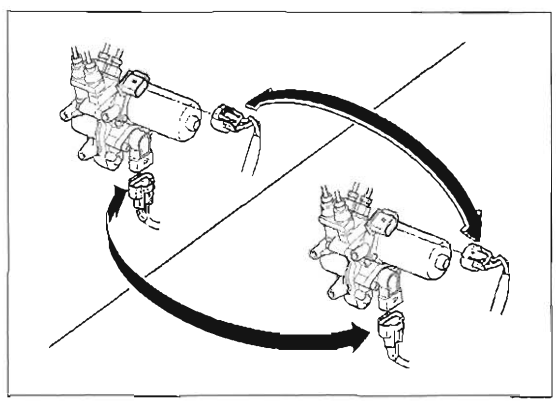
   Connect the rear modulator 3P (Gray) and 2P connectors to the front modulator.

   Perform the pre-start self-diagnosis, retrieve the problem code and record it.

   Is any problem code indicated?

   7 blinks–Faulty front ABS modulator.

   6 blinks–Faulty ABS control unit.



8. **Wire harness short circuit inspection for front modulator**

   Disconnect the ABS control unit 12P (Black) connector.

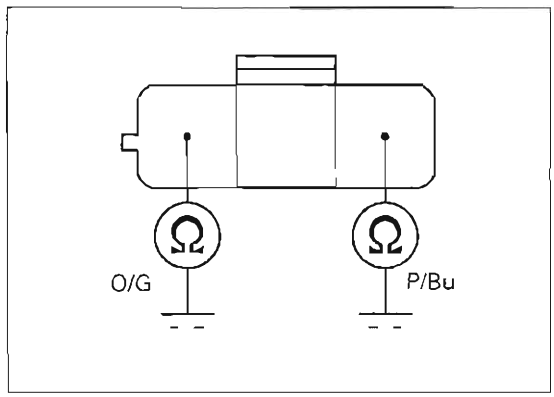
   Check for continuity between the front ABS modulator 3P (Light gray) wire harness side connector terminal and ground.

   Connection: **Orange/green - ground**
   Pink/blue - ground

   Is there continuity?

   YES – Short circuit in wire harness between the front ABS modulator and the ABS control unit.

   NO – GO TO STEP 9.



9. **Wire harness continuity inspection**

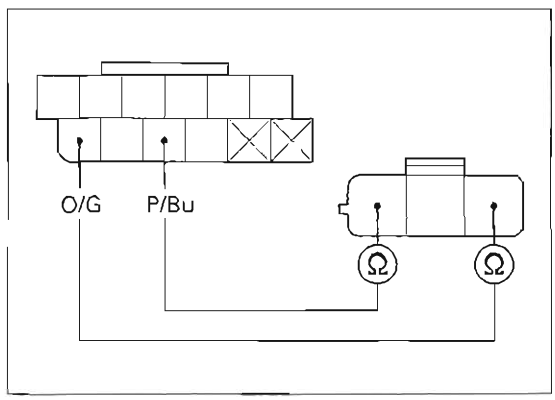
   Check for continuity between the front ABS modulator 3P (Light gray) wire harness side connector terminals and the ABS control unit 12P (Black) wire harness side connector terminals.

   Connection: **Orange/green - Orange/green**
   Pink/blue - Pink/blue

   Is there continuity?

   YES – Faulty ABS control unit.

   NO – Open circuit in wire harness between the front ABS modulator and the ABS control unit.



Problem code 7: Rear modulator crank angle sensor system inspection

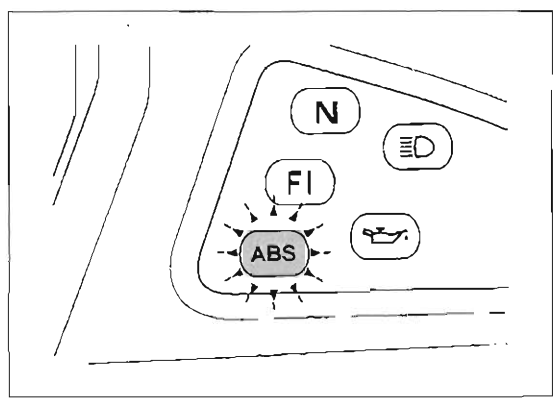
1. **ABS Indicator Checking**

   Turn the ignition switch to "ON" and check the ABS indicator.

   Is the indicator still blinking?

   NO – GO TO STEP 2.

   YES – GO TO STEP 3.



2. **ABS Indicator Function Rechecking**

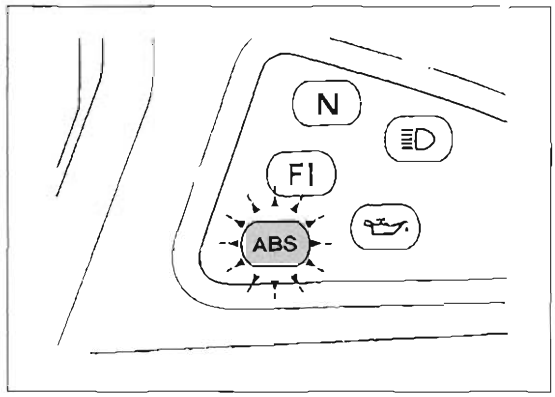
   Retrieve the problem code and erase it.

   Perform the pre-start self-diagnosis and check the ABS indicator.

   Is the indicator still blinking?

   NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
   • Check the connector and wire harness of the wheel speed sensor system for loose connection.

   YES – GO TO STEP 3.



3. **Crank Angle Sensor Input Voltage Inspection**

   Disconnect the rear ABS modulator 3P (Light gray) connector.

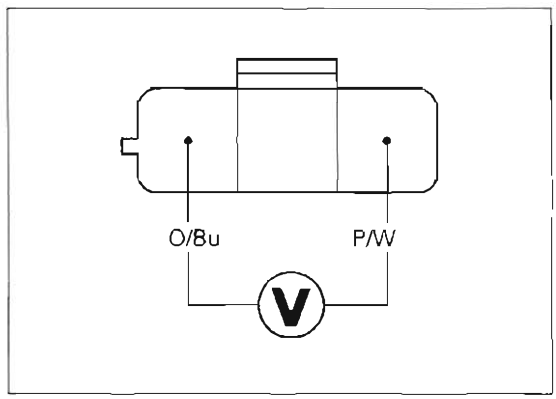
   Measure the voltage between the 3P (Light gray) connector wire harness side terminals with the ignition switch turned to "ON".

   Connection: Orange/blue (+) - Pink/white (-)
   Standard: 4.5 - 5.5 V

   Is the voltage within standard value?

   NO – GO TO STEP 8.

   YES – GO TO STEP 4.



4. **Crank Angle Sensor Short Circuit Inspection at ABS Control Unit Connector**

   Disconnect the ABS control unit 12P (Black) connector.

   Connect the rear ABS modulator 3P (Light gray) connector.

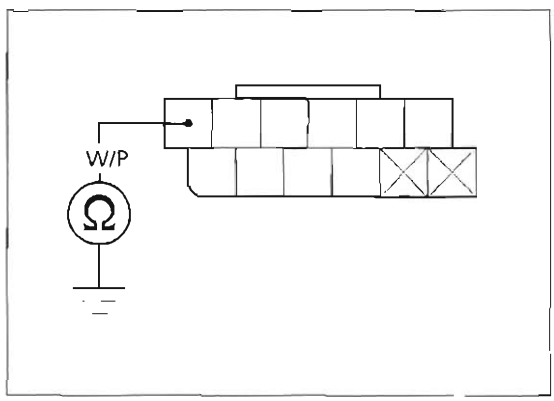
   Check for continuity between the ABS control unit 12P (Black) wire harness side connector and ground.

   Connection: White/pink - ground

   Is there continuity?

   YES – GO TO STEP 5.

   NO – GO TO STEP 6.



5. **Crank Angle Sensor short Circuit Inspection at Modulator Connector**

   Disconnect the rear ABS modulator 3P (Light gray) connector.

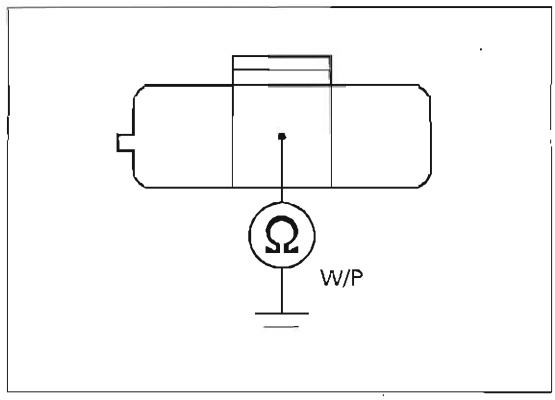
   Check for continuity between the rear ABS modulator 3P (Light gray) connector and ground.

   Connection: **White/pink - ground**

   Is there continuity?

   YES – Short circuit in wire harness between the rear ABS modulator and the ABS control unit.

   NO – GO TO STEP 7.



6. **Wire Harness Continuity Inspection**

   Disconnect the rear ABS modulator 3P (Light gray) connector.

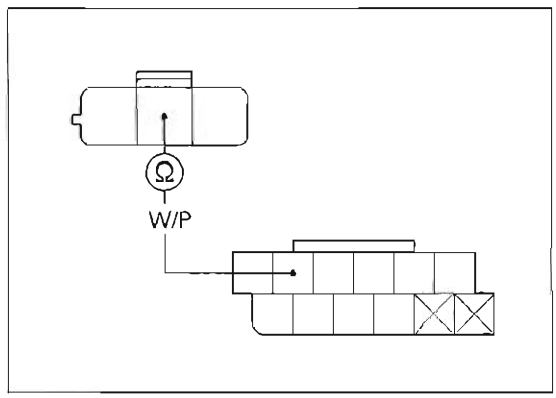
   Check for continuity between the ABS control unit 12P (Black) connector and rear modulator 3P (Light gray) connector.

   Connection: **White/pink - White/pink**

   Is there continuity?

   NO – Open circuit in wire harness between the rear ABS modulator and the ABS control unit.

   YES – GO TO STEP 7.



7. **Modulator Inspection by Replacing the Front and Rear Modulators**

   Connect the ABS control unit 5P (Black) connector.

   Remove the front and rear modulators and interchange them.

   Connect the rear modulator 3P (Gray) and 2P connectors to the rear modulator.

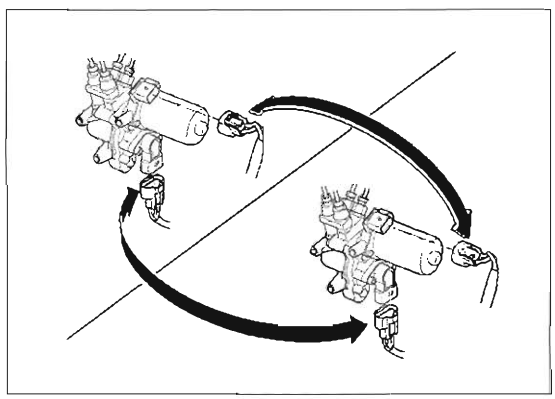
   Connect the front modulator 3P (Gray) and 2P connectors to the front modulator.

   Perform the pre-start self-diagnosis and retrieve the problem code, and record it.

   Is any problem code indicated?

   6 blinks–Faulty rear ABS modulator.

   7 blinks–faulty ABS control unit.

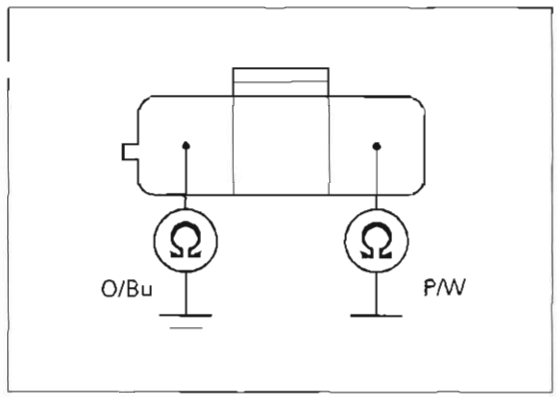


8. Wire Harness Short Circuit Inspection for Rear Modulator

Disconnect the ABS control unit 12P (Black) connector.

Check for continuity between the rear ABS modulator 3P (Light gray) wire harness side connector terminal and ground.

Connection: Orange/blue - ground
Pink/white - ground



Is there continuity?

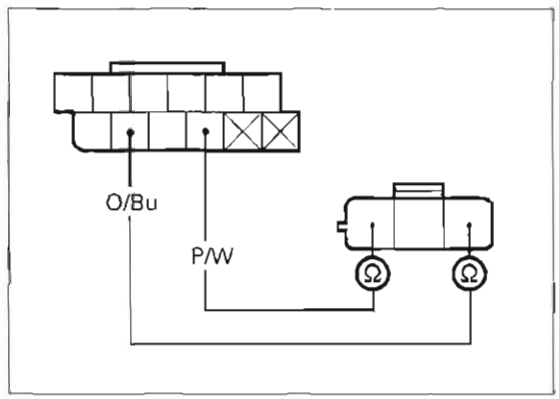
YES – Short circuit in wire harness between the rear ABS modulator and the ABS control unit.

NO – GO TO STEP 9.

9. Wire Harness Continuity Inspection

Check for continuity between the rear ABS modulator 3P (Light gray) wire harness side connector terminals and the ABS control unit 12P (Black) wire harness side connector terminals.

Connection: Orange/blue - Orange/blue
Pink/white - Pink/white



Is there continuity?

YES – Faulty ABS control unit.

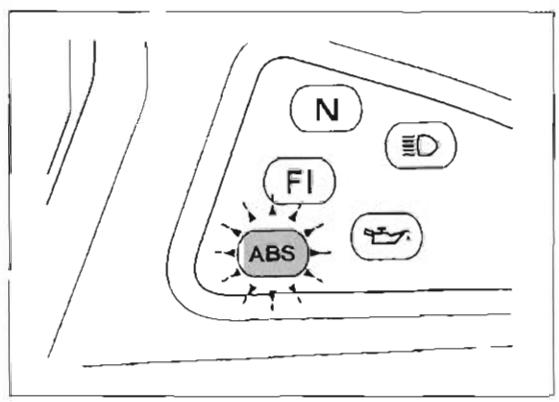
NO – Open circuit in wire harness between the rear ABS modulator and the ABS control unit.

Problem code 10: ABS control unit (front relay circuit)

1. ABS Indicator Checking

The ABS indicator blinks or comes on and stays on when the ABS control unit has been disrupted by an extremely powerful radio wave (electromagnetic interfere). This is just a temporary symptom. Erase the problem code and the ABS control unit is normal unless the symptom occurs again.

Turn the ignition switch to "ON" and check the ABS indicator.



Is the indicator still blinking?

NO – GO TO STEP 2.

YES – GO TO STEP 3.

2. **ABS Indicator Function Rechecking**

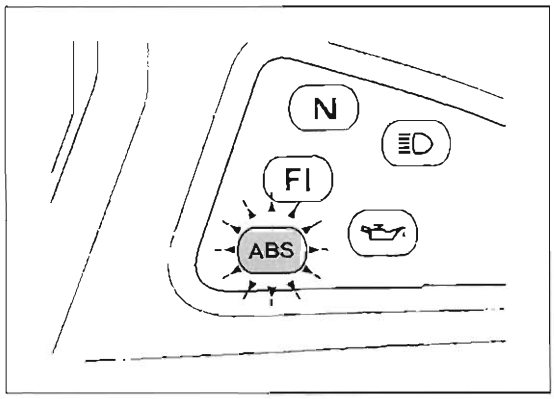
   Retrieve the problem code and erase it.

   Perform the pre-start self-diagnosis and check the ABS indicator.

   Is the indicator still blinking?

   NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
   • Check the connector and wire harness of the wheel speed sensor system for loose connection.

   YES – GO TO STEP 3.



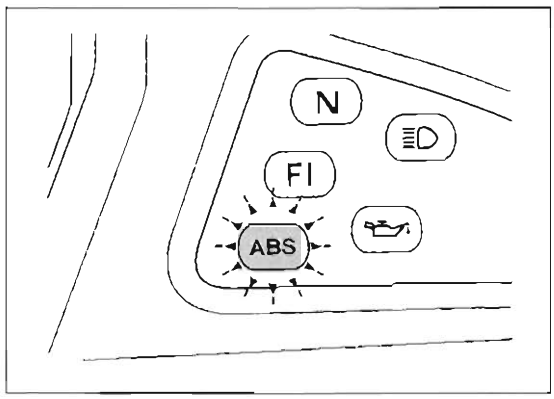
3. **Rechecking the Problem Code**

   Retrieve the problem code and record the latest problem code.

   Is the problem code other than 10 blinks?

   YES – Diagnose the latest problem code.

   NO – GO TO STEP 4.



4. **Modulator Inspection by Replacing the Front and Rear Modulators**

   Connect the front ABS control unit 3P (Light gray) and 2P connectors to the rear ABS modulator.

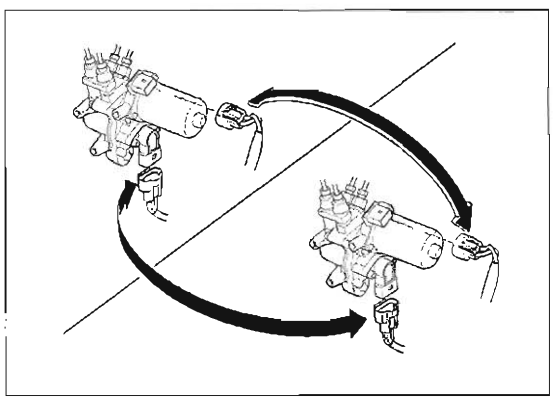
   Connect the rear modulator 3P (Gray) and 2P connectors to the rear modulator.

   Perform the pre-start self-diagnosis and retrieve the problem code, and record it.

   Is any problem code indicated?

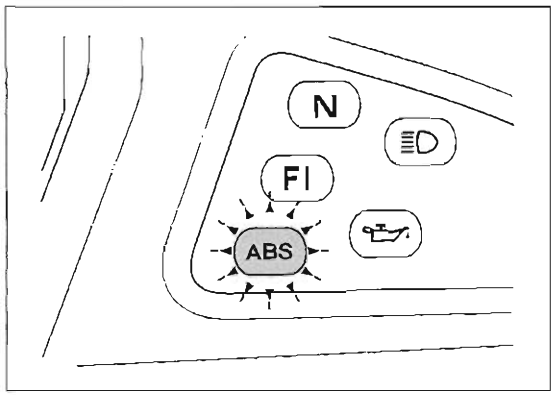
   11 blinks–Faulty front ABS modulator.

   10 blinks–Faulty ABS control unit.



Problem code 11: ABS control unit (rear relay circuit)

1. **ABS Indicator Checking**



The ABS indicator blinks or come on and stays on when the ABS control unit has been disrupted by an extremely powerful radio wave (electromagnetic interfere). This is just a temporary symptom. Erase the problem code and the ABS control unit is normal unless the symptom occurs again.

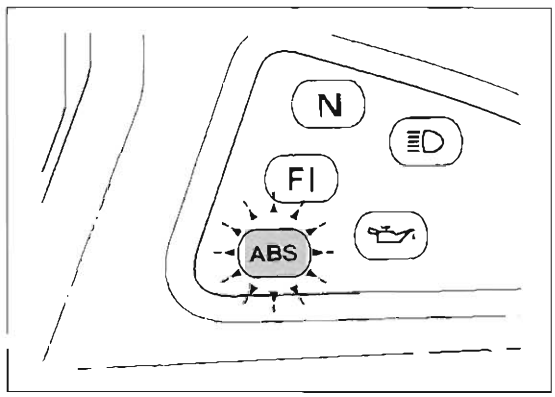
Turn the ignition switch to "ON" and check the ABS indicator.

Is the indicator still blinking?

NO – GO TO STEP 2.

YES – GO TO STEP 3.

2. **ABS Indicator Function Rechecking**



Retrieve the problem code and erase it.

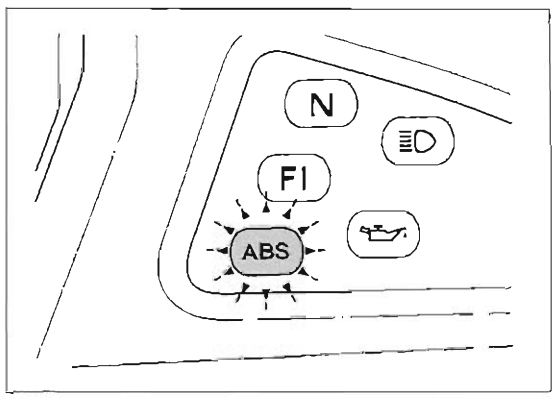
Perform the pre-start self-diagnosis and check the ABS indicator.

Is the indicator still blinking?

NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for loose connection.

YES – GO TO STEP 3.

3. **Rechecking the Problem Code**



Retrieve the problem code and record the latest problem code.

Is the problem code other than 11 blinks?

YES – Diagnose the latest problem code.

NO – GO TO STEP 4.

4. **Modulator Inspection by Replacing the Front and Rear Modulators**

   Connect the front ABS control unit 3P (Light gray) and 2P connectors to the rear ABS modulator.

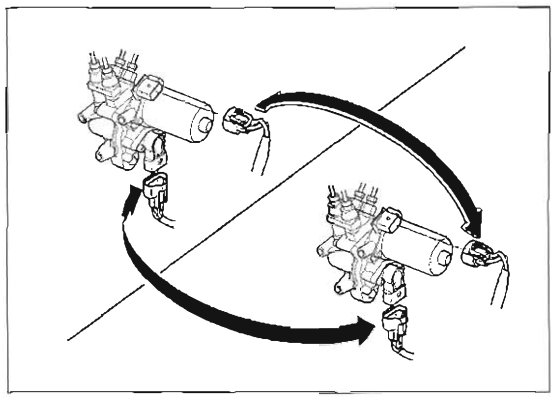
   Connect the rear modulator 3P (Gray) and 2P connectors to the rear modulator.

   Perform the pre-start self-diagnosis and retrieve the problem code, and record it.

   Is the any problem code indicated?

   10 blinks–Faulty rear ABS modulator.

   11 blinks–Faulty ABS control unit.



Problem code 12 and 13: ABS control unit (front and rear motor drive circuit)

1. **ABS Indicator Checking**

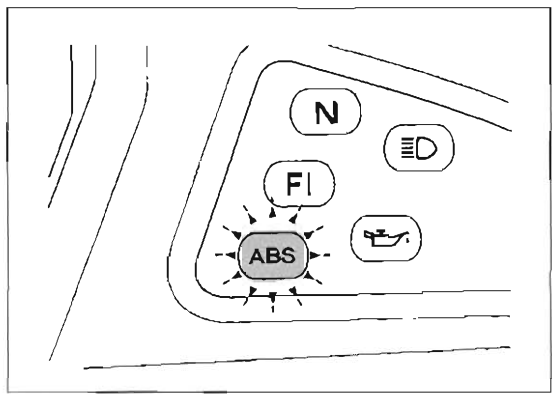
   The ABS indicator blinks or come on and stays on when the ABS control unit has been disrupted by an extremely powerful radio wave (electromagnetic interfere). This is just a temporary symptom. Erase the problem code and the ABS control unit is normal unless the symptom occurs again.

   Turn the ignition switch to "ON" and check the ABS indicator.

   Is the indicator still blinking?

   NO – GO TO STEP 2.

   YES – GO TO STEP 3.



2. **ABS Indicator Function Rechecking**

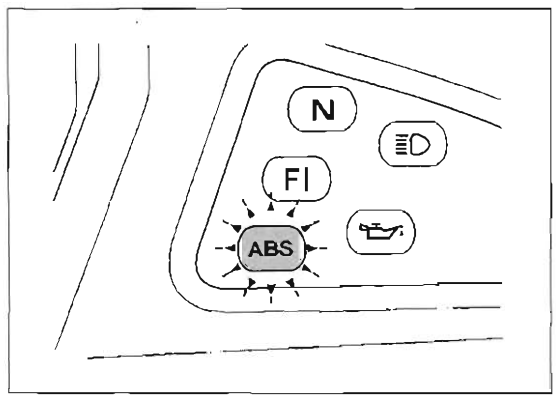
   Retrieve the problem code and erase it.

   Perform the pre-start self-diagnosis and check the ABS indicator.

   Is the indicator still blinking?

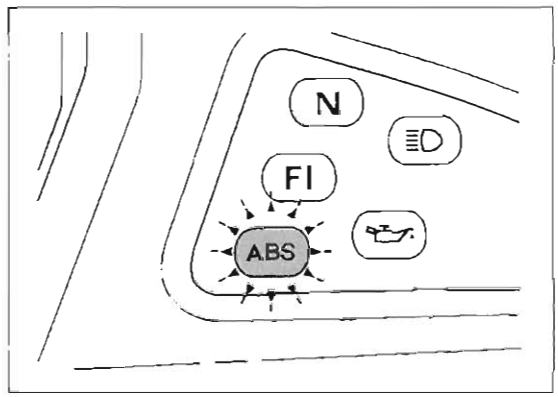
   NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
   • Check the connector and wire harness of the wheel speed sensor system for loose connection.

   YES – GO TO STEP 3.



3. Rechecking the Problem Code

Retrieve the problem code and record the latest problem code.



Is the problem code other than 12 or 13 blinks?

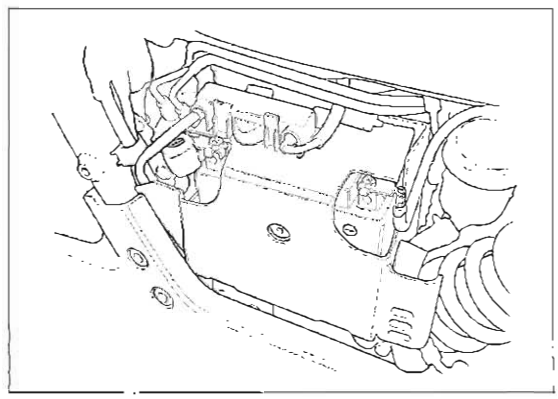
YES – Diagnose the latest problem code.

NO – Faulty ABS control unit.

Problem code 14: Power circuit inspection

1. Battery Charging System Inspection

- Ask the rider about the following when the motorcycle is brought in for inspection. This problem code will light up to indicate battery discharge.
  - Ask whether the motorcycle has been run with large capacity electric load accessories.
  - Ask whether the motorcycle has been left for long time with the ignition switch turned to "ON" (after the pre-start self-diagnosis).
- Check to see whether the indicated idle speed matches the specified idle speed.
- Before troubleshooting check for following:
  - Front and rear ABS fuse 30A condition.
  - Short or open circuit in wire harness between the fuse box and ABS control unit.



Is the charging system OK?

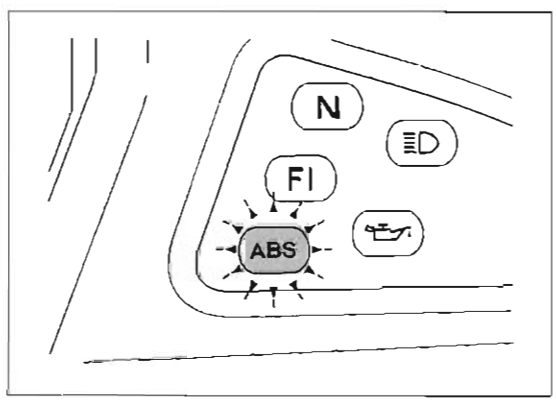
NO – Check the charging system.

YES – GO TO STEP 2.

2. ABS Indicator Function Rechecking

Retrieve the problem code and erase it.

Perform the pre-start self-diagnosis and check the ABS indicator.



Is the indicator still blinking?

NO – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for loose connection.

YES – Blinks (GO TO STEP 4.), Stay on (GO TO STEP 3.)

3. **Input Voltage Inspection**

Disconnect the ABS control unit 5P (Black) and 5P (Brown) connectors.

Measure the voltage between the ABS control unit 5P wire harness side connector terminals.

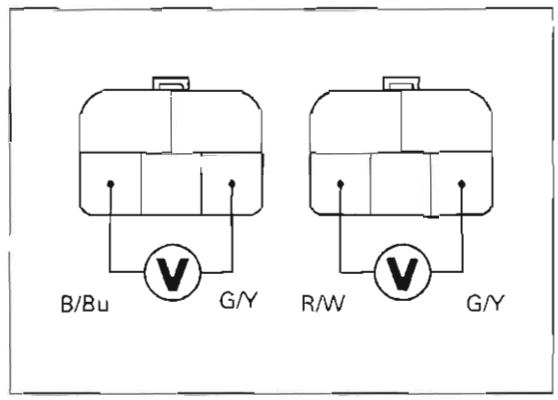
Connection: **Black/blue (+) - Green/yellow (-)**
Red/white (+) - Green/yellow (-)

Standard: **10 - 17 V at all time**

Is the voltage within the standard value?

NO – Check the charging system (page 19-8).

YES – Faulty ABS control unit.



4. **Recheck Voltage After Replacing the New Battery**

Retrieve the problem code and verify that the problem code is "14". Erase the problem code.

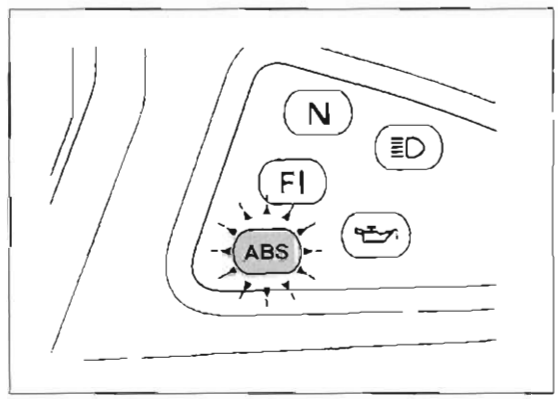
Replace the battery with a new fully charged battery.

Perform the pre-start self-diagnosis and check the ABS indicator.

Is the indicator still blinking?

YES – Faulty ABS control unit.

NO – Faulty removed battery.



Problems not detected by ABS control unit (ABS indicator stays on)

1. **Input Voltage Line Inspection at ABS Control Unit**

Before troubleshooting, check for the follow

- ABS fuse 10A condition.
- Short or open circuit in wire harness between the fuse box and ABS control unit.

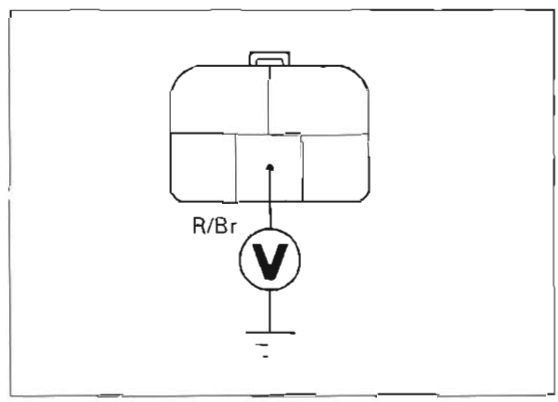
Disconnect the ABS control unit 5P (Brown) connector.
Measure the voltage between the ABS control unit 5P (Brown) wire harness side connector and ground with the ignition switch turned to "ON".

Connection: **Red/brown (+) - ground (-)**

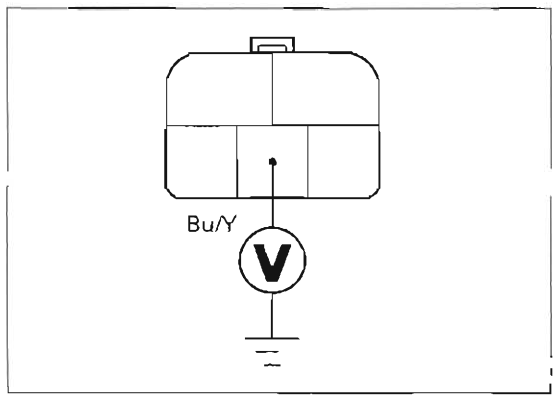
Is there voltage?

NO – Open circuit in wire harness between the fuse box and ABS control unit.

YES – GO TO STEP 2.



2. **ABS Indicator Output Voltage**



Connect the ABS control unit 5P (Brown) connector.

Disconnect the ABS control unit 5P (Black) connector.

With the ignition switch turned to "ON" measure the voltage between the ABS control unit 5P (Black) wire harness side connector terminal and ground.

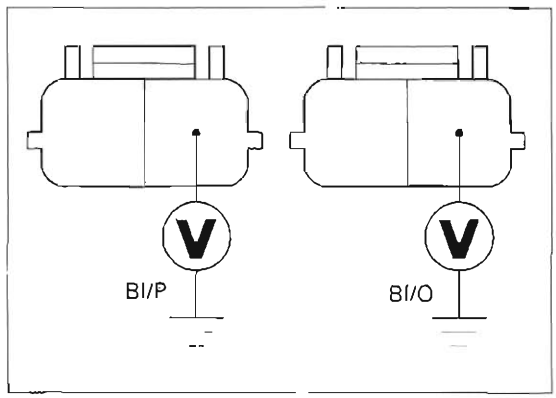
Connection: Blue/yellow (+) - ground (-)
Standard: 1 - 3 V

Is the voltage within standard value?

NO – Open circuit in wire harness between the combination meter (ABS indicator) and ABS control unit.

YES – GO TO STEP 3.

3. **Short Circuit Inspection in Wheel Speed Sensor Input Signal Line**



Connect the ABS control unit 5P (Black) connector.

Disconnect the front and rear wheel speed sensor 2P connectors.

Measure the voltage between each wheel speed sensor 2P connector wire harness side connector terminal and ground with the ignition switch turned to "ON".

Connection: Black/pink - ground
Black/orange - ground

Is there voltage?

YES – Open circuit in wire harness between the front and/or rear wheel speed sensor and ABS control unit.

NO – GO TO STEP 5.

4. **Wire Harness Continuity Inspection**

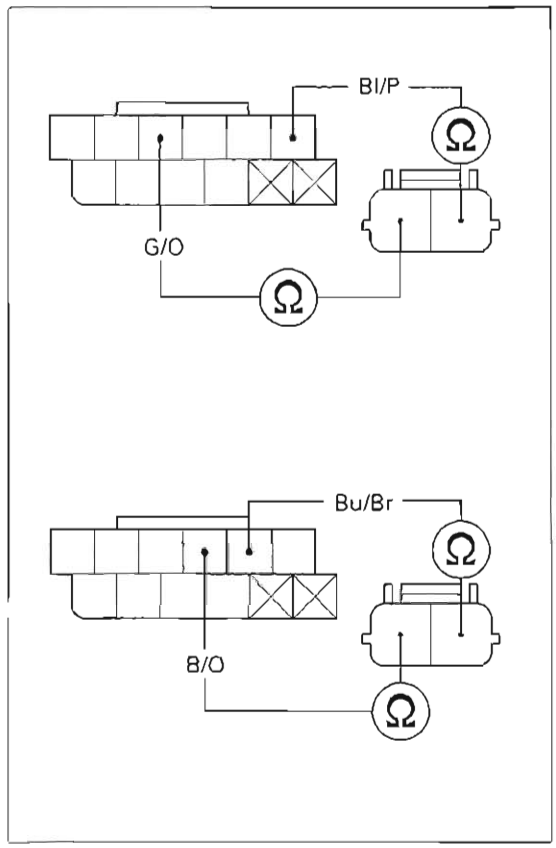
Disconnect the front and rear wheel speed sensor 2P connectors.

Check for continuity between each wheel speed sensor 2P connector wire harness side and ABS control unit 12P (Black) wire harness connector terminals.

Is there continuity?

NO – Open circuit in wire harness between the front and/or rear wheel speed sensor and ABS control unit.

YES – GO TO STEP 5.



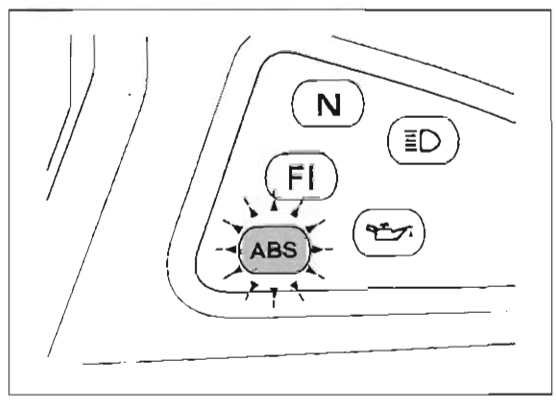
5. **ABS Indicator Rechecking**

Perform the pre-start self-diagnosis and check the ABS indicator.

Does the indicator go off?

YES – • Fine foreign matter in modulator or the ABS control unit has been disrupted by an extremely powerful radio wave.
• Check the connector and wire harness of the wheel speed sensor system for loose connection.

NO – Faulty ABS control unit.



WHEEL SPEED SENSOR

AIR GAP INSPECTION

Front

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: Front/rear: 0.4 - 1.2 mm (0.02 - 0.05 in)

The sensor air gap cannot be adjusted.
If it is not within specification, check each installed part for deformation, looseness and damage.



Rear

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: Front/rear: 0.7 - 1.2 mm (0.03 - 0.05 in)

If it is not within specification, check each installed part for deformation, looseness and damage.
If each part is normal, adjust the clearance using the shim.

SHIM'S USE RANGE: From zero to one shim

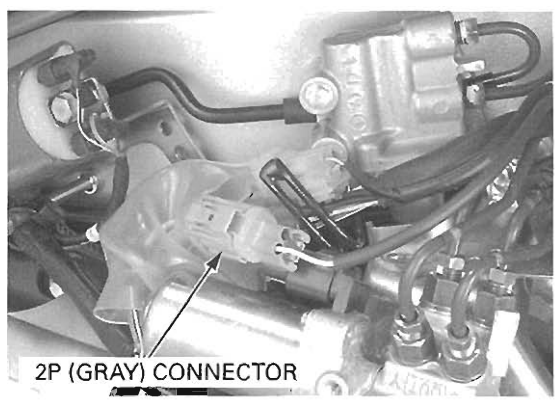


REPLACEMENT

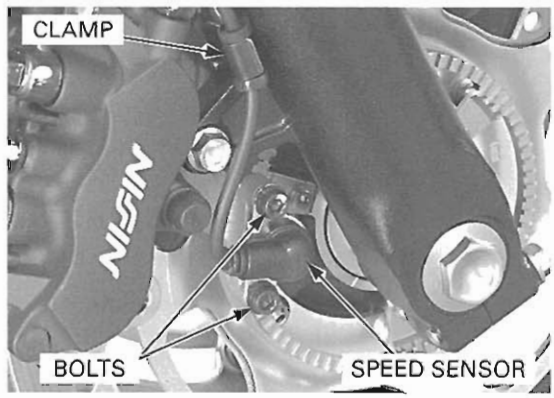
Front sensor

Remove the middle cowl (page 2-13).

Disconnect the sensor 2P (Gray) connector.



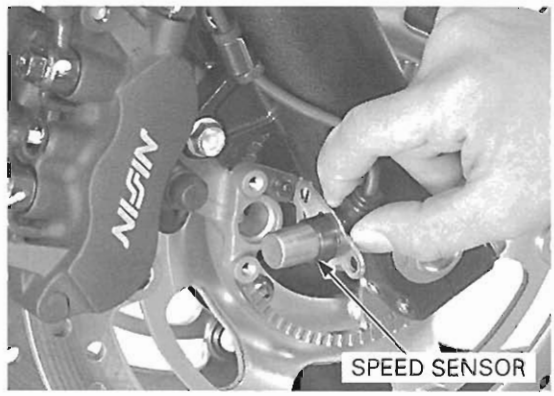
Remove the two bolts, clamp and wheel speed sensor.



Route the wire properly (page 1-27).

Installation is in the reverse order of removal.

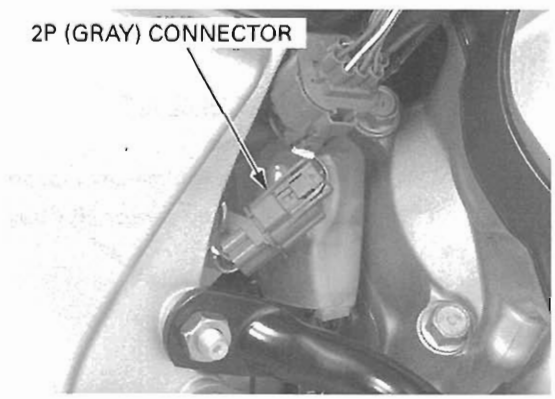
After installation, check the air gap (page 18-31).



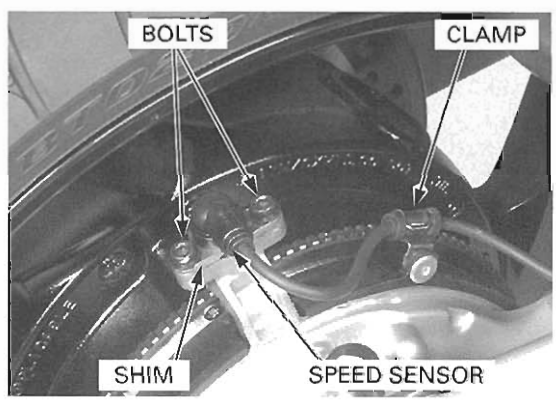
Rear sensor

Remove the middle cowl (page 2-13).

Disconnect the rear wheel speed sensor 2P (Gray) connector.

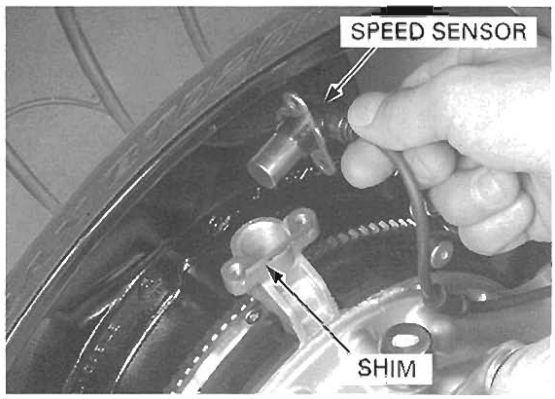


Remove the two bolts and the wheel speed sensor and shim.



Route the wire properly (page 1-27).

Installation is in the reverse order of removal.

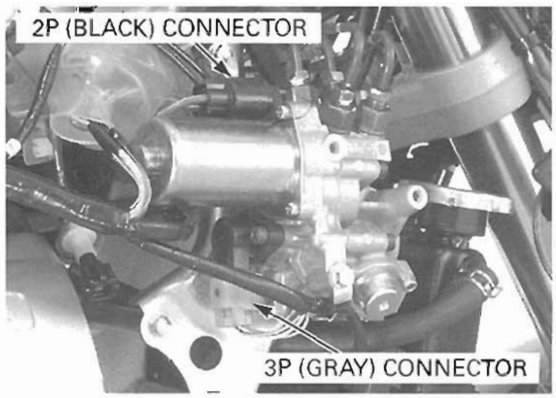


ABS MODULATOR

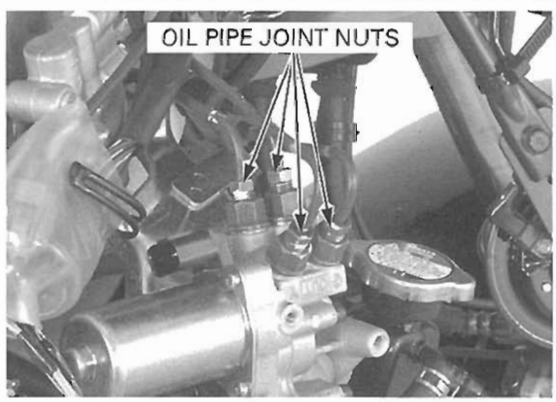
FRONT MODULATOR REMOVAL

Drain the lever and pedal hydraulic system (page 17-7).
Remove the middle cowl (page 2-13).

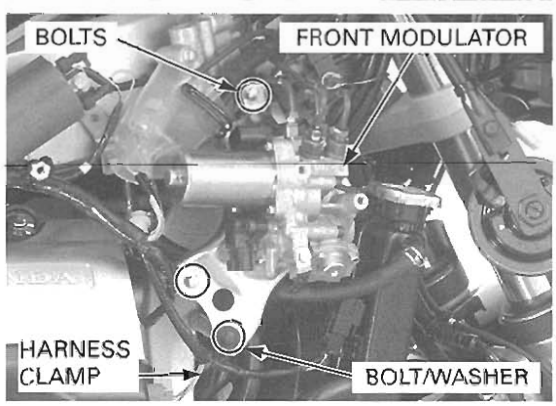
Disconnect the control motor 2P (Black) and crank angle sensor 3P (Light gray) connectors.



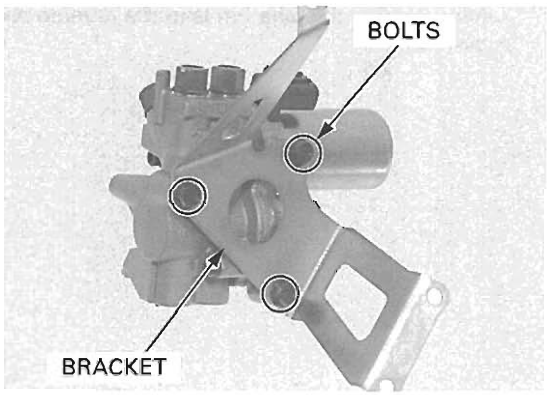
Loosen the oil pipe joint nuts, then disconnect the brake pipe from the front modulator.



Remove the modulator stay mounting bolts, washer, harness clamp and modulator/stay assembly from the frame.



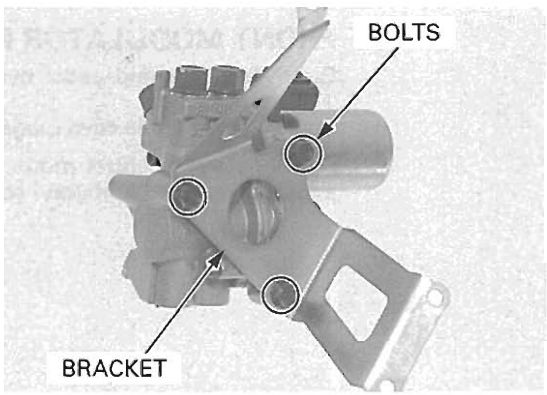
Remove the three bolts and modulator stay from the modulator.



FRONT MODULATOR INSTALLATION

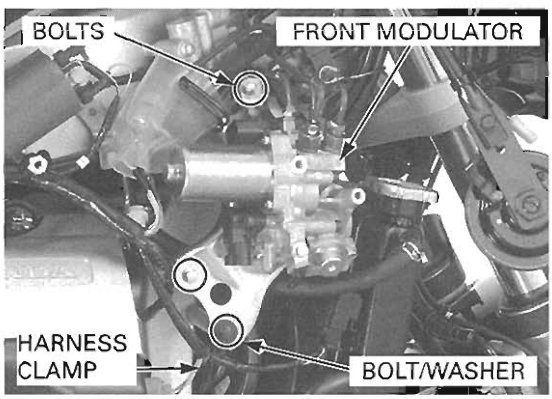
Install the modulator onto the stay and tighten the three mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



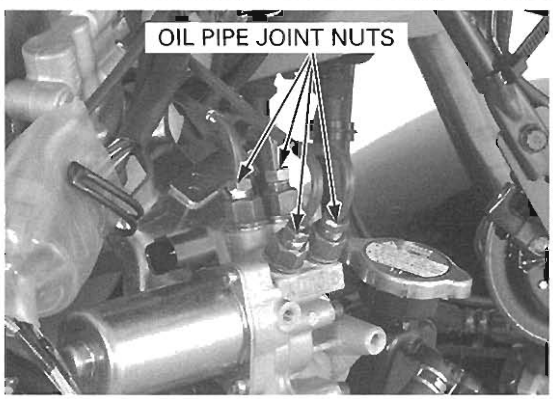
Install the modulator/stay assembly onto the frame, being careful not to interfere with the brake pipes.

Install the harness clamp and tighten the modulator stay mounting bolts.



Set the brake pipes into the modulator ports and make sure that the paint color on the brake pipes are aligned with the marks on the modulators.
Apply brake fluid to the joint nut threads on the brake pipes.
Tighten the joint nuts to the specified torque.

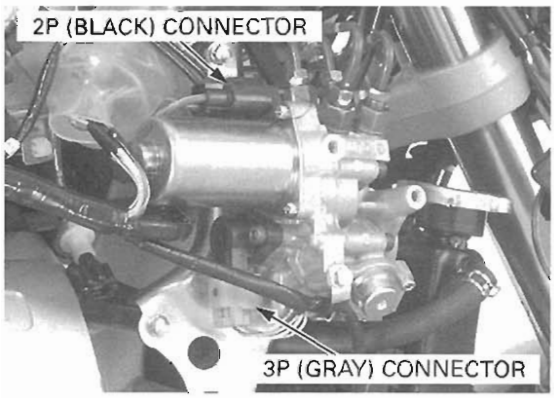
TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)



Connect the control motor 2P (Black) and crank angle sensor 3P (Light gray) connectors.

Fill and bleed the lever and pedal brake hydraulic system (page 17-7).

Install the middle cowl (page 2-13).



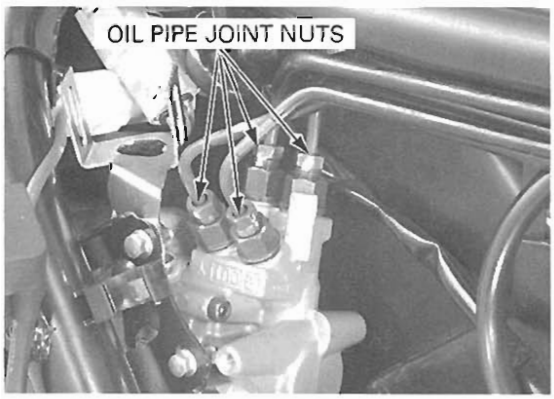
REAR MODULATOR REMOVAL

Drain the lever and pedal hydraulic system (page 17-7).

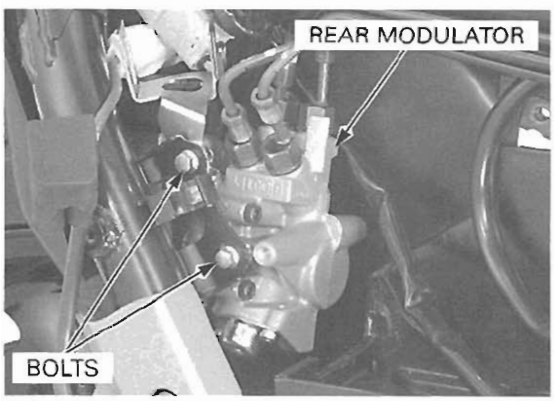
Remove the following:

- Rear cowl (page 2-8)
- Battery (page 19-5)

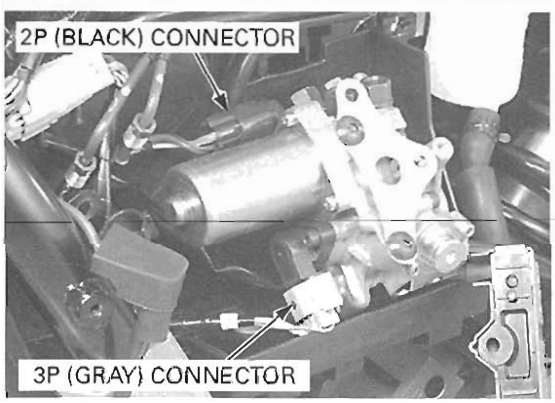
Loosen the oil pipe joint nuts, then remove the oil pipes from the rear modulator.



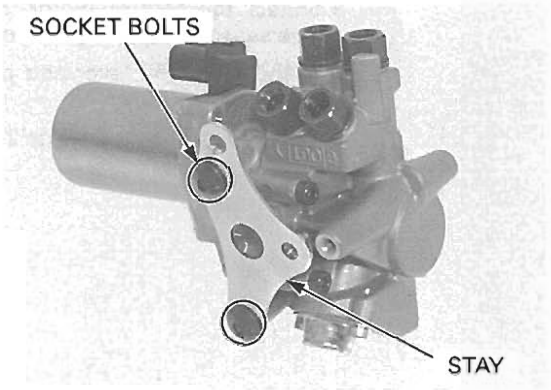
Remove the rear modulator stay mounting bolts, then remove the rear modulator assembly.



Disconnect the control motor 2P (Black) and crank angle sensor 3P (Light gray) connectors.



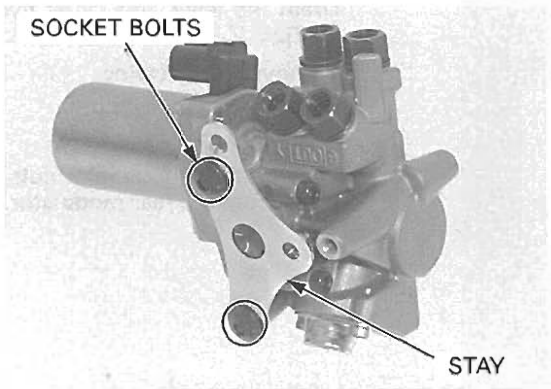
Remove the two socket bolts and modulator stay from the modulator.



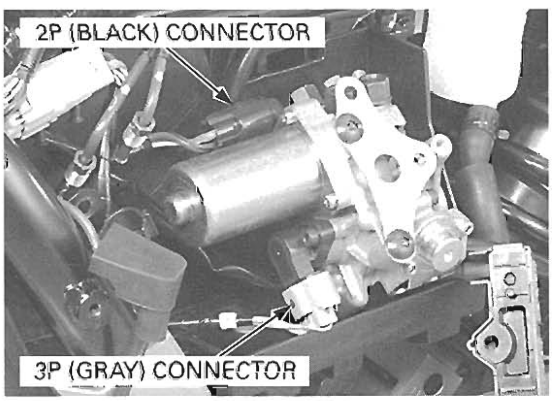
REAR MODULATOR INSTALLATION

Install the modulator onto the stay and tighten the two socket bolts to the specified torque.

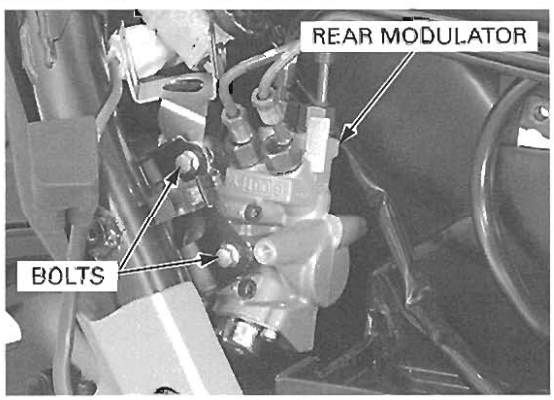
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the control motor 2P (Black) and crank angle sensor 3P (Light gray) connectors.



Install the modulator/stay assembly onto the frame, being careful not to interfere with the brake pipes. Install and tighten the modulator stay mounting bolts securely.

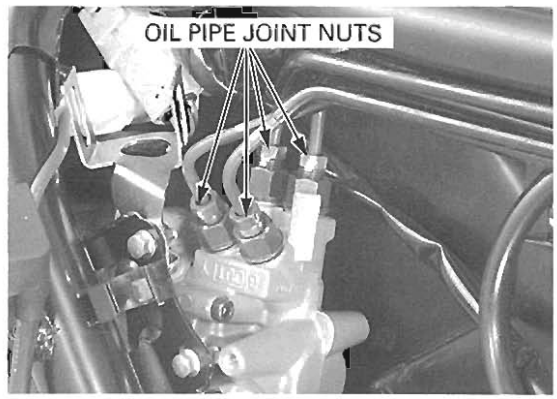


Set the brake pipes into the modulator ports and make sure that the paint color on the brake hoses are aligned with the marks on the modulators.

Tighten the oil pipe joint nuts to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Fill and bleed the lever and pedal brake hydraulic system (page 17-7).
Install the rear cowl (page 2-8).
Install the battery (page 19-5).



ABS CONTROL UNIT

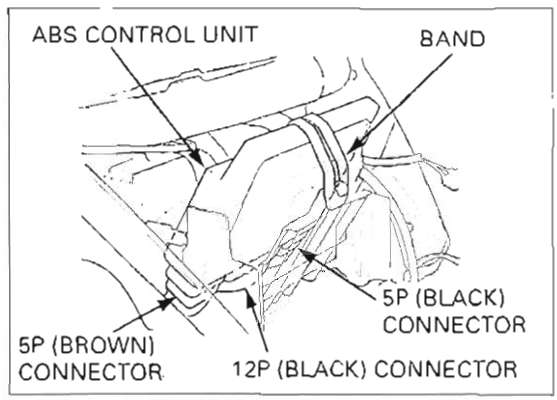
REMOVAL/INSTALLTION

Remove the rear cowl (page 2-8).

Remove the rubber band.

Disconnect the ABS control unit 12P (Black), 5P (Black) and 5P (Brown) connectors.

Installation is in the reverse order of removal.



19. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM 19-2

SERVICE INFORMATION 19-3

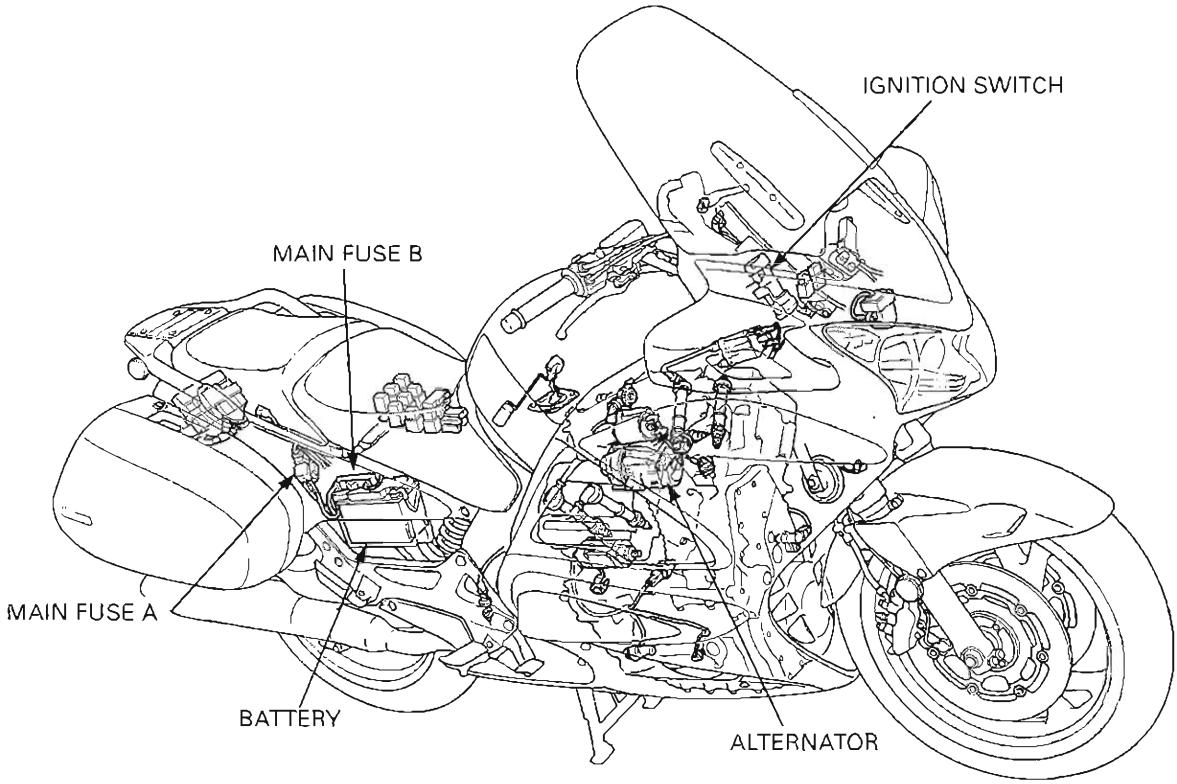
TROUBLESHOOTING 19-4

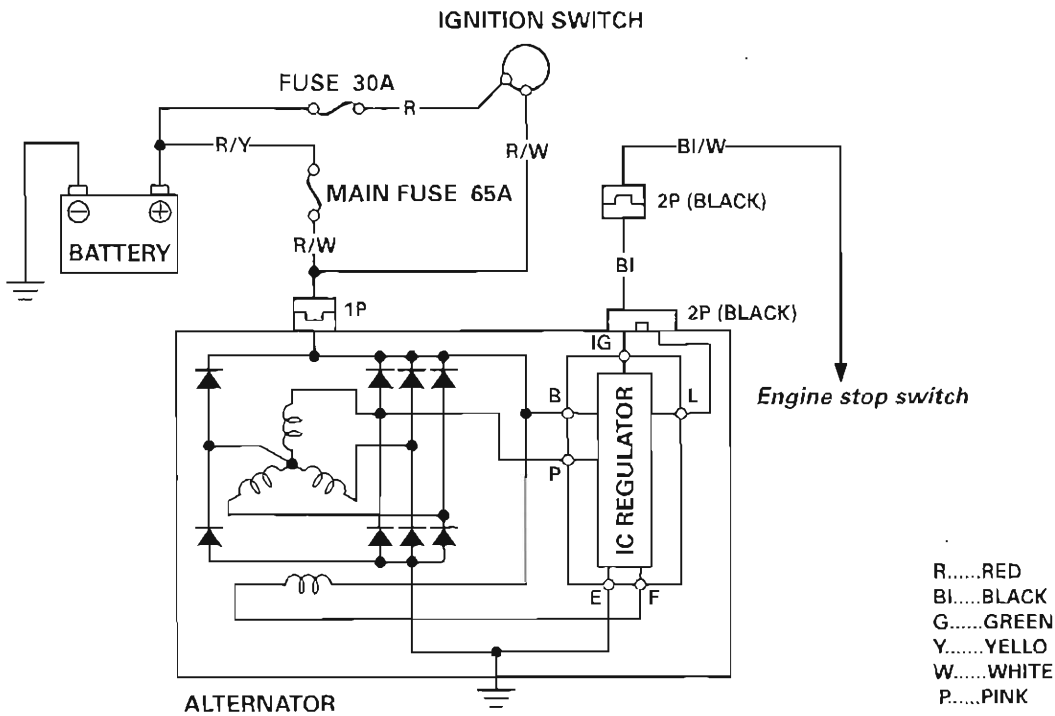
BATTERY 19-5

CHARGING SYSTEM INSPECTION 19-8

ALTERNATOR INSPECTION 19-9

SYSTEM DIAGRAM





SERVICE INFORMATION

GENERAL

⚠WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.

- Always turn OFF the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is 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 if overcharged or undercharged, or of left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 19-4).
- 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.
- If the battery terminals were disconnected, the data showing the possible travel distance and fuel remaining will be reset. After the connection of battery terminals, the data will be indicated in quotation marks ("---").
- Refer to page 11-3 for alternator removal and disassembly.

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 (U.S.A. only) or BM-210**

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 11Ah
	Current leakage		2.5 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	4.5 A/0.5 h
Alternator	Capacity		0.742 kW/5,000 min^{-1} (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. **BATTERY TEST**

   Remove the battery (page 19-5).

   Check the battery condition using the recommended battery tester.

   RECOMMENDED BATTERY TESTER:
   BM-210-AH (U.S.A. only), BM-210 or BATTERY MATE or equivalent

   Is the battery in good condition?

   No – Faulty battery.

   YES – GO TO STEP 2.

2. **CURRENT LEAKAGE TEST**

   Install the battery (page 19-5).

   Check the battery current leakage test (Leak test; page 19-8).

   Is the current leakage below 2.5 mA?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.

3. **CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER CONNECTOR**

   Disconnect the regulator/rectifier connector and recheck the battery current leakage.

   Is the current leakage below 2.5 mA?

   YES – Faulty regulator/rectifier.

   NO –
   - Shorted wire harness.
   - Faulty ignition switch.

4. **ALTERNATOR CHARGING COIL INSPECTION**

   Check the alternator charging coil (page 19-9).

   Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20 °C/68 °F)?

   No – Faulty charging coil.

   YES – GO TO STEP 5.

5. **CHARGING VOLTAGE INSPECTION**

   Measure and record the battery voltage using a digital multimeter (page 19-5).

   Start the engine.

   Measure the charging voltage (page 19-8).

   Compare the measurement to the result of the following calculation.

   STANDARD:
   Measured battery Voltage < Measured charging voltage < 15.5 V

   Is the measured charging voltage within the standard voltage?

   YES – Faulty battery.

   NO – GO TO STEP 6.

6. **REGULATOR/RECTIFIER SYSTEM INSPECTION**

   Check the voltage and resistance at the regulator/rectifier connector (page 19-10).

   Are the results of checked voltage and resistance correct?

   YES – Faulty regulator/rectifier.

   NO –
   - Open circuit in related wire.
   - Loose or poor contacts of related terminal.
   - Shorted wire harness.

BATTERY

REMOVAL/INSTALLATION

Always turn the ignition switch OFF before removing the battery.

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

Remove the fuse holder from the battery cover.

Remove the battery cover by releasing the tab from the rear fender groove and two hooks from the two tabs on the rear fender.

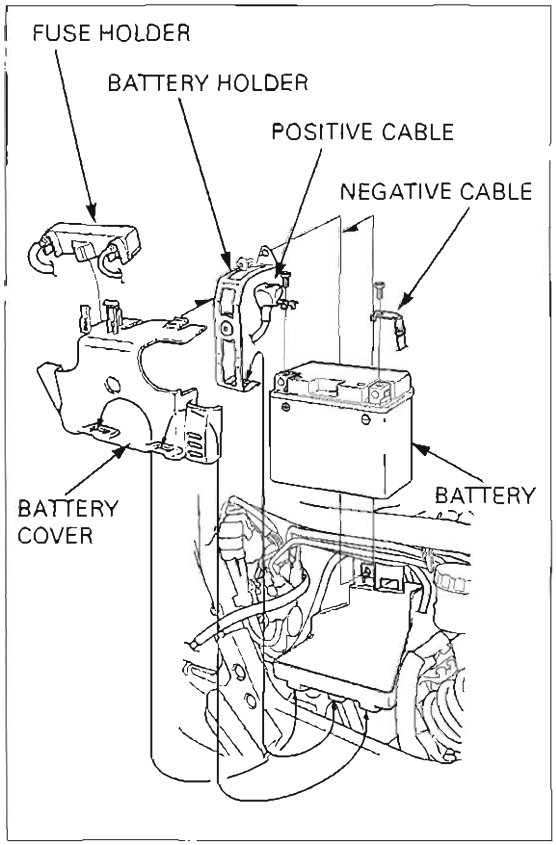
Remove the socket bolt and battery holder.

Connect the positive terminal first and then the negative cable.

Disconnect the negative cable and then the positive cable, and remove the battery.

Install the battery in the reverse order of removal with the proper wiring as shown.

After installing the battery, coat the terminals with clean grease.



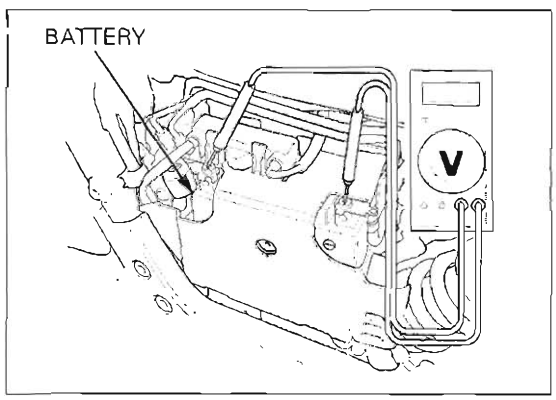
VOLTAGE INSPECTION

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 in U.S.A.



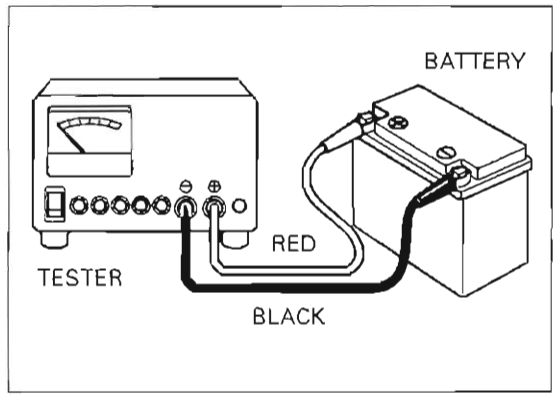
BATTERY TESTING

Remove the battery (page 19-5).

- 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.

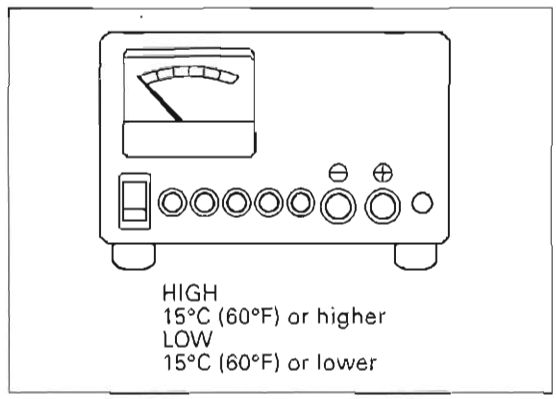
Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

TOOL:
Battery tester BM-210-AH (U.S.A. only) or BM-210



For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery

Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.

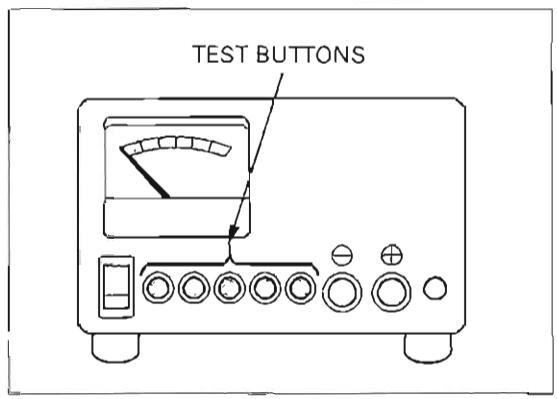


For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

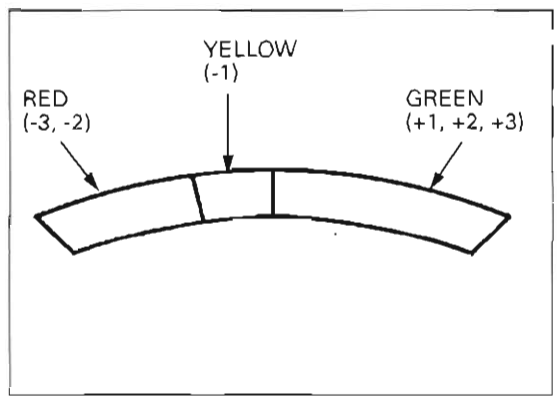
Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

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.

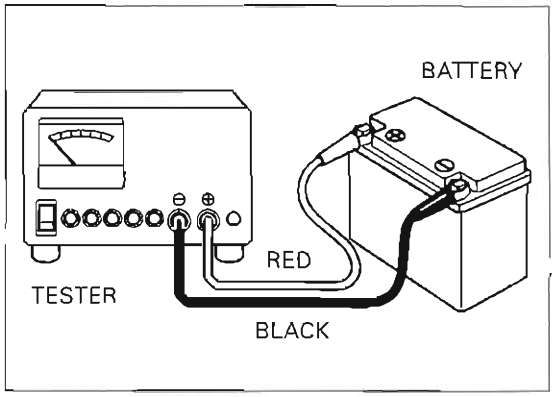


BATTERY CHARGING

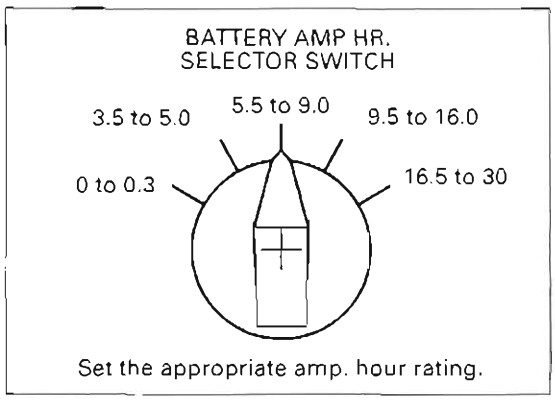
Remove the battery (page 19-5).

- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger - gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

TOOL:
Cristie battery charger MC1012/2 (U.S.A. only)



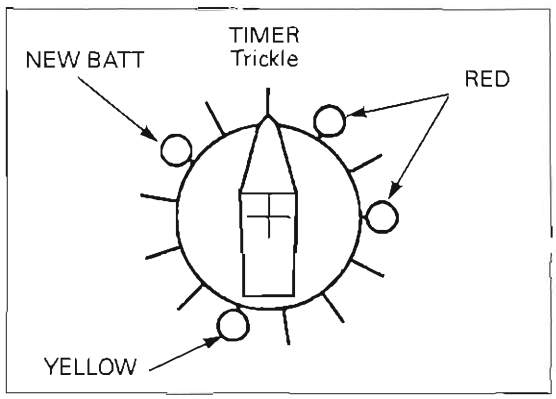
1. Turn the Power Switch to the OFF position.
2. Set the BATTERY AMP HR. SELECTOR SWITCH for the size of the battery being charged.
3. Set the TIMER to the position indicated by the Honda Battery Tester; RED-3, RED-2, or YELLOW 1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals; RED to Positive, BLACK to negative.



Set the appropriate amp. hour rating.

Connect the battery cables only when the Power Switch is OFF.

5. Turn the Power Switch to the ON position.
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the Power Switch OFF and disconnect the clamps. The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.
7. Let the battery cool for at least 10minutes or until gassing subsides after charging.
8. Re-test the battery using the Honda Battery Tester and recharge if necessary using the above steps.

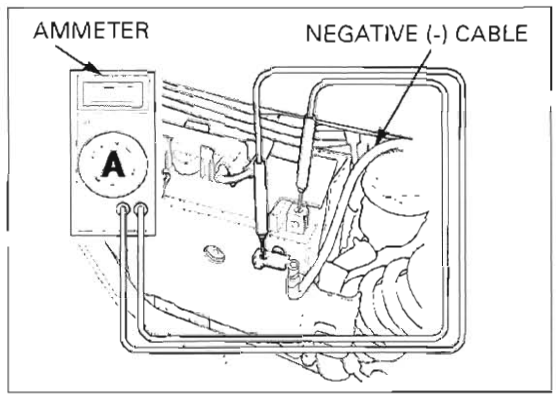


CHARGING SYSTEM INSPECTION

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: 2.5 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

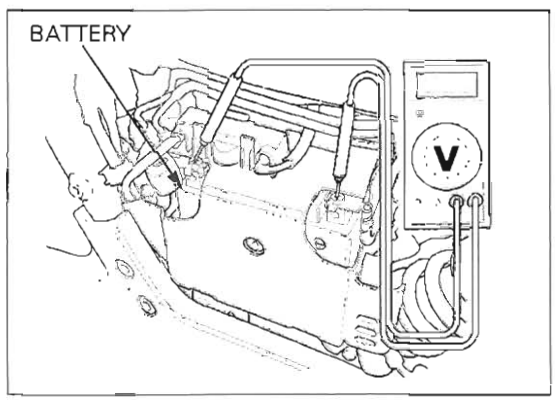
CHARGING VOLTAGE INSPECTION

Be sure the battery is in good condition before performing this test.

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.

Warm up the engine to normal operating temperature.
Stop the engine, and connect the multimeter as shown.

- 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 min^{-1} (rpm).

Standard: Measured battery voltage (page 19-5) < Measured charging voltage (page 19-8) < 15.5 V at 5,000 min^{-1} (rpm)

WIRE HARNESS INSPECTION

Remove the throttle body (page 5-64).
Remove the thermostat housing (page 6-8).

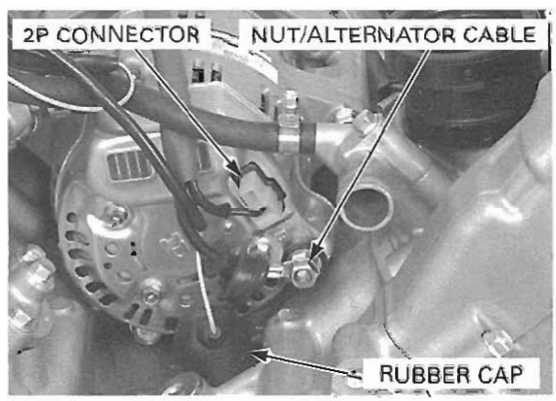
Be sure to disconnect the battery negative cable to prevent sparking when disconnecting or connecting the alternator cable.

Disconnect the battery negative (-) cable from the battery.

Pull the rubber cap off the alternator terminal, remove the nut and disconnect the alternator cable.

Disconnect the alternator 2P connector

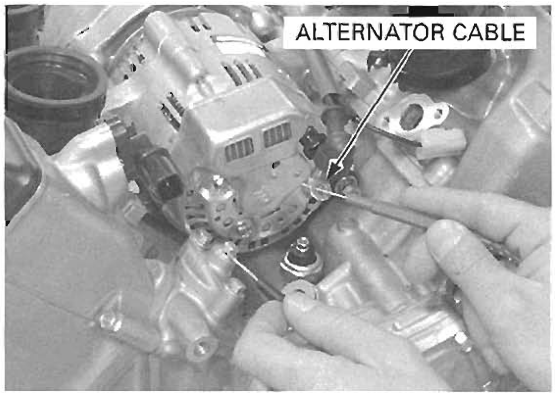
Connect the battery negative cable to the battery and check the following at the wire harness side.



BATTERY CHARGING LINE

Measure the voltage between the alternator cable terminal (+) and ground (-).

There should be battery voltage at all times.

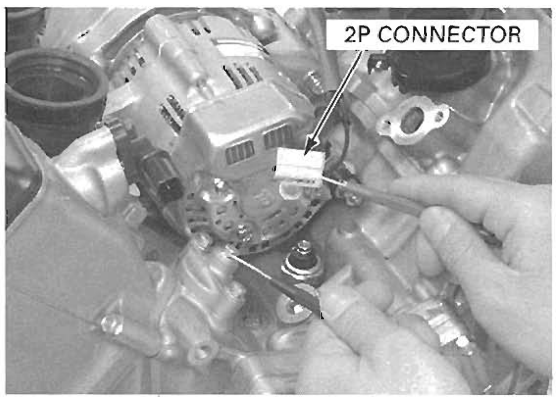


BATTERY VOLTAGE LINE

Measure the voltage between the White/Black wire terminal (+) of the alternator 2P connector wire harness side and ground (-).

There should be battery voltage with the ignition switch turned to "ON" and engine stop switch turned to "RUN".

Install the removed parts in the reverse order of removal.



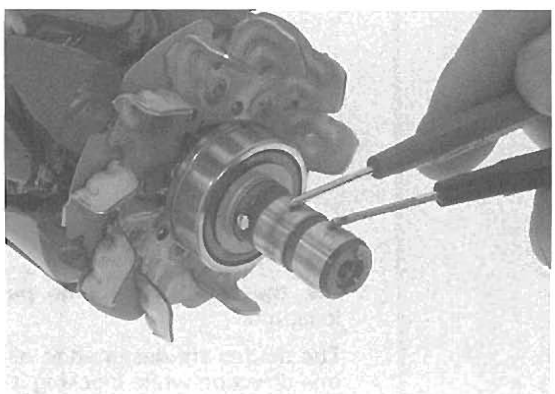
ALTERNATOR INSPECTION

Disassemble the alternator (page 11-5).

ROTOR COIL

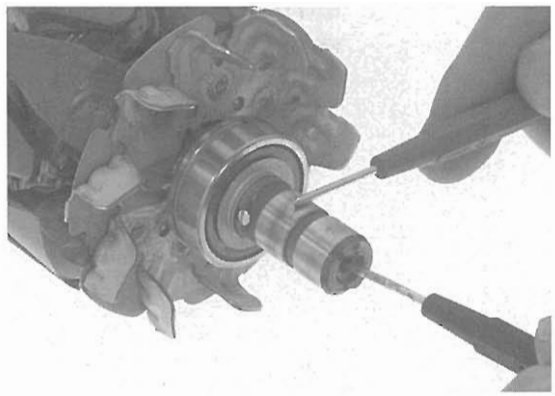
Measure the rotor coil resistance between the slip rings.

STANDARD: 0.1 – 1.0 Ω (at 20°C/68°F)



Check for continuity between the slip ring and rotor shaft.

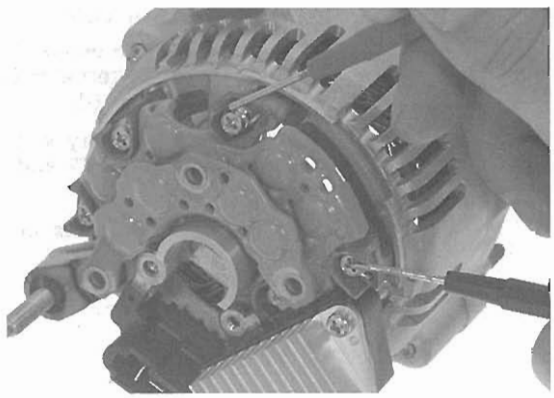
There should be no continuity.



STATOR COIL

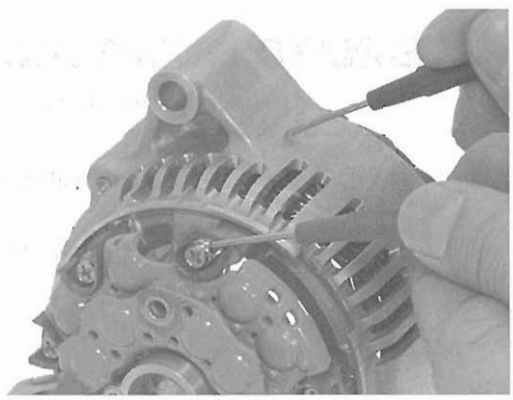
Measure the resistance between the stator coil wires.

STANDARD: 0.1 – 1.0 Ω (at **20°C/68°F**)



Check for continuity between the stator coil wire and alternator case.

There should be no continuity.



RECTIFIER

See the wire diagram on page 19-0 for terminal locations.

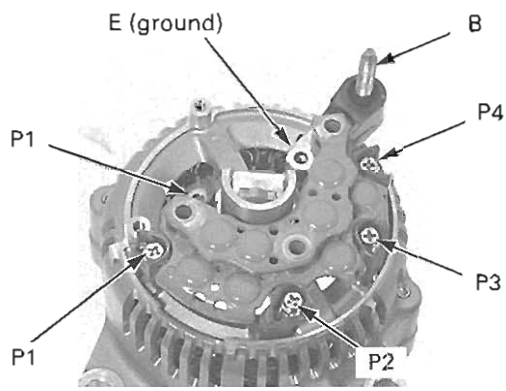
The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes, each diode must be tested for continuity in both directions that have diode checking capability; a total of 16 checks.

Check for continuity in each direction between:

- B and P (P1, P2, P3, P4) terminals
- E (ground) and P (P1, P2, P3, P4) terminals

All diodes should have continuity in only one direction.

If any of the diodes fail, replace the regulator/rectifier assembly.



20. IGNITION SYSTEM

SYSTEM DIAGRAM 20-2

SERVICE INFORMATION 20-3

TROUBLESHOOTING 20-4

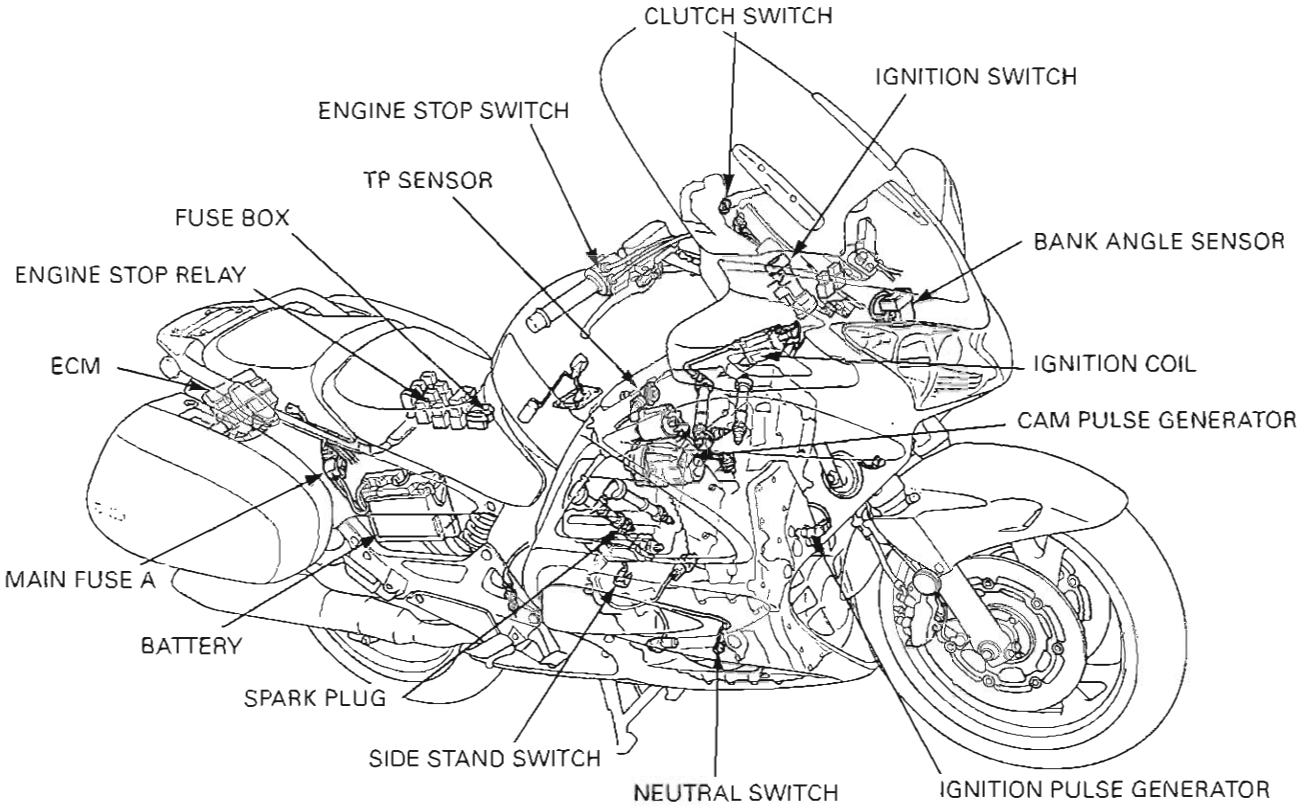
IGNITION SYSTEM INSPECTION 20-5

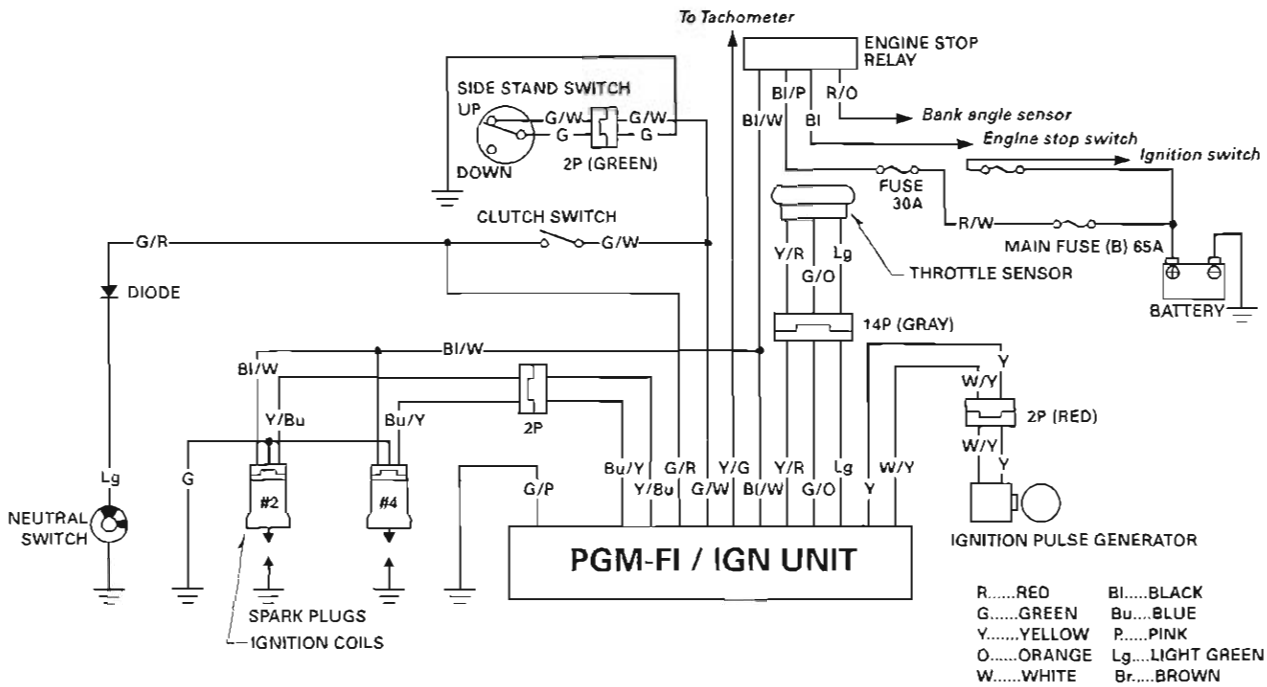
IGNITION COIL 20-7

IGNITION PULSE GENERATOR 20-7

IGNITION TIMING 20-8

SYSTEM DIAGRAM





SERVICE INFORMATION

GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 20-4).
- 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 all 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.
- Refer to the Throttle Position (TP) sensor inspection (page 5-82), cam pulse generator inspection (page 5-82) and ECM inspection (page 5-86).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	CR7EH-9 (NGK)
		W22FER9 (DENSO)
	Optional	CR8EH-9 (NGK)
		W24FER9 (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)		12° BTDC at idle

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Ignition pulse generator flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

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) or Ignition Mate peak voltage tester, MTP-08-0193 (U.S.A. only)
ECM test harness	070MZ-0010100

TROUBLESHOOTING

- Inspect for the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (shorting the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the direct ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned to "ON" and the engine stop switch turned to "RUN" (the engine is not cranked by the starter motor).

No spark at all plugs

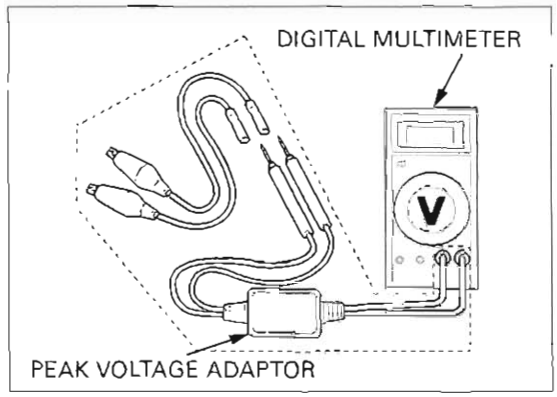
	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches turned ON/RUN. (other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/white wire between the direct ignition coil and engine stop switch. 3. Loose or poor contact of the direct ignition coil primary wire terminal, or an open circuit in primary coil (check at the ECM connector). 4. Faulty ECM (when the initial voltage is normal while disconnecting ECM connector). 5. An open circuit or loose connection in No.4 related circuit wires. – Side stand switch line: Green/white line – Neutral switch line: Blue/red and Light green/red wires. 6. Open or short circuit in the ignition coil signal wire (No.1/3: Yellow/blue, No.2/4: Blue/yellow) 7. Faulty peak voltage adaptor. 8. Faulty ECM (when No.1 through 7 are normal).
	Peak voltage is normal, but it drops down to 2 - 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/white (+) and body ground (-) at the ECM multi-connector or loosen ECM connection. 4. Faulty side stand switch or neutral switch. 5. An open circuit or loose connection in No.4 related circuit. – Side stand switch line: Green/white wire – Neutral switch line: Light green wire 6. Faulty ignition pulse generator (measure the peak voltage). 7. Faulty ECM (when above No.1 - 6 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 (when above No.1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (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 (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 low	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (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 ignition pulse generator (when above No. 1 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

TOOLS:
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) or
Ignition Mate peak voltage tester, MTP-08-0193 (U.S.A. only)



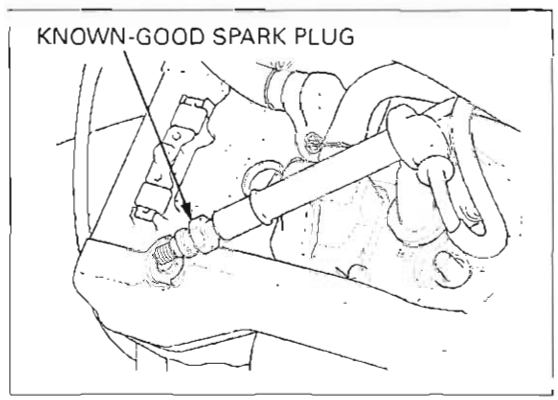
IGNITION COIL PRIMARY PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the spark plug caps from the spark plugs (page 3-6).

Remove the middle cowl (page 2-13).

Connect known-good spark plugs to the spark plug caps and ground the spark plugs to the cylinder as done in a spark test.



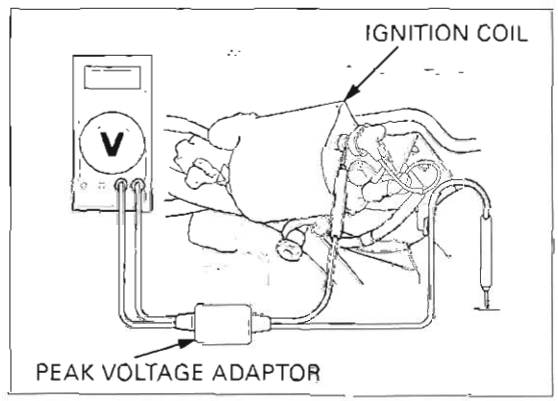
Avoid touching the tester probes to prevent electric shock.

With the ignition coil primary wire connected, connect the peak voltage adaptor to the ignition coil.
Turn the ignition switch to "ON" and the engine stop switch to "RUN".
Check for initial voltage at this time.

CONNECTION:
No.1/3 coil:
Black/white (+) - Yellow/blue (–)
No.2/4 coil:
Black/white (+) - Blue/yellow (–)

Standard: Battery voltage

If the initial voltage cannot be measured, check the power supply circuit (refer to the troubleshooting, (page 20-4).



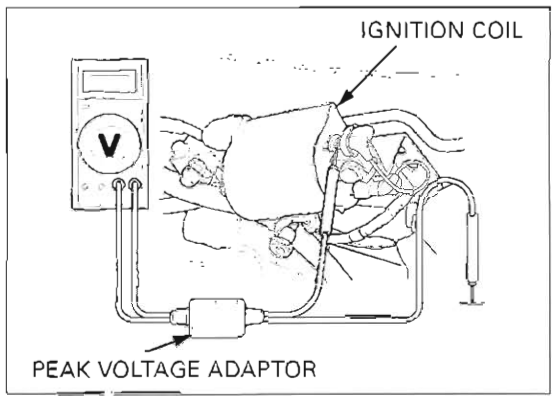
Avoid touching the spark plug and tester probes to electric shock.

Crank the engine with the starter motor and read the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for continuity of the Black/White, Yellow/Blue and Blue/Yellow wires.

If no defects are found in wire harness, refer to the troubleshooting chart (page 20-4).



IGNITION PULSE GENERATOR PEAK VOLTAGE

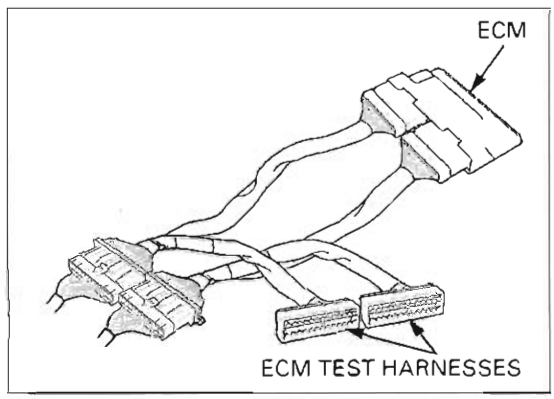
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the rear cowl (page 2-8).

Disconnect the ECM connectors from the ECM.

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

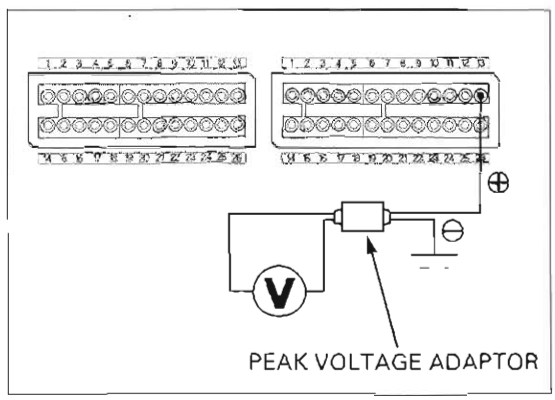
TOOL:
ECM test harness 070MZ-0010100



Connect the peak voltage tester or peak voltage adaptor probes to the connector terminals of the test harness.

TOOLS:
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) or
Ignition Mate peak voltage tester, MTP-08-0193 (U.S.A. only)

CONNECTION:
B13 (+) – Ground (–)



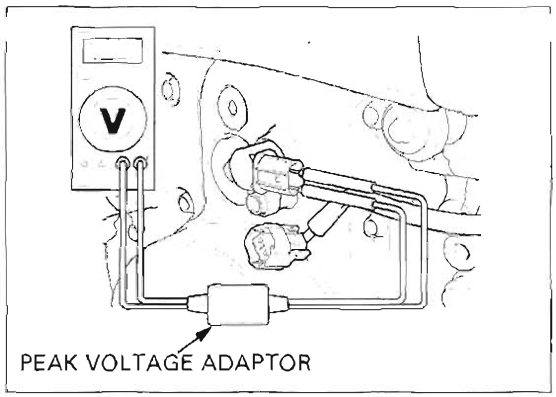
Avoid touching the spark plugs and tester probes to prevent electric shock.

Crank the engine with the starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum

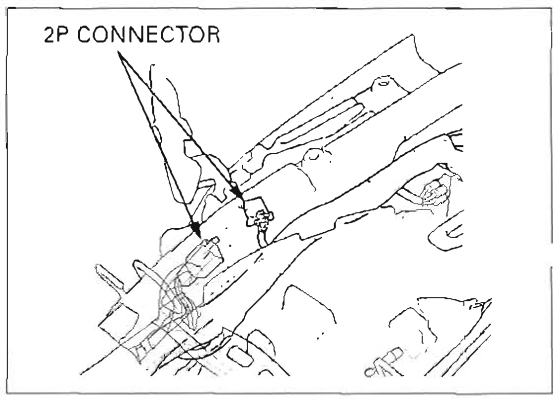
If the peak voltage measured at ECM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Disconnect the ignition pulse generator 2P (Black) 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.



Check the following:

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, check the 2P connector for loose connection and the wire harness has an open circuit or loose connection.
- If both peak voltage measurements 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.

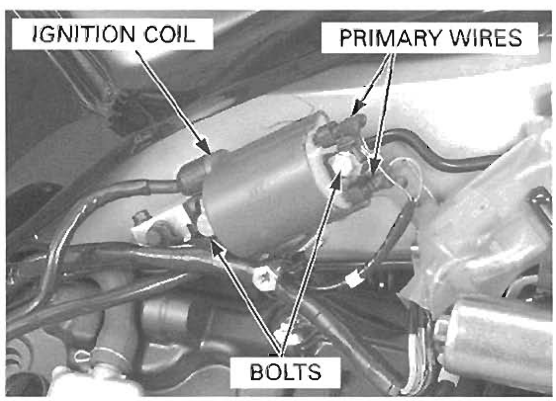


IGNITION COIL

Remove the middle cowl (page 2-13).
Remove the spark plug caps from the spark plugs.

Disconnect the ignition coil primary wires.
Remove the bolts and ignition coil.

Installation is in the reverse order of removal.



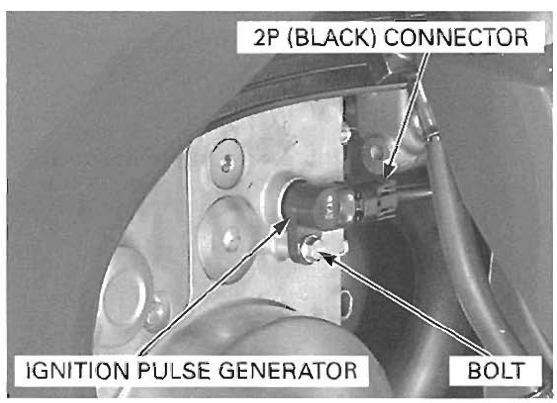
IGNITION PULSE GENERATOR

REMOVAL/INSTALLATION

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

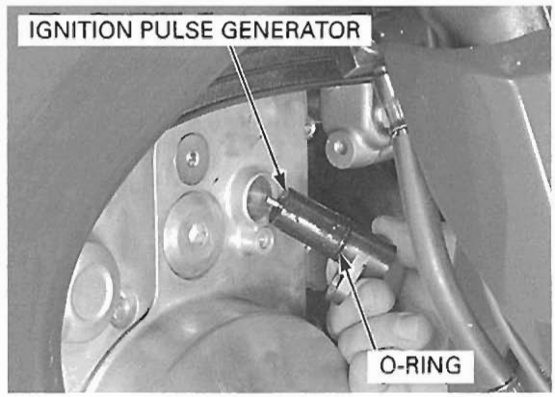
Remove the bolt and ignition pulse generator.

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



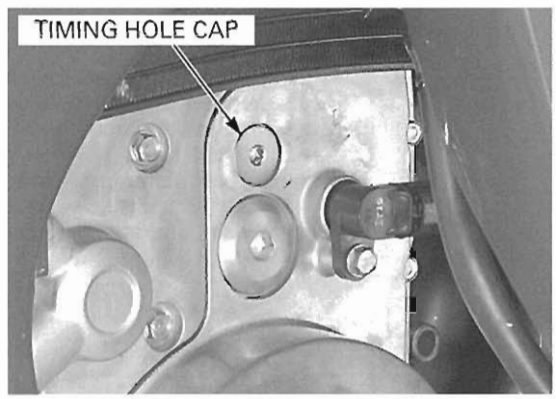
Installation is in the reverse order of removal.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



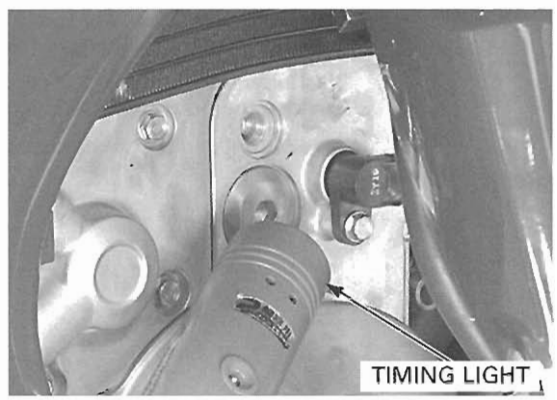
IGNITION TIMING

Warm up the engine.
Stop the engine and remove the timing hole cap.



Read the instructions for timing light operation.

Connect the timing light to the No.1 spark plug wire.

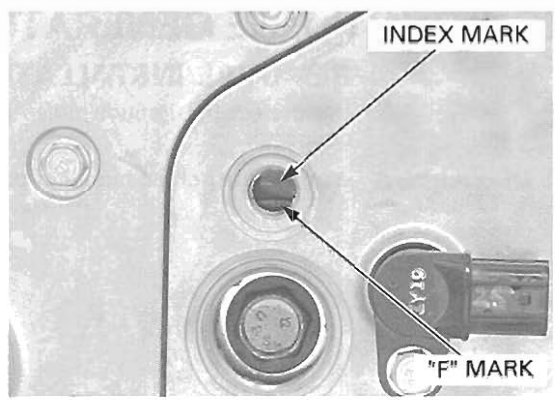


Start the engine and let it idle.

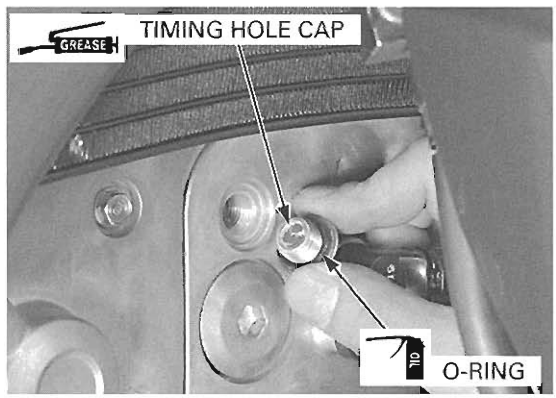
IDLE SPEED: 1,000 ± 100 min^{-1} (rpm)

The ignition timing is correct if the index mark on the right crankcase cover aligns between the "F" mark on the ignition pulse generator rotor as shown.

Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move clockwise when the engine speed is at approximately 2,000 min^{-1} (rpm).

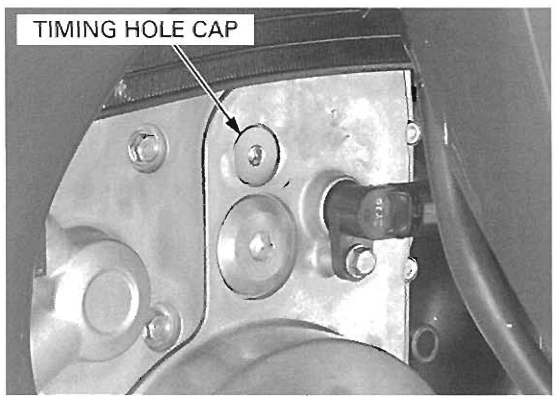


Check that the O-ring is in good condition, replace if necessary.
Apply oil to the O-ring.
Apply grease to the timing hole cap threads.



Tighten the timing hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



21. ELECTRIC STARTER

SYSTEM DIAGRAM 21-2

SERVICE INFORMATION 21-3

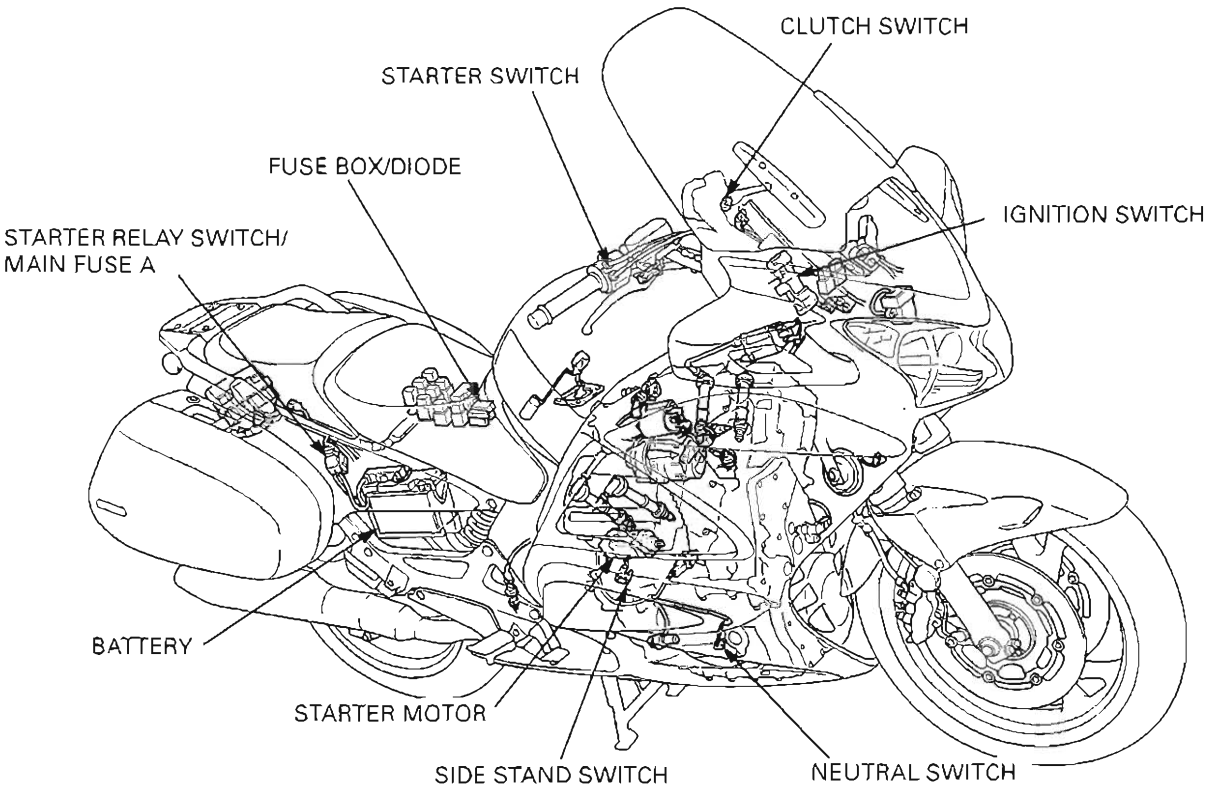
TROUBLESHOOTING 21-4

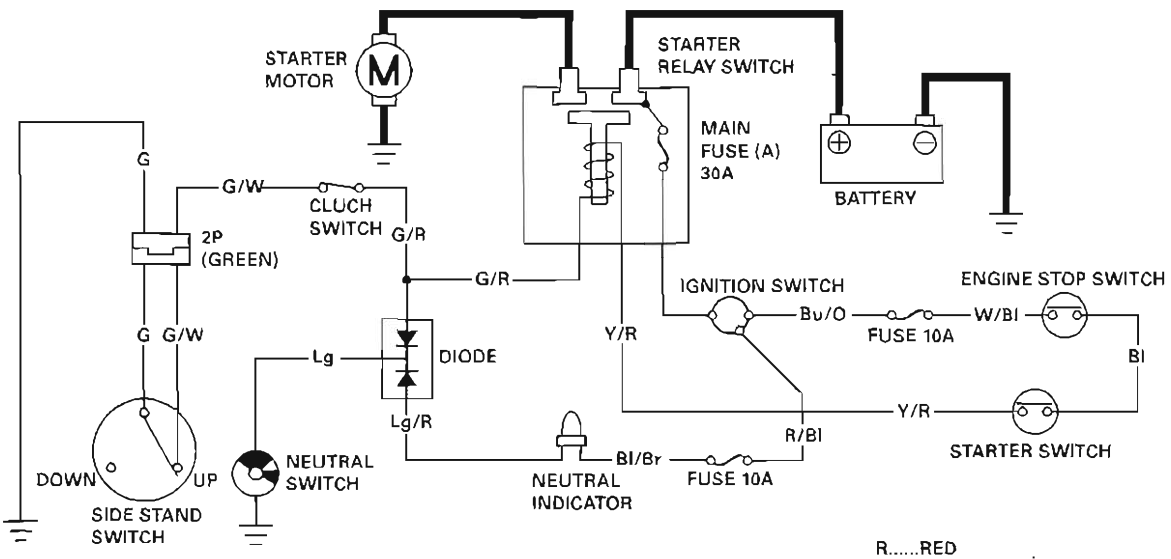
STARTER MOTOR 21-6

STARTER RELAY SWITCH 21-11

DIODE 21-13

SYSTEM DIAGRAM





R.....RED
G.....GREEN
Y.....YELLOW
W.....WHITE
Bl.....BLACK
Bu.....BLUE
Br.....BROWN
Lg.....LIGHT GREEN

SERVICE INFORMATION

GENERAL

- Always turn the ignition switch 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 11-3).
- 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.
- Refer to the following component information.
  - Ignition switch (page 22-23)
  - Engine stop switch (page 22-25)
  - Starter switch (page 22-25)
  - Neutral switch (page 22-27)
  - Side stand switch (page 22-27)
  - Clutch switch (page 22-26)

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection

   Check for blown main fuse or sub fuse.

   Is the fuse blown?

   YES – Replace the fuse.

   NO – GO TO STEP 2.

2. Battery Inspection

   Make sure the battery is fully charged and in good condition.

   Is the battery in good condition?

   YES – Replace the battery.

   NO – GO TO STEP 3.

3. **Starter Relay Switch Operation**

   Check the starter relay switch operation.
   You should hear the relay "CLICK" when the starter switch button is depressed.

   Is there a "CLICK"?

   YES – GO TO STEP 4.

   NO – GO TO STEP 5.

4. **Starter Motor Inspection**

   Apply battery voltage to the starter motor directly and check the operation.

   Does the starter motor turn?

   YES – • Poorly connected starter motor cable.
   • Faulty starter relay switch (page 21-11).

   NO – Faulty starter motor (page 11-4).

5. **Relay Coil Ground Wire Lines Inspection**

   Disconnect the starter relay switch connector, and check the relay coil ground wire lines as below for continuity:

   1. Green/red terminal-clutch switch diode – neutral switch line (with the transmission in neutral and clutch lever released).
   2. Green/red terminal/clutch switch – side stand switch line (in any gear except neutral, and with the clutch lever pulled in and the side stand up.

   Apply battery voltage to the starter motor directly and check the operation.

   Is there continuity?

   NO – • Faulty neutral switch (page 22-27).
   • Faulty neutral diode (page 21-13).
   • Faulty clutch switch (page 22-26).
   • Faulty side stand switch (page 22-27).
   • Loose or poor contact connector.
   • Open circuit in wire harness.

   YES – GO TO STEP 6.

6. **Starter Relay Voltage Inspection**

   Connect the starter relay switch connector.

   With the ignition switch ON and the starter switch pushed, measure the starter relay voltage at the starter switch connector (between Yellow/red (+) and ground (–).

   Is the starter relay switch operation correct?

   NO – • Faulty ignition switch (page 22-23).
   • Faulty starter switch (page 22-25).
   • Blown main or sub-fuse.
   • Faulty clutch switch (page 22-26) / side stand diode (page 21-13).
   • Loose or poor contact connector.
   • Open circuit in wire harness.

   YES – GO TO STEP 7.

7. **Starter Relay Switch Operation**

   Check the starter relay switch operation.

   Is there battery voltage?

   NO – Faulty starter relay switch.

   YES – Loose or poor contact starter relay switch connector.

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.

1. **Clutch Switch Inspection**

   Check the clutch switch operation.

   Is the clutch switch operation normal?

   NO – Faulty clutch switch.

   YES – GO TO STEP 2.

2. **Side Stand Switch Inspection**

   Check the side stand switch operation.

   Is the side stand switch operation normal?

   NO – Faulty side stand switch (page 22-27).

   YES – • Open circuit in wire harness.
   • Loose or poor contact connector.

Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

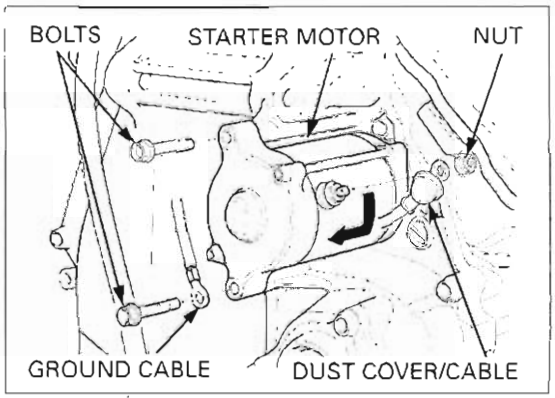
Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problems

STARTER MOTOR

REMOVAL

Remove the seat rail (page 2-19).
Remove the lower fuel tank (page 5-57).

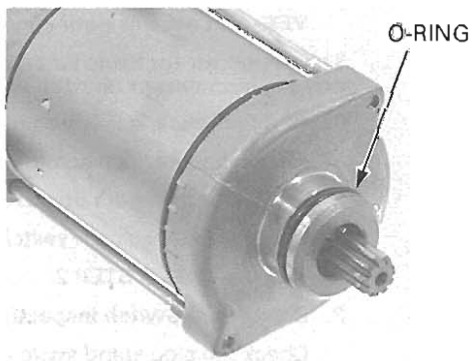
Remove the dust cover, nut and starter motor cable.
Remove the starter motor upper mounting bolt.
Loosen the starter motor lower mounting bolt.
Turn the starter motor until the lower mounting bolt can be removed.
Pull the starter motor out of the crankcase and ground cable.



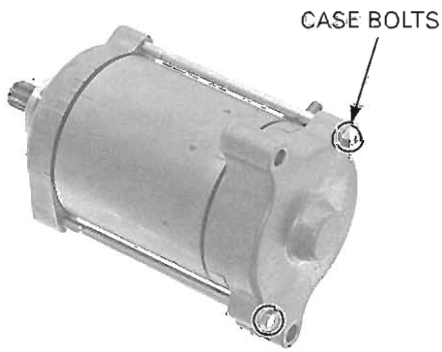
DISASSEMBLY

Remove the following:

- O-ring

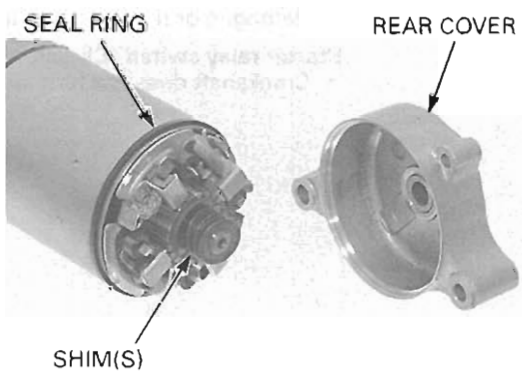


- Starter motor case bolts



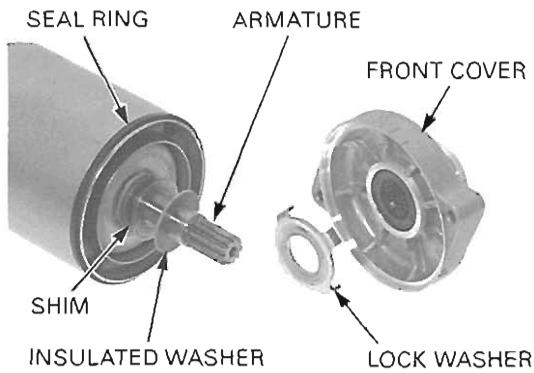
Record the location and number of shims.

- Rear cover assembly
- Seal ring
- Shim (s)



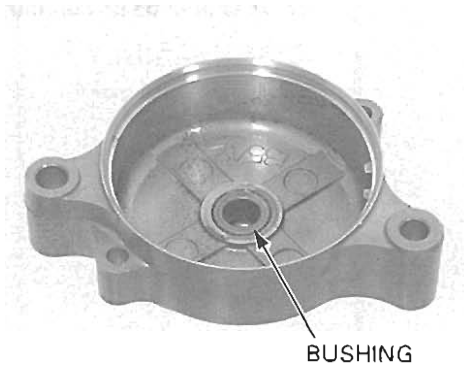
Record the location and number of shims.

- Front cover assembly
- Seal ring
- Lock washer
- Insulated washer
- Shim (s)
- Armature

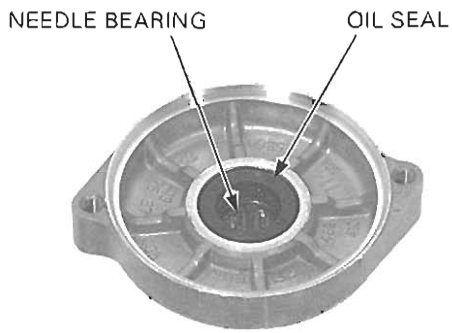


INSPECTION

Check the bushing in the rear cover for wear or damage.

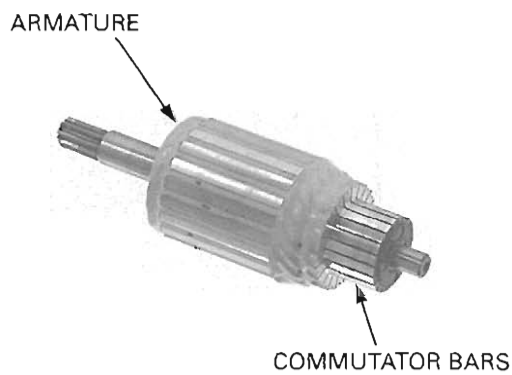


Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.

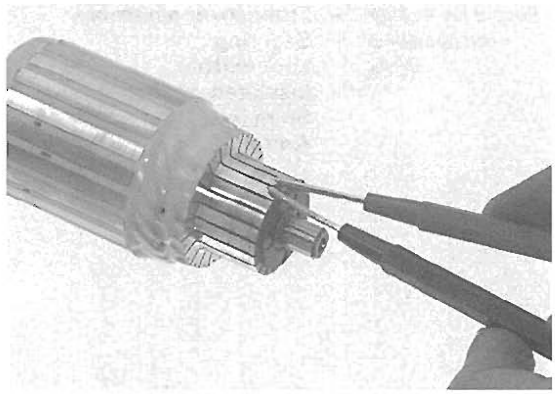


Do not use emery or sand paper on the commutator.

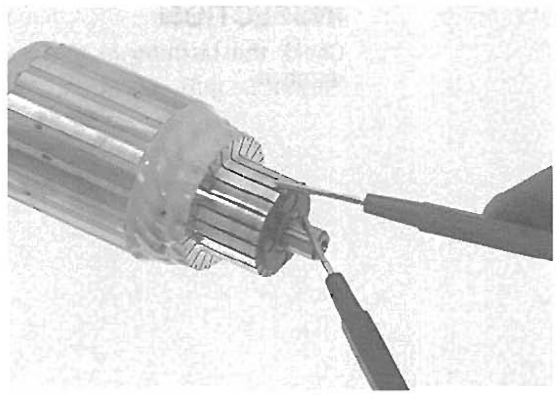
Check the commutator bars of the armature for discoloration.



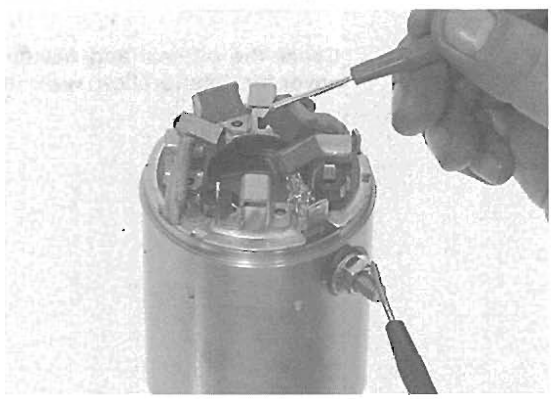
Check for continuity between pairs of commutator bars.
There should be continuity.



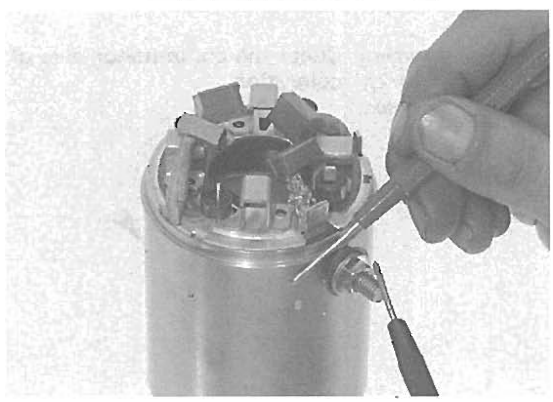
Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.



Check for continuity between the insulated brush and cable terminal (the indigo colored wire or the insulated brush holder).
There should be continuity.

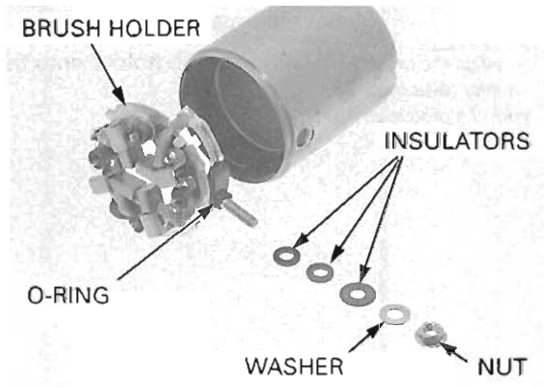


Check for continuity between the cable terminal and the rear cover.
There should be no continuity.



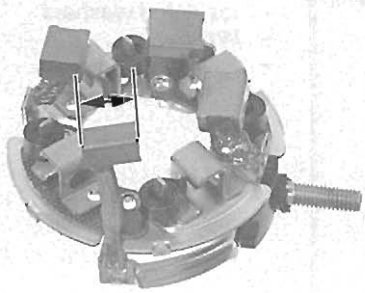
Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal

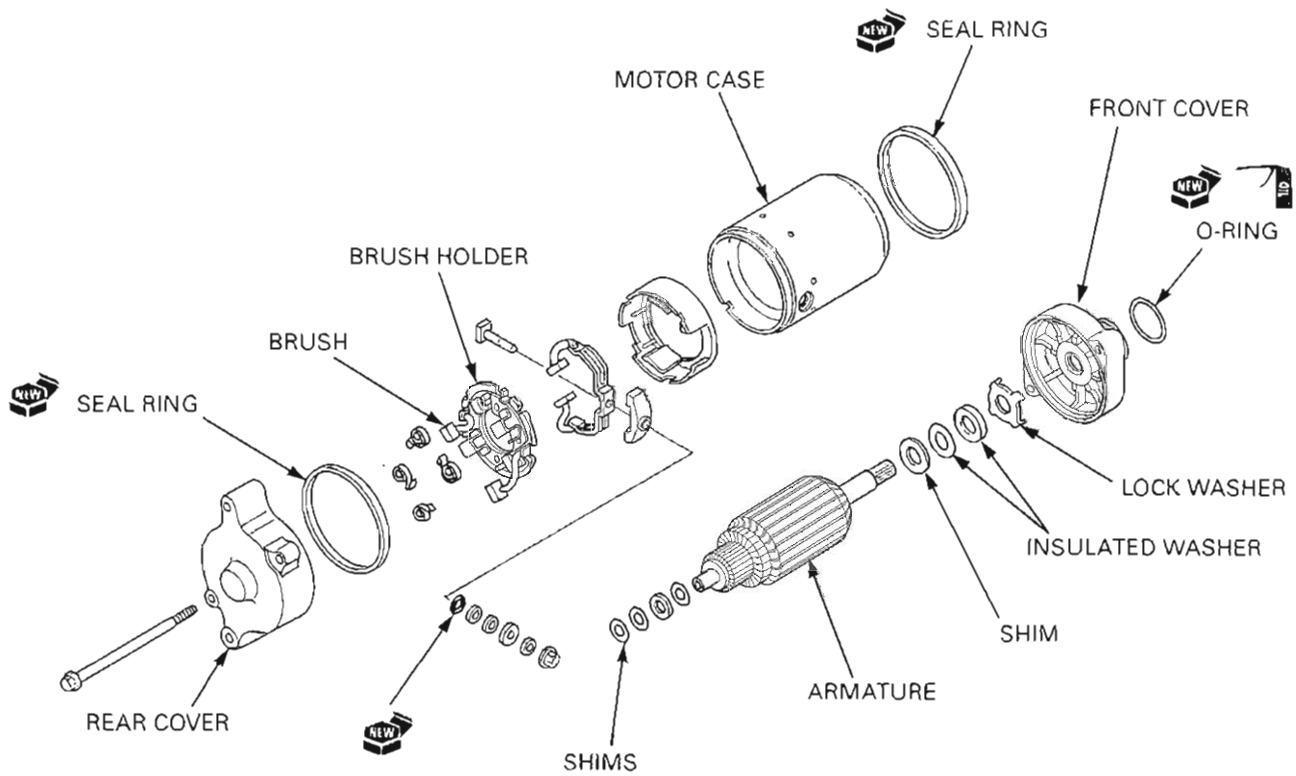


Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)



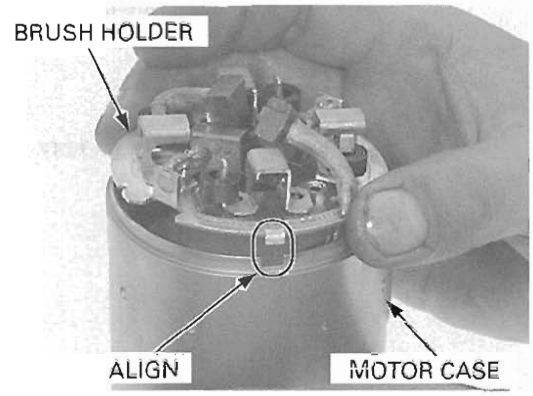
ASSEMBLY



Set the brushes on the brush holder.

Align the brush holder plate boss with the groove of the motor case.

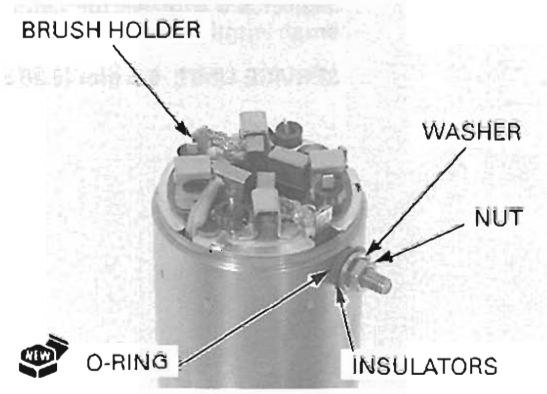
Install the brush holder onto the motor case.



Install the insulators properly as noted during removal.

Install the following:

- New O-ring
- Insulated washers
- Washer
- Nut



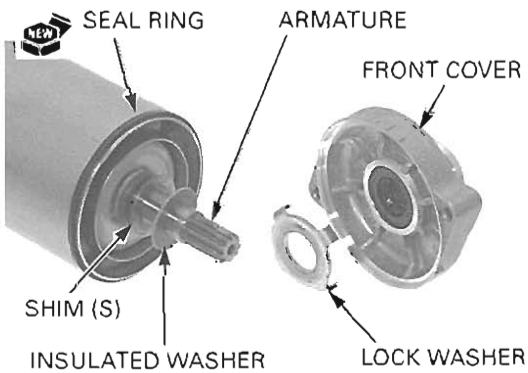
Install the armature in the motor case.
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

NOTICE

The coil may be damaged if the magnet pulls the armature against the case.

Install the shims properly as noted during removal.

Install the shims and insulated washers on the armature shaft.
Install the lock washer onto the front cover.
Install a new seal ring onto the motor case.
Assemble the front cover and motor case.

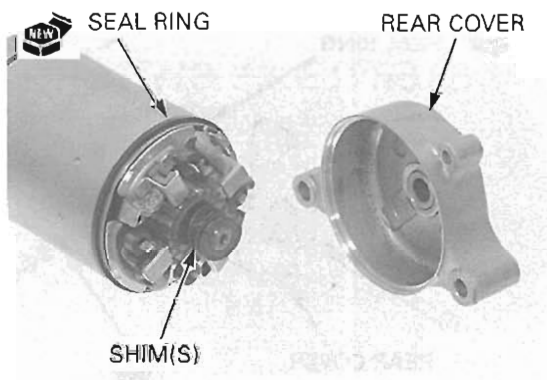


Install a new seal ring on the motor case.

Install the shims properly as noted during removal.

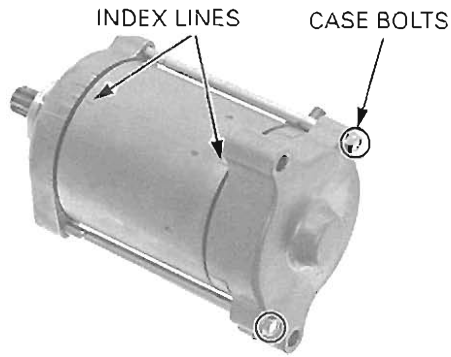
Install the shims onto the armature shaft.

Assemble the motor case and rear cover, aligning the brush holder boss with the groove in the rear cover.



Make sure the index lines are aligned.

Install and tighten the case bolts securely.



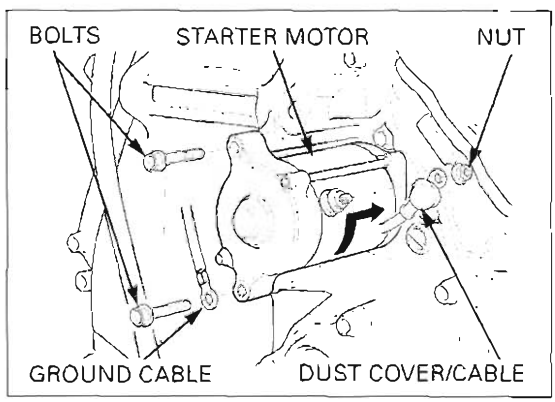
Coat a new O-ring with oil and install it into the starter motor groove.



INSTALLATION

Install the starter motor lower mounting bolt and ground cable to the starter motor
Install the starter motor into the crankcase.
Align the lower mounting bolt hole of the crankcase and lower mounting bolt by turning the starter motor, then tighten the lower mounting bolt securely.
Install and tighten the starter motor upper mounting bolt securely.
Route the starter motor cable and tighten the nut securely.
Cover the dust cover securely.

Install the lower fuel tank (page 5-58).
Install the seat rail (page 2-19).



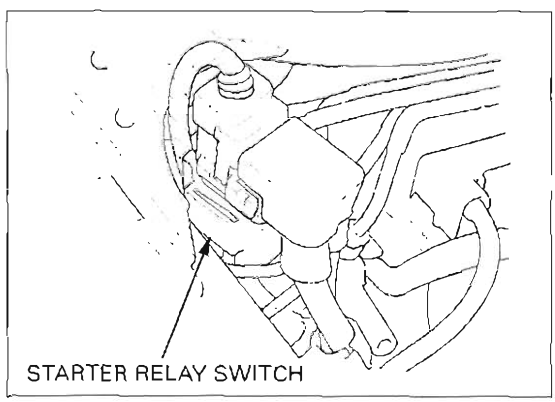
STARTER RELAY SWITCH

OPERATION INSPECTION

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

Shift the transmission into neutral.
Turn the ignition switch ON and engine stop switch to RUN.
Press 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.

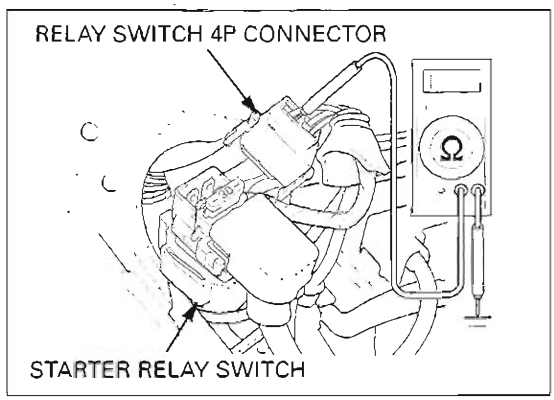


GROUND LINE INSPECTION

Disconnect the starter relay switch 4P connector.

Check for continuity between the Green/red wire (ground line) 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).

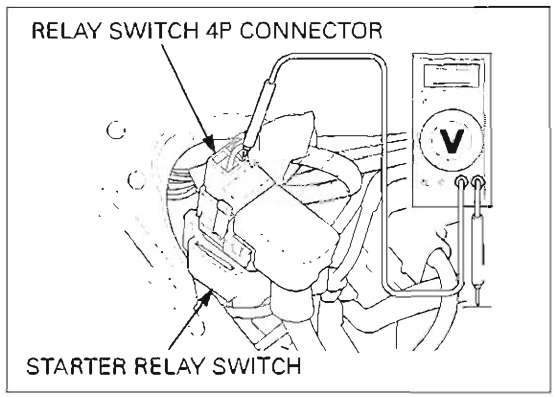


STARTER RELAY VOLTAGE INSPECTION

Connect the starter relay switch 4P 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 ON and engine stop switch at RUN, it is normal.

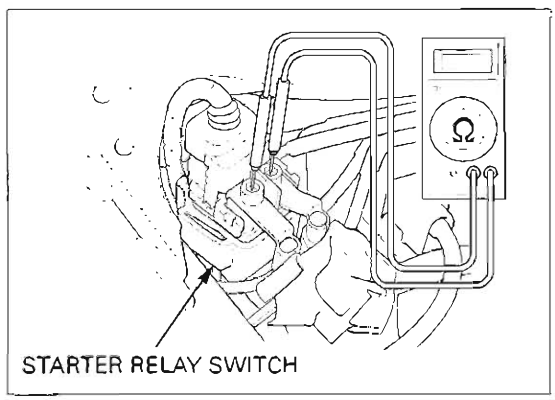


CONTINUITY INSPECTION

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 when the starter switch is pushed.

There should be continuity when the starter switch is pushed.

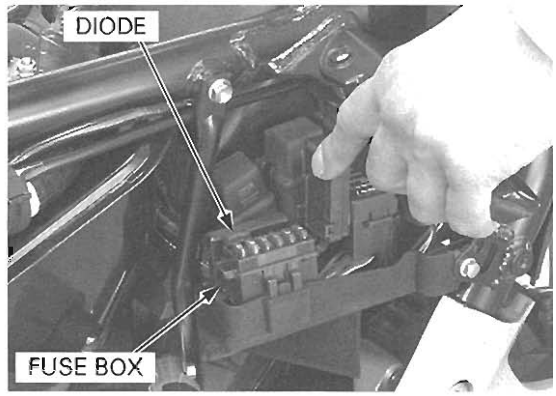


DIODE

REMOVAL

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

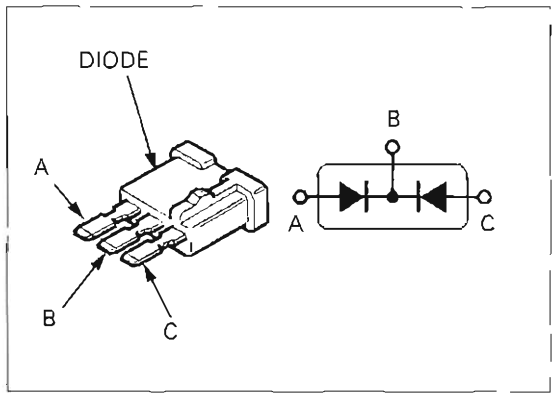
Open the fuse box and remove the diode.



INSPECTION

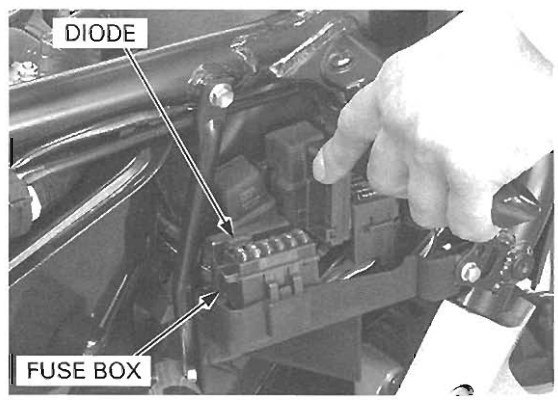
Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity, in one direction, the diode is normal.



INSTALLATION

Install the diode in the reverse order of removal.



22. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION 22-2

SERVICE INFORMATION 22-3

TROUBLESHOOTING 22-4

HEADLIGHT 22-5

HEADLIGHT AIMING 22-6

POSITION LIGHT 22-9

TURN SIGNAL 22-9

TAIL/BRAKE LIGHT 22-10

COMBINATION METER 22-11

SPEEDOMETER/VEHICLE SPEED SENSOR 22-12

TACHOMETER 22-14

COOLANT TEMPERATURE GAUGE/ SENSOR 22-15

FUEL LEVEL SYSTEM MALFUNCTION INDICATOR 22-17

FUEL LEVEL SYSTEM TROUBLESHOOTING 22-18

OPEN AIR TEMPERATURE SENSOR 22-20

FAN MOTOR RELAY 22-21

OIL PRESSURE SWITCH 22-21

FUEL LEVEL SENSOR REMOVAL/ INSTALLATION 22-23

IGNITION SWITCH 22-23

HANDLEBAR SWITCHES 22-25

BRAKE LIGHT SWITCH 22-26

CLUTCH SWITCH 22-26

NEUTRAL SWITCH 22-27

SIDE STAND SWITCH 22-27

HORN 22-29

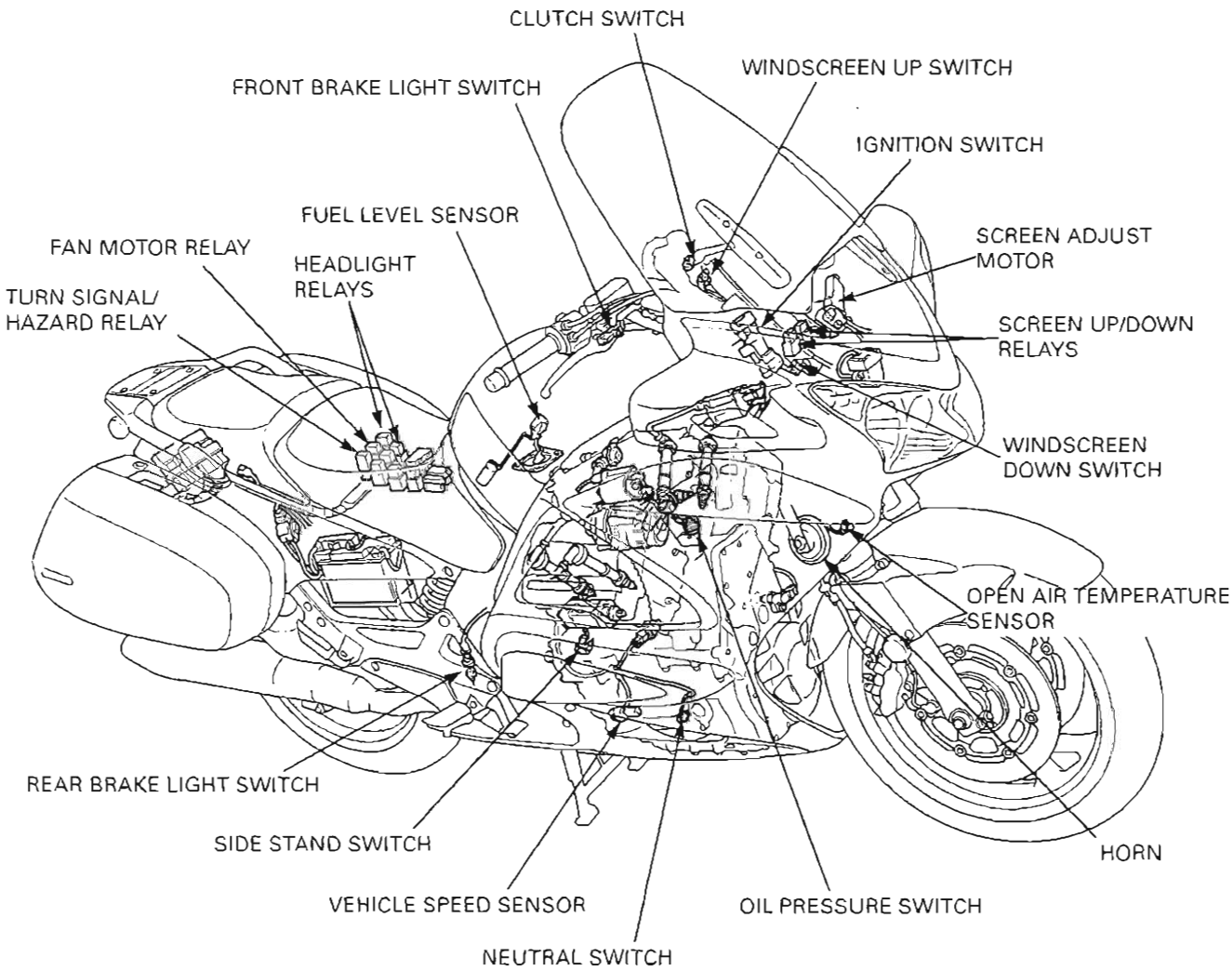
HEADLIGHT RELAY 22-29

MAIN STOP RELAY 22-30

TURN SIGNAL/HAZARD RELAY 22-30

WINDSCREEN ADJUSTER (DELUXE TYPE ONLY) 22-31

SYSTEM LOCATION



SERVICE INFORMATION

GENERAL

- A halogen headlight bulb becomes very hot while the headlight is ON, and will remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.
- Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- 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.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- If the battery terminals were disconnected, the data showing the possible travel distance and fuel remaining will be reset. After the connection of battery terminals, the data will be indicated in quotation marks ("---").
- If the fuel remaining is less than five liters after filling with fuel, the meter may not indicate the possible travel distance and the remaining quantity of fuel correctly at times.
- Approx 60 seconds are required for the fuel reserve sensor for the detection of fuel level. When the battery terminals are disconnected and connected or after filling with fuel, the fuel level meter may return to normal 60 seconds after the ignition switch is turned to on.
- 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

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 45 W X 2
		Lo	12V – 45 W X 2
	Position light		12V – 5 W X 2
	Brake/tail light		12V – 21/5 W X 2
	Front turn signal/position light		12V – 21/5 W X 2
	Rear turn signal light		12V – 21 W X 2
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI malfunction indicator		LED
	Low fuel indicator		LED
Fuse	Main fuse A		30 A
	Main fuse B		65 A
	PGM-FI fuse		20 A
	Sub fuse (Standard type)		10 A X 5, 15 A X 2, 30A X 1
	Sub fuse (Deluxe type)		10 A X 6, 15 A X 2, 20A X 1, 30A X 3
Coolant temperature sensor resistance		(80°C/176°F)	2.1 – 2.6 kΩ
		(120°C/248°F)	0.65 – 0.75 kΩ
Open air temperature sensor resistance (25°C/77°F)			4.8 – 5.2 Ω
Fan motor switch	Start to close (ON)		98 – 102 °C (208 – 216 °F)
	Stop to open		93 – 97 °C (199 – 207 °F)

TORQUE VALUES

Ignition switch mounting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt; replace with a new one
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Neutral switch terminal screw	2 N·m (0.18 kgf·m, 1.3 lbf·ft)	

TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operates normally, but the speedometer does not operate
Faulty speedometer

The speedometer operates normally, but the odometer/trip meter does not operate
Faulty odometer/trip meter

The speedometer operation is abnormal

1. **Fuse Inspection**

   Check for blown main fuse or sub fuse.

   Is the fuse blown?

   YES – Replace the fuse

   NO – GO TO STEP 2.

2. **Battery Inspection**

   Make sure the battery is fully charged and in good condition.

   Is the battery in good condition?

   YES – Replace the battery

   NO – GO TO STEP 3.

3. **Speed Sensor Power Input Voltage Inspection (Speed Sensor Side)**

   Check for loose or poor contact of the speed sensor 3P (Black) connector.

   With the ignition switch "ON", measure the voltage at the speed sensor connector.

   Is there battery voltage?

   NO – • Loose or poor contact of related terminals
   • Open circuit in Black/brown or Green/black wires between the battery and speed sensor

   YES – GO TO STEP 4.

4. **Speed Sensor Power Input Voltage Inspection (Combination Meter Side)**

   Check for loose or poor contact of the combination meter multi-connectors.

   With the ignition switch "ON", measure the voltage at bottom of the speedometer terminals.

   Is there battery voltage?

   NO – • Loose or poor contact of related terminals
   • Open circuit in Black/brown or Green/black wires between the battery and speed sensor

   YES – GO TO STEP 5.

5. **Speed Sensor Signal Line Inspection**

   With the ignition switch "OFF", check for continuity of the Pink/green wire between the terminals of the speed sensor and speedometer.

   Is there continuity?

   NO – Open circuit in Pink/green wire

   YES – GO TO STEP 6.

6. **Speed Sensor Signal Inspection**

   Support the motorcycle using the center stand to raise the rear wheel off the ground.

   Measure the output voltage (sensor signal) at the speedometer with the ignition switch "ON" and sensor connector connected by slowly turning the rear wheel with your hand.

   CONNECTION: Pink (+) – Green (-)
   STANDARD: Repeat 0 to 5 V

   Is the voltage within the specified value?

   NO – • Faulty speed sensor
   • Loose speed sensor mounting bolts

   YES – Faulty speedometer

HEADLIGHT

BULB REPLACEMENT

Disconnect the headlight bulb 3P sockets.

Remove the dust cover.

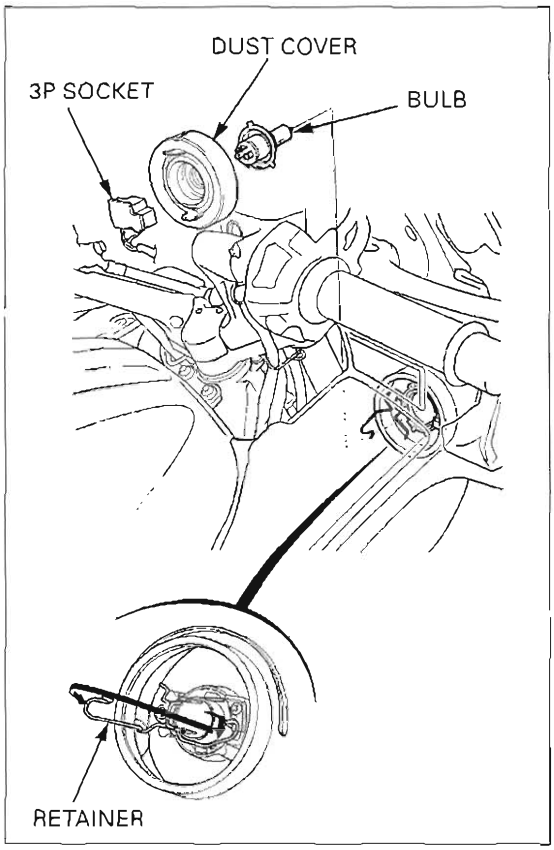
Unhook the bulb retainer and remove the headlight bulb.

Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent early bulb failure.

Install the new headlight bulb aligning its tabs with the groove in the headlight unit.

Installation is in the reverse order of removal.



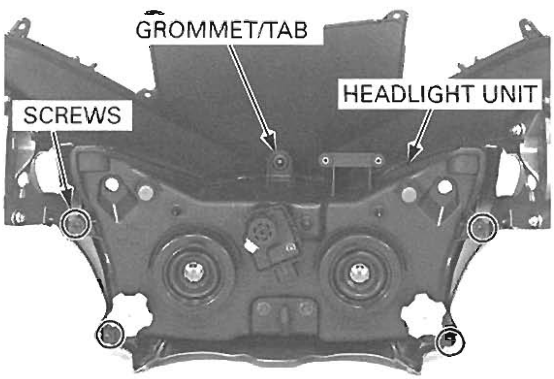
REMOVAL/INSTALLATION

Remove the upper cowl (page 2-16).

Remove the five screws.

Remove the grommet from the tab and headlight unit.

Install the headlight unit in the reverse order of removal.



HEADLIGHT AIMING

SYSTEM INSPECTION

Headlight adjuster does not operate

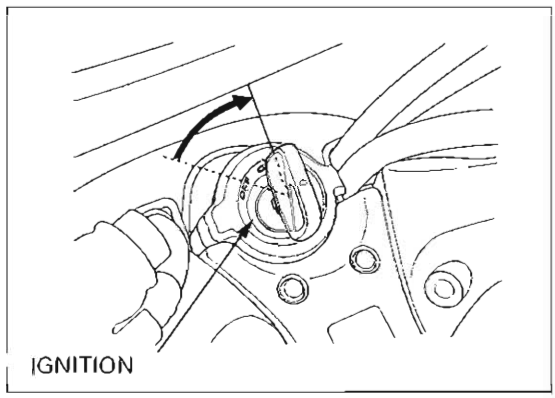
1. Headlight Inspection

   Turn the ignition switch to "ON" and check that the headlight low beams turn on.

   Do the headlight low beams turn on?

   YES – GO TO STEP 2.

   NO – Check the headlight sub fuse 10A.



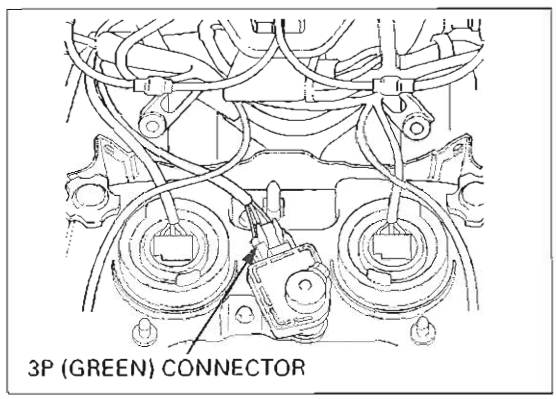
2. Connector Inspection

   Turn the ignition switch to "OFF".
   Remove the upper cowl (page 2-16).
   Disconnect the aiming motor 3P (Green) connector from the headlight unit.
   Check for loose contacts or corroded terminals.

   Are the 3P connector terminals normal?

   YES – GO TO STEP 3.

   NO – Faulty 3P (Green) connector connection



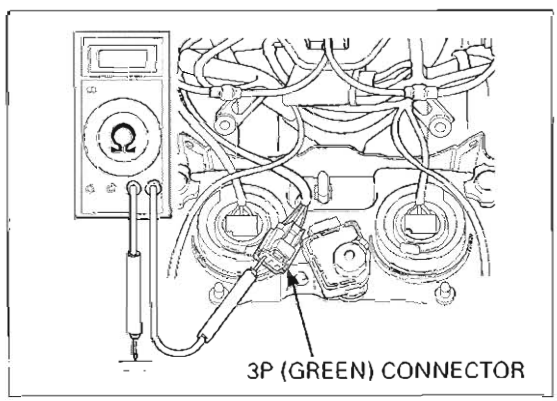
3. Ground Circuit Inspection

   Check for continuity between the Green wire terminal and ground.

   Is there continuity?

   YES – GO TO STEP 4.

   NO – Check for an open circuit in Green wire between the combination meter and ground terminal.



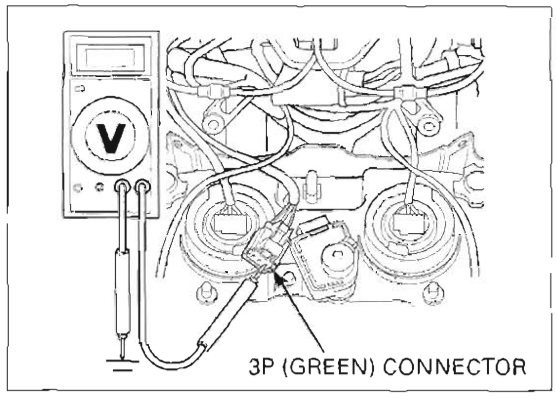
4. **Power Circuit Inspection**

Measure the voltage between the Black/brown wire terminal (+) and ground (-) with the ignition switch to "ON".

Is there battery voltage?

YES – GO TO STEP 5.

NO – Open circuit in the Black/brown wire in wire harness.



5. **Light green Circuit Inspection**

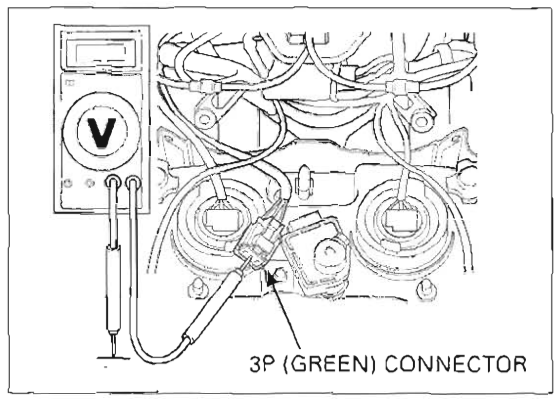
Connect the voltmeter to the Light green terminal of the 3P (Green) connector wire harness side (+) and ground (-).
Check that the voltage varies with the headlight aiming knob position while operating the knob.

Standard: 1.2 – 10.8 V

Is there standard voltage?

YES – Replace the aiming motor.

NO – • Open or short circuit in Light green wire between the aiming motor and headlight aiming knob.
• Check the headlight aiming knob.



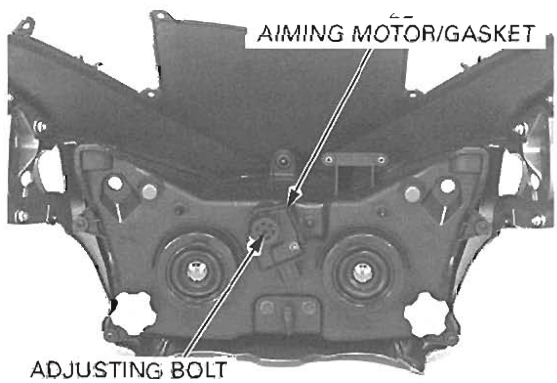
AIMING MOTOR REPLACEMENT

Remove the upper cowl (page 2-16).

Turn the aiming motor counterclockwise.
Turn the adjusting bolt counterclockwise and remove the aiming motor from the headlight unit.
Remove the gasket.

Installation is in the reverse order of removal.

Adjust the headlight beam (page 3-22).



HEADLIGHT AMING KNOB

SYSTEM INSPECTION

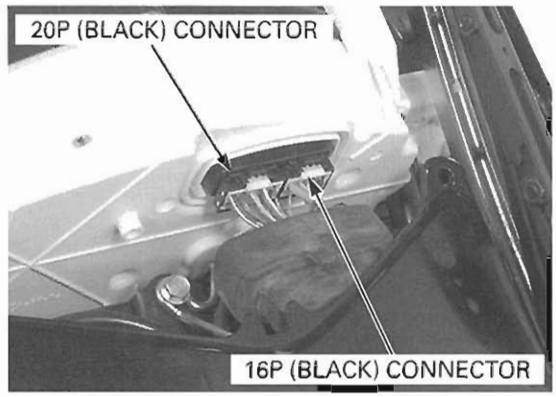
1. **Connector Inspection**

   Turn the ignition switch to "OFF".
   Remove the inner screen cover.
   Disconnect the combination meter 20P (Black) and 16P (Black) connectors and check for poor contacts or corroded terminals.

   Are the 16P connector terminals normal?

   YES – GO TO STEP 2.

   NO – Faulty combination meter 20P (Black) and 16P (Black) connector connection.



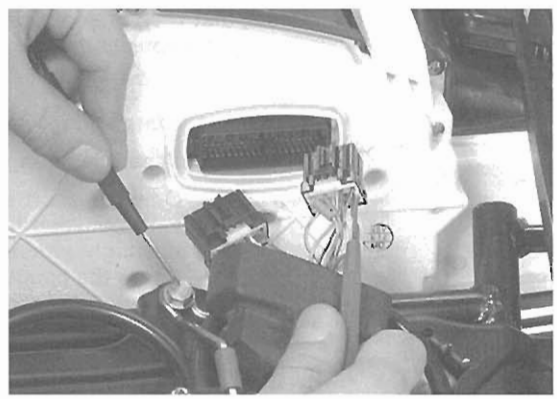
2. **Continuity Inspection**

   Check for continuity between the Green/yellow wire terminal of the wire harness side connector and ground.

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Check for an open circuit in the Green wire of the wire harness.



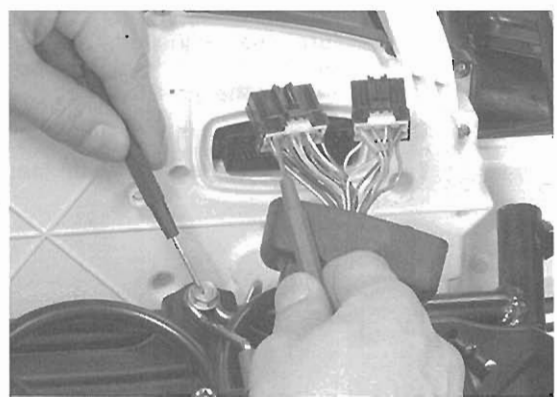
3. Voltage Inspection

   Start the engine and let it idle.
   Measure the voltage between the Black/brown wire terminal (+) of the wire harness side and ground (-).

   Is there battery voltage?

   YES – GO TO STEP 4.

   NO – Open circuit in the Black/brown wire of the wire harness.



4. **Headlight aiming knob Inspection**

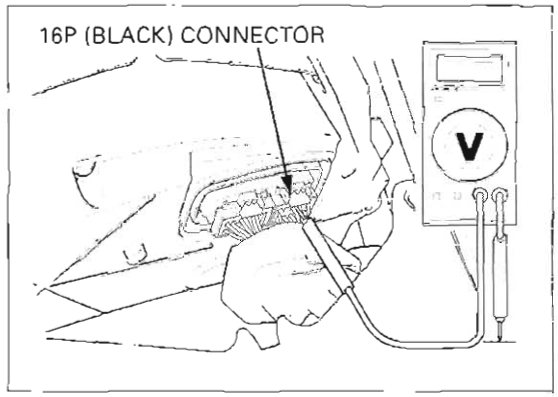
Connect the combination meter 20P (Black) and 16P (Black) connectors.
Turn the ignition switch to "ON" and measure the voltage between the Light green wire terminal (+) and ground (-).

Standard: 1.2 – 10.8 V

Is there standard voltage?

YES – The headlight aiming knob is normal.

NO – Faulty headlight aiming knob.



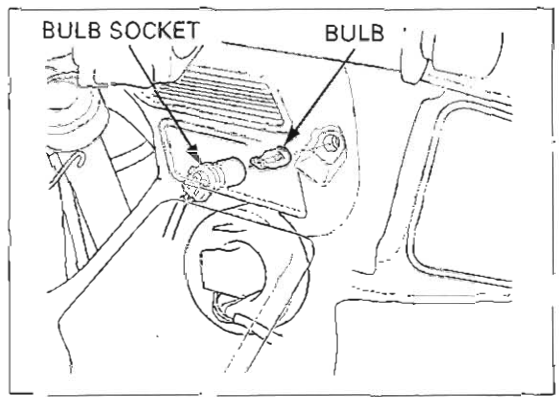
POSITION LIGHT

BULB REPLACEMENT

Pull out the position light bulb socket.

Remove the bulb from the socket, replace it with a new one.

Install the position light bulb socket and headlight unit in the reverse order of removal.



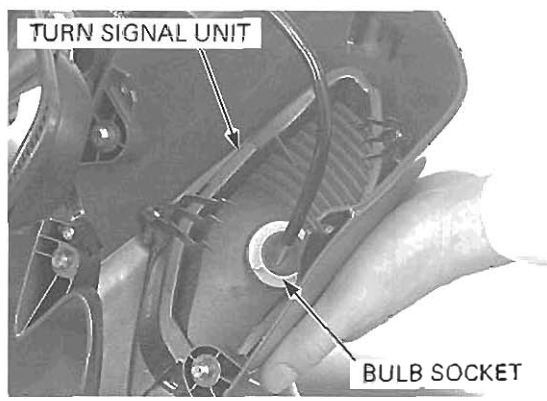
TURN SIGNAL

BULB REPLACEMENT

FRONT

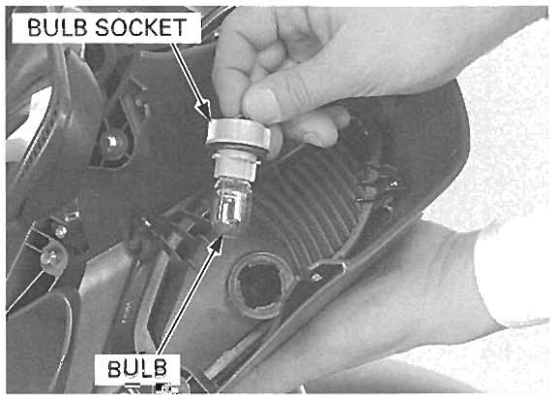
Remove the mirror cover (page 2-11).

Turn the bulb socket counterclockwise and remove it from the turn signal unit.



Remove the bulb from the socket and replace it with a new one.

Install the turn signal bulb socket in the reverse order of removal.



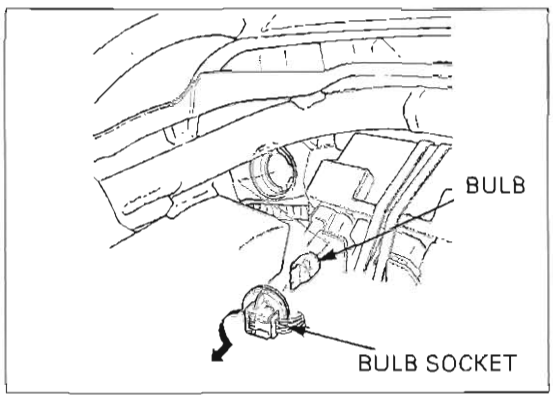
REAR

Remove the seat (page 2-5).

Turn the bulb socket counterclockwise and remove it from the turn signal unit.

Remove the bulb from the socket and replace it with a new one.

Install the turn signal bulb socket in the reverse order of removal.



TAIL/BRAKE LIGHT

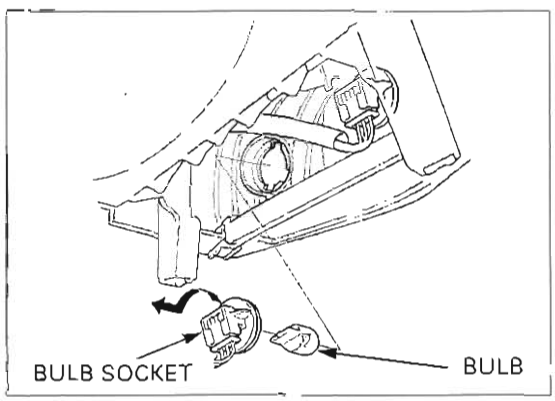
BULB REPLACEMENT

Remove the rear fender A (page 2-8).

Turn the bulb sockets counterclockwise, then remove the bulb sockets.

Remove the bulb and replace them with new ones.

Install the tail/brake light sockets in the reverse order of removal.



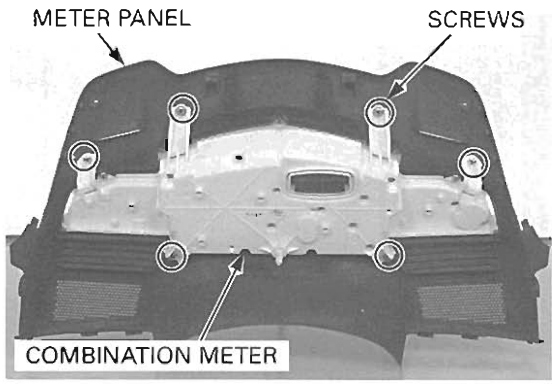
COMBINATION METER

REMOVAL/INSTALLATION

Remove the meter panel (page 2-17).

Remove the six screws and the combination meter from the meter panel.

Installation is in the reverse order of removal.

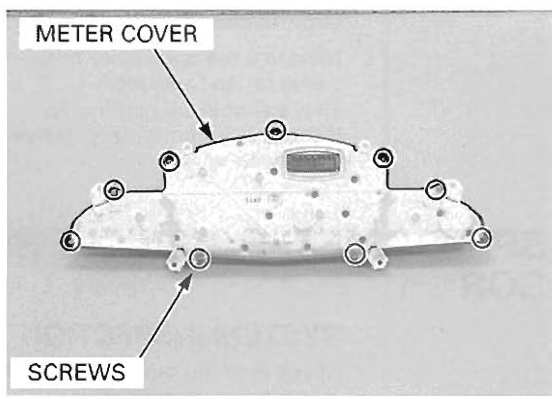


DISASSEMBLY/ASSEMBLY

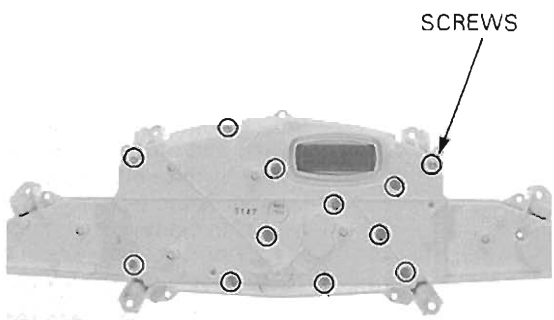
Remove the headlight aiming knob.



Remove the screws and the combination meter cover.

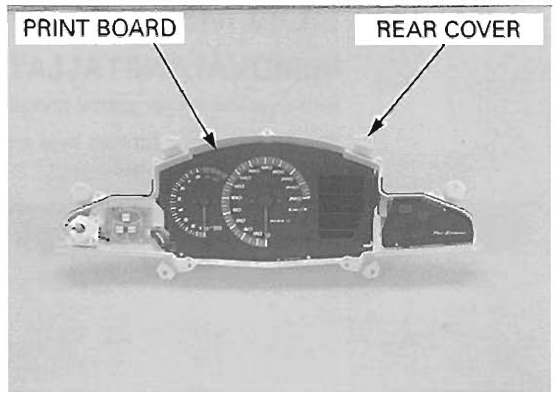


Remove the screws.



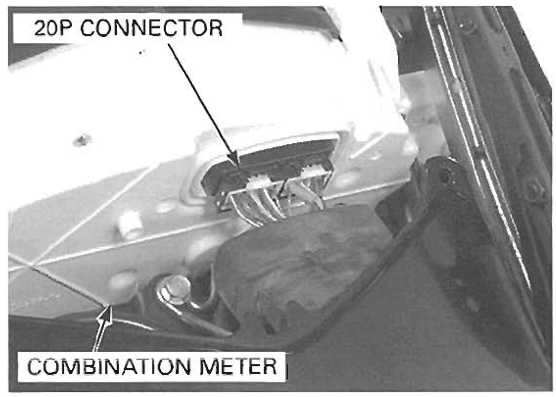
Remove the combination meter print board assembly from the rear cover.

Assembly is in the reverse order of disassembly.



POWER/GROUND LINE INSPECTION

Disconnect the combination meter 20P (Black) connector.
Check the following at the wire harness side connector terminals of the combination meter.



Power input line

Measure the voltage between the Black/brown wire terminal (+) and ground (–).
There should be battery voltage with the ignition switch "ON".
If there is no voltage, check for an open circuit in the Brown/blue wire.

Back-up voltage line

Measure the voltage between the Red/green wire terminal (+) and ground (–).
There should be battery voltage at all times.
If there is no voltage, check for an open circuit in the Red/green wire.

Ground line

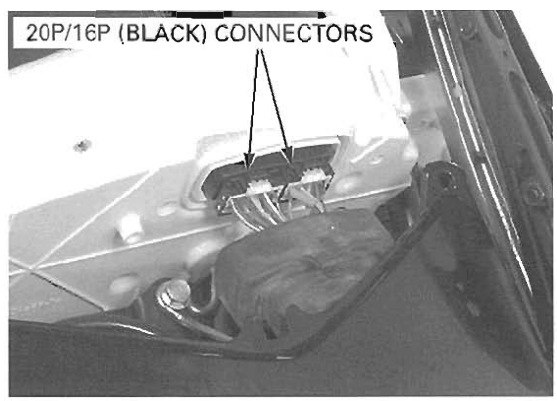
Measure the continuity between the Green wire terminal (+) and ground (–).
There should be continuity.
If there is no continuity, check for an open circuit in the Green wire.

SPEEDOMETER/VEHICLE SPEED SENSOR

SYSTEM INSPECTION

Check that the tachometer and coolant temperature meter function properly.

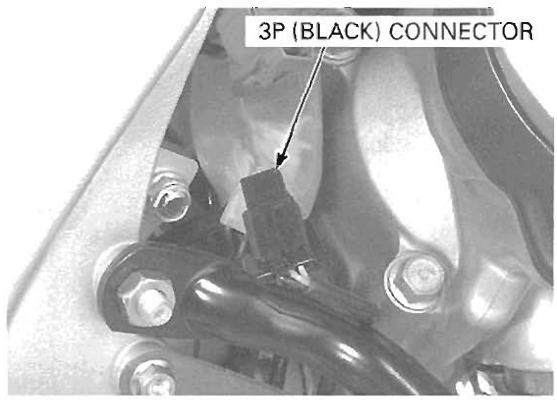
- If they do not function, perform the power and ground line inspection of the combination meter (page 22-12).
- If they function, shift the transmission into neutral, combination meter connectors are connected and turn the ignition switch ON.
  Measure the voltage between the Yellow/green (+) and Green (–) wire terminals of the wire harness side connector.
  Slowly turn the rear wheel by hand.
  There should be 0 to 5 V pulse voltage.



– If pulse voltage appears, replace the combination meter print circuit board.
– If pulse voltage does not appear, check for an open or short circuit in the Yellow/green wire.
  If the Yellow/green wire is OK, check the speed sensor (page 22-13).

VEHICLE SPEED SENSOR INSPECTION

Disconnect the vehicle speed sensor 3P (Black) connector and check for loose or poor contact of the connector.

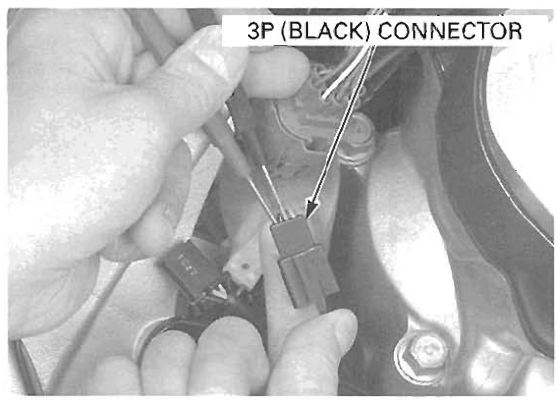


Disconnect the vehicle speed sensor 3P (Black) connector.

Turn the ignition switch ON and measure the voltage at the 3P (Black) connector at the wire harness side.

CONNECTION: Black/brown (+) – Green/black (–)
STANDARD: Battery voltage

If there is no voltage, check for open circuit in Black/brown and Green/black wire and loose contact of the wire harness connectors.

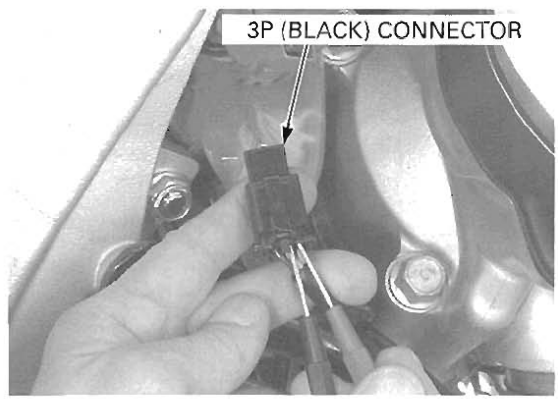


Support the motorcycle securely and place the rear wheel off the ground.
Shift the transmission into neutral.
Connect the vehicle speed sensor 3P (Black) connector.

Measure the voltage at the sensor connector terminals with the ignition switch ON while slowly turning the rear wheel by hand.

CONNECTION: Pink (+) – Green (–)
STANDARD: Repeat 0 to 5V

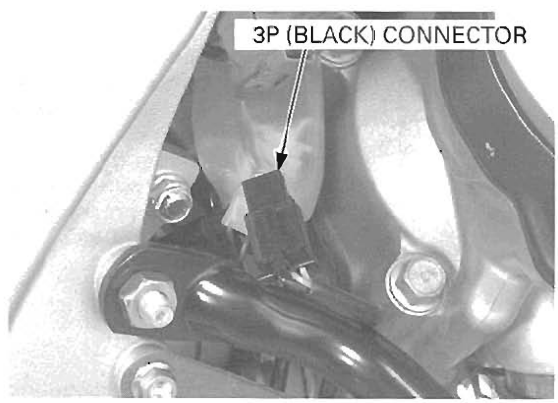
If the measurement is out of specification, replace the speed sensor.



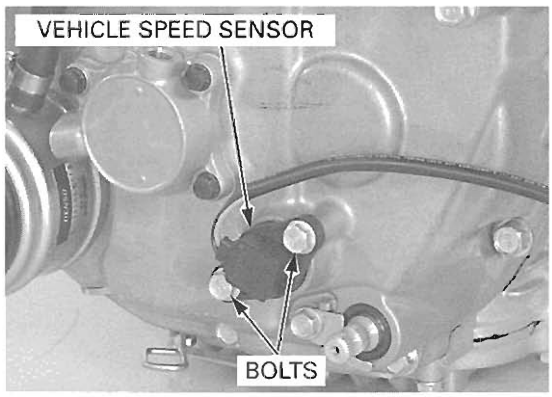
REMOVAL/INSTALLATION

Remove the middle cowl (page 2-13).

Disconnect the vehicle speed sensor 3P (Black) connector.



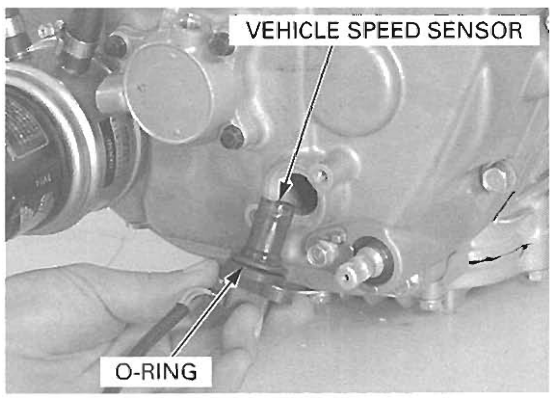
Remove the bolts and vehicle speed sensor.



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

Route the sensor wire.

Installation is in the reverse order of removal.



TACHOMETER

SYSTEM INSPECTION

Remove the inner screen cowl (page 2-16).

Remove the combination meter connector cover.
Connect the voltmeter to the combination meter 16P (Black) connector.

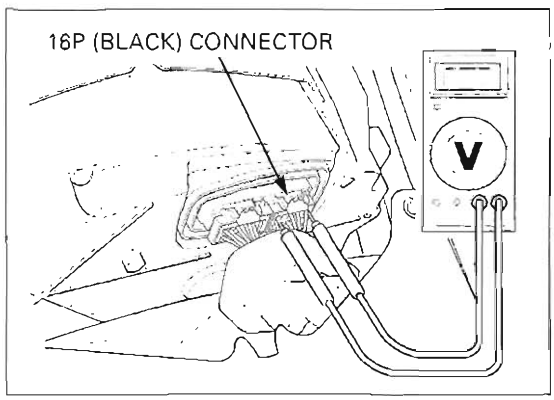
CONNECTION: **Yellow/green (+) – Green/black (-)**

Start the engine and measure the tachometer input voltage.

STANDARD: **Repeat 0 to 5 V**

If the measurement is normal, replace the tachometer.
If the measurement is out of specification, replace the ECM.

If the measurement is 0 V, check for continuity between the combination meter 16P (Black) connector terminal and the ECM 26P (Black) connector Yellow/green terminals.
If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit.
If there is continuity, replace the combination meter printed circuit board (page 22-11).



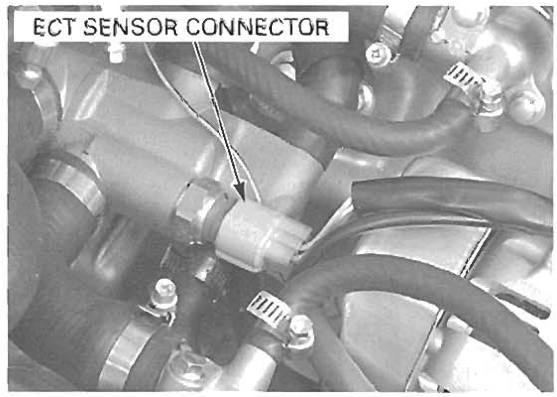
COOLANT TEMPERATURE GAUGE/ SENSOR

SYSTEM INSPECTION

Drain the coolant (page 6-6).
Remove the throttle body (page 5-64).

Disconnect the ECT sensor wire connector from the sensor.

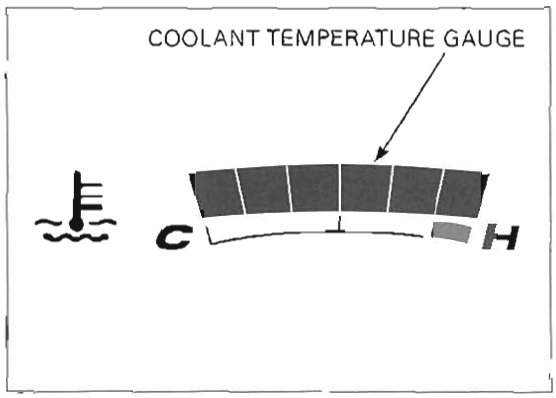
Ground the Green/blue terminal of the 3P connector with a jumper wire.



Turn the ignition switch to "ON" and check the coolant temperature gauge.
The coolant temperature gauge should indicate "H".

If the coolant temperature gauge does not indicate "H", check the wire harness for an open or short circuit.
If the wire harness is normal, replace the combination meter (page 22-11).

If the coolant temperature gauge indicates "H", check the ECT sensor (page 22-15).

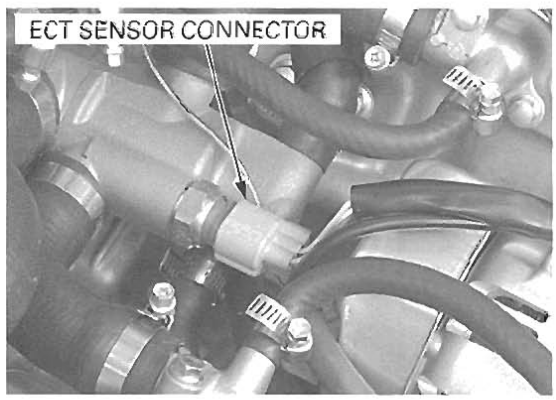


REMOVAL

Drain the coolant (page 6-6).
Remove the throttle body (page 5-64).

Disconnect the ECT sensor wire connector from the sensor.

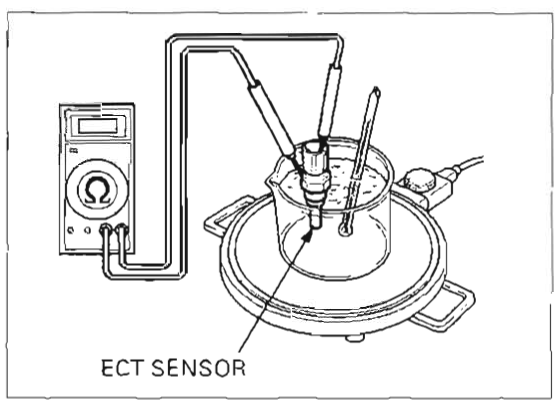
Remove the ECT sensor and sealing washer from the thermostat housing.



ECT SENSOR UNIT INSPECTION

Suspend the ECT 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.

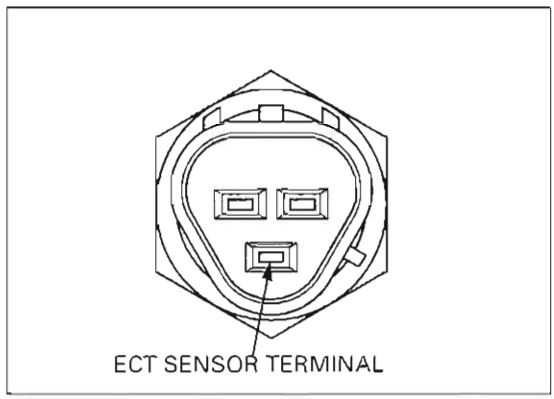
- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.



The ECT sensor terminal is shown in the illustration.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Temperature	80°C (68°F)	120°C (248°F)
Resistance	2.1 – 2.6 kΩ	0.65 – 0.73 kΩ

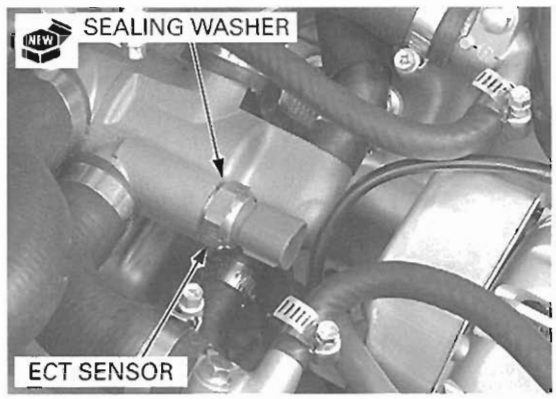


INSTALLTION

Always replace the sealing washer with a new one.

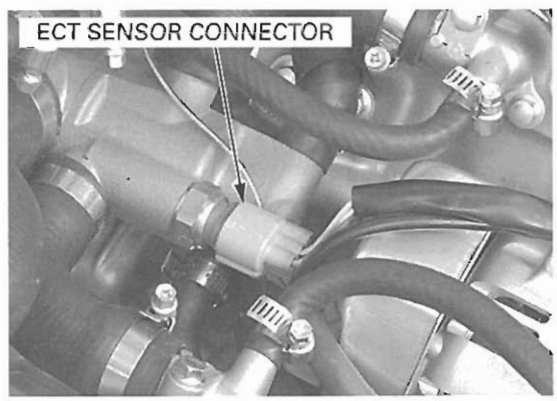
Install and tighten the ECT sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



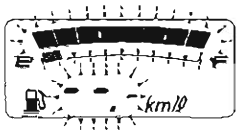
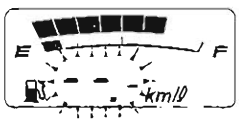
Connect the ECT sensor connector.

Install the throttle body (page 5-68).
Fill the system and bleed the air (page 6-6).



FUEL LEVEL SYSTEM MALFUNCTION INDICATOR

- The fuel meter shows the following indications if the fuel level system fails.
- Check the PGM-FI malfunction indicator lamp. If it blinks, inspect the PGM-FI system (page 5-7).
- If the fuel meter indicates as below, check each part of the fuel level system according to the fuel level system trouble-shooting (page 22-23).

Fuel level meter indication	Symptoms	Causes	Refer to
Normal indication 	Normal.	• Nothing	-
All fuel segments blink and "--.-" blink 	All fuel segments blink and "--.-" blinks continuously.	• Open or short circuit at the fuel level sensor circuit • Faulty fuel level sensor • Short circuit at the fuel reserve sensor circuit • Faulty fuel reserve sensor • Faulty combination meter	22-18
"--.-" blink 	Fuel consumption indicator is normal but "--.-" blinks.	• Open or short circuit at the fuel pulse line circuit • Faulty ECM • Faulty combination meter	22-20

FUEL LEVEL SYSTEM TROUBLE-SHOOTING

ALL FUEL SEGMENTS BLINK AND "--.-" BLINKS CONTINUOUSLY.

1. **Fuel Level Sensor Line Inspection**

   Drain the fuel from the upper fuel tank (page 5-50).

   Turn the ignition switch OFF.

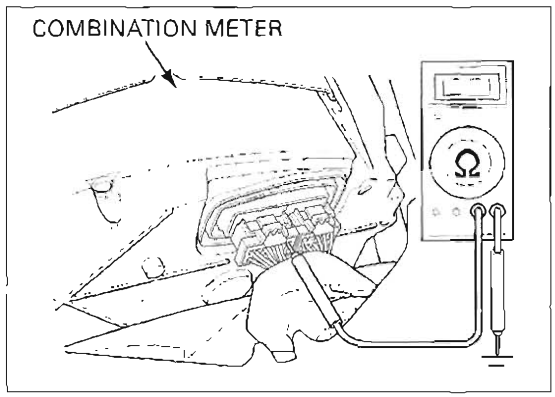
   Disconnect the combination meter 20P/16P (Black) connectors.
   Measure the resistance between the Gray/black wire at the wire harness side and ground.

   Connection: Gray/black (+) – Ground(–)
   Standard: 213 – 219 Ω (20 °C/68 °F)

   Is the resistance within 213 – 219 kΩ (20 °C/68 °F)?

   No – GO TO STEP 2.

   YES – GO TO STEP 4.



2. **Fuel Level Sensor Inspection**

   Remove the fuel level sensor (page 22-23).

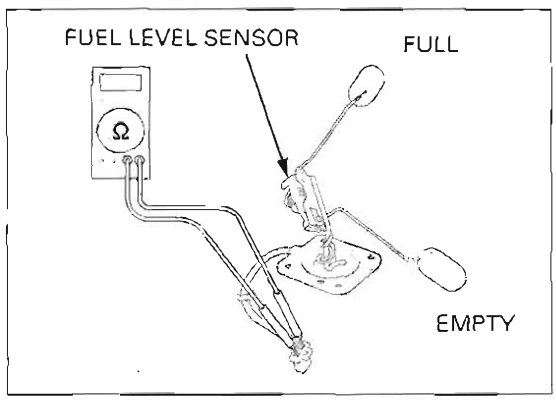
   Connect the ohmmeter to the fuel level sensor Gray/black and Green/black terminals.
   Inspect the resistance of the float at the full and empty positions.

	FULL	EMPTY
Resistance	1 – 6 Ω	213 – 219 Ω

   Is the fuel level sensor normal condition?

   No – Faulty fuel level sensor.

   YES – GO TO STEP 3.



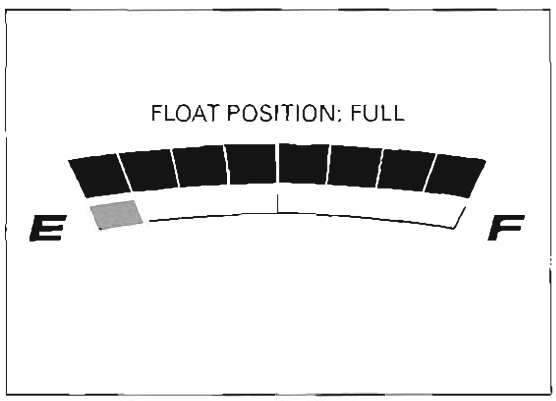
3. **Fuel Meter Inspection**

   Connect the removed fuel level sensor 2P (Blue) connector to the wire harness and move the float to empty.
   Turn the ignition switch to "ON" and check that two segments indicate.
   Turn the ignition switch to "OFF".
   Move the float to full.
   Turn the ignition switch to "ON" and check that all segments indicate.

   Is the fuel meter normal indication?

   No – Faulty combination meter.

   YES – GO TO STEP 4.



4. Fuel Reserve Sensor Ground Inspection

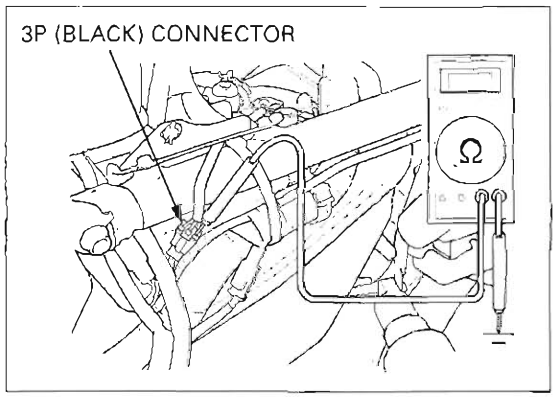
Turn the ignition switch OFF.

Check for continuity between the Green terminal of the fuel pump 3P (Black) connector and ground with the 3P (Black) connector connected.

Is there continuity?

No – • Faulty fuel reserve sensor.
• Open circuit in Green wire.

YES – GO TO STEP 5.



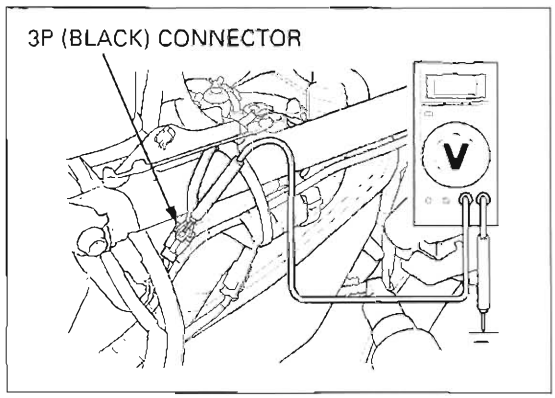
5. Fuel Reserve Sensor Voltage Inspection

Turn the ignition switch to "ON".
Measure the voltage between the Brown/black terminal (+) of the fuel pump 3P (Black) connector and ground (-) with the 3P (Black) connector is connected.

Is the voltage near the battery voltage?

YES – Faulty fuel reserve sensor.

No – GO TO STEP 6.



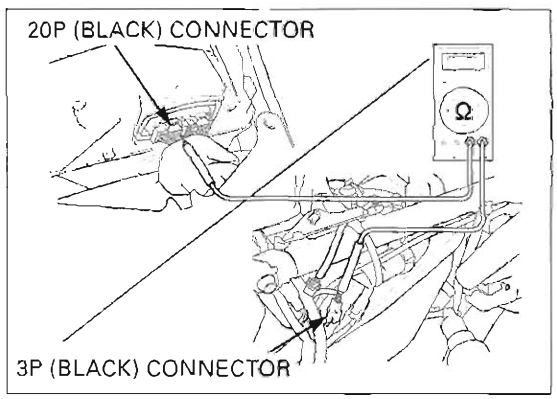
6. Continuity Inspection

Disconnect the fuel pump 3P (Black) connector.
Check for continuity at the Brown/black wire between the combination meter and fuel pump.

Is there continuity?

No – Open circuit in Brown/black wire.

YES – • Faulty combination meter.
• Faulty fuel reserve sensor.



FUEL CONSUMPTION INDICATOR IS NORMAL BUT "--.-" BLINKS.

1. **Fuel Pulse Line Inspection**

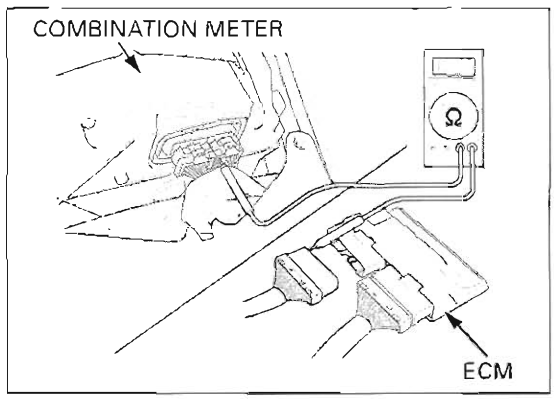
Turn the ignition switch OFF.

Disconnect the combination meter connectors and ECM connector.
Check for continuity at the Pink/orange wire between the speedometer and ECM.

Is there continuity?

No – Open circuit at the Pink/orange wire.

YES – GO TO STEP 2.



2. **Fuel Meter Inspection**

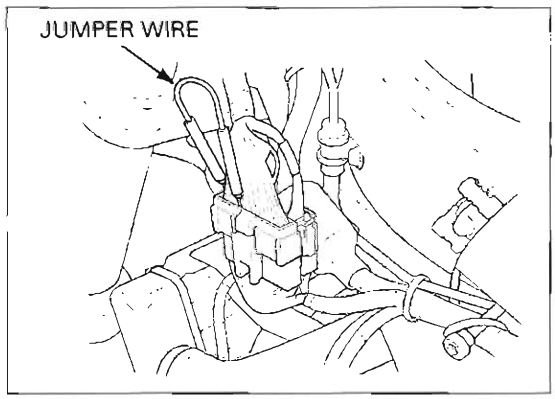
Remove the left side cover (page 2-6).
Support the motorcycle securely on its center stand.
Start the engine and shift the transmission into 1st.
Increase the vehicle speed 5 km/h at meter reading for 15 seconds or more.

Contact the Pink/orange wire with the Green wire at the connector for a moment using the jumper wire.

Is there any value indication in the fuel consumption indicator?

No – Faulty combination meter.

YES – Faulty ECM.



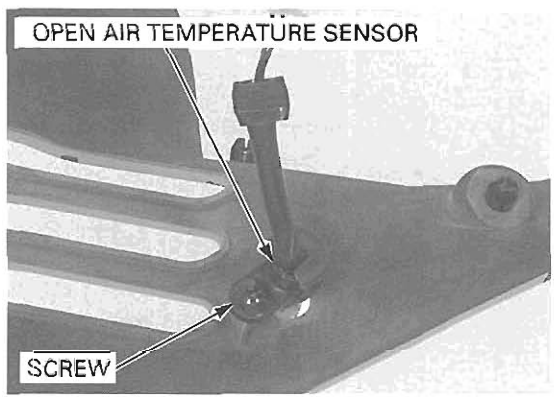
OPEN AIR TEMPERATURE SENSOR

REMOVAL/INSTALLATION

Remove the right inner cowl (page 2-12).

Remove the screw and open air temperature sensor from the right inner middle cowl.

Installation is in the reverse order of removal.

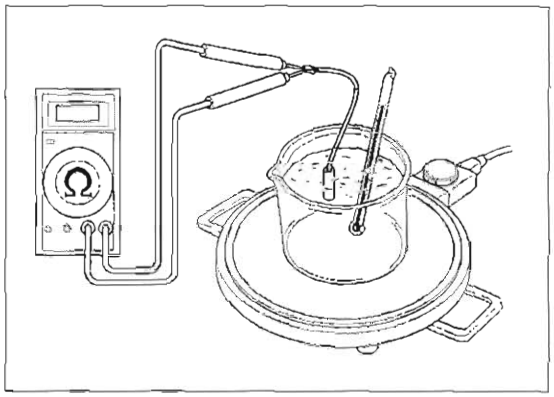


INSPECTION

Remove the open air temperature sensor from the right inner cowl (page 2-12).

Measure the resistance between the open air temperature sensor terminals.

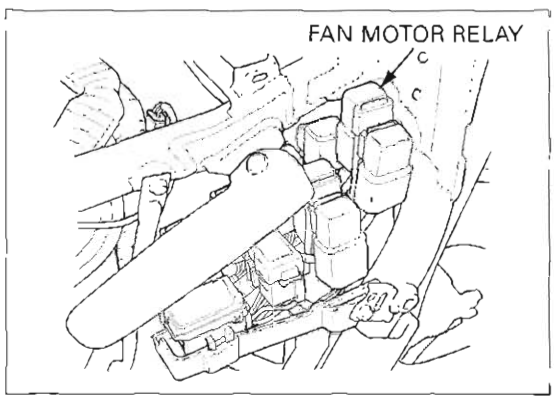
STANDARD: 4.8 - 5.2 Ω (25°C/77°F)



FAN MOTOR RELAY

Remove the side cover (page 2-6).

Disconnect the fan motor relay 4P (Black) connector, then remove the fan motor relay.



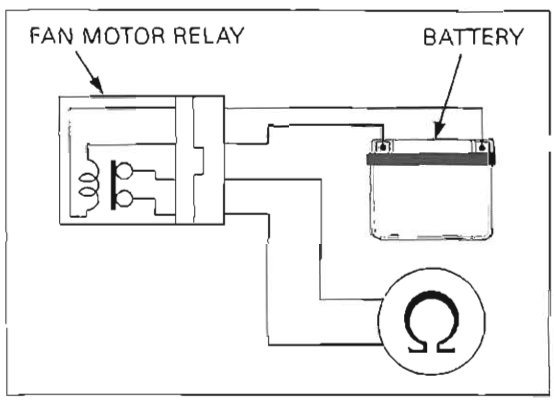
Connect the ohmmeter to the fan motor relay connector terminals.

CONNECTION: Black/blue – Black/pink

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

CONNECTION: Black/pink (+) – Brown (-)

There should be no continuity when the 12 V battery is connected.
If the continuity exists when the 12 V battery is connected, replace the fan motor relay.

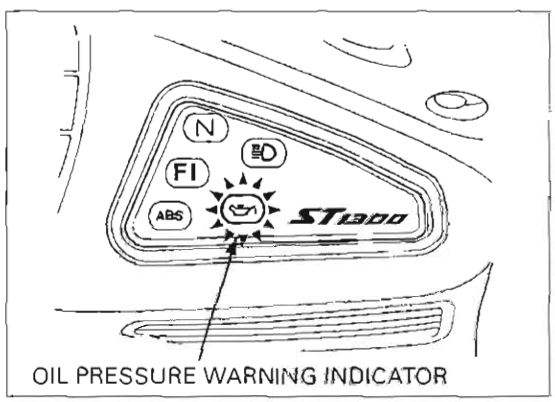


OIL PRESSURE SWITCH

INSPECTION

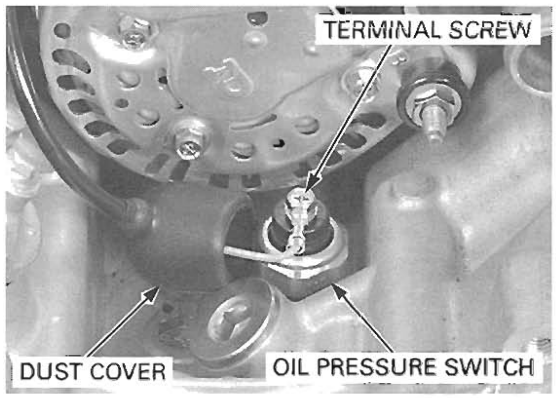
If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure the oil pressure warning indicator comes on with the ignition switch ON.



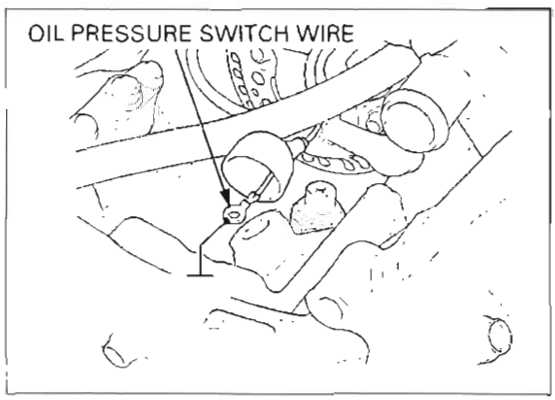
If the indicator does not come on, inspect as follows:
Remove the throttle body (page 5-64).
Remove the thermostat housing (page 6-8).

Remove the dust cover.
Remove the screw and oil pressure switch terminal.



Short the oil pressure switch wire terminal to ground using a jumper wire.
The oil pressure warning indicator comes on with the ignition switch "ON".
If the light does not come on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

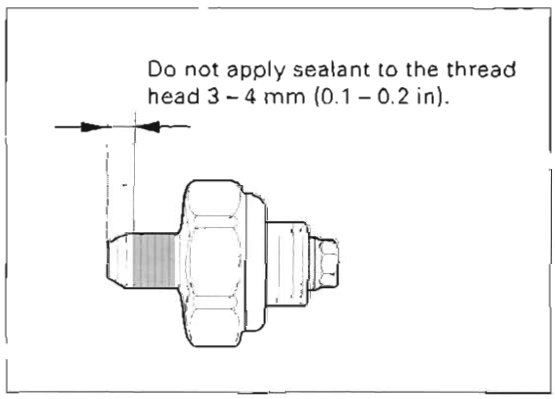
Start the engine and make sure that the light goes out.
If the light does not go out, check the oil pressure (page 4-5).
If the oil pressure is normal, replace the oil pressure switch (page 22-22).



REMOVAL/INSTALLATION

Remove the boot, terminal screw and wire terminal (page 22-22).
Remove the oil pressure switch from the crankcase.

Apply sealant to the oil pressure switch threads as shown.

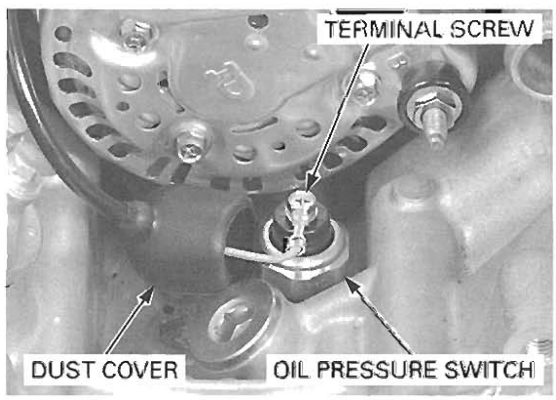


Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

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

Install the dust cover.

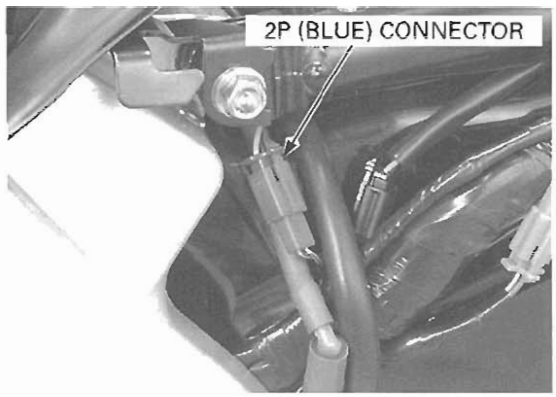


FUEL LEVEL SENSOR REMOVAL/ INSTALLATION

Remove the side cover (page 2-6).

Disconnect the fuel reserve sensor 2P (Blue) connector.

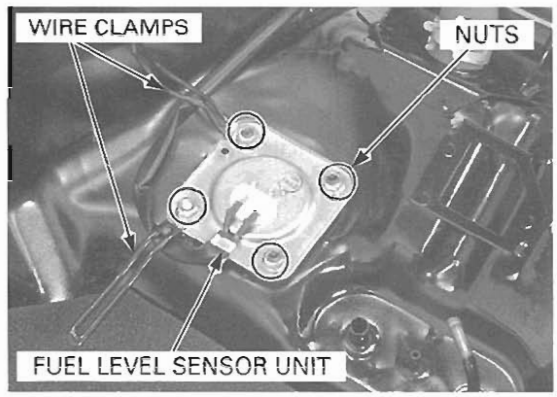
Remove the upper fuel tank (page 5-56).



Be careful not to damage the float arm.

Remove the nuts, wire clamps and fuel level sensor unit from the upper fuel tank.

Fuel level sensor inspection (page 22-18)

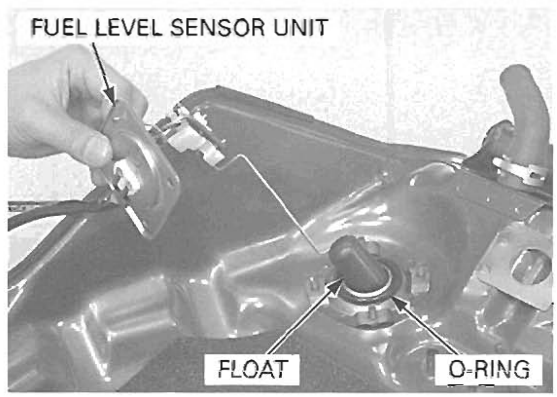


Check that the O-ring is in good condition and replace if necessary.

Be careful not to damage the float arm.

Install the fuel level sensor into the fuel tank.

Installation is in the reverse order of removal.

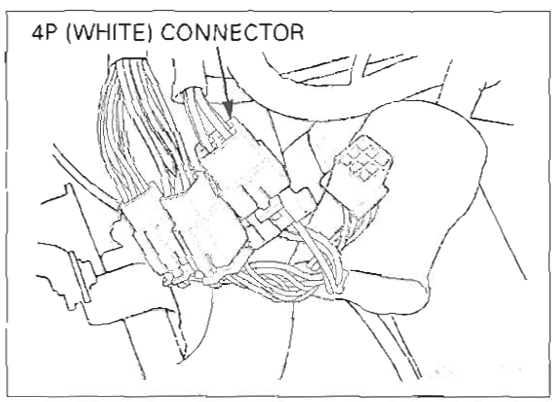


IGNITION SWITCH

INSPECTION

Remove the middle cowl (page 2-13).

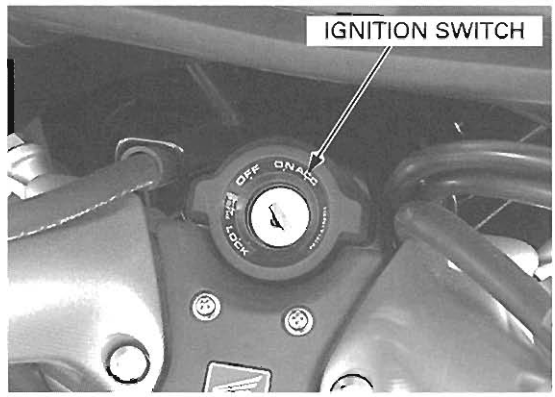
Disconnect the ignition switch wire 4P (White) connector.



Check for continuity between the wire terminals of the ignition switch connector in each switch position.
Continuity should exist between the color coded wires as follows:

IGNITION SWITCH

	BAT1	IG1	BAT2	ACC	IG2	KEY
ACC			○—○			KEY ON
ON	○—○		○—○	○—○		KEY ON
OFF						KEY OFF
LOCK						KEY OFF LOCK PIN
COLOR	R	R/Bl	R	R/W	Bu/O	



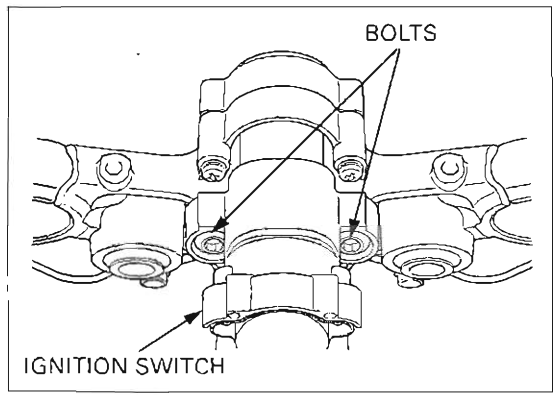
REMOVAL/INSTALLATION

Remove the top bridge (page 15-20).

Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.
Tighten the ignition switch mounting bolt to the specified torque.

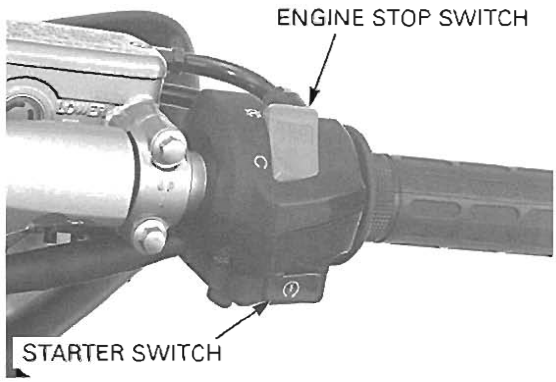
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



HANDLEBAR SWITCHES

Disconnect the handlebar switch 9P (Red), 9P (Black), 6P (White) connectors.

Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:



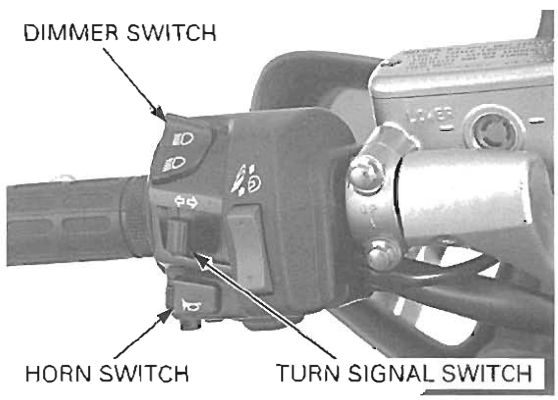
ENGINE STOP/STARTER SWITCHES

ENGINE STOP SWITCH

	IG	BAT
OFF		
RUN	○—○	
COLOR	W	W/Bl

STARTER SWITCH

	ST	IG	BAT4	HL
FREE			○—○	
PUSH	○—○			
COLOR	Y/R	Bl	Bl/R	Bu/W



TURN SIGNAL/DIMMER/HORN SWITCHES

TURN SIGNAL SWITCH

	W	R	L	PO	PR	PL
R	○—○			○—○		
N				○—○	○	
L	○	—○		○—○		
COLOR	Gr	Lb	O	Bl/Br	Lb/W	O/W

DIMMER SWITCH

	HL	Lo	Hi
Lo	○—○		
(N)	○—○	○	
Hi	○	—○	
COLOR		W	Bu

HORN SWITCH

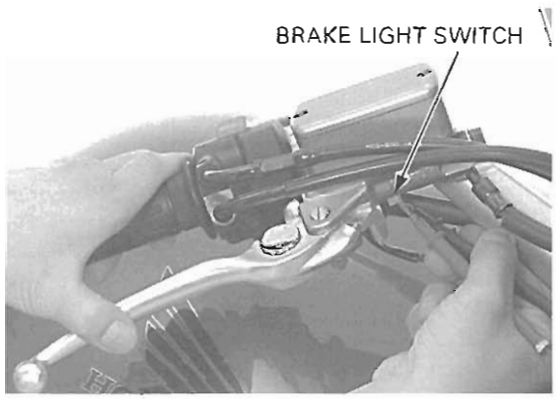
	Ho	BAT
FREE		
PUSH	○	—○
COLOR	Lg	Bl/Br

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.

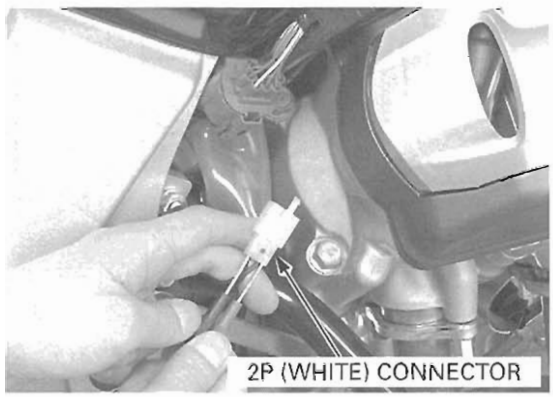


REAR

Remove the right middle cowl (page 2-13).

Disconnect the rear brake light switch 2P (White) connector and check for continuity between the terminals.

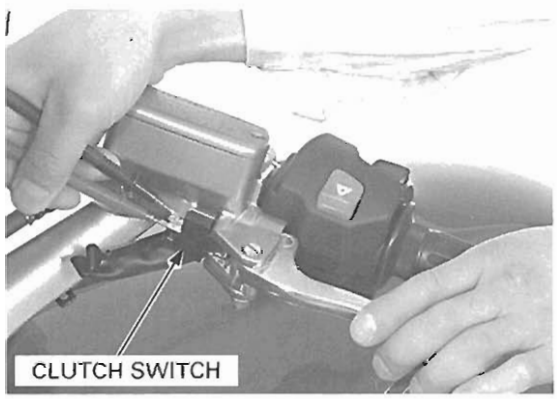
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal released.



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

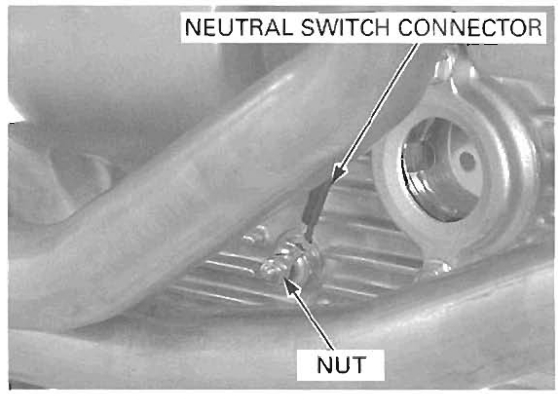
INSPECTION

Remove the right middle cowl (page 2-13).

Remove the nut and remove the neutral switch wire from the neutral 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 in gear.



REMOVAL/INSTALLATION

Remove the right middle cowl (page 2-13).

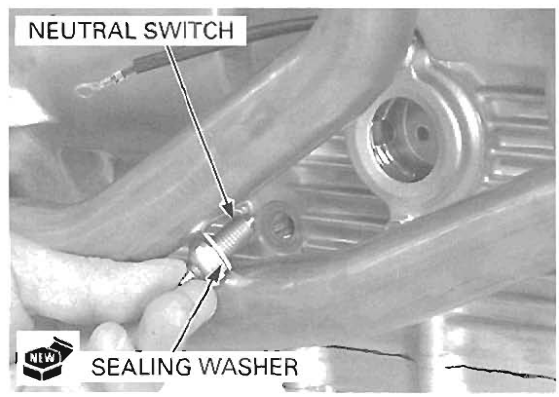
Remove the screw and remove the neutral switch wire from the neutral switch.
Remove the neutral switch and sealing washer.

Install the neutral switch with a new sealing washer. Tighten the neutral switch to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the neutral switch wire to the neutral switch. Install and tighten the neutral switch terminal nut to the specified torque.

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



SIDE STAND SWITCH

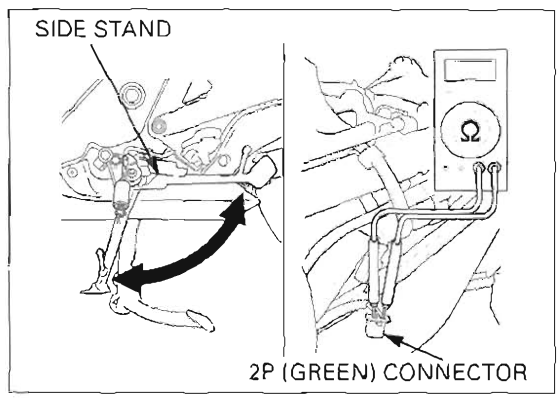
INSPECTION

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

Disconnect the side stand switch 2P (Green) connector.

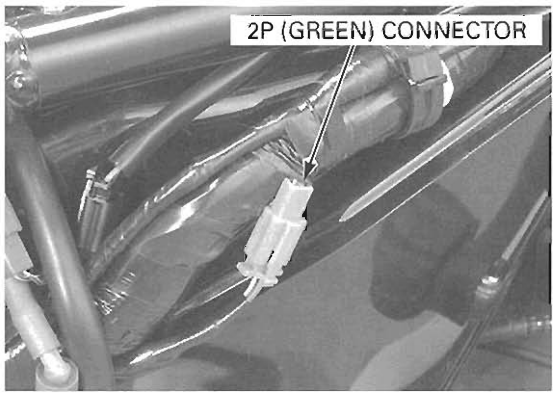
Check for continuity between the wire terminals of the side stand switch connector.

Continuity should exist only when the side stand is lowered.

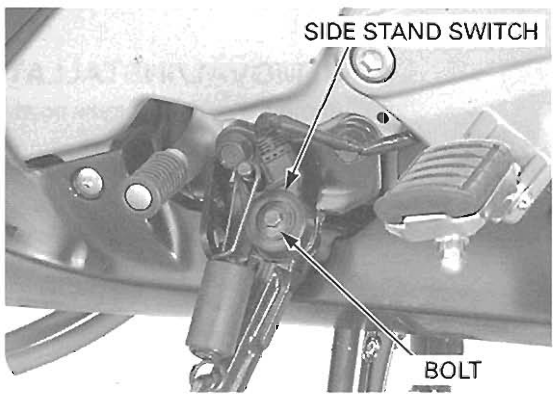


REMOVAL

Disconnect the side stand switch 2P (Green) connector.

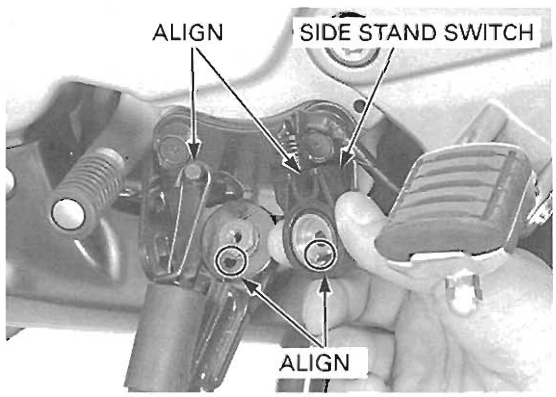


Remove the bolt and side stand switch.



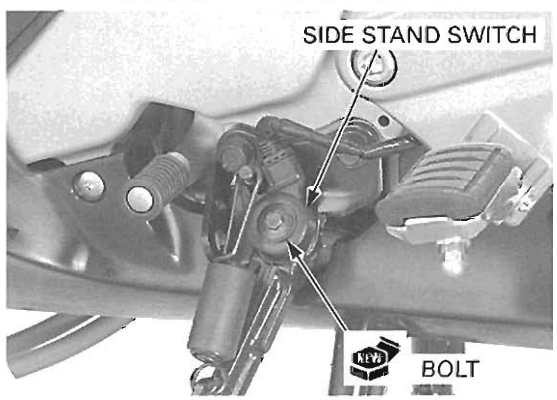
INSTALLATION

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.



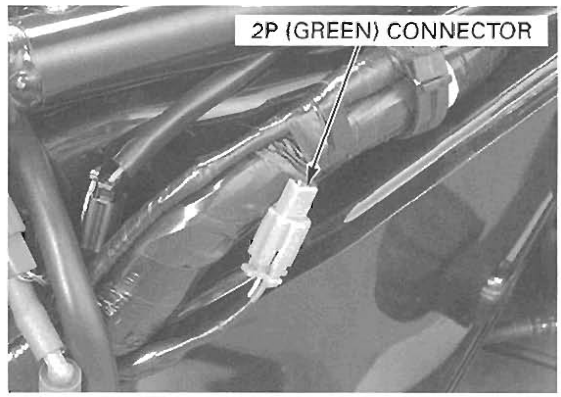
Secure the side stand switch with a new bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Connect the side stand switch 2P (Green) connector.

Install the left side cover (page 2-6).



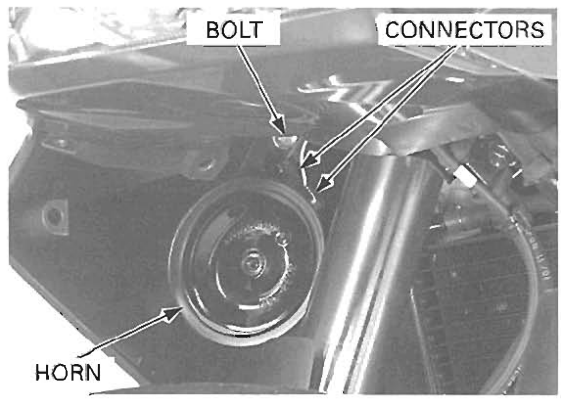
HORN

Remove the inner cowl (page 2-12).

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 12 V battery is connected across the horn terminals.

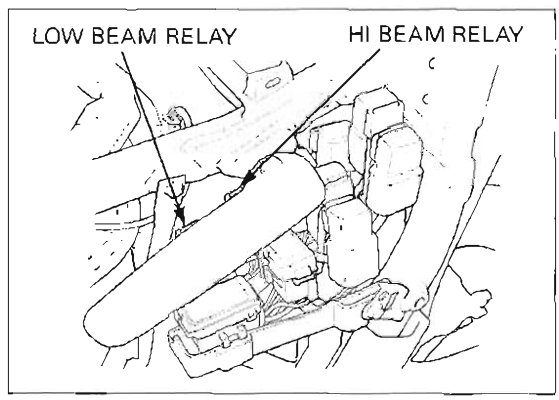
If horn is abnormal, remove the bolt and replace the horn.



HEADLIGHT RELAY

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

Disconnect the headlight relay 4P (Black) connectors, then remove the headlight relays.



Connect the ohmmeter to the headlight relay connector terminals.

CONNECTION:

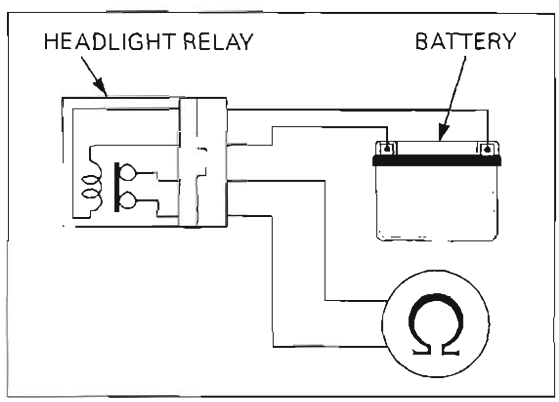
Hi beam relay:	**Blue/black – Black/red**
Low beam relay:	**White/black - Black/red**

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

CONNECTION:

Hi beam relay:	**Blue – Green**
Low beam relay:	**White – Green**

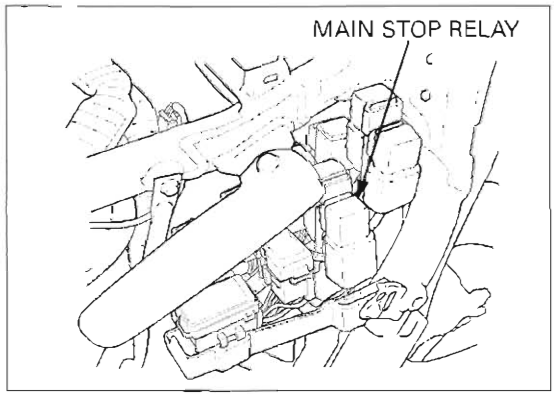
There should be no continuity only when the 12 V battery is connected.
If the continuity exists when the 12 V battery is connected, replace the headlight relay.



MAIN STOP RELAY

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

Disconnect the main stop relay 4P connector, then remove the main stop relay.



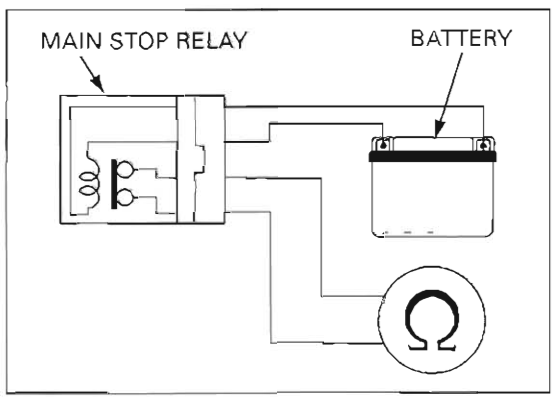
Connect the ohmmeter to the headlight relay connector terminals.

CONNECTION: White – White/Green

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

CONNECTION: Red/Green (+) – Green (-)

There should be no continuity when the 12 V battery is connected.
If continuity exists when the 12 V battery is connected, replace the main stop relay.



TURN SIGNAL/HAZARD RELAY

INSPECTION

1. **Recommended Inspection**

   Check the following
   - Battery condition
   - Burned out bulb or non-specified wattage
   - Burned fuse
   - Ignition switch and turn signal switch function
   - Loose connector

   Check for the above items.

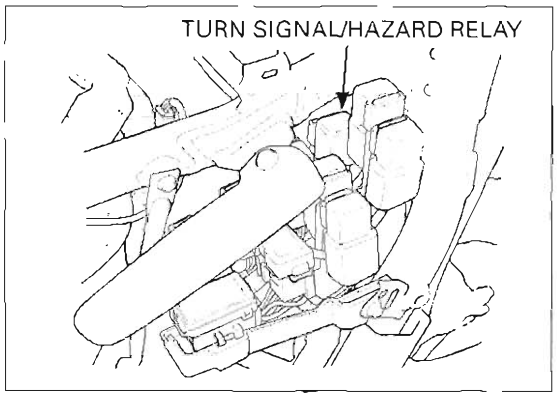
   Are the above items in good condition?

   NO – Replace or repair the faulty part(s)

   YES – GO TO STEP 2.

2. **Turn Signal Circuit Inspection**

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



Disconnect the turn signal/hazard relay 3P connector from the relay.
Short the Gray and Red/green terminals of the turn signal/hazard relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch "ON".

Does the light come on?

YES – • Faulty turn signal/hazard relay
• Poor connection of the connector.

NO – Broken wire harness

WINDSCREEN ADJUSTER (DELUXE TYPE ONLY)

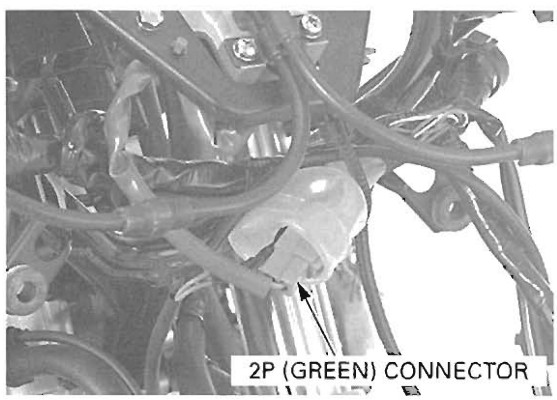
SYSTEM INSPECTION

The windscreen adjuster system has an electrical circuit breaker inside of the screen adjust motor.
If the windscreen gets jammed, the circuit breaker will operate to avoid overheating the windscreen motor.
If this happens, wait a few minutes for the windscreen motor to cool before operating the windscreen.

WINDSCREEN ADJUSTER DOES NOT OPERATE

1. **Screen Adjust Motor Inspection**

Remove the upper cowl (page 2-16).
Disconnect the screen adjust motor 2P (Green) connector.
Connect the 12V battery to the 2P (Green) connector terminal of the motor side.



Does the screen adjust motor operate?

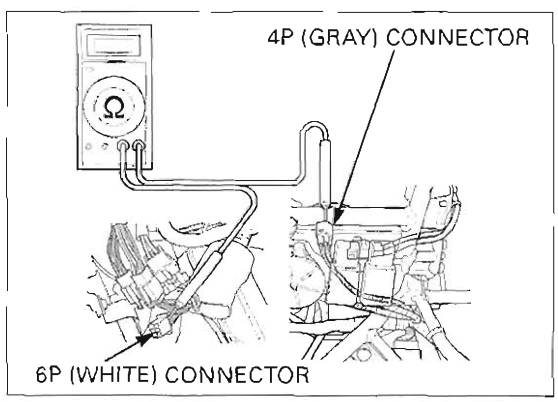
YES – GO TO STEP 2.

NO – Replace the screen adjust motor assembly (page 22-35).

2. **Continuity Inspection 1**

Disconnect the left handle switch 6P (White) connector.
Disconnect the screen adjust motor 4P (Gray) connector.
Check for continuity between the 6P connector and 4P (Gray) connector.

Connection:
Light green/blue – Light green/blue
Light green/yellow – Light green/yellow



Is there continuity?

YES – GO TO STEP 3.

NO – Open circuit in the wire harness between the screen adjust motor and left handlebar switch.

3. **Continuity Inspection 2**

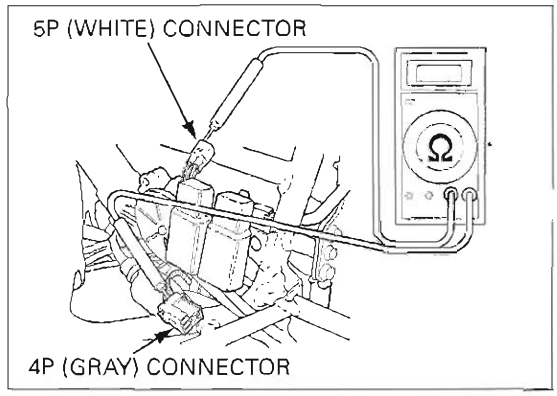
Disconnect the screen up relay 5P (White) connector and down 5P (White) connector.
Check for continuity between the 5P (White) connectors and screen adjust motor 4P (Gray) connector.

Connection: Pink/yellow – Pink/yellow
Pink/blue – Pink/blue

Is there continuity?

YES – GO TO STEP 4.

NO – Open circuit in the wire harness between the screen adjust motor and screen up/down relays.



4. **Continuity Inspection 3**

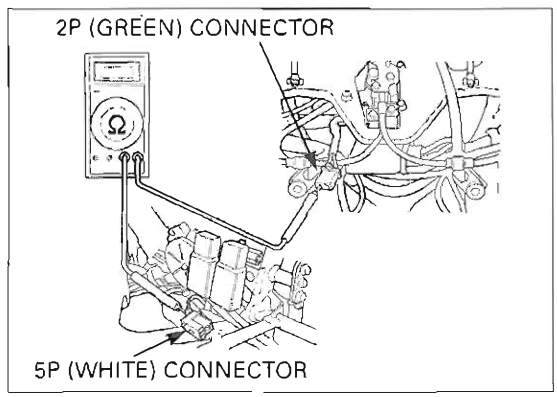
Disconnect the screen up relay 5P (White) connector and down 5P (White) connector.
Disconnect the screen adjust motor 2P (Green) connector.
Check for continuity between the 5P (White) connectors and screen adjust motor 2P (Green) connector.

Connection: Orange/black – Orange/black
Orange /blue – Orange/blue

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the wire harness between the screen adjust motor and screen up/down relays.



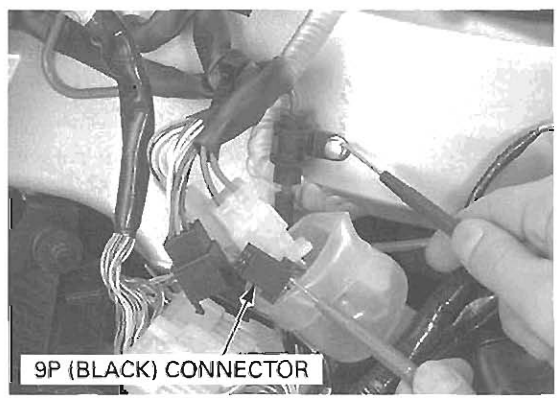
5. **Power Circuit Inspection**

Disconnect the left handlebar switch 9P (Black) connector.
Measure the battery voltage between the Pink terminal (+) of the wire harness side and ground (-) with the ignition switch turn to "ON".

Is there battery voltage?

YES – GO TO STEP 6.

NO –
- Open circuit in the wire harness.
- Faulty screen main relay.
- Blown sub fuse (20A)



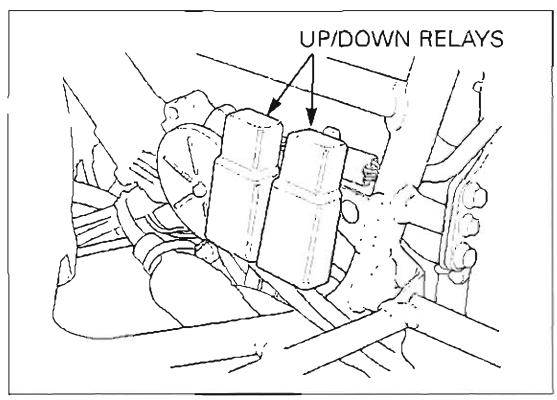
6. **Ground Circuit Inspection**

Check for continuity between the Green terminals of the screen up/down relay wire harness side and ground.

Is there continuity?

YES – Faulty screen up/down relays.

NO – Open circuit in the Green wire of the wire harness.



SCREEN ADJUSTING SWITCH

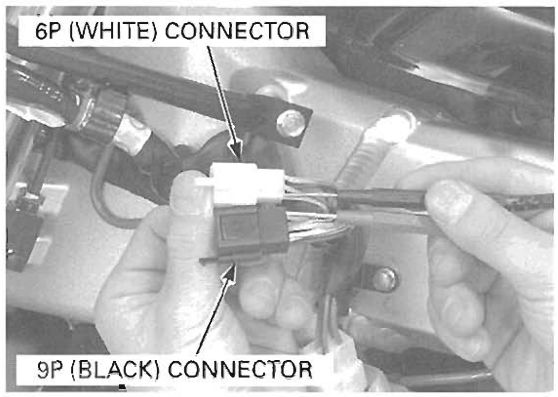
INSPECTION

Remove the left middle cowl (page 2-12).

Disconnect the left handlebar switch 6P (White) and 9P (Black) connectors.

Check for continuity between the Pink and Light green/yellow terminals of the left handlebar switch 6P connector handlebar switch side with the screen adjusting switch to "UP".
If there is no continuity, replace the left handlebar switch assembly.

Check for continuity between the Pink and Light green/blue terminals of the left handlebar switch 6P connector handlebar switch side with the screen adjusting switch to "DOWN".
If there is no continuity, replace the left handlebar switch assembly.

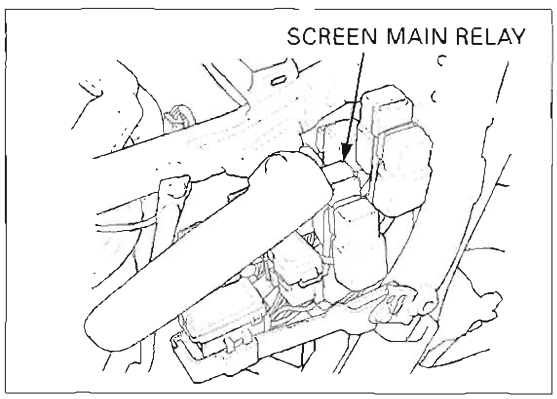


SCREEN MAIN RELAY

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

Disconnect the screen main relay 4P (White) connector.

Remove the screen main relay.



Connect the ohmmeter to the screen main relay connector terminals.

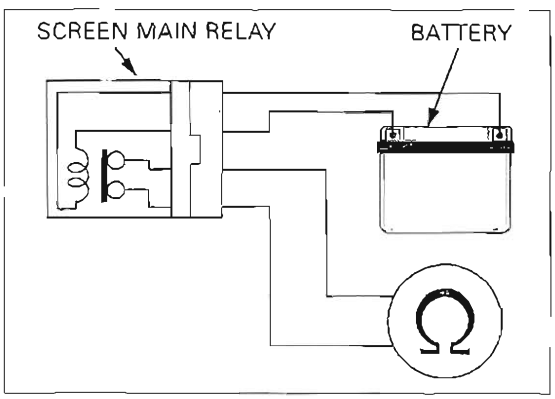
CONNECTION: Pink – Pink/blue

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

CONNECTION: Red/black(+) – Green (-)

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

If there is no continuity when the 12V battery is connected, replace the screen main relay.

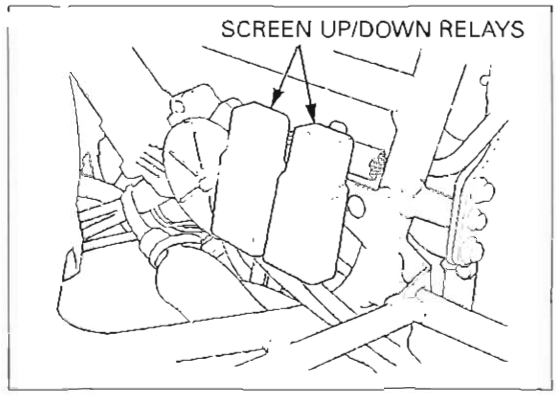


SCREEN UP/DOWN RELAY

Remove the upper cowl (page 2-16).

Disconnect the screen up/down relay 5P (White) connectors.

Remove the screen up/down relays.

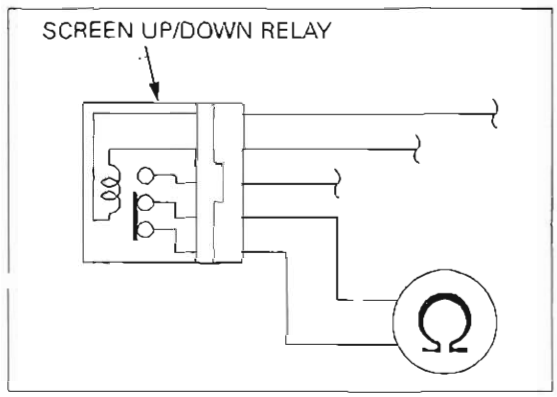


Connect the ohmmeter to the screen up/down relay connector terminals.

CONNECTION:
Up relay: Orange/black – Green
Down relay: Orange/blue – Green

There should be continuity.

If there is no continuity, replace the screen up/down relay.



Connect the ohmmeter to the screen up/down relay connector terminals.

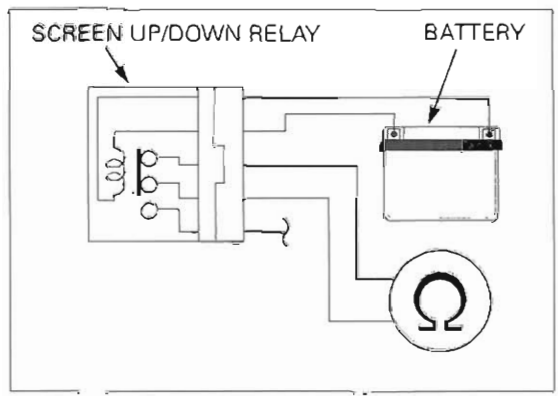
CONNECTION:
Up relay: Orange/black – Pink
Down relay: Orange/blue – Pink

Connect the 12V battery to the following screen up/down relay connector terminals.

CONNECTION:
Up relay: Pink/yellow (+) – Green (-)
Down relay: Pink/blue (+) – Green (-)

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

If there is no continuity when the 12V battery is connected, replace the screen up/down relay.

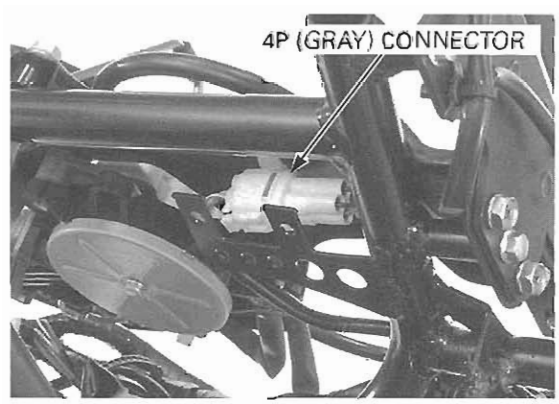


SCREEN ADJUST MOTOR

SWITCH INSPECTION

Remove the upper cowl (page 2-16).

Disconnect the screen adjust motor 4P (Gray) connector.
Connect the ohmmeter between the Pink/yellow and Light green/yellow terminals of the 4P (Gray) connector screen adjust motor switch side.



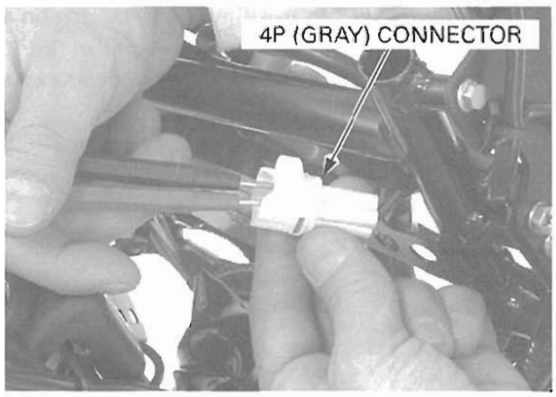
Disconnect the screen adjust motor 2P (Green) connector.
Connect the 12V battery to the 2P (Green) connector terminals of the screen adjust motor side.

The up switch is normal if there is no continuity when the screen is fully up.

If there is continuity, replace the screen adjust motor assembly.



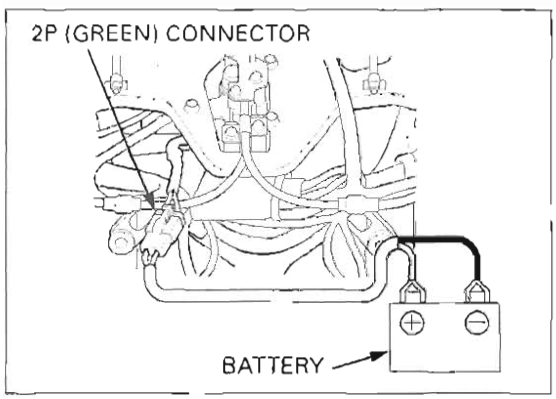
Connect the ohmmeter between the Pink/blue and Light green/blue terminals of the 4P (Gray) connector screen adjust motor side.



Disconnect the screen adjust motor 2P (Green) connector.
Connect the 12V battery to the 2P (Green) connector terminals of the screen adjust motor side.

The down switch is normal if there is no continuity when the screen is fully down.

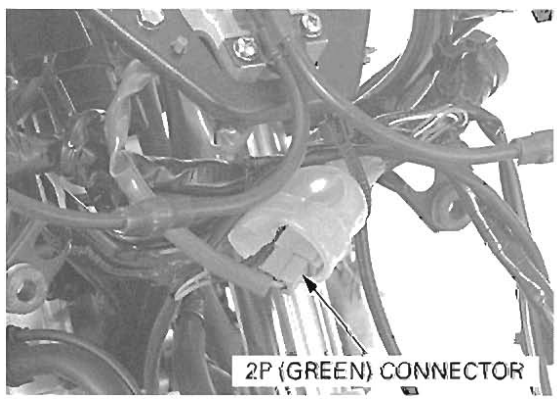
If there is continuity, replace the screen adjuster assembly.



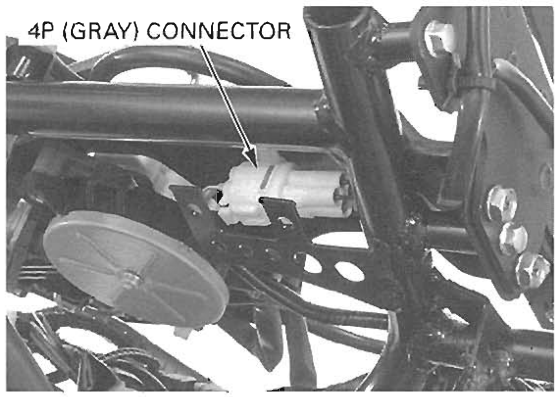
REMOVAL/INSTALLATION

Remove the upper cowl (page 2-16).

Disconnect the screen adjust motor 2P (Green) connector.

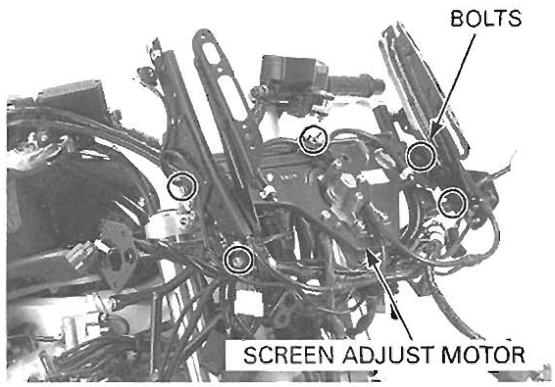


Disconnect the screen adjust motor 4P (Gray) connector.



Remove the bolts and screen adjust motor assembly.

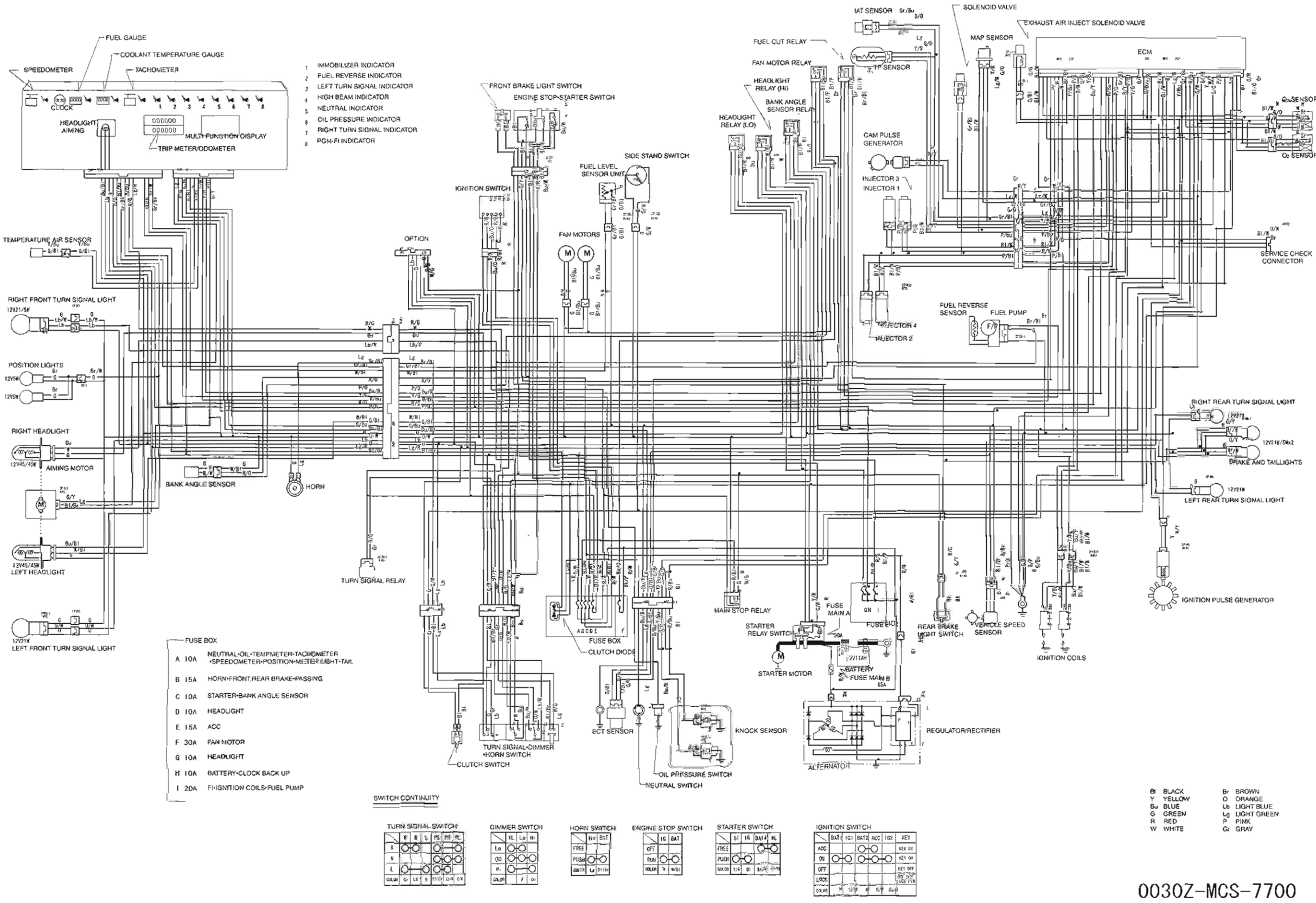
Installation is in the reverse order of removal.



23. WIRING DIAGRAMS

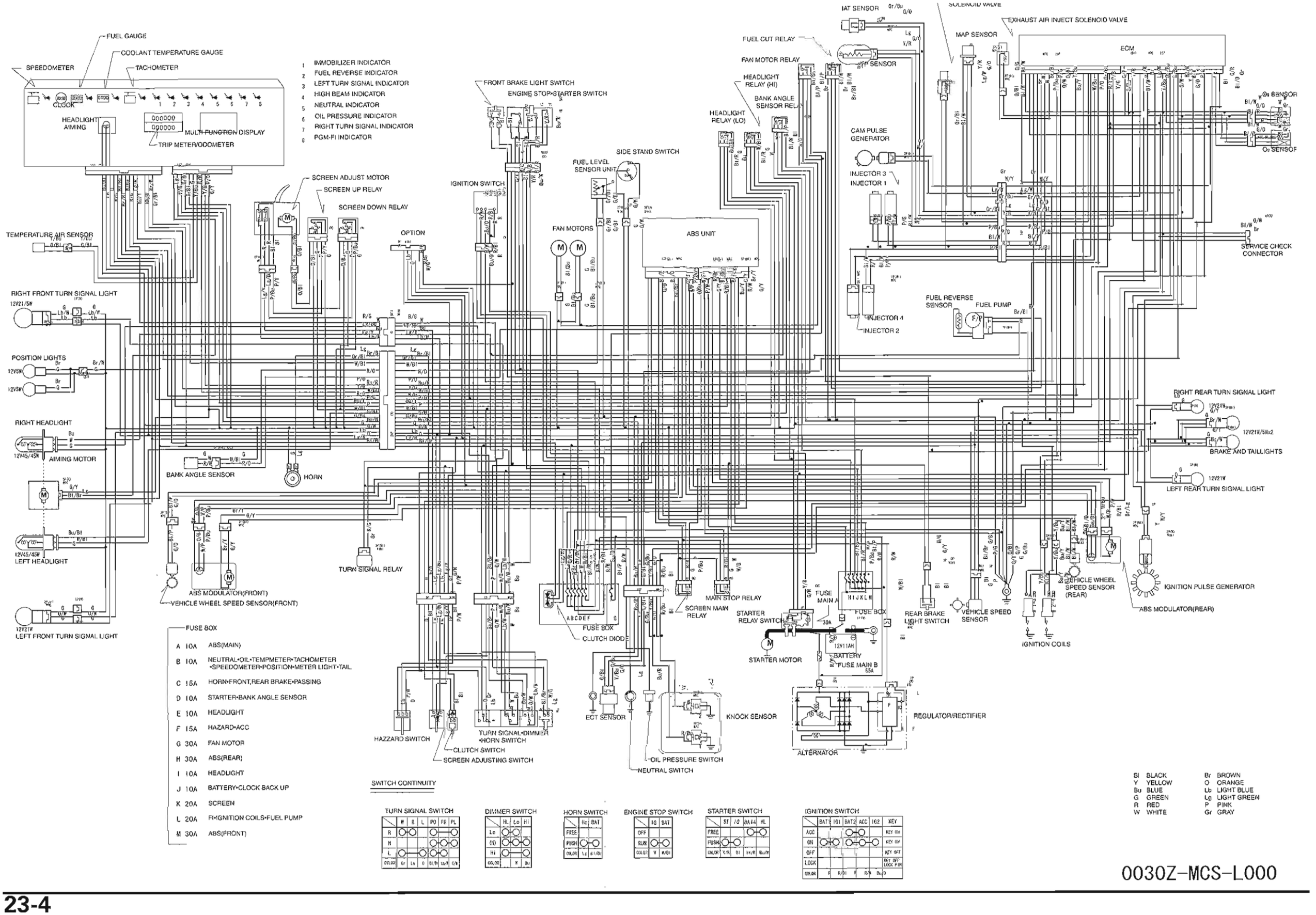
STANDARD:..... 23-3 DELUXE:..... 23-4

STANDARD:



0030Z-MCS-7700

DELUXE:



SWITCH CONTINUITY

TURN SIGNAL SWITCH

	W	R	L	PO	FR	PL
R	○				○	○
N					○	○
L		○		○	○	○
COLOR	Gr	Lb	O	Bl/R	Lb/Y	G/R

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
OFF			
Hi	○		○
COLOR		W	Bu

HORN SWITCH

	Ho	BAT
FREE		
PUSH	○	○
COLOR	Lg	Bl/Br

ENGINE STOP SWITCH

	IG	BAT
OFF		
RUN	○	○
COLOR	R	R/Bl

STARTER SWITCH

	ST	IG	BA.IG	HL
FREE			○	
PUSH	○	○		
COLOR	Y/R	Bl	Bl/R	Bu/W

IGNITION SWITCH

	BAT	IG1	BAT2	ACC	IG2	KEY
ACC			○			KEY ON
ON	○	○	○		○	KEY ON
OFF						KEY OFF
LOCK						KEY OFF LOCK PIN
COLOR	R	R/Bl	R	R/W	Bu/O	

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

0030Z-MCS-L000

24. TECHNICAL FEATURES

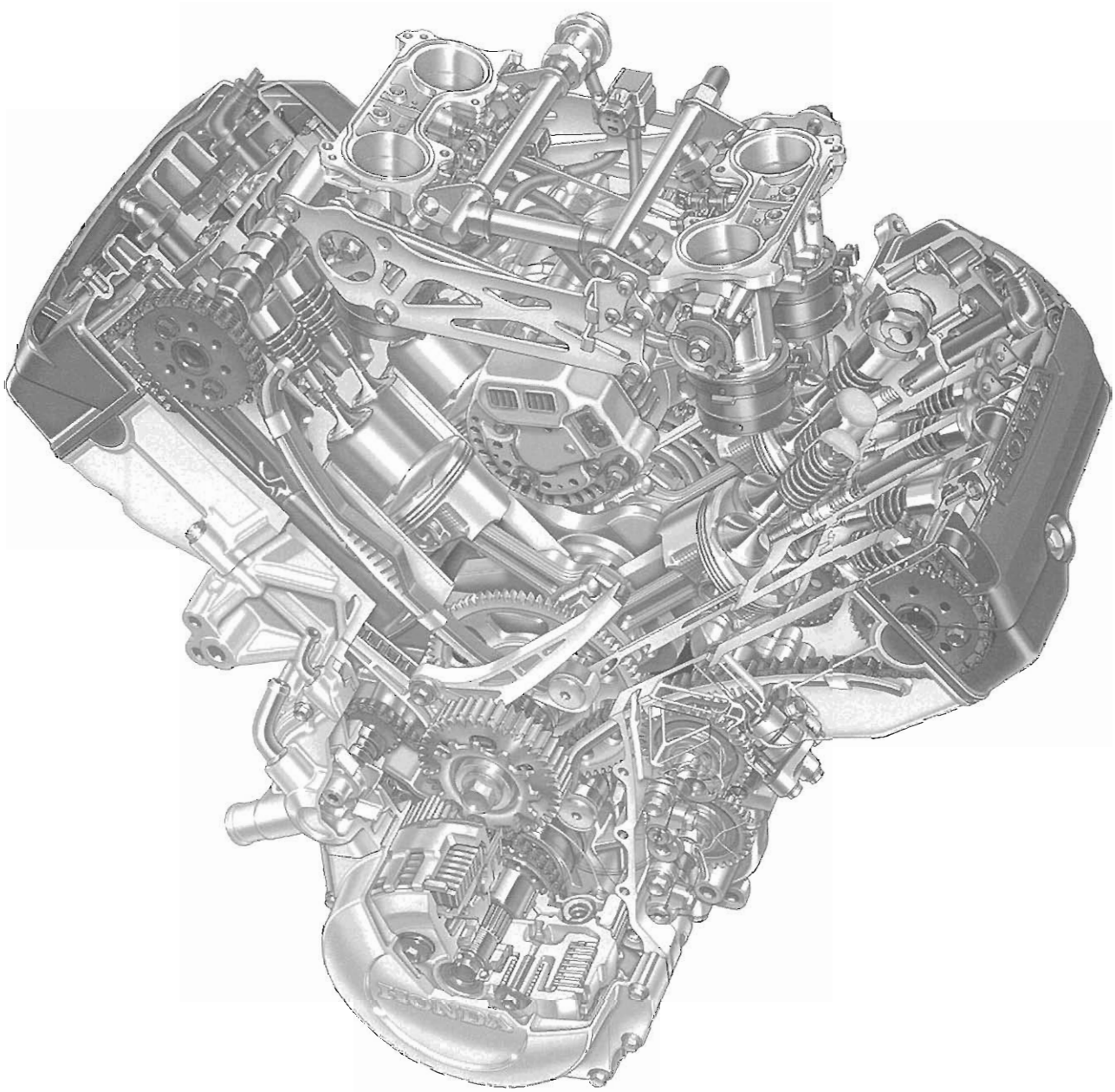
ENGINE LAYOUT 24-2

DUAL FUEL TANK 24-6

WINDSCREEN HEIGHT ADJUSTER 24-8

ENGINE LAYOUT

ENGINE ILLUSTRATION

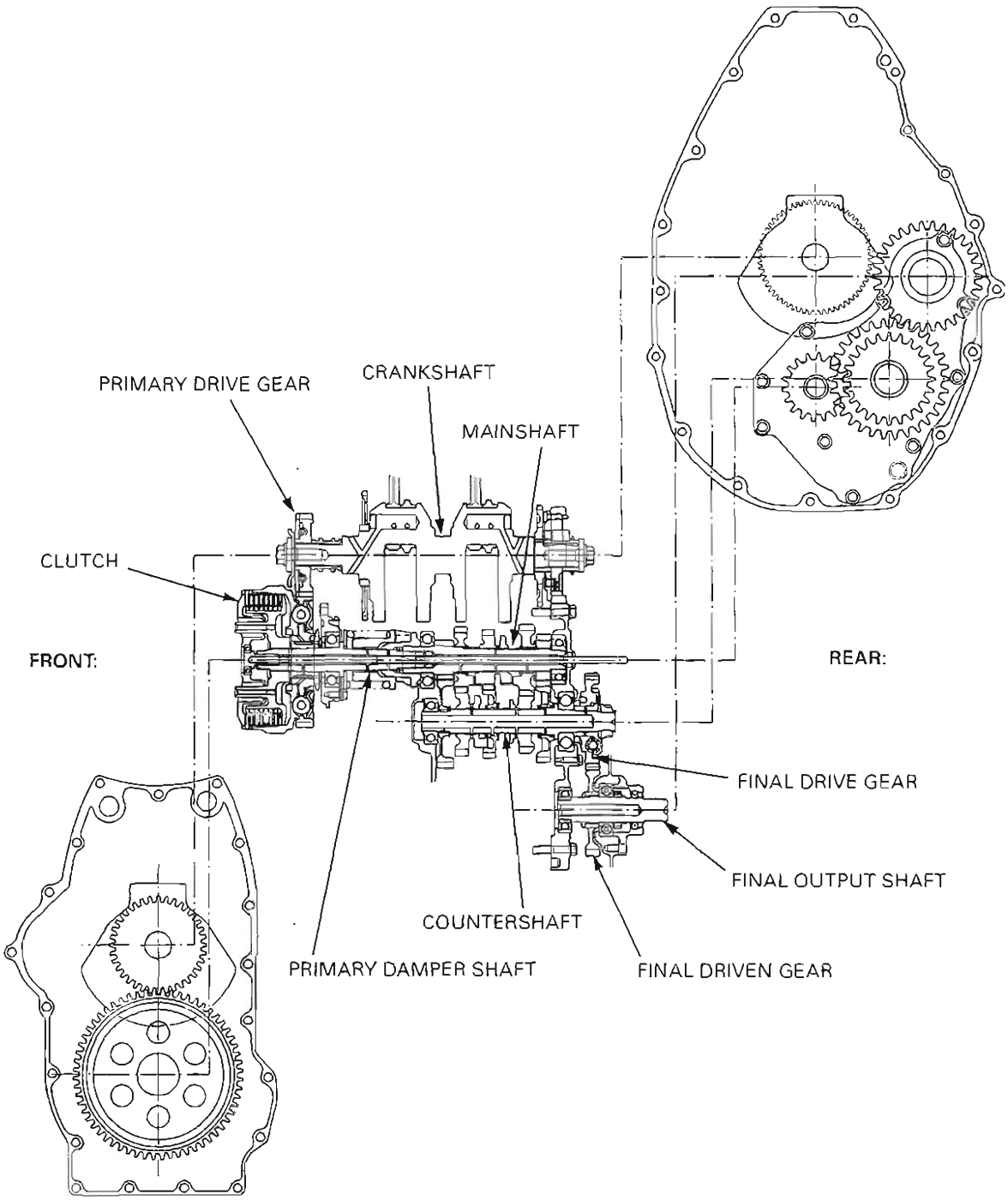


POWER OUTPUT

The power output mechanism is located below the crankshaft. The crankshaft output power is transferred to the final output in the following order.

Primary drive gear – Clutch – Primary damper shaft – Mainshaft – Countershaft – Final drive gear – Final output shaft

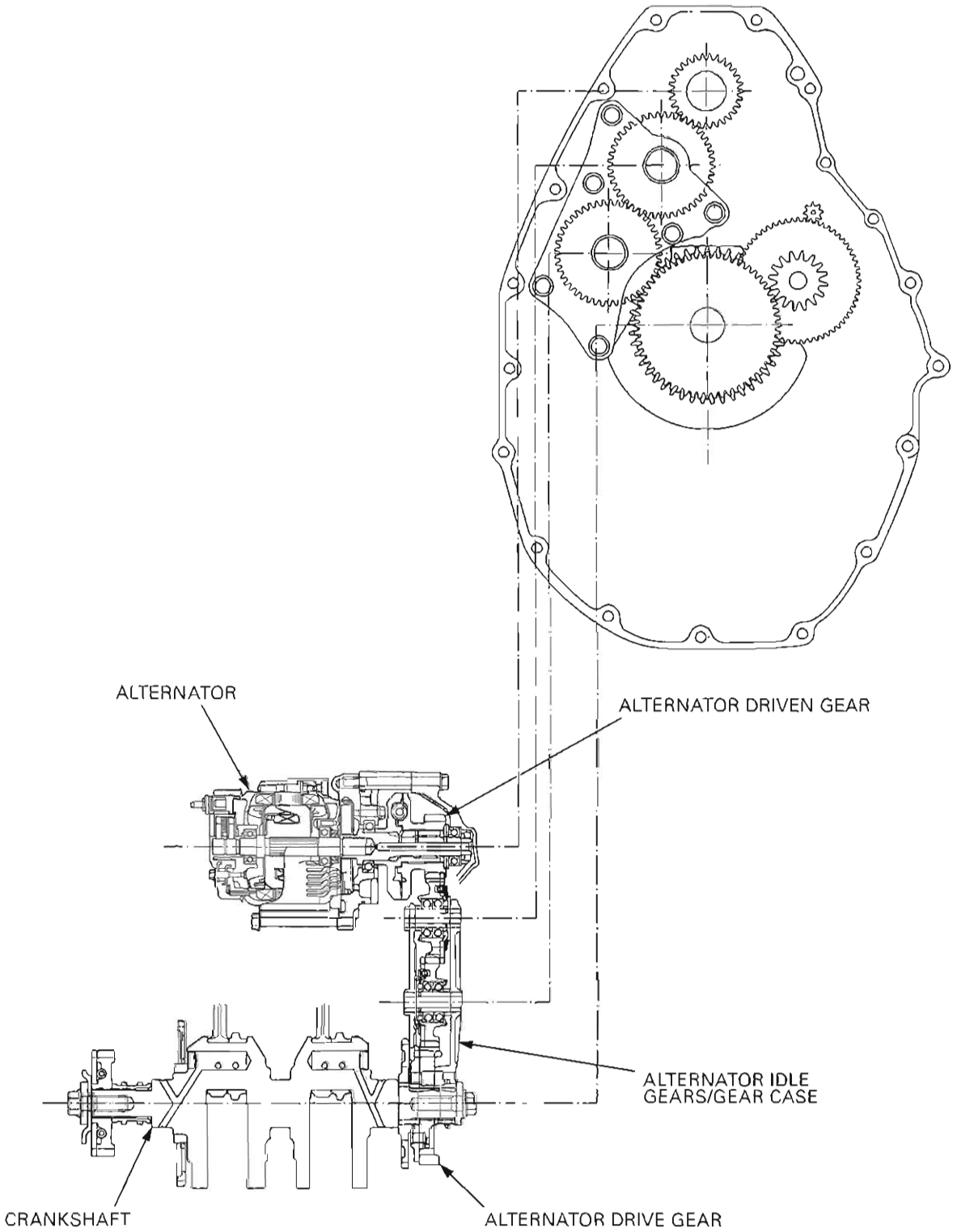
The final output shaft is mounted on the casette transmission holder.



ALTERNATOR DRIVE TRAIN

The alternator is located in the cylinder V-bank and is driven via the gear train mechanism with the drive gear on the crankshaft.

The alternator is rotated in the opposite direction of the crankshaft at 2.25 times the crank speed. This will oppose the torque effect of the crankshaft, minimizing the left to right torque reaction of the longitudinally mounted V-Four engine.

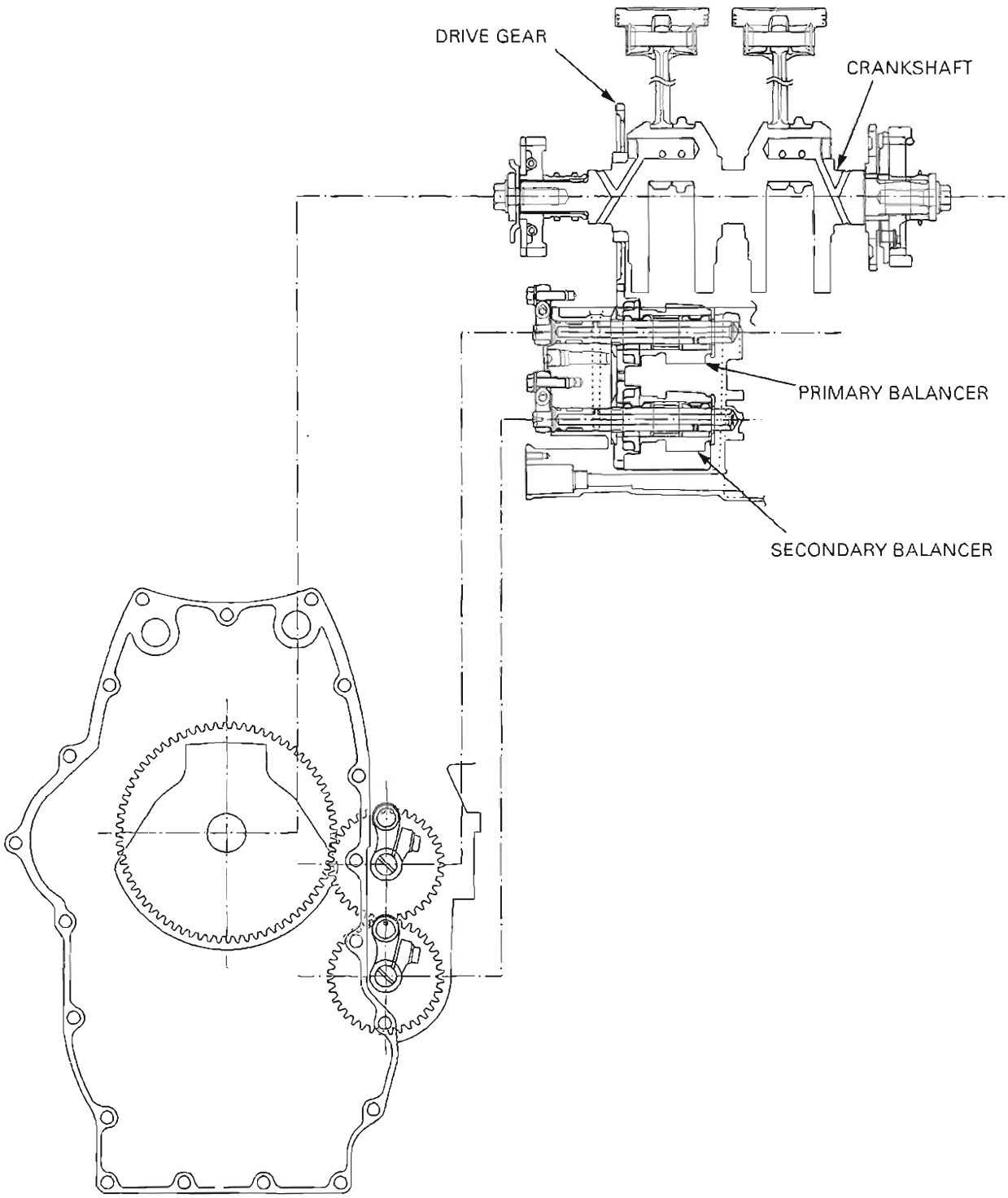


DUAL SHAFT BALANCER

The dual shaft balancer is installed in the lower crankcase, to the left side of the crankshaft.

The primary balancer is directly driven off the side of the crankshaft at a 2:1 gear ratio. The secondary balancer is positioned directly below the primary balancer, and it is driven directly from the primary balancer gear at a 1:1 gear ratio. The secondary balancer rotates in the opposite direction of the primary balancer.

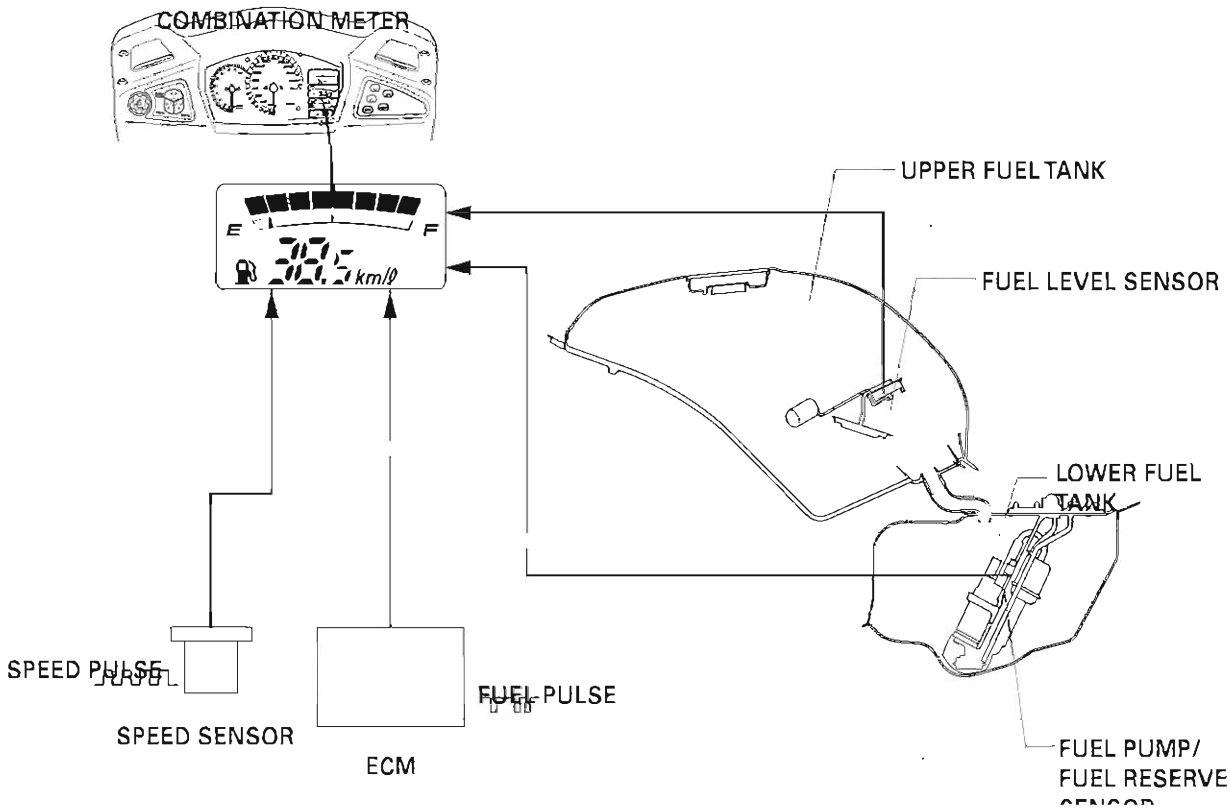
The combination of these two balancers counteracts the effects of the crankshaft's rotating counterweights, almost totally eliminating secondary vibration.



DUAL FUEL TANK

FUEL TANK LAYOUT

This motorcycle features a dual fuel tank. The upper fuel tank capacity is 20.8 liters and the lower fuel tank capacity is 8.2 liters. Both fuel tanks are connected by the fuel joint hose and the air vent hose.

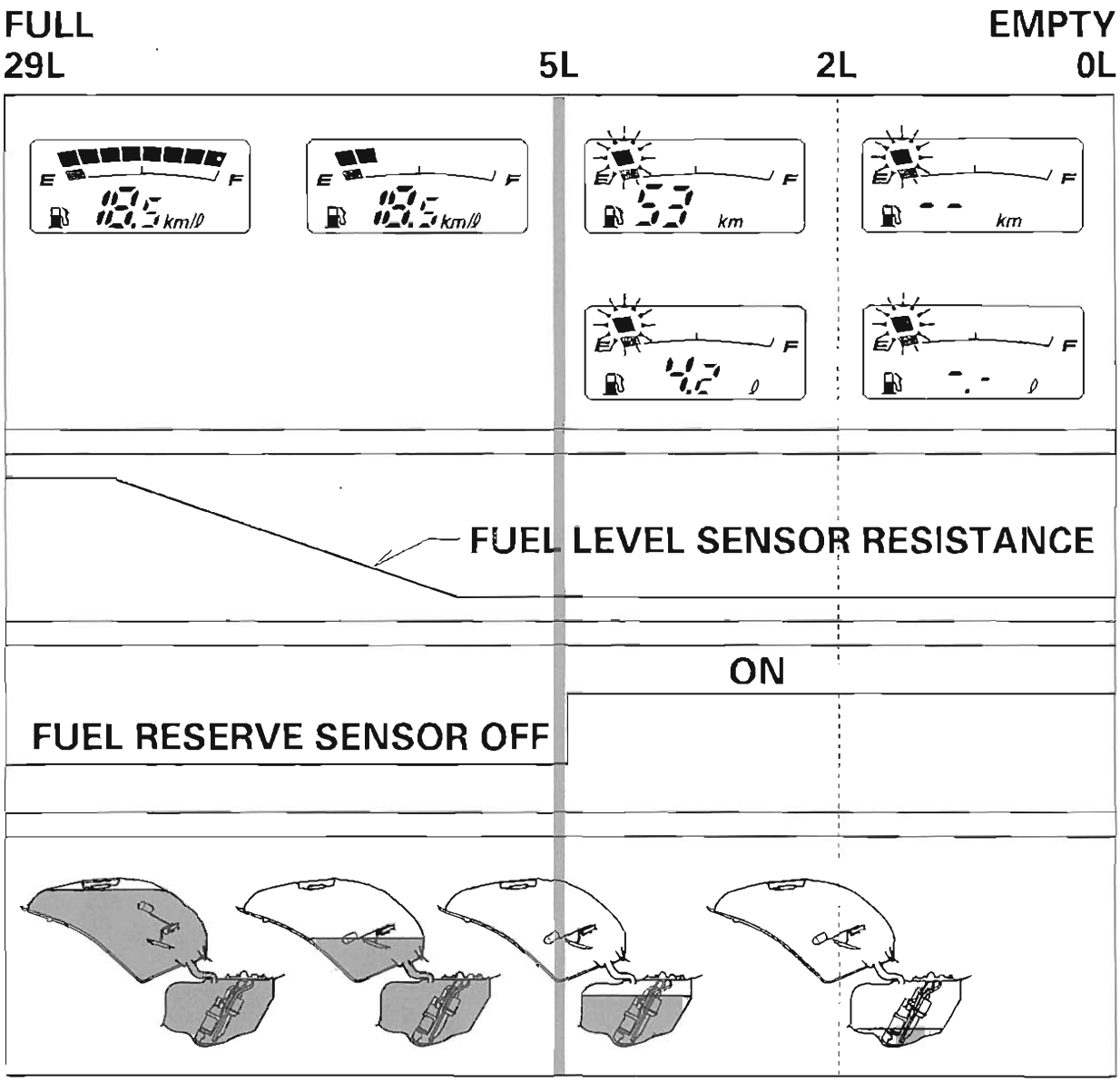


TRAVEL COMPUTER

A fuel level display is installed in the combination meter of the motorcycle.
The fuel level display indicates fuel level meter (8 segments) and block fuel consumption/possible travel distance/fuel remaining.
The block fuel consumption and total fuel consumption are computed and indicated from the speed pulse of the vehicle speed sensor and the fuel pulse of the ECM.
The block fuel consumption is indicated at intervals of every 15 seconds, or in the time spent for consumption of 10 cc fuel.
The total fuel consumption is indicated by the average fuel consumption from the point of time of resetting to the present.

INDICATION OF POSSIBLE TRAVEL DISTANCE AND FUEL REMAINING

The fuel level is indicated using signals from the fuel level sensor (level gauge) and fuel reserve sensor (thermistor), and shown on the fuel level meter, via eight "segments".
When the fuel reserve sensor is turned on, the travel computer detects a signal from the fuel level sensor, and calculates possible travel distance, based on the amount of fuel remaining and the fuel consumption for 20 minutes immediately prior to the fuel reserve sensor turning on. When this happens, the fuel level meter begins to blink the final segment.
The possible travel distance is recalculated every 15 seconds. The remaining quantity of fuel is calculated by fuel pulse signals sent to the ECM. Therefore, the possible travel distance varies according to driving conditions and behavior.



- If the battery terminals were disconnected, the data showing the possible travel distance and the fuel remaining will be reset. After connecting the battery terminals, the data will be indicated in quotation marks ("--").
- If the fuel remaining is less than five liters after filling with fuel, the meter may not indicate the possible travel distance and the remaining quantity of fuel correctly at times.
- Approx. 60 seconds are required for the fuel reserve sensor for the detection of fuel level. When battery terminals are disconnected and connected or after filling with fuel, the indication of the fuel level meter should return to normal 60 seconds after the ignition switch is turned on.

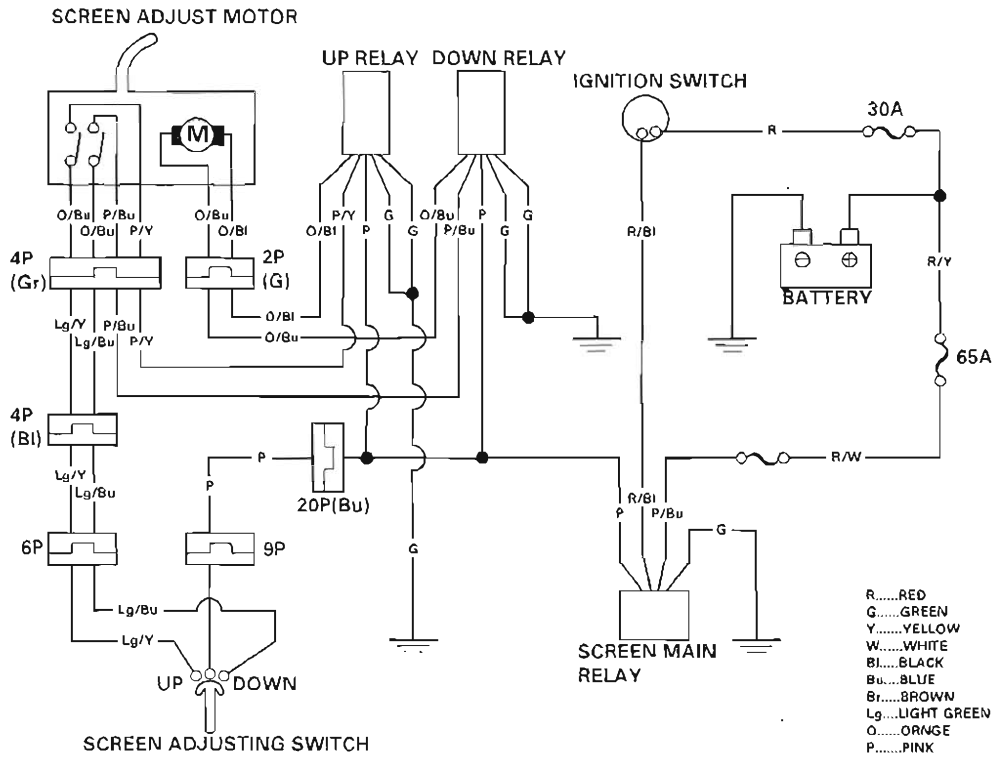
WINDSCREEN HEIGHT ADJUSTER

OUTLINE

This motorcycle (Deluxe type) has an adjustable windscreen system.
The windscreen height can be adjusted 188 mm by the screen adjust motor.

The windscreen height affects how much wind protection is offered to the rider. The wind protection performance of the screen is changed depending on the speed of the motorcycle.

This system provides stepless operation of the windscreen height adjustment by the screen adjusting switch, and can even be adjusted while riding at full touring speed.

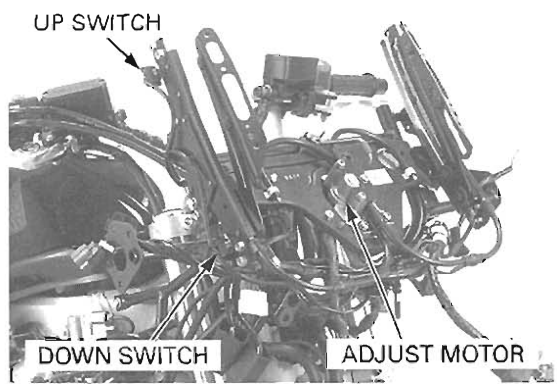


COMPONENT PARTS

SCREEN ADJUST MOTOR/UP/DOWN SWITCH

The screen adjust motor is under the upper cowl.
The screen adjust motor moves the windscreen up and down.
The screen adjust motor has an electrical circuit breaker that stops the system operation.
If the windscreen gets jammed, the circuit breaker will operate to avoid overheating the windscreen motor.
If this happens, wait a few minutes for the windscreen motor to cool before operating the windscreen.

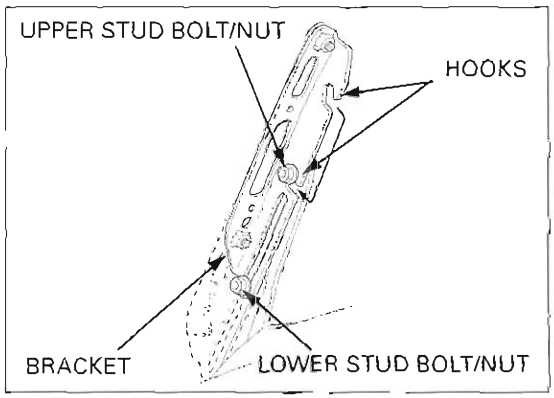
The up and down switch is on the rail of the screen adjust motor.
When the windscreen reaches the up/down limit, the up/down switch cuts off the current of the up/down relay.



The wind screen install height can be adjusted. The adjustable range is 60 mm.

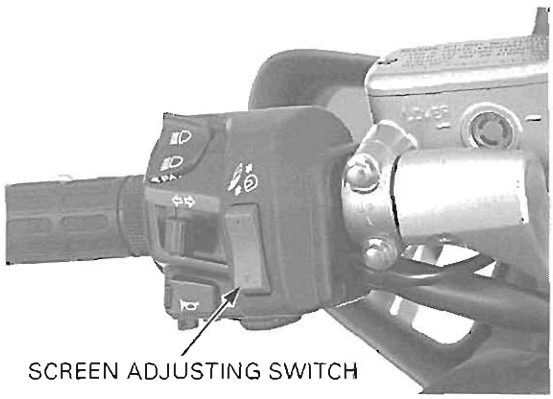
Loosen the nuts and remove the hook on the bracket from the upper stud bolt.
Slide the bracket and exchange the hook on the bracket.

After adjustment, tighten the nuts securely.



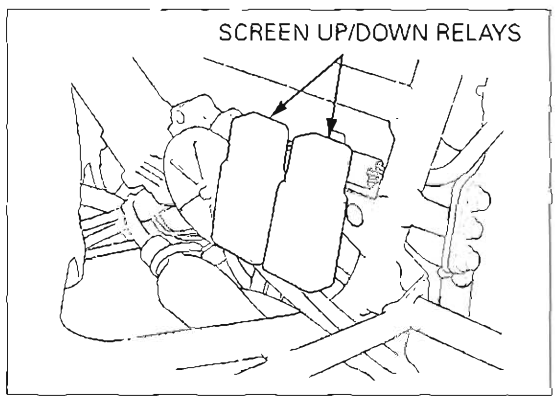
SCREEN ADJUSTING SWITCH

The screen adjusting switch is on the left handlebar switch.
Push the screen adjusting switch to UP, the windscreen moves up.
Push the screen adjusting switch to DOWN, the windscreen moves down.



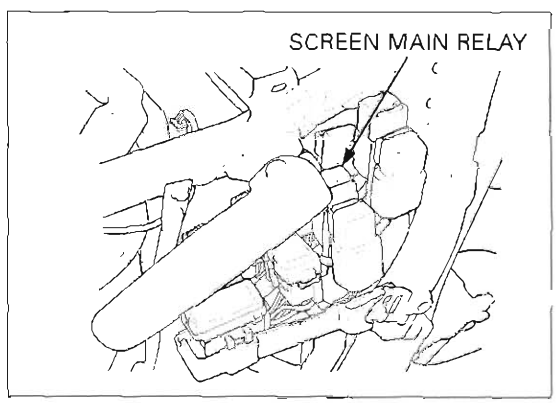
SCREEN UP/DOWN RELAY

The screen up/down relay is on the screen adjust motor bracket.
These relays control the direction the screen adjust motor turns.



SCREEN MAIN RELAY

The screen main relay is on the left side on the frame.
This relay controls the current flow of the screen adjusting switch and the screen up/down relays.



25. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START 25-2

ENGINE LACKS POWER 25-2

POOR PERFORMANCE AT LOW AND IDLE SPEED 25-4

POOR PERFORMANCE AT HIGH SPEED 25-5

POOR HANDLING 25-6

ENGINE DOES NOT START OR IS HARD TO START

1. **Spark Plug Inspection**

   Remove and inspect the spark plug.

   Are the spark plugs in good condition?

   NO – • Incorrect spark plug heat range
   • Incorrect spark plug gap
   • Dirty air cleaner

   YES – GO TO STEP 2.

2. **Spark Test**

   Perform spark test.

   Are there good sparks?

   NO – • Faulty spark plug
   • Loose or disconnected ignition system wires
   • Faulty ignition coil
   • Broken or shorted spark plug wire
   • Faulty ignition pulse generator
   • Faulty engine stop switch
   • Faulty ignition switch
   • Faulty engine control module (ECM)

   YES – GO TO STEP 3.

3. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system.

   Is the fuel injection system normal?

   NO – Faulty fuel injection system (page 5-71).

   YES – GO TO STEP 4.

4. **Cylinder compression Inspection**

   Test the cylinder compression.

   Is the compression normal?

   NO – • *Valve stuck open*
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Seized valve
   • Improper valve timing

   YES – GO TO STEP 5.

5. **Engine Start Condition**

   Start by following normal procedure.

   Does the engine start but then stop?

   Yes – • Leaking throttle body insulator
   • Faulty starter valve
   • Improper ignition timing (Faulty ECM or ignition pulse generator)
   • Contaminated fuel

ENGINE LACKS POWER

1. **Drive Train Inspection**

   Raise wheel off the ground and spin by hand.

   Does the wheel spin freely?

   NO – • Brake dragging
   • Worn or damaged wheel bearings

   YES – GO TO STEP 2.

2. **Tire Pressure Inspection**

   Check the tire pressure.

   Are the tire pressures correct?

   NO – • Faulty tire valve
   • Punctured tire

   YES – GO TO STEP 3.

3. **Clutch Inspection**

   Accelerate rapidly from 1st to 2nd gear.

   Does the engine speed change accordingly when the clutch is released?

   NO – • Clutch slipping
   • Worn clutch discs/plates
   • Warped clutch discs/plates
   • Weak clutch spring
   • Faulty hydraulic assist system
   • Additive in engine oil

   YES – GO TO STEP 4.

4. **Engine Performance Inspection**

   Accelerate lightly.

   Does the engine speed increase?

   NO – • Clogged air cleaner
   • Restricted fuel flow
   • Clogged muffler

   YES – GO TO STEP 5.

5. **Spark Plug Inspection**

   Remove and inspect the spark plugs.

   Are the spark plugs in good condition?

   NO – • Plugs not serviced frequently enough
   • Incorrect spark plug heat range
   • Incorrect spark plug gap

   YES – GO TO STEP 6.

6. **Engine Oil Inspection**

   Check the oil level and condition.

   Is the engine oil in good condition?

   NO – • Oil level too high
   • Oil level too low
   • Contaminated oil

   YES – GO TO STEP 7.

7. **Ignition Timing Inspection**

   Check the ignition timing.

   Is the ignition timing normal?

   NO – • Faulty engine control module (ECM)
   • Faulty ignition pulse generator
   • Improper valve timing

   YES – GO TO STEP 8.

8. **Cylinder compression Inspection**

   Test the cylinder compression.

   Is the compression normal?

   NO – • Valve clearance too small
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Improper valve timing

   YES – GO TO STEP 9.

9. Programmed Fuel Injection System Inspection

   Check the fuel injection system.

   Is the fuel injection system normal?

   NO – Faulty fuel injection system (page 5-71).

   YES – GO TO STEP 10.

10. Lubrication Inspection

    Remove the cylinder head cover and inspect lubrication.

    Is the valve train lubricated properly?

    NO – • Faulty engine control module (ECM)
    • Faulty ignition pulse generator
    • Improper valve timing

    YES – GO TO STEP 11.

11. Overheating Inspection

    Check for engine overheating.

    Is the engine overheating?

    YES – • Coolant level too low
    • Fan motor not working (Faulty fan motor switch)
    • Thermostat stuck closed
    • Excessive carbon build-up in combustion chamber
    • Use of poor quality fuel
    • Wrong type of fuel
    • Clutch slipping

    NO – GO TO STEP 12.

12. Engine Knocking Inspection

    Accelerate or run at high speed.

    Is the engine knocking?

    YES – • Worn piston and cylinder
    • Wrong type of fuel
    • Thermostat stuck closed
    • Excessive carbon build-up in combustion chamber
    • Ignition timing too advanced (Faulty ECM)

    NO – • Engine does not knock

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Spark Plug Inspection

   Remove and inspect the spark plugs.

   Are the spark plugs in good condition?

   NO – • Plugs not serviced frequently enough
   • Incorrect spark plug heat range
   • Incorrect spark plug gap

   YES – GO TO STEP 2.

2. Ignition Timing Inspection

   Check the ignition timing.

   Is the ignition timing normal?

   NO – • Faulty engine control module (ECM)
   • Faulty ignition pulse generator
   • Improper valve timing

   YES – GO TO STEP 3.

3. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system.

   Is the fuel injection system normal?

   NO – Faulty fuel injection system (page 5-71).

   YES – GO TO STEP 4.

4. **Starter Valve Synchronization Inspection**

   Check the starter valve synchronization.

   Is the starter valve synchronization normal?

   NO – Adjust the starter valve synchronization (page 5-78).

   YES – GO TO STEP 5.

5. **Intake Pipe Leaking Inspection**

   Check for leaks in intake manifold pipe.

   Is there leaking?

   YES – • Loose insulator
   • Damaged insulator

POOR PERFORMANCE AT HIGH SPEED

1. **Ignition Timing Inspection**

   Check the ignition timing.

   Is the ignition timing normal?

   NO – • Faulty engine control module (ECM)
   • Faulty ignition pulse generator
   • Improper valve timing

   YES – GO TO STEP 2.

2. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system.

   Is the fuel injection system normal?

   NO – Faulty fuel injection system (page 5-71).

   YES – GO TO STEP 3.

3. **Valve Timing Inspection**

   Check the valve timing.

   Is the valve timing correct?

   NO – Camshafts not installed properly

   YES – GO TO STEP 4.

4. **Valve Spring Inspection**

   Check for the valve springs.

   Is the valve spring free length normal?

   NO – Faulty valve spring

   YES – Not weak

POOR HANDLING

Steering is heavy
- Steering bearing adjustment nut too tight
- Damaged steering head bearings

Either wheel is wobbling
- Excessive wheel bearing play
- Bent rim
- Improper installed wheel hub
- Swingarm pivot bearing excessively worn
- Bent frame

The motorcycle pulls to one side
- Front and rear wheel not aligned
- Faulty shock absorber
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

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