

TYPE CODE

- Throughout this manual, the following abbreviations are used to identify individual model.

CODE	AREA TYPE
ED	EUROPEAN DIRECT SALES (Holland, Denmark, Spain, Belgium, Portugal, Italy, Austria, Sweden, Norway, Finland)
E	U.K. (Ireland)
F	France
G	Germany, Austria, Switzerland, Holland, Belgium

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.

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 recommend 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. can cause you to be seriously hurt or killed.

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.

⚠ 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.

⚠ 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.

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the XL1000V.

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

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

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

Section 4 through 20 describe parts of the motorcycle, grouped according to location.

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

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


If you are not familiar with this motorcycle, read Technical Feature in Section 22.

If you don't know the source of the trouble, go to section 23 Troubleshooting.

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

You must use your own good judgement.

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

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

DANGER

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

WARNING

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

CAUTION

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

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

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

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CONTENTS

	GENERAL INFORMATION	1
	FRAME/BODY PANELS/EXHAUST SYSTEM	2
	MAINTENANCE	3
ENGINE AND DRIVE TRAIN	LUBRICATION SYSTEM	4
	FUEL SYSTEM (Programmed Fuel Injection)	5
	COOLING SYSTEM	6
	ENGINE REMOVAL/INSTALLATION	7
	CYLINDER HEAD/VALVES	8
	CLUTCH/GEARSHIFT LINKAGE	9
	ALTERNATOR/STARTER CLUTCH	10
	CRANKCASE/TRANSMISSION	11
	CRANKSHAFT/PISTON/CYLINDER	12
CHASSIS	FRONT WHEEL/SUSPENSION/STEERING	13
	REAR WHEEL/SUSPENSION	14
	HYDRAULIC BRAKE	15
ELECTRICAL	BATTERY/CHARGING SYSTEM	16
	IGNITION SYSTEM	17
	ELECTRIC STARTER	18
	LIGHTS/METERS/SWITCHES	19
	IMMOBILIZER SYSTEM (HISS)	20
	WIRING DIAGRAMS	21
	TECHNICAL FEATURE	22
	TROUBLESHOOTING	23
	INDEX	24

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SERVICE PUBLICATION OFFICE

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

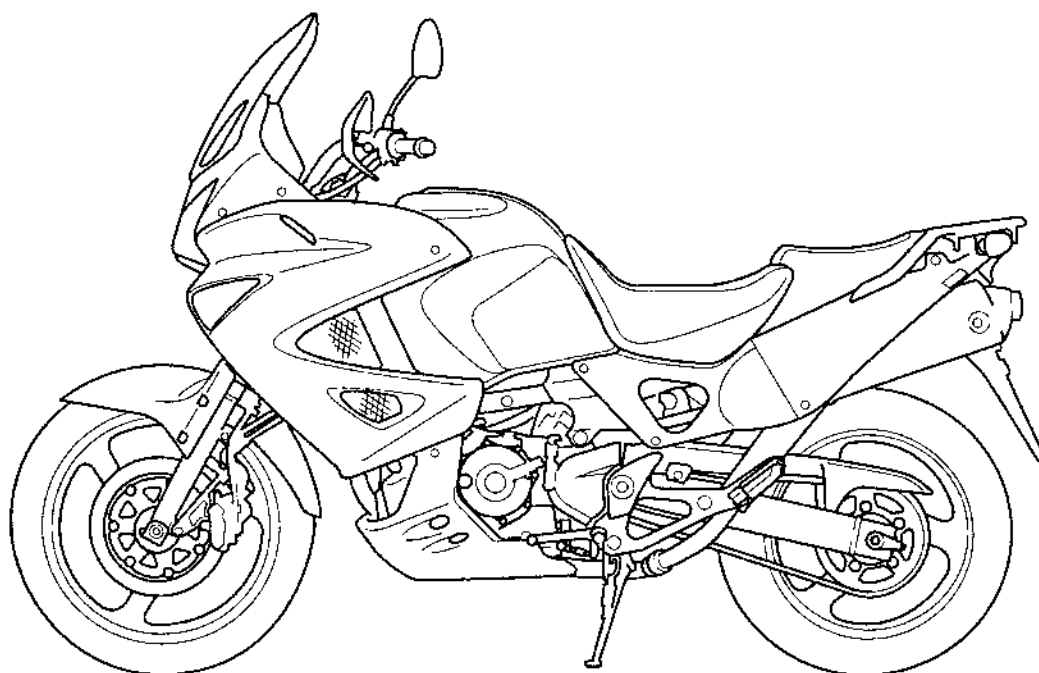
SERVICE RULES	1-2	FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS.....	1-9
MODEL IDENTIFICATION.....	1-2	REAR WHEEL/SUSPENSION SPECIFICATIONS.....	1-9
GENERAL SPECIFICATIONS.....	1-4	HYDRAULIC BRAKE SPECIFICATIONS	1-10
LUBRICATION SYSTEM SPECIFICATIONS ·	1-6	BATTERY/CHARGING SYSTEM SPECIFICATIONS.....	1-10
FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS.....	1-6	IGNITION SYSTEM SPECIFICATIONS	1-10
COOLING SYSTEM SPECIFICATIONS	1-6	ELECTRIC STARTER SPECIFICATIONS	1-11
CYLINDER HEAD/VALVES SPECIFICATIONS.....	1-7	LIGHTS/METERS/SWITCHES SPECIFICATIONS.....	1-11
CLUTCH SPECIFICATIONS	1-7	STANDARD TORQUE VALUES	1-12
ALTERNATOR/STARTER CLUTCH.....	1-7	ENGINE & FRAME TORQUE VALUES	1-12
CRANKCASE/TRANSMISSION SPECIFICATIONS.....	1-8	LUBRICATION & SEAL POINTS	1-19
CRANKSHAFT/PISTON/CYLINDER SPECIFICATIONS.....	1-8	CABLE & HARNESS ROUTING	1-23
		EMISSION CONTROL SYSTEMS	1-32

GENERAL INFORMATION

SERVICE RULES

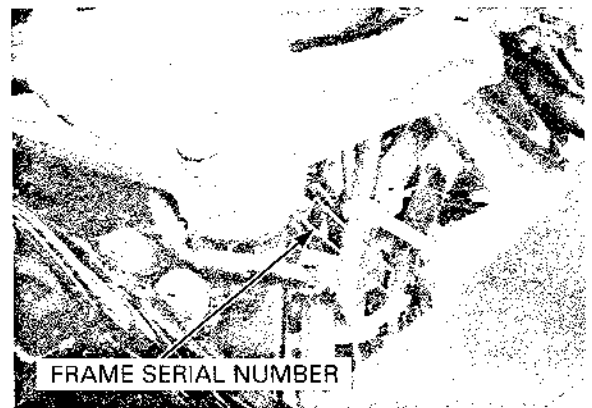
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 1-23).

MODEL IDENTIFICATION

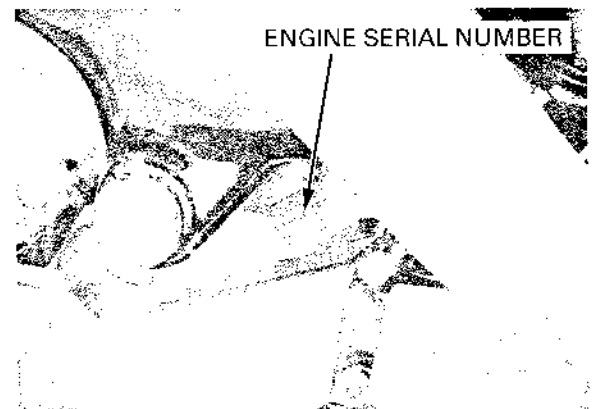


GENERAL INFORMATION

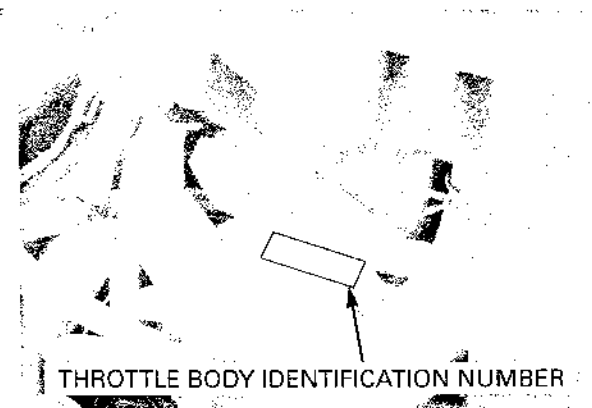
The frame serial number is stamped on the right side of the steering head.



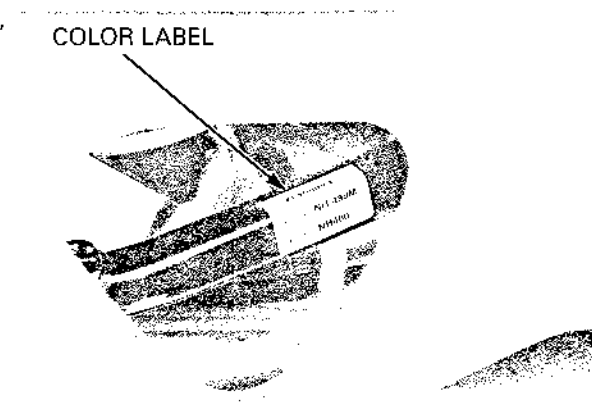
The engine serial number is stamped on the lower left side of the cylinder block.



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



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



GENERAL INFORMATION

GENERAL SPECIFICATIONS

	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,292 mm (90.2 in)
	Overall width	924 mm (36.4 in)
	Overall height	1,465 mm (57.7 in)
	Wheelbase	1,559 mm (61.4 in)
	Seat height	843 mm (33.2 in)
	Footpeg height	338 mm (13.3 in)
	Ground clearance	181 mm (7.1 in)
	Dry weight	245 kg (540 lbs)
	Curb weight	265 kg (584 lbs)
	Maximum weight capacity	201 kg (443 lbs)
FRAME	Frame type	Diamond
	Front suspension	Telescopic fork
	Front axle travel	155 mm (6.10 in)
	Rear suspension	Swingarm
	Rear axle travel	145 mm (5.70 in)
	Front tire size	110/80R19M/C 59H
	Rear tire size	150/70R17M/C 69H
	Front tire brand	TW101 RADIAL E (Bridgestone)
		T66X (Michelin)
	Rear tire brand	TW152 RADIAL E (Bridgestone)
		T66XA (Michelin)
	Front brake	Hydraulic double disc
	Rear brake	Hydraulic single disc
	Caster angle	27°30'
ENGINE	Trail length	110 mm (4.3 in)
	Fuel tank capacity	25.0 liter (6.60 US gal, 5.50 Imp gal)
	Cylinder arrangement	90° V
	Bore and stroke	98.0 X 66.0 mm (3.90 X 2.60 in)
	Displacement	996 cm ³ (60.8 cu-in)
	Compression ratio	9.8 : 1
	Valve train	Chain driven, DOHC
	Intake valve opens	15° BTDC
	Intake valve closes	30° ABDC
	Exhaust valve opens	40° BBDC
	Exhaust valve closes	5° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
FUEL DELIVERY SYSTEM	Air filtration	Oiled paper element
	Engine dry weight	76.3 kg (168.2 lbs)
	Firing order	Rear - 450° - Front - 270° - Rear
FUEL DELIVERY SYSTEM	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	42 mm (1.7 in)
DRIVE TRAIN	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operating
	Transmission	Constant mesh, 6-speeds
	Primary reduction	1.682 (74/44)
	Final reduction	2.938 (47/16)
	Gear ratio 1st	2.571 (36/14)
	2nd	1.684 (32/19)
	3rd	1.292 (31/24)
	4th	1.100 (33/30)
	5th	0.969 (31/32)
	6th	0.853 (29/34)
	Gearshift pattern	Left foot operated return system, 1 - N - 2 - 3 - 4 - 5 - 6

GENERAL INFORMATION

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

GENERAL INFORMATION

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.4 liter (3.6 US qt, 3.0 Imp qt)	—
	After draining/filter change	3.6 liter (3.8 US qt, 3.2 Imp qt)	—
	After disassembly	4.1 liter (4.3 US qt, 3.6 Imp qt)	—
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		588 kPa (6.0 kgf/cm ² , 85 psi) at 5,000 min ⁻¹ (rpm)/(80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ45A
Starter valve vacuum difference	20 mm Hg
Base starter valve for synchronization	No.1 (Rear)
Idle speed	1,200 ± 100min ⁻¹ (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 kΩ
Fuel injection resistance (at 20°C/68°F)	13.4 – 14.2 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
Cam pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Manifold absolute pressure at idle	200 – 250 mm Hg
Fuel pressure at idle	320 – 370 kPa (3.2 – 3.7 kgf/cm ² , 46 – 53 psi)
Fuel pump flow (at 12V)	270 cm ³ (9.1 US oz, 9.5 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.8 liter (3.0 US qt, 2.5 Imp qt)
	Reserve tank	0.5 liter (0.5 US qt, 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	75 – 82 °C (167 – 180 °F)
	Fully open	82 °C (180 °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			1,320 kPa (13.5 kgf/cm ² , 192 psi) at 300 min ⁻¹ (rpm)	—
Valve clear- ance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.31 ± 0.03 (0.012 ± 0.001)	—
Camshaft	Cam lobe height	IN	38.680 – 38.840 (1.5228 – 1.5291)	38.38 (1.511)
		EX	38.830 – 38.990 (1.5287 – 1.5350)	38.53 (1.517)
	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.		33.978 – 33.993 (1.3377 – 1.3383)	33.97 (1.337)
	Valve lifter bore I.D.		34.010 – 34.026 (1.3390 – 1.3396)	34.04 (1.340)
Valve, valve guide	Valve stem O.D.	IN	5.975 – 5.990 (0.2352 – 0.2358)	5.965 (0.2348)
		EX	5.965 – 5.980 (0.2348 – 0.2354)	5.955 (0.2344)
	Valve guide I.D.	IN/EX	6.000 – 6.012 (0.2362 – 0.2367)	6.040 (0.2378)
	Stem-to-guide clear- ance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylin- der head		14.0 – 14.2 (0.55 – 0.56)	—
	Valve seat width	IN	1.1 – 1.3 (0.04 – 0.05)	1.7 (0.07)
		EX	1.3 – 1.5 (0.05 – 0.06)	1.9 (0.07)
Valve spring free length			43.9 (1.73)	42.9 (1.69)
Cylinder head warpage			—	0.10 (0.004)

CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 - 20 (3/8 - 13/16)	-
Clutch	Spring free length	47.6 (1.87)	46.6 (1.83)
	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.	28.000 - 28.021 (1.1024 - 1.1032)	28.031 (1.1036)
	O.D.	34.975 - 34.991 (1.3770 - 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980 - 27.993 (1.1016 - 1.1021)	27.970 (1.1012)

ALTERNATOR/STARTER CLUTCH

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	57.749 - 57.768 (2.2736 - 2.2743)	57.639 (2.2692)

GENERAL INFORMATION

CRANKCASE/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M5, M6	31.000 – 31.016 (1.2205 – 1.2211)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	33.05 (1.301)
	Gear busing O.D.	M5	30.955 – 30.980 (1.2187 – 1.2197)	30.93 (1.218)
		M6	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C2, C3, C4	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
	Gear-to-bushing clearance	M5	0.020 – 0.061 (0.0008 – 0.0024)	–
		M6	0.020 – 0.061 (0.0008 – 0.0024)	–
		C2, C3, C4	0.020 – 0.007 (0.0008 – 0.0028)	–
	Gear bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
Shift fork, fork shaft	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Countershaft O.D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)	29.92 (1.178)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	–
		C2	0.010 – 0.056 (0.0004 – 0.0022)	–
	Fork I.D.		12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Shift fork shaft O.D.		11.987 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)

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)	0.048 (0.0019)
Cylinder	I.D.		98.005 – 98.025 (3.8585 – 3.8592)	98.100 (3.8622)
	Out of round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Piston, piston rings	Piston O.D. at 20 mm (0.8 in) from bottom		97.965 – 97.985 (3.8569 – 3.8577)	97.900 (3.8543)
	Piston pin bore I.D.		24.002 – 24.008 (0.9450 – 0.9452)	24.03 (0.946)
	Piston pin O.D.		23.994 – 24.000 (0.9446 – 0.9449)	23.984 (0.9443)
	Piston -to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.046 (0.0018)
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.55 (0.022)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.70 (0.028)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.065 – 0.100 (0.0026 – 0.0039)	0.115 (0.0045)
		Second	0.035 – 0.070 (0.0014 – 0.0028)	0.085 (0.0033)
Cylinder-to-piston clearance			0.020 – 0.060 (0.0008 – 0.0024)	0.200 (0.0079)
Connecting rod small end I.D.			24.020 – 24.041 (0.9457 – 0.9465)	24.051 (0.9469)
Connecting rod-to-piston pin clearance			0.020 – 0.047 (0.9457 – 0.9465)	0.067 (0.0026)

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1oz) max.
Fork	Spring free length	422.6 (16.64)	414.1 (16.30)
	Pipe runout	—	0.20 (0.008)
	Recommended fork fluid	Honda ultra cushion oil 10W or equivalent	—
	Fluid level	112 (4.4)	—
	Fluid capacity	531 ± 2.5 cm ³ (17.9 ± 0.08 US oz, 18.7 ± 0.09 Imp oz)	—
Steering head bearing pre-load		1.0 – 1.5 kgf (2.2 – 3.3 lbf)	—

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Driver and passenger	280 kPa (2.80 kgf/cm ² , 41 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.
Drive chain	Size/link	DID 525HV 112L4	—
		RK 525ROZ1 112LE	—
	Slack	35 – 45 (1-3/8 – 1-3/4)	—
Shock absorber	Pre-load adjuster standard position	4 clicks from minimum position	—

GENERAL INFORMATION

HYDRAULIC BRAKE SPECIFICATIONS

			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc warpage	—	0.20 (0.008)
	Master cylinder I.D.	12.700 (0.5000)	—
	Secondary master cylinder I.D.	12.700 (0.5000)	—
	Left caliper cylinder I.D.	Upper	25.400 (1.0000)
		Middle	22.650 (0.8917)
		Lower	25.400 (1.0000)
	Right caliper cylinder I.D.	Upper	27.000 (1.0629)
		Middle	22.650 (0.8917)
		Lower	27.000 (1.0629)
Rear	Specified brake fluid	DOT 4	—
	Brake pedal height	83.5 (3.29)	—
	Brake disk thickness	5.0 (0.20)	4.0 (0.16)
	Brake disc warpage	—	0.30 (0.012)
	Master cylinder I.D.	17.460 (0.6874)	—
	Caliper cylinder I.D.	Front	22.650 (0.8917)
		Center	27.000 (1.0629)
		Rear	22.650 (0.8917)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 17/18Ah
	Current leakage		0.1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.7 A/5 – 10 h
		Quick	8.5 A/0.5 h
Alternator	Capacity		0.434 kW/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.3 – 0.5 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug (Iridium)	Standard	IJR8B9 (NGK)
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)		10° 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 – 60 W X 2
		Lo 12V – 55 W X 2
	Position light	12V – 5 W
	Brake/tail light	12V – 21/5 W X 2
	Turn signal light	12V – 21 W X 4
	License light	12V – 5 W
	Instrument light	LED
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	PGM-FI malfunction indicator	LED
	Immobilizer indicator	LED
	Low fuel indicator	LED
Fuse	Main fuse	30 A
	Sub fuse	10 A X 3, 20A X 3
Tachometer peak voltage		10.5 V minimum
Thermosen- sor resistance	At 80 °C (176 °F)	47 – 57 Ω
	At 120 °C (248 °F)	14 – 18 Ω
Fan motor switch	Start to close (ON)	98 – 102 °C (208 – 216 °F)
	Stop to open	93 – 97 °C (199 – 207 °F)

GENERAL INFORMATION

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE FASTENER TYPE	N·m (kgf·m, lbf·ft)	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	10 (1.0, 7)
10 mm hex bolt and nut	34 (3.5, 25)	(8 mm head, small flange)	
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt	12 (1.2, 9)
		(8 mm head, large flange)	
		6 mm flange bolt	12 (1.2, 9)
		(10 mm head) and nut	
		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. Apply molybdenum disulfide oil to the threads and seating surface.
9. CT bolt.
10. Left hand threads.

ENGINE

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	2	12	14 (1.4, 10)	
Timing hole cap	1	14	10 (1.0, 7)	NOTE 7
Crankshaft hole cap	1	30	15 (1.5, 11)	NOTE 7
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 4
Engine oil drain bolt	1	12	29 (3.0, 22)	

LUBRICATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil filter boss	1	—	See page 1-15	
Oil pump assembly bolt		6	13 (1.3, 9)	NOTE 9

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ECT (Engine Coolant Temperature)/thermo sensor	1	12	23 (2.3, 17)	
Throttle body insulator band screw	4	5	1 (0.09, 0.7)	
Throttle cable bracket screw	2	5	3 (0.35, 2.5)	
Starter valve synchronization plate screw	2	4	2.1 (0.21, 1.5)	
Starter valve lock nut	2	10	2.3 (0.23, 1.7)	
MAP sensor bracket screw	2	5	3.4 (0.35, 2.5)	
MAP sensor screw	1	4	2.1 (0.21, 1.5)	
Vacuum hose guide screw	1	4	1.2 (0.13, 0.9)	
Fuel rail stay bolt	4	5	5.4 (0.55, 4.0)	
Fuel rail B mounting bolt	4	5	5.4 (0.55, 4.0)	
Fuel rail A mounting bolt	2	5	5.4 (0.55, 4.0)	

GENERAL INFORMATION

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Drive sprocket bolt	1	10	54 (5.5, 40)	

CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head flange bolt	12	10	53 (5.4, 39)	NOTE 4
Cylinder head sealing bolt	2	12	32 (3.3, 24)	NOTE 2
Camshaft holder flange bolt	16	7	21 (2.1, 15)	NOTE 4
Cylinder head cover bolt	8	6	10 (1.0, 7)	
Breather plate flange bolt	4	6	12 (1.2, 9)	NOTE 2, 9
PAIR check reed valve cover bolt	4	5	5 (0.52, 3.8)	NOTE 2
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
Cylinder head stud bolt (exhaust pipe stud bolt)	8	6	See page 1-15	

CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch spring bolt	5	6	12 (1.2, 9)	
Clutch center lock nut	1	25	127 (13.0, 94)	NOTE 3, 4
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
Primary drive gear bolt	1	12	88 (9.0, 65)	NOTE 4

GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Shift drum center socket bolt	1	8	23 (2.3, 17)	NOTE 2
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	

CRANKCASE/TRANSMISSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankcase bolt (Main journal)	8	10	42 (4.3, 31)	NOTE 4
Crankcase flange bolt	1	10	39 (4.0, 29)	
Cam chain tensioner bolt	2	8	23 (2.3, 17)	NOTE 2
Cam chain guide bolt	2	8	23 (2.3, 17)	NOTE 2

CRANKSHAFT/PISTON/CYLINDER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Connecting rod bolt	4	9	29 (3.0, 22) ± 120 °	NOTE 4
Oil jet	2	6	3.4 (0.35, 2.5)	NOTE 2

BATTERY/CHARGING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel flange bolt	1	12	157 (16.0, 116)	NOTE 4
Starter one-way clutch socket bolt	6	8	23 (2.3, 17)	NOTE 2
Stator socket bolt	3	6	12 (1.2, 9)	

GENERAL INFORMATION

IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Ignition pulse generator flange bolt	2	6	12 (1.2, 9)	NOTE 2

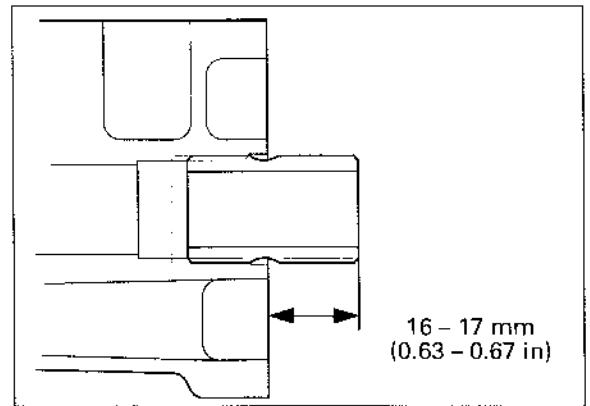
ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor terminal nut	1	6	10 (1.0, 7)	

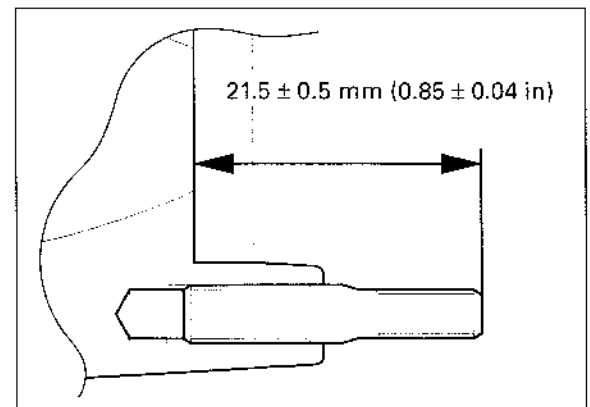
LIGHTS/METERS/SWITCHES

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
Oil pressure switch terminal screw	1	4	2 (0.2, 1.4)	
Neutral switch	1	10	12 (1.2, 9)	

Oil filter boss:



Exhaust pipe stud bolt:



GENERAL INFORMATION

FRAME

FRAME BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Windshield screen screw	4	5	1 (0.1, 0.7)	
Upper cowl stay lower mounting bolt	2	10	44 (4.5, 33)	
Upper cowl stay mounting nut (head pipe)	1	8	27 (2.8, 20)	
Exhaust pipe joint nut	4	7	12 (1.2, 9)	
Rear exhaust pipe band bolt	1	8	21 (2.1, 15)	
Muffler band bolt	2	8	26 (2.7, 20)	

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 (fuel pump side)	1	12	22 (2.2, 16)	
Fuel cock nut	2	22	34 (3.5, 25)	
Fuel cock lever screw	2	5	9 (0.9, 6.5)	
Air funnel screw	4	5	4 (0.42, 3.0)	
Air cleaner housing screw	8	4	2.5 (0.25, 1.8)	
O ₂ sensor (G type only)	1	18	44 (4.5, 33)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Cooling fan mounting nut	1	5	3 (0.27, 2.0)	NOTE 2
Fan motor bracket mounting bolt	3	6	8 (0.8, 5.8)	
Fan motor mounting bolt	3	5	5 (0.5, 3.6)	
Fan motor switch	1	16	17 (1.7, 12)	
Thermosensor	1	PT 1/8	10 (1.0, 7)	NOTE 1

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Engine hanger flange nut (A)	1	12	64 (6.5, 47)	
Engine hanger flange nut (C)	1	12	64 (6.5, 47)	
Engine hanger flange bolt (B)	2	10	39 (4.0, 29)	
Shock link bracket nut (12 mm)	1	12	64 (6.5, 47)	
Shock link bracket nut (14 mm)	1	14	74 (7.5, 54)	

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
Throttle housing screw	2	5	4 (0.42, 3.0)	
Choke lever pivot bolt	1	6	9 (0.9, 6.5)	
Handlebar upper holder bolt	4	8	27 (2.8, 20)	
Front axle bolt	1	14	59 (6.0, 43)	
Front axle holder pinch bolt	4	8	22 (2.2, 16)	
Front brake disc bolt	12	6	20 (2.0, 14)	NOTE 6
Fork socket bolt	2	8	20 (2.0, 14)	NOTE 2
Fork cap	2	39	22 (2.2, 16)	
Steering stem nut	1	24	103 (10.5, 76)	
Steering bearing adjusting nut	1	26	24 (2.4, 17)	See page 13-37
Steering bearing adjusting nut lock nut	1	26	—	
Fork top bridge pinch bolt	4	8	22 (2.2, 16)	
Fork bottom bridge pinch bolt	4	8	27 (2.8, 20)	

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Rear axle nut	1	18	93 (9.5, 69)	NOTE 5
Final driven sprocket nut	5	12	108 (11.0, 80)	
Rear brake disc bolt	6	8	42 (4.3, 31)	NOTE 6
Swingarm pivot nut	1	18	93 (9.5, 69)	NOTE 5
Drive chain slider screw	2	5	4 (0.42, 3.0)	NOTE 2
Shock absorber upper mounting nut	1	10	59 (6.0, 43)	NOTE 5
Shock absorber lower mounting nut	1	10	44 (4.5, 33)	NOTE 5
Shock link-to-bracket nut	1	10	59 (6.0, 43)	NOTE 5
Shock link-to-shock link plate nut	1	10	44 (4.5, 33)	NOTE 5
Swingarm-to-shock link plate nut	1	12	88 (9.0, 65)	NOTE 5

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Front master cylinder reservoir cap screw	2	4	1 (0.15, 1.1)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
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 lever adjuster	1	5	4 (0.4, 3.9)	
Front brake light switch screw	1	4	1 (0.12, 0.9)	
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	12	23 (2.3, 17)	
Front caliper sub slide pin	2	8	13 (1.3, 9)	
Pad pin	3	10	18 (1.8, 13)	
Brake caliper bleed valve	6	8	5.4 (0.55, 4.0)	
Second master cylinder push rod nut	1	8	18 (1.8, 13)	
Second master cylinder connector	1	6	10 (1.0, 7)	
Rear master cylinder mounting bolt	2	6	12 (1.2, 9)	
Rear master cylinder reservoir mounting bolt	1	6	12 (1.2, 9)	
Rear master cylinder push rod nut	1	8	18 (1.8, 13)	
Rear master cylinder reservoir hose joint screw	1	4	1 (0.15, 1.1)	NOTE 2
Brake hose oil bolt	12	10	34 (3.5, 25)	
Brake pipe joint	—	10	17 (1.7, 12)	NOTE 4
Brake pipe 2/3way joint	2	6	12 (1.2, 9)	
Brake hose guide bolt	2	6	10 (1.0, 7)	
Delay valve mounting bolt	2	6	12 (1.2, 9)	
PCV (Proportional Control Valve) mounting bolt	2	6	12 (1.2, 9)	

IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Rear ignition coil mounting bolt	2	6	12 (1.2, 9)	

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)	
Fuel reserve sensor	1	18	23 (2.3, 17)	
Ignition switch mounting bolt	2	8	26 (2.7, 20)	

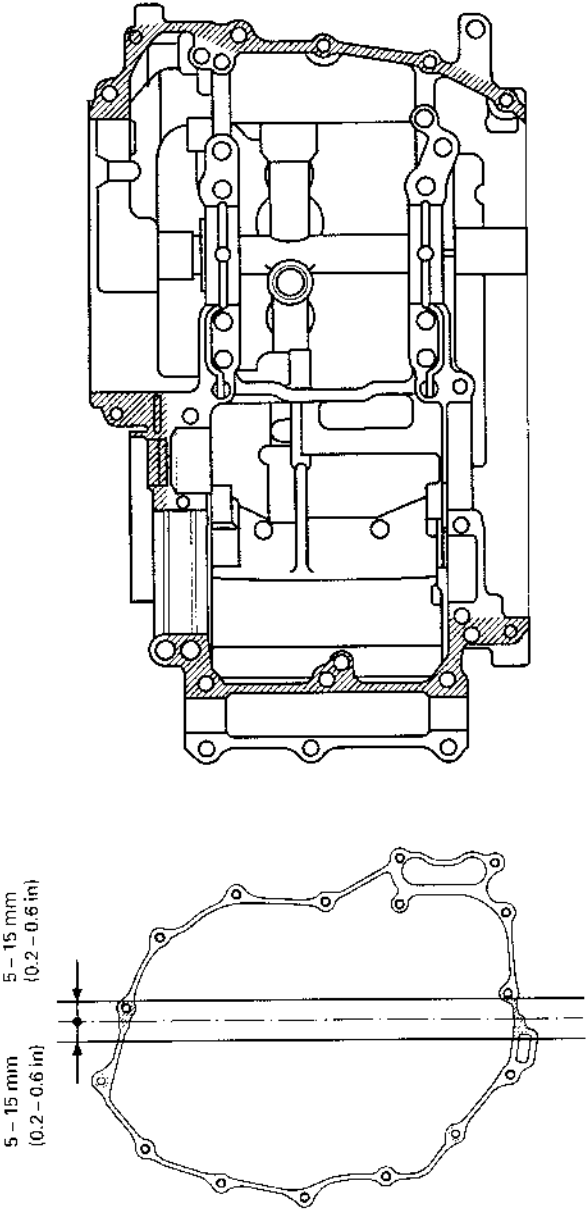
GENERAL INFORMATION

OTHERS

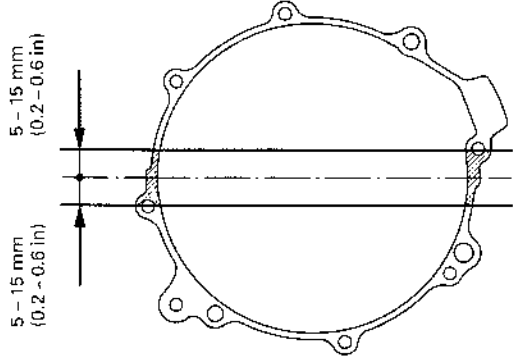
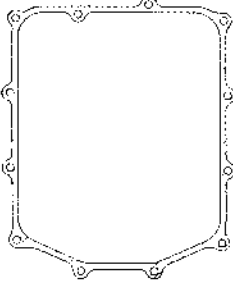
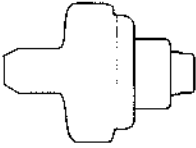
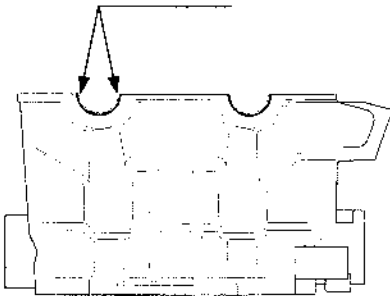
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf-m, lbf-ft)	REMARKS
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot nut	1	10	29 (3.0, 22)	
Change pedal bolt	1	8	27 (2.8, 20)	
Footpeg bracket bolt	2	8	39 (4.0, 29)	
Bank angle sensor bolt	2	8	10 (1.0, 7)	
Rear turn signal unit nut	2	10	5 (0.5, 3.6)	

LUBRICATION & SEAL POINTS

ENGINE

LOCATION	MATERIAL	REMARKS
<p>Crankcase mating surface</p>  <p>The drawing includes a side view of the engine crankcase with the oil pan area highlighted. Below it is a top-down view of the oil pan, showing a dashed line representing the centerline and arrows indicating the application of sealant to the mating surface. The sealant is applied in a continuous, wavy line around the perimeter of the pan.</p> <p>5 - 15 mm (0.2 - 0.6 in)</p> <p>5 - 15 mm (0.2 - 0.6 in)</p>	<p>Liquid sealant (Three Bond 1207B or equivalent)</p>	

GENERAL INFORMATION

LOCATION	MATERIAL	REMARKS
 <p>Oil pan mating surface</p>  <p>Oil pressure switch threads</p> <p>Do not apply to the thread head 3 - 4 mm (0.1 - 0.2 in).</p>  <p>Alternator wire grommet</p>	<p>Liquid sealant (Three Bond 1207B or equivalent)</p>	
<p>Cylinder head semi-circular cut-out</p>  <p>Cylinder head gasket mating surface (cover side)</p>	<p>Sealant</p>	
<p>Main journal bearing surface Connecting rod bearing surface Valve stem (valve guide sliding surface) M3/4, C5, C6 shifter gear (shift fork grooves) Each gear teeth and rotating surface Piston pin bore Connecting rod small end inner surface Valve lifter outer sliding surface Camshaft lobes/journals and thrust surface Clutch outer/primary driven gear sliding surface Primary drive gear sliding surface Other rotating area and sliding surface</p>	<p>Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)</p>	

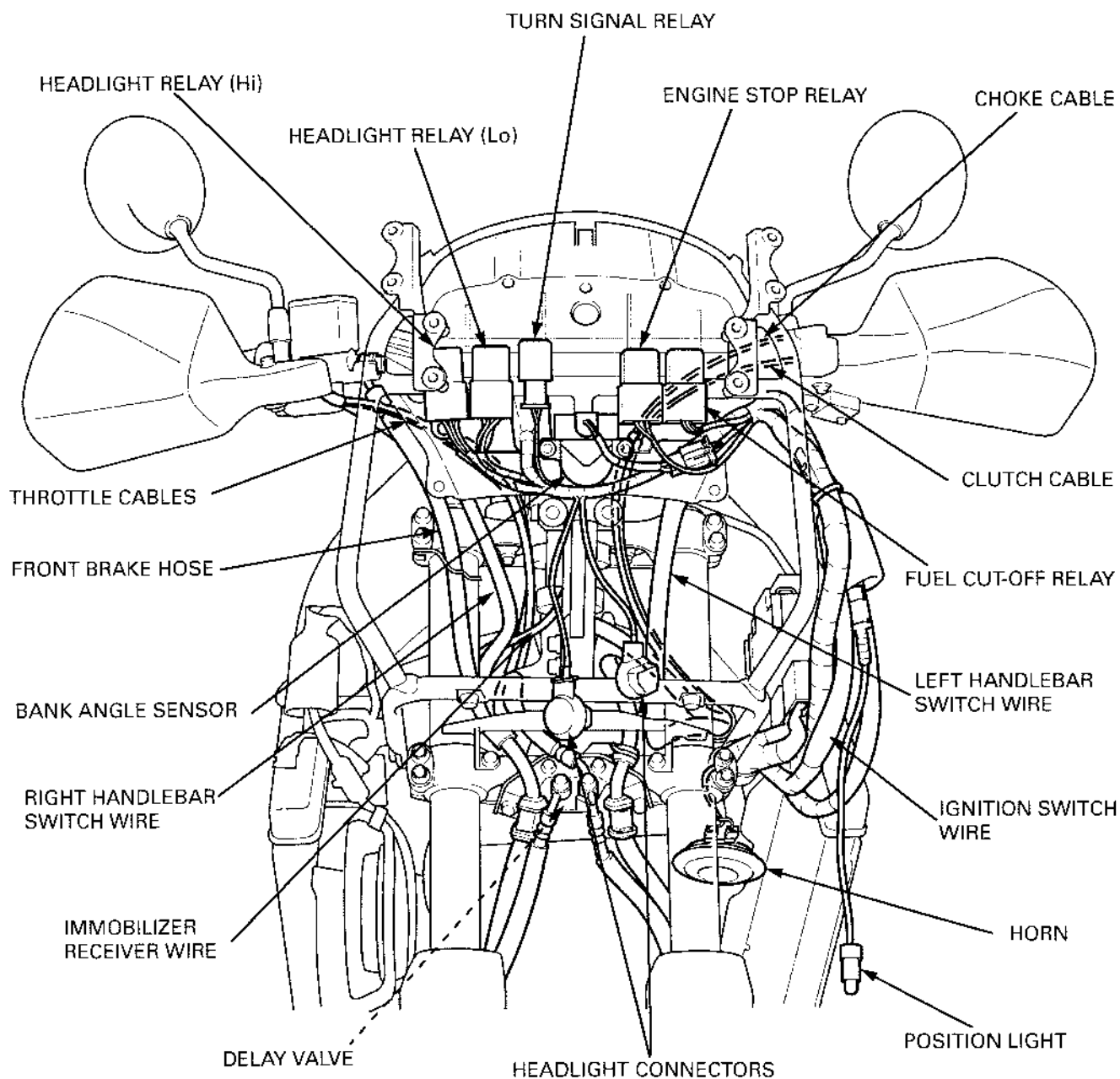
GENERAL INFORMATION

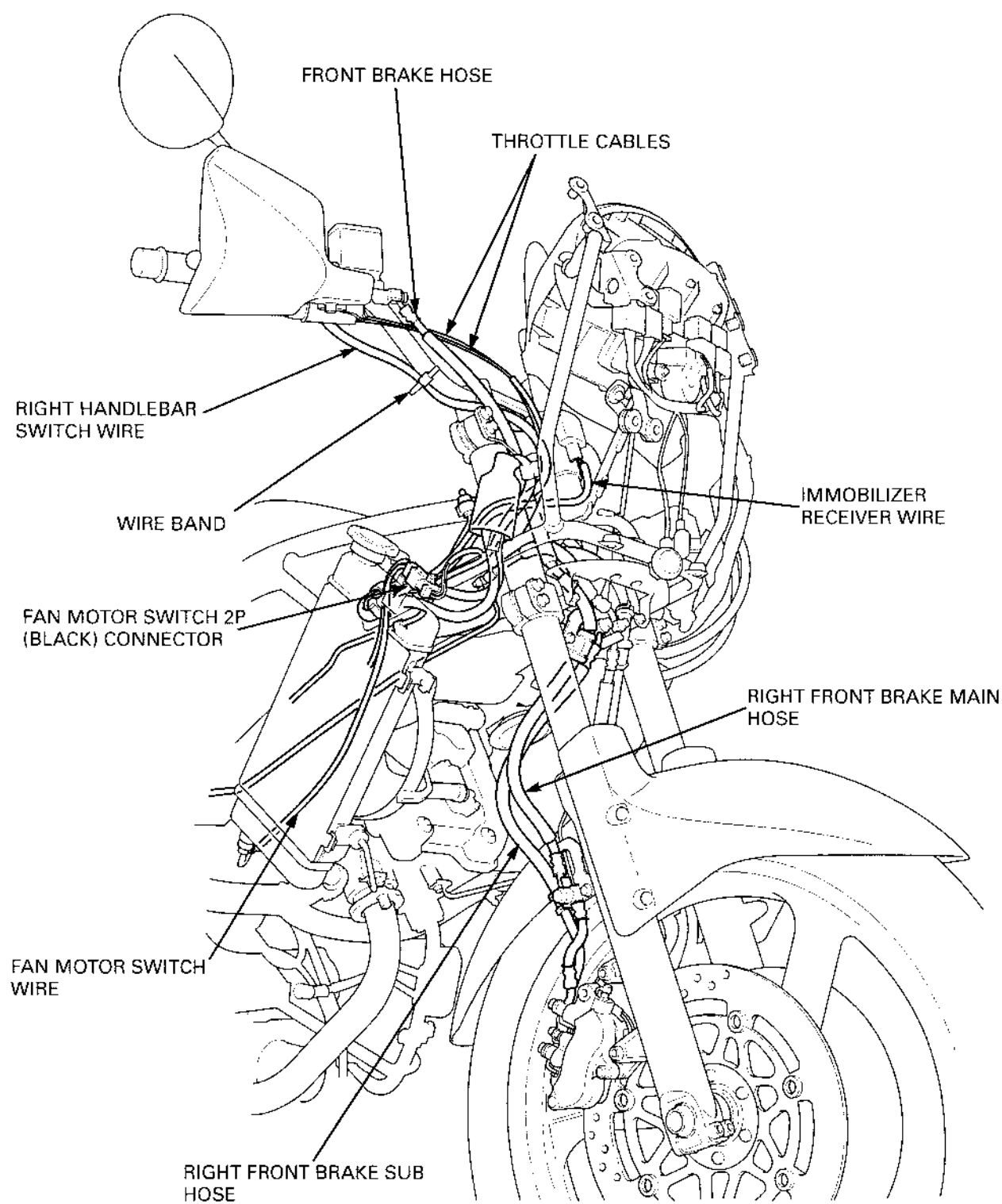
LOCATION	MATERIAL	REMARKS
Piston sliding area Piston ring surface Clutch disc surface Each bearing Crankcase bolt (main journal) threads and seating Cylinder head bolt threads and seating surface Camshaft holder bolt threads and seating surface Connecting rod nut threads Clutch center lock nut threads Flywheel bolt threads and seating surface Primary drive gear bolt threads and seating surface Oil filter cartridge threads and O-ring Each O-ring	Engine oil	
Timing hole cap threads Each oil seal lips	Multi-purpose grease	
Ignition pulse generator mounting bolt threads Cylinder head cover breather plate bolt threads PAIR check valve cover bolt threads Oil filter boss threads Oil pump driven sprocket bolt threads Oil jet threads Cam sprocket bolt threads Cam chain tensioner pivot bolt threads Cam chain guide bolt threads Cam chain guide B bolt threads Starter one-way clutch socket bolt threads Mainshaft bearing set plate bolt threads Shift drum bearing set plate bolt threads Shift drum center bolt threads	Locking agent	Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 2.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm Coating width: 6.5 ± 1 mm

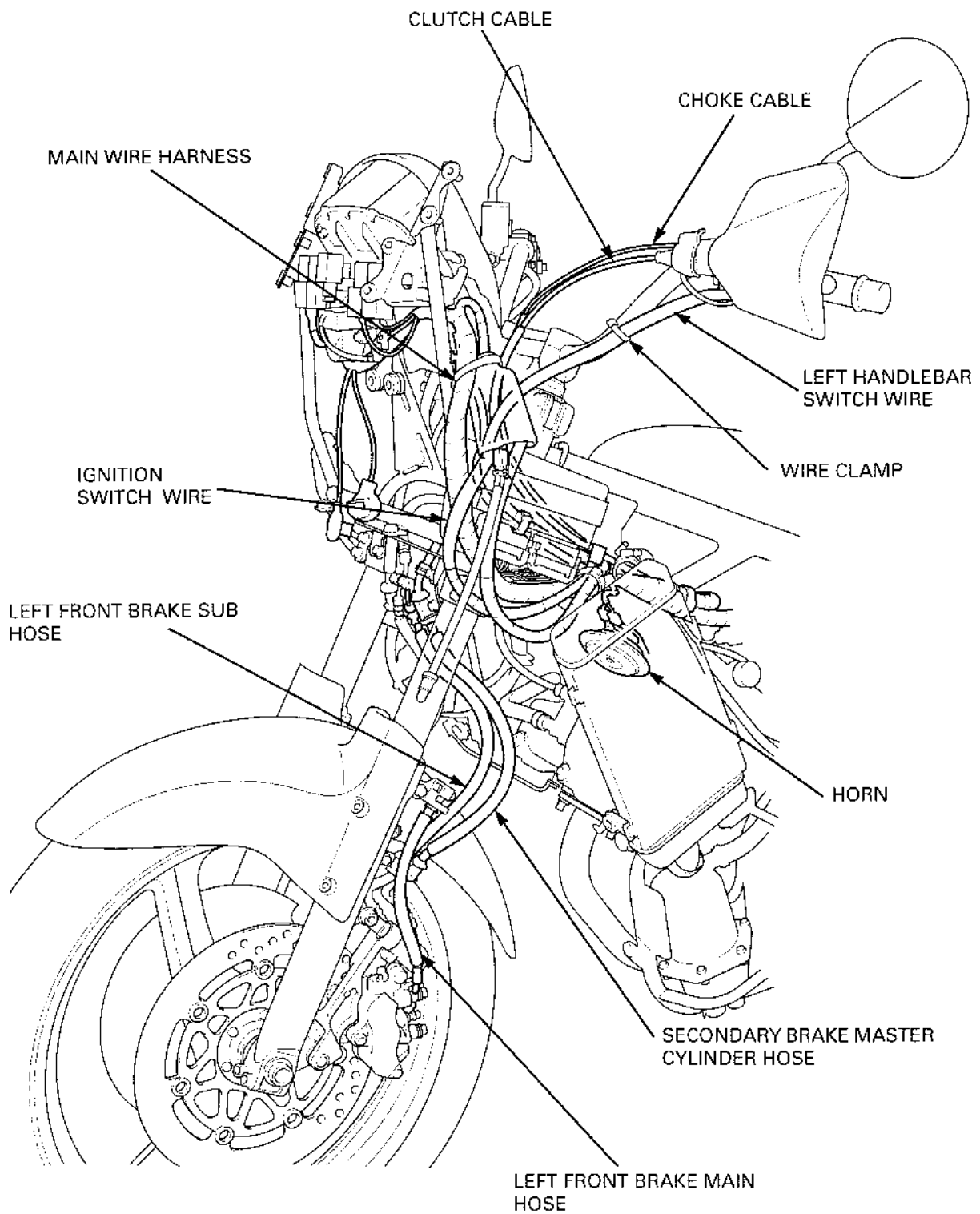
GENERAL INFORMATION

FRAME

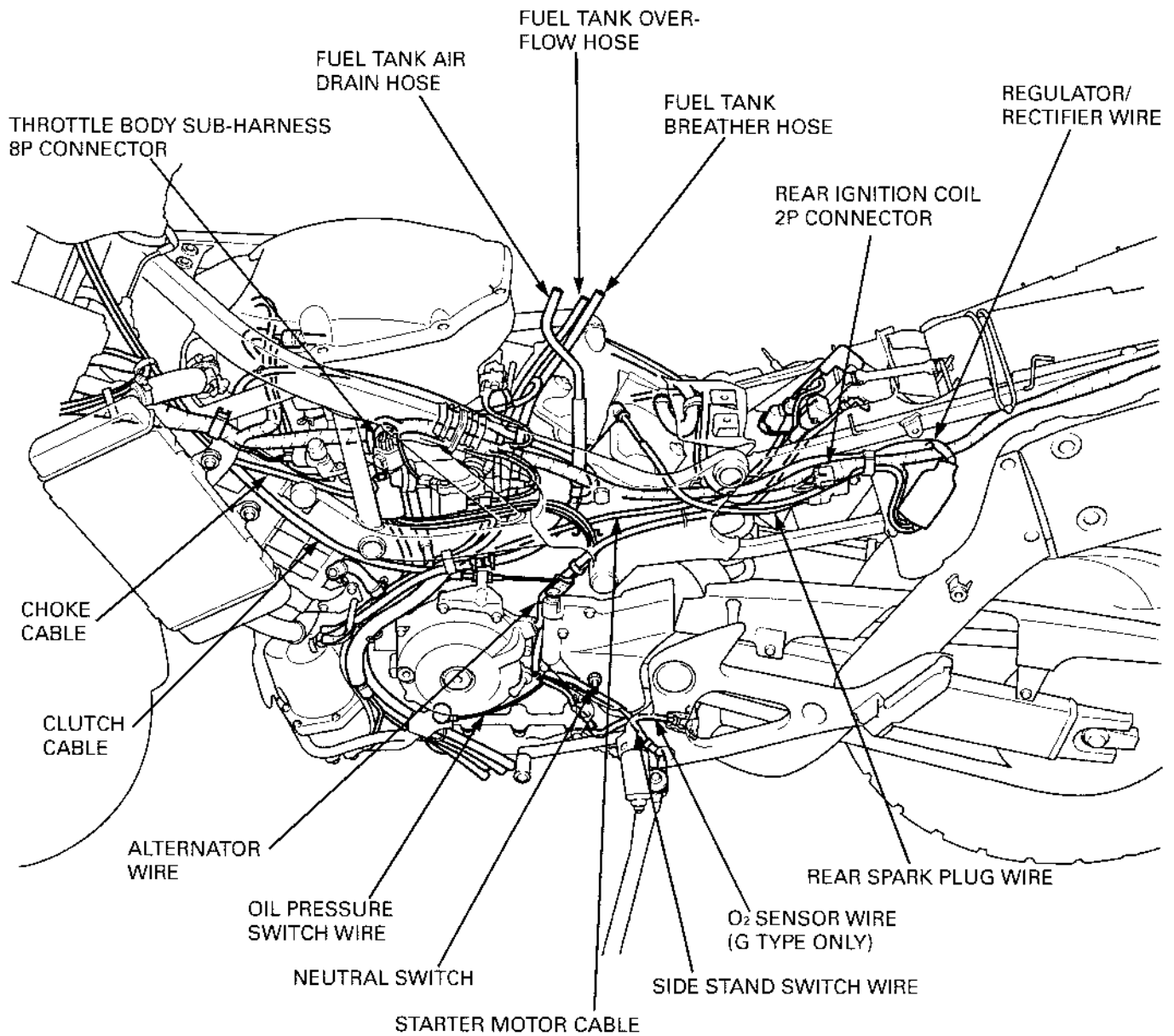
LOCATION	MATERIAL	REMARKS
Seat catch hook sliding area Front wheel dust seal lips Left front brake caliper pivot bearing sliding surface Left front brake caliper pivot oil seal lips Left fork needle bearing sliding surface Rear wheel dust seal lips Rear wheel side collar inner surface Change pedal link tie-rod ball joints Change pedal pivot area Throttle grip pipe sliding area and rolled-up portion Clutch lever pivot bolt sliding surface Rear brake pedal pivot sliding surface Driver footpeg sliding area Pillion footpeg sliding area Side stand pivot	Multi-purpose grease	
Steering head bearing sliding surface Steering head dust seal lips	Urea based multi-purpose grease with extreme pressure (example: EXCELITE EP2 manufactured by KYDO YUSHI, Japan), Shell Stamina EP2 or equivalent	
Swingarm pivot bearings Swingarm pivot dust seal lips Swingarm shock link plate needle bearing Swingarm shock link plate dust seal lips Shock link needle bearings Shock link dust seal lips Shock absorber needle bearings Shock absorber dust seal lips	Multi-purpose grease (Shell Alvania EP2 or equivalent)	
Throttle cable A, B outer inside	Cable lubricant	
Handlebar grip rubber inside	Honda bond A or equivalent	
Steering bearing adjustment nut threads Brake pipe joint threads Fuel feed hose O-ring	Engine oil	
Front brake lever-to-push rod contacting area Front brake push rod-to-master piston contacting area Front brake lever pivot Secondary master piston-to-push rod contacting area Rear master brake master piston-to-push rod contacting area Front and rear brake caliper slide pin sliding surface Front and rear brake caliper dust seals Front and rear brake caliper boot inside Front and rear brake caliper pin boot inside	Silicone grease	
Front and rear brake master piston and cups Secondary master piston and cups Front and rear brake caliper piston and piston seals	DOT 4 brake fluid	
Fork cap O-ring Fork dust seal and oil seal lips	Honda ultra cushion oil 10W or equivalent	
Rear brake reservoir hose joint screw threads Front and rear brake caliper slide pin threads	Locking agent	

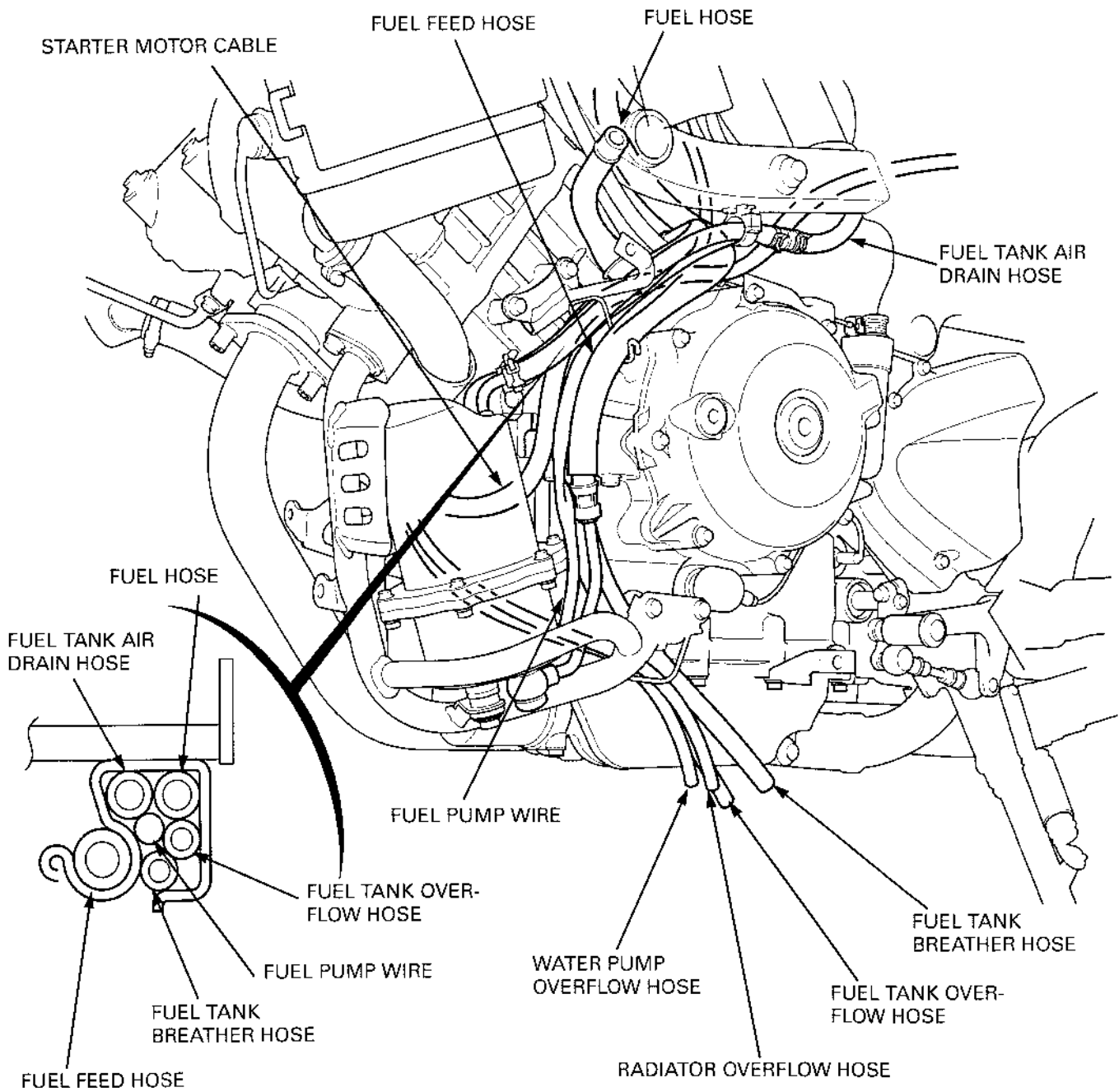
CABLE & HARNESS ROUTING

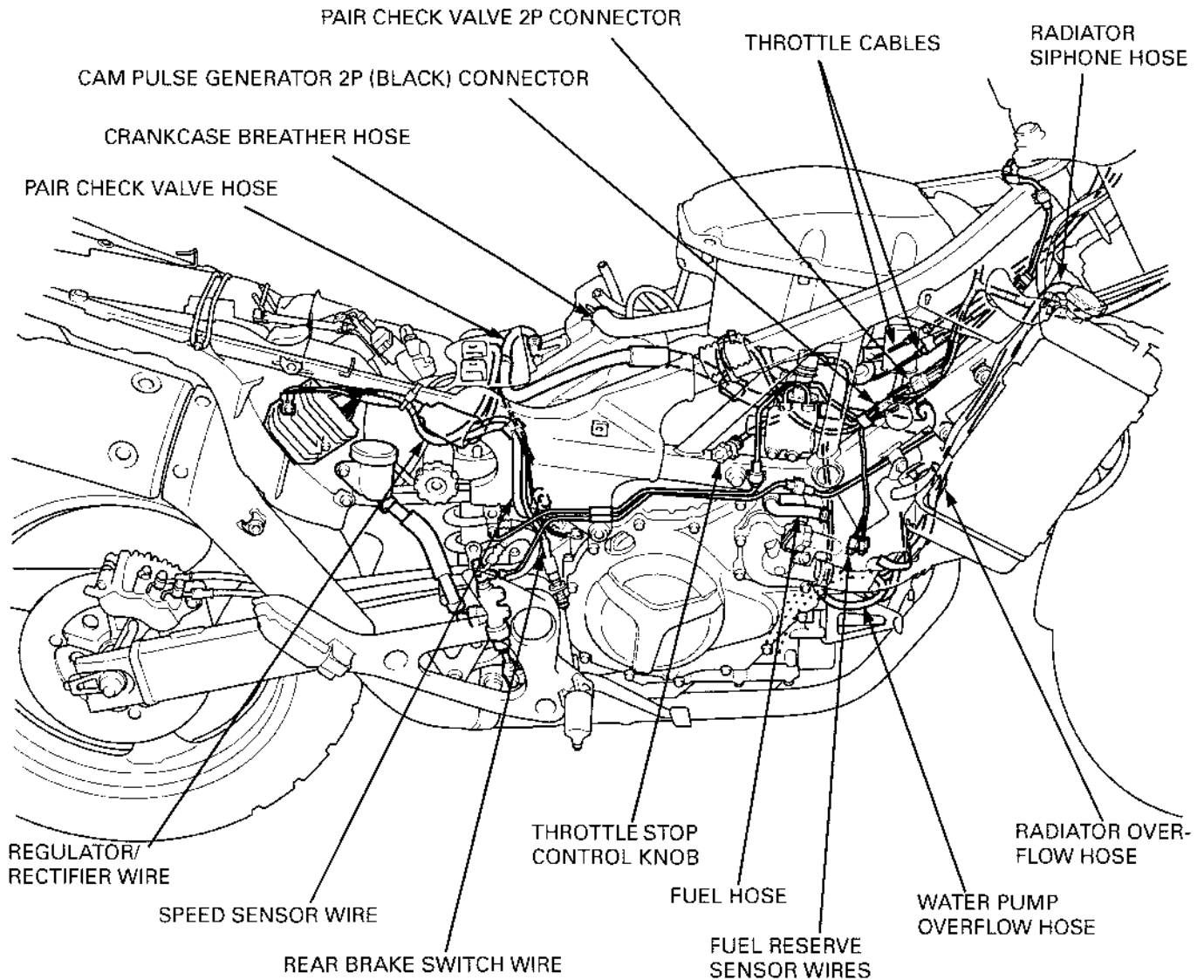


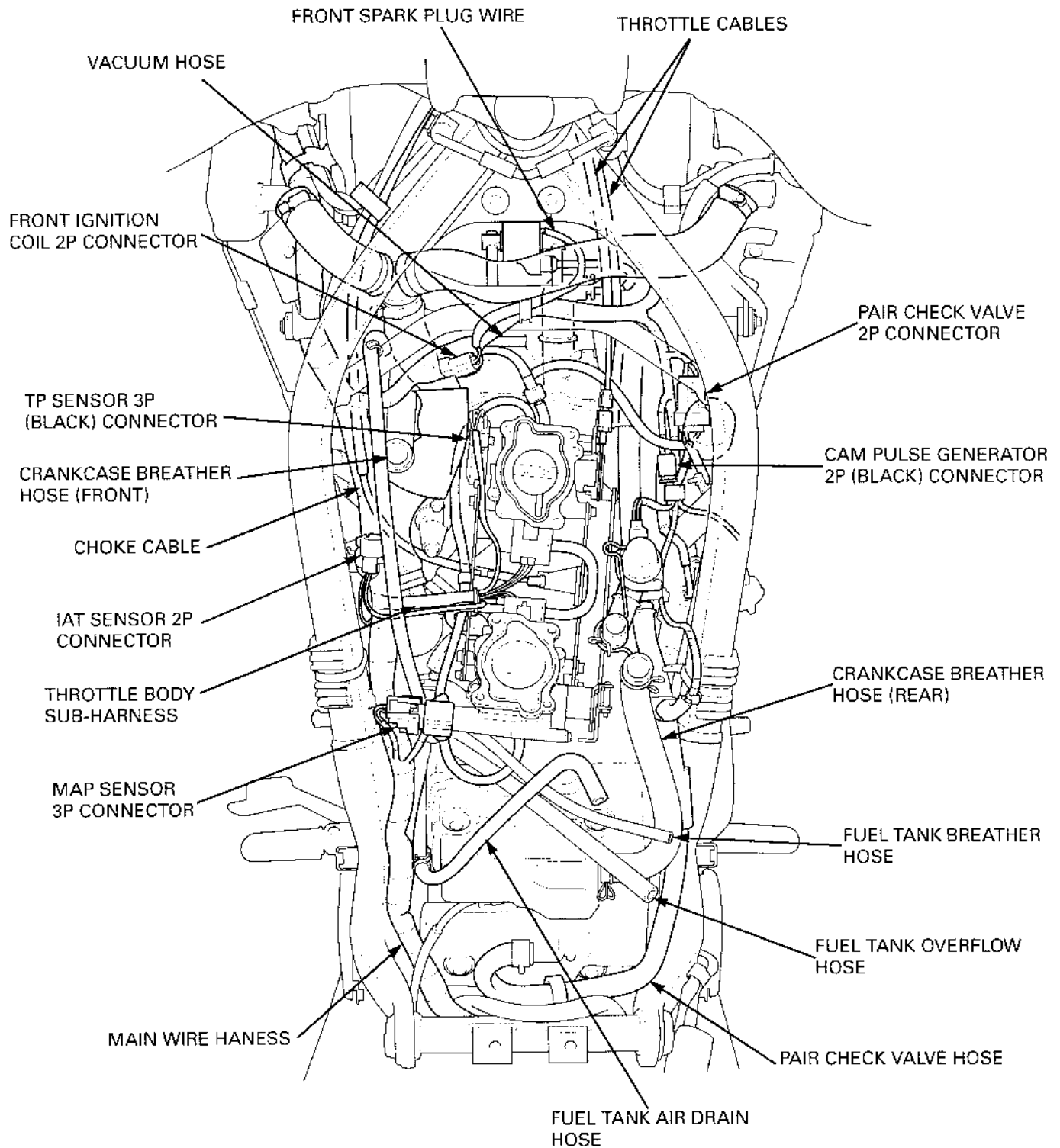


GENERAL INFORMATION

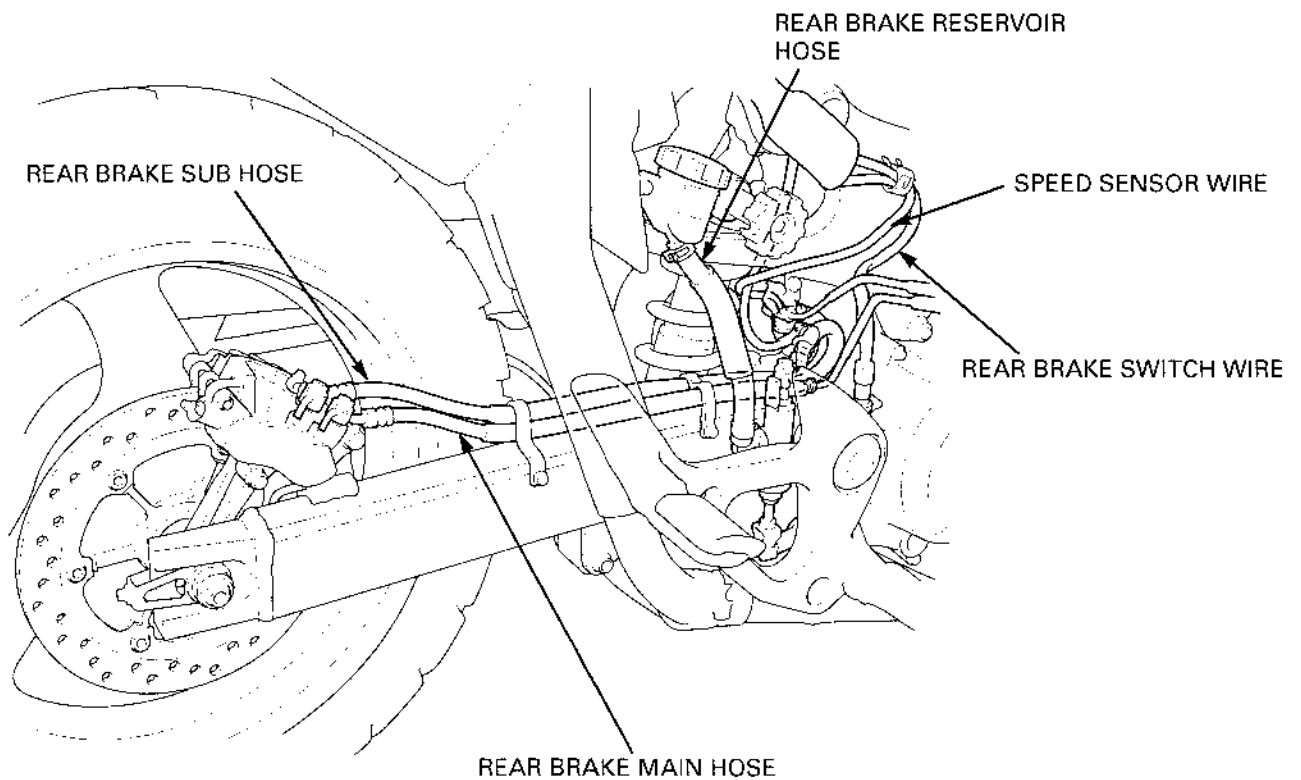
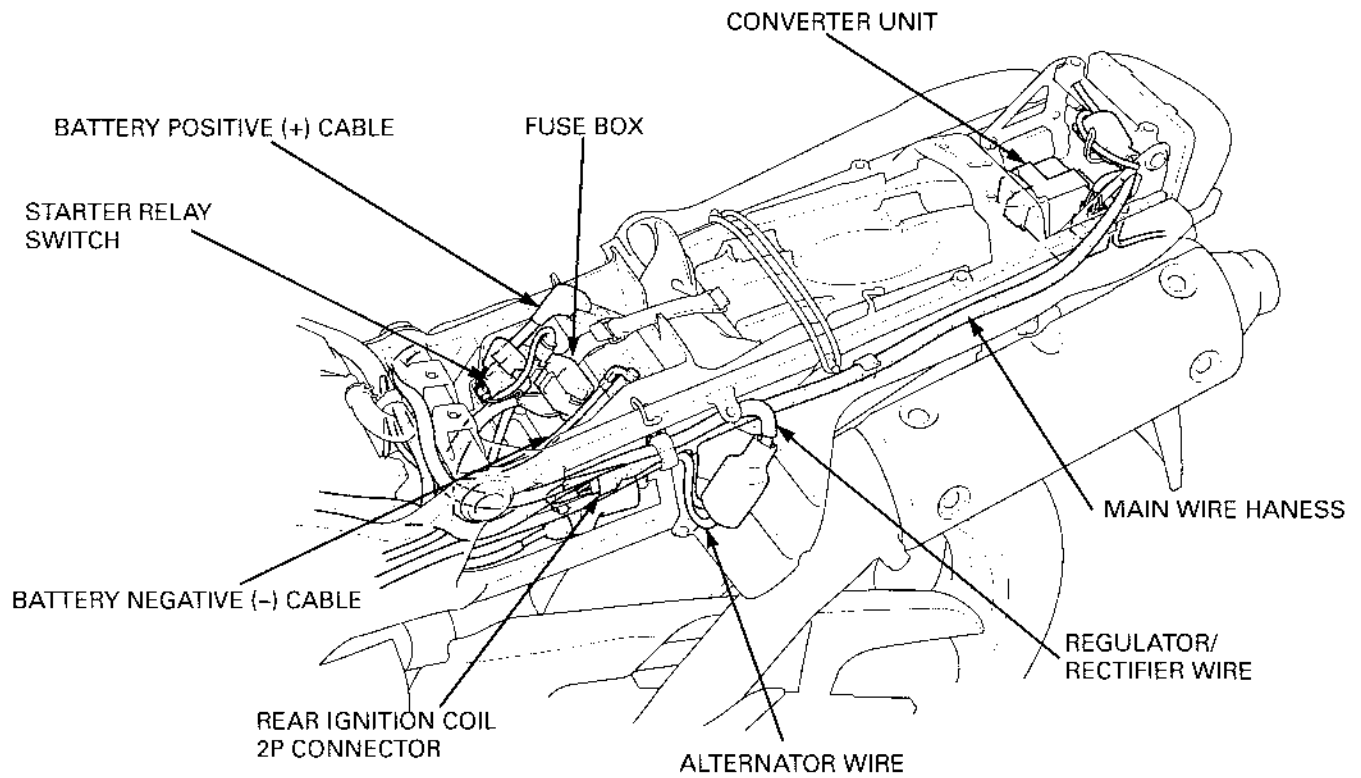


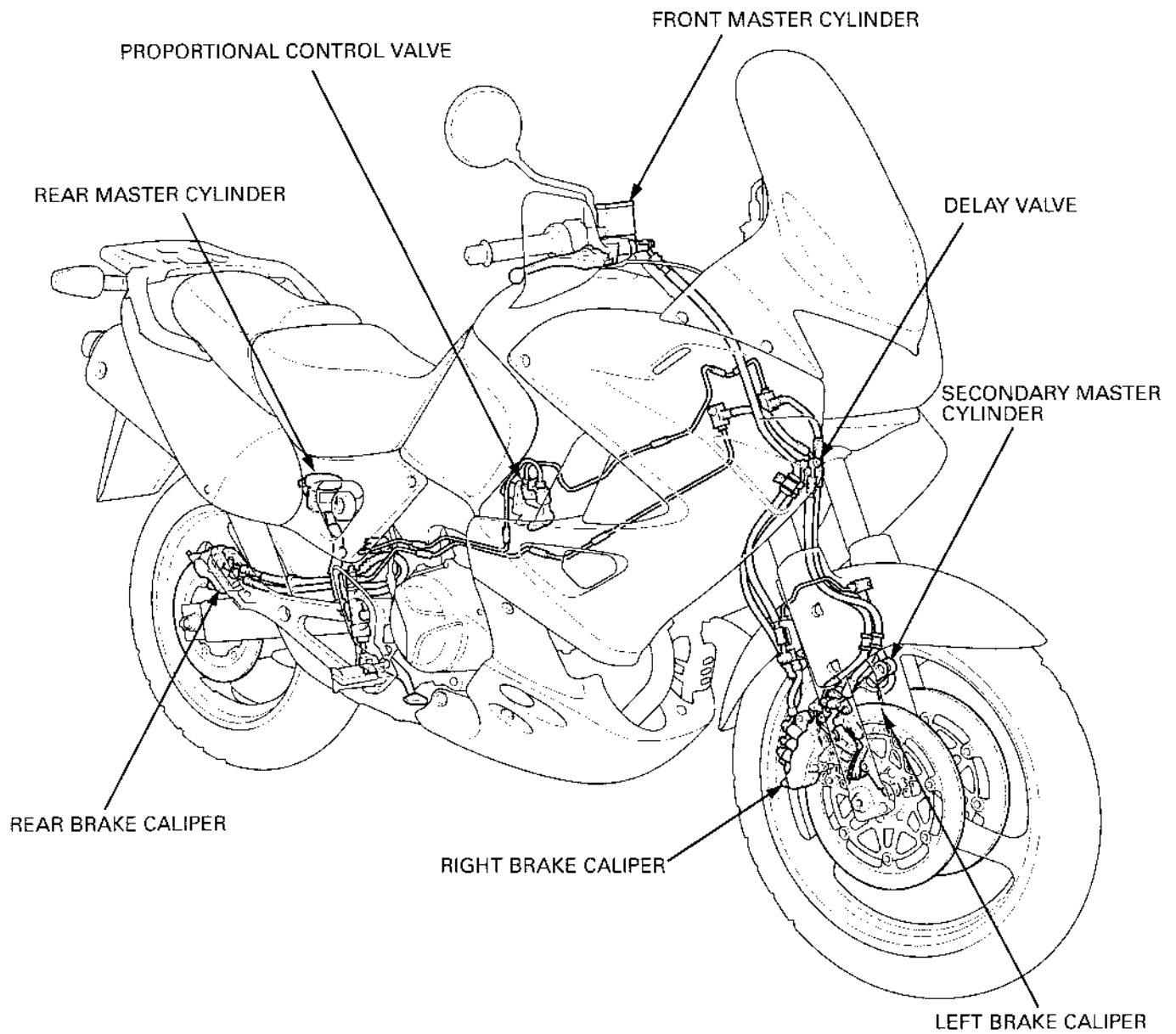






GENERAL INFORMATION





GENERAL INFORMATION

EMISSION CONTROL SYSTEMS

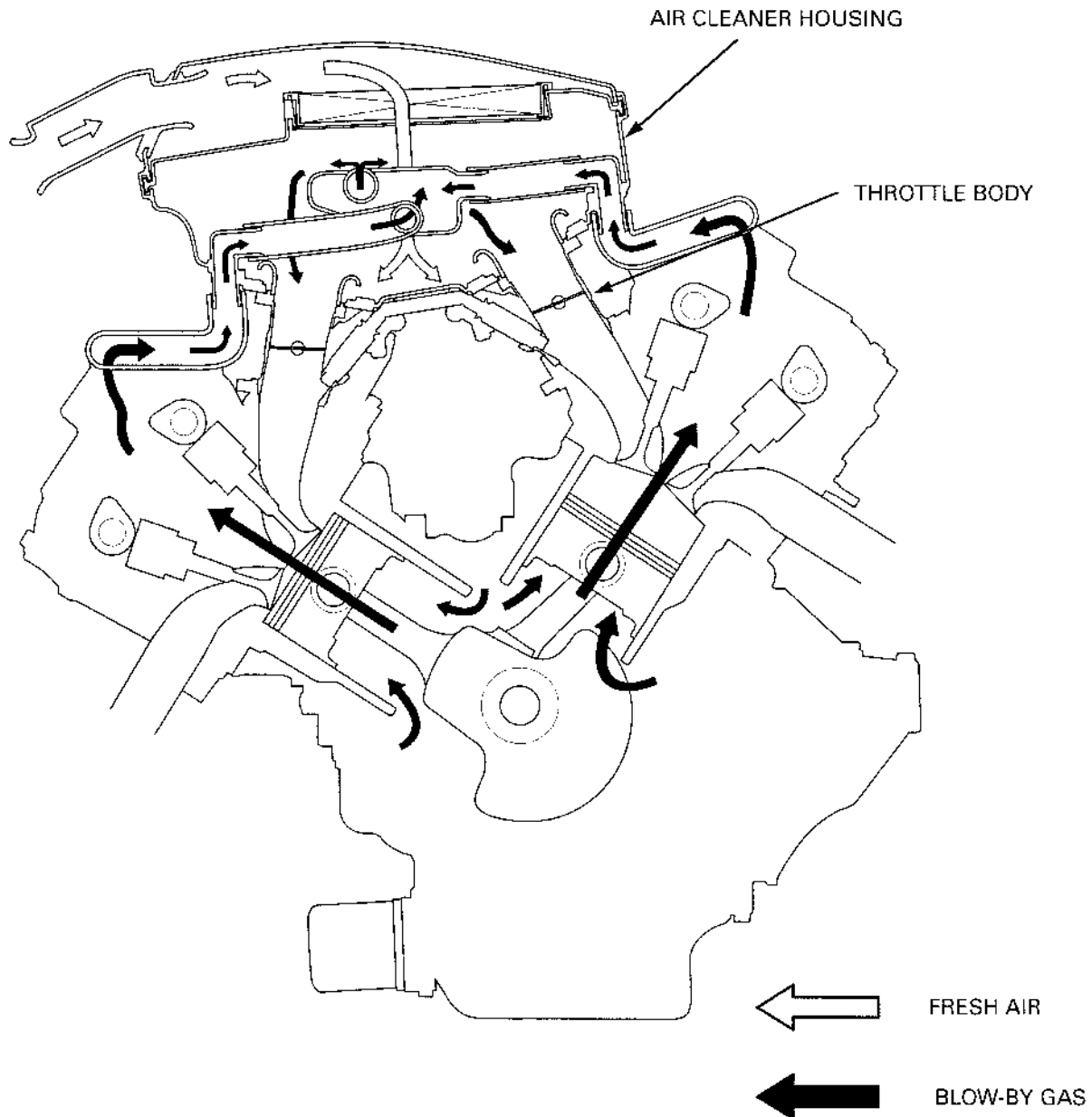
SOURCE OF EMISSIONS

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)

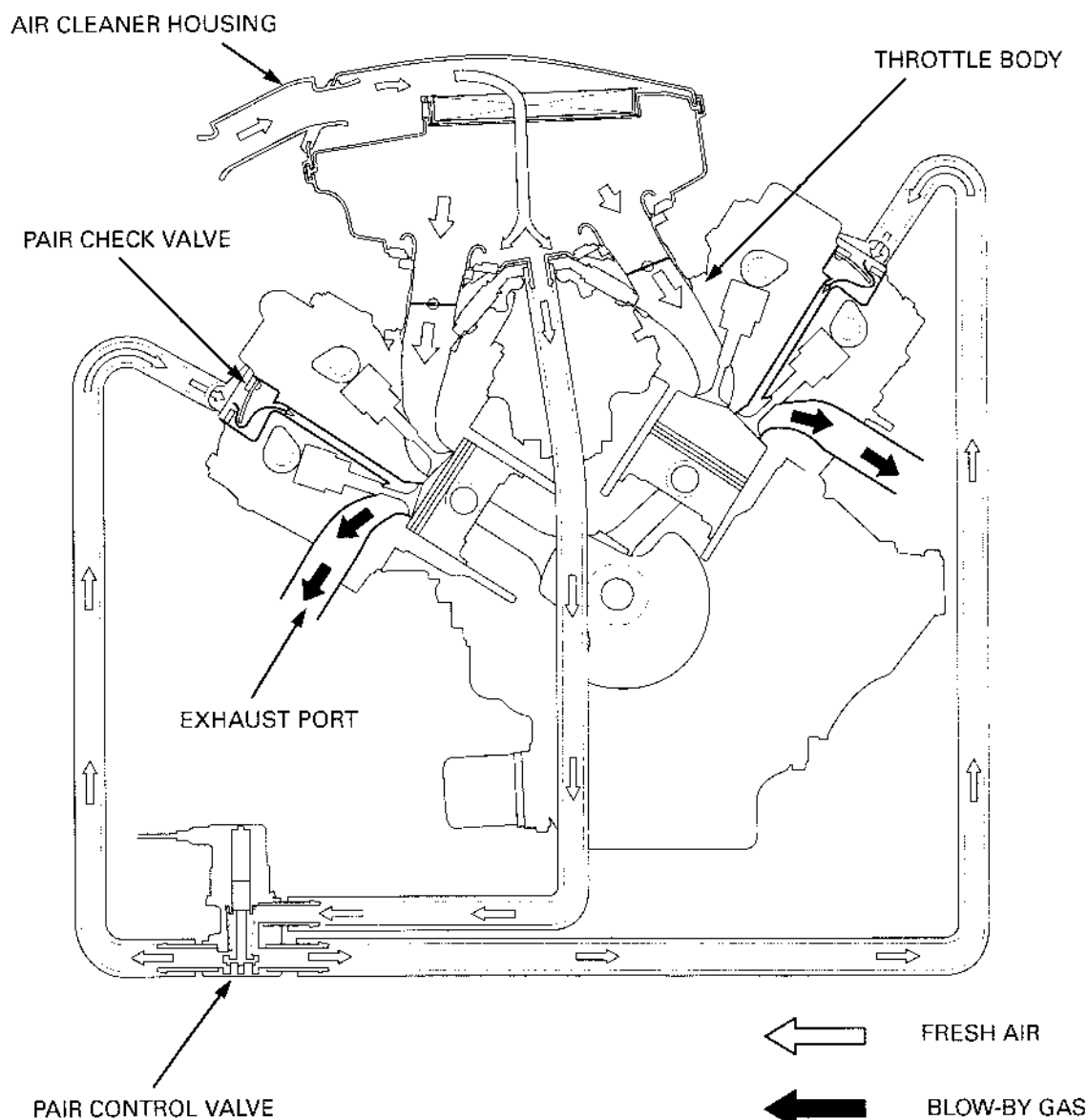
The exhaust emission control system is composed of a lean fuel injection setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crank case emission control system.

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 the running condition (ECT/IAT/TP/MAP sensor and engine revolution).

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



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

The three-way catalytic converters are in the exhaust system. Through chemical reactions, they convert HC, CO, and NOx in the engine's exhaust to carbon dioxide (CO₂), dinitrogen (N₂), and water vapor.

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

GENERAL INFORMATION

NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Local law prohibits 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 than those specified by the manufacturer.

2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-2	HEADLIGHT UNDER COVER	2-6
TROUBLESHOOTING	2-2	INNER COWL	2-7
SEAT	2-3	UNDER COWL	2-7
SIDE COVER	2-3	MIDDLE COWL	2-8
REAR CARRIER	2-4	WINDSHIELD SCREEN	2-8
REAR FENDER	2-4	UPPER COWL COVER	2-10
NUMBER PLATE BRACKET	2-5	UPPER COWL	2-10
REAR FENDER B	2-6	MUFFLER/EXHAUST PIPE	2-11

SERVICE INFORMATION

GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- 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

Windshield screen screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Upper cowl stay lower mounting bolt	44 N·m (4.5 kgf·m, 33 lbf·ft)
Upper cowl stay mounting nut (head pipe)	27 N·m (2.8 kgf·m, 20 lbf·ft)
Exhaust pipe joint nut	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear exhaust pipe band bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)
Muffler band bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

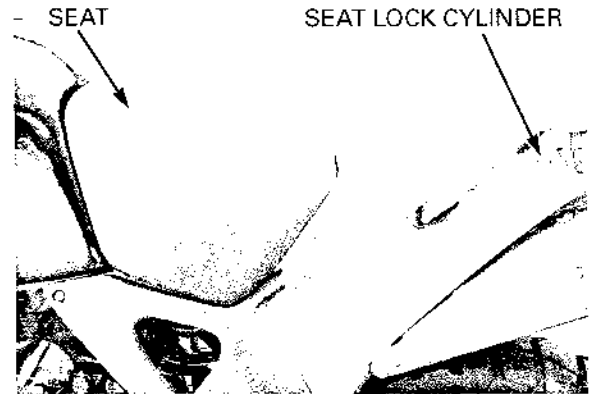
- Broken exhaust system
- Exhaust gas leak

Poor performance

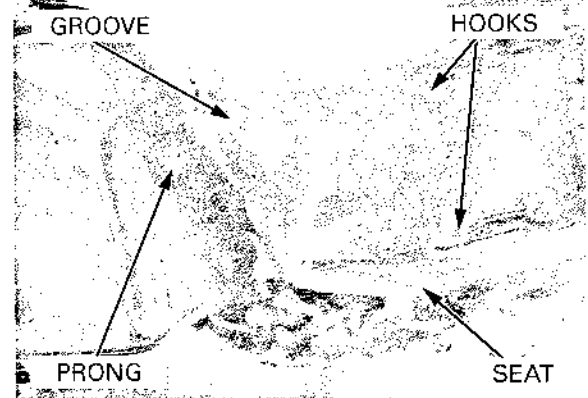
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

SEAT

Unhook the seat with the ignition key.
Pull the seat back and remove it.



Install the seat while aligning its groove with the prong on the fuel tank and the hooks with the catches on the frame.
Push the seat forward, then down to lock it.



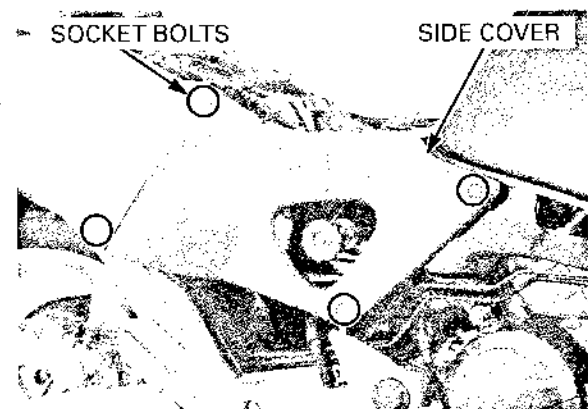
SIDE COVER

At the side cover removal/installation, be careful not to damage the tabs on the rear fender.

Remove the seat (page 2-3).

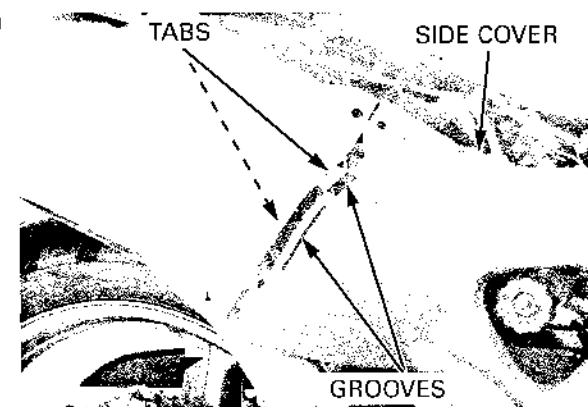
Remove the socket bolts.

Release the tabs on the rear fender from the grooves on the side cover and remove the side cover.



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

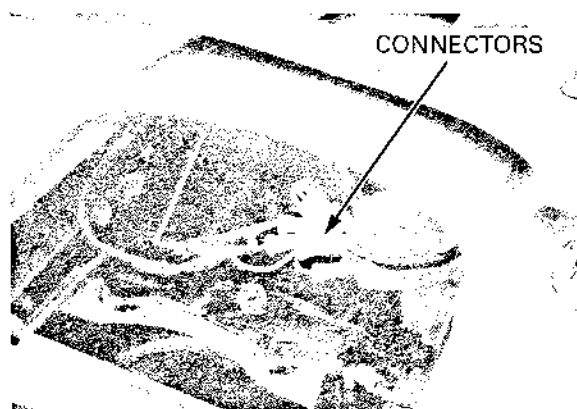
Installation is in the reverse order of removal.



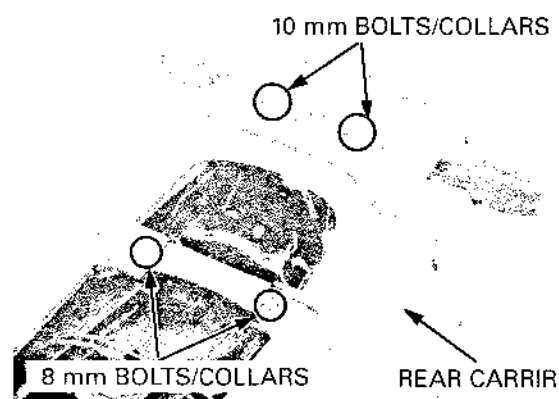
REAR CARRIER

Remove the seat (page 2-3).

Disconnect the rear turn signal connectors.

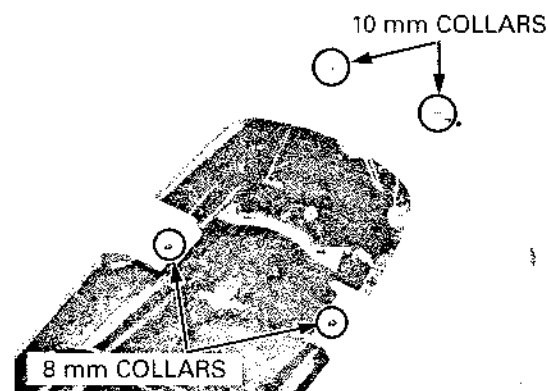


Remove the bolts (10 mm/8 mm), collars and rear carrier.



Remove the collars (10 mm/8 mm).

Installation is in the reverse order of removal.



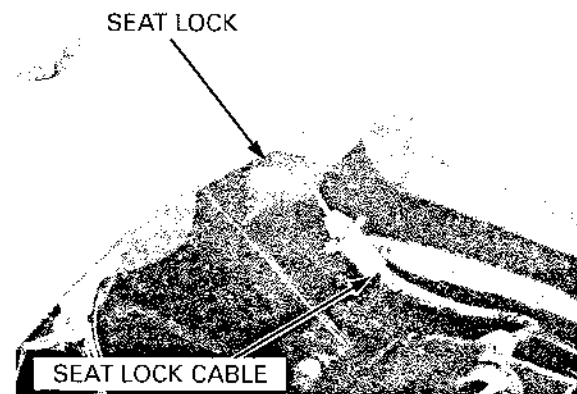
REAR FENDER

Remove the seat (page 2-3).

Remove the rear carrier (page 2-4).

At the rear fender removal/installation, be careful not to damage the tabs on the rear fender.

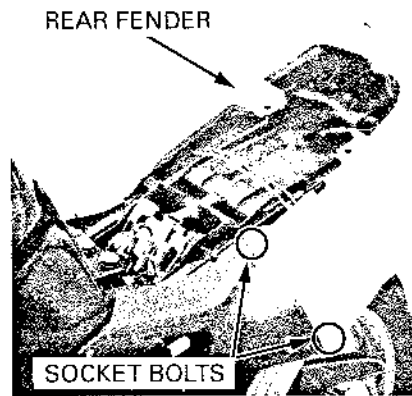
Disconnect the seat lock cable from the seat lock.



Remove the socket bolts.

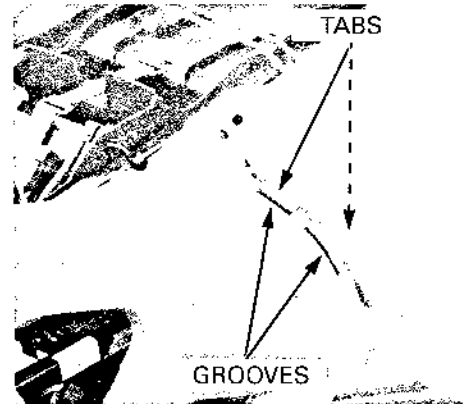
Unhook the tabs on the rear fender from the grooves on the side covers.

Remove the rear fender.



Align the tabs on the rear fender with the grooves on the side covers.

Installation is in the reverse order of removal.

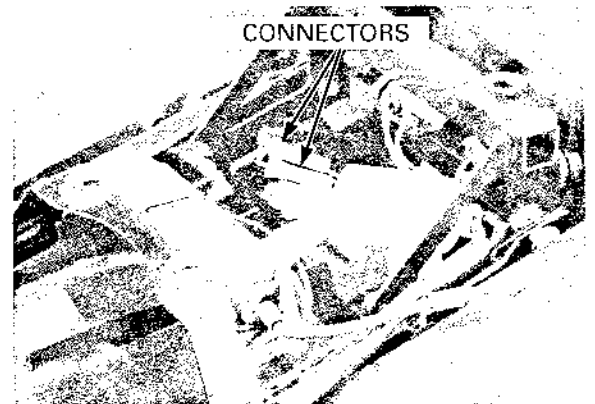


NUMBER PLATE BRACKET

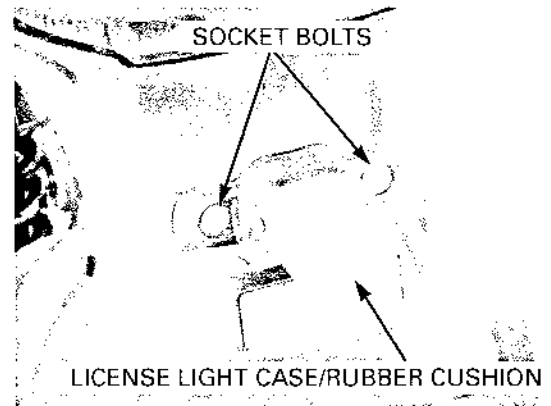
Remove the rear fender (page 2-4).

Remove the muffler (page 2-11).

Disconnect the license light connectors.

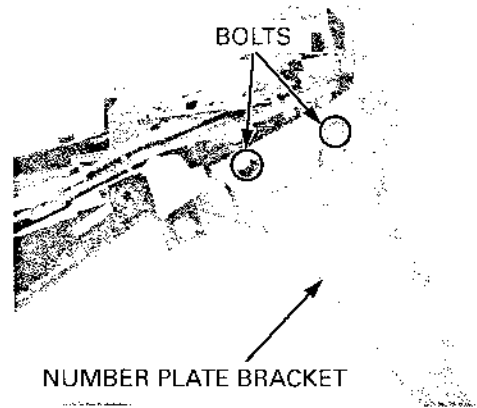


Remove the socket bolts and license light case and the rubber cushion.



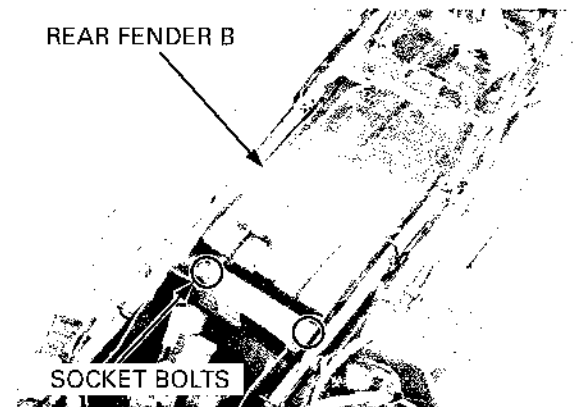
FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the bolts and the number plate bracket.
Installation is in the reverse order of removal.



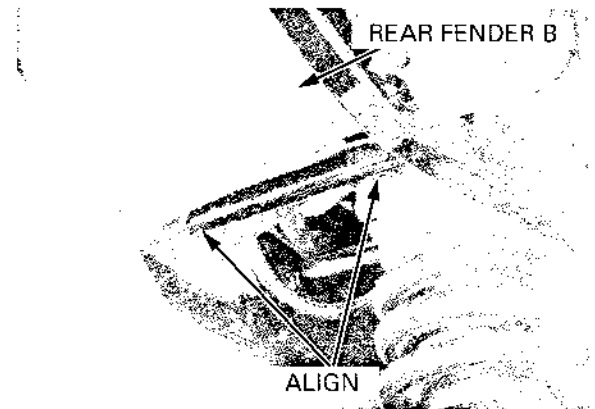
REAR FENDER B

Remove the number plate bracket (page 2-5).
Remove the side cover (page 2-3).
Remove the battery (page 16-5).
Remove the converter unit.
Remove the socket bolts and the rear fender B.



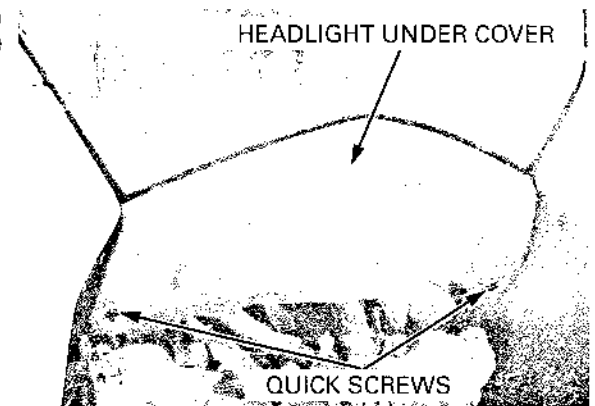
Align the groove on the rear fender B with the frame.

Installation is in the reverse order of removal.



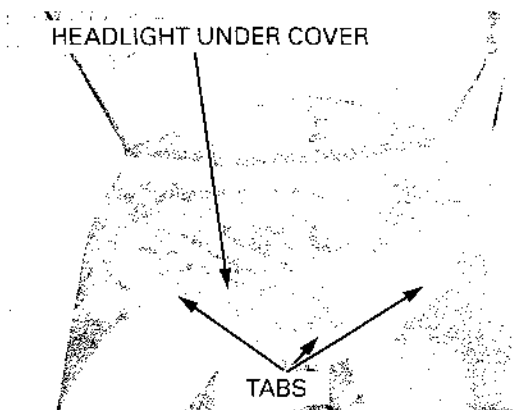
HEADLIGHT UNDER COVER

Remove the quick screws and release the tabs on the headlight under cover from the grooves on the upper cowl.
Remove the headlight under cover.



Align the tabs on the headlight under cover with the grooves on the upper cowl.

Installation is in the reverse order of removal.

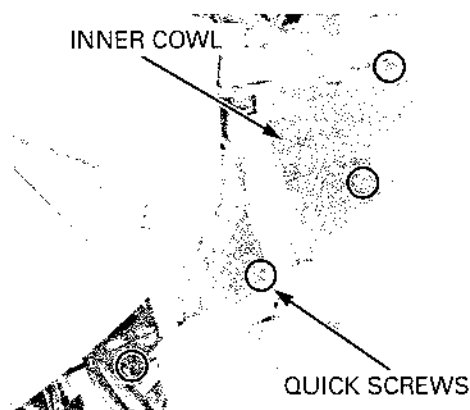


INNER COWL

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

Remove the quick screws and remove the inner cowl.

Installation is in the reverse order of removal.

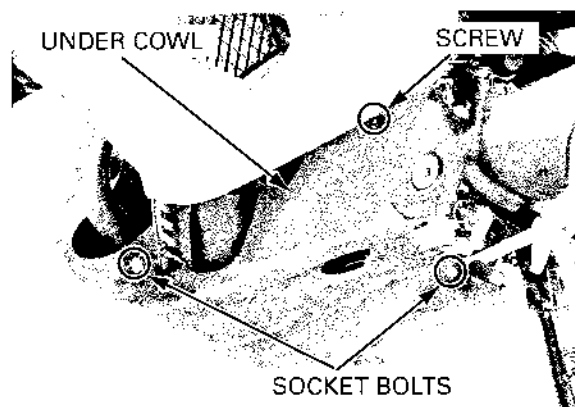


UNDER COWL

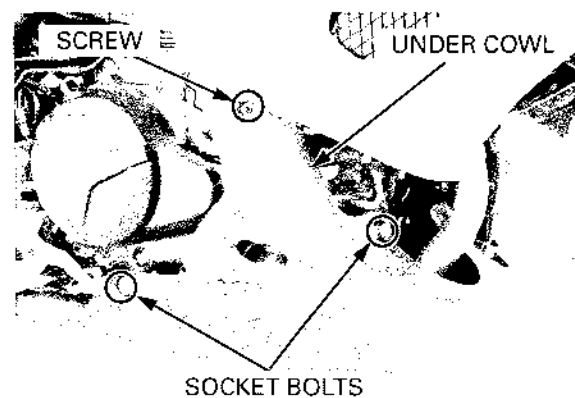
At the under cowl removal/installation, be careful not to damage the tabs on the under cowl.

Remove the socket bolts, screws and under cowl.

Release the tabs on the under cowl from the middle cowl and remove the under cowl.



Installation is in the reverse order of removal.



MIDDLE COWL

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

Remove the inner cowl (page 2-7).

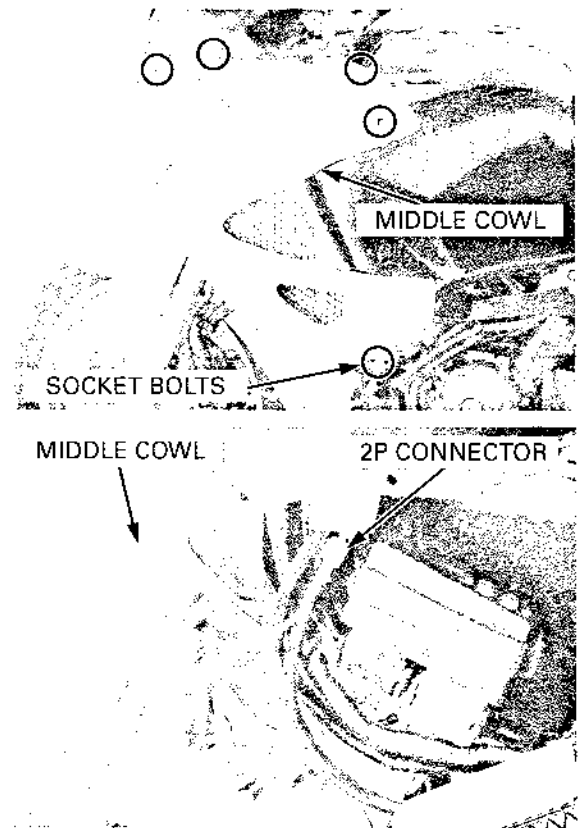
Remove the under cowl (page 2-7).

At the middle cowl removal/installation, be careful not to damage the tabs on the middle cowl.

Remove the socket bolts and remove the middle cowl.

Disconnect the front turn signal 2P connectors.

Installation is in the reverse order of removal.



WINDSHIELD SCREEN

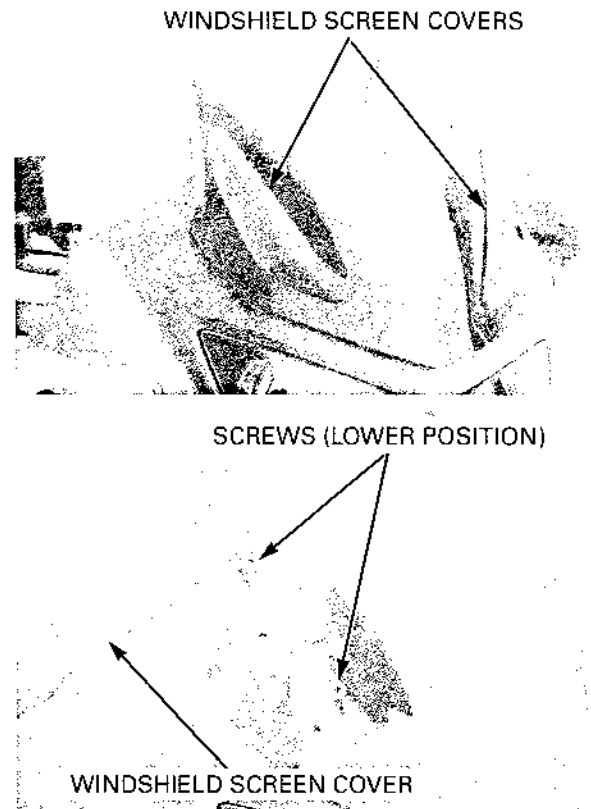
WINDSHIELD SCREEN HEIGHT ADJUSTMENT

Do not scratch and damage the windshield screen.

The windshield screen height can be adjusted. The adjustable range is 40 mm (1.6 in).

Release the tabs on the windshield screen cover from the holes on the windshield screen except top tab on the windshield screen cover.

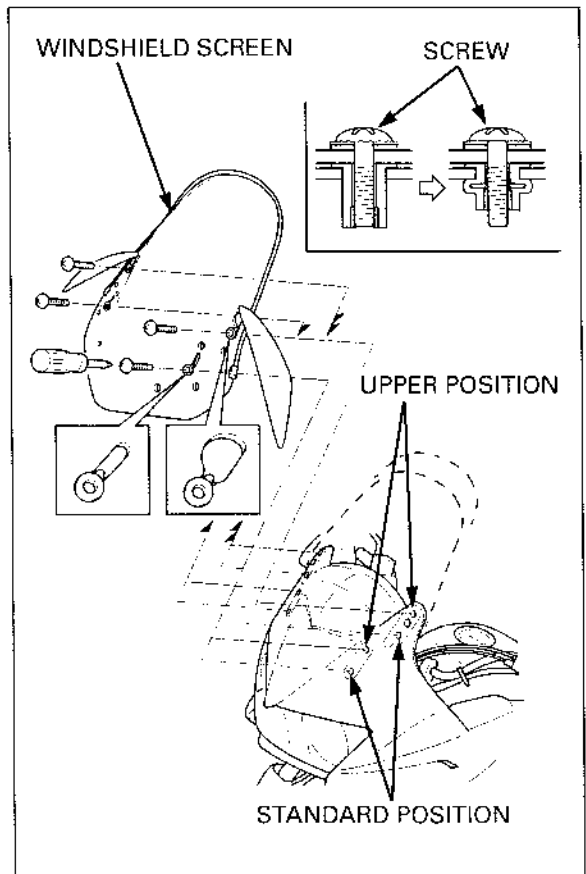
Turn the windshield screen cover and remove the screws.



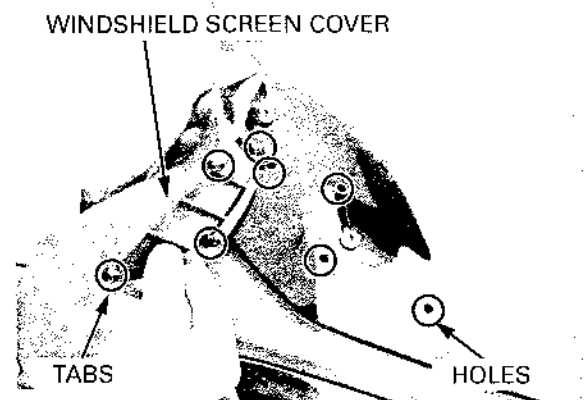
Remove the windshield screen and set it to the upper position or standard position as shown.

Tighten the screws to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



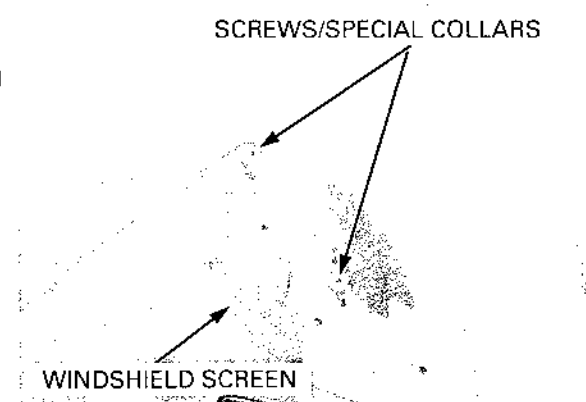
Turn the windshield screen cover to the original position and install the tabs on the windshield screen cover to the holes on the windshield screen securely.



REMOVAL/INSTALLATION

Release the tabs on the windshield screen cover and turn the windshield screen cover (page 2-8).

Remove the screws, special collars and windshield screen.

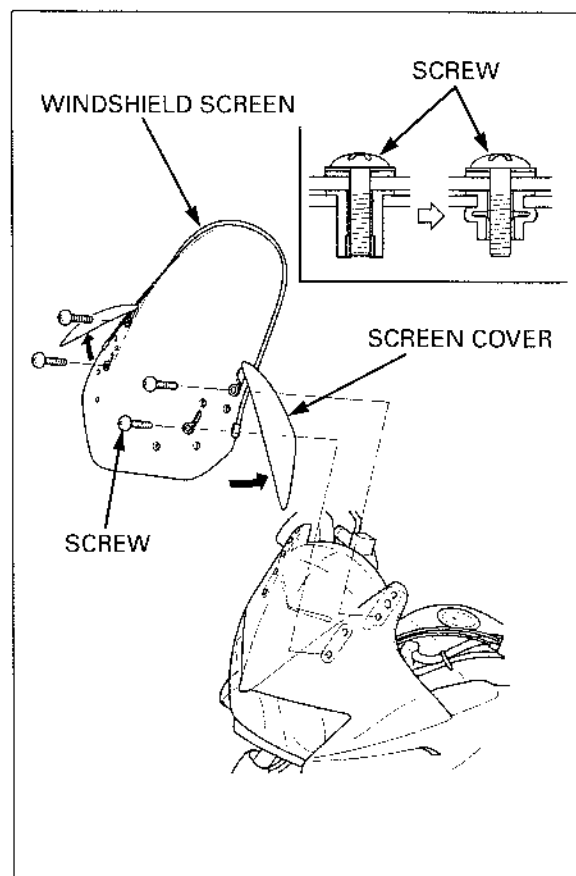


FRAME/BODY PANELS/EXHAUST SYSTEM

Tighten the screws to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

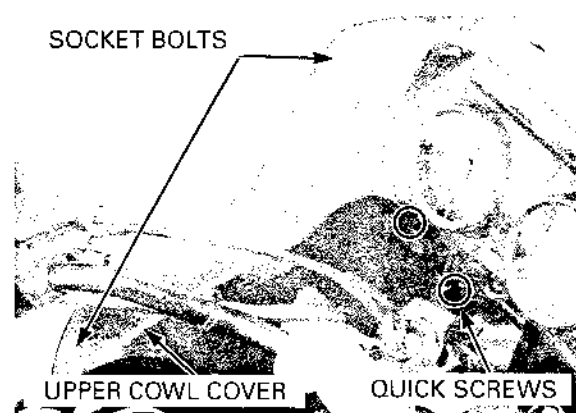
Turn the windshield screen cover to the original position and install the tabs on the windshield screen cover to the holes on the windshield screen securely (page 2-8).



UPPER COWL COVER

Remove the socket bolts, quick screws and upper cowl cover.

Installation is in the reverse order of removal.



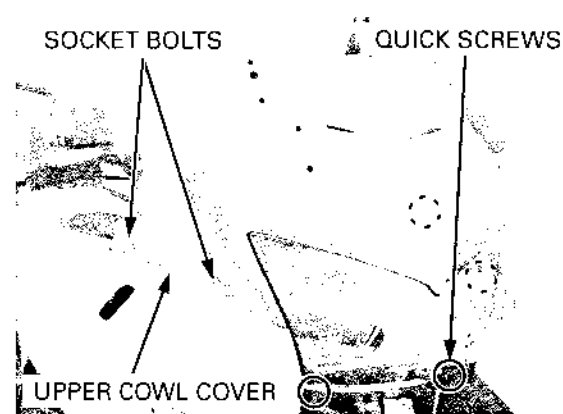
UPPER COWL

Remove the windshield screen (page 2-9).
Remove the headlight under cover (page 2-6).
Remove the upper cowl cover (page 2-10).
Remove the position light from the headlight case.

Disconnect the headlight 3P connectors.

Remove the socket bolts, quick screws and upper cowl.

Installation is in the reverse order of removal.



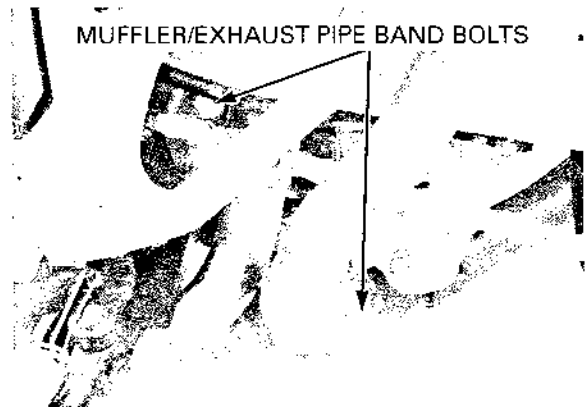
MUFFLER/EXHAUST PIPE

MUFFLER REMOVAL

Remove the rear fender (page 2-4).
Remove the under cowl (page 2-7).
Loosen the right muffler band bolt.

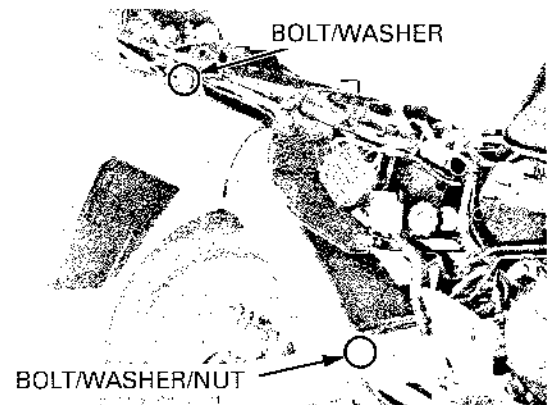


Loosen the left muffler band bolt and rear exhaust pipe band bolt.



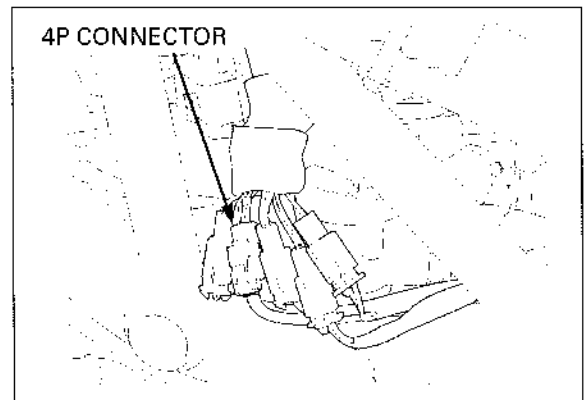
Remove the muffler mounting bolts, washers and nuts.

Remove the muffler.



EXHAUST PIPE REMOVAL

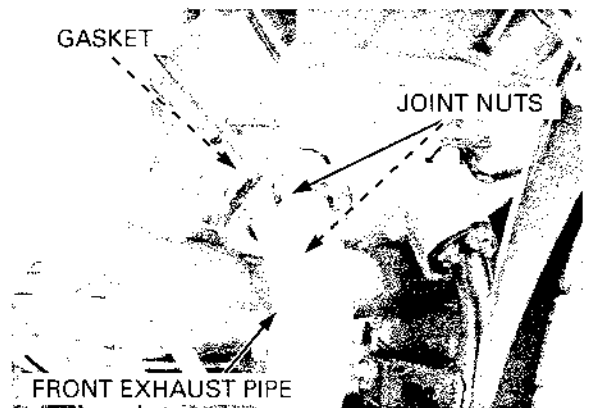
G type only: Disconnect the O₂ sensor 4P connector.



FRAME/BODY PANELS/EXHAUST SYSTEM

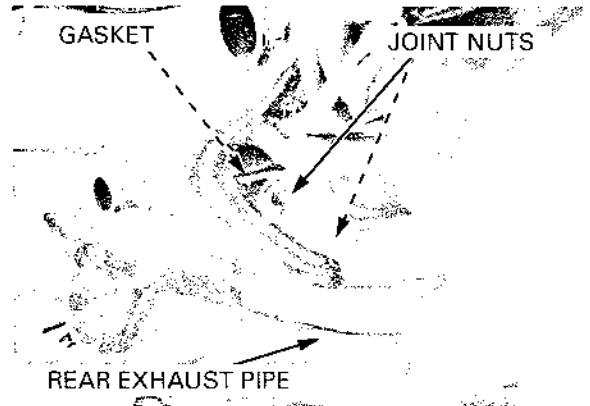
Remove the front exhaust pipe joint nuts and front exhaust pipe.

Remove the front exhaust pipe gasket.

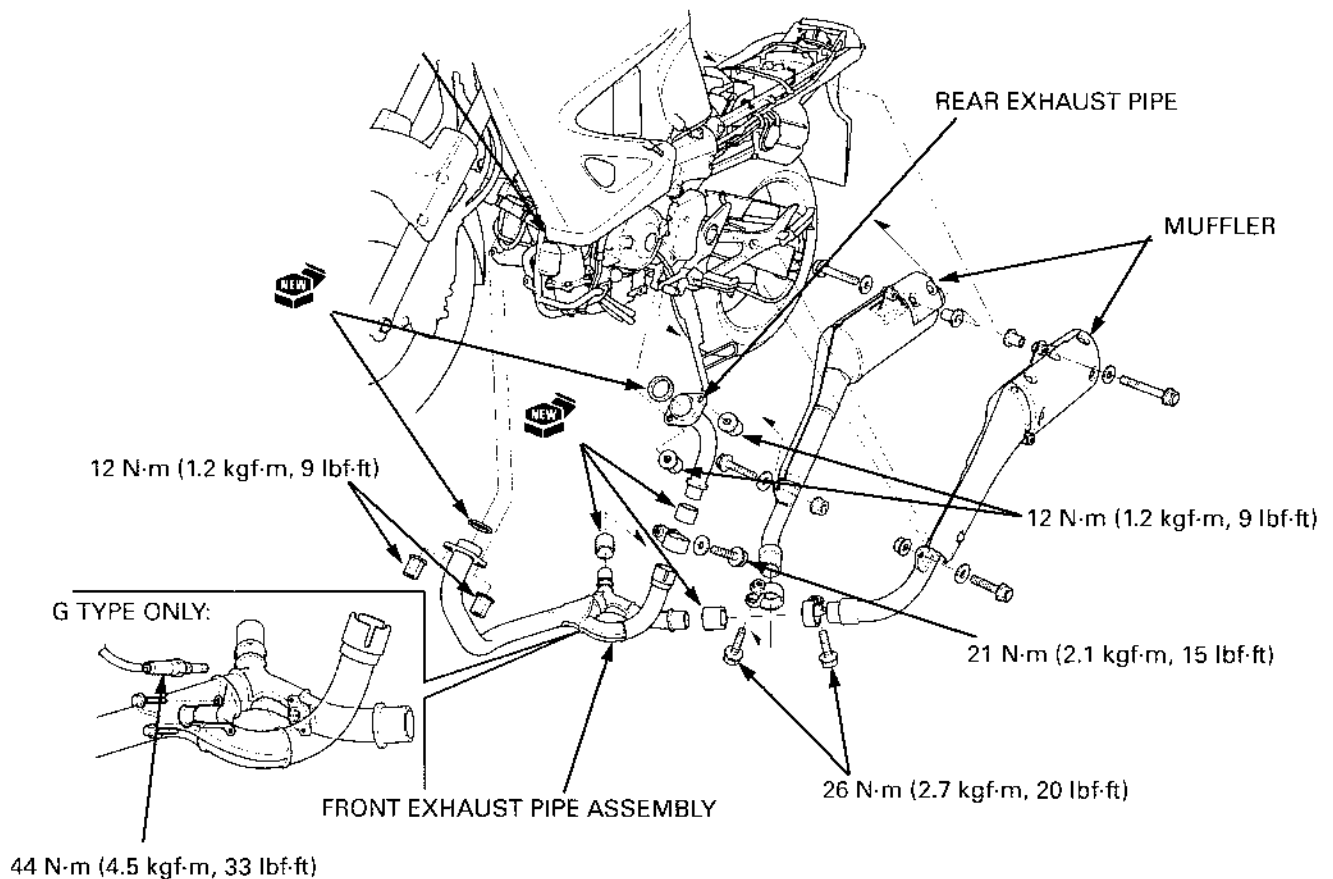


Remove the rear exhaust pipe joint nuts and rear exhaust pipe.

Remove the rear exhaust pipe gasket.



INSTALLATION



Always replace the exhaust pipe gaskets with new ones.

Installation is in the reverse order of removal.

Tighten the bolts and nuts to their specified torque.

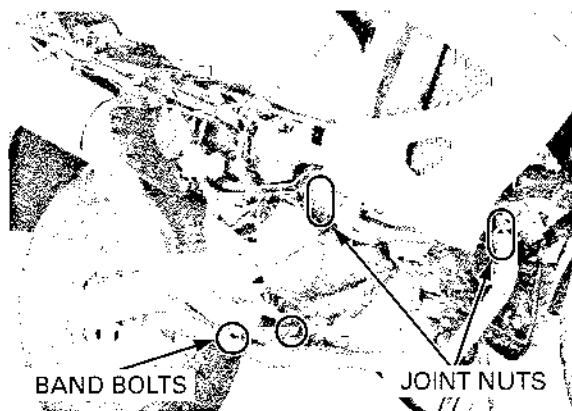
TORQUE:

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

Rear exhaust pipe band

bolt: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Muffler band bolt: 26 N·m (2.7 kgf·m, 20 lbf·ft)



MEMO

SERVICE INFORMATION	3-2	DRIVE CHAIN	3-17
MAINTENANCE SCHEDULE	3-4	DRIVE CHAIN SLIDER	3-21
FUEL LINE	3-5	BRAKE FLUID	3-21
THROTTLE OPERATION	3-5	BRAKE PAD WEAR	3-22
CHOKE OPERATION	3-6	BRAKE SYSTEM	3-23
AIR CLEANER	3-6	BRAKE LIGHT SWITCH	3-24
SPARK PLUG	3-7	HEADLIGHT AIM	3-25
VALVE CLEARANCE	3-9	CLUTCH SYSTEM	3-25
ENGINE OIL/OIL FILTER	3-12	SIDE STAND	3-26
ENGINE IDLE SPEED	3-15	SUSPENSION	3-26
RADIATOR COOLANT	3-15	NUTS, BOLTS, FASTENERS	3-27
COOLING SYSTEM	3-15	WHEELS/TIRES	3-28
SECONDARY AIR SUPPLY SYSTEM	3-16	STEERING HEAD BEARINGS	3-28

MAINTENANCE

SERVICE INFORMATION

GENERAL

- Place the motorcycle on a 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

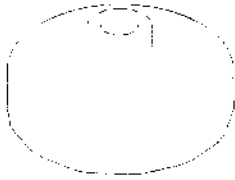
ITEM			SPECIFICATIONS
Throttle grip free play			2 – 6 mm (1/16 – 1/4 in)
Spark plug	NGK		IJR8B9
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance	IN		0.16 ± 0.03 mm (0.006 ± 0.001 in)
	EX		0.31 ± 0.03 mm (0.012 ± 0.001 in)
Engine oil capacity	After draining		3.4 liter (3.6 US qt, 3.0 Imp qt)
	After draining/oil filter change		3.6 liter (3.8 US qt, 3.2 Imp qt)
Recommended engine oil			HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40
Engine idle speed			1,200 ± 100 min ⁻¹ (rpm)
Drive chain slack			35 – 45 mm (1-3/8 – 1-3/4 in)
Recommended brake fluid			DOT 4
Tire size	Front		110/80R19M/C 59H
	Rear		150/70R17M/C 69H
Tire brand	Bridgestone	Front	TW101 RADIAL E
		Rear	TW152 RADIAL E
	Michelin	Front	T66X
		Rear	T66XA
Tire air pressure	Driver only	Front	250 kPa (2.50 kgf/cm ² , 36 psi)
		Rear	250 kPa (2.50 kgf/cm ² , 36 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm ² , 36 psi)
		Rear	280 kPa (2.80 kgf/cm ² , 41 psi)
Minimum tire tread depth	Front		1.5 mm (0.06 in)
	Rear		2.0 mm (0.08 in)

TORQUE VALUES

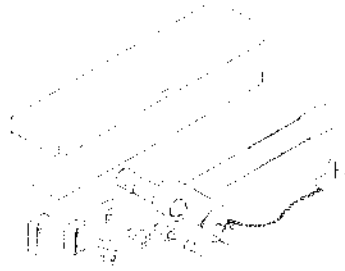
Spark plug	14 N·m (1.4 kgf·m, 10 lbf·ft)	
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the threads and O-ring
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Front brake master cylinder reservoir cap screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	

TOOLS

Oil filter wrench
07HAA-PJ70101



Drive chain tool set
07HMH-MR10103



MAINTENANCE

MAINTENANCE SCHEDULE

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

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

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

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ↓	ODOMETER READING (NOTE 1)								REFER TO PAGE
			X1,000 km	1	6	12	18	24	30	36	
			X1,000 mi	0.6	4	8	12	16	20	24	
			Months		6	12	18	24	30	36	
* FUEL LINE						I		I		I	3-5
* THROTTLE OPERATION						I		I		I	3-5
* CHOKE OPERATION						I		I		I	3-5
* AIR CLEANER		NOTE2					R			R	3-6
SPARK PLUG											3-7
* VALVE CLEARANCE								I			3-9
ENGINE OIL				R		R		R		R	3-12
ENGINE OIL FILTER				R		R		R		R	3-13
* ENGINE IDLE SPEED				I	I	I	I	I	I	I	3-15
RADIATOR COOLANT		NOTE3				I		I		R	3-15
* COOLING SYSTEM						I		I		I	3-15
* SECONDARY AIR SUPPLY SYSTEM						I		I		I	3-16
DRIVE CHAIN											3-17
DRIVE CHAIN SLIDER						I		I		I	3-21
BRAKE FLUID		NOTE3			I	I	R	I	I	R	3-21
BRAKE PAD WEAR					I	I	I	I	I	I	3-22
BRAKE SYSTEM				I		I		I		I	3-23
* BRAKE LIGHT SWITCH						I		I		I	3-24
* HEADLIGHT AIM						I		I		I	3-25
CLUTCH SYSTEM				I	I	I	I	I	I	I	3-25
SIDE STAND						I		I		I	3-26
* SUSPENSION						I		I		I	3-26
* NUT, BOLTS, FASTENERS				I		I		I		I	3-27
** WHEELS/TIRES						I		I		I	3-28
** STEERING HEAD BEARINGS				I		I		I		I	3-28

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

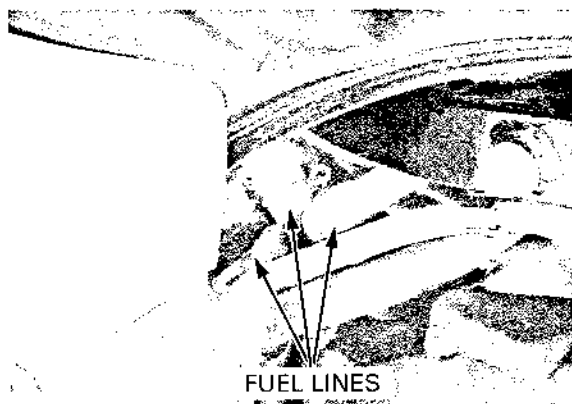
** In the interest of safety, we recommended these items be serviced only by an authorized HONDA dealer

NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequency 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.

FUEL LINE

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

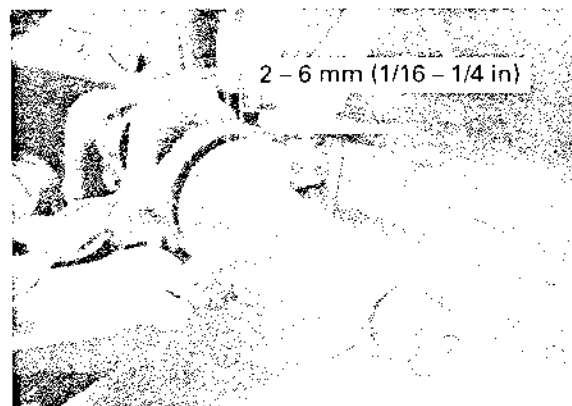


THROTTLE OPERATION

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.

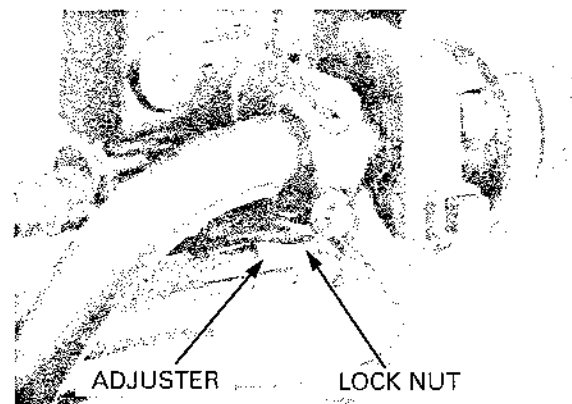
Measure the free play at the throttle grip flange.

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.

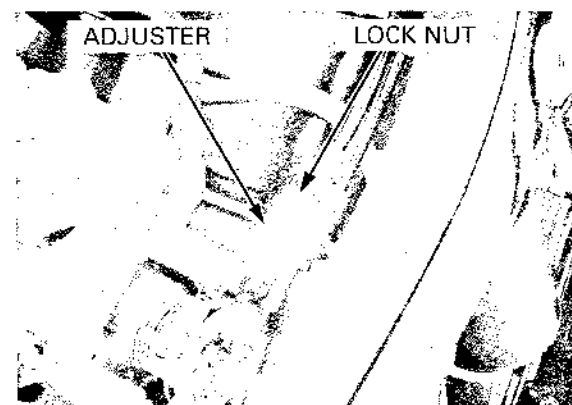
Remove the air cleaner housing (page 5-55).

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.

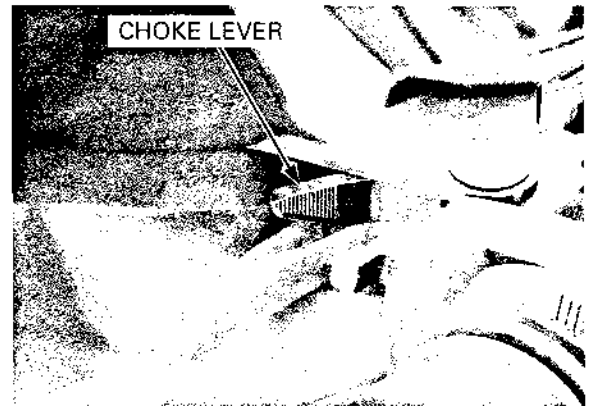


MAINTENANCE

CHOKE OPERATION

This model uses a bypass air volume control choke system controlled by the starter valve. The starter valve opens the bypass air circuit via a cable when the choke lever is ON position.

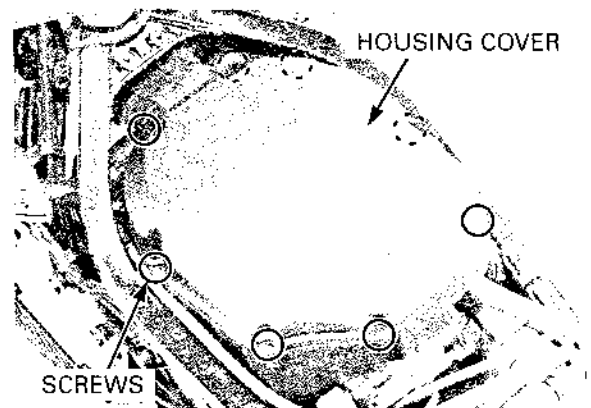
Check for smooth choke lever operation.
Lubricate the choke cable if the operation is not smooth.



AIR CLEANER

Remove the fuel tank (page 5-53).

Remove the screws and air cleaner housing cover.

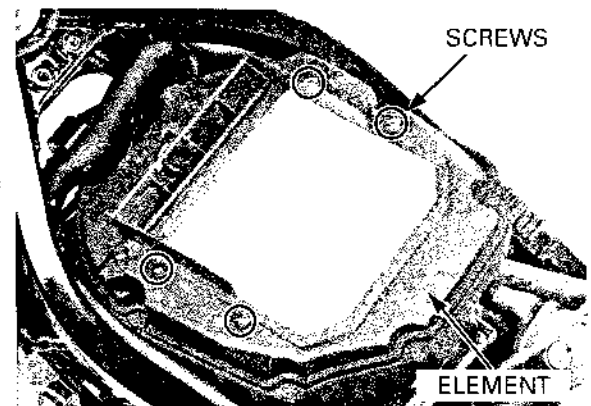


Remove the screws.

Remove and discard the air cleaner element in accordance with the maintenance schedule (page 3-4).

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

Install the removed parts in the reverse order of removal.



SPARK PLUG

REMOVAL

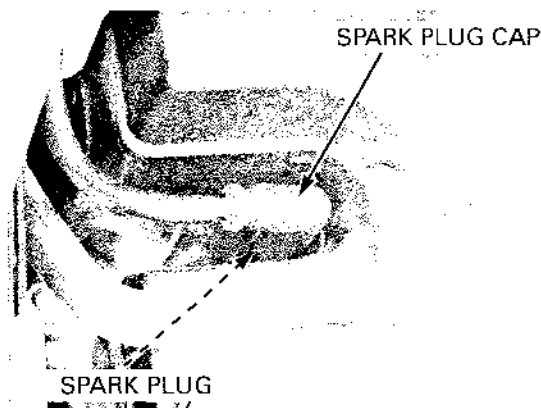
Front cylinder:

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

Disconnect the spark plug cap.

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

Inspect or replace as described in the maintenance schedule (page 3-4).

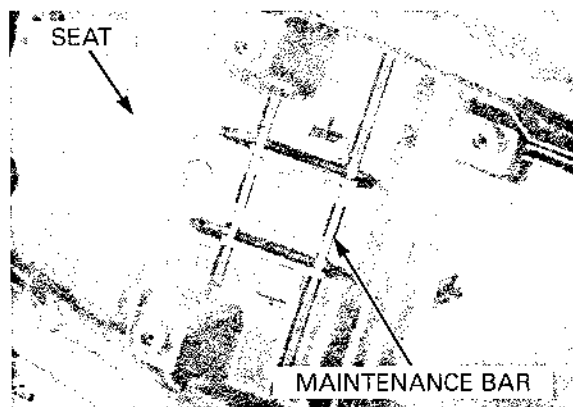


Rear cylinder:

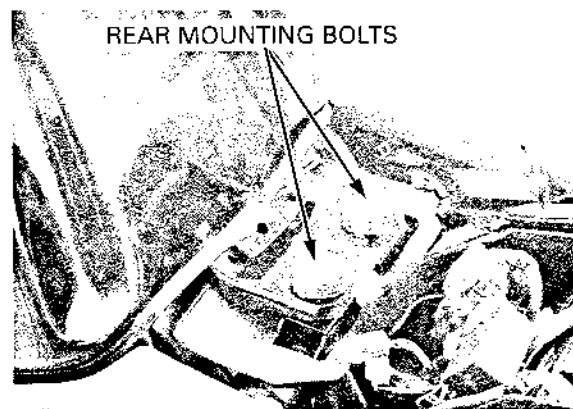
Make sure the fuel tank cap is closed, before fuel tank lift up.

Turn the right and left fuel valves to OFF position.

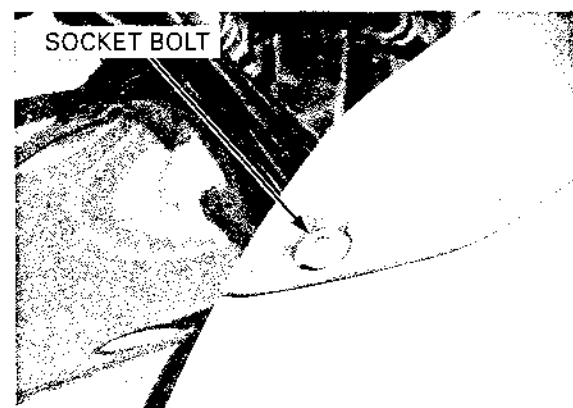
Remove the seat (page 2-3) and remove the maintenance bar from the seat.



Remove the fuel tank rear mounting bolts.



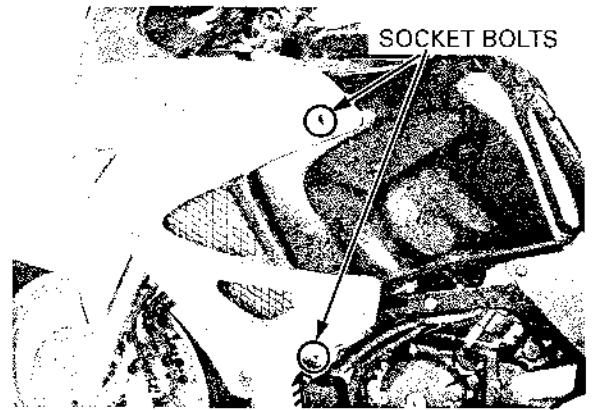
Remove the upper cowl cover socket bolts.



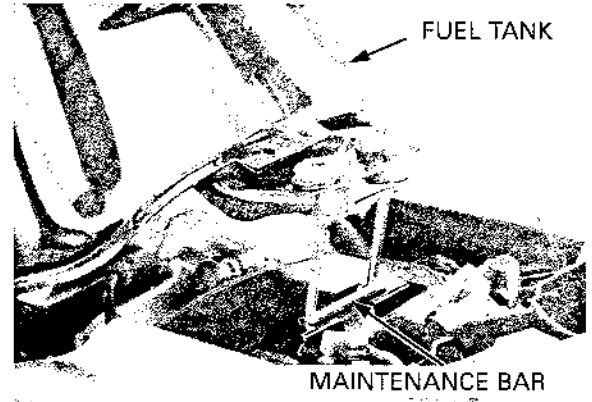
MAINTENANCE

Remove the under cowl (page 2-7).

Remove the middle cowl socket bolts.

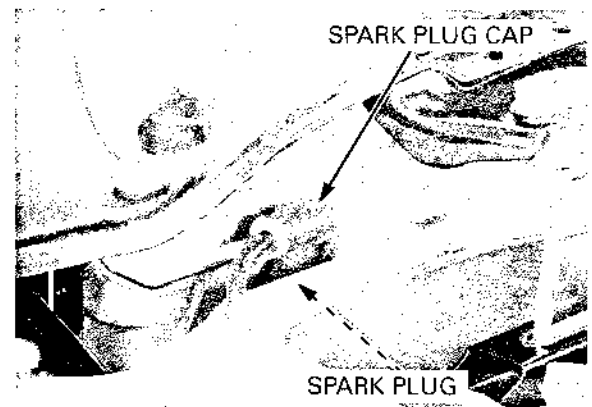


Raise the rear of the fuel tank and support it with the maintenance bar.



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

Disconnect the spark plug cap. Remove the spark plugs using a equipped spark plug wrench or an equivalent. Inspect or replace as described in the maintenance schedule (page 3-4).



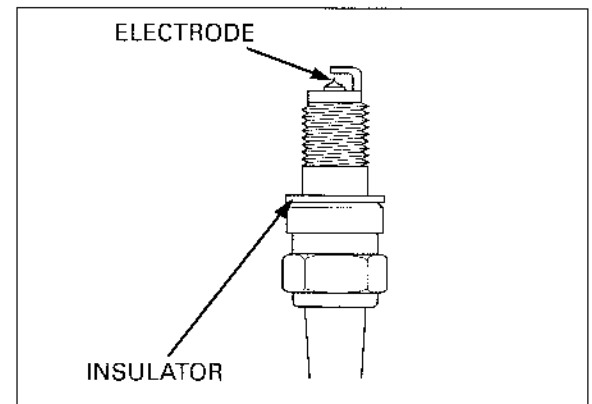
INSPECTION

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

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

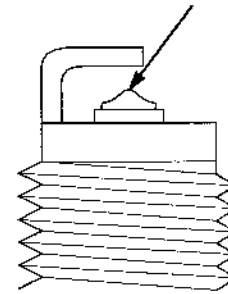
This motorcycle's spark plug equipped with iridium center electrode. Replace the spark plug if the electrodes is contaminated.

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



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

ROUNDED ELECTRODE



Always use specified spark plugs on this motorcycle.

SPECIFIED SPARK PLUG:

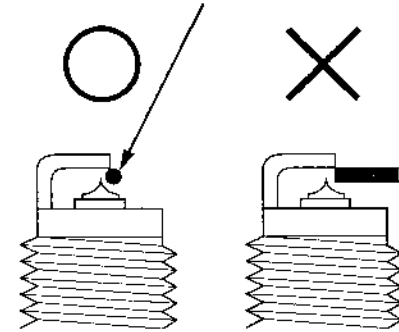
NGK: IJR8B9

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

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

Make sure that the ϕ 1.0 mm (0.04 in) plug gauge does not insert between the gap.

WIRE TYPE FEELER GAUGE



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

If the gauge can be inserted into the gap, replace the plug with a new one.

INSTALLATION

Front and rear cylinder:

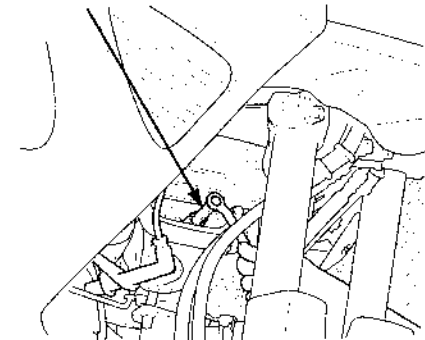
Reinstall the spark plug in the cylinder head and hand tighten, then torque to specification.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

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

Installation is in the reverse order of removal.

SPARK PLUG WRENCH



VALVE CLEARANCE

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

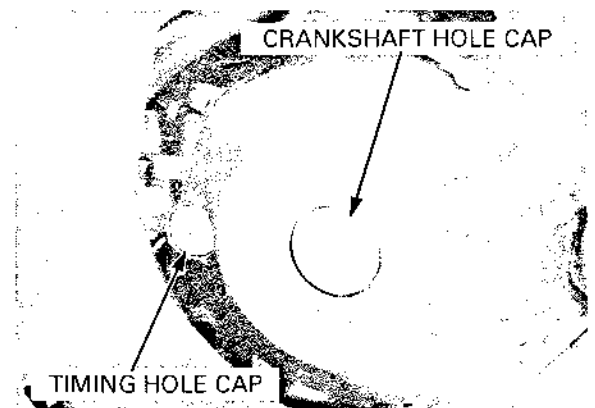
INSPECTION

Remove the front and rear cylinder head covers (page 8-6).

Remove the timing hole cap and crankshaft hole cap.

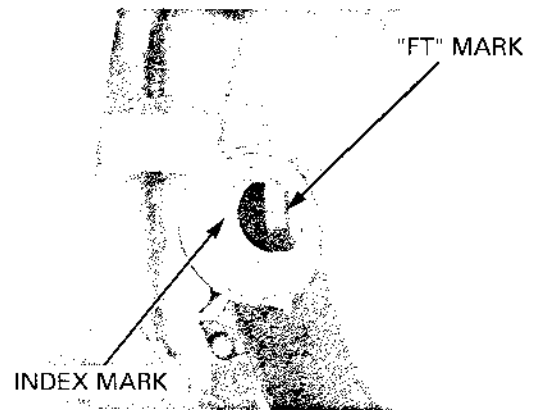
CRANKSHAFT HOLE CAP

TIMING HOLE CAP



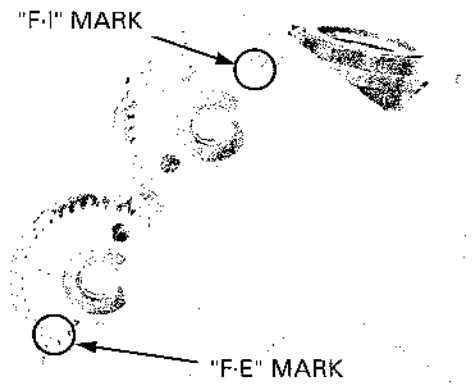
MAINTENANCE

Rotate the crankshaft counterclockwise and align the "FT" mark on the left crankcase cover.



The timing marks ("F-I" for intake and "F-E" for exhaust) on the front cylinder cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks are facing inward, rotate the crankshaft counterclockwise 360° (1 full turn) and align the "FT" mark with the index mark.



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 front cylinder intake and exhaust valves using a feeler gauge.

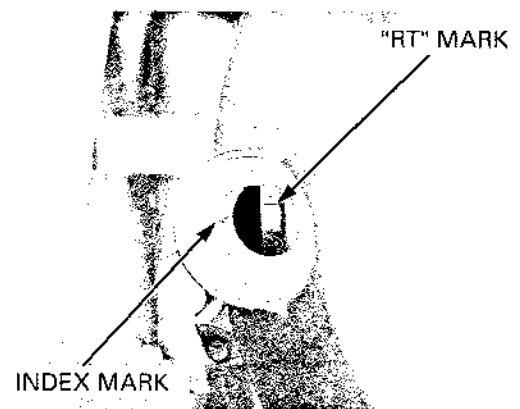
VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)

EX: 0.31 ± 0.03 mm (0.012 ± 0.001 in)



Rotate the crankshaft counterclockwise 270° and align the "RT" mark with index mark.
Check the rear cylinder valve clearance.



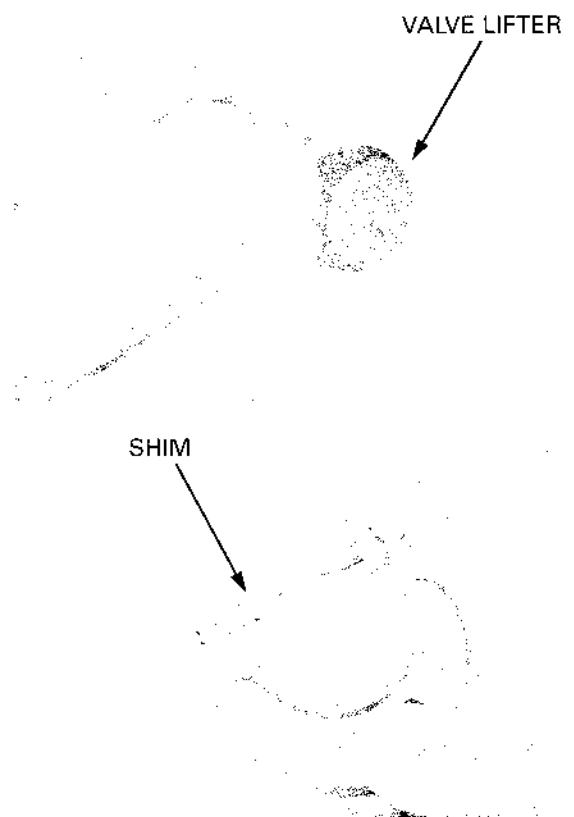
ADJUSTMENT

Remove the intake camshaft and exhaust camshaft (page 8-8).

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

- 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 a tweezers or magnet.

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



Fifty-one different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.450 mm thickness shim in intervals of 0.025 mm.

Measure the shim thickness and record it.

Calculate the new shim thickness using the equation below.

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

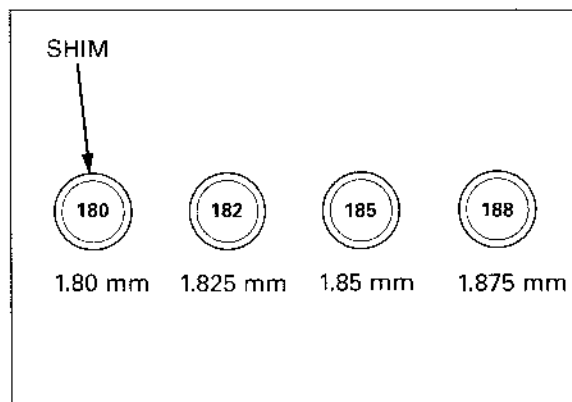
A: New shim thickness

B: Recorded valve clearance

C: Specified valve clearance

D: Old shim thickness

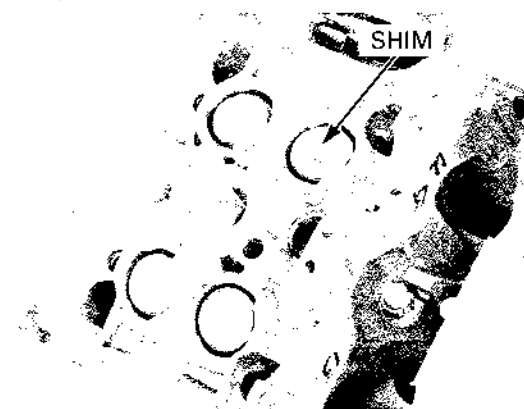
- Make sure of the correct shim thickness by measuring the shim by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.450 mm.



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.

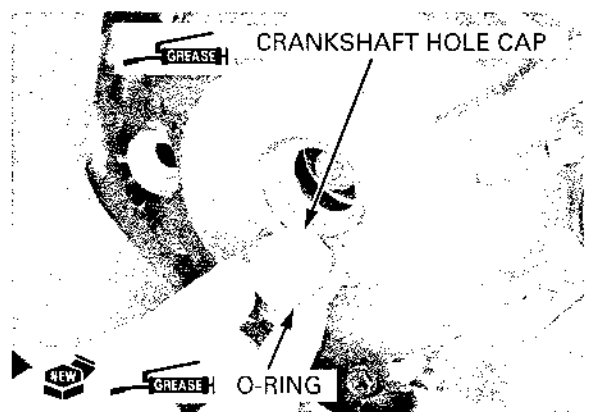
Install the intake camshaft and exhaust camshaft (page 8-24).



MAINTENANCE

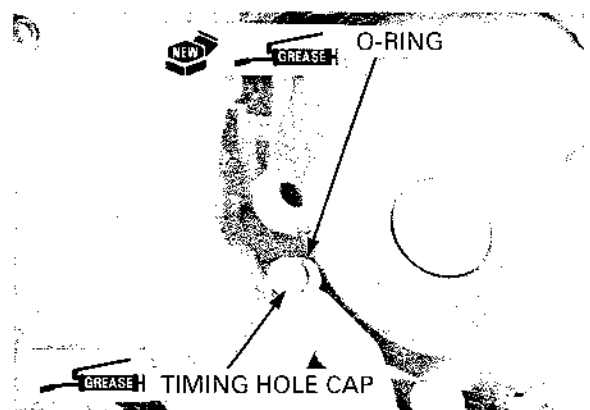
Coat a new O-ring with grease and install it onto the crankshaft hole cap.
Apply grease to the crankshaft hole cap threads.
Install and tighten the crankshaft hole cap to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



Coat a new O-ring with grease and install it onto the timing hole cap.
Apply grease to the timing hole cap threads.
Install and tighten the timing hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

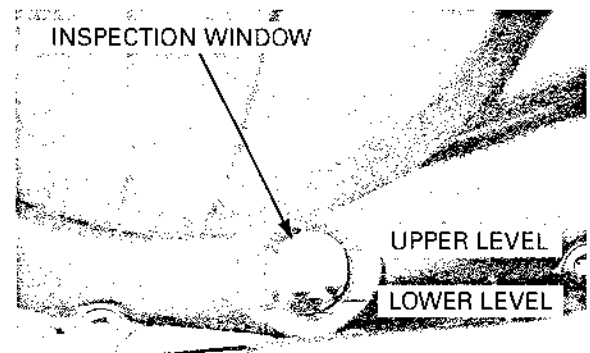


ENGINE OIL/OIL FILTER

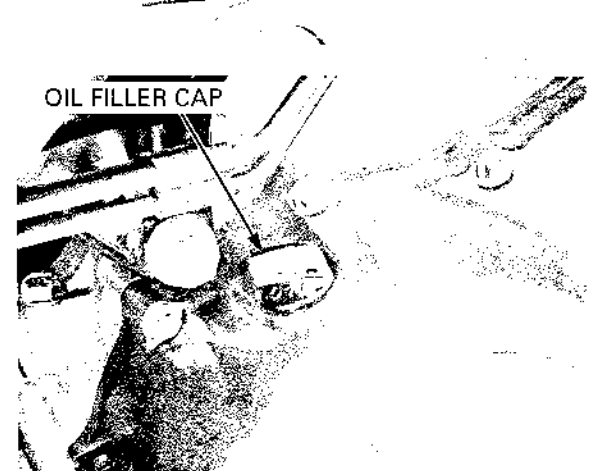
OIL LEVEL INSPECTION

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

Wait for a few minutes and check that the oil level is between the upper and lower level marks in 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.



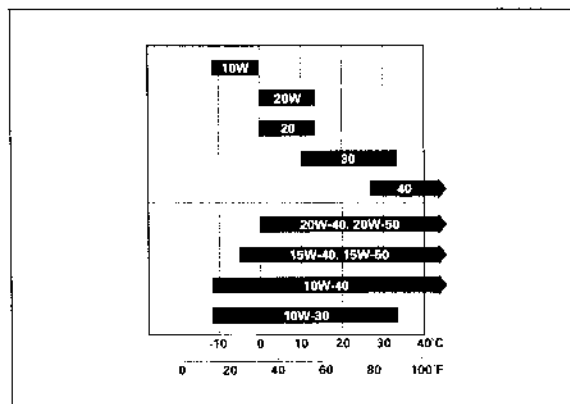
Fill the recommended engine oil up to the upper level line.

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 4-stroke oil or equivalent motor oil API service classification: SE, SF or SG
Viscosity: SAE 10W-40

Reinstall the filler cap.



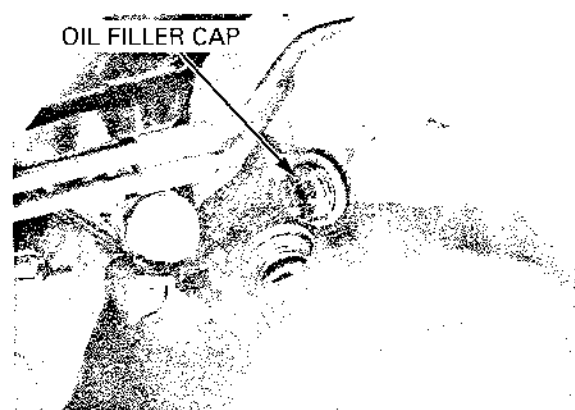
ENGINE OIL & FILTER CHANGE

Warm up the engine.

Remove the under cowl (page 2-7).

Stop the engine and remove the oil filler cap.

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



Remove the drain bolt, drain the oil completely.



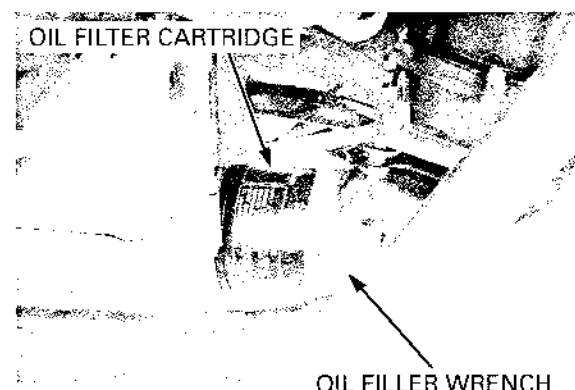
OIL DRAIN BOLT/SEALING WASHER

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

TOOL:

Oil filter wrench

07HAA-PJ70101

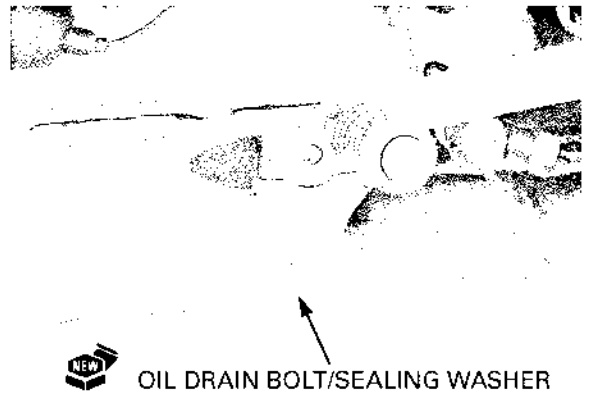


OIL FILTER WRENCH

MAINTENANCE

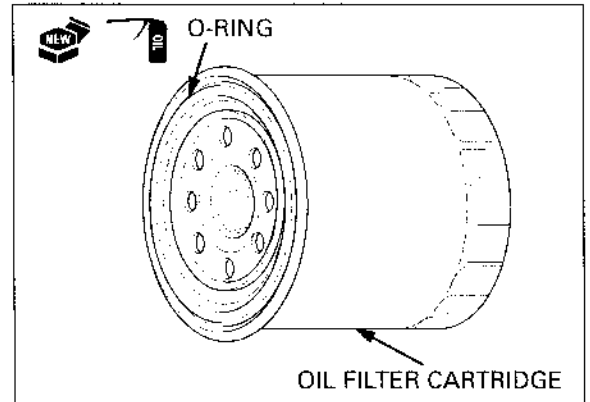
Check that the sealing washer on the drain bolt is in good condition, and replace if necessary. Install and tighten the drain bolt.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



OIL DRAIN BOLT/SEALING WASHER

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



O-RING

OIL FILTER CARTRIDGE

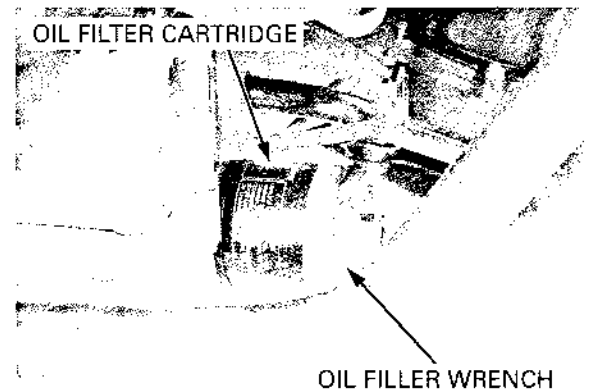
Install the new oil filter and tighten it to the specified torque.

TOOL:

Oil filter wrench

07HAA-PJ70101

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



OIL FILTER CARTRIDGE

OIL FILLER WRENCH

Fill the crankcase with recommended engine oil.

OIL CAPACITY:

3.4 liter (3.6 US qt, 3.0 Imp qt) after draining

3.6 liter (3.8 US qt, 3.2 Imp qt) after draining/filter change

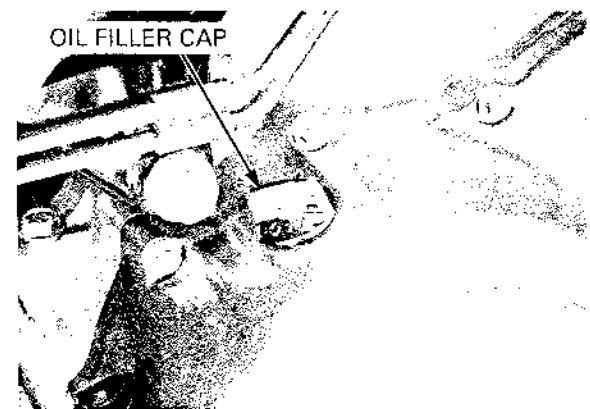
Install the oil filler cap.

Start the engine and let it idle for a few minutes.

Stop the engine and recheck the oil level.

Make sure there are no oil leaks.

Install the under cowl (page 2-7).



OIL FILLER CAP

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.

IDLE SPEED: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)



RADIATOR COOLANT

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

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

If necessary, add recommended coolant.

RECOMMENDED ANTIFREEZE:

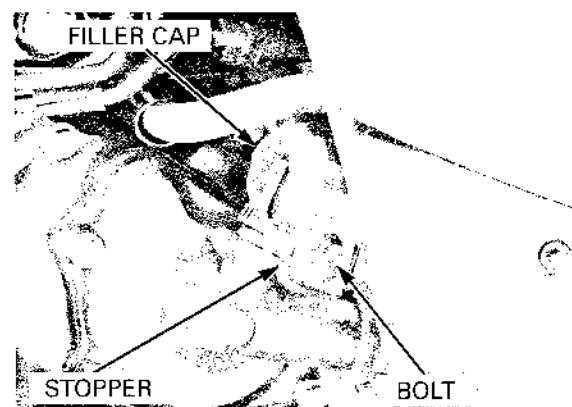
High quality ethylene glycol antifreeze containing corrosion protection inhibitors.



Remove the bolt and filler cap stopper.

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

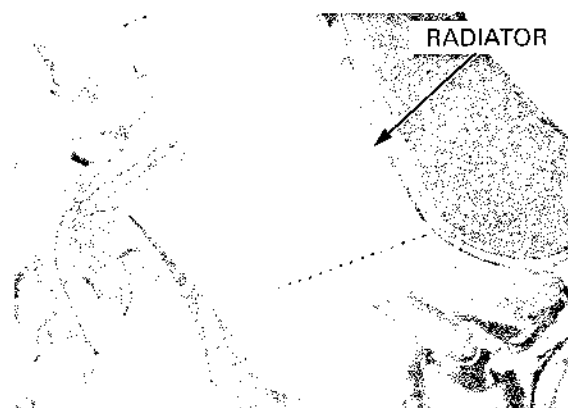
Remove the middle cowl (page 2-8).

Remove the radiator grill (page 6-11).

Check the radiator air passages for clogging or damage.

Straighten bend fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

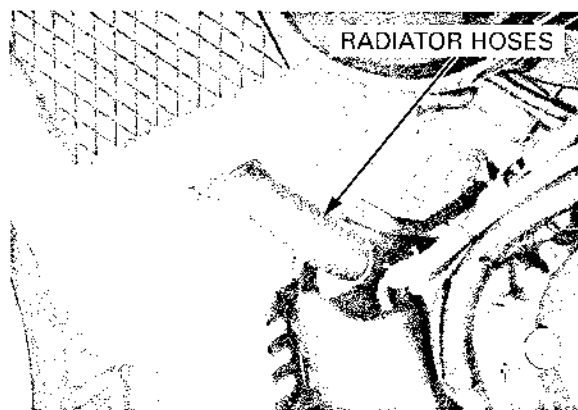
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



MAINTENANCE

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

Install the middle cowl (page 2-8).

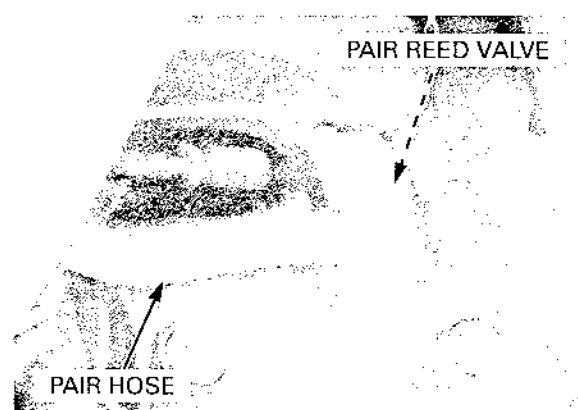


SECONDARY AIR SUPPLY SYSTEM

- This model is equipped 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.

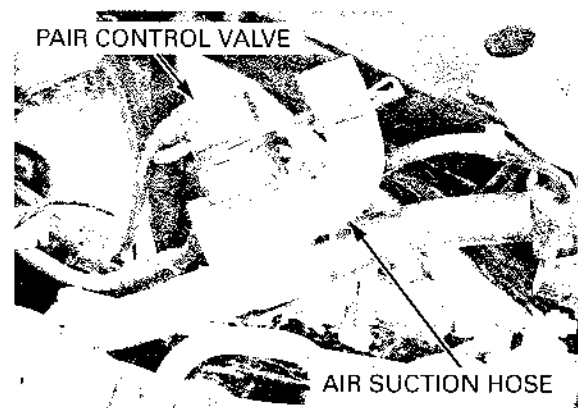
If the hoses show any signs of heat damage, inspect the PAIR check valve in the PAIR reed valve cover for damage.

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



Remove the air cleaner housing (page 5-55).

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.



DRIVE CHAIN

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

DRIVE CHAIN SLACK INSPECTION

NOTICE

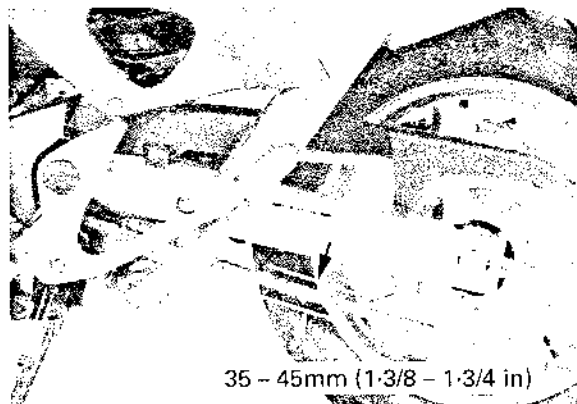
Excessive chain slack, 45 mm (1-3/4 in) or more, may damage the frame.

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

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

CHAIN SLACK: 35 – 45 mm (1-3/8 – 1-3/4 in)

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



ADJUSTMENT

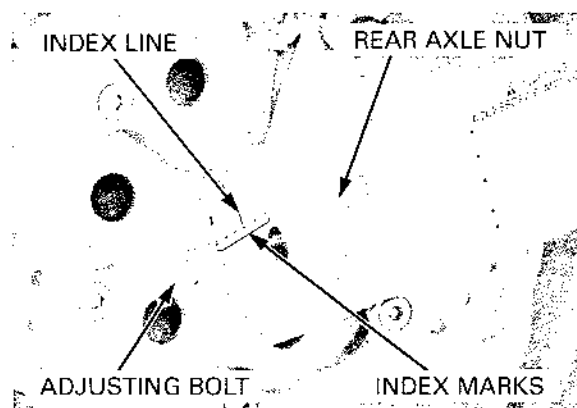
Loosen the rear axle nut.

Turn both adjusting bolts an equal number of turn until the correct drive chain slack is obtained.

Make sure the index marks on both adjusters are aligned with the index line of the swingarm.

Tighten the rear axle nut.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

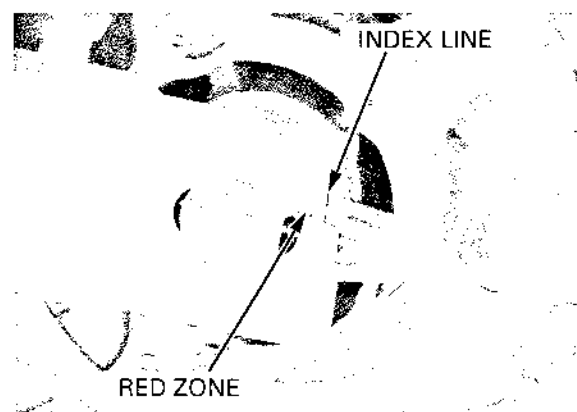


Recheck the drive chain slack and free wheel rotation.

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

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

If the red zone of the indicator label reaches the index line on the swingarm, replace the drive chain with a new one (page 3-19).



MAINTENANCE

CLEANING AND LUBRICATION

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

Be sure the chain has dried completely before lubricating.

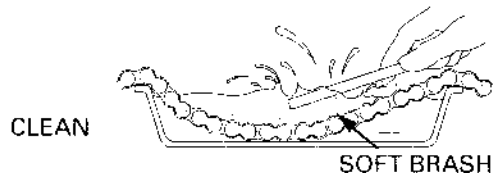
Inspect the drive chain for possible damage or wear.

Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

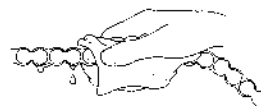
Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace sprocket as necessary.

NON-FLAMMABLE OR HIGH
FLASH POINT SOLVENT

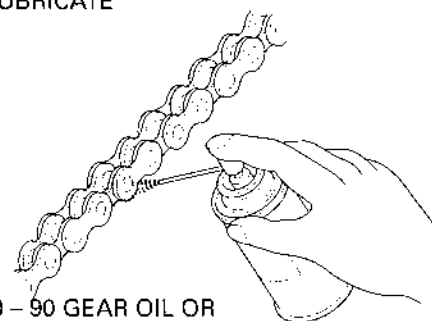


WIPE AND DRY



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

LUBRICATE



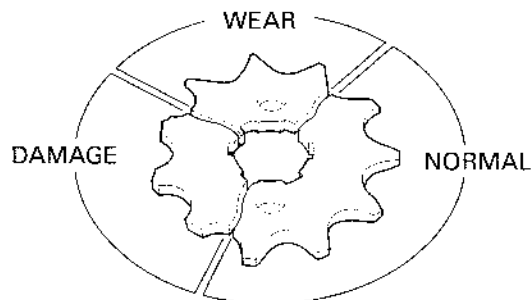
#80 - 90 GEAR OIL OR
DRIVE CHAIN LUBRICANT

SPROCKETS INSPECTION

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

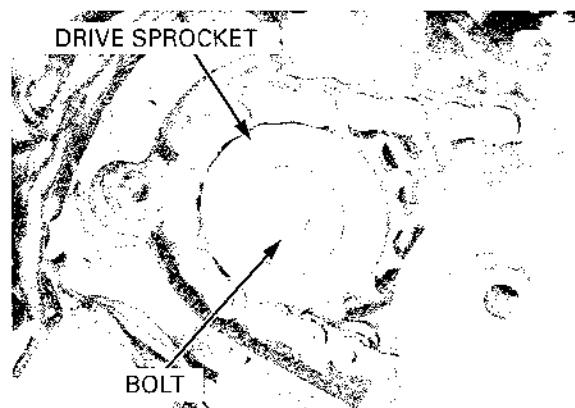
Never use a new drive chain on worn sprockets.

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



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

If any are loose, torque them.



REPLACEMENT

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

Loosen the drive chain (page 3-17).

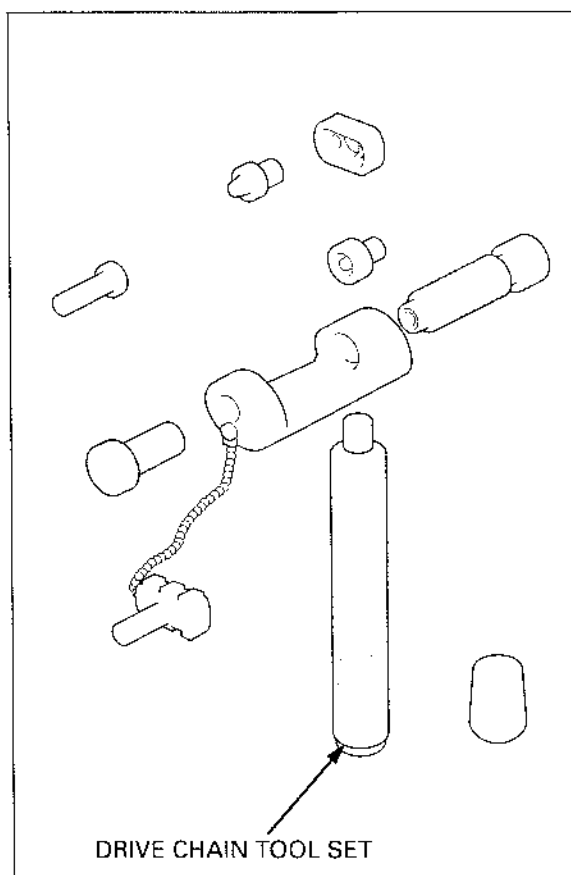
Assemble the special tool as shown.

TOOL:

Drive chain tool set

07HMH-MR10103

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



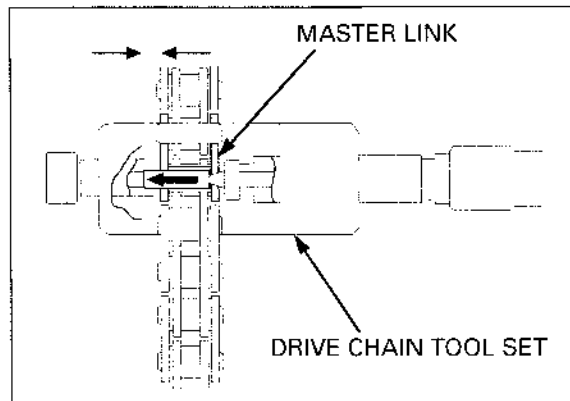
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

TOOL:

Drive chain tool set

07HMH-MR10103

Remove the drive chain.



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

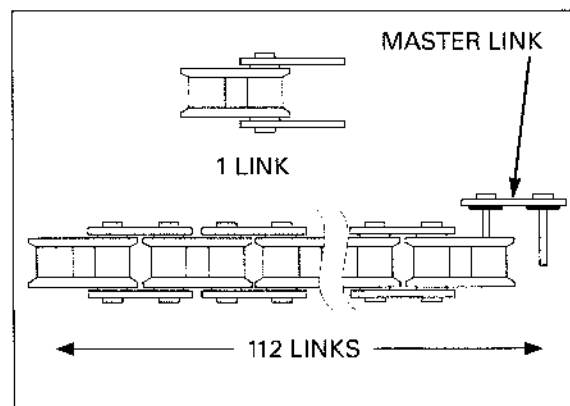
Remove the excess drive chain links from the new drive chain with the drive chain tool set.

STANDARD LINKS: 112 LINKS

REPLACEMENT CHAIN

DID: 525HV 112L4

RK: 525ROZ1 112LE

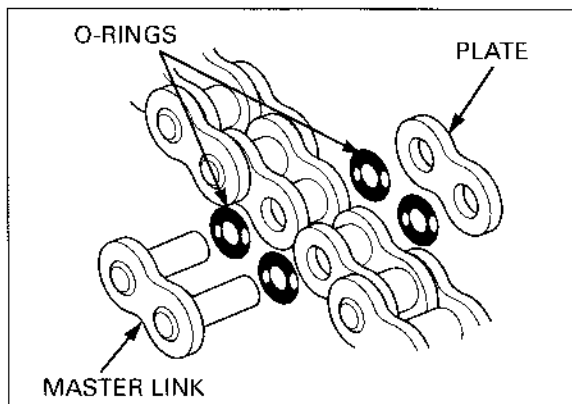


NOTICE

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

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

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

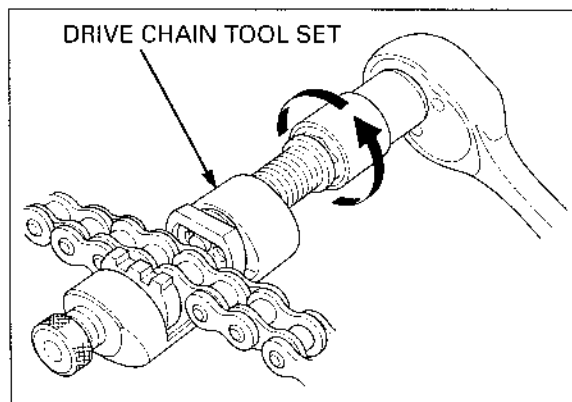


Assemble and set the drive chain tool set.

TOOL:

Drive chain tool set

07HMH-MR10103



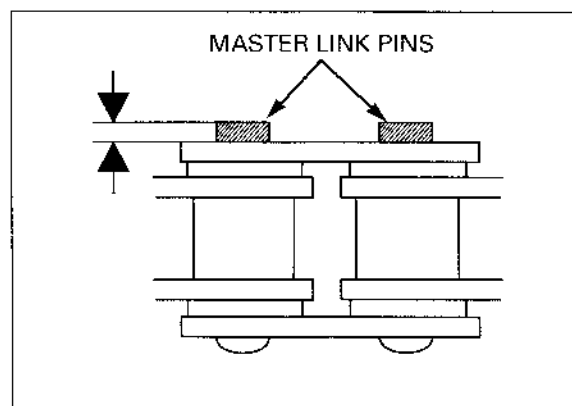
Make sure that the master link pins are installed properly.
Measure the master link pin length projected from the plate.

STANDARD LENGTH:

DID: 1.30 – 1.50 mm (0.051 – 0.059 in)

RK: 1.20 – 1.40 mm (0.047 – 0.055 in)

Stake the master link pins.

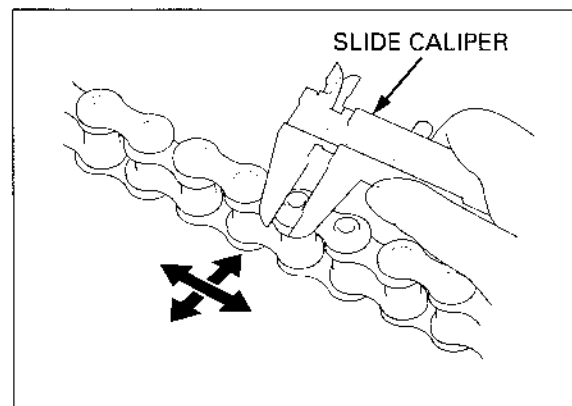


Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

DIAMETER OF THE STAKED AREA:

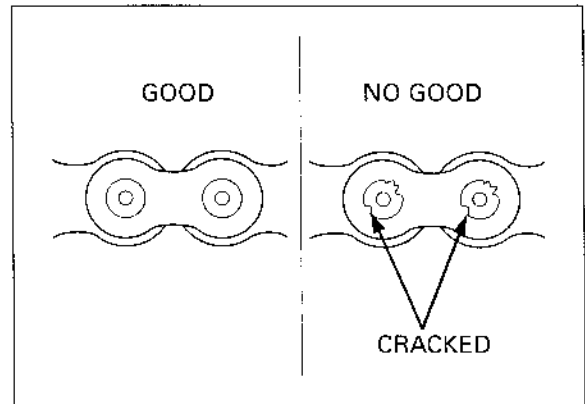
DID: 5.50 – 5.80 mm (0.217 – 0.228 in)

RK: 5.45 – 5.85 mm (0.215 – 0.230 in)



A drive chain with a clip-type master link must not be used.

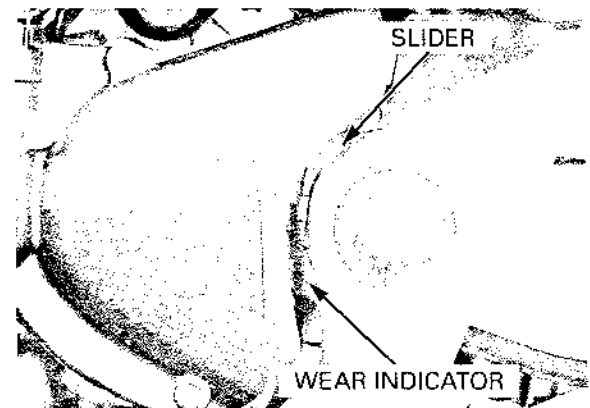
After staking, check the staked area of the master link for cracks. If there is any cracking, replace the master link, O-rings and plate.



DRIVE CHAIN SLIDER

Inspect the drive chain slider for excessive wear or damage.

If it is worn to the wear indicator, replace the drive chain slider.



BRAKE FLUID

- 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.

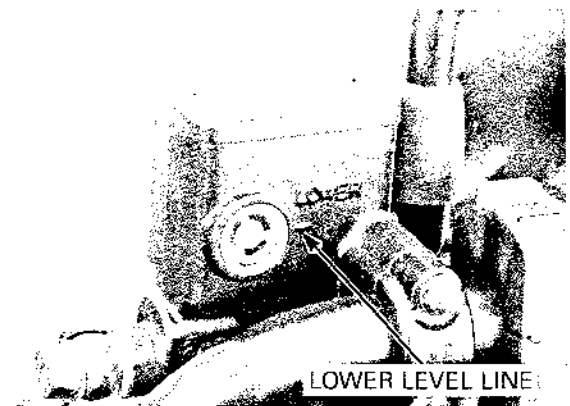
NOTICE

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 3-22). 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 3-23).

FRONT BRAKE

Turn the handlebar 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 3-22).



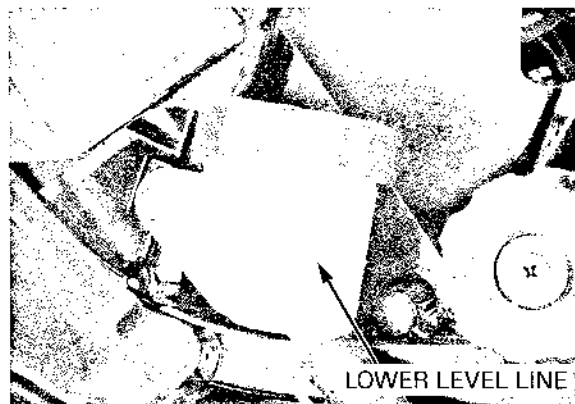
REAR BRAKE

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

Place the motorcycle on a level surface, and support it upright position.

Check the rear brake fluid reservoir level.

If the level is near the lower level line, check the brake pad wear (page 3-22).



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 wear limit groove.

Refer to brake pad replacement (page 15-14).

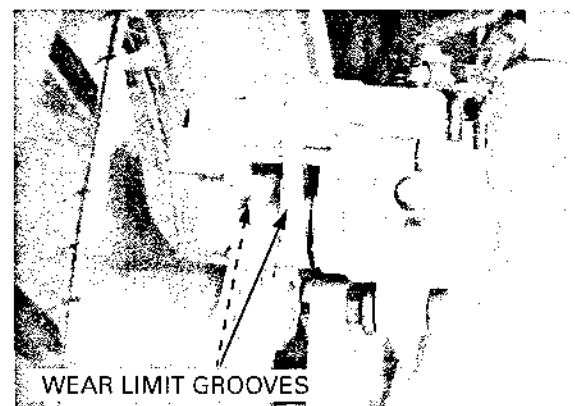


REAR BRAKE PADS

Check the brake pad for wear.

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

Refer to brake pad replacement (page 15-16).



BRAKE SYSTEM

INSPECTION

This model is equipped with a Combined Brake System.

Check the front and rear brake operation as follows:

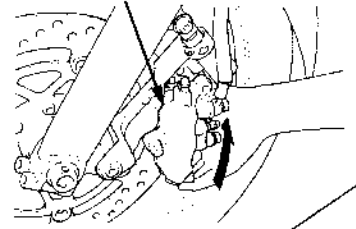
Shift the transmission into neutral.

Do not use the oil filter as a jack point.

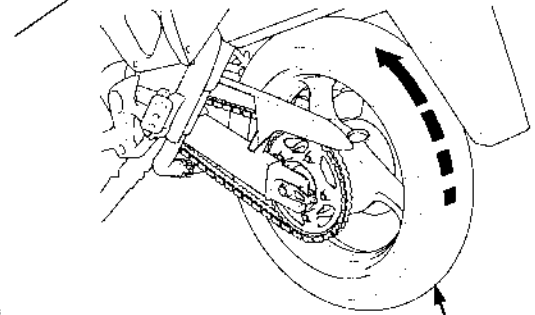
Jack-up the motorcycle to raise the rear wheel off the ground.

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.

LEFT FRONT BRAKE CALIPER



REAR WHEEL

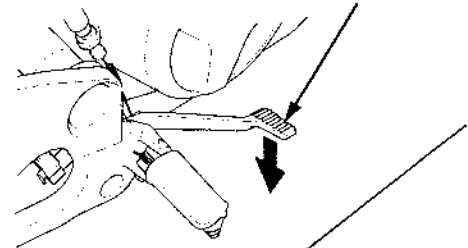


Do not use the oil filter as a jack point.

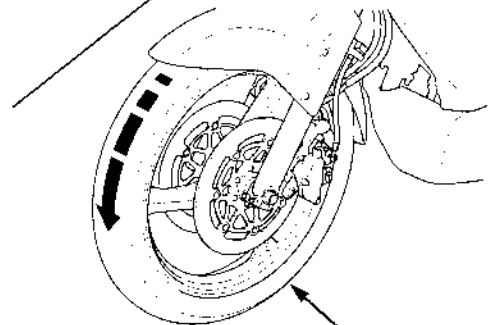
Jack-up the motorcycle to raise the front wheel off the ground.

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

BRAKE PEDAL



FRONT WHEEL



MAINTENANCE

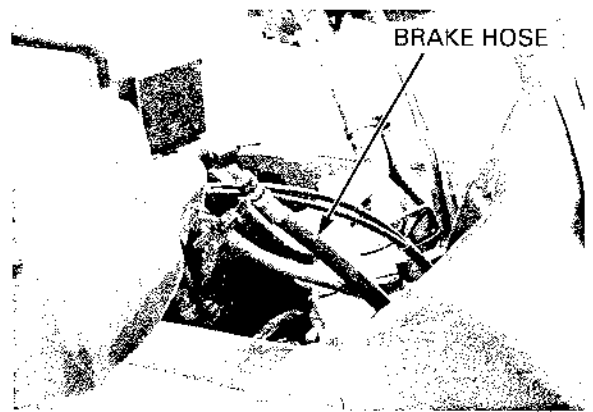
Firmly apply the brake lever or pedal, and check that no air has entered the system.
If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.

Tighten any loose fittings.

Replace hoses and fittings as required.

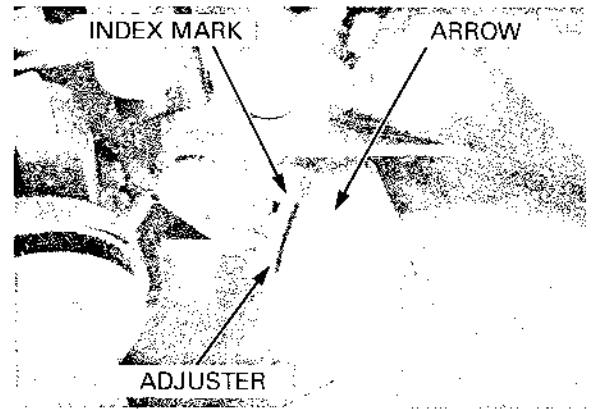
Refer the procedure for brake bleeding (page 15-9).



BRAKE LEVER ADJUSTMENT

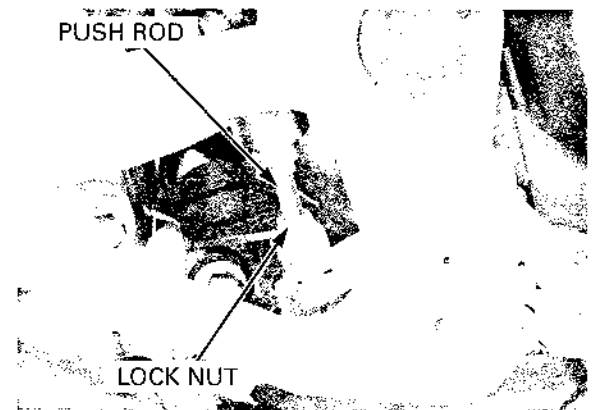
Align the allow on the brake lever with the index mark on the adjuster.

The distance between the tip 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.

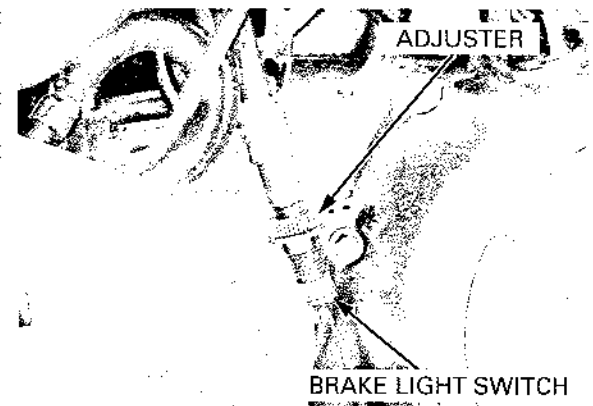


BRAKE LIGHT SWITCH

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.



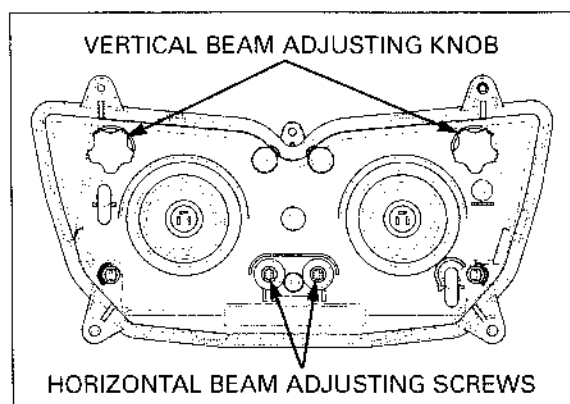
HEADLIGHT AIM

Remove the right and left upper cowl covers (page 2-10).
Remove the headlight under cover (page 2-6).
Place the motorcycle on a level surface.

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

Adjust the headlight beam vertically by turning the vertical beam adjusting knob.
A clockwise rotation moves the beam up and counterclockwise rotation moves the beam down.

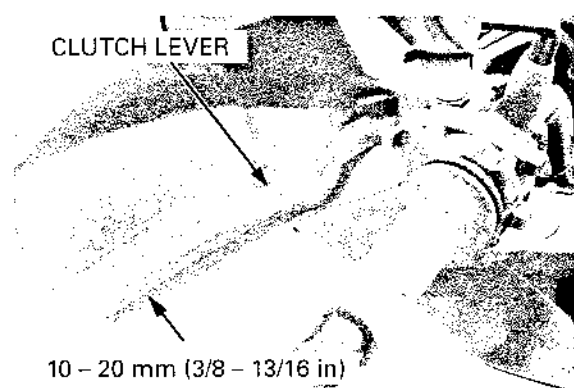
Adjust the headlight beam horizontally by turning the horizontal beam adjusting screws using a spanner.
A clockwise rotation moves the beam toward the right side of the rider.



CLUTCH SYSTEM

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

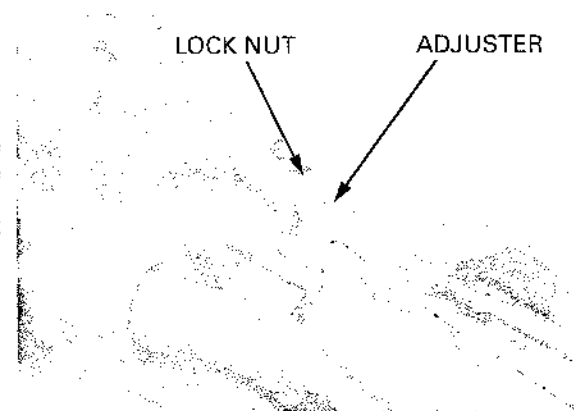
FREE PLAY: 10 – 20 mm (3/8 – 13/16 in)



Minor adjustment are made at the adjuster near the lever.
Loosen the lock nut and turn the adjuster.
Tighten the lock nut securely.

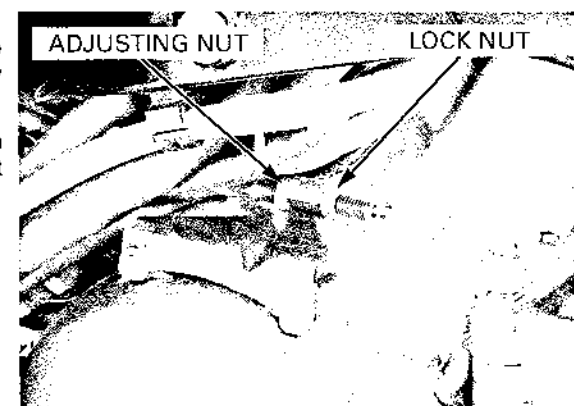
The adjuster may be damaged if it is positioned too far out, leaving minimal threads engagement.

If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn.
Tighten the lock nut and make a major adjustment as described below.



Major adjustment is performed at the clutch arm.
Loosen the lock nut and turn the adjusting nut to adjust free play. Hold the adjusting nut securely while tightening the lock nut.

If proper free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch.

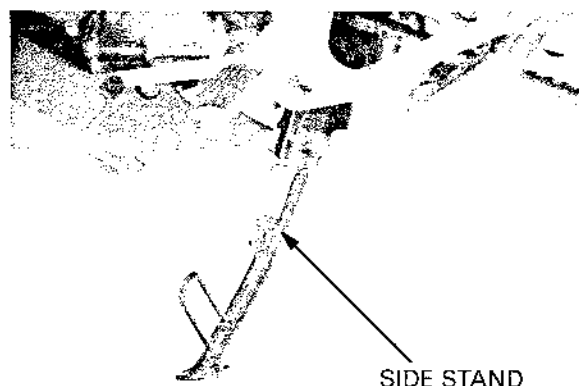


SIDE STAND

Support the motorcycle on a level surface.

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

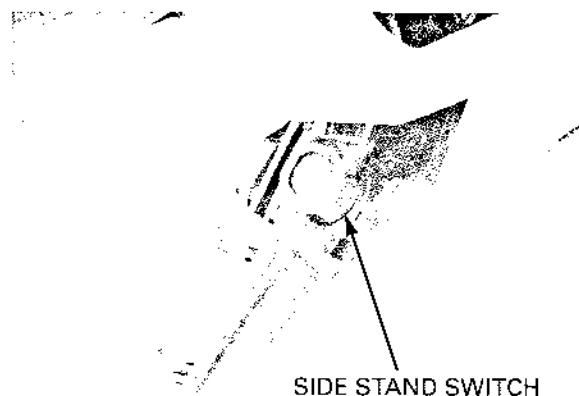
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.



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 19-22).



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.

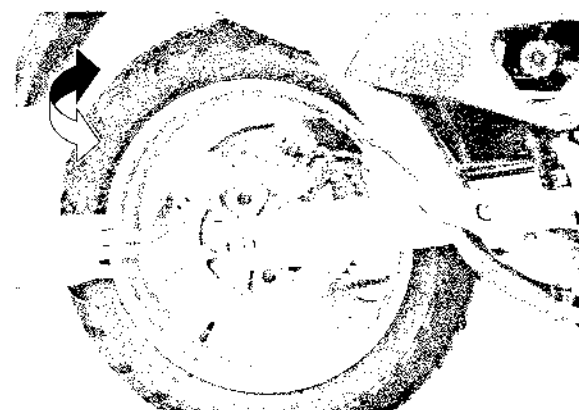
Refer to the fork service (page 13-21).



REAR SUSPENSION INSPECTION

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

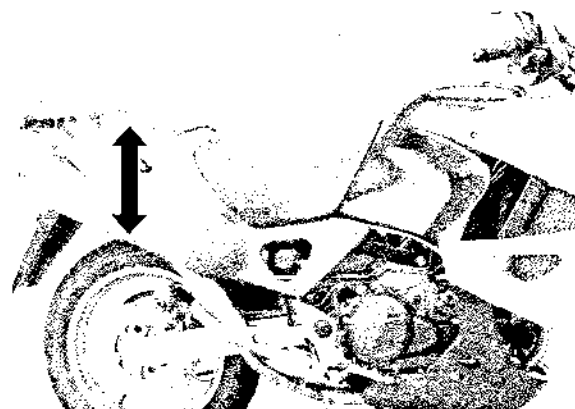
Hold the swingarm and move the rear wheel sideways with force to see if the axle bearings are worn.



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 14-12).



REAR SUSPENSION ADJUSTMENT

SPRING PRE-LOAD ADJUSTER

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

TURN CLOCKWISE:

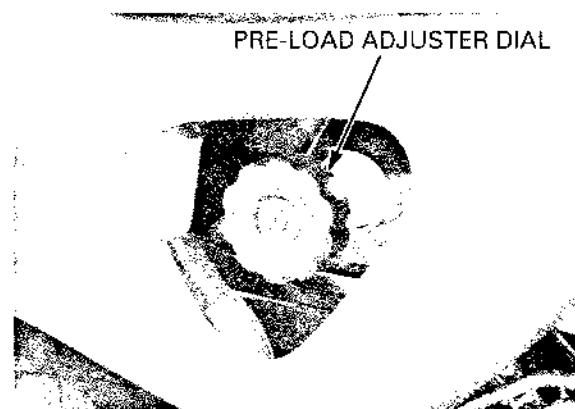
Increase the spring pre-load

TURN COUNTERCLOCKWISE:

Decrease the spring pre-load

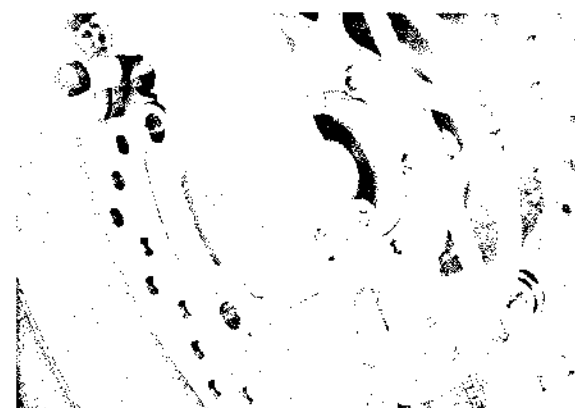
PRE-LOAD ADJUSTER STANDARD POSITION:

4 clicks from minimum position



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/cm ² , psi)		250 (2.50, 36)	250 (2.50, 36)
Tire size		110/80R19 M/C 58H	150/70R17 M/C 69H
Tire brand	Bridgestone	TW101 RADIAL E	TW152 RADIAL E
	Michelin	T66X	T66XA

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

Check the front wheel and rear wheel 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)



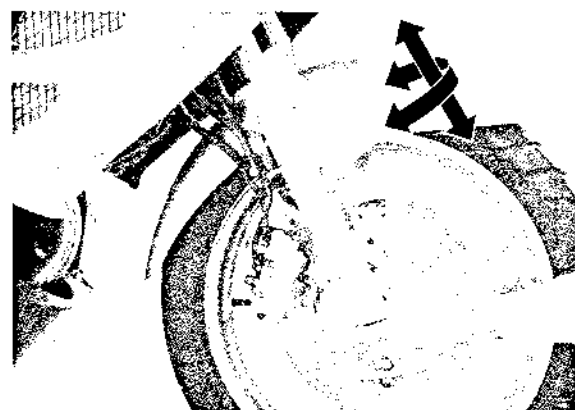
STEERING HEAD BEARINGS

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.

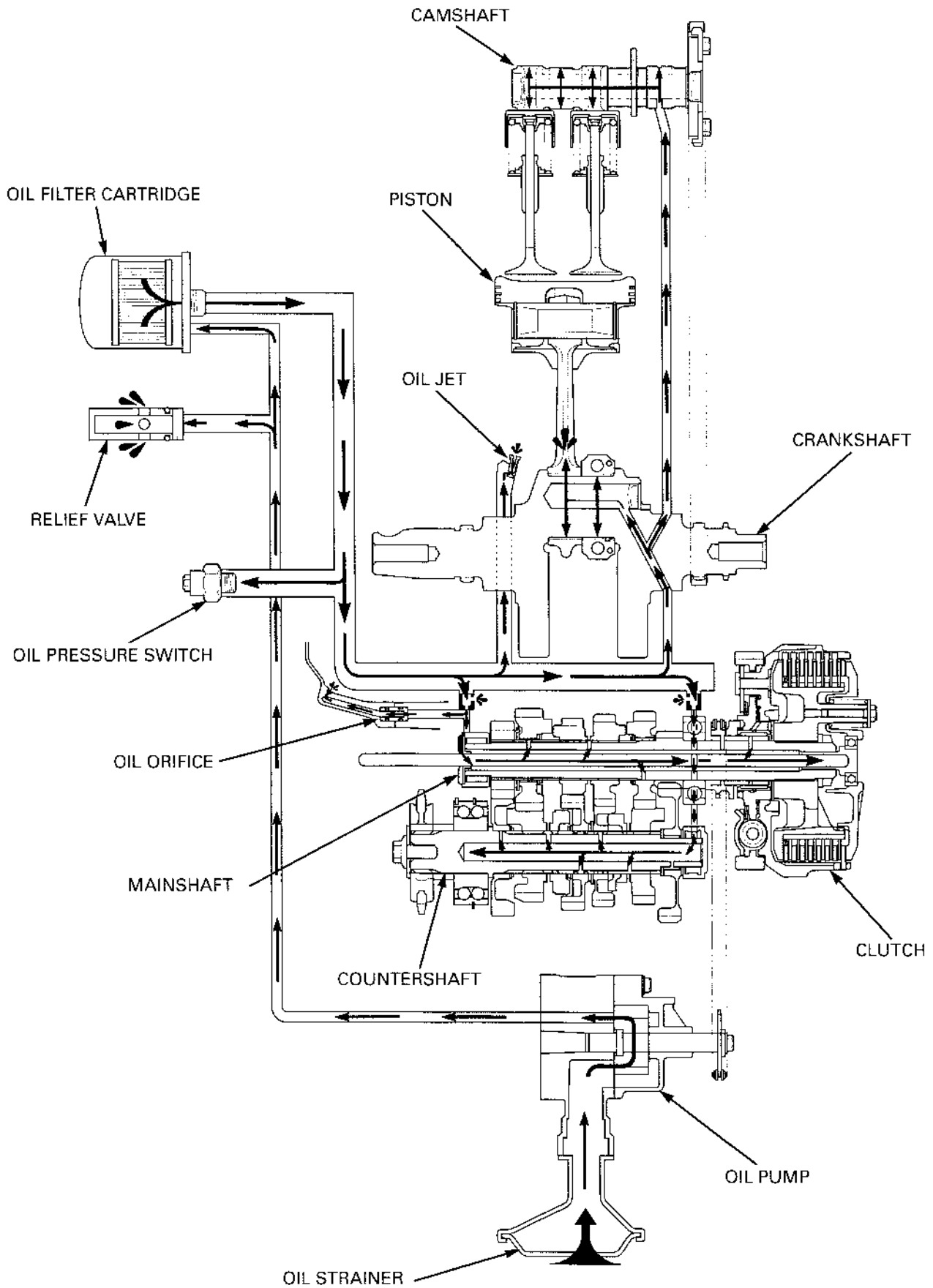
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 13-34).



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-2	OIL PRESSURE INSPECTION	4-5
SERVICE INFORMATION	4-3	OIL STRAINER/PRESSURE RELIEF VALVE	4-6
TROUBLESHOOTING	4-4	OIL PUMP	4-8

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

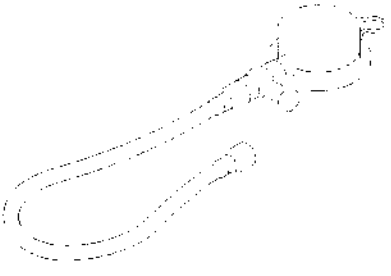


SPECIFICATIONS

ITEM		STANDARD	Unit: mm (in)
Engine oil capacity	After draining	3.4 liter (3.6 US qt, 3.0 Imp qt)	—
	After draining/filter change	3.6 liter (3.8 US qt, 3.2 Imp qt)	—
	After disassembly	4.1 liter (4.3 US qt, 3.6 Imp qt)	—
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		588 kPa (6.0 kgf/cm ² , 85 psi) at 5,000 min ⁻¹ (rpm)/(80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

TORQUE VALUES

Oil filter boss	See page 1-15	
Oil pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Oil pump driven sprocket bolt/washer	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply a locking agent to the threads
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	Apply sealant to the threads
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the O-ring
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	

TOOLS

Oil pressure gauge 07506-3000001 	Oil pressure gauge attachment 07406-0030000 	Oil filter wrench 07HAA-PJ70101 
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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.

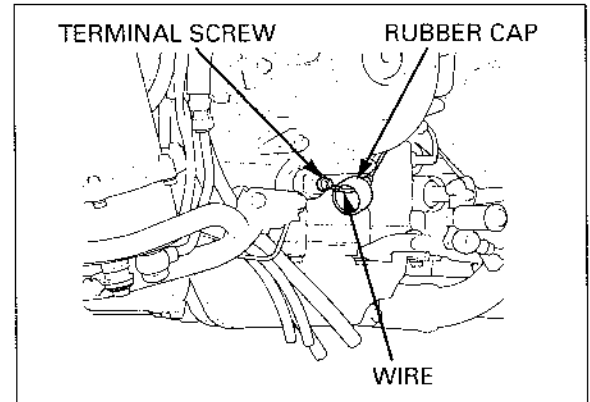
Remove the under cowl (page 2-7).

Check the oil level (page 3-12).

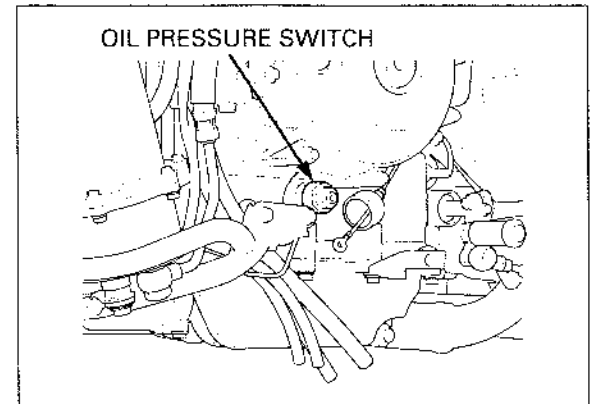
Warm up the engine to normal operating temperature (approximately 80°C/176°F).

Stop the engine.

Remove the rubber cap and disconnect the oil pressure switch wire connector from the switch.



Remove the oil pressure switch.



Install the oil pressure gauge attachment and oil pressure gauge to the switch hole.

TOOLS:

Oil pressure gauge 07506-3000001

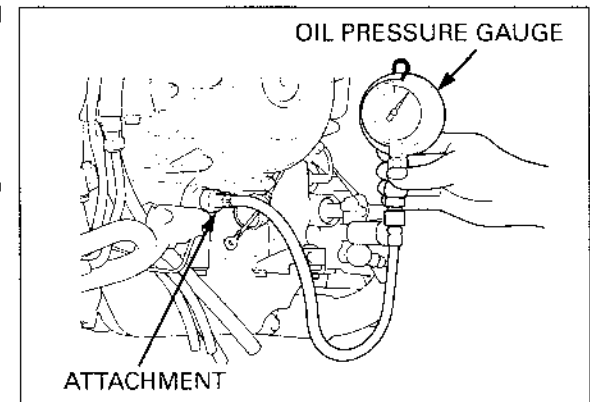
Oil pressure gauge attachment 07406-0030000

Start the engine and increase the rpm to 5,000 min⁻¹ (rpm) and read the oil pressure.

OIL PRESSURE:

588 kPa (6.0 kgf/cm², 85 psi) at 5,000 min⁻¹ (rpm)/ (80°C/176°F)

Stop the engine and remove the tools.

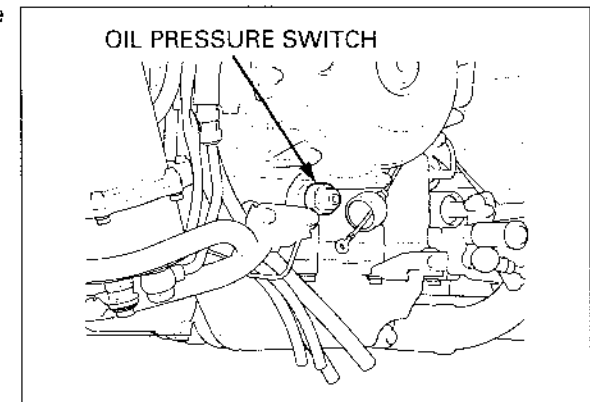


Apply sealant to the threads of the oil pressure switch.

Install and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

To prevent crankcase damage, do not overtighten the switch.



LUBRICATION SYSTEM

Connect the oil pressure switch connector, tighten the terminal screw to the specified torque.

TORQUE: 2 N·m (0.2 kgf-m, 1.4 lbf-ft)

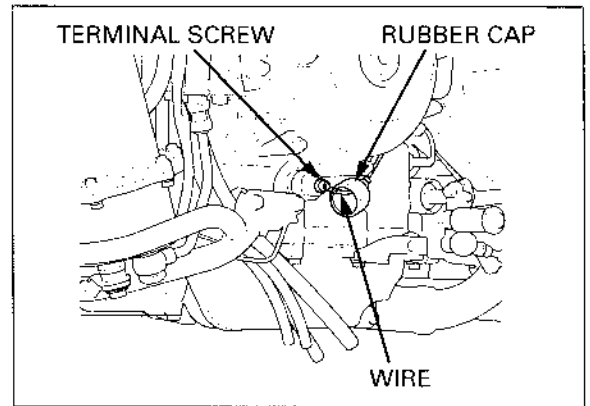
Install the rubber cap.

Fill the crankcase with recommended oil (page 3-12).

Start the engine and check the oil pressure indicator light goes out after a few seconds.

If the oil pressure indicator light remains on a few seconds, stop the engine and check the indicator system.

Install the under cowl (page 2-7).



OIL STRAINER/PRESSURE RELIEF VALVE

REMOVAL

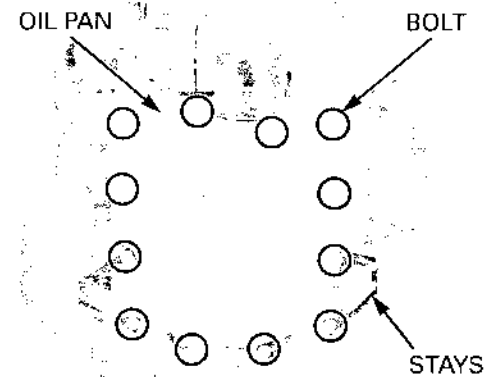
Remove the under cowl (page 2-7).

Drain the engine oil (page 3-12).

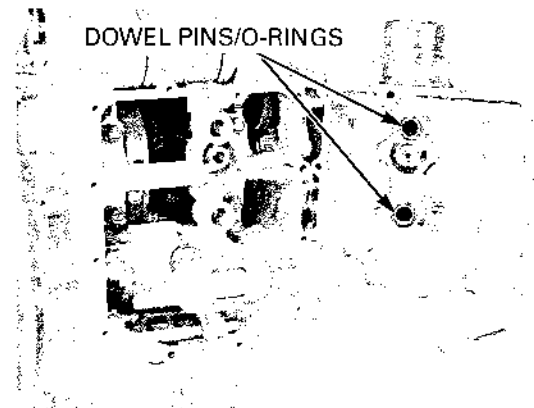
Remove the exhaust pipe (page 2-11).

Remove the oil pan flange bolts and under cowl stays.

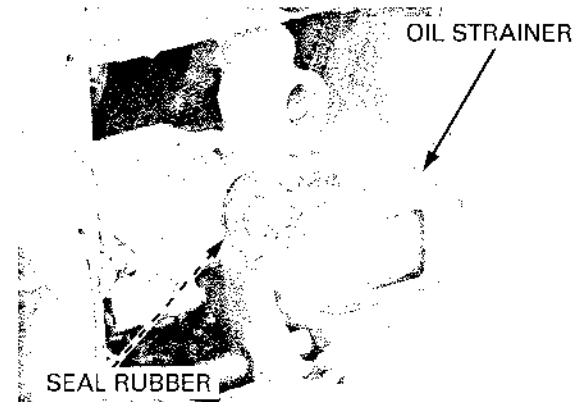
Remove the oil pan.



Remove the dowel pins and O-rings.

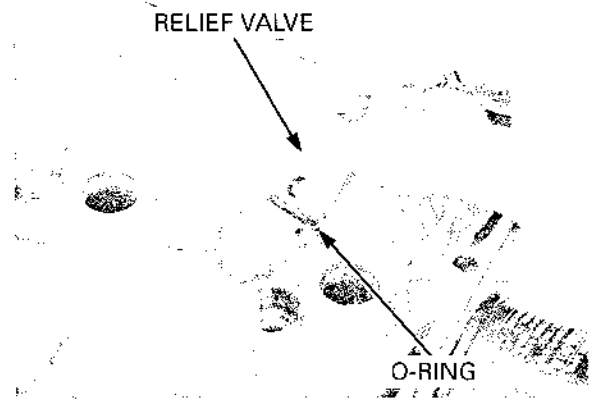


Remove the oil strainer and seal rubber from the oil pump.



Remove the oil pressure relief valve from the oil pan.

Remove the O-ring from the relief valve body.



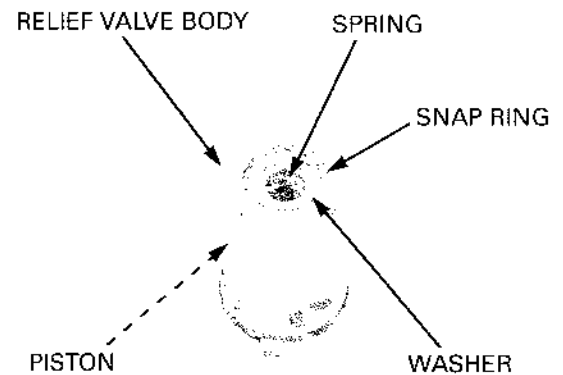
INSPECTION

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.

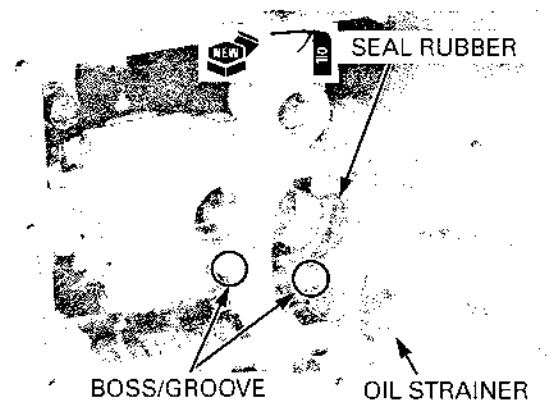
Assemble the relief valve in the reverse order of disassembly.



INSTALLATION

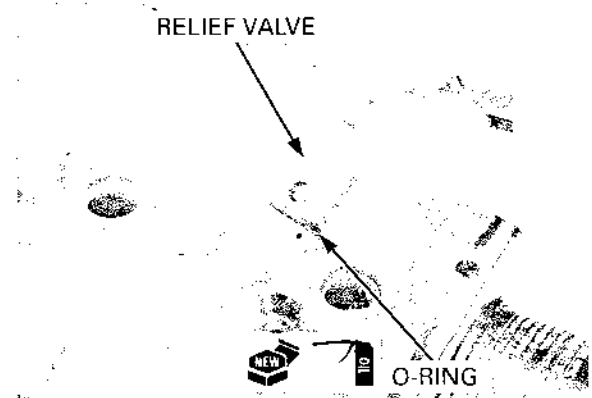
Apply oil to the new seal rubber and install it onto the oil strainer.

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



Apply oil to the new O-ring and install it onto the relief valve body groove.

Install the relief valve into the oil pan.

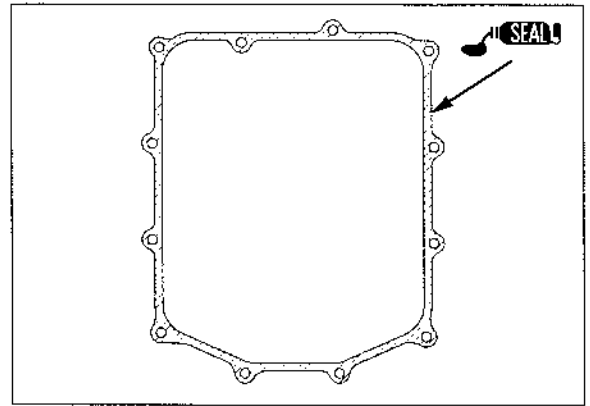


LUBRICATION SYSTEM

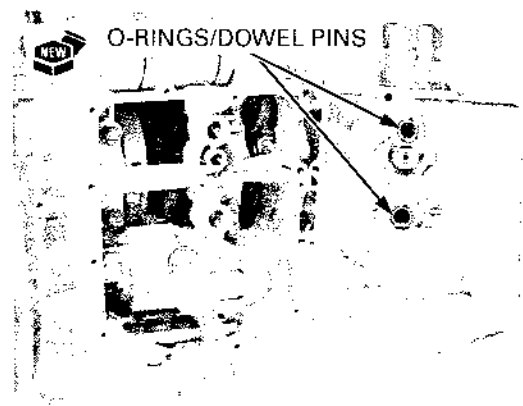
Clean the oil pan mating surface thoroughly.

Do not apply sealant more than necessary.

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



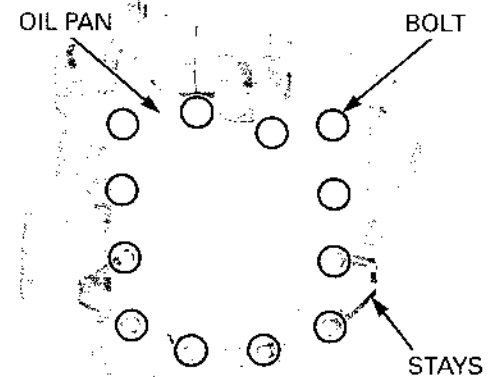
Install the dowel pins and new O-rings to the oil pan.



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

Install the exhaust pipe (page 2-12).
Fill the crankcase with recommended oil (page 3-12).
Install the under cowl (page 2-7).

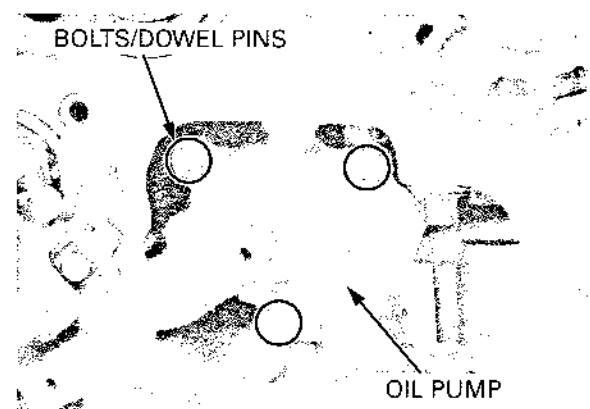
After installation, check that there are no oil leaks.



OIL PUMP

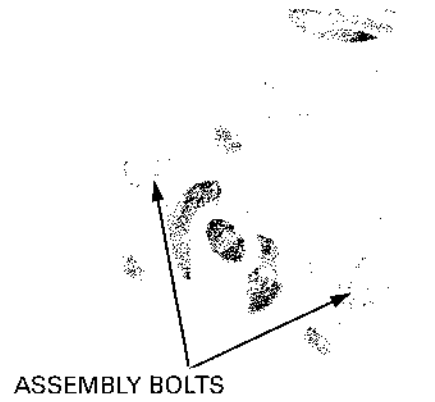
REMOVAL

- Remove the clutch assembly (page 9-6).
- Remove the oil strainer (page 4-6).
- Remove the three flange bolts and oil pump assembly.
- Remove the dowel pins.



DISASSEMBLY

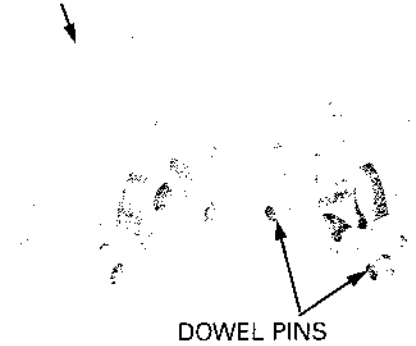
Remove the oil pump assembly bolts.



ASSEMBLY BOLTS

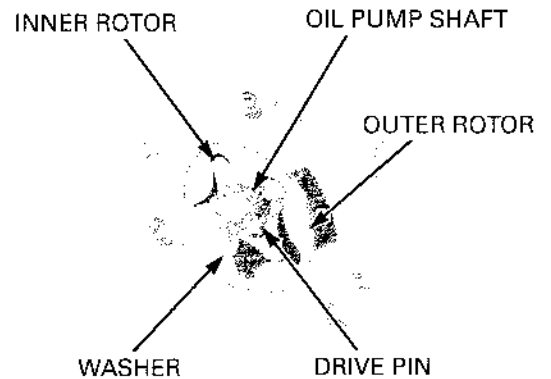
Remove the oil pump body and dowel pins.

OIL PUMP BODY



DOWEL PINS

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



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 cover.

Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

TIP CLEARANCE:



LUBRICATION SYSTEM

Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

BODY CLEARANCE:



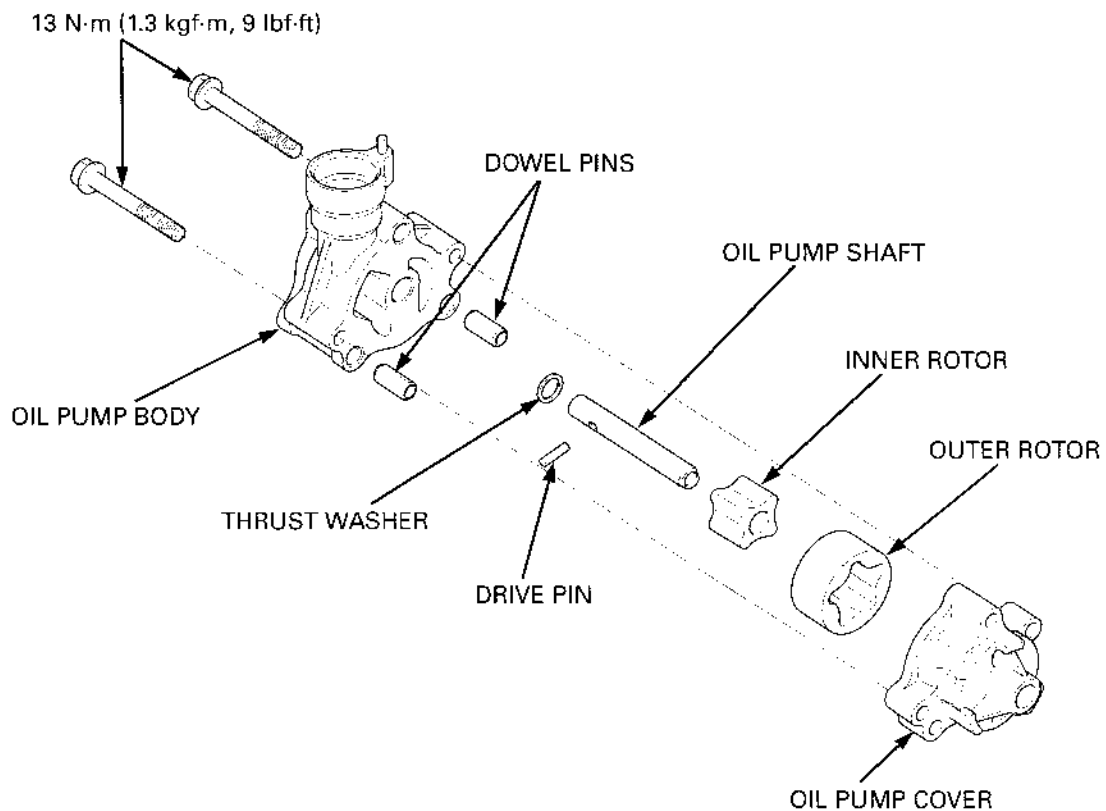
Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.12 mm (0.005 in)

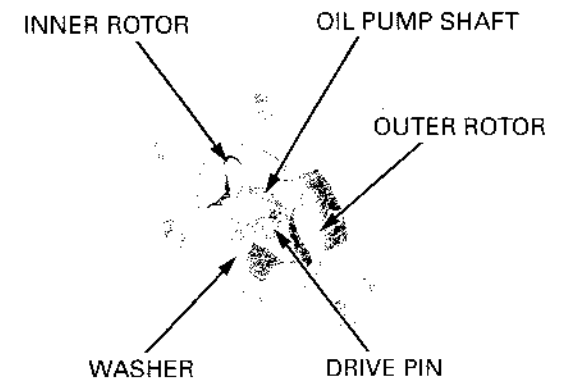
SIDE CLEARANCE:



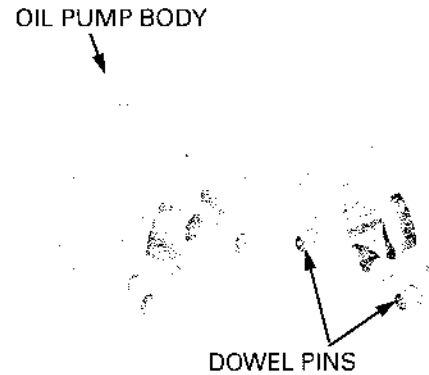
ASSEMBLY



Install the outer and inner rotors into the oil pump cover.
Install the oil pump shaft through the oil pump cover and inner rotor.
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.

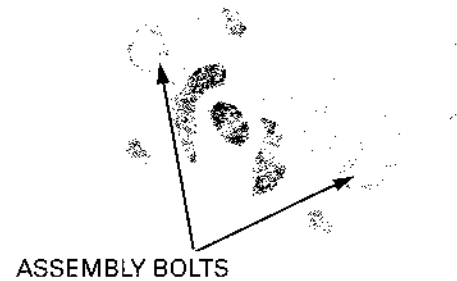


Install the dowel pins.
Install the oil pump body onto the oil pump cover.



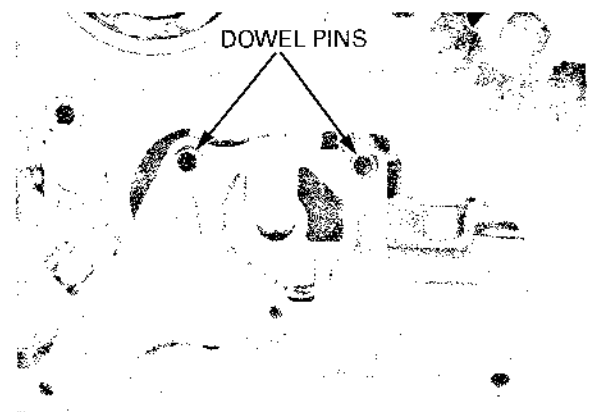
Install and tighten the assembly bolts to the specified torque.

TORQUE: 13 N-m (1.3 kgf-m, 9 lbf-ft)



INSTALLATION

Install the dowel pins into the crankcase.



LUBRICATION SYSTEM

Install the oil pump into the crankcase.

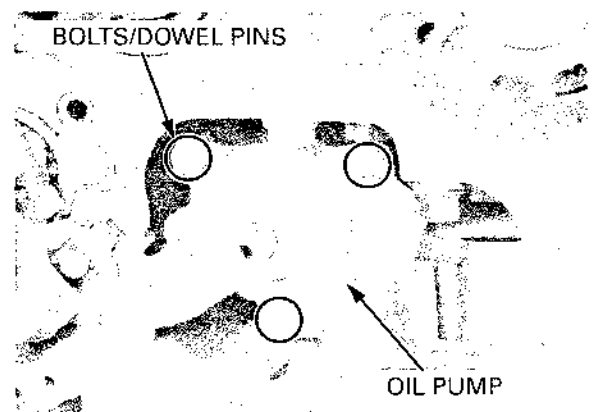
Install and tighten the three flange bolts securely.

Install the oil pan and strainer (page 4-7).

Install the clutch assembly (page 9-12).

Fill the crankcase with recommended oil (page 3-12).

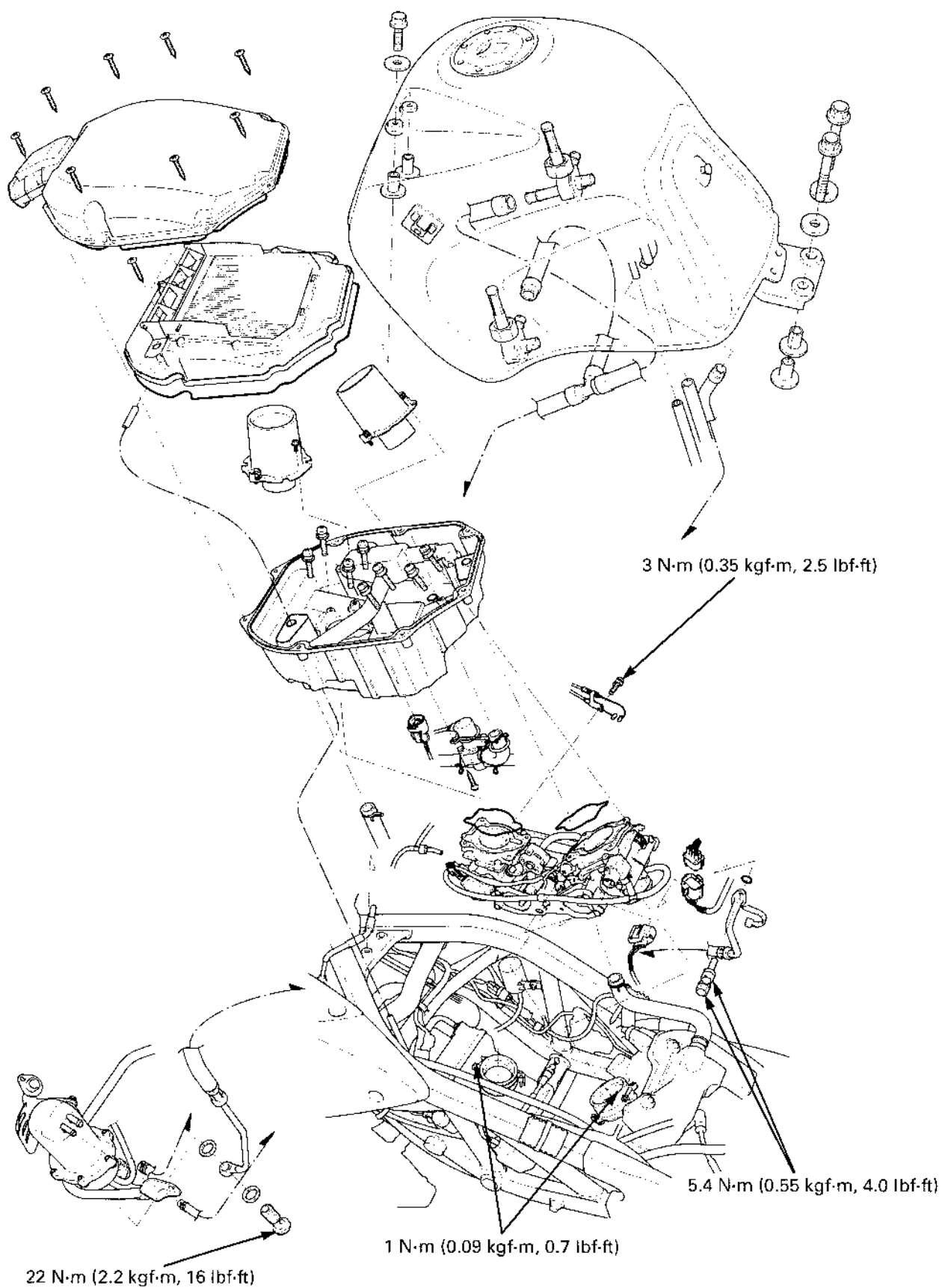
After installation, check that there are no oil leaks.



5. FUEL SYSTEM (Programmed Fuel Injection)

COMPONENT LOCATION	5-2	THROTTLE BODY	5-60
SERVICE INFORMATION	5-3	INJECTOR	5-66
TROUBLESHOOTING	5-5	STARTER VALVE.....	5-69
SYSTEM LOCATION.....	5-6	STARTER VALVE SYNCHRONIZATION	5-71
SYSTEM DIAGRAM.....	5-7	MAP SENSOR.....	5-73
PGM-FI SELF-DIAGNOSIS INFORMATION	5-8	IAT SENSOR	5-74
MIL CODE INDEX.....	5-12	ECT SENSOR	5-74
MIL TROUBLESHOOTING.....	5-14	CAM PULSE GENERATOR.....	5-75
DTC CODE INDEX.....	5-29	TP SENSOR.....	5-76
DTC TROUBLESHOOTING.....	5-32	BANK ANGLE SENSOR	5-78
FUEL LINE INSPECTION	5-47	ENGINE STOP RELAY	5-79
FUEL PUMP.....	5-49	ECM (ENGINE CONTROL MODULE).....	5-79
FUEL CUT-OFF RELAY	5-52	VARIABLE AIR INTAKE CONTROL VALVE	5-81
FUEL TANK	5-53	PAIR SOLENOID VALVE	5-83
AIR CLEANER HOUSING	5-55	O ₂ SENSOR (G type only).....	5-84

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, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Always replace the sealing washers when the fuel pump is removed.
- The programmed fuel injection system is equipped with the Self-Diagnostic System described (page 5-8). 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 5-5).
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map. It must be remembered, however, that when any abnormality is detected in two 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 5-6).
- 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 19-17).
- The vehicle speed sensor sends digital pulse signal to the ECM (PGM-FI unit) and computation. Refer to procedures for vehicle speed sensor inspection (page 19-11).
- 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.
- When replacing the ECM, always follow the steps in the IMMOBILIZER SYSTEM (page 20-6).

SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ45A
Starter valve vacuum difference	20 mm Hg
Base starter valve for synchronization	No.1 (Rear)
Idle speed	1,200 ± 100min ⁻¹ (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 kΩ
Fuel injection resistance (at 20°C/68°F)	13.4 – 14.2 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
Cam pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Manifold absolute pressure at idle	200 – 250 mm Hg
Fuel pressure at idle	320 – 370 kPa (3.2 – 3.7 kgf/cm ² , 46 – 53 psi)
Fuel pump flow (at 12V)	270 cm ³ (9.1 US oz, 9.5 Imp oz) minimum/10 seconds

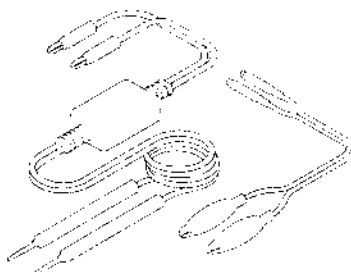
FUEL SYSTEM (Programmed Fuel Injection)

TORQUE VALUES

ECT/thermo sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)
Throttle body insulator band screw	1 N·m (0.09 kgf·m, 0.7 lbf·ft)
Throttle cable bracket screw	3 N·m (0.35 kgf·m, 2.5 lbf·ft)
Starter valve synchronization plate screw	2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)
Starter valve lock nut	2.3 N·m (0.23 kgf·m, 1.7 lbf·ft)
Vacuum hose guide screw	1.2 N·m (0.13 kgf·m, 0.9 lbf·ft)
MAP sensor bracket screw	3.4 N·m (0.35 kgf·m, 2.5 lbf·ft)
MAP sensor screw	2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)
Fuel rail stay bolt	5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)
Fuel rail B mounting bolt	5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)
Fuel rail A mounting bolt	5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)
Fuel filler cap bolt	2 N·m (0.18 kgf·m, 1.3 lbf·ft)
Fuel hose banjo bolt (fuel pump side)	22 N·m (2.2 kgf·m, 16 lbf·ft)
Fuel cock nut	34 N·m (3.5 kgf·m, 25 lbf·ft)
Fuel cock lever screw	9 N·m (0.9 kgf·m, 6.5 lbf·ft)
Air funnel screw	4 N·m (0.42 kgf·m, 3.0 lbf·ft)
Air cleaner housing screw	2.5 N·m (0.25 kgf·m, 1.8 lbf·ft)
O ₂ sensor (G type only)	44 N·m (4.5 kgf·m, 33 lbf·ft)

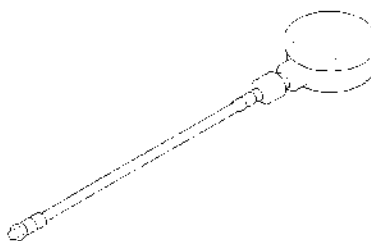
TOOLS

Imrie diagnostic tester (model 625) or Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/minimum)

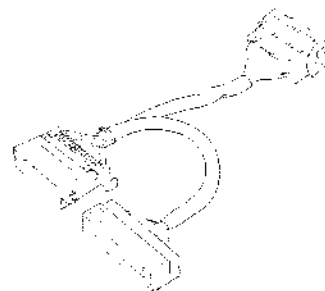


07HGJ-0020100

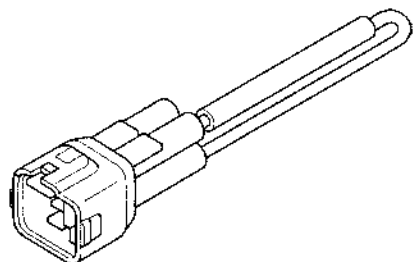
Fuel pressure gauge
07406-0040003



ECM test harness 32P
070MZ-0010201



DLC short connector
070PZ-ZY30100



TROUBLESHOOTING

Engine won't to start

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

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

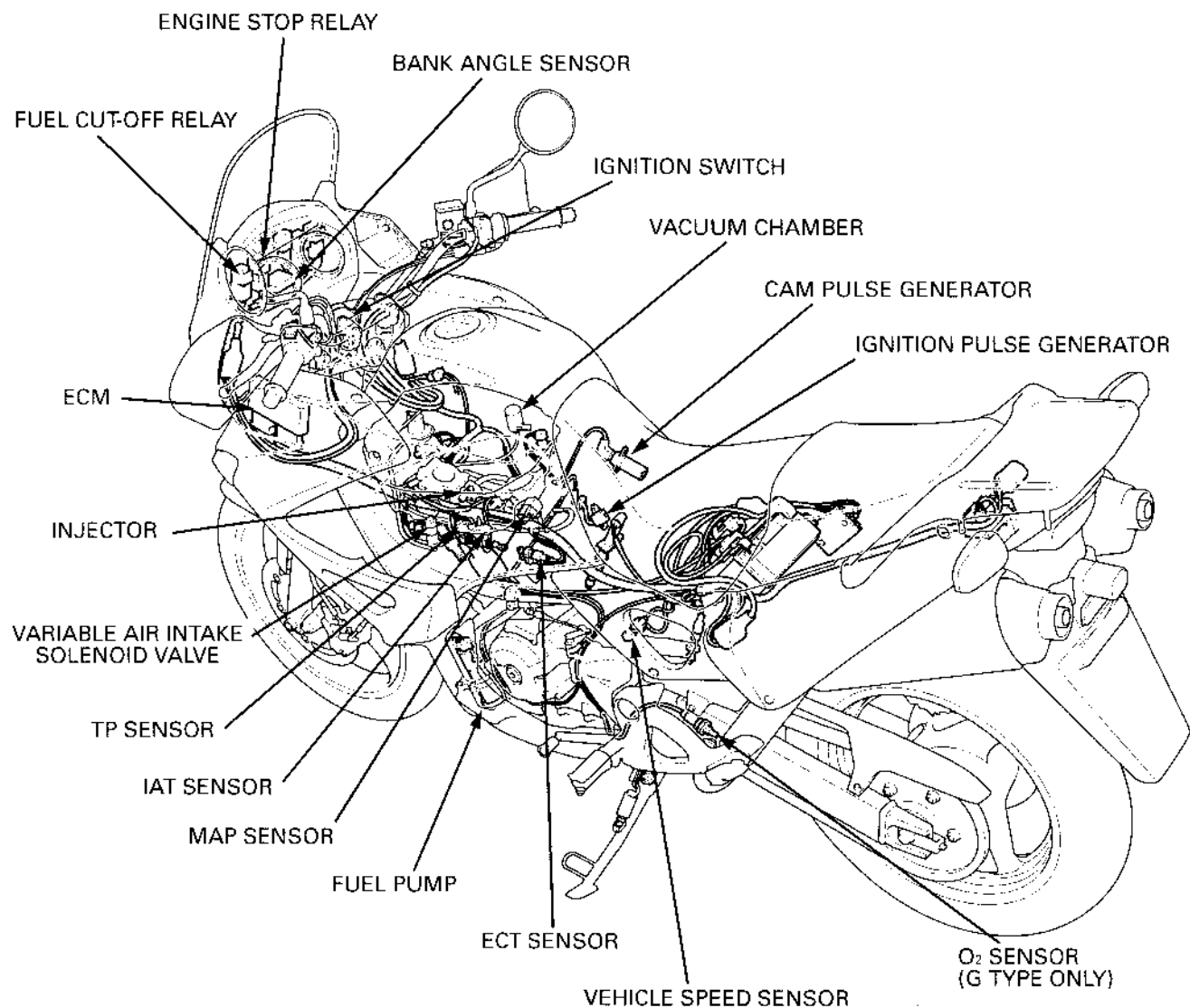
Backfiring or misfiring during acceleration

- Ignition system malfunction

Poor performance (driveability) and poor fuel economy

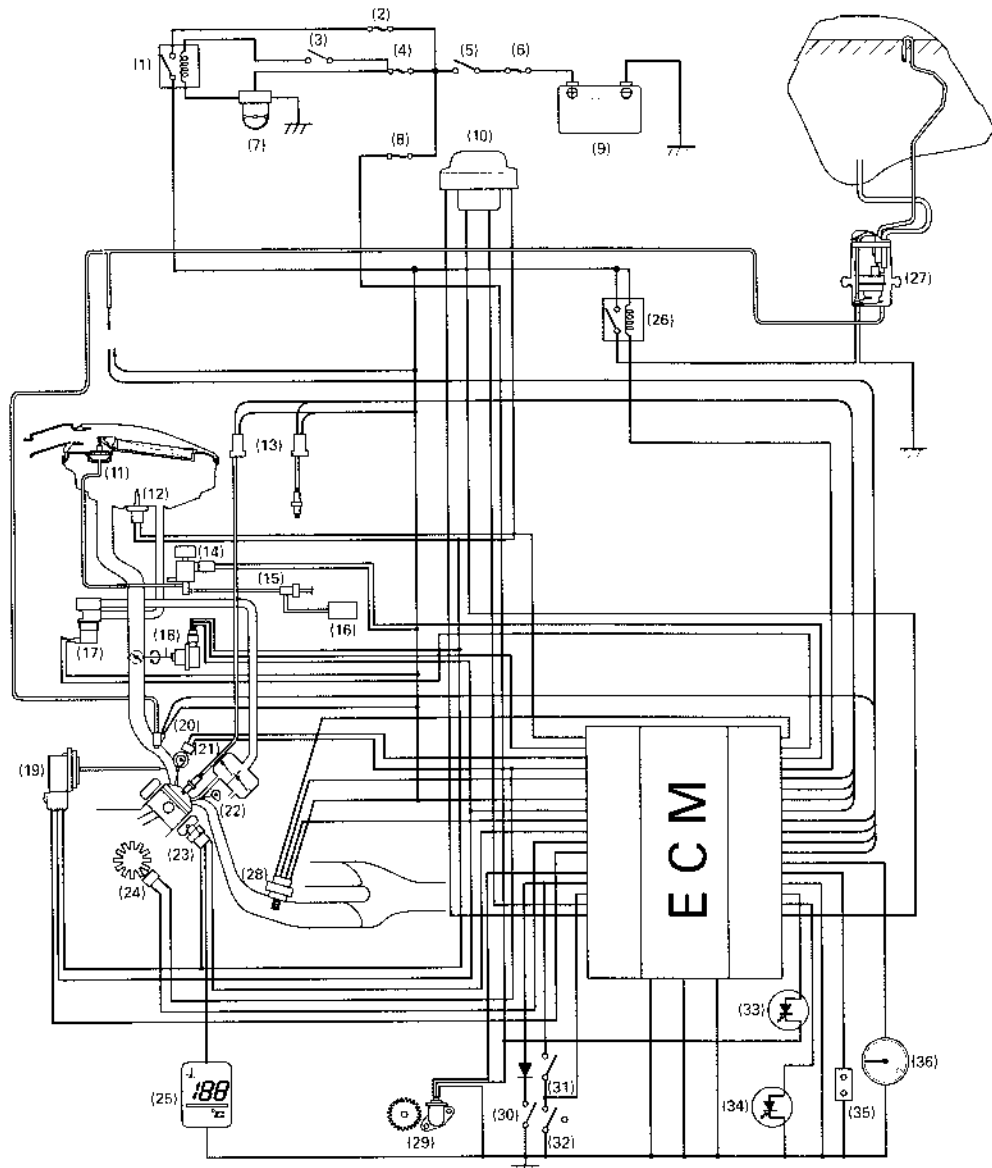
- Pinched or clogged fuel hose
- Faulty pressure regulator

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)	MAP sensor
(2)	Sub-fuse (20A)	(20)	Injector
(3)	Engine stop switch	(21)	Cam pulse generator
(4)	Sub-fuse (10A)	(22)	PAIR check valve
(5)	Ignition switch	(23)	ECT sensor
(6)	Main fuse A (30A)	(24)	Ignition pulse generator
(7)	Bank angle sensor	(25)	Coolant temperature indicator
(8)	Sub-fuse (10A)	(26)	Fuel cut-off relay
(9)	Battery	(27)	Fuel pump
(10)	Immobilizer receiver	(28)	O ₂ sensor
(11)	Variable intake port diaphragm	(29)	Vehicle speed sensor
(12)	IAT sensor	(30)	Neutral switch
(13)	Ignition coil	(31)	Clutch switch
(14)	Variable air intake solenoid valve	(32)	Side stand switch
(15)	One-way valve	(33)	PGM-FI malfunction indicator
(16)	Vacuum chamber	(34)	Immobilizer indicator
(17)	PAIR solenoid valve	(35)	Data link connector
(18)	TP sensor	(36)	Tachometer

PGM-FI SELF-DIAGNOSIS INFORMATION

SELF-DIAGNOSTIC PROCEDURE

Place the motorcycle on its side stand.

Start the engine and let it idle.

NOTE:

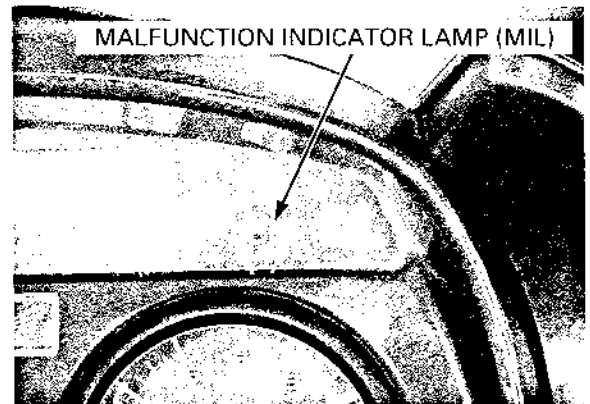
- If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blink.

The MIL will start blink only with the side stand down and with the engine off (engine stop switch is RUN) or engine revs are below 5,000 min⁻¹ (rpm). In any conditions, the MIL will illuminate and stay on.

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

If the malfunction indicator blinks, note how many times the MIL blinks or read the Diagnosis Trouble Code (DTC) with the Honda Diagnosis System (HDS) Pocket Tester, and determine the cause of the problem.

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



DTC (With the HDS Pocket Tester)

Turn the ignition switch OFF.

Remove the seat (page 2-3).

Connect the HDS Pocket Tester to the Data Link Connector (DLC).

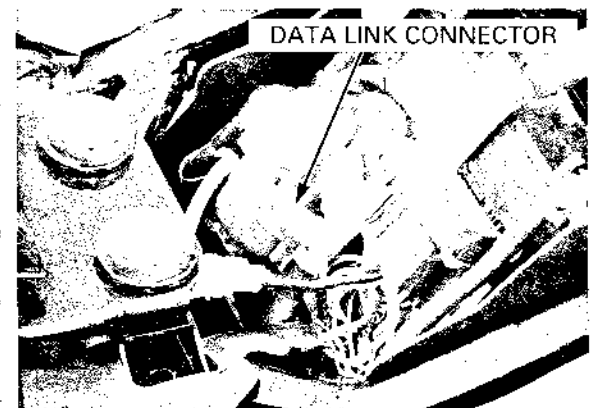
Turn the ignition switch ON and engine stop switch "RUN".

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

Refer to the DTC code index (page 5-29) and begin the appropriate troubleshooting procedure.

NOTE:

- For specific operations, refer to the user's manual that came with the HDS Pocket Tester.



MIL CODE (Without the HDS Pocket Tester)

Turn the ignition switch OFF.

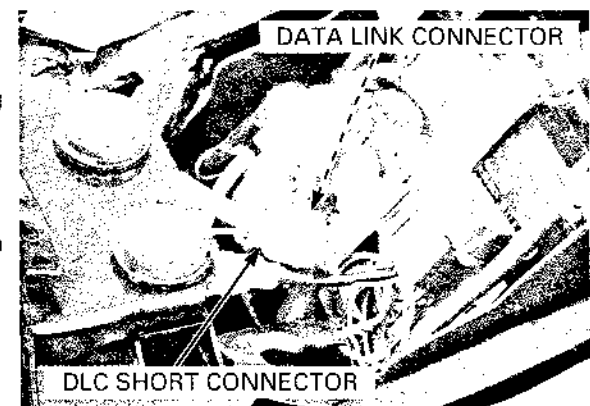
Remove the seat (page 2-3).

Short the Data Link Connector (DLC) terminals using a special tool.

TOOL:

DLC short connector **070PZ-ZY30100**

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

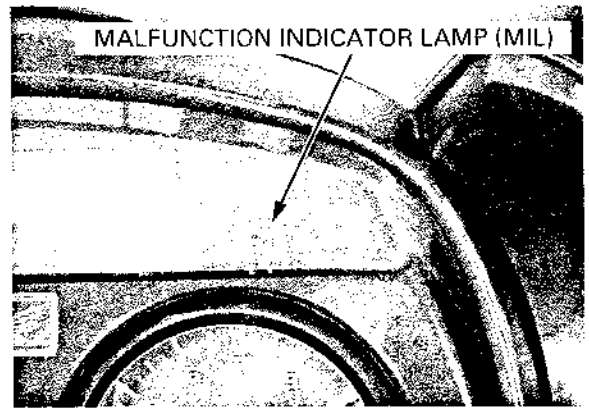


Even if the PGM-FI has memory data, the MIL does not blink when the engine running.

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



SELF-DIAGNOSIS RESET PROCEDURE

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

With the HDS Pocket Tester

Use the HDS Pocket Tester to clear the ECU memory. See the HDS Pocket Tester user's manual for specific instruction.

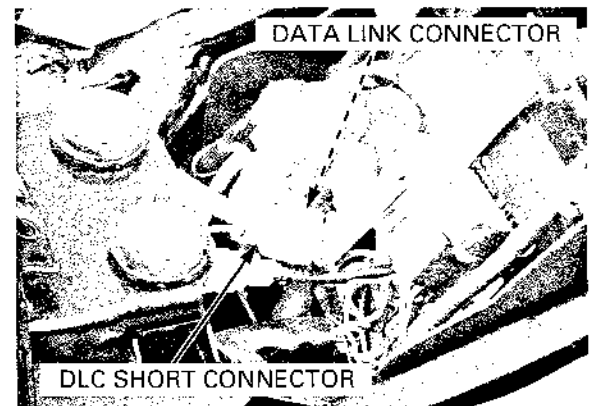
Without the HDS Pocket Tester

1. Turn the engine stop switch RUN and ignition switch OFF.
2. Short the Data Link Connector (DLC) terminals using a special tool.

TOOL:

DLC short connector **070PZ-ZY30100**

3. Turn the ignition switch ON.
4. Remove the special tool from the Data Link Connector (DLC).

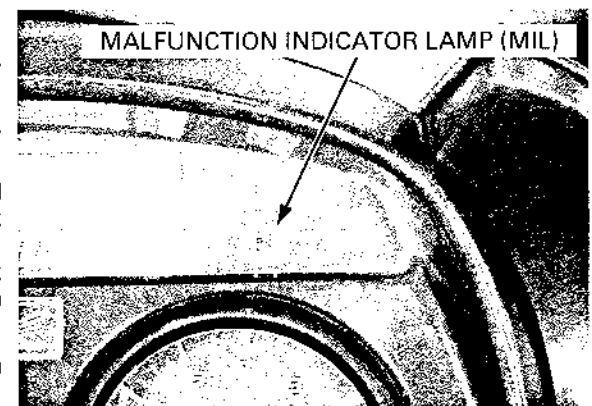


5. The MIL lights about 5 seconds.

While the indicator lights, short the Data Link Connector (DLC) again with the special tool.

Self-diagnosis memory data is erased, if the MIL turn off and start blinking.

- The Data Link Connector (DLC) must be jumped while the indicator lights. If not, the MIL will not start blinking.
- Note that the self diagnosis memory data cannot be erased if you turn off the ignition switch before the MIL starts blinking.
- If the MIL blinks 20 times, the data has not been erased, so try again.



FUEL SYSTEM (Programmed Fuel Injection)

PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the ignition pulse generator and cam pulse generator inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the all spark plugs are installed correctly.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- If the Imrie diagnostic tester (model 625) 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.

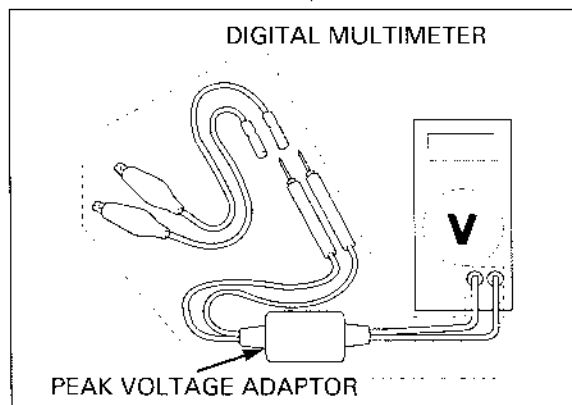
Avoid touching the tester probes to prevent electric shock.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

Imrie diagnostic tester (model 625) or

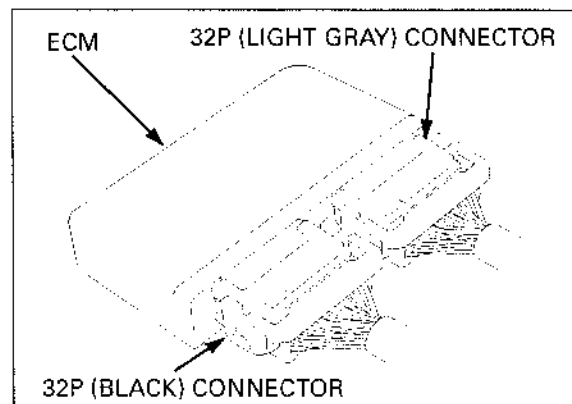
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)



TEST HARNESS CONNECTION

Remove the left middle cowl (page 2-8).

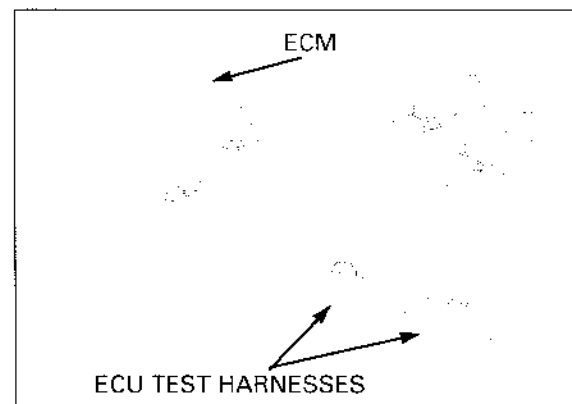
Disconnect the ECM 32P (Black) and 32P (Light gray) connectors from the ECM unit.



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

TOOLS:

ECM test harness 32P 070MZ-0010201
(two required)



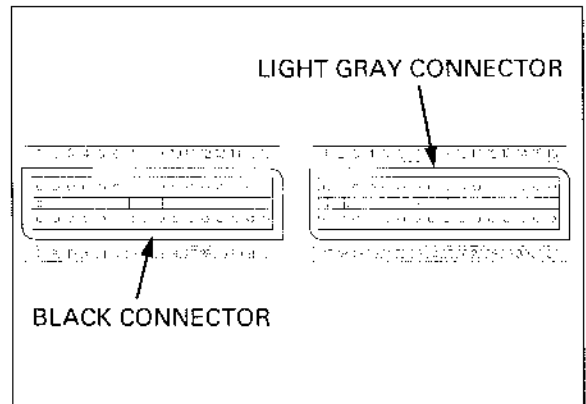
TEST HARNESS TERMINAL LAYOUT

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

VIEW FROM WIRE HARNESS SIDE:



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



FUEL SYSTEM (Programmed Fuel Injection)

MIL CODE INDEX

- 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.
- 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 5-15) troubleshooting.

MIL	Detection Item	Causes	Symptoms	Refer to
No blinks	ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine does not start 	5-80
No blinks	ECM power/ground circuit malfunction	<ul style="list-style-type: none"> Open circuit at the power input wire of the ECM Faulty bank angle sensor Open circuit in bank angle sensor related circuit Faulty engine stop relay Open circuit in engine stop relay related wires Faulty engine stop switch Open circuit in engine stop switch related wires Faulty ignition switch Blown PGM-FI fuse (20 A) Open circuit in engine stop switch ground 	<ul style="list-style-type: none"> Engine does not start 	5-80
No blinks	ECM output line malfunction	<ul style="list-style-type: none"> ECM output voltage line (Yellow/Red wire) short circuit. 	<ul style="list-style-type: none"> Engine does not start 	—
No blinks	MIL circuit malfunction	<ul style="list-style-type: none"> Faulty ECM Open or short circuit in MIL wire 	<ul style="list-style-type: none"> Engine operates normally 	5-8
Stay lit	Data link circuit malfunction	<ul style="list-style-type: none"> Short circuit in data link connector Faulty ECM Short circuit in data link connector wire 	<ul style="list-style-type: none"> Engine operates normally 	—
1 Blink	MAP sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on MAP sensor connector Open or short circuit in MAP sensor wire Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-14
2 Blinks	MAP sensor performance problem	<ul style="list-style-type: none"> Loose or poor connection of the MAP sensor vacuum hose Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-15
7 Blinks	ECT sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on ECT sensor Open or short circuit in ECT sensor wire Faulty ECT sensor 	<ul style="list-style-type: none"> Hard start at a low temperature (Simulate using numerical values; 90 °C/ 194 °F) 	5-16
8 Blinks	TP sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on TP sensor connector Open or short circuit in TP sensor wire Faulty TP sensor 	<ul style="list-style-type: none"> Poor engine response and performance when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°) 	5-18
9 Blinks	IAT sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on IAT sensor Open or short circuit in IAT sensor wire Faulty IAT sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 25 °C/ 77 °F) 	5-20
11 Blinks	Vehicle speed sensor circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on vehicle speed sensor connector Open or short circuit in vehicle speed sensor connector Faulty vehicle speed sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-21

FUEL SYSTEM (Programmed Fuel Injection)

MIL	Detection Item	Causes	Symptoms	Refer to
12 Blinks	No.1 injector (rear) circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.1 (rear) injector connector Open or short circuit in No.1 (rear) injector wire Faulty No.1 (rear) injector 	<ul style="list-style-type: none"> Engine does not start 	5-23
13 Blinks	No.2 injector (front) circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.2 (front) injector connector Open or short circuit in No.2 (front) injector wire Faulty No.2 (front) injector 	<ul style="list-style-type: none"> Engine does not start 	5-24
18 Blinks	Cam pulse generator no signal	<ul style="list-style-type: none"> Loose or poor contact on cam pulse generator Open or short circuit in cam pulse generator Faulty cam pulse generator 	<ul style="list-style-type: none"> Engine does not start 	5-24
19 Blinks	Ignition pulse generator no signal	<ul style="list-style-type: none"> Loose or poor contact on ignition pulse generator Open or short circuit in ignition pulse generator Faulty ignition pulse generator 	<ul style="list-style-type: none"> Engine does not start 	5-25
21 Blinks	O ₂ sensor circuit malfunction (G type only)	<ul style="list-style-type: none"> Loose or poor contact on O₂ sensor connector Short circuit in O₂ sensor Faulty O₂ sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-25
23 Blinks	O ₂ sensor heater malfunction (G type only)	<ul style="list-style-type: none"> Loose or poor contact on O₂ sensor connector Open or short circuit in O₂ sensor heater Faulty O₂ sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-27
33 Blinks	E ² -PROM in ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine operates normally Does not hold the self-diagnosis data 	5-28

MIL TROUBLESHOOTING

MIL 1 BLINK (MAP SENSOR)

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

1. MAP Sensor Output Voltage Inspection

Turn the ignition switch OFF.

Connect the test harness to ECM connectors (page 5-10).

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

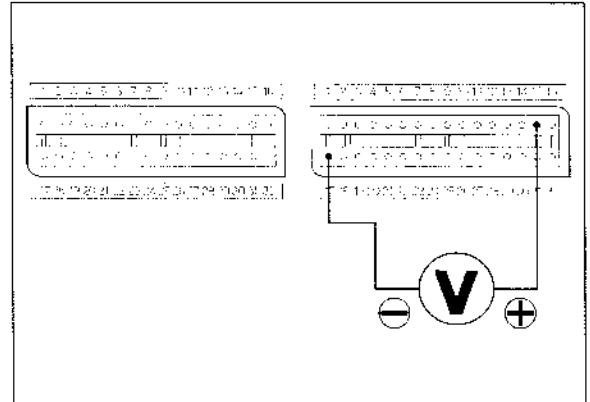
Measure the voltage at the test harness terminals.

Connection: B15 (+) -B17 (-)

Is the voltage within 2.7 – 3.1V?

YES – • Intermittent failure.
• Loose or poor contact on the ECM connectors.

NO – • About 5V
GO TO STEP 2.
• About 0V
GO TO STEP 3.



2. MAP Sensor Output Line Inspection

Turn the ignition switch OFF.

Connect the ECM connectors.

Disconnect the MAP sensor 3P connector.

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

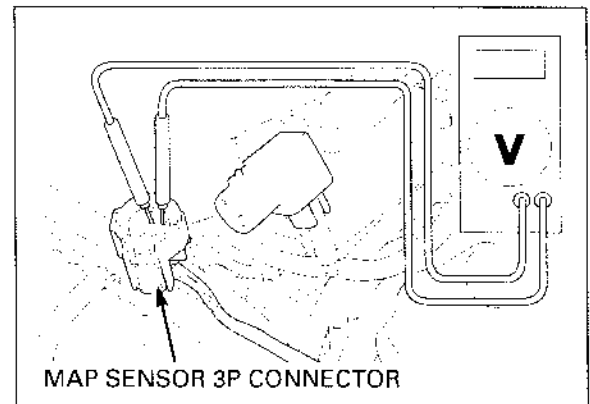
Measure the voltage at the wire harness side.

Connection: Light green/Yellow (+) – Green/Orange (-)

Is the voltage within 4.75 – 5.25V?

YES – Faulty MAP sensor.

NO – • Open circuit in Light green/Yellow wire.
• Open circuit in Green/Orange wire.



3. MAP Sensor Input Voltage Inspection

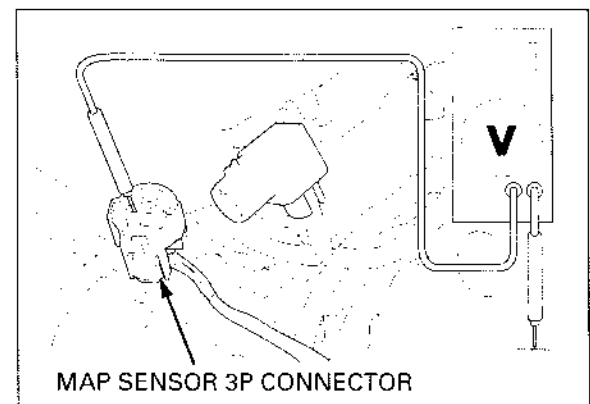
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Ground(-)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 4.

NO – GO TO STEP 5.



4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

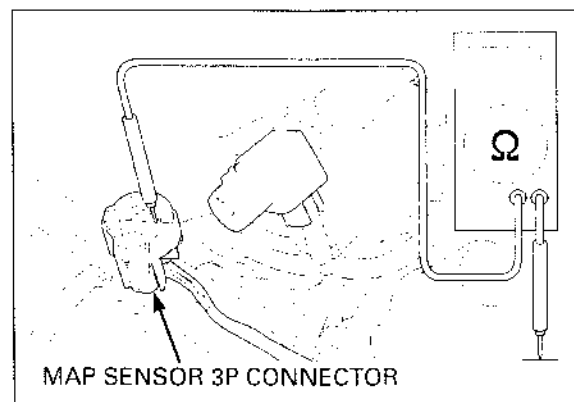
Check for continuity between the MAP sensor 3P connector terminal of the wire harness side and ground.

Connection: Light green/Yellow – Ground

Is there continuity?

YES – Short circuit in Light green/Yellow wire.

NO – Faulty MAP sensor.



5. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.

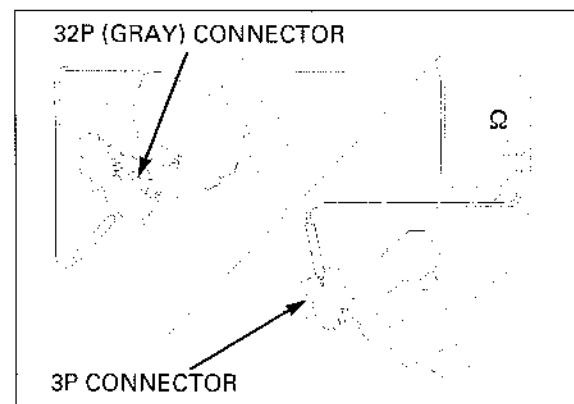
Disconnect the ECM connectors.

Check for continuity at the Yellow/Red wire between the MAP sensor 3P connector terminal and the ECM connectors.

Is there continuity?

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

NO – Open circuit in Yellow/Red wire.



MIL 2 BLINKS (MAP SENSOR)

1. MAP Sensor Hose Inspection

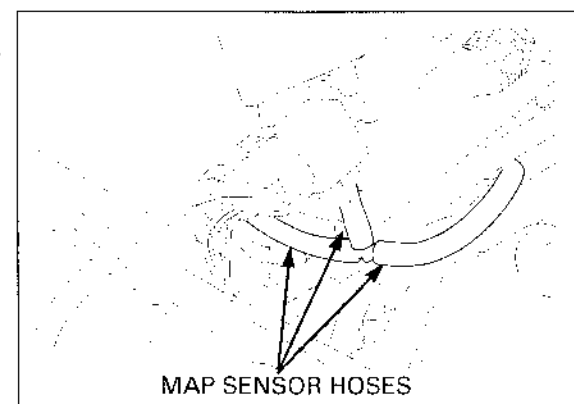
Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor hoses.

Is the MAP sensor hoses connection correct?

YES – GO TO STEP 2.

NO – Correct the hose installation.



FUEL SYSTEM (Programmed Fuel Injection)

2. MAP Sensor Output Voltage Inspection

Connect the test harness to ECM connectors (page 5-10).

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

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

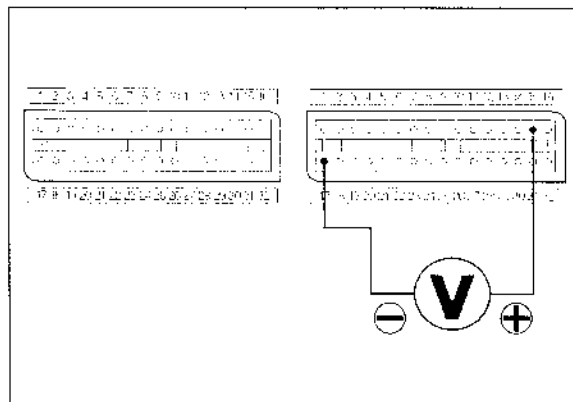
Connection: B15 (+) – B17 (–)

Standard: 2.7 – 3.1 V
(1,013 kPa/760 mmHg)

Is the voltage within 2.7 – 3.1 V?

YES – GO TO STEP 3.

NO – Faulty MAP sensor.



3. MAP Sensor Output Voltage Inspection At Idle

Start the engine.

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

Connection: B15 (+) – B17 (–)

Standard: 2.7 V maximum

Is the voltage less than 2.7 V?

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

NO – Faulty MAP sensor.

MIL 7 BLINKS (ECT SENSOR)

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

1. ECT Sensor Output Voltage Inspection

Turn the ignition switch OFF.

Connect the test harness to ECM connectors (page 5-10).

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

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

Connection: B27 (+) – B17 (–)

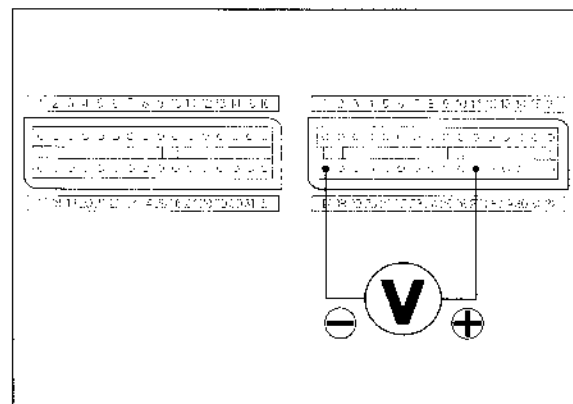
Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

YES –

- Intermittent failure.
- Loose or poor contact on the ECM connector.

NO – GO TO STEP 2.



2. ECT Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 2P (Green) connector.
Turn the ignition switch ON and engine stop switch "RUN".
Measure the voltage at the wire harness side of the ECT sensor 2P (Green) connector.

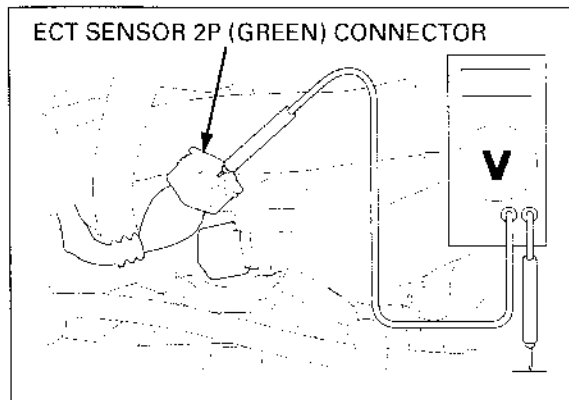
Connection: Pink/White (+) – Ground (–)

Standard: 4.75 – 5.25 V (20°C/68°F)

Is the voltage within 4.75 - 5.25 V?

YES – GO TO STEP 3.

NO – GO TO STEP 4.



3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 2P (Green) connector.
Measure the resistance at the ECT sensor terminals.

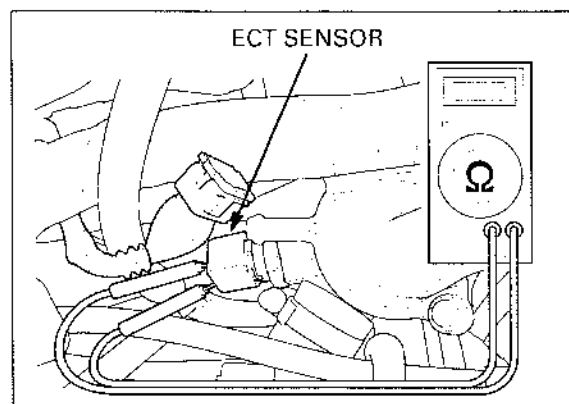
Connection: Pink/White – Green/Orange

Standard: 2 – 3 kΩ (20°C/68°F)

Is the resistance within 2 - 3 kΩ (20°C/68°F)?

NO – Faulty ECT sensor.

YES – GO TO STEP 4.



4. ECT Sensor Open Circuit Inspection

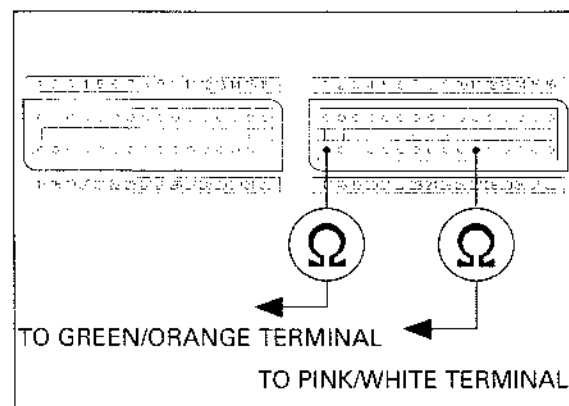
Check for continuity at the Pink/White and Green/Orange wire between the ECT sensor 2P (Green) connector terminal and the ECM connector.

Are there continuity?

YES – GO TO STEP 5.

NO –

- Open circuit in Pink/White wire.
- Open circuit in Green/Orange wire.



5. ECT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 2P (Green) connector.

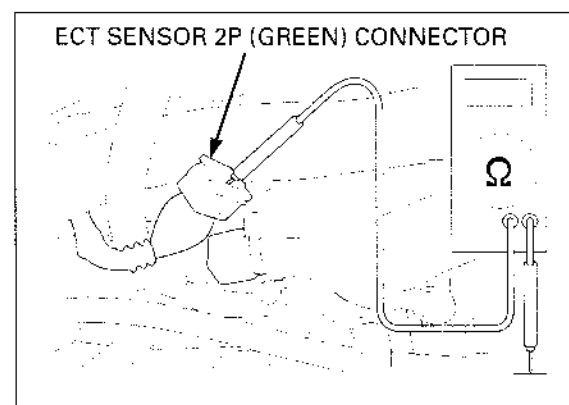
Check for continuity between the ECT sensor 2P (Green) connector terminal of the wire harness side and ground.

Connection: Pink/White – Ground

Is there continuity?

YES – Short circuit in Pink/White wire.

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



MIL 8 BLINKS (TP SENSOR)

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

1. TP Sensor Output Voltage

Turn the ignition switch OFF.

Connect the test harness to ECM connectors (page 5-10).

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

Measure the TP sensor output voltage at the test harness terminals.

Connection: B14 (+) – B17 (–)

Standard: *0.4 – 0.6 V (throttle fully closed)

*4.2 – 4.8 V (throttle fully opened)

NOTE:

- A voltage marked * refers to the value of the ECM output voltage (STEP 1) when the voltage reading shows 5 V.

When the ECM output voltage reading shows other than 5 V, derive the TP sensor output voltage at the test harness as follows:

In the case of the ECM output voltage is 4.75 V:

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

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

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

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

Is the voltage at the standard value?

- YES** – • Intermittent failure.
• Loose or poor contact on the ECM connector.

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P (Black) connector.

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

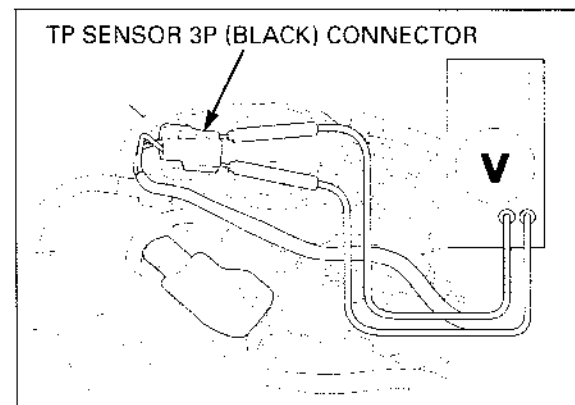
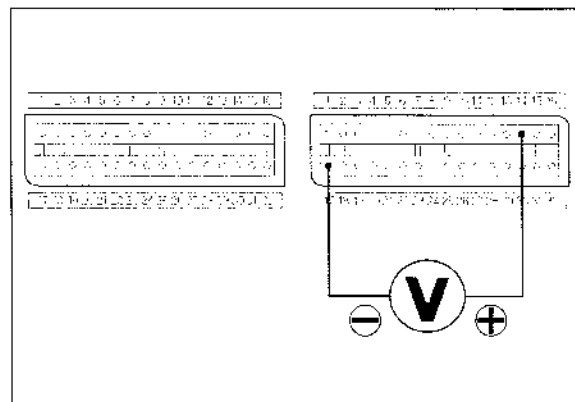
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



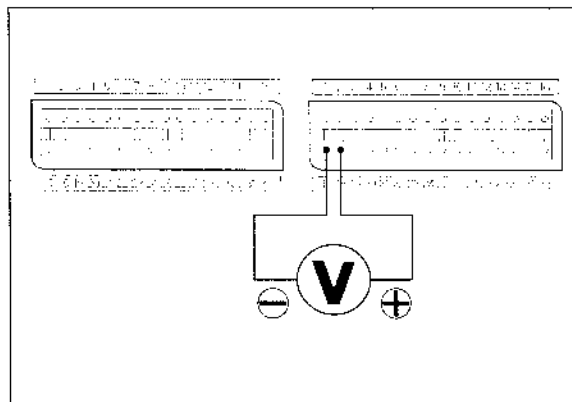
3. ECM Output Voltage Inspection

Measure the voltage at the test harness terminals.

Connection: B18 (+) – B17 (–)

Is the voltage within 4.75 – 5.25 V?

- YES** – • Open circuit in Yellow/Red wire.
• Open circuit in Green/Orange wire.
- NO** – Replace the ECM with a known good one, and recheck.



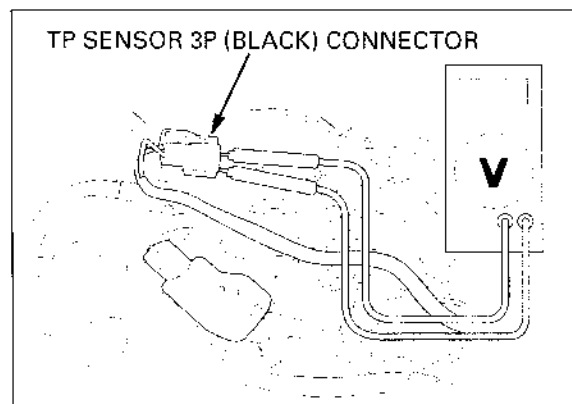
4. TP Sensor Output Line Inspection

Measure the voltage at the wire harness side.

Connection: Red/Yellow (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25 V?

- YES** – GO TO STEP 5.
- NO** – Open circuit in Red/Yellow wire.



5. TP Sensor Output Line Short Circuit Inspection

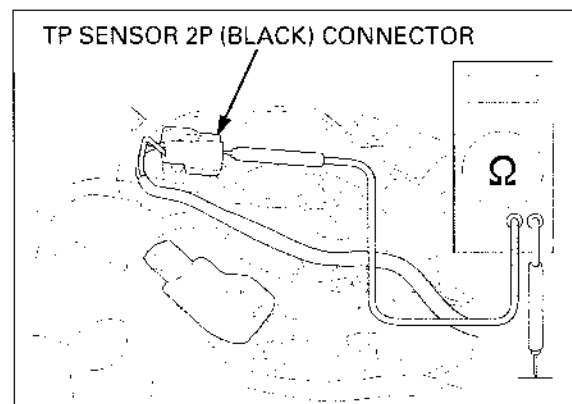
Turn the ignition switch OFF.

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

Connection: Red/Yellow – Ground

Is there continuity?

- YES** – Short circuit in Red/Yellow wire.
- NO** – Faulty TP sensor.



MIL 9 BLINKS (IAT SENSOR)

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

1. IAT Sensor Output Voltage Inspection

Turn the ignition switch OFF.
Connect the test harness to ECM connectors (page 5-10).

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

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

Connection: B30 (+) – B17 (–)

Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

YES – • Intermittent failure.
• Loose or poor contact on the ECM connector.

NO – GO TO STEP 2.

2. IAT Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

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

Measure the voltage at the wire harness side of IAT sensor 2P connector.

Connection: Gray/Blue (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 3.

NO – GO TO STEP 4.

3. IAT Sensor Resistance Inspection

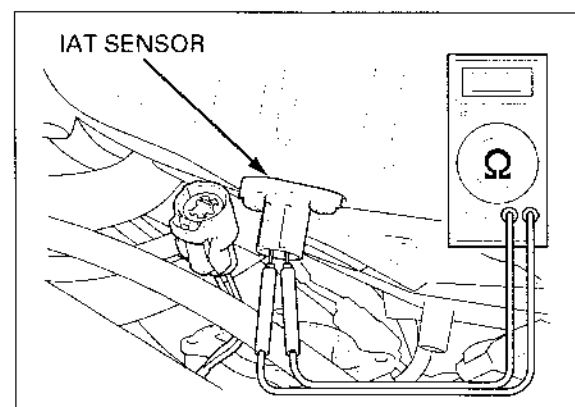
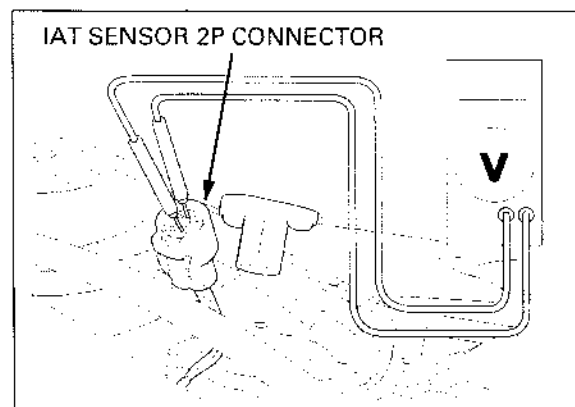
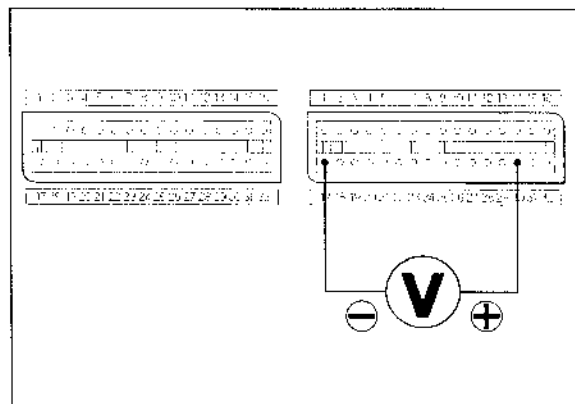
Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.
Measure the resistance at the IAT sensor terminals (at 20 - 30 °C/68 - 86°F).

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 4.



4. IAT Sensor Open Circuit Inspection

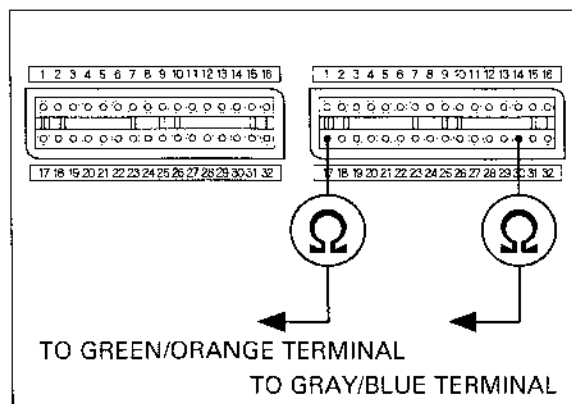
Check for continuity at the Gray/Blue and Green/Orange wire between the IAT sensor 2P connector terminal and the ECM connector.

Are there continuity?

YES – GO TO STEP 5.

NO –

- Open circuit in Gray/Blue wire
- Open circuit in Green/Orange wire



5. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

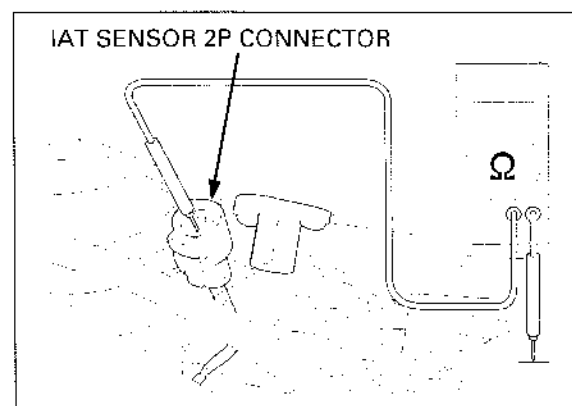
Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

Connection: Gray/Blue – Ground

Is there continuity?

YES – Short circuit in Gray/Blue wire.

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



MIL 11 BLINKS (VEHICLE SPEED SENSOR)

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

1. Vehicle Speed Sensor Pulse Inspection

Connect the test harness to the wire harness connectors (page 5-10).

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 is ON while slowly turning the rear wheel by hand.

Connection: B25 (+) – A4 (–)

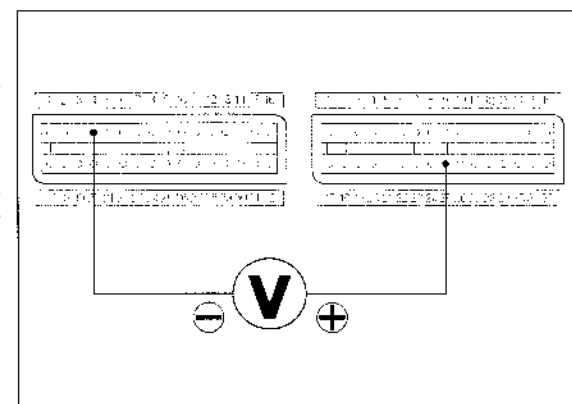
Standard: Repeat 0 to 5 V

Is the voltage at the standard value?

YES –

- Intermittent failure.
- Loose or poor contact on the ECM connectors.

NO – GO TO STEP 2.



FUEL SYSTEM (Programmed Fuel Injection)

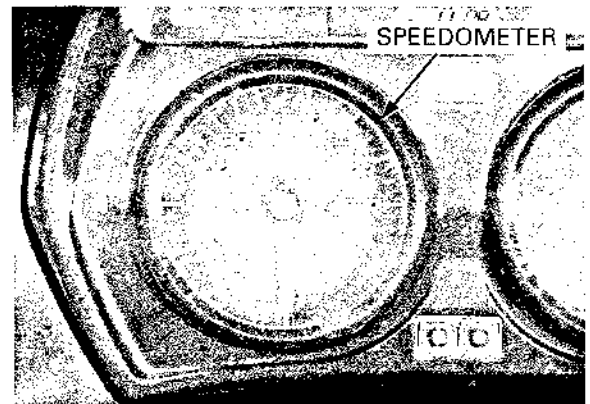
2. Combination Meter Inspection

Check for operation of speedometer.

Does the speed meter operate normal?

YES – Open or short circuit in the Pink/Green wire.

NO – GO TO STEP 3.



3. Vehicle Speed Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P (Blue) connector.

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

Measure the voltage at the wire harness side.

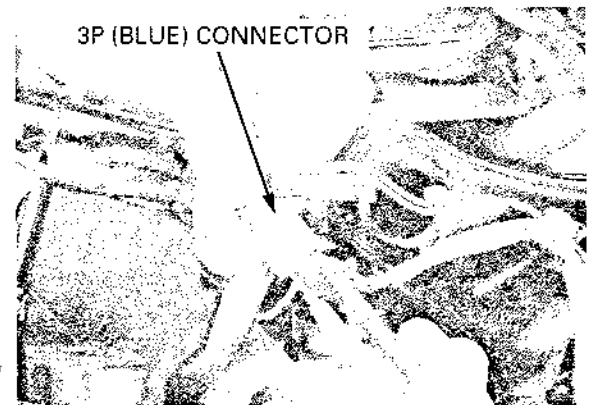
Connection: Black/Brown (+) – Green (-)

Does the battery voltage exist?

YES – GO TO STEP 4.

NO –

- Open circuit in the Black/Brown wire.
- Open circuit in the Green or Green/Black wire.
- Faulty combination meter.



4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

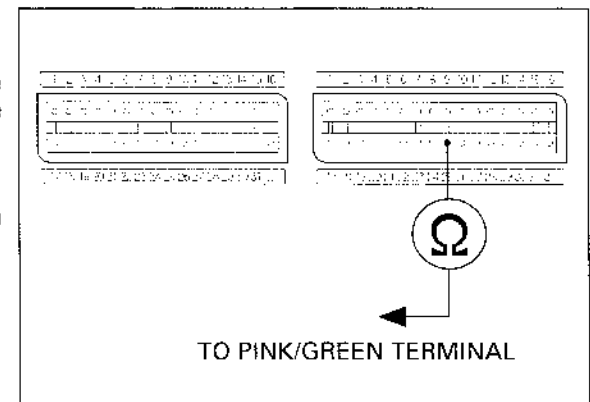
Disconnect the ECM connectors.

Check for continuity at the Pink/Green wire between the ECM connector terminal and the ground.

Is there continuity?

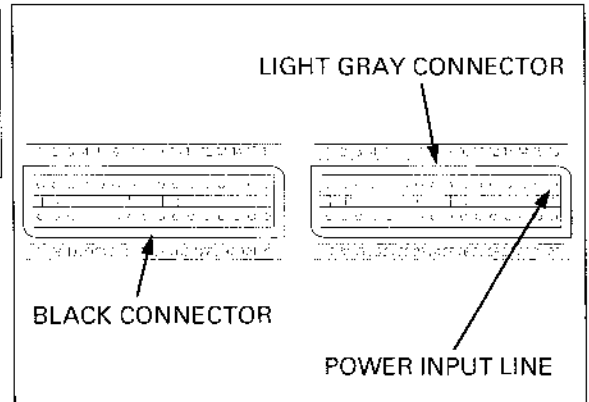
YES – Short circuit in the Pink or Pink/Green wire.

NO – Faulty vehicle speed sensor.



MIL 12 BLINKS (No.1 REAR INJECTOR)

MIL	INJECTOR	POWER INPUT LINE	SIGNAL	SIGNAL AT ECM
12	No.1 (rear)	Black/White	Pink/Blue	A11
13	No.2 (front)	Black/White	Pink/Yellow	A12



1. Injector Circuit Resistance Inspection

Turn the ignition switch OFF.

Connect the test harness to the wire harness connectors (page 5-10).

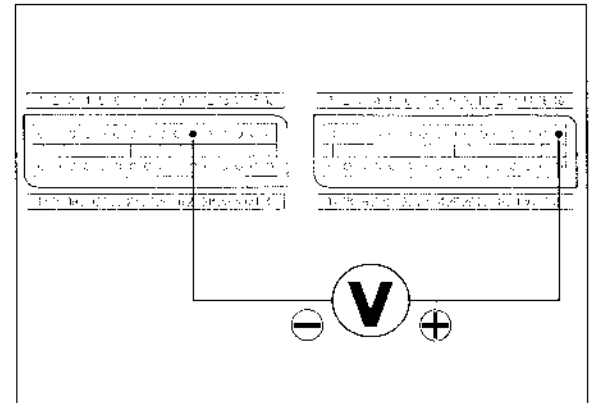
Measure the resistance of the ECM connector terminals.

Connection: **POWER INPUT LINE – SIGNAL AT ECM**

Is there continuity?

YES – GO TO STEP 4.

NO – GO TO STEP 2.



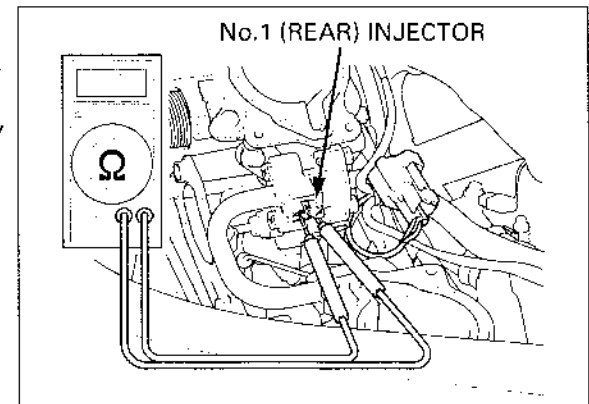
2. Injector Resistance Inspection

Disconnect the No.1 (rear) injector 2P (Brown) connector and measure the resistance of the No.1 (rear) injector 2P (Brown) connector terminals.

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

YES – GO TO STEP 3.

NO – Faulty injector.



3. Injector Input Voltage Inspection

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

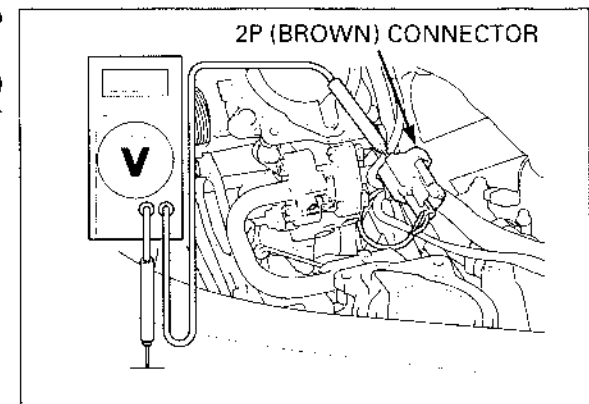
Measure the voltage between the No. 1 (rear) injector 2P (Brown) connector of the wire harness side and ground.

Connection: **POWER INPUT LINE (+) – Ground (–)**

Does the battery voltage exist?

YES – Open circuit in SIGNAL line wire.

NO – Open circuit in POWER INPUT line wire.



FUEL SYSTEM (Programmed Fuel Injection)

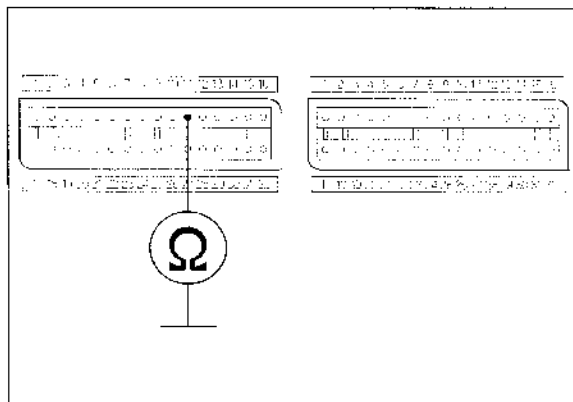
4. Injector Signal Line Short Circuit Inspection

Check for continuity between the ECM connector terminal and ground.

Connection: SIGNAL AT ECM – Ground

Is there continuity?

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



MIL 13 BLINKS (No.2 FRONT INJECTOR)

See page 5-23

MIL 18 BLINKS (CAM PULSE GENERATOR)

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

1. Cam Pulse Generator Peak Voltage Inspection at ECM

Turn the ignition switch OFF.

Connect the test harness to the wire harness connectors (page 5-10).

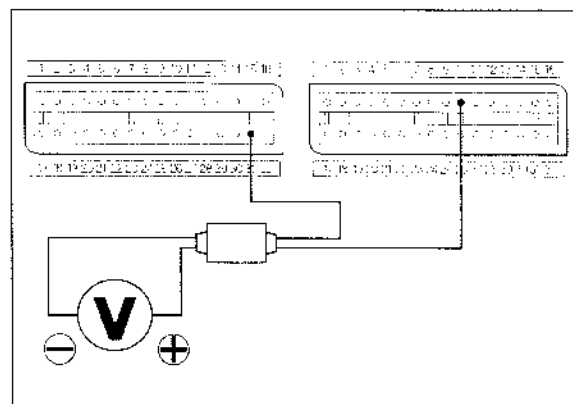
Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the test harness terminals.

Connection: B10 (+) – A31 (–)

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

- YES** – • Intermittent failure.
• Loose or poor contact on the ECM connector.

NO – GO TO STEP 2.



2. Cam Pulse Generator Peak Voltage Inspection

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

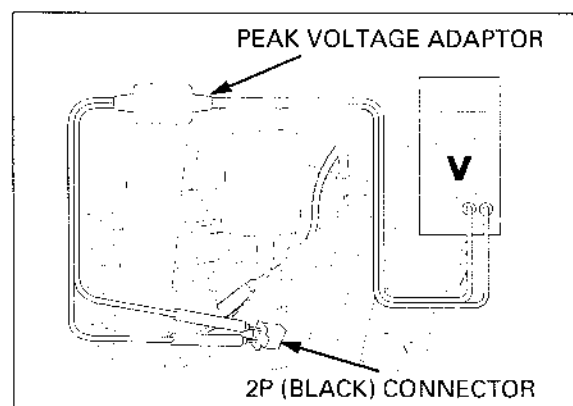
Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the cam pulse generator 2P (Black) connector.

Connection: Gray (+) – White/Yellow (–)

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

- YES** – Open or short circuit in the White/Yellow wire or Gray wire.

NO – Faulty cam pulse generator.



MIL 19 BLINKS (IGNITION PULSE GENERATOR)

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

1. Ignition Pulse Generator Peak Voltage Inspection at ECM

Turn the ignition switch OFF.

Connect the test harness to the wire harness connectors (page 5-10).

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

Connection: B9 (+) – A31 (–)

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

- YES** –
- Intermittent failure.
 - Loose or poor contact on the ECM connectors.

NO – GO TO STEP 2.

2. Ignition Pulse Generator Peak Voltage Inspection

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

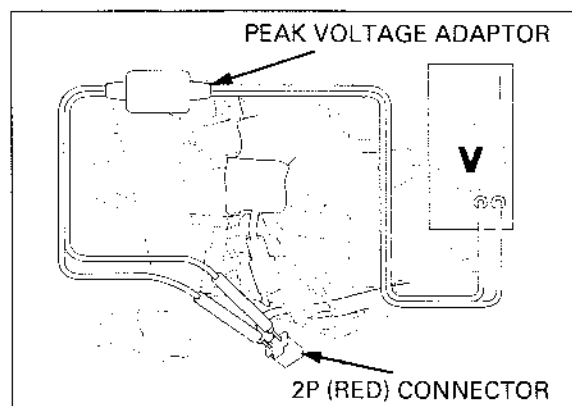
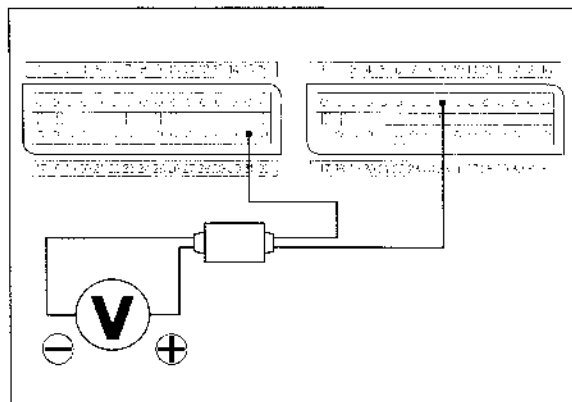
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P (Red) connector.

Connection: Yellow (+) – Yellow/White (–)

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

- YES** –
- Open or short circuit in the Yellow or White/Yellow wire.

NO – Faulty ignition pulse generator.



MIL 21 BLINKS (O₂ SENSOR): G type only

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

1. O₂ Sensor Output Voltage Inspection

Connect the test harness to the wire harness connectors (page 5-10).

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

Check the voltage at the test harness terminal.

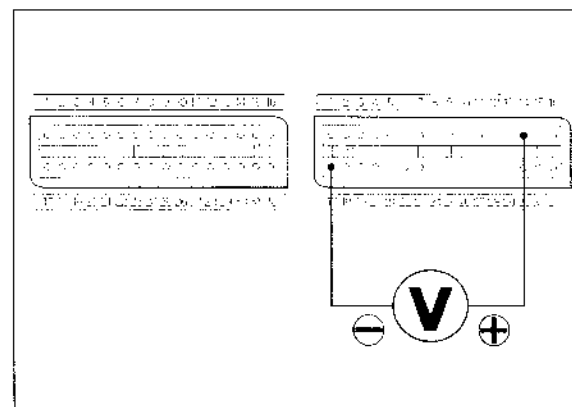
Connection: B14 (+) – B17 (–)

Standard: 0.3 – 0.6 V

Is the voltage at the standard value?

- YES** –
- Check the fuel pressure (page 5-47). If the system is correct,.

NO – GO TO STEP 2.



FUEL SYSTEM (Programmed Fuel Injection)

2. O₂ Sensor Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the O₂ sensor 4P connector.

Check the continuity between the test harness connector terminals and the O₂ Sensor 4P connector.

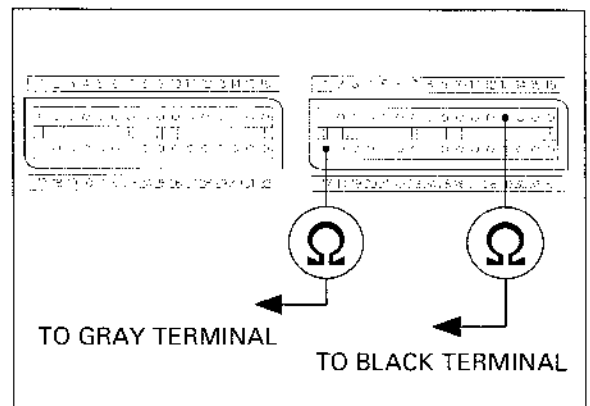
Connection: Black (White/Orange) – B13
Gray (Green/Orange) – B17

Is there continuity?

YES – GO TO STEP 3.

NO –

- Open circuit in the Black (White/Orange) wire
- Open circuit in the Gray (Green/Orange) wire



3. O₂ Sensor Short Circuit Inspection

Connect the O₂ sensor 4P connector.

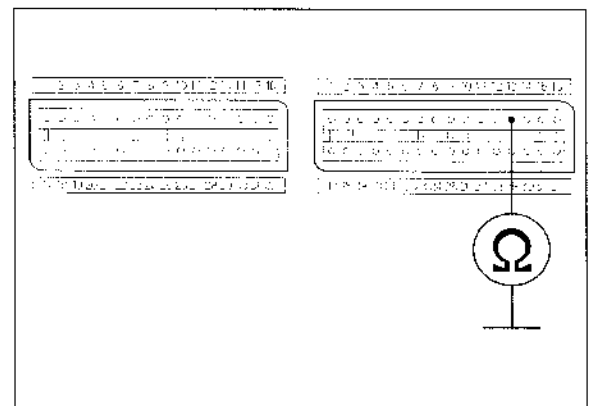
Check the continuity between the ECM connector terminal and ground.

Connection: B13 – Ground

Is there continuity?

YES – Short circuit in the Black (White/Orange) wire

NO – GO TO STEP 4.



4. O₂ Sensor Inspection

Replace the O₂ sensor with a new one (page 5-84).

Reset the ECM (page 5-9).

Start and warm up the engine up to coolant temperature is 80 °C (176 °C), then let it idle.

Check the voltage at the test harness terminal.

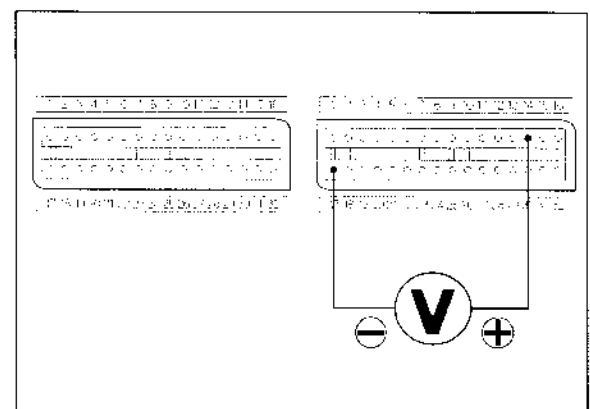
Connection: B14 (+) – B17 (–)

Standard: 0.3 – 0.6 V

Is the voltage at the standard value?

YES – Faulty original O₂ sensor.

NO – Check the fuel supply system.



**MIL 23 BLINKS (O₂ SENSOR HEATER):
G type only**

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

1. O₂ Sensor Heater Resistance Inspection

Turn the ignition switch OFF.

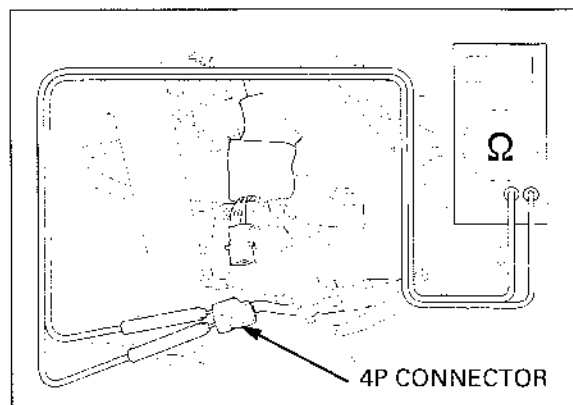
Disconnect the O₂ sensor 4P connector and measure the resistance at the sensor side connector white wire terminals.

Connection: White – White

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

YES – GO TO STEP 2.

NO – Faulty O₂ sensor



2. O₂ Sensor Heater Open circuit Inspection

Connect the O₂ sensor 4P connector.

Measure the resistance at the test harness terminals.

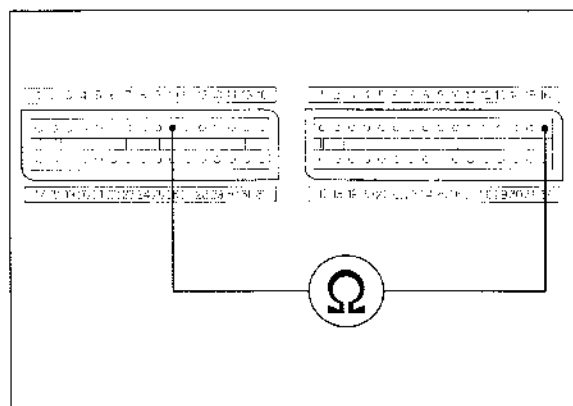
Connection: B16 – A10

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

YES – GO TO STEP 3.

NO –

- Open circuit in the Black/White wire
- Open circuit in the Black/Green wire



3. O₂ Sensor Heater Short Circuit Inspection 1

Disconnect the O₂ sensor 4P connector.

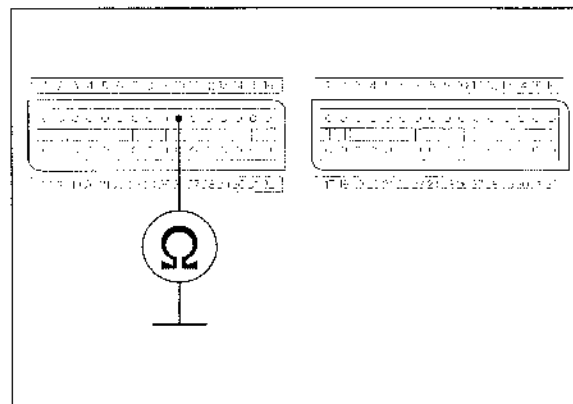
Check for continuity between the Black/Green wire terminal at test harness and ground.

Connection: A10 – Ground

Is there continuity?

YES – Short circuit in the Black/Green wire

NO – GO TO STEP 4.



FUEL SYSTEM (Programmed Fuel Injection)

4. O₂ Sensor Heater Short Circuit Inspection 2

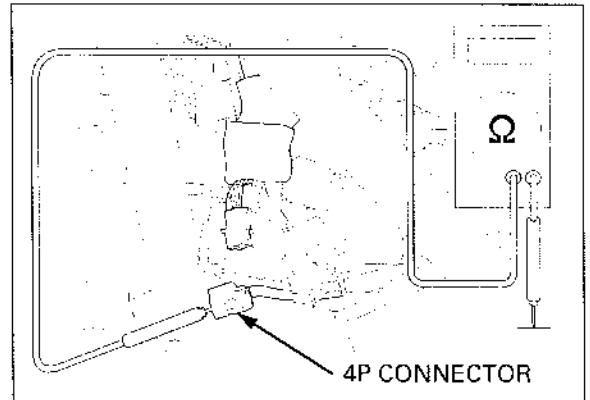
Check for continuity between the O₂ sensor 4P connector terminals and ground.

Connection: White – Ground

Is there continuity?

YES – Faulty O₂ sensor

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



MIL 33 BLINKS (E²-PROM)

1. Recheck MIL Brinks 1

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

Does the MIL blink 33 times?

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

NO – GO TO STEP 2.

2. Recheck MIL Brinks 2

Turn the ignition switch OFF.

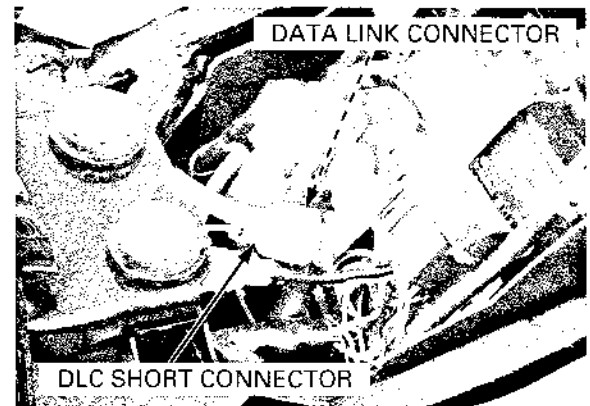
Short the data link connector with a special tool (page 5-8).

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

Does the MIL blink 33 times?

YES – GO TO STEP 3.

NO – Intermittent failure



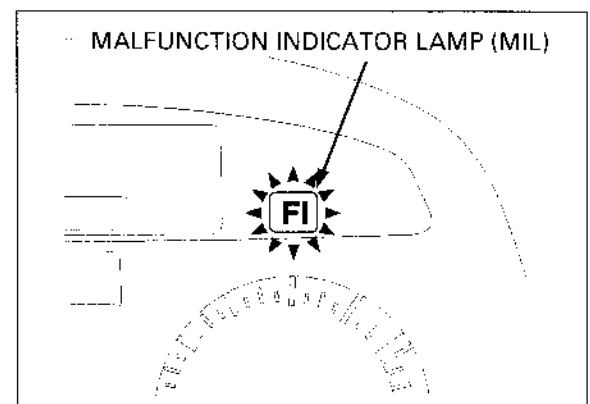
3. Recheck MIL Brinks 3

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

Does the MIL blink 33 times?

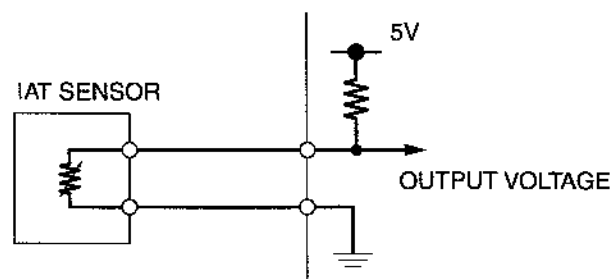
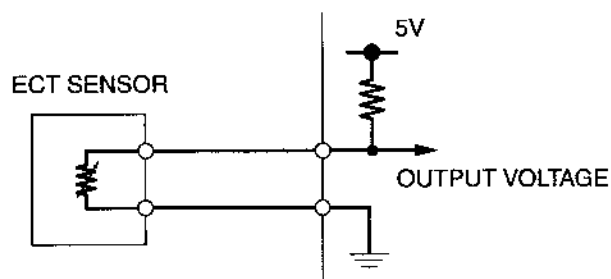
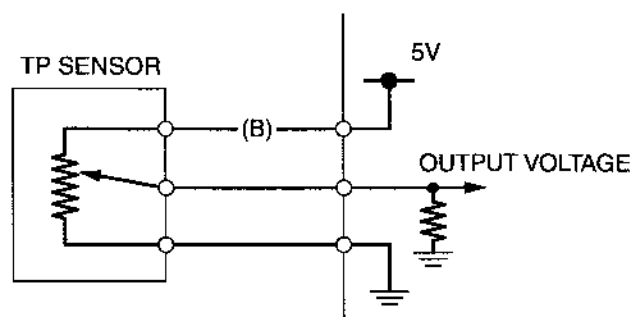
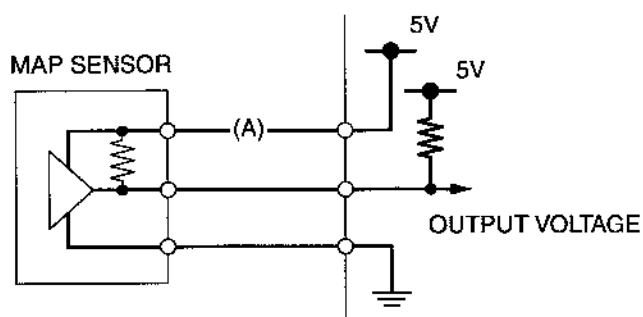
YES – Replace the ECM with a new one, and recheck.

NO – Intermittent failure



DTC CODE INDEX

- The Diagnostic Trouble Codes (DTC) are based upon Malfunction Indicator Lamp (MIL) codes and are displayed as hyphenated numbers. The digits in front of the hyphen are equal to an MIL code and indicate the Function Failure. The digit behind the hyphen details the symptom. For example, in the case of the TP sensor, the ECM stores two levels of information, a function failure and a detail of the symptom:
(08 - 1) = TP sensor voltage - *lower* than the specified value
or
(08 - 2) = TP sensor voltage - *higher* than the specified value.
- The MAP, ECT, TP and IAT sensor can be made diagnoses according to the sensor output voltage value. If the failure occurs, the ECM determines the failure function, the output voltage is high or low compared to the standard voltage, then read out the DTC to the HDS Pocket Tester.
For example:
 - If the input voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be read out.
 - If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be read out.



FUEL SYSTEM (Programmed Fuel Injection)

DTC	Detection Item	Causes	Symptoms	Refer to
–	ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine does not start MIL does not blink 	5-80
–	ECM power input circuit malfunction	<ul style="list-style-type: none"> Open circuit at the power input wire of the ECM Faulty bank angle sensor Open circuit in bank angle sensor related circuit Faulty engine stop relay Open circuit in engine stop relay related wires Faulty engine stop switch Open circuit in engine stop switch related wires Faulty ignition switch Blown PGM-FI fuse (20 A) Open circuit in engine stop switch ground Blown sub-fuse (10 A) (Starter/ignition) 	<ul style="list-style-type: none"> Engine does not start MIL does not blink 	5-80
–	ECM output line malfunction	<ul style="list-style-type: none"> ECM output voltage line (Yellow/Red wire) short circuit. 	<ul style="list-style-type: none"> Engine does not start 	–
–	MIL circuit malfunction	<ul style="list-style-type: none"> Faulty ECM Open or short circuit in MIL wire 	<ul style="list-style-type: none"> Engine operates normally MIL does not blink 	5-8
–	Data link circuit malfunction	<ul style="list-style-type: none"> Short circuit in data link connector Faulty ECM Short circuit in data link connector wire 	<ul style="list-style-type: none"> Engine operates normally MIL stays lit 	–
1-1	MAP sensor circuit low voltage	<ul style="list-style-type: none"> Open or short circuit in MAP sensor wire Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-32
1-2	MAP sensor circuit high voltage	<ul style="list-style-type: none"> Loose or poor contact on MAP sensor connector Open circuit in MAP sensor wire Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-33
2-1	MAP sensor performance problem	<ul style="list-style-type: none"> Loose or poor connection of the MAP sensor vacuum hose Faulty MAP sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-34
7-1	ECT sensor circuit low voltage	<ul style="list-style-type: none"> Short circuit in ECT sensor wire Faulty ECT sensor 	<ul style="list-style-type: none"> Hard start at a low temperature (Simulate using numerical values; 90 °C/194 °F) 	5-35
7-2	ECT sensor circuit high voltage	<ul style="list-style-type: none"> Loose or poor contact on ECT sensor Open circuit in ECT sensor wire Faulty ECT sensor 	<ul style="list-style-type: none"> Hard start at a low temperature (Simulate using numerical values; 90 °C/194 °F) 	5-35
8-1	TP sensor circuit low voltage	<ul style="list-style-type: none"> Loose or poor contact on TP sensor connector Open or short circuit in TP sensor wire Faulty TP sensor 	<ul style="list-style-type: none"> Poor engine performance and response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°) 	5-36
8-2	TP sensor circuit high voltage	<ul style="list-style-type: none"> Open circuit in TP sensor wire Faulty TP sensor 	<ul style="list-style-type: none"> Poor engine performance and response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°) 	5-38
9-1	IAT sensor circuit low voltage	<ul style="list-style-type: none"> Short circuit in IAT sensor wire Faulty IAT sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 25 °C/77 °F) 	5-38
9-2	IAT sensor circuit high voltage	<ul style="list-style-type: none"> Loose or poor contact on IAT sensor Open circuit in IAT sensor wire Faulty IAT sensor 	<ul style="list-style-type: none"> Engine operates normally (Simulate using numerical values; 25 °C/77 °F) 	5-39

FUEL SYSTEM (Programmed Fuel Injection)

DTC	Detection Item	Causes	Symptoms	Refer to
11-1	Vehicle speed sensor no signal (circuit malfunction)	<ul style="list-style-type: none"> Loose or poor contact on vehicle speed sensor connector Open or short circuit in vehicle speed sensor connector Faulty vehicle speed sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-40
12-1	No.1 injector (rear) circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.1 (rear) injector connector Open or short circuit in No.1 (rear) injector wire Faulty No.1 (rear) injector 	<ul style="list-style-type: none"> Engine does not start 	5-41
13-1	No.2 injector (front) circuit malfunction	<ul style="list-style-type: none"> Loose or poor contact on No.2 (front) injector connector Open or short circuit in No.2 (front) injector wire Faulty No.2 (front) injector 	<ul style="list-style-type: none"> Engine does not start 	5-43
18-1	Cam pulse generator no signal	<ul style="list-style-type: none"> Loose or poor contact on cam pulse generator Open or short circuit in cam pulse generator Faulty cam pulse generator 	<ul style="list-style-type: none"> Engine does not start 	5-43
19-1	Ignition pulse generator no signal	<ul style="list-style-type: none"> Loose or poor contact on ignition pulse generator Open or short circuit in ignition pulse generator Faulty ignition pulse generator 	<ul style="list-style-type: none"> Engine does not start 	5-43
21-1	O ₂ sensor circuit malfunction (G type only)	<ul style="list-style-type: none"> Loose or poor contact on O₂ sensor connector Short circuit in O₂ sensor Faulty O₂ sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-44
23-1	O ₂ sensor heater malfunction (G type only)	<ul style="list-style-type: none"> Loose or poor contact on O₂ sensor connector Open or short circuit in O₂ sensor Faulty O₂ sensor 	<ul style="list-style-type: none"> Engine operates normally 	5-45
33-1	E ² -PROM in ECM malfunction	<ul style="list-style-type: none"> Faulty ECM 	<ul style="list-style-type: none"> Engine operates normally Does not hold the self-diagnosis data 	5-46

DTC TROUBLESHOOTING

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

1. MAP Sensor System Inspection

Turn the ignition switch ON and engine stop switch "RUN".
Check the MAP sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES - GO TO STEP 2.

NO -

- Intermittent failure.
- Loose or poor contact on the MAP sensor connector.

2. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the MAP sensor 3P connector.

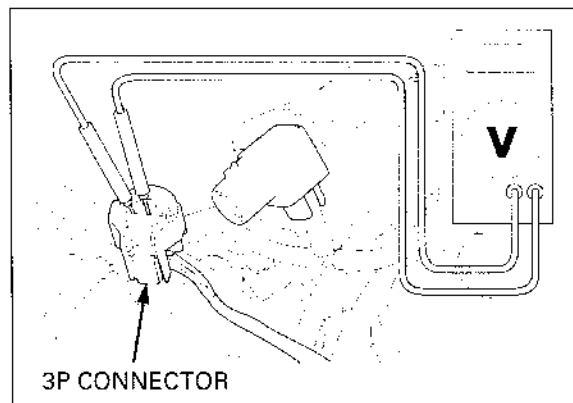
Turn the ignition switch ON and engine stop switch "RUN".
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) - Green/Orange (-)

Is the voltage within 4.75 - 5.25V?

YES - GO TO STEP 5.

NO - GO TO STEP 3.



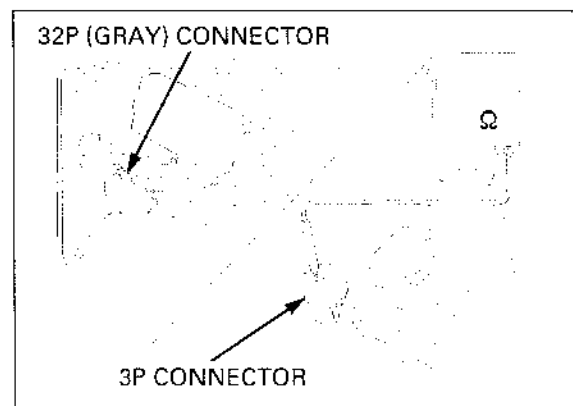
3. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.
Disconnect the ECM connectors.
Check for continuity at the Yellow/Red wire between the MAP sensor 3P connector terminal and the ECM connectors.

Is there continuity?

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

NO - Open circuit in Yellow/Red wire.



4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the MAP sensor 3P connector and ECM connector.

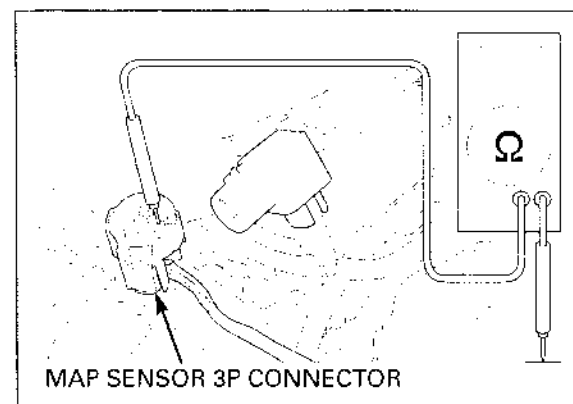
Check for continuity between the MAP sensor 3P connector terminal of the wire harness side and ground.

Connection: Light green/Yellow - Ground

Is there continuity?

YES - Short circuit in Light green/Yellow wire.

NO - GO TO STEP 5.



5. MAP Sensor Inspection

Replace the MAP sensor with a new one (page 5-73).

Reset the ECM (page 5-9).

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

Check the MAP sensor with the HDS Pocket Tester.

Is DTC 1-1 indicated?

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

NO – Faulty original MAP sensor.

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

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

1. MAP Sensor System Inspection 1

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

Check the MAP sensor with the HDS Pocket Tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the MAP sensor connector.

2. MAP Sensor System Inspection 2

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector. Connect the MAP sensor terminals at the wire harness side with a jumper wire.

Connection: Light green/Yellow – Green/Orange

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

Check the MAP sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – Faulty MAP sensor.

NO – GO TO STEP 3.

3. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF. Remove the jumper wire.

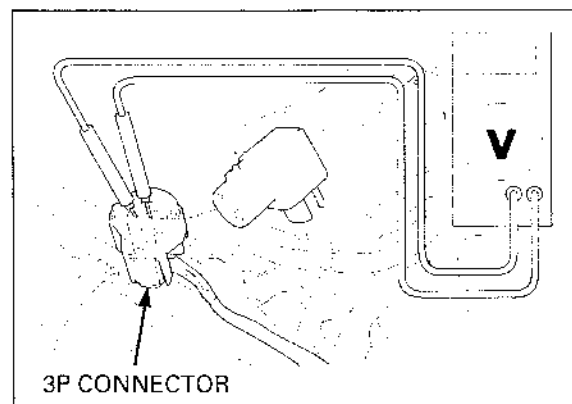
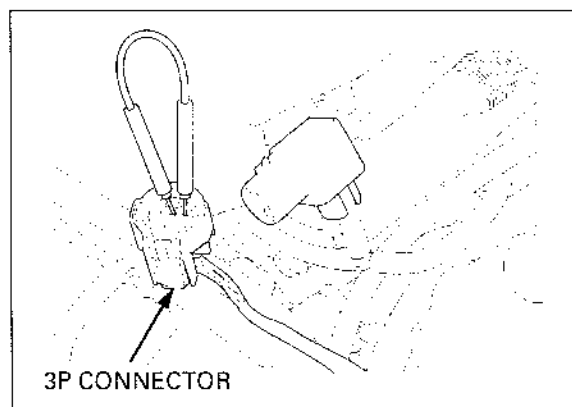
Turn the ignition switch ON. Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 4.

NO – Open circuit in Green/Orange wire.



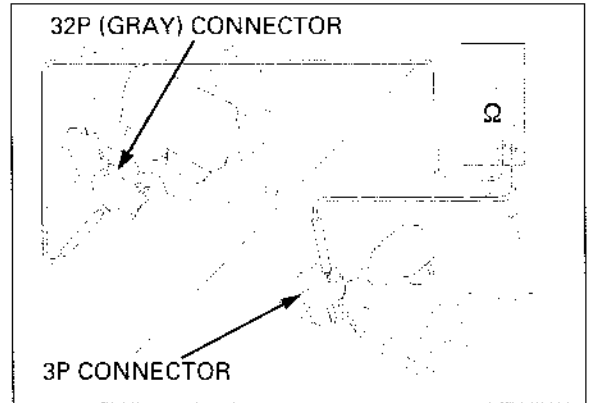
FUEL SYSTEM (Programmed Fuel Injection)

4. MAP Sensor Output Line Open Circuit Inspection

Disconnect the ECM connectors.
Check for continuity at the Light green/Yellow wire between the MAP sensor 3P connector terminal and the ECM connector.

Is there continuity?

- YES** – Replace the ECM with a new one, and recheck.
NO – Open circuit in Light green/Yellow wire.



DTC 2-1 (MAP SENSOR)

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

1. MAP Sensor System Inspection

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

Start the engine and check the MAP sensor with the HDS Pocket Tester at idle speed.

Is 1.6 V indicated?

- YES** – Intermittent failure.
NO – GO TO STEP 2.

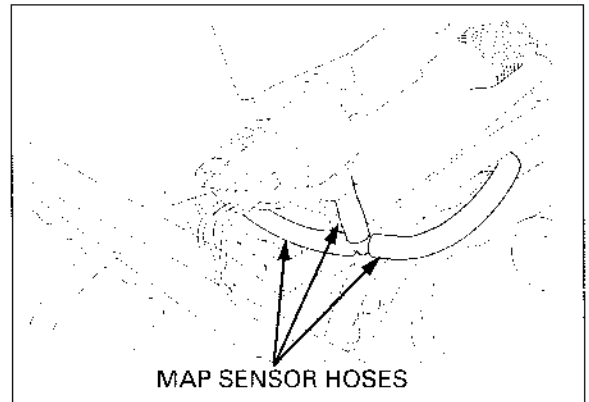
2. Manifold Absolute Pressure Test

Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor hoses.

Is the MAP sensor hoses connection correct?

- YES** – GO TO STEP 3.
NO – Correct the hose installation.



3. MAP Sensor System Inspection

Replace the MAP sensor with a new one (page 5-73).

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

Start the engine and check the MAP sensor with the HDS Pocket Tester at idle speed.

Is 1.6 V indicated?

- YES** – Faulty original MAP sensor.
NO – Replace the ECM with a new one, and recheck.

DTC 7-1 (ECT SENSOR LOW VOLTAGE)

1. ECT Sensor System Inspection

Turn the ignition switch ON.

Check the ECT sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the ECT sensor connector.

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 2P (Green) connector.

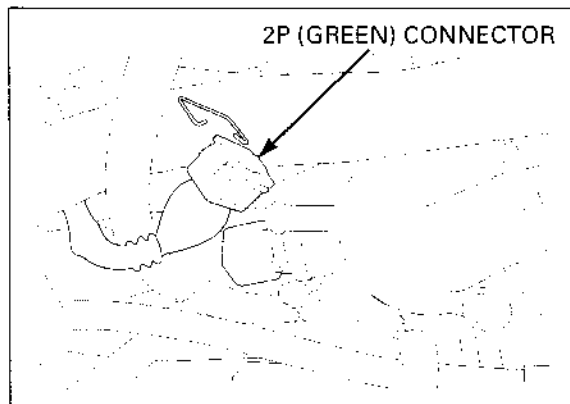
Turn the ignition switch ON and engine stop switch "RUN".

Check the ECT sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty the ECT sensor.



3. ECT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 2P (Green) connector.

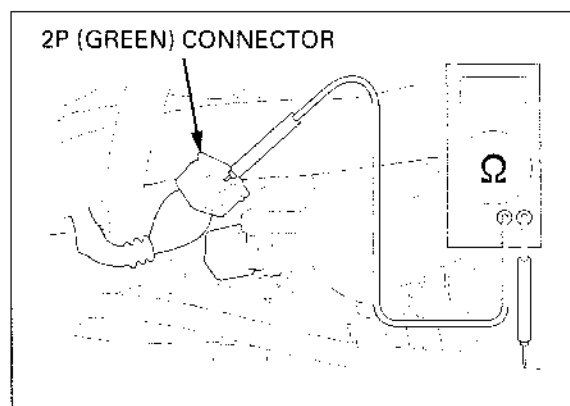
Check for continuity between the ECT sensor 2P (Green) connector terminal of the wire harness side and ground.

Connection: Pink/White – Ground

Is there continuity?

YES – Short circuit in Pink/White wire.

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



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 2P (Green) connector and recheck the DTC.

1. ECT Sensor System Inspection

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

Check the ECT sensor with the HDS Pocket Tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the ECT sensor 2P (Green) connector.

FUEL SYSTEM (Programmed Fuel Injection)

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 2P (Green) connector.
Connect the ECT sensor terminals with a jumper wire.

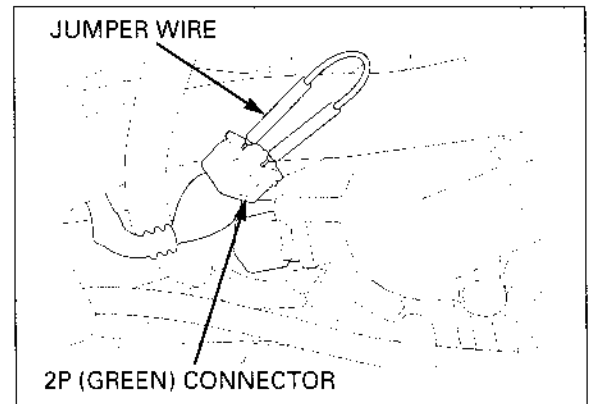
Connection: Pink/White – Green/Orange

Turn the ignition switch ON and engine stop switch "RUN".
Check the ECT sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – Faulty the ECT sensor.

NO – GO TO STEP 3.



3. ECT Sensor Output Line Inspection

Turn the ignition switch OFF.

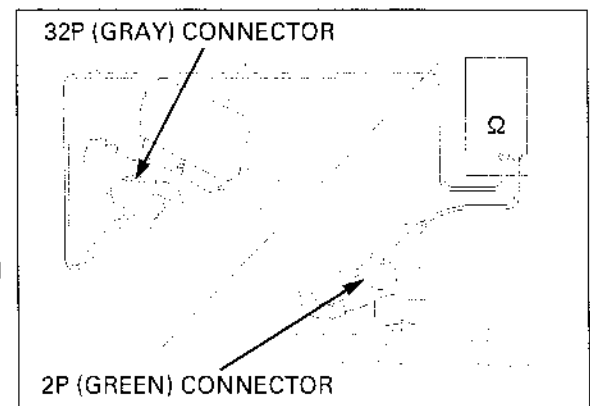
Remove the jumper wire.

Disconnect the ECM connector.
Check for continuity at the Pink/White and Green/Orange wire between the ECT sensor 2P (Green) connector terminal and the ECM connector.

Are there continuity?

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

NO – • Open circuit in Pink/White wire.
• Open circuit in Green/Orange wire.



DTC 8-1 (TP SENSOR LOW VOLTAGE)

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

1. TP Sensor System Inspection

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

Check the TP sensor with the HDS Pocket Tester when the throttle fully closed.

Is about 0 V indicated?

YES – • Intermittent failure.
• Loose or poor contact on the TP sensor connector.

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the TP sensor 3P (Black) connector.

Turn the ignition switch ON.

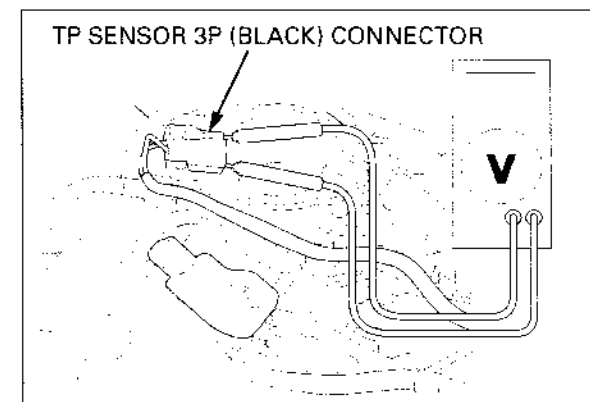
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



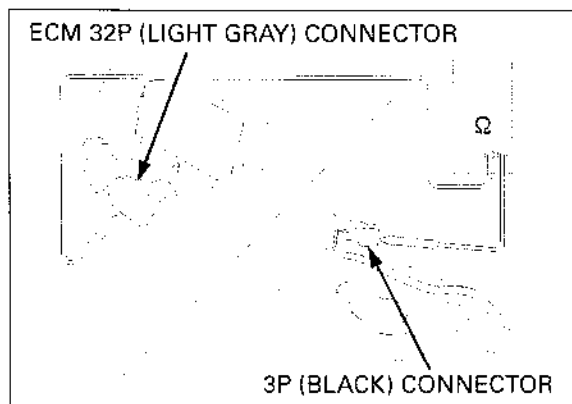
3. TP Sensor Circuit Inspection

Disconnect the ECM connector.
Check for continuity at the Yellow/Red wire between the TP sensor 3P (Black) connector terminal and the ECM connector.

Is there continuity?

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

NO – Open circuit in Yellow/Red wire.



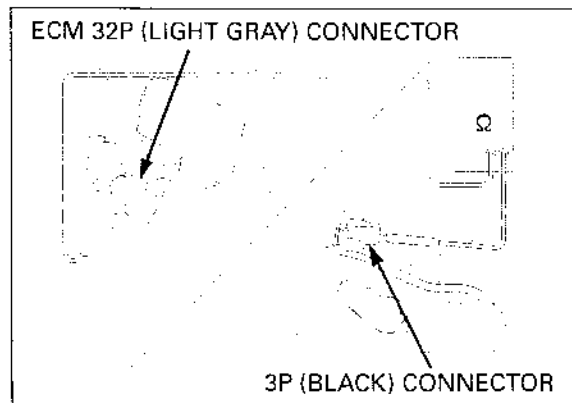
4. TP Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.
Check for continuity at the Red/Yellow wire between the TP sensor 3P (Black) connector terminal and the ECM connector.

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Red/Yellow wire.



5. TP Sensor Output Line Short Circuit Inspection

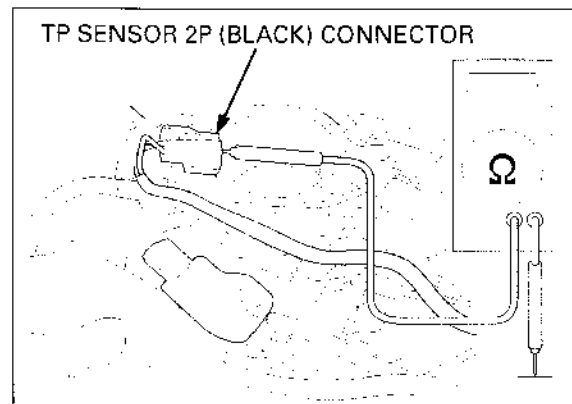
Disconnect the TP sensor 3P (Black) connector.
Check for continuity between the TP sensor 3P (Black) connector terminal of the wire harness side and ground.

Connection: Red/Yellow – Ground

Is there continuity?

YES – Short circuit in Red/Yellow wire.

NO – GO TO STEP 6.



6. TP Sensor Inspection

Replace the TP sensor with a new one.
Turn the ignition switch ON and engine stop switch "RUN".
Reset the ECM (page 5-9).

Check the TP sensor with the HDS Pocket Tester.

Is DTC 8-1 indicated?

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

NO – Faulty original TP sensor.

FUEL SYSTEM (Programmed Fuel Injection)

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

1. TP Sensor System Inspection

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

Check the TP sensor with the HDS Pocket Tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the TP sensor 3P (Black) connector.

2. TP Sensor Resistance Inspection

Turn the ignition switch OFF.

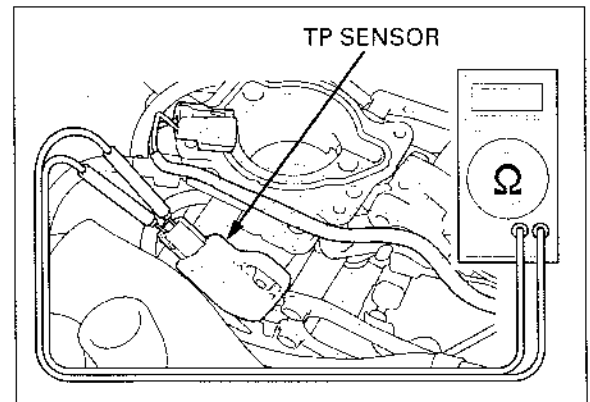
Disconnect the TP sensor 3P (Black) connector. Measure the resistance at the TP sensor side.

Connection: Red/Yellow – Green/Orange

Is the resistance within 0.4 - 0.6 Ω ?

YES – GO TO STEP 3.

NO – Faulty TP sensor.



3. TP Sensor Input Voltage Inspection

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

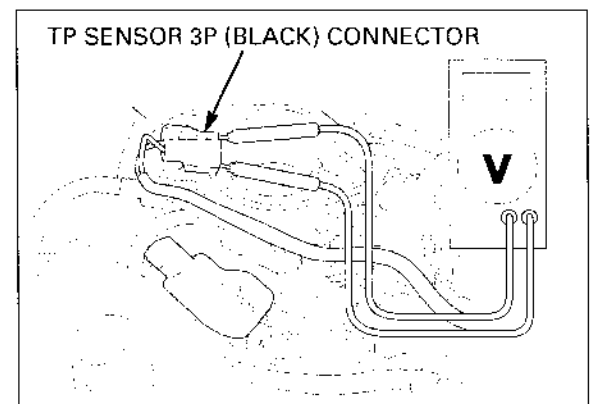
Measure the voltage at the wire harness side.

Connection: Yellow/Red (+) – Green/Orange (-)

Is the voltage within 4.75 – 5.25 V?

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

NO – Open circuit in Green/Orange wire.



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. IAT Sensor System Inspection

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

Check the IAT 2P sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the IAT sensor 2P connector.

2. IAT Sensor Inspection

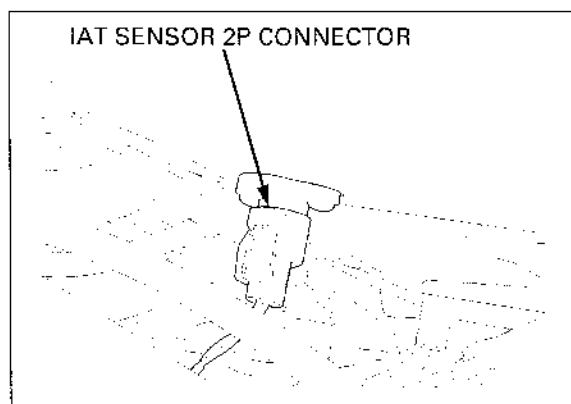
Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

Turn the ignition switch ON and engine stop switch "RUN".
Check the IAT sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor.



3. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

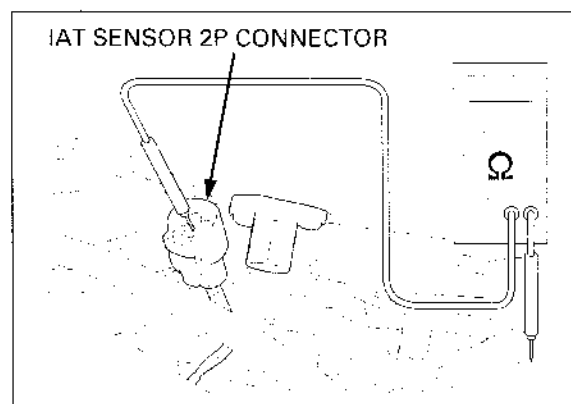
Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

Connection: Gray/Blue – Ground

Is there continuity?

YES – Short circuit in Gray/Blue wire.

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



DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

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

1. IAT Sensor System Inspection

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

Check the IAT sensor with the HDS Pocket Tester.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the IAT sensor 2P connector.

2. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.
Connect the IAT sensor terminals with a jumper wire.

Connection: Gray/Blue – Green/Orange

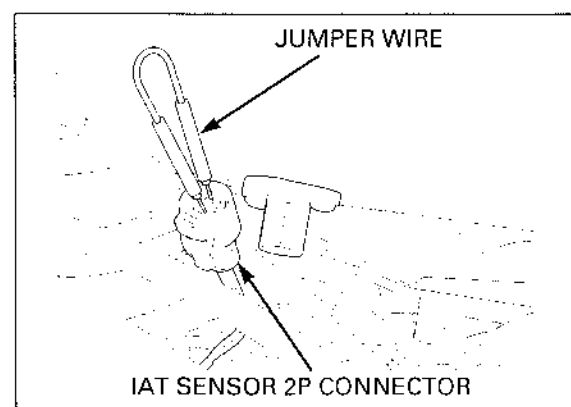
Turn the ignition switch ON and engine stop switch "RUN".

Check the IAT sensor with the HDS Pocket Tester.

Is about 0 V indicated?

YES – Faulty IAT sensor.

NO – GO TO STEP 3.



FUEL SYSTEM (Programmed Fuel Injection)

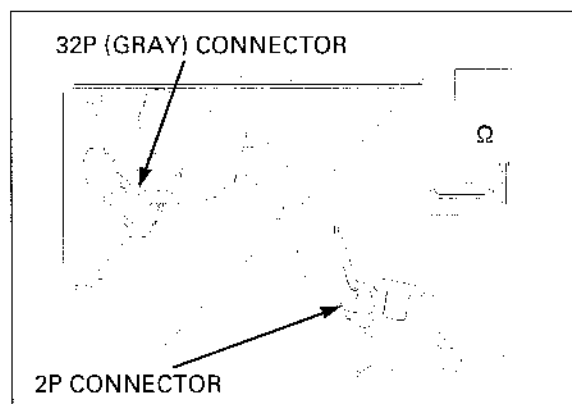
3. IAT Sensor Output Line Inspection

Disconnect the ECM connector.
Check for continuity at the Gray/Blue (IAT) and Green/Orange (SG) wire between the IAT sensor 2P connector terminal and the ECM connector.

Are there continuity?

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

NO –
• Open circuit in Gray/Blue wire.
• Open circuit in Green/Orange wire.



DTC 11-1 (VEHICLE SPEED SENSOR)

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

1. Vehicle Speed Sensor System Inspection

Support the motorcycle securely and place the rear wheel off the ground.
Start the engine and shift the transmission into gear.

Check the vehicle speed sensor with the HDS at 10 km/h.

Is 10 km/h indicated?

YES –
• Intermittent failure.
• Loose or poor contact on the vehicle speed sensor connector.

NO – GO TO STEP 2.

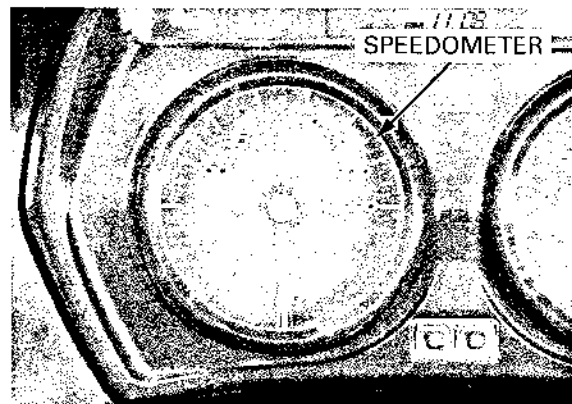
2. Combination Meter Inspection

Check for operation of speedometer.

Does the speed meter operate normally?

YES – Open or short circuit in the Pink/Green wire.

NO – GO TO STEP 3.



3. Vehicle Speed Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P (Blue) connector.

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

Measure the voltage at the wire harness side.

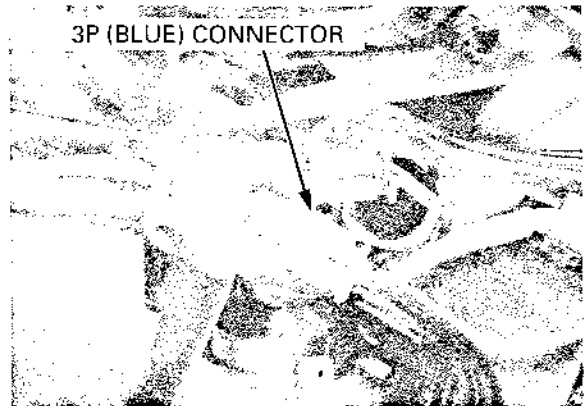
Connection: Black/Brown (+) – Green (–)

Does the battery voltage exist?

YES – GO TO STEP 4.

NO –

- Open circuit in the Black or Black/Brown wire.
- Open circuit in the Green or Green/Black wire.
- Faulty combination meter.



4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM connector.

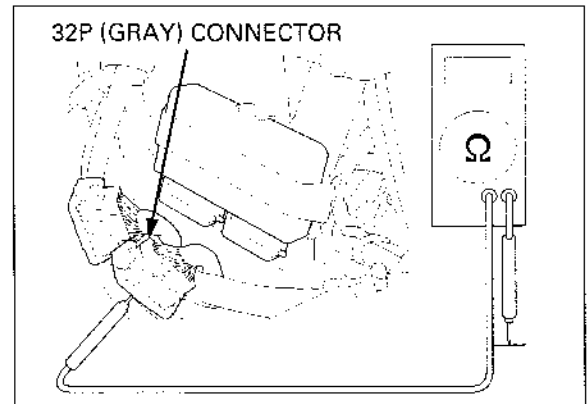
Check for continuity at the Pink/Green wire between the ECM connector terminal and the ground.

Connection: B25 – Ground

Is there continuity?

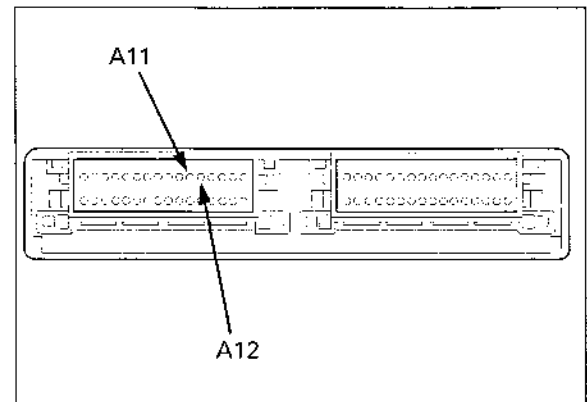
YES – Short circuit in the Pink or Pink/Green wire.

NO – Inspect vehicle speed sensor (page 19-11).



DTC 12-1 (No.1 REAR INJECTOR)

DTC	INJECTOR	POWER INPUT LINE	SIGNAL	SIGNAL AT ECM
12-1	No.1 (rear)	Black/White	Pink/Blue	A11
13-1	No.2 (front)	Black/White	Pink	A12



1. Injector System Inspection

Reset the ECM (page 5-9).

Start the engine and check the injector with the HDS Pocket Tester.

Is the DTC 12-1 indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the injector connector.

FUEL SYSTEM (Programmed Fuel Injection)

2. Injector Circuit Resistance Inspection

Turn the ignition switch OFF.

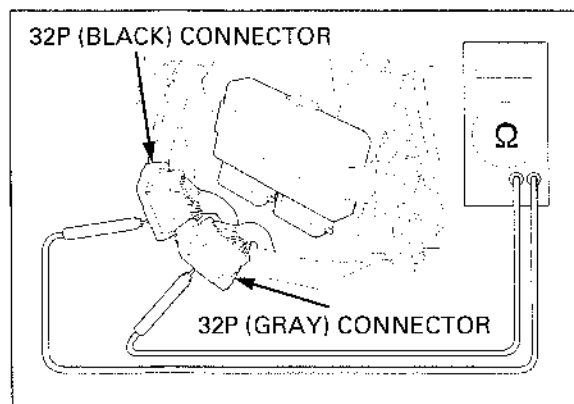
Disconnect the ECM connector and measure the resistance of the ECM connector terminals.

Connection: POWER INPUT LINE – SIGNAL AT ECM

Is there continuity?

YES – GO TO STEP 5.

NO – GO TO STEP 3.



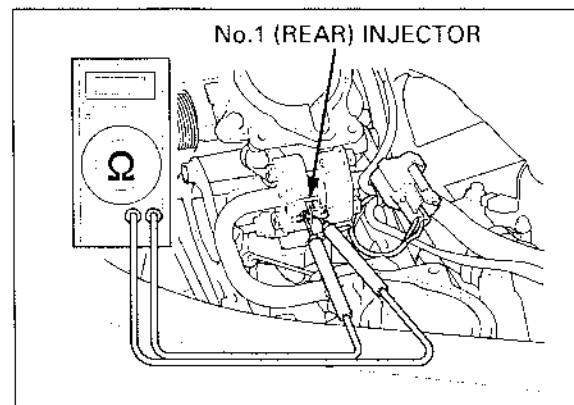
3. Injector Resistance Inspection

Disconnect the No.1 (rear) injector 2P (Brown) connector and measure the resistance of the No.1(rear) injector 2P (Brown) connector terminals.

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

YES – GO TO STEP 4.

NO – Faulty injector.



4. Injector Input Voltage Inspection

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

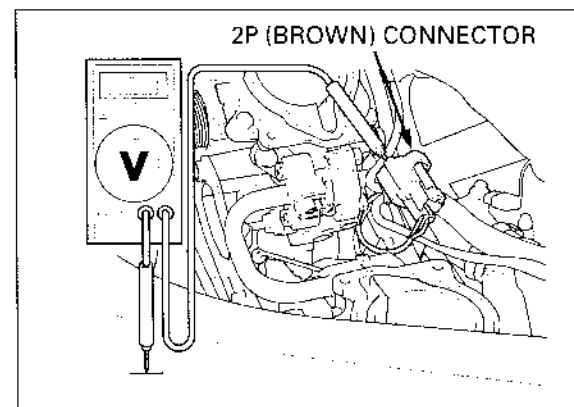
Measure the voltage between the No. 1 (rear) injector 2P (Brown) connector of the wire harness side and ground.

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

Does the battery voltage exist?

YES – Open circuit in SIGNAL line wire.

NO – Open circuit in POWER INPUT line wire.



5. Injector Signal Line Short Circuit Inspection

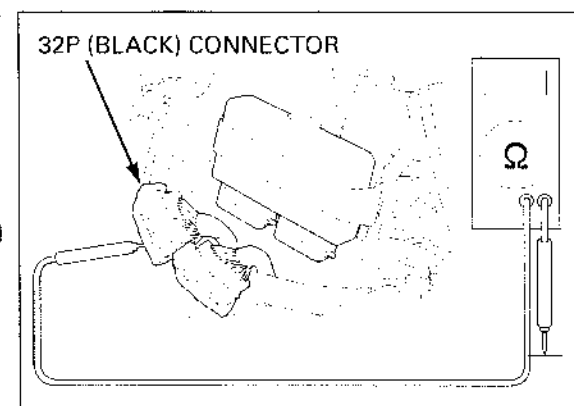
Check for continuity between the ECM connector terminal and ground.

Connection: SIGNAL AT ECM – Ground

Is there continuity?

YES – • Short circuit in the SIGNAL line wire.
• Faulty injector.

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



DTC 13-1 (No.2 FRONT INJECTOR)

See page 5-41

DTC 18-1 (CAM PULSE GENERATOR)

- Before starting the inspection, check for loose or poor contact on the cam pulse generator connector and recheck the DTC.

1. Cam Pulse Generator Peak Voltage Inspection

Disconnect the cam pulse generator connector.

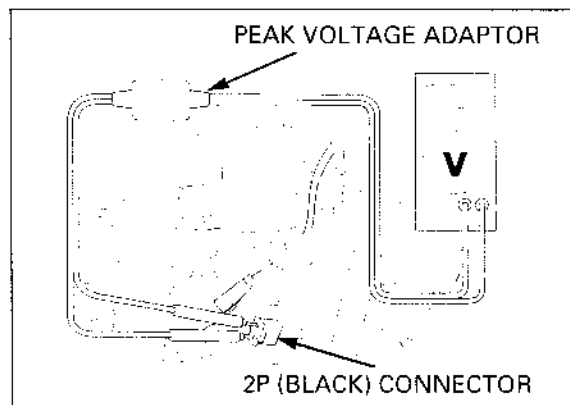
Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the cam pulse generator 2P (Black) connector.

Connection: Gray (+) – White/Yellow (–)

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

YES – GO TO STEP 2.

NO – Faulty cam pulse generator.



2. Cam Pulse Generator Circuit Inspection

Turn the ignition switch OFF.

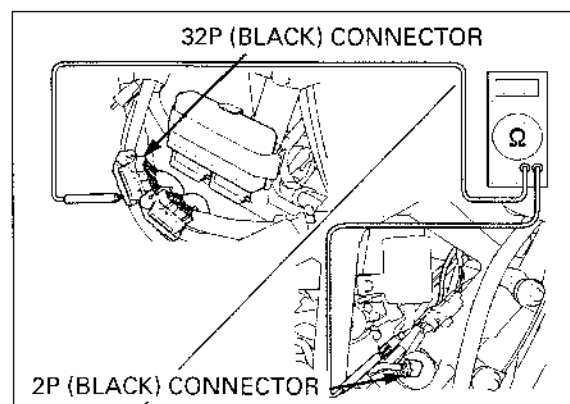
Disconnect the cam pulse generator 2P (Black) connector and the ECM connector.

Check for continuity at the Gray and White/Yellow wire between the cam pulse generator 2P (Black) connector terminals and the ECM 32P (Black) connector terminals.

Is there continuity?

YES – Short circuit in the Gray wire.

NO – • Open circuit in the White/Yellow wire.
• Open circuit in the Gray wire.



DTC 19-1 (IGNITION PULSE GENERATOR)

- Before starting the inspection, check for loose or poor contact on the ignition pulse generator connector and recheck the DTC.

1. Ignition Pulse Generator Peak Voltage Inspection

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

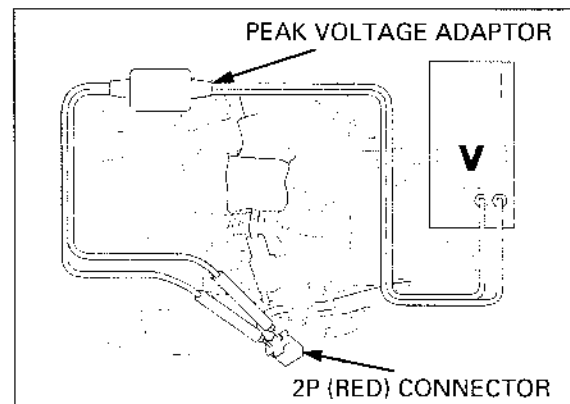
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P (Red) connector.

Connection: Yellow (+) – Yellow/White (–)

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

YES – GO TO STEP 2.

NO – Faulty ignition pulse generator.



FUEL SYSTEM (Programmed Fuel Injection)

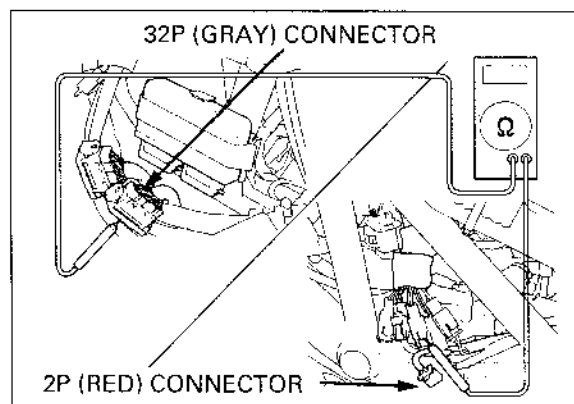
2. Ignition Pulse Generator Circuit Inspection

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

Check for continuity at the Yellow and Yellow/White wire between the ignition pulse generator 2P (Red) connector terminals and the ECM 32P (Black) connector terminals.

Is there continuity?

- YES** – Short circuit in the Yellow wire.
- NO** –
- Open circuit in the Yellow wire.
 - Open circuit in the Yellow/White wire.



DTC 21-1 (O₂ SENSOR): G type only

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

1. O₂ Sensor System Inspection

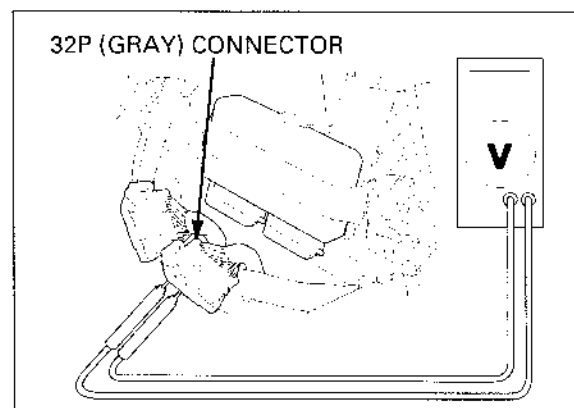
Turn the ignition switch ON and warm up the engine up to coolant temperature is 80 °C (176 °F), then let it idle.

Check the O₂ sensor with the HDS Pocket Tester.

Standard: 0.3 – 0.6 V

Is the voltage at the standard value?

- YES** – Check the fuel pressure (page 5-47). If the system is correct, GO TO STEP 3.
- NO** – GO TO STEP 2.



2. O₂ Sensor Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the O₂ Sensor 4P connector and the ECM connectors.

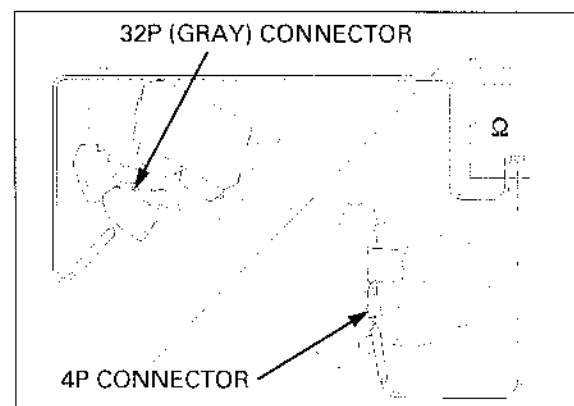
Check the continuity between the ECM connector terminals and the O₂ Sensor 4P connector.

Connection: White/Orange – B13

Green/Orange – B17

Is there continuity?

- YES** – GO TO STEP 3.
- NO** –
- Open circuit in the at signal line wire
 - Open circuit in the Green/Orange wire



3. O₂ Sensor Short Circuit Inspection

Connect the O₂ sensor 4P connector and disconnect the ECM connectors.

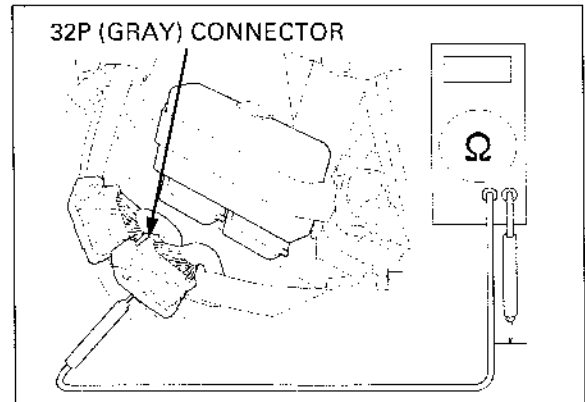
Check the continuity between the ECM connector terminals and ground.

Connection: B13 – Ground

Is there continuity?

YES – Short circuit in the White/Orange wire

NO – GO TO STEP 4.



4. O₂ Sensor Inspection

Replace the O₂ sensor with a new one (page 5-84).

Reset the ECM (page 5-9).

Turn the ignition switch ON and warm up the engine up to coolant temperature is 80 °C (176 °F), then let it idle.

Check the O₂ sensor with the HDS Pocket Tester.

Standard: 0.3 – 0.6 V

Is the voltage at the standard value?

YES – Faulty original O₂ sensor.

NO – Check the fuel supply system.

DTC 23-1 (O₂ SENSOR HEATER): G type only

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

1. O₂ Sensor System Inspection

Reset the ECM (page 5-9).

Start the engine and check the O₂ sensor heater with the HDS Pocket Tester.

Is the DTC 23-1 indicated?

YES – GO TO STEP 2.

NO –

- Intermittent failure.
- Loose or poor contact on the O₂ sensor connector.

2. O₂ Sensor Heater Resistance Inspection

Turn the ignition switch OFF.

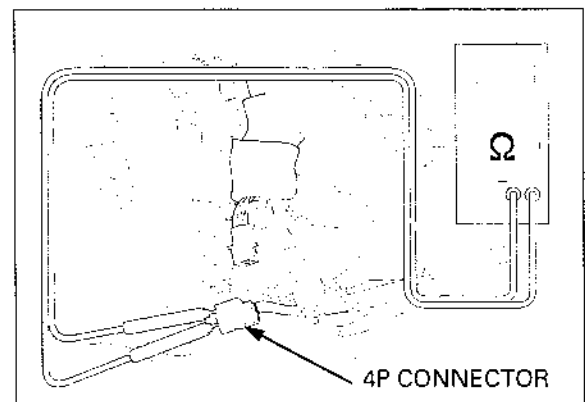
Disconnect the O₂ sensor 4P connector and measure the resistance at the sensor side connector white wire terminals.

Connection: White – White

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

YES – GO TO STEP 3.

NO – Faulty O₂ sensor.



FUEL SYSTEM (Programmed Fuel Injection)

3. O₂ Sensor Heater Open circuit Inspection

Connect the O₂ sensor 4P connector.

Disconnect the ECM connectors and measure the resistance at the ECM terminals.

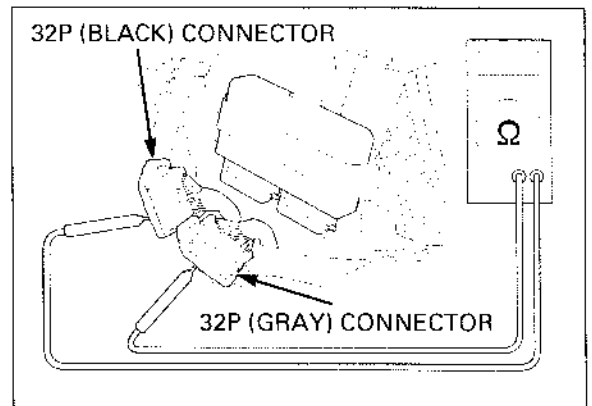
Connection: Black/White – Black/Green

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

YES – GO TO STEP 4.

NO –

- Open circuit in the Black/White wire.
- Open circuit in the Black/Green wire.



4. O₂ Sensor Heater Short Circuit Inspection 1

Disconnect the O₂ sensor 4P connector.

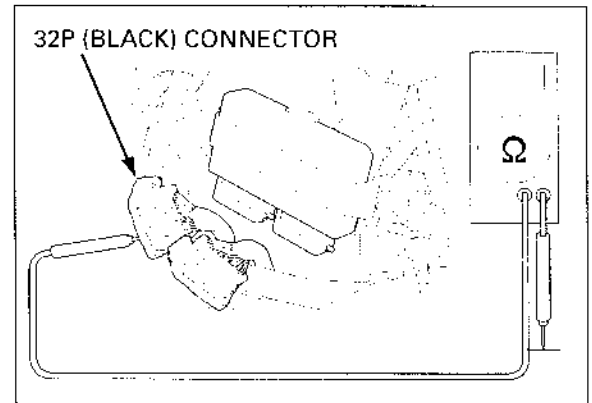
Check for continuity between the Black/Green wire terminal at ECM and ground.

Connection: Black/Green – Ground

Is there continuity?

YES – Short circuit in the Black/Green wire.

NO – GO TO STEP 5.



5. O₂ Sensor Heater Short Circuit Inspection 2

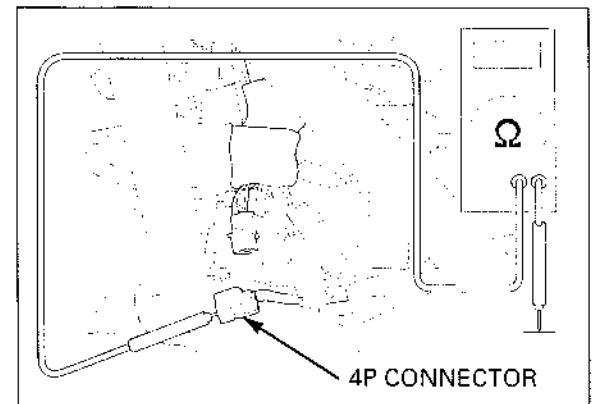
Check for continuity between the O₂ sensor heater connector terminal and ground.

Connection: White – Ground

Is there continuity?

YES – Faulty O₂ sensor.

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



DTC 33-1 (E²-PROM)

1. Recheck DTC

Reset the ECM (page 5-9).

Turn the ignition switch ON and recheck the ECM E²-PROM.

Is the DTC 33-1 indicated?

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

NO – Intermittent failure.

FUEL LINE INSPECTION

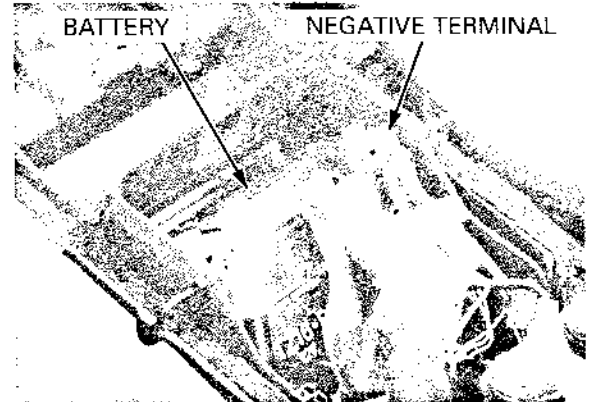
FUEL PRESSURE INSPECTION

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 seat (page 2-3).

Disconnect the battery negative cable from the battery terminal.

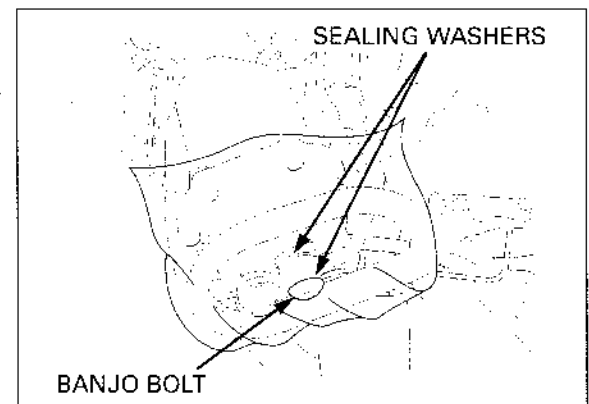


Remove the under cowl (page 2-7).

Set a clean oil pan under the fuel pump.

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

Slowly loosen the banjo bolt and catch the remaining fuel using a 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

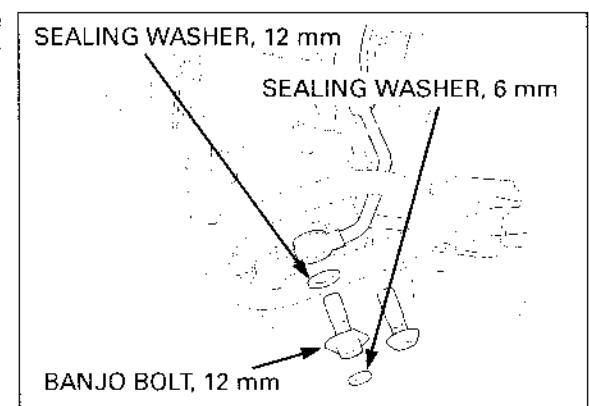
Sealing washer, 6 mm

Part No. 90430-PD6-003

TOOL:

Fuel pressure gauge

07406-0040003



FUEL SYSTEM (Programmed Fuel Injection)

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

IDLE SPEED: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)

STANDARD: 320 – 370 kPa (3.2 – 3.7 kgf/cm², 46 – 53 psi)

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

- Fuel pump (page 5-49)

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

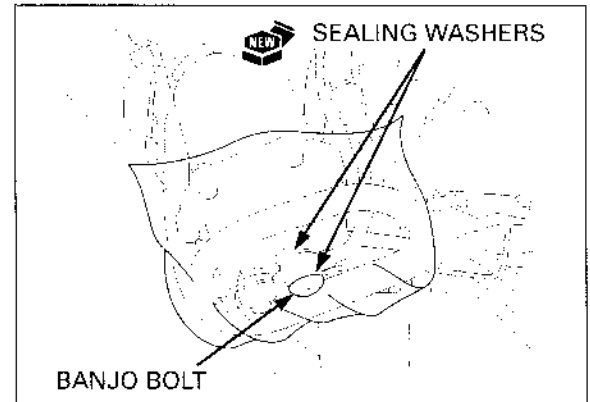
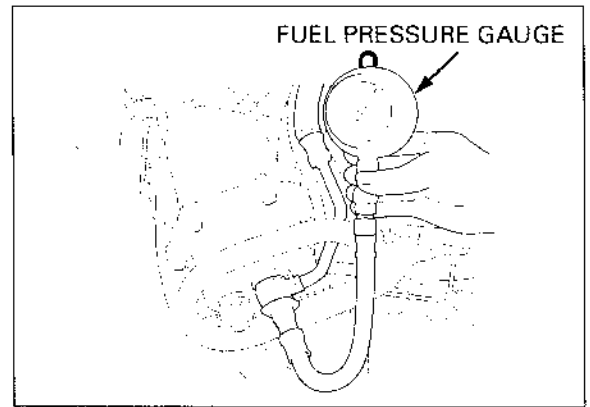
- Fuel feed hose/pipe leaking
- Clogged fuel filter (fuel tank side)
- Fuel pump (page 5-49)

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)

Install the removed parts in the reverse order of removal.

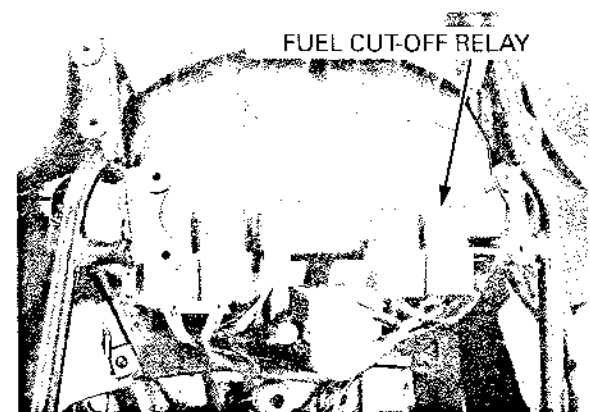


FUEL FLOW INSPECTION

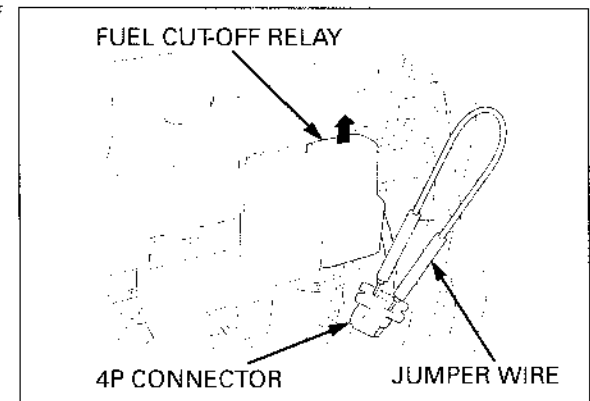
Turn the ignition switch to "OFF".

Remove the upper cowl (page 2-10).

Disconnect the fuel cut-off relay 4P connector.



Jump the Brown and Black/White wire terminals of the wire harness side using a jumper wire.



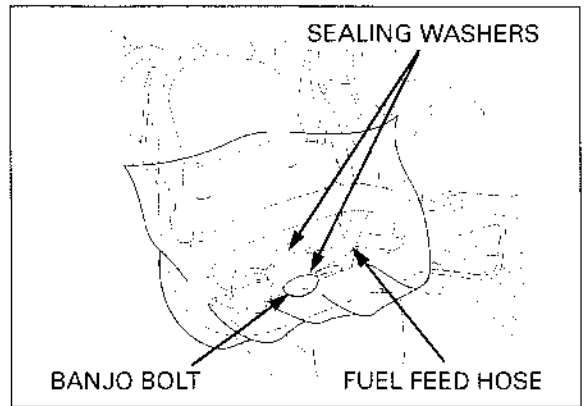
Release the fuel pressure (page 5-47) and remove the fuel feed hose from the fuel pump.

Set a graduated beaker under the fuel pump.

Connect the battery negative cable to the battery terminal.

Wipe off spilled out gasoline.

Turn the ignition switch to "ON" and check the fuel flow from the fuel pump.



If the fuel flow out from the fuel pump, measure the fuel flow following.

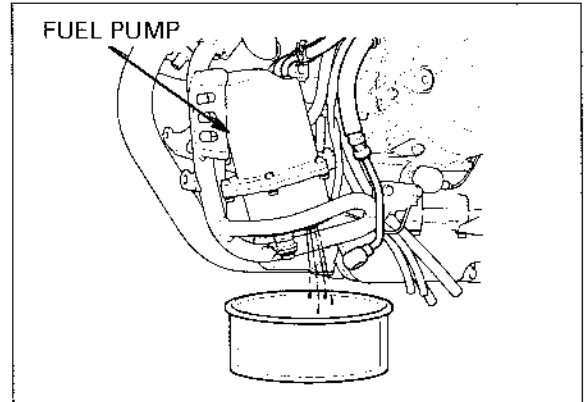
Turn the ignition switch ON for 10 seconds. Measure the amount of fuel flow.

Amount of fuel flow:

270 cm³ (9.1 US oz, 9.5 Imp oz) minimum /10 seconds at 12 V

If the fuel does not flow out or less than specified, inspect the following:

- Pinched or clogged fuel feed hose/pipe
- Clogged fuel filter (fuel tank side)
- Fuel valve
- Open circuit or poor contact in wire harness
- Fuel pump (page 5-49)

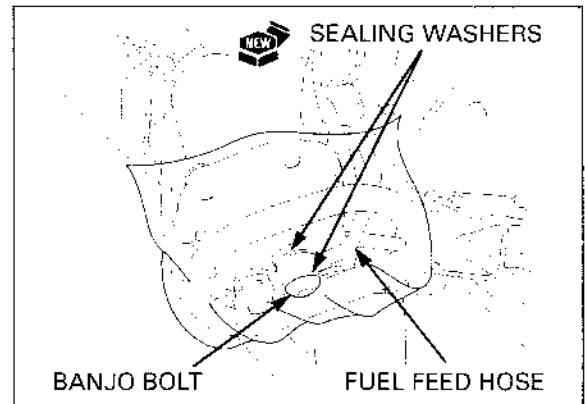


After inspection, install and tighten the fuel feed hose banjo bolt using the new sealing washers.

TORQUE: 22 N·m (2.2 kgf-m, 16 lbf-ft)

Start the engine and check for leak.

Install the under cowl (page 2-7).



FUEL PUMP

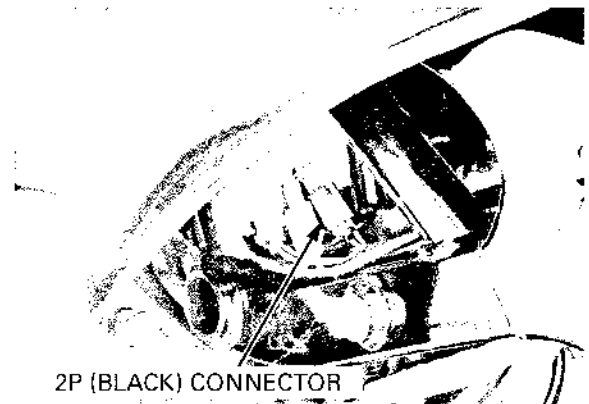
INSPECTION

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:

Open and support the fuel tank using the equipped tools (page 3-7).

Disconnect the fuel pump 2P (Black) connector.



FUEL SYSTEM (Programmed Fuel Injection)

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

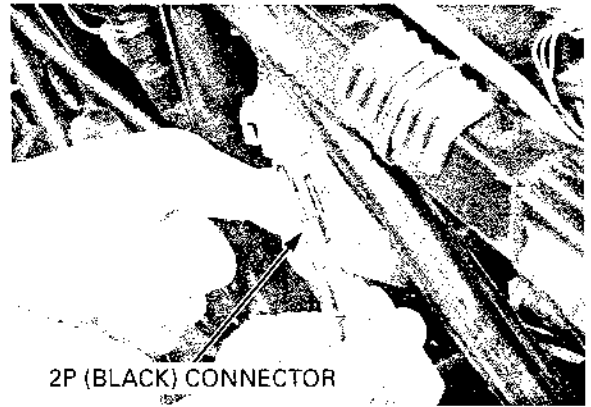
Connection: Brown (+) – Green (–)

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 20A
- Engine stop switch (page 19-19)
- Fuel cut-off relay (page 5-52)
- Engine stop relay (page 5-79)
- Bank angle sensor (page 5-78)
- ECM (page 5-79)



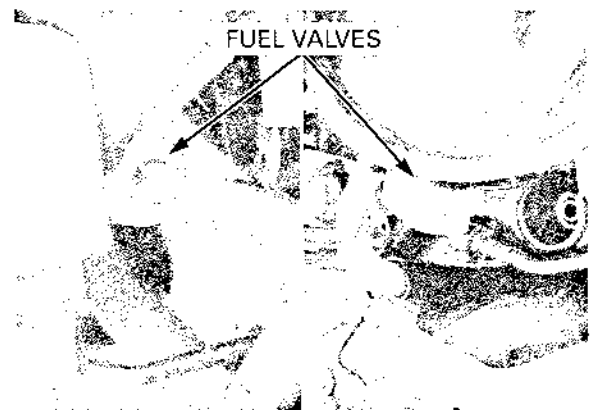
REMOVAL/INSTALLATION

NOTICE

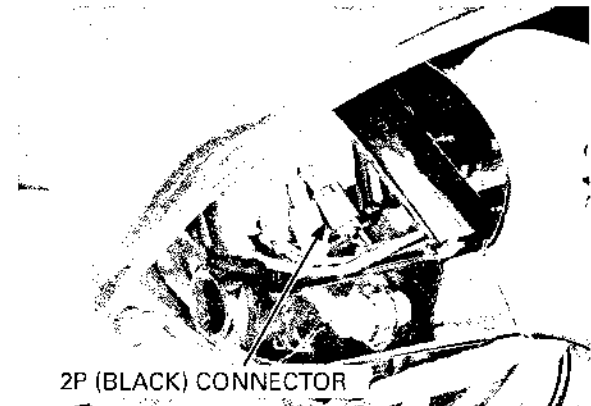
- *Before disconnecting the fuel feed hose, release the fuel pressure by loosening the fuel feed hose banjo bolt at the fuel tank.*
- *Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.*

Open and support the fuel tank using the maintenance bar (page 3-7).

Turn the fuel valves to "OFF".



Disconnect the fuel pump 2P (Black) connector.



FUEL SYSTEM (Programmed Fuel Injection)

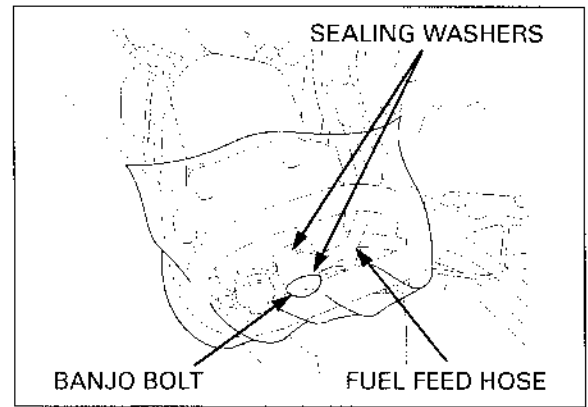
Wipe off spilled out gasoline.

Set a clean oil pan under the fuel pump.

Release the fuel pressure (page 5-47).

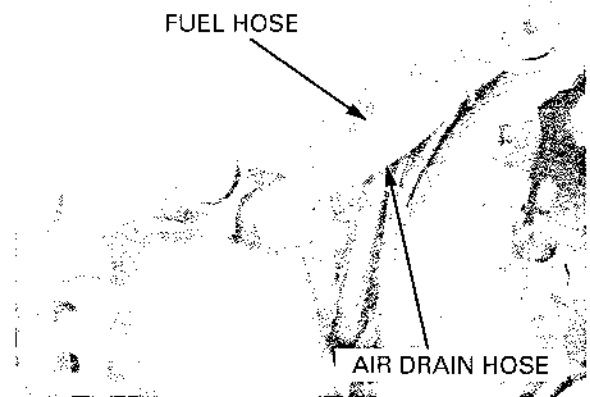
Remove the fuel banjo bolt, sealing washers and fuel feed hose from the fuel pump.

Drain the fuel from the fuel pump (0.5 liter).

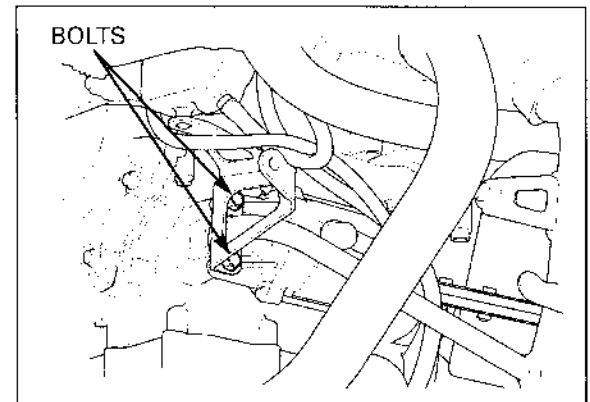


Disconnect the air drain hose and fuel hose from the fuel pump.

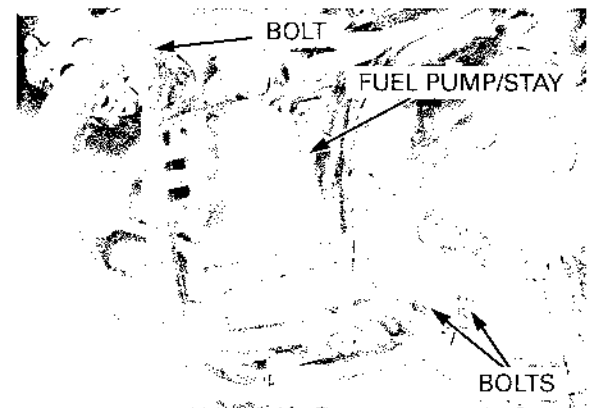
Drain the fuel from the air drain hose and fuel hose.



Remove the bolts.

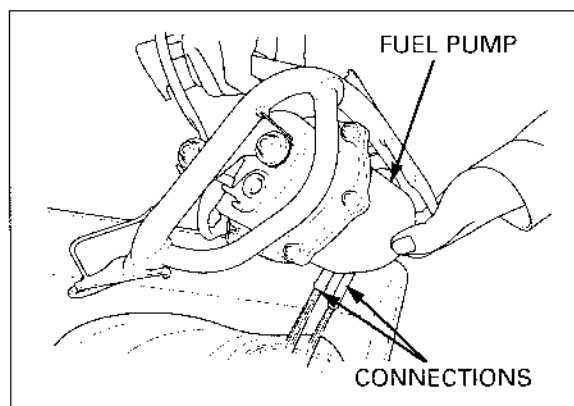


Remove the bolts and fuel pump/stay.



FUEL SYSTEM (Programmed Fuel Injection)

Drain the fuel from the fuel hose connections of the fuel pump.



Remove the nuts, washers and fuel pump from the stay.

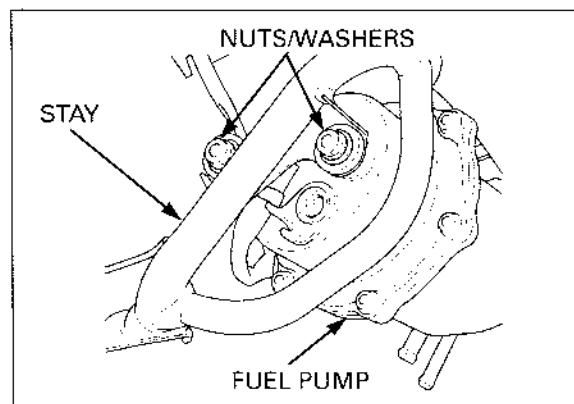
NOTICE

Do not disassemble the fuel pump.

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

Installation is in the reverse order of removal.

After installation, start the engine and check for leak.

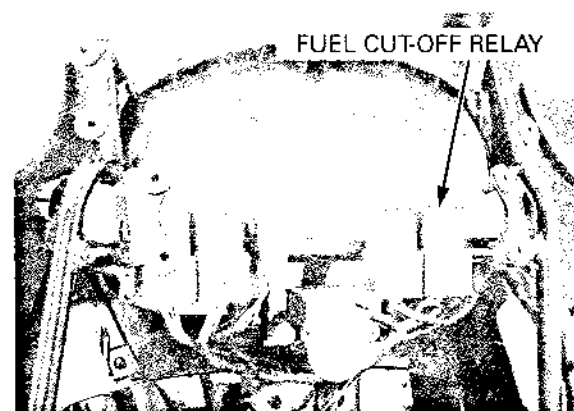


FUEL CUT-OFF RELAY

INSPECTION

Remove the upper cowl (page 2-10).

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



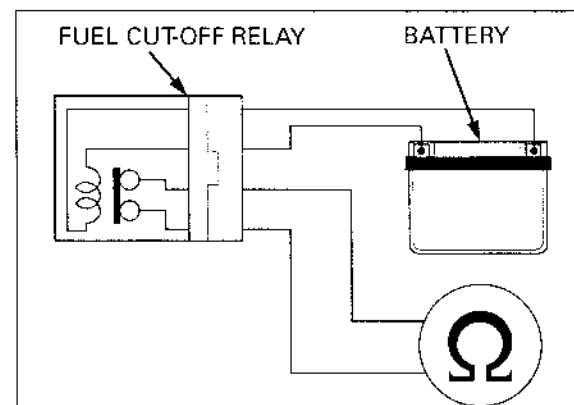
Connect the ohmmeter to the fuel cut-off relay connector terminals.

Connection: Black/White – Brown

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

Connection: Brown/Black – Black/White

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

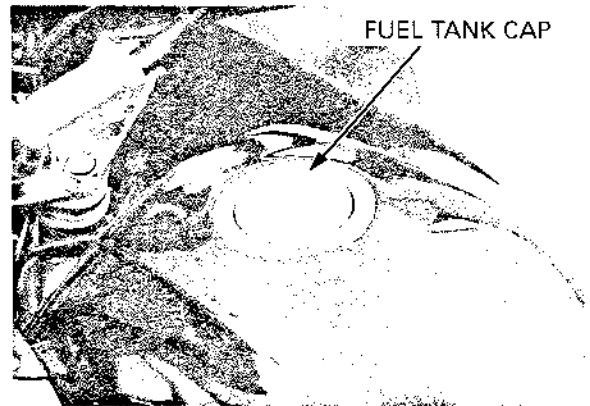


FUEL TANK

REMOVAL

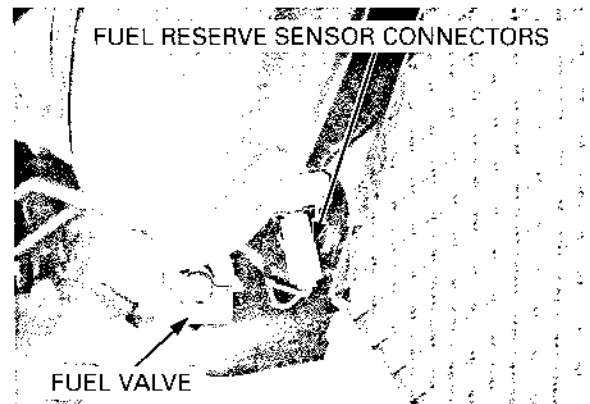
Open the fuel tank cap and pump the fuel from the fuel tank into an approved gasoline container (10 liters).

Open and support the fuel tank using the maintenance bar (page 3-7).

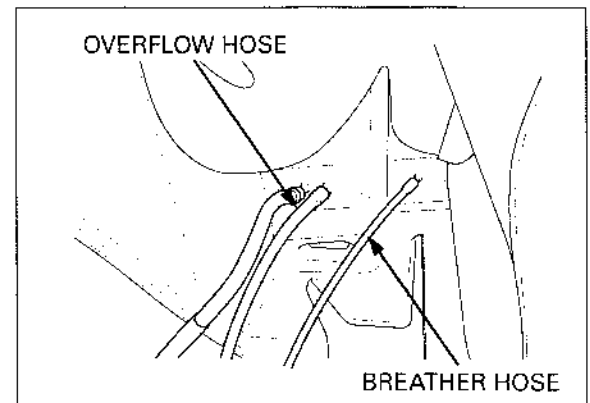


Turn the fuel valves to "OFF" and disconnect the fuel hoses from the fuel valves.

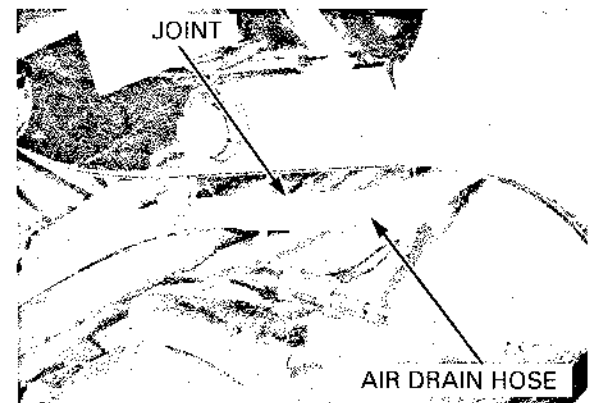
Disconnect the fuel reserve sensor connector.



Remove the maintenance bar and disconnect the fuel tank overflow hose and breather hose from the fuel tank while hold the fuel tank rear end.



Disconnect the air drain hose at the joint.



FUEL SYSTEM (Programmed Fuel Injection)

Remove the fuel tank front mounting bolts, washers.

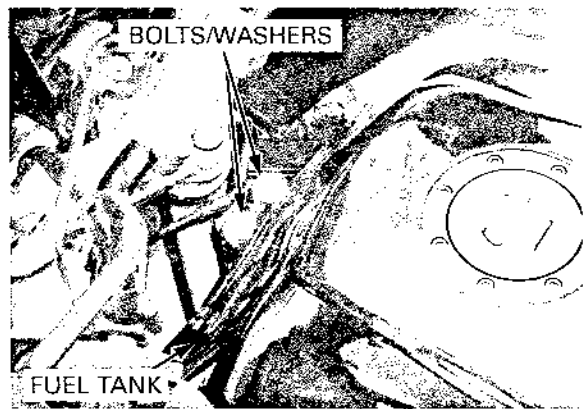
Remove the fuel tank.

Place the fuel tank on level surface.

NOTICE

Be careful not to damage the fuel tank.

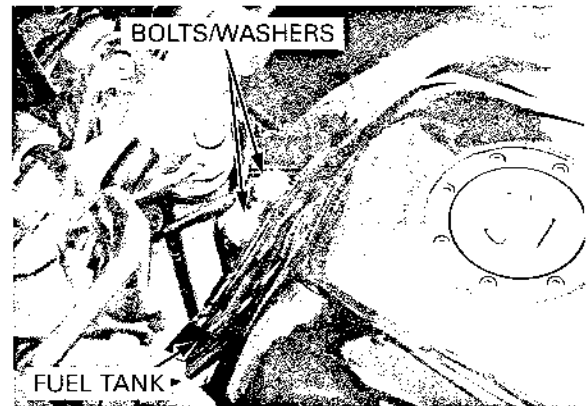
Refer to procedures for fuel level sensor removal (page 19-17).



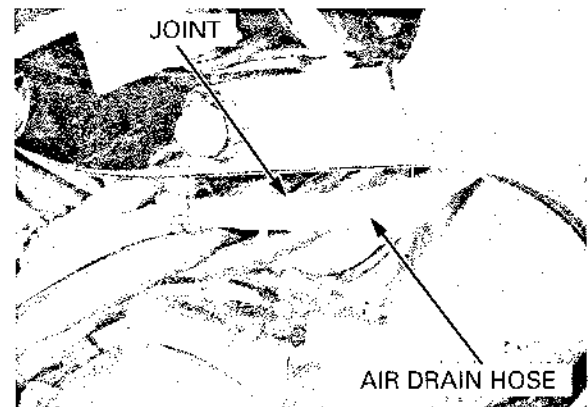
INSTALLATION

Install the fuel tank onto the frame.

Install and tighten fuel tank front mounting bolts.

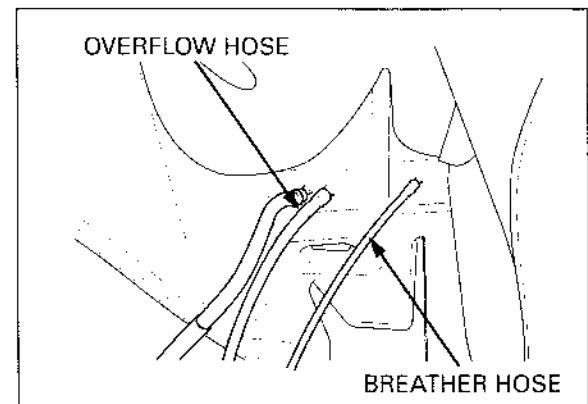


Route the air drain hose as shown and connect it to the joint.



Lift the fuel tank rear end and connect the fuel tank overflow hose and breather hose to the fuel tank.

Install the maintenance bar to the fuel tank rear end.

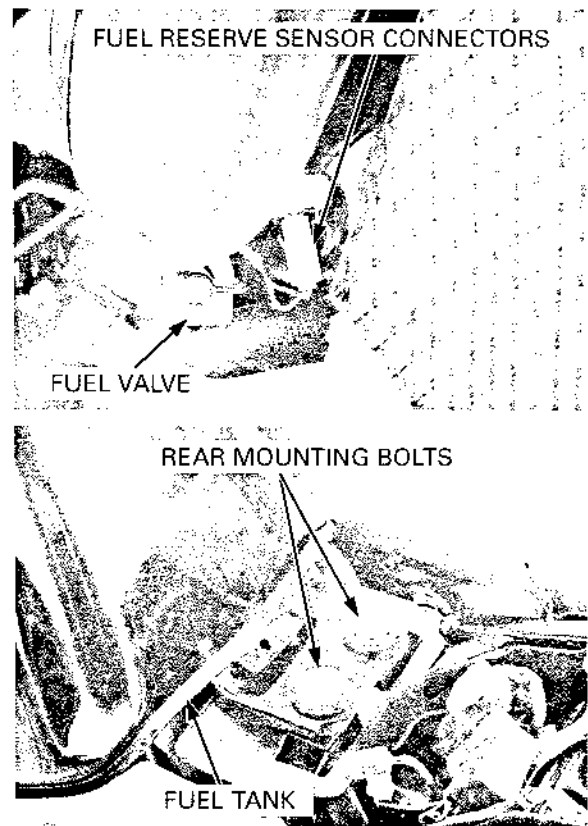


Connect the fuel hoses to the fuel valves.
Connect the fuel reserve sensor connector.

Remove the maintenance bar and close the fuel tank.

Install and tighten the fuel tank rear mounting bolts securely.

After installation, start the engine and check for leak.

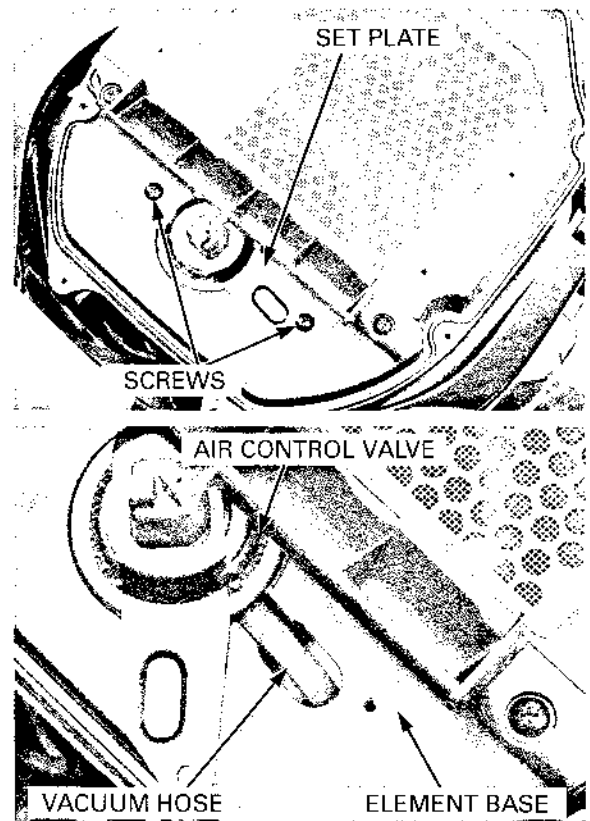


AIR CLEANER HOUSING

REMOVAL

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

Remove the screws and air control valve set plate.

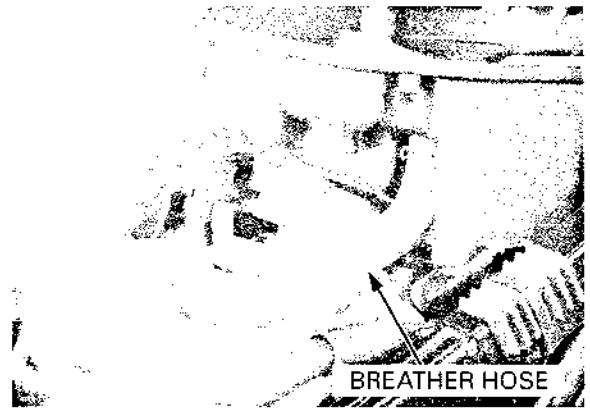


Disconnect the vacuum hose from the air control valve.

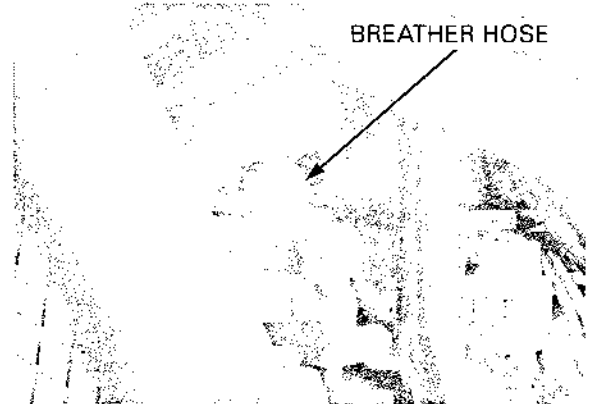
Remove the element base from the air cleaner housing (page 3-6).

FUEL SYSTEM (Programmed Fuel Injection)

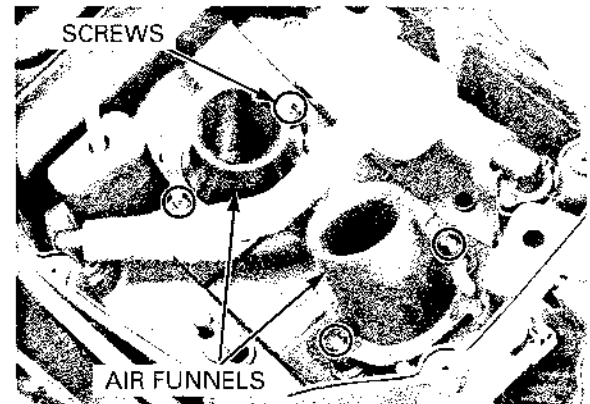
Disconnect the rear crankcase breather hose from the air cleaner housing.



Disconnect the front crankcase breather hose from the air cleaner housing.



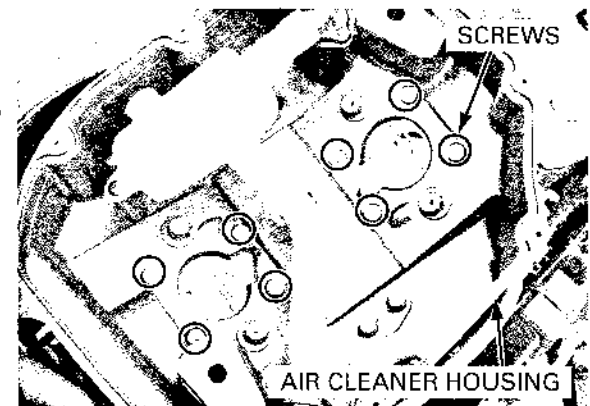
Remove the screws and air funnels.



Remove the screws and air cleaner housing.

NOTICE

Be careful not to damage the throttle link while removing the air cleaner housing.

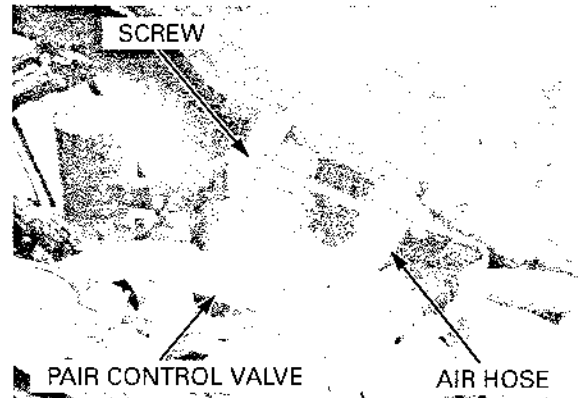


Disconnect the IAT sensor 2P connector.

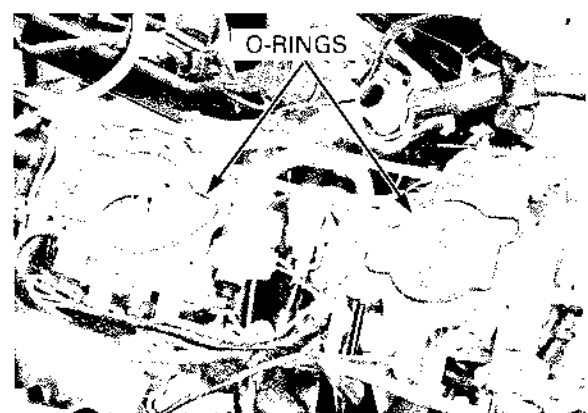


Disconnect the PAIR control valve air hose from the air cleaner housing.

Remove the screw and PAIR control valve from the air cleaner housing.



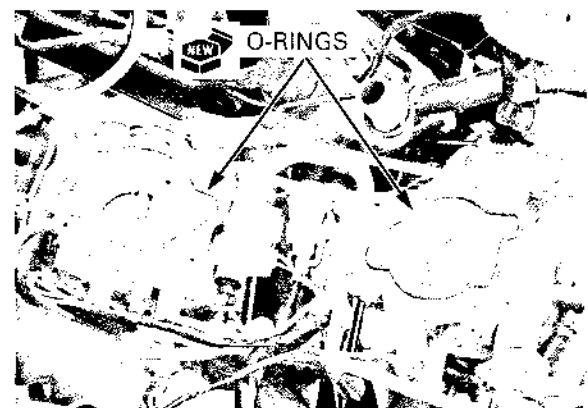
Remove the O-rings.



INSTALLATION

Route the wires and vacuum hoses properly (page 1-23).

Install new O-rings into the throttle body grooves.



FUEL SYSTEM (Programmed Fuel Injection)

Install the PAIR control valve to the air cleaner housing and tighten the screw securely.

Connect the PAIR control air hose to the air cleaner housing.

NOTICE

Be careful not to damage the throttle link while installing the air cleaner housing.

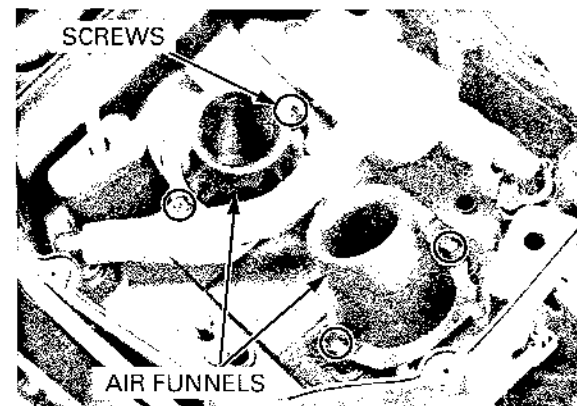
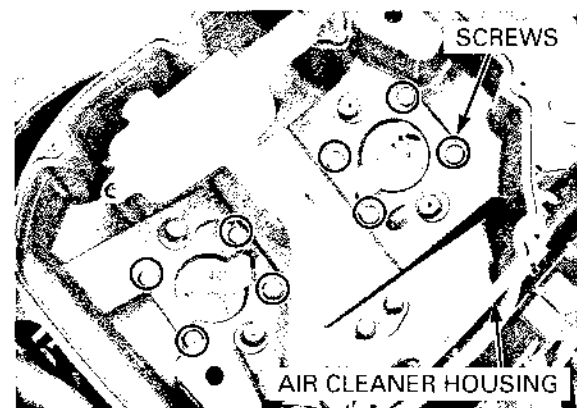
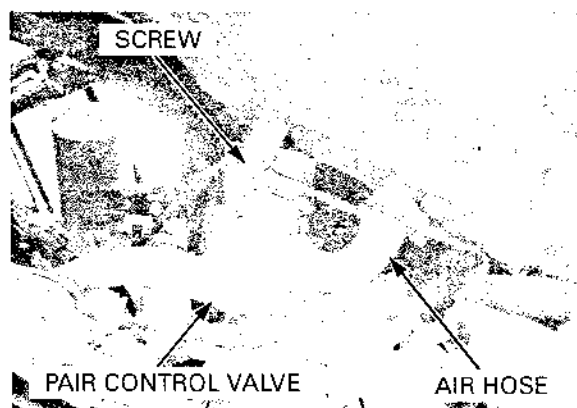
Connect the IAT sensor 2P connector.

Install and tighten the air cleaner housing screws to the specified torque.

TORQUE: 2.5 N·m (0.25 kgf·m, 1.8 lbf·ft)

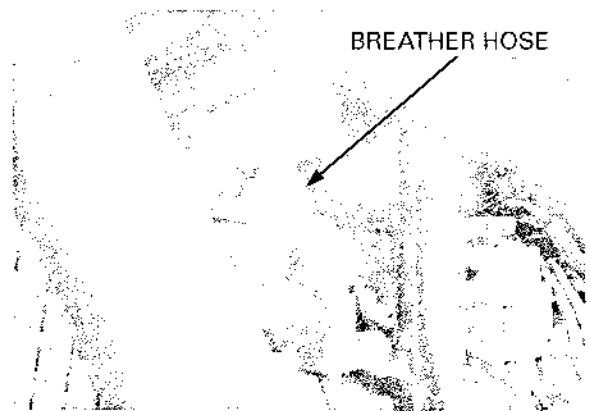
Install the air funnel and tighten the screws to the specified torque.

TORQUE: 4 N·m (0.42 kgf·m, 3.0 lbf·ft)

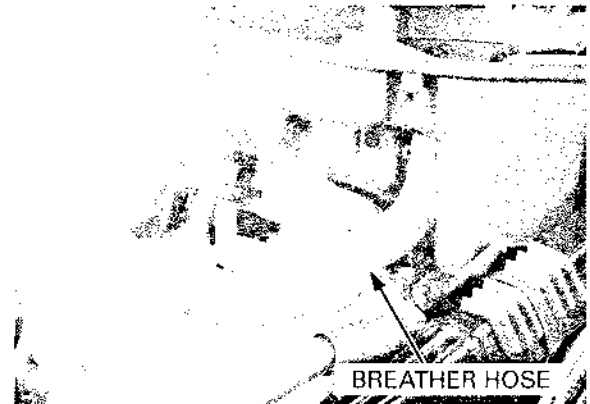


FUEL SYSTEM (Programmed Fuel Injection)

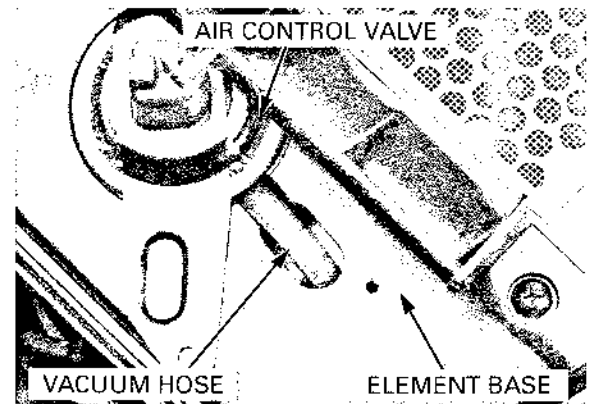
Connect the front crankcase breather hose to the air cleaner housing.



Connect the rear crankcase breather hose to the air cleaner housing.

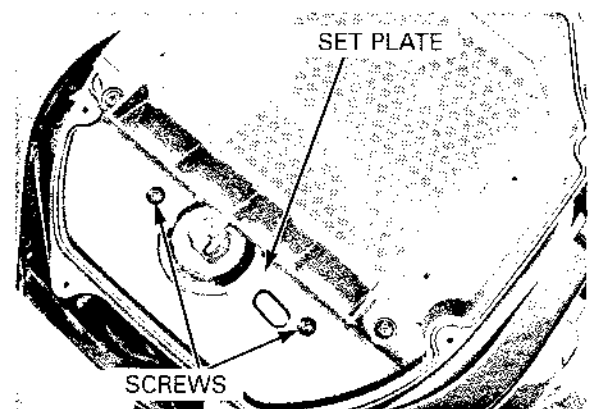


Connect the vacuum hose to the air control valve.
Install the element base to the air cleaner housing (page 3-6).



Install the air control valve set plate and tighten the screws securely.

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



THROTTLE BODY

REMOVAL

NOTICE

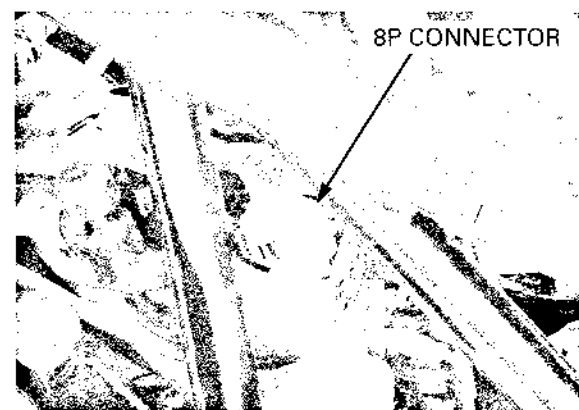
- *Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.*
- *Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt.*
- *Always replace the sealing washer when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

Remove the air cleaner housing (page 5-55).
Release the fuel pressure (page 5-47).

Remove the throttle stop screw knob from the cable stay.



Disconnect the throttle body sub-harness 8P connector.

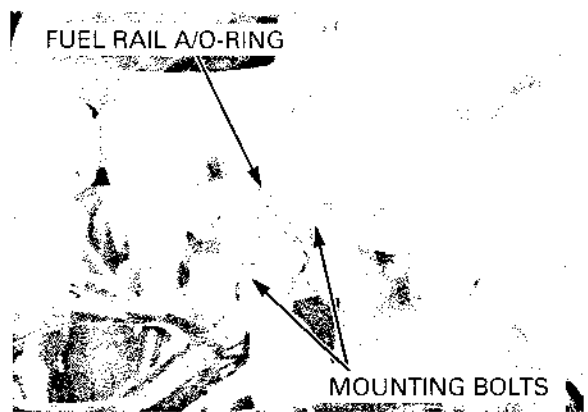


Disconnect the MAP sensor 3P connector.



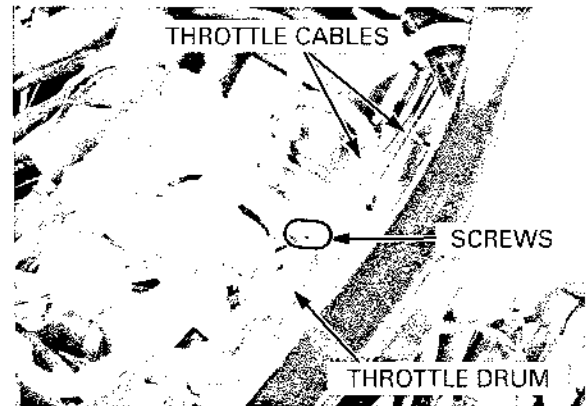
FUEL SYSTEM (Programmed Fuel Injection)

Remove the fuel rail A mounting bolts, feed rail and O-ring.



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.

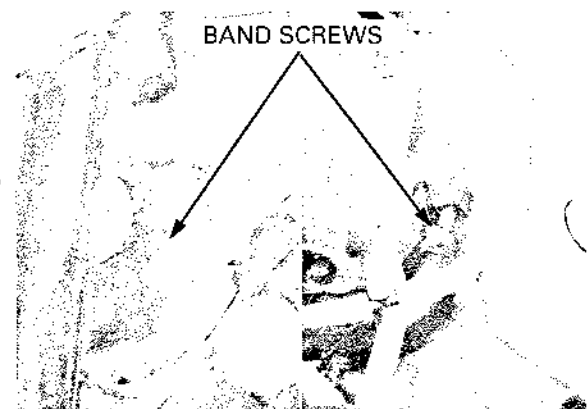


Loosen the throttle body side insulator band screws using a long type phillips.

Remove the throttle body from the insulators.

NOTICE

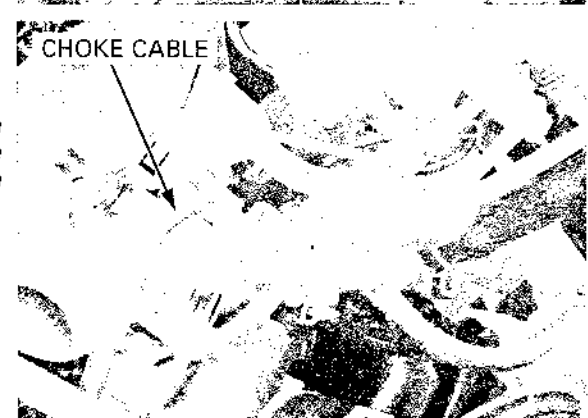
Do not hold the fuel rail and throttle link on the throttle body while removing the throttle body.



Remove the choke cable from the throttle body.

NOTICE

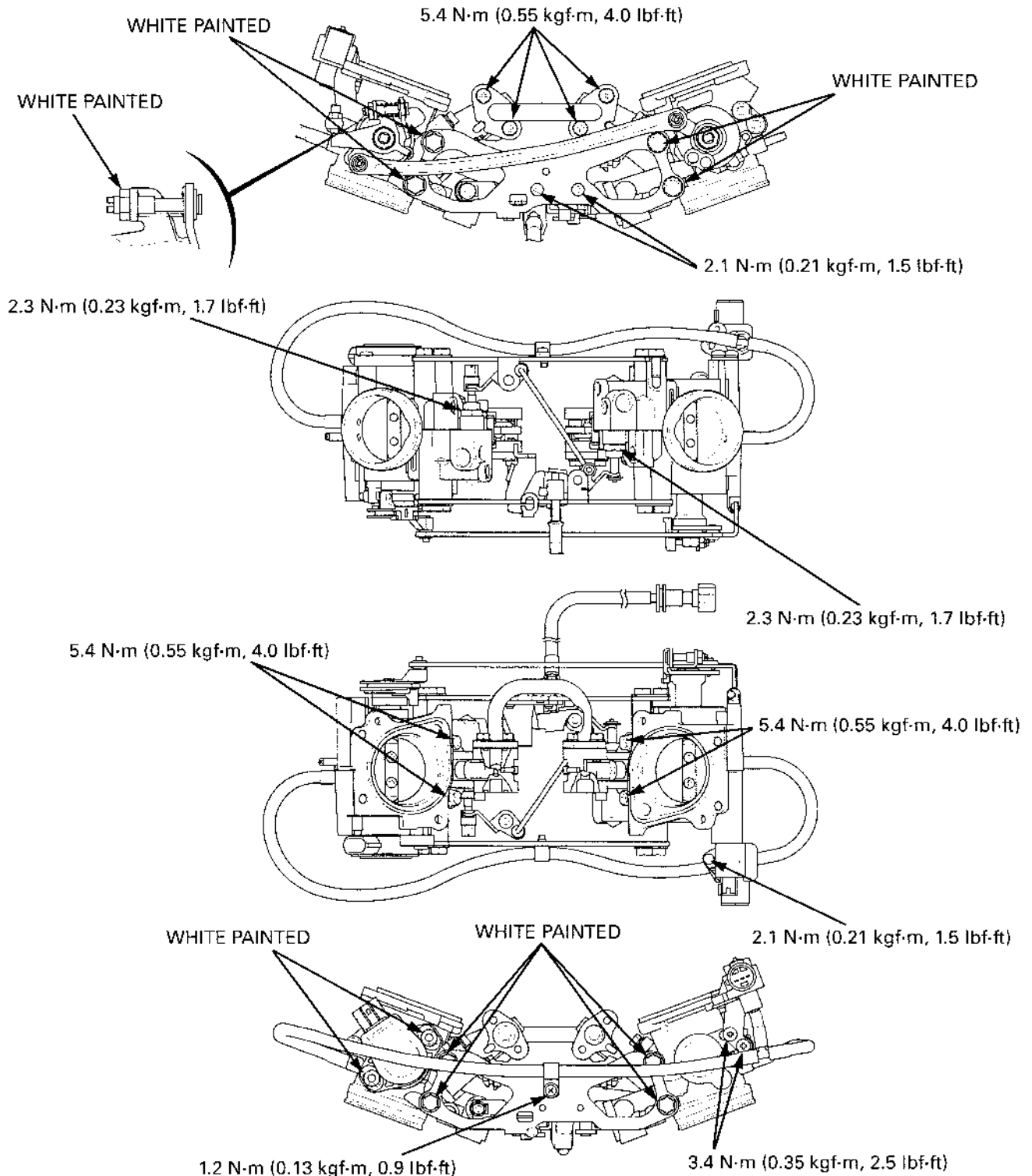
Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.



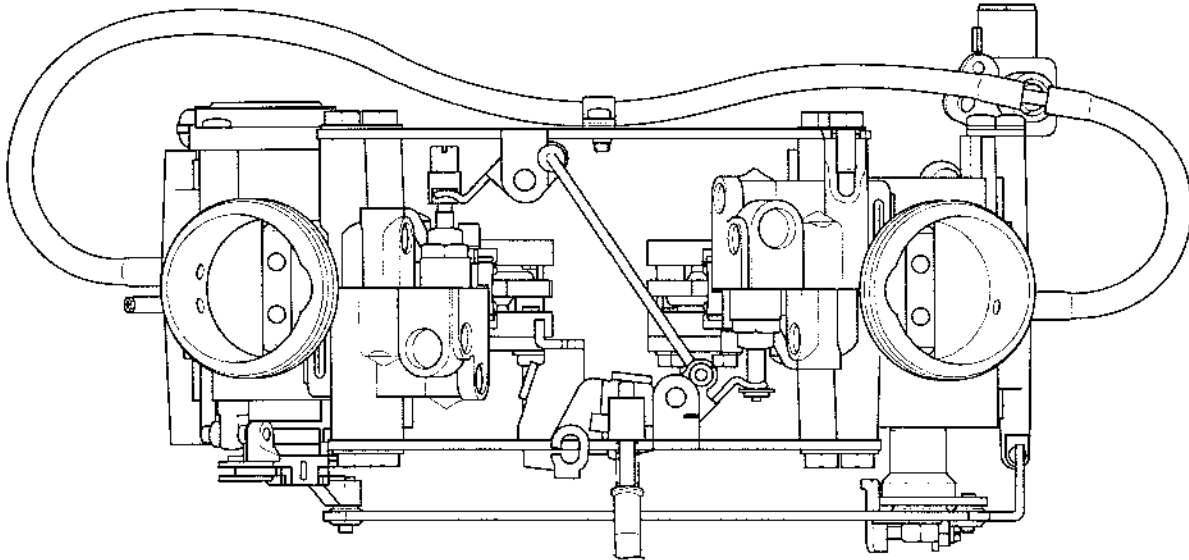
FUEL SYSTEM (Programmed Fuel Injection)

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.



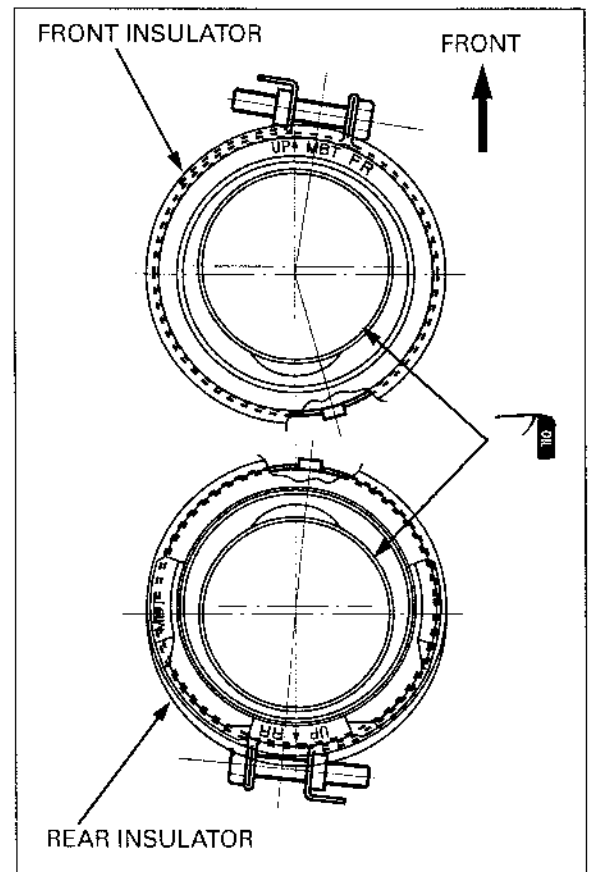
THROTTLE BODY VACUUM HOSE ROUTING



INSTALLATION

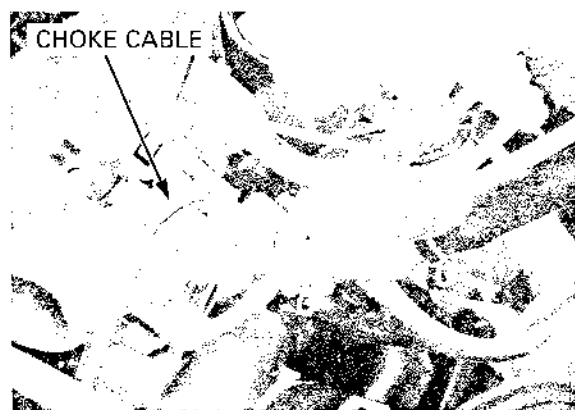
Check the insulator band angle.

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



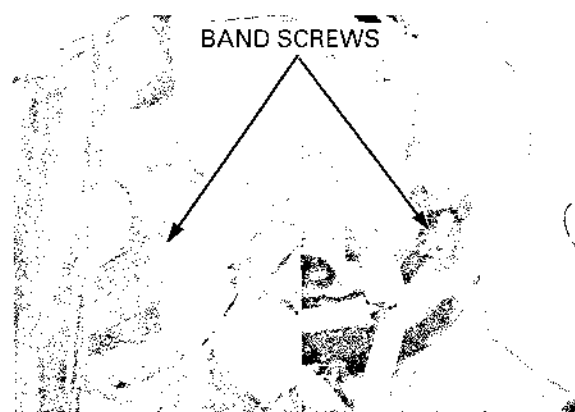
FUEL SYSTEM (Programmed Fuel Injection)

Install the choke cable to the throttle body.



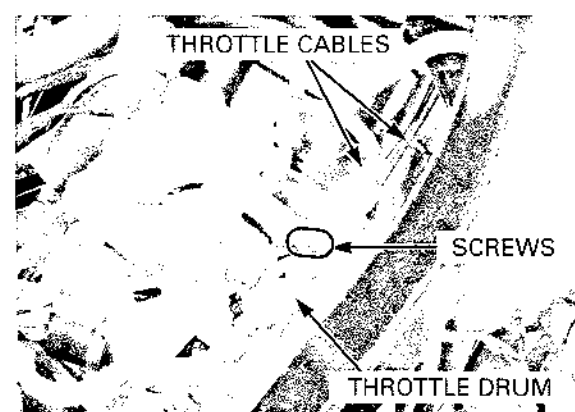
Install the throttle body into the insulators, tighten the throttle body side insulator band screws to the specified torque.

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

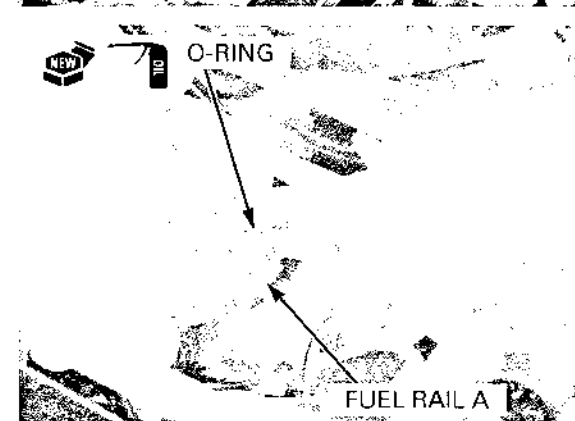


Connect the throttle cable ends to the throttle drum. Install the throttle cable guide bracket to the throttle body, then tighten the screws to the specified torque.

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



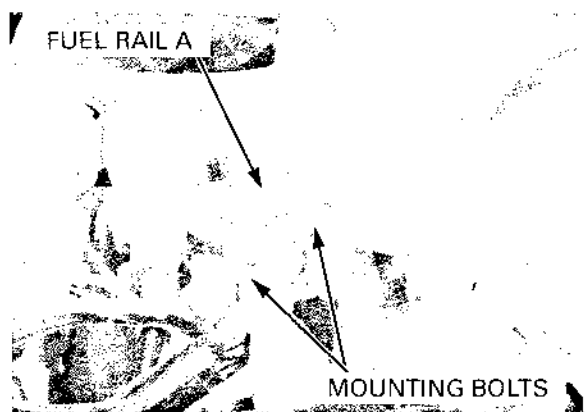
Apply oil to the new O-ring and install it to the fuel rail A groove.



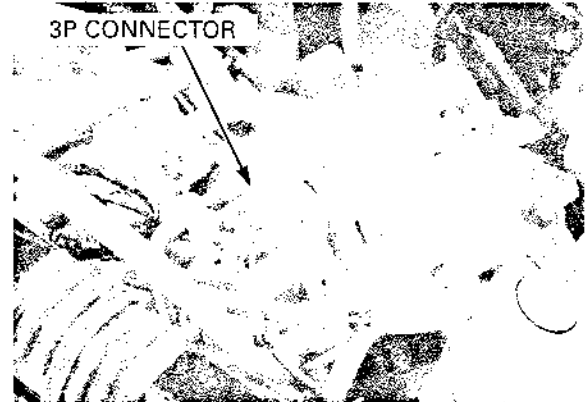
FUEL SYSTEM (Programmed Fuel Injection)

Install the fuel rail A and tighten the bolts to the specified torque.

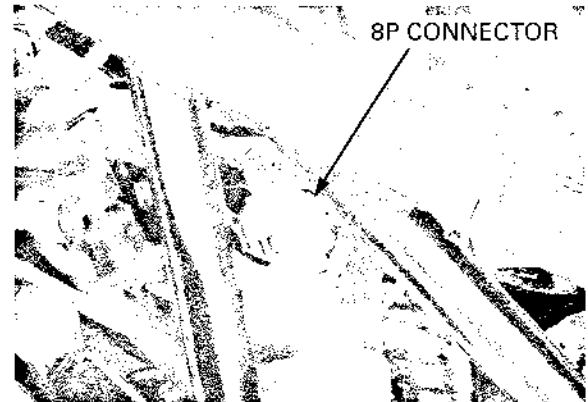
TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)



Connect the MAP sensor 3P connector.



Route the throttle body sub-harness properly, connect the 8P connector.



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

Install the air cleaner housing (page 5-55).

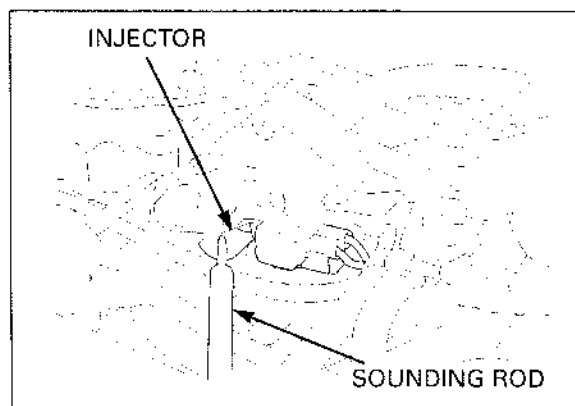


INJECTOR

INSPECTION

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

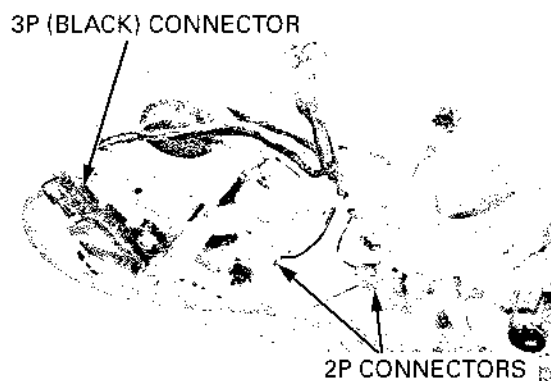
If the injector does not operate, replace the injector.



REMOVAL

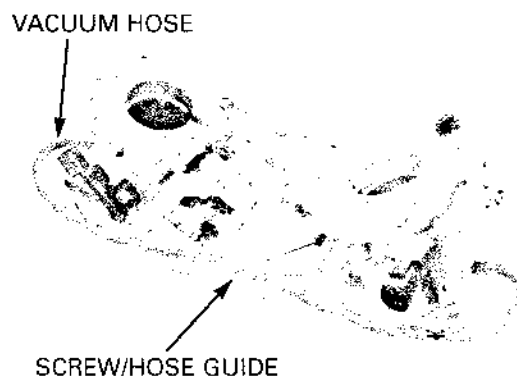
Remove the throttle body (page 5-60).
Disconnect the TP sensor 3P (Black) connector.
Disconnect the each injector 2P connector from each injector.

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

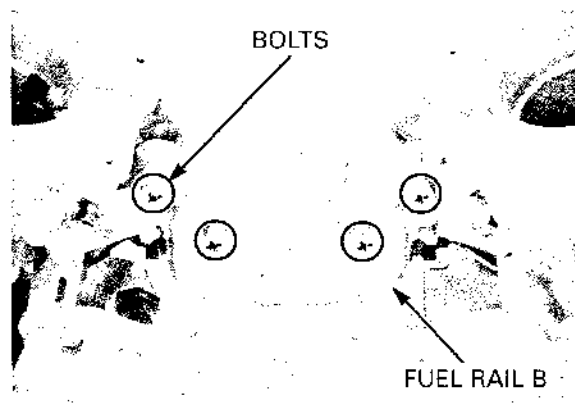


Remove the screw and hose guide.

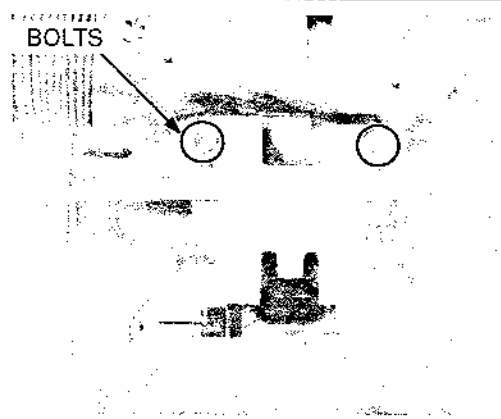
Disconnect the vacuum hose from the MAP sensor and throttle body.



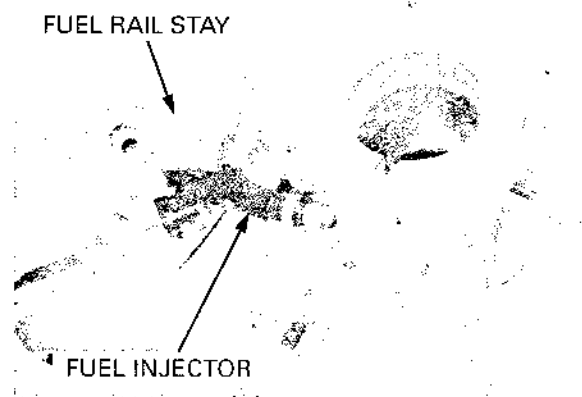
Remove the fuel rail B mounting bolts, fuel rail B and O-ring.



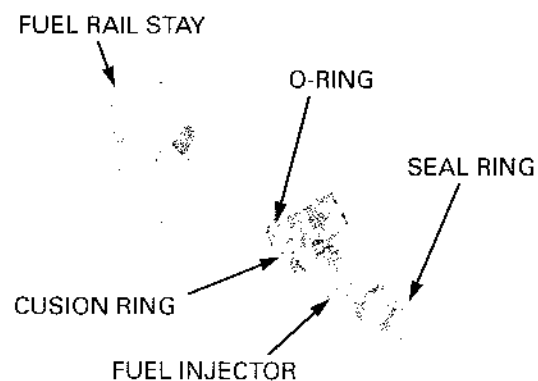
Remove the fuel rail stay bolts.



Remove the injector/fuel rail stay from the throttle body.



Remove the injector from the fuel rail stay.
Remove the seal ring, O-ring and cushion ring.

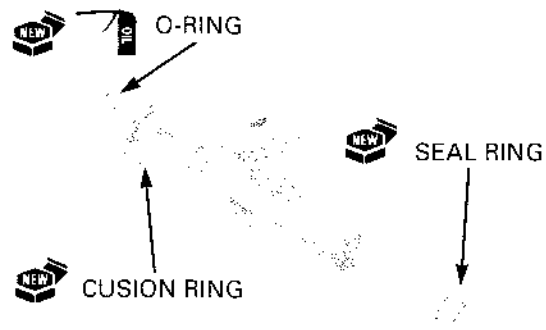


INSTALLATION

Apply oil to the new O-ring.

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

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



FUEL SYSTEM (Programmed Fuel Injection)

Install the fuel injector to the fuel rail stay, being careful not to damage the O-ring.

FUEL RAIL STAY

FUEL INJECTOR

Install the fuel injector/fuel rail stay into the throttle body, being careful not to damage the seal ring.

FUEL RAIL STAY

FUEL INJECTOR

Install and tighten the fuel rail stay bolts to the specified torque.

TORQUE: 5.4 N-m (0.55 kgf-m, 4.0 lbf-ft)

BOLTS

Install the new O-rings to the fuel rail stay grooves.

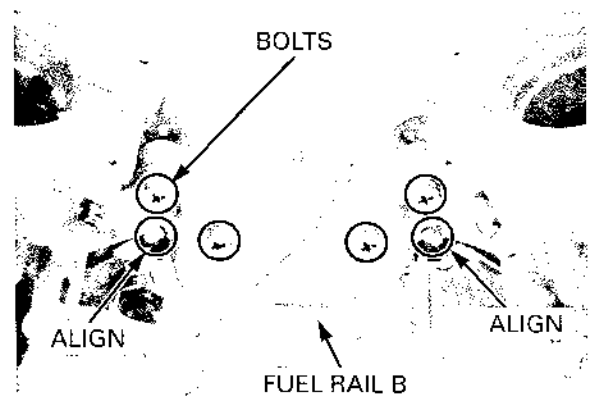
O-RINGS

FUEL SYSTEM (Programmed Fuel Injection)

Install the fuel rail B to the fuel rail stays aligning the groove of the fuel rail B with the tab on the fuel rail stays.

Install and tighten the fuel rail B mounting bolts to the specified torque.

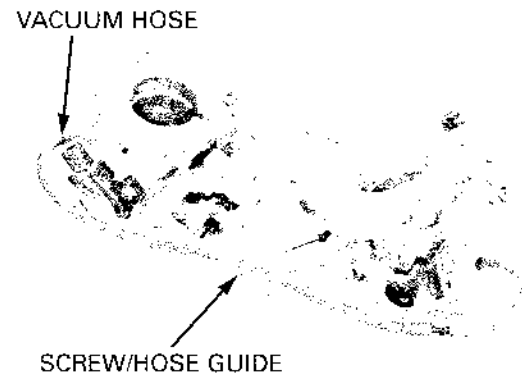
TORQUE: 5.4 N·m (0.55 kgf-m, 4.0 lbf-ft)



Connect the vacuum hose to the MAP sensor and throttle body.

Install the hose guide and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.13 kgf-m, 0.9 lbf-ft)



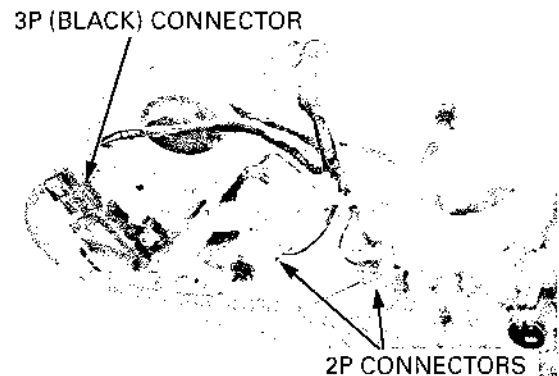
Route the throttle body sub-harness into the throttle body.

Connect the each injector 2P connector to each injector.

Connect the TP sensor 3P (Black) connector.

Install the throttle body (page 5-63).

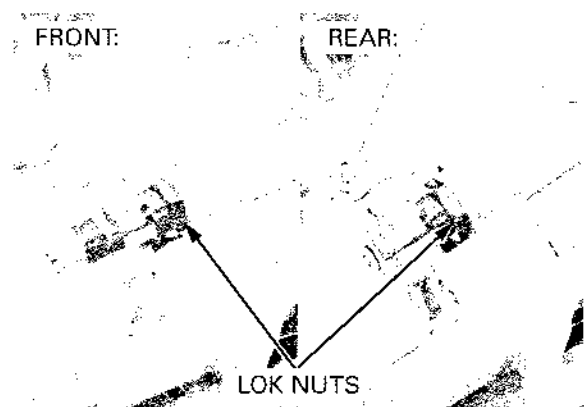
The throttle body sub-harness has the identification marks for the injector connector connection (#1: Brown for rear, #2: Gray for front). Install the injector connectors proper locations.



STARTER VALVE

DISASSEMBLY

Loosen the lock nut.

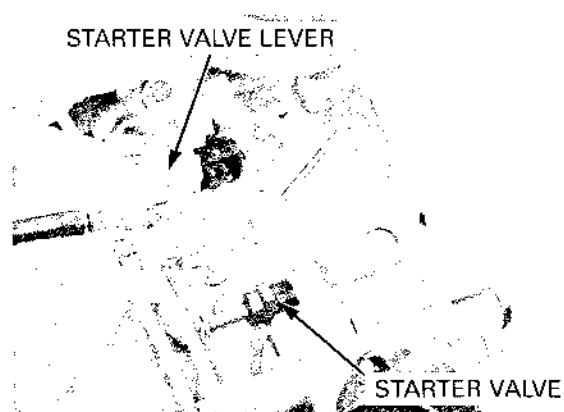


FUEL SYSTEM (Programmed Fuel Injection)

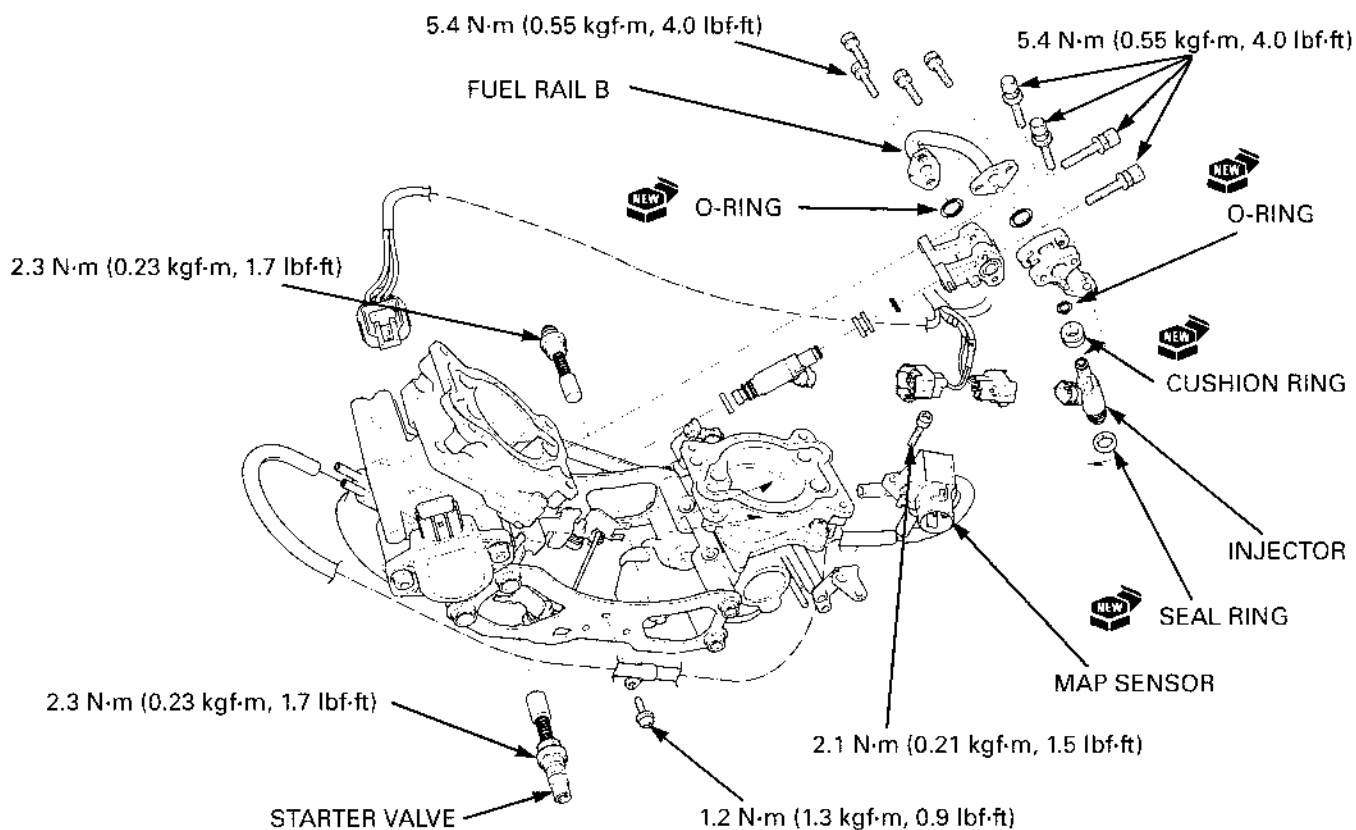
Turn the starter valve lever.
Compress the starter valve spring and remove the starter valve.

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

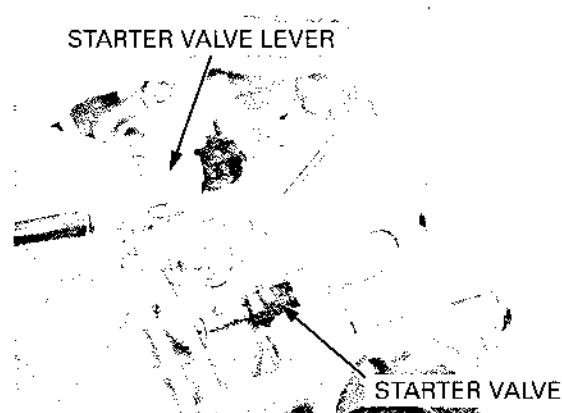
Clean the starter valve bypass using compressed air.



ASSEMBLY



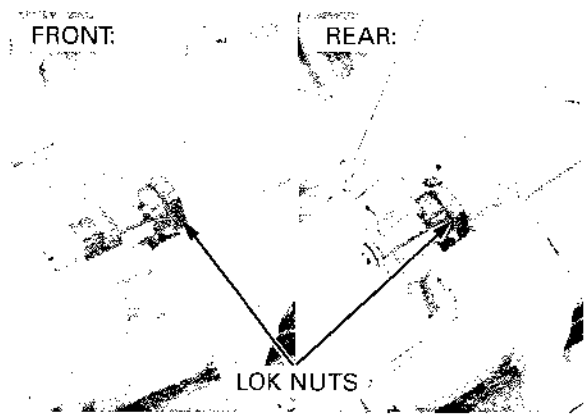
Turn the starter valve lever.
Install the starter valve assembly into the valve hole while compress the starter valve spring.



Set the each starter valve to the lever groove as shown.

Tighten the starter valve lock nut to the specified torque.

TORQUE: 2.3 N·m (0.23 kgf·m, 1.7 lbf·ft)

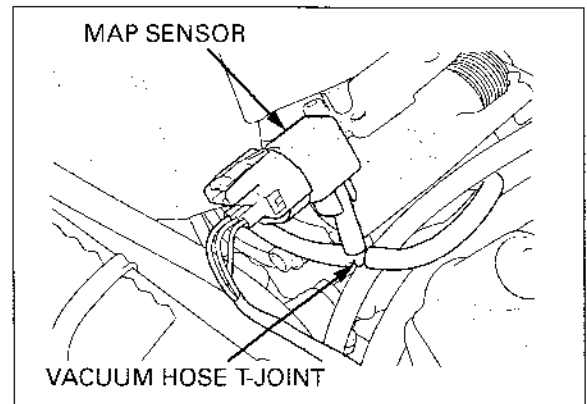


STARTER VALVE SYNCHRONIZATION

- 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 min^{-1} (rpm) or smaller that will accurately indicate 50 min^{-1} (rpm) change.

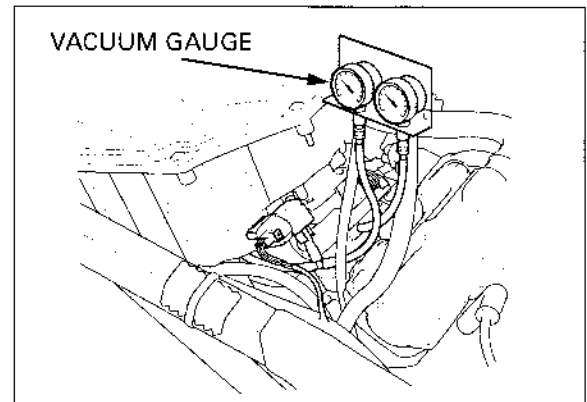
Disconnect the MAP sensor vacuum hose at the T-joint.

Start the engine and hold the engine speed above $2,000 \text{ min}^{-1}$ (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 as shown.

Connect the tachometer.



FUEL SYSTEM (Programmed Fuel Injection)

Disconnect each PAIR air suction hose from the reed valve cover and plug the cover.

AIR SUCTION HOSE

PAIR REED VALVE COVER

Start and warm up the engine.

Adjust the idle speed.

IDLE SPEED: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)

THROTTLE STOP SCREW KNOB

The No. 1 starter valve cannot be adjusted, it is the base starter valve.

Adjust No.2 intake vacuum pressure with the No.1 cylinder using a long type phillips from the left side.

No.2 SCREW

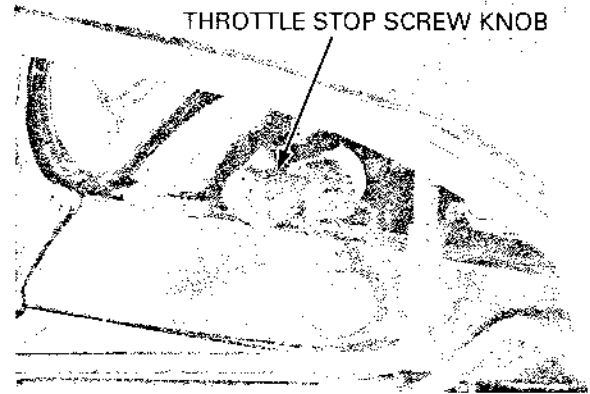
Remove the plugs and connect the PAIR air suction hoses to the reed valve covers.

AIR SUCTION HOSE

PAIR REED VALVE COVER

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

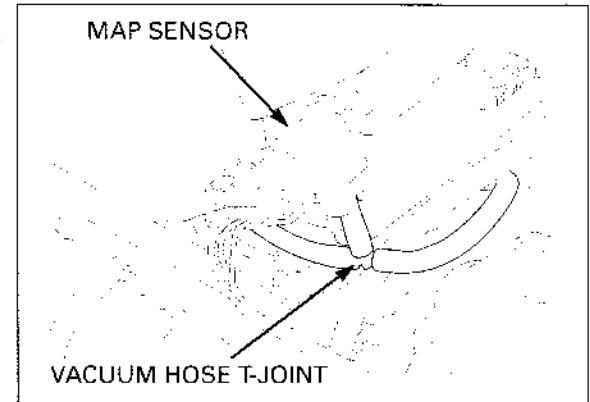
IDLE SPEED: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)



Remove the vacuum gauge from the vacuum hoses. Connect the each cylinder vacuum hose to the T-joint securely.

Reset the ECM (page 5-9).

Install the air cleaner housing (page 5-57).



MAP SENSOR

OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 5-10).

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

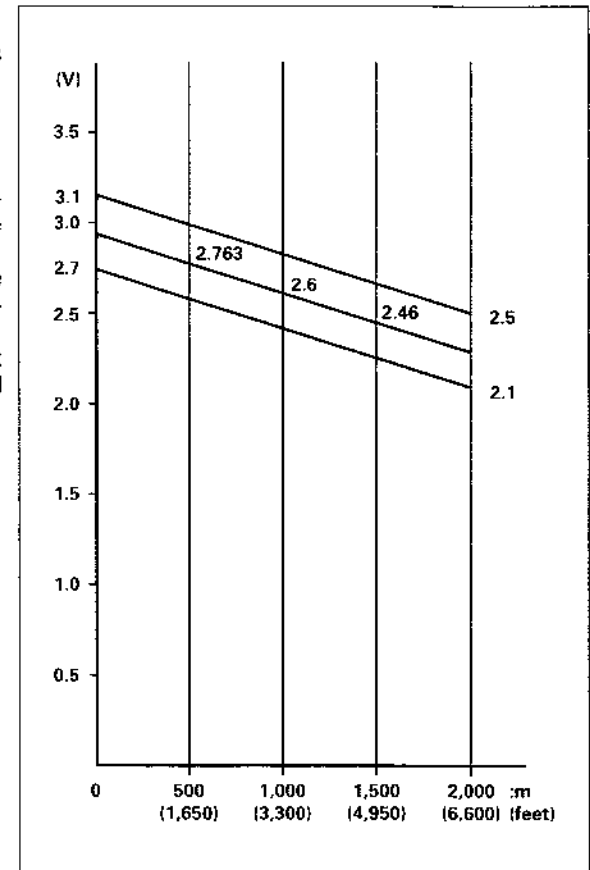
Connection: B15 (+) – B17 (–)

STANDARD: 2.7 – 3.1 V

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

The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.

Check the sea level measurement and be sure that the measured voltage falls within the specified value.



FUEL SYSTEM (Programmed Fuel Injection)

MAP SENSOR REMOVAL/INSTALLATION

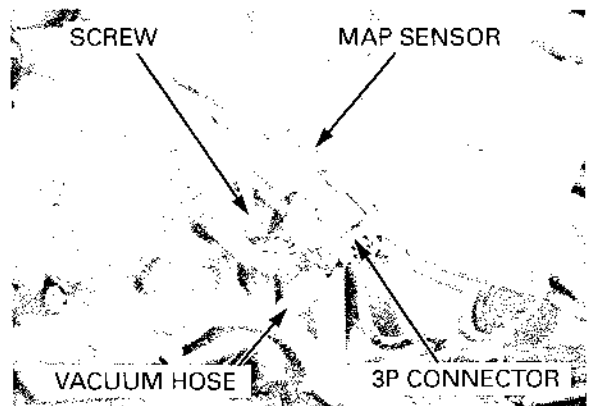
Remove the air cleaner housing (page 5-55).

Disconnect the MAP sensor 3P connector.
Remove the screw and MAP sensor from the throttle body.

Disconnect the vacuum hose from the MAP sensor.

Installation is in the reverse order of removal.

TORQUE: 2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)



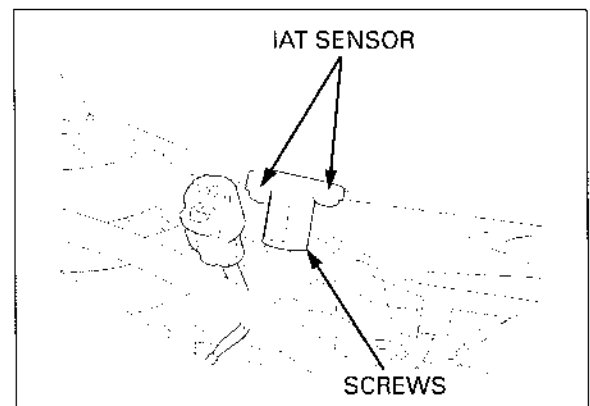
IAT SENSOR

REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-55).

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

Installation is in the reverse order of removal.



ECT SENSOR

Replace the ECT sensor while the engine is cold.

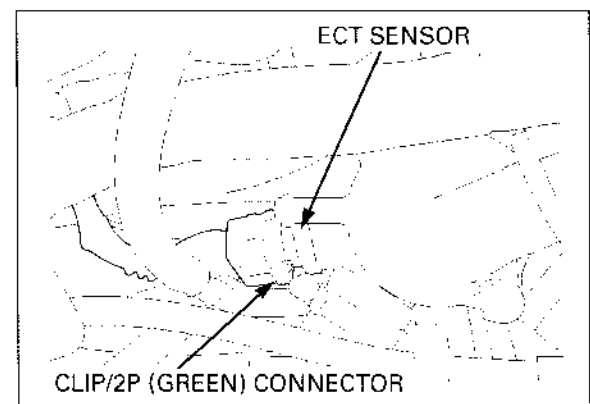
REMOVAL/INSTALLATION

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

Remove the air cleaner housing (page 5-55).

Remove the clip and disconnect the ECT sensor 2P (Green) connector from the sensor.

Remove the ECT sensor and sealing washer.



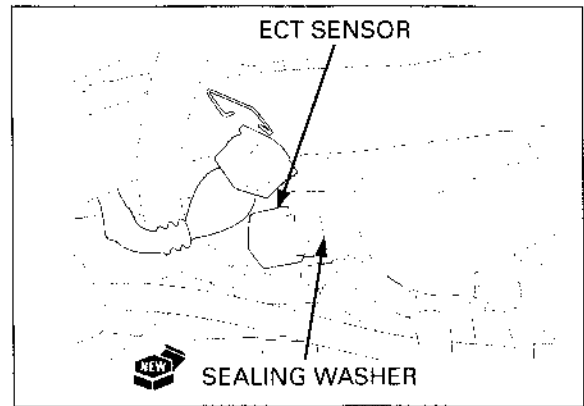
Always replace a sealing washer with a new one.

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 2P (Green) connector and install the clip securely.

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

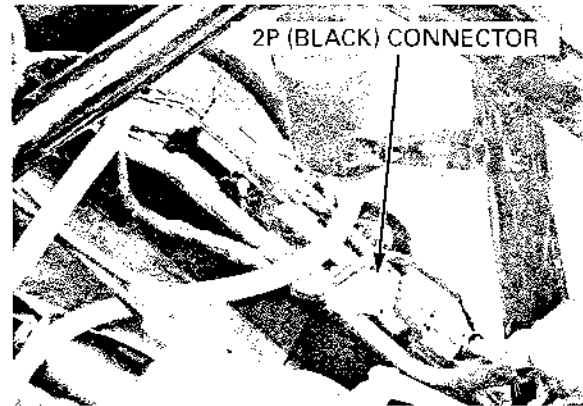


CAM PULSE GENERATOR

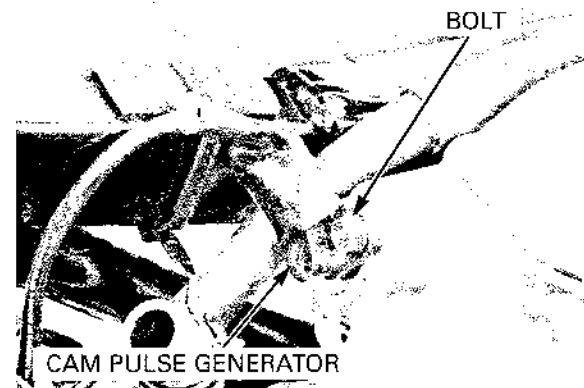
REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-55).

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

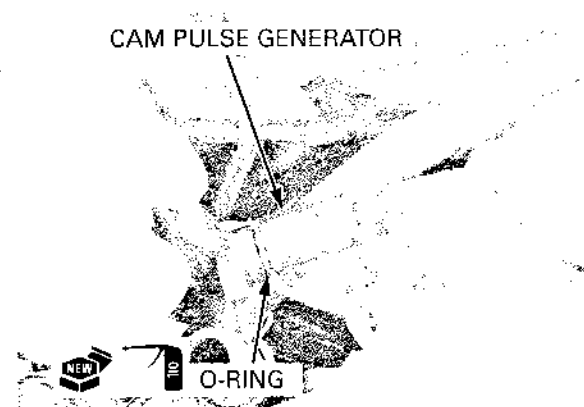


Remove the bolt and cam pulse generator from the rear cylinder head.



Apply oil to the new O-ring and install it onto the cam pulse generator. Install the cam pulse generator into the cylinder head.

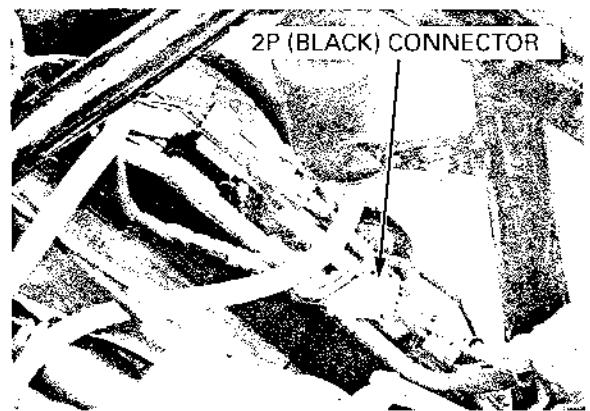
Install and tighten the mounting bolt securely.



FUEL SYSTEM (Programmed Fuel Injection)

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

Install the removed parts in the reverse order of removal.



TP SENSOR

INSPECTION

Remove the left middle cowl (page 2-8).

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

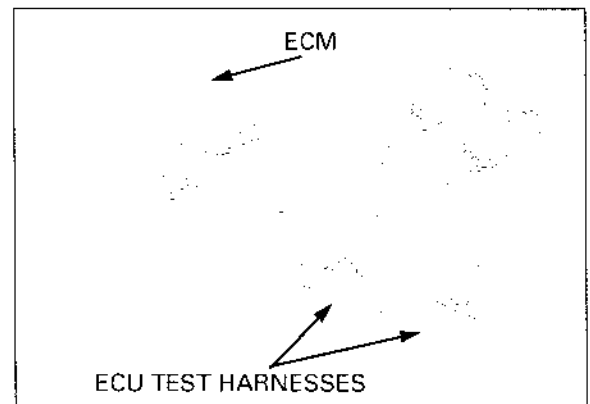
Check the connector for loose or corroded terminals.

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

TOOL:

ECM test harness 32P

070MZ-0010201
(two required)



INPUT VOLTAGE INSPECTION

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

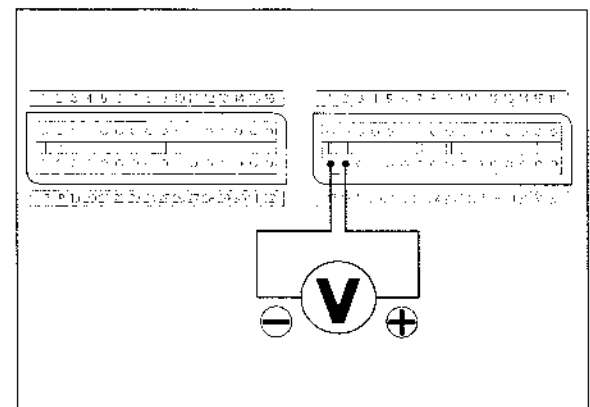
Measure and record the input voltage at the test harness terminals using a digital multimeter.

Connection: B18 (+) – B17 (–)

Standard: 4.75 – 5.25 V

If the measurement is out of specification, check the following:

- Loose connection of the ECM multi-connector
- Open circuit in wire harness.



OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

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

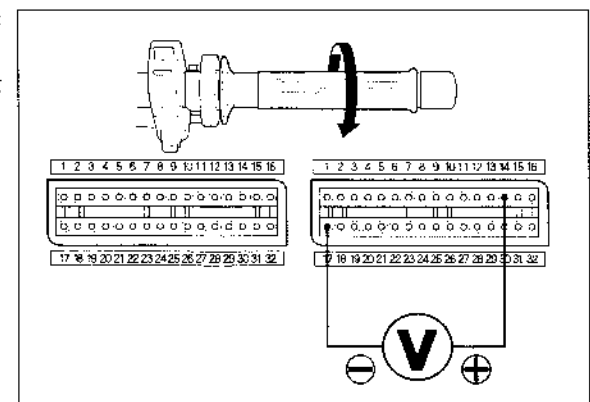
Measure and record the output voltage at the test harness terminals.

Connection:

B14 (+) – B17 (–)

MEASURING CONDITION:

At throttle fully open



OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

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

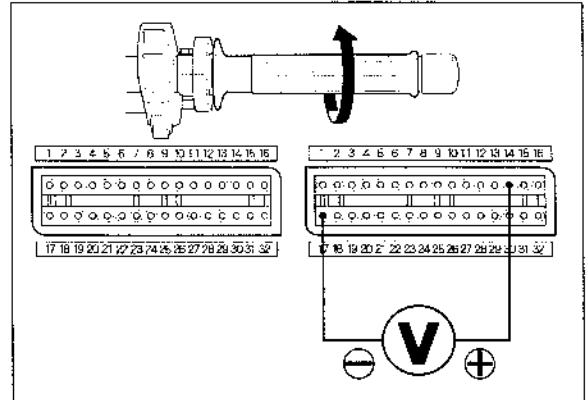
Measure and record the output voltage with the throttle fully closed.

Connection:

B14 (+) – B17 (–)

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 = V_o

The sensor is normal if the measurement output voltage measured in step 2 is within 10% of V_o .

With the throttle fully closed:

Measured input voltage X 0.1 = V_c

The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of V_c .

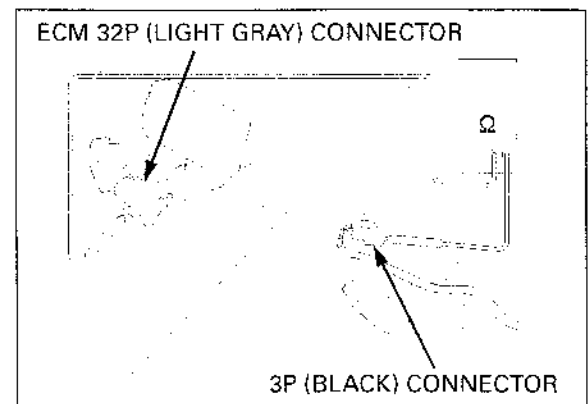
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

CONTINUITY INSPECTION

Remove the air cleaner housing (page 5-55).

Disconnect the ECM 32P (Black) and 32P (Light gray) connector and the TP sensor 3P (Black) 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 2-10).

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

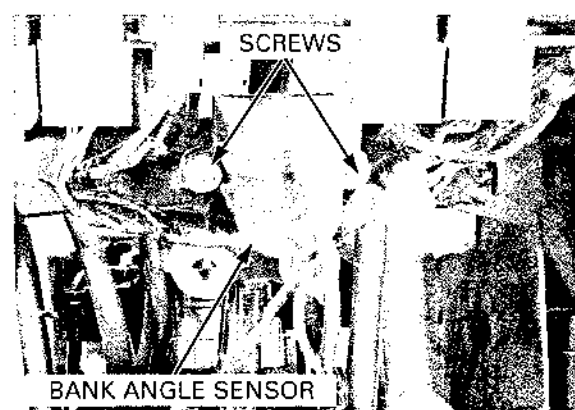
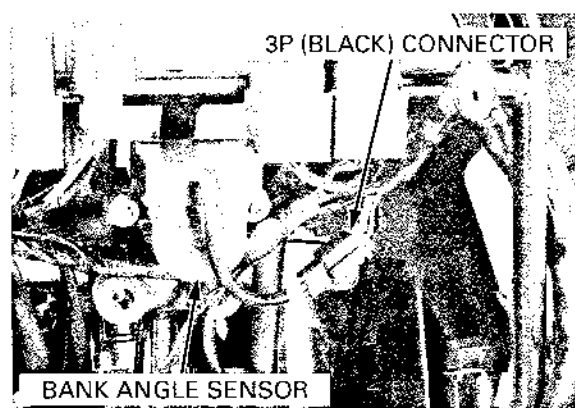
Measure the voltage between the following terminals of the bank angle sensor 3P (Black) connector with the connector connected.

TERMINAL	STANDARD
White/Black (White) (+) - Green (-)	Battery voltage
Red/Orange (Red/White) (+) - Green (-)	0 - 1 V

Do not disconnect the bank angle sensor connector during inspection.

Turn the ignition switch OFF.

Remove the screws and bank angle sensor.



Place the bank angle sensor horizontal as shown.

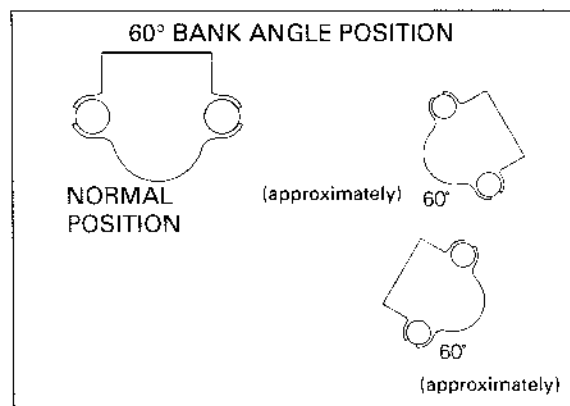
Turn the ignition switch ON and engine stop switch "RUN".

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

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

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

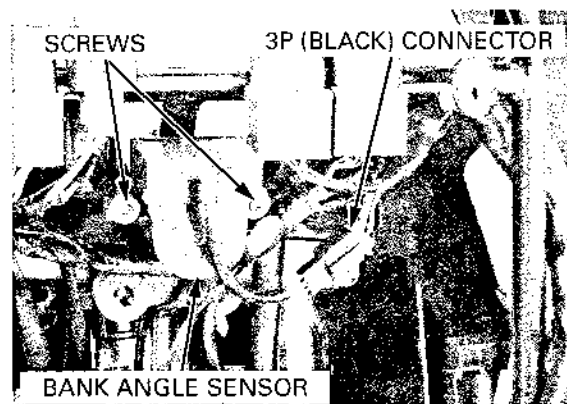
If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.



REMOVAL/INSTALLATION

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

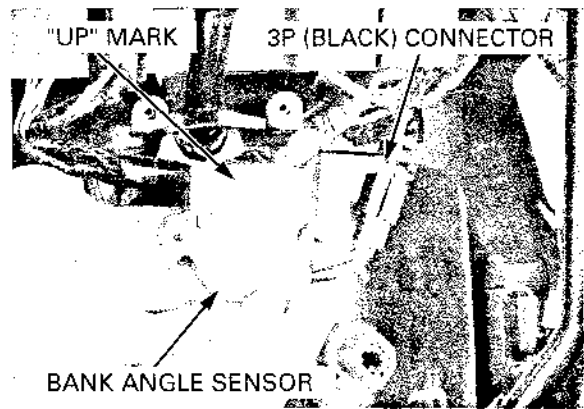
Remove the screws and bank angle sensor.



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.

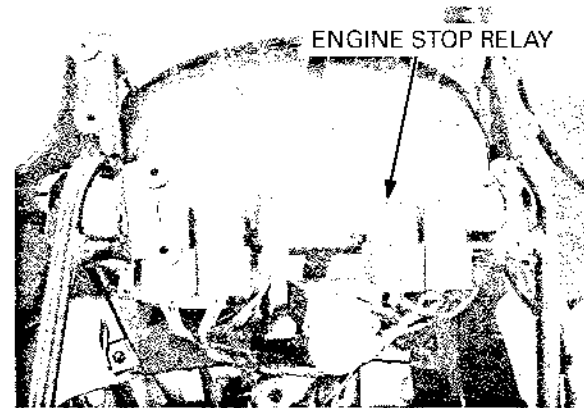


ENGINE STOP RELAY

INSPECTION

Remove the upper cowl (page 2-10).

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



Connect the ohmmeter to the engine stop relay connector terminals.

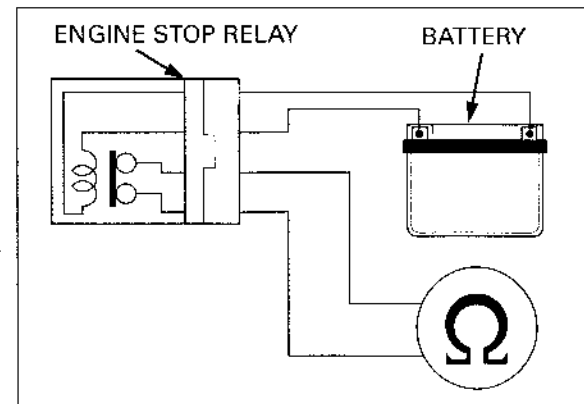
Connection: Black/White – White/Black

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.



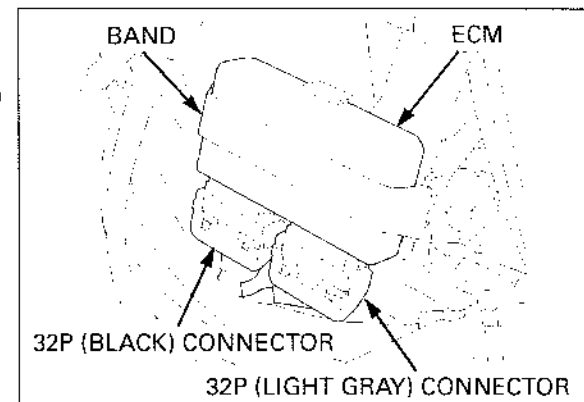
ECM (ENGINE CONTROL MODULE)

REMOVAL/INSTALLATION

Remove the left middle cowl (page 2-8).

Remove the ECM holder band and ECM.

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



FUEL SYSTEM (Programmed Fuel Injection)

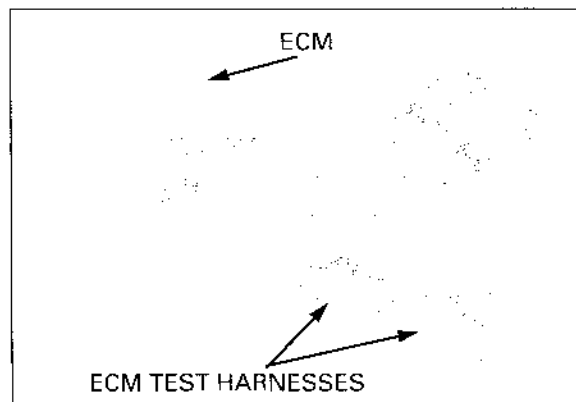
POWER/GROUND LINE INSPECTION

Connect the ECM test harness between the main wire harness and ECM (page 5-10).

TOOL:

ECM test harness 32P

070MZ-0010201
(two required)

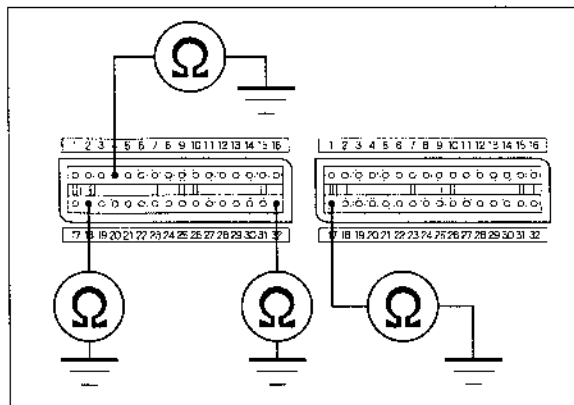


GROUND LINE

Check for continuity between the ECM test harness connector A4 terminal and ground, between the A18 terminal and ground, between the A32 terminal and ground, and between the B17 terminal and ground.

There should be continuity at all times.

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



POWER INPUT LINE

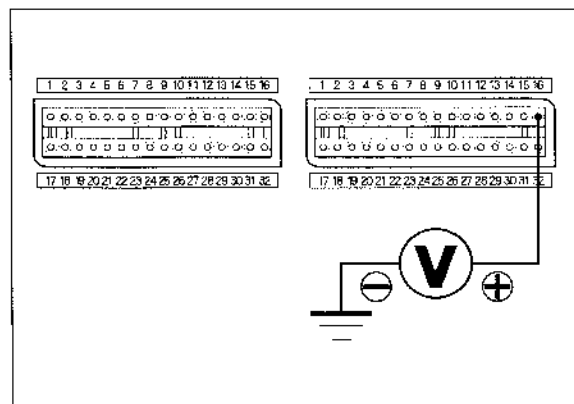
Turn the ignition switch ON with the engine stop switch in RUN position.

Measure the voltage between the ECM test harness connector B16 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 5-78).



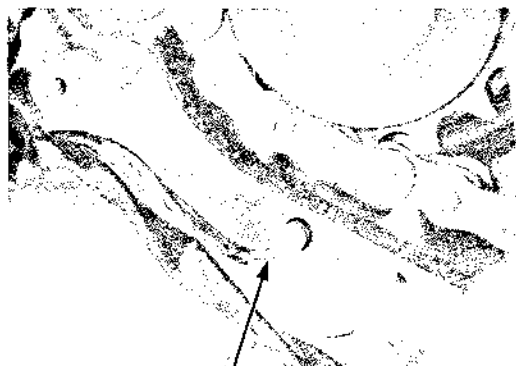
VARIABLE AIR INTAKE CONTROL VALVE

INSPECTION

Support the motorcycle on its center stand with the transmission in neutral.

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

Disconnect the neutral switch connector from the switch.



NEUTRAL SWITCH CONNECTOR

Start the engine.

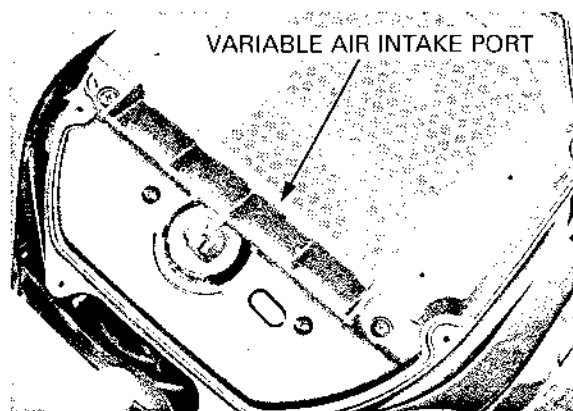
Check the operation of the variable air intake port.

With the engine speed above 5,500 min⁻¹ (rpm), the variable air intake port is opens.

With the engine speed below 5,000 min⁻¹ (rpm), the variable air intake port is closes.

If the operation of the variable air intake port is incorrect, inspect the following:

- Diaphragm damage
- Vacuum hose leakage
- Loose or poor contact on the vacuum hose
- Bypass control solenoid valve (page 5-81)
- Loose or poor contact on the bypass control solenoid valve connector
- Open or short circuit between the bypass control solenoid valve and the ECM
- One-way valve and/or vacuum chamber damage (page 5-82)



VARIABLE AIR INTAKE PORT

BYPASS CONTROL SOLENOID VALVE REMOVAL

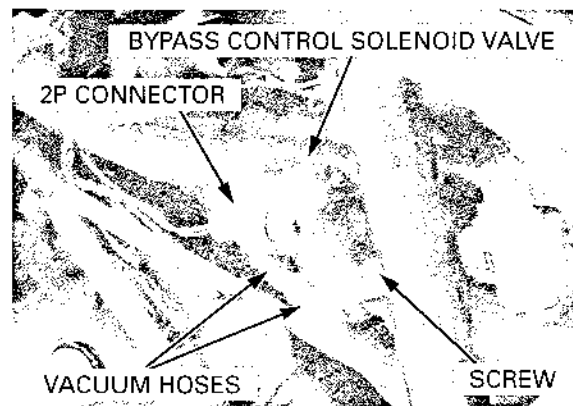
Remove the left middle cowl (page 2-8).

Remove the fuel tank (page 5-53).

Disconnect the vacuum hoses from the bypass control solenoid valve.

Disconnect the bypass control solenoid valve 2P connector.

Remove the screw and bypass control solenoid valve from the air cleaner housing.



BYPASS CONTROL SOLENOID VALVE

2P CONNECTOR

VACUUM HOSES

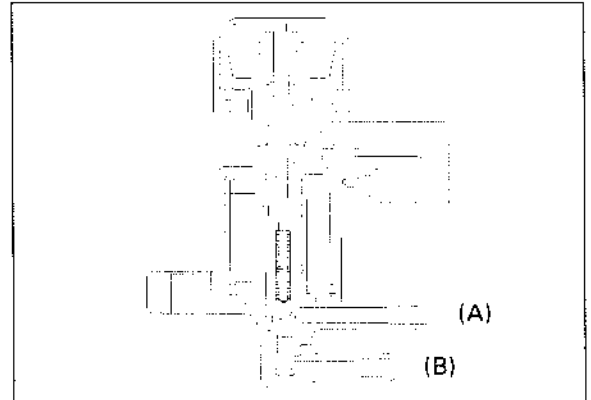
SCREW

FUEL SYSTEM (Programmed Fuel Injection)

Inspection

Remove the bypass control solenoid valve.

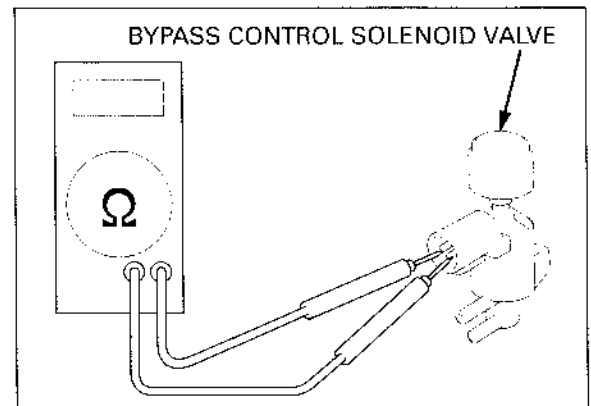
Check that the air should flow (A) to (B), only when the 12V battery is connected to the bypass control solenoid valve terminal.



Check the resistance between the terminals of the bypass control solenoid valve.

STANDARD: 28 – 32 Ω (20 °C/68 °F)

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



ONE-WAY VALVE

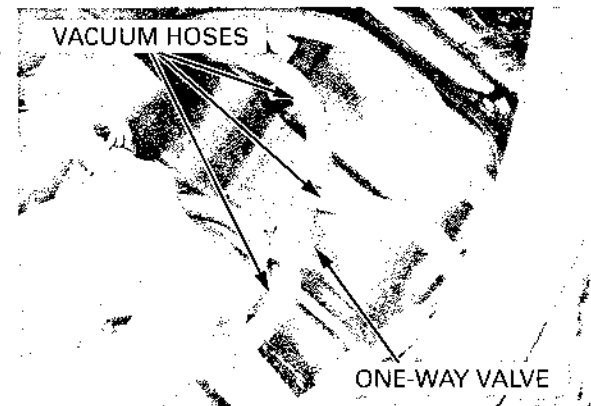
Removal/Installation

Remove the air cleaner housing (page 5-55).

Disconnect the vacuum hoses and the one-way valve.

Route the vacuum hoses correctly (page 1-23).

Installation is in the reverse order of removal.

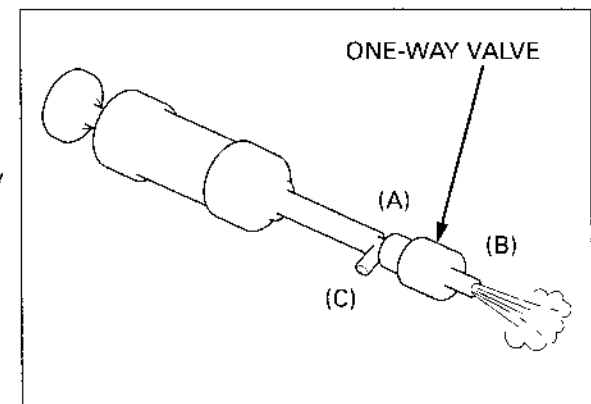


Inspection

Check the one-way valve operation as follow:

- Air should flow (A) to (B)
- Air should flow (A) to (C)
- Air should not flow (B) to (A)
- Air should not flow (B) to (C)

If the operation is incorrect, replace the one-way valve.



VACUUM CHAMBER

Removal/Installation

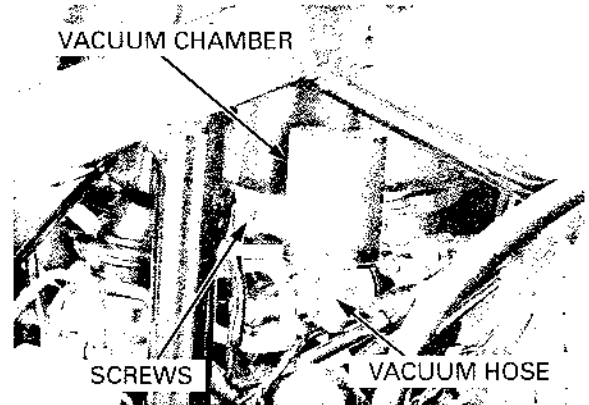
Remove the fuel tank (page 5-53).

Disconnect the vacuum hose from the vacuum chamber.

Remove the screw and vacuum chamber from the air cleaner housing.

Inspection

Check the vacuum chamber for damage and scratches, replace if necessary.

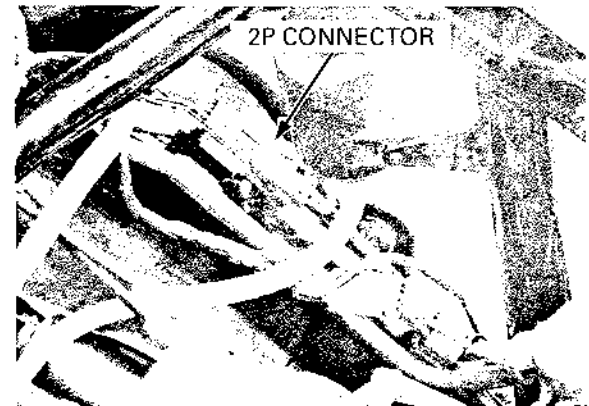


PAIR SOLENOID VALVE

REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-55).

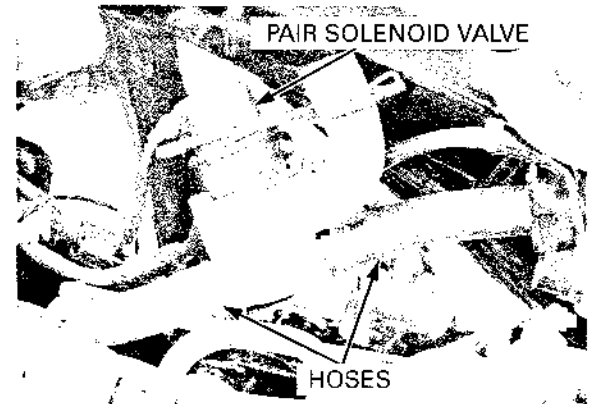
Disconnect the PAIR solenoid valve 2P connector.



Disconnect the PAIR air suction hoses from the PAIR solenoid valve.

Remove the PAIR solenoid valve.

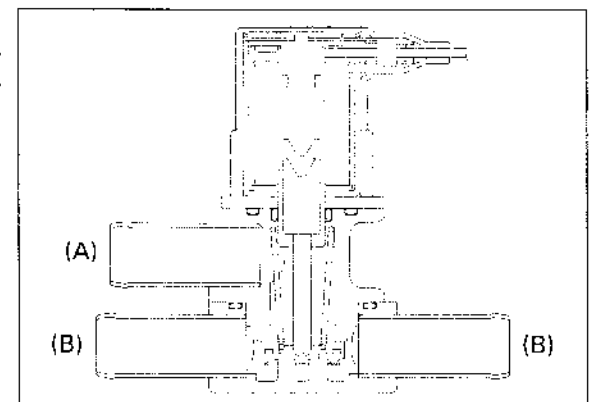
Installation is in the reverse order of removal.



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.

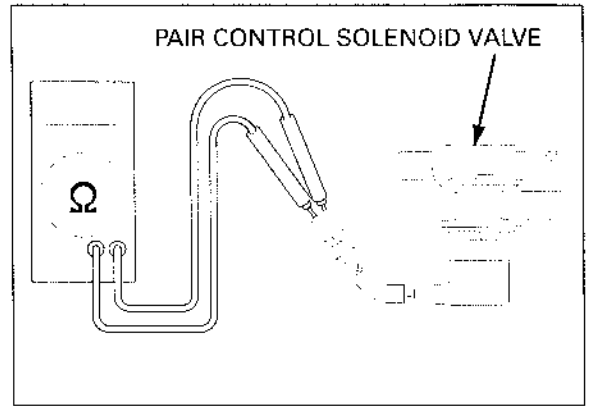


FUEL SYSTEM (Programmed Fuel Injection)

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.



O₂ SENSOR (G type only)

Do not service the O₂ sensor while it is hot.

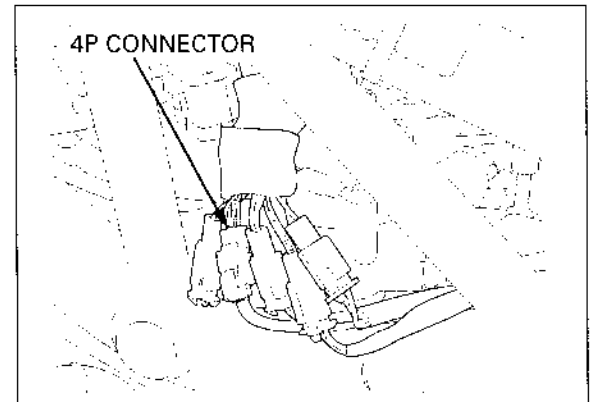
REMOVAL

NOTICE

- Handle the O₂ sensor with care.
- Do not get grease, oil or other materials in the O₂ sensor air hole.

Remove the left middle cowl (page 2-8).

Disconnect the O₂ sensor 4P connector.



Remove the O₂ sensor units using the special tool.

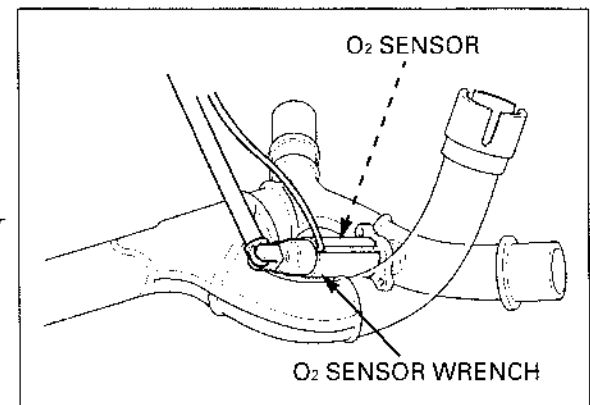
TOOL:

O₂ sensor wrench

07LAA-PT50101

NOTICE

- Be careful not to damage the sensor wire.
- Do not use an impact wrench while removing or installing the O₂ sensor.



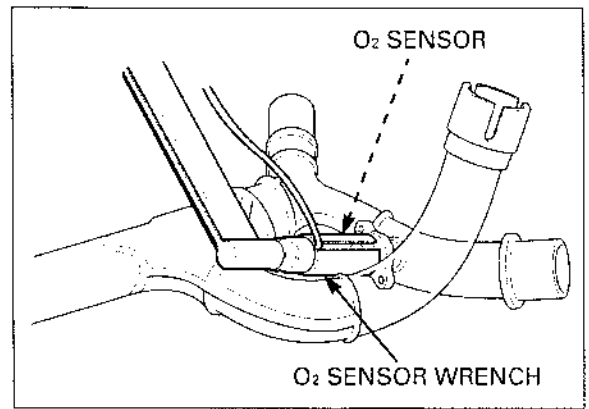
FUEL SYSTEM (Programmed Fuel Injection)

Install the O₂ sensor unit.
Tighten the unit to the specified torque using the special tool.

TOOL:

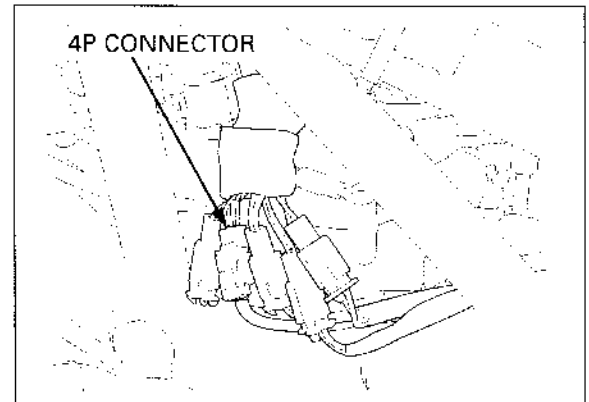
O₂ sensor wrench 07LAA-PT50101

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



Route the O₂ sensor wire properly (page 1-23).

Connect the O₂ sensor 4P connector.

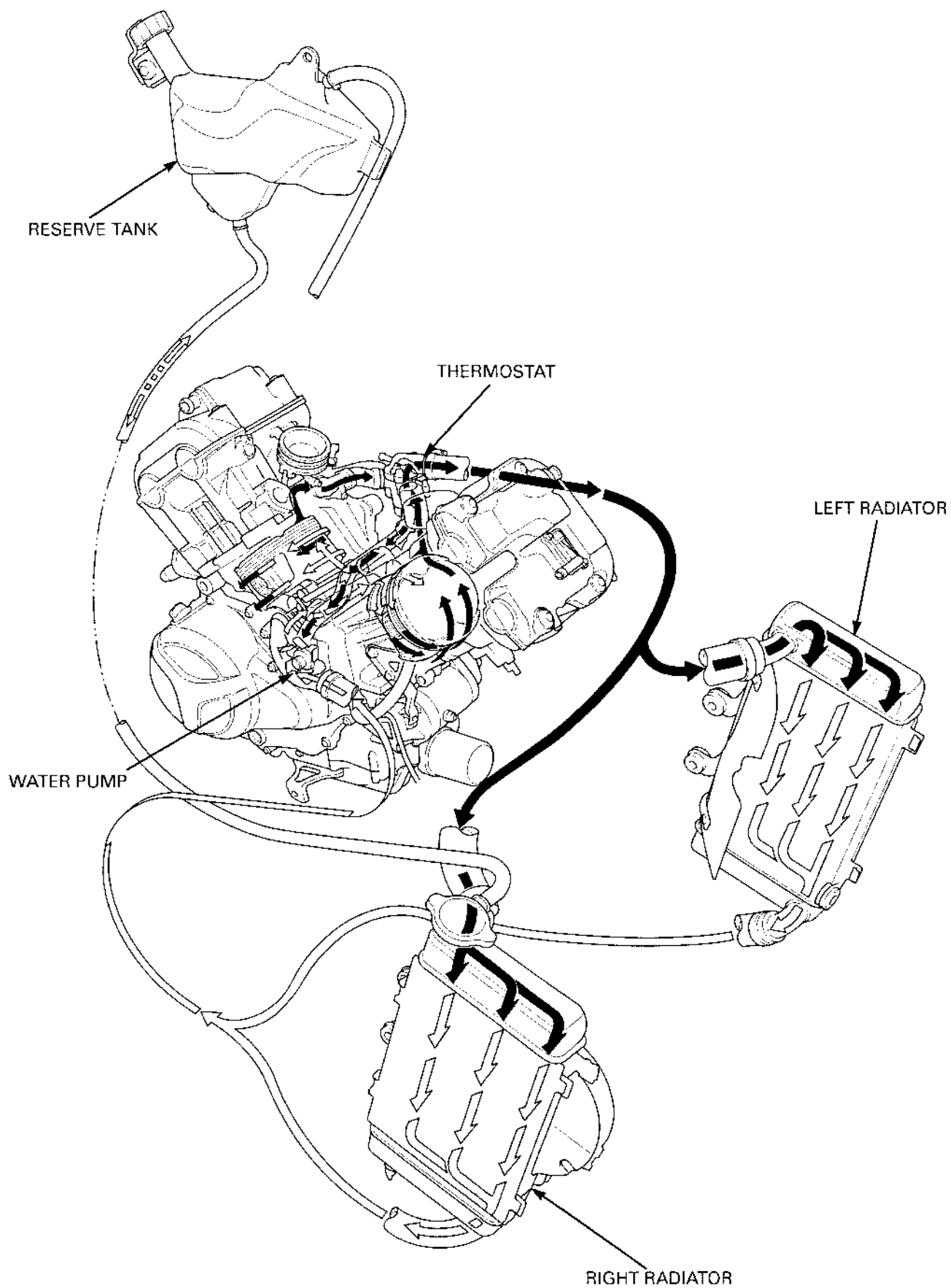


MEMO

6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-2	RADIATOR	6-9
SERVICE INFORMATION	6-3	RADIATOR RESERVE TANK	6-15
TROUBLESHOOTING	6-5	THERMOSTAT	6-15
SYSTEM TESTING	6-6	WATER PUMP	6-18
COOLANT REPLACEMENT	6-7		

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 cooling system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to the fan motor switch inspection (page 19-15) and coolant temperature sensor inspection (page 19-13).

SPECIFICATIONS

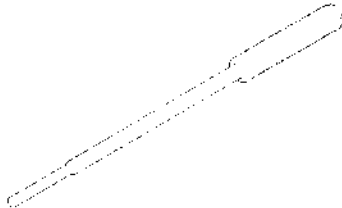
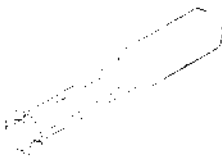
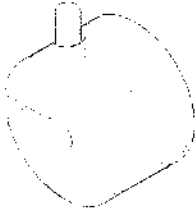
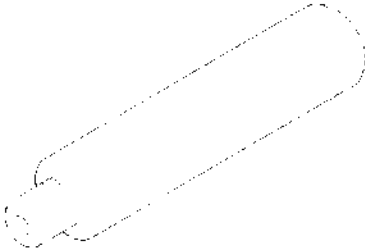



ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.8 liter (3.0 US qt, 2.5 Imp qt)
	Reserve tank	0.5 liter (0.5 US qt, 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	75 – 82°C (167 – 180 °F)
	Fully open	82 °C (180 °F)
	Valve 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

Cooling fan mounting nut	3 N·m (0.27 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)	
Fan motor bracket mounting bolt	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	
ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply sealant to the threads
Thermosensor	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fan motor switch	17 N·m (1.7 kgf·m, 12 lbf·ft)	

COOLING SYSTEM

TOOLS

<p>Bearing remover shaft 07936-GE00100</p> 	<p>Bearing remover, 10 mm 07936-GE00200</p> 	<p>Remover weight 07741-0010201</p> 
<p>Driver 07749-0010000</p> 	<p>Attachment, 28 X 30 mm 07946-1870100</p> 	<p>Pilot, 10 mm 07746-0040100</p> 
<p>Mechanical seal driver attachment 07945-4150400</p> 		

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature gauge or thermo 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 thermo sensor
- Thermostat stuck open
- Faulty cooling fan motor switch

Coolant leak

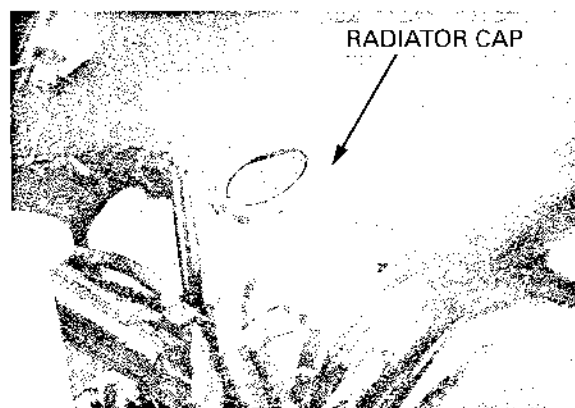
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

SYSTEM TESTING

COOLANT (HYDROMETER TEST)

Remove the upper cowl cover (page 2-10).

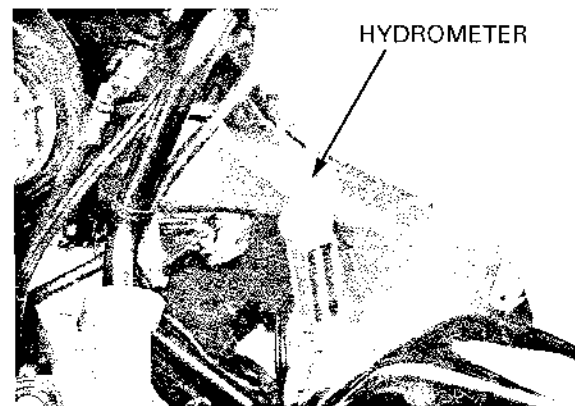
Remove the radiator cap.



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 6-7).

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 6-6).

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

RADIATOR CAP RELIEF PRESSURE:

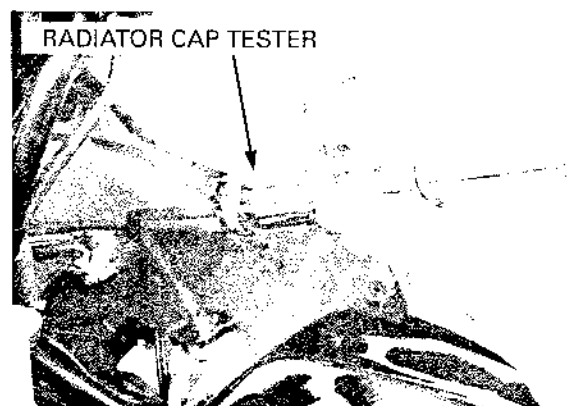
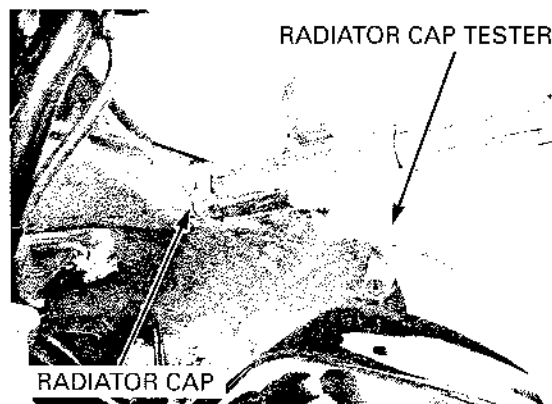
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)

Pressure 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 specified pressure for at least 6 seconds.



COOLANT REPLACEMENT

PREPARATION

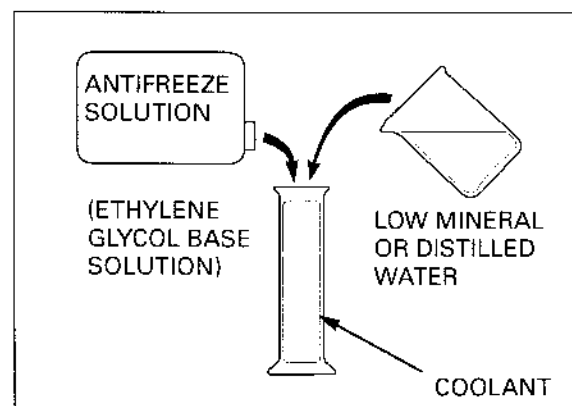
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing corrosion protection inhibitors

RECOMMENDED MIXTURE:

50 – 50 (Distilled water and antifreeze)



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.

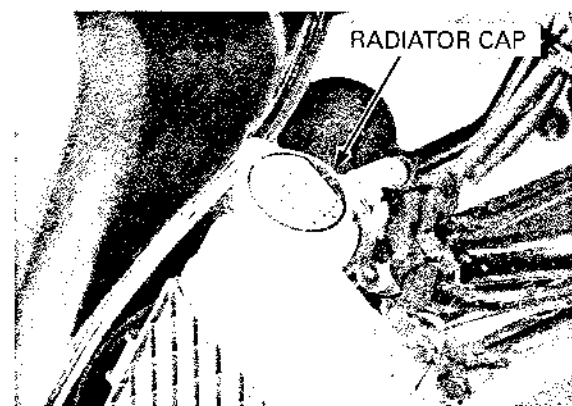
REPLACEMENT/AIR BLEEDING

Remove the upper cowl cover (page 2-10).

Remove the under cowl (page 2-7).

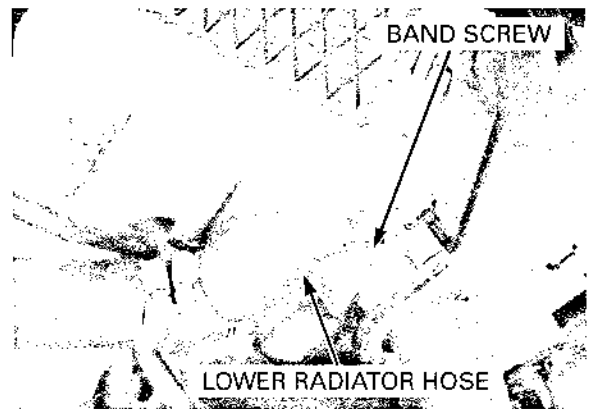
Remove the middle cowl (page 2-8).

Remove the radiator cap.



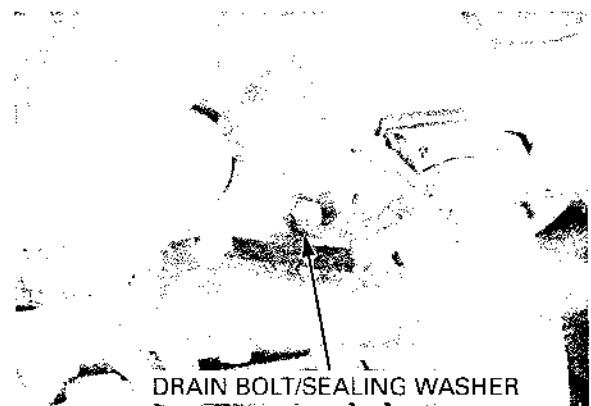
COOLING SYSTEM

Disconnect the lower radiator hose at the right radiator by losing the hose band screw and drain the coolant from the system.



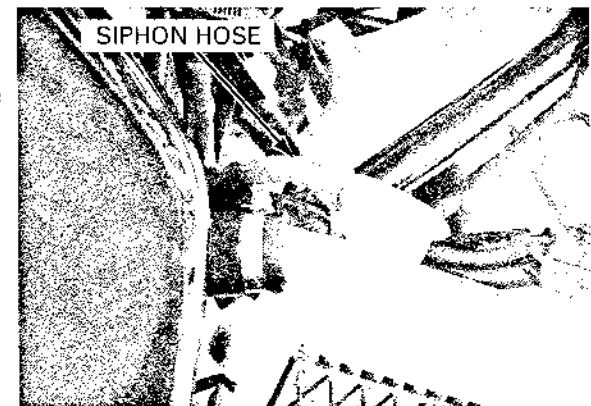
Remove the cylinder drain bolt and drain the coolant from the cylinder.

Reinstall the drain bolt with the new sealing washer.

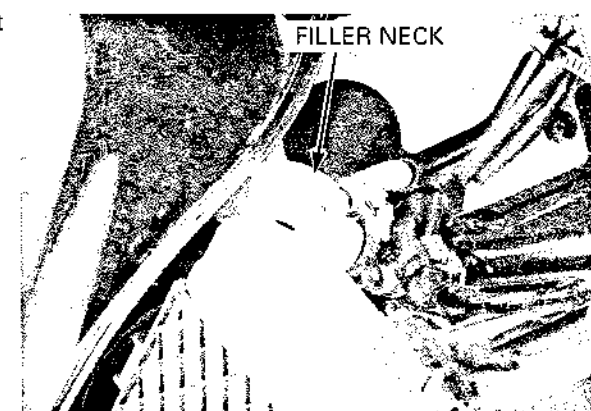


Disconnect the siphon hose from the radiator. Drain the reserve tank coolant from the siphon hose. Empty the coolant and rinse the inside of the reserve tank with water.

Reconnect the siphon hose to the radiator.



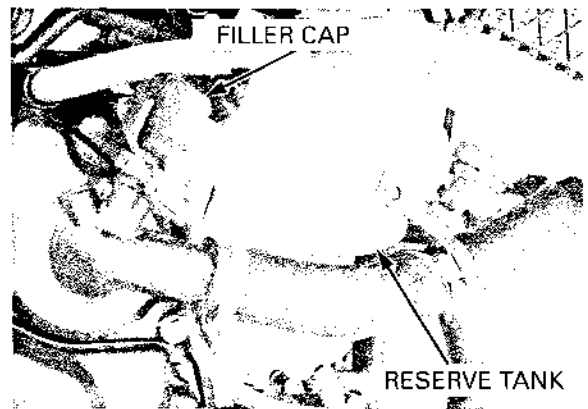
Fill the system with the recommended coolant through the filler opening up to filler neck.



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follow:

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.



RADIATOR

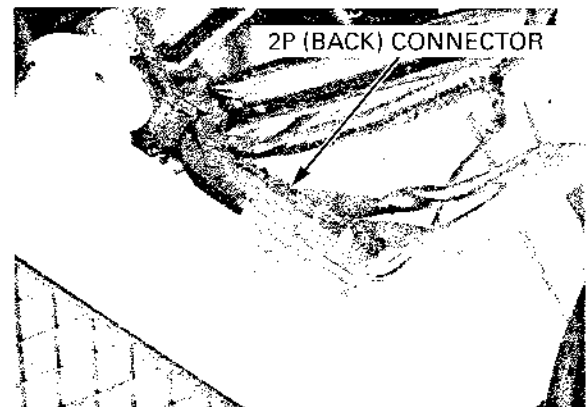
REMOVAL/INSTALLATION

Be careful not to damage the radiator core.

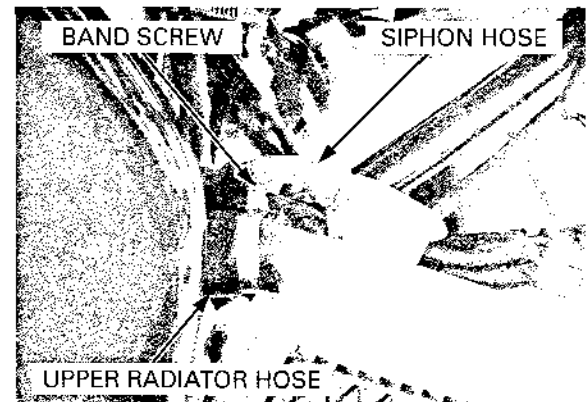
Drain the coolant (page 6-7).

Right radiator

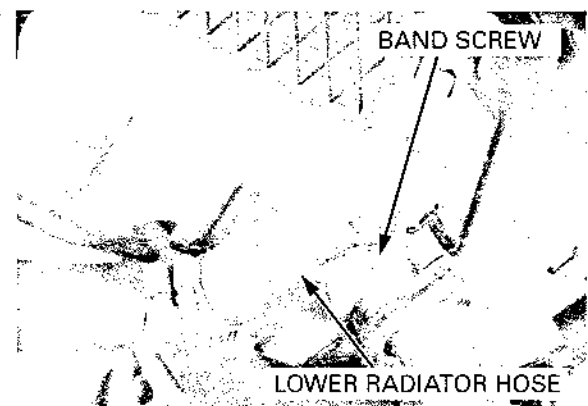
Disconnect the fan motor switch 2P (Black) connector.



Disconnect the siphon hose from the radiator. Loosen the band screw and upper radiator hose from the radiator.

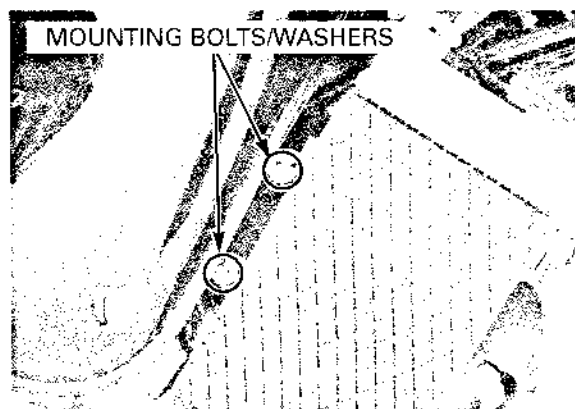


Loosen the band screw and disconnect the lower radiator hose from the radiator.



COOLING SYSTEM

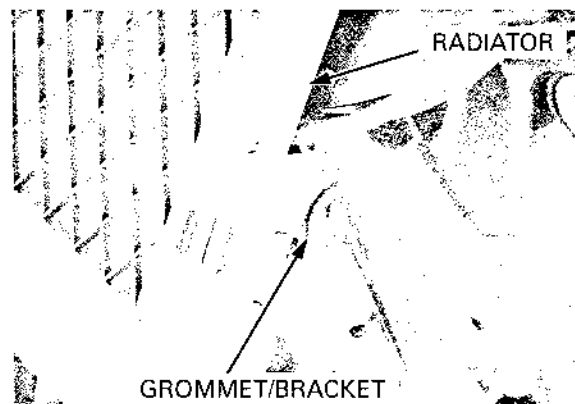
Remove the mounting bolts and washers.



Release the grommet on the radiator from the radiator bracket.

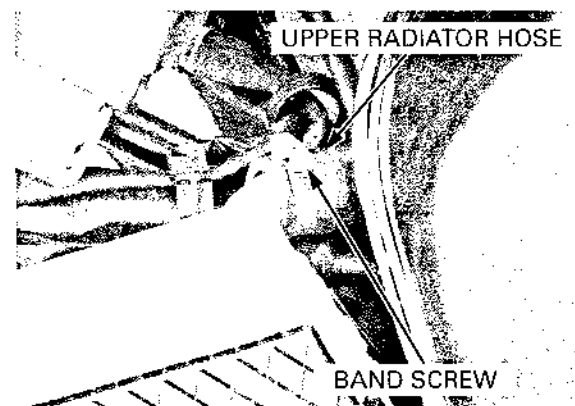
Installation is in the reverse order of removal.

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

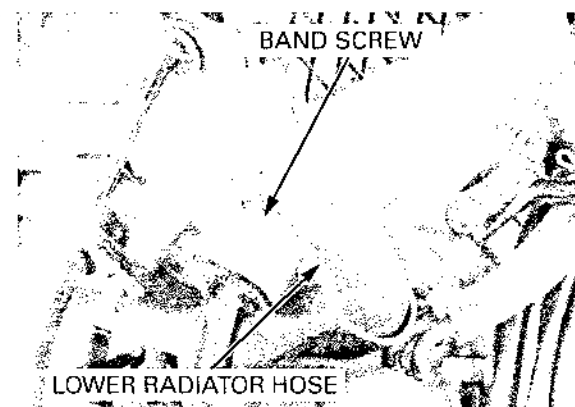


Left radiator

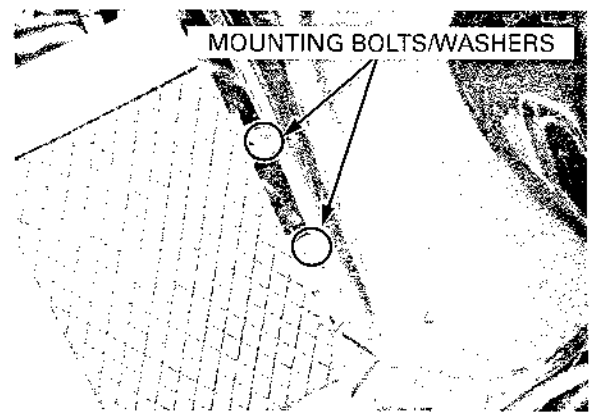
Loosen the band screw and disconnect the upper radiator hose from the radiator.



Loosen the band screw and disconnect the lower radiator hose from the radiator.



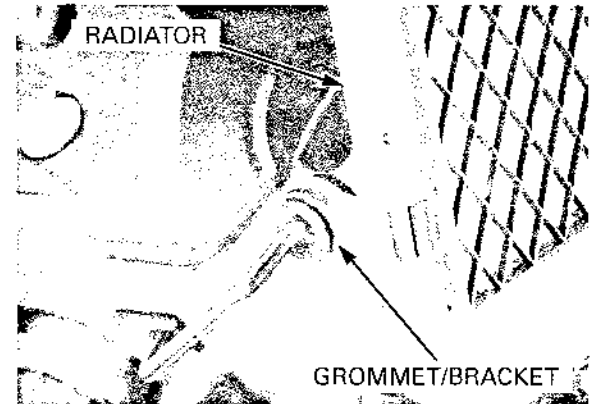
Remove the mounting bolts and washers.



Release the grommet on the radiator from the radiator bracket.

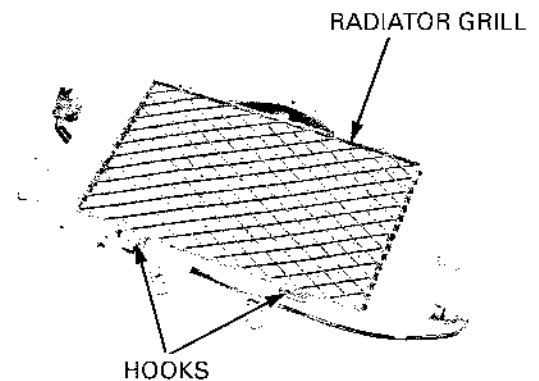
Installation is in the reverse order of removal.

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

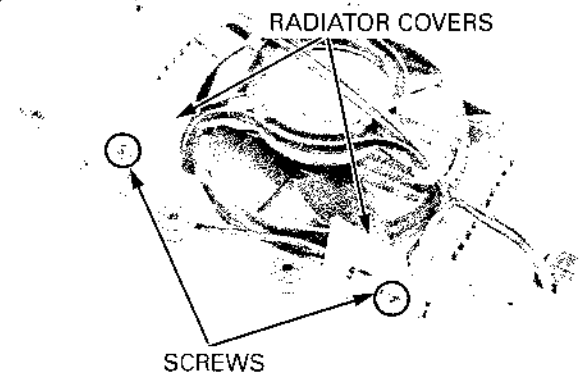


DISASSEMBLY

Release the hooks and remove the radiator grill.

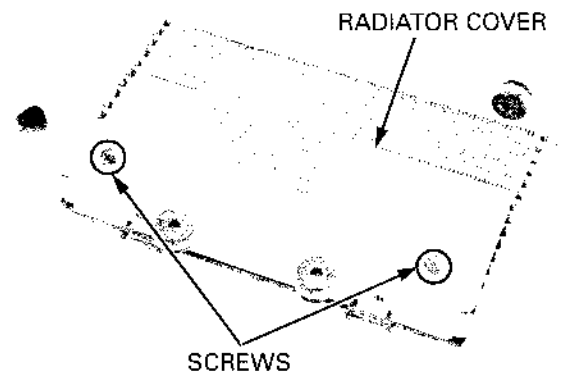


Right radiator: Remove the screws and radiator covers from the right radiator.



COOLING SYSTEM

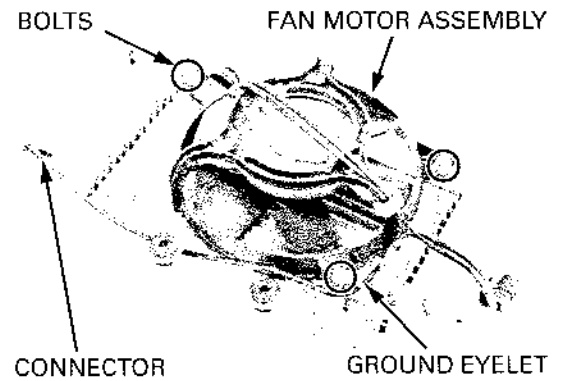
Left radiator: Remove the screws and radiator cover from the left radiator.



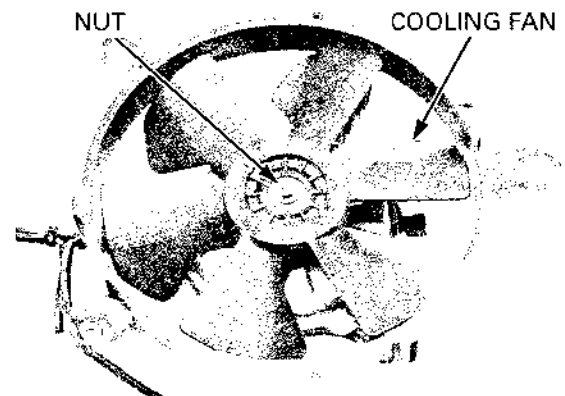
Cooling fan disassembly

Disconnect the fan motor switch connector.

Remove the three bolts, ground eyelet and cooling fan motor assembly.

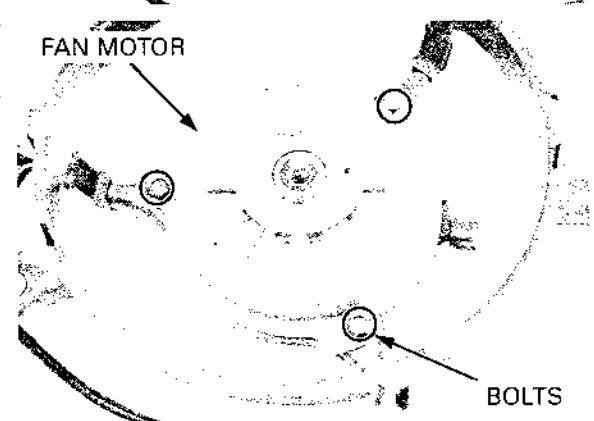


Remove the nut and cooling fan.

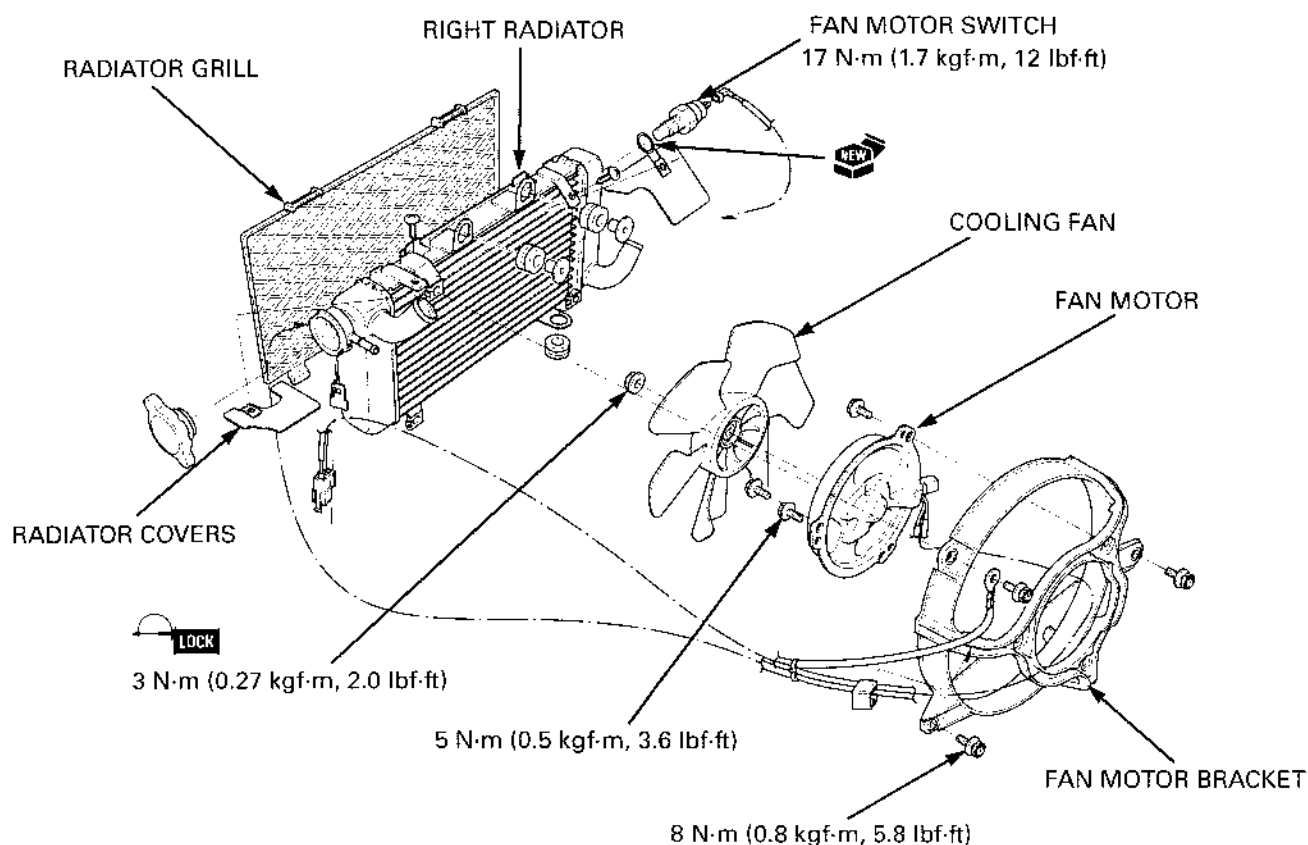


Remove the bolts and fan motor from the fan motor bracket.

Refer to the fan motor switch information (page 19-15).



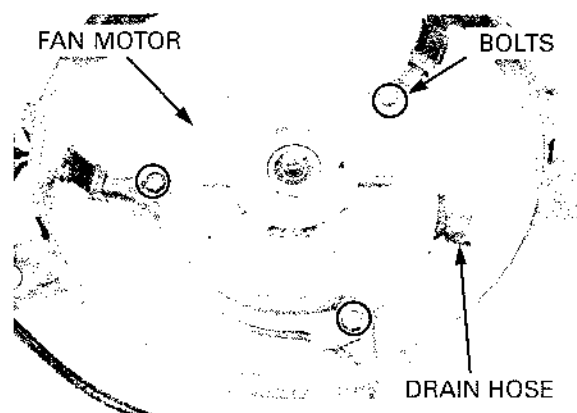
ASSEMBLY



Cooling fan assembly

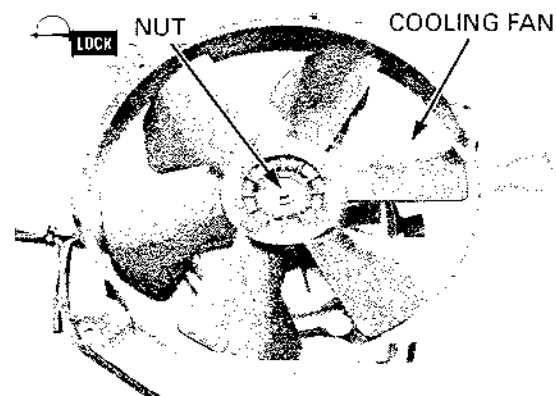
Install the fan motor onto the fan motor bracket with the drain hose as shown. Install and tighten the bolts to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



Install the cooling fan onto the fan motor shaft by aligning the flat surfaces. Install and tighten the nut to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.0 lbf·ft)



COOLING SYSTEM

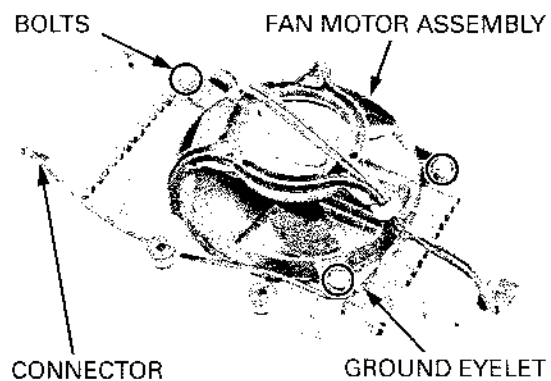
Install the cooling fan motor assembly onto the radiator.

Route the ground eyelet properly.

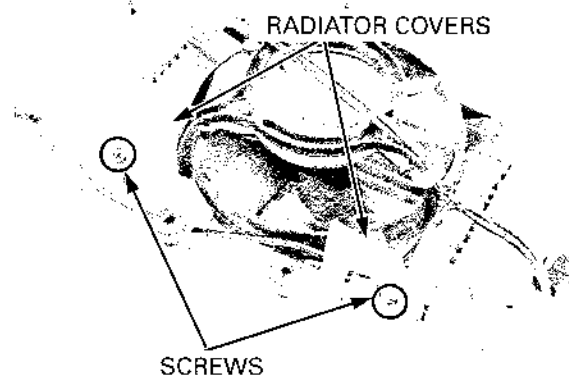
Install and tighten the bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf-m, 5.8 lbf-ft)

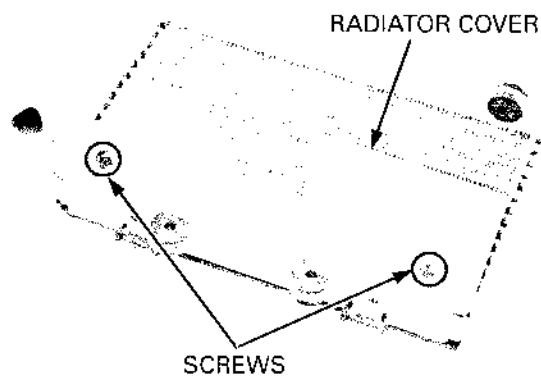
Connect the fan motor switch connector.



Right radiator: Install the radiator covers to the right radiator. Install and tighten the screws securely.

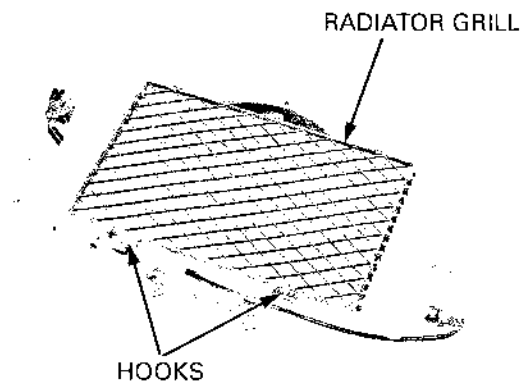


Left radiator: Install the radiator cover to the left radiator. Install and tighten the screws securely.



Install the radiator grill while aligning the tabs to the hooks on the radiator.

Install the radiator (page 6-9).

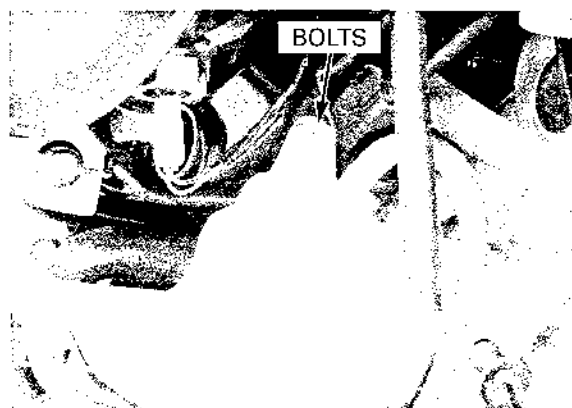


RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

Remove the right radiator (page 6-9).

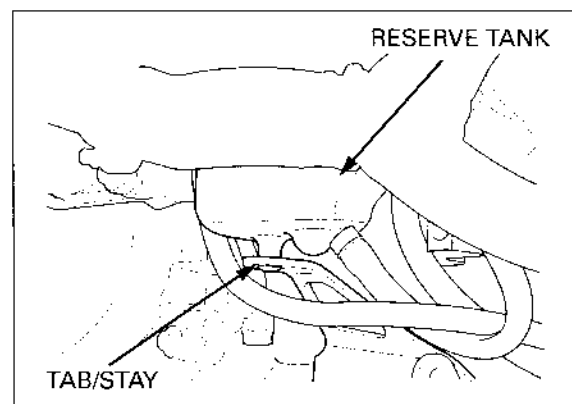
Remove the bolt.



Remove the tab on the reserve tank from the stay, then remove the reserve tank.

Installation is in the reverse order of removal.

Install the right radiator (page 6-9).



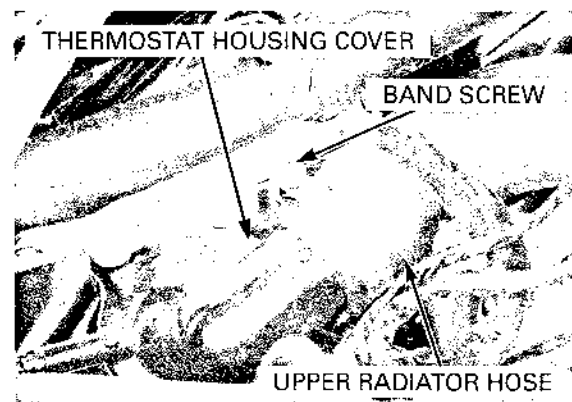
THERMOSTAT

REMOVAL

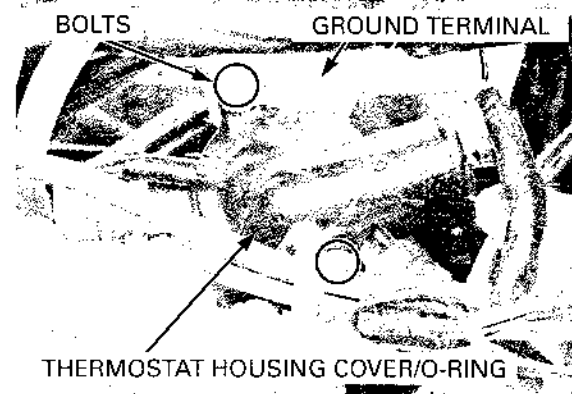
Drain the coolant (page 6-7).

Remove the air cleaner housing (page 5-55).

Loosen the hose band screw and disconnect the upper radiator hose from the thermostat housing cover.

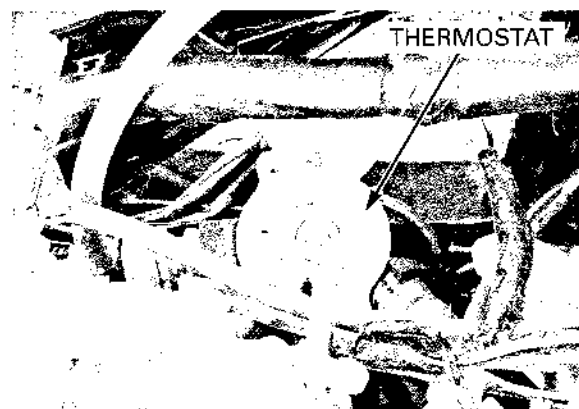


Remove the bolts, ground terminal, thermostat housing cover and O-ring.



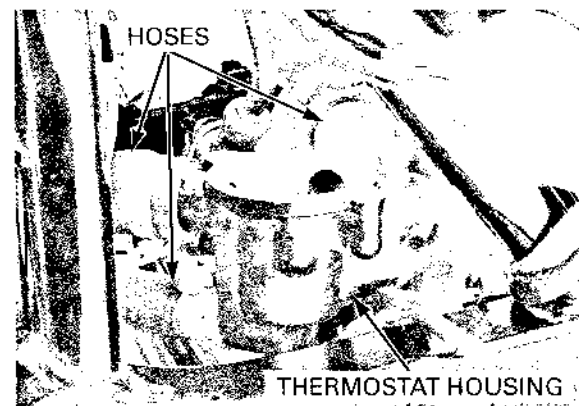
COOLING SYSTEM

Remove the thermostat.



Disconnect the thermosensor connector and ECT sensor 2P (Green) connector.

Loosen the hose band screws and disconnect the radiator hoses from the thermostat housing. Remove the thermostat housing.



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 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:

75 – 82 °C (167 – 180 °F)

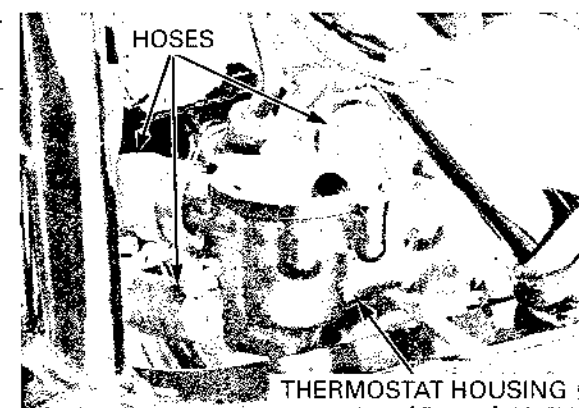
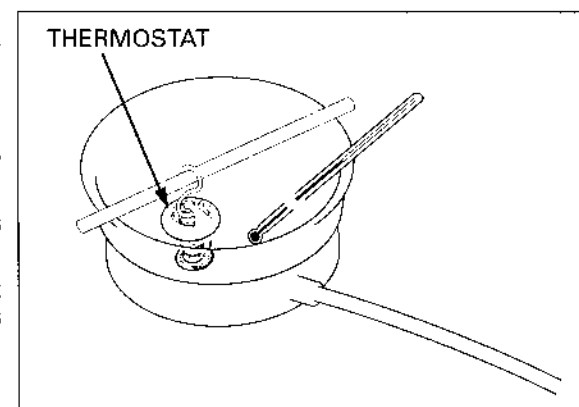
VALVE LIFT:

8 mm (0.3 in) minimum at 82 °C (180 °F)

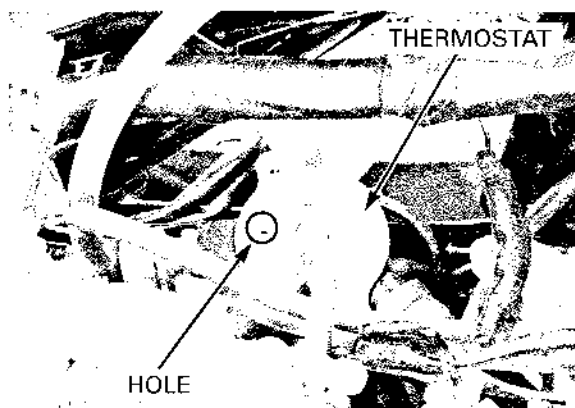
INSTALLATION

Connect the radiator hoses to the thermostat housing and tighten the hose band screws securely.

Connect the thermosensor connector and ECT sensor 2P (Green) connector.



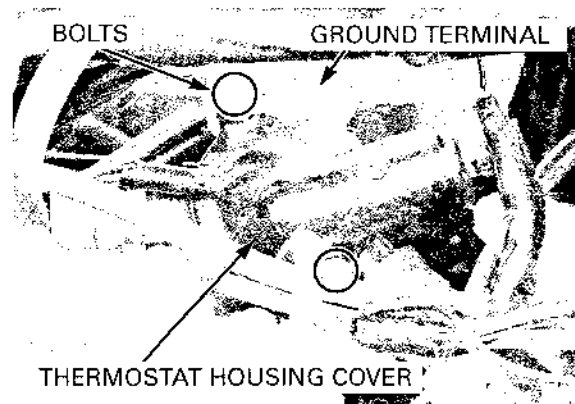
Install the thermostat into the housing with its hole facing rearward.



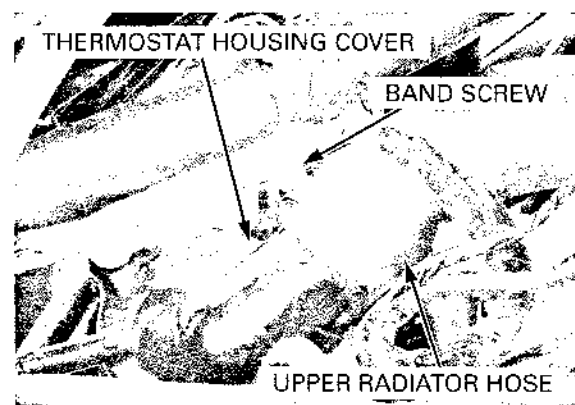
Install the new O-ring into the thermostat housing cover groove.
Install the thermostat housing cover onto the housing.



Install the ground terminal and tighten the housing cover bolts securely.



Connect the upper radiator hose to the thermostat housing cover and tighten the hose band screw securely.



Fill the system with recommended coolant and bleed the air (page 6-7).
Install the air cleaner housing (page 5-55).

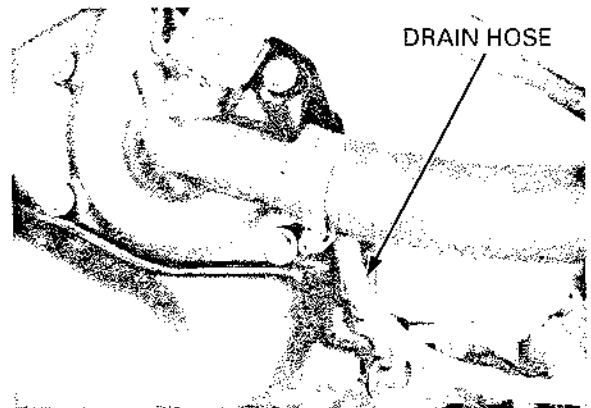
WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the under cowl (page 2-7).

Disconnect the drain hose from the right crankcase cover and inspect the hose joint for signs of coolant leakage.

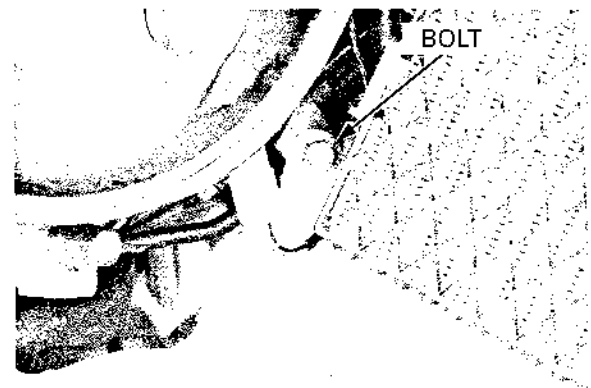
If there is leakage, the mechanical seal is defective and you must replace the water pump as an assembly.



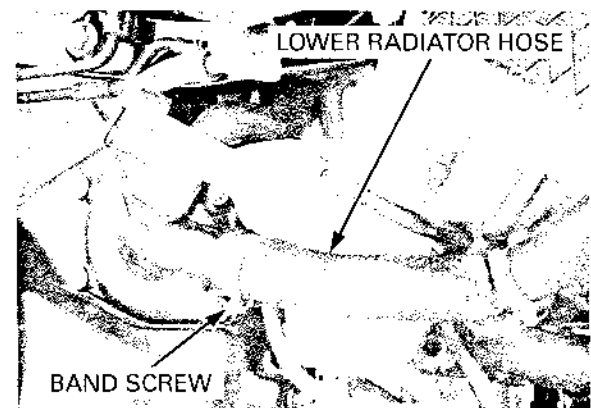
RIGHT CRANKCASE COVER REMOVAL

Drain the coolant (page 6-7).

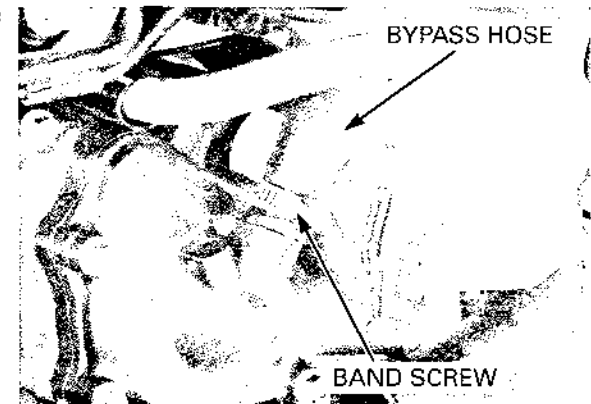
Remove the radiator reserve tank bolt.



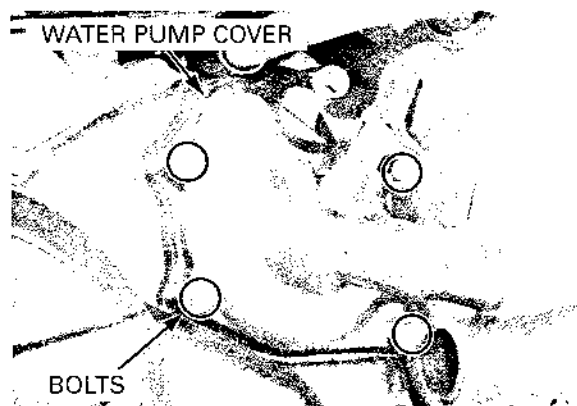
Loosen the hose band screw and disconnect the lower radiator hose.



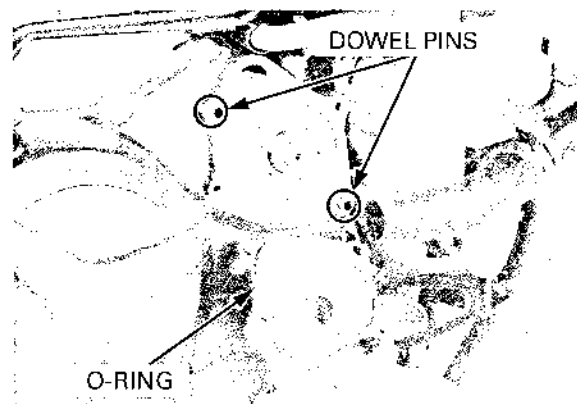
Loosen the hose band screw and disconnect the bypass hose from the water pump cover.



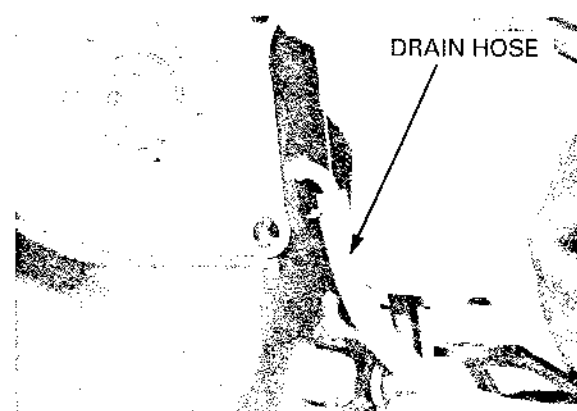
Remove the bolts and water pump cover.



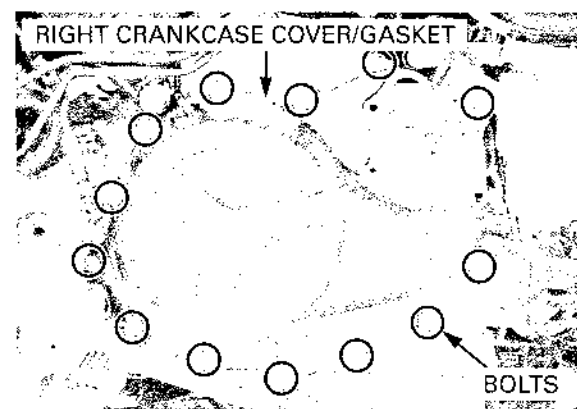
Remove the O-ring and dowel pins.



Disconnect the ignition pulse generator 2P (Red) connector (page 9-6).
Disconnect the drain hose from the right crankcase cover.



Remove the bolts and right crankcase cover.
Remove the dowel pins and gasket.

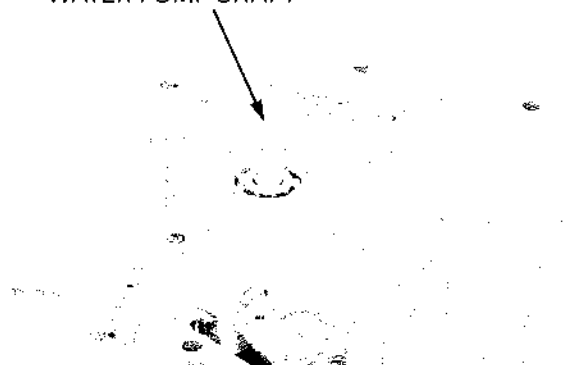


COOLING SYSTEM

MECHANICAL SEAL REPLACEMENT

Remove the water pump shaft from the right crankcase cover.

WATER PUMP SHAFT



Remove the bearing using the special tools.

TOOLS:

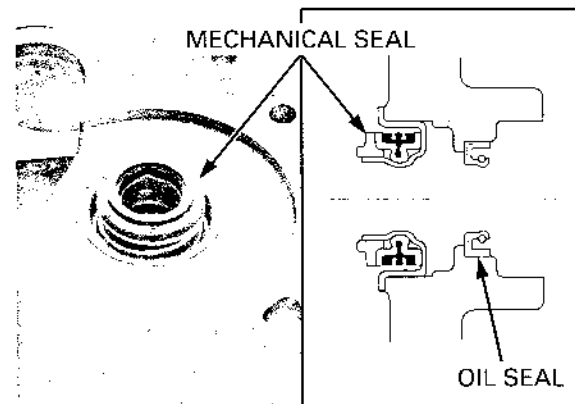
Bearing remover shaft	07936-GE00100
Bearing remover, 10mm	07936-GE00200
Remover weight	07741-0010201

BEARING



Remove the mechanical seal and oil seal from the right crankcase cover.

MECHANICAL SEAL



Drive a new mechanical seal using the special tool.

TOOLS:

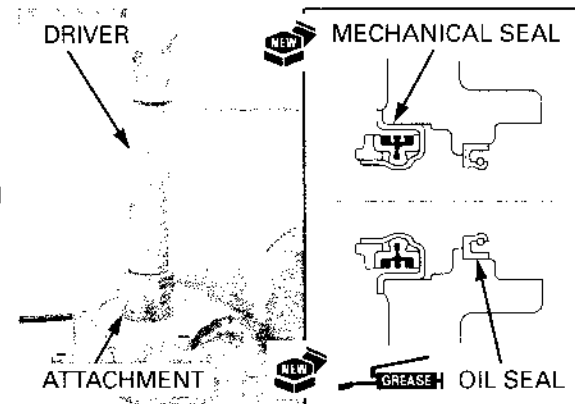
Driver	07749-0010000
Mechanical seal driver attachment	07945-4150400

Apply grease to a new oil seal lip and install the oil seal into the right crankcase cover.

DRIVER

NEW

MECHANICAL SEAL



ATTACHMENT

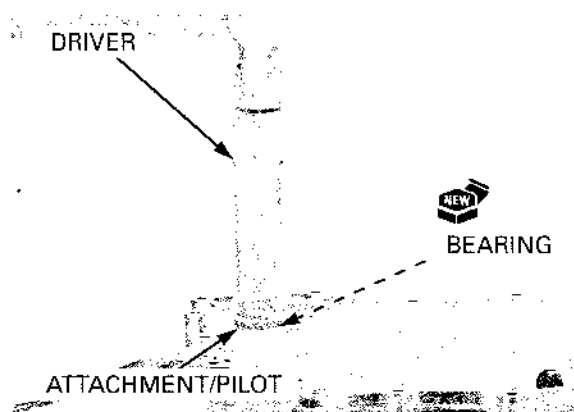
NEW

OIL SEAL

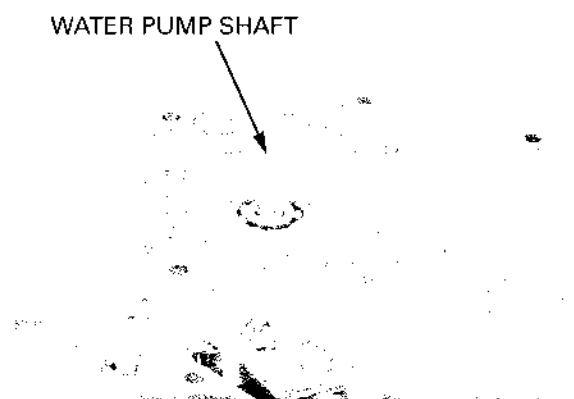
Drive a new bearing with the mark side facing out, using the special tool.

TOOLS:

Driver	07749-0010000
Attachment, 28X30 mm	07946-1870100
Pilot, 10 mm	07746-0040100

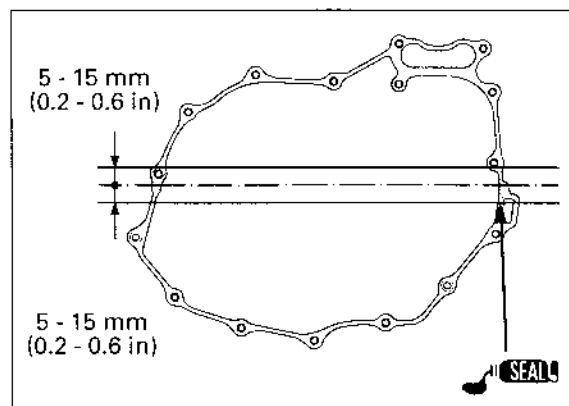


Support the bearing inner race properly and install the water pump shaft.

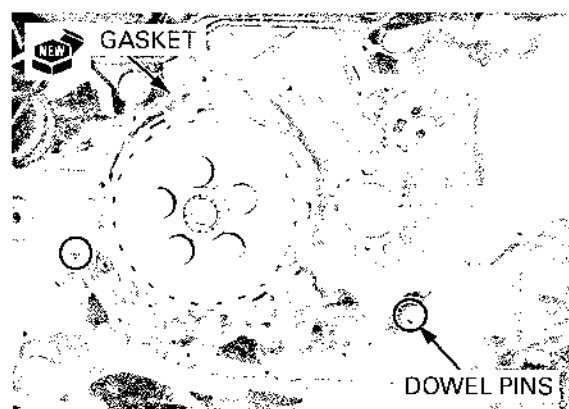


RIGHT CRANKCASE COVER INSTALLATION

Apply sealant to the crankcase mating surfaces as shown.

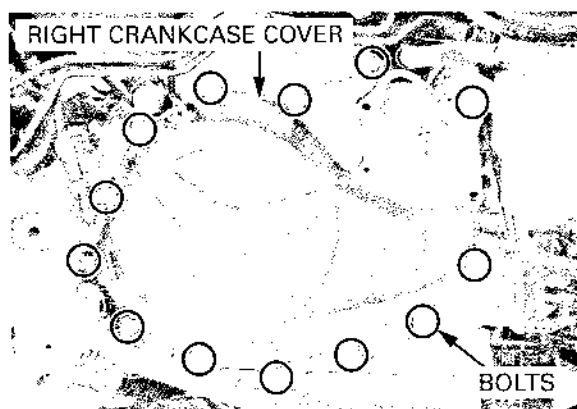


Install the dowel pins and a new gasket.



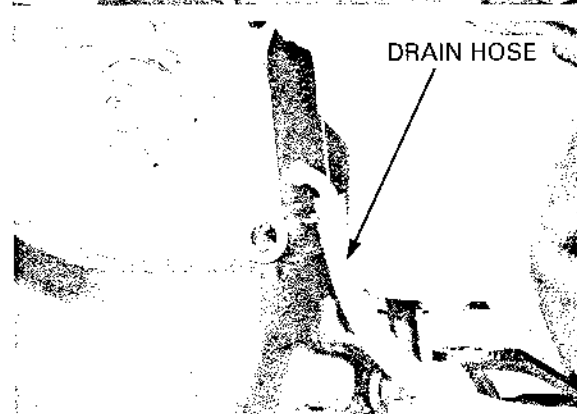
COOLING SYSTEM

Install the right crankcase cover, aligning the gear teeth of the water pump shaft and water pump driven sprocket and tighten the bolts securely.

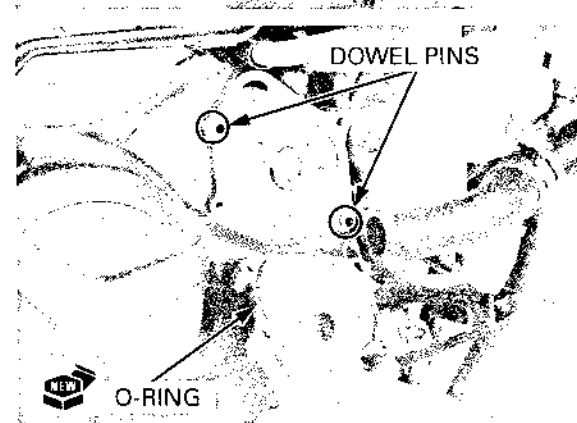


Route the ignition pulse generator wire and drain hose properly (page 1-23).

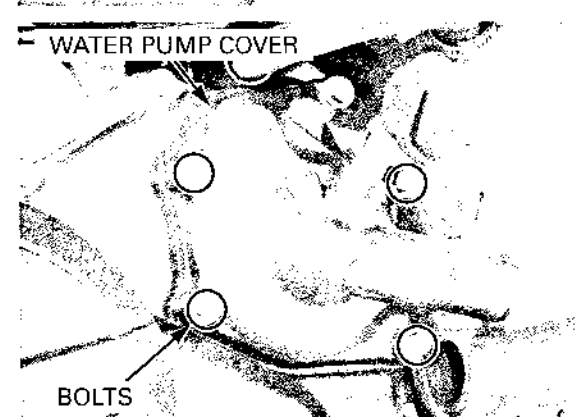
Connect the ignition pulse generator 2P (Red) connector (page 9-19).



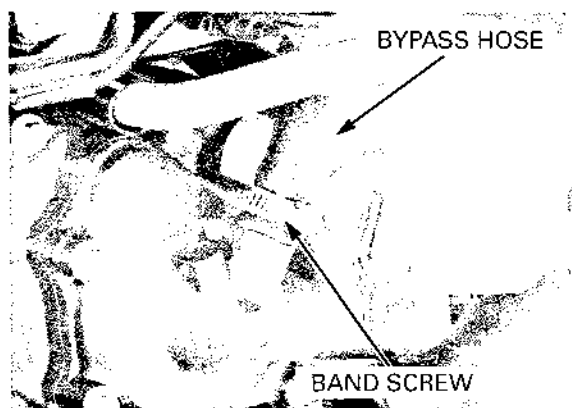
Install the dowel pins and a new O-ring into the water pump cover groove.



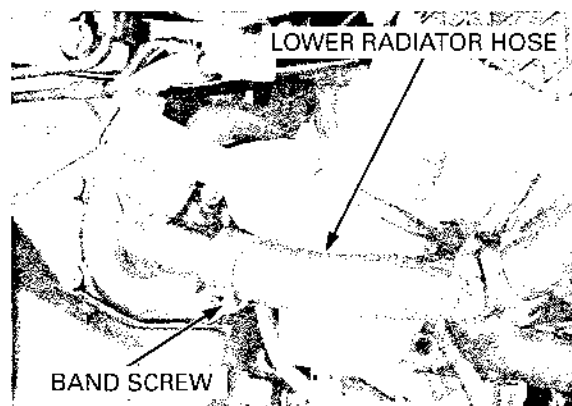
Install and tighten the bolts securely.



Connect the bypass hose to the water pump cover and tighten the band screw securely.

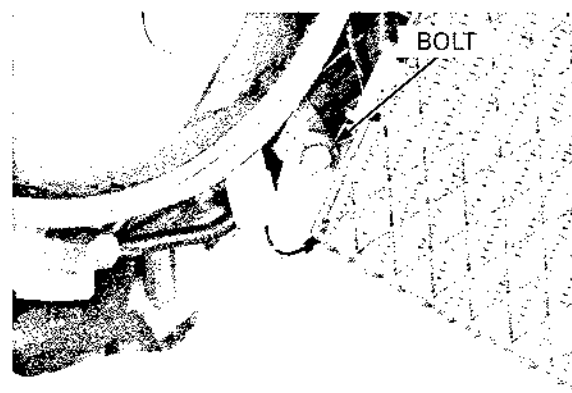


Connect the lower radiator hose to the water pump cover and tighten the band screw securely.



Install and tighten the radiator reserve tank bolt securely.

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



MEMO

7. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION 7-2

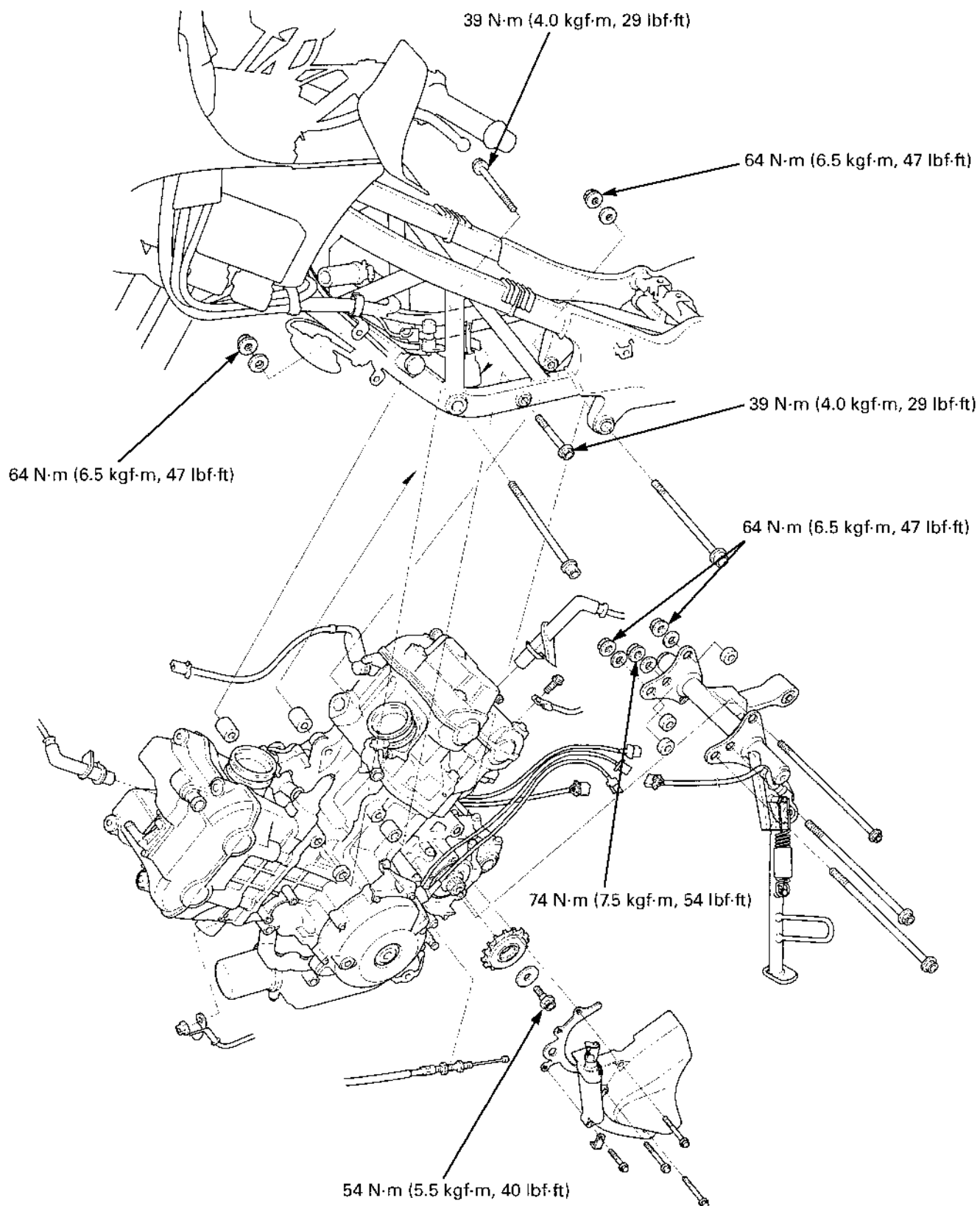
SERVICE INFORMATION 7-3

ENGINE REMOVAL7-4

ENGINE INSTALLATION7-7

7

COMPONENT LOCATION



SERVICE INFORMATION

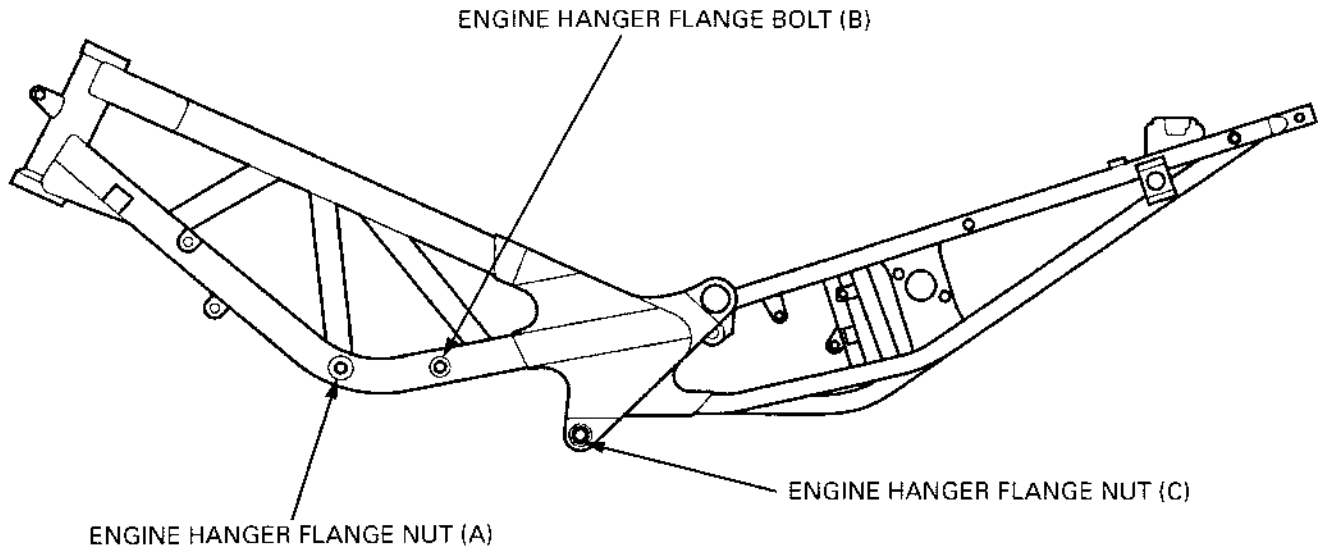
GENERAL

- 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
 - Clutch
 - Cylinder head/valves
 - Gearshift linkage
 - Oil pump
 - Water pump
- The following components require engine removal for service.
 - Crankcase/transmission
 - Crankshaft/piston/cylinder
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the tightening torque to sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.



SERVICE DATA

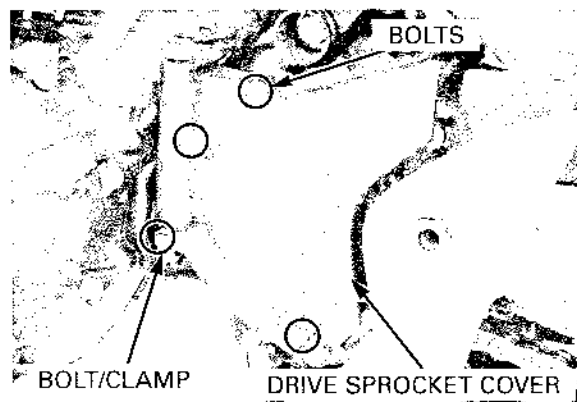
ITEM		SPECIFICATIONS
Engine dry weight		74.8 kg (164.9 lbs)
Engine oil capacity	After disassembly	2.8 liter (3.0 US qt, 2.5 Imp qt)
Coolant capacity	Radiator and engine	4.1 liter (4.3 US qt, 3.6 Imp qt)

TORQUE VALUES

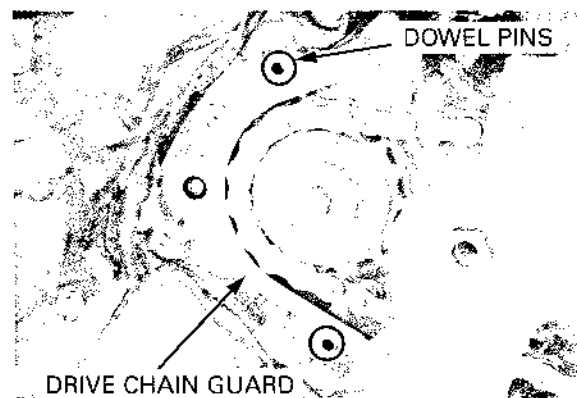
Engine hanger flange nut (A)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Engine hanger flange bolt (B)	39 N·m (4.0 kgf·m, 29 lbf·ft)
Engine hanger flange nut (C)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Shock link bracket nut (12 mm)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Shock link bracket nut (14 mm)	74 N·m (7.5 kgf·m, 54 lbf·ft)
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)

ENGINE REMOVAL

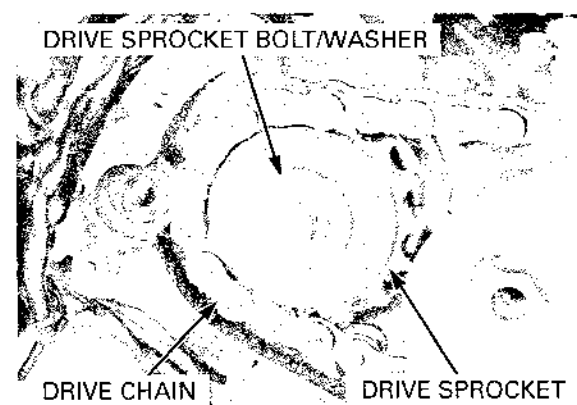
Disconnect the clutch cable from the clutch arm.
Remove the bolts, clamp and drive sprocket cover.



Remove the drive chain guard and dowel pins.



Loosen the rear axle nut and drive chain adjusters.
Remove the drive sprocket bolt, washer and the drive sprocket with the drive chain from the countershaft.



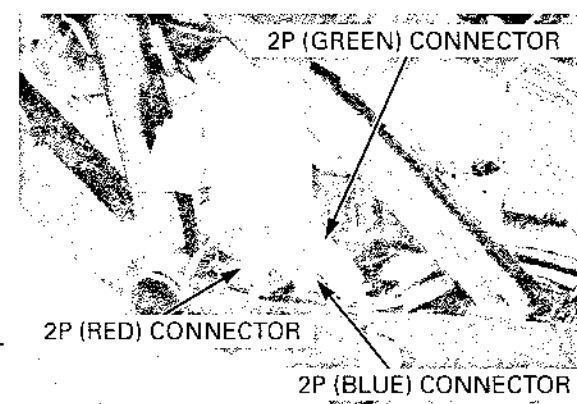
Drain the engine oil (page 3-12).
Drain the coolant (page 6-7).

Remove the following:

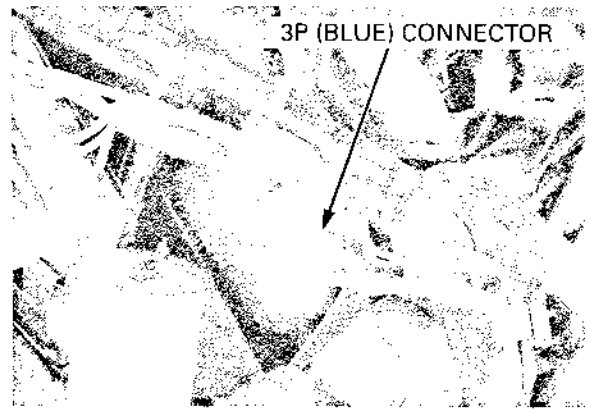
- Muffler and exhaust pipe (page 2-11)
- Right and left radiators (page 6-9)
- Fuel pump (page 5-49)
- Throttle body (page 5-60)

Disconnect the following:

- Side stand 2P (Green) connector
- Ignition pulse generator 2P (Red) connector
- Neutral switch/oil pressure switch 2P (Blue) connector

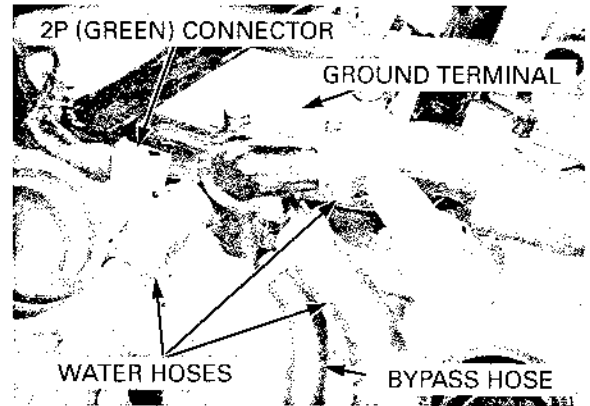


Disconnect the speed sensor 3P (Blue) connector.



Remove the thermostat housing assembly by disconnecting the following:

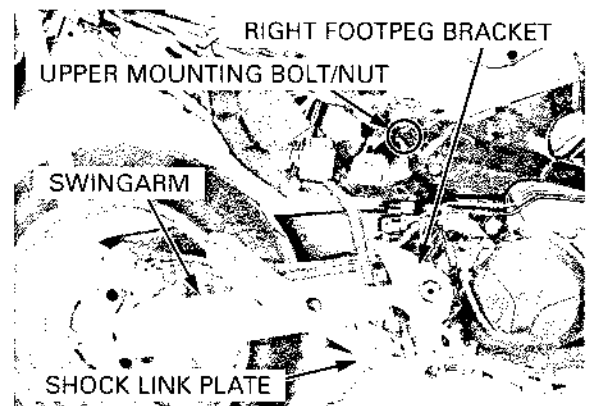
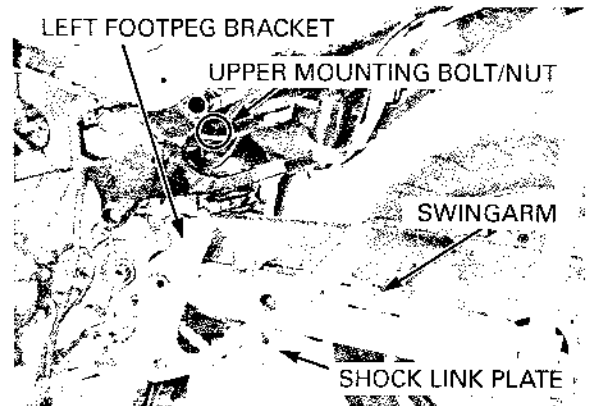
- Ground terminal
- ECT sensor 2P (Green) connector
- Thermosensor connector
- Water hoses from the cylinder head
- Bypass hose from the water pump



Support the motorcycle securely using a safety stand or hoist.

Remove the following:

- Shock link plate
- Shock absorber upper mounting bolt/nut
- Right and left footpeg bracket
- Swingarm

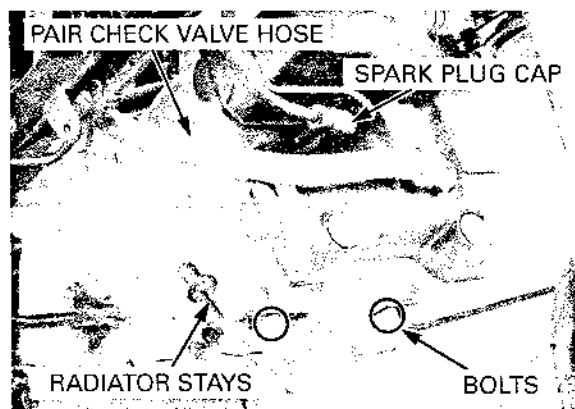


ENGINE REMOVAL/INSTALLATION

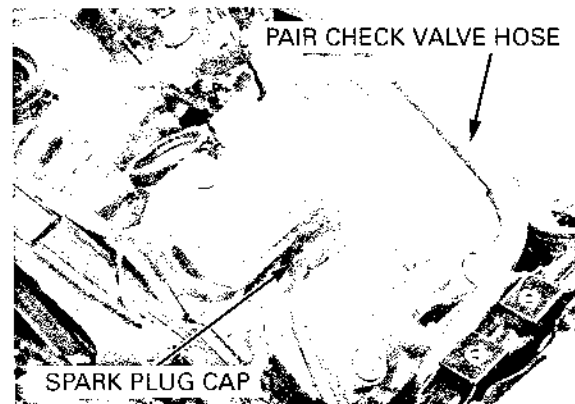
Remove the nut and starter motor cable (page 18-6).

Remove the bolts and radiator stays.

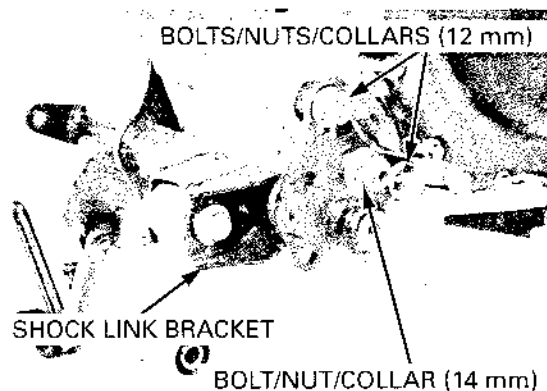
Disconnect the front PAIR check valve hose and front spark plug cap.



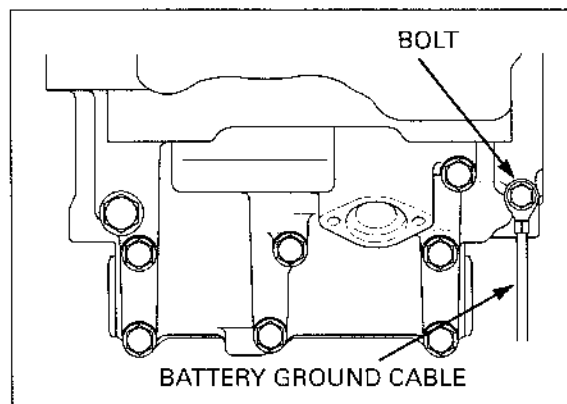
Disconnect the rear PAIR check valve hose and rear spark plug cap.



Remove the shock link bracket nuts, bolts, collars and bracket with the side stand.



Remove the bolt and the battery ground cable from the engine.

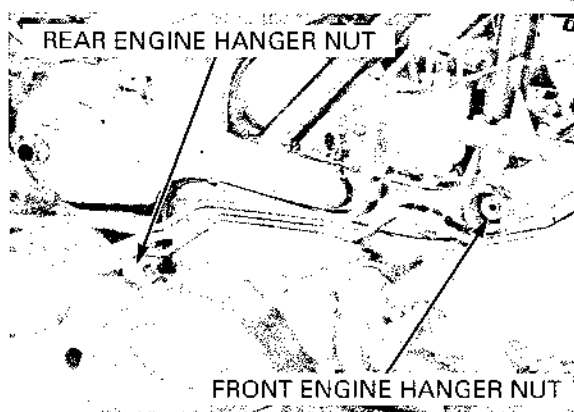


ENGINE REMOVAL/INSTALLATION

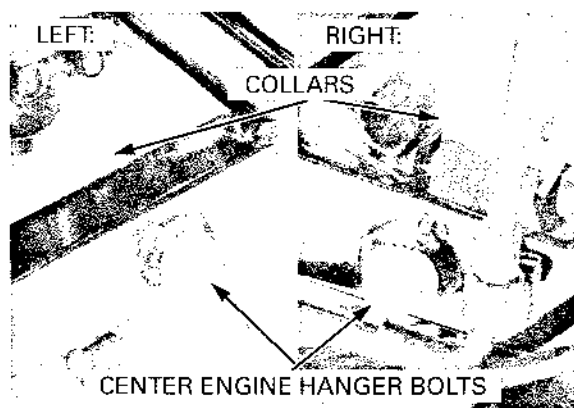
The jack height must be continually adjusted to relieve stress for ease of bolt removal.

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

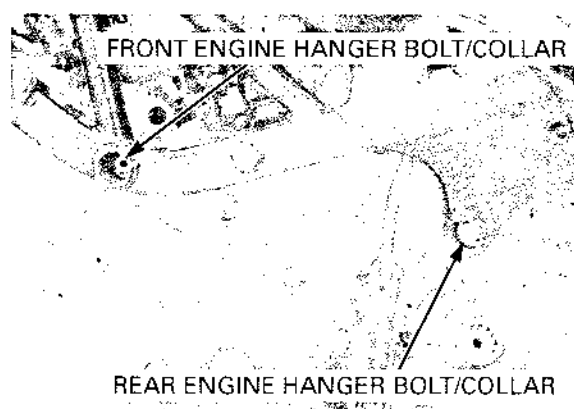
Loosen and remove the front engine hanger nut and rear engine hanger nut from the right side



Remove the right and left center engine hanger bolt/collars.



Remove the front and rear engine hanger bolts, collars and engine from the frame.



ENGINE INSTALLATION

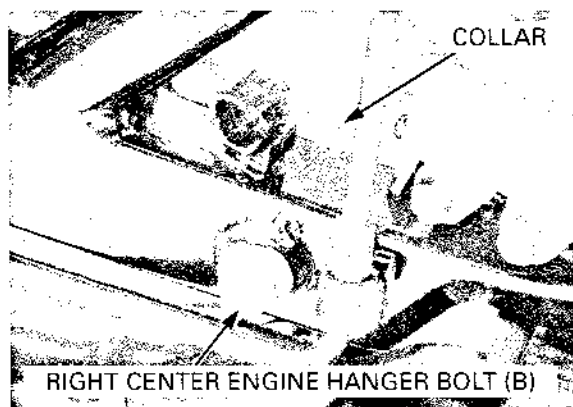
- Note the direction of the hanger bolts.
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.

When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 7-3 "SERVICE INFORMATION".

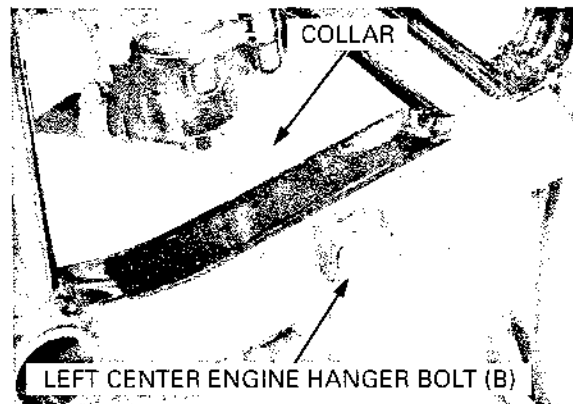


ENGINE REMOVAL/INSTALLATION

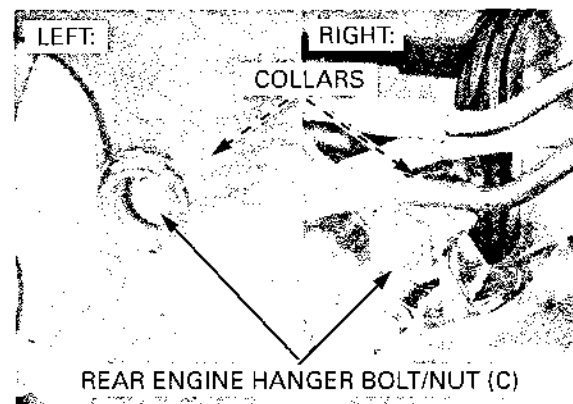
Install the engine into the frame.
Install the collar.
Install the right center engine hanger bolt (B).



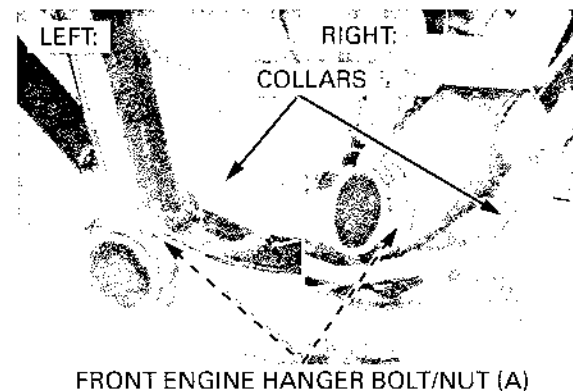
Install the collar.
Install the left center engine hanger bolt (B).



Install the collars.
Install the rear engine hanger bolt and nut (C).



Install the collars.
Install the front engine hanger bolt and nut (A).

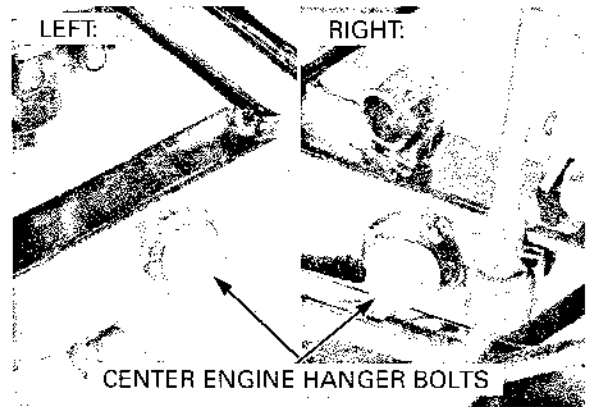


Tighten the right engine hanger bolt (B) to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

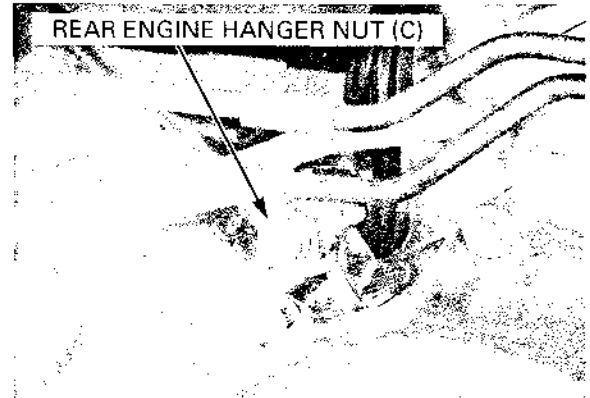
Tighten the right engine hanger bolt (B) to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



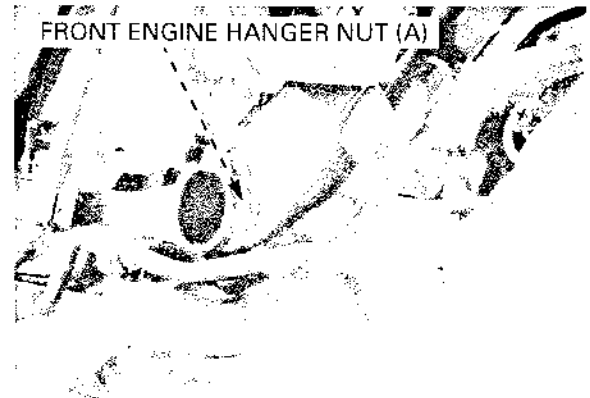
Tighten the rear engine hanger nut (C) to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



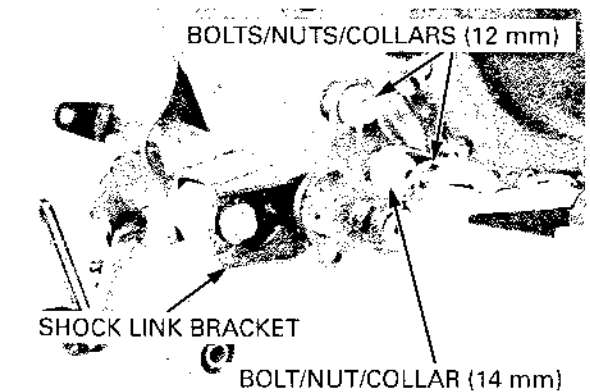
Tighten the front engine hanger nut (A) to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Install the shock link bracket with the side stand. Install the collars, bracket bolts and nuts. Tighten the bracket nuts to the specified torque.

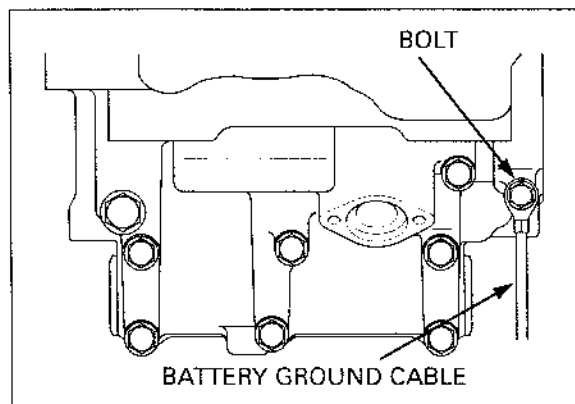
TORQUE: (12 mm): 64 N·m (6.5 kgf·m, 47 lbf·ft)
(14 mm): 74 N·m (7.5 kgf·m, 54 lbf·ft)



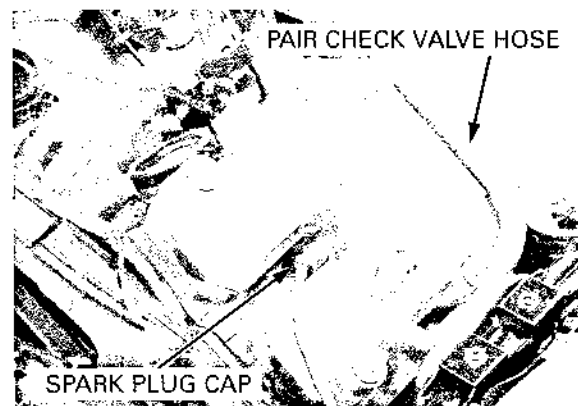
ENGINE REMOVAL/INSTALLATION

Route the hoses, cables and wire harness properly (page 1-23).

Install the battery ground cable to the engine. Install and tighten the bolts securely.



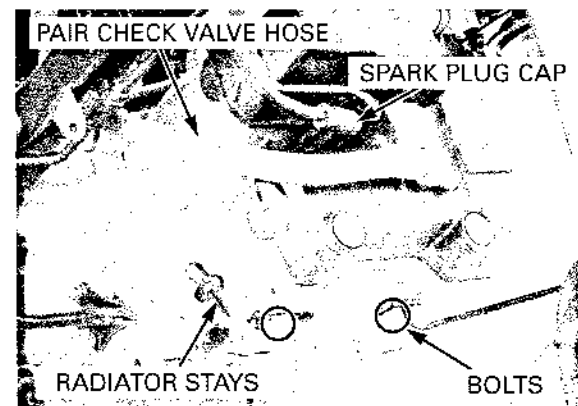
Connect the rear PAIR check valve hose and rear spark plug cap.



Connect the front PAIR check valve hose and front spark plug cap.

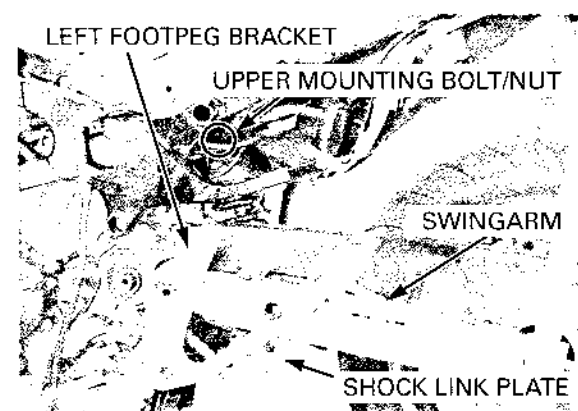
Install the radiator stays and bolts.

Install the starter motor cable and tighten the nut (page 18-12).



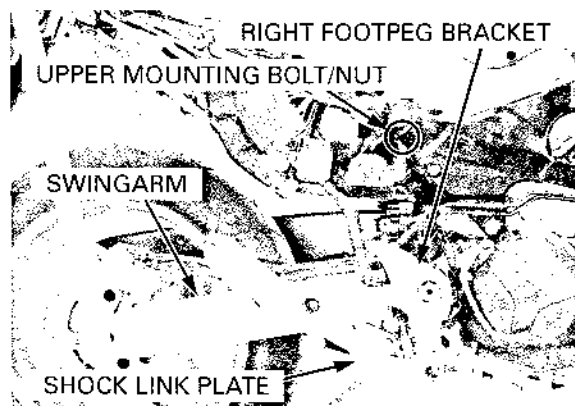
Install the following (left side):

- Swingarm
- Shock absorber upper mounting bolt/nut
- Shock link plate
- Footpeg bracket



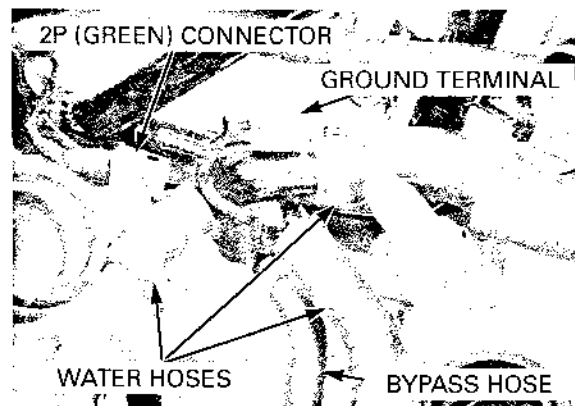
Install the following (right side):

- Swingarm
- Shock absorber upper mounting bolt/nut
- Shock link plate
- Footpeg bracket



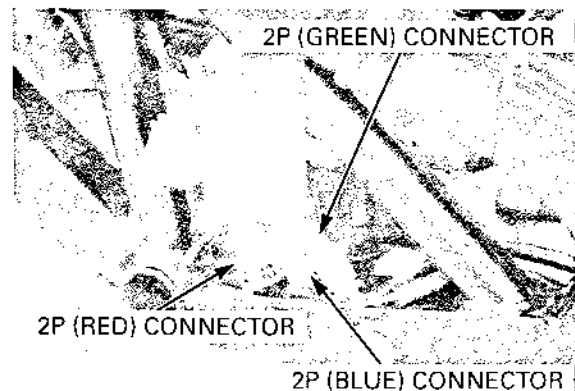
Install the thermostat housing assembly by connecting the following:

- Bypass hose to the water pump
- Water hoses to the cylinder head
- Thermosensor connector
- ECT sensor 2P (Green) connector
- Ground terminal



Connect following:

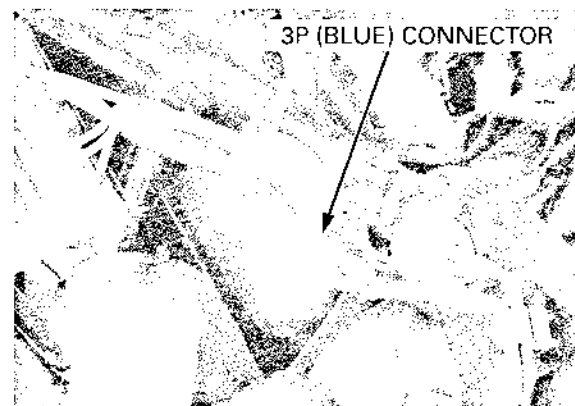
- Side stand switch 2P (Green) connector
- Ignition pulse generator 2P (Red) connector
- Neutral switch/oil pressure switch 2P (Blue) connector



Connect the speed sensor 3P (Blue) connector.

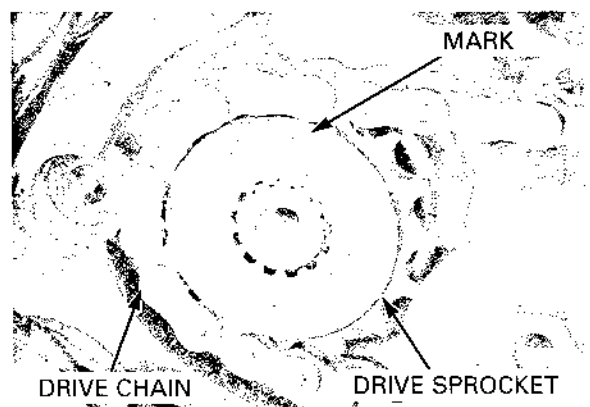
Install the following:

- Exhaust pipe/muffler (page 2-12)
- Right and left radiators (page 6-9)
- Throttle body (page 5-63)
- Fuel pump (page 5-54)



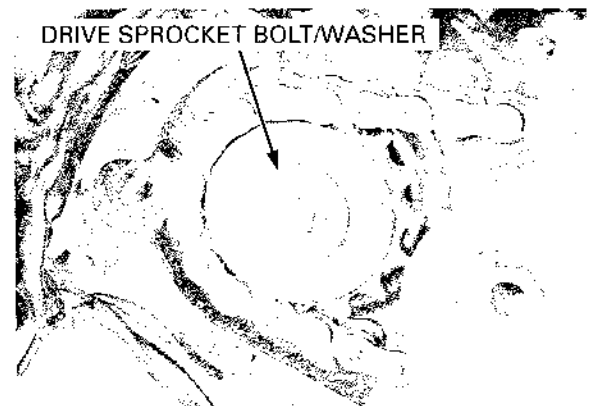
ENGINE REMOVAL/INSTALLATION

Install the drive sprocket with its marking side facing outward.
Install the drive sprocket with the drive chain onto the countershaft.

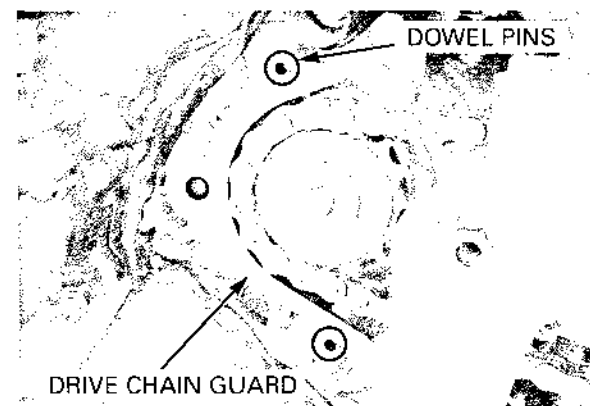


Install the washer and tighten the bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf-m, 40 lbf-ft)

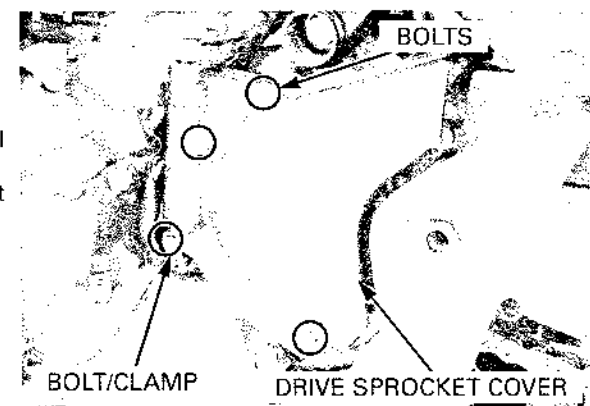


Install the drive chain guard and dowel pins.



Install the drive sprocket cover, clamp and bolt.
Tighten the bolts securely.
Connect the clutch cable to the clutch arm.

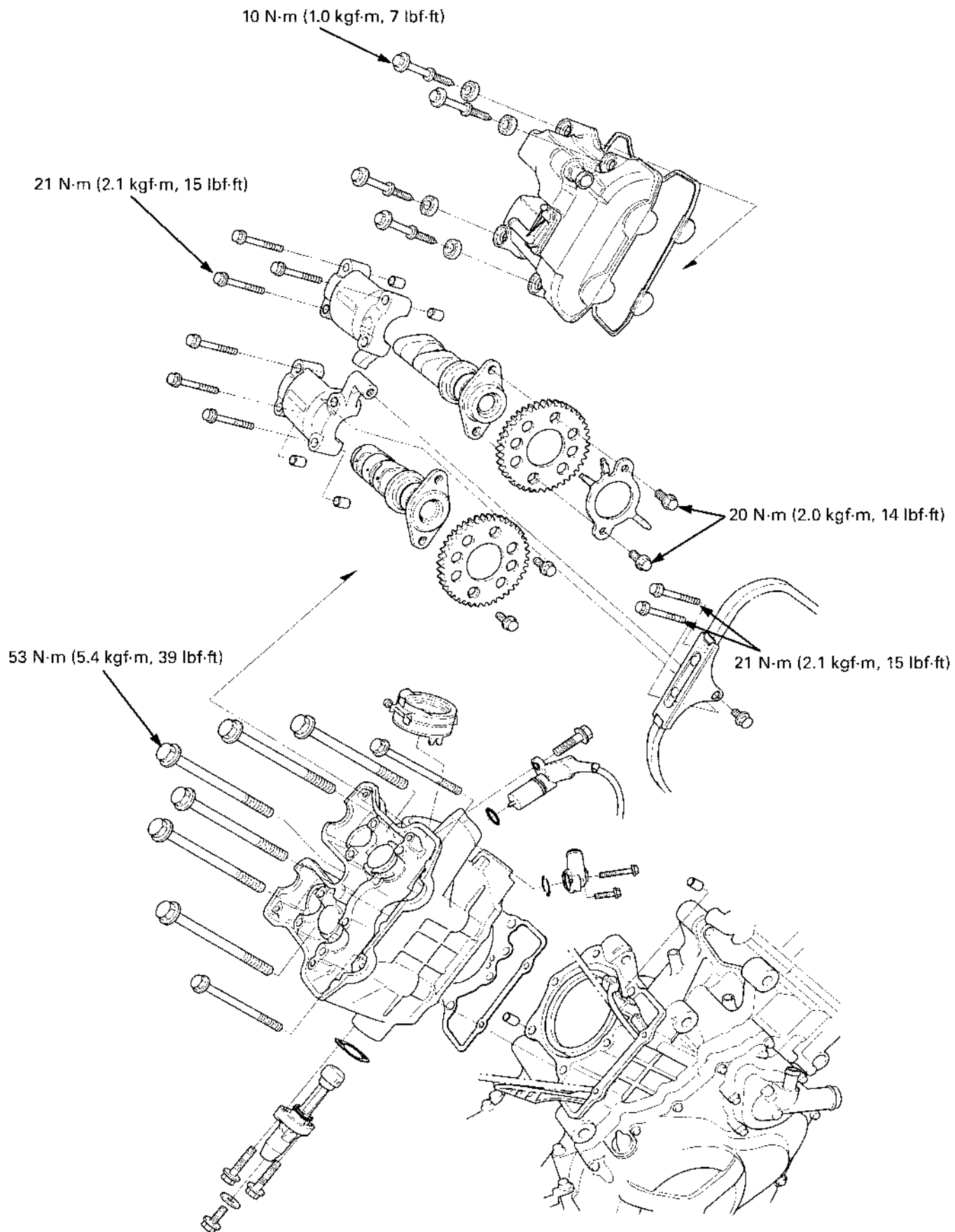
Adjust the drive chain slack (page 3-17).
Pour recommended engine oil up to the proper level (page 3-12).
Fill the cooling system with recommended coolant and bleed the air (page 6-7).



8. CYLINDER HEAD/VALVES

COMPONENT LOCATION	8-2	CYLINDER HEAD INSPECTION	8-14
SERVICE INFORMATION	8-3	VALVE GUIDE REPLACEMENT	8-17
TROUBLESHOOTING	8-5	VALVE SEAT INSPECTION/REFACING	8-17
CYLINDER COMPRESSION TEST.....	8-6	CYLINDER HEAD ASSEMBLY	8-21
CYLINDER HEAD COVER REMOVAL	8-6	CYLINDER HEAD INSTALLATION.....	8-22
CYLINDER HEAD COVER DISASSEMBLY ...	8-7	CAMSHAFT INSTALLATION	8-24
CAMSHAFT REMOVAL	8-8	CYLINDER HEAD COVER ASSEMBLY	8-29
CAMSHAFT INSPECTION	8-11	CYLINDER HEAD COVER INSTALLATION.....	8-30
CYLINDER HEAD REMOVAL	8-12	CAM CHAIN TENSIONER LIFTER.....	8-32
CYLINDER HEAD DISASSEMBLY.....	8-14		

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

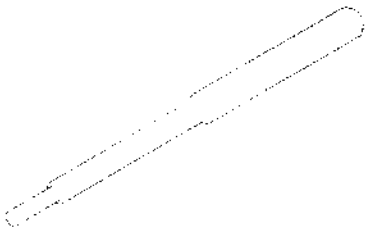
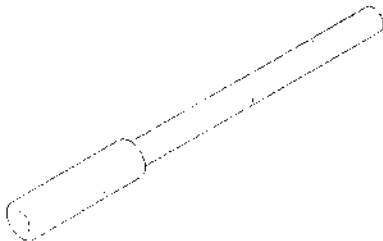
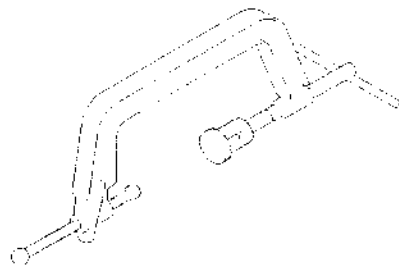






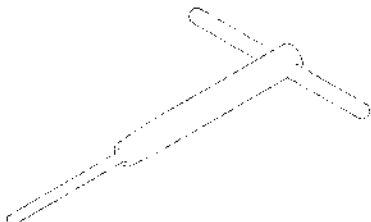
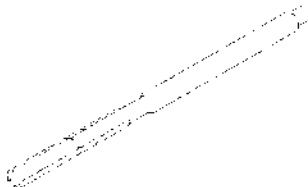
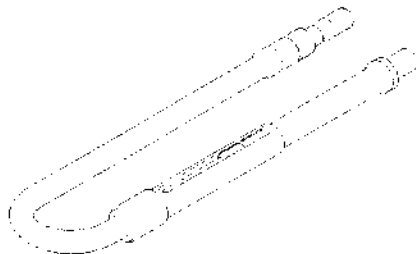
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,320 kPa (13.5 kgf/cm ² , 192 psi) at 300 min ⁻¹ (rpm)	—
Valve clear- ance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.31 ± 0.03 (0.012 ± 0.001)	—
Camshaft	Cam lobe height	IN	38.680 – 38.840 (1.5228 – 1.5291)	38.38 (1.511)
		EX	38.830 – 38.990 (1.5287 – 1.5350)	38.53 (1.517)
	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.		33.978 – 33.993 (1.3377 – 1.3383)	33.97 (1.337)
	Valve lifter bore I.D.		34.010 – 34.026 (1.3390 – 1.3396)	34.04 (1.340)
Valve, valve guide	Valve stem O.D.	IN	5.975 – 5.990 (0.2352 – 0.2358)	5.965 (0.2348)
		EX	5.965 – 5.980 (0.2348 – 0.2354)	5.955 (0.2344)
	Valve guide I.D.		6.000 – 6.012 (0.2362 – 0.2367)	6.040 (0.2378)
	Stem-to-guide clear- ance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylin- der head		14.0 – 14.2 (0.55 – 0.56)	—
	Valve seat width	IN	1.1 – 1.3 (0.04 – 0.05)	1.7 (0.07)
EX		1.3 – 1.5 (0.05 – 0.06)	1.9 (0.07)	
Valve spring free length			43.9 (1.73)	42.9 (1.69)
Cylinder head warpage			—	0.10 (0.004)

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Cam sprocket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Camshaft holder flange bolt (10 mm)	21 N·m (2.1 kgf·m, 15 lbf·ft)	Apply oil to the threads and flange surface
Cylinder head flange bolt	53 N·m (5.4 kgf·m, 39 lbf·ft)	Apply oil to the threads and flange surface
Cylinder head sealing bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	Apply a locking agent to the threads
Breather plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Spark plug	14 N·m (1.4 kgf·m, 10 lbf·ft)	CT bolt
PAIR check reed valve cover bolt	5 N·m (0.52 kgf·m, 3.8 lbf·ft)	Apply a locking agent to the threads
Cam chain guide bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Cam chain tensioner bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads

CYLINDER HEAD/VALVES

TOOLS

<p>Valve guide remover 07742-0010100</p> 	<p>Adjustable valve guide driver 07743-0020000</p> 	<p>Valve spring compressor 07757-0010000</p> 
<p>Valve seat cutter, 35 mm (EX 45°) 07780-0010400</p>  <p>or equivalent commercially available</p>	<p>Valve seat cutter, 40 mm (IN 45°) 07780-0010500</p>  <p>or equivalent commercially available</p>	<p>Flat cutter, 35 mm (EX 32°) 07780-0012300</p>  <p>or equivalent commercially available</p>
<p>Flat cutter, 38.5 mm (IN 32°) 07780-0012400</p>  <p>or equivalent commercially available</p>	<p>Interior cutter, 37.5 mm (EX 60°) 07780-0014100</p>  <p>or equivalent commercially available</p>	<p>Interior cutter, 42 mm (IN 60°) 07780-0014400</p>  <p>or equivalent commercially available</p>
<p>Cutter holder, 6 mm 07VMH-MBB0100</p>  <p>or equivalent commercially available</p>	<p>Valve guide reamer, 6.012 mm 07VMH-MBB0200</p> 	<p>Compression gauge attachment 07RMJ-MY50100</p> 

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring (page 12-11).

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 12-11)

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 12-11)

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 12-11)

Rough idle

- Low cylinder compression

CYLINDER HEAD/VALVES

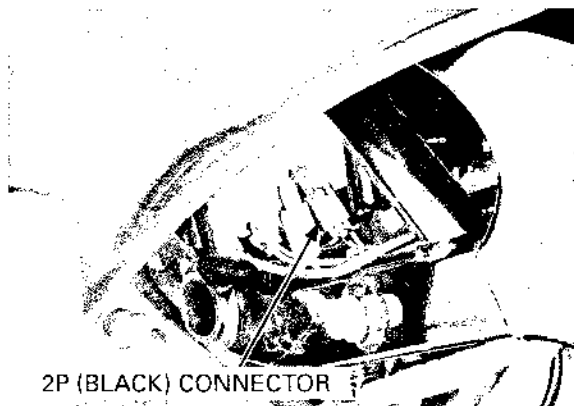
CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.

Open and support the front end of fuel tank (page 3-7).

Stop the engine and remove the all spark plug caps and one spark plug (page 3-7).

Disconnect the fuel pump 2P (Black) connector.



2P (BLACK) CONNECTOR

Install a compression gauge and attachment into the spark plug hole.

TOOL:

Compression gauge attachment 07RMJ-MY50100

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

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

Compression pressure:

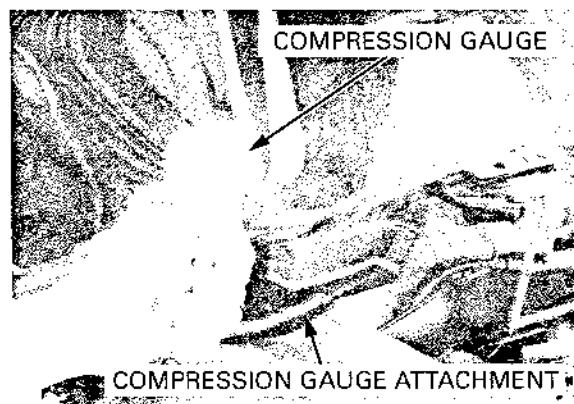
1,177 kPa (12.0 kgf/cm², 171 psi) at 300 min⁻¹ (rpm)

Low compression can be caused by:

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

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head



COMPRESSION GAUGE

COMPRESSION GAUGE ATTACHMENT

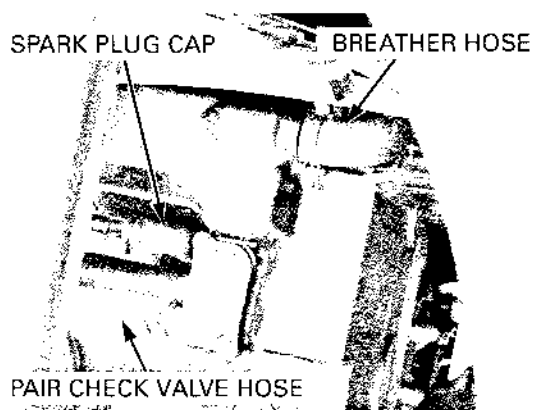
To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

CYLINDER HEAD COVER REMOVAL

FRONT

Remove the lower heat guard (page 17-7).

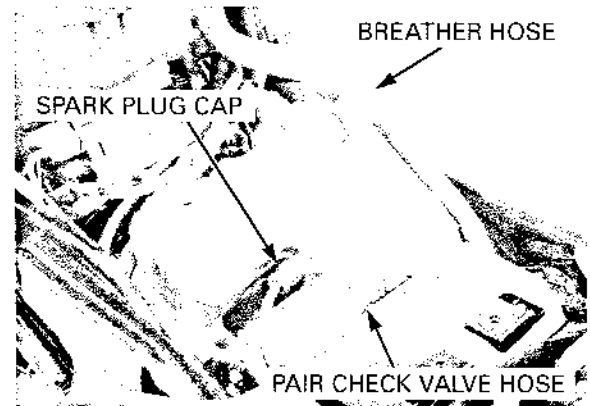
Remove the spark plug cap from the spark plug. Disconnect the crankcase breather hose and PAIR check valve hose from the cylinder head cover.



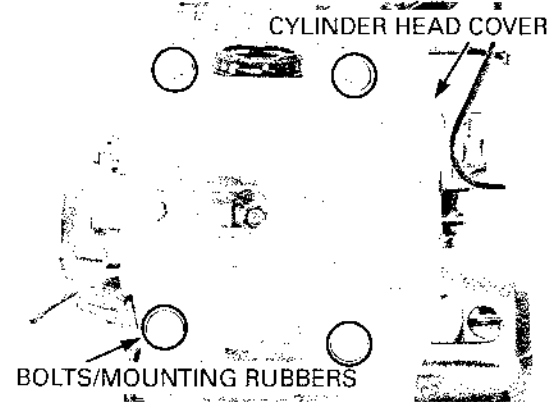
REAR

Remove the fuel tank (page 5-53).

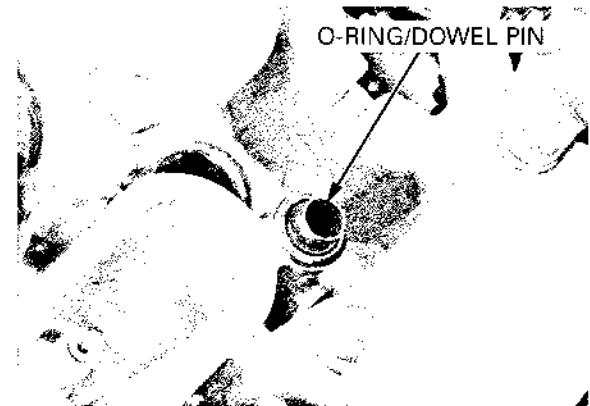
Remove the spark plug cap from the spark plug.
Disconnect the crankcase breather hose and PAIR
check valve hose from the cylinder head cover.



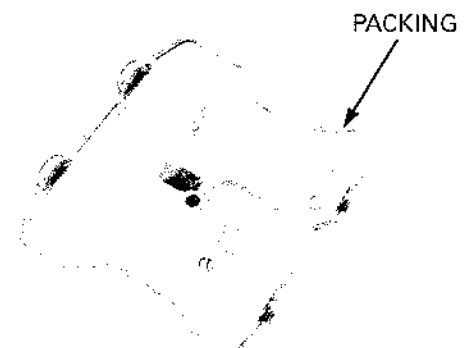
Remove the cylinder head cover bolts and mounting rubbers.
Remove the cylinder head cover.



Remove the O-ring and dowel pin.

**CYLINDER HEAD COVER DISASSEMBLY**

Remove the cylinder head cover packing.



CYLINDER HEAD/VALVES

Remove bolts and breather plate and gasket from the rear cylinder head cover.

BREATHER PLATE/GASKET

BOLTS

Check the PAIR check reed valve for wear or damage, replace if necessary.

PAIR CHECK REED VALVE

CAMSHAFT REMOVAL

For front cylinder, remove the following:

- Air cleaner housing (page 5-55)
- Radiator (page 6-9)
- Cylinder head cover (page 8-6)
- Cam pulse generator (page 5-75): rear cylinder only

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

Turn the crankshaft counterclockwise, align the "RT" mark (For front cylinder: "FT" mark) on the flywheel with the index mark on the left crankcase cover.

TIMING HOLE CAP/O-RING

CRANKSHAFT HOLE CAP/O-RING

INDEX MARK

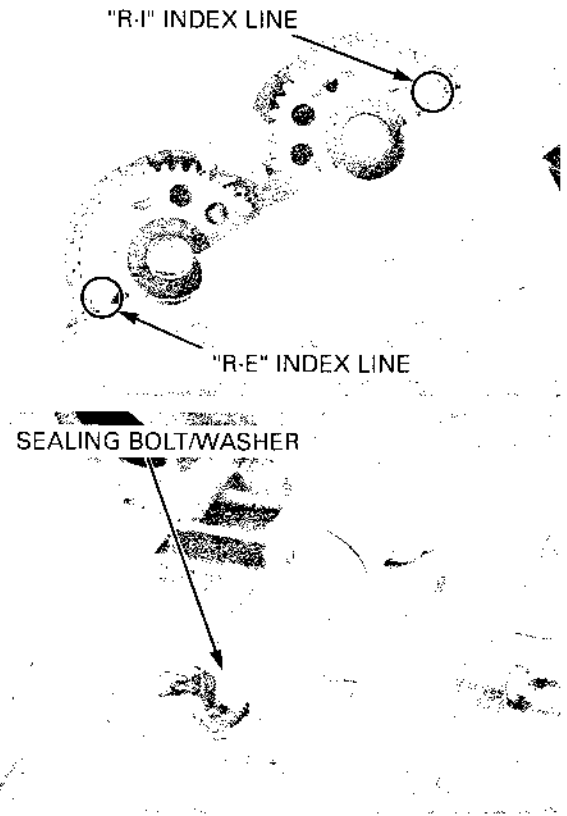
"RT" MARK

Make sure that the index lines ("R-I" for intake and "R-E" for exhaust) on the cam sprockets are facing outward and that the front piston is at TDC (Top Dead Center) on the compression stroke.

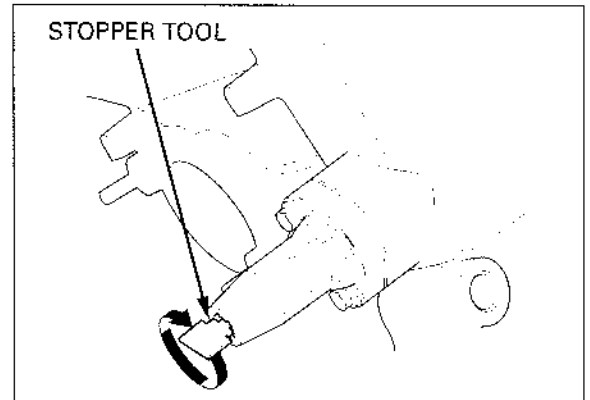
It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follow:

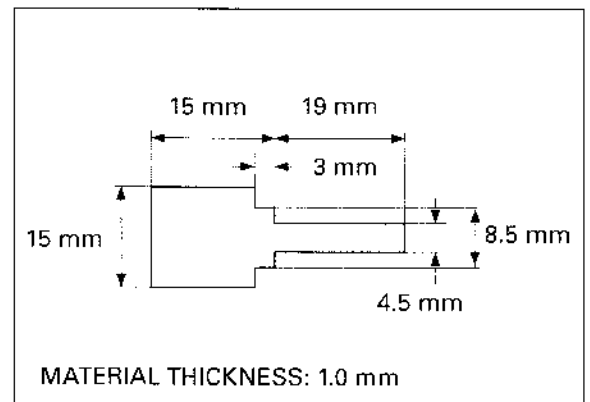
Remove the cam chain tensioner lifter sealing bolt and sealing washer.



Turn the 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.

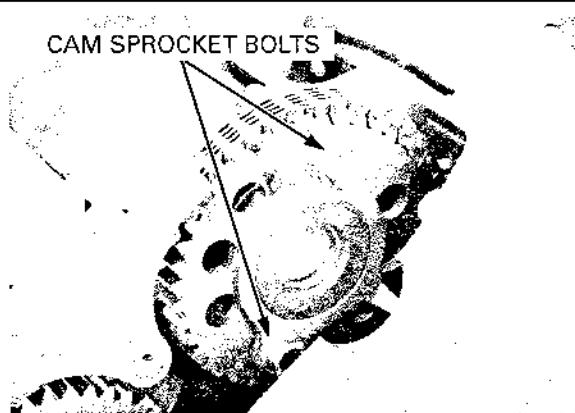


CYLINDER HEAD/VALVES

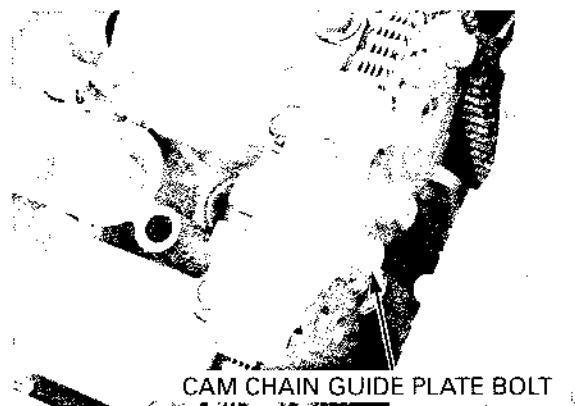
Be careful not to drop the cam sprocket bolts into the crankcase.

Remove the cam sprocket bolts from intake and exhaust camshafts.

Turn the crankshaft one full turn (360°), remove the other cam sprocket bolts from the camshafts.



Remove the cam chain guide plate bolt.



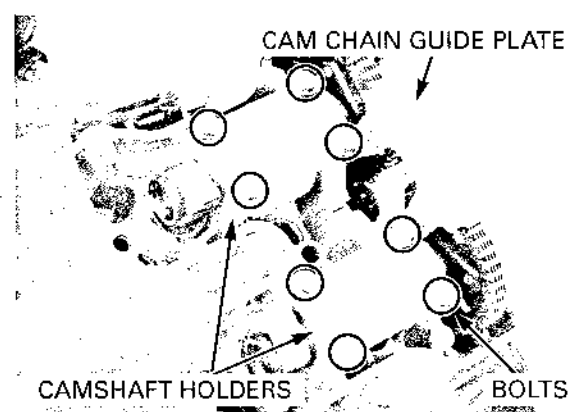
Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.

Loosen and remove the camshaft holder flange bolts gradually in several steps and remove the camshaft holders and cam chain guide plate.

NOTICE

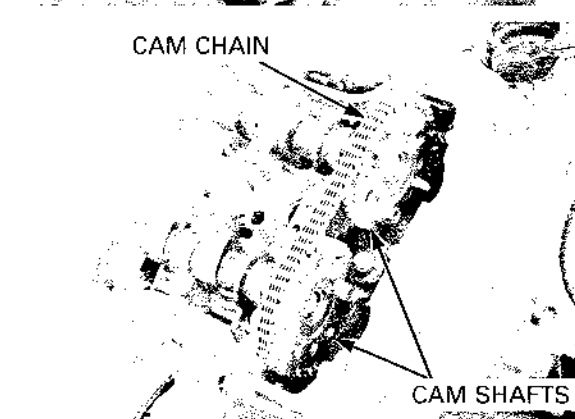
From outside to inside, loosen the bolts in a criss-cross pattern in several steps or the camshaft holder might break.

Do not forcibly remove the dowel pins from the camshaft holder.



Derail the cam chain from the cam sprockets and suspend it with a piece of wire to prevent it from falling the crankcase.

Remove the cam shafts.



Remove the valve lifters and shims from the normal valve lifter bore.

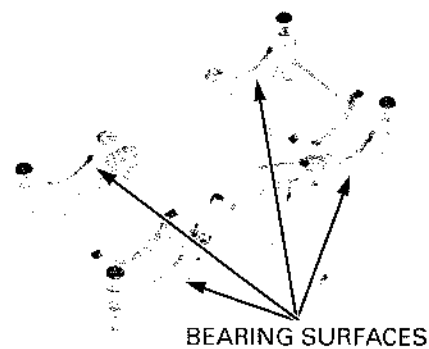
- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.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



CAMSHAFT INSPECTION

CAMSHAFT HOLDER

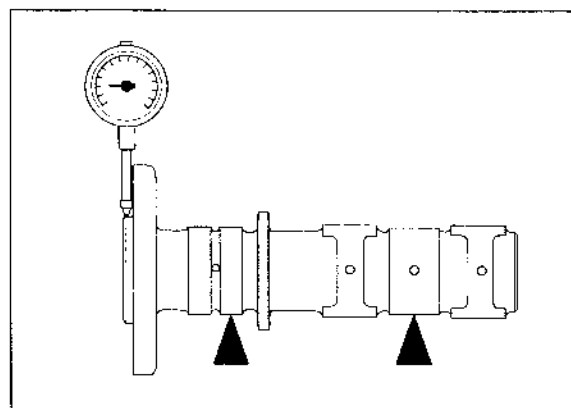
Inspect the bearing surface of the camshaft holder for scoring, scratches, evidence of insufficient lubrication.



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: 38.38 mm (1.511 in)

EX: 38.53 mm (1.517 in)



CYLINDER HEAD/VALVES

CAMSHAFT OIL CLEARANCE

Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.
Lay a strip of plastigauge lengthwise on top of each camshaft journal.

Do not rotate the camshaft when using plastigauge.

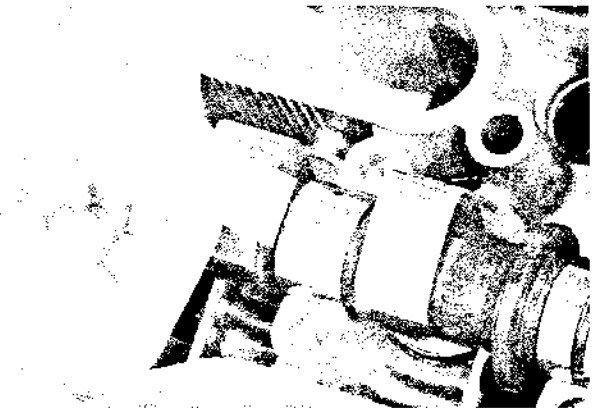
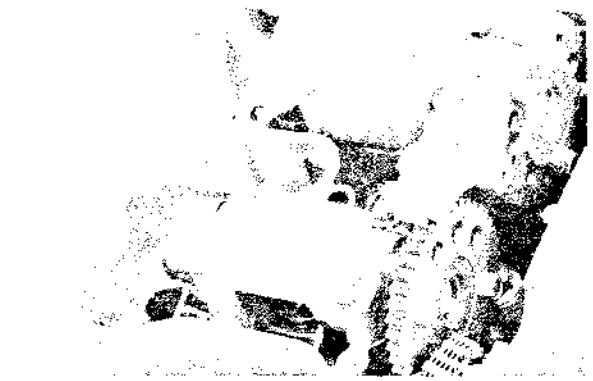
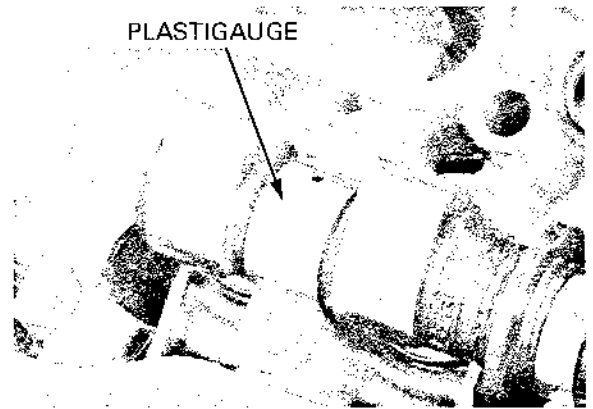
Install the camshaft holders and tighten the bolts in a crisscross pattern in 2 - 3 steps.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Remove the camshaft holders and measure the width of each plastigauge.
The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



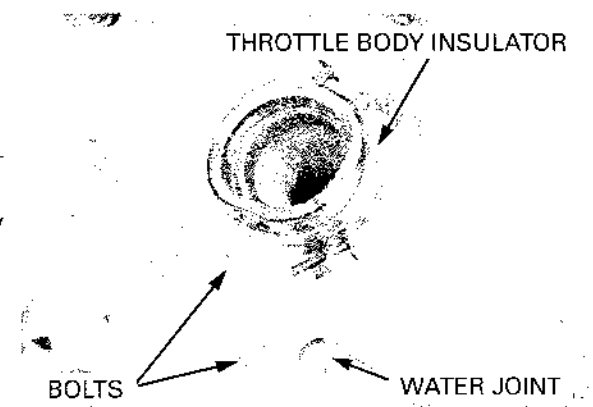
CYLINDER HEAD REMOVAL

Remove the following:

- Throttle body (page 5-60)
- Camshaft (page 8-8)
- Cam chain tensioner lifter (page 8-32)

Remove the SH bolts and water joints from the cylinder head.

Loosen the screw and remove the throttle body insulator.

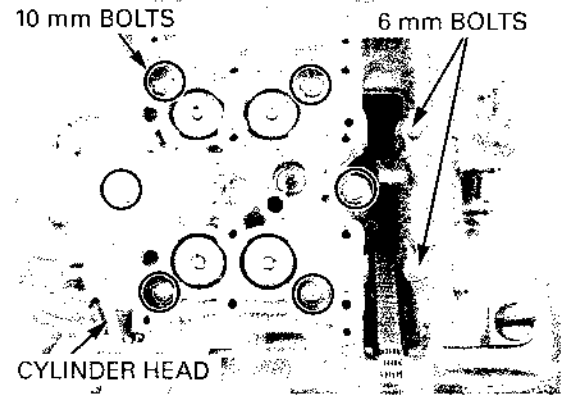


Loosen the 10 mm bolts in a criss-cross pattern in 2 – 3 steps.

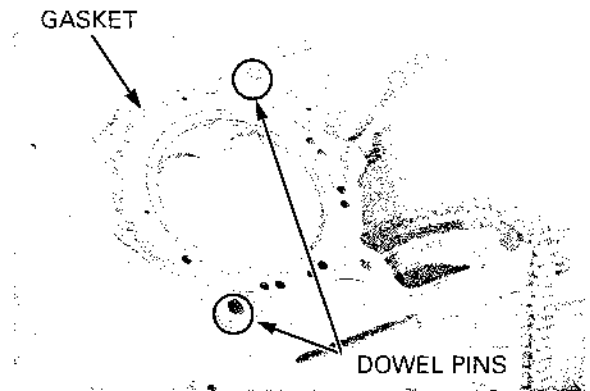
Remove the two 6 mm flange bolts.

Remove the six 10 mm bolts.

Remove the cylinder head.



Remove the gasket and dowel pins.

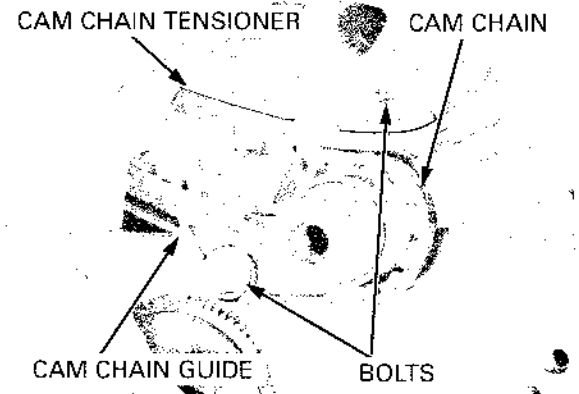


Front cylinder: Remove the flywheel (page 10-5).

Remove the bolt and front cam chain guide and collar.

Remove the bolt, front cam chain tensioner and collar.

Remove the front cam chain.



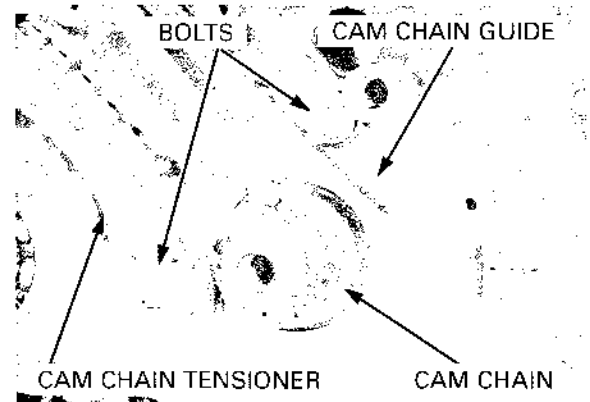
Rear cylinder: Remove the primary drive gear (page 9-18).

Remove the bolt and rear cam chain guide.

Remove the bolt, rear cam chain tensioner and collar.

Remove the front and rear cam chains and timing sprocket from the crankshaft.

Remove the rear cam chain.

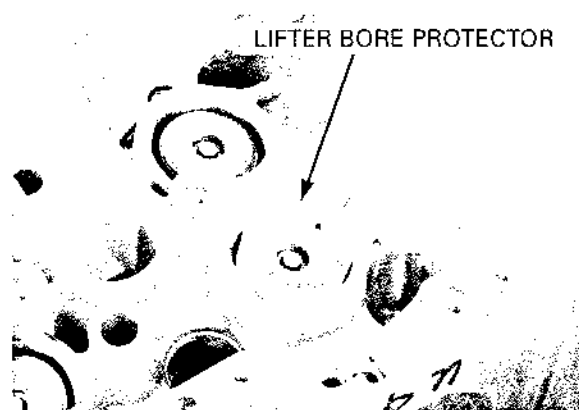


CYLINDER HEAD DISASSEMBLY

Remove the spark plug from the cylinder head.

Make a lifter bore protector from a plastic 35 mm film container by cutting the bottom of the container.

Install the protector into the valve lifter bore.



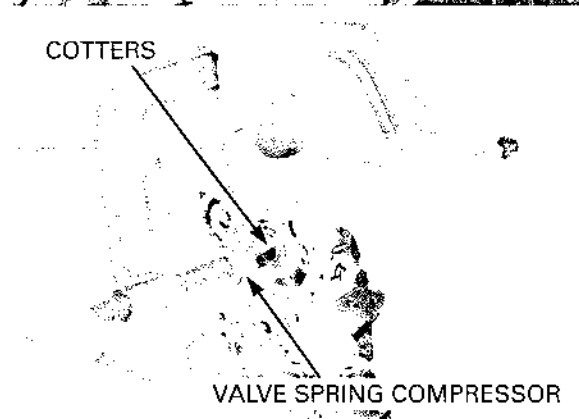
Remove the normal valve spring cotters using the special tools as shown.

TOOL:

Valve spring compressor 07757-0010000

NOTICE

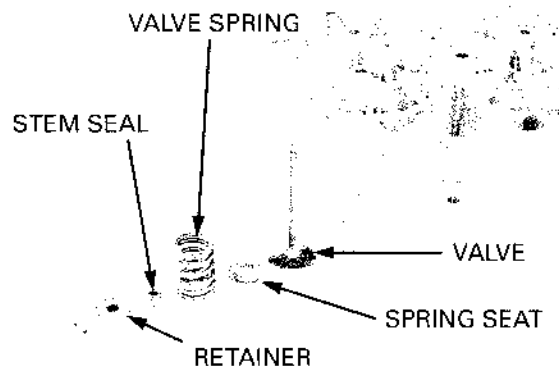
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.



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

Remove the following:

- Spring retainer
- Valve spring
- Valve
- Stem seal
- Valve spring seat

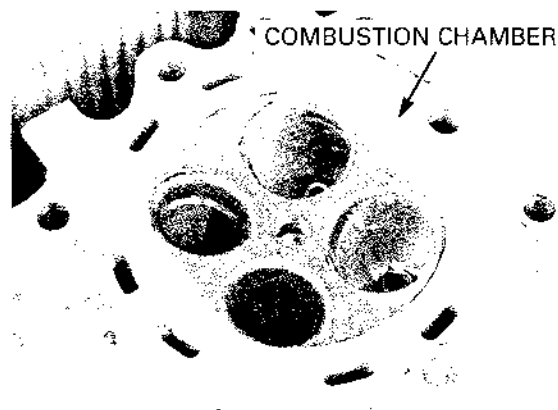


CYLINDER HEAD INSPECTION

CYLINDER HEAD

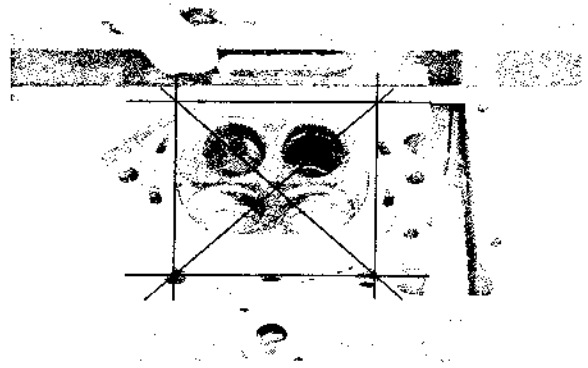
Avoid damaging the gasket surface.

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)

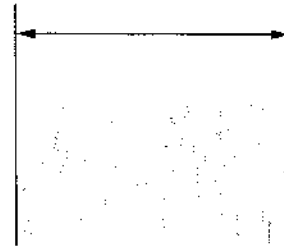


VALVE SPRING

Measure the normal side valve spring free length.

SERVICE LIMIT: 42.9 mm (1.69 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: 33.97 mm (1.337 in)

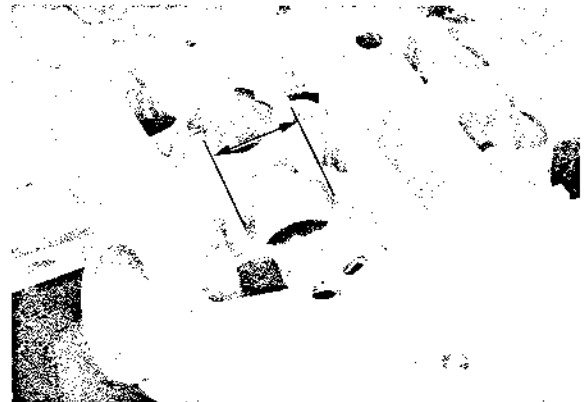


VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.

Measure the each valve lifter bore I.D.

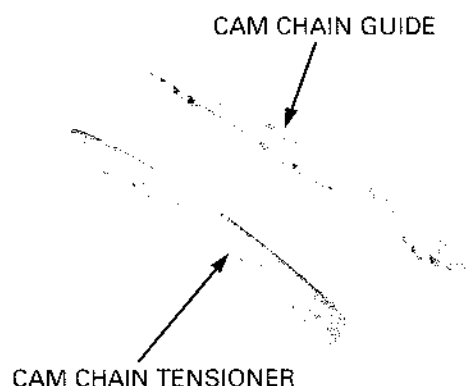
SERVICE LIMIT: 34.04 mm (1.340 in)



CYLINDER HEAD/VALVES

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

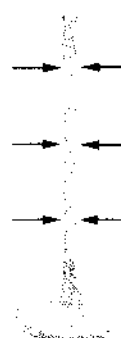
Check that the valve moves smoothly in the guide. Inspect each valve for bending, burning or abnormal stem wear.

Measure and record each valve stem O.D.

SERVICE LIMITS:

IN: 5.965 mm (0.2348 in)

EX: 5.955 mm (0.2344 in)

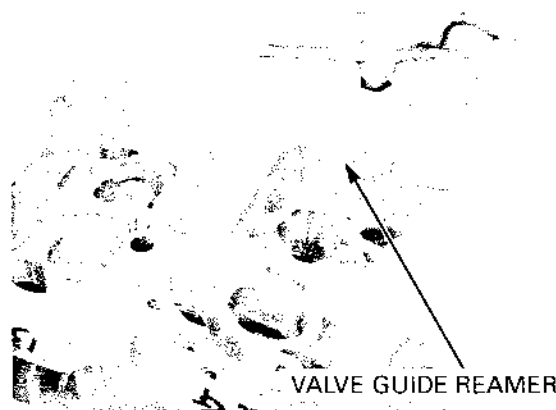


Ream the guides to remove any carbon deposits before checking clearances.

Insert the reamer from the camshaft side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 6.012 mm 07VMH-MBB0200



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 6.040 mm (0.2378 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: 0.085 mm (0.0033 in)

Reface the valve seats whenever the valve guides are replaced (page 8-18).

If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit. If the stem-to-guide clearance is out of standard with the new guides, replace the valves and guides.

VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 130 – 140°C (275 – 290°F) with a hot plate or oven.

NOTICE

Do not use a torch to heat the cylinder head; it may cause warping.

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

TOOL:

Valve guide remover 07742-0010100

Drive in the guide to the specified depth from the top of the cylinder head.

TOOL:

Adjustable valve guide driver 07743-0020000

Install the valve guide while measuring the valve guide height from the cylinder head.

SPECIFIED DEPTH:

Normal side: 14.0 – 14.2 mm (0.55 – 0.56 in)

Let the cylinder head cool to room temperature.

Use cutting oil on the reamer during this operation

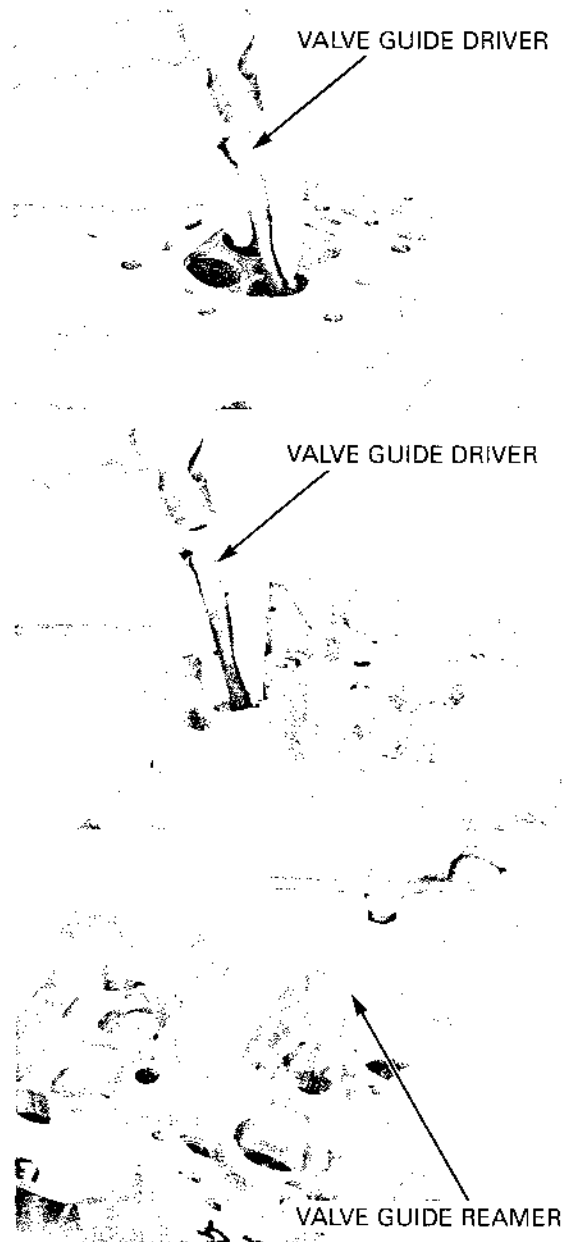
Ream the new valve guide after installation.
Insert the reamer from the camshaft side of the head and also always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 6.012 mm 07VMH-MBB0200

Clean the cylinder head thoroughly to remove any metal particles.

Reface the valve seat (page 8-18).

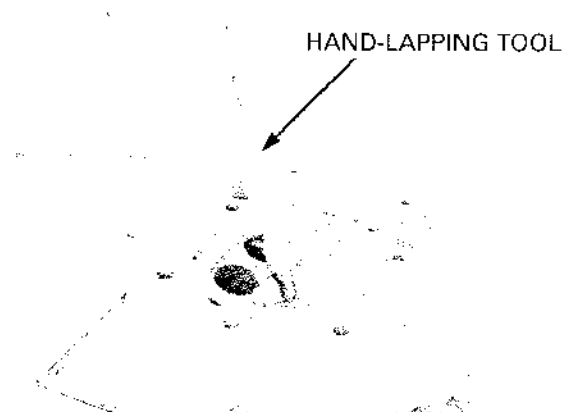


VALVE SEAT INSPECTION/REFACING

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.



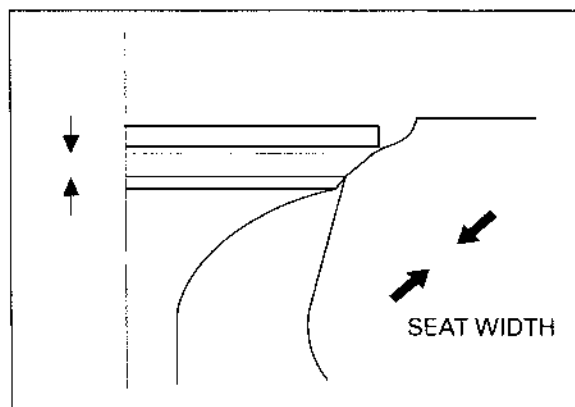
CYLINDER HEAD/VALVES

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: 1.1 – 1.3 mm (0.04 – 0.05 in)

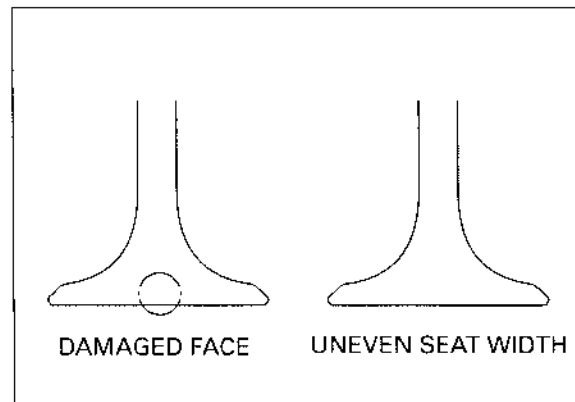
SERVICE LIMIT: 1.7 mm (0.07 in)

If the seat width is not within specification, reface the valve seat (page 8-18).



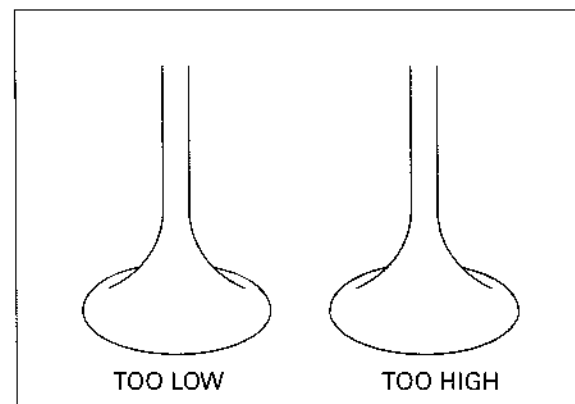
Inspect the valve seat face for:

- 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.

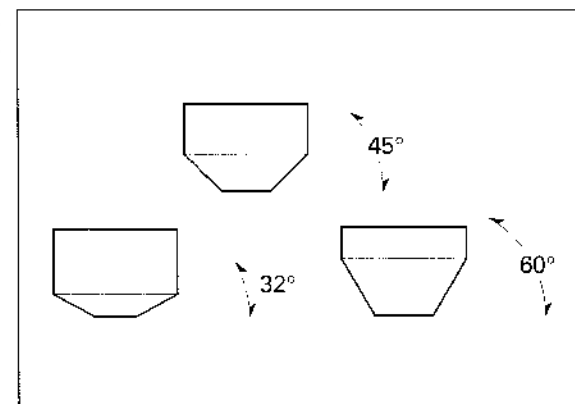
- Contact area (too high or too low)
 - Reface the valve seat.



VALVE SEAT REFACING

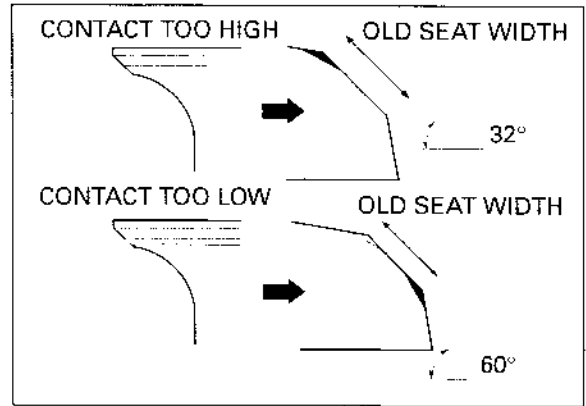
Follow the refacing manufacturer's operating instructions.

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.

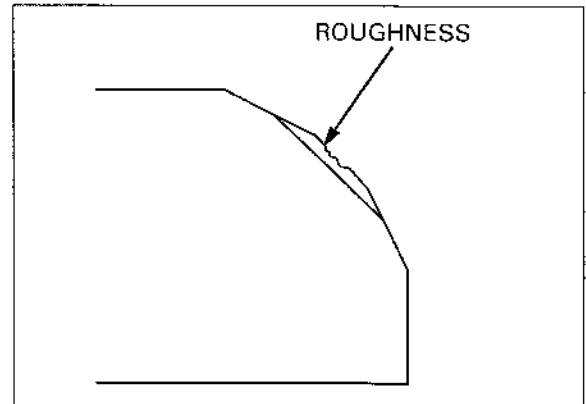


Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

Use a 45° seat cutter to remove any roughness or irregularities from the seat.

TOOLS:

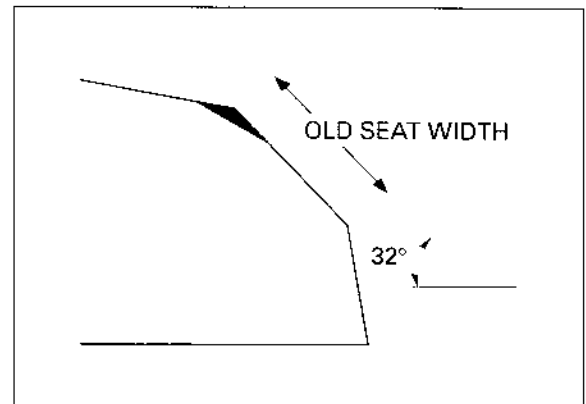
Seat cutter, 35 mm (EX) 07780-0010400
 Seat cutter, 40 mm (IN) 07780-0010500
 Cutter holder, 6 mm 07VMH-MBB0100
 or equivalent commercially available



Use a 32° flat cutter to remove the top 1/4 of the existing valve seat material.

TOOLS:

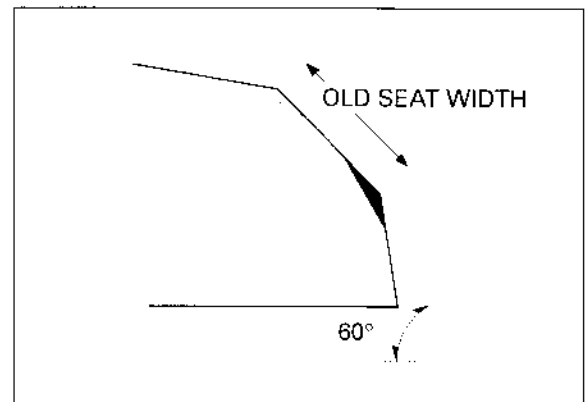
Flat cutter, 35 mm (EX) 07780-0012300
 Flat cutter, 38.5 mm (IN) 07780-0012400
 Cutter holder, 6 mm 07VMH-MBB0100
 or equivalent commercially available



Use a 60° interior cutter to remove the bottom 1/4 of the old seat.

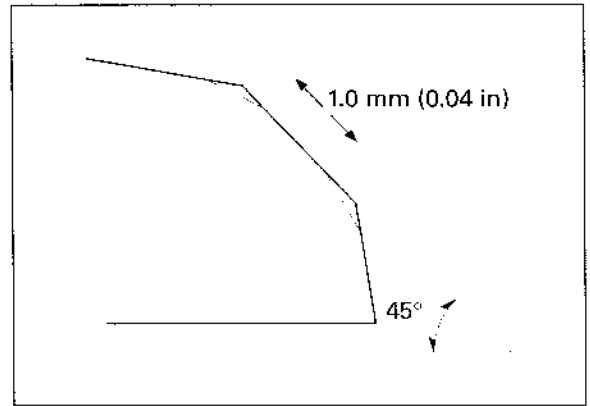
TOOLS:

Interior cutter, 37.5 mm (EX) 07780-0014100
 Interior cutter, 42 mm (IN) 07780-0014400
 Cutter holder, 6 mm 07VMH-MBB0100
 or equivalent commercially available



CYLINDER HEAD/VALVES

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

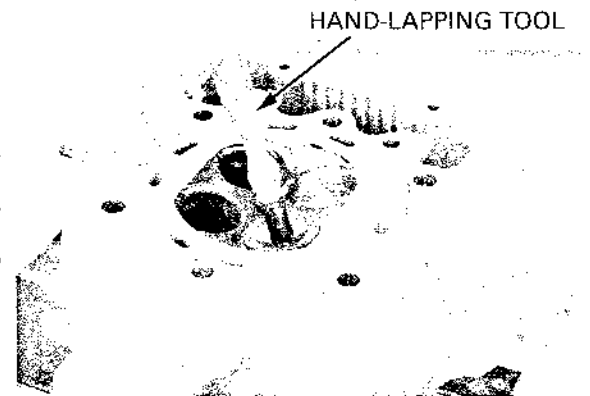


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

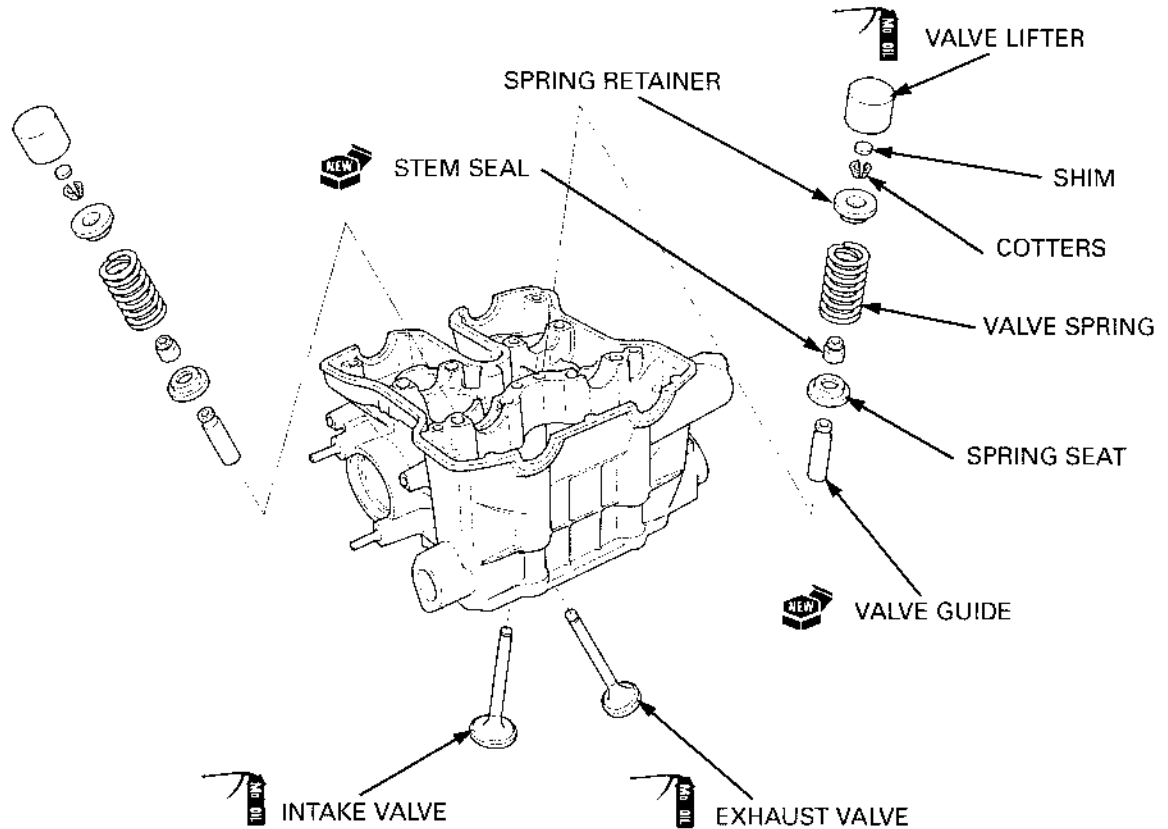
NOTICE

- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of 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

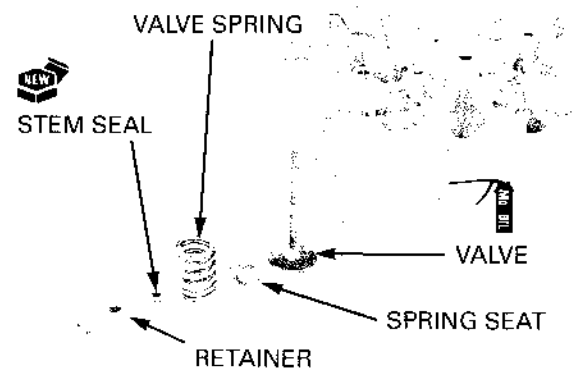


Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the spring seat.
Install the new stem seal.

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.

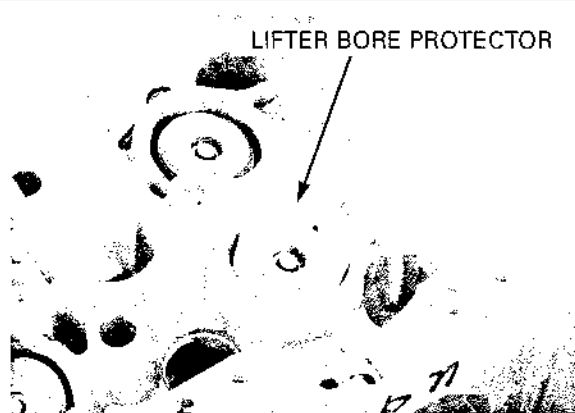


COMBUSTION CHAMBER SIDE

CYLINDER HEAD/VALVES

Install the tappet hole protector into the valve lifter bore.

Install the valve spring retainer.



Grease the cotters to ease installation.

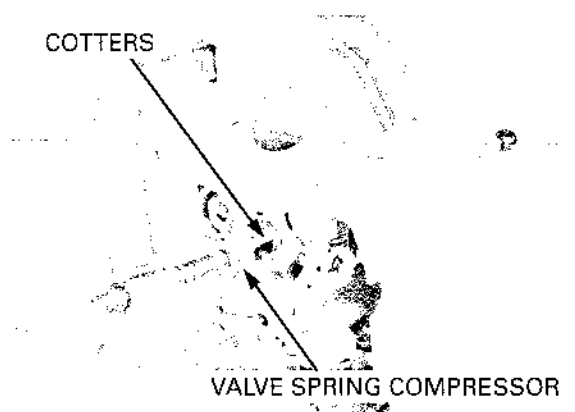
Install the valve cotters using the special tool as shown.

NOTICE

To prevent loss of tension, do not compress the valve spring more than necessary.

TOOL:

Valve spring compressor 07757-0010000



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 and tighten the spark plug.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



CYLINDER HEAD INSTALLATION

Rear cylinder: Install the cam chain onto the timing sprocket.

Install the cam chain guide and bolt.

Install the cam chain tensioner collar, tensioner and bolt.

Tighten the cam chain guide and cam chain tensioner bolts to the specified torque.

TORQUE:

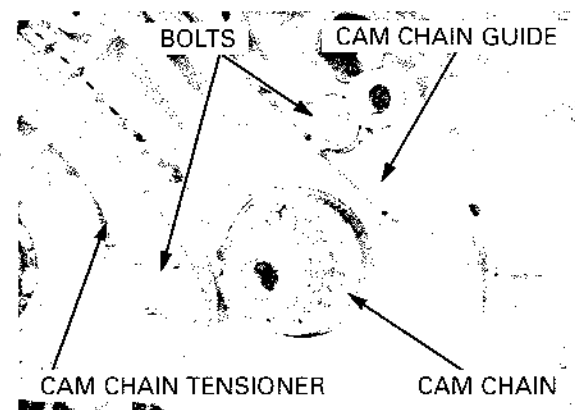
Cam chain tensioner bolt:

23 N·m (2.3 kgf·m, 17 lbf·ft)

Cam chain guide bolt:

23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the primary drive gear (page 9-18).



Front cylinder: Install the cam chain onto the timing sprocket.
Install the cam chain guide and bolt.
Install the cam chain tensioner collar, tensioner and bolt.

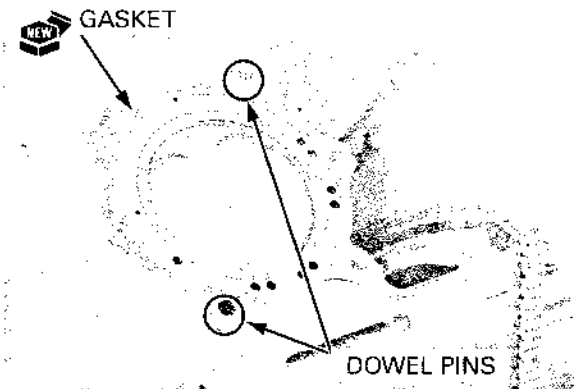
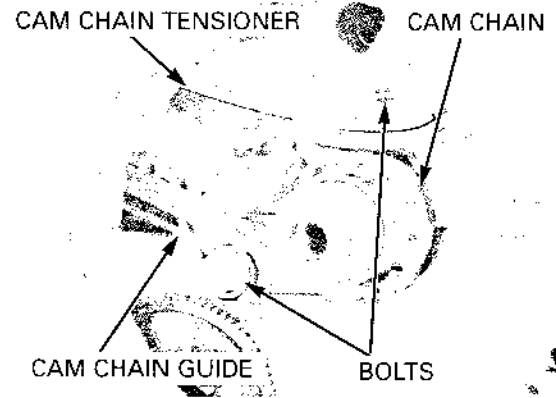
Tighten the cam chain guide and cam chain tensioner bolts to the specified torque.

TORQUE:

Cam chain tensioner bolt:
23 N·m (2.3 kgf-m, 17 lbf-ft)
Cam chain guide bolt:
23 N·m (2.3 kgf-m, 17 lbf-ft)

Install the flywheel (page 10-9).

Install a new gasket and dowel pins.



Install the cylinder head onto the cylinder block.

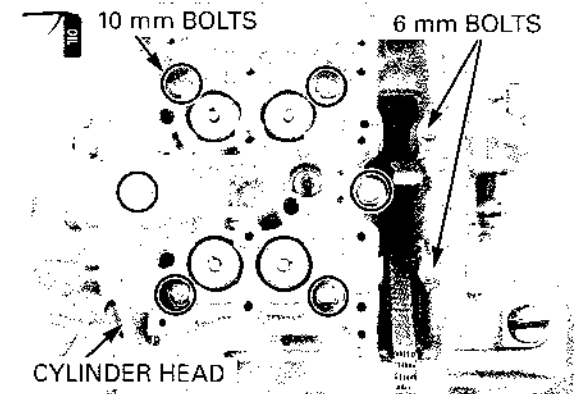
Apply oil to the threads and seating surface of the 10 mm bolts and install them.

Install the two 6 mm flange bolts.

Tighten the 10 mm bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

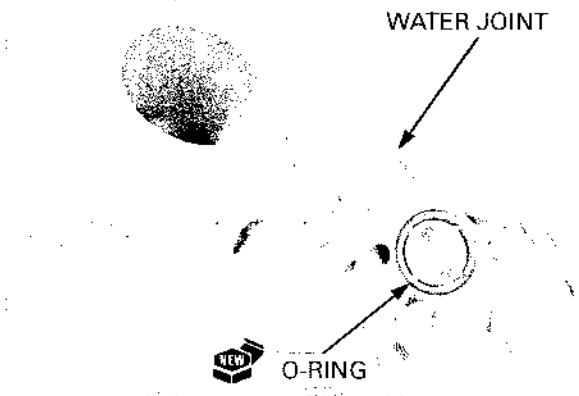
TORQUE: 53 N·m (5.4 kgf-m, 39 lbf-ft)

Tighten the 6 mm flange bolts securely.



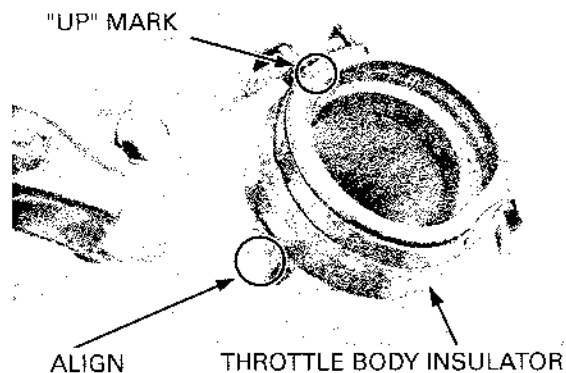
Install a new O-ring into the groove of the water hose joint.

Install the water joint to the cylinder head, then install and tighten the bolts.

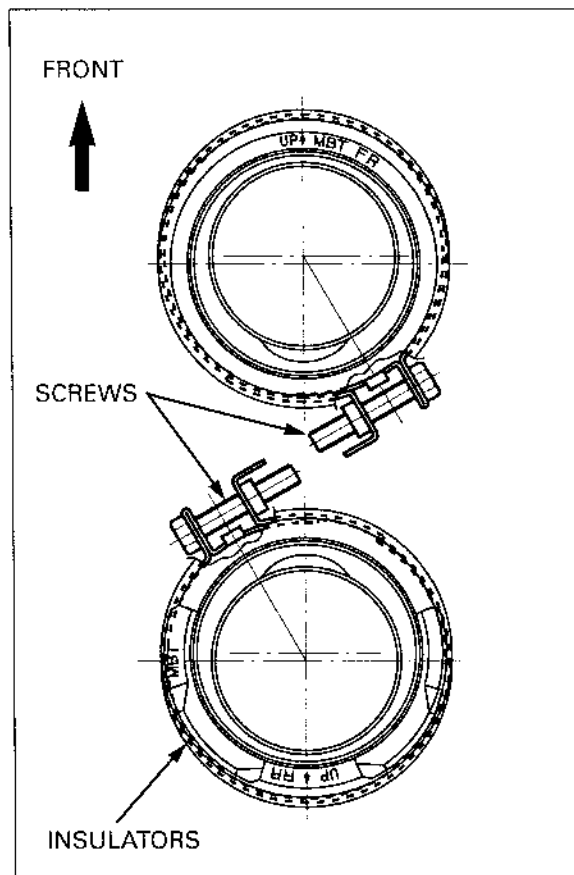


CYLINDER HEAD/VALVES

Install the throttle body insulator with the "UP" mark facing out and up so that the tab is positioned as shown.



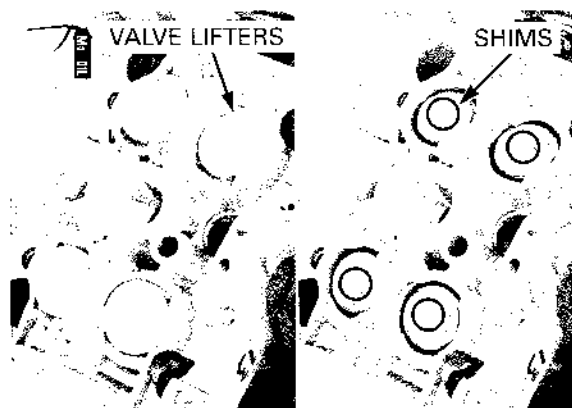
Position the band screws as shown and tighten it securely.



CAMSHAFT INSTALLATION

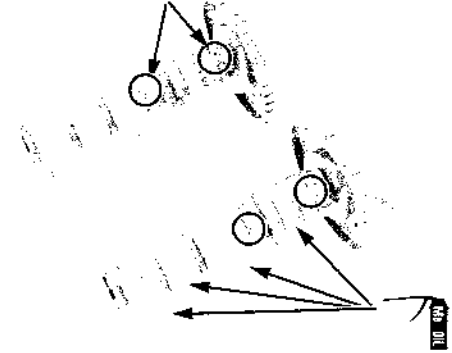
Apply molybdenum disulfide oil to the outer surface of the each valve lifter.

Install the shims and valve lifters into the valve lifter bores.

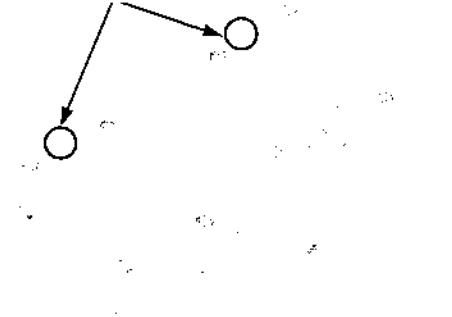


- If the camshaft holder replacement is required, replace the holder and cylinder head as an assembly.
- Follow this procedure from beginning to end, even if you are only servicing one cylinder head camshafts.
- Check the camshaft marks so that you install each camshaft in its correct location.
- The mark on the camshaft have the following meanings.
F IN: Front cylinder intake camshaft
F EX: Front cylinder exhaust camshaft
R IN: Rear cylinder intake camshaft
R EX: Rear cylinder 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.

IDENTIFICATION MARK



IDENTIFICATION MARK

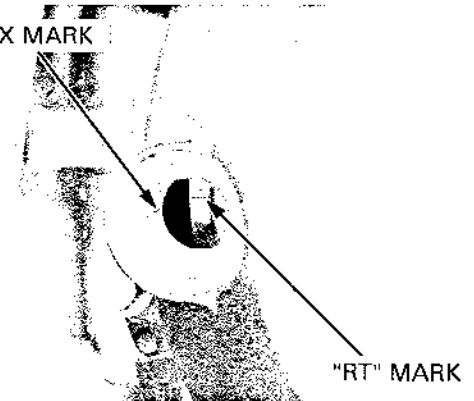


WHEN BOTH THE FRONT AND REAR CAMSHAFTS WERE REMOVED:

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover.

Make sure that the rear piston is at TDC (Top Dead Center) on the compression stroke.

INDEX MARK

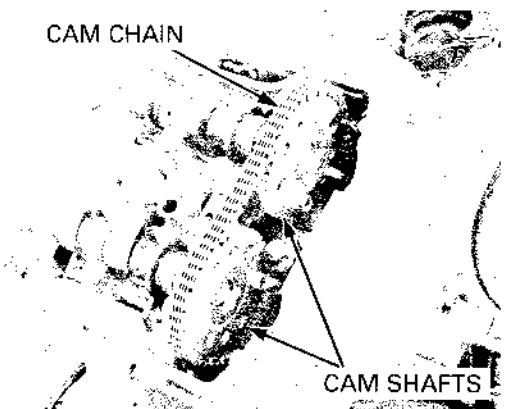


Apply molybdenum oil solution to the camshaft journals of the cylinder head and camshaft holder.

Install the rear cylinder intake and exhaust camshafts.

Install the cam chain onto the cam sprockets.

CAM CHAIN



CAM SHAFTS

Make sure that the index lines on the cam sprockets are facing outward and are flush with the cylinder head.

CYLINDER HEAD/VALVES

Install the camshaft holders to the cylinder head original positions as shown.

Apply clean engine oil to the threads and seating surfaces of the camshaft holder bolts.

Install the cam chain guide plate.

Tighten the camshaft holder flange bolts in a criss-cross pattern in 2 or 3 steps.

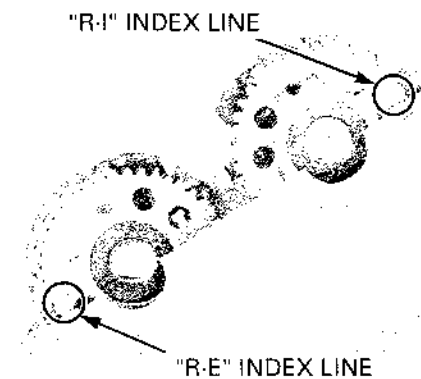
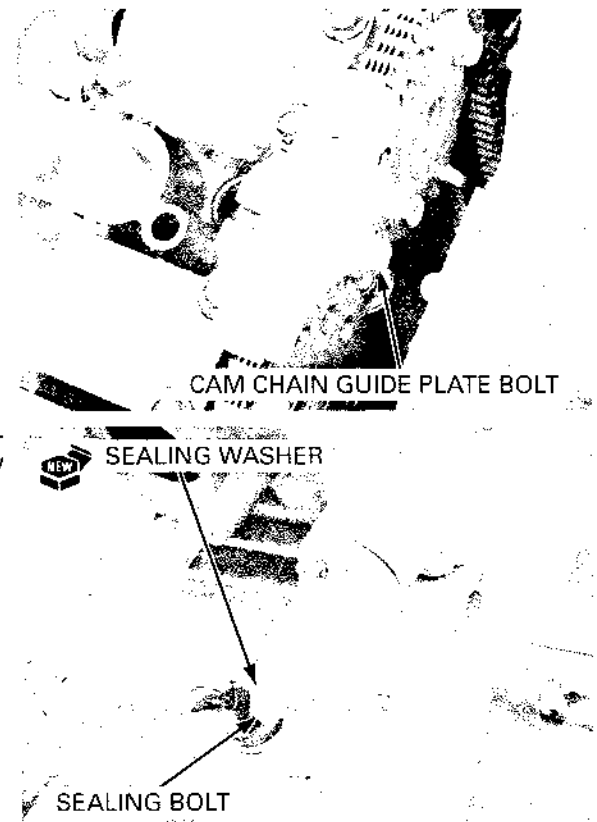
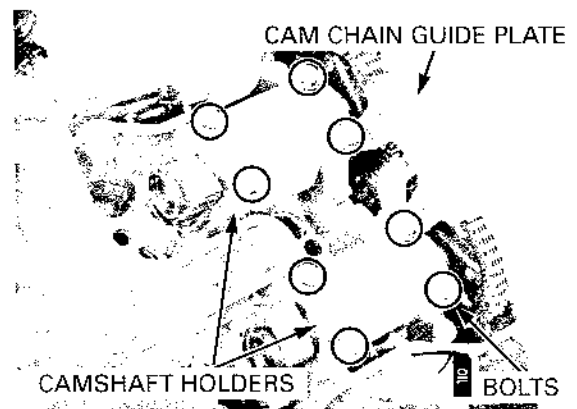
Tighten the camshaft holder flange bolts to the specified torque.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Install and tighten the bolt securely.

Remove the stopper tool from the cam chain tensioner lifter and install the sealing bolt with a new sealing washer.

Check the timing mark ("R-I" for intake and "R-E" for exhaust) on the rear cylinder cam sprockets are flush with the cylinder head surface and facing outward as shown.



Turn the crankshaft counterclockwise 1-1/4 turn (450°) and align the "FT" mark on the flywheel with the index mark on the left crankcase cover. Make sure that the front piston is at TDC (Top Dead Center) on the compression stroke.

Install the front cylinder camshafts following the same procedure as installation of the rear cylinder camshaft.

Install the crankshaft hole cap and timing hole cap (page 3-9).

Install the following:

- Cylinder head cover (page 8-30)
- Radiator (page 6-15)
- Air cleaner housing (page 5-57)

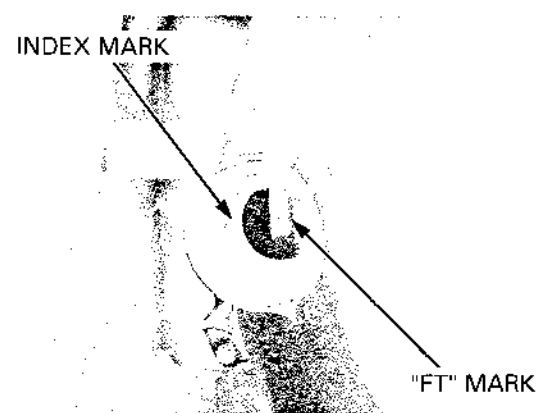
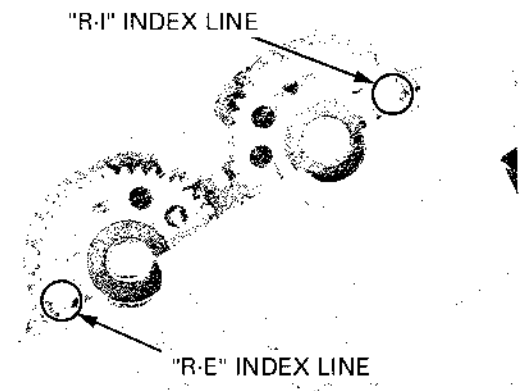
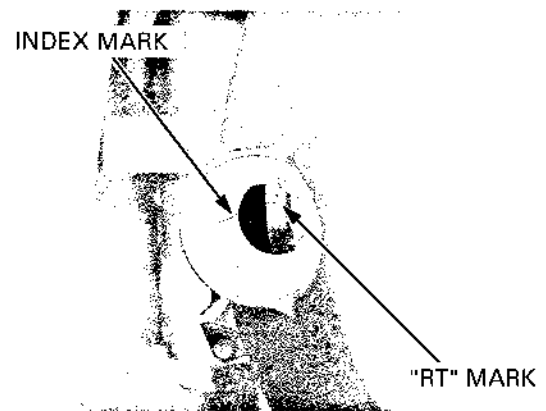
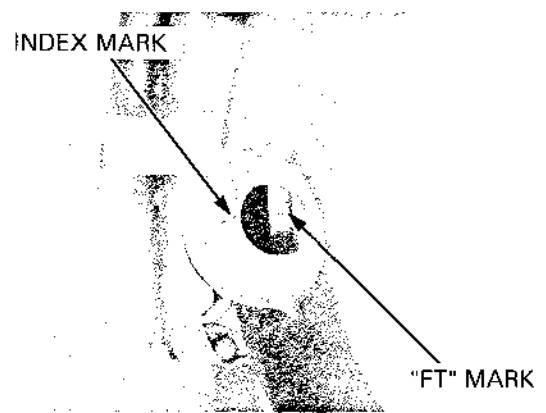
IF ONLY THE FRONT CYLINDER CAM-SHAFT WAS REMOVED:

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

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover.

Make sure that the index lines on the rear cam sprockets are facing outward. If they are not, turn the crankshaft counterclockwise one full turn (360°) and realign the "RT" mark with the index mark.

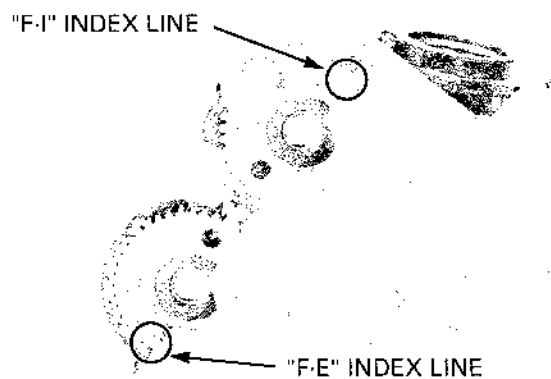
Turn the crankshaft counterclockwise 1-1/4 turn (450°) and align the "FT" mark on the flywheel with the index mark on the left crankcase cover.



CYLINDER HEAD/VALVES

Install the front cylinder camshafts with the index lines on the cam sprocket facing outward.

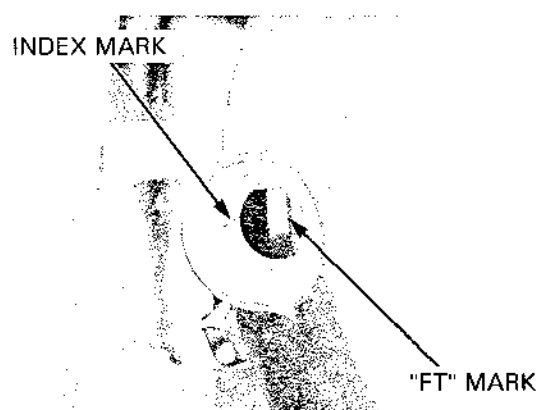
Install the camshaft holders following the same procedure as when both the front and rear camshafts were removed (page 8-25).



IF ONLY THE REAR CYLINDER CAM-SHAFT WAS REMOVED:

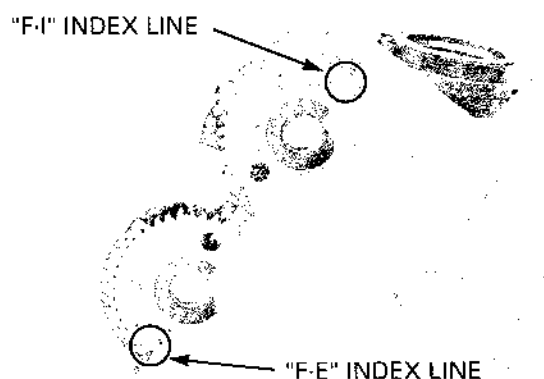
Remove the front cylinder head cover (page 8-6).

Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the left crankcase cover.

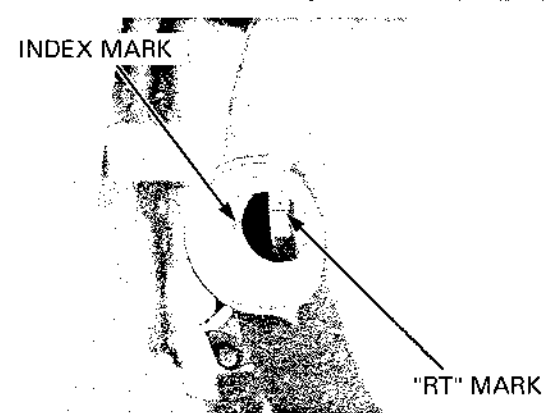


Make sure that the index lines on the front cam sprockets are facing outward.

If they are not, turn the crankshaft counterclockwise one full turn (360°) and realign the "FT" mark with the index mark.

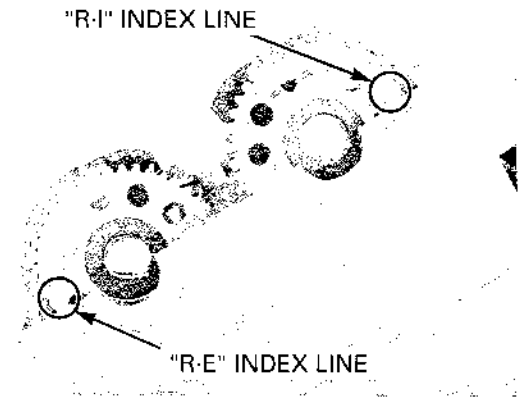


Turn the crankshaft counterclockwise 3/4 turn (270°) and align the "RT" mark on the flywheel with the index mark on the left crankcase cover.



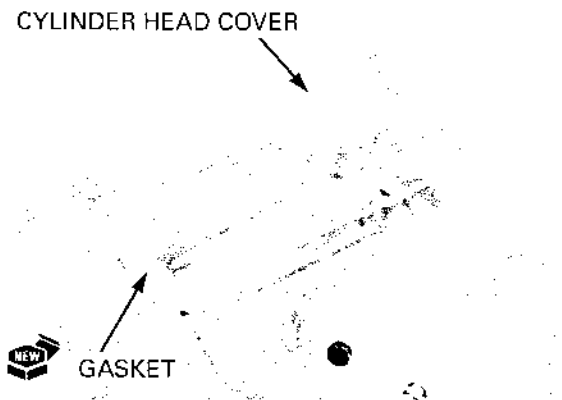
Install the rear cylinder camshafts with the index lines on the cam sprocket facing outward.

Install the camshaft holders following the same procedure as when both the front and rear camshafts were removed (page 8-25).



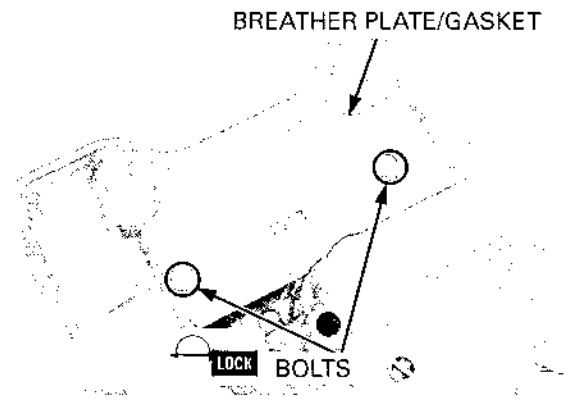
CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather plate to the rear cylinder head cover.

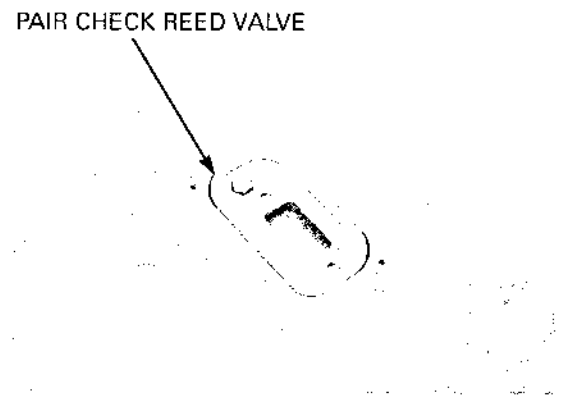


Install the crankcase breather plate to the rear cylinder head cover.
Apply a locking agent to the crankcase breather plate flange bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



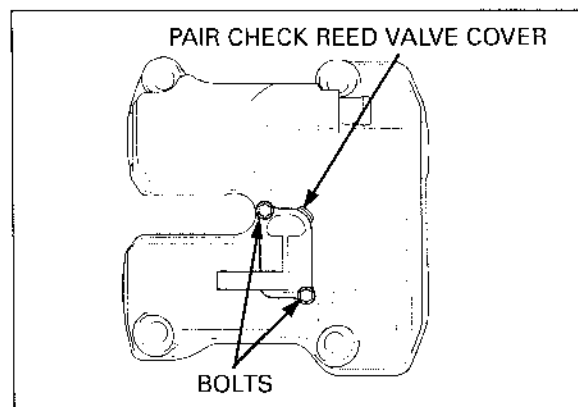
Install the PAIR check reed valve into the cylinder head cover.



CYLINDER HEAD/VALVES

Install the PAIR check reed valve covers.
Apply a locking agent to the PAIR check reed cover bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 5 N·m (0.52 kgf·m, 3.8 lbf·ft)

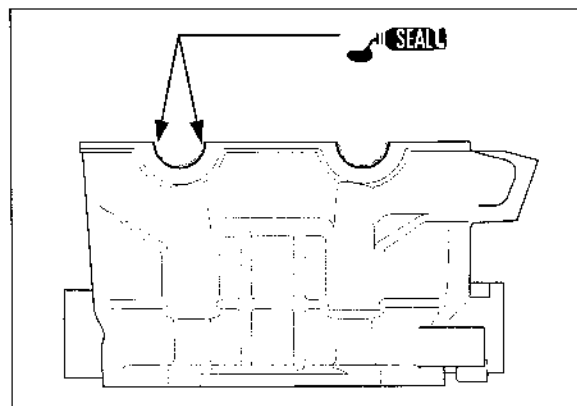


CYLINDER HEAD COVER INSTALLATION

Apply sealant to the cylinder head cover side of a new packing.
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 dowel pin and new O-ring.



Install the cylinder head cover onto the cylinder head.

Install the mounting rubbers with their "UP" mark facing up.

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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

For the rear cylinder head, install the spark plug cap to the spark plug.

Connect the PAIR air hose to the PAIR check reed valve cover.

Connect the crankcase breather hose.

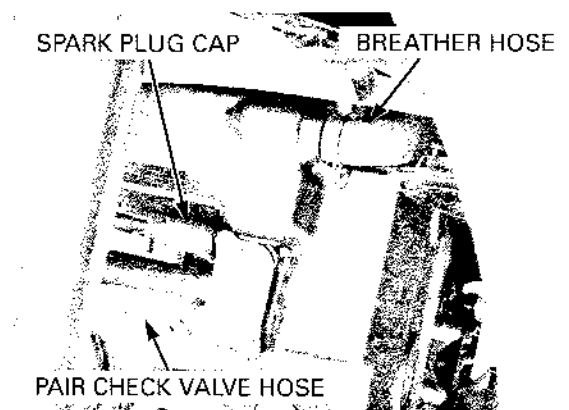
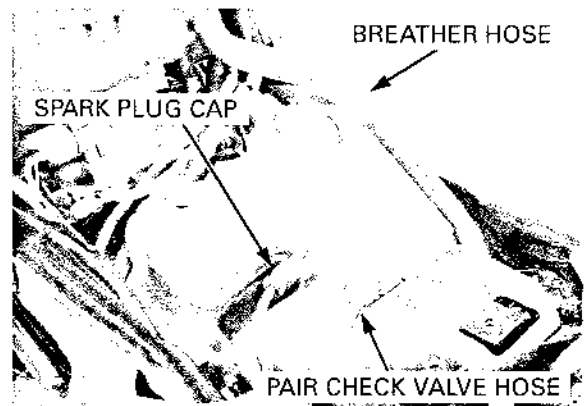
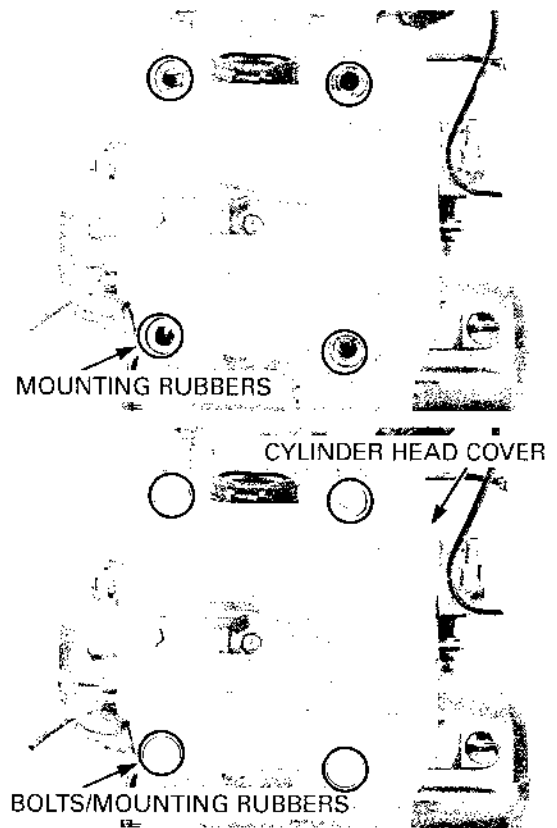
Install the fuel tank (page 5-54).

For the front cylinder head, install the spark plug cap to the spark plug.

Connect the PAIR air hose to the PAIR check reed valve cover.

Connect the crankcase breather hose.

Install the lower heat guard (page 17-7).



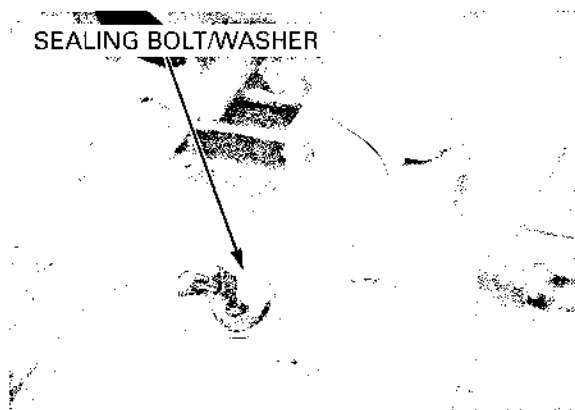
CAM CHAIN TENSIONER LIFTER

REMOVAL

Remove the throttle body (page 5-60).

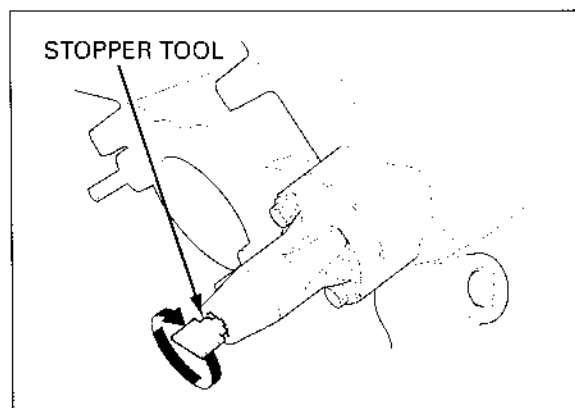
Remove the cam chain tensioner sealing bolt and sealing washer.

SEALING BOLT/WASHER



Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool to prevent damaging the cam chain.

STOPPER TOOL

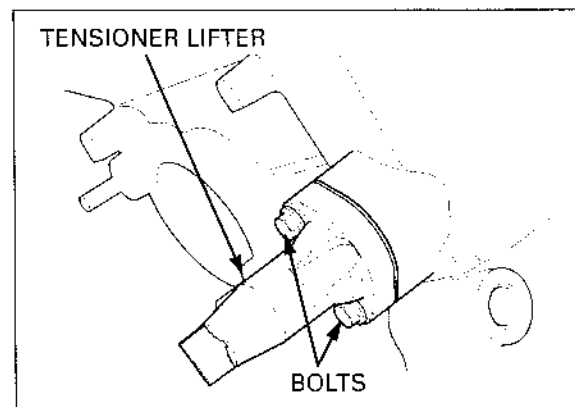


Be careful not to enter the dust and dirt to enter the cylinder head.

Remove the bolts and cam chain tensioner lifter. Remove the gasket.

TENSIONER LIFTER

BOLTS

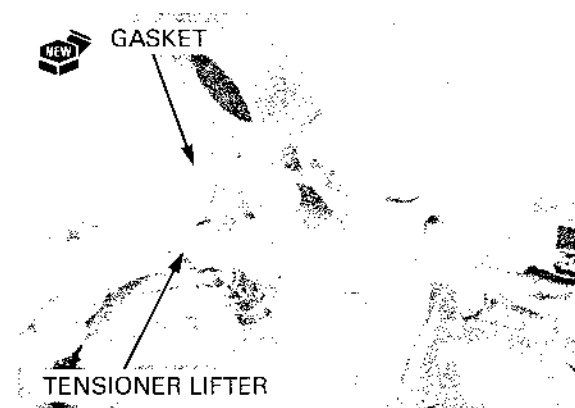


INSTALLATION

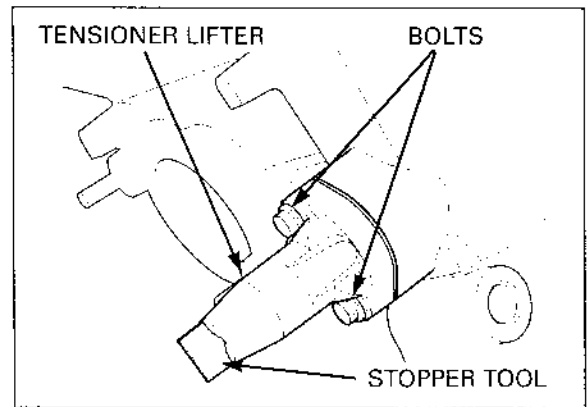
Install the new gasket onto the cam chain tensioner lifter.

NEW GASKET

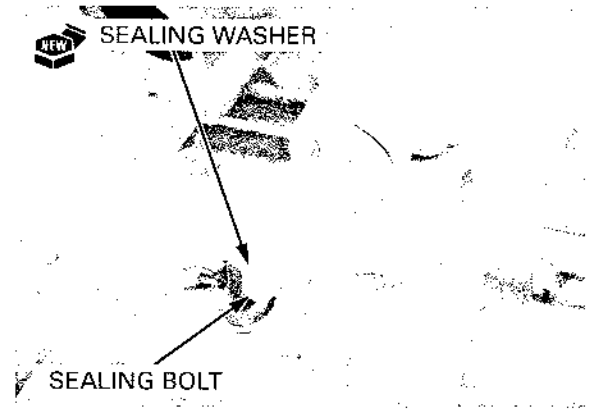
TENSIONER LIFTER



Install the cam chain tensioner lifter into the cylinder head.
Install and tighten the mounting bolts.
Remove the stopper tool.



Install a new sealing washer and tighten the sealing bolt securely.
Install the removed parts in the reverse order of removal.

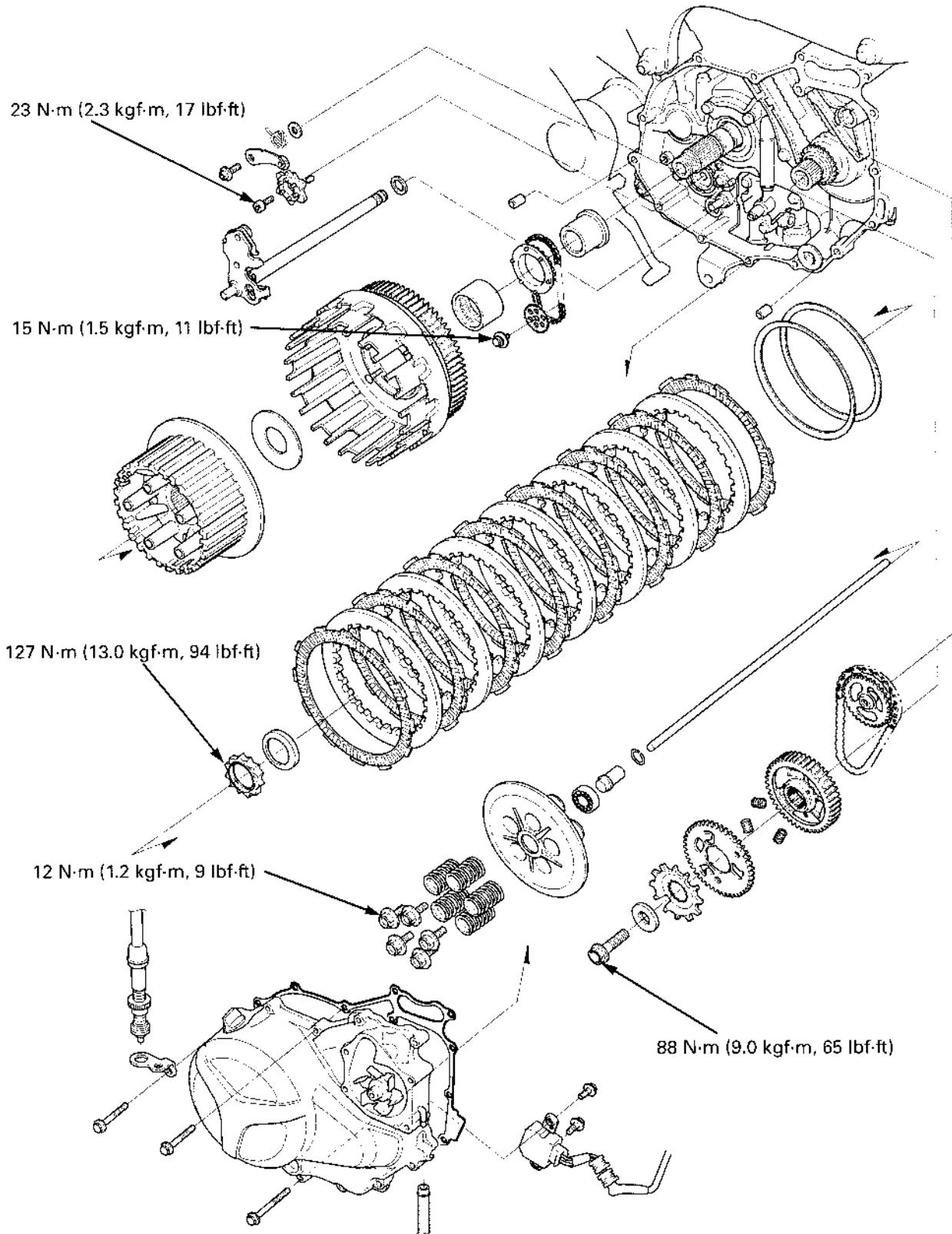


MEMO

9. CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION	9-2	GEARSHIFT LINKAGE	9-15
SERVICE INFORMATION	9-3	PRIMARY DRIVE GEAR	9-18
TROUBLESHOOTING	9-5	RIGHT CRANKCASE COVER INSTALLATION	9-19
RIGHT CRANKCASE COVER REMOVAL	9-6	CLUTCH LIFTER ARM	9-21
CLUTCH	9-6		

COMPONENT LOCATION



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.
- Clean off any gasket material from the right crankcase cover surface.
- Be careful not to damage the crankcase cover mating surface when servicing.
- When removing or servicing the clutch, use care not to allow the dust or dirt to enter the engine.
- 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)

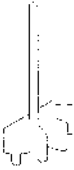

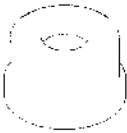

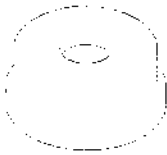


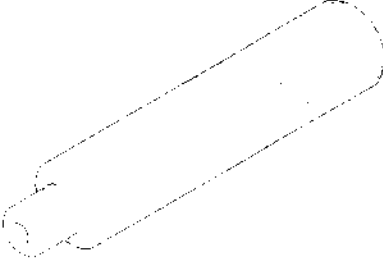
ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length	47.6 (1.87)	46.6 (1.83)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide	I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)

TORQUE VALUES

Clutch spring bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the thread and flange surface Stake the nut
Clutch center lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply a locking agent to the threads Apply oil to the threads and flange surface
Primary drive gear bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	
Shift drum center socket bolt	23 N·m (2.3 kgf·m, 1.7 lbf·ft)	
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m, 1.7 lbf·ft)	

CLUTCH/GEARSHIFT LINKAGE

TOOLS

<p>Gear holder 07724-0010100</p> 	<p>Clutch center holder 07724-0050002</p> 	<p>Attachment, 32 X 35 mm 07746-0010100</p> 
<p>Attachment, 37 X 40 mm 07746-0010200</p> 	<p>Attachment, 42 X 47 mm 07746-0010300</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Pilot, 35 mm 07746-0040800</p> 	<p>Driver 07749-0010000</p> 	

TROUBLESHOOTING

Clutch lever hard to pull in

- Damaged, kinked or dirty clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Improperly routed clutch cable

Clutch slips when accelerating

- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever free play
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Too much clutch lever free play
- Clutch plate warped
- Loose clutch center lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift

- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear

- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

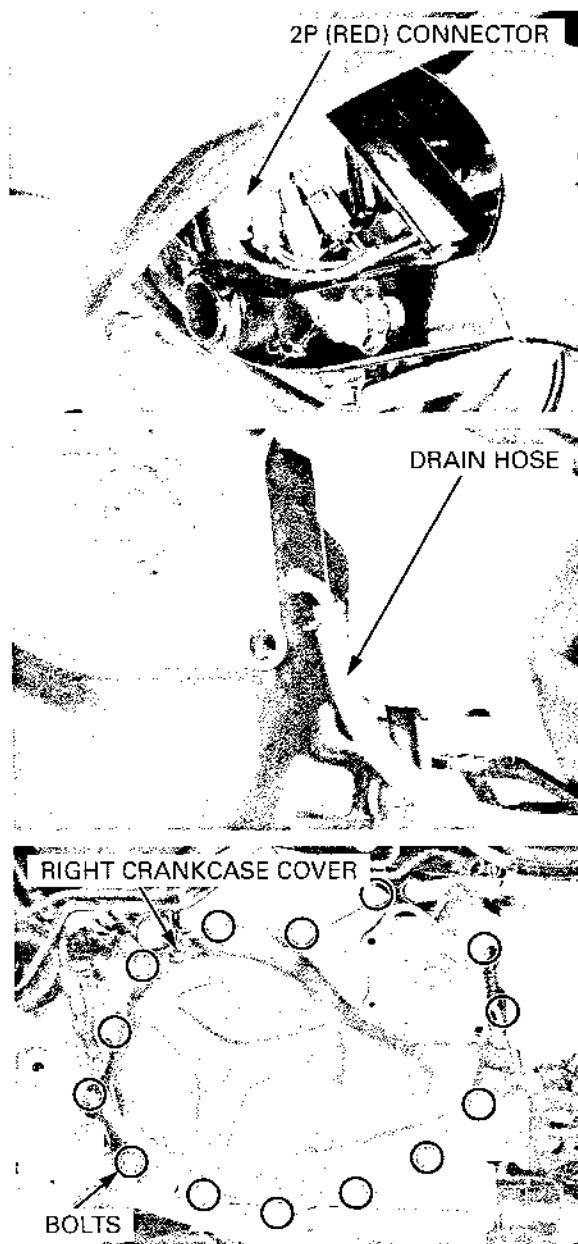
RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-13).
Drain the coolant (page 6-7).
Remove the water pump cover (page 6-18).
Open and support the rear end of the fuel tank (page 3-7).

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

Disconnect the drain hose from the right crankcase cover.

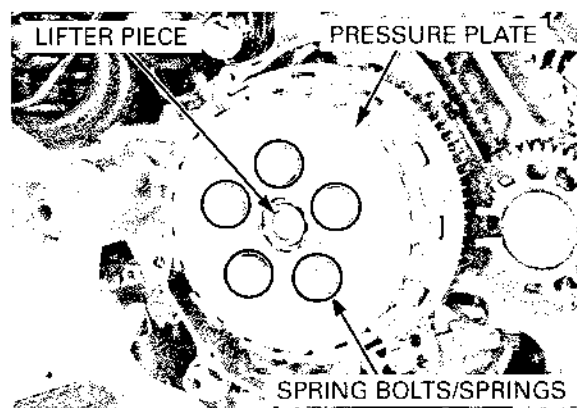
Remove the bolts and right crankcase cover.
Remove the gasket and dowel pins.



CLUTCH

REMOVAL

Remove the right crankcase cover (page 9-6).
Remove the clutch spring bolts, springs and pressure plate.
Remove the clutch lifter piece.

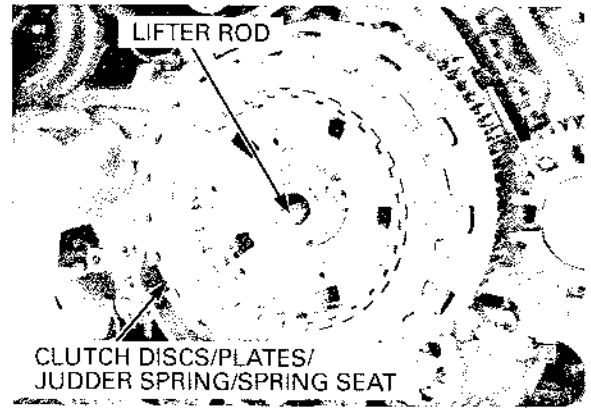


CLUTCH/GEARSHIFT LINKAGE

Remove the clutch lifter rod from the mainshaft.

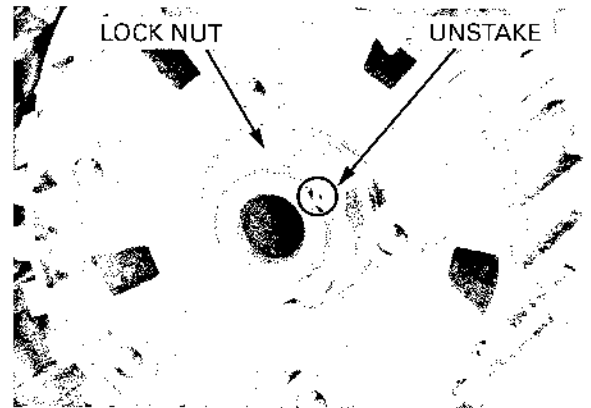
Remove the following:

- Eight clutch discs
- Seven clutch plates
- Judder spring
- Spring seat



Be careful not to damage the mainshaft threads.

Unstake the clutch center lock nut.



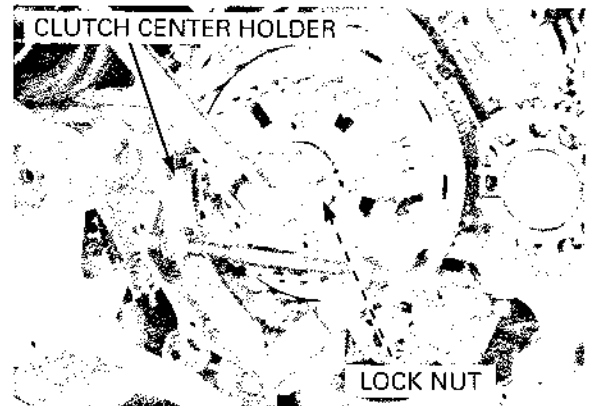
Hold the clutch center with the clutch center holder, then loosen and remove the lock nut.

TOOL:

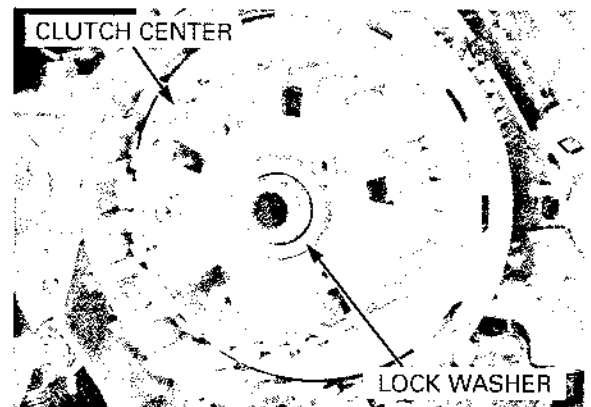
Clutch center holder

07724-0050002

Discard the lock nut.

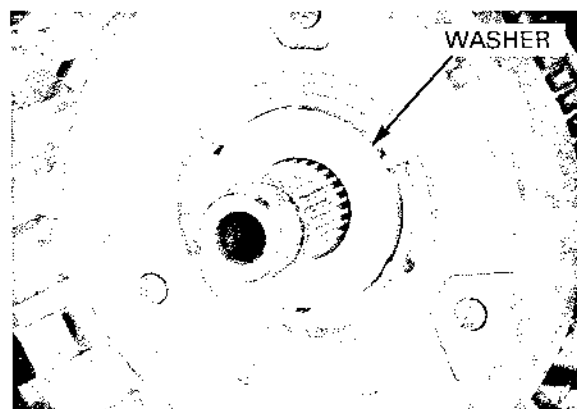


Remove the lock washer and clutch center.

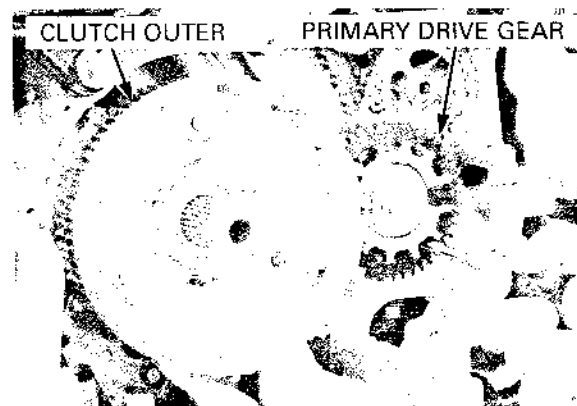


CLUTCH/GEARSHIFT LINKAGE

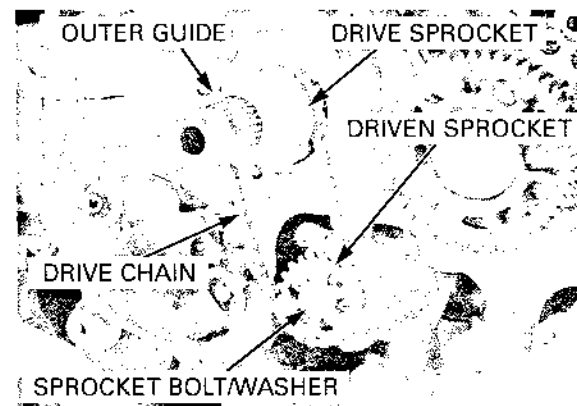
Remove the washer.



Align the primary drive gear and sub-gear teeth with a screwdriver, then remove the clutch outer.



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



INSPECTION

Clutch lifter bearing

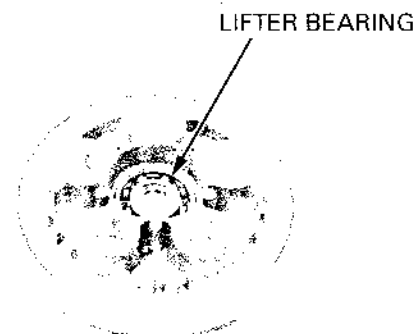
Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and 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 fit loosely in the pressure plate.

TOOLS:

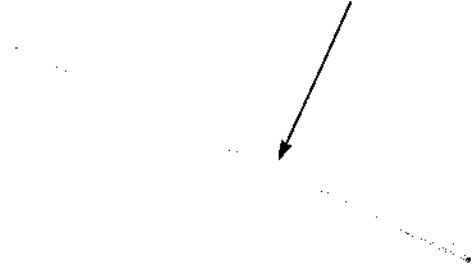
Driver	07749-0010000
Attachment, 32X35 mm	07746-0010100
Pilot, 17 mm	07746-0040400



Clutch lifter rod

Check the clutch lifter rod for wear and trueness.

LIFTER ROD

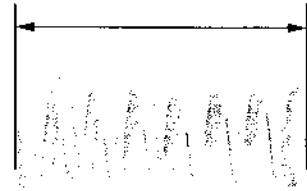


Clutch spring

Replace the clutch spring as a set.

Measure the clutch spring free length.

SERVICE LIMIT: 46.6 mm (1.83 in)



Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates.

Replace if necessary.

CLUTCH CENTER



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 disc thickness of each disc.

SERVICE LIMIT: 3.5 mm (0.14 in)



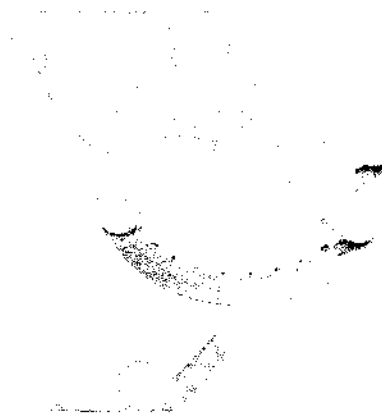
CLUTCH/GEARSHIFT LINKAGE

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.

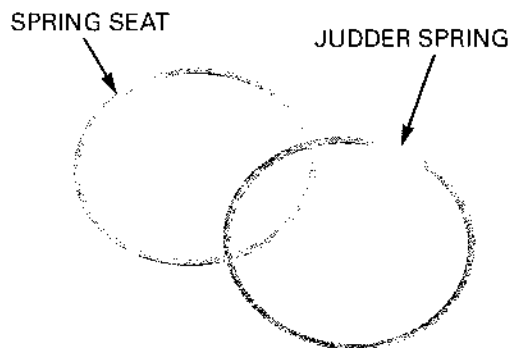
SERVICE LIMIT: 0.30 mm (0.012 in)



Judder spring/spring seat

Check the judder spring and spring seat for wear or other damage, replace if necessary.

Replace if necessary.

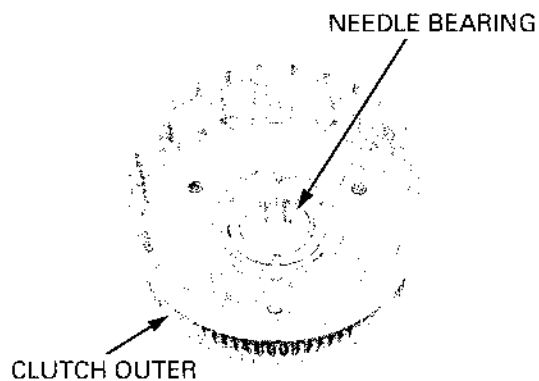


Clutch outer

Check the slots of the clutch outer for damage or wear caused by the clutch discs.

Replace if necessary.

Check the needle bearing for wear or damage, replace if necessary (page 9-11).



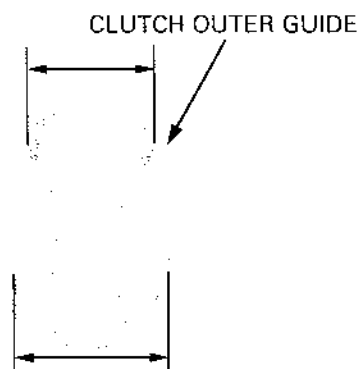
Clutch outer guide

Measure the O.D. and I.D. of the clutch outer guide.

SERVICE LIMITS:

O.D.: 34.965 mm (1.3766 in)

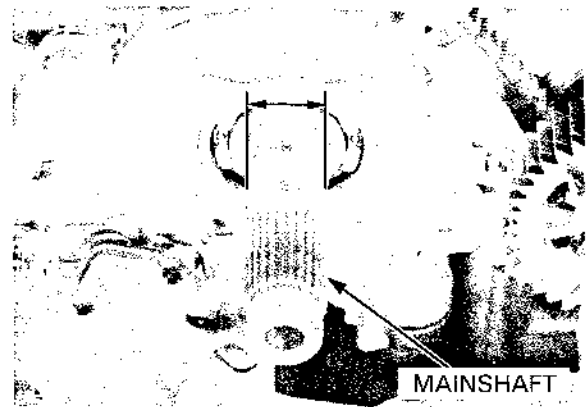
I.D.: 28.031 mm (1.1036 in)



Mainshaft

Measure the mainshaft O.D. at clutch outer guide sliding surface.

SERVICE LIMIT: 27.970 mm (1.1012 in)



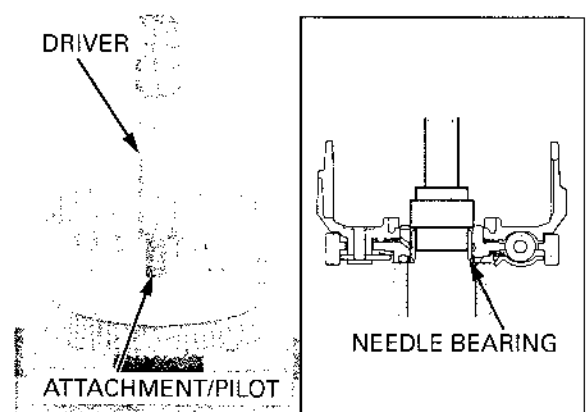
CLUTCH OUTER NEEDLE BEARING REPLACEMENT

Remove the right clutch outer (page 9-6).

Press the needle bearing out of the clutch outer using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 37 X 40 mm	07746-0010200
Pilot, 35 mm	07746-0040800

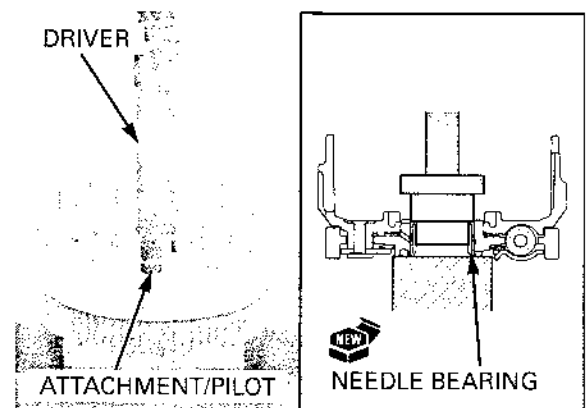


Press the needle bearing into the clutch outer with the marked side facing up.

Press a new needle bearing into the clutch outer so that the casing of the needle bearing is flush with the clutch outer surface as shown.

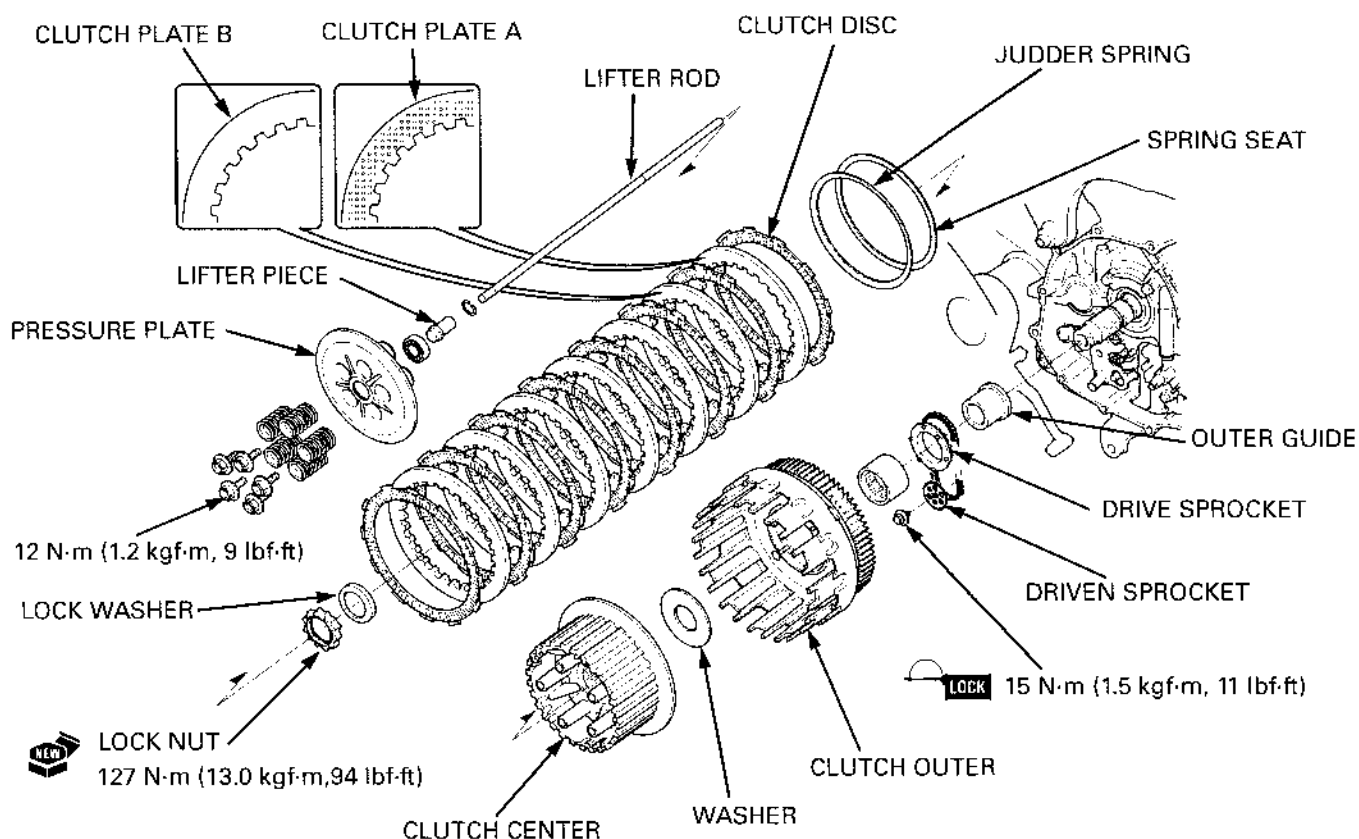
TOOLS:

Driver	07749-0010000
Attachment, 42 X 47 mm	07746-0010300
Pilot, 35 mm	07746-0040800



CLUTCH/GEARSHIFT LINKAGE

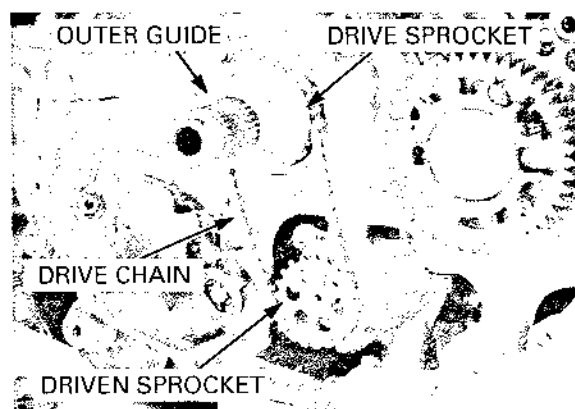
INSTALLATION



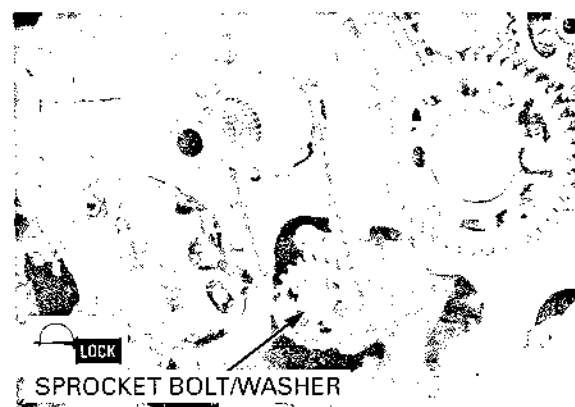
Coat the clutch outer guide with molybdenum disulfide oil and install it onto the mainshaft with the flange side facing the crankcase.

Make sure that the six bosses on the oil pump drive sprocket face toward the clutch outer.

Install the oil pump drive/driven sprocket and drive chain as an assembly.



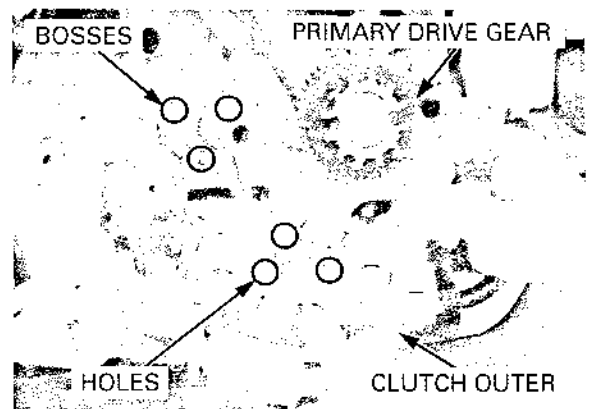
Apply a locking agent to the threads of the oil pump driven sprocket bolt.
Install the driven sprocket bolt with the washer.



CLUTCH/GEARSHIFT LINKAGE

Align the primary drive gear and sub-gear teeth with a screwdriver as shown.

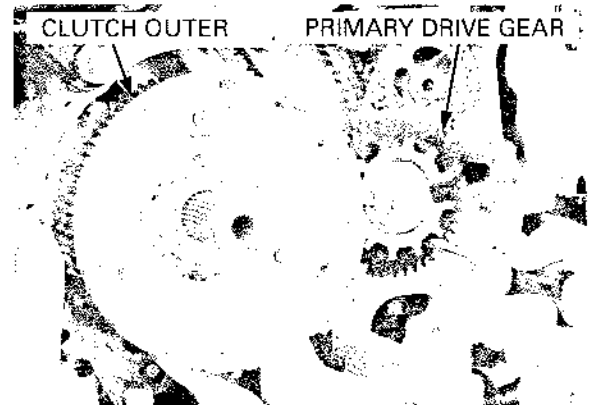
Align the bosses on the oil pump drive sprocket with the holes in the clutch outer by turning the driven sprocket with your finger.



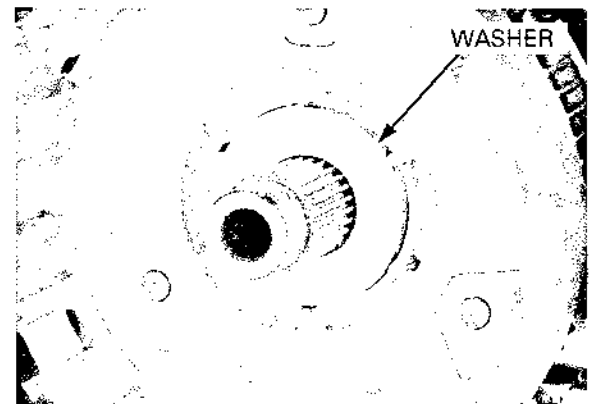
Install the clutch outer to the mainshaft.

Tighten the oil pump drive sprocket bolt to the specified torque.

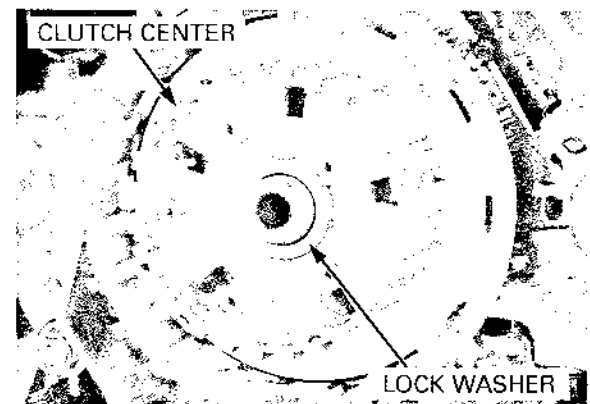
TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)



Install the washer onto the mainshaft.



Install the clutch center and lock washer.



CLUTCH/GEARSHIFT LINKAGE

Apply oil to the threads and seating surface of a new lock nut and install it to the mainshaft.

Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

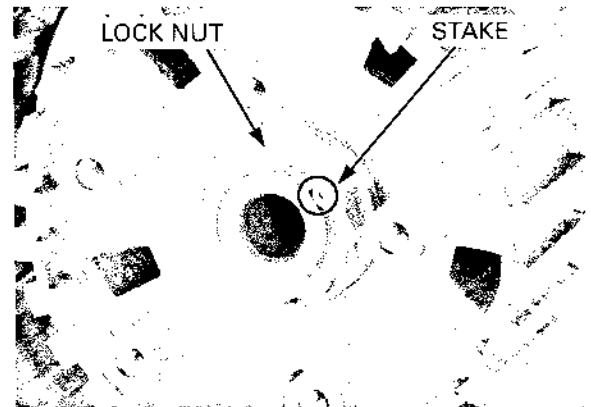
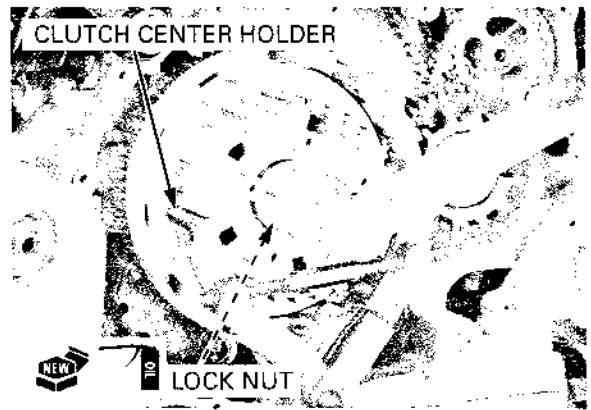
TOOL:

Clutch center holder 07724-0050002

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)

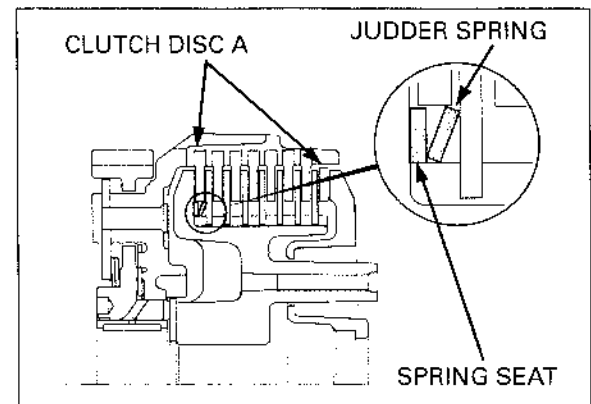
Be careful not to damage the mainshaft threads.

Stake the lock nut into the mainshaft groove with a punch.



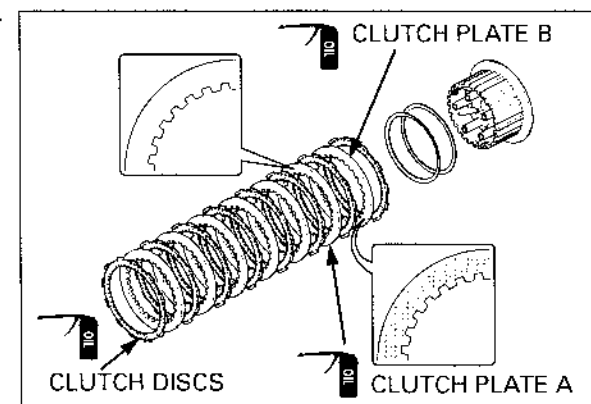
Install the spring seat and judder spring onto the clutch center as shown.

Coat the clutch discs and plates with clean engine oil.

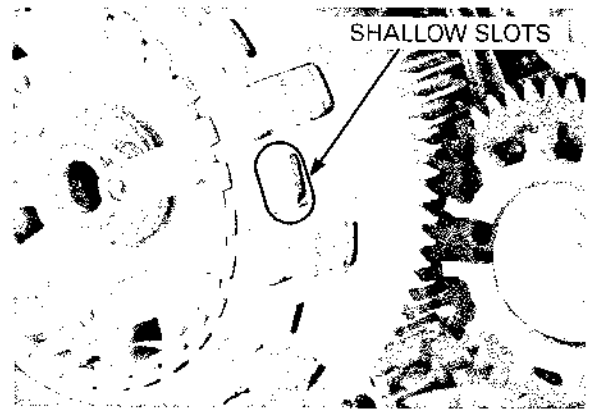


Clutch plate B has different surface as compared with clutch plate A. Install clutch plate B original position (as shown).

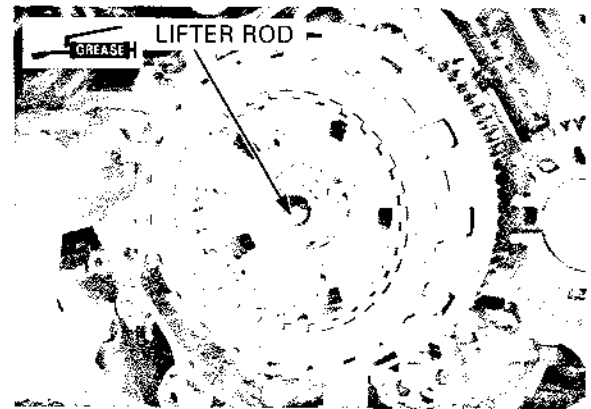
Stack the clutch discs B and plates (A:6, B:1) alternately, starting with the disc.



Install the outer clutch disc in the shallow slot on the clutch outer.



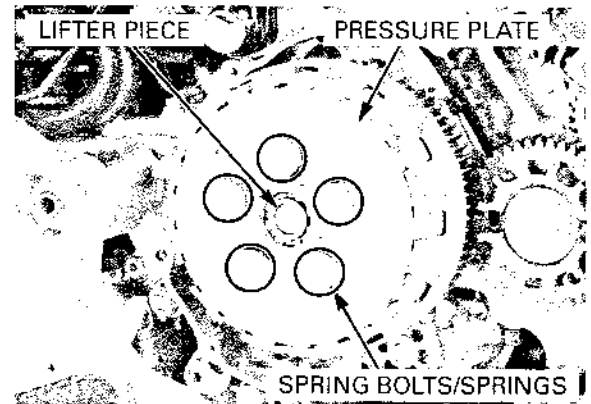
Apply grease to the tip of the lifter rod and install it into the mainshaft.



Install the clutch lifter piece into the mainshaft.
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 right crankcase cover.

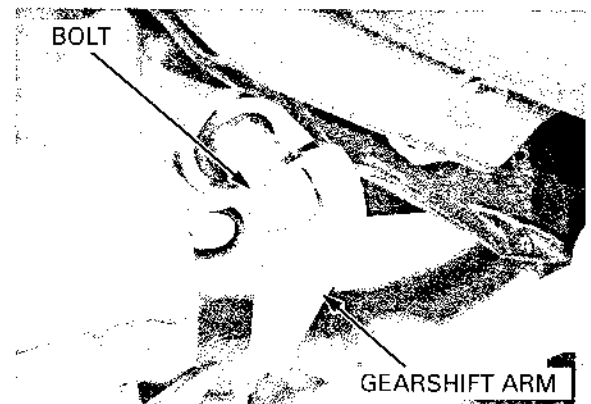


GEARSHIFT LINKAGE

REMOVAL

Remove the clutch (page 9-6).

Remove the bolt and gearshift arm.

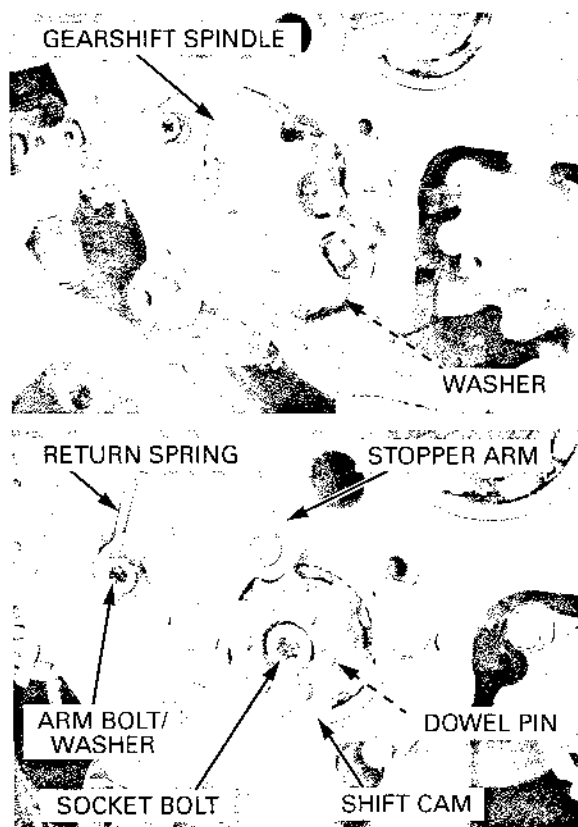


CLUTCH/GEARSHIFT LINKAGE

Pull the gearshift spindle assembly and thrust washer out of the crankcase.

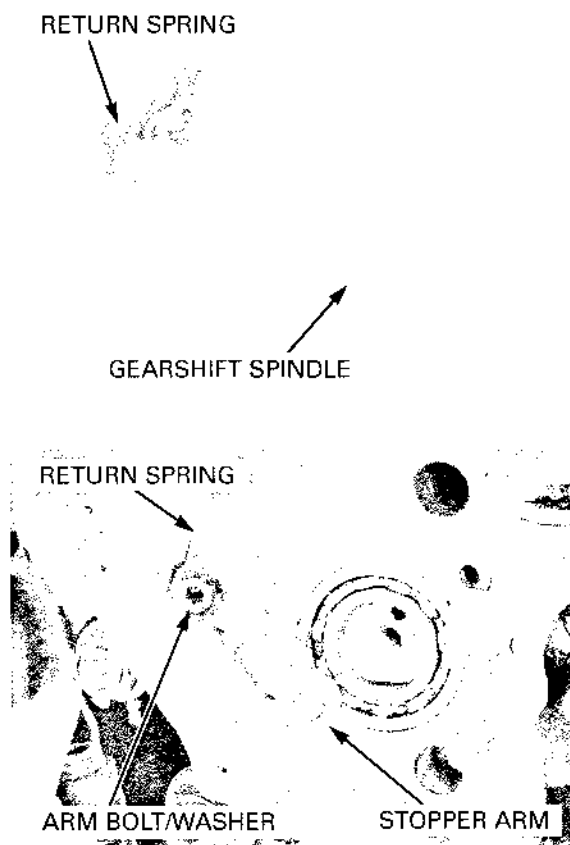
Remove the following:

- Shift drum center socket bolt
- Gearshift cam
- Dowel pin
- Stopper arm bolt
- Stopper arm
- Washer
- Return spring



INSPECTION

Check the gearshift spindle for wear, damage or bending.
Check the return spring for fatigue or damage.



INSTALLATION

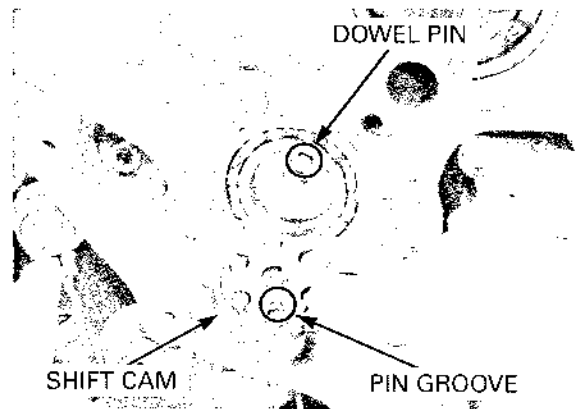
Install the following:

- Washer
- Return spring
- Stopper arm

Tighten the stopper arm bolt securely.

Install the dowel pin onto the shift drum.

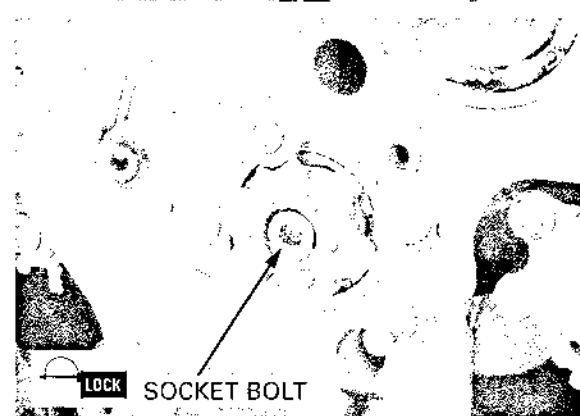
Lift the stopper arm with a screwdriver and install the gearshift cam by aligning the pin groove in the cam with the dowel pin.



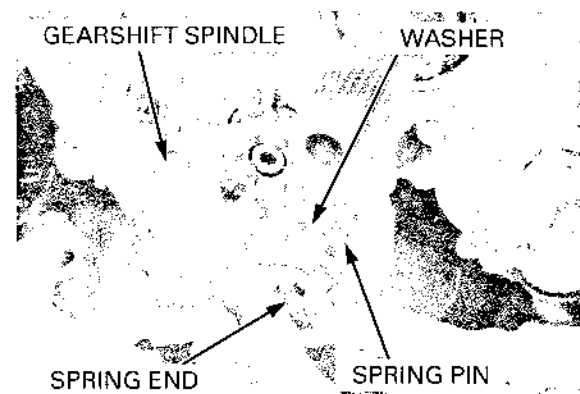
Apply locking agent to the shift drum center socket bolt threads.

Install and tighten the shift drum center socket bolt to the specified torque.

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



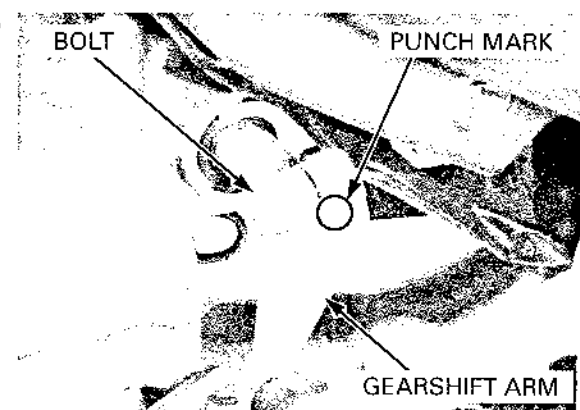
Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the gearshift spindle return spring pin.



Install the gearshift arm aligning the punch marks on the gearshift spindle.

Install and tighten the pinch bolt securely.

Install the clutch assembly (page 9-12).



PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch assembly (page 9-6).

Temporarily install the clutch outer.

Install the special tool between the primary drive and driven gears as shown, loosen the primary drive gear bolt, and remove the bolt and special washer.

TOOL:

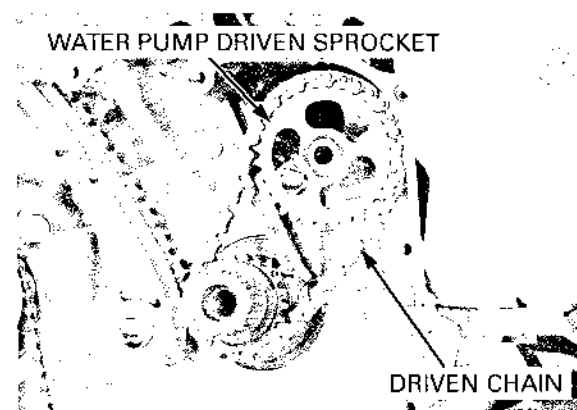
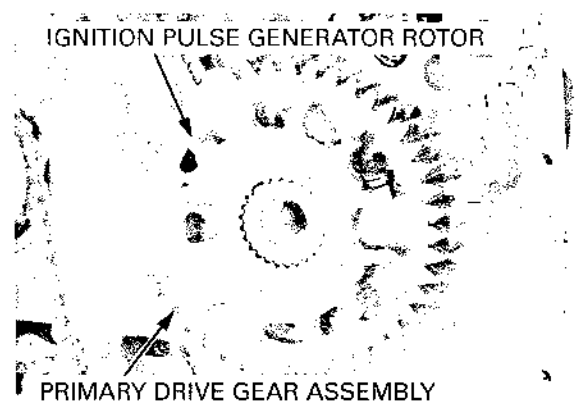
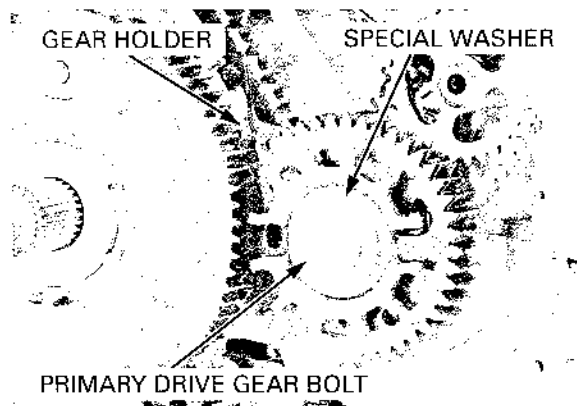
Gear holder

07724-0010100

Remove the clutch outer.

Remove the ignition pulse generator rotor and primary drive gear assembly.

Remove the water pump driven sprocket and drive chain.

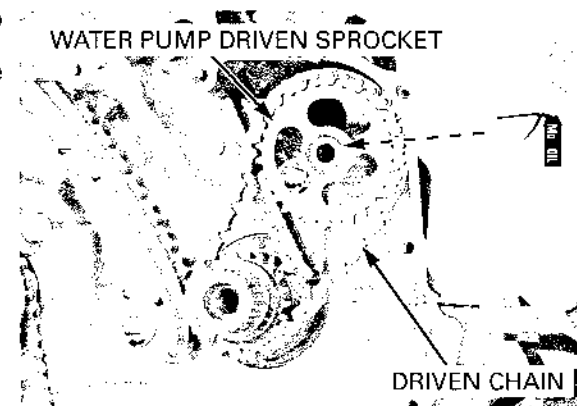


INSTALLATION

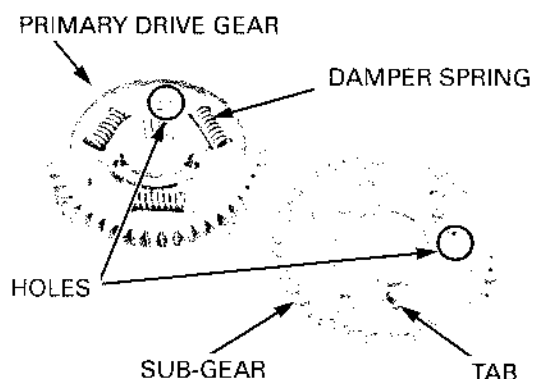
Apply molybdenum disulfide oil to the water pump driven sprocket shaft.

Install the water pump drive chain over the drive and driven sprockets.

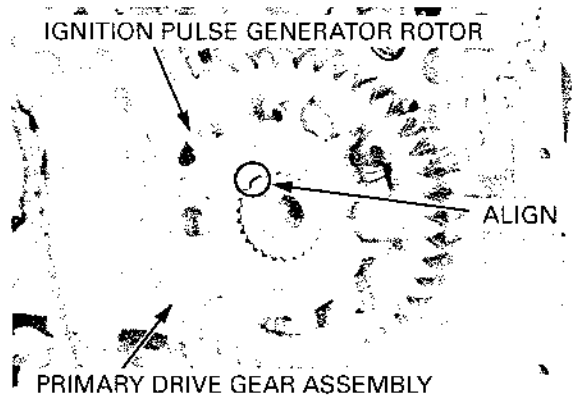
Install the driven sprocket shaft into the crankcase.



Install the damper springs into the primary drive gear grooves.
Apply molybdenum disulfide grease to the primary drive gear and sub-gear sliding surfaces.
Install the sub-gear onto the primary drive gear boss so that the sub-gear tabs are positioned against the damper spring and holes are aligned.



Install the primary drive gear assembly and ignition pulse generator rotor, aligning the wide grooves with the wide teeth.



Apply oil to the threads and seating surface of the primary drive gear bolt.
Install the special washer and primary drive gear bolt.

Temporarily install the clutch outer.

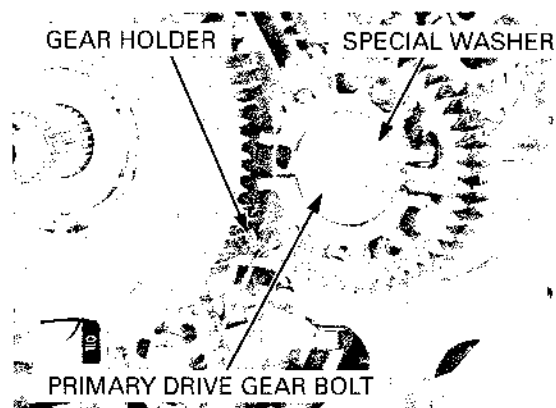
Install the special tool between the primary drive gear and driven gears as shown.
Tighten the primary drive gear bolt to the specified torque.

TOOL:

Gear holder 07724-0010100

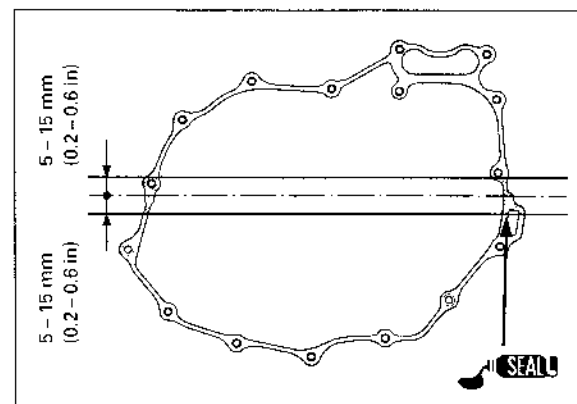
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Install the clutch (page 9-12).



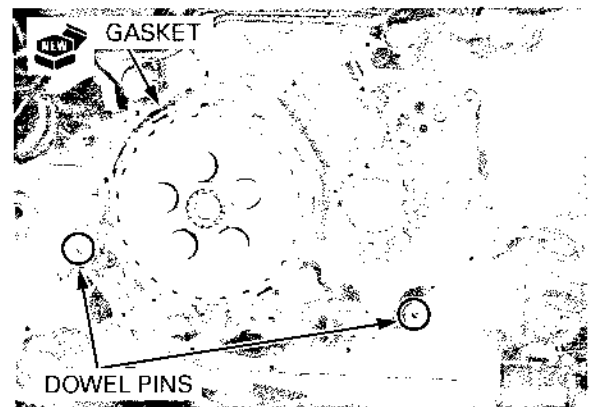
RIGHT CRANKCASE COVER INSTALLATION

Apply sealant to the mating surfaces of the crankcase as shown.



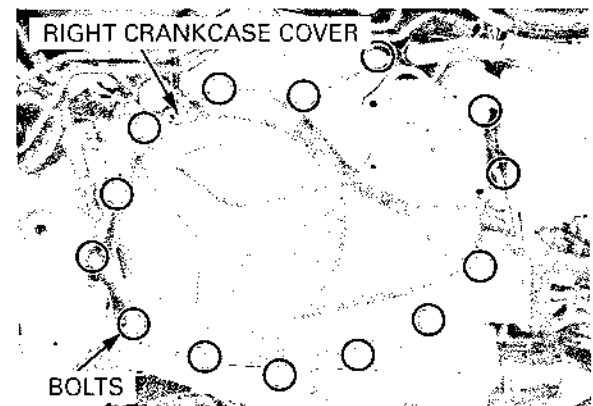
CLUTCH/GEARSHIFT LINKAGE

Install the two dowel pins and new gasket.



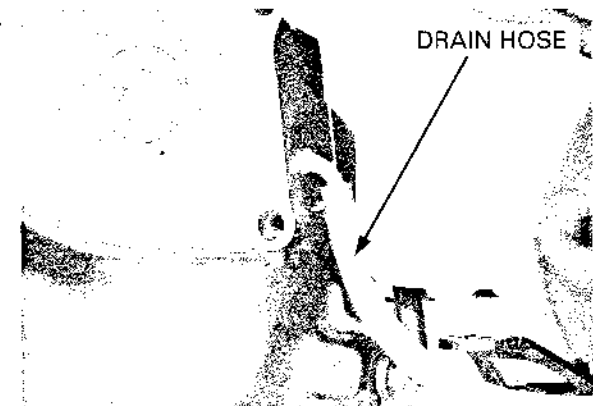
Install the right crankcase cover, aligning the gear teeth of the water pump shaft and water pump driven sprocket

Install and tighten the bolts in a crisscross pattern in 2 or 3 steps.



Route the wire and hose correctly (page 1-23).

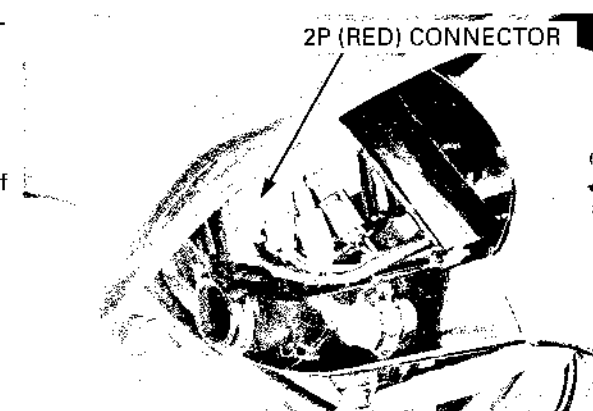
Connect the drain hose to the right crankcase cover.



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

Install the water pump cover (page 6-21).
Pour the recommended engine oil (page 3-13).
Fill and bleed the cooling system (page 6-7).

Install the removed parts in the reverse order of removal.



CLUTCH LIFTER ARM

REMOVAL

Remove the drive sprocket cover (page 7-4).

Remove the clutch lifter piece by turning the clutch lifter arm counterclockwise.

CLUTCH LIFTER PIECE

CLUTCH LIFTER ARM

Remove the clutch lifter arm, spring and washer.

CLUTCH LIFTER ARM

SPRING

WASHER

INSPECTION

Check the dust seal for fatigue or damage.

Check the needle bearing for wear, damage or loose fit.

Replace these parts if necessary.

If the dust seal replacement is required, press the dust seal to the case surface.

DUST SEAL

NEEDLE BEARING

Check the clutch lifter arm for damage or bending.

Check the spring for fatigue or damage.

Replace these parts if necessary.

SPRING

CLUTCH LIFTER ARM

CLUTCH/GEARSHIFT LINKAGE

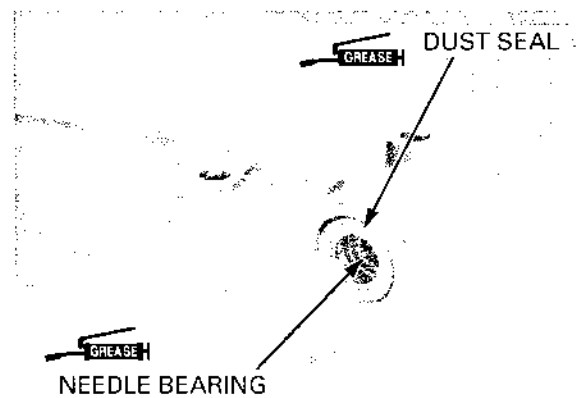
Check the clutch lifter piece for damage or bending.
Check the dust seal for fatigue or damage.

CLUTCH LIFTER PIECE

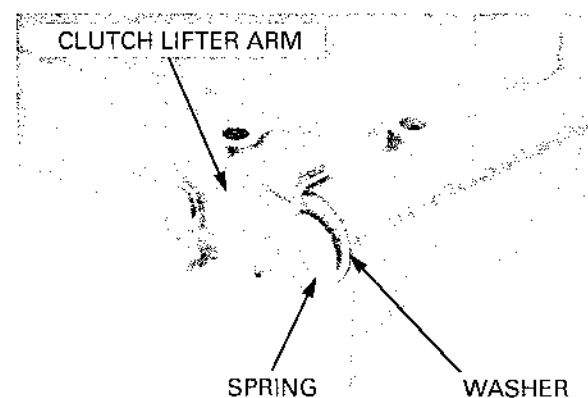
DUST SEAL

INSTALLATION

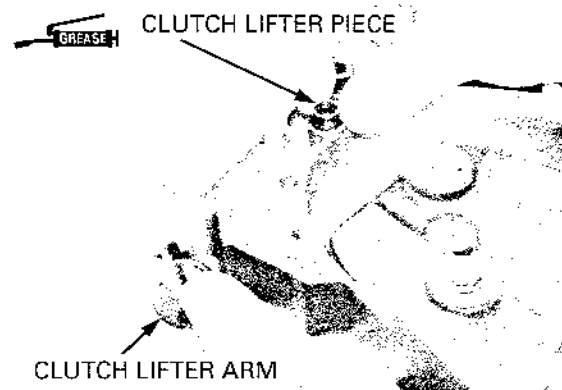
Apply grease to the dust seal lips and needle bearing.



Apply grease to the clutch lifter arm sliding surface and slit.
Install the washer, spring and clutch lifter arm.



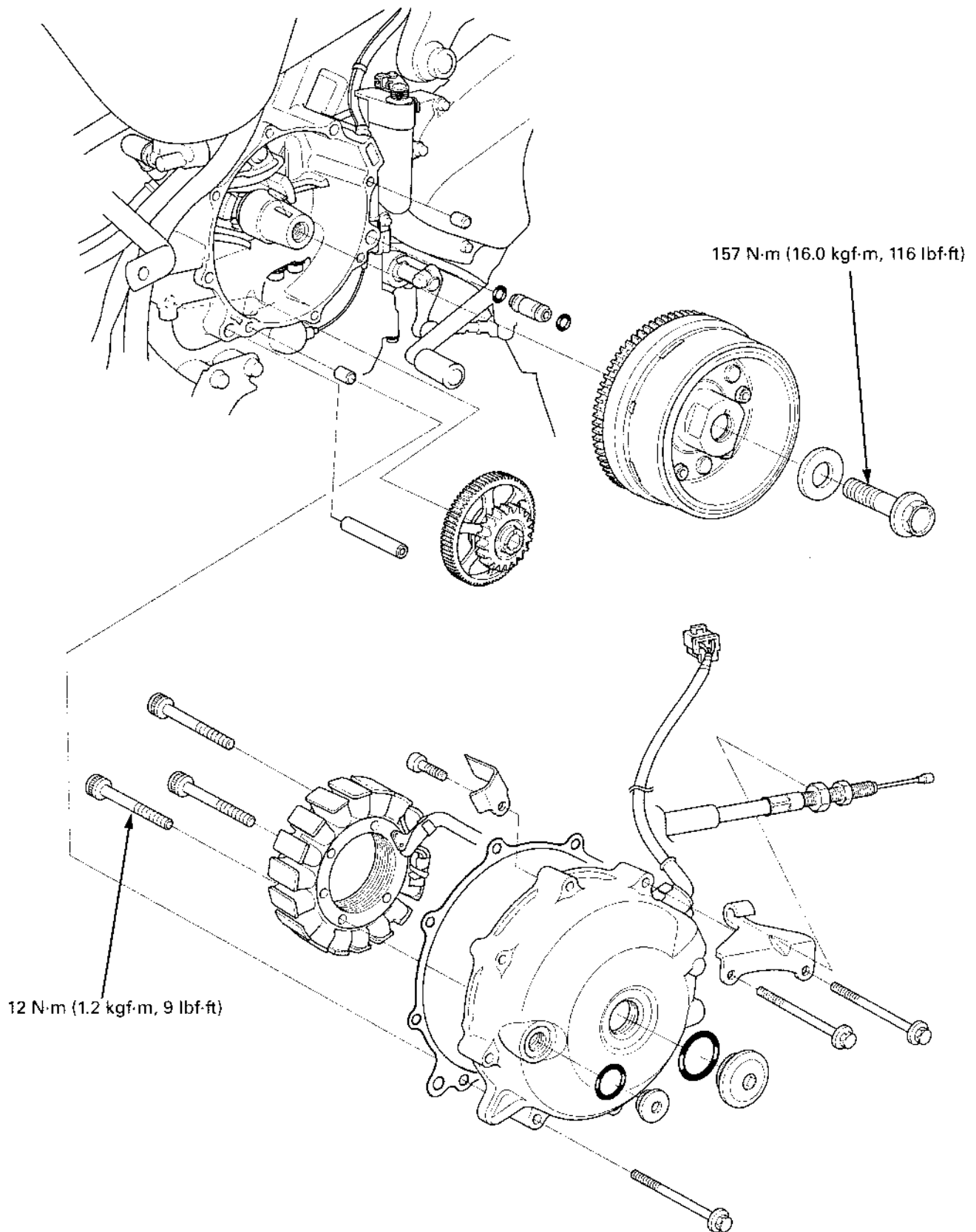
Align the clutch lifter arm slit and hole on the right crankcase cover by turning the clutch lifter arm counterclockwise.
Apply grease to the clutch lifter piece.
Install the clutch lifter piece.
Install the drive sprocket cover (page 7-7).



10. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION	10-2	FLYWHEEL REMOVAL	10-5
SERVICE INFORMATION	10-3	STARTER CLUTCH	10-6
TROUBLESHOOTING	10-3	FLYWHEEL INSTALLATION	10-9
ALTERNATOR COVER REMOVAL	10-4	ALTERNATOR COVER INSTALLATION	10-10
STATOR	10-4		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. These parts can be removed with the engine installed in the frame.
- The front cylinder cam sprockets must be removed to remove the starter reduction gear.
- The charging system inspection see page 16-6.
- The starter motor service see page 18-6.

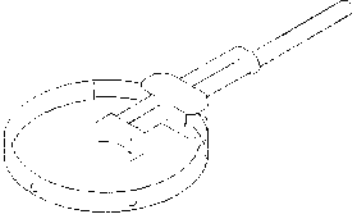
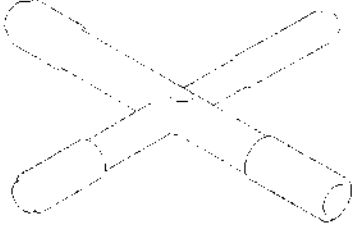
SPECIFICATIONS

		Unit: mm (in)	
ITEM	STANDARD	SERVICE LIMIT	
Starter driven gear boss O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.639 (2.2692)	

TORQUE VALUES

Flywheel flange bolt	157 N·m (16.0 kgf·m, 116 lbf·ft)	Apply oil to the threads and flange surface
Starter one-way clutch socket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Stator socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

<p>Flywheel holder 07725-0040000</p> 	<p>Rotor puller 07733-0020001</p> 
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TROUBLESHOOTING

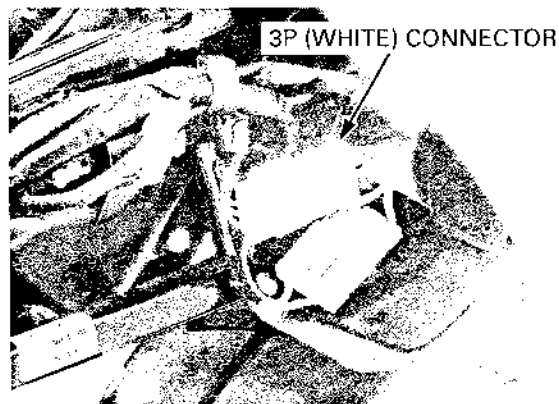
Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged starter reduction gear/shaft

ALTERNATOR COVER REMOVAL

Remove the side cover (page 2-3).

Disconnect the alternator 3P (White) connector.

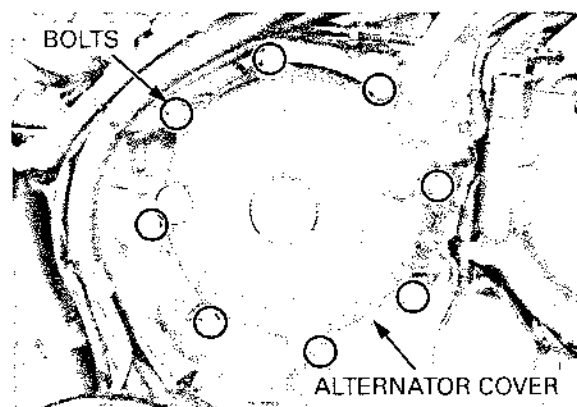


The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.

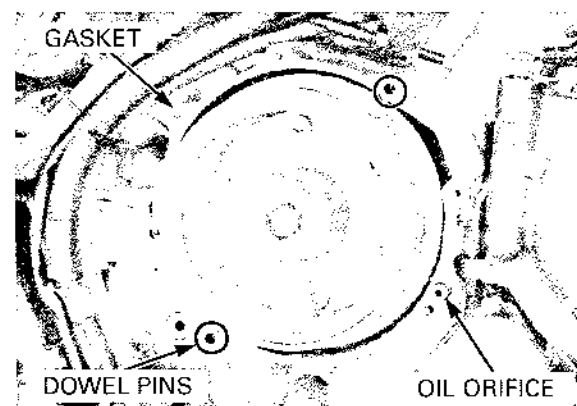
Remove the alternator cover bolts and alternator cover.

NOTICE

The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal.



Remove the gasket, oil orifice and dowel pins.



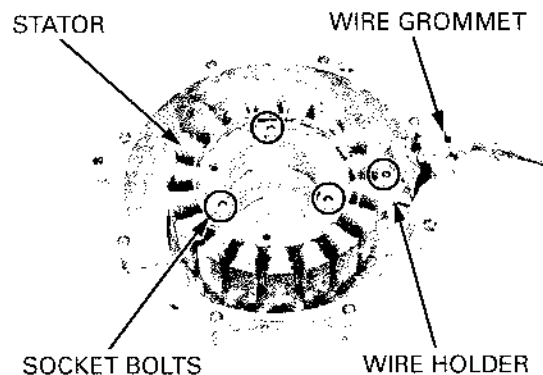
STATOR

REMOVAL

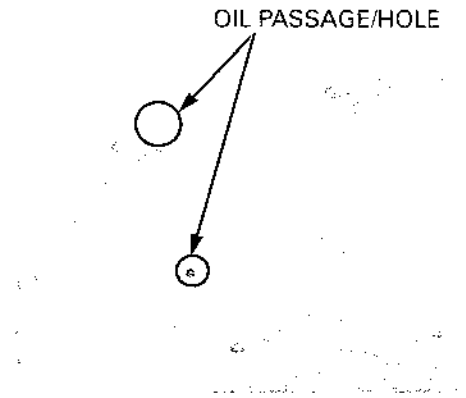
Remove the alternator wire grommet from the alternator cover.

Remove the socket bolt and stator wire holder.

Remove the socket bolts and stator.



Clean the oil passage and oil hole.



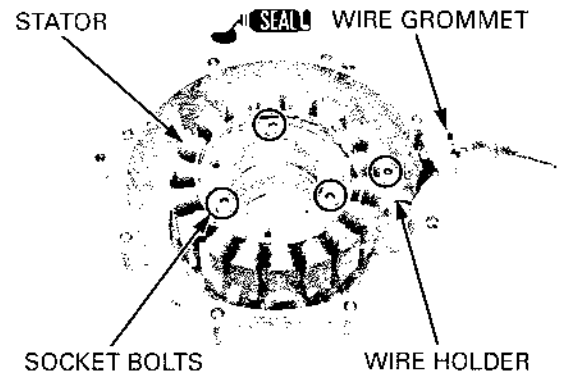
INSTALLATION

Install the stator into the alternator cover.

Apply sealant to the wire grommet, then install the wire grommet into the alternator cover groove securely.
Install and tighten the socket bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the wire holder and tighten the socket bolt securely.



FLYWHEEL REMOVAL

Remove the alternator cover (page 10-4).

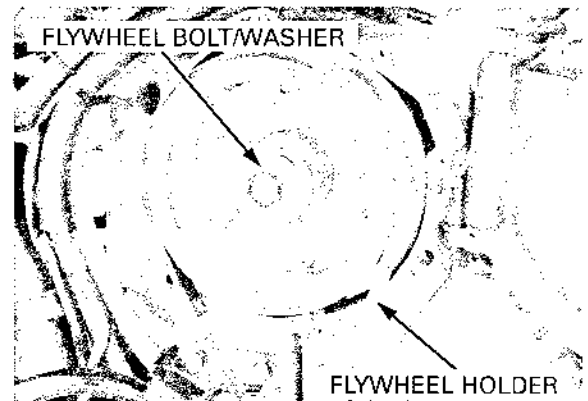
Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

TOOL:

Flywheel holder

07725-0040000

Remove the washer.

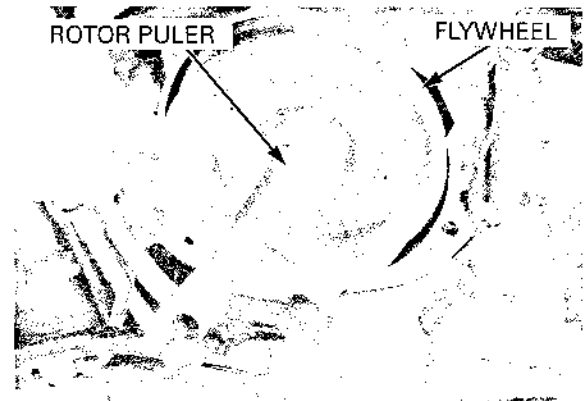


Remove the flywheel using the special tool.

TOOL:

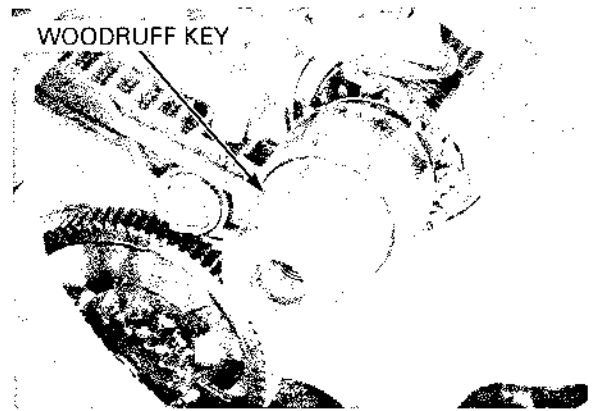
Rotor puller

07733-0020001



ALTERNATOR/STARTER CLUTCH

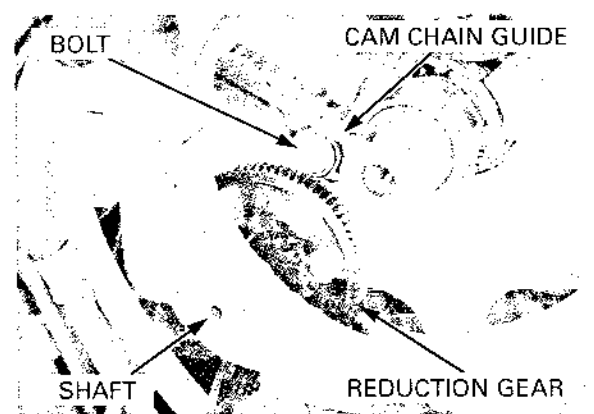
Remove the woodruff key.



Remove the front cam chain (page 8-12).

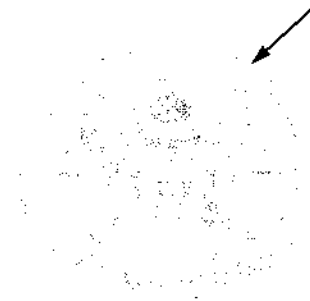
Remove the bolt and cam chain guide.

Pull the starter reduction gear shaft and remove the reduction gear.



Check the starter reduction gear and shaft for wear or damage.

REDUCTION GEAR



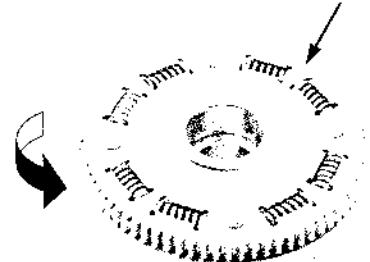
STARTER CLUTCH

INSPECTION

Check the operation of the one-way clutch by turning the driven gear.

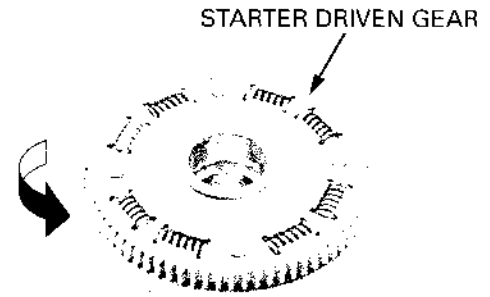
You should be able to turn the driven gear counter-clockwise smoothly, but the gear should not turn clockwise.

STARTER DRIVEN GEAR



DISASSEMBLY

Remove the starter driven gear by turning it counterclockwise.



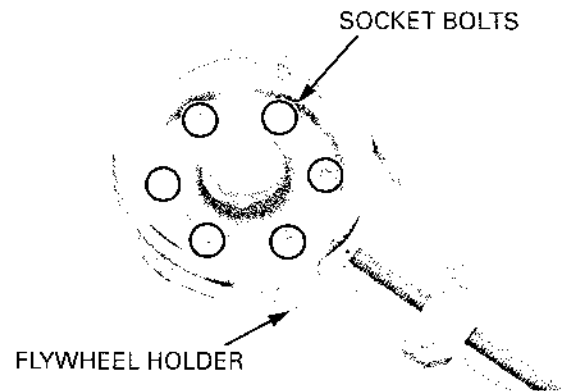
Hold the flywheel with a flywheel holder, and remove the starter one-way clutch socket bolts.

TOOL:

Flywheel holder 07725-0040000

Remove the starter one-way clutch assembly.
Remove the starter one-way clutch from the clutch outer.

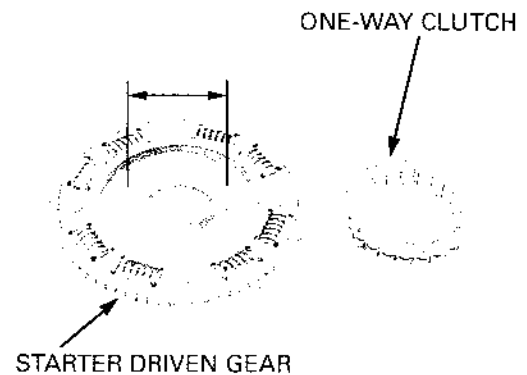
Check the starter driven gear for abnormal wear or damage.



Measure the starter driven gear boss O.D.

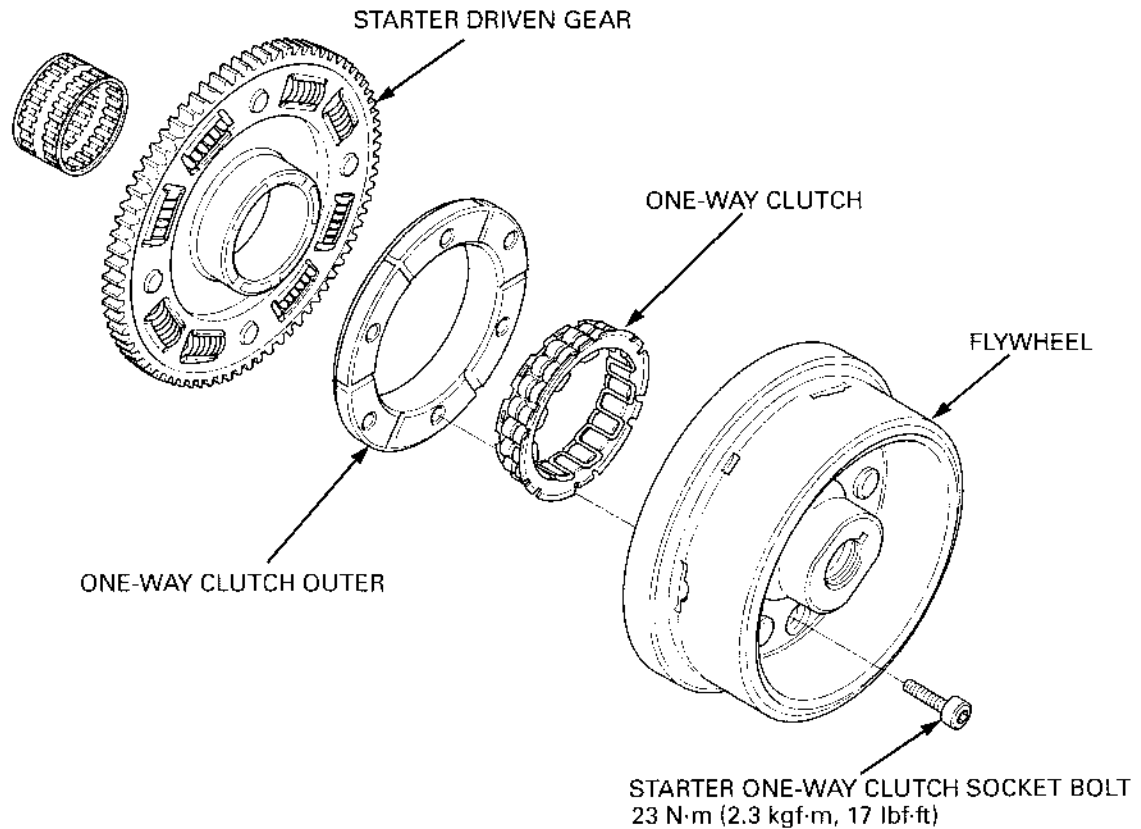
SERVICE LIMIT: 57.639 mm (2.2692 in)

Check the one-way clutch for wear or damage and replace if necessary.

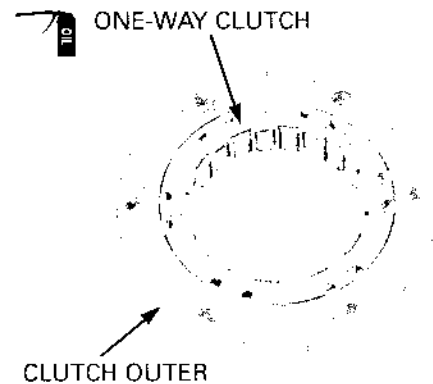


ALTERNATOR/STARTER CLUTCH

ASSEMBLY



Apply oil to the starter one-way clutch.
Install the one-way clutch into the clutch outer with the flange side facing in.



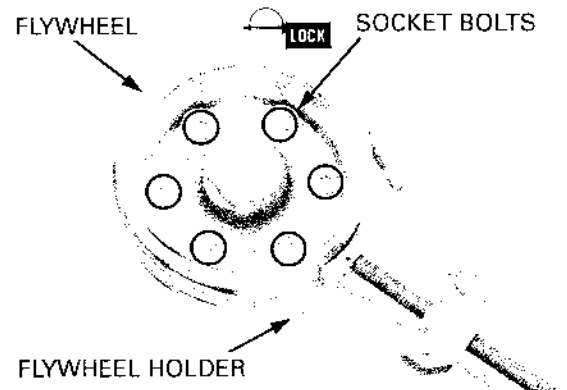
Install the starter one-way clutch assembly onto the flywheel.

Apply a locking agent to the starter one-way clutch socket bolt threads.
Hold the flywheel with a flywheel holder, and tighten the starter one-way clutch socket bolts to the specified torque.

TOOL:

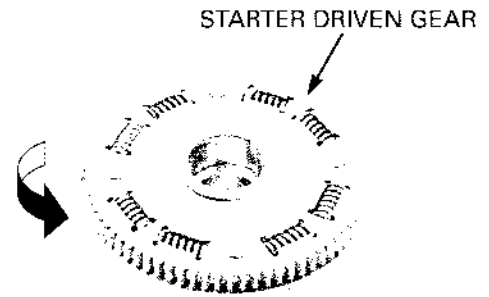
Flywheel holder 07725-0040000

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the starter driven gear into the one-way clutch.

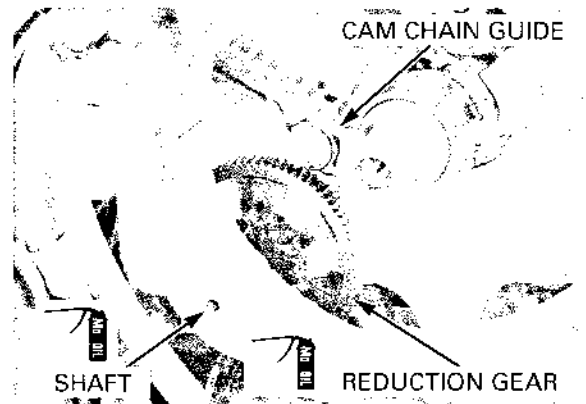
Recheck the one-way clutch operation.
You should be able to turn the driven gear counter-clockwise smoothly, but the gear should not turn clockwise.



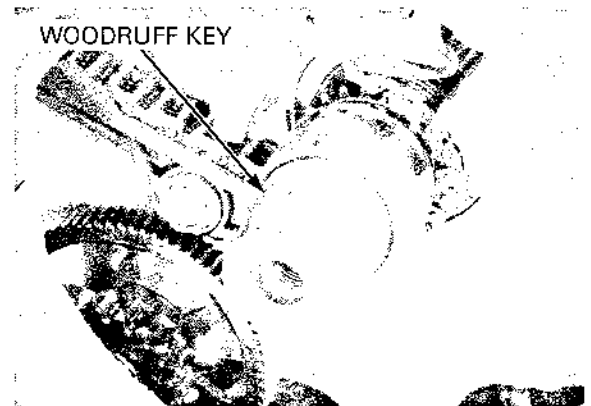
FLYWHEEL INSTALLATION

Apply molybdenum disulfide oil to the starter reduction gear and shaft.
Install starter reduction gear and insert the shaft with the holed end facing out.

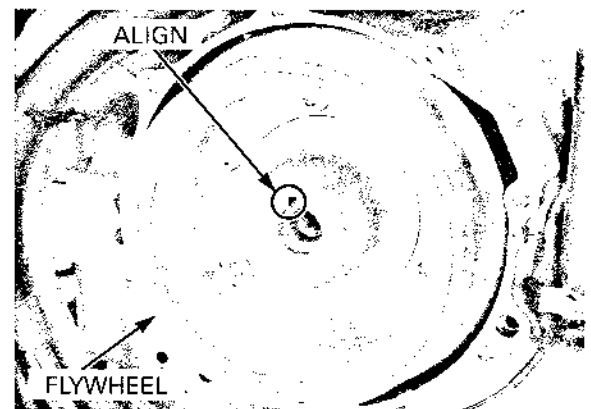
Install the cam chain guide (page 8-22).



Clean any oil from the crankshaft taper.
Install the woodruff key on the crankshaft.



Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.



ALTERNATOR/STARTER CLUTCH

Apply oil to the flywheel bolt threads and seating surface.

Install the washer and flywheel bolt.

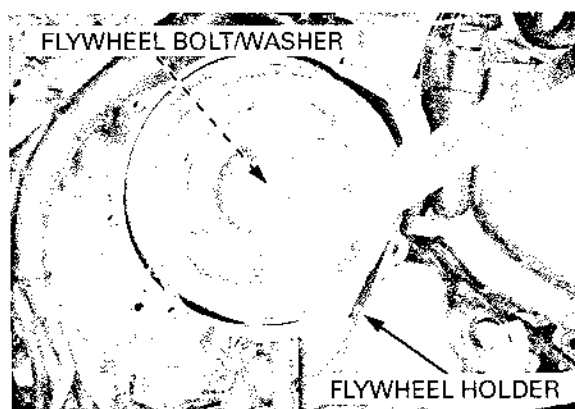
Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

TOOL:

Flywheel holder 07725-0040000

TORQUE: 157 N·m (16.0 kgf·m, 116 lbf·ft)

Install the alternator cover (page 10-10).

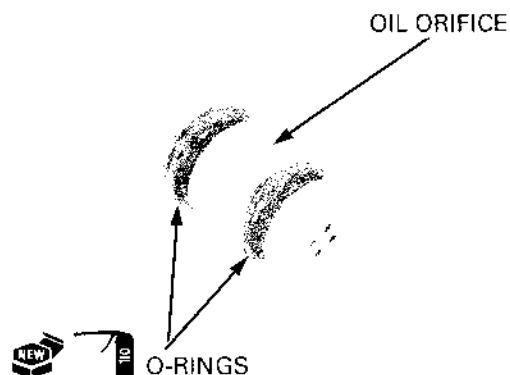


ALTERNATOR COVER INSTALLATION

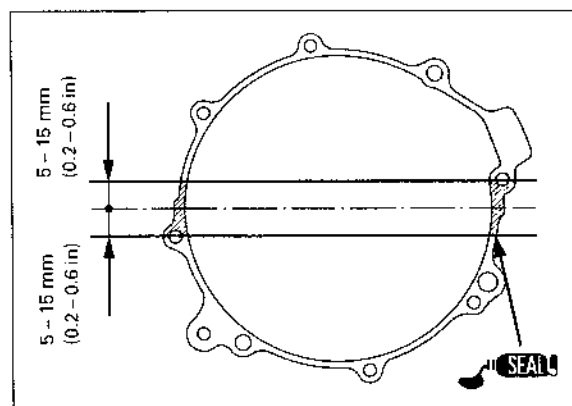
Check the oil orifice for clog or damage.

Clean or replace the oil orifice if necessary.

Apply oil to the new O-rings and install them to the oil orifice grooves.

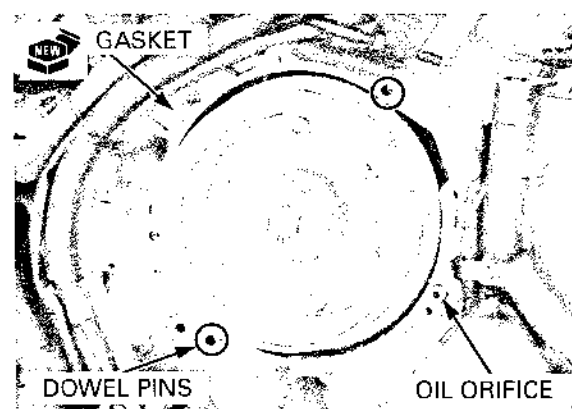


Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pins and new gasket.

Install the oil orifice to the crankcase.

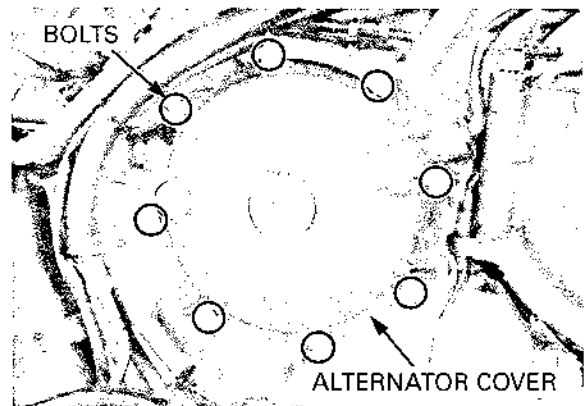


Install the alternator cover.

NOTICE

The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.

Install and tighten the bolts securely.

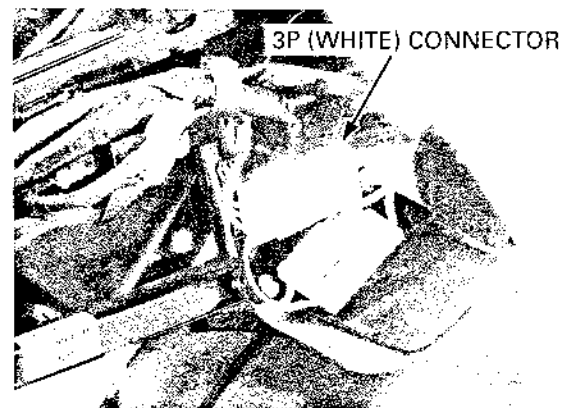


Route the alternator wire correctly (page 1-23).

Connect the alternator 3P (White) connector.

Check the oil level and add the recommended oil up to proper level (page 3-13).

Install the side cover (page 2-3).

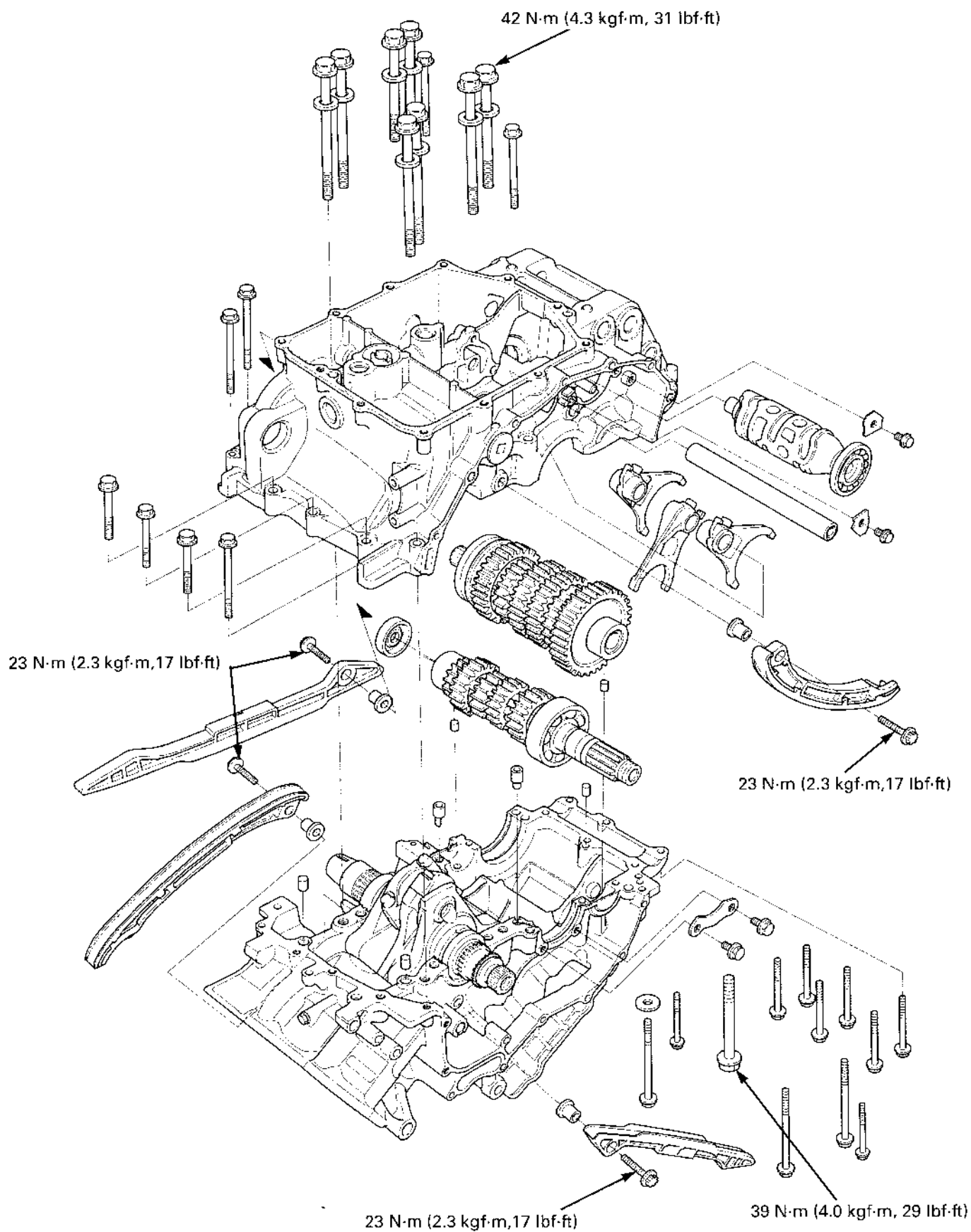


MEMO

11. CRANKCASE/TRANSMISSION

COMPONENT LOCATION	11-2	SHIFT FORK/SHIFT DRUM	11-6
SERVICE INFORMATION	11-3	TRANSMISSION	11-9
TROUBLESHOOTING	11-4	CRANKCASE ASSEMBLY	11-14
CRANKCASE SEPARATION	11-5		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
 - Transmission
 - Crankshaft
 - Piston/connecting rod
- The following components must be removed before separating the crankcase:
 - Flywheel (page 10-5)
 - Clutch (page 9-6)
 - Gearshift linkage (page 9-15)
 - Cylinder head (page 8-12)
 - Engine (page 7-4)
 - Oil pump (page 4-8)
 - Starter motor (page 18-6)
 - Water pump (page 6-18)
- 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.

SPECIFICATIONS

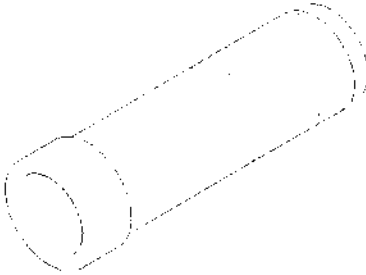
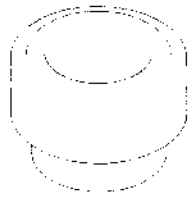
		Unit: mm (in)		
ITEM		STANDARD		SERVICE LIMIT
Transmission	Gear I.D.	M5, M6	31.000 – 31.016 (1.2205 – 1.2211)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	33.05 (1.301)
	Gear busing O.D.	M5	30.955 – 30.980 (1.2187 – 1.2197)	30.93 (1.218)
		M6	30.950 – 30.975 (1.2187 – 1.2195)	30.93 (1.218)
		C2, C3, C4	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
	Gear-to-bushing clearance	M5	0.020 – 0.065 (0.0008 – 0.0024)	–
		M6	0.020 – 0.061 (0.0008 – 0.0024)	–
		C2, C3, C4	0.020 – 0.007 (0.0008 – 0.0028)	–
	Gear bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Countershaft O.D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)	29.92 (1.178)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	–
		C2	0.010 – 0.056 (0.0004 – 0.0022)	–
Shift fork, fork shaft	Fork I.D.		12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Shift fork shaft O.D.		11.987 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)

TOEQUE VALUES

Crankcase bolt (Main journal)	42 N·m (4.3 kgf·m, 31 lbf·ft)	Apply oil to the threads and seating surface
Crankcase flange bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Cam chain tensioner bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Cam chain guide bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads

CRANKCASE/TRANSMISSION

TOOLS

<p>Inner driver C 07746-0030100</p> 	<p>Attachment, 35 mm I.D. 07746-0030400</p> 
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TROUBLESHOOTING

Hard to shift

- Improper clutch operation
- Incorrect transmission oil weight
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam groove
- Bent gearshift spindle

Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Broken shift drum stopper arm spring
- Worn or bent shift forks
- Broken gearshift spindle return spring

Excessive engine noise

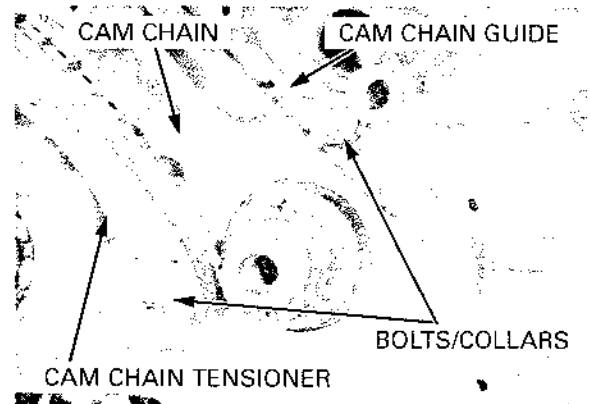
- Worn or damaged transmission gear
- Worn or damaged transmission bearings

CRANKCASE SEPARATION

Refer to Service Information (page 11-3) for removal of necessary parts before separating the crankcase.

Remove the bolt, collar and cam chain tensioner.
Remove the bolt, collar and cam chain guide.

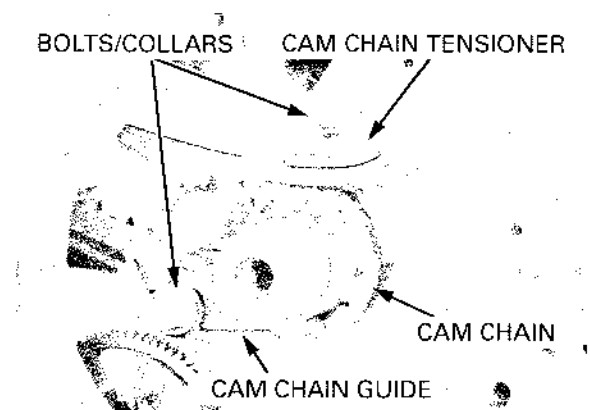
Remove the cam chain.



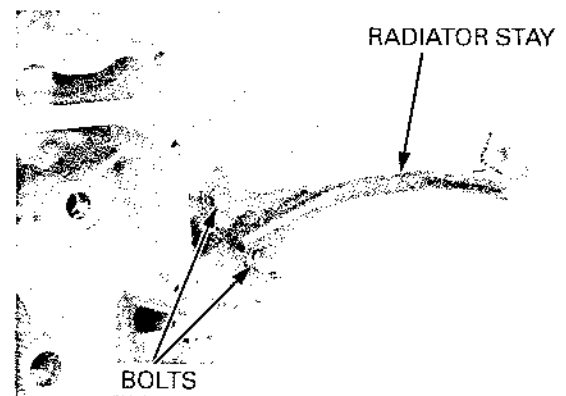
Remove the bolt, collar and cam chain tensioner.
Remove the bolt, collar and cam chain guide.

Remove the reduction gear and shaft.

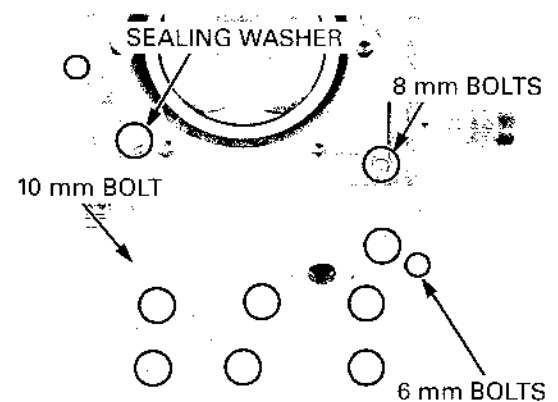
Remove the cam chain.



Remove the bolts and radiator stay.



Loosen the 6 mm bolts, 8 mm bolts, 10 mm bolts and sealing washer in a crisscross pattern in 2 or 3 steps and remove the upper crankcase.



CRANKCASE/TRANSMISSION

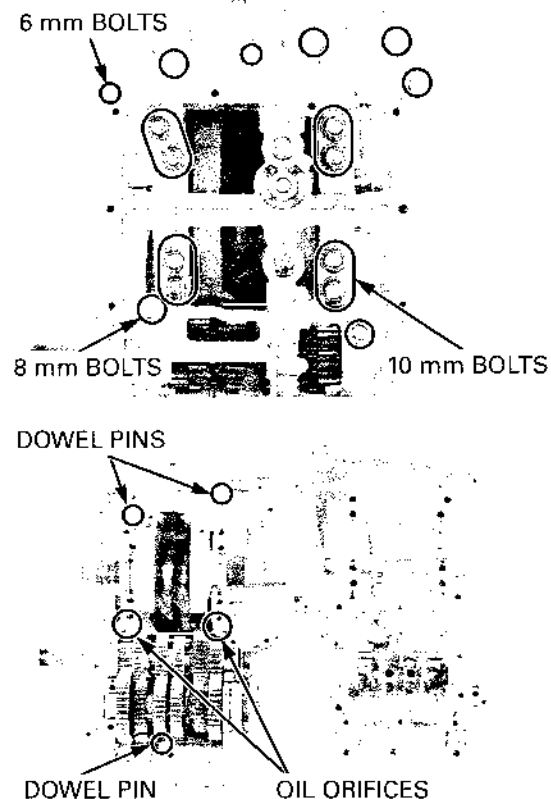
Place the engine with the upper side down.

Loosen the 6 mm bolts, 8 mm bolts and 10 mm bolts in a crisscross pattern in 2 or 3 steps, then remove them from the lower case.

Separate the lower crankcase from the upper crankcase.

Remove the dowel pins and oil orifices.

Clean any sealant from the crankcase mating surfaces.



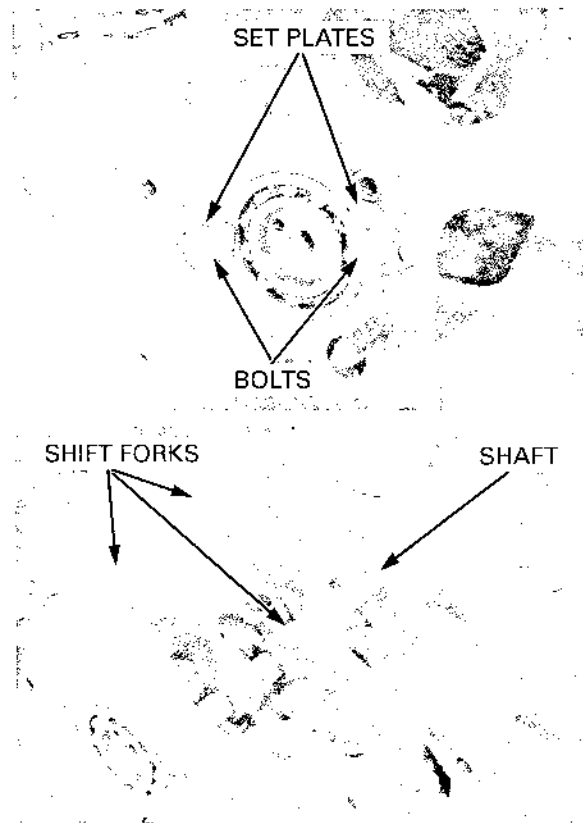
SHIFT FORK/SHIFT DRUM

REMOVAL

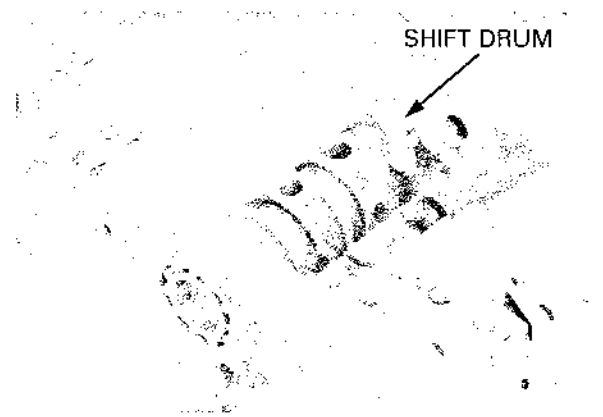
Separate the crankcase halves (page 11-5).

Remove the bolts and set plates.

Remove the shift fork shaft and shift forks.



Remove the shift drum from the lower crankcase.



INSPECTION

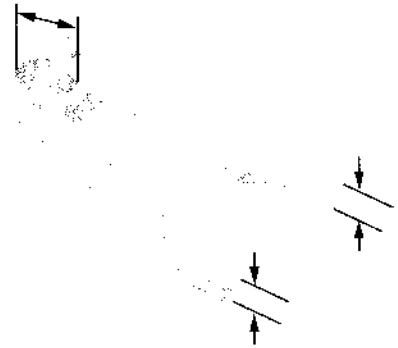
Check the shift fork guide pin for abnormal wear or damage

Measure the shift fork I.D.

SERVICE LIMIT: 12.03 mm (0.474 in)

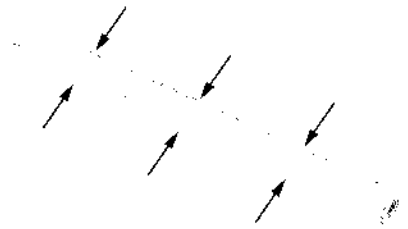
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)



Measure the shift fork shaft O.D.

SERVICE LIMIT: 11.95 mm (0.470 in)

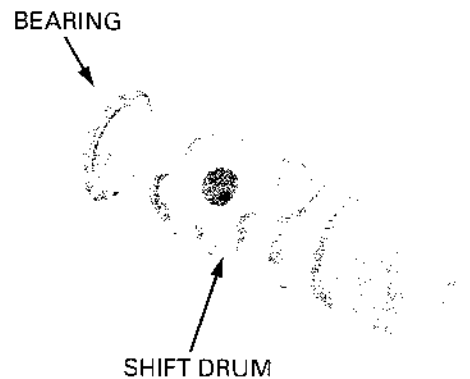


Inspect the shift drum grooves for wear or damage.

Turn the outer race of the shift drum bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

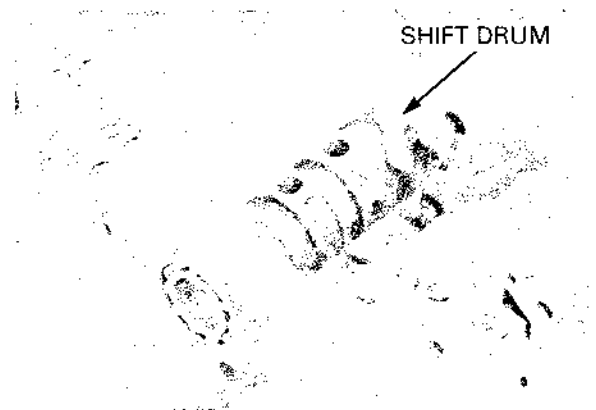
If necessary, replace the bearing.



CRANKCASE/TRANSMISSION

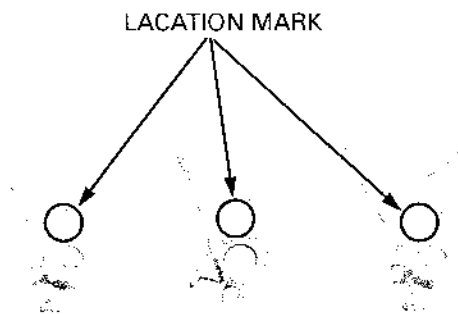
INSTALLATION

Install the shift drum to the lower crankcase.



The shift forks have location marks.

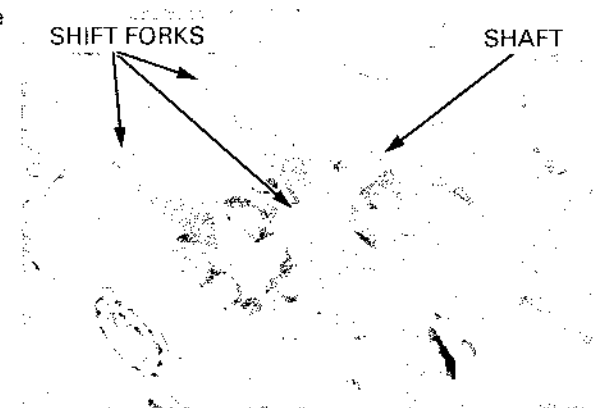
- "RL" for right
- "C" for center
- "RL" for left



Face the shift fork location marks to the clutch side.

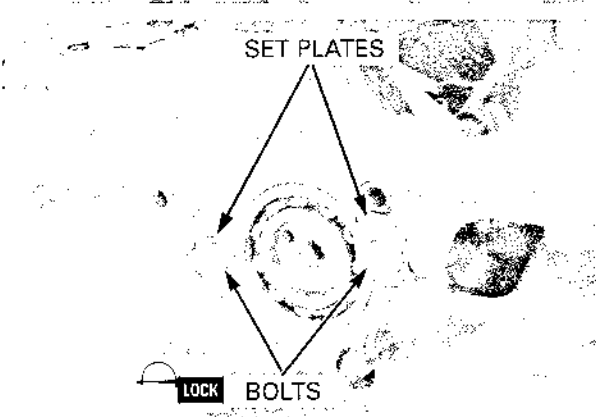
Install the shift forks into the shift drum guide grooves.

Install shift fork shaft.



Apply a locking agent to the set plate bolt threads. Install the set plates with its "OUT" mark facing out, and its cutout aligned with the pin on the crankcase. Install and tighten the set plate bolts.

Assemble the crankcase halves (page 11-14).

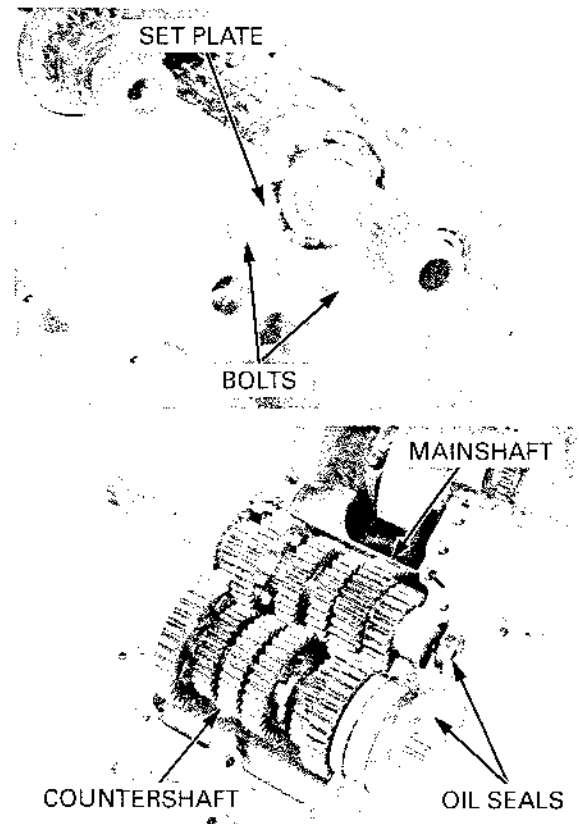


TRANSMISSION

REMOVAL/DISASSEMBLY

Separate the crankcase halves (page 11-5).
Remove the bolts and mainshaft bearing plate.

Remove the oil seals.
Remove the mainshaft and countershaft assemblies from the upper crankcase.
Disassemble the mainshaft and countershaft.
Clean all disassembled parts in solvent thoroughly.



INSPECTION

Check the shift fork groove of the shifter gear for excessive wear or damage.

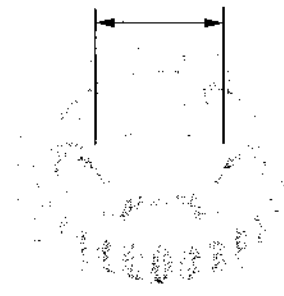
SHIFTER GEAR



Disassemble the mainshaft and countershaft.
Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.
Measure the I.D. of each gear.

SERVICE LIMITS:

M5, M6: 31.04 mm (1.222 in)
C1: 26.04 mm (1.025 in)
C2, C3, C4: 33.05 mm (1.301 in)



CRANKCASE/TRANSMISSION

Measure the O.D. of each gear bushing.

SERVICE LIMITS:

M5: 30.93 mm (1.218 in)
M6: 30.93 mm (1.218 in)
C2, C3, C4: 32.93 mm (1.296 in)

Measure the I.D. of each gear bushing.

SERVICE LIMITS:

M5: 28.02 mm (1.103 in)
C2: 30.02 mm (1.182 in)

Calculate the gear-to-bushing clearance.

STANDARDS:

M5: 0.020 – 0.045 mm (0.0008 – 0.0018 in)
M6: 0.020 – 0.061 mm (0.0008 – 0.0024 in)
C2, C3, C4: 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: 24.96 mm (1.101 in)

Measure the countershaft O.D. at the C2 gear.

SERVICE LIMIT: 29.92 mm (1.178 in)

Calculate the gear bushing-to-shaft clearance.

STANDARDS:

M5: 0.005 – 0.039 mm (0.0002 – 0.0015 in)
C: 0.010 – 0.056 mm (0.0004 – 0.0022 in)

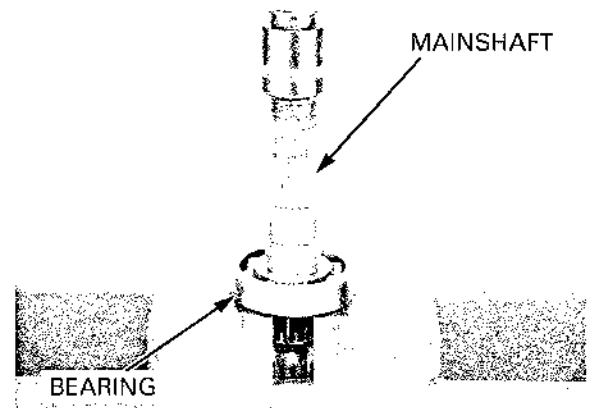
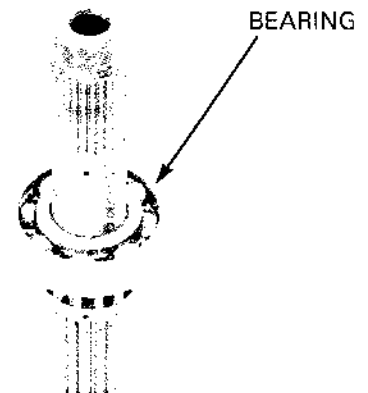
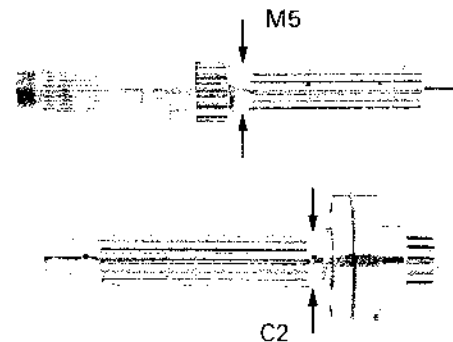
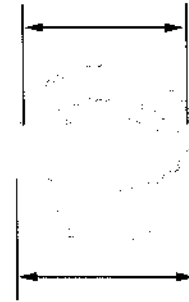
Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft.

Remove and discard the mainshaft bearing, if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.

Replace the countershaft, collar, and bearing as an assembly, if the race does not turn smoothly, quietly, or fits loosely on the countershaft.

Mainshaft bearing replacement

Press out the mainshaft from the bearing using a hydraulic press.



Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tools.

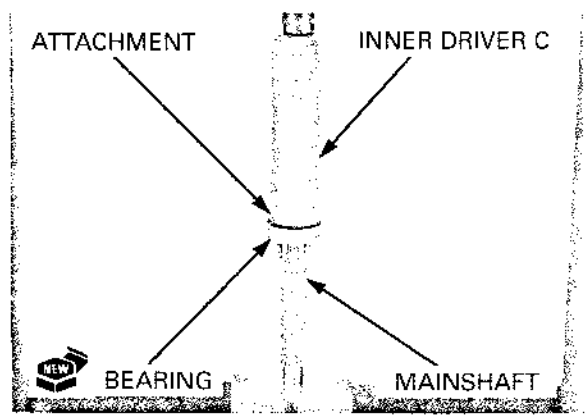
TOOLS:

Inner driver C

07746-0030100

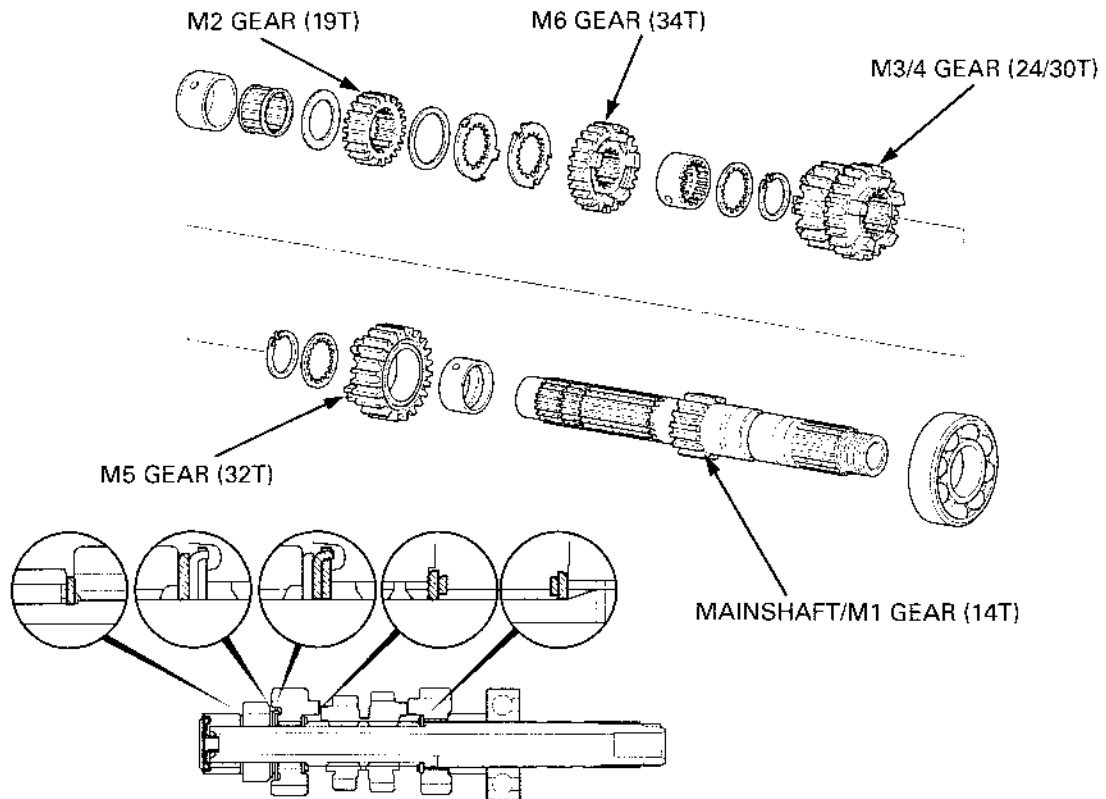
Attachment, 35 mm I.D.

07746-0030400



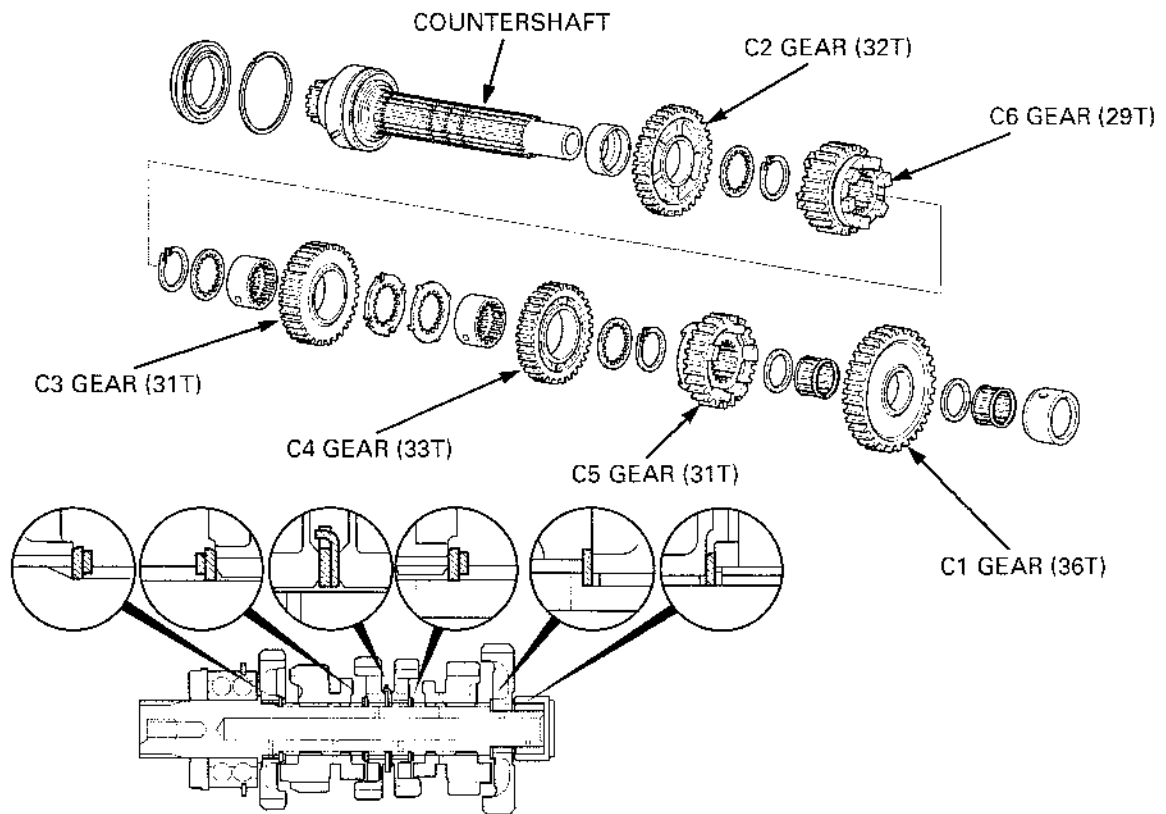
ASSEMBLY

Mainshaft:



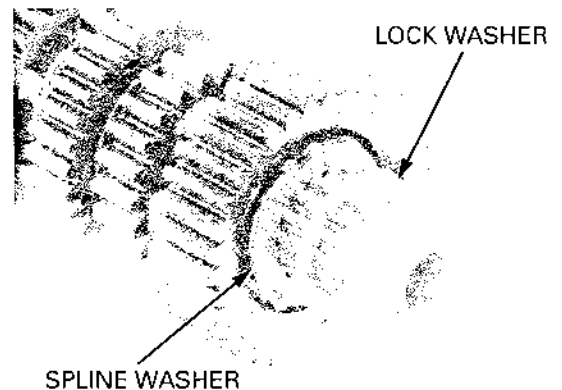
CRANKCASE/TRANSMISSION

Countershaft:



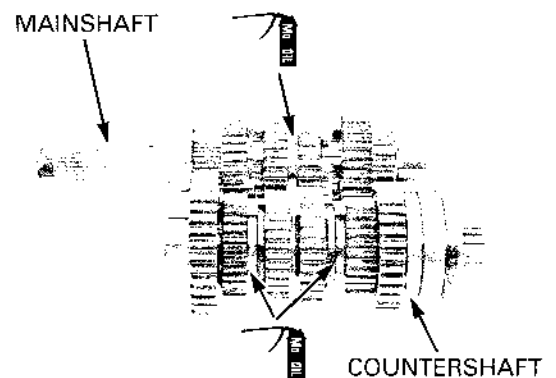
Assemble the transmission gear and shafts.

- Align the lock washer tabs with the spline washer groove.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the spline.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.



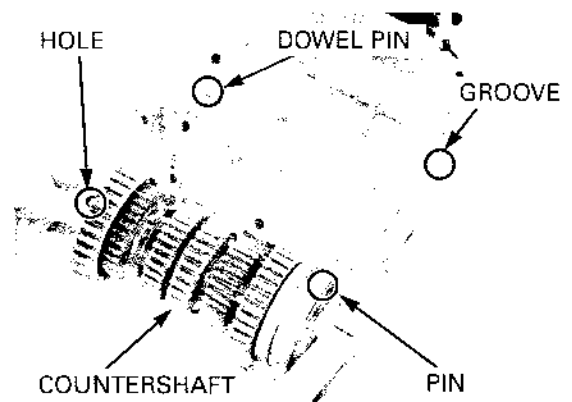
Coat each gear with clean engine oil and check for smooth movement.

Apply molybdenum disulfide oil to the shift fork grooves in the shifter gear.

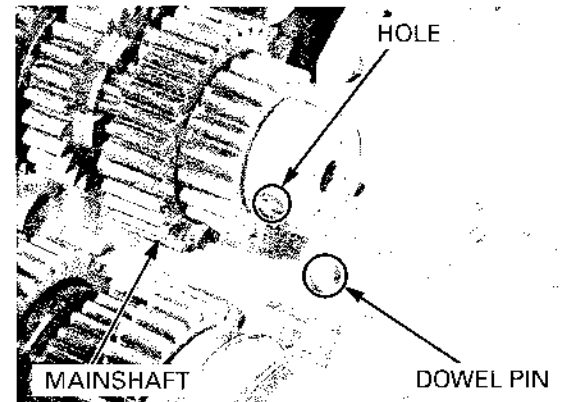


INSTALLATION

Install the countershaft assembly, aligning the hole in the needle bearing outer race with the dowel pin, and set ring with the ring groove. Reset the pin on the ball bearing into the pin groove.

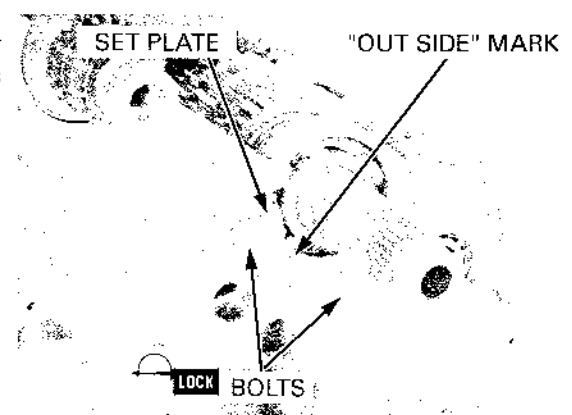


Install the mainshaft assembly, aligning the hole in the needle bearing outer race with the dowel pin.

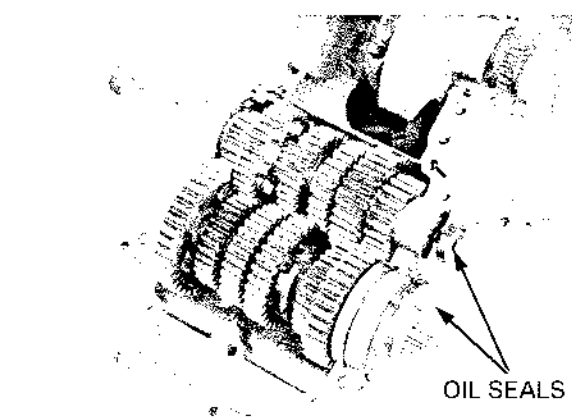


Apply a locking agent to the set plate bolt threads. Install the mainshaft bearing set plate with its "OUT SIDE" mark facing out and tighten the bolts securely.

Assemble the crankcase halves (page 11-14).

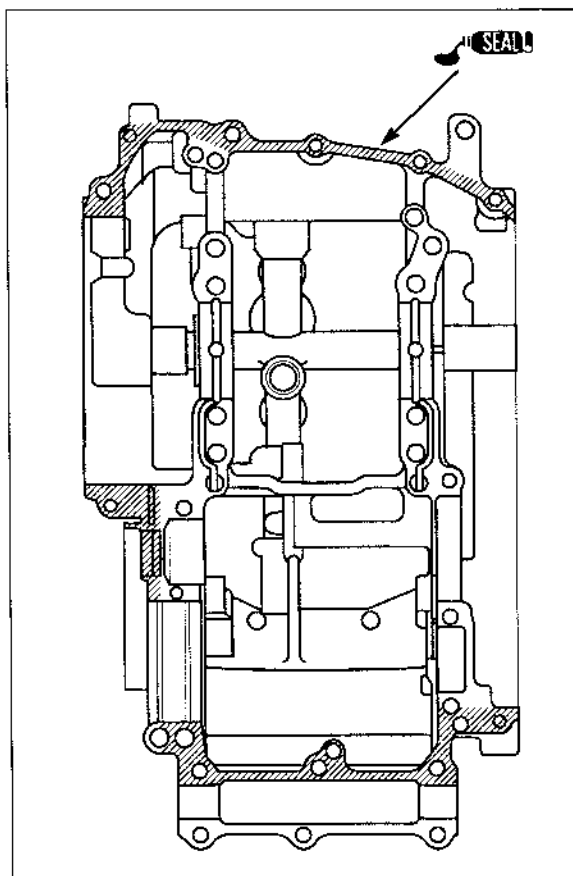


Install the oil seals.



CRANKCASE ASSEMBLY

Apply a light, but thorough, coating of liquid sealant to the crankcase mating surface as shown.

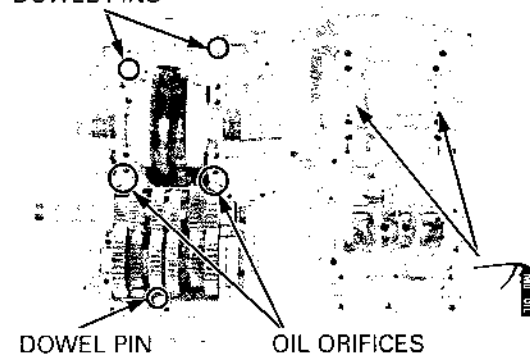


Install the dowel pins and oil orifices.

Apply molybdenum disulfide oil to the main journal bearing surfaces on the lower crankcase.

Install the lower crankcase onto the upper crankcase, aligning the shift forks with the gear shifter grooves.

DOWEL PINS



DOWEL PIN

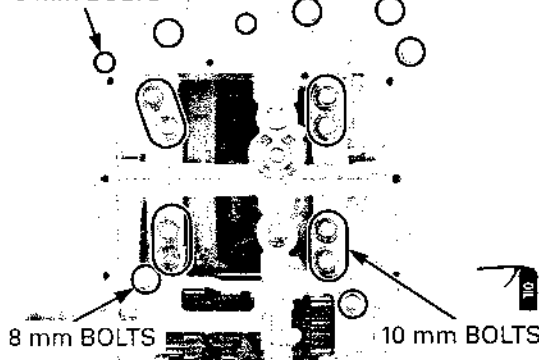
OIL ORIFICES

Apply oil crankcase bolt (main journal) threads and seating surfaces.

Install the crankcase 10 mm, 8 mm and 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

TORQUE: 10 mm bolt: 42 N·m (4.3 kgf·m, 31 lbf·ft)

6 mm BOLTS



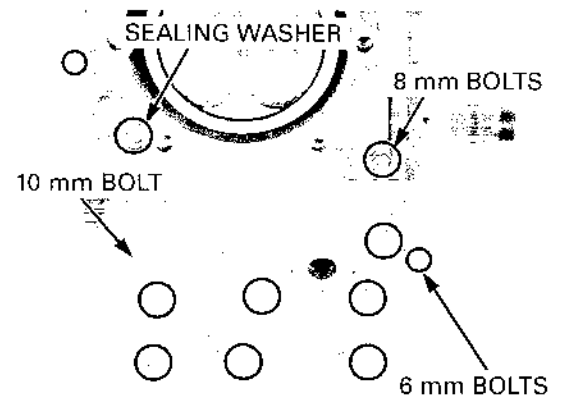
8 mm BOLTS

10 mm BOLTS

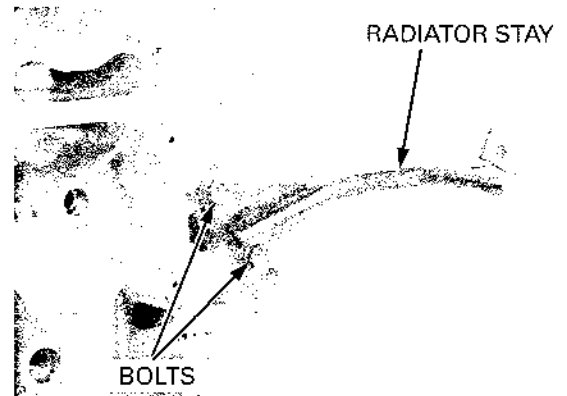
CRANKCASE/TRANSMISSION

Install the crankcase flange 10 mm, 8 mm and 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

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



Install the radiator stay.
Install and tighten the bolts securely.



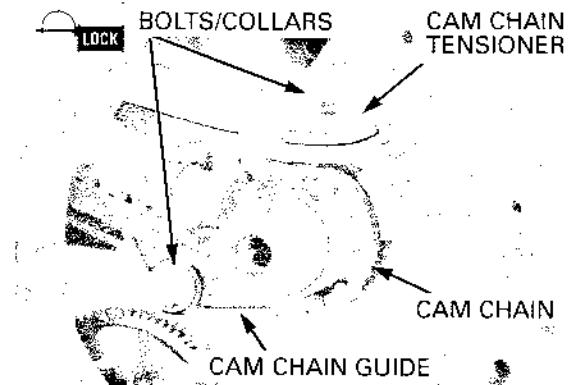
Apply molybdenum disulfide oil to the starter reduction gear shaft.
Install the reduction gear and gear shaft with the hole end facing out.

Install the cam chain.

Apply locking agent to the cam chain tensioner bolt and guide bolt threads.

Install and tighten the cam chain tensioner bolt and guide bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

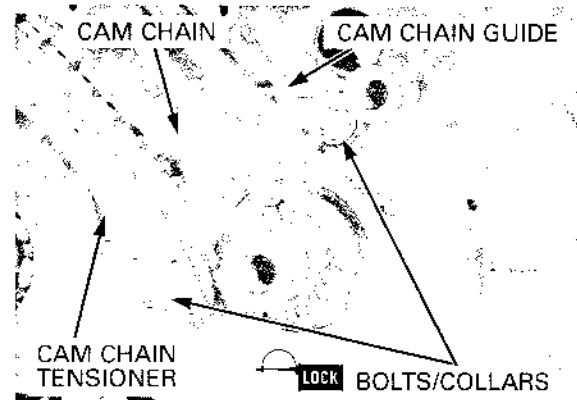


Install the cam chain.

Apply locking agent to the cam chain tensioner bolt and guide bolt threads.

Install and tighten the cam chain tensioner bolt and guide bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

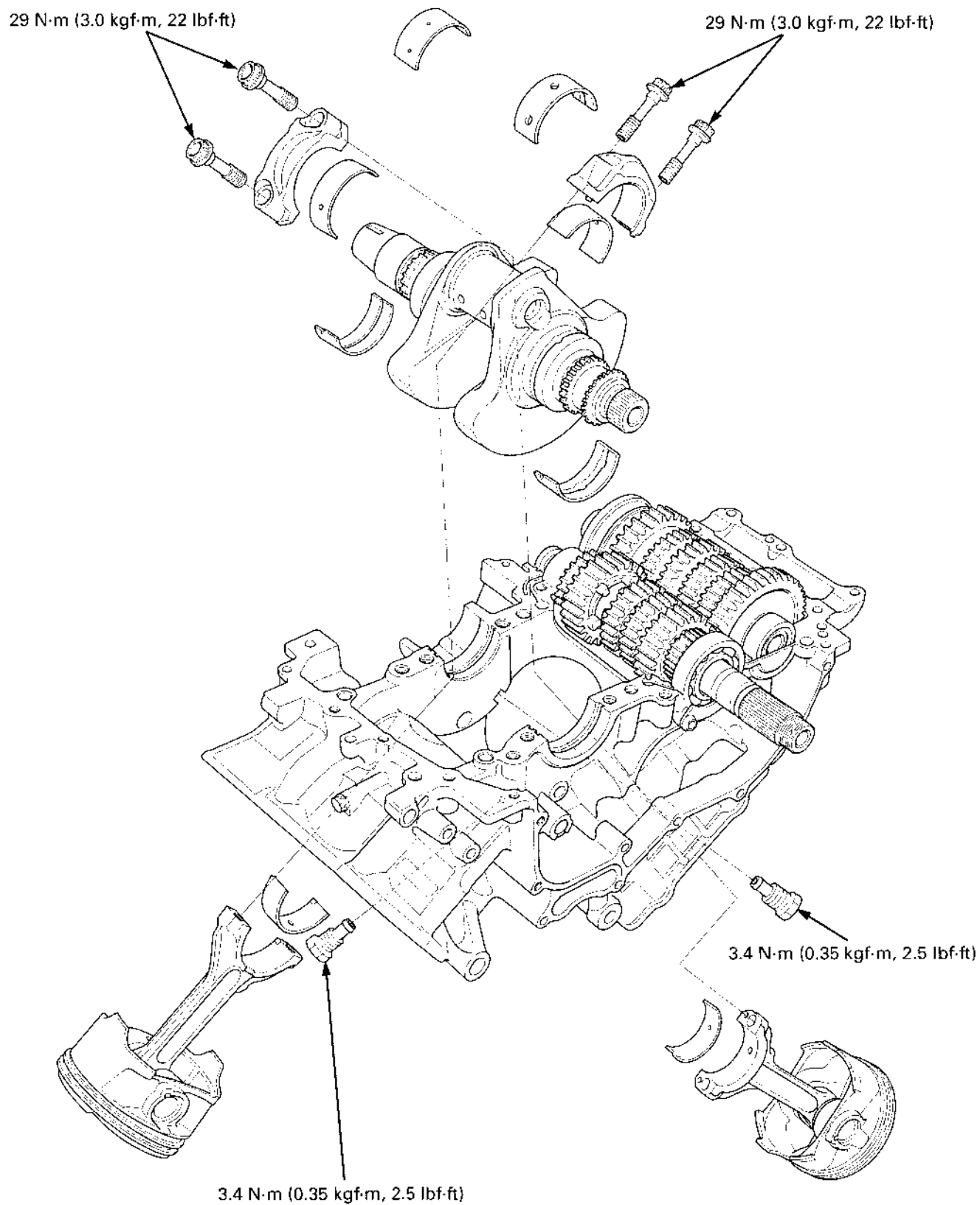


MEMO

12. CRANKSHAFT/PISTON/CYLINDER

COMPONENT LOCATION	12-2	MAIN JOURNAL BEARING.....	12-6
SERVICE INFORMATION	12-3	CRANKPIN BEARING	12-8
TROUBLESHOOTING	12-3	PISTON/CYLINDER	12-11
CRANKSHAFT.....	12-4		

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 11-5) and assembly (page 11-14).
- 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)	
Cylinder	Main journal bearing oil clearance	0.020 – 0.038 (0.0008 – 0.0015)	0.048 (0.0019)	
	I.D.	98.005 – 98.025 (3.8585 – 3.8592)	98.100 (3.8622)	
	Out of round	—	0.10 (0.004)	
	Taper	—	0.10 (0.004)	
	Warpage	—	0.05 (0.002)	
Piston, piston rings	Piston O.D. at 20 mm (0.8 in) from bottom	97.965 – 97.985 (3.8569 – 3.8577)	97.900 (3.8543)	
	Piston pin bore I.D.	24.002 – 24.008 (0.9450 – 0.9452)	24.03 (0.946)	
	Piston pin O.D.	23.994 – 24.000 (0.9446 – 0.9449)	23.984 (0.9443)	
	Piston -to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.046 (0.0018)	
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.55 (0.022)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.70 (0.028)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.065 – 0.100 (0.0026 – 0.0039)	0.115 (0.0045)
		Second	0.035 – 0.070 (0.0014 – 0.0028)	0.085 (0.0033)
Cylinder-to-piston clearance		0.020 – 0.060 (0.0008 – 0.0024)	0.200 (0.0079)	
Connecting rod small end I.D.		24.020 – 24.041 (0.9457 – 0.9465)	24.051 (0.9469)	
Connecting rod-to-piston pin clearance		0.020 – 0.047 (0.9457 – 0.9465)	0.067 (0.0026)	

TOEQUE VALUES

Connecting rod bolt 29 N·m (3.0 kgf·m, 22 lbf·ft) ± 120°

Apply oil to the threads and seating surface

Oil jet 3.4 N·m (0.35 kgf·m, 2.5 lbf·ft)

Apply a locking agent to the threads

TROUBLESHOOTING

Cylinder compression is too low, hard to starting 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

Separate the crankcase halves (page 11-5).

SIDE CLEARANCE INSPECTION

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

Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

Remove the connecting rod bolts and bearing caps. Tap the side of the cap lightly if the bearing cap is hard to remove.

Be careful not to damage the crankpin, main journal and bearing inserts.

NOTICE

Before removal, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.

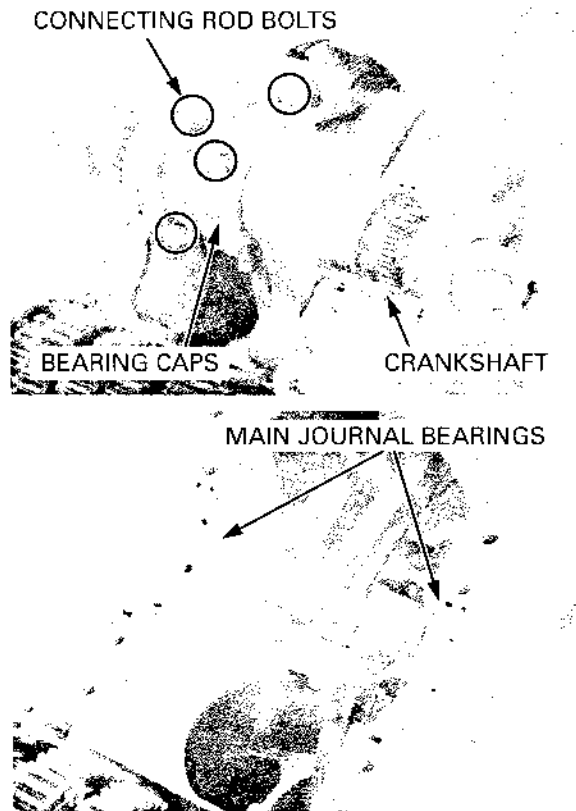
Remove the crankshaft.

CONNECTING ROD BOLTS

BEARING CAPS

CRANKSHAFT

MAIN JOURNAL BEARINGS



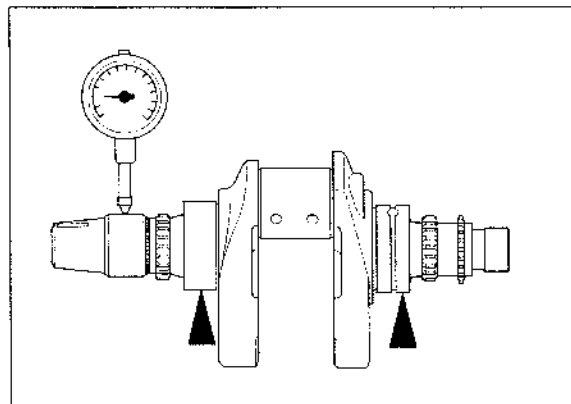
INSPECTION

Hold the crankshaft both end.

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)

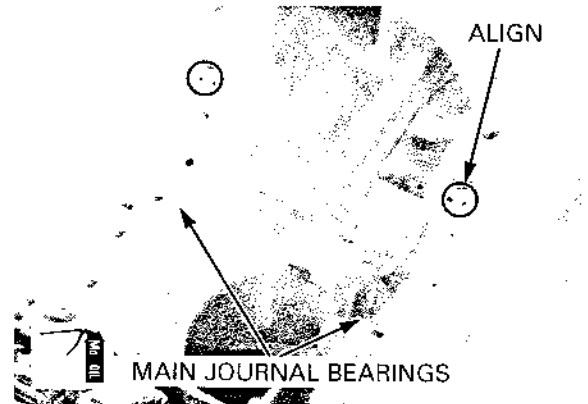


INSTALLATION

The bearing tabs should be aligned with the grooves in the case.

Install the main journal bearings into the upper and lower crankcase.

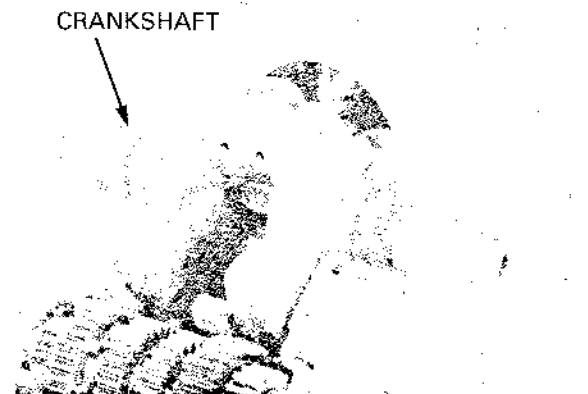
Apply molybdenum disulfide oil to the upper and lower main journal bearings.



Install the crankshaft.

NOTICE

Position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.



Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the bearing caps.

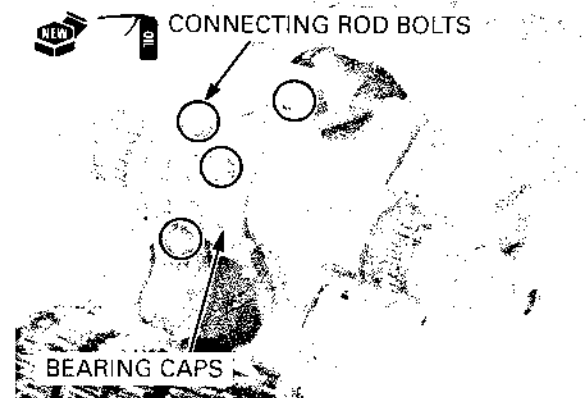
Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap.

Apply oil to the new connecting rod bolt threads and seating surface.

Tighten the bolts alternately 2 or 3 steps, then tighten them to the specified torque.

TORQUE: 29 N-m (3.0 kgf-m, 22 lbf-ft) \pm 120 °

Assemble the crankcase halves (page 11-14).



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 12-4).

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.

MAIN JOURNAL BEARINGS



Do not rotate the crankshaft during inspection.

OIL CLEARANCE 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.



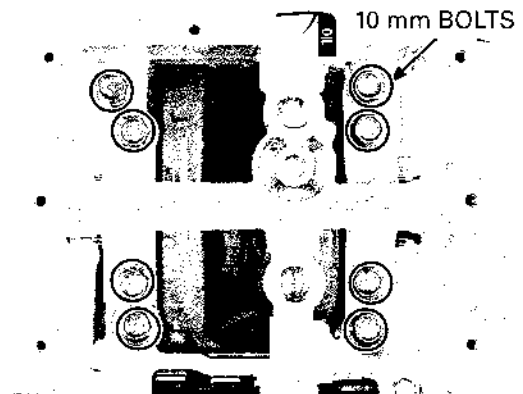
Install the dowel pins and oil orifices.

Carefully install the lower crankcase on the upper crankcase.

Apply engine oil to the crankcase 10 mm bolt threads and seating surfaces and install them.

Tighten the 10 mm bolts in several steps, then tighten them to the specified torque.

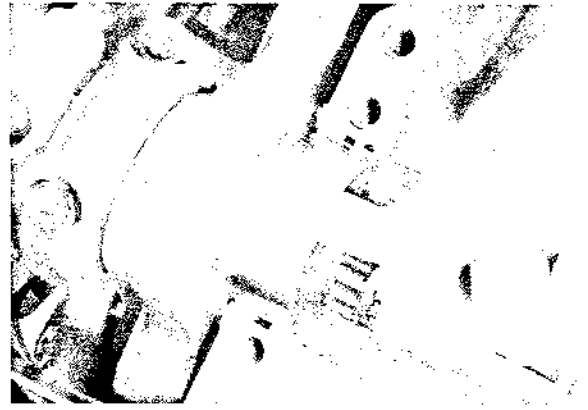
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Remove the 10 mm bolts and lower crankcase.

SERVICE LIMIT: 0.048 mm (0.0019 in)

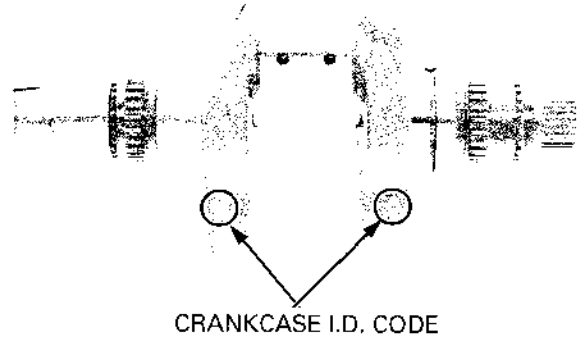
If the main bearing clearance is beyond tolerance, select a replacement bearing.



BEARING SELECTION

Letters (A, B or C) on the left side of upper crankcase are the codes for the bearing support I.D.s from left to right.

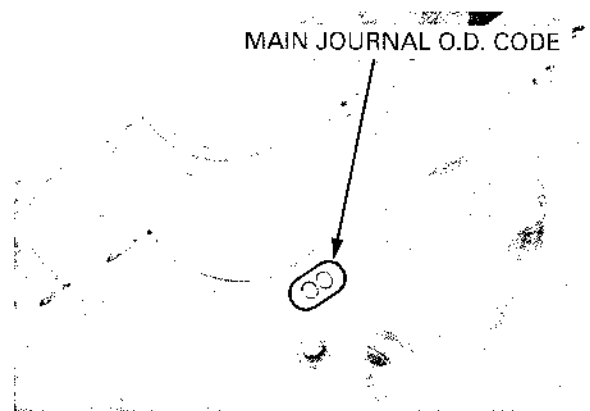
Record the crankcase bearing support I.D. code letters from the pad on the left side of the upper crankcase as shown.



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 SUPPORT I.D. CODE		
			A	B	C
			55.994 – 56.000 mm (2.2045 – 2.2047 in)	56.000 – 56.006 mm (2.2047 – 2.2050 in)	56.006 – 56.012 mm (2.2050 – 2.2052 in)
MAIN JOURNAL O.D. CODE	1	53.010 – 53.016 mm (2.0870 – 2.0872 in)	E (Yellow)	D (Green)	C (Brown)
	2	53.004 – 53.010 mm (2.0868 – 2.0870 in)	D (Green)	C (Brown)	B (Black)
	3	52.998 – 53.004 mm (2.0865 – 2.0868 in)	C (Brown)	B (Black)	A (Blue)

CRANKSHAFT/PISTON/CYLINDER

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

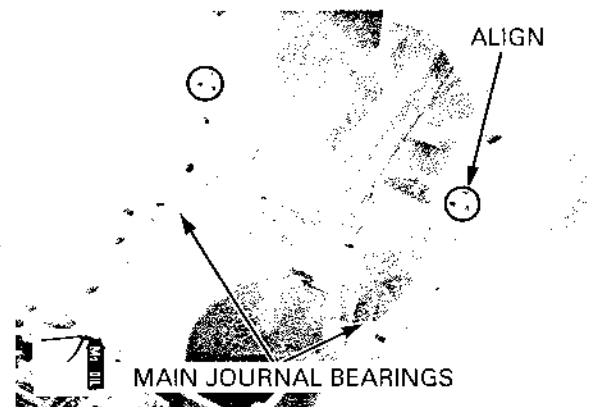
Clean the bearing outer surfaces and crankcase bearing supports.

Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each grooves.

NOTICE

Do not interchange the left and right bearing inserts. The oil hole in the right bearing insert are larger than the ones in the left bearing insert.

COLOR CODE



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 12-4).

BEARING INSPECTION

Check the bearing inserts for unusual wear or peeling.

Check the bearing tabs for damage.

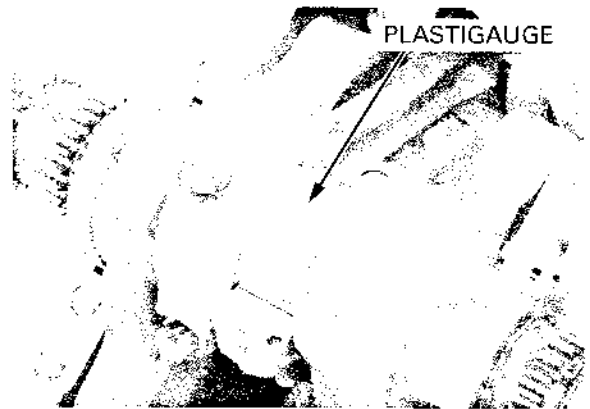
CRANKPIN BEARING



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.



Use removed connecting rod bolts when checking the oil clearance.

Carefully install the bearing caps by aligning the I.D. code.
Apply engine oil to the connecting rod bolt threads and seating surfaces and install them.
Tighten the bolts in 2 or 3 steps.

TORQUE: 19 N·m (2.0 kgf·m, 14 lbf·ft) ± 120 °



Remove the bolts and bearing cap.
Measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.067 mm (0.0026 in)

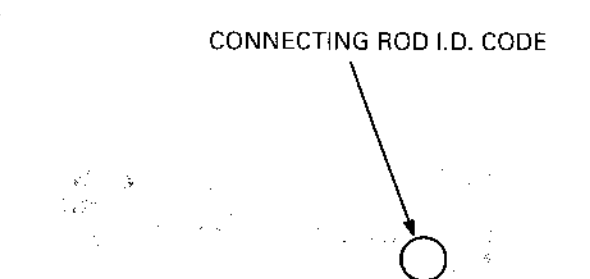
If the oil clearance exceeds the service limit, select the correct replacement bearings.



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.



CRANKSHAFT/PISTON/CYLINDER

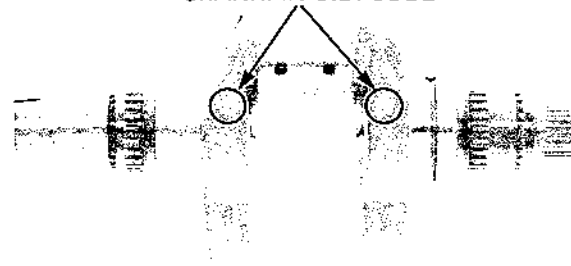
Letters (A, B or C) on the crank weight are the codes for the crankpin O.D.s from left to right.

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 O.D. CODE



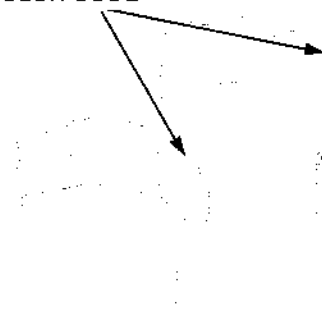
CRANKPIN BEARING SELECTION TABLE:

			CONNECTING ROD I.D. CODE		
			1	2	3
			46.000 – 46.006 mm (1.8110 – 1.8113 in)	46.006 – 46.012 mm (1.8113 – 1.8115 in)	46.012 – 46.018 mm (1.8115 – 1.8117 in)
CRANK PIN O.D. CODE	A	42.998 – 43.004 mm (1.6928 – 1.6930 in)	E (Yellow)	D (Green)	C (Brown)
	B	42.992 – 42.998 mm (1.6926 – 1.6928 in)	D (Green)	C (Brown)	B (Black)
	C	42.986 – 42.992 mm (1.6924 – 1.6926 in)	C (Brown)	B (Black)	A (Blue)

BEARING THICKNESS:

A (Blue) Thick
B (Black): ↑
C (Brown): Middle
D (Green) ↓
E (Yellow) Thin

COLOR CODE



NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

BEARING INSTALLATION

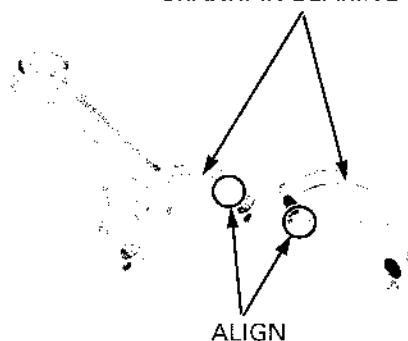
Clean the bearing outer surfaces, bearing cap and connecting rod.

Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.

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.

CRANKPIN BEARING



PISTON/CYLINDER

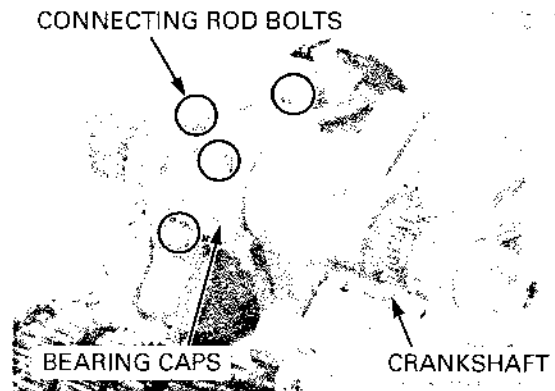
PISTON/CONNECTING ROD REMOVAL

NOTICE

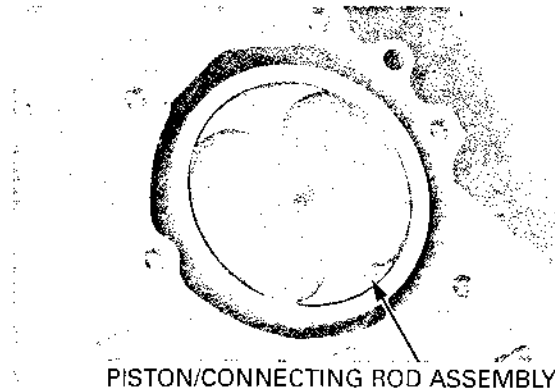
- This motorcycle is equipped with the aluminum cylinder sleeve. Before piston removal, place a clean shop towel around the connecting rod to prevent damaging the cylinder sleeve.
- Do not try to remove the piston/connecting rod assembly from bottom of the cylinder; the assembly will get stuck in the 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.

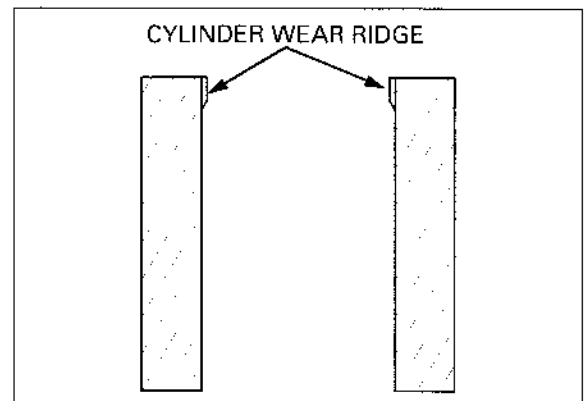
Remove the bolts and connecting rod bearing cap.
Remove the crankshaft.



Remove the piston/connecting rod assembly from the top of the cylinder.

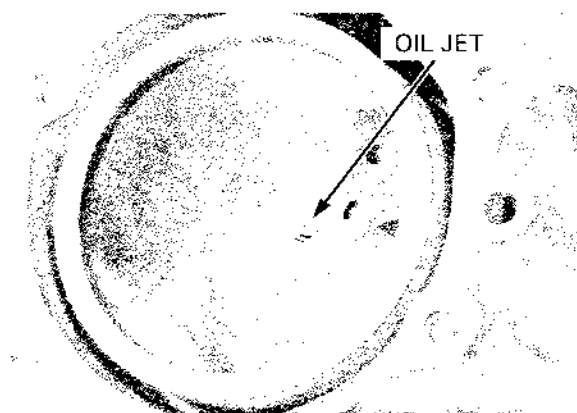


On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel. Any ridge must be removed with an automotive type ridge reamer before removing the pistons to allow the pistons and rings to pass through the cylinder.



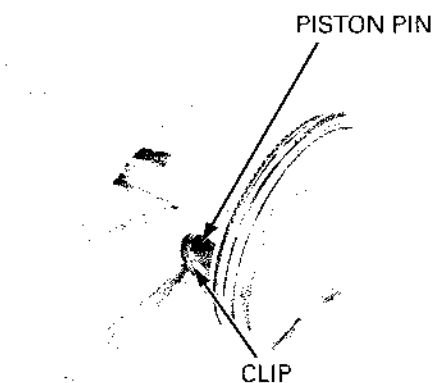
CRANKSHAFT/PISTON/CYLINDER

Remove the oil jet from the upper crankcase.



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

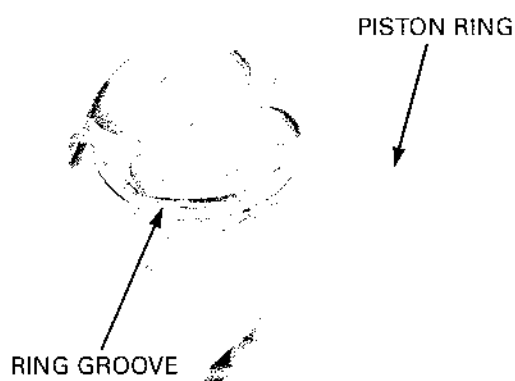
Do not damage the piston ring by spreading the ends too far.

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: 0.115 mm (0.0045 in)
Second: 0.085 mm (0.0033 in)

Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

SERVICE LIMITS:

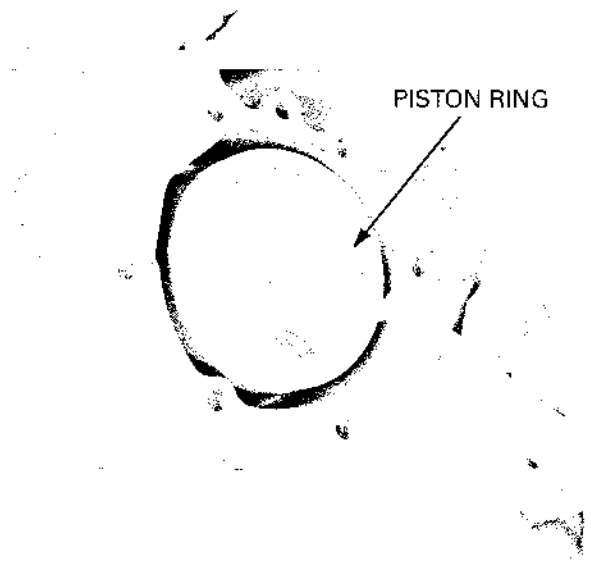
Top: 0.55 mm (0.022 in)
Second: 0.70 mm (0.028 in)
Oil (side rail): 0.70 mm (0.028 in)

Measure the diameter of the piston at 20 mm (0.8 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 97.900 mm (3.8543 in)

Measure the piston pin bore.

SERVICE LIMIT: 24.03 mm (0.946 in)



CRANKSHAFT/PISTON/CYLINDER

Measure the O.D. of the piston pin.

SERVICE LIMIT: 23.984 mm (0.9443 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.046 mm (0.0018 in)



CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

SERVICE LIMIT: 24.051 mm (0.9469 in)

Calculate the piston-to-piston pin clearance.

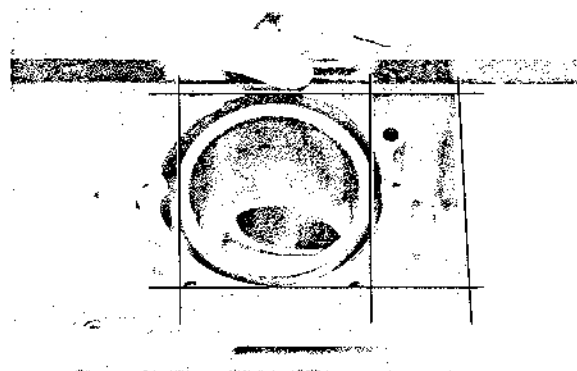
SERVICE LIMIT: 0.067 mm (0.0026 in)



CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.05 mm (0.002 in)



Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. in X and Y axis at three levels.

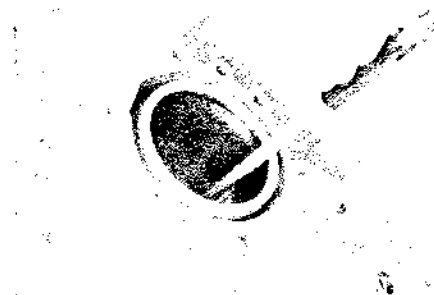
Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 98.100mm (3.8622 in)

Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.

Refer procedures for measurement of the piston O.D. (page 12-13).

SERVICE LIMIT: 0.200 mm (0.0079 in)



Calculate the taper and out of round at three levels in X and Y axis, Take the maximum reading to determine them.

SERVICE LIMITS:

Taper: 0.10 mm (0.004 in)

Out of round: 0.10 mm (0.004 in)

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).

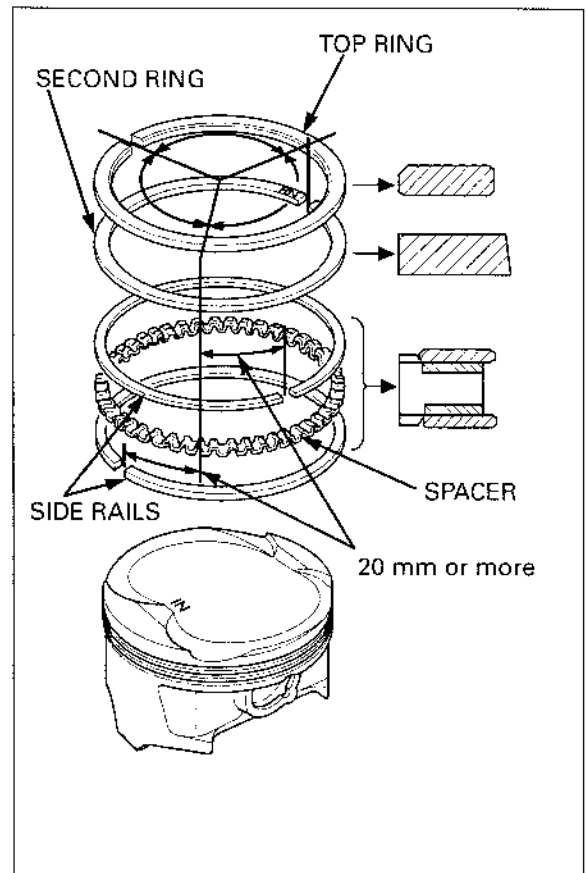
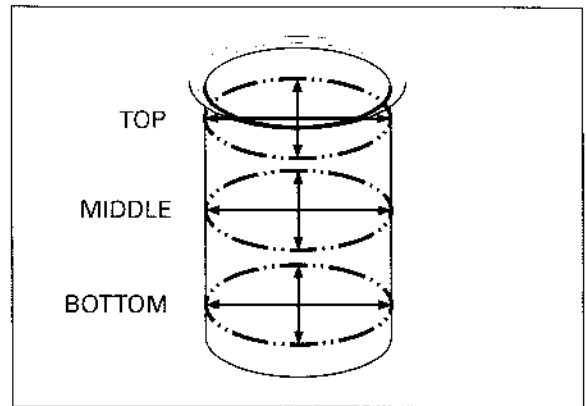
PISTON ASSEMBLY

Carefully install the piston rings into the piston ring grooves with their marking facing up.

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking facing up.
- Do not mix the top and second rings; top ring is narrower than the second ring in width.

Stagger the piston ring end gaps 120° apart from each other.

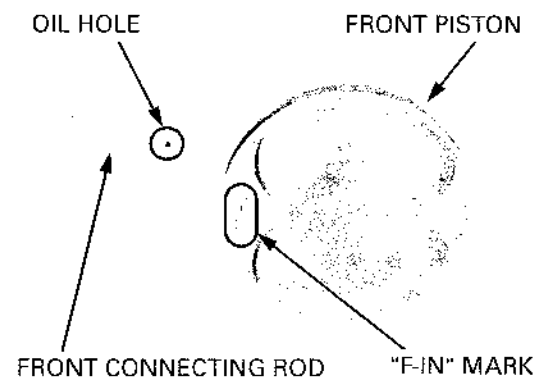
Stagger the side rail end gaps as shown.



PISTON INSTALLATION

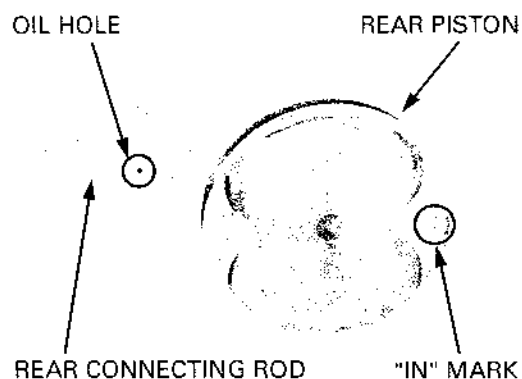
Apply molybdenum disulfide oil to the connecting rod small end inner surfaces and piston pin outer surfaces.

Assemble the front piston and connecting rod with the oil hole on the connecting rod facing the "F-IN" mark on the piston crown.



CRANKSHAFT/PISTON/CYLINDER

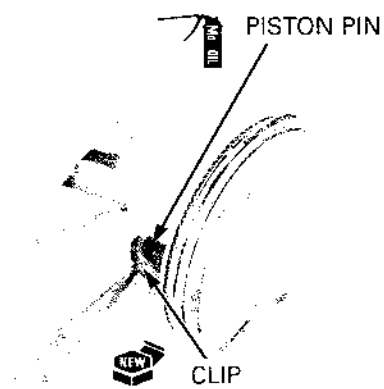
Assemble the rear piston and connecting rod with the oil hole on the connecting rod facing the opposite side of the "IN" mark on the piston crown.



Apply molybdenum disulfide oil to the piston pin outer surface.

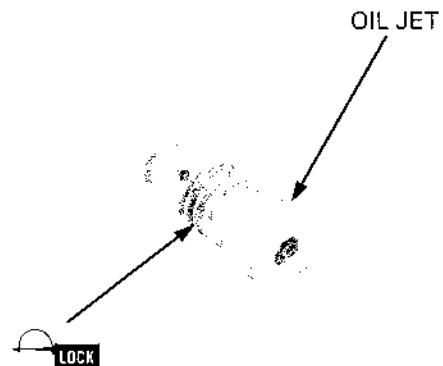
Install the piston pin, and secure it using a new piston pin clips.

- Make sure that the piston pin clips seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.



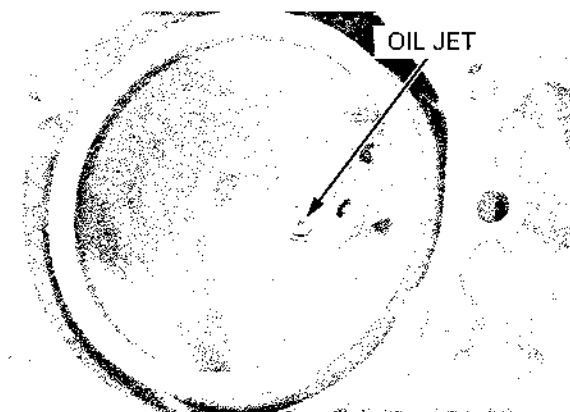
Check the oil jet for damage or clog.
Clean or replace the oil jet if necessary.

Clean and apply a locking agent to the oil jet threads.



Install and tighten the oil jet to the upper crankcase to the specified torque.

TORQUE: 3.4 N·m (0.35 kgf·m, 2.5 lbf·ft)



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, being careful not to damage the top surface of the cylinder, especially around the cylinder bore.
- Be careful not to damage the cylinder sleeve and crankpin with the connecting rod bolt threads.

Apply engine oil to the crankpin bearing surfaces.

Install the crankshaft.

Install the bearing cap.

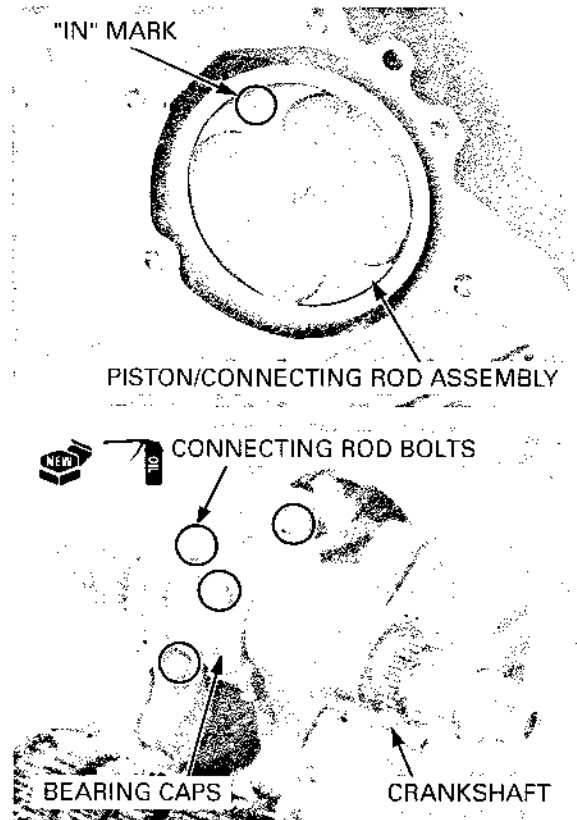
Insure that the marks on the caps are aligned with the marks on the connecting rods.

Apply oil to the new connecting rod bolt threads and seating surfaces.

Install the connecting rod bolts and tighten the bolts gradually and alternately, then tighten them to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft) ± 120 °

Assemble the crankcase halves (page 11-14).

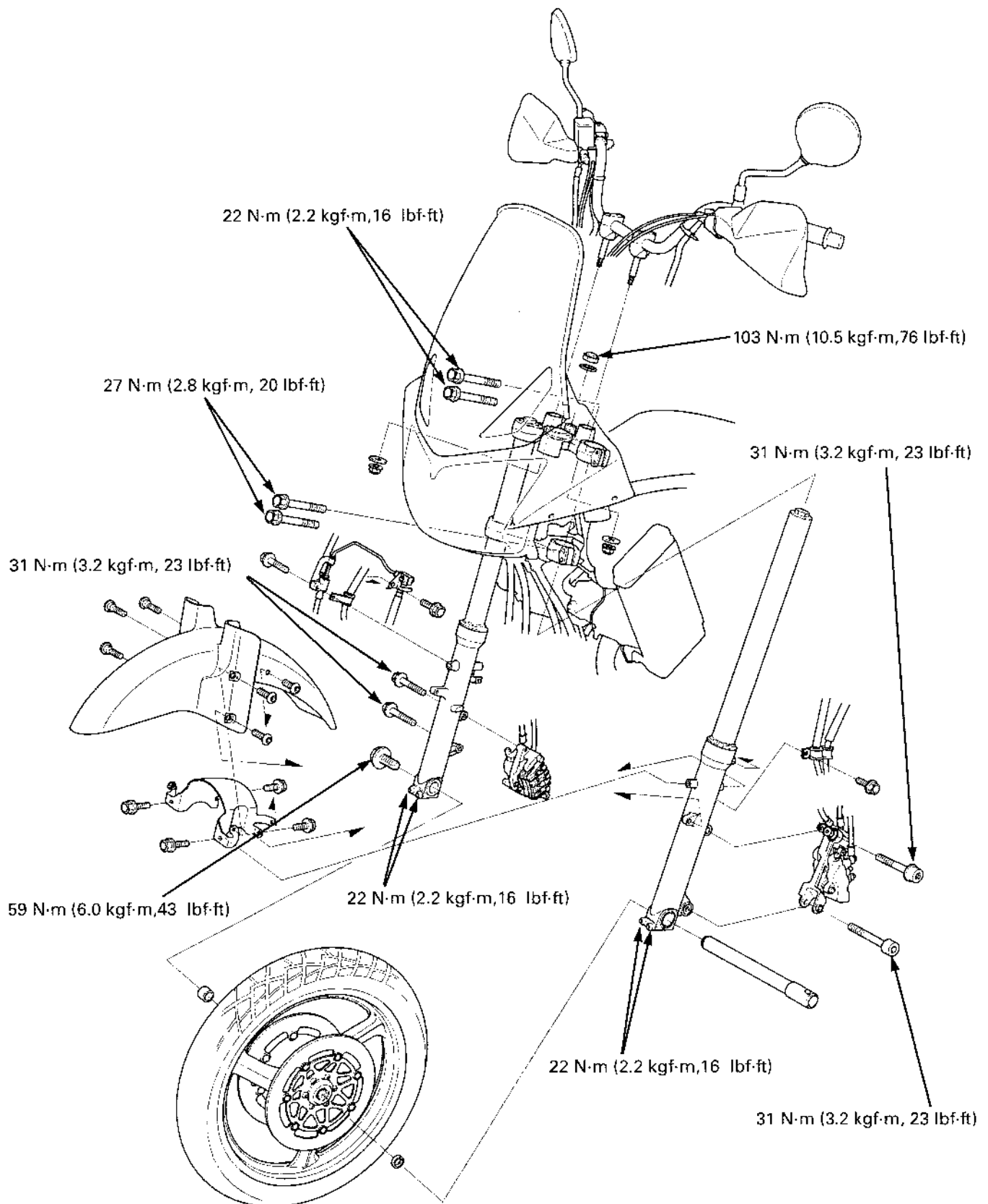


MEMO

13. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION	13-2	FRONT WHEEL	13-15
SERVICE INFORMATION	13-3	FORK	13-21
TROUBLESHOOTING	13-5	STEERING STEM	13-34
HANDLEBAR	13-6		

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 15-4).
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".

SPECIFICATIONS

Unit: mm (in)




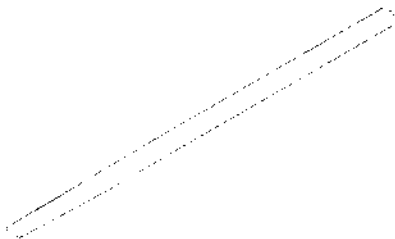

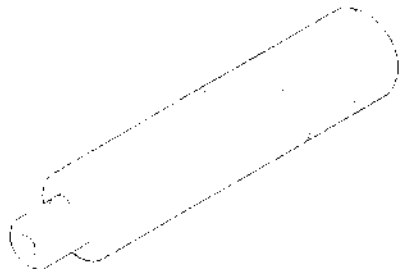

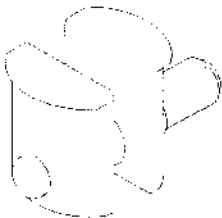
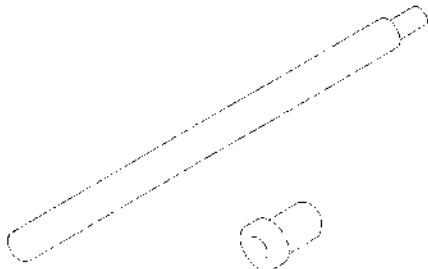
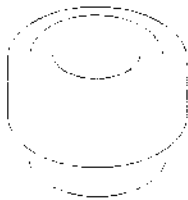
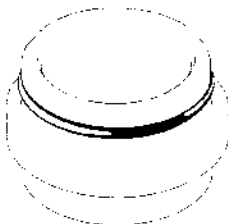
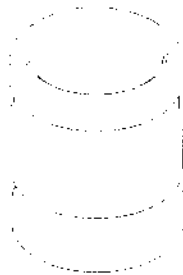
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1oz) max.
Fork	Spring free length	422.6 (16.64)	414.1 (16.30)
	Pipe runout	—	0.20 (0.008)
	Recommended fork fluid	Honda ultra cushion oil 10W or equivalent	—
	Fluid level	112 (4.4)	—
	Fluid capacity	531 ± 2.5 cm ³ (17.9 ± 0.08 US oz, 18.7 ± 0.09 Imp oz)	—
Steering head bearing pre-load		1.0 – 1.5 kgf (2.2 – 3.3 lbf)	—

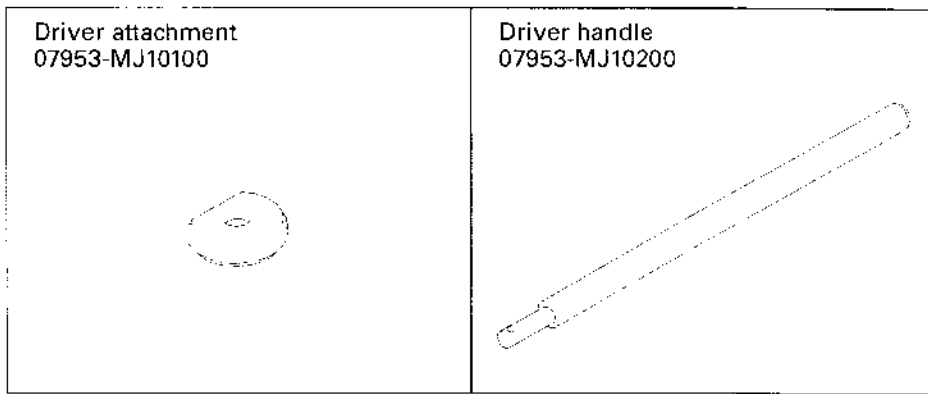
TOEQUE VALUES

Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC screw; replace with a new one
Throttle housing screw	4 N·m (0.42 kgf·m, 3.0 lbf·ft)	
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle holder 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	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Steering bearing adjusting nut	24 N·m (2.4 kgf·m, 17 lbf·ft)	See page 13-37
Steering bearing adjusting nut lock nut	—	
Fork top bridge pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork bottom bridge pinch bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Choke lever pivot bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Handlebar upper holder bolt	27 N·m (2.8 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
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 cylinder)	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt; replace with a new one

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

<p>Attachment, 42 X 47 mm 07746-0010300</p> 	<p>Attachment, 52 X 55 mm 07746-0010400</p> 	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Bearing remover shaft 07GGD-0010100 or 07746-0050100</p> 	<p>Bearing remover head, 20 mm 07746-0050600</p> 	<p>Driver 07749-0010000</p> 
<p>Steering stem socket 07916-3710101</p> 	<p>Ball race remover 07946-3710500</p> 	<p>Needle bearing remover 07946-KA50000</p> 
<p>Attachment, 30 mm I.D. 07746-0030300</p> 	<p>Oil seal driver 07947-KA40200</p> 	<p>Slider weight 07947-KA50100</p> 



TROUBLESHOOTING

Hard steering

- Steering head bearing adjusting 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
- Wheel installed incorrectly
- 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 front tire
- Unbalanced front tire and wheel

Front heel turns hard

- 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

Hard suspension

- Bent fork pipes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

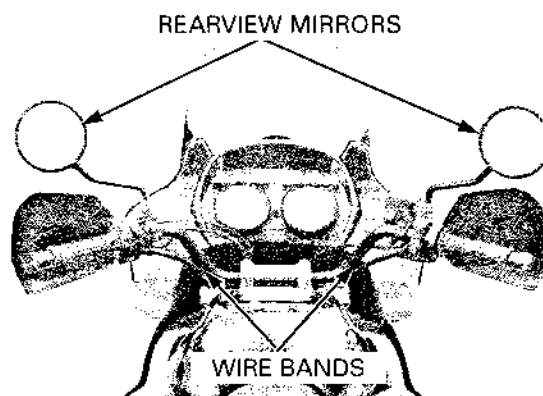
Front suspension noise

- Insufficient fluid in fork
- Loose fork fasteners

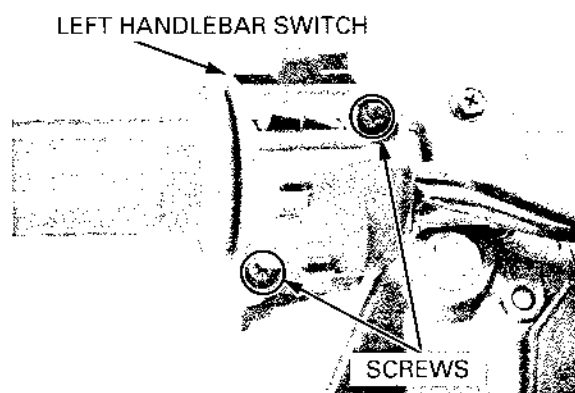
HANDLEBAR

REMOVAL

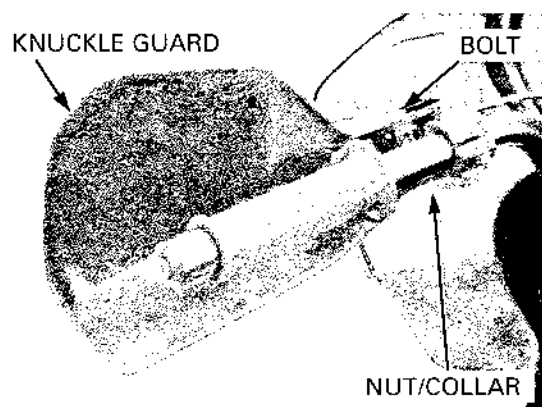
Remove the wire bands and rearview mirrors.



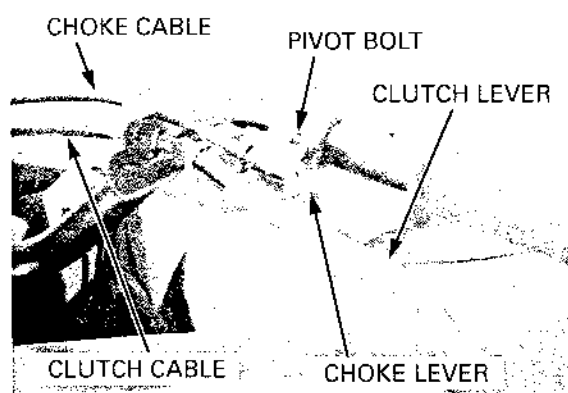
Disconnect the clutch switch connectors from the clutch lever bracket.
Remove the screws and left handlebar switch from the handlebar.



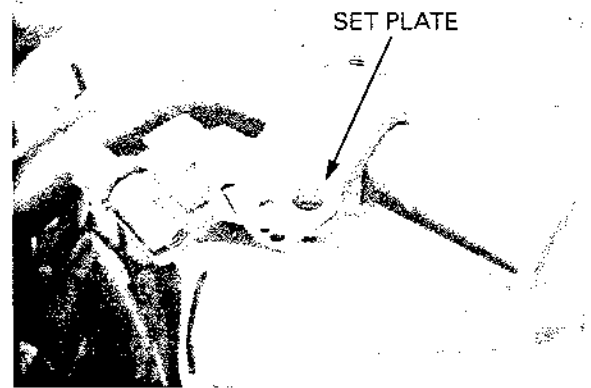
Remove the bolt, nut, collar and knuckle guard.



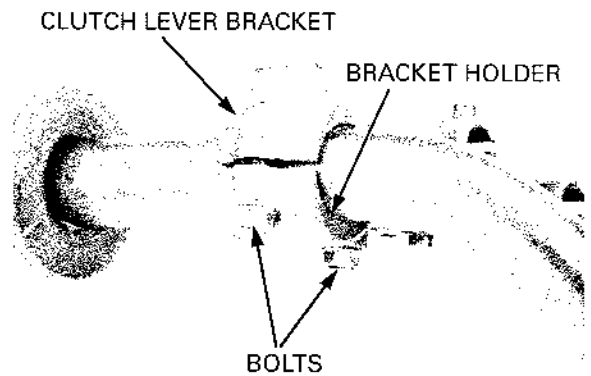
Remove the choke lever/clutch lever pivot bolt.
Disconnect the clutch cable and choke cable from the clutch lever and choke lever.
Remove the choke lever and clutch lever.



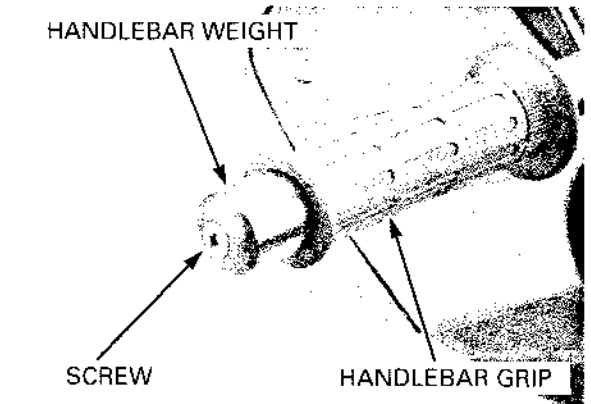
Remove the set plate.



Remove the bolts and clutch lever bracket holder from the handlebar.
Remove the clutch lever bracket from the handlebar.



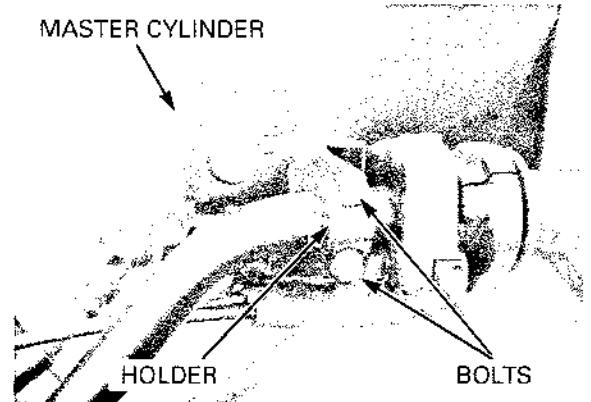
Remove the screw, handlebar weight and the handlebar grip from the handlebar.



Disconnect the front brake switch wire connectors from the switch.

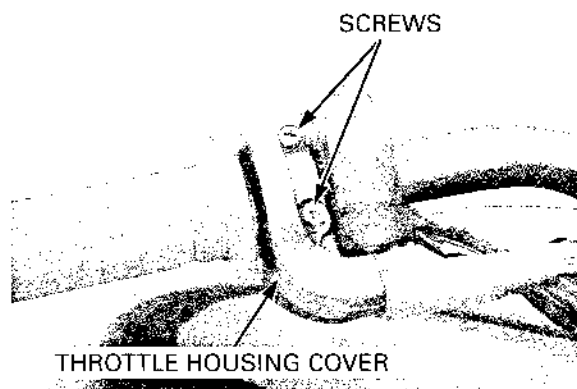
Remove the master cylinder holder bolts, holder and master cylinder assembly.

Keep the brake master cylinder upright to prevent air from entering the hydraulic system

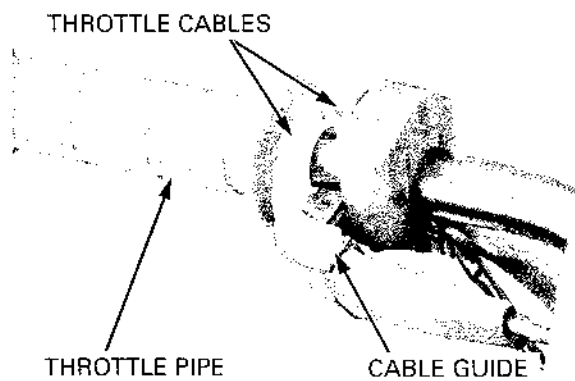


FRONT WHEEL/SUSPENSION/STEERING

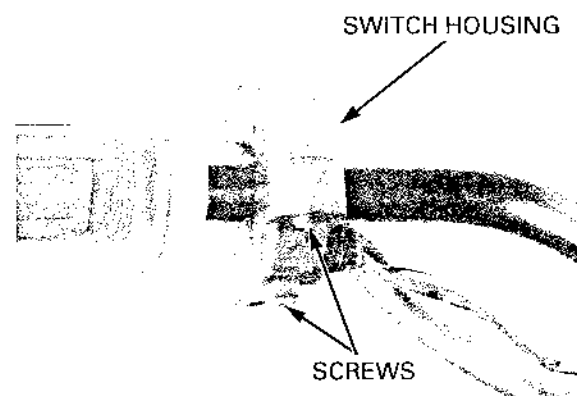
Remove screws and throttle housing cover from the handlebar.



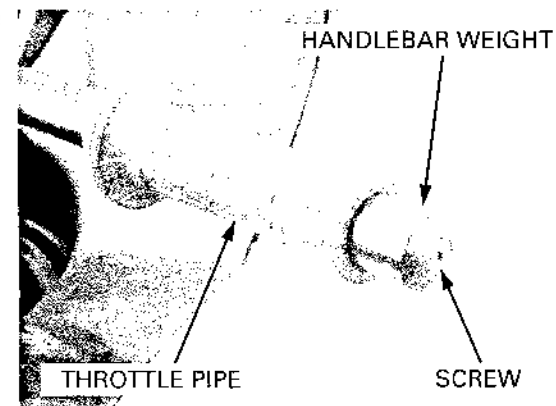
Remove the throttle cable guide and disconnect the throttle cables from the throttle pipe. Remove the screws and engine stop switch from the handlebar.



Remove the screws and engine stop switch from the handlebar.



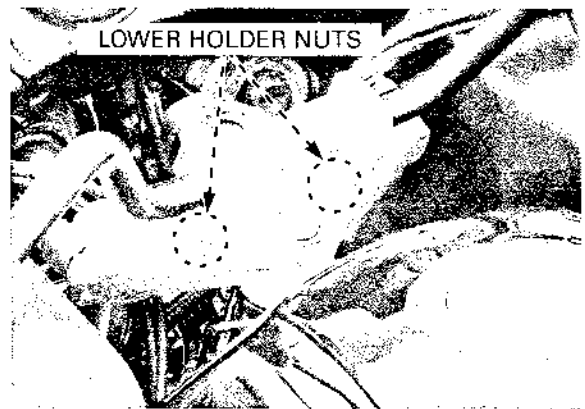
Remove the screw, handlebar weight and throttle pipe from the handlebar.



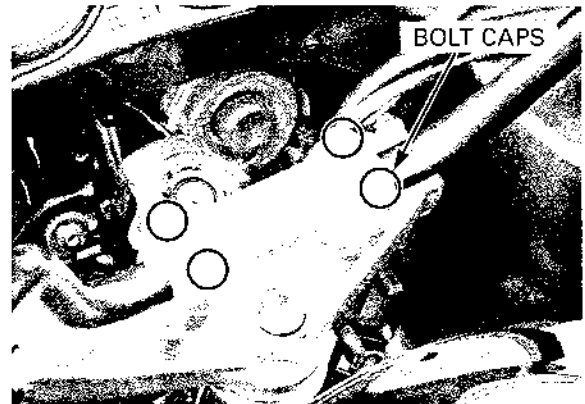
If the handlebar lower holders will be removed, loosen the lower holder nuts before removing the upper holder.

Loosen the handlebar lower holder nuts.

Do not remove the handlebar lower holder nuts yet.

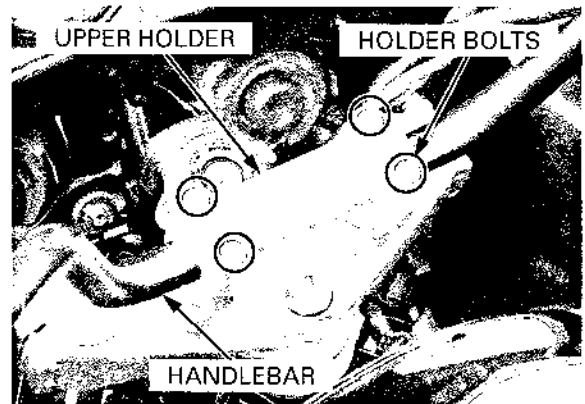


Remove the handlebar upper holder bolt caps.

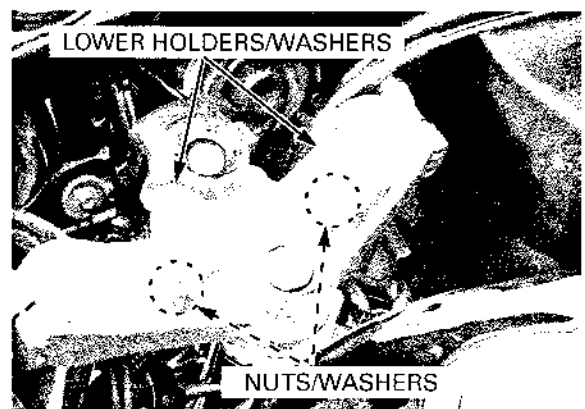


Remove the handlebar upper holder bolts and upper holder.

Remove the handlebar.

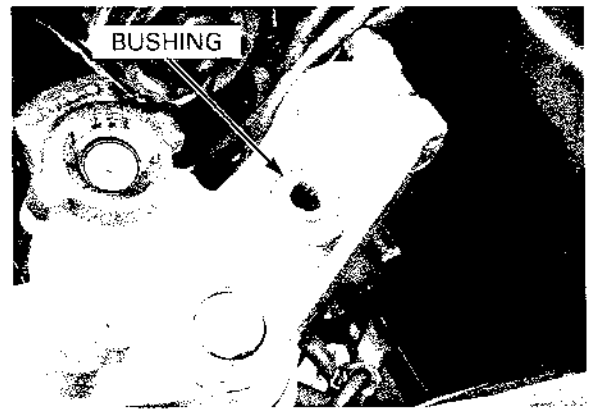


Remove the handlebar lower holder nuts/washers and lower holders.



FRONT WHEEL/SUSPENSION/STEERING

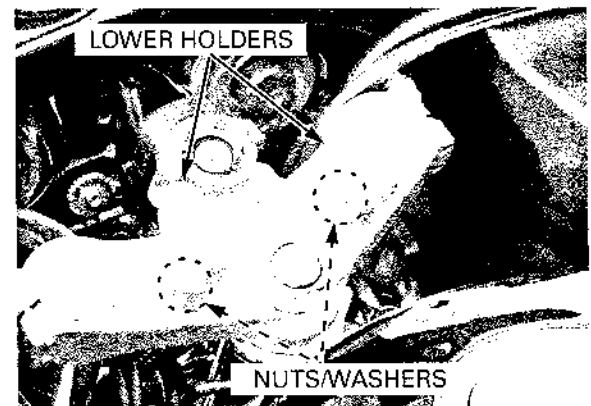
Check the bushings for wear or damage.
Replace the bushing if necessary.



INSTALLATION

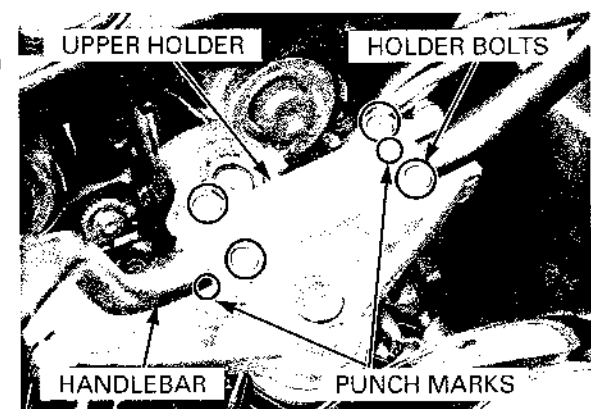
Install the handlebar lower holders and handlebar lower holder nuts/washers.

Do not tighten the lower holder nuts yet.

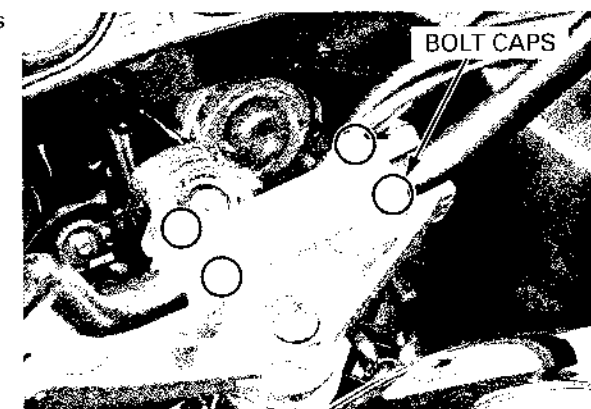


Install the handlebar and handlebar upper holder.
Install and tighten the forward bolts first, then
tighten the rear bolts to the specified torque.

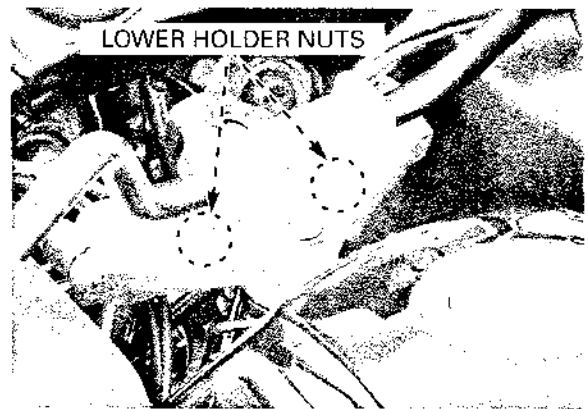
TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Install the handlebar upper holder bolt caps
securely.



Tighten the handlebar lower holder nuts securely.



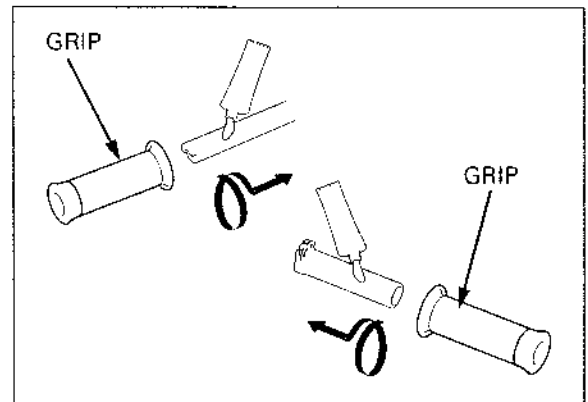
Clean the inside surface of the left handlebar grip and outside surface of the handlebar.

Apply Honda Bond A 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.

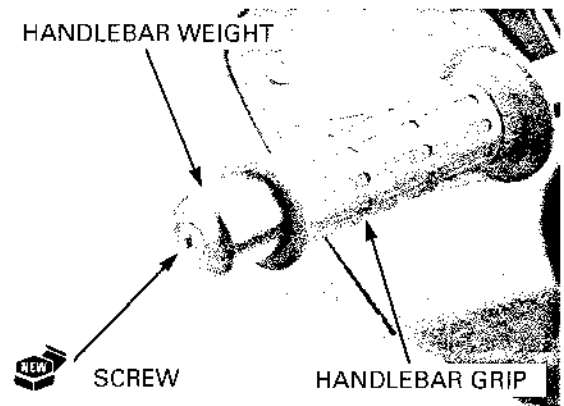
Rotate the grip for even application of the adhesive.

Allow the adhesive to dry for an hour before using.

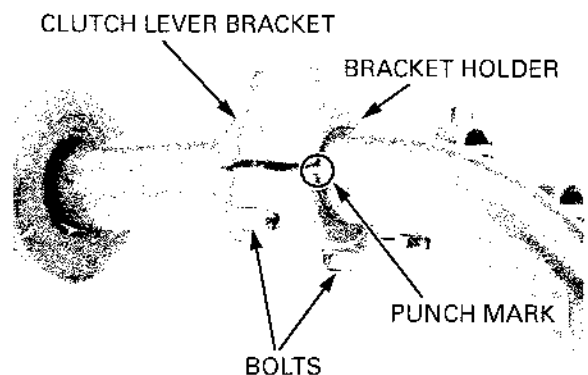


Install the handlebar weight to the handlebar aligning the tab on the handlebar weight with the slit of the handlebar.
Install and tighten the new screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

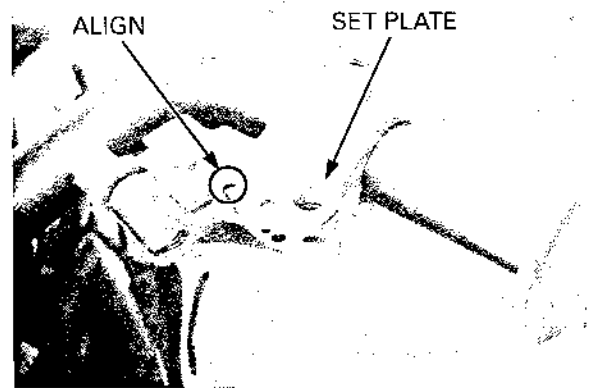


Install the clutch lever bracket and holder, aligning mating surface of the holder with the punch mark on the handlebar.
Tighten the forward bolt first, then tighten the rear bolt.



FRONT WHEEL/SUSPENSION/STEERING

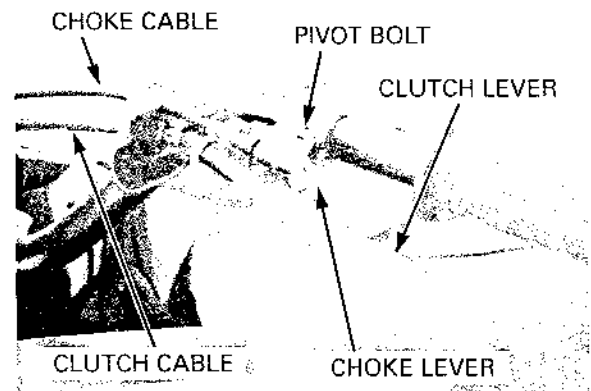
Install the set plate to the clutch lever bracket, aligning the tab on the set plate with the hole on the clutch lever bracket.



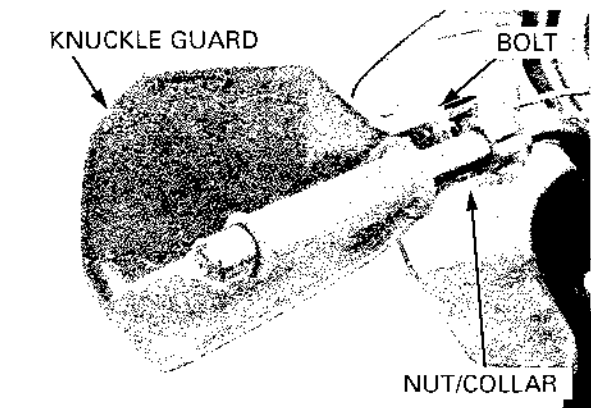
Install the clutch lever and choke lever.
Apply grease to the choke lever/clutch lever pivot bolt.
Install and tighten the choke lever/clutch lever pivot bolt to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

Connect the clutch cable and choke cable to the clutch lever and choke lever.

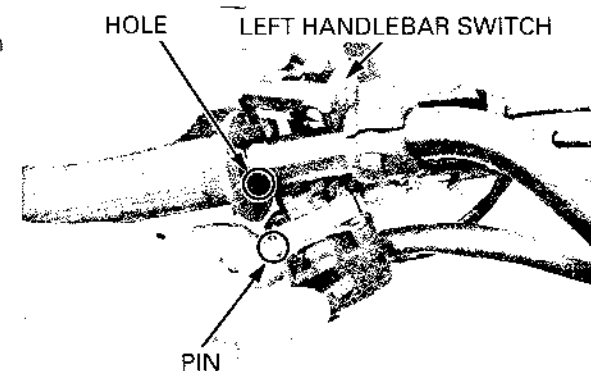


Install the knuckle guard, collar, bolt and nut.
Install the dust cover over the clutch lever bracket.



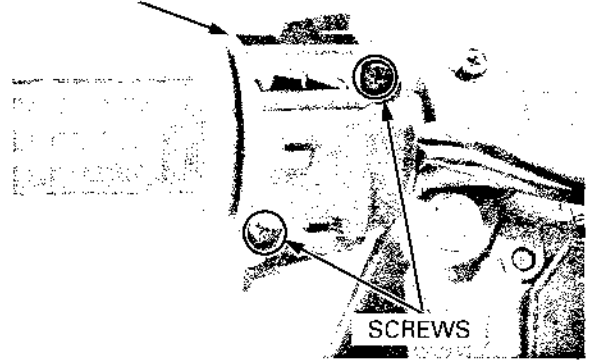
Connect the clutch switch connectors.

Install the left handlebar switch, aligning the pin on the switch with the hole in the handlebar.

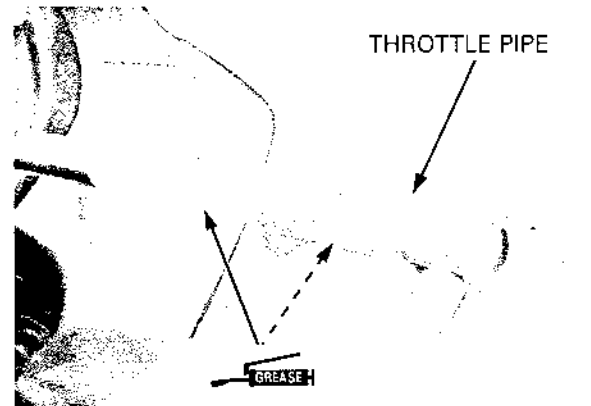


Tighten the forward screw first, then tighten the rear screw.

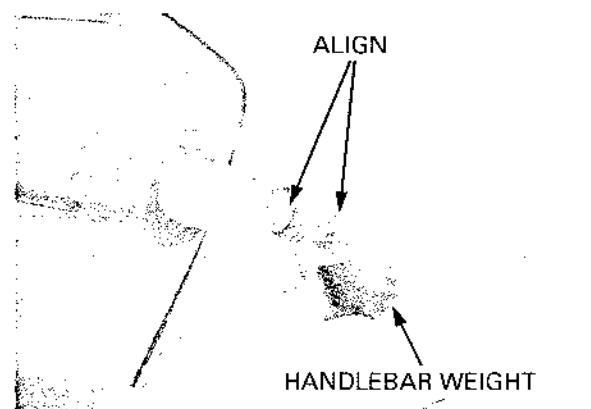
LEFT HANDLEBAR SWITCH



Apply grease to the throttle pipe inner surface and handlebar sliding outer surface. Install the throttle pipe.

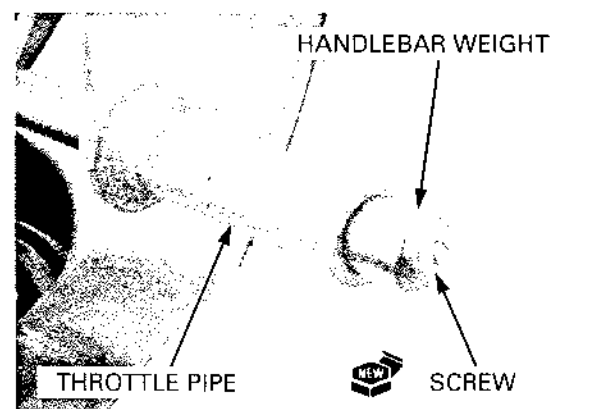


Install the handlebar weight to the handlebar aligning the tab on the handlebar weight with the slit of the handlebar.



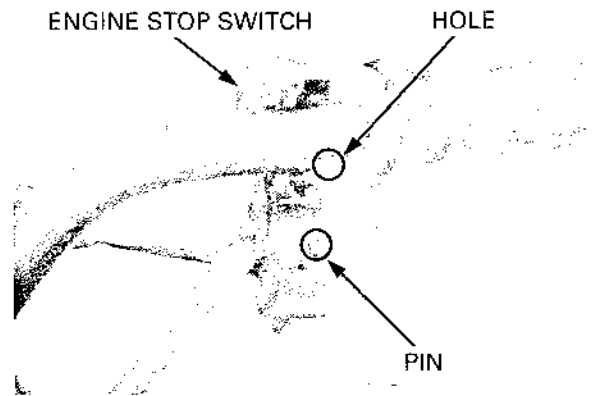
Install and tighten the new screw to the specified torque.

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

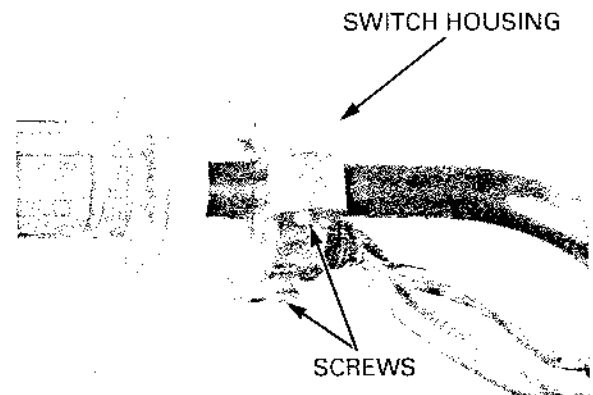


FRONT WHEEL/SUSPENSION/STEERING

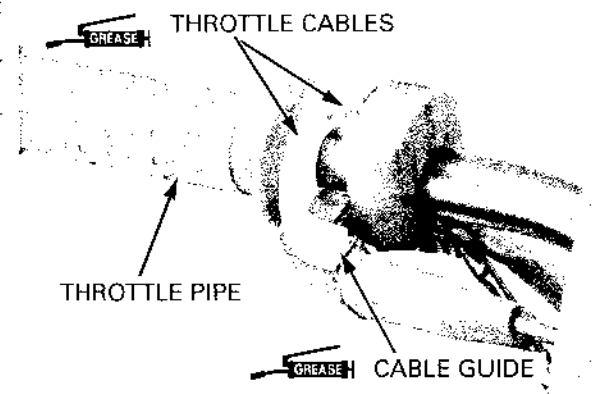
Install the engine stop switch, aligning the pin on the switch with the hole in the handlebar.



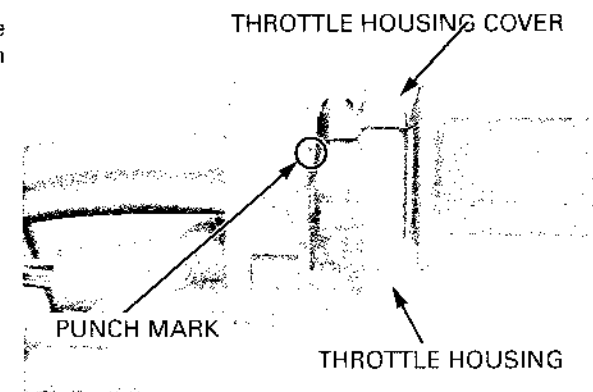
Tighten the forward screw first, then tighten the rear screw securely.



Apply grease to the throttle cable ends and connect them to the throttle grip.
Apply grease to the throttle cable guide sliding surface.
Install the throttle cable guide to the throttle housing.

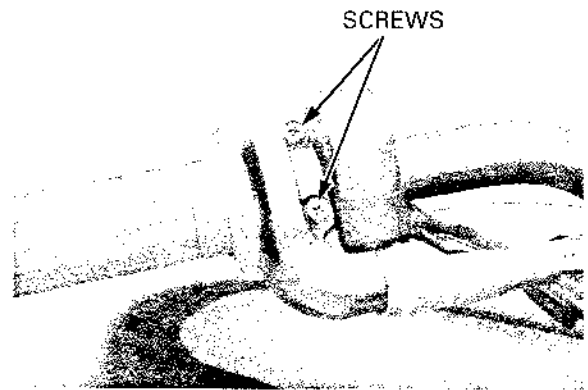


Install the throttle housing to the handlebar.
Install the throttle housing cover to the throttle housing aligning its mating surface with the punch mark on the handlebar.



Install and tighten the throttle housing cover screws to the specified torque.

TORQUE: 4 N·m (0.42 kgf·m, 3.0 lbf·ft)

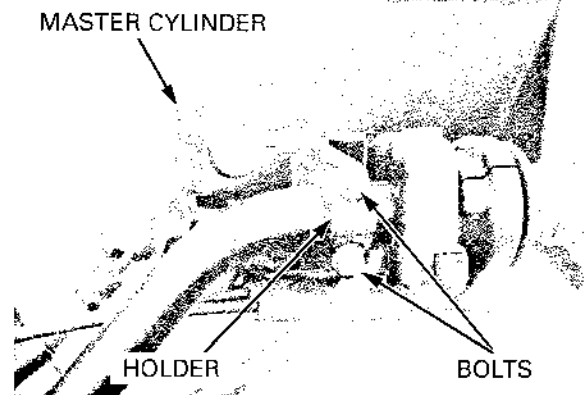


Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

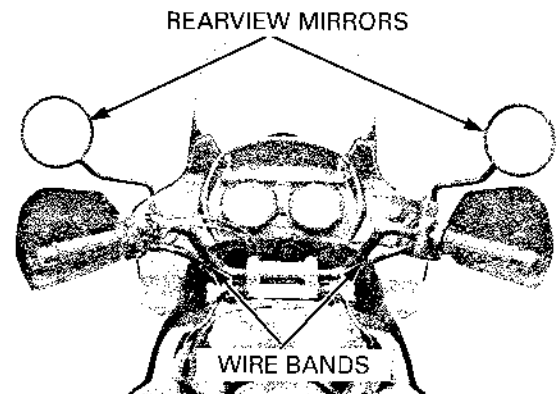
Tighten the upper bolt first, the lower bolt.

Connect the brake switch wire connectors.



Route the cables, wires and harness properly (page 1-23).

Install the wire bands and rearview mirror.

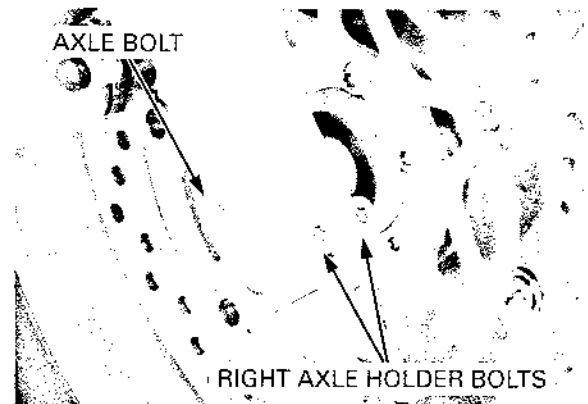


FRONT WHEEL

REMOVAL

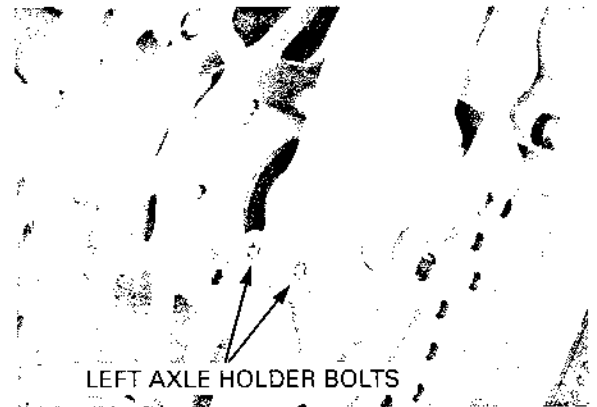
Support the motorcycle securely using a safety stand or a hoist.

Loosen the right axle holder bolts.
Remove the axle bolt.



FRONT WHEEL/SUSPENSION/STEERING

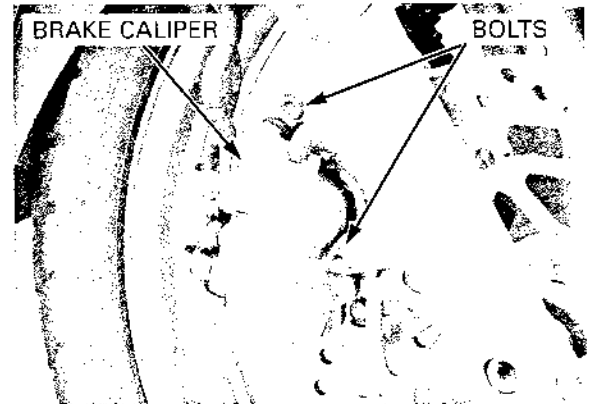
Loosen the left axle holder bolts.



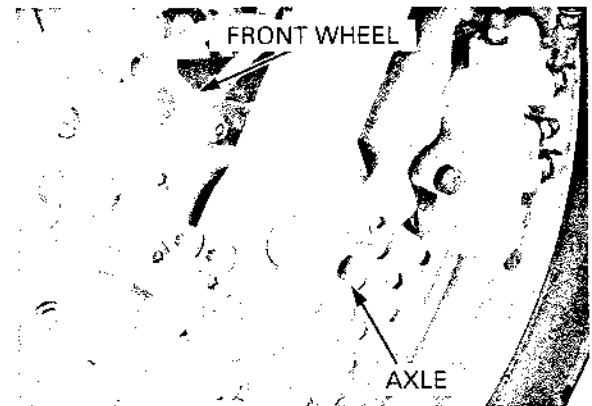
Remove the mounting bolts and right brake caliper.

Do not operate the brake lever and 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.



Remove the axle and the front wheel.

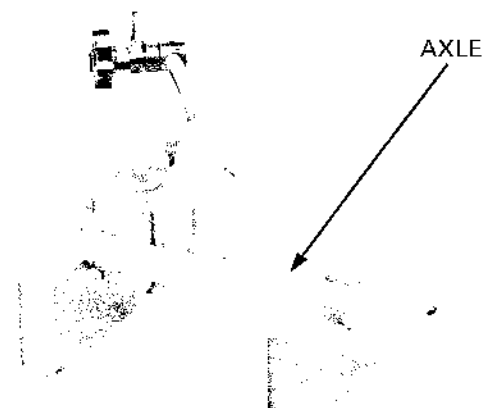


INSPECTION

Axle

Set the axle in V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



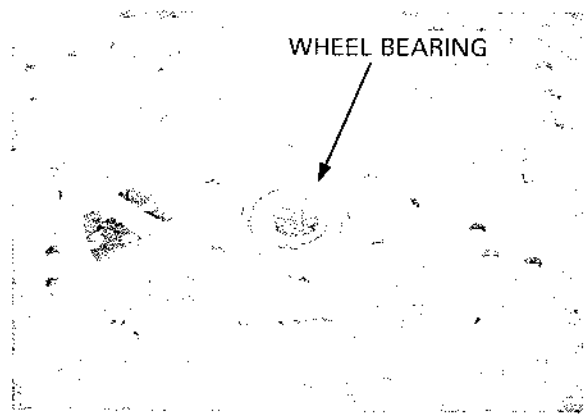
Wheel bearing

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the bearings in pairs.

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace the new bearings, if necessary (page 13-18).



Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.

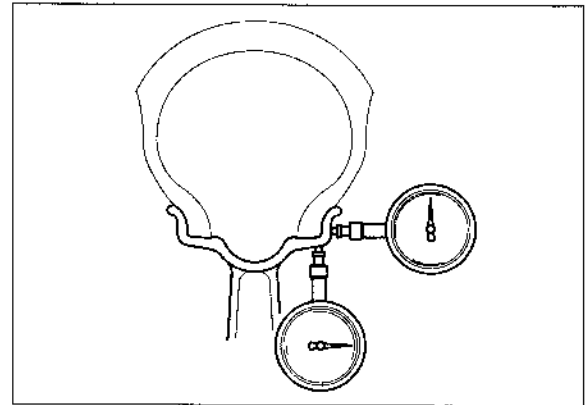
Spin the wheel by hand, and read the runout using a dial indicator.

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)

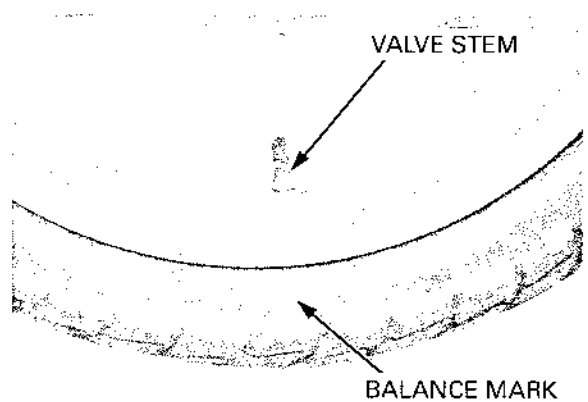


Wheel balance

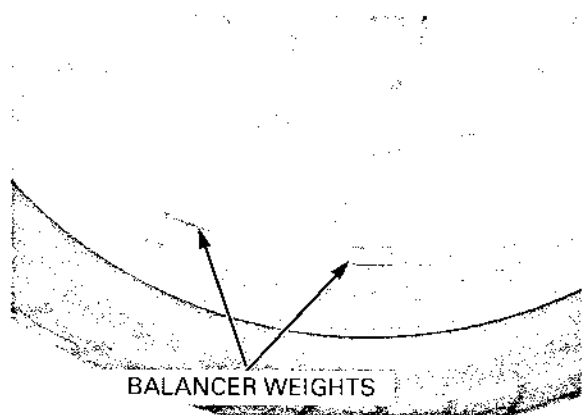
For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

NOTICE

Wheel balance directly affects the stability, handling and over all safety of the motorcycle. Always check balance when the tire has been removed from the rim.



Note the rotating direction marks on the wheel and tire.



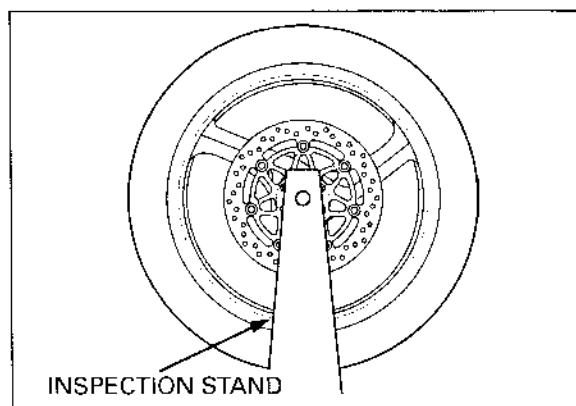
FRONT WHEEL/SUSPENSION/STEERING

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.

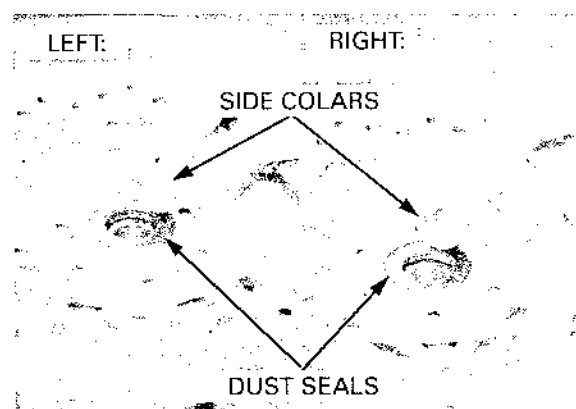
To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



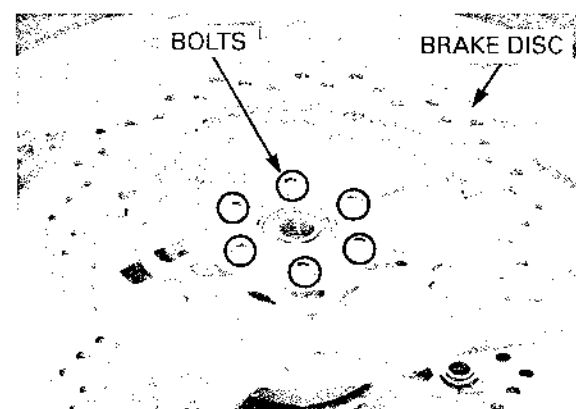
DISASSEMBLY

Remove the side collars.

Remove the dust seals.



Remove the bolts and brake discs.

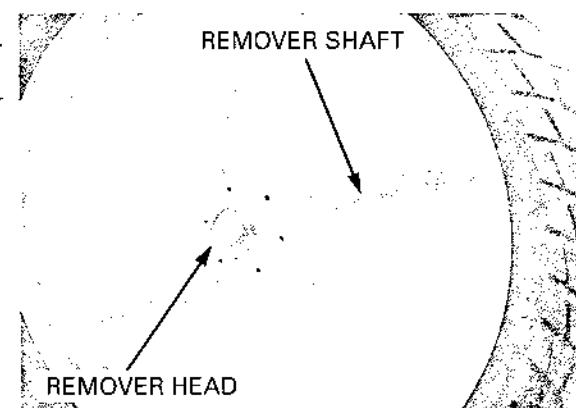


Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

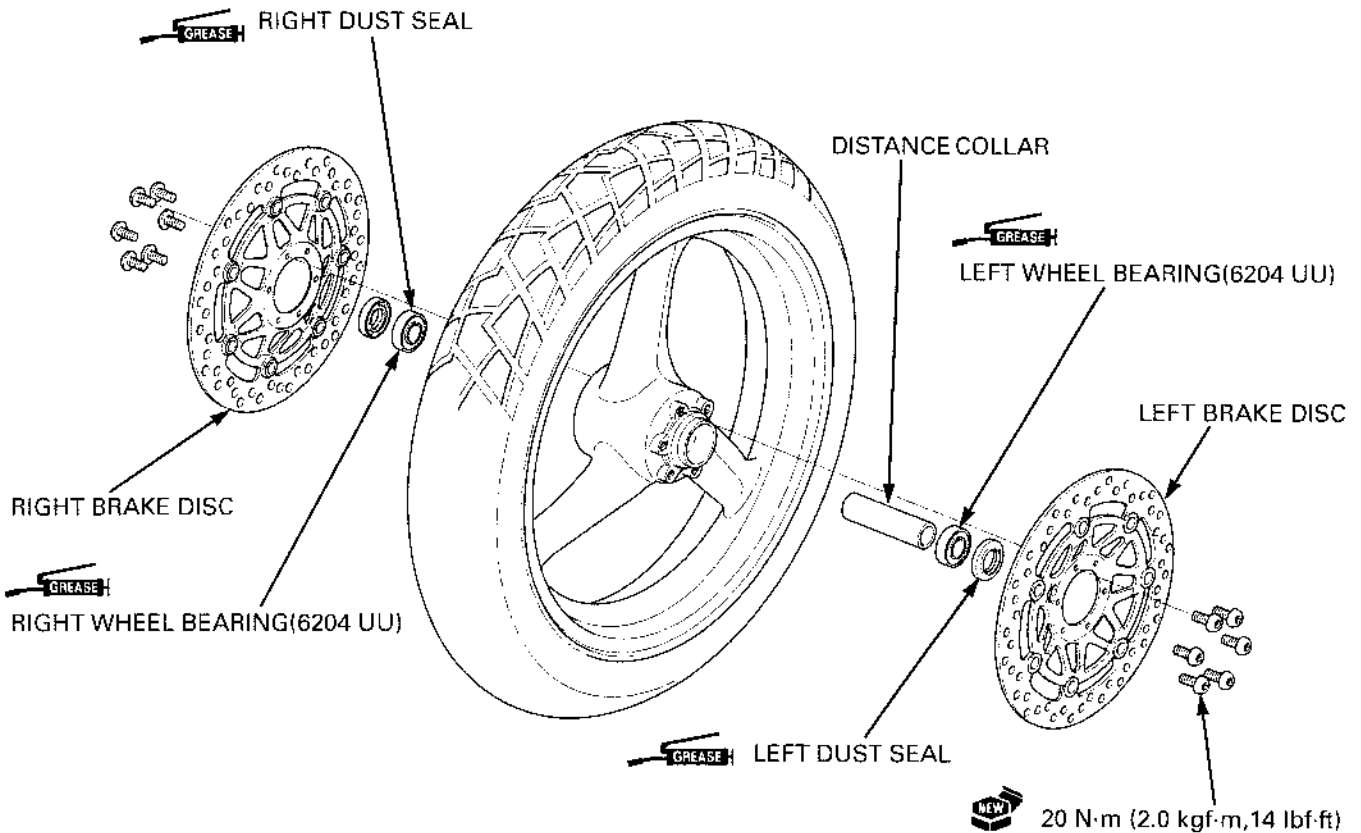
TOOLS:

Bearing remover head, 20 mm 07746-0050600

Bearing remover shaft 07GGD-0010100 or
07746-0050100



ASSEMBLY



Never install the old bearings. Once the bearings have been removed, the bearing must be replaced with new ones.

Drive in a new left bearing squarely. Install the distance collar, then drive in the right bearing using the special tool.

TOOLS:

Driver

07749-0010000

Attachment, 42 X 47 mm

07746-0010300

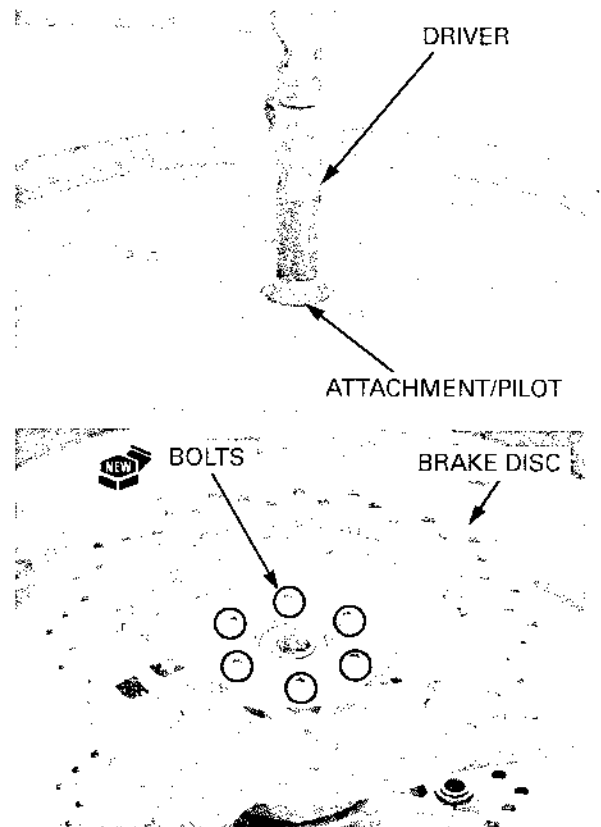
Pilot, 20 mm

07746-0040500

Do not get grease on the brake discs or stopping power will be reduced.

Install the brake discs on the wheel hub with its rotating direction mark facing out. Install and tighten the new mounting bolts to the specified torque.

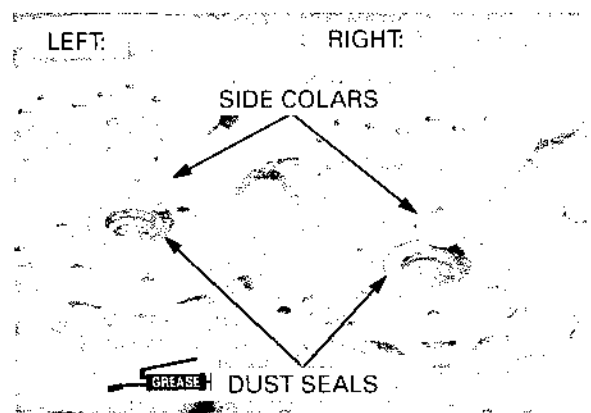
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



FRONT WHEEL/SUSPENSION/STEERING

Apply grease to the dust seal lips, then install them into the wheel hub.

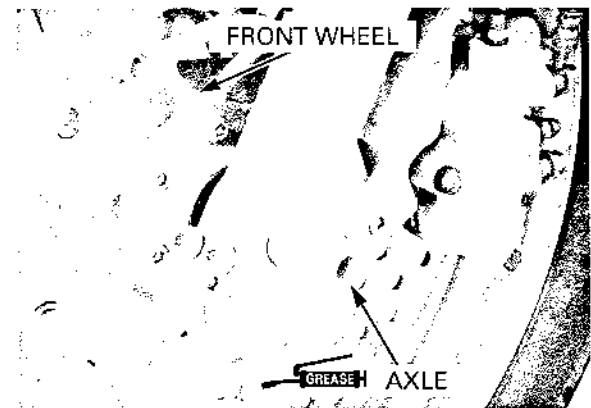
Install the side collars.



INSTALLATION

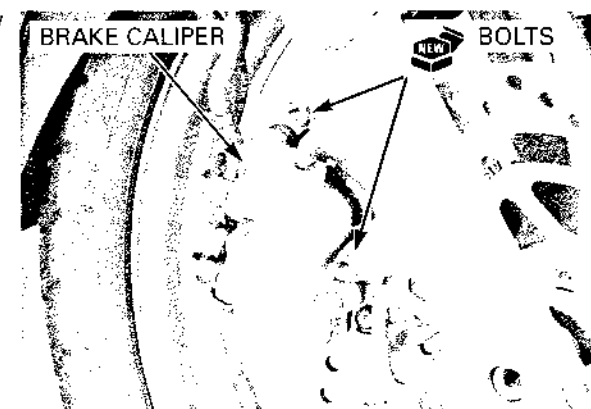
Install the front wheel between the fork legs.

Apply thin layer of grease to the front axle surface.
Install the front axle from the left side.



Install the right brake caliper and tighten the new mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

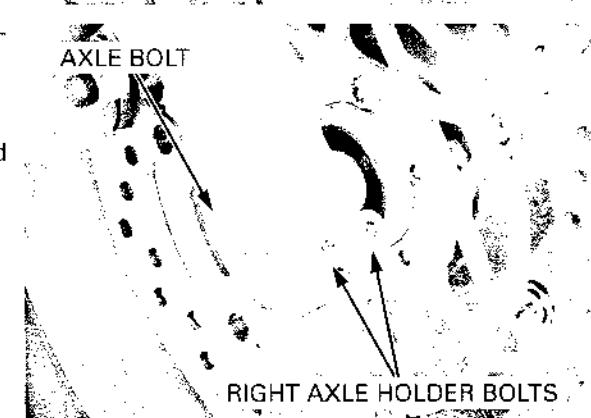


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten the right axle pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation by applying the brake lever.



Tighten the left axle pinch bolts to the specified torque.

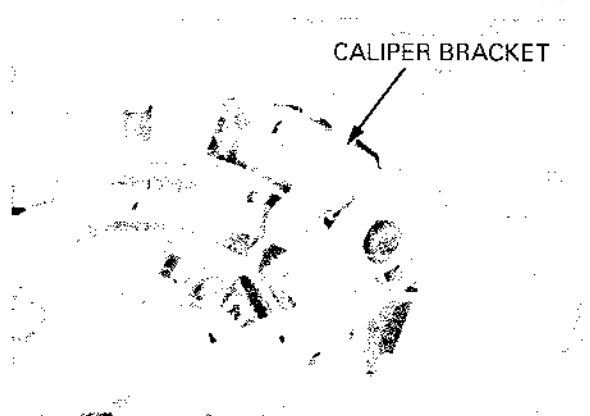
TORQUE: 22 N-m (2.2 kgf-m, 16 lbf-ft)



Check the clearance between the brake disc and caliper bracket on each side after installation. The clearance should be at least 0.7 mm (0.03 in).

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 caliper. Failure to provide clearance will damage the brake disc and affect braking efficiency.



FORK

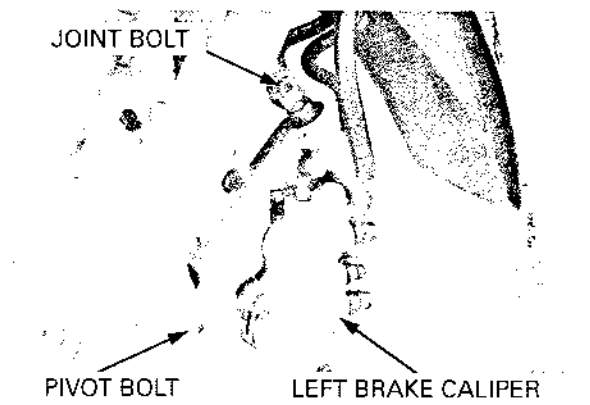
REMOVAL

Remove the front wheel (page 13-15).

For the left fork leg removal, remove the following:

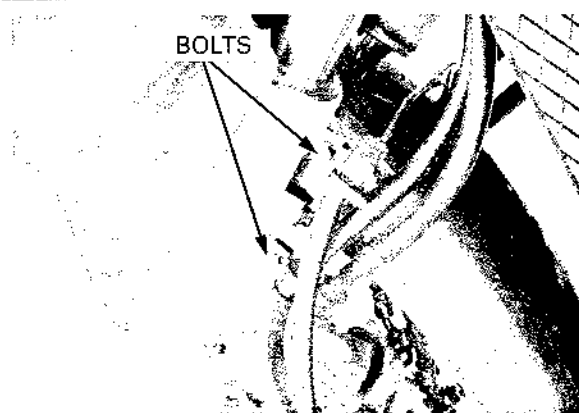
- Left brake caliper pivot bolt
- Left brake caliper bolt (second master joint)

Support the left brake caliper with a piece of wire so that it does not hang from the brake hoses. Do not twist the brake hose.

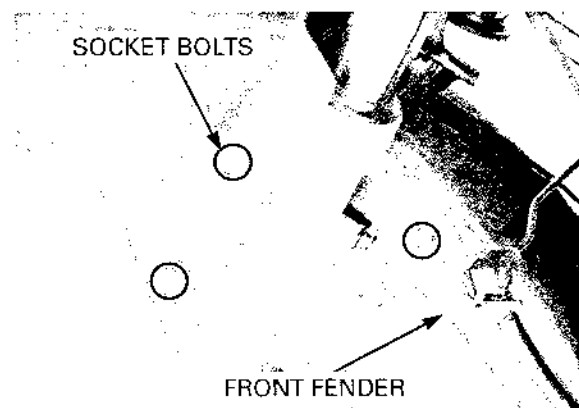


FRONT WHEEL/SUSPENSION/STEERING

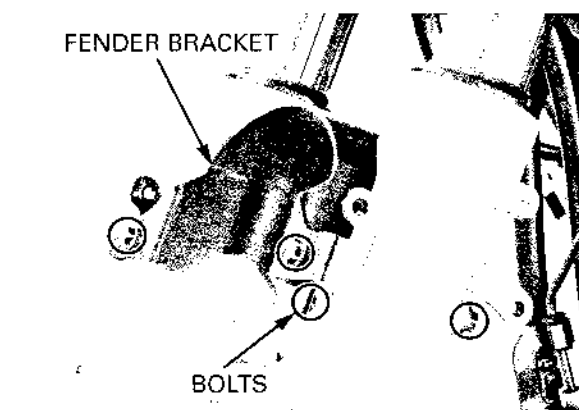
Remove the brake pipe/hose clamp bolts.



Remove the socket bolts and bolts and front fender.

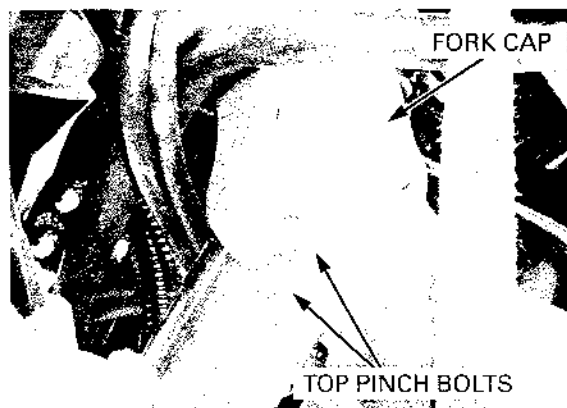


Remove the bolts and front fender bracket.

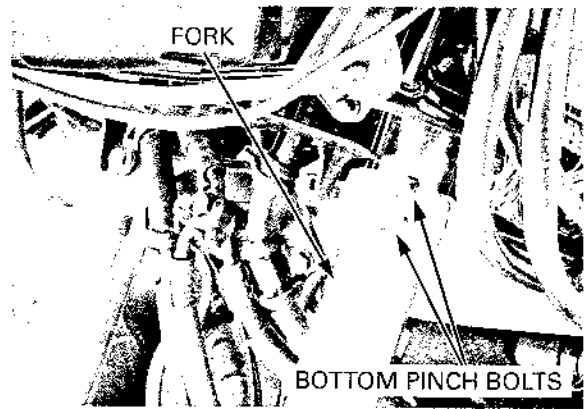


Loosen the fork top bridge pinch bolts.

When the fork leg will be disassembled, loosen the fork cap, but do not remove it yet.



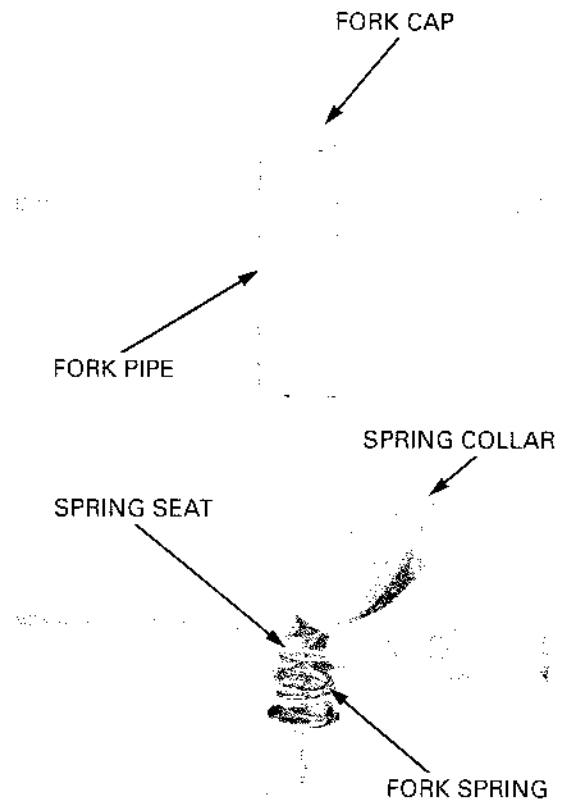
Loosen the fork bottom pinch bolts and remove the fork from the fork top bridge and steering stem.



DISASSEMBLY

Remove the fork cap from the fork pipe.

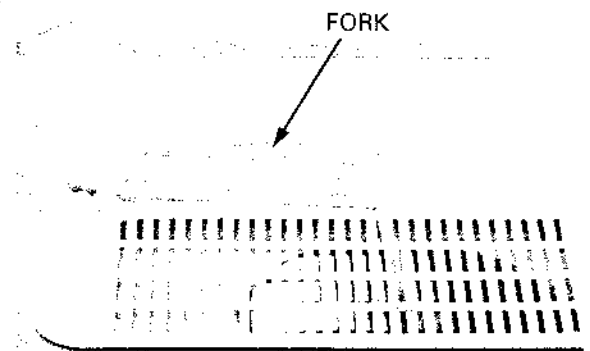
Be careful not to scratch the fork pipe or damage the dust seal.



Remove the spring collar and spring seat from the fork pipe.

Remove the fork spring from the fork pipe.

Pour out the fork fluid by pumping the fork pipe several times.



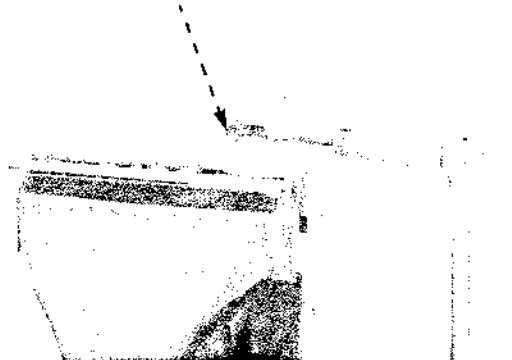
FRONT WHEEL/SUSPENSION/STEERING

Hold the fork slider in a vice with soft jaws or a shop towel.

Remove the fork socket bolt and sealing washer.

If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat, collar, and fork cap.

FORK SOCKET BOLT/SEALING WASHER



Do not remove the fork piston ring, unless it is necessary to replace with a new one.

Remove the fork piston and rebound spring from the fork pipe.

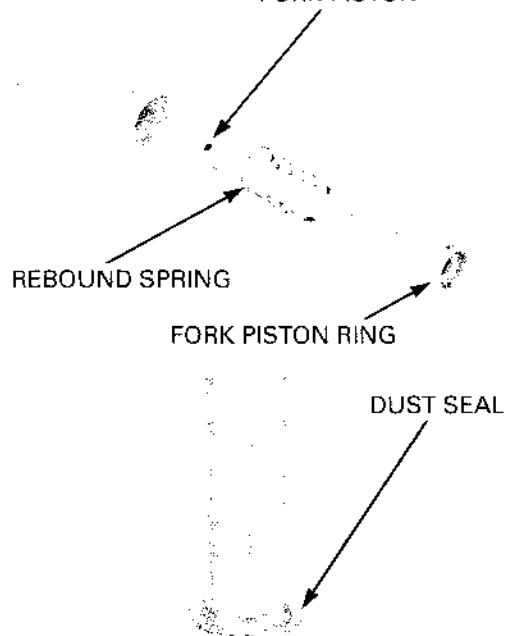
FORK PISTON

REBOUND SPRING

FORK PISTON RING

DUST SEAL

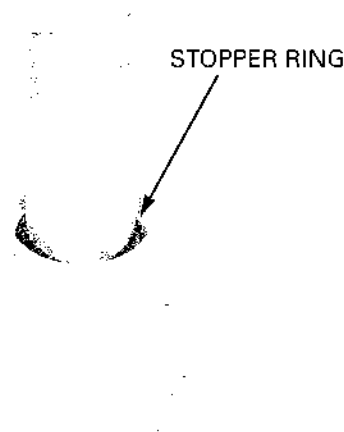
Remove the dust seal.



Do not scratch the fork pipe sliding surface.

Remove the oil seal stopper ring.

STOPPER RING

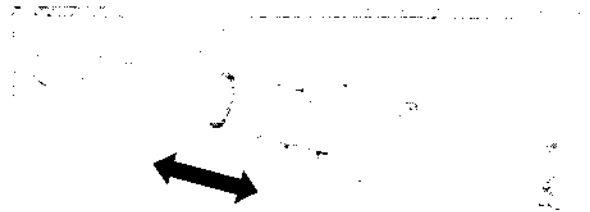


Check that the fork pipe moves smoothly in the fork slider.

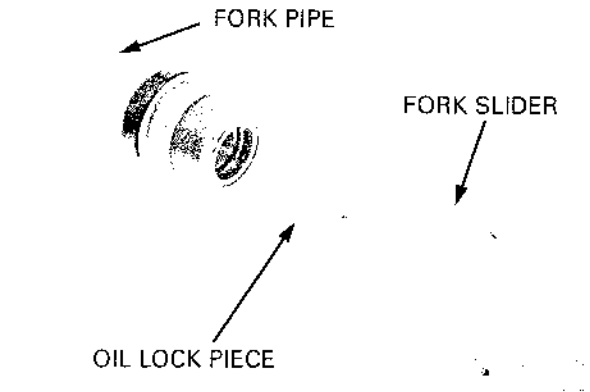
If it does not, check the fork pipe for bending or damage, and bushings for wear or damage.

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.

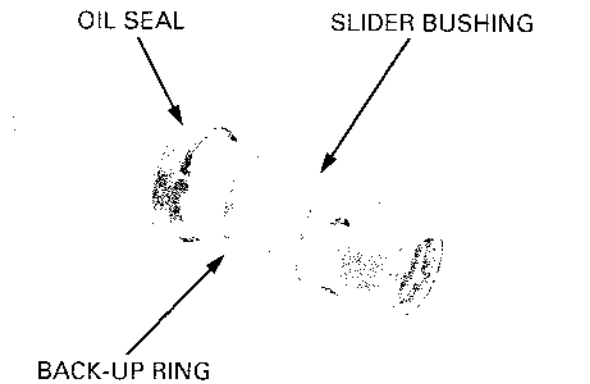
The slider bushing will be forced out by the fork pipe bushing.



Remove the oil lock piece from the fork slider.

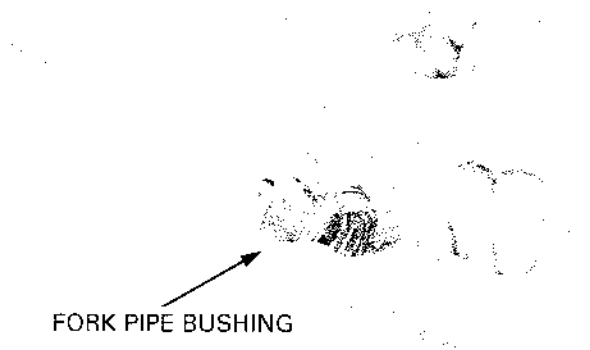


Remove the oil seal, back-up ring and slider bushing from the fork pipe.



Do not remove the sliding bushing unless it is necessary to replace it with a new one.

Carefully remove the fork pipe bushing by prying the slit with a screwdriver until the bushing can be pulled off by hand.

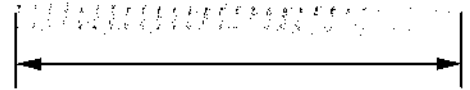


INSPECTION

Fork spring

Measure the fork spring free length.

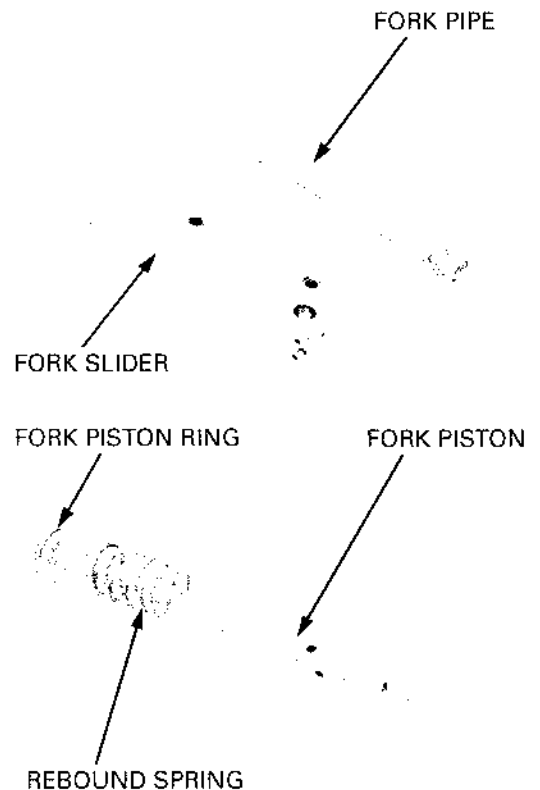
SERVICE LIMIT: 414.1 mm (16.30 in)



Fork pipe/slider/piston

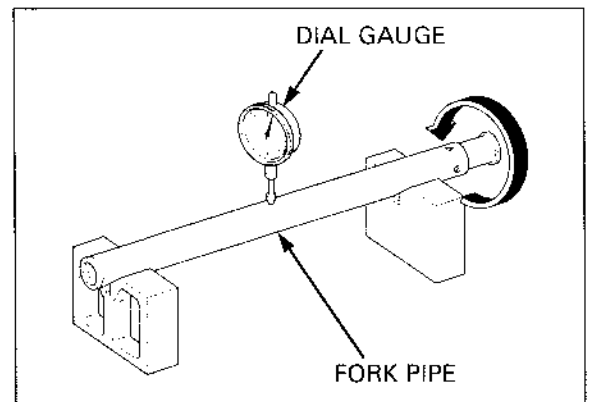
Check the fork pipe and fork slider for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

Check the fork piston ring for wear or damage. Check the rebound spring for fatigue or damage. Replace the component if necessary.



Place the fork pipe in V-block and measure the runout. Actual runout is 1/2 the total indicator reading. Replace the fork damper assembly, if any component are damaged.

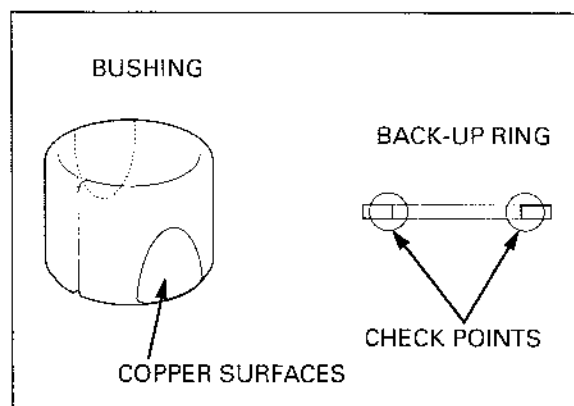
SERVICE LIMIT: 0.20 mm (0.008 in)



Fork pipe bushing

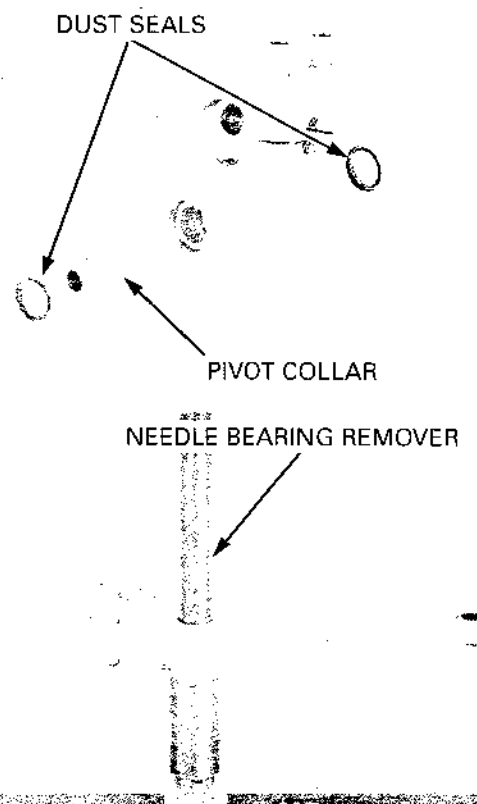
Visually inspect the slider and fork pipe bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



Brake caliper pivot bearing replacement

Remove the dust seals and pivot collar.



Press out the pivot bearings using the special tool.

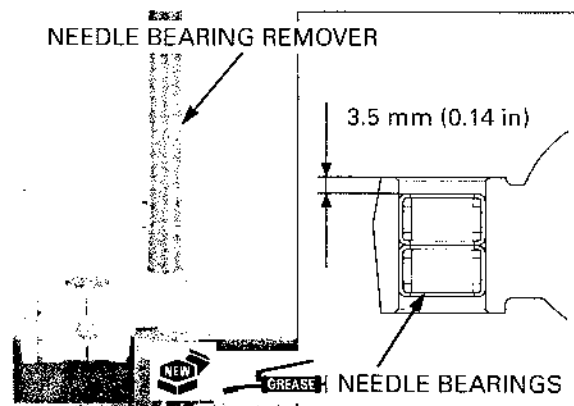
TOOL:

Needle bearing remover 07946-KA50000

Apply grease to the new pivot bearings.

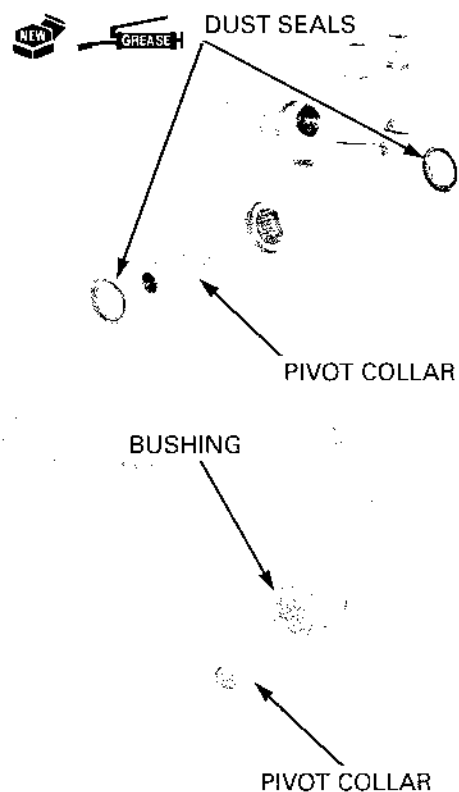
Press the needle bearings into the fork slider using the same tool.

Install the bearing so that the bearing cage below 3.5 mm (0.14 in) from the pivot surface.



FRONT WHEEL/SUSPENSION/STEERING

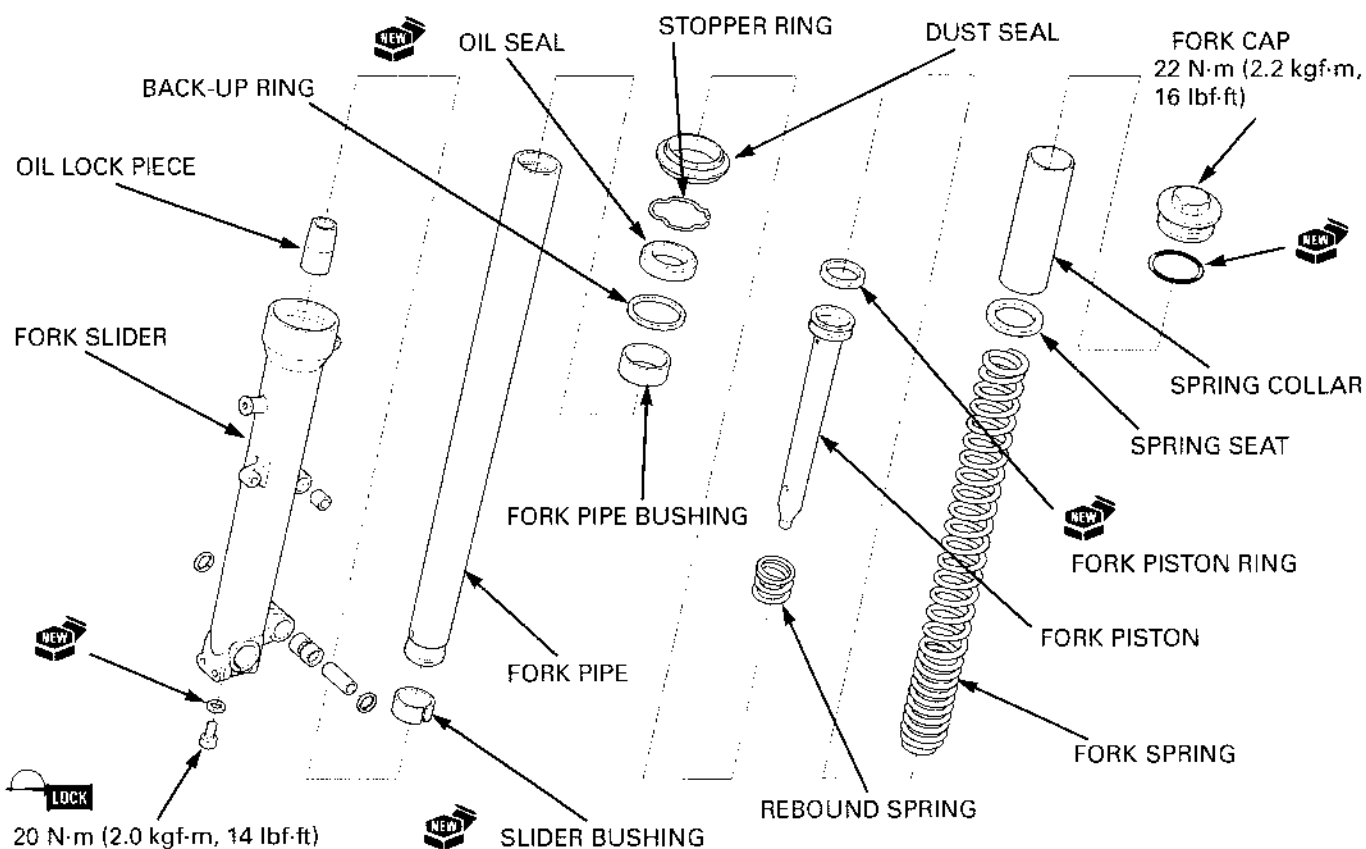
Apply grease to the new dust seal lips.
Install the dust seal and pivot collar.



Check the pivot collar and bushing for wear or damage.

Replace the component if necessary.

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.

Apply fork oil to the new oil seal lip.

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.

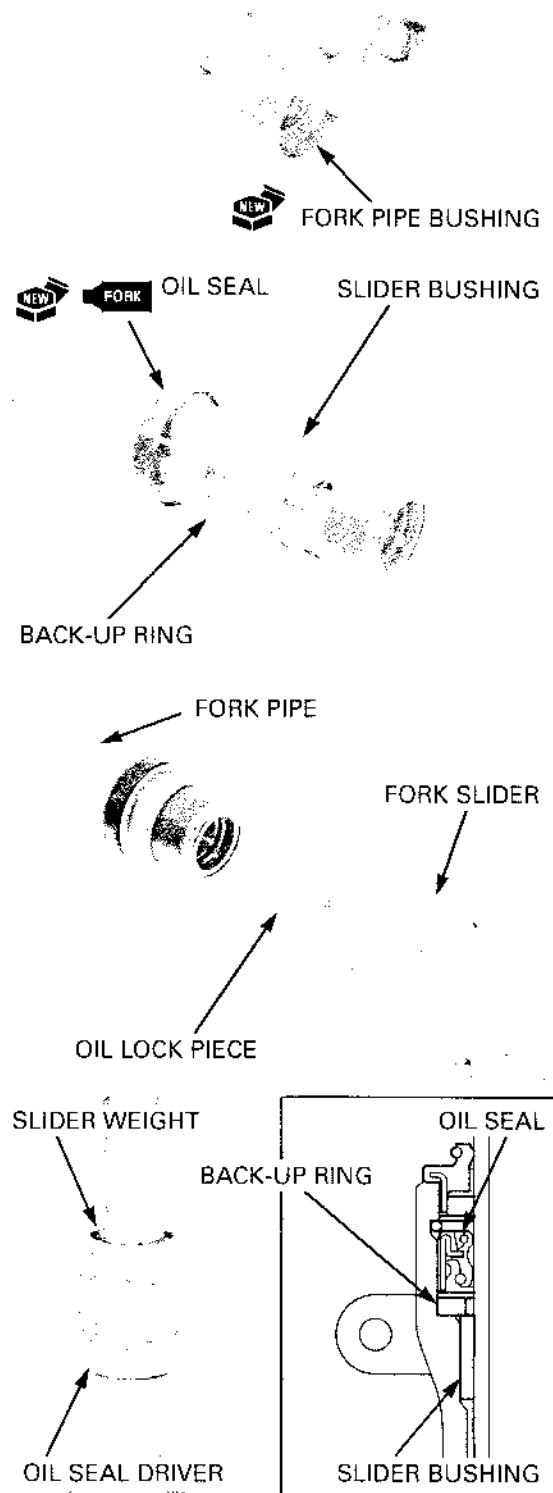
Install the oil lock piece to the fork pipe.
Install the fork pipe into the fork slider.

Drive the oil seal in using the special tools.

TOOLS:

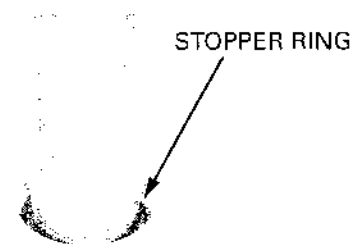
Slider weight
Oil seal driver

07947-KA50100
07947-KA40200

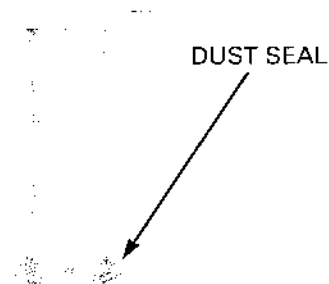


FRONT WHEEL/SUSPENSION/STEERING

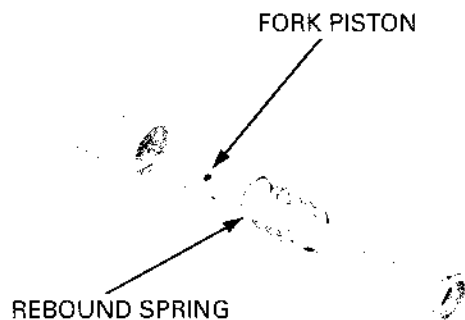
Install the stopper ring into the fork slider groove securely.



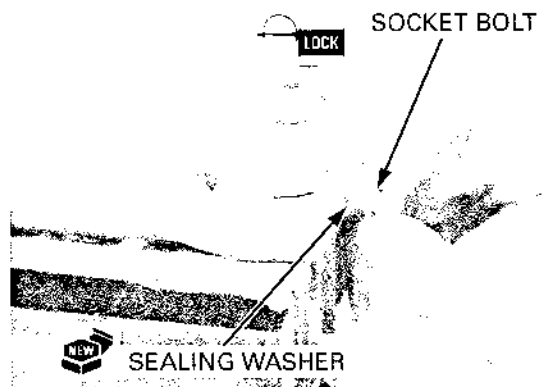
Install the dust seal.



Install the rebound spring to the fork piston.
Install the fork piston into the fork pipe.



Hold the axle holder in a vise with soft jaws or a shop towel.
Clean and apply a locking agent to the fork socket bolt threads.
Install the socket bolt with a new sealing washer.

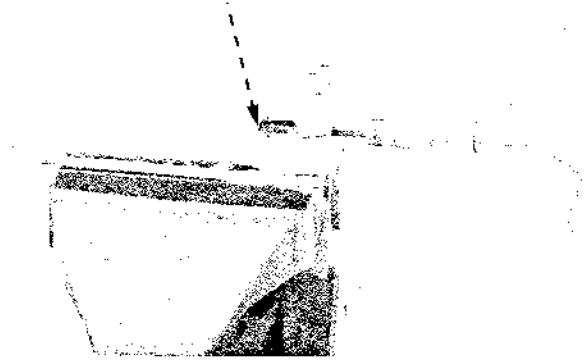


If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat, collar, and fork cap.

Tighten the fork socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

FORK SOCKET BOLT/SEALING WASHER



Pour the specified amount of recommended fork fluid into the fork pipe.

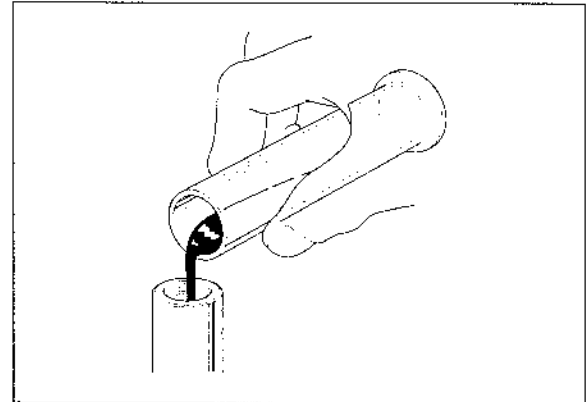
RECOMMENDED FORK FLUID:

Honda ultra cushion oil 10W or equivalent

FORK FLUID CAPACITY:

$531 \pm 2.5 \text{ cm}^3$ (17.9 \pm 0.08 US oz, 18.7 \pm 0.09 Imp oz)

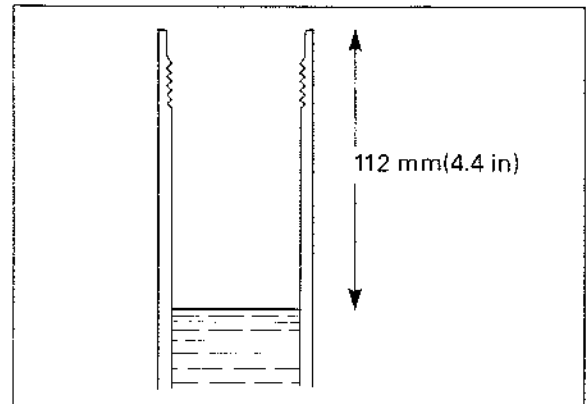
Pump the fork pipe several times.



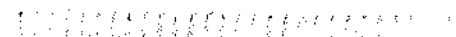
Be sure the oil level is the same in the both forks.

Measure the oil level from the top of the fork pipe while compressing the pipe all the way after stroking the fork pipe slowly more than 5 times.

FORK OIL LEVEL: 112 mm (4.4 in)



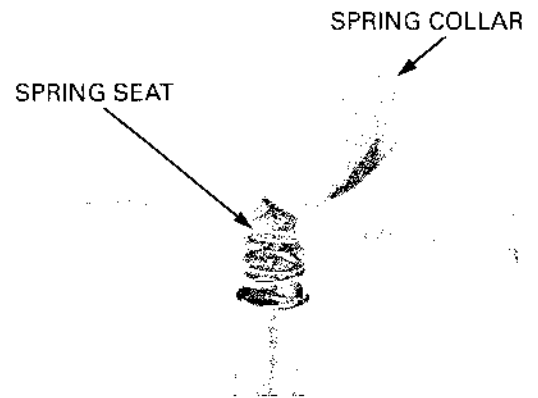
Pull the fork pipe up and install the fork spring with the tightly would end facing down.



TIGHTLY WOULD END

FRONT WHEEL/SUSPENSION/STEERING

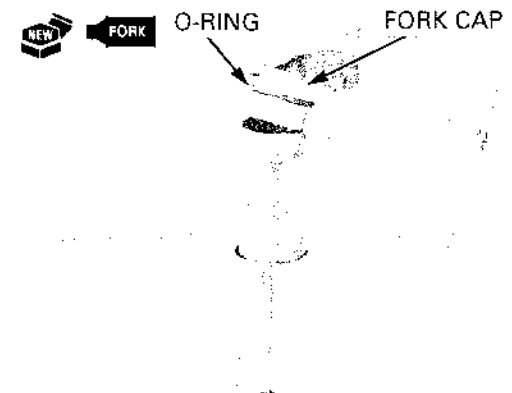
Install the spring seat and collar.



Install new O-ring onto the fork cap.
Apply fork fluid to the new O-ring.

*Tighten the fork cap
after installing the
fork pipe into the
fork bridge.*

Install the fork cap into the fork pipe.



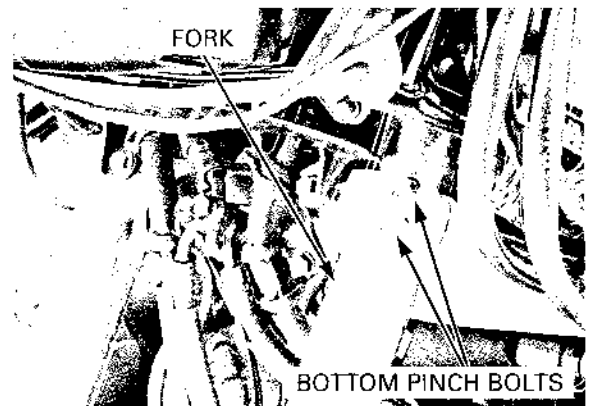
INSTALLATION

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: 27 N·m (2.8 kgf·m, 20 lbf·ft)

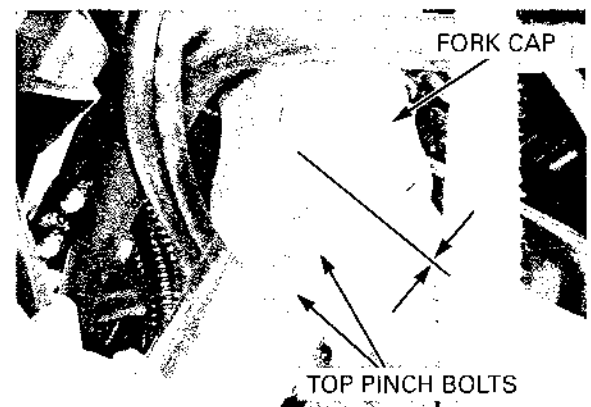


Tighten the fork cap to the specified torque if it was removed.

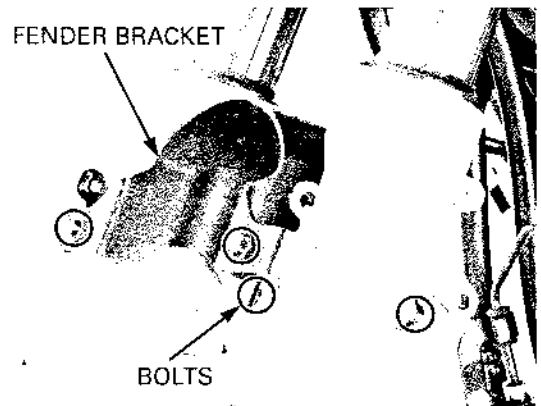
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the top bridge pinch bolt to the specified torque.

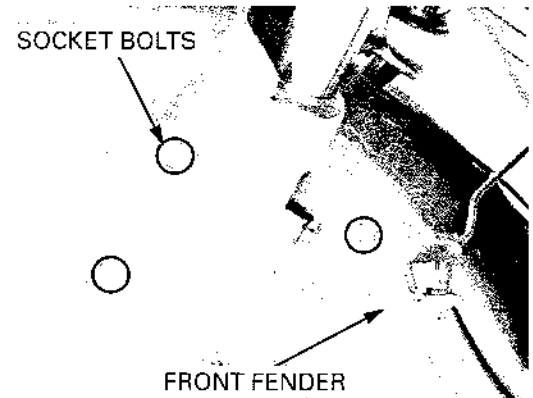
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



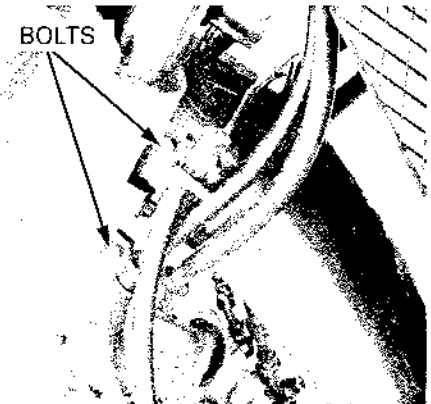
Install the front fender bracket and tighten the bolts securely.



Install the front fender and tighten the socket bolts securely.



Install and tighten the brake pipe/hose clamp bolts securely.



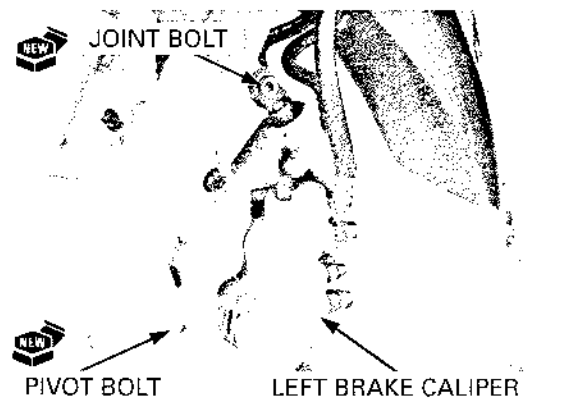
Install and tighten the new left caliper pivot bolt to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Install and tighten the new left caliper (secondary master joint) bolt to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Install the front wheel (page 13-20).



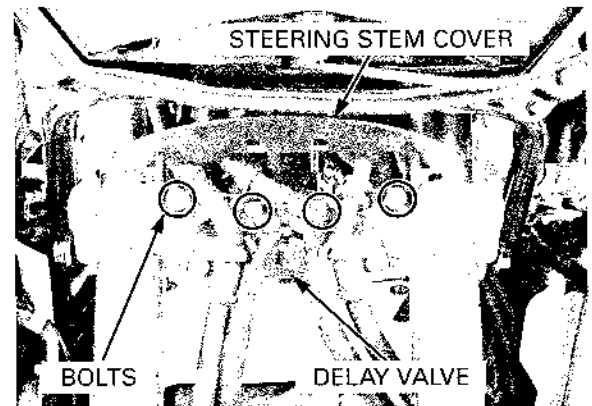
STEERING STEM

REMOVAL

Remove the following:

- Front wheel (page 13-15)
- Handlebar (page 13-6)

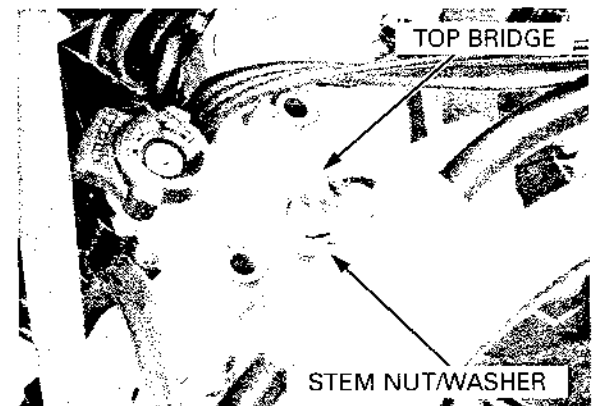
Remove the bolts and steering stem cover.
Remove the bolts and delay valve.



Remove the stem nut and washer.

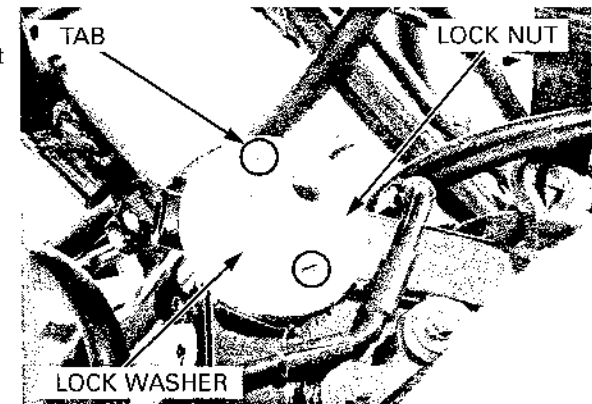
Remove the fork legs (page 13-21).
Disconnect the ignition switch 4P (White) connector.
Disconnect the immobilizer 4P (Natural) connector.

Remove the top bridge.



Straighten the tabs of the lock washer.

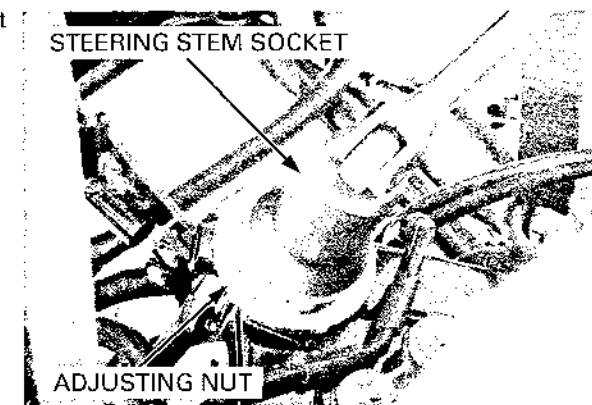
Remove the steering bearing adjusting nut lock nut and lock washer.



Remove the steering stem bearing adjusting nut using the special tool.

TOOL:

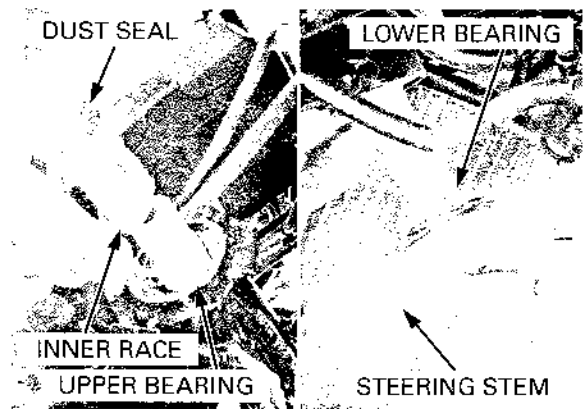
Steering stem socket 07916-3710101



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing

Check the steering bearings, inner and outer races for wear or damage.



BEARING REPLACEMENT

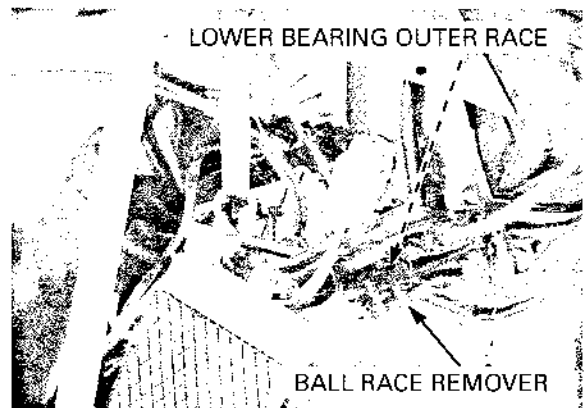
Always replace the bearings and races as a set.

Remove the lower bearing outer race using the following tool.

TOOL:

Ball race remover

07946-3710500



Remove the upper bearing outer race using the following tools.

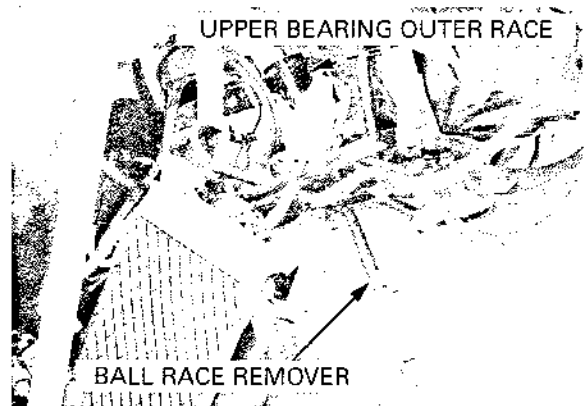
TOOLS:

Driver attachment

07953-MJ10100

Driver handle

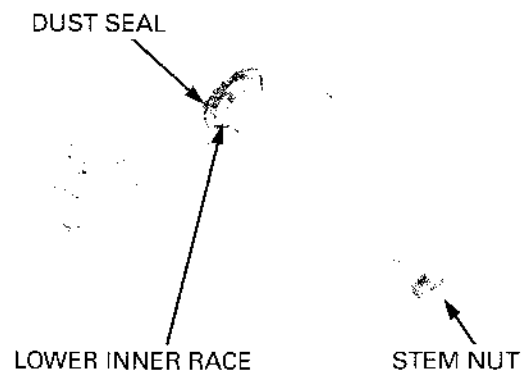
07953-MJ10200



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.



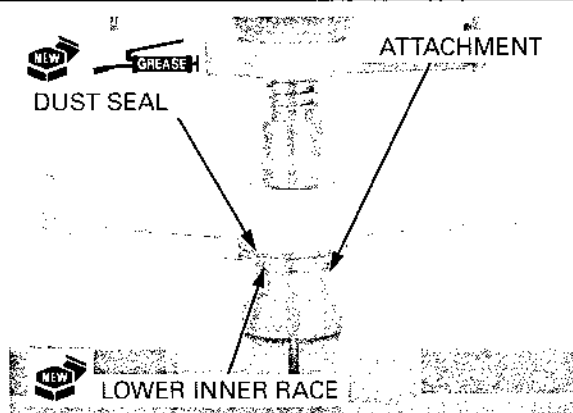
FRONT WHEEL/SUSPENSION/STEERING

Apply grease to a 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:

Attachment, 30 mm I.D. 07746-0030300

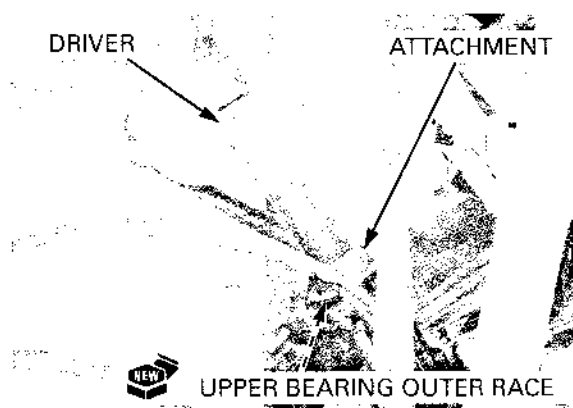


Drive the new upper bearing outer race into the head pipe using the following tools.

TOOLS:

Driver 07749-0010000

Attachment, 42 X 47 mm 07746-0010300

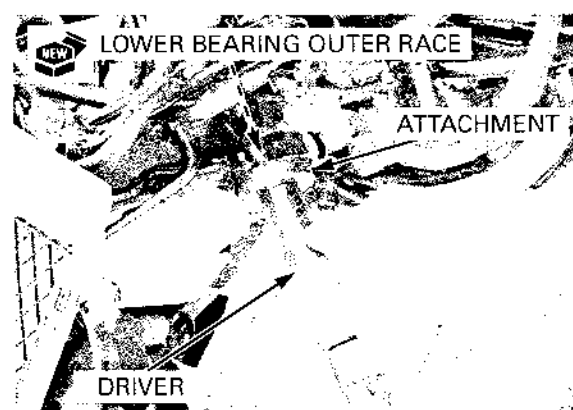


Drive the new lower bearing outer race into the head pipe using the following tools.

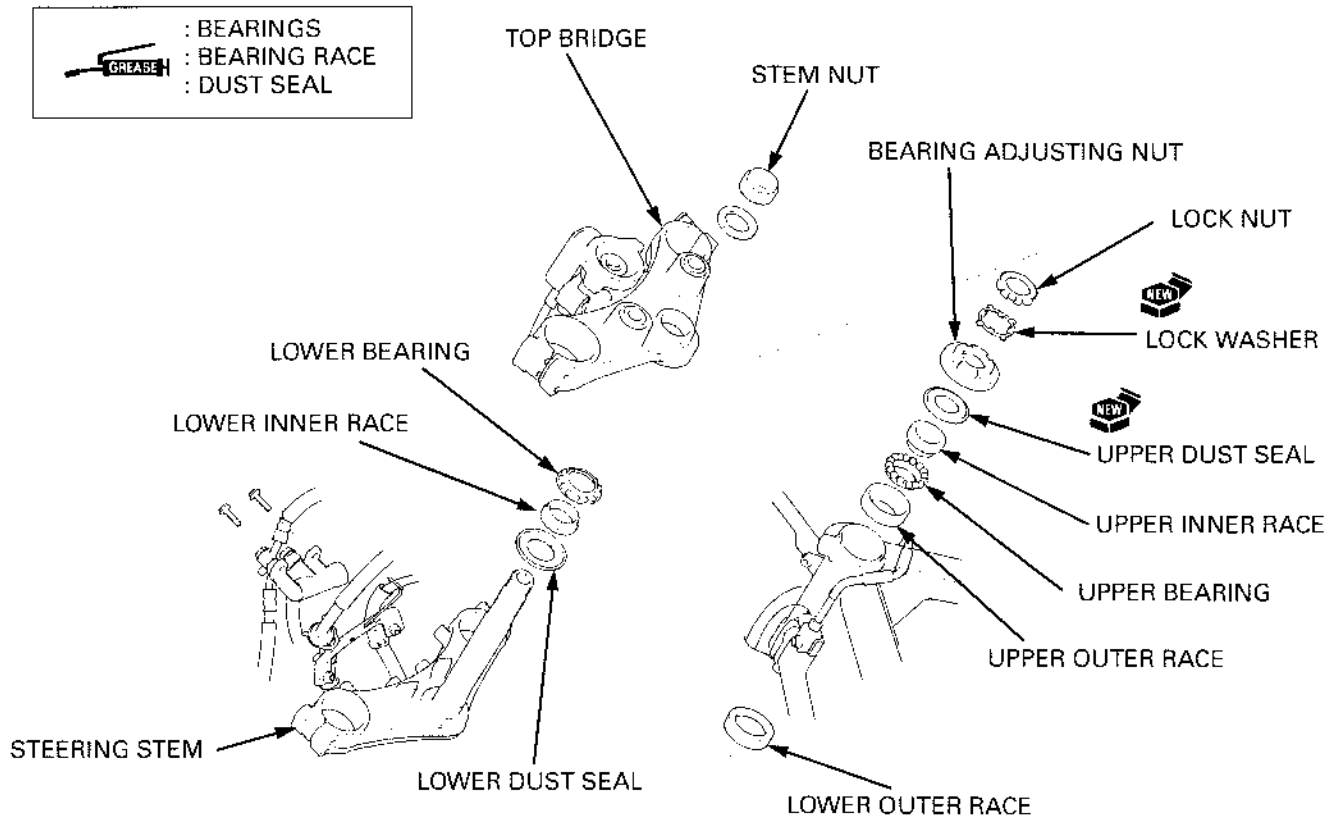
TOOLS:

Driver 07749-0010000

Attachment, 52 X 55 mm 07746-0010400

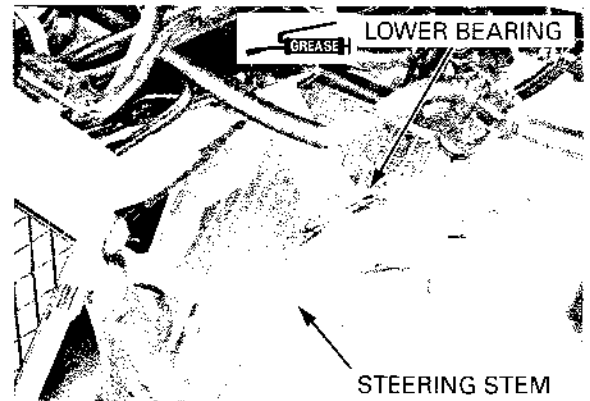


INSTALLATION

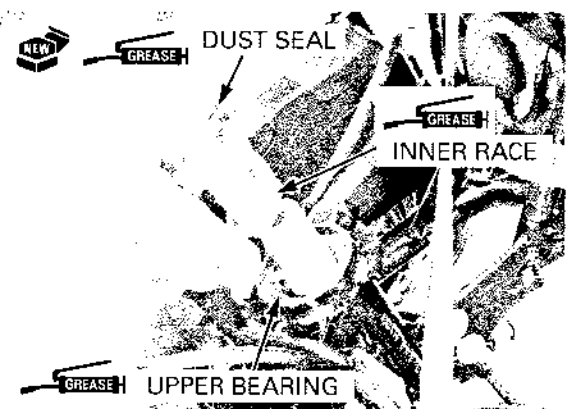


Apply grease to upper and lower bearings and bearing races.

Install the lower bearing onto the steering stem. Insert the steering stem into the steering head pipe.



Install upper bearing, inner race and new dust seal.



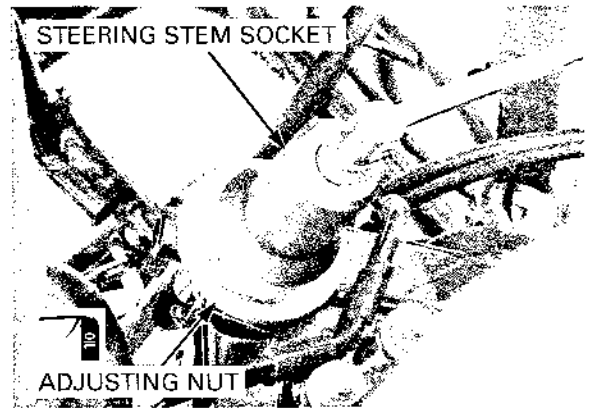
FRONT WHEEL/SUSPENSION/STEERING

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**

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



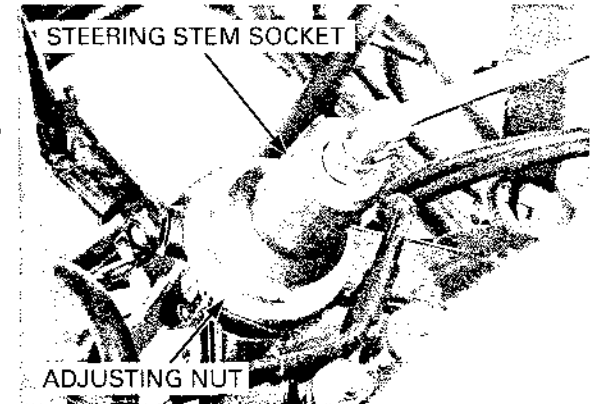
Move the steering stem right and left, lock-to-lock, five times to seat the bearings.
Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.



Retighten the bearing adjusting nut to the specified torque.

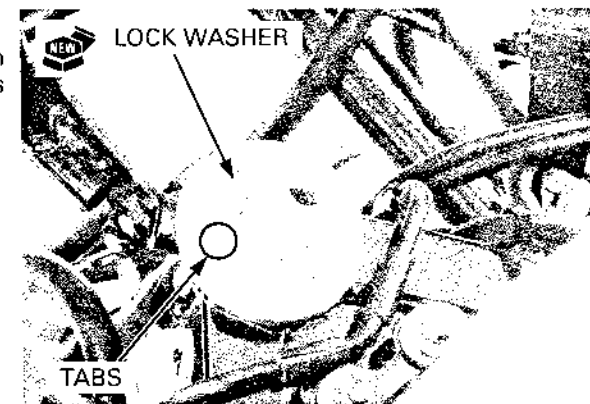
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.



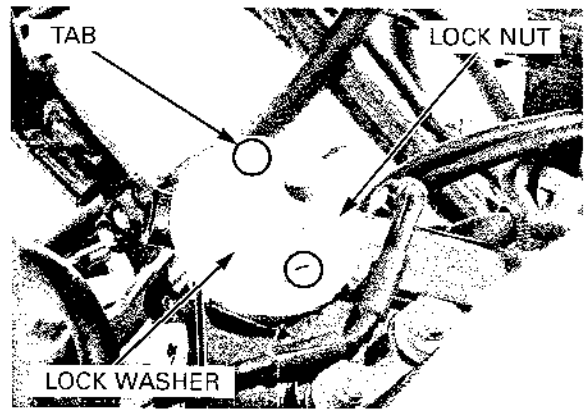
Install the new lock washer onto the steering stem.

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°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.



Install the top bridge.

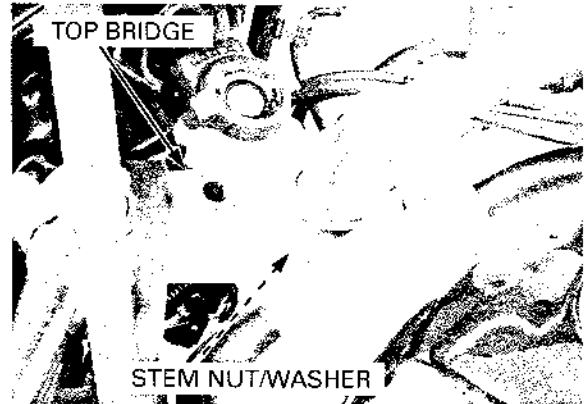
Install the fork legs (page 13-32).

Connect the ignition switch 4P (White) connector.
Connect the immobilizer 4P (Natural) connector.

Install the washer and steering stem nut.

Tighten the steering stem nut to the specified torque.

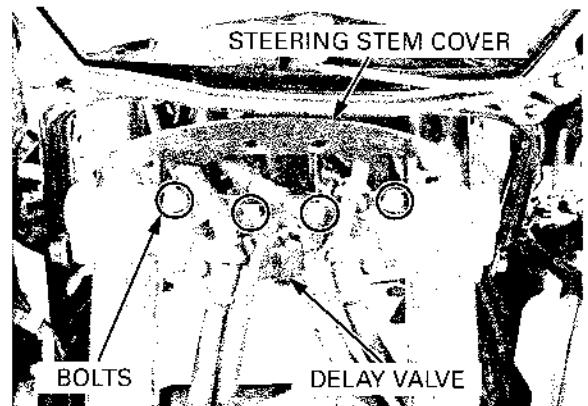
TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)



Install the delay valve and tighten the bolts securely.

Install the steering stem cover and tighten the bolts securely.

Install the front wheel (page 13-20).



STEERING HEAD BEARING PRE-LOAD

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

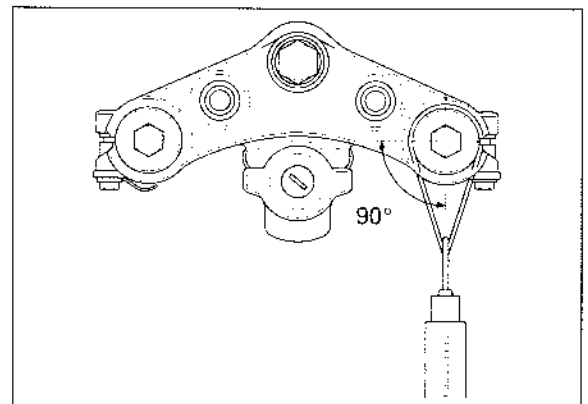
Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube and measure the steering head bearing pre-load.

The pre-load should be within 1.0 – 1.5 kgf (2.2 – 3.3 lbf).

If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.

Make sure that there is no cable or wire harness interference.

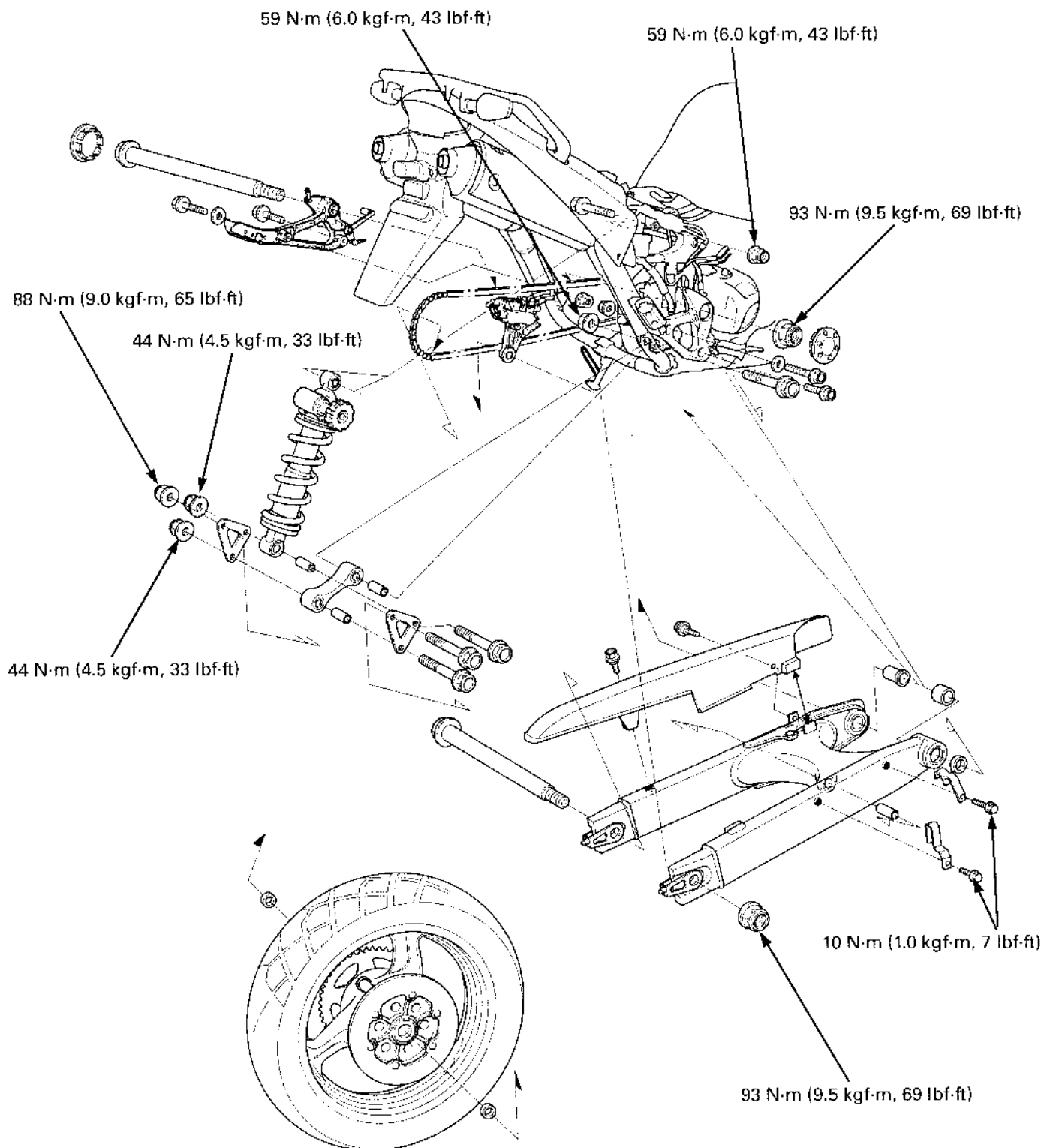


MEMO

14. REAR WHEEL/SUSPENSION

COMPONENT LOCATION	14-2	SHOCK ABSORBER.....	14-12
SERVICE INFORMATION	14-3	SUSPENSION LINKAGE	14-15
TROUBLESHOOTING	14-5	SWINGARM	14-18
REAR WHEEL	14-6		

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 the rear wheel installation, check the 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.
- Before disposal of the shock absorber, release the nitrogen (page 14-13).
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.
- Refer to the brake system information (page 15-4).

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	2.0 (0.08)
Cold tire pressure	Driver only		250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Driver and passenger		280 kPa (2.80 kgf/cm ² , 41 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.
Drive chain	Size/link	DID	525HV 112L4	—
		RK	525ROZ1 112LE	—
	Slack		35 – 45 (1-3/8 – 1-3/4)	—
Shock absorber	Pre-load adjuster standard position		4 clicks from minimum position	—





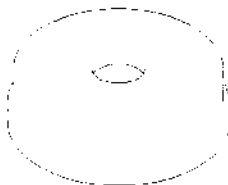






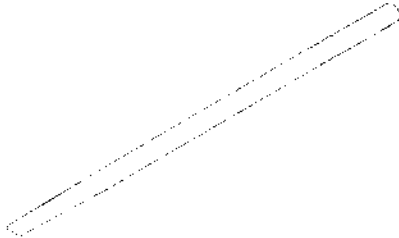
Unit: mm (in)


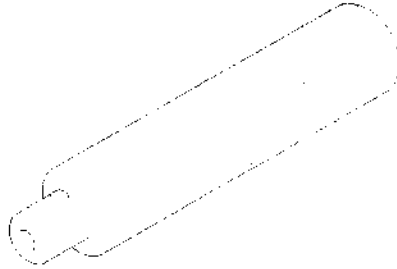
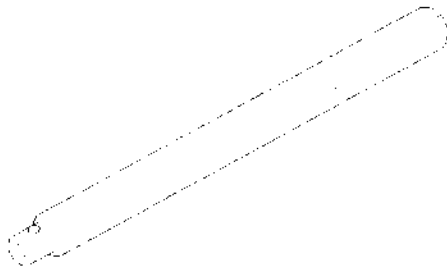
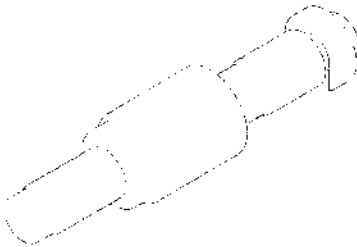
TOEQUE VALUES

Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Final driven sprocket nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Shock absorber upper mounting nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Drive chain slider screw	4 N·m (0.42 kgf·m, 3.0 lbf·ft)	Apply a locking agent to the threads
Swingarm-to-shock link plate nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Shock link-to-shock link plate nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock link-to-bracket nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Shock link bracket bolt (12 mm)	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Shock link bracket bolt (14 mm)	74 N·m (7.5 kgf·m, 54 lbf·ft)	
Brake hose guide bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

REAR WHEEL/SUSPENSION

TOOLS

Attachment, 32 X 35 mm 07746-0010100 	Attachment, 37 X 40 mm 07746-0010200 	Attachment, 42 X 47 mm 07746-0010300 
Attachment, 52 X 55 mm 07746-0010400 	Attachment, 62 X 68 mm 07746-0010500 	Attachment, 24 X 26 mm 07746-0010700 
Attachment, 22 X 24 mm 07746-0010800 	Pilot, 17 mm 07746-0040400 	Pilot, 20 mm 07746-0040500 
Pilot, 25 mm 07746-0040600 	Pilot, 28 mm 07746-0041100 	Bearing remover shaft 07GGD-0010100 or 07746-0050100 

<p>Bearing remover head, 20 mm 07746-0050600</p> 	<p>Driver 07749-0010000</p> 	<p>Driver handle attachment 07949-3710001</p> 
<p>Needle bearing remover 07LMC-KV30100</p> 		

TROUBLESHOOTING

Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

Hard suspension

- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Incorrect swingarm pivot fasteners tightening
- Tire pressure too high

Rear wheel wobbling

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

Rear wheel turns hard

- Faulty rear wheel bearings
- Bent rear axle
- Rear axle drag
- Drive chain too tight

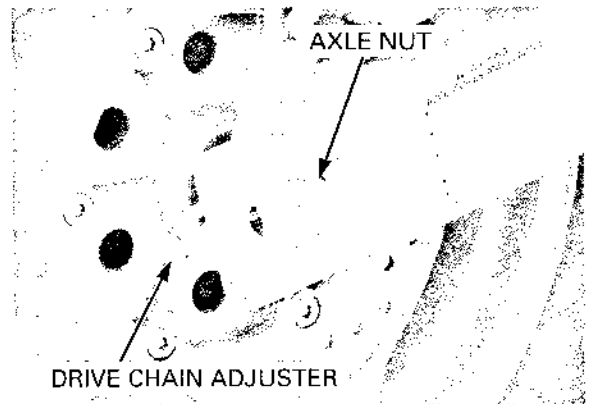
Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

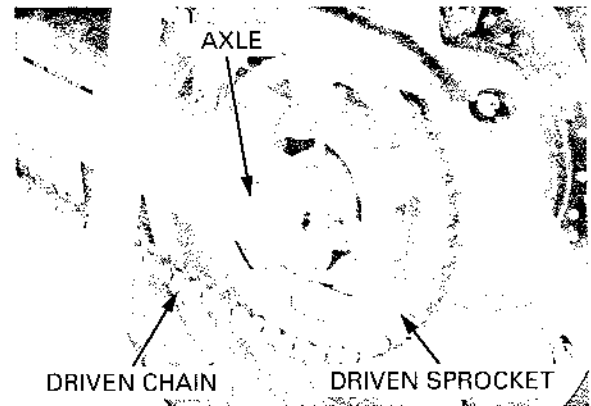
REAR WHEEL

REMOVAL

Loosen the drive chain adjusters and rear axle nut.
Support the motorcycle securely using a hoist or equivalent.
Remove the axle nut.



Push the rear wheel forward.
Derail the drive chain from the driven sprocket.
Remove the axle from the left side and remove the rear wheel.

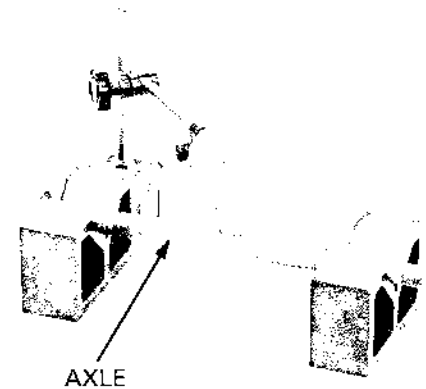


INSPECTION

Axle

Place the axle in V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

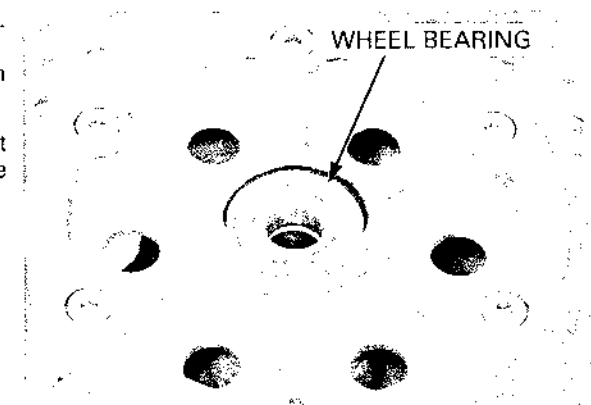
SERVICE LIMIT: 0.20 mm (0.008 in)



Wheel bearing

Turn the inner race of each bearing with your finger.
Bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

Replace the wheel bearings in pairs. Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

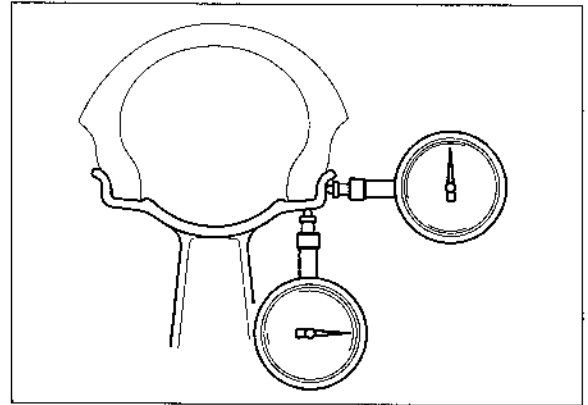
SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)

Wheel balance

Refer to the wheel balance servicing (page 13-17).

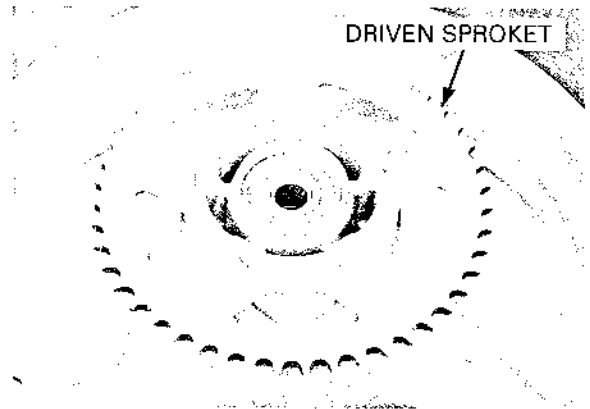


Driven sprocket

Check the condition of the final driven sprocket teeth.

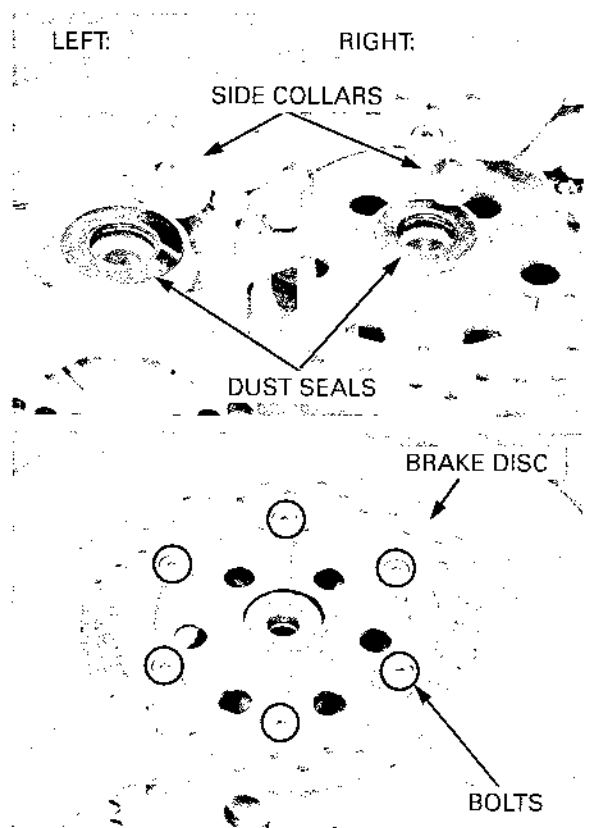
Replace the sprocket if worn or damaged.

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.



DISASSEMBLY

Remove the side collars and dust seals.

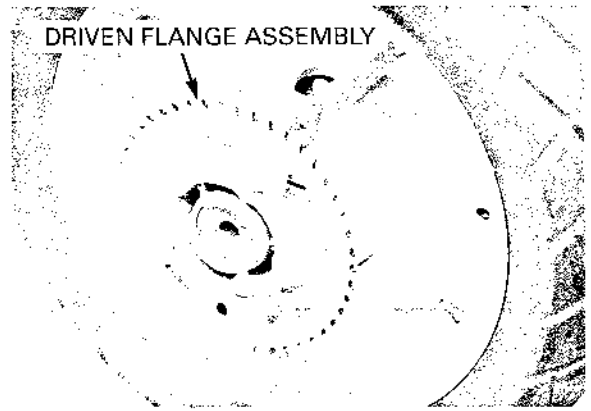


Remove the bolts and brake disc.

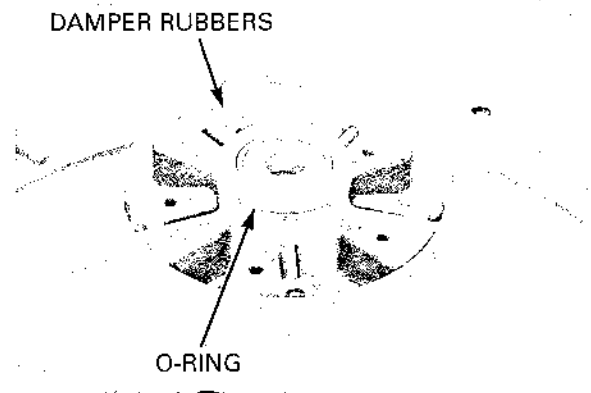
REAR WHEEL/SUSPENSION

If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.

Remove the driven flange assembly from the left wheel hub.



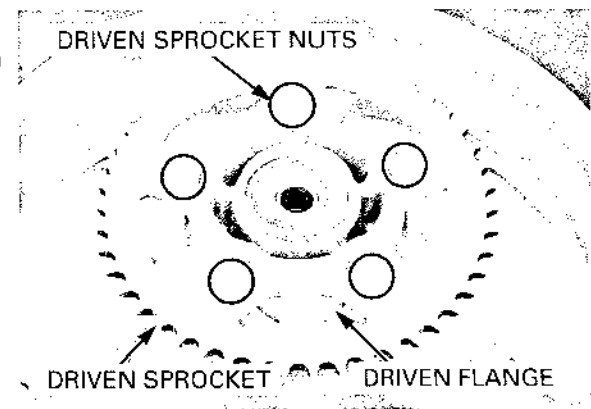
Remove the wheel damper rubbers.
Remove the O-ring.



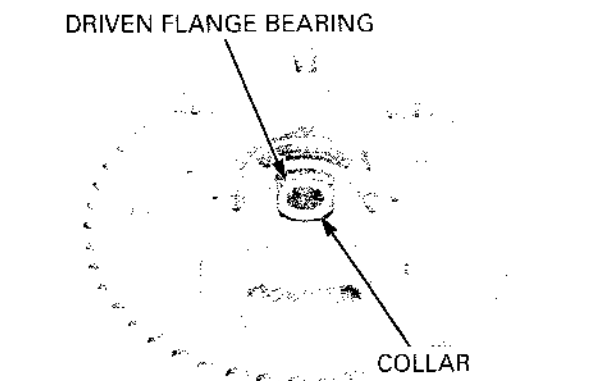
Driven flange bearing removal

Loosen the driven sprocket nuts.

Remove the driven flange from the wheel hub, then remove the driven sprocket nuts and sprocket.



Remove the driven flange collar.
Drive out the driven flange bearing.

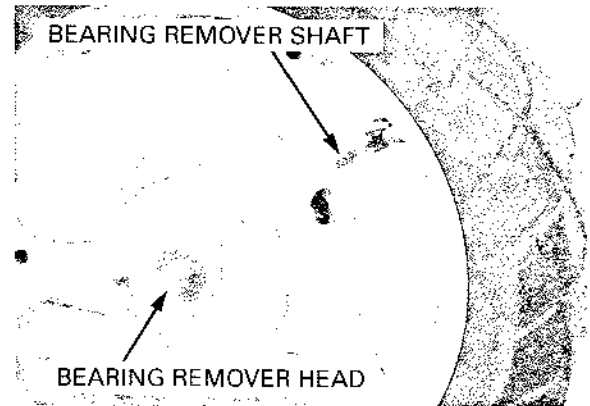


Wheel bearing replacement

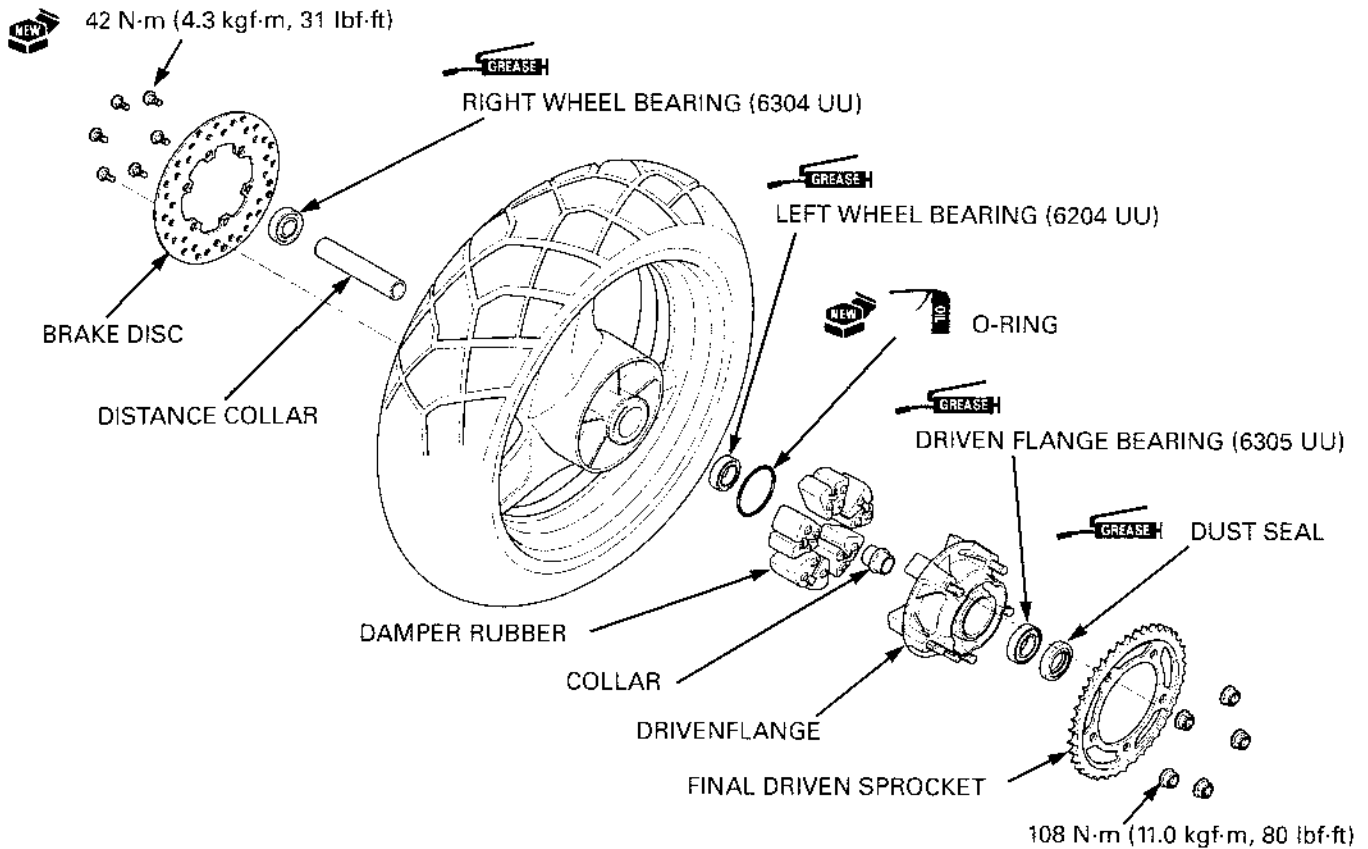
Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm 07746-0050600
Bearing remover shaft 07GGD-0010100 or 07746-0050100



ASSEMBLY



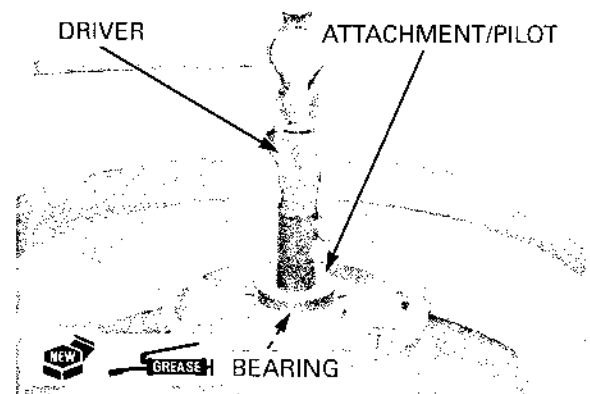
Wheel bearing installation

Never install the old bearings, once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely.

TOOLS:

Driver 07749-0010000
Attachment, 52 X 55 mm 07746-0010400
Pilot, 20 mm 07746-0040500

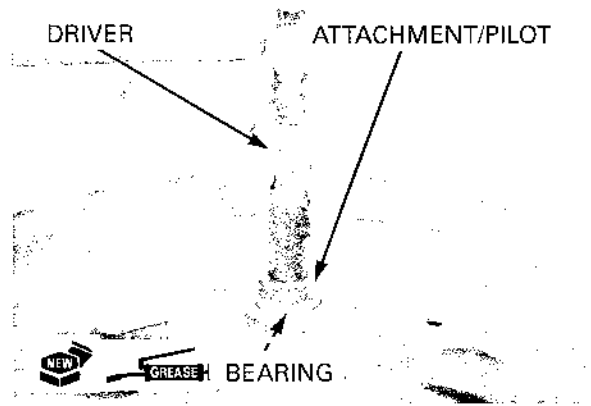


REAR WHEEL/SUSPENSION

Install the distance collar, then drive in a new left bearing squarely.

TOOLS:

Driver	07749-0010000
Attachment, 42 X 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



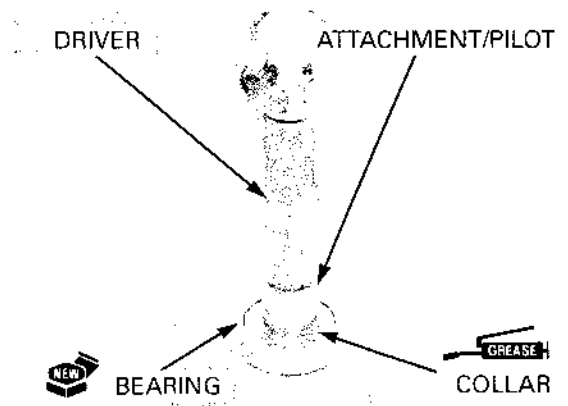
Driven flange bearing installation

Apply grease and install the driven flange collar.

Drive the driven flange collar into the new driven flange bearing using the special tools.

TOOLS:

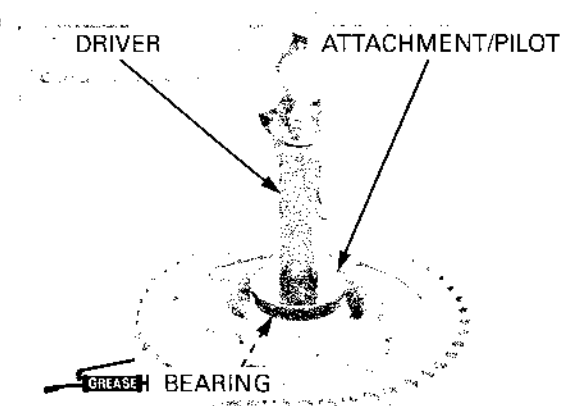
Driver	07749-0010000
Attachment, 42 X 47 mm	07746-0010300
Pilot, 25 mm	07746-0040600



Drive a new driven flange bearing/collar into the driven flange using the special tools.

TOOLS:

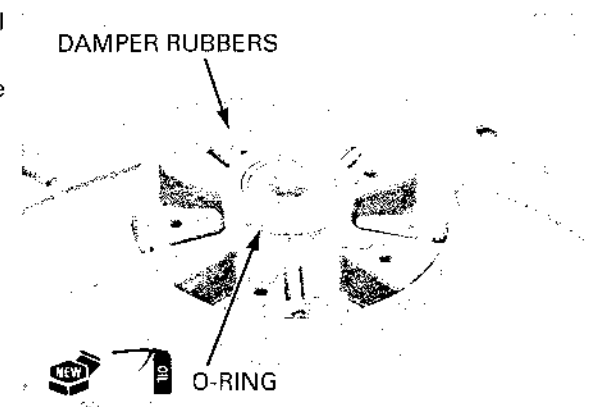
Driver	07749-0010000
Attachment, 62 X 68 mm	07746-0010500
Pilot, 25 mm	07746-0040600



Replace the
damper rubber as a
set.

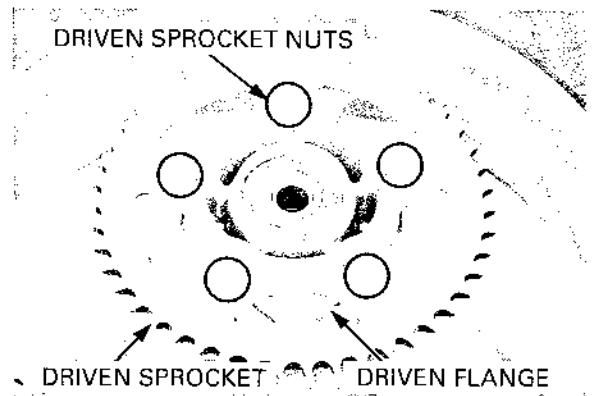
Install the wheel damper rubbers into the wheel hub.

Apply oil to the new O-ring and install it into the groove of the wheel hub.



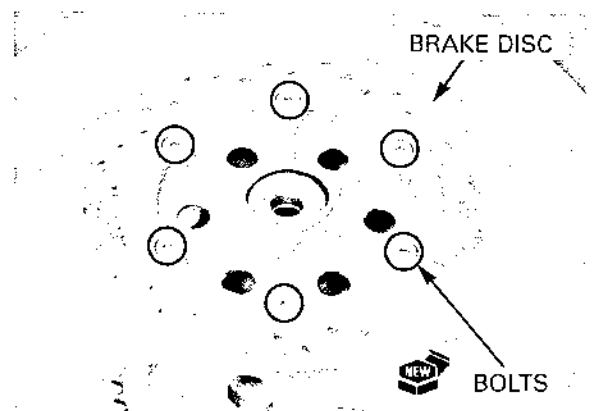
Install the driven flange assembly into the left wheel hub.
If the driven sprocket was removed, install the driven sprocket and tighten the nuts to the specified torque.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



Install the brake disc on the wheel hub with its rotating direction mark facing out.
Install and tighten the new bolts to the specified torque.

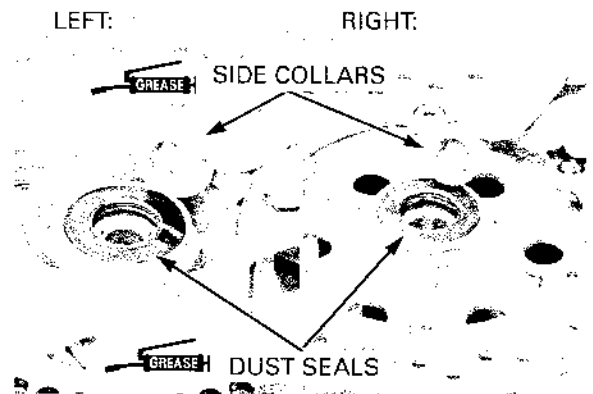
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Apply grease to the dust seal lips, then install it into the driven flange.

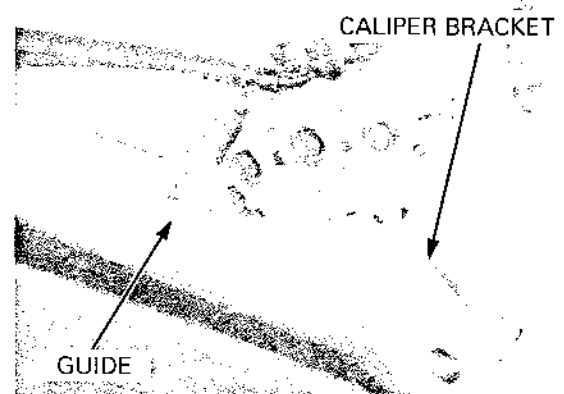
Apply grease to the side collar inside.

Install the side collars.



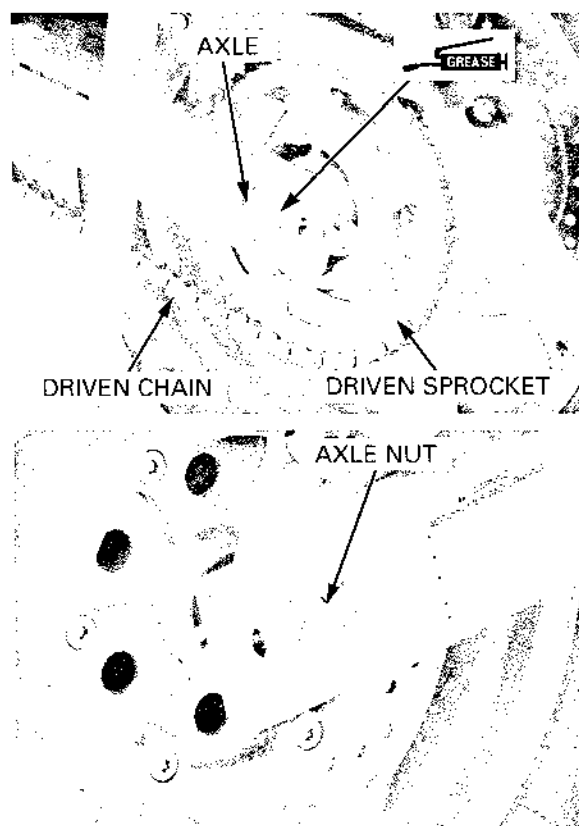
INSTALLATION

Install the rear brake caliper bracket onto the guide of the swingarm.



REAR WHEEL/SUSPENSION

Place the rear wheel into the swingarm.
Install the drive chain over the driven sprocket.
Apply thin layer of grease to the rear axle surface.
Install the rear axle from the left side.



Loosely install the rear axle nut.
Adjust the drive chain slack (page 3-17).
Tighten the rear axle nut to the specified torque.
TORQUE: 93 N·m (9.5 kgf-m, 69 lbf-ft)

SHOCK ABSORBER

REMOVAL

Support the motorcycle securely using a safety stand or hoist.

Remove the side cover (page 2-3).

Remove the shock absorber lower mounting bolt/nut.

LOWER MOUNTING BOLT/NUT

Remove the upper mounting bolt/nut and shock absorber.

UPPER MOUNTING BOLT/NUT

SHOCK ABSORBER

INSPECTION

Visually inspect the damper unit for damage.

Check for the:

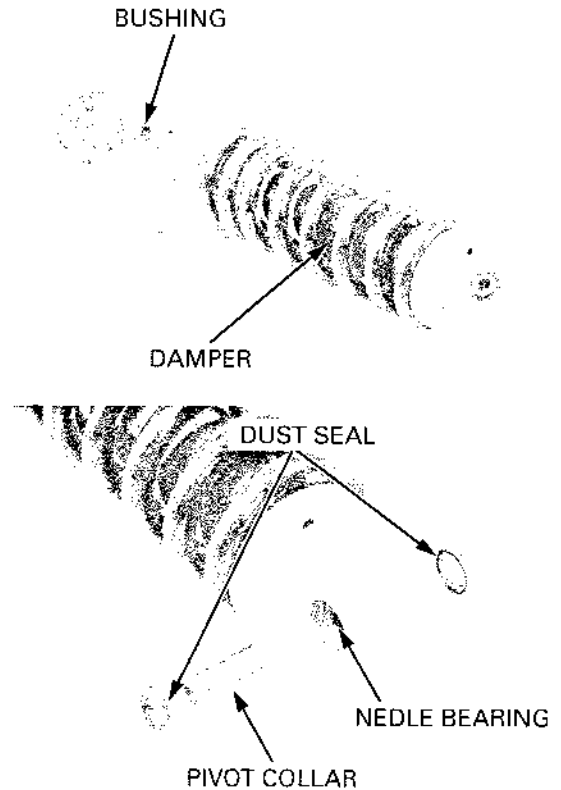
- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Upper mounting bushing for wear or damage

Inspect all the other parts for wear or damage.

Remove the lower joint pivot collar and dust seals.

Check the dust seals and needle bearing for wear or damage.

Replace them if necessary.



SHOCK ABSORBER DISPOSAL PROCEDURE

Center punch the damper to mark the drilling point.

Wrap the damper unit inside a plastic bag.

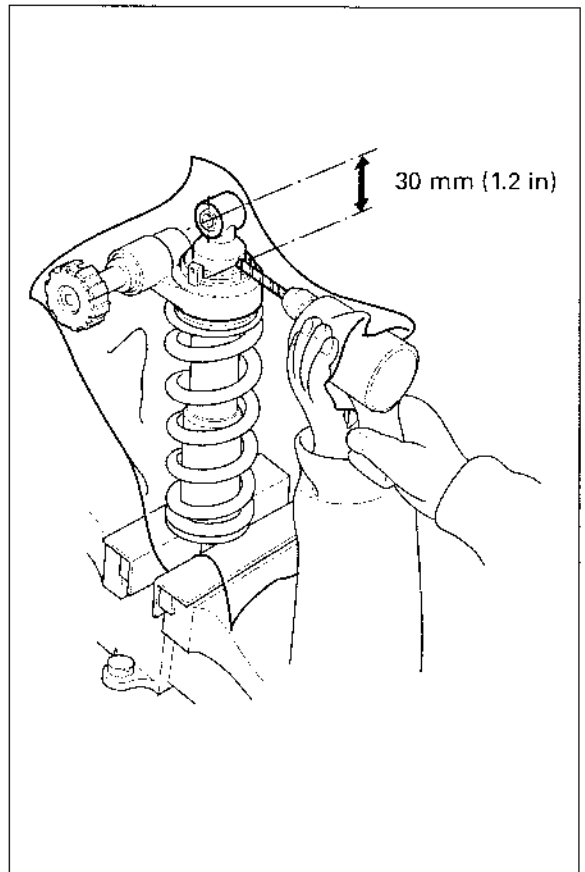
Support the damper in a vise as shown.

Through the open end of the bag, insert a drill motor with a sharp 30 mm (1.2 in) drill bit.

NOTICE

- Point the valve away from you to prevent debris getting in your eyes.
- Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber reservoir.

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.



REAR WHEEL/SUSPENSION

LOWER JOINT NEEDLE BEARING REPLACEMENT

Remove the pivot collar and dust seals.

Place the damper with the rebound damping adjuster facing up.

Set the damper in a hydraulic press.

Press the needle bearing out from the lower joint.

TOOLS:

Driver handle attachment	07749-3710001
Attachment, 22 X 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

Pack a new needle bearing with multi-purpose grease.

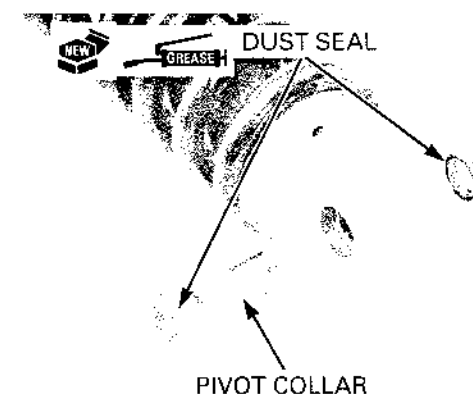
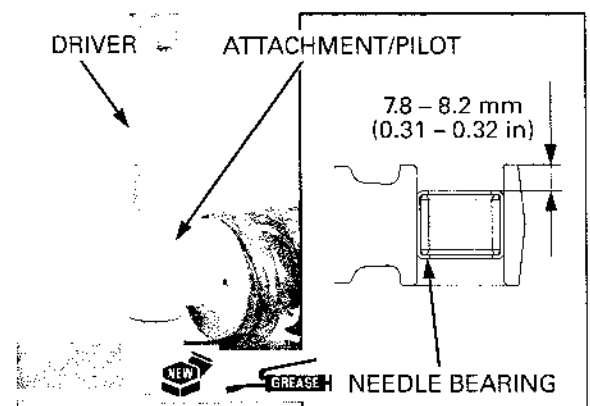
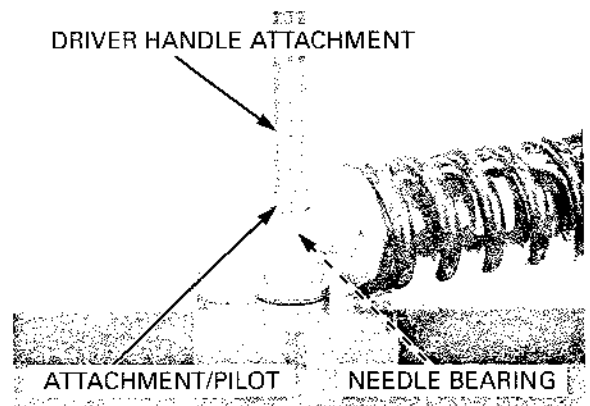
Press the needle bearing into the lower joint until the depth from the lower joint surface is 7.8 - 8.2 mm (0.31 - 0.32 in), using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 24 X 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

Apply grease to the new dust seal lips.

Install the dust seals and pivot collar.

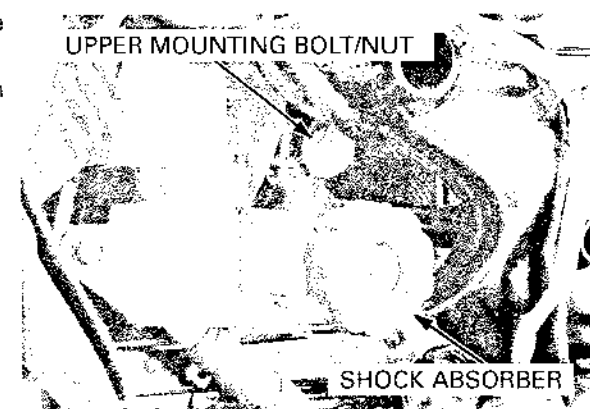


INSTALLATION

Install the shock absorber into the frame with the rebound damping adjuster facing to the right.

Install the upper mounting bolt and nut and tighten the upper mounting nut to the specified torque.

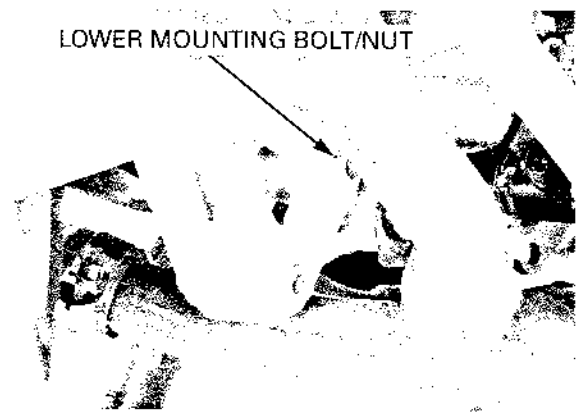
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



Install the shock absorber lower mounting nut and tighten the lower mounting nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Install the side cover (page 2-3).



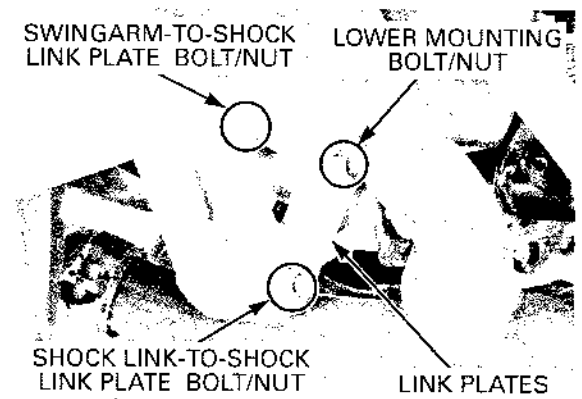
SUSPENSION LINKAGE

REMOVAL

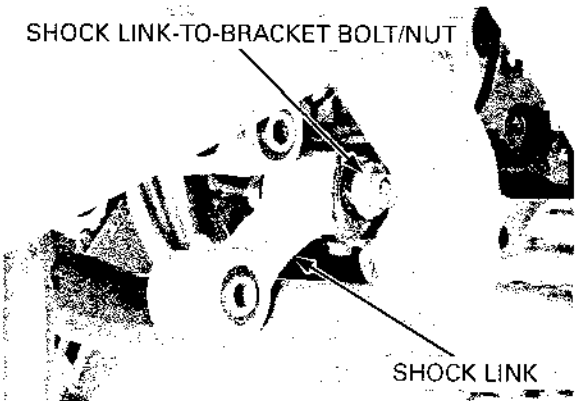
Support the motorcycle securely using a hoist or equivalent.

Remove the following:

- Shock absorber lower mounting bolt/nut
- Swingarm-to-shock link plate bolt/nut
- Shock link-to-shock link plate bolt/nut
- Shock link plates



Remove the shock link-to-bracket nut, bolt and shock link.

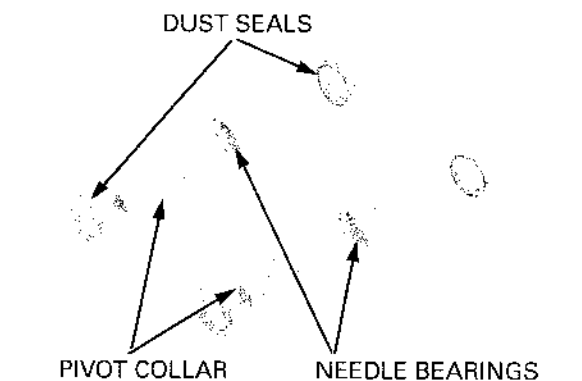


INSPECTION

Remove the pivot collars and dust seals from the shock link.

Check the dust seals and collars for wear, damage or fatigue.

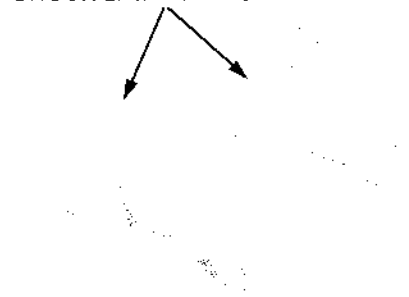
Check the needle bearings for damage or loose fit.



REAR WHEEL/SUSPENSION

Check the shock link plates for damage or fatigue.

SHOCK LINK PLATES



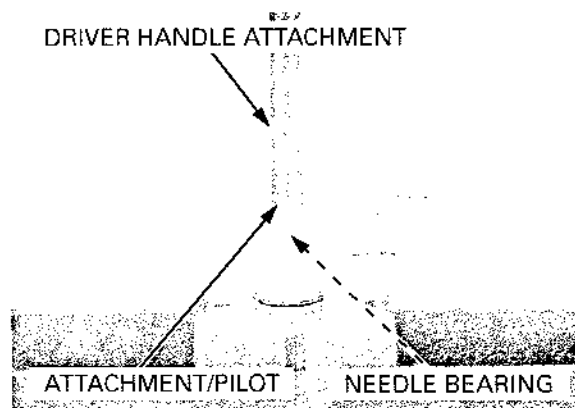
SHOCK LINK BEARING REPLACEMENT

Press out the needle bearing out of the shock link using the special tools.

TOOLS:

Driver handle attachment	07949-3710001
Attachment, 22 X 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

DRIVER HANDLE ATTACHMENT



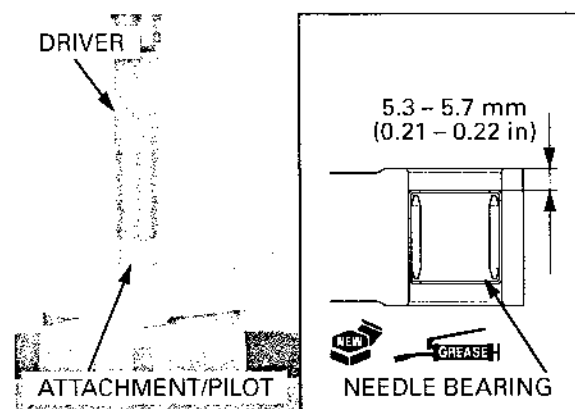
Press the needle bearing into the shock link with the marked side facing out.

Press a new needle bearing into the shock link so that the needle bearing surface is lower 5.3 – 5.7 mm (0.21 – 0.22 in) from the end of the shock link using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 24 X 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

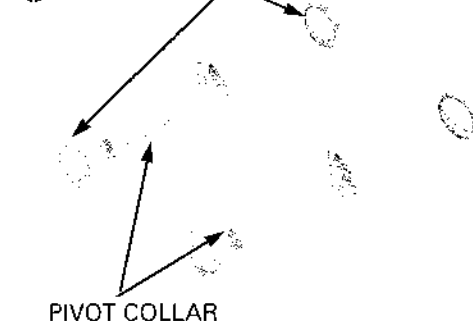
DRIVER



Apply grease to the new dust seal lips, install them into the shock link.
Install the pivot collars.

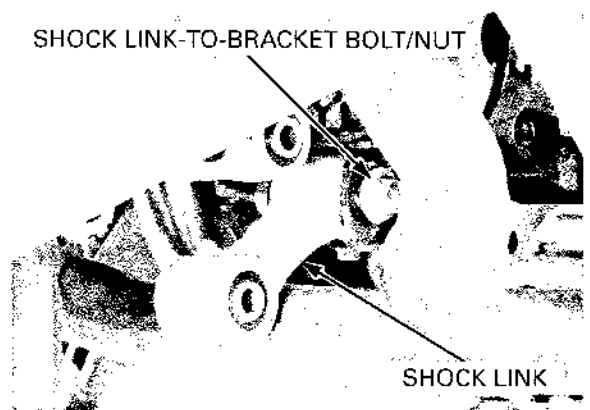
NEW GREASE DUST SEALS

PIVOT COLLAR

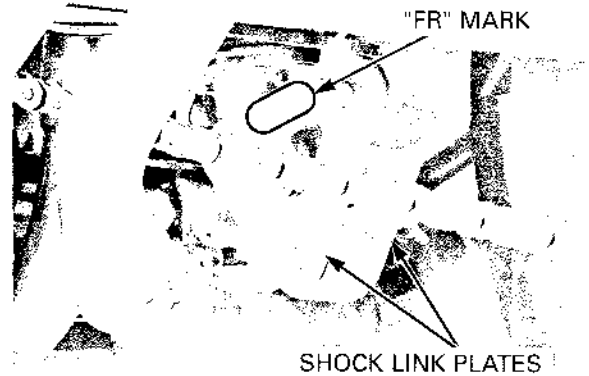


INSTALLATION

Install the shock link to the bracket.
Install the shock link-to-bracket bolt and nut.



Shock link plates with their "FR" mark facing to the front.



Remove the following:

- Swingarm-to-shock link plate bolt/nut
- Shock absorber lower mounting bolt/nut
- Shock link-to-shock link plate bolt/nut

Tighten the swingarm-to-shock link plate nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Tighten the shock absorber lower mounting nut to the specified torque.

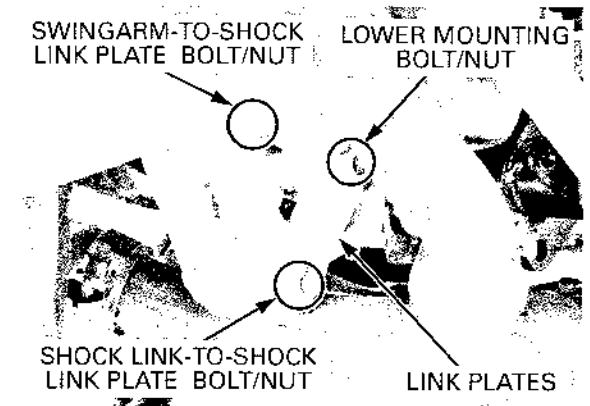
TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Tighten the shock link-to-bracket nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten the shock link-to-shock link plate nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

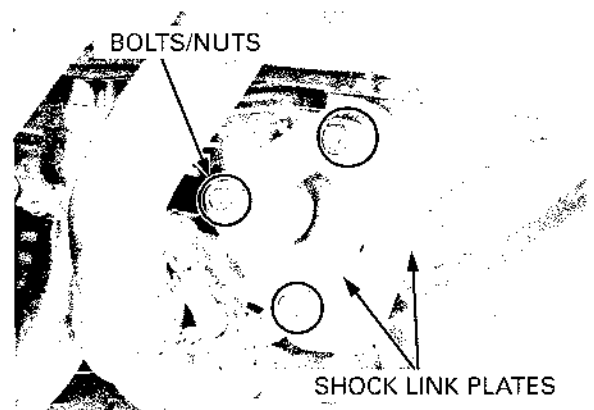


SWINGARM

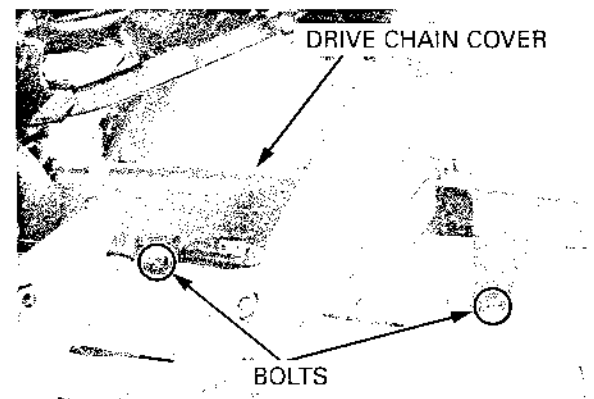
REMOVAL

Remove the rear wheel (page 14-6).

Remove the nuts, bolts and shock link plates.

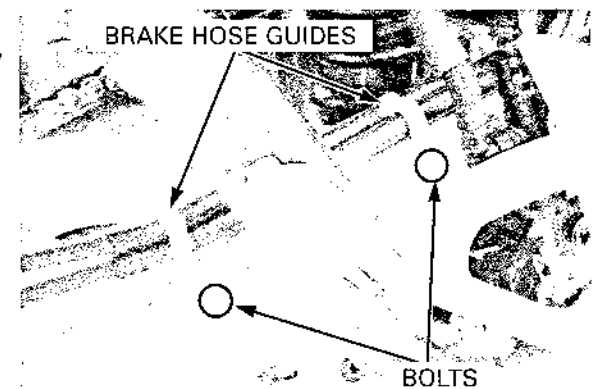


Remove the socket bolts and drive chain cover.

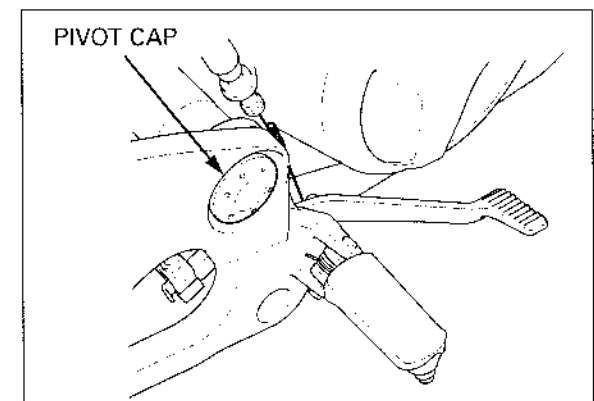


Remove the bolts and brake hose guides.

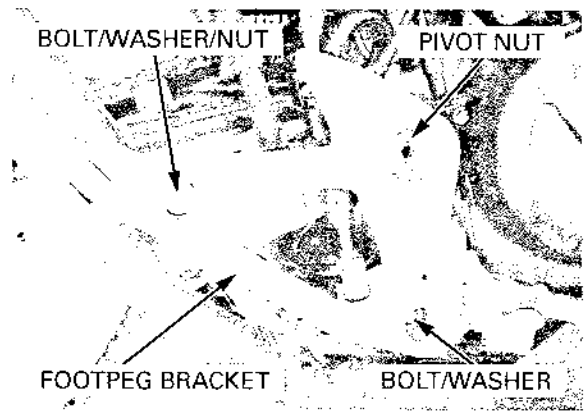
Remove the rear brake caliper/bracket assembly from the swingarm.



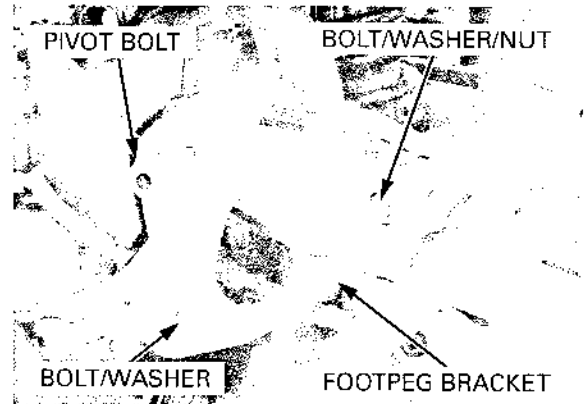
Remove the right and left swingarm pivot caps.



Loosen the swingarm pivot nuts.
Remove the muffler mounting bolt, washer and nut.
Remove the bolt, washer, swingarm pivot nut and right footpeg bracket.

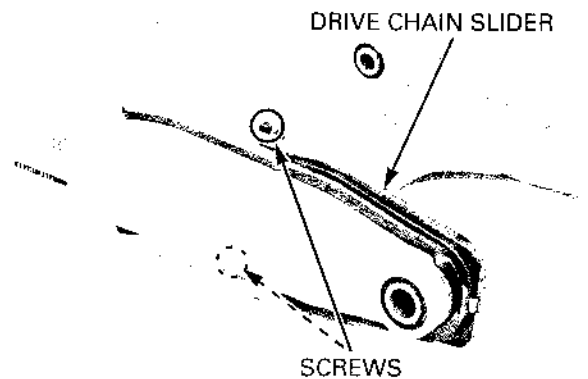


Remove the bolt and washer.
Remove the muffler mounting bolt, washer and nut.
Remove the swingarm pivot bolt and left footpeg bracket.
Remove the swingarm.

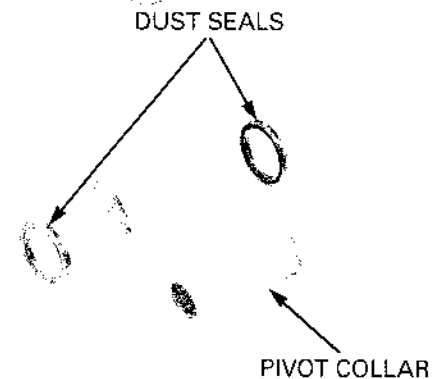


DISASSEMBLY/INSPECTION

Remove the screws and drive chain slider.
Check the drive chain slider for wear or damage.



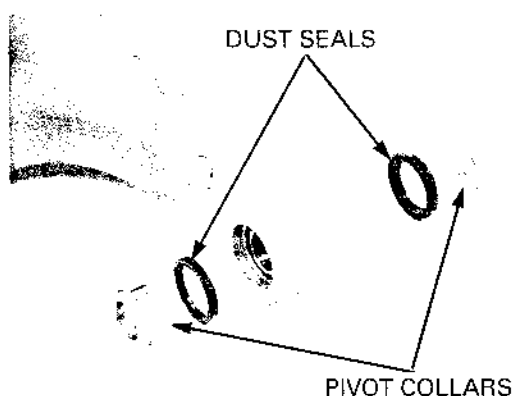
Remove the pivot collar and dust seals from the swingarm left pivot.
Check the dust seals and collar for damage or fatigue.



REAR WHEEL/SUSPENSION

Remove the pivot collars and dust seals from the swingarm right pivot.

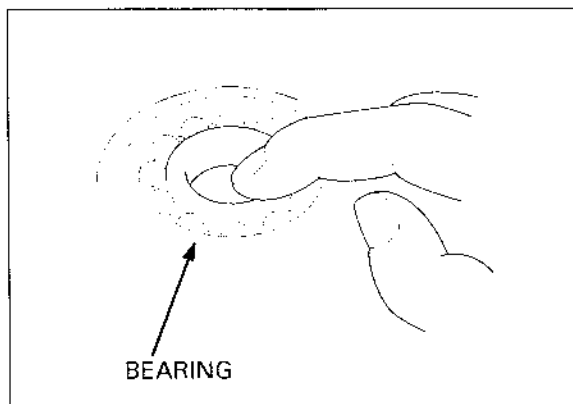
Check the dust seals and pivot collars for damage or fatigue.



Turn the inner race of right pivot bearings with your finger.

The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the swingarm pivot.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.

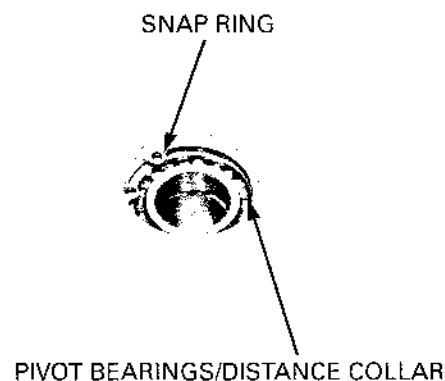


PIVOT BEARING REPLACEMENT

Remove the snap ring.

Remove the right pivot bearings (radial ball bearings) from the swingarm pivot.

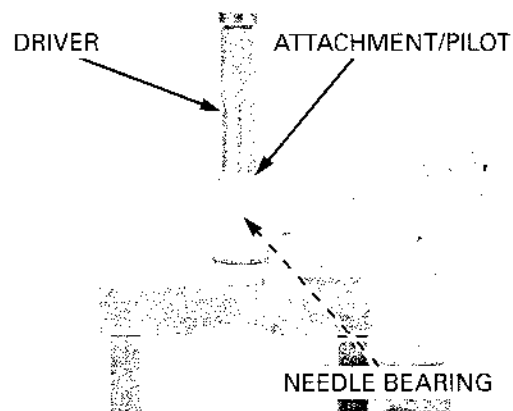
Remove the distance collar.



Press the left pivot bearing (needle bearing) out of the swingarm using the special tools and a hydraulic press.

TOOLS:

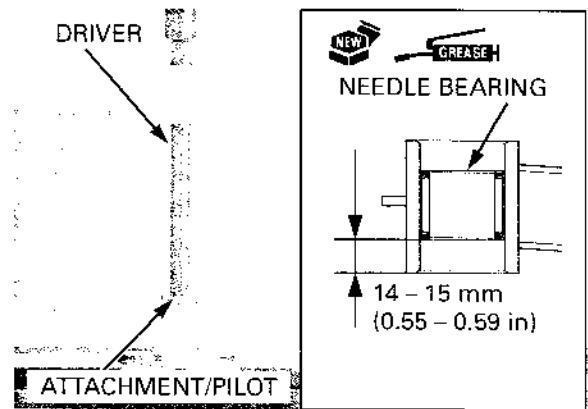
Driver	07749-0010000
Attachment, 32 X 35 mm	07746-0010100
Pilot, 28 mm	07746-0041100



Pack new needle bearing with grease.
Press the needle bearing into the swingarm left pivot until the depth from the swingarm outer surface is 14 – 15 mm (0.55 – 0.59 in) using the special tools and a hydraulic press.

TOOLS:

Driver handle attachment	07949-3710001
Attachment, 37 X 40 mm	07746-0010200
Pilot, 28 mm	07746-0041100



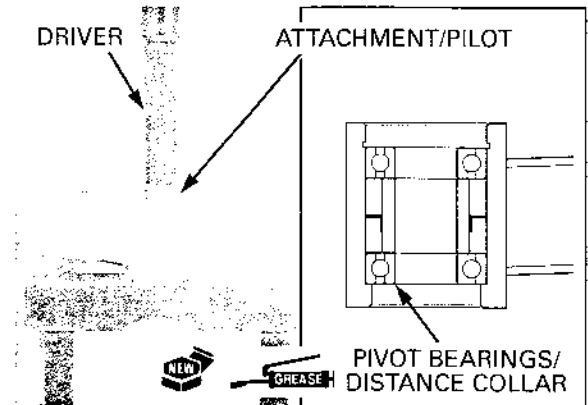
Press new right pivot bearing (radial ball bearing) in until it seat, using the special tools and a hydraulic press.

TOOLS:

Driver	07749-0010000
Attachment, 37 X 40 mm	07746-0010200
Pilot, 20 mm	07746-0040500

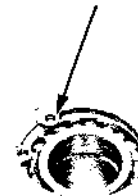
Install the distance collar.

Press new right pivot bearing (radial ball bearing) using the same tools.



Install the snap ring into the groove securely.

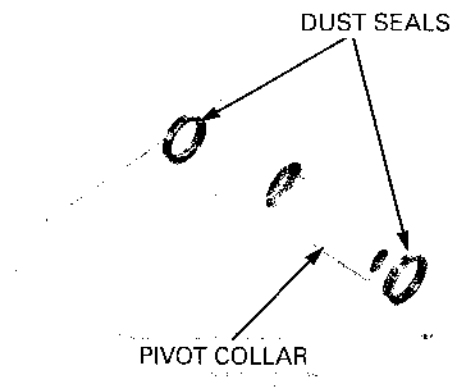
SNAP RING



Shock link plate bearing replacement

Remove the pivot collar and dust seals from the shock link plate pivot of the swingarm.

Check the dust seals and collar for damage or fatigue.



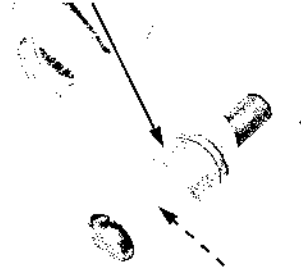
REAR WHEEL/SUSPENSION

Remove the needle bearing out of swingarm using the special tool.

TOOL:

Needle bearing remover 07LMC-KV30100

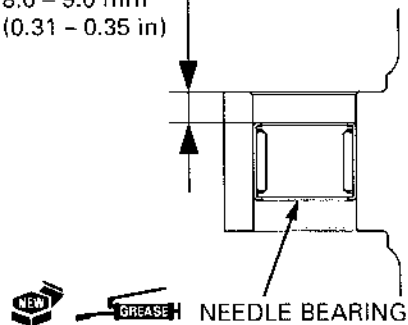
NEEDLE BEARING REMOVER



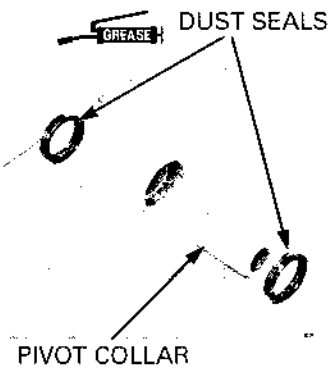
NEEDLE BEARING

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 8.0 – 9.0 mm (0.31 – 0.35 in), using the same tool.

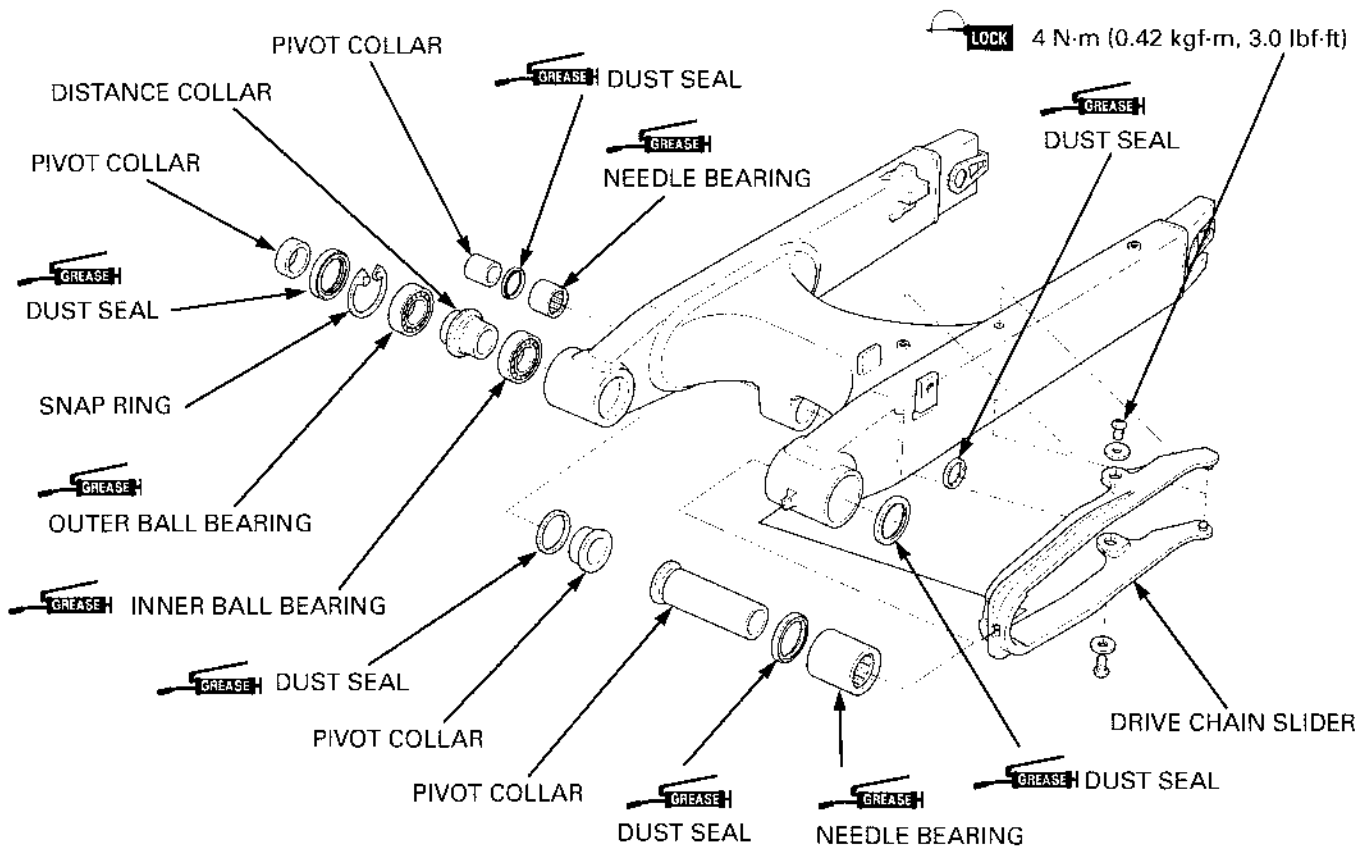
8.0 – 9.0 mm
(0.31 – 0.35 in)



Apply grease to the dust seal lips, then install the dust seals and pivot collar into the swingarm.

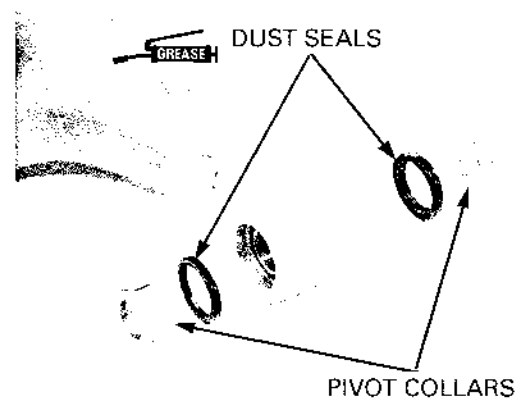


ASSEMBLY

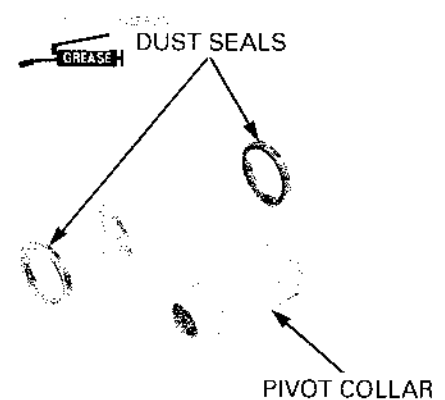


Apply grease to the dust seal lips, then install the dust seals into the right swingarm pivot.

Install the pivot collars into the right swingarm pivot.



Apply grease to the dust seal lips, then install the dust seals and pivot collar into the left swingarm pivot.

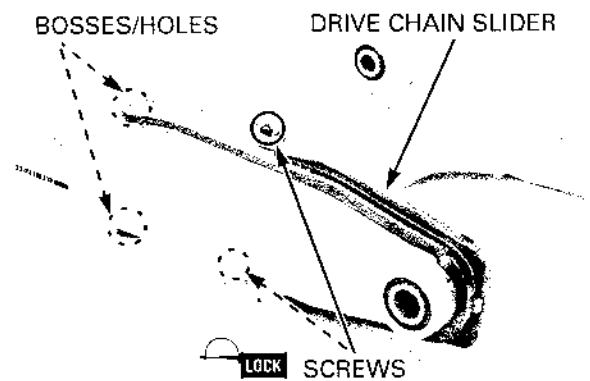


REAR WHEEL/SUSPENSION

Install the drive chain slider bosses into the hole in the swingarm.

Clean and apply a locking agent to the drive chain slider screw threads.
Install and tighten the drive chain slider screws to the specified torque.

TORQUE: 4 N·m (0.42 kgf·m, 3.0 lbf·ft)



INSTALLATION

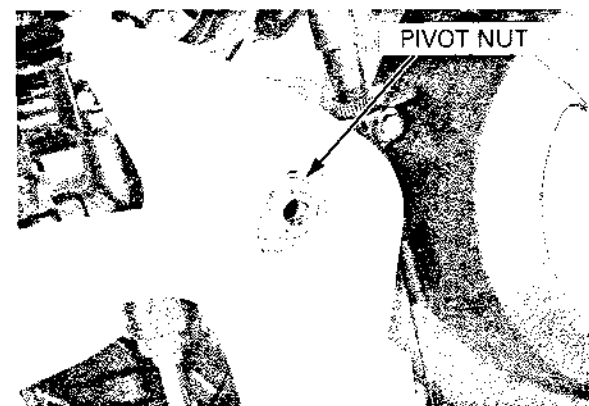
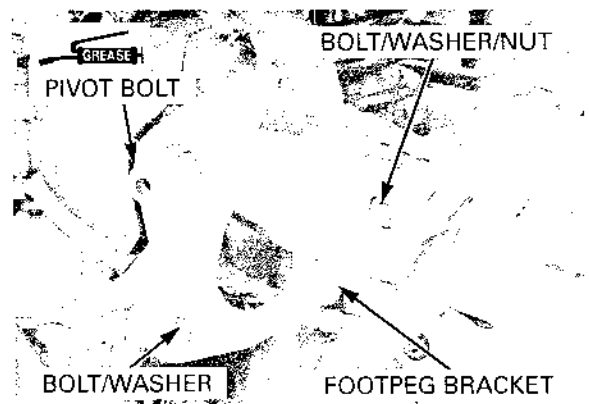
Apply thin coat of grease to the swingarm pivot bolt surface.

Install the swingarm in the frame and insert pivot bolt through the left footpeg bracket, swingarm, engine and right footpeg bracket.
Install and tighten the bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Install and tighten the muffler mount bolt/washer/nut securely.

Install the swingarm pivot nut.



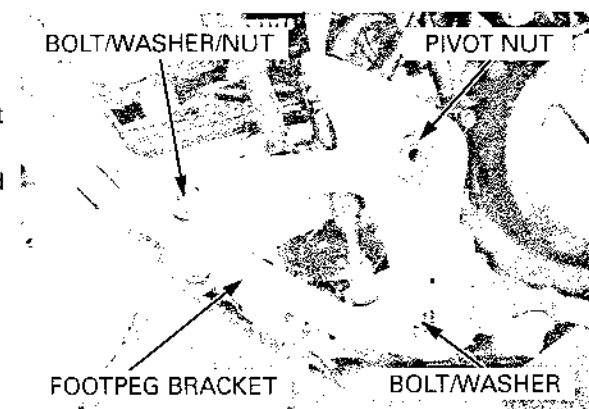
Install and tighten the bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

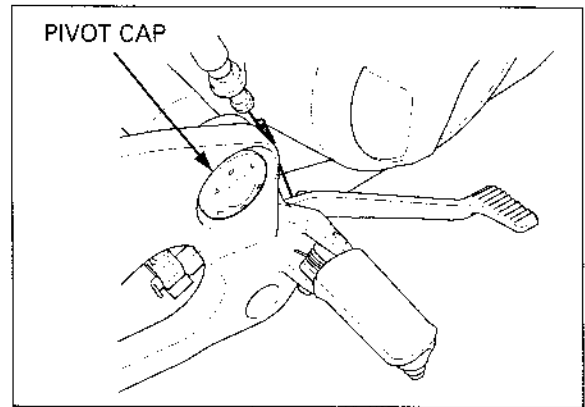
Install and tighten the muffler mount bolt/nut securely.

Tighten the swingarm pivot nut to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

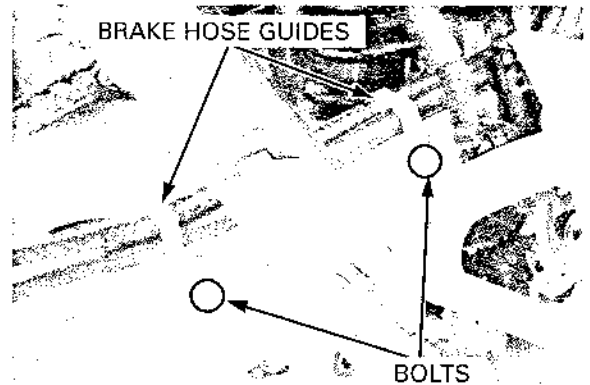


Install the left and right swingarm pivot caps.

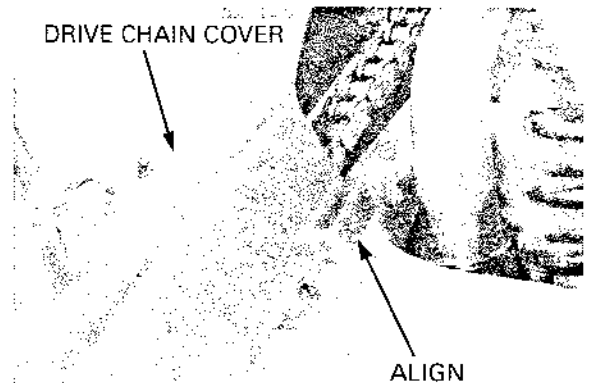


Route the brake hose properly, tighten the brake hose guide bolts to the specified torque.

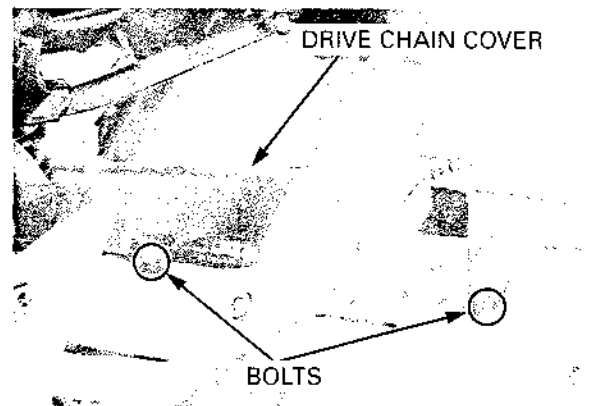
TORQUE: 10 N-m (1.0 kgf-m, 7 lbf-ft)



Install the drive chain cover aligning the guide with the tab on the swingarm.



Install and tighten the socket bolts securely.



REAR WHEEL/SUSPENSION

Install the shock link plates, bolts and nuts.

Tighten the swingarm-to-shock link plate nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf-m, 65 lbf-ft)

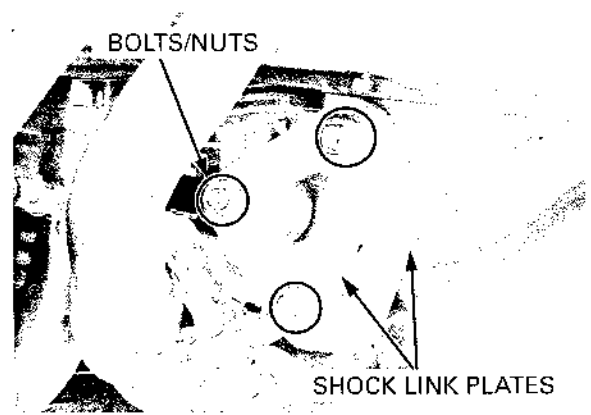
Tighten the shock absorber lower mounting nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf-m, 33 lbf-ft)

Tighten the shock link-to-shock link plate nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf-m, 33 lbf-ft)

Install the rear wheel (page 14-11).



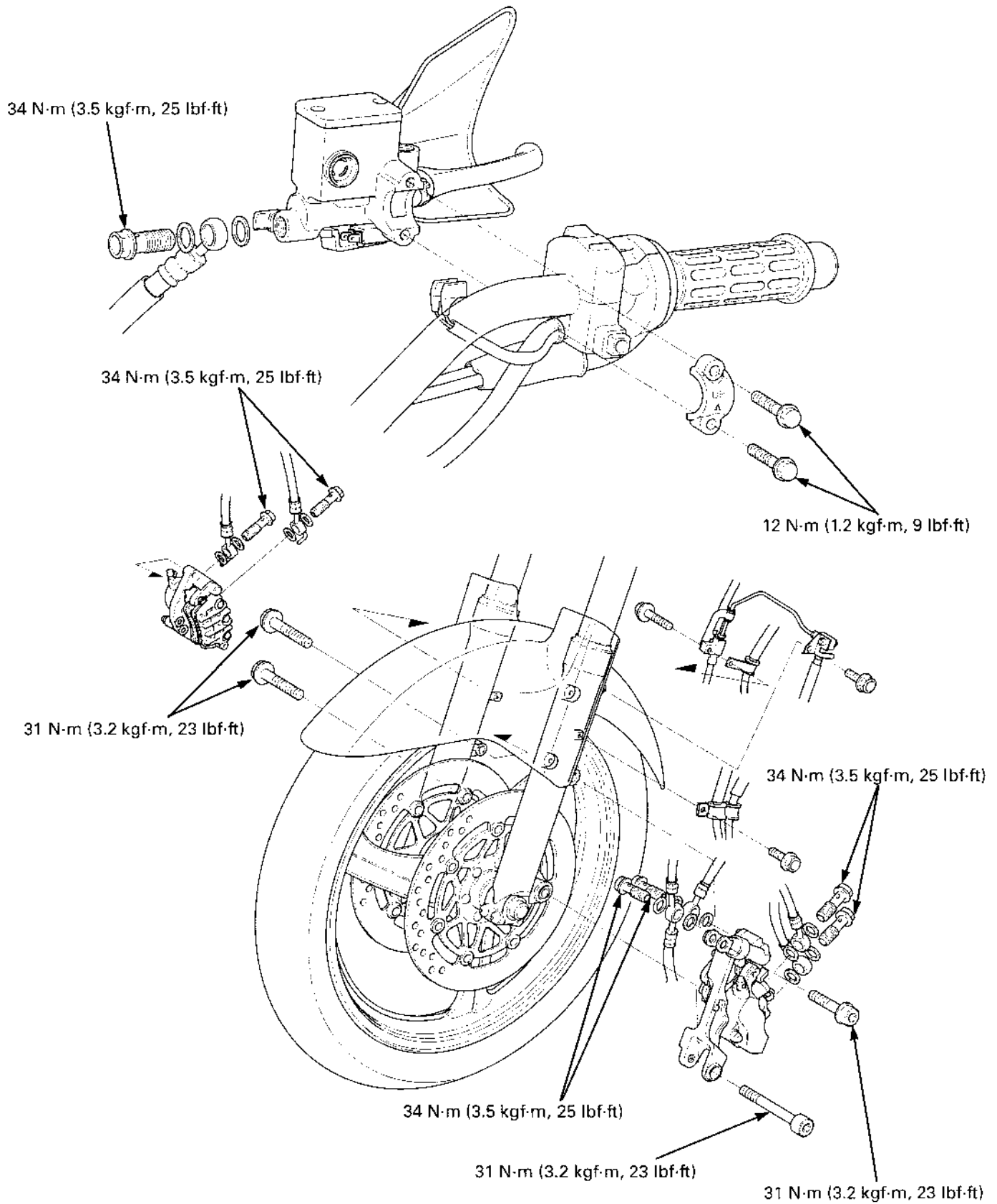
15. HYDRAULIC BRAKE

COMPONENT LOCATION	15-2	SECONDARY MASTER CYLINDER	15-24
SERVICE INFORMATION	15-4	REAR MASTER CYLINDER	15-26
TROUBLESHOOTING	15-6	PROPORTIONAL CONTROL VALVE	15-31
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-7	DELAY VALVE	15-31
BRAKE PAD/DISC	15-14	FRONT BRAKE CALIPER	15-32
FRONT MASTER CYLINDER	15-18	REAR BRAKE CALIPER	15-38
		BRAKE PEDAL	15-42

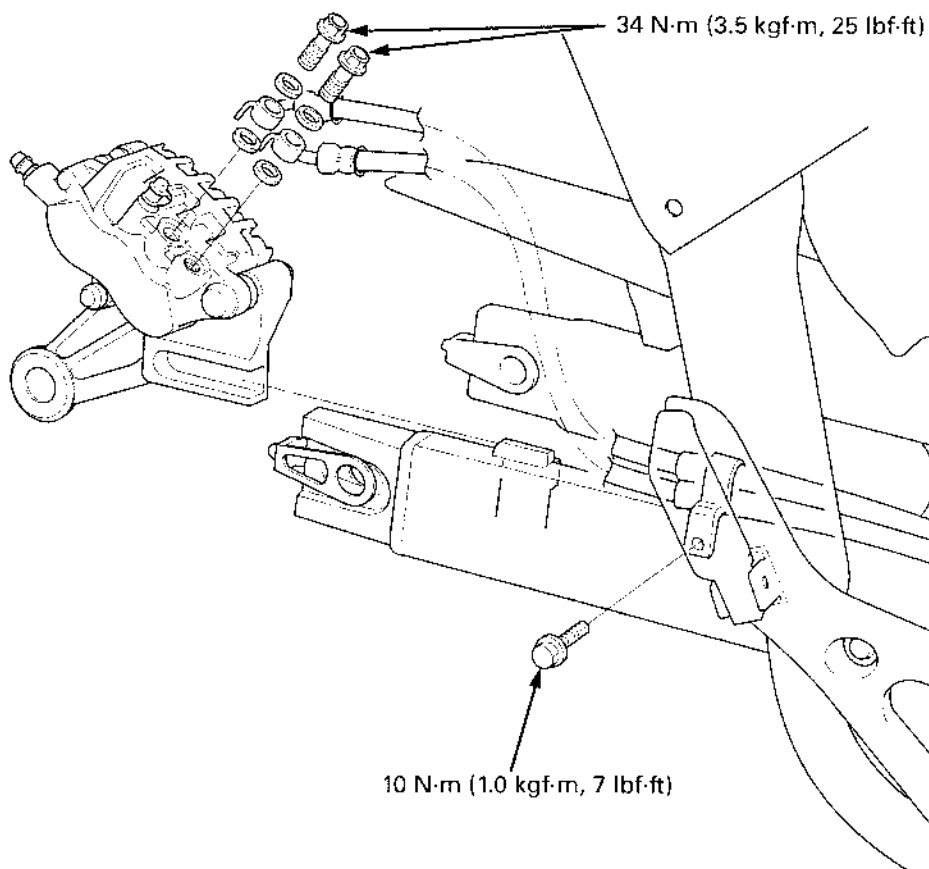
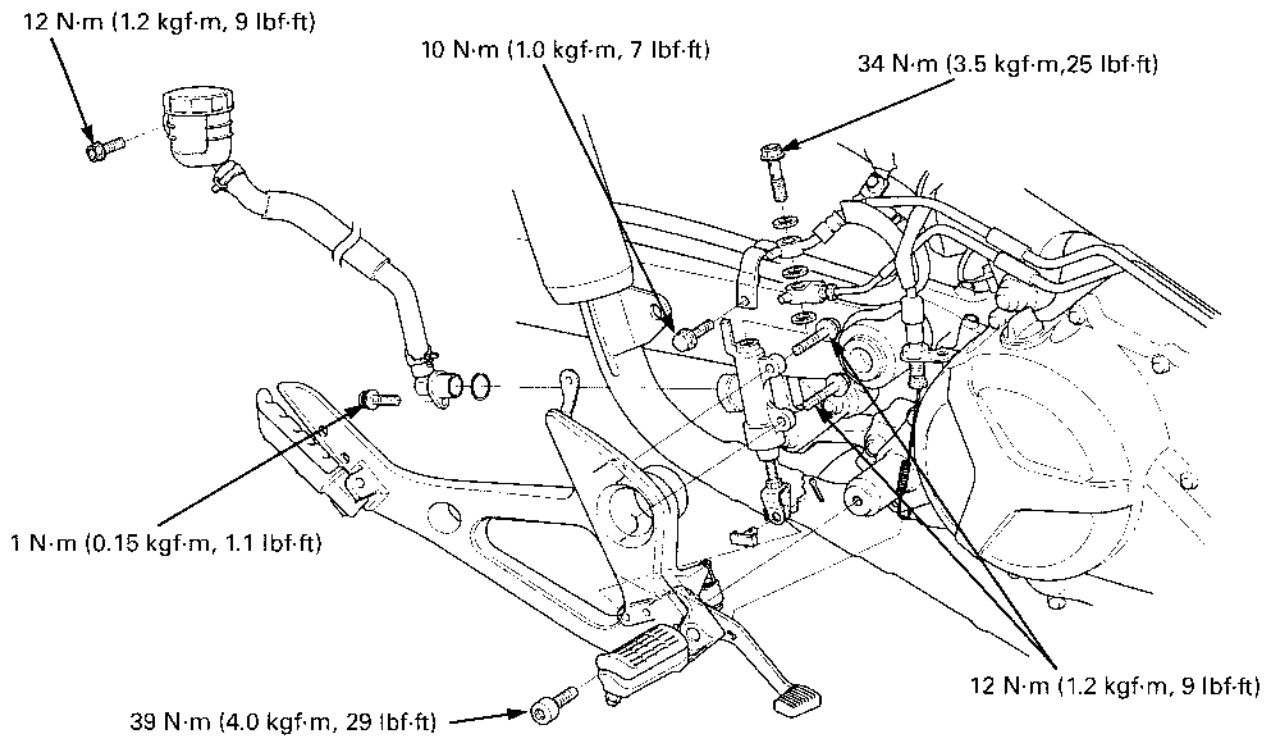
HYDRAULIC BRAKE

COMPONENT LOCATION

FRONT:



REAR:



SERVICE INFORMATION

GENERAL

⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

NOTICE

Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.

- This model is equipped with a Linked Brake System. The system air bleeding procedure on page 15-9 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.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.
- Always check brake operation before riding the motorcycle.
- This section covers service of the standard brake components (including LBS) of the brake system.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	—
	Brake disc thickness		4.5 (0.18)	3.5 (0.14)
	Brake disc warpage		—	0.20 (0.008)
	Master cylinder I.D.		12.700 (0.5000)	—
	Secondary master cylinder I.D.		12.700 (0.5000)	—
	Left caliper cylinder I.D.	Upper	25.400 (1.0000)	—
		Middle	22.650 (0.8917)	—
		Lower	25.400 (1.0000)	—
	Right caliper cylinder I.D.	Upper	27.000 (1.0629)	—
Middle		22.650 (0.8917)	—	
Lower		27.000 (1.0629)	—	
Rear	Specified brake fluid		DOT 4	—
	Brake pedal height		83.5 (3.29)	—
	Brake disk thickness		5.0 (0.20)	4.0 (0.16)
	Brake disc warpage		—	0.30 (0.012)
	Master cylinder I.D.		17.460 (0.6874)	—
	Caliper cylinder I.D.	Front	22.650 (0.8917)	—
		Center	27.000 (1.0629)	—
Rear		22.650 (0.8917)	—	

TOEQUE VALUES

Front master cylinder reservoir cap screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Brake lever adjuster	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Front brake light switch screw	1 N·m (0.12 kgf·m, 0.9 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)	
Pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Brake caliper bleed valve	5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)	
Secondary master cylinder push rod lock nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Secondary master cylinder connector	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear master cylinder reservoir mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear master cylinder push rod nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Rear master cylinder hose joint screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	Apply a locking agent to the threads
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)	Apply oil to the threads
Footpeg bracket bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Brake pipe 2/3 way joint	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake hose guide bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Delay valve mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
PCV (Proportional Control Valve) mounting bolt	12 N·m (1.2 kgf·m, 9 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

Above items are normal but the brake system still has poor performance, check for nose dive during braking. If the nose dive 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 (PCV)

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.

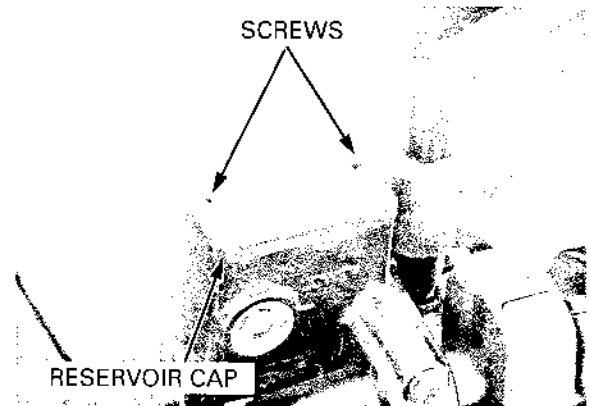
Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.

When using a commercially available air brake bleeder, follow the manufacturer's operating instructions.

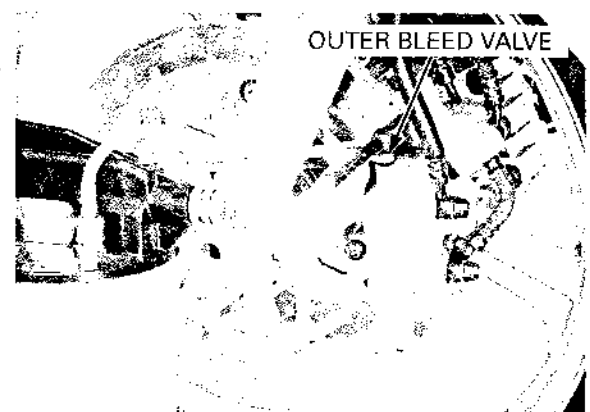
BRAKE FLUID DRAINING

Lever brake line:

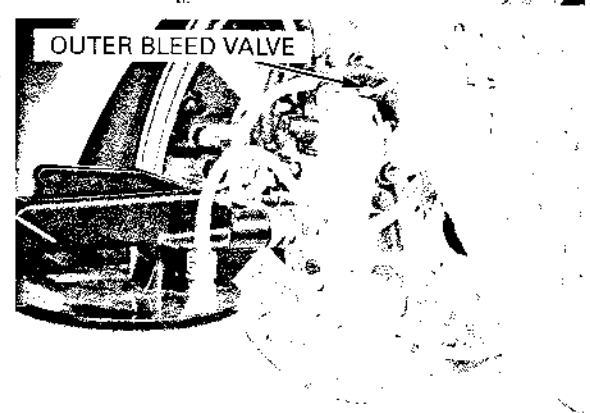
Turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap. Remove the screws and reservoir cap. Remove the diaphragm plate and diaphragm.



Connect a commercially available air bleed tool to the left front brake caliper outer bleed valve. Loosen the outer bleed valve and operate a air bleed tool. Drain the brake fluid.



Connect a commercially available air bleeding tool to the right front brake caliper outer bleed valve. Loosen the outer bleed valve and operate a air bleed tool. Drain the brake fluid.



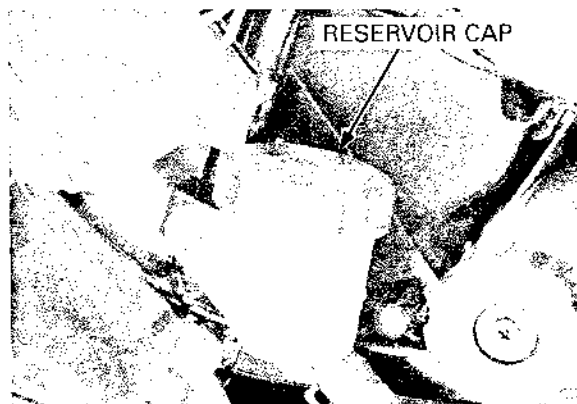
HYDRAULIC BRAKE

Pedal brake line:

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

Remove the reservoir cap.

Remove the diaphragm plate and diaphragm.

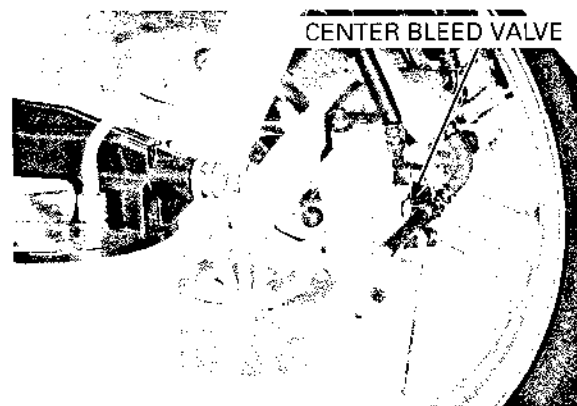


RESERVOIR CAP

Connect a commercially available air bleed tool to the left front brake caliper center bleed valve.

Loosen the center bleed valve and operate a air bleed tool.

Drain the brake fluid.

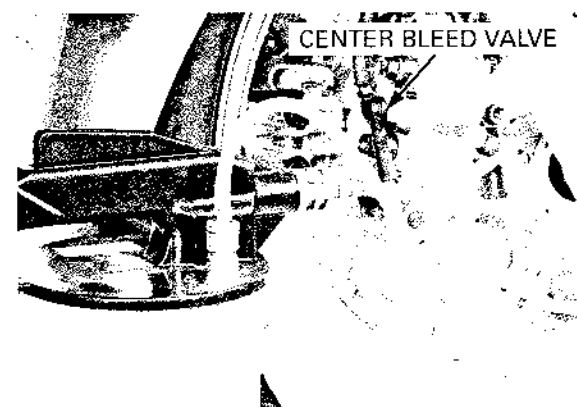


CENTER BLEED VALVE

Connect a commercially available air bleed tool to the right front brake caliper center bleed valve.

Loosen the center bleed valve and operate a air bleed tool.

Drain the brake fluid.

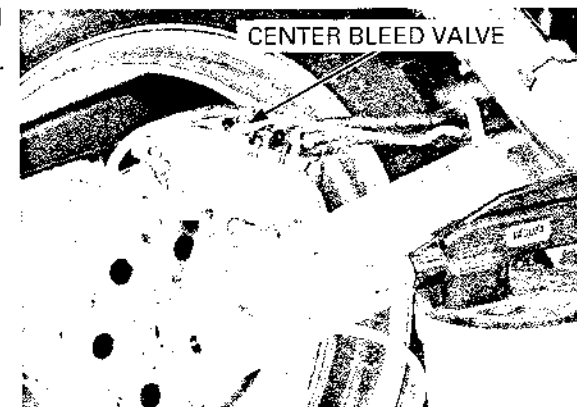


CENTER BLEED VALVE

Connect a commercially available air bleeding tool to the rear brake caliper center bleed valve.

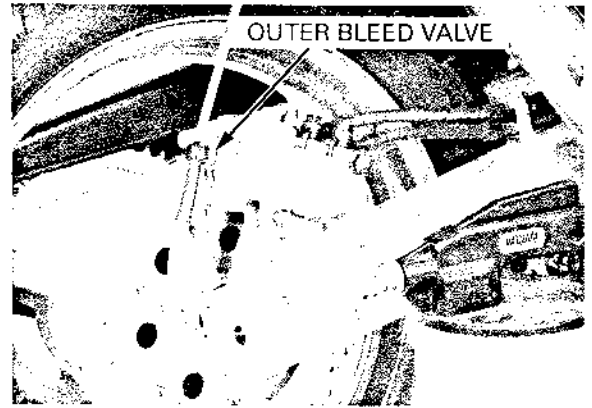
Loosen the center bleed valve and operate a air bleed tool.

Drain the brake fluid.



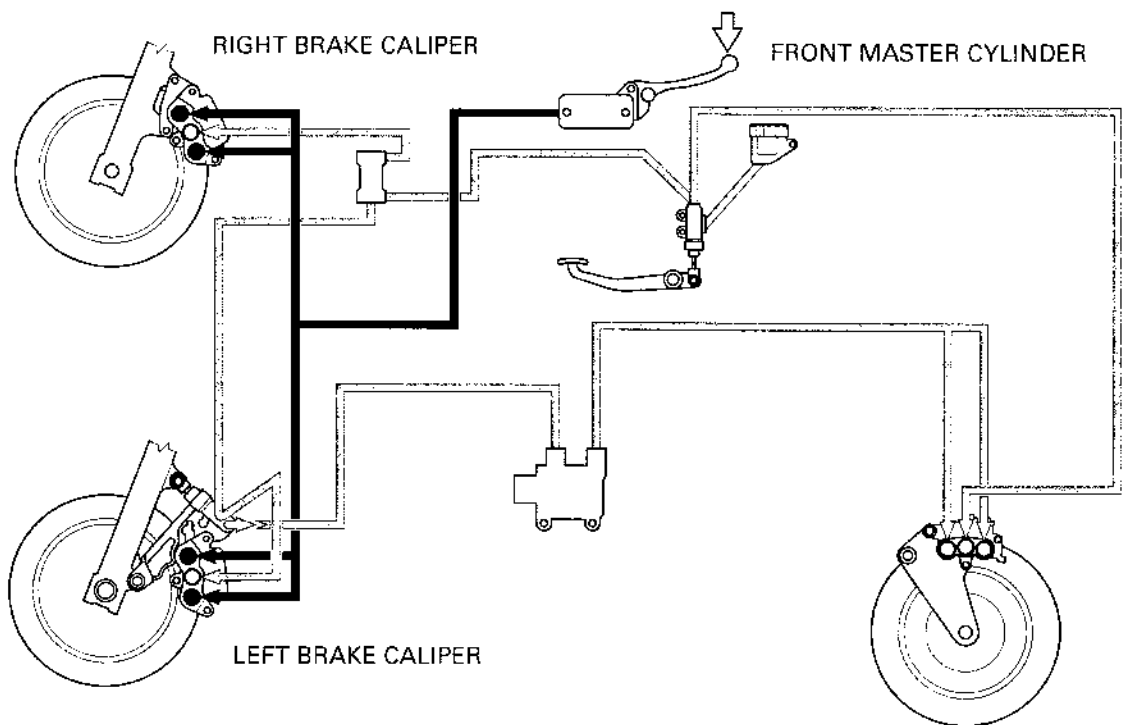
CENTER BLEED VALVE

Connect a commercially available air bleeding tool to the rear brake caliper outer bleed valve. Loosen the outer bleed valve and operate a air bleed tool. Drain the brake fluid.



BRAKE FLUID FILLING/AIR BLEEDING

Lever brake line (master cylinder-to-front brake caliper)

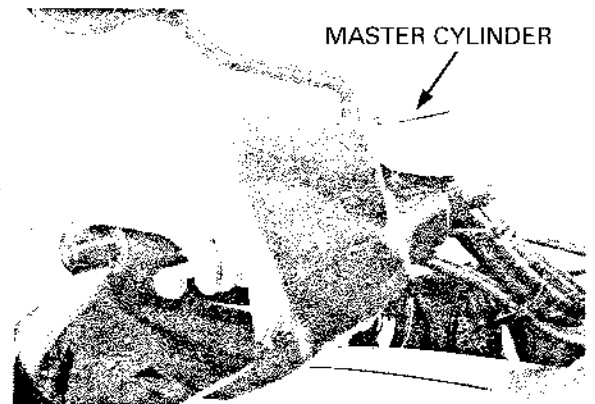


Fill the reservoir with DOT 4 brake fluid from a sealed container.

NOTICE

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. There are not compatible.

Operate the brake lever several times to bleed air from the master cylinder.



HYDRAULIC BRAKE

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

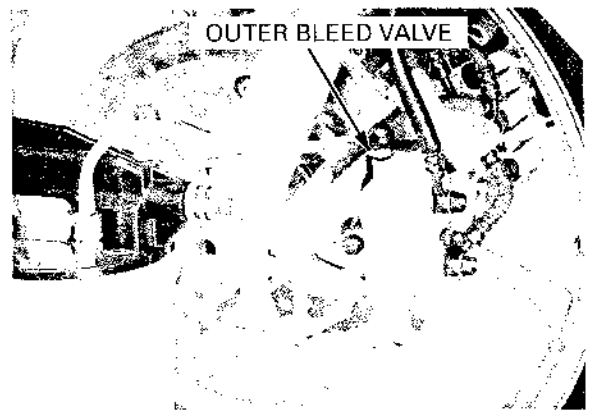
Connect a commercially available air bleed tool to the left front brake caliper outer bleed valve.

Operate a 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: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)

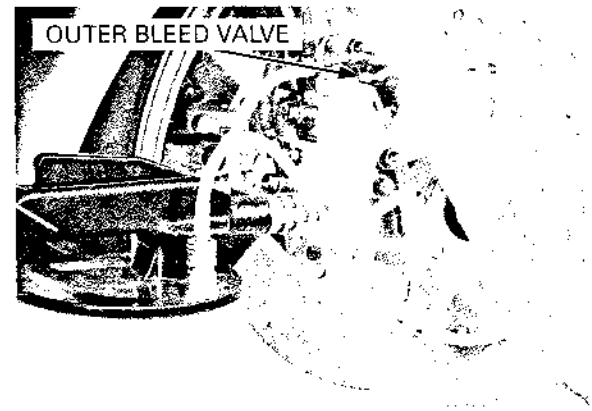


Connect a commercially available air bleed tool to the right front brake caliper outer bleed valve.

Operate a air bleed tool and loosen the outer bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

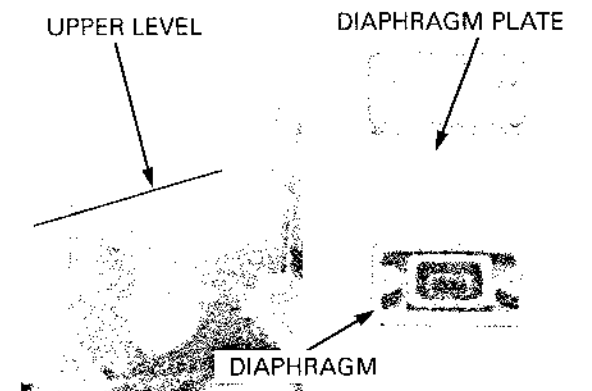
Close the bleed valve.

TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)



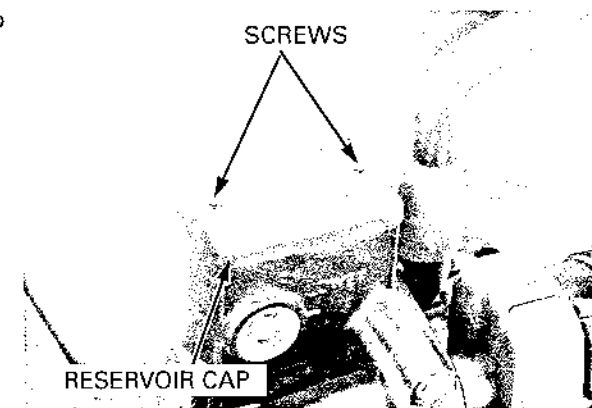
Fill the fluid reservoir to the upper level.

Reinstall the diaphragm and diaphragm plate.

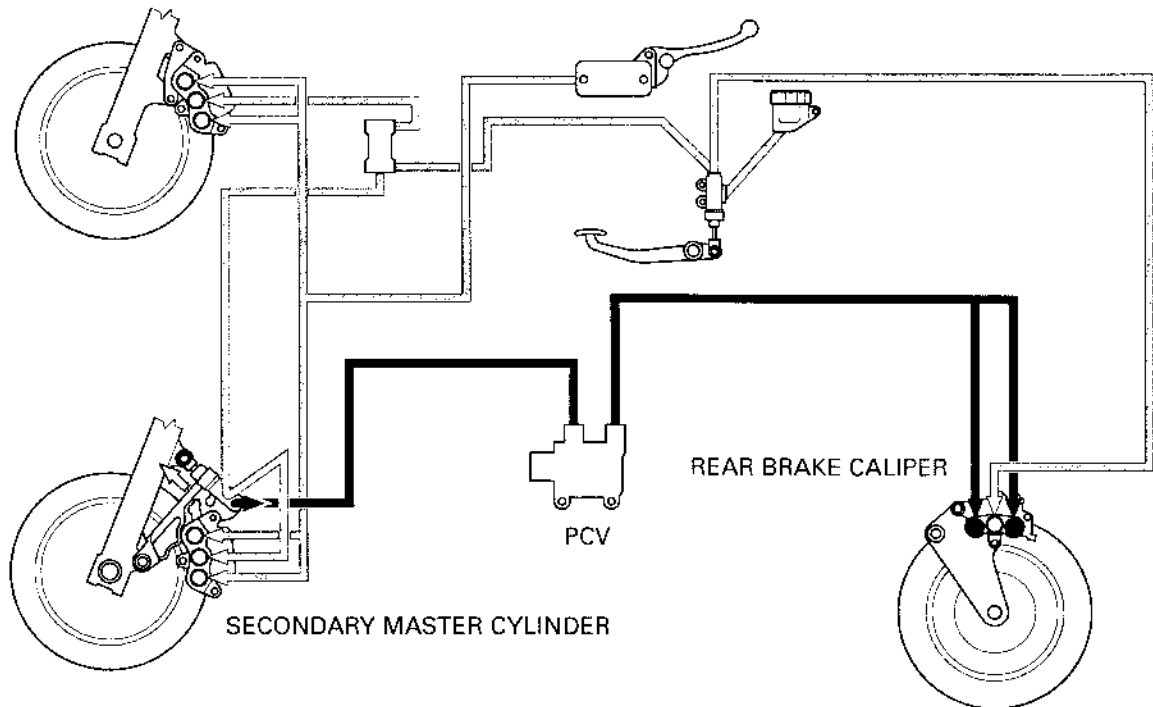


Install the reservoir cap, and tighten the screws to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m, 1.1 lbf·ft)



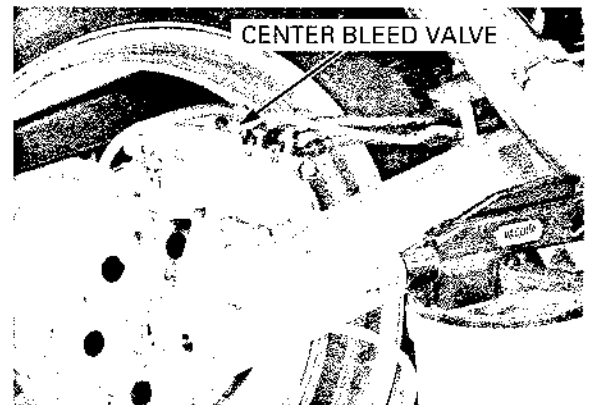
Servo brake line (secondary master cylinder-to-rear brake caliper)



Connect a commercially available air bleed tool to the rear brake caliper center air bleed valve. Operate a air bleed tool and loosen the center bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

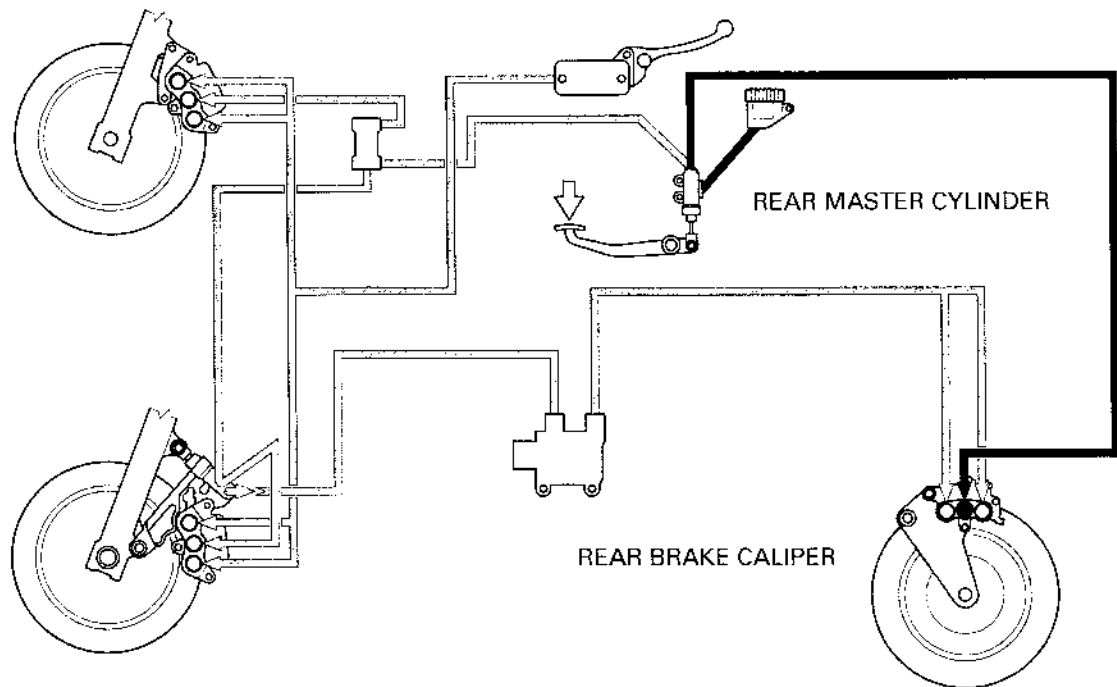
Close the bleed valve.

TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)



HYDRAULIC BRAKE

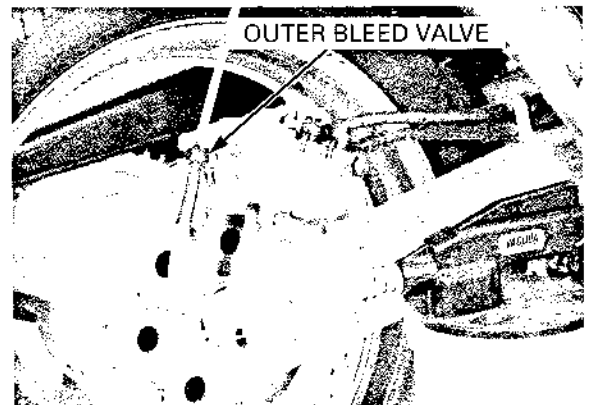
Pedal brake line (rear master cylinder-to-rear brake caliper)



Connect a commercially available air bleed tool to the rear brake caliper outer bleed valve. Operate a air bleed tool and loosen the outer bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

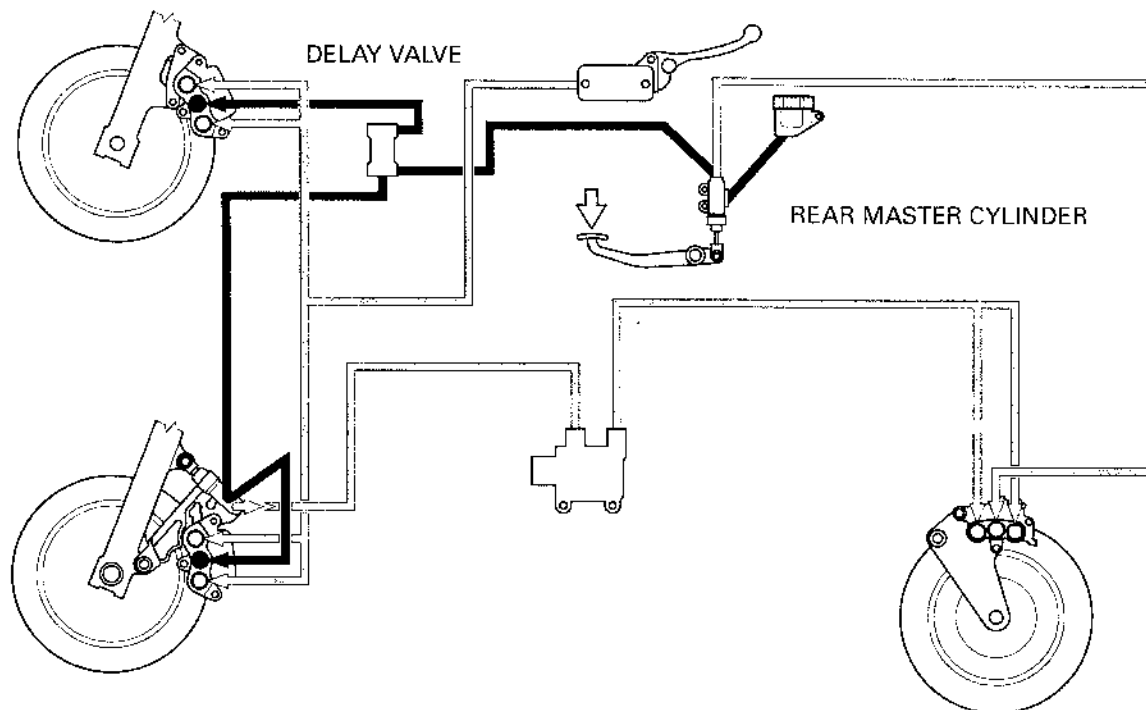
Close the bleed valve.

TORQUE: 5.4 N·m (0.55 kgf-m, 4.0 lbf-ft)



Pedal brake line (rear master cylinder-to-front brake caliper)

RIGHT FRONT BRAKE CALIPER

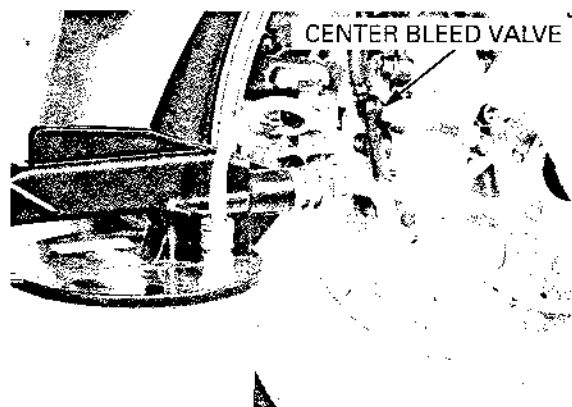


LEFT FRONT BRAKE CALIPER

Connect a commercially available air bleed tool to the right front brake caliper center bleed valve. Operate a 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.

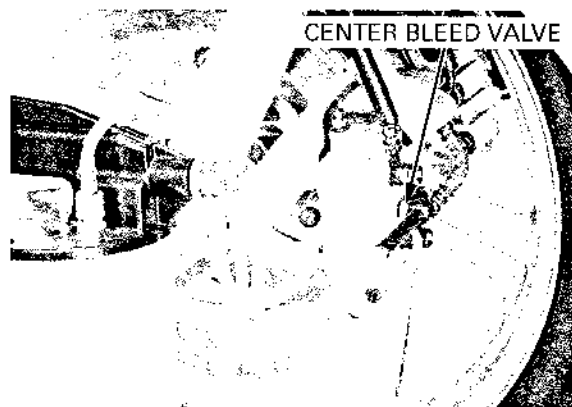
TORQUE: 5 N·m (0.55 kgf·m, 4.0 lbf·ft)



Connect a commercially available air bleed tool to the left front brake caliper center bleed valve. Operate a air bleed tool and loosen the center bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

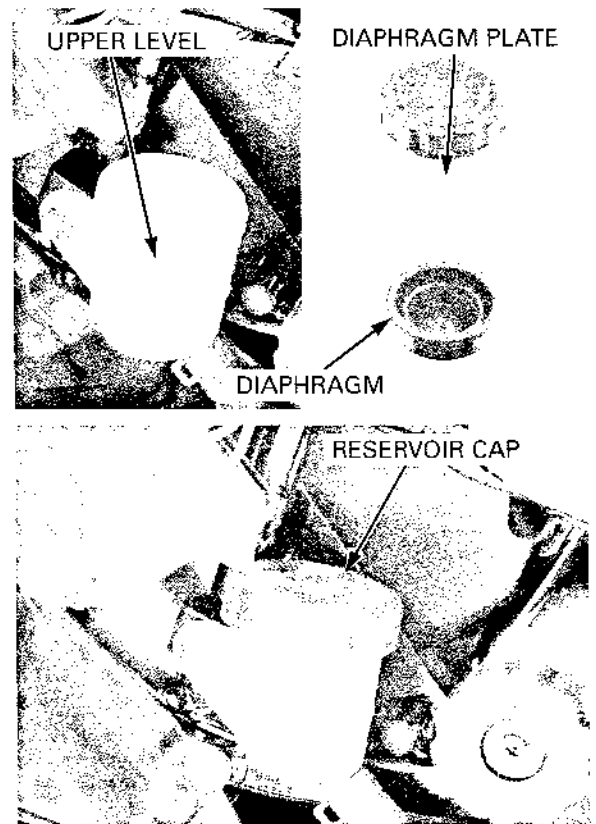
Close the bleed valve.

TORQUE: 5 N·m (0.55 kgf·m, 4.0 lbf·ft)



HYDRAULIC BRAKE

Fill the fluid reservoir to the upper level.
Reinstall the diaphragm and diaphragm plate.



Install the reservoir cap securely.
Install the side cover (page 2-3).

BRAKE PAD/DISC

Always replace the brake pads in pairs to assure even disc pressure.

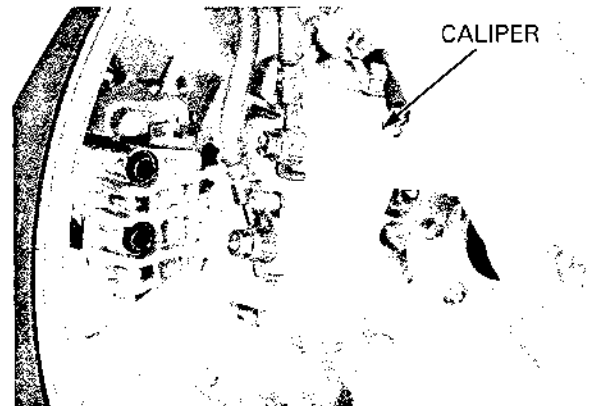
FRONT BRAKE PAD REPLACEMENT

NOTICE

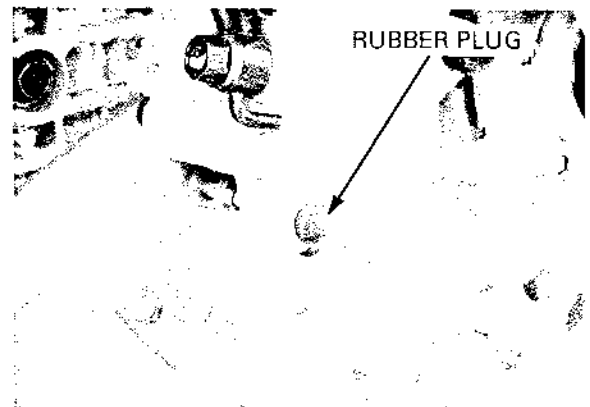
After the brake pad replacement, check the brake operation by applying the brake lever or pedal.

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

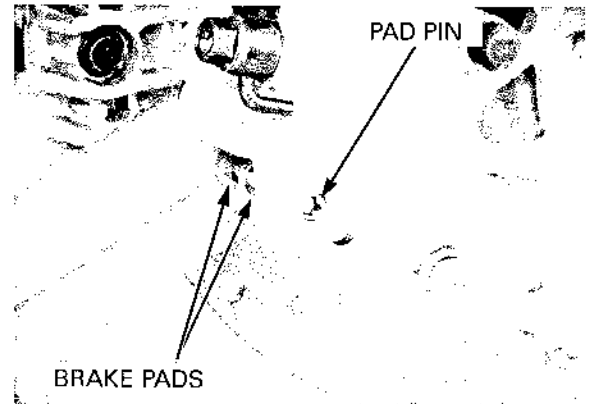
Push the caliper pistons all the way in to allow installation of new brake pads.



Remove the pad pin rubber plug.

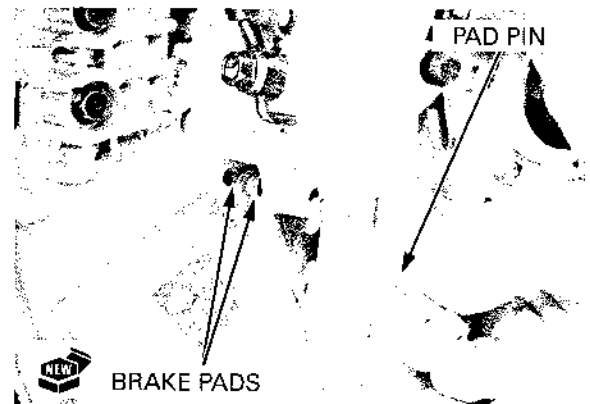


Remove the pad pin and brake pads.



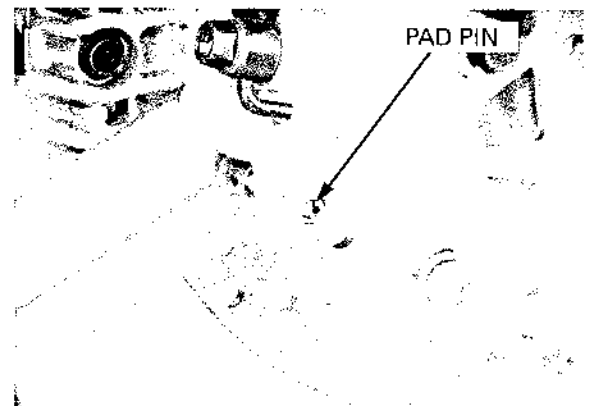
Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place. Push the new brake pads against the pad spring, then install the pad pin.



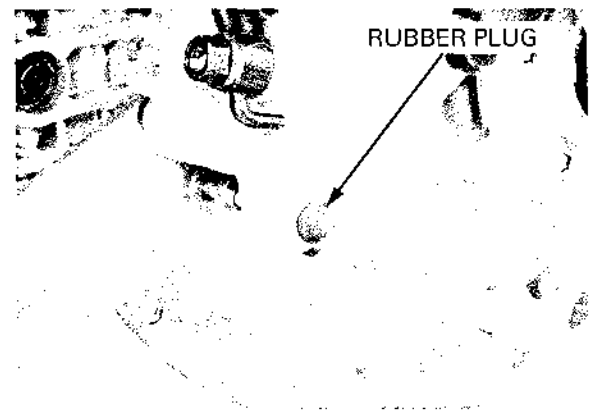
Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



HYDRAULIC BRAKE

Install the pad pin rubber plug.



Always replace the brake pads in pairs to assure even disc pressure.

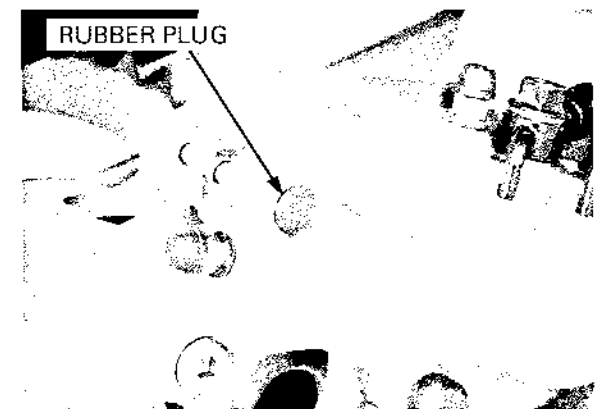
REAR BRAKE PAD REPLACEMENT

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

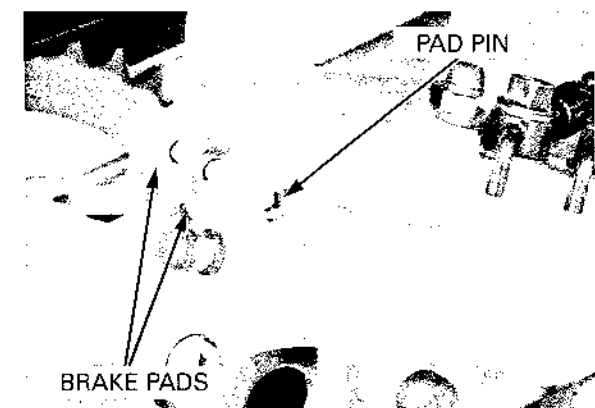
Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.



Remove the pad pin rubber plug.

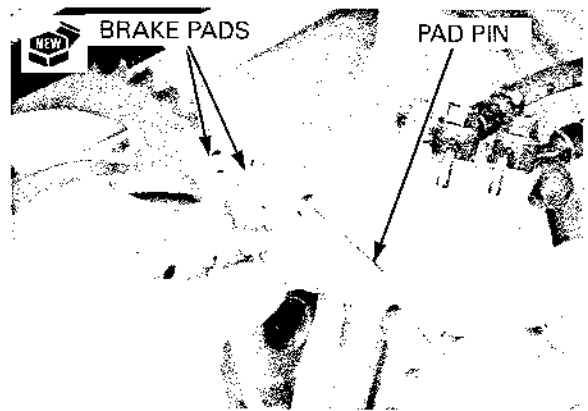


Remove the pad pin and brake pads.



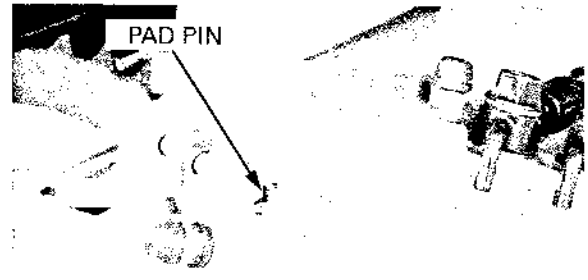
Clean the inside of the caliper especially around the caliper pistons.

Make sure the new brake pad spring is in place. Push the brake pads against the pad spring, then install the pad pin.

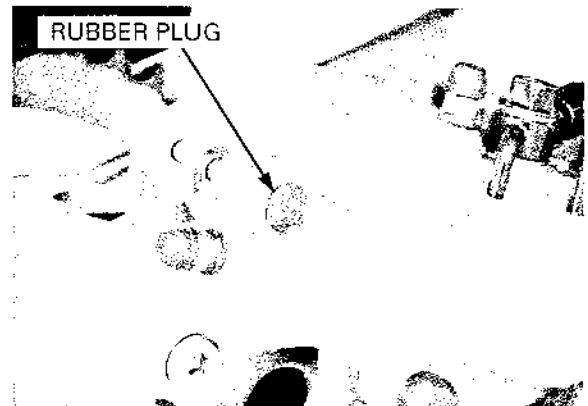


Tighten the pad pin to the specified torque.

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 crack.

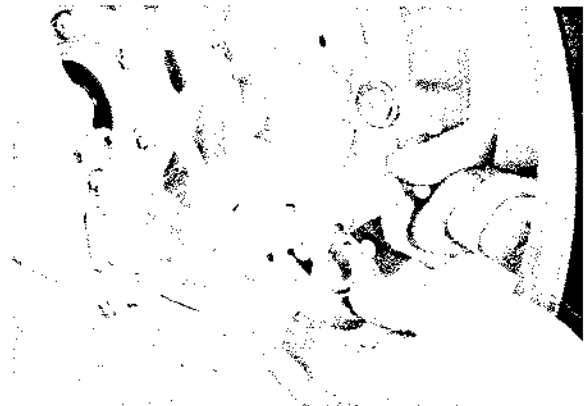
Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:

FRONT: 3.5 mm (0.14 in)

REAR: 4.0 mm (0.16 in)

Replace the brake disc if the smallest measurement is less than the service limit.



HYDRAULIC BRAKE

Measure the brake disc warpage with a dial indicator.

SERVICE 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.

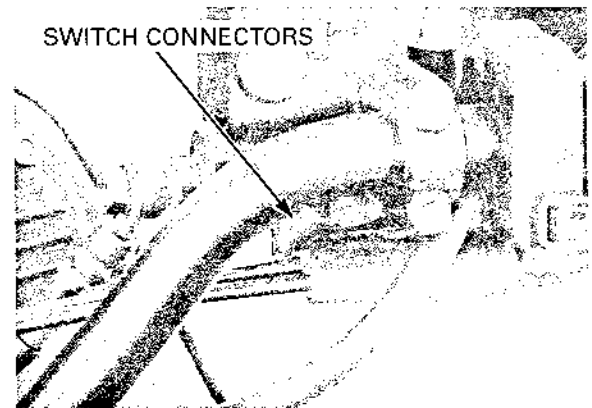


FRONT MASTER CYLINDER

REMOVAL

Drain the front hydraulic system (page 15-7).

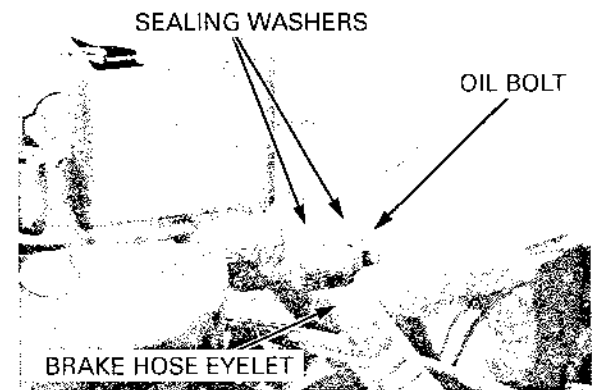
Disconnect the brake light switch connectors.



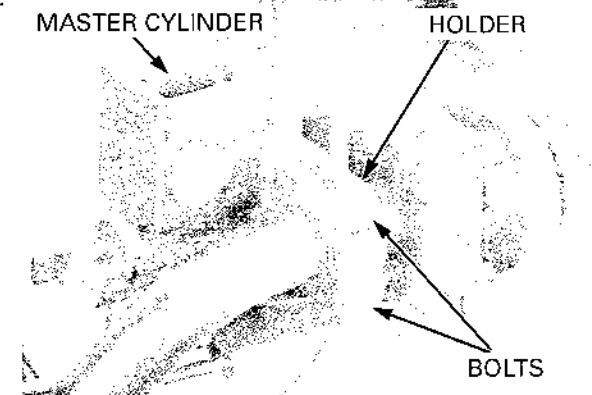
Avoid spilling fluid on painted, plastic, or rubber parts.

Place a rag over these parts whenever the system is serviced.

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

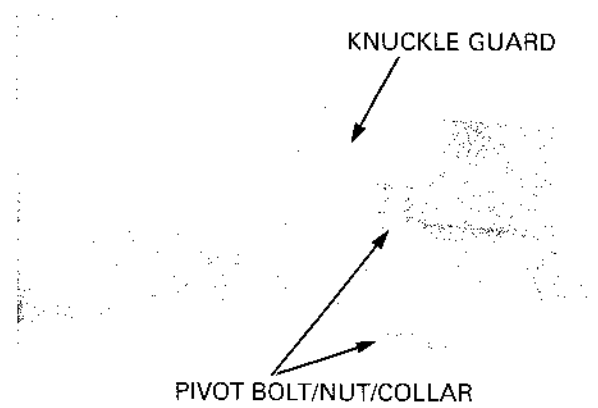


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

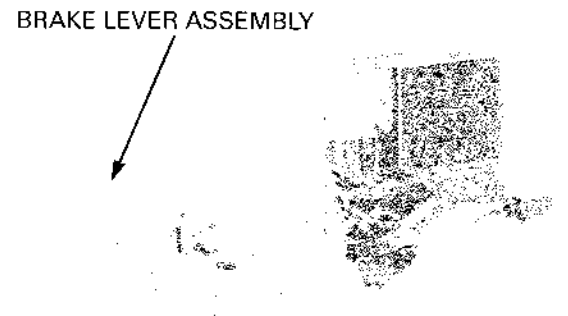


DISASSEMBLY

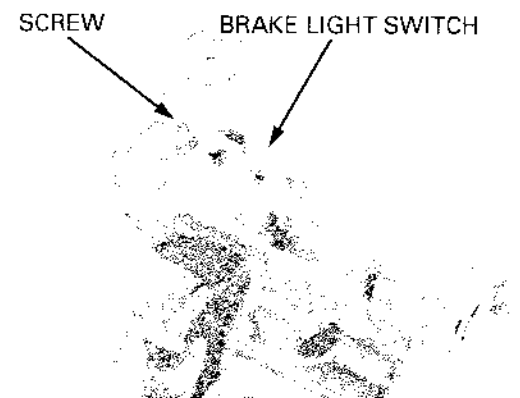
Remove the pivot bolt/nut/collar and knuckle guard.



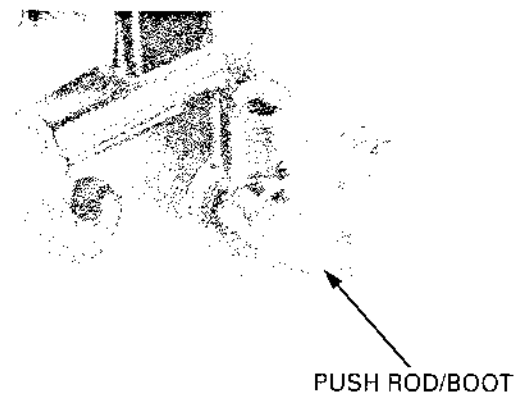
Remove the brake lever assembly.



Remove the screw and brake light switch.



Remove the push rod/boot.



HYDRAULIC BRAKE

Remove the snap ring from the master cylinder body using the special tool as shown.

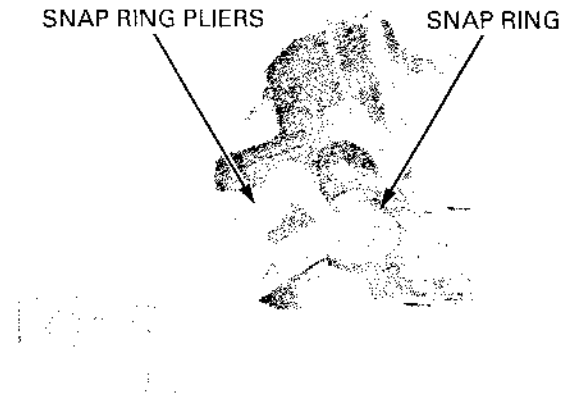
TOOL:

Snap ring pliers

07914-SA50001

SNAP RING PLIERS

SNAP RING



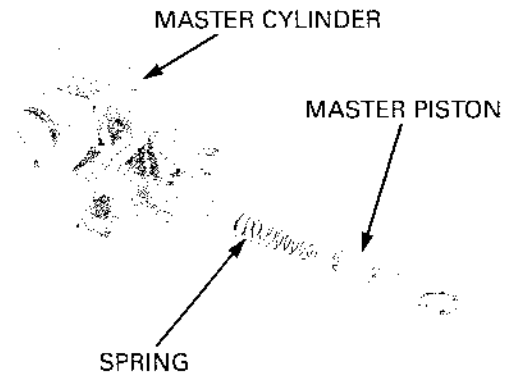
Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

MASTER CYLINDER

MASTER PISTON

SPRING

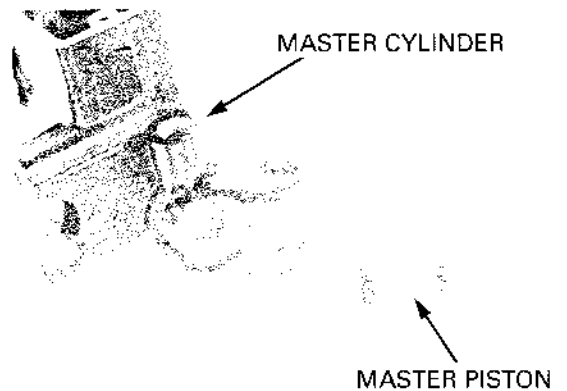


INSPECTION

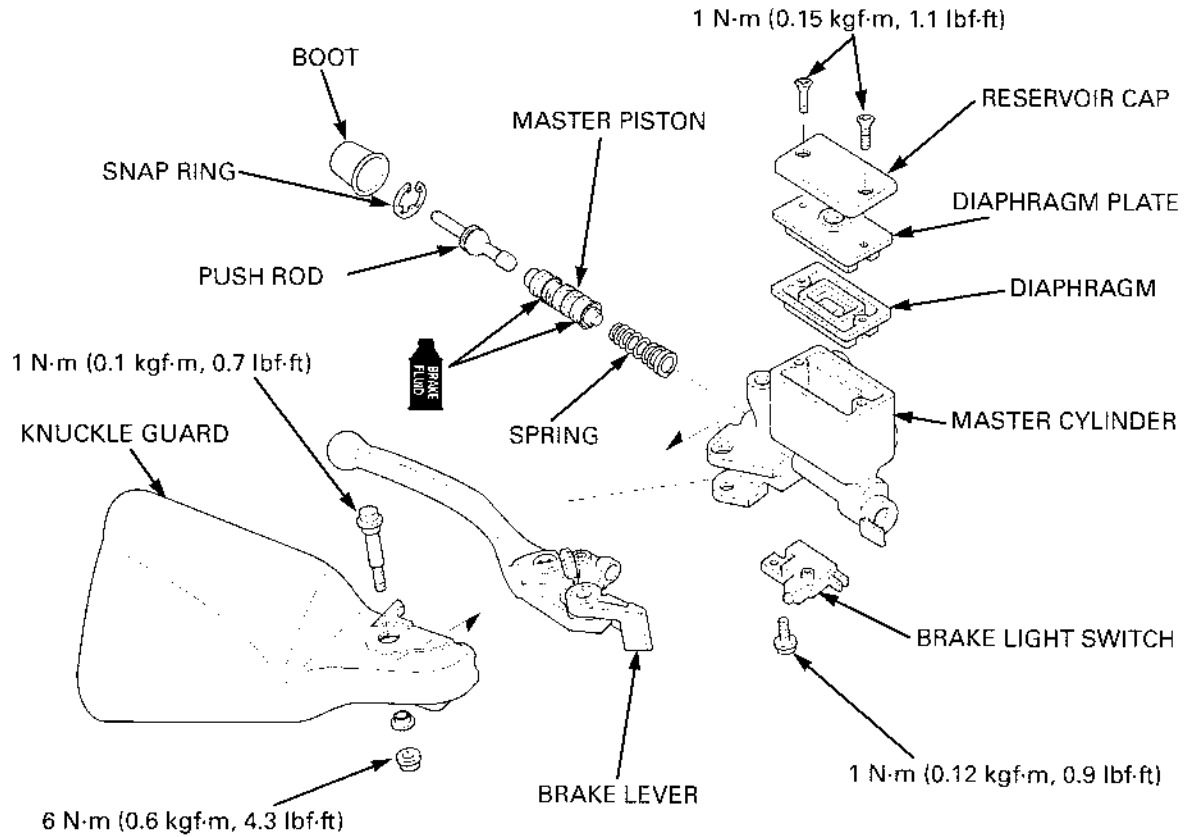
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.

MASTER CYLINDER

MASTER PISTON



ASSEMBLY



Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

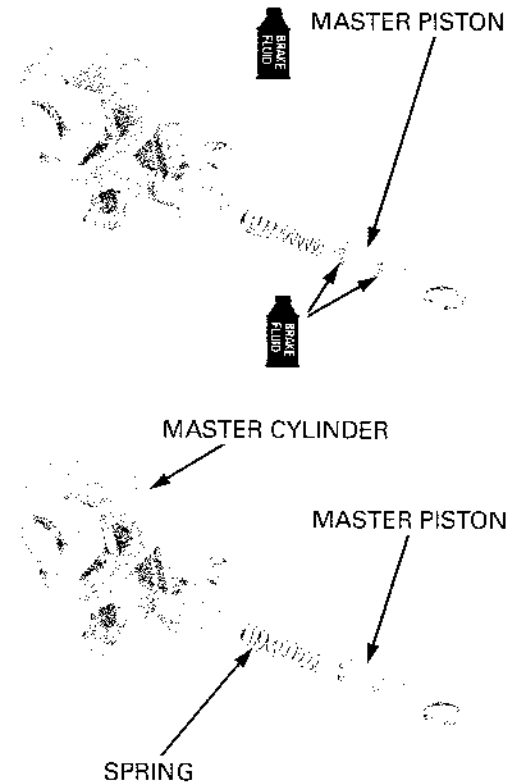
Coat all parts with clean brake fluid before assembly.

When installing the cups, do not allow the lips to turn inside out.

Dip the piston in brake fluid.

Install the spring to the master piston.

Install the master piston/spring into the master cylinder.



HYDRAULIC BRAKE

Be certain the snap ring is firmly seated in the groove.

Install the snap ring using the special tool.

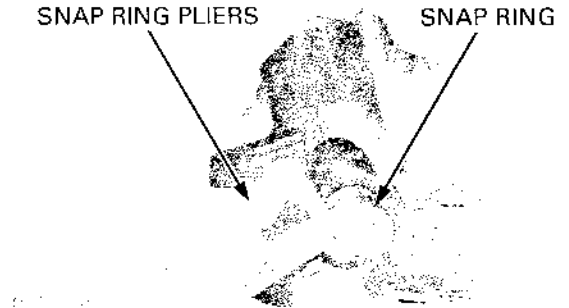
TOOL:

Snap ring pliers

07914-SA50001

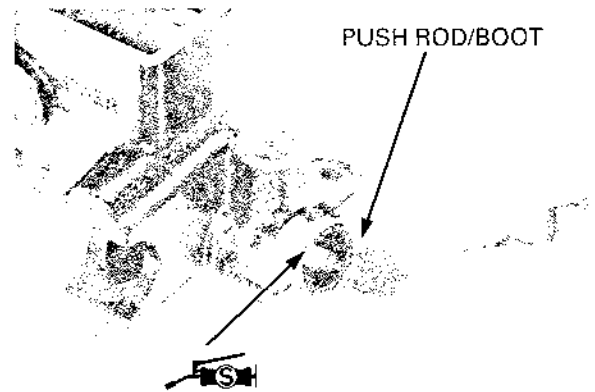
SNAP RING PLIERS

SNAP RING



Apply silicone grease to the inside of the boot and contact surfaces of the master piston and push rod. Install the push rod/boot.

PUSH ROD/BOOT

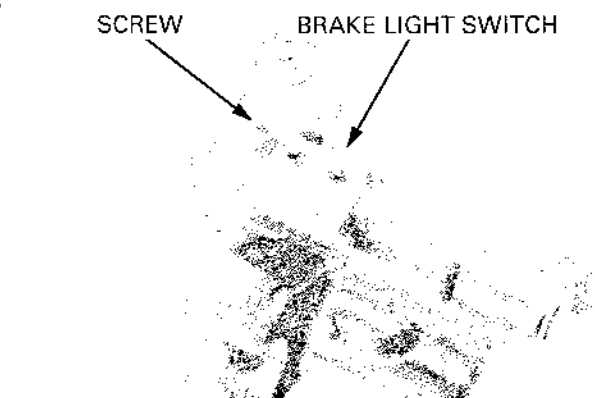


Install the brake light switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.12 kgf·m, 0.9 lbf·ft)

SCREW

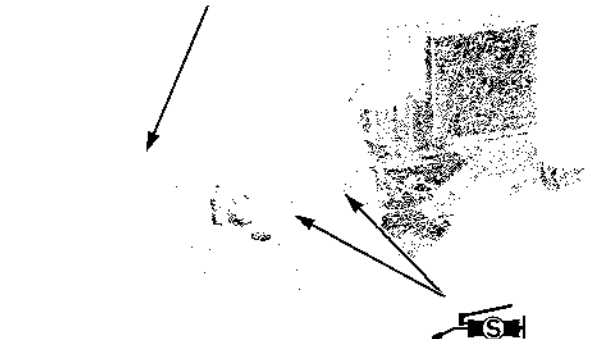
BRAKE LIGHT SWITCH



Apply silicone grease to the contact surfaces of the brake lever and push rod tip.

Install the brake lever assembly.

BRAKE LEVER ASSEMBLY



Install the knuckle guard.
Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install the collar.

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)

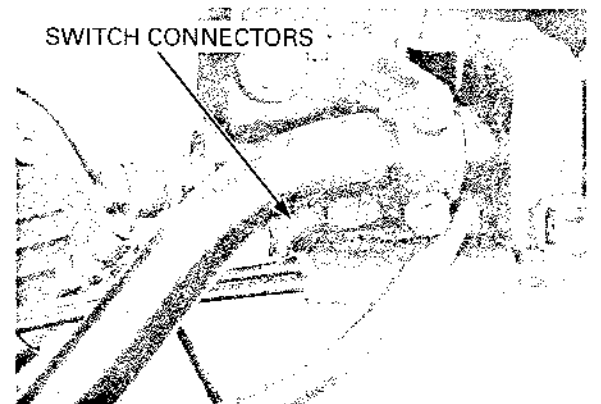
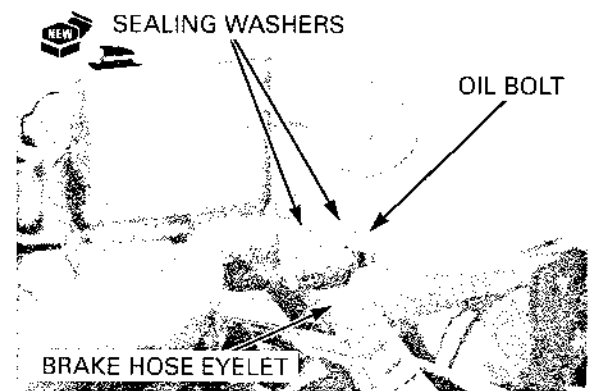
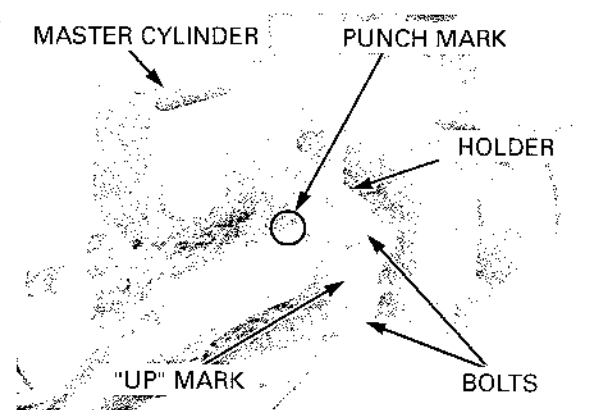
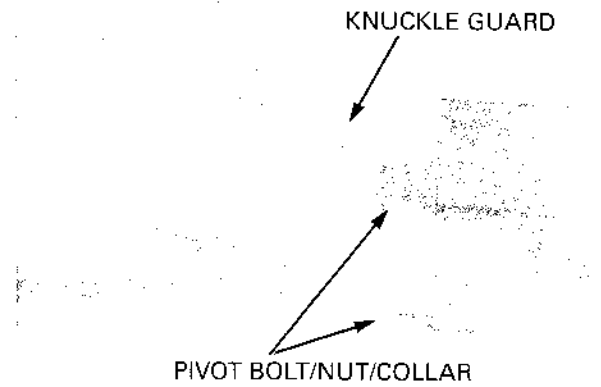
Install the brake hose eyelet with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the brake light switch connectors.

Fill and bleed the brake system (page 15-7).



HYDRAULIC BRAKE

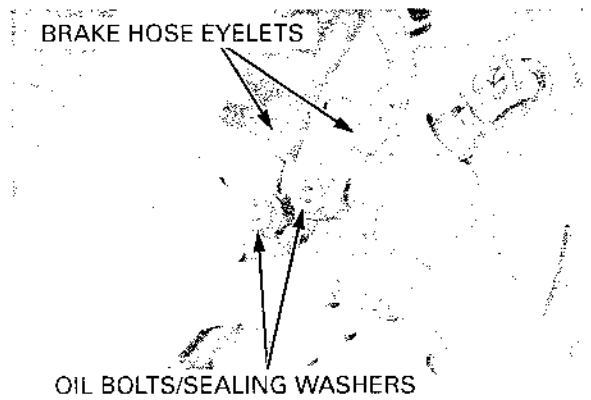
SECONDARY MASTER CYLINDER

REMOVAL/DISASSEMBLY

Drain the pedal brake hydraulic system (page 15-7).
Remove the left front brake caliper (page 15-32).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the brake hose oil bolts, sealing washers, brake hose eyelets 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

SNAP RING PLIERS

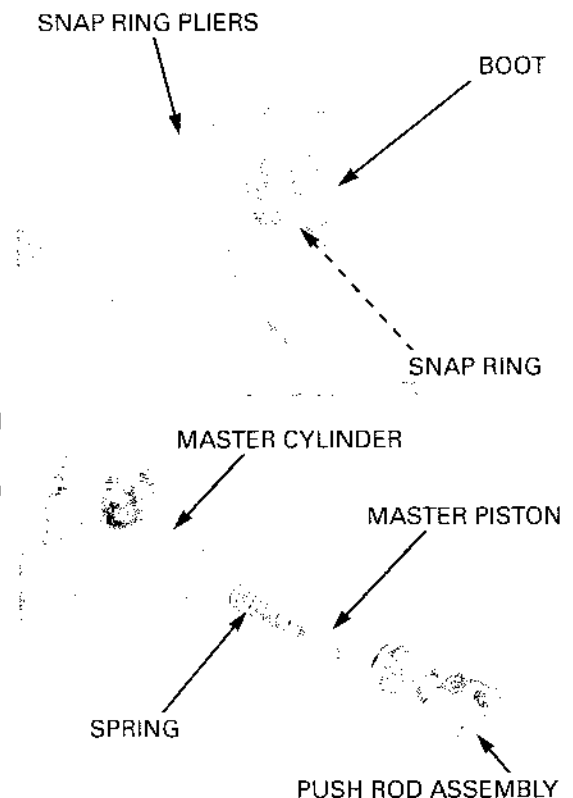
BOOT

SNAP RING

Do not disassemble the secondary master cylinder push rod or the correct brake performance is not obtained.

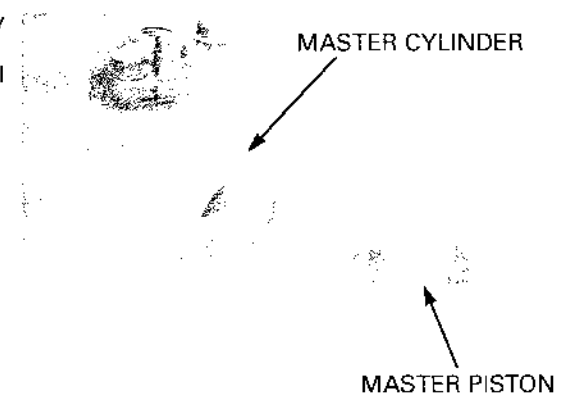
Remove the push rod assembly, master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

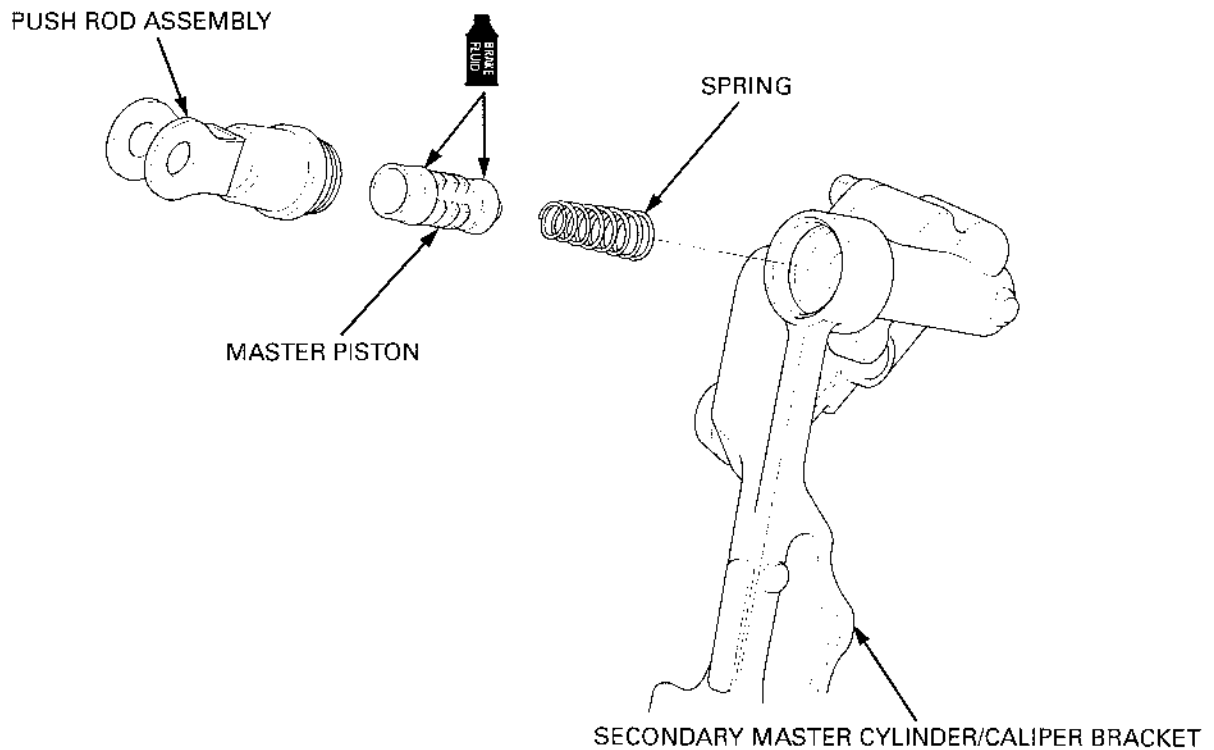


INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.

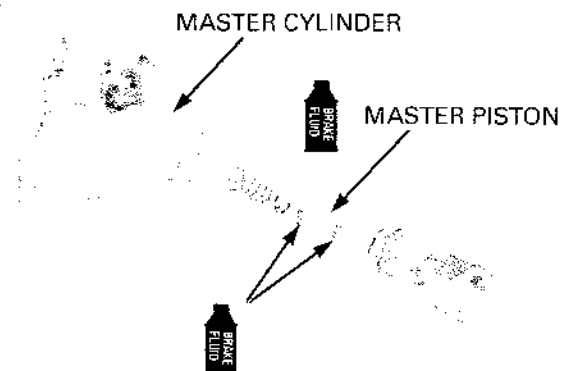


ASSEMBLY/INSTALLATION



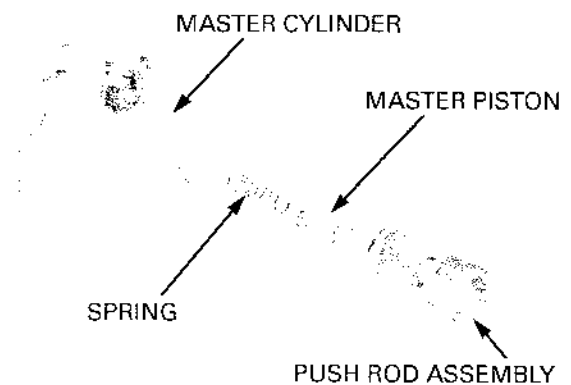
Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

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 into the piston.
Install the piston assembly into the master cylinder.



HYDRAULIC BRAKE

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.

SNAP RING PLIERS

BOOT

SNAP RING

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 15-37).

Fill and bleed the air from lever and pedal brake line (page 15-7).

BRAKE HOSE EYELETS

OIL BOLTS/

SEALING WASHERS

REAR MASTER CYLINDER

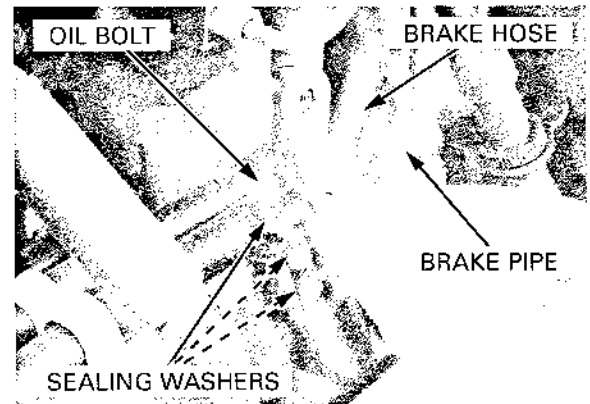
REMOVAL

Drain the rear hydraulic system (page 15-7).

Avoid spilling fluid on painted, plastic, or rubber parts.

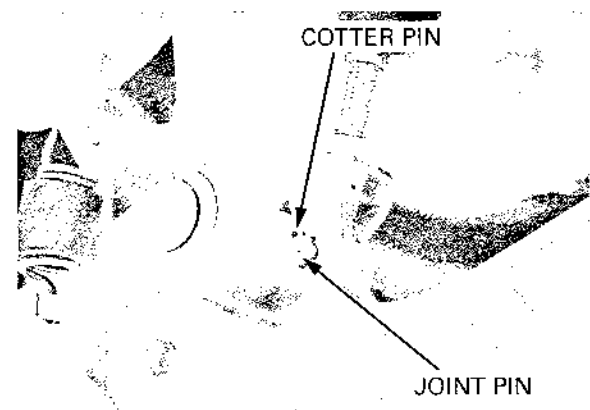
Place a rag over these parts whenever the system is serviced.

Remove the brake hose oil bolt, sealing washers, brake hose and pipe.

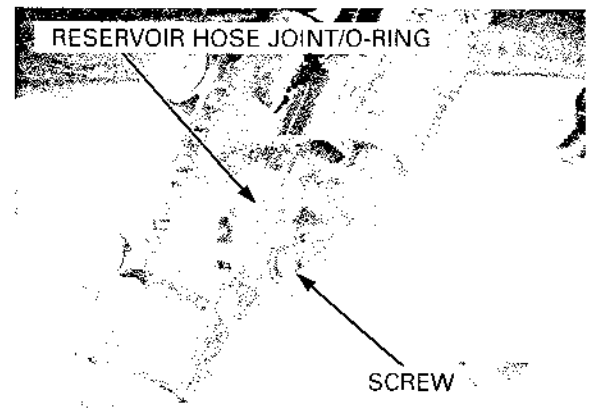


Remove the right footpeg bracket (page 14-18).

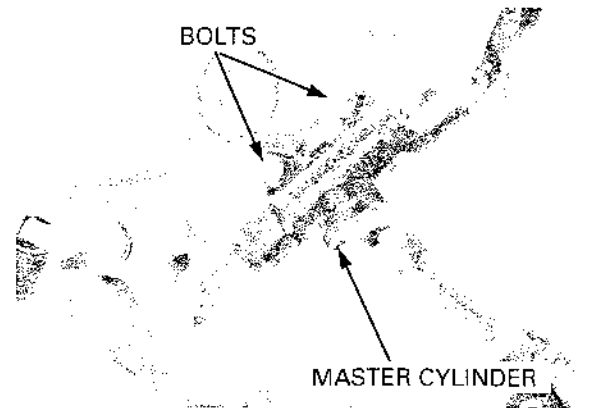
Remove and discard the brake pedal joint cotter pin.
Remove the brake pedal joint pin.



Remove the screw and reservoir hose joint and O-ring from the master cylinder.



Remove the mounting bolts and rear master cylinder.



DISASSEMBLY

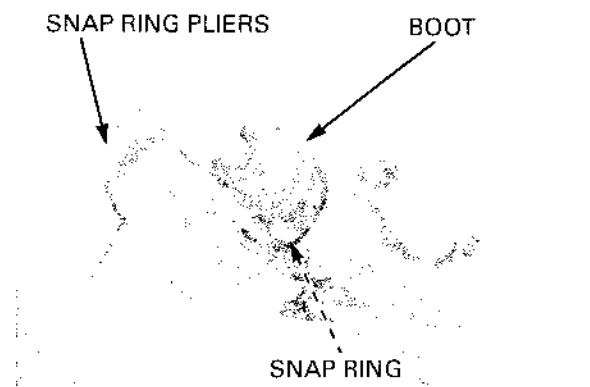
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

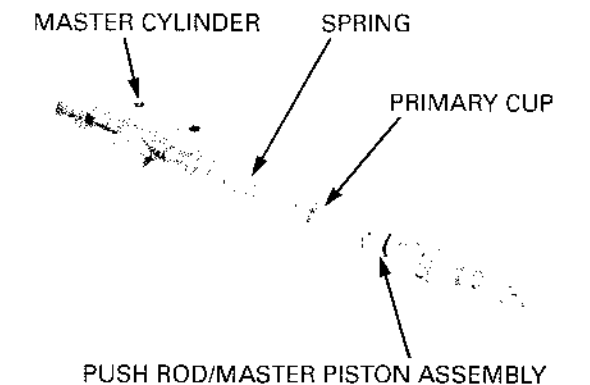
TOOL:

Snap ring pliers

07914-SA50001



Remove the push rod/master piston assembly, primary cup and spring.
Clean the inside of the cylinder with brake fluid.



HYDRAULIC BRAKE

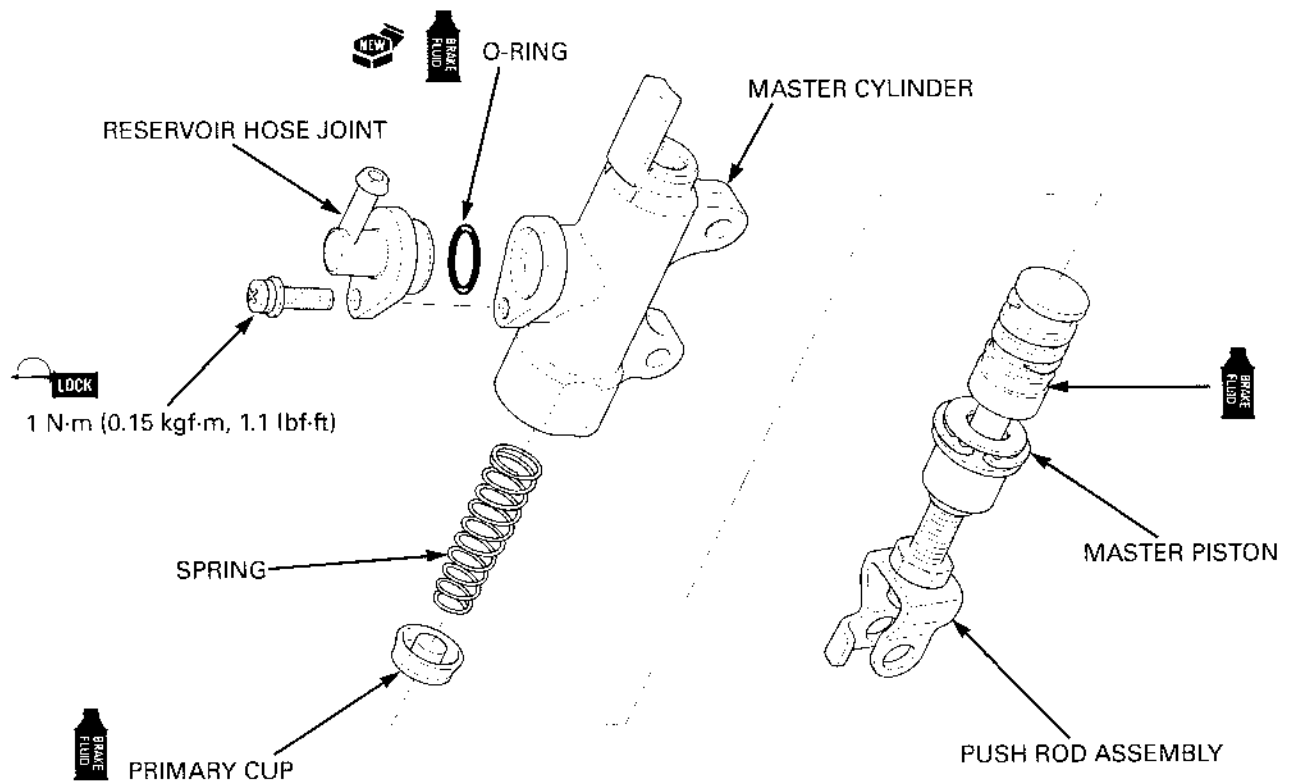
INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.

MASTER CYLINDER

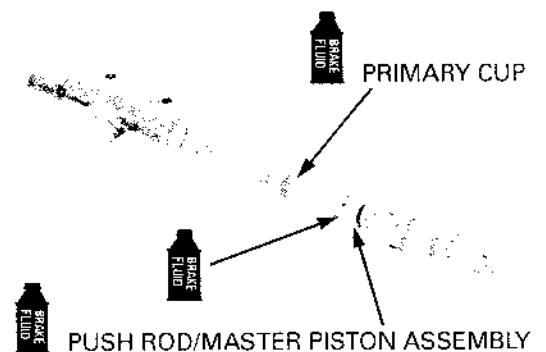
MASTER PISTON

ASSEMBLY



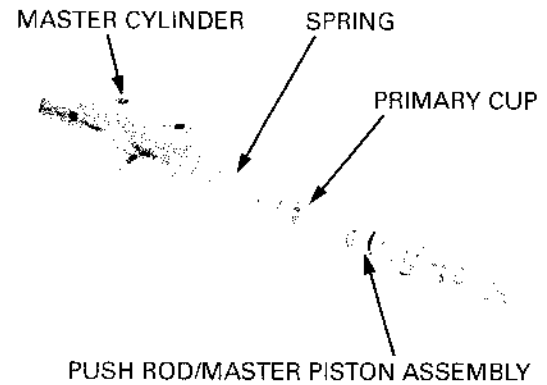
Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

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 to the primary cup.
Install the spring/primary cup and master piston/push rod assembly.



Be certain the snap ring is firmly seated in the groove.

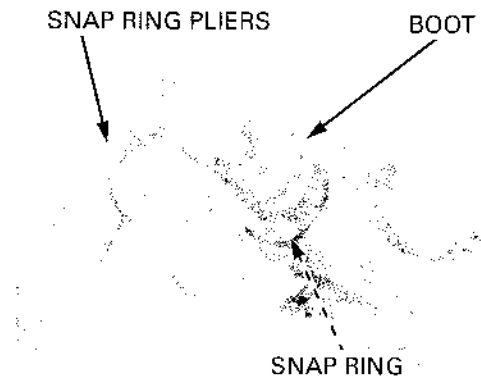
Install the snap ring using the special tool.

TOOL:

Snap ring pliers

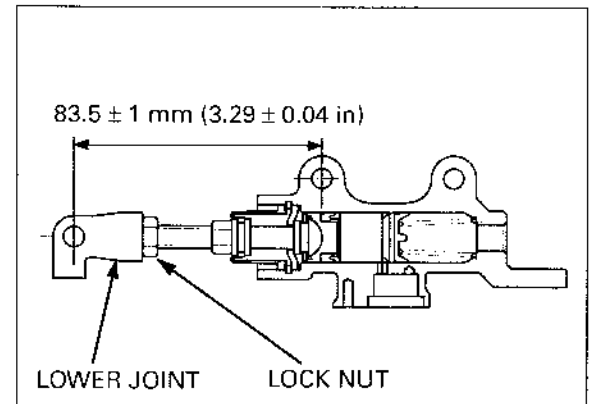
07914-SA50001

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.

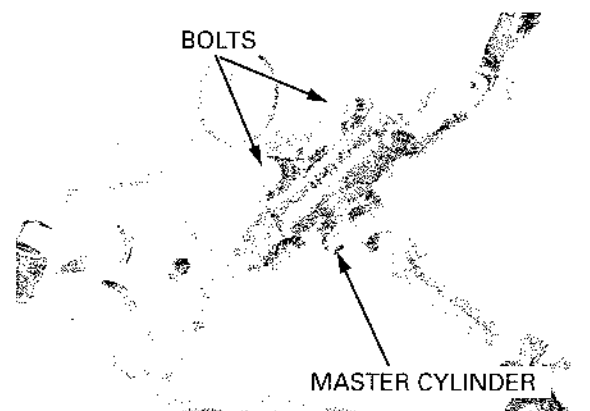
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



INSTALLATION

Place the master cylinder onto the right footpeg bracket.
Install and tighten the rear master cylinder mounting bolts to the specified torque.

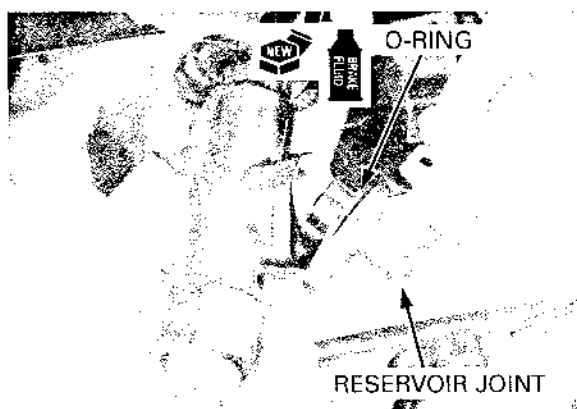
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



HYDRAULIC BRAKE

Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.

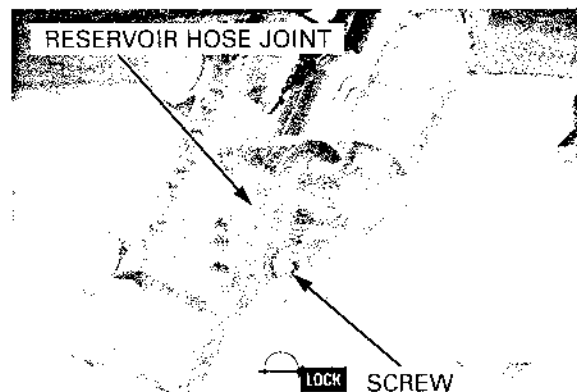
Install the reservoir hose joint into the master cylinder.



Clean and apply a locking agent to the screw threads.

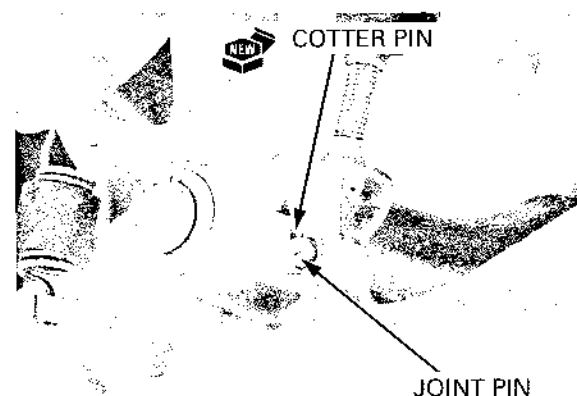
Install and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m, 1.1 lbf·ft)



Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.

Install the right footpeg bracket (page 14-24).

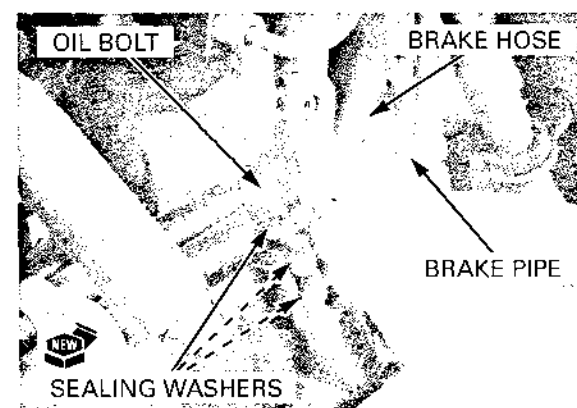


Install the brake hose and pipe with the oil bolt and new sealing washers.

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 15-9).



PROPORTIONAL CONTROL VALVE

REMOVAL/INSTALLATION

Drain the pedal and servo line hydraulic system (page 15-7).

Remove the fuel tank (page 5-53).

Loosen the oil pipe nut and remove the oil pipe.

Remove the mounting bolts and PCV.

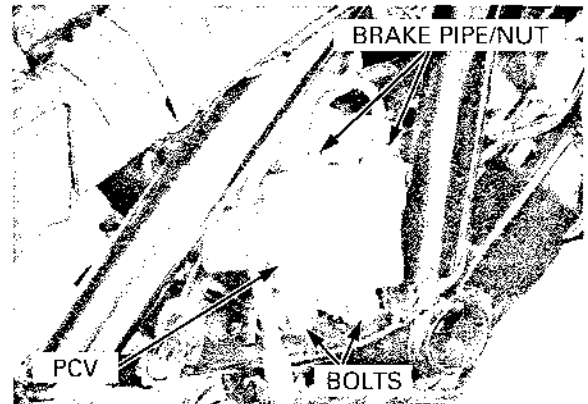
Installation is in the reverse order of removal.

Tighten the PCV mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill and bleed the brake system (page 15-9).

Install the fuel tank (page 5-54).



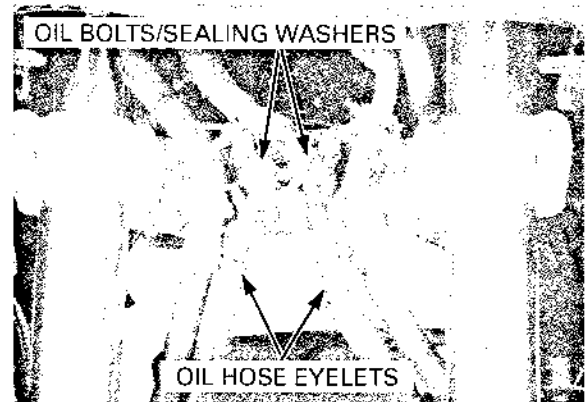
DELAY VALVE

REMOVAL

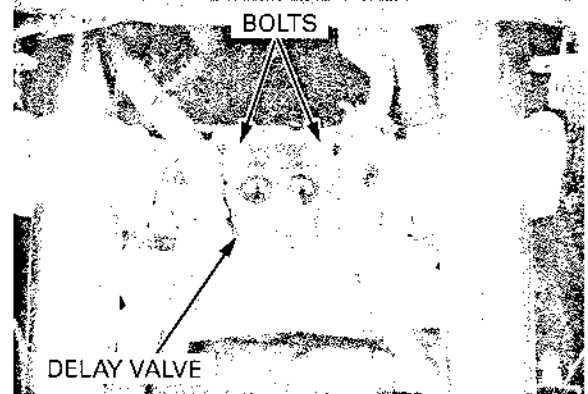
Remove the steering stem cover (page 13-34).

Drain the pedal and servo line hydraulic system (page 15-7).

Remove the oil bolts, sealing washers and brake hose eyelets from the delay valve.



Remove the mounting bolts and delay valve.

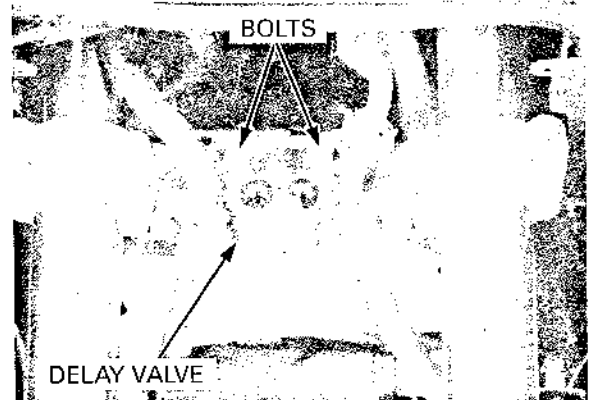


HYDRAULIC BRAKE

INSTALLATION

Install the delay valve onto the steering stem. Install and tighten the delay valve mounting bolts to the specified torque.

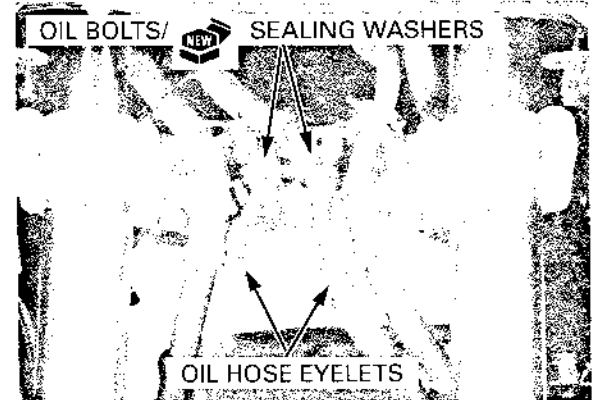
TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)



Install the brake hoses with the oil bolts and new sealing washers. Push the eyelet joints against the stoppers on the delay valve, then tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf-m, 25 lbf-ft)

Fill and bleed the brake system (page 15-9).
Install the steering stem cover (page 13-37).



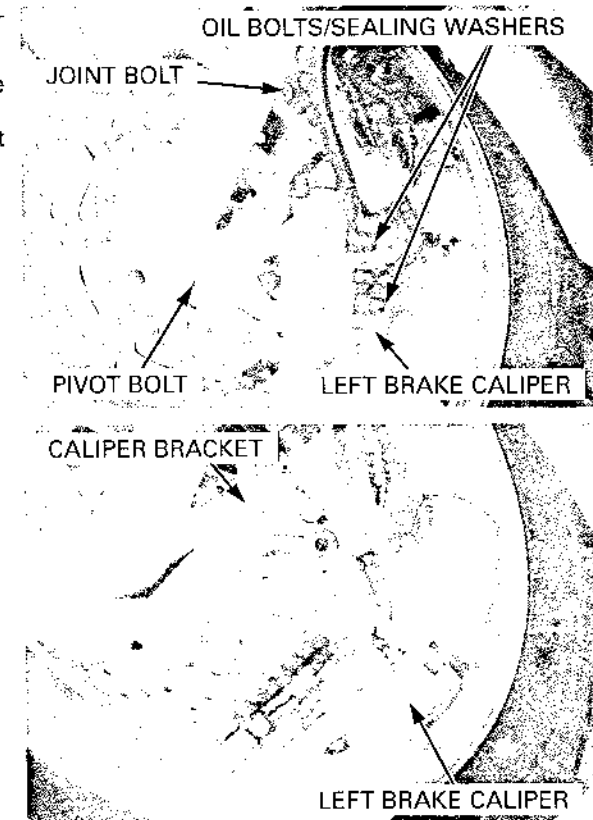
FRONT BRAKE CALIPER

LEFT CALIPER REMOVAL

Drain the lever and pedal brake line hydraulic system (page 15-7).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the oil bolts, sealing washers and brake hose eyelet joints. Remove the secondary master cylinder joint bolt and caliper pivot bolt.



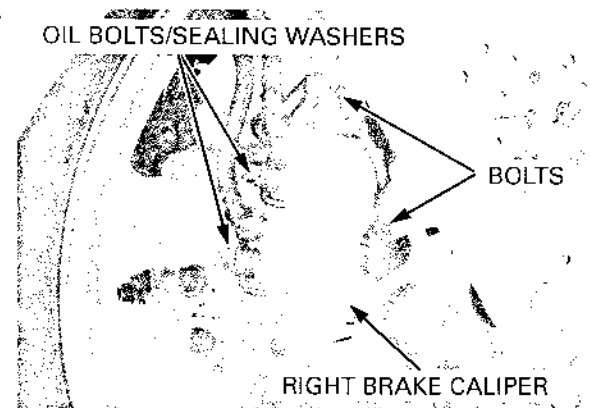
Remove the caliper from the bracket.

RIGHT CALIPER REMOVAL

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

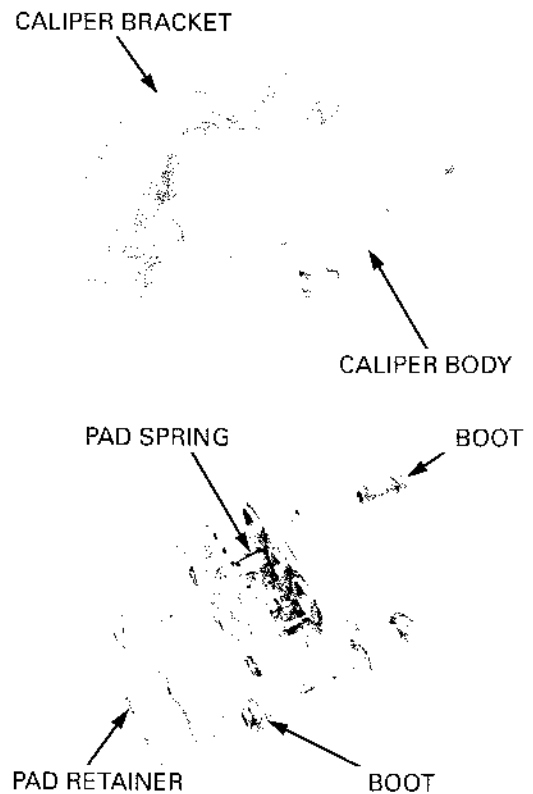
Remove the oil bolt, sealing washers and brake hose eyelet joints.

Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.

**DISASSEMBLY**

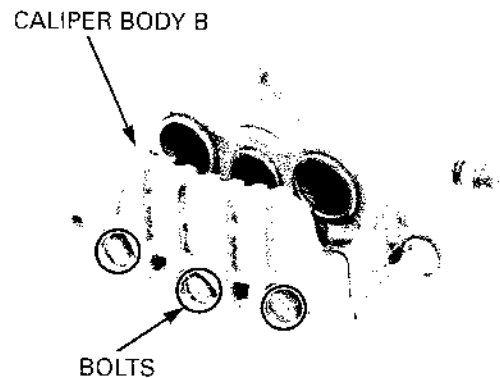
Right side: Remove the brake pads (page 15-14).

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 bracket.

Remove the bolts and caliper body B



HYDRAULIC BRAKE

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.

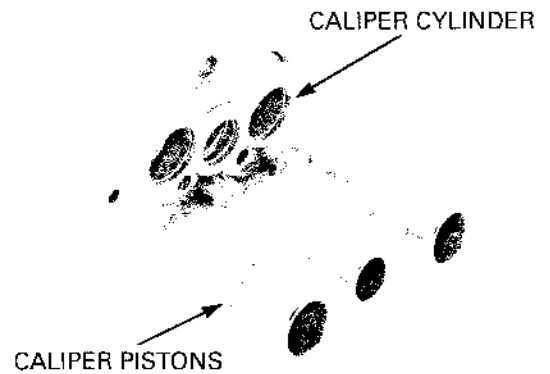
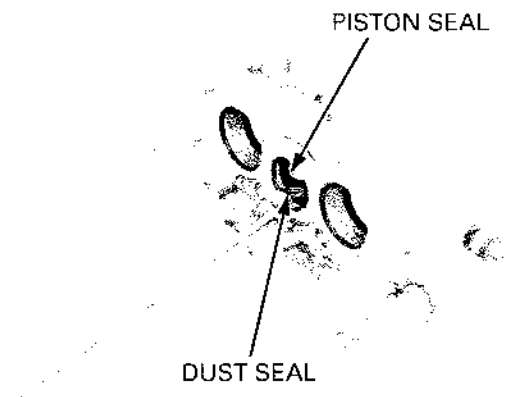
Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.

INSPECTION

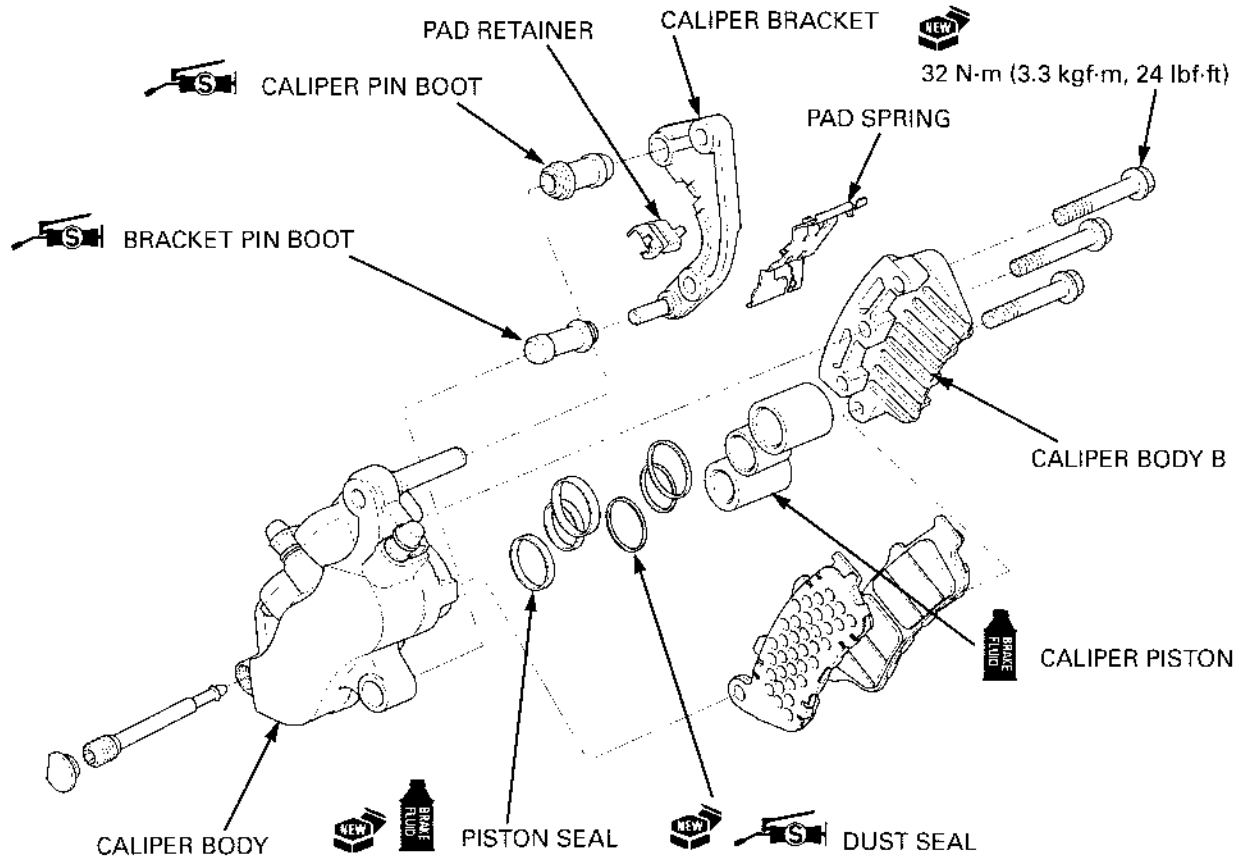
Check the caliper cylinder for scoring or other damage.

Check the caliper pistons for scratches, scoring or other damage.

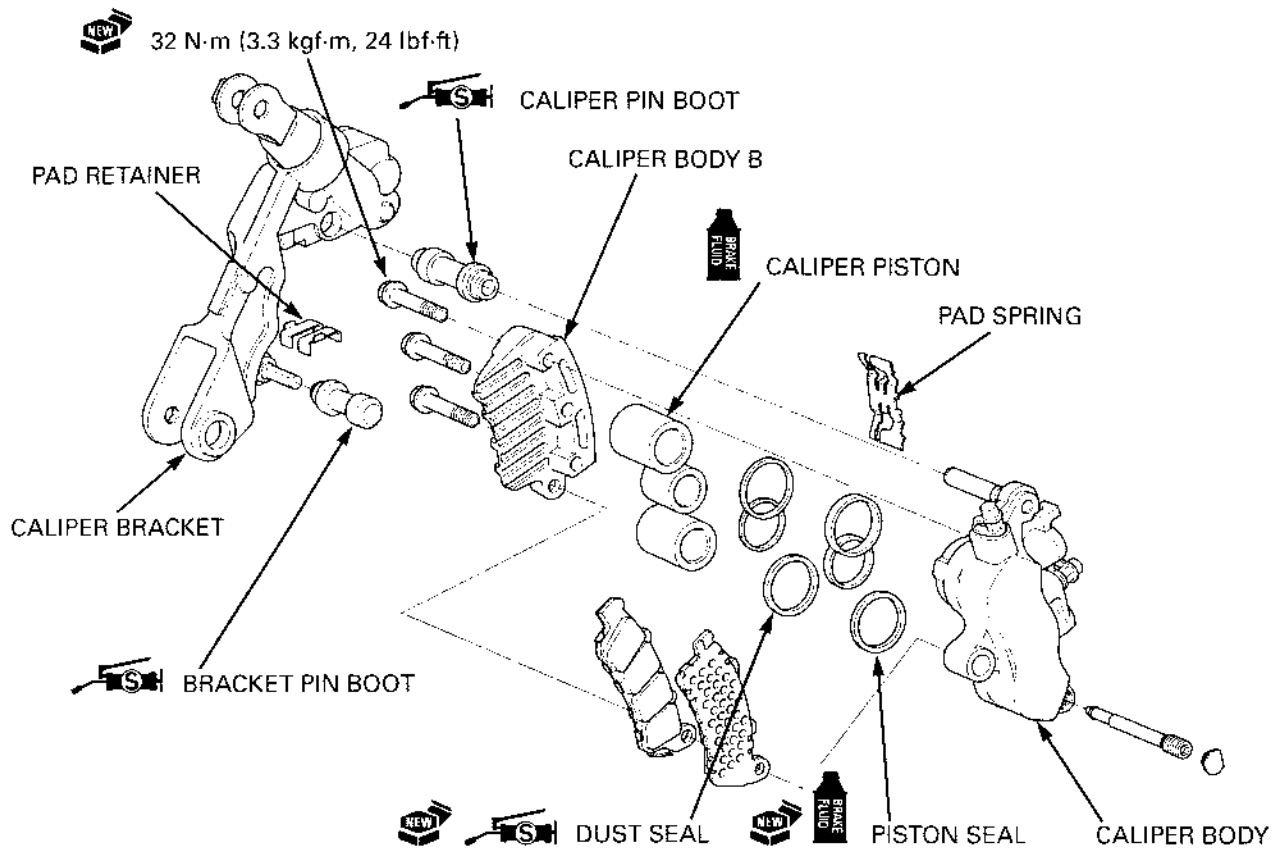


ASSEMBLY

Right:



Left:

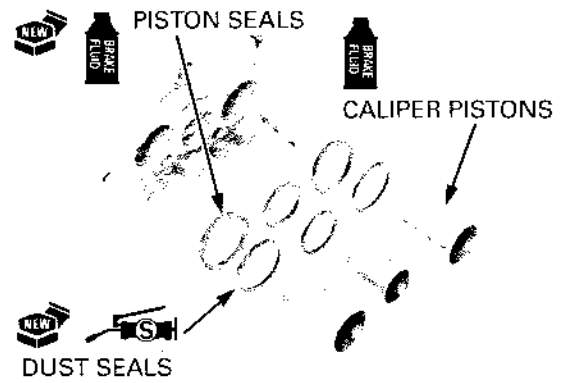


HYDRAULIC BRAKE

Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

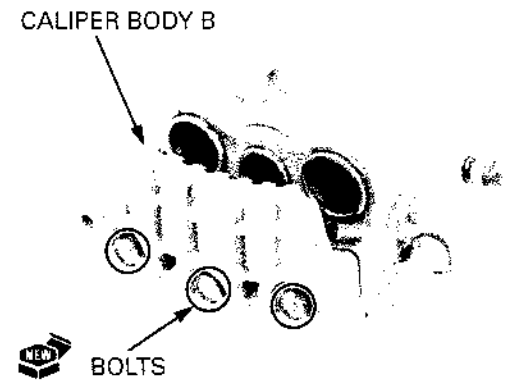
Install the piston and dust seal into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

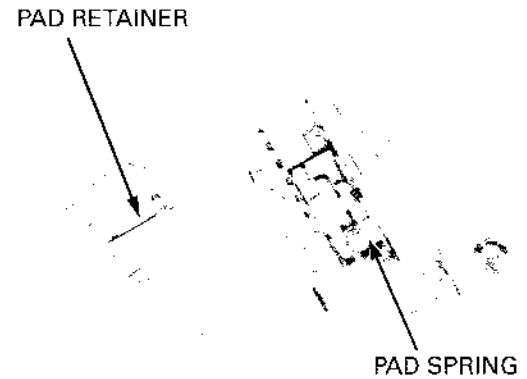
TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



Install the brake pad retainer onto the caliper bracket.

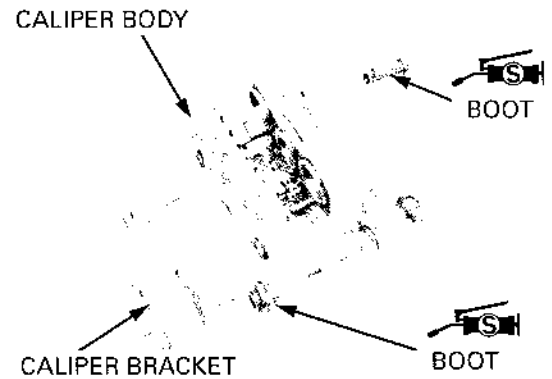
Note the installation direction of the pad spring.

Install the pad spring into the caliper body.



Apply silicone grease to the boot inside, then install them.

Assemble the caliper and bracket.



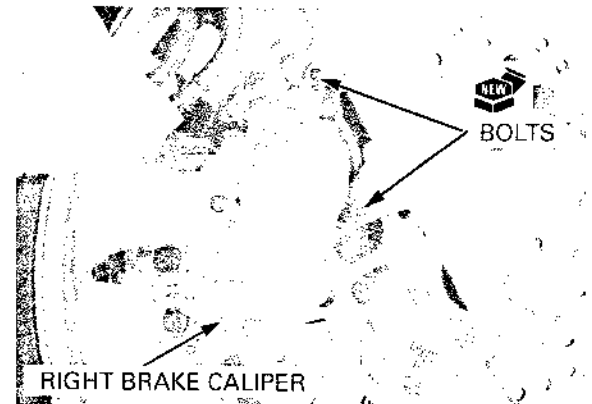
RIGHT CALIPER INSTALLATION

Install the brake pads and caliper onto the fork leg (page 15-14).

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)



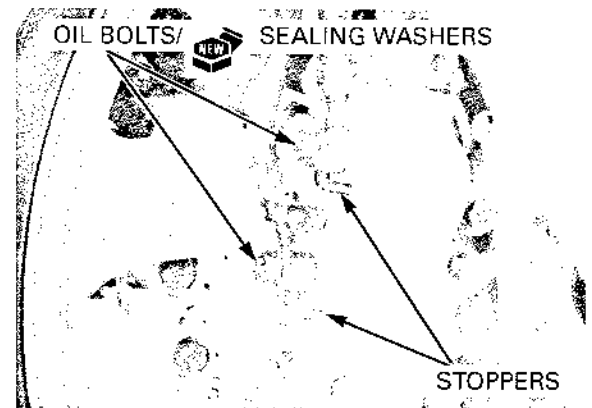
Install the brake hose eyelets joint to the caliper body with new sealing washers and oil bolts.

Push the brake hose eyelet stoppers against the caliper, then tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

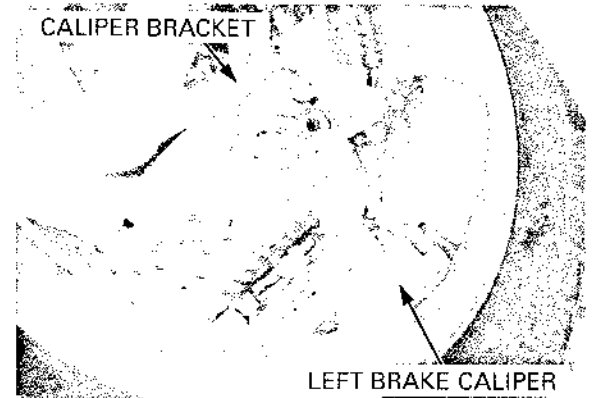
Install the brake pad (page 15-14).

Fill and bleed the front brake hydraulic system (page 15-9).



LEFT CALIPER INSTALLATION

Install the left rake caliper onto the bracket.



Install the left brake caliper/bracket assembly over the brake disc.

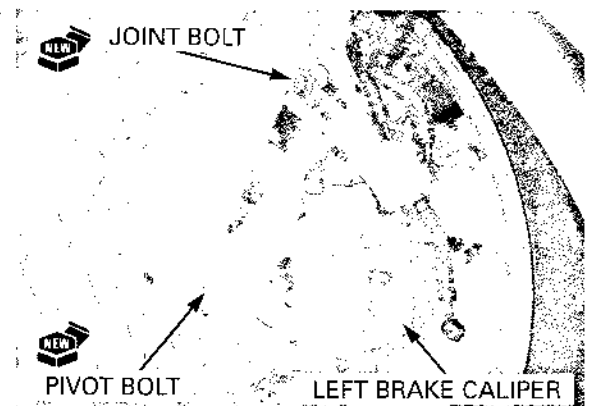
Install the new caliper pivot bolt and secondary master cylinder joint bolt.

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)



HYDRAULIC BRAKE

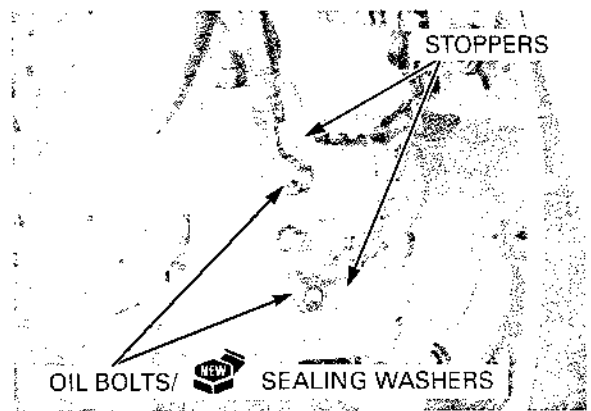
Install the brake hose eyelet joints to the caliper body with new sealing washers and oil bolts.

Push the brake hose eyelets to the stoppers 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 15-14).

Fill and bleed the front brake hydraulic system (page 15-9).



REAR BRAKE CALIPER

REMOVAL

Drain the rear brake hydraulic system (page 15-7).

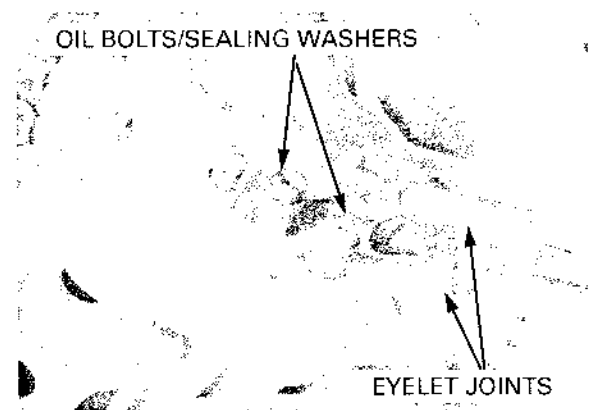
Loosen the oil bolts, then remove the rear wheel (page 14-6).

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the oil bolts, sealing washers and brake hose eyelet joints.

Remove the rear wheel (page 14-6).

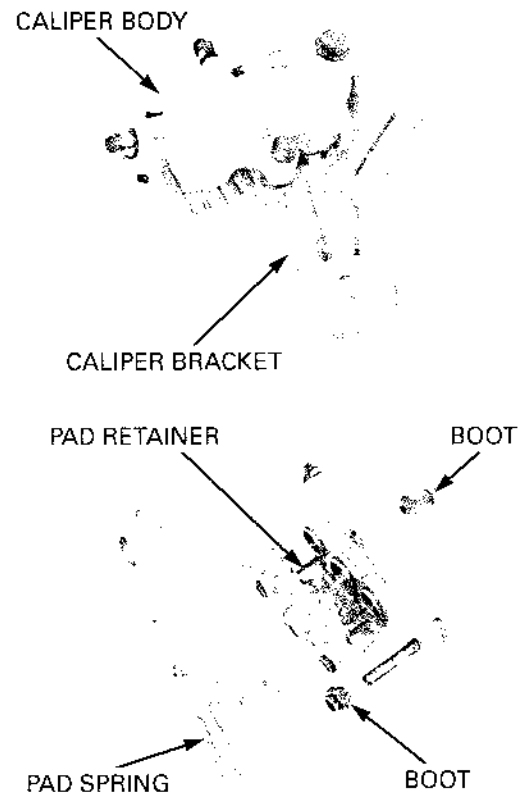
Remove the rear brake caliper from the groove on the swingarm.



DISASSEMBLY

Remove the brake pads (page 15-16).

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 bracket.

Remove the bolts and caliper body B.

CALIPER BODY B

BOLTS

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.

Check the caliper pistons for scratches, scoring or other damage.

PISTON SEAL

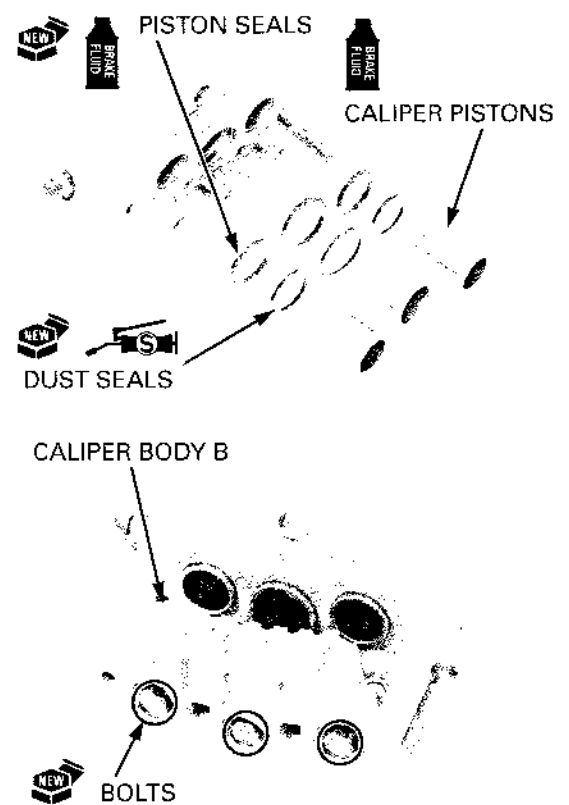
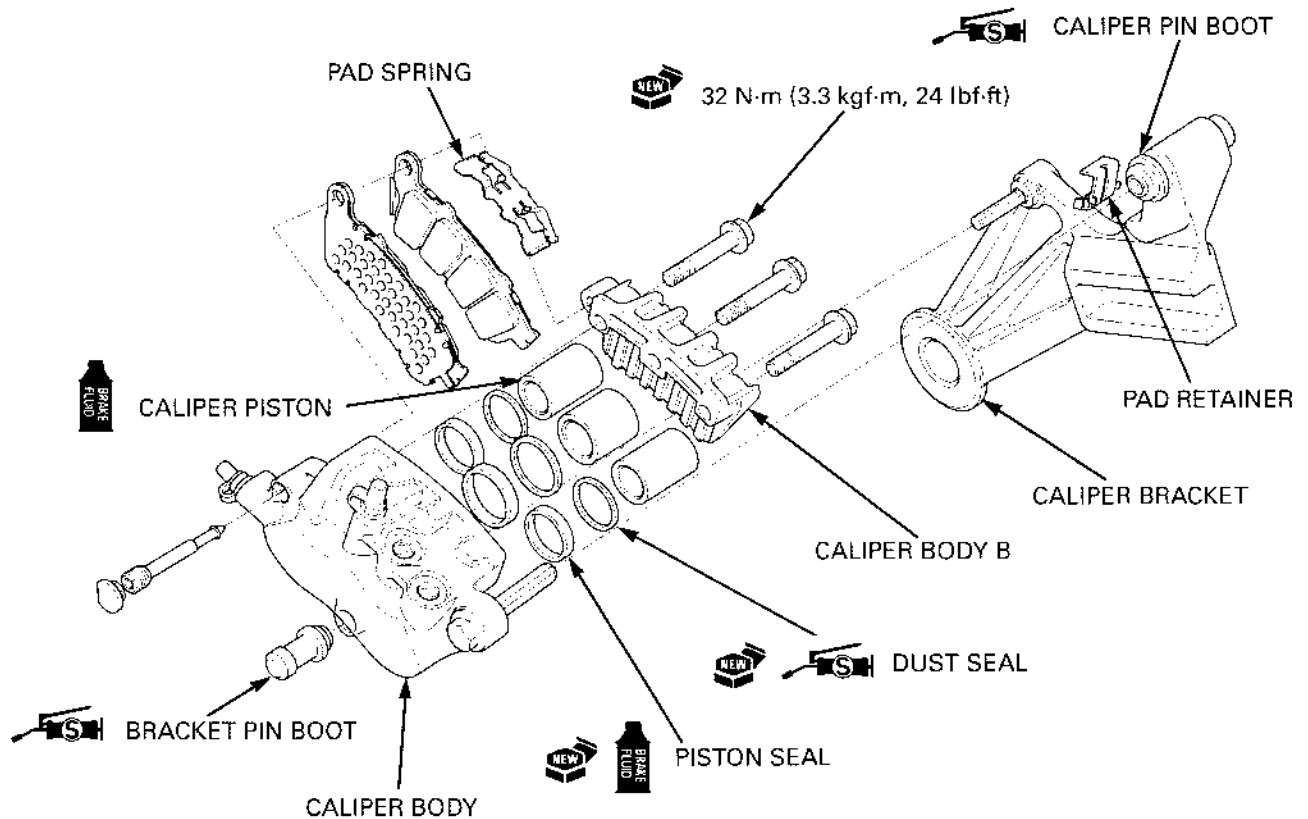
DUST SEAL

CALIPER CYLINDER

CALIPER PISTONS

HYDRAULIC BRAKE

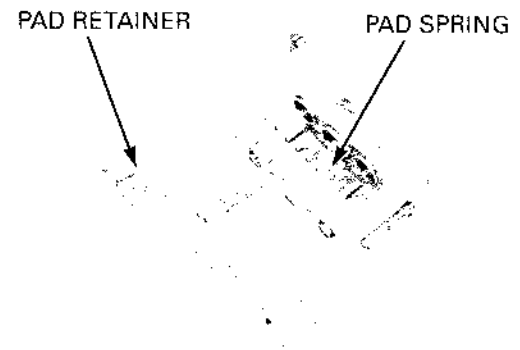
ASSEMBLY



Install the brake pad retainer onto the caliper bracket.

Note the installation direction of the pad spring.

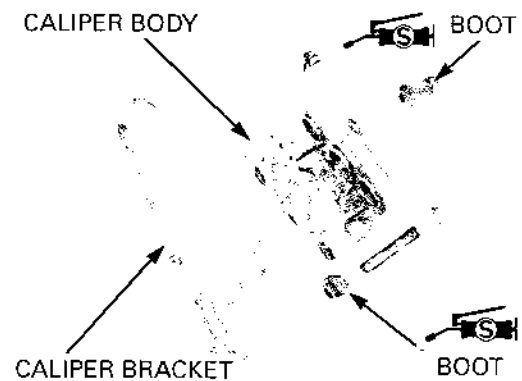
Install the pad spring into the caliper body.



Apply silicone grease to the boot inside, then install them.

Assemble the caliper and bracket.

Install the rear brake pads (page 15-16).

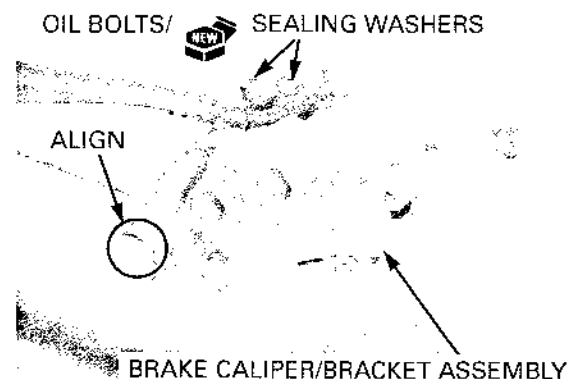


INSTALLATION

Temporarily install the brake hose eyelet joints to the caliper body with new sealing washers and oil bolts.

Install the caliper/bracket assembly onto the swingarm aligning the bracket groove with the swingarm guide.

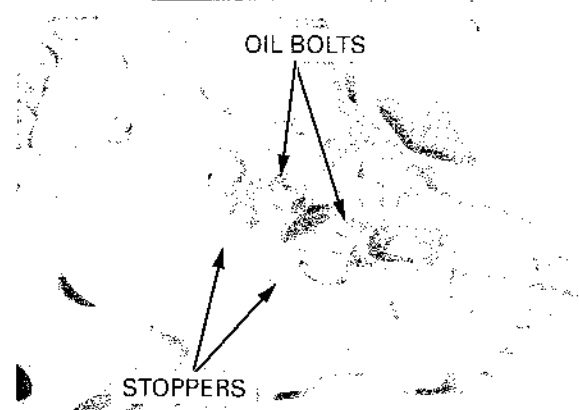
Install the rear wheel (page 14-11).



Push the brake hose eyelet stoppers to the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf-m, 25 lbf-ft)

Fill and bleed the rear brake hydraulic system (page 15-9).



BRAKE PEDAL

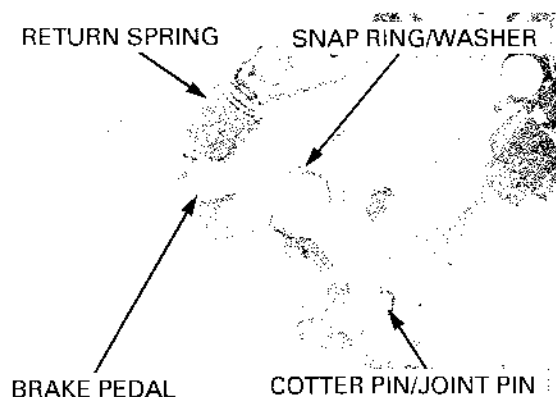
REMOVAL

Remove the right footpeg bracket assembly (page 14-18).

Unhook the brake pedal return spring from the brake pedal.

Remove and discard the brake pedal joint cotter pin. Remove the joint pin.

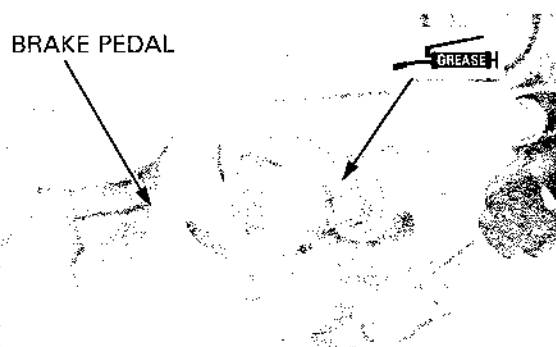
Remove the snap ring, thrust washer and brake pedal from the footpeg.



INSTALLATION

Apply grease to the sliding surface of the brake pedal and footpeg.

Install the brake pedal to the pedal pivot.

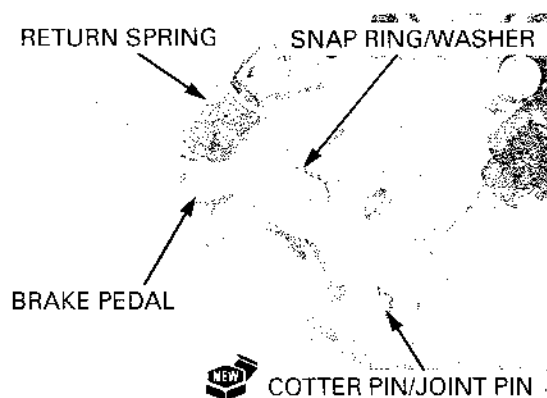


Secure the pedal pivot with a snap ring and washer.

Hook the brake pedal return spring.

Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.

Install the right footpeg bracket assembly (page 14-24).

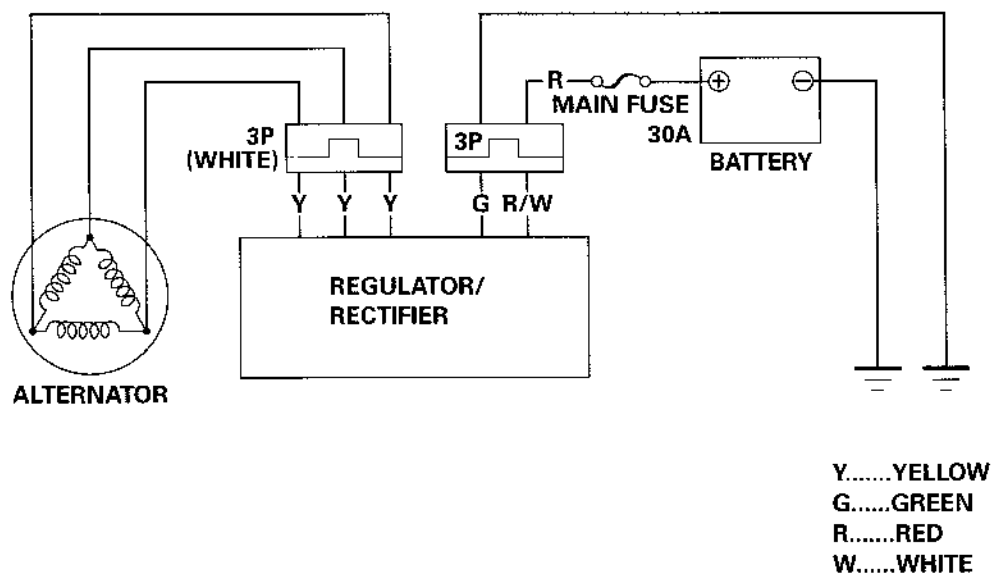
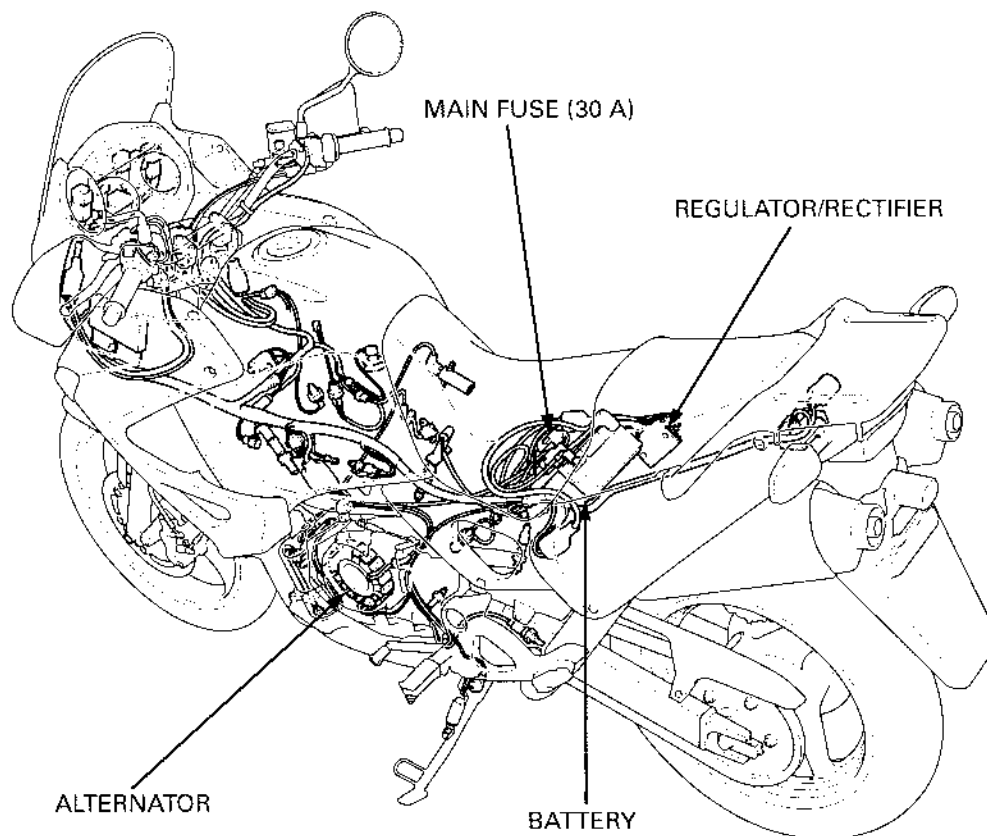


16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM.....	16-2	CHARGING SYSTEM INSPECTION.....	16-6
SERVICE INFORMATION	16-3	ALTERNATOR CHARGING COIL	16-6
TROUBLESHOOTING	16-4	REGULATOR/RECTIFIER	16-7
BATTERY.....	16-5		

BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or call a physician immediately.

NOTICE

- *Always turn off the ignition switch before disconnecting any electrical component.*
- *Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is 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 if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, 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 16-4).
- 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 mark ("—").
- Refer to page 10-4 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 or BATTERY MATE or equivalent**

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V - 17/18Ah
	Current leakage		0.1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.7 A/5 - 10 h
		Quick	8.5 A/0.5 h
Alternator	Capacity		0.434 kW/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.3 - 0.5 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST

Remove the battery (page 16-5).

Check the battery condition using the recommended battery tester.

RECOMMENDED BATTERY TESTER:

BM210 or BATTERY MATE or equivalent

Is the battery good condition?

No – Faulty battery.

YES – GO TO STEP 2.

2. CURRENT LEAKAGE TEST

Install the battery (page 16-5).

Check the battery current leakage test (Leak test; page 16-6).

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 16-6).

Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20 °C/68 °F)?

No – Faulty charging coil.

YES – GO TO STEP 5.

5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 16-6).

Start the engine.

Measure the charging voltage (page 16-6).

Compare the measurement to result of the following calculation.

STANDARD:

Measured battery Voltage < Measured charging voltage < 15.5 V

Is the measured charging voltage within the standard voltage?

YES – Faulty battery.

NO – GO TO STEP 6.

6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connector (page 16-7).

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 seat (page 2-3).

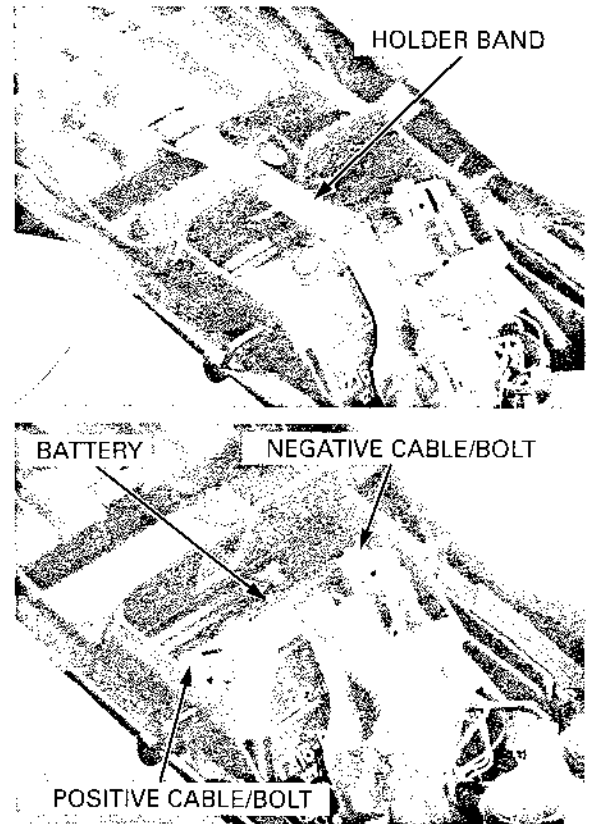
Remove the battery holder band.

Disconnect the negative cable and then the positive cable, and remove the battery.

Connect the positive terminal first and then the negative cable.

Install the battery in the reverse order of removal with the proper wiring as shown.

After installing the battery, coat the terminals with clean grease.



VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:

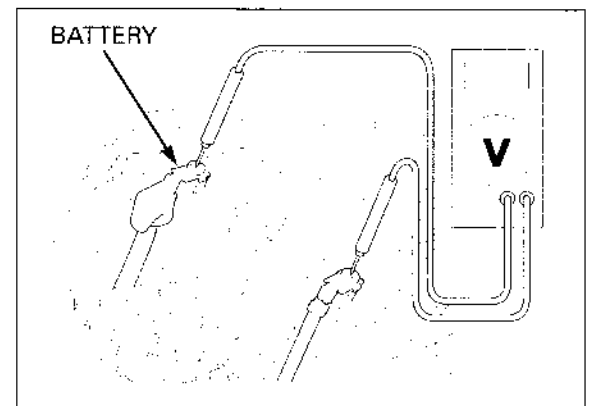
Fully charged: 13.0 – 13.2V

Under charged: Below 12.3V

TOOL:

Digital multimeter

Commercially available



BATTERY CHARGING

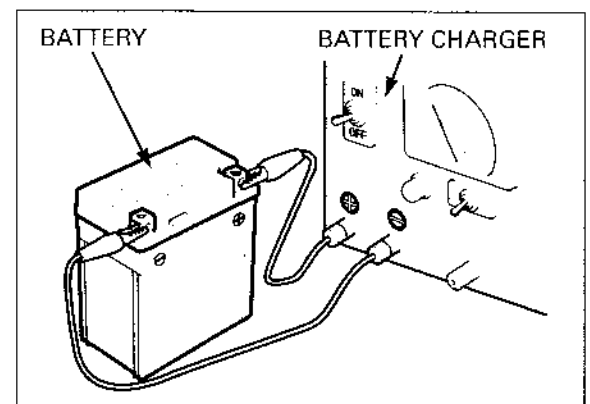
Remove the battery (page 16-5).

Turn power ON/OFF at the charger, not at the battery terminal.

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (-) cable to the battery negative (-) terminal.

- Quick-charging should only be done in an emergency; slow charging is preferred.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.



CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECTION

Turn the ignition switch off and disconnect the negative battery cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal.

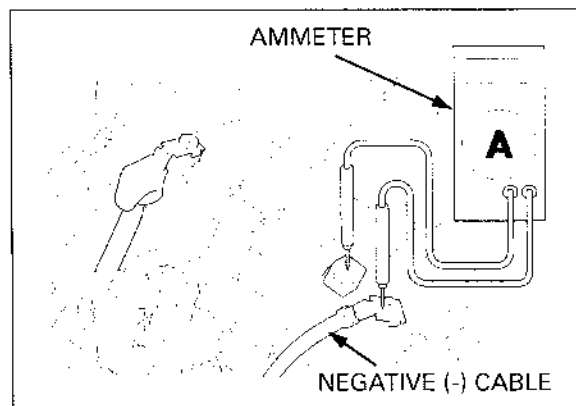
With the ignition switch off, check for current leakage.

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 0.1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



CHARGING VOLTAGE INSPECTION

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

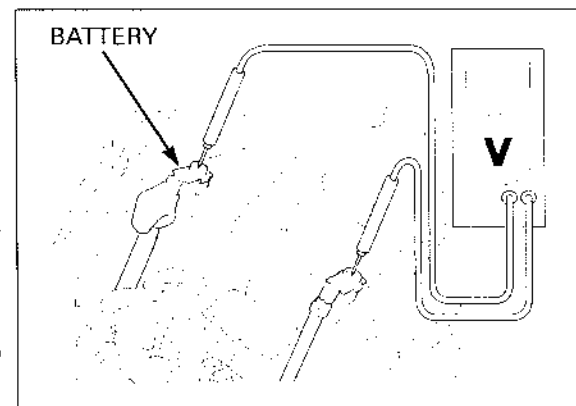
Stop the engine, and connect the multimeter as shown.

- 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 16-5) < Measured charging voltage (page 16-6) < 15.5 V at 5,000 min⁻¹ (rpm)



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.

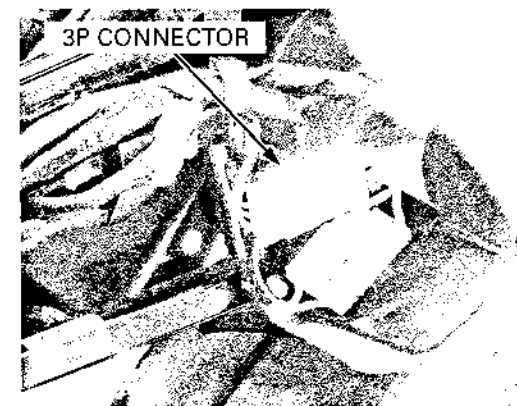
ALTERNATOR CHARGING COIL

INSPECTION

Remove the side cover (page 2-3).

Disconnect the alternator 3P connector.

It is not necessary to remove the stator coil to make this test.



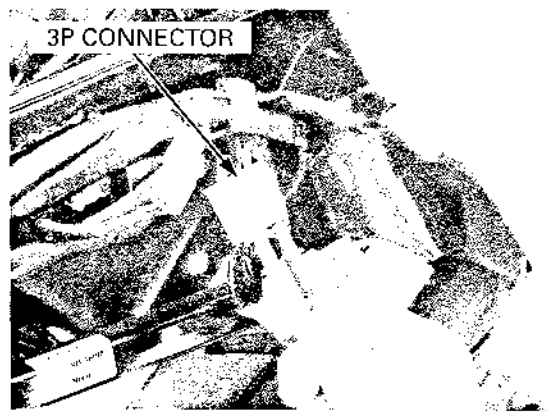
Check the resistance between all three Yellow terminals.

STANDARD: 0.3 – 0.5 Ω (at 20°C/68°F)

Check for continuity between all three Yellow terminals and Ground.

There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.



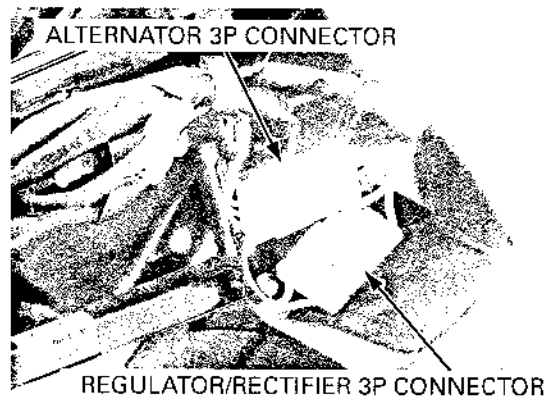
REGULATOR/RECTIFIER

SYSTEM INSPECTION

Remove the side cover (page 2-3).

Disconnect the regulator/rectifier 3P connector and alternator 3P connector.

Check it for loose contact or corroded terminals.



If the regulated voltage reading (page 16-6) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.3 – 0.5 Ω at (20°C/68°F)
Ground line	Green and ground	Continuity should exist

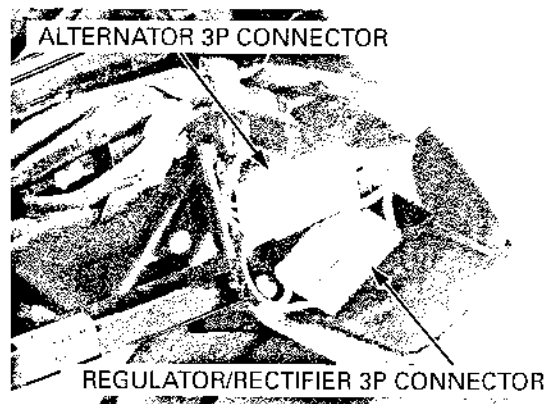
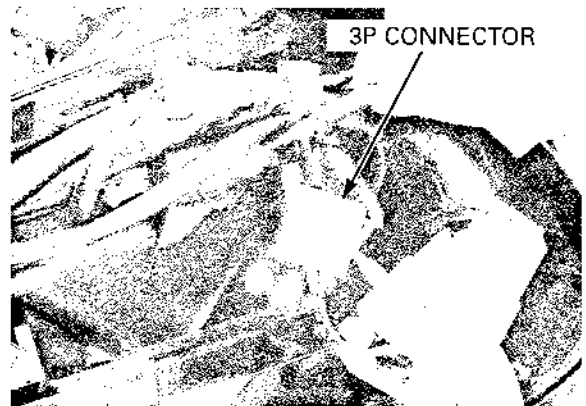
If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

REMOVAL/INSTALLATION

Remove the side cover (page 2-3).

Disconnect the alternator 3P connector.

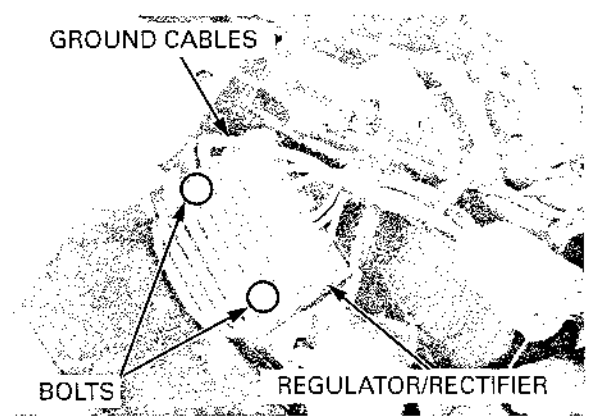
Disconnect the regulator/rectifier 3P connector.



BATTERY/CHARGING SYSTEM

Remove the regulator/rectifier unit mounting bolts, regulator/rectifier and ground cables.

Install the regulator/rectifier unit in the reverse order of removal.

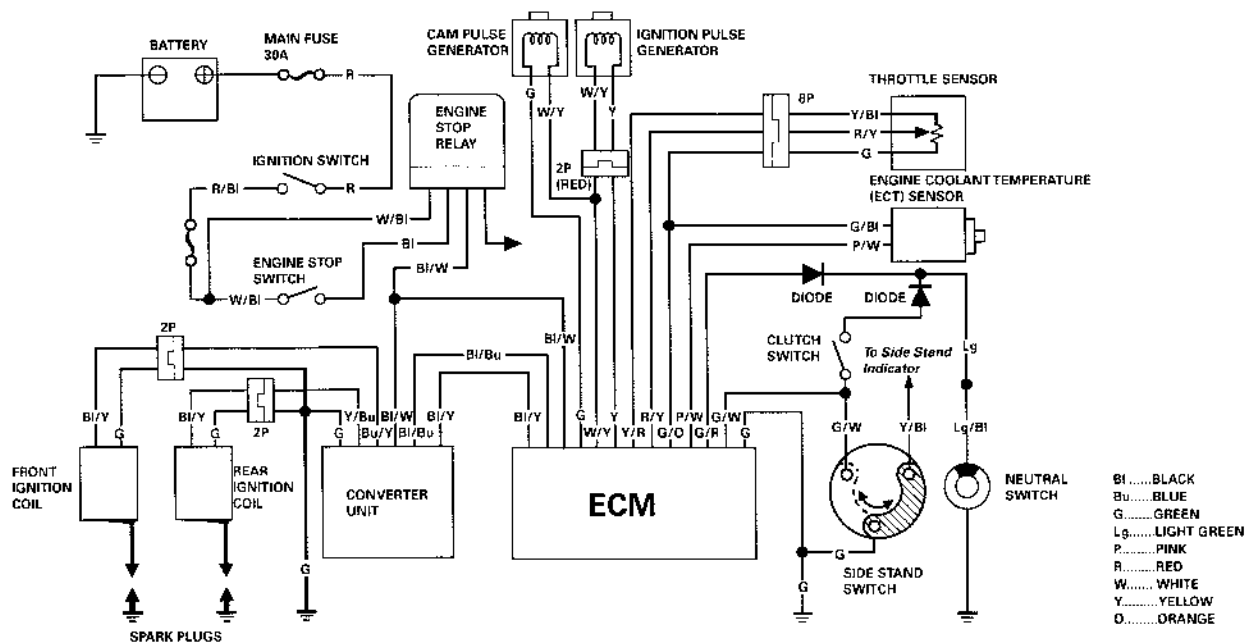
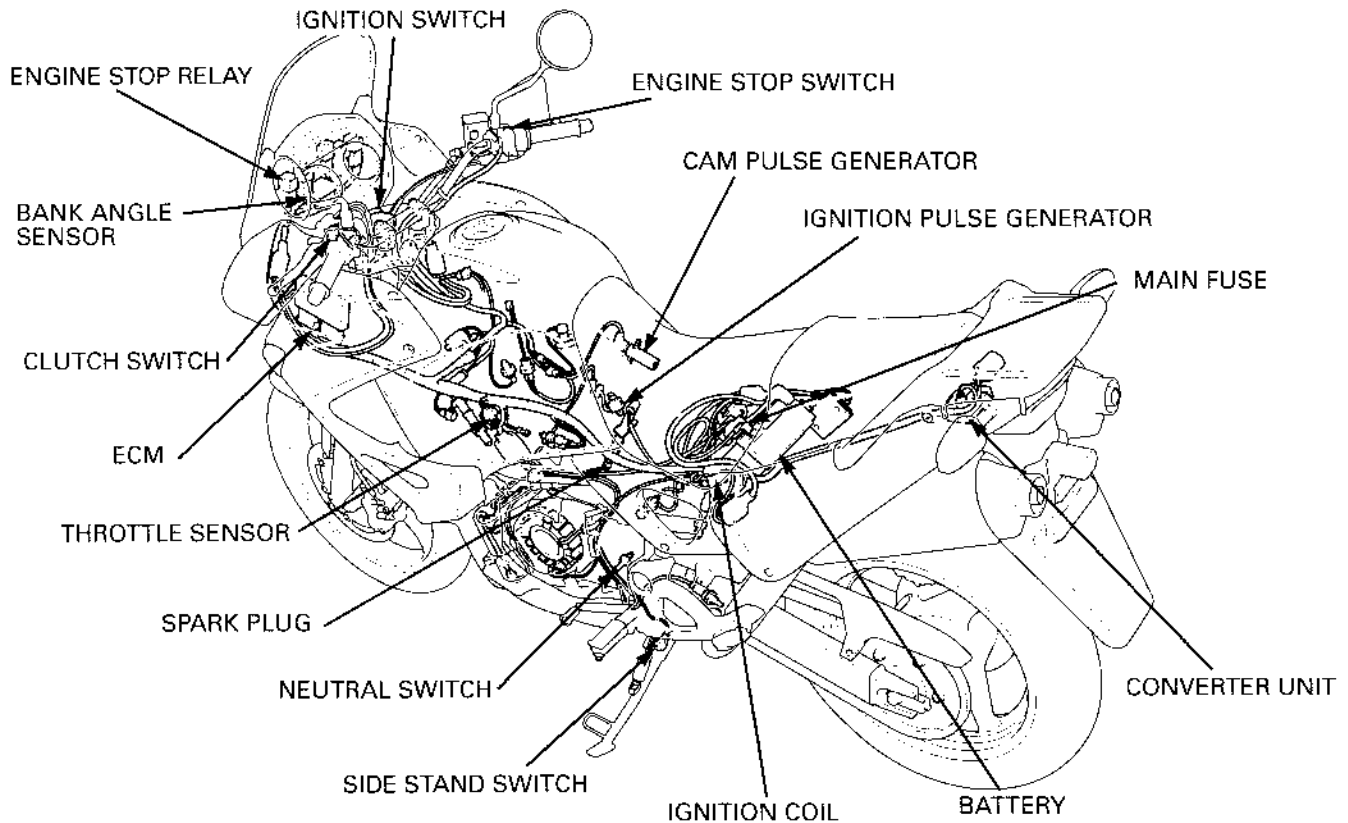


17. IGNITION SYSTEM

SYSTEM DIAGRAM.....	17-2	IGNITION COIL	17-7
SERVICE INFORMATION	17-3	IGNITION PULSE GENERATOR.....	17-9
TROUBLESHOOTING.....	17-4	IGNITION TIMING	17-10
IGNITION SYSTEM INSPECTION.....	17-5		

IGNITION SYSTEM

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 17-4).
- 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 those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- The direct ignition coil that the ignition coil and spark plug cap are integrated, is adopted in this motorcycle.
- Refer to the Throttle Position (TP) sensor inspection (page 5-76), cam pulse generator inspection (page 5-75) and ECM inspection (page 5-79).




SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug (Iridium)	Standard	IJR8B9 (NGK)
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)		10° BTDC at idle

TOEQUE VALUES

Spark plug	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply grease to the threads
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Rear ignition coil mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Ignition pulse generator flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

<p>Imrie diagnostic tester (model 625) or Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/minimum)</p>  <p>07HGJ-0020100</p>	<p>Inspection adaptor 07VMJ-0020100</p> 	<p>ECM test harness 32P 070MZ-0010201</p> 
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IGNITION SYSTEM

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water got into the direct ignition coil (leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the direct ignition coil with the other good one and perform the spark test. If there is spark, the exchanged direct ignition coil is faulty.

No spark at all plugs

	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	Low peak voltage	<ol style="list-style-type: none"> Incorrect peak voltage adaptor connections. The multimeter impedance is too low; below 10 MΩ/DCV (System is normal if measured voltage is over the specifications with reverse connections). Cranking speed too low (Battery is under charged). 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). Poorly connected connectors or an open circuit in ignition system. Faulty side stand switch or neutral switch. An open circuit or loose connection in No.6 related circuit wires. <ul style="list-style-type: none"> Side stand switch line: green/white wire Neutral switch line: light green and light green/black wires Faulty ECM and/or converter unit (when No.1 through 7 are normal).
	No peak voltage	<ol style="list-style-type: none"> Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connection). Battery is undercharged (Voltage drops largely when the engine is started). Faulty ignition switch or engine stop switch. Loose or poorly connected ECM or converter unit connectors. No voltage at the black/white wire of the ECM or converter unit. Open circuit or poor connection in green (ground) wire of the ECM or converter unit. Faulty side stand switch or neutral switch. An open circuit or loose connection in No.7 related circuit wires. <ul style="list-style-type: none"> Side stand switch line: green/white wire Neutral switch line: light green and light green/black wires Faulty peak voltage adaptor. Faulty ignition pulse generator (Measure peak voltage). Faulty ECM and/or converter unit (in case when above No.1 thorough 10 are normal).
	Peak voltage is normal, but does not spark	<ol style="list-style-type: none"> Faulty spark plug or leaking ignition coil secondary current ampere. Faulty ignition coil.
Ignition pulse generator	Low peak voltage	<ol style="list-style-type: none"> The multimeter impedance is too low; below 10 MΩ/DCV. Cranking speed is too slow (Battery is under charged). 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). Faulty ignition pulse generator (in case when above No. 1 through 3 are normal).
	No peak voltage.	<ol style="list-style-type: none"> Faulty peak voltage adaptor. Faulty ignition pulse generator.

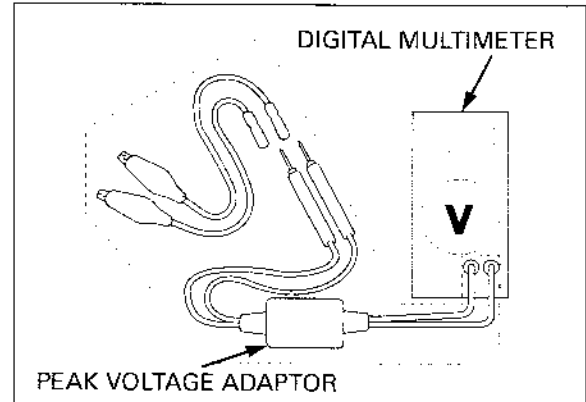
IGNITION SYSTEM INSPECTION

- 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 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

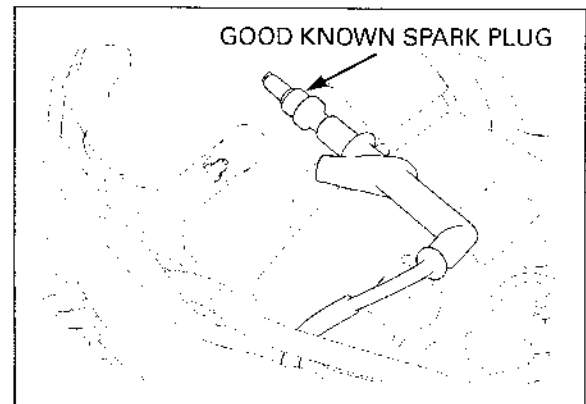


IGNITION COIL PRIMARY PEAK VOLTAGE

- 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.

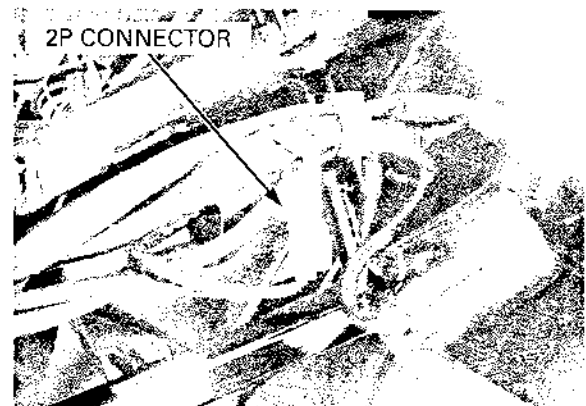
Disconnect the spark plug cap from the spark plug (page 3-7).

Connect good known spark plugs to the spark plug caps and ground the spark plugs to the cylinder heads as done is spark test.



Front: Remove the air cleaner housing (page 5-55).
 Rear: Remove the left side cover (page 2-3).

Disconnect the ignition coil 2P connector.

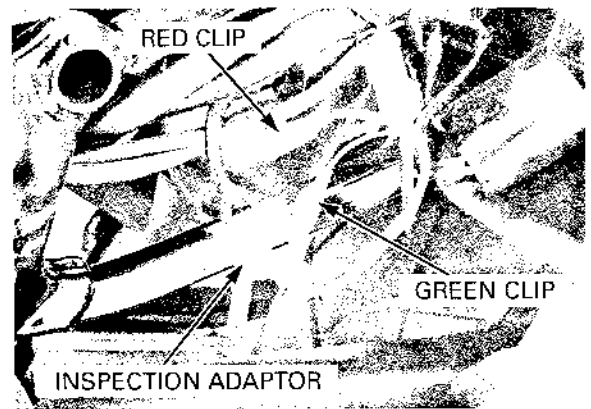


IGNITION SYSTEM

Connect the inspection adaptor.

TOOL:

Inspection adaptor **07VMJ-0020100**



Connect the peak voltage adaptor to the inspection adaptor.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor **07HGJ-0020100**
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

Connection: Red clip (+) - Green clip (-)

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

*Avoid touching the
tester probes to
prevent electric
shock.*

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting chart (page 17-4).

IGNITION PULSE GENERATOR PEAK VOLTAGE

- Check all system connection 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.

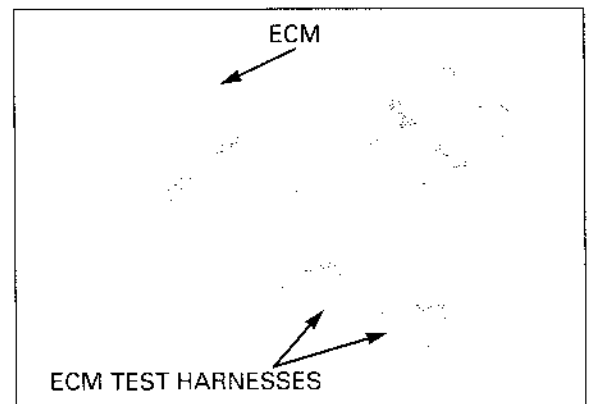
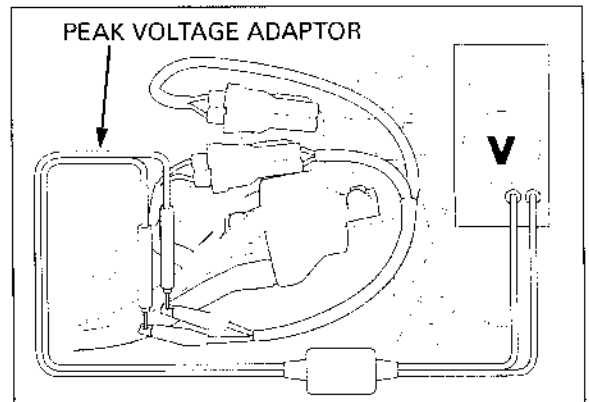
Remove the left middle cowl (page 2-8).

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

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

TOOL:

ECM test harness 32P **070MZ-0010201**
(two required)



Connect the peak voltage tester or peak voltage adaptor probes to the connector terminal of the wire harness side and ground.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTION:

B9 (+) – A31 (–)

*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

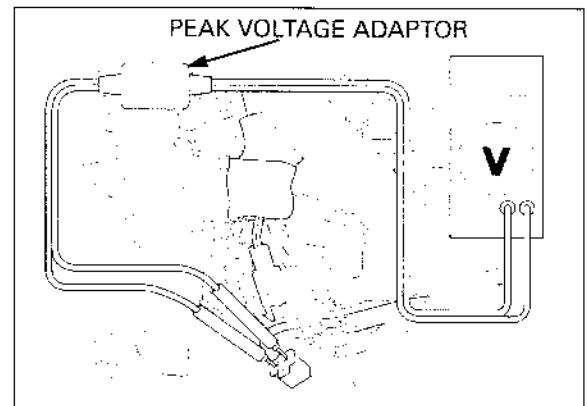
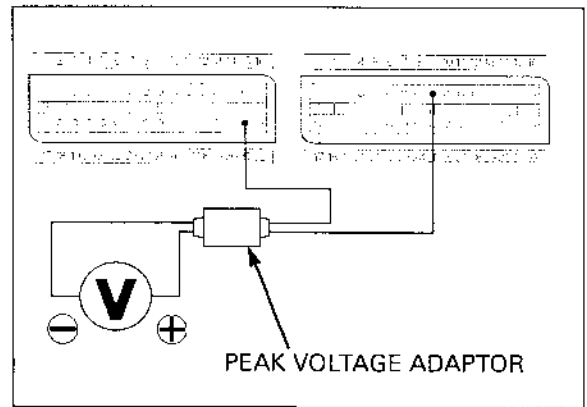
If the peak voltage measured at ECM multi-connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Open and support the fuel tank using the equipped tools (page 3-5).

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/Yellow).

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure 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

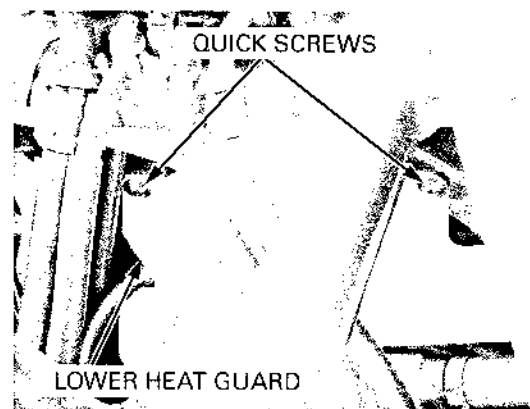
REMOVAL/INSTALLATION

FRONT:

Disconnect the spark plug cap from the spark plug (page 3-7).

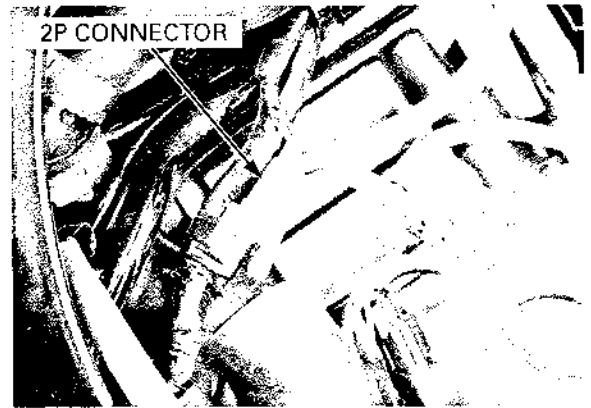
Remove the air cleaner housing (page 5-55).

Remove the quick screws and lower heat guard.

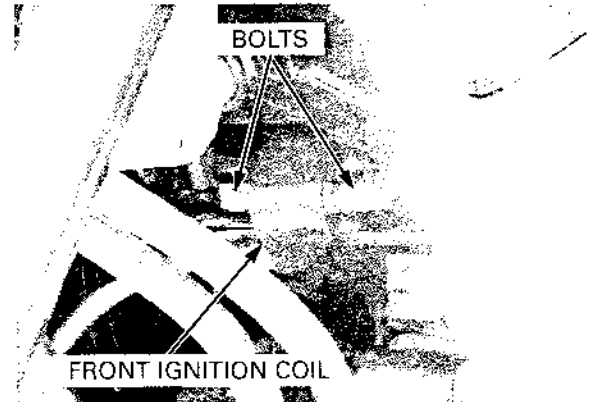


IGNITION SYSTEM

Disconnect the front ignition coil 2P connector.

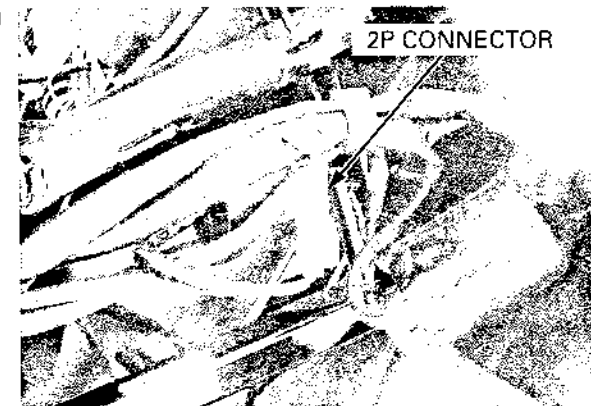


Remove the bolts and front ignition coil.
Installation is in the reverse order of removal.

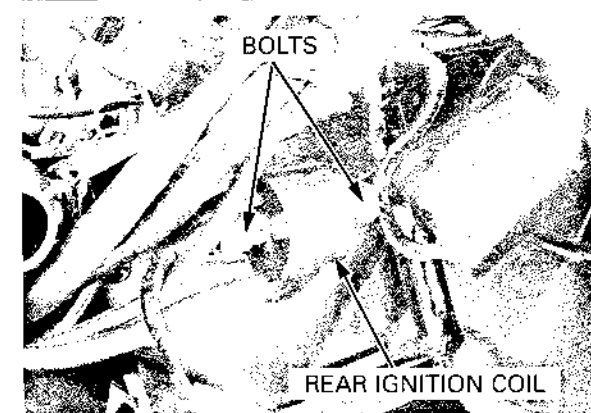


REAR:

Disconnect the spark plug cap from the spark plug
(page 3-7).
Remove the side cover (page 2-3).
Disconnect the rear ignition coil 2P connector.



Remove the bolts and rear ignition coil.
Installation is in the reverse order of removal.
Tighten the bolts to the specified torque.
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



IGNITION PULSE GENERATOR

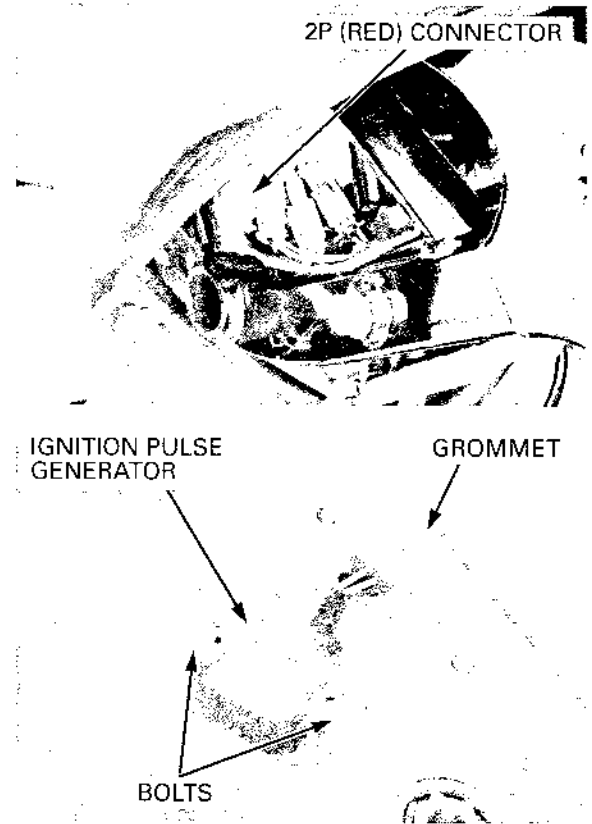
REMOVAL

Open and support the fuel tank using the equipped tools (page 3-7).

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

Remove the right crankcase cover (page 9-6).

Remove the ignition pulse generator flange bolts. Release the wire grommet from the right crankcase cover groove, then remove the ignition pulse generator.



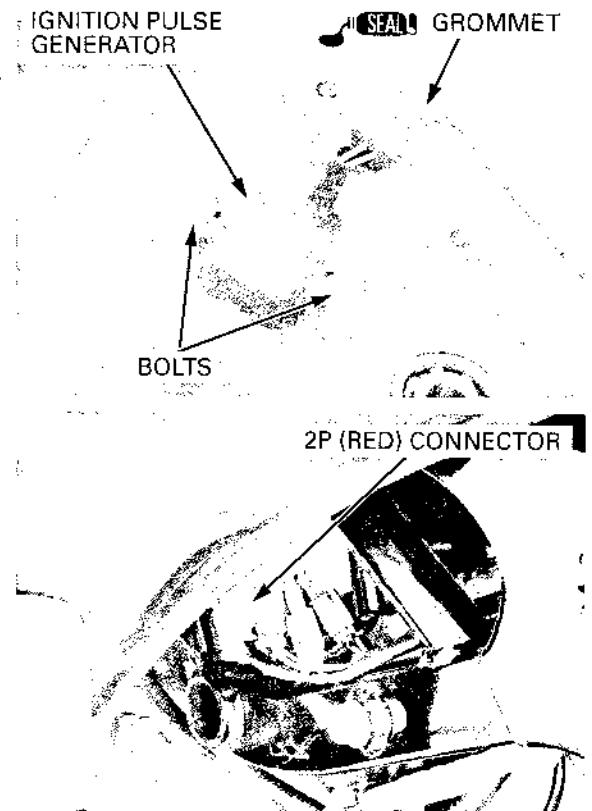
INSTALLATION

Install the ignition pulse generator into the cover. Apply sealant to the wire grommet, then install it into the groove of the cover.

Install and tighten the ignition pulse generator flange bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the right crankcase cover (page 9-19).



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

IGNITION SYSTEM

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 rear spark plug wire.

Start the engine and let it idle.

IDLE SPEED: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)

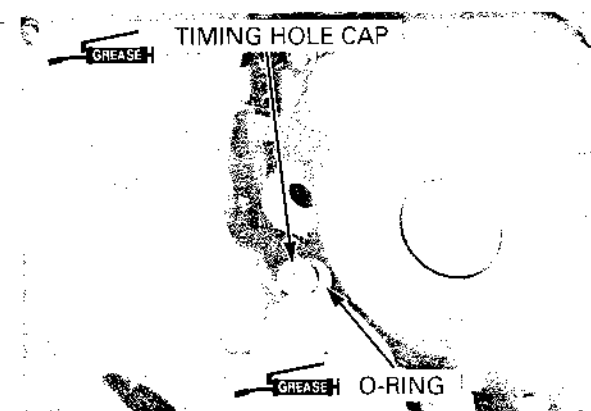
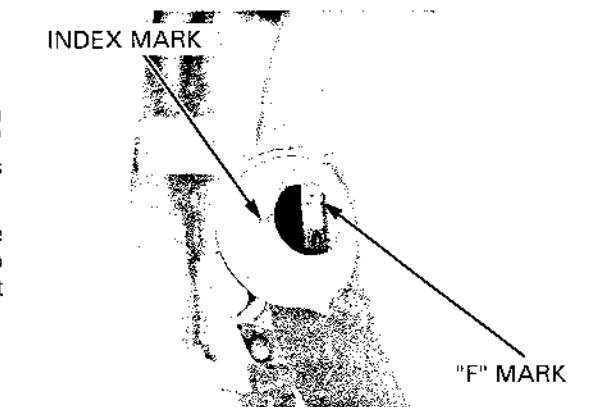
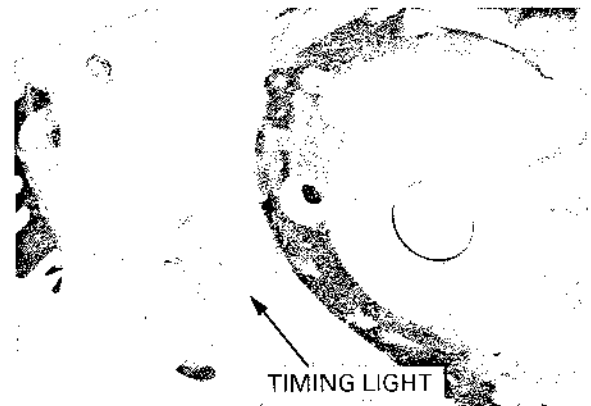
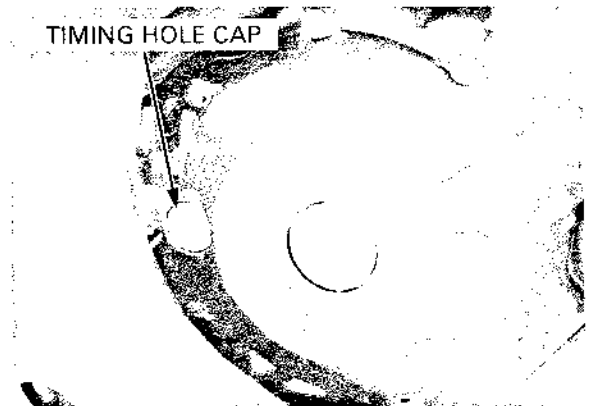
The ignition timing is correct if the index mark on the right crankcase cover aligns between the "F" mark on the ignition pulse generator rotor as shown.

Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise when the engine speed at approximately $2,000 \text{ min}^{-1}$ (rpm).

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

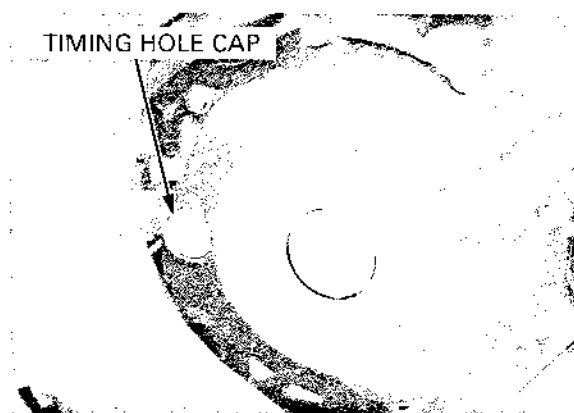
Apply grease to the O-ring.

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)



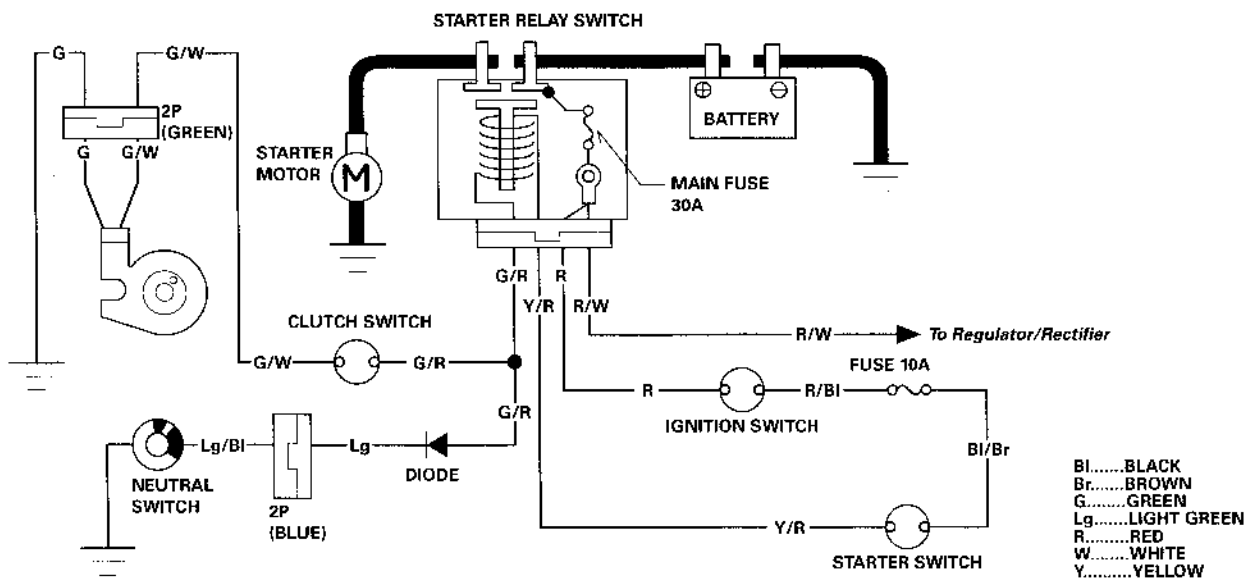
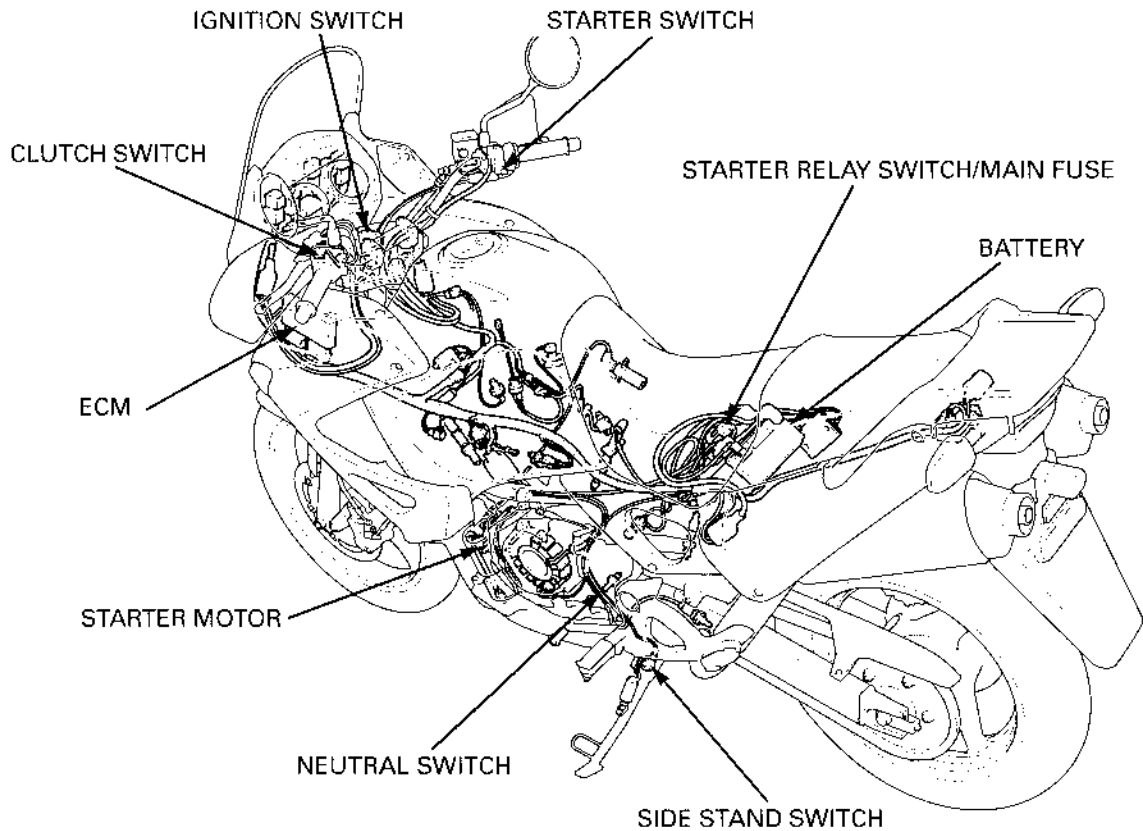
MEMO

18. ELECTRIC STARTER

SYSTEM DIAGRAM.....	18-2	STARTER MOTOR	18-6
SERVICE INFORMATION	18-3	STARTER RELAY SWITCH.....	18-13
TROUBLESHOOTING	18-4	DIODE.....	18-15

ELECTRIC STARTER

SYSTEM DIAGRAM



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 18-4).
- 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 components informations.
 - Ignition switch
 - Engine stop switch
 - Starter switch
 - Neutral switch
 - Side stand switch
 - Clutch switch

SPECIFICATIONS

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

TORQUE VALUES

Starter motor terminal nut 10 N·m (1.0 kgf·m, 7 lbf·ft)

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection

Check for blown main fuse or sub fuse.

Is the fuse blow?

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 fuse.

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 the "CLICK" hear?

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.

Is the starter motor turn?

YES – • Poorly connected starter motor cable.
• Faulty starter relay switch (page 18-13).

NO – Faulty starter motor (page 18-6).

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.

Are there continuity?

NO – • Faulty neutral switch (page 19-21).
• Faulty neutral diode (page 18-15).
• Faulty clutch switch (page 19-20).
• Faulty side stand switch (page 19-22).
• 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 (-)).

Apply battery voltage to the starter motor directly and check the operation.

Is there battery voltage?

- NO** – • Faulty ignition switch (page 19-18).
• Faulty starter switch (page 19-19).
• Blown out main or sub-fuse.
• Faulty clutch switch (page 19-20) / side stand diode (page 18-15).
• 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. Clutch Switch Inspection

Check the side stand switch operation.

Is the side stand switch operation normal?

NO – Faulty side stand switch (page 19-22).

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
- Poor connected battery ground cable

Starter motor turns, but engine does not turn

- Starter motor is running backwards
 - Case assembled improperly
 - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

Starter relay switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problems

STARTER MOTOR

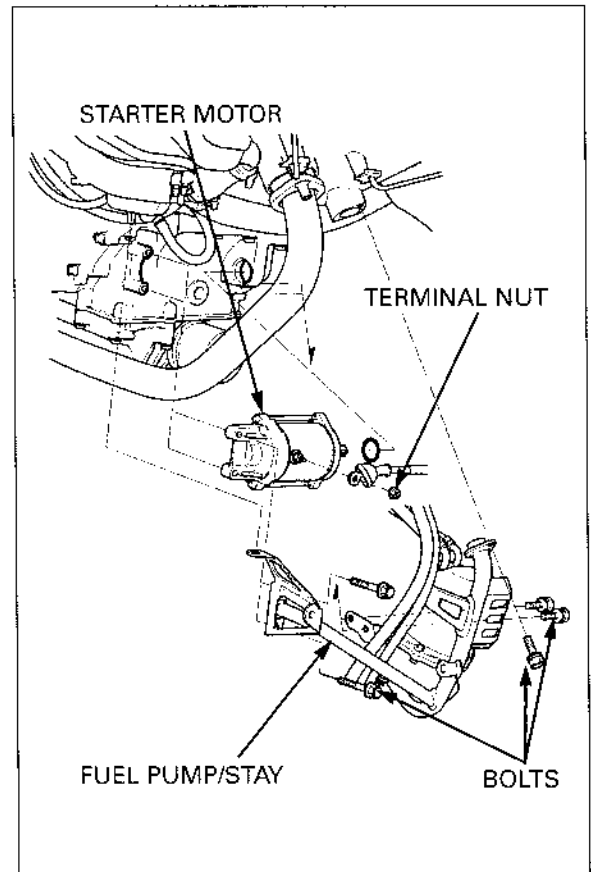
REMOVAL

Remove the under cowl (page 2-7).

Remove the bolts and fuel pump/stay assembly.

Remove the rubber cap, nut and the starter motor cable from the starter motor.

Pull the starter motor out of the crankcase.

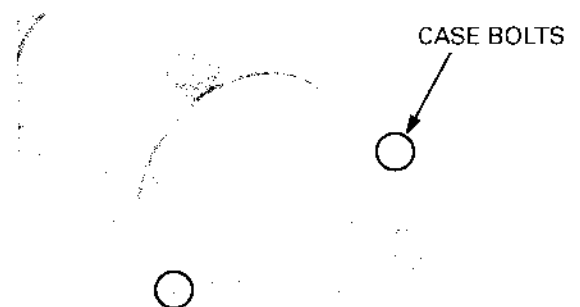


Remove the O-ring from the groove on the starter motor.



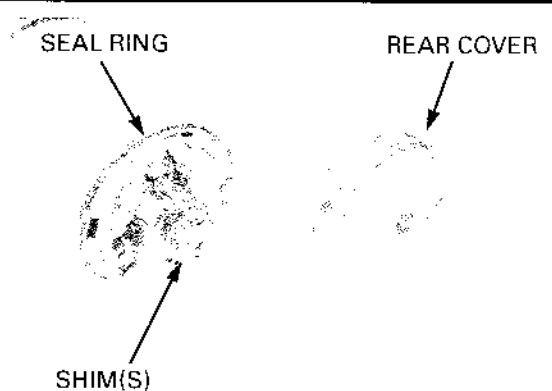
DISASSEMBLY

Remove the case bolts.

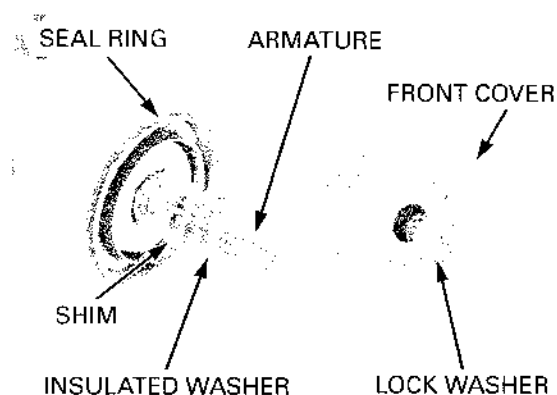


Remove the following:

- Record the location and number of shims.
- Rear cover assembly
 - Seal ring
 - Shim (s)

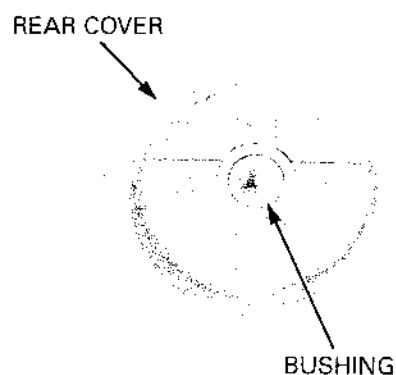


- Record the location and number of shims.
- Front cover assembly
 - Seal ring
 - Lock washer
 - Insulated washer
 - Shim (s)
 - Armature

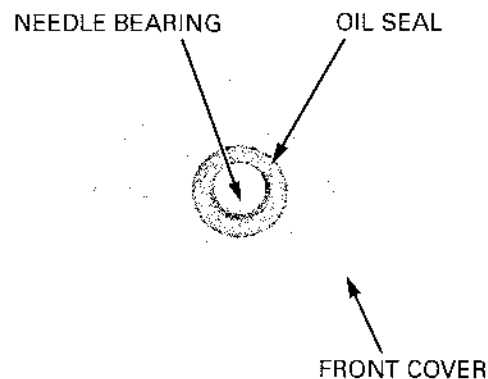


INSPECTION

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.



ELECTRIC STARTER

Do not use emery or sand paper on the commutator.

Check the commutator bars of the armature for discoloration.

ARMATURE

COMMUTATOR BARS

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.

BRUSH

CABLE TERMINAL

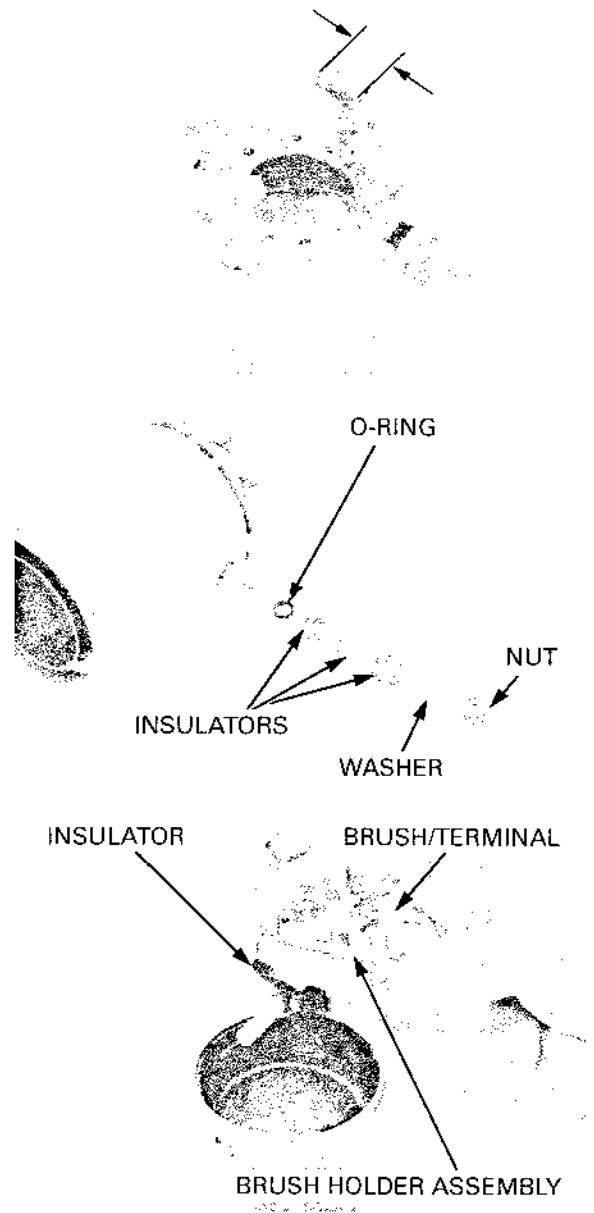
Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

Remove the following:

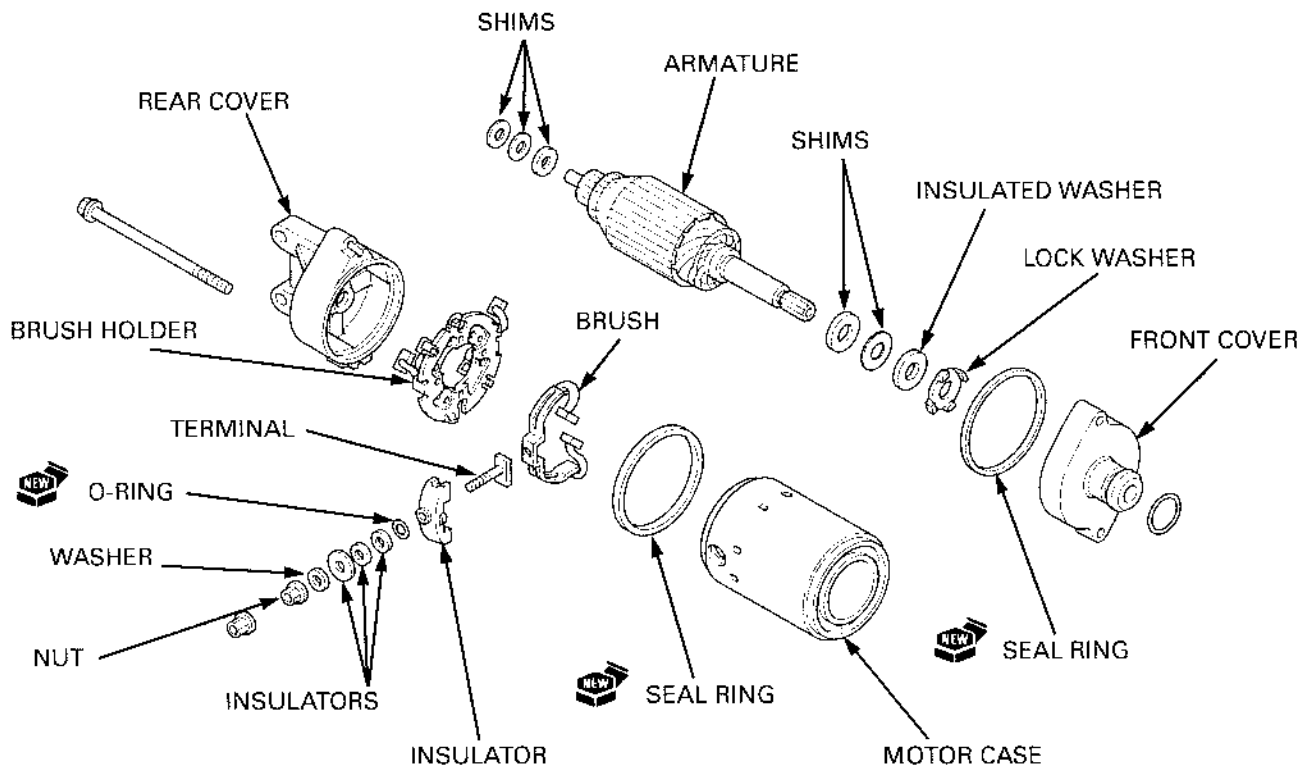
- Nut
- Washer
- Insulators
- O-ring

Remove the brush holder assembly, brush/terminal and insulator from the motor case.



ELECTRIC STARTER

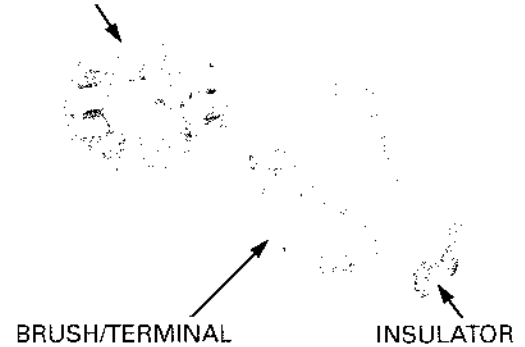
ASSEMBLY



Set the brush/terminal to the brush holder assembly.

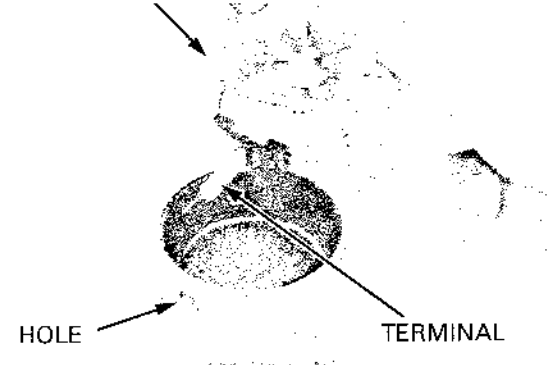
Install the insulator to the terminal.

BRUSH HOLDER ASSEMBLY



Set the brush holder assembly to the motor case aligning the terminal with the hole on the motor case.

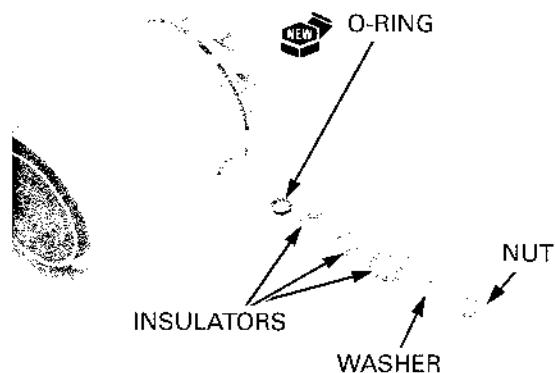
BRUSH HOLDER ASSEMBLY



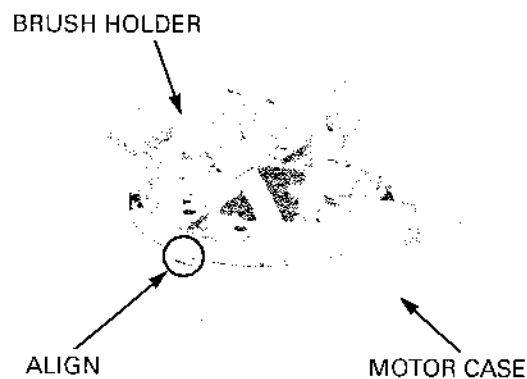
Install the insulators properly as noted during removal.

Install the following:

- New O-ring
- Insulated washers
- Washer
- Nut



Align the holder tab with the case groove.

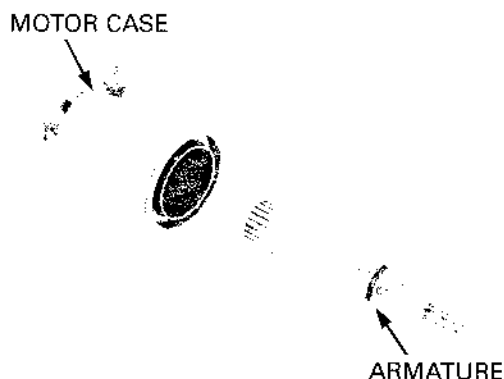


Install the armature in the motor case.

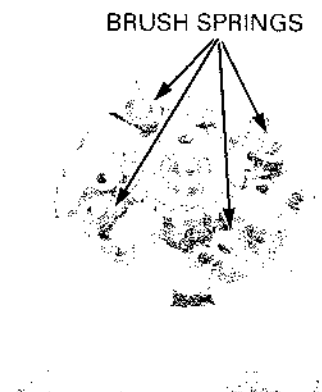
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

NOTICE

The coil may be damaged if the magnet pulls the armature against the case.



Install the brush springs properly.



ELECTRIC STARTER

Install a new seal ring on the motor case.

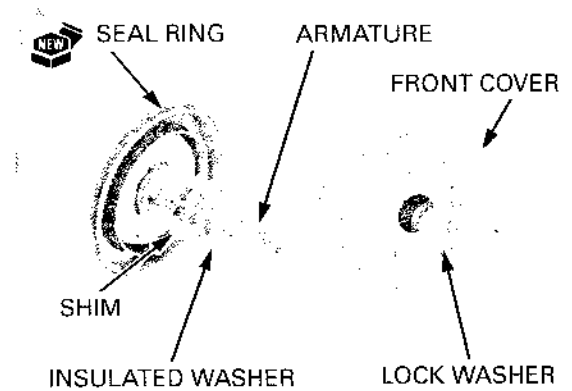
Install the shims properly as noted during removal.

Install the shims and insulated washer onto the armature shaft.

Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover.

Install the front cover.

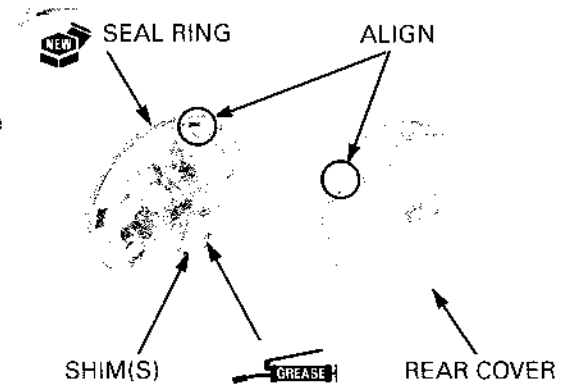


Install the shims properly as noted during removal.

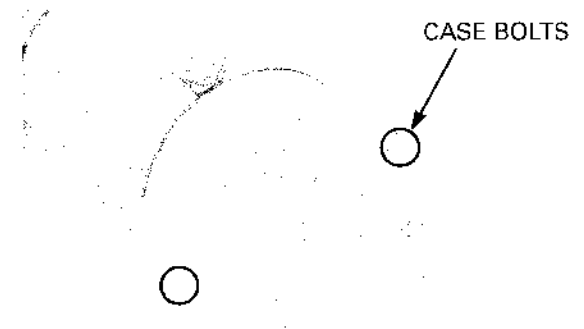
Install the shims onto the armature shaft.

Install a new seal ring on the motor case.

Apply thin coat of grease to the armature shaft end.
Install the rear cover aligning its groove with the brush holder tab.

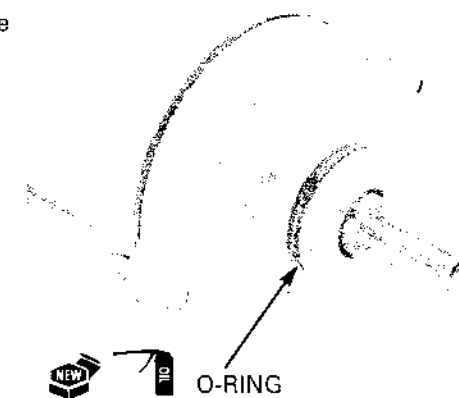


Install and tighten the case bolts securely.



INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.



Install the starter motor into the crankcase.
Install the fuel pump/stay assembly.
Install and tighten the bolts securely.

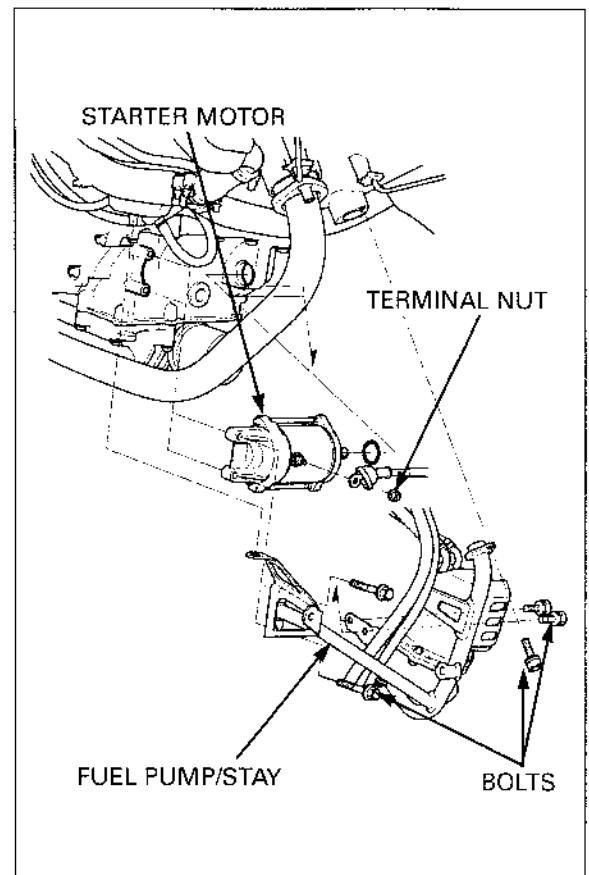
Route the starter motor cable.

Install the starter motor cable, then tighten the terminal nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the rubber cap securely.

Install the removed parts in the reverse order of removal.



STARTER RELAY SWITCH

OPERATION INSPECTION

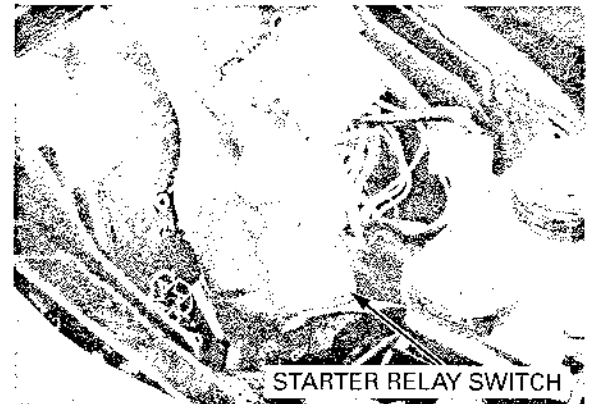
Remove the seat (page 2-3).

Shift the transmission into neutral.

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

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.



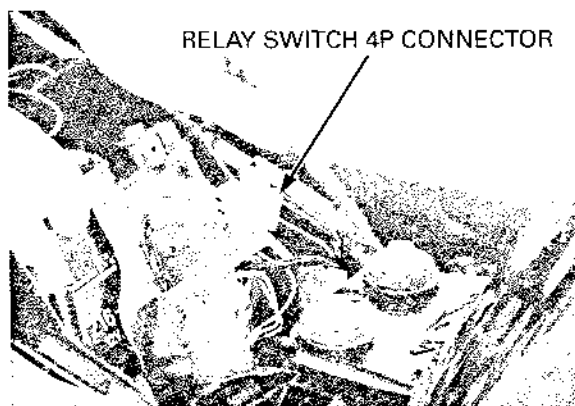
ELECTRIC STARTER

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).



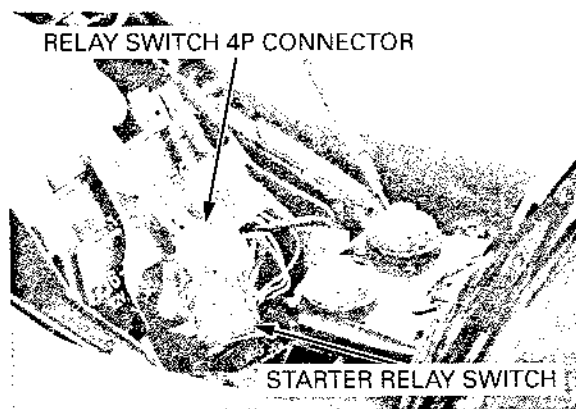
STARTER RELAY VOLTAGE INSPECTION

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.



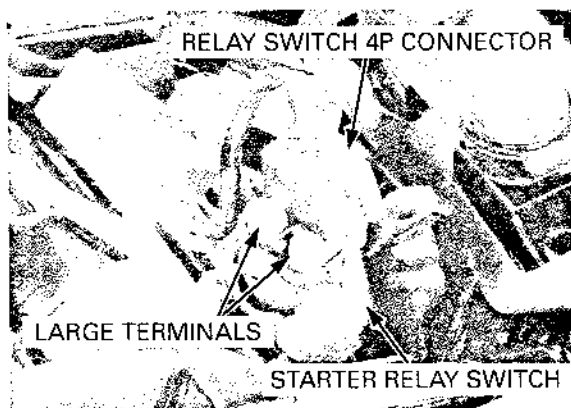
CONTINUITY INSPECTION

Connect an ohmmeter to the starter relay switch large terminals.

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

Check for continuity between the starter relay switch terminals.

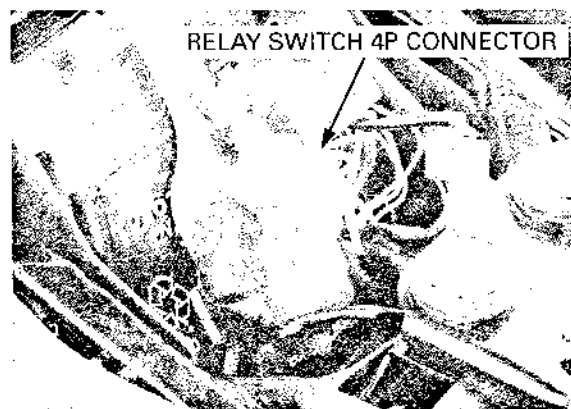
There should be continuity when the ignition switch turned to "ON" and the engine stop switch to "RUN".



REMOVAL/INSTALLATION

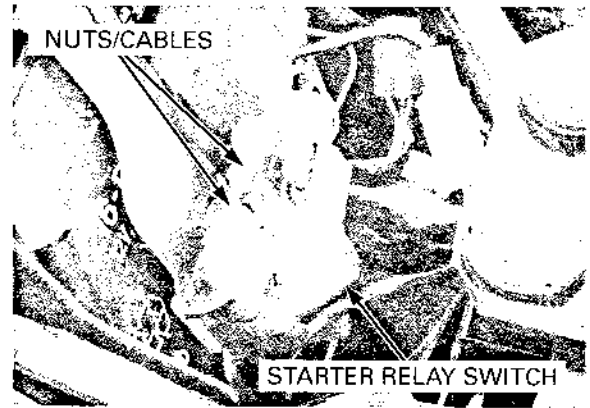
Remove the seat (page 2-3).

Disconnect the starter relay switch 4P connector.



Remove the nuts and disconnect the starter motor cables.

Remove the starter relay switch.

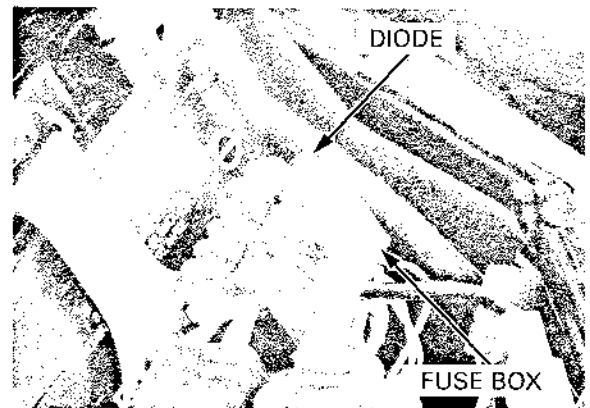


DIODE

REMOVAL

Remove the seat (page 2-3).

Open the fuse box and remove the diode.



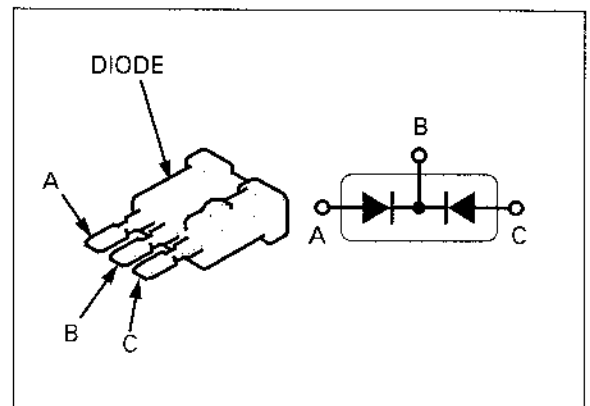
INSPECTION

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.

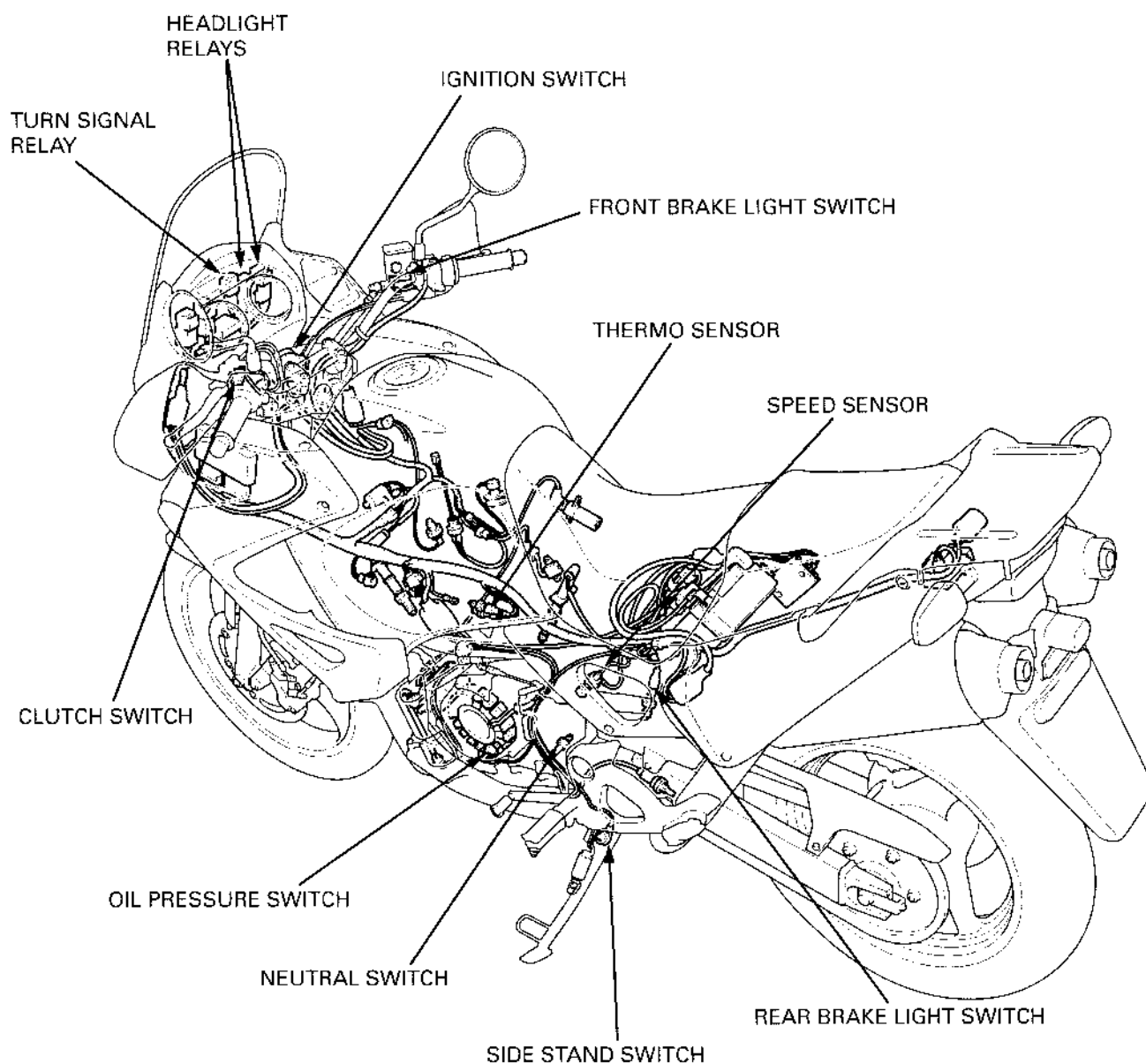


MEMO

19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION.....	19-2	COOLING FAN MOTOR SWITCH	19-15
SERVICE INFORMATION	19-3	OIL PRESSURE SWITCH	19-16
TROUBLESHOOTING	19-4	FUEL RESERVE SENSOR.....	19-17
HEADLIGHT.....	19-5	IGNITION SWITCH	19-18
POSITION LIGHT	19-6	HANDLEBAR SWITCHES	19-19
TURN SIGNAL	19-6	BRAKE LIGHT SWITCH	19-20
LICENSE LIGHT.....	19-7	CLUTCH SWITCH	19-20
TAIL/BRAKE LIGHT	19-8	NEUTRAL SWITCH.....	19-21
COMBINATION METER.....	19-8	SIDE STAND SWITCH	19-22
SPEEDOMETER/VEHICLE SPEED SENSOR	19-11	HORN	19-23
TACHOMETER	19-13	HEADLIGHT RELAY.....	19-23
COOLANT TEMPERATURE GAUGE/ SENSOR	19-13	TURN SIGNAL RELAY.....	19-24

SYSTEM LOCATION



SERVICE INFORMATION

GENERAL

NOTICE

A halogen headlight bulb becomes very hot while the headlight is ON, and 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.
- 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
		Lo
	Position light	12V – 60 W X 2
	Brake/tail light	12V – 55 W X 2
	Turn signal light	12V – 5 W
	License light	12V – 21/5 W X 2
	Instrument light	12V – 21 W X 4
	Turn signal indicator	12V – 5 W
	High beam indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	PGM-FI malfunction indicator	LED
	Immobilizer indicator	LED
	Low fuel indicator	LED
Fuse	Main fuse	30 A
	Sub fuse	10 A X 3, 20A X 3
Tachometer peak voltage		10.5 V minimum
Thermosensor resistance	At 80 °C (176 °F)	47 – 57 Ω
	At 120 °C (248 °F)	14 – 18 Ω
Fan motor switch	Start to close (ON)	98 – 102 °C (208 – 216 °F)
	Stop to open	93 – 97 °C (199 – 207 °F)

TOEQUE VALUES

Ignition switch mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply sealant to the threads
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil pressure switch terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate
Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate
Faulty odometer/trip meter

The speedometer operate is abnormal

1. Fuse Inspection

Check for blown main fuse or sub fuse.

Is the fuse blow?

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 fuse

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 (Natural) connector.

With the ignition switch ON and 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 and 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 a hoist or other support to rise the rear wheel off the ground.

Measure the output voltage (sensor signal) at the speedometer with the ignition switch is ON while slowly turning the rear wheel by your hand.

CONNECTION: Pink (+) – Green (-)

STANDARD: Repeat 0 to 5 V

Is the voltage within specified value?

NO – • Faulty speed sensor
• Loose speed sensor mounting bolts

YES – Faulty speedometer

HEADLIGHT

BULB REPLACEMENT

Remove the upper cowl cover (page 2-10).

Disconnect the headlight bulb connectors.

Remove the dust cover.

Avoid touching halogen headlight bulb.

Finger prints can create hot spots that cause a bulb to break.

Unhook the bulb retainer and remove the headlight bulb.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

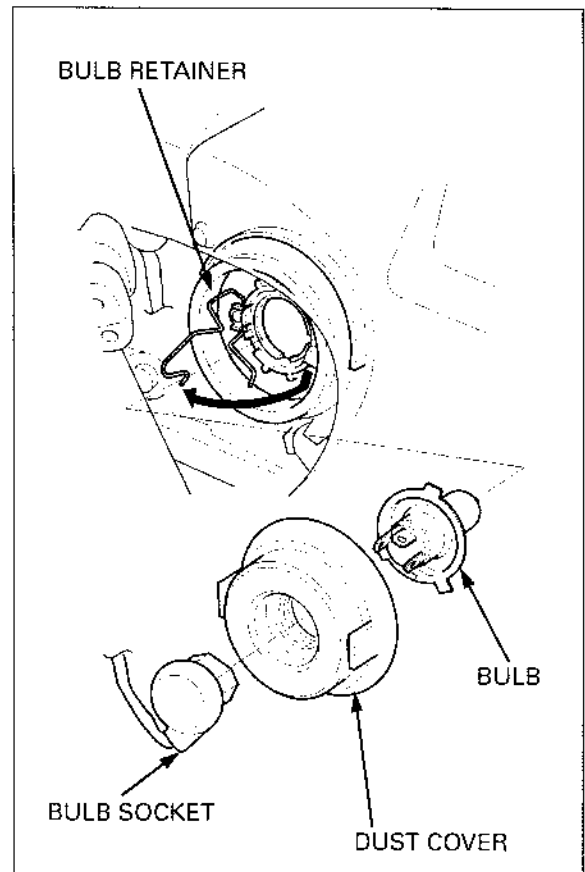
Install a new headlight bulb aligning its tabs with the groove in the headlight unit.

Hook the bulb retainer into the headlight unit groove.

Install the dust cover tightly against the headlight unit with its arrow mark facing up.

Connect the headlight connectors.

Install the upper cowl cover (page 2-10).

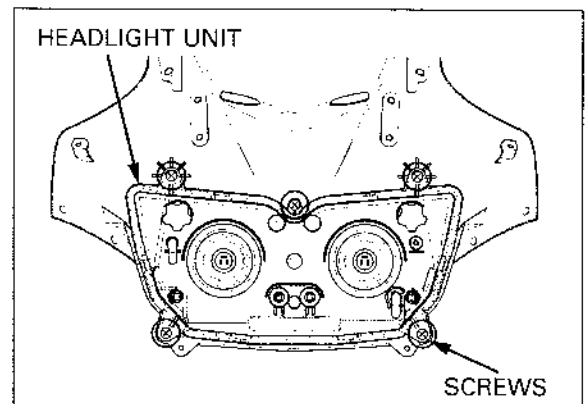


REMOVAL/INSTALLATION

Remove the upper cowl (page 2-10).

Remove the five screws, collar and headlight unit.

Install the headlight unit in the reverse order of removal.

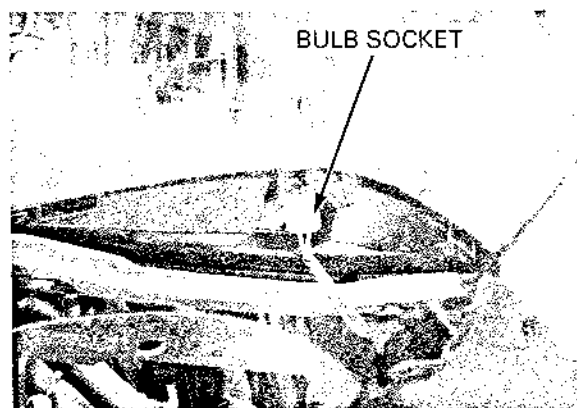


POSITION LIGHT

BULB REPLACEMENT

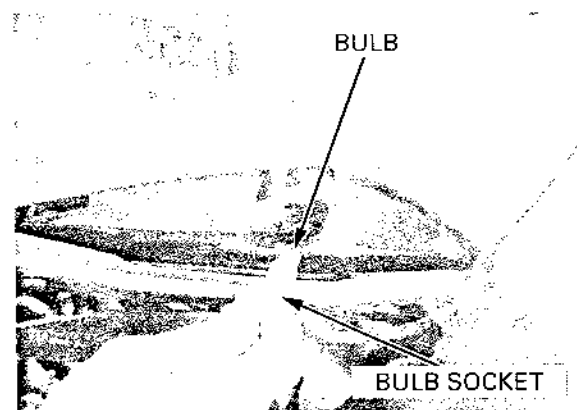
Remove the headlight under cover (page 2-6).

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

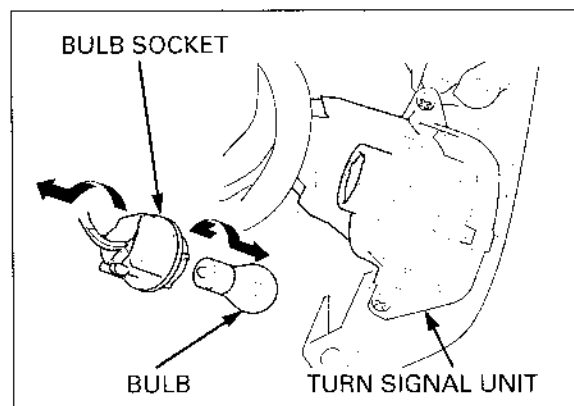
FRONT:

Remove the inner cowl (page 2-7).

Turn the bulb socket counterclockwise and remove it from the turn signal unit.

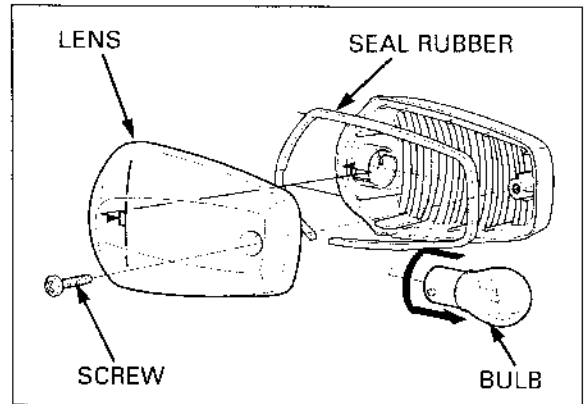
Remove the bulb from the socket and replace it with a new one.

Install the front turn signal bulb socket in the reverse order of removal.



REAR:

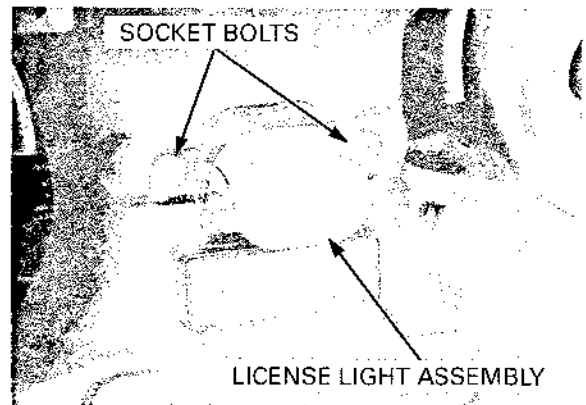
Remove the screw, turn signal lens and seal rubber.
While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.
Install the rear turn signal bulb socket in the reverse order of removal.



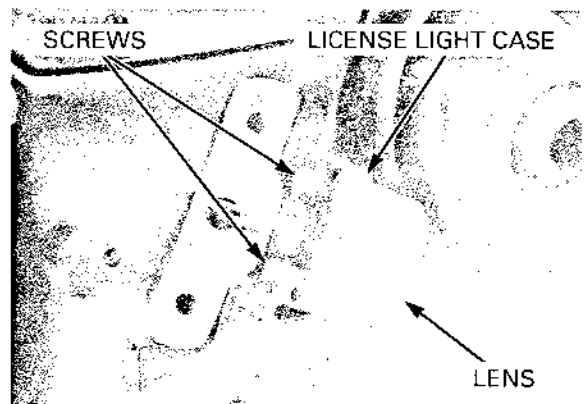
LICENSE LIGHT

BULB REPLACEMENT

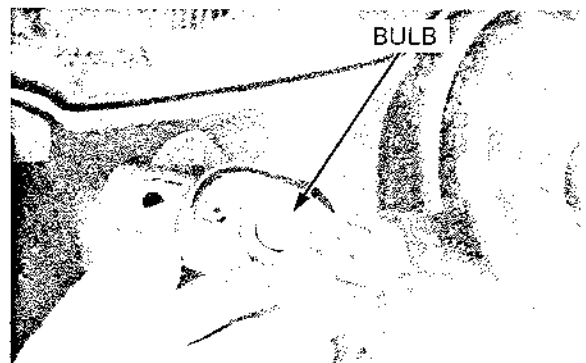
Remove the license light bracket socket bolts and the license light assembly.



Remove the screws, license light case and lens.



While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.
Install the license light bulb in the reverse order of removal.



TAIL/BRAKE LIGHT

BULB REPLACEMENT

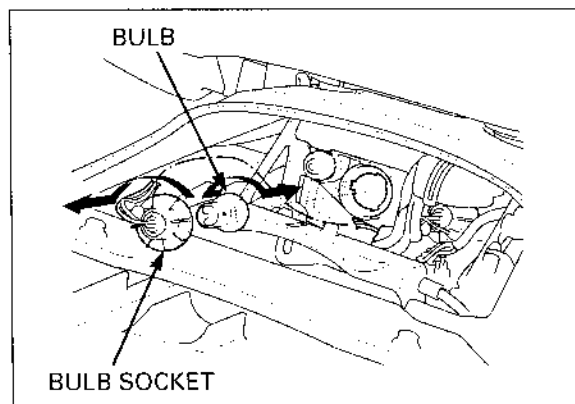
Remove the seat (page 2-3).

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.

Install the seat (page 2-3).



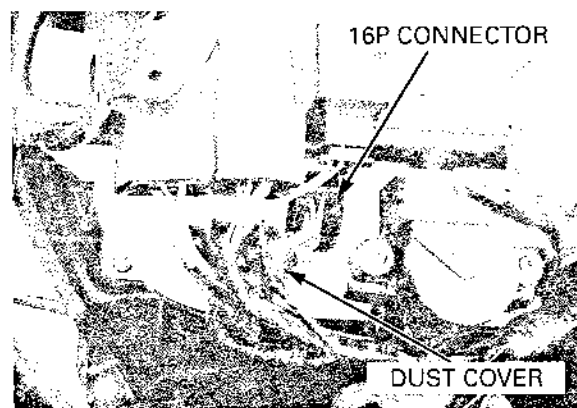
COMBINATION METER

REMOVAL

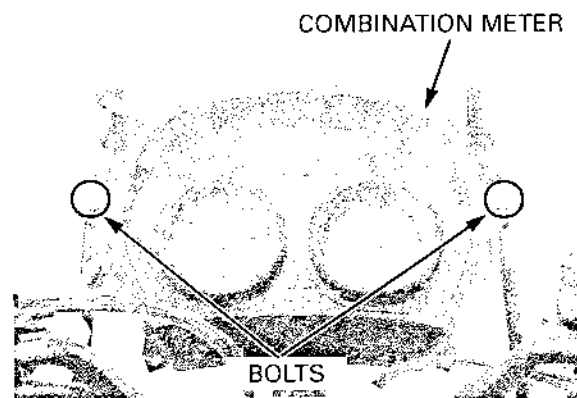
Remove the upper cowl (page 2-10).

Remove the combination meter connector dust cover.

Disconnect the combination meter 16P connector.

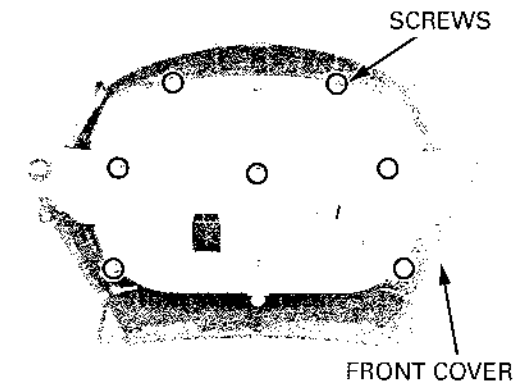


Remove the combination meter mounting bolts and combination meter from the upper cowl stay.

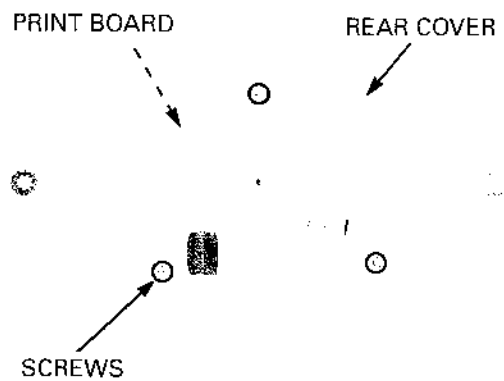


DISASSEMBLY/ASSEMBLY

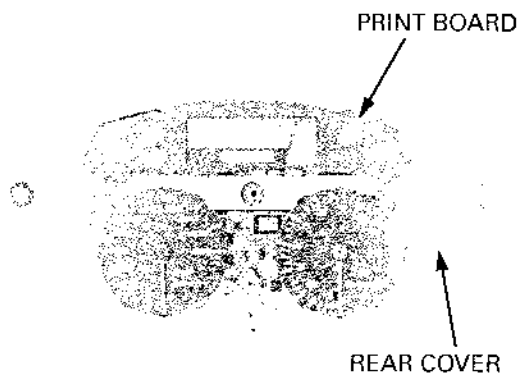
Remove the screws and combination meter front cover.



Remove the combination meter print board assembly from the rear cover.

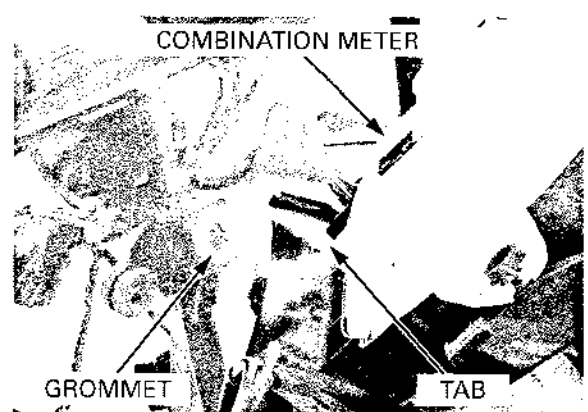


Install the print board assembly into the rear cover. Assembly is in the reverse order of disassembly.



INSTALLATION

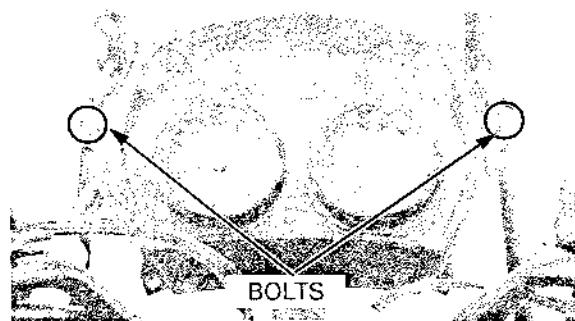
Install the combination meter onto the upper cowl stay aligning the tab on the combination meter with the grommet on the upper cowl stay.



LIGHTS/METERS/SWITCHES

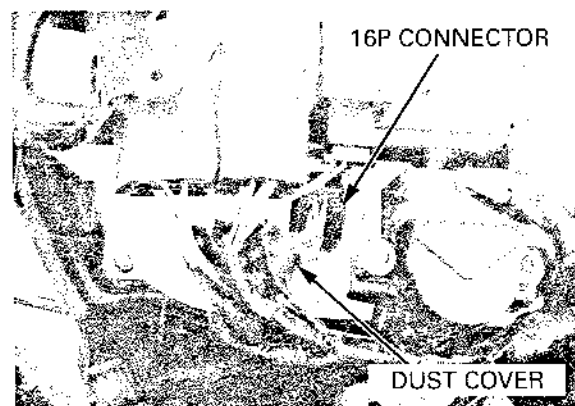
Install and tighten the bolts securely.

COMBINATION METER



Connect the combination meter 16P connector.
Install the connector dust cover securely.

Install the upper cowl (page 2-10).



POWER/GROUND LINE INSPECTION

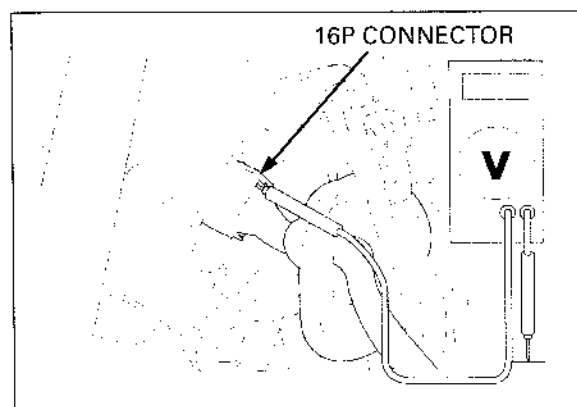
Disconnect the combination meter 16P connector.
Check the following at the wire harness side connector terminals of the combination meter.

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 open circuit in Black/Brown 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 open circuit in Red/Green wire.

Ground line

Measure the continuity between the Green wire terminal (+) and Ground (-).

There should be continuity.

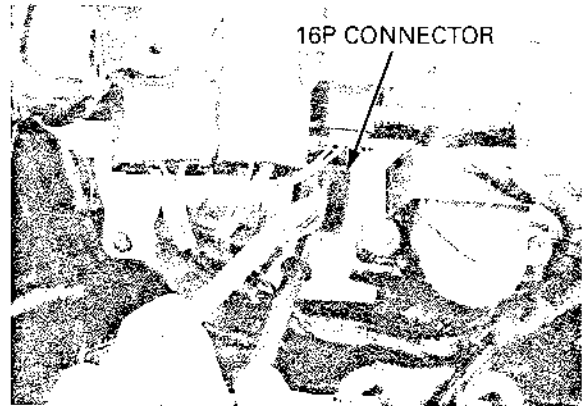
If there is no continuity, check for open circuit in Green wire.

SPEEDOMETER/VEHICLE SPEED SENSOR

SYSTEM INSPECTION

Check that the tachometer and coolant temperature meter function properly.

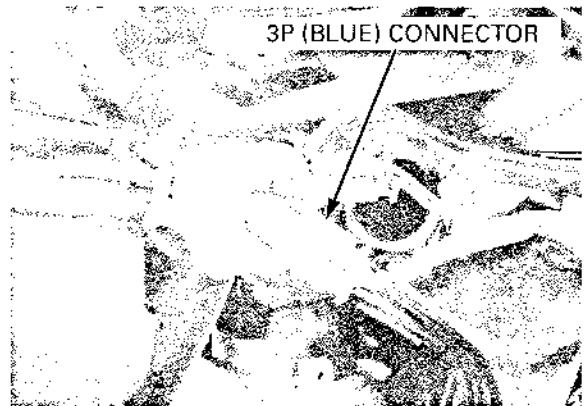
- If they do not function, perform the power and ground line inspection of the combination meter (page 19-10).
 - If they function, shift the transmission into neutral, disconnect the combination meter combination meter 16P connector and turn the ignition switch ON.
Measure the voltage between the Pink/Green (+) and Green/Black (-) wire terminals of the wire harness side connector.
Slowly turn the rear wheel by hand.
There should be 0 to 5 V pulse voltage.
- If pulse voltage appears, replace the combination meter print circuit board.
 - If pulse voltage does not appear, check for open or short circuit in Pink/Green wire.
If the Pink/Green wire is OK, check for the speed sensor (page 19-11).



SPEED SENSOR INSPECTION

Remove the side cover (page 2-3).

Disconnect the speed sensor 3P (Blue) connector and check for loose or poor contact of the connector.

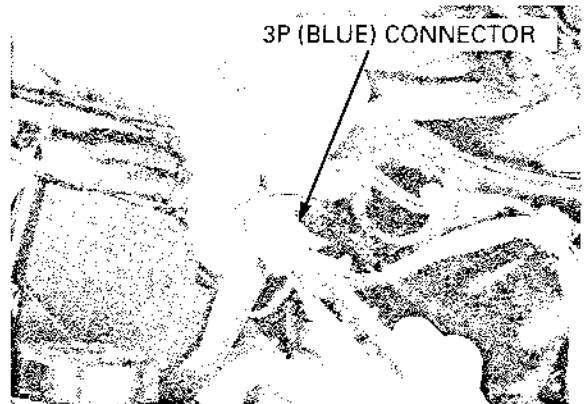


Connect the speed sensor 3P (Blue) connector.

Turn the ignition switch is ON and measure the voltage at the 3P (Blue) connector with the connector connected.

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 loosen contact of the wire harness connectors.



LIGHTS/METERS/SWITCHES

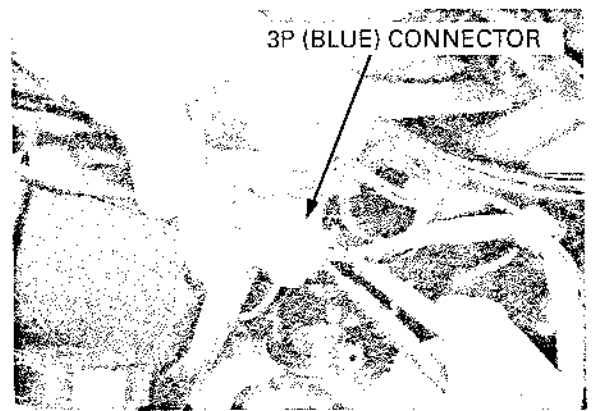
Support the motorcycle securely and place the rear wheel off the ground.
Shift the transmission into neutral.
Connect the speed sensor 3P (Blue) connector.

Measure the voltage at the sensor connector terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

CONNECTION: Pink (+) – Green (–)

STANDARD: Repeat 0 to 5V

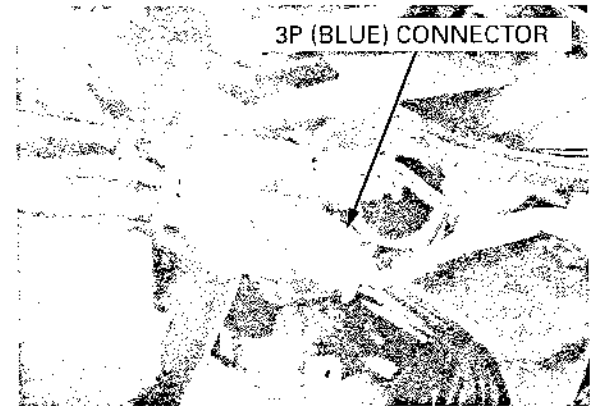
If the measurement is out of specification, replace the speed sensor.



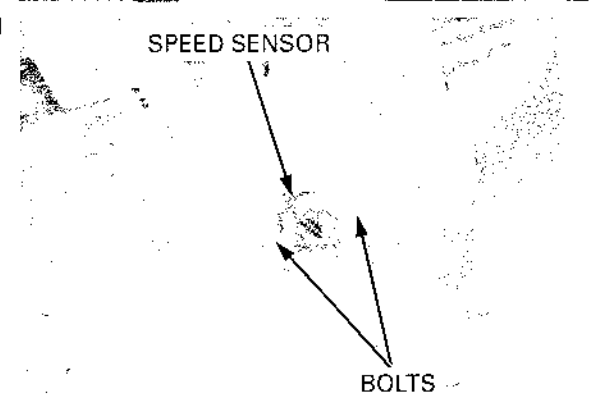
REMOVAL/INSTALLATION

Remove the side cover (page 2-3).

Disconnect the speed sensor 3P (Blue) connector.



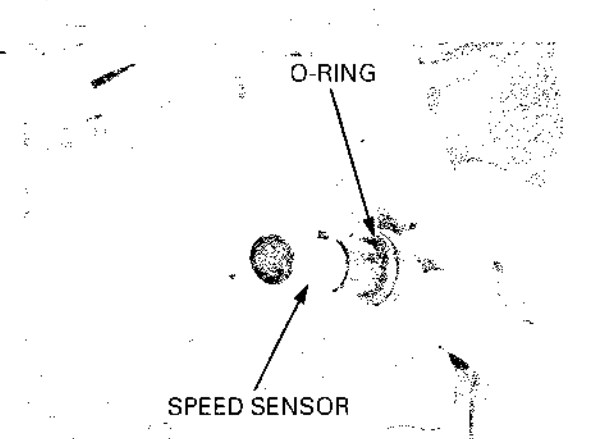
Remove the bolts, battery ground cable and speed sensor.



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

Installation is in the reverse order of removal.

Route the speed sensor and battery ground cable properly (page 1-23).



TACHOMETER

SYSTEM INSPECTION

Remove the upper cowl (page 2-10).

Remove the combination meter connector cover.
Connect the peak voltage adaptor to the tachometer Yellow/Green (+) terminal and Green (-).

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTION: Yellow/Green (+) and Ground (-)

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

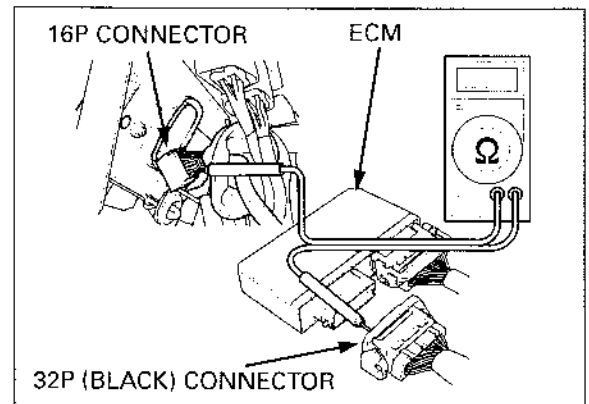
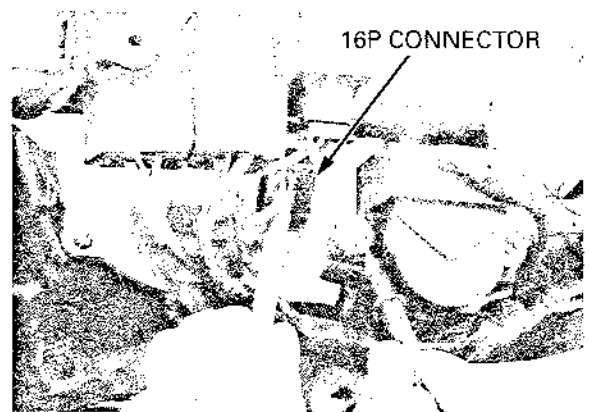
If the value is normal, replace the tachometer.

If the measured value is below 10.5 V, replace the ECM.

If the value is 0 V, check for continuity between the combination meter 16P connectors terminal and the ECM 32P (Black) multi-connector Yellow/Green terminals.

If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit.

If there is continuity, replace the combination meter printed circuit board (page 19-9).



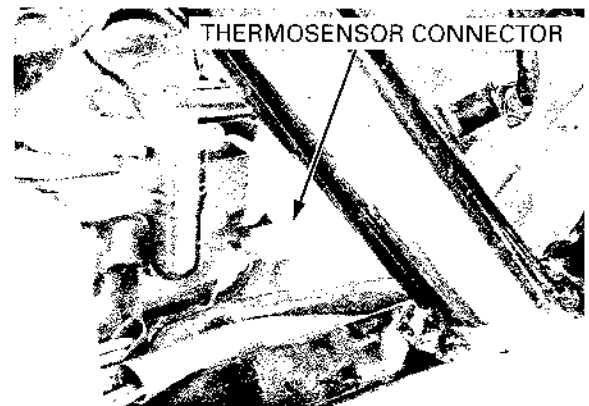
COOLANT TEMPERATURE GAUGE/SENSOR

INSPECTION

Remove the fuel tank (page 5-53).

Disconnect the thermosensor wire connector from the sensor.

Ground the thermosensor wire with a jumper wire.



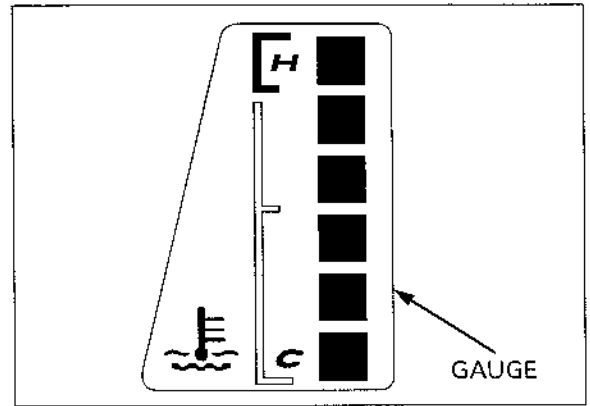
LIGHTS/METERS/SWITCHES

Turn the ignition switch to "ON" and check the coolant temperature gauge.

The coolant temperature gauge indicate "H".

If the coolant temperature gauge does not indicate, check the wire harness for open or short circuit. If the wire harness is normal, replace the combination meter (page 19-8).

If the coolant temperature gauge indicates, check the thermosensor unit (page 19-14).

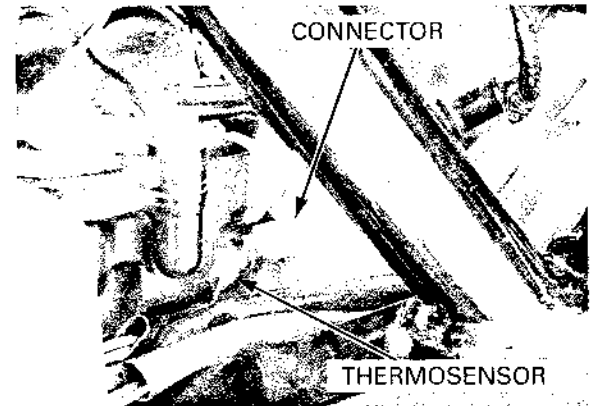


THERMOSENSOR UNIT INSPECTION

Drain the coolant (page 6-7).

Remove the fuel tank (page 5-53).

Disconnect the thermosensor wire connector and remove the thermosensor.

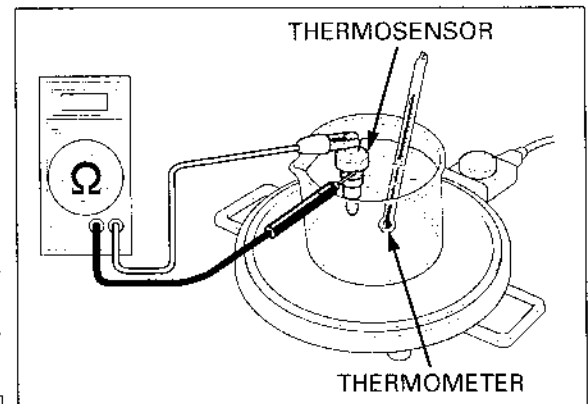


Suspend the thermosensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the thermosensor 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 thermosensor touch the pan.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Temperature	80°C (178°F)	120°C (248°F)
Resistance	47 – 57 Ω	14 – 18 Ω



Clean and apply sealant to the thermosensor threads.

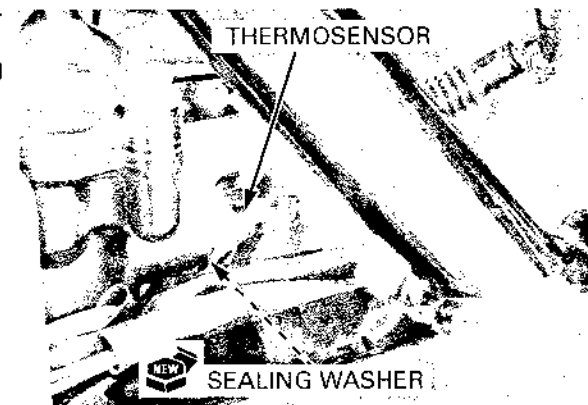
Install and tighten the thermosensor to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the thermosensor wire connector.

Install the fuel tank (page 5-54).

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



COOLING FAN MOTOR SWITCH

INSPECTION

Remove the middle cowl (page 2-8).

Check for a blown fuse before inspection.

Fan motor does not stop

Turn the ignition switch OFF, disconnect the connector from the fan motor switch and turn the ignition switch ON again.

If the fan motor does not stop, check for a shorted wire between the fan motor and switch.

If the fan motor stops, replace the fan motor switch.

Fan motor does not start

Before testing, warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector to the body with a jumper wire.

Turn the ignition switch ON and check the fan motor.

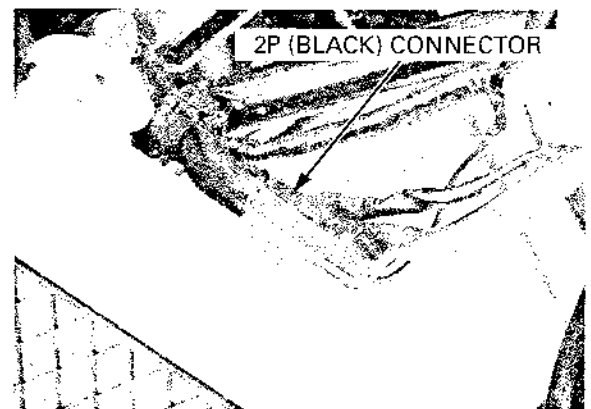
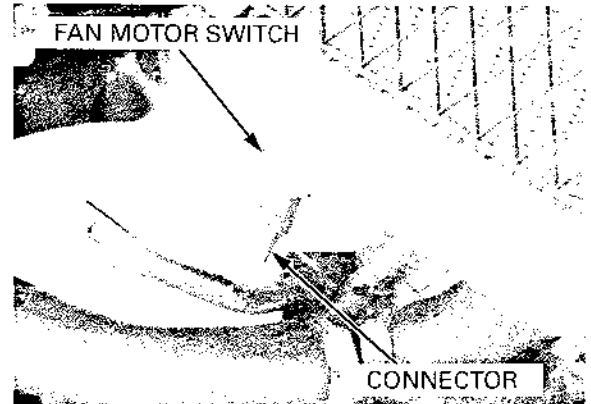
If the motor starts, check the connection at the fan motor switch terminal.

If it is OK, replace the fan motor switch.

If the motor does not start, check for voltage between the fan motor switch connector and ground.

If battery voltage is measured, replace fan motor.

If there is no battery voltage, check for poor connection of the fan motor 2P (Black) connector or broken wire harness.

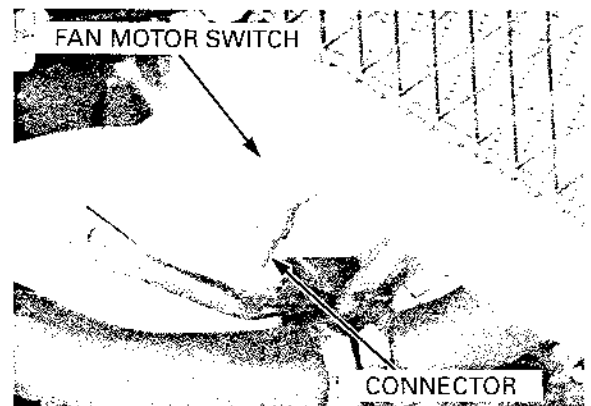


REMOVAL/INSTALLATION

Drain the coolant (page 6-7).

Remove the middle cowl (page 2-8).

Disconnect the fan motor switch connector and remove the switch.



LIGHTS/METERS/SWITCHES

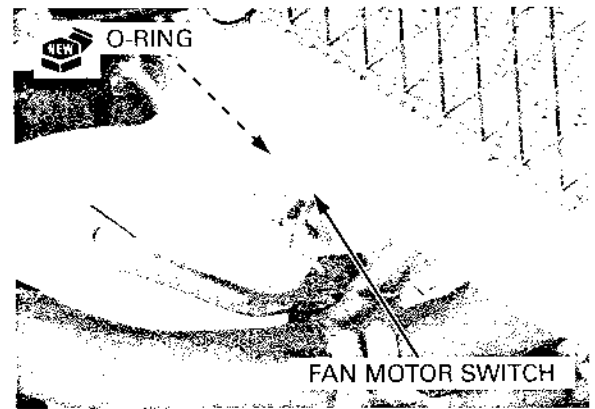
Install a new O-ring onto the fan motor switch.
Apply sealant to the fan motor switch threads.
Install and tighten the fan motor switch.

TORQUE: 18 N·m (1.8 kgf-m, 13 lbf-ft)

Install the removed parts in the reverse order of removal.

Install the middle cowl (page 2-8).

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

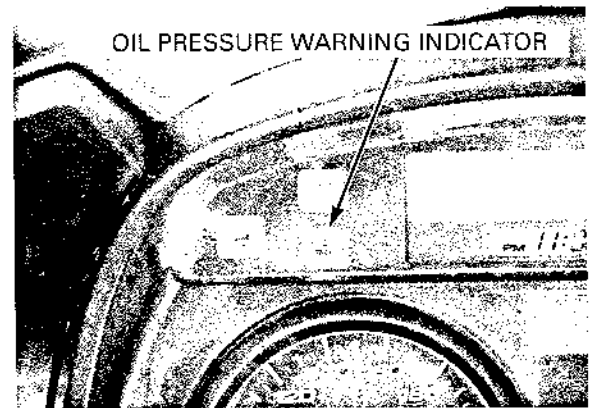


OIL PRESSURE SWITCH

INSPECTION

If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.

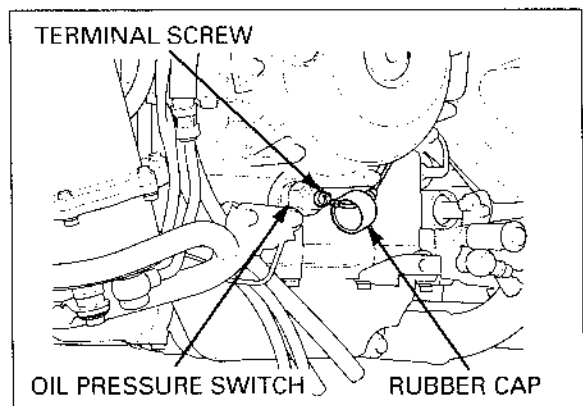


If the indicator does not come on, inspect as follow:

Remove the under cowl (page 2-7).

Remove the rubber cap.

Remove the screw and oil pressure switch terminal.



Short the oil pressure switch wire terminal with the ground using a jumper wire.

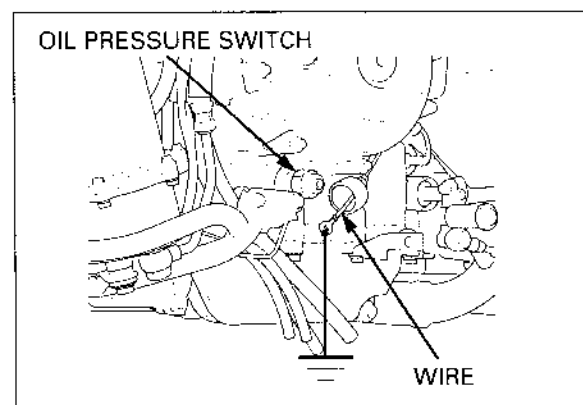
The oil pressure warning indicator comes on with the ignition switch is ON.

If the light does not comes on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out.

If the light does not go out, check the oil pressure .

If the oil pressure is normal, replace the oil pressure switch (page 19-17).



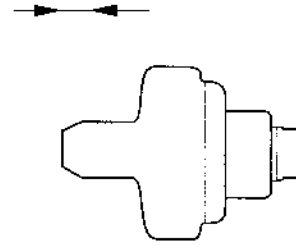
REMOVAL/INSTALLATION

Remove the boot, terminal screw and wire terminal (page 19-16).

Remove the oil pressure switch from the crankcase.

Apply sealant to the oil pressure switch threads as shown.

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



Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

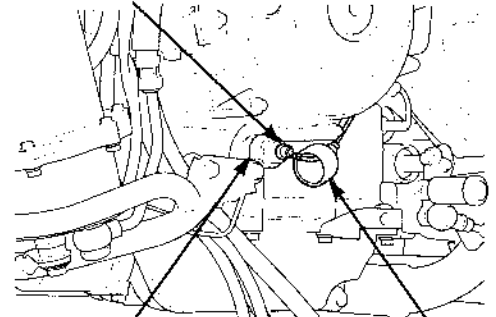
Connect the oil pressure switch terminal to the switch and tighten the screw to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the dust cover.

Install the under cowl (page 2-7).

TERMINAL SCREW



OIL PRESSURE SWITCH

RUBBER CAP

FUEL RESERVE SENSOR

REMOVAL/INSTALLATION

Remove the fuel tank (page 5-53).

Remove the fuel reserve sensor and O-ring from the fuel tank.

Connect the ohmmeter to the fuel reserve sensor terminals.

Inspect the resistance of the fuel reserve sensor.

STANDARD: 1.12 – 1.82 kΩ (25 C°/77 F°)

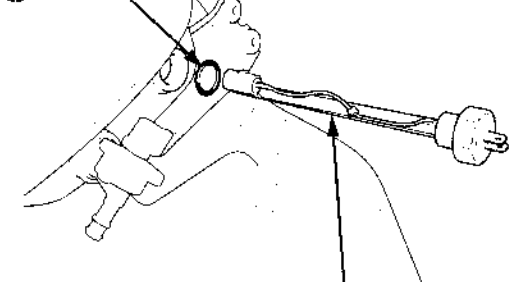
Install the fuel reserve sensor and new O-ring to the fuel tank.

Tighten the fuel reserve sensor to the specified torque.

TORQUE: 2.7 N·m (0.28 kgf·m, 2.0 lbf·ft)

Install the fuel tank (page 5-54).

O-RING



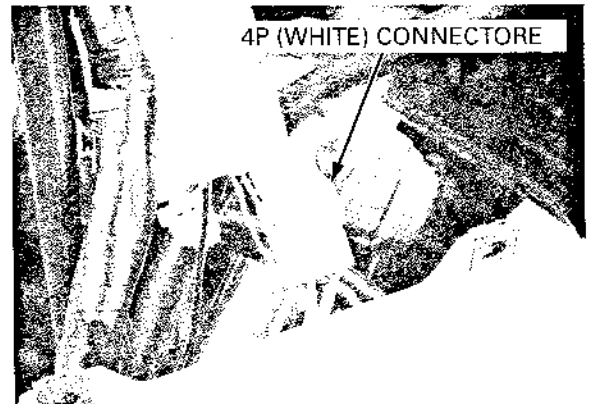
FUEL RESERVE SENSOR

IGNITION SWITCH

INSPECTION

Remove the middle cowl (page 2-8).

Disconnect the ignition switch 4P (White) connectors.



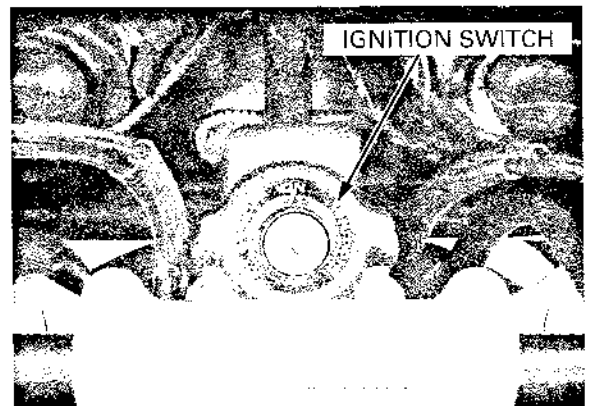
4P (WHITE) CONNECTORE

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

IGNITION SWITCH					
	BAT1	IG1	BAT2	ACC	IG2
ACC					
DN					
OFF					
LOCK					
COLCH					



IGNITION SWITCH

REMOVAL/INSTALLATION

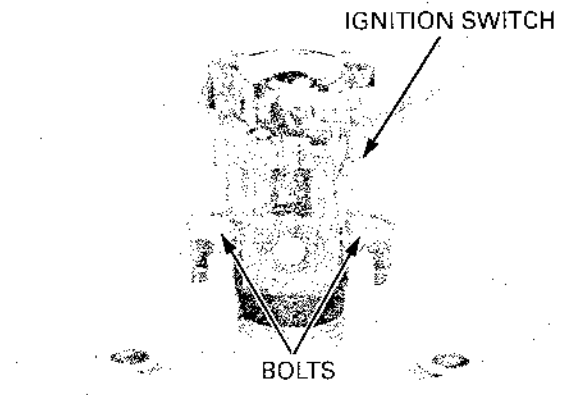
Remove the top bridge (page 13-34).

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: 26 N·m (2.7 kgf·m, 20 lbf·ft)



IGNITION SWITCH

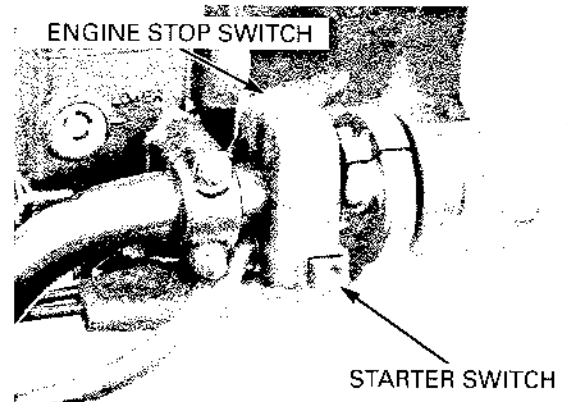
BOLTS

HANDLEBAR SWITCHES

Disconnect the handlebar switch 6P (Red), 9P (Black) and 2P (Natural) connectors.

Check for continuity between the wire terminals of the handlebar switch connector.

Continuity should exist between the color coded wire terminals as follows:



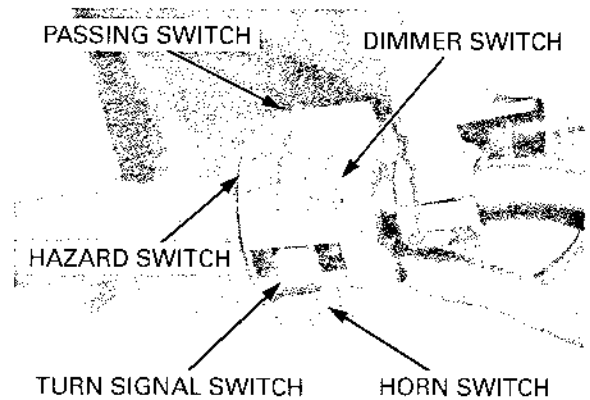
ENGINE STOP/STARTER SWITCHES

ENGINE STOP SWITCH

IG	BAT3
COLOR	Bl : W/Bl

STARTER SWITCH

ST	BAT4	HL
FREE		
PUSH		
COLOR	Y/R	Bl/R Bu/W



TURN SIGNAL/HORN/PASSING/DIMMER/HAZARD SWITCHES

TURN SIGNAL SWITCH

W	R	L
COLOR	B/R : Lb	O

HORN SWITCH

Ho	BAT5
FREE	
PUSH	
COLOR	Lg Bl/Br

PASSING SWITCH

BAT6	Hi
FREE	
PUSH	
COLOR	Bu/W Bu

DIMMER SWITCH

HL	Lo	Hi
COLOR	Bu/W W	Bu

HAZARD SWITCH

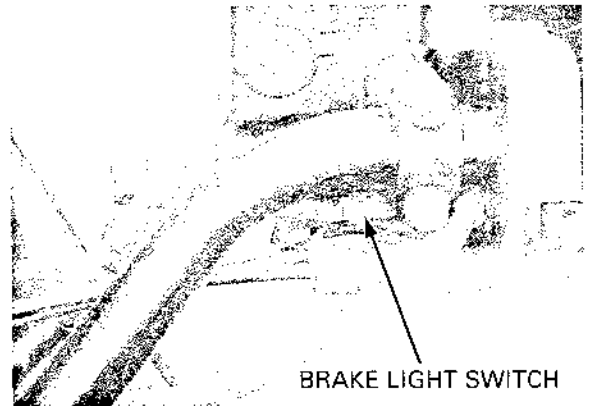
HZ	R	L
OFF		
ON		
COLOR	P/W Lb	O

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 is released.

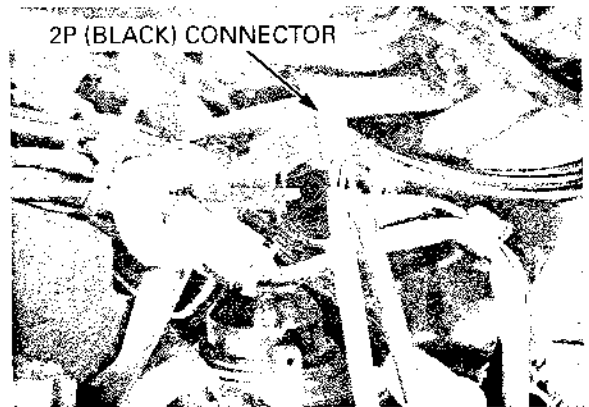


REAR

Remove the side cover (page 2-3).

Disconnect the rear brake light switch 2P (Black) connector and check for continuity between the terminals.

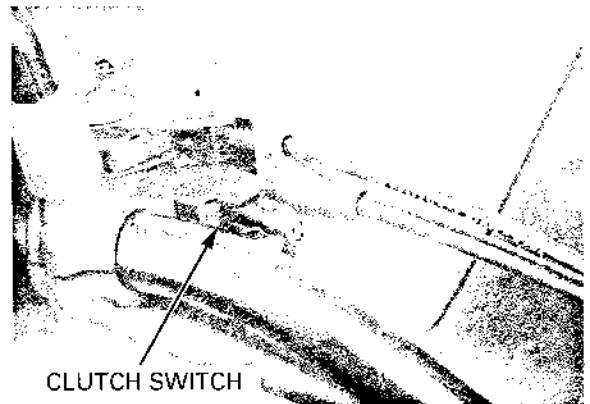
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



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 is released.



NEUTRAL SWITCH

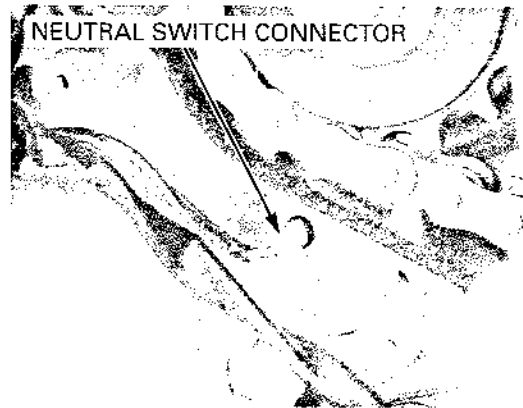
INSPECTION

Remove the drive sprocket cover (page 7-4).

Disconnect the neutral switch connector from the switch.

Shift the transmission into neutral and check for continuity between the Light green/Black wire terminal and ground.

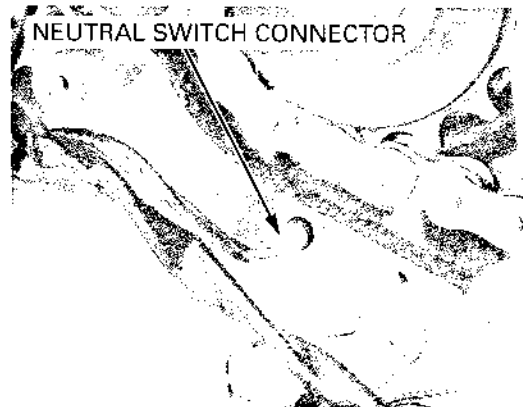
There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.



REMOVAL/INSTALLATION

Remove the drive sprocket cover (page 7-4).

Disconnect the neutral switch connector from the switch.



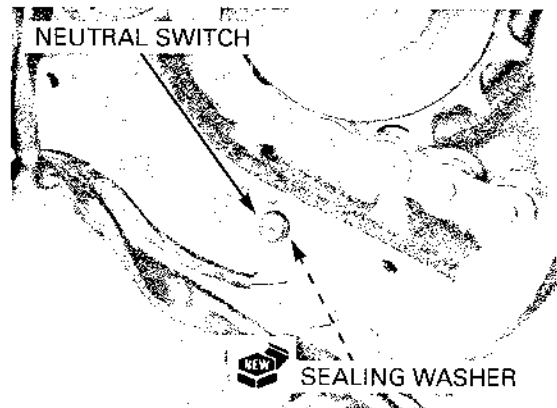
Remove the neutral switch and sealing washer from the crankcase.

Install the neutral switch with a new sealing washer and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch wire connector.

Route the neutral switch wire properly (page 1-23).



SIDE STAND SWITCH

INSPECTION

Open and support the rear end of the fuel tank (page 3-7).

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 UP.

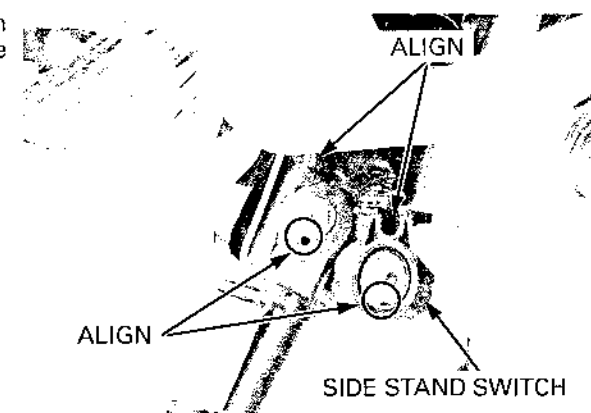
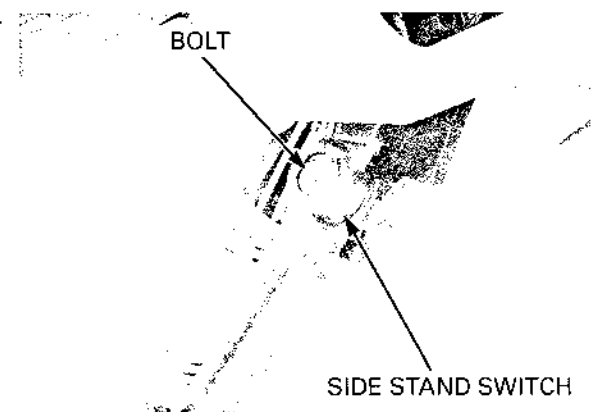
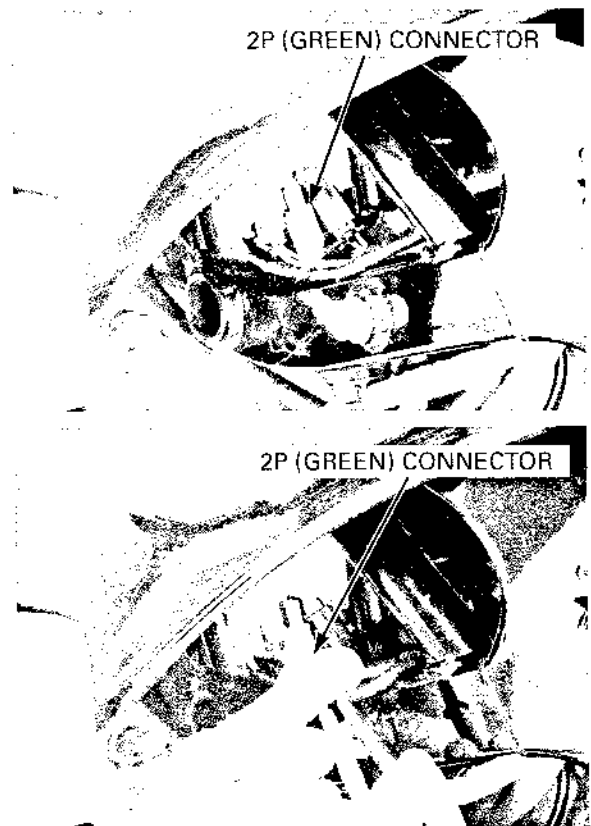
REMOVAL

Disconnect the side stand switch 2P (Green) connector.

Remove the bolt and side stand switch.

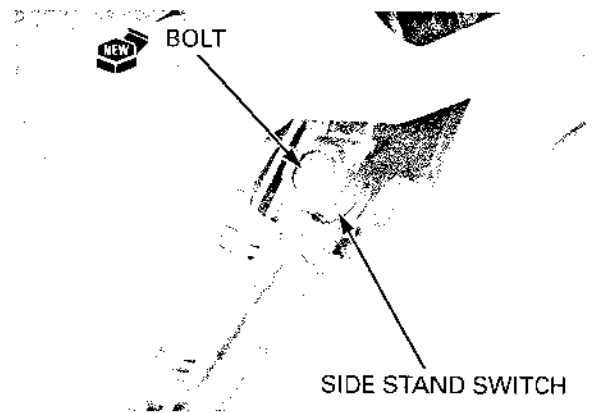
INSTALLATION

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.



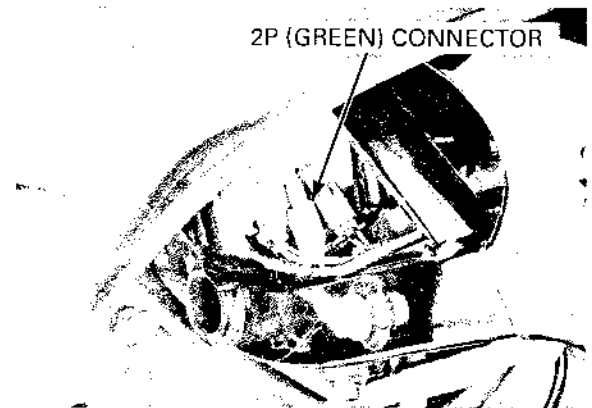
Secure the side stand switch with a new bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Route the side stand switch wire properly (page 1-23).

Connect the side stand switch 2P (Green) connector.

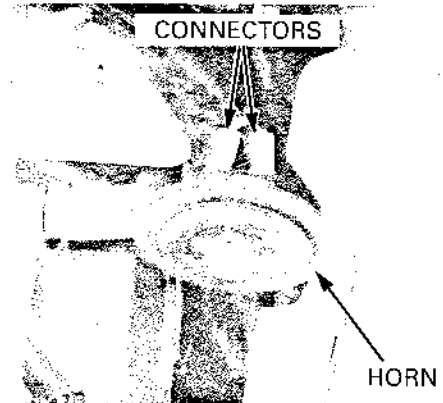


HORN

Disconnect the wire connectors from the horn.

Connect the 12V battery to the horn terminal directly.

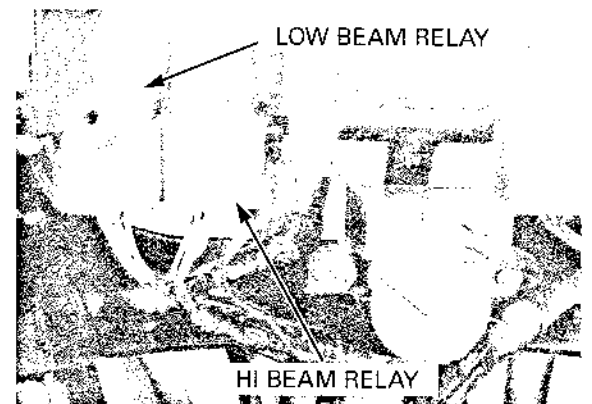
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



HEADLIGHT RELAY

Remove the upper cowl (page 2-10).

Disconnect the headlight relay 4P connector, then remove the headlight relay.



LIGHTS/METERS/SWITCHES

Connect the ohmmeter to the headlight relay connector terminals.

CONNECTION:

Hi beam relay: Blue/Black – Black/Red
Low beam relay: White/Black – Black/Red

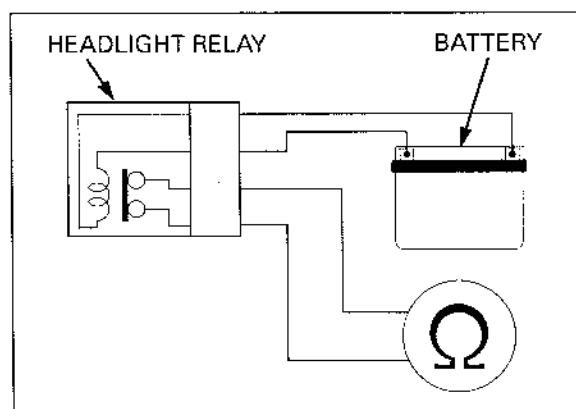
Connect the 12 V battery to the following headlight relay connector terminals.

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 is exist when the 12 V battery is connected, replace the headlight relay.



TURN SIGNAL 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 malfunction part(s)

YES – GO TO STEP 2.

2. Turn Signal Circuit Inspection

Remove the upper cowl (page 2-10).

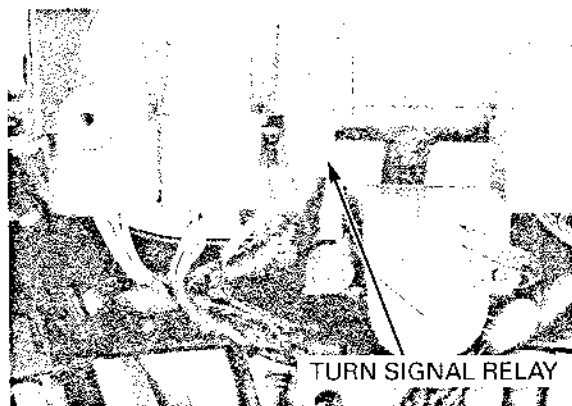
Disconnect the turn signal connectors from the relay.

Short the White/Green and Gray terminals of the turn signal relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.

Is the light come on?

YES – • Faulty turn signal relay
• Poor connection of the connector.

NO – Broken wire harness



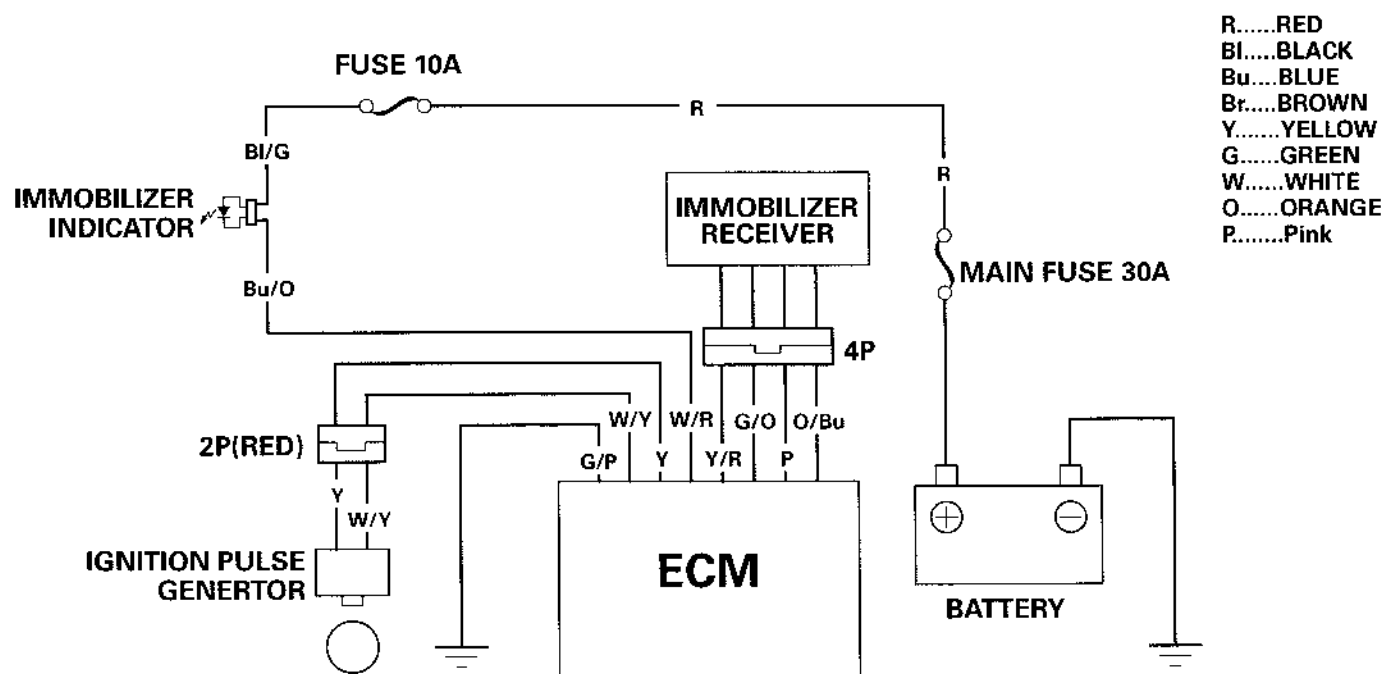
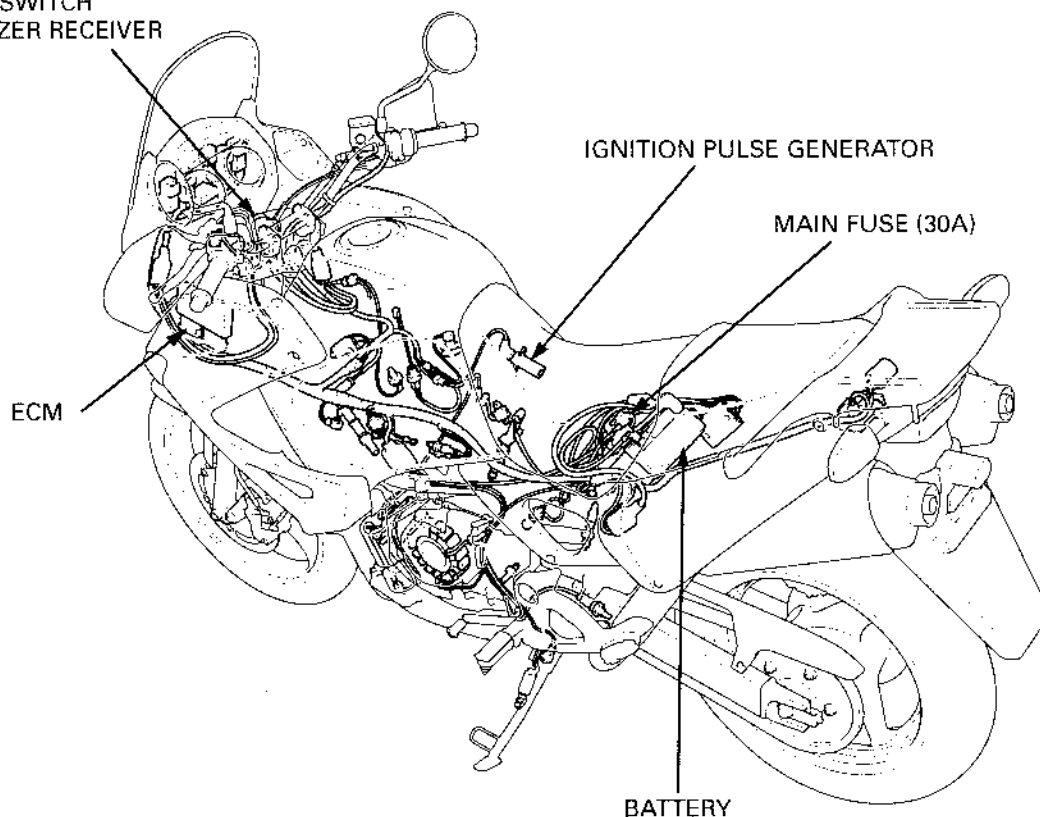
20. IMMOBILIZER SYSTEM (HISS)

SYSTEM DIAGRAM.....	20-2	TROUBLESHOOTING.....	20-9
SERVICE INFORMATION	20-3	IMMOBILIZER INDICATOR	20-11
KEY REGISTRATION PROCEDURES	20-4	ENGINE CONTROL MODULE (ECM).....	20-11
DIAGNOSTIC CODE INDICATION	20-7	IMMOBILIZER RECEIVER.....	20-12

IMMOBILIZER SYSTEM (HISS)

SYSTEM DIAGRAM

IGNITION SWITCH
IMMOBILIZER RECEIVER



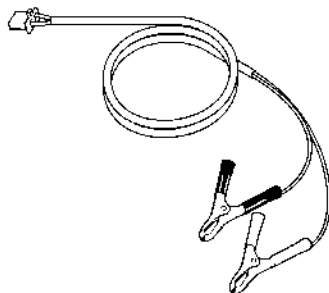
SERVICE INFORMATION

GENERAL

- HISS is the abbreviation of Honda Ignition Security System.
- When checking the immobilizer system (HISS), follow the steps in the troubleshooting flow chart (page 20-9).
- Keep the immobilizer key away from the other vehicle's immobilizer key when using it. The jamming of the key code signal may occur and the proper operation of the system will be obstructed.
- The key has built-in electronic part (transponder). Do not drop and strike the key against a hard material object, and do not leave the key on the dashboard in the car, etc. where the temperature will rise. Do not leave the key in the water for a prolonged time such as by washing the clothes.
- The engine control module (ECM) as well as the transponder keys must be replaced if all transponder keys have been lost.
- The system does not function with a duplicated key code is registered into the transponder with the immobilizer system (HISS).
- The ECM can store up to four key codes. (The four keys can be registered.)
- Do not modify the immobilizer system as it can cause the system failure. (The engine cannot be started.)
- Refer to the ignition system inspection (page 17-4).
- Refer to the ignition switch servicing (page 19-18).

TOOLS

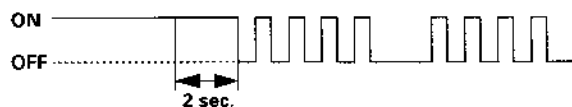
Inspection adaptor
07XMZ-MBW0101



KEY REGISTRATION PROCEDURES

When the key has been lost, or additional spare key is required:

1. Obtain a new transponder key.
2. Grind the key in accordance with the shape of the original key.
3. Apply 12 V battery voltage to the ignition pulse generator lines of the Engine Control Module (ECM) using the special tool (page 20-7).
4. Turn the ignition switch ON with the original key. The immobilizer indicator comes on and it remains on.
 - The code of the original key recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
5. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds, then it blinks four times repeatedly.



- The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key inserted in the ignition switch are cancelled. (Registration of the lost key or spare key is cancelled.)

The spare key must be registered again.

6. Turn the ignition switch OFF and remove the key.
7. Turn the ignition switch ON with a new key or the spare key. (Never use the key registered in previous steps.) The indicator comes on for two seconds then it blinks four times repeatedly.



- The new key or spare key is registered in the ECM.
- If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).

NOTICE

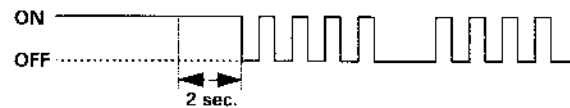
Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).

8. Repeat the steps 6 and 7 when you continuously register the other new key.

The ECM can store up to four key codes. (The four keys can be registered.)
9. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.
10. Turn the ignition switch ON with the registered key.
 - The immobilizer system (HISS) returns to the normal mode.
11. Check that the engine can be started using all registered key.

When the ignition switch is faulty:

1. Obtain a new ignition switch and two new transponder key.
2. Remove the ignition switch (page 19-18).
3. Apply 12 V battery voltage to the ignition pulse generator lines of the Engine Control Module (ECM) using the special tool (page 20-7).
4. Set the original (registered) key near the immobilizer receiver so that the transponder in the key can communicate with the receiver.
5. Connect a new ignition switch to the wire harness and turn it ON with a new transponder key. (keep the ignition switch away from the receiver.) The immobilizer indicator comes on and it remains on.
 - The code of the original key recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
6. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.



- The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key set near the receiver are cancelled.
7. Turn the ignition switch OFF and remove the key.
 8. Install the ignition switch onto the top bridge (page 19-18).
 9. Turn the ignition switch ON with a first new key. The indicator comes on for two seconds then it blinks four times repeatedly.



- The first key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
10. Turn the ignition switch OFF and disconnect the red clip of the inspection adaptor from the battery positive (+) terminal.
 11. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on for two seconds then it goes off.
 - The immobilizer system (HISS) returns to the normal mode.
 12. Turn the ignition switch OFF and connect the red clip of the inspection adaptor to the battery positive (+) terminal.
 13. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on and it remains on.
 - The code if the first key is recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
 14. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.
 - The immobilizer system (HISS) enters the registration mode. Registration of the original key used in step 4 is cancelled.

IMMOBILIZER SYSTEM (HISS)

15. Turn the ignition switch OFF and remove the key.
16. Turn the ignition switch ON with a second new key. (Never use the key registered in previous step.) The indicator comes on for two seconds then it blinks four times repeatedly.
 - The second key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).

NOTICE

Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).

17. Repeat the steps 15 and 16 when you continuously register the other new key.

The ECM can store up to four key codes. (The four keys can be registered.)
18. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.
19. Turn the ignition switch ON with the registered key.
 - The immobilizer system (HISS) returns to the normal mode.
20. Check that the engine can be started using all registered key.

When all keys have been lost, or the Engine Control Module (ECM) is faulty

1. Obtain a new ECM and two new transponder keys.
2. Grind the keys in accordance with the shape of the original key (or use the key number plate when all key have been lost).
3. Replace the ECM with a new one.
4. Turn the ignition switch ON with a first new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
 - The first key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
5. Turn the ignition switch OFF and remove the first key.
6. Turn the ignition switch ON with a second new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
 - The second key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 20-7).
7. Turn the ignition switch OFF and remove the second key.
 - The system (ECM) will not enter the normal mode unless the two keys are registered in ECM.
 - The third new key cannot be continuously registered. When it is necessary to register the third key, follow the procedures "When the key has been lost, or additional key is required" (page 20-4).
8. Check that the engine can be started using all registered keys.

DIAGNOSTIC CODE INDICATION

Open and support the fuel tank using the equipped tools (page 3-7).

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

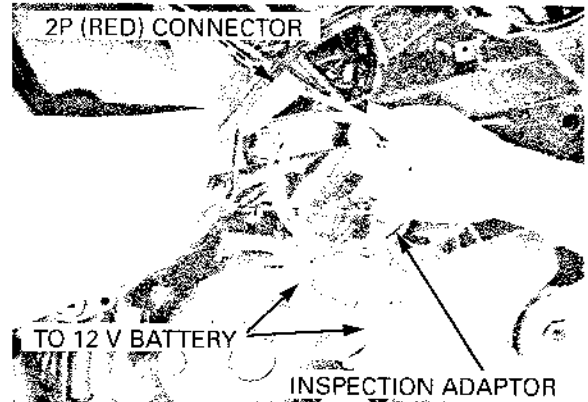
Connect the inspection adaptor to the wire harness side connector.

Connect the Red clip of the adaptor to the 12V battery positive (+) terminal and green clip to the negative (-) terminal.

TOOL:

Inspection adaptor

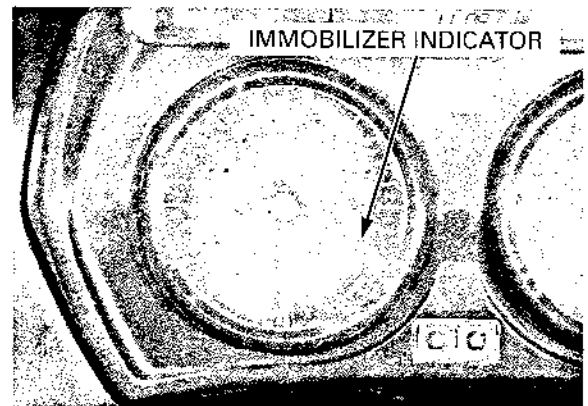
07XMZ-MBW0101



Turn the ignition switch ON with the properly registered key.

The immobilizer indicator will come on for approx. ten seconds then it will start blinking to indicate the diagnostic code if the system is abnormal. The blinking frequency is repeated.

The immobilizer indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)



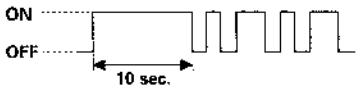


DIAGNOSTIC CODE

When the system (ECM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
<p>ON</p> <p>OFF</p> <p>10 sec.</p>	ECM data is abnormal	Faulty ECM	Replace the ECM
	Code signals cannot send or receive	Faulty receiver or wire harness	Follow the troubleshooting (page 20-9)
	Identification code is disagree	Jamming by the other transponder	Keep the other vehicle's transponder key away from the immobilizer receiver more than 50 mm (2.0 in)
	Secret code is disagree		

IMMOBILIZER SYSTEM (HISS)

When the system (ECM) enters the diagnostic mode from the registration mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
 <p>ON OFF 10 sec.</p>	Registration is overlapped	The key is already registered properly	Use a new key or cancelled key
	Code signals cannot send or receive	Communication fails	Follow the troubleshooting (page 20-9)
	Registration is impossible	The key is already registered on the other system	Use a new key

TROUBLESHOOTING

The immobilizer indicator comes on for approx. two seconds then it goes off, when the ignition switch is turned ON with the properly registered key and the immobilizer system (HISS) functions normally. If there is any problem or the properly registered key is not used, the indicator will remain on.

Immobilizer indicator does not come on when the ignition switch is turned ON

1. Fuse Inspection

Check for blown fuse (10 A).

Is the fuse blown?

YES – Replace the fuse.

NO – GO TO STEP 2.

2. Combination Meter Inspection

Check that the oil pressure and neutral indicator lights come on with the ignition switch ON.

Is the indicator come on?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. Combination Meter Power Input line Inspection

Check the power input line (Black/Brown wire) at the combination meter connector (page 19-10).

Is the voltage specified value?

NO – Open circuit in Black/Brown wire.

YES – Faulty combination meter.

4. Immobilizer Indicator Line Inspection at The ECM Connector

Check the immobilizer indicator line (Pink) at the Engine Control Module (ECM) connector (page 20-11).

Is the voltage specified?

NO – GO TO STEP 5.

YES – GO TO STEP 6.

5. Immobilizer Indicator Line Inspection at The Combination Meter Connector

Check the immobilizer indicator line (Blue/Orange wire) at the combination meter connector (page 20-11).

Is the voltage specified value?

NO – Open circuit in Blue/Orange wire.

YES – Faulty combination meter.

6. Power Input Line Inspection at The ECM Connector

Check the power input line (Black/White wire) at the Engine Control Module (ECM) connector (page 20-11).

Is the voltage specified value?

NO – Open circuit in Black/White wire.

YES – GO TO STEP 7.

7. Ground Line Inspection at The ECM Connector

Check the ground line (Green wire) at the combination meter connector (page 20-12).

Is there continuity?

NO – Open circuit in Green wire.

YES – • Loose or poor contact of the ECM connector.
• Faulty ECM.

IMMOBILIZER SYSTEM (HISS)

Immobilizer indicator does not come on when the ignition switch is turned ON

1. Fuse Inspection

Check for blown fuse (10 A).

Is the fuse blow?

YES – Replace the fuse.

NO – GO TO STEP 2.

2. First Transponder Key Inspection

Turn the ignition switch ON with the spare transponder key and check the immobilizer indicator. The indicator should come on for 2 seconds then go off.

Is the indicator go off?

YES – Faulty first transponder key.

NO – GO TO STEP 3.

3. Diagnostic Code Inspection

Perform the diagnostic code indication procedure (page 20-7) and check that the immobilizer indicator comes on then it starts blinking.

Is the indicator blinks or stay lit?

BRINKS–Read the diagnostic code (page 20-7).

STAY LIT–GO TO STEP 4.

4. Immobilizer Indicator Line Inspection at The ECM Connector

Check the immobilizer indicator line (Pink wire) at the Engine Control Module (ECM) connector (page 20-11).

Is the voltage specified value?

NO – Short circuit in Pink wire.

YES – GO TO STEP 5.

5. Ignition Pulse Generator Line Inspection

Check the ignition pulse generator lines (Yellow and White/Yellow wires) between the ECM and ignition pulse generator connectors (page 20-12).

Is there continuity?

YES – • Open circuit in Yellow wire.
• Open circuit in White/Yellow wire.

NO – Faulty ECM.

Diagnostic code  is indicated (Code signals cannot send or receive)

1. Immobilizer Receiver Power Input Line Inspection

Check the power input line at the immobilizer receiver connector (page 20-12).

Is the voltage approx. 5 V?

NO – Open or short circuit in Yellow/Red wire.

YES – GO TO STEP 2.

2. Immobilizer Receiver Ground Line Inspection

Check the ground at the immobilizer receiver connector (page 20-12).

Is there continuity?

NO – Open or short circuit in Green/Orange wire.

YES – GO TO STEP 3.

3. Immobilizer Receiver Signal Line Inspection

Check the signal line between the immobilizer receiver and ECM connector (page 20-13).

Is there continuity?

NO – • Open or short circuit in Pink wire.
• Open or short circuit in Orange/Blue wire.

YES – Faulty immobilizer receiver.

IMMOBILIZER INDICATOR

Remove the upper cowl (page 2-10).

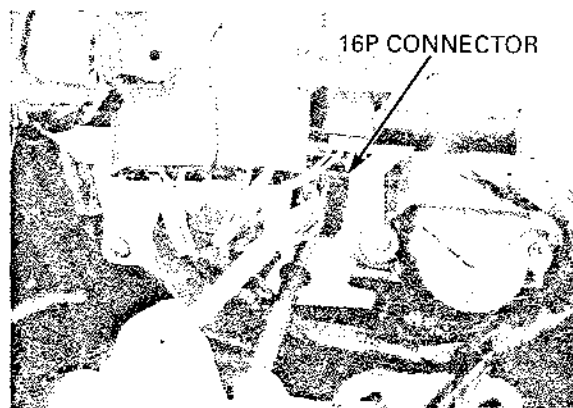
Perform the following inspections with the combination meter 16P connector connected.

POWER INPUT LINE INSPECTION

Measure the voltage between the Black/Brown (+) and Green (-) wire terminals.

Turn the ignition switch ON.

There should be battery voltage.



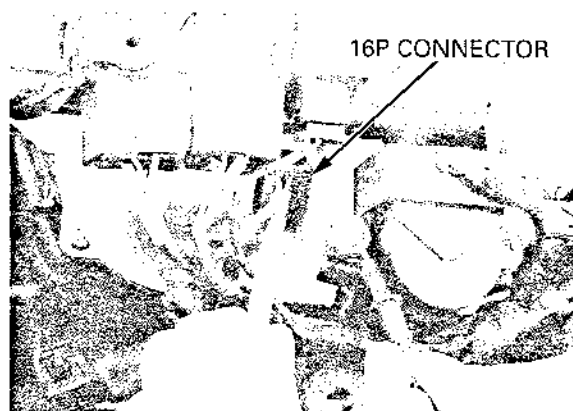
IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the Blue/Orange (+) and ground(-).

Turn the ignition switch ON.

There should be battery voltage.

There should be no voltage for approx. two seconds after the ignition switch is turned ON, then the battery voltage should appear, if the system is normal.



ENGINE CONTROL MODULE (ECM)

Remove the upper cowl (page 2-10).

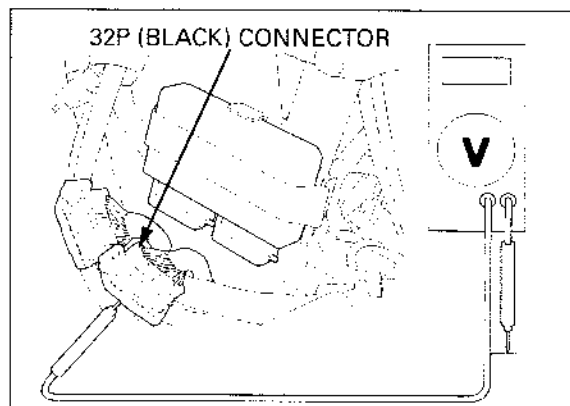
Disconnect the ECM 32P (Black) connector. Perform the following inspections at the wire harness side connector of the ECM.

IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the Blue/Orange wire terminal (+) and ground (-).

Turn the ignition switch ON.

There should be battery voltage.

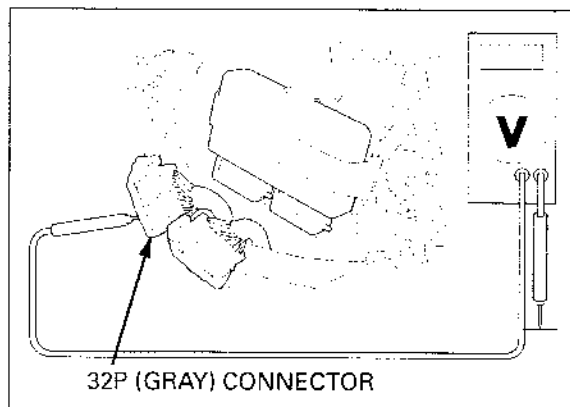


POWER INPUT LINE INSPECTION

Disconnect the ECM 32P (Gray) connector. Measure the voltage between the Black/White wire terminal (+) and ground (-).

Turn the ignition switch ON.

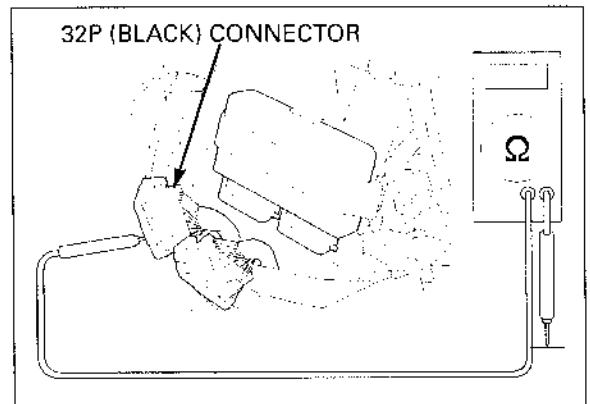
There should be battery voltage.



IMMOBILIZER SYSTEM (HISS)

GROUND LINE INSPECTION

Check for continuity between the Green wire terminal and ground.
There should be continuity at all times.

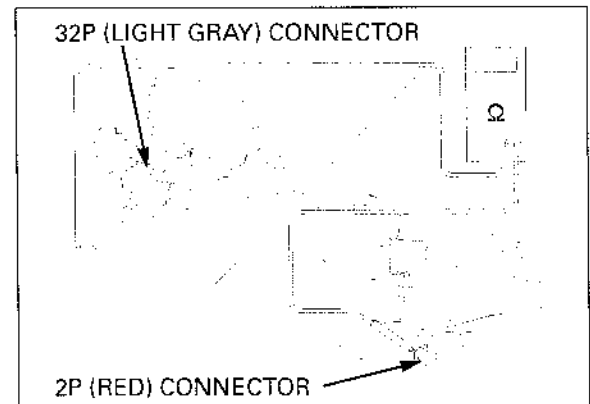


IGNITION PULSE GENERATOR LINE INSPECTION

Disconnect the ignition pulse generator 2P (Red) connector (page 20-7).

Check the Yellow and White/Yellow wire for continuity between the ECM and ignition pulse generator connector.

There should be continuity between the same color wire terminals.



IMMOBILIZER RECEIVER

Remove the upper cowl cover (page 2-10).

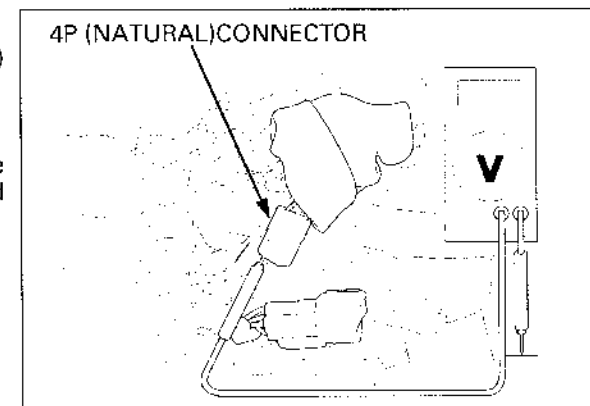
Disconnect the immobilizer receiver 4P (Natural) connector.

POWER INPUT LINE INSPECTION

Measure the voltage between the Yellow/Red wire terminal (+) of the wire harness side connector and ground (-).

Turn the ignition switch ON.

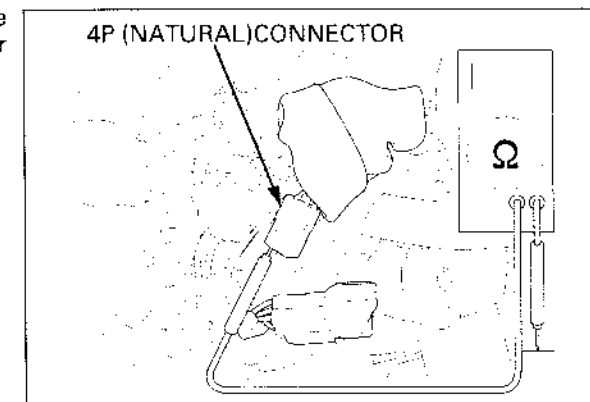
There should be approx. 5 V.



GROUND LINE INSPECTION

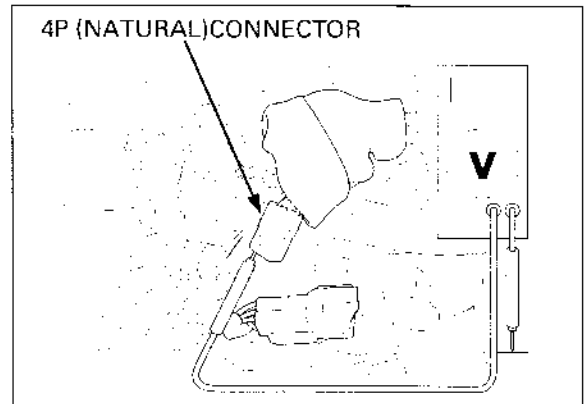
Check for continuity between the Green/Orange wire terminal of the wire harness side connector and ground.

There should be continuity at all times.



SIGNAL LINE INSPECTION

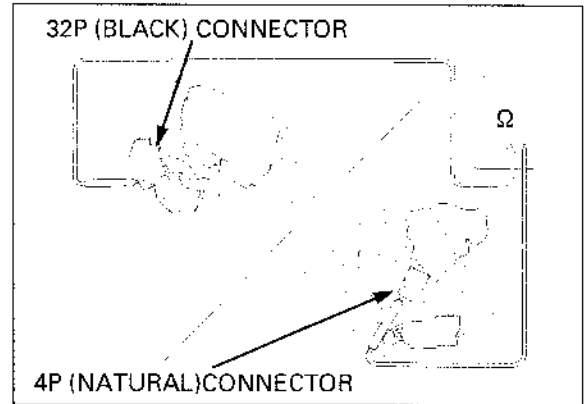
Measure the voltage between the Pink wire terminal (+) of the wire harness side connector and ground (-).
Turn the ignition switch ON.
There should be approx. 5 V.



Disconnect the engine control module (ECM) connector.

Check the Orange/Blue wire for continuity between the immobilizer receiver and ECM 32P (Black) connector.
There should be continuity.

Check for continuity between the Orange/Blue wire terminal and ground.
There should be no continuity.



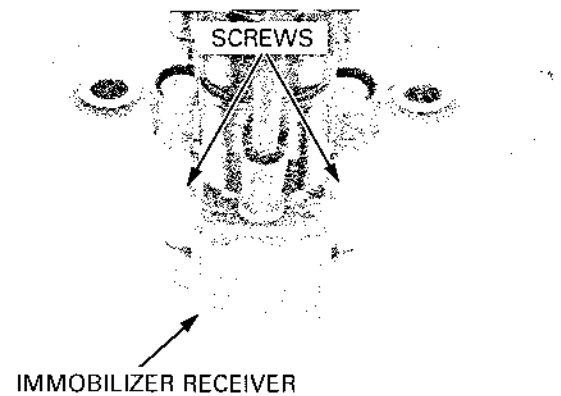
REPLACEMENT

Remove the top bridge (page 13-34).

Remove the two screws and the immobilizer receiver.

Install a new receiver and tighten the two screws.
Route the receiver wire properly (page 1-23).

Install the removed parts in the reverse order of removal.



REPLACEMENT PARTS FOR PROBLEM

Problem	Replacement parts				
	Transponder Key	Immobilizer receiver	ECM	Ignition switch	*Accessory lock and key
One Key has been lose, or additional spare key is required	○				
All key have been lost, or ECM is faulty	○		○		
Immobilizer receiver is faulty		○			
Ignition switch is faulty	○			○	
*Accessory lock is faulty					○

*Accessory lock means the seat lock, fuel fill cap or helmet holder.

MEMO

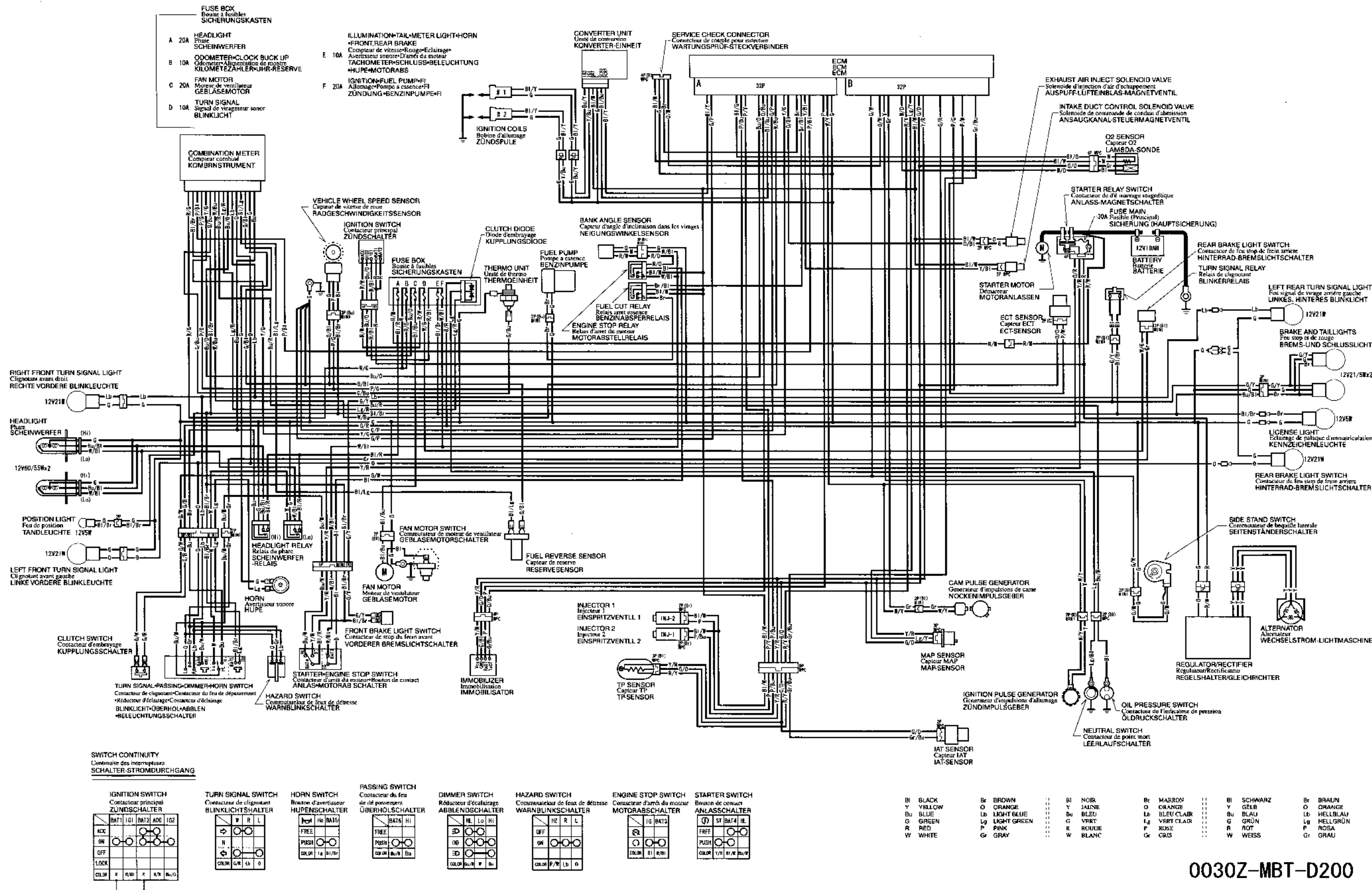
21. WIRING DIAGRAMS

STANDARD: ED, E, F, G type (English,
French, Germany):..... 21-3

STANDARD: ED, E, F,G type (Italian,
Spanish, Dutch).....21-4

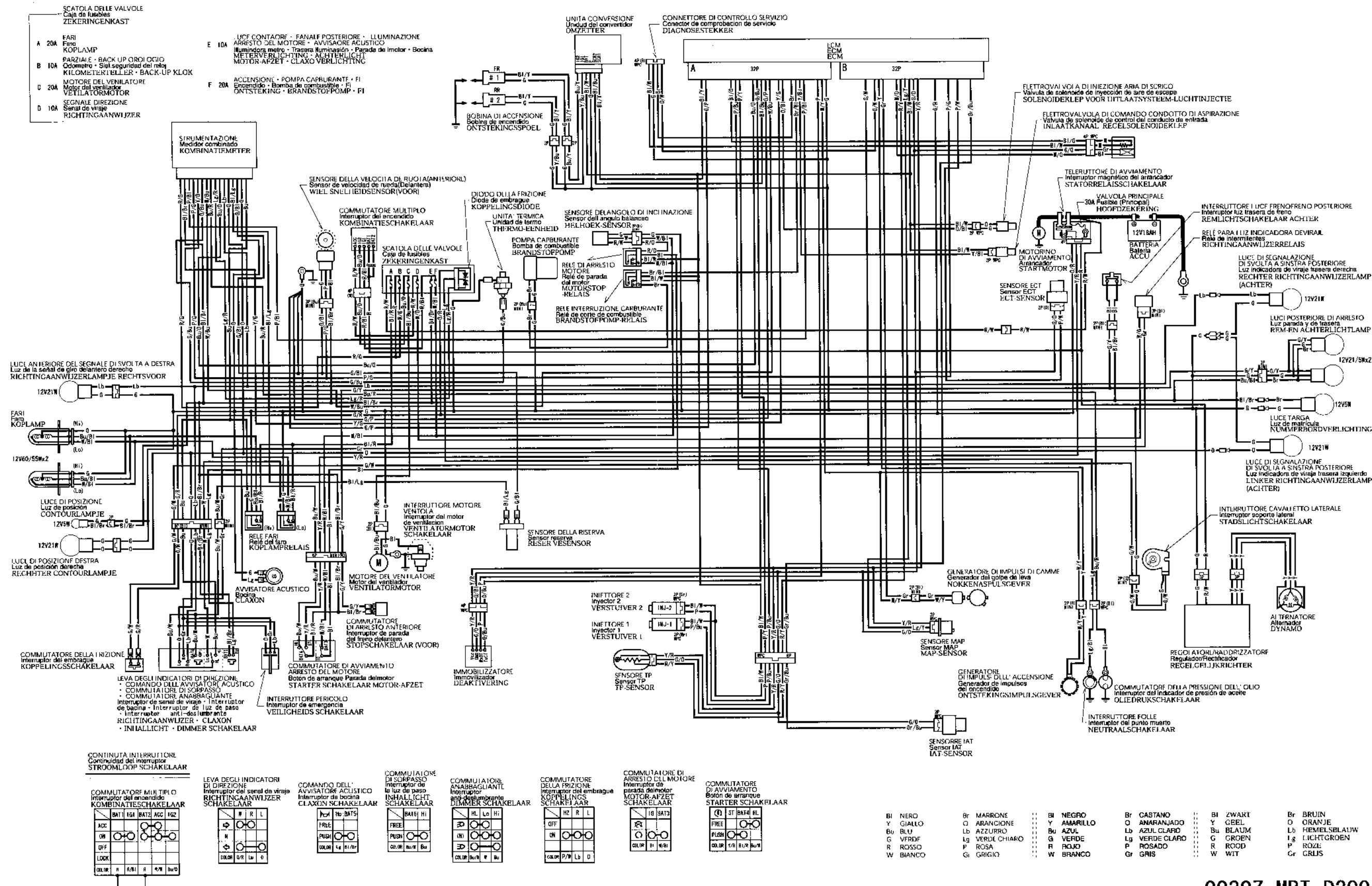
MEMO

STANDARD: ED, E, F, G type (English, French, Germany):



0030Z-MBT-D200

STANDARD: ED, E, F,G type (Italian, Spanish, Dutch)



0030Z-MBT-D200

22. TECHNICAL FEATURE

RETURN-LESS FUEL SUPPLY SYSTEM 22-2

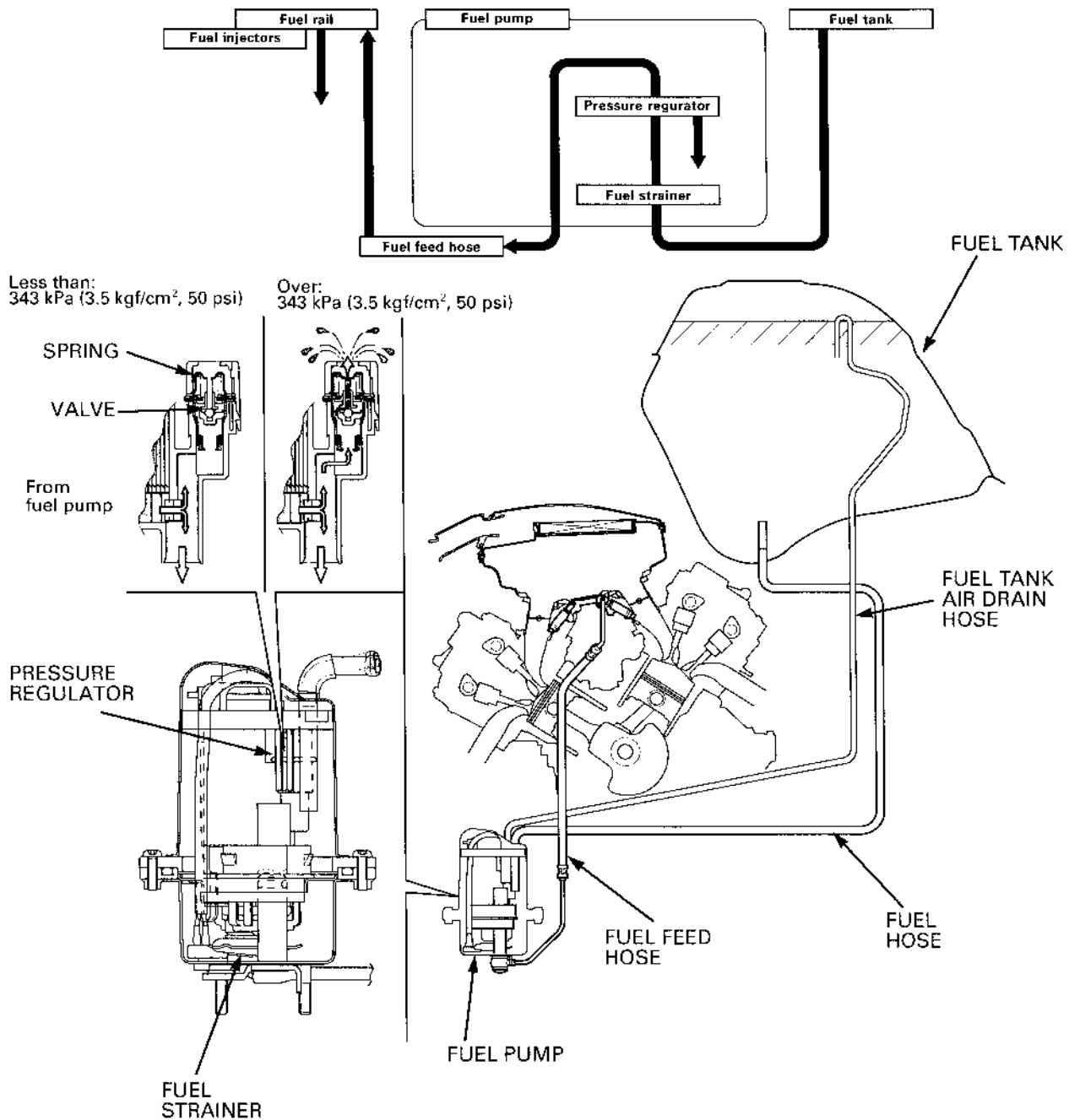
RETURN-LESS FUEL SUPPLY SYSTEM

The fuel delivery system consists of the fuel tank, fuel strainer, fuel pump, fuel filter, pressure regulator, fuel feed hose, fuel rails and injectors. The pressure regulator is located in the fuel pump. This system is equipped with the absolute fuel pressure. (There are no fuel return hose and vacuum hose of pressure regulator with this system.)

The fuel pressure in the fuel delivery system is regulated by the pressure regulator and always kept absolute pressure 343 kPa (3.5 kgf/cm², 50 psi).

The pressure regulator returns the fuel by opening the valve when the fuel pressure increases more than 343 kPa (3.5 kgf/cm², 50 psi).

This system actualizes the optimum injection volume by the ECM control without the control of relative pressure between the fuel pressure and the manifold absolute pressure.



23. TROUBLESHOOTING

ENGINE DOES NOT STAR OR IS
HARD TO START 23-2

ENGINE LACKS POWER 23-2

POOR PERFORMANCE AT LOW AND
IDLE SPEED.....23-4

POOR PERFORMANCE AT HIGH SPEED23-5

POOR HANDLING.....23-6

ENGINE DOES NOT START OR IS HARD TO START

1. Spark Plug Inspection

Remove and inspect spark plug.

Are there 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 converter unit
• 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 5-66).

YES – GO TO STEP 4.

4. Cylinder compression Inspection

Test the cylinder compression.

Is the compression specified?

- 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.

Is the engine start but stops?

- Yes** – • Leaking intake manifold
• Faulty idle air control 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.

Is 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 there tire pressure correct?

- NO** – • Faulty tire valve
• Punctured tire

YES – GO TO STEP 3.

3. Clutch Inspection

Accelerate rapidly low to second.

Is the engine speed change accordingly when clutch is released?

- NO** – • Clutch slipping
• Worn clutch discs/plates
• Warped clutch discs/plates
• Weak clutch spring
• Additive in engine oil

YES – GO TO STEP 4.

4. Engine Performance Inspection

Accelerate lightly.

Is 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 spark plug.

Are there 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 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 specified?

- 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 specified?

- 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 5-66).

YES – GO TO STEP 10.

10. Lubrication Inspection

Remove 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. Over Heating Inspection

Check for engine over heating.

Is the engine over heating?

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 advance (Faulty ECM)

NO – • Engine does not knock

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Spark Plug Inspection

Remove and inspect spark plug.

Are there 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 specified?

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 5-66).

YES – GO TO STEP 4.

4. Starter Valve Synchronization Inspection

Check the starter valve synchronization.

Is the starter valve synchronization specified?

NO – Adjust the starter valve synchronization (page 5-71).

YES – GO TO STEP 5.

5. Intake Pipe Leaking Inspection

Check for leaks 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 specified?

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 5-66).

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 specified?

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 pulled to one side

- Front and rear wheel not aligned
- Faulty shock absorber
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

AIR CLEANER	3-6	DELAY VALVE	15-31
AIR CLEANER HOUSING	5-55	DIAGNOSTIC CODE INDICATION	20-7
ALTERNATOR CHARGING COIL	16-6	DIODE	18-15
ALTERNATOR COVER INSTALLATION	10-10	DRIVE CHAIN	3-17
ALTERNATOR COVER REMOVAL	10-4	DRIVE CHAIN SLIDER	3-21
ALTERNATOR/STARTER CLUTCH	1-7	DTC CODE INDEX	5-29
BANK ANGLE SENSOR	5-78	DTC TROUBLESHOOTING	5-32
BATTERY	16-5	ECM (ENGINE CONTROL MODULE)	5-79
BATTERY/CHARGING SYSTEM SPECIFICATIONS	1-10	ECT SENSOR	5-74
BRAKE FLUID	3-21	ELECTRIC STARTER SPECIFICATIONS	1-11
BRAKE FLUID REPLACEMENT/AIR BLEEDING	15-7	EMISSION CONTROL SYSTEMS	1-32
BRAKE LIGHT SWITCH		ENGINE & FRAME TORQUE VALUES	1-12
LIGHTS/METERS/SWITCHES	19-20	ENGINE CONTROL MODULE (ECM)	20-11
MAINTENANCE	3-24	ENGINE DOES NOT STAR OR IS HARD TO START	23-2
BRAKE PAD WEAR	3-22	ENGINE IDLE SPEED	3-15
BRAKE PAD/DISC	15-14	ENGINE INSTALLATION	7-7
BRAKE PEDAL	15-42	ENGINE LACKS POWER	23-2
BRAKE SYSTEM	3-23	ENGINE OIL/OIL FILTER	3-12
CABLE & HARNESS ROUTING	1-23	ENGINE REMOVAL	7-4
CAM CHAIN TENSIONER LIFTER	8-32	ENGINE STOP RELAY	5-79
CAM LOBE HEIGHT	8-11	FLYWHEEL INSTALLATION	10-9
CAM PULSE GENERATOR	5-75	FLYWHEEL REMOVAL	10-5
CAMSHAFT INSPECTION	8-11	FORK	13-21
CAMSHAFT INSTALLATION	8-24	FRONT BRAKE CALIPER	15-32
CAMSHAFT OIL CLEARANCE	8-12	FRONT MASTER CYLINDER	15-18
CAMSHAFT REMOVAL	8-8	FRONT WHEEL	13-15
CAMSHAFT RUNOUT	8-11	FRONT WHEEL/SUSPENSION/STEERING	
CHARGING SYSTEM INSPECTION	16-6	SPECIFICATIONS	1-9
CHOKE OPERATION	3-6	FUEL CUT-OFF RELAY	5-52
CLUTCH	9-6	FUEL LINE	3-5
CLUTCH LIFTER ARM	9-21	FUEL LINE INSPECTION	5-47
CLUTCH SPECIFICATIONS	1-7	FUEL PUMP	5-49
CLUTCH SWITCH	19-20	FUEL RESERVE SENSOR	19-17
CLUTCH SYSTEM	3-25	FUEL SYSTEM (Programmed Fuel Injection)	
COMBINATION METER	19-8	SPECIFICATIONS	1-6
COMPONENT LOCATION		FUEL TANK	5-53
ALTERNATOR/STARTER CLUTCH	10-2	GEARSHIFT LINKAGE	9-15
CLUTCH	9-2	GENERAL SPECIFICATIONS	1-4
CRANKCASE/TRANSMISSION	11-2	HANDLEBAR	13-6
CRANKSHAFT/PISTON/CYLINDER	12-2	HANDLEBAR SWITCHES	19-19
CYLINDER HEAD/VALVES	8-2	HEADLIGHT	19-5
ENGINE REMOVAL/INSTALLATION	7-2	HEADLIGHT AIM	3-25
FRONT WHEEL/SUSPENSION/STEERING	13-2	HEADLIGHT RELAY	19-23
FUEL SYSTEM (Programmed Fuel Injection)	5-2	HEADLIGHT UNDER COVER	2-6
HYDRAULIC BRAKE	15-2	HORN	19-23
REAR WHEEL SUSPENSION	14-2	HYDRAULIC BRAKE SPECIFICATIONS	1-10
COOLANT REPLACEMENT	6-7	IAT SENSOR	5-74
COOLANT TEMPERATURE GAUGE/SENSOR	19-13	IGNITION COIL	17-7
COOLING FAN MOTOR SWITCH	19-15	IGNITION PULSE GENERATOR	17-9
COOLING SYSTEM	3-15	IGNITION SWITCH	19-18
COOLING SYSTEM SPECIFICATIONS	1-6	IGNITION SYSTEM INSPECTION	17-5
CRANKCASE ASSEMBLY	11-14	IGNITION SYSTEM SPECIFICATIONS	1-10
CRANKCASE SEPARATION	11-5	IGNITION TIMING	17-10
CRANKCASE/TRANSMISSION SPECIFICATIONS	1-8	IMMOBILIZER INDICATOR	20-11
CRANKPIN BEARING	12-8	IMMOBILIZER RECEIVER	20-12
CRANKSHAFT	12-4	INJECTOR	5-66
CRANKSHAFT/PISTON/CYLINDER		INNER COWL	2-7
SPECIFICATIONS	1-8	KEY REGISTRATION PROCEDURES	20-4
CYLINDER COMPRESSION TEST	8-6	LICENSE LIGHT	19-7
CYLINDER HEAD ASSEMBLY	8-21	LIGHTS/METERS/SWITCHES SPECIFICATIONS	1-11
CYLINDER HEAD COVER ASSEMBLY	8-29	LUBRICATION & SEAL POINTS	1-19
CYLINDER HEAD COVER DISASSEMBLY	8-7	LUBRICATION SYSTEM DIAGRAM	4-2
CYLINDER HEAD COVER INSTALLATION	8-30	LUBRICATION SYSTEM SPECIFICATIONS	1-6
CYLINDER HEAD COVER REMOVAL	8-6	MAIN JOURNAL BEARING	12-6
CYLINDER HEAD DISASSEMBLY	8-14	MAINTENANCE SCHEDULE	3-4
CYLINDER HEAD INSPECTION	8-14	MAP SENSOR	5-73
CYLINDER HEAD INSTALLATION	8-22	MIDDLE COWL	2-8
CYLINDER HEAD REMOVAL	8-12	MIL CODE INDEX	5-12
CYLINDER HEAD/VALVES SPECIFICATIONS	1-7	MIL TROUBLESHOOTING	5-14

INDEX

MODEL IDENTIFICATION	1-2	STANDARD TORQUE VALUES.....	1-12
MUFFLER/EXHAUST PIPE	2-11	STARTER CLUTCH.....	10-6
NEUTRAL SWITCH.....	19-21	STARTER MOTOR	18-6
NUMBER PLATE BRACKET	2-5	STARTER RELAY SWITCH	18-13
NUTS, BOLTS, FASTENERS.....	3-27	STARTER VALVE	5-69
O2 SENSOR (G type only).....	5-84	STARTER VALVE SYNCHRONIZATION	5-71
OIL PRESSURE INSPECTION	4-5	STATOR.....	10-4
OIL PRESSURE SWITCH.....	19-16	STEERING HEAD BEARINGS.....	3-28
OIL PUMP	4-8	STEERING STEM	13-34
OIL STRAINER/PRESSURE RELIEF VALVE.....	4-6	SUSPENSION.....	3-26
PAIR SOLENOID VALVE.....	5-83	SUSPENSION LINKAGE.....	14-15
PGM-FI SELF-DIAGNOSIS INFORMATION	5-8	SWINGARM	14-18
PISTON/CYLINDER.....	12-11	SYSTEM DIAGRAM	
POOR HANDLING.....	23-6	BATTERY/CHARGING SYSTEM.....	16-2
POOR PERFORMANCE AT HIGH SPEED	23-5	ELECTRIC STARTER.....	18-2
POOR PERFORMANCE AT LOW AND IDLE SPEED.....	23-4	FUEL SYSTEM (Programmed Fuel Injection)	5-7
POSITION LIGHT	19-6	IGNITION SYSTEM	17-2
PRIMARY DRIVE GEAR	9-18	IMMOBILIZER SYSTEM (HISS)	20-2
PROPORTIONAL CONTROL VALVE.....	15-31	SYSTEM FLOW PATTERN	6-2
RADIATOR	6-9	SYSTEM LOCATION	
RADIATOR COOLANT.....	3-15	FUEL SYSTEM (Programmed Fuel Injection)	5-6
RADIATOR RESERVE TANK	6-15	LIGHTS/METERS/SWITCHES	19-2
REAR BRAKE CALIPER.....	15-38	SYSTEM TESTING	6-6
REAR CARRIER.....	2-4	TACHOMETER	19-13
REAR FENDER	2-4	TAIL/BRAKE LIGHT	19-8
REAR FENDER B.....	2-6	THERMOSTAT	6-15
REAR MASTER CYLINDER	15-26	THROTTLE BODY.....	5-60
REAR WHEEL	14-6	THROTTLE OPERATION	3-5
REAR WHEEL/SUSPENSION SPECIFICATIONS.....	1-9	TP SENSOR	5-76
REGULATOR/RECTIFIER.....	16-7	TRANSMISSION	11-9
RETURN-LESS FUEL SUPPLY SYSTEM.....	22-2	TROUBLESHOOTING	
RIGHT CRANKCASE COVER INSTALLATION	9-19	ALTERNATOR/STARTER CLUTCH.....	10-3
RIGHT CRANKCASE COVER REMOVAL	9-6	BATTERY/CHARGING SYSTEM	16-4
SEAT	2-3	CLUTCH	9-5
SECONDARY AIR SUPPLY SYSTEM	3-16	COOLING SYSTEM	6-5
SECONDARY MASTER CYLINDER	15-24	CRANKCASE/TRANSMISSION	11-4
SERVICE INFORMATION		CRANKSHAFT/PISTON/CYLINDER	12-3
ALTERNATOR/STARTER CLUTCH	10-3	CYLINDER HEAD/VALVES	8-5
BATTERY/CHARGING SYSTEM.....	16-3	ELECTRIC STARTER/STARTER CLUTCH.....	18-4
CLUTCH	9-3	FRAME/BODY PANELS/EXHAUST SYSTEM.....	2-2
COOLING SYSTEM.....	6-3	FRONT WHEEL/SUSPENSION/STEERING	13-5
CRANKCASE/TRANSMISSION	11-3	FUEL SYSTEM (Programmed Fuel Injection)	5-5
CRANKSHAFT/PISTON/CYLINDER.....	12-3	HYDRAULIC BRAKE	15-6
CYLINDER HEAD/VALVES.....	8-3	IGNITION SYSTEM	17-4
ELECTRIC STARTER/STARTER CLUTCH	18-3	IMMOBILIZER SYSTEM (HISS)	20-9
ENGINE REMOVAL/INSTALLATION	7-3	LIGHTS/METERS/SWITCHES	19-4
FRAME/BODY PANELS/EXHAUST SYSTEM	2-2	LUBRICATION SYSTEM	4-4
FRONT WHEEL/SUSPENSION/STEERING	13-3	REAR WHEEL SUSPENSION.....	14-5
FUEL SYSTEM (Programmed Fuel Injection).....	5-3	TURN SIGNAL.....	19-6
HYDRAULIC BRAKE.....	15-4	TURN SIGNAL RELAY	19-24
IGNITION SYSTEM	17-3	UNDER COWL	2-7
IMMOBILIZER SYSTEM (HISS).....	20-3	UPPER COWL	2-10
LIGHTS/METERS/SWITCHES.....	19-3	UPPER COWL COVER.....	2-10
LUBRICATION SYSTEM	4-3	VALVE CLEARANCE	3-9
MAINTENANCE	3-2	VALVE GUIDE REPLACEMENT.....	8-17
REAR WHEEL SUSPENSION	14-3	VALVE SEAT INSPECTION/REFACING	8-17
SERVICE RULES	1-2	VARIABLE AIR INTAKE CONTROL VALVE.....	5-81
SHIFT FORK/SHIFT DRUM.....	11-6	WATER PUMP.....	6-18
SHOCK ABSORBER.....	14-12	WHEELS/TIRES	3-28
SIDE COVER	2-3	WINDSHIELD SCREEN	2-8
SIDE STAND	3-26	WIRING DIAGRAM	
SIDE STAND SWITCH.....	19-22	ED, E, F, G (English, French, Germany).....	21-3
SPARK PLUG	3-7	ED, E, F, G (Italian, Spanish, Dutch).....	21-4
SPEEDOMETER/VEHICLE SPEED SENSOR.....	19-11		