Paper Book Part No. 62MEW00

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the NT700V/VA.

Follow the Maintenance Schedule (Section 4) 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 4 apply to the whole motorcycle. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 5 through 23 describe parts of the motorcycle, grouped according to location.

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

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

If you are not familiar with this motorcycle, read Technical Feature in Section 2.

If you don't know the source of the trouble, go to section 25 Troubleshooting.

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

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

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

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

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

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

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

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. Honda Motor Co., Ltd. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATSOEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON Honda MOTORCYCLES, MOTOR SCOOTERS OR ATVS.

Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

CONTENTS

	GENERAL INFORMATION	1
	TECHNICAL FEATURE	2
	FRAME/BODY PANELS/EXHAUST SYSTEM	3
	MAINTENANCE	4
ENGINE AND DRIVE TRAIN	LUBRICATION SYSTEM	5
	FUEL SYSTEM (PGM-FI)	6
	COOLING SYSTEM	7
	ENGINE REMOVAL/INSTALLATION	8
	CYLINDER HEAD/VALVES	9
	CYLINDER/PISTON	10
	CLUTCH/GEARSHIFT LINKAGE	11
	ALTERNATOR/STARTER CLUTCH	12
	CRANKCASE/TRANSMISSION/CRANKSHAFT	13
	FINAL DRIVE	14
CHASSIS	FRONT WHEEL/SUSPENSION/STEERING	15
	REAR WHEEL/SUSPENSION	16
	HYDRAULIC BRAKE	17
	ANTI-LOCK BRAKE SYSTEM (ABS)	18
ELECTRICAL	BATTERY/CHARGING SYSTEM	19
	IGNITION SYSTEM	20
	ELECTRIC STARTER	21
	LIGHTS/METERS/SWITCHES	22
	IMMOBILIZER SYSTEM (HISS)	23
	WIRING DIAGRAMS	24
	TROUBLESHOOTING	25
	INDEX	26

Date of Issue: November, 2005
© Honda Motor Co., Ltd.

TYPE CODE

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

CODE	AREA TYPE
ED	EUROPEAN DIRECT SALES (Netherlands, Spain, Germany, Belgium, Portugal, Italy, Switzerland, Austria)
E	U.K. (Ireland)
F	France
U	Australia

A Few Words About Safety

Service Information

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

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

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

For Your Customer's Safety

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

⚠WARNING

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

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

For Your Safety

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

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

⚠WARNING

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

Follow the procedures and precautions in this manual carefully.

Important Safety Precautions

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

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

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

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

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

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

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

1

SERVICE RULES 1-2

MODEL IDENTIFICATION 1-3

GENERAL SPECIFICATIONS 1-5

LUBRICATION SYSTEM SPECIFICATIONS 1-7

FUEL SYSTEM (PGM-FI) SPECIFICATIONS 1-7

COOLING SYSTEM SPECIFICATIONS 1-7

CYLINDER HEAD/VALVE SPECIFICATIONS 1-8

CYLINDER/PISTON SPECIFICATIONS 1-8

CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS 1-9

ALTERNATOR/STARTER CLUTCH SPECIFICATIONS 1-9

CRANKSHAFT/TRANSMISSION SPECIFICATIONS 1-10

FINAL DRIVE SPECIFICATIONS 1-10

FRONT WHEEL/SUSPENSION/ STEERING SPECIFICATIONS 1-11

REAR WHEEL/SUSPENSION SPECIFICATIONS 1-11

HYDRAULIC BRAKE SPECIFICATIONS 1-11

BATTERY/CHARGING SYSTEM SPECIFICATIONS 1-12

IGNITION SYSTEM SPECIFICATIONS 1-12

ELECTRIC STARTER SPECIFICATIONS 1-12

LIGHTS/METERS/SWITCHES SPECIFICATIONS 1-12

STANDARD TORQUE VALUES 1-13

ENGINE & FRAME TORQUE VALUES 1-13

LUBRICATION & SEAL POINTS 1-18

CABLE & HARNESS ROUTING (NT700VA) 1-20

CABLE & HARNESS ROUTING (NT700V) 1-35

EMISSION CONTROL SYSTEMS 1-50

SERVICE RULES

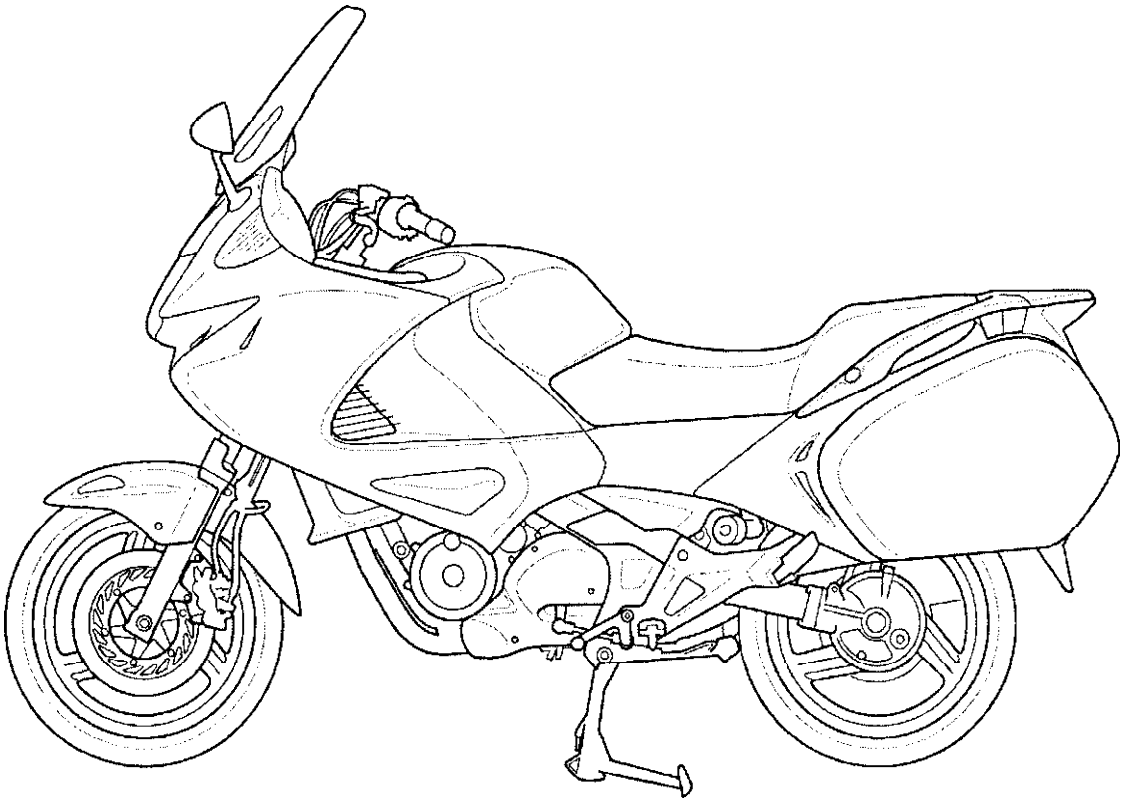
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 shown in the Cable and Harness Routing (page 1-35).

ABBREVIATION

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

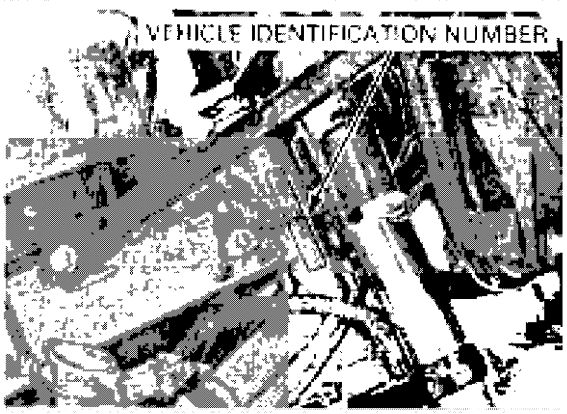
Abbrev. term	Full term
PGM-FI	Programmed Fuel Injection
MAP sensor	Manifold Absolute Pressure sensor
TP sensor	Throttle Position sensor
ECT sensor	Engine Coolant Temperature sensor
IAT sensor	Intake Air Temperature sensor
CKP sensor	Crankshaft Position sensor
CMP sensor	Camshaft Position sensor
VS sensor	Vehicle Speed sensor
IACV	Idle Air Control Valve
ECM	Engine Control Module
EEPROM	Electrically Erasable Programmable Read Only Memory
DLC	Data Link Connector
SCS connector	Service Check Short connector
HDS	Honda Diagnostic System
DTC	Diagnostic Trouble Code
MIL	Malfunction Indicator Lamp
FP	Fuel Pump
PAIR	Pulsed Secondary Air Injection
ABS	Anti-lock Brake System
HISS	Honda Ignition Security System

MODEL IDENTIFICATION

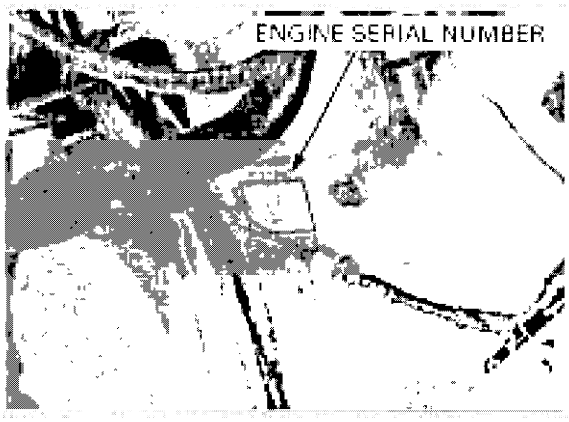


SERIAL NUMBERS

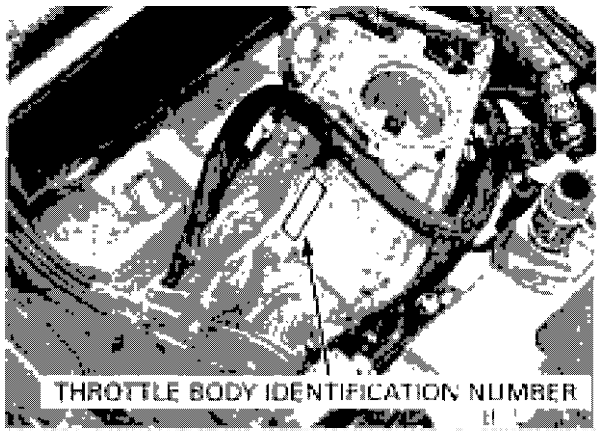
The Vehicle Identification Number (V.I.N) is stamped on the right side of the steering head.



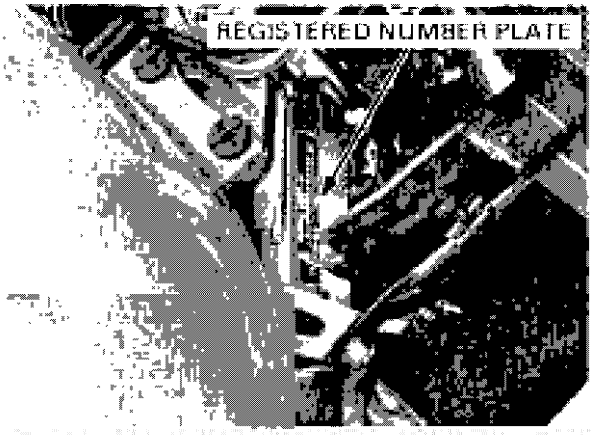
The engine serial number is stamped on the right side of the crankcase.



The throttle body identification number is stamped on the throttle drum side of the throttle body.

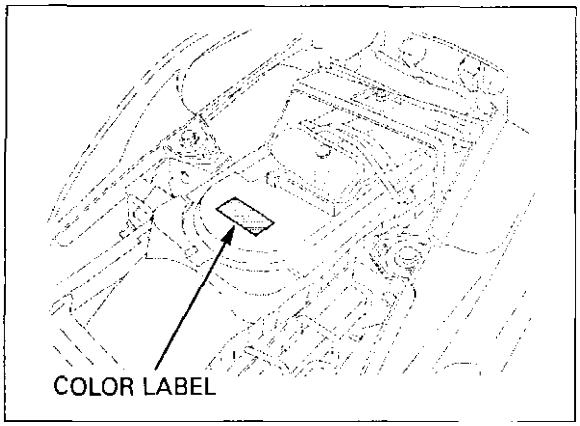


The registered number plate is attached on the right side of the frame.



LABELS

The color label is attached on the rear fender. When ordering color-coded parts, always specify the designated color code.



GENERAL SPECIFICATIONS

ITEM			SPECIFICATIONS
DIMENSION	Overall length		2,215 mm (87.2 in)
	Overall width		805 mm (31.7 in)
	Overall height (Windscreen high position)		1,480 mm (58.2 in)
	Overall height (Windscreen low position)		1,320 mm (52.0 in)
	Wheelbase		1,475 mm (58.1 in)
	Seat height		805 mm (31.6 in)
	Footpeg height		322 mm (12.7 in)
	Ground clearance		160 mm (6.3 in)
	Curb weight (NT700V)		254 kg (560 lbs)
	Curb weight (NT700VA)		257 kg (567 lbs)
	Maximum weight capacity		197 kg (434 lbs)
FRAME	Frame type		Diamond
	Front suspension		Telescopic fork
	Front axle travel		115 mm (4.5 in)
	Rear suspension		Swingarm
	Rear axle travel		123 mm (4.8 in)
	Front tire size		120/70ZR17M/C (58W)
	Rear tire size		150/70ZR17M/C (69W)
	Tire brand	Michelin	Front: MACADAM90XB/ Rear: MACADAM90XB
		Bridgestone	Front: BT020F RADIAL J/ Rear: BT020R RADIAL U
	Front brake		Hydraulic double disc
	Rear brake		Hydraulic single disc
	Caster angle		28° 50'
	Trail length		115 mm (4.5 in)
	Fuel tank capacity		19.7 liters (5.2 US gal, 4.3 Imp gal)
ENGINE	Cylinder arrangement		2 cylinders 52° V transverse
	Bore and stroke		81.0 x 66.0 mm (3.19 x 2.60 in)
	Displacement		680.2 cm^3 (41.6 cu-in)
	Compression ratio		10.0 : 1
	Valve train		Silent cam chain driven, OHC
	Intake valve	opens	10° BTDC (at 1 mm lift)
		closes	30° ABDC (at 1 mm lift)
	Exhaust valve	opens	35° BBDC (at 1 mm lift)
		closes	5° ATDC (at 1 mm lift)
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Net and viscous paper element
	Engine dry weight		65.2 kg (144 lbs)
	Firing order		Front - 232° - Rear - 488° - Front
	Cylinder number		Front: #2/Rear: #1
FUEL DELIVERY SYSTEM	Type		PGM-FI (Programmed Fuel Injection)
	Throttle bore		40 mm (1.6 in)
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Cable operating
	Transmission		Constant mesh, 5-speeds
	Primary reduction		1.763 (67/38)
	Secondary reduction		0.939 (31/33)
	Third reduction (Output drive reduction)		1.059 (18/17)
	Final reduction		3.090 (34/11)
	Gear ratio	1st	2.571 (36/14)
		2nd	1.688 (27/16)
		3rd	1.300 (26/20)
		4th	1.074 (29/27)
		5th	0.955 (21/22)
	Gearshift pattern		Left foot operated return system, 1 - N - 2 - 3 - 4 - 5

ITEM		SPECIFICATIONS
ELECTRICAL	Ignition system	Full transistorized ignition
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted/triple phase full-wave rectification
	Lighting system	Battery

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.6 liters (2.75 US qt, 2.29 Imp qt)	–
	After draining/filter change	2.8 liters (2.96 US qt, 2.46 Imp qt)	–
	After disassembly	3.2 liters (3.38 US qt, 2.82 Imp qt)	–
Recommended engine oil		Suggested oil: Honda "4-stroke motorcycle oil" or an equivalent Oil recommendation: API classification SG or higher (except oils labeled as energy conserving on the circular API service label) Viscosity: SAE 10W-30 JASO T 903 standard: MA	–
Oil pressure at oil pressure switch		568 kPa (5.8 kgf/cm^2, 82 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 – 0.08 (0.001 – 0.003)	0.10 (0.004)

FUEL SYSTEM (PGM-FI) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ66A
Idle speed	1,200 ± 100 min^{-1} (rpm)
Throttle grip free play	2 – 6 mm (1/12 – 1/4 in)
IAT sensor resistance (at 20 °C/68 °F)	1 – 4 kΩ
ECT sensor resistance (at 20 °C/68 °F)	2.32 – 2.59 kΩ
Fuel injector resistance (at 20 °C/68 °F)	10.0 – 14.0 Ω
CMP sensor peak voltage (at 20 °C/68 °F)	0.7 V minimum
CKP sensor peak voltage (at 20 °C/68 °F)	0.7 V minimum
Fuel pressure at idle	343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12V)	200 cm^3 (6.8 US oz, 7.0 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.88 liters (1.99 US qt, 1.65 Imp qt)
	Reserve tank	0.4 liter(0.42 US qt, 0.35 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum at 95 °C (203 °F)
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		1:1 mixture with distilled water

CYLINDER HEAD/VALVE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 min^{-1} (rpm)			1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm^2, 199 ± 14 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Camshaft	Cam lobe height	IN	40.609 – 40.769 (1.5988 – 1.6051)	40.58 (1.598)
		EX	40.695 – 40.855 (1.6022 – 1.6085)	40.67 (1.601)
	Runout		–	0.05 (0.002)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN	11.983 – 11.994 (0.4718 – 0.4722)	11.92 (0.469)
		EX	11.983 – 11.994 (0.4718 – 0.4722)	11.92 (0.469)
	Rocker arm I.D.	IN/EX	12.006 – 12.024 (0.4726 – 0.4734)	12.05 (0.474)
	Rocker arm-to-shaft clearance		0.012 – 0.041 (0.0008 – 0.0016)	0.14 (0.006)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.460 (0.2150)
		EX	5.460 – 5.475 (0.2150 – 0.2156)	5.455 (0.2148)
	Valve guide I.D.	IN/EX	5.500 – 5.512 (0.2165 – 0.2170)	5.54 (0.218)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX	0.025 – 0.052 (0.0009 – 0.0020)	0.09 (0.004)
	Valve guide projection above cylinder head	IN	12.5 – 12.7 (0.49 – 0.50)	–
		EX	16.7 – 16.9 (0.66 – 0.67)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring	Free length	IN/EX	44.91 (1.768)	43.9 (1.73)
Cylinder head warpage			–	0.10 (0.004)

CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		81.000 – 81.015 (3.1890 – 3.1896)	81.10 (3.193)
	Out of round		–	0.06 (0.002)
	Taper		–	0.06 (0.002)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston rings	Piston O.D. at 15 mm (0.59 in) from bottom		80.970 – 80.990 (3.1878 – 3.1886)	80.91 (3.185)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7089)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.010 – 0.045 (0.0004 – 0.0018)	0.065 (0.0026)
		Second	0.010 – 0.045 (0.0004 – 0.0018)	0.065 (0.0026)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.037 (0.7093 – 0.7101)	18.047 (0.7105)
Connecting rod-to-piston pin clearance			0.016 – 0.043 (0.0006 – 0.0017)	0.06 (0.002)

CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever free play			10 – 20 (3/8 – 3/4)	–
Clutch	Spring free length		43.2 (1.70)	41.7 (1.64)
	Disc thickness	Disc A	2.692 – 2.708 (0.1060 – 0.1066)	2.3 (0.09)
		Disc B	2.920 – 3.080 (0.1150 – 0.1213)	2.6 (0.10)
		Disc C	2.692 – 2.708 (0.1060 – 0.1066)	2.3 (0.09)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide		I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
		O.D.	31.959 – 31.975 (1.2582 – 1.2588)	31.92 (1.257)
Mainshaft O.D. at clutch outer guide			21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)
Clutch outer guide-to-mainshaft clearance			0.011 – 0.049 (0.0004 – 0.0019)	0.08 (0.003)
Clutch outer I.D.			32.000 – 32.025 (1.2598 – 1.2608)	32.09 (1.263)
Clutch outer-to-outer guide clearance			0.025 – 0.066 (0.0010 – 0.0026)	0.18 (0.007)
Oil pump drive sprocket I.D.			32.025 – 32.145 (1.2608 – 1.2655)	32.16 (1.266)
Oil pump drive sprocket-to-clutch outer guide clearance			0.066 – 0.170 (0.0026 – 0.0067)	0.23 (0.009)

ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.414 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)

CRANKSHAFT/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)
	Crankshaft runout		–	0.03 (0.001)
	Main journal O.D.		52.976 – 52.994 (2.0857 – 2.0864)	52.976 (2.0857)
Main journal I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)
Shift fork, fork shaft	I.D.		13.000 – 13.018 (0.5118 – 0.5125)	13.03 (0.513)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D.			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)
Shift drum journal I.D.			12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Shift drum-to-shift drum journal clearance			0.016 – 0.042 (0.0006 – 0.0017)	0.09 (0.035)
Transmission	Gear I.D.	M3	28.020 – 28.041 (1.1031 – 1.1040)	28.06 (1.105)
		M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C4	31.000 – 31.025 (1.2204 – 1.2215)	31.05 (1.222)
		C2	27.991 – 28.012 (1.1020 – 1.1070)	28.030 (1.1035)
	Gear busing O.D.	M3	27.979 – 28.000 (1.1015 – 1.1024)	27.960 (1.1008)
		M5	27.959 – 27.980 (1.1007 – 1.1016)	27.940 (1.1000)
		C1, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)
		C1, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.985)
	Mainshaft O.D.	at M3	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	at C2	23.971 – 23.984 (0.9437 – 0.9443)	23.950 (0.9429)
	Bushing-to-shaft clearance	M3	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)
Output drive train	Output gear I.D.		24.000 – 24.021 (0.9449 – 0.9457)	24.04 (0.946)
	Output gear bushing	O.D.	23.959 – 23.980 (0.9433 – 0.9441)	23.70 (0.933)
		I.D.	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
	Output drive gear shaft O.D.		19.979 – 20.000 (0.7866 – 0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020 – 0.042 (0.0008 – 0.0016)	0.08 (0.003)
	Output gear damper spring free length		66.9 (2.63)	63 (2.48)
	Output drive gear backlash		0.08 – 0.23 (0.003 – 0.009)	0.40 (0.016)
	Backlash difference between measurements		–	0.10 (0.004)

FINAL DRIVE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	After draining	130 cm^3 (4.3 US oz, 4.5 Imp oz)	–
	After disassembly	150 cm^3 (5.1 US oz, 5.3 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurements		–	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–
Final drive gear assembly preload		0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·ft)	–

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm², 36 psi)	–
	Driver and passenger	250 kPa (2.50 kgf/cm², 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	426.1 (16.78)	417.6 (16.44)
	Tube runout	–	0.20 (0.008)
	Recommended fork fluid	Honda ULTRA CUSHION OIL 10W or equivalent	–
	Fluid level	124 (4.9)	–
	Fluid capacity	464 ± 2.5 cm³ (15.7 ± 0.08 US oz, 16.3 ± 0.09 Imp oz)	–
Steering head bearing preload		8.3 – 13.5 N (0.8 – 1.4 kgf)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm², 42 psi)	–
	Driver and passenger	290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.
Shock absorber spring preload adjuster setting		8 position from full out	–

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Specified brake fluid			DOT 4	–
Front	Brake disc thickness		4.3 – 4.7 (0.17 – 0.19)	3.5 (0.14)
	Brake disc warpage		–	0.30 (0.012)
	Master cylinder I.D.		12.700 – 12.743 (0.4724 – 0.5016)	12.755 (0.5022)
	Master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Right caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Center	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Left caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Center	25.400 – 25.450 (1.0000 – 1.0020)	25.462 (1.0024)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Right caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
	Left caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Center	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
		Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
Rear	Brake disc thickness		5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc warpage		–	0.30 (0.012)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.		32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2633)
	Caliper piston O.D.		31.948 – 31.998 (1.2578 – 1.2594)	31.940 (1.2575)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 14 Ah
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		452 kW/5,000 min^{-1} (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	CPR8EA-9 (NGK)
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage		100 V minimum
CKP sensor 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 (0.47)	6.5 (0.26)

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (High)	12 V – 55 W
	Headlight (Low)	12 V – 55 W
	Position light	12 V – 5 W
	Brake/taillight	12 V – 21/5 W x 2
	License light	12 V – 5 W
	Front turn signal light	12 V – 21 W x 2
	Rear turn signal light	12V – 21 W x 2
	Instrument light	LED x 14
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	Immobilizer indicator	LED
Fuse (NT700V)	Main fuse	30 A
	Sub fuse	20 A x 3, 10 A x 5
Fuse (NT700VA)	Main fuse	30 A
	Sub fuse	30 A x 2, 20 A x 3, 10 A x 6

STANDARD TORQUE VALUES

FASTENER TYPE	N·m (kgf·m, lbf·ft)	FASTENER TYPE	N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5.2 (0.5, 3.8)	5 mm screw	4.2 (0.4, 3.2)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9.0 (0.9, 6.6)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm hex bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	27 (2.8, 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.

ENGINE

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Left crankcase rear cover bolt	1	6	13 (1.3, 9)	CT bolt

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	2	10	16 (1.6, 12)	
Timing hole cap	1	14	10 (1.0, 7)	Apply engine oil to the threads and flange surface
Crankshaft hole cap	1	30	15 (1.5, 11)	Apply engine oil to the threads and flange surface
Valve adjusting screw lock nut	8	7	23 (2.3, 17)	Apply engine oil to the threads and flange surface
Engine oil filter cartridge	1	20	26 (2.7, 20)	
Engine oil drain bolt	1	14	30 (3.1, 22)	

LUBRICATION SYSTEM

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)	Apply sealant to the threads
Oil pressure switch terminal screw	1	4	1.9 (0.2, 1.4)	
Oil cooler bolt	1	20	64 (6.5, 47)	Apply engine oil to the threads
Oil pump assembly bolt	3	6	13 (1.3, 9)	CT bolt

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ECT sensor	1	12	24.5 (2.5, 18)	
Throttle body clamp screw	1	5	2.1 (0.2, 1.5)	
IACV screw	3	5	3.4 (0.3, 2.5)	
Set plate torx screw	2	5	2.1 (0.2, 1.5)	
Throttle cable guide screw	2	5	3.4 (0.3, 2.5)	
Fuel injector mounting bolt	4	5	5.4 (0.6, 4.0)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump cover bolt	5	6	13 (1.3, 9)	CT bolt

CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	8	6	10 (1.0, 7)	
Cylinder head bolt	4	8	23 (2.3, 17)	Apply engine oil to the threads and flange surface
Cylinder head nut	8	10	40 (4.1, 30)	Apply engine oil to the threads and flange surface
Cam sprocket bolt	4	7	23 (2.3, 17)	Apply a locking agent
Cam chain tensioner bolt	4	6	10 (1.0, 7)	
Camshaft holder bolt	12	8	23 (2.3, 17)	Apply engine oil to the threads and flange surface
Reed valve cover bolt	4	5	5.2 (0.5, 3.7)	CT bolt
Cylinder head sealing bolt	2	18	44 (4.5, 32)	Apply a locking agent

CYLINDER/PISTON

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

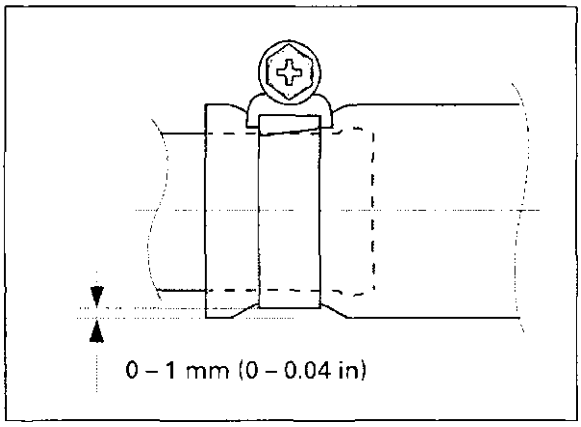
CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lifter plate bolt	4	6	12 (1.2, 9)	
Clutch center lock nut	1	18	128 (13.1, 95)	Apply engine oil to the threads and flange surface Stake
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Apply a locking agent
Primary drive gear bolt	1	12	88 (9.0, 65)	Apply engine oil to the threads and flange surface
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel bolt	1	12	157 (16.0, 116)	Left hand threads Replace with a new one
Stator socket bolt	4	6	12 (1.2, 9)	Apply a locking agent
Starter one-way clutch outer torx bolt	6	8	30 (3.1, 22)	Apply a locking agent
Stator wire holder socket bolt	1	6	12 (1.2, 9)	Apply a locking agent

WATER HOSE BAND SCREW:



CRANKSHAFT/TRANSMISSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankcase bolt, 8 mm	13	8	23 (2.3, 17)	
Crankcase bolt, 6 mm	5	6	12 (1.2, 9)	
Crank pin bearing cap nut	4	9	42 (4.3, 31)	Apply engine oil to the threads and flange surface
Output gear case mounting bolt	3	8	31 (3.2, 23)	Apply sealant to the threads
Output drive gear bearing holder bolt	2	8	31 (3.2, 23)	Apply engine oil to the threads and flange surface
Output driven gear bearing holder socket bolt	4	8	31 (3.2, 23)	Apply engine oil to the threads and flange surface
Output drive gear bearing lock nut (inner)	1	30	73 (7.4, 54)	Apply engine oil to the threads and flange surface Stake
(outer)	1	64	98 (10.0, 72)	Apply engine oil to the threads and flange surface Stake
Output driven gear bearing lock nut (inner)	1	30	137 (14.0, 101)	Apply engine oil to the threads and flange surface Stake
(outer)	1	64	98 (10.0, 72)	Apply engine oil to the threads and flange surface Stake
Output drive gear shaft bolt	1	10	49 (5.0, 36)	Apply engine oil to the threads
Oil seal stopper plate bolt	1	6	13 (1.3, 9)	CT bolt

ELECTRIC STARTER/STARTER CLUTCH

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

LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Neutral switch	1	10	12 (1.2, 9)	

FRAME

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Upper cowl stay flange bolt	2	10	49 (5.0, 36)	
Seat rail upper flange bolt	2	12	59 (6.0, 44)	
Seat rail lower flange bolt	2	12	59 (6.0, 44)	
Rear fender bolt (upper/lower)	4	6	12 (1.2, 9)	
Rear fender bolt (side)	2	6	7.0 (0.7, 5.2)	
Exhaust pipe joint nut	4	8	25 (2.5, 18)	
Muffler band bolt	2	8	17 (1.7, 13)	
Main stand pivot bolt	1	6	12 (1.2, 9)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Final drive oil filler cap	1	30	12 (1.2, 9)	

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel pump mounting nut	6	6	12 (1.2, 9)	
Fuel filler cap	1	4	1.8 (0.2, 1.3)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Thermostat housing cover bolt	2	6	9.8 (1.0, 7)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine hanger bolt (Front low; A)	2	10	39 (4.0, 29)	
Engine hanger cross plate bolt	2	8	27 (2.8, 20)	
Engine hanger cross plate nut	2	8	27 (2.8, 20)	
Engine hanger bolt (Rear up; C)	1	10	39 (4.0 29)	Apply engine oil to the threads and flange surface
Engine hanger bolt (Rear low; D)	1	10	39 (4.0 29)	Apply engine oil to the threads and flange surface

CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Gearshift pedal pivot bolt	1	8	27 (2.8, 20)	

FINAL DRIVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Pinion retainer	1	64	108 (11.0, 80)	
Pinion retainer lock plate bolt	1	6	10 (1.0, 7)	
Pinion joint nut	1	16	108 (11.0, 80)	Apply a locking agent
Dust guard plate bolt	1	6	10 (1.0, 7)	
Gear case cover bolt	2	10	47 (4.8, 35)	Apply a locking agent
Gear case cover bolt	6	8	25 (2.6, 19)	
Final gear case assembly mounting nut	4	10	64 (6.5, 47)	UBS nut
Final gear case stud bolt	4	10	–	page 14-22

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Clutch lever pivot nut	1	6	5.9 (0.6, 4.3)	
Handlebar holder bolt	4	8	27 (2.8, 20)	
Front axle	1	14	59 (6.0, 44)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Front brake disc bolt	12	8	42 (4.3, 31)	ALOC bolt; replace with a new one
Fork center socket bolt	2	10	20 (2.0, 15)	Apply a locking agent
Fork cap	2	36	22 (2.2, 16)	
Fork top bridge pinch bolt	2	8	23 (2.3, 17)	
Fork bottom bridge pinch bolt	2	10	39 (4.0, 29)	
Steering top thread	1	26	page 15-30	
Steering top thread lock nut	1	26	page 15-30	
Steering stem nut	1	24	103 (10.5, 76)	

REAR WHEEL/BRAKE/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	18	89 (9.1, 66)	U-nut
Rear axle pinch bolt	1	8	32 (3.3, 24)	
Rear shock absorber upper mounting bolt	1	10	44 (4.5, 32)	U-nut
Rear shock absorber lower mounting bolt	1	10	44 (4.5, 32)	U-nut
Swingarm pivot nut	1	18	127 (13, 74)	U-nut
Rear brake disc bolt	8	6	42 (4.3, 31)	ALOC bolt; replace with a new one
Stopper plate bolt	5	6	20 (2.0, 15)	ALOC bolt; replace with a new one

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake caliper bleed valve	4	8	5.4 (0.6, 4.0)	
Front master cylinder reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Brake pad pin	3	10	17.2 (1.8, 13)	
Brake hose oil bolt	6	10	34 (3.5, 25)	
Brake pipe nut	7	10	17 (1.7, 13)	Apply brake fluid to the threads
Front brake hose clamper bolt	1	6	12 (1.2, 9)	
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Brake lever pivot nut	1	6	6.0 (0.6, 4.4)	
Front brake light switch screw	1	4	1.2 (0.1, 0.9)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake caliper bracket pin	2	8	12 (1.2, 9)	Apply a locking agent
Rear master cylinder holder bolt	2	6	12 (1.2, 9)	ALOC bolt; replace with a new one
Rear brake reservoir joint screw	1	4	1.5 (0.2, 1.1)	Apply a locking agent
Rear master cylinder lower joint lock nut	1	8	17.2 (1.8, 1.3)	
Front brake caliper pin	2	8	22 (2.2, 16)	Apply a locking agent
Front brake caliper mounting bolt	4	8	31 (3.2, 23)	ALOC bolt; replace with a new one
Rear brake caliper bracket pin	1	8	22 (2.2, 16)	Apply a locking agent
Rear brake caliper pin	1	12	27 (2.8, 20)	
Rear brake caliper stopper bolt	1	18	89 (9.1, 66)	
Proportional control valve mounting bolt	2	6	12 (1.2, 9)	

ABS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Modulator stay bolt	3	6	12 (1.2, 9)	ALOC bolt; replace with a new one
Pulser ring bolt	6	5	7.0 (0.7, 5.2)	

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)	
Ignition switch mounting bolt	2	8	24 (2.4, 18)	

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 lock nut	1	10	29 (3.0, 22)	
Step holder bolt	4	8	27 (2.8, 20)	

LUBRICATION & SEAL POINTS

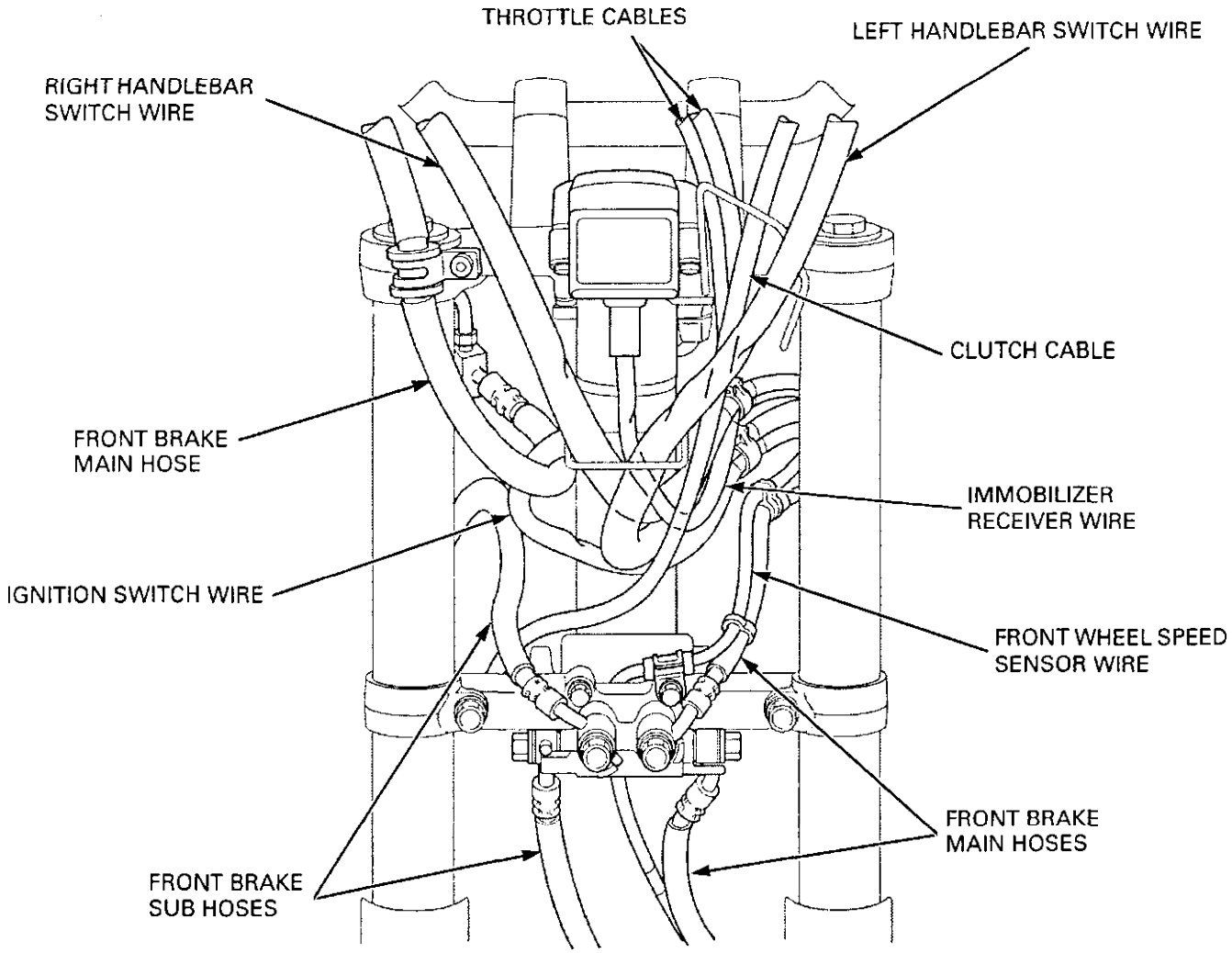
ENGINE

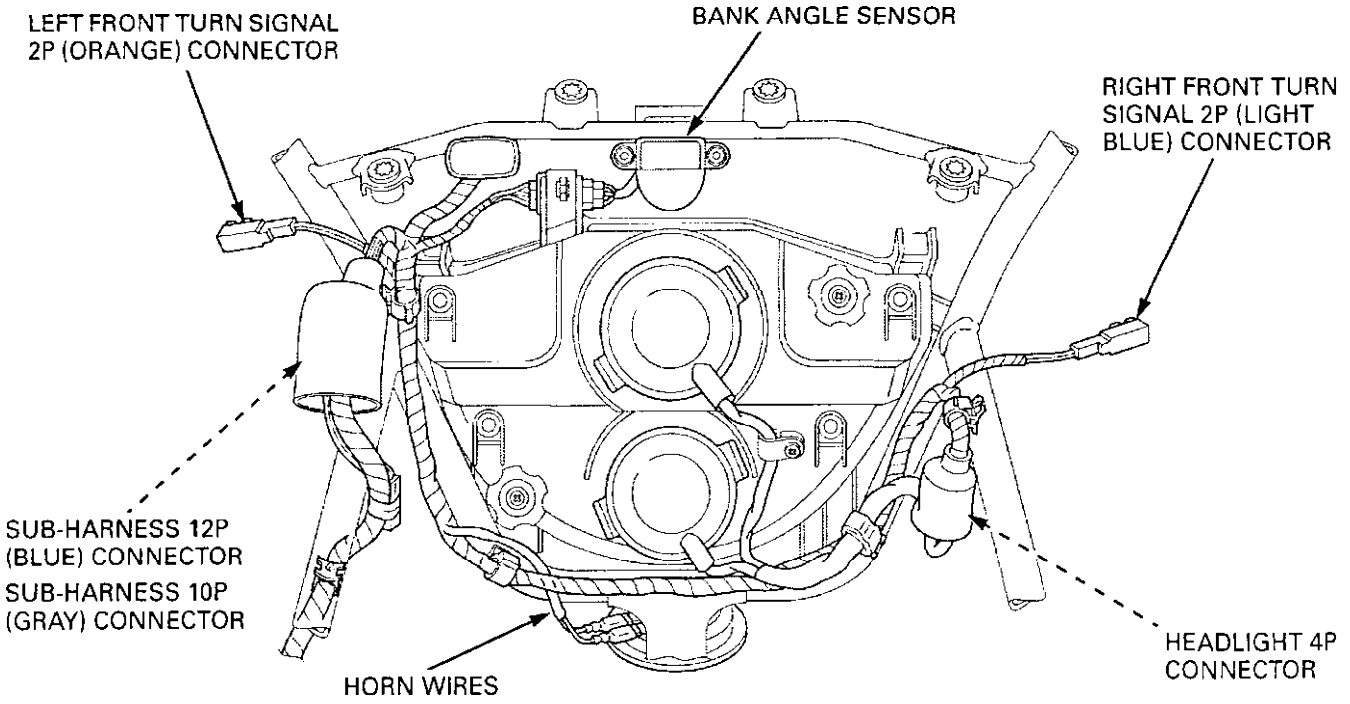
MATERIAL	LOCATION	REMARKS
Molybdenum disulfide oil	Camshaft lobes/journals Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Crankpin bearing surface Crankshaft journals Clutch outer guide outer surface Transmission gear shift fork groove Transmission bushing inner and outer surface Transmission spline bushing outer surface Connecting rod small end inner surface	
Engine oil	Piston outer surface Piston ring outer surface Piston pin outer surface Primary drive gear bolt threads and seating surface Flywheel bolt threads and seating surface Starter one-way clutch sprag Starter idle and reduction gear shaft outer surface Clutch center lock nut threads Clutch lifer arm-to-right crankcase cover sliding surface Clutch lifer piece-to-right crankcase cover sliding surface Clutch disc outer surface Cylinder stud bolt threads Cylinder head 8 mm bolt threads and seating surface Valve adjusting screw lock nut threads and seating surface Connecting rod bolt/nut threads and seating surface Cylinder head mounting bolt and nut seating surface Transmission gear tooth Oil cooler bolt threads Oil filter cartridge threads and O-ring Each bearings rotating area Each O-rings	
Multi-purpose grease	Crankshaft hole cap threads Timing hole cap threads Each oil seal lips	
Sealant (Three Bond 1207B or equivalent)	Oil pressure switch threads Right and left crankcase mating surface Right crankcase cover mating surface Left crankcase cover mating surface Output gear case mounting bolt threads	Do not apply to the sealant to the head 3 – 4 mm (0.1 – 0.2 in). page 5-5 page 13-47 page 11-20 page 12-11
Sealant (Three Bond 1323B or 2415)	Left crankcase cover bolt threads	page 12-11
Locking agent	Cam sprocket bolt threads Starter one-way clutch outer bolt threads Oil pump driven sprocket bolt threads Final gear case stud bolt threads (gear case side) Stator wire holder socket bolt threads Gearshift stopper arm bolt threads Gearshift cam plate bolt threads Transmission bearing setting plate bolt threads Cam chain tensioner setting plate bolt threads Stator mounting bolt threads Cylinder head sealing bolt threads Left crankcase cover bolt threads (marked "△")	 Coating width: 6.5 ± 1 mm (0.26 ± 0.04 mm page 12-11

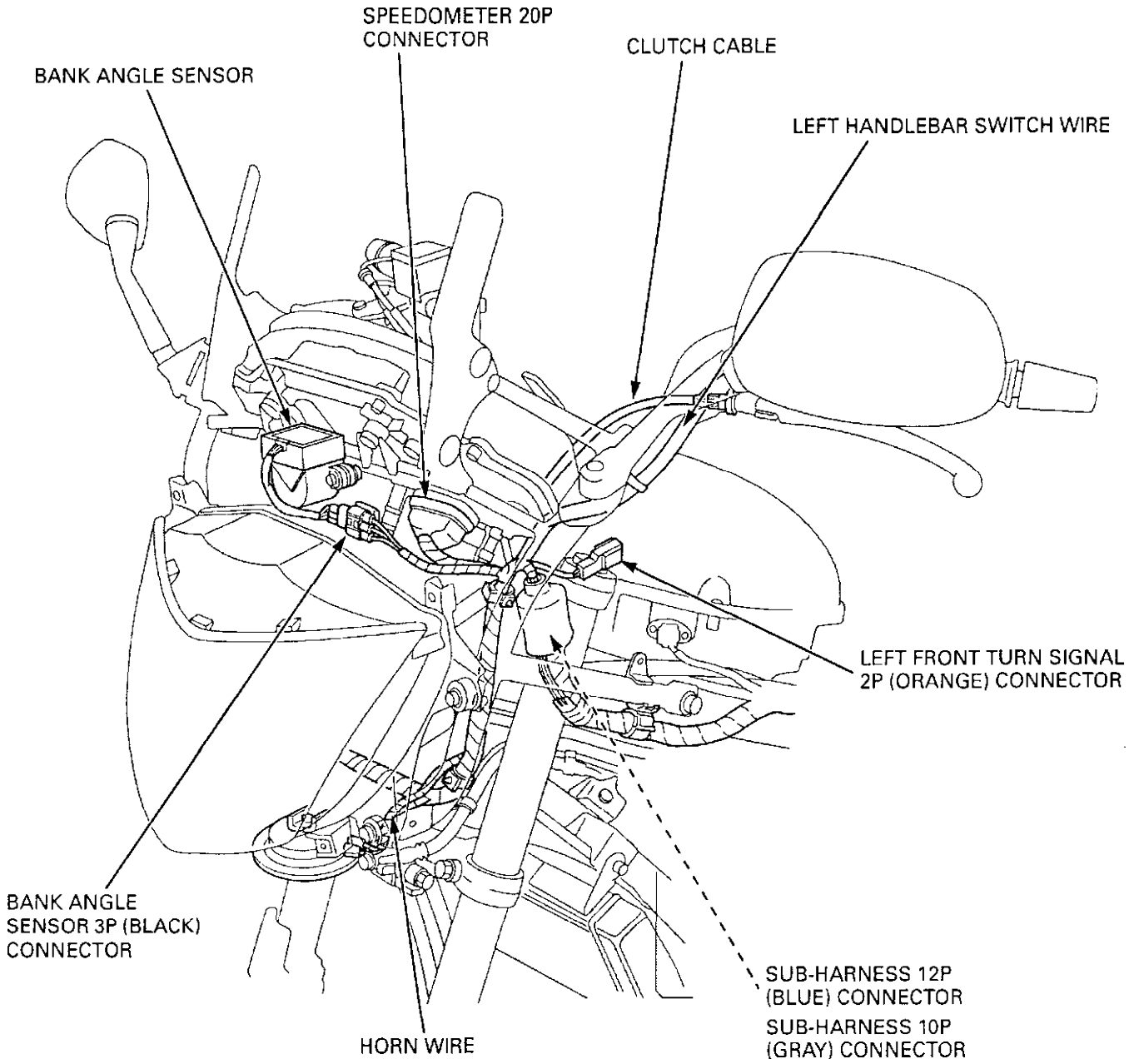
FRAME

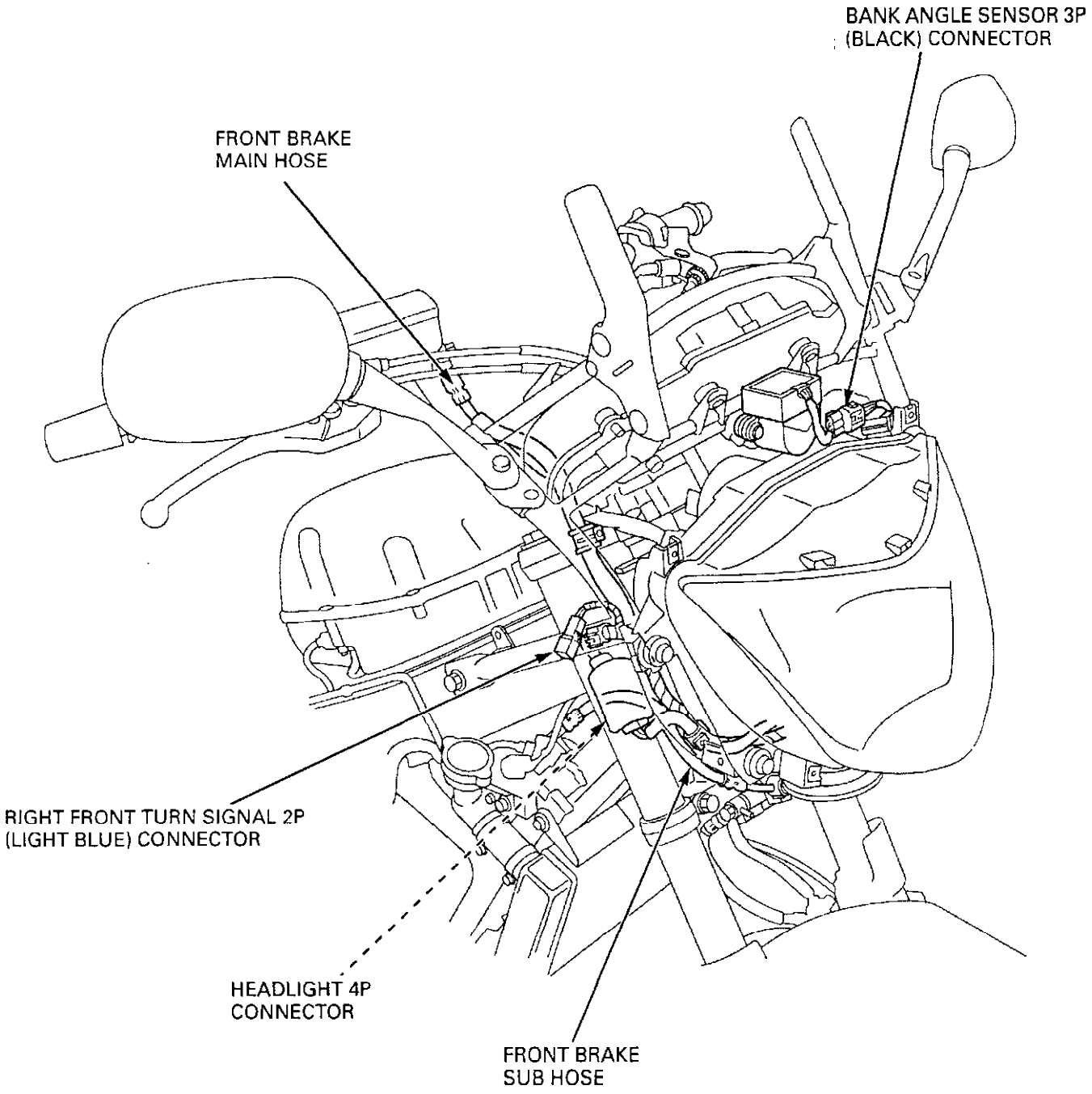
MATERIAL	LOCATION	REMARKS
Sealant	Final gear case cover mating surface	
	ECT sensor threads	Do not apply to the thread head.
Multi-purpose grease	Side stand pivot	Apply 1 g
	Throttle pipe flange and sliding surface	Spreading 0.2 – 0.3 g
	Clutch lever pivot	
	Gearshift pedal pivot thrust surface	
	Brake pedal pivot sliding surface	
	Front/rear wheel dust seal lips	
	Swingarm pivot dust seal lips	
	Swingarm pivot bearings	Apply 1.0 – 1.5 g for each bearing
	Final gear case O-ring	
	Final gear case oil seal lips	
Urea based multi-purpose grease with extreme pressure (Kyodo Yushi EXCELITE EP2, Shell stamina EP2 or equivalent)	Steering head bearings	Apply 3 – 5 g for each bearing
	Steering head bearing dust seal lips	
Molybdenum disulfide grease	Universal joint bearings	
	Drive shaft oil seal lip	Apply 0.5 g
	Drive shaft splines (universal joint side)	Apply 1 g
	Final drive pinion joint splines	Apply 2 g
Molybdenum disulfide paste	Final driven flange-to-rear wheel hub mating surface	Apply 0.5 – 1.0 g
	Output shaft splines (universal joint side)	Apply 1 g
	Final driven flange O-ring	
	Rear wheel hub O-ring groove	
	Ring gear O-ring groove and spline	Apply 4 – 5 g
	Final driven flange sliding portion	Apply 2 – 3 g
Cable lubricant	Throttle cable outer inside	
	Clutch cable outer inside	
	Choke cable outer inside	
Honda bond A or equivalent	Handlebar grip rubber inside	
Engine oil	Steering bearing top threads	
	Rear brake cam felt seal	
Silicone grease	Brake lever pivot	Apply 0.1 g
	Brake lever-to-master piston contacting area	Apply 0.1 g
	Brake caliper slide pin sliding surface	
	Brake caliper bracket pin sliding surface	
	Brake caliper and bracket pin boot inside	
DOT 4 brake fluid	Brake master piston and cups	
	Brake caliper piston and piston seals	
Honda ULTRA CUSHION OIL 10W or equivalent	Fork dust seal and oil seal lips	
	Fork cap O-ring	
Locking agent	Pinion joint nut threads	
	Final gear case cover 10 mm bolt threads	
	Fork center socket bolt threads	
	Brake caliper bracket pin threads	
	Brake caliper slide pin threads	
	Final gear case stud bolt threads	
	Steering stem cover bolt threads	

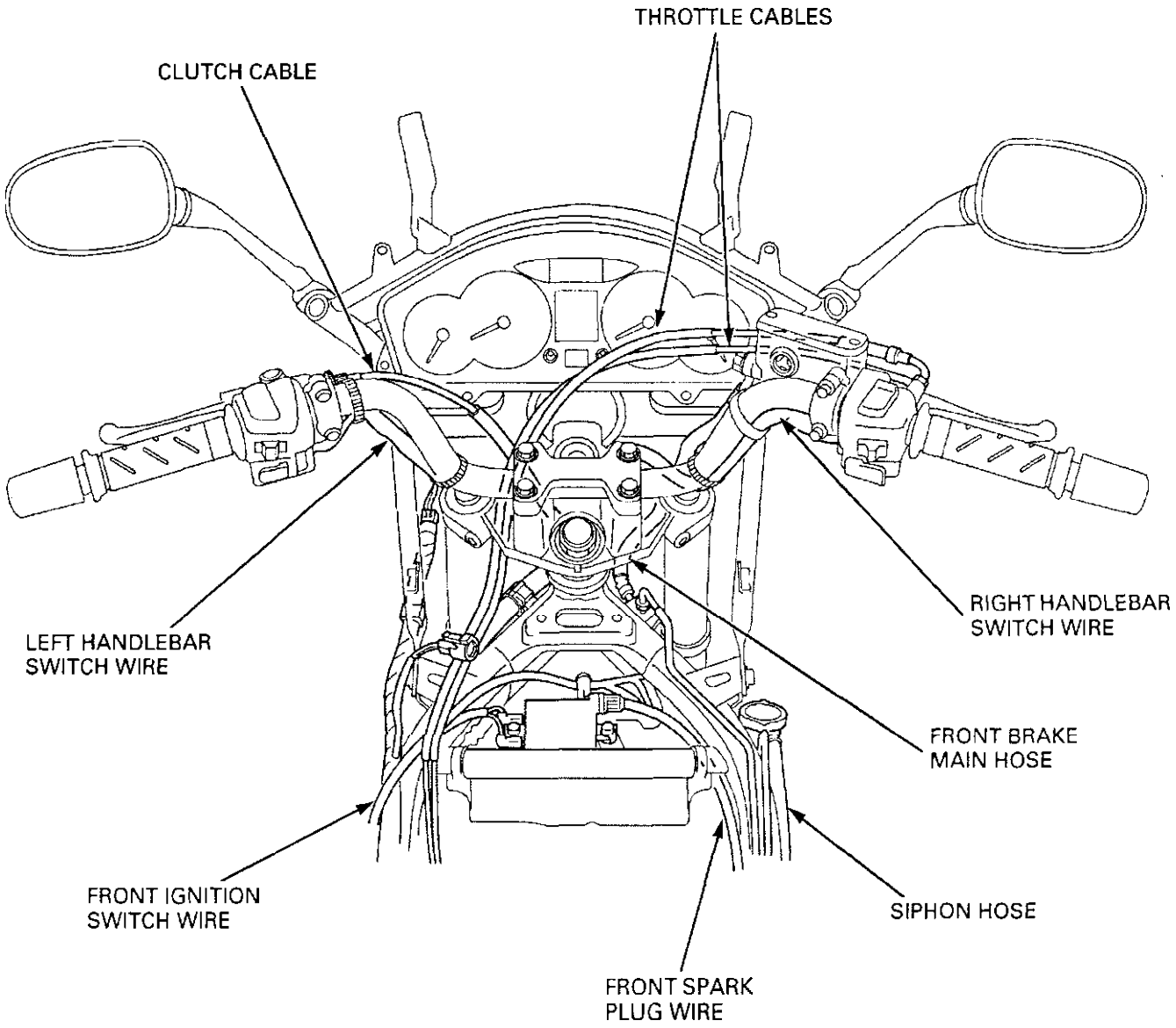
CABLE & HARNESS ROUTING (NT700VA)

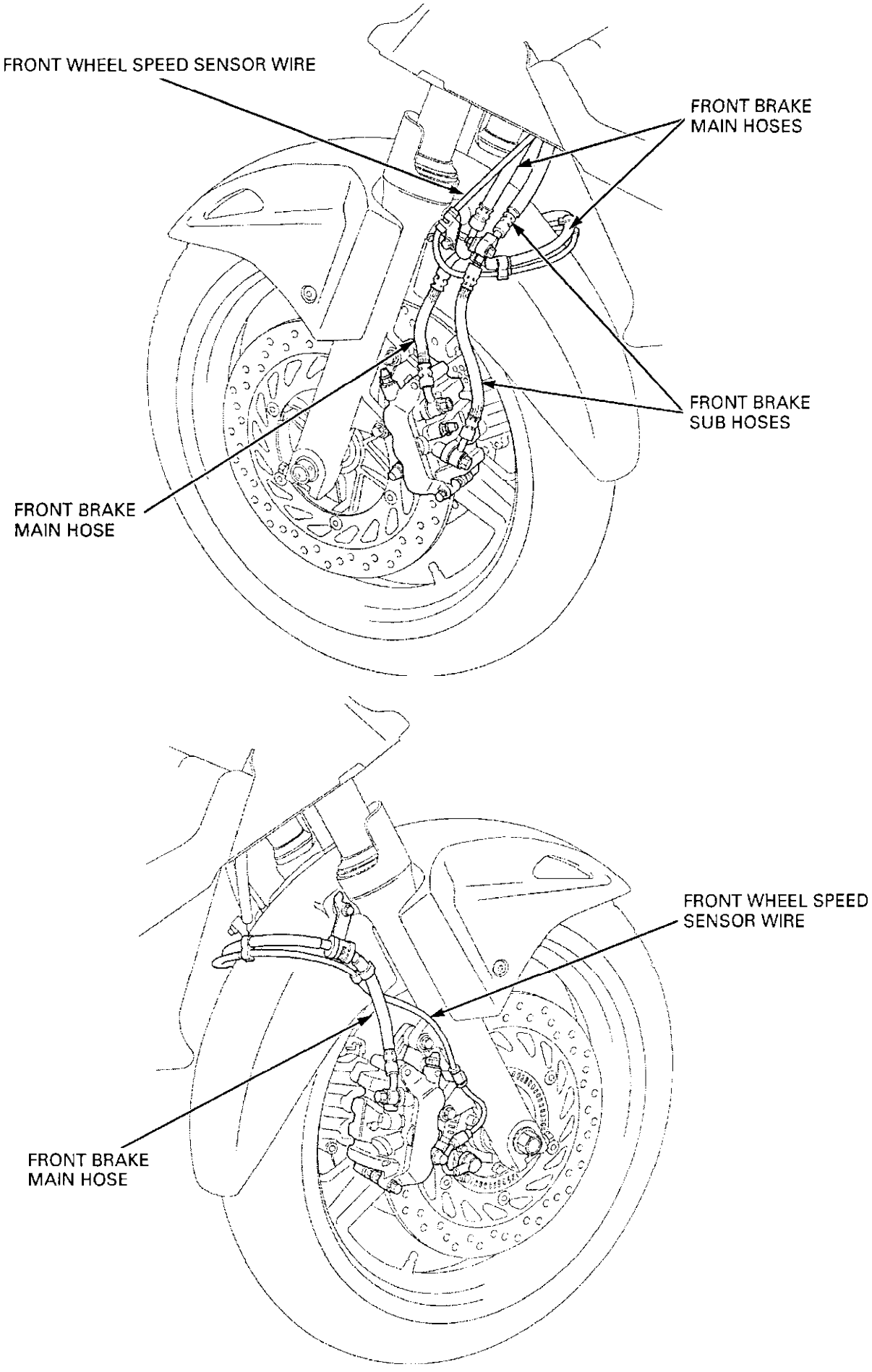


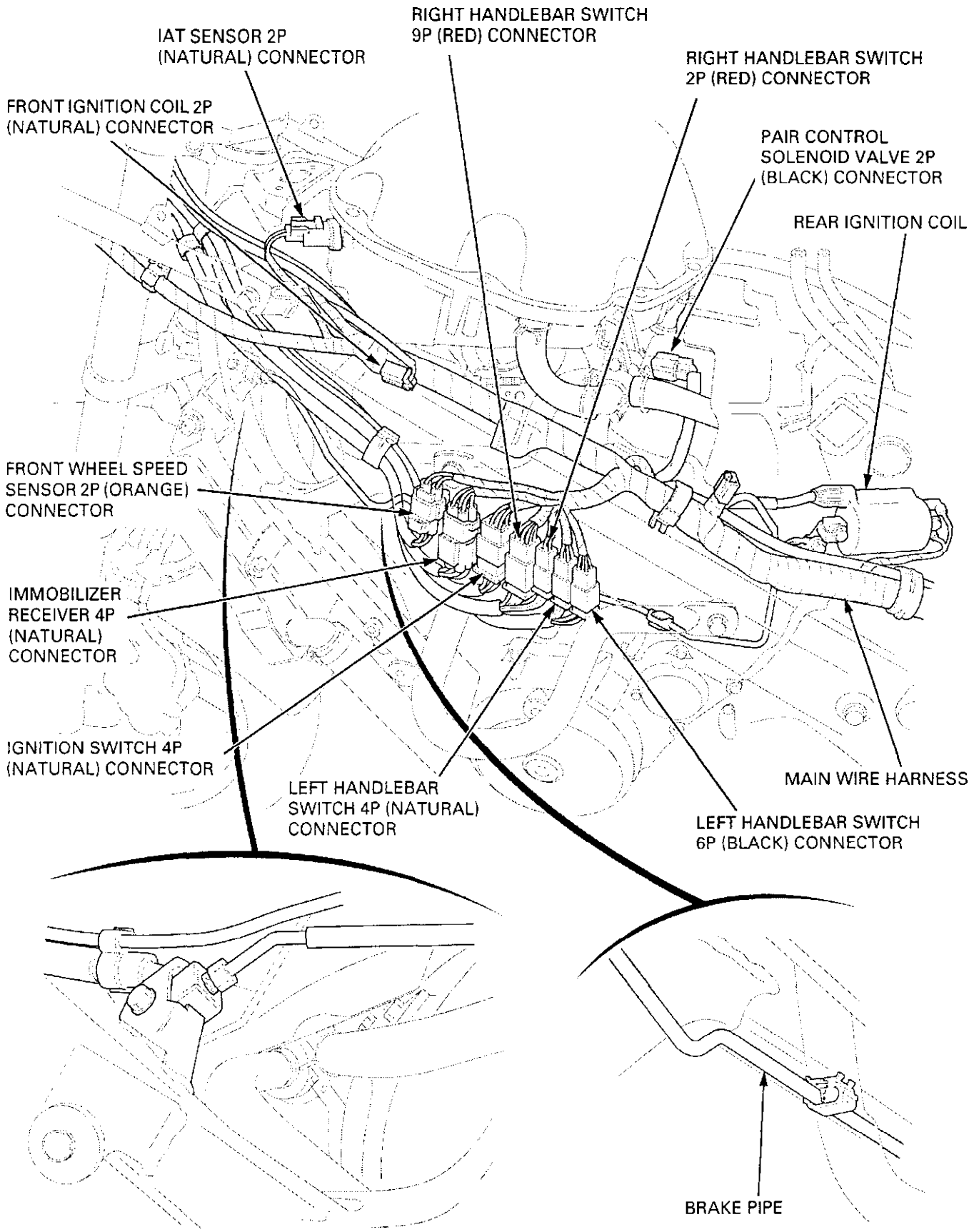


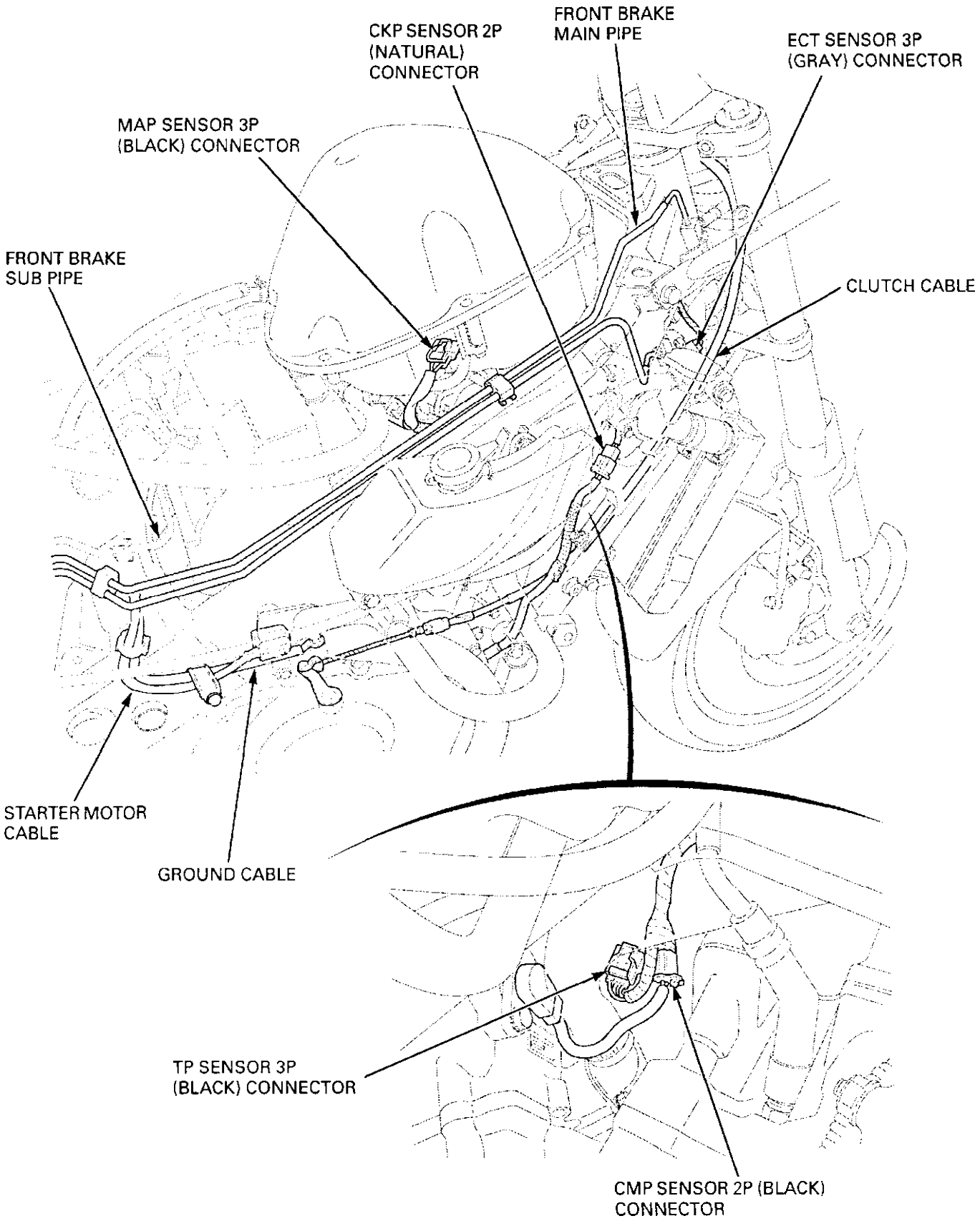

SPEEDOMETER 20P CONNECTOR
CLUTCH CABLE
BANK ANGLE SENSOR
LEFT HANDLEBAR SWITCH WIRE
LEFT FRONT TURN SIGNAL 2P (ORANGE) CONNECTOR
BANK ANGLE SENSOR 3P (BLACK) CONNECTOR
SUB-HARNESS 12P (BLUE) CONNECTOR
SUB-HARNESS 10P (GRAY) CONNECTOR
HORN WIRE

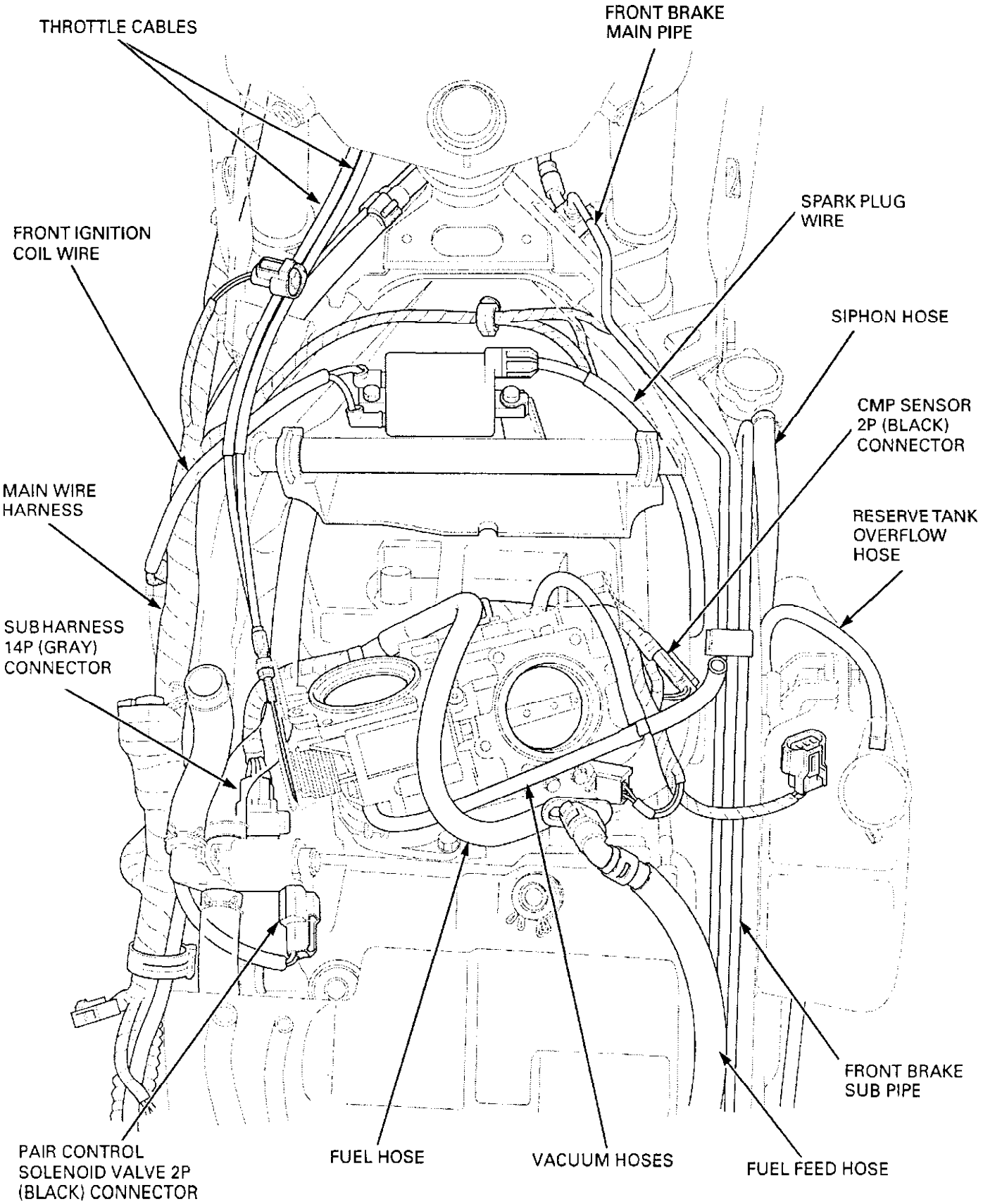

BANK ANGLE SENSOR 3P
(BLACK) CONNECTOR
FRONT BRAKE
MAIN HOSE
RIGHT FRONT TURN SIGNAL 2P
(LIGHT BLUE) CONNECTOR
HEADLIGHT 4P
CONNECTOR
FRONT BRAKE
SUB HOSE

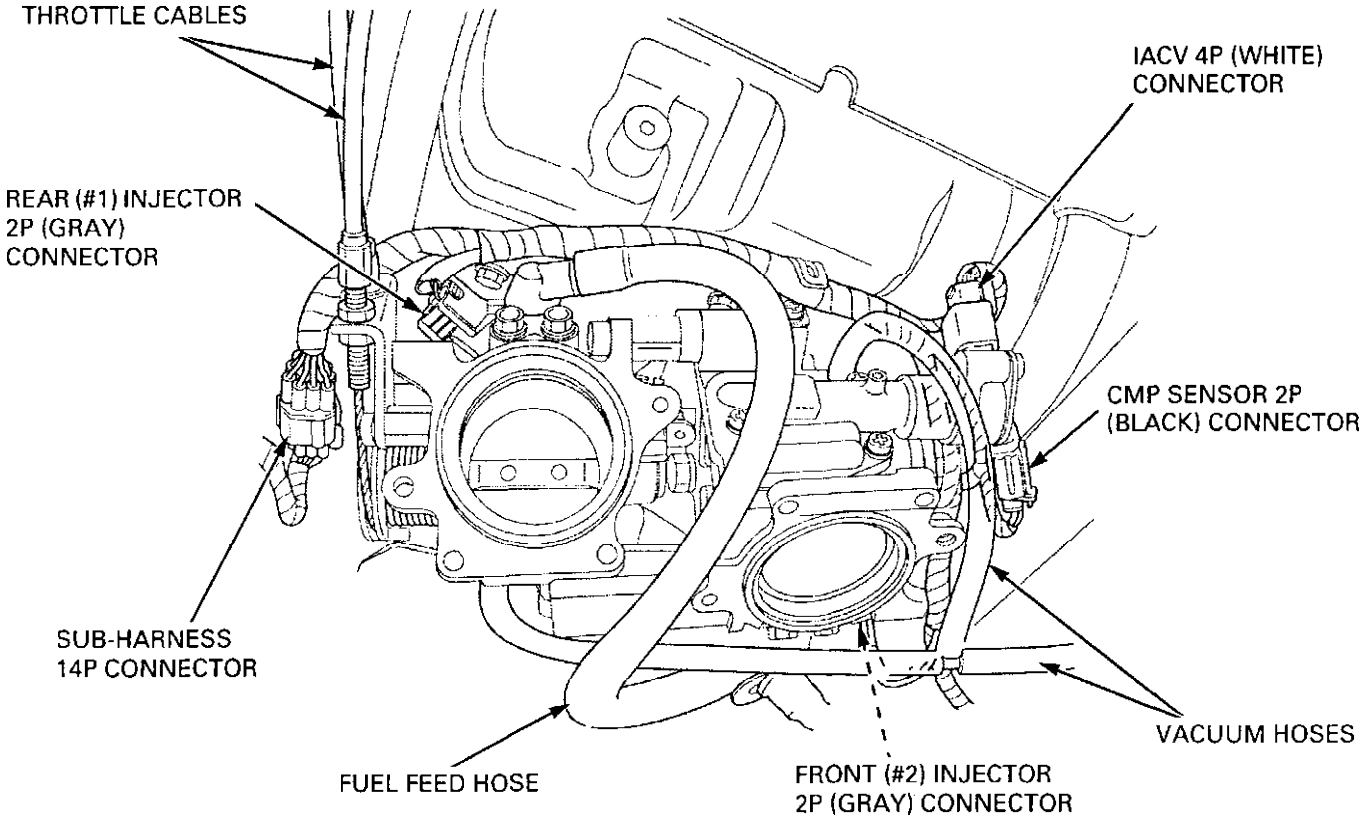

THROTTLE CABLES
CLUTCH CABLE
LEFT HANDLEBAR SWITCH WIRE
RIGHT HANDLEBAR SWITCH WIRE
FRONT BRAKE MAIN HOSE
FRONT IGNITION SWITCH WIRE
SIPHON HOSE
FRONT SPARK PLUG WIRE

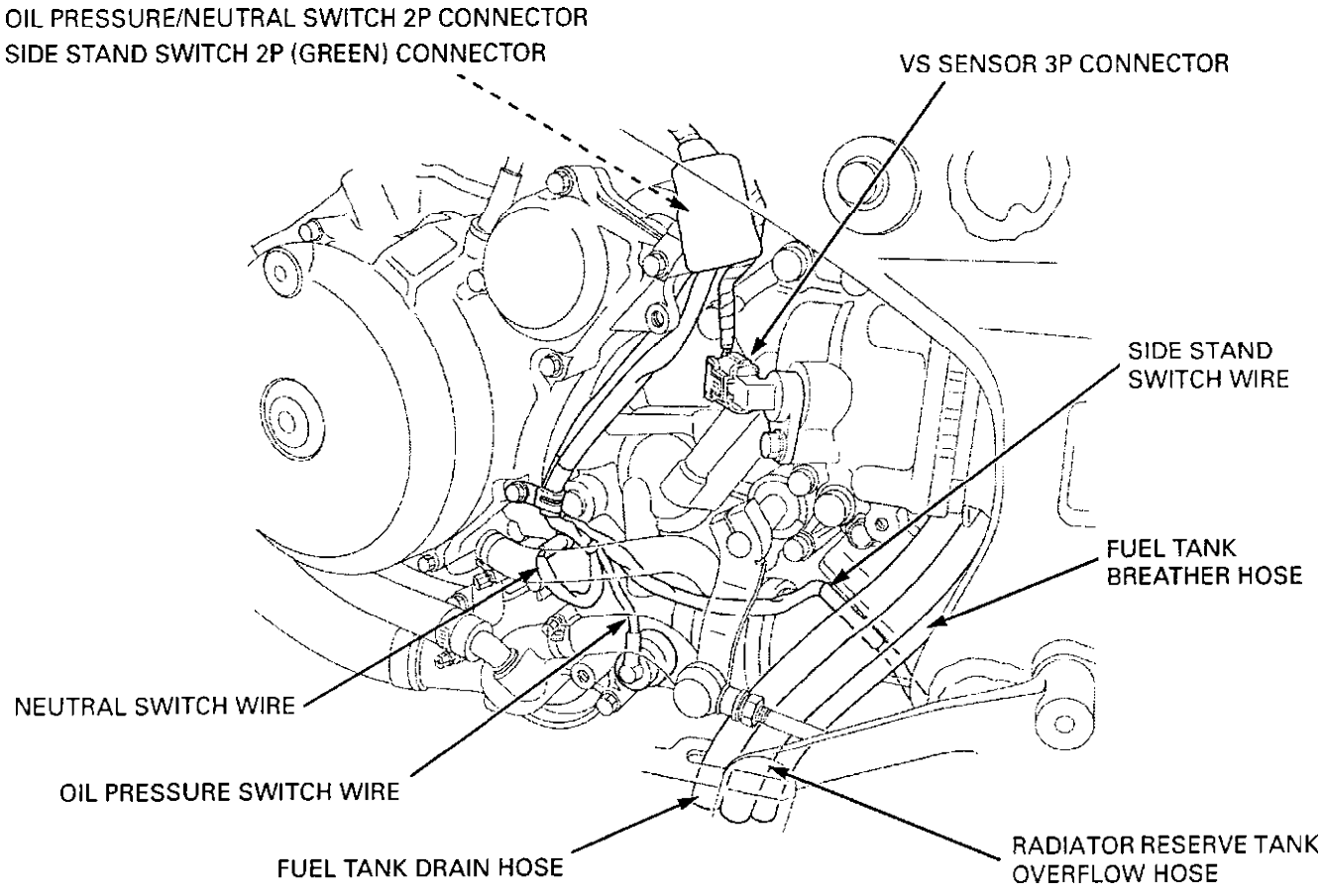

FRONT WHEEL SPEED SENSOR WIRE
FRONT BRAKE MAIN HOSES
FRONT BRAKE SUB HOSES
FRONT BRAKE MAIN HOSE
FRONT WHEEL SPEED SENSOR WIRE
FRONT BRAKE MAIN HOSE

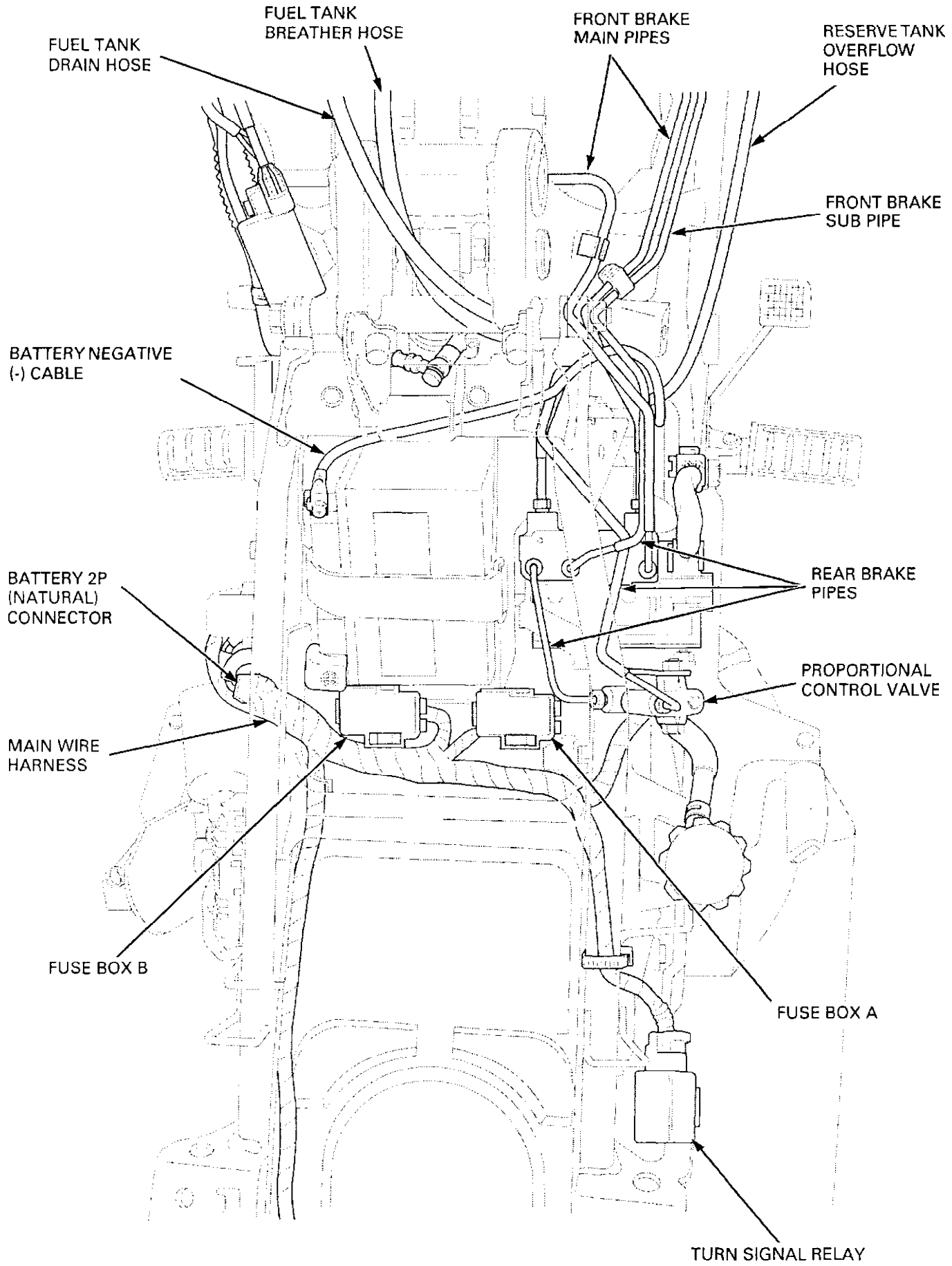

IAT SENSOR 2P (NATURAL) CONNECTOR
RIGHT HANDLEBAR SWITCH 9P (RED) CONNECTOR
RIGHT HANDLEBAR SWITCH 2P (RED) CONNECTOR
FRONT IGNITION COIL 2P (NATURAL) CONNECTOR
PAIR CONTROL SOLENOID VALVE 2P (BLACK) CONNECTOR
REAR IGNITION COIL
FRONT WHEEL SPEED SENSOR 2P (ORANGE) CONNECTOR
IMMOBILIZER RECEIVER 4P (NATURAL) CONNECTOR
IGNITION SWITCH 4P (NATURAL) CONNECTOR
LEFT HANDLEBAR SWITCH 4P (NATURAL) CONNECTOR
MAIN WIRE HARNESS
LEFT HANDLEBAR SWITCH 6P (BLACK) CONNECTOR
BRAKE PIPE

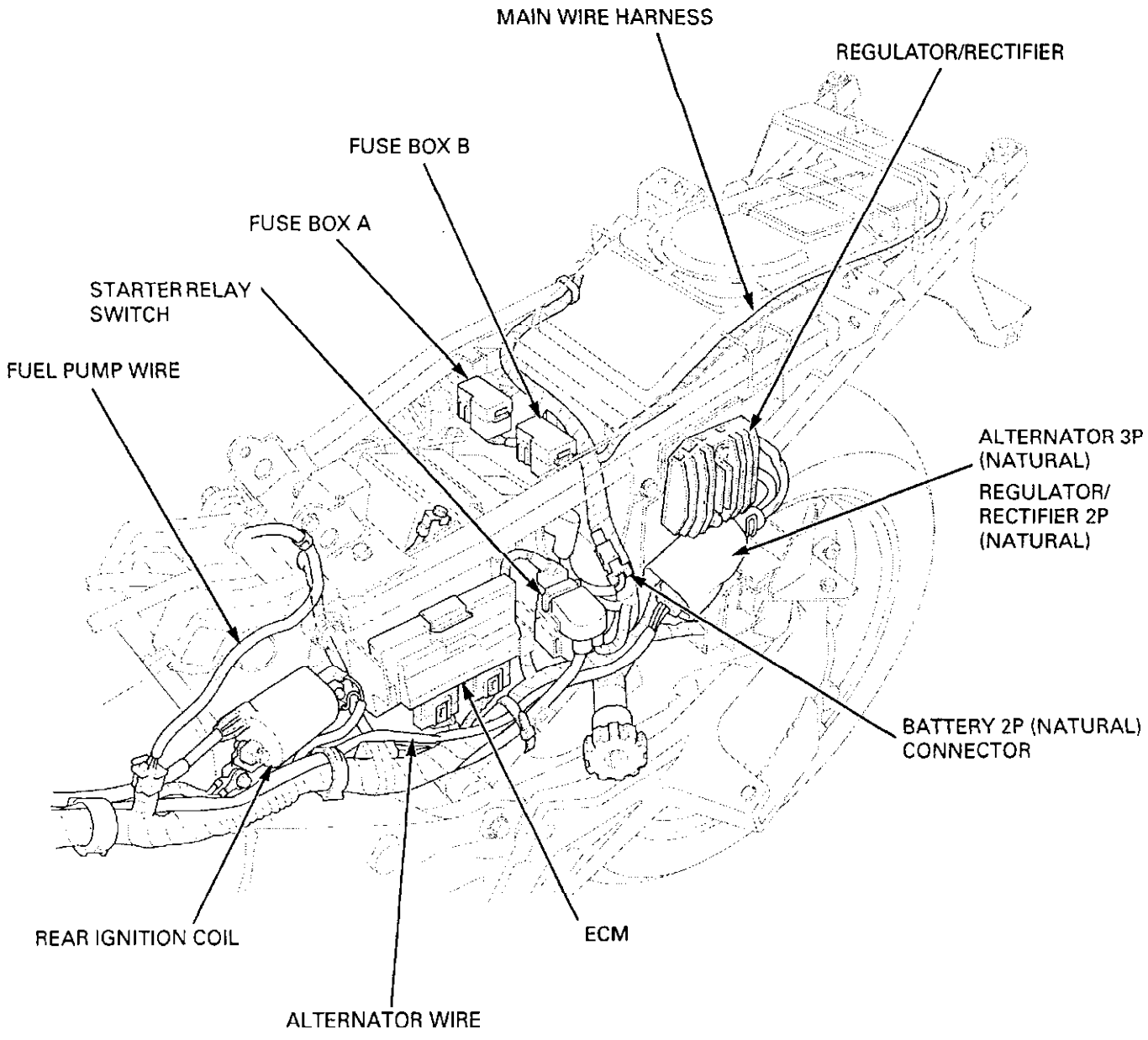

CKP SENSOR 2P (NATURAL) CONNECTOR
FRONT BRAKE MAIN PIPE
ECT SENSOR 3P (GRAY) CONNECTOR
MAP SENSOR 3P (BLACK) CONNECTOR
FRONT BRAKE SUB PIPE
CLUTCH CABLE
STARTER MOTOR CABLE
GROUND CABLE
TP SENSOR 3P (BLACK) CONNECTOR
CMP SENSOR 2P (BLACK) CONNECTOR

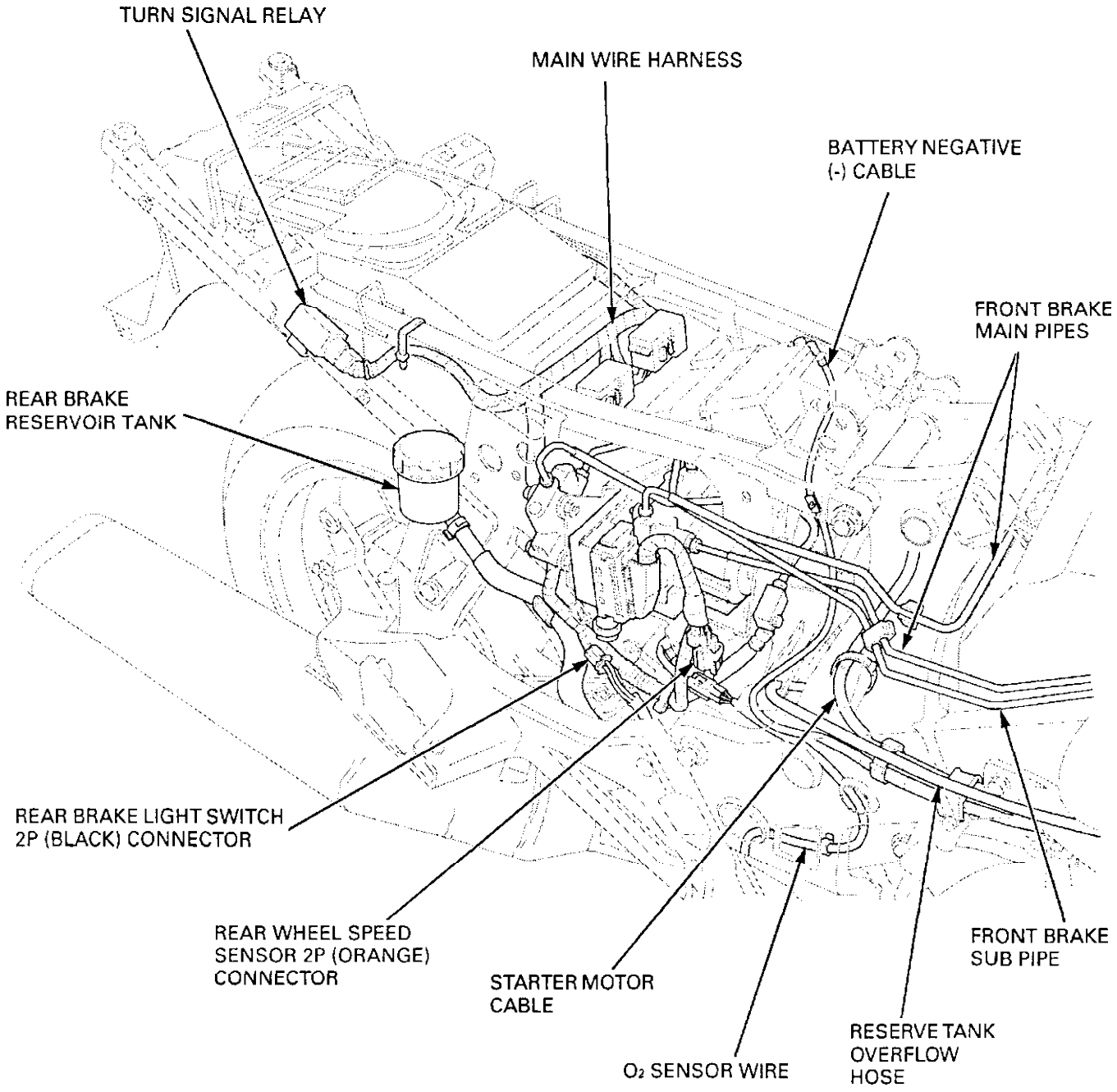

THROTTLE CABLES
FRONT BRAKE MAIN PIPE
SPARK PLUG WIRE
FRONT IGNITION COIL WIRE
SIPHON HOSE
CMP SENSOR 2P (BLACK) CONNECTOR
MAIN WIRE HARNESS
RESERVE TANK OVERFLOW HOSE
SUB HARNESS 14P (GRAY) CONNECTOR
FRONT BRAKE SUB PIPE
PAIR CONTROL SOLENOID VALVE 2P (BLACK) CONNECTOR
FUEL HOSE
VACUUM HOSES
FUEL FEED HOSE

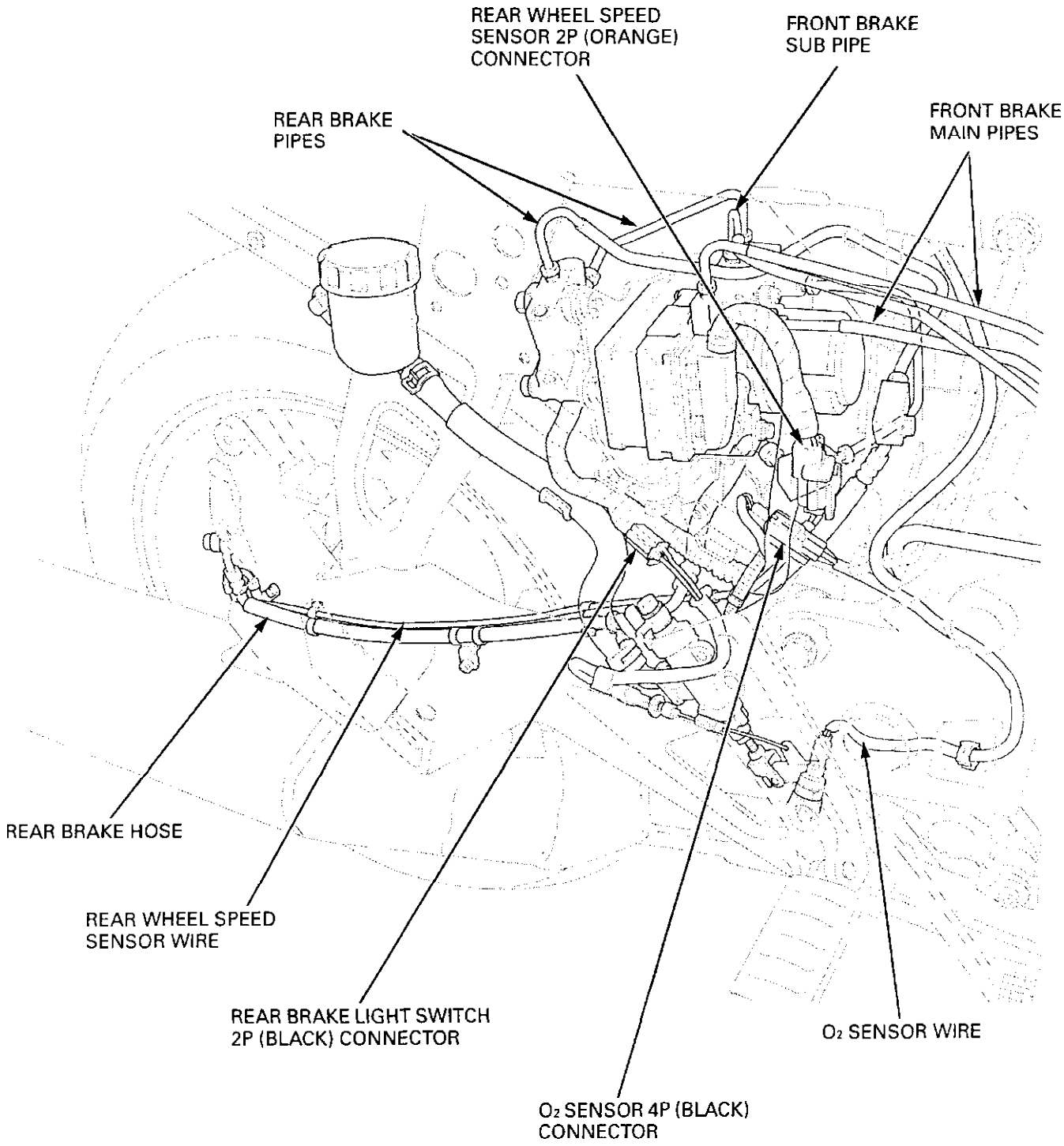

THROTTLE CABLES
IACV 4P (WHITE) CONNECTOR
REAR (#1) INJECTOR 2P (GRAY) CONNECTOR
CMP SENSOR 2P (BLACK) CONNECTOR
SUB-HARNESS 14P CONNECTOR
VACUUM HOSES
FUEL FEED HOSE
FRONT (#2) INJECTOR 2P (GRAY) CONNECTOR

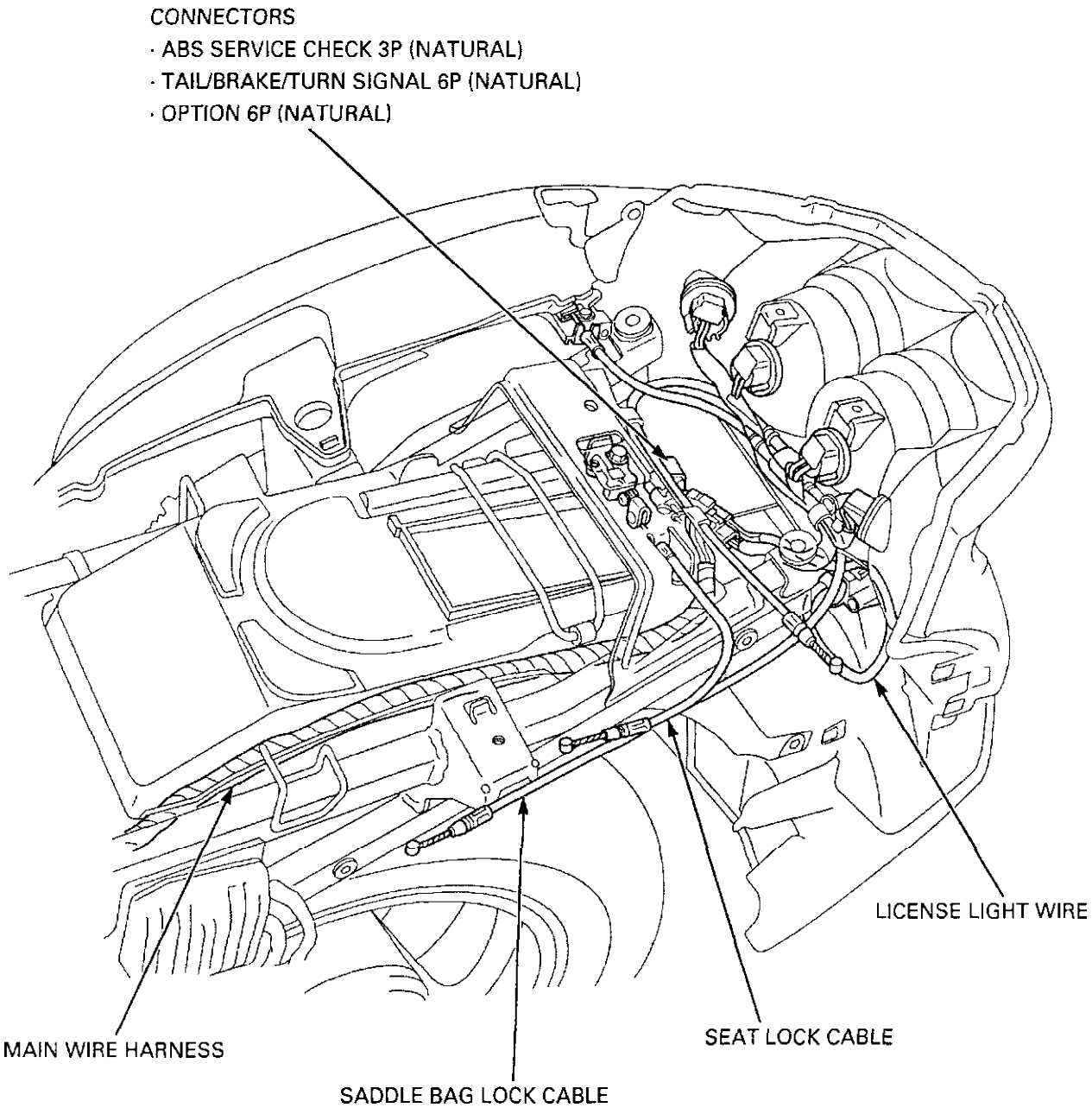

OIL PRESSURE/NEUTRAL SWITCH 2P CONNECTOR
SIDE STAND SWITCH 2P (GREEN) CONNECTOR
VS SENSOR 3P CONNECTOR
SIDE STAND SWITCH WIRE
FUEL TANK BREATHER HOSE
NEUTRAL SWITCH WIRE
OIL PRESSURE SWITCH WIRE
FUEL TANK DRAIN HOSE
RADIATOR RESERVE TANK OVERFLOW HOSE

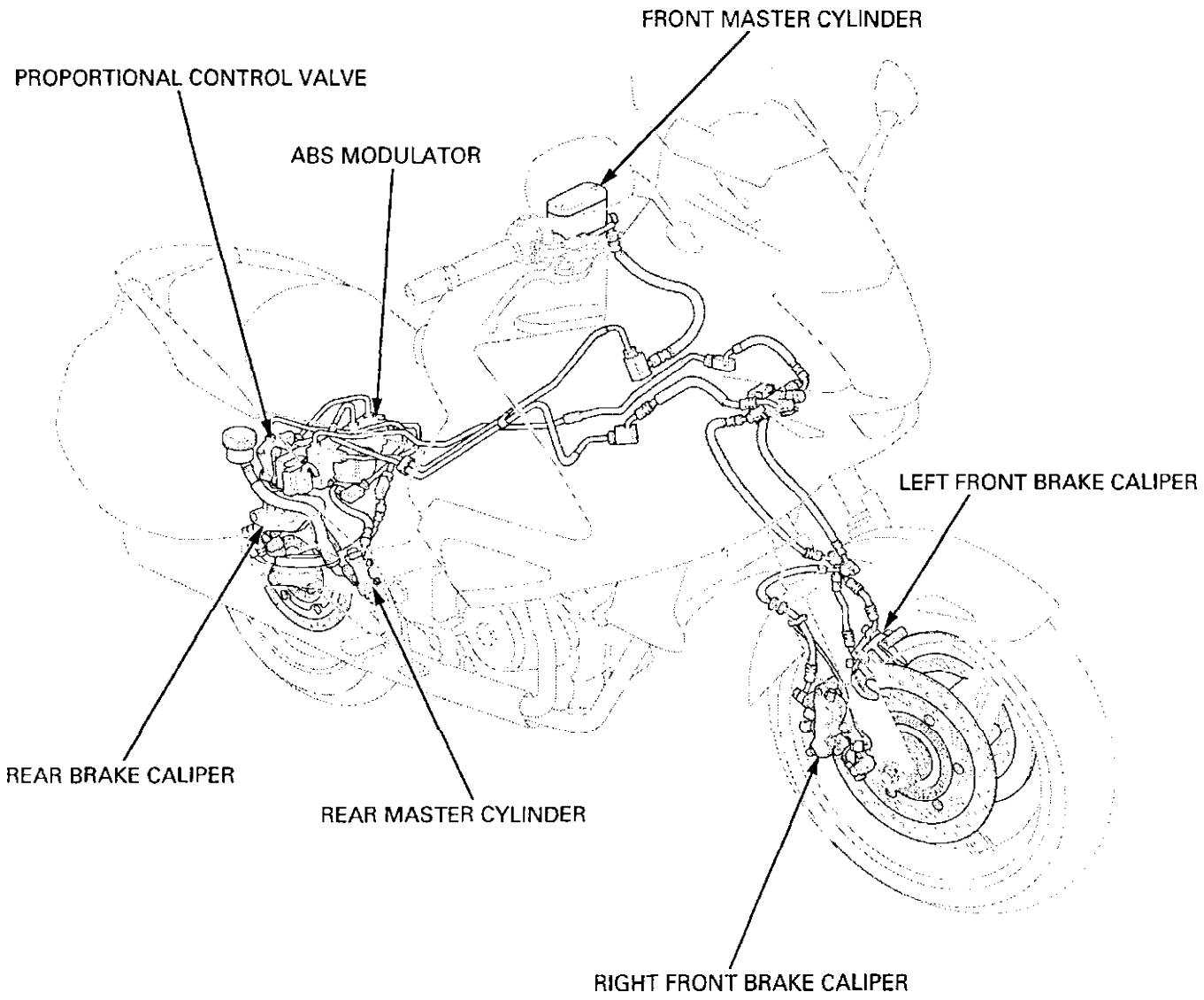

FUEL TANK DRAIN HOSE
FUEL TANK BREATHER HOSE
FRONT BRAKE MAIN PIPES
RESERVE TANK OVERFLOW HOSE
FRONT BRAKE SUB PIPE
BATTERY NEGATIVE (-) CABLE
BATTERY 2P (NATURAL) CONNECTOR
REAR BRAKE PIPES
PROPORTIONAL CONTROL VALVE
MAIN WIRE HARNESS
FUSE BOX B
FUSE BOX A
TURN SIGNAL RELAY


MAIN WIRE HARNESS
REGULATOR/RECTIFIER
FUSE BOX B
FUSE BOX A
STARTER RELAY SWITCH
FUEL PUMP WIRE
ALTERNATOR 3P (NATURAL)
REGULATOR/ RECTIFIER 2P (NATURAL)
BATTERY 2P (NATURAL) CONNECTOR
REAR IGNITION COIL
ECM
ALTERNATOR WIRE

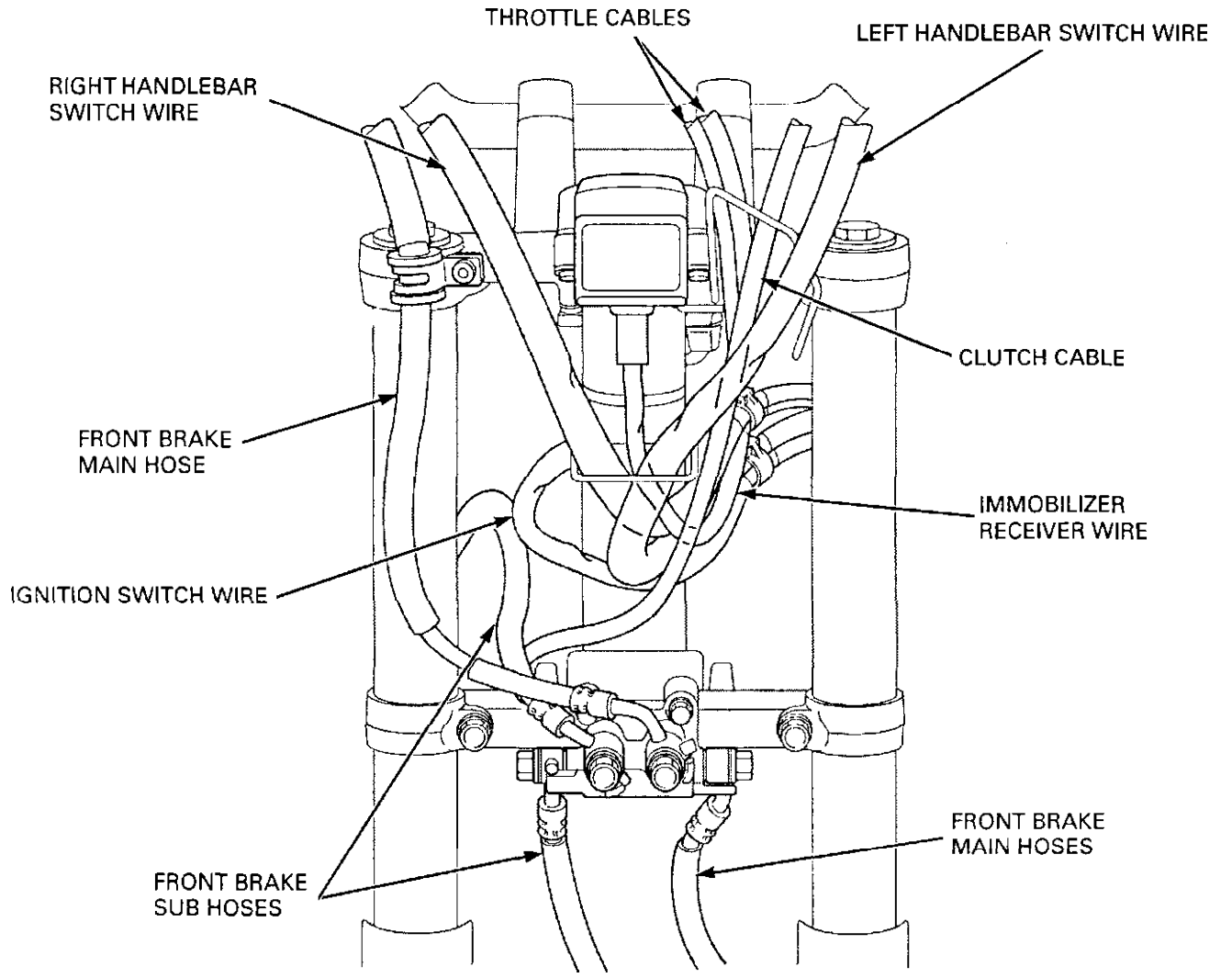

TURN SIGNAL RELAY
MAIN WIRE HARNESS
BATTERY NEGATIVE (-) CABLE
FRONT BRAKE MAIN PIPES
REAR BRAKE RESERVOIR TANK
REAR BRAKE LIGHT SWITCH 2P (BLACK) CONNECTOR
REAR WHEEL SPEED SENSOR 2P (ORANGE) CONNECTOR
STARTER MOTOR CABLE
O2 SENSOR WIRE
RESERVE TANK OVERFLOW HOSE
FRONT BRAKE SUB PIPE

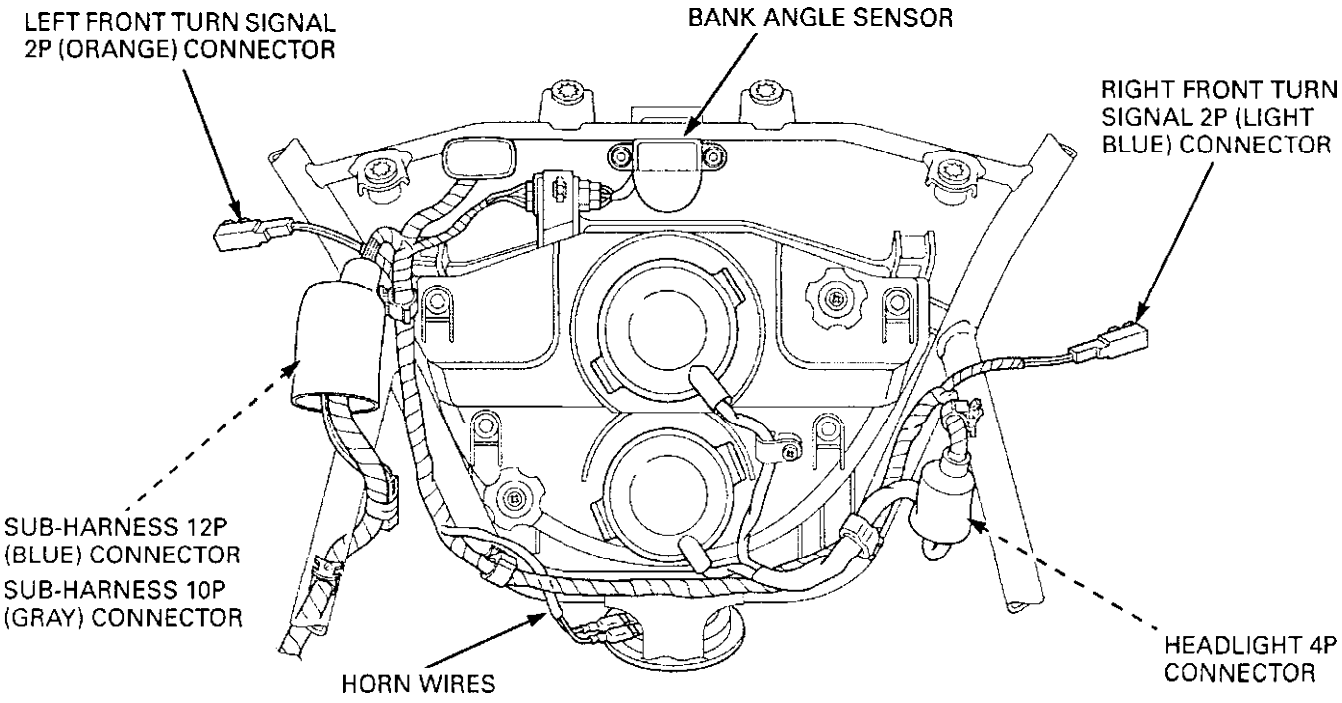

REAR WHEEL SPEED SENSOR 2P (ORANGE) CONNECTOR
FRONT BRAKE SUB PIPE
REAR BRAKE PIPES
FRONT BRAKE MAIN PIPES
REAR BRAKE HOSE
REAR WHEEL SPEED SENSOR WIRE
REAR BRAKE LIGHT SWITCH 2P (BLACK) CONNECTOR
O2 SENSOR 4P (BLACK) CONNECTOR
O2 SENSOR WIRE

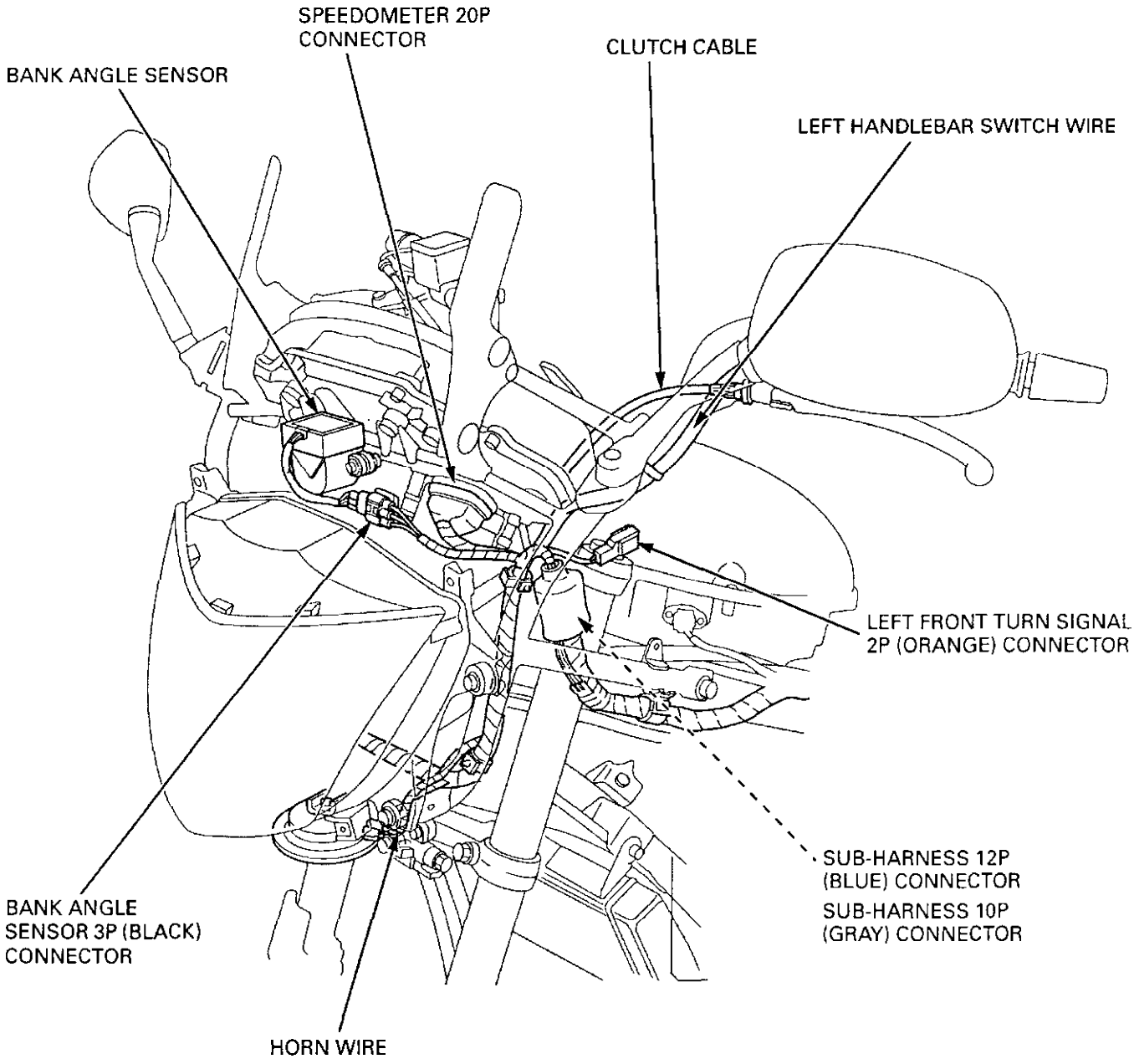

CONNECTORS
· ABS SERVICE CHECK 3P (NATURAL)
· TAIL/BRAKE/TURN SIGNAL 6P (NATURAL)
· OPTION 6P (NATURAL)
LICENSE LIGHT WIRE
MAIN WIRE HARNESS
SEAT LOCK CABLE
SADDLE BAG LOCK CABLE

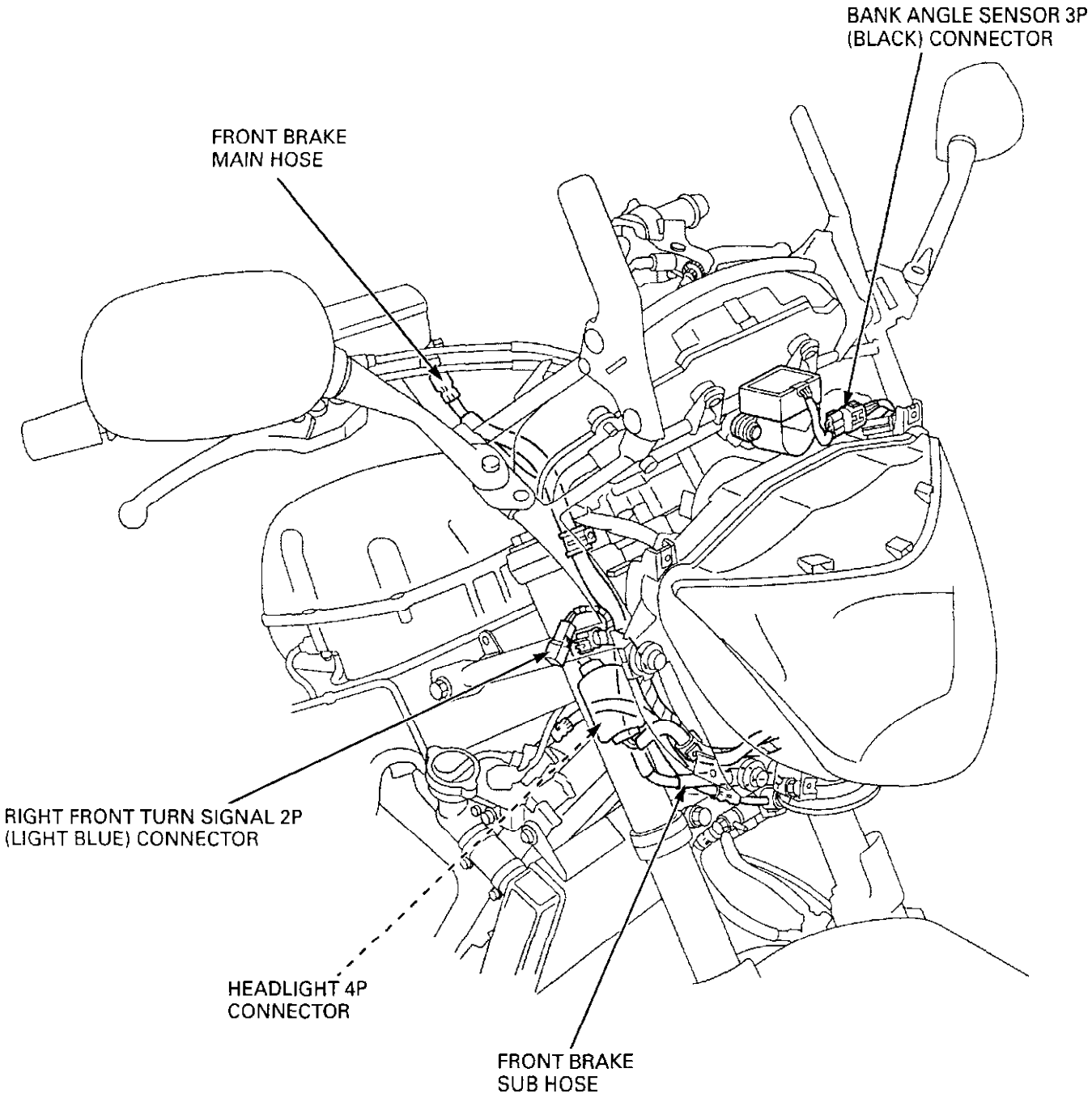

FRONT MASTER CYLINDER
PROPORTIONAL CONTROL VALVE
ABS MODULATOR
LEFT FRONT BRAKE CALIPER
REAR BRAKE CALIPER
REAR MASTER CYLINDER
RIGHT FRONT BRAKE CALIPER

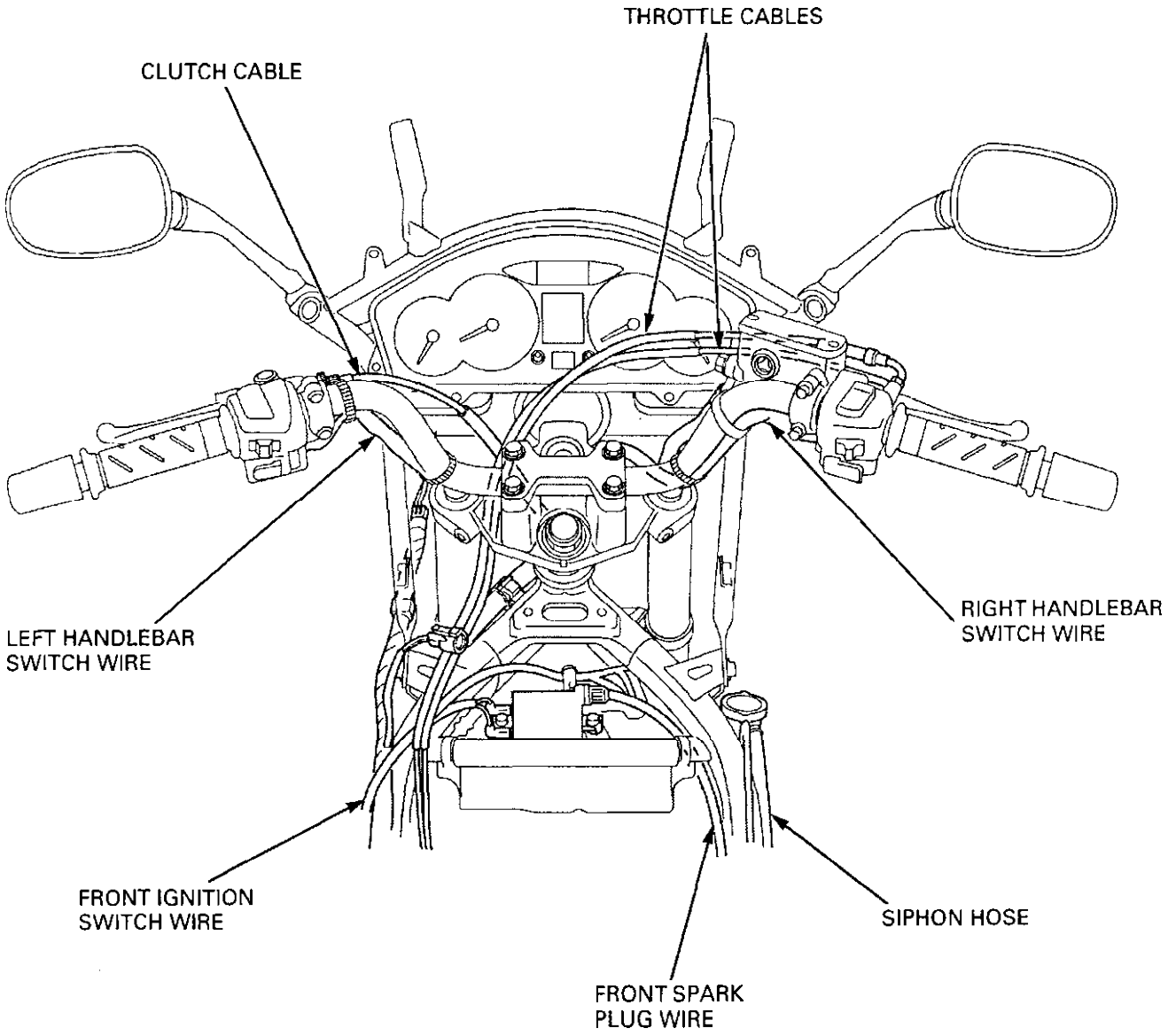
CABLE & HARNESS ROUTING (NT700V)

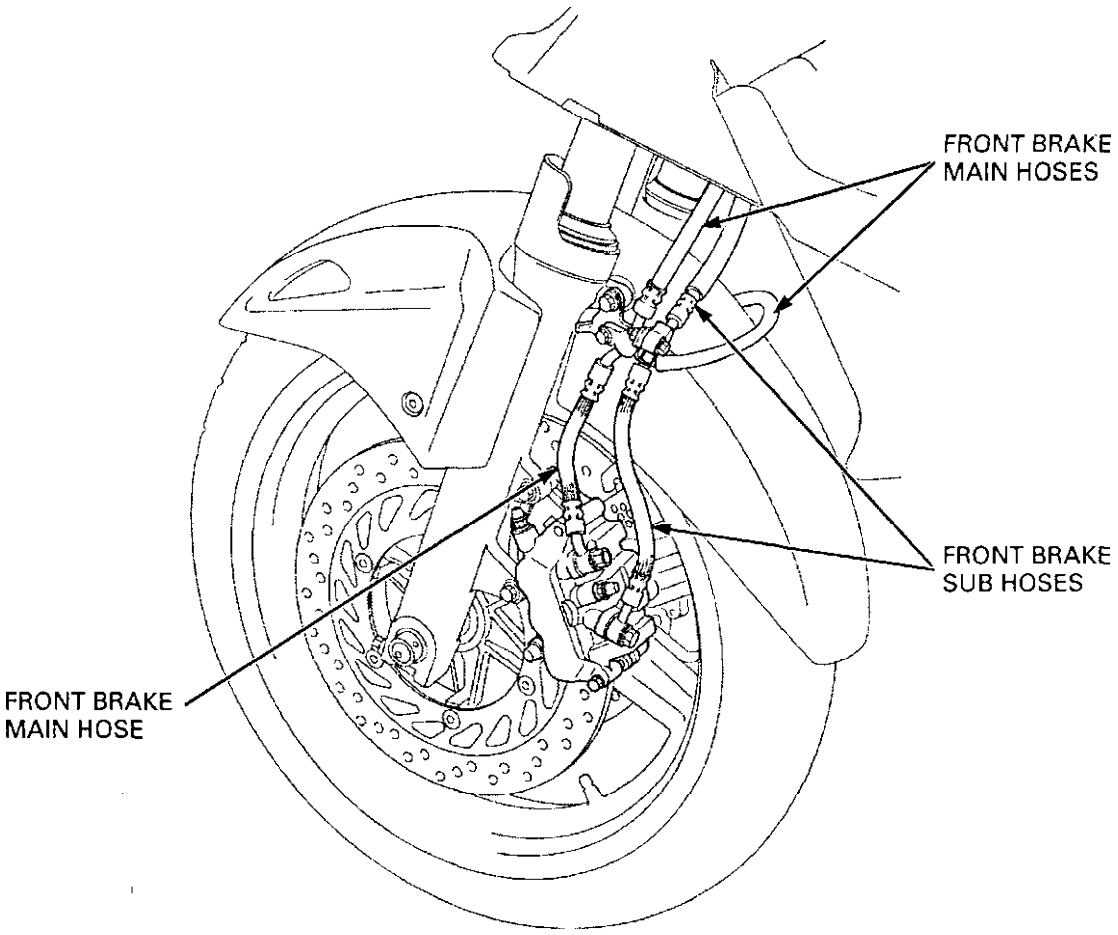


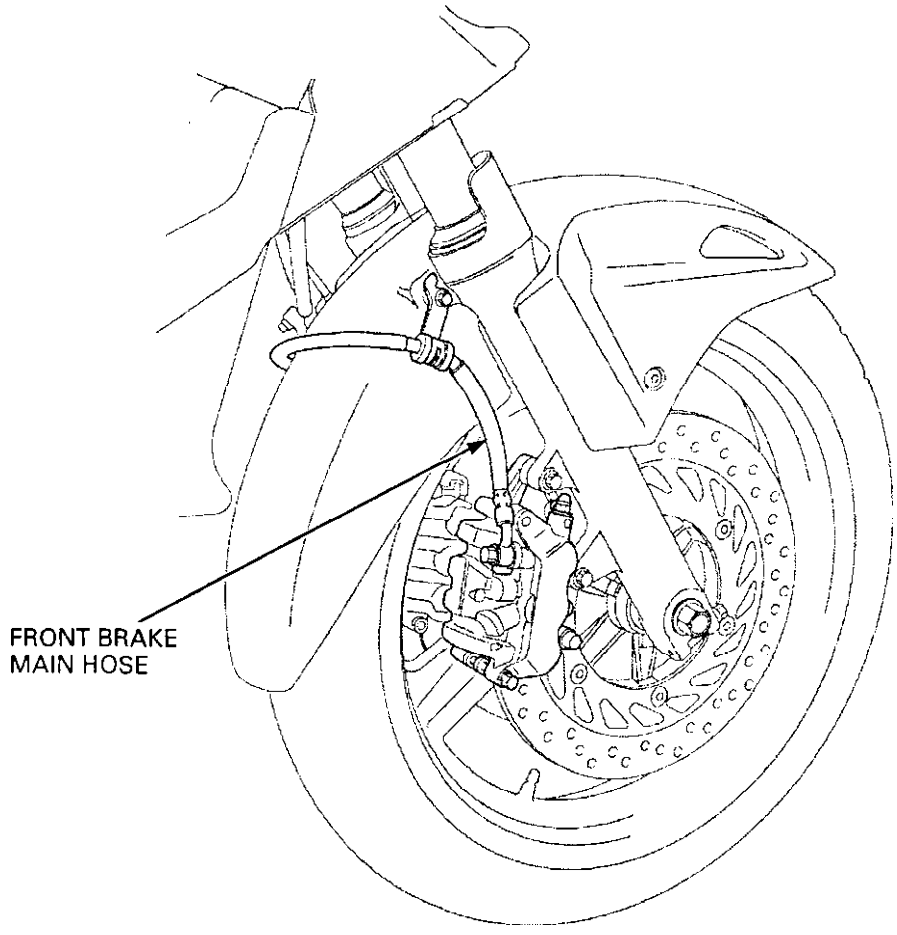


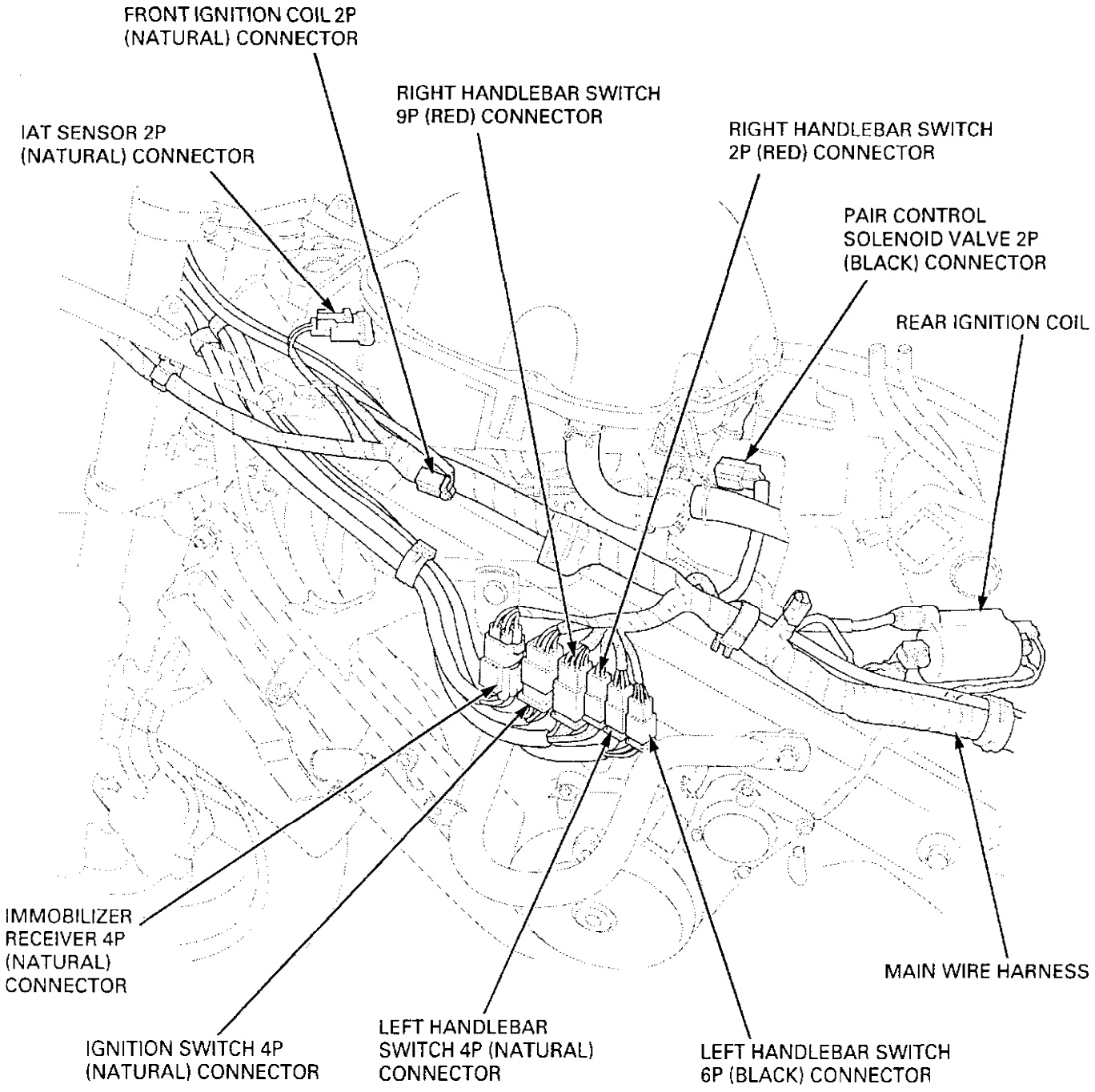

SPEEDOMETER 20P CONNECTOR
CLUTCH CABLE
BANK ANGLE SENSOR
LEFT HANDLEBAR SWITCH WIRE
LEFT FRONT TURN SIGNAL 2P (ORANGE) CONNECTOR
SUB-HARNESS 12P (BLUE) CONNECTOR
SUB-HARNESS 10P (GRAY) CONNECTOR
BANK ANGLE SENSOR 3P (BLACK) CONNECTOR
HORN WIRE

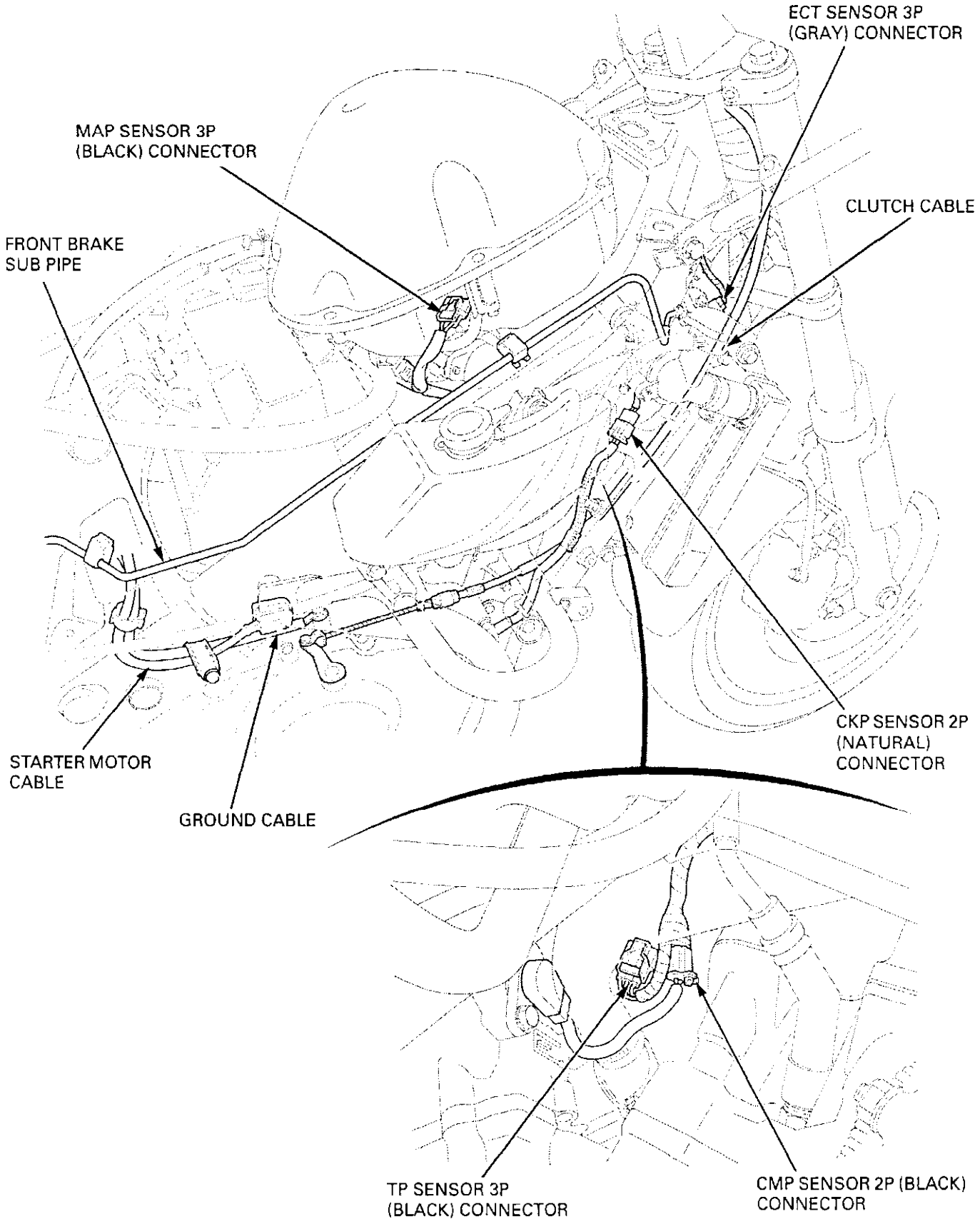

BANK ANGLE SENSOR 3P
(BLACK) CONNECTOR
FRONT BRAKE
MAIN HOSE
RIGHT FRONT TURN SIGNAL 2P
(LIGHT BLUE) CONNECTOR
HEADLIGHT 4P
CONNECTOR
FRONT BRAKE
SUB HOSE

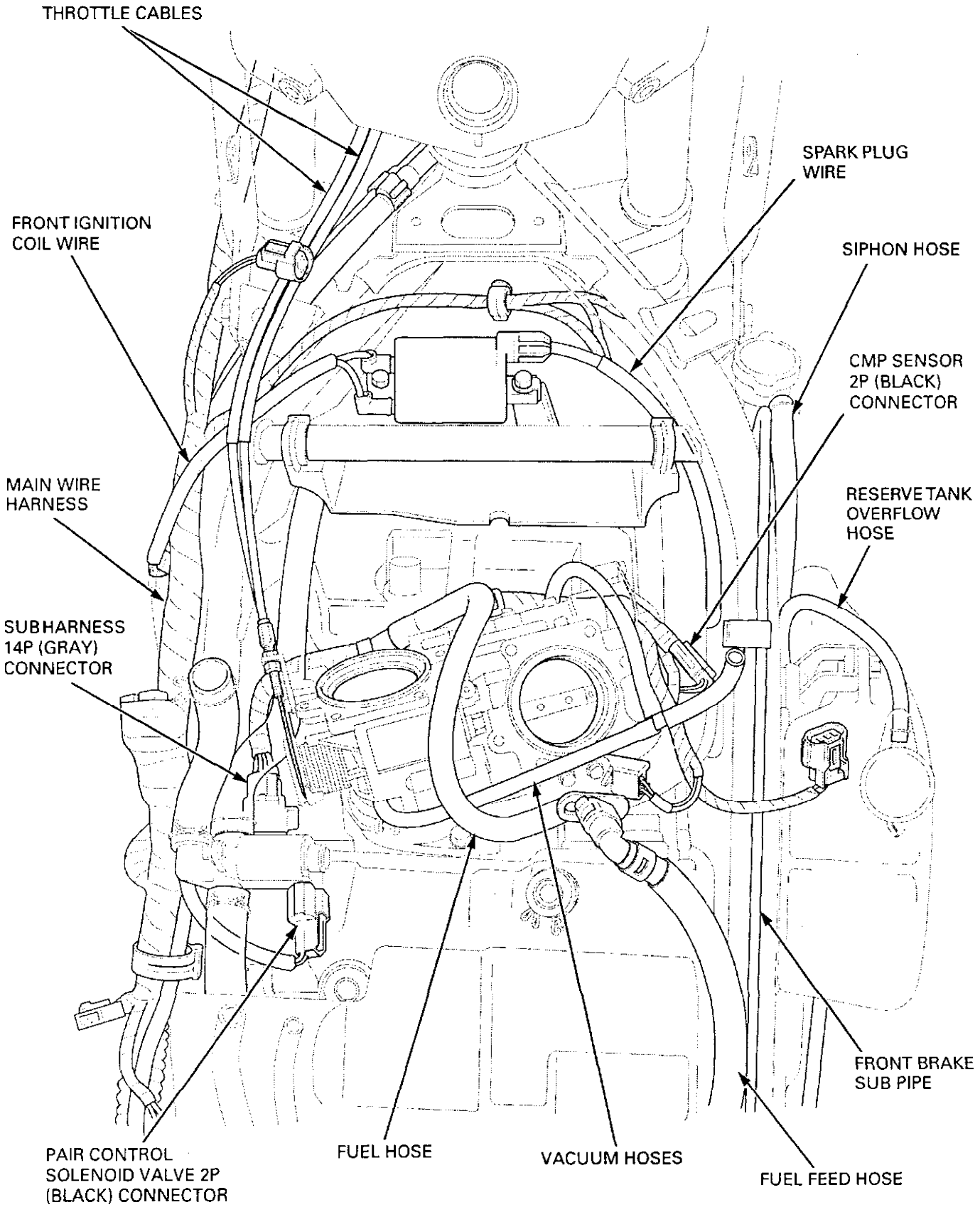

THROTTLE CABLES
CLUTCH CABLE
LEFT HANDLEBAR SWITCH WIRE
RIGHT HANDLEBAR SWITCH WIRE
FRONT IGNITION SWITCH WIRE
SIPHON HOSE
FRONT SPARK PLUG WIRE

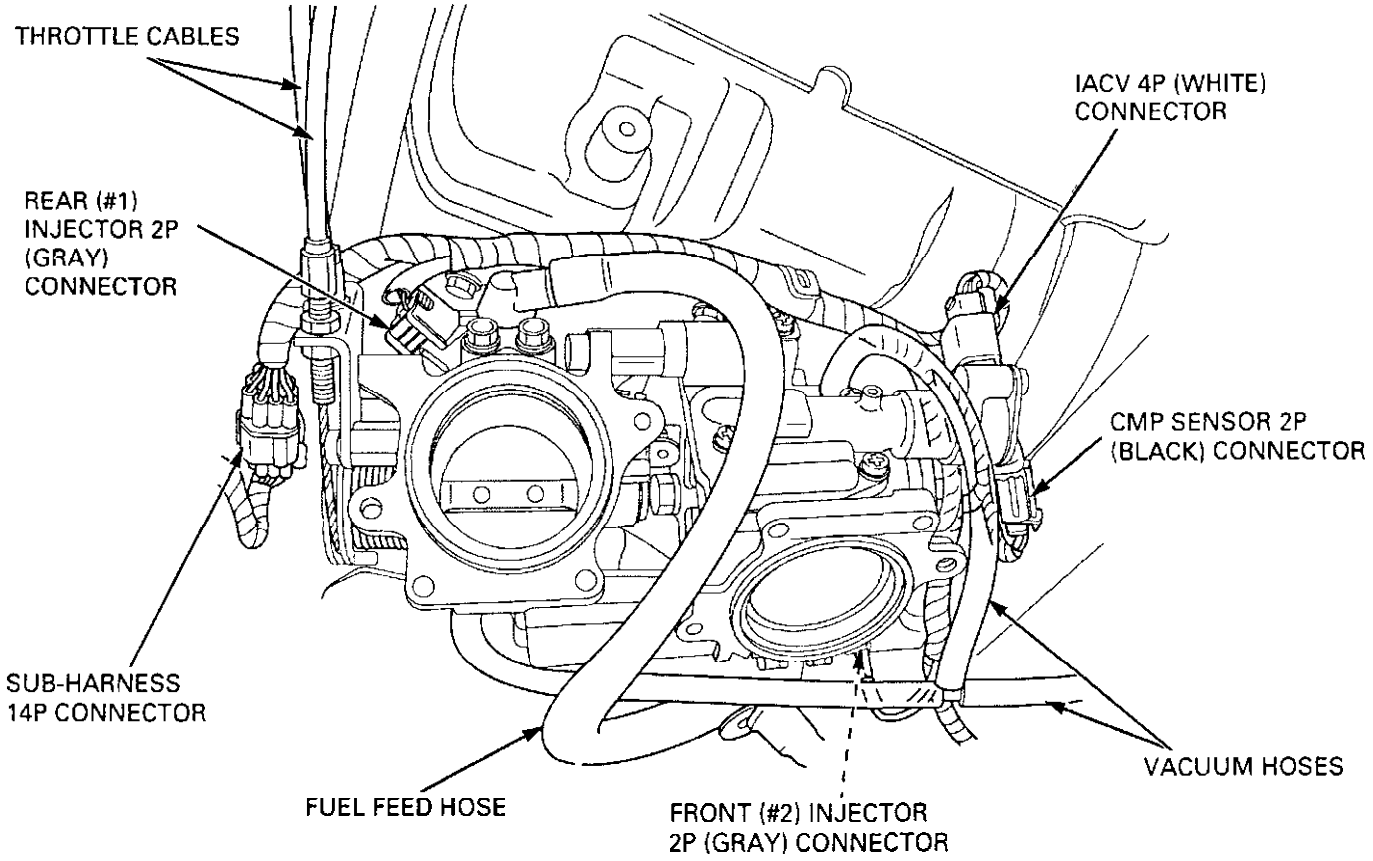

FRONT BRAKE
MAIN HOSES
FRONT BRAKE
SUB HOSES
FRONT BRAKE
MAIN HOSE

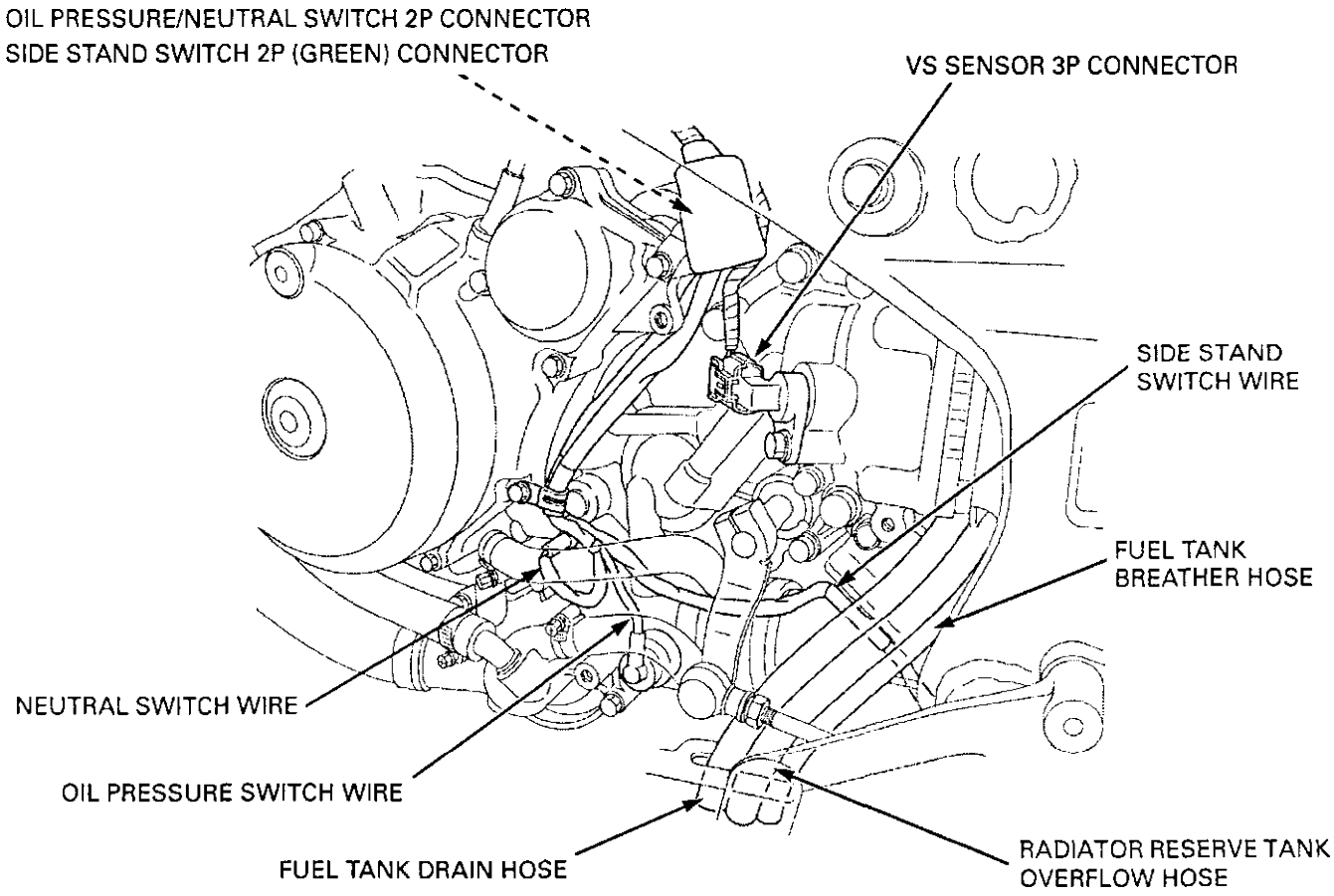

FRONT BRAKE
MAIN HOSE

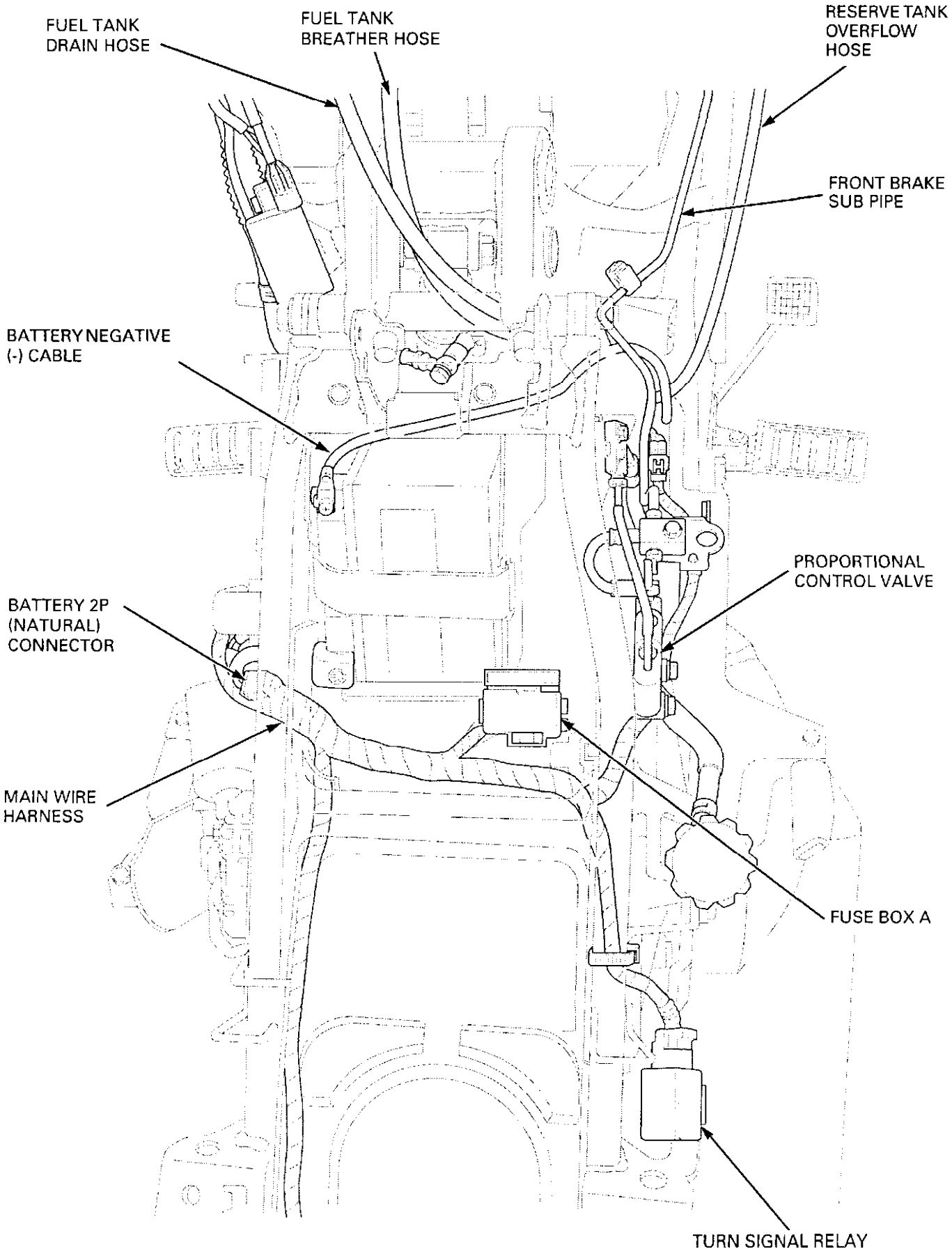

FRONT IGNITION COIL 2P (NATURAL) CONNECTOR
RIGHT HANDLEBAR SWITCH 9P (RED) CONNECTOR
IAT SENSOR 2P (NATURAL) CONNECTOR
RIGHT HANDLEBAR SWITCH 2P (RED) CONNECTOR
PAIR CONTROL SOLENOID VALVE 2P (BLACK) CONNECTOR
REAR IGNITION COIL
IMMOBILIZER RECEIVER 4P (NATURAL) CONNECTOR
MAIN WIRE HARNESS
IGNITION SWITCH 4P (NATURAL) CONNECTOR
LEFT HANDLEBAR SWITCH 4P (NATURAL) CONNECTOR
LEFT HANDLEBAR SWITCH 6P (BLACK) CONNECTOR

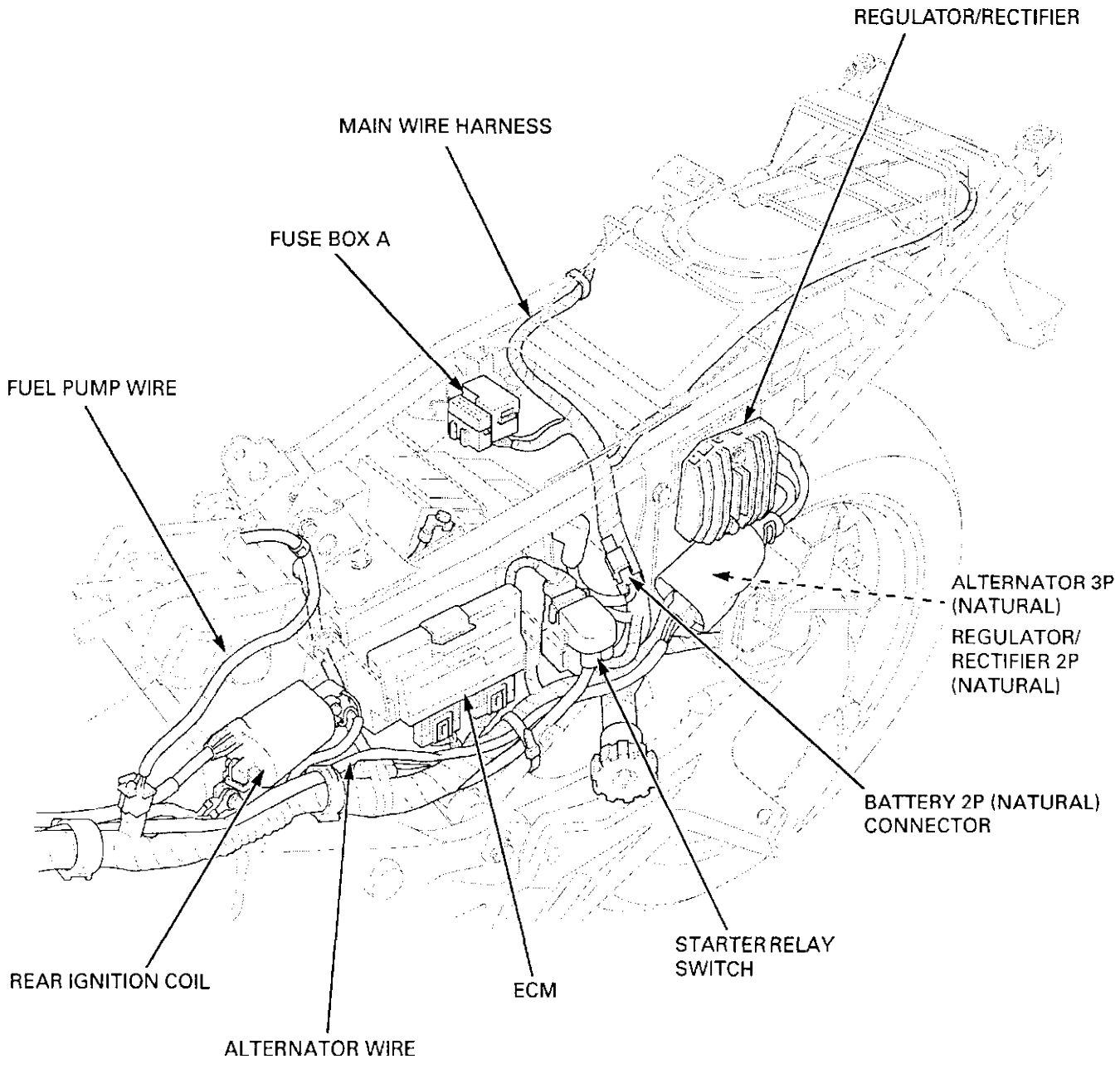

ECT SENSOR 3P
(GRAY) CONNECTOR
MAP SENSOR 3P
(BLACK) CONNECTOR
CLUTCH CABLE
FRONT BRAKE
SUB PIPE
CKP SENSOR 2P
(NATURAL)
CONNECTOR
STARTER MOTOR
CABLE
GROUND CABLE
TP SENSOR 3P
(BLACK) CONNECTOR
CMP SENSOR 2P (BLACK)
CONNECTOR

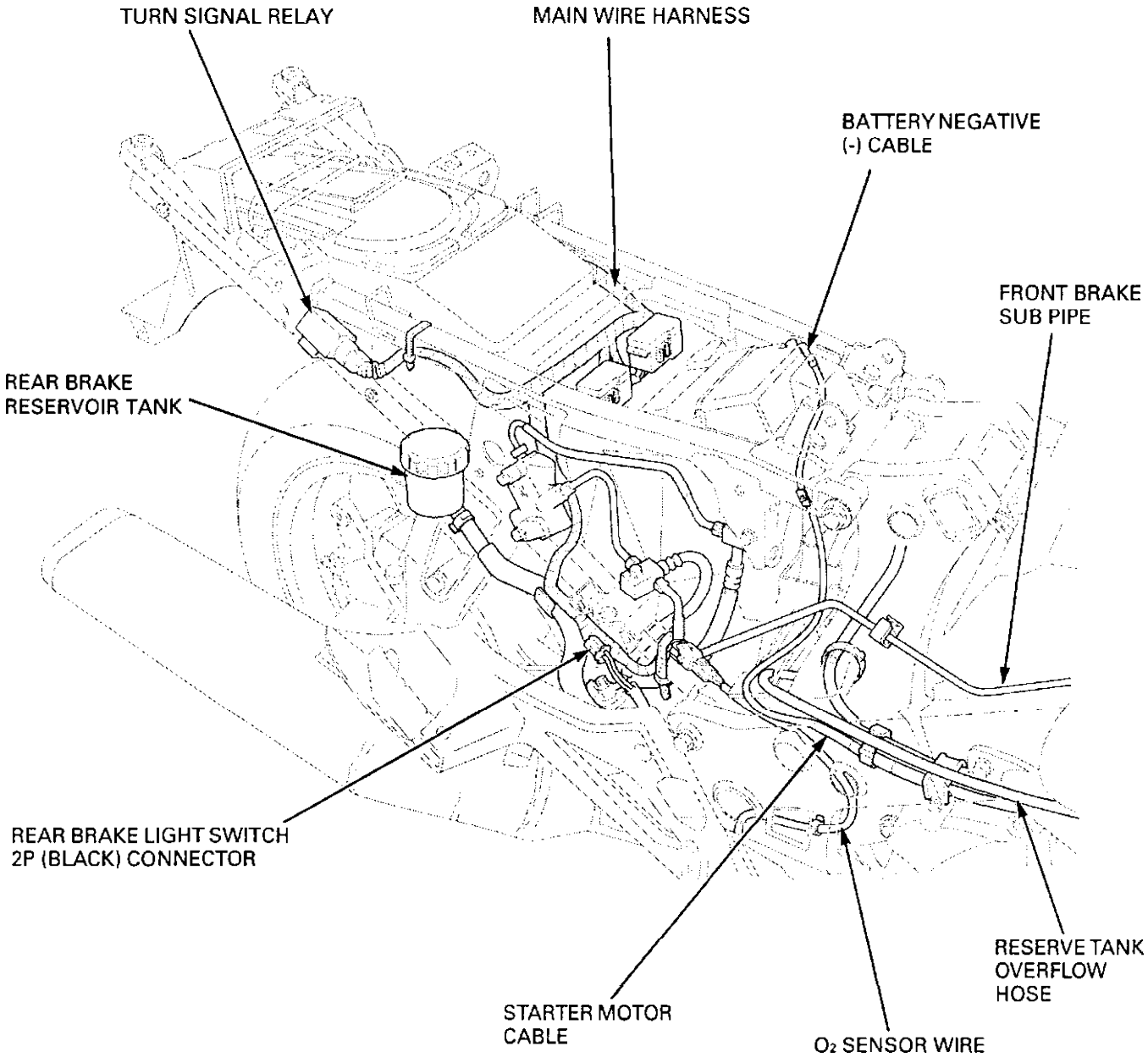

THROTTLE CABLES
SPARK PLUG WIRE
FRONT IGNITION COIL WIRE
SIPHON HOSE
CMP SENSOR 2P (BLACK) CONNECTOR
MAIN WIRE HARNESS
RESERVE TANK OVERFLOW HOSE
SUB HARNESS 14P (GRAY) CONNECTOR
FRONT BRAKE SUB PIPE
PAIR CONTROL SOLENOID VALVE 2P (BLACK) CONNECTOR
FUEL HOSE
VACUUM HOSES
FUEL FEED HOSE

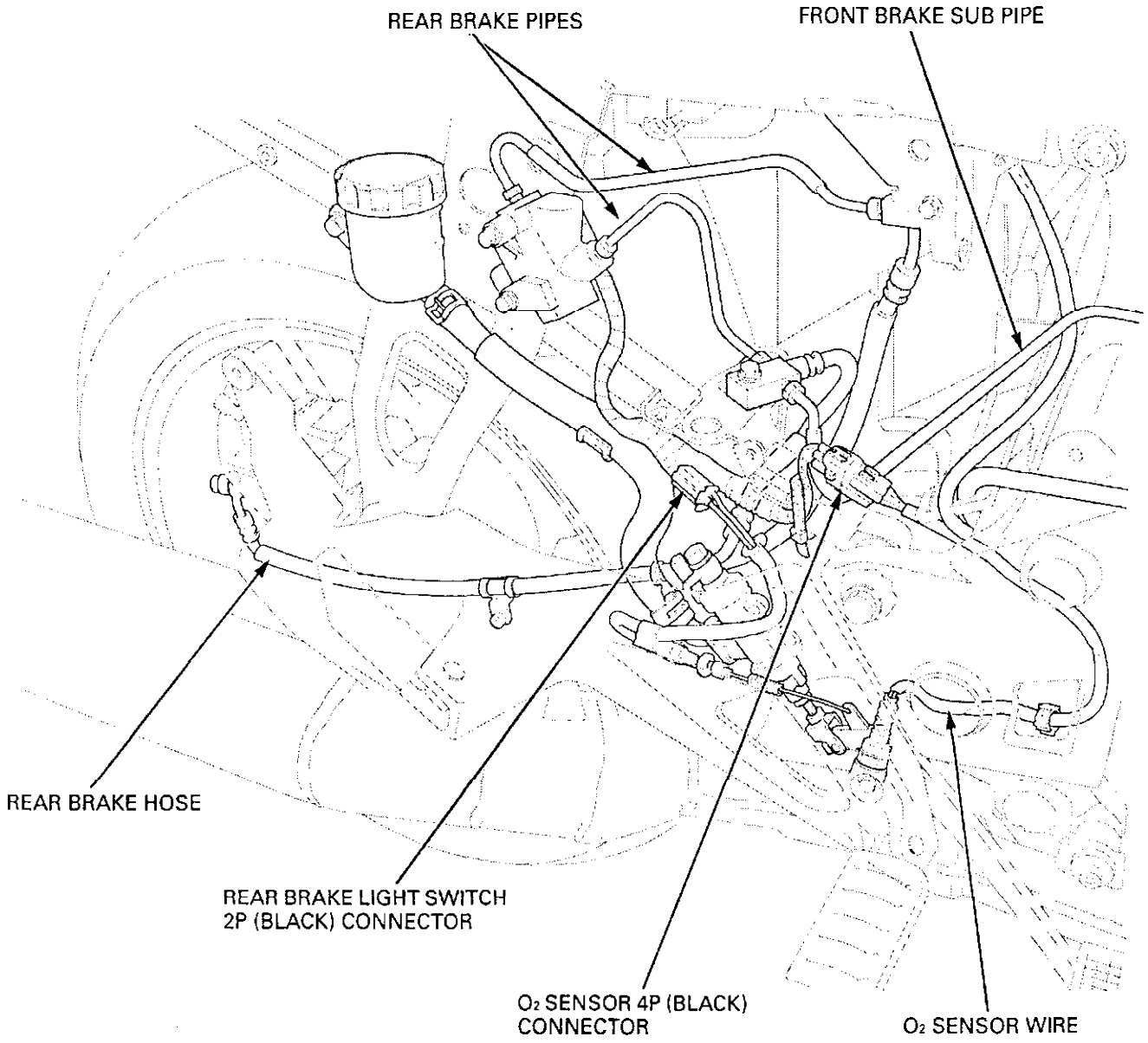

THROTTLE CABLES
IACV 4P (WHITE) CONNECTOR
REAR (#1) INJECTOR 2P (GRAY) CONNECTOR
CMP SENSOR 2P (BLACK) CONNECTOR
SUB-HARNESS 14P CONNECTOR
VACUUM HOSES
FUEL FEED HOSE
FRONT (#2) INJECTOR 2P (GRAY) CONNECTOR

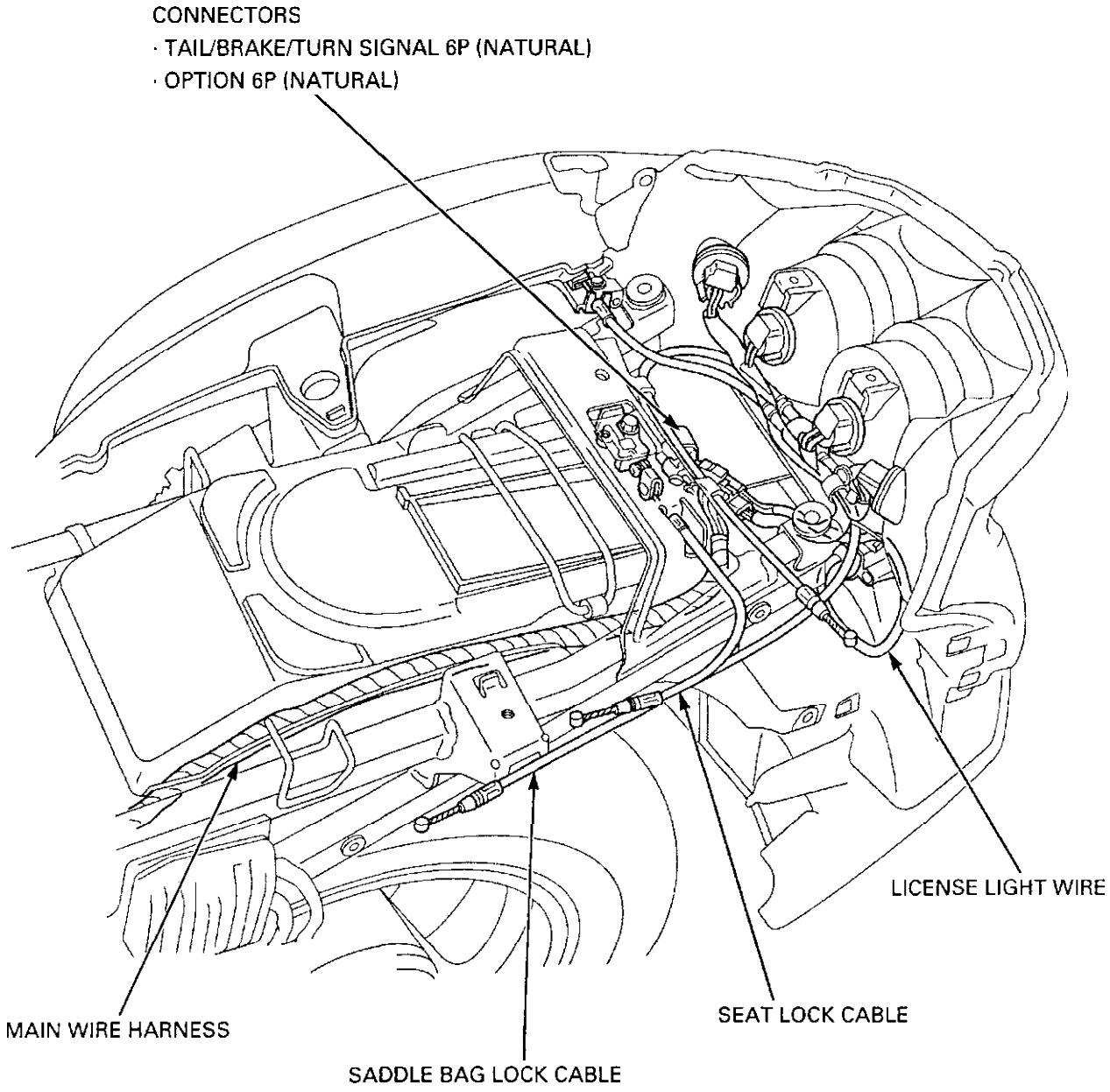

OIL PRESSURE/NEUTRAL SWITCH 2P CONNECTOR
SIDE STAND SWITCH 2P (GREEN) CONNECTOR
VS SENSOR 3P CONNECTOR
SIDE STAND SWITCH WIRE
FUEL TANK BREATHER HOSE
NEUTRAL SWITCH WIRE
OIL PRESSURE SWITCH WIRE
FUEL TANK DRAIN HOSE
RADIATOR RESERVE TANK OVERFLOW HOSE

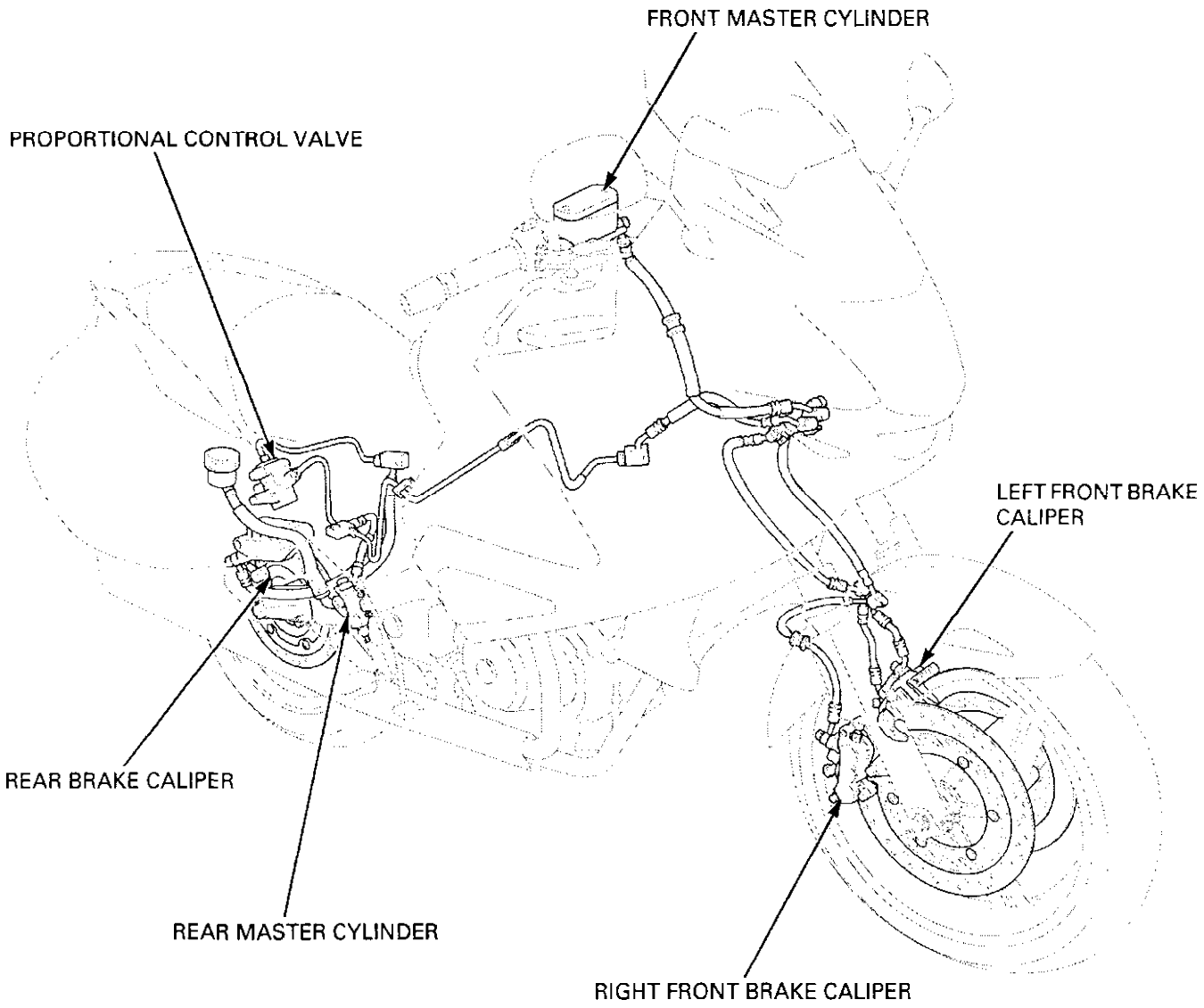

FUEL TANK
DRAIN HOSE
FUEL TANK
BREATHER HOSE
RESERVE TANK
OVERFLOW
HOSE
FRONT BRAKE
SUB PIPE
BATTERY NEGATIVE
(-) CABLE
PROPORTIONAL
CONTROL VALVE
BATTERY 2P
(NATURAL)
CONNECTOR
MAIN WIRE
HARNESS
FUSE BOX A
TURN SIGNAL RELAY


REGULATOR/RECTIFIER
MAIN WIRE HARNESS
FUSE BOX A
FUEL PUMP WIRE
ALTERNATOR 3P (NATURAL)
REGULATOR/ RECTIFIER 2P (NATURAL)
BATTERY 2P (NATURAL) CONNECTOR
STARTER RELAY SWITCH
REAR IGNITION COIL
ECM
ALTERNATOR WIRE


TURN SIGNAL RELAY
MAIN WIRE HARNESS
BATTERY NEGATIVE (-) CABLE
FRONT BRAKE SUB PIPE
REAR BRAKE RESERVOIR TANK
REAR BRAKE LIGHT SWITCH 2P (BLACK) CONNECTOR
STARTER MOTOR CABLE
O2 SENSOR WIRE
RESERVE TANK OVERFLOW HOSE


REAR BRAKE PIPES
FRONT BRAKE SUB PIPE
REAR BRAKE HOSE
REAR BRAKE LIGHT SWITCH
2P (BLACK) CONNECTOR
O2 SENSOR 4P (BLACK)
CONNECTOR
O2 SENSOR WIRE


CONNECTORS
· TAIL/BRAKE/TURN SIGNAL 6P (NATURAL)
· OPTION 6P (NATURAL)
LICENSE LIGHT WIRE
SEAT LOCK CABLE
MAIN WIRE HARNESS
SADDLE BAG LOCK CABLE


FRONT MASTER CYLINDER
PROPORTIONAL CONTROL VALVE
LEFT FRONT BRAKE CALIPER
REAR BRAKE CALIPER
REAR MASTER CYLINDER
RIGHT FRONT BRAKE CALIPER

EMISSION CONTROL SYSTEMS

SOURCE OF EMISSIONS

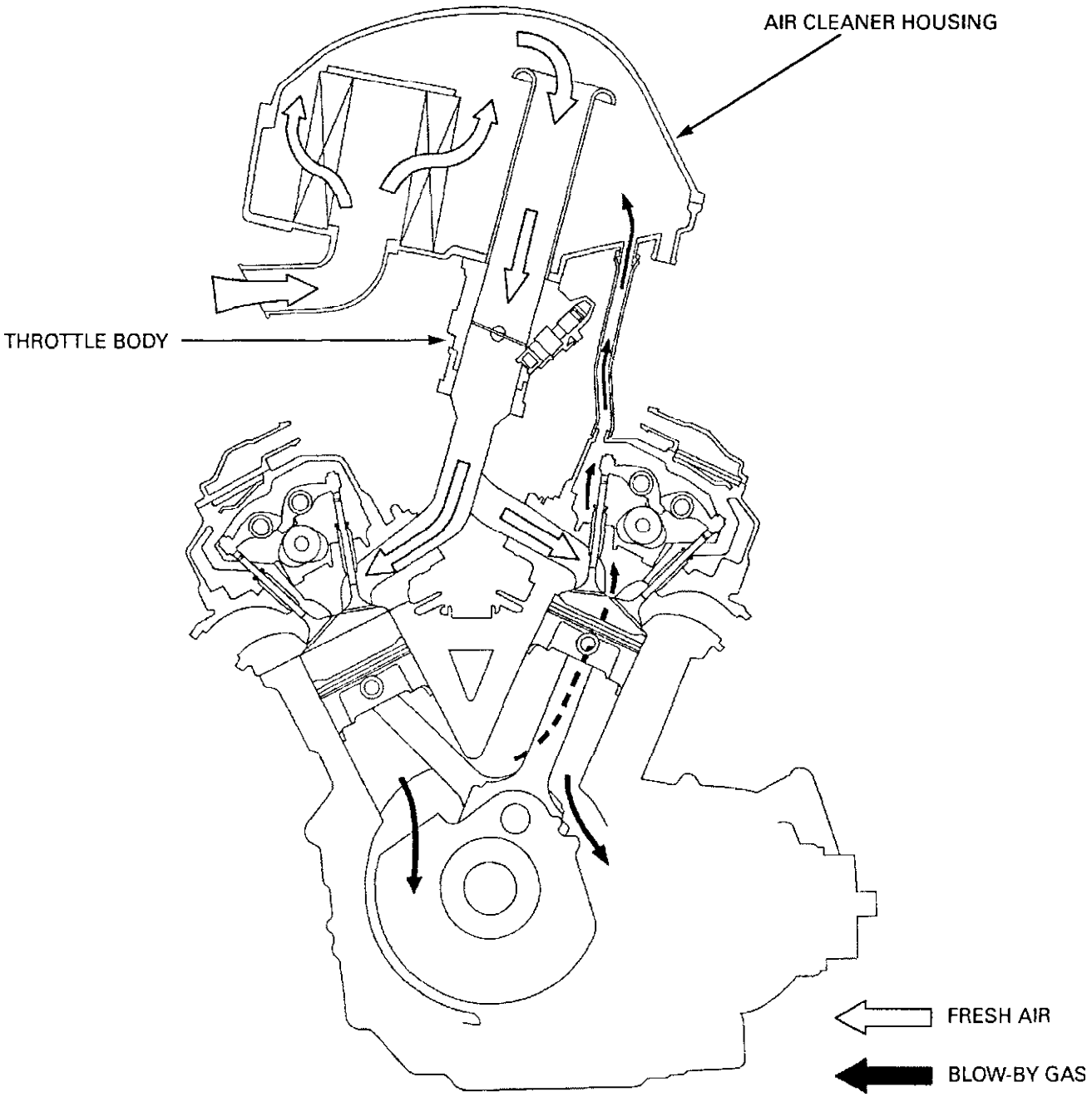
The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons. Control of carbon monoxide, oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subject to sunlight. Carbon monoxide does not react in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

Honda Motor Co., Ltd. utilizes various systems to reduce carbon monoxide, oxides of nitrogen 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

The exhaust emission control system includes of a pulse secondary air supply system and PGM-FI system.

No adjustment should be made about the exhaust emission control systems. The exhaust emission control system is separate from the crank case emission control system.

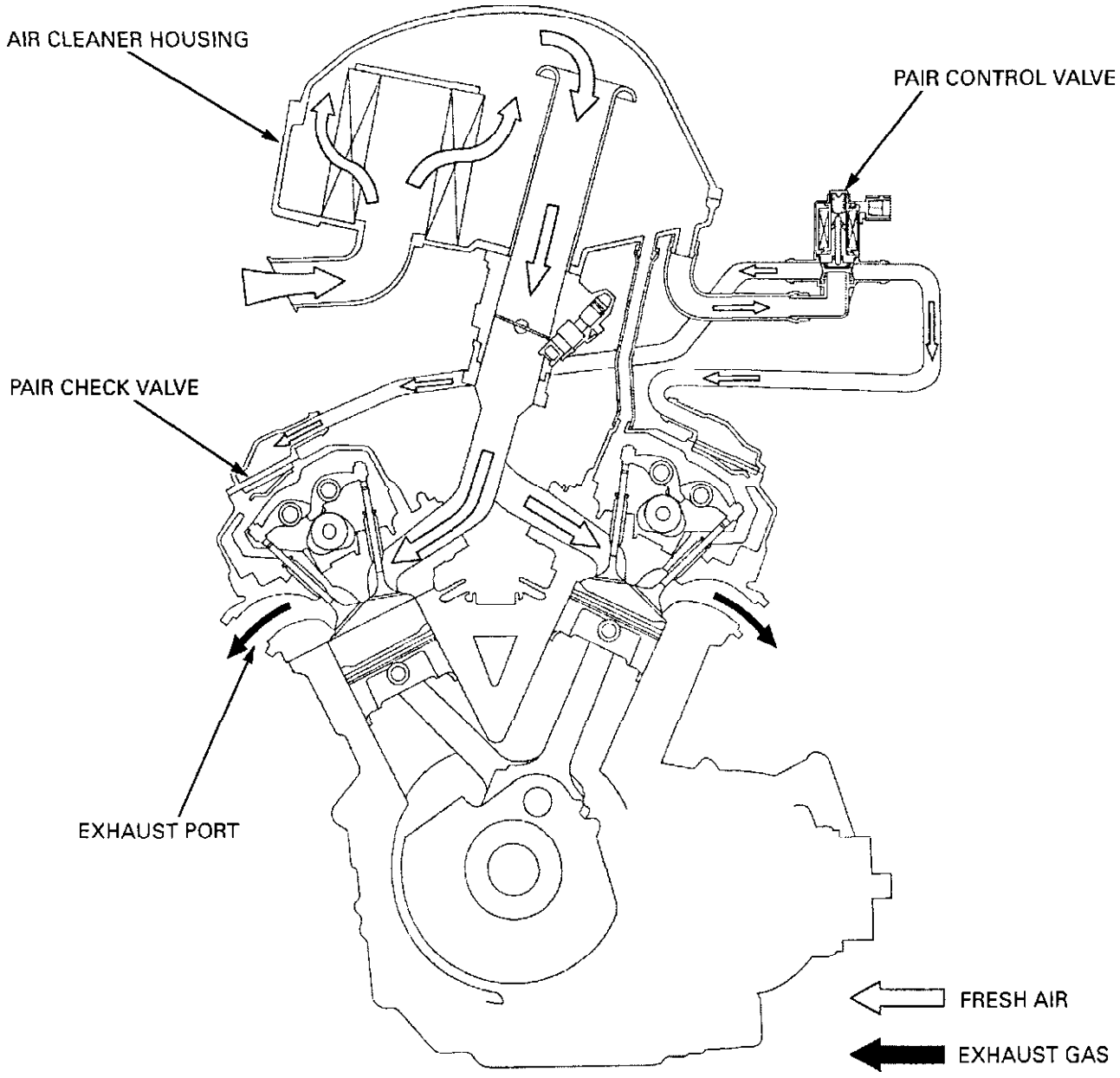
SECONDARY AIR SUPPLY SYSTEM

The secondary air supply system introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR (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.



THREE-WAY CATALYTIC CONVERTER

This motorcycle is equipped with a three-way catalytic converter.

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

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

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 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. TECHNICAL FEATURE

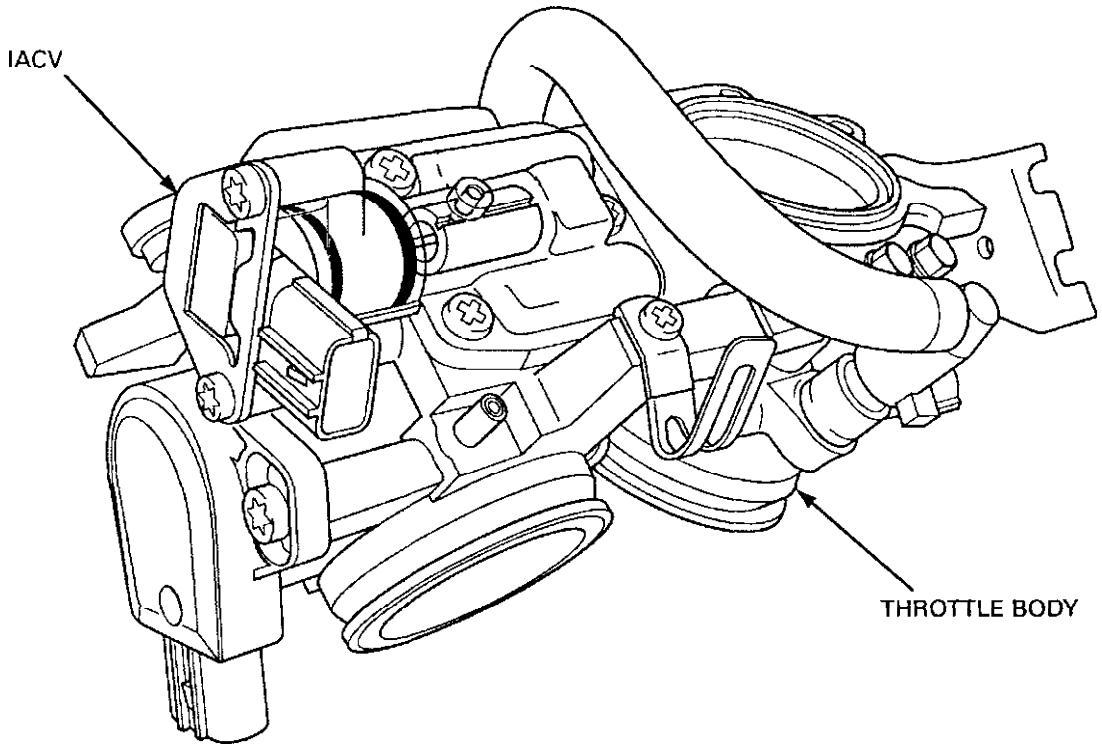
IACV (Idle Air Control Valve)..... 2-2

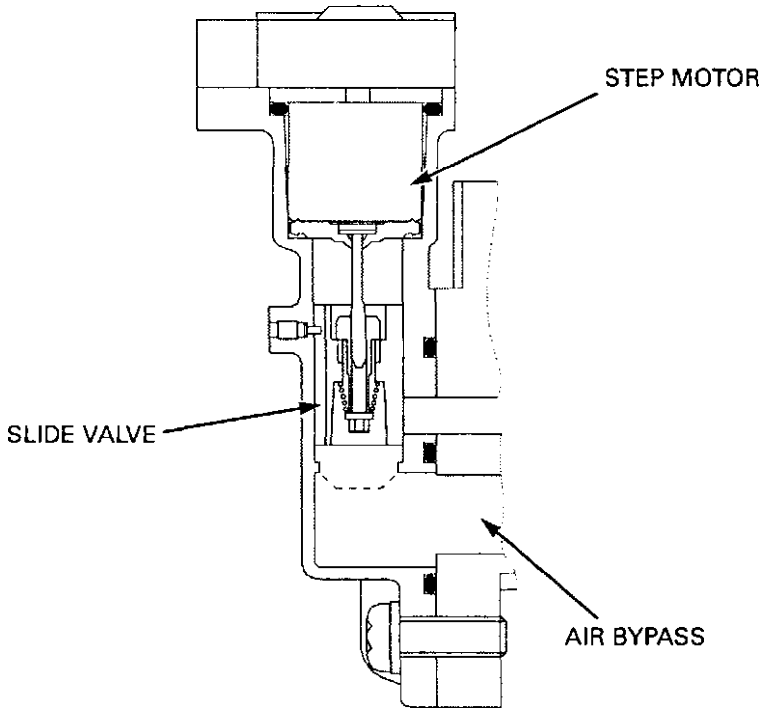
IACV (Idle Air Control Valve)

SUMMARY

This motorcycle adopts an Idle Air Control system for the V-twin engine, this system is composed the IACV that are incorporated into the throttle body. The IACV consists of a step motor and a slide valve, and controls the amount of air bypassed around the closed throttle body. With the ignition switch ON, the amount of inlet air is determined from information detected by the ECT sensor. During engine start-up or while maintaining idle (throttle valve closed), the amount of inlet air is corrected by various sensor's information.

This system eliminates the need for manual idle speed adjustment.





IACV OPERATION

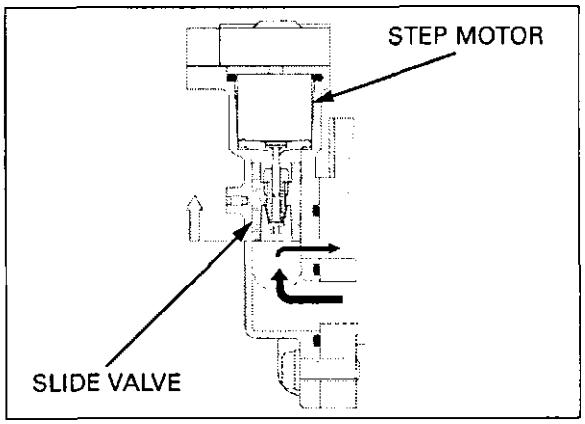
The ECM controls the IACV when engine idling, so the ECM stops to control the IACV operation at closed position in case that the ECM detects the following condition:

- Throttle valve open
- Neutral switch OFF (in gear) and clutch switch ON

When engine idling, from ignition switch ON to warming up, the ECM control the IACV step motor as following operations:

With the ignition switch ON

When the ignition switch ON, the IACV activates initial function, idle-open-idle position. There will be a step motor operating sound.



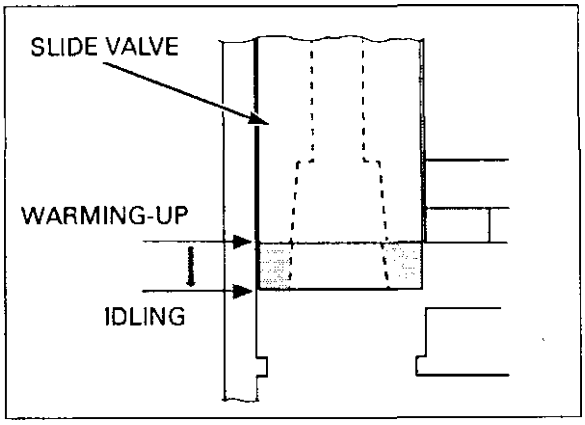
Start the engine - warming up

This optimizes the bypass opening with the throttle valve closed, and the corrected amount of inlet air passes through allowing proper engine start up.

After the engine has started, the ECM controls the IACV step motor to move the slide valve to the left by applying various sensor's information. This results in a reduced amount of bypassed air compared to the amount during engine start-up, and initiates engine warm-up for several minutes.

After warming up - idling

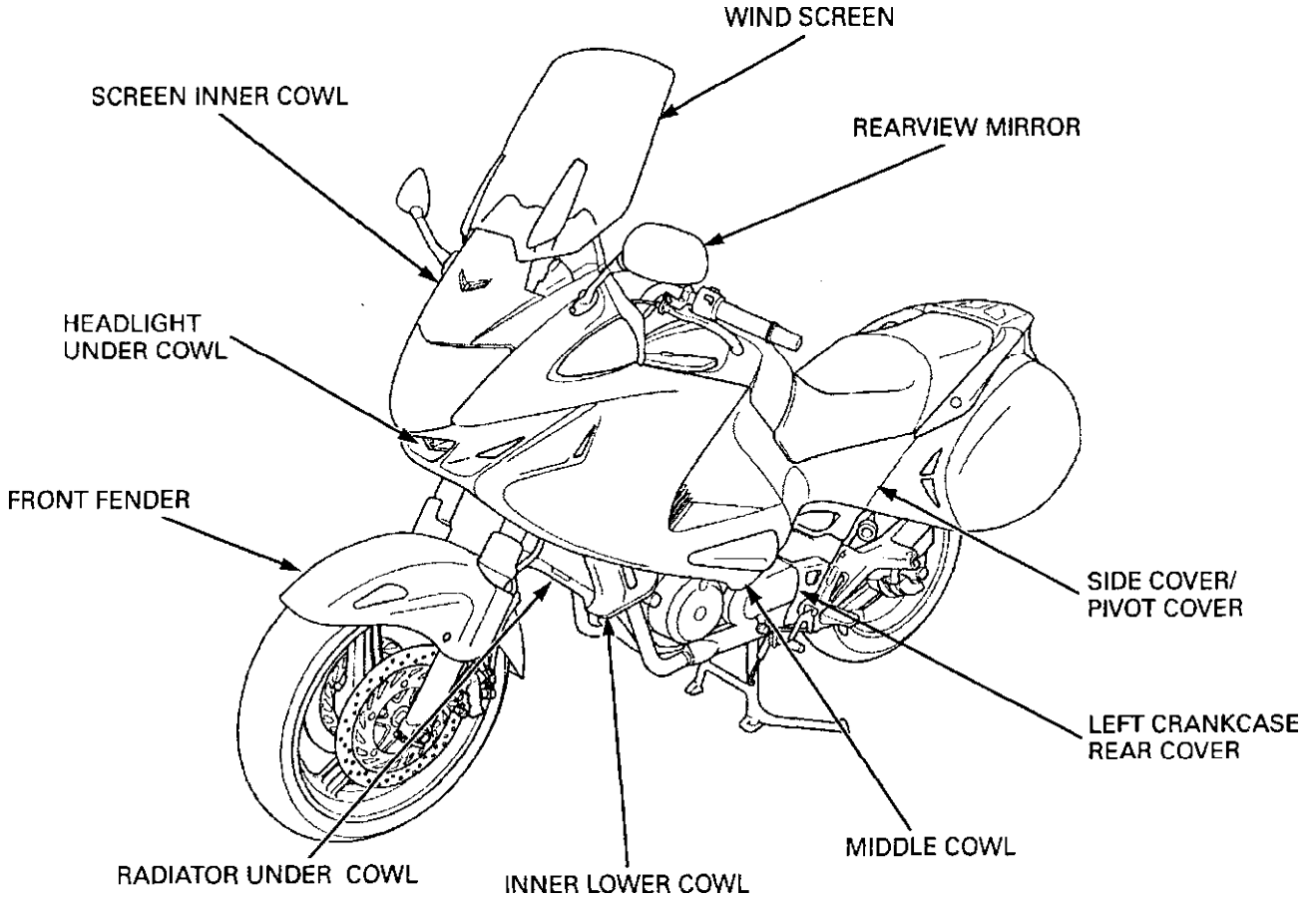
When the ECM receives input signals which indicates the completion of engine warm-up, it operates the step motor to move the slide valve to the left. This results in a reduced amount of bypassed air compared to the amount during engine warm-up, which allows proper engine idle to be maintained.

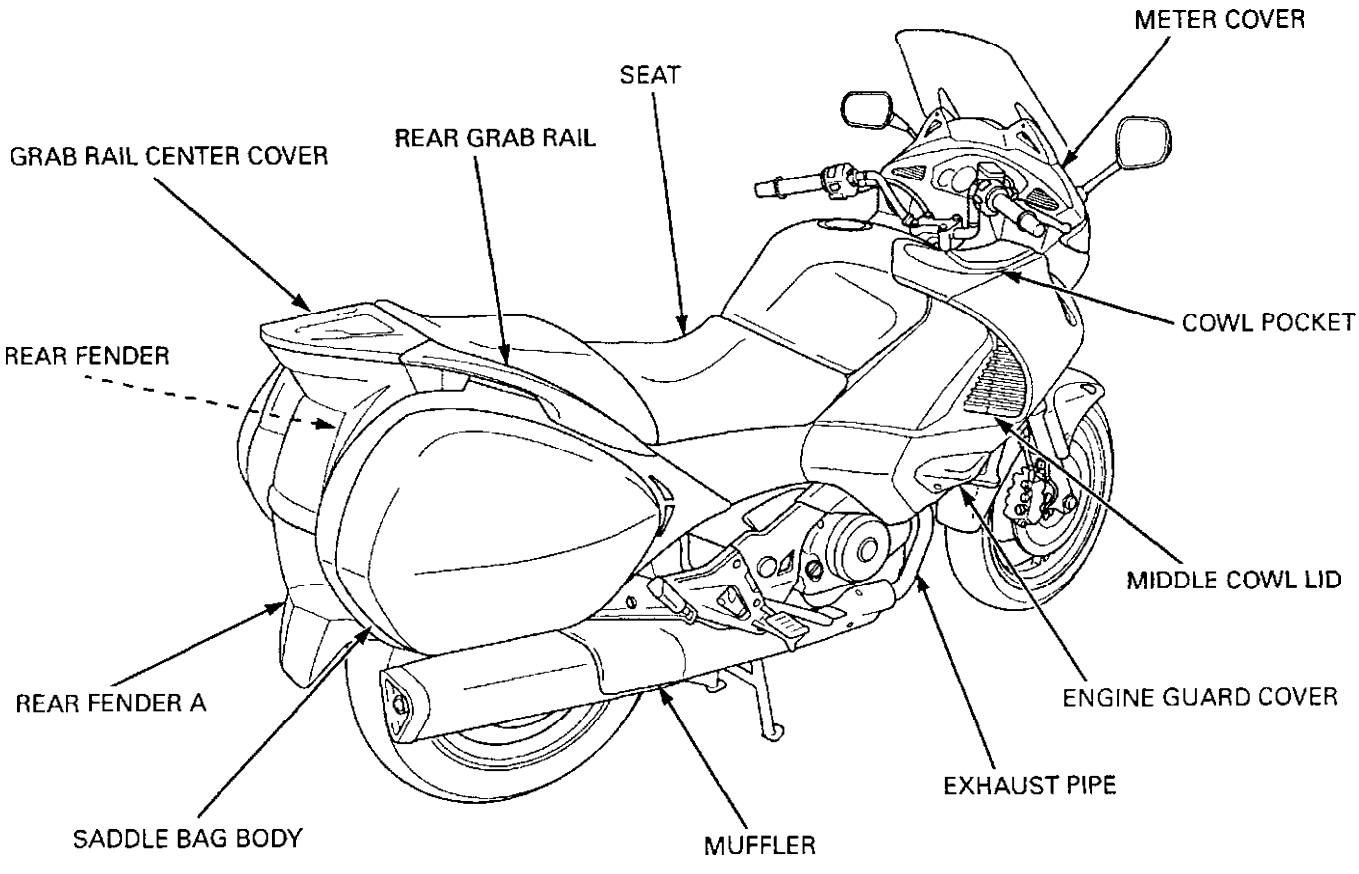


3. FRAME/BODY PANELS/EXHAUST SYSTEM

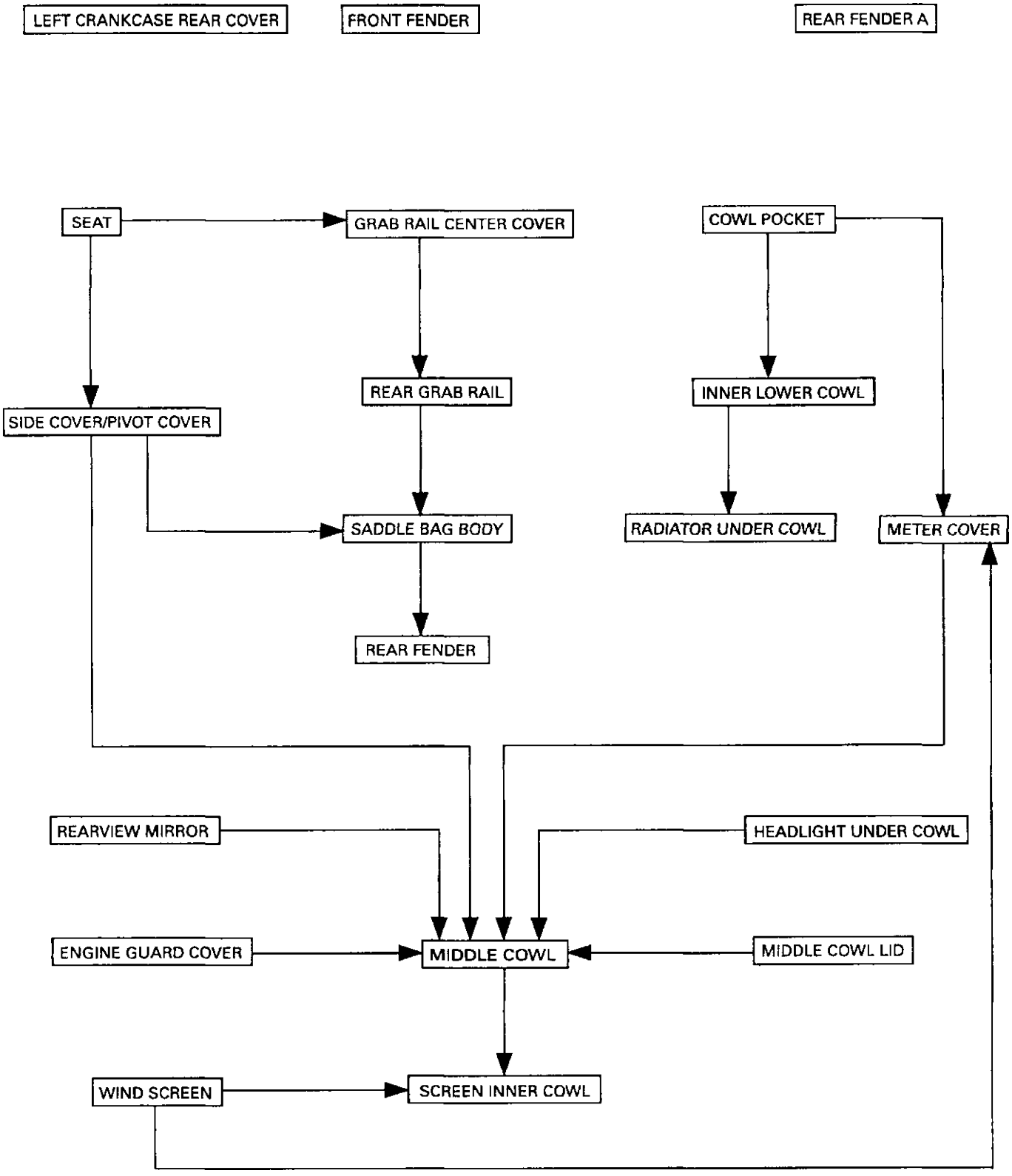
BODY PANEL LOCATION 3-2
SERVICE INFORMATION 3-4
TROUBLESHOOTING 3-4
SEAT 3-5
SIDE COVER/PIVOT COVER 3-5
REAR FENDER A 3-6
SADDLE BAG BODY 3-7
HEADLIGHT UNDER COWL 3-8
MIDDLE COWL LID 3-9
ENGINE GUARD COVER 3-9
REARVIEW MIRROR 3-9
COWL POCKET 3-10
METER COVER 3-10
MIDDLE COWL 3-11
WINDSCREEN 3-13
SCREEN INNER COWL 3-14
INNER LOWER COWL 3-14
LEFT CRANKCASE REAR COVER 3-15
FRONT FENDER 3-15
REAR FENDER 3-16
EXHAUST SYSTEM 3-17
SIDE STAND 3-21
MAIN STAND 3-21

BODY PANEL LOCATION





BODY PANEL REMOVAL CHART



SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the body panels, fuel tank 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 with new ones 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 pipe joint nuts first, then tighten the mounting fasteners.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Left crankcase rear cover bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt
Upper cowl stay flange bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Seat rail upper flange bolt	59 N·m (6.0 kgf·m, 44 lbf·ft)	
Seat rail lower flange bolt	59 N·m (6.0 kgf·m, 44 lbf·ft)	
Exhaust pipe joint nut	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Rear fender bolt (upper/lower)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear fender bolt (side)	7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)	
Muffler band nut	17 N·m (1.7 kgf·m, 13 lbf·ft)	
Step holder bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Main stand pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Side stand pivot lock nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

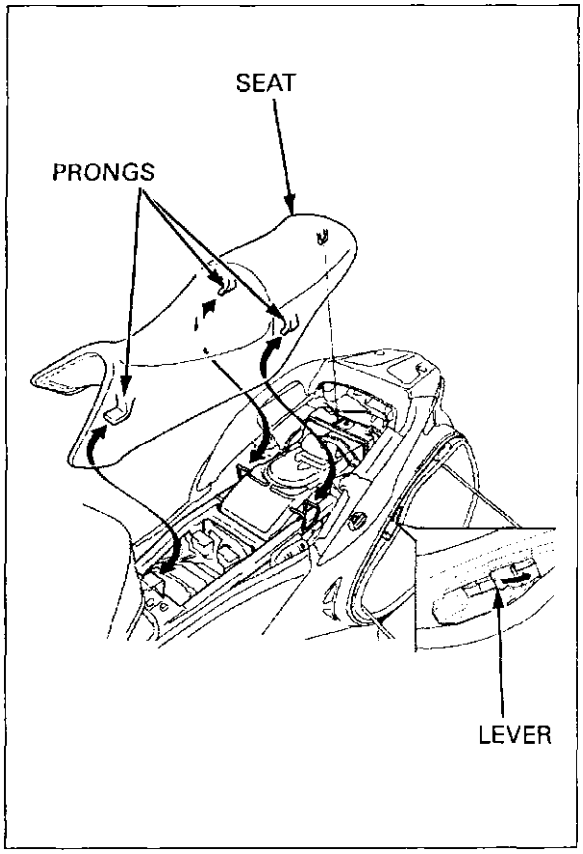
Poor performance
- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

SEAT

Open the left saddle bag using the ignition key.

Pull the lever and unlock the seat, then remove the seat off.

Install the seat assembly by inserting its prongs under the raised lip of the frame properly.



SIDE COVER/PIVOT COVER

REMOVAL/INSTALLATION

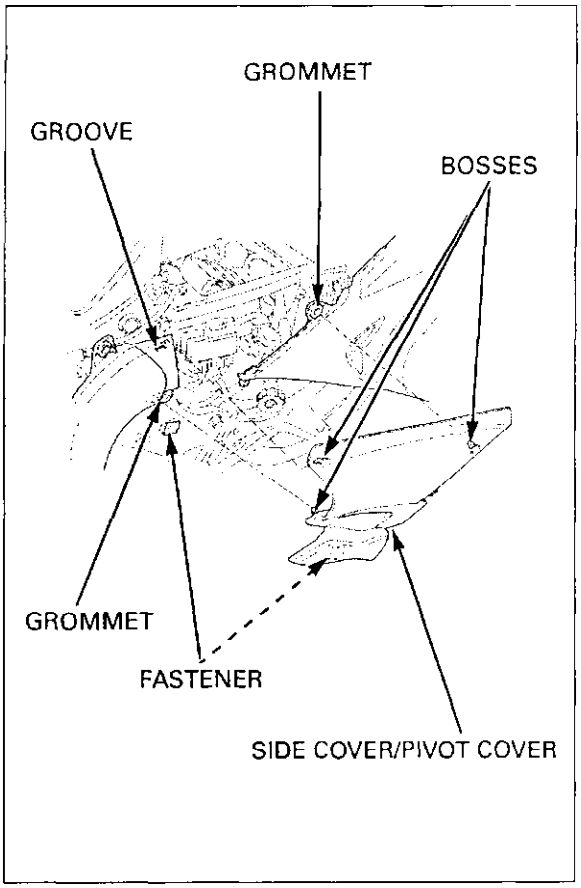
Be careful not to damage the side cover bosses.

Remove the seat (page 3-5).

Release the bosses on the side cover from the frame grommets and groove of the middle cowl.

Remove the side cover/pivot cover by releasing its fastener from the frame fastener and groove of the middle cowl.

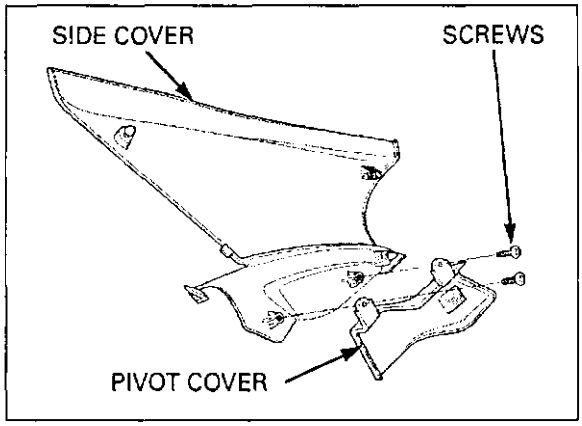
Install the side cover by inserting its bosses into the frame grommets and groove of the middle cowl.



DISASSEMBLY/ASSEMBLY

Remove the screws and pivot cover from the side cover.

Assembly is in the reverse order of disassembly.

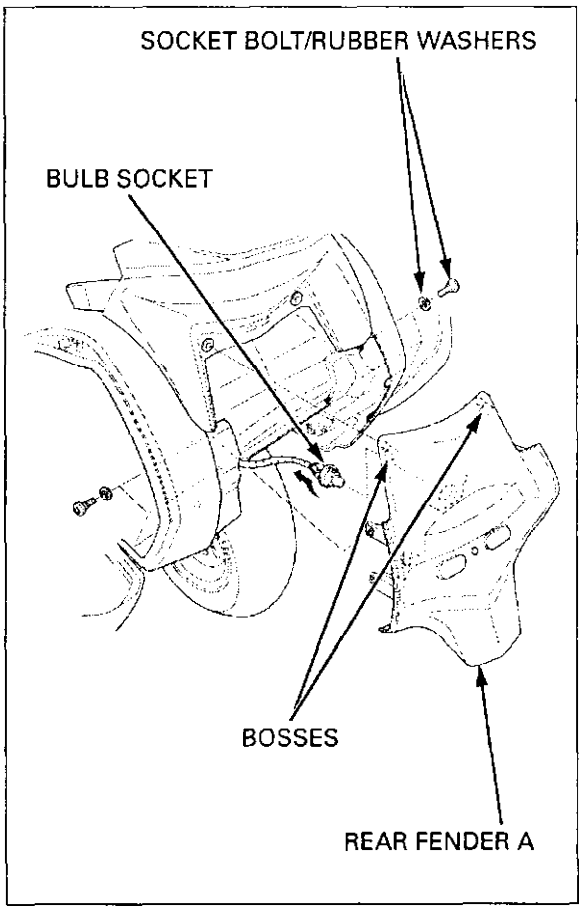


REAR FENDER A

Open the saddle bag using the ignition key (page 3-5).

Remove the socket bolts and rubber washers.
Loosen the saddle bag socket bolts, then make sure the clearance.
Release the bosses from the grommets being careful not to damage the tab, then remove the rear fender A.
Remove the license light bulb socket from the rear fender A (page 22-6).

Installation is in the reverse order of removal.



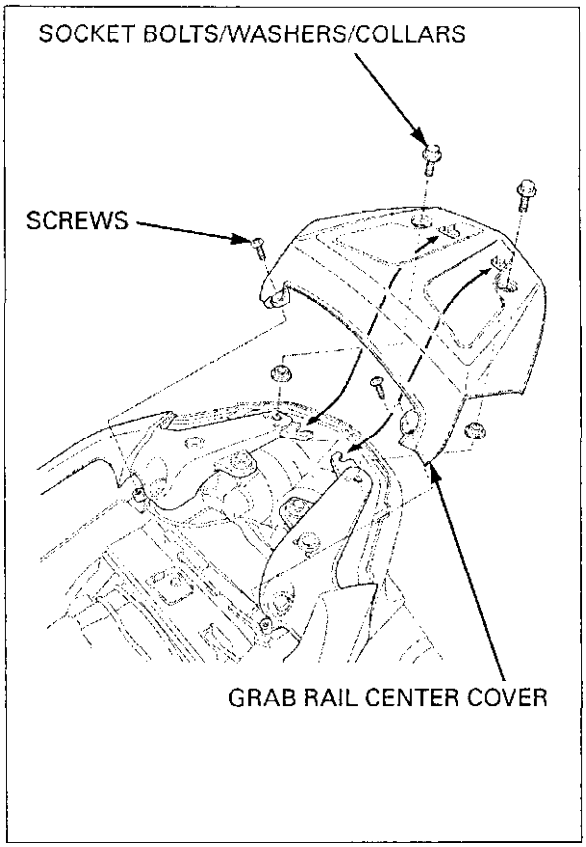
SADDLE BAG BODY

GRAB RAILCENTER COVER

Remove the seat (page 3-5).

Remove the socket bolts, screws, washers and collars.
Remove the grab rail center cover.

- At installation, align the tabs on the grab rail center cover to the grooves on the rear grab rails.



REAR GRAB RAIL

Remove the grab rail center cover (page 3-7).

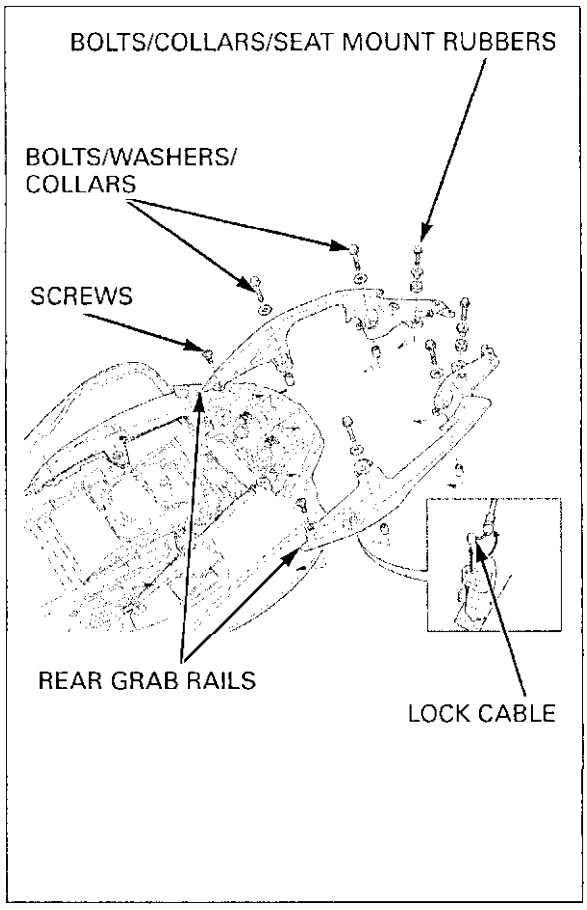
Remove the following:

- Screws
- Bolts/washers/collars
- Bolts/collars/seat mount rubbers

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

Remove the rear grab rails.

Installation is in the reverse order of removal.



SADDLE BAG BODY

Remove the rear grab rail (page 3-7).

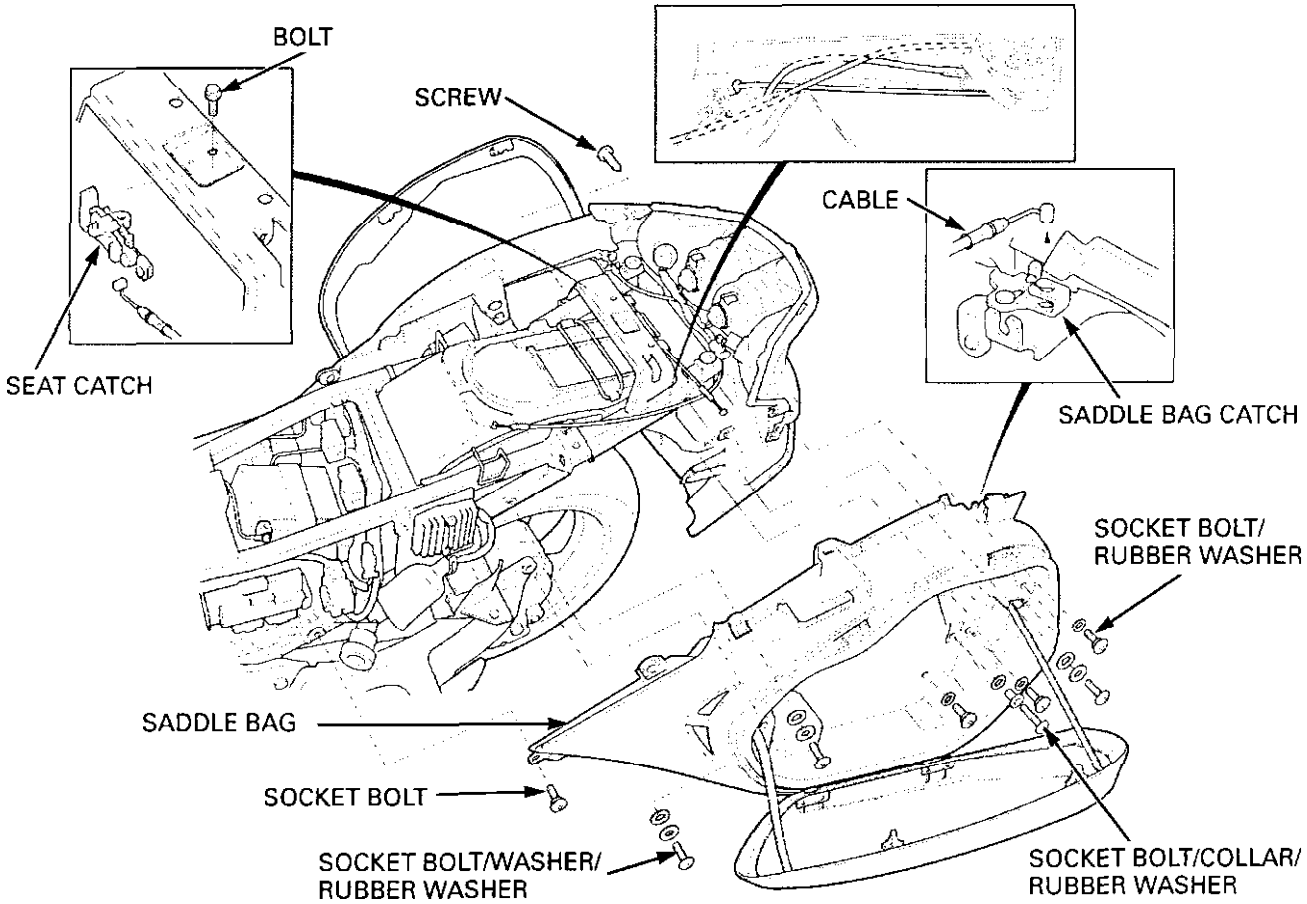
Disconnect the cable from the saddle bag catch (left side only).
Remove the bolt, seat catch and disconnect the cable from the seat catch (right side only).

Remove the following:

- Screw
- Socket bolt
- Socket bolts/washers/rubber washer
- Socket bolt/collar/rubber washer
- Socket bolts/rubber washers

Release the groove on the saddlebag body from the tab on the frame and then remove the saddle bag.

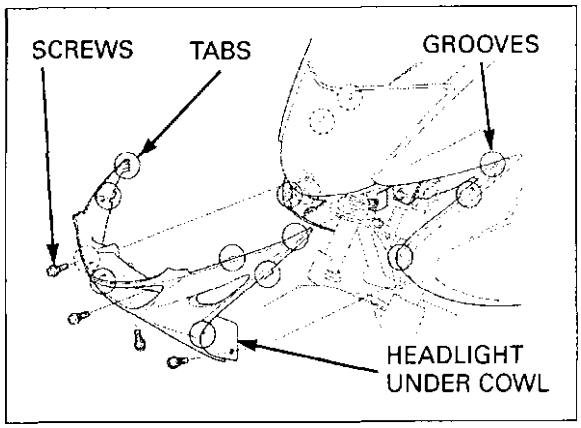
Installation is in the reverse order of removal.



HEADLIGHT UNDER COWL

Remove the screws and headlight under cowl.

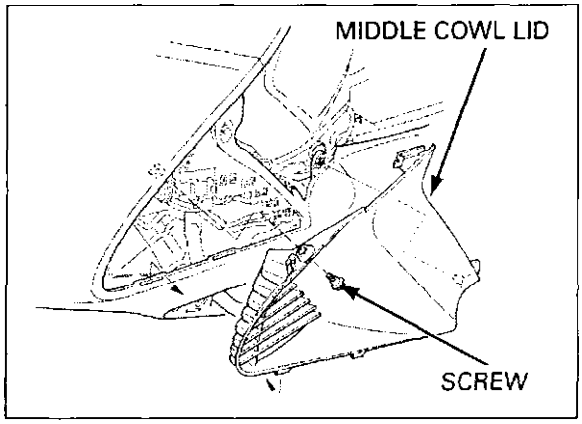
At installation, align the tabs on the headlight under cowl to the grooves on the headlight unit and middle cowl.



MIDDLE COWL LID

Remove the screw and middle cowl lid.

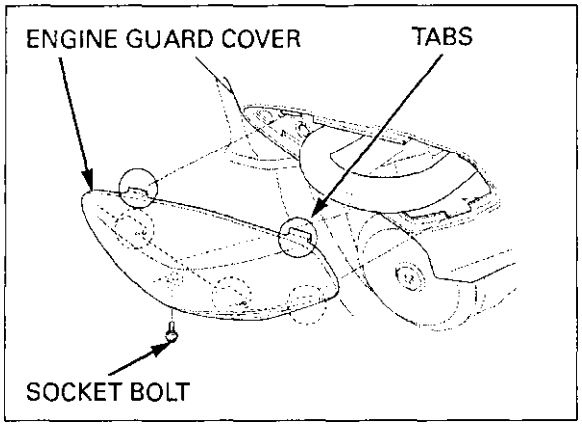
Installation is in the reverse order of removal.



ENGINE GUARD COVER

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

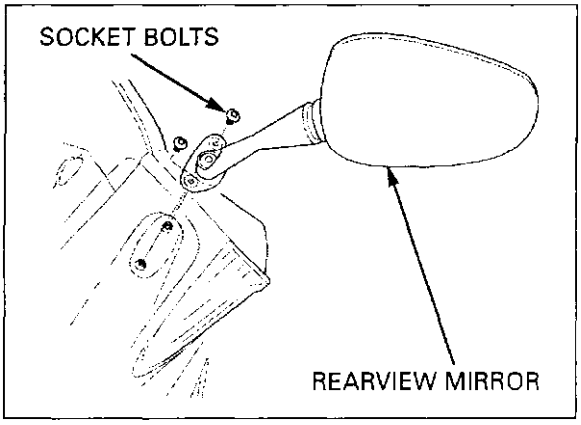
Install the engine guard cover with its tabs aligning the grooves on the middle cowl.



REARVIEW MIRROR

Remove the socket bolts and rearview mirror.

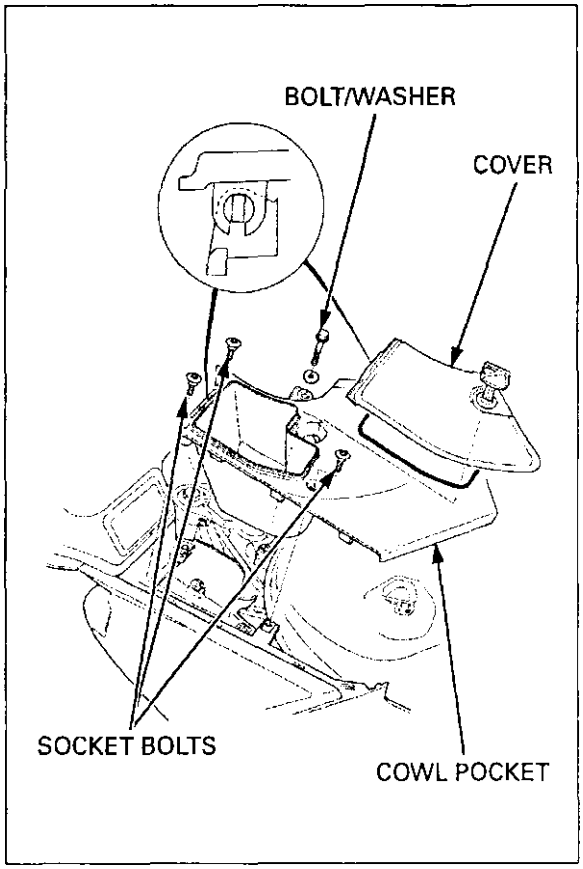
Installation is in the reverse order of removal.



COWL POCKET

Open and remove the cover.
Remove the socket bolts, bolt, washer and cowl pocket.

Installation is in the reverse order of removal.

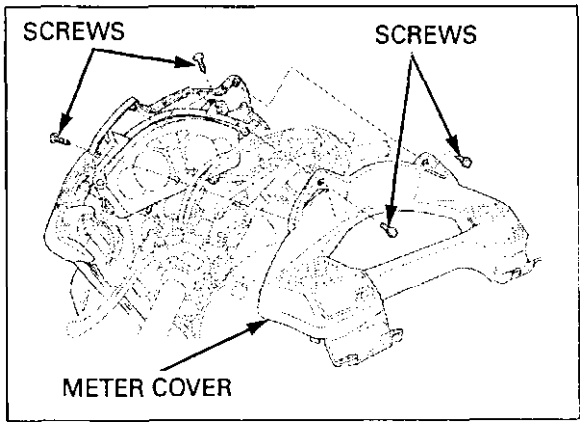


METER COVER

Remove the right and left cowl pocket (page 3-10).
Remove the windscreen (page 3-13).
Remove the inner lid (page 3-14).

Remove the screws.
Release the tabs on the meter cover from the grooves on the screen inner cowl, then remove the meter cover

Installation is in the reverse order of removal.



MIDDLE COWL

RIGHT MIDDLE COWL

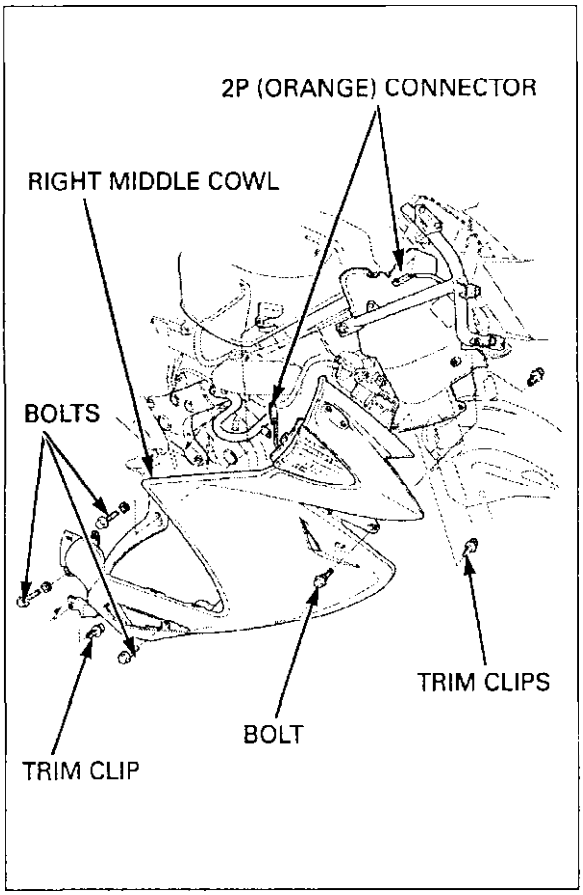
REMOVAL/INSTALLATION

Remove the following:

- Rearview mirror (page 3-9)
- Headlight under cowl (page 3-8)
- Side cover/pivot cover (page 3-5)
- Middle cowl lid (page 3-9)
- Engine guard cover (page 3-9)
- Meter cover (page 3-10)

Disconnect the right front turn signal 2P (Sky blue) connector.
Remove the bolts, screw and trim clips.
Remove the right middle cowl.

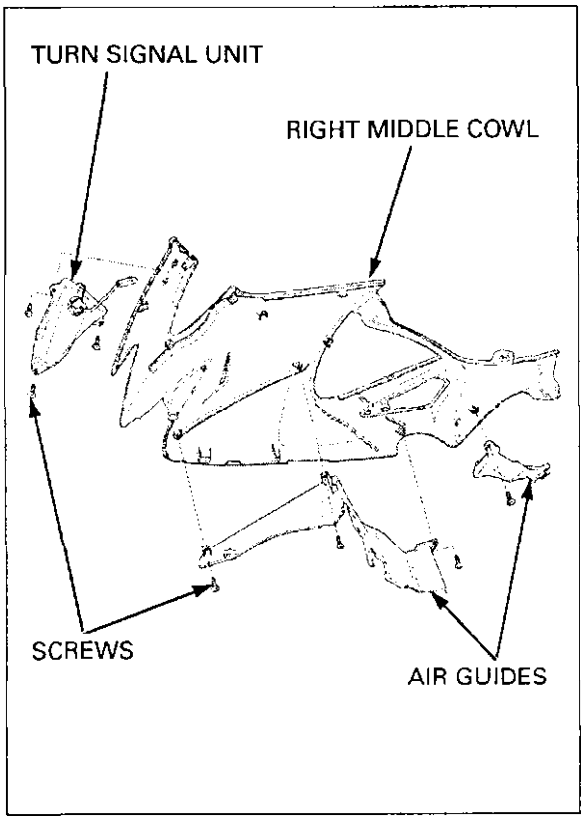
Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Remove the screws and right front turn signal unit.
Remove the screws and right middle cowl air guides.

Assembly is in the reverse order of disassembly.



LEFT MIDDLE COWL

REMOVAL/INSTALLATION

Remove the following:

- Rearview mirror (page 3-9)
- Headlight under cowl (page 3-8)
- Side cover/pivot cover (page 3-5)
- Middle cowl lid (page 3-9)
- Engine guard cover (page 3-9)
- Meter cover (page 3-10)

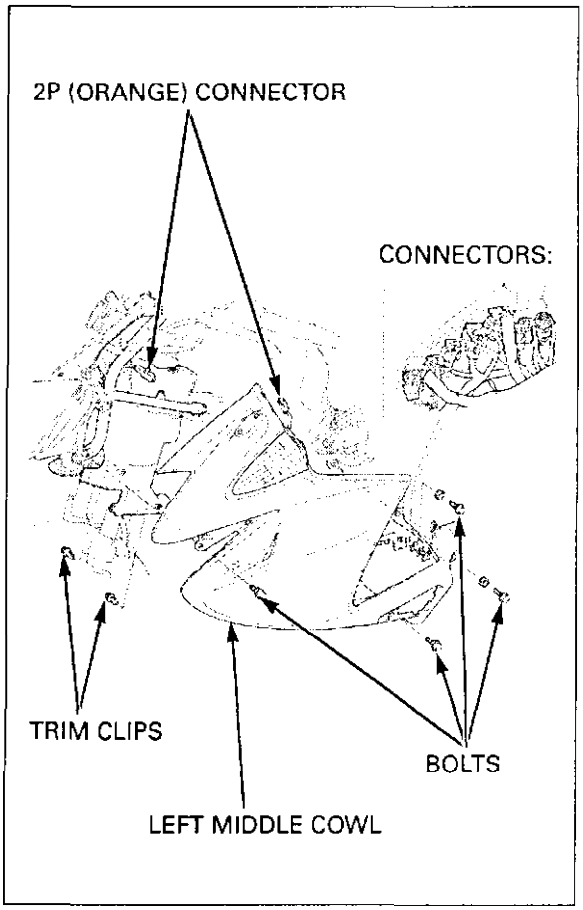
Disconnect the left front turn signal 2P (Orange) connector.
Remove the bolts, screw and trim clips.

Remove the following connector from the left middle cowl:

- Immobilizer 4P (Natural)
- Ignition switch 4P (Natural)
- Right handlebar switch 9P (Red)
- Right handlebar switch 2P (Red)
- Left handlebar switch 4P (Natural)
- Left handlebar switch 6P (Black)
- Front wheel speed sensor 2P (Orange)

Remove the left middle cowl.

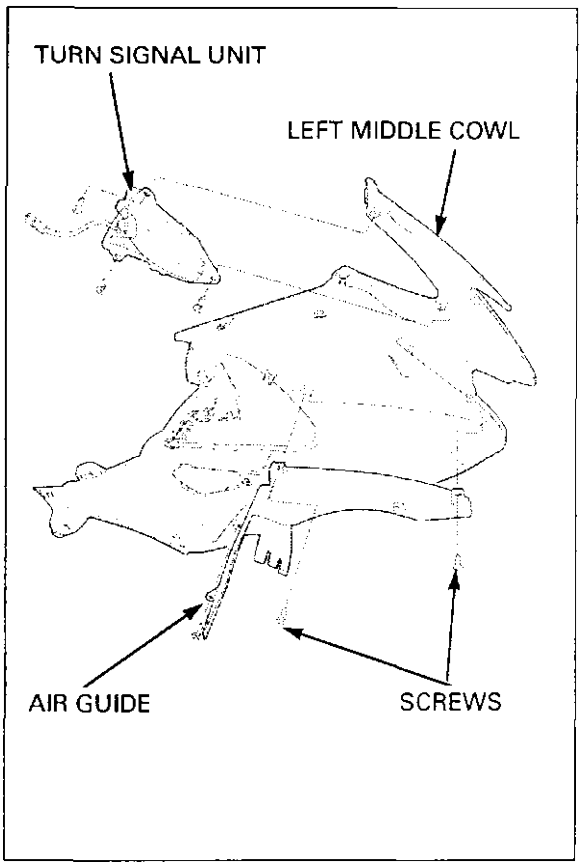
Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Remove the screws and left front turn signal unit.
Remove the screws and left middle cowl air guide.

Assembly is in the reverse order of disassembly.



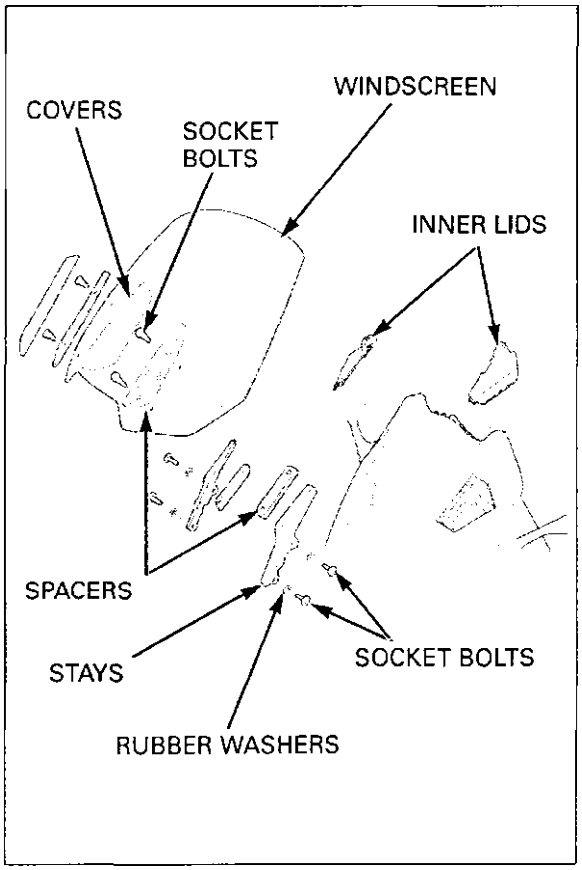
WINDSCREEN

REMOVAL/INSTALLATION

Remove the right/left windscreen covers.
Remove the socket bolts, right/left screen spacers and windscreen.

Remove the right and left inner lids.
Remove the socket bolts, rubber washers and windscreen stays.

Installation is in the reverse order of removal.

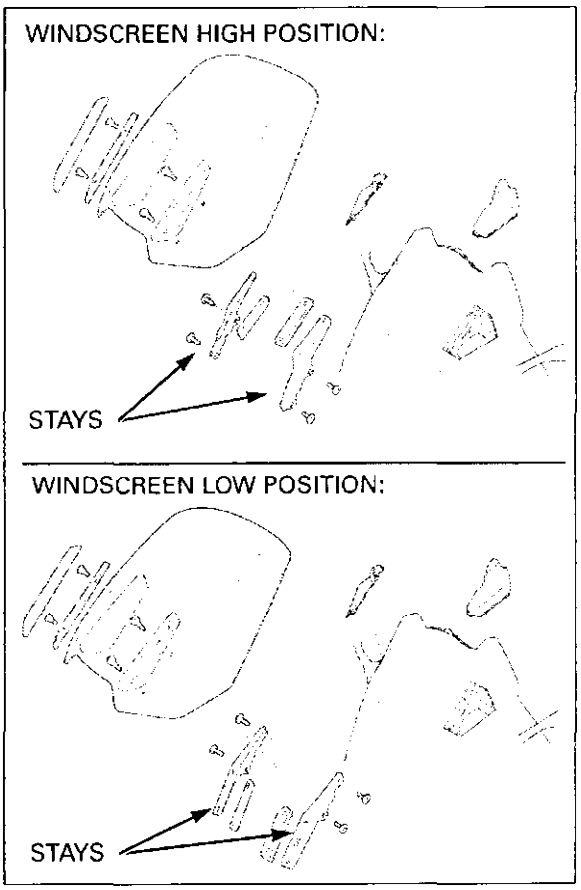


WINDSCREEN HEIGHT ADJUSTMENT

Remove the windscreen (page 3-13).

When the wind screen height is ready to be adjusted, exchange the right and left windscreen stay.

Installation is in the reverse order of removal.

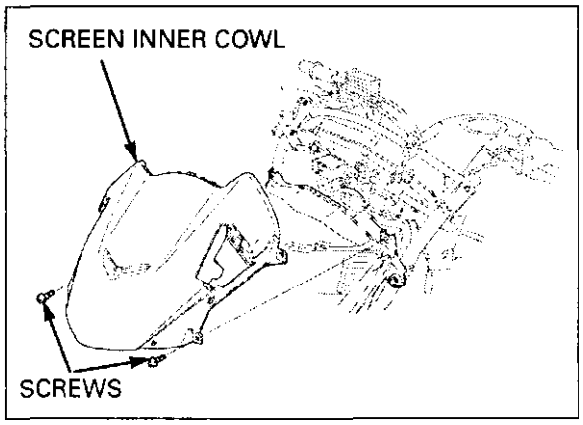


SCREEN INNER COWL

Remove the right/left middle cowls (page 3-11).
Remove the windscreen (page 3-13).

Remove the screws and screen inner cowl.

Installation is in the reverse order of removal.



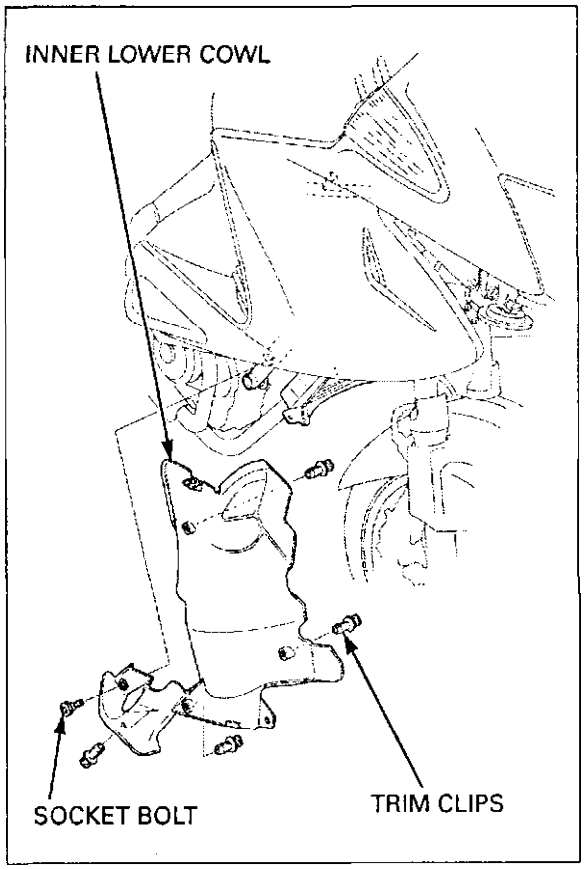
INNER LOWER COWL

INNER LOWER COWL

Remove the headlight under cowl (page 3-8).
Remove the cowl pocket (page 3-10).

Remove the trim clips and socket bolt, then remove the inner lower cowl.

Installation is in the reverse order of removal.

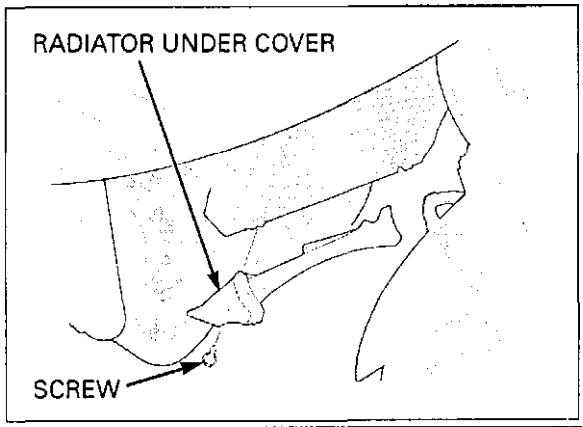


RADIATOR UNDER COVER

Remove the inner lower cowl (page 3-14).

Remove the screw and radiator under cowl.

Installation is in the reverse order of removal.

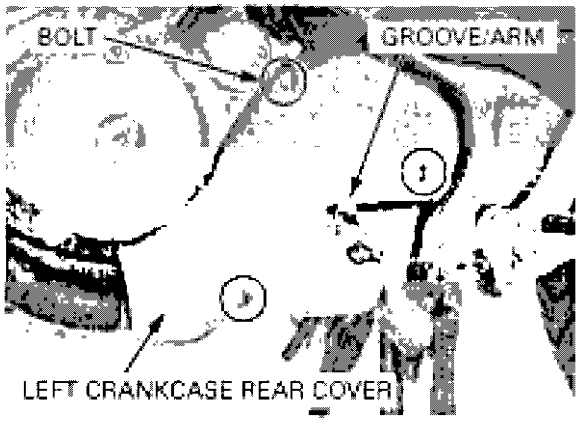


LEFT CRANKCASE REAR COVER

Remove the bolts and left crankcase rear cover by releasing its grove from the gearshift arm.

Installation is in the reverse order of removal.

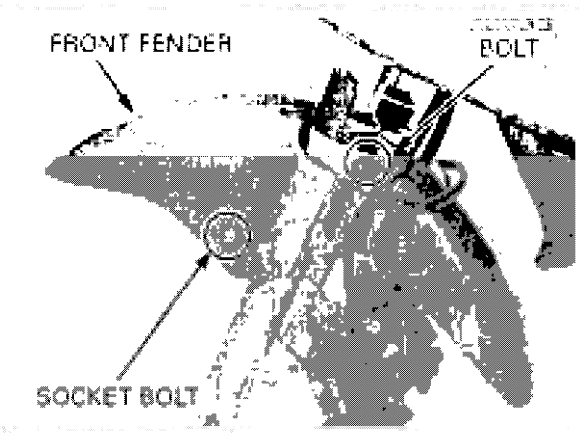
TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



FRONT FENDER

Remove the front wheel (page 15-12).

Remove the bolts and lift the front fender up.

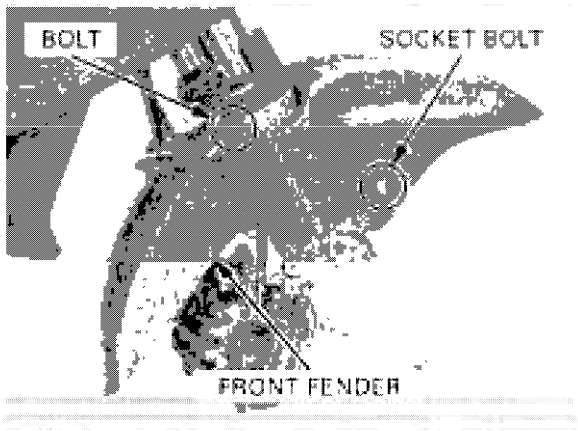


Rotate the fork legs and remove the front fender downward.

NOTE:

To prevent twisting the brake hose, do not rotate the fork legs more than necessary to remove the front fender.

Installation is in the reverse order of removal.



REAR FENDER

REMOVAL/INSTALLATION

Remove the saddle bag body (page 3-7).
Remove the brake/tail light unit (page 22-6).

Remove the following from the rear fender:

- ECM
- Fuse boxes
- Starter relay switch
- Relay connectors

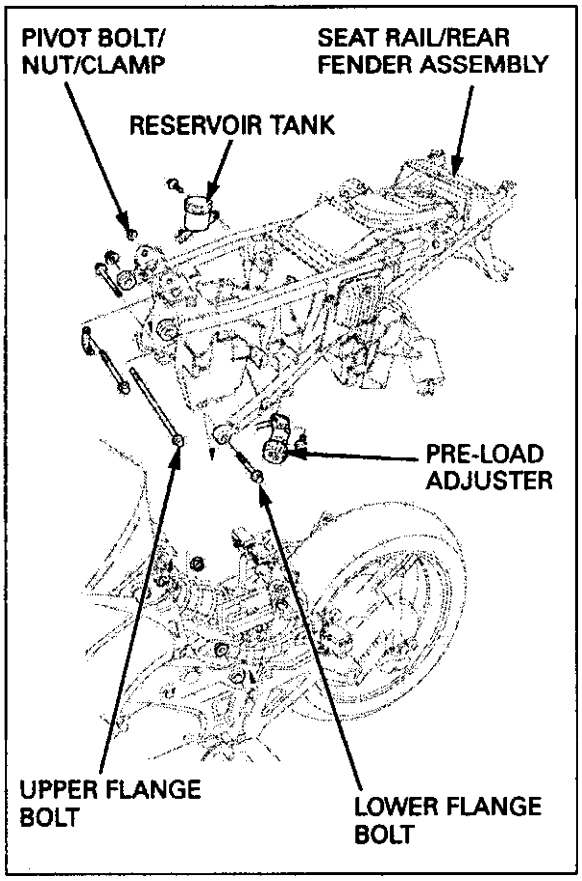
Remove the fuel tank pivot bolt/nut and clamp.
Remove the bolt and rear brake reservoir tank.
Remove the bolt and pre-load adjuster.

Remove the seat rail upper/lower flange bolts/nuts.
Remove the seat rail/rear fender assembly.

Route the wires properly (page 1-35).

Installation is in the reverse order of removal.

TORQUE:
Seat rail upper flange bolt:
59 N·m (6.0 kgf·m, 44 lbf·ft)
Seat rail lower flange bolt:
59 N·m (6.0 kgf·m, 44 lbf·ft)

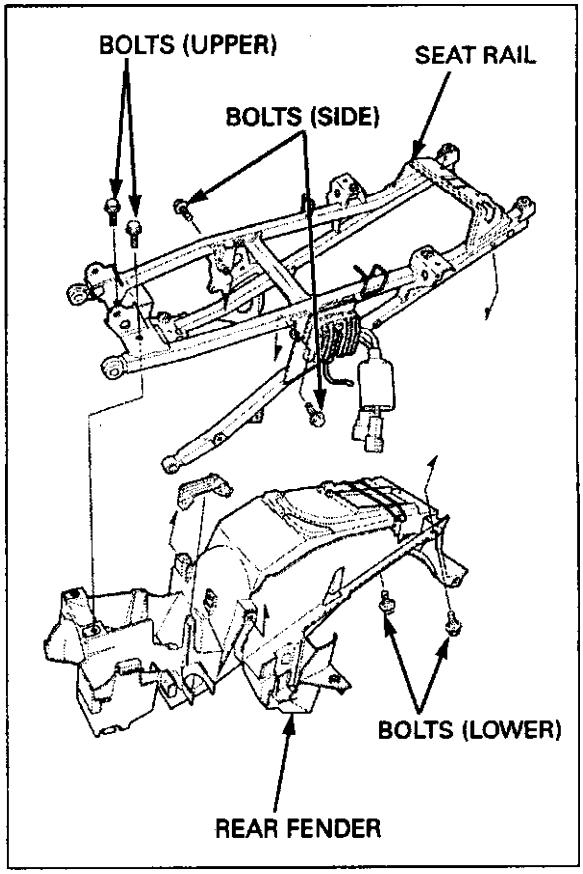


DISASSEMBLY/ASSEMBLY

Remove the bolts, then disassemble the rear fender form the seat rail.

Assembly is in the reverse order of disassembly.

TORQUE:
Rear fender bolt (upper/lower):
12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear fender bolt (side):
7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)



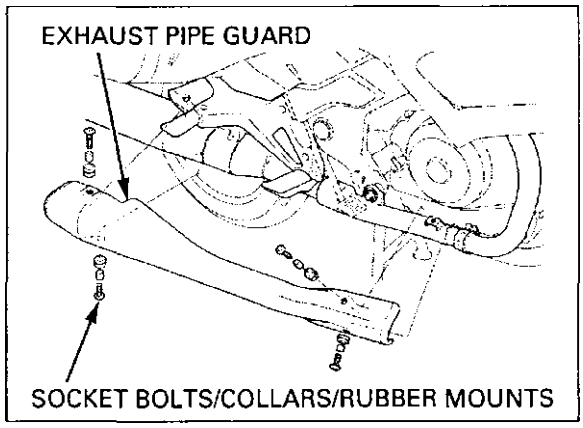
EXHAUST SYSTEM

REMOVAL

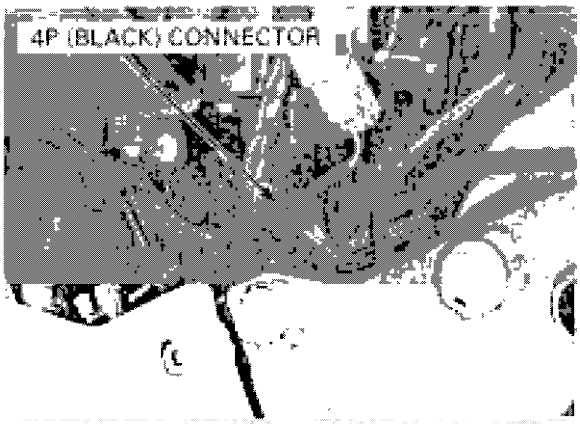
MUFFLER

Remove the side cover/pivot cover (page 3-5).

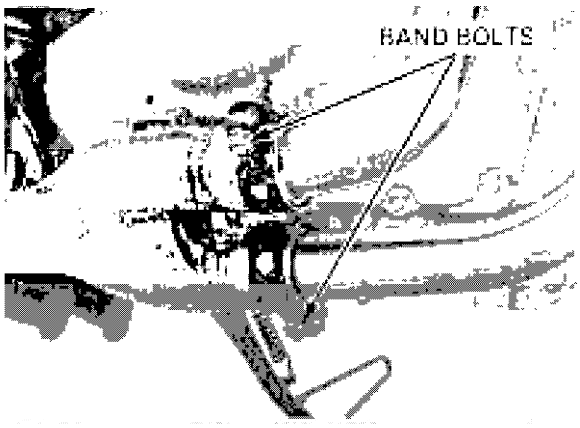
Remove the socket bolts, collars, rubber mounts and exhaust pipe guard.



Disconnect the O_2 sensor 4P (Black) connector.

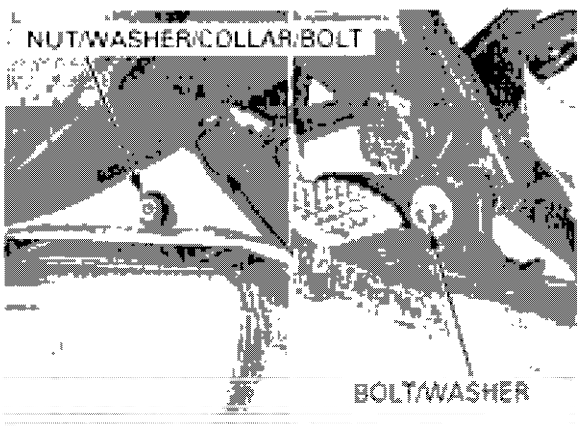


Loosen the muffler band bolts.



Remove the nut, washer, collar and muffler rear mounting bolt.
Remove the muffler front mounting bolt and washer.

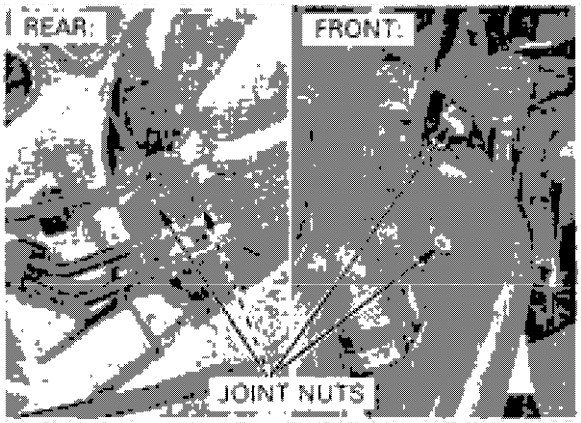
Remove the muffler.



EXHAUST PIPE

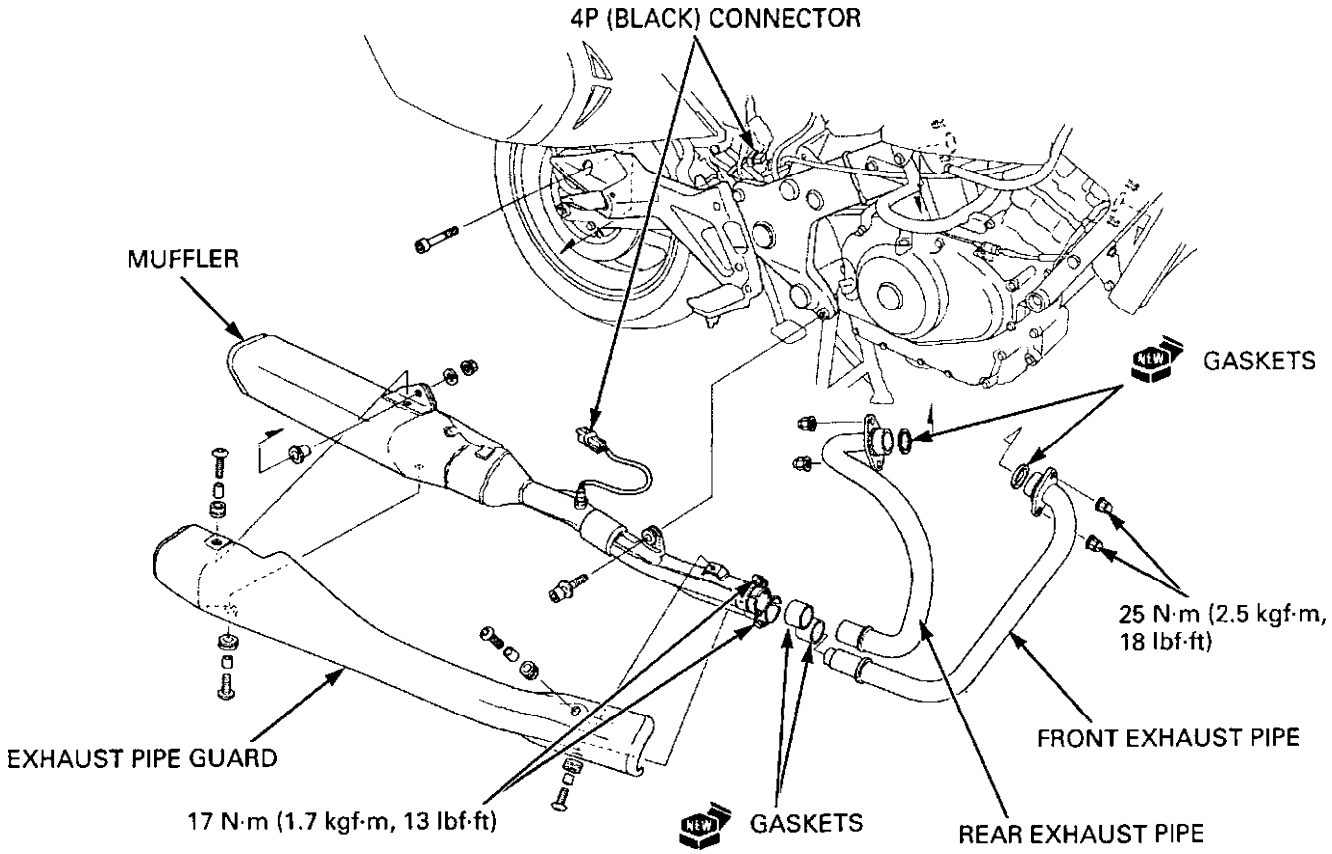
Remove the exhaust pipe joint nuts.

Remove the front/rear exhaust pipes.



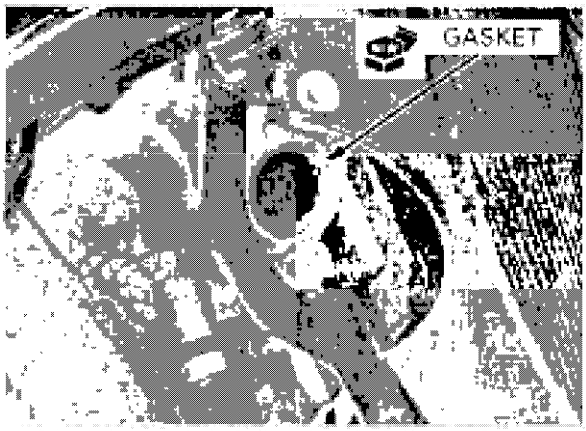
Remove the front and rear gaskets.

INSTALLATION



EXHAUST PIPE

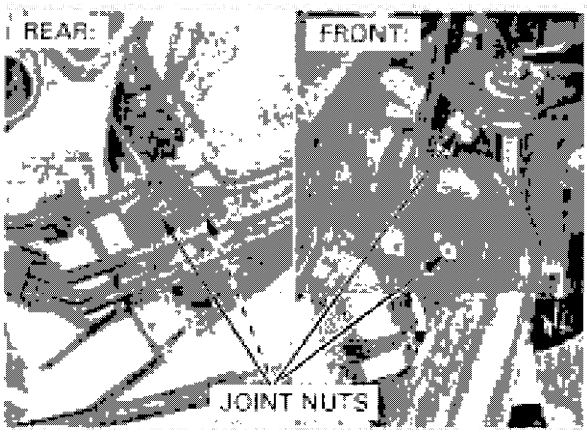
Install a new front and rear exhaust pipe gaskets.



Install the front/rear exhaust pipes and muffler.

Tighten the exhaust pipe joint nuts to the specified torque.

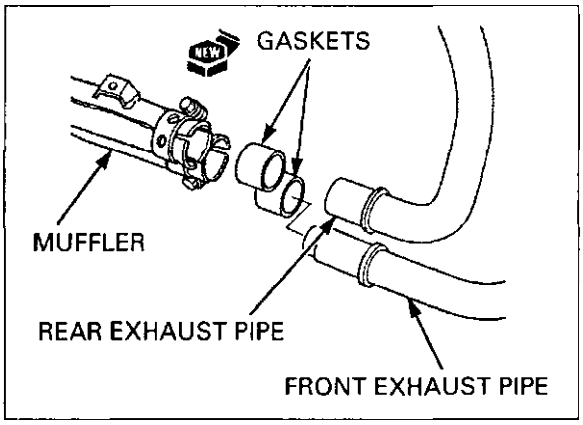
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



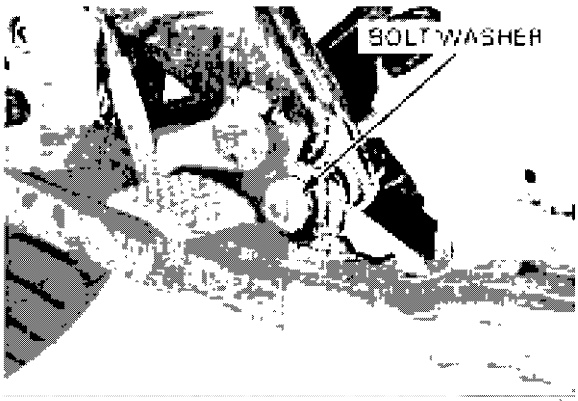
MUFFLER

Install a new muffler gaskets to the front and rear exhaust pipe.

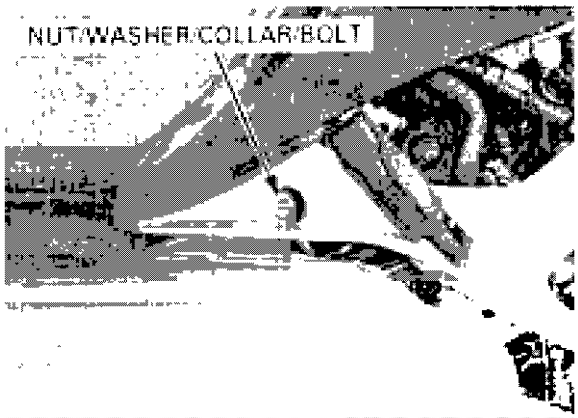
Install the muffler to the front and rear exhaust pipe.



Install and tighten the muffler front mounting bolt securely.

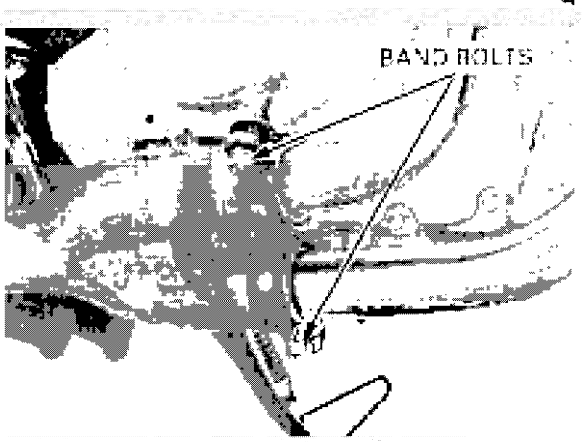


Install and tighten the muffler rear mounting bolt securely.

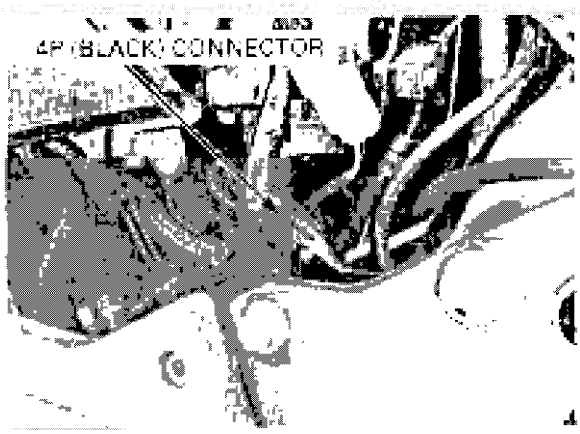


Tighten the muffler band bolts to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)

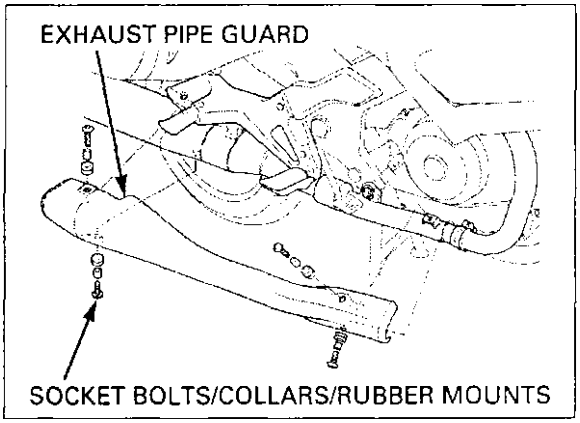


Connect the O_2 sensor 4P (Black) connector.



Install the exhaust pipe guard, rubber mounts and collars.
Install and tighten the socket bolts securely.

Install the side cover/pivot cover (page 3-5).



SIDE STAND

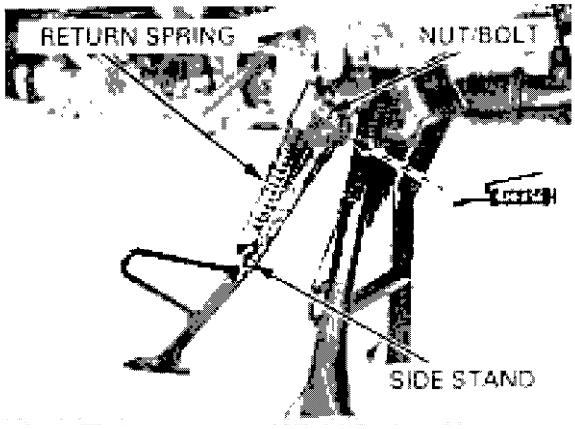
Remove the side stand switch (page 22-19).

Support the motorcycle securely using the main stand.

Unhook the return spring.
Remove the pivot nut, bolt and side stand.

Installation is in the reverse order of removal.
At installation, apply grease to the pivot bolt sliding surfaces.

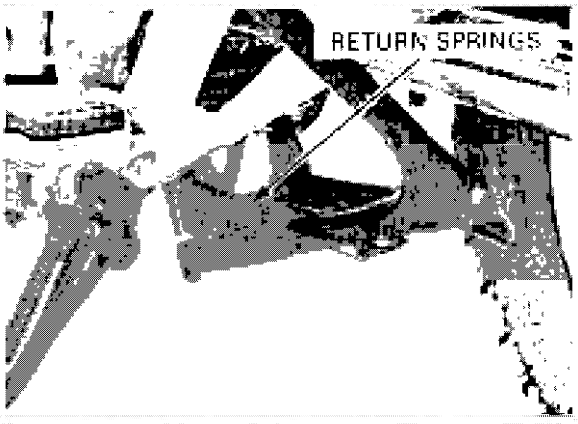
TORQUE:
Side stand pivot bolt 10 N·m (1.0 kgf·m, 7 lbf·ft)
Side stand pivot nut 29 N·m (3.0 kgf·m, 22 lbf·ft)



MAIN STAND

Support the motorcycle securely using the side stand.

Unhook the return springs.

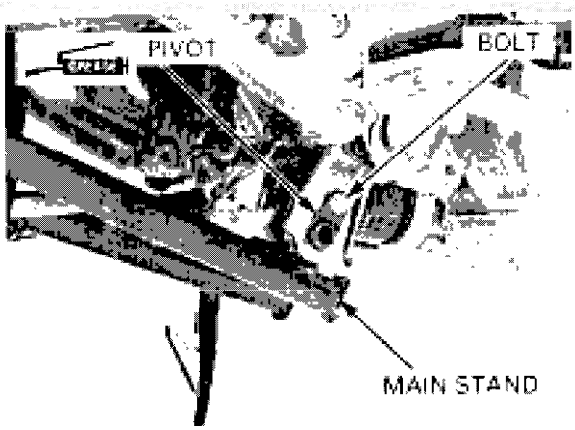


Remove the bolt and main stand pivot.
Remove the main stand.

Installation is in the reverse order of removal.

At installation, apply grease to the pivot sliding surfaces.

TORQUE:
Main stand pivot bolt 12 N·m (1.2 kgf·m, 9 lbf·ft)



4. MAINTENANCE

SERVICE INFORMATION 4-2
MAINTENANCE SCHEDULE 4-4
FUEL LINE 4-5
THROTTLE OPERATION 4-6
AIR CLEANER 4-7
SPARK PLUG 4-7
VALVE CLEARANCE 4-9
ENGINE OIL 4-11
ENGINE OIL FILTER 4-12
RADIATOR COOLANT 4-14
COOLING SYSTEM 4-14
SECONDARY AIR SUPPLY SYSTEM 4-15
FINAL DRIVE OIL 4-16
BRAKE FLUID 4-17
BRAKE PADS WEAR 4-18
BRAKE SYSTEM 4-19
BRAKE LIGHT SWITCH 4-20
HEADLIGHT AIM 4-21
CLUTCH SYSTEM 4-21
SIDE STAND 4-22
SUSPENSION 4-22
NUTS, BOLTS, FASTENERS 4-23
WHEELS/TIRES 4-23
STEERING HEAD BEARINGS 4-24

SERVICE INFORMATION

GENERAL

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

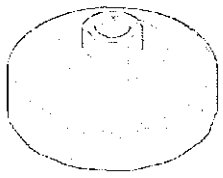
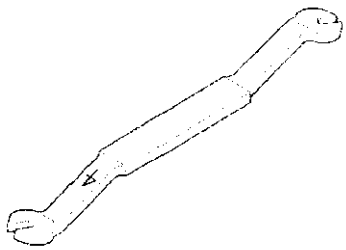
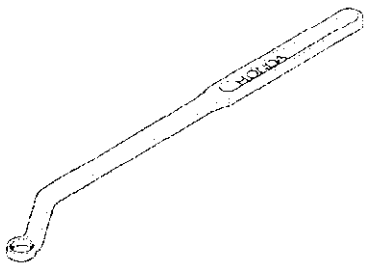
SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip free play			2 – 6 mm (1/16 – 1/4 in)
Spark plug	Standard		CPR8EA-9 (NGK)
Spark plug gap			0.8 – 0.9 mm (0.031 – 0.035 in)
Valve clearance	Intake		0.15 ± 0.02 mm (0.006 ± 0.001 in)
	Exhaust		0.20 ± 0.02 mm (0.008 ± 0.001 in)
Recommended engine oil			Suggested oil: Honda "4-stroke motorcycle oil" or an equivalent Oil recommendation: API classification SG or higher (except oils labeled as energy conserving on circular API service label) Viscosity: SAE 10W-30 JASO T903 standard: MA
Engine oil capacity	After draining		2.6 liter (2.75 US qt, 2.29 Imp qt)
	After draining/filter change		2.8 liter (2.96 US qt, 2.46 Imp qt)
	After disassembly		3.2 liter (3.38 US qt, 2.82 Imp qt)
Engine idle speed			1,200 ± 100 min^{-1} (rpm)
Recommended final drive oil			Hypoid gear oil, SAE #80
Final drive oil capacity	After draining		130 cm^2 (4.3 US oz, 4.5 Imp oz)
	After disassembly		150 cm^2 (5.1 US oz, 5.3 Imp oz)
Recommended brake fluid			DOT 4
Clutch lever free play			10 – 20 mm (3/8 – 3/4 in)
Cold tire pressure	Driver only	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
Tire size		Front	120/70ZR17M/C (58W)
		Rear	150/70ZR17M/C (69W)
Tire brand	Michelin	Front	MACADAM90XB
		Rear	MACADAM90XB
	Bridgestone	Front	BT020F RADIAL J
		Rear	BT020R RADIAL U
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply engine oil to the threads and flange surface
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply engine oil to the threads and flange surface
Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17lbf·ft)	Apply engine oil to the threads and seating surface
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Engine oil drain bolt	30 N·m (3.1 kgf·m, 22 lbf·ft	
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front master cylinder reservoir cap screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Rear master cylinder lower joint lock nut	17.2 N·m (1.8 kgf·m, 1.3 lbf·ft)	

TOOLS

Oil filter wrench 07HAA-PJ70101	Tappet adjust wrench, 4 mm 07908-KE90100	Tappet lock wrench 07908-MB00100
		

MAINTENANCE SCHEDULE

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

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

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

	FREQUENCY / ITEMS	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	4-5
*	THROTTLE OPERATION					I		I		I	4-6
	AIR CLEANER	NOTE 2					R			R	4-7
	SPARK PLUG				I	R	I	R	I	R	4-7
*	VALVE CLEARANCE			I		I		I		I	4-9
	ENGINE OIL			R		R		R		R	4-11
	ENGINE OIL FILTER			R		R		R		R	4-12
	RADIATOR COOLANT	NOTE 3				I		I		R	4-14
*	COOLING SYSTEM					I		I		I	4-14
*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	4-15
	FINAL DRIVE OIL					I		I		R	4-16
	BRAKE FLUID	NOTE 3			I	I	R	I	I	R	4-17
	BRAKE PADS WEAR				I	I	I	I	I	I	4-18
	BRAKE SYSTEM			I		I		I		I	4-19
*	BRAKE LIGHT SWITCH					I		I		I	4-20
*	HEADLIGHT AIM					I		I		I	4-21
	CLUTCH SYSTEM			I	I	I	I	I	I	I	4-21
	SIDE STAND					I		I		I	4-22
*	SUSPENSION					I		I		I	4-22
*	NUTS, BOLTS, FASTENERS			I		I		I		I	4-23
**	WHEELS/TIRES					I		I		I	4-23
**	STEERING HEAD BEARINGS			I		I		I		I	4-24

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

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

Honda recommends that an authorized Honda dealer should road test the motorcycle after each periodic maintenance is carried out.

NOTES:

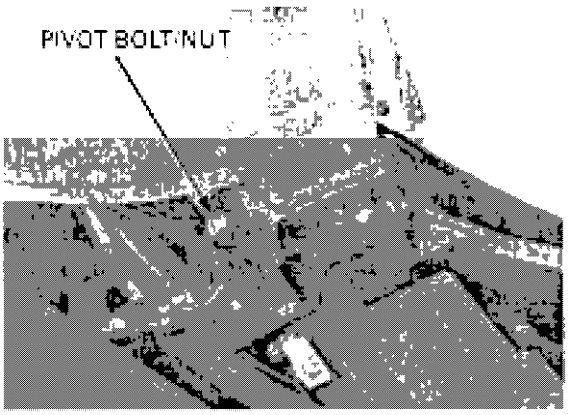
1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Replace every 2 years, or at the indicated odometer intervals, whichever comes first. Replacement requires mechanical skill.

FUEL LINE

Support the motorcycle securely on its center stand.

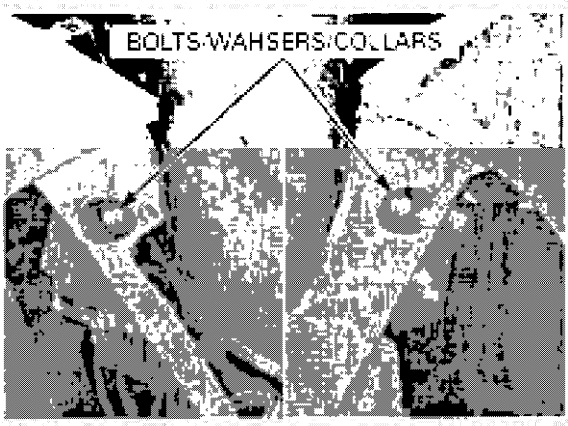
Remove the seat (page 3-5).
Remove the middle cowl lid (page 3-9).
Remove the cowl pocket (page 3-10).

Loosen the fuel tank rear pivot bolt/nut.

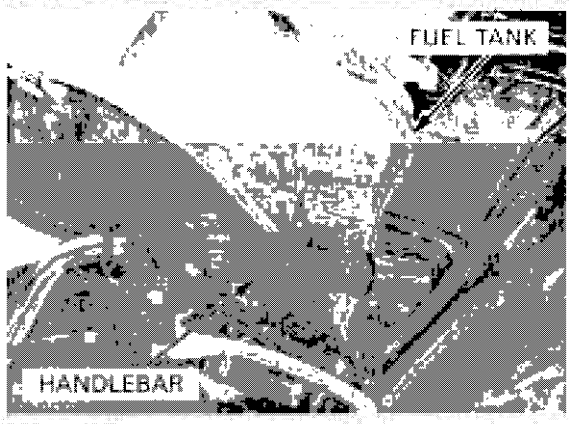


Remove the fuel tank mounting bolts/washers/collars.

Lift and open the fuel tank.

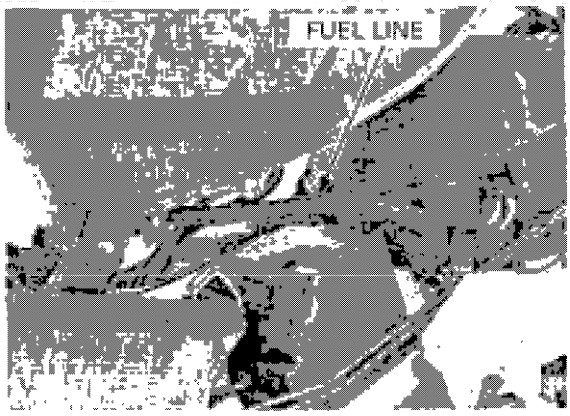


Turn the handlebar to left and lock the steering, then place the fuel tank on the handlebar grip.



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

Installation is in the reverse order of removal.



THROTTLE OPERATION

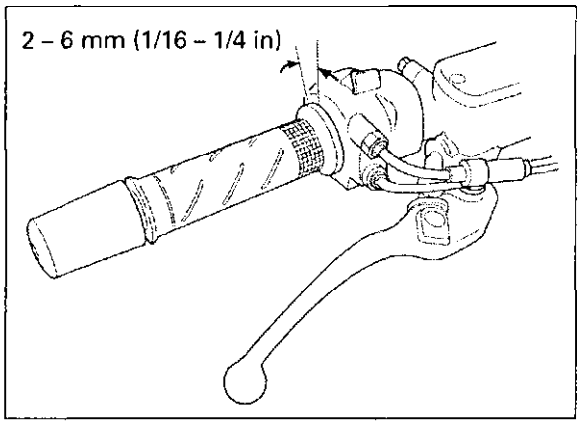
Check for any deterioration or damage to the throttle cables. Check the throttle grip for smooth operation. Check that the throttle opens and automatically closes in all steering positions.

If the throttle grip does not return properly, lubricate the throttle cables and overhaul and lubricate the throttle grip housing.
For cable lubrication: Disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

If the throttle grip still does not return properly, replace the throttle cables.

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip free play and the throttle cable connection.

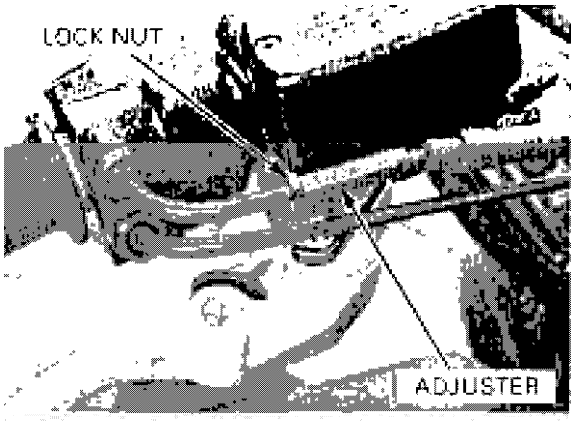
Measure the throttle grip free play at the throttle grip flange.



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 is made with the upper adjuster.

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

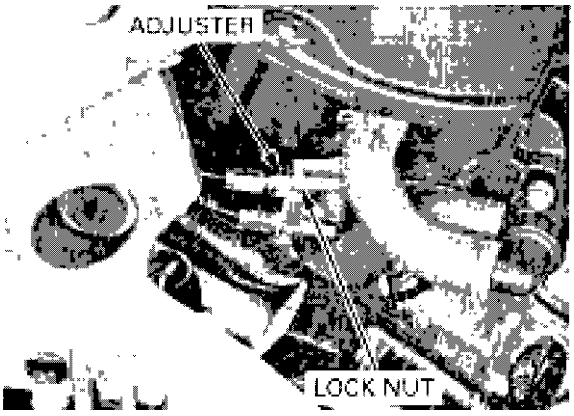


Major adjustment is made with the lower adjuster.

Open and support the fuel tank (page 4-5).

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

Recheck the throttle operation and install the air cleaner housing (page 4-7).



AIR CLEANER

NOTE:

The viscous paper element type air cleaner can not be cleaned because the element contains a dust adhesive.

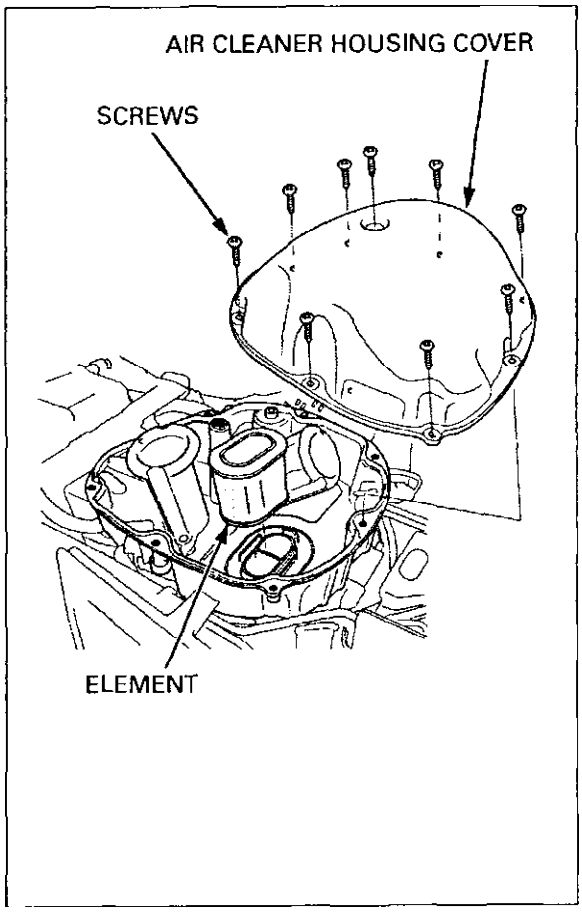
Open and support the fuel tank (page 4-5).

Remove the screws and air cleaner housing cover.

Remove the air cleaner element from the air cleaner housing.

Replace the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.



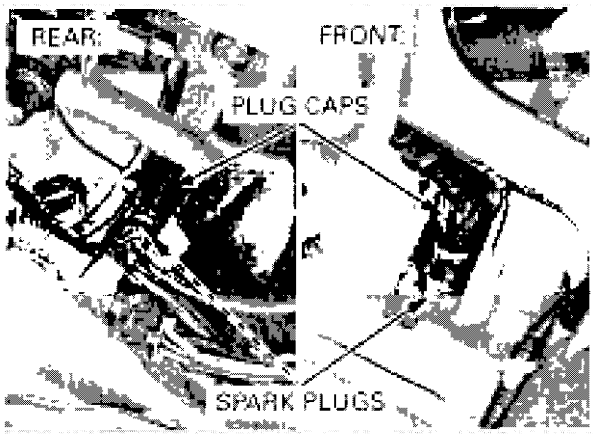
SPARK PLUG

Front: Remove the right middle cowl lid (page 3-9).
Rear: Open and support the fuel tank (page 4-5).

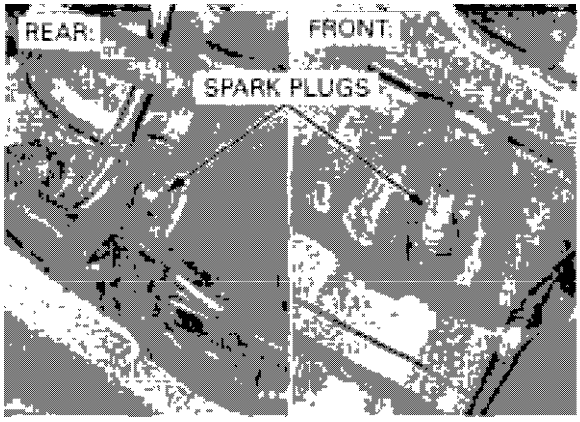
Disconnect the spark plug caps and clean around the spark plug bases.

NOTE:

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



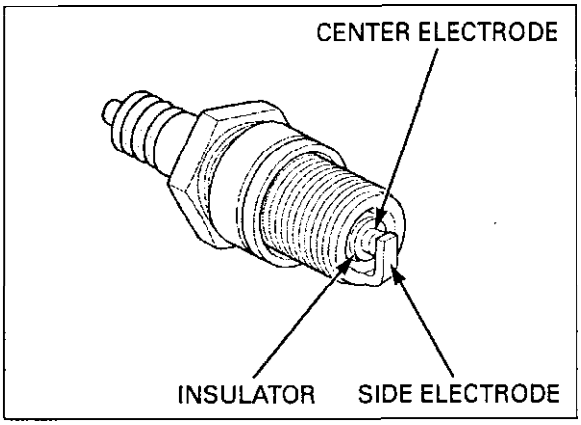
Remove the spark plugs.



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

RECOMMENDED SPARK PLUG:
Standard: CPR8EA-9 (NGK)

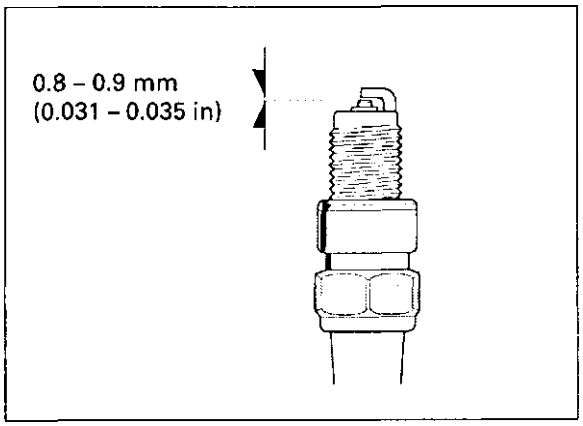
Clean the spark plug electrodes with a wire brush or special plug cleaner.



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

SPARK PLUG GAP: 0.8 – 0.9 mm (0.031 – 0.035 in)

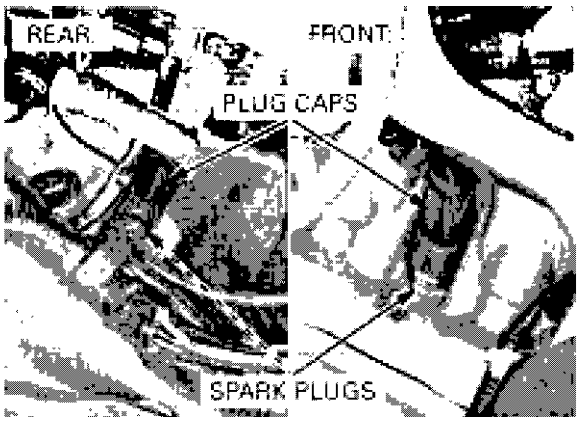
If necessary, adjust the gap by bending the side electrode carefully.



Thread each spark plug in by hand to prevent cross-threading and tighten them with a spark plug wrench.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Connect the spark plug caps.



VALVE CLEARANCE

INSPECTION

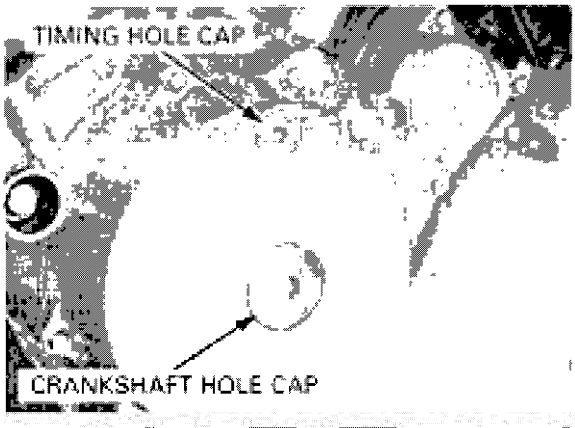
NOTE:

- After the valve clearance inspection, inspect the engine idle speed (page 6-77).
- Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

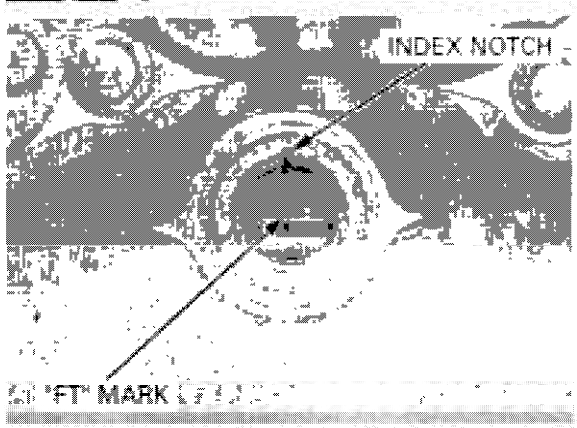
FRONT:

Remove the cylinder head cover (page 9-6).

Remove the timing and crankshaft hole caps.



Rotate the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.
This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft counterclockwise one full turn and align the "FT" mark with the index notch again.

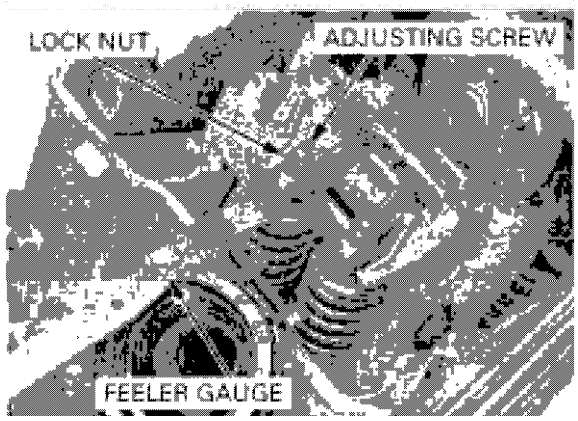


When checking the clearance, slide the feeler gauge from the center toward the outside.

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

VALVE CLEARANCES:

INTAKE: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EXHAUST: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



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

TOOLS:
Tappet adjusting wrench, 4 mm 07908-KE90100
Tappet lock wrench 07908-MB00100

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

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

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the lock nut, recheck the valve clearance.

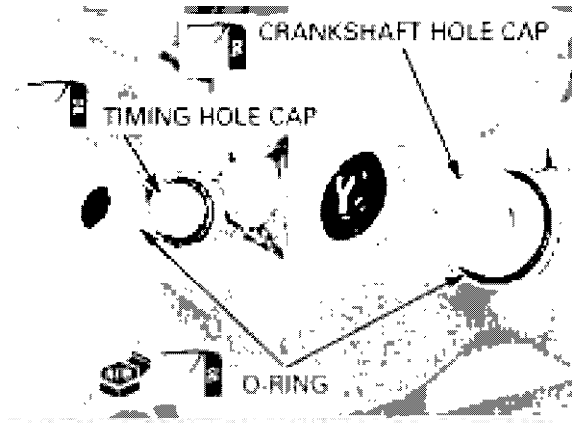
Coat new O-rings with oil and install them into the timing and crankshaft hole cap grooves.
Apply engine oil to the timing and crankshaft hole cap threads.
Install the timing hole cap and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

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

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the cylinder head cover (page 9-33).

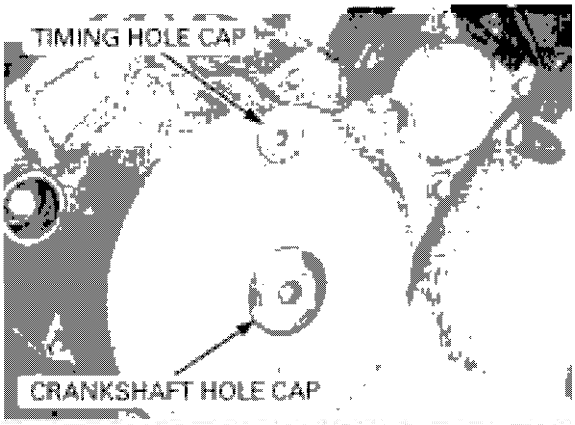


REAR:

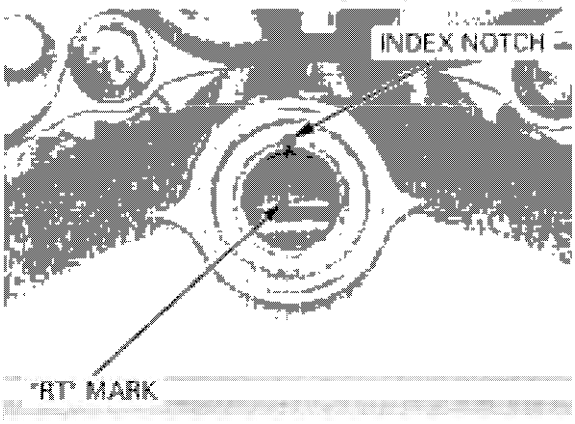
Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F)

Remove the cylinder head cover (page 9-6).

Remove the timing and crankshaft hole caps.



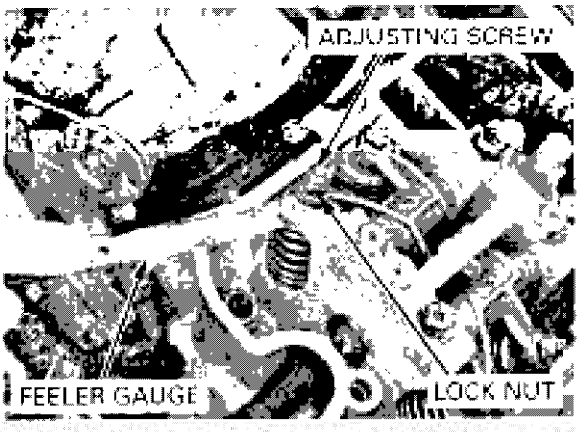
Rotate the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.



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

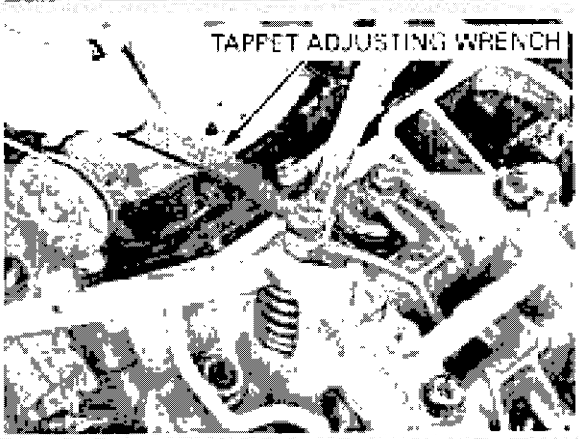
Check the valve clearances by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES:
INTAKE: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EXHAUST: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



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

TOOLS:
Tappet adjusting wrench, 4 mm 07908-KE90100
Tappet lock wrench 07908-MB00100



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

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

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the lock nut, recheck the valve clearance.

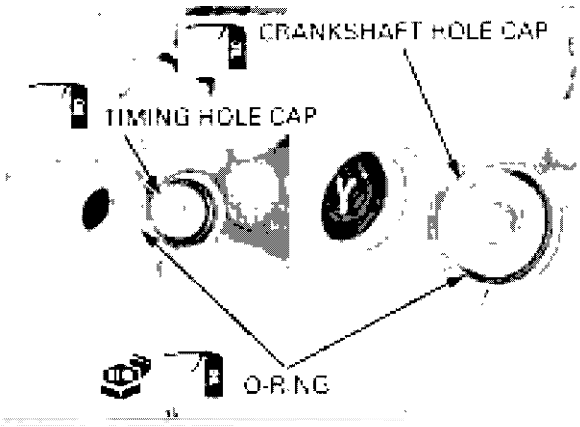
Coat new O-rings with oil and install them into the timing and crankshaft hole cap grooves.
Apply engine oil to the timing and crankshaft hole cap threads.
Install the timing hole cap and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

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

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the cylinder head cover (page 9-33).

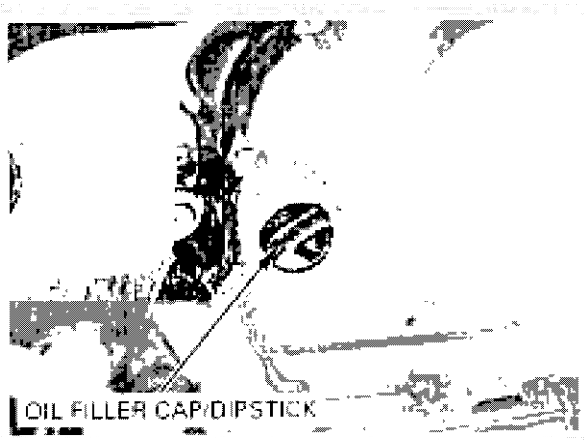


ENGINE OIL

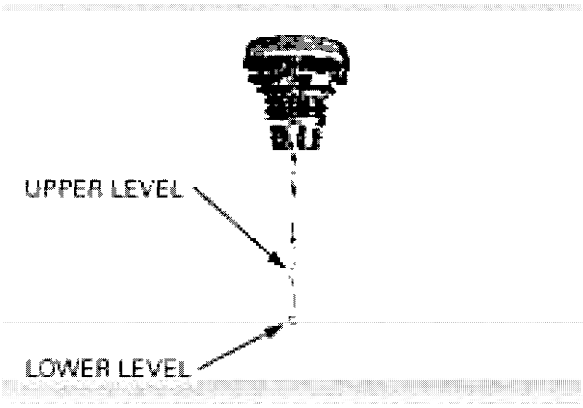
OIL LEVEL CHECK

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

Remove the oil filler cap/dipstick and wipe the oil from the dipstick with a clean cloth.
Insert the dipstick without screwing it in, remove it and check the oil level.



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

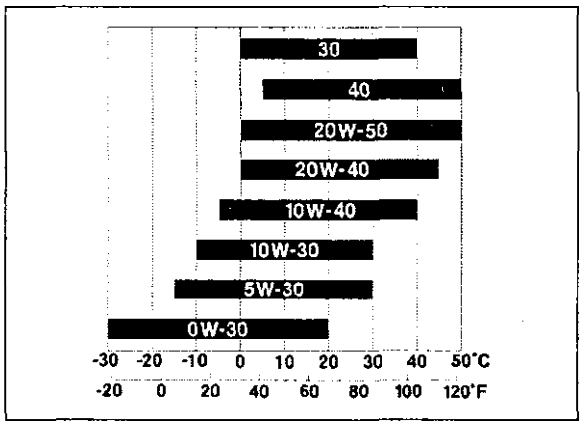


RECOMMENDED ENGINE OIL:

Suggested oil: Honda "4-stroke motorcycle oil " or an equivalent
Oil recommendation:
API service classification SG or higher (except oils labeled as energy conserving on the circular API service label)
Viscosity: SAE 10W-30
JASO T903 standard: MA

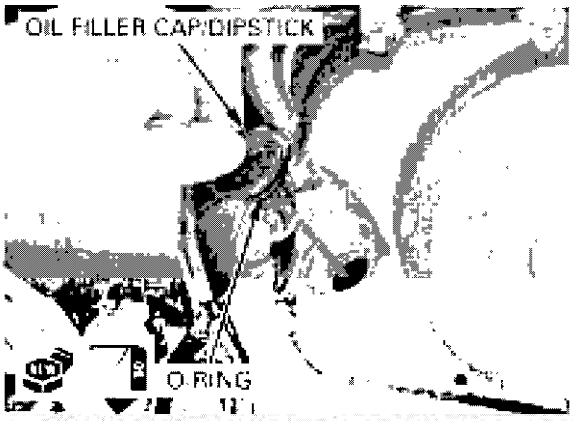
NOTE:

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



Make sure the O-ring is in good condition and install the oil filler cap/dipstick.

For engine oil change, refer to page 4-12.



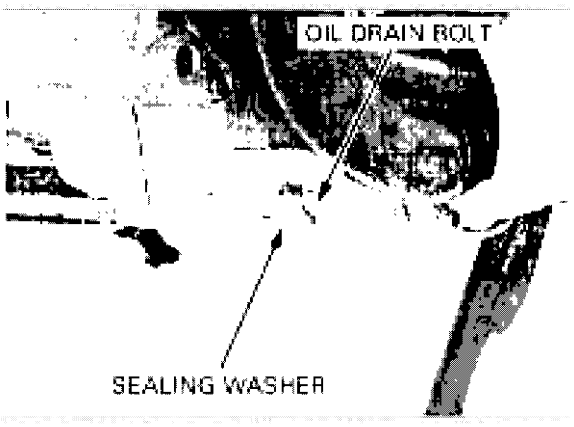
ENGINE OIL FILTER

NOTE:

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

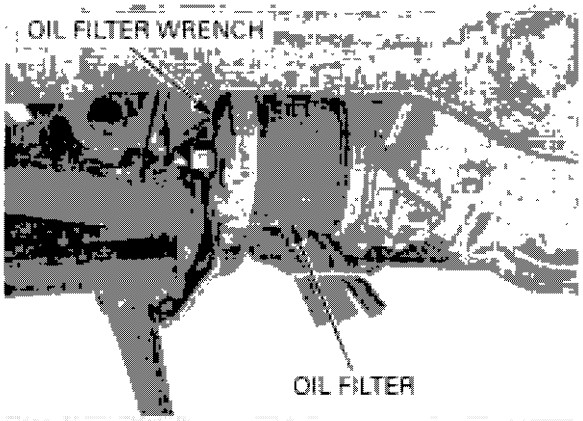
Start the engine, warm it up and stop it.

Remove the oil filler cap/dipstick (page 4-11).
Remove the oil drain bolt, sealing washer and drain the oil.



Remove the oil filter cartridge using the special tool and let the remaining oil drain out.

TOOL:
Oil filter wrench **07HAA-PJ70101**

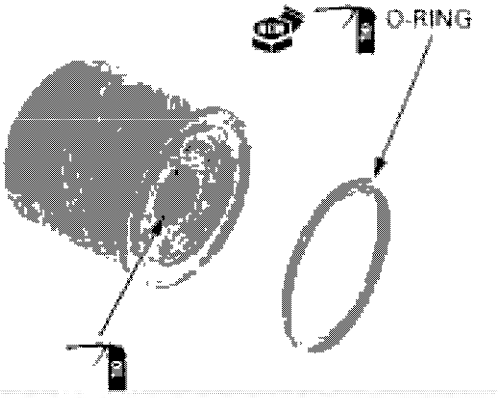


Coat a new O-ring with oil and install it to the oil filter cartridge.
Apply oil to the threads of a new oil filter cartridge.

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

TOOL:
Oil filter wrench **07HAA-PJ70101**

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



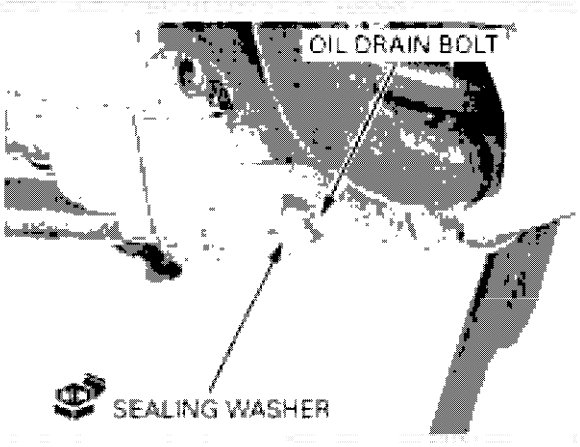
Install the oil drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

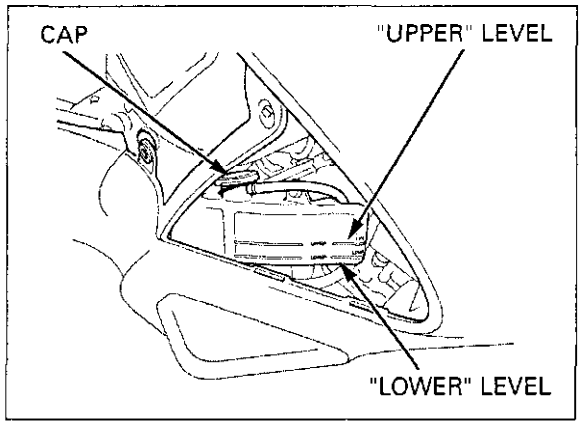
Fill the crankcase with the recommended engine oil (page 4-12).

OIL CAPACITY:
2.6 liters (2.75 US qt, 2.29 Imp qt) at draining
2.8 liters (2.96 US qt, 2.46 Imp qt) at filter change
3.2 liters (3.38 US qt, 2.82 Imp qt) at disassembly

Check the engine oil level (page 4-11).
Install the oil filler cap/dipstick (page 4-12).
Make sure there are no oil leaks.



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 with the motorcycle is in an upright position.

If the level is low, remove the reserve tank cap, and fill the tank to the "UPPER" level line with a 1:1 mixture of distilled water and antifreeze (coolant preparation: page 7-6).

RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing corrosion protection inhibitors.

NOTICE

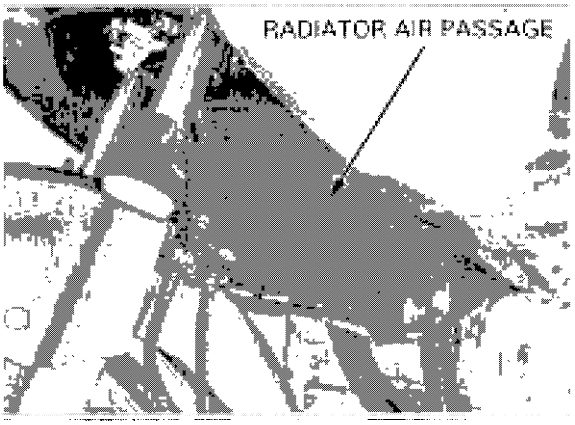
Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

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

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove any air from the cooling system (page 7-7).

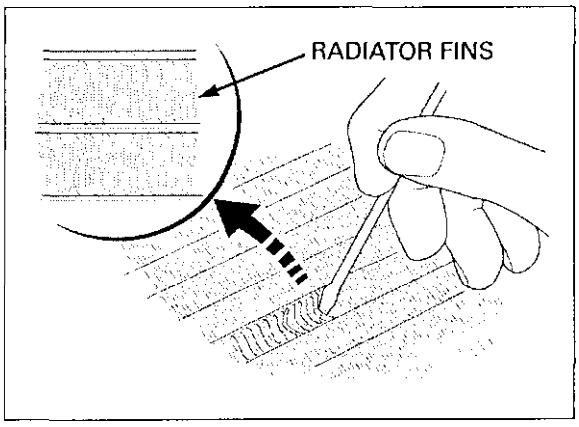
COOLING SYSTEM

Check the radiator air passage for clogs or damage.



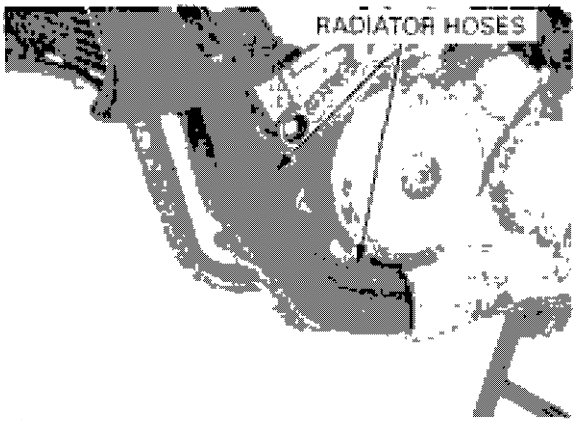
Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water. Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

For radiator replacement, refer to page 7-10.



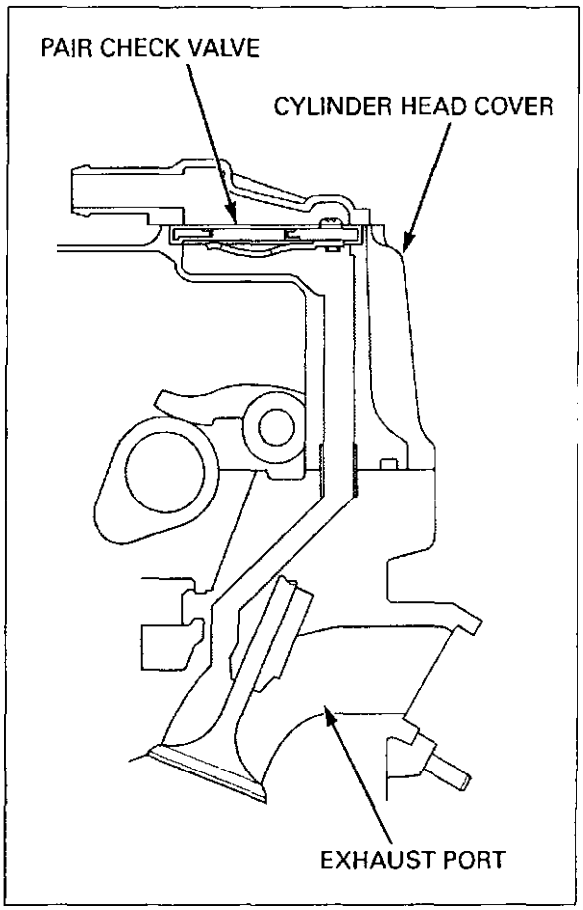
Remove the middle cowl (page 3-11).

Check for any coolant leakage from the water pump, radiator hoses and hose joints.
Check the radiator hoses for cracks or deterioration and replace if necessary.
Check that all hose clamps are tight.



SECONDARY AIR SUPPLY SYSTEM

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

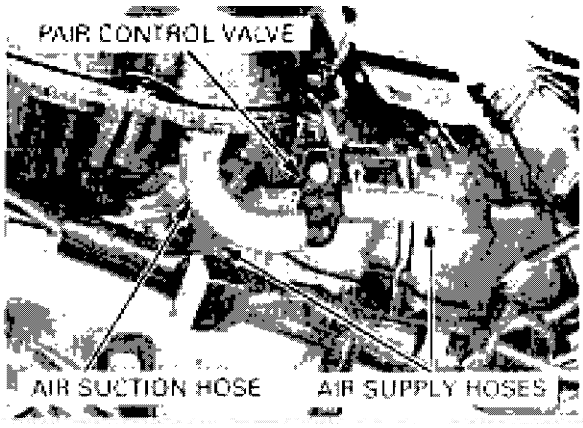


Open and support the fuel tank (page 4-5).

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

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

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



FINAL DRIVE OIL

OIL LEVEL CHECK

Place the motorcycle on its center stand on a level surface.

Remove the oil filler cap from the final gear case.

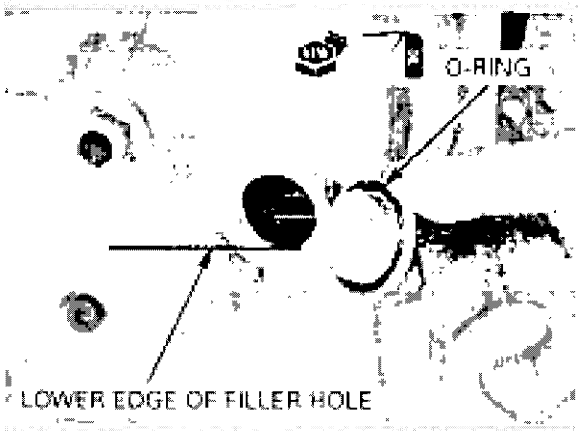
Check that the oil level is up to the lower edge of the oil filler hole.

Check for leaks if the oil level is low. Pour the recommended oil through the oil filler hole until it reaches the lower edge of the hole.

RECOMMENDED OIL: Hypoid gear oil, SAE #80

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

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



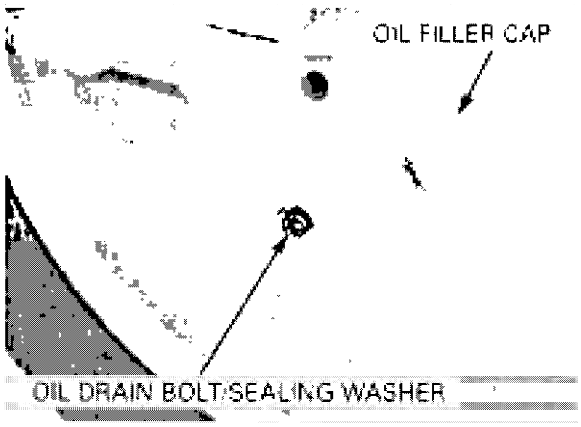
OIL CHANGE

Remove the oil filler cap and drain bolt/sealing washer from the final gear case, slowly turn the rear wheel and drain the oil.

After the oil is completely drained, install the drain bolt with a new sealing washer and tighten it.

Fill the final gear case with the recommended oil to the correct level (page 4-16).

OIL CAPACITY:
130 cm³ (4.3 US oz, 4.5 Imp oz) after draining
150 cm³ (5.1 US oz, 5.3 Imp oz) after disassembly



BRAKE FLUID

NOTICE

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

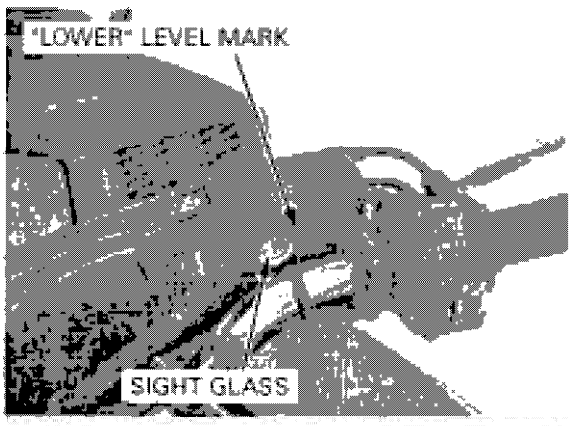
- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.

NOTE:

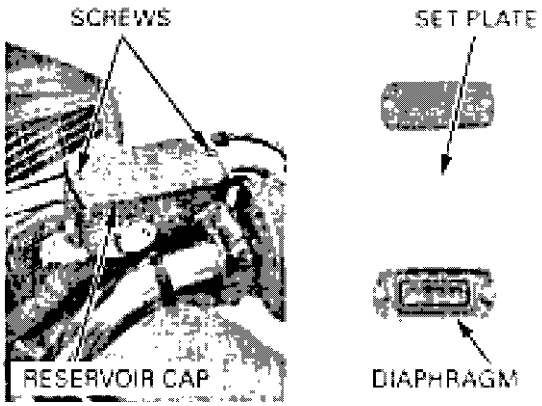
- When the fluid level is low, check the brake pads for wear (page 4-18).
- A low fluid level may be due to wear of the brake pads. If the brake pads are worn and the caliper pistons are pushed out, this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks (page 4-19).

FRONT

Turn the handlebar to the left side so the reservoir is level and check the front brake reservoir fluid level through the sight glass.



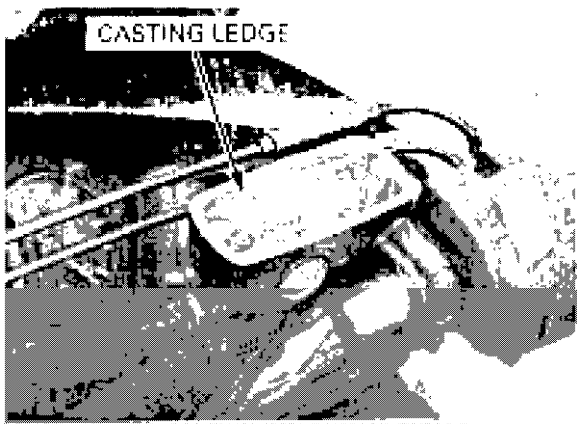
If the fluid level is near the "LOWER" level mark, remove the screws, reservoir cap, set plate and diaphragm.



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

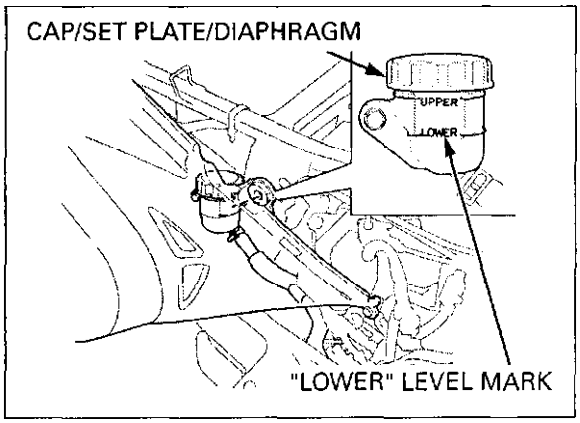
Install the diaphragm, set plate and reservoir cap and tighten the cap screws.

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



REAR

Place the motorcycle on a level surface, and support it in an upright position.
Check the rear brake reservoir fluid level.

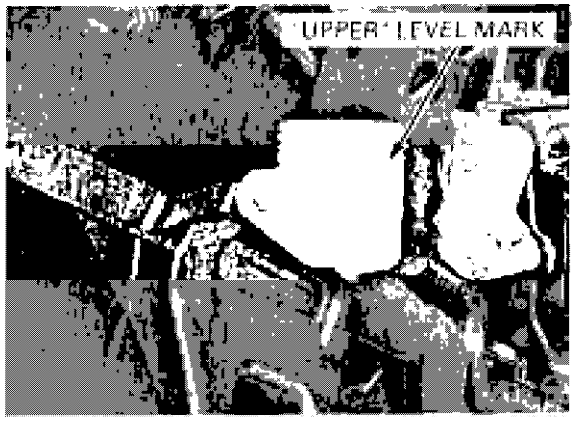


Remove the seat (page 3-5).

If the fluid level is near the "LOWER" level mark, remove the reservoir cap, set plate and diaphragm.

Fill the reservoir with DOT 4 brake fluid from a sealed container to the "UPPER" level mark.

Install the diaphragm, set plate and reservoir cap securely.



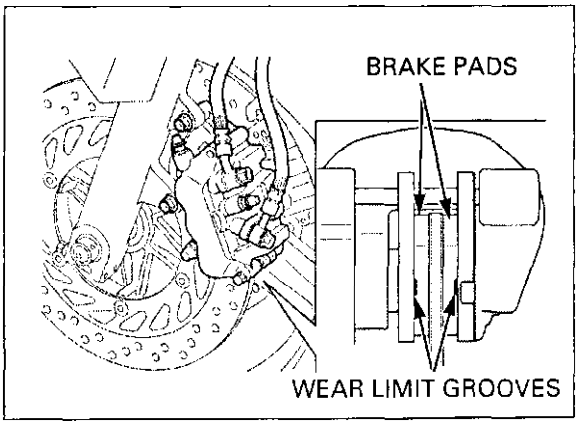
BRAKE PADS WEAR

FRONT BRAKE PADS

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

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

For brake pad replacement, refer to page 17-14.

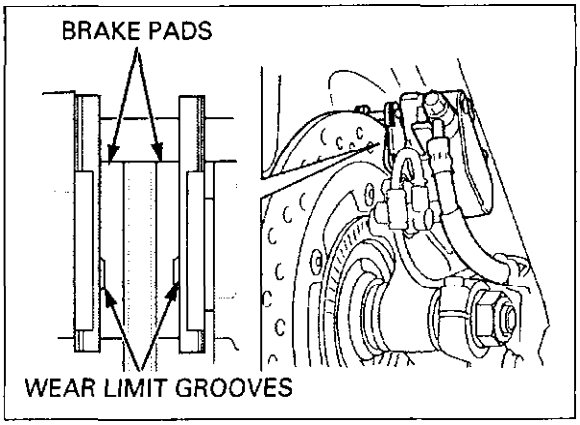


REAR BRAKE PADS

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

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

For brake pad replacement, refer to page 17-14.



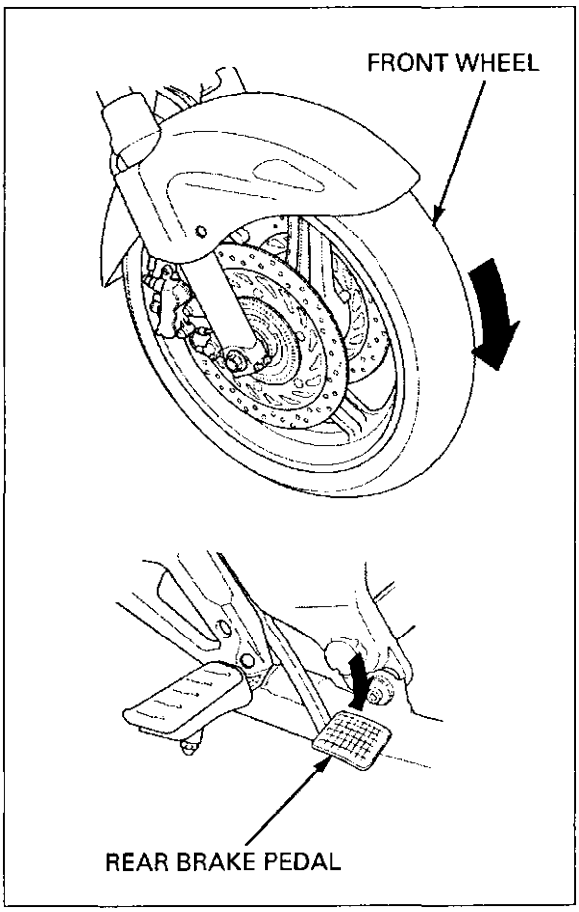
BRAKE SYSTEM

INSPECTION

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

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

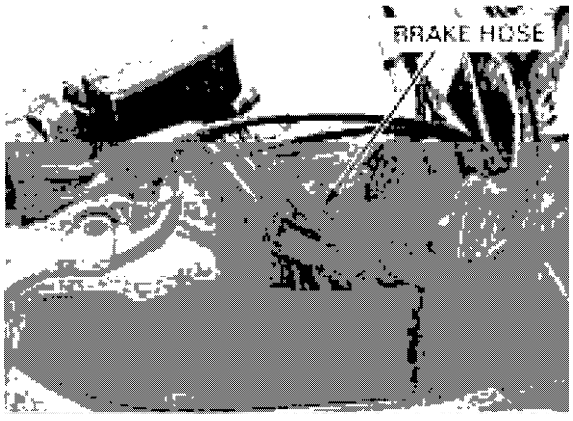
Apply the rear brake pedal.
Make sure the front wheel does not turn while the rear brake pedal is applied.



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

For air bleeding procedures, refer to page 17-9.

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



BRAKE LEVER ADJUSTMENT

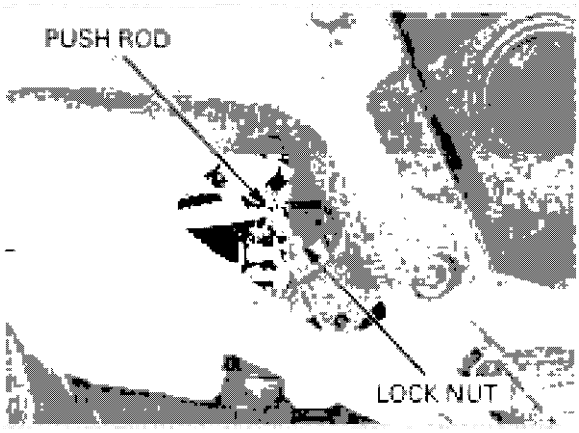
Align the allowance on the brake lever with the index number on the adjuster.

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

BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod as required.
Tighten the lock nut to the specified torque.

TORQUE: 17.2 N·m (1.8 kgf·m, 1.3 lbf·ft)



BRAKE LIGHT SWITCH

NOTE:

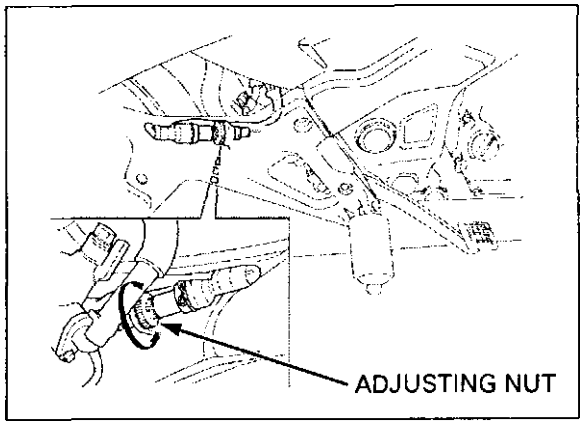
- The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are not synchronized, either replace the switch unit or the malfunctioning parts of the system.
- Make the rear brake light switch adjustments after the brake pedal height adjustment and the brake pedal free play adjustment have been made.

Check that the brake light comes on just prior to the brake actually being engaged.
If the light fails to come on, adjust the switch so that the light comes on at the proper time.

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

Hold the switch body and turn the adjusting nut as required.

Recheck the brake light switch operation.



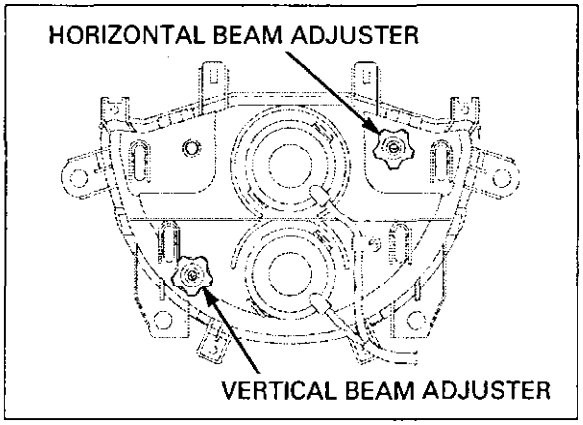
HEADLIGHT AIM

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

Place the motorcycle on a level surface.

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

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

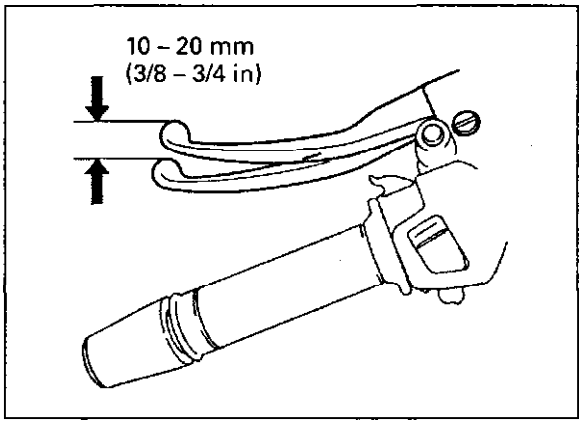


CLUTCH SYSTEM

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

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

FREE PLAY: 10 – 20 mm (3/8 – 3/4 in)

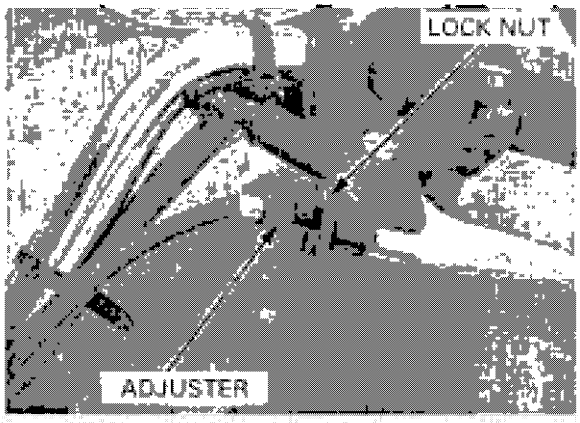


Minor adjustment is made with the upper adjuster at the clutch lever.
Loosen the lock nut and turn the adjuster as required.
Tighten the lock nut while holding the adjuster.

NOTICE

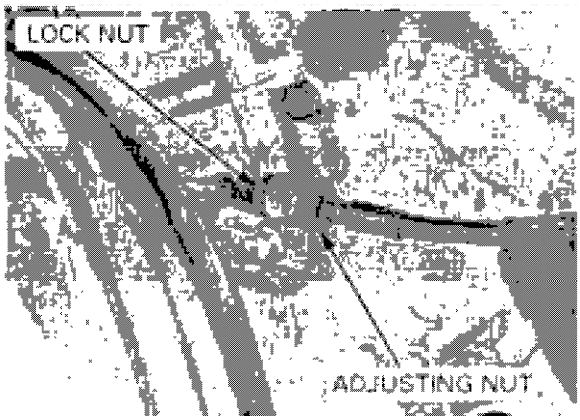
The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.

If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn.
Tighten the lock nut and make major adjustment (page 4-21).



Major adjustment is made with the lower adjusting nut at the engine.
Loosen the lock nut and turn the adjusting nut as required.
After adjustment is complete, tighten the lock nut while holding the adjusting nut.

Check the clutch operation.
If the free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (page 11-6).



SIDE STAND

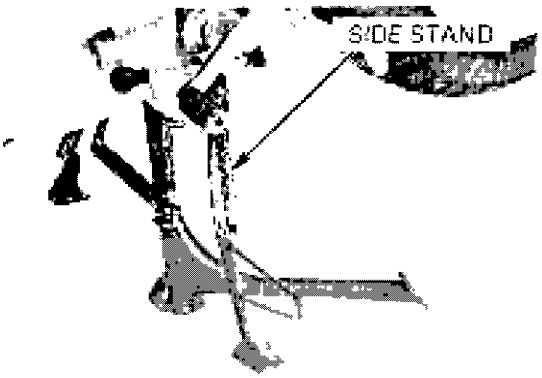
Support the motorcycle on a level surface.

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, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 22-19).



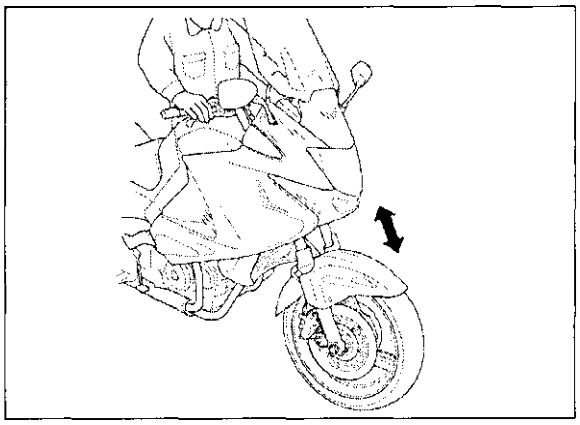
SUSPENSION

FRONT SUSPENSION INSPECTION

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

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

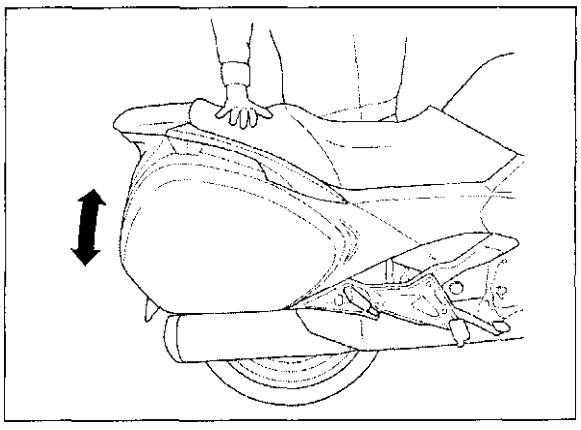
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.
For fork service, refer to page 15-18.



REAR SUSPENSION INSPECTION

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

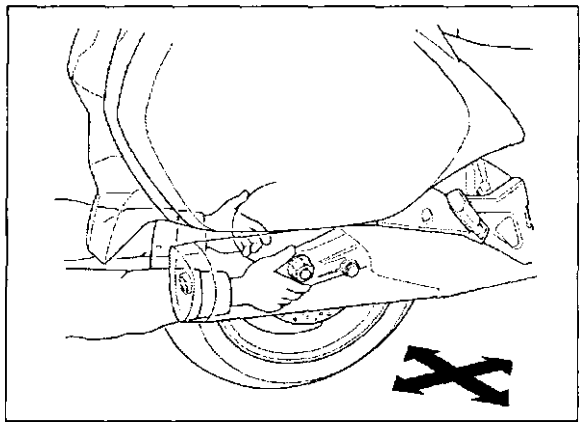
For shock absorber service, refer to page 16-14.



Support the motorcycle securely and raise the rear wheel off the ground.
Check for worn swingarm bearings by grabbing the rear wheel and attempting to move the wheel side to side.

Replace the bearings if any looseness is noted (page 16-18).

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



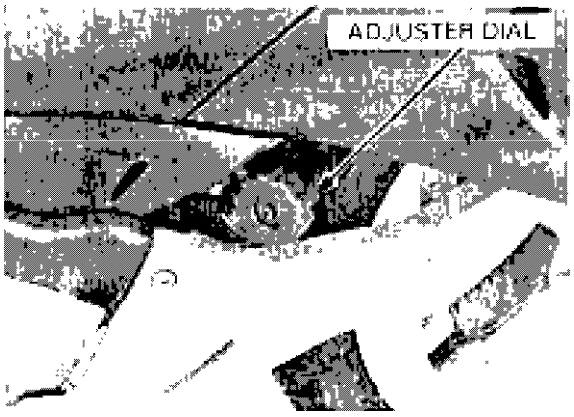
REAR SUSPENSION ADJUSTMENT

SPRING PRE-LOAD ADJUSTER

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

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

PRE-LOAD ADJUSTER STANDARD POSITION:
8 clicks out from lower position



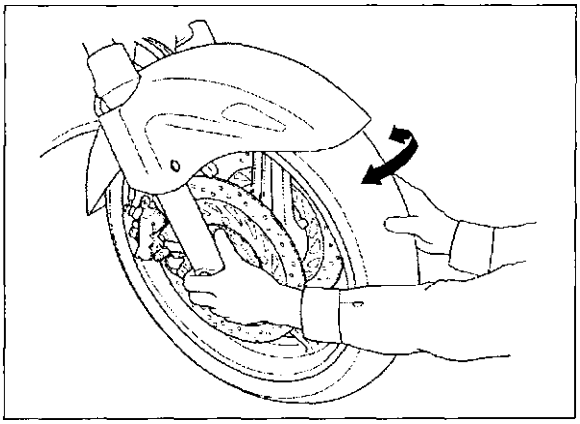
NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-13).
Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

WHEELS/TIRES

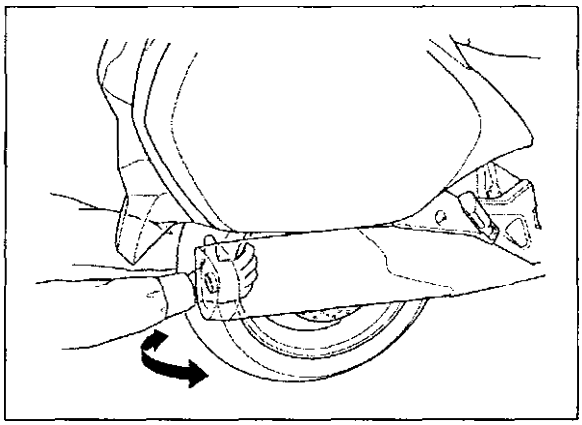
Support the motorcycle securely and raise the front wheel off the ground.
Hold the front fork leg and move the front wheel sideways forcefully to see if the wheel bearings are worn.

For front wheel service, refer to page 15-12.



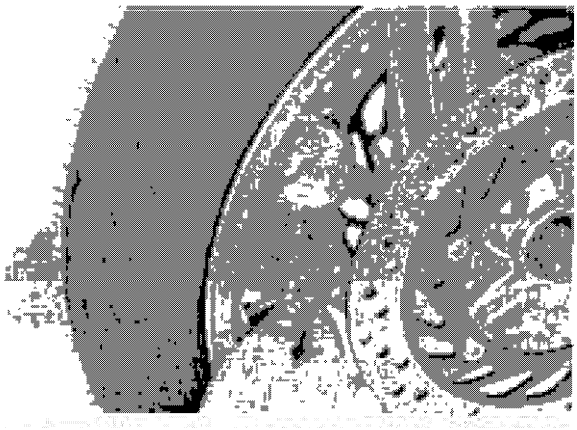
Support the motorcycle securely and raise the rear wheel off the ground.
Hold the swingarm and move the rear wheel sideways with the force to see if the wheel bearings are worn.

For rear wheel service, refer to page 16-6.



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

RECOMMENDED TIRE PRESSURE:
Driver only:
Front: 250 kPa (2.50 kgf/cm², 36 psi)
Rear: 290 kPa (2.90 kgf/cm², 42 psi)
Driver and passenger:
Front: 250 kPa (2.50 kgf/cm², 36 psi)
Rear: 290 kPa (2.90 kgf/cm², 42 psi)



Check the tires for cuts, embedded nails, or other damage.
Check the front and rear wheels for trueness.

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

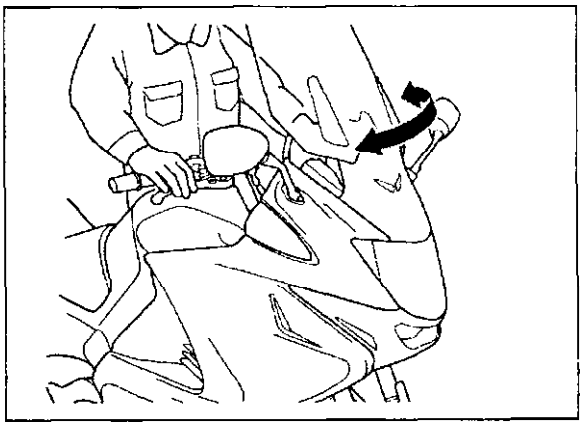
MINIMUM TREAD DEPTH: Front: 1.5 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS

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

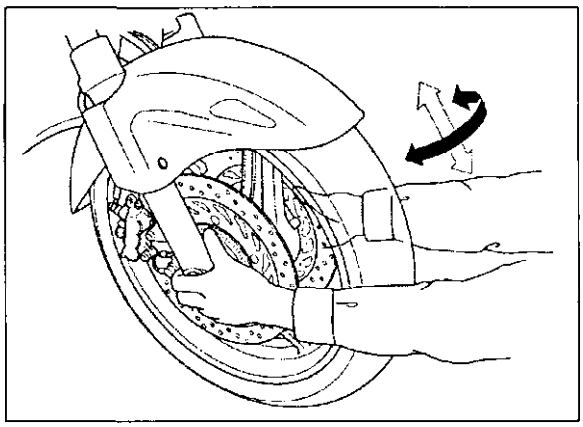
Check that the handlebar moves freely from side to side. Make sure the control cables do not interfere with the handlebar rotation.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 15-27).



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

Replace the bearings if any looseness is noted (page 15-27).



5. LUBRICATION SYSTEM

5

LUBRICATION SYSTEM DIAGRAM 5-2

SERVICE INFORMATION 5-3

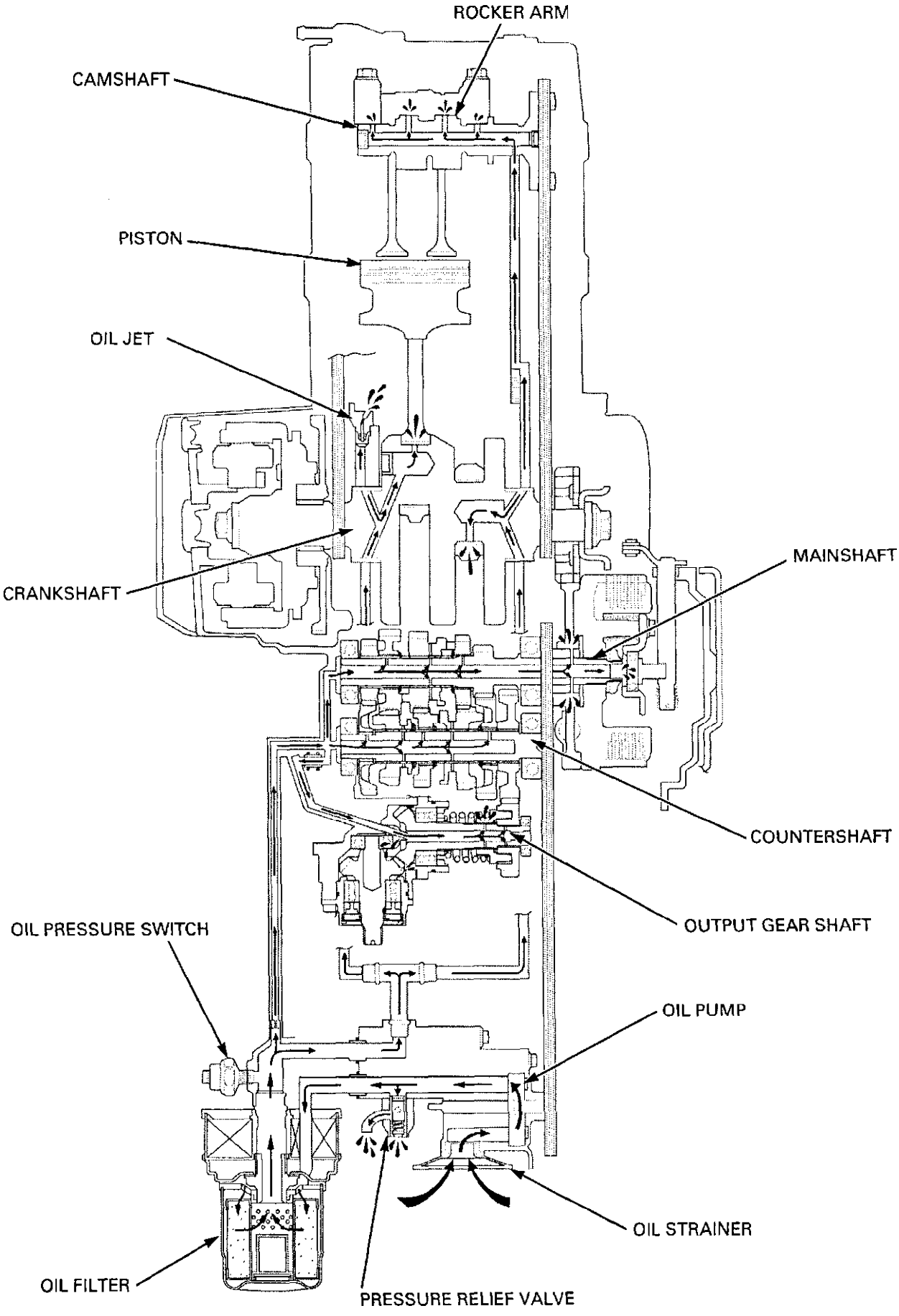
TROUBLE SHOOTING 5-4

OIL PRESSURE CHECK 5-5

OIL PUMP 5-6

OIL COOLER 5-12

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ CAUTION

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

- The crankcase must be separated to service the oil pump (page 5-6).
- 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.
- For engine oil level check (page 4-11).
- For engine oil and filter change (page 4-11).
- For final drive oil check and change (page 4-16).
- For oil pressure indicator inspection (page 22-14).

SPECIFICATIONS

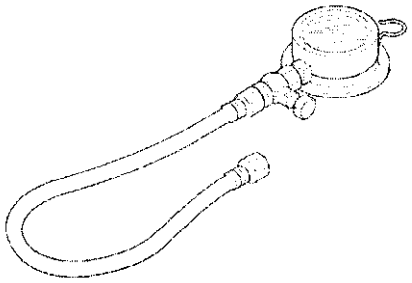
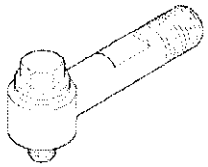
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.6 liters (2.75 US qt, 2.29 Imp qt)	–
	After draining/filter change	2.8 liters (2.96 US qt, 2.46 Imp qt)	–
	After disassembly	3.2 liters (3.38 US qt, 2.82 Imp qt)	–
Recommended engine oil		Suggested oil: Honda "4-stroke motorcycle oil" or equivalent Oil recommendation: API service classification: SG or higher (except oils labeled as energy conserving on circular API service label) Viscosity: SAE 10W-30 JASO T 903 standard: MA	–
Oil pressure at oil pressure switch		568 kPa (5.8 kgf/cm^2, 82 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 – 0.08 (0.001 – 0.003)	0.10 (0.004)

TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch terminal screw	1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil cooler bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply engine oil to the threads
Oil pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt

TOOLS

Oil pressure gauge set 07506-3000001  or equivalent commercially available	Oil pressure gauge attachment 07510-4220100  or equivalent commercially available

TROUBLE SHOOTING

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

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

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

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

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

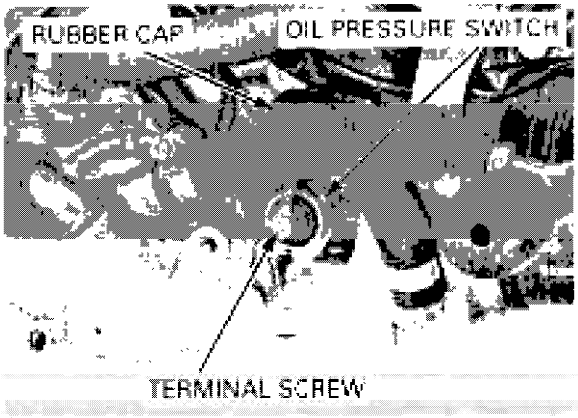
Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE CHECK

Remove the left crankcase rear cover (page 3-15).

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

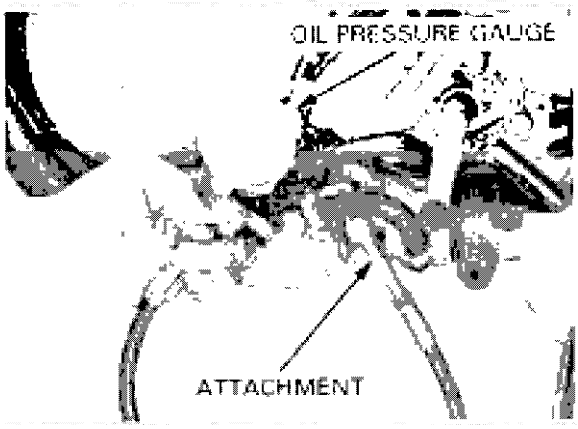
Remove the rubber cap and disconnect the oil pressure switch wire by removing the terminal screw.



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

TOOLS:

Oil pressure gauge set	**07506-3000001**
Oil pressure gauge attachment	**07510-4220100**
or equivalent commercially available	



Check the oil level and add the recommended oil if necessary (page 4-11).

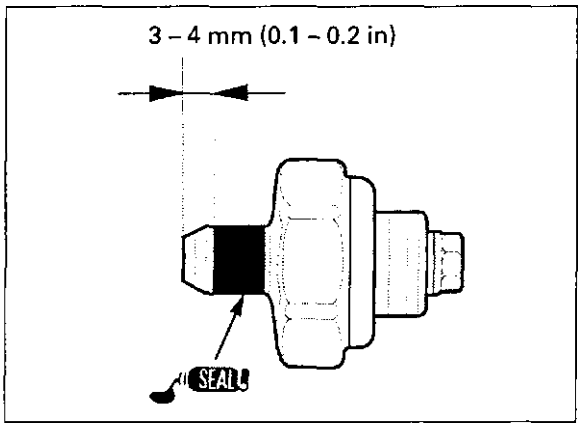
Start the engine and check the oil pressure at 5,000 min^{-1} (rpm).

OIL PRESSURE:
568 kPa (5.8 kgf/cm^2, 82 psi) at 5,000 min^{-1} (rpm)
(80°C/176°F)

Stop the engine.

Do not apply sealant to the thread head 3–4 mm (0.1–0.2 in).

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



TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the oil pressure switch wire and tighten the terminal screw.

TORQUE: 1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the rubber cap.

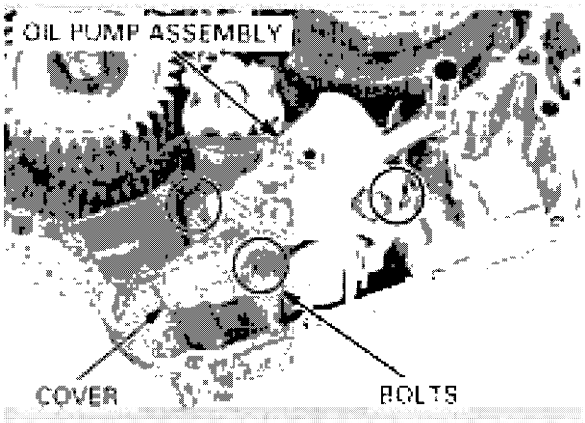
Start the engine.
Check that the oil pressure indicator turns off after 1 or 2 seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 22-14).

OIL PUMP

REMOVAL

Separate the crankcase (page 13-9).

Remove the bolts, pressure relief valve cover and oil pump assembly from the left crankcase.

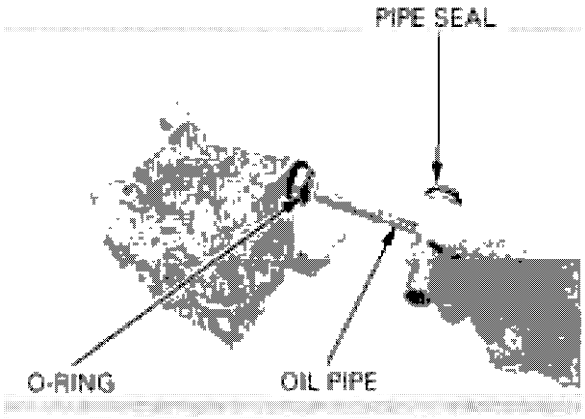


Remove the dowel pin, collars and O-rings.

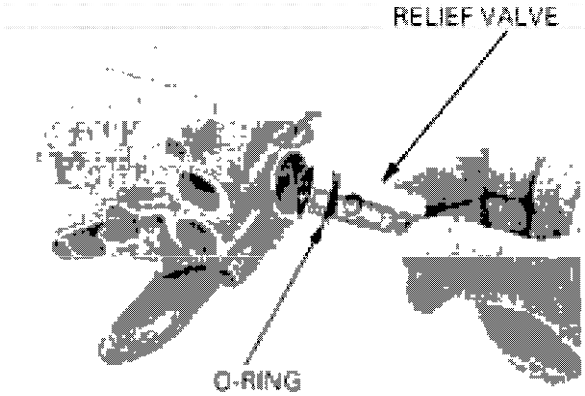
DISASSEMBLY

OIL PUMP BODY

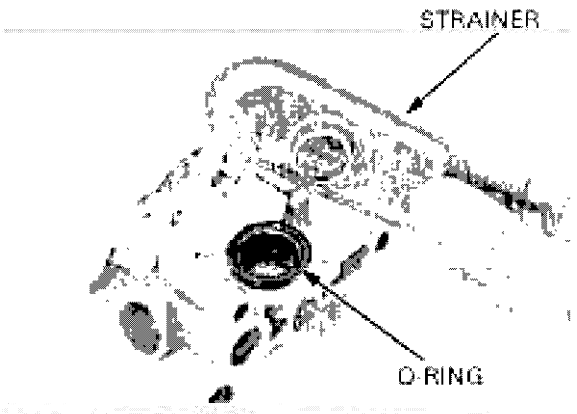
Remove the oil pipe, oil pipe seal and O-ring.



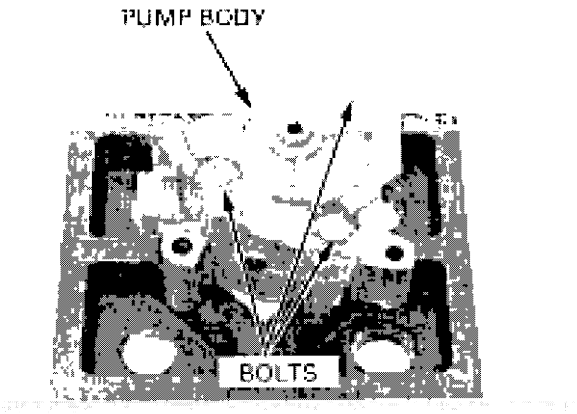
Remove the pressure relief valve and O-ring.



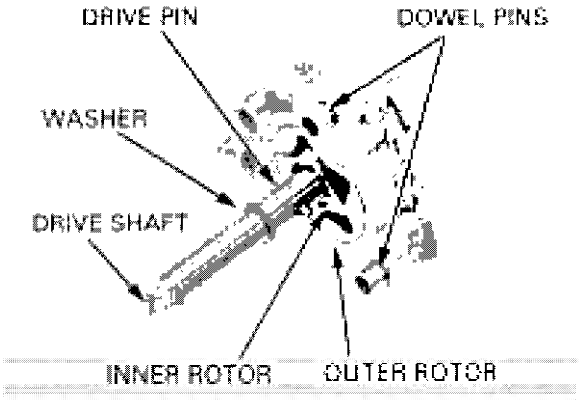
Remove the oil strainer and O-ring.



Remove the bolts and pump body from the pump cover.



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

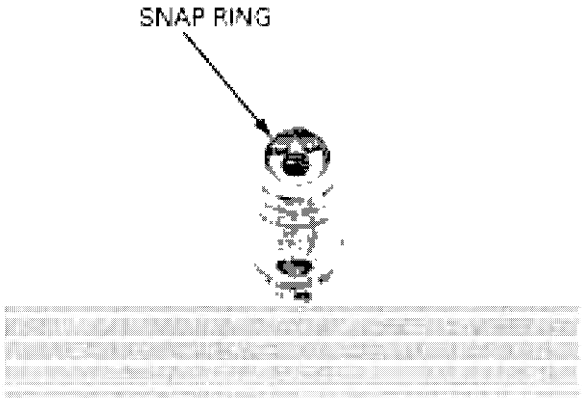


PRESSURE RELIEF VALVE

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

The snap ring is under spring pressure. Use care when removing it and wear eye and face protection. Be careful not to lose the disassembled parts.

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

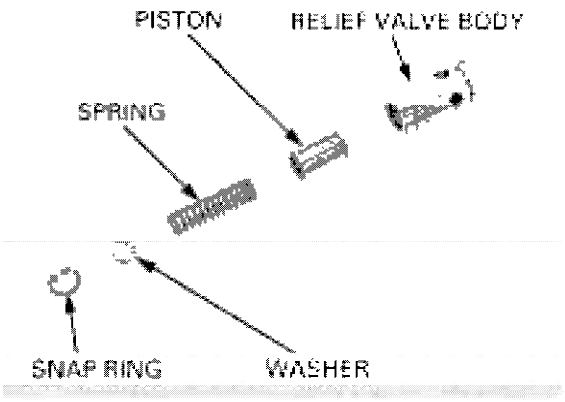


Check the piston for wear, sticking or damage.
Check the valve spring for wear or fatigue.
Check the relief valve body for clogging or damage.

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

NOTE:

- Install the snap ring with the chamfered edge facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the groove.



INSPECTION

NOTE:

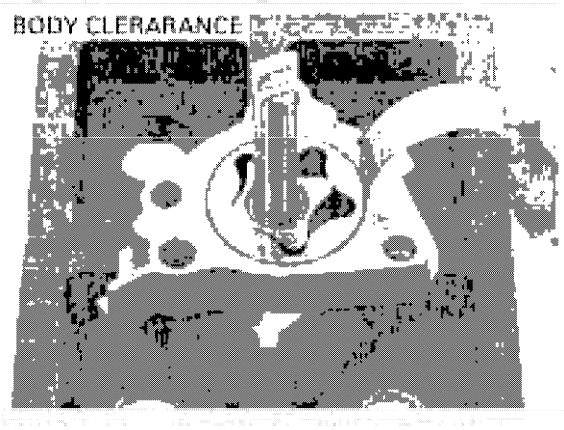
Measure each clearance at several points and use the largest reading to compare the service limit.

BODY CLEARANCE

Temporarily assemble the inner rotor, outer rotor, drive pin and pump shaft into the pump body.

Measure the body clearance.

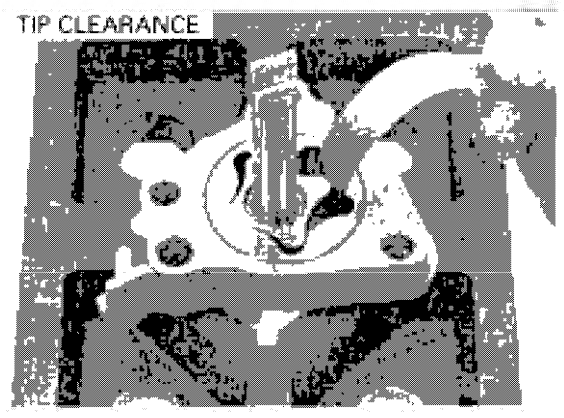
SERVICE LIMIT: 0.35 mm (0.014 in)



TIP CLEARANCE

Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



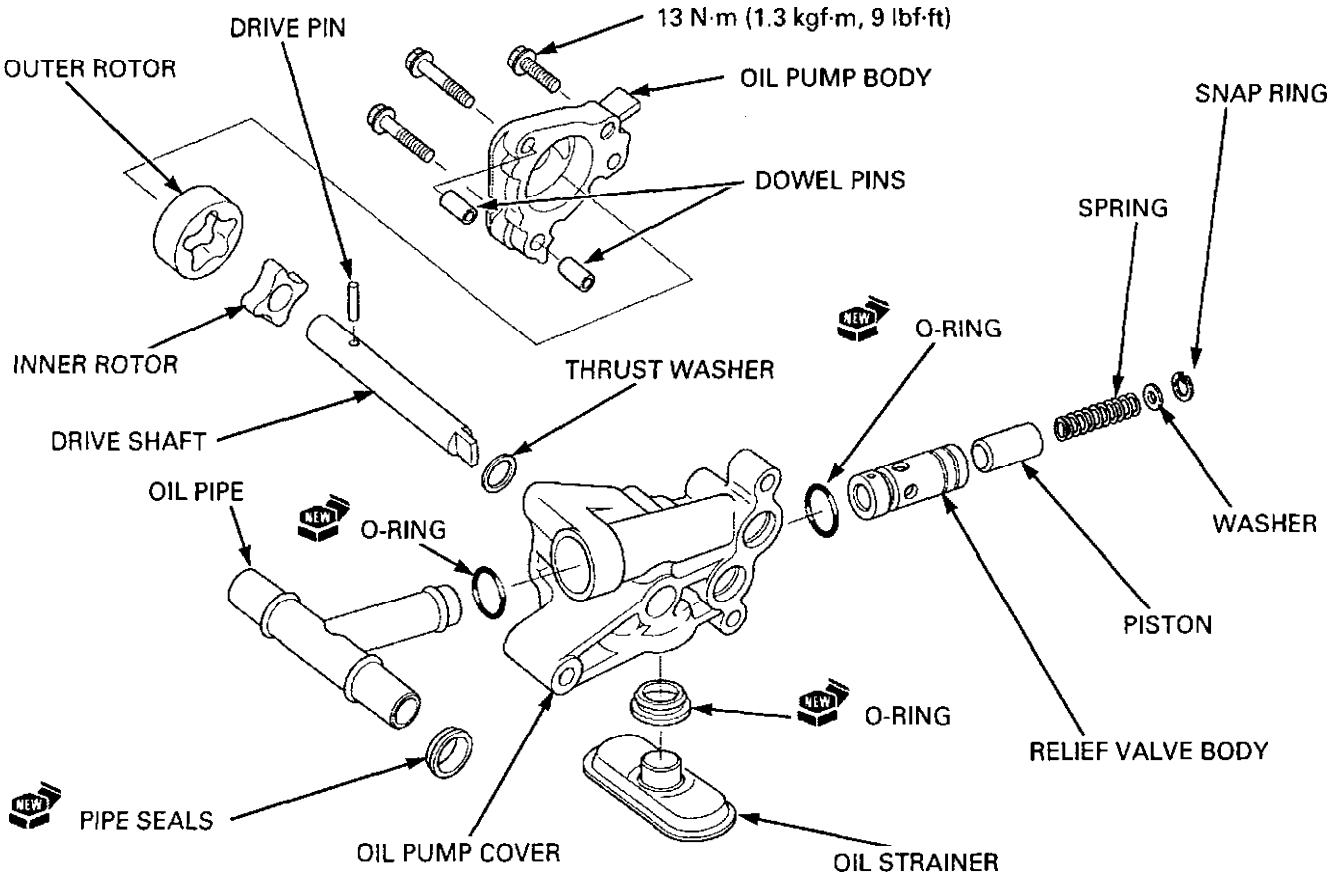
SIDE CLEARANCE

Measure the side clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

OIL PUMP ASSEMBLY

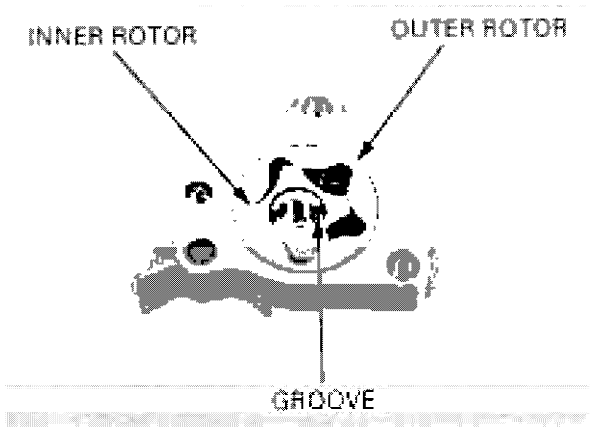
Dip all parts in clean engine oil.



Install the outer and inner rotors to the pump body.

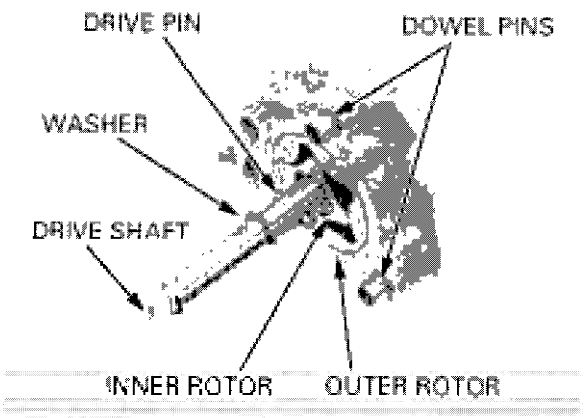
NOTE:

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



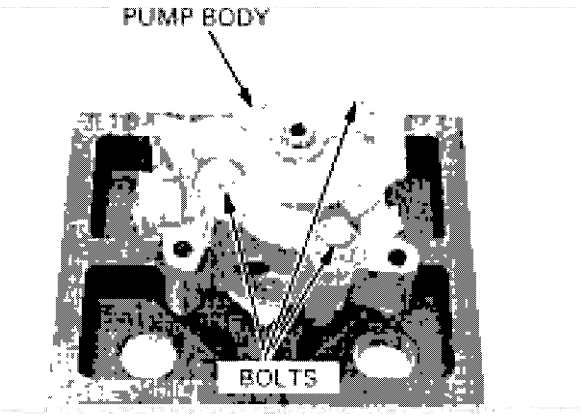
Install the drive shaft and drive pin by aligning the drive pin with the grooves in the inner rotor.

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



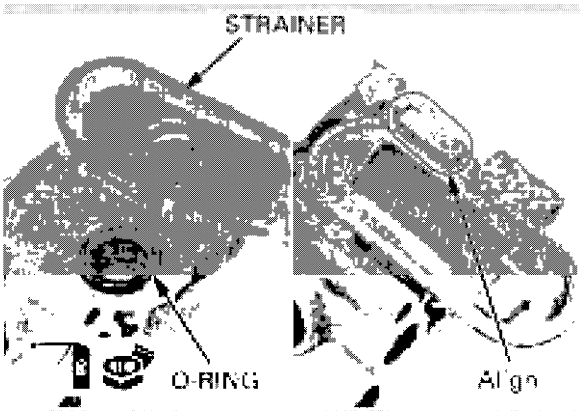
Install the pump cover on the pump body.
Install and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



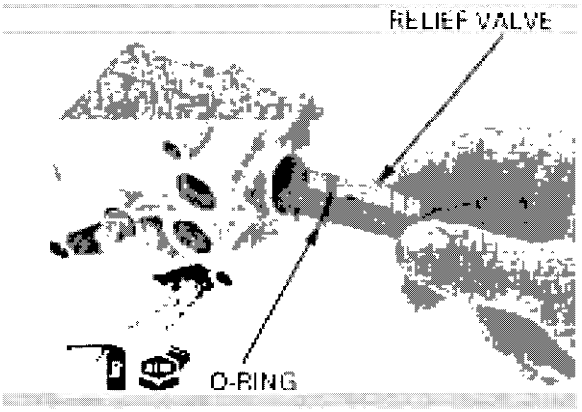
Clean the oil strainer.

Coat a new O-ring with oil and install it to the oil pump body.
Install the oil strainer to the oil pump by aligning its side end with the groove on the oil pump.



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

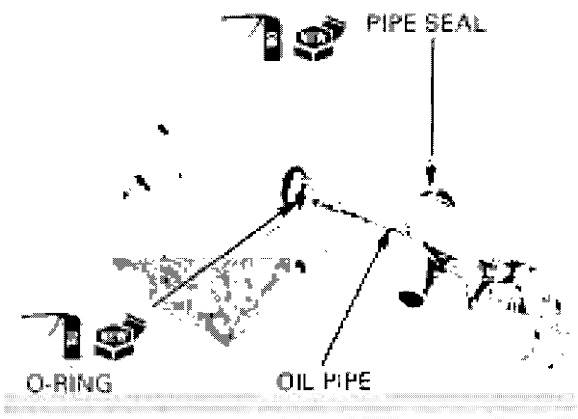
Install the pressure relief valve into the oil pump body.



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

NOTE:
Install an oil pipe seal with its tapered side facing out.

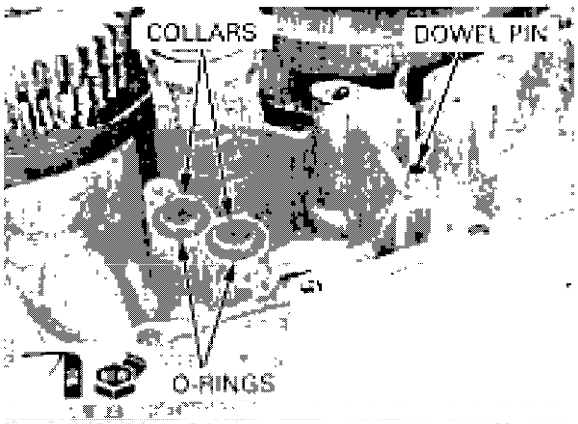
Install the oil pipe to the oil pump securely.



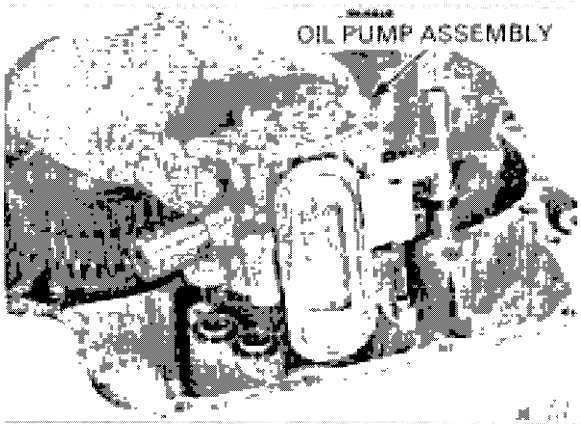
INSTALLATION

Install the dowel pin and collars.

Coat new O-rings with oil and install them.

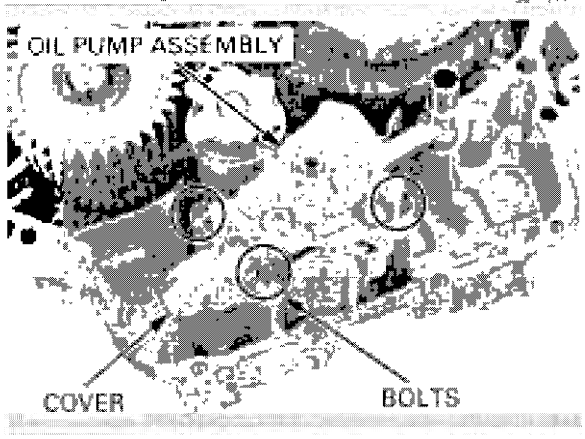


Install the oil pump assembly into the crankcase securely.



Install the pressure relierf valve cover and tighten the bolts securely.

Assemble the crankcase (page 13-47).
Check the oil pressure (page 5-5).

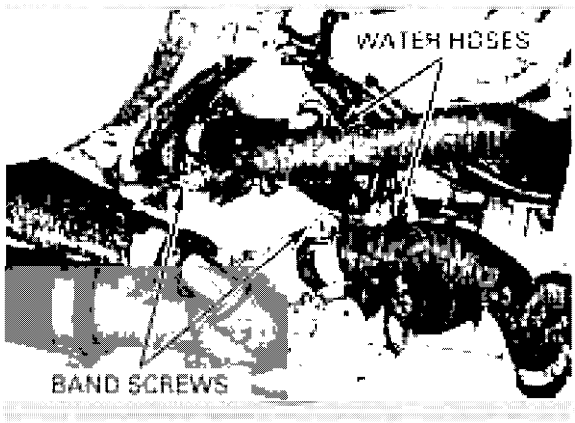


OIL COOLER

REMOVAL/INSTALLATION

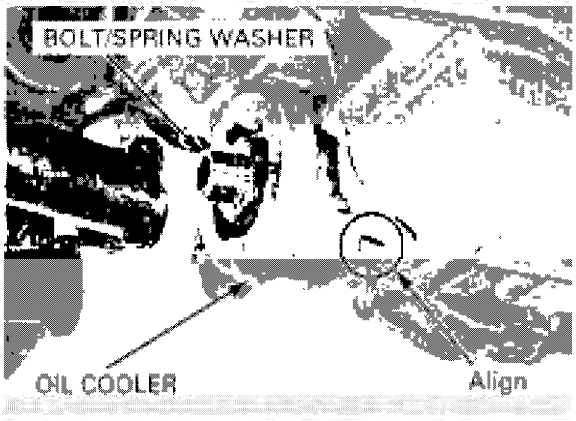
Remove the left crankcase rear cover (page 3-15).
Remove the oil filter (page 4-12).
Drain the coolant from the cooling system (page 7-6).

Loosen the band screws, then disconnect the water hoses from the water pump.



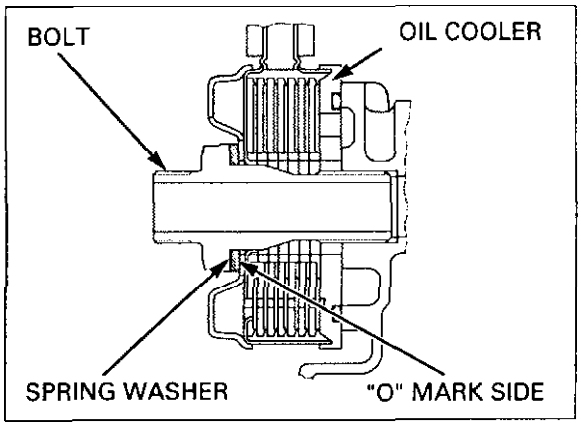
Remove the bolt, spring washer and oil cooler from the crankcase.

Installation is in the reverse order of removal.
At installation, align the stopper on oil cooler with the tab on the crankcase.



Install the spring washer with its "O" mark side facing oil cooler side.
Apply engine oil to the bolt threads and install it.
Tighten the bolt to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



6. FUEL SYSTEM (PGM-FI)

COMPONENT LOCATION 6-2

SERVICE INFORMATION 6-3

SYMPTOM TROUBLESHOOTING 6-6

PGM-FI SYSTEM LOCATION 6-7

PGM-FI SYSTEM DIAGRAM 6-8

CONNECTOR LOCATION 6-9

PGM-FI TROUBLESHOOTING INFORMATION 6-14

DTC INDEX 6-18

DTC TROUBLESHOOTING 6-19

MIL TROUBLESHOOTING 6-38

MIL CIRCUIT INSPECTION 6-54

FUEL LINE INSPECTION 6-55

FUEL PUMP 6-59

FUEL PUMP RELAY 6-61

FUEL TANK 6-62

AIR CLEANER HOUSING 6-63

THROTTLE BODY 6-65

INJECTOR 6-69

MAP SENSOR 6-71

IAT SENSOR 6-71

ECT SENSOR 6-72

CMP SENSOR 6-72

BANK ANGLE SENSOR 6-73

FI/IGNITION RELAY 6-74

ECM (ENGINE CONTROL MODULE) 6-75

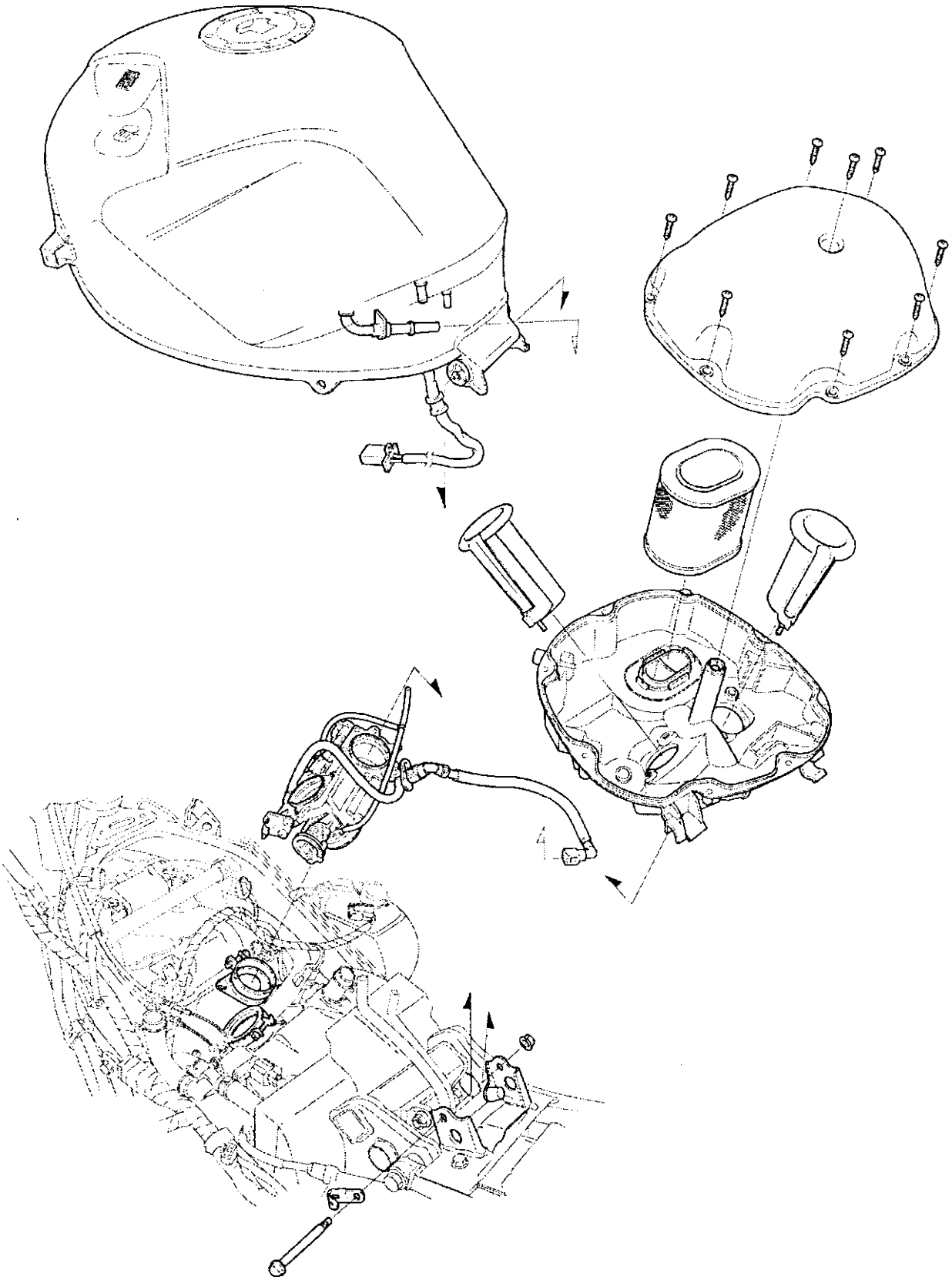
ENGINE IDLE SPEED 6-77

IACV (Idle Air Control Valve) 6-77

SECONDARY AIR SUPPLY SYSTEM 6-79

O_2 SENSOR 6-82

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Before disconnecting fuel feed hose, relieve pressure from the system by disconnecting the quick connect fitting in the fuel pump (page 6-55).
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bend, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake port with tape or a clean cloth to keep dirt and debris from entering the intake port after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle valve.
- Prevent dirt and debris from entering the throttle bore and fuel feed hose, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts, nuts and screws of the throttle body.
- Always replace the packing when the fuel pump is removed.
- It is impossible to disassemble the fuel pump after removing it.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- The VS sensor sends digital pulse signal to the ECM and computation. Refer to procedures for VS sensor inspection
  - DTC troubleshooting (page 6-19)
  - MIL troubleshooting (page 6-38)
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Use a digital tester for PGM-FI system inspection.
- For fuel level sensor inspection (page 22-11).

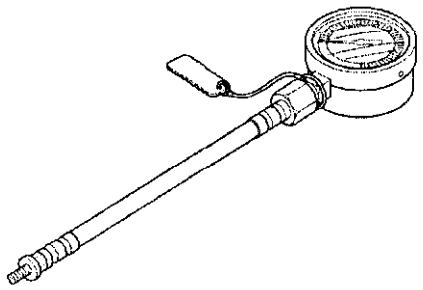
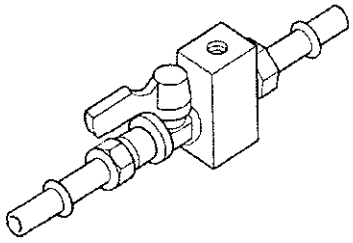
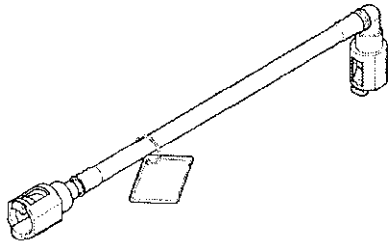
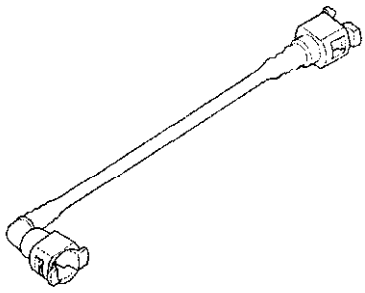
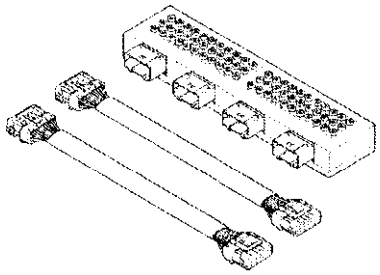
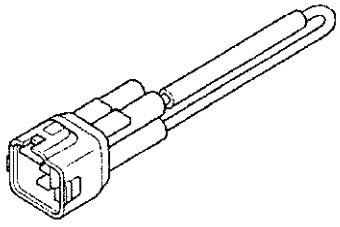
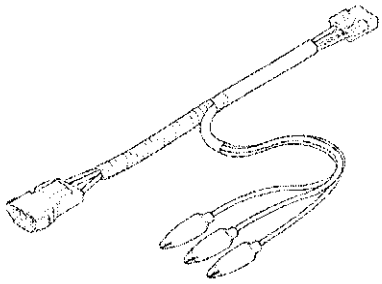
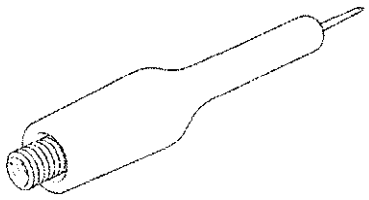
SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ66A
Idle speed	1,200 ± 100 min^{-1} (rpm)
Throttle grip free play	2 – 6 mm (1/12 – 1/4 in)
IAT sensor resistance (20°C/68°F)	1 – 4 kΩ
ECT sensor resistance (20°C/68°F)	2.32 – 2.59 kΩ
Fuel injector resistance (at 20°C /68°F)	10.0 – 14.0 Ω
CMP sensor peak voltage (at 20°C /68°F)	0.7 V minimum
CKP sensor peak voltage (at 20°C /68°F)	0.7 V minimum
Fuel pressure at idle	343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12 V)	200 cm^3 (6.8 US oz, 7.0 Imp oz) minimum/10 seconds

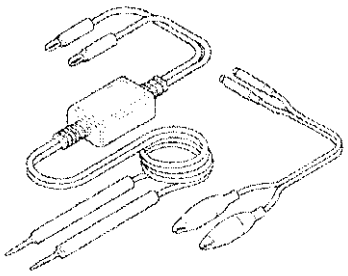
TORQUE VALUES

ECT sensor	24.5 N·m (2.5 kgf·m, 18 lbf·ft)
Throttle body clamp screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)
IACV screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)
Set plate torx screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)
Throttle cable guide screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)
Fuel injector mounting bolt	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)
Fuel pump mounting nut	12 N·m (1.2 kgf·m, 9 lbf·ft)
Fuel filler cap	1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)

TOOLS

Fuel pressure gauge 07406-0040004 	Pressure gauge manifold 07ZAJ-S5A0110 	Pressure gauge hose attachment C 07ZAJ-S7C01000 
Pressure gauge hose attachment A 07ZAJ-SA5A0120 	Fuel attachment joint 07ZAJ-S7C0200 	ECM test harness 33P 070MZ-MCA0100 
SCS connector 070PZ-ZY30100 	Inspection test harness 07GMJ-ML80100 	Test probe 07ZAJ-RDJA110 

Imrie diagnostic tester (model 625)
or Peak voltage adaptor
07HGJ-0020100



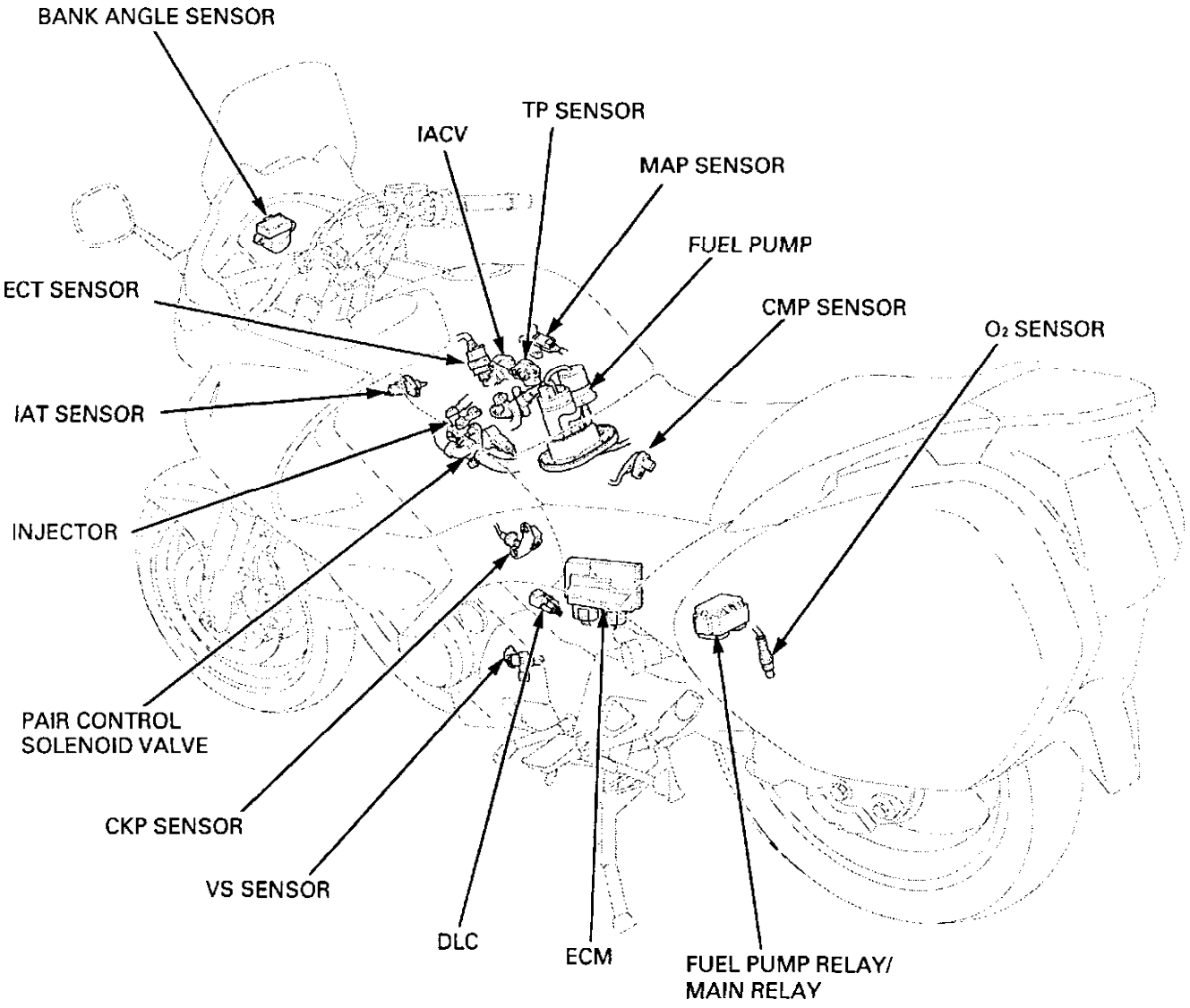
with commercially available digital multimeter (impedance 10MΩ/DCV minimum)

SYMPTOM TROUBLESHOOTING

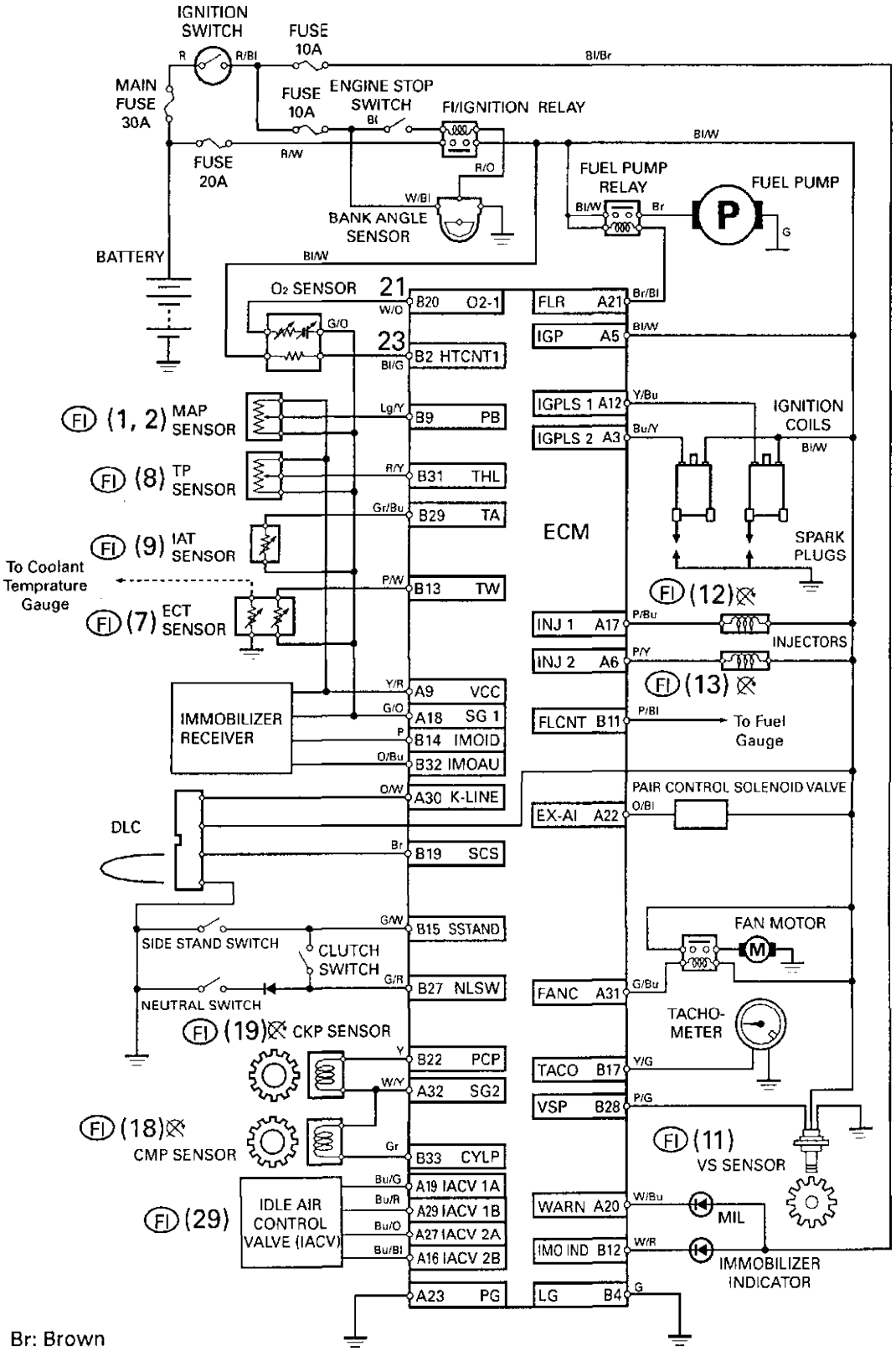
When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 6-18) and begin the appropriate troubleshooting procedure. If there are no DTC/MIL blinking stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find cause.

Symptom	Diagnosis procedure	Also check for
Engine cranks but won't start (No DTC and MIL blinking)	1. Crank the starter for more than ten seconds and check the DTC (page 6-15) and execute the troubleshooting according to the DTC. 2. Inspect the fuel supply system (page 6-58).	• No fuel to injector – Clogged fuel filter – Pinched or clogged fuel feed hose – Pinched or clogged fuel tank breather hose – Faulty fuel pump – Faulty fuel pump circuits • Intake air leak • Contaminated/deteriorated fuel • Faulty fuel injector • IACV stuck • Faulty ignition system
Engine cranks but won't start (No fuel pump operation sound when the turning the ignition ON)	1. ECM power/ground circuits malfunction (page 6-75) 2. Inspect the fuel supply system (page 6-58).	• Open circuit in the power input and/or ground wire of the ECM • Faulty bank angle sensor or related circuit • Faulty FI/IGN relay or related circuit • Faulty engine stop switch or related circuit • Blown STARTER/IGN fuse (10 A)
Engine stalls, hard to start, rough idling	1. Check the idle speed. 2. Check the IACV. 3. Inspect the fuel supply system (page 6-58).	• Restricted fuel feed hose • Contaminated/deteriorated fuel • Intake air leak • Faulty IACV • Restricted fuel tank breather hose • Faulty ignition system
Afterburn when engine braking is used	Check the PAIR system (page 6-79).	• Faulty pulse secondary air injection (PAIR) system – Faulty PAIR control solenoid valve – Faulty PAIR check valve – Clogged hose of the PAIR system • Faulty ignition system
Backfiring or misfiring during acceleration	Check the ignition system.	• Faulty ignition system
Poor performance (driveability) and poor fuel economy	Inspect the fuel supply system (page 6-58).	• Pinched or clogged fuel feed hose • Faulty pressure regulator • Faulty injector • Faulty ignition system
MIL stays ON but no DTCs set, or MIL never comes ON at all	Troubleshoot the MIL circuit (page 6-38).	• Faulty MIL circuit
MIL stays ON at all (No DTC set)	Check the DLC circuit (Brown wire) for short circuit.	• Short circuit in the DLC related wire

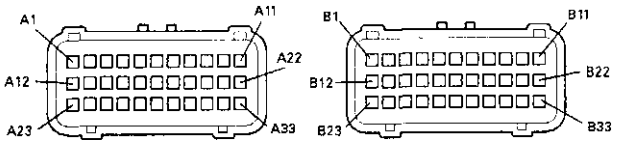
PGM-FI SYSTEM LOCATION



PGM-FI SYSTEM DIAGRAM



Bl: Black Br: Brown
Y: Yellow O: Orange
Bu: Blue Lg: Light green
G: Green P: Pink
R: Red Gr: Gray
W: White



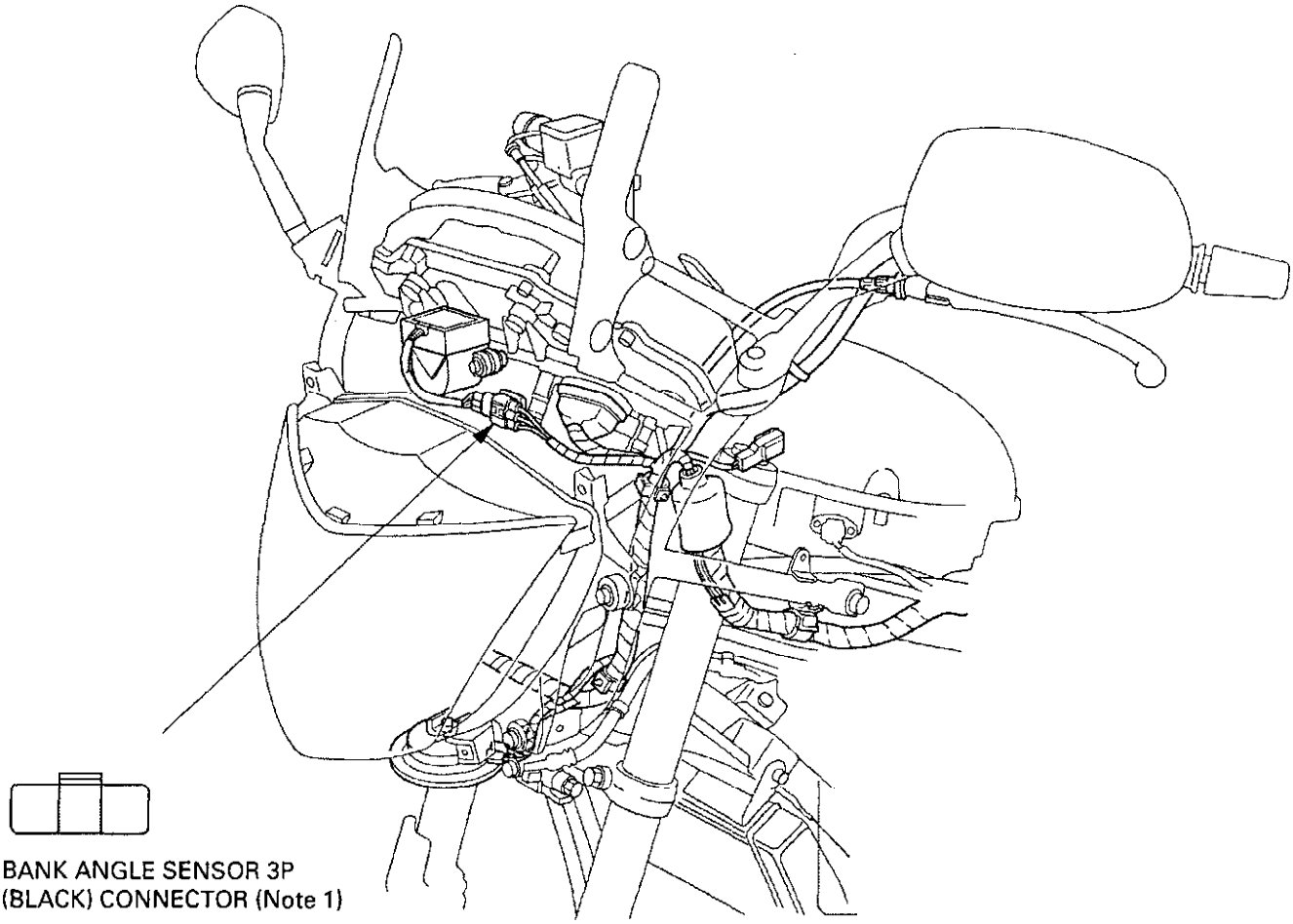
ECM 33P (Black) CONNECTOR 33P (Light gray) CONNECTOR

ECM side of the male terminals

CONNECTOR LOCATION

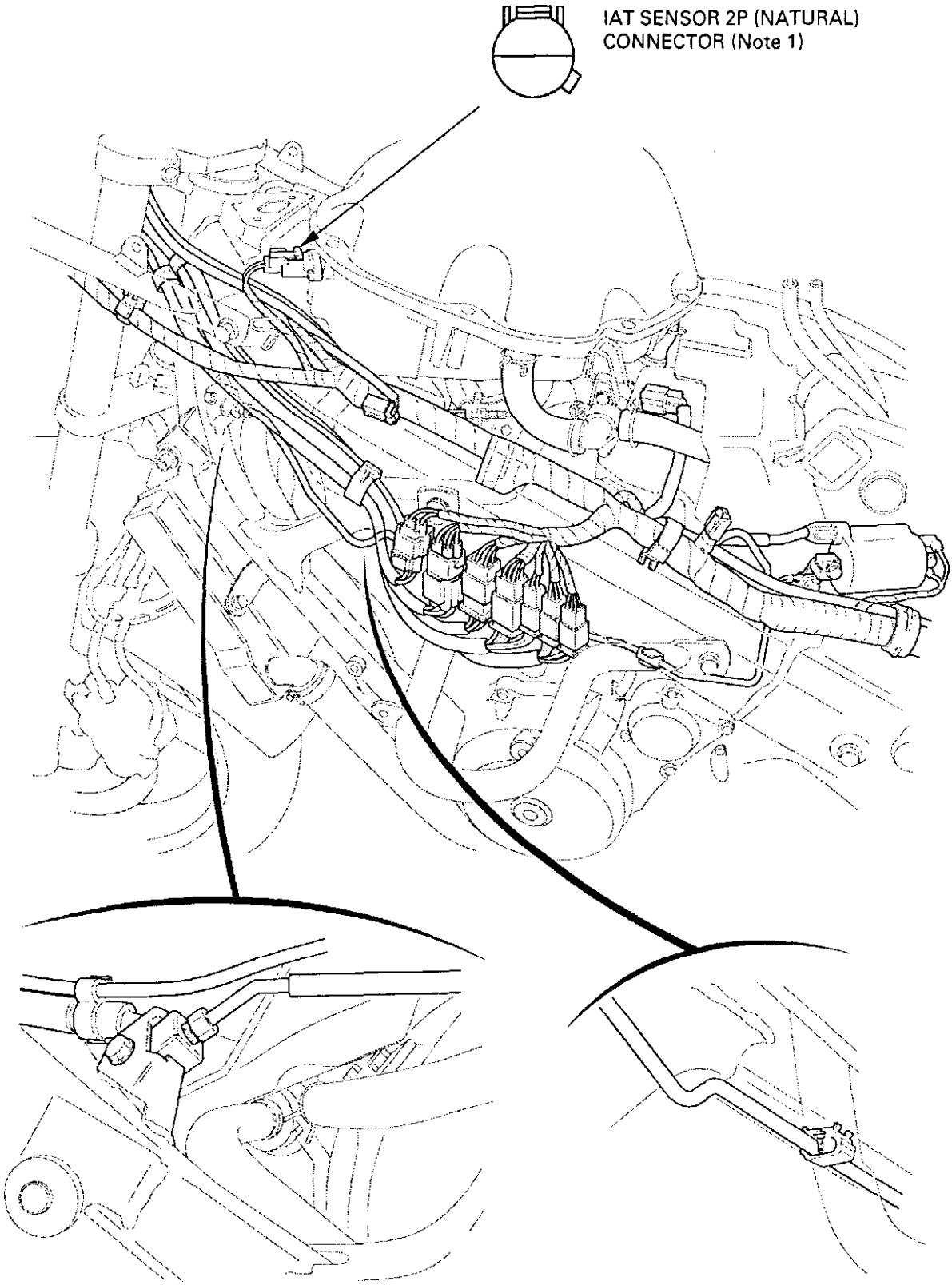
FRONT SIDE LOCATION

Note 1: Remove the screen inner cowl (page 3-14).

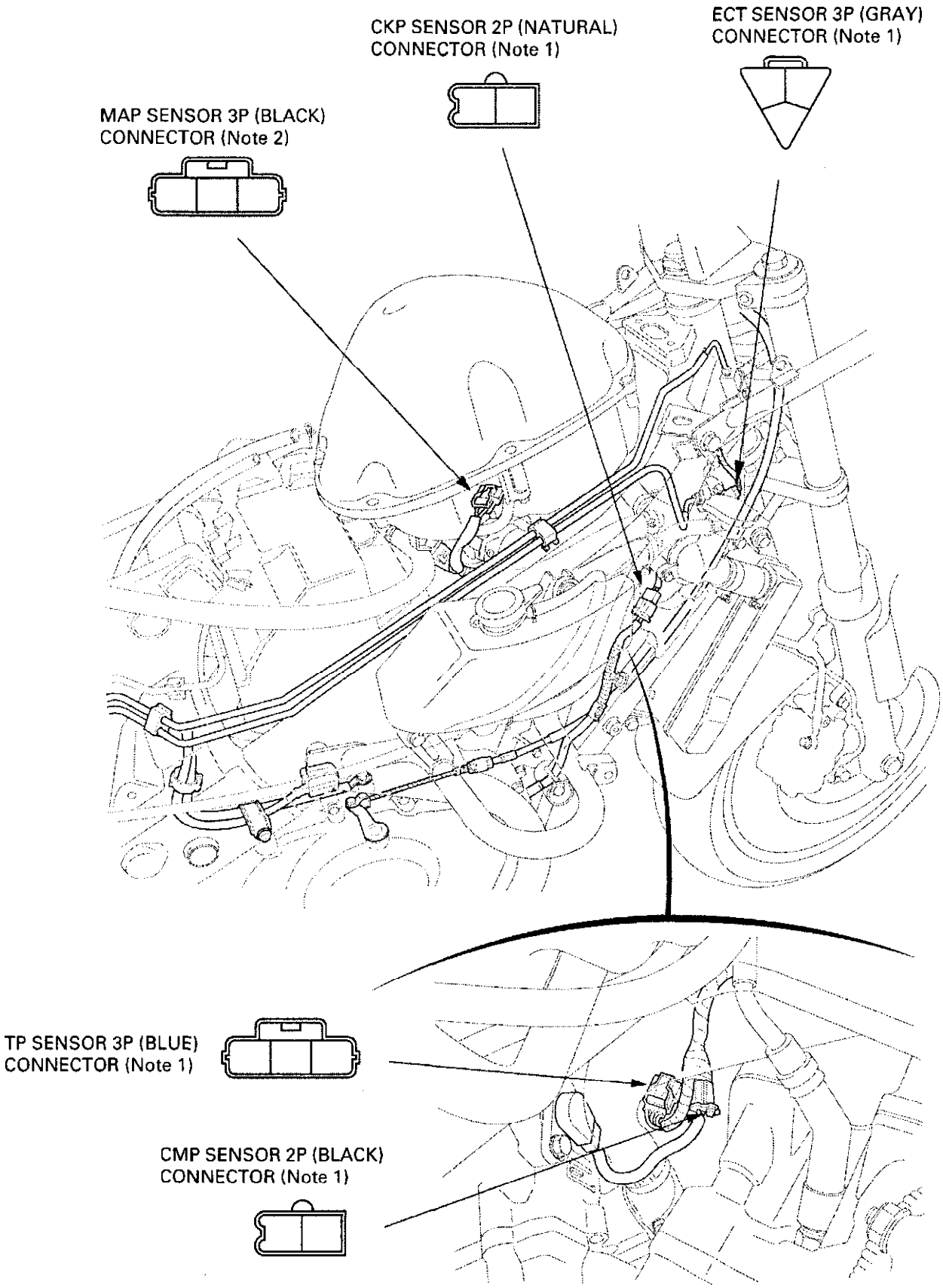


BANK ANGLE SENSOR 3P
(BLACK) CONNECTOR (Note 1)

Note 1: Open and support the fuel tank (page 4-5).

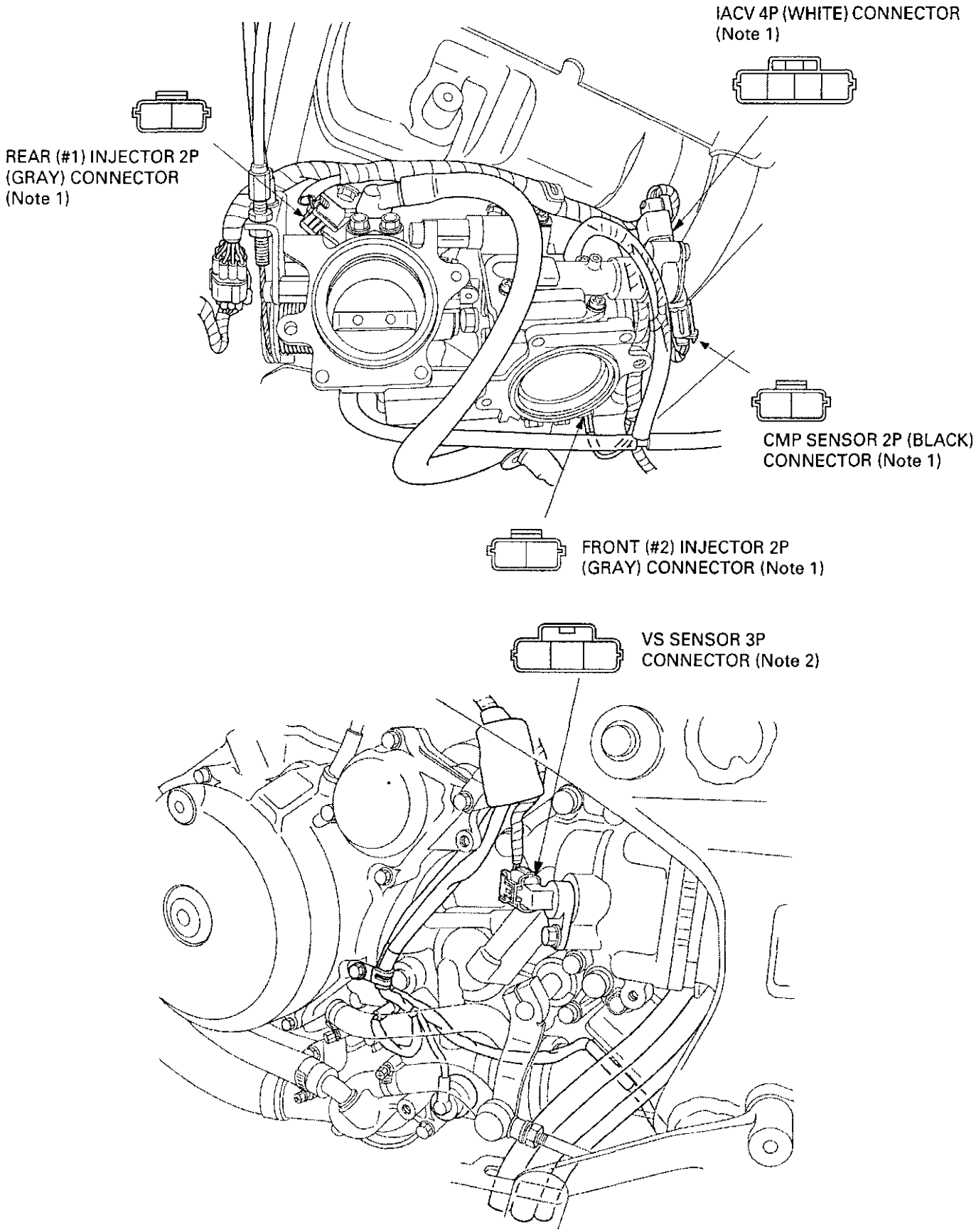


Note 1: Remove the right middle cowl (page 3-11).
Note 2: Open and support the fuel tank (page 4-5).

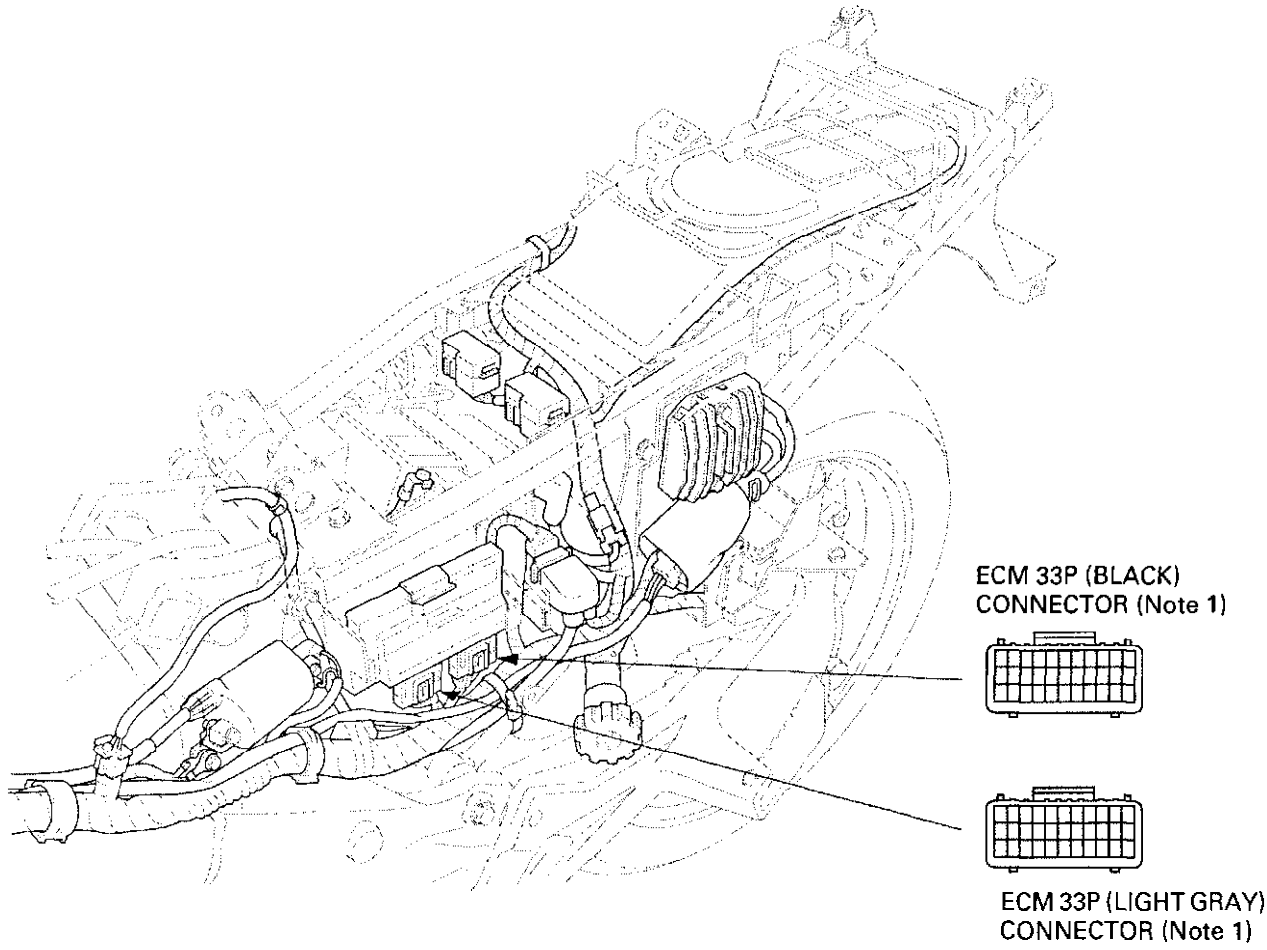


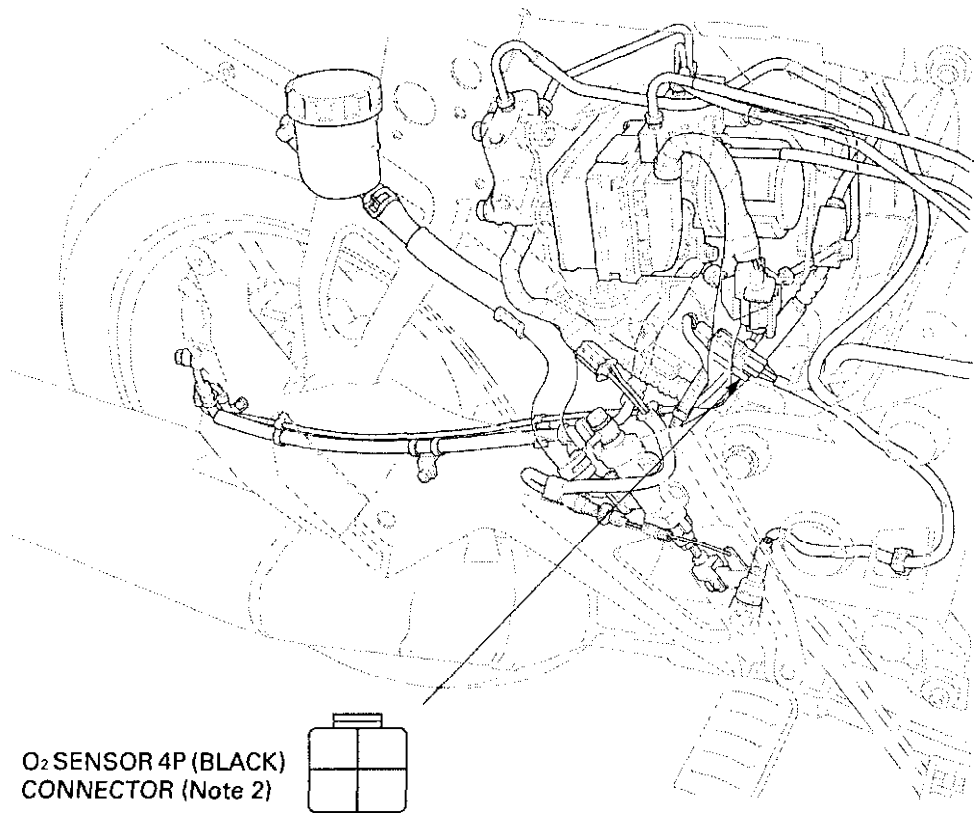
MIDDLE SIDE LOCATION

Note 1: Remove the air cleaner housing (page 6-63).
Note 2: Remove the left crankcase rear cover (page 3-15).



Note 1: Remove the left side cover/pivot cover (page 3-5).
Note 1: Remove the right side cover/pivot cover (page 3-5).





PGM-FI TROUBLESHOOTING INFORMATION

GENERAL TROUBLESHOOTING

Intermittent Failure

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

Opens and Shorts

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

If the MIL has come on

Refer to DTC READOUT (page 6-15).

If the MIL did not stay on

If the MIL did not stay on, but there is a driveability problem, do the SYMPTOM TROUBLESHOOTING (page 6-6).

SYSTEM DESCRIPTION

SELF-DIAGNOSIS SYSTEM

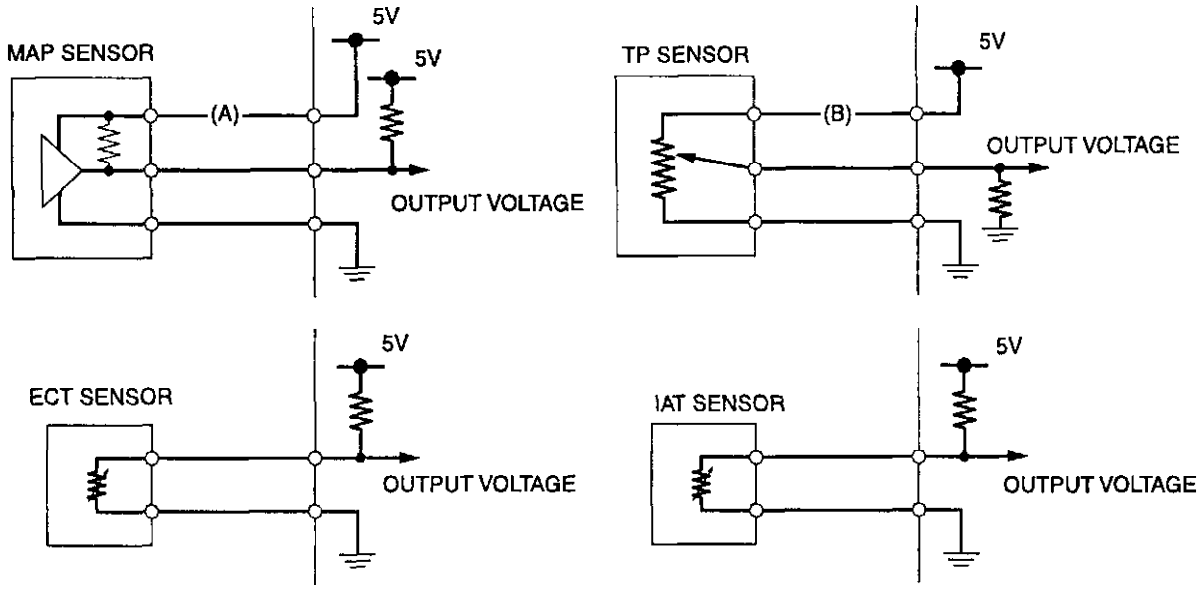
The PGM-FI system is equipped with the self-diagnostic system. When any abnormality occurs in the system, the ECM turns on the MIL and stores a DTC in its erasable memory.

FAIL-SAFE FUNCTION

The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is maintained by pre-programed value in the simulated program map. When any abnormality is detected in the injector(s), crankshaft position (CKP) sensor and/or camshaft position (CMP) sensor, the fail-safe function stops the engine to protect it from damage.

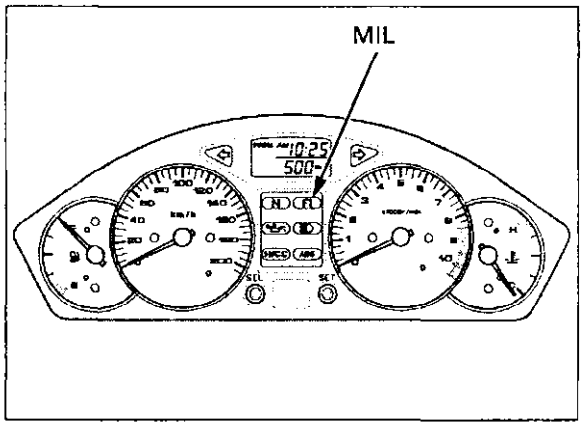
DTC (Diagnostic Trouble Code)

- The DTC is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the HDS pocket tester.
  The digits in front of the hyphen are the main code, they indicate the component of function failure.
  The digits behind the hyphen are the sub code, they detail the specific symptom of the component or function failure.
  For example, in the case of the TP sensor:
  - DTC 08 – 1 = (TP sensor voltage) – (lower than the specified value)
  - DTC 08 – 2 = (TP sensor voltage) – (higher than the specified value).
- The MAP, ECT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor.
  If a failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the HDS Pocket Tester.
  For example:
  - If the 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 displayed.
  - If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.



MIL Blink Pattern

- If the HDS pocket tester is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is the equivalent the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.5 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by five short blinks, the MIL is 25 (two long blinks = 20 blinks, plus five short blinks).
- When the ECM stores more than one DTC, the MIL will indicate them by blinking in the order from the lowest number to highest number.



MIL Check

When the ignition switch is turned ON and engine stop switch " ⟳ ", the MIL will stay on for a few seconds, then go off. If the MIL does not come on, troubleshoot the MIL circuit (page 6-38).

CURRENT DTC/FREEZE DTC

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

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

HDS POCKET TESTER INFORMATION

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

How to connect the HDS Pocket Tester

Turn the ignition switch to OFF.

Remove the side cover/pivot cover (page 3-5).

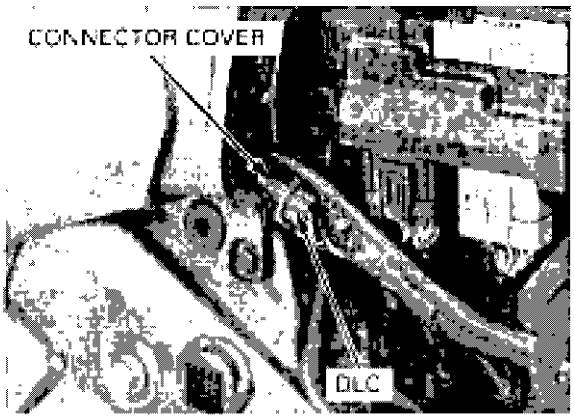
Remove the dummy connector from the DLC.

Connect the HDS pocket tester to the DLC.

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

NOTE:

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



ECM reset

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

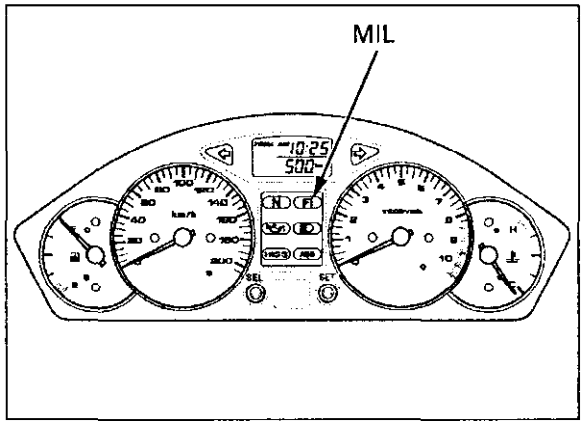
DTC READOUT

Start the engine and check the MIL.

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

If the MIL stays on or blinks, connect the HDS Pocket Tester to the DLC (page 6-15).
Read the DTC, freeze data and follow the troubleshooting index (page 6-18).

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



Reading DTC with the MIL

Turn the ignition switch to OFF.

Remove the side cover/pivot cover (page 3-5).

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

TOOL:
SCS connector 070PZ-ZY30100
CONNECTION: Brown – Green

Turn the ignition switch to ON, read, note the MIL blinks and refer to the troubleshooting index (page 6-18).

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

CLEARING DTC

Connect the HDS Pocket Tester to the DLC (page 6-15).

Clear the DTC with the HDS while the engine is stopped.

To clear the DTC without HDS, refer to the following procedure.

How to clear the DTC with SCS service connector

1. Remove the side cover/pivot cover (page 3-5).
2. Turn the ignition switch to OFF.
3. Remove the dummy connector and short the Brown and Green wire terminals of the DLC using the special tool.

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

   TOOL:
   SCS connector 070PZ-ZY30100
   CONNECTION: Brown – Green
4. Turn the ignition switch to ON.
5. Remove the special tool wire from the DLC.
6. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with the special tool. The self-diagnostic memory is erased if the malfunction indicator goes off and starts blinking.

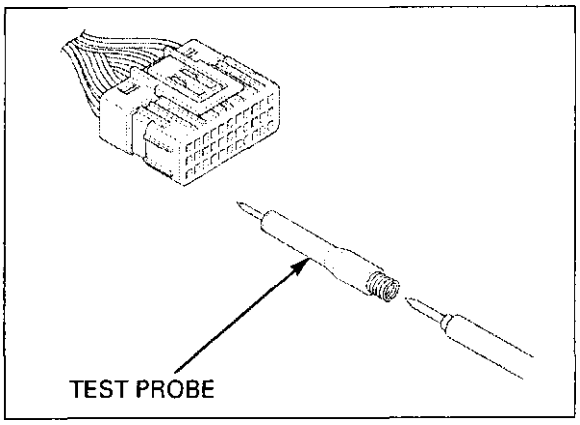
NOTE:
- The DLC must be jumped while the MIL lights. If not, the MIL will not start blinking.
- Note that the self-diagnostic memory cannot be erased if the ignition switch is turned "OFF" before the MIL starts blinking.

CIRCUIT INSPECTION

INSPECTION AT ECM CONNECTOR

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

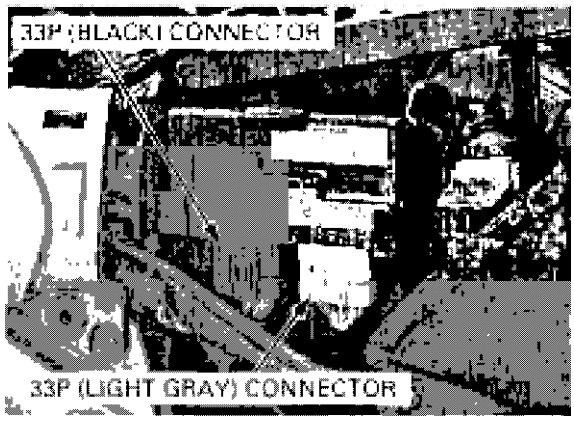
  TOOL:
  Test probe 07ZAJ-RDJA110



TEST HARNESS CONNECTION

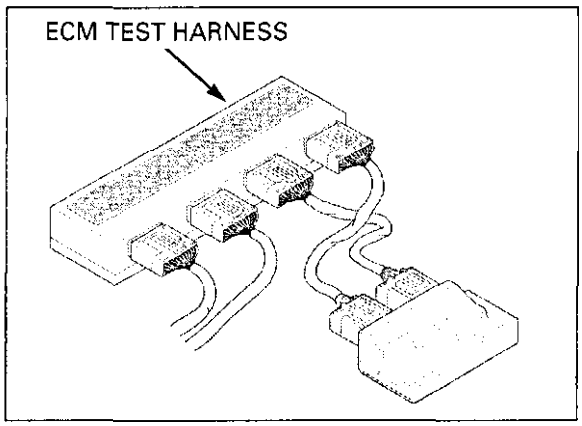
Remove the left side cover/pivot cover (page 3-5).
Connect the battery cable.

Disconnect the ECM 33P connectors from the module.



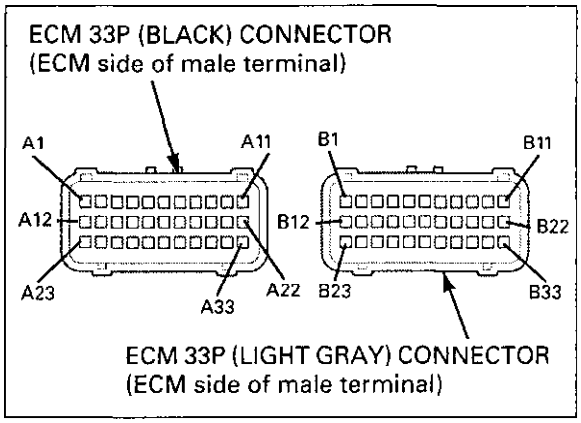
Connect the ECM test harness between the main wire harness and the ECM.

TOOL:
ECM test hamess 33P **070MZ-MCA0100**

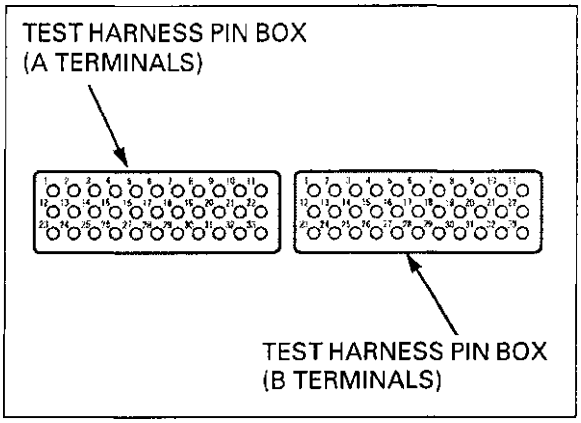


TEST HARNESS TERMINAL LAYOUT

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



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



DTC INDEX

DTC (MIL blinks)	Function Failure	Symptom/Fail-safe function	Refer to (DTC)	Refer to (MIL)
1-1 (1)	MAP sensor circuit low voltage (less than 0.2 V) • MAP sensor or its circuit malfunction	• Engine operates normally	6-19	6-38
1-2 (1)	MAP sensor circuit high voltage (more than 3.9 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally	6-20	6-38
2-1 (2)	MAP sensor performance problem • Loose or poor connection of the MAP sensor vacuum hose • MAP sensor malfunction	• Engine operates normally	6-21	6-39
7-1 (7)	ECT sensor circuit low voltage (less than 0.07 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Fail-safe value: 90°C/194°F • Cooling fan turns on	6-22	6-40
7-2 (7)	ECT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Fail-safe value: 90°C/194°F • Cooling fan turns on	6-23	6-40
8-1 (8)	TP sensor circuit low voltage (less than 0.3 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Fail-safe value: 0°	6-24	6-42
8-2 (8)	TP sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the TP sensor connector • TP sensor or its circuit malfunction	• Poor engine acceleration • Fail-safe value: 0°	6-25	6-42
9-1 (9)	IAT sensor circuit low voltage (less than 0.07 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	6-26	6-44
9-2 (9)	IAT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Fail-safe value: 25°C/77°F	6-27	6-44
11-1 (11)	VS sensor no signal • Loose or poor contact of the VS sensor connector • VS sensor or its circuit malfunction	• Engine operates normally	6-28	6-45
12-1 (12)	No. 1 injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	6-30	6-47
13-1 (13)	No. 2 injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	6-31	6-48
18-1 (18)	CMP sensor no signal • Loose or poor contact of the CMP sensor connector • CMP sensor or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	6-32	6-49
19-1 (19)	CKP sensor no signal • Loose or poor contact of the CKP sensor connector • CKP sensor or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	6-33	6-50
21-1 (21)	O_2 sensor malfunction • Loose or poor contact of the O_2 sensor connector • O_2 sensor or its circuit malfunction	• Engine operates normally	6-34	6-51
23-1 (23)	O_2 sensor heater circuit malfunction • Loose or poor contact of the O_2 sensor heater connector • O_2 sensor heater or its circuit malfunction	• Engine operates normally	6-35	6-52
29-1 (29)	IACV circuit malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	6-36	6-53

DTC TROUBLESHOOTING

DTC 1-1 (MAP SENSOR LOW VOLTAGE)

1. MAP Sensor System Inspection

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

Is about 0 V or below indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the MAP sensor connector

2. MAP Sensor Input Voltage Inspection

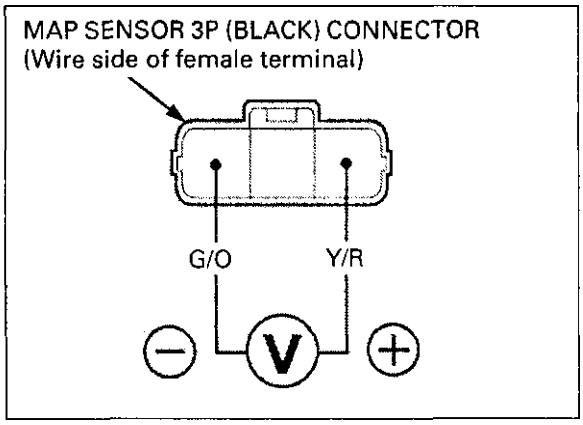
Turn the ignition switch OFF.
Disconnect the MAP sensor 3P (Black) connector.

Turn the ignition switch ON and engine stop switch " ⌒ ".
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 – GO TO STEP 3.



3. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

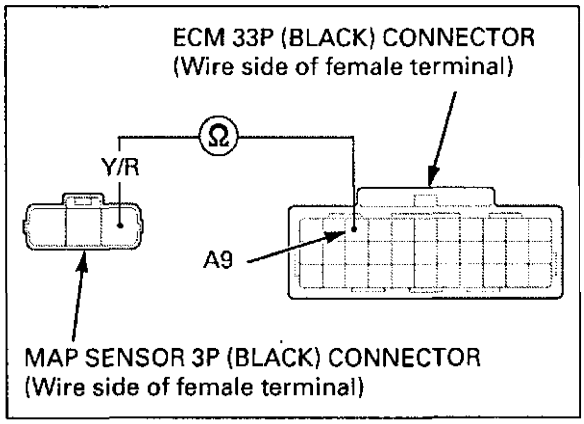
Check for continuity at the Yellow/red wire between the MAP sensor 3P (Black) connector terminal and the ECM 33P (Black) connector.
Connection: A9 – Yellow/red

TOOL:
Test probe **07ZAJ-RDJA110**

Is there continuity?

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

NO – Open circuit in Yellow/red wire



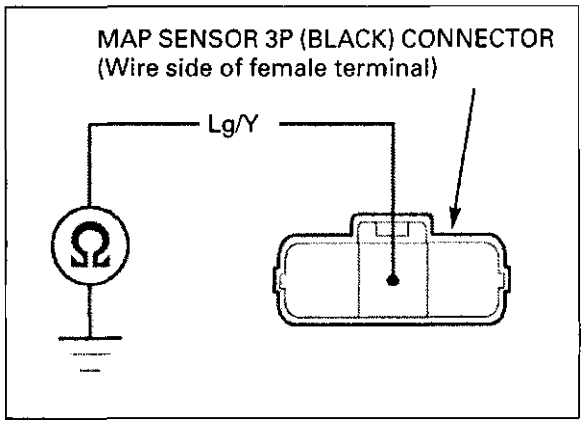
4. MAP Sensor Output Line Short Circuit Inspection

Check for continuity between the MAP sensor 3P (Black) 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 known good one (page 6-75).
Reset the ECM (page 6-15).
Turn the ignition switch ON and engine stop switch " ⟳ ".

Check the MAP sensor with the HDS.

Is DTC 1-1 indicated?

YES – Replace the ECM with a known good 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 3P (Black) connector and recheck the DTC.

1. **MAP Sensor System Inspection 1**

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

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.

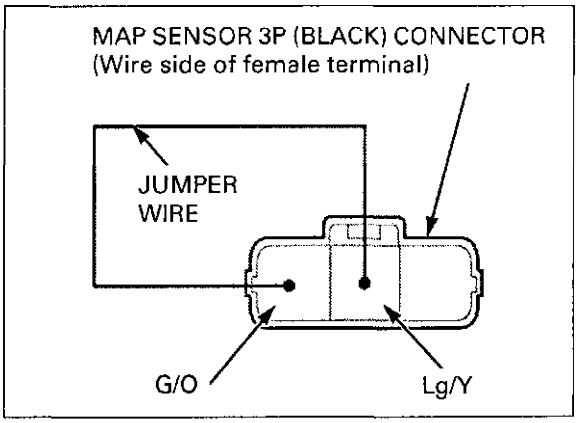
Disconnect the MAP sensor 3P (Black) connector.
Connect the MAP sensor terminals at the wire harness side with a jumper wire.
Connection: Light green/yellow – Green/orange

Turn the ignition switch ON and engine stop switch " ⟳ ".
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**

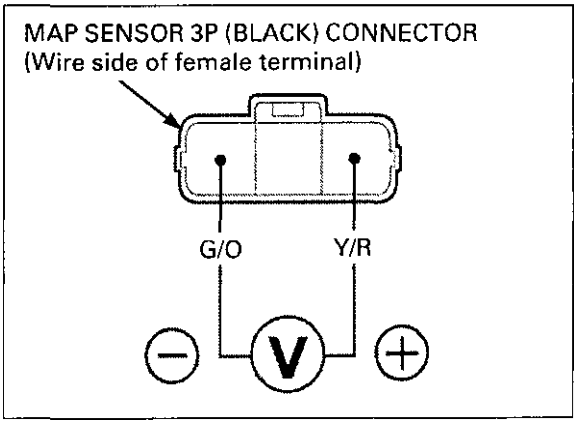
Turn the ignition switch OFF.
Remove the jumper wire.

Turn the ignition switch ON and engine stop switch " ⟳ ".
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
• Open circuit in Yellow/red wire



4. **MAP Sensor Output Line Open Circuit Inspection**

Disconnect the ECM 33P connectors.
Check for continuity at the Light green/yellow wire between the MAP sensor 3P (Black) connector terminal and the ECM 33P (Light gray) connector.

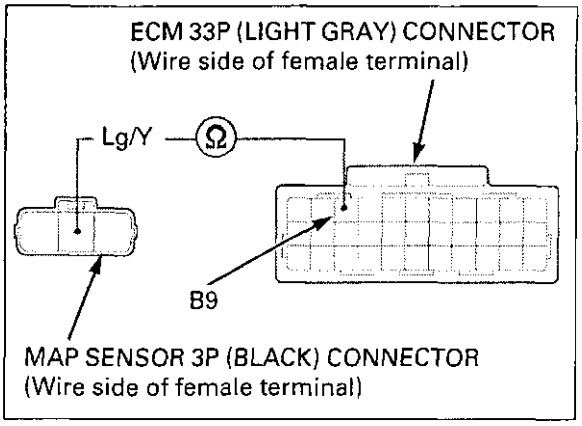
Connection: B9 – Light green/yellow

TOOL:
Test probe **07ZAJ-RDJA110**

Is there continuity?

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

NO – Open circuit in Light green/yellow wire



DTC 2-1 (MAP SENSOR)

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

1. **MAP Sensor System Inspection**

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

Start the engine and check the MAP sensor with the HDS pocket tester at idle speed.

Is the voltage within 1.6 – 1.8 V?

YES – Intermittent failure

NO – GO TO STEP 2.

2. **Manifold Absolute Pressure Test**

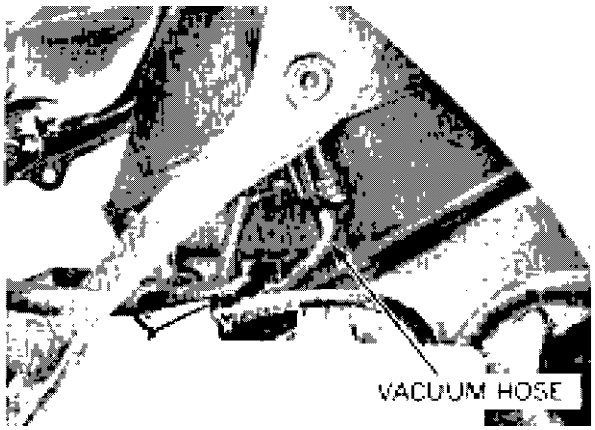
Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connection correct?

YES – GO TO STEP 3.

NO – Correct the hose installation



3. **MAP Sensor System Inspection**

Replace the MAP sensor with a known good one (page 6-75).
Turn the ignition switch ON and engine stop switch " ⌒ ".

Start the engine and check the MAP sensor with the HDS pocket tester at idle speed.

Is the voltage within 1.6 – 1.8 V?

YES – Faulty original MAP sensor

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

DTC 7-1 (ECT SENSOR LOW VOLTAGE)

1. **ECT Sensor System Inspection**

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

   Check the ECT sensor with the HDS pocket tester.

   Is about 0 V indicated?

   NO – Intermittent failure.

   YES – GO TO STEP 2.

2. **ECT Sensor Inspection**

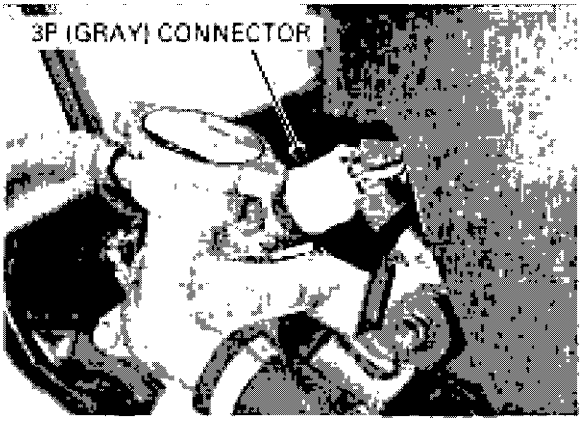
   Remove the right middle cowl (page 3-11).
   Turn the ignition switch OFF.
   Disconnect the ECT sensor 3P (Gray) connector.

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

   Is about 0 V indicated?

   NO – GO TO STEP 3.

   YES – GO TO STEP 4.



3. **ECT Sensor Resistance Inspection**

   Turn the ignition switch OFF.

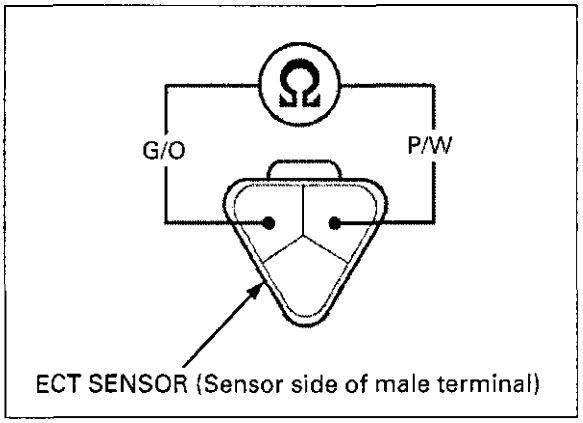
   Measure the resistance at the ECT sensor terminals.

   CONNECTION: Pink/white – Green/orange
   STANDARD: 2.32 – 2.59 kΩ (20°C/68°F)

   Is the resistance within 2.32 – 2.59 kΩ?

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

   No – Faulty ECT sensor.



4. **ECT Sensor Short Circuit Inspection**

   Disconnect the ECM 33P connector from the module (page 6-65).

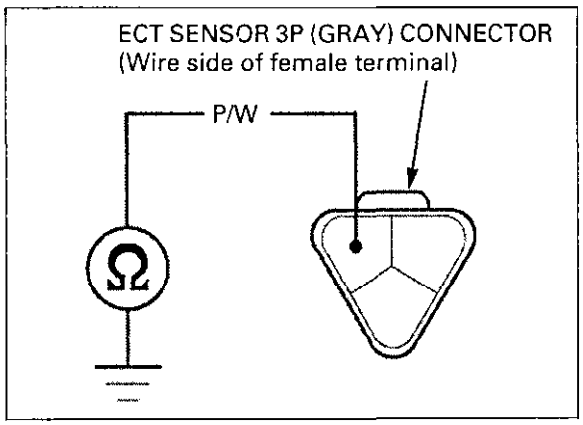
   Check for continuity between the ECT sensor 3P (Gray) connector of the wire harness side and ground.

   CONNECTION: Pink/white – Ground

   Is there continuity?

   YES – Short circuit in Pink/White wire.

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



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

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

1. **ECT Sensor System Inspection**

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

   Check the ECT sensor with the HDS pocket tester.

   Is about 5 V indicated?

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

   YES – GO TO STEP 2.

2. **ECT Sensor Inspection**

   Remove the right middle cowl (page 3-11).
   Turn the ignition switch OFF.

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

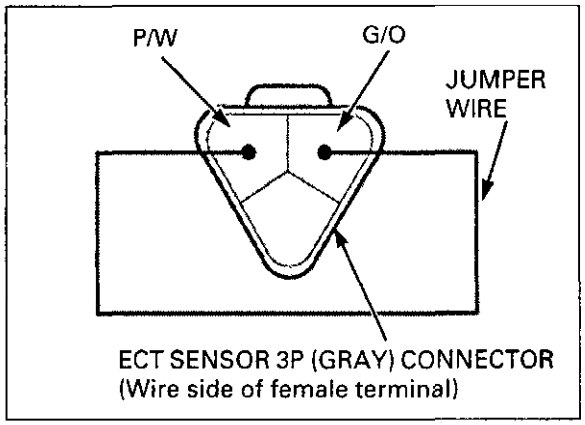
   CONNECTION: Pink/white – Green/orange

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

   Is about 0 V indicated?

   YES – Faulty ECT sensor.

   NO – GO TO STEP 3.



3. **ECT Sensor Open Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the jumper wire.

   Disconnect the ECM 33P connectors (page 6-65).
   Check for continuity between the ECM connector and ECT sensor connector of the wire harness side.

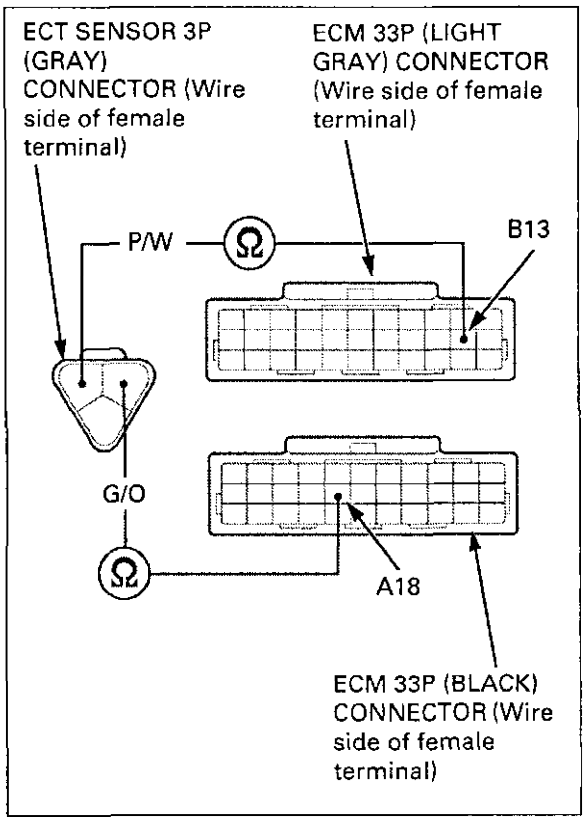
   CONNECTION: B13 – Pink/white
   A18 – Green/orange

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

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

   NO – • Open circuit in Pink/white wire.
   • Open circuit in Green/orange wire.



DTC 8-1 (TP SENSOR LOW VOLTAGE)

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

1. **TP Sensor System Inspection**

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

   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**

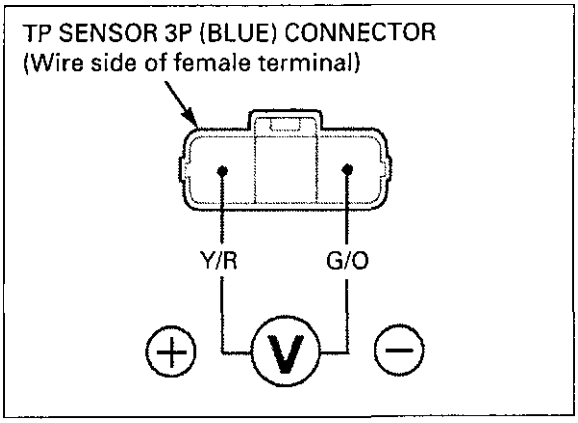
   Turn the ignition switch OFF.
   Remove the air cleaner housing (page 6-63).
   Disconnect the TP sensor 3P (Blue) connector.

   Turn the ignition switch ON and engine stop switch " ⟳ ".
   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**

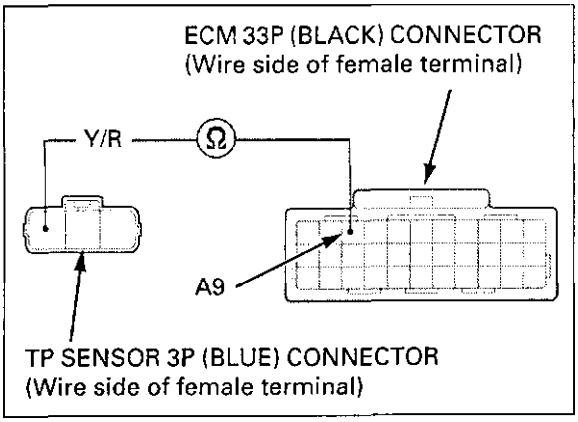
   Disconnect the ECM 33P connectors.
   Check for continuity at the Yellow/red wire between the TP sensor 3P (Blue) connector terminal and the ECM 33P (Black) connector.
   Connection: A9 – Yellow/red

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

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

   NO – Open circuit in Yellow/red wire



4. **TP Sensor Output Line Open Circuit Inspection**

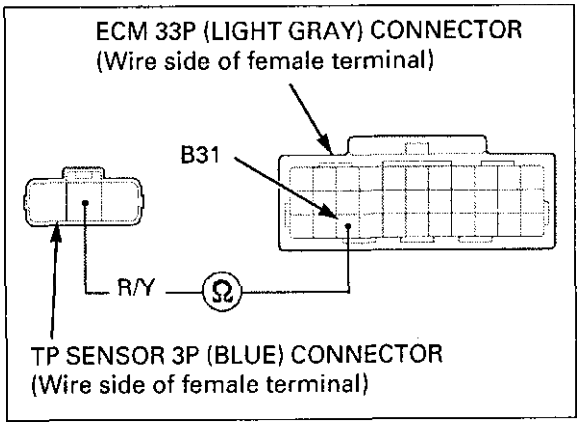
   Check for continuity at the Red/yellow wire between the TP sensor 3P (Blue) connector terminal and the ECM 33P (Light gray) connector.
   Connection: B31 – Red/yellow

   TOOL:
   Test probe **07ZAJ-RDJA110**

   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 (Blue) connector.

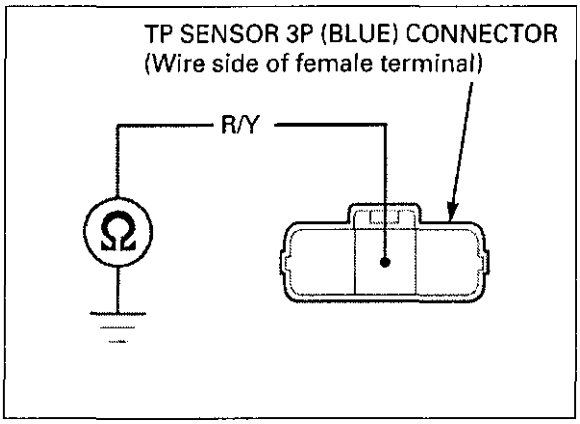
   Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

   Connection: Red/yellow – Ground

   Is there continuity?

   YES – Short circuit in Red/yellow wire

   NO – GO TO STEP 6.



6. **TP Sensor Inspection**

   Replace the TP sensor with a known good one.
   Reset the ECM (page 6-15).
   Turn the ignition switch ON and engine stop switch " ⟳ ".

   Check the TP sensor with the HDS pocket tester.

   Is DTC 8-1 indicated?

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

   NO – Faulty original TP sensor

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

1. **TP Sensor System Inspection**

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

   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 connector

2. **TP Sensor Resistance Inspection**

   Turn the ignition switch OFF.

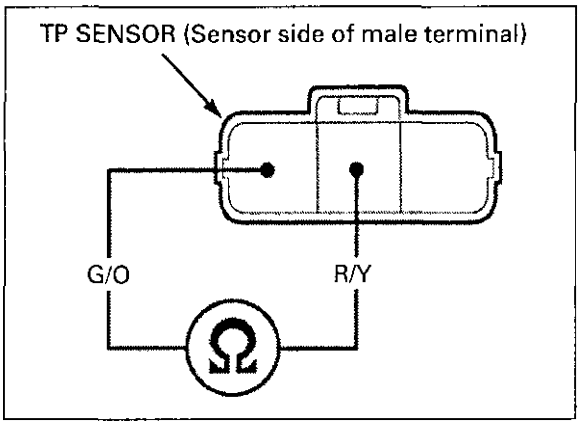
   Disconnect the TP sensor 3P (Blue) connector.
   Measure the resistance at the TP sensor side.

   Connection: Red/yellow – Green/orange

   Is the resistance within 0.5 - 1.5 kΩ?

   YES – GO TO STEP 3.

   NO – Faulty TP sensor



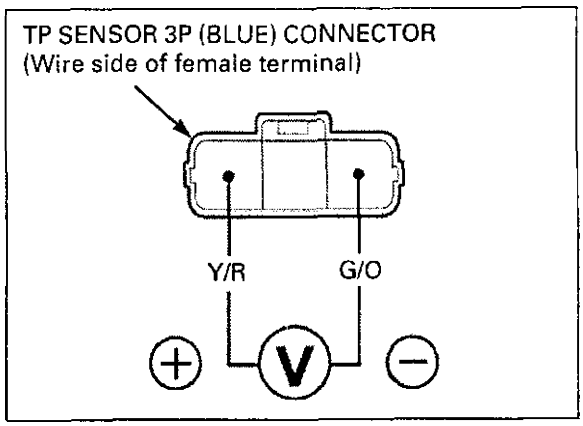
3. **TP Sensor Input Voltage Inspection**

Turn the ignition switch ON and engine stop switch " ⌒ ".
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 known good one, and recheck

NO – Open circuit in Green/orange or wires



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. **IAT Sensor System Inspection**

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

Check the IAT sensor with the HDS pocket tester.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the IAT sensor connector

2. **IAT Sensor Inspection**

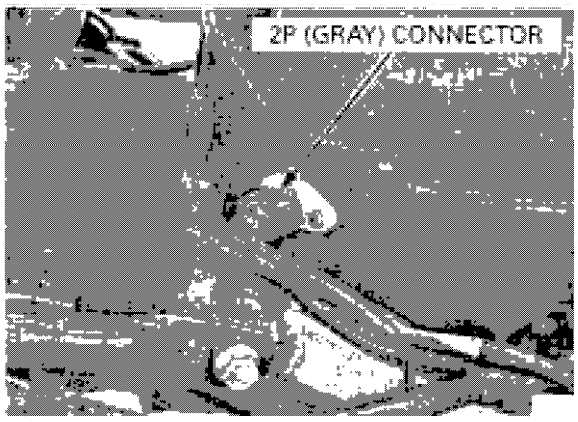
Open and support the fuel tank (page 4-5).
Turn the ignition switch OFF.
Disconnect the IAT sensor 2P (Gray) connector.

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

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor



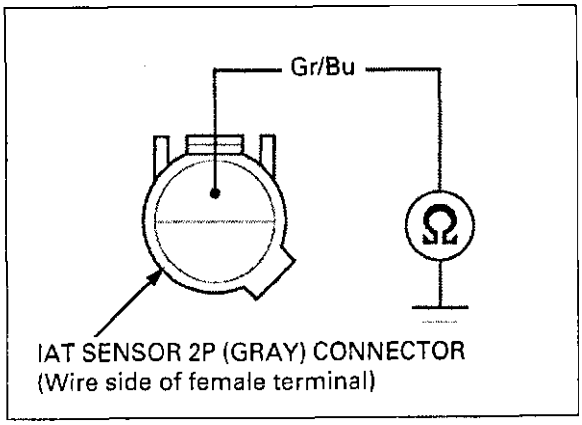
3. **IAT Sensor Output Line Short Circuit Inspection**

Check for continuity between the IAT sensor 2P (Gray) 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



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 " ⌒ ".

   Check the IAT sensor with the HDS pocket tester.

   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – • Intermittent failure
   • Loose or poor contact on the IAT sensor connector

2. **IAT Sensor Inspection**

   Turn the ignition switch OFF.
   Open and support the fuel tank (page 4-5).

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

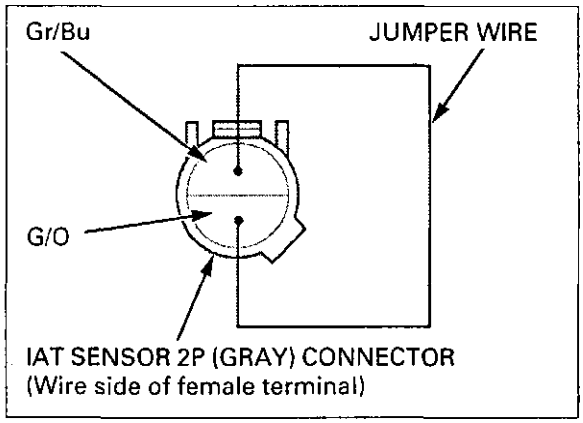
   Connection: Gray/blue – Green/orange

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

   Is about 0 V indicated?

   YES – Faulty IAT sensor

   NO – GO TO STEP 3.



3. **IAT Sensor Output Line Inspection**

   Disconnect the ECM 33P connectors.
   Check for continuity at the Gray/blue and Green/orange wire between the IAT sensor 2P (Gray) connector terminals and the ECM 33P connectors.

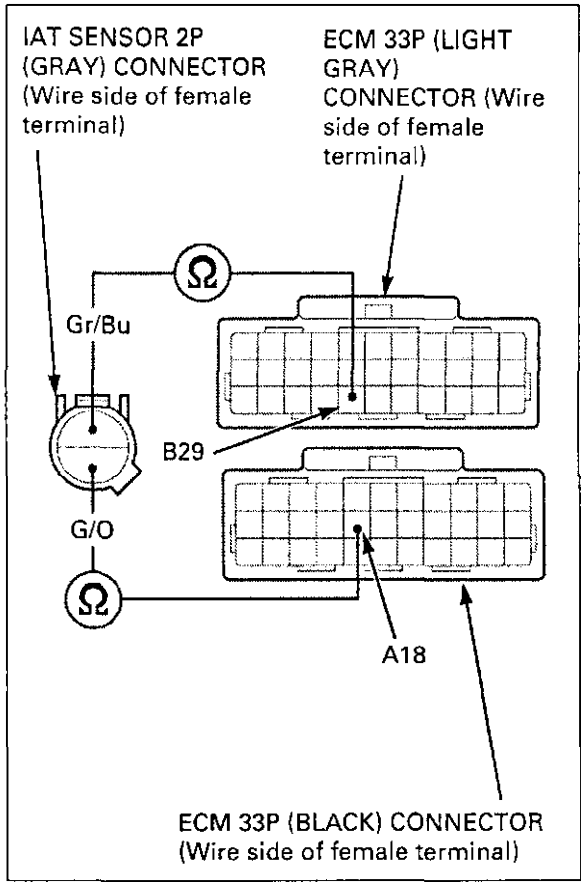
   CONNECTION: B29 – Gray/blue
   A18 – Green/orange

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

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

   NO – • Open circuit in Gray/blue wire
   • Open circuit in Green/orange wire



DTC 11-1 (VS SENSOR)

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

1. **VS Sensor System Inspection**

   Place the motorcycle on its center stand and rear wheel off the ground.

   Start the engine and operate the throttle grip.

   Check the VS sensor with the HDS pocket tester.

   Is the vehicle speed indicated normally?

   YES – GO TO STEP 2.

   NO – GO TO STEP 3.

2. **Recheck the DTC**

   Reset the DTC (page 6-16).

   Test ride the motorcycle.

   Stop the engine.

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

   Is the DTC 11-1 indicated?

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

   NO – • Loose or poor contact on the ECM connectors.
   • Intermittent failure.

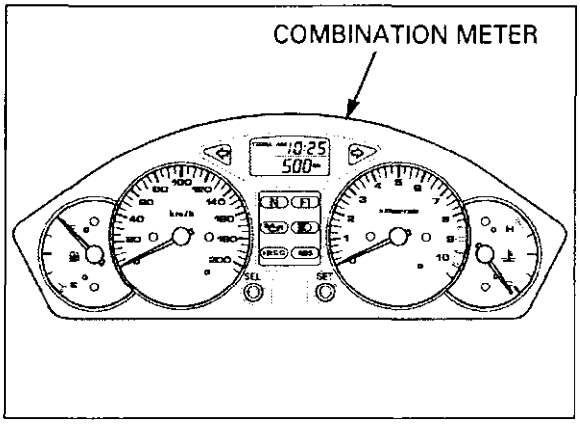
3. **Combination Meter Inspection**

   Check for operation of combination meter.

   Does the combination meter operate normally?

   NO – Inspect the combination meter (page 22-8).

   YES – GO TO STEP 4.



4. **VS Sensor Input Voltage Inspection**

   Turn the ignition switch OFF.

   Disconnect the VS sensor 3P connector (page 22-9).

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

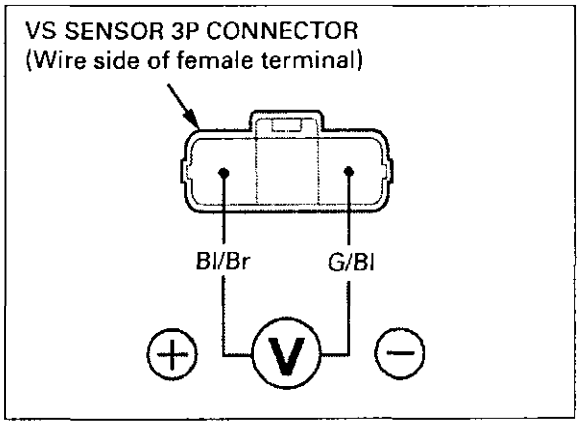
   Measure the voltage at the VS sensor connector of the wire harness side.

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

   Does the battery voltage exist?

   NO – • Open or short circuit in the Black/brown wire.
   • Open circuit in the Green/black wire.

   YES – GO TO STEP 5.



5. **VS Sensor Pulse Line Open Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P connectors (page 6-65).

Check for continuity between the ECM 33P (Light green) connector and VS sensor 3P connector of the wire harness side.

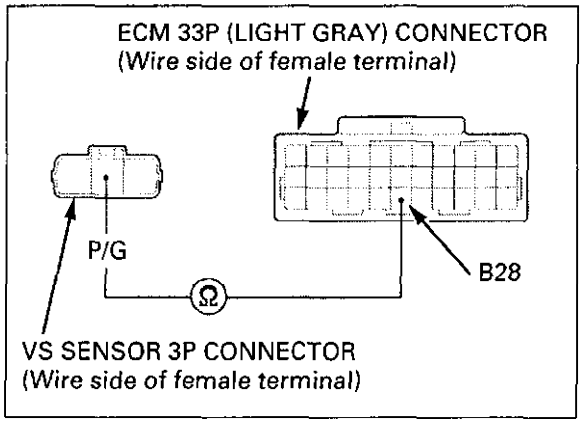
CONNECTION: B28 – Pink/green

TOOL:
Test probe **07ZAJ-RDJA110**

Is there continuity?

NO – Open circuit in Pink/green wire.

YES – GO TO STEP 6.



6. **VS Sensor Pulse Line Short Circuit Inspection**

Disconnect combination meter connectors (page 22-7).

Be sure to disconnect the ECM connector.

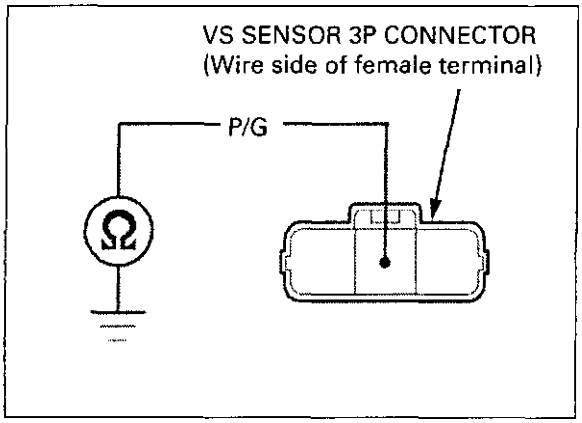
Check for continuity between the VS sensor 3P connector of the wire harness side and ground.

CONNECTION: Pink/green – Ground

Is there continuity?

YES – Short circuit in the Pink/green wire.

NO – Faulty VS sensor.



DTC 12-1 (No.1 REAR INJECTOR)

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

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

1. **Injector System Inspection**

   Reset the DTC (page 6-16).
   Turn the ignition switch ON and engine stop switch "○", start the engine and check the injector with the HDS pocket tester.

   Is the DTC 12-1 indicated?

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

   YES – GO TO STEP 2.

2. **Injector Input Voltage Inspection**

   Remove the air cleaner housing (page 6-63).

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

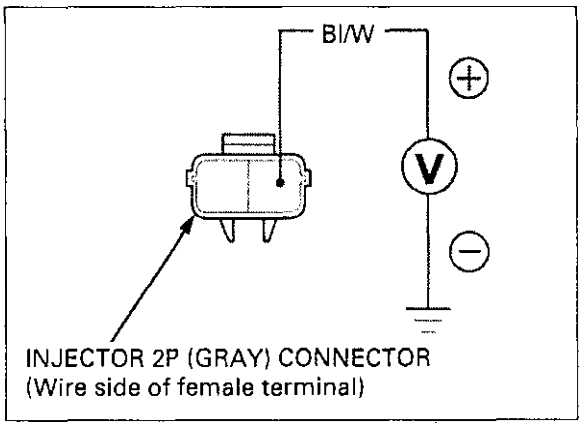
   Measure the voltage between the injector 2P (Gray) connector of the wire harness side and ground.

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

   Does the battery voltage exist?

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

   YES – GO TO STEP 3.



3. **Injector Resistance Inspection**

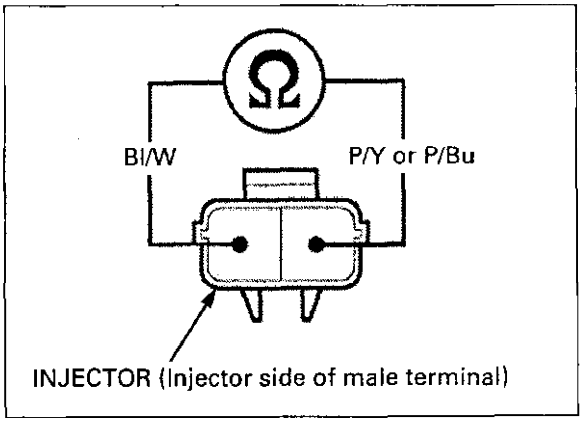
   Measure the resistance of the injector connector terminals.

   STANDARD: 10.0 – 14.0 Ω (20°C/68°F)

   Is the resistance within 10.0 – 14.0 Ω (20°C/68°F)?

   NO – Faulty injector.

   YES – GO TO STEP 4.



4. **Injector Signal Line Open Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector (page 6-65).

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

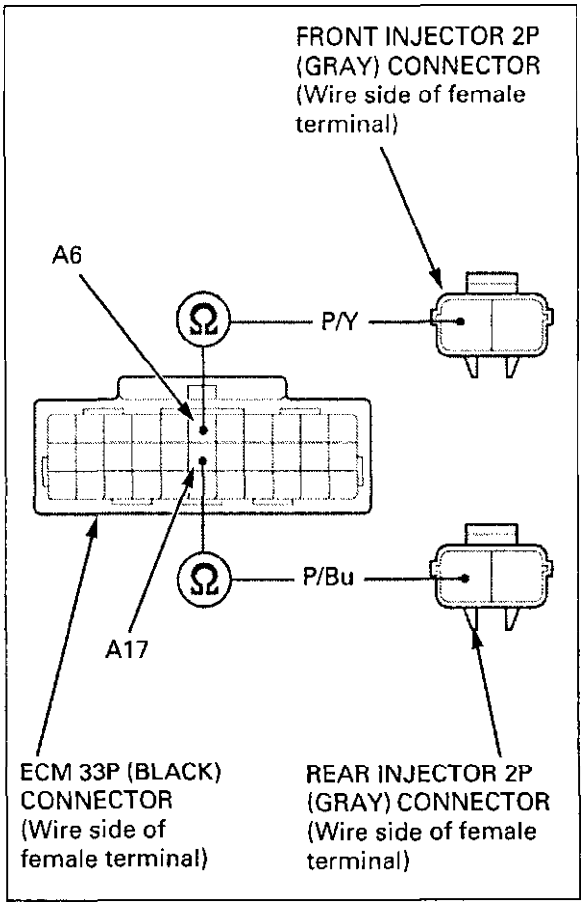
CONNECTION: SIGNAL LINE – SIGNAL LINE

TOOL:
Test probe **07ZAJ-RDJA110**

Is there continuity?

NO – Open circuit in SIGNAL line wire.

YES – GO TO STEP 5.



5. **Injector Signal Line Short Circuit Inspection**

Be sure to disconnect the ECM connector.

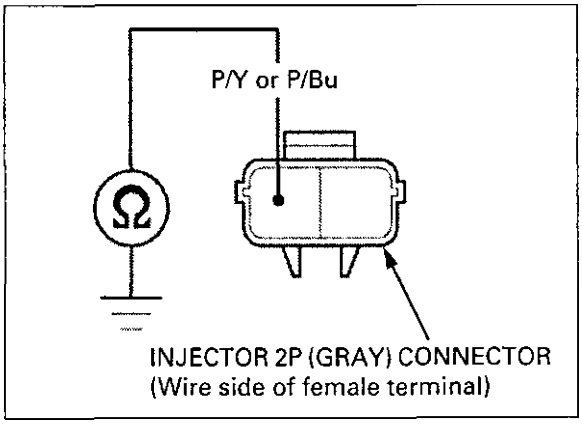
Check for continuity between the injector 2P (Gray) connector and ground.

CONNECTION: SIGNAL LINE – Ground

Is there continuity?

YES – Short circuit in the SIGNAL line wire.

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



DTC 13-1 (No.2 FRONT INJECTOR)

See page 6-30

DTC 18-1 (CMP SENSOR)

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

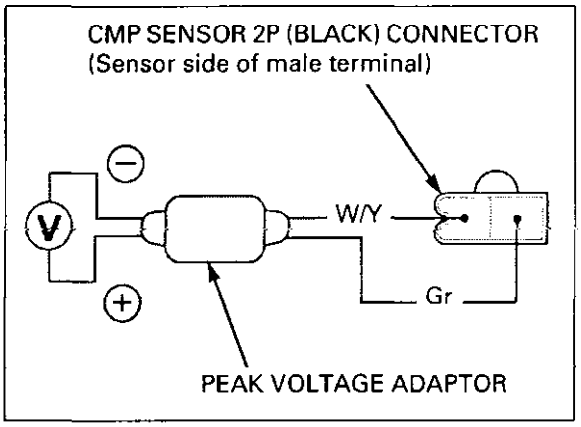
1. CMP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.
Disconnect the CMP sensor 2P (Black) connector.

Turn the ignition switch ON and engine stop switch " ⟳ ".
Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the CMP sensor 2P (Black) connector.

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

TOOLS:
Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)



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

YES – GO TO STEP 2.

NO – Faulty CMP sensor

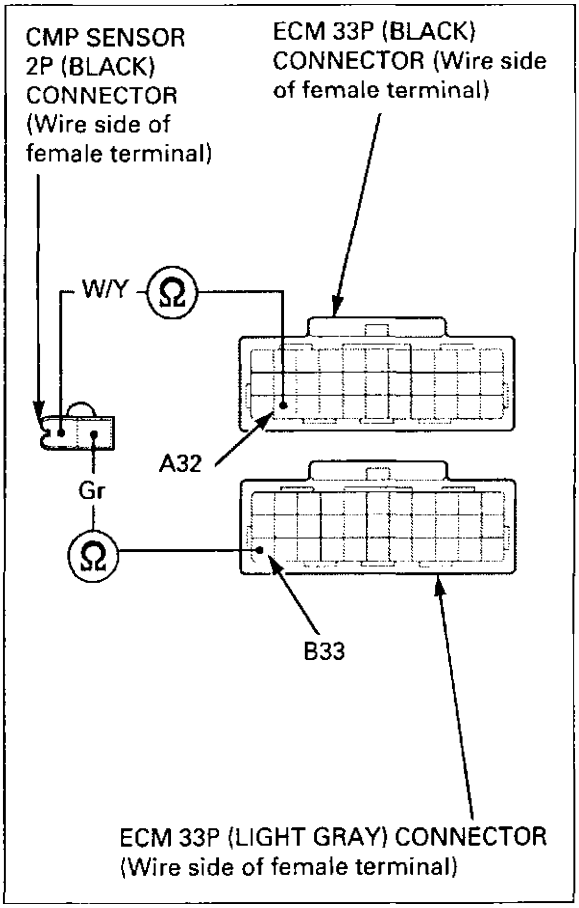
2. CMP Sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

Check for continuity at the Grey and White/yellow wire between the CMP sensor 2P (Black) connector terminals and the ECM 33P connectors terminals.

Connection: B33 – Gray
A32 – White/yellow

TOOL:
Test probe 07ZAJ-RDJA110



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 (CKP SENSOR)

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

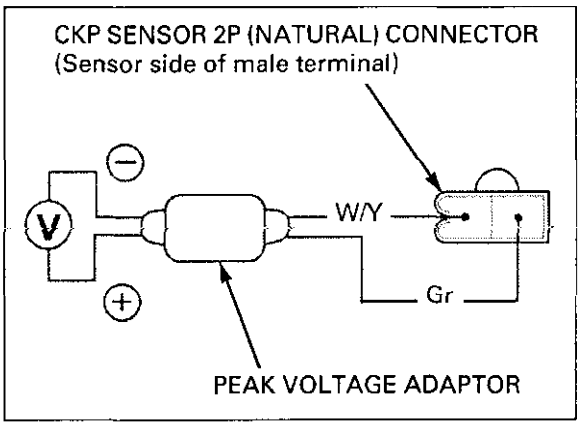
1. CKP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.
Disconnect the CKP sensor 2P (Natural) connector.

Turn the ignition switch ON and engine stop switch " ⟳ ".
Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the CKP sensor 2P (Natural) connector.

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

TOOLS:
Imrie diagnosis tester (model 625) or
Peak voltage adaptor · 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)



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

YES – GO TO STEP 2.

NO – Faulty CKP sensor

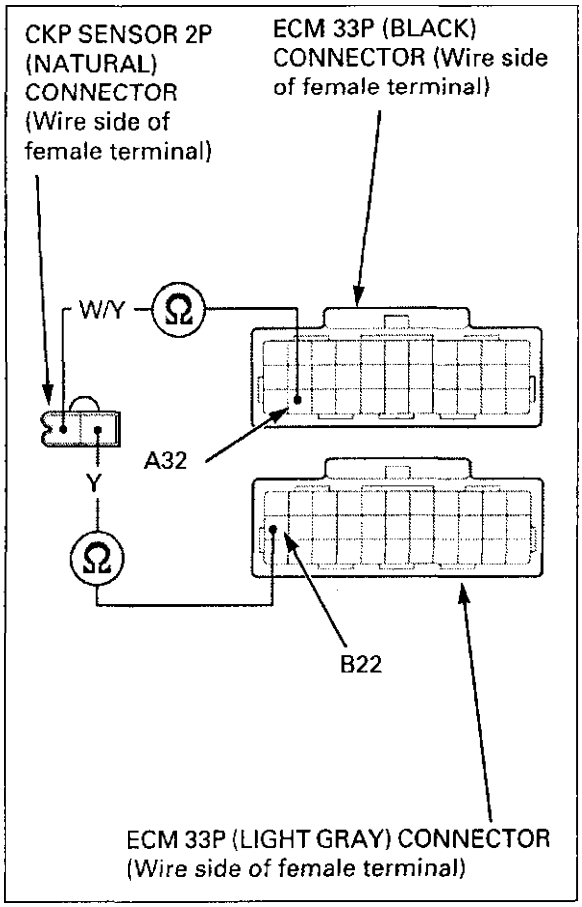
2. CKP Sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

Check for continuity at the Yellow and White/yellow wire between the CKP sensor 2P (Natural) connector terminals and the ECM connector terminals.

Connection: B22 – Yellow
A32 – White/yellow

TOOL:
Test probe **07ZAJ-RDJA110**



Is there continuity?

YES – Short circuit in the Yellow wire

NO – • Open circuit in the Yellow wire
• Open circuit in the White/yellow wire

DTC 21-1 (O_2 SENSOR)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) connector and recheck the DTC.

1. **O_2 Sensor System Inspection**

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

   Test-ride the motorcycle.
   Check the O_2 sensor with the HDS pocket tester.

   Is the DTC21-1 indicated?

   NO – • Check the fuel pressure (page 6-58).
   • If the system is correct, GO TO STEP 3.

   YES – GO TO STEP 2.

2. **O_2 Sensor Open Circuit Inspection**

   Turn the ignition switch OFF.
   Remove the right side cover/pivot cover (page 3-5).

   Disconnect the ECM 33P connector and O_2 sensor 4P (Black) connector.

   Check for continuity between the ECM 33P connector of the wire harness side and O_2 sensor 4P (Black) connector of the wire harness side.

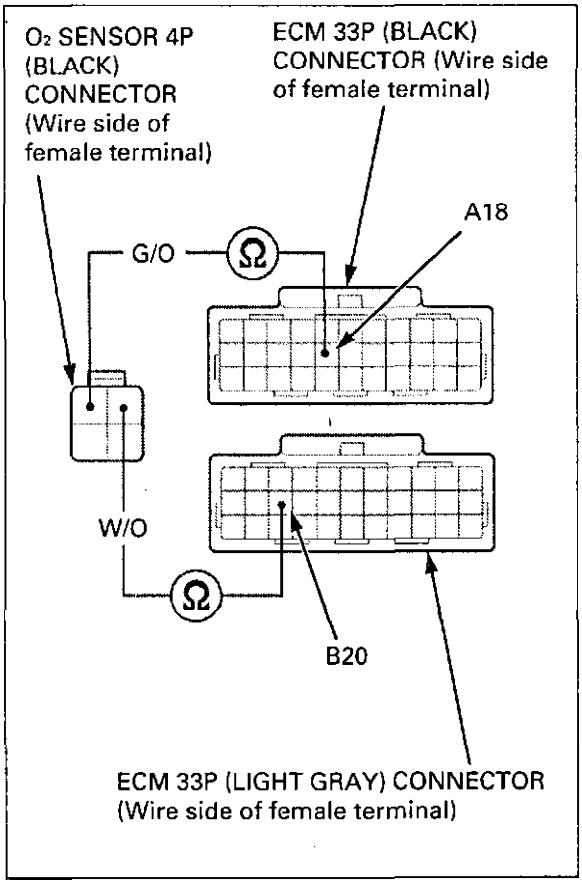
   CONNECTION: A18 – Green/orange
   B20 – White/orange

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Are there continuities?

   YES – GO TO STEP 3.

   NO – • Open circuit in Green/orange wire.
   • Open circuit in White/orange wire.



3. **O_2 Sensor Short Circuit Inspection**

   Connect the O_2 sensor 4P (Black) connector and Disconnect the ECM 33P (Light gray) connector.

   Check the continuity between the ECM 33P (Light gray) connector of the wire harness side and ground.

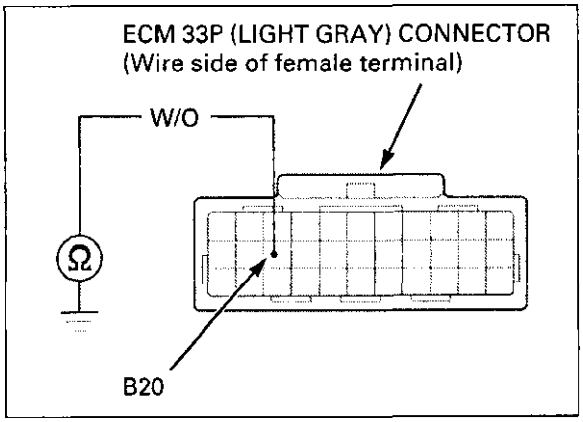
   CONNECTION: B20 – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in White/orange wire

   NO – GO TO STEP 4.



4. O_2 Sensor Inspection

Replace the O_2 sensor with a new one.
Reset the ECM.

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

Test-ride the motorcycle.
Check the O_2 sensor with the HDS pocket tester.

Is the DTC21-1 indicated?

NO – Faulty original O_2 sensor.

YES – Check the fuel supply system.

DTC 23-1 (O_2 SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) connector and recheck the DTC.

1. O_2 Sensor Heater System Inspection

Reset the DTC (page 6-16).

Start the engine and check the O_2 sensor heater with the HDS pocket tester.

Is the DTC 23-1 indicated?

YES – GO TO STEP 2.

NO – • Loose or poor contact on the O_2 sensor 4P (Black) connector.
• Intermittent failure.

2. O_2 Sensor Heater Resistance Inspection

Turn the ignition switch OFF.
Remove the right side cover/pivot cover (page 3-5).

Disconnect the O_2 sensor 4P (Black) connector.

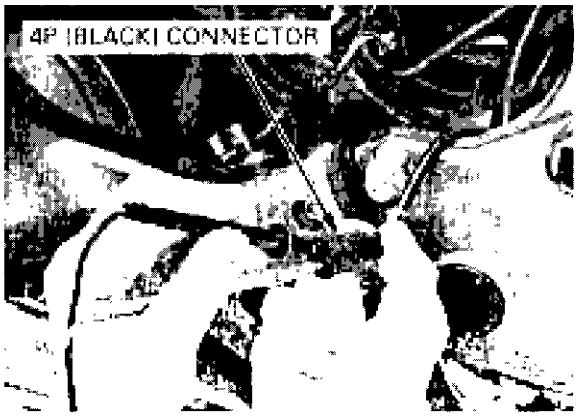
Measure the resistance at the O_2 sensor 4P (Black) connector terminals of the sensor side.

CONNECTION: White – White

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

YES – GO TO STEP 3.

NO – Faulty O_2 sensor.



3. O_2 Sensor Heater Power Input Line Inspection

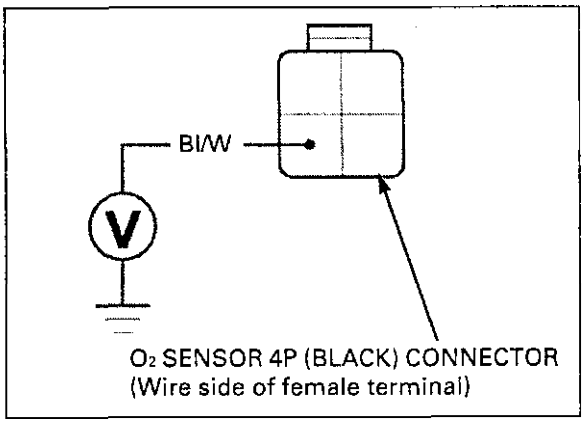
Turn the ignition switch ON then measure the voltage between the O_2 sensor 4P (Black) connector of the wire harness side and ground.

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

Does the battery voltage exist?

YES – GO TO STEP 4.

NO – Open circuit in the Black/white wire.



4. **O_2 Sensor Heater Open circuit Inspection**

   Turn the ignition switch OFF.

   Disconnect the ECM 33P (Gray) connector.

   Check for continuity between the ECM 33P (Gray) connector and O_2 sensor 4P (Black) connector of the wire harness side.

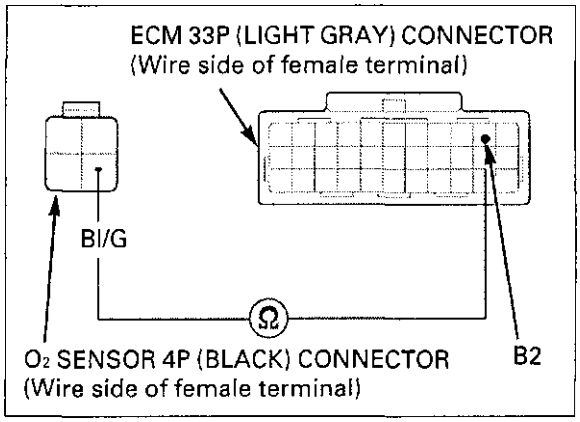
   CONNECTION: Black/green – B2

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 5.

   NO – Open circuit in Black/green wire.



5. **O_2 Sensor Heater Short circuit Inspection**

   Connect the ECM 33P (Gray) connector.

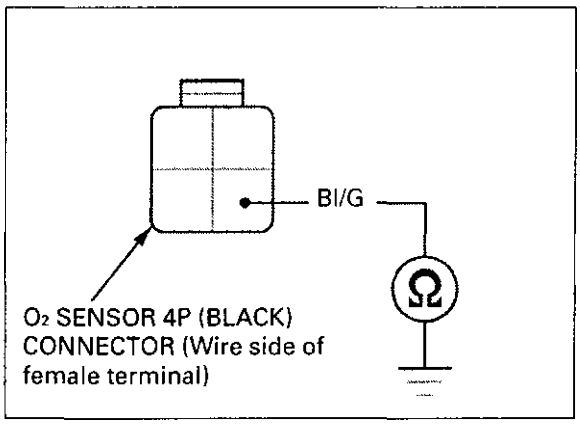
   Check for continuity between the O_2 sensor 4P (Black) connector of the wire harness side and ground.

   CONNECTION: Black/green – Ground

   Is there continuity?

   YES – Short circuit in Black/green wire.

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



DTC 29-1 (IACV)

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

1. **Recheck DTC**

   Reset the DTC (page 6-16).
   Start the engine and recheck the DTC.

   Is the DTC 29-1 indicated?

   NO – • Intermittent failure.
   • Loose or poor contact on the IACV 4P (White) connector.

   YES – GO TO STEP 2.

2. **IACV Short Circuit Inspection**

   Remove the air cleaner housing (page 6-63).

   Turn the ignition switch OFF.
   Disconnect the IACV 4P (White) connector.

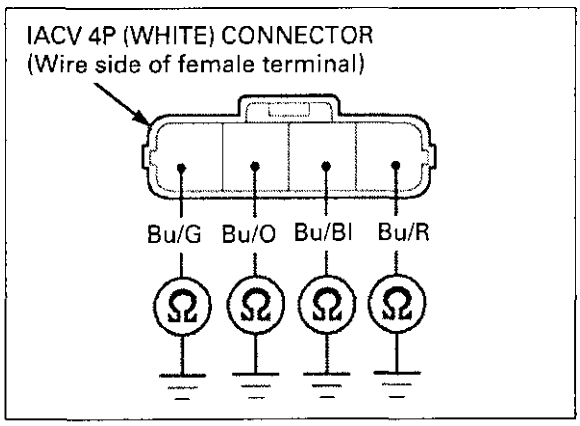
   Check for continuities between the IACV 4P (White) connector and ground.

   CONNECTION: Blue/green – Ground
   Blue/orange – Ground
   Blue/black – Ground
   Blue/red – Ground

   Are there continuities?

   YES – • Short circuit in Blue/green or Blue/orange wire.
   • Short circuit in Blue/black or Blue/red wire.

   NO – GO TO STEP 3.



3. IACV Circuit Continuity Inspection

Disconnect the ECM 33P (Black) connector.

Check for continuities between the ECM 33P (Black) connector terminals and the IACV 4P (White) connector terminals.

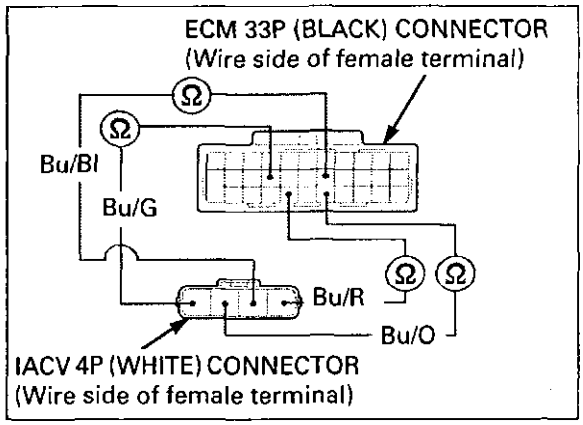
CONNECTION: A19 – Blue/green
A27 – Blue/orange
A16 – Blue/black
A29 – Blue/red

TOOL:
Test probe **07ZAJ-RDJA110**

Are there continuities?

YES – GO TO STEP 4.

NO – • Open or loose contact in Blue/green or Blue/orange wire.
• Open or loose contact in Blue/black or Blue/red wire.



4. IACV Resistance Inspection

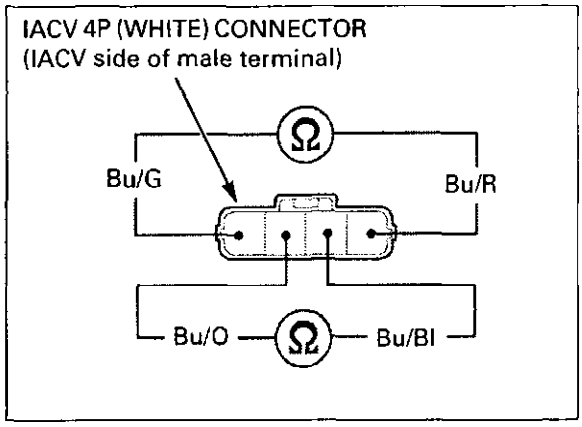
Measure the resistance at the IACV 4P (White) connector terminals.

CONNECTION: Blue/green – Blue/red
Blue/black – Blue/orange
STANDARD: 99 – 121 Ω (25°C/77°F)

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

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

NO – Faulty IACV.



MIL TROUBLESHOOTING

MIL 1 BLINK (MAP SENSOR)

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

1. MAP Sensor Output Voltage Inspection

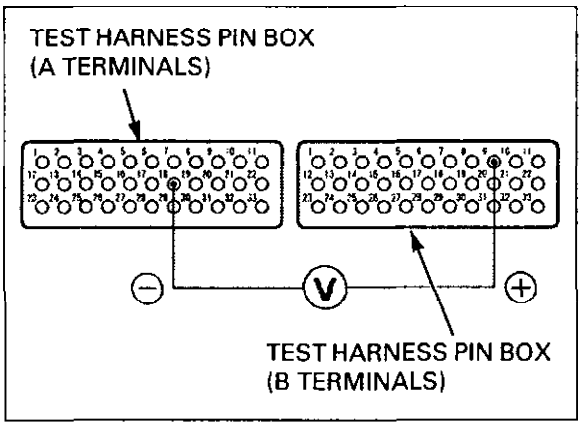
Turn the ignition switch OFF.
Connect the ECM test harness to ECM connectors (page 6-17).
Turn the ignition switch ON and engine stop switch " Ω ".
Measure the voltage at the test harness terminals.

Connection: B9 (+) – A18 (–)

Is the voltage within 2.7 – 3.1V?

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

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



2. MAP Sensor Output Line Inspection

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

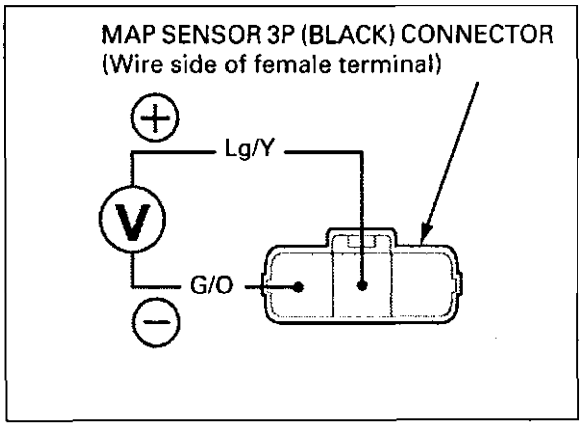
Turn the ignition switch ON and engine stop switch " Ω ".
Measure the voltage at the wire harness side.

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

Is the voltage within 2.7 – 3.1V?

YES – Faulty MAP sensor

NO – • Open circuit in Light green/orange wire
• Open circuit in Green/orange wire



3. MAP Sensor Input Voltage Inspection

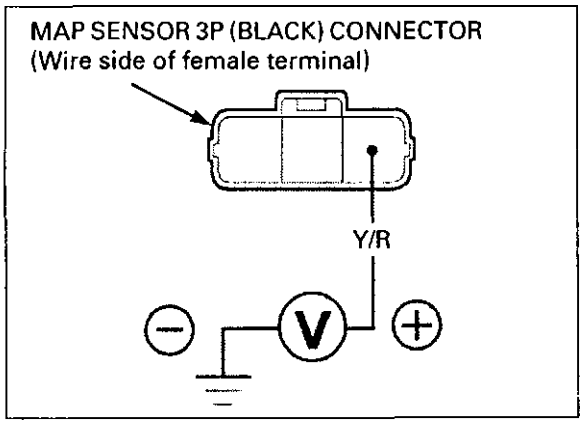
Measure the voltage at the wire harness side.

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**

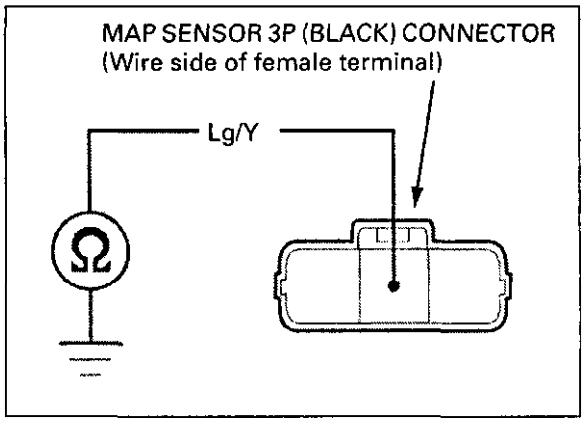
Check for continuity between the MAP sensor 3P (Black) connector terminal of the wire harness side and ground.

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 33P connectors.

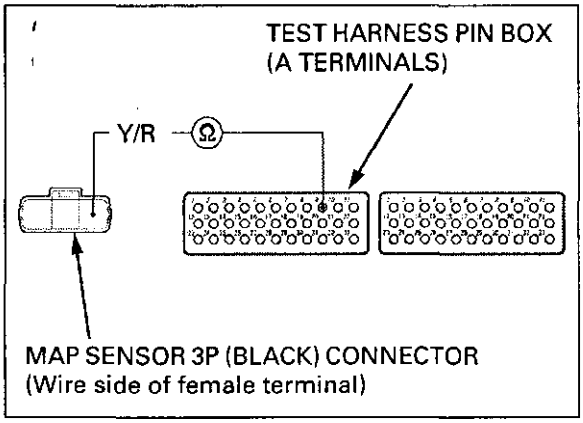
Check for continuity at the Yellow/red wire between the MAP sensor 3P (Black) connector terminal and the test harness terminal.

Connection: A9 – Yellow/red

Is there continuity?

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

NO – Open circuit in Yellow/red wire



MIL 2 BLINKS (MAP SENSOR)

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

1. **MAP Sensor Hose Inspection**

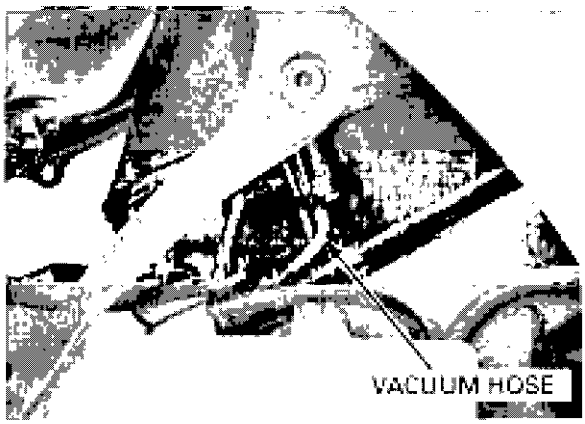
Turn the ignition switch OFF

Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor hose connection correct?

YES – GO TO STEP 2.

NO – Correct the hose connection or installation



2. **MAP Sensor Output Voltage Inspection**

Connect the ECM test harness to ECM connectors (page 6-17).

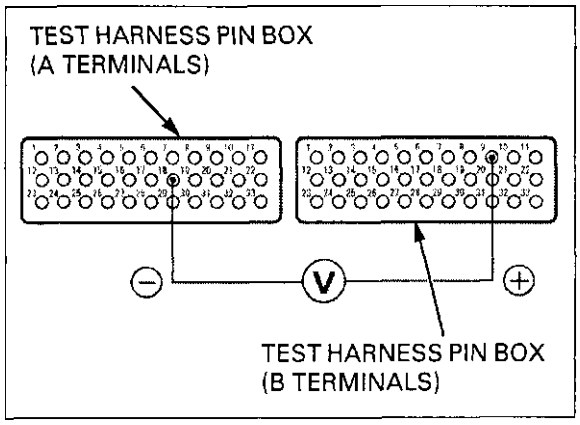
Turn the ignition switch ON and engine stop switch " ⟳ ".
Measure the voltage at the test harness terminals.

Connection: B9 (+) –A18 (–)

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.

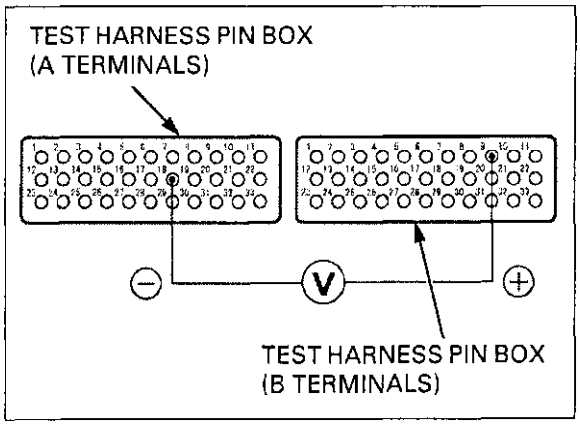
Measure the voltage at the test harness terminals.

Connection: B9 (+) –A18 (–)
Standard: 2.7 V maximum

Is the voltage less than 2.7 V?

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

NO – Faulty MAP sensor



MIL 7 BLINKS (ECT SENSOR)

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

1. **ECT Sensor Output voltage Inspection**

Turn the ignition switch OFF.
Connect the test harness to ECM 33P connectors (page 6-17).

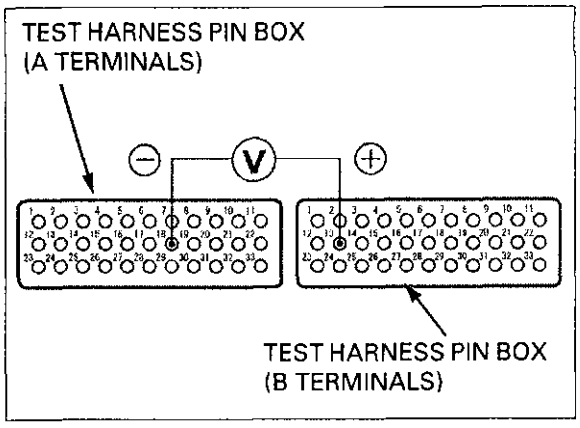
Turn the ignition switch ON and engine stop switch "⟳".
Measure the voltage at the test harness terminals.

CONNECTION: B13 (+) – A18 (–)
STANDARD: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

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

No – GO TO STEP 2.



2. ECT Sensor Input Voltage Inspection

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

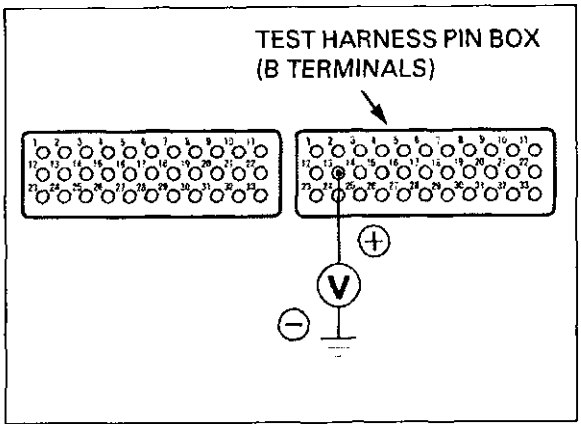
Turn the ignition switch ON and engine stop switch "○".
Measure the voltage at the test harness terminal and ground.

CONNECTION: B13 (+) – ground (–)

Is the voltage within 4.75 – 5.25 V?

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

YES – GO TO STEP 3.



3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.

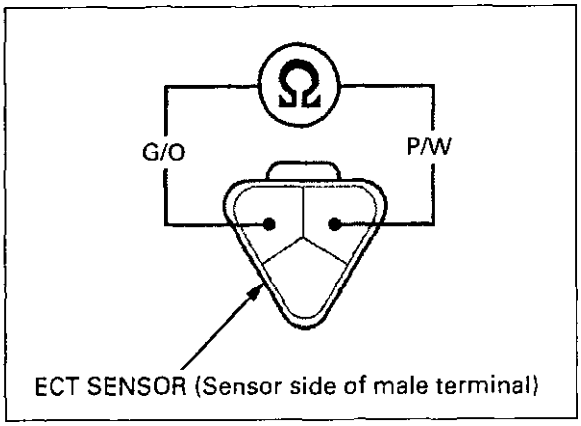
Measure the resistance at the ECT sensor terminals.

CONNECTION: Pink/white – Green/orange
STANDARD: 2.32 – 2.59 kΩ (20°C/68°F)

Is the resistance within 2.32 – 2.59 kΩ?

No – Faulty ECT sensor.

YES – GO TO STEP 4.



4. ECT Sensor Open Circuit Inspection

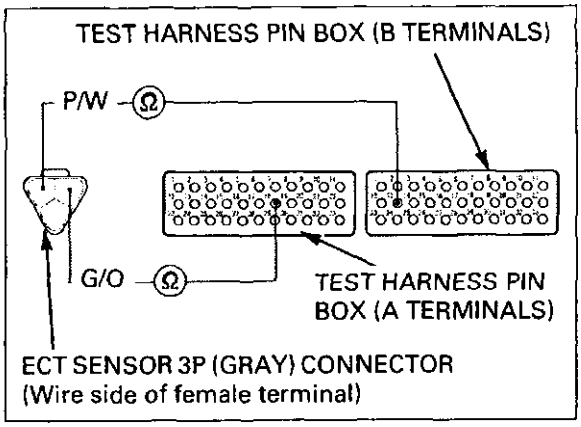
Check for continuity between the test harness terminals and ECT sensor connector of the wire harness side.

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

Is there continuity?

NO – • Open circuit in Pink/white wire.
• Open circuit in Green/orange wire.

YES – GO TO STEP 5.



5. ECT Sensor Short Circuit Inspection

Disconnect the test harness and ECM 33P connectors disconnected.

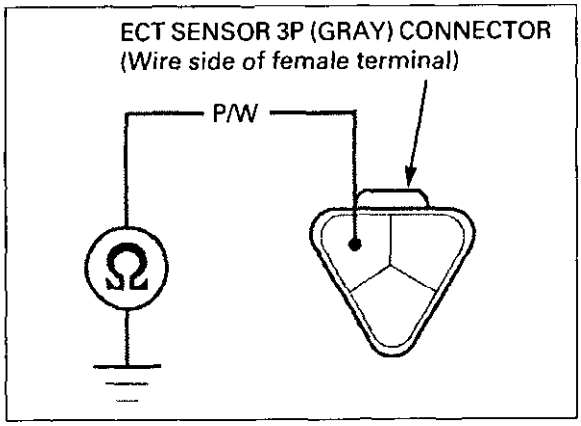
Check for continuity between the ECT sensor connector of the wire harness side and ground.

CONNECTION: Pink/white – Ground

Is there continuity?

YES – Short circuit in Pink/white wire.

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



MIL 8 BLINKS (TP SENSOR)

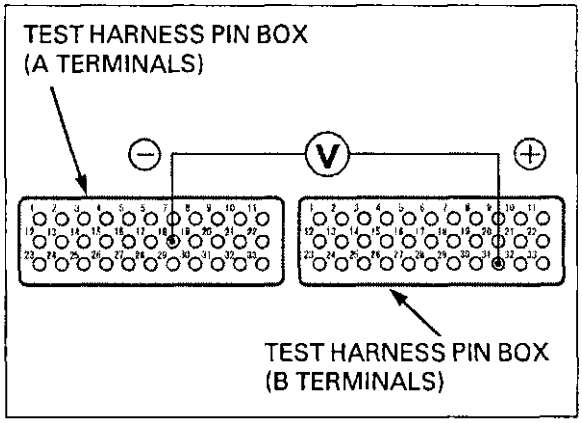
- Before starting the inspection, check for loose or poor contact on the TP sensor 3P (Blue) connector and recheck the MIL blinking.

1. TP Sensor Output Voltage

Turn the ignition switch OFF.
Connect the ECM test harness to ECM connectors (page 6-17).

Turn the ignition switch ON and engine stop switch " ⋂ ".
Measure the TP sensor output voltage at the test harness terminals.

Connection: B31 (+) – A18 (–)
Standard: *0.4 – 0.6 V (throttle fully closed)
***4.3 – 4.9 V (throttle fully opened)**



NOTE:

- A voltage marked * refers to the value of the ECM output voltage (STEP 3) 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 X 4.75/5.0 = 0.38 V
  0.6 X 4.75/5.0 = 0.57 V
  Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.
  Replace 0.4 and 0.6 with 4.3 and 4.9 respectively, in the above equations to determine the throttle fully opened range.

Is there standard voltage?

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

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the TP sensor 3P (Blue) connector.

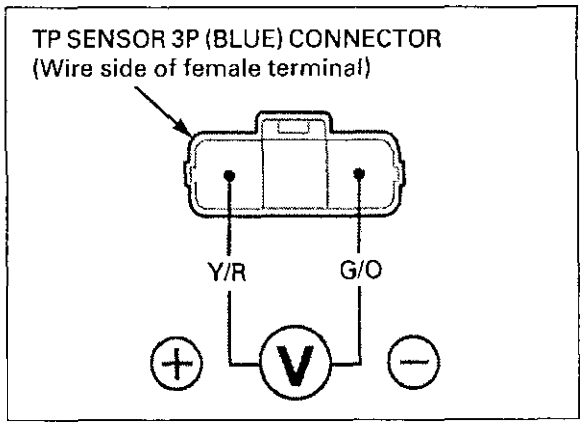
Turn the ignition switch ON and engine stop switch " ⋂ ".
Measure the voltage at the wire harness side.

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 Output Voltage Inspection**

Turn the ignition switch OFF.
Connect the ECM test harness to ECM connectors (page 6-17).

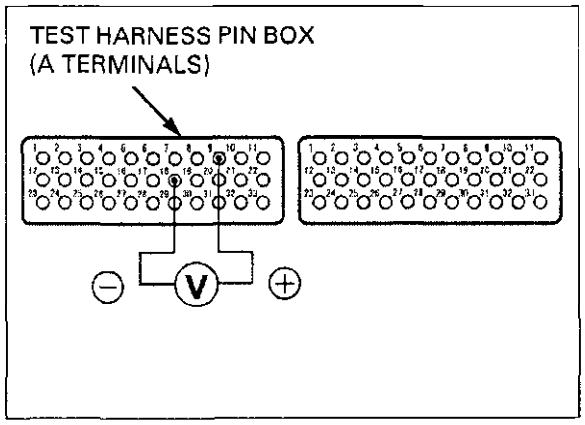
Turn the ignition switch ON and engine stop switch " Ω ".
Measure the voltage at the test harness terminals.

Connection: A9 (+) –A18 (–)

Is the voltage within 4.75 – 5.25V?

YES – • Open circuit in Red/yellow wire
• Open circuit in Green/orange wire

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



4. **TP Sensor Output Line Inspection**

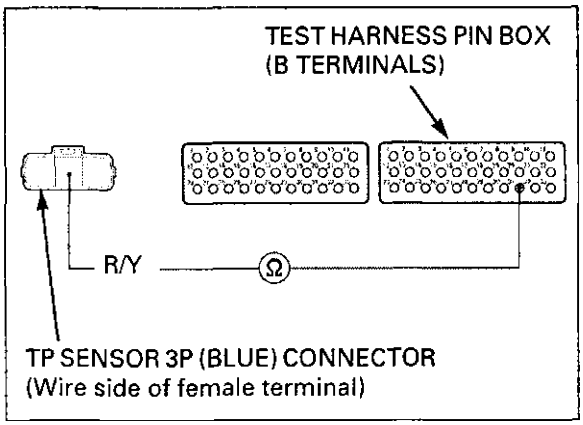
Check for continuity between the TP sensor 3P (Blue) connector terminal of the wire harness side and the test harness terminal.

Connection: Red/yellow – B31

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Red/yellow wire



5. **TP Sensor Output Line Short Circuit Inspection**

Turn the ignition switch OFF.

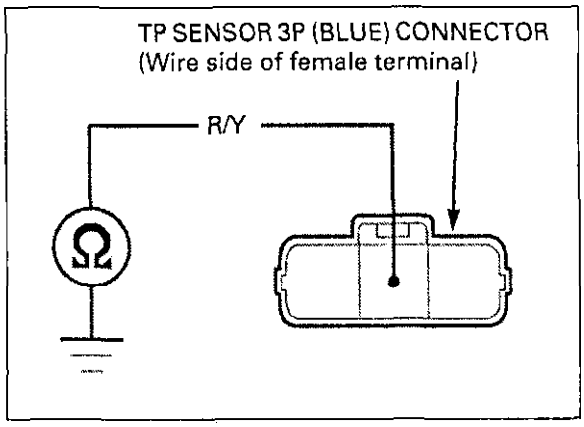
Check for continuity between the TP sensor 3P (Blue) connector terminal of the wire harness side and ground.

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 2P (Natural) connector and recheck the MIL blinking.

1. IAT Sensor Output Voltage Inspection

Turn the ignition switch OFF.
Connect the ECM test harness to ECM connectors (page 6-17).

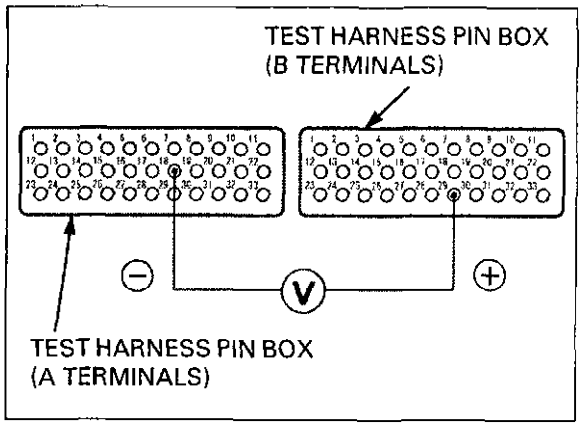
Turn the ignition switch ON and engine stop switch " ⋂ ".
Measure the voltage at the test harness terminals.

Connection: B29 (+) – A18 (–)
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 connectors

NO – GO TO STEP 2.



2. IAT Sensor Input Voltage Inspection

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

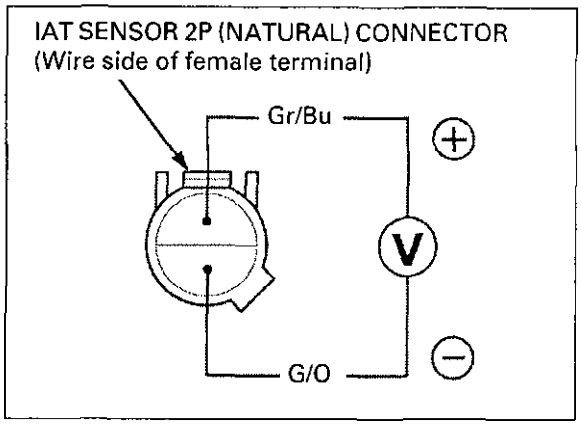
Turn the ignition switch ON and engine stop switch " ⋂ ".
Measure the voltage at the wire harness side of IAT sensor connector.

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 (Natural) connector.

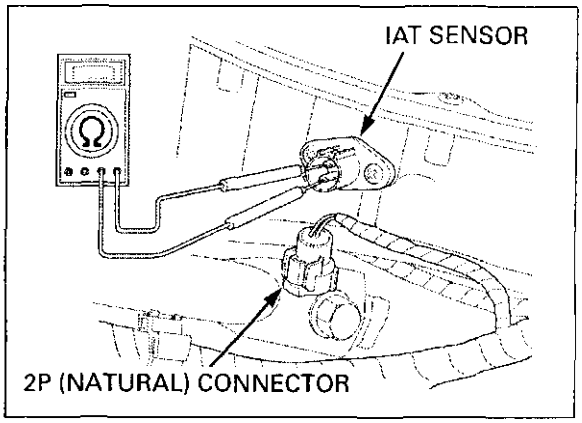
Measure the resistance at the IAT sensor terminals (at 20 – 30°C/68 – 86°F).

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**

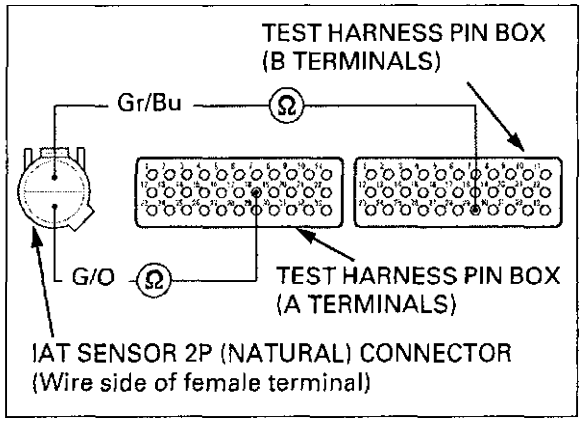
Turn the ignition switch OFF.
Check for continuity at the Gray/blue and Green/orange wires between the IAT sensor 2P (Natural) connector terminal and the test harness terminals.

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

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**

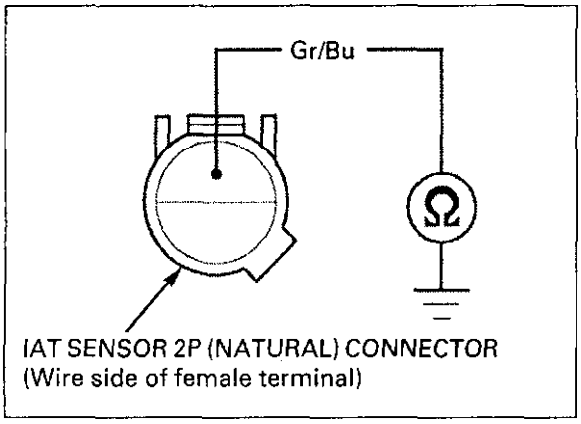
Check for continuity between the IAT sensor 2P (Natural) connector terminal of the wire harness side and ground.

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 (VS SENSOR)

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

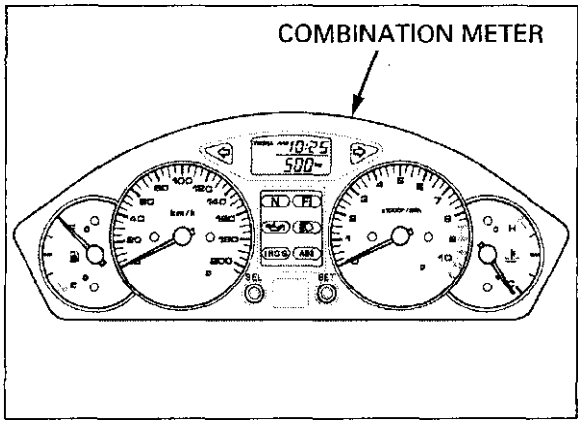
1. **Combination Meter Inspection**

Check for operation of combination meter.

Does the combination meter operate normally?

NO – Inspect the combination meter (page 22-8).

YES – GO TO STEP 2.



2. **VS Sensor Pulse Inspection At ECM**

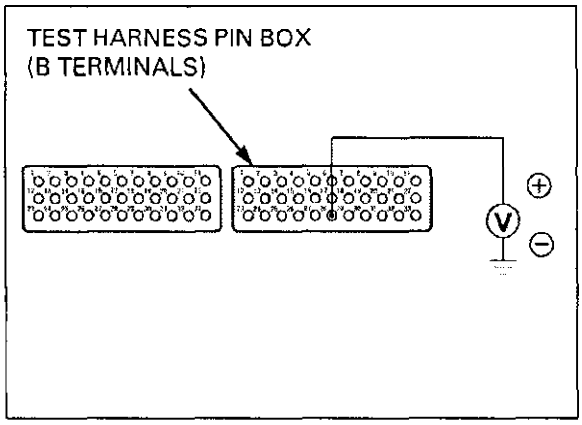
Turn the ignition switch OFF.

Connect the test harness to the ECM 33P connectors (page 6-17).

Place the motorcycle on its center stand and rear wheel off the ground.

Measure the voltage between the test harness terminal and ground with the ignition switch ON and engine stop switch "○" while slowly turning the rear wheel by hand.

CONNECTION: B28 (+) – ground (–)
STANDARD: Repeat 0 to 5 V



Is the voltage at the standard value?

YES – GO TO STEP 3.

NO – GO TO STEP 4.

3. **Recheck MIL Blinks**

Install the removed parts in the reverse order of removal.

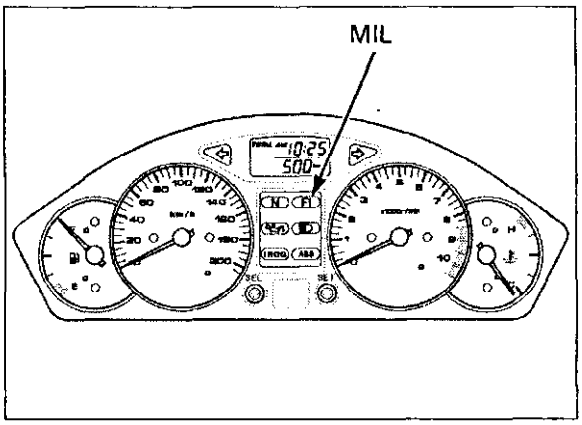
Reset the self diagnosis memory data from the ECM (page 6-16).

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

Test ride the motorcycle.

Stop the engine.

Retrieve the self diagnosis memory data (page 6-15) and check that the MIL blinks.



Is the MIL blink 11 times?

NO – • Loose or poor contact on the ECM connector.
• Intermittent failure.

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

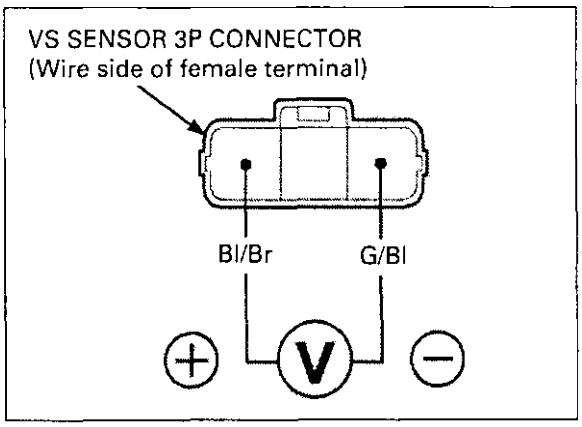
4. **VS Sensor Input Voltage Inspection**

Turn the ignition switch OFF.

Disconnect the VS sensor 3P connector (page 22-10).

Turn the ignition switch ON and engine stop switch "○".
Measure the voltage at the VS sensor connector of the wire harness side.

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



Does the battery voltage exist?

NO – • Open or short circuit in Black/brown wire.
• Open circuit in Green/black wire.
• Faulty combination meter.

YES – GO TO STEP 5.

5. **VS Sensor Pulse Line Open Circuit Inspection**

Turn the ignition switch OFF.

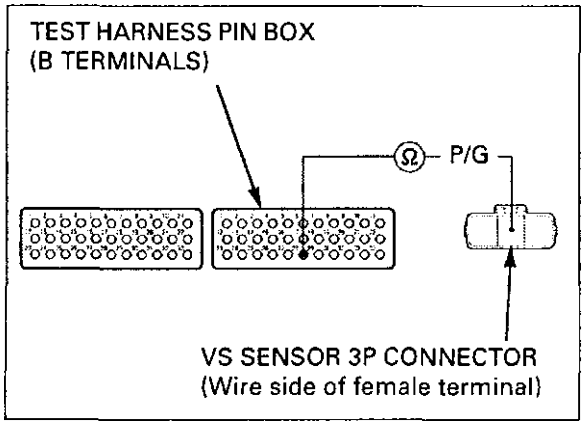
Check for continuity between the test harness terminal and VS sensor connector of the wire harness side.

CONNECTION: B28 – Pink/green

Is there continuity?

NO – Open circuit in Pink/green wire.

YES – GO TO STEP 6.



6. **VS Sensor Pulse Line Short Circuit Inspection**

Disconnect the test harness and ECM 33P connectors disconnected.
Disconnect combination meter 20P connector (page 22-7).

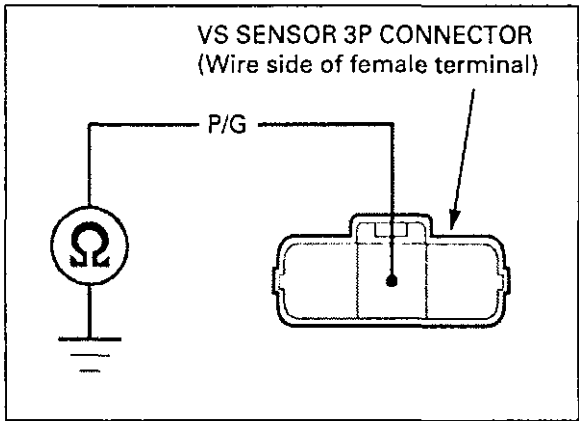
Check for continuity between the vehicle speed sensor connector and ground.

CONNECTION: Pink/green – Ground

Is there continuity?

YES – Short circuit in Pink/green wire.

NO – Faulty VS sensor.



MIL 12 BLINKS (No.1 REAR INJECTOR)

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

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

1. **Injector Input Voltage Inspection**

Remove the air cleaner housing (page 6-63).

Disconnect the injector 2P (Gray) connector.

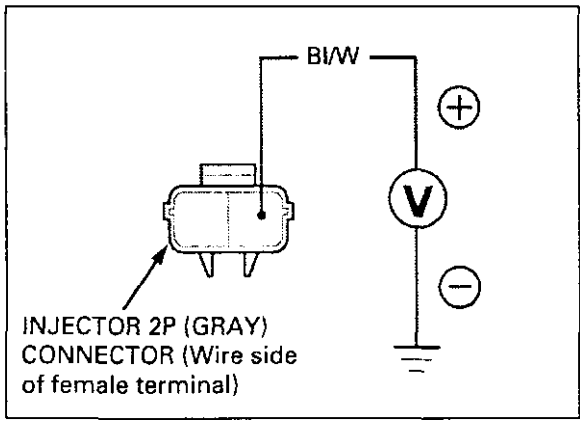
Turn the ignition switch ON and engine stop switch "○".
Measure the voltage between the injector 2P (Gray) connector of the wire harness side and ground.

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

Does the battery voltage exist?

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

YES – GO TO STEP 2.



2. **Injector Resistance Inspection**

Turn the ignition switch OFF.

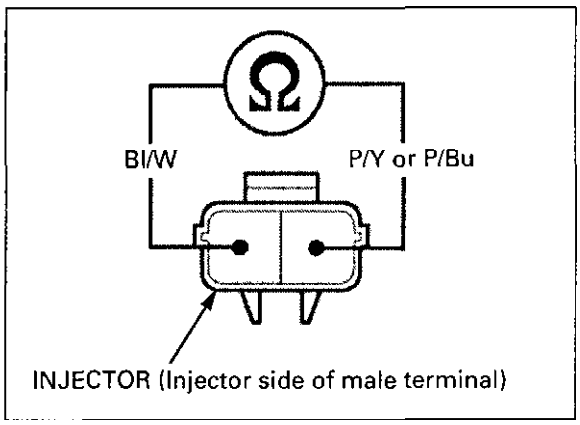
Measure the resistance of the injector connector terminals.

STANDARD: 10.0 – 14.0 Ω (20°C/68°F)

Is the resistance within 10.0 – 14.0 Ω (20°C/68°F)?

NO – Faulty injector.

YES – GO TO STEP 3.



3. **Injector Signal Line Open Circuit Inspection**

Connect the test harness to the ECM 33P (Black) connector (page 6-17).

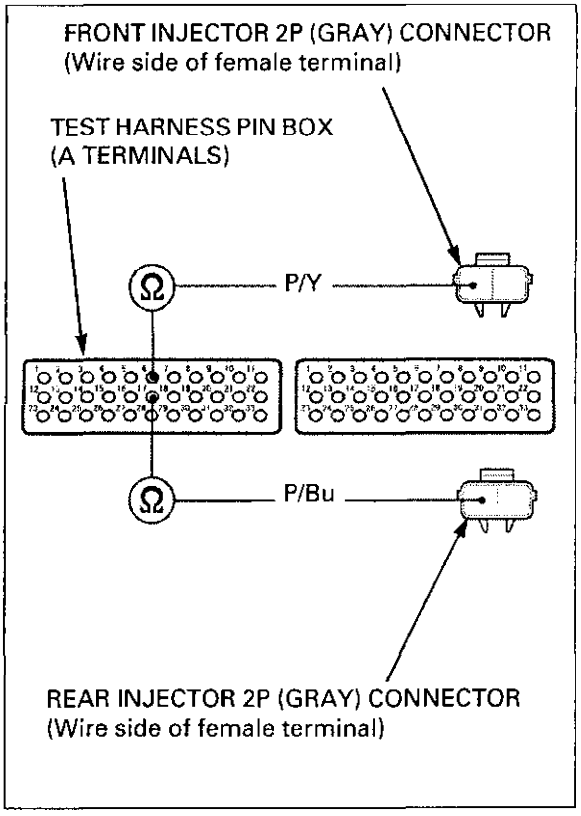
Check for continuity between the test harness terminal and injector 2P (Gray) connector of the wire harness side.

CONNECTION: SIGNAL LINE – SIGNAL LINE

Is there continuity?

NO – Open circuit in SIGNAL line wire.

YES – GO TO STEP 4.



4. **Injector Signal Line Short Circuit Inspection**

Disconnect the test harness and ECM 33P (Black) connectors disconnected.

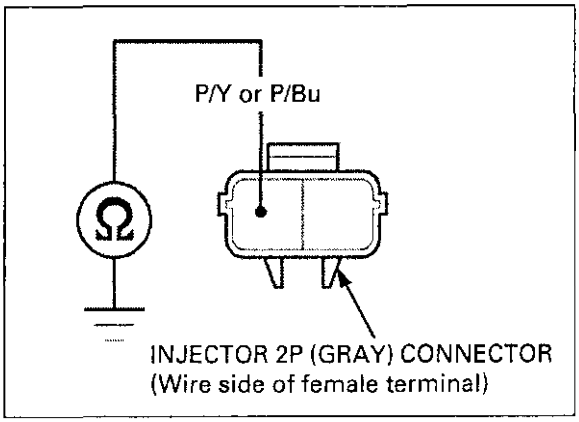
Check for continuity between the injector 2P (Gray) connector of the wire harness side and ground.

CONNECTION: SIGNAL LINE – Ground

Is there continuity?

YES – Short circuit in SIGNAL line wire.

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



MIL 13 BLINKS (No.2 FRONT INJECTOR)

See page 6-48.

MIL 18 BLINKS (CMP SENSOR)

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

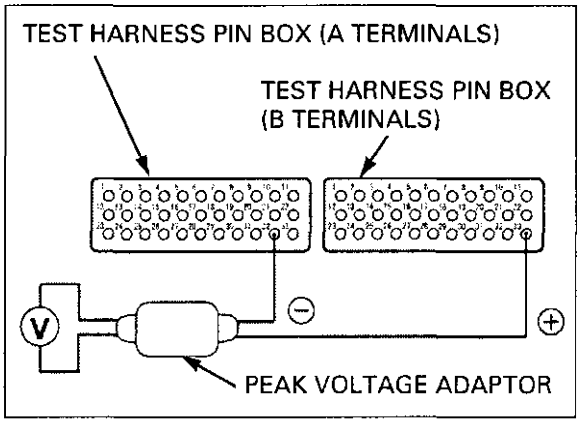
1. CMP Sensor Peak Voltage Inspection at ECM

Turn the ignition switch OFF.
Connect the ECM test harness to the ECM connectors (page 6-17).

Turn the ignition switch ON and engine stop switch " ⌒ ".
Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the test harness terminals.

Connection: B33 (+) – A32 (–)

TOOLS:
Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)



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

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

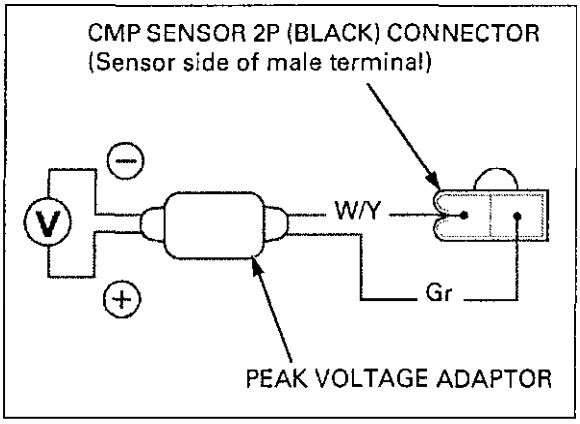
NO – GO TO STEP 2.

2. CMP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.
Remove the air cleaner housing (page 6-63).
Disconnect the CMP sensor 2P (Black) connector.

Turn the ignition switch ON and engine stop switch " ⌒ ".
Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the CMP sensor 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 CMP sensor

MIL 19 BLINKS (CKP SENSOR)

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

1. CKP Sensor Peak Voltage Inspection at ECM

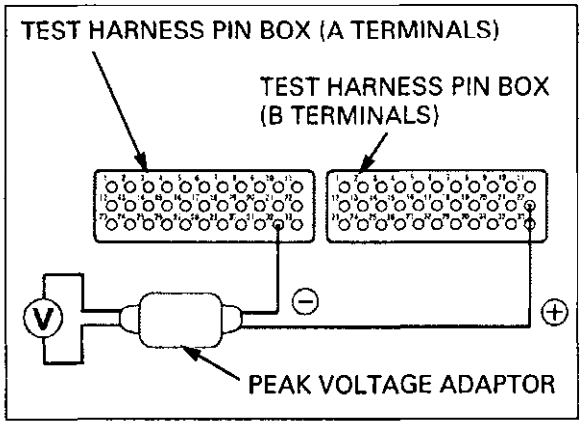
Turn the ignition switch OFF.

Connect the ECM test harness to the ECM connectors (page 6-17).

Turn the ignition switch ON and engine stop switch " ⟳ ".
Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the test harness terminals.

Connection: B22 (+) – A32 (–)

TOOLS:
Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)



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

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

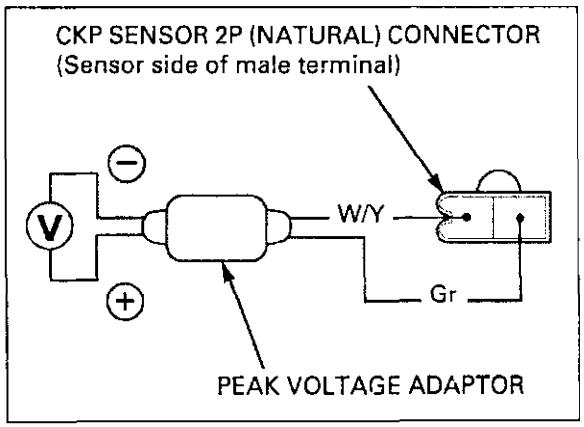
NO – GO TO STEP 2.

2. CKP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.
Remove the right middle cowl (page 3-11).
Disconnect the CKP sensor 2P (Natural) connector.

Turn the ignition switch ON and engine stop switch " ⟳ ".
Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the CKP sensor 2P (Natural) connector.

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



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

YES – Open or short circuit in the Yellow, White/yellow wire

NO – Faulty CKP sensor

MIL 21 BLINKS (O_2 SENSOR)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) connector and recheck the MIL blinking.

1. O_2 Sensor System Inspection

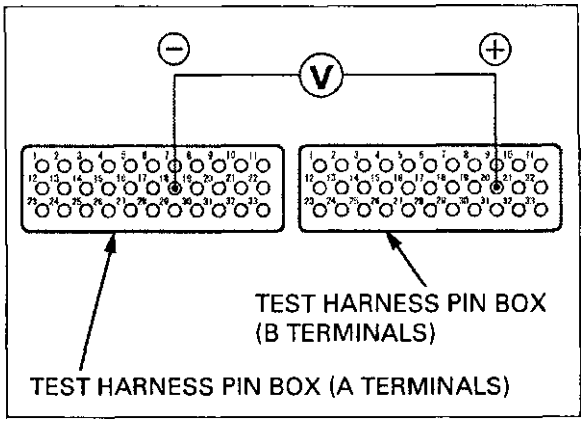
Connect the ECM test harness to the ECM connectors (page 6-17).
Start the engine and warm up the engine up to coolant temperature is 80 °C (176 °F), then let it idle.

Test-ride the motorcycle and recheck the MIL blinking.

Is the MIL 21 blinks?

NO – Check the fuel pressure (page 6-58), if the system is correct.

YES – GO TO STEP 2.



2. O_2 Sensor Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the O_2 sensor 4P (Black) connector.

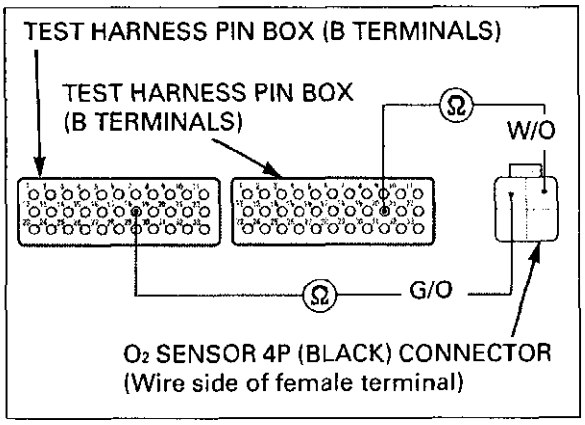
Check for continuity between the test harness terminals and the O_2 sensor connector terminals of the wire harness side.

CONNECTION: B20 – White/orange
A18 – Green/orange

Is there continuities?

NO – • Open circuit in the White/orange (Black) wire.
• Open circuit in the Green/orange (Gray) wire.

YES – GO TO STEP 3.



3. O_2 Sensor Short Circuit Inspection

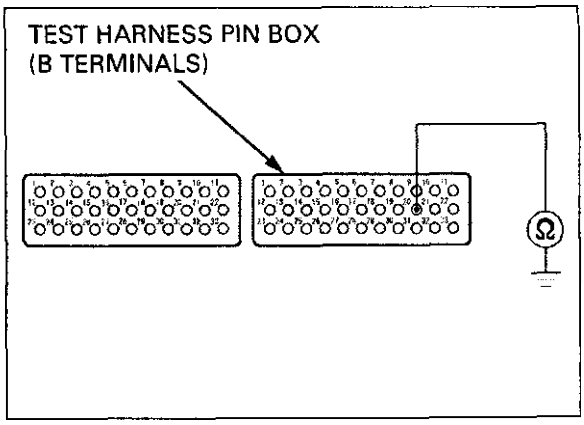
Connect the O_2 sensor 4P (Black) connector.
Check for continuity between the test harness terminal and ground.

CONNECTION: B20 – Ground

Is there continuity?

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

NO – GO TO STEP 4.



4. **O_2 Sensor Inspection**

Replace the O_2 sensor with a known good one.
Reset the ECM (page 6-15).

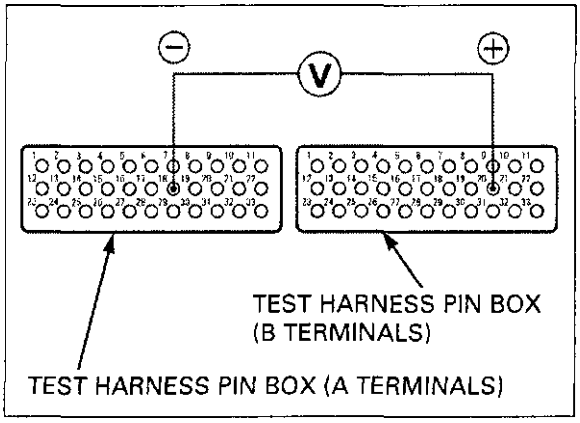
Turn the ignition switch ON.
Warm the engine until the coolant temperature is 80 °C (176 °F), the let it idle.

Test-ride the motorcycle and recheck the MIL blinking.

Is the MIL 21 blinks?

NO – Faulty original O_2 sensor.

YES – Check the fuel supply system.



MIL 23 BLINKS (O_2 SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) connector and recheck the MIL blinking.

1. **O_2 Sensor Heater Resistance Inspection**

Turn the ignition switch OFF.
Remove the right side cover/pivot cover (page 3-5).

Disconnect the O_2 sensor 4P (Black) connector.

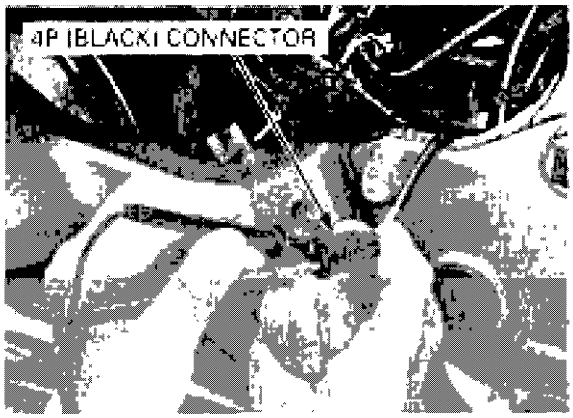
Measure the resistance at the O_2 sensor connector terminals.

CONNECTION: White – White

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

NO – Faulty O_2 sensor.

YES – GO TO STEP 2.



2. **O_2 Sensor Heater Circuit Inspection**

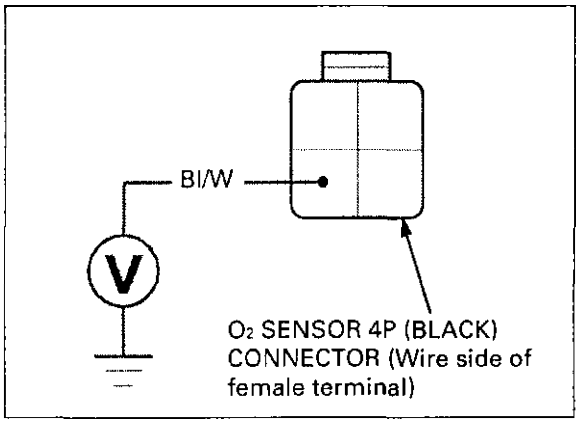
Turn the ignition switch ON.
Measure the voltage at the O_2 sensor 4P (Black) connector of wire harness side.

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

Does the battery voltage exit?

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

YES – GO TO STEP 3.



3. **O_2 Sensor Heater Open circuit Inspection 2**

Turn the ignition switch OFF.

Connect the ECM test harness to the ECM connectors (page 6-17).

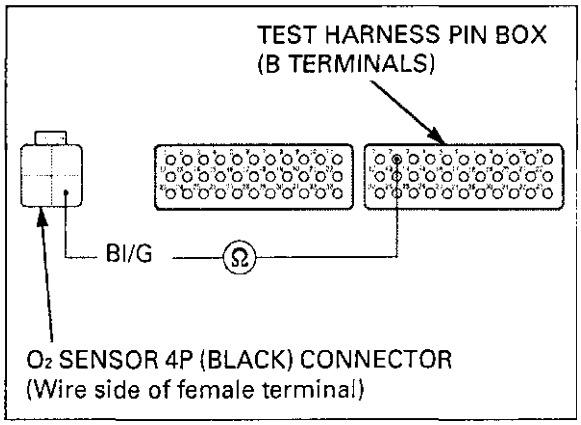
Check for continuity between the test harness terminal and O_2 sensor 4P (Black) connector of the wire harness side.

CONNECTION: B2 – Black/green

Is there continuity?

NO – Open circuit in Black/green wire.

YES – GO TO STEP 4.



4. **O_2 Sensor Heater Short circuit Inspection**

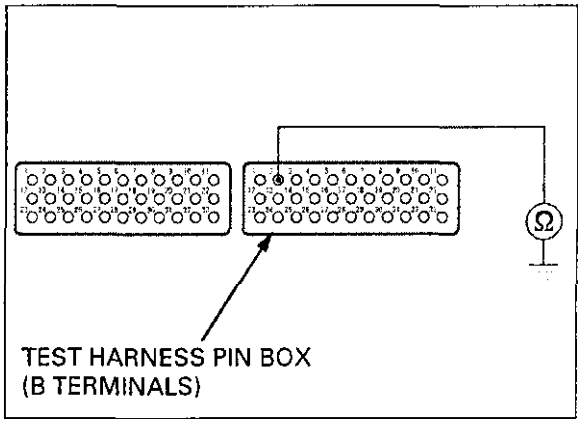
Check for continuity between the test harness terminal and ground.

Connection: B2 – Ground

Is there continuity?

YES – Short circuit in the Black/green wire.

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



MIL 29 BLINKS (IACV)

- Before starting the inspection, check for loose or poor contact on the IACV 4P (White) connector and recheck the MIL blinking.

1. **IACV Short Circuit Inspection**

Turn the ignition switch OFF.
Remove the air cleaner housing (page 6-63).

Disconnect the IACV 4P (White) connector.

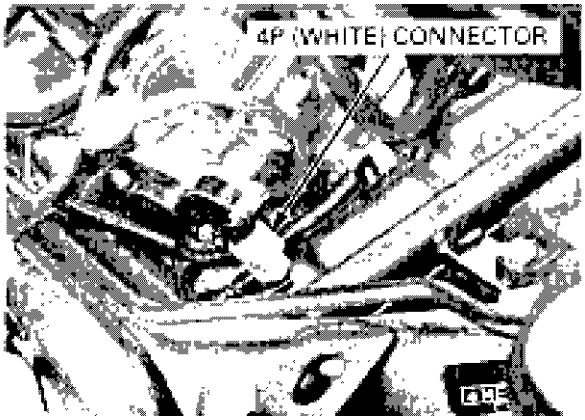
Check for continuities between the IACV 4P (White) connector and ground.

Connection: Blue/green – Ground
Blue/orange – Ground
Blue/black – Ground
Blue/red – Ground

Are there continuities?

YES – • Short circuit in Blue/black or Blue/orange wire.
• Short circuit in Blue/red or Blue/green wire.

NO – GO TO STEP 2.



2. **IACV Circuit Continuity Inspection**

Connect the ECM test harness to ECM connectors (page 6-17).

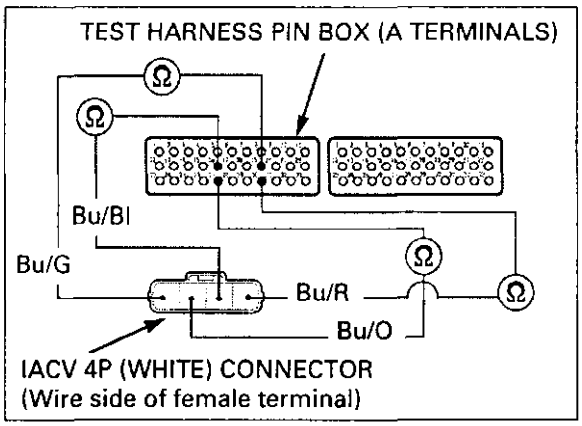
Check for continuities between the test harness and the IACV 4P (White) connector.

Connection: A16 – Blue/green
A27 – Blue/orange
A29 – Blue/black
A19 – Blue/red

Are there continuities?

YES – GO TO STEP 3.

NO – • Open or loose contact in Blue/black or Blue/orange wire.
• Open or loose contact in Blue/red or Blue/green wire.



3. **IACV Resistance Inspection**

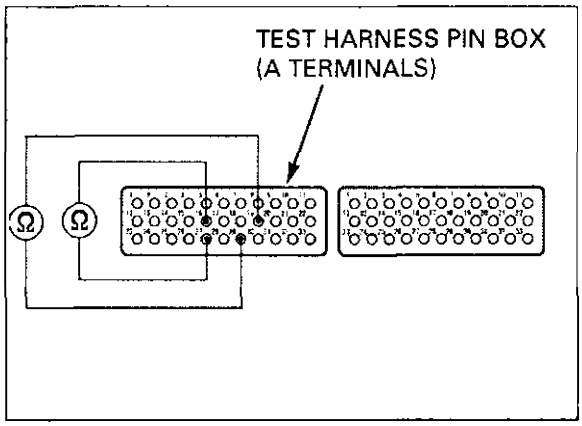
Disconnect the test harness from the ECM.
Connect the IACV 4P (White) connector.
Measure the resistance at the test harness terminals.

CONNECTION: A19 – A29
A16 – A27
STANDARD: 99 – 121 Ω (25°C/77°F)

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

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

NO – Faulty IACV.



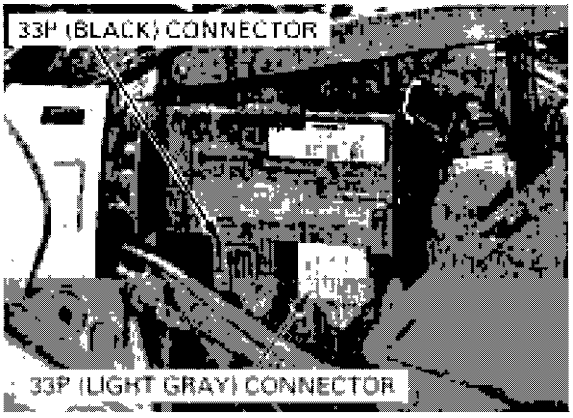
MIL CIRCUIT INSPECTION

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

Check for operation of the combination meter function properly.

- If they do not function, check the combination meter power input line (page 22-8).
- If they function properly, check the follows:

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

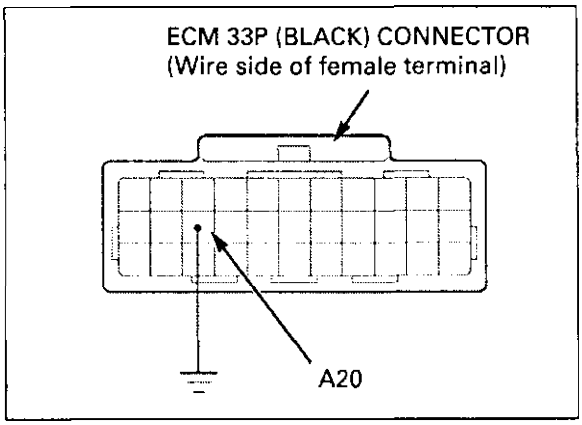


Ground the A20 terminal of the wire harness side connector with a jumper wire.

TOOL:
Test probe **07ZAJ-RDJA110**

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

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



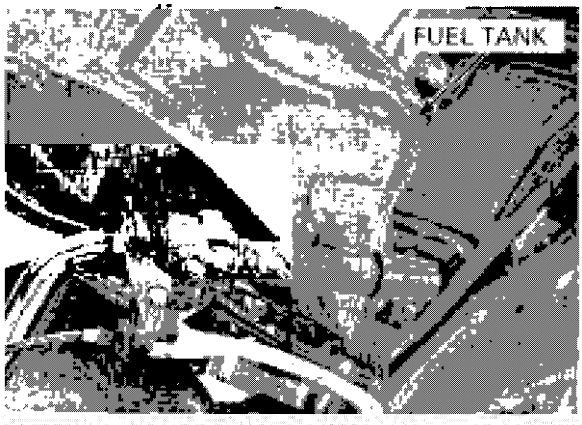
FUEL LINE INSPECTION

FUEL PRESSURE RELIEVING/QUICK CONNECT FITTING REMOVAL

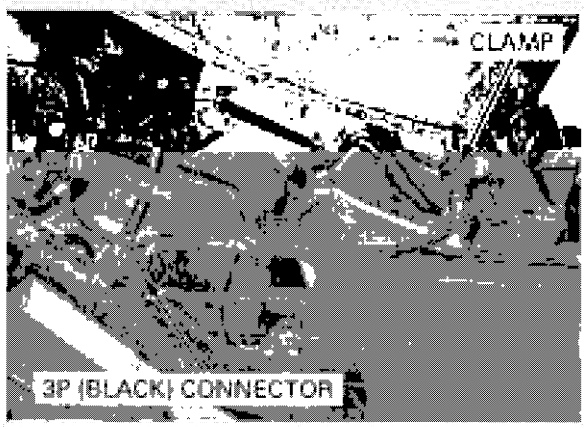
- Before disconnecting fuel feed hose, relieve pressure from the system as following procedures.

1. Turn the ignition switch OFF.

   Open and support the fuel tank (page 4-5).

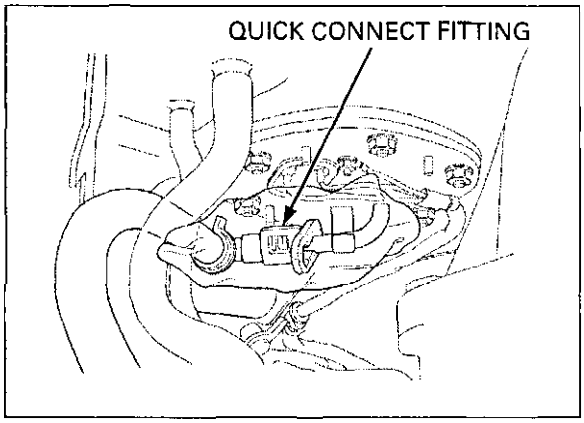


2. Release the wire from the clamp and disconnect the fuel pump 3P (Black) connector.
3. Start the engine, and let it idle until the engine stalls.
4. Turn the ignition switch OFF.
5. Disconnect the battery cable (page 19-6).



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

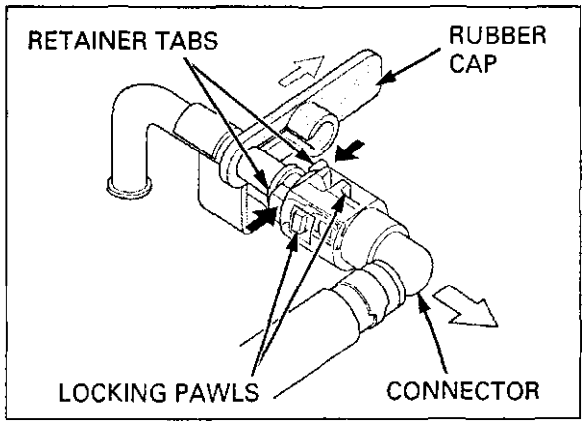
   Place a shop towel over the quick connect fitting.



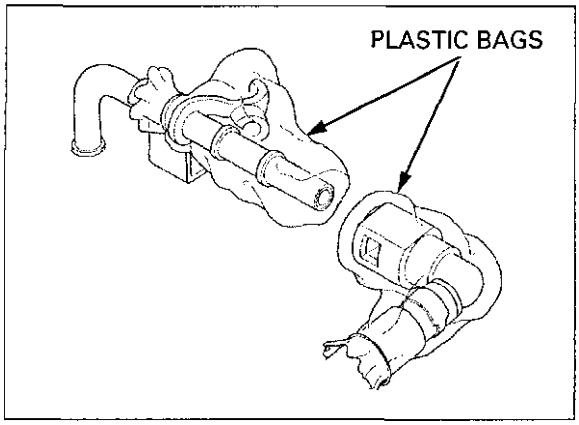
7. Slide and release the rubber cap.
8. Hold the connector with one hand and squeeze the retainer tabs with the other hand release them from the locking pawls.

   Pull the connector off.

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



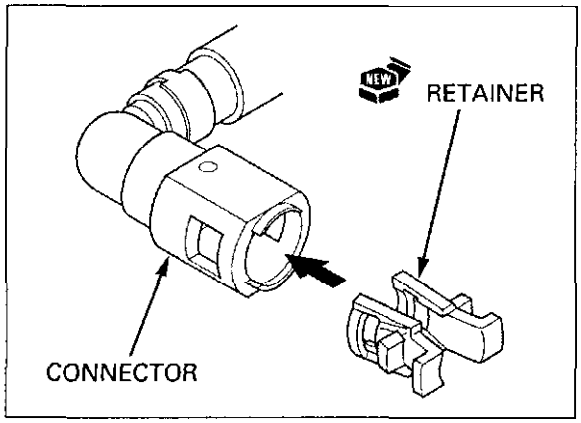
9. To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.



QUICK CONNECT FITTING INSTALLATION

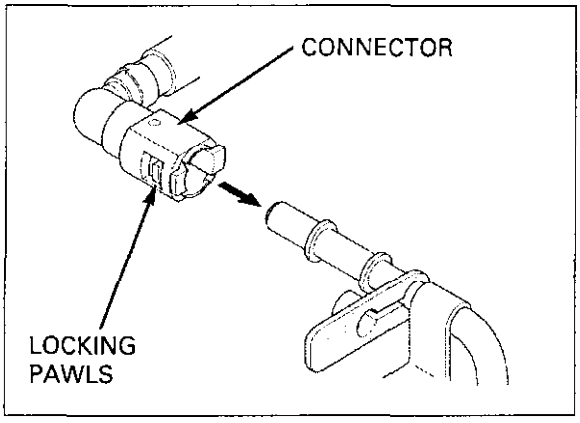
- Always replace the retainer of the quick connect fitting when the fuel feed hose is disconnected.
- If any damage or cut-out on the rubber cap, replace it with a new one.
- Do not bent or twist fuel feed hose.

1. Insert a new retainer into the connector.

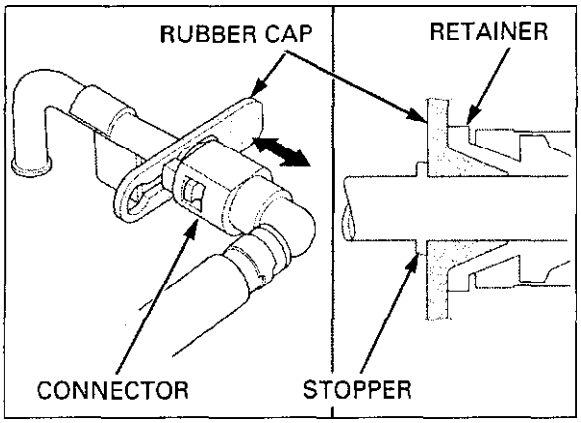


2. Align the quick connect fitting with the pipe and align the retainer locking pawls with the connector grooves.
   Then press the quick connect fitting onto the pipe until both retainer pawls lock with a "CLICK".

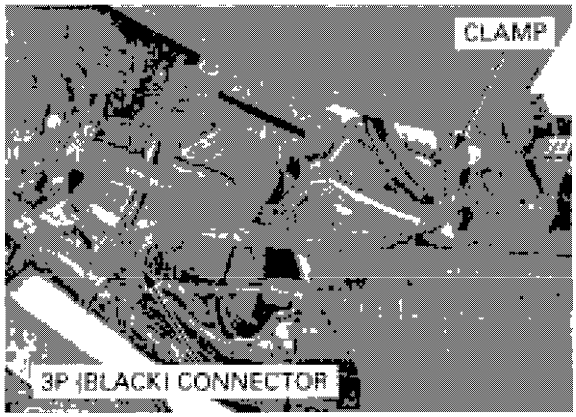
   If it is hard to connect, put a small amount of engine oil on the pipe end.



3. Make sure the connection is secure and that the pawls are firmly locked into place; check visually and by pulling the connector.
4. Set the rubber cap between the retainer tab and stopper on pipe.



5. Connect the fuel pump 3P (Black) connector and clamp the wire.



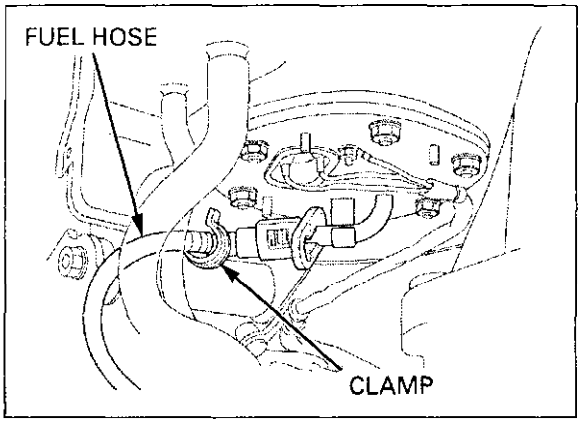
6. Set the fuel hose to the clamp.
7. Connect the positive cable and negative cable to the battery.

Do not start the engine.

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

   The fuel pump will run for about 2 seconds, and fuel pressure will rise.
   Repeat 2 or 3 times, and check that there is no leakage in the fuel supply system.

   Installation is in the reverse order of removal.



FUEL PRESSURE TEST

Relieve the fuel pressure and disconnect the quick connect fitting (page 6-55).

Attach the fuel pressure gauge, attachment and manifold.

TOOLS:

Fuel pressure gauge	**07406-0040004**
Pressure gauge manifold	**07ZAJ-S5A0110**
Pressure gauge hose attachment C	**07ZAJ-S7C0100**
Pressure gauge hose attachment A	**07ZAJ-S5A0120**
Fuel attachment joint	**07ZAJ-S7C0200**

Temporally connect the positive cable and negative cable to the battery.

Start the engine and let it idle.

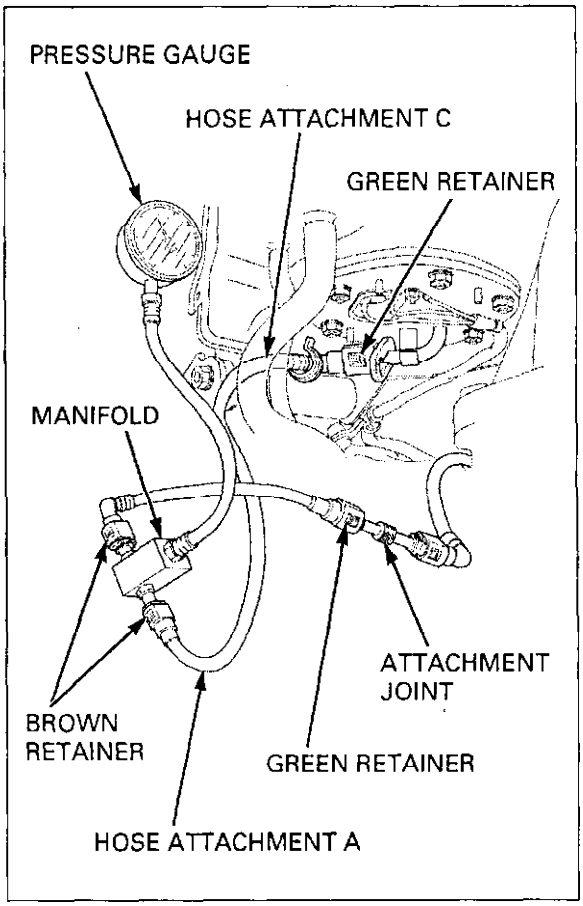
Read the fuel pressure.

STANDARD: 343 kPa (3.5 kgf/cm², 50 psi)

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

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

- Fuel line leaking
- Pinched or clogged fuel feed hose or fuel tank breather hose
- Fuel pump (page 6-59)
- Clogged fuel filter (Assembly of the fuel pump:page 6-60)

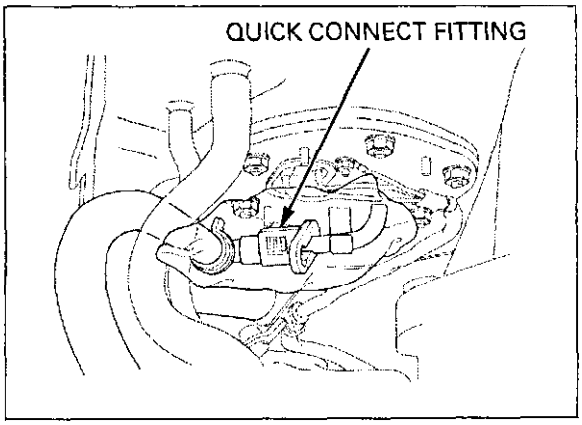


Wrap a shop towel around the attachment to soak up any spilled fuel.

After inspection, relieve the fuel pressure by starting the engine and let it idle until it stalls.

Remove the fuel pressure gauge, attachment and manifold from the fuel pump.

Connect the quick connect fitting (page 6-56).

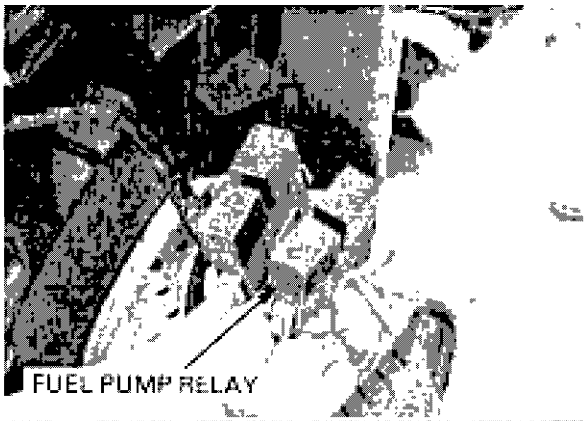


FUEL FLOW INSPECTION

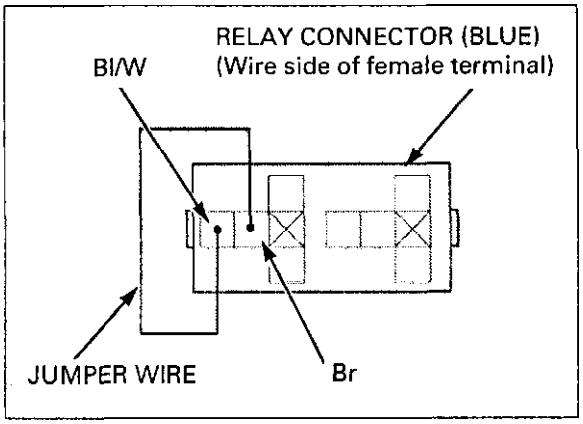
Relieve the fuel pressure and disconnect the quick connect fitting (page 6-55).
Remove the saddle bag body (page 3-7).
Remove the fuel pump relay (page 6-61).

Turn the ignition switch OFF.

Remove the relay connector cover from the rear fender B.



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



Connect the hose attachment to the fuel pump joint.

TOOLS:
Pressure gauge hose attachment 07ZAJ-S7C0100

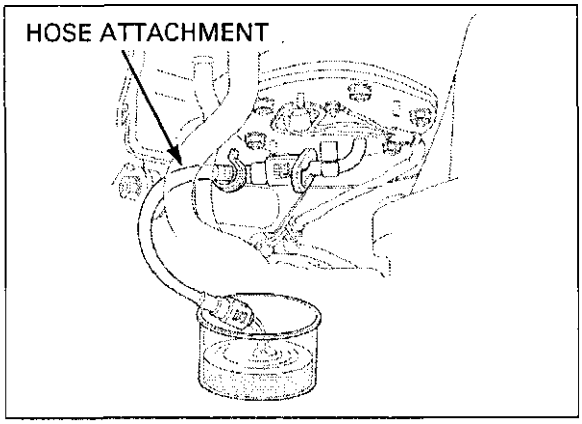
Wipe spilled gasoline out of the container.

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

Temporally connect the positive cable and negative cable to the battery.

Turn the ignition switch ON, engine stop switch "○" for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:
200 cm³ (6.8 US oz, 7.0 Imp oz) minimum /10 seconds at 12 V



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

- Fuel pump (page 6-59).
- Clogged fuel filter (Assembly of the fuel pump:page 6-60)

Connect the quick connect fitting (page 6-56).

FUEL PUMP

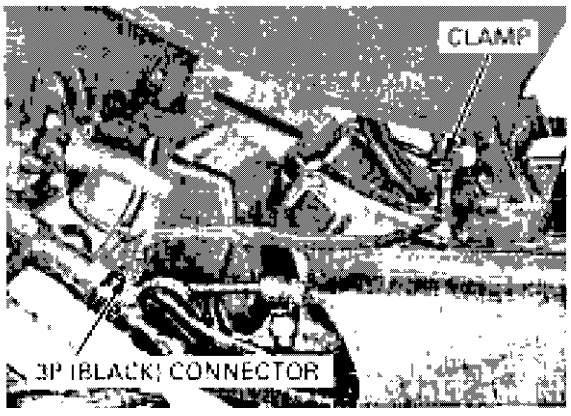
INSPECTION

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

Turn the ignition switch OFF.

Open and support the fuel tank (page 4-5).

Release the wire from the clamp.
Disconnect the fuel pump 3P (Black) connector.



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

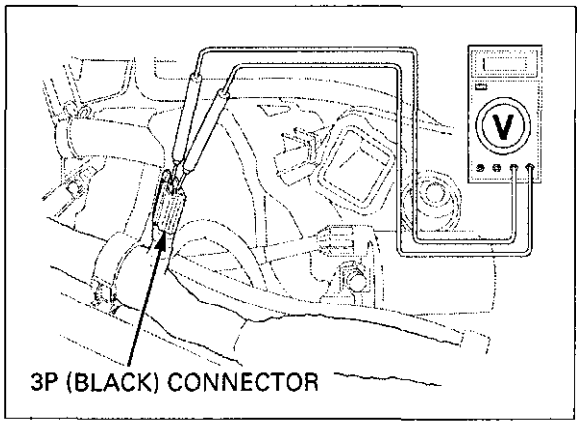
CONNECTION: Brown (+) – Green (–)

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:

- Open circuit in Brown wire and/or Green wire
- Fuse 20A
- Fuel pump relay (page 6-61)
- FI/ignition relay (page 6-74)
- Engine stop switch (page 22-16)
- Bank angle sensor (page 6-73)
- ECM (page 6-75)



REMOVAL

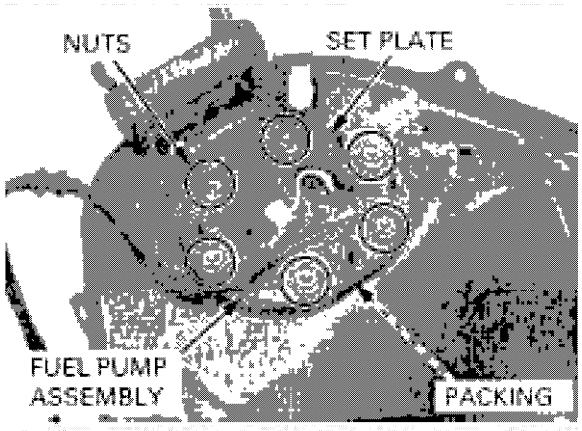
- Do not disassemble the fuel pump assembly.

After disconnect the fuel pump 3P (Black) connector, be sure to relieve the fuel pressure by starting the engine and let it idle until it stalls.

Remove the fuel tank (page 6-62).

Remove the following:

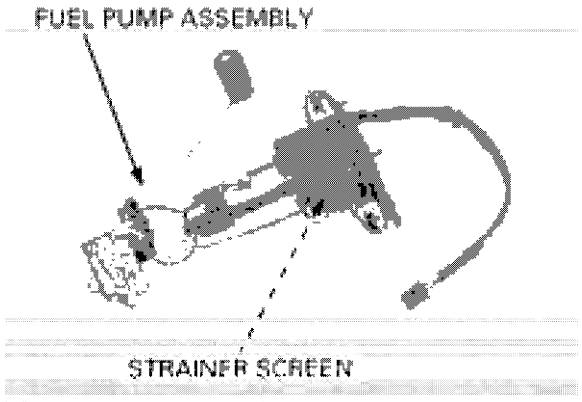
- Nuts
- Fuel pump assembly
- Packing



Check the fuel pump for damage.

Replace the fuel pump if it necessary.

Clean the fuel strainer screen.



INSTALLATION

- When installing the fuel pump assembly, put the mating surface of the fuel tank on a level surface.

Clean the mating surface of the fuel tank and fuel pump.

Apply engine oil to the lip surface of a new packing inside.

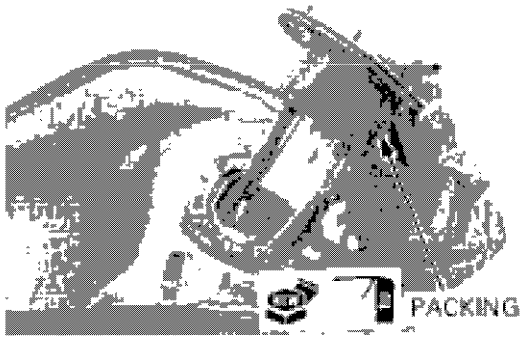
Always replace packing with a new one.

Place a new packing onto the fuel tank.

Install the fuel pump assembly to the fuel tank.

Be careful not to pinch the dirt and debris between the fuel pump and packing.

- Be careful not to damage the pipe end when installing the set plate.
- Be careful not to damage the fuel level sensor when installing the fuel pump assembly.

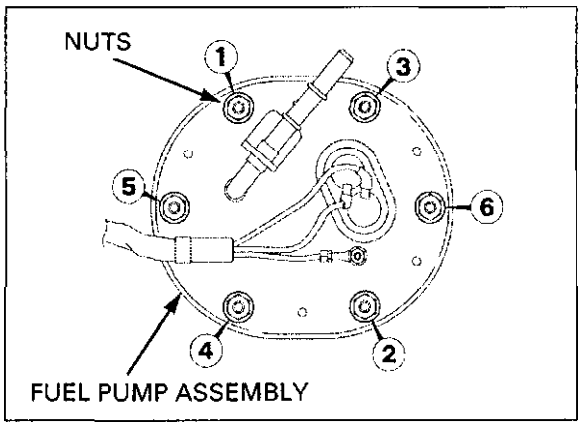


Install the fuel pump mounting nuts.

Tighten the fuel pump mounting nuts in the sequence.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the fuel tank (page 6-62).

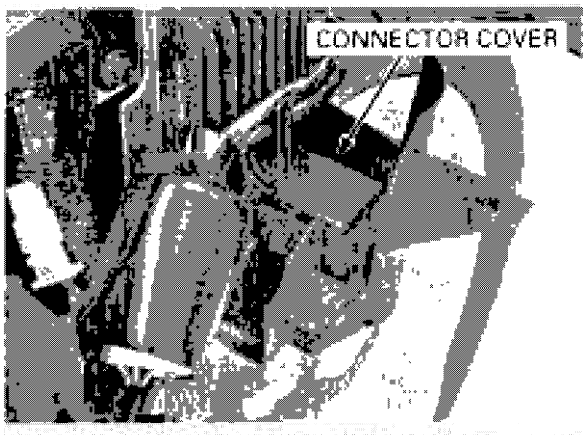


FUEL PUMP RELAY

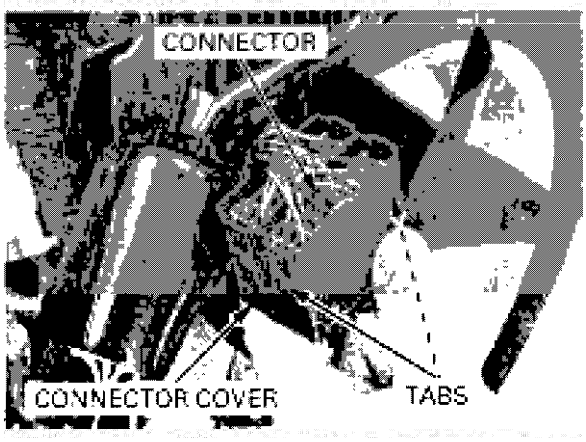
INSPECTION

Remove the saddle bag body (page 3-7).

Remove the relay connector cover from the rear fender B



Release the tabs and remove the relay connector from the cover.



Disconnect the fuel pump relay from the relay connector.

Connect the ohmmeter to the fuel pump relay connector terminals.

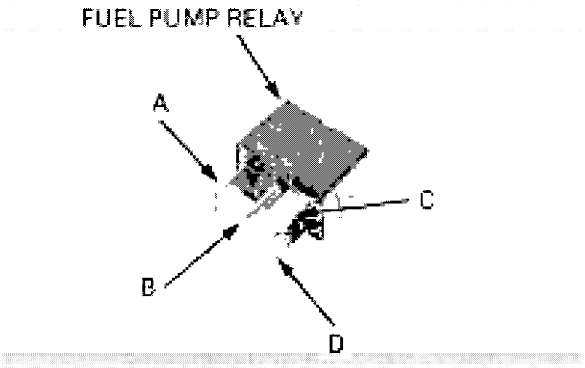
CONNECTION: A – B

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

CONNECTION: C – D

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

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



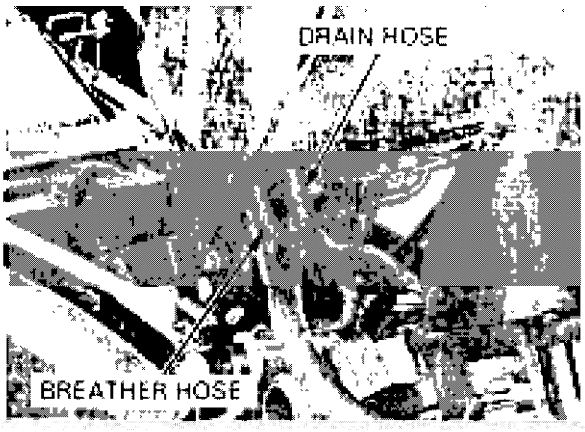
FUEL TANK

REMOVAL/INSTALLATION

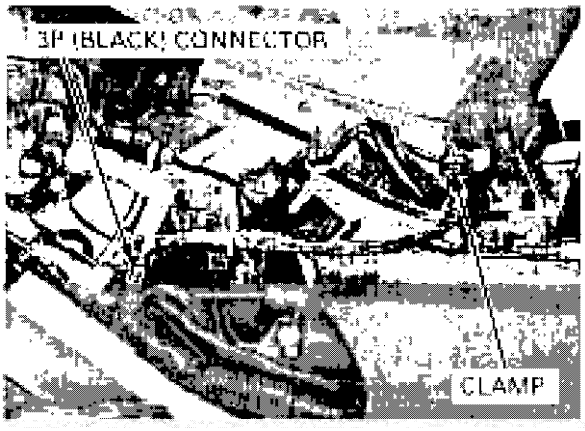
Open and support the fuel tank (page 4-5).

Disconnect the fuel tank drain hose and breather hose.

Relieve the fuel pressure and remove the quick connect fitting (page 6-55).

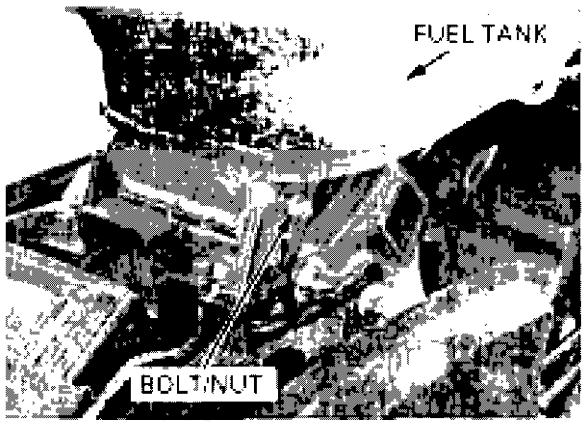


Disconnect the fuel pump 3P (Black) connector and remove the wire from the clamp.



Remove the following:

- Bolt
- Nut
- Clamp
- Fuel tank assembly

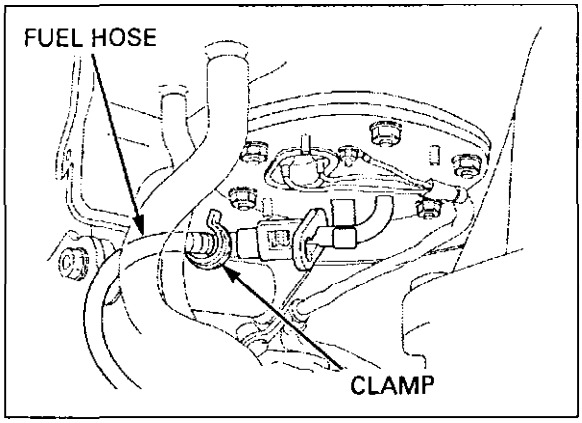


Installation is in the reverse order of removal.

While installing the fuel tank, route the wire harness properly (page 1-35).

Route the fuel tank drain hose and breather hose properly do not to be kinked or bound.

Set the fuel hose to the clamp.



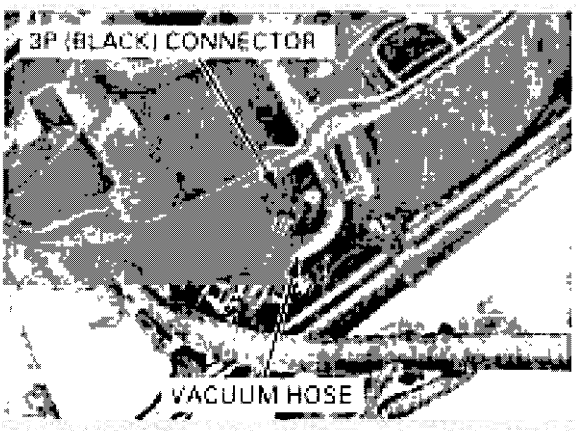
AIR CLEANER HOUSING

REMOVAL/INSTALLATION

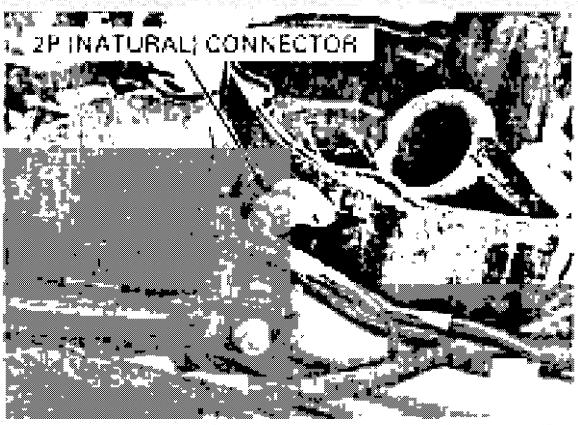
- Be careful not to damage the hoses and pipe end.

Remove the air cleaner element (page 4-7).

Disconnect the MAP sensor 3P (Black) connector.
Disconnect the MAP sensor vacuum hose.

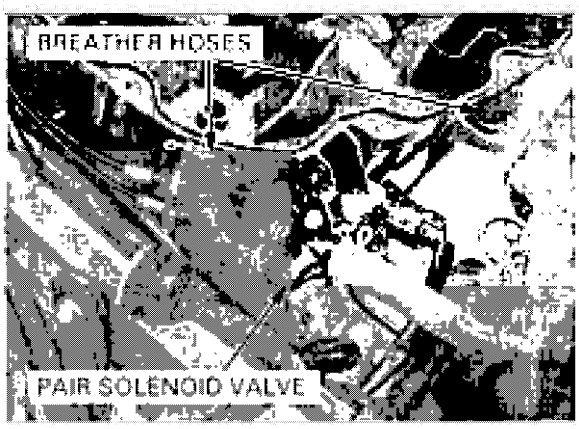


Disconnect the IAT sensor 2P (Natural) connector.



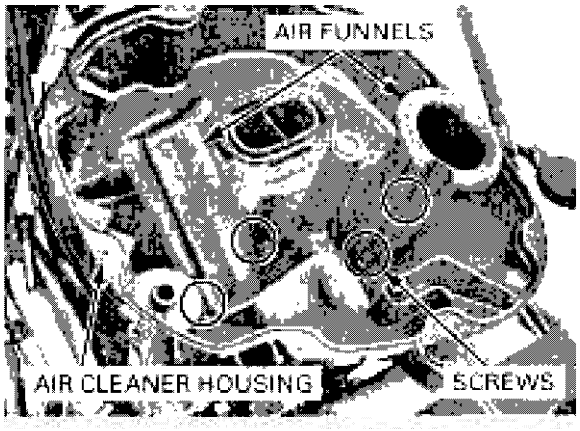
Disconnect the breather hoses from the air cleaner housing.

Remove the PAIR solenoid valve from the air cleaner housing.

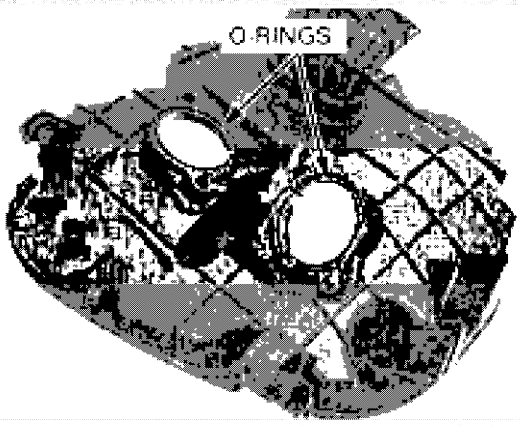


Remove the screws and air funnels.

Remove the air cleaner housing.

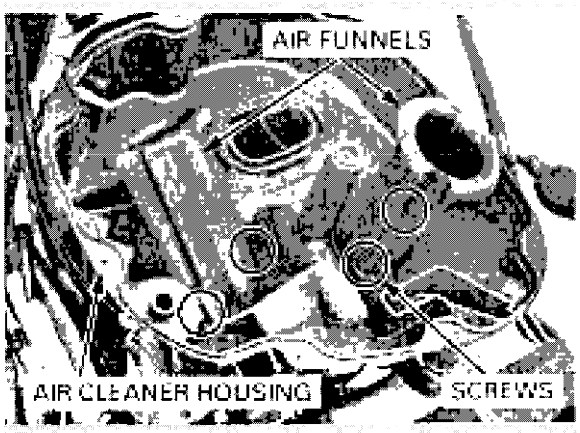


Check the O-rings for wear or damage.
Replace the O-rings if necessary.



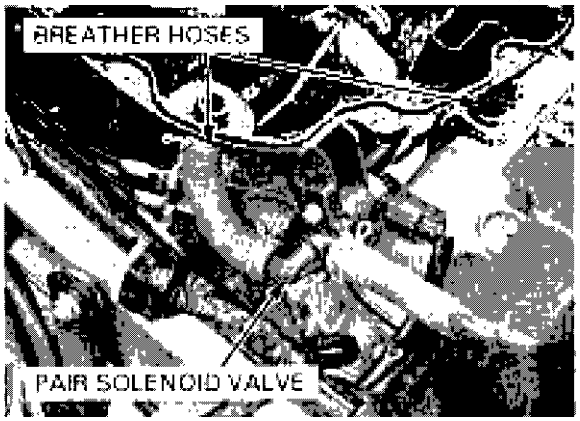
Install the air cleaner housing.

Install the air funnel and tighten the screws securely.

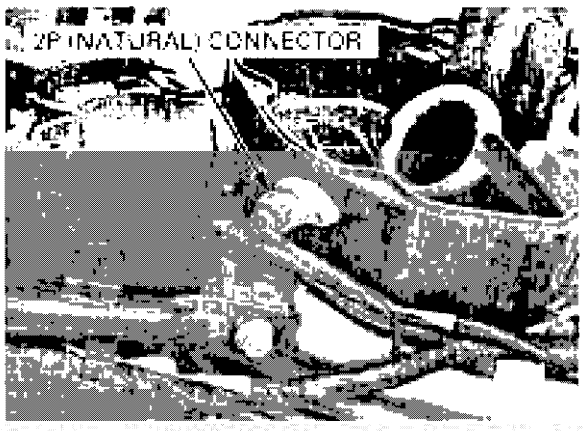


Install the PAIR solenoid valve from the air cleaner housing.

Connect the breather hose to the air cleaner housing.

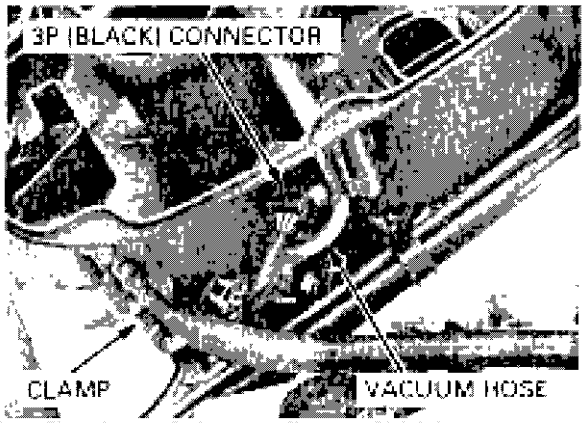


Connect the IAT sensor 2P (Natural) connector.



Connect the MAP sensor vacuum hose.
Connect the MAP sensor 3P (Black) connector.
Set the fuel hose to the clamp on the air cleaner housing.

Install the air cleaner element (page 4-7).



THROTTLE BODY

REMOVAL

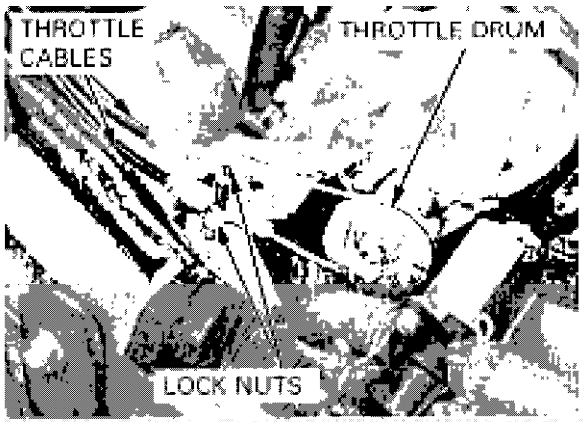
NOTICE

- *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 (page 6-55).*

Relieve the fuel pressure and disconnect the quick connect fitting (page 6-55).

Remove the air cleaner housing (page 6-63).

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

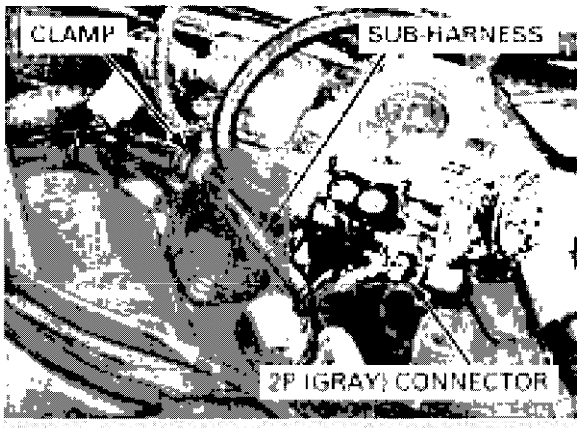


Loosen the insulator band screws.

Remove the throttle body from the insulators.

Disconnect the rear injector (#1) 2P (Gray) connector.

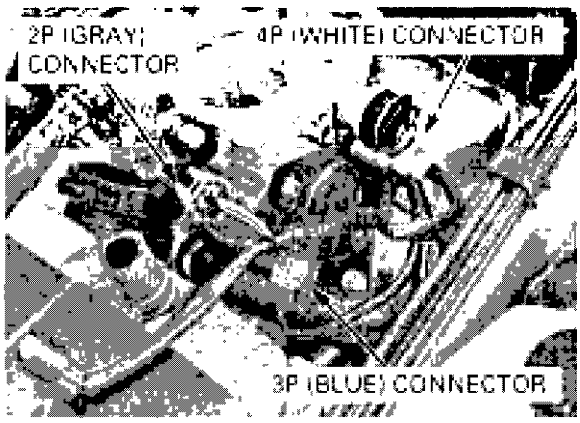
Remove the sub-harness from the clamp of the throttle body.



Disconnect the following connectors:

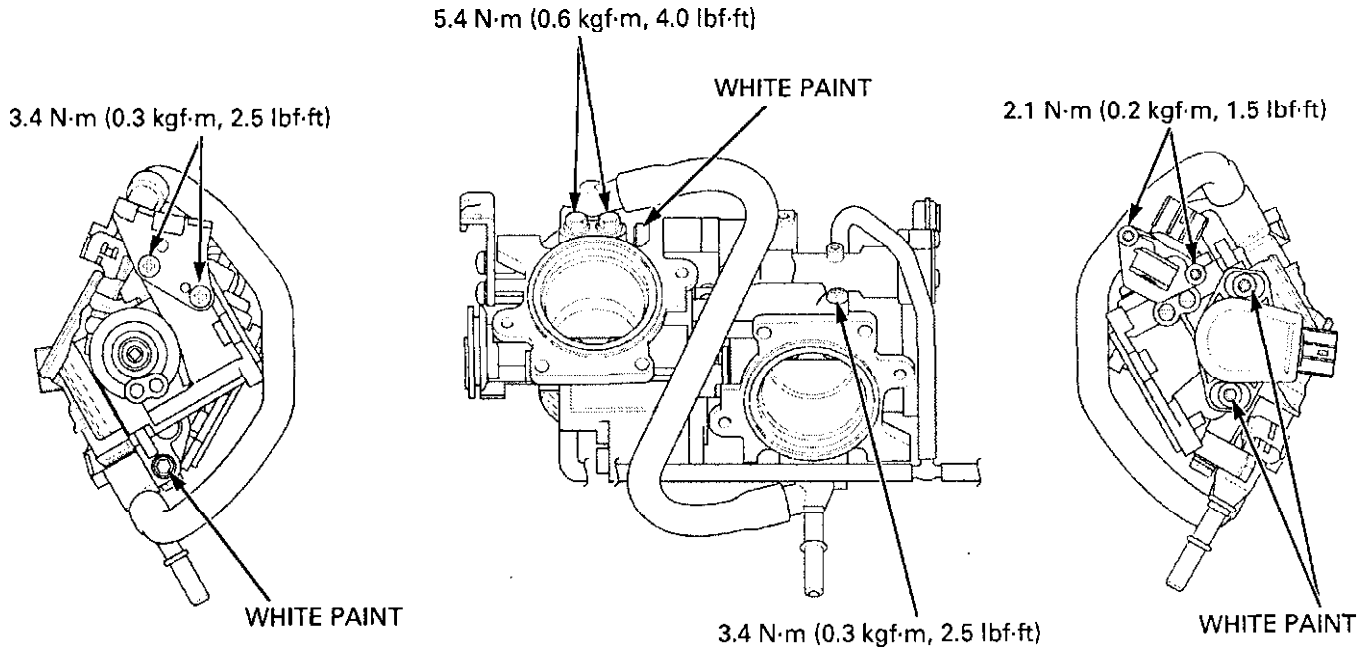
- Front injector (#2) 2P (Gray)
- TP sensor 3P (Blue)
- IACV 4P (White)

Remove the throttle body.



NOTICE

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

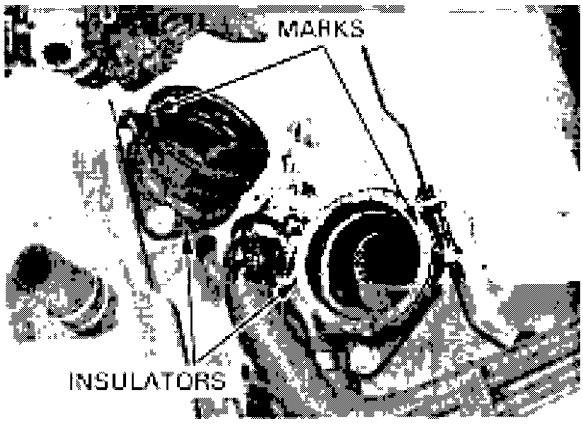


INSTALLATION

Check the insulators with its marked side facing to throttle body.

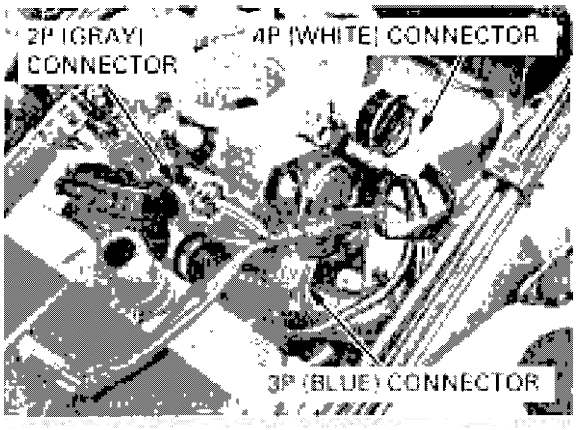
Check the insulator band angle.

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

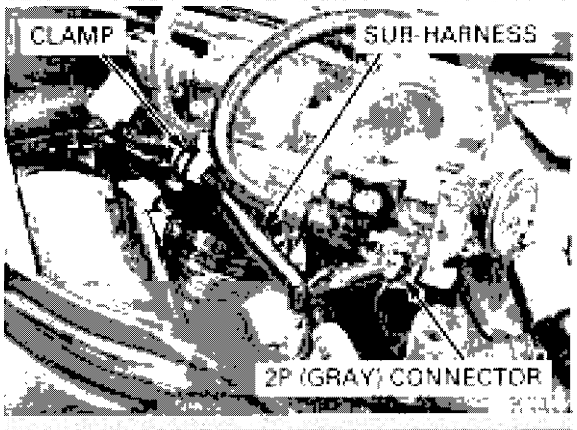


Connect the following connectors:

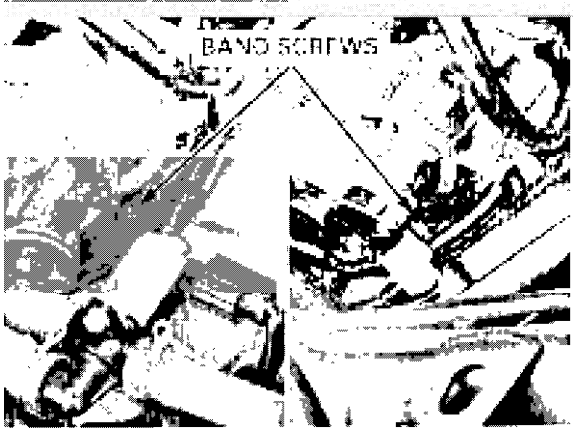
- Front injector (#2) 2P (Gray)
- TP sensor 3P (Blue)
- IACV 4P (White)



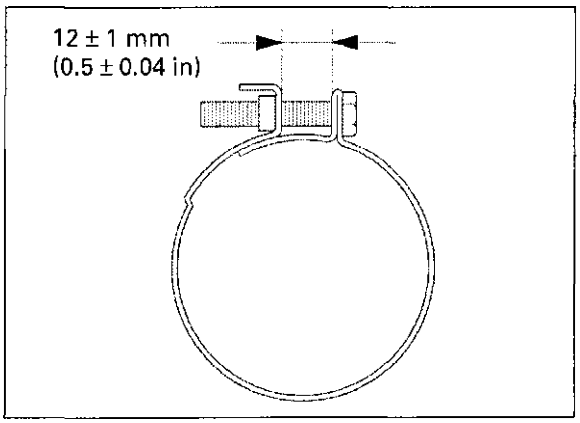
Install the sub-harness to the clamp of the throttle body securely.
Connect the rear injector (#1) 2P (Gray) connector.



Install the throttle body to the insulator and tighten the screws securely.



Check the insulator band distance is 12 ± 1 mm (0.5 ± 0.04 in).

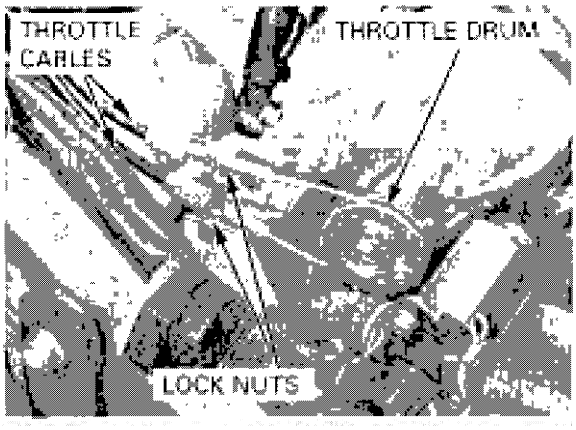


Connect the throttle cables to the throttle drum and cable bracket.

Tighten the lock nuts securely.

Adjust the throttle grip free play (page 4-6).

Install the air cleaner housing (page 6-63).



INJECTOR

REMOVAL

NOTICE

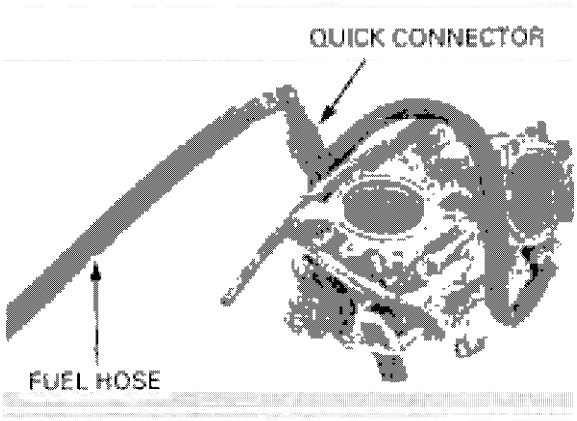
- *Before disconnecting fuel feed hose, relieve pressure from the system (page 6-55).*
- *The fuel feed hose is made of the resin. Be careful not to bend or fold the fuel feed hose.*

Relieve the fuel pressure and disconnect the quick connect fitting (page 6-55).

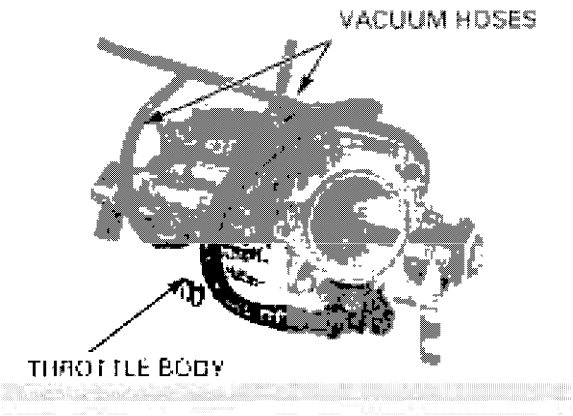
Remove the throttle body (page 6-65).

Clean around the injector base and fuel hose quick connector with compressed air before removing the injector, and be sure that no debris is allowed to enter into the throttle body.

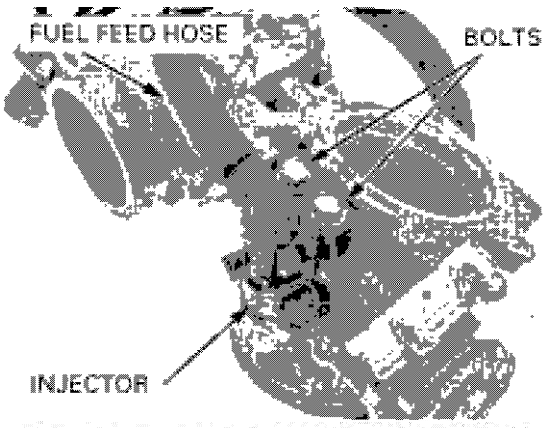
Disconnect the fuel hose quick connector.



Disconnect the vacuum hoses from the joints of the throttle body.

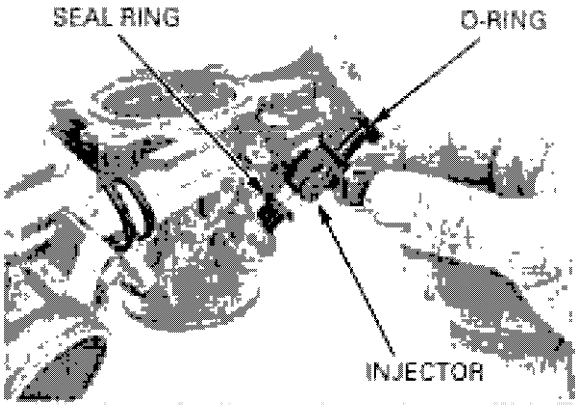


Remove the bolts and fuel feed hose from the injector.



Remove the injector from the throttle body.

Remove the O-ring and seal ring.

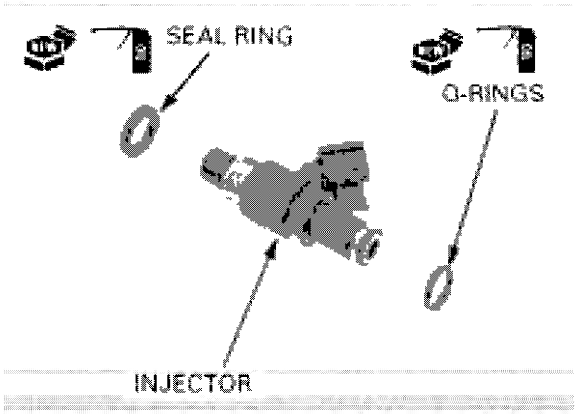


INSTALLATION

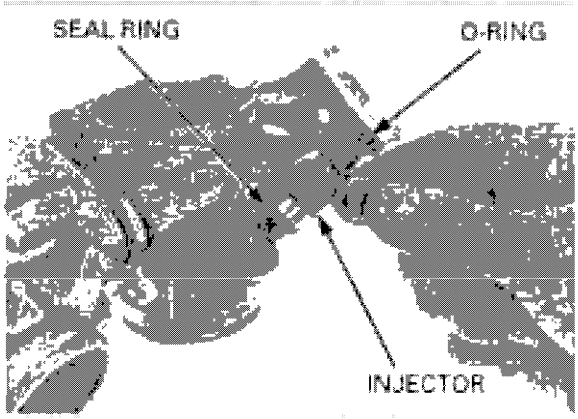
Coat a new O-ring and new seal ring with engine oil.

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

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



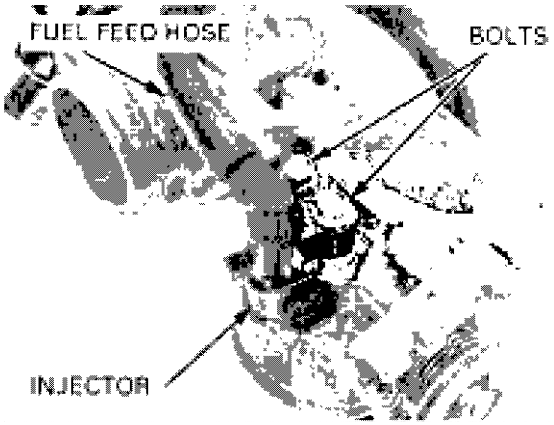
Install the injector into the throttle body, being careful not to damage the seal ring.



Install the fuel feed hose to the injector, being careful not to damage the O-ring.

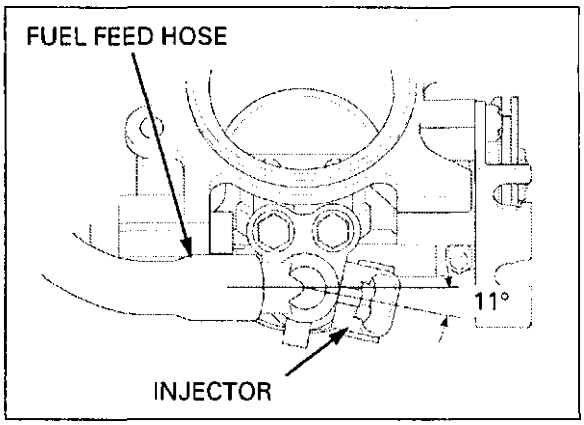
Install and tighten the bolts to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



Adjust the injector installation angle as shown.

Install the throttle body (page 6-65).



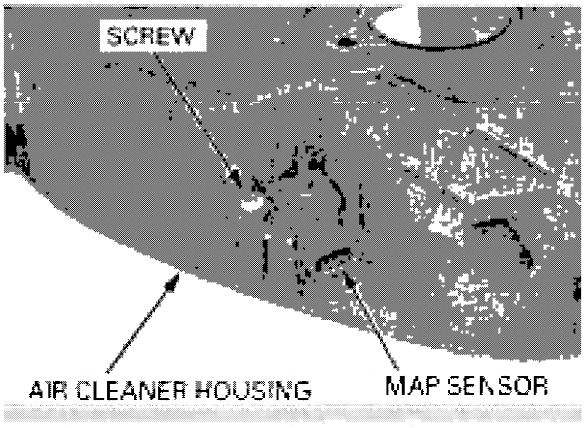
MAP SENSOR

REMOVAL/INSTALLATION

Remove the air cleaner housing (page 6-63).

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

Installation is in the reverse order of removal.



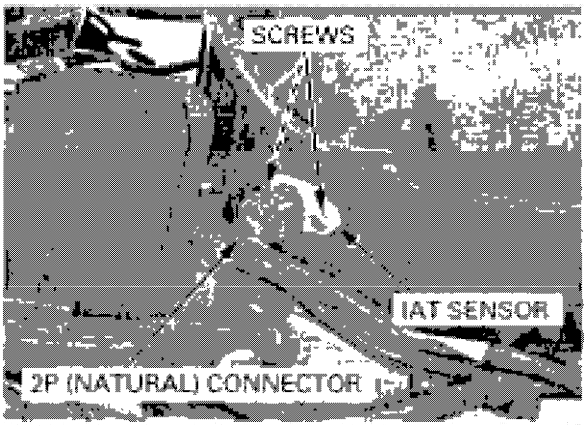
IAT SENSOR

REMOVAL/INSTALLATION

Open and support the fuel tank (page 4-5).

Disconnect the IAT sensor 2P (Natural) connector. Remove the screws and IAT sensor from the air cleaner housing.

Installation is in the reverse order of removal.



ECT SENSOR

REMOVAL/INSTALLATION

Remove the right middle cowl (page 3-11).
Drain the coolant (page 7-6).

Replace the ECT sensor while the engine is cold.

Disconnect the ECT sensor 3P (Gray) connector from the sensor.
Remove the ECT sensor and sealing washer.

Always replace a sealing washer with a new one.

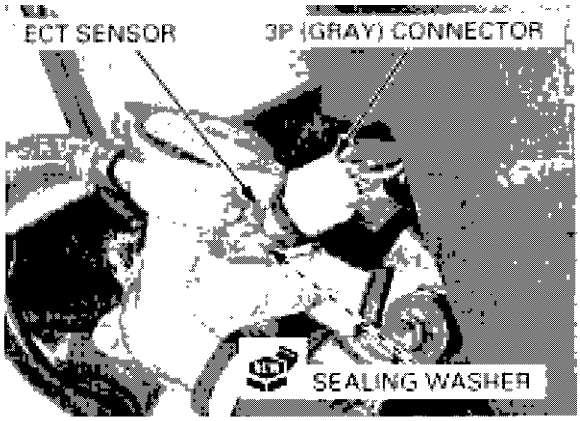
Install the new sealing washer and ECT sensor.
Tighten the ECT sensor to the specified torque.

TORQUE: 24.5 N·m (2.5 kgf·m, 18 lbf·ft)

Connect the ECT sensor 3P (Gray) connector.

Install the right middle cowl (page 3-11).

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

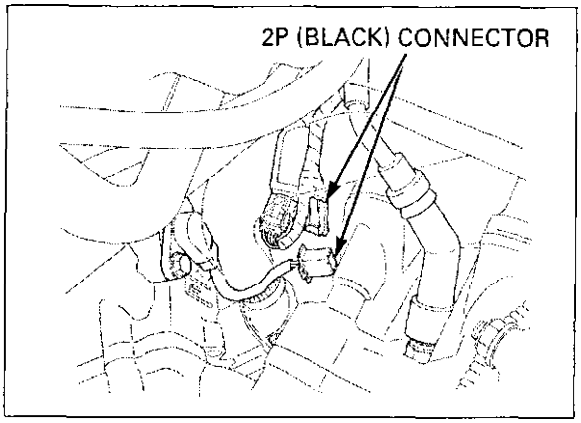


CMP SENSOR

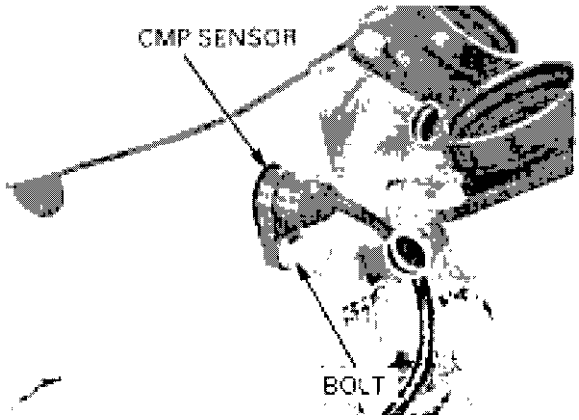
REMOVAL/INSTALLATION

Remove the right middle cowl (page 3-11).
Remove the throttle body (page 6-65).

Disconnect the CMP sensor 2P (Black) connector.



Remove the bolt and CMP sensor from the rear cylinder head.

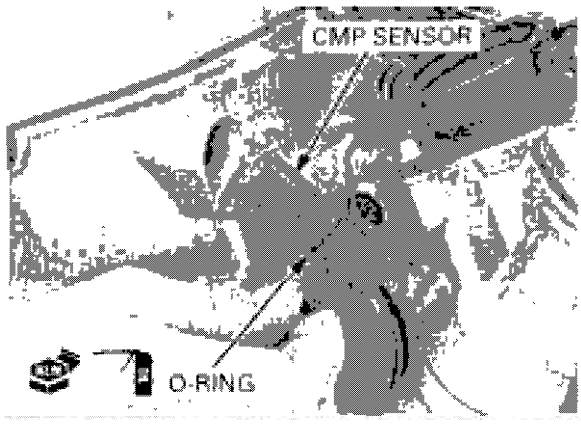


Apply oil to the new O-ring and install it onto the CMP sensor.
Install the CMP sensor into the rear cylinder head.

Install and tighten the bolt securely.

Connect the CMP sensor 2P (Black) connector.

Install the throttle body (page 6-65).
Install the right middle cowl (page 3-11).



BANK ANGLE SENSOR

INSPECTION

Place the motorcycle on its center stand on a level surface.

Remove the screen inner cowl (page 3-14).

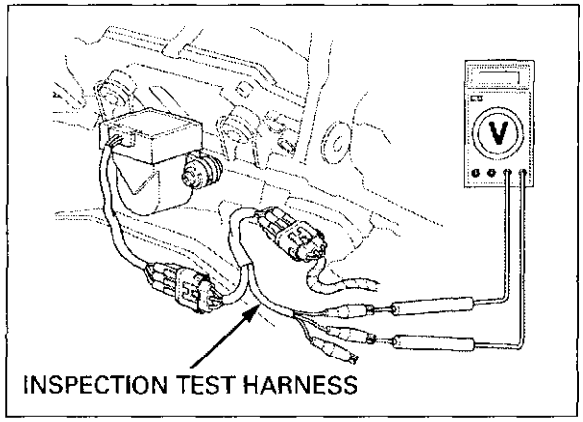
Disconnect the bank angle sensor 3P (Black) connector and connect the inspection test harness.

TOOL:
Inspection test harness **07GMJ-ML80100**

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

Measure the voltage between the test harness terminals.

CONNECTION	STANDARD
White(+) – Red/white(–)	Battery voltage
Red/white(+) – Green(–)	0 – 1 V

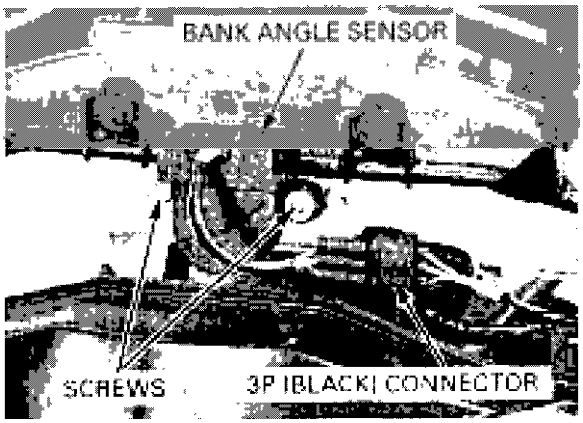


Turn the ignition switch OFF.

Do not disconnect the bank angle sensor connector during inspection.

Remove the two screws and bank angle sensor.

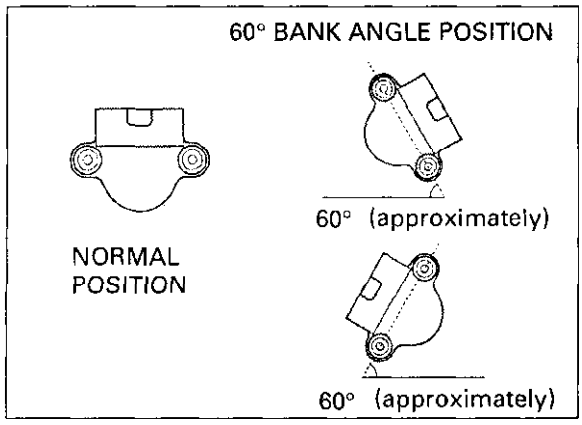
Connect the bank angle sensor 3P (Black) connector.



If you check this test, the ignition switch "OFF", then turn the ignition switch "ON" and engine stop switch "○".

Place the bank angle sensor is normal position as shown, and ignition switch ON and engine stop switch "○" then bank angle sensor is normal if the engine stop relay clicks and power supply is closed.

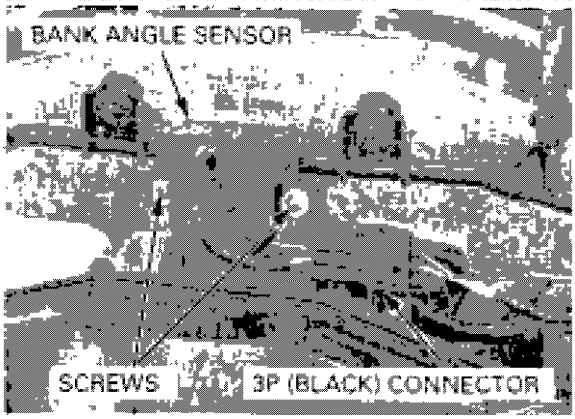
Incline the bank angle sensor approximately 60° to the left or right with keep the ignition switch ON and engine stop switch "○" then bank angle sensor is normal if the engine stop relay clicks and power supply is open.



REMOVAL/INSTALLATION

Remove the screen inner cowl (page 3-14).

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

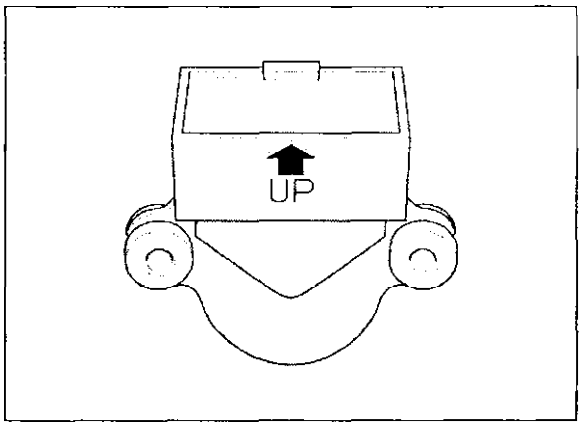


Route the sensor wire correctly (page 1-35).

Install the bank angle sensor with its "UP" mark facing up.
Tighten the mounting screws securely.

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

Install the screen inner cowl (page 3-14).

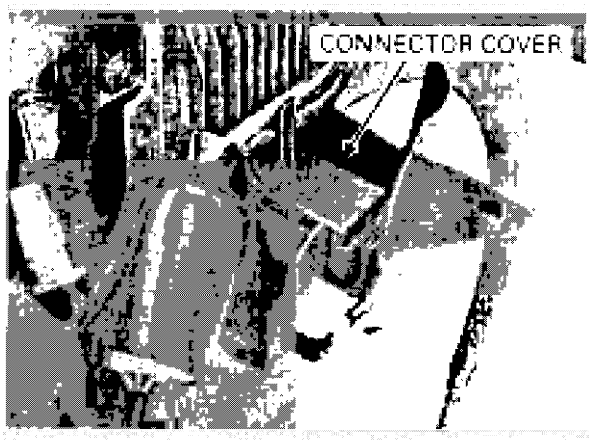


FI/IGNITION RELAY

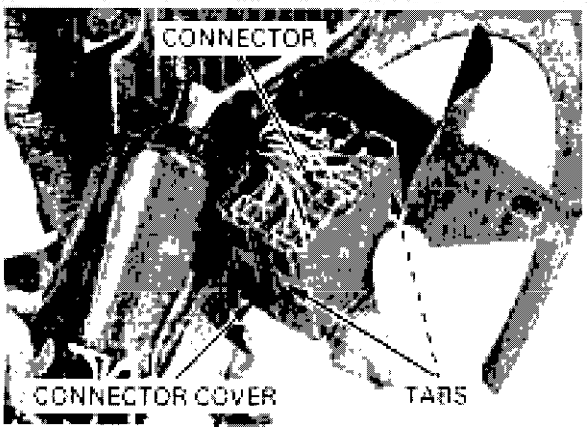
INSPECTION

Remove the saddle bag body (page 3-7).

Remove the relay connector cover from the rear fender B



Release the tabs and remove the relay connector from the cover.



Disconnect the FI/ignition relay from the relay connector.

Connect the ohmmeter to the relay connector terminals.

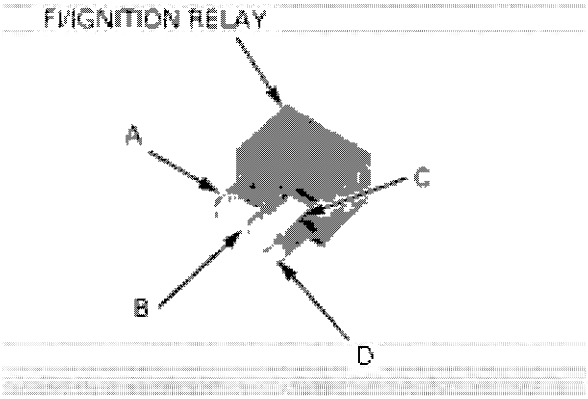
CONNECTION: A – B

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

CONNECTION: C – D

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

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



ECM (ENGINE CONTROL MODULE)

ECM POWER/GROUND LINE INSPECTION

Engine does not start (MIL no blinks)

1. **ECM Power Input Voltage Inspection**

   - Before starting the inspection, check for loose or poor contact on the ECM 33P connectors and recheck the MIL blinking.

   Connect the test harness to the ECM 33P connectors (page 6-17).

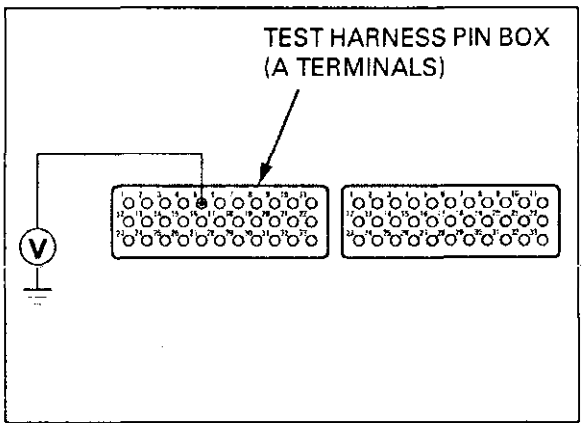
   Turn the ignition switch ON and engine stop switch "○".
   Measure the voltage between the test harness terminal and ground.

   CONNECTION: A5 (+) – Ground (–)

   Does the battery voltage exist?

   YES – GO TO STEP 2.

   NO – GO TO STEP 3.



2. **ECM Ground Line Inspection**

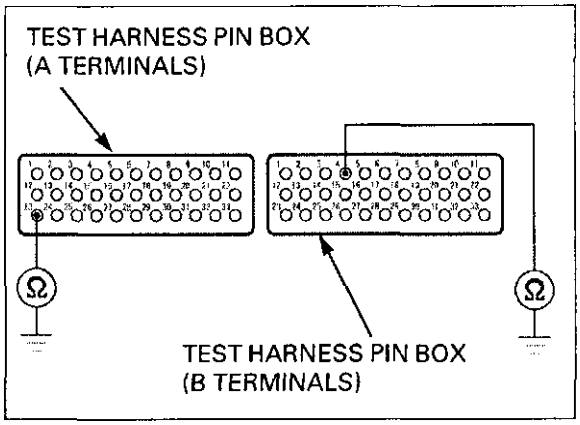
Turn the ignition switch OFF.
Check for continuity between the test harness terminal and ground.

CONNECTION: A23 – Ground
CONNECTION: B4 – Ground

Is there continuities?

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

NO – Open circuit in the Green wire.



3. **FI/Ignition Relay Inspection 1**

Turn the ignition switch OFF.
Disconnect the FI/ignition relay from the relay connector (page 6-74).

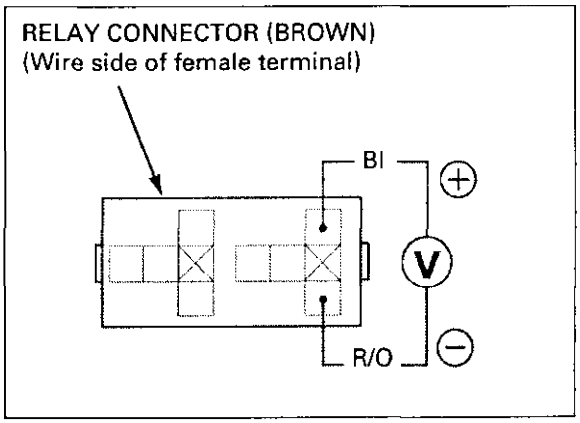
Turn the ignition switch ON and engine stop switch "○".
Measure the voltage at the FI/ignition relay connector of the wire harness side.

CONNECTION: Black (+) – Red/orange (–)

Does the battery voltage exist?

NO – • Faulty sub fuse.
• Open circuit in the Black or Red/orange wire.

YES – GO TO STEP 4.



4. **Engine Stop Relay Inspection 2**

Turn the ignition switch OFF.
Jump the FI/ignition relay connector terminals.

CONNECTION: Black/white – Red/white

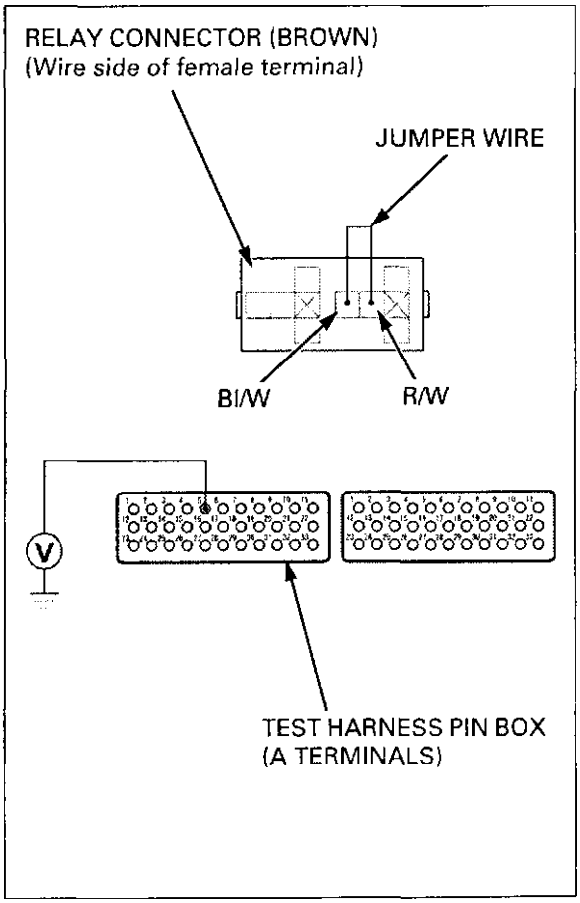
Turn the ignition switch ON and engine stop switch "○".
Measure the voltage at the ECM 33P connector wire harness side terminal and ground.

CONNECTION: A5 (+) – Ground (–)

Does the battery voltage exist?

YES – • Inspect the FI ignition relay (page 6-74).
• Inspect the bank angle sensor (page 6-73).

NO – Open circuit in Black/white wire between the engine stop relay and the ECM.

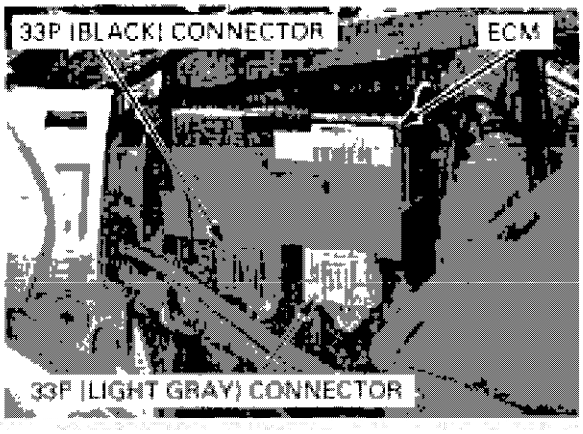


REMOVAL/INSTALLATION

Remove the left side cover/pivot cover (page 3-5).

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

Installation is in the reverse order of removal.



ENGINE IDLE SPEED

IDLE SPEED INSPECTION

NOTE:

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect following items.
  - No DTC and MIL blinking.
  - Spark plug condition (page 4-7).
  - Air cleaner condition (page 4-7).
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment from the previous designs.

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

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

ENGINE IDLE SPEED: 1,200 ± 100 min^{-1} (rpm)

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

- Throttle operation and throttle grip free play (page 4-6).
- Intake air leak or engine top-end problem (page 9-5).
- IACV operation (page 6-77).

IACV (Idle Air Control Valve)

IACV INSPECTION

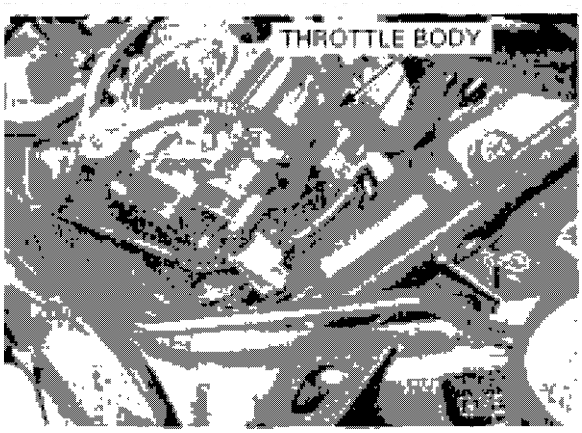
The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned ON, the IACV operates for a few seconds.

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

NOTE:

The IACV operation can be checked visually as following:

- Remove the IACV from the throttle body with its 4P (White) connector in place, then turn the ignition switch ON.

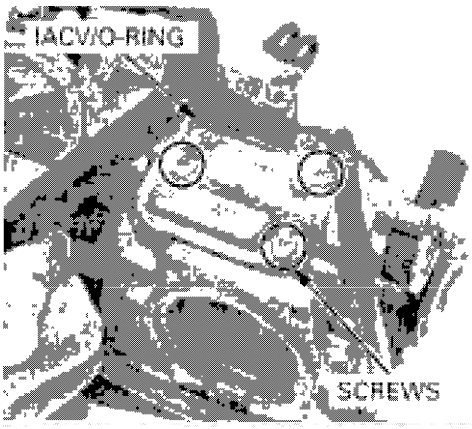


REMOVAL/INSTALLATION

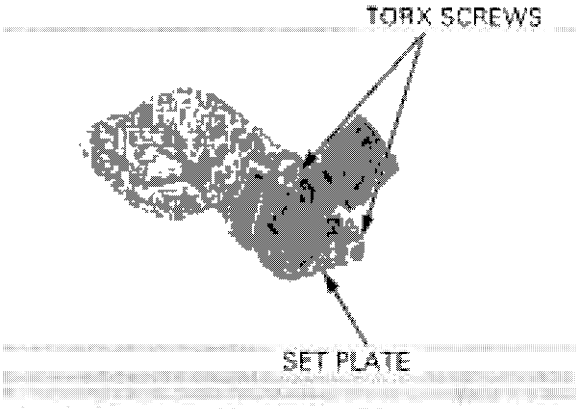
- Do not remove the IACV cover unless it is necessary to replace it with a new one.
- If the IACV cover is removed, be careful so that the dirt or debris not enter the throttle body.

Remove the throttle body (page 6-65).

Remove the screws, IACV and O-ring.



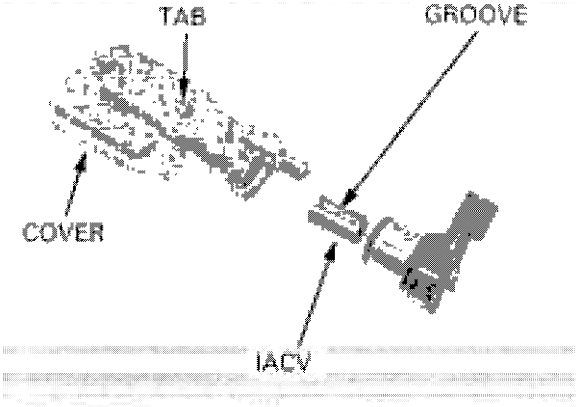
Remove the torx screws and set plate.



Remove the IACV from the cover.

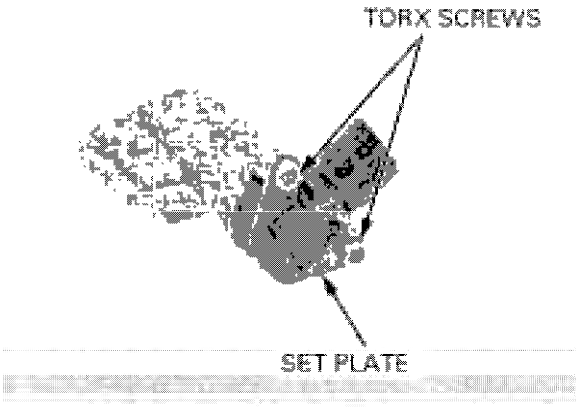
Check the IACV for wear or damage.
If necessary replace with a new ones.

Install the IACV to the cover with its groove to the tab on the cover.

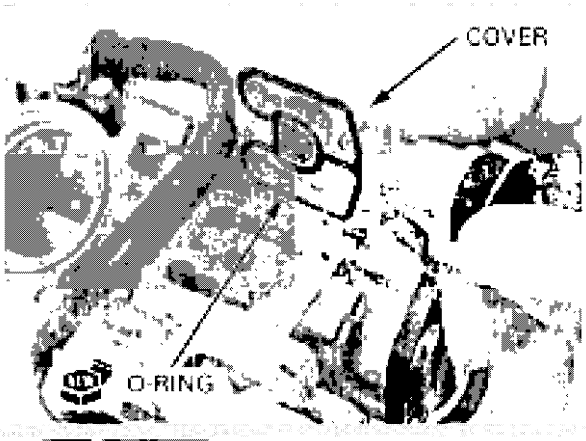


Install the set plate and tighten the torx screws to the specified torque.

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



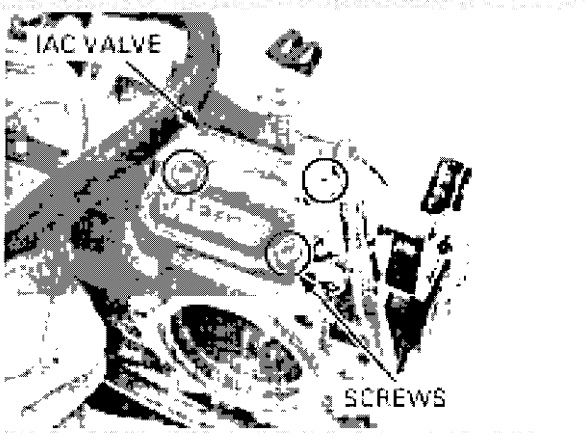
Install a new O-ring to the IACV cover groove securely.



Install the IACV and tighten the screws to the specified torque.

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

Install the throttle body (page 6-65).



SECONDARY AIR SUPPLY SYSTEM

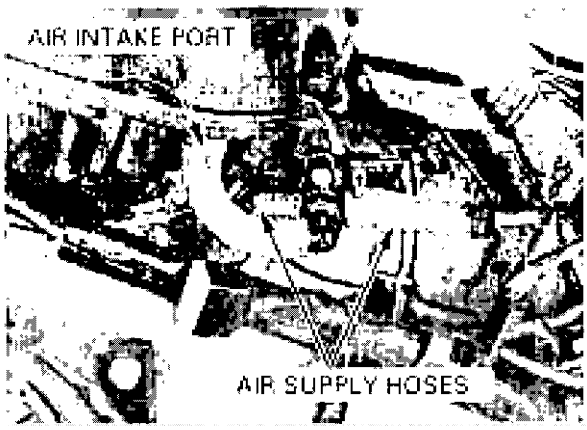
SYSTEM INSPECTION

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

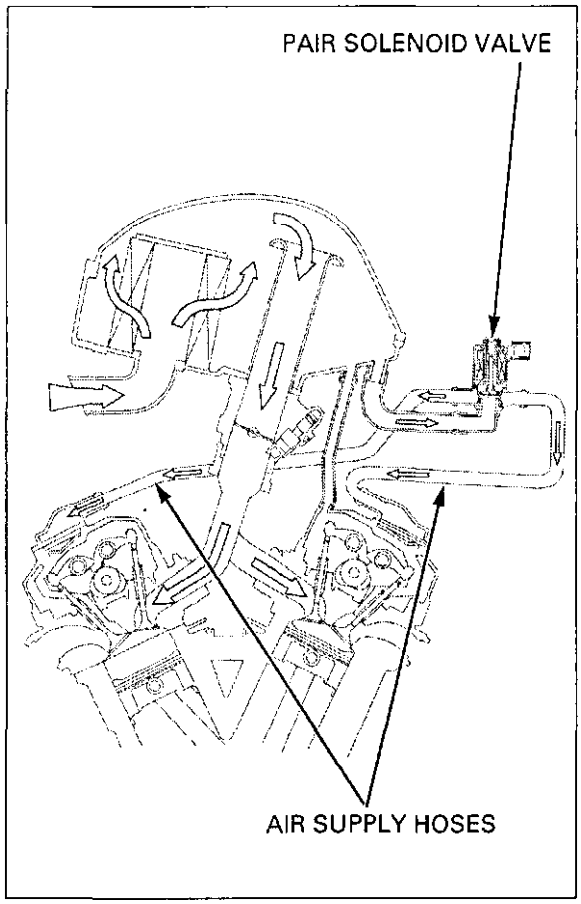
Stop the engine.

Open and support the fuel tank (page 4-5).

Disconnect the air supply hoses from the air cleaner housing.
Check that the secondary air intake port is clean and free of carbon deposits.
Check the pulse secondary air injection (PAIR) check valve if the port is carbon fouled (page 6-81).



Start the engine and open the throttle slightly to be certain that air is sucked in through the air supply hose.
If the air is not drawn in, check the air supply hoses for clogs and the PAIR solenoid valve (page 6-80).



PAIR SOLENOID VALVE

INSPECTION

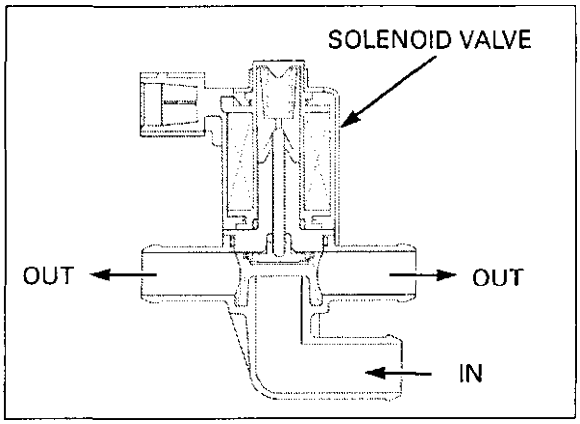
Remove the PAIR solenoid valve (page 6-81).

Check air flow from input side to output side hose. Air should flow out.

Connect the 12V battery to the solenoid valve side 2P connector terminals.

CONNECTION: Black/white (+) – Orange/black (–)

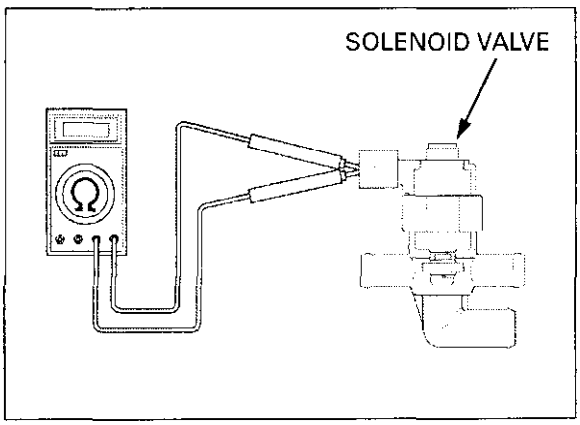
Air should not flow when the battery is connected.



Measure the resistance between the connector terminals.

STANDARD: 23 – 27 Ω (20°C/68°F)

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



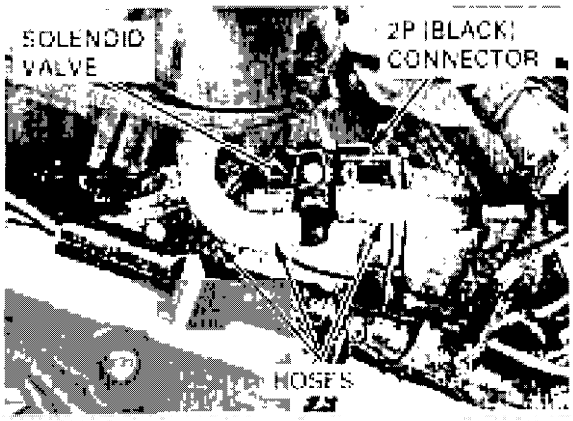
REMOVAVAL/INSTALLATION

Open and support the fuel tank (page 6-62).

Disconnect the air suction hoses from the solenoid valve.

Disconnect the solenoid valve 2P (Black) connector.
Remove the solenoid valve from the air cleaner housing.

Installation is in the reverse order of removal.

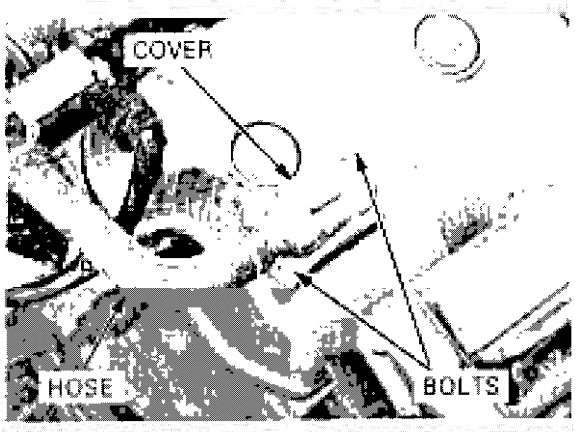


PAIR CHECK VALVE INSPECTION

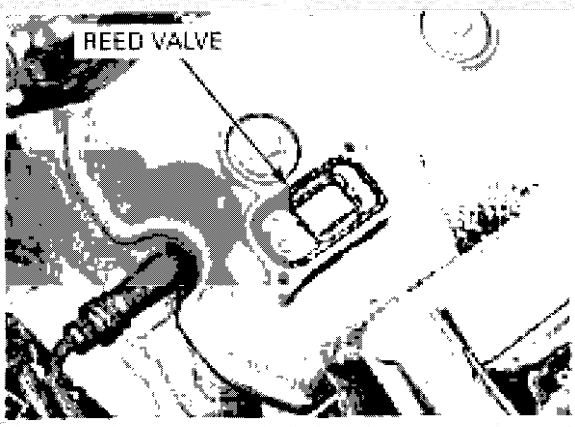
INSPECTION

Remove the air cleaner housing (page 6-63).
Remove the cylinder head cover protector (page 9-6).

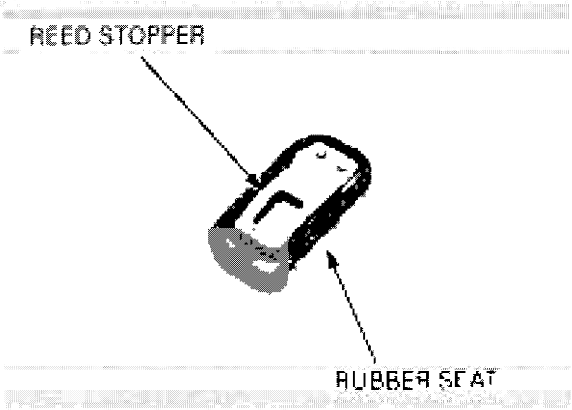
Disconnect the air suction hose from the PAIR check reed valve cover.
Remove the bolts and PAIR check valve cover.



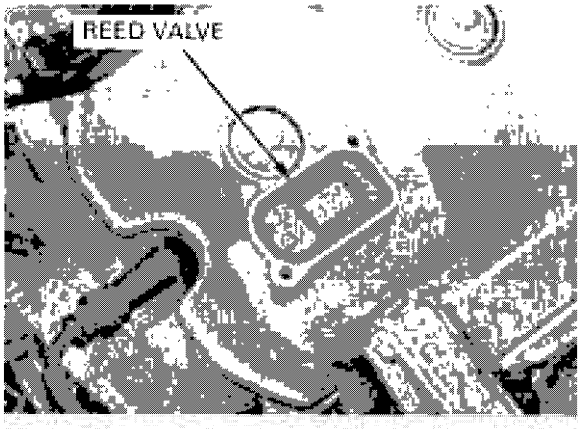
Remove the reed valve from the cylinder head cover.



Check the reed for damage or fatigue. Replace if necessary.
Replace the PAIR check reed valve if the rubber seat is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.



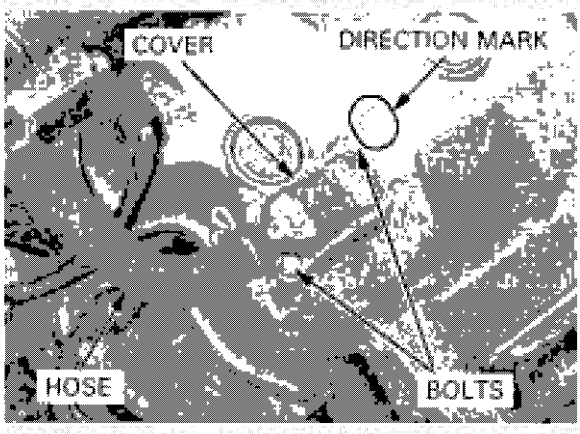
Install the reed valve to the cylinder head cover.



- The direction marks on the cylinder head cover have the following means.
  - FF: Front
  - RR: Rear

Install the PAIR check reed valve cover with its hose connect direction aligning the direction mark on the cylinder head cover.
Install and tighten the bolts securely.
Connect the air suction hose to the PAIR check reed valve cover securely.

Install the air cleaner housing (page 6-63).
Install the cylinder head cover protector (page 9-33).



O_2 SENSOR

REMOVAL

- Handle the O_2 sensor with care.
- Do not get grease, oil or other materials in the O_2 sensor air hole.
- Do not use an impact wrench while removing or installing the O_2 sensor.
- Be careful not to damage the sensor wire.

Do not service the O_2 sensor while it is hot.

Remove the exhaust system (page 3-17).

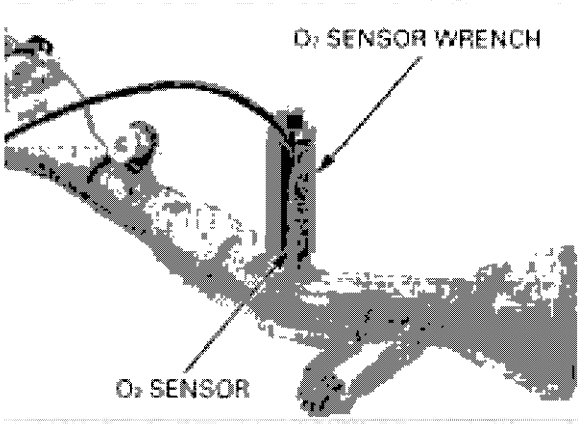
Remove the O_2 sensor using the special tool.

TOOL:

O_2 sensor wrench	**07LAA-PT50101**

NOTICE

- *Be careful not to damage the sensor wire.*
- *Do not use an impact wrench while removing or installing the O_2 sensor*



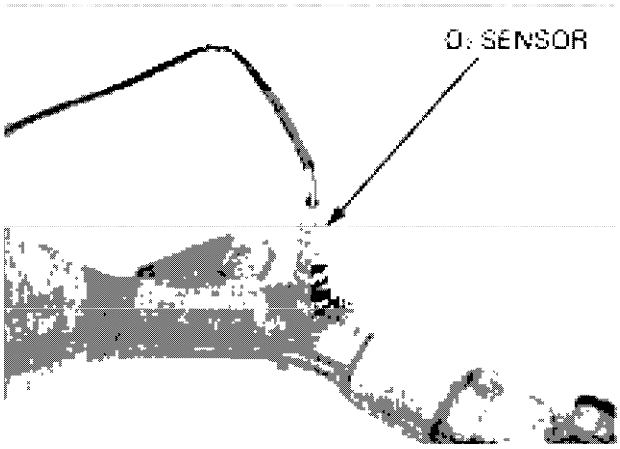
INSTALLATION

Install the O_2 sensor and tighten it securely.

TOOL:

O_2 sensor wrench	**07LAA-PT50101**

Install the exhaust system (page 3-17).



7. COOLING SYSTEM

SYSTEM FLOW PATTERN 7-2

SERVICE INFORMATION 7-3

TROUBLESHOOTING 7-4

SYSTEM TESTING 7-5

COOLANT REPLACEMENT 7-6

THERMOSTAT 7-8

THERMOSTAT HOUSING 7-9

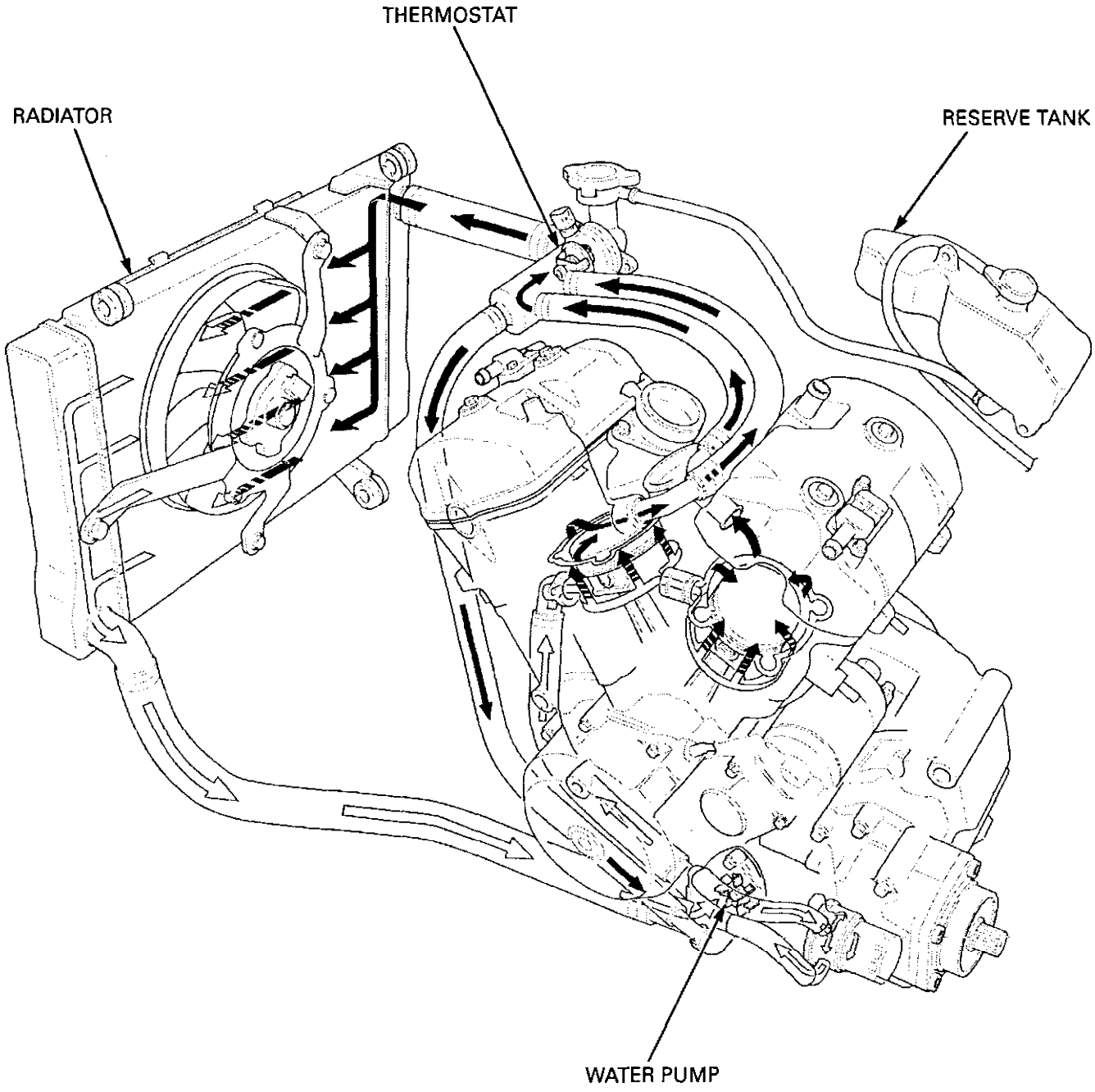
RADIATOR/COOLING FAN 7-10

FAN CONTROL RELAY 7-14

WATER PUMP 7-15

RADIATOR RESERVE TANK 7-18

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠WARNING

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

⚠CAUTION

Radiator coolant is toxic. Keep it away from eyes, mouth and skin.

- If any coolant gets in your eyes, rinse them with water and consult a physician immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

NOTICE

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service 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.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.88 liters (1.99 US qt, 1.65 Imp qt)
	Reserve tank	0.4 liter(0.42 US qt, 0.35 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum at 95 °C (203 °F)
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		1:1 mixture with distilled water

TORQUE VALUES

Water pump cover bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt
Thermostat housing cover bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	

TROUBLESHOOTING

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

Engine temperature too low
- Thermostat stuck open
- Faulty fan motor switch

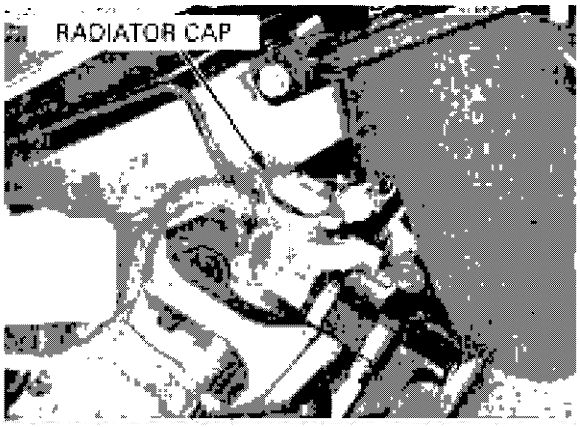
Coolant leaks
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

SYSTEM TESTING

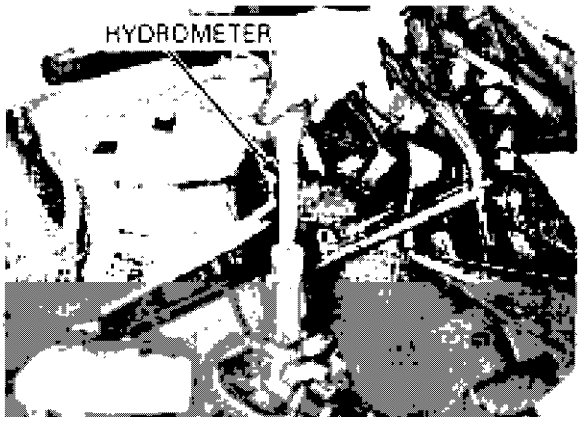
COOLANT (HYDROMETER TEST)

Remove the right middle cowl (page 3-11).

Remove the radiator cap.



Test the coolant specific gravity using a hydrometer.



STANDARD COOLANT CONCENTRATION:

1:1 (*distilled water and the recommended* antifreeze)

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

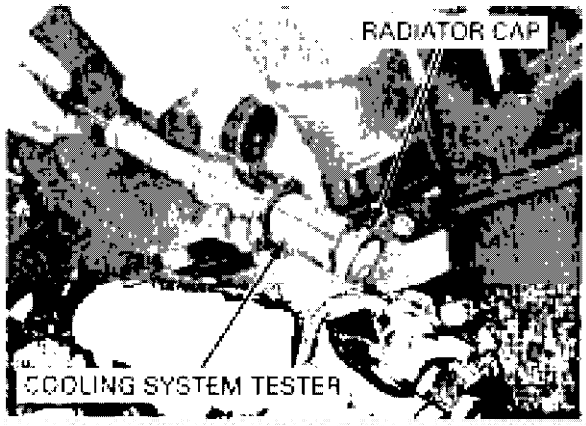
RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (page 7-5).

Wet the sealing surfaces of the cap, then install the cap onto the tester.

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

RADIATOR CAP RELIEF PRESSURE:
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)



Pressurize the radiator, engine and hoses using the tester, and check for leaks.

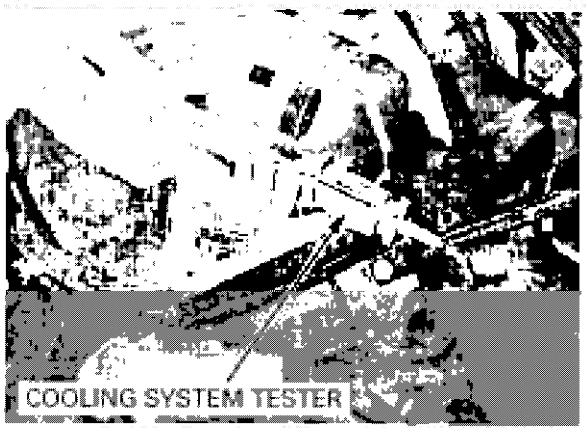
NOTICE

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

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

Remove the tester and install the radiator cap.

Install the right middle cowl (page 3-11).



COOLANT REPLACEMENT

PREPARATION

NOTICE

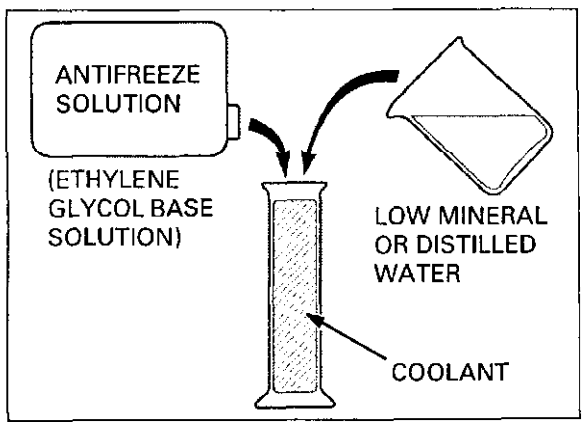
Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

NOTE:
The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.

Mix only distilled, low mineral water with the recommended antifreeze.

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

RECOMMENDED MIXTURE:
1:1 (distilled water and the recommended antifreeze)

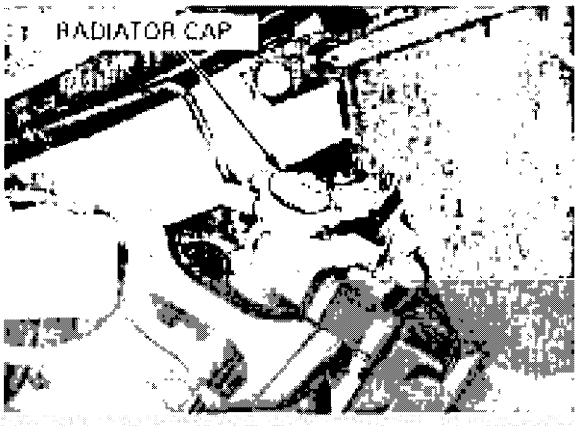


REPLACEMENT/AIR BLEEDING

NOTE:
When filling the system or reserve tank with coolant, or checking the coolant level, hold the motorcycle in an upright position.

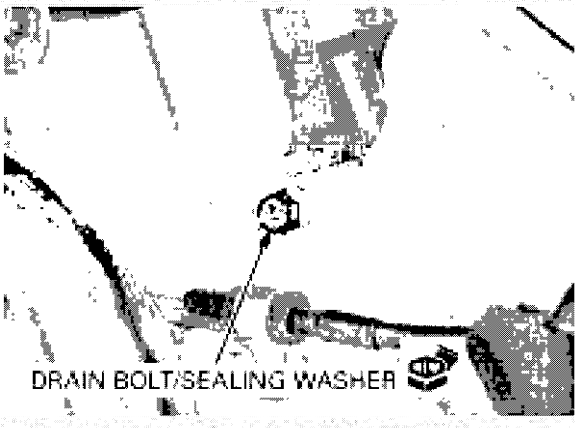
Remove the right middle cowl (page 3-11).

Remove the radiator cap.



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

Reinstall the drain bolt with a new sealing washer.



Remove the left crankcase rear cover (page 3-15).

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

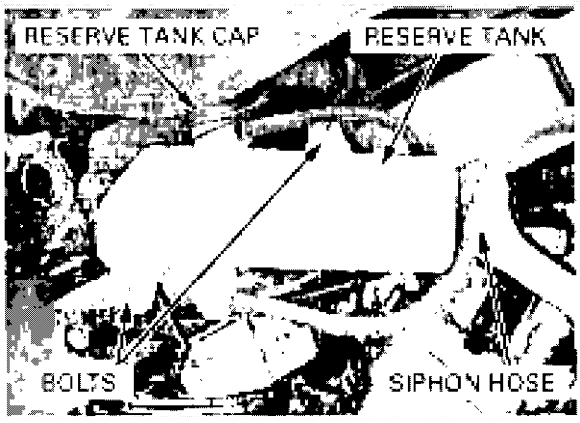
Reinstall the drain bolt with a new sealing washer.

Remove the bolts and drain the reserve coolant.

Empty the coolant and rinse the inside of the reserve tank with water.

Install and tighten the bolts securely.

Fill the reserve tank to the upper level line and install the tank cap.

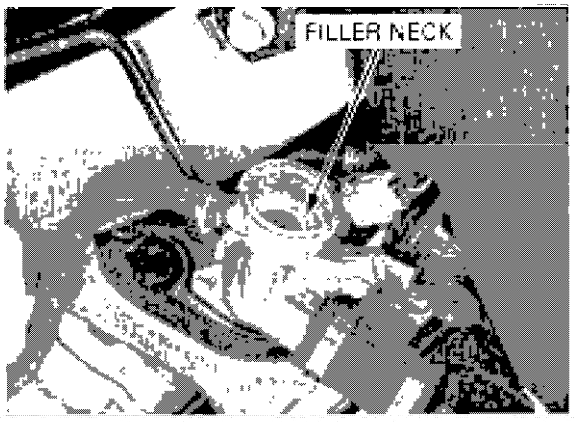


Fill the system with the recommended coolant through the filler opening up to the filler neck.

Bleed air from the system as follows:

1. Shift the transmission into neutral.
   Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
4. Install the radiator cap.

Install the right middle cowl (page 3-11).

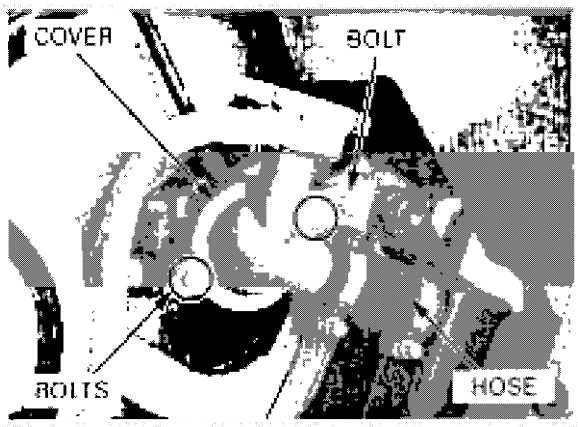


THERMOSTAT

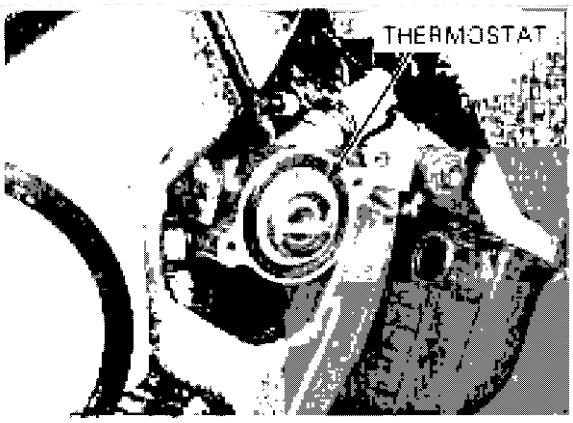
REMOVAL

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

Place a shop towel under the thermostat housing.
Loosen the band screw and disconnect the radiator upper water hose.
Remove the bolts and thermostat cover.

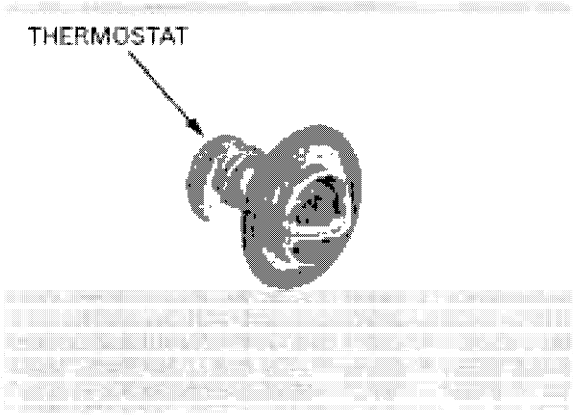


Remove the thermostat.



THERMOSTAT INSPECTION

Visually inspect the thermostat for damage.
Replace the thermostat if the valve stays open at room temperature.



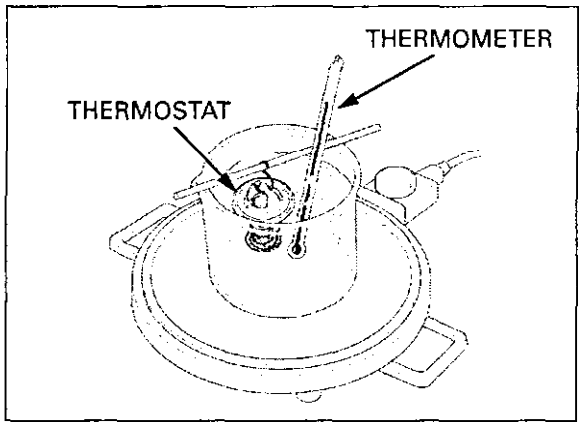
Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element. Do not let the thermostat or thermometer touch the pan, or you will get false readings.

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

THERMOSTAT BEGINS TO OPEN:
80 – 84 °C (176 – 183 °F)

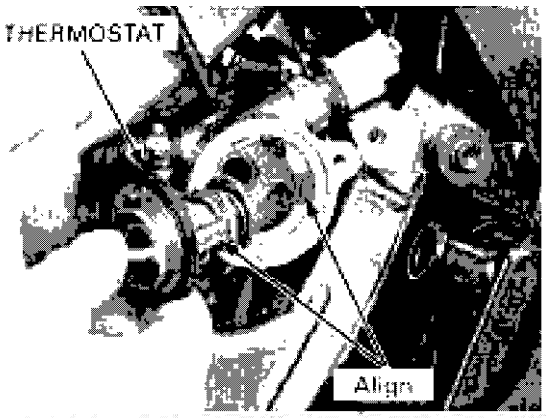
VALVE LIFT:
8 mm (0.3 in) minimum at 95 °C (203 °F)

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



INSTALLATION

Install the thermostat by aligning it with the thermostat housing slot.



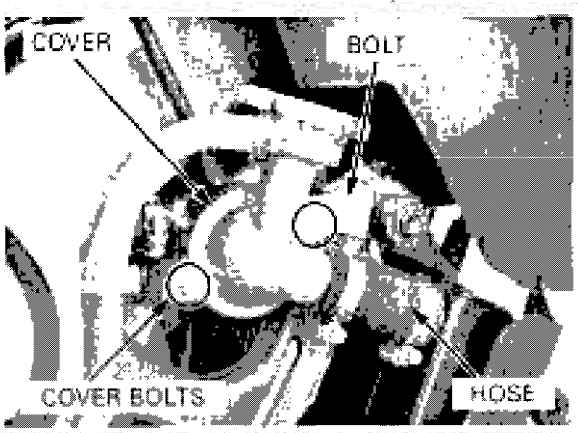
Install and tighten the bolt securely.

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

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the radiator upper water hose and tighten the band screw securely.

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



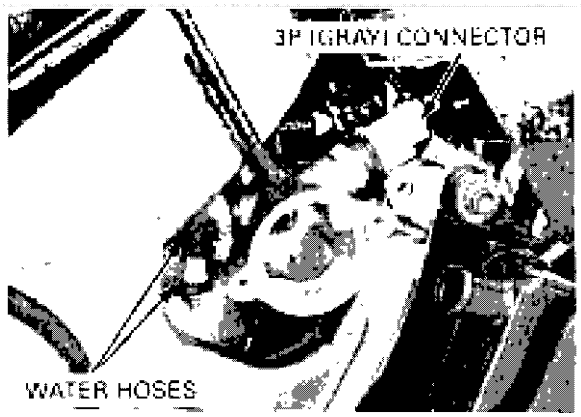
THERMOSTAT HOUSING

REMOVAL/INSTALLATION

Drain the coolant from the system (page 7-7).
Remove the thermostat (page 7-8).

Disconnect the ECT sensor 3P (Gray) connector.

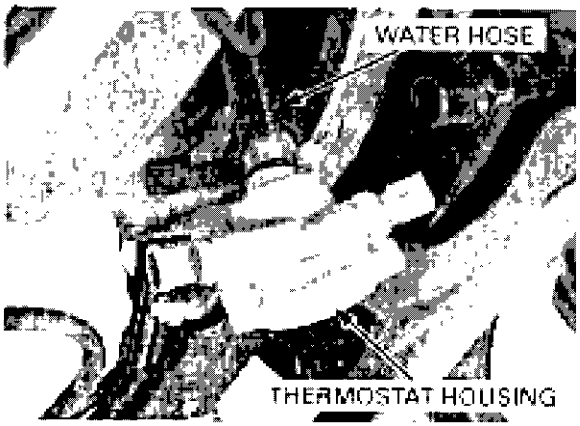
Loosen the band screws and disconnect the water hoses.



Loosen the band screw and disconnect the water hose.
Remove the thermostat housing assembly.

Route the hoses and wires properly (page 1-35).

Install the thermostat housing assembly in the reverse order of removal.



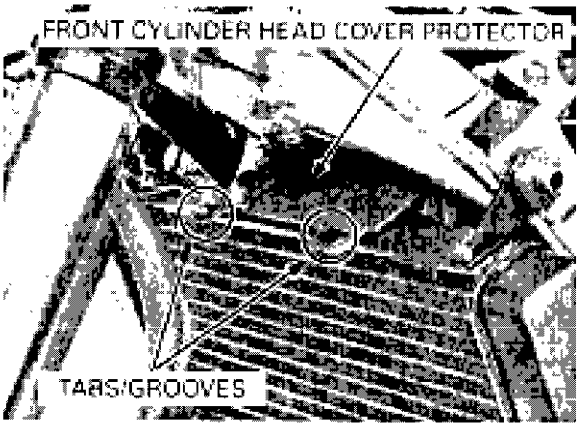
RADIATOR/COOLING FAN

REMOVAL

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

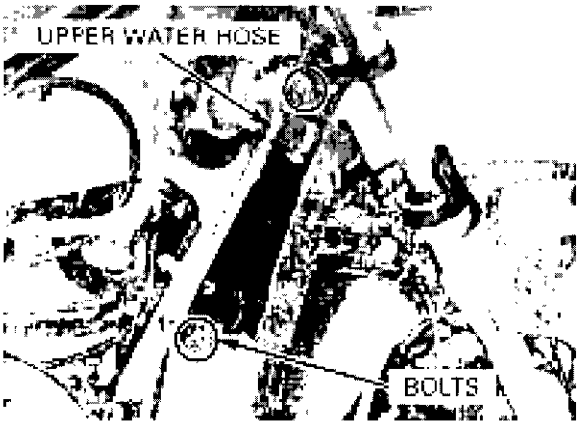
Drain the coolant from the system (page 7-7).
Remove the middle cowl (page 3-11).
Remove the inner lower cowl (page 3-14).
Remove the radiator under cover (page 3-14).

Remove the tabs on the radiator from the grooves on the front cylinder head cover protector.



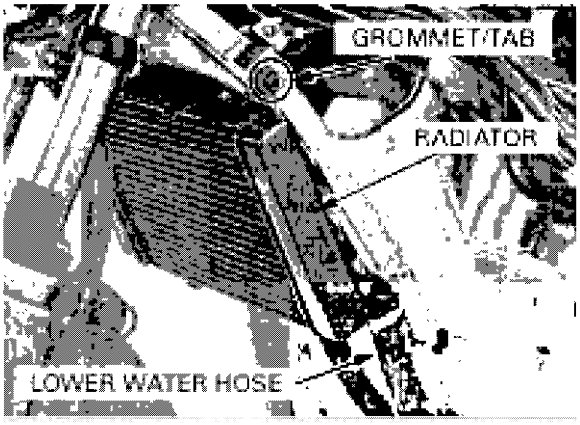
Loosen the band screw and disconnect the radiator upper water hose.

Remove the bolts.

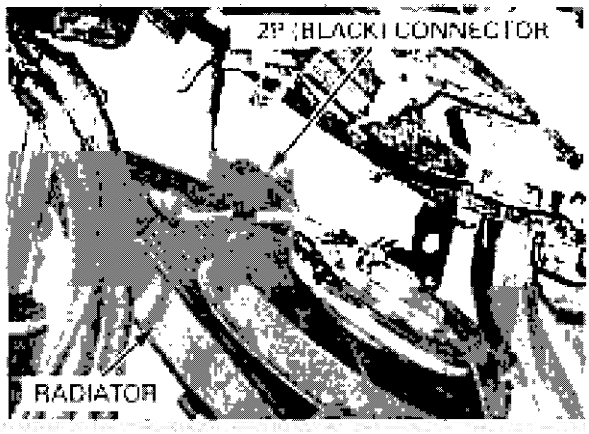


Loosen the band screw and disconnect the radiator lower water hose.

Remove the grommet on the radiator from the tab on the frame.



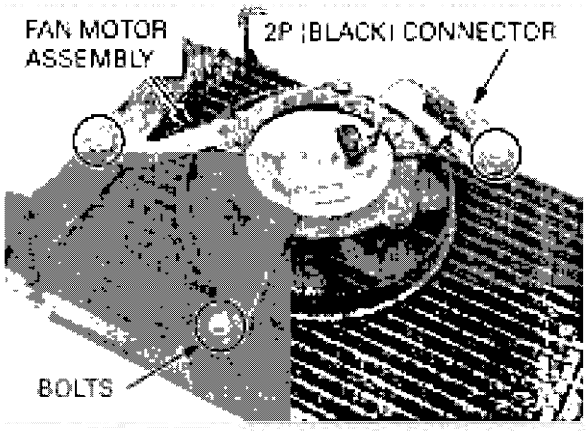
Remove the wire band and disconnect the fan motor 2P (Black) connector.



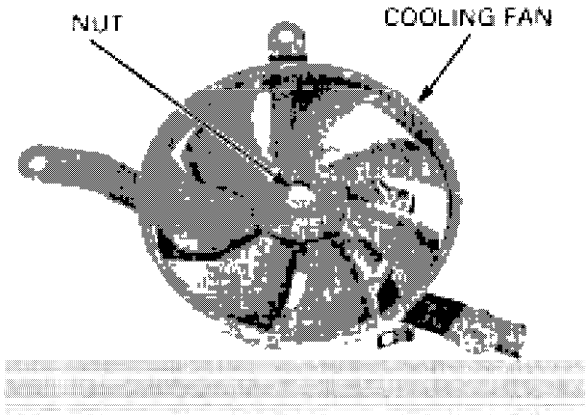
DISASSEMBLY

Remove the fan motor 2P (Black) connector from the shroud.

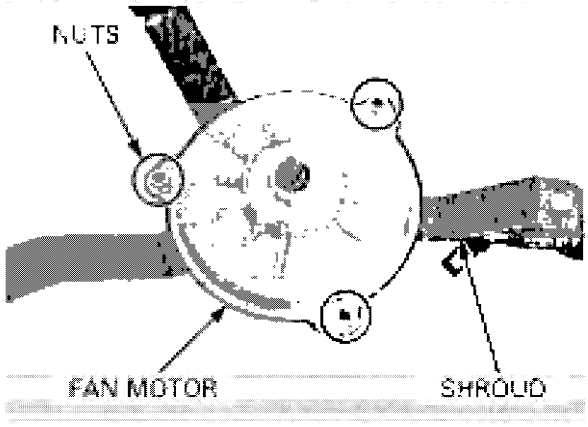
Remove the bolts and fan motor assembly.



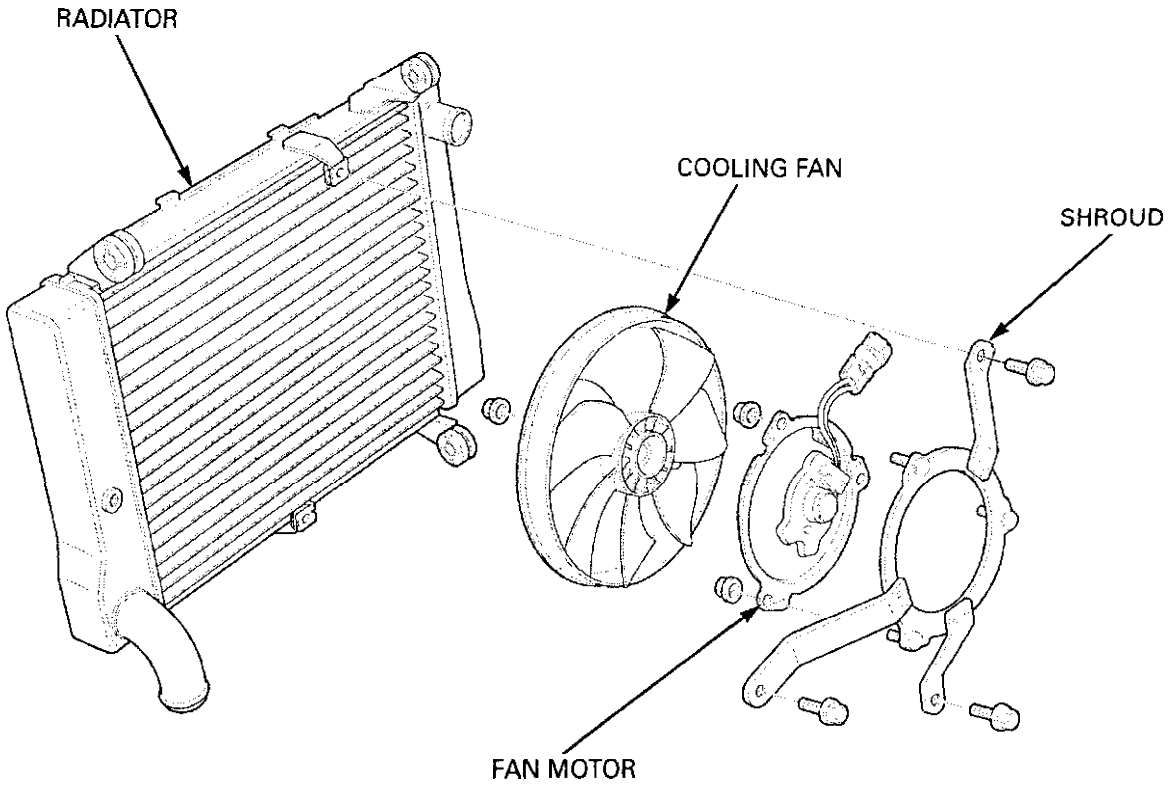
Remove the nut and cooling fan.



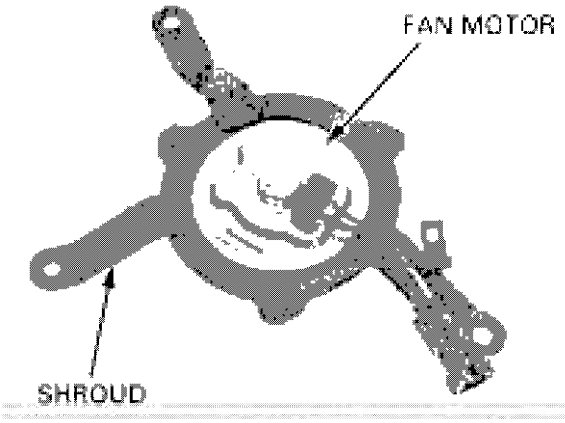
Remove the nuts and fan motor from the shroud.



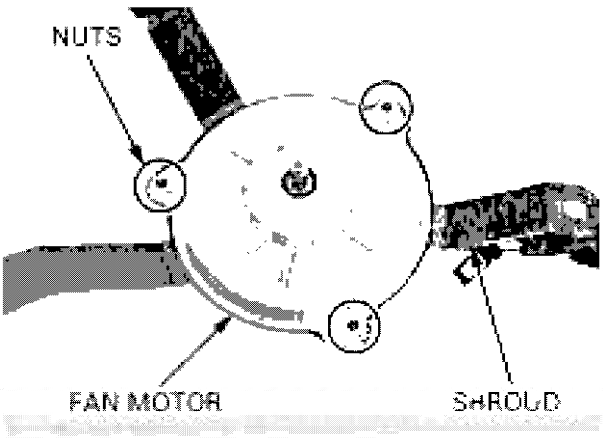
ASSEMBLY



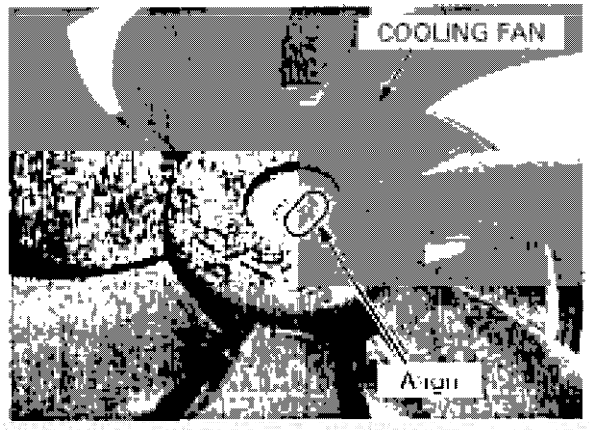
Install the fan motor on the shroud in the direction as shown.



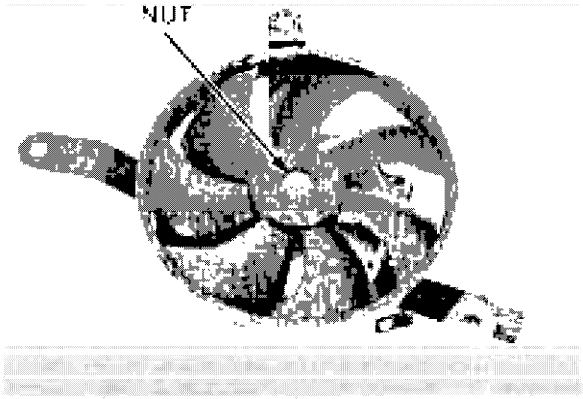
Install and tighten the bolts to the specified torque.



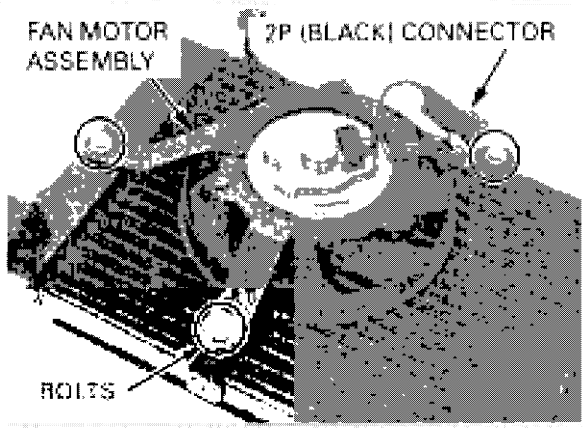
Install the cooling fan onto the motor shaft, aligning the flat surfaces.



Install and tighten the nut securely.



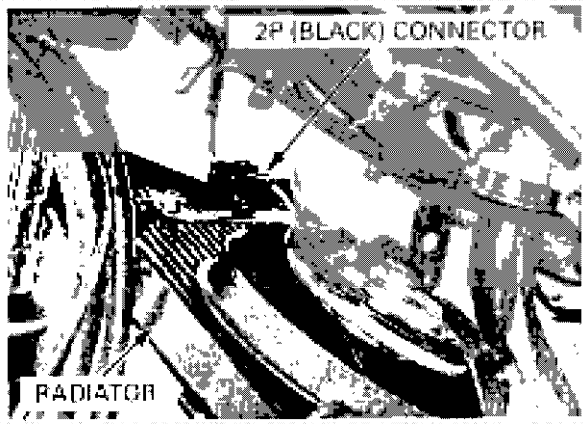
Install the fan motor assembly on the radiator and tighten the bolts to the specified torque.



INSTALLATION

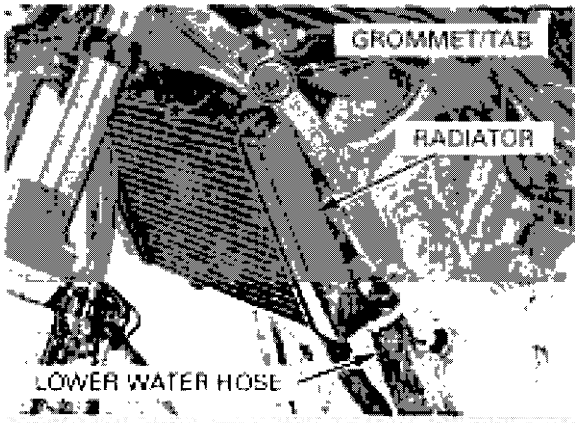
Route the wire properly (page 1-35).

Connect the fan motor 2P (Black) connector.



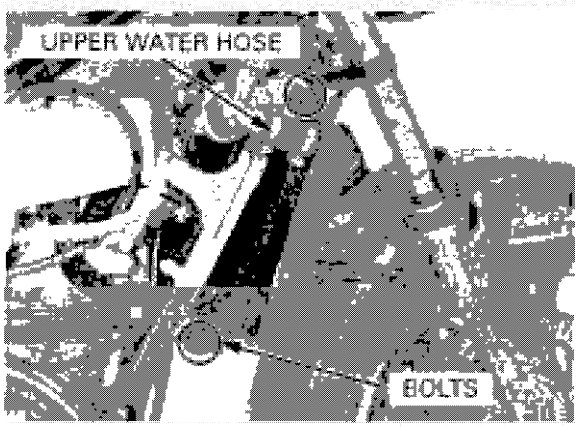
Install the radiator by inserting its grommet into the tab of the frame.

Connect the radiator lower water hose to the radiator.
Tighten the band screw securely.



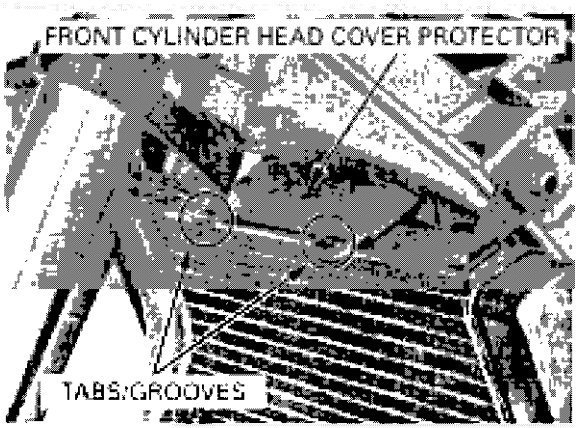
Install and tighten the bolts securely.

Connect the radiator upper water hose to the radiator.
Tighten the band screw securely.



Install the grooves on the front cylinder head cover protector to the tabs on the radiator.

Fill and bleed the cooling system (page 7-7).
Install the middle cowl (page 3-11).
Install the radiator under cover (page 3-14).
Install the inner lower cowl (page 3-14).

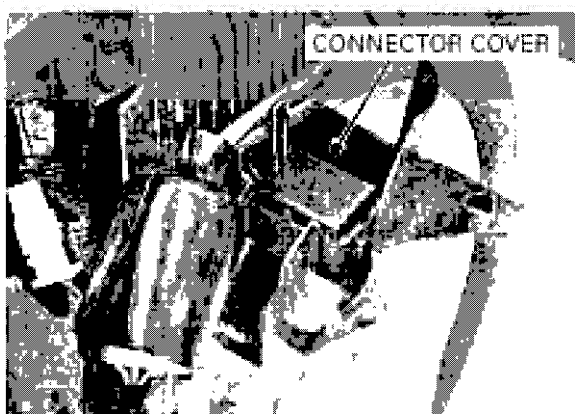


FAN CONTROL RELAY

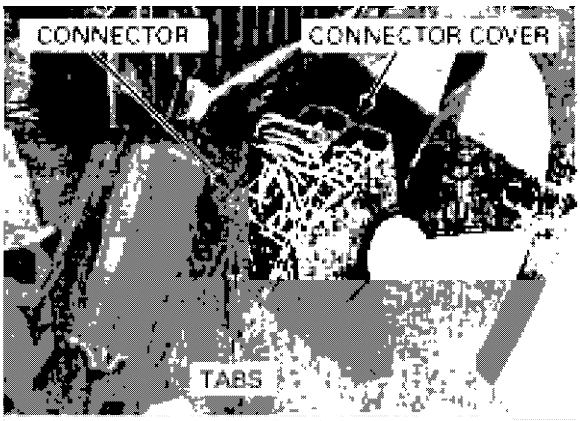
INSPECTION

Remove the saddle bag body (page 3-7).

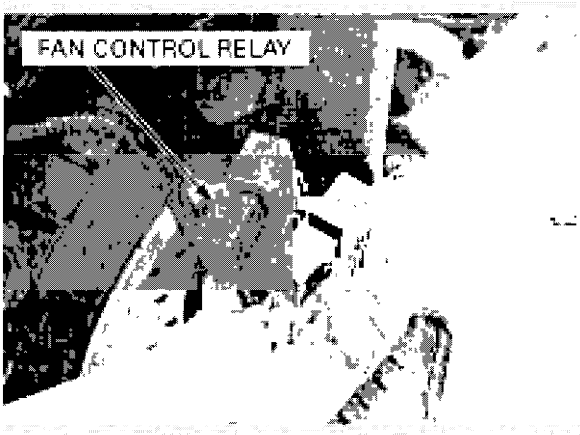
Remove the relay connector cover from the rear fender B.



Release the tabs and remove the relay connector from the cover.



Disconnect the fan control relay from the relay connector.



Connect the ohmmeter to the fan control relay connector terminals.

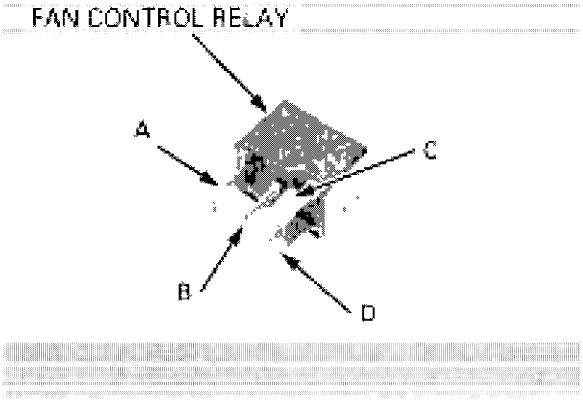
CONNECTION: A – B

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

CONNECTION: C – D

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

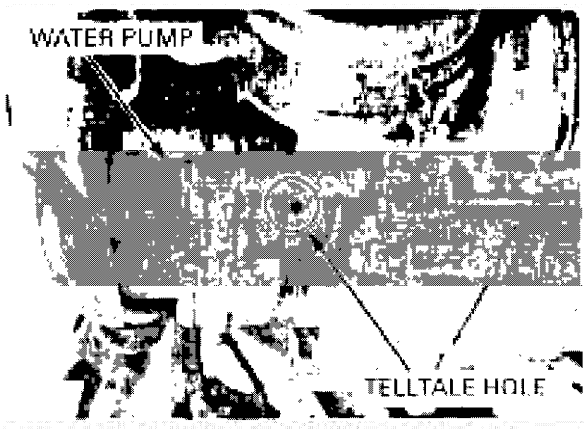
If there is no continuity when the 12V battery is connected, replace the fan control relay.



WATER PUMP

MECHANICAL SEAL INSPECTION

Inspect the telltale hole for signs of coolant leakage. If there is leakage, the water pump mechanical seal is defective and the water pump should be replaced.

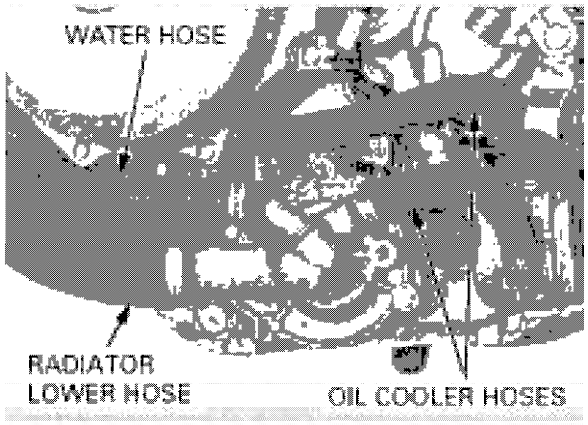


REMOVAL

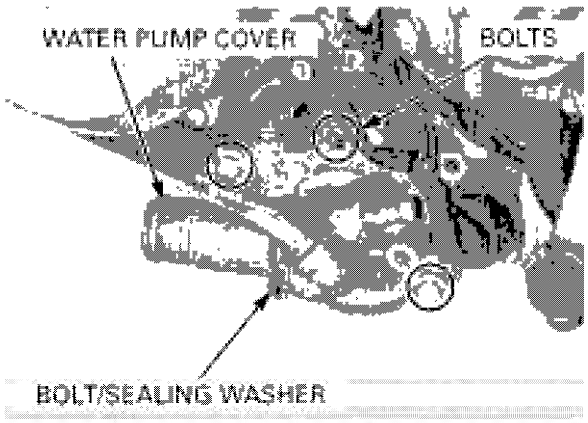
Drain the coolant from the system (page 7-7).

Loosen the band screw and disconnect the following hose:

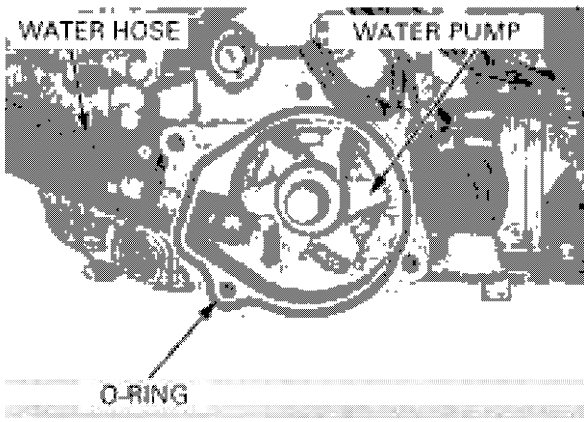
- radiator lower water
- water hose (to thermostat case).
- oil cooler hoses



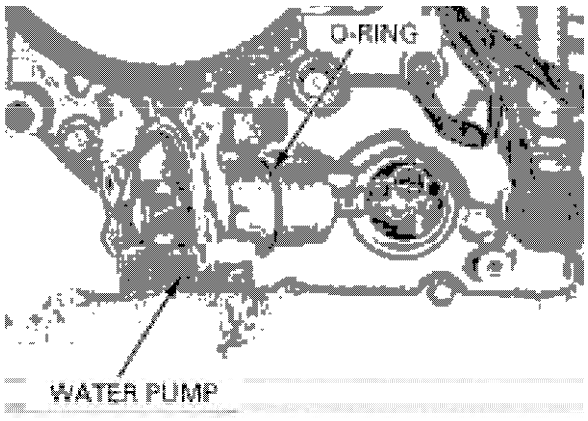
Remove the bolts, sealing washer and water pump cover.



Loosen the band screw and disconnect the water hose (to front cylinder).
Remove the O-ring from the water pump groove.



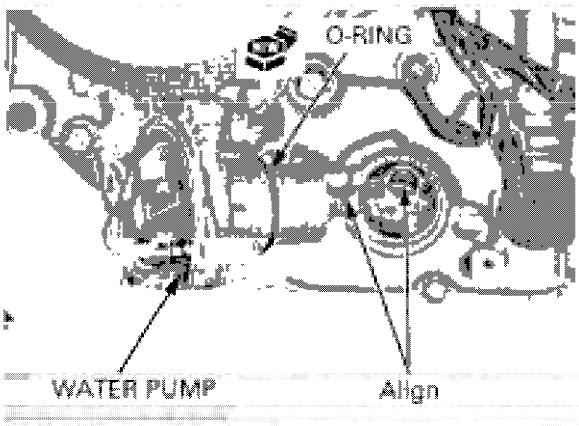
Remove the water pump and O-ring



INSTALLATION

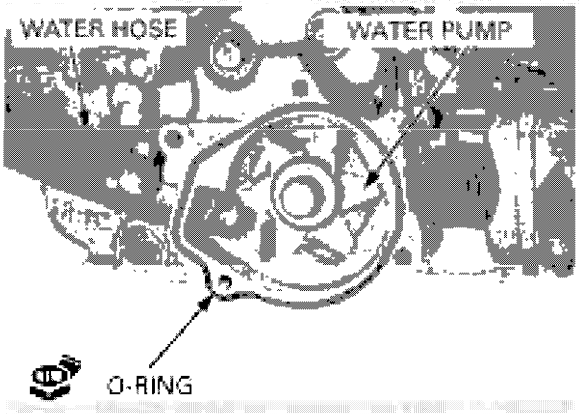
Coat a new O-ring with oil and install it onto the stepped section of the water pump.

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



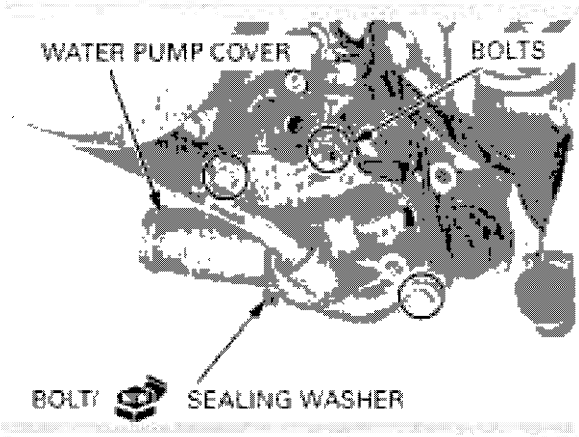
Connect the water hose (to front cylinder).
Tighten the band screw securely.

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



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

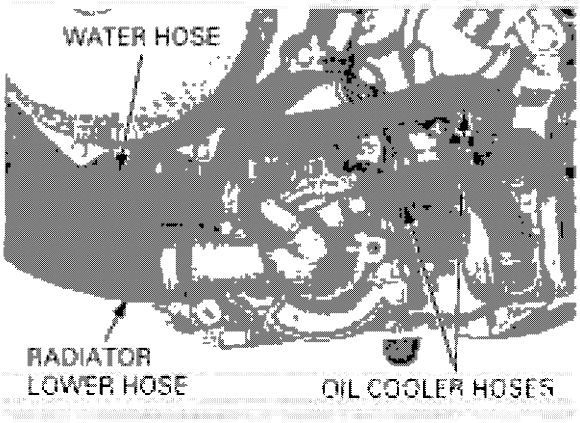
TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



Connect the following hoses and tighten the band screws securely:

- water hose (to thermostat case)
- oil cooler hoses
- radiator lower water

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



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

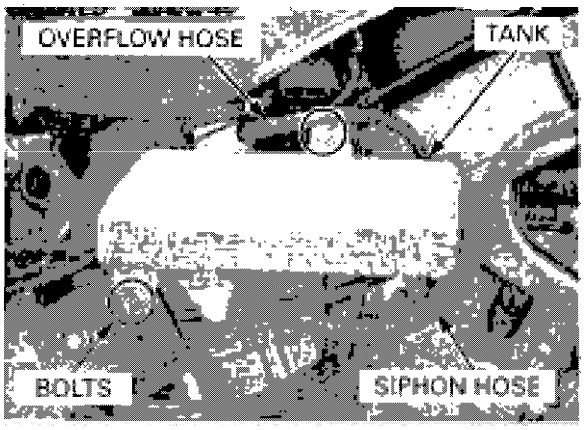
Remove the middle cowl (page 3-11).

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

Remove the bolt and reserve tank.

Installation is in the reverse order of removal.

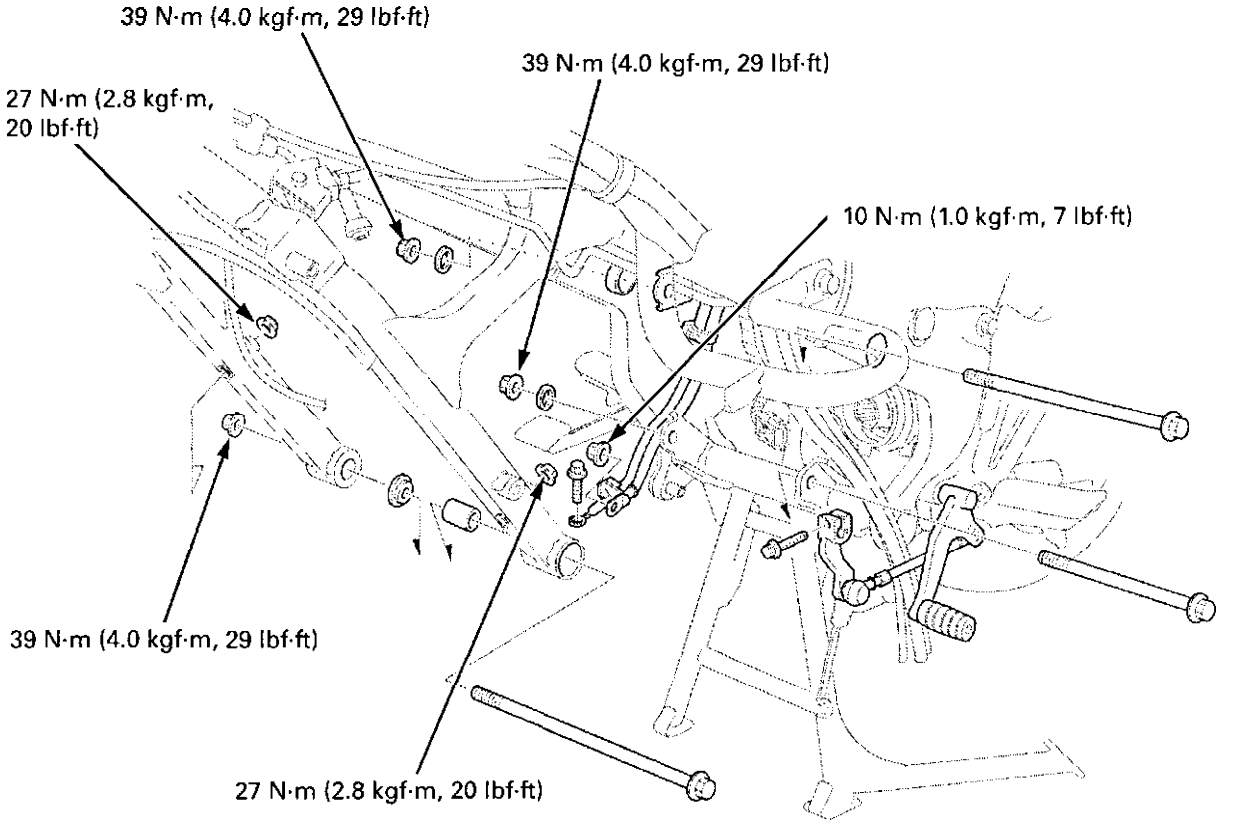
Route the hoses properly (page 1-35).

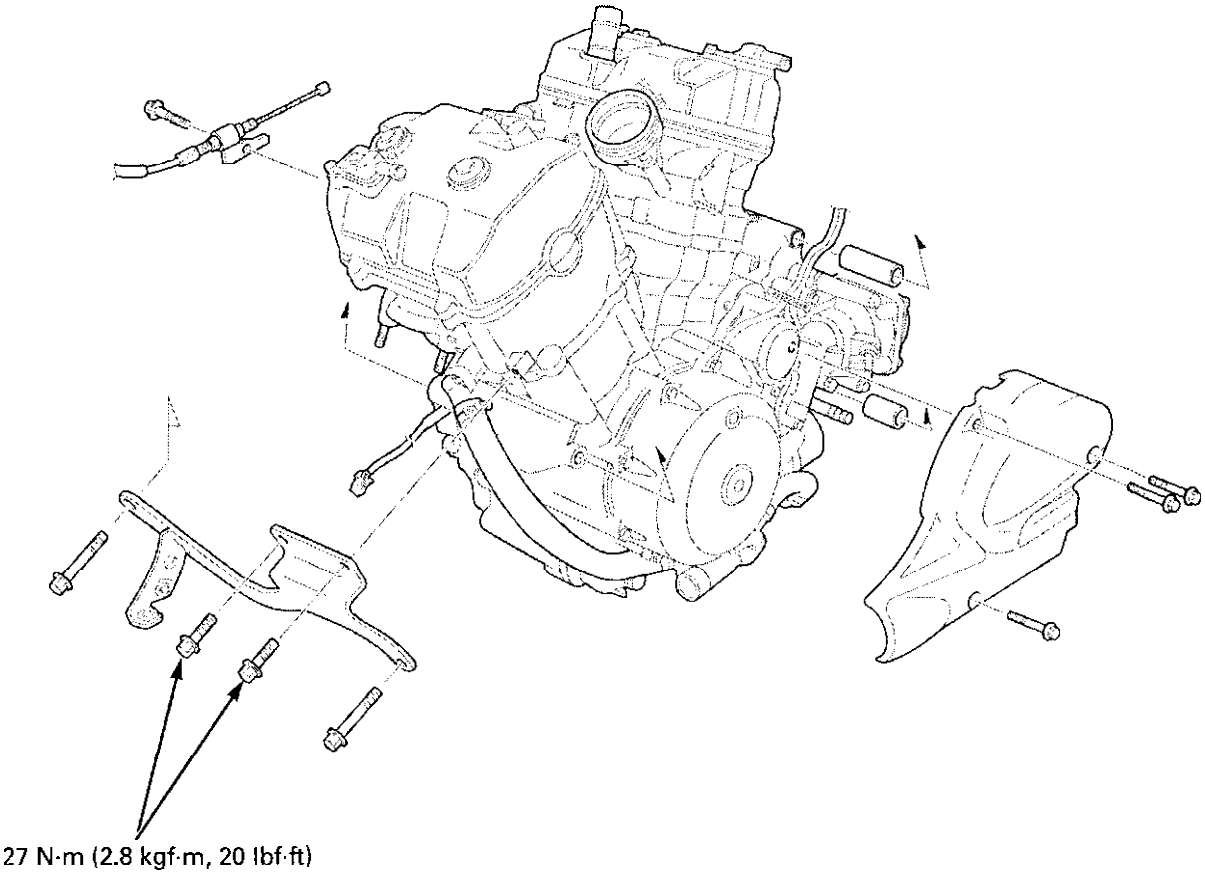


8. ENGINE REMOVAL/INSTALLATION

SYSTEM COMPONENTS 8-2
SERVICE INFORMATION 8-3
ENGINE REMOVAL 8-4
ENGINE INSTALLATION 8-7

SYSTEM COMPONENTS





SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you make a mistake with the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

NOTICE

Do not support the engine using the engine oil filter or it will be damaged.

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for servicing.
  - Cylinder head (page 9-14)
  - Cylinder/piston (page 10-4)
  - Crankshaft (page 13-11)
  - Transmission (Including gearshift drum/shift fork: page 13-19)
  - Output gear case (page 13-27)
  - Oil pump (page 5-6)
- The following components can be serviced with the engine in the frame.
  - Camshaft (page 9-8)
  - Throttle body (page 6-65)
  - Water pump (page 7-15)
  - Clutch/gearshift linkage (page 11-6)
  - Alternator/starter clutch (page 12-4)
  - Electric starter (page 21-6)

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	65.2 kg (144 lbs)
Engine oil capacity at disassembly	3.2 liters (3.38 US qt, 2.82 Imp qt)
Coolant capacity (radiator and engine)	1.88 liters (1.99 US qt, 1.65 Imp qt)

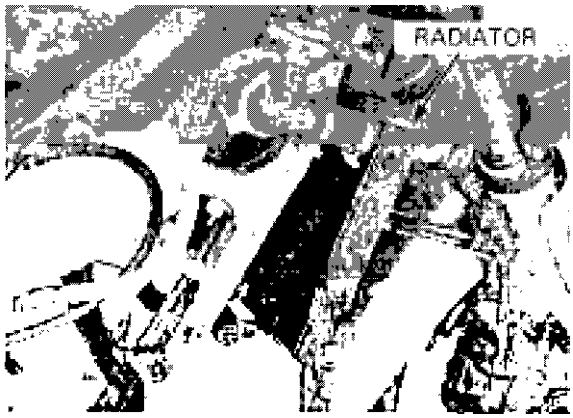
TORQUE VALUES

Engine hanger bolt (Front low; A)	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Engine hanger cross plate bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Engine hanger cross plate nut	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Engine hanger bolt (Rear up; C)	39 N·m (4.0 kgf·m, 29 lbf·ft)	Apply engine oil to the threads and flange surface
Engine hanger bolt (Rear low; D)	39 N·m (4.0 kgf·m, 29 lbf·ft)	Apply engine oil to the threads and flange surface
Starter motor cable terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	

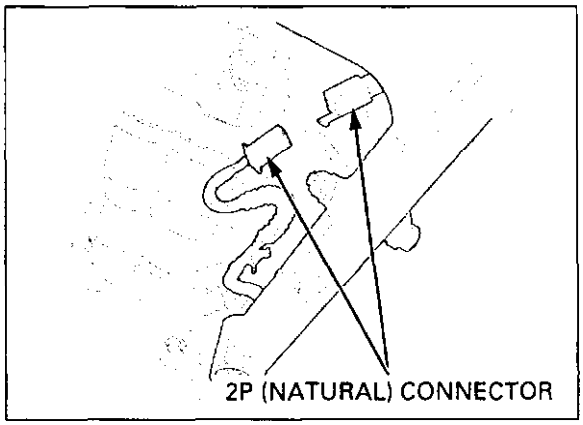
ENGINE REMOVAL

Drain the engine oil (page 4-12).
Drain the coolant from the cooling system (page 7-7).

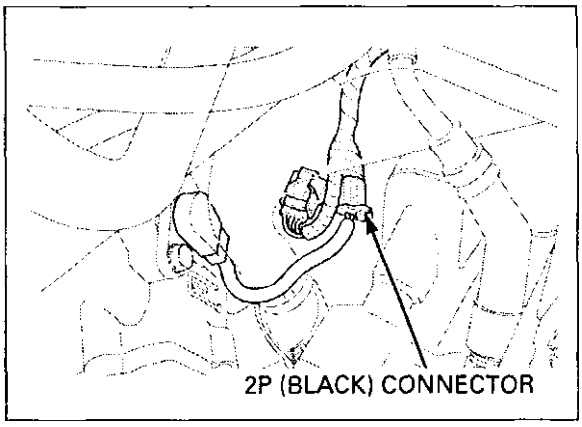
Remove the following:
- Both side covers (page 3-5)
- Fuel tank (page 6-62)
- Spark plug caps (page 4-7)
- Left crankcase rear cover (page 3-15)
- Exhaust system (page 3-17)
- Radiator (page 7-10)



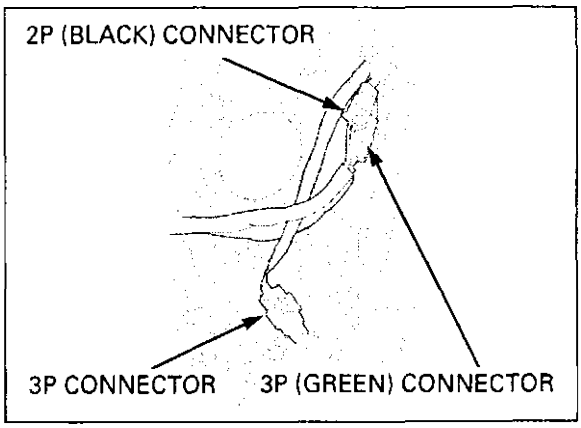
Disconnect the CKP sensor 2P (Natural) connector.



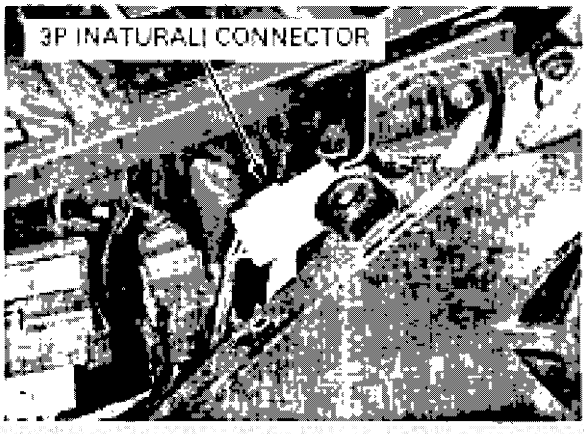
Disconnect the CMP sensor 2P (Black) connector.



Disconnect the following connectors:
- Neutral/oil pressure switch 2P (Black)
- VS sensor 3P
- Side stand 3P (Green)



Disconnect the alternator 3P (Natural) connector.

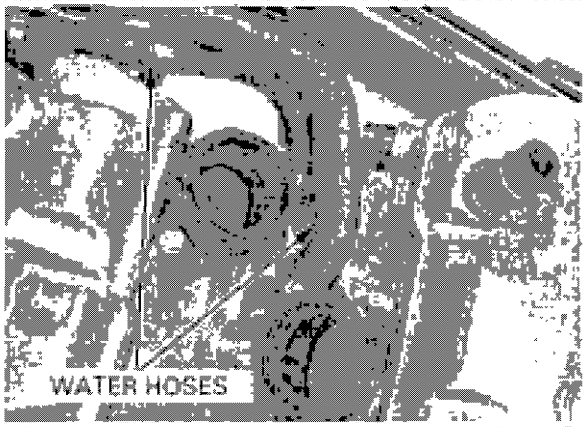


Remove the throttle body (page 6-65).

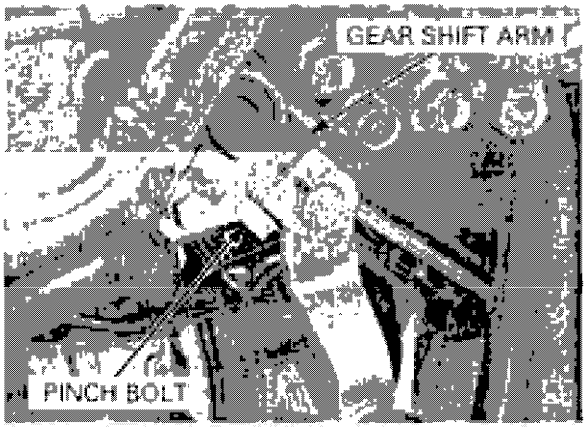
NOTE:

Wrap the intake manifold port with a shop towel or cover them with a piece of tape to prevent any foreign material from dropping into the engine.

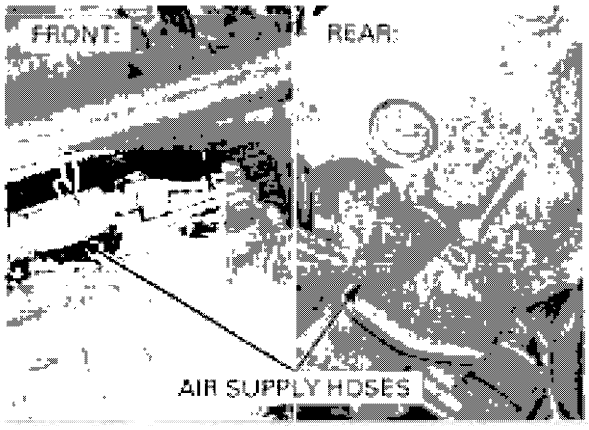
Loosen the band screws and disconnect the water hoses (to thermostat case).



Remove the pinch bolt and gear shift arm.



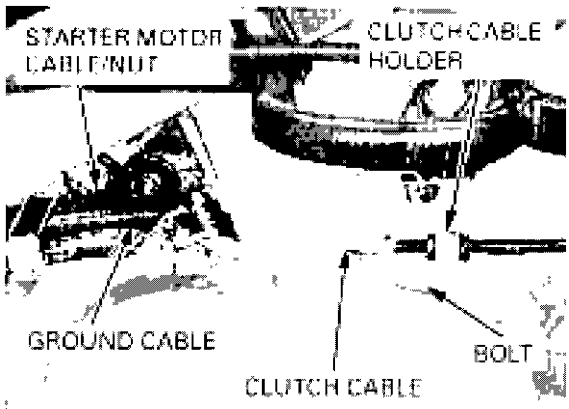
Disconnect the air supply hoses from the PAIR check valve covers.



Remove the clutch cable holder bolt and disconnect the clutch cable end from the clutch lifter arm.

Remove the rubber cap and starter motor terminal nut.
Disconnect the starter motor cable.

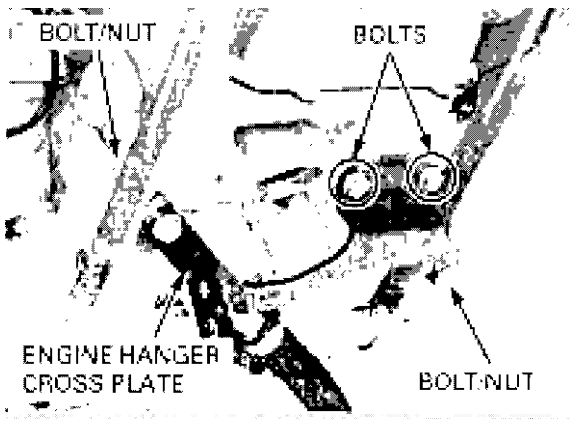
Remove the bolt and disconnect the ground cable.



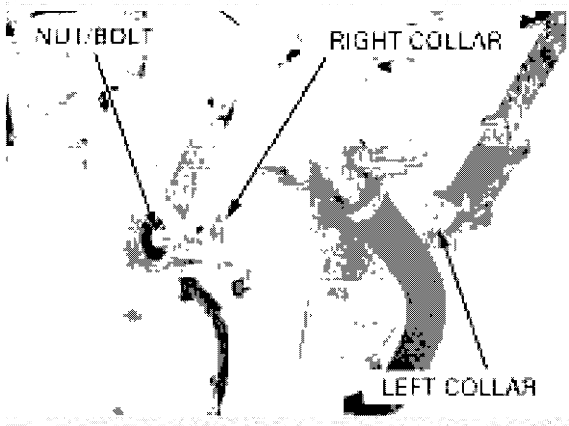
The jack height must be continually adjusted to relieve stress for bolt removal.

Place a floor jack or other adjustable support under the engine.

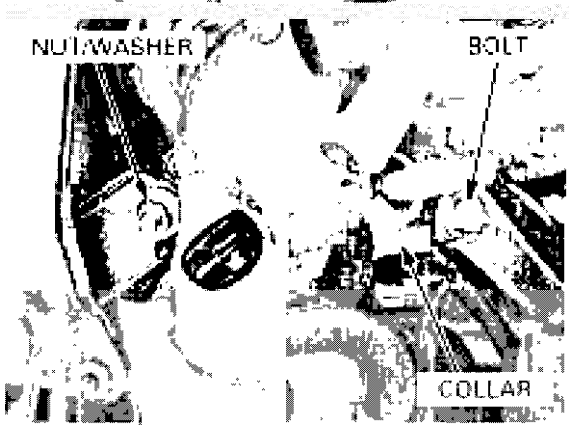
Remove the bolts, nut and engine hanger cross plate.



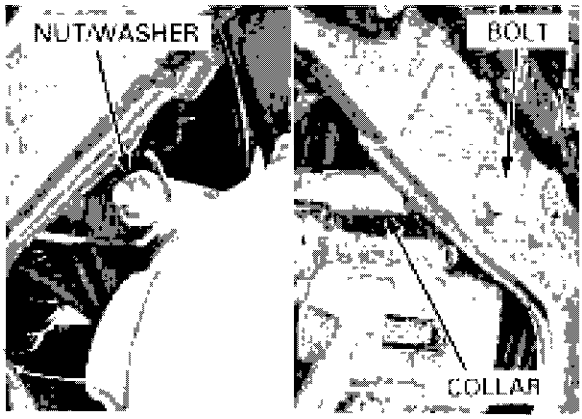
Remove the engine hanger nut, bolt and collars (front, low; A).



Remove the rear engine hanger nut, washer, bolt and collar (rear, low; D).



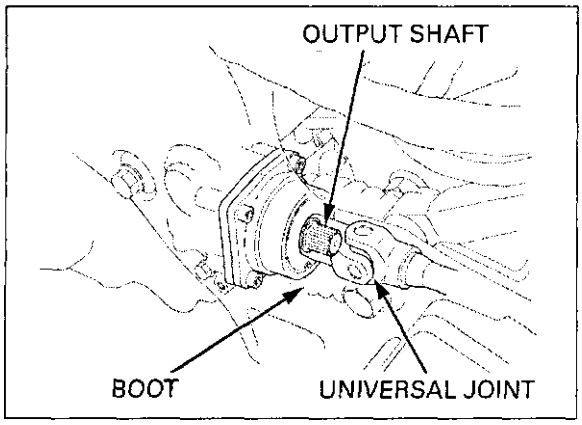
Remove the rear engine hanger nut, washer, bolt and collar (rear, up; C).



Release the joint boot from the output gear case.

During engine removal, hold the engine securely and be careful not to damage the frame and engine.

Move the engine forward and release the output shaft from the universal joint in the swingarm. Carefully maneuver the engine and remove it out of the frame to the right.



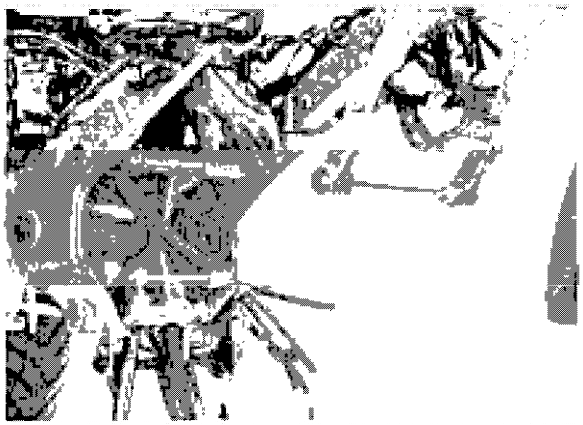
ENGINE INSTALLATION

NOTE:

- All the engine mounting bolts and nuts loosely install, then tighten the bolts and nuts to the specified torque in the specified sequence.
- Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence. If you make a mistake with the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.
- Route the wires, hoses and cables properly (page 1-35).

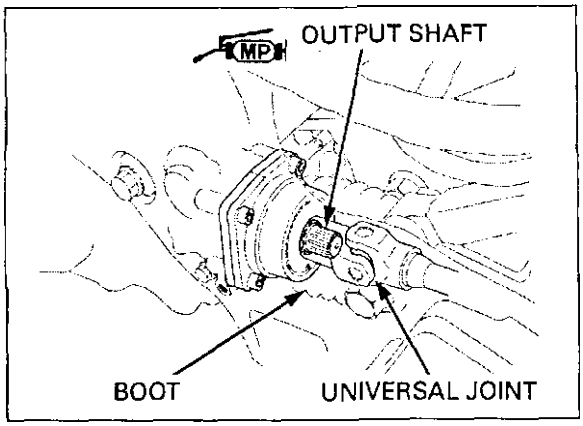
During engine installation, hold the engine securely and be careful not to damage the frame and engine.

Using a floor jack or other adjustable support, carefully place the engine into the frame and maneuver it into place.



Carefully align the mounting points.

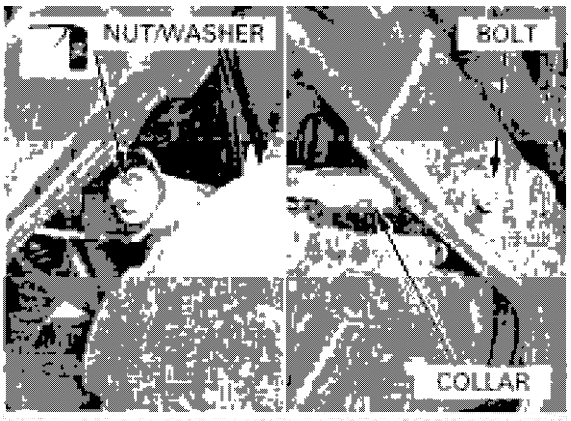
Apply 1 g (0.04 oz) of molybdenum disulfide paste to the output shaft splines. Engage the output shaft with the universal joint.



Temporarily install the all engine mounting fasteners and collar.

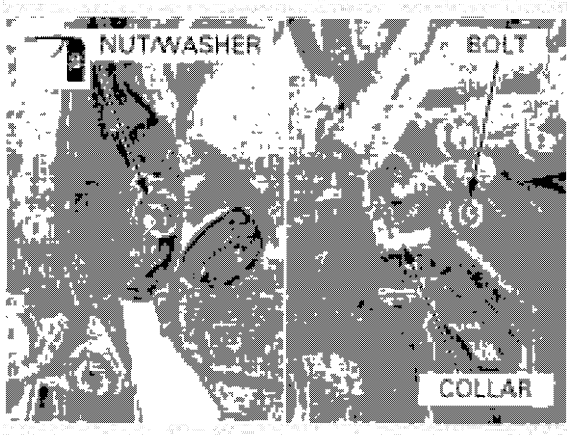
Apply engine oil to the nut threads and flange surfaces.
Tighten the engine hanger nut (rear, up; C) to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



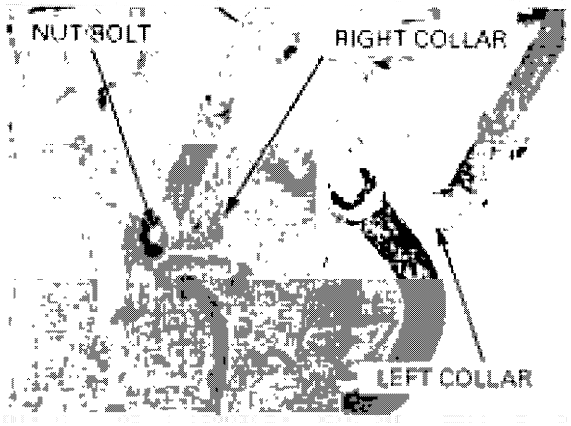
Apply engine oil to the nut threads and flange surfaces.
Tighten the engine hanger nut (rear, low; D) to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



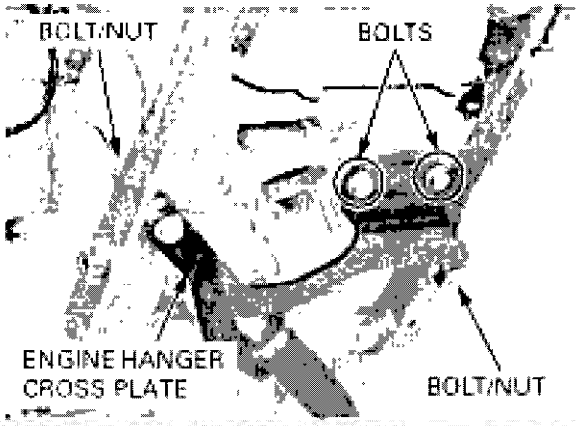
Tighten the engine hanger nut (front, low; A) to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Tighten the front engine hanger plate bolts and nuts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

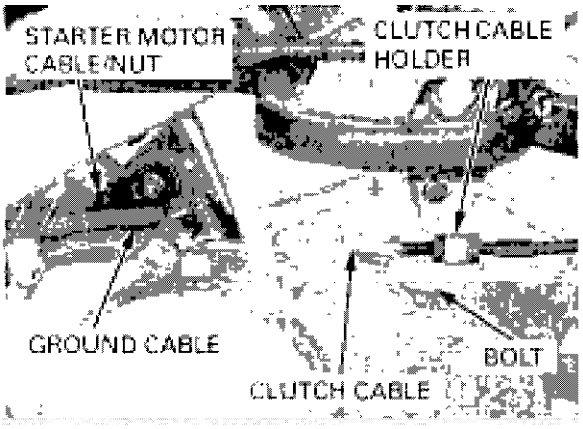


Connect the starter motor cable and tighten the terminal nut to the specified torque.

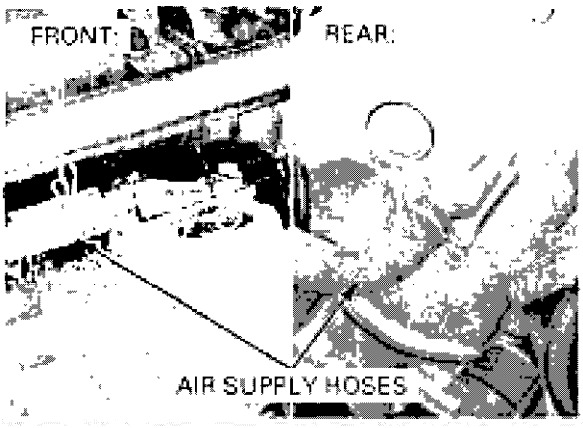
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the ground cable and tighten the bolt securely.

Connect the clutch cable end to the clutch lifter arm.
Install the clutch cable holder and bolt.
Tighten the bolt securely.

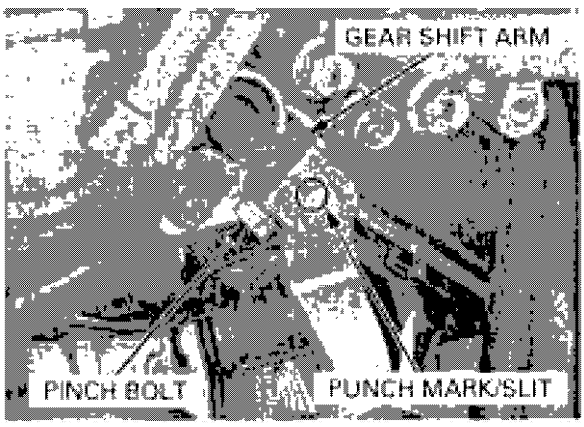


Connect the air supply hoses to the PAIR check valve covers.

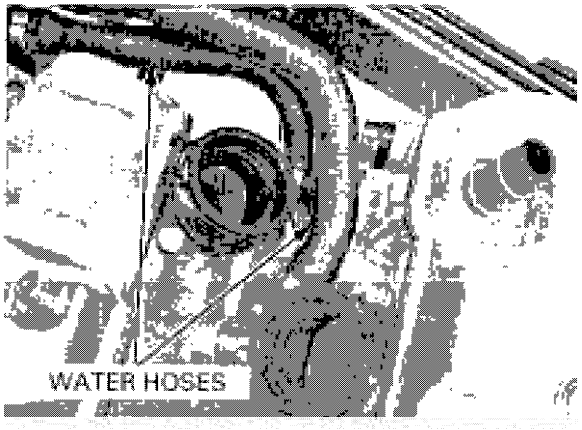


Install the gearshift arm to the gearshift spindle, aligning with the punch mark and slit.

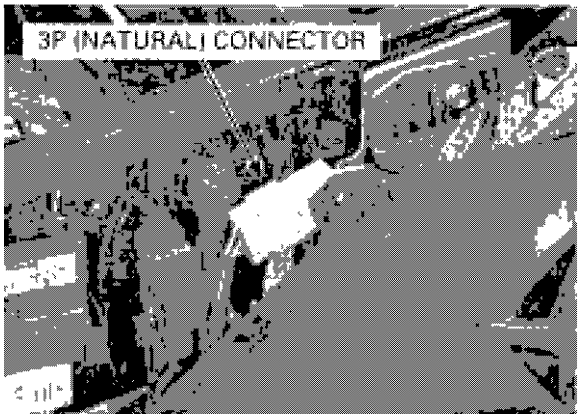
Tighten the gearshift arm pinch bolt securely.



Connect the water hoses (to thermostat case) and tighten the band screws securely.

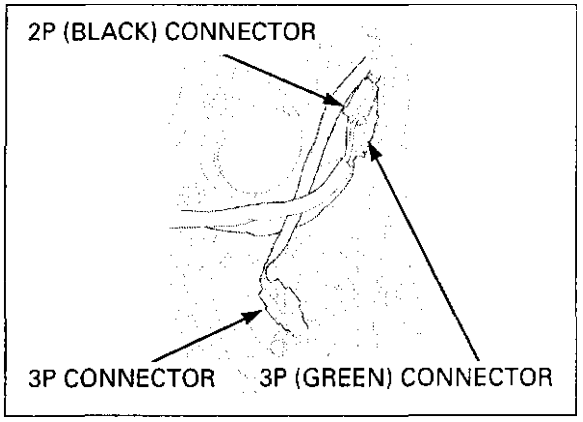


Connect the alternator 3P (Natural) connector.

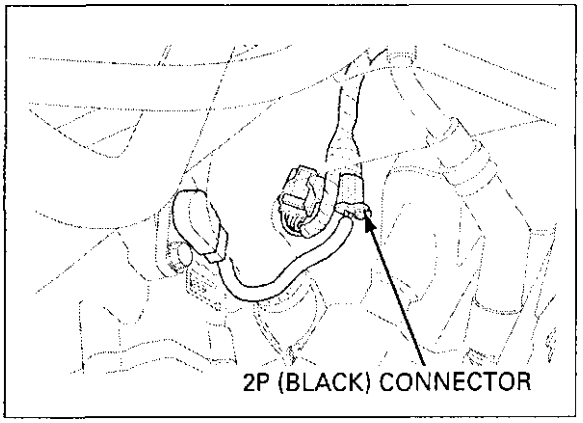


Connect the following connectors:

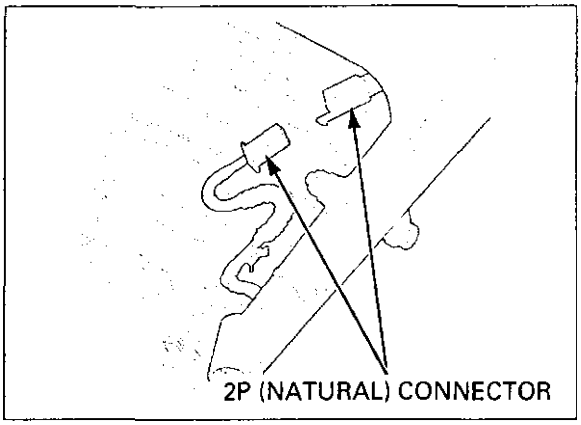
- Neutral/oil pressure switch 2P (Black)
- VS sensor 3P
- Side stand 3P (Green)



Connect the CMP sensor 2P (Black) connector.



Connect the CKP sensor 2P (Natural) connector.



Install the following:

- Radiator (page 7-13)
- Throttle body (page 6-65)
- Exhaust system (page 3-18)
- Left crankcase rear cover (page 3-15)
- Spark plug cap (page 4-7)
- Fuel tank (page 6-62)
- Both side covers (page 3-5)

Fill the crankcase with engine oil (page 4-12).
Fill and bleed the cooling system (page 7-7).

Check the engine oil level (page 4-11).

9. CYLINDER HEAD/VALVE

SYSTEM COMPONENTS 9-2

SERVICE INFORMATION 9-3

TROUBLESHOOTING 9-5

CYLINDER COMPRESSION 9-6

CYLINDER HEAD COVER REMOVAL 9-6

CAMSHAFT REMOVAL 9-8

CYLINDER HEAD REMOVAL 9-14

CYLINDER HEAD DISASSEMBLY 9-16

VALVE GUIDE REPLACEMENT 9-19

VALVE SEAT INSPECTION/ REFACING 9-20

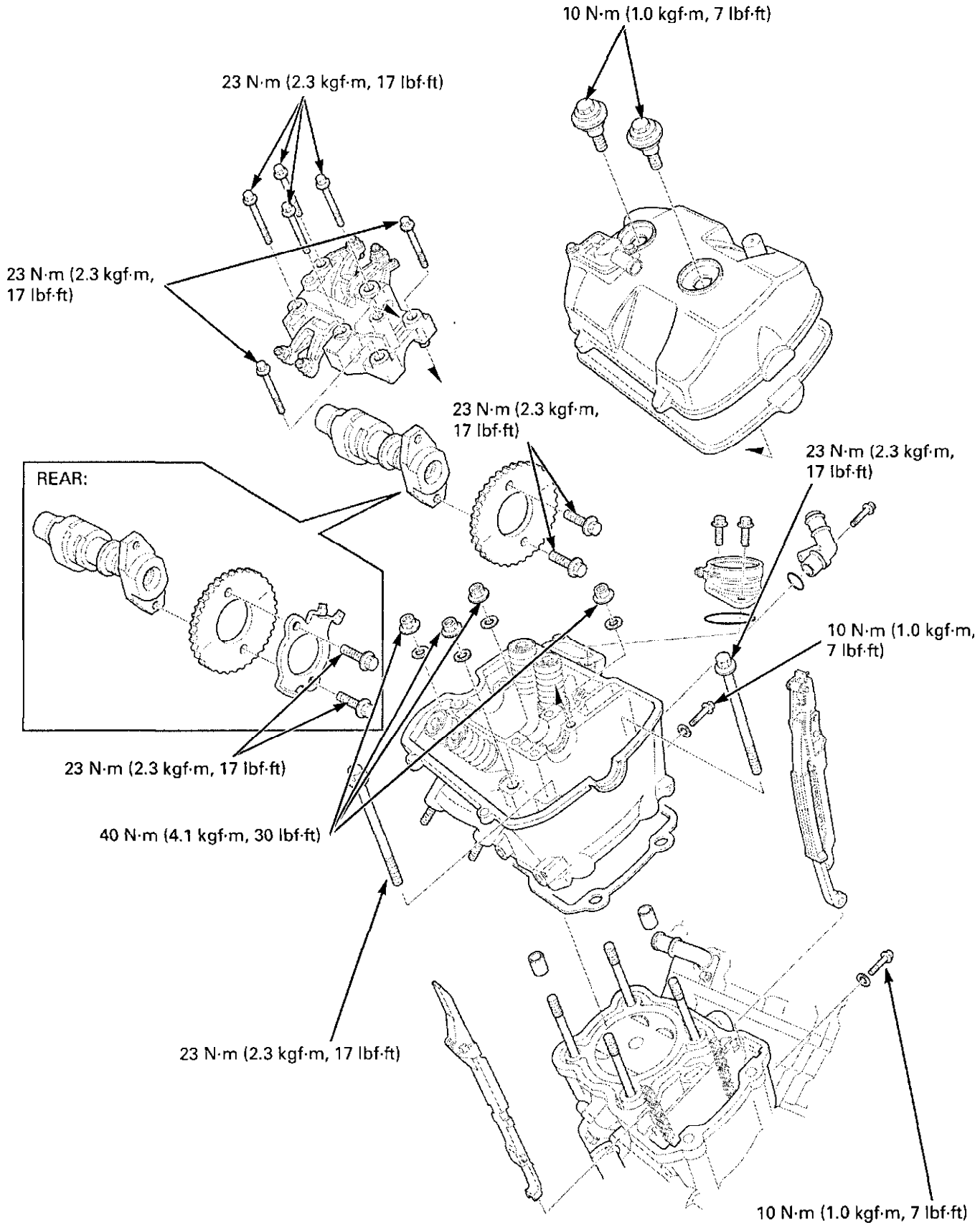
CYLINDER HEAD ASSEMBLY 9-24

CYLINDER HEAD INSTALLATION 9-26

CAMSHAFT INSTALLATION 9-29

CYLINDER HEAD COVER INSTALLATION 9-33

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- This section covers service of the rocker arm, camshaft, cylinder head and valve.
- The rocker arm, camshaft and front cylinder head services can be done with the engine installed in the frame. The rear cylinder head service requires engine removal.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head and camshaft holder. Clean the oil passages before assembling the cylinder head and cover.

SPECIFICATIONS

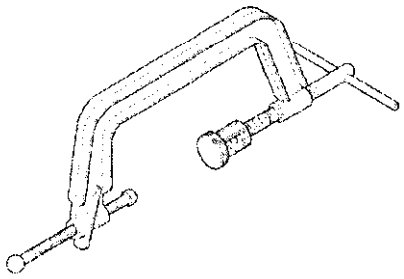
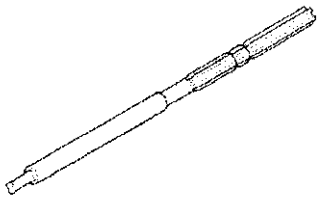
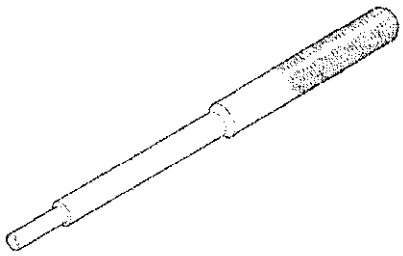
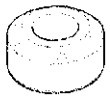
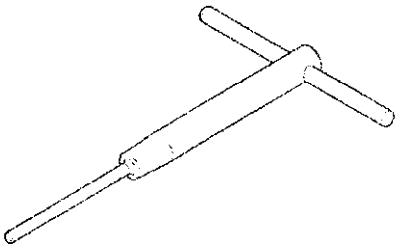
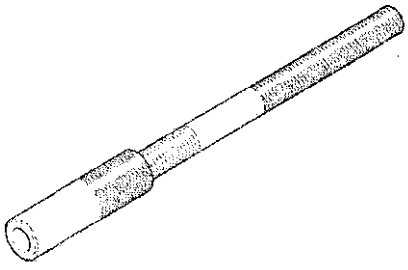
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 min^{-1} (rpm)			1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm^2, 199 ± 14 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Camshaft	Cam lobe height	IN	40.609 – 40.769 (1.5988 – 1.6051)	40.58 (1.598)
		EX	40.695 – 40.855 (1.6022 – 1.6085)	40.67 (1.601)
	Runout		–	0.05 (0.002)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN	11.983 – 11.994 (0.4718 – 0.4722)	11.92 (0.469)
		EX	11.983 – 11.994 (0.4718 – 0.4722)	11.92 (0.469)
	Rocker arm I.D.	IN/EX	12.006 – 12.024 (0.4726 – 0.4734)	12.05 (0.474)
	Rocker arm-to-shaft clearance		0.012 – 0.041 (0.0008 – 0.0016)	0.014 (0.006)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.460 (0.2150)
		EX	5.460 – 5.475 (0.2150 – 0.2156)	5.455 (0.2148)
	Valve guide I.D.	IN/EX	5.500 – 5.512 (0.2165 – 0.2170)	5.54 (0.218)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX	0.025 – 0.052 (0.0009 – 0.0020)	0.09 (0.004)
	Valve guide projection above cylinder head	IN	12.5 – 12.7 (0.49 – 0.50)	–
		EX	16.7 – 16.9 (0.66 – 0.67)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring	Free length	IN/EX	44.91 (1.768)	43.9 (1.73)
Cylinder head warpage			–	0.10 (0.004)

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply engine oil to the threads and flange surface
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply engine oil to the threads and flange surface
Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and flange surface
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Cylinder head bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and seating surface
Cylinder head nut	40 N·m (4.1 kgf·m, 30 lbf·ft)	Apply engine oil to the threads and seating surface
Cam sprocket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply locking agent
Cam chain tensioner bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and seating surface
Reed valve cover bolt	5.2 N·m (0.5 kgf·m, 3.7 lbf·ft)	CT bolt
Cylinder head sealing bolt	44 N·m (4.5 kgf·m, 32 lbf·ft)	Apply locking agent

TOOLS

Valve spring compressor 07757-0010000 	Valve guide reamer, 5.510 mm 07984-2000001 	Valve guide driver, 5.5 mm 07742-0010100 
Valve seat cutter, 27.5 mm (45° IN) 07780-0010200  or equivalent commercially available	Valve seat cutter, 33 mm (45° EX) 07780-0010800 or equivalent commercially available	Flat cutter, 33 mm (32° IN) 07780-0012900 or equivalent commercially available
Flat cutter, 27 mm (32° EX) 07780-0013300 or equivalent commercially available	Interior cutter, 30 mm (60° IN) 07780-0014000 or equivalent commercially available	Interior cutter, 26 mm (60° EX) 07780-0014500 or equivalent commercially available
Cutter holder, 5.5 mm 07781-0010101  or equivalent commercially available	Valve guide driver 07743-0020000 	

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.

Compression too low, hard starting or poor performance at low speed

- Valves
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem (page 10-3)

Compression too high

- Excessive carbon build-up on piston head or combustion chamber

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 10-3)

Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn or damaged rocker arm and/or shaft
- Worn rocker arm follower or valve stem end
- Worn cam sprocket teeth
- Worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 10-3)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION

NOTE:
If the engine must be running to do some work, make sure the area is well-ventilated, Never run the engine in an enclosed area.

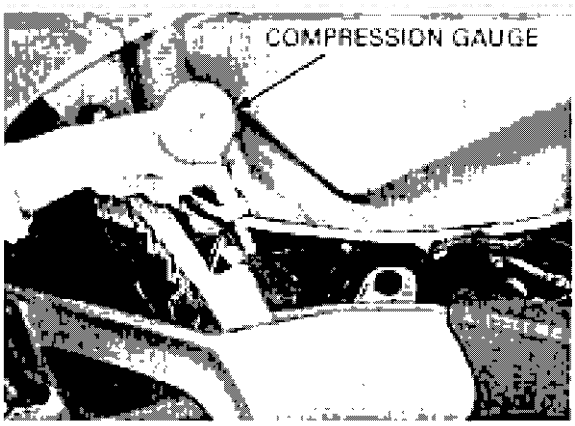
To measure the cylinder compression of each cylinder, remove only one plug at a time.

Warm up the engine to normal operating temperature.
Stop the engine, disconnect the spark plug caps and remove one spark plug at a time.

Shift the transmission into neutral.

Install a compression gauge into the spark plug hole.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stop rising.



To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

The maximum reading is usually reached within 4–7 seconds.

Compression pressure:
1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi) at 400 min⁻¹ (rpm)

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

FRONT

Open and support the fuel tank (page 4-5).
Remove the throttle body (page 6-65).

Remove the front cylinder head cover protector.

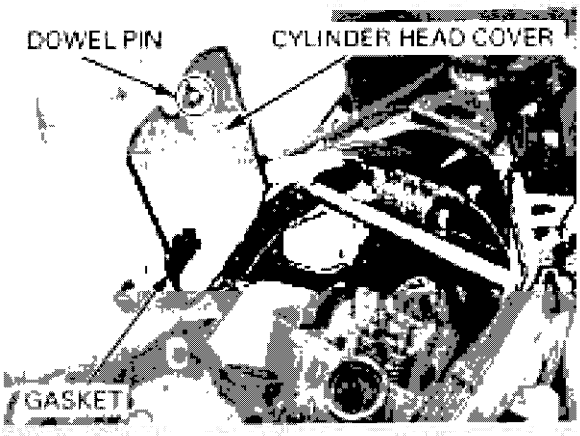
Remove the cylinder head cover bolts, washers and rubber seals.

Disconnect the air supply hose to the PAIR valve cover.

Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.

Remove the cylinder head cover, dowel pin and gasket.

- The dowel pin may leave on the cylinder head.



REAR

Remove the fuel tank (page 6-62).

Remove the rear cylinder head cover protector.

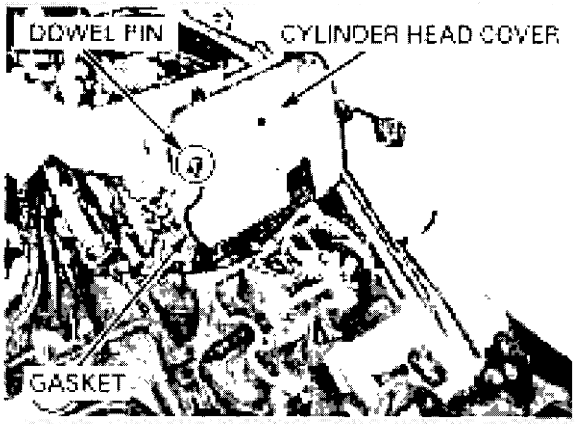
Remove the cylinder head cover bolts, washers and rubber seals.

Disconnect the air supply hose to the PAIR valve cover.

Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.

Remove the cylinder head cover, dowel pin and gasket.

- The dowel pin may leave on the cylinder head.



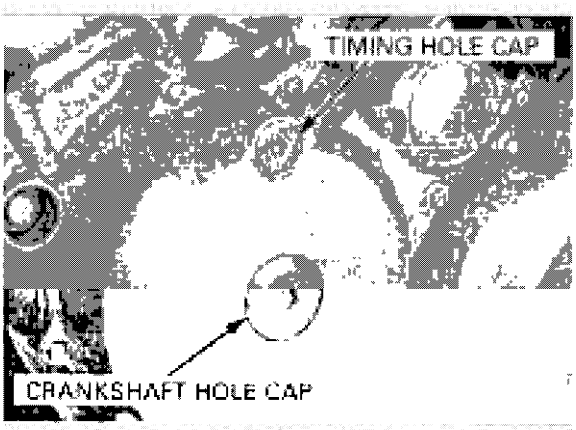
CAMSHAFT REMOVAL

NOTE:

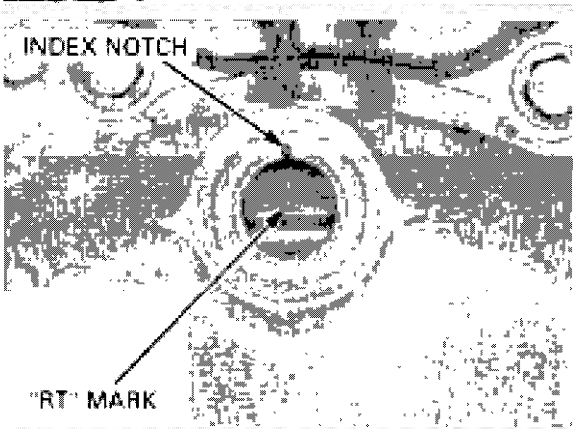
- The camshaft can be serviced with the engine in the frame.
- The front camshaft uses the same service procedure as the rear camshaft.

Remove the rear cylinder head cover (page 9-7).

Remove the crankshaft hole cap, timing hole cap and O-rings from the left crankcase cover.



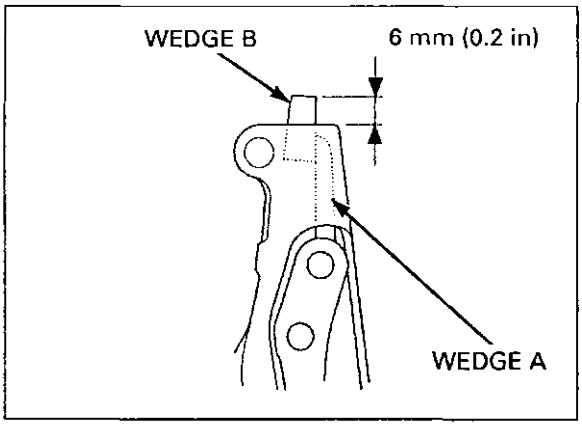
Turn the crankshaft counterclockwise and align the "RT" mark (front cylinder: "FT" mark) with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dead Center) on the exhaust stroke so the piston is at TDC on the compression stroke when removing the camshaft holder.



Measure the cam chain tensioner wedge B length as shown.

SERVICE LIMIT: 6 mm (0.2 in)

Replace the cam chain with a new one if the projection exceeds the service limit.



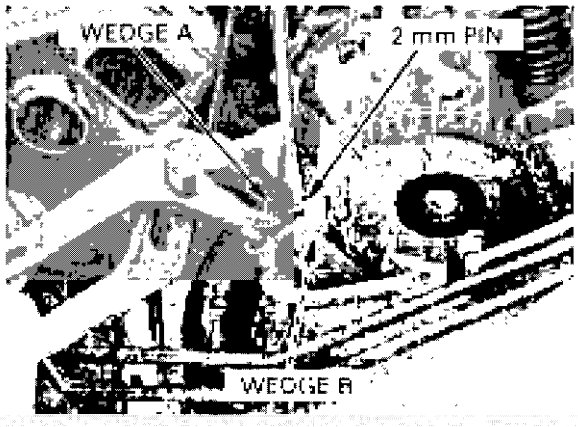
For the cam chain replacement, remove the following:

Front:
- Front camshaft
- Flywheel (page 12-5)

Rear:
- Rear camshaft
- Primary drive gear (page 11-12)

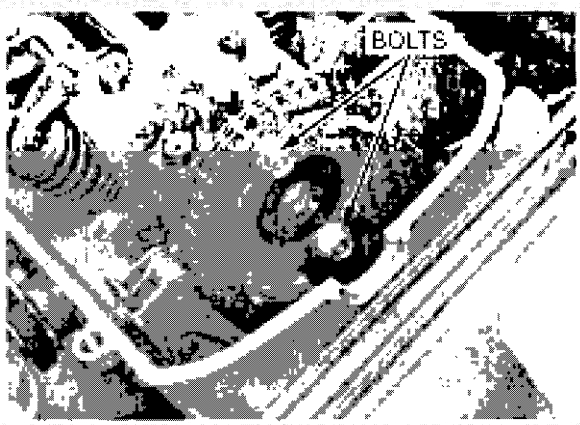
Be careful not to let the 2 mm pin fall into the crankcase.

Install the 2 mm pin into the cam chain tensioner wedge A hole while pulling the wedge A straight up and pushing down the wedge B.



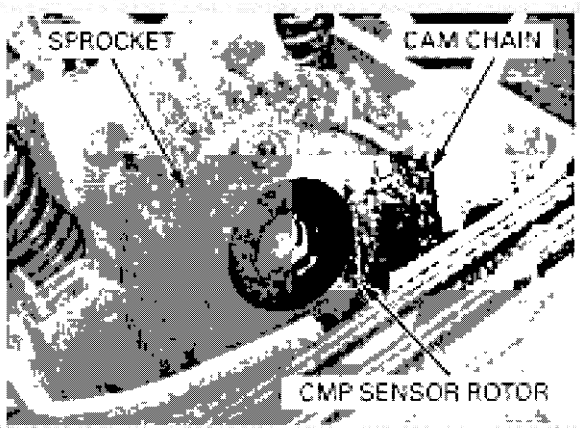
Be careful not to let the cam sprocket bolts fall into the crankcase.

Remove the cam sprocket bolt, turn the crankshaft counterclockwise one full turn (360°) and remove the other cam sprocket bolt.



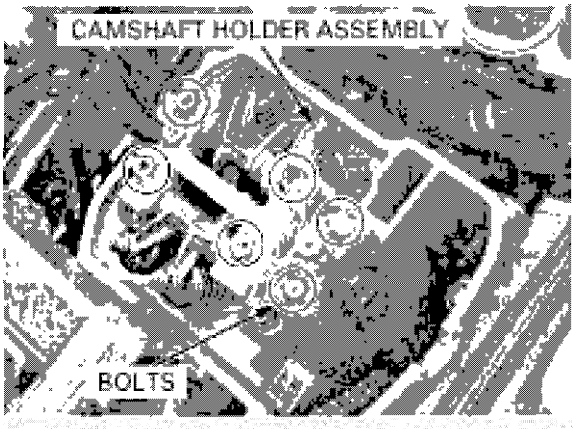
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

Remove the CMP sensor rotor (rear cylinder only) cam sprocket from the camshaft flange surface.

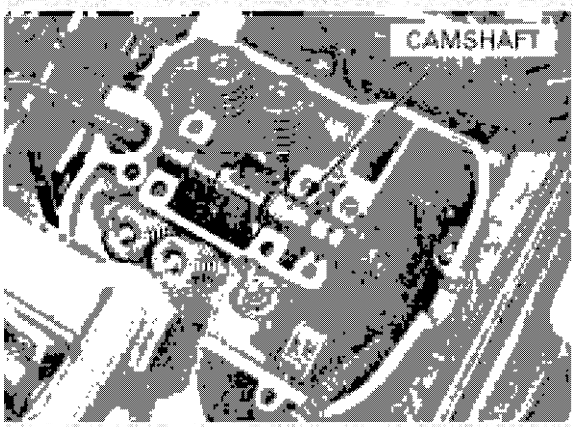


Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

Loosen the bolts in a crisscross pattern in several steps, then remove them and camshaft holder assembly.



Remove the camshaft.

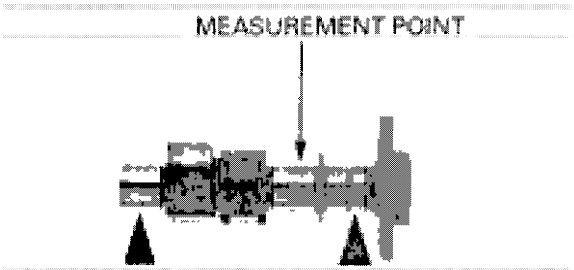


INSPECTION

CAMSHAFT RUNOUT

Support both end journals of the camshaft with V-blocks and check the camshaft runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.05 mm (0.002 in)



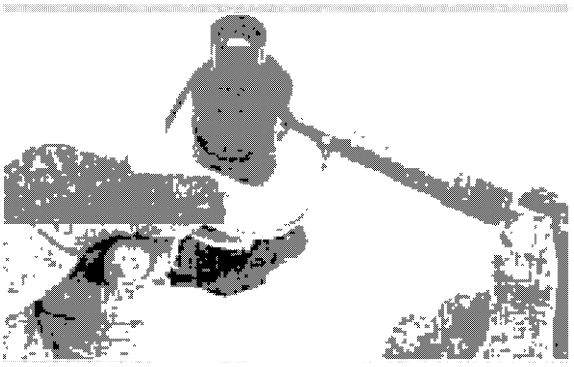
CAM LOBE HEIGHT

Check the cam lobe surfaces for scoring or evidence of insufficient lubrication.

Measure each cam lobe height.

SERVICE LIMITS: IN: 40.58 mm (1.598 in)
EX: 40.67 mm (1.601 in)

NOTE:
Check the rocker arm if the cam lobe is worn or damaged.



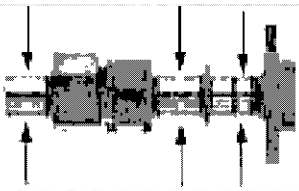
CAMSHAFT JOURNAL

Check the camshaft journal surfaces for scoring or evidence of insufficient lubrication.

Measure the O.D. of each camshaft journal.

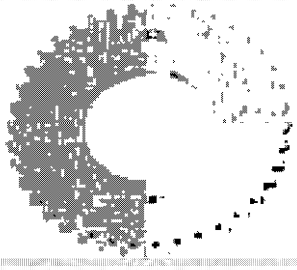
SERVICE LIMIT: 21.90 mm (0.862 in)

NOTE:
Check the oil passages and camshaft holder for wear or damage if the journal surface is worn or damaged.



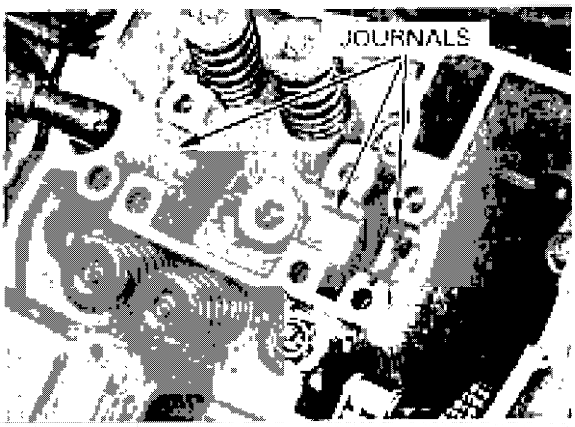
CAM SPROCKET

Check the cam sprocket for wear or damage.



CYLINDER HEAD

Check the camshaft journal surfaces of cylinder head for scoring, scratches or evidence of insufficient lubrication.

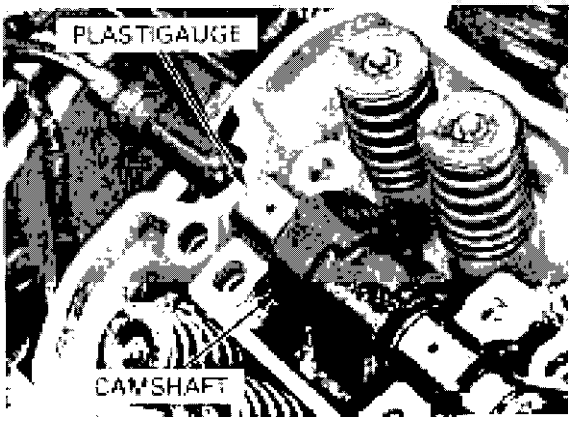


CAMSHAFT OIL CLEARANCE

Remove the cylinder head (page 9-14).

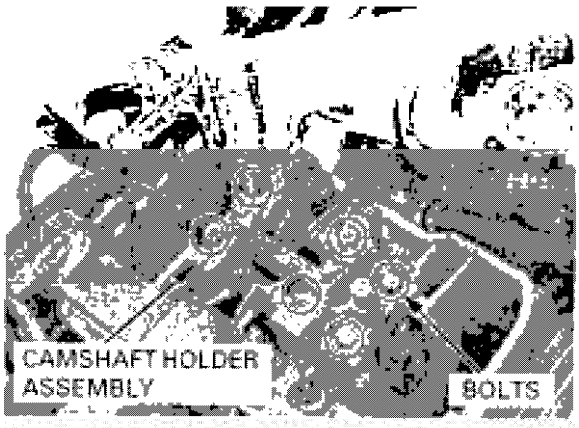
Clean off any oil from the journals of the camshaft holders, cylinder head and camshaft.
Put the camshaft onto the cylinder head and lay a strip of plastigauge lengthwise on each camshaft journal.

NOTE:
- Do not block any oil holes with the plastigauge.
- Do not rotate the camshaft during inspection.



Carefully install the camshaft holder and tighten the camshaft holder bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



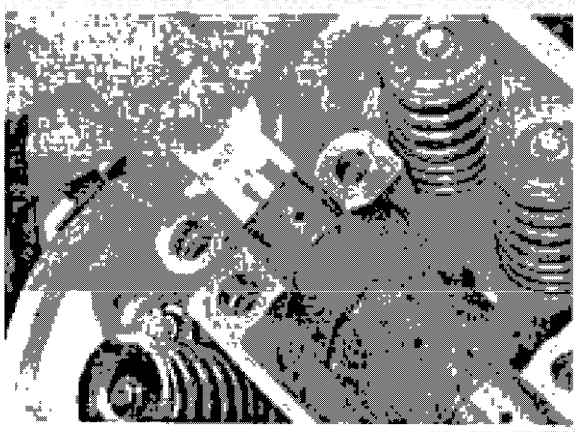
Remove the camshaft holder and measure the width of each plastigauge.

The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limit is exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holder if the clearance still exceeds the service limit.

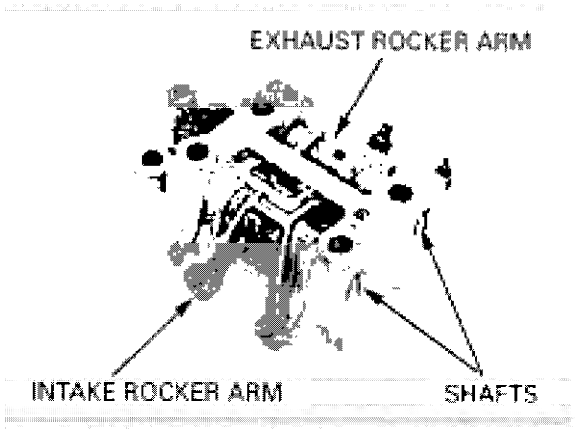


CAMSHAFT HOLDER DISASSEMBLY

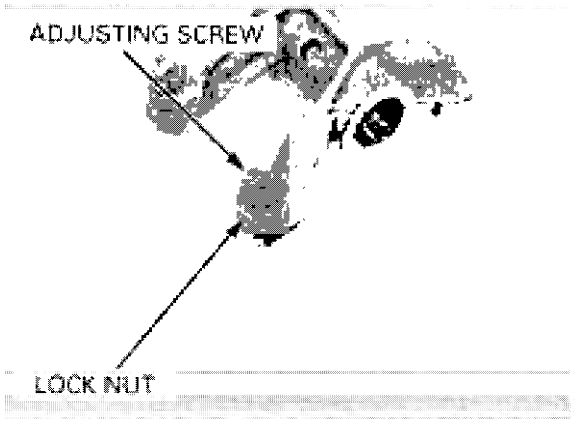
NOTE:

The front cylinder camshaft holder service uses the same procedure as the rear cylinder camshaft holder.

Remove the rocker arm shafts, intake and exhaust rocker arms.

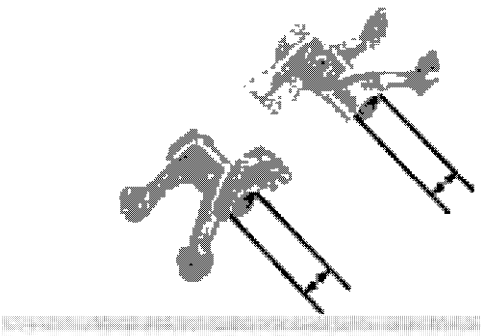


Remove the lock nut and valve adjusting screw.



ROCKER ARM/ROCKER ARM SHAFT INSPECTION

Check the sliding surface of the rocker arms for wear or damage where they contact the camshaft, or for clogged oil holes.
Check the contact surface of the valve adjusting screw for wear or damage.



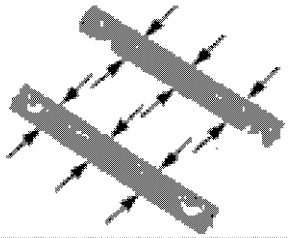
Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)

Check the shaft for wear or damage.

Measure each rocker arm shaft O.D.

SERVICE LIMIT: 11.92 mm (0.469 in)



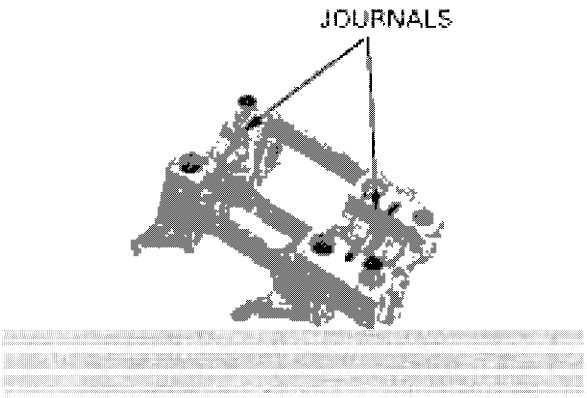
Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.14 mm (0.006 in)

Replace the rocker arm and/or shaft if necessary.

CAMSHAFT HOLDER INSPECTION

Check the camshaft journal surfaces of each camshaft holder for scoring, scratches or evidence of insufficient lubrication.



CYLINDER HEAD REMOVAL

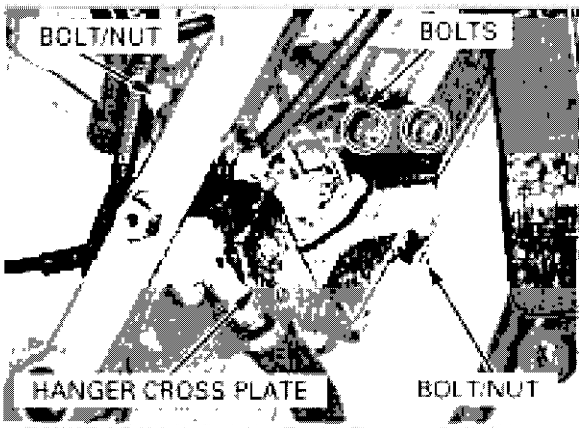
NOTE:

- The engine must be removed from the frame before servicing the rear cylinder head.
- The front cylinder head service can be done with the engine in the frame.
- The front cylinder head uses the same service procedure as the rear cylinder head.

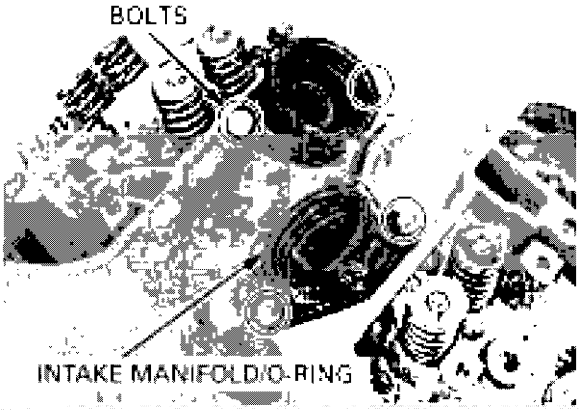
Remove the following:

- Cylinder head cover (page 9-6)
- Camshaft (page 9-8)

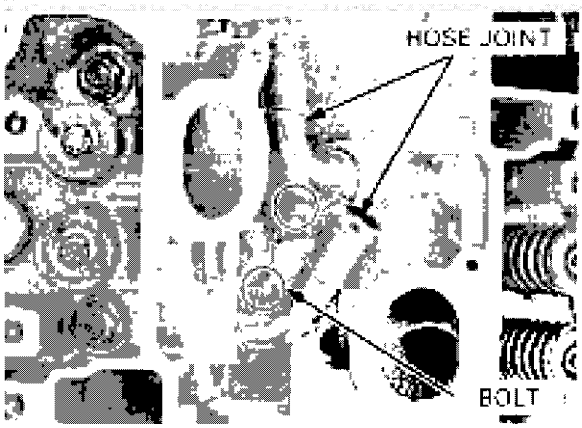
Front cylinder head only: Swing the radiator and remove the bolts, nuts and engine hanger cross plate.



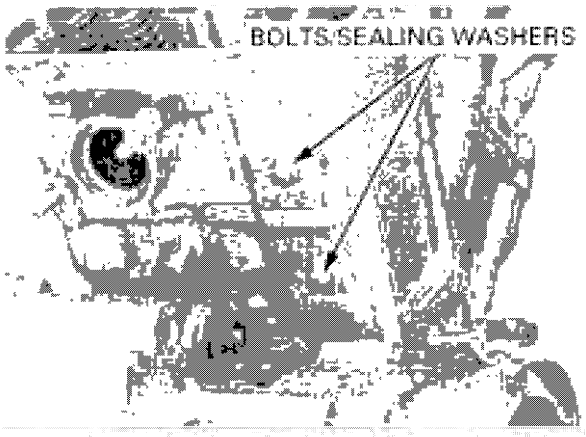
Remove the bolts, intake manifold and O-ring.



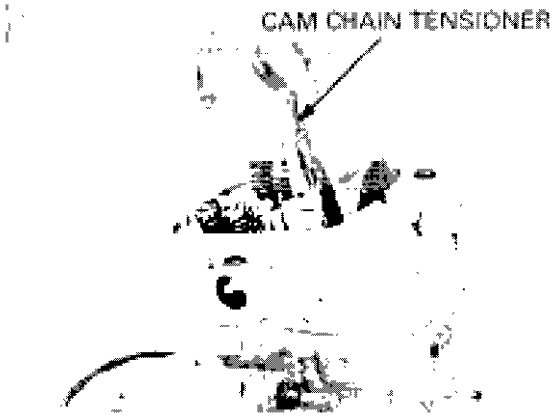
Remove the bolt and water hose joint from the cylinder head.



Remove the cam chain tensioner mounting bolts and sealing washers.



Remove the cam chain tensioner.



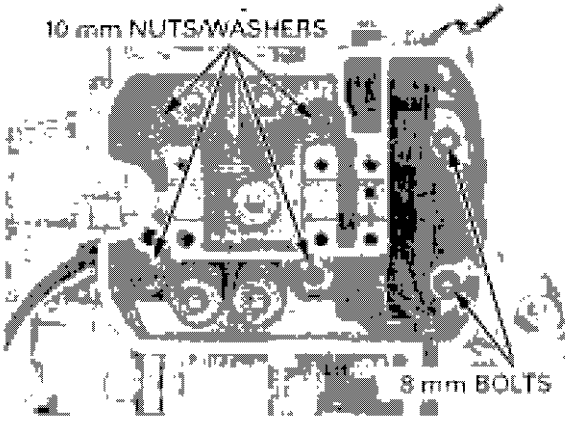
Loosen the bolts and nuts in a criss-cross pattern in several steps.

Remove the following cylinder head bolts and nuts:

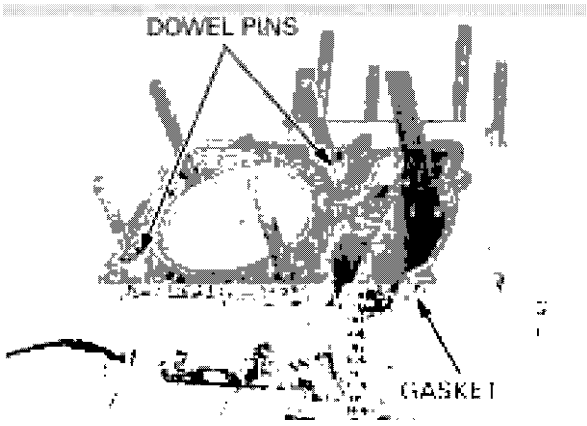
- 8 mm bolts
- 10 mm nuts/washers

Be careful not to damage the mating surface when removing the cylinder head.

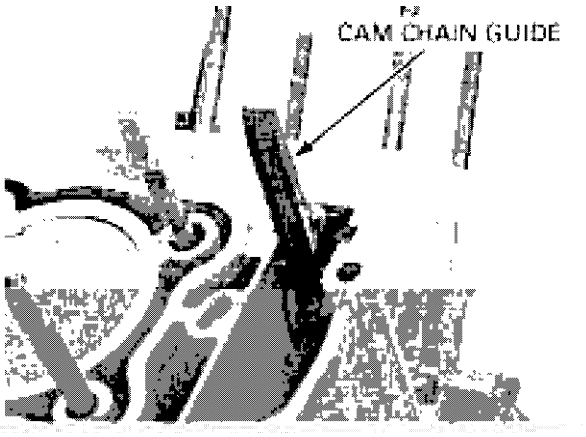
Remove the cylinder head.



Remove the gasket and dowel pins.



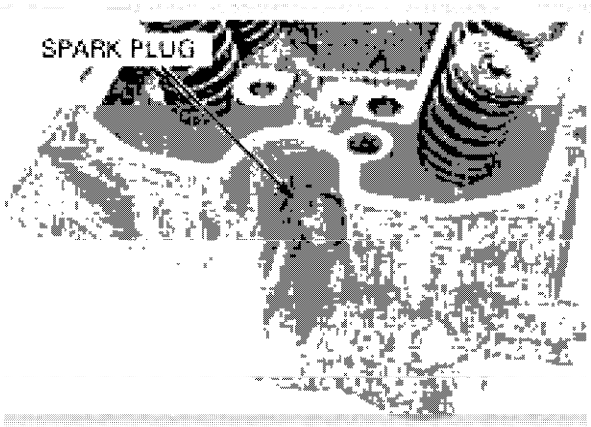
Remove the cam chain guide.



CYLINDER HEAD DISASSEMBLY

Remove the spark plug.

Remove the CMP sensor (rear cylinder head only; page 6-72).



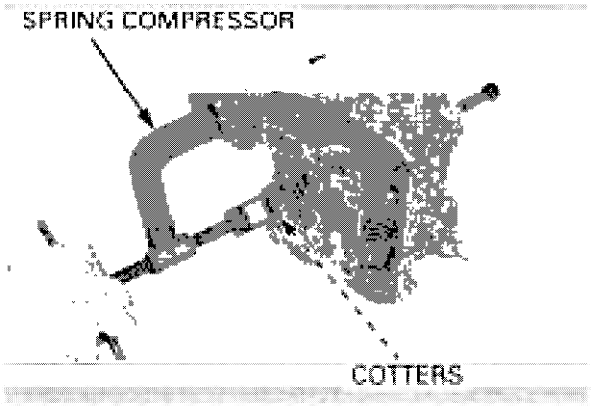
Mark all parts during disassembly so they can be placed back in their original position.

Remove the cotters using a special tool.

TOOL:
Valve spring compressor **07757-0010000**

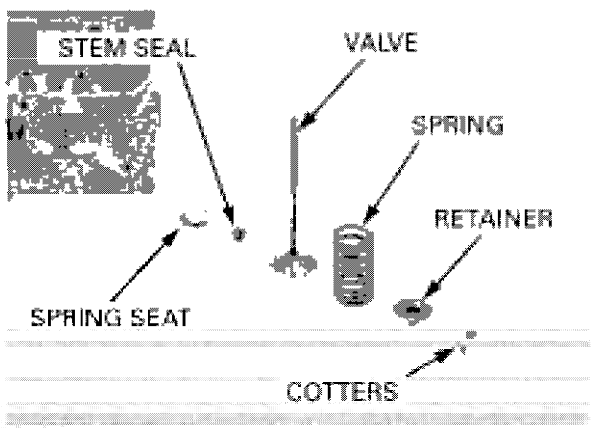
NOTICE

Compressing the valve spring more than necessary will cause loss of valve spring tension.



Do not reuse the removed stem seal.

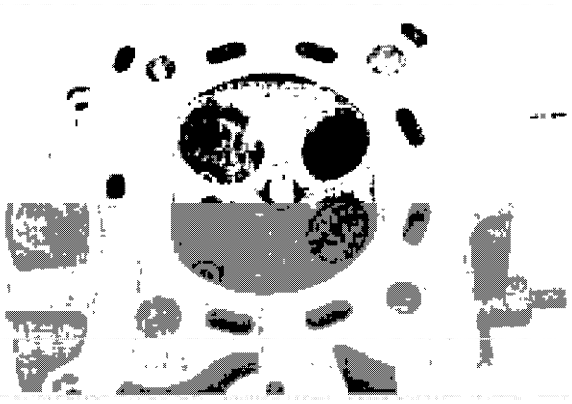
Remove the valve spring compressor, then remove the retainer, spring and valve.
Remove the stem seal and spring seat.



Avoid damaging the gasket surface.

Remove the carbon deposits from the combustion chamber and clean off the head gasket surface.

Check the spark plug hole and valve areas for cracks.

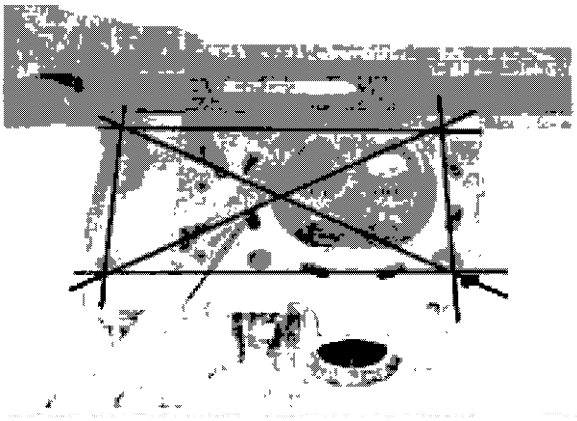


INSPECTION

CYLINDER HEAD

Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

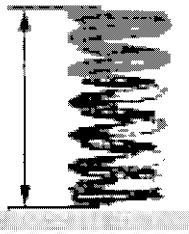


VALVE SPRING

Check the valve spring for fatigue or damage.

Measure the free length of each valve spring.

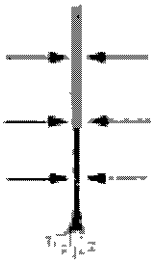
SERVICE LIMIT: 43.9 mm (1.73 in)



VALVE STEM, VALVE GUIDE

Check each valve for bending, burning, scratches or abnormal wear.
Insert the valves in their original positions in the cylinder head. Check that each valve moves up and down smoothly, without binding.
Measure each valve stem O.D. and record it.

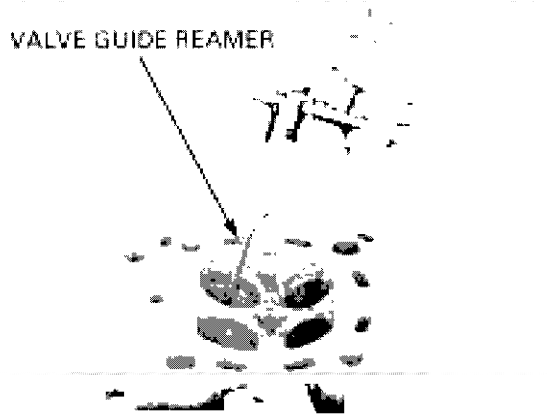
SERVICE LIMITS: IN: 5.460 mm (0.2150 in)
EX: 5.455 mm (0.2148 in)



Ream the valve guide to remove any carbon build-up before measuring the guide I.D.

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves maybe installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.



TOOL:
Valve guide reamer, 5.510 mm (IN/EX)
07984-2000001

Measure each valve guide I.D. and record it.

SERVICE LIMITS: IN: 5.54 mm (0.218 in)
EX: 5.54 mm (0.218 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS: IN: 0.07 mm (0.003 in)
EX: 0.09 mm (0.004 in)

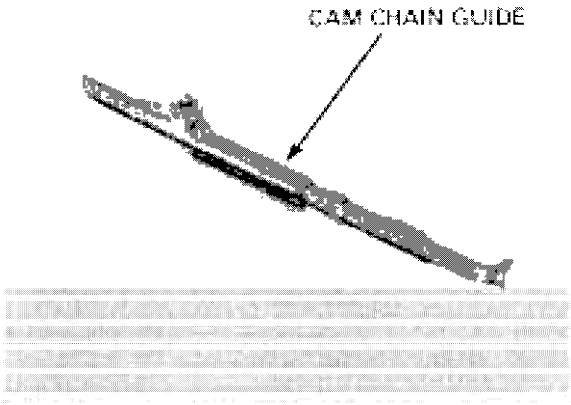
If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance.
If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limit with a new guide, also replace the valve.

NOTE:

Inspect and reface the valve seats whenever the valve guides are replaced (page 9-20).

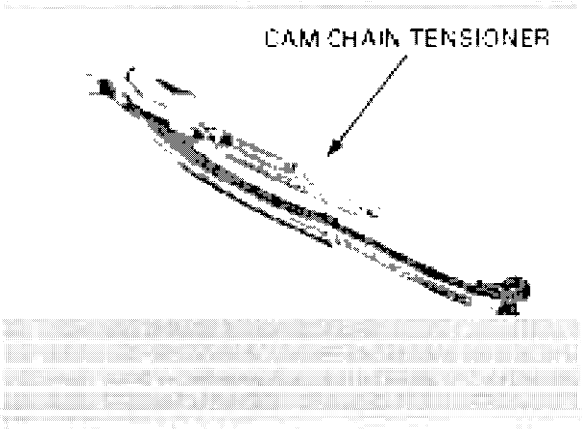
CAM CHAIN GUIDE

Check the cam chain guide for wear or damage.
Replace the cam chain guide if necessary.



CAM CHAIN TENSIONER

Check the cam chain tensioner for wear or damage. Replace the cam chain tensioner if necessary.



VALVE GUIDE REPLACEMENT

NOTE:

Refinish the valve seats whenever the valve guides are replaced to prevent uneven seating.

Chill new valve guides in a freezer section of refrigerator for about an hour.

Heat the cylinder head to 130 – 140°C (275 – 290°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (300°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

To avoid burns, wear insulated gloves when handling the heated cylinder head.

NOTICE

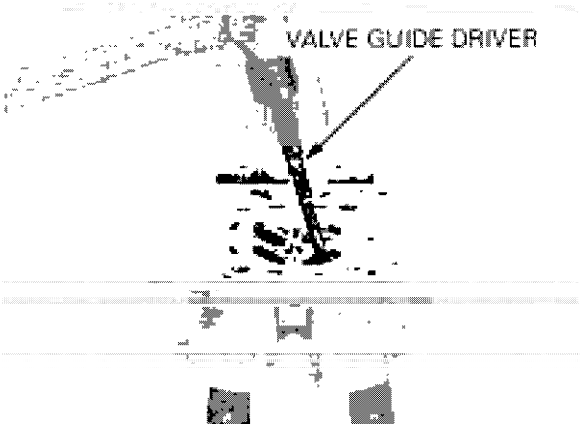
Using a torch to heat the cylinder head may cause warping.

Be careful not to damage the cylinder head.

Support the cylinder head and drive out the old guides from the combustion chamber side of the head.

TOOL:

Valve guide driver
5.5 mm (IN/EX) **07742-0010100**

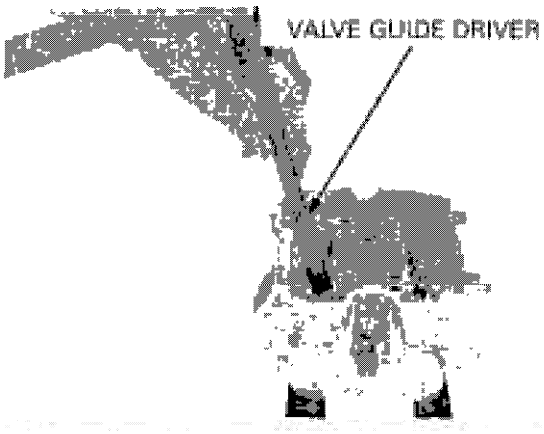


Adjust the valve guide driver to the valve guide height.

TOOL:
Valve guide driver 07743-0020000

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:
IN: 12.5 – 12.7 mm (0.49 – 0.50 in)
EX: 16.7 – 16.9 mm (0.66 – 0.67 in)

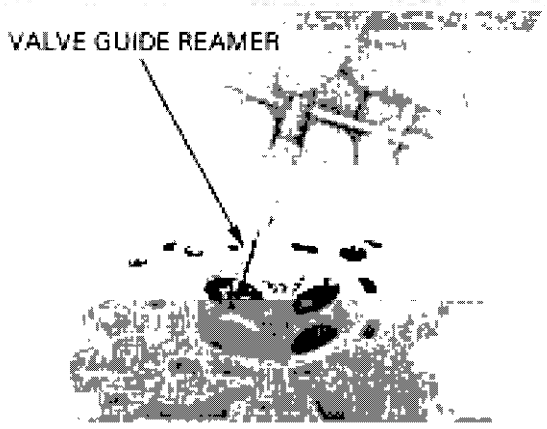
Drive new guides in from the camshaft side of the cylinder head to the valve guide height while the cylinder head is still heated.



Let the cylinder head cool to room temperature, then ream the new valve guides.

TOOL:
Valve guide reamer, 5.510 mm (IN/EX) 07984-2000001

NOTE:
- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves maybe installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.



Clean the cylinder head thoroughly to remove any metal particles after reaming.

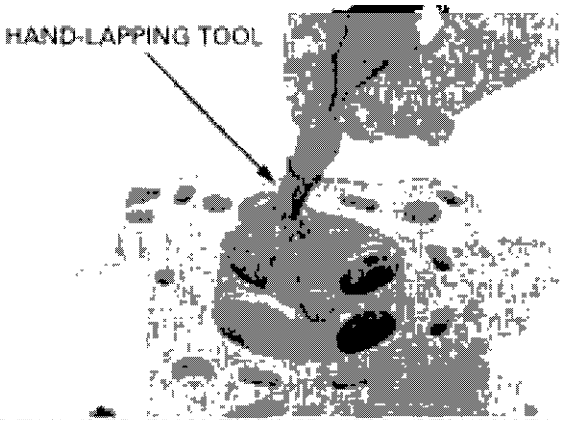
Reface the valve seat (page 9-21).

VALVE SEAT INSPECTION/REFACING

INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a thin coat of Prussian Blue to each valve face.
Tap the valve against the valve seat several times using a hand-lapping tool, without rotating valve, to make a clear pattern.



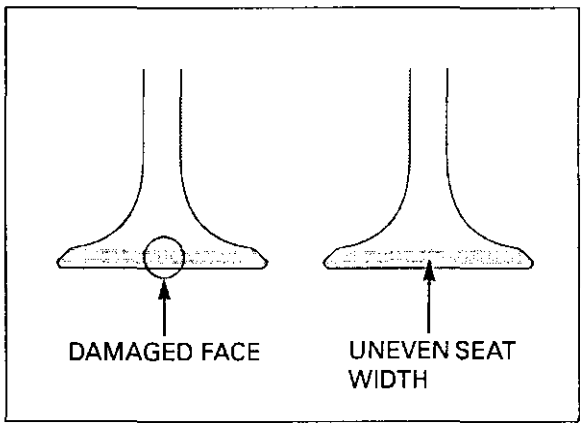
Remove the valve and inspect the valve seat face.

NOTE:

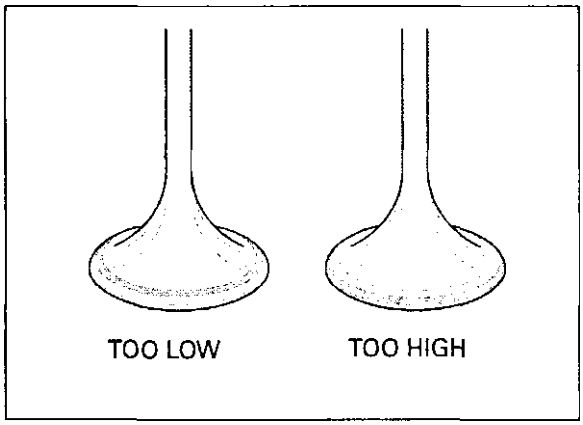
- The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Inspect the valve seat face for:

- Uneven seat width:
  – Replace the valve and reface the valve seat.
- Damaged face:
  – Replace the valve and reface the valve seat.



- Contact area (too high or too low area):
  – Reface the valve seat.

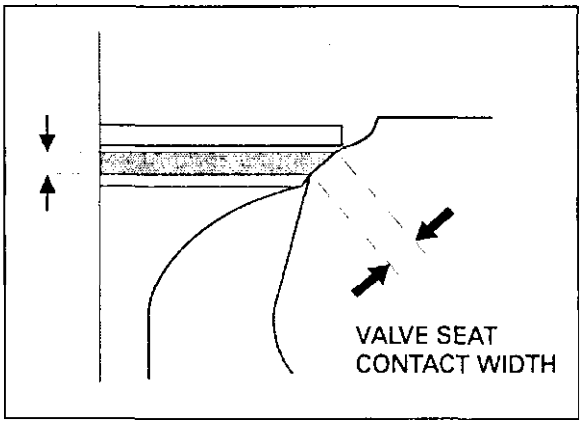


Inspect the width of the valve seat.

The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

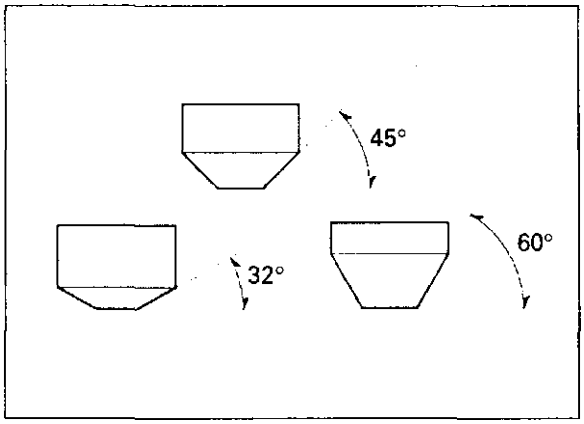
If the valve seat width is not within specification, reface the valve seat.



VALVE SEAT REFACING

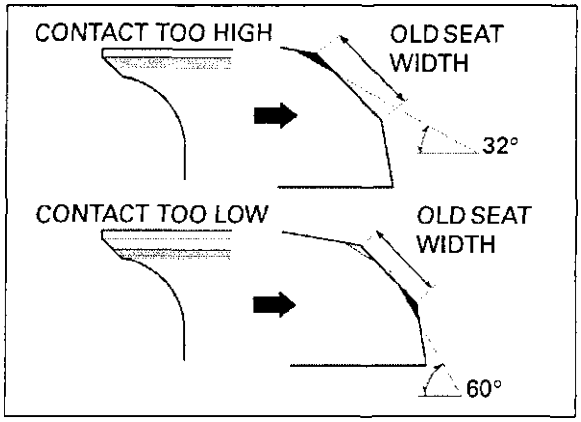
NOTE:

- Follow the refacer manufacturer's operating instructions.
- Reface the valve seat whenever the valve guide has been replaced.
- Be careful not to grind the seat more than necessary.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.

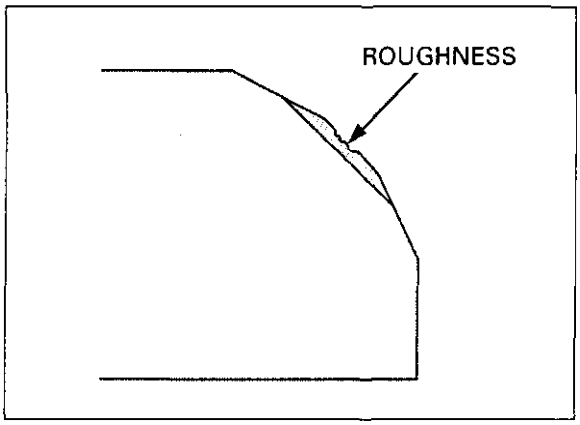


Using a 45° cutter, remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 27.5 mm (IN)	**07780-0010200**
Seat cutter, 33 mm (EX)	***07780-0010800***
Cutter holder, 5.5 mm	**07781-0010101**

or equivalent commercially available

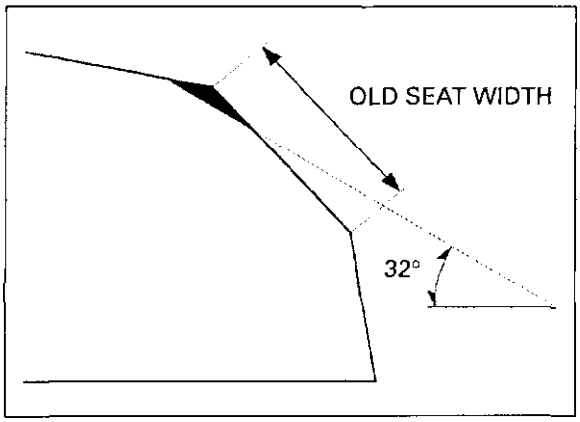


Using a 32° cutter, remove the top 1/4 of the existing valve seat material.

TOOLS:

Flat cutter, 33 mm (IN)	**07780-0012900**
Flat cutter, 27 mm (EX)	**07780-0013300**
Cutter holder, 5.5 mm	**07781-0010101**

or equivalent commercially available

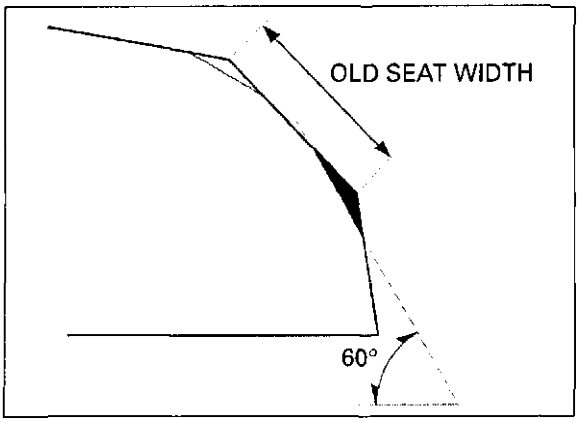


Using a 60° cutter, remove the bottom 1/4 of the old seat.

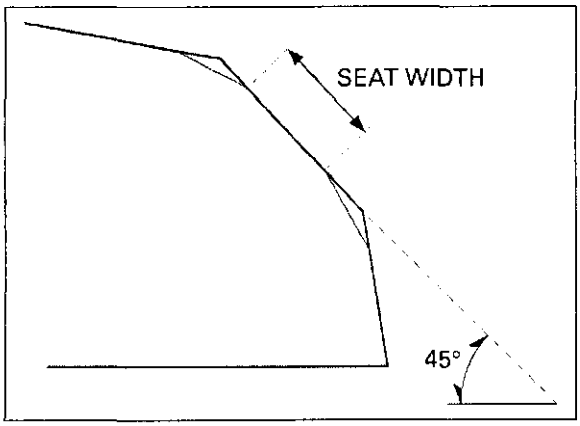
TOOLS:

Interior cutter, 30 mm (IN)	**07780-0014000**
Interior cutter, 26 mm (EX)	**07780-0014500**
Cutter holder, 5.5 mm	**07781-0010101**

or equivalent commercially available



Using a 45° seat cutter, cut the seat to the proper width.
Make sure that all pitting and irregularities are removed.



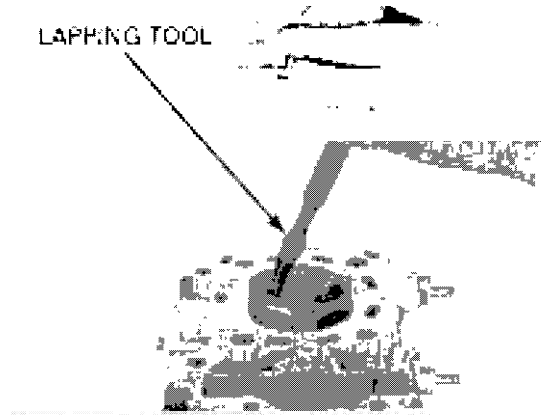
NOTICE

- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of lapping tool frequently to prevent uneven seat wear.*
- *Lapping compound can cause damage if it enters between the valve stem and guide.*

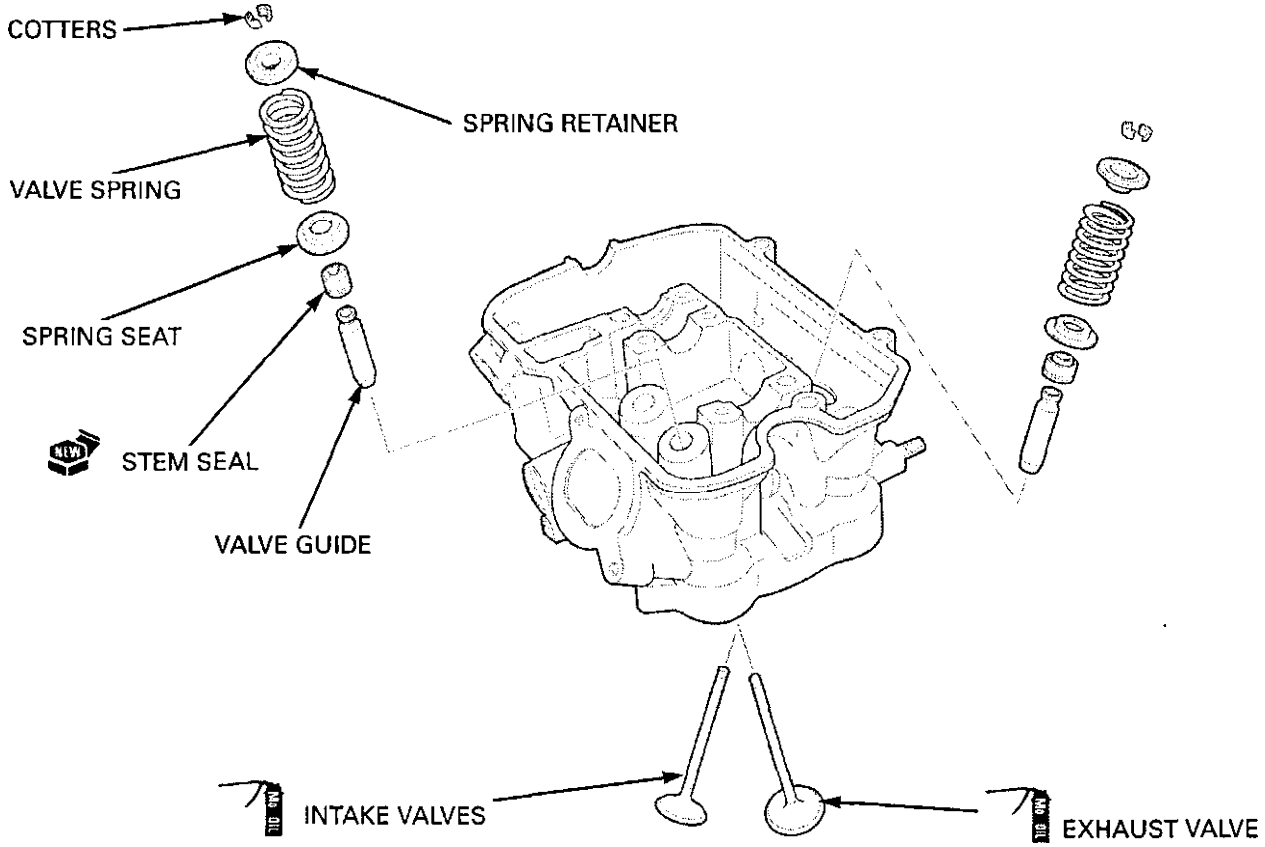
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

After lapping, wash any residual compound off the cylinder head and valve.

Recheck the seat contact after lapping.

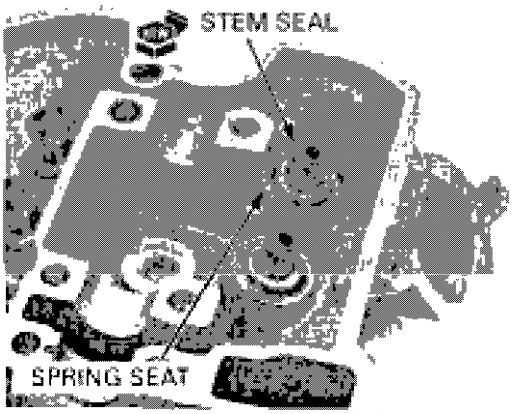


CYLINDER HEAD ASSEMBLY



Blow out all of the oil passages in the cylinder head with compressed air.

Install the spring seat and new stem seal.



Lubricate valve stem and valve guide inner surfaces with molybdenum disulfide oil.

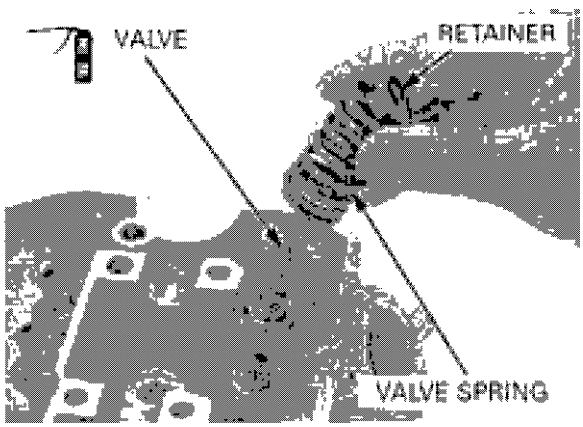
Install the valve into the valve guide.

NOTE:

To avoid damage to the stem seal, turn the valve slowly when valve installing.

Install the valve spring with tightly wound coils facing the combustion chamber.

Install the spring retainer.



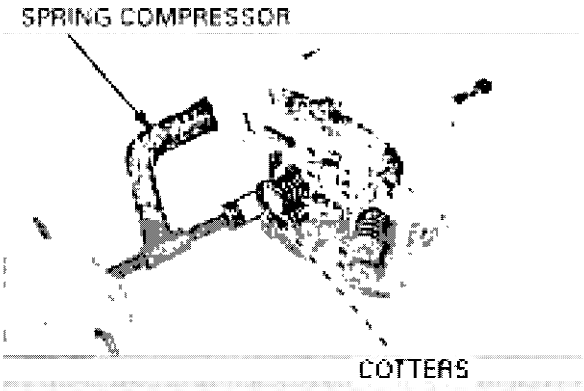
Grease the cotters to ease installation.

Install the cotters using a special tool.

TOOL:
Valve spring compressor 07757-0010000

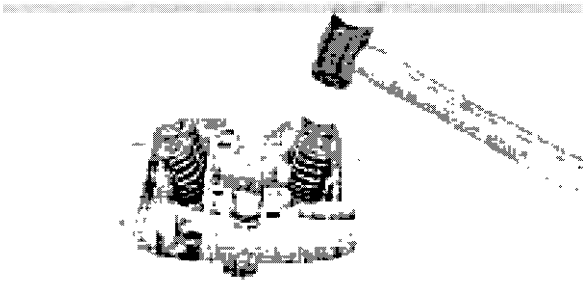
NOTICE

Compressing the valve springs more than necessary will cause loss of valve spring tension.



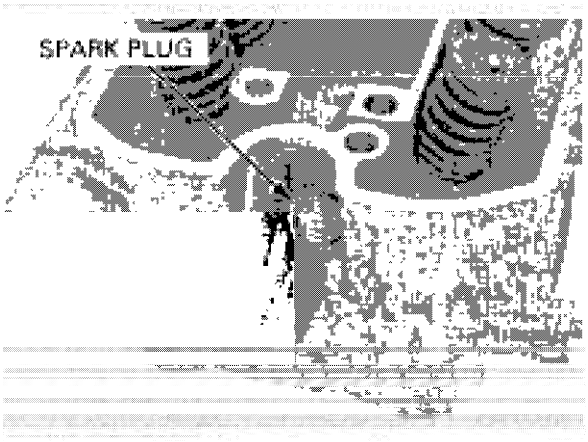
Support the cylinder head so the valve heads will not contact anything and possibly get damaged.

Tap the valve stems gently with two plastic hammers to seat the cotters firmly as shown.



Install the spark plug.

Install the CMP sensor (rear cylinder only; page 6-72).



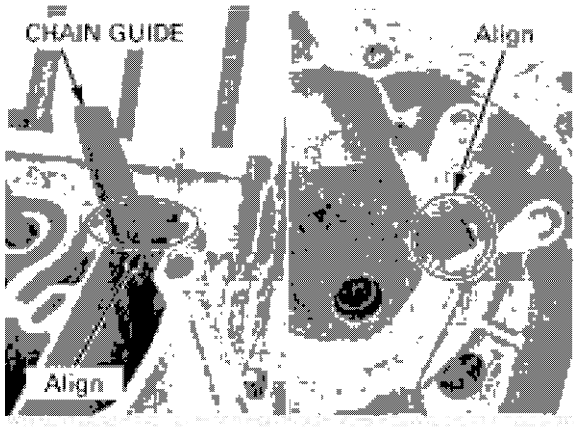
CYLINDER HEAD INSTALLATION

NOTE:

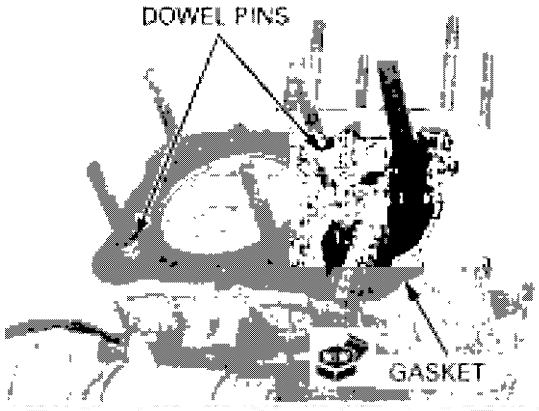
- The front cylinder head uses the same service procedure as the rear cylinder head.
- Be careful not to damage the mating surfaces when cleaning the cylinder head mating surface.
- When cleaning the cylinder head mating surface, place the shop towel over the cylinder opening to prevent dust or dirt from entering the engine.

Clean the gasket mating surfaces of the cylinder and cylinder head thoroughly, being careful not to damage them.

Install the cam chain guide by aligning the guide end with the groove in the crankcase and the bosses with the groove in the cylinder.

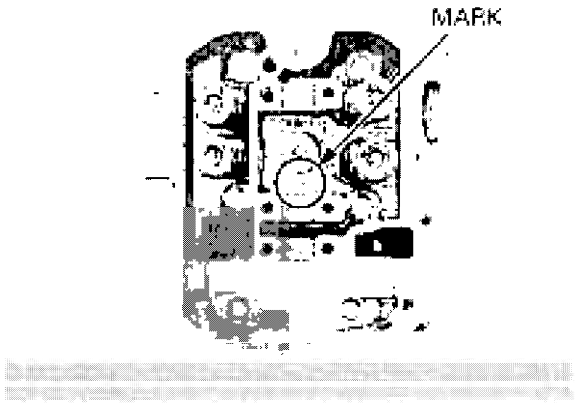


Install the dowel pins and a new gasket.



The cylinder heads are identified by marks on their oil pockets.

- "F": Front cylinder head
- "R": Rear cylinder head



Install the cylinder head to the cylinder.

Apply oil to the each bolts and nuts threads and seating surfaces.

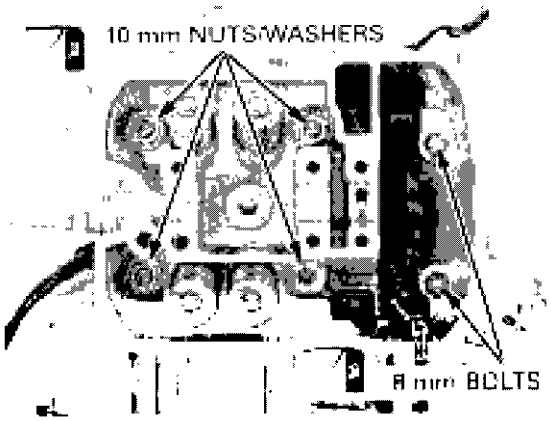
Install and tighten the cylinder head bolts, nuts and washer to the specified torque.

TORQUE:

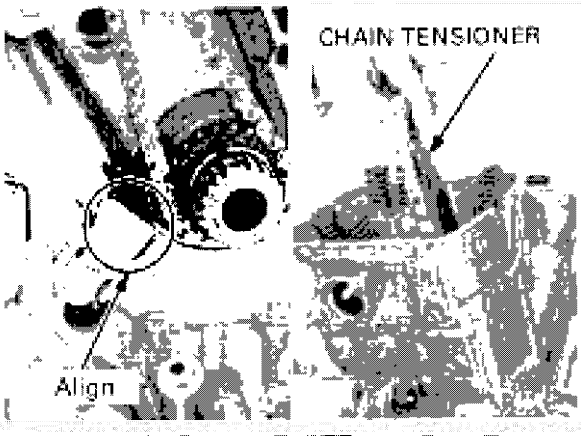
10 mm nut: 40 N·m (4.1 kgf·m, 30 lbf·ft)
8 mm bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)

NOTE:

- Tighten all to hand-tight, then torque the larger fasteners before tightening the smaller fasteners.
- Tighten the bolts and nuts in a crisscross pattern in several steps.

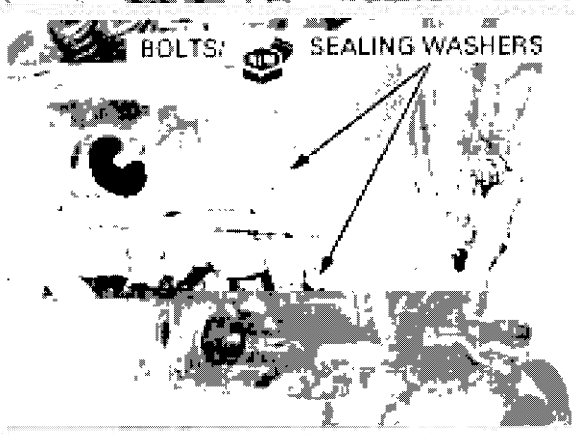


Install the cam chain tensioner, aligning its end with the groove in the crankcase.

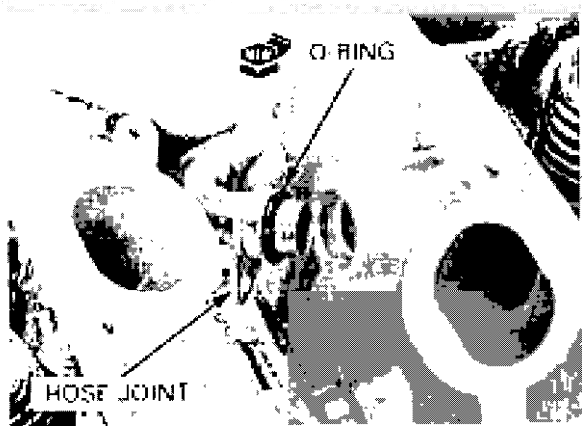


Install the tensioner bolts with new sealing washers and tighten them alternately.

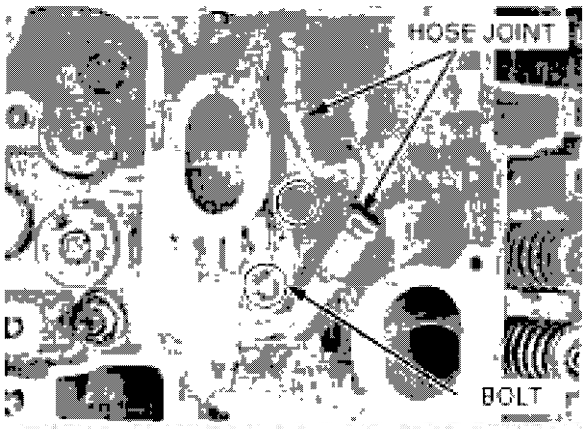
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



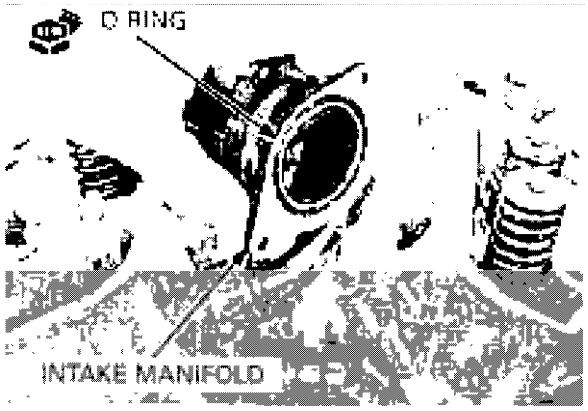
Install a new O-ring to the water hose joint.



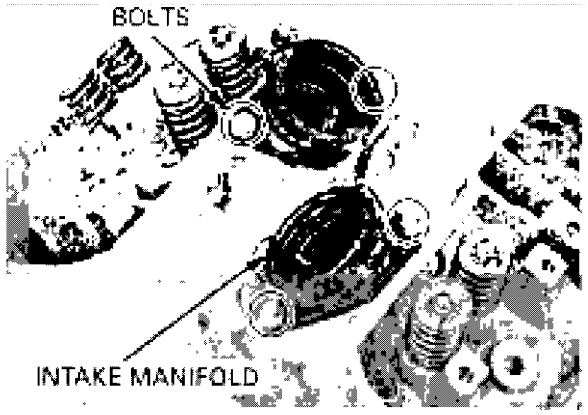
Install the water hose joint and tighten the bolt securely.



Install a new O-ring to the intake manifold groove.



Install the intake manifold and tighten the bolts securely.

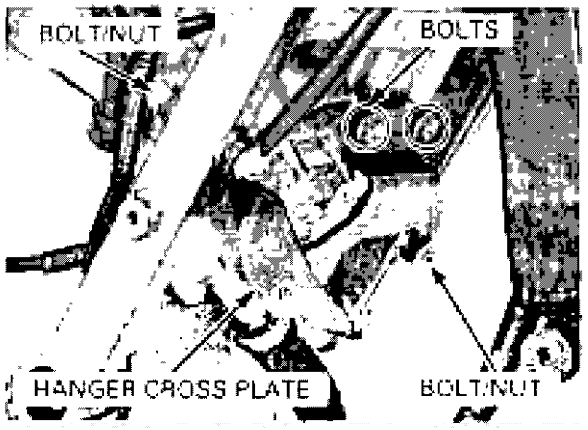


Install the engine hanger cross plate, bolts and nuts. Tighten the bolts and nuts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

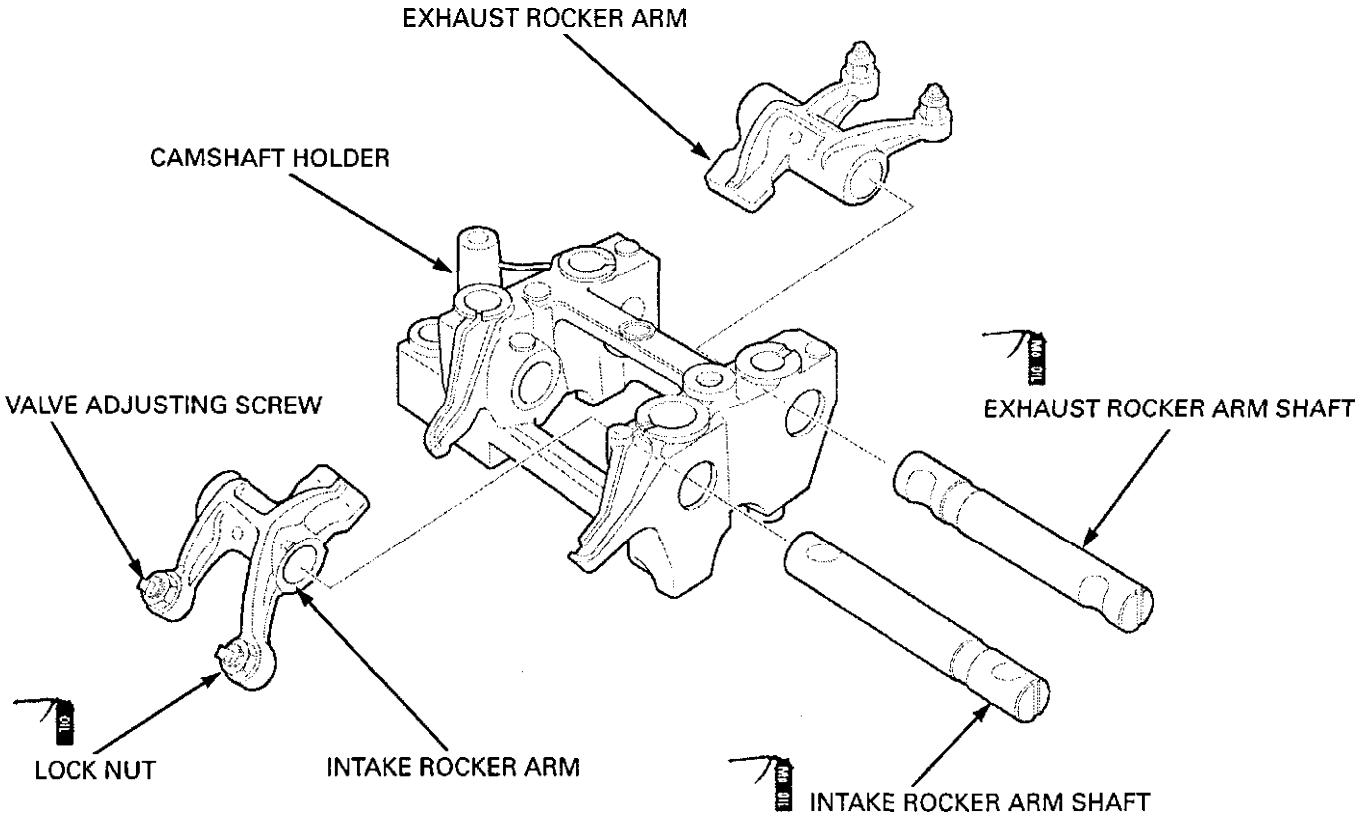
Install the following:

- Radiator (page 7-10)
- Camshaft (page 9-29)
- Cylinder head cover (page 9-33)

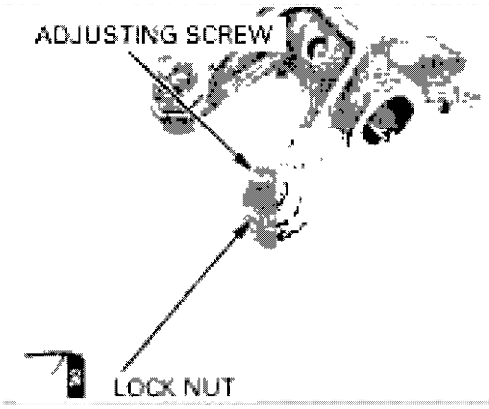


CAMSHAFT INSTALLATION

CAMSHAFT HOLDER ASSEMBLY



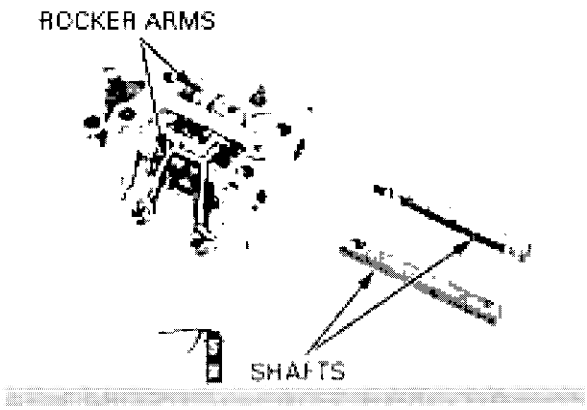
Apply engine oil to the valve adjusting screw lock nut threads and seating surface.
Install the valve adjusting screw and lock nut.



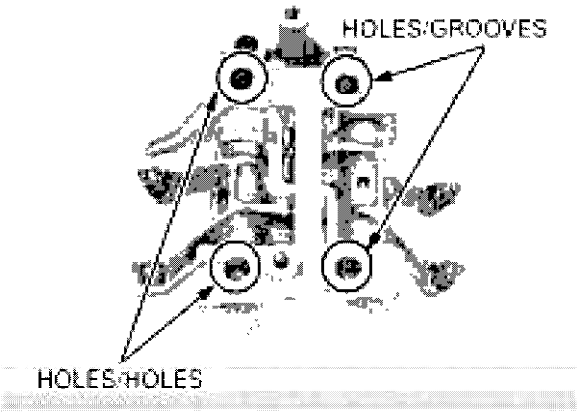
NOTE:

- The rocker arms are identified by the stamped marks:
  "IN": Intake rocker arm
  "EX": Exhaust rocker arm
- The intake rocker arm shaft has two holes on each end.
- The exhaust rocker arm shaft has two grooves on each end.

Apply molybdenum disulfide oil solution to the sliding surface of the shaft.
Install the rocker arms and shafts.



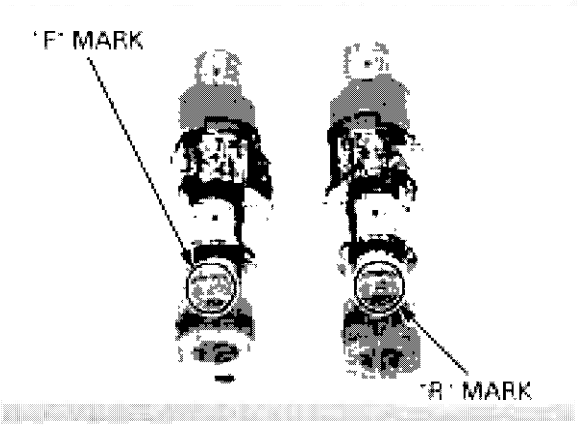
Align the intake rocker arm shaft holes with the holder holes.
Align the exhaust rocker arm shaft grooves with the holder holes.



CAMSHAFT INSTALLATION

NOTE:

- The camshafts are identified by the stamped marks:
  "F": Front cylinder camshaft
  "R": Rear cylinder camshaft
- If both (front and rear) camshafts were removed, install the front cylinder camshaft first, then install the rear cylinder camshaft.
- If the rear cylinder head was not serviced, remove the rear cylinder head cover to check the camshaft position.
- If the front cylinder head was not serviced, remove the front cylinder head cover to check the camshaft position.

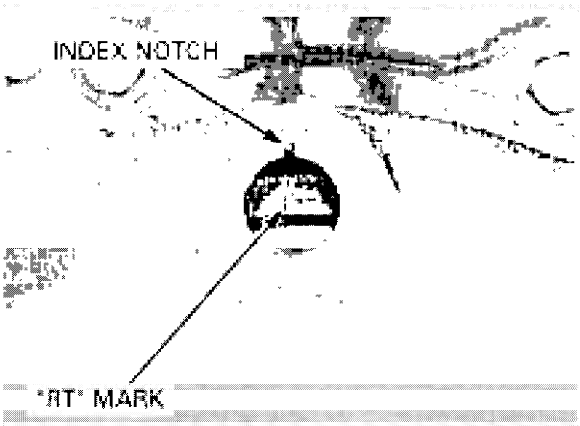


FRONT CYLINDER TDC SETTING

If the rear cylinder has not been serviced, begin here.

Remove the rear cylinder head cover (page 9-7) and check the rear cylinder camshaft position as follows:

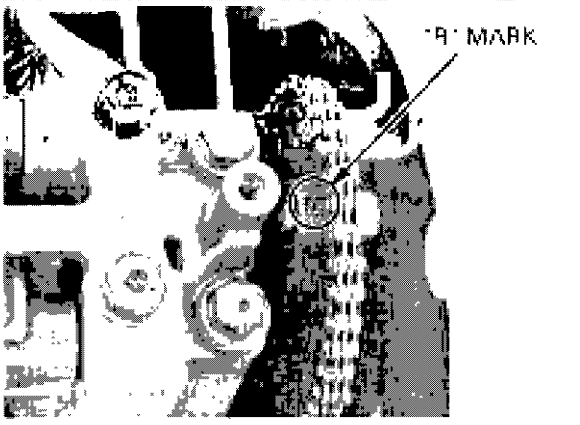
Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index notch on the left crankcase cover.



Then check the identification mark "R" on the rear camshaft.

- If the "R" mark faces up, turn the crankshaft counterclockwise 1-1/7 (412°) turn (align the "FT" mark on the flywheel with the index notch) and begin installation of the front camshaft.
- If the "R" mark faces down (cannot be seen), turn the crankshaft counterclockwise 1/7 (52°) turn (align the "FT" mark with the index notch) and begin installation of the front camshaft.

Install the front camshaft (page 9-31).



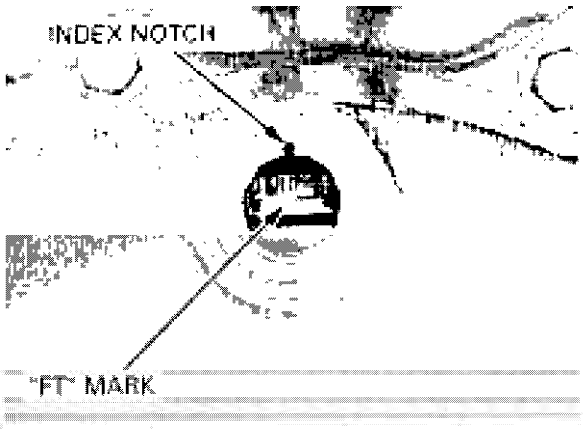
BOTH CYLINDER TDC SETTING

If both camshafts have been serviced, begin installation of the front camshaft.

Align the "FT" mark on the flywheel with the index notch on the left crankcase cover.

Install the front camshaft (page 9-31).

Set the rear cylinder at TDC (page 9-31).
Install the rear camshaft (page 9-31).

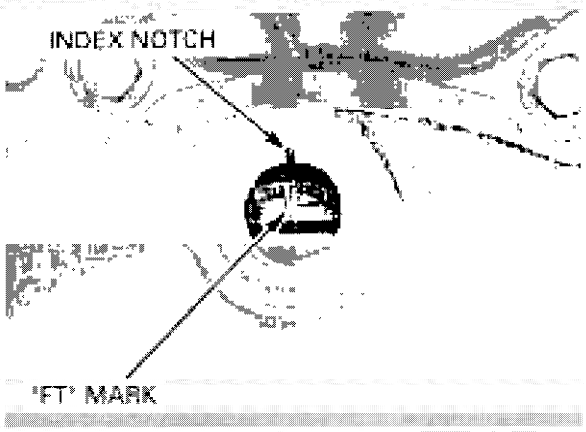


REAR CYLINDER TDC SETTING

If the front cylinder has not been serviced, begin here.

Remove the front cylinder head cover (page 9-6) and check the front cylinder camshaft position as follows:

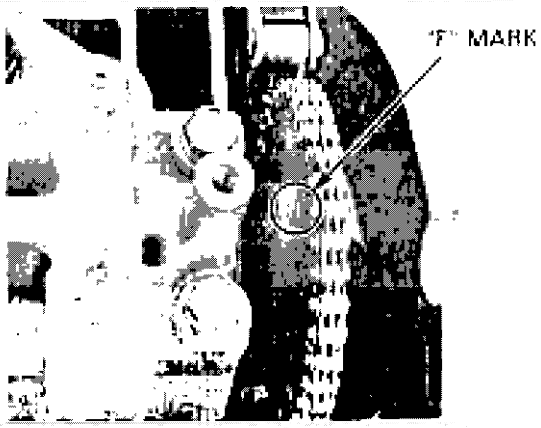
Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index notch on the left crankcase cover.



Then check the identification mark "F" on the front camshaft.

- If the "F" mark faces up, turn the crankshaft counterclockwise 6/7 (308°) turn (align the "RT" mark on the flywheel with the index notch) and begin installation of the rear camshaft.
- If the "F" mark faces down (cannot be seen), turn the crankshaft clockwise 1-6/7 (668°) turn (align the "RT" mark with the index notch) and begin installation of the rear camshaft.

Install the rear camshaft using the following procedure.

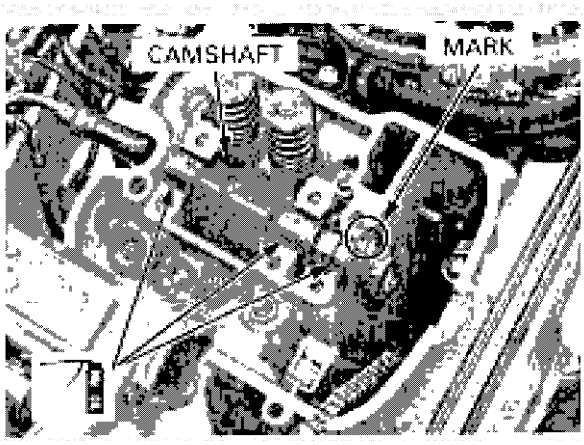


CAMSHAFT INSTALLATION

The front camshaft uses the same service procedure as the rear camshaft.

Lubricate the camshaft lobe and journal surfaces with molybdenum disulfide oil.

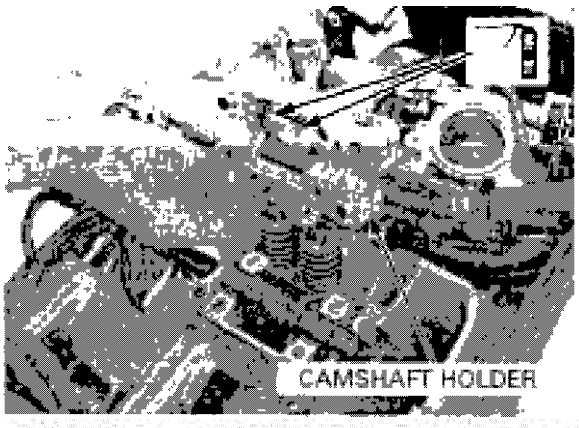
Install the camshaft with the camshaft identification mark (R: rear camshaft, F: front camshaft) facing up.



Lubricate each rocker arm slipper surfaces with molybdenum disulfide oil.

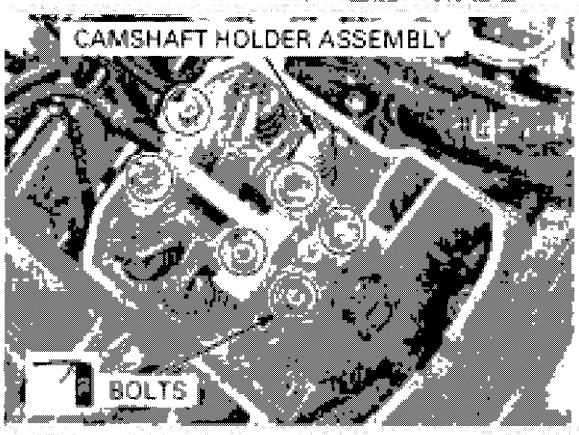
NOTE:
Before camshaft holder installation, loosen the valve adjusting screw and lock nut fully.

Install the camshaft holder assembly.



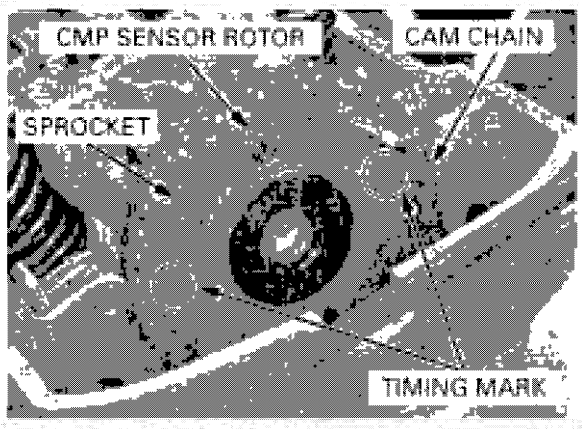
Apply oil to the camshaft holder bolt threads and seating surface.
Install the camshaft holder bolts.
Tighten the bolts to the specified torque in a criss-cross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the cam sprocket to the cam chain with the timing mark facing outside.

Install the cam sprocket on the camshaft flange and check that the timing marks align with the upper surface of the cylinder head.



Install the CMP sensor rotor (rear cylinder only).

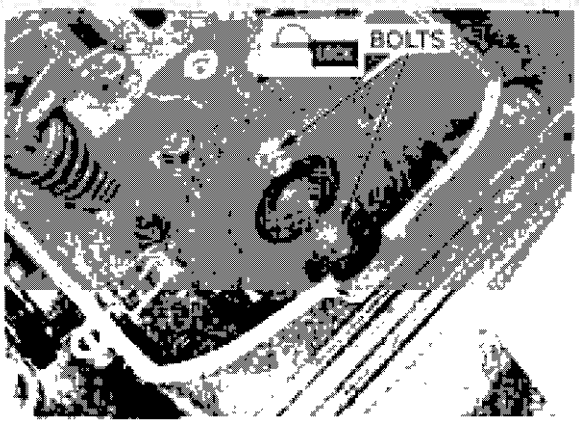
Be careful not to let the cam sprocket bolts fall into the crankcase.

Clean and apply a locking agent to the cam sprocket bolt threads.

Align the cam sprocket bolt holes in the cam sprocket and camshaft.
Temporarily install the cam sprocket bolt.
Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

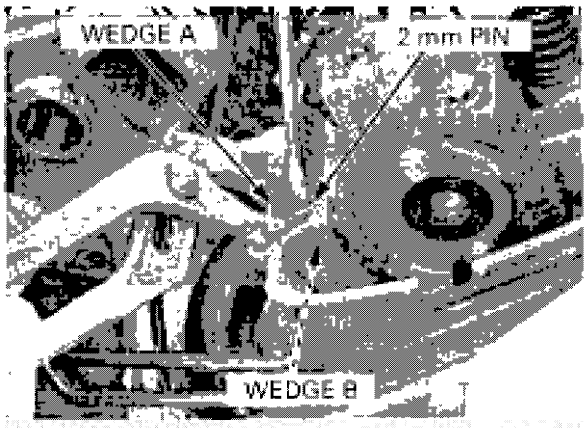
Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.



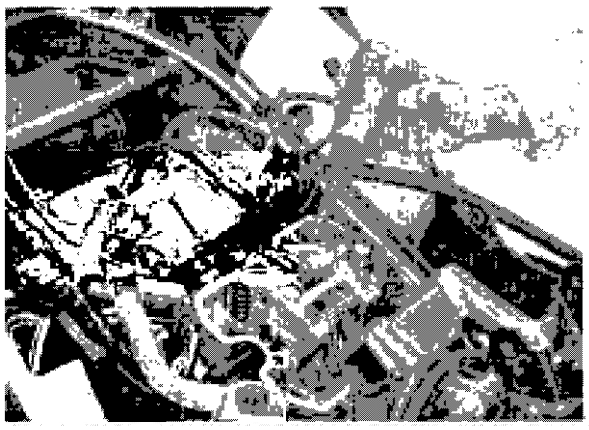
Remove the 2 mm pin while holding cam chain tensioner wedge A and pushing down the wedge B.

NOTE:

- Be careful not to let the 2 mm pin fall into the crankcase.
- Do not forget to remove the 2 mm pin before installing the cylinder head cover.



Fill the oil pockets in the head with engine oil.
Adjust the valve clearance (page 4-9).



CYLINDER HEAD COVER INSTALLATION

Clean the gasket groove and cylinder head mating surface of the cylinder head cover.

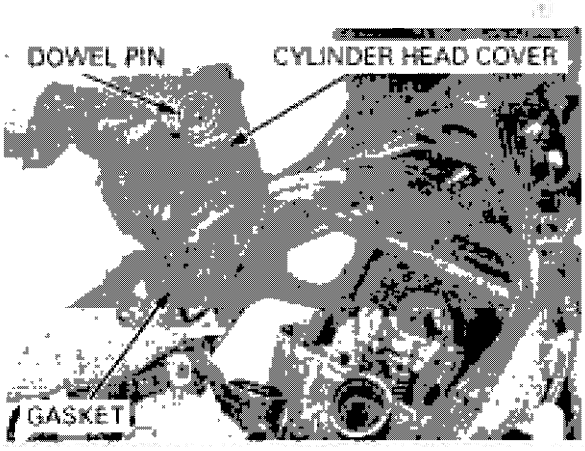
Install the gasket into the groove.

FRONT

Clean the cylinder head cover mating surface of the cylinder head.

Install the dowel pin to the front cylinder head cover.

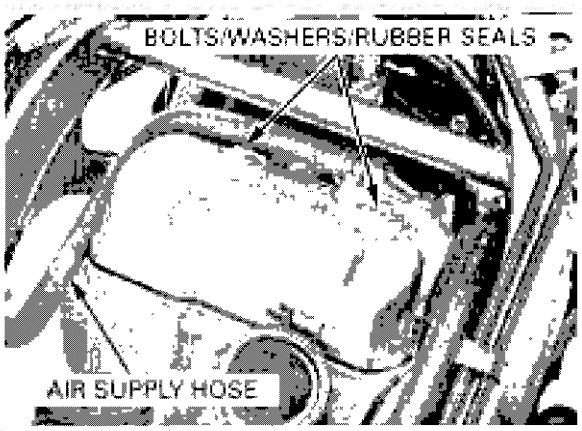
Install the front cylinder head cover on the front cylinder head.



Install the rubber seals and washers.
Install and tighten the cylinder head cover bolts to the specified torque.

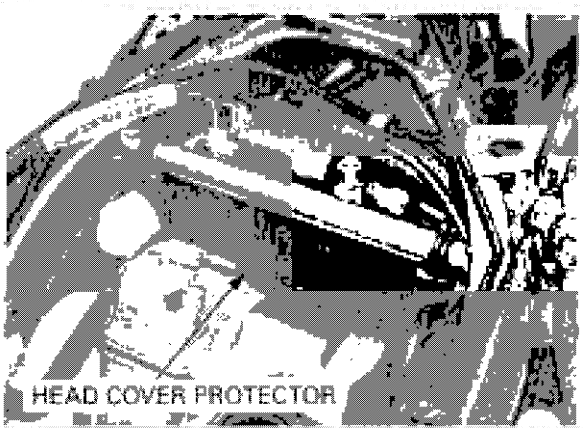
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the air supply hose.



Install the front cylinder head cover protector.

Install the throttle body (page 6-65).
Close the fuel tank (page 4-5).

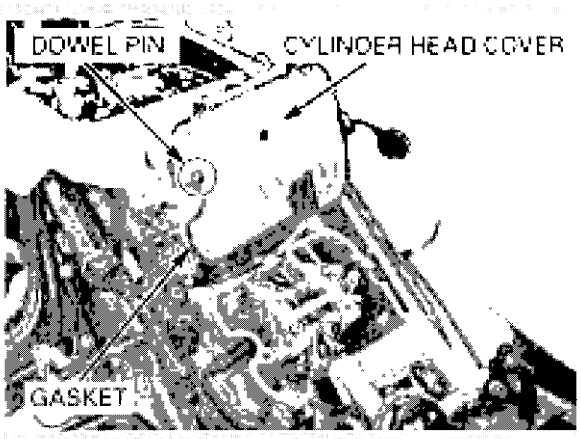


REAR

Clean the cylinder head cover mating surface of the cylinder head.

Install the dowel pin to the rear cylinder head cover.

Install the rear cylinder head cover on the rear cylinder.



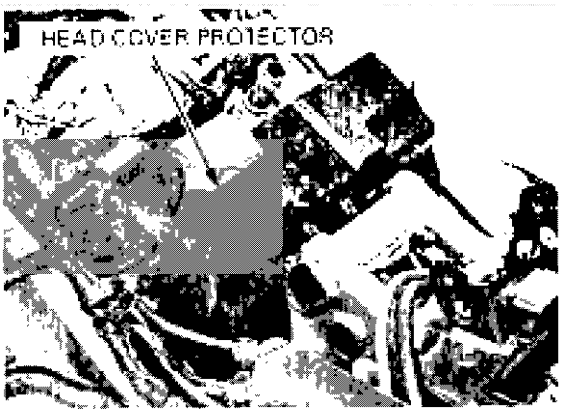
Install the rubber seals and washers.
Install and tighten the cylinder head cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the crankcase breather hose.

Install the rear cylinder head cover protector.

Install the fuel tank (page 6-62).



10. CYLINDER/PISTON

SYSTEM COMPONENTS 10-2

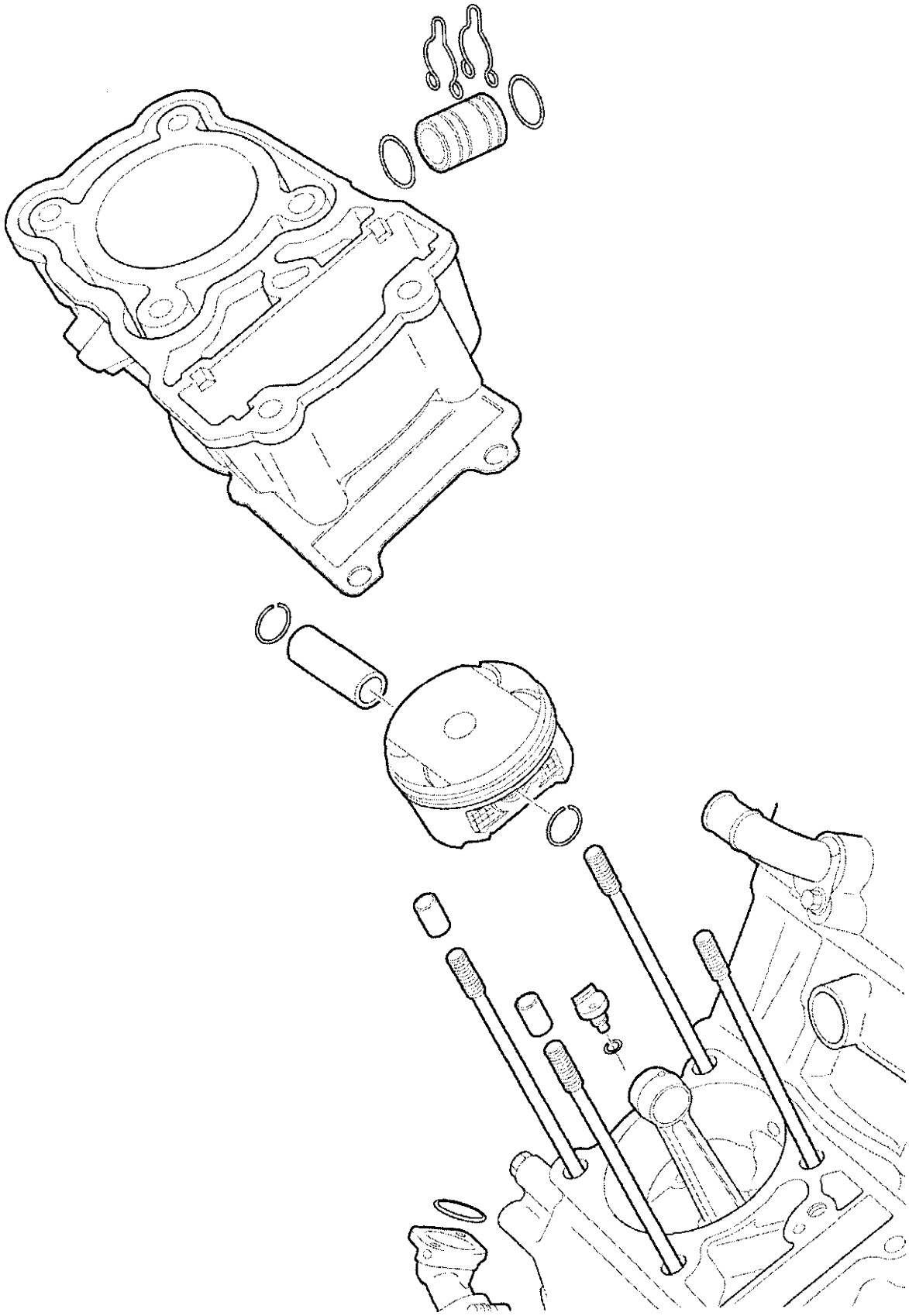
SERVICE INFORMATION 10-3

TROUBLESHOOTING 10-3

CYLINDER/PISTON REMOVAL 10-4

CYLINDER/PISTON INSTALLATION 10-9

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- This section covers service of the piston and cylinder. To service these parts, the engine must be removed from the frame.
- Take care not to damage the cylinder walls and pistons.
- Be careful not to damage the mating surfaces when removing the cylinder. Do not strike the cylinder too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder. Clean the oil passages before installing the cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		81.000 – 81.015 (3.1890 – 3.1896)	81.10 (3.193)
	Out of round		–	0.06 (0.002)
	Taper		–	0.06 (0.002)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston rings	Piston O.D. at 15 mm (0.59 in) from bottom		80.970 – 80.990 (3.1878 – 3.1886)	80.91 (3.185)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7089)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.010 – 0.045 (0.0004 – 0.0018)	0.065 (0.0026)
		Second	0.010 – 0.045 (0.0004 – 0.0018)	0.065 (0.0026)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.037 (0.7093 – 0.7101)	18.047 (0.7105)
Connecting rod-to-piston pin clearance			0.016 – 0.043 (0.0006 – 0.0017)	0.06 (0.002)

TORQUE VALUE

Cylinder stud bolt	See page 10-8

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin hole
- Worn cylinder, piston or piston rings
- Worn connecting rod small end

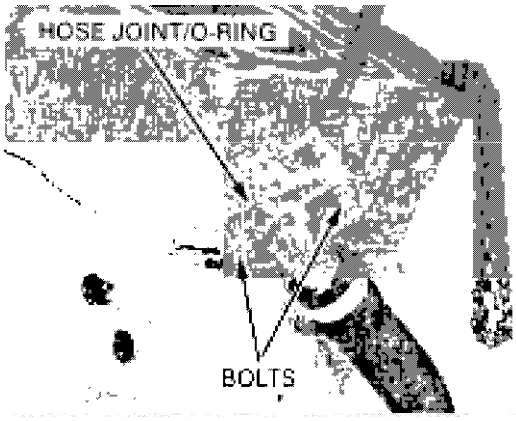
CYLINDER/PISTON REMOVAL

CYLINDER REMOVAL

NOTE:
The front cylinder uses the same service procedure as the rear cylinder.

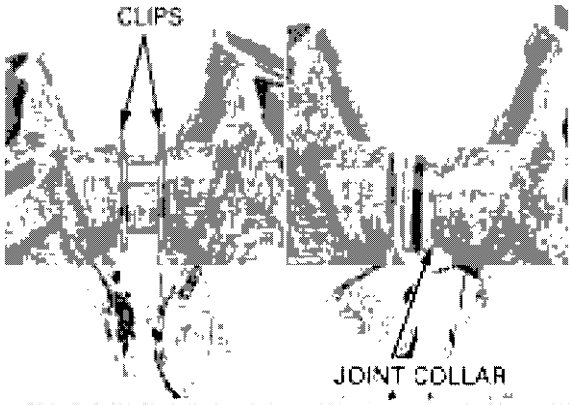
Remove the cylinder head (page 9-14).

Front cylinder only: Remove the bolts and water hose joint/O-ring.



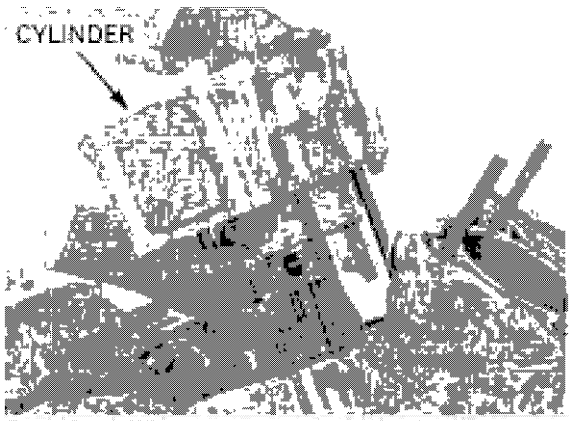
Remove the retaining clips.

Slide the cylinder joint collar toward either the front or rear cylinder.



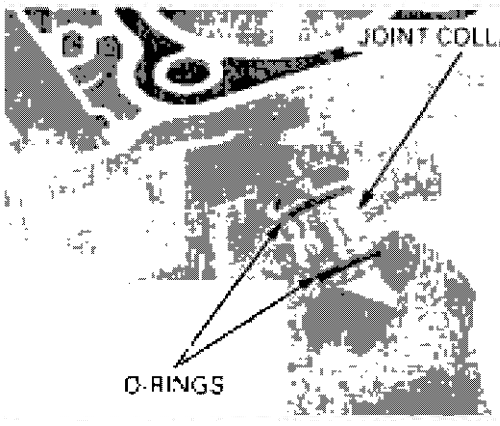
Lift the cylinder and remove it, being careful not to damage the piston with the stud bolts.

NOTE:
- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.



Remove the joint collar from the cylinder.

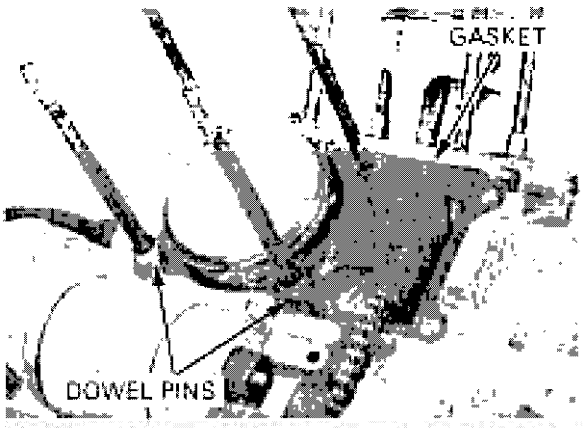
Remove the O-rings.



Remove the gasket and dowel pins.

Be careful not to damage the gasket surface.

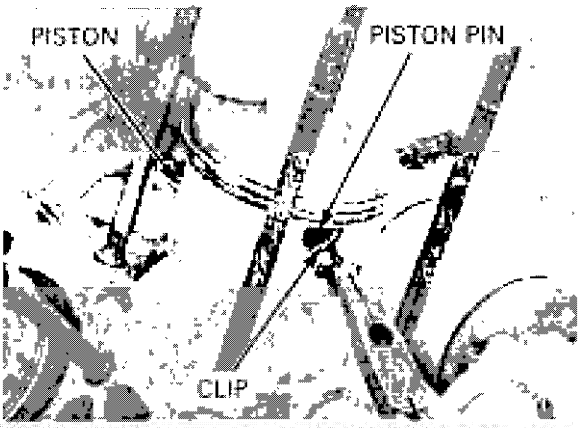
Clean off any gasket material from the cylinder upper surface.



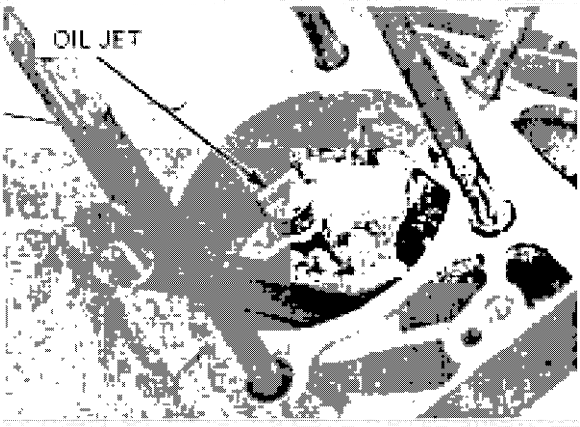
PISTON REMOVAL

Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Remove the piston pin clip with pliers.
Push the piston pin out of the piston and connecting rod, and remove the piston.



Remove the oil jet from the crankcase.



Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up a point opposite the gap.

Never use a wire brush; it will scratch the groove.

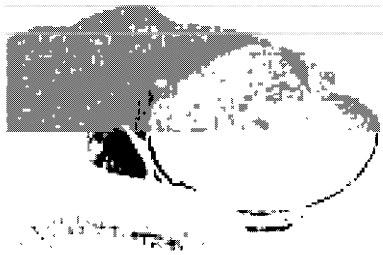
Clean carbon deposits from the ring grooves with a used piston ring that will be discarded.

INSPECTION

PISTON/PISTON RING

Always replace the piston rings as a set.

Inspect the piston rings for smooth movement by rotating them. The rings should be able to move in their grooves without catching.

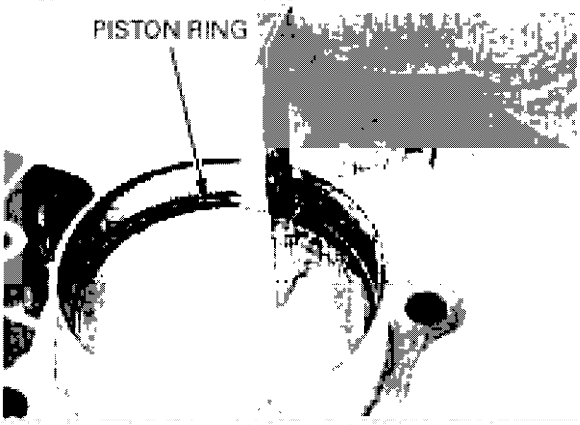


Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMITS:

Top: 0.065 mm (0.0026 in)
Second: 0.065 mm (0.0026 in)

Insert the piston ring into the bottom of the cylinder squarely using the piston crown.
Measure the ring end gap.

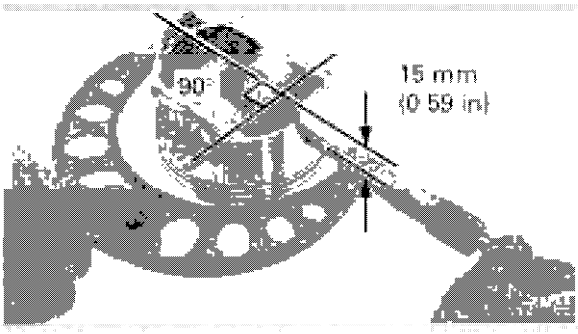


SERVICE LIMITS:

Top: 0.50 mm (0.020 in)
Second: 0.65 mm (0.026 in)
Oil (side rail): 0.90 mm (0.035 in)

Measure the piston O.D. at a point 15 mm (0.59 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 80.91 mm (3.185 in)

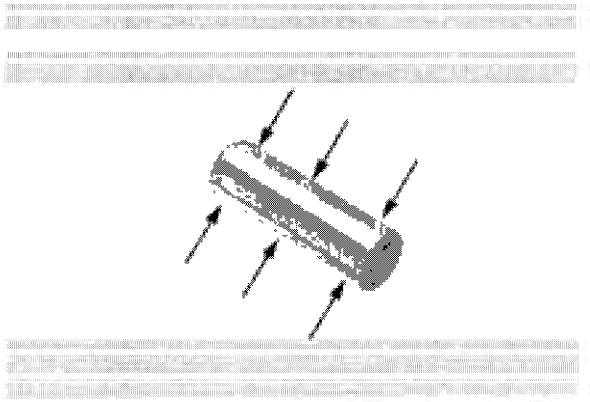


Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance (page 10-7).

SERVICE LIMIT: 0.10 mm (0.004 in)

Measure the piston pin O.D. at three points.

SERVICE LIMIT: 17.98 mm (0.708 in)

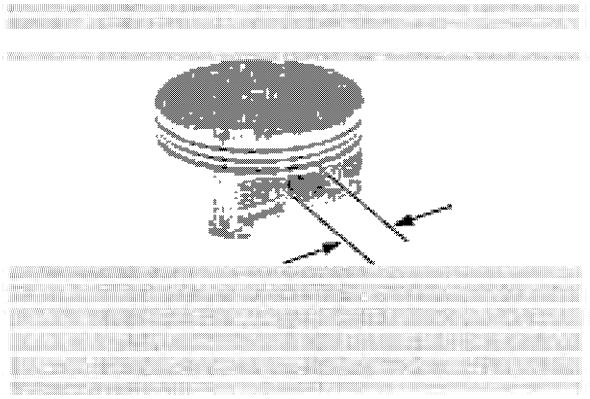


Measure the piston pin bore I.D.

SERVICE LIMIT: 18.05 mm (0.711 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



CONNECTING ROD

Measure the connecting rod small end I.D.

SERVICE LIMIT: 18.047 mm (0.7105 in)

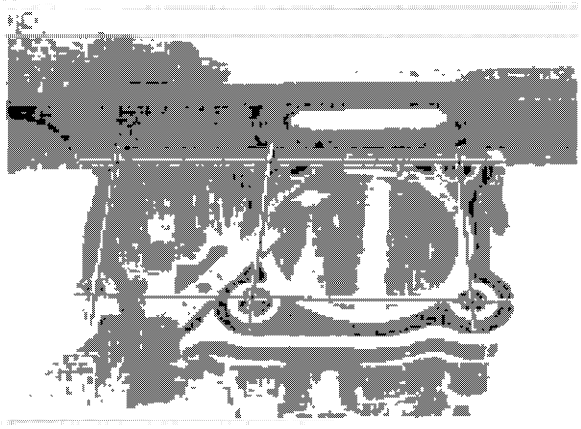
Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

CYLINDER

Check the top of the cylinder for warpage with a straight edge and feeler gauge across the stud holes.

SERVICE LIMIT: 0.10 mm (0.004 in)

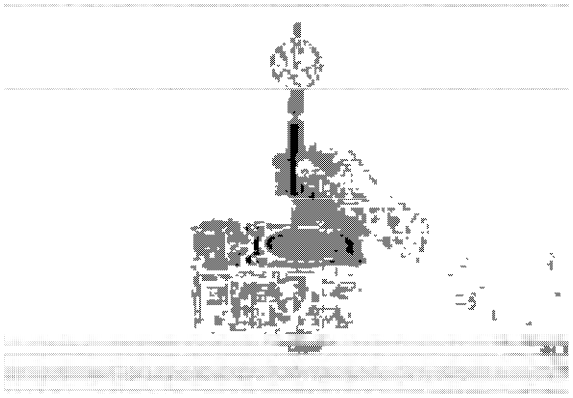


Check the cylinder wall for scratches or wear.
Measure the cylinder I.D. at three levels on the X and Y axes. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 81.10 mm (3.193 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



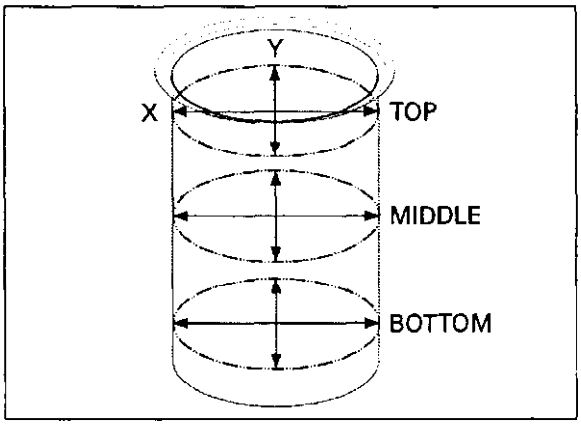
Calculate the cylinder taper and out-of-round at three levels on the X and Y axes. Take the maximum reading to determine the taper and out-of-round.

SERVICE LIMITS:
Taper: 0.06 mm (0.002 in)
Out-of-round: 0.06 mm (0.002 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:
0.25 mm (0.010 in)
0.50 mm (0.020 in)

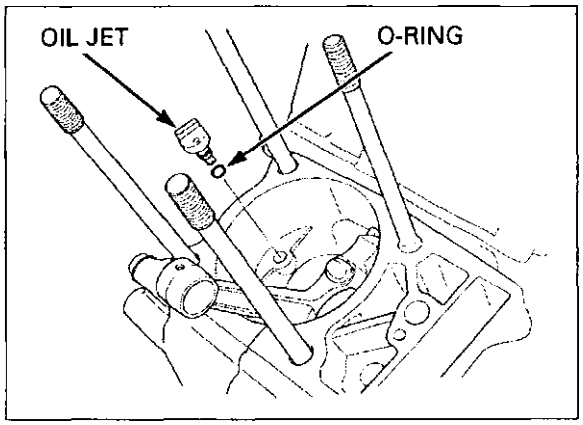
The piston to cylinder clearance for the oversize piston must be: 0.010 – 0.045 mm (0.0004 – 0.0018 in).



OIL JET

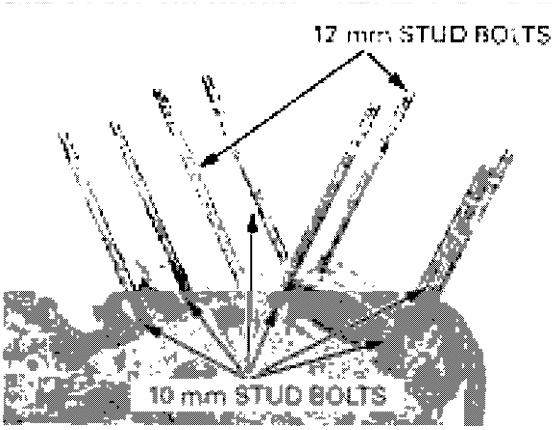
Remove the O-ring from the oil jet.

Check the oil jet for clog.
Clean or replace it, if necessary.



CYLINDER STUD BOLT REPLACEMENT

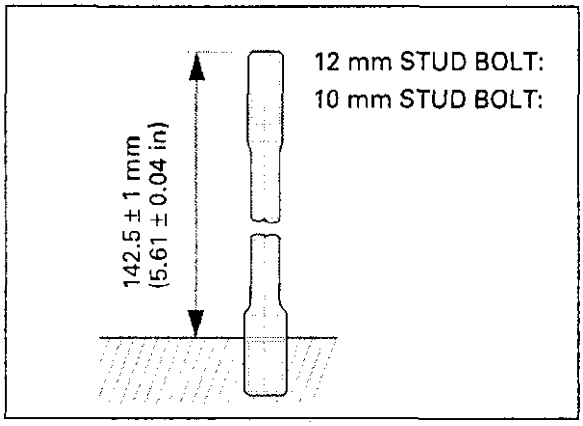
Thread two nuts onto the stud and tighten them together, and use a wrench on them to turn the stud bolt out.



Apply engine oil to the lower threads of a new stud bolt and install it.

Be sure to verify the stud height from the crankcase surface.

Adjust the height if necessary.



CYLINDER/PISTON INSTALLATION

PISTON RING INSTALLATION

Apply oil to the piston and piston ring outer surface.

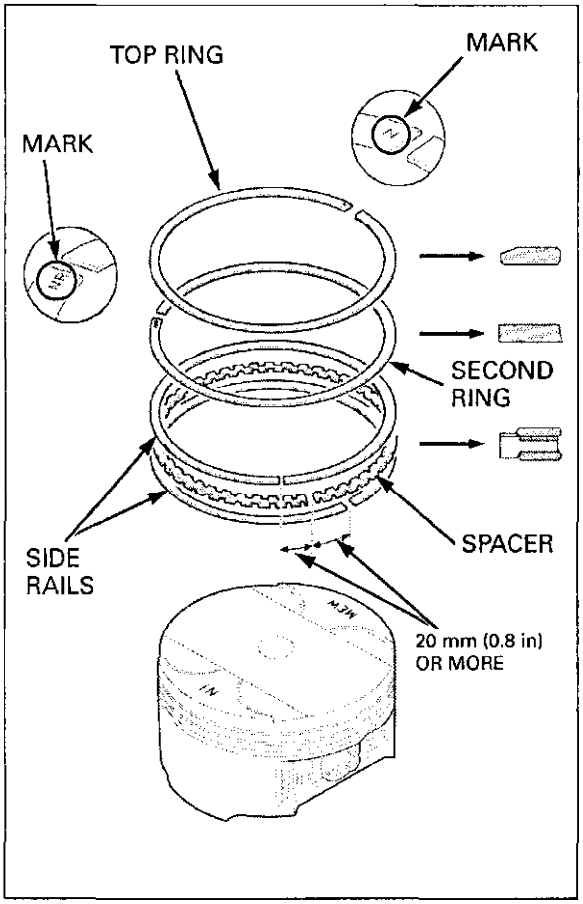
Be careful not to damage the piston and rings.

Carefully install the piston rings into the piston ring grooves with the markings facing up.

NOTE:

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.
Stagger the side rail end gaps as shown.

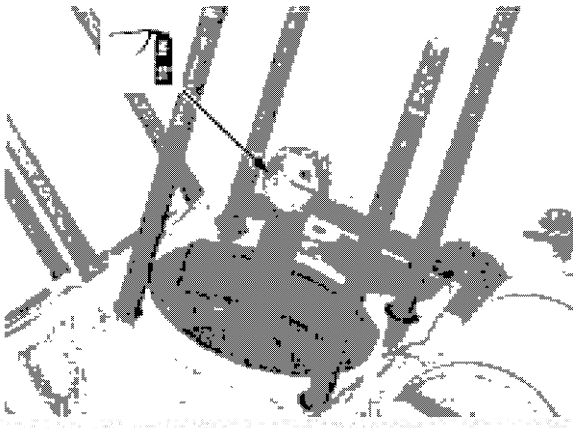


PISTON INSTALLATION

Replace the O-ring with a new one and apply engine oil.
Install new O-ring to the oil jet groove securely.

Install the oil jet to the crankcase securely.

Apply molybdenum disulfide oil to the connecting rod bore.



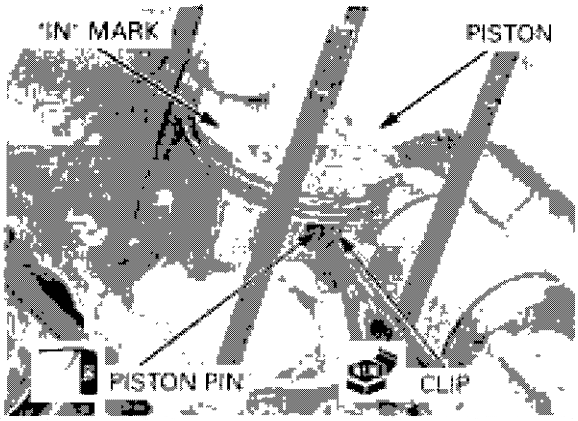
Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Apply engine oil to the piston pin outer surface.

Install the piston.
Install the piston pin through the piston and connecting rod.

Install new piston pin clips into the grooves in the piston pin hole.

NOTE:
- Make sure the piston pin clip is seated securely.
- Do not align the clip end gap with the piston cutout.

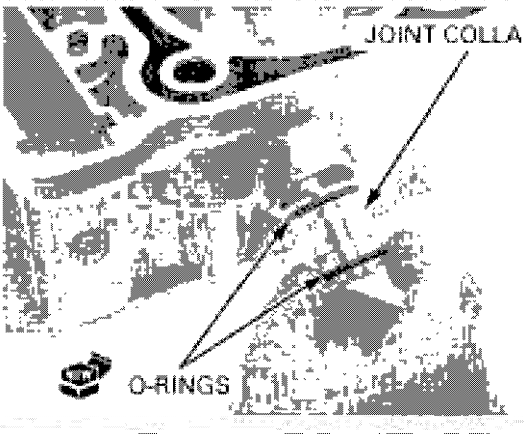


CYLINDER INSTALLATION

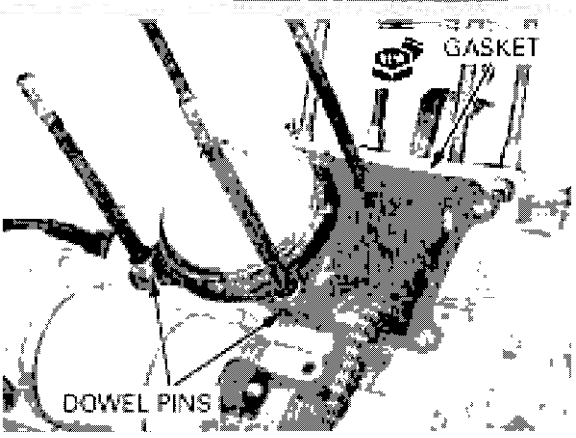
The front cylinder uses the same service procedure as the rear cylinder.

Clean the gasket surfaces of the cylinder and crankcase thoroughly, being careful not to damage them.

Install new O-rings to the joint collar.
Install the joint collar to the cylinder.



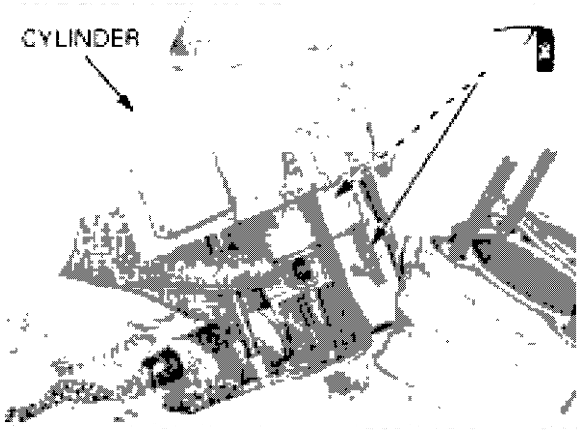
Install the dowel pins and a new gasket.



Be careful not to damage the piston rings and cylinder wall.

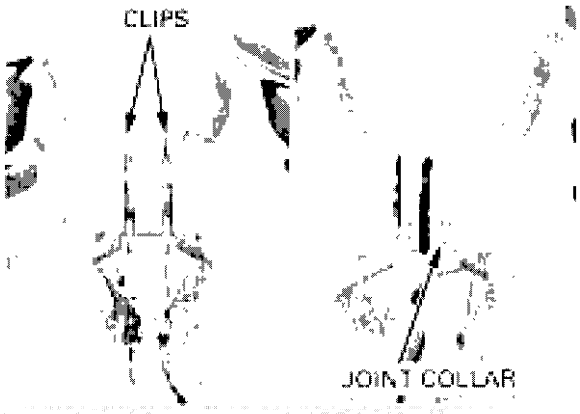
Apply engine oil to the cylinder wall, piston outer surface and piston rings.

Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.



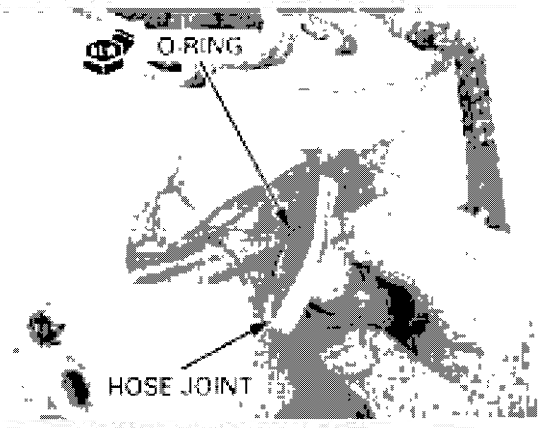
Slide the joint collar into the hole in the cylinder and connect it.

Install the retaining clips into the joint collar grooves.



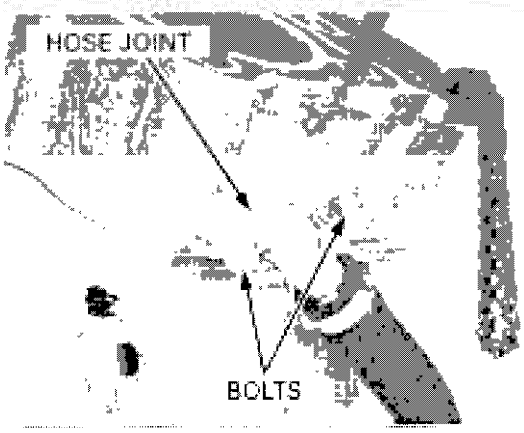
Front cylinder only:

Install a new O-ring to the hose joint groove.



Install the hose joint to the front cylinder and tighten the bolts securely.

Install the cylinder head (page 9-26).



11. CLUTCH/GEARSHIFT LINKAGE

SYSTEM COMPONENTS 11-2

SERVICE INFORMATION 11-3

TROUBLESHOOTING 11-4

RIGHT CRANKCASE COVER REMOVAL 11-5

CLUTCH REMOVAL 11-6

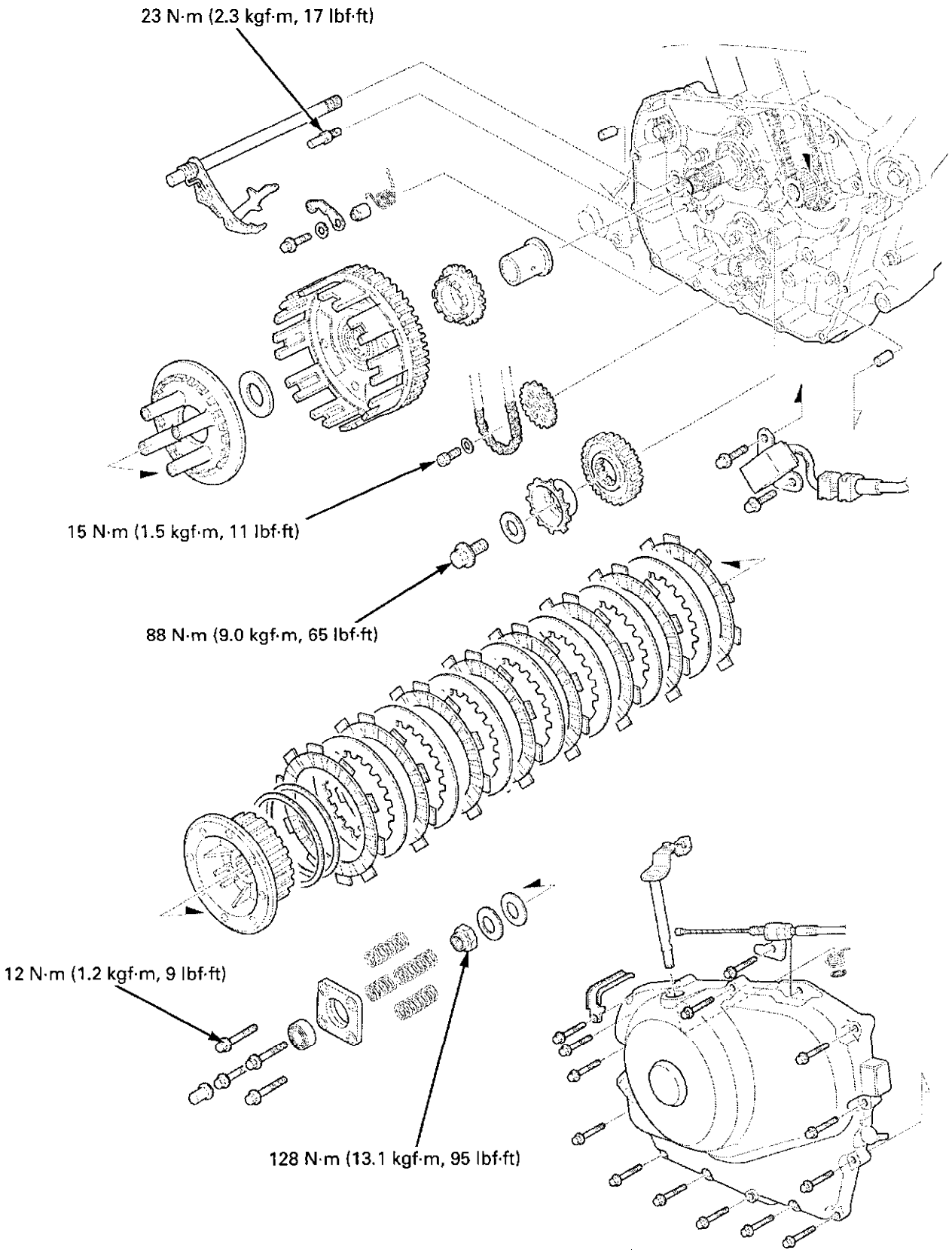
PRIMARY DRIVE GEAR 11-12

GEARSHIFT LINKAGE 11-14

CLUTCH INSTALLATION 11-16

RIGHT CRANKCASE COVER INSTALLATION 11-19

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- The clutch and gearshift linkage can be serviced with the engine in the frame.
- Engine oil viscosity, oil level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil and oil level before servicing the clutch system.

SPECIFICATIONS

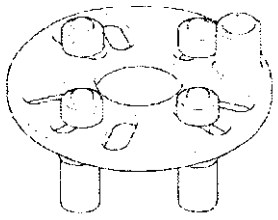
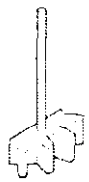
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever free play			10 – 20 (3/8 – 3/4)	–
Clutch	Spring free length		43.2 (1.70)	41.7 (1.64)
	Disc thickness	Disc A	2.692 – 2.708 (0.1060 – 0.1066)	2.3 (0.09)
		Disc B	2.920 – 3.080 (0.1150 – 0.1213)	2.6 (0.10)
		Disc C	2.692 – 2.708 (0.1060 – 0.1066)	2.3 (0.09)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide		I.D.	21.991 – 22.016 (0.8658 –0.8668)	22.03 (0.867)
		O.D.	31.959 – 31.975 (1.2582 – 1.2588)	31.92 (1.257)
Mainshaft O.D. at clutch outer guide			21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)
Clutch outer guide-to-mainshaft clearance			0.011 – 0.049 (0.0004 – 0.0019)	0.08 (0.003)
Clutch outer I.D.			32.000 – 32.025 (1.2598 – 1.2608)	32.09 (1.263)
Clutch outer-to-outer guide clearance			0.025 – 0.066 (0.0010 – 0.0026)	0.18 (0.007)
Oil pump drive sprocket I.D.			32.025 – 32.145 (1.2608 – 1.2655)	32.16 (1.266)
Oil pump drive sprocket-to-clutch outer guide clearance			0.066 – 0.170 (0.0026 – 0.0067)	0.23 (0.009)

TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	128 N·m (13.1 kgf·m, 95 lbf·ft)	Replace with a new one and stake Apply engine oil to the threads and flange surface
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply locking agent
Primary drive gear bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply engine oil to the threads and flange surface
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Gearshift pedal pivot bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	

TOOLS

Clutch center holder 07JMB-MN50301	Gear holder, 2.5 07724-0010100
	

TROUBLESHOOTING

Clutch lever engagement hard
- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Too much clutch lever free play
- Warped clutch plates
- Loose clutch center lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

Clutch slips
- No clutch lever free play
- Worn clutch discs
- Weak clutch springs
- Clutch lifter sticking
- Engine oil level too low or oil additive used

Hard to shift
- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged gearshift cam
- Bent fork shaft or damaged shift forks and shift drum (page 13-20)

Transmission jumps out of gear
- Broken shift drum stopper arm
- Weak or broken gearshift spindle return springs
- Worn or damaged gearshift cam
- Bent fork shaft or worn shift forks and shift drum (page 13-20)
- Worn gear dogs or dog holes (page 13-20)

RIGHT CRANKCASE COVER REMOVAL

REMOVAL

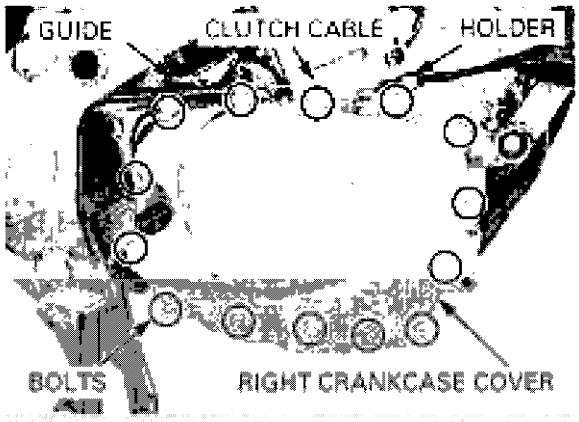
Drain the engine oil (page 4-12).
Remove the exhaust system (page 3-17).

Remove the bolts in a crisscross pattern in several steps.

Remove the clutch cable holder and disconnect the clutch cable.

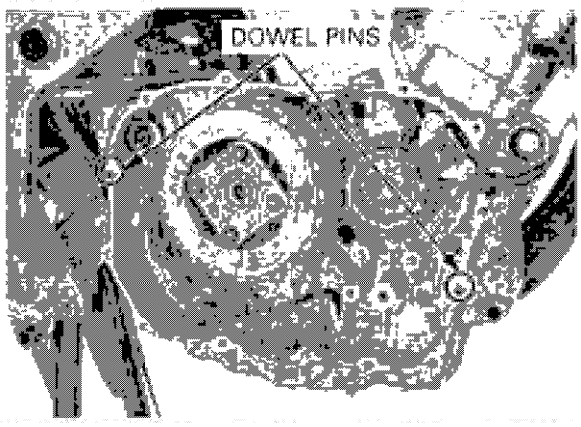
Remove the starter motor cable/ground cable guide.

Remove the right crankcase cover.



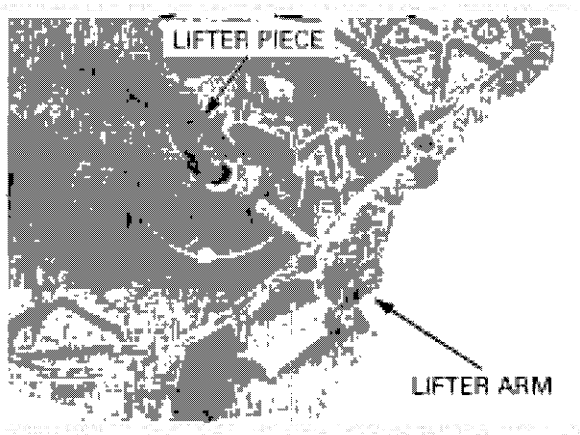
Be careful not to damage the mating surface.

Remove the dowel pins and clean off the sealant from the mating surface.

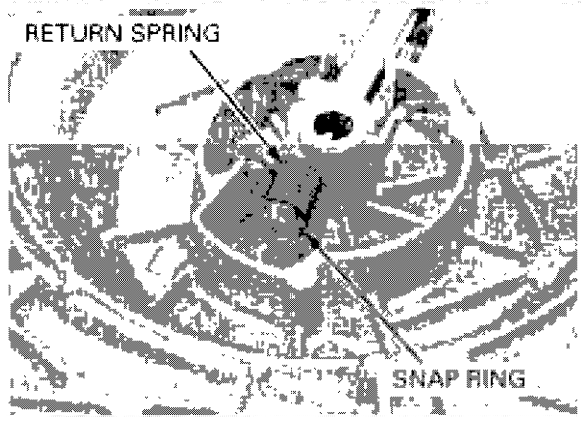


DISASSEMBLY

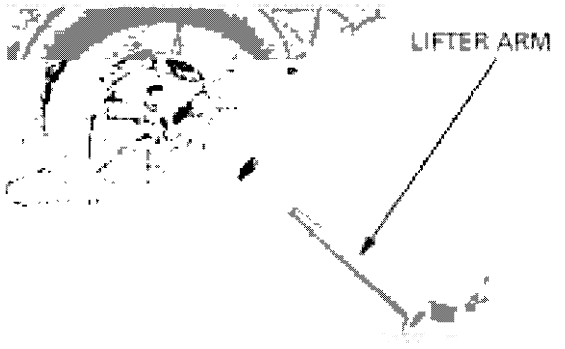
Remove the clutch lifter piece while turning the lifter arm clockwise.



Remove the snap ring and return spring from the right crankcase cover.



Remove the clutch lifter arm.

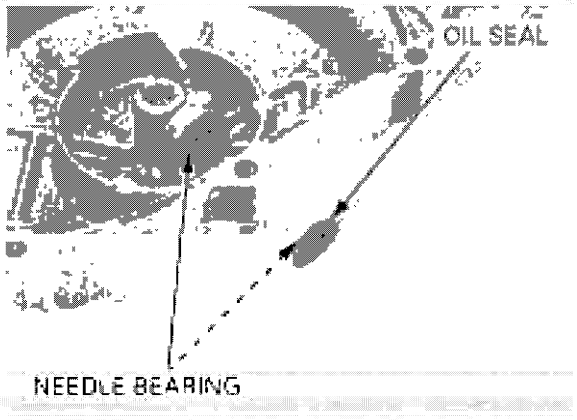


INSPECTION

Check the oil seal for fatigue or damage.
Check the needle bearings for wear, damage or loose fit.

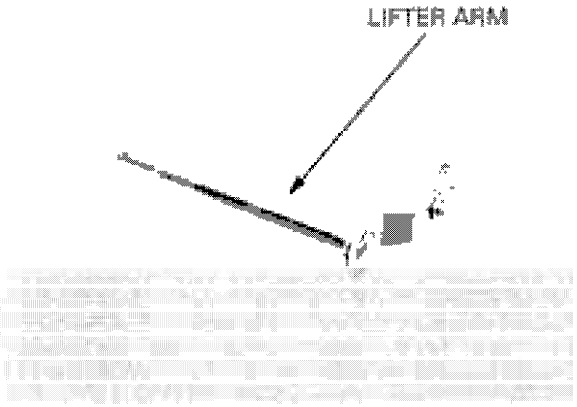
Replace these parts if necessary.

NOTE:
If the oil seal replacement is required, install the oil seal to the case surface.



Check the clutch lifter arm for wear, damage or bending.
Check the spring for fatigue or damage.

Replace these parts if necessary.

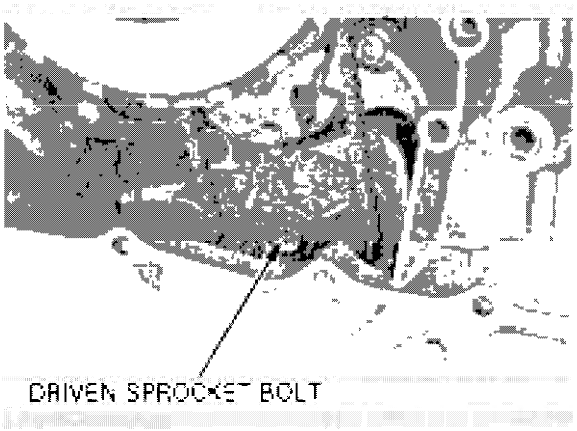


CLUTCH REMOVAL

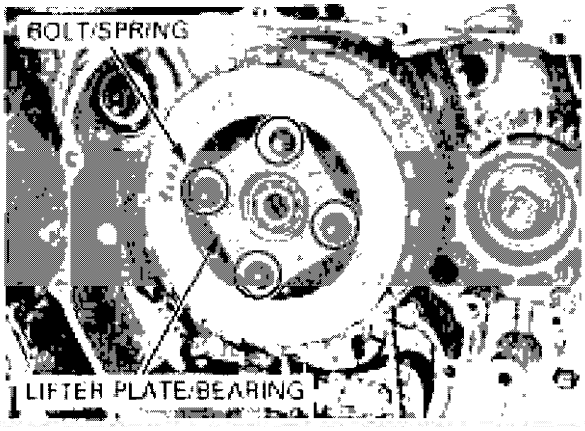
REMOVAL

Remove the right crankcase cover (page 11-5).

If the oil pump driven sprocket will be removed, loosen the driven sprocket bolt while the clutch is still installed.

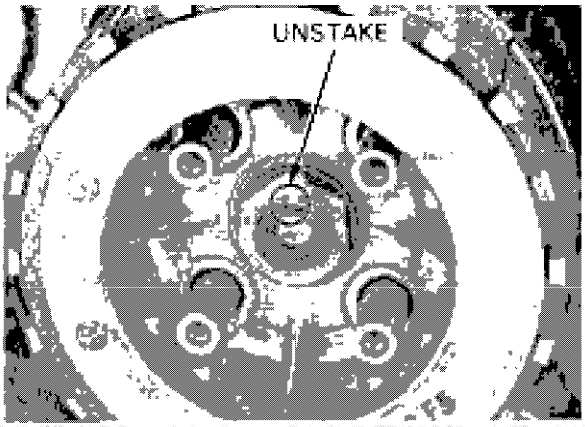


Loosen the clutch lifter plate bolts in a crisscross pattern in several steps.
Remove the lifter plate/bearing and clutch springs.



Be careful not to damage the main-shaft threads.

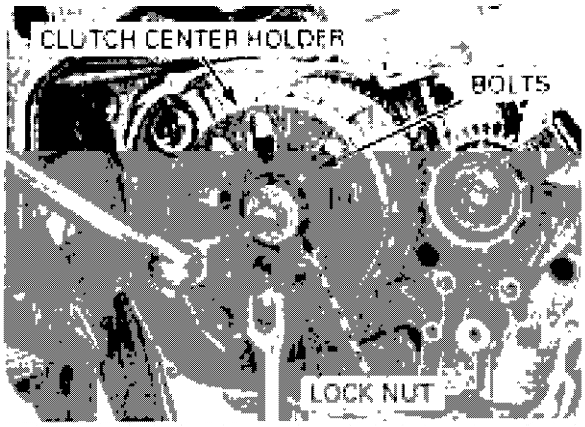
Unstake the clutch center lock nut.



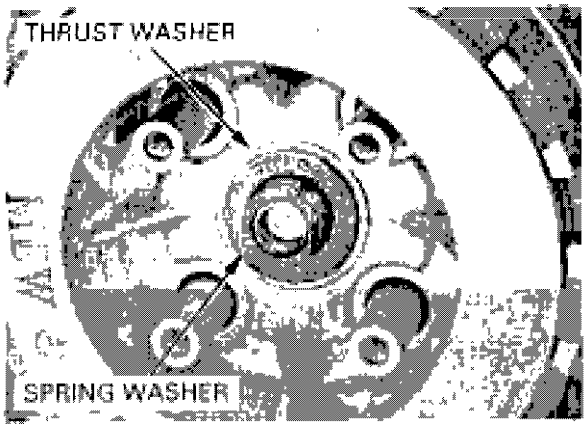
Set the clutch center holder onto the clutch center.
Install and finger tighten the four lifter plate bolts.
Hold the clutch center using a special tool and loosen the clutch center lock nut.

TOOL:
Clutch center holder **07JMB-MN50301**

Remove the tool and clutch center lock nut.

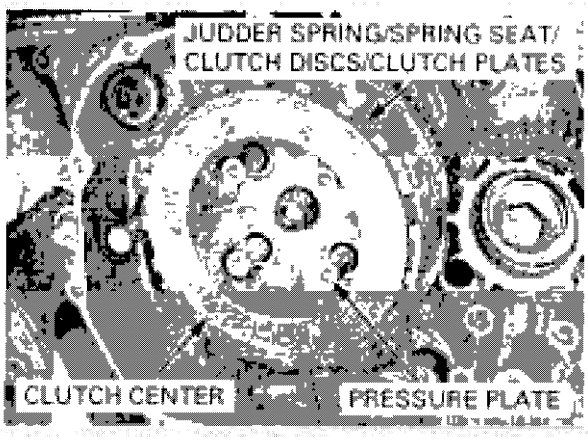


Remove the spring washer and thrust washer.

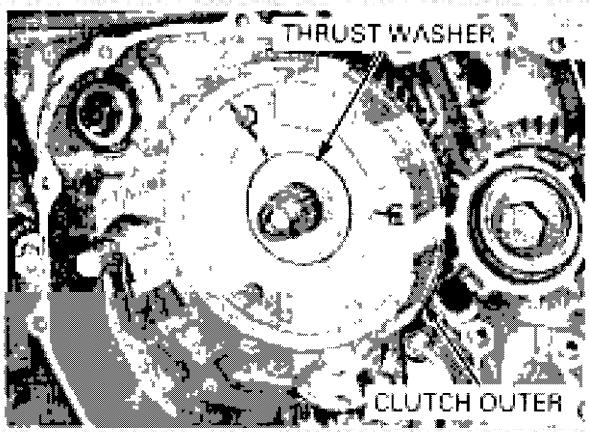


Remove the following:

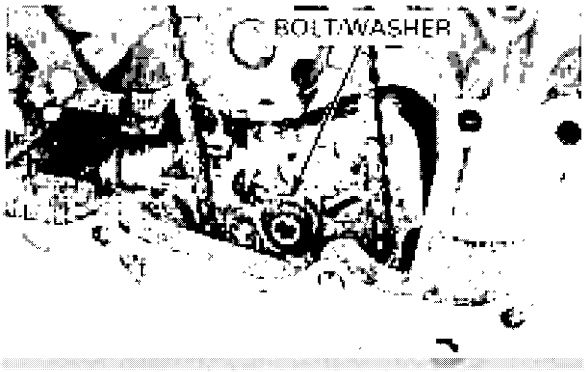
- Clutch center
- Pressure plate
- Clutch disc B
- Seven clutch plates
- Six clutch discs A
- Clutch disc C
- Judder spring
- Spring seat



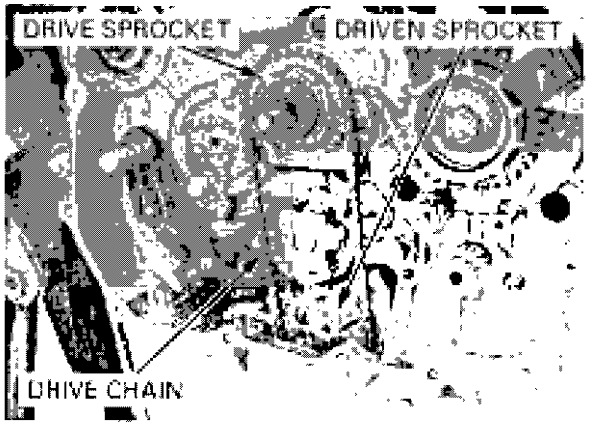
Remove the thrust washer and clutch outer.



Remove the oil pump driven sprocket bolt and washer.



Remove the oil pump drive sprocket, driven sprocket and drive chain as a set.



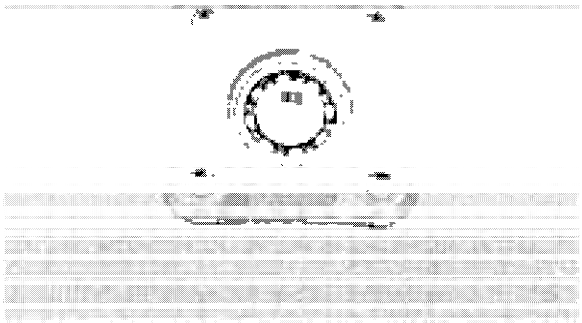
Remove the clutch outer guide.

INSPECTION

LIFTER PLATE BEARING

Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the lifter plate.

Remove and discard the bearing if the races do not turn smoothly and quietly, or if they fit loosely in the lifter plate.

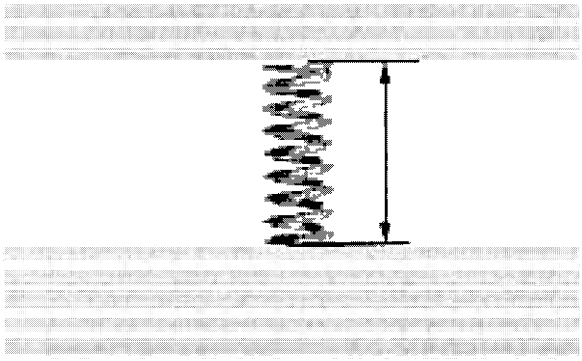


CLUTCH SPRING

Replace the clutch springs as a set.

Check the clutch spring free length.

SERVICE LIMIT: 41.7 mm (1.64 in)



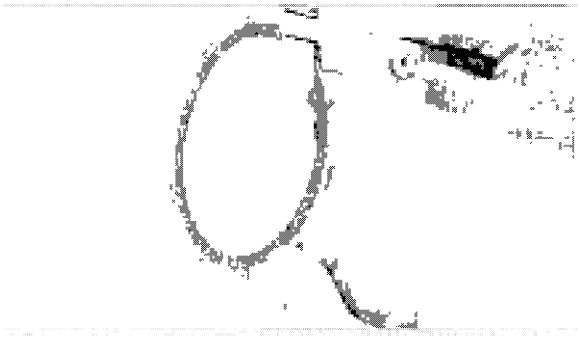
CLUTCH DISC

Replace the clutch discs and plates as a set.

Replace the clutch discs for signs of scoring or discoloration.

Measure the clutch disc thickness.

SERVICE LIMITS: Disc A: 2.3 mm (0.09 in)
Disc B: 2.6 mm (0.10 in)
Disc C: 2.3 mm (0.09 in)



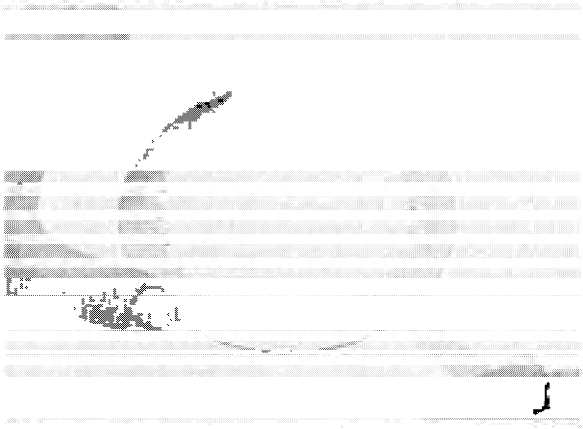
CLUTCH PLATE

Replace the clutch discs and plates as a set.

Check the clutch plate for discoloration.

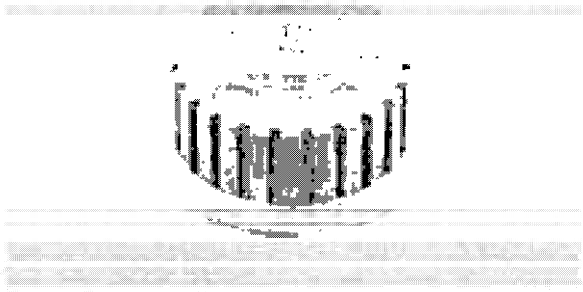
Check the clutch plate warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)



CLUTCH CENTER

Check the clutch center for nicks, indentations or abnormal wear caused by the clutch plates.

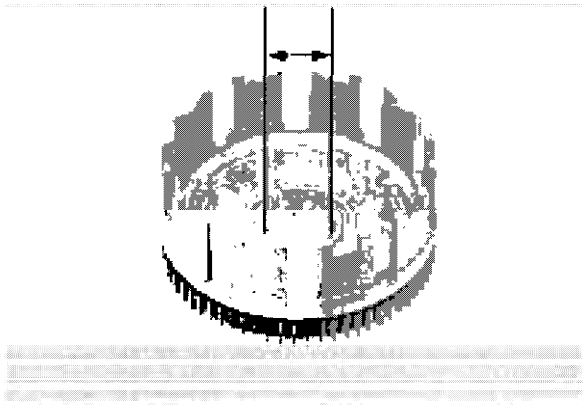


CLUTCH OUTER

Check the slot in the clutch outer for nicks, indentations or abnormal wear caused by the clutch discs.

Measure the clutch outer I.D.

SERVICE LIMIT: 32.09 mm (1.263 in)



CLUTCH OUTER GUIDE

Check the clutch outer guide for damage or abnormal wear.

Measure the clutch outer guide I.D.

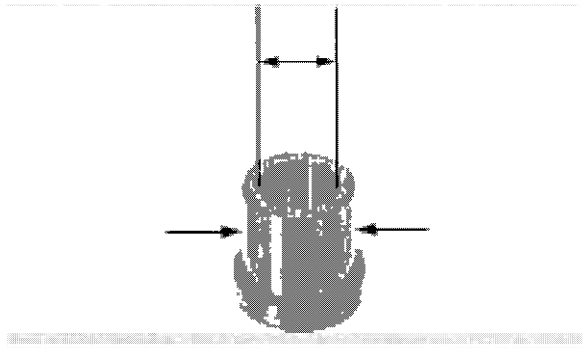
SERVICE LIMIT: 22.03 mm (0.867 in)

Measure the clutch outer guide O.D.

SERVICE LIMIT: 31.92 mm (1.257 in)

Calculate the clutch outer-to-outer guide clearance.

SERVICE LIMIT: 0.18 mm (0.007 in)



OIL PUMP DRIVE SPROCKET

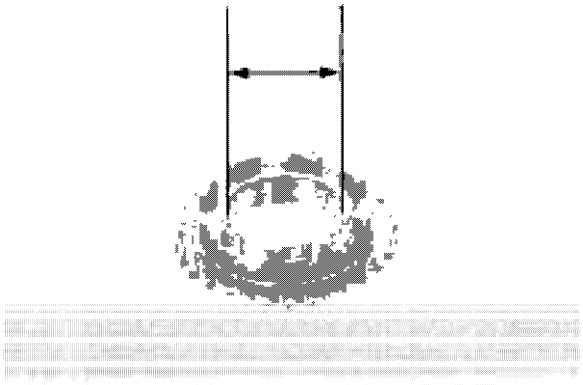
Check the oil pump drive sprocket for wear or damage.

Measure the I.D. of the drive sprocket.

SERVICE LIMIT: 32.16 mm (1.266 in)

Calculate the oil pump drive sprocket-to-clutch outer guide clearance.

SERVICE LIMIT: 0.23 mm (0.009 in)



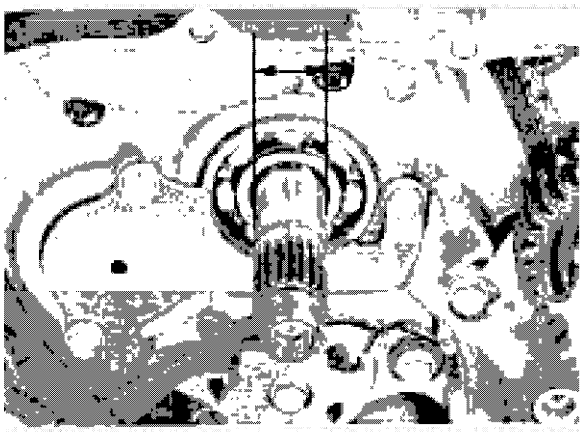
MAINSHAFT

Measure the mainshaft O.D. at the clutch outer guide sliding surface.

SERVICE LIMIT: 21.95 mm (0.864 in)

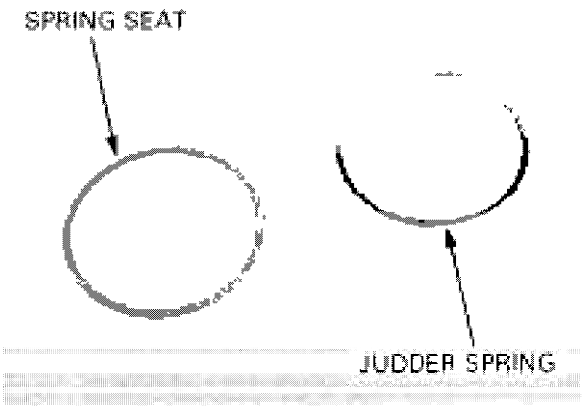
Calculate the clutch outer guide-to-mainshaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)



JUDDER SPRING/SPRING SEAT

Check the spring seat and judder spring for distortion, wear or damage.



OIL PUMP DRIVEN SPROCKET

Check the oil pump driven sprocket for wear or damage.

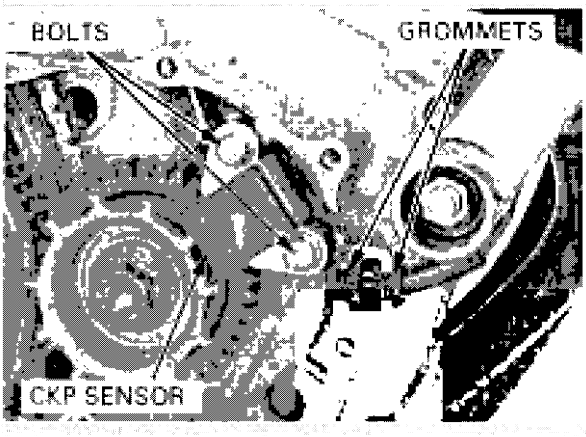
PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch (page 11-6).

Remove the CKP sensor mounting bolts.

Remove the CKP sensor and grommets.



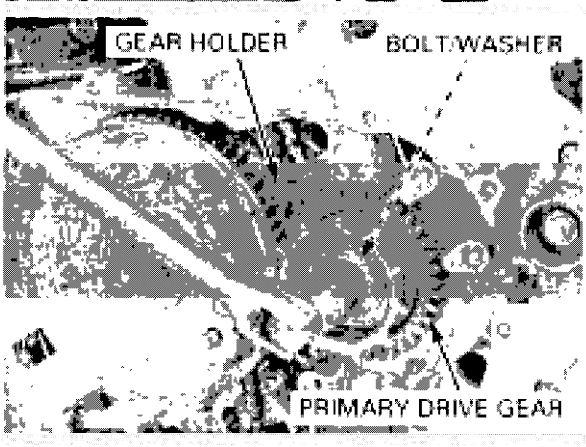
Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft (page 11-16).

Hold the primary drive gear using a special tool and remove the primary drive gear bolt and washer.

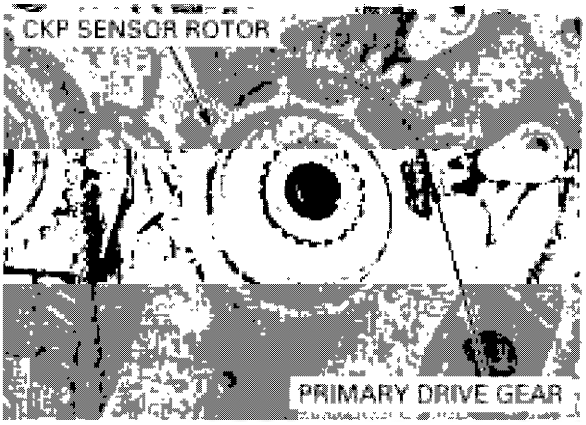
TOOL:

Gear holder, 2.5 **07724-0010100**

Remove the gear holder and temporarily installed parts.

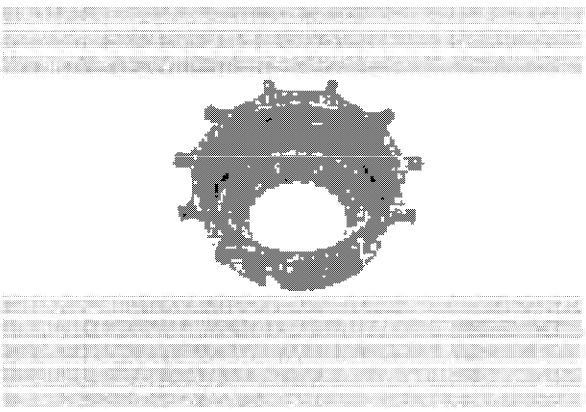


Remove the CKP sensor rotor and primary drive gear.

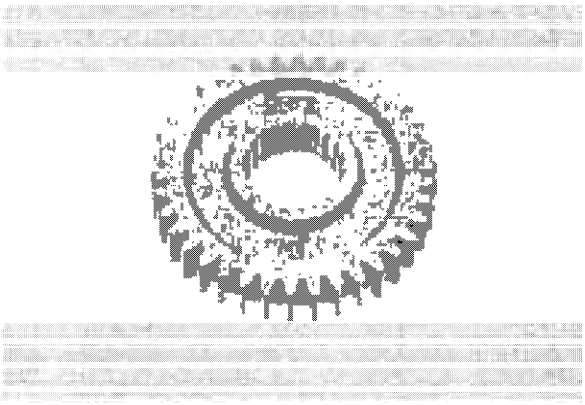


INSPECTION

Check the CKP sensor rotor for wear or damage.



Check the primary drive gear for wear or damage.

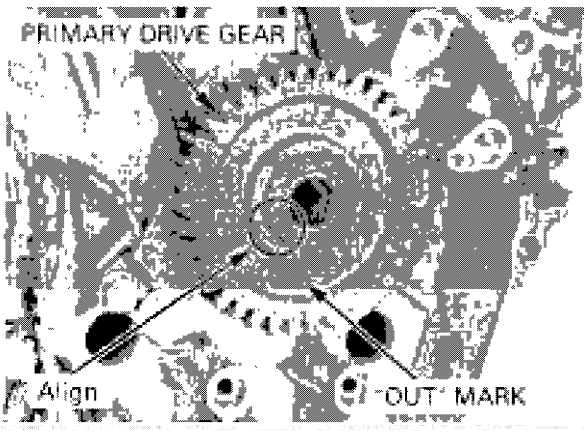


INSTALLATION

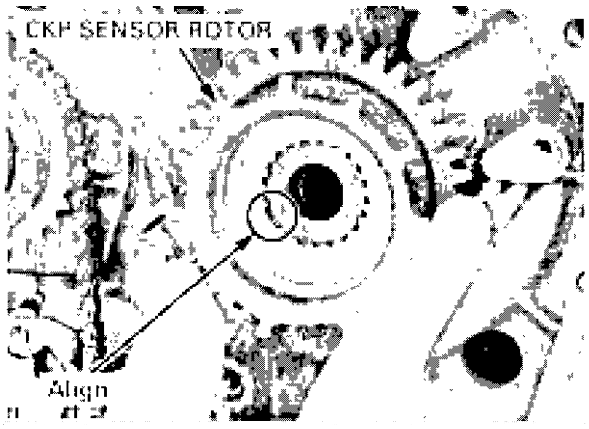
Install the primary drive gear on the crankshaft.

NOTE:

- Install the primary drive gear, aligning its wide groove with the wide tooth of the crankshaft.
- Install the primary drive gear with its "OUT" mark facing out.



Install the CKP sensor rotor, aligning its wide groove with the wide tooth of the crankshaft.



Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft.

Apply oil to the primary drive gear bolt threads and seating surface.
Install the washer and primary drive gear bolt.

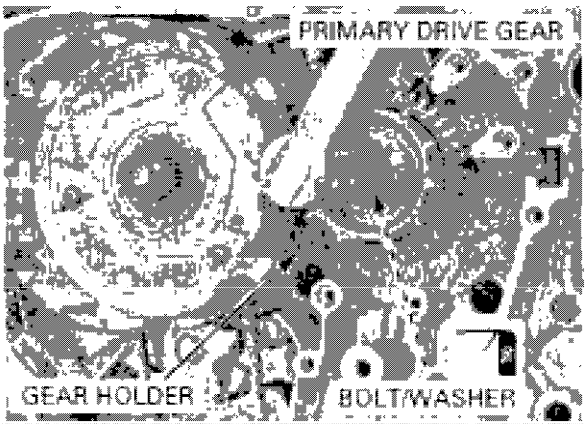
Hold the primary drive gear using a special tool.

TOOL:
Gear holder, 2.5 07724-0010100

Tighten the bolt to the specified torque.

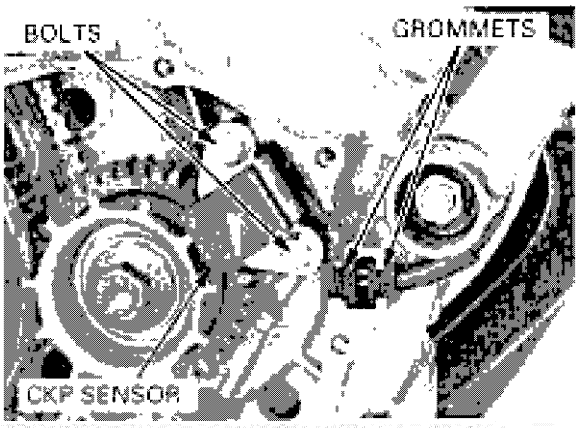
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Remove the gear holder and temporarily installed parts.



Install the CKP sensor, wire grommets and tighten the bolts.

Install the clutch (page 11-16).



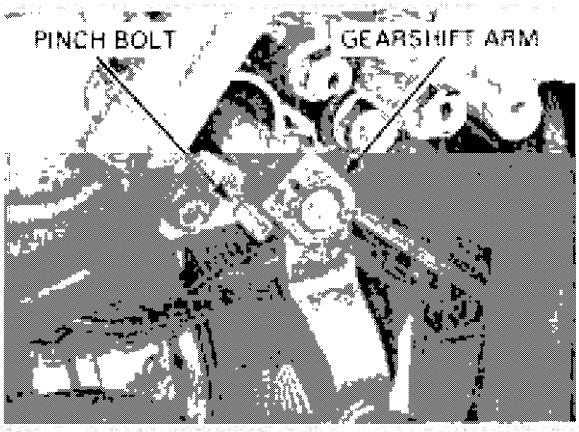
GEARSHIFT LINKAGE

REMOVAL

Remove the following:

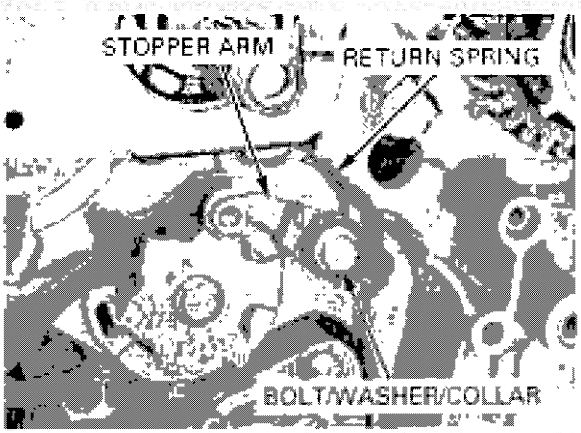
- Left crankcase rear cover (page 3-15).
- Clutch (page 11-6)

Remove the pinch bolt and gearshift arm from the spindle.
Clean the gearshift spindle.

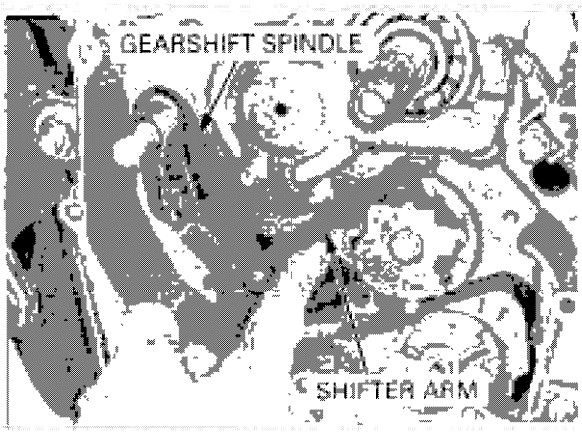


Remove the following:

- Bolt
- Washer
- Stopper arm
- Collar
- Return spring



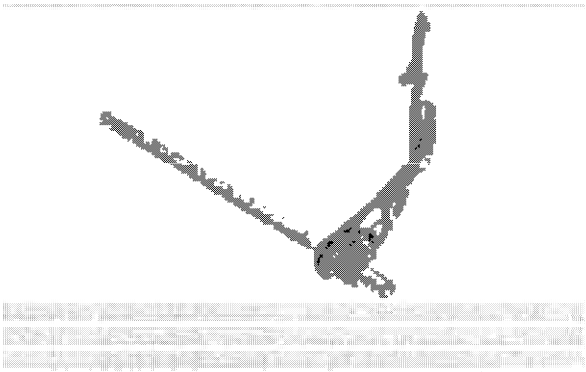
Remove the gearshift spindle from the crankcase while unhooking the shifter arm from the gearshift cam plate.



INSPECTION

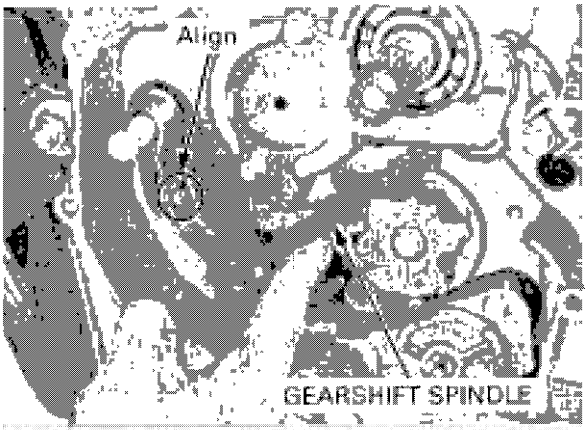
Check the gearshift spindle for bend, wear or damage.

Check the return spring for fatigue or damage.



INSTALLATION

Install the gearshift spindle, aligning the return spring ends with the pin in the case.

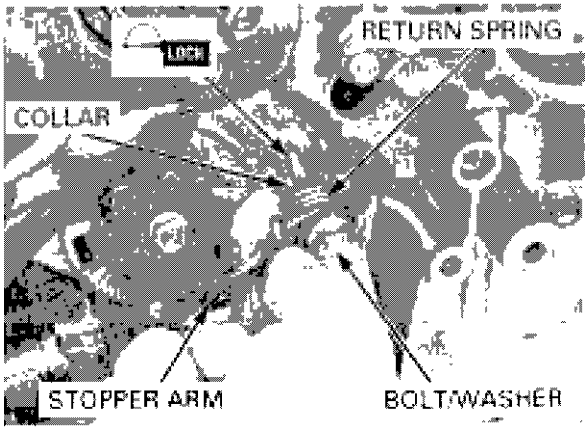


Hook the shift arm to the gearshift cam plate.

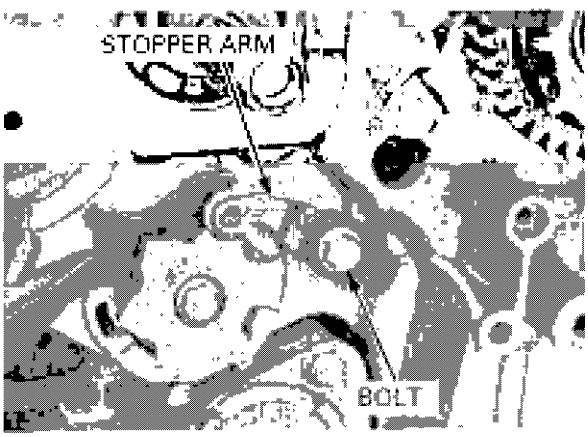
Clean and apply a locking agent to the bolt threads.

Install the following:

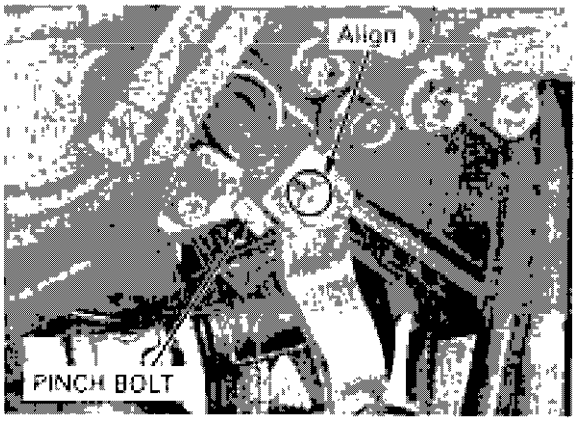
- Collar
- Return spring
- Stopper arm
- Washer
- Bolt



Hold the stopper arm with the screwdriver, and tighten the bolt securely.



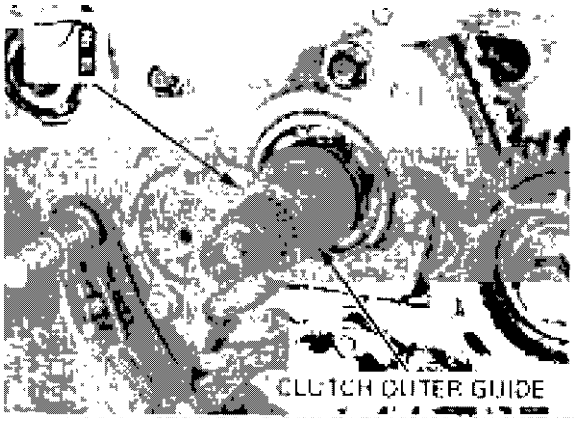
Install the gearshift arm to the spindle, aligning with the punch mark and slit.
Tighten the pinch bolt securely.



CLUTCH INSTALLATION

Apply molybdenum disulfide oil to the clutch outer guide outer surface.

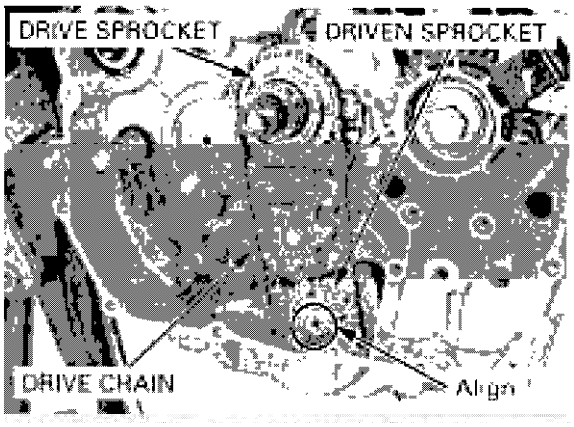
Install the clutch outer guide to the mainshaft.



Install the oil pump drive chain, drive sprocket and driven sprocket as a set.

NOTE:

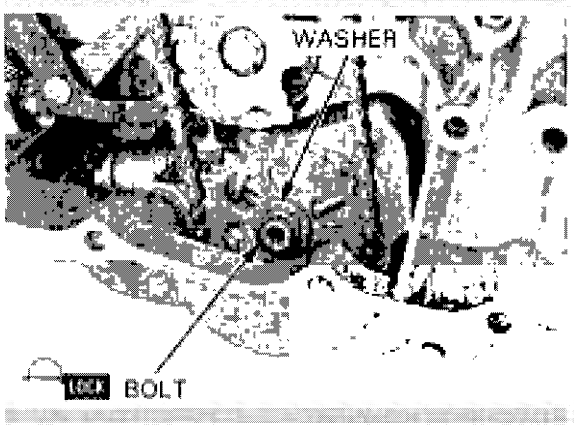
- Install the driven sprocket with the "O" mark facing outside.
- Align the flat surfaces of the driven sprocket hole and oil pump shaft end.



Apply locking agent to the oil pump driven sprocket bolt threads and install the washer and bolt.

NOTE:

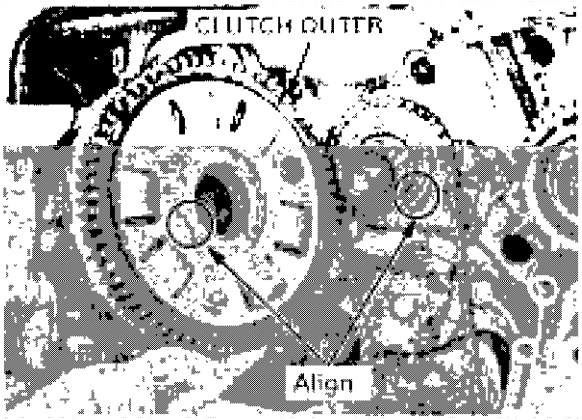
Tighten the driven sprocket bolt to the specified torque after installing the clutch.



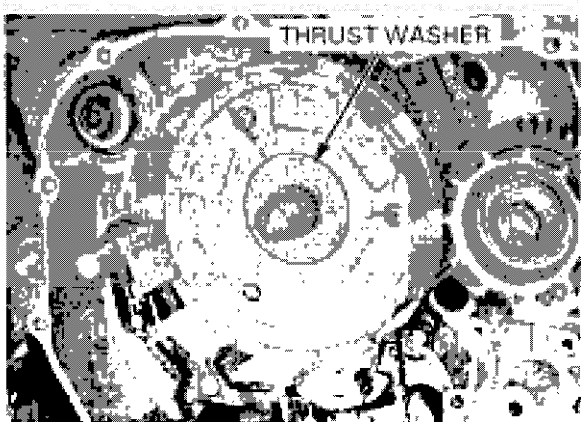
Install the clutch outer onto the mainshaft.

NOTE:

Align the grooves in the clutch outer with the bosses on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer onto the shaft.



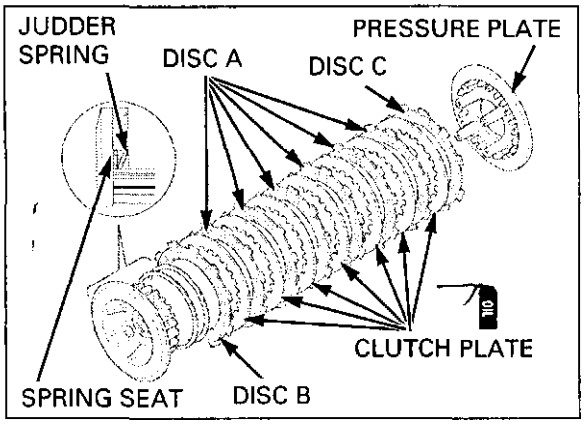
Install the thrust washer onto the mainshaft.



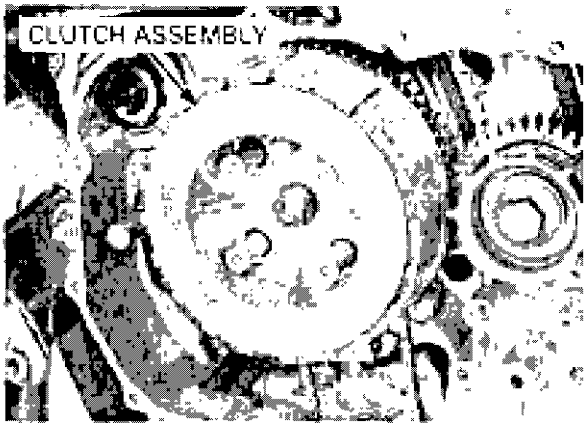
- Clutch disc is available in three types.
  - Clutch disc B: Has a larger I.D. than disc A and C.
  - Clutch disc A: Blue paint on the tab.
  - Clutch disc C: Orange paint on the tab.

Coat the clutch discs and plates with engine oil.
Install the spring seat and judder spring to the clutch center as shown.

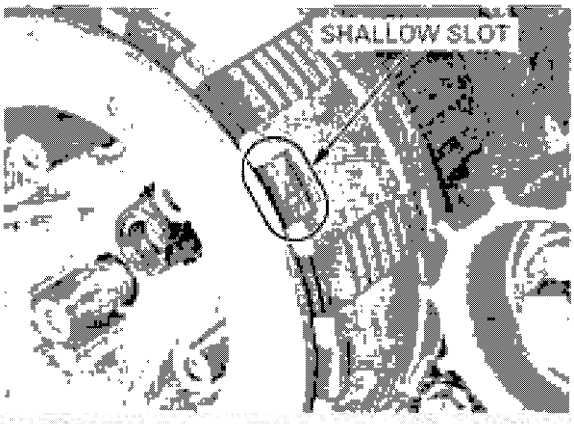
Install the clutch disc B.
Install the seven clutch plate and six disc A, starting with the clutch plate.
Install the clutch disc C.
Install the pressure plate.



Install the clutch assembly into the clutch outer.

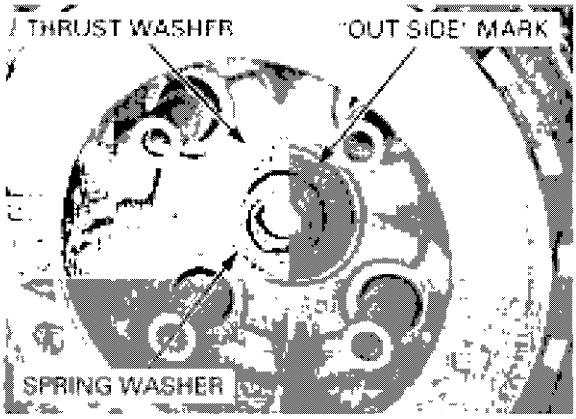


Install the clutch disc B *into the shallow slots of the* clutch outer.



Install the thrust washer.

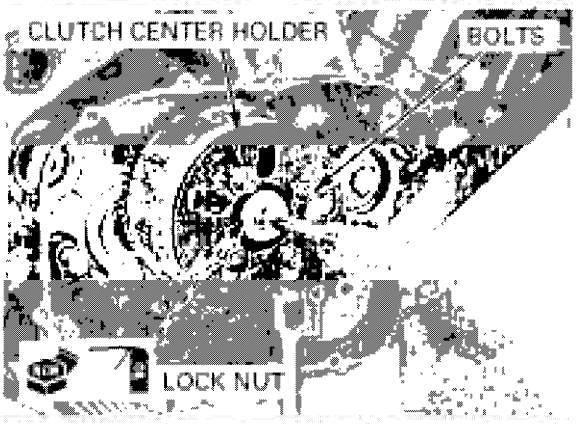
Install the spring washer with its "OUT SIDE" mark facing out.



Apply oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft.
Set the clutch center holder onto the clutch center.
Install and finger tighten the four lifter plate bolts.
Hold the clutch center using a special tool and tighten the lock nut.

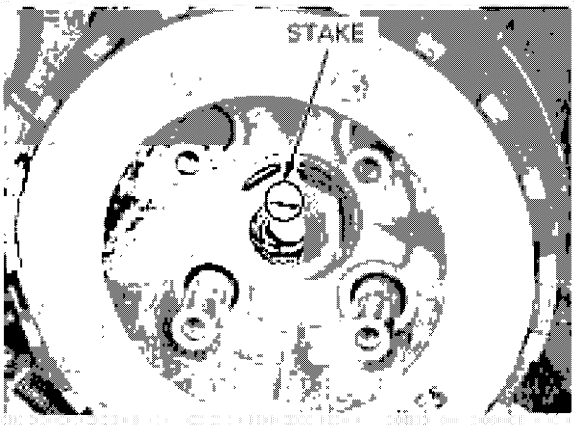
TOOL:
Clutch center holder 07JMB-MN50301

TORQUE: 128 N·m (13.1 kgf·m, 95 lbf·ft)



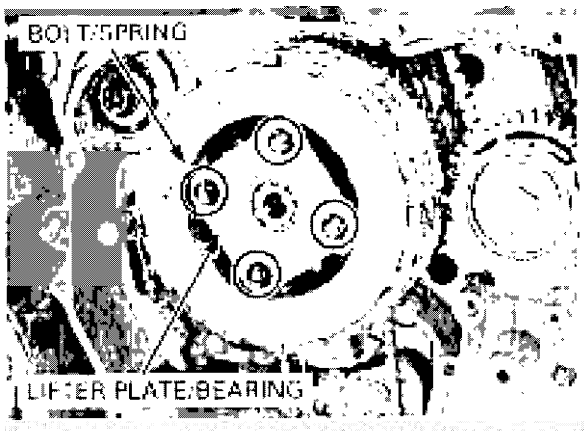
Be careful not to damage the mainshaft threads.

Stake the clutch center lock nut into the mainshaft groove.



Install the clutch springs, lifter plate/bearing and bolts.
Tighten the bolts in a crisscross pattern in several steps to the specified torque.

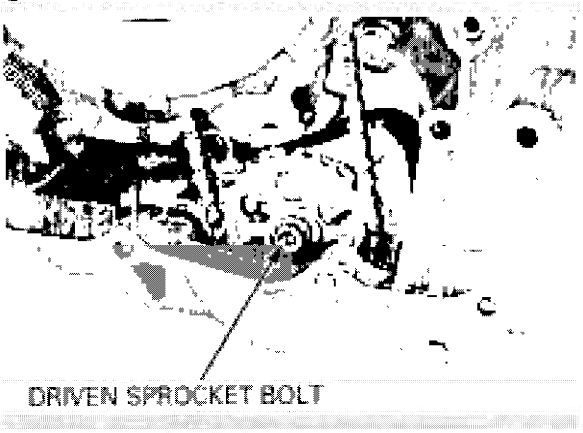
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Tighten the oil pump driven sprocket bolt if it is removed.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

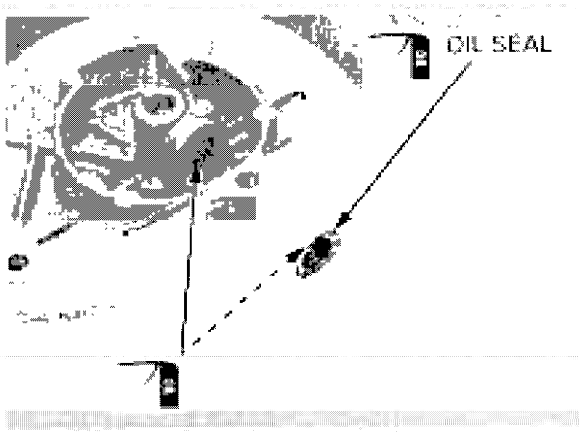
Install the right crankcase cover (page 11-19).



RIGHT CRANKCASE COVER INSTALLATION

ASSEMBLY

Apply engine oil to the needle bearings and dust seal lips.

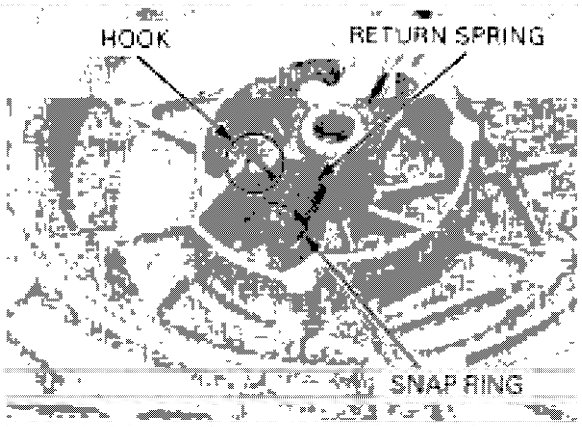


Apply engine oil to the clutch lifter arm sliding surface and slit.

Install the clutch lifter arm.

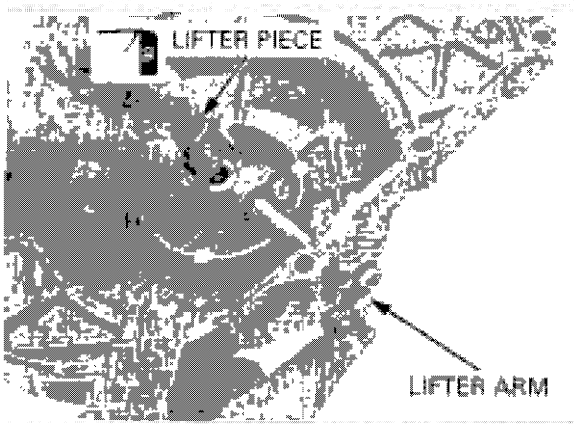
Install the return spring and snap ring.

Hook the spring end in the cover tab.



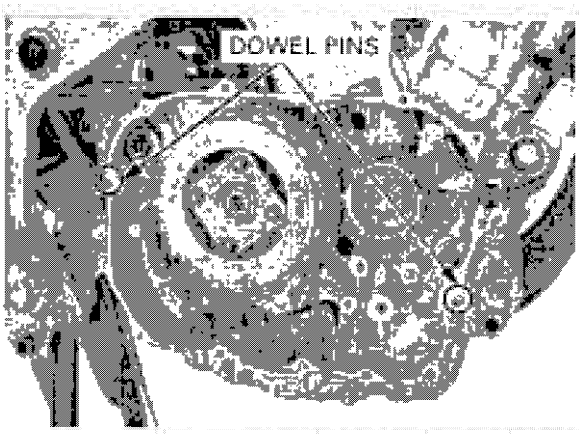
Apply engine oil to the clutch lifter piece.

Install the clutch lifter piece, aligning the piece end with the groove in the clutch lifter arm by turning the clutch lifter arm clockwise.



INSTALLATION

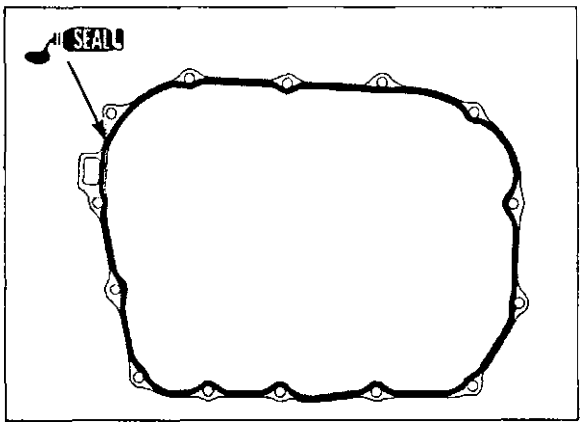
Install the two dowel pins.



Be careful not to damage the mating surfaces.

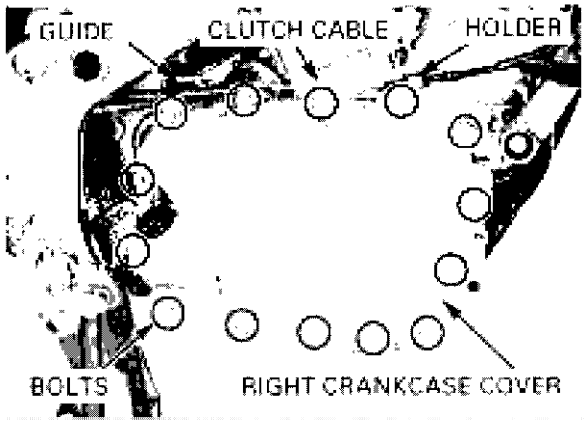
Clean the mating surfaces of the right crankcase and cover.

Apply liquid sealant (Three Bond 1207B or equivalent) to the right crankcase cover mating surface.



Connect the clutch cable.
Install the right crankcase cover, clutch cable holder, starter motor cable/ground cable guide and tighten the bolts in a crisscross pattern in several steps.

Fill the crankcase with the recommended engine oil (page 4-11).
Install the exhaust system (page 3-17).



12. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION 12-2

SERVICE INFORMATION 12-3

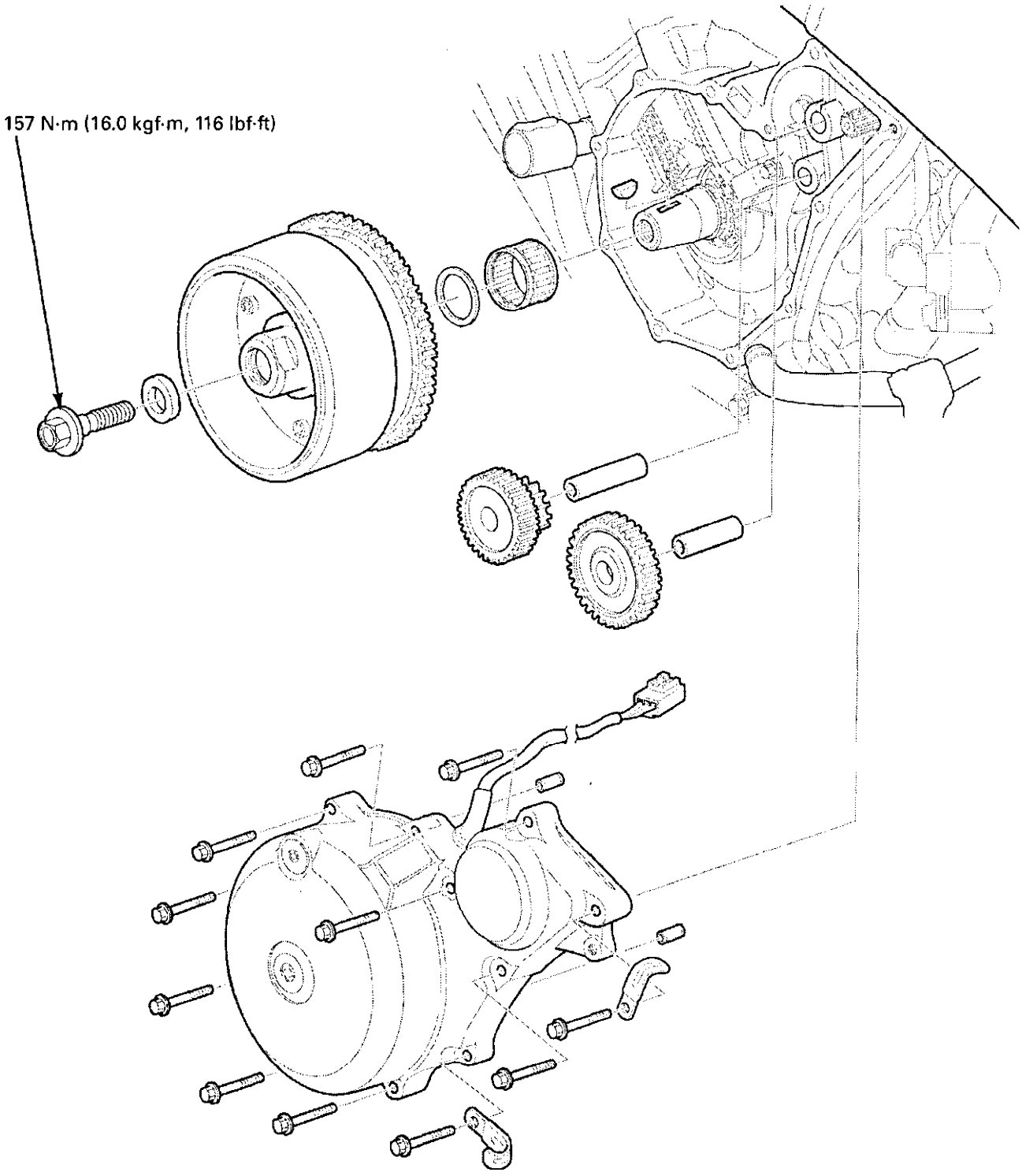
TROUBLESHOOTING 12-3

STATOR REMOVAL 12-4

FLYWHEEL/STARTER CLUTCH 12-5

STATOR INSTALLATION 12-11

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator and flywheel. All service can be done with the engine installed in the frame.
- For alternator stator inspection, refer to page 19-9.
- For starter motor service, refer to page 21-6.

SPECIFICATIONS

Unit: mm (in)

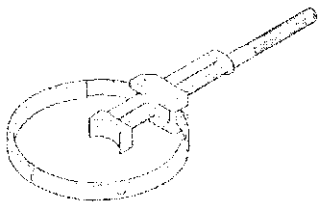
ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.417 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)

TORQUE VALUES

Flywheel bolt	157 N·m (16.0 kgf·m, 116 lbf·ft)	Left hand threads Replace with a new one
Stator socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent
Starter one-way clutch outer torx bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	Apply locking agent
Stator wire holder socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent

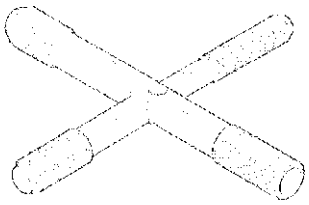
TOOLS

Flywheel holder
07725-0040000



or equivalent commercially available

Rotor puller
07733-0020001



TROUBLESHOOTING

Starter motor turns, but engine does not turn

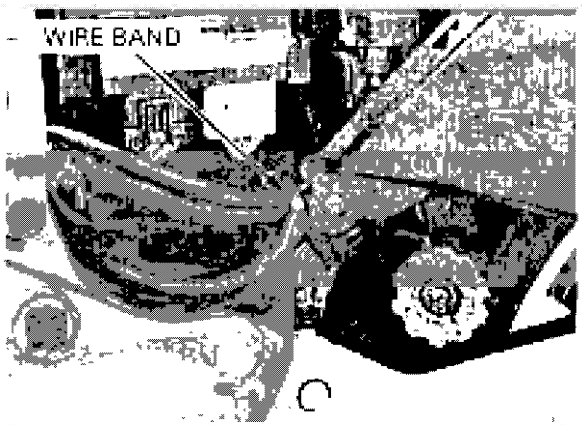
- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear

STATOR REMOVAL

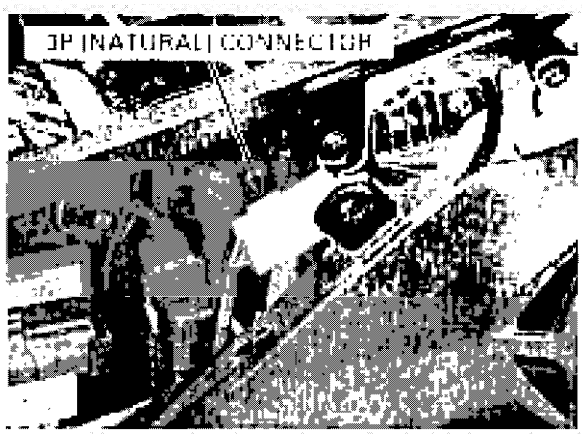
Remove the following:

- Left side cover/pivot cover (page 3-5)
- Left crankcase rear cover (page 3-15).

Release the wires from the clamps and wire bands.



Disconnect the alternator 3P (Natural) connector.



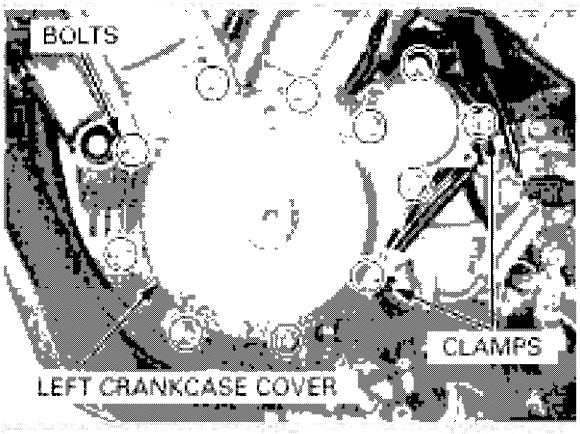
Place a container under the left crankcase cover to catch the engine oil.

Loosen the bolts in a crisscross pattern in several steps.

Remove the bolts, harness clamps and left crankcase cover.

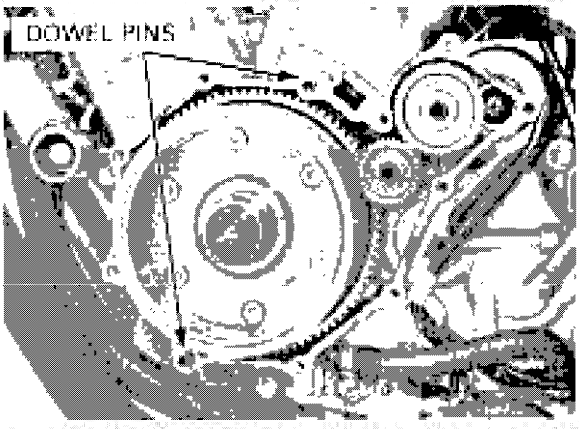
NOTE:

- The left crankcase cover (stator) is magnetically attached to the flywheel, be careful during removal.
- Be careful not to damage the alternator cover.



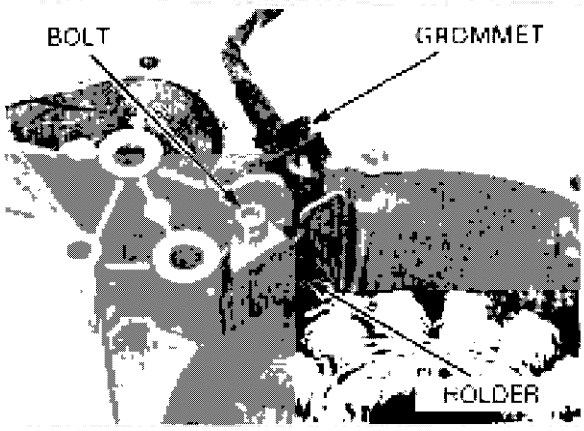
Be careful not to damage the mating surface.

Remove the dowel pins and clean off the sealant from the mating surface.

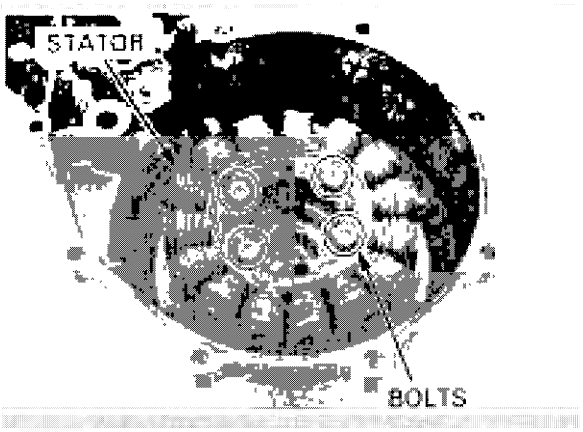


Remove the bolt and stator wire holder from the left crankcase cover.

Remove the wire grommet.



Remove the bolts and stator from the left crankcase cover.



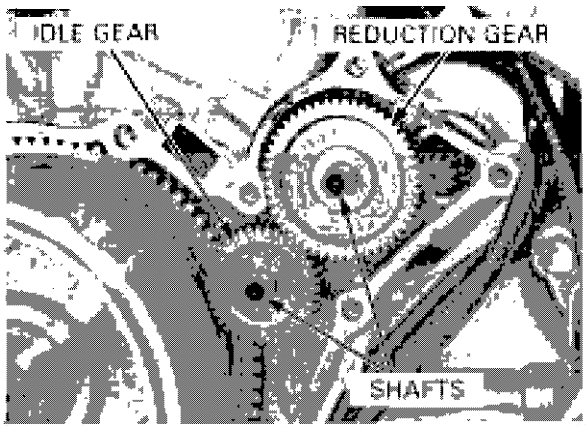
FLYWHEEL/STARTER CLUTCH

FLYWHEEL REMOVAL

Refer to (page 19-9) for alternator (charging coil) inspection.

Remove the left crankcase cover (page 12-4).

Remove the starter reduction gear and shaft.
Remove the starter idle gear and shaft.

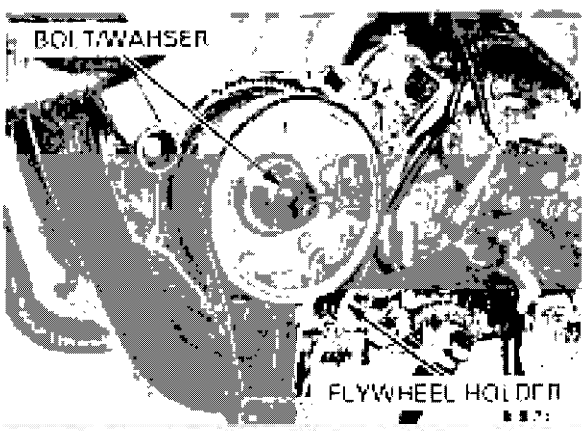


The flywheel bolt has left hand threads. Always replace the flywheel bolt if it has been removed.

Remove the flywheel bolt and washer while holding the flywheel using a special tool.

TOOL:

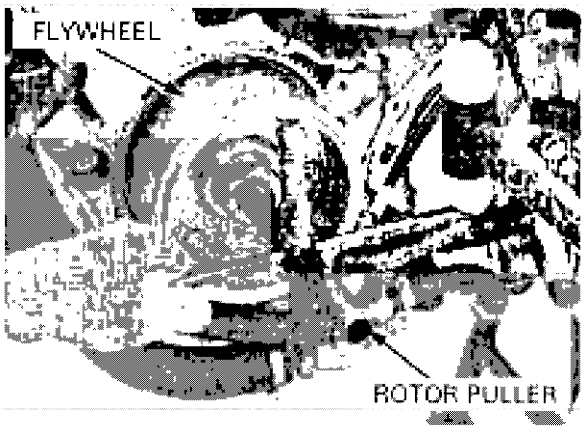
Flywheel holder — **07725-0040000 or equivalent commercially available**



Remove the flywheel using a special tool.

TOOL:

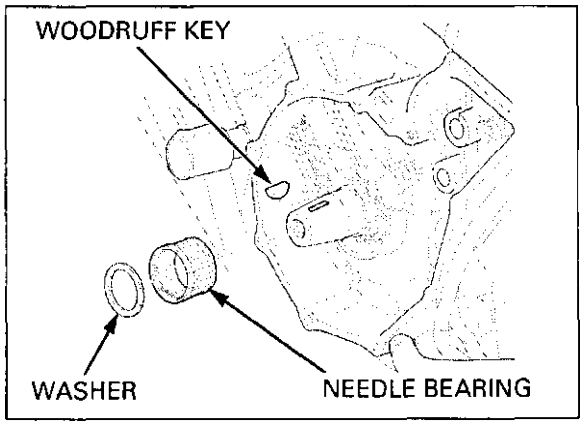
Rotor puller	**07733-0020001**



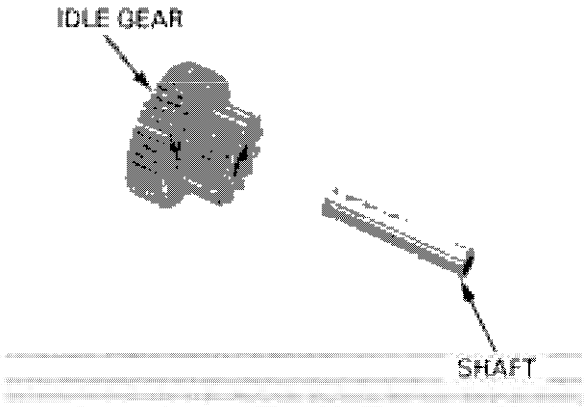
Remove the washer and needle bearing and woodruff key from the crankshaft.

NOTE:

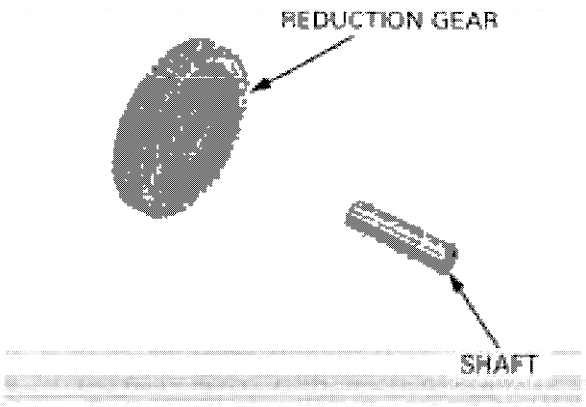
- When woodruff key removal, be careful not to damage the key groove and crankshaft.
- Do not lose the woodruff key.



Check the starter idle gear and shaft for wear or damage.



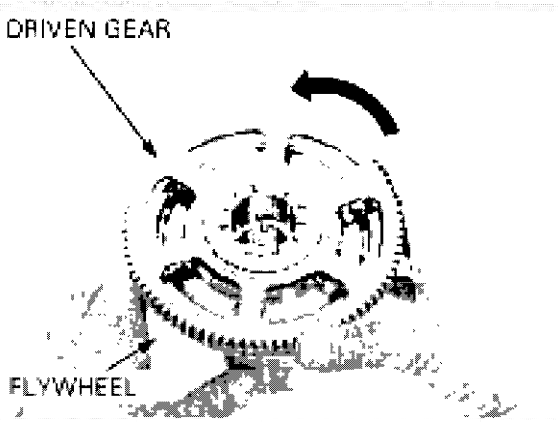
Check the starter reduction gear and shaft for wear or damage.



STARTER DRIVEN GEAR/STARTER CLUTCH REMOVAL

Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

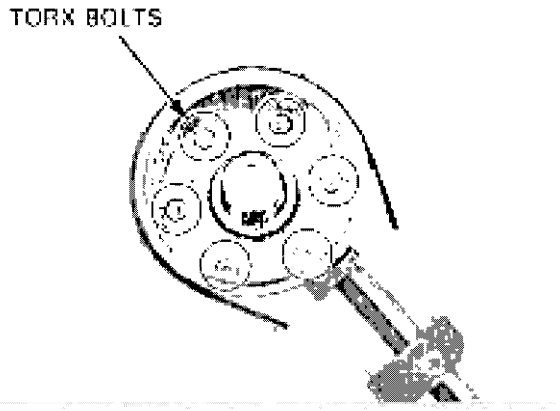
Remove the starter driven gear from the flywheel while turning the driven gear counterclockwise.



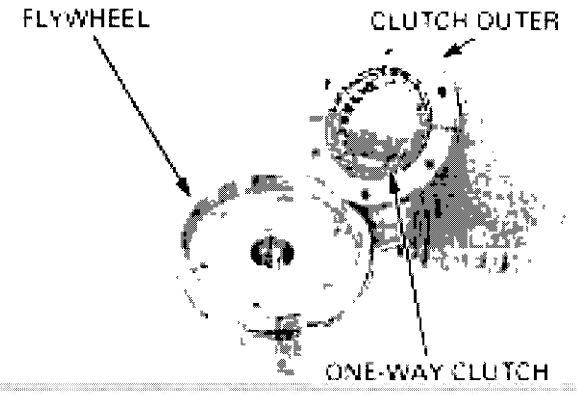
Remove the bolts while holding the flywheel using a special tool.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available**



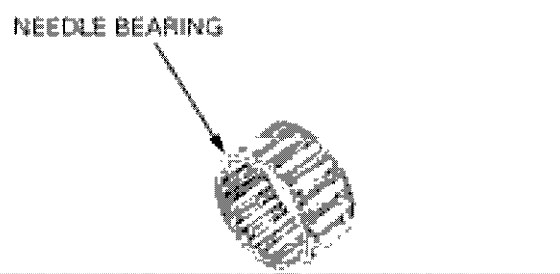
Remove the clutch outer/one-way clutch from the flywheel.



STARTER CLUTCH INSPECTION

NEEDLE BEARING

Check the needle bearing for abnormal wear or damage.

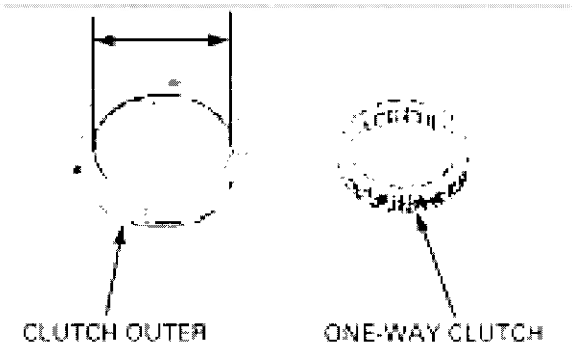


ONE-WAY CLUTCH

Check the one-way clutch sprag for abnormal wear, damage or irregular movement.

NOTE:

- Do not remove the one-way clutch from the clutch outer, unless it is necessary to replace with a new one.
- If the spring is removed from the one-way clutch groove, replace the one-way clutch assembly with a new one.



CLUTCH OUTER

Check the clutch inner contact surface for wear or damage.

Measure the clutch outer I.D.

SERVICE LIMIT: 74.46 mm (2.931 in)

STARTER DRIVEN GEAR

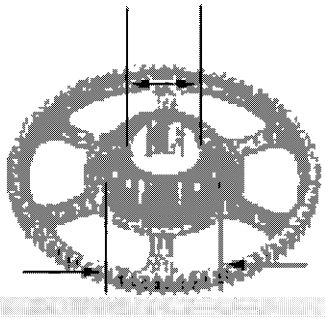
Check the one-way clutch sprag contact surface for wear or damage.

Measure the driven gear O.D.

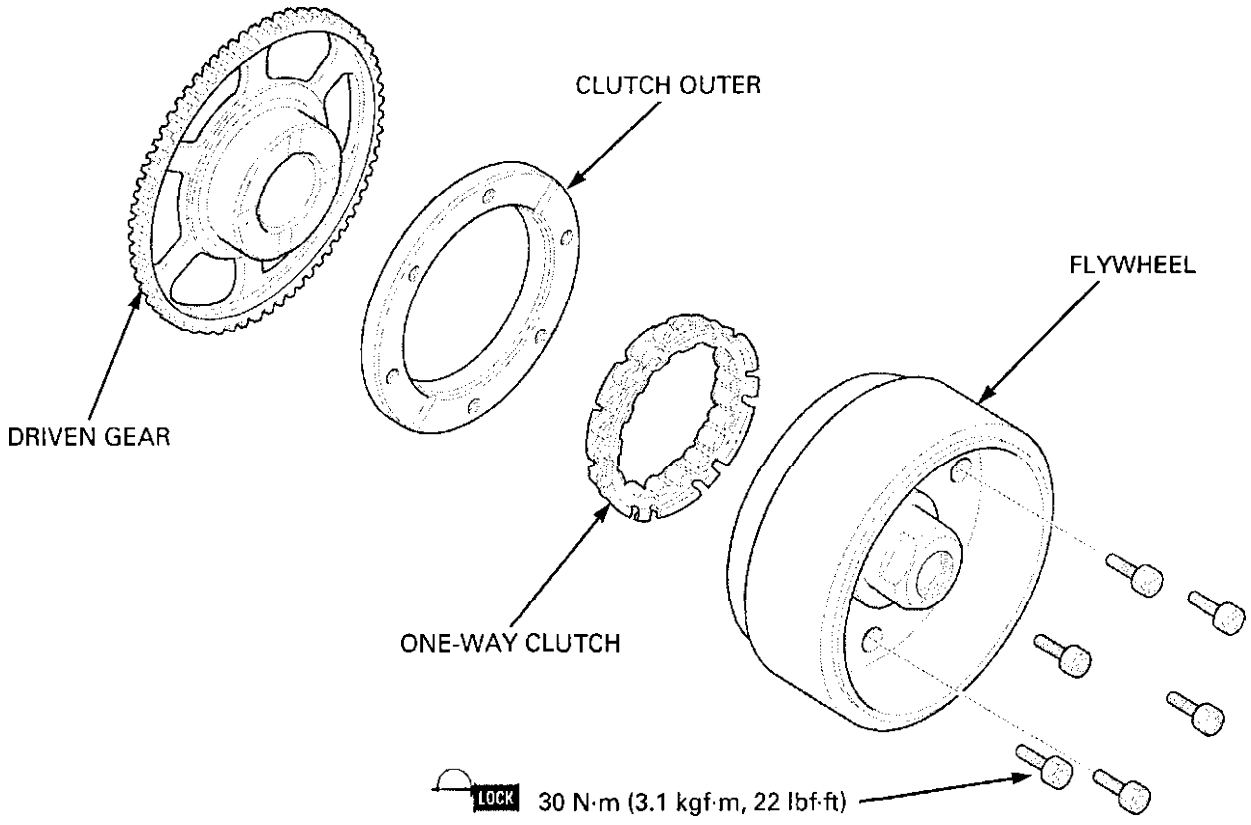
SERVICE LIMIT: 57.73 mm (2.273 in)

Measure the driven gear I.D.

SERVICE LIMIT: 37.10 mm (1.461 in)

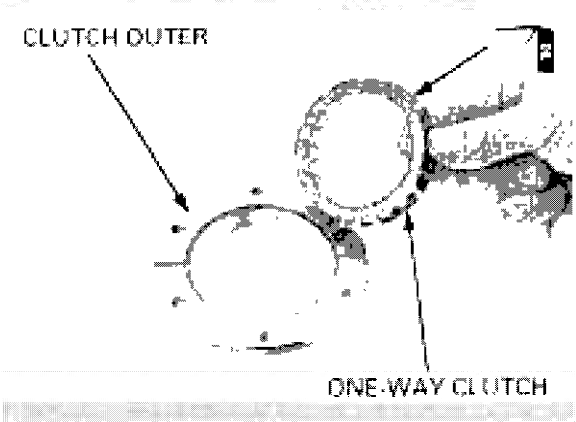


STARTER DRIVEN GEAR/STARTER CLUTCH INSTALLATION

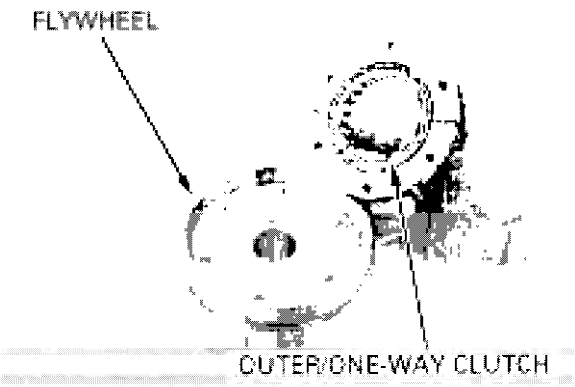


Clean the one-way clutch and apply engine oil to the sprag.
Install the one-way clutch into the clutch outer with its flange side facing the flywheel.

NOTE:
If the spring is removed from the one-way clutch groove, replace the one-way clutch assembly with a new one.



Install the clutch outer/one-way clutch to the flywheel.



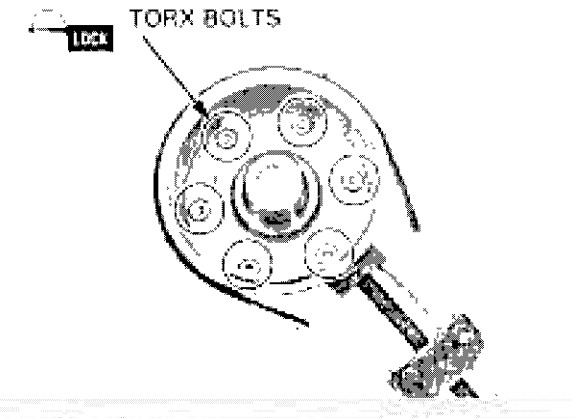
Hold the flywheel using a special tool.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available**

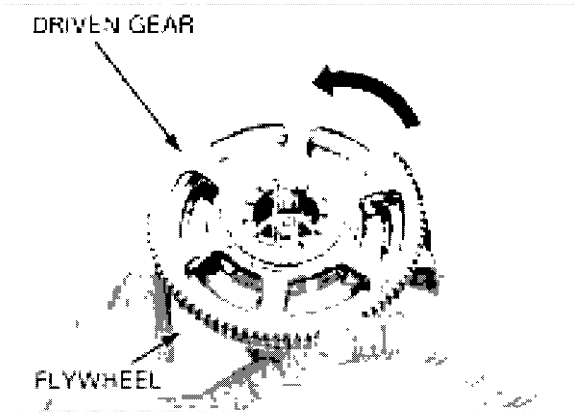
Clean and apply a locking agent to the bolt threads.
Install and tighten the bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



Install the starter driven gear to the flywheel while turning the driven gear counterclockwise.

Recheck the one-way clutch operation (page 12-7).

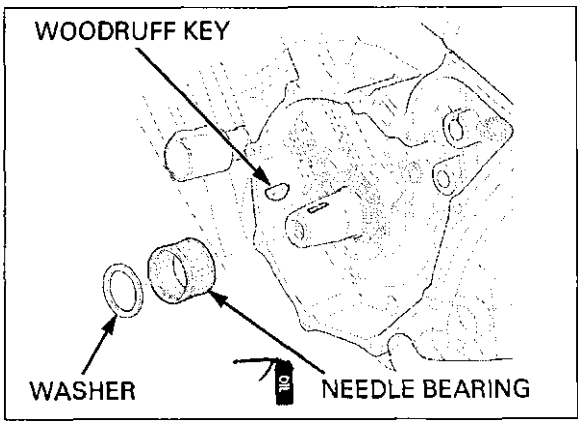


FLYWHEEL INSTALLATION

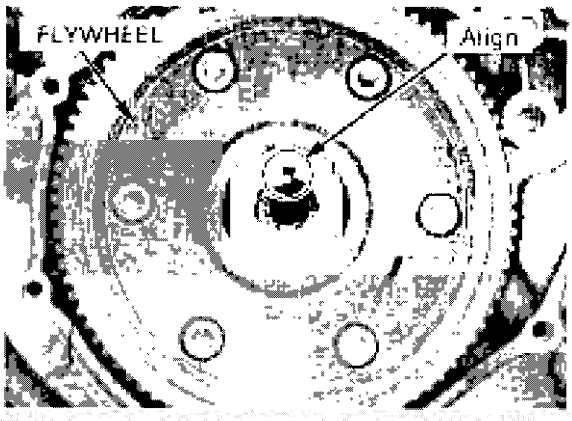
During woodruff key installation, be careful not to damage the key groove or crankshaft.

Install the woodruff key to the key groove of the crankshaft.

Apply engine oil to the needle bearing and install it to the crankshaft.
Install the washer to the crankshaft.
Wipe any oil off the mating surface of the crankshaft.



Wipe any oil off the mating surface of the flywheel.
Install the flywheel to the crankshaft, aligning the key groove of the flywheel with the woodruff key on the crankshaft.



Hold the flywheel using a special tool.

TOOL:

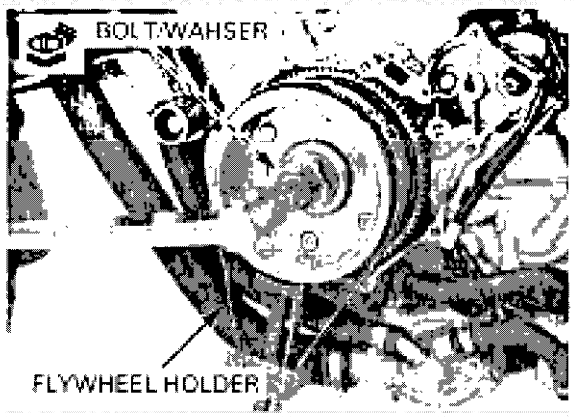
Flywheel holder	**07725-0040000 or equivalent commercially available**

Install a new flywheel bolt with the washer.

The flywheel bolt has left hand threads.

Tighten the flywheel bolt with the washer to the specified torque.

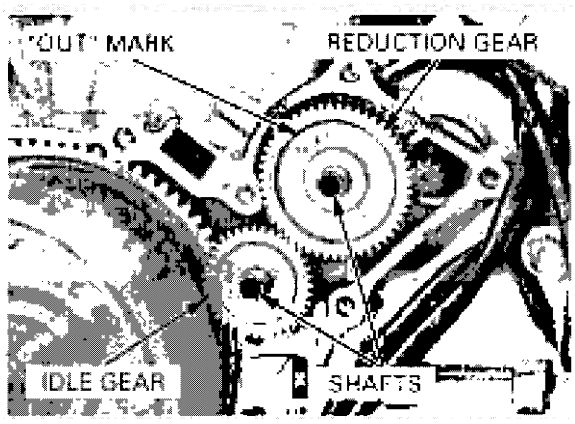
TORQUE: 157 N·m (16.0 kgf·m, 116 lbf·ft)



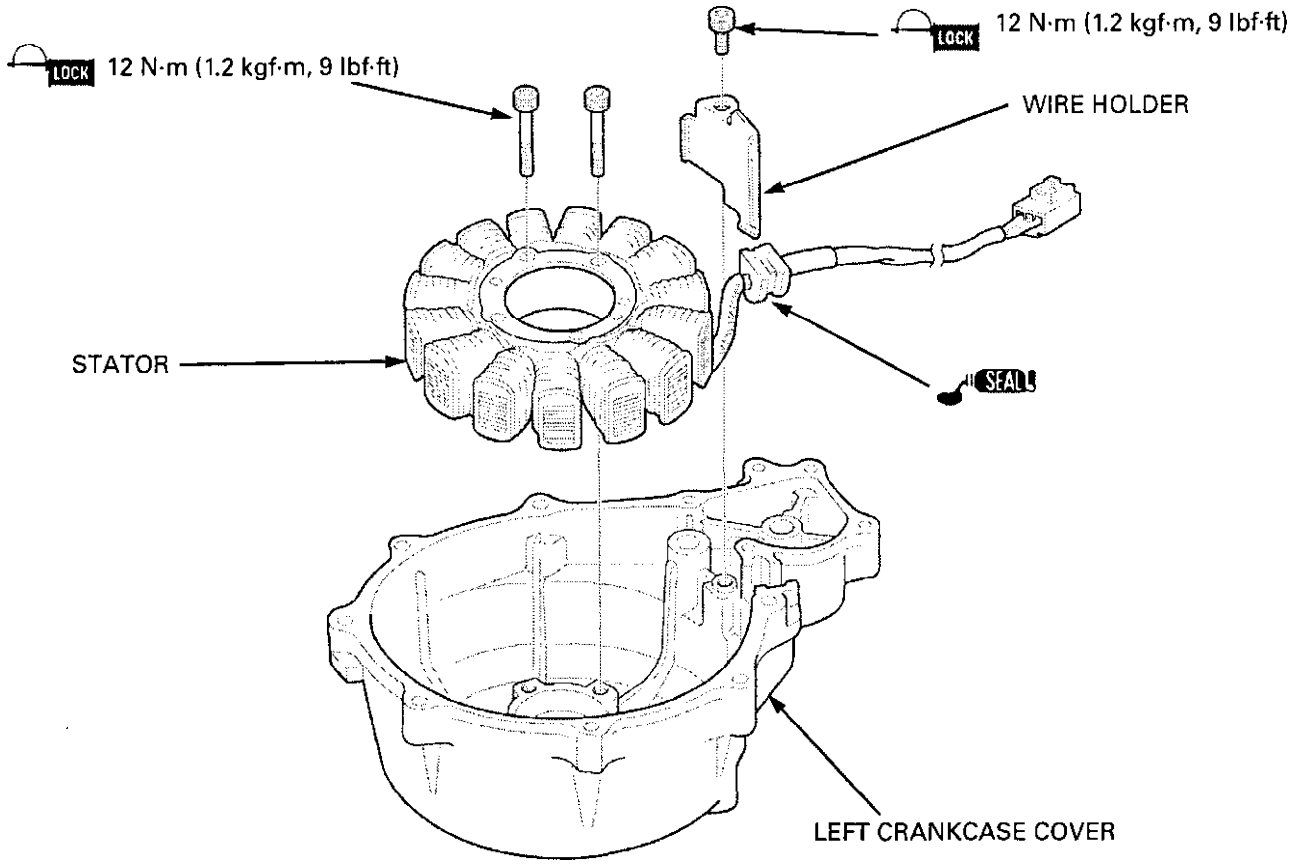
Apply engine oil to the starter reduction gear and starter idle gear shafts.
Install the starter reduction gear, idle gear and shafts to the left crankcase as an assembly.

NOTE:
Install the starter reduction gear with its "OUT" mark facing out.

Install the stator and left crankcase cover (page 12-11).

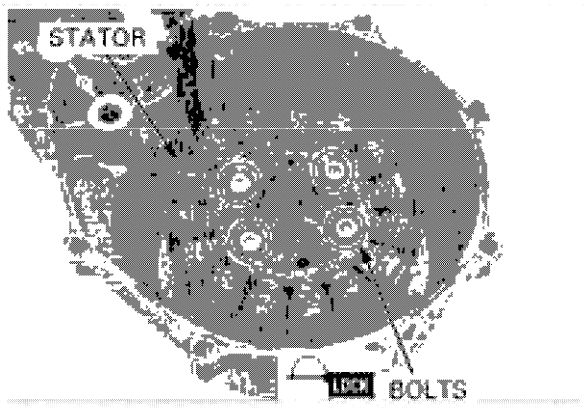


STATOR INSTALLATION



Install the stator to the left crankcase cover.
Clean and apply a locking agent to the bolt threads (page 1-18).
Install and tighten the stator socket bolts to the specified torque.

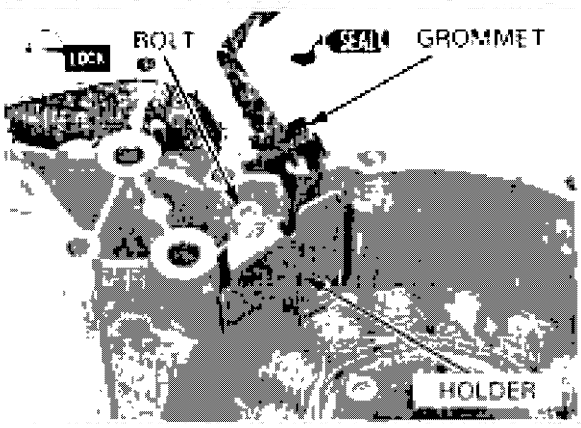
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Clean and apply sealant to the wire grommet seating surface and install the grommets into the grooves in the left crankcase cover.

Clean and apply a locking agent to the bolt threads (page 1-18).
Install the wire holder to the left crankcase cover.
Install and tighten the bolt to the specified torque.

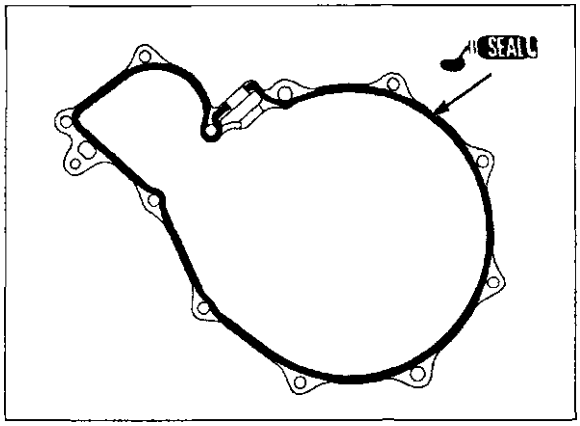
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



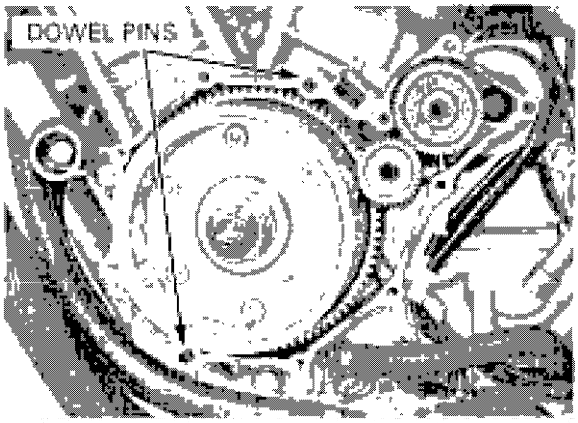
Clean off the sealant from the left crankcase cover mating surface.

Do not wipe off the excessive sealant by using the organic solvent.

Apply liquid sealant (Three Bond 1207B or equivalent) to the left crankcase cover mating surface.



Install the dowel pins.

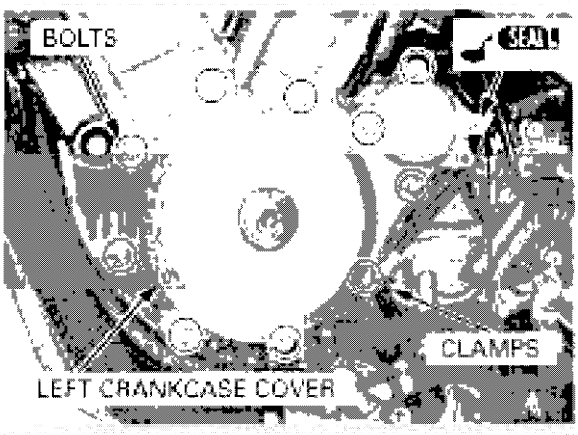


The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.

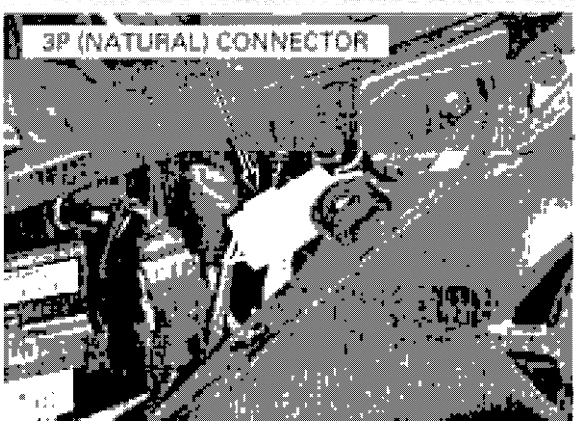
Install the left crankcase cover and harness clamps.

Clean and apply sealant (Three Bond 1323B or 2415) to the bolt threads as shown.

Install and tighten the left crankcase cover bolts in a crisscross pattern in several steps.

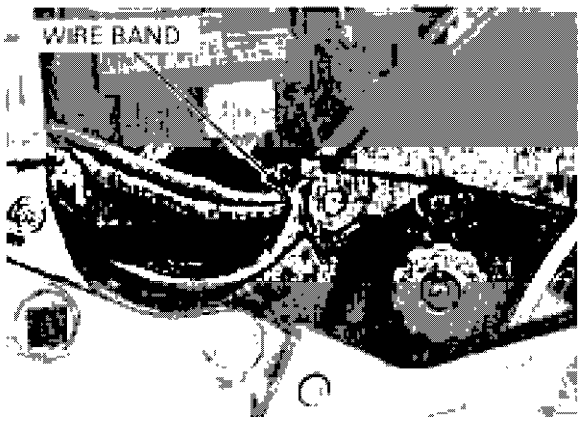


Connect the alternator 3P (Natural) connector.



Route the wires properly (page 1-35).

Clamp the wires with clamp and wire bands.



Install the following:

- Left side cover (page 3-5)
- Left crankcase rear cover (page 3-15)

Check the engine oil level (page 4-11).

13. CRANKSHAFT/TRANSMISSION

SYSTEM COMPONENTS 13-2

SERVICE INFORMATION 13-3

TROUBLESHOOTING 13-8

CRANKCASE SEPARATION 13-9

CRANKSHAFT/CONNECTING ROD 13-11

CRANKPIN BEARING 13-13

MAIN JOURNAL BEARING 13-15

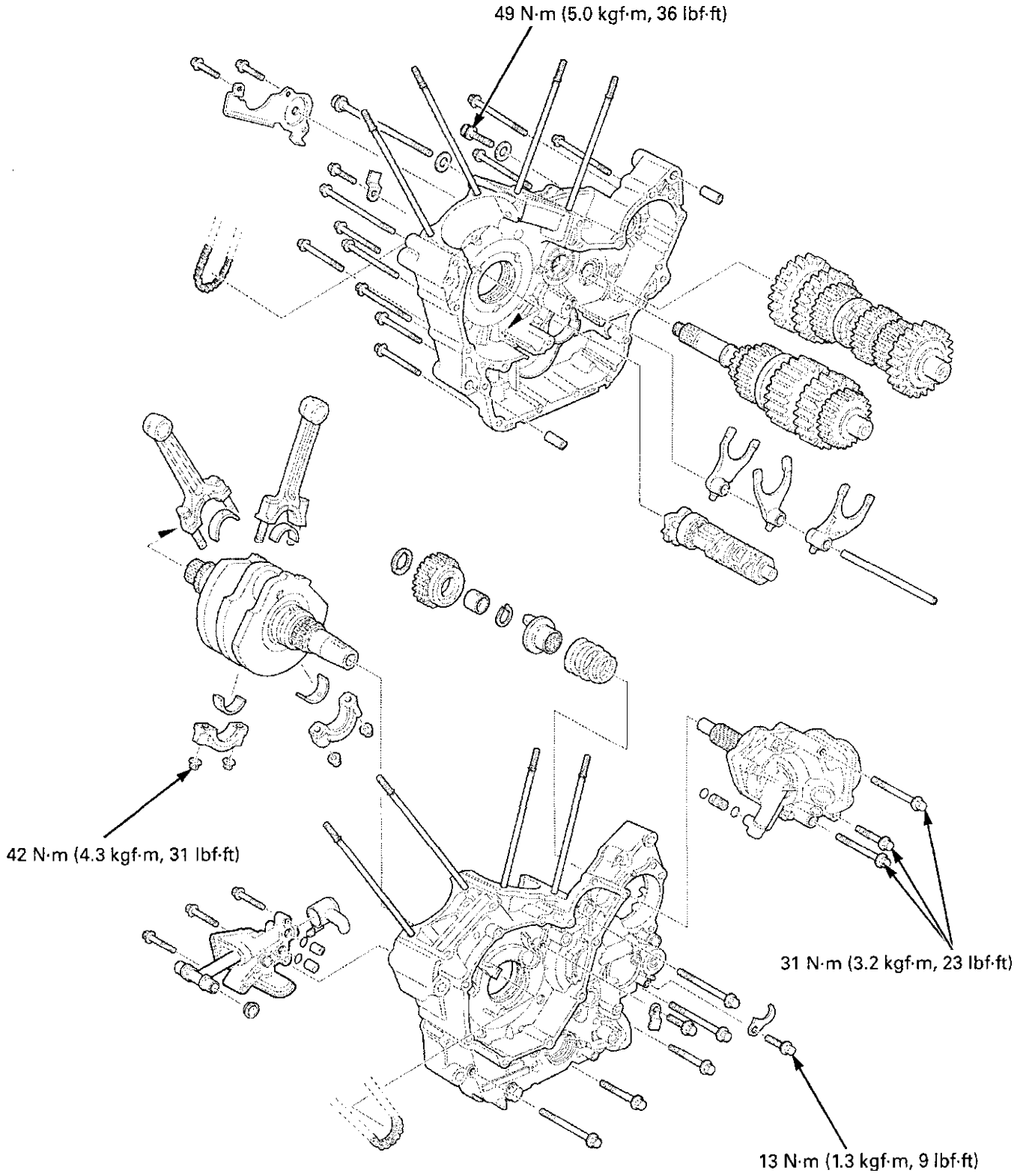
TRANSMISSION 13-19

OUTPUT GEAR 13-27

CRANKCASE BEARING REPLACEMENT 13-46

CRANKCASE ASSEMBLY 13-47

SYSTEM COMPONENTS



CRANKCASE BOLT (8 mm): 23 N·m (2.3 kgf·m, 17 lbf·ft)
CRANKCASE BOLT (6 mm): 12 N·m (1.2 kgf·m, 9 lbf·ft)

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
  - Oil pump (page 5-6)
  - Crankshaft/connecting rod (page 13-11)
  - Output gear (page 13-27)
  - Transmission (page 13-19)
- The following parts must be removed before separating the crankcase:
  - Oil filter (page 4-12)
  - Water pump (page 7-15)
  - Cylinder head (page 9-14)
  - Cylinder (page 10-4)
  - Piston (page 10-5)
  - Clutch (page 11-6)
  - Gearshift linkage (page 11-14)
  - Primary drive gear (page 11-12)
  - Flywheel (page 12-5)
  - Starter motor (page 21-6)
  - VS sensor (page 22-10)
  - Neutral switch (page 22-19)
  - Oil pressure switch (page 5-5)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crank pin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance. Incorrect oil clearance can cause major engine damage.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- Whenever you replace the output driven/drive gears, bearings, bearing holder or gear case, perform the gear contact pattern and backlash inspection and adjust the shim. The extension lines from the gear engagement surfaces should intersect at one point.
- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not over tighten the lock nuts. The specification later in the text gives both actual and indicated.
- Protect the output gear case with a shop towel or soft jaws while holding it in vise. Do not clamp it too tightly as it could damage the gear case.

SPECIFICATIONS

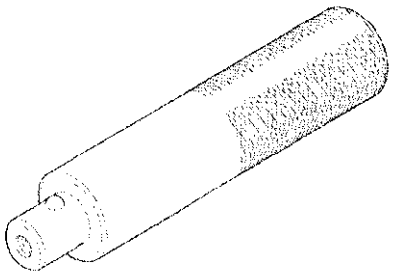
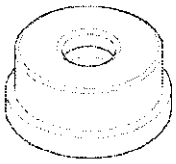
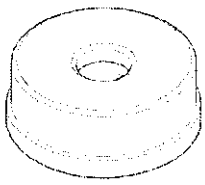
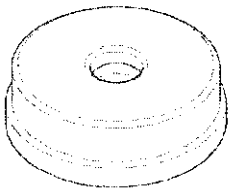
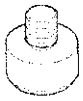
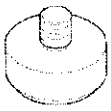
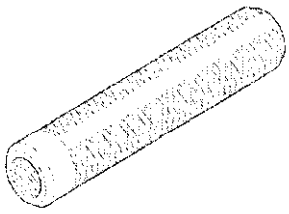
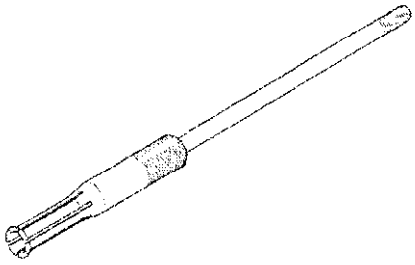
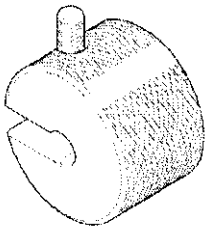
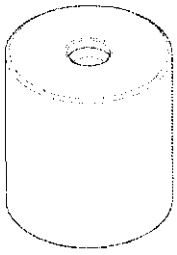
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)
	Crankshaft runout		–	0.03 (0.001)
	Main journal O.D.		52.976 – 52.994 (2.0857 – 2.0864)	52.976 (2.0857)
Main journal I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)
Shift fork, fork shaft	I.D.		13.000 – 13.018 (0.5118 – 0.5125)	13.03 (0.513)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D.			11.966 – 11.984 (0.4711 – 0.4818)	11.94 (0.470)
Shift drum journal I.D.			12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Shift drum-to-shift drum journal clearance			0.016 – 0.042 (0.0006 – 0.0017)	0.09 (0.035)
Transmission	Gear I.D.	M3	28.020 – 28.041 (1.1031 – 1.1040)	28.06 (1.105)
		M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C4	31.000 – 31.025 (1.2204 – 1.2215)	31.05 (1.222)
		C2	27.991 – 28.012 (1.1020 – 1.1070)	28.030 (1.1035)
	Gear busing O.D.	M3	27.989 – 28.000 (1.1015 – 1.1024)	27.960 (1.1008)
		M5	27.959 – 27.980 (1.1007 – 1.1016)	27.940 (1.1000)
		C1, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)
		C1, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.985)
	Mainshaft O.D.	at M3	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
	Countershaft O.D.	at C2	23.971 – 23.984 (0.9437 – 0.9443)	23.950 (0.9429)
	Bushing-to-shaft clearance	M3	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)
Output drive train	Output gear I.D.		24.000 – 24.021 (0.9449 – 0.9457)	24.04 (0.946)
	Output gear bushing	O.D.	23.959 – 23.980 (0.9433 – 0.9441)	23.70 (0.933)
		I.D.	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
	Output drive gear shaft O.D.		19.979 – 20.000 (0.7866 – 0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020 – 0.042 (0.0008 – 0.0016)	0.008 (0.003)
	Output gear damper spring free length		66.9 (2.63)	63 (2.48)
	Output drive gear backlash		0.08 – 0.23 (0.003 – 0.009)	0.40 (0.016)
	Backlash difference between measurements		–	0.10 (0.004)

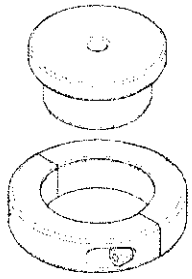
TOEQUE VALUES

Crankcase bolt (8 mm)	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Crankcase bolt (6 mm)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Crank pin bearing cap nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	Apply engine oil to the threads and flange surface
Output gear case mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply sealant to the threads
Output drive gear bearing holder bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply engine oil to the threads and flange surface
Output driven gear bearing holder socket bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply engine oil to the threads and flange surface
Output drive gear bearing lock nut		
(inner)	73 N·m (7.4 kgf·m, 54 lbf·ft)	Apply engine oil to the threads and flange surface Stake
(outer)	98 N·m (10.0 kgf·m, 72 lbf·ft)	Apply engine oil to the threads and flange surface Stake
Output driven gear bearing lock nut		
(inner)	137 N·m (14.0 kgf·m, 101 lbf·ft)	Apply engine oil to the threads and flange surface Stake
(outer)	98 N·m (10.0 kgf·m, 72 lbf·ft)	Apply engine oil to the threads and flange surface Stake
Output drive gear shaft bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	Apply engine oil to the threads
Oil seal stopper plate bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt

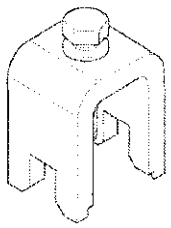
TOOLS

Driver 07749-0010000 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 62 x 68 mm 07746-0010500 	Pilot, 22 mm 07746-0041000 	Pilot, 17 mm 07746-0040400
Pilot, 20 mm 07746-0040500 	Pilot, 30 mm 07746-0040700 	Remover handle 07936-3710100 
Bearing remover, 20 mm 07936-3710600 	Remover weight 07741-0010201 	Driver, 57 mm 070MF-MEG0100 

Metal installer set
070MF-MEG0200

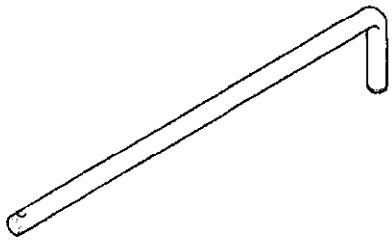


Damper spring compressor
07964-ME90000

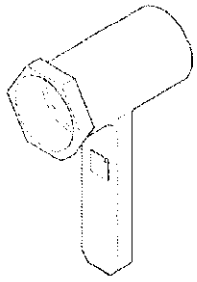


Shaft holder A
07PAB-0010100

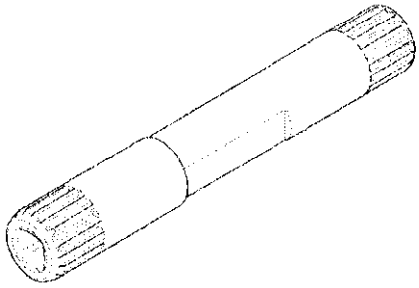
Holder handle
07PAB-0010400



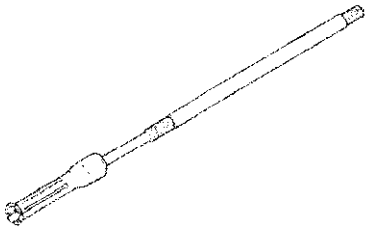
Lock nut wrench, 30/64 mm
07916-MB00002



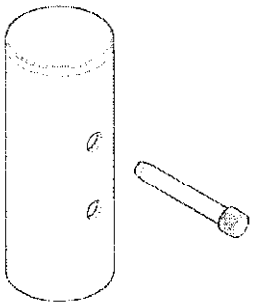
Differential inspection tool
07KMK-HC50101



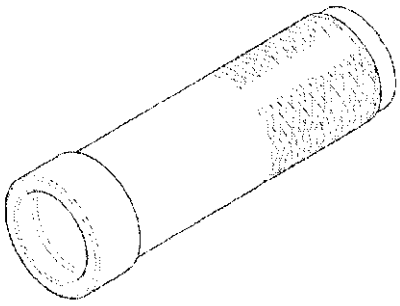
Bearing remover, 17 mm
07936-3710300



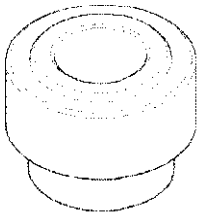
Oil seal driver
07965-KE80200



Driver, 40 mm I.D.
07746-0030100



Attachment, 30 mm I.D.
07746-0030300



TROUBLESHOOTING

Excessive engine noise
- Worn main journal bearings
- Worn crankpin bearings
- Worn or damaged transmission gear
- Worn or damaged transmission bearings

Excessive noise in side gear
- Worn or damaged output shaft and final drive shaft gears
- Worn or damaged output gear case bearing
- Incorrect adjustment shim

Hard to shift
- Improper clutch operation (page 11-9)
- Incorrect engine oil viscosity
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Bent gearshift spindle

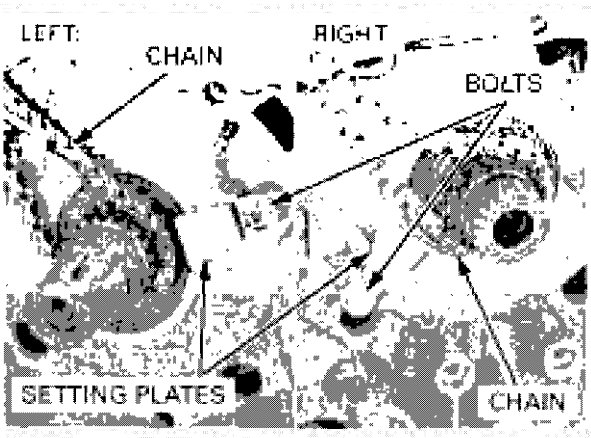
Transmission jumps out of gear
- Worn gear dogs or holes
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

CRANKCASE SEPARATION

Remove the engine from the frame (page 8-4).

Refer to Service Information (page 13-3) for removal of necessary parts before separating the crankcase.

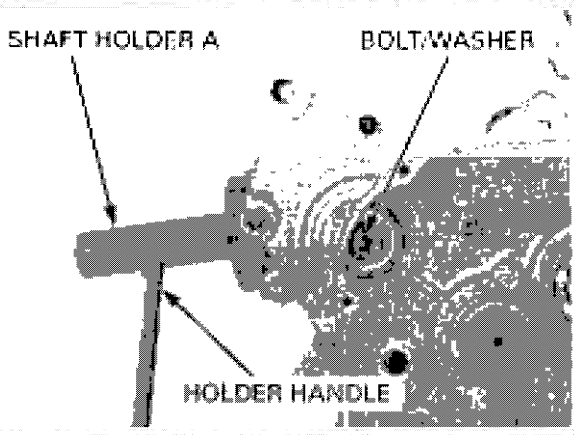
Remove the bolts and cam chain tensioner setting plates.
Remove the cam chains.



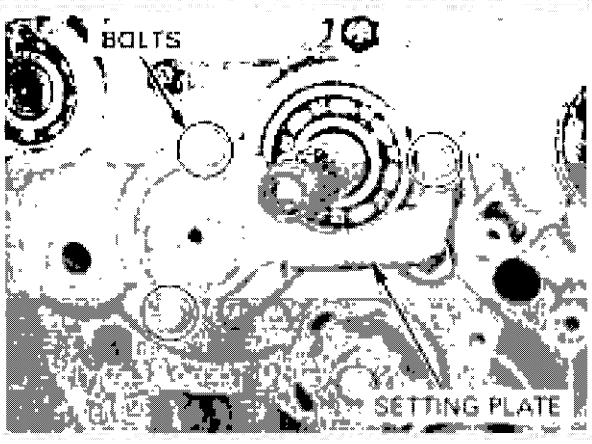
Hold the output driven gear shaft using the special tools, loosen the output drive gear shaft bolt and remove it with the washer.

TOOLS:

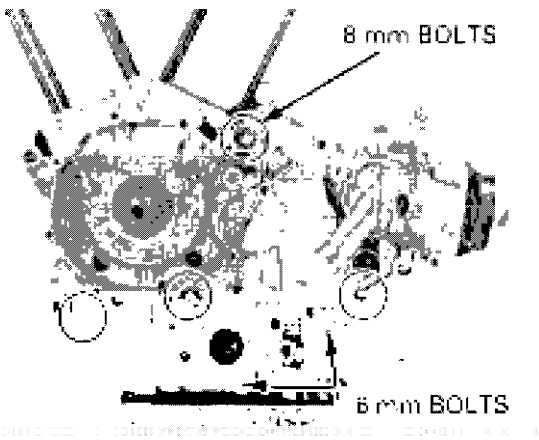
Shaft holder A	**07PAB-0010100**
Holder handle	**07PAB-0010400**



Remove the bolts and bearing setting plate.

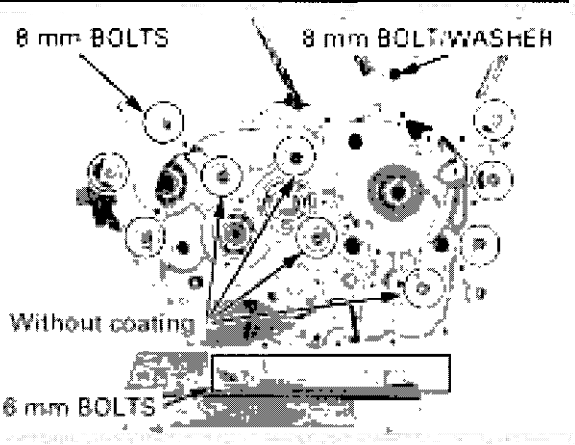


Loosen and remove the 6 mm and 8 mm bolts in a crisscross pattern in several steps.

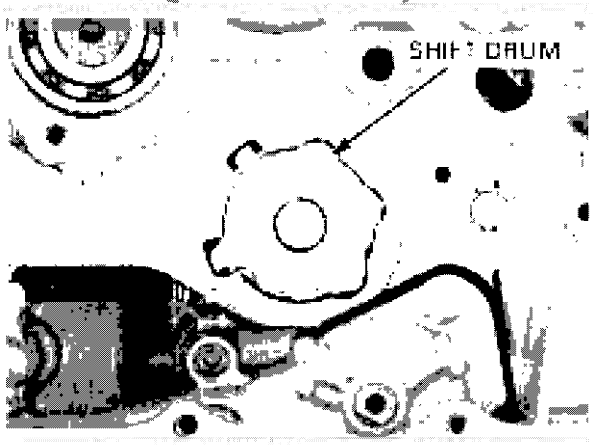


Loosen and remove the 6 mm and 8 mm bolts with washer in a crisscross pattern in several steps.

- Seven 8 mm bolts with coating: for outside right crankcase.
- Four 8 mm bolts without coating: for inside of right crankcase.

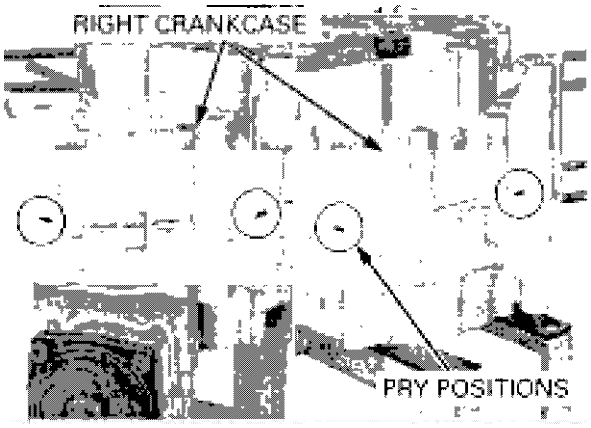


Turn the shift drum until the position as shown.



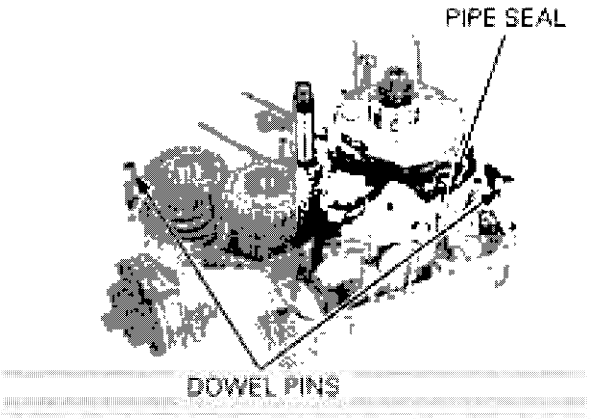
Place the crankcase with the left crankcase down and remove the right crankcase.

1. Separate the right crankcase from the left crankcase while prying at the points as shown.
2. Separate the right crankcase from the left crankcase while softly tapping them at several locations with a soft hammer.



Remove the dowel pins and pipe seal.

Clean off the sealant from the left and right crankcase mating surfaces.



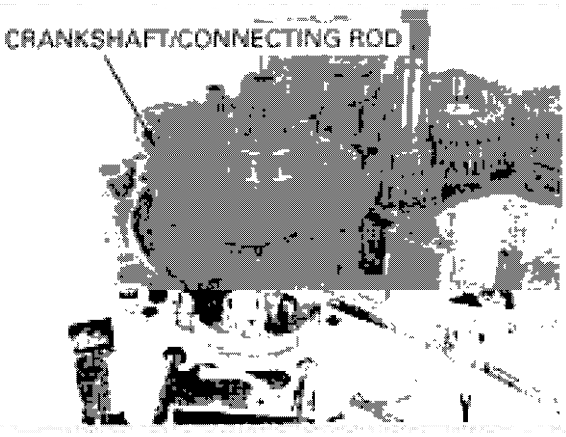
CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase (page 13-9).

During crankshaft and connecting rod service, be careful not to damage the main journal or crank pin bearing inserts.

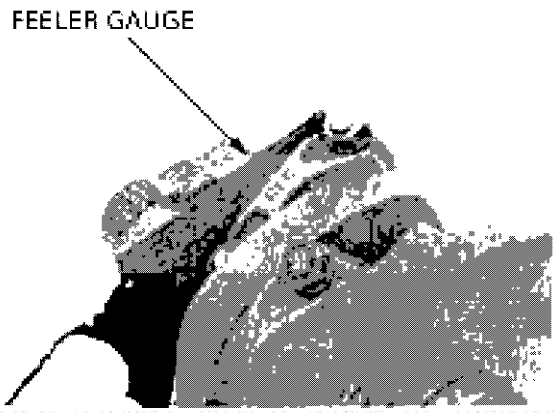
Remove the crankshaft/connecting rod from the left crankcase.



SIDE CLEARANCE INSPECTION

Before removing the connecting rods, check the big end side clearance.
Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end.

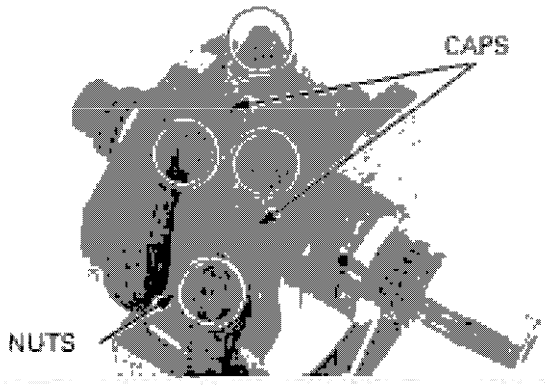
SERVICE LIMIT: 0.30 mm (0.012 in)



CONNECTING ROD REMOVAL

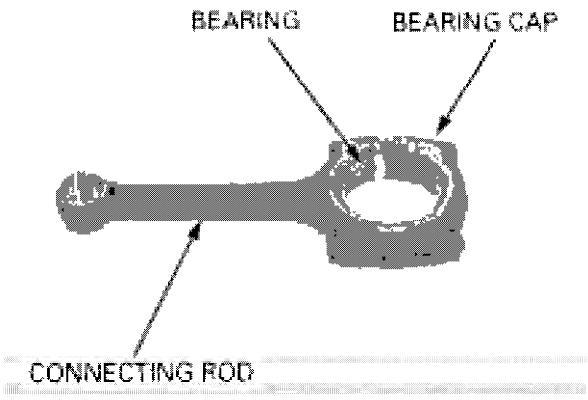
Tap the side of the cap lightly if bearing cap is hard to remove.

Remove the crankpin bearing cap nuts and the bearing caps.



Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

For the connecting rod small end inspection, refer to page 10-7.



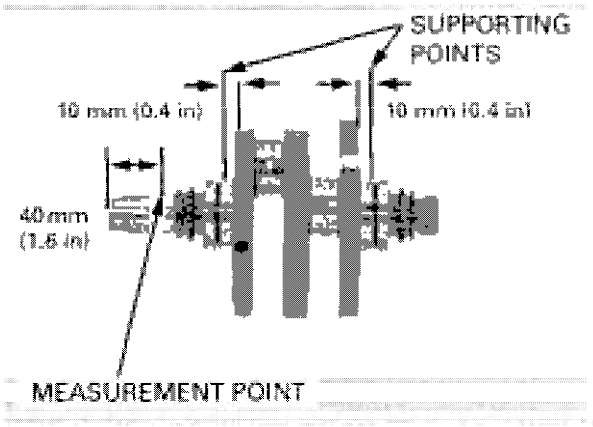
CRANKSHAFT INSPECTION

Check the camshaft journal surfaces for damage, discoloration or scratch.

CRANKSHAFT RUNOUT

Place the crankshaft on a stand or V-blocks.
Set a dial indicator on the main journals.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.03 mm (0.001 in)



CONNECTING ROD INSTALLATION

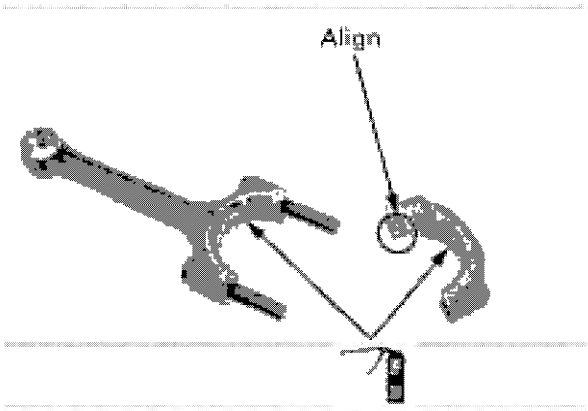
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Wipe any oil from the connecting rod, cap and bearing inserts.
Install the bearing inserts on the connecting rods and caps by aligning the tab with the groove.

Apply molybdenum disulfide oil to the thrust surface of the bearings.

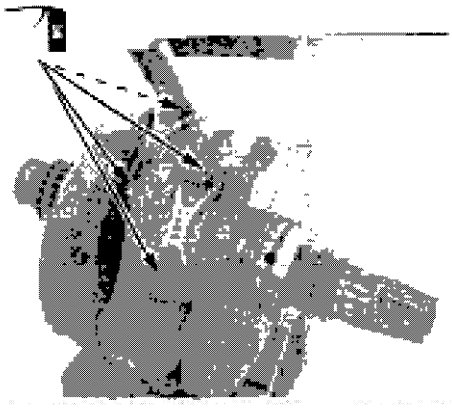
Install the rods and caps on the crankshaft by aligning the I.D. code on the rod and cap. Be sure each part is installed in its original position, as noted during removal.



Apply engine oil to the bering cap nut threads and seating surface, then tighten them in several steps alternately.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

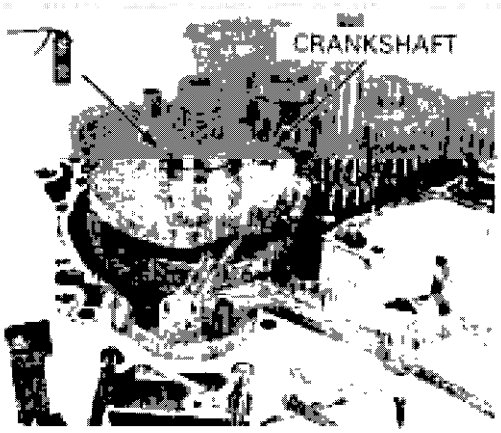
After tightening the nuts, check that the connecting rods move freely without binding.



CRANKSHAFT INSTALLATION

Apply molybdenum disulfide oil to the main journal bearing inserts and install the crankshaft into the left crankcase.

Assemble the crankcase (page 13-47).

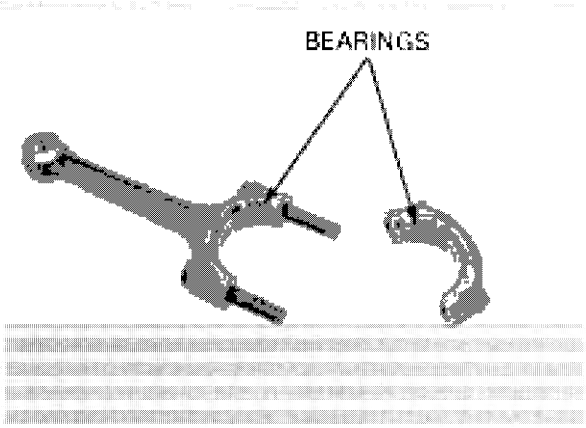


CRANKPIN BEARING

BEARING INSPECTION

Remove the connecting rod (page 13-11).
Check the bearing inserts for unusual wear, damage or peeling and replace them if necessary.

Select the replacement bearing (page 13-14).

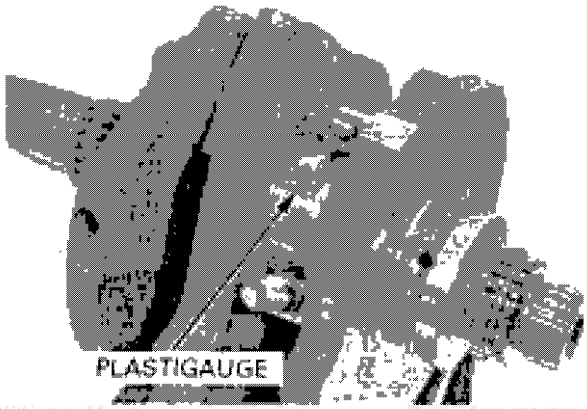


OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

Carefully install the connecting rods and bearing caps on the correct crankpins.



Do not rotate the crankshaft during inspection.

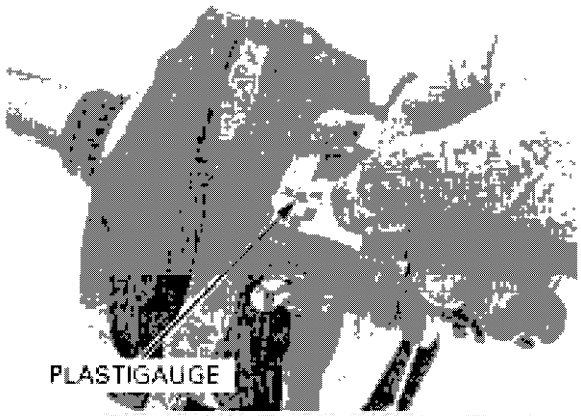
Apply engine oil to the threads and seating surfaces of the bearing cap nuts.
Install the nuts and tighten them evenly.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Remove the bearing caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)

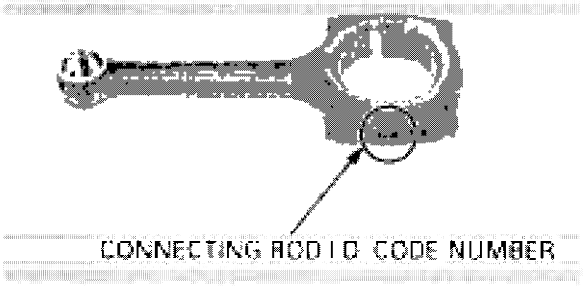
If the clearance exceeds the service limit, select the correct replacement bearings as follows.



BEARING SELECTION

Record the connecting rod I.D. code number.

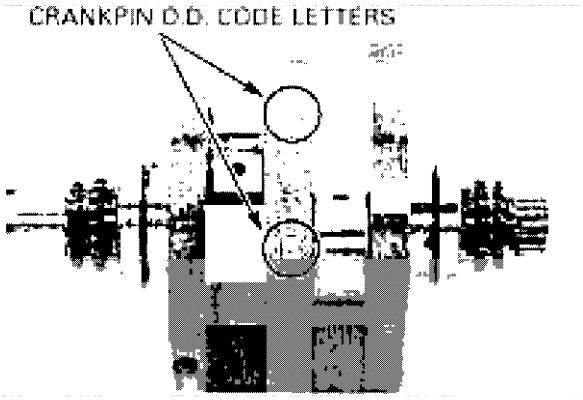
NOTE:
Number 1 or 2 on the connecting rod is the code for the connecting rod I.D.



Record the crankpin O.D. code letter.

NOTE:
Letters A or B on each crank weight is the code for the crankpin O.D.

Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.



CRANKPIN BEARING SELECTION TABLE:

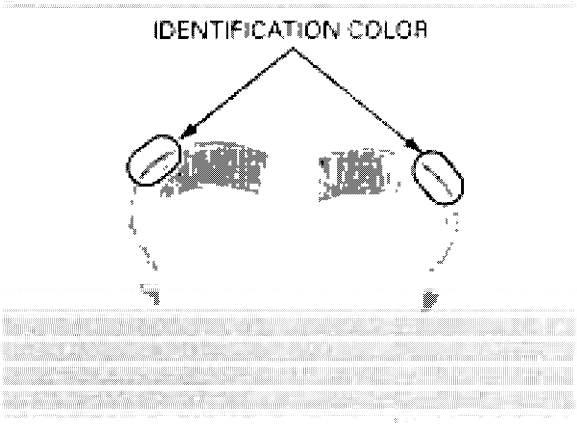
			CONNECTING ROD I.D. CODE	
			1	2
			46.000 – 46.008 mm (1.8110 – 1.8113 in)	46.008 – 46.016 mm (1.8113 – 1.8116 in)
CRANKPIN O.D. CODE	A	42.985 – 42.993 mm (1.6923 – 1.6926 in)	C (Black)	B (Blue)
	B	42.977 – 42.985 mm (1.6920 – 1.6923 in)	B (Blue)	A (Purple)

BEARING THICKNESS:

A (Purple):	**Thick**
B (Blue):	**↕**
C (Black):	**Thin**

NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

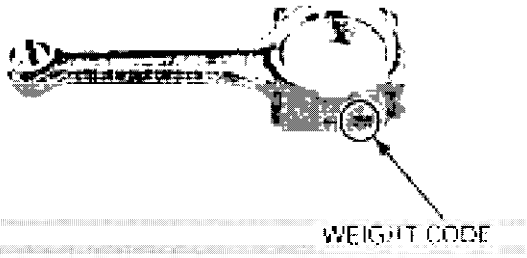


CONNECTING ROD SELECTION

An alphabetical weight code is stamped on the cap.

		WEIGHT
CONNECTING ROD WEIGHT CODE	A	400.0 – 407.5 g (14.11 – 14.37 oz)
	B	407.5 – 412.5 g (14.37 – 14.55 oz)
	C	412.5 – 417.5 g (14.55 – 14.73 oz)

Install the connecting rod (page 13-12).
Install the crankshaft (page 13-13).



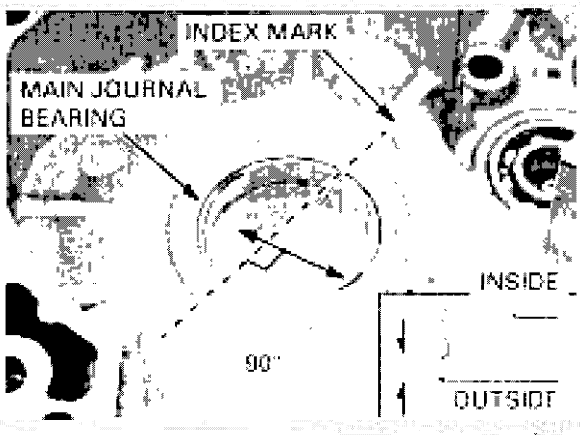
MAIN JOURNAL BEARING

BEARING INSPECTION

Remove the crankshaft (page 13-11).
Clean off any oil from the bearings.

Check the bearings for unusual wear, damage or peeling and replace them if necessary.

Measure the main journal bearing I.D. at between the bearing groove and crankcase outer side end of the bearing, and 90 degrees to the index mark.



Clean off any oil from the crankshaft journals.

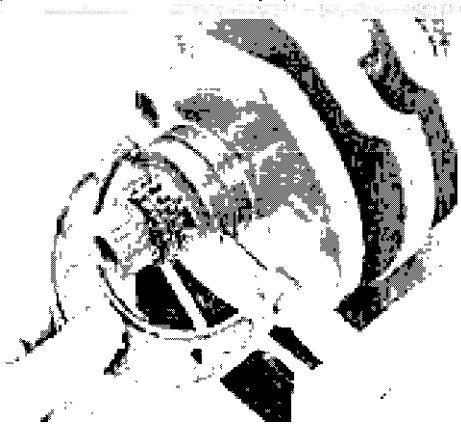
Measure and record the crankshaft main journal O.D.

SERVICE LIMIT: 52.976 mm (2.0857 in)

Calculate the main journal oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)

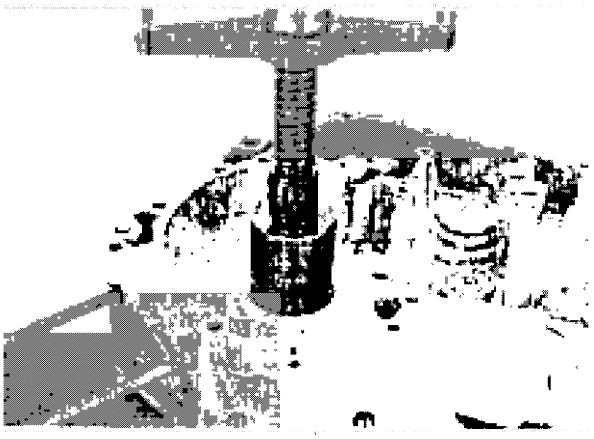
If the clearance exceeds the service limit, select the bearing.



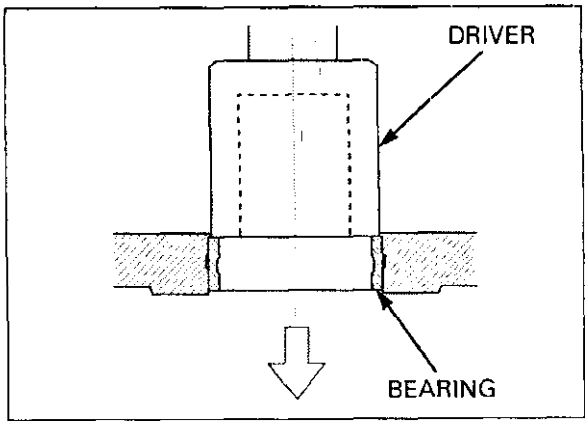
BEARING SELECTION

Set a special tool and hydraulic press on the outside of the crankcase.

TOOL:
Driver, 57 mm **070MF-MEG0100**

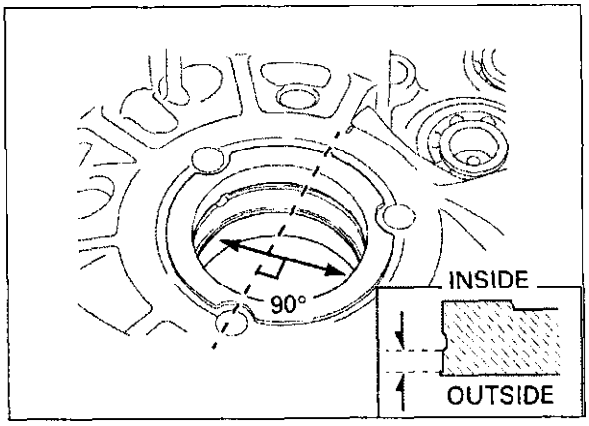


Press the main journal bearings toward the outside of the crankcase.



Measure and record the crankcase main journal I.D. at between the main journal groove and crankcase outer side end, and 90 degrees to the index mark.

SERVICE LIMIT: 58.070 mm (2.2862 in)



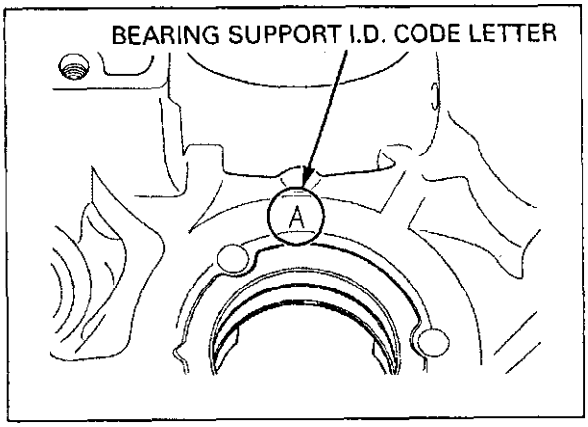
Depending upon the results of the above measurements there are four possible scenarios for main bearing selection:

- Crankshaft and crankcase are replaced
- Crankcase only is replaced
- Crankshaft only is replaced
- Main bearings only are replaced

Carefully refer to the following instructions and tables for main bearing selection.

Record the bearing support I.D. code letter.

NOTE:
Letters A or B on each crankcase is the code for the crankcase I.D.

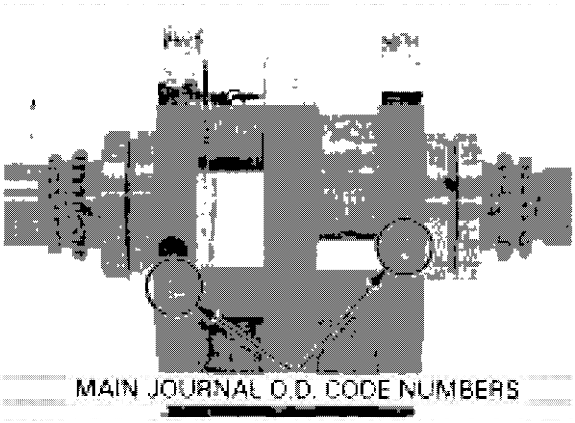


Record the main journal O.D. code number.

NOTE:

Letters 1, 2 or 3 on each crank weight is the code for crankshaft journal O.D.

Cross-reference the crankshaft and crankcase codes to determine the replacement bearing color.



MAIN JOURNAL O.D. CODE NUMBERS

In case the crankshaft and crankcase are replaced:

			MAIN JOURNAL O.D. CODE		
			1	2	3
			52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D. CODE	A	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)
	B	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)

In case the crankcase only is replaced:

			MAIN JOURNAL O.D.			
			52.994 – 53.000 mm (2.0864 – 2.0866 in)	52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D. CODE	A	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	B	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)	A (Blue)

In case the crankshaft only is replaced:

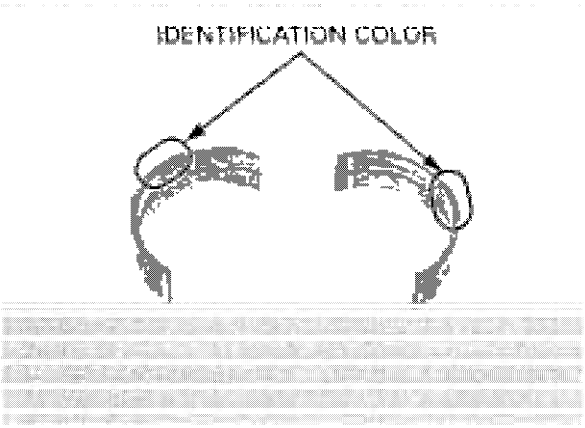
		MAIN JOURNAL O.D. CODE		
		1	2	3
		52.998 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D.	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)
	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)
	58.022 – 58.034 mm (2.2843 – 2.2848 in)	B (Black)	A (Blue)	A (Blue)
	58.034 – 58.046 mm (2.2848 – 2.2853 in)	A (Blue)	O.S. G (Red)	O.S. G (Red)
	58.046 – 58.058 mm (2.2853 – 2.2857 in)	O.S. G (Red)	O.S. F (Pink)	O.S. F (Pink)
	58.058 – 58.070 mm (2.2857 – 2.2862 in)	O.S. F (Pink)	O.S. E (Yellow)	O.S. E (Yellow)

In case of main bearing replacement only:

		MAIN JOURNAL O.D.			
		52.994 – 53.000 mm (2.0864 – 2.0866 in)	52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D.	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)	A (Blue)
	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	58.022 – 58.034 mm (2.2843 – 2.2848 in)	B (Black)	A (Blue)	A (Blue)	O.S. G (Red)
	58.034 – 58.046 mm (2.2848 – 2.2853 in)	A (Blue)	O.S. G (Red)	O.S. G (Red)	O.S. F (Pink)
	58.046 – 58.058 mm (2.2853 – 2.2857 in)	O.S. G (Red)	O.S. F (Pink)	O.S. F (Pink)	O.S. E (Yellow)
	58.058 – 58.070 mm (2.2857 – 2.2862 in)	O.S. F (Pink)	O.S. E (Yellow)	O.S. E (Yellow)	O.S. E (Yellow)

BEARING THICKNESS:

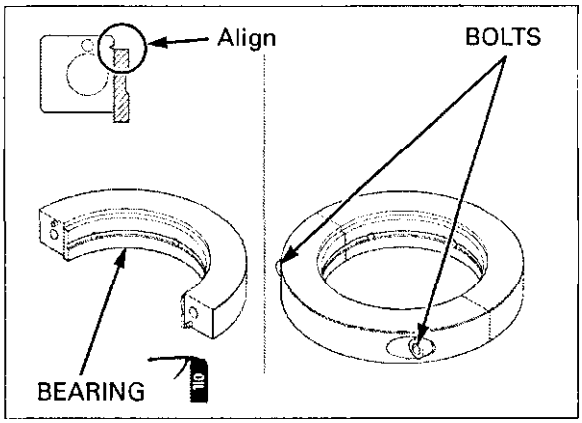
O.S. E (Yellow): Thick
O.S. F (Pink): ↑
O.S. G (Red):
A (Blue): Middle
B (Black):
C (Brown): ↓
D (Green): Thin



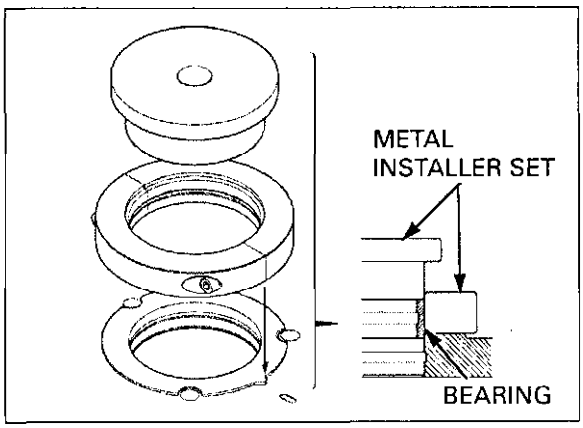
BEARING INSTALLATION

Apply engine oil to new bearing surface.
Set new bearings to the metal installer aligning its side edge with the metal installer grooves.

TOOL:
Metal installer set **070MF-MEG0200**

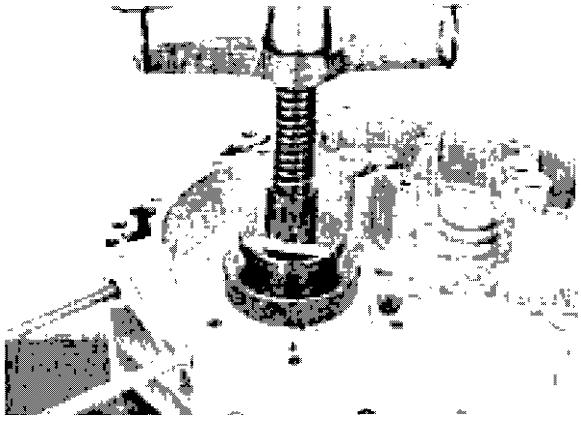


Set the bearings and special tools assembly on inside of the crankcase, fitting the bearing edge in the crankcase main journal.
Align the mating line of the bearings with the index mark on the crankcase as shown.

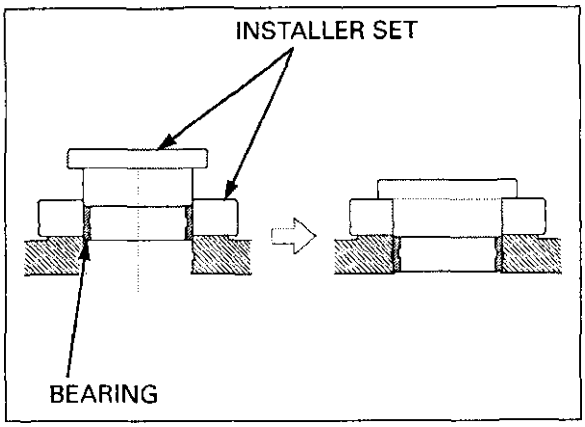


Set the hydraulic press.

TOOL:
Metal installer set **070MF-MEG0200**



Press the new bearings until the metal installer flange fully seat.

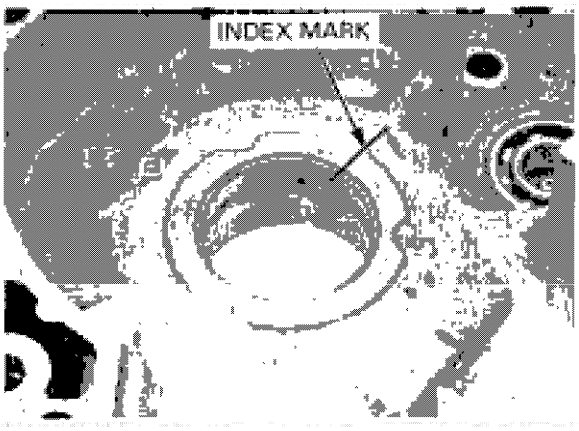


Make sure the bearing mating line aligns with the index mark on the crankcase.

Check the oil clearance (page 13-15).

- After selecting new bearings, recheck the clearance. Incorrect clearance can cause severe engine damage.

Install the crankshaft (page 13-13).

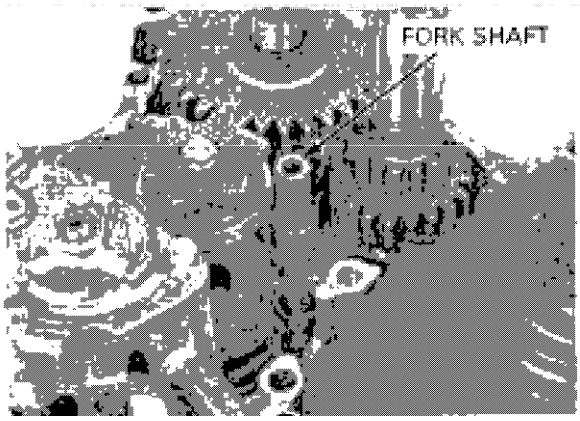


TRANSMISSION

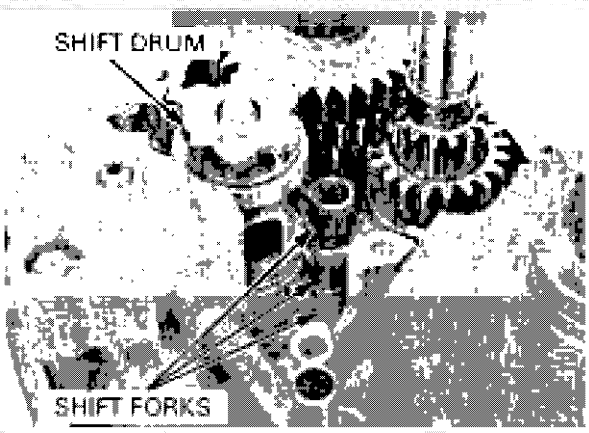
REMOVAL

Separate the crankcase (page 13-9).

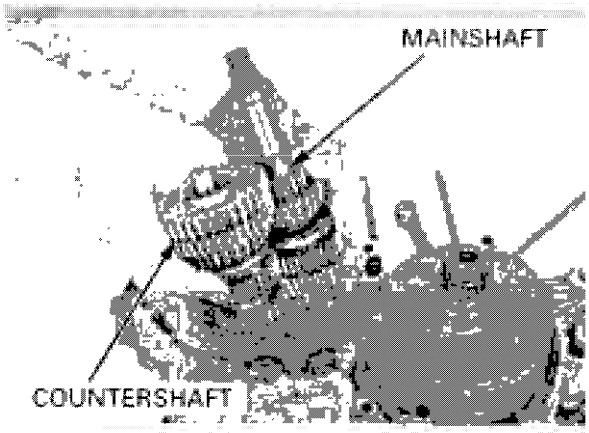
Remove the fork shaft from the shift forks.



Remove the shift forks and shift drum.

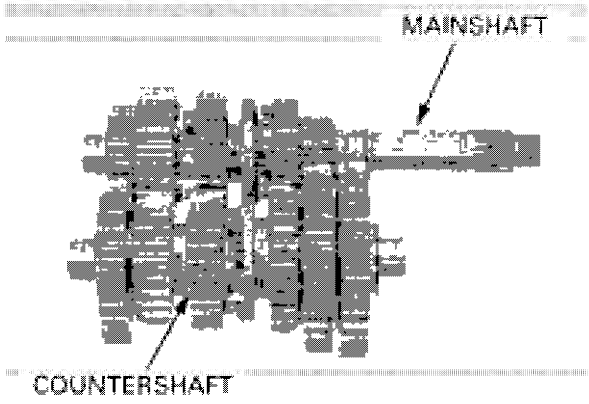


Remove the mainshaft and countershaft together.



TRANSMISSION DISASSEMBLY

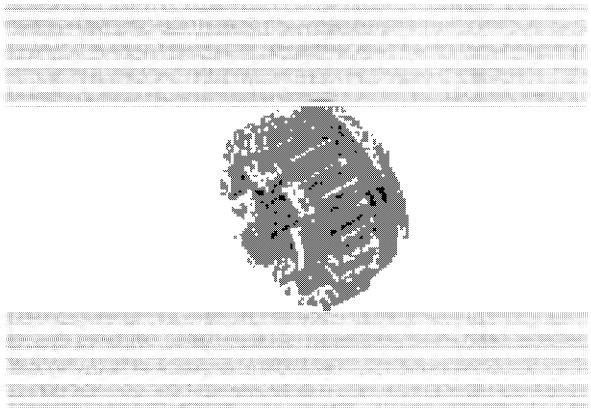
Disassemble the mainshaft and countershaft.



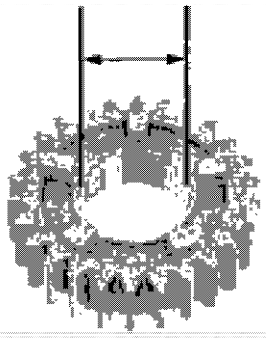
INSPECTION

GEARS

Check the gear dogs, dog holes and teeth for damage or excessive wear.



Measure the I.D. of each gear.

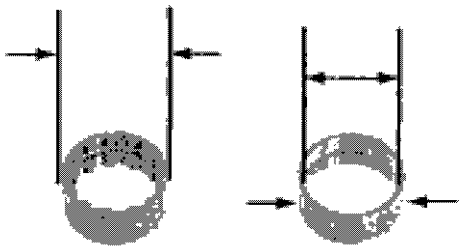


SERVICE LIMITS:

M3 gear:	**28.06 mm (1.105 in)**
M5 gear:	**28.04 mm (1.104 in)**
C1, C4 gears:	**31.05 mm (1.222 in)**
C2 gears:	**28.030 mm (1.1035 in)**

BUSHINGS

Check the bushings for wear or damage.
Measure the O.D. of each bushing.



SERVICE LIMITS:

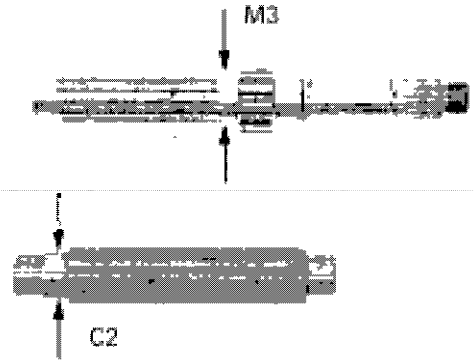
M3 gear bushing:	**27.960 mm (1.1008 in)**
M5 gear bushing:	**27.940 mm (1.1000 in)**
C1, C4 gear bushings:	**30.93 mm (1.218 in)**

Measure the I.D. of the M3 gear bushing.

SERVICE LIMIT: 25.04 mm (0.985 in)

MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for abnormal wear or damage.
Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.



SERVICE LIMITS:

Mainshaft (at M3 gear bushing):
24.94 mm (0.982 in)

Countershaft (at C2 gear bushing):
23.950 mm (0.9429 in)

Calculate the gear-to-bushing and bushing-to-shaft clearance.

SERVICE LIMITS:

Gear-to-bushing	
M3, M5:	**0.08 mm (0.003 in)**
C1, C4:	**0.11 mm (0.004 in)**
Bushing-to-shaft	
M3:	**0.08 mm (0.003 in)**

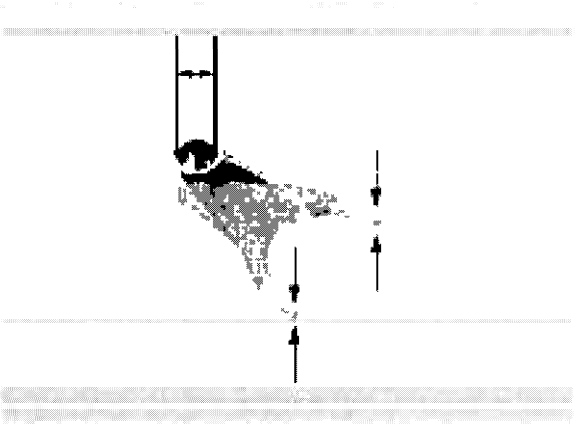
SHIFT FORK

Check for deformation or abnormal wear.
Measure the shift fork claw thickness.

SERVICE LIMITS: 5.6 mm (0.22 in)

Measure the shift fork I.D.

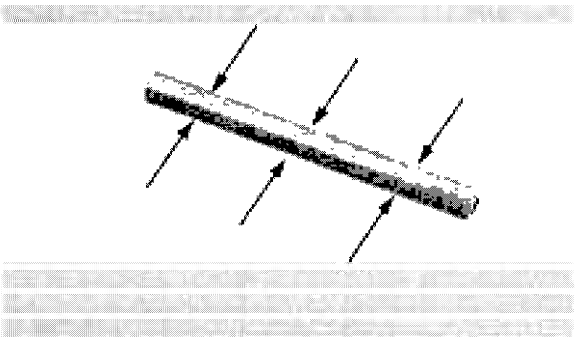
SERVICE LIMIT: 13.03 mm (0.513 in)



SHIFT FORK SHAFT

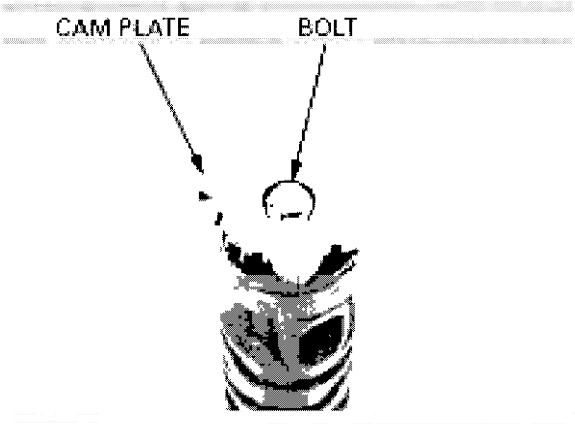
Check the shaft for bend, abnormal wear or damage.
Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.90 mm (0.508 in)

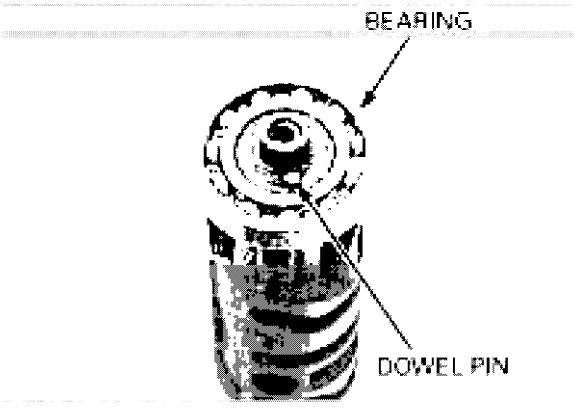


SHIFT DRUM/SHIFT DRUM BEARING

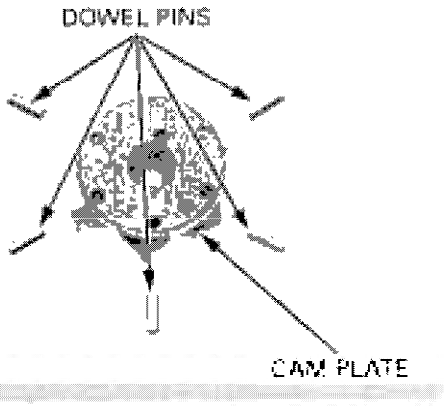
Remove the bolt and gearshift cam plate.



Remove the dowel pin and bearing.



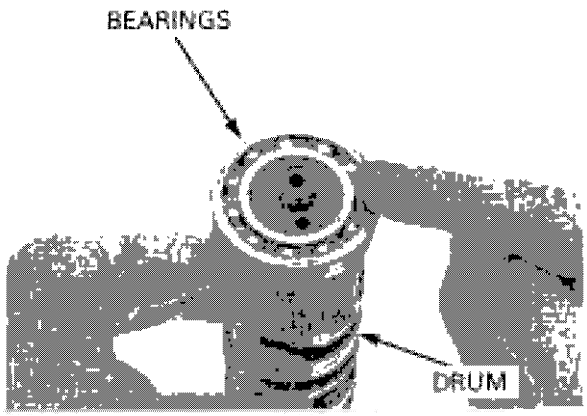
Remove the dowel pins from the gearshift cam plate.



Temporarily install the bearing on the shift drum.
Turn the outer race of the bearing with your finger. The bearing should turn smoothly and quietly.

Also check that the bearing inner race fits tightly on the shift drum.

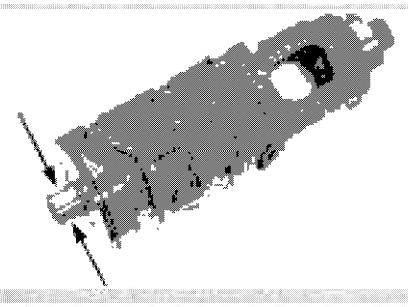
Remove and discard the bearing if the races do not turn smoothly, quietly, or if it fits loosely on the shift drum.



Check the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.

Measure the shift drum O.D. at left end.

SERVICE LIMIT: 11.94 mm (0.470 in)



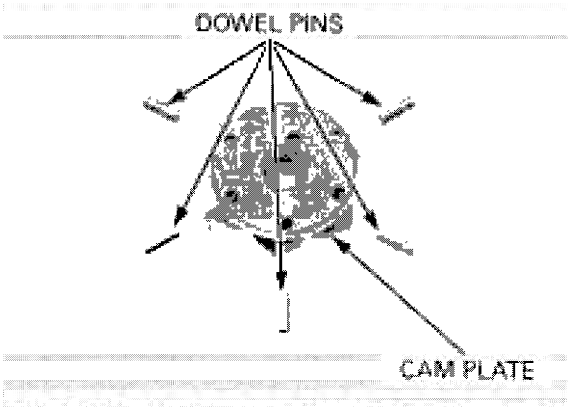
Check the shift drum journal in the left crankcase for excessive wear or damage.
Measure the shift drum journal I.D.

SERVICE LIMIT: 12.05 mm (0.474 in)

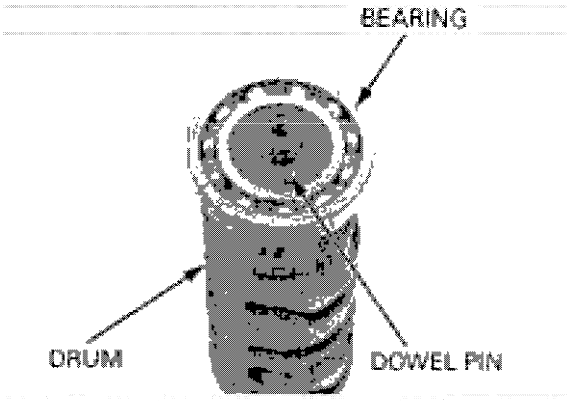
Calculate the shift drum-to-shift drum journal clearance.

SERVICE LIMIT: 0.09 mm (0.035 in)

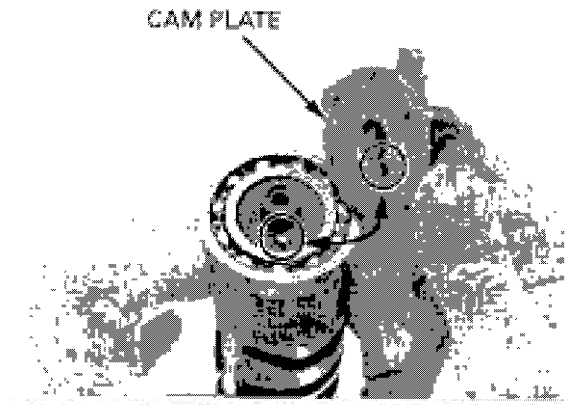
Install the dowel pins into the cam plate holes.



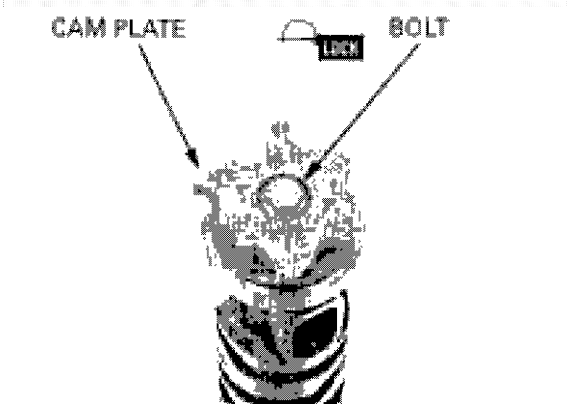
Install the bearing on the shift drum.
Install the dowel pin into the shift drum hole.



Install the gearshift cam plate by aligning the hole on the cam plate with the dowel pin.



Clean and apply a locking agent to the gearshift cam plate bolt (page 1-18).
Install and tighten the bolt securely.



TRANSMISSION ASSEMBLY

Clean all parts in solvent.

Apply oil to the all gear teeth.

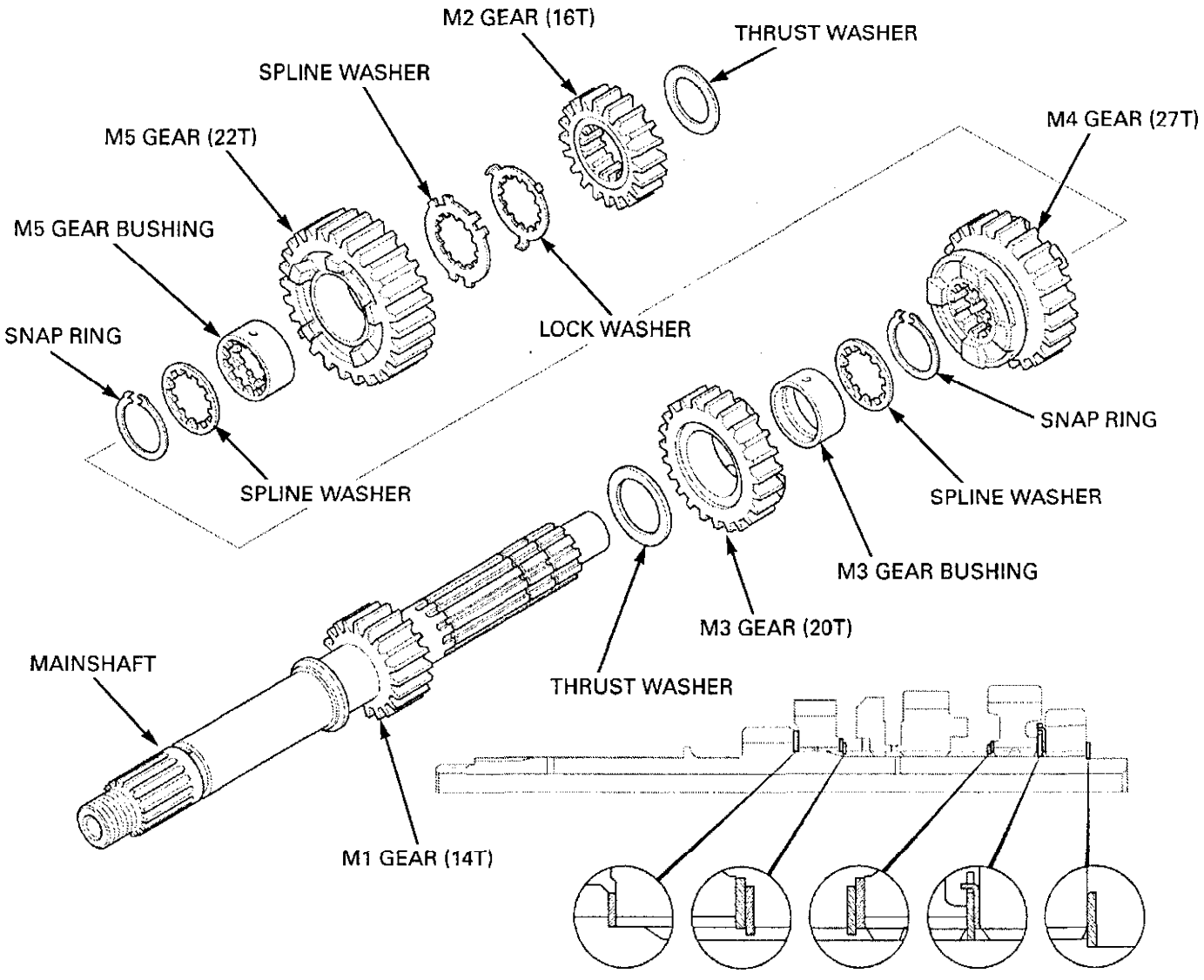
Apply molybdenum disulfide oil to the gear and bushing sliding surface and shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

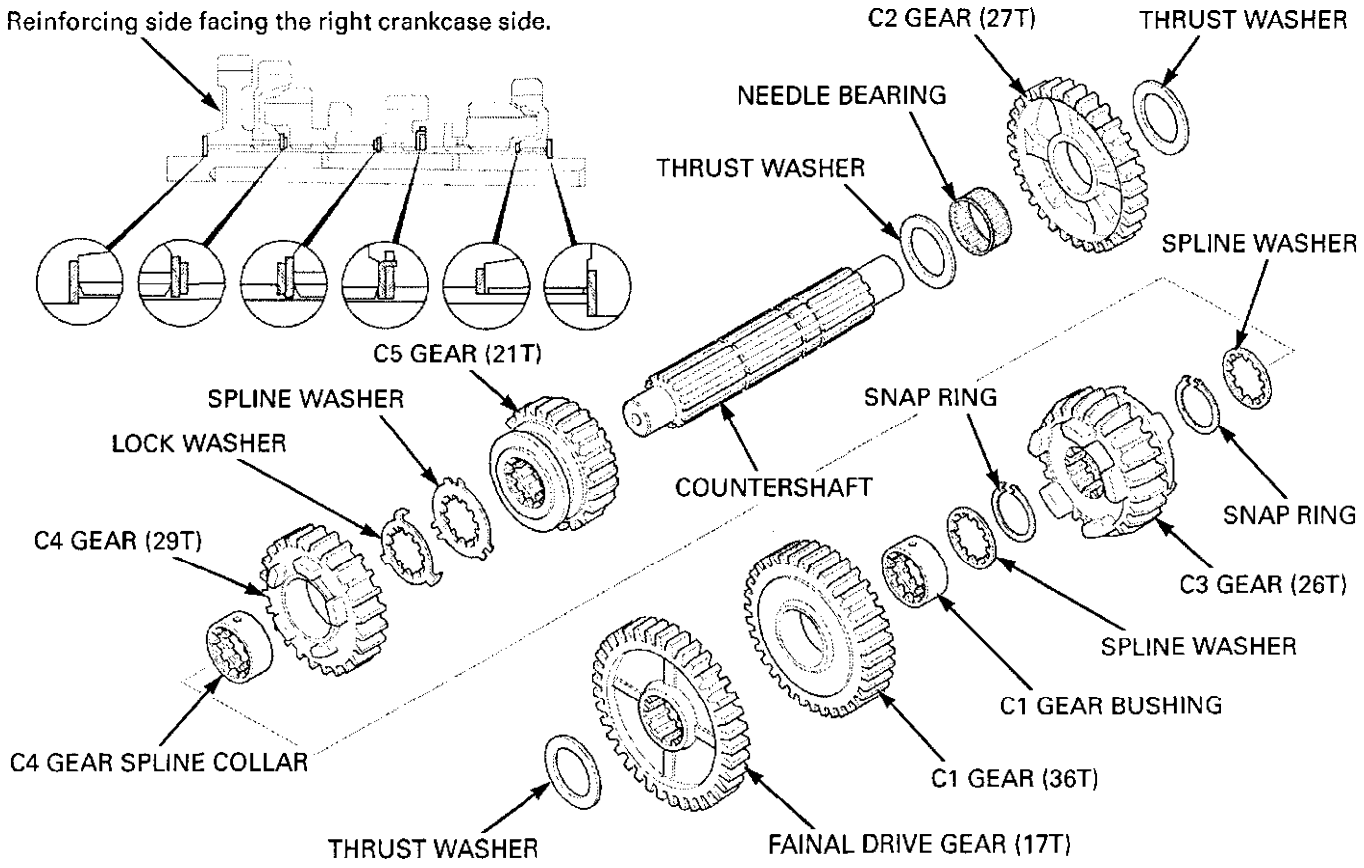
NOTE:

- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust load side.
- Do not reuse a worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.
- Align the lock washer tabs with the spline washer grooves.
- Align the oil holes in the M5 gear bushing and mainshaft, and C1, C4 gear bushing and countershaft.

MAINSHAFT

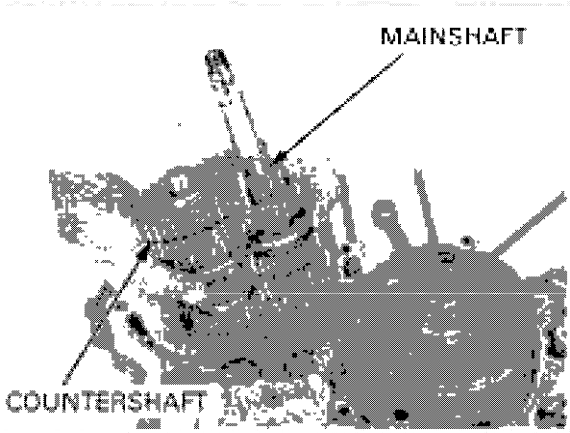


COUNTERSHAFT



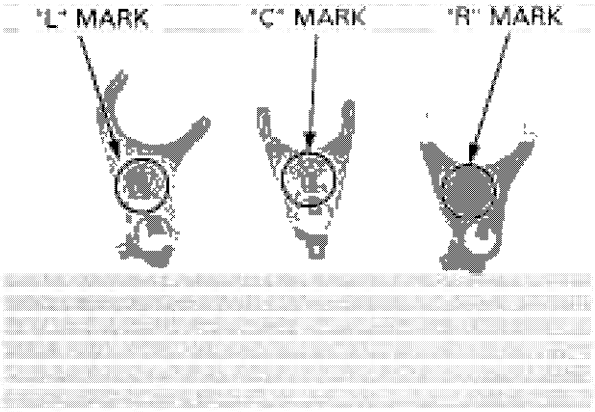
INSTALLATION

Install the mainshaft and countershaft together into the left crankcase.

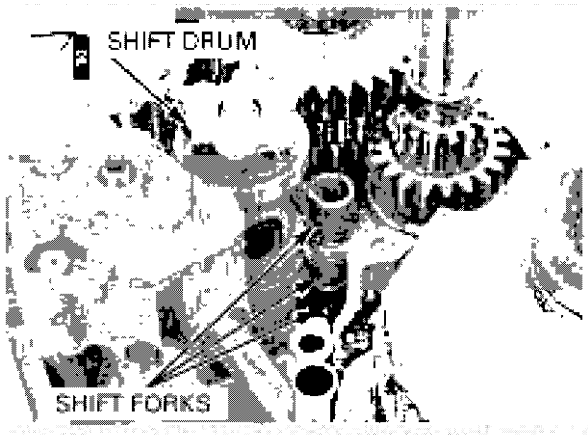


The shift forks have the following identification marks.

- "L": Left shift fork
- "C": Center shift fork
- "R": Right shift fork



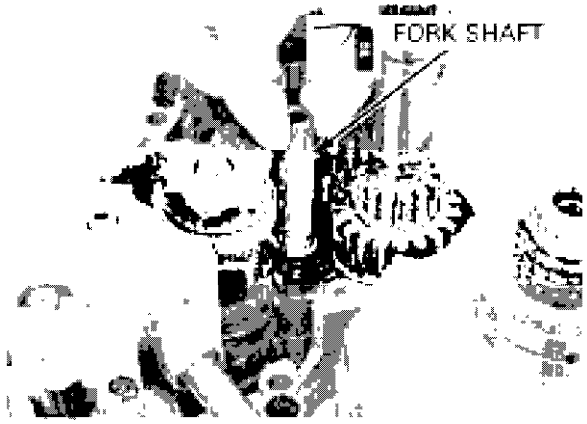
Install the shift forks into the shifter gear grooves with the markings facing up (right crankcase side). Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.



Apply engine oil to the shift fork shaft and insert it through the shift forks into the right crankcase.

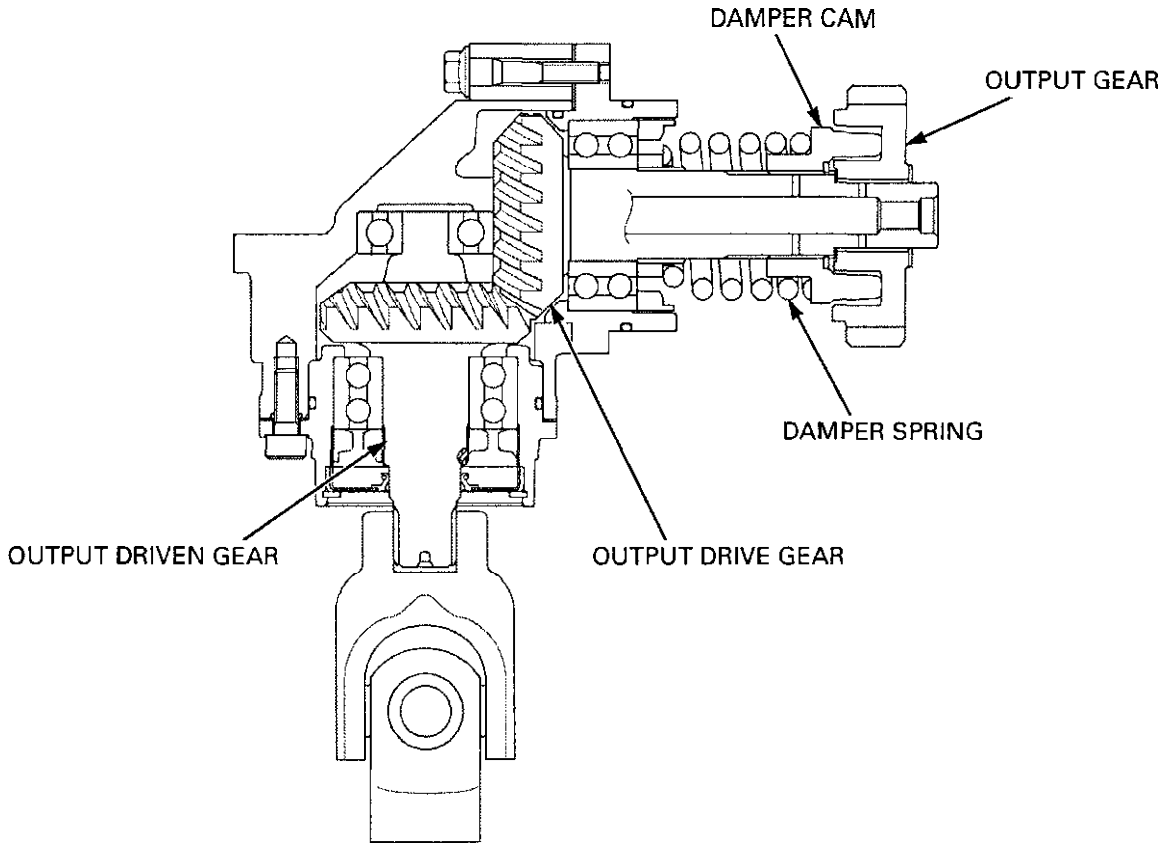
After installation, check for smooth transmission operation.

Assemble the crankcase (page 13-47).



OUTPUT GEAR

Description of the output gear assembly:



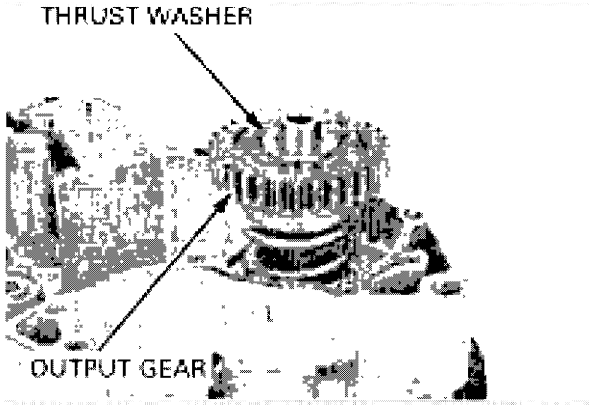
REMOVAL

Separate the crankcase (page 13-9).

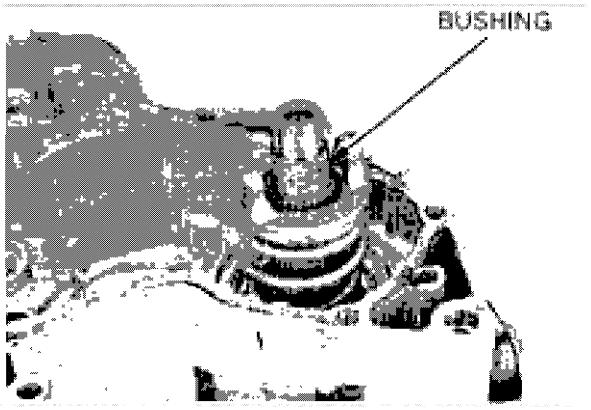
Remove the following:

- Crankshaft (page 13-11)
- Transmission (page 13-19)

Remove the thrust washer and output gear.



Remove the bushing from the output drive gear shaft.



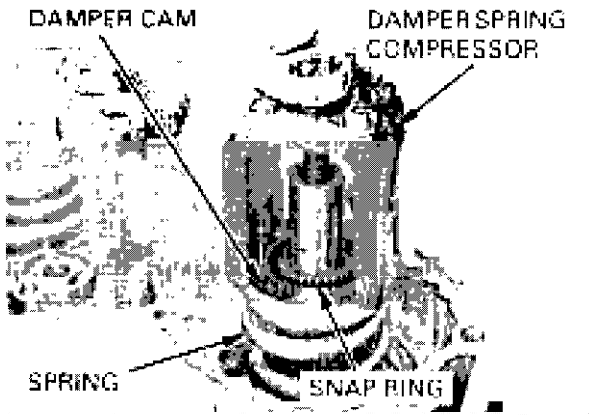
Set the damper spring compressor onto the damper cam and output drive gear shaft.

Compress the damper spring by turning the compressor bolt clockwise until the snap ring can be removed.

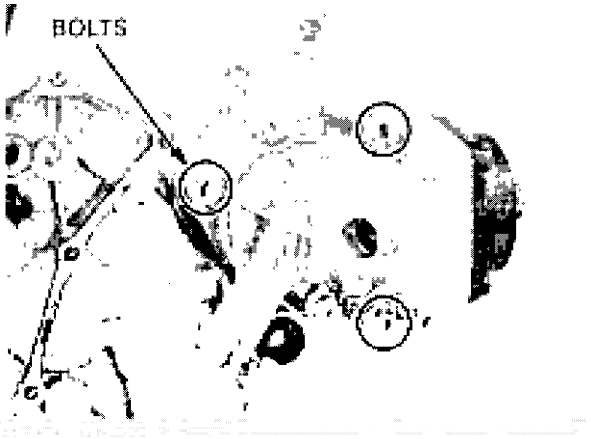
TOOLS:

Damper spring compressor	**07964-ME90000**
Snap ring pliers	**07914-5670101**

Remove the snap ring, special tools, damper cam and spring from the drive gear shaft.



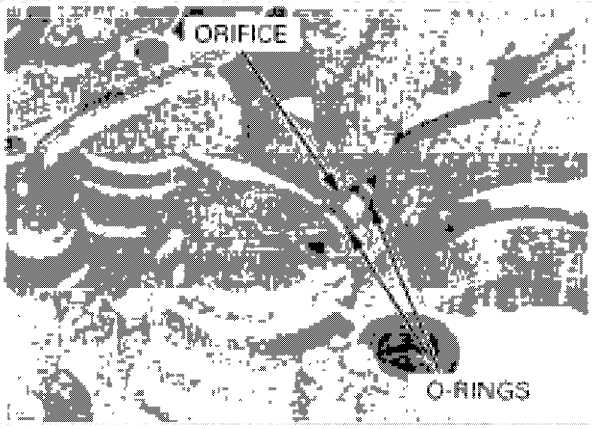
Remove the output gear case mounting bolts.



Remove the output gear case assembly and O-ring.

Remove the orifice and O-rings.
Check the orifice for clog or damage.

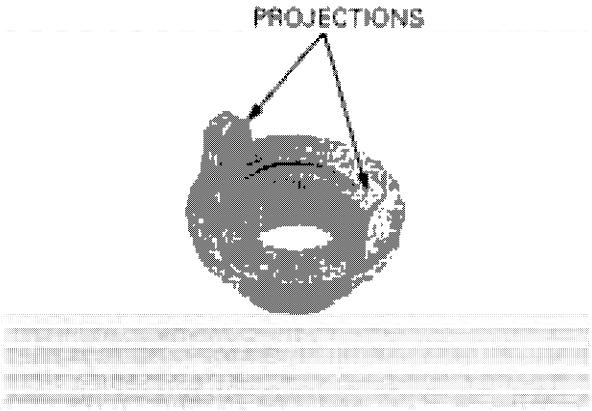
Replace it if necessary.



INSPECTION

DAMPER CAM

Check the projections of damper cam for damage or excessive wear.

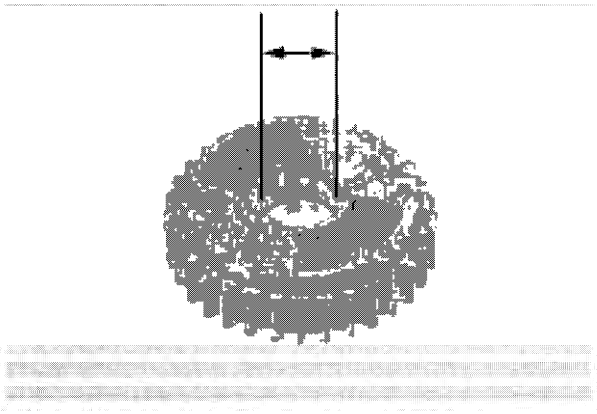


OUTPUT GEAR

Check the gear teeth for damage or excessive wear, and the gear dog holes for damage.

Measure the output gear I.D.

SERVICE LIMIT: 24.04 mm (0.946 in)



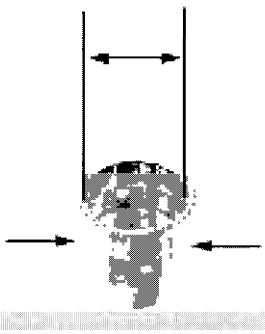
BUSHING

Check the output gear bushing for wear or damage. Measure the bushing I.D. and O.D.

SERVICE LIMITS: O.D. 23.70 mm (0.933 in)
I.D. 20.06 mm (0.790 in)

Calculate the output gear-to-bushing clearance.

SERVICE LIMIT: 0.082 mm (0.0032 in)



OUTPUT DRIVE GEAR SHAFT

Measure the O.D. of the output drive gear shaft at the bushing sliding area.

SERVICE LIMIT: 19.97 mm (0.786 in)

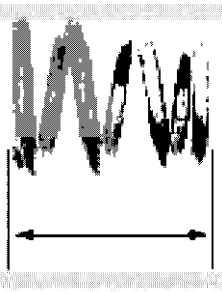
Calculate the bushing-to-shaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

DAMPER SPRING

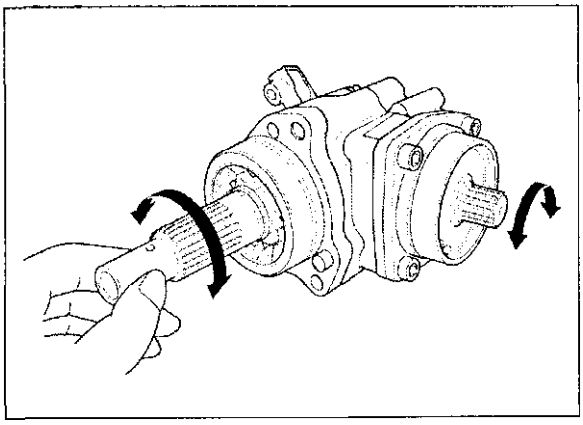
Measure the damper spring free length.

SERVICE LIMIT: 63 mm (2.48 in)



Turn the output drive gear shaft and check that the output drive and driven gear shafts turn smoothly and quietly without binding.

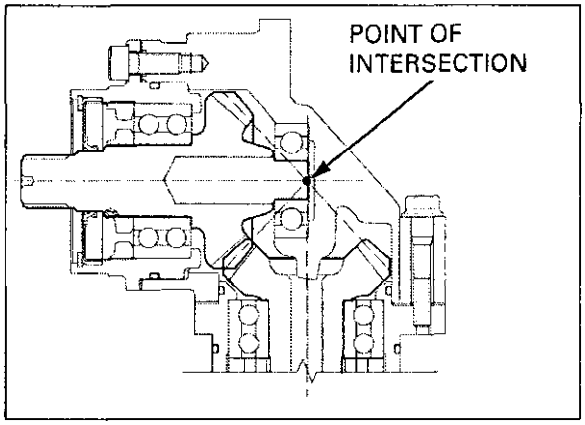
If the shafts do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. They must be checked after disassembly; replace faulty parts/assemblies as required.



BACKLASH INSPECTION/GEAR TOOTH CONTACT PATTERN CHECK

NOTE:

Perform the backlash inspection and contact pattern check whenever you replace the output driven/drive gears, bearings, bearing holder and gear case. The extension lines from the gear engagement surfaces should intersect at one point.



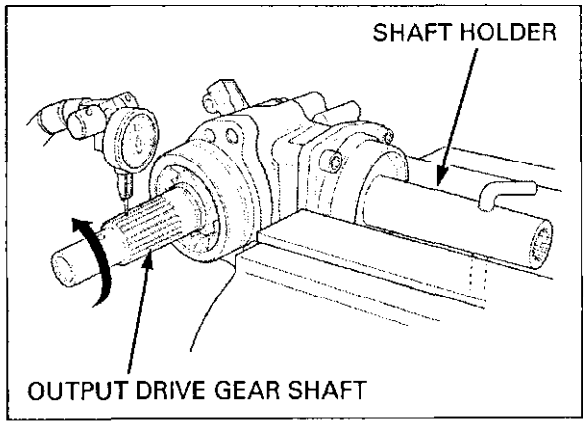
BACKLACH INSPECTION

Set the output gear case in a vise with soft jaws.

Set a horizontal type dial indicator on the output drive gear shaft as shown.
Hold the output driven gear shaft with the shaft holder and rotate the drive gear shaft until gear slack is taken up.

TOOLS:

Shaft holder A	**07PAB-0010100**
Holder handle	**07PAB-0010400**



Turn the drive gear shaft back and forth to read backlash.

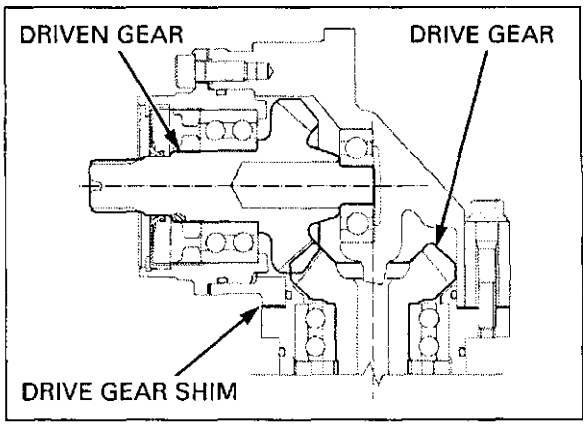
STANDARD: 0.08 – 0.23 mm (0.003 – 0.009 in)
SERVICE LIMIT: 0.40 mm (0.016 in)

Remove the dial indicator. Turn the drive gear shaft 120° and measure backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

Backlash difference between measurements
SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely or the case is deformed.
Inspect the bearings and case.

If the backlash is excessive, replace the output drive gear shim with a thinner one.
If the backlash is too small, replace the output drive gear shim with a thicker one.



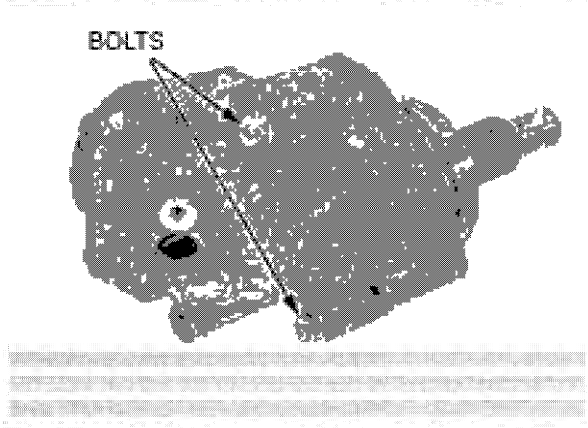
Backlash is changed by about 0.06 – 0.07 mm (0.002 – 0.003 in) when shim thickness is changed by 0.10 mm (0.004 in).

OUTPUT DRIVE GEAR SHIMS:

0.30 mm (0.012 in)
0.35 mm (0.014 in)
0.40 mm (0.016 in)
0.45 mm (0.018 in)
0.50 mm (0.020 in) – Standard
0.55 mm (0.022 in)
0.60 mm (0.024 in)
0.65 mm (0.026 in)
0.70 mm (0.028 in)
0.75 mm (0.030 in)

OUTPUT DRIVE GEAR SHIM REPLACEMENT

Remove the bolts and drive gear assembly from the gear case.

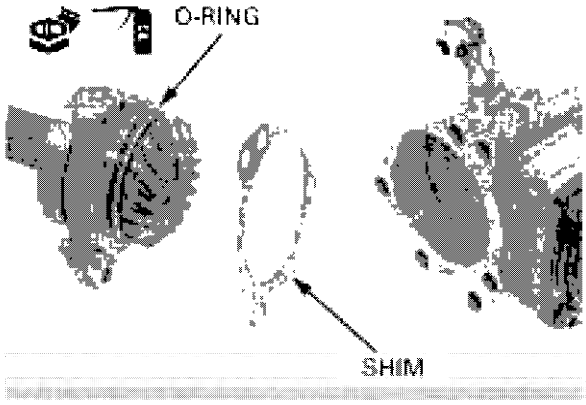


Remove the shim and O-ring from the bearing holder.

Select the replacement shim (page 13-32).

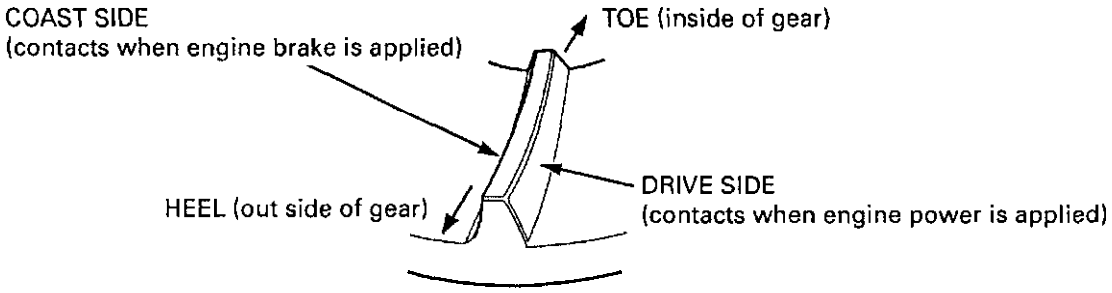
Coat a new O-ring with oil and install it into the bearing holder groove.
Install the shim.
Install the drive gear assembly to the gear case and tighten the bolts.

Recheck the backlash (page 13-31).
After backlash adjustment has been made, check the gear tooth contact pattern as described below.



GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:



Remove the drive gear assembly from the gear case (page 13-32).
Apply a thin coat of Prussian Blue to the output driven gear teeth.

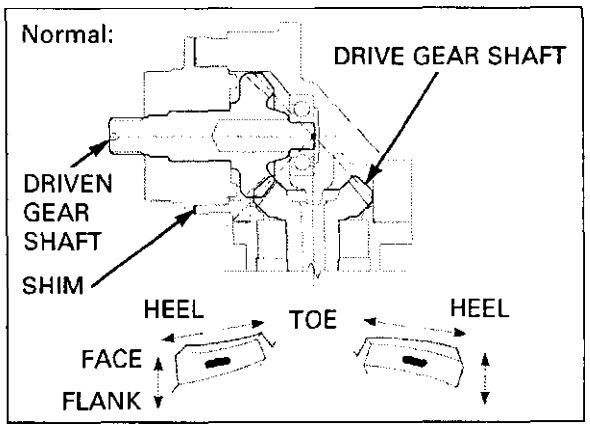
Reinstall the drive gear with the shim.

Rotate the drive gear shaft several times in the normal direction of rotation.

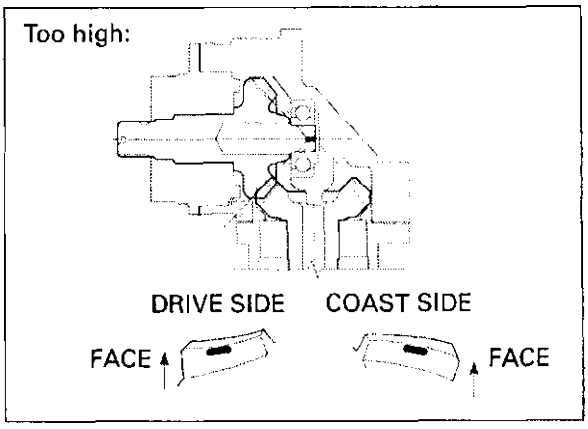
Remove the drive gear assembly and check the gear tooth contact pattern.

Contact is normal if Prussian Blue is transferred to the approximate center of each tooth and slightly to the toe.

If the pattern is not correct, remove and replace the output driven gear shim.

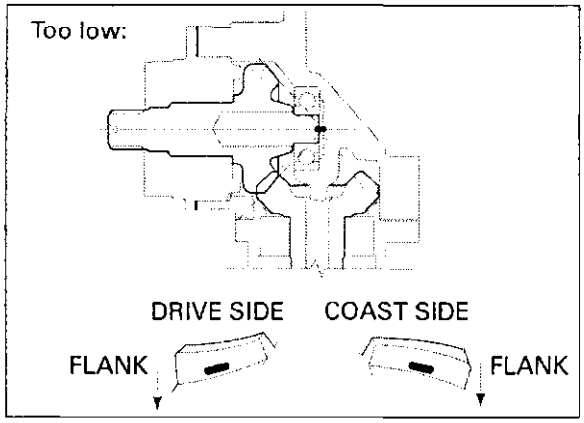


Replace the shim with a thinner one if the contact pattern is too high, toward the face.



Replace the shim with a thicker one if the contact pattern is too low, toward the flank.

The pattern will shift about 1.5 – 2.0 mm (0.06 – 0.08 in) when the shim thickness is changed by 0.10 mm (0.04 in)

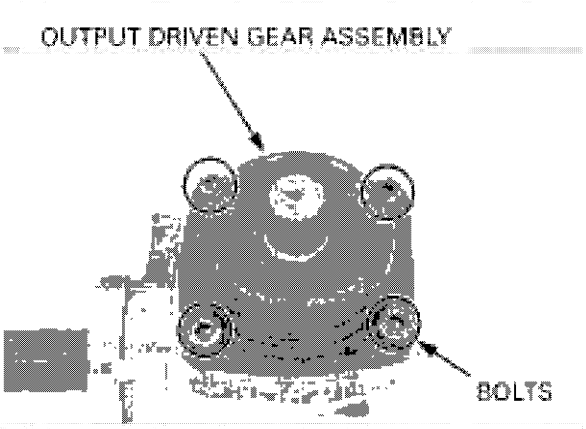


OUTPUT DRIVEN GEAR SHIMS:

0.20 mm (0.008 in)
0.25 mm (0.010 in)
0.30 mm (0.012 in)
0.35 mm (0.014 in)
0.40 mm (0.016 in) – Standard
0.45 mm (0.018 in)
0.50 mm (0.020 in)
0.55 mm (0.022 in)
0.60 mm (0.024 in)

OUTPUT DRIVEN GEAR SHIM REPLACEMENT

Remove the bolts and output driven gear assembly.

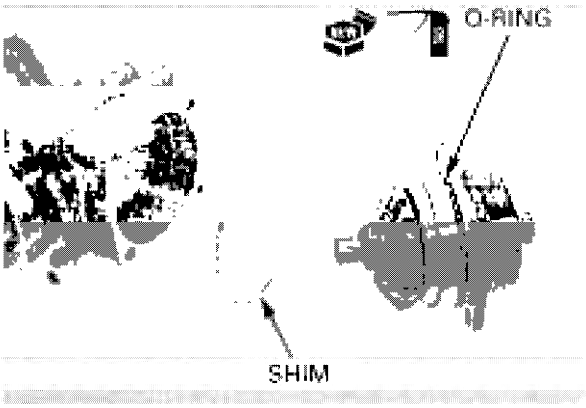


Remove the shim and O-ring from the bearing holder.

Select the replacement shim (page 13-34).

Coat a new O-ring with oil and install it into the bearing holder groove.
Install the shim.
Install the driven gear assembly to the gear case and tighten the bolts.

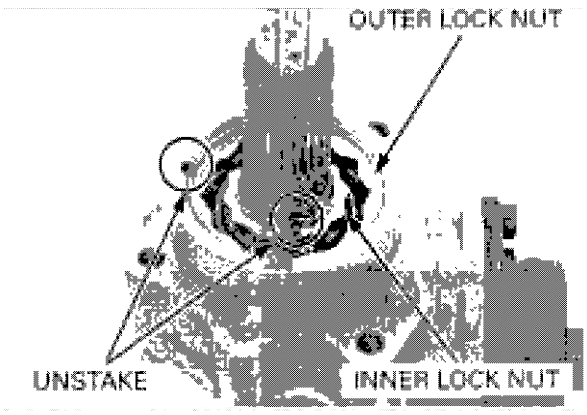
Recheck the contact pattern (page 13-33).



OUTPUT DRIVE GEAR DISASSEMBLY

Hold the output gear case in a vise with soft jaws.

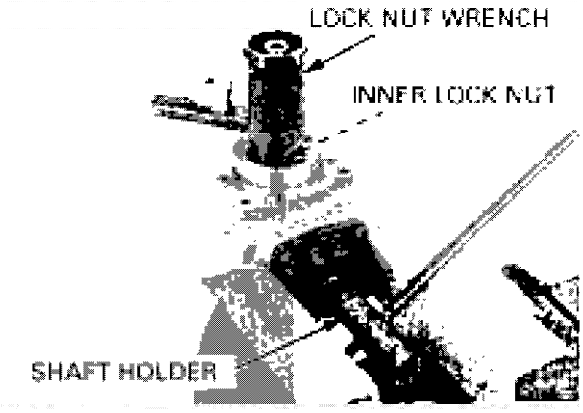
Unstake the bearing inner/outer race lock nuts.



Remove the bearing inner race lock nut using the special tools.

TOOLS:

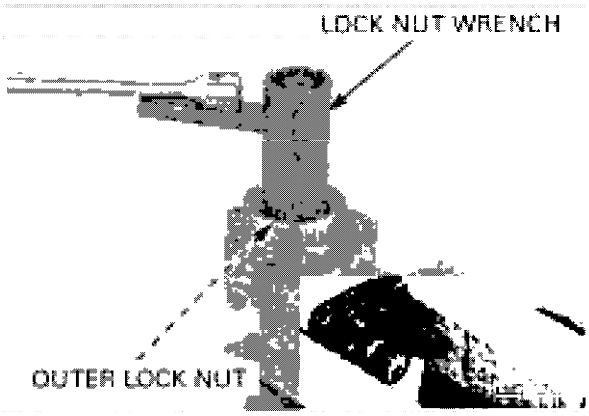
Shaft holder A	**07PAB-0010100**
Holder handle	**07PAB-0010400**
Lock nut wrench, 36/64 mm	**07916-MB00002**



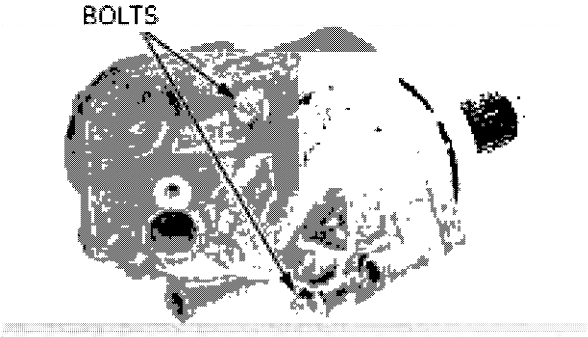
Remove the bearing outer race lock nut using a special tool.

TOOL:

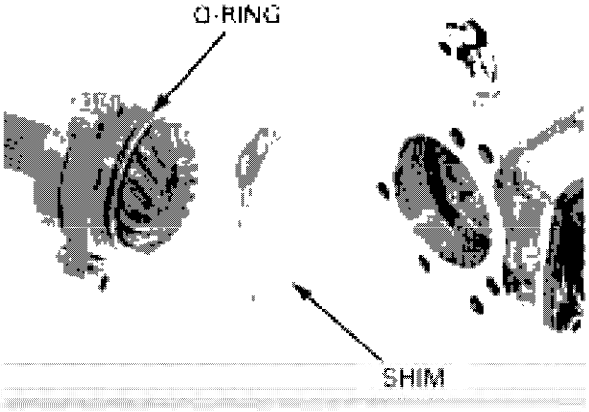
Lock nut wrench, 36/64 mm	**07916-MB00002**



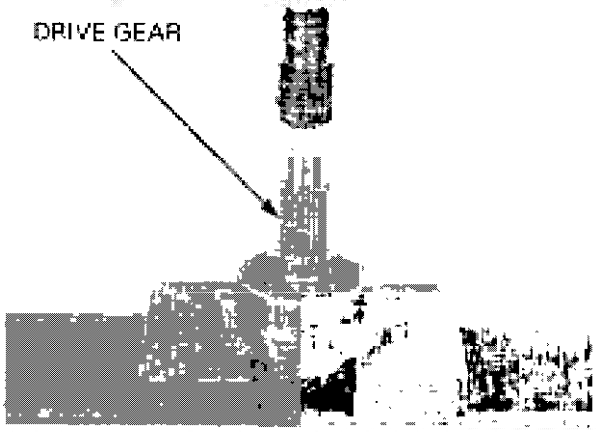
Remove the two bolts and the drive gear assembly from the gear case.



Remove the shim and O-ring from the bearing holder.



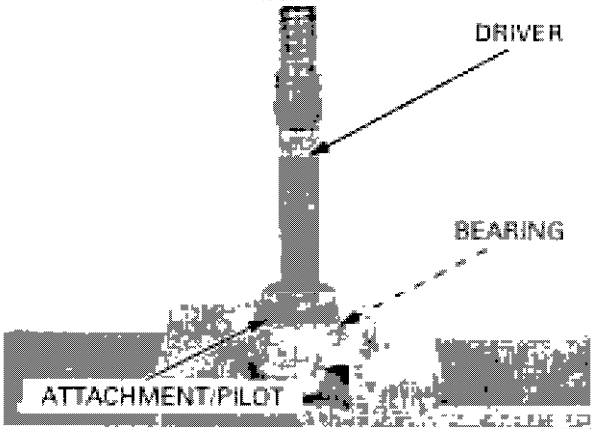
Press the drive gear out of the bearing using a hydraulic press.



Press the drive gear bearing out of the bearing holder using the special tools and a hydraulic press.

TOOLS:

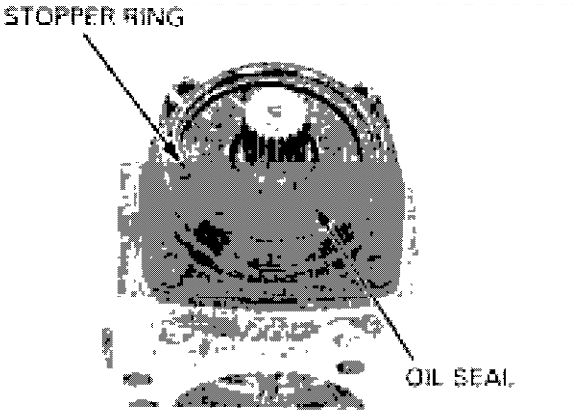
Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 30 mm	**07746-0040700**



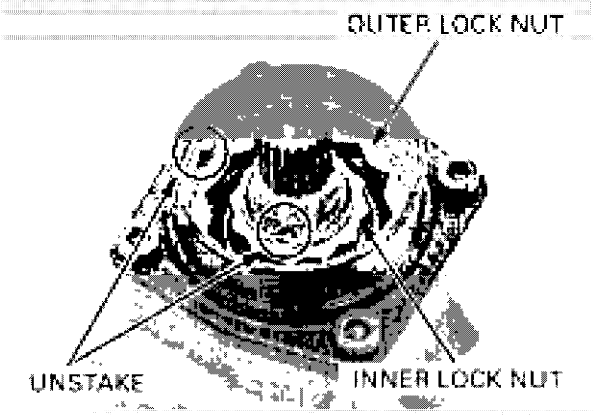
OUTPUT DRIVEN GEAR DISASSEMBLY

Hold the output gear case in a vise with soft jaws.

Remove the stopper ring and oil seal.



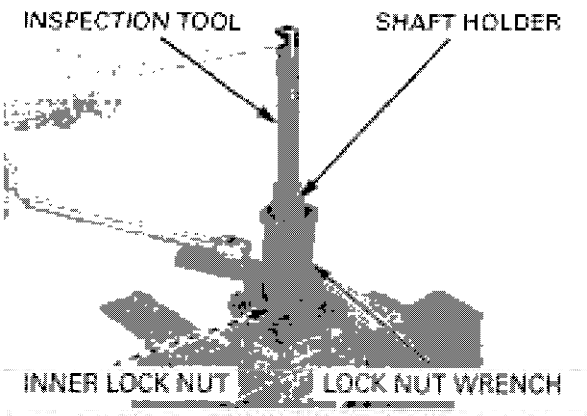
Unstake the bearing inner and outer race lock nuts.



Hold the driven gear shaft and remove the bearing inner race lock nut using the special tools.

TOOLS:

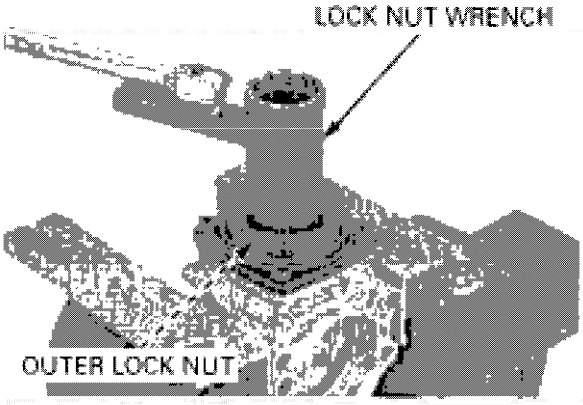
Shaft holder A	**07PAB-0010100**
Lock nut wrench, 36/64 mm	**07916-MB00002**
Differential inspection tool	**07KMK-HC50101**



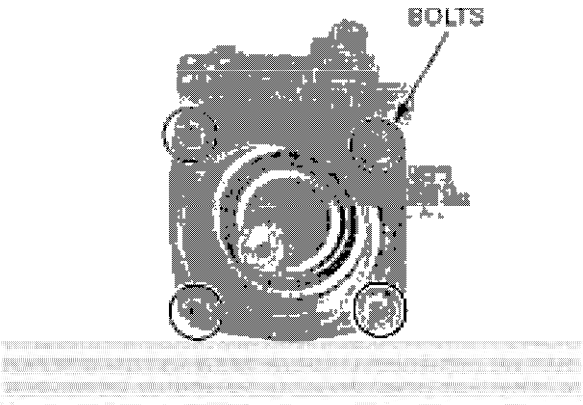
Remove the bearing outer race lock nut using a special tool.

TOOL:

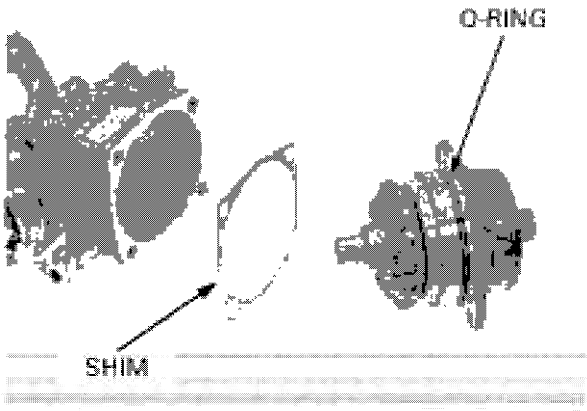
Lock nut wrench, 36/64 mm	**07916-MB00002**



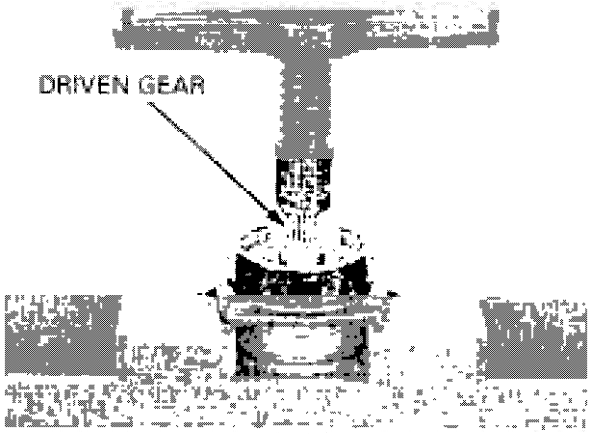
Remove the bolts and driven gear assembly from the gear case.



Remove the shim and O-ring from the bearing holder.



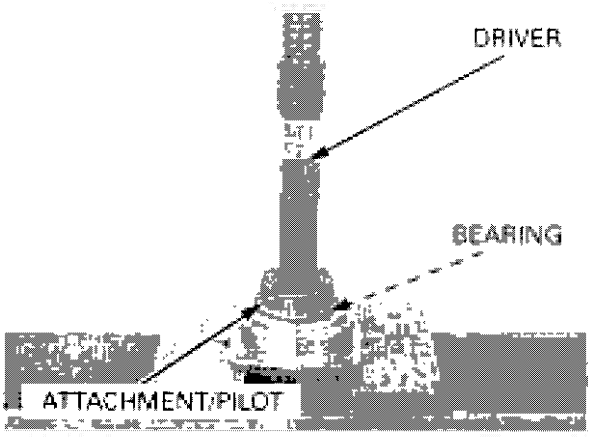
Press the driven gear out of the bearing using a hydraulic press.



Press the driven gear bearing out of the bearing holder using the special tools and a hydraulic press.

TOOLS:

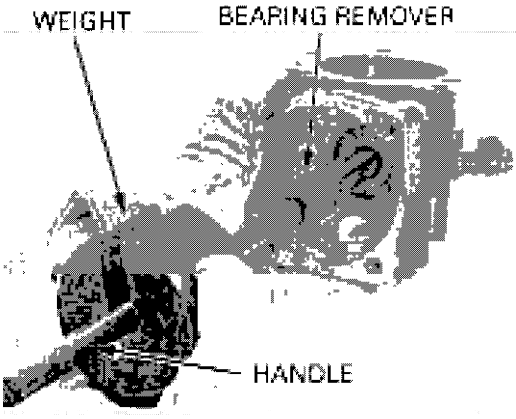
Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 30 mm	**07746-0040700**



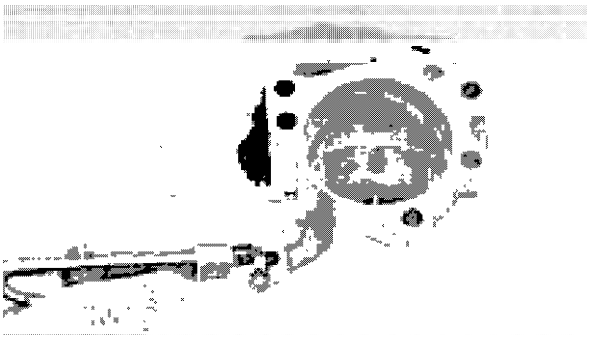
Remove the driven gear case bearing using the special tools.

TOOLS:

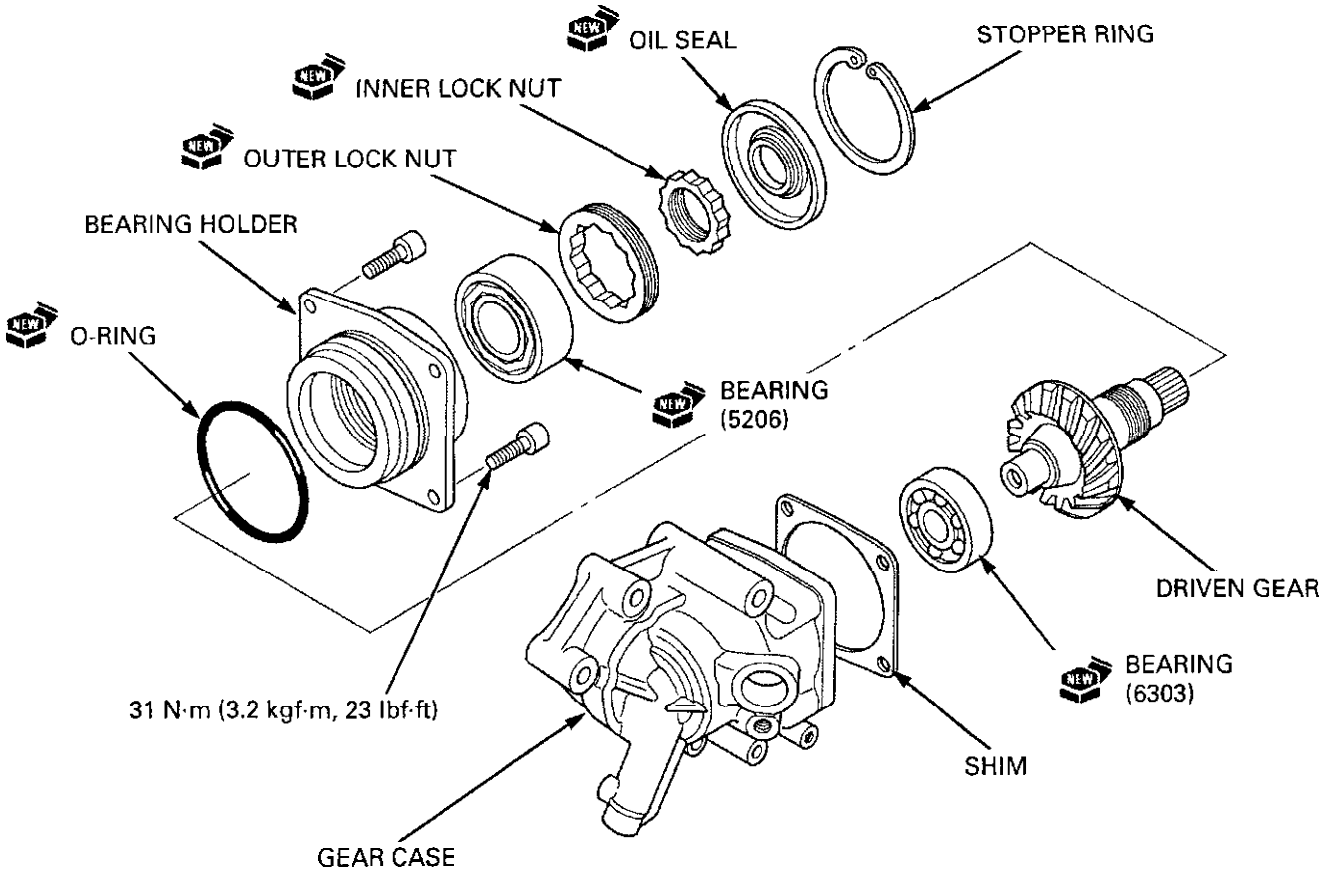
Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201**



Blow oil passage in the output gear case with compressed air.



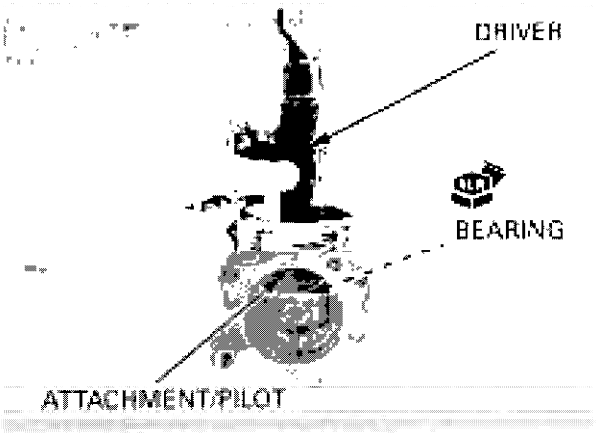
OUTPUT DRIVEN GEAR ASSEMBLY



Drive a new bearing into the gear case with the marked side facing up until it is fully seated.

TOOLS:

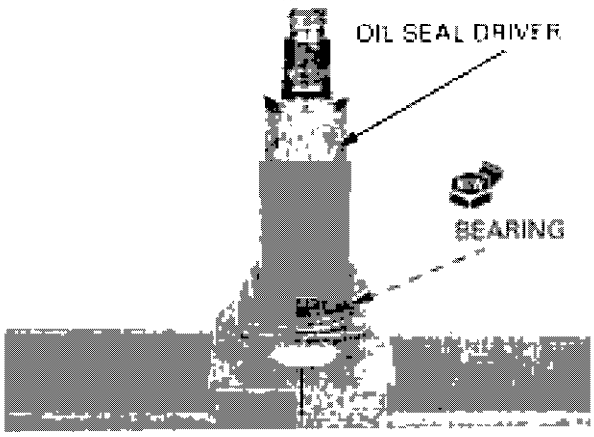
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 17 mm	**07746-0040400**



Press a new bearing into the bearing holder with the marked side facing up until it is fully seated and make sure it rotates freely after installation.

TOOL:

Oil seal driver	**07965-KE80200**

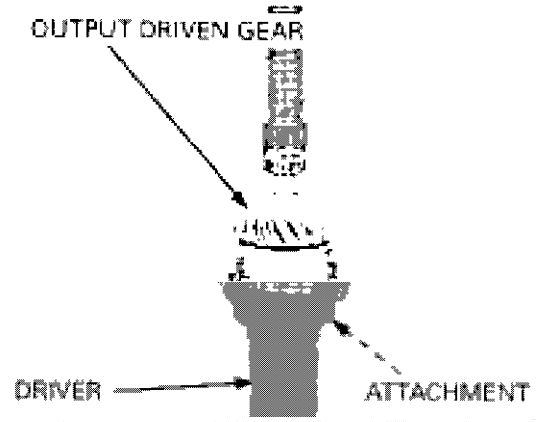


If the output driven gear requires replacement, the driven and drive gear must be replaced as a set.

Support the bearing inner race and press the output driven gear into the bearing holder using the special tools.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**

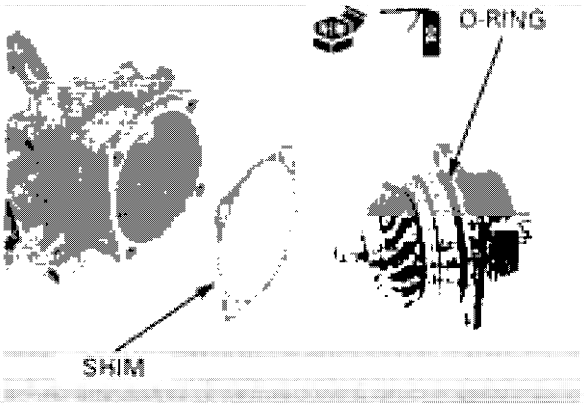


Coat a new O-ring with oil and install it into the bearing holder groove.

Install the shim.

NOTE:

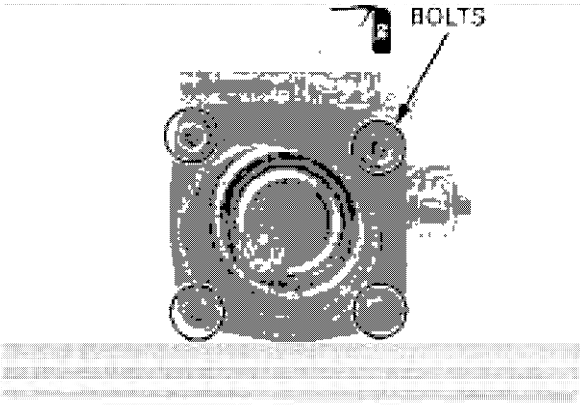
When the bearing, gear, holder and/or case have been replaced, use the 0.40 mm (0.016 in) shim for initial reference.



Hold the output gear case in a vise with soft jaws. Install the driven gear assembly into the gear case, aligning with the bolt holes

Apply engine oil to the threads and seating surface of the bolts and tighten them.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



Apply engine oil to the threads of a new bearing outer race lock nut and tighten it to the specified torque using a special tool.

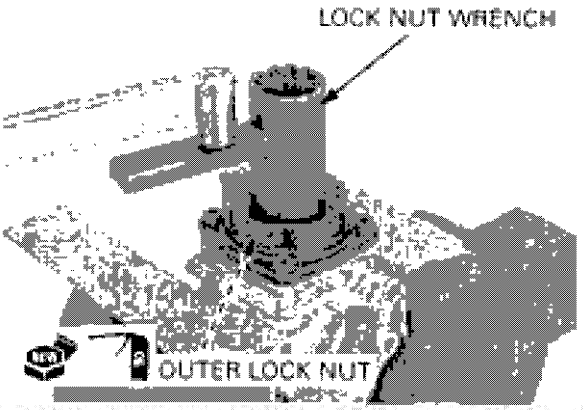
TOOL:

Lock nut wrench, 36/64 mm	**07916-MB00002**

Refer to torque wrench reading information, on "Service information" (page 13-3).

TORQUE:

Actual: 98 N·m (10.0 kgf·m, 72 lbf·ft)
Indicated: 89 N·m (9.1 kgf·m, 66 lbf·ft)



Apply engine oil to the threads of a new inner race lock nut.

Hold the driven gear shaft and tighten it to the specified torque using the special tools.

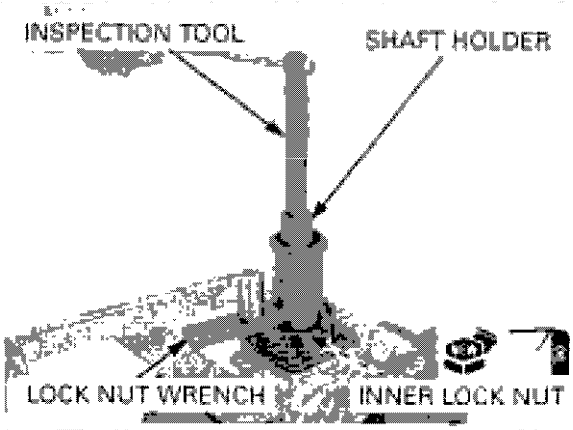
TOOLS:

Shaft holder A	**07PAB-0010100**
Lock nut wrench, 36/64 mm	**07916-MB00002**
Differential inspection tool	**07KMK-HC50101**

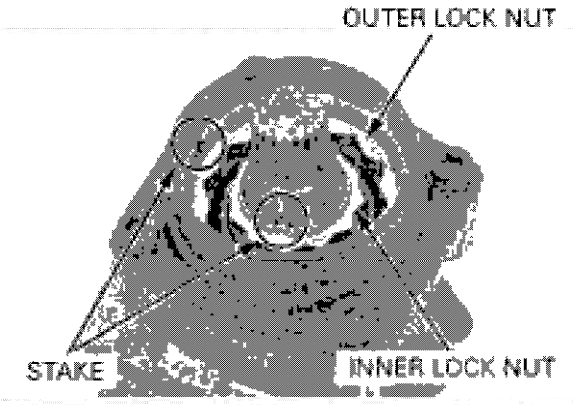
Refer to torque wrench reading information, on "Service information" (page 13-3).

TORQUE:

Actual: 137 N·m (14.0 kgf·m, 101 lbf·ft)
Indicated: 124 N·m (13.0 kgf·m, 90 lbf·ft)



Stake the bearing inner and outer race lock nuts.

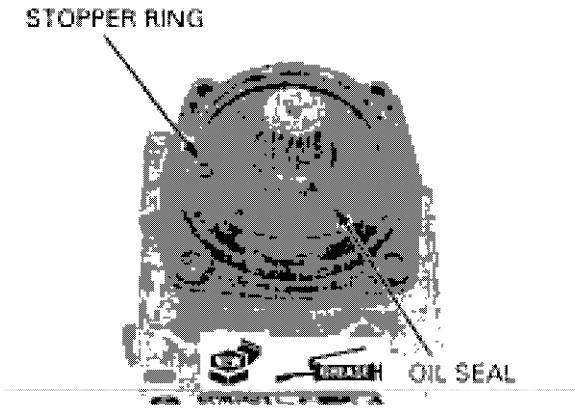


Pack grease into the seal lip cavity of a new oil seal and install it until the ring groove is visible so the stopper ring can be installed.

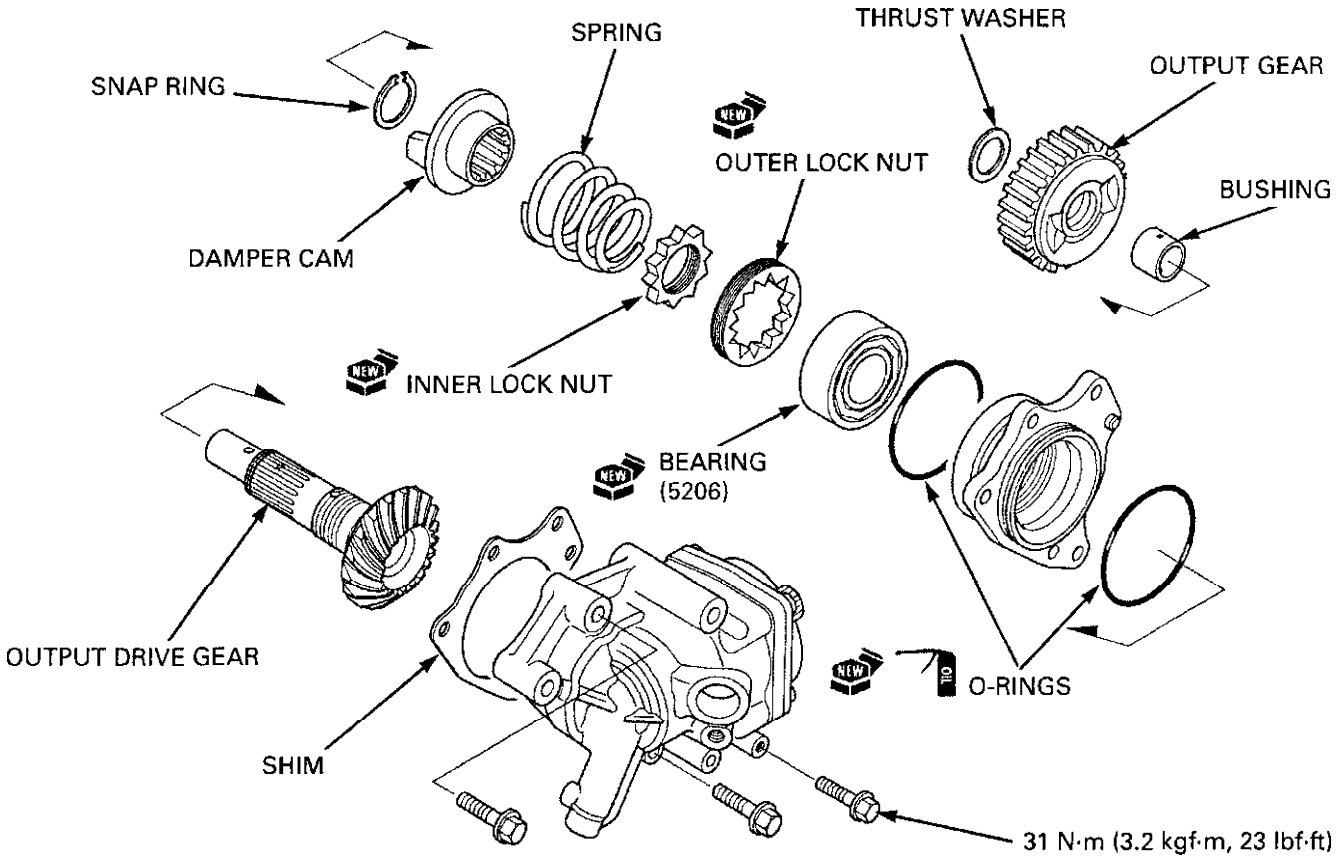
Install the stopper ring into the bearing holder groove securely.

NOTE:

- Install the stopper ring with the chamfered edge facing the thrust load side.
- Do not reuse worn stopper ring which could easily spin in the groove.
- Check that the stopper ring is seated in the groove.



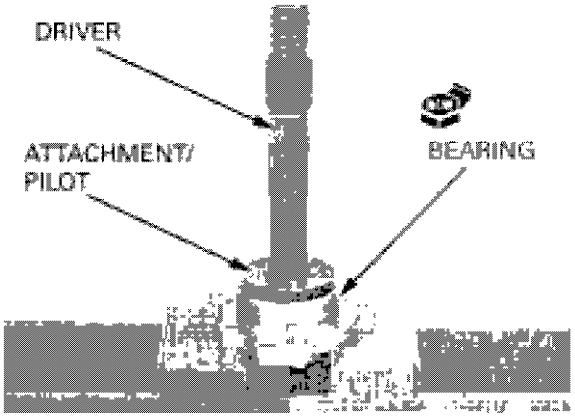
OUTPUT DRIVE GEAR ASSEMBLY



Press a new bearing into the bearing holder with the marked side facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**



If the output drive gear requires replacement, the drive and driven gears must be replaced as a set.

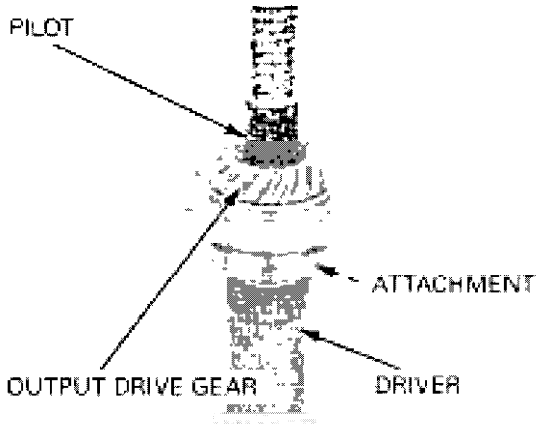
Support the bearing inner race and press the output drive gear using the special tools.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**
Pilot, 22 mm	**07746-0041000**

NOTE:

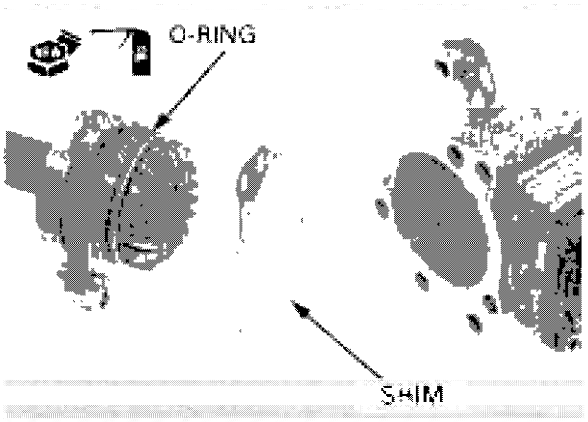
- Place the pilot's threaded end into the drive shaft.
- If the bearing, gear, holder and/or case is replaced, a new shim must be selected (See page 13-31, Backlash Inspection)



Coat a new O-ring with oil and install it into the bearing holder groove.
Install the shim.

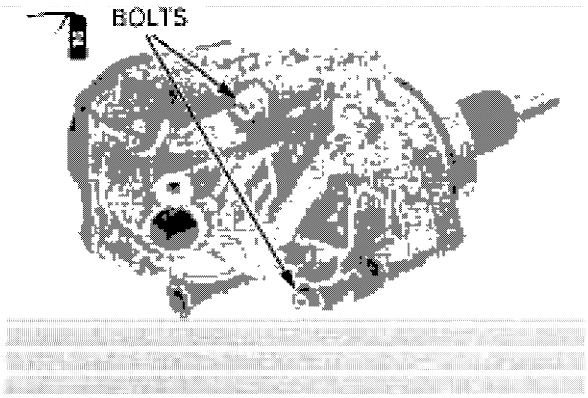
NOTE:

- When the bearing, gear, holder and/or case have been replaced, use the 0.50 mm (0.020 in) shim for initial reference.



Install the drive gear assembly into the gear case.
Apply oil to the bolt threads and seating surface.
Tighten the bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



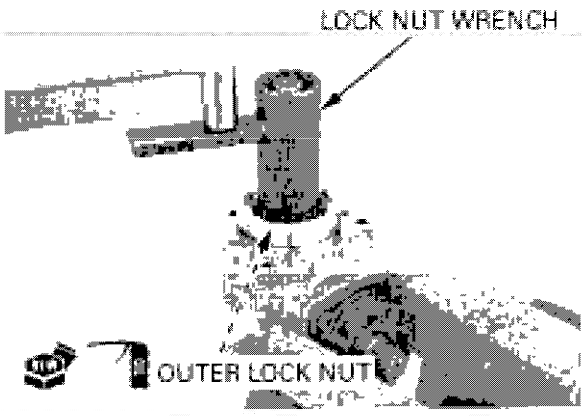
Hold the gear case in a vise with soft jaws.

Apply oil to the threads of a new bearing outer race lock nut and tighten it to the specified torque using a special tool.

TOOL:
Lock nut wrench, 36/64 mm 07916-MB00002

Refer to torque wrench reading information, on page 13-3 "Service information".

TORQUE:
Actual: 98 N·m (10.0 kgf·m, 72 lbf·ft)
Indicated: 89 N·m (9.1 kgf·m, 66 lbf·ft)

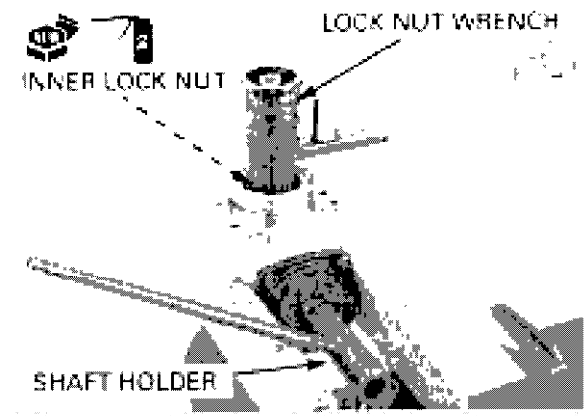


Apply engine oil to the threads of a new bearing inner race lock nut and tighten it to the specified torque using the special tools.

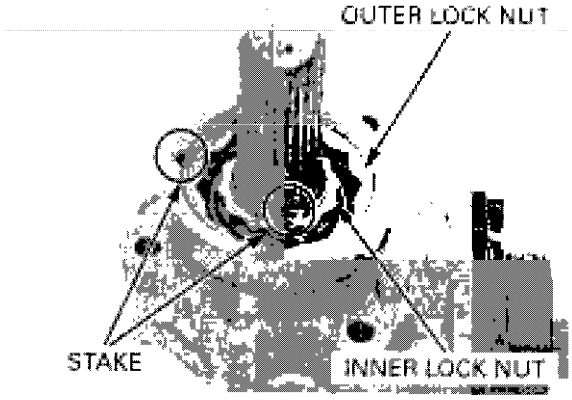
TOOLS:

Lock nut wrench, 36/64 mm	**07916-MB00002**
Shaft holder A	**07PAB-0010100**
Holder handle	**07PAB-0010400**

TORQUE:
Actual: 73 N·m (7.4 kgf·m, 54 lbf·ft)
Indicated: 66 N·m (6.7 kgf·m, 49 lbf·ft)

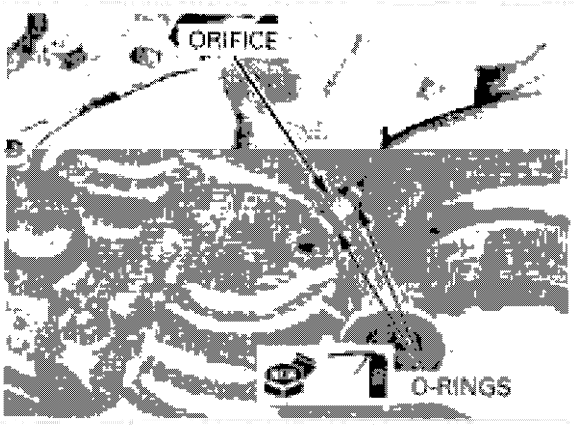


Stake the bearing inner and outer race lock nuts.



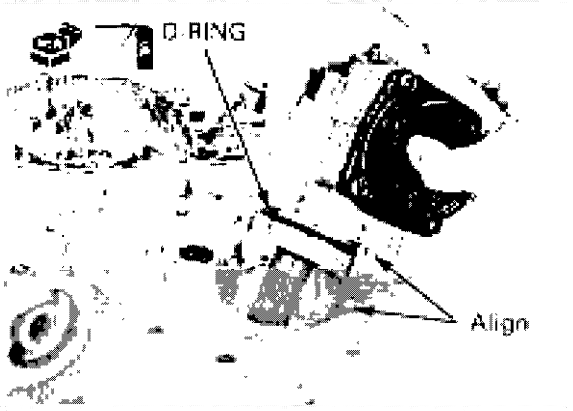
INSTALLATION

Coat new O-rings with oil and install them into the orifice grooves.
Install the orifice into the crankcase.



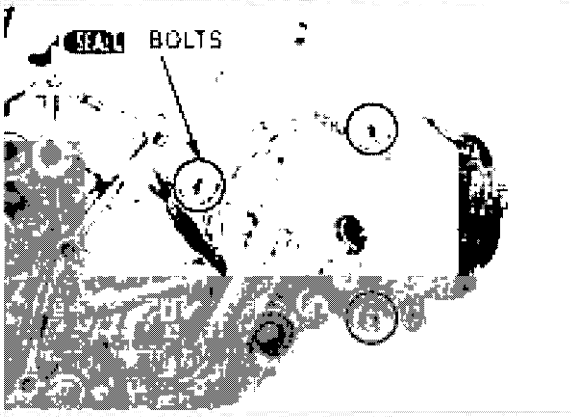
Coat a new O-ring with oil and install it into the groove in the gear case.

Install the output gear case assembly into the left crankcase by aligning the gear case boss with the crankcase hole.

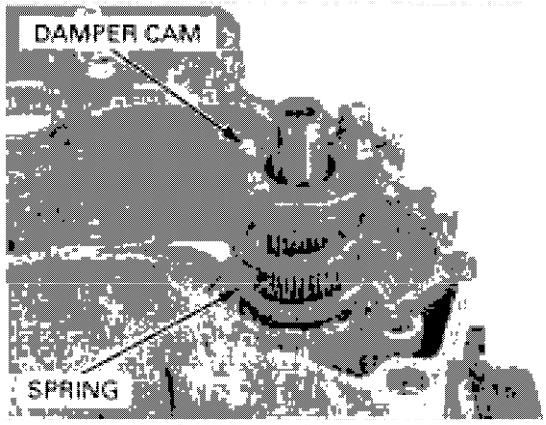


Apply sealant to the gear case mounting bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



Install the damper spring over the drive gear shaft with the tapered side facing the left crankcase.
Install the damper cam onto the spring.



Install the snap ring on the damper cam.

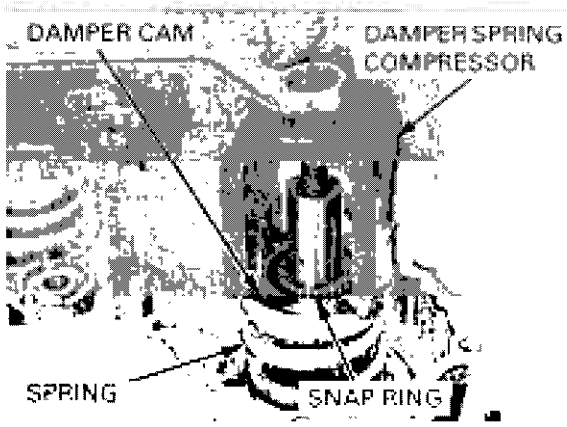
Set the damper spring compressor onto the damper cam and drive gear shaft.
Compress the damper spring by turning the compressor bolt clockwise until the snap ring groove is visible.

TOOL:
Damper spring compressor 07964-ME90000

Install the snap ring into the groove in the shaft.

TOOL:
Snap ring pliers 07914-5670101

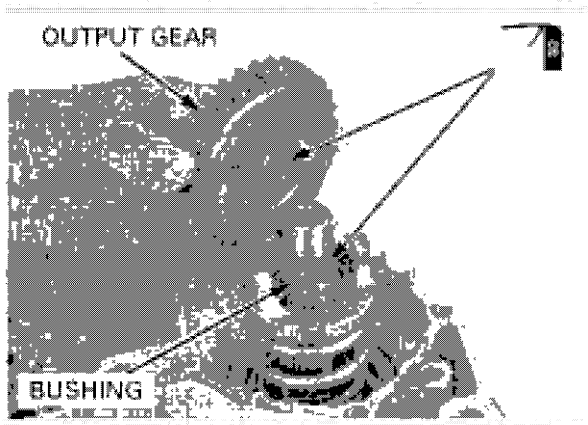
Loosen and remove the special tool.



NOTE:
- Install the snap ring with the chamfered edges facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the groove.

Apply oil to the sliding surface of the output gear and bushing.
Install the bushing into the output gear shaft.

Install the output gear onto the gear shaft by aligning the damper cam projections with the output gear holes.

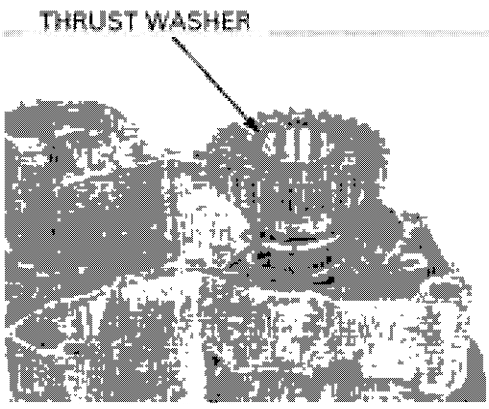


Install the thrust washer.

Install the followings:

- Crankshaft (page 13-13)
- Transmission (page 13-26)
- Oil pump (page 5-11)

Assemble the crankcase (page 13-47).



CRANKCASE BEARING REPLACEMENT

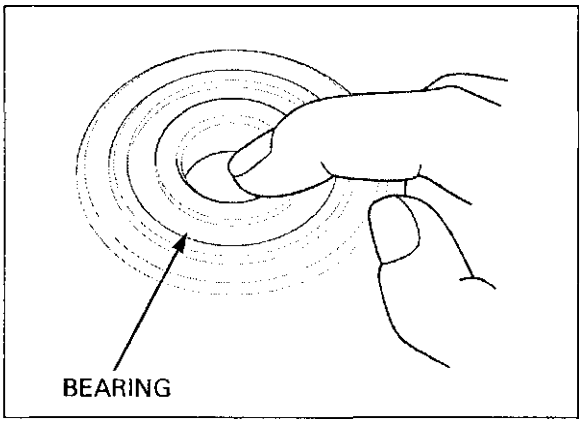
INSPECTION

Remove the following:

- Crankshaft (page 13-11)
- Transmission (page 13-19)
- Output gear (page 13-27)
- Oil pump (page 5-6)

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the crankcase.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the crankcase.

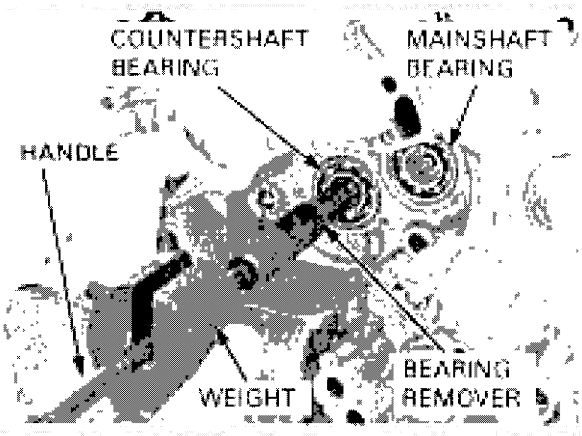


LEFT CRANKCASE BEARINGS

Remove the mainshaft and countershaft bearings using the special tools.

TOOLS:

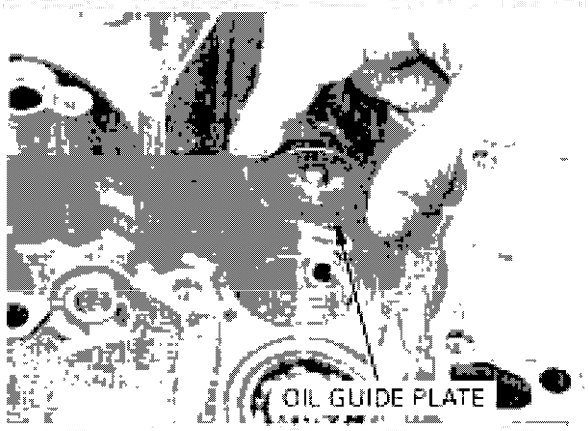
Bearing remover set, 20 mm	**07936-3710001**
– bearing remover, 20 mm	**07936-3710600**
– remover handle	**07936-3710100**
– remover weight	**07741-0010201**



Remove the oil guide plate from the crankcase.

Check the oil guide plate for clog or deformation.

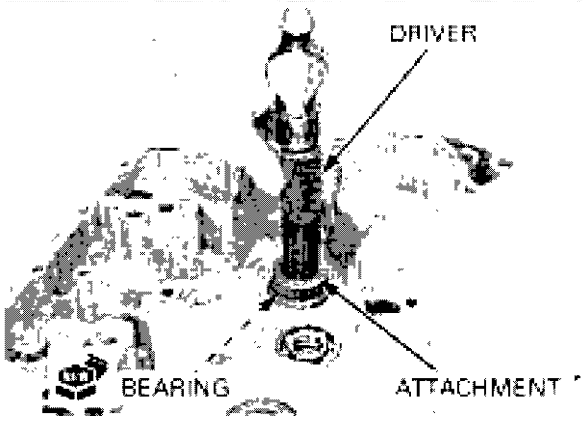
Install the oil guide plate into the crankcase.



Drive new bearings into the left crankcase with the marked side facing up until they are fully seated.

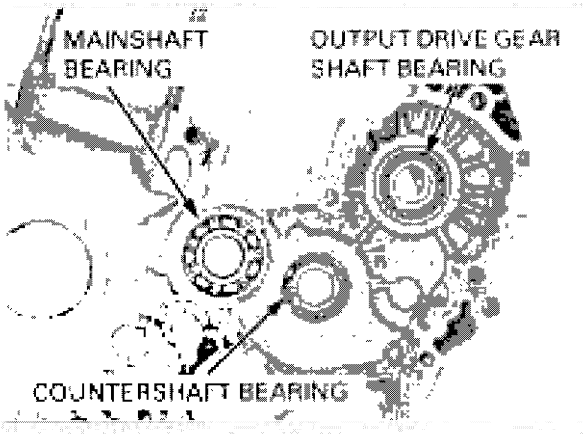
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**



RIGHT CRANKCASE BEARINGS

Drive the bearings out of the right crankcase.



Drive new bearings into the right crankcase with the marked side facing up until they are fully seated.

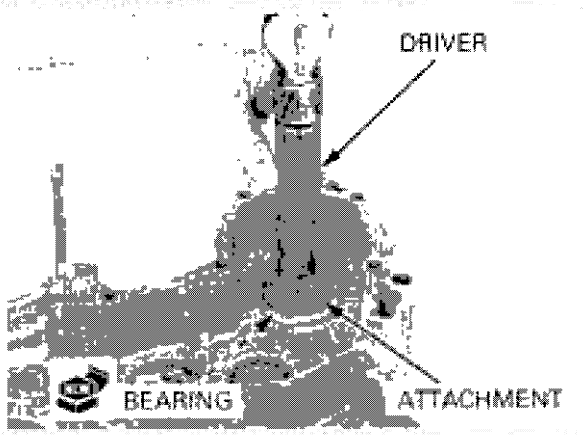
TOOLS:

Mainshaft bearing:

Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**
Pilot, 22 mm	**07746-0041000**

Countershaft/output drive gear shaft bearings:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 20 mm	**07746-0040500**

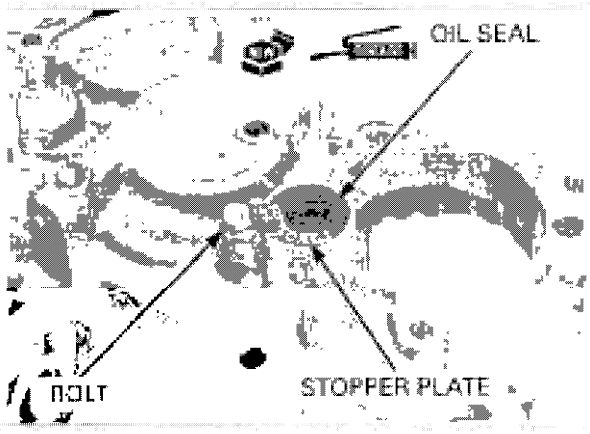


CRANKCASE ASSEMBLY

Apply grease to a new oil seal lip.
Install the oil seal.

Install the oil seal stopper plate and tighten the bolt to the specified torque.

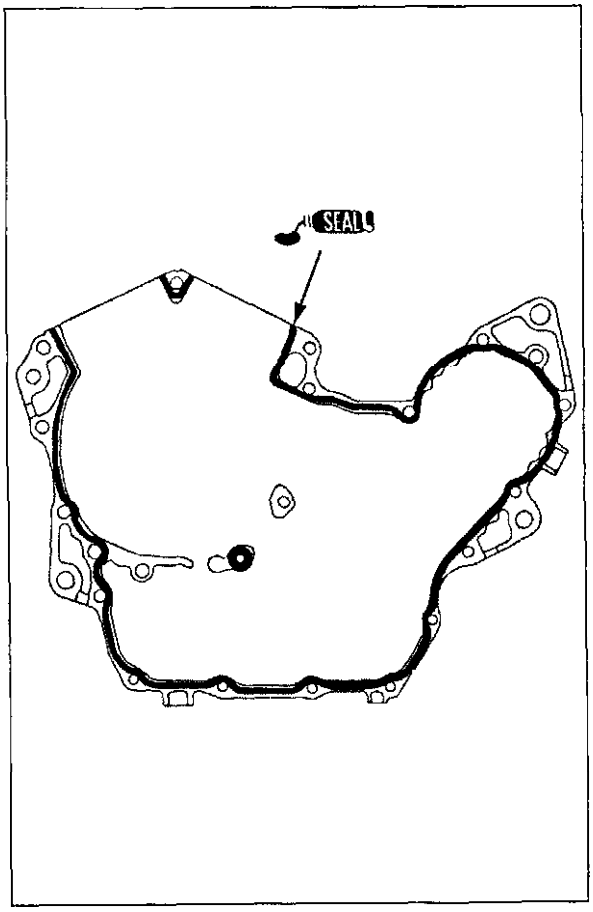
TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them.

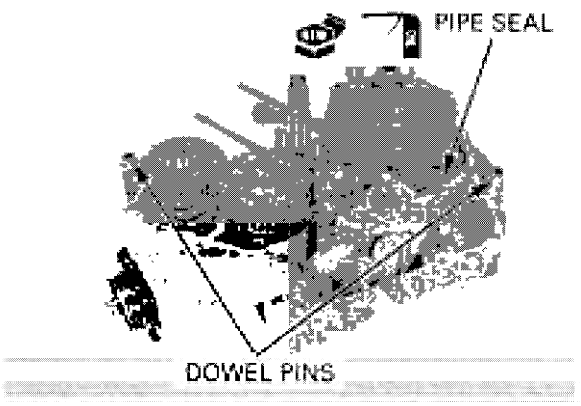
Make sure the all parts are installed in the left crankcase.

Apply liquid sealant (Three Bond 1207B or equivalent) to the crankcase mating surfaces.

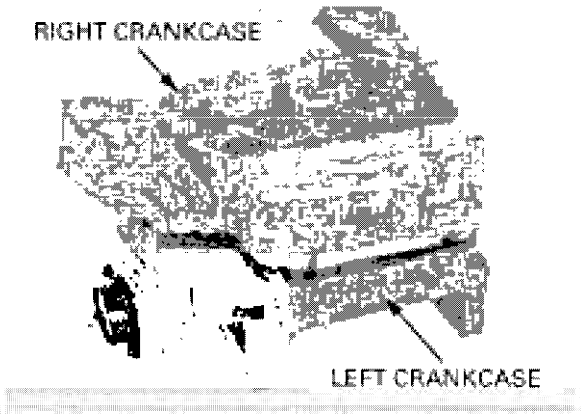


Install the two dowel pins into the left crankcase.
Coat a new pipe seal with oil and install it to the oil pipe.

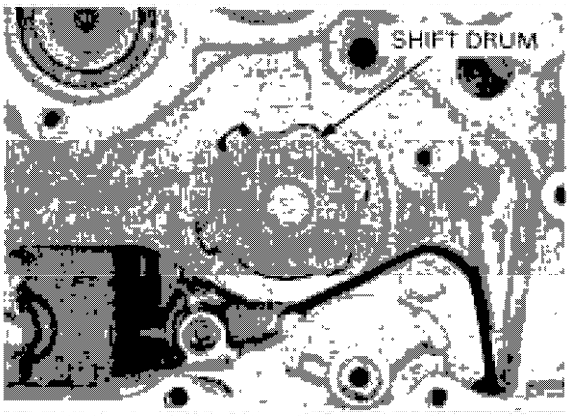
NOTE:
Install an pipe seal with its tapered side facing out.



Install the right crankcase over the left crankcase.



Turn the shift drum until the position as shown.



Install the right crankcase bolts with the washer.

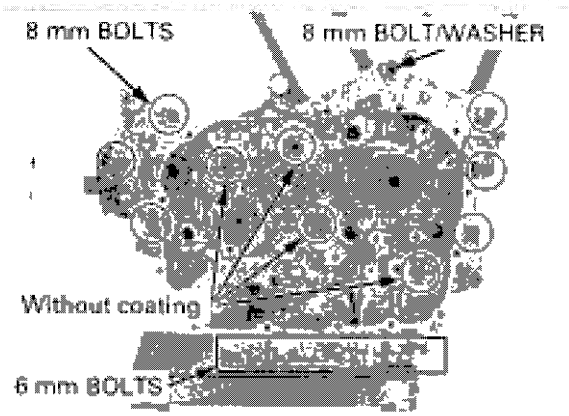
Tighten the 8 mm bolts in a crisscross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

- Seven 8 mm bolts with coating: for outside right crankcase.
- Four 8 mm bolts without coating: for inside of right crankcase.

Tighten the 6 mm bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

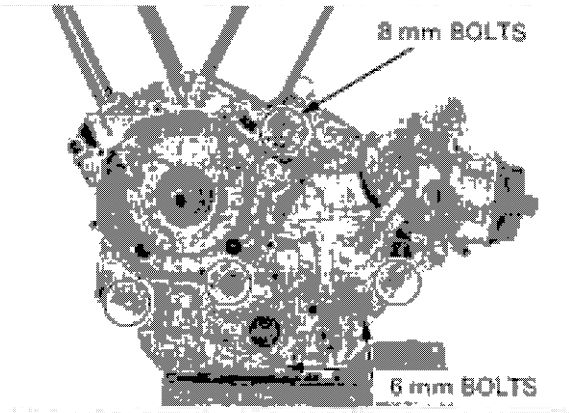


Install the left crankcase bolts and tighten the 8 mm bolts in a crisscross pattern in several steps.

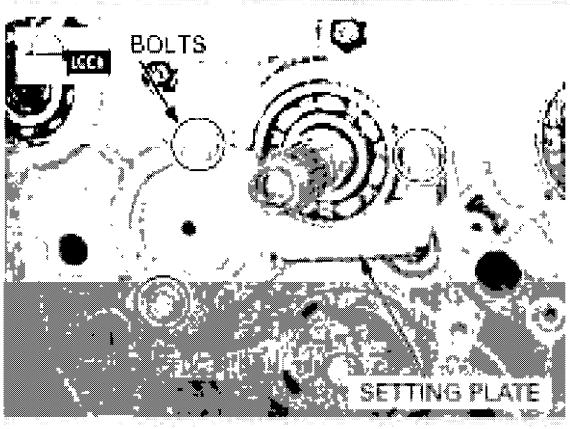
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the 6 mm bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Clean and apply locking agent to the bolt threads (page 1-18).
Install the bearing setting plate and tighten the bolts.



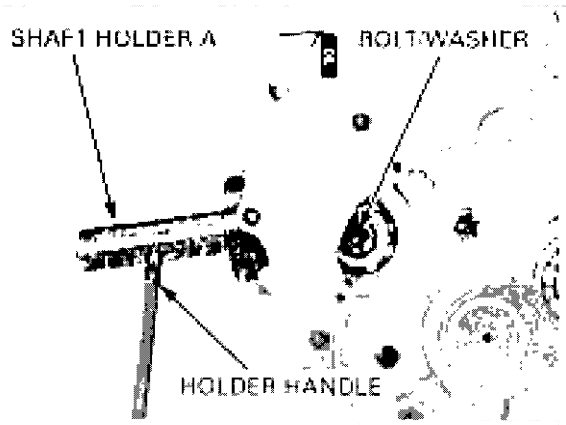
Apply engine oil to the bolt threads.
Install and tighten the bolt with the washer by holding the output driven gear shaft using the special tools.

TOOL:

Shaft holder A	**07PAB-0010100**
Holder handle	**07PAB-0010400**

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)

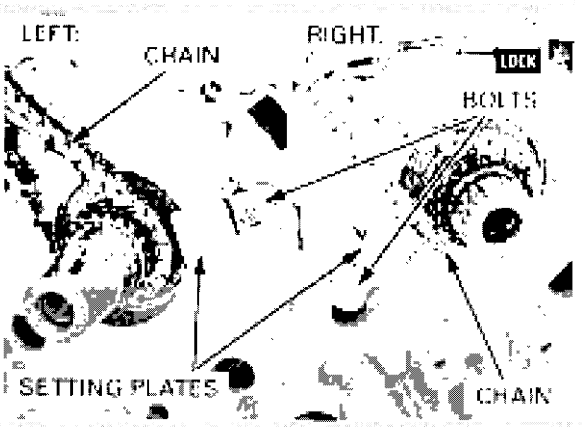
Recheck the all crankcase bolt torque values.



Install the cam chains.

Apply locking agent to the bolt threads (page 1-18).
Install the cam chain tensioner setting plates and tighten the bolts.

Install the remaining parts (page 13-3).
Install the engine into the frame (page 8-7).



14. FINAL DRIVE

SYSTEM COMPONENTS 14-2

SERVICE INFORMATION 14-3

TROUBLESHOOTING 14-6

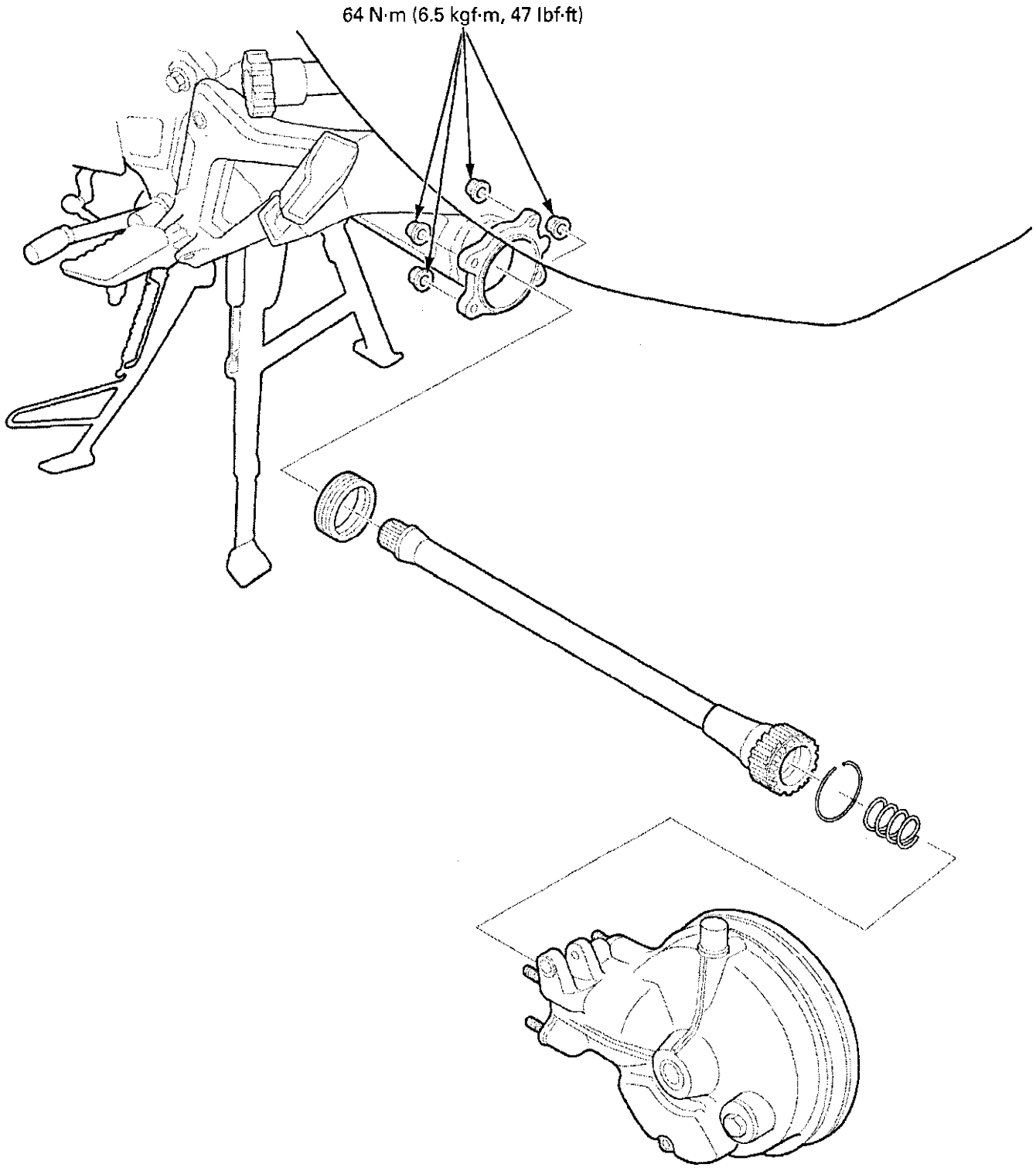
FINAL DRIVE REMOVAL 14-7

FINAL DRIVE DISASSEMBLY/ INSPECTION 14-8

FINAL DRIVE ASSEMBLY 14-17

FINAL DRIVE INSTALLATION 14-22

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- The final drive gear assembly and final drive shaft must be removed together.
- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gears or gear case. the extension lines from the gear engagement surfaces should intersect at one point.
- Protect the gear case with a shop towel or soft jaws while holding it in a vise. Do not clamp the gear case too tightly or it could be damaged.
- Replace the ring and pinion gears as a set.

SPECIFICATIONS

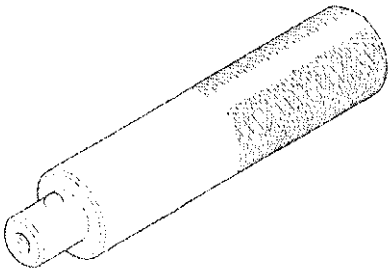
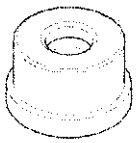
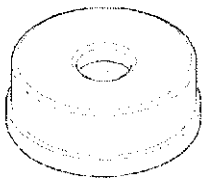
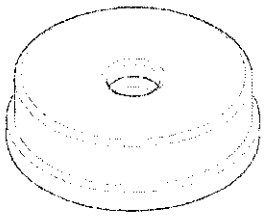
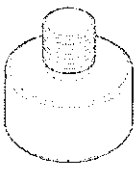
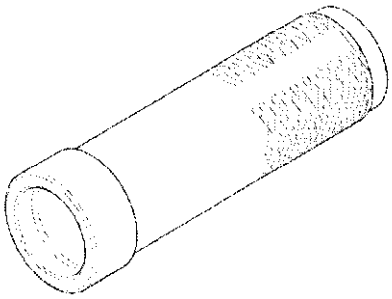
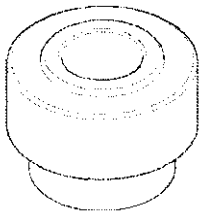
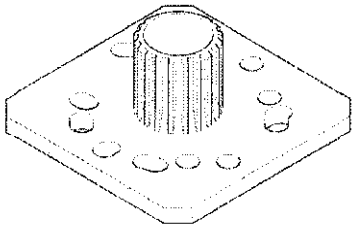
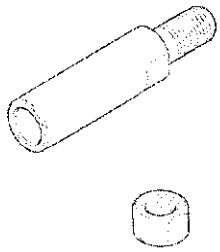
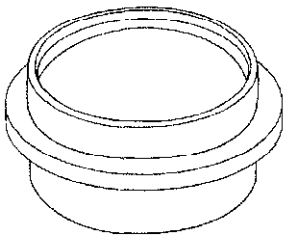
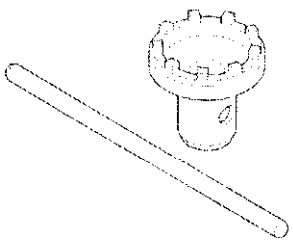
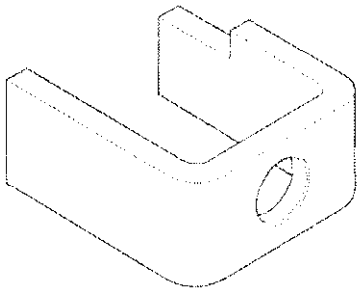
Unit: mm (in)

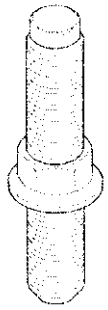
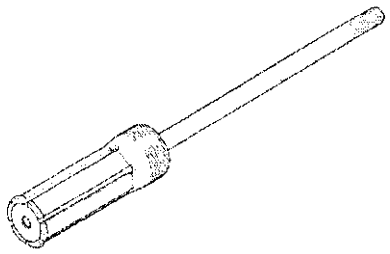
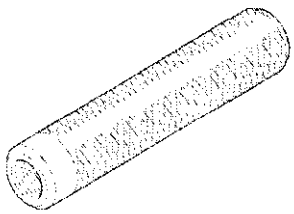
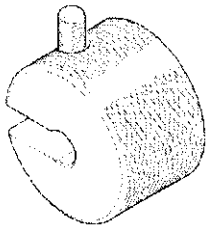
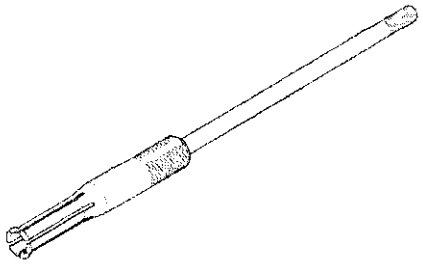
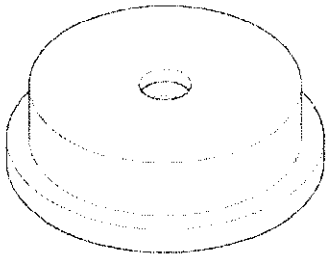
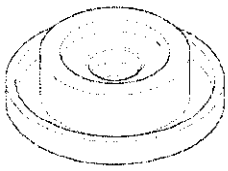
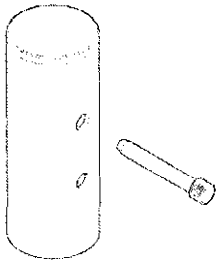
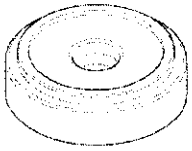
ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	After draining	130 cm^3 (4.3 US oz, 4.5 Imp oz)	–
	After disassembly	150 cm^3 (5.1 US oz, 5.3 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurements		–	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–
Final drive gear assembly preload		0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·ft)	–

TORQUE VALUES

Pinion retainer	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Pinion retainer lock plate bolt	10 N·m (1.0 kgf·m,7 lbf·ft)	
Pinion joint nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply locking agent
Dust guard plate bolt	10 N·m (1.0 kgf·m,7 lbf·ft)	
Gear case cover 10 mm bolt	47 N·m (4.8 kgf·m, 35 lbf·ft)	Apply locking agent
Gear case cover 8 mm bolt	25 N·m (2.6 kgf·m, 19 lbf·ft)	
Final gear case assembly mounting nut	64 N·m (6.5 kgf·m, 47 ibf·ft)	UBS bolt

TOOLS

Driver 07749-0010000 	Attachment, 32 x 35 mm 07746-0010100 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 72 x 75 mm 07746-0010600 	Pilot, 19 mm 07746-0041400 	Driver, 40 mm I.D. 07746-0030100 
Attachment, 25 mm I.D. 07746-0030200 	Pinion holder plate 07924-ME40010 	Collar set "C" 07924-ME40020 
Oil seal driver 070MF-MEG0300 	Retainer wrench 07910-ME80000 	Pinion puller base 07HMC-MM80110 

Puller shaft 07931-ME40000 	Bearing remover, 35 mm 07936-3710400 	Remover handle 07936-3710100 
Remover weight 07741-0010201 	Bearing remover, 20 mm 07936-3710600 	Bearing driver attachment 07GAD-SD40101 
Oil seal driver attachment 07LAD-SM40100 	Oil seal driver, 55.7 x 60.3 mm 07965-KE80200 	Attachment, 44 x 49.5 mm 07945-3330300 

TROUBLESHOOTING

Excessive noise
- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gears
- Oil level too low
- Worn or damaged pinion gear and/or pinion joint splines

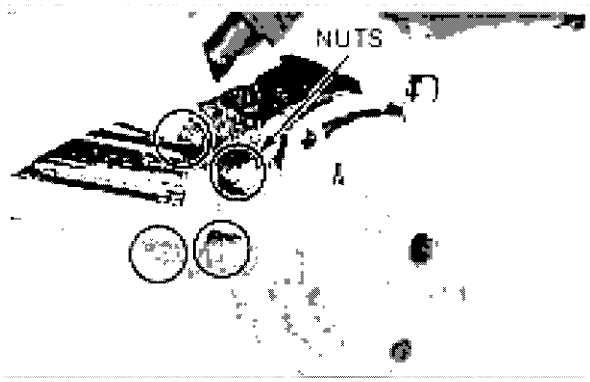
Oil leak
- Clogged breather
- Oil level too high
- Damaged seals
- Loose case cover bolts

Excessive rear wheel backlash
- Worn drive shaft splines
- Excessive backlash between pinion and ring gears
- Worn driven flange and ring gear splines
- Excessive play in final drive case bearings
- Worn drive shaft, universal joint and/or pinion joint splines
- Excessive play or worn universal joint bearing

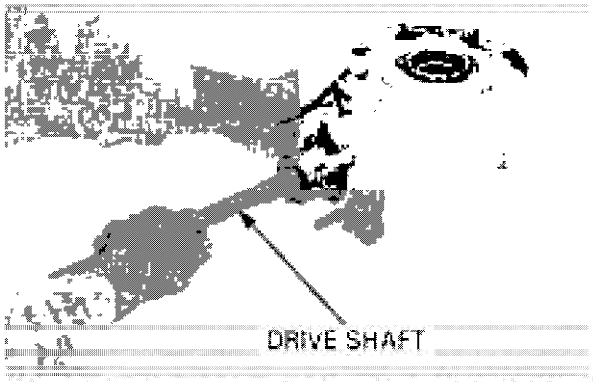
FINAL DRIVE REMOVAL

Drain the final drive oil (page 4-16).
Remove the rear wheel (page 16-6).

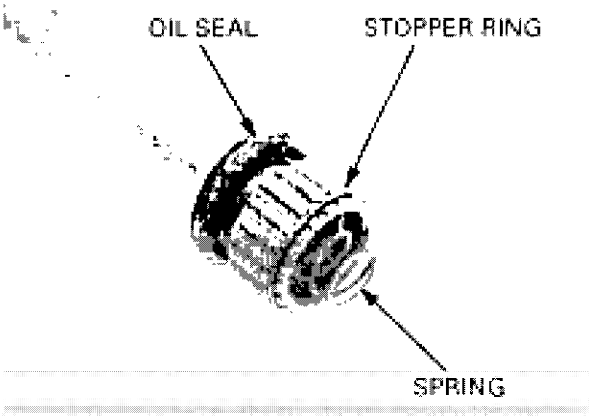
Remove the four mounting nuts and final drive gear case assembly.



Remove the drive shaft from the gear case by gently turning the drive shaft and pulling it.



Remove the spring, oil seal and stopper ring from the drive shaft.

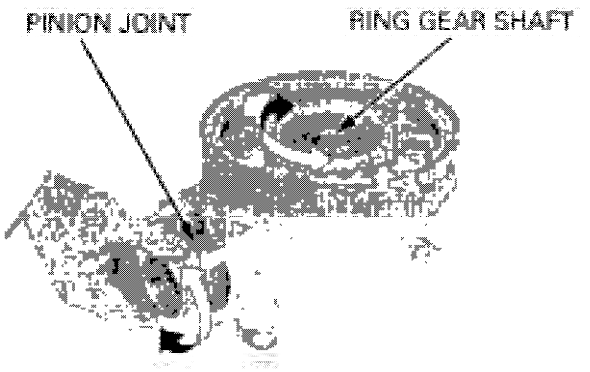


INSPECTION

Check the splines of the drive shaft for damage or wear.
If the splines of the drive shaft are damaged, check the universal joint splines also.

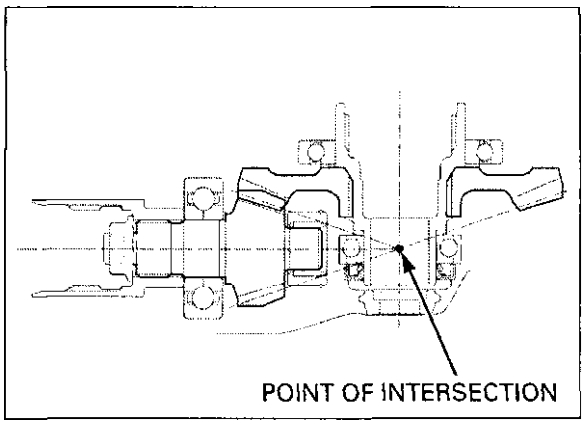
Turn the pinion joint and check that the pinion and ring gears turn smoothly and quietly without binding.

If the gears do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. They must be checked after disassembly; replace faulty parts/assemblies as required.



FINAL DRIVE DISASSEMBLY/ INSPECTION

NOTE:
Perform the backlash inspection and contact pattern check whenever you replace the pinion gear, ring gear, bearings and gear case. The extension lines from the gear engagement surfaces should intersect at one point.



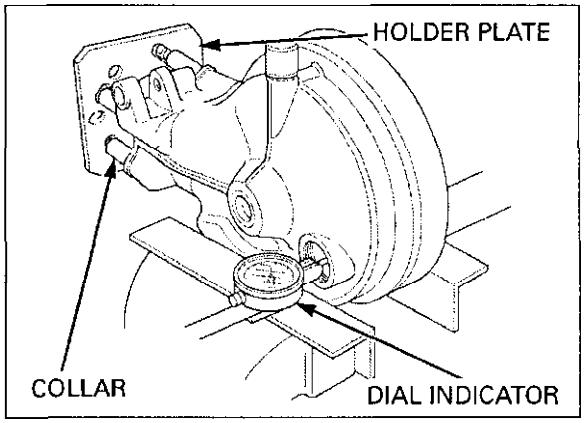
BACKLASH INSPECTION

Remove the oil filler cap.
Hold the final drive gear case assembly in a vise with soft jaws.

Install the special tools onto the gear case and into the pinion joint to hold the pinion gear.

TOOLS:

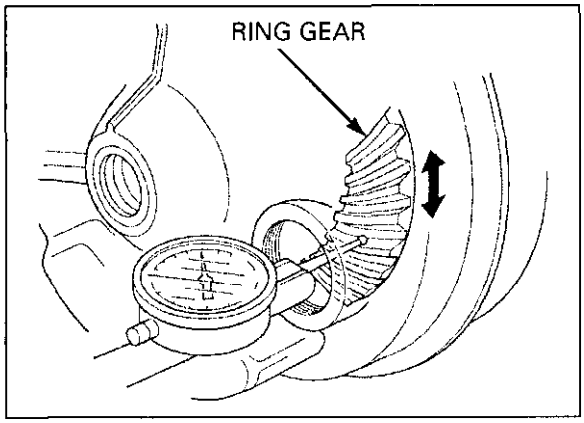
Pinion holder plate	**07924-ME40010**
Collar set "C"	**07924-ME40020**



Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Turn the ring gear back and forth to read the backlash.

STANDARD: 0.05 – 0.15 mm (0.002 – 0.006 in)
SERVICE LIMIT: 0.30 mm (0.012 in)

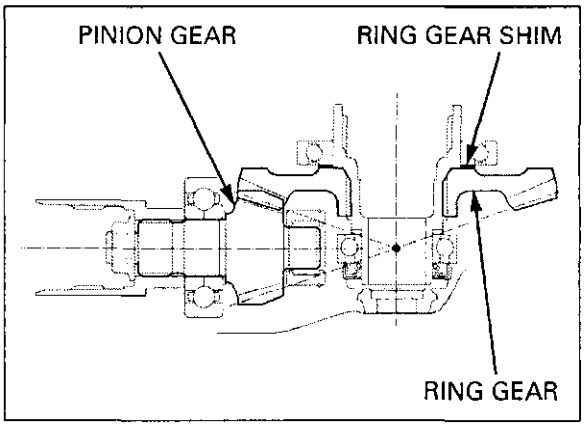


Remove the dial indicator. Turn the ring gear 120° and measure the backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed.
Inspect the bearings and case.

If the backlash is excessive, replace the ring gear shim with a thicker one.
If the backlash is too small, replace the ring gear shim with a thinner one.

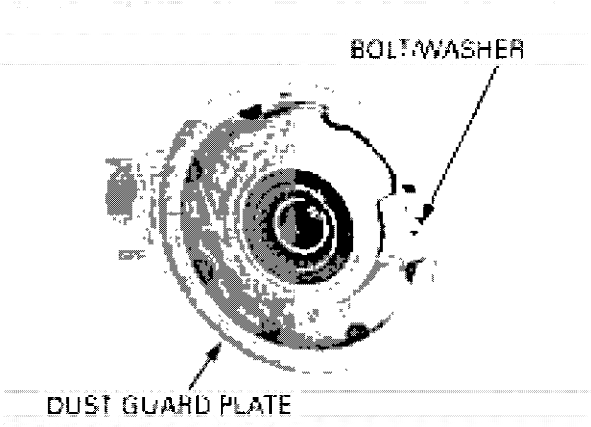


RING GEAR SHIMS:
A: 1.82 mm (0.072 in)
B: 1.88 mm (0.074 in)
C: 1.94 mm (0.076 in)
D: 2.00 mm (0.079 in) – Standard
E: 2.06 mm (0.081 in)
F: 2.12 mm (0.083 in)
G: 2.18 mm (0.086 in)
H: 2.24 mm (0.088 in)
I: 2.30 mm (0.091 in)

For ring gear shim replacement, refer to page 14-11.

FINAL GEAR CASE SEPARATION

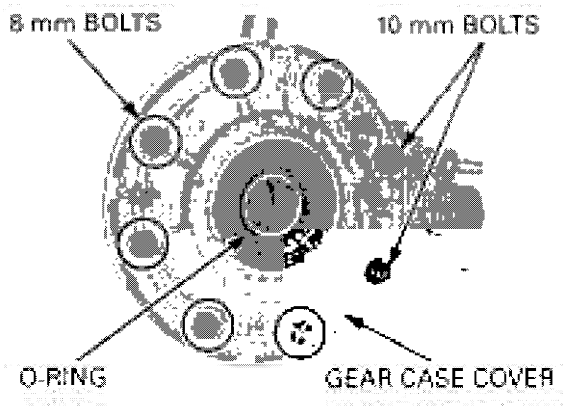
Remove the bolt, washer and the dust guard plate by turning it clockwise.



Remove the O-ring.

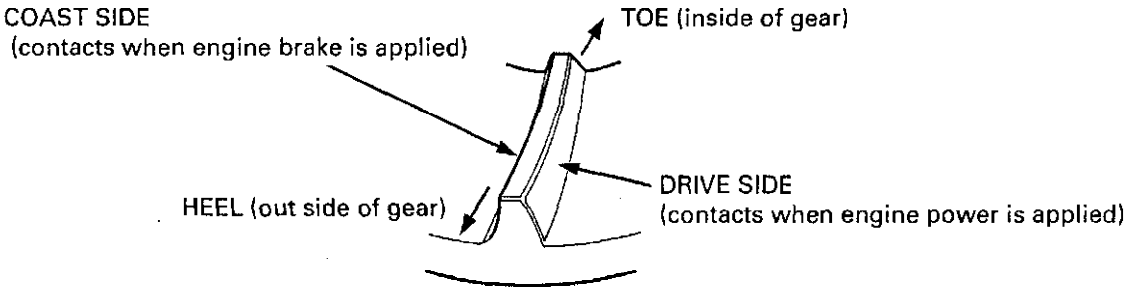
Loosen the cover bolts in a crisscross pattern in several steps and remove them.
Pry the gear case cover and remove it from the case.

Remove the wave washer.



GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:

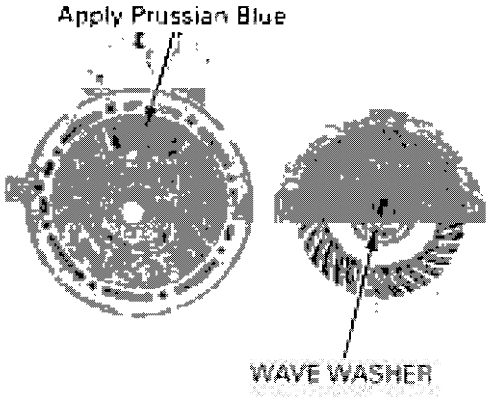


Keep dust and dirt out of the case and cover.

Clean the sealing material off the mating surfaces of the gear case and cover, being careful not to damage them.

Apply a thin coat of Prussian Blue to the pinion gear teeth.

Install the wave washer.

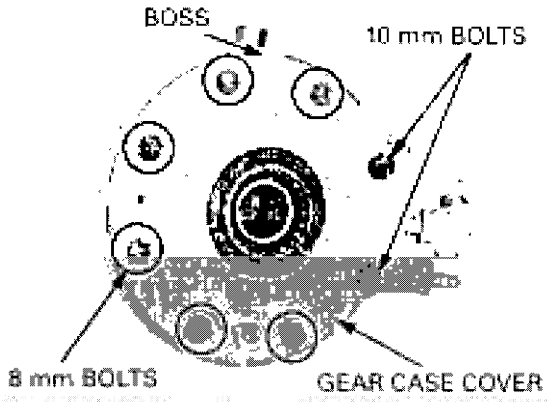


Install the case cover and tighten the bolts in a crisscross pattern in several steps until the cover evenly touches the gear case.
Apply a locking agent to the 10 mm bolt threads.
Install and tighten the two 10 mm bolts to the specified torque in several steps alternately.

TORQUE: 47 N·m (4.8 kgf·m, 35 lbf·ft)

Tighten the six 8 mm bolts to the specified torque in a crisscross pattern in several times.

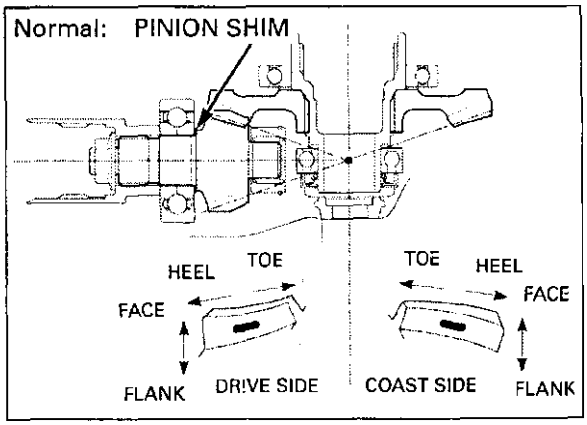
TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)



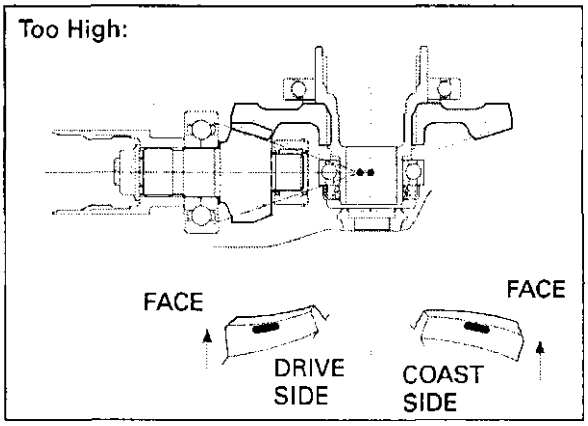
Remove the oil filler cap.
Rotate the ring gear several times in normal direction of rotation.
Check the gear tooth contact pattern through the oil filler hole.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.

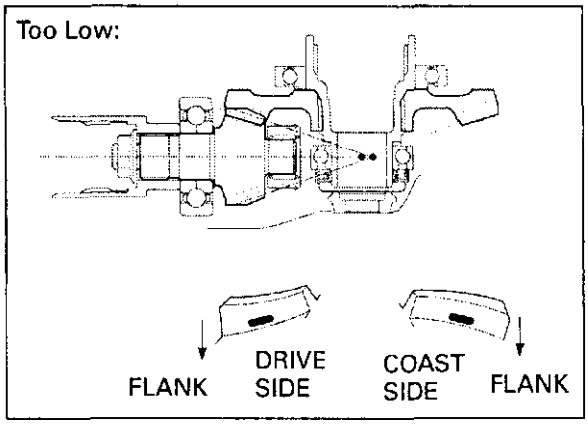
If the patterns are not correct, remove and replace the pinion gear shim with a suitable one (page 14-12).



Replace the pinion gear shim with a thicker one if the contact pattern is too high, toward the face.



Replace the pinion gear shim with a thinner one if the contact pattern is too low, toward the flank.



The patterns will shift about 1.5 – 2.0 mm (0.06 – 0.08 in) when the thickness of the shim is changed by 0.1 mm (0.004 in).

PINION GEAR SHIMS:
A: 1.82 mm (0.072 in)
B: 1.88 mm (0.074 in)
C: 1.94 mm (0.076 in)
D: 2.00 mm (0.079 in) – Standard
E: 2.06 mm (0.081 in)
F: 2.12 mm (0.083 in)
G: 2.18 mm (0.086 in)

For pinion gear shim replacement, separate the final gear case (page 14-9).

RING GEAR REMOVAL/SHIM REPLACEMENT

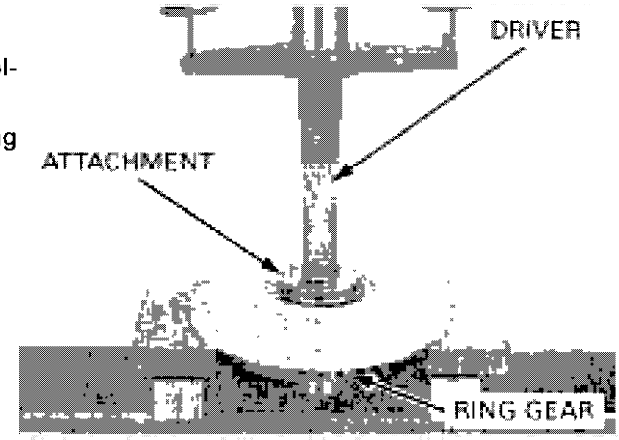
Remove the final gear case cover (page 14-9).

If the ring gear stays in the cover, remove it as follows:

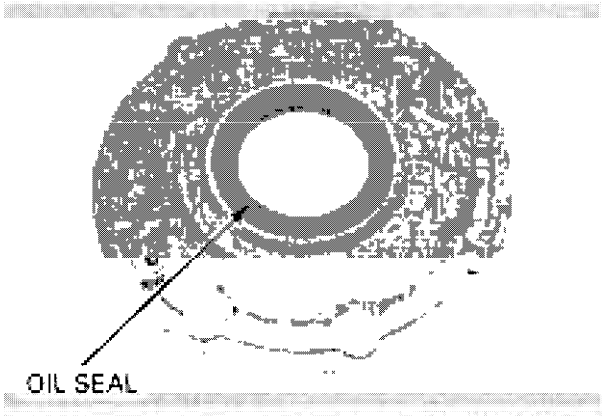
Press the ring gear out of the gear case cover using the special tools and hydraulic press.

TOOLS:

Driver	**07749-0010000**
Oil seal driver attachment	**07LAD-SM40100**



Remove the oil seal.

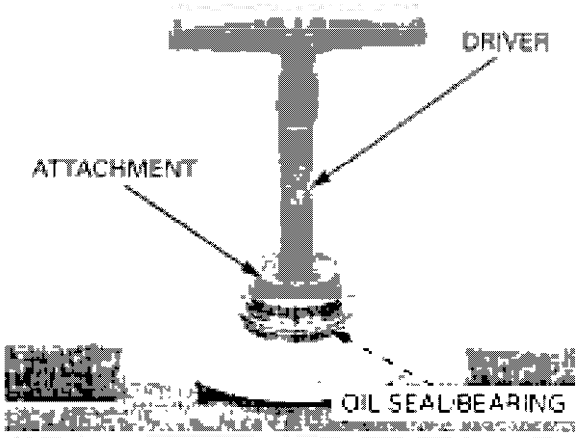


If the bearing remained in the cover, remove it as follows:

Press the oil seal and bearing out of the cover using the special tools and hydraulic press.

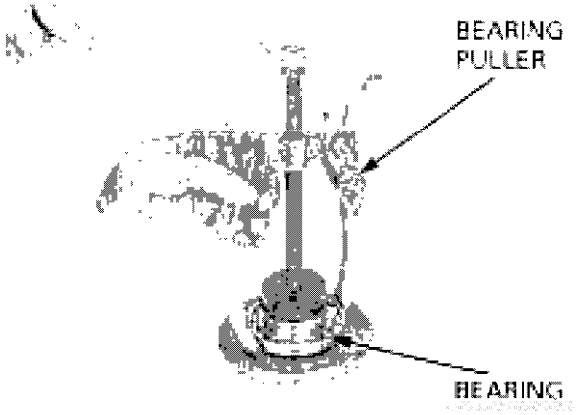
TOOLS:

Driver	**07749-0010000**
Oil seal driver	**070MF-MEG0300**
Attachment, 72 x 75 mm	**07746-0010600**



If the bearing remained on the ring gear, remove it as follows:

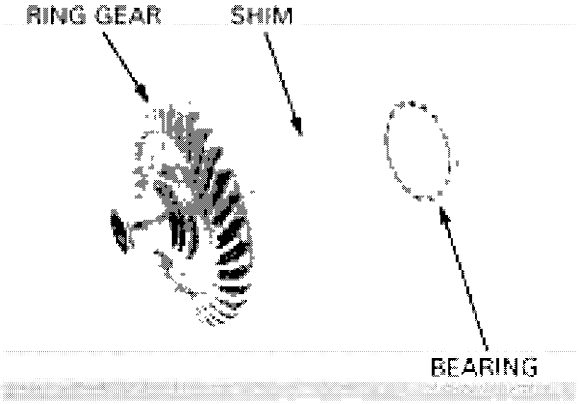
Remove the ring gear bearing using a commercially available bearing puller.



Select the replacement shim (page 14-9).

NOTE:

When the gear set, pinion bearing, ring gear bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thickness shim for initial reference.



PINION GEAR REMOVAL

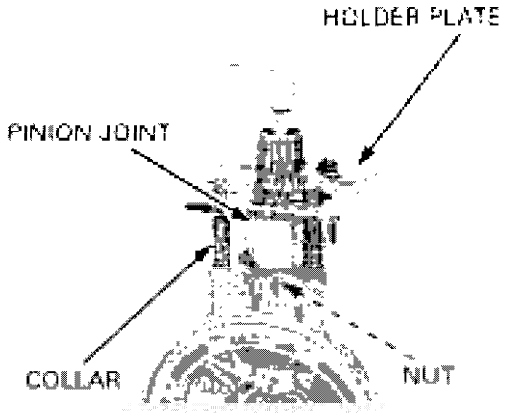
Hold the gear case in a vise with soft jaws.

Hold the pinion joint and remove the pinion joint nut using the special tools.

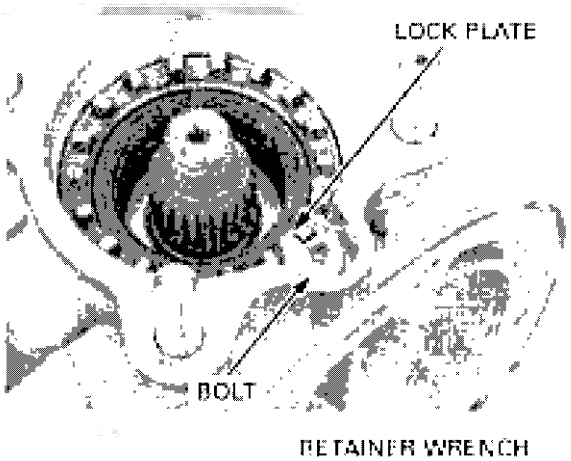
TOOLS:

Pinion holder plate	**07924-ME40010**
Collar set "C"	**07924-ME40020**

Remove the pinion joint.



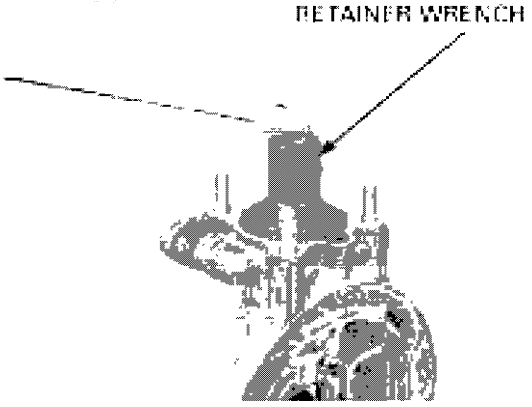
Remove the bolt and retainer lock plate.



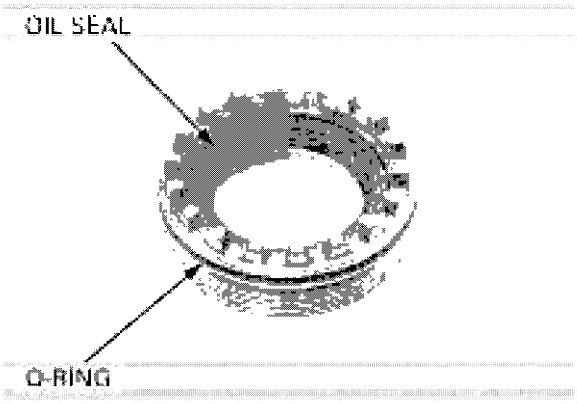
Remove the pinion retainer using the special tool.

TOOL:

Retainer wrench	**07910-ME80000**



Remove the O-ring and oil seal from the pinion retainer.

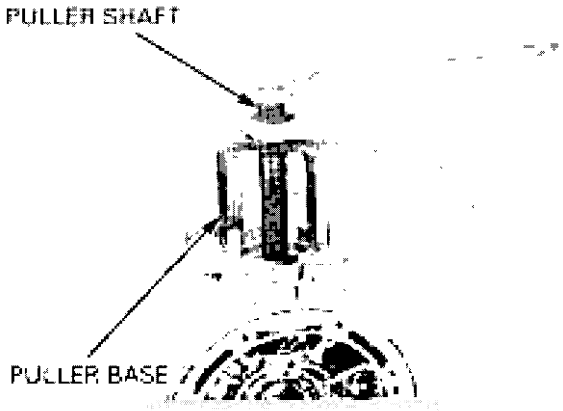


Install the special tools onto the pinion gear shaft and gear case.

TOOLS:

Pinion puller base	**07HMC-MM80110**
Puller shaft	**07931-ME40000**

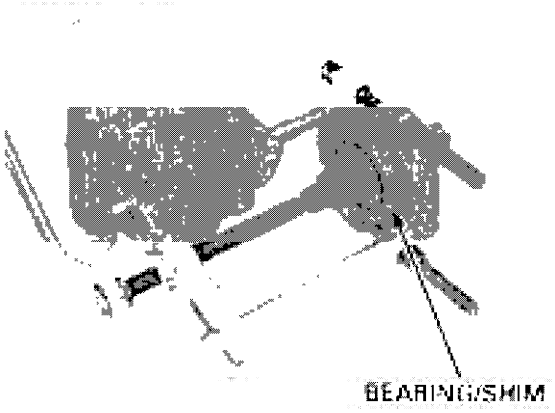
Pull the pinion gear assembly out of the gear case. Check the pinion gear needle bearing in the gear case for wear or damage.



PINION GEAR BEARING/SHIM REPLACEMENT

Pull the pinion gear bearing from the shaft with a commercially available bearing puller.

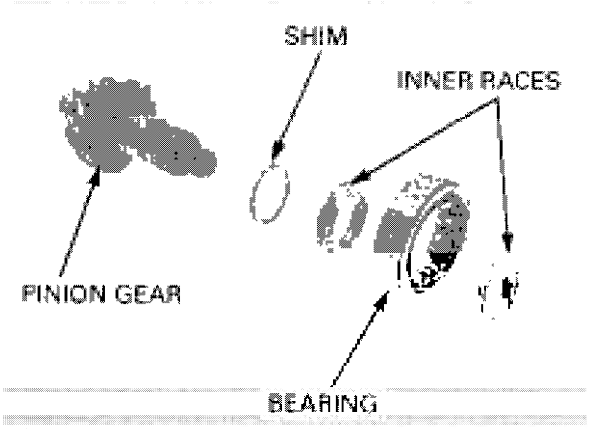
Remove the pinion shim.



Select the replacement shim (page 14-11)

Install the shim and a new bearing onto the pinion gear.

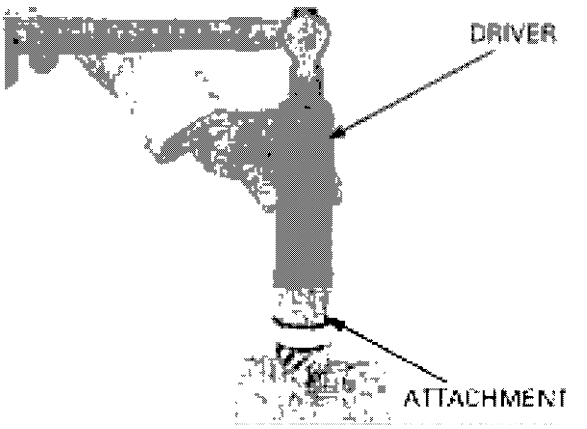
NOTE:
When the gear set, pinion bearing, ring gear bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thickness shim for initial reference.



Drive a new bearing with the marked side facing up.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 25 mm I.D.	**07746-0030200**



CASE BEARING REPLACEMENT

RING GEAR BEARING

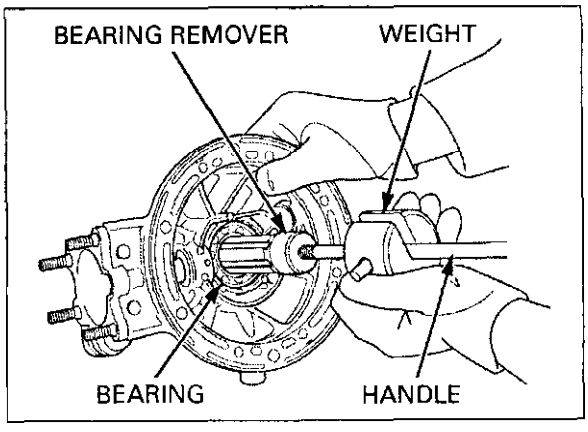
Be sure to wear heavy gloves when handling the heated gear case.

Heat the gear case to 80°C (176°F) evenly using a heat gun.

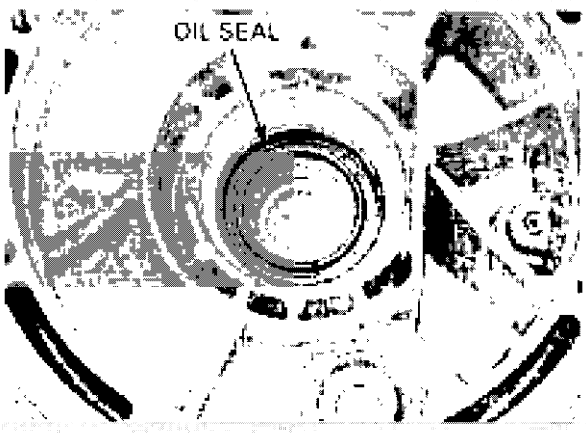
Remove the ring gear bearing from the gear case using the special tools.

TOOLS:

Bearing remover, 35 mm	**07936-3710400**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201**

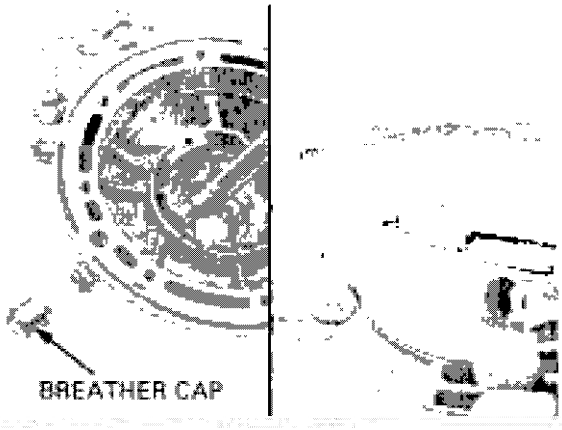


Remove the oil seal.



Remove the breather cap and blow compressed air through the hole.

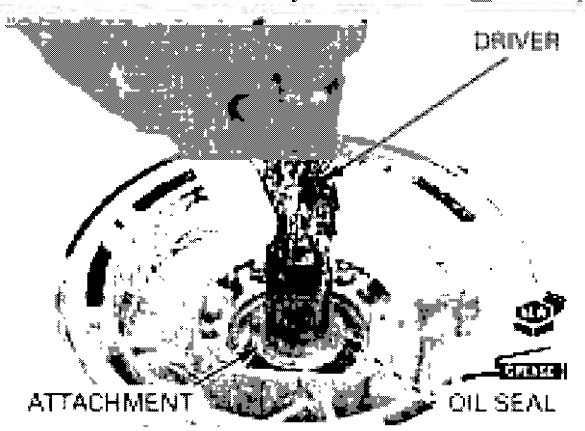
Install the breather cap.



Apply grease to a new oil seal lip.
Drive the oil seal into the gear case with the marked side facing down until it is fully seated.

TOOLS:

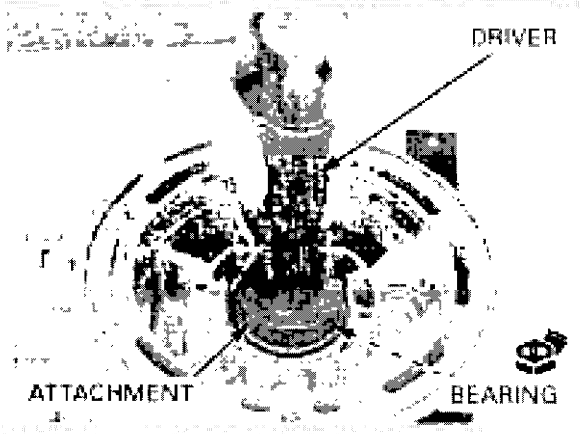
Driver	**07749-0010000**
Attachment, 44 x 49.5 mm	**07945-3330300**



Drive a new ring gear bearing into the gear case with the marked side facing inside until it is fully seated using the special tools.

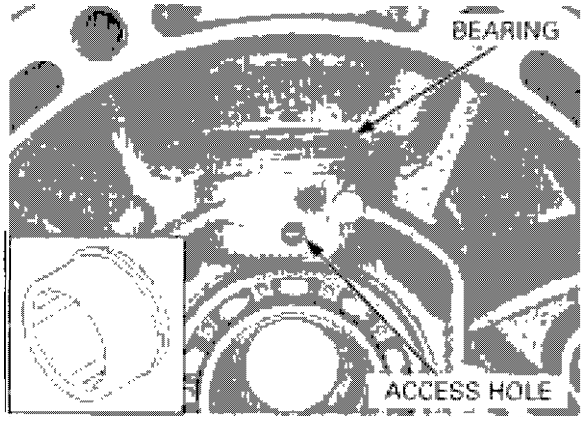
TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**



PINION NEEDLE BEARING

Rotate the stopper ring until the end of the stopper ring appears in the access hole.
Strike gently near the end of the ring with a punch to bend the end upward.
Grasp the end of the ring with needle-nose pliers and pull the stopper ring out through the access hole.

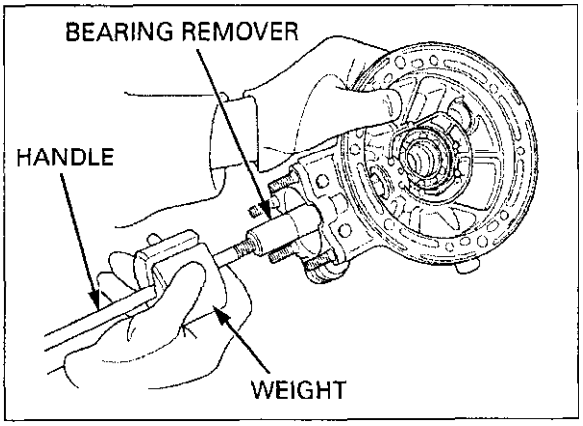


Be sure to wear heavy gloves when handling the heated gear case.

Heat the gear case to 80°C (176°F) and remove the needle bearing using the special tools.

TOOLS:

Bearing remover, 20 mm	**07936-3710600**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201**
or equivalent commercially available	



Install a new stopper ring into the groove of a new bearing securely.

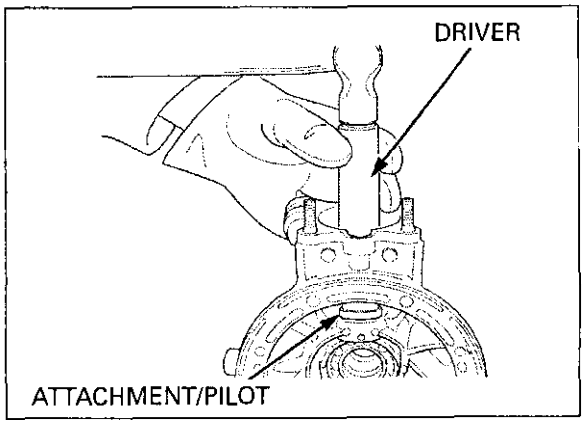
Place the needle bearing in a freezer.

Heat the gear case to 80°C (176°F).

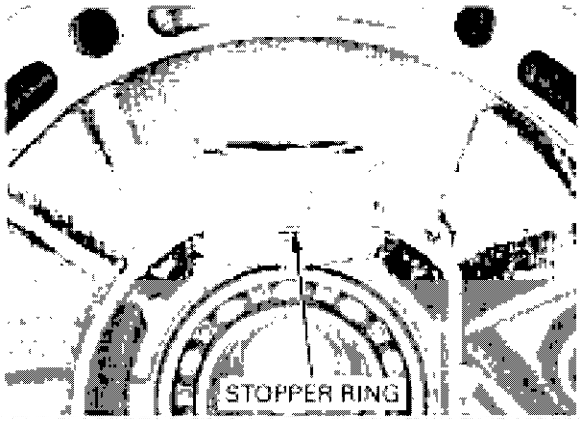
Remove the needle bearing from the freezer and drive it into the gear case with the marked side facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 19 mm	**07746-0041400**

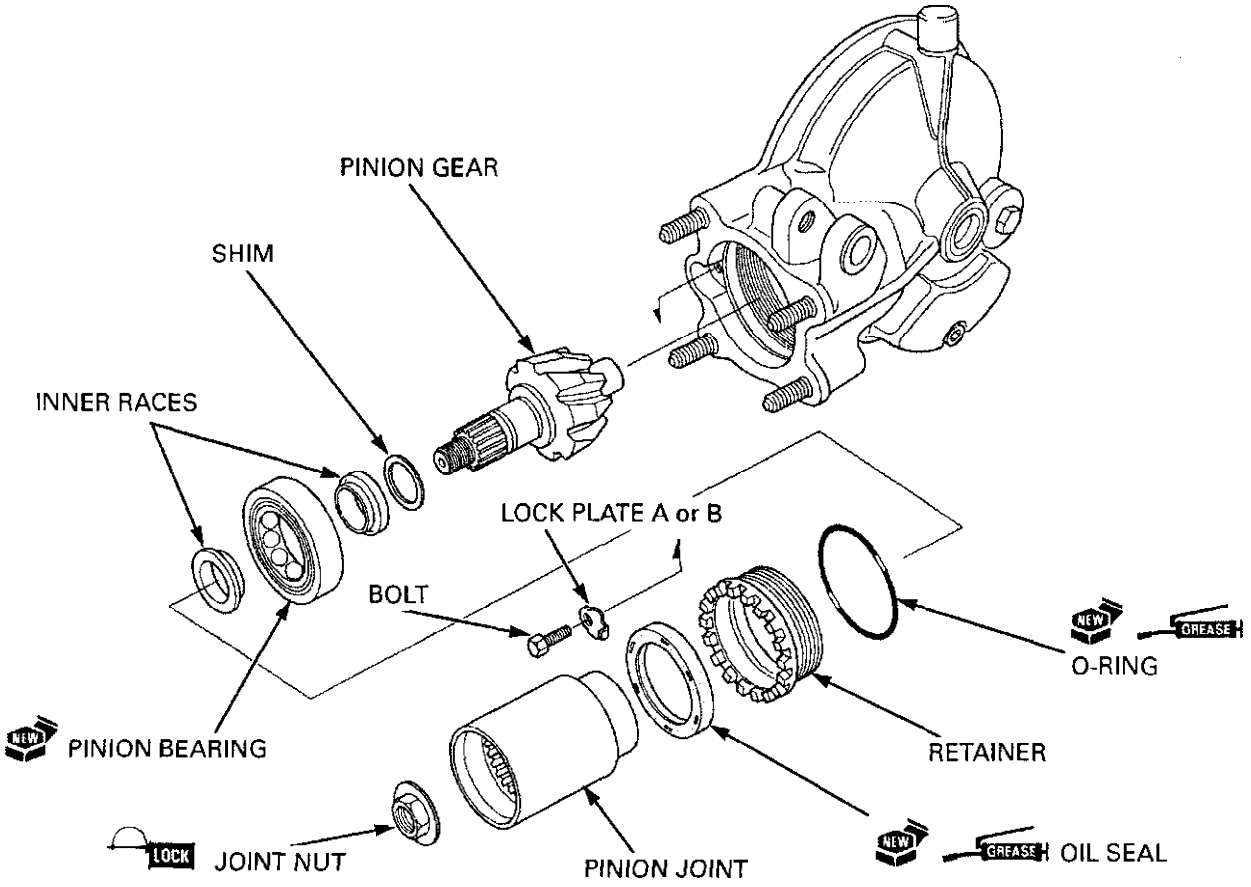


Make sure the stopper ring is securely set in the groove of the gear case.



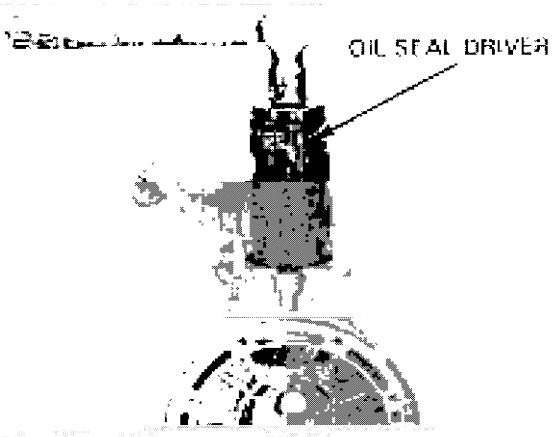
FINAL DRIVE ASSEMBLY

PINION GEAR INSTALLATION



Drive the pinion gear assembly into the gear case using the special tool.

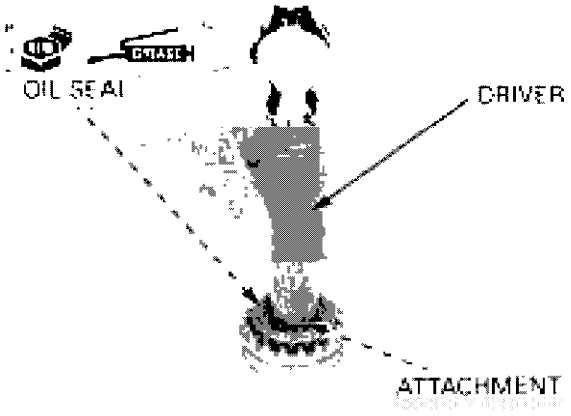
TOOLS:
Oil seal driver, 55.7 x 60.3 mm 07965-KE80200



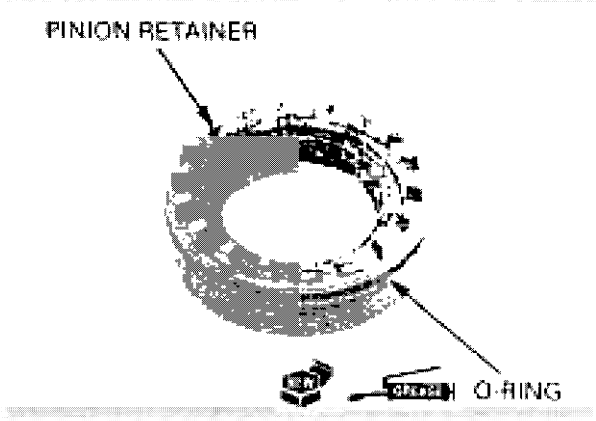
Drive a new oil seal into the pinion retainer with the marked side facing up until it is fully seated.

TOOLS:
Driver 07749-0010000
Attachment, 44 x 49.5 mm 07945-3330300

Pack grease into the seal lip cavity.



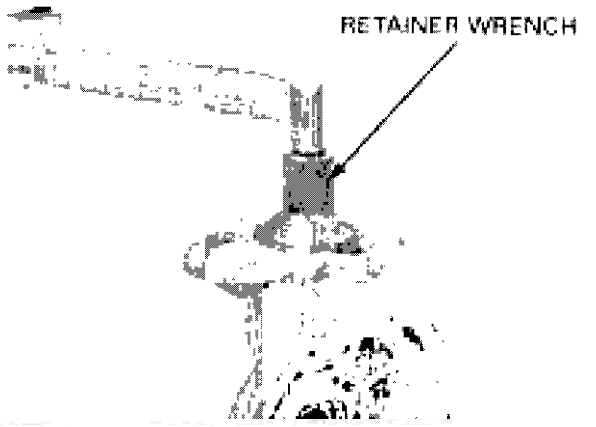
Coat a new O-ring with grease and install it into the retainer groove.



Hold the gear case in a vise with soft jaws.
Install the retainer into the gear case and tighten it to the specified torque using a special tool.

TOOL:
Retainer wrench **07910-ME80000**

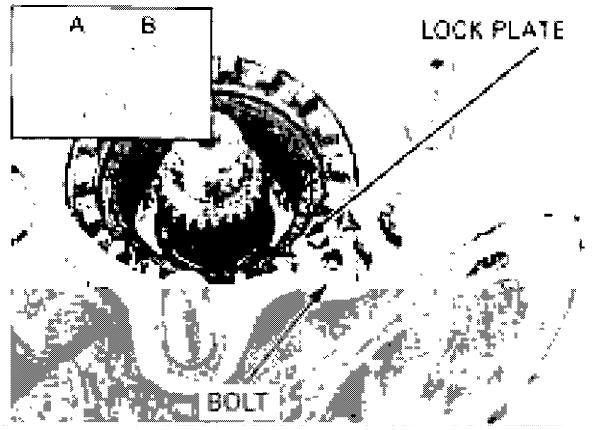
TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



The lock plate is available in the two types, A (single tab) and B (double tab), as shown.

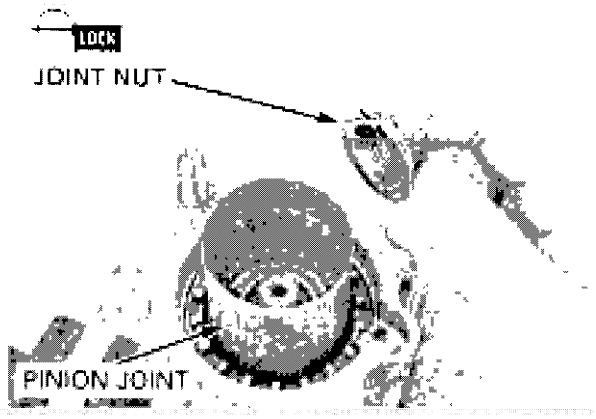
Install the lock plate with its tab facing up, depending on the position of the pinion retainer grooves in relation to the lock plate and tighten the bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Clean the threads of the pinion gear shaft and pinion joint nut thoroughly.

Apply locking agent to the joint nut threads and install the pinion joint and joint nut onto the pinion gear shaft.

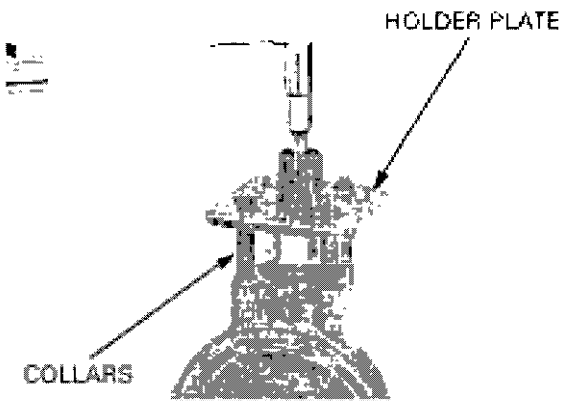


Hold the pinion joint with the special tools and tighten the pinion joint nut to the specified torque.

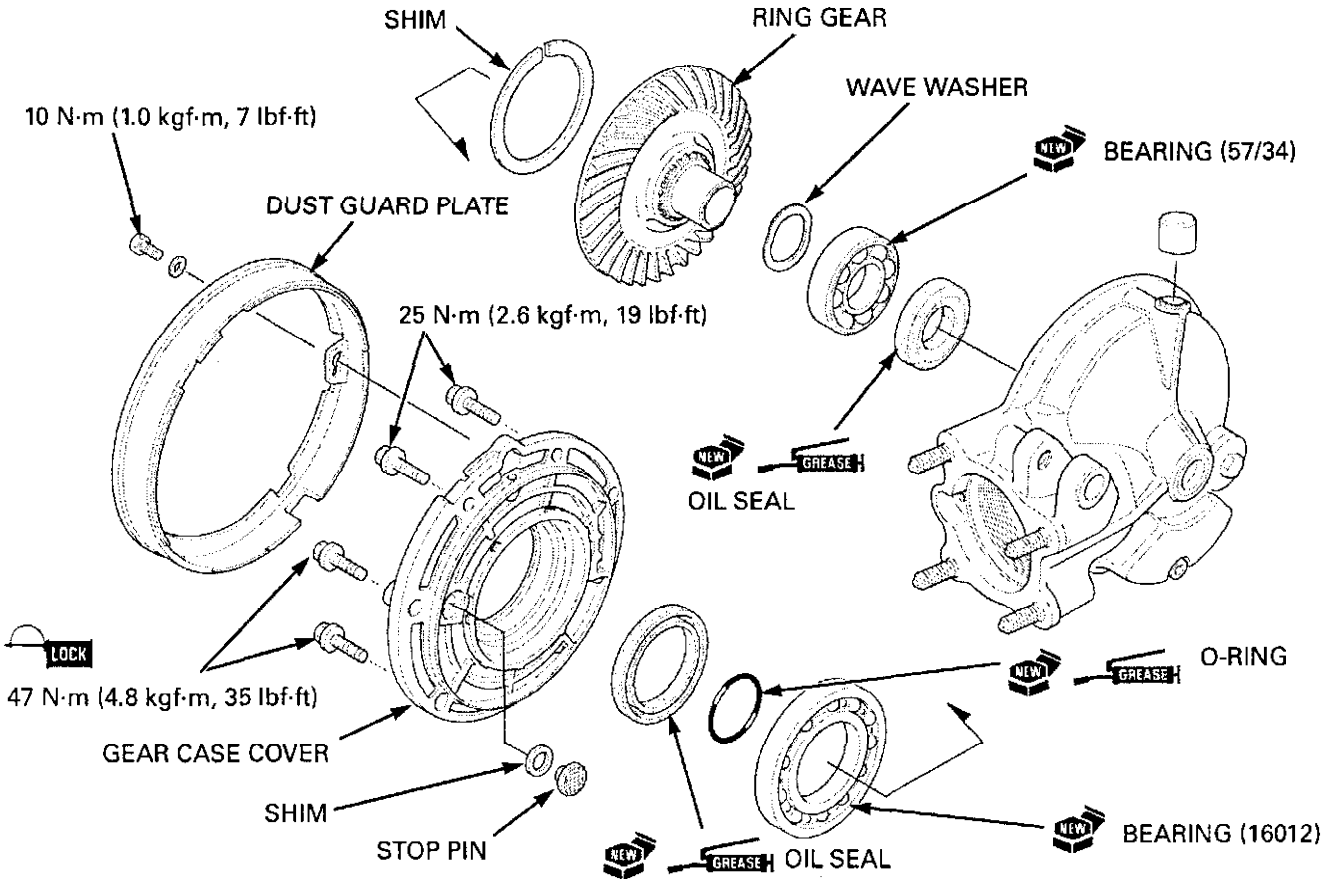
TOOLS:

Pinion holder plate	**07924-ME40010**
Collar set "C"	**07924-ME40020**

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



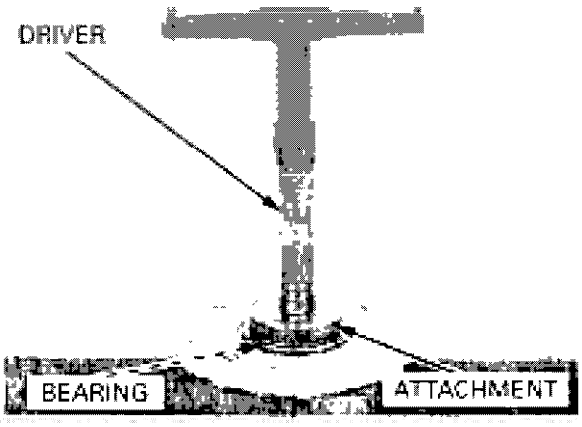
RING GEAR INSTALLATION



Press the ring gear bearing into the cover with the marked side facing inside until it is fully seated.

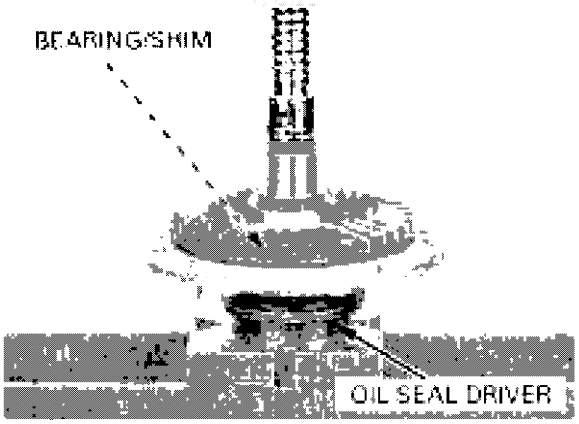
TOOLS:

Driver	**07749-0010000**
Bearing driver attachment	**07GAD-SD40101**



Install the shim onto the ring gear.
Support the bearing inner race with the special tool and press the ring gear into the bearing using a hydraulic press.

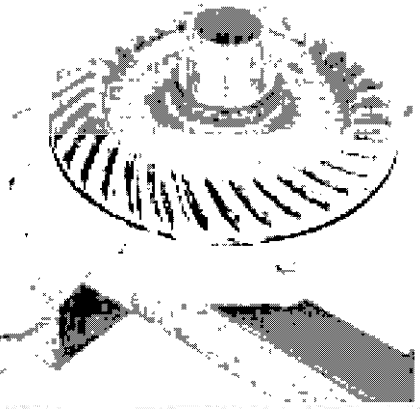
TOOL:
Oil seal driver **070MF-MEG0300**



Measure the clearance between the ring gear and stop pin with a feeler gauge.

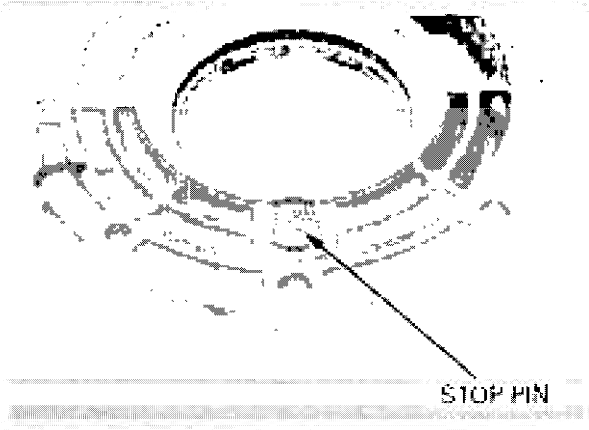
CLEARANCE: 0.30 – 0.60 mm (0.012 – 0.024 in)

Remove the ring gear if the clearance does not fall within the specification.



Be sure to wear heavy gloves when handling the heated gear case.

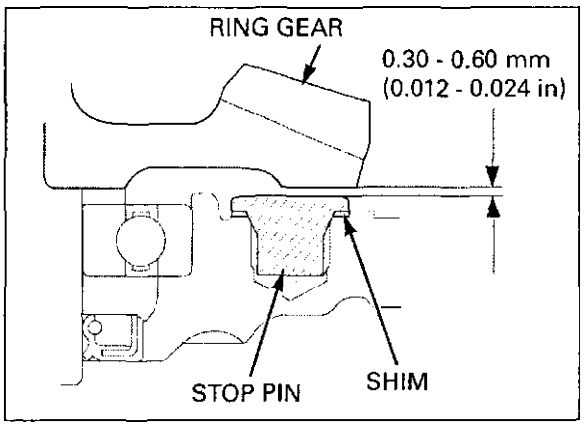
Heat the gear case cover to approximately 80°C (176°F). Heat the case cover evenly and slowly to prevent warpage.
When the gear case cover is heated to the proper temperature, remove the stop pin by tapping the cover.



Select a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the gear case cover.

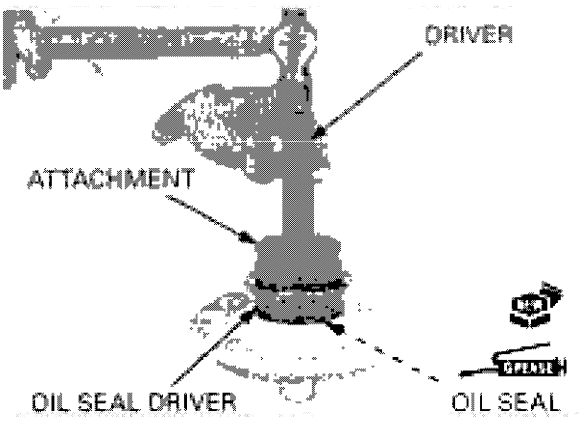


Apply grease to a new oil seal lips.

Install a new oil seal until it is flush with the cover surface using the special tools.

TOOLS:

Driver	**07749-0010000**
Oil seal driver	**070MF-MEG0300**
Attachment, 72 x 75 mm	**07746-0010600**



FINAL GEAR CASE ASSEMBLY

NOTE:

When the gear set, bearing and/or gear case has been replaced, check the following:

- Tooth contact pattern (page 14-10)
- Gear case backlash (page 14-8).

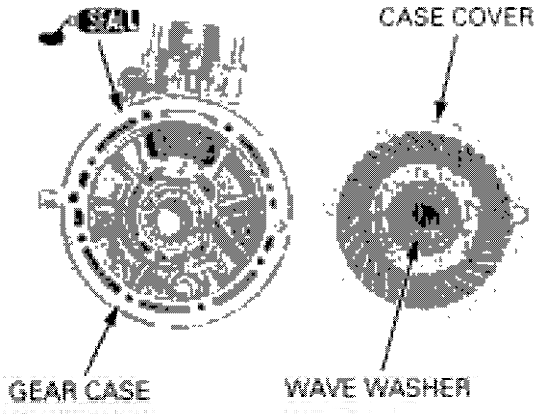
Keep dust and dirt out of the case and cover.

Clean the mating surface of the gear case and cover, being careful not to damage them.

Apply liquid sealant to the mating surface of the gear case.

Install the wave washer.

Install the case cover onto the gear case.



Apply locking agent to the threads of the case cover 10 mm bolts.

Install the bolts, and tighten them in a crisscross pattern in several steps until the cover evenly touches the gear case.

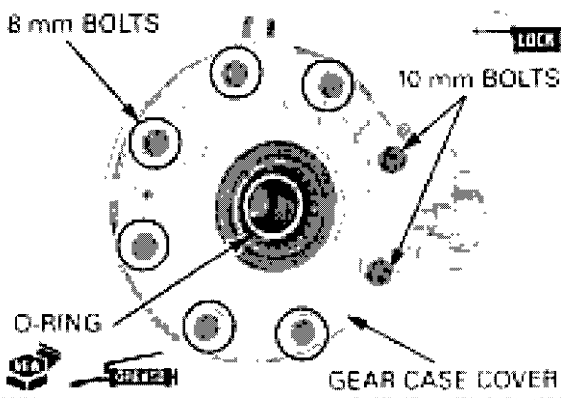
Tighten the two 10 mm bolts to the specified torque in several steps alternately.

TORQUE: 47 N·m (4.8 kgf·m, 35 lbf·ft)

Tighten the six 8 mm bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

Coat a new O-ring with grease and install it in the ring gear groove.

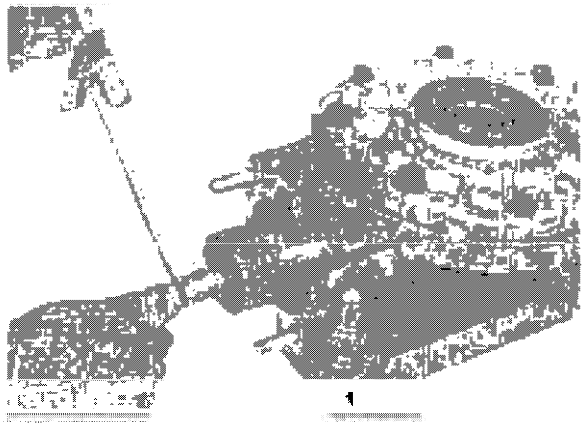


Check that the gear assembly turns smoothly without binding.

Measure the final gear assembly preload.

STANDARD:
0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·ft)

If the preload reading does not fall within the specification, check the bearings for proper installation.

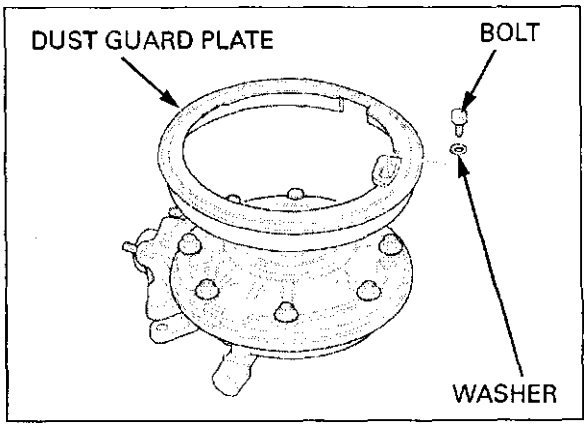


Install the dust guard plate, aligning its tabs with the cover grooves.

Turn the dust guard plate counterclockwise and install the bolt and washer.

Tighten the bolt to the specified torque.

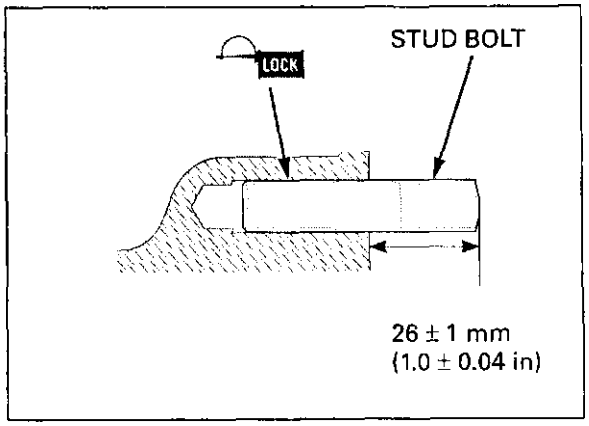
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



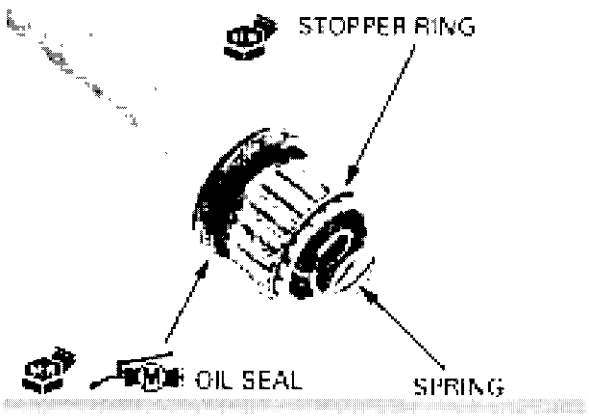
FINAL DRIVE INSTALLATION

Check that the gear case stud bolts are tight.
If any are loose, remove them, clean their threads with contact cleaner, then install them using a locking agent.

After installing, be sure to measure the distance from the top of each stud to the gear case surface as shown.



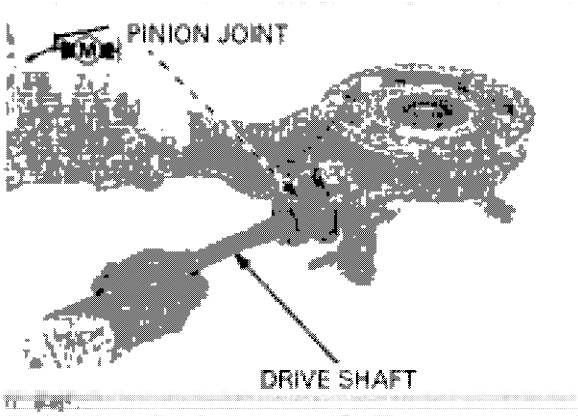
Install a new stopper ring into the drive shaft groove.
Install the spring into the drive shaft.
Apply 0.5 g (0.02 oz) of molybdenum disulfide grease to a new oil seal lips and install it onto the drive shaft.



Apply 2 g (0.08 oz) or more of molybdenum disulfide grease to the pinion joint splines.

Make sure the stopper ring is seated properly by pulling on the drive shaft lightly.
Be careful not to damage the drive shaft oil seal.

Install the drive shaft into the pinion joint until the stopper ring seats in the pinion joint spline groove.



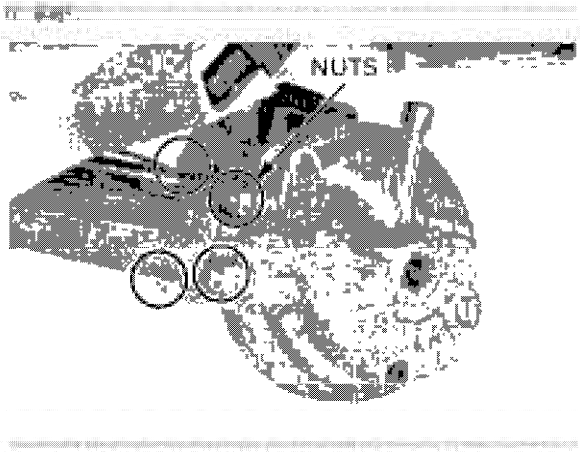
Apply 1 g (0.04 oz) of molybdenum disulfide grease to the universal joint side splines of the drive shaft.

Insert the final drive assembly into the swingarm and align the drive shaft splines with the universal joint splines.

Install the gear case mounting nuts.
Tighten the gear case mounting nuts in a crisscross pattern in several steps.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Install the rear wheel (page 16-13).
Fill the gear case with the recommended final drive gear oil (page 4-16).



15. FRONT WHEEL/SUSPENSION/STEERING

SYSTEM COMPONENTS 15-2

SERVICE INFORMATION 15-3

TROUBLESHOOTING 15-5

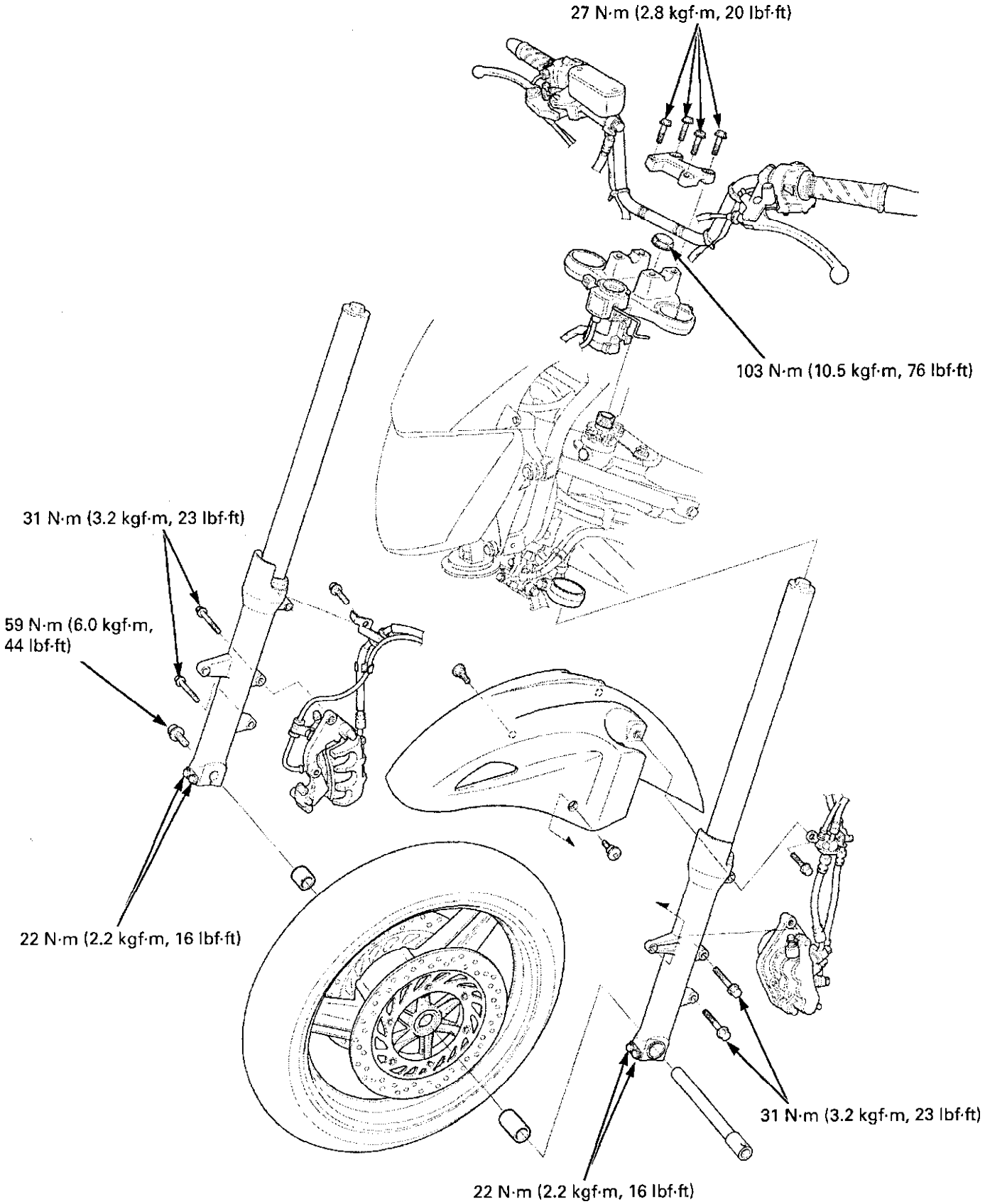
HANDLEBAR 15-6

FRONT WHEEL 15-12

FORK 15-18

STEERING STEM 15-27

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- For hydraulic brake system service, refer to page 17-2.

SPECIFICATIONS

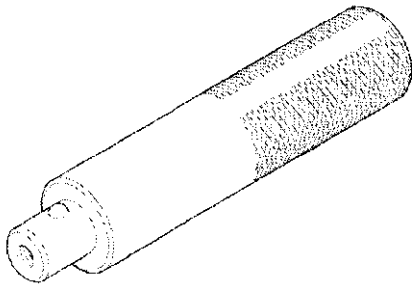
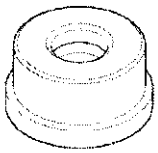
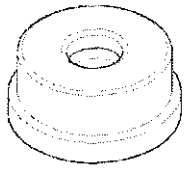
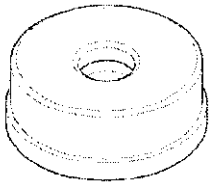
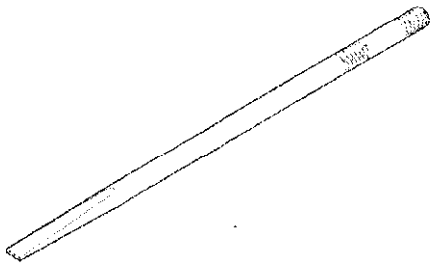
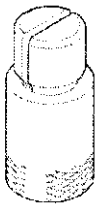
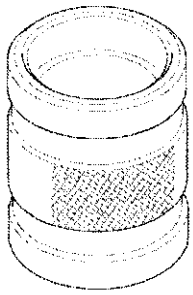
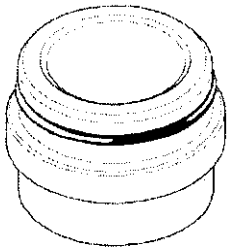
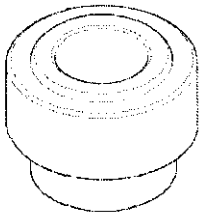
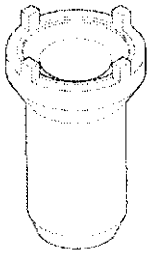
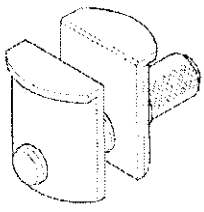
Unit: mm (in)

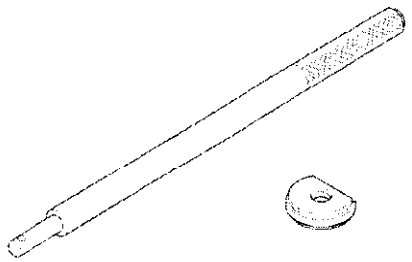
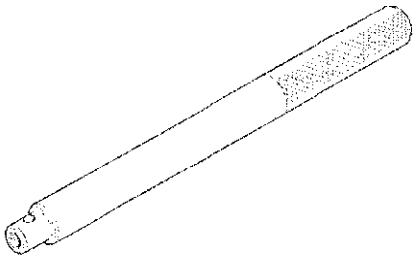
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm^2, 36 psi)	–
	Driver and passenger	250 kPa (2.50 kgf/cm^2, 36 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	426.1 (16.78)	417.6 (16.44)
	Tube runout	–	0.20 (0.008)
	Recommended fork fluid	Honda ULTRA CUSHION OIL 10W or equivalent	–
	Fluid level	124 (4.9)	–
	Fluid capacity	464 ± 2.5 cm^3 (15.7 ± 0.08 US oz, 16.3 ± 0.09 Imp oz)	–
Steering head bearing preload		8.3 – 13.5 N (0.8 – 1.4 kgf)	–

TORQUE VALUES

Clutch lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Handlebar holder bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Front axle	59 N·m (6.0 kgf·m, 44 lbf·ft)	
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Fork center socket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent
Fork cap	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork bottom bridge pinch bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Steering top thread	page 15-30	
Steering top thread lock nut	page 15-31	
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt: replace with a new one
Front pulser ring bolt (NT700VA only)	7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)	

TOOLS

Driver 07749-0010000 	Attachment, 37 x 40 mm 07746-0010200 	Attachment, 42 x 47 mm 07746-0010300 
Attachment, 52 x 55 mm 07746-0010400 	Pilot, 20 mm 07746-0040500 	Bearing remover shaft 07GGD-0010100 
Bearing remover head, 20 mm 07746-0050600 	Slider weight 07947-KA50100 	Driver attachment 07947-KF00100 
Attachment, 30 mm I.D. 07746-0030300 	Steering stem socket 07916-3710101 	Bearing remover 07946-3710500 

Ball race remover 07953-MJ10000	Driver 07949-3710001
	

TROUBLESHOOTING

Hard steering
- Steering top thread too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure
- Faulty tire

Steers to one side or does not track straight
- Bent fork leg
- Damaged steering head bearings
- Loose steering top thread
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot components (page 16-18)

Front wheel wobbles
- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Axle fastener not tightened properly

Wheel hard to turn
- Faulty wheel bearings
- Bent axle
- Brake drag (page 17-6)

Soft suspension
- Weak fork spring
- Low fluid level in fork
- Insufficient fluid weight (low viscosity)
- Low tire pressure

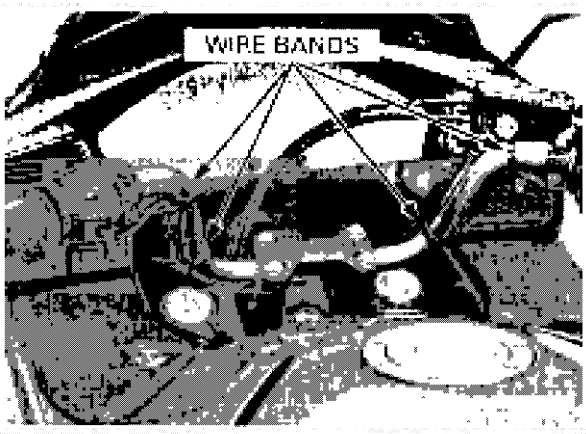
Stiff suspension
- High tire pressure
- Bent fork tube
- Fork slider binds
- High fluid level in fork leg
- Incorrect fluid weight (high viscosity)
- Clogged fork fluid passage

Front suspension noise
- Loose fork fasteners
- Insufficient fluid weight (low viscosity)
- Worn slider or fork tube bushing

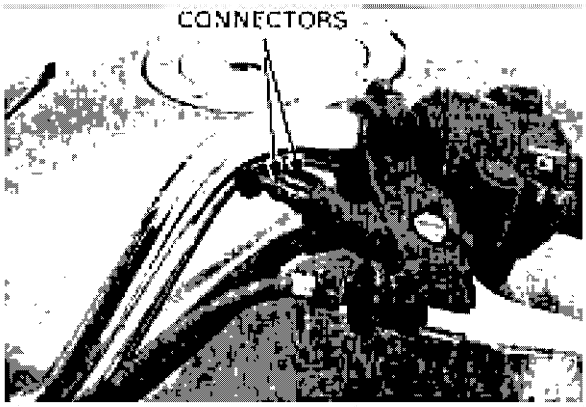
HANDLEBAR

REMOVAL

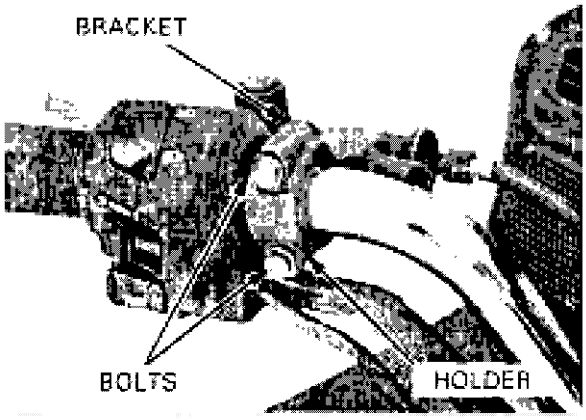
Remove the wire bands and handlebar switch wires.



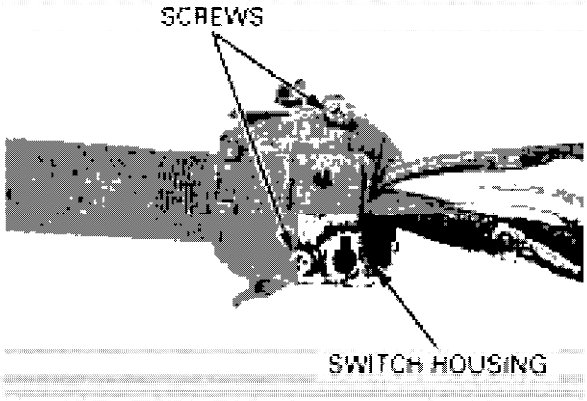
Disconnect the clutch switch connectors from the clutch switch.



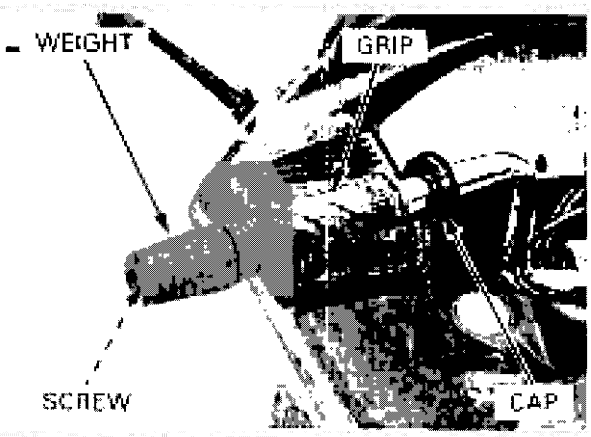
Remove the bolts, holder and clutch lever bracket.



Remove the screws and left handlebar switch housing.



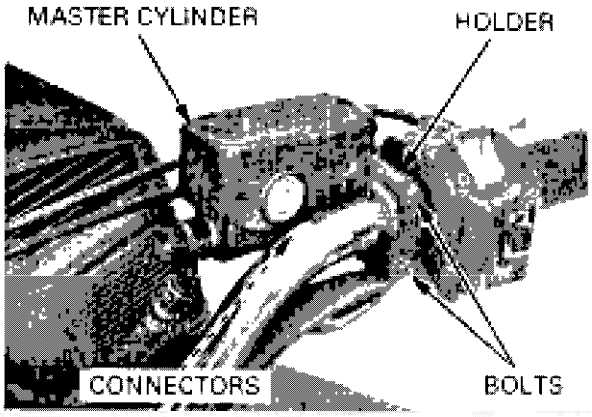
Remove the screw, handlebar weight, left handlebar grip and housing cap.



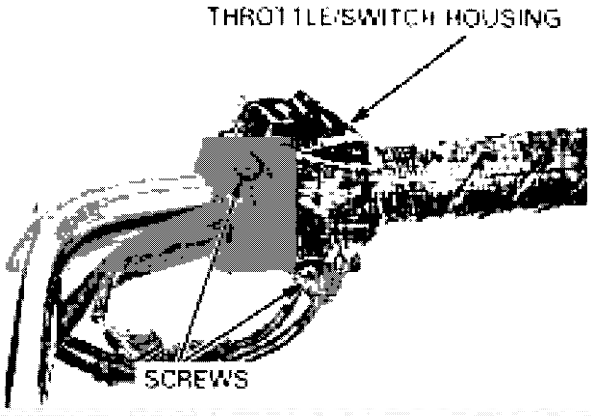
Disconnect the front brake light switch wire connectors from the switch.

Keep the reservoir upright to prevent air from entering the hydraulic system.

Remove the bolts, holder and master cylinder assembly.

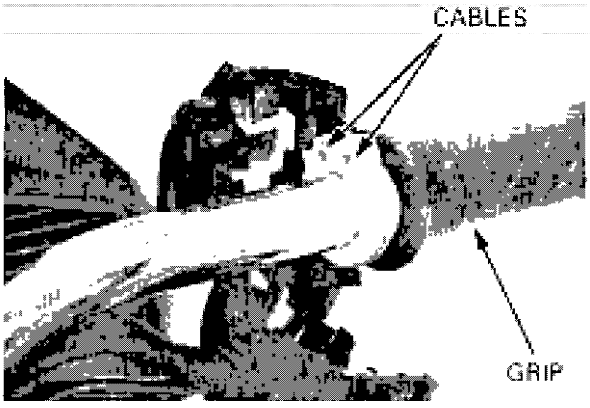


Remove the screws and right handlebar switch/throttle housing.

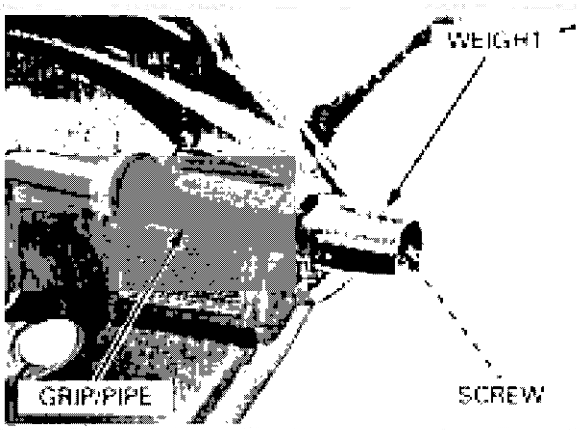


Disconnect the throttle cables from the throttle pipe and remove the throttle grip from the right handlebar.

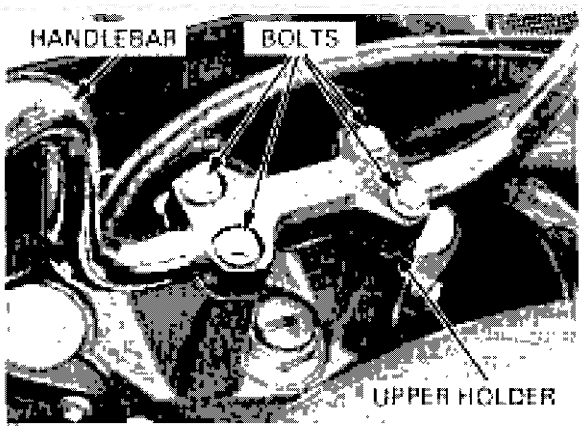
Remove the right handlebar switch/throttle housing from the handlebar.



Remove the screw, handlebar weight and right handlebar grip/throttle pipe.



Remove the bolts, handlebar upper holder and handlebar.



INSTALLATION

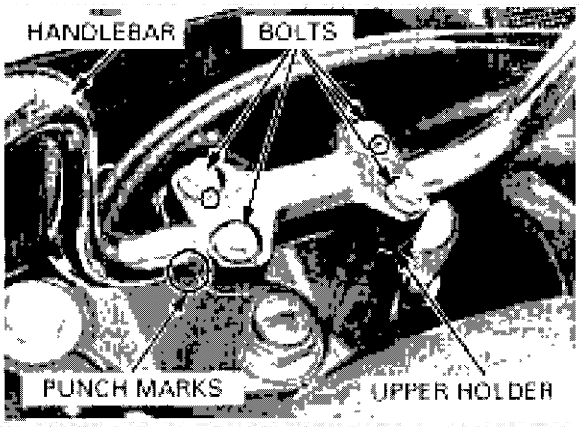
NOTE:

- Route the cable, hose and wires properly (page 1-35).

Install the handlebar onto the lower holder and align the punch mark on the handlebar with the top of the top bridge.

Install the upper holder with its punch marks facing forward.
Install the holder bolts and tighten the forward bolts first, then tighten the rear bolts to the specified torque.

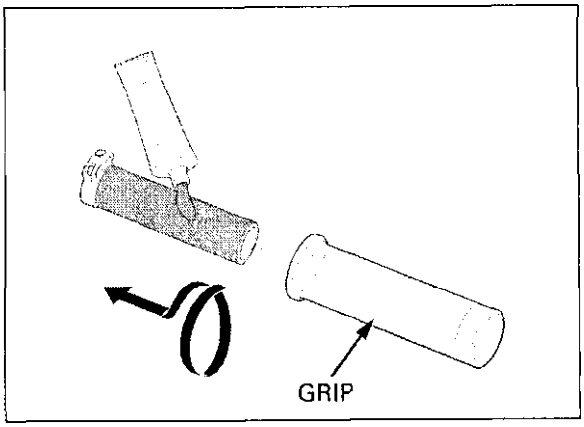
TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Clean the inside surface of the right handlebar grip and the outside surface of the throttle pipe.
Apply Honda bond A or equivalent to the inside surface of the handlebar grip and to the outside surface of the throttle pipe. Wait 3 – 5 minutes and install the grip.

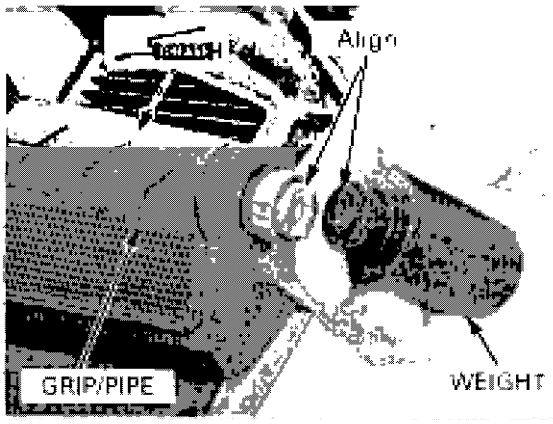
Allow the adhesive to dry for 1 hour before using.

Rotate the grip for even application of the adhesive.

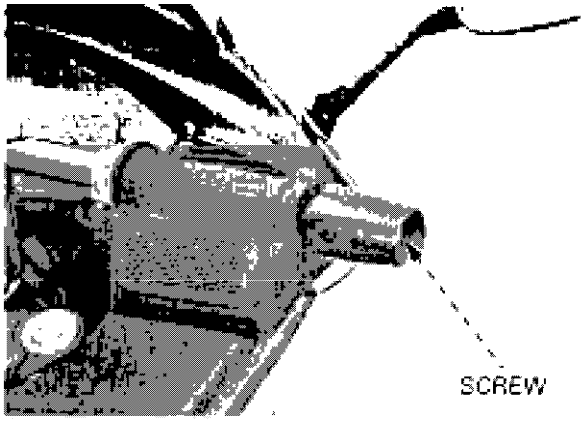


Apply grease 0.2 – 0.3 g to the throttle grip pipe flange groove and sliding surface.

Install the right handlebar weight, aligning the its tab with the tab on the handlebar.

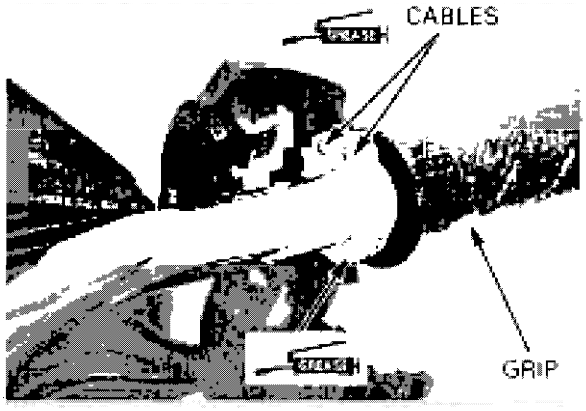


Install and tighten the screw securely.

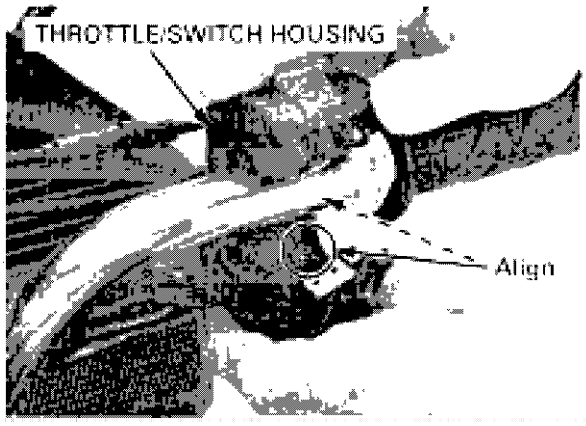


Apply grease 0.2 – 0.3 g to the throttle grip pipe flange groove and sliding surface.

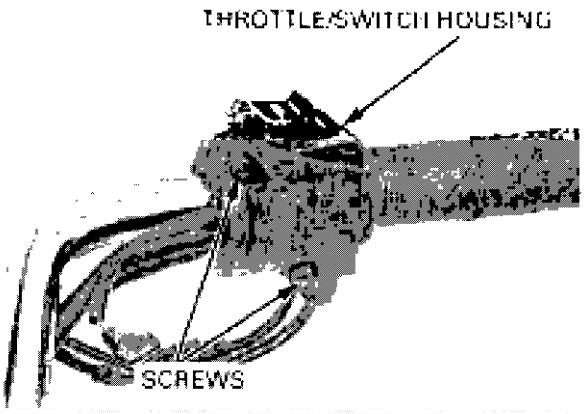
Connect the throttle cables to the throttle grip flange.



Install the right handlebar throttle/switch housing with the two screws, aligning the locating pin with the hole in the handlebar.



Tighten the front long screw first, then tighten the rear short screw.

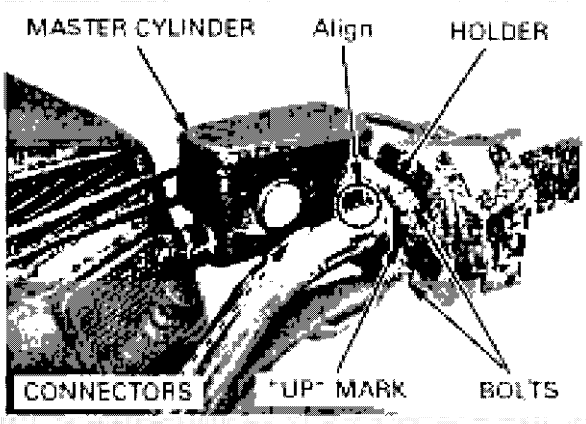


Install the holder with its "UP" mark facing up.

Install the master cylinder, holder and bolts.
Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the front brake light switch connectors.



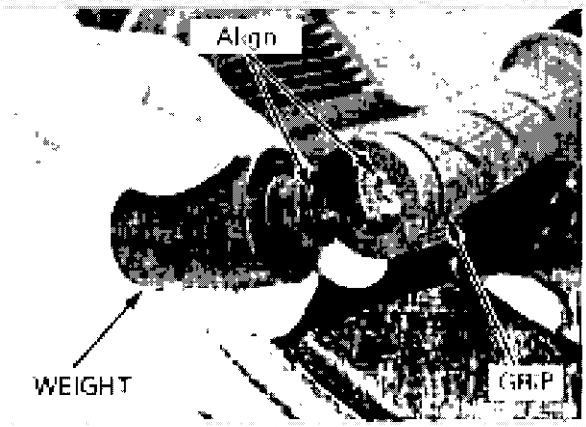
Install the housing cap.

Clean the inside surface of the left handlebar grip and the outside surface of the handlebar.
Apply Honda bond A or equivalent to the inside surface of the handlebar grip and to the outside surface of the handlebar. Wait 3 – 5 minutes and install the grip.

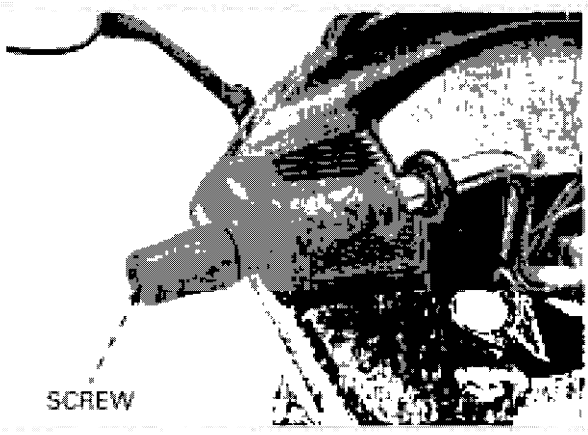
Allow the adhesive to dry for 1 hour before using.

Rotate the grip for even application of the adhesive.

Install the left handlebar weight, aligning the its tab with the tab on the handlebar.

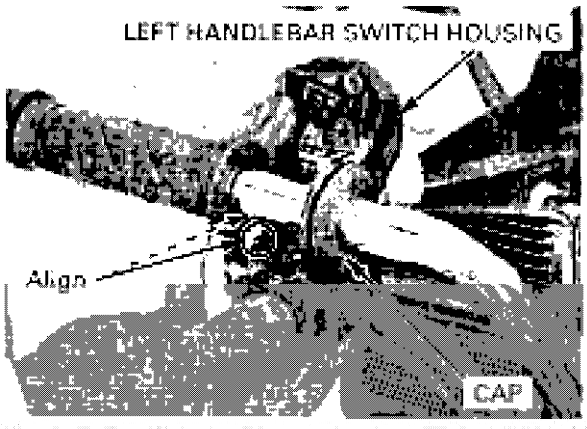


Install and tighten the screw securely.

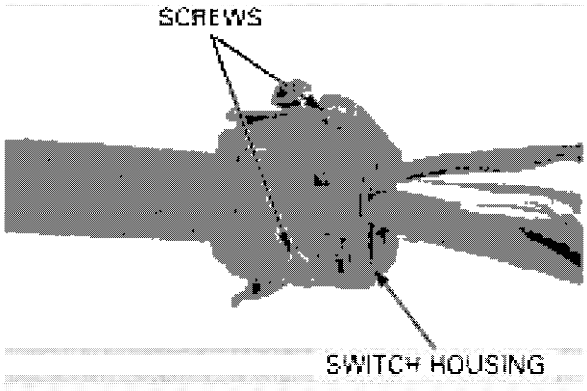


Set the housing cap flange into the housing groove.

Install the left handlebar switch housing, aligning the locating pin with the hole in the handlebar.

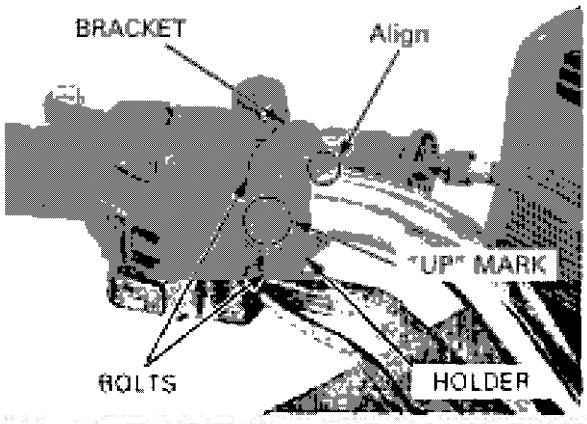


Install the screws.
Tighten the front short screw first, then tighten the rear long screw.

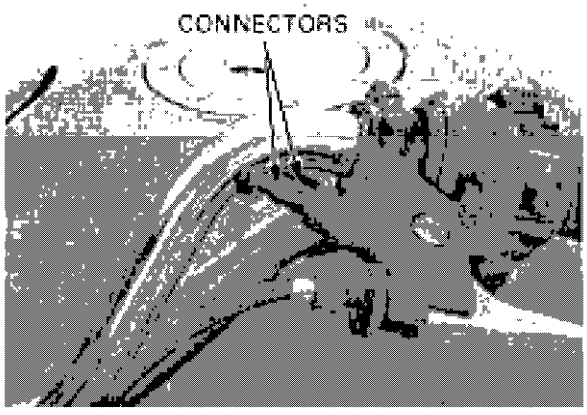


Install the holder with its "UP" mark facing up.

Install the clutch lever bracket, holder and bolts.
Align the edge of the bracket with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

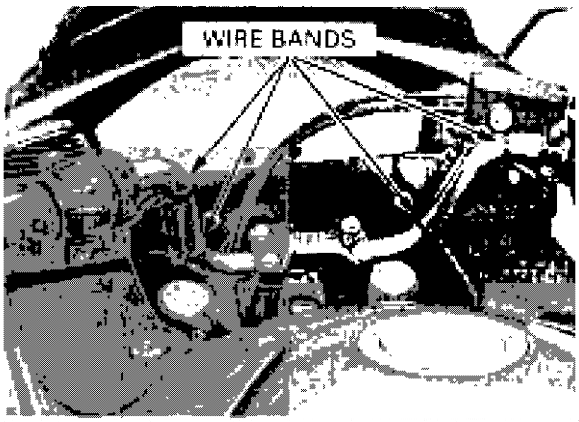


Connect the clutch switch connectors.



Install the handlebar switch wires to the wire bands.

Adjust the clutch lever free play (page 4-21).
Adjust the throttle grip free play (page 4-6)



FRONT WHEEL

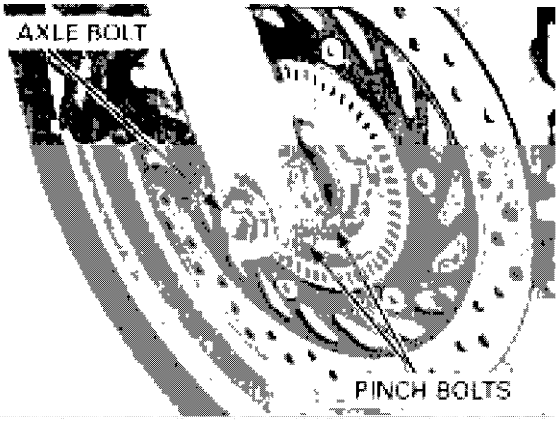
REMOVAL

Loosen the axle pinch bolts.

Loosen the front axle bolt.

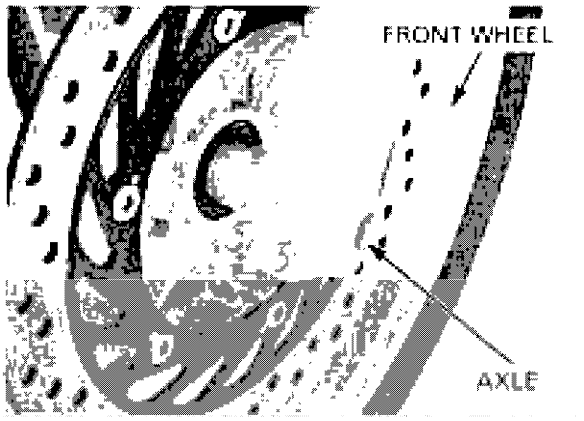
Support the motorcycle securely and raise the front wheel off the ground.

Remove the mounting bolts, right and left brake caliper (page 17-22).



Do not operate the brake lever and pedal after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Remove the axle and front wheel.

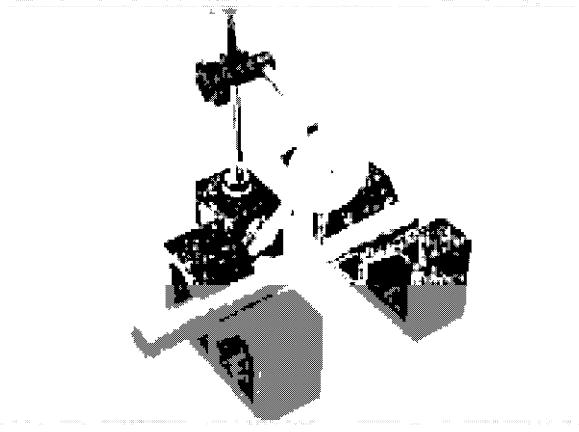


INSPECTION

AXLE

Set the front axle in V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

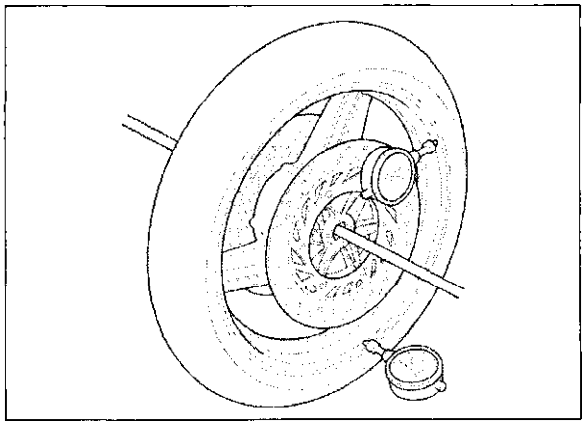
SERVICE LIMIT: 0.2 mm (0.008 in)



WHEEL RIM

Check the rim runout by placing the wheel in a trueing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

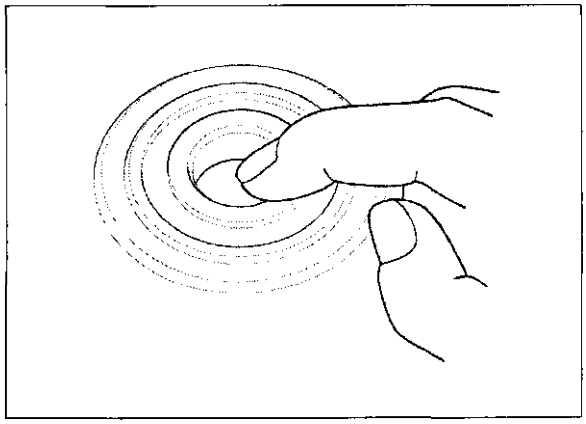


WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub (page 15-14).

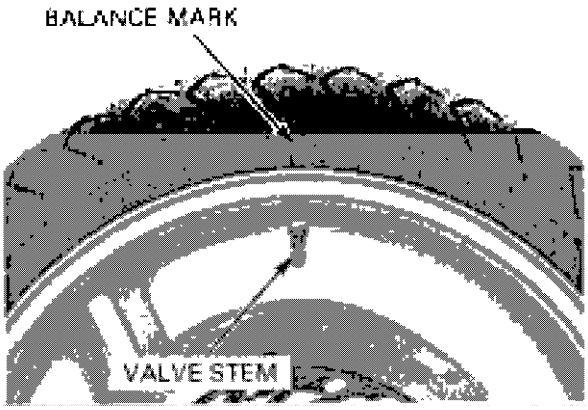


Carefully check balance before installing the wheel.

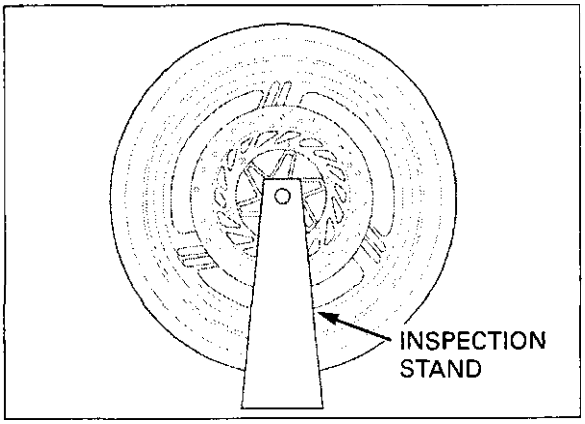
WHEEL BALANCE

NOTE:

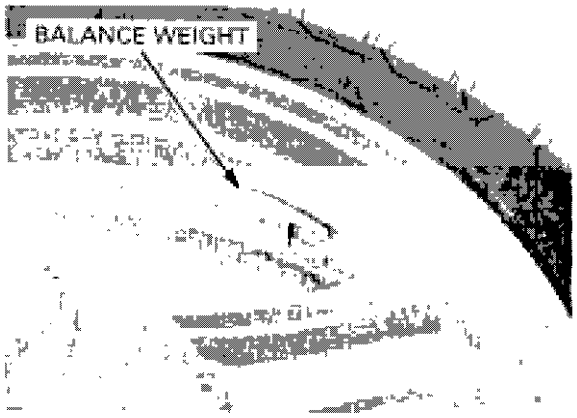
- Mount the tire with the arrow mark facing in the direction of rotation.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (light mass point: a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



Mount the wheel, tire and brake disc assembly on an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.



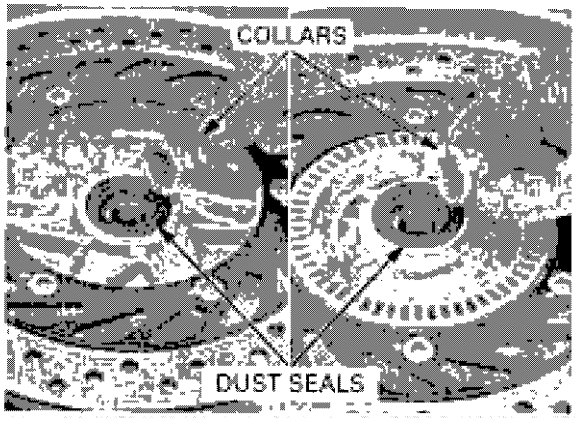
To balance the wheel, install a new balance weight on the lightest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.
Do not add more than 60 g (2.1 oz) to the front wheel.



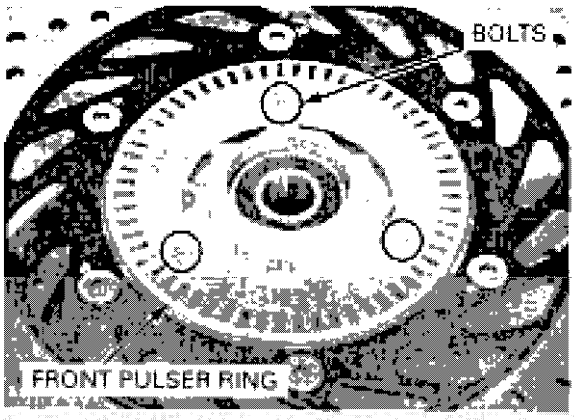
DISASSEMBLY

Remove the side collars.

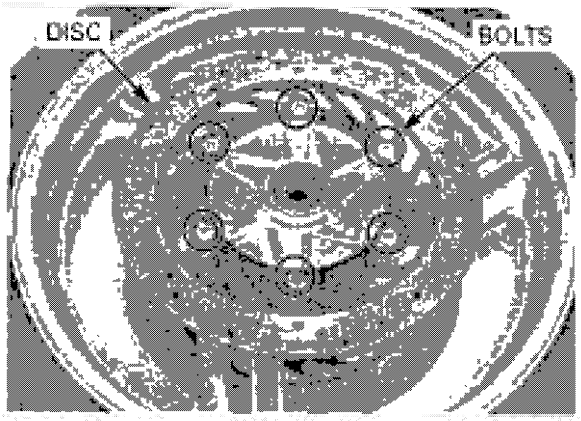
Remove the dust seals.



NT700VA only: Remove the bolts and front pulser ring from the right wheel hub.



Do not reuse the bolts. Remove the bolts and brake discs from both sides of the wheel.

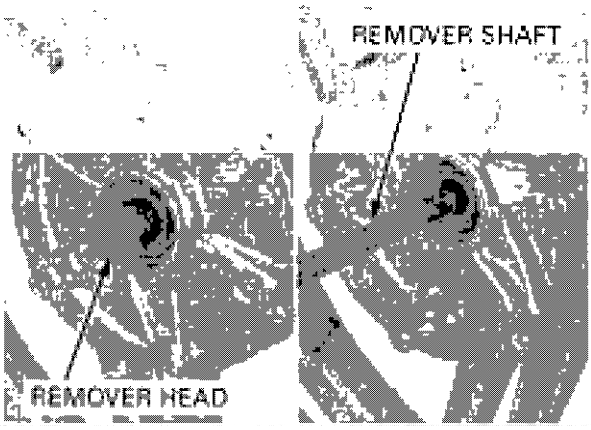


Replace the wheel bearings in pairs. Do not reuse old bearing.

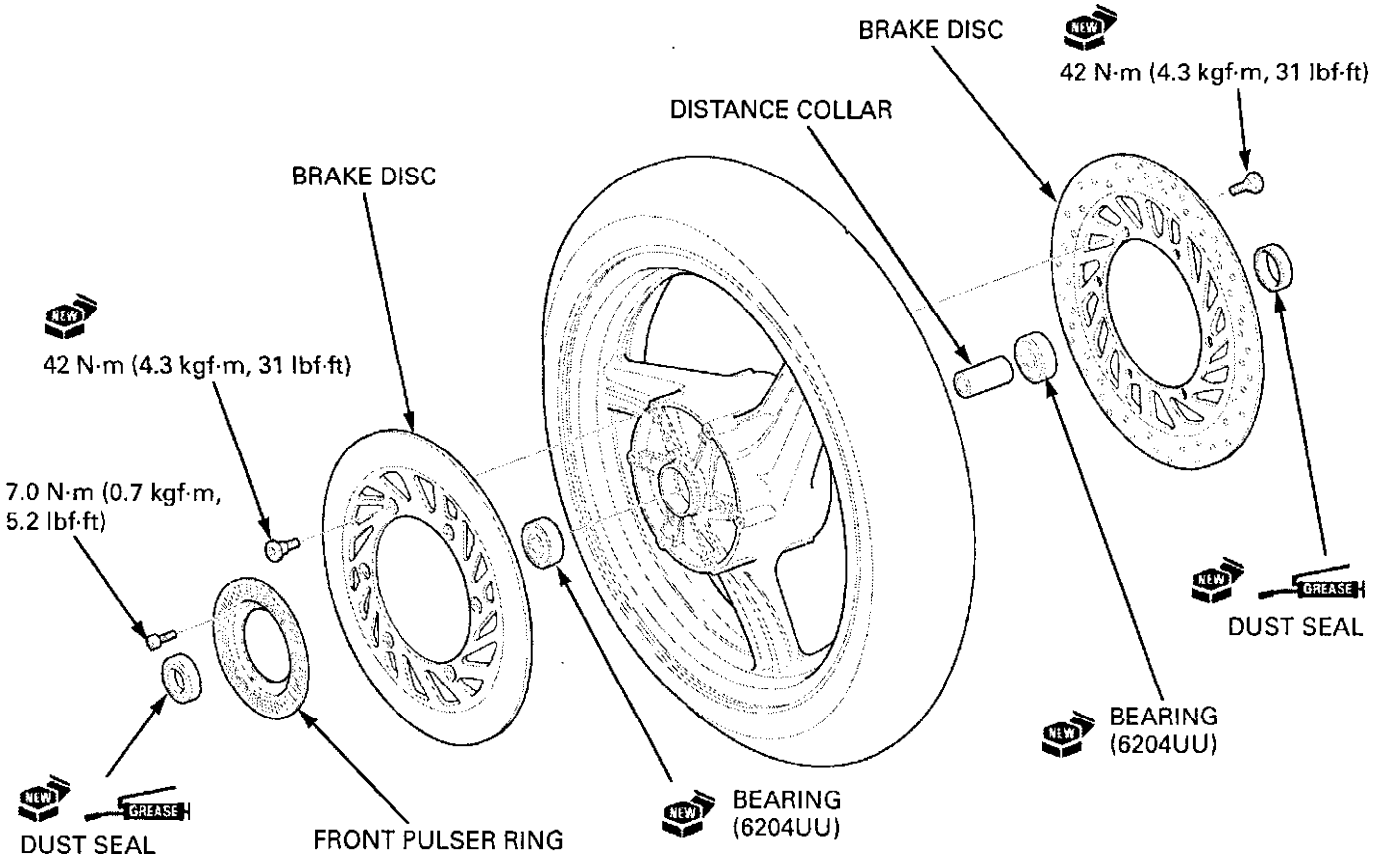
Install the remover head into the bearing.
From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	**07GGD-0010100**
Bearing remover head, 20 mm	**07746-0050600**



ASSEMBLY

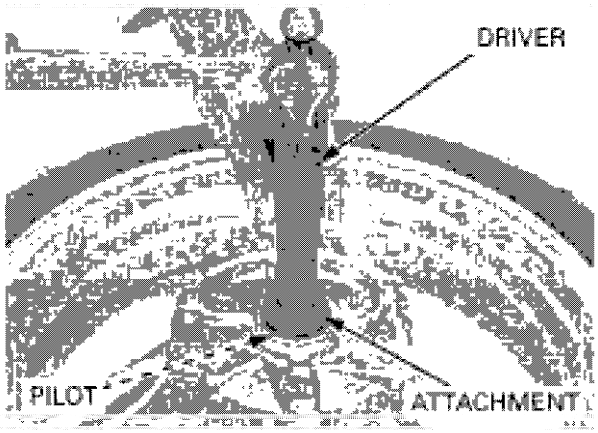


Drive in a new right bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.
Drive in a new left bearing squarely with the marked side facing up until it is seated on the collar.

TOOLS:

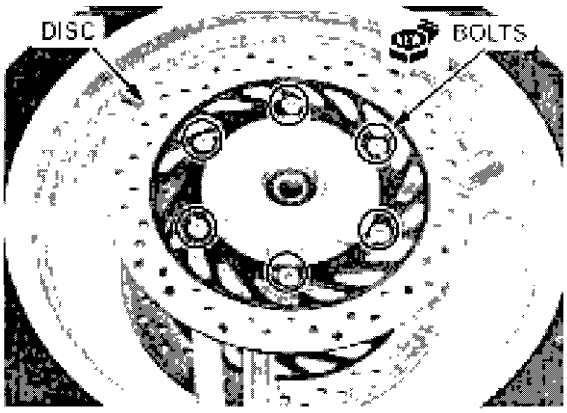
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**



Do not get grease on the brake disc or stopping power will be reduced.

Install the brake disc with the marked side facing out.
Install new bolts and tighten them in a crisscross pattern in several steps.

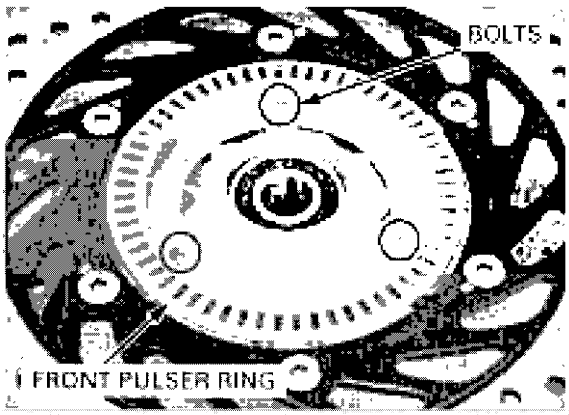
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



NT700 VA only:

Install the front pulser ring onto the right wheel hub, then tighten the bolts to the specified torque.

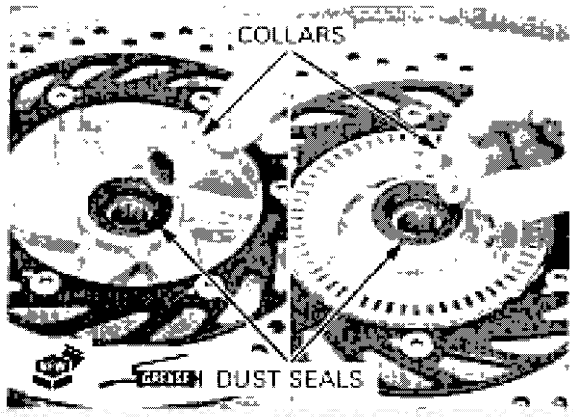
TORQUE: 7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)



Apply grease to new dust seal lips and install the dust seals until they are flush with the wheel hub.

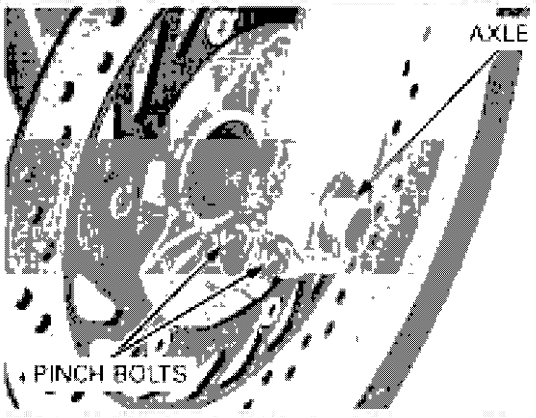
Install the left side collar is longer than right side collar.

Install the side collars.



INSTALLATION

Place the front wheel between the fork legs so the brake disc is positioned between the brake pads.
Apply thin coat of grease to the axle sliding surface.
Insert the axle from the right side until it is fully seated.



Tighten the axle bolt to the specified torque.

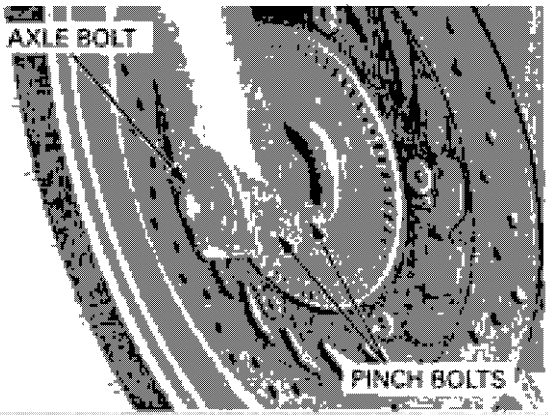
TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)

Tighten the right axle pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install the right and left brake caliper (page 17-22). Install and tighten new mounting bolts to the specified torque.

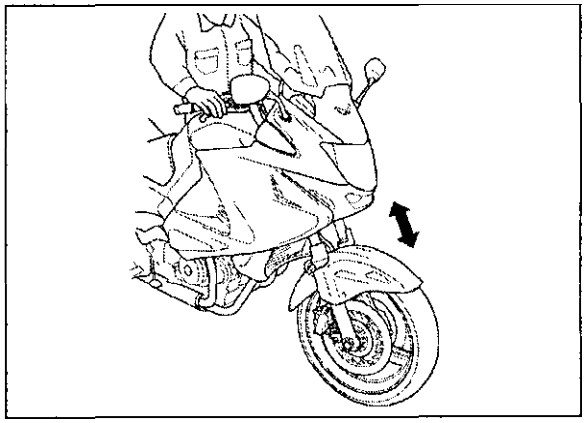
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.

Tighten the left axle pinch bolts to the specified torque.

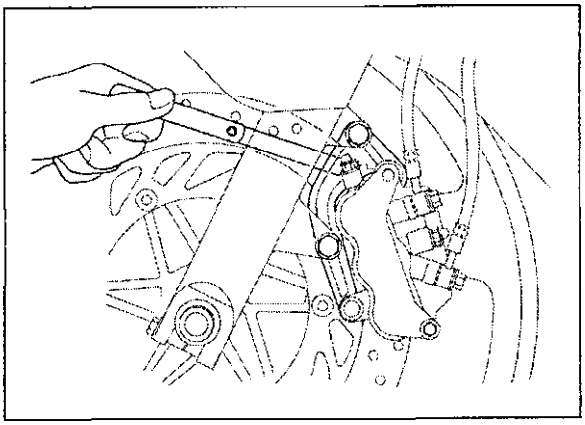
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Make sure the axle end groove is flush with the fork leg outer surface as shown.

Check the clearance between the brake disc and caliper bracket on each side after installation.
The clearance should be at least 0.7 mm (0.03 in).

- After installing the wheel, apply the front and rear brakes several times and recheck the caliper clearance between each surface of the brake disc and the brake caliper. Failure to provide clearance will damage the brake disc and affect braking efficiency.



FORK

REMOVAL

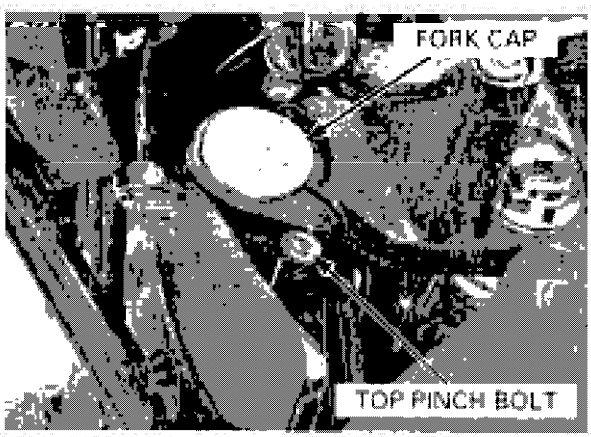
When the fork is ready to be disassembled, loosen the fork cap, but do not remove it. Support the brake caliper so it does not hang from the brake hose.

Remove the following:

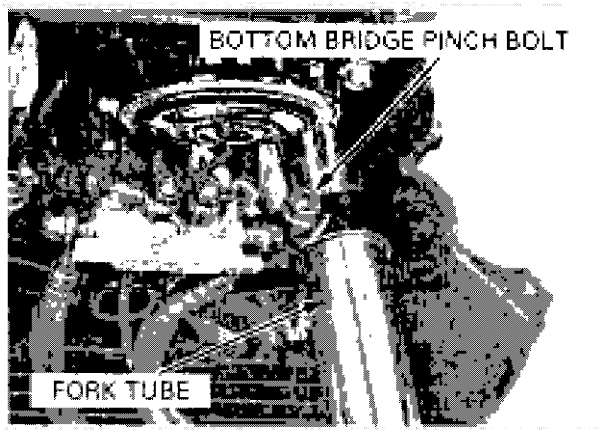
- Front wheel (page 15-12)
- Front brake calipers (page 17-22)
- Front fender (page 3-15)

Loosen the fork top pinch bolt.

When the fork is ready to be disassembled, loosen the fork cap, but do not remove it yet.



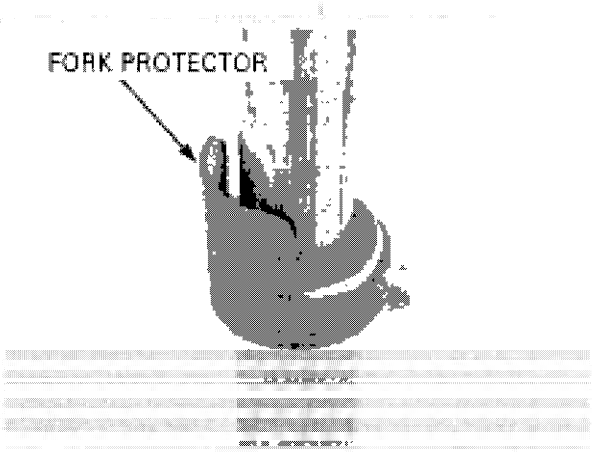
Loosen the fork bottom bridge pinch bolt. Pull the fork leg down and remove the fork tube from the top bridge and steering stem.



DISASSEMBLY

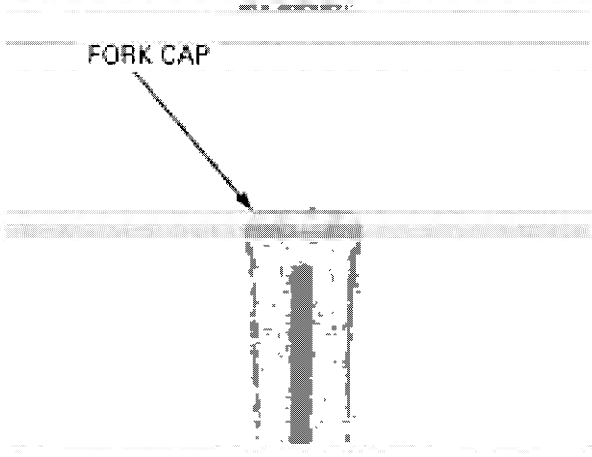
Be careful not to scratch the fork tube or damage the dust seal.

Remove the fork protector by prying carefully with a screwdriver.



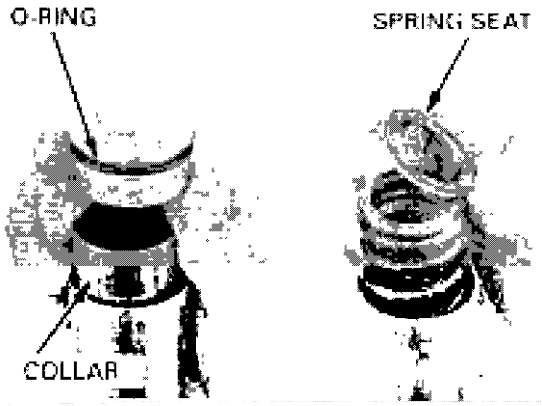
The fork cap is under spring pressure; use care when loosening it.

Remove the fork cap from the fork tube.



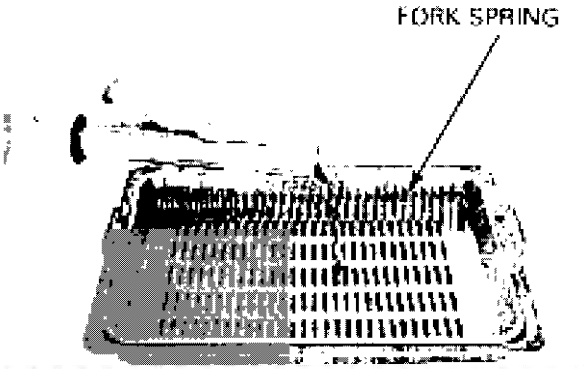
Remove the O-ring from the fork cap.

Remove the collar and spring seat.



Remove the fork spring from the fork tube.

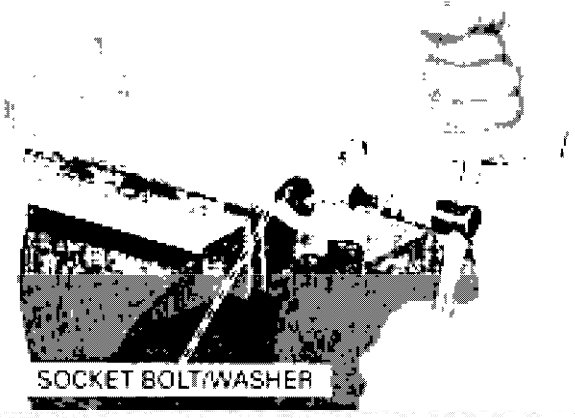
Pour out the fork fluid by pumping the fork tube several times.



Hold the fork slider in a vise with soft jaws.

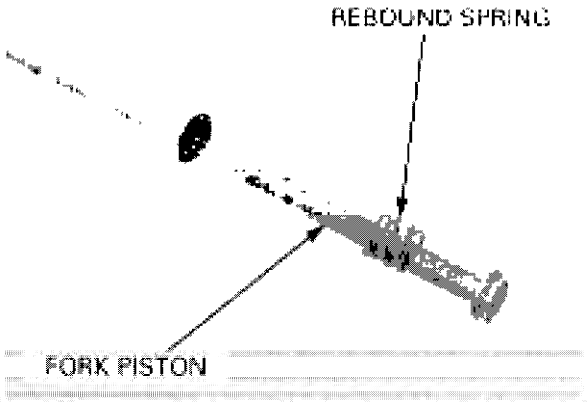
If the fork piston turns with the fork center socket bolt, temporarily install the fork spring, spring seat, collar and fork cap.

Remove the fork center socket bolt and sealing washer.



Do not remove the fork piston ring, unless it is necessary to replace with a new one.

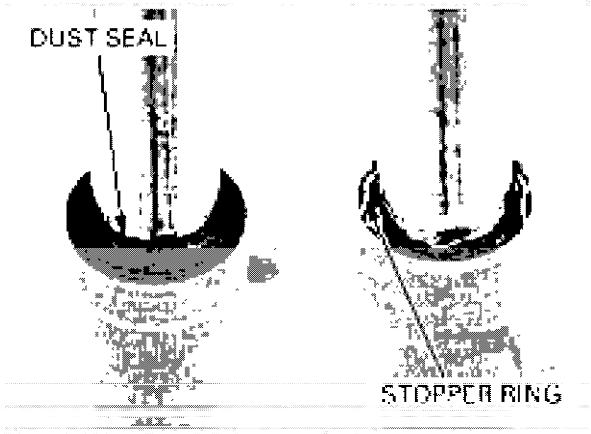
Remove the fork piston and rebound spring.



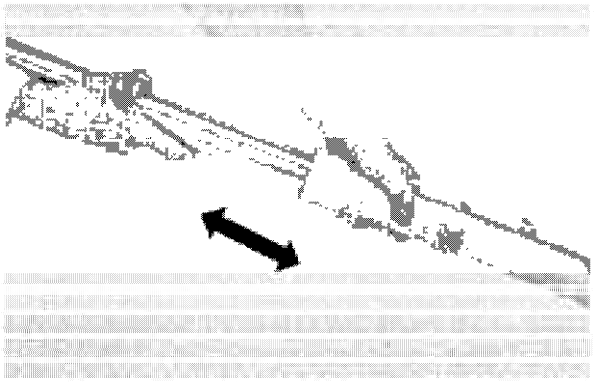
Remove the dust seal.

Do not scratch the fork tube sliding surface.

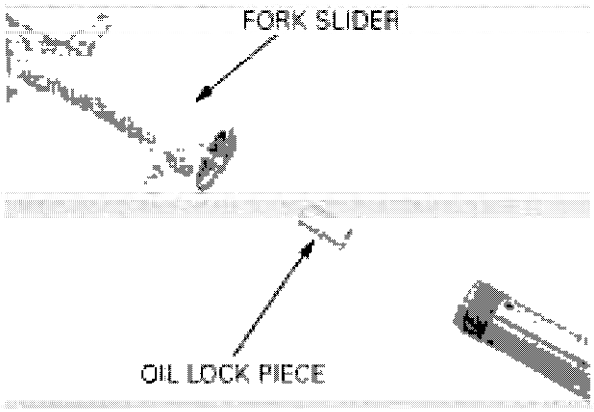
Remove the oil seal stopper ring.



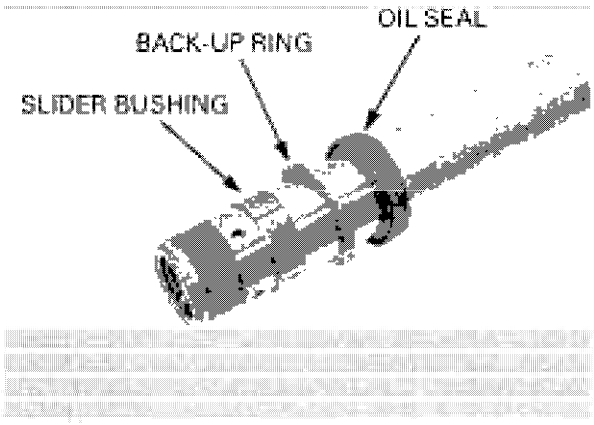
Using quick successive motions, pull the fork tube out of the fork slider.



Remove the oil lock piece.



Remove the oil seal, back-up ring and slider bushing.

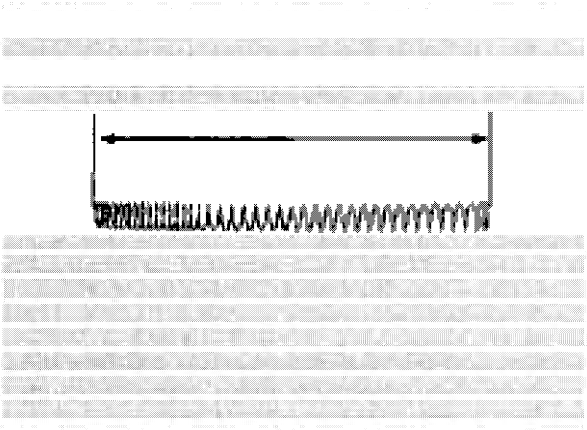


INSPECTION

FORK SPRING

Measure the fork spring free length.

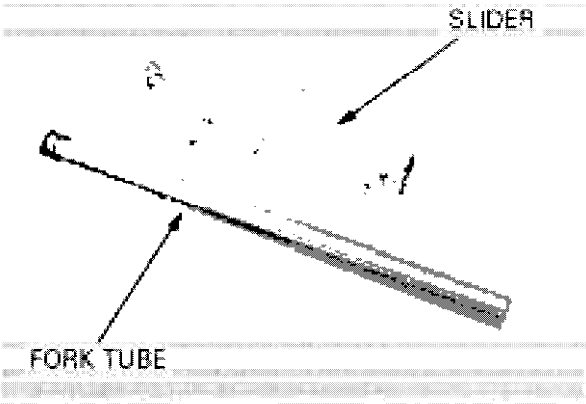
SERVICE LIMIT: 417.6 mm (16.44 in)



FORK TUBE/SLIDER/PISTON

Check the fork tube and slider for score marks, and excessive or abnormal wear.

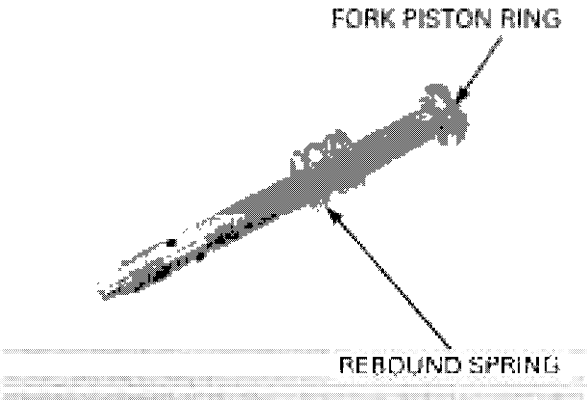
Replace any damaged component if necessary.



Check the fork piston for score marks, and excessive or abnormal wear.

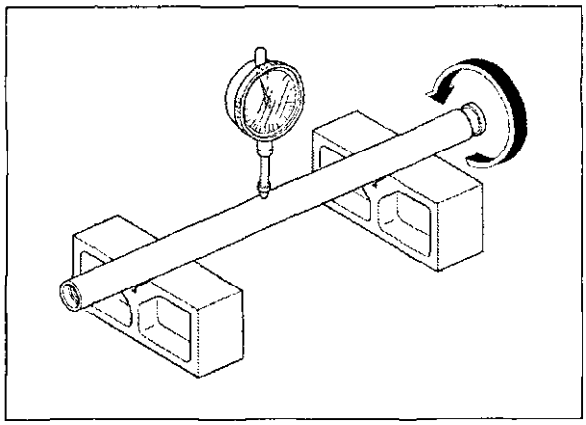
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

Replace any damaged component if necessary.



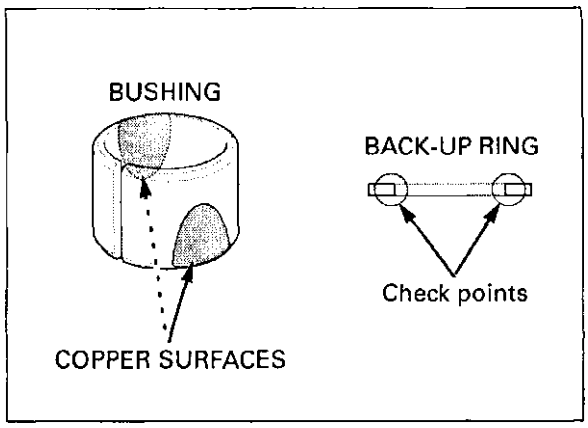
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



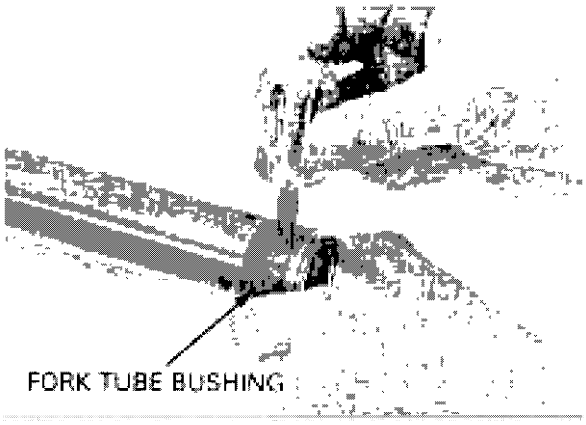
Visually inspect the slider and guide bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



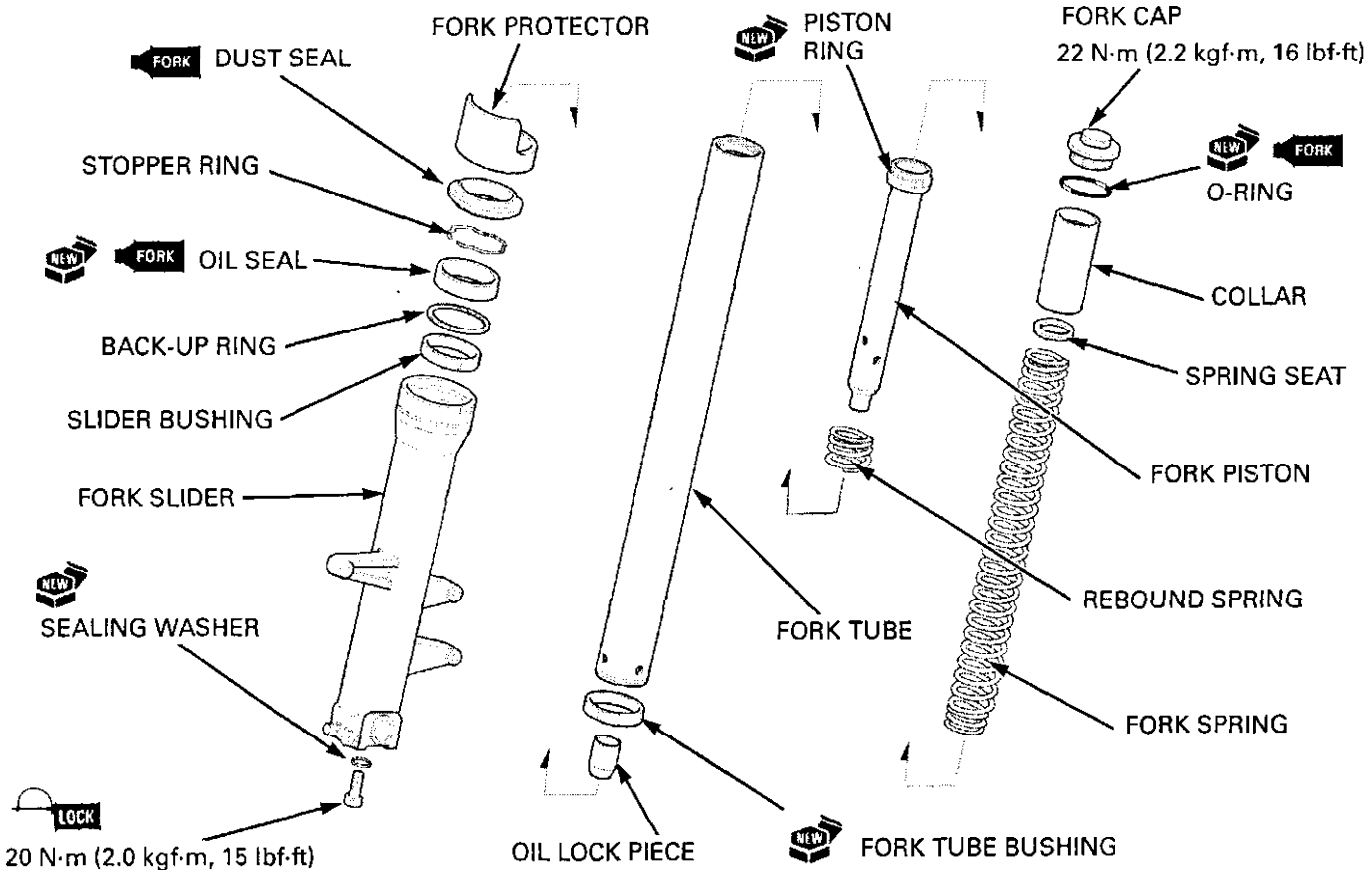
Do not remove the fork tube bushing unless it is necessary to replace it with a new one.

Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.



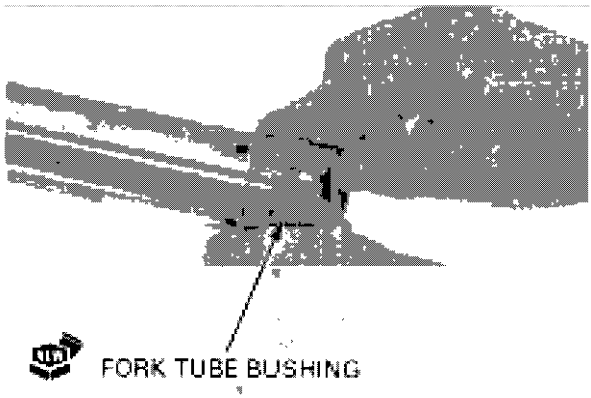
ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Do not open the bushing slit more than necessary.

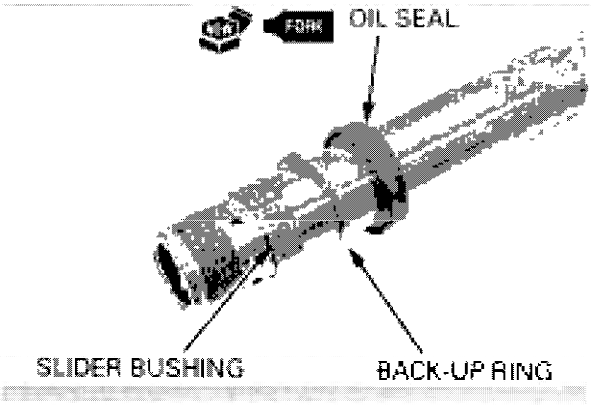
Install a new fork tube bushing, being careful not to damage the coating of the bushing if it has been removed.



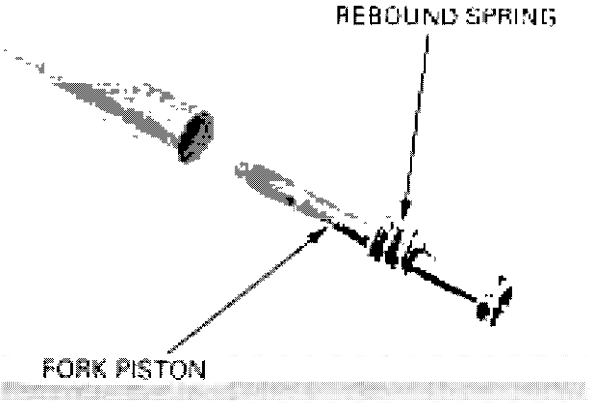
Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the oil seal with its marked side facing up.

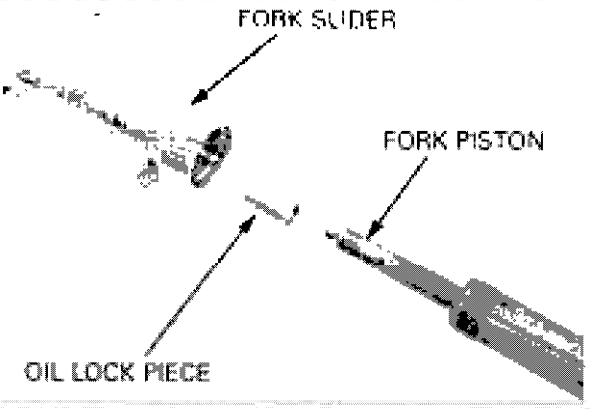
Apply fork fluid to the new oil seal lips.
Install the slider bushing, back-up ring and new oil seal onto the fork tube.



Install the rebound spring to the fork piston, then install them into the fork tube.

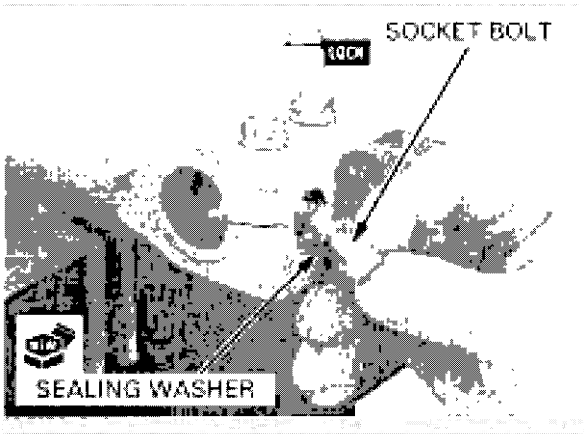


Install the oil lock piece to the fork piston end.
Install the fork tube assembly into the fork slider.



Hold the fork slider in a vise with soft jaws.

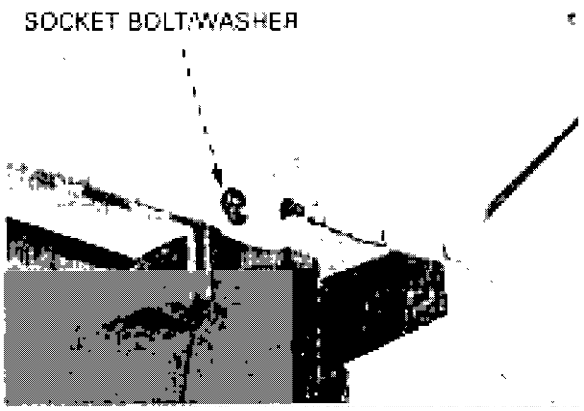
Apply a locking agent to the fork center socket bolt threads.
Install the socket bolt with a new sealing washer.



If the fork piston turns with the fork center socket bolt, temporarily install the fork spring, spring seat, collar and fork cap

Tighten the fork center socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

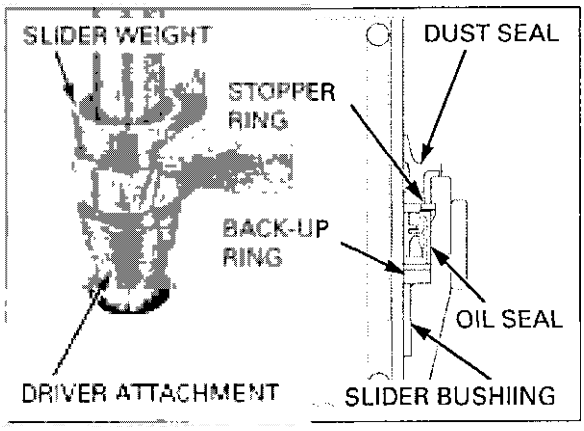


Apply fork fluid to a new oil seal lips. Install the oil seal with the marked side facing up.

Drive the oil seal until the stopper ring groove is visible using a special tools.

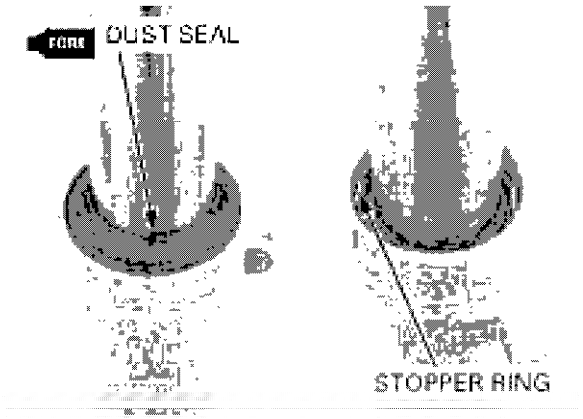
TOOLS:

Slider weight	**07947-KA50100**
Driver attachment	**07947-KF00100**



Install the stopper ring into the groove into the fork slider, being careful not to scratch the fork tube sliding surface.

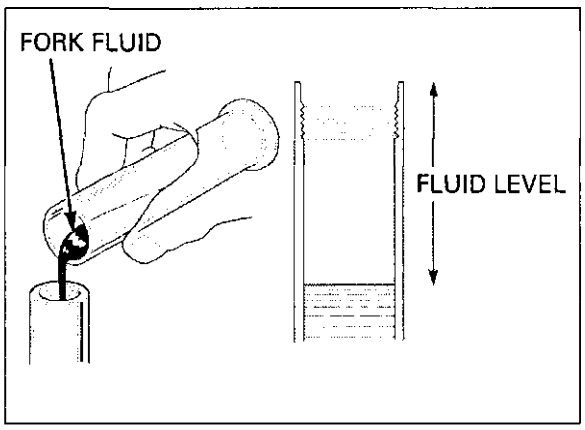
Coat a new dust seal with fork fluid and install it.



Pour the specified amount of the recommended fork fluid into the fork tube.

RECOMMENDED FORK FLUID:
Honda ULTRA CUSHION OIL 10W or equivalent

FORK FLUID CAPACITY:
464 ± 2.5 cm³ (15.7 ± 0.08 US oz, 16.3 ± 0.09 Imp oz)

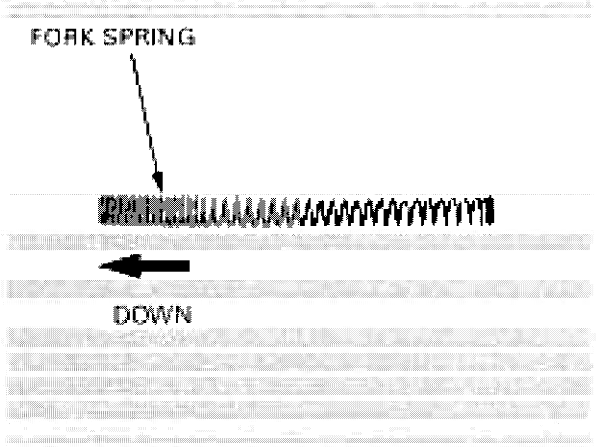


Slowly pump the fork tube several times to remove any trapped air from the lower portion of the fork tube.

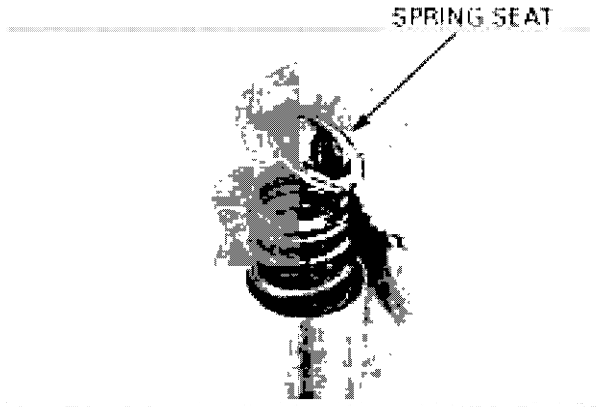
Compress the fork tube fully. Measure the fluid level from the top of the fork tube.

FORK FLUID LEVEL: 124 mm (4.9 in)

Pull the fork tube up and install the fork spring with the tapered side (tightly wound coil side) facing down.



Install the spring seat.

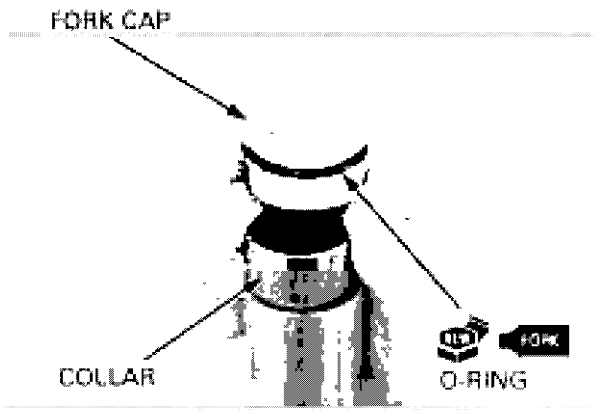


Install the collar.

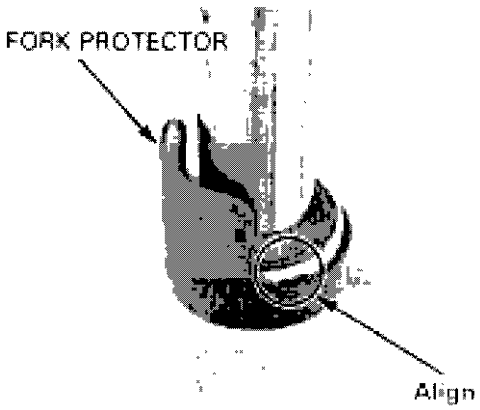
Coat a new O-ring with fork fluid and install it into the fork cap groove.

Be careful not to cross-thread the fork cap. Tighten the fork cap after installing the fork tube into the fork bridge.

Hold the fork cap securely and install it into the fork tube.



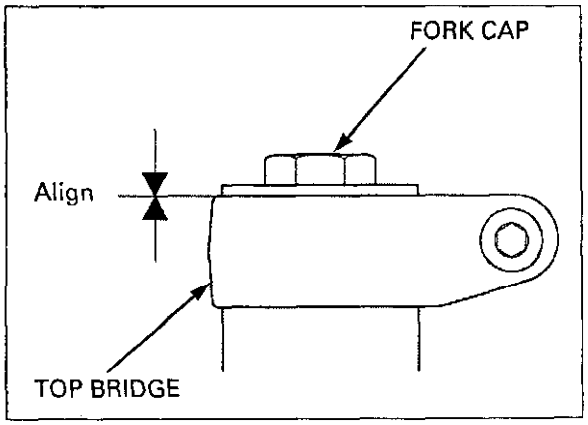
Install the fork protector onto the fork slider aligning the protector boss with the groove in the fork slider.



INSTALLATION

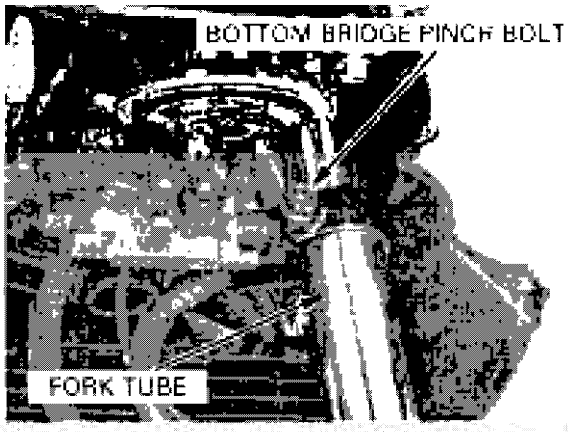
Install the fork leg through the bottom bridge.

Align the top end of the fork tube with the upper surface of the top bridge.



Tighten the fork bottom bridge pinch bolts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 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)

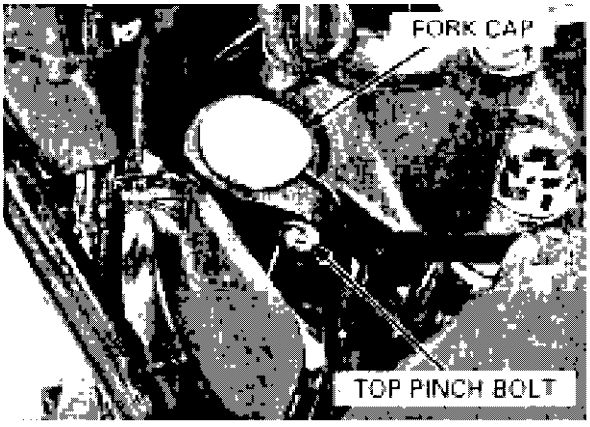
Tighten the fork top bride pinch bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the brake hose clamp to the fork and tighten it securely.

Install the following:

- Front fender (page 3-15)
- Front brake calipers (page 17-27)
- Front wheel (page 15-16)



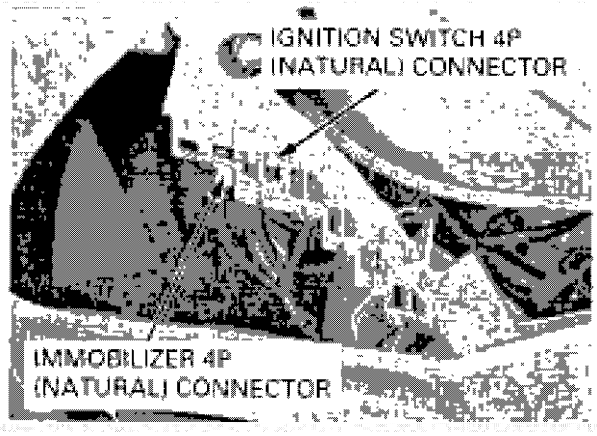
STEERING STEM

REMOVAL

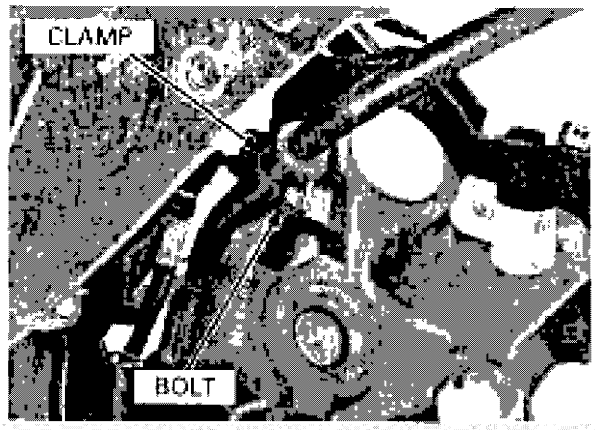
Remove the following:

- Handlebar (page 15-6)
- Front wheel (page 15-12)
- Front fender (page 3-15)

Release the wire band and disconnect the ignition switch 4P (Natural) connector and immobilizer 4P (Natural) connector.



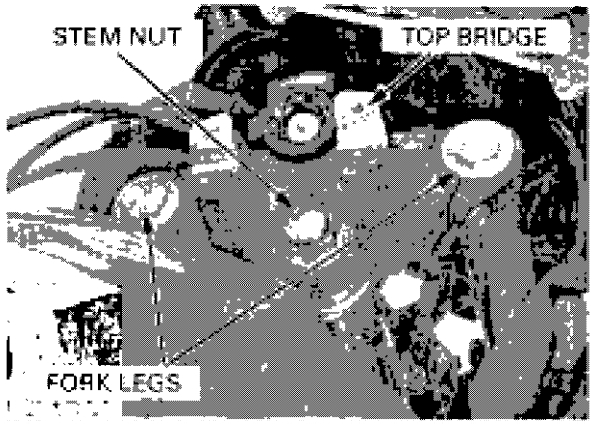
Remove the bolt and front brake hose clamp.



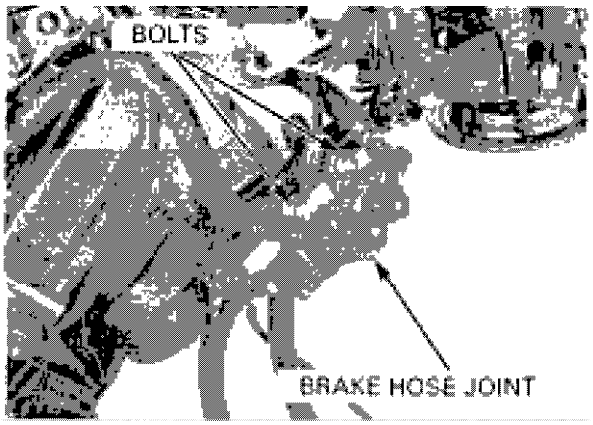
Remove the stem nut.

Remove the fork legs (page 15-18).

Remove the top bridge.

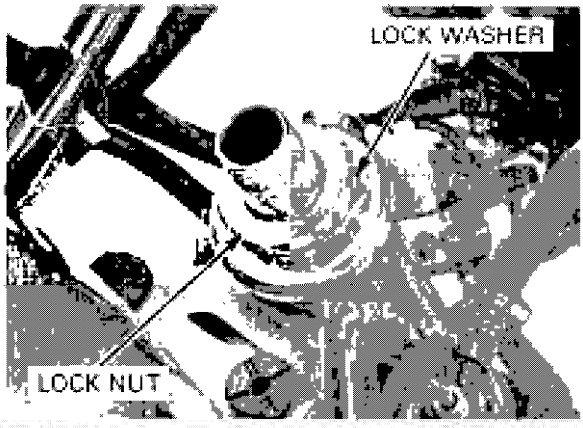


Remove the bolts and front brake hose joint.



Straighten the lock washer tabs.

Remove the steering top thread lock nut and lock washer.



Loosen the steering top thread using the special tool.

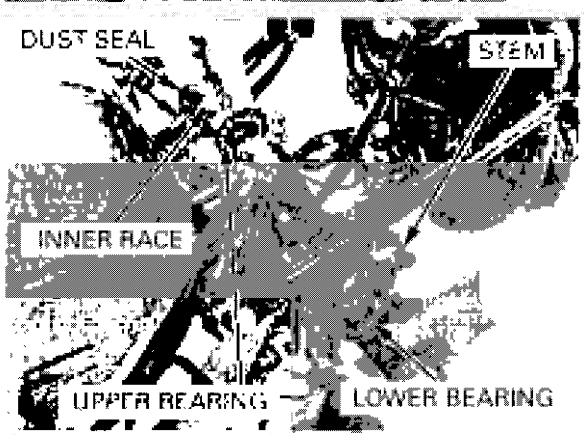
TOOL:

Steering stem socket	**07916-3710101**

While holding the steering stem, remove the top thread.

Remove the following:

- Steering stem
- Dust seal
- Upper inner race
- Upper bearing
- Lower bearing

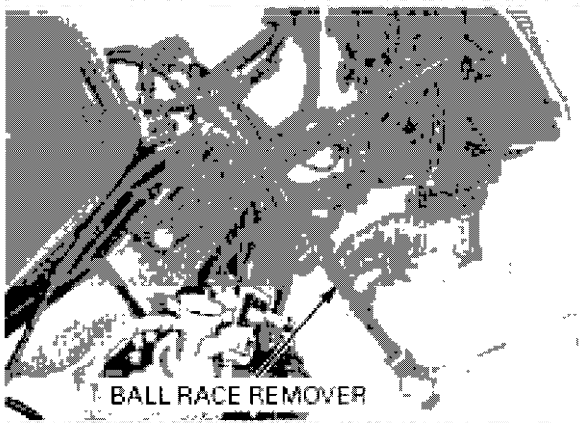


BEARING RACE REPLACEMENT

Remove the upper bearing outer race using the special tools.

TOOLS:

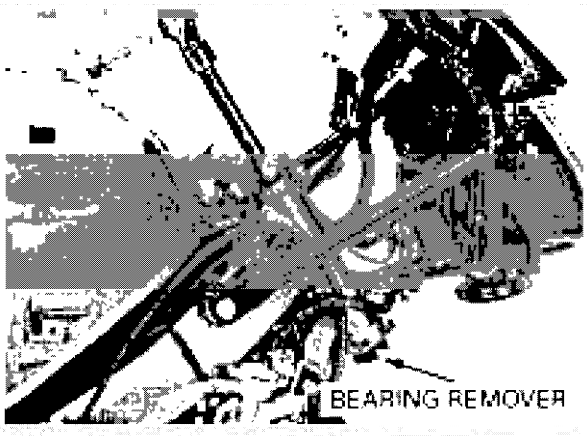
Ball race remover	**07953-MJ10000**
	or
Driver	**07949-3710001**
Attachment, 37 x 40 mm	**07746-0010200**



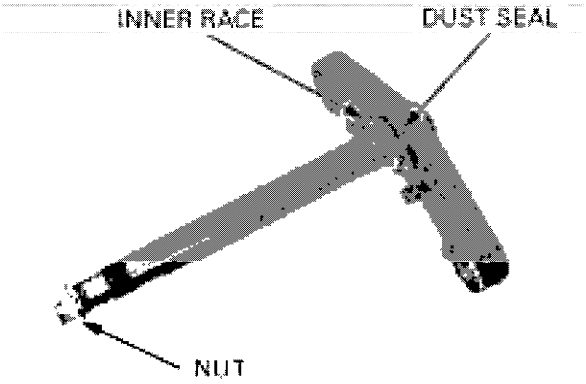
Remove the lower bearing outer race using the special tool and suitable shaft.

TOOL:

Bearing remover	**07946-3710500**



Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race.
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



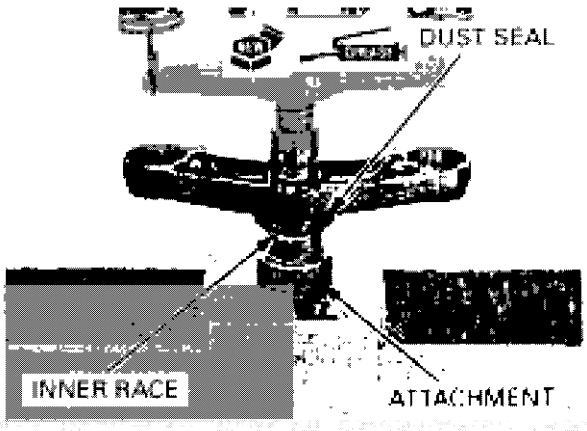
NOTE:
Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

- Excelite EP2 (Kyodo Yushi) or
- Stamina EP2 (Shell) or equivalent

Apply grease to a new dust seal lip and install it onto the steering stem.
Press a new lower bearing inner race using a special tool and hydraulic press.

TOOL:

Attachment, 30 mm I.D.	**07746-0030300**



Drive in a new upper bearing outer race into the steering head pipe using the special tools.

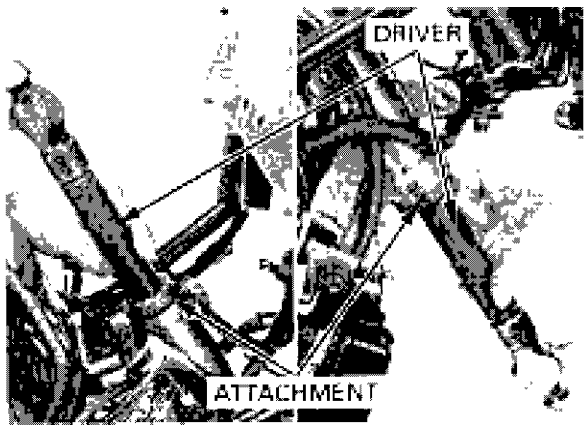
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**

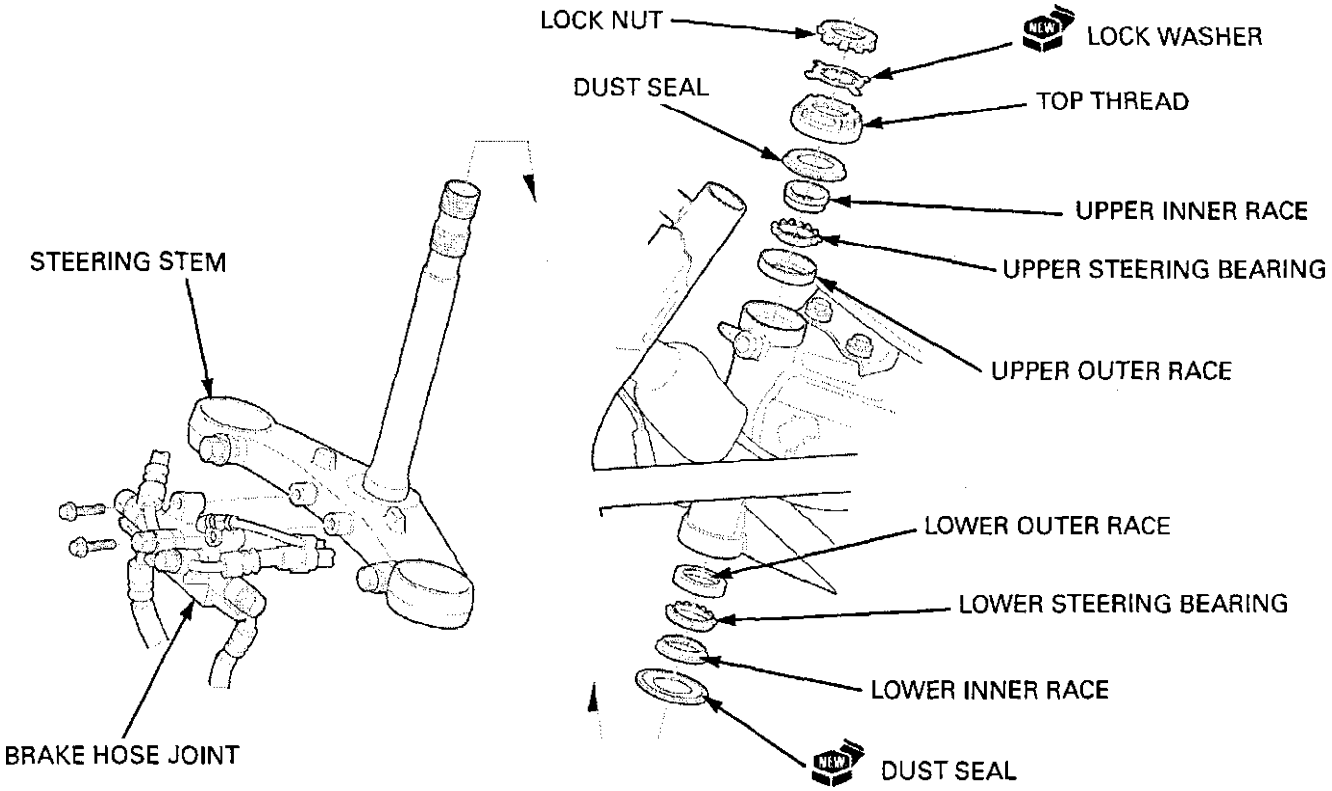
Drive in a new lower bearing outer race.

TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**



INSTALLATION



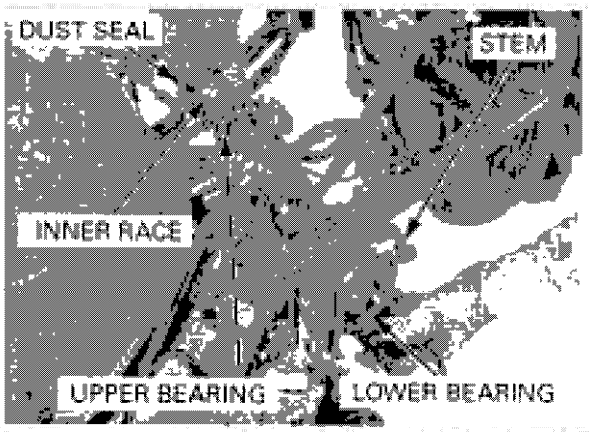
NOTE:
Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

- Excelite EP2 (Kyodo Yushi) or
- Stamina EP2 (Shell) or equivalent

Apply 3 – 5 g (0.1 – 0.2 oz) of grease (page 15-29) to each new steering bearing and fill it up. Install the lower steering bearing onto the stem.
Apply grease to a new upper dust seal lip.
Apply oil to the threads of the steering top thread.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

- Upper steering bearing
- Upper inner race
- Dust seal
- Top thread



Tighten the top thread to the specified torque.

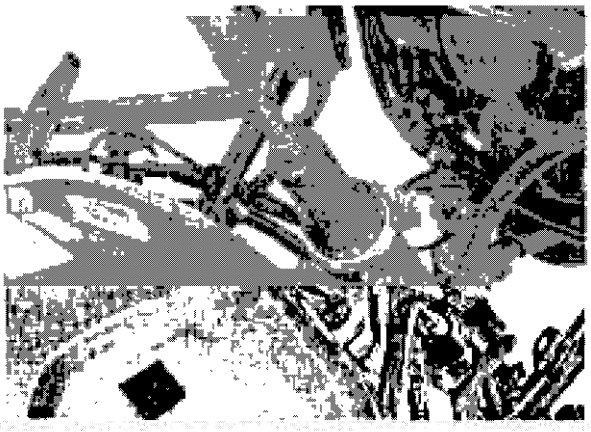
TOOL:
Steering stem socket **07916-3710101**

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Turn the steering stem left and right, lock-to-lock five times to seat the bearings.

Retighten the top thread to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

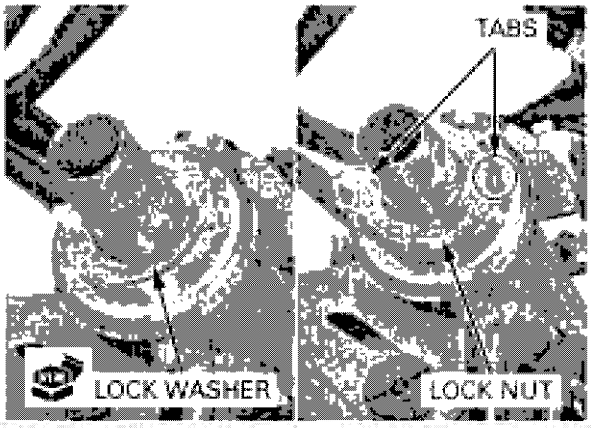


Install a new lock washer, aligning its bent tabs with the grooves in the top thread.

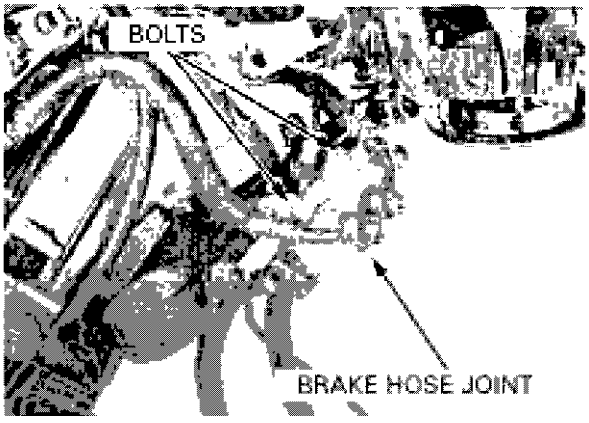
Do not over tighten the lock nut until lock washer being flat.

Install and finger tighten the lock nut, further tighten finger tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend up the lock washer tabs into the grooves of the lock nut.



Install the front brake hose joint and tighten the bolts securely.



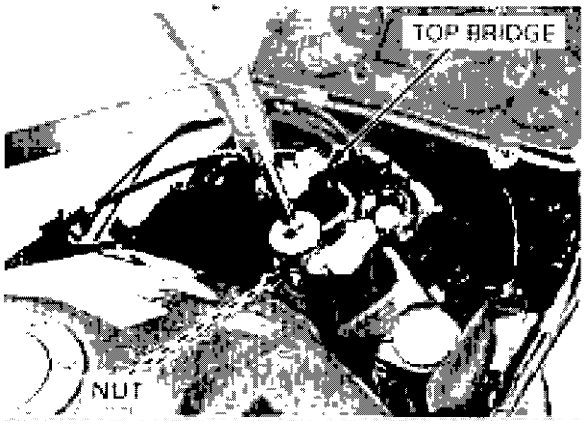
Install the top bridge and stem nut.

Install the fork legs into the bottom and top bridges (page 15-26).

Tighten the stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Turn the steering stem left and right, lock-to-lock several times to make sure the steering stem moves smoothly, without play or binding.

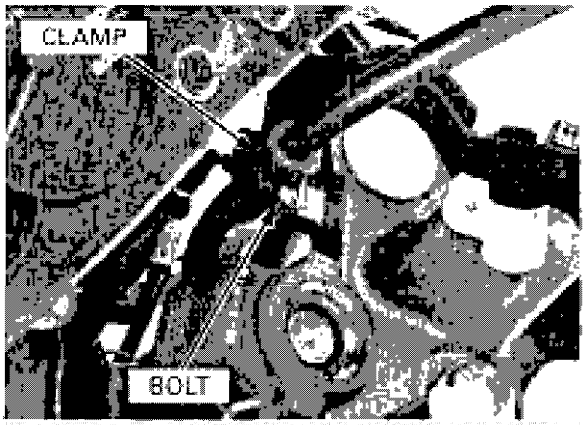


Install the front brake hose clamp and tighten the bolt securely.

Route the hose, wires and cables into the cable guides properly (page 1-35).

Install the following:

- Front wheel (page 15-16)
- Front fender (page 3-15)
- Handlebar (page 15-8)



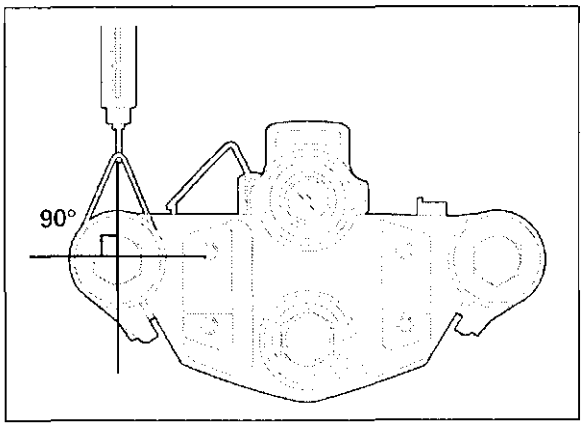
STEERING BEARING PRE-LOAD

Support the motorcycle securely and raise the front wheel off the ground.
Position the steering stem straight ahead.

Make sure there is no cable, wire harness or hose interference.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

Pull the spring scale keeping it at a right angle to the steering stem.
Read the scale at the point where the steering stem just starts to move.



STEERING BEARING PRE-LOAD:
8.3 – 13.5 N (0.8 – 1.4 kgf)

If the readings do not fall within the limits, readjust the steering top thread.

16. REAR WHEEL/SUSPENSION

SYSTEM COMPONENTS 16-2

SERVICE INFORMATION 16-3

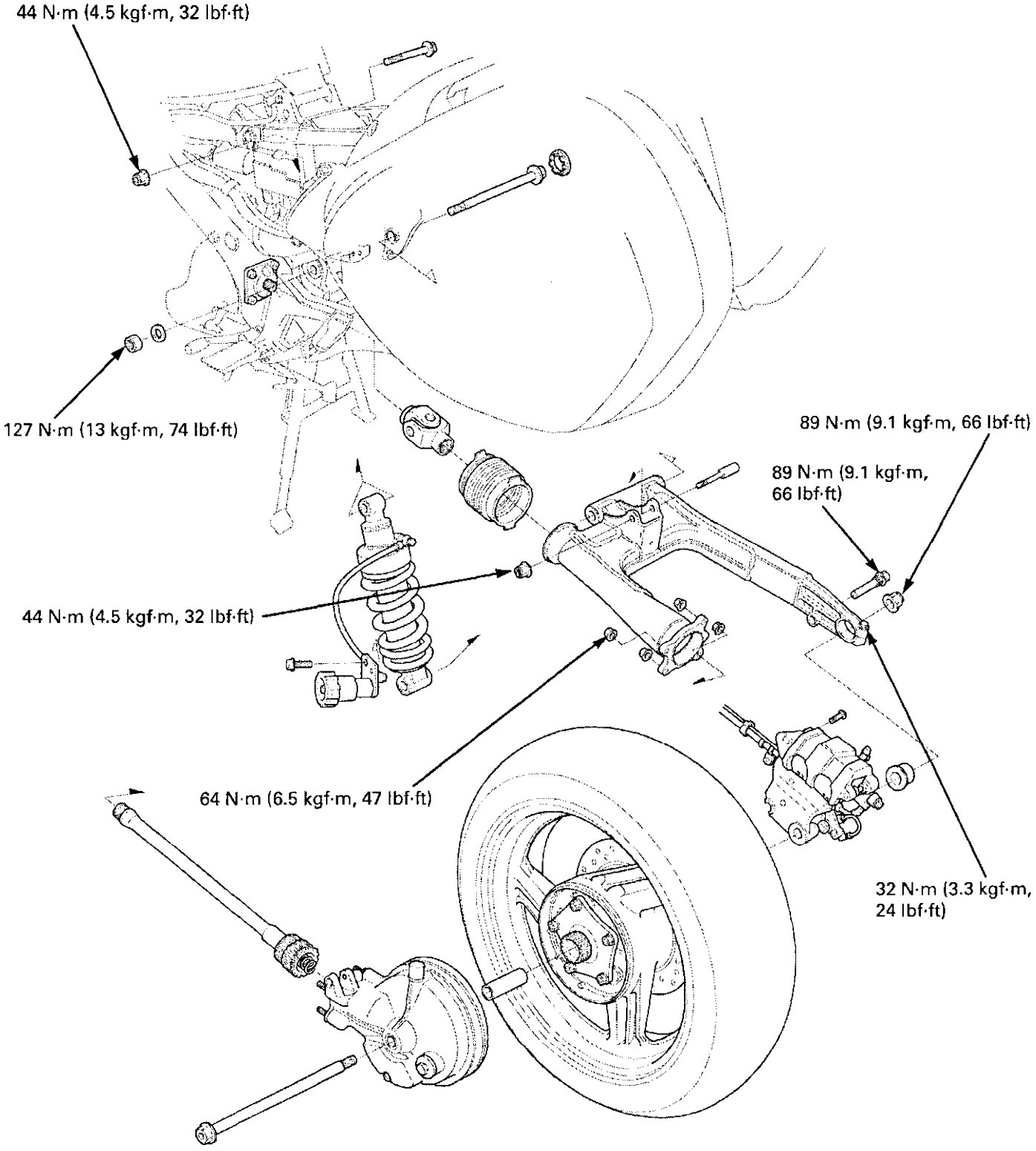
TROUBLESHOOTING 16-5

REAR WHEEL 16-6

SHOCK ABSORBER 16-14

SWINGARM 16-18

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- When servicing the rear wheel, shock absorber, or swingarm, raise the rear wheel off the ground by supporting the frame securely.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

SPECIFICATIONS

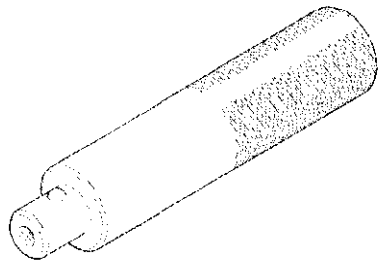
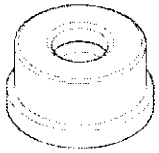
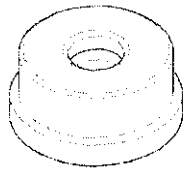
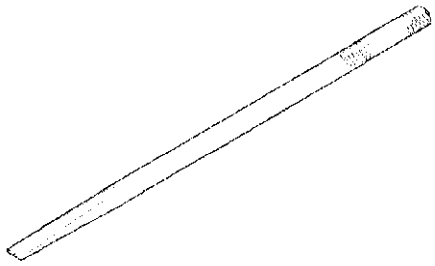
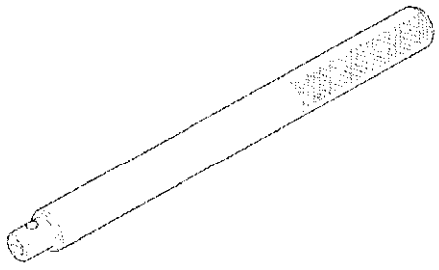
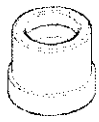
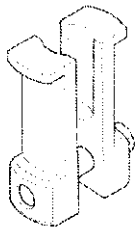
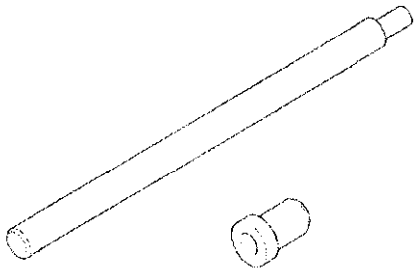
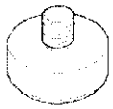
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm², 42 psi)	–
	Driver and passenger	290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.
Shock absorber spring preload adjuster setting		8 position from full out	–

TORQUE VALUES

Rear axle nut	89 N·m (9.1 kgf·m, 66 lbf·ft)	U-nut
Rear axle pinch bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	
Rear shock absorber upper mounting bolt	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Rear shock absorber lower mounting bolt	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Swingarm pivot nut	127 N·m (13 kgf·m, 74 lbf·ft)	
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Stopper plate bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	ALOC bolt: replace with a new one
Rear brake caliper stopper bolt	89 N·m (9.1 kgf·m, 66 lbf·ft)	
Pulser ring bolt	7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)	
Step holder bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Final gear assembly mounting nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	UBS nut

TOOLS

Driver 07749-0010000 	Attachment, 37 x 40 mm 07746-0010200 	Attachment, 42 x 47 mm 07746-0010300 
Pilot, 20 mm 07746-0040500 	Bearing remover shaft 07GGD-0010100 	Bearing remover head, 20 mm 07746-0050600
Driver handle 07949-3710001 	Pilot, 17mm 07746-0040400 	Attachment, 22 x 24 mm 07746-0010800 
Needle bearing remover attachment 07HMC-MR70100 	Needle bearing remover 07946-KA50000 	Pilot, 28 mm 07746-0041100 

TROUBLESHOOTING

Soft suspension
- Incorrect suspension adjustment
- Weak shock absorber spring
- Oil leakage from damper unit
- Low tire pressure

Stiff suspension
- Incorrect suspension adjustment
- Bent damper rod
- Damaged shock absorber rubber mounts
- Damaged swingarm pivot bearings
- High tire pressure

Rear suspension noise
- Loose suspension fasteners
- Binding shock absorber case
- Worn shock absorber rubber mounts
- Faulty rear shock absorber

Rear wheel wobbles
- Bent rim
- Unbalanced rear tire and wheel
- Insufficient tire pressure
- Faulty swingarm pivot bearings
- Axle fastener not tightened properly
- Faulty tire

Wheel hard to turn
- Faulty wheel bearings
- Bent axle
- Brake drag

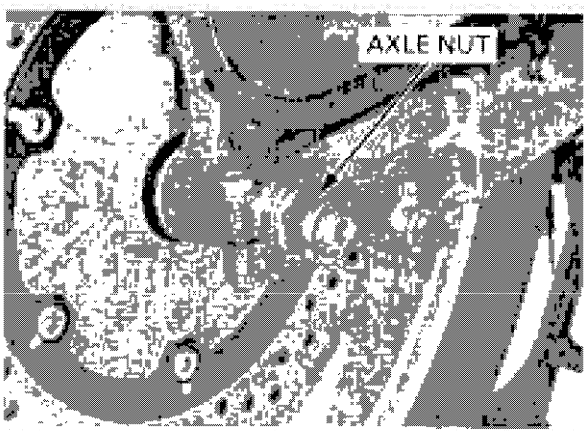
REAR WHEEL

REMOVAL

Remove the muffler (page 3-17).
Remove the rear fender A (page 3-6).

Remove the axle nut.

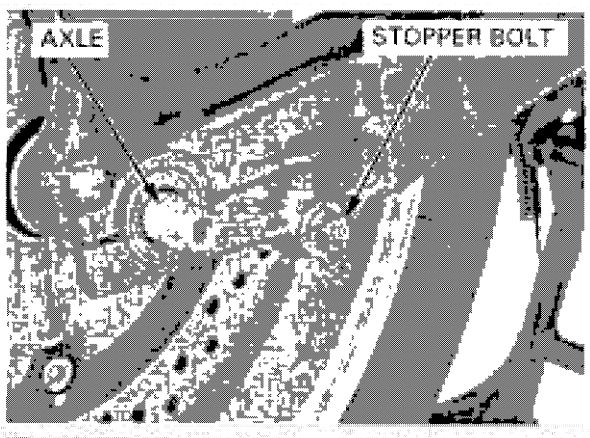
Support the motorcycle securely and raise the rear wheel off the ground.



Do not hang the caliper from the brake hose. Do not twist the brake hose.

Remove the rear caliper stopper bolt.

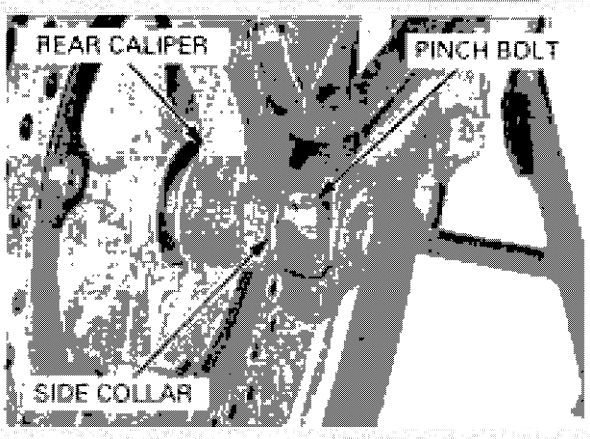
Remove the axle.



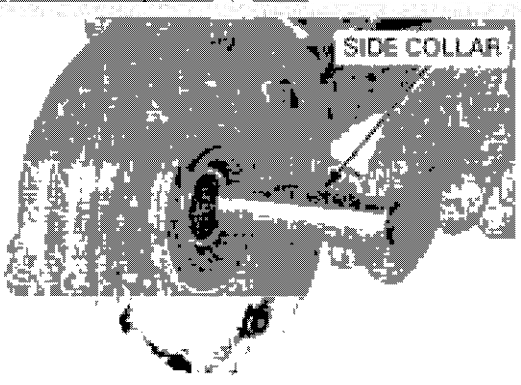
Remove the rear caliper from the rear brake disc.

Loosen the pinch bolt and remove the axle and right side collar.

Move the rear wheel to the right to separate it from the final drive gear case and carefully remove the rear wheel out of the frame.



Remove the left side collar from the ring gear.

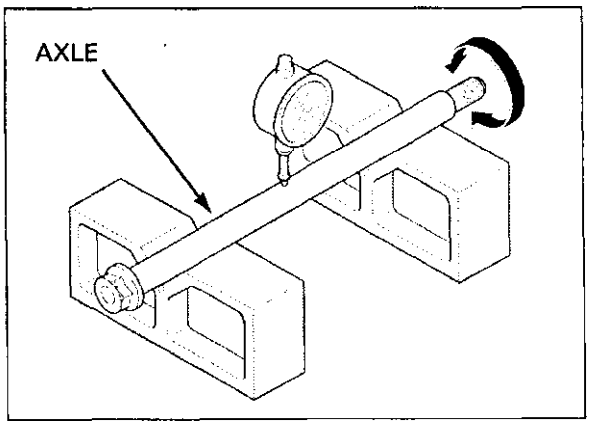


INSPECTION

AXLE

Set the rear axle in V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

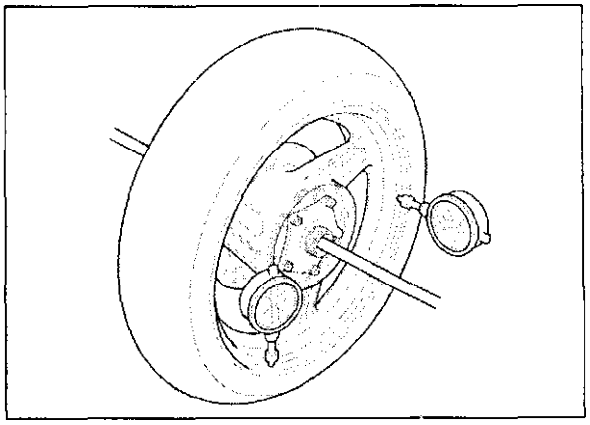
SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL RIM

Check the rim runout by placing the wheel in a trueing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

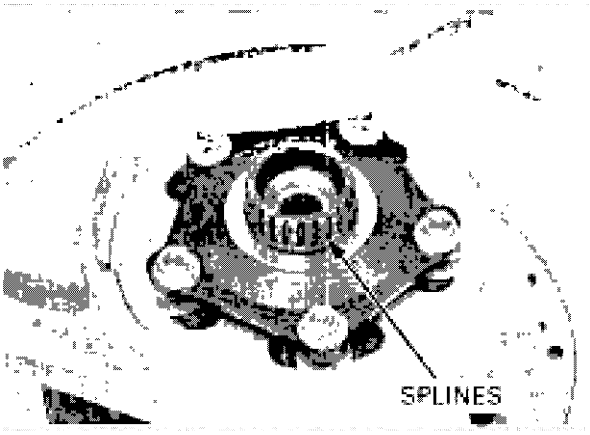


FINAL DRIVEN FLANGE

Check the driven flange splines for wear or damage. If damaged, check the splines of the ring gear also.

WHEEL BALANCE

Refer to page 15-13 for wheel balance. Do not add balance weight more than 60 g (2.1 oz) to the rear wheel.

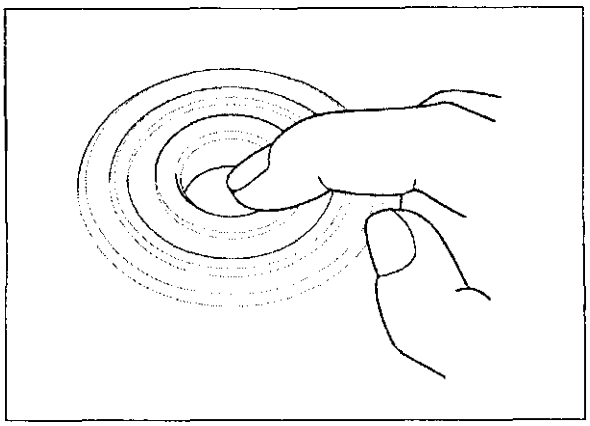


WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

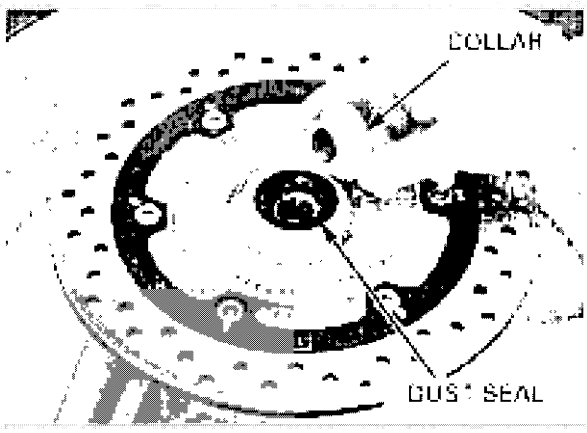
Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

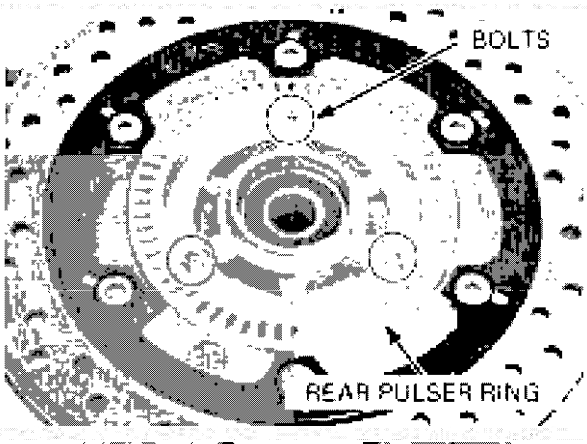


DISASSEMBLY

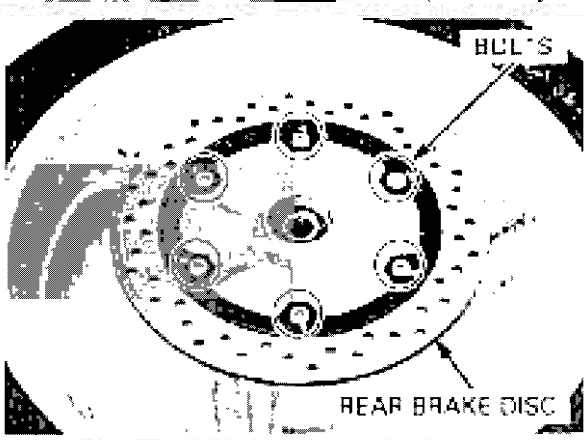
Remove the side collar and dust seal.



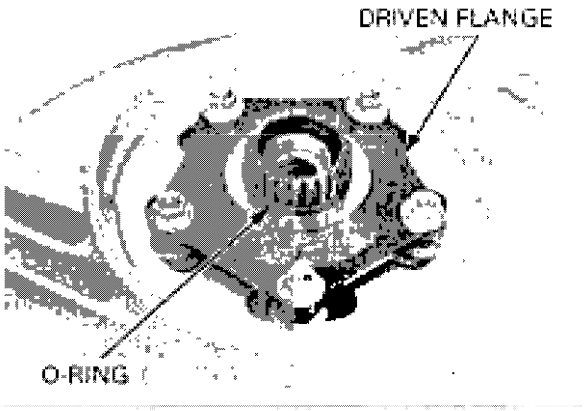
NT700VA only: Remove the bolts and rear pulser ring from the right wheel hub.



Remove the bolts and rear brake disc.

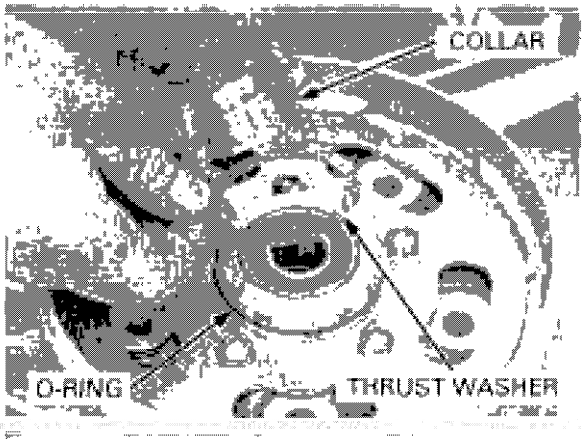


Remove the O-ring from the final driven flange.
Remove the final driven flange from the left wheel hub.



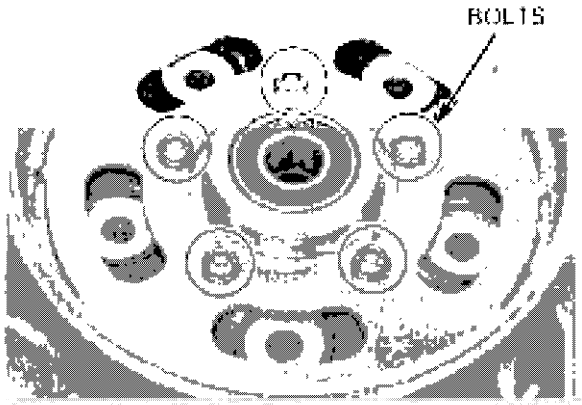
Remove the collar and thrust washer.

Remove the O-ring.

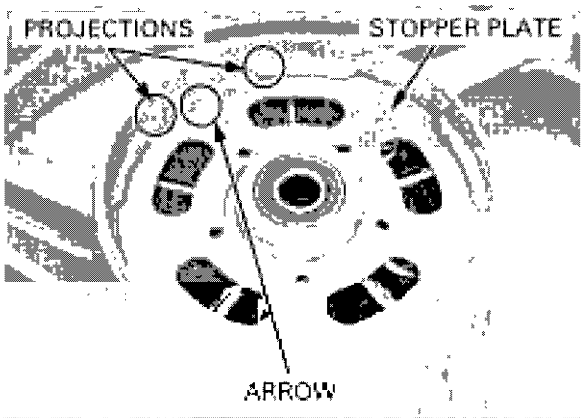


Do not reuse the bolts.

Remove the bolts.



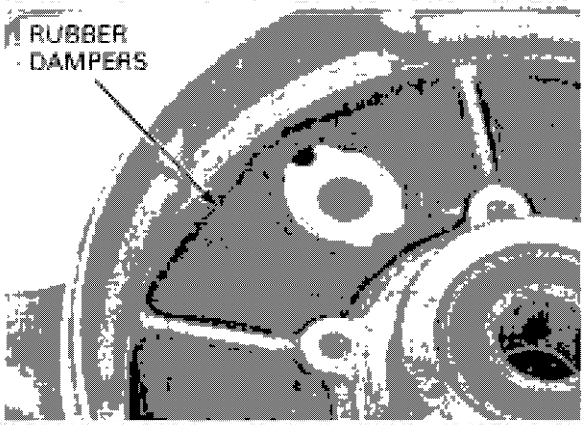
Align the arrow on the stopper plate between the projections on the wheel hub by turning the stopper plate and remove the plate.



Remove the rubber dampers.

Replace the rubber dampers as a set.

Check the rubber dampers for deterioration or damage.

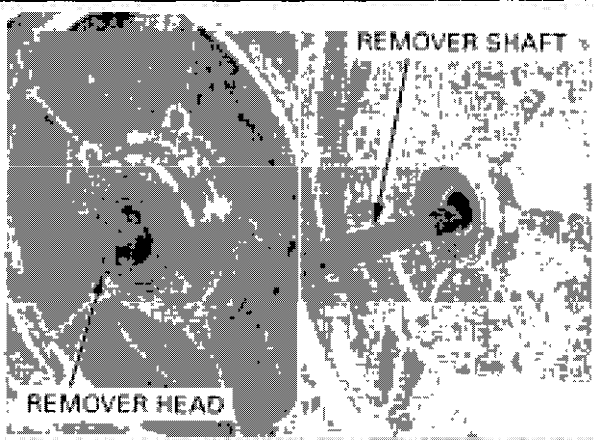


Replace the wheel bearings in pairs. Do not reuse old bearing.

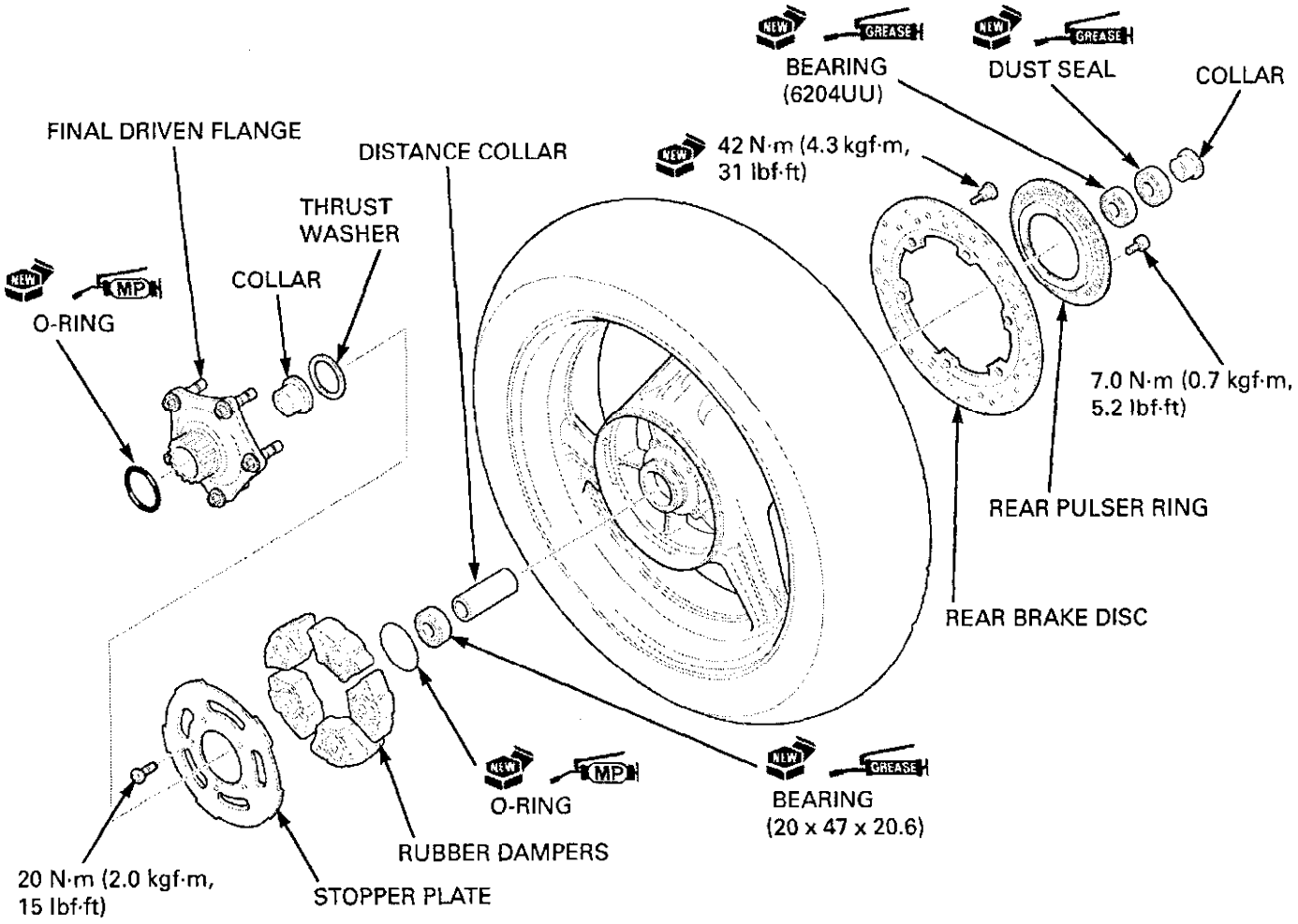
Install the remover head into the bearing.
From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	**07GGD-0010100**
Bearing remover head, 20 mm	**07746-0050600**



ASSEMBLY

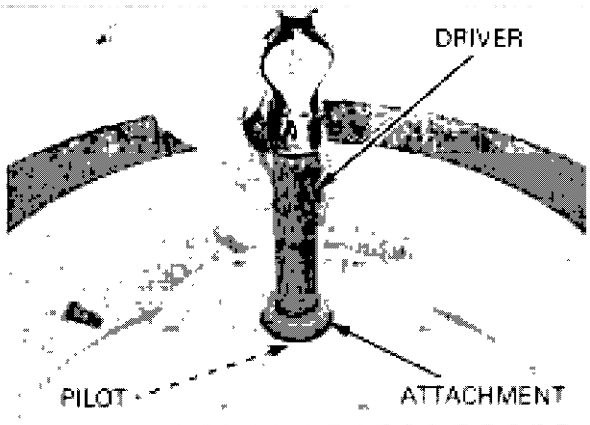


Drive in a new right bearing squarely with the marked side facing up until it is fully seated.

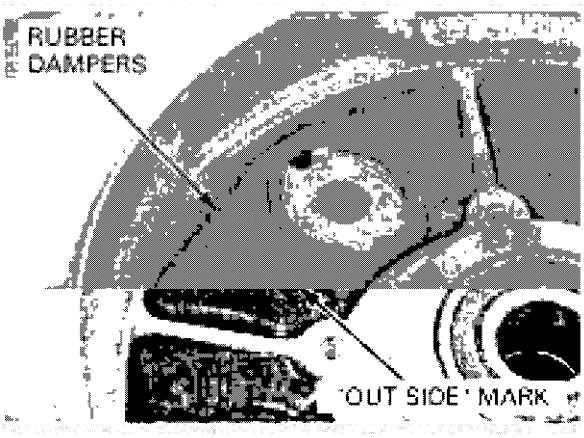
Install the distance collar.
Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**

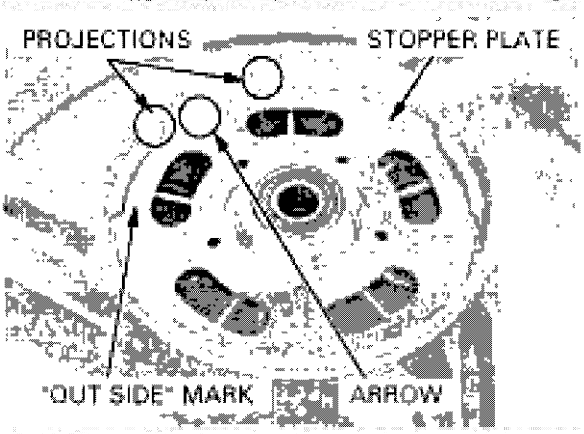


Install the rubber dampers with its "OUT SIDE" mark facing out.



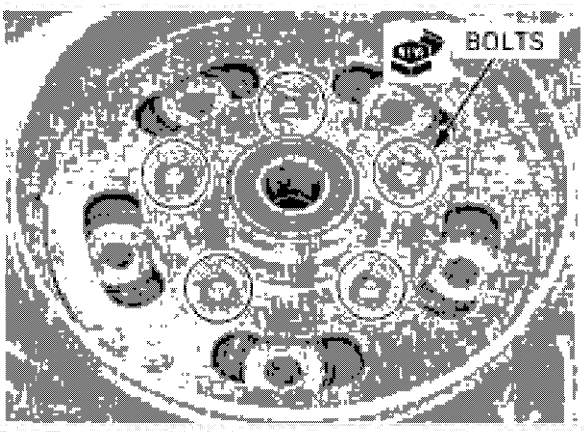
Install the stopper plate with the "OUT SIDE" mark facing up.

Install the stopper plate, aligning the arrow between the projections on the wheel hub.
Align the bolt holes by turning the stopper ring.

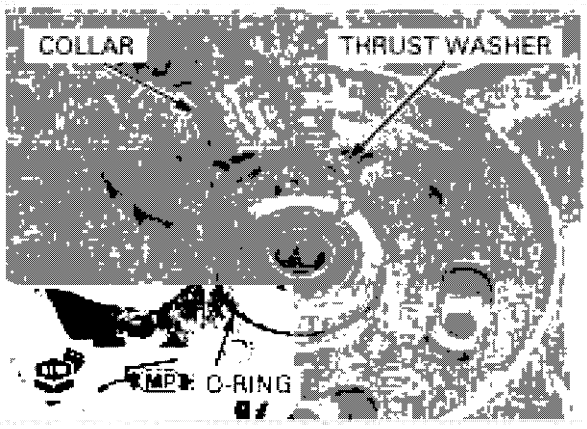


Install and tighten new bolts to the specified torque.

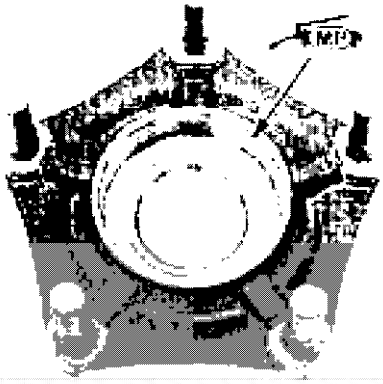
TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)



Pack molybdenum disulfide paste into the O-ring groove in the wheel hub.
Coat a new O-ring with molybdenum disulfide paste and install it into the left wheel hub groove.
Apply 2 – 3 g (0.07 – 0.11 oz) of molybdenum disulfide paste to the mating surface of the thrust washer and wheel hub end (driven flange side).
Install the thrust washer and collar.

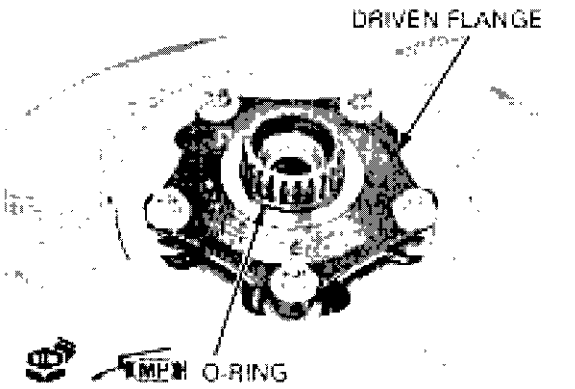


Apply 0.5 – 1.0 g (0.02 – 0.04 oz) of molybdenum disulfide paste to the mating surface of the final driven flange and thrust washer.



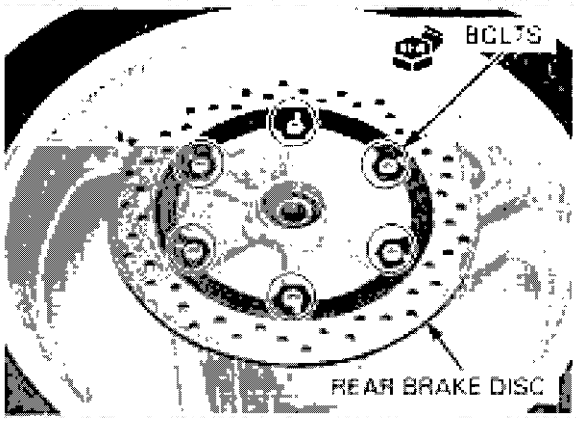
Coat a new O-ring with molybdenum disulfide paste and install it into the driven flange groove.

Install the driven flange into the left wheel hub.



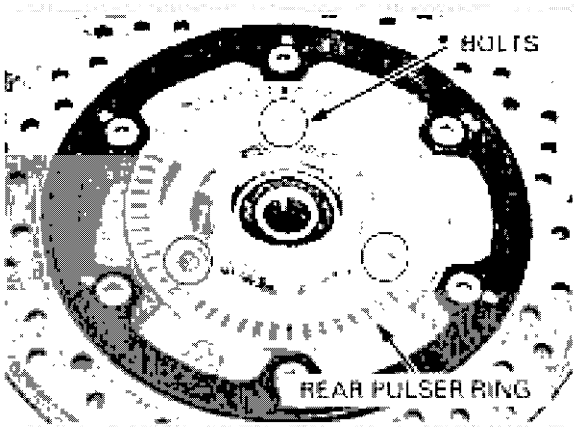
Install the brake disc to the right wheel hub.
Install and tighten new bolts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



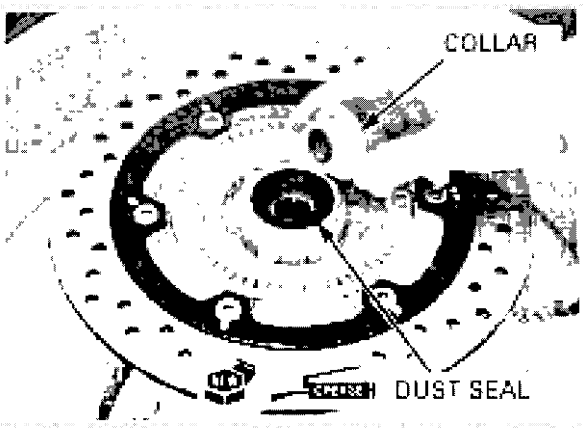
NT700VA only: Install the rear pulser ring to the right wheel hub.
Install and tighten the bolts to the specified torque.

TORQUE: 7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)



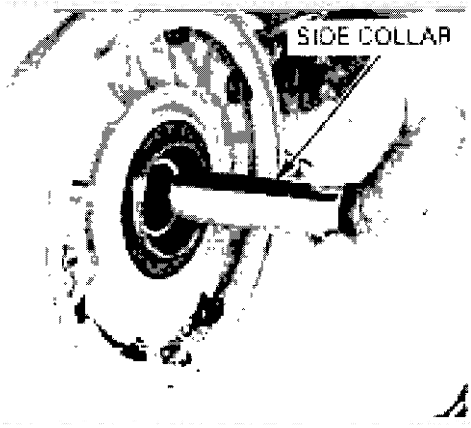
Apply grease to new dust seal lips and install the dust seal until it is flash with the wheel hub.

Install the side collar.



INSTALLATION

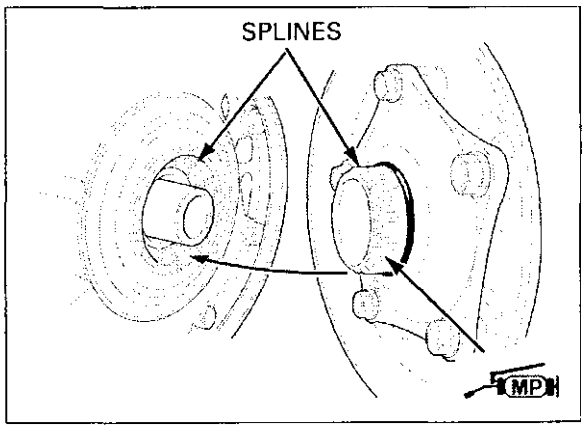
Install the left side collar into the ring gear.



Apply 4 – 5 g (0.14 – 0.18 oz) of molybdenum disulfide paste to the joint surface of the final gear case, O-ring guide and driven flange.

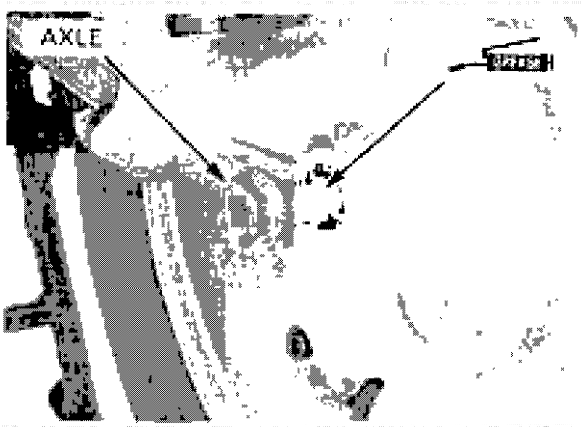
Hold the wheel securely and be careful not to damage the gear case.

Place the rear wheel into the swingarm and engage the driven flange spline with the ring gear spline.



Install the right side collar to the swingarm with its flange side facing the rear wheel.

Install the rear brake caliper to the rear brake disc.
Apply grease to the rear axle sliding surface.
Install the rear axle.



Install the rear caliper stopper bolt and axle nut.

Tighten the axle nut to the specified torque while holding the axle.

TORQUE: 89 N·m (9.1 kgf·m, 66 lbf·ft)

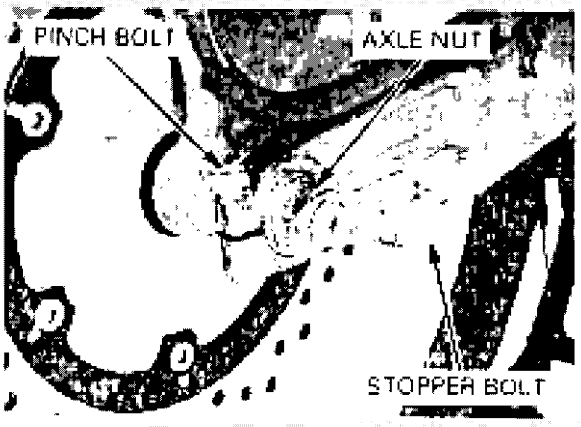
With the rear brake applied, pump the swingarm up and down several times to seat the axle.

Tighten the pinch bolt to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

Tighten the rear caliper stopper bolt to the specified torque.

TORQUE: 89 N·m (9.1 kgf·m, 66 lbf·ft)



Install the rear fender A (page 3-6).
Install the muffler (page 3-19).

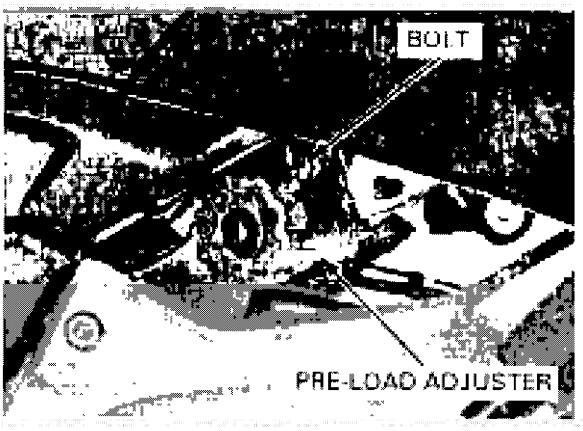
SHOCK ABSORBER

REMOVAL

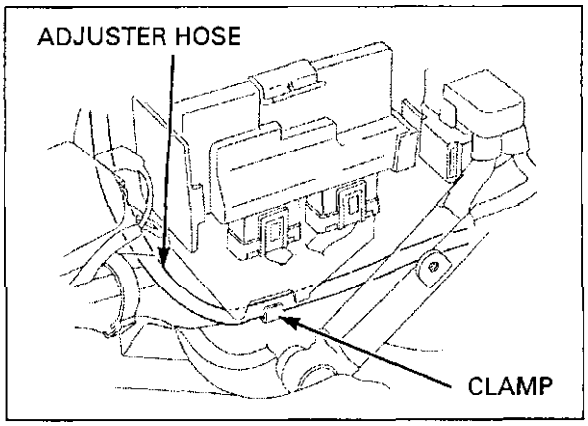
Support the frame and swingarm securely using a hoist or equivalent.

Remove the bolts and pre-load adjuster from the frame.

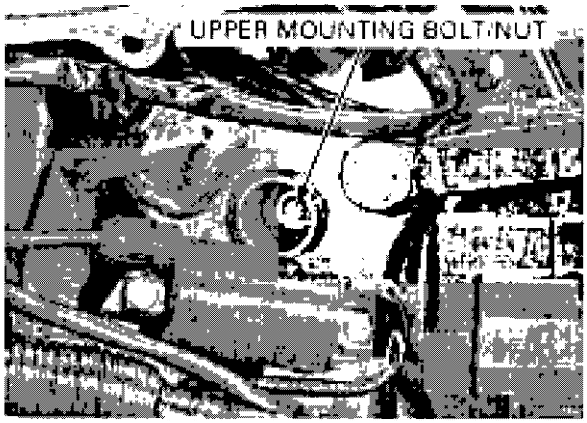
Remove the side cover/pivot cover (page 3-5).



Remove the pre-load adjuster hose from the clamp.

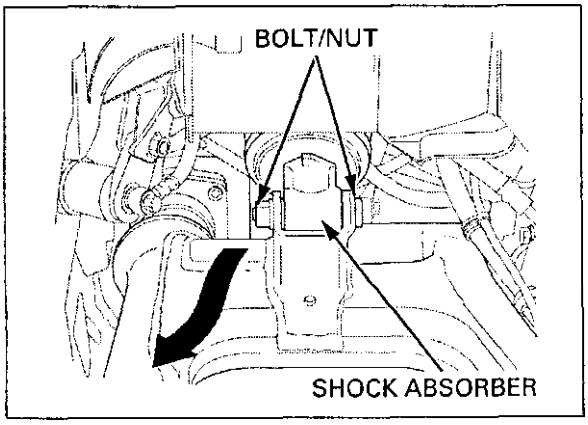


Remove the upper mounting bolt and nut.



Remove the lower mounting bolt and nut.

Remove the shock absorber to left side of the frame.



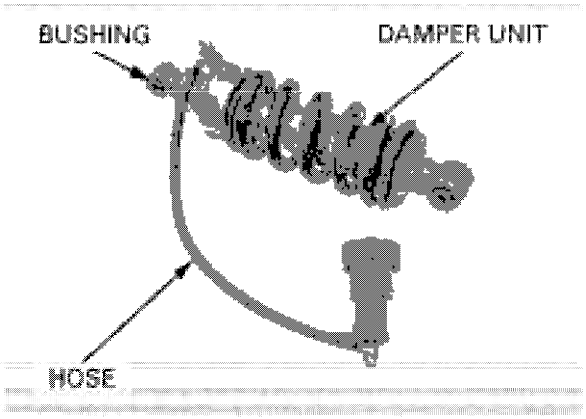
INSPECTION

Visually inspect the damper unit for damage.

Check for the:

- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Upper mount bushing for wear or damage
- Damper hose for deformation or oil leaks

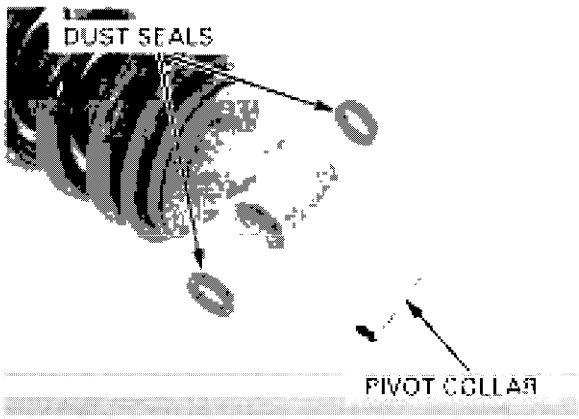
Inspect all the other parts for wear or damage.



Remove the lower joint pivot collar and dust seals.

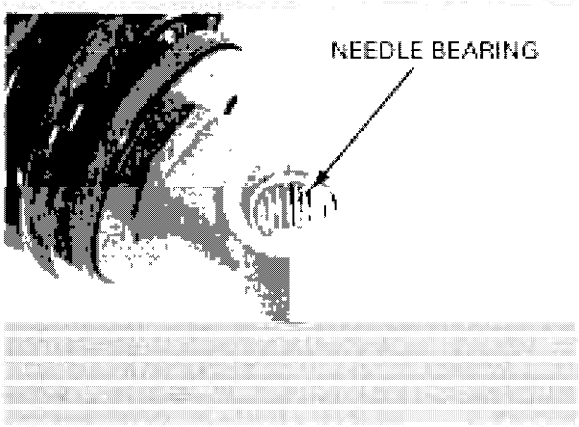
Check the dust seals for wear or damage.

Replace them if necessary.



Check the needle bearing for wear or damage.

Replace it if necessary.



SHOCK ABSORBER DISPOSAL PROCEDURE

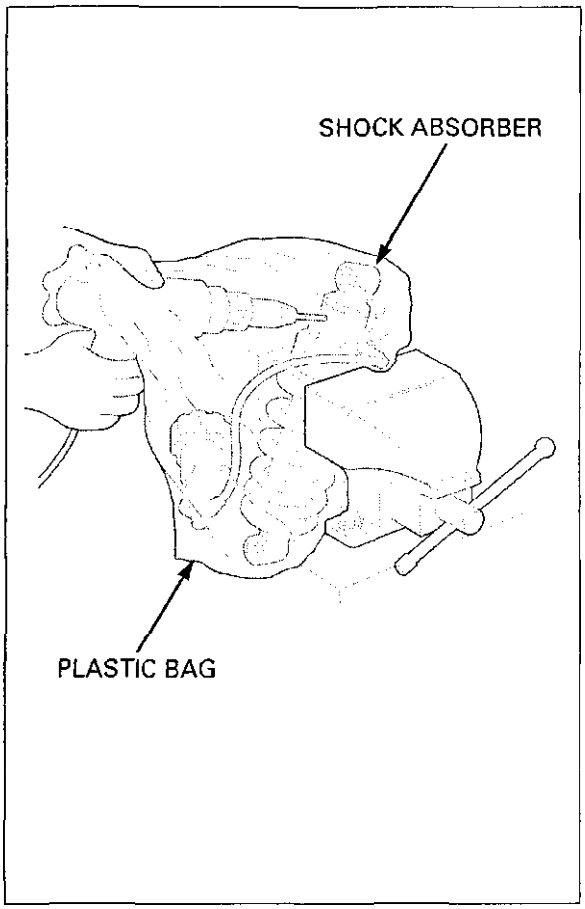
Center punch the damper to mark the drilling point.

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 30.8 mm (1.21 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.



LOWER JOINT NEEDLE BEARING REPLACEMENT

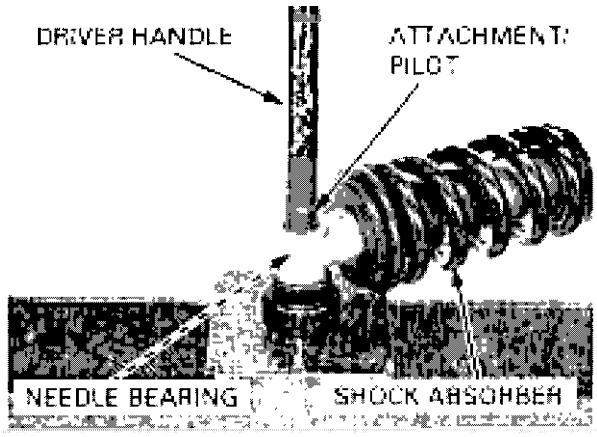
Remove the pivot collar and dust seals (page 16-15).

Set the shock absorber in a hydraulic press.

Press the needle bearing out from the lower joint.

TOOLS:

Driver handle	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**

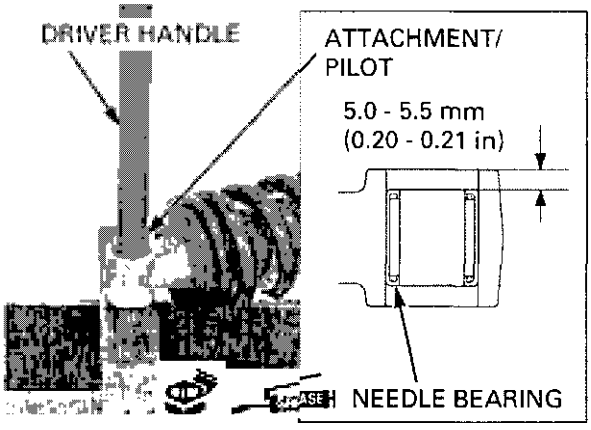


Pack a new needle bearing with molybdenum disulfide paste.

Press the needle bearing into the lower joint until the depth from the lower joint surface is 5.0 - 5.5 mm (0.20 - 0.21 in), using the special tool.

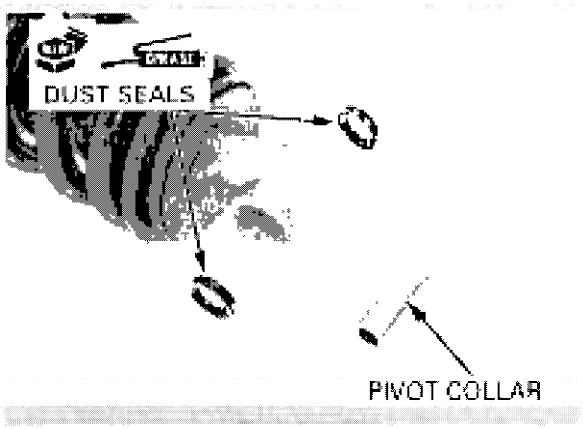
TOOLS:

Driver handle	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	***07746-0040400***



Apply grease to new dust seal lips.

Install the dust seals and pivot collar.



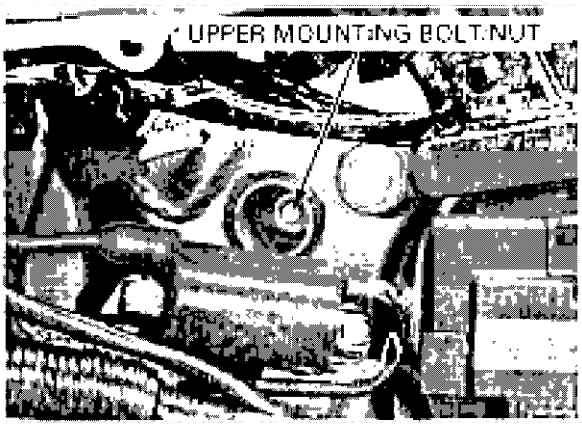
INSTALLATION

Install the shock absorber into the frame with the rebound damping adjuster facing to the left.

Install the upper mounting bolt and nut.

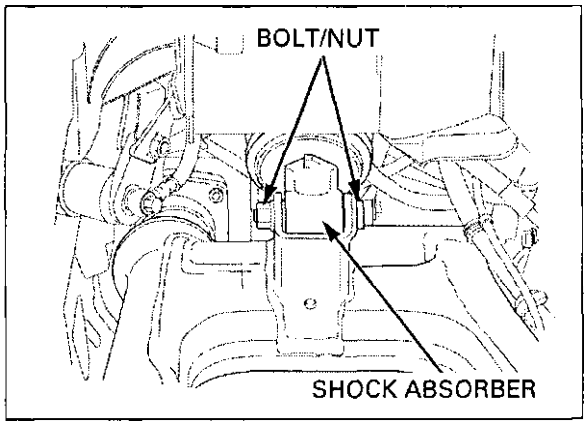
Tighten the upper mounting nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

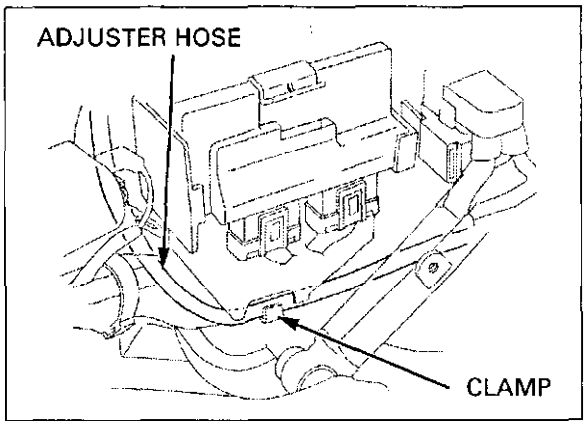


Install the lower mounting bolt and nut.
Tighten the lower mounting nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

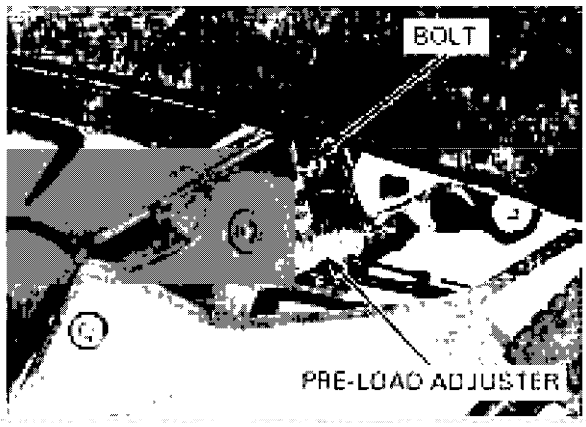


Set the pre-load adjuster hose to the clamp.



Install the pre-load adjuster to the frame and tighten the bolts securely.

Install the side cover/pivot cover (page 3-5).



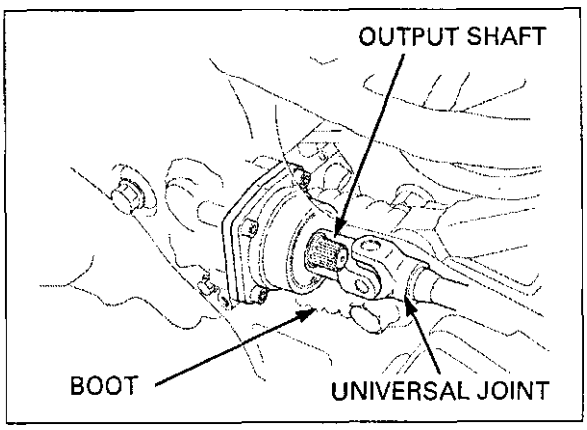
SWINGARM

REMOVAL

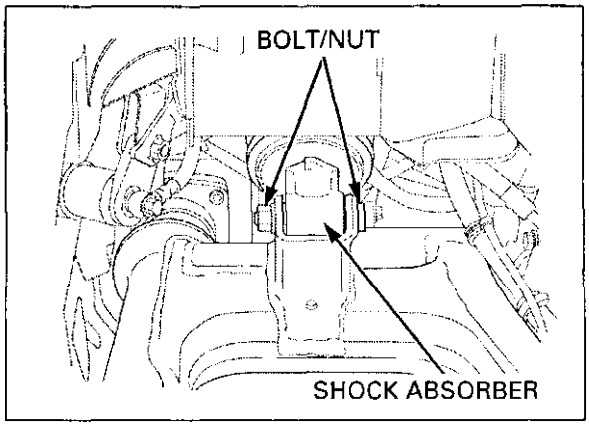
Remove the following:

- Rear wheel (page 16-6)
- Final drive gear case (page 14-7)

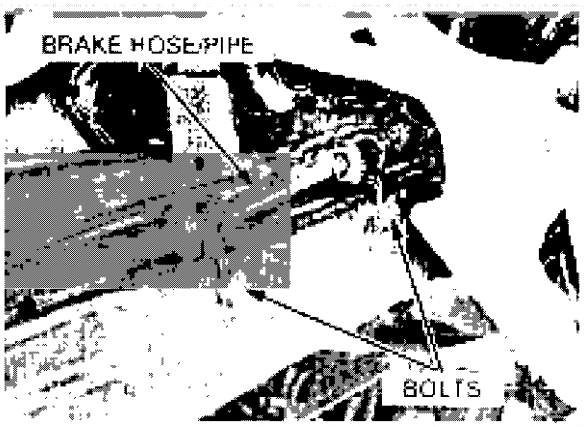
Remove the boot and universal joint.



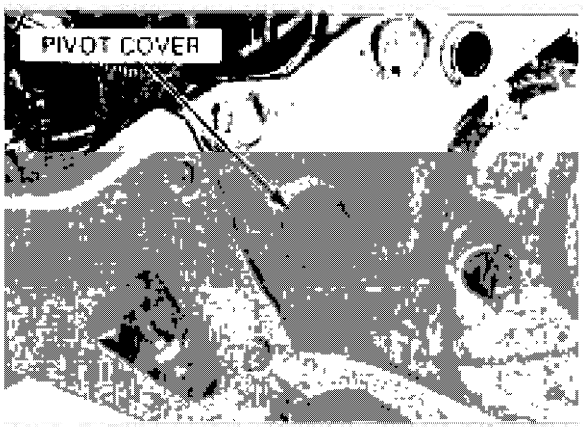
Remove the shock absorber lower mounting nut and bolt.



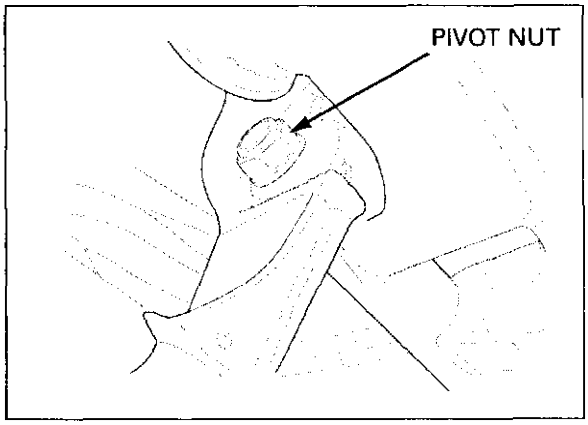
Remove the bolts and brake hose/pipe from the swingarm.



Remove the swingarm pivot cover.

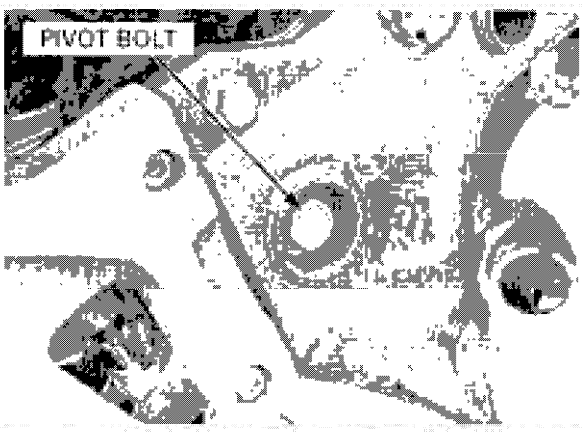


Remove the pivot nut.



Remove the pivot bolt.

Remove the swingarm from the frame.

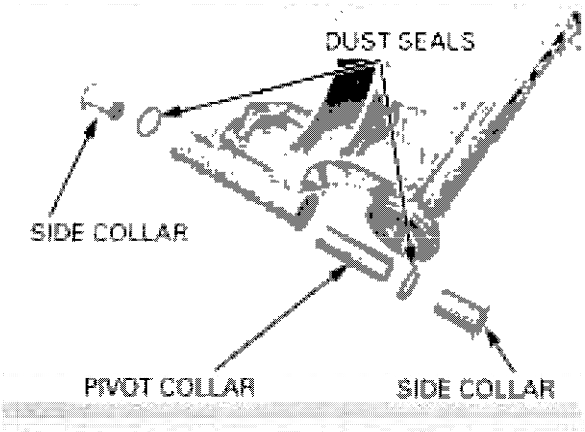


DISASSEMBLY/INSPECTION

Remove the dust seals and side collars from the swingarm pivots.

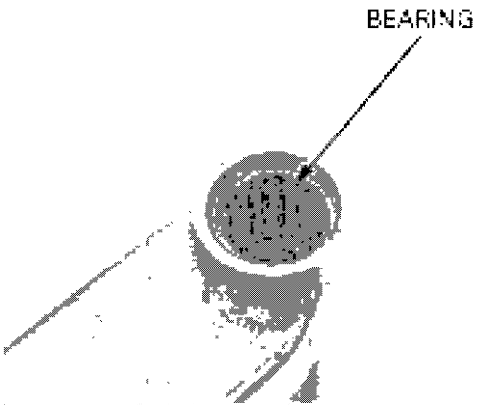
Remove the pivot collar from the swingarm left pivot.

Check the dust seals side collar and pivot collar for damage or fatigue.



Turn the inner race of the 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.

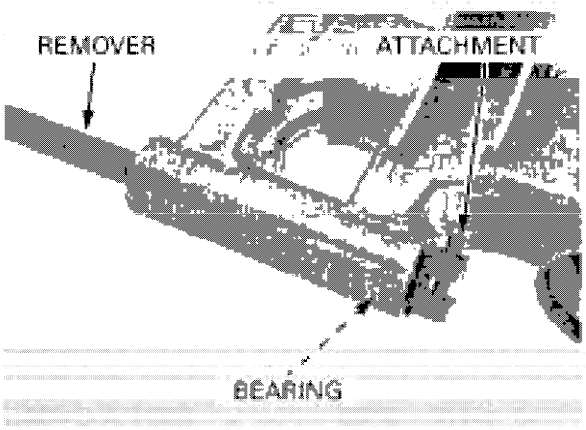


PIVOT BEARING REPLACEMENT

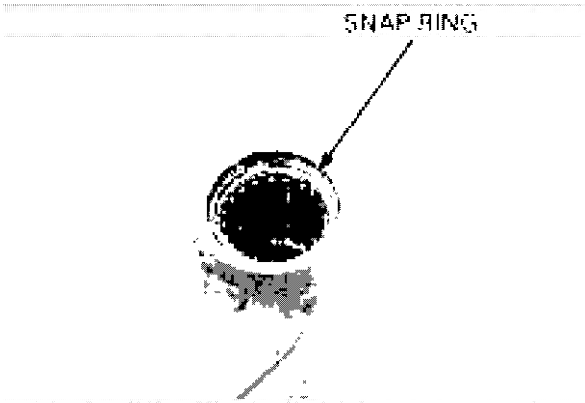
Remove the left pivot needle bearing from the left swingarm pivot using the special tool.

TOOLS:

Needle bearing remover attachment	**07HMC-MR70100**
Needle bearing remover	**07946-KA50000**



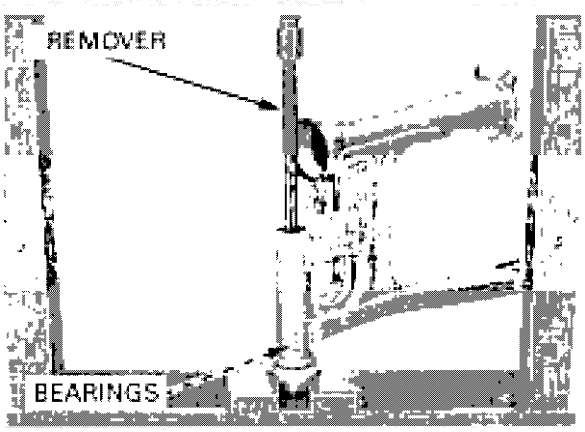
Remove the snap ring.



Remove the right pivot needle bearing and radial ball bearing from the right swingarm pivot.

TOOL:

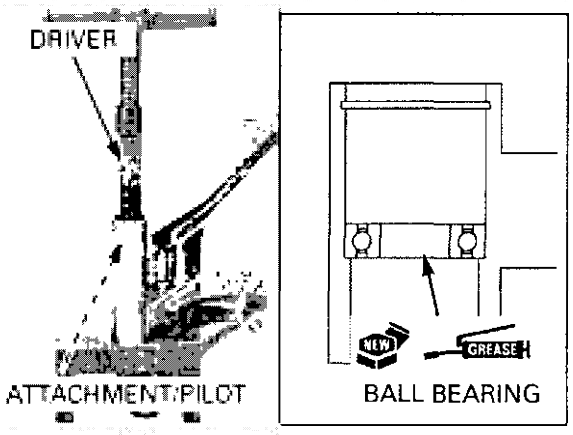
Needle bearing remover	**07946-KA50000**



Pack new radial ball bearing with grease.
Press the radial ball bearing in right swingarm pivot until it seat, using the special tools and a hydraulic press.

TOOLS:

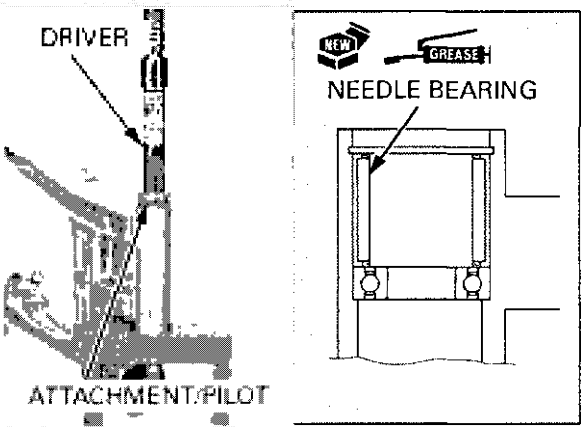
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 20 mm	**07746-0040500**



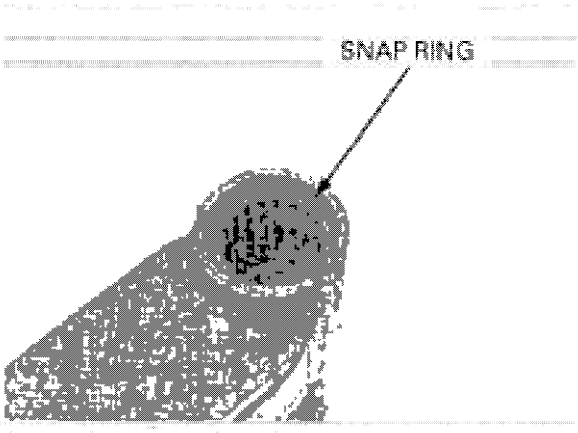
Pack new needle bearing with grease.
Press the needle bearing in right swingarm pivot with the marking side facing up until it seat, using the special tools and a hydraulic press.

TOOLS:

Driver	**07749-0010000**
Attachment, 37 x 40 mm	**07746-0010200**
Pilot, 28 mm	**07746-0041100**



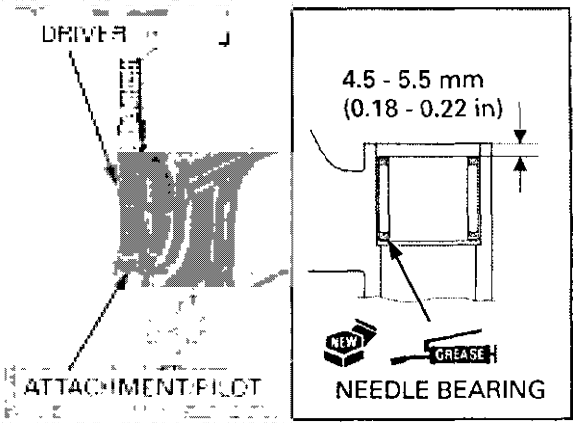
Install the snap ring into the groove securely.



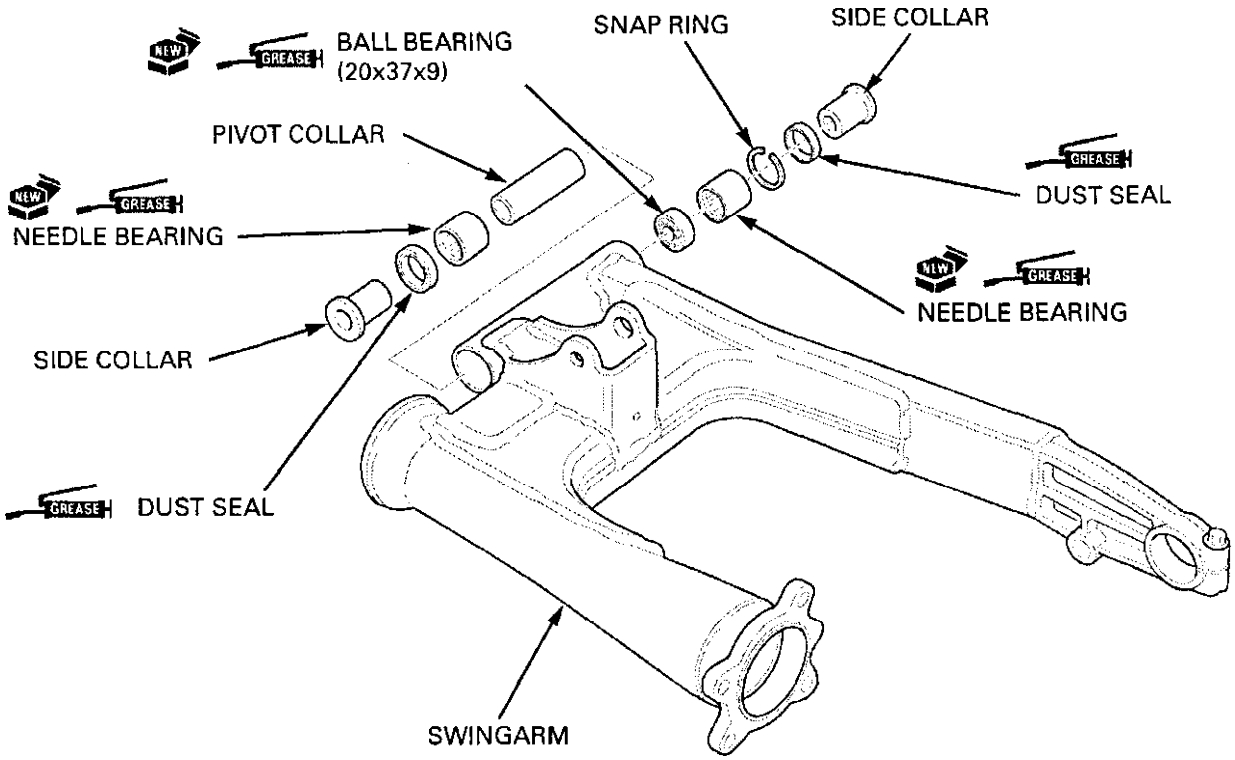
Pack new needle bearing with grease.
Press the needle bearing in left swingarm pivot with the marking side facing up until the depth from the swingarm outer surface is 4.5 - 5.5 mm (0.18 - 0.22 in), using the special tools and a hydraulic press.

TOOLS:

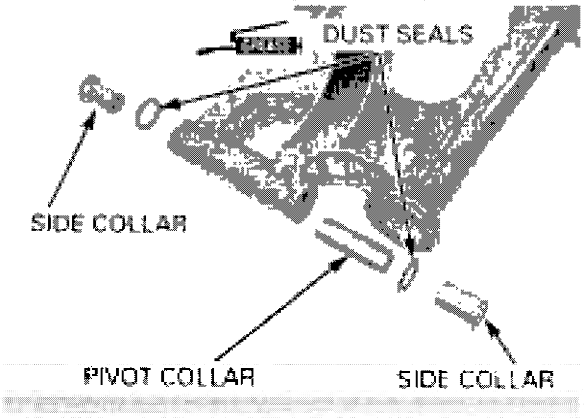
Driver	**07749-0010000**
Attachment, 37 x 40 mm	**07746-0010200**
Pilot, 28 mm	**07746-0041100**



ASSEMBLY



Install the pivot collar to the left swingarm pivot.
Apply grease to the dust seal lips, then install the dust seals into the swingarm pivots.
Install the side collars to the swingarm pivots.

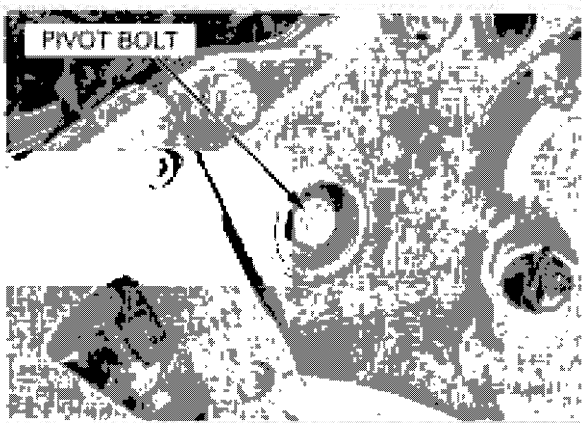


INSTALLATION

Set the swingarm into the frame and hold it.

Install the joint boot over the output gear case.

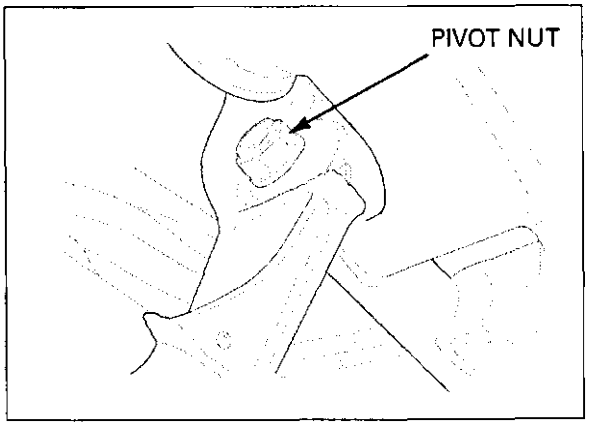
Install the pivot bolt.



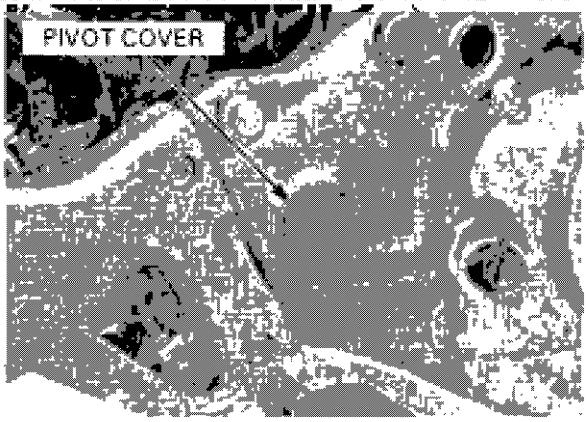
Install the pivot nut.

Tighten the pivot nut to the specified torque.

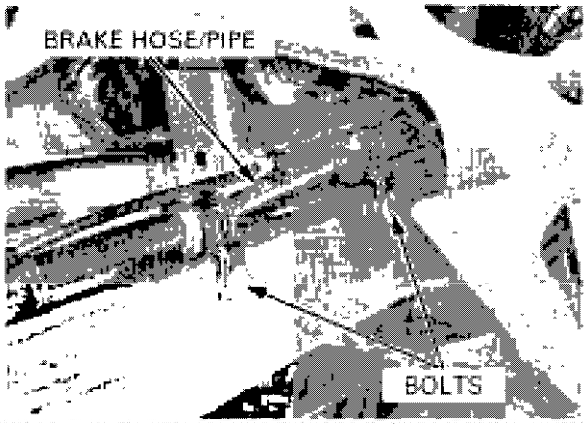
TORQUE: 127 N·m (13.0 kgf·m, 74 lbf·ft)



Install the swingarm pivot cover.

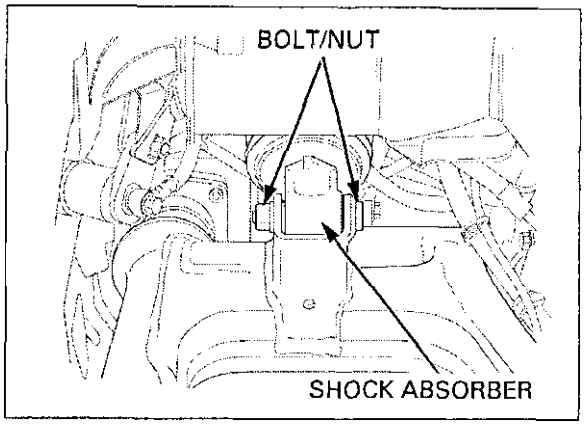


Install the brake hose/pipe to the swingarm and tighten the bolts securely.



Install and tighten the shock absorber lower mounting bolt to the specified torque.

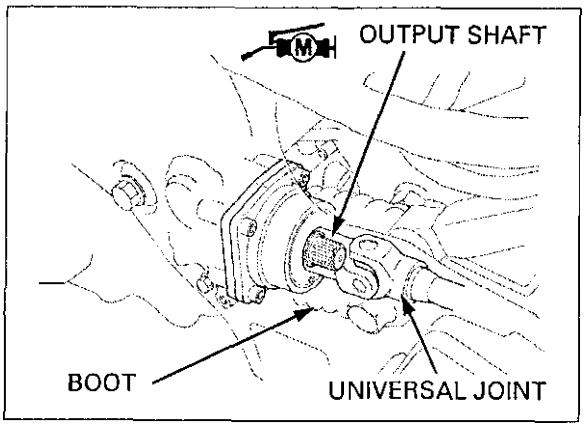
TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)



Apply 1 g (0.04 oz) of molybdenum disulfide grease to the output shaft splines.

Install the joint boot and universal joint.
Install the final drive gear case with aligning the drive shaft and universal joint spline (page 14-21).
Set the joint boot securely.

Install the rear wheel (page 16-13)



17. HYDRAULIC BRAKE

SYSTEM COMPONENTS 17-2

SERVICE INFORMATION 17-4

TROUBLESHOOTING 17-6

BRAKE FLUID REPLACEMENT/
AIR BLEEDING 17-7

BRAKE PAD/DISC 17-14

FRONT MASTER CYLINDER 17-16

FRONT BRAKE CALIPER 17-22

REAR MASTER CYLINDER 17-28

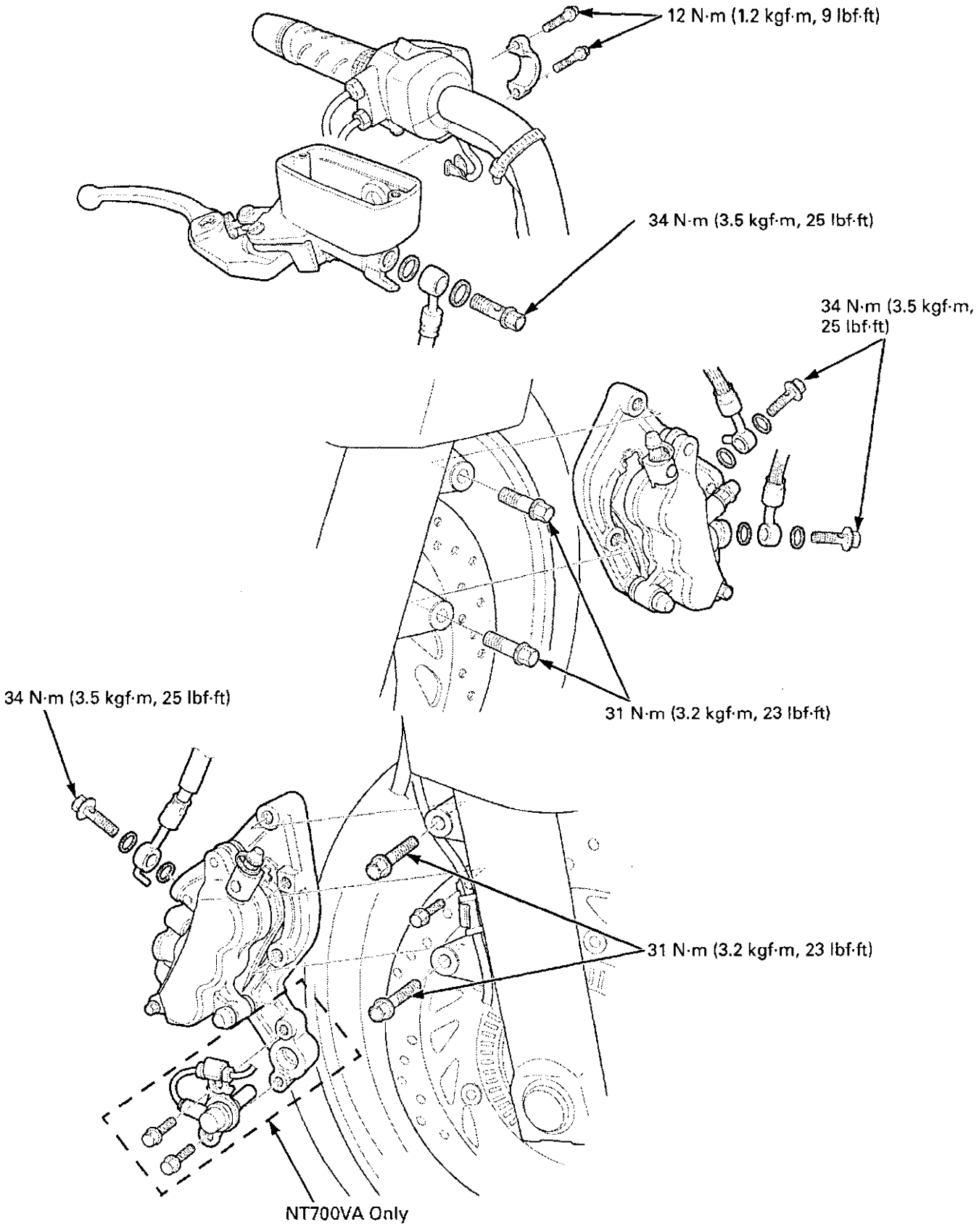
REAR BRAKE CALIPER 17-35

PROPORTIONAL CONTROL VALVE 17-38

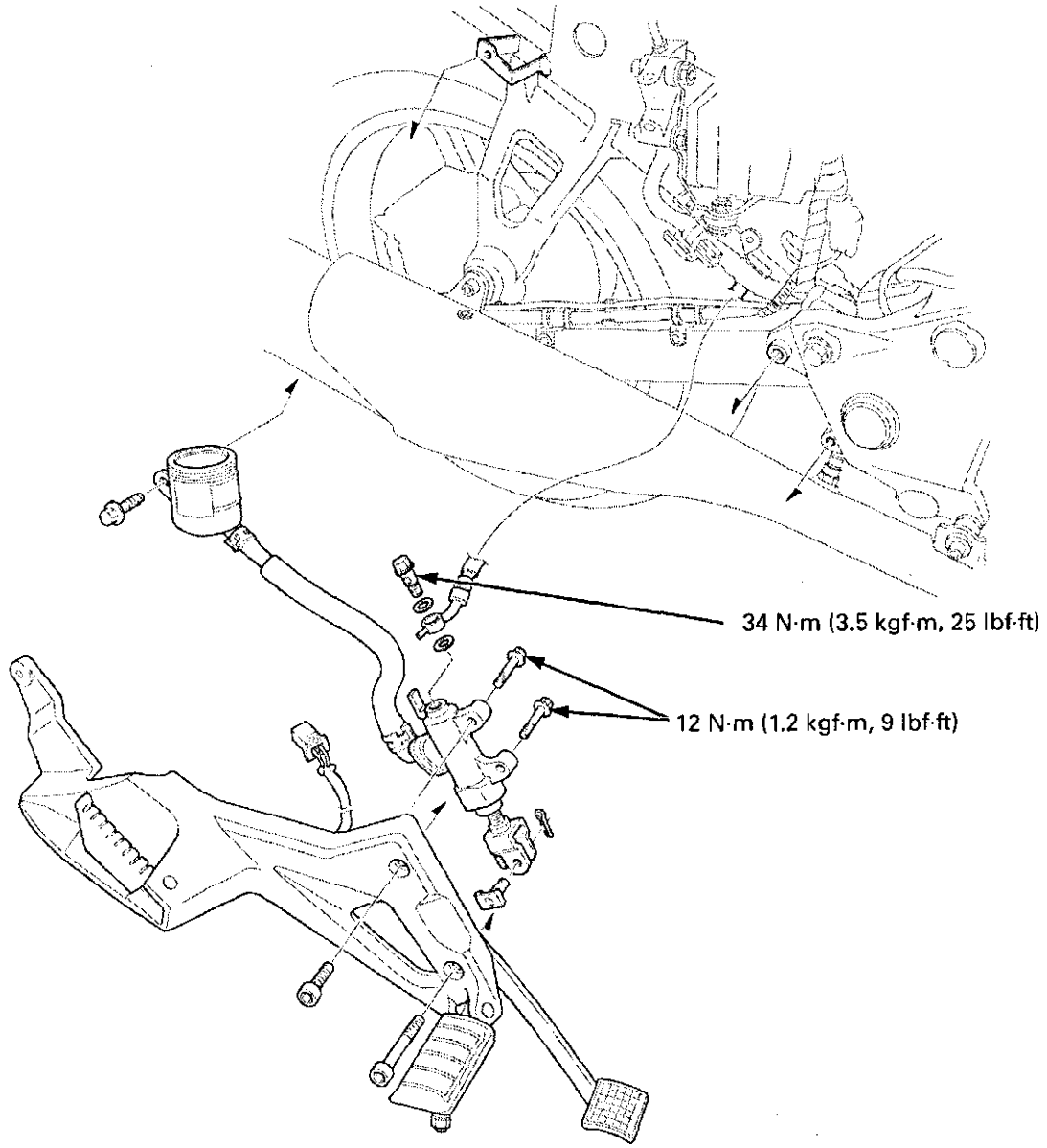
BRAKE PEDAL 17-39

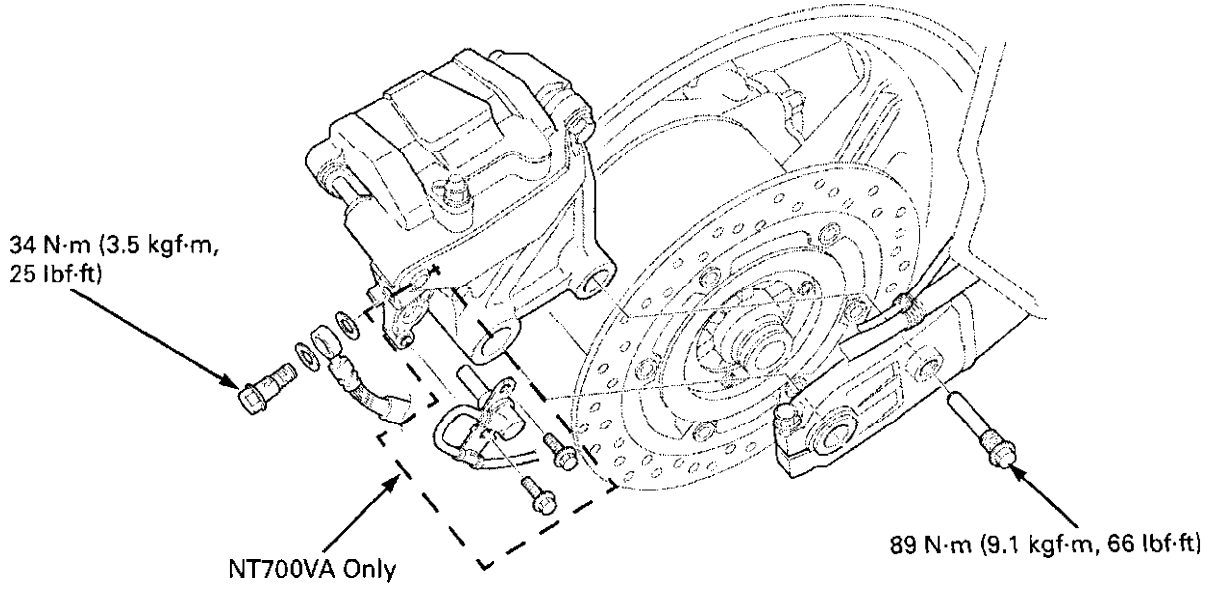
SYSTEM COMPONENTS

FRONT:



REAR:


34 N·m (3.5 kgf·m, 25 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)


34 N·m (3.5 kgf·m, 25 lbf·ft)
NT700VA Only
89 N·m (9.1 kgf·m, 66 lbf·ft)

SERVICE INFORMATION

GENERAL

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

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 section covers service of the conventional brake components of the brake system. For Anti-lock Brake System (ABS) service, See page 18-3.
- The brake fluid replacement procedure for the ABS model (NT700VA) should be performed in the same manner as in the ordinal procedure. Note that replacement and bleeding air from the brake fluid in the modulator is not necessary, as it sealed in the modulator.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Never allow contaminants (e.g., dirt, water) to enter an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

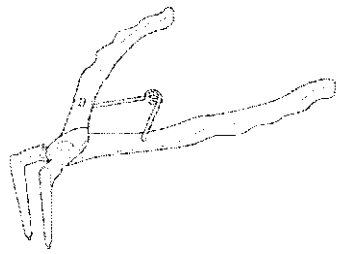
ITEM			STANDARD	SERVICE LIMIT
Specified brake fluid			DOT 4	–
Front	Brake disc thickness		4.3 – 4.7 (0.17 – 0.19)	3.5 (0.14)
	Brake disc warpage		–	0.30 (0.012)
	Master cylinder I.D.		12.700 – 12.743 (0.4724 – 0.5016)	12.755 (0.5022)
	Master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Right caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Center	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Left caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Center	25.400 – 25.450 (1.0000 – 1.0020)	25.462 (1.0024)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
	Right caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
	Left caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Center	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
		Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
Rear	Brake disc thickness		5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc wrapage		–	0.30 (0.012)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.		32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2633)
	Caliper piston O.D.		31.948 – 31.998 (1.2578 – 1.2594)	31.940 (1.2575)

TORQUE VALUES

Brake caliper bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Front master cylinder reservoir cap screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Brake pad pin	17.2 N·m (1.8 kgf·m, 13 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake pipe nut	17 N·m (1.7 kgf·m, 13 lbf·ft)	
Front brake hose clamper bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Front brake light switch screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper bracket pin	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent
Rear master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt: replace with a new one
Rear brake reservoir joint screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	Apply locking agent
Rear master cylinder lower joint lock nut	17.2 N·m (1.8 kgf·m, 1.3 lbf·ft)	
Front brake caliper pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent
Front brake caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt: replace with a new one
Rear brake caliper bracket pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent
Rear brake caliper pin	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Rear brake caliper stopper bolt	89 N·m (9.1 kgf·m, 66 lbf·ft)	
Proportional control valve mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Step holder bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	

TOOL

Snap ring pliers
07914-SA50001



TROUBLESHOOTING

Brake lever soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- 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 piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master piston
- Bent brake lever/pedal

Brake drag
- 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")
- Faulty proportional control valve

BRAKE FLUID REPLACEMENT/AIR BLEEDING

NOTICE

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

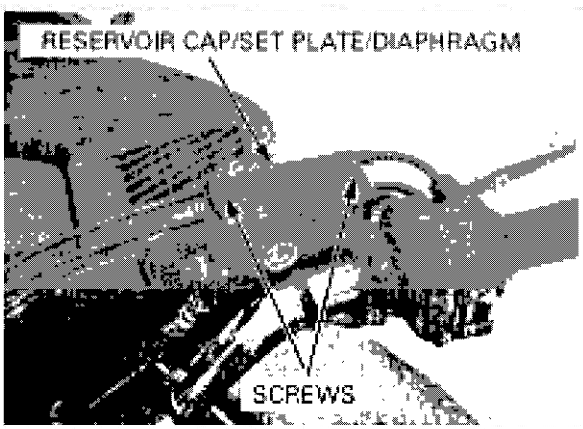
NOTE:

- Do not allow foreign material to enter the system when filling the reservoir.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

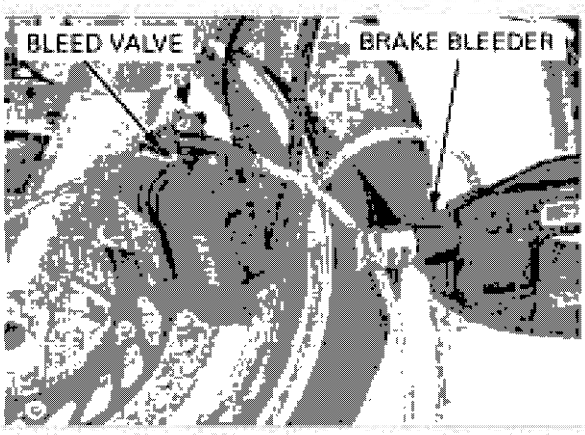
BRAKE FLUID DRAINING

Lever brake line:

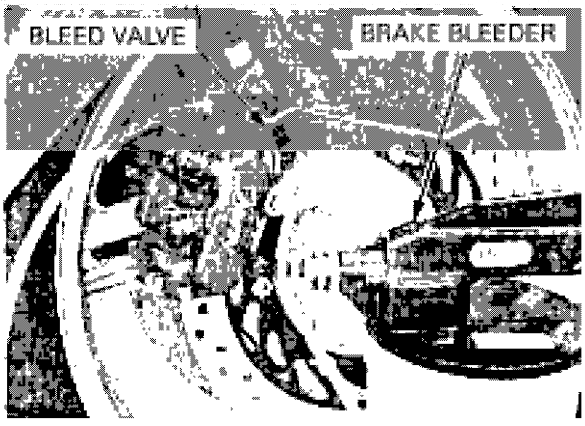
Turn the handlebar to the left until the front master cylinder reservoir is level before removing the reservoir cap.
Remove the screws and reservoir cap.
Remove the set plate and diaphragm.



Connect a commercially available brake bleeder to the left front brake caliper outer bleed valve.
Loosen the outer bleed valve and operate a air bleed tool.
Drain the brake fluid.



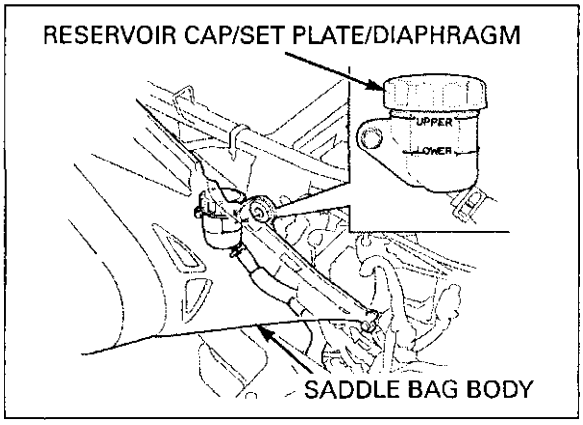
Connect a commercially available brake bleeder to the right front brake caliper bleed valve.
Loosen the bleed valve and operate a air bleed tool.
Drain the brake fluid.



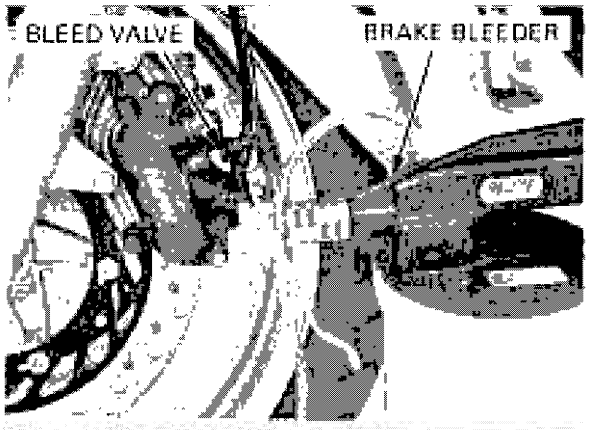
Pedal brake line:

Remove the seat (page 3-5).

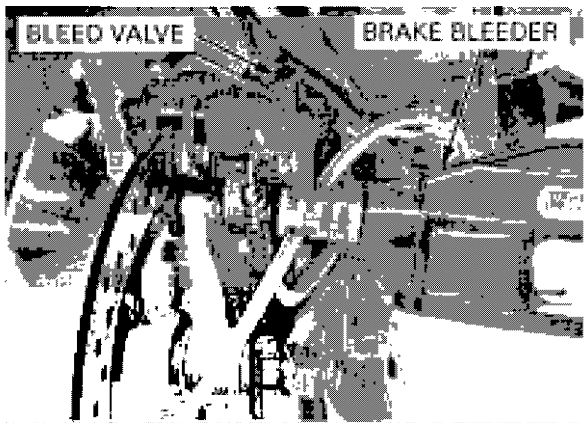
Remove the reservoir cap.
Remove the diaphragm plate and diaphragm.



Connect a commercially available brake bleeder to the left front brake caliper center bleed valve.
Loosen the bleed valve and operate a air bleed tool.
Drain the brake fluid.

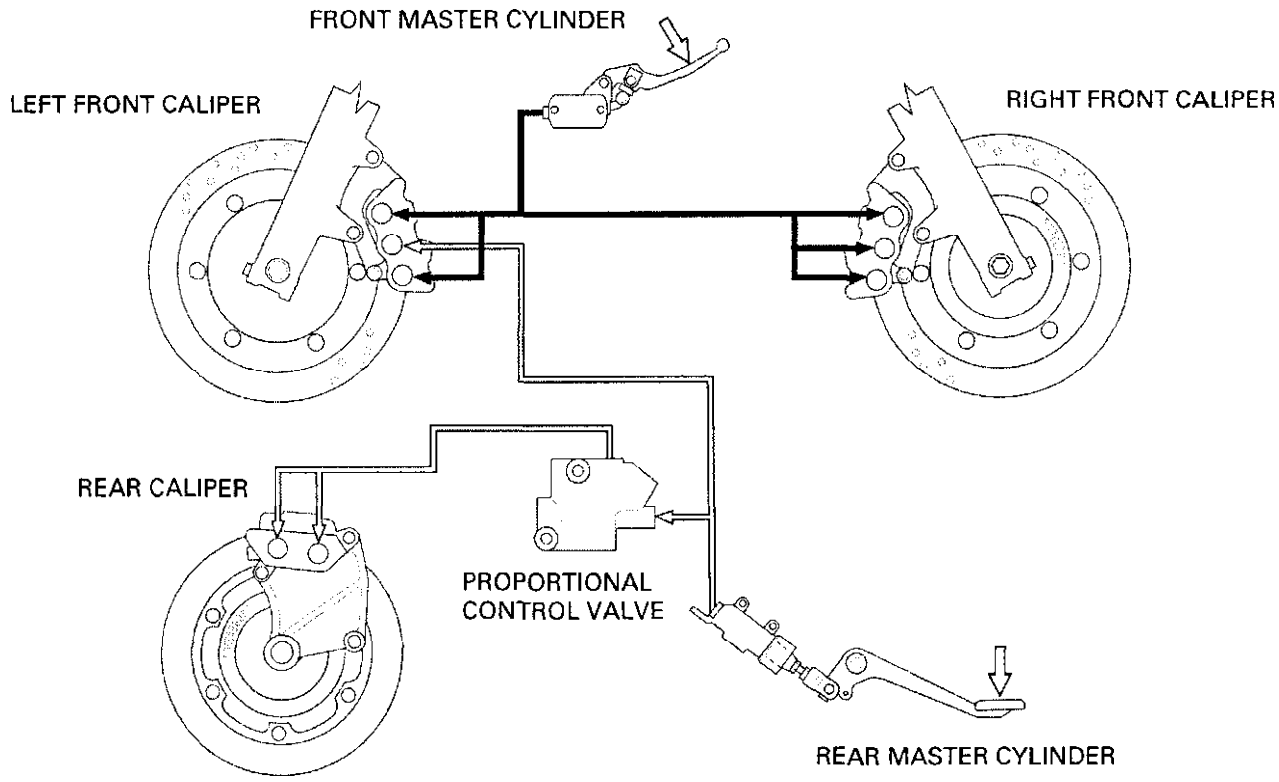


Connect a commercially available brake bleeder to the rear brake caliper bleed valve.
Loosen the bleed valve and operate a air bleed tool.
Drain the brake fluid.

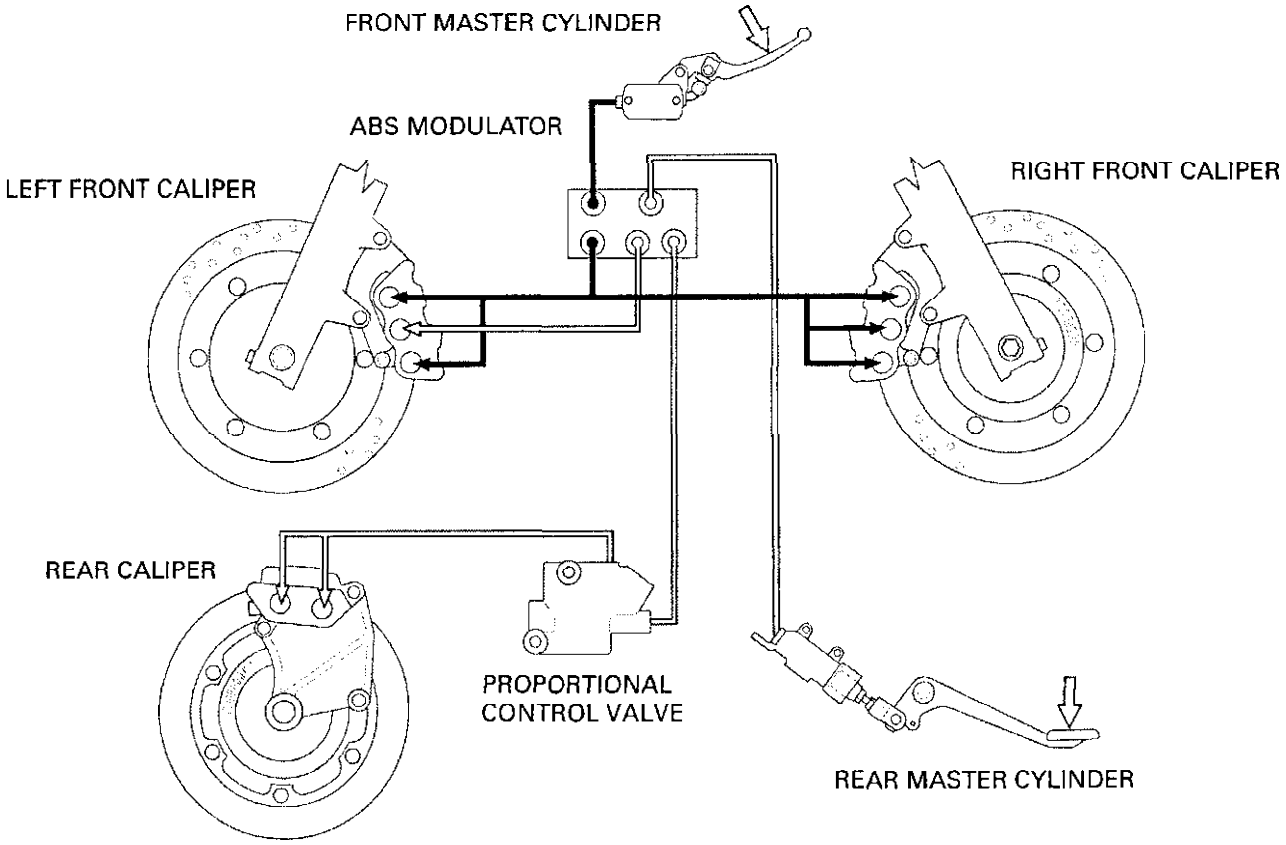


BRAKE FLUID FILLING/BLEEDING

Brake fluid line (NT700V)



Brake fluid line (NT700VA)

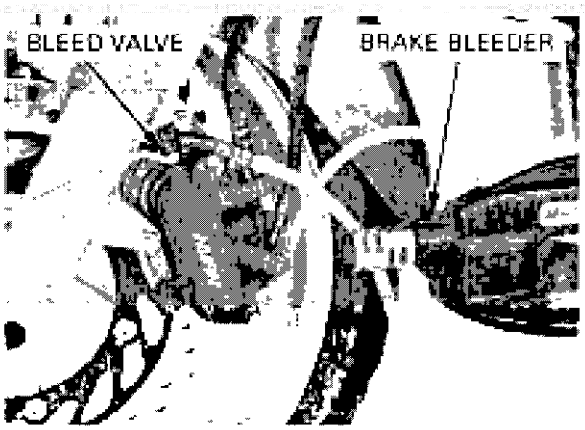


Front:

Do not mix different types of fluid since they are not compatible.

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

Connect a commercially available brake bleeder to the left caliper outer bleed valve.
Operate the brake bleeder and loosen the bleed valve.
If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir is low.



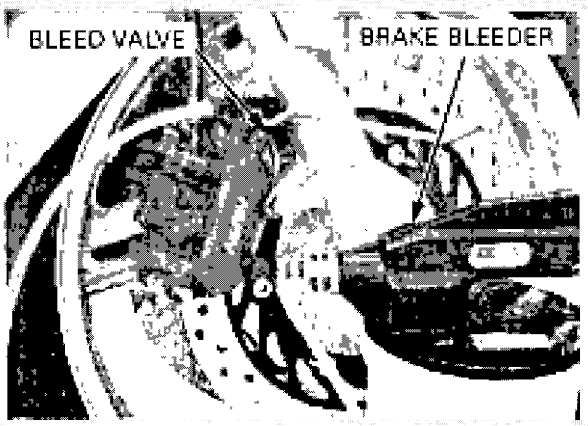
NOTE:

- Check the fluid level often while bleeding to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.
- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Connect a commercially available brake bleeder to the right caliper bleed valve.
Operate the brake bleeder and loosen the bleed valve.
If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir is low.



Close the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Perform the bleeding procedure until the system is completely flushed/bled.

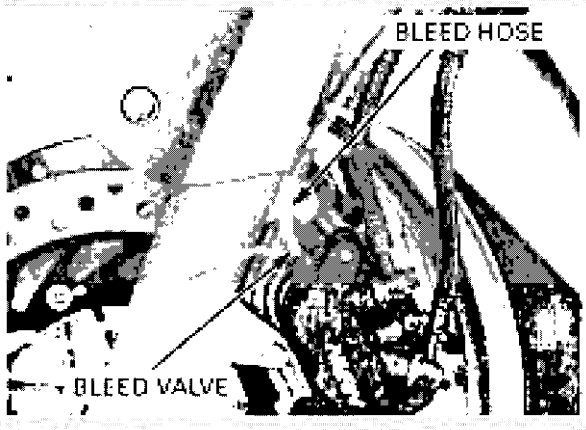
Operate the brake lever. If it is still spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:

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

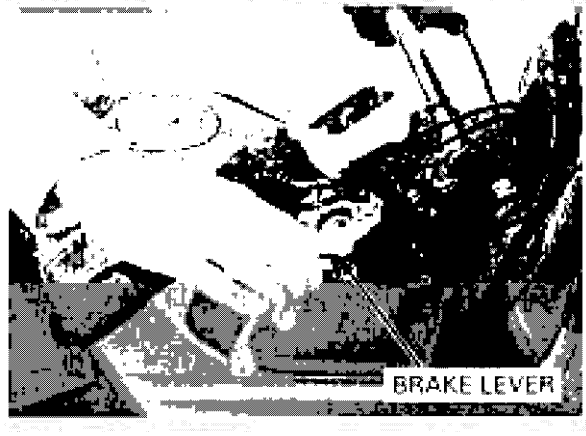
Connect a bleed hose to the left caliper outer bleed valve.

Pressurize the system with the brake lever until lever resistance is felt.



1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

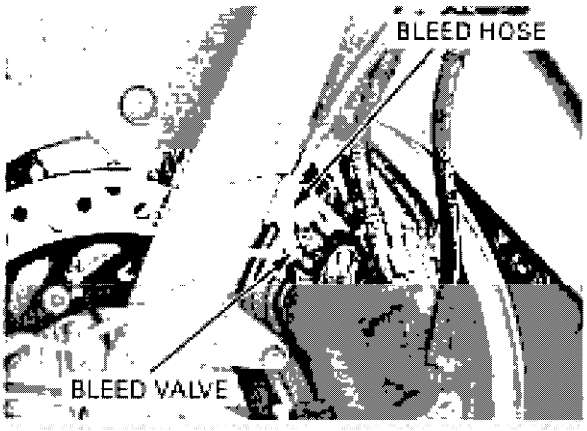
- Do not release the lever until the bleed valve has been closed.



Repeat steps 1and 2 until air bubbles do not appear in the bleed hose.

After bleeding the air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



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

Connect a bleed hose to the right caliper bleed valve.

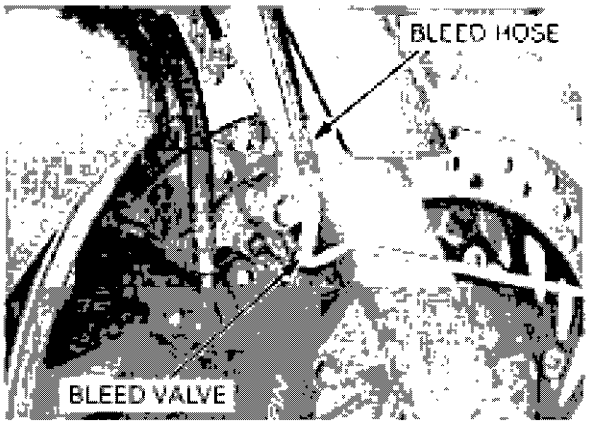
1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

- Do not release the lever until the bleed valve has been closed.

Repeat steps 1and 2 until air bubbles do not appear in the bleed hose.

After bleeding the air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

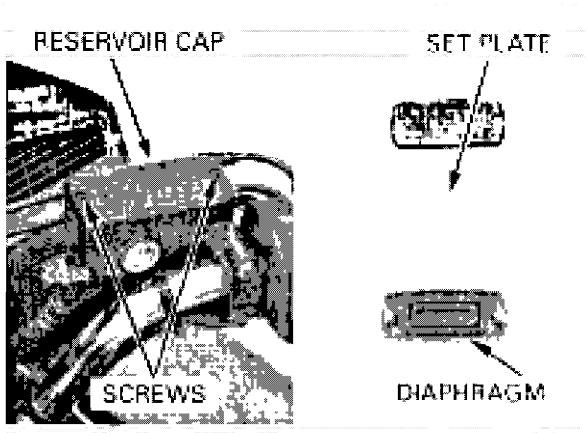


Fill the reservoir to the upper level line with DOT 4 brake fluid.

Install the diaphragm and set plate.

Install the reservoir cap and tighten the screws to the specified torque.

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



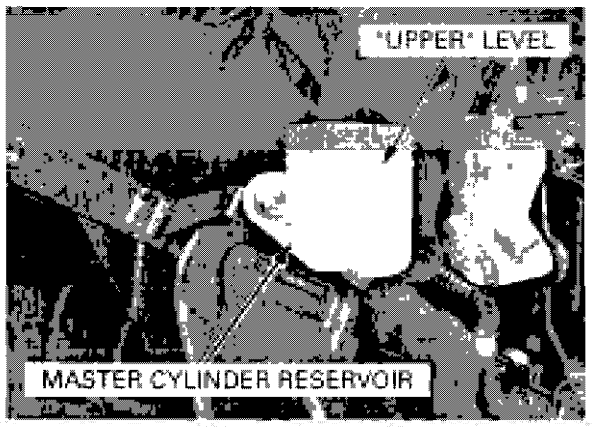
Rear:

Add fluid and bleed any air from the brake pedal line in the sequence as follow:

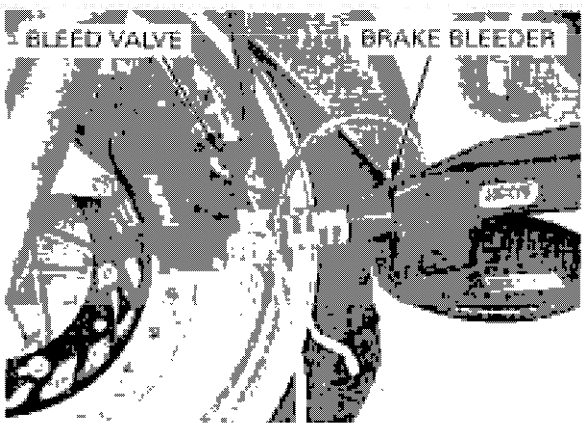
1. Left front brake caliper center bleed valve
2. Rear caliper bleed valve

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

Operate the brake pedal several times to bleed any air from the master cylinder.



Connect a commercially available brake bleeder to the left front caliper center bleed valve.



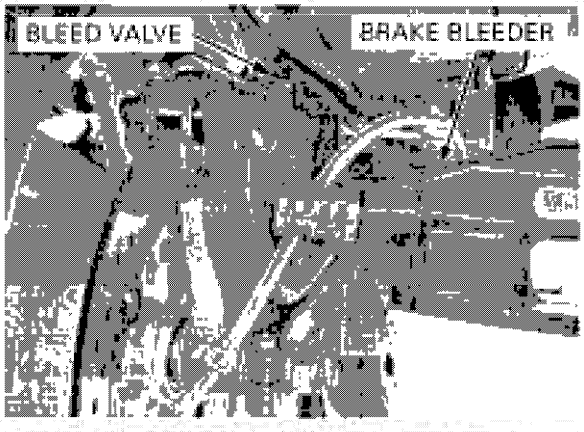
NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

1. Pump the brake bleeder and loosen the left front caliper center bleed valve. Add fluid when the fluid level in the master cylinder is low to prevent drawing air into the system.
2. Repeat the above procedures until a sufficient amount of fluid flows out of the caliper center bleed valve.

It is not problem if the fluid flowing out from the center bleed valve contains air bubbles because the lines will be bled later.

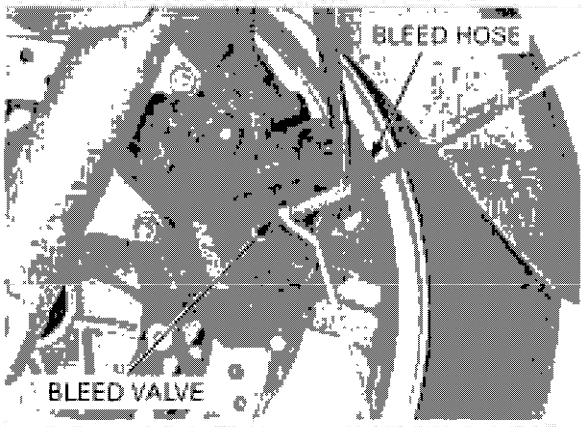
Connect a commercially available brake bleeder to the rear caliper bleed valve.
Repeat step 1 and 2 for rear caliper bleed valve.



Bleed the hydraulic system.

If a brake bleeder is not available, perform the following procedure.

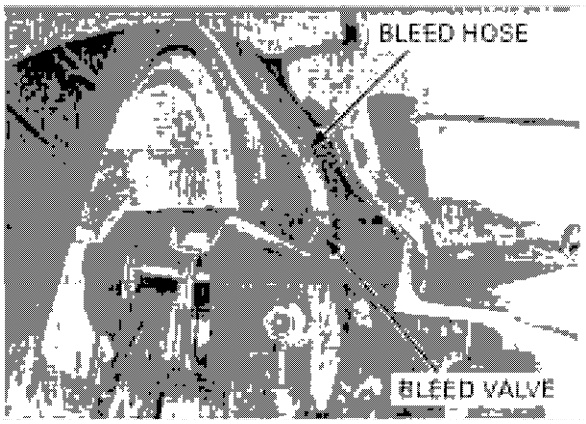
Connect a bleed hose to the left front caliper center bleed valve.



Do not release the pedal until the bleed valve has been closed.

1. Pump the brake pedal several (5 - 10) times quickly, then push the brake pedal all the way down, loosen the left front caliper center bleed valve and loosen the bleed valve 1/4 of turn.
   Wait several seconds and close the bleed valve
   Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
2. Repeat the above procedures until a sufficient amount of the fluid flows out from the left front caliper center bleed valve.

It is not a problem if the fluid flowing out from the left front center bleed valve contains air bubbles because the lines will be bled later.

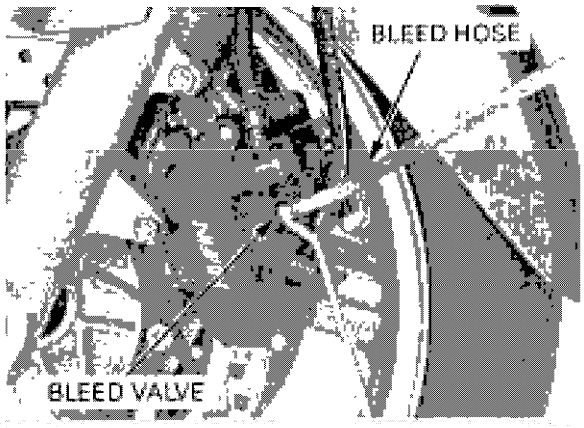


Connect a bleed hose to the rear caliper bleed valve.
Repeat step 1 and 2 for the rear caliper bleed valve.

Bleed the hydraulic system.

Connect a bleed hose to the left front caliper center bleed valve.

1. Pump the brake pedal several (5 - 10) times quickly, then push the brake pedal all the way down, loosen the left front caliper center bleed valve and loosen the bleed valve 1/4 of a turn.
   Wait several seconds and close the bleed valve.
   Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
2. Repeat the above procedures until air bubbles do not appear in the transparent hose.

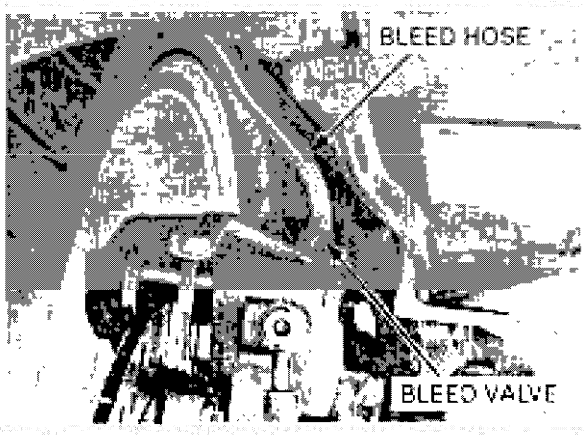


Connect a bleed hose to the rear caliper bleed valve.
Repeat step 1 and 2 for the rear caliper bleed valve.

Note that you may feel strong resistance on the rear (combined) brake pedal during pumping when bleeding air from the caliper. This symptom is caused by the Proportional control valve function. Be sure to apply the brake pedal fully.

Tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

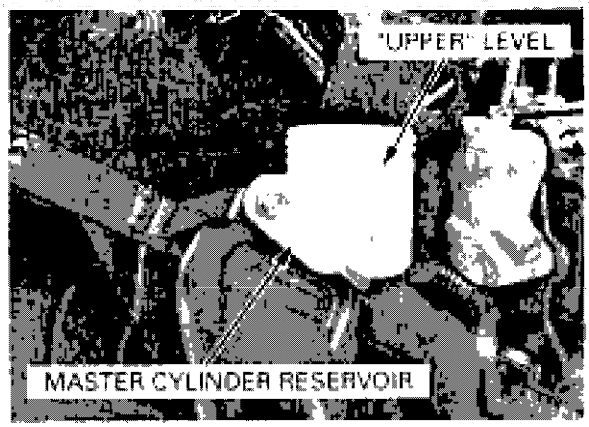


After there are no more air bubbles in the fluid, repeat the air bleeding procedure about two or three times at each bleed valve.
Make sure the bleed valves are closed and operate the brake pedal. If it still feels spongy, bleed the system again.

After bleeding the air completely, tighten the bleed valves to the specified torque.

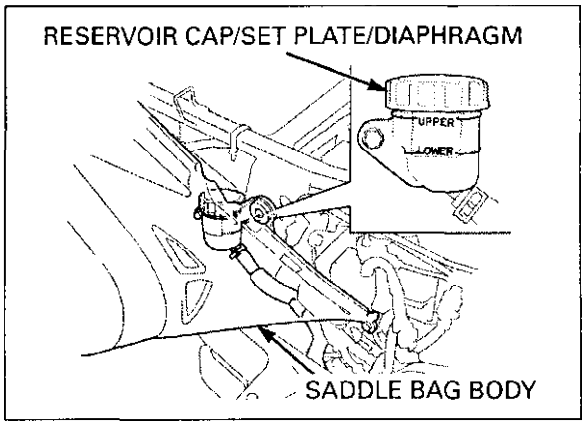
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Fill the reservoir to the "UPPER" level with DOT4 brake fluid to the upper level.



Install the diaphragm, set plate and reservoir cap.

Install the seat (page 3-5).



BRAKE PAD/DISC

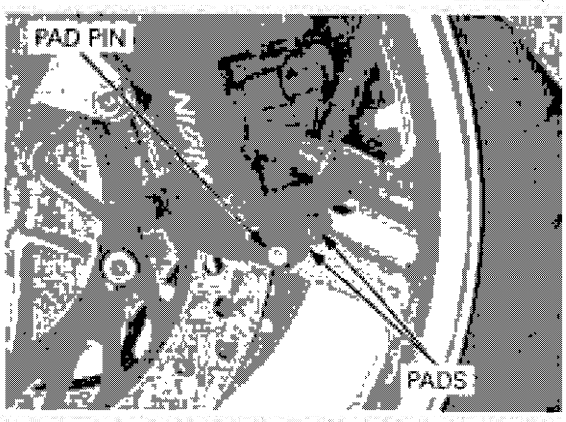
BRAKE PAD REPLACEMENT

Front

Check the brake fluid level in the reservoir as this operation causes the level to rise.

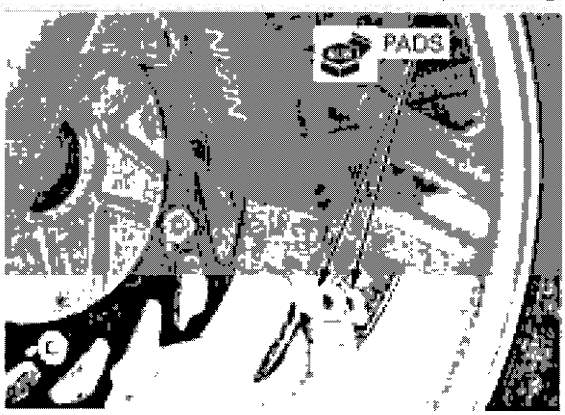
Push the caliper piston all the way in to allow installation of new brake pads.

Loosen the pad pin.
Pull the pad pin out of the caliper body while pushing in the pads against the pad spring.
Remove the brake pads.



Make sure the pad spring is installed correctly.

Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.



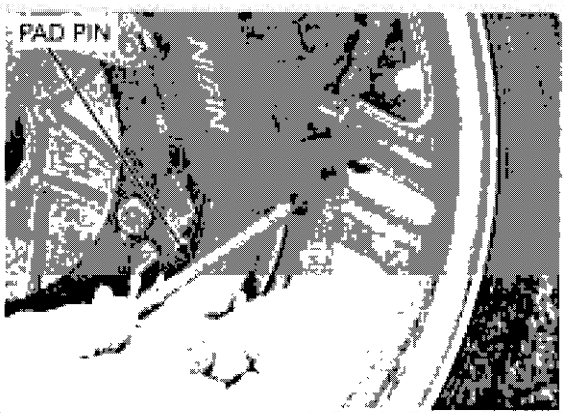
Always replace the brake pads in pairs to ensure even disc pressure.

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

Tighten the pad pin to the specified torque.

TORQUE: 17.2 N·m (1.8 kgf·m, 13 lbf·ft)

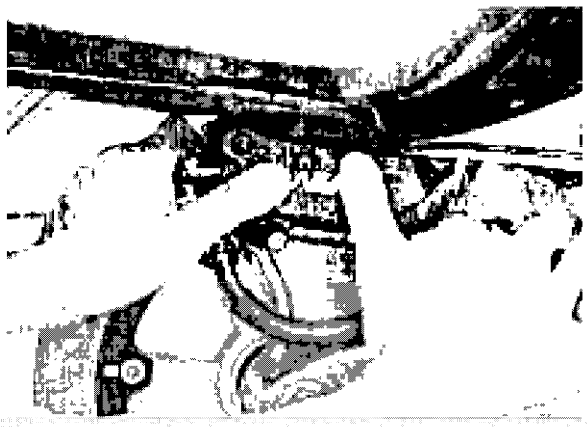
Operate the brake lever to seat the caliper piston against the pads.



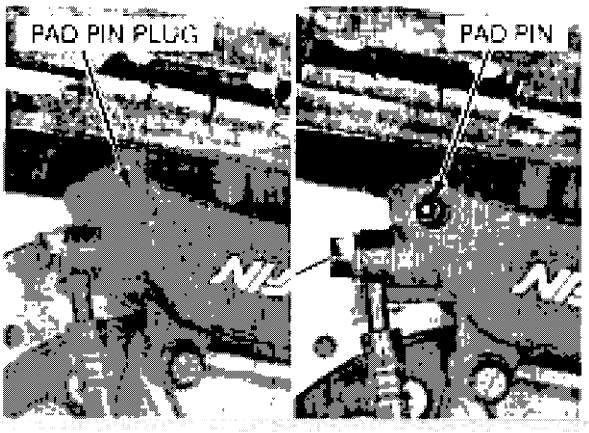
Rear

Check the brake fluid level in the reservoir as this operation causes the level to rise.

Push the caliper piston all the way in to allow installation of new brake pads.



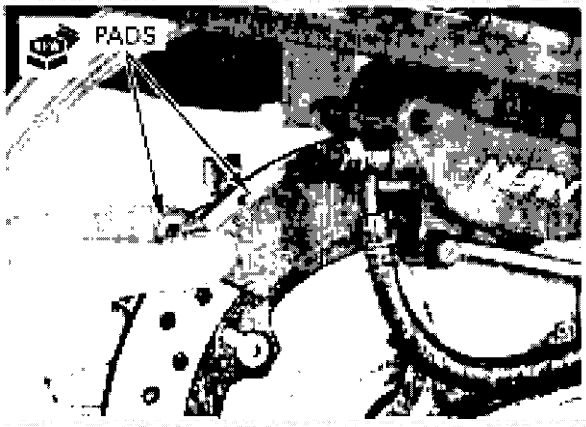
Remove the pad pin plug and loosen the pad pin.



Remove the brake pads.

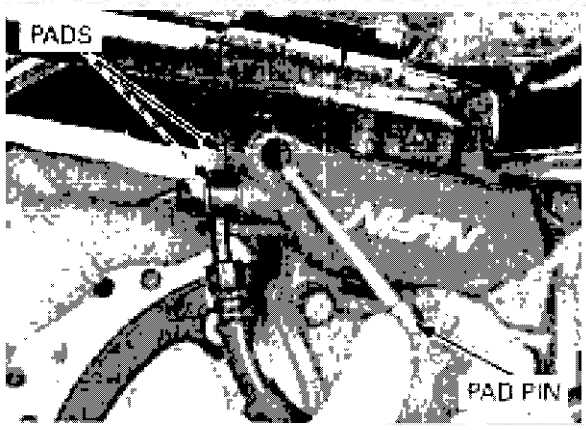
Make sure the pad spring is installed correctly.

Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.



Always replace the brake pads in pairs to ensure even disc pressure.

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

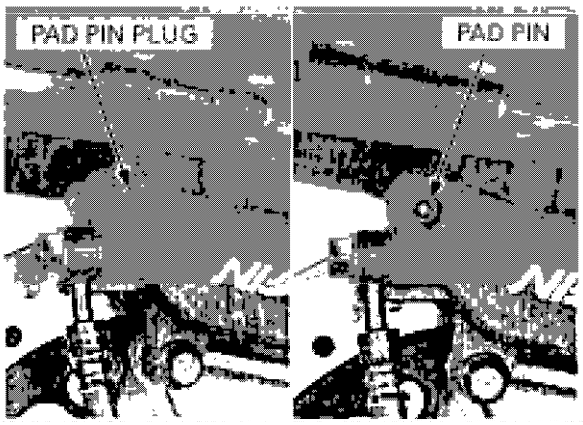


Tighten the pad pin to the specified torque.

TORQUE: 17.2 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug securely.

Operate the brake pedal to seat the caliper piston against the pads.



BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

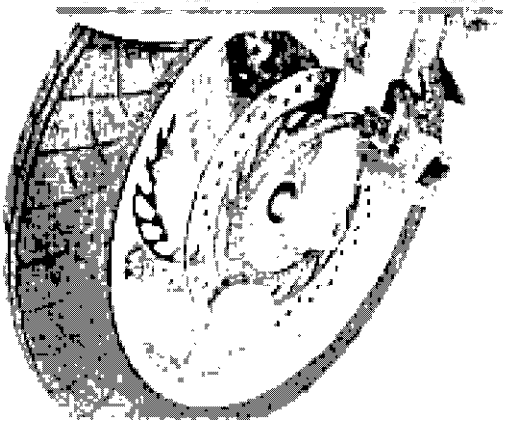
SERVICE LIMITS: FRONT: 3.5 mm (0.14 in)
REAR: 5.0 mm (0.20 in)

Measure the brake disc warpage with a dial indicator.

SERVICE LIMITS: FRONT/REAR: 0.30 mm (0.012 in)

Check the bearing for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the bearings are normal.

For brake disc replacement, refer to page 15-14.

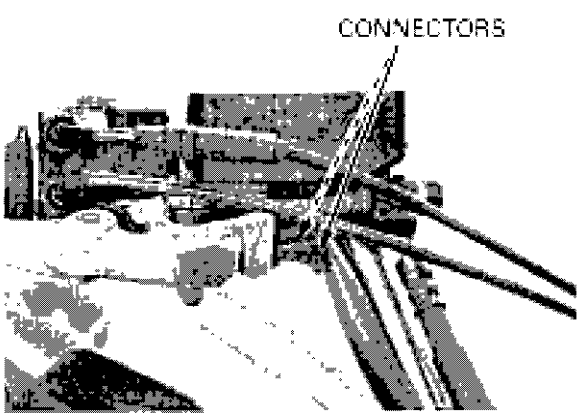


FRONT MASTER CYLINDER

REMOVAL

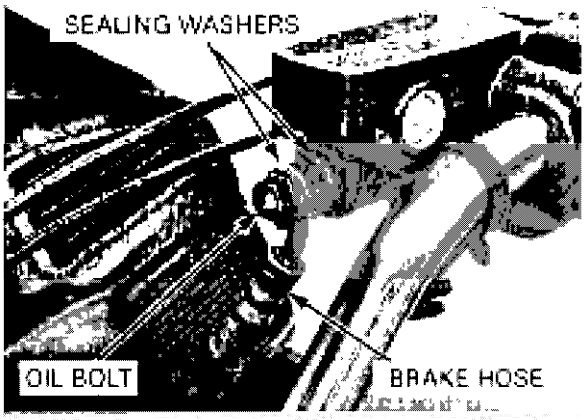
Drain the brake fluid from the hydraulic system (page 17-7).

Disconnect the front brake light switch connectors.

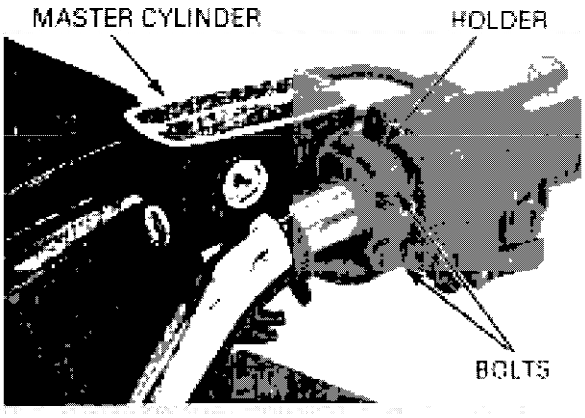


When removing the oil bolt, cover the end of the hose to prevent contamination.

Remove the oil bolt and sealing washers.

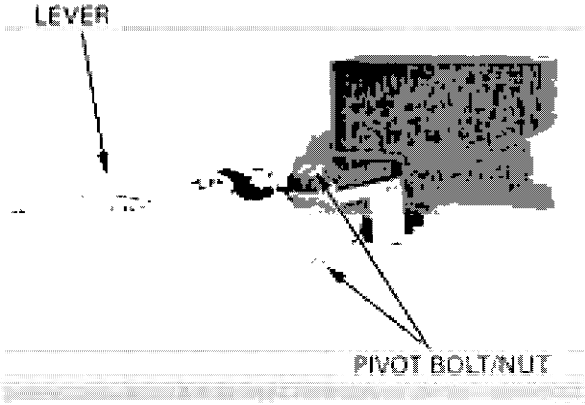


Remove the bolts, holder and master cylinder.

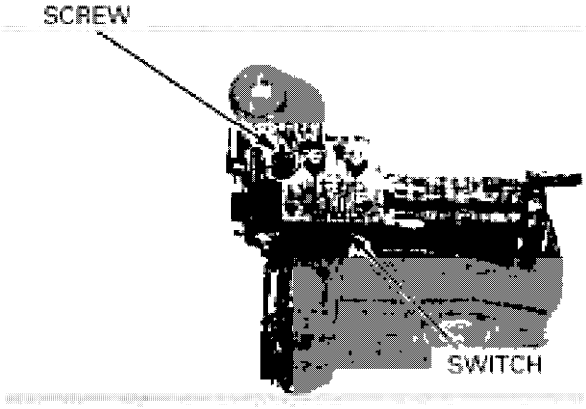


DISASSEMBLY

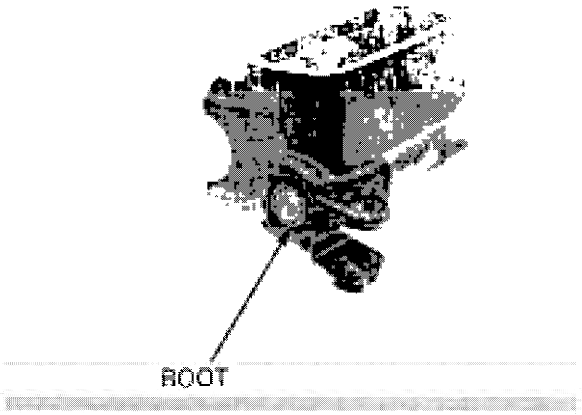
Remove the nut, pivot bolt and brake lever.



Remove the screw and front brake light switch.



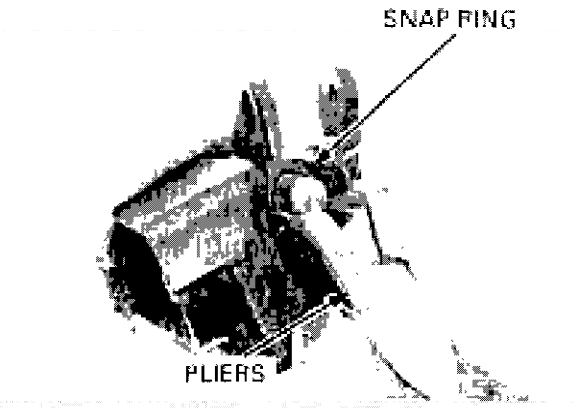
Remove the boot.



Remove the snap ring using a special tool.

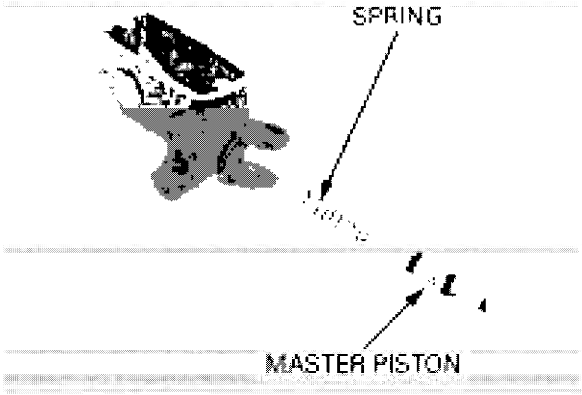
TOOL:

Snap ring pliers	**07914-SA50001**



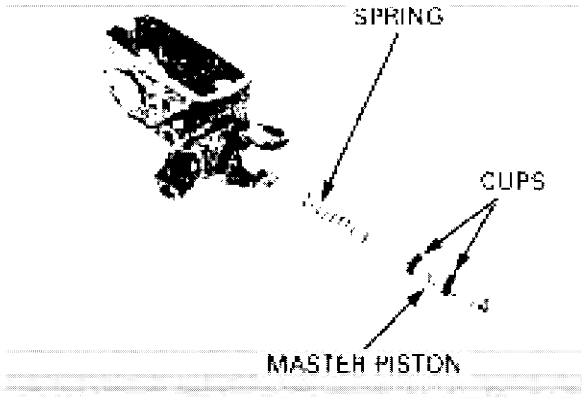
Remove the master piston and spring.

Clean the master cylinder, reservoir and master piston in clean brake fluid.



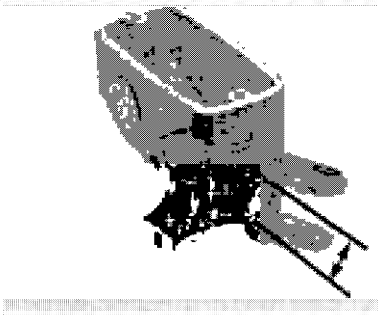
INSPECTION

Check the piston cups for wear, deterioration or damage.
Check the spring for fatigue or damage.
Check the master cylinder and piston for scoring, scratches or damage.



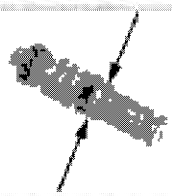
Measure the master cylinder I.D.

SERVICE LIMIT: 12.755 mm (0.5022 in)

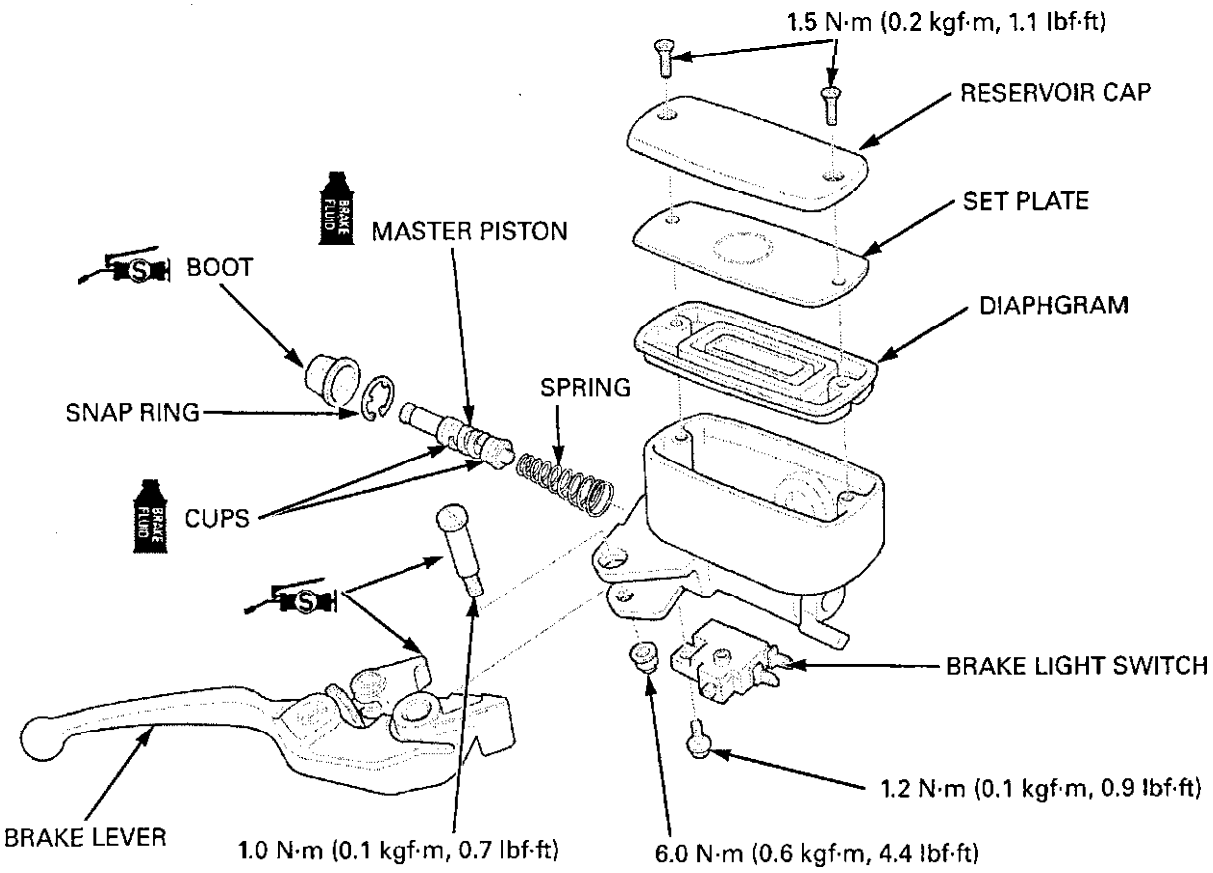


Measure the master piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



ASSEMBLY

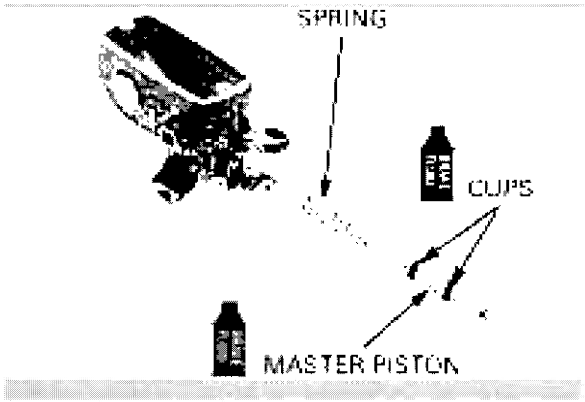


NOTE:
Replace the piston, spring, cups and snap ring as a set.

Coat the master piston and piston cups with clean brake fluid.
Install the spring onto the piston end.

Do not allow the piston cup lips to turn inside out.

Install the master piston/spring into the master cylinder.



Install the snap ring into the groove in the master cylinder using a special tool.

TOOL:
Snap ring pliers **07914-SA50001**

- Install the snap ring with the chamfered edges facing the thrust load side.
- Check that the snap ring is seated in the grooves.

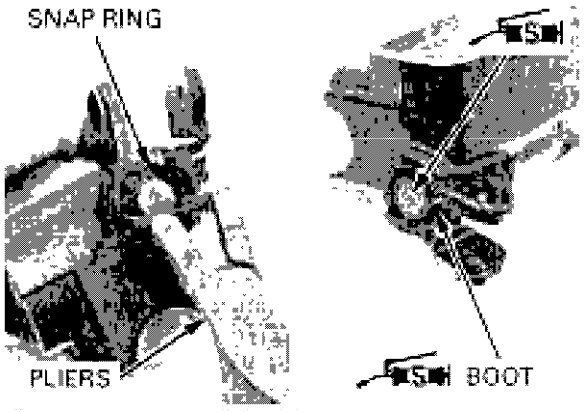
Apply 0.1 g of silicone grease to the boot inner surface.
Install the boot into the master cylinder and the piston groove.

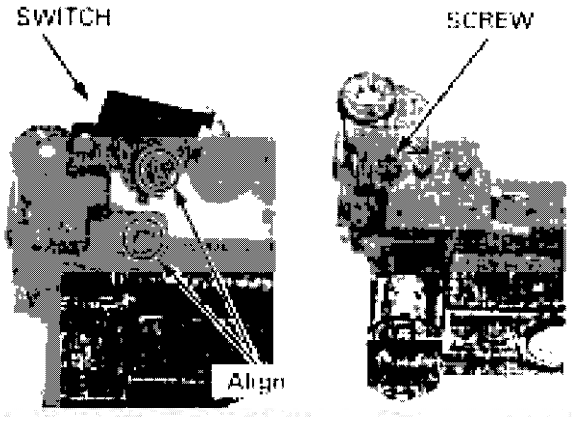
Apply silicone grease to the brake lever contacting surface of the piston.

Install the brake light switch, aligning its boss with the groove of the master cylinder.

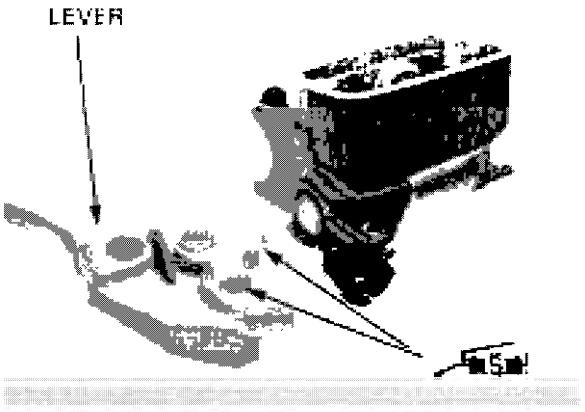
Install and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)





Apply 0.1 g of silicone grease to the brake lever pivot and brake piston contacting surface of the lever.

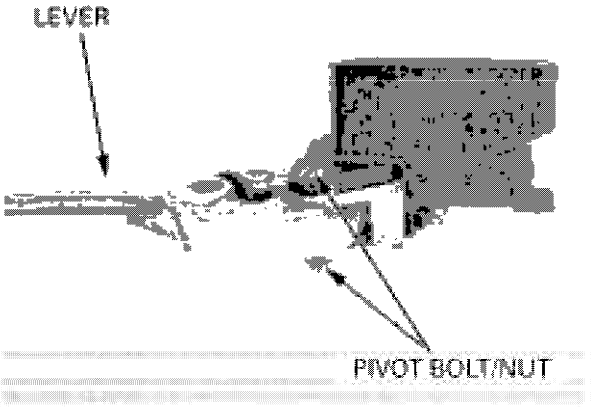


Install the brake lever and pivot bolt, and tighten it to the specified torque.

TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Tighten the nut to the specified torque while holding the pivot bolt.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



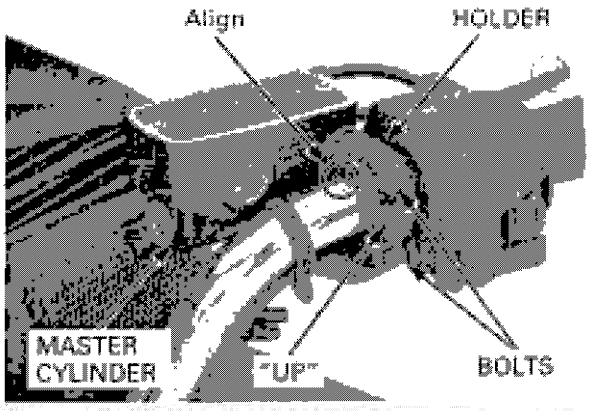
INSTALLATION

Install the holder with its "UP" mark facing up.

Install the master cylinder with the holder and two bolts.

Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

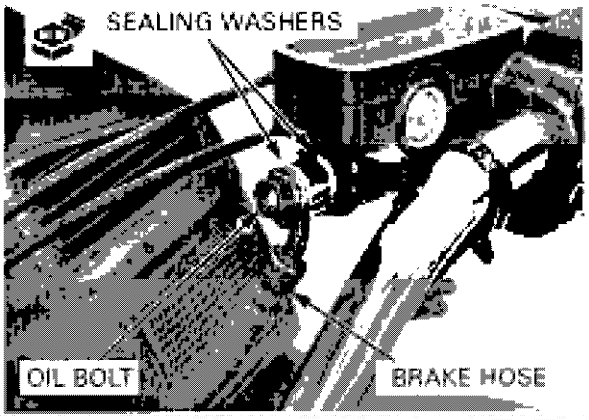


Be sure to rest the hose joint against the stopper.

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers.

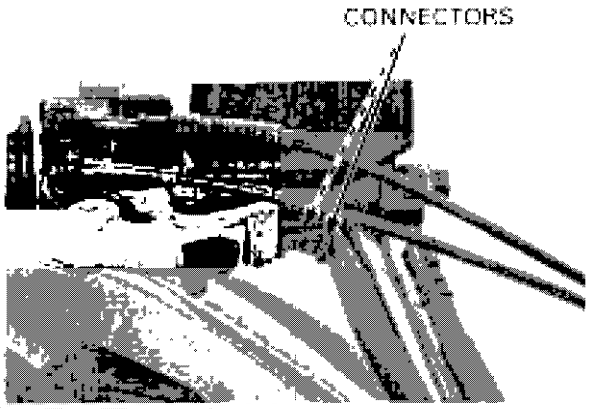
Tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Connect the brake light switch connectors.

Fill and bleed the hydraulic system (page 17-9).



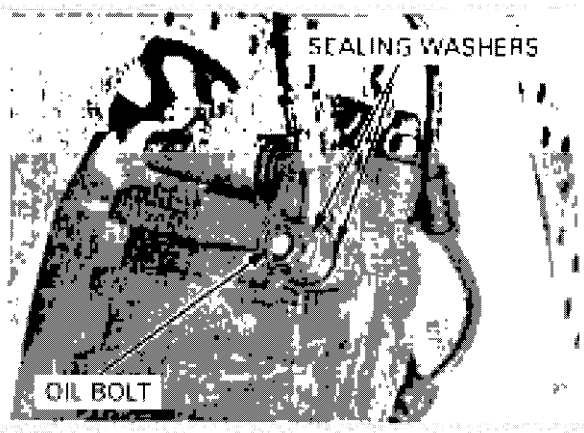
FRONT BRAKE CALIPER

RIGHT CALIPER REMOVAL

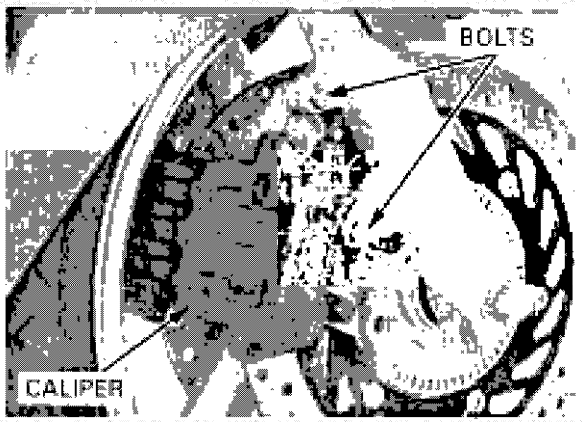
Drain the brake fluid from the hydraulic system (page 17-7).
Remove the brake pads (page 17-14).

NT750V only: Remove the front wheel speed sensor (page 18-33).

When removing the oil bolt, cover the end of the hose to prevent contamination. Remove the oil bolt and sealing washers.



Do not reuse the bolts. Remove the mounting bolts and right caliper assembly.

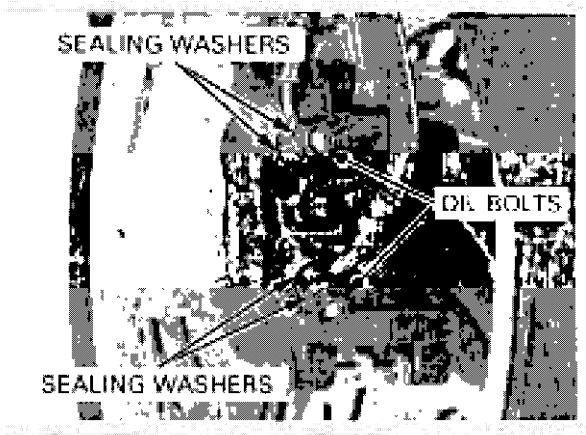


LEFT CALIPER REMOVAL

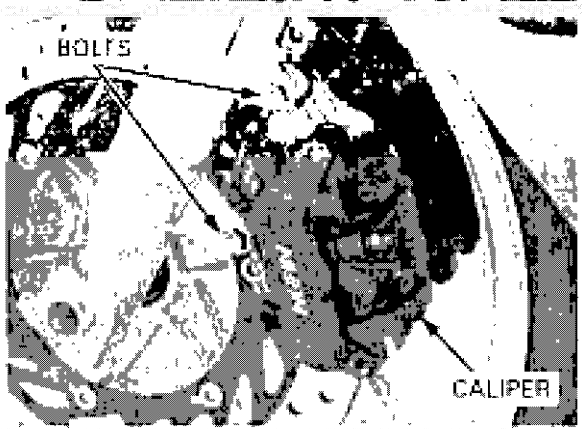
Drain the brake fluid from the hydraulic system (page 17-7).

Remove the brake pads (page 17-14).

When removing the oil bolt, cover the end of the hose to prevent contamination. Remove the oil bolts and sealing washers.

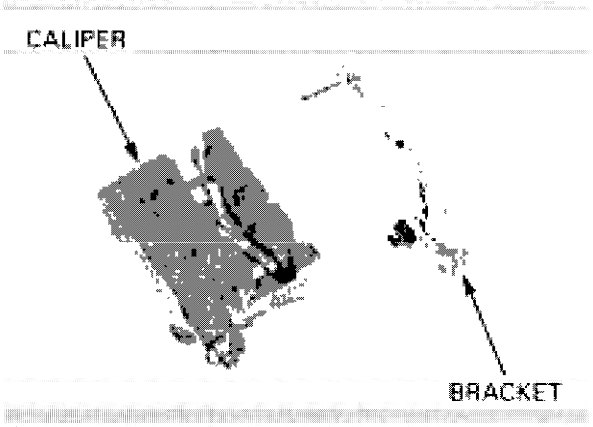


Do not reuse the bolts. Remove the mounting bolts and left caliper assembly.

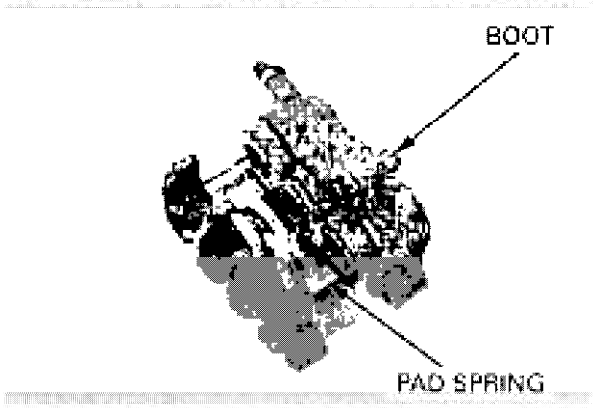


DISASSEMBLY

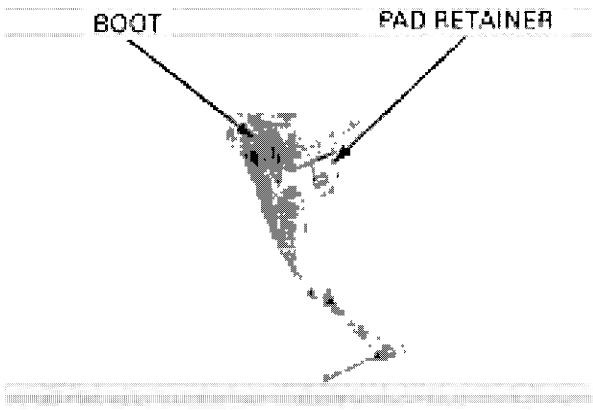
Disassemble the bracket from the caliper.



Remove the bracket pin boot and pad spring from the caliper.



Remove the caliper pin boot and pad retainer from the bracket
Clean the retainer and bracket mating surfaces.



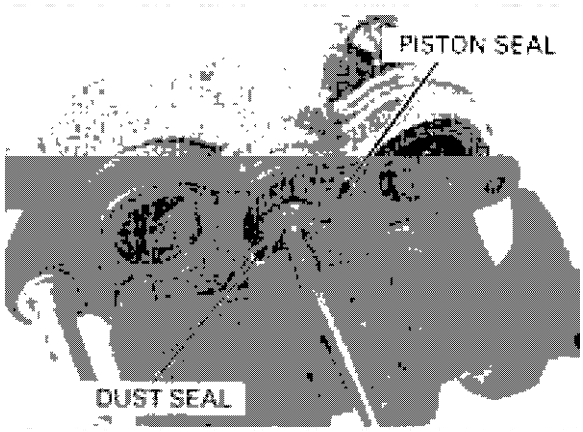
Do not use high pressure air or bring the nozzle too close the inlet.

Place a shop towel over the pistons.
Position the caliper body with the piston facing down and apply 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 and piston seals in and lift them out.

Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.



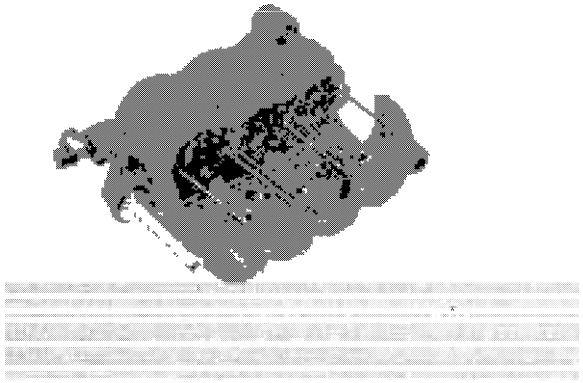
INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMITS:

Right caliper:	**Front:**	**22.712 mm (0.8942 in)**
	Center:	**22.712 mm (0.8942 in)**
	Rear:	**22.712 mm (0.8942 in)**
Left caliper:	**Front:**	**22.712 mm (0.8942 in)**
	Center:	**25.462 mm (1.0024 in)**
	Rear:	**22.712 mm (0.8942 in)**

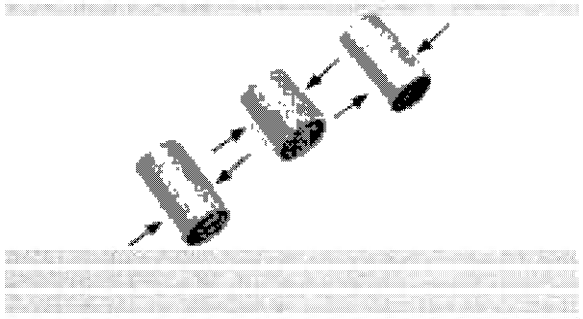


Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

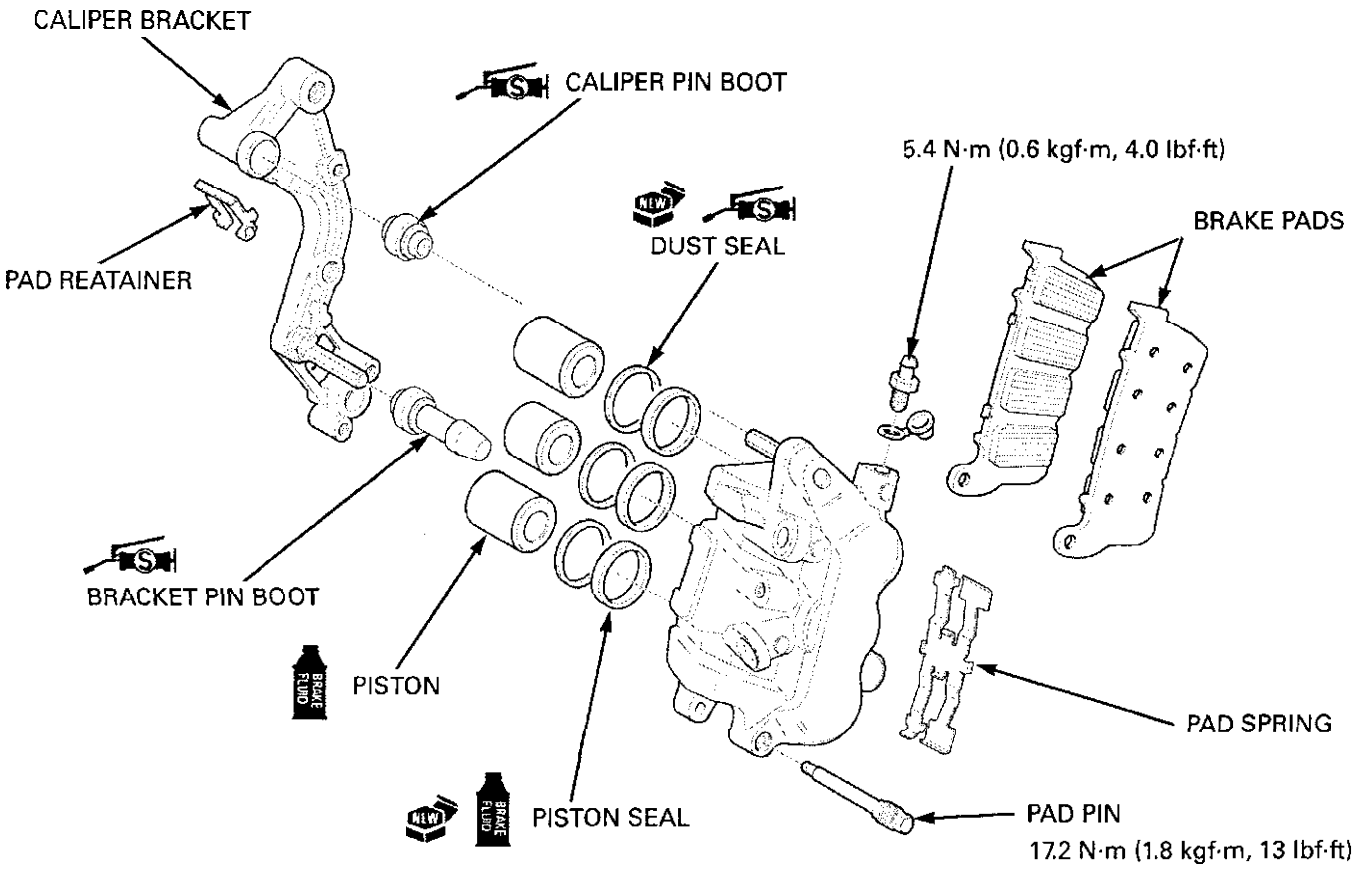
SERVICE LIMITS:

Right caliper:	**Front:**	**22.560 mm (0.8882 in)**
	Center:	**22.560 mm (0.8882 in)**
	Rear:	**22.560 mm (0.8882 in)**
Left caliper:	**Front:**	**22.560 mm (0.8882 in)**
	Center:	**25.310 mm (0.9965 in)**
	Rear:	**22.560 mm (0.8882 in)**

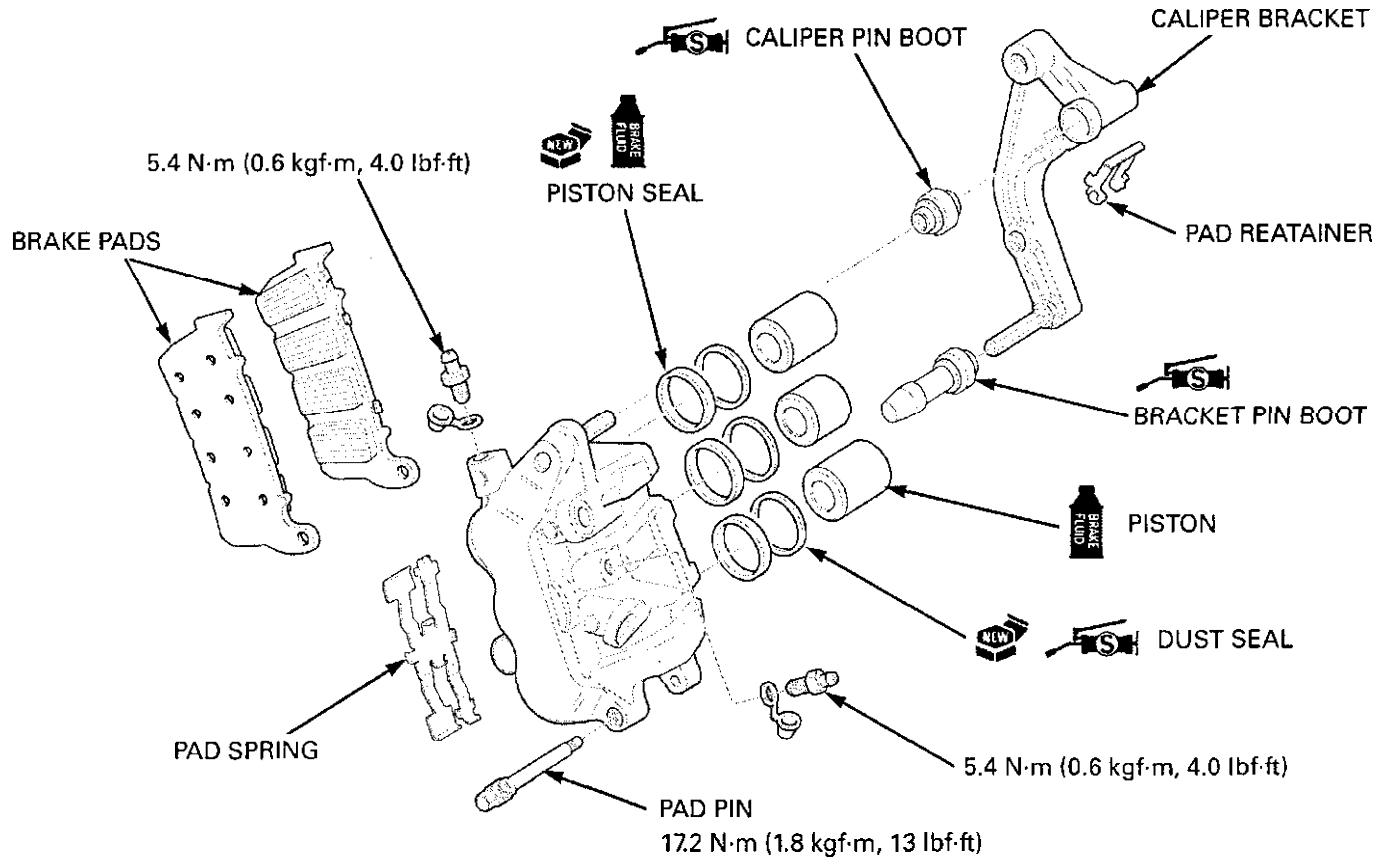


ASSEMBLY

RIGHT CALIPER

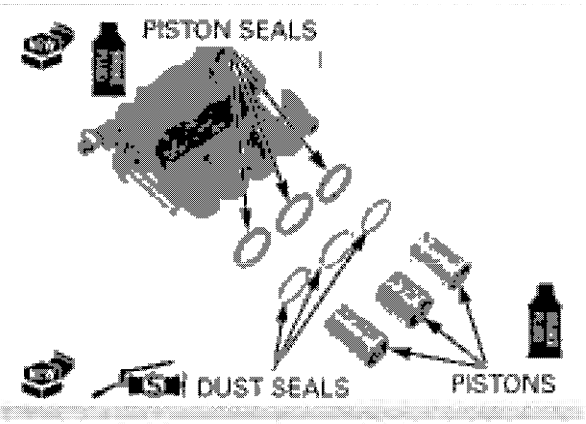


LEFT CALIPER



Coat new piston seals with clean brake fluid, new dust seals with silicone grease and install them into the seal grooves in the caliper.

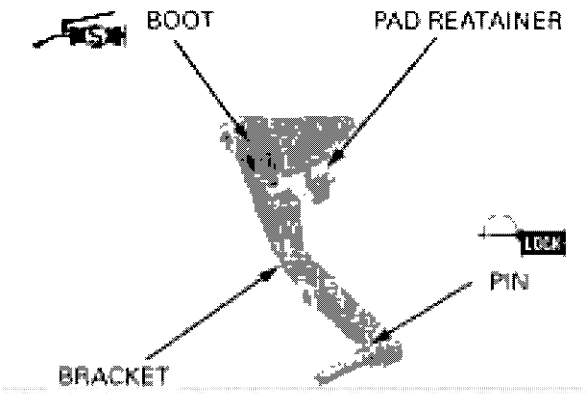
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.



Check the caliper pin boot and replace it if it is hard, deteriorated or damaged.
Apply silicone grease to the inside of the caliper pin boot.
Install the caliper pin boot in the bracket.
If the bracket pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply Honda Bond A or equivalent to the pad retainer mating surface.
Install the retainer onto the bracket.



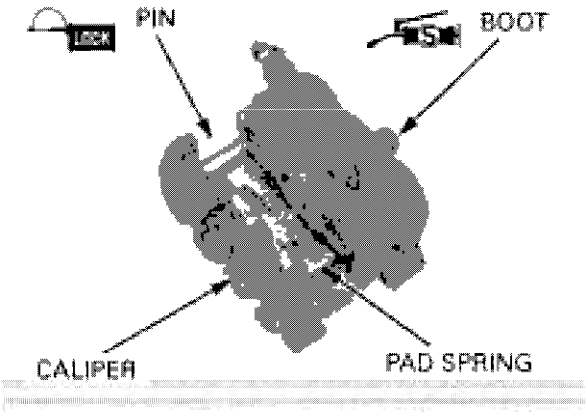
Check the bracket pin boot and replace it if it is hard, deteriorated or damaged.

Apply silicone grease to the inside of the bracket pin boot.

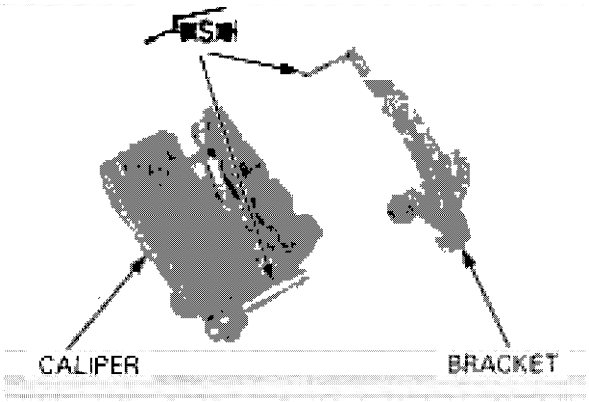
Install the bracket pin boot and pad spring in the caliper.

If the caliper pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Apply silicone grease to the caliper and bracket pins.
Assemble the caliper bracket and the caliper body.

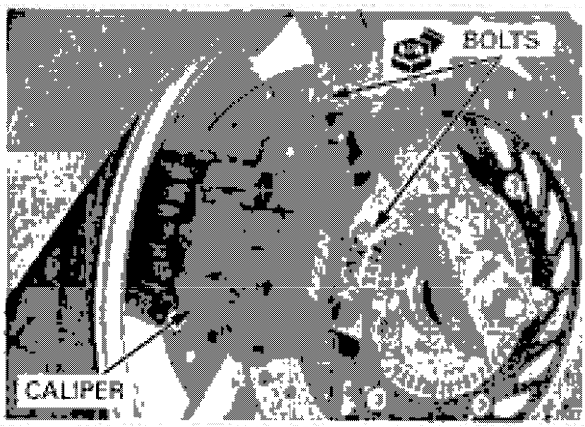


RIGHT CALIPER INSTALLATION

Install the brake caliper onto the fork leg.

Install new mounting bolts and tighten them to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



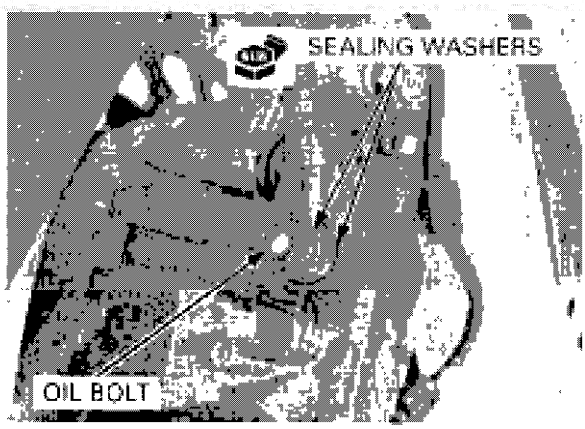
Connect the brake hose to the caliper with the oil bolt and new sealing washers.
Push the stopper on the brake hose eyelet joint against the caliper body, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 17-14).

Fill and bleed the hydraulic system (page 17-9).
Install the brake pad (page 17-14).

NT750V only: Install the front wheel speed sensor (page 18-33).

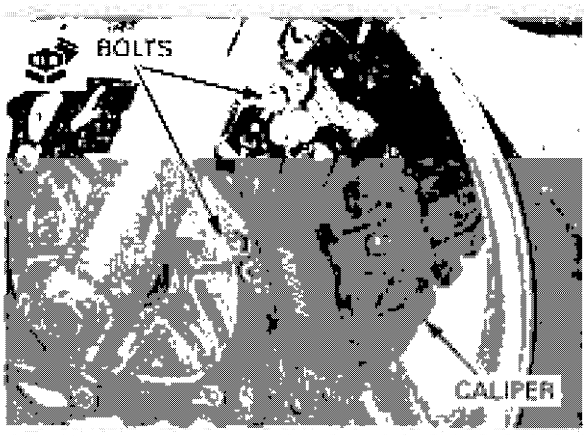


LEFT CALIPER INSTALLATION

Install the brake caliper onto the fork leg.

Install new mounting bolts and tighten them to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

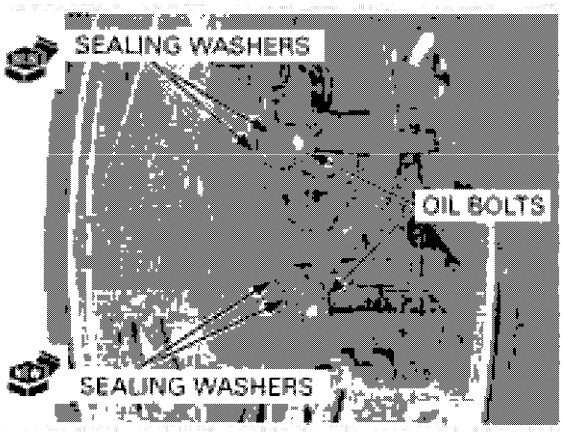


Connect the brake hoses to the caliper with the oil bolts and new sealing washers.
Push the stopper or the brake hose eyelet joint against the caliper body, then tighten the oil bolts to the specified torque

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 17-14).

Fill and bleed the hydraulic system (page 17-9).

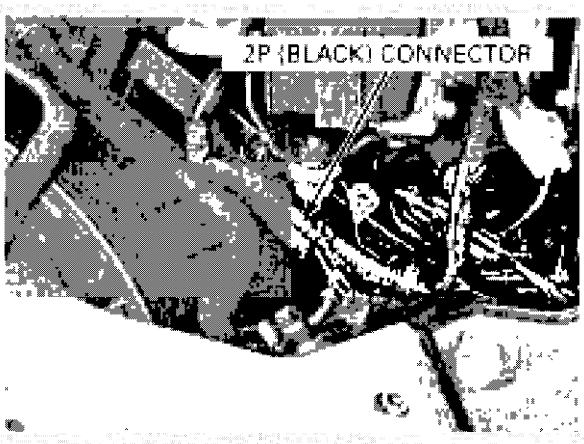


REAR MASTER CYLINDER

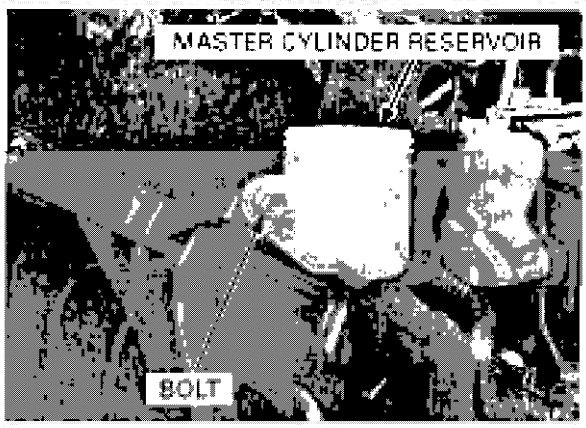
REMOVAL

Remove the right saddle bag body (page 3-7).
Drain the brake fluid from the hydraulic system (page 17-7).

Disconnect the rear brake light switch 2P (Black) connector.

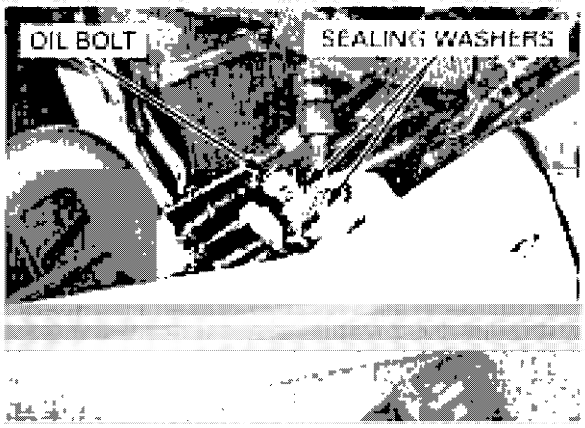


Remove the bolt and rear master cylinder reservoir.

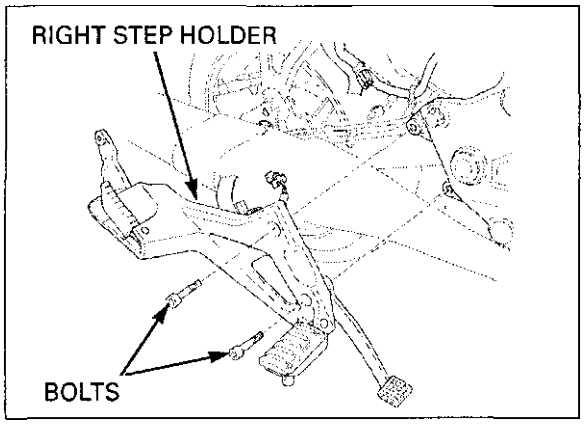


When removing the oil bolt, cover the end of the hose to prevent contamination.

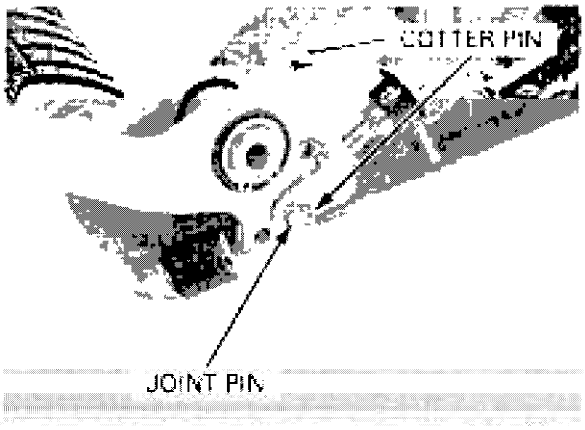
Remove the brake hose oil bolt, sealing washers and brake hose.



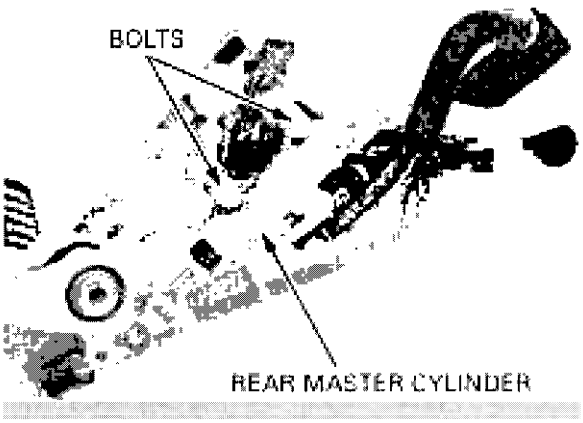
Remove the bolts and right step holder.



Remove the cotter pin and joint pin.

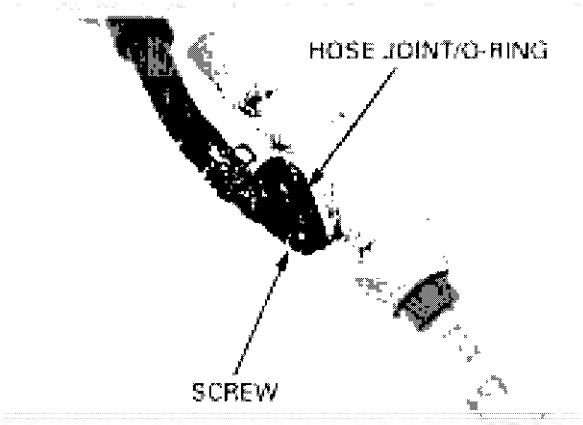


Remove the bolts and rear master cylinder assembly from the right step holder.

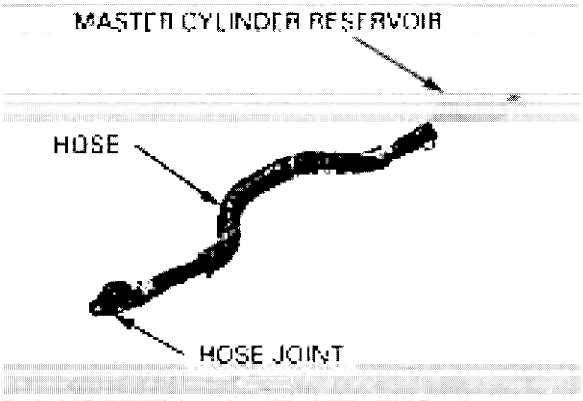


DISASSEMBLY

Remove the screw, reservoir hose joint and O-ring.



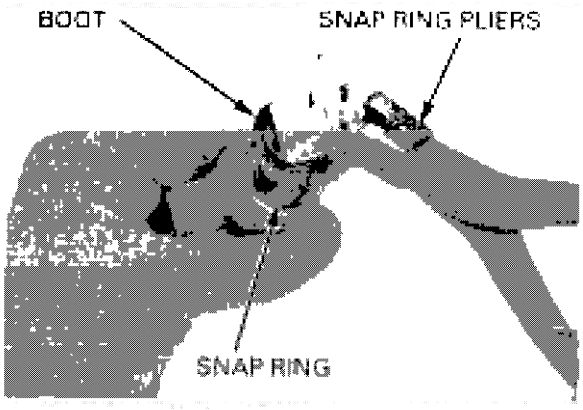
Disassemble the hose, hose joint and rear master cylinder reservoir.



Remove the boot.

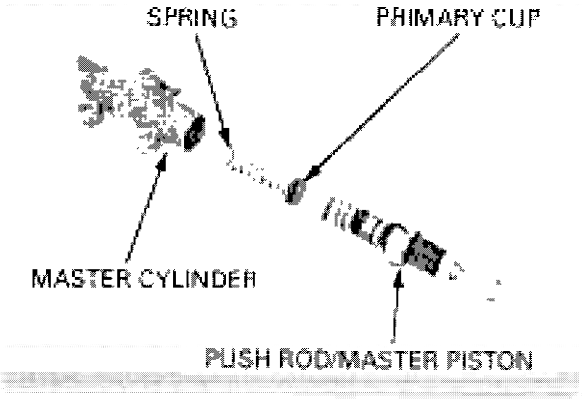
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers **07914-SA50001**



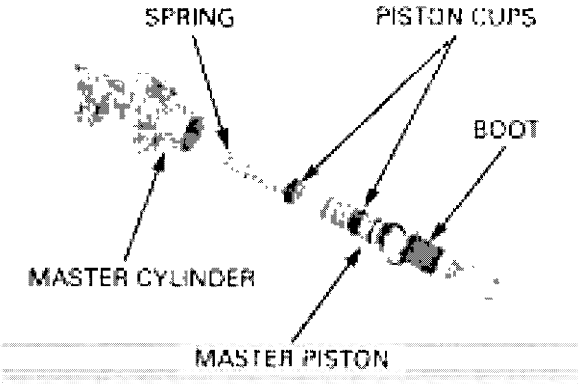
Remove the push rod/master piston, primary cup and spring.

Clean the master cylinder, reservoir and master piston in clean brake fluid.



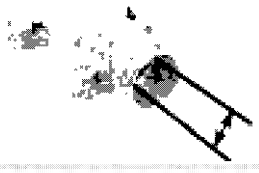
INSPECTION

Check the piston cups and boot for wear, deterioration or damage.
Check the spring for fatigue or damage.
Check the master cylinder and piston for scoring, scratches or damage.



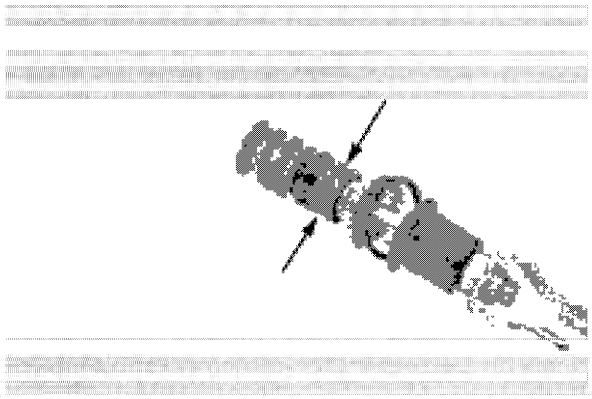
Measure the master cylinder I.D.

SERVICE LIMIT: 17.515 mm (0.6896 in)

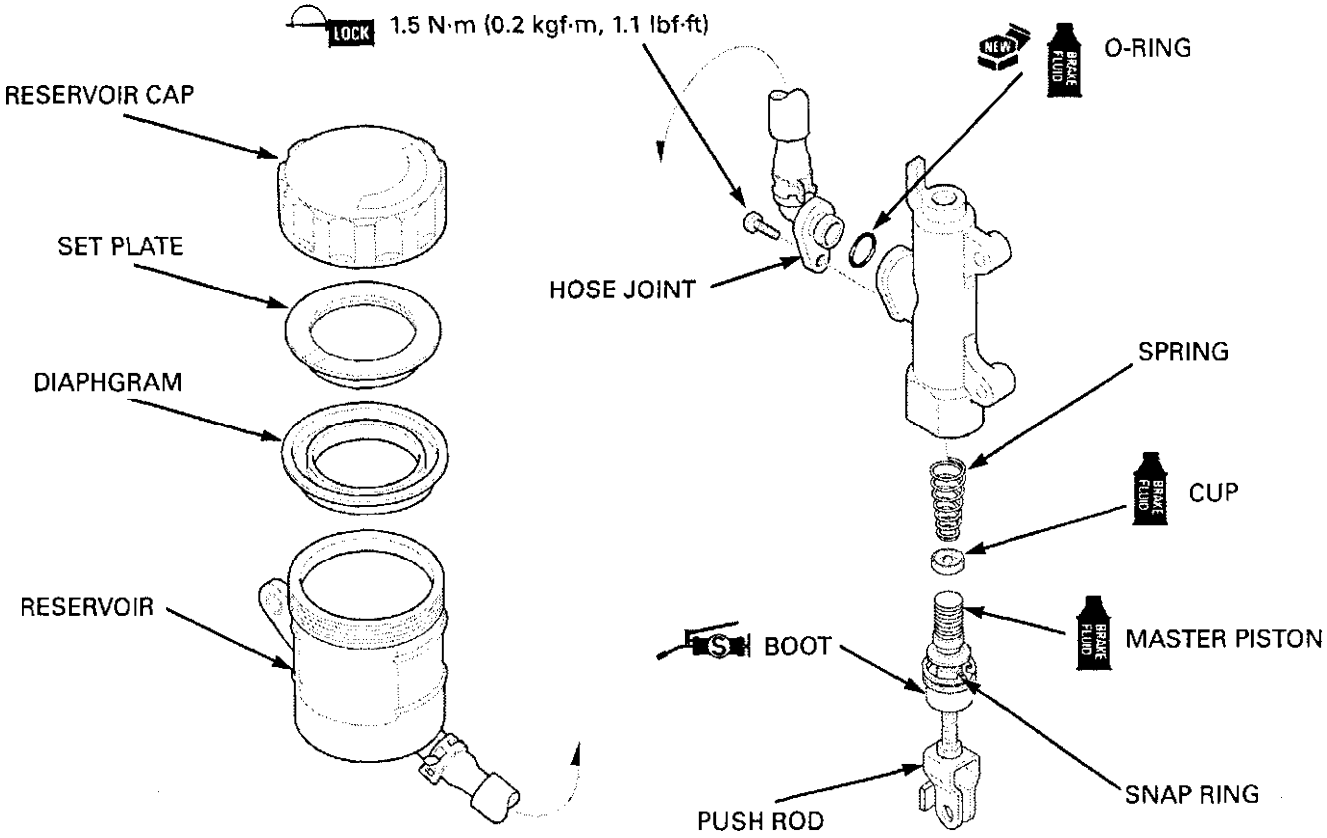


Measure the master piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



ASSEMBLY



NOTE:

Replace the piston, spring, cups, washer and snap ring as a set.

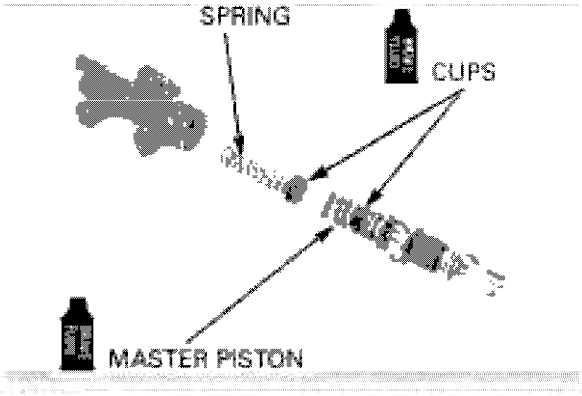
Coat the master piston and piston cups with clean brake fluid.

Install the primary cup onto the tip of the spring.

Do not allow the piston cup lips to turn inside out.

Install the spring/primary cup and master piston/ push rod assembly.

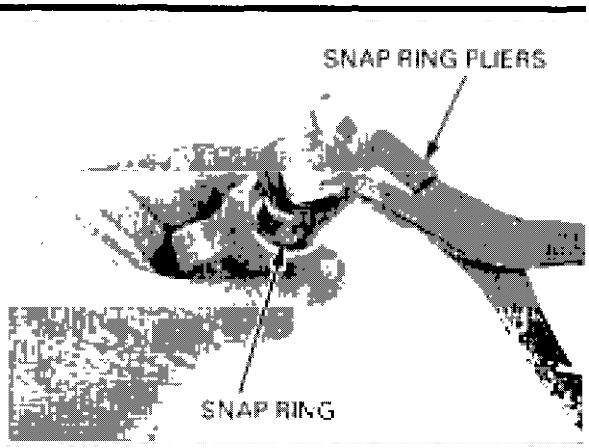
Apply silicone grease to the push rod boot fitting area.



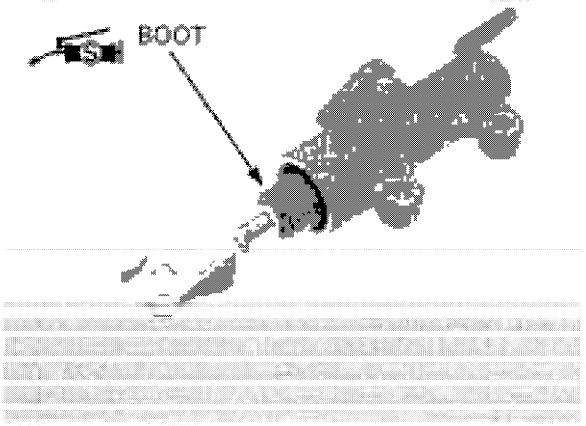
Install the snap ring into the groove in the master cylinder using a special tool.

TOOL:
Snap ring pliers **07914-SA50001**

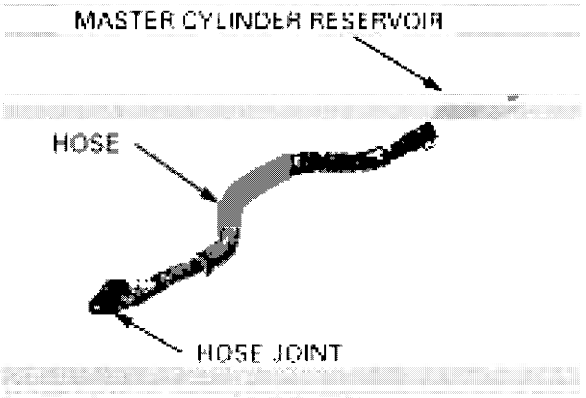
- Install the snap ring with the chamfered edges facing the thrust load side.
- Check that the snap ring is seated in the groove.



Apply 0.1 g of silicone grease to the boot inner surface.
Install the boot into the master cylinder and the piston groove.

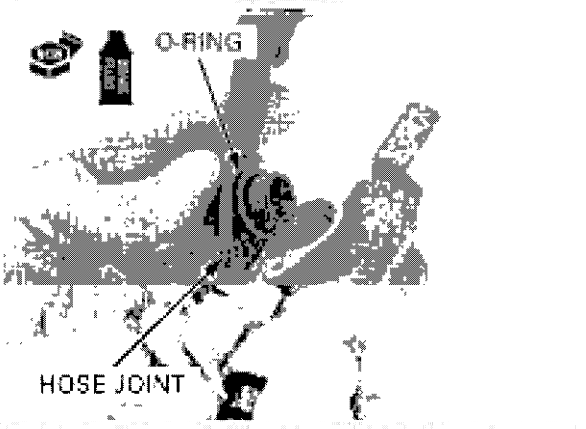


Assemble the hose, hose joint and rear master cylinder reservoir.



Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.

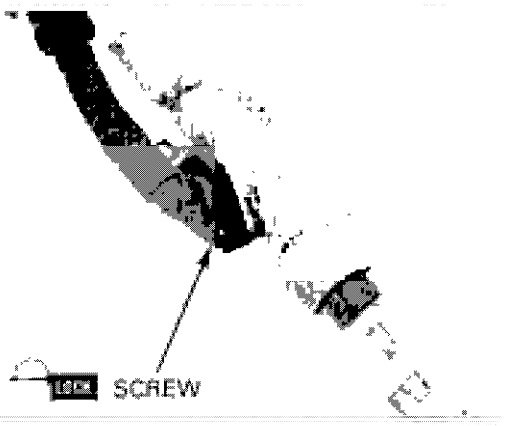
Install the reservoir hose joint into the master cylinder.



Apply a locking agent to the reservoir hose joint screw threads.

Install and tighten the screw to the threads.

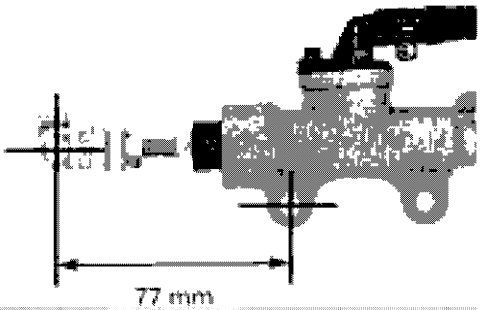
TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)



If the push rod is disassembled, adjust the push rod length as shown.

After adjustment, tighten the lock nut to the specified torque.

TORQUE: 17.2 N·m (1.8 kgf·m, 13 lbf·ft)

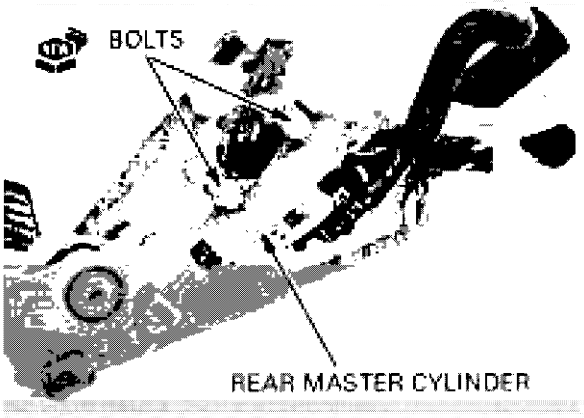


INSTALLATION

Install the rear master cylinder to the right step holder.

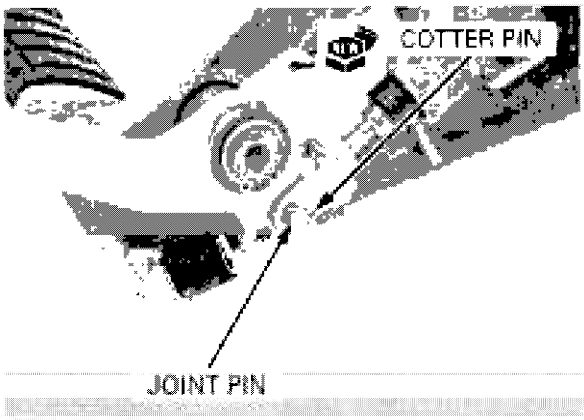
Tighten new mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



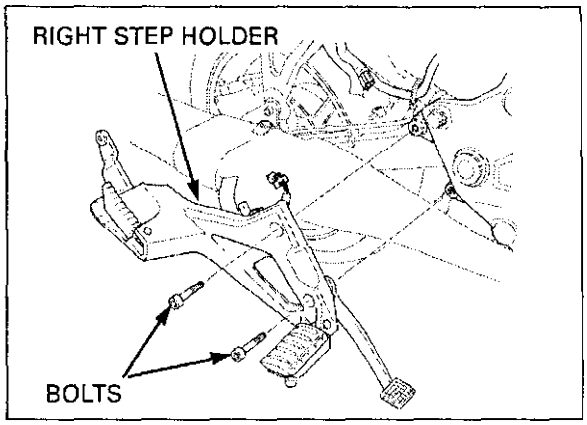
Install the joint pin.

Secure the joint pin using a new cotter pin.



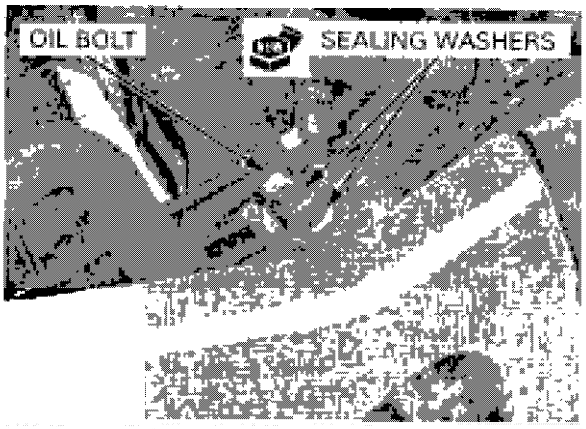
Install the right step holder and tighten the bolts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

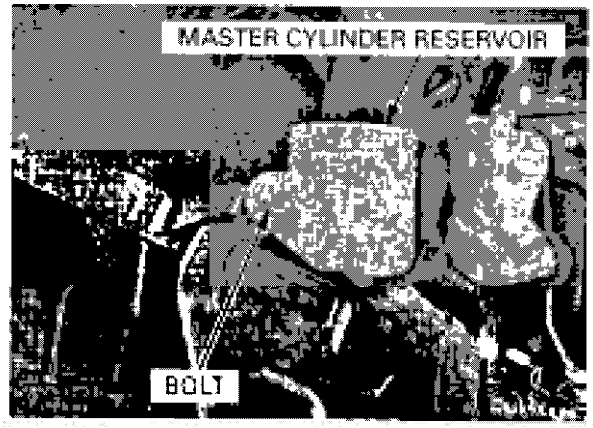


Install the brake hose with the oil bolt and new sealing washers.
Push the stopper on the eyelet joint against the stopper of the master cylinder, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

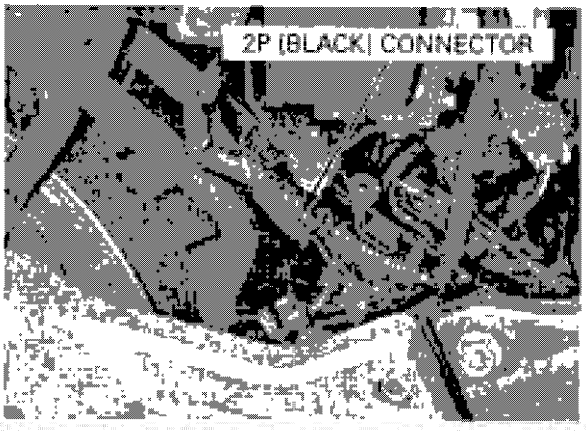


Install the rear master cylinder reservoir and tighten the bolt securely.



Connect the rear brake light switch 2P (Black) connector.

Fill and bleed the hydraulic system (page 17-9).
Install the right saddle bag body (page 3-7).



REAR BRAKE CALIPER

REMOVAL

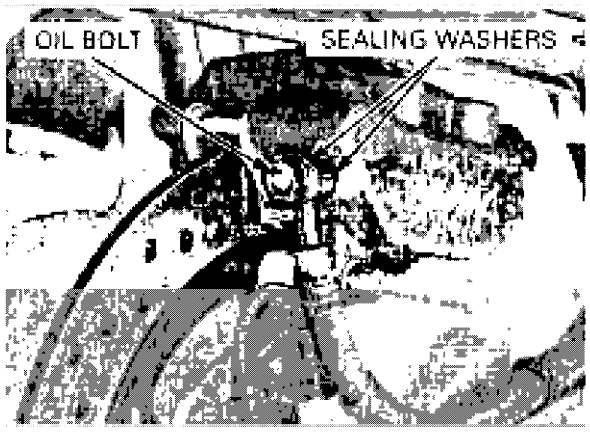
Drain the brake fluid from the hydraulic system (page 17-7).

Remove the brake pads (page 17-14).

When removing the oil bolt, cover the end of the hose to prevent contamination.

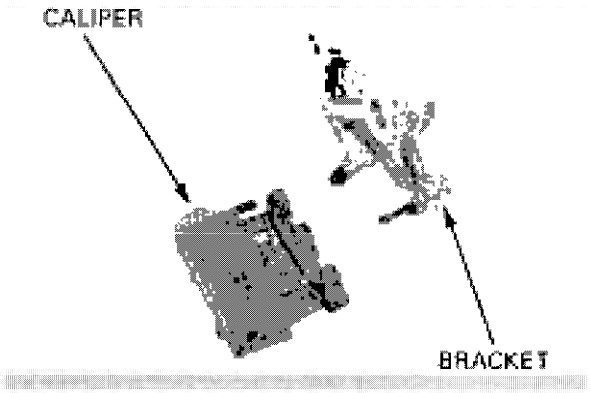
Remove the oil bolt and sealing washers.

Remove the rear wheel (page 16-6).

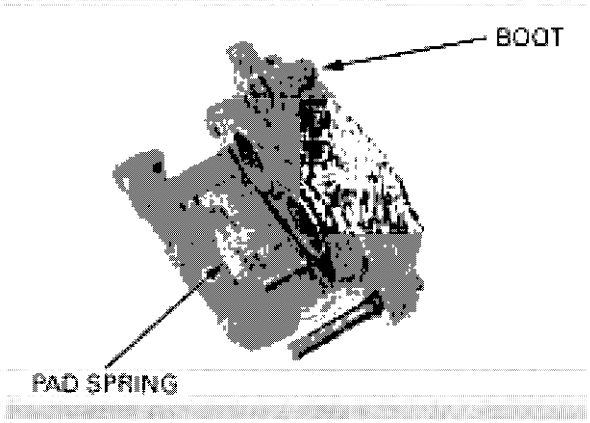


DISASSEMBLY

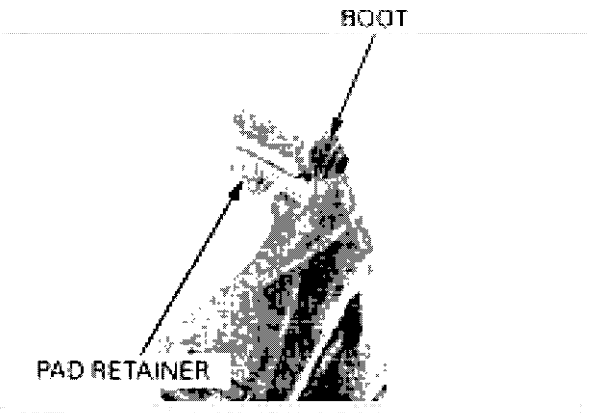
Disassemble the bracket from the caliper.



Remove the bracket pin boot and pad spring from the caliper.

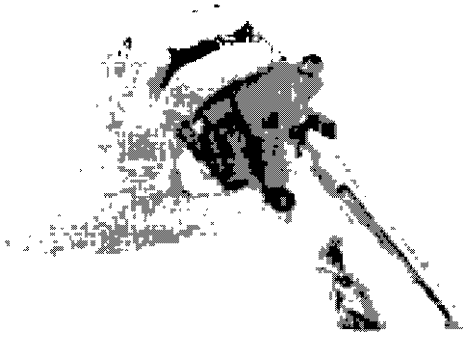


Remove the caliper pin boot and pad retainer from the bracket
Clean the retainer and bracket mating surfaces.



Do not use high pressure air or bring the nozzle too close the inlet.

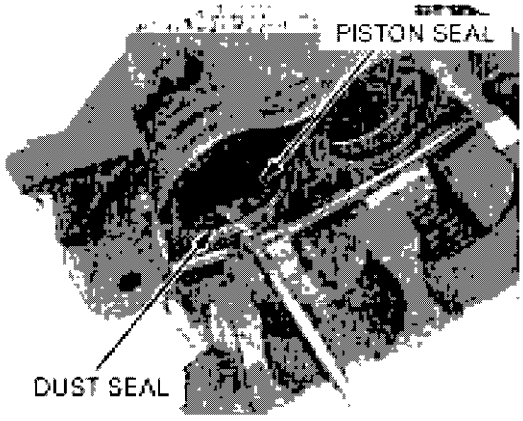
Place a shop towel over the pistons.
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust and piston seals in and lift them out.

Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.

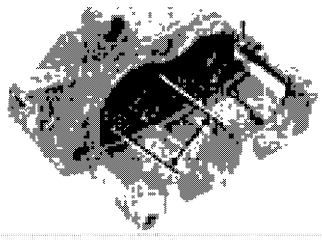


INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

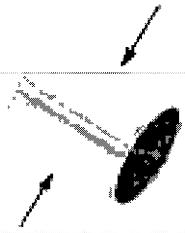
SERVICE LIMIT: 32.090 mm (1.2633 in)



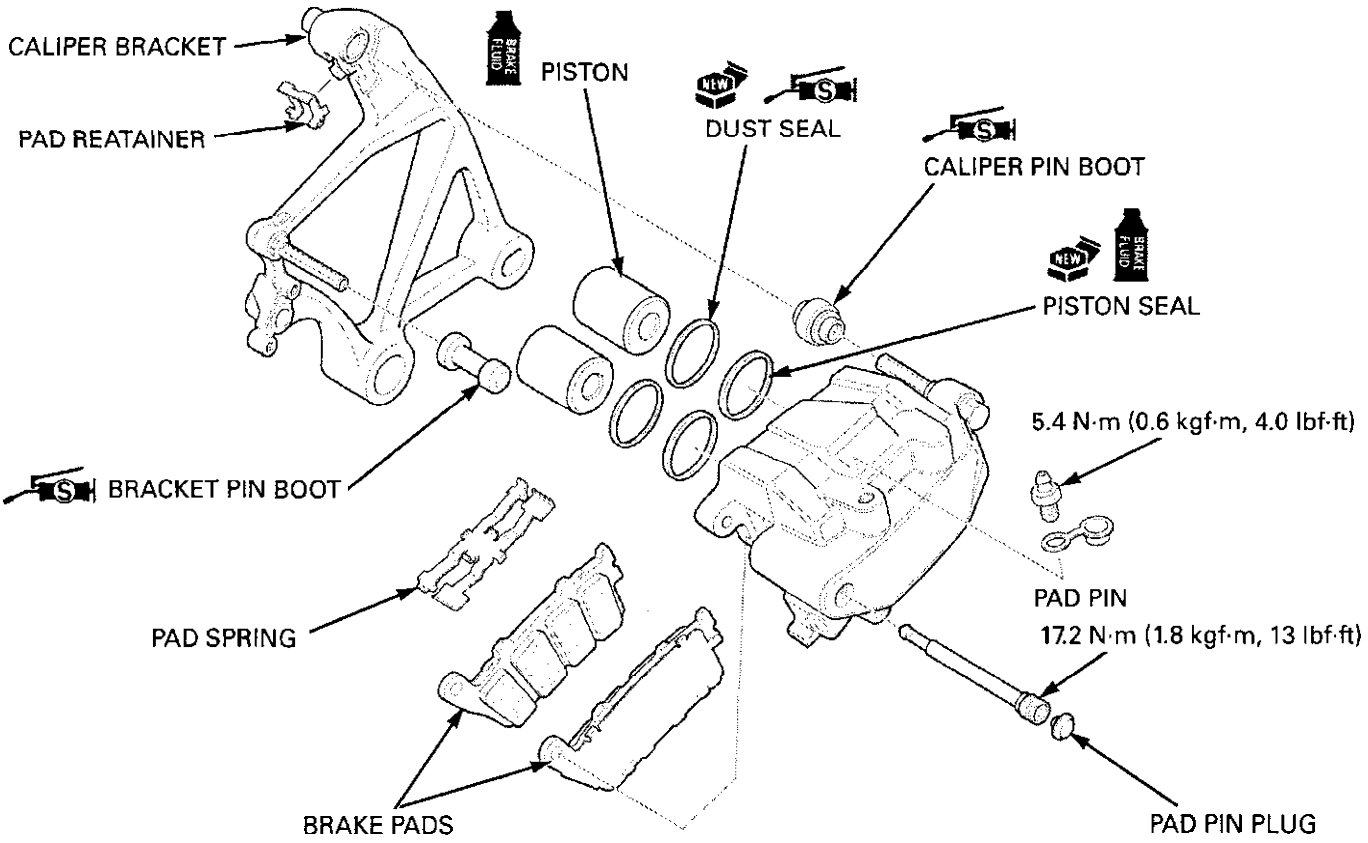
Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 31.940 mm (1.2575 in)

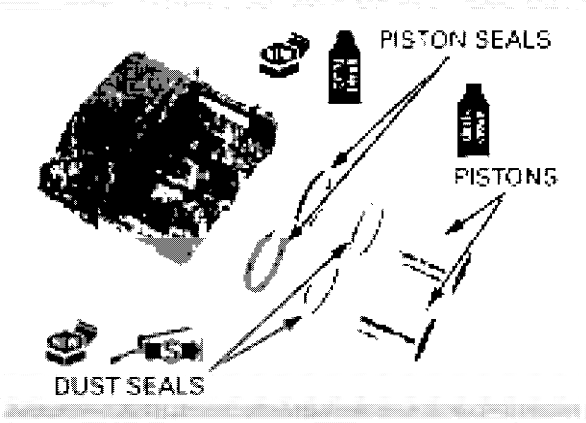


ASSEMBLY



Coat new piston seals with clean brake fluid, new dust seals with silicone grease and install them into the seal grooves in the caliper.

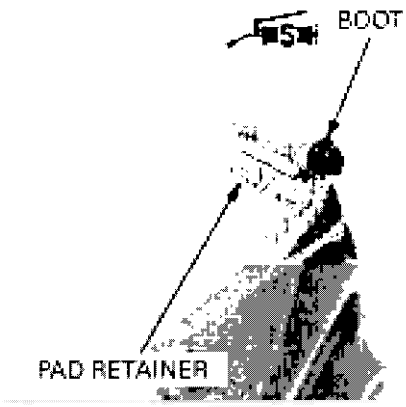
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.



Check the caliper pin boot and replace it if it is hard, deteriorated or damaged.
Apply silicone grease to the inside of the caliper pin boot.
Install the caliper pin boot in the bracket.
If the bracket pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Apply Honda Bond A or equivalent to the pad retainer mating surface.
Install the retainer onto the bracket.



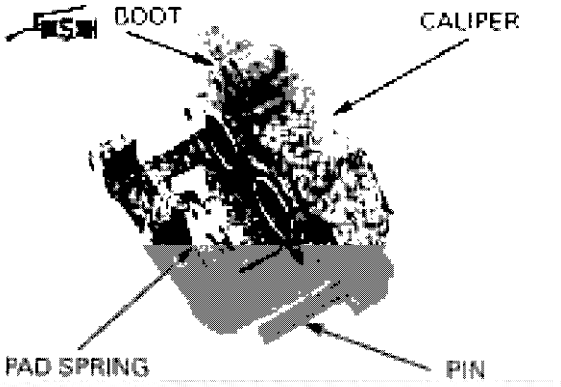
Check the bracket pin boots and replace it if it is hard, deteriorated or damaged.

Apply silicone grease to the inside of the bracket pin boot.

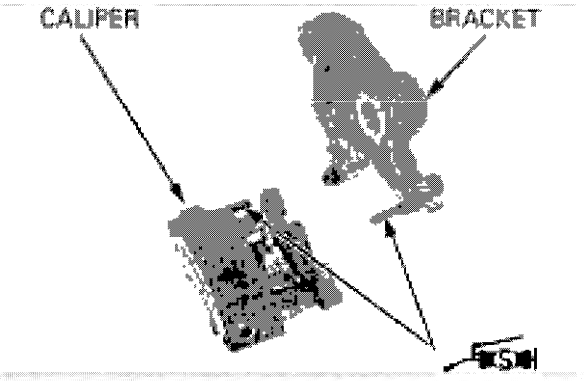
Install the bracket pin boot and pad spring in the caliper.

If the caliper pin is removed, tighten it to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Apply silicone grease to the caliper and bracket pins.
Assemble the caliper bracket and the caliper body.



INSTALLATION

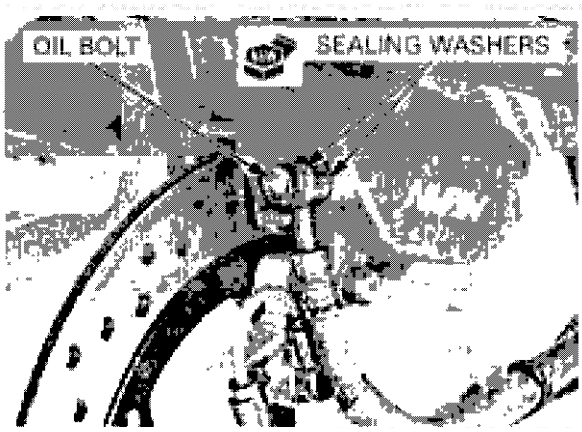
Install the rear caliper to the swingarm.

Install the rear wheel (page 16-13).
Install the brake pad (page 17-14).

Install the brake hose eyelet to the caliper body with new sealing washers and oil bolt.
Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 24 lbf·ft)

Fill and bleed the hydraulic system (page 17-9).

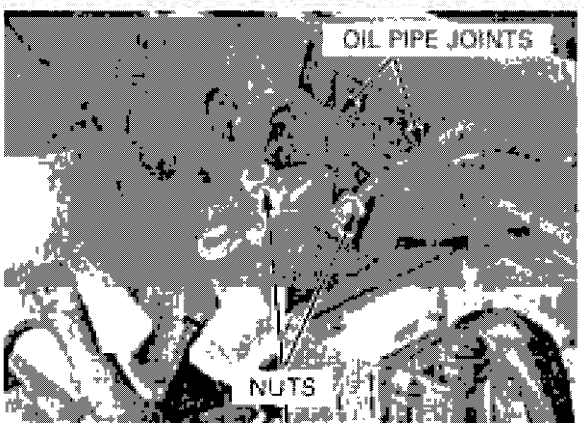


PROPORTIONAL CONTROL VALVE

REMOVAL/INSTALLATION

Remove the right saddle bag body (page 3-7).
Drain the brake fluid from the hydraulic system (page 17-7).

Remove the nuts and oil pipe joints from the proportional control valve.



Remove the bolts and proportional control valve.

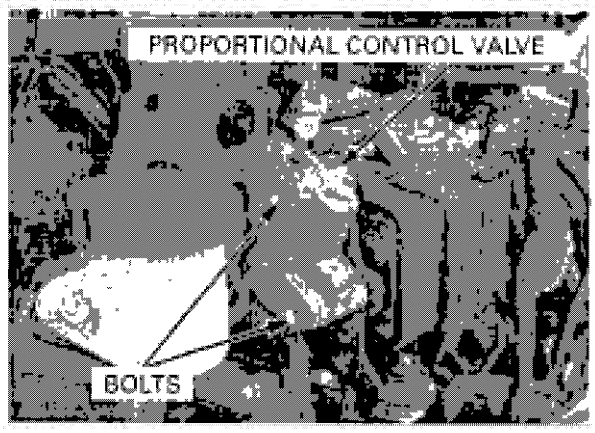
Install the proportional control valve and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the oil pipe joints to the proportional control valve and tighten the nuts to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)

Fill and bleed the hydraulic system (page 17-9).
Install the right saddle bag body (page 3-8).



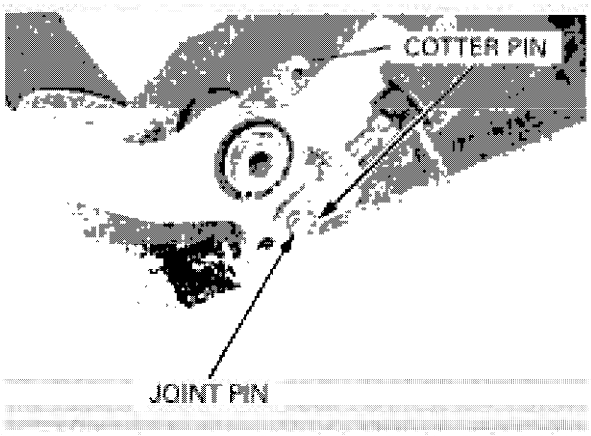
BRAKE PEDAL

REMOVAL/INSTALLATION

Remove the right step holder (page 17-28).

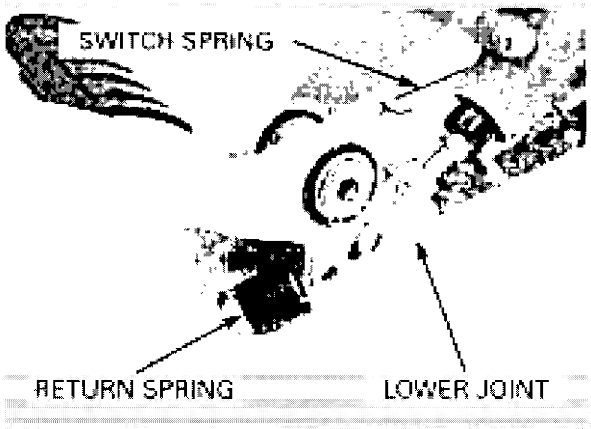
Remove and discard the brake pedal joint cotter pin.

Remove the joint pin.

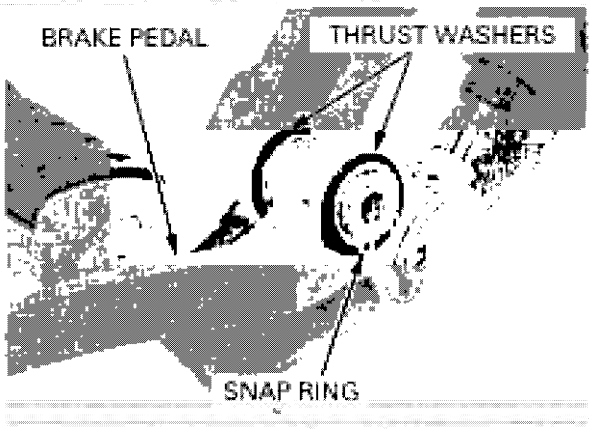


Remove the lower joint from the brake pedal.

Unhook the brake pedal return spring and brake light switch spring from the brake pedal.

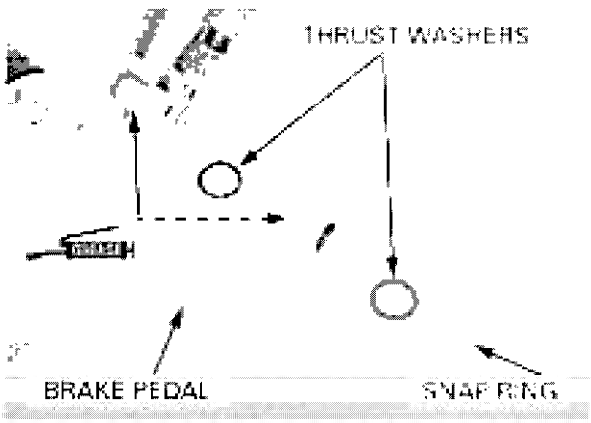


Remove the snap ring, thrust washers and brake pedal from the footpeg.



Apply grease to the sliding surface of the brake pedal and footpeg.

Installation is in the reverse order of removal.



18. ANT-LOCK BRAKE SYSTEM (ABS; NT700VA)

ABS SYSTEM LOCATION 18-3

ABS SYSTEM DIAGRAM 18-4

SERVICE INFORMATION 18-5

ABS TROUBLESHOOTING INFORMATION 18-7

ABS INDICATOR PROBLEM CODE INDEX 18-12

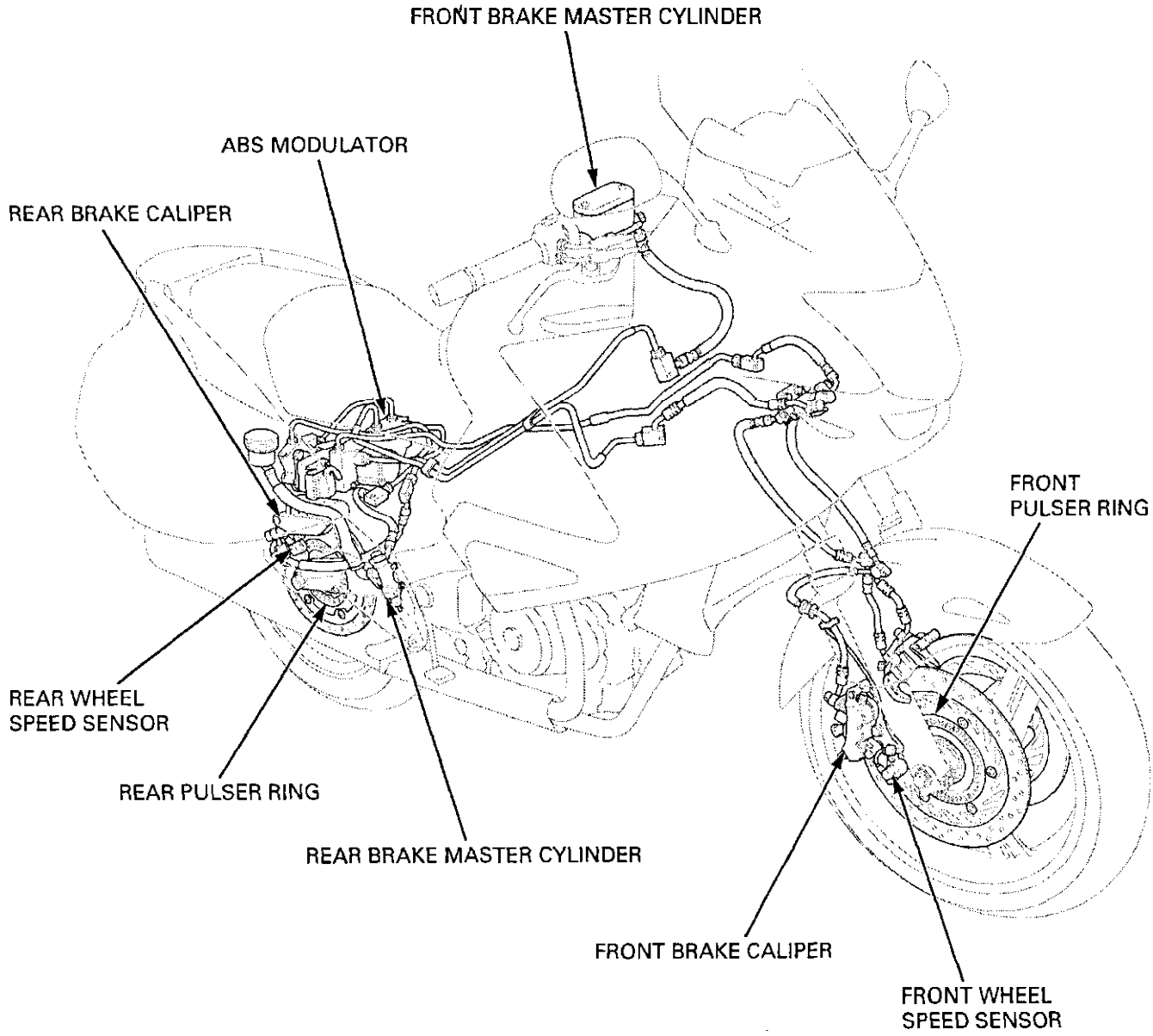
TROUBLESHOOTING 18-14

FRONT WHEEL SPEED SENSOR 18-32

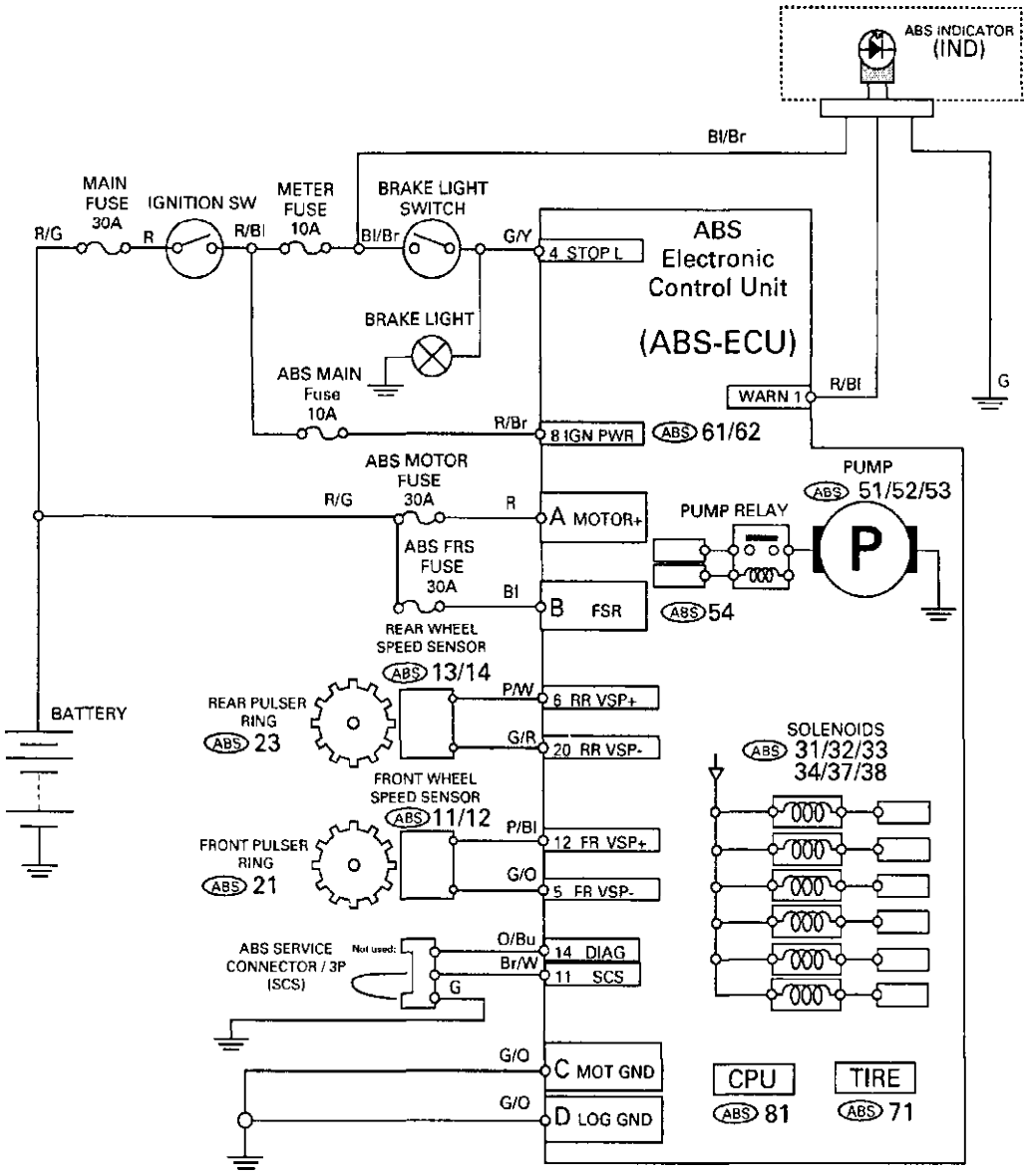
REAR WHEEL SPEED SENSOR 18-34

ABS MODULATOR 18-35

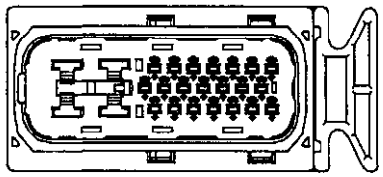
ABS SYSTEM LOCATION

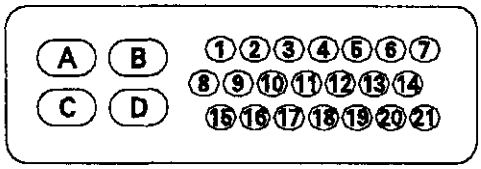


ABS SYSTEM DIAGRAM



Bl.... Black
Y..... Yellow
Bu... Blue
G..... Green
R..... Red
W..... White
Br.... Brown
O..... Orange
P..... Pink





SERVICE INFORMATION

GENERAL

- This section covers service of the Anti-lock Brake System (ABS; NT700VA). For conventional brake service, refer to section 17.
- Pre-start self-diagnosis starts when the ignition switch is turned ON. ABS modulator control unit receives signals and detects if the ABS system functions normally. Pre-start self-diagnosis is complete by when the vehicle speed goes to 10 km/h (6 mph) approximately. The ABS system and the vehicle running condition are monitored constantly after pre-start self-diagnosis until the ignition switch is turned OFF.
- When the ABS control unit detects a problem, it stops the ABS function and switches back to the conventional brake operation, and the ABS indicator blinks or stays on. Take care during the test ride.
- Troubles not resulting from a faulty ABS (e.g. brake disc squeak, unevenly worn brake pad) cannot be recognized by the ABS diagnosis system.
- When the ABS modulator control unit detects a problem, the ABS indicator blinks to notify the rider of the problem. To detect the faulty part, retrieve the problem code by shorting the service check connector terminals.
- Read "Before Starting Troubleshooting" carefully, inspect and troubleshoot the ABS system according to the Diagnostic Troubleshooting flow chart. Observe each step of the procedures one by one. Write down the problem code and probable faulty part before starting diagnosis and troubleshooting.
- ABS control unit (ECU) can record only the first problem data detected while the ignition switch is turned ON until it is turned OFF even when there are multiple failures, erase the problem code when diagnostic troubleshooting is complete, test ride the motorcycle above 30 km/h (18 mph) and check the other problem code by retrieving the self-diagnosis system.
- When the wheel speed sensor and/or pulser ring is replaced, check the clearance (air gap) between both components.
- The ABS control unit (ECU) is mounted on the modulator (the modulator with the built-in ECU). Do not disassemble the ABS modulator. Replace the ABS modulator as an assembly when it is faulty.
- The ABS modulator may be damaged if dropped. Also if a connector is disconnected when current is flowing, the excessive voltage may damage the control unit. Always turn off the ignition switch before servicing.
- Be careful not to damage the wheel speed sensor and pulser ring when removing and installing the wheel.
- The following color codes are used throughout this section.

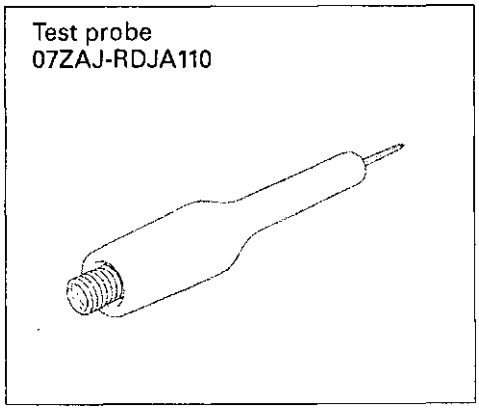
Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

TORQUE VALUES

Brake pipe nut	17 N·m (1.7 kgf·m, 13 lbf·ft)	Apply brake fluid to the threads
Modulator stay bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt; replace with a new one
Pulser ring bolt	7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	

TOOL

Test probe
07ZAJ-RDJA110



ABS TROUBLESHOOTING INFORMATION

SYSTEM DESCRIPTION

SUMMARY OF ABS PRE-START SELF-DIAGNOSIS SYSTEM

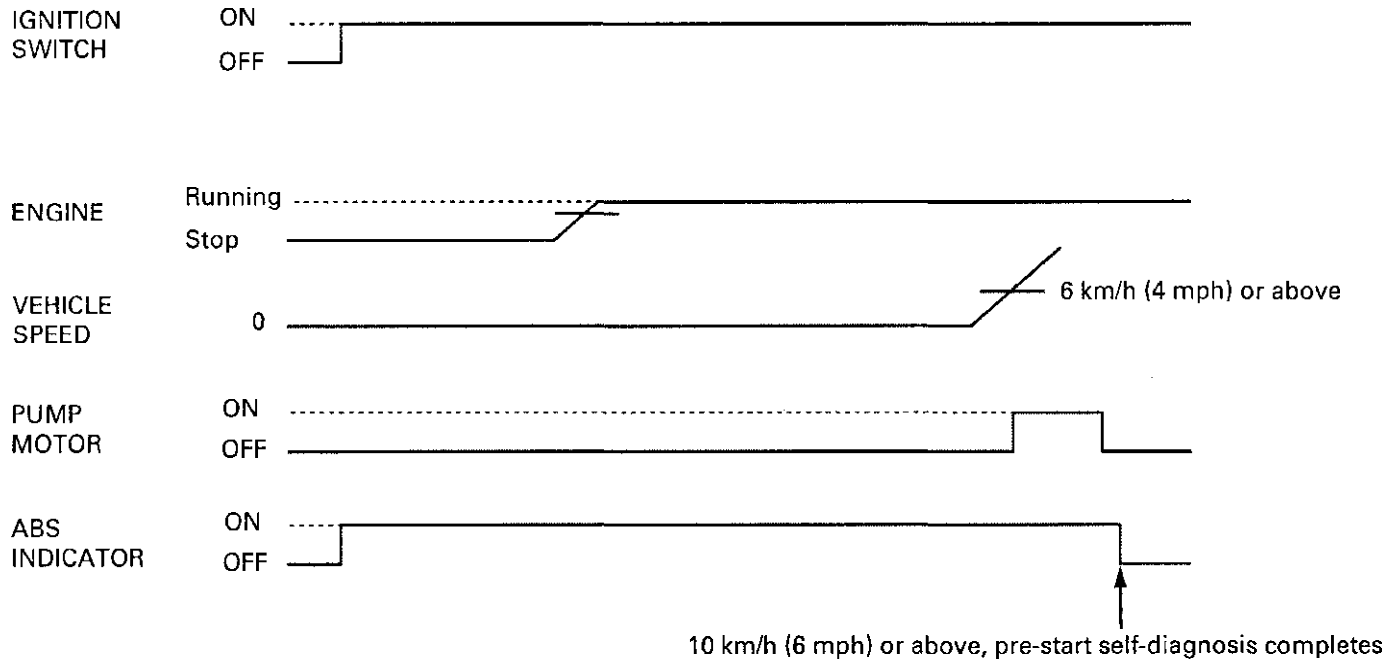
The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the modulator. When there is any abnormality, the problem and the problematic part can be detected by outputting the problem code.

When the vehicle is running, pulse signals generated at the front/rear wheel speed sensor are sent to the ABS control unit. When the ABS control unit detects that vehicle speed goes to 6 km/h (4 mph), the pump motor is temporarily operated to check if the ABS system functions normally. If the system is normal, pre-start self-diagnosis is complete by when the vehicle speed goes to 10 km/h (6 mph) approximately.

If the ABS indicator blinks, because problem is detected during the pre-start self-diagnosis, See page 18-7.

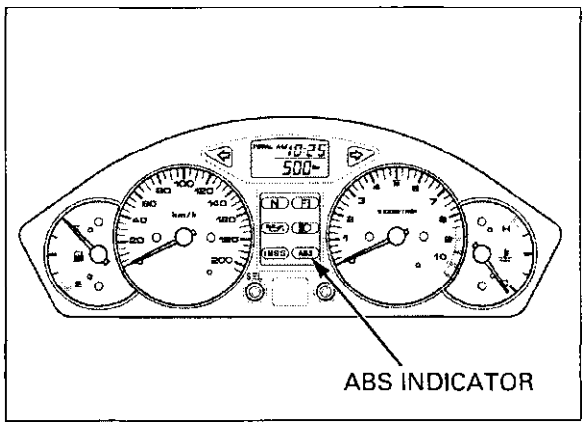
If the ABS indicator does not come on when the ignition switch is turned ON, or the ABS indicator stays on after the pre-start self-diagnosis procedure is complete, the ABS indicator may be faulty. Follow the troubleshooting (page 18-10).

Pre-start self-diagnosis when normal:



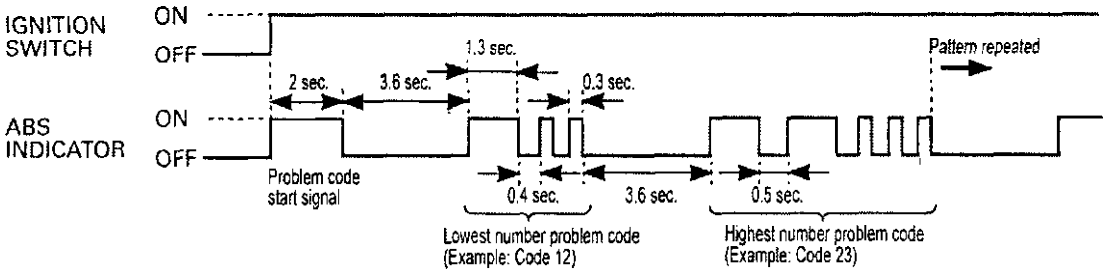
PRE-START SELF-DIAGNOSIS PROCEDURE

1. *Turn the ignition switch ON and engine stop switch to "○".*
2. Make sure the ABS indicator comes on.
3. Start the engine.
4. Ride the motorcycle and increase the vehicle speed to approximately 10 km/h (6 mph).
5. The ABS is normal if the ABS indicator goes off.



PROBLEM CODE INDICATION PATTERN

- The ABS indicator indicates the problem code by blinking a specified number of times. The indicator has two types of blinkings, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.3 seconds. When two long blinks occur, and three short blinks, that problem code is 23 (two long blinks = 20 blinks, three short blinks = 3 blinks). Then, go to troubleshooting and see problem code 23.
- When the ABS control unit stores some problem codes, the ABS indicator shows the problem codes in the order from the lowest number to highest number. For example, when the indicator indicates code 12, then indicates code 23, two failures have occurred.



When the problem code is not stored:

PROBLEM CODE READOUT

NOTE:

- The problem code is not erased by turning the ignition switch to OFF while the problem code is being output. Note that turning the ignition switch to ON again does not indicate the problem code. To show the problem code again, repeat the problem code retrieval procedures from the beginning.
- After diagnostic troubleshooting, erase the problem code(s) and perform the pre-start self-diagnosis to be sure that there is no problem in the ABS indicator (indicator is operating normally).

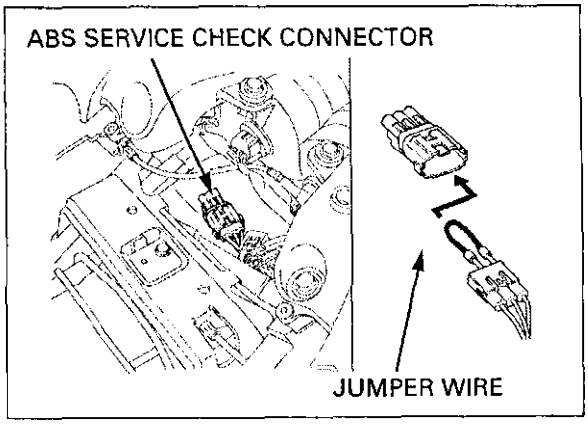
Do not apply the front or rear brake during retrieval.

1. Remove the seat (page 3-5).

   Turn the ignition switch OFF.

   Disconnect the dummy connector from the ABS service check 3P (Natural) connector.
   Short the wire terminals of the ABS service check 3P (Natural) connector with a jumper wire.

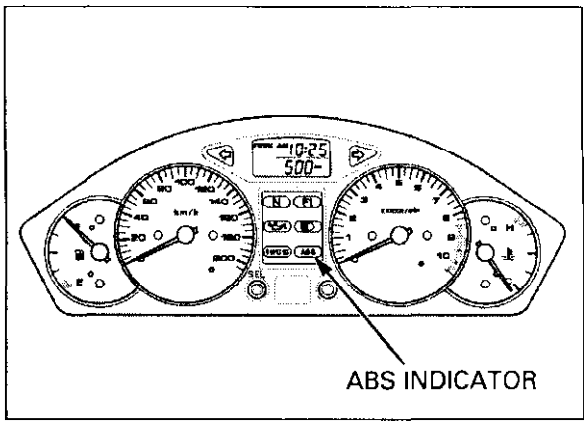
   CONNECTION: Brown/white – Green



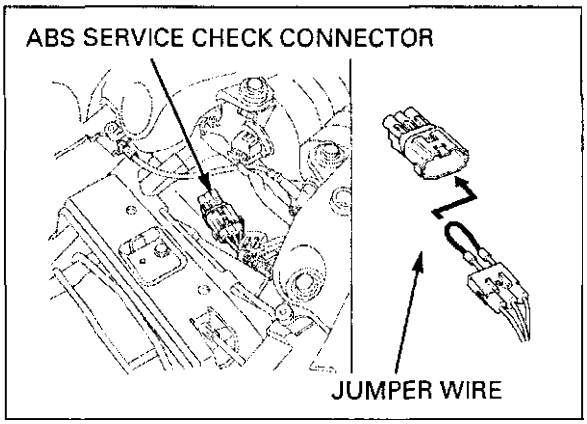
2. Turn the ignition switch ON.

   The ABS indicator starts problem code indication.

   Note how many times the ABS indicator blinks, and determine the cause of the problem (page 18-9).



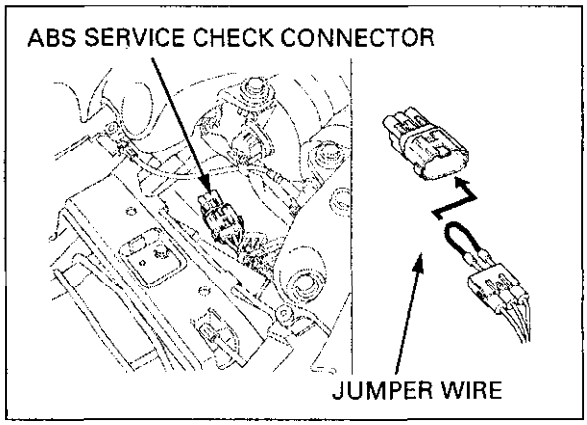
3. Turn the ignition switch OFF and remove the jumper wire.



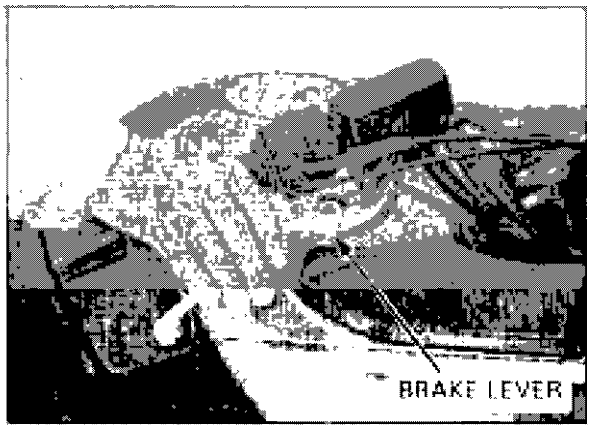
CLEANING PROBLEM CODE

1. Short the wire terminals of the service check 3P (Natural) connector with a jumper wire with the ignition switch turned OFF in the same manner as retrieval.

   CONNECTION: Brown/White – Green



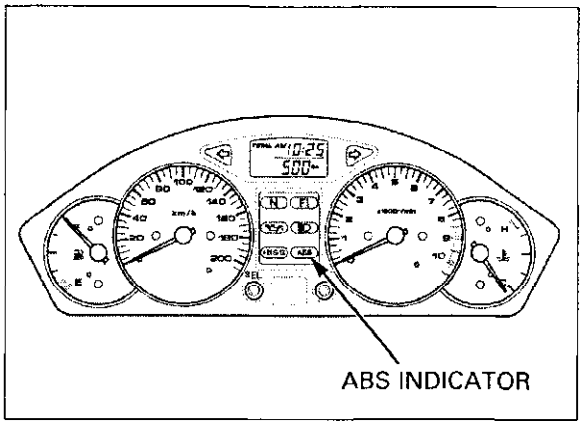
2. Turn the ignition switch ON and engine stop switch to "○" while squeezing the brake lever. The ABS indicator should come on for 2 seconds and go off.
3. Release the brake lever immediately after the ABS indicator is off. The ABS indicator should come on.
4. Squeeze the brake lever immediately after the ABS indicator is on. The ABS indicator should go off.



5. Release the brake lever immediately after the ABS indicator is off.
   When code erasure is complete, the ABS indicator blinks 2 times and stays on.

   If the ABS indicator does not blink 2 times, the data has not been erased, so try again.

   If the ABS indicator blinks 2 times and blinks, faulty ABS system, go to ABS trouble shooting (page 18-10).
6. Turn the ignition switch to OFF.



ABS INDICATOR PROBLEM CODE INDEX

NOTE:

- The ABS indicator denotes the problem codes from 11 to 81. The indicator has two types of blinks, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.3 seconds.
- ABS control unit (ECU) can record only the first problem data detected while the ignition switch is turned ON until it is turned OFF even when there are multiple failures. To detect possible multiple failures, erase the problem code when diagnostic troubleshooting is complete, test ride the motorcycle above 30 km/h (18 mph) and check the other problem code by retrieving the self diagnosis system (page 18-5).
- The ABS indicator might blink in the following cases. Correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the motorcycle were installed (incorrect tire size).
  - Deformation of the wheel or tire.
- The ABS indicator might blink while riding under the following conditions. This is temporary failure. Be sure to erase the problem code (page 18-9).
  Then, test ride the motorcycle above 30 km/h (18 mph) and check the problem code by retrieving the self-diagnosis system (page 18-5). Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
  - The motorcycle has continuously run bumpy roads.
  - The front wheel leaves the ground for a long time when riding (wheelie).
  - Only either the front or rear wheel rotates.
  - The ABS operates continuously.
  - The ABS control unit has been disrupted by an extremely powerful radio wave (electromagnetic interference).

Problem Code	Check Part/Symptoms	Detection		Probable faulty part	Reference page
		A	B		
–	ABS indicator does not come on			• Indicator related wires	18-10
	ABS indicator stays on after the pre-start self-diagnosis procedure is complete				18-11
11	Front wheel speed sensor	O	O	• Wheel speed sensor or related wires	18-13
13	Rear wheel speed sensor	O	O		18-15
12	Front wheel speed sensor		O	• Wheel speed sensor or related wires • Electromagnetic interference	18-13
14	Rear wheel speed sensor		O		18-15
21	Front pulser ring		O	• Pulser ring or wheel speed sensor	18-13
23	Rear pulser ring		O		18-15
31	Solenoid valve	O	O	• Solenoid valve (modulator)	18-17
32					
33					
34					
37					
38					
41	Front wheel lock		O	• Riding condition	18-13
42					
43	Rear wheel lock		O		18-15
51	Motor lock	O	O	• Pump motor (modulator) or related wires	18-17
52	Motor stuck off	O	O		
53	Motor stuck on	O	O		
54	Fail-safe relay	O	O	• Fail-safe relay (modulator) or related wires	18-19
61	Power circuit	O	O	• Input voltage (too low)	18-20
62	Power circuit	O	O	• Input voltage (too high)	
71	Tire		O	• Tire size	18-21
81	CPU	O	O	• ABS control unit (modulator)	18-22

(A) Pre-start self-diagnosis (page 18-5)
(B) Ordinary self-diagnosis: diagnoses while the motorcycle is running (after pre-start self-diagnosis)

TROUBLESHOOTING

NOTE:

- Perform inspection with the ignition switch turned OFF, unless otherwise specified.
- All connector diagrams in the troubleshooting are viewed from the terminal side.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- When the ABS modulator assembly is detected to be faulty, recheck the wire harness and connector connections closely before replacing it.
- After diagnostic troubleshooting, erase the problem code (page 18-7).
  Then test ride the motorcycle above 30 km/h (18 mph) and check the other problem code by retrieving the self-diagnosis system (page 18-5).

NO PROBLEM CODE FAILURE

ABS INDICATOR DOES NOT COME ON (when the ignition switch turned ON)

1. **Combination Meter Power/ground Line Inspection**

   Check the combination meter power and ground lines.

   Are the wires normal?

   NO – Open circuit in related wires.

   YES – GO TO STEP 2.

2. **Indicator Operation Inspection**

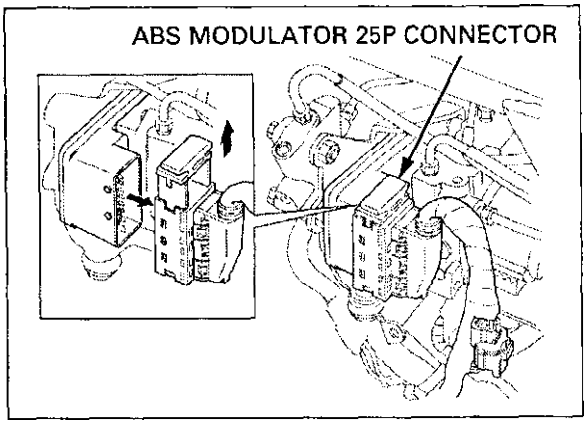
   Disconnect the ABS modulator 25P connector (page 18-24).

   Turn the ignition switch ON and check the ABS indicator.

   Does the indicator come on?

   YES – Faulty ABS modulator.

   NO – GO TO STEP 3.



3. **Indicator Signal Line Short Circuit Inspection**

   Disconnect the combination meter 20P connector.

   Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

   TOOL:

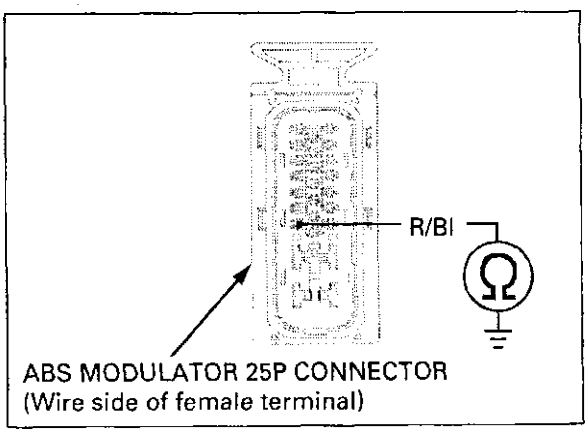
   Test probe **07ZAJ-RDJA110**

   CONNECTION: Red/black – Ground

   Is there continuity?

   YES – Short circuit in Red/black wire between the combination meter and ABS modulator.

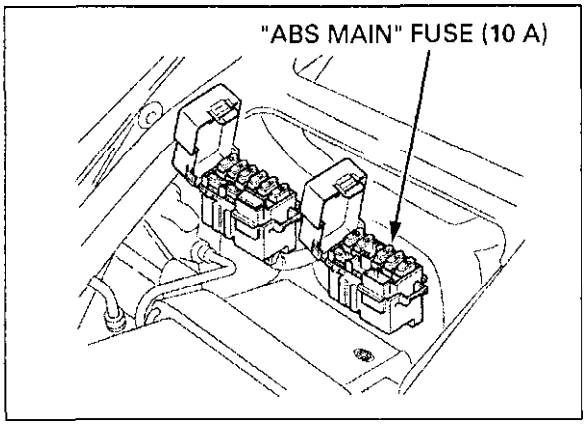
   NO – Faulty combination meter.



ABS INDICATOR STAYS ON (–Indicator does not go off when the motorcycle is running, –Problem code is not indicated by the retrieval procedure)

1. Fuse Inspection

Check the "ABS MAIN" fuse (10 A) in the fuse box.



Is the fuse blown?

YES – GO TO STEP 2.

NO – GO TO STEP 3.

2. ABS Power Input Line Short Circuit Inspection

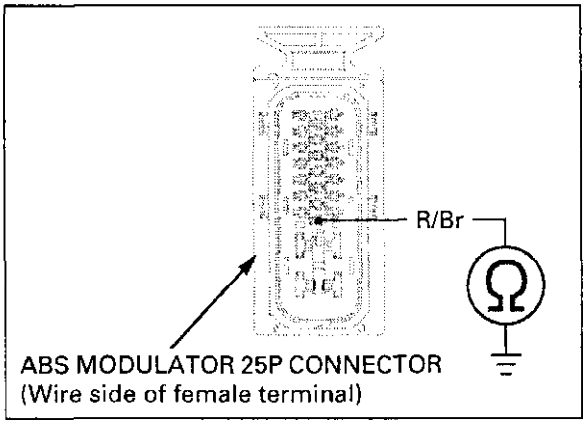
Disconnect the ABS modulator 25P connector (page 18-24).

Check for continuity between the ABS modulator connector of the wire harness side and ground with "ABS MAIN" fuse removed.

TOOL:

Test probe **07ZAJ-RDJA110**

CONNECTION: Red/brown – Ground



Is there continuity?

NO – Intermittent failure. Replace the "ABS MAIN" fuse (10 A) with a new one, and recheck.

YES – Short circuit in Red/brown wire between the fuse box and ABS modulator.

3. ABS Power Input Line Open Circuit Inspection

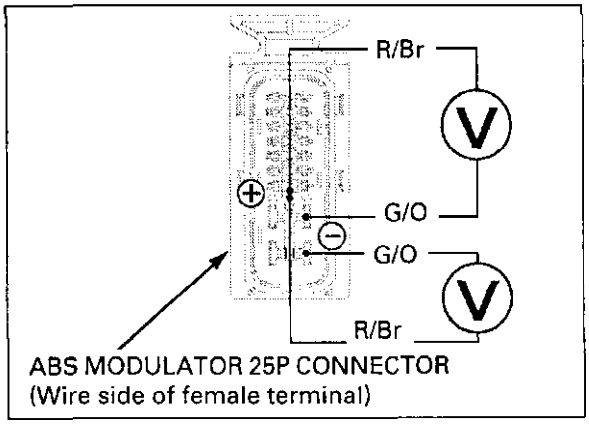
Install the "ABS MAIN" fuse.
Disconnect the ABS modulator 25P connector (page 18-24).

Measure the voltage between the ABS modulator of the wire harness side with the ignition switch turned ON.

TOOL:

Test probe **07ZAJ-RDJA110**

CONNECTION: Red/brown (+) – Green/orange (–)



Does the battery voltage exist?

NO – • Open circuit in Red/brown wire between the fuse box and ABS modulator.
• Open circuit in Green/orange wire between the ABS modulator and body ground.
• Loose or poor contact on the connector

YES – GO TO STEP 4.

4. **Service Check Line Short Circuit Inspection**

Turn the ignition switch OFF.

Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

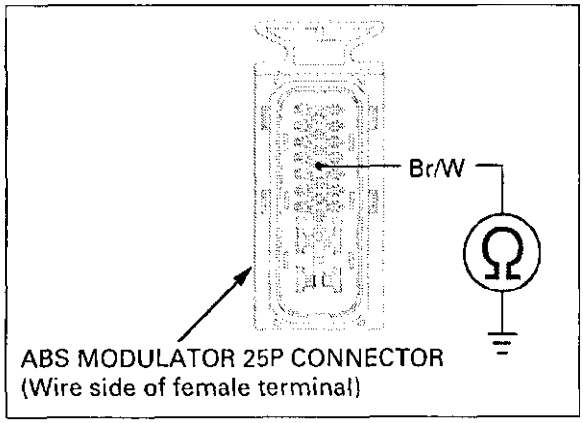
TOOL:
Test probe **07ZAJ-RDJA110**

CONNECTION: Brown/white – Ground

Is there continuity?

YES – Short circuit in Brown/white wire between the service check connector and ABS modulator.

NO – GO TO STEP 5.



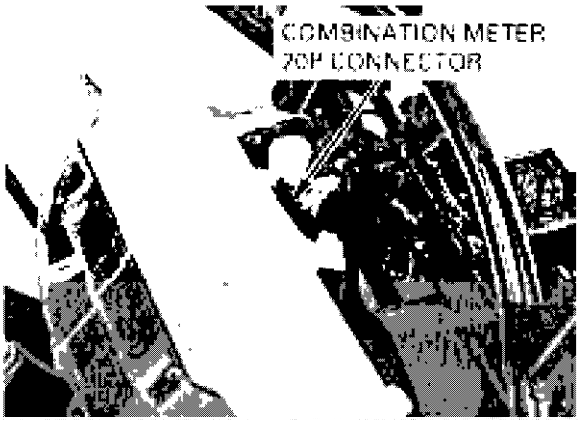
5. **Indicator Operation Inspection**

With the combination meter 20P connector connected, short the Red/black wire terminal of the combination meter and ground with a jumper wire.
Check the ABS indicator with the ignition switch turned ON.

Does the ABS indicator go off?

NO – Faulty combination meter.

YES – GO TO STEP 6.



6. **Indicator Signal Line Open Circuit Inspection**

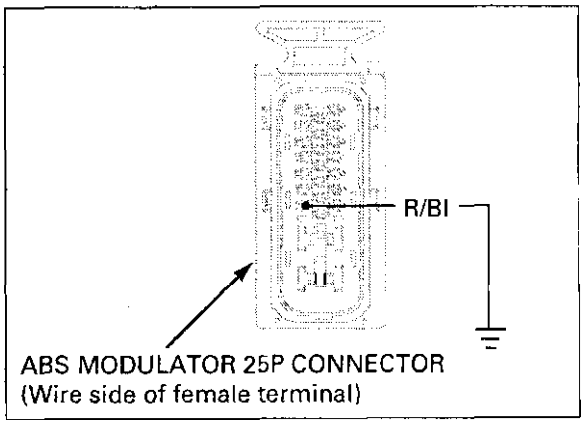
Turn the ignition switch OFF.

Remove the jumper wire from the combination meter 20P connector.
Short the Red/black wire terminal of the ABS modulator 25P connector and ground with a jumper wire.
Check the ABS indicator with the ignition switch turned ON.

Does the ABS indicator go off?

NO – Open circuit in Red/black wire between the combination meter and ABS modulator.

YES – Faulty ABS modulator.



PROBLEM CODE 11, 12, 21, 41 or 42 (Front Wheel Speed Sensor)

NOTE:

- The ABS indicator might blink under unusual riding or conditions (page 18-9).
  This is temporary failure. Erase the problem code (page 18-7).
  Then test ride the motorcycle above 30 km/h (18 mph) and check the problem code by retrieving the self-diagnosis system (page 18-6).
- If the problem code 41 is indicated, check the front brake for drag.

1. ***Speed Sensor Air Gap Inspection***

   Support the motorcycle securely using a hoist or equivalent and raise the wheel off the ground.
   Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.

   STANDARD: 0.2 – 1.2 mm (0.01 – 0.05 in)

   Is the air gap correct?

   NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.

   YES – GO TO STEP 2.

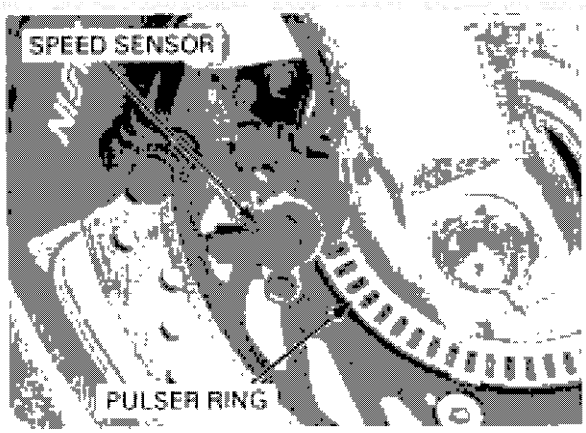
2. **Speed Sensor Condition Inspection**

   Inspect the area around the front wheel speed sensor:
   Check that there is iron or other magnetic deposits between the pulser ring and wheel speed sensor, and the pulser ring slots for obstructions.
   Check installation condition of the pulser ring or wheel speed sensor for looseness.
   Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).

   Are the sensor and pulser ring in good condition?

   NO – Remove any deposits. Install properly or replace faulty part.

   YES – GO TO STEP 3.



3. **Speed Sensor Line Short Circuit Inspection (at control unit side)**

   Disconnect the ABS modulator 25P connector (page 18-24).
   Disconnect the front wheel speed sensor 2P (Orange) connector (page 18-22).

   Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

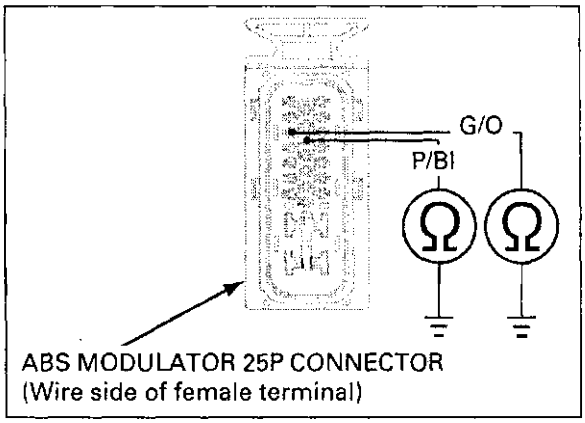
   TOOL:
   Test probe **07ZAJ-RDJA110**

   CONNECTION: Pink/black – Ground
   Green/orange – Ground

   Is there continuity?

   YES – Short circuit in wire between the ABS modulator and front wheel speed sensor.

   NO – GO TO STEP 4.



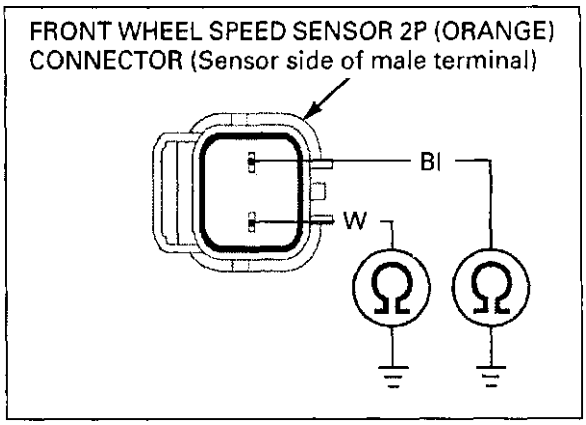
4. **Speed Sensor Line Short Circuit Inspection (at sensor side)**

   Check for continuity between each terminal (Black and White) of the sensor side 2P (Orange) connector and ground in the same manner as the previous step.

   Is there continuity?

   YES – Faulty front wheel speed sensor.

   NO – GO TO STEP 5.



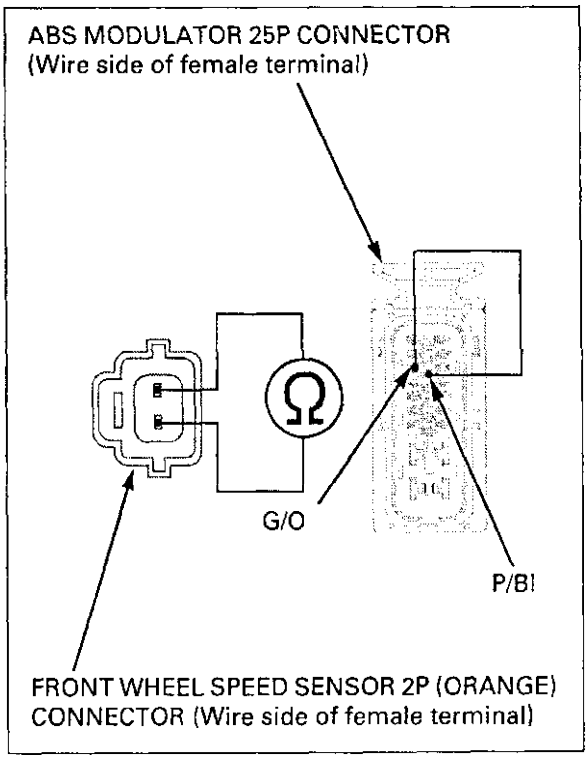
5. **Speed Sensor Line Open Circuit Inspection**

   Short the Pink/black and Green/orange wire terminals of the ABS modulator 25P connector with a jumper wire.
   Check for continuity at the terminals of the wire harness side front wheel speed sensor 2P (Orange) connector.

   Is there continuity?

   NO – Open circuit in wire between the ABS modulator and speed sensor.

   YES – GO TO STEP 6.



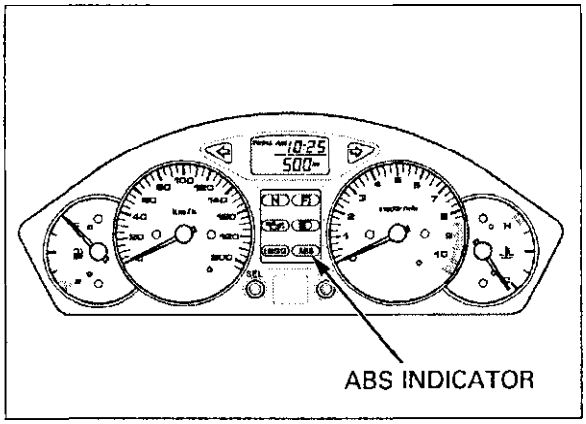
6. **Failure Reproduction with a New Speed Sensor**

Replace the front wheel speed sensor with a new one (page 18-22).
Connect the ABS modulator 25P connector.
Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Dose the indicator blink 11, 12, 21, 41 or 42 times?

NO – Faulty removed front wheel speed sensor.

YES – Faulty ABS modulator.



PROBLEM CODE 13, 14, 23 or 43 (Rear Wheel Speed Sensor)

NOTE:

- The ABS indicator might blink under unusual riding or conditions (page 18-9).
  This is temporary failure. Erase the problem code (page 18-7).
  Then test ride the motorcycle above 30 km/h (18 mph) and check the problem code by retrieving the self-diagnosis system (page 18-6).
- If the problem code 43 is indicated, check the rear brake for drag.

1. **Speed Sensor Air Gap Inspection**

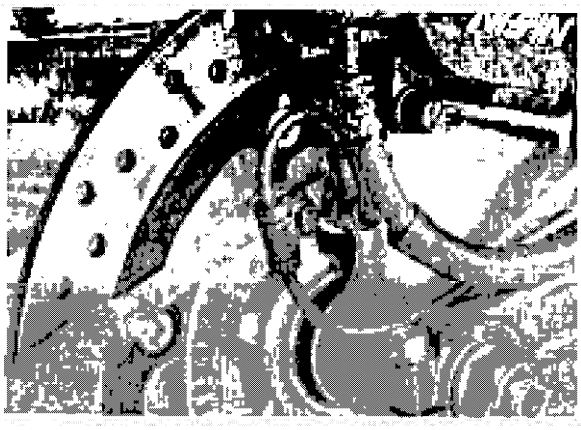
Place the motorcycle on its center stand.
Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.

STANDARD: 0.2 – 1.2 mm (0.01 – 0.05 in)

Is the air gap correct?

NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.

YES – GO TO STEP 2.



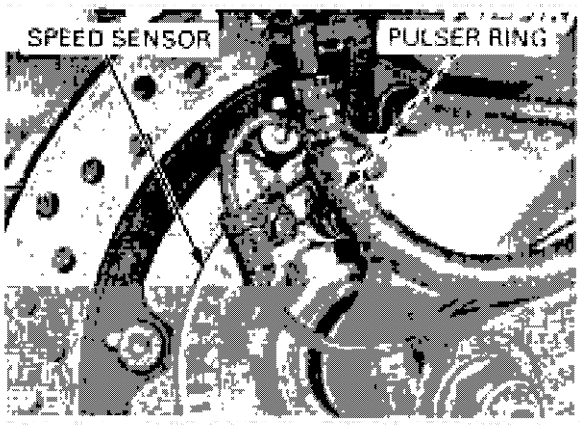
2. **Speed Sensor Condition Inspection**

Inspect the area around the rear wheel speed sensor:
Check that there is iron or other magnetic deposits between the pulser ring and wheel speed sensor, and the pulser ring slots for obstructions.
Check installation condition of the pulser ring or wheel speed sensor for looseness.
Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).

Are the sensor and pulser ring in good condition?

NO – Remove any deposits. Install properly or replace faulty part.

YES – GO TO STEP 3.



3. **Speed Sensor Line Short Circuit Inspection (at control unit side)**

   Disconnect the ABS modulator 25P connector (page 18-24).
   Disconnect the rear wheel speed sensor 2P (Orange) connector (page 18-24).

   Check for continuity between the ABS modulator connector of the wire harness side and ground.

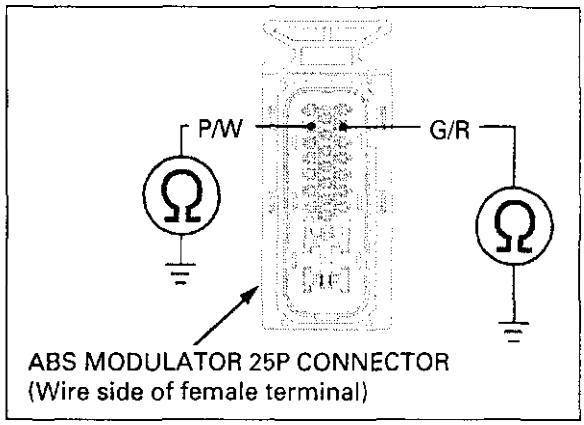
   TOOL:
   Test probe **07ZAJ-RDJA110**

   CONNECTION: Pink/white – Ground
   Green/red – Ground

   Is there continuity?

   YES – Short circuit in wire between the ABS modulator and rear wheel speed sensor.

   NO – GO TO STEP 4.



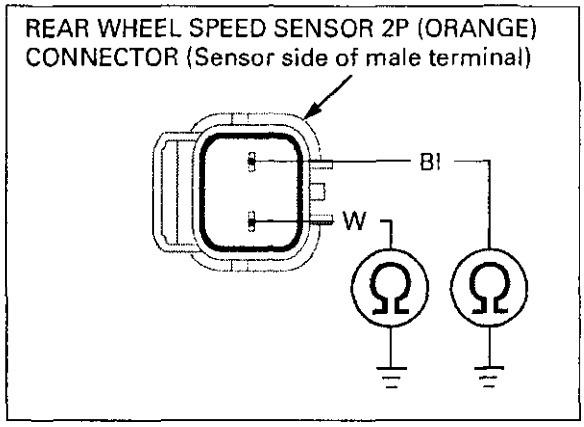
4. **Speed Sensor Line Short Circuit Inspection (at sensor side)**

   Check for continuity between each terminal (Black and White) of the sensor side 2P (Orange) connector and ground in the same manner as the previous step.

   Is there continuity?

   YES – Faulty rear wheel speed sensor.

   NO – GO TO STEP 5.



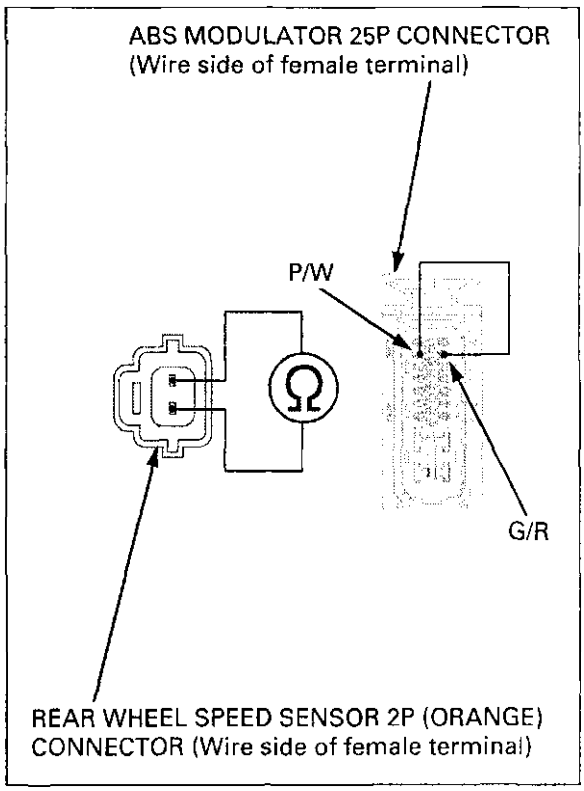
5. **Speed Sensor Line Open Circuit Inspection**

   Short the Pink/white and Green/red wire terminals of the ABS modulator 25P connector with a jumper wire.
   Check for continuity at the terminals of the wire harness side rear wheel speed sensor 2P (Orange) connector.

   Is there continuity?

   NO – Open circuit in wire between the ABS modulator and speed sensor.

   YES – GO TO STEP 6.



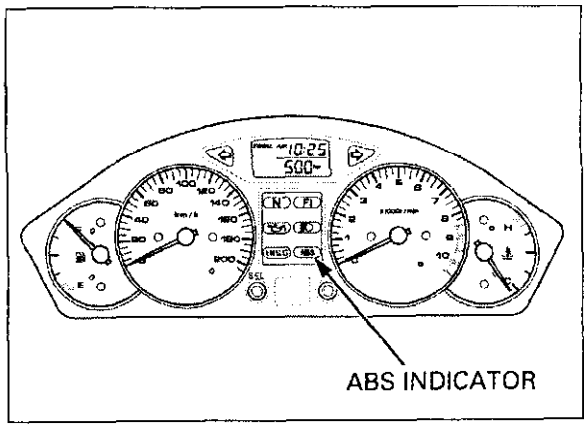
6. **Failure Reproduction with a New Speed Sensor**

Replace the rear wheel speed sensor with a new one (page 18-24).
Connect the ABS modulator 25P connector.
Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Dose the indicator blink 13, 14, 23 or 43 times?

NO – Faulty removed rear wheel speed sensor.

YES – Faulty ABS modulator.



PROBLEM CODE 31, 32, 33, 34, 37 or 38 (Solenoid Valve)

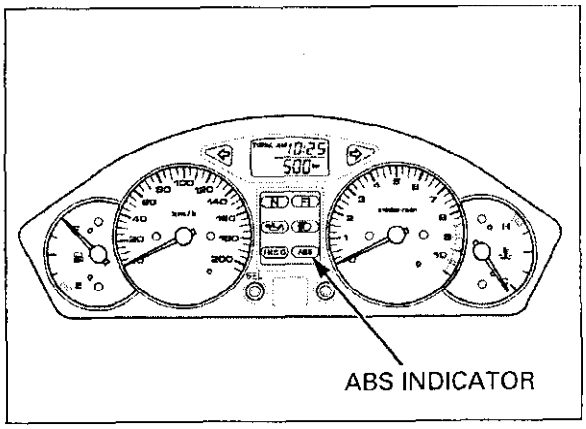
1. **Failure Reproduction**

Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Does the indicator blink 31, 32, 33, 34, 37 or 38 times?

YES – Faulty ABS modulator.

NO – Solenoid valve is normal (temporary failure).



PROBLEM CODE 51, 52 or 53 (Pump Motor)

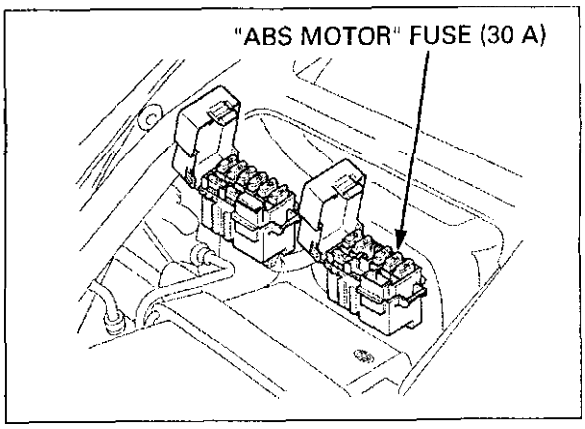
1. **Fuse Inspection**

Check the "ABS MOTOR" fuse (30 A) in the fuse box for blown.

Is the fuse blown?

YES – GO TO STEP 2.

NO – GO TO STEP 3.



2. **Motor Power Input Line Short Circuit Inspection**

Disconnect the ABS modulator 25P connector (page 18-24).

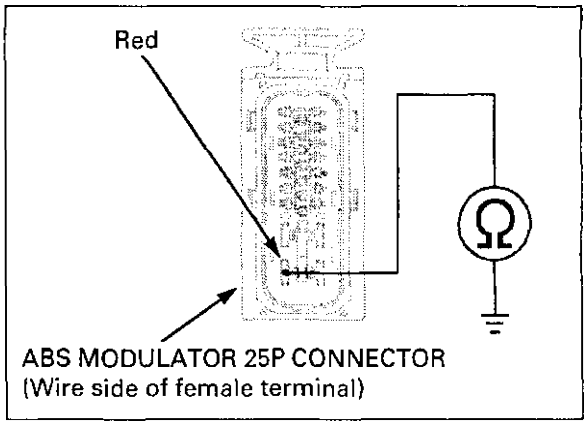
Check for continuity between the ABS modulator 25P connector of the wire harness side and ground with "ABS MOTOR" fuse removed.

CONNECTION: Red – Ground

Is there continuity?

NO – Temporary failure. Replace the "ABS MOTOR" fuse (30 A) with a new one and recheck.

YES – Short circuit in Red wire between the fuse box and ABS modulator.



3. **Motor Power Input Line Open Circuit Inspection (at control unit side)**

Install the "ABS MOTOR" fuse.
Disconnect the ABS modulator 25P connector (page 18-24).

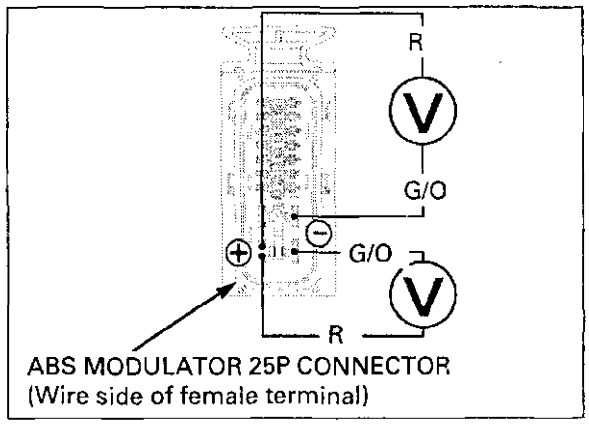
Measure the voltage between the ABS modulator 25P connector from the wire harness side. There should be battery voltage at all times.

CONNECTION: Red (+) – Green/orange (–)

Is there battery voltage?

NO – • Open circuit in Red wire and/or Red/green wire between the battery and ABS modulator.
• Open circuit in Green/orange wire between the ABS modulator and body ground.
• Loose or poor contact on the connector.

YES – GO TO STEP 4.



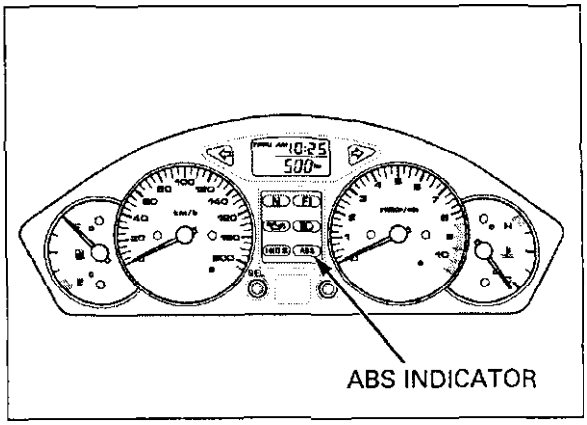
4. **Failure Reproduction**

Turn the ignition switch "OFF".
Connect the ABS modulator 25P connector.
Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Does the indicator blink 51, 52, or 53 times?

YES – Faulty ABS modulator.

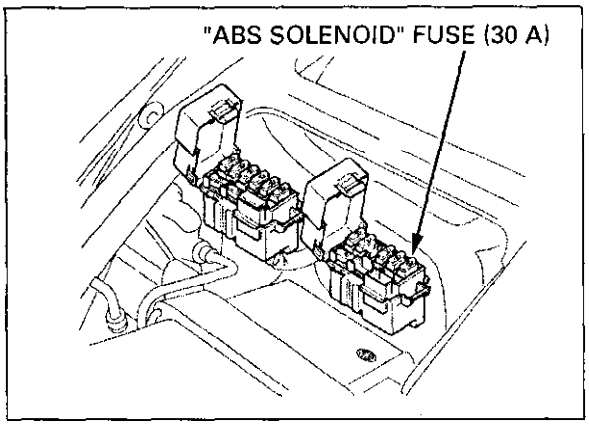
NO – Pump motor is normal (temporary failure).



PROBLEM CODE 54 (Fail-safe Relay)

1. **Fuse Inspection**

Check the "ABS SOLENOID" fuse (30 A) in the fuse box for blown.



Is the fuse blown?

YES – GO TO STEP 2.

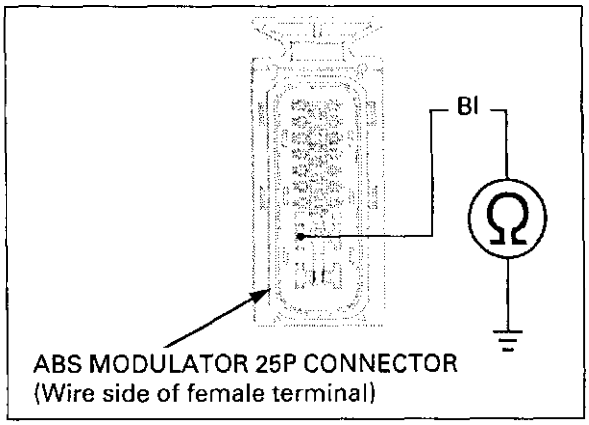
NO – GO TO STEP 3.

2. **Relay Power Input Line Short Circuit Inspection**

Disconnect the ABS modulator 25P connector (page 18-24).

Check for continuity between the ABS modulator 25P connector of the wire harness side and ground with "ABS FAIL-SAFE RELAY" fuse removed.

CONNECTION: Black – Ground



Is there continuity?

NO – Temporary failure. Replace the "ABS FAIL-SAFE RELAY" fuse (30 A) with a new one and recheck.

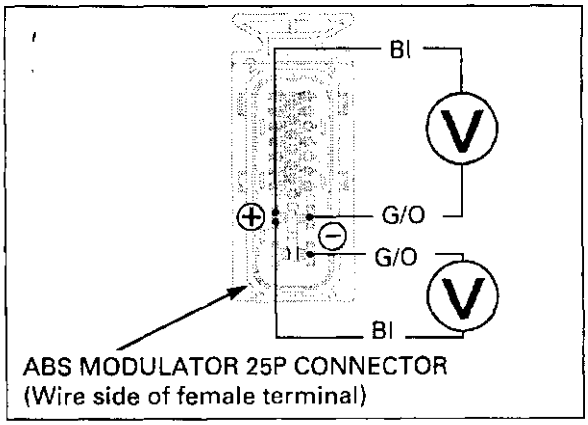
YES – Short circuit in Black wire between the fuse box and ABS modulator.

3. **Relay Power Input Line Open Circuit Inspection (at control unit side)**

Install the "ABS FAIL-SAFE RELAY" fuse (30 A). Disconnect the ABS modulator 25P connector (page 18-24).

Measure the voltage between the ABS modulator 25P connector from the wire harness side. There should be battery voltage at all times.

CONNECTION: Black (+) – Green/orange (–)



Is there battery voltage?

NO –
- Open circuit in Black wire and/or Red/green wire between the battery and ABS modulator.
- Open circuit in Green/orange wire between the ABS modulator and ground.
- Loose or poor contact on the connector.

YES – GO TO STEP 4.

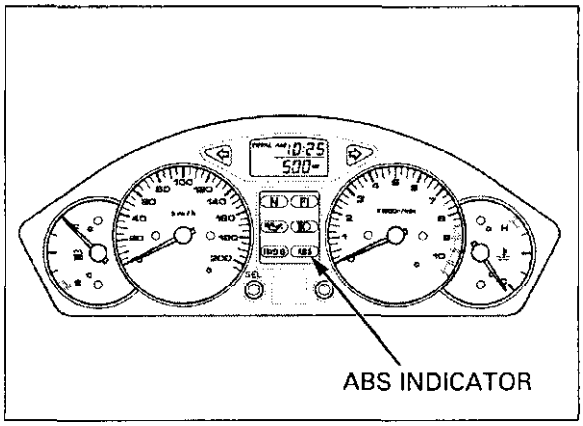
4. **Failure Reproduction**

Turn the ignition switch OFF.
Connect the ABS modulator 25P connector.
Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Does the indicator blink 54 times?

YES – Faulty ABS modulator.

NO – Fail-safe relay is normal (temporary failure).



PROBLEM CODE 61 or 62 (Power Circuit)

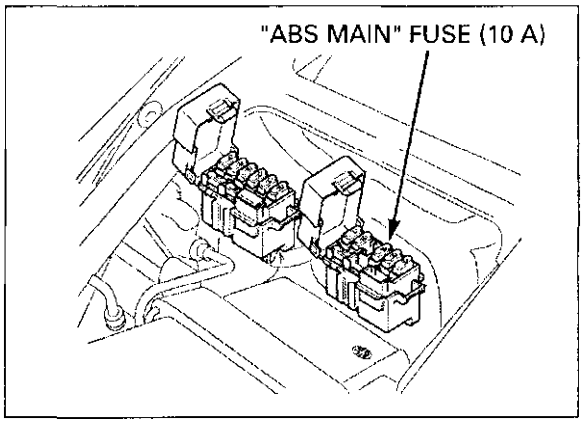
1. **Fuse Inspection**

Check the "ABS MAIN" fuse (10 A) in the fuse box.

Is the fuse blown?

YES – GO TO STEP 2.

NO – GO TO STEP 3.



2. **ABS Power Input Line Short Circuit Inspection**

Disconnect the ABS modulator 25P connector (page 18-24).

Check for continuity between the ABS modulator connector of the wire harness side and ground with "ABS MAIN" fuse removed.

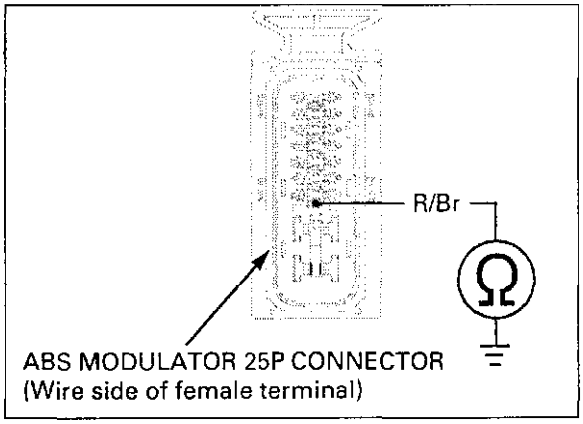
TOOL:
Test probe **07ZAJ-RDJA110**

CONNECTION: Red/brown – Ground

Is there continuity?

NO – Intermittent failure. Replace the "ABS MAIN" fuse (10 A) with a new one, and recheck.

YES – Short circuit in Red/brown wire between the fuse box and ABS modulator.



3. **ABS Power Input Line Open Circuit Inspection**

Install the "ABS MAIN" fuse.
Disconnect the ABS modulator 25P connector (page 18-24).

Measure the voltage between the ABS modulator of the wire harness side with the ignition switch turned ON.

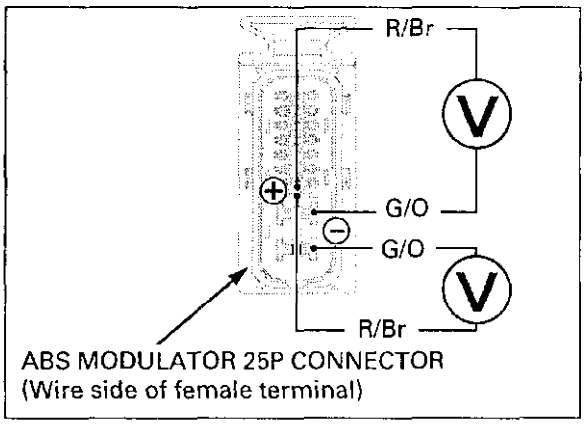
TOOL:
Test probe **07ZAJ-RDJA110**

CONNECTION: Red/brown (+) – Green/orange (–)

Does the battery voltage exist?

NO – • Open circuit in Red/brown wire between the fuse box and ABS modulator.
• Open circuit in Green/orange wire between the ABS modulator and body ground.
• Loose or poor contact on the connector

YES – GO TO STEP 4.



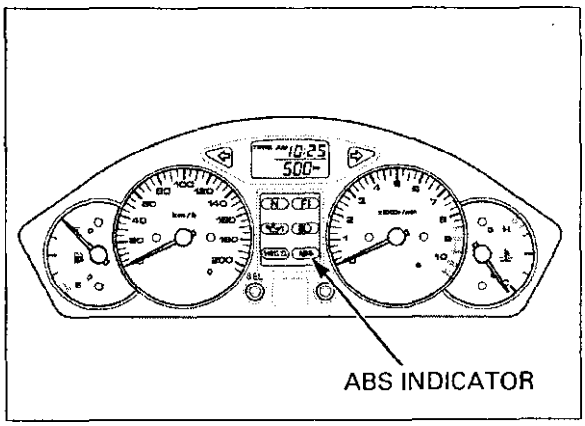
4. **Failure Reproduction**

Turn the ignition switch "OFF".
Connect the ABS modulator 25P connector.
Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Does the indicator blink 61 or 62 times?

YES – Faulty ABS modulator.

NO – Power circuit is normal (temporary failure).



PROBLEM CODE 71 (Tire Size)

NOTE:
- Check the following and correct the faulty part.
  – Incorrect tire pressure.
  – Tires not recommended for the motorcycle were installed (incorrect tire size).
  – Deformation of the wheel or tire.

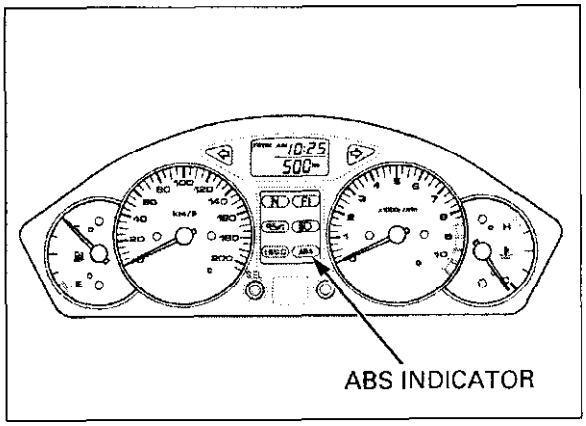
1. **Failure Reproduction**

If the above items are normal, recheck the problem code indication:
Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Does the indicator blink 71 times?

YES – Faulty ABS modulator.

NO – Tire size is normal (temporary failure).



PROBLEM CODE 81 (CPU; ABS Control Unit)

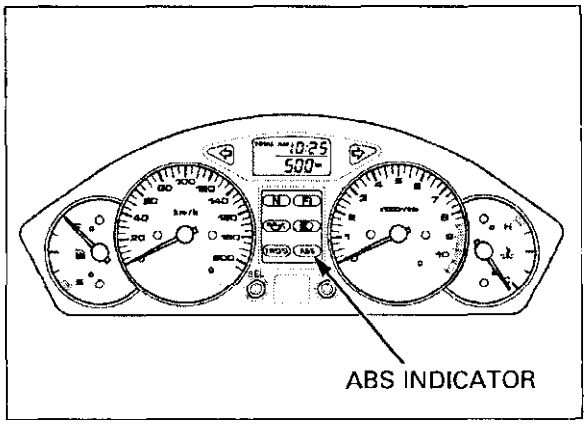
1. **Failure Reproduction**

Erase the problem code (page 18-7).
Test ride the motorcycle above 30 km/h (18 mph).
Retrieve the problem code (page 18-6).

Does the indicator blink 81 times?

YES – Faulty ABS modulator.

NO – CPU is normal (temporary failure).



FRONT WHEEL SPEED SENSOR

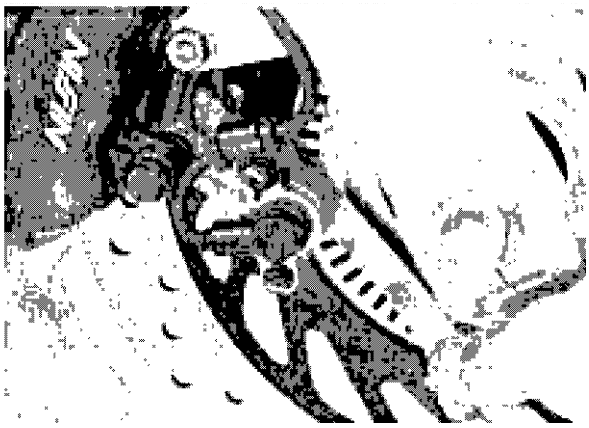
INSPECTION

Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: 0.2 – 1.2 mm (0.01 – 0.05 in)

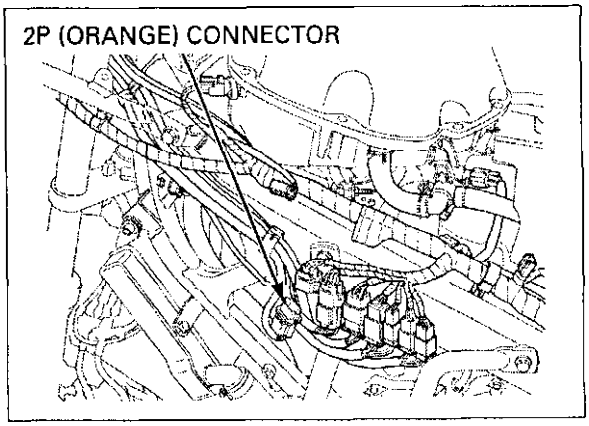
The sensor air gap cannot be adjusted.
If it is not within specification, check each installation part for deformation, looseness and damage.



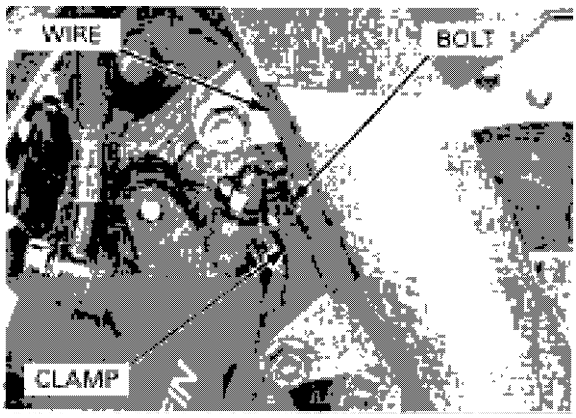
REMOVAL/INSTALLATION

Disconnect the front wheel speed sensor 2P (Orange) connector.

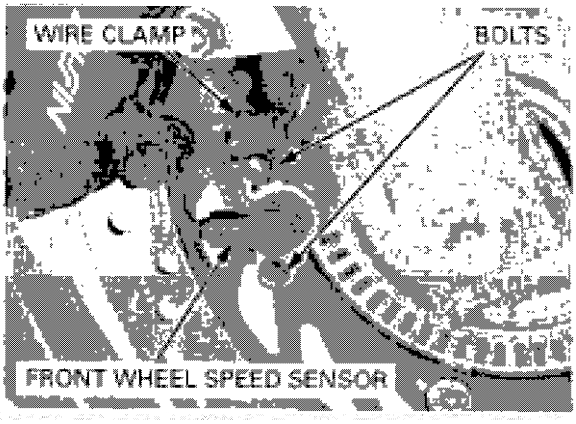
Release the wheel speed sensor wire from the clamps (page 1-35).



Remove the bolt, then release the wheel speed sensor wire from the clamp.

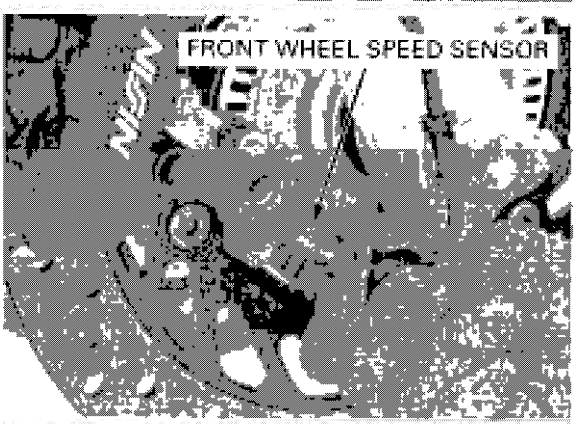


Remove the bolts, wire clamp and the front wheel speed sensor.



Check that there is iron or other magnetic deposits between the pulser ring and front wheel speed sensor.
Remove any deposits.

Check the sensor tip for deformation or damage (e.g., chipped pulser ring teeth).
Replace the front wheel speed sensor if necessary.



Route the sensor wire properly (page 1-35).

Installation is in the reverse order of removal.

After installing the speed sensor, Measure the clearance (air gap) between the sensor and pulser ring (page 18-22).

REAR WHEEL SPEED SENSOR

INSPECTION

Place the motorcycle on its center stand.

Measure the clearance (air gap) between the rear wheel speed sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

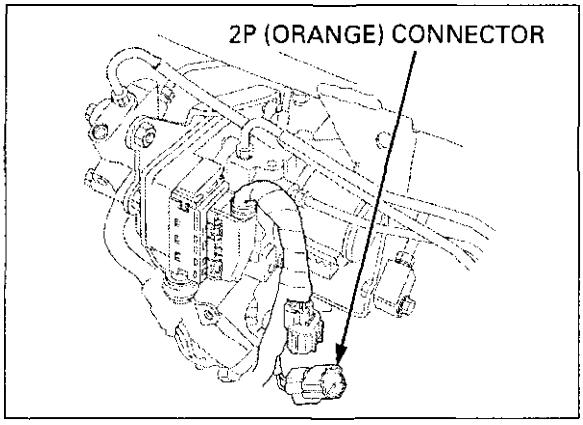
STANDARD: 0.2 – 1.2 mm (0.01 – 0.05 in)

The sensor air gap cannot be adjusted.
If it is not within specification, check each installed part for deformation, looseness and damage.

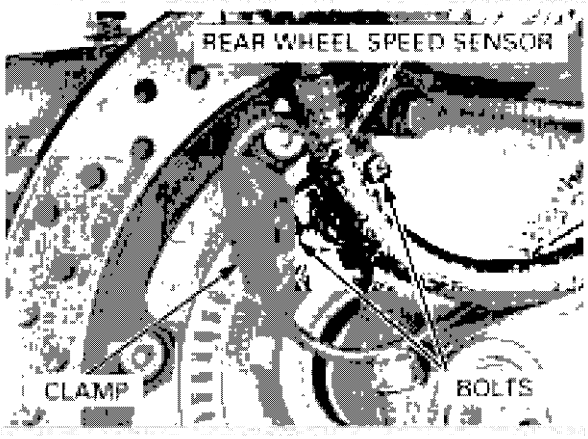
REMOVAL/INSTALLATION

Remove the right side cover/pivot cover (page 3-5).

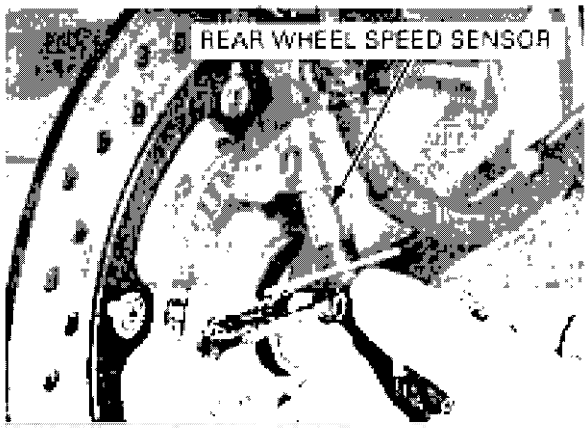
Disconnect the rear wheel speed sensor 2P (Orange) connector.
Remove the wire harness from the clamps (page 1-35).



Remove the bolts, clamp and rear wheel speed sensor.



Check that there is iron or other magnetic deposits between the pulser ring and rear wheel speed sensor.
Remove any deposits.



Route the sensor wire properly (page 1-35).

Check the sensor tip for deformation or damage (e.g., chipped pulser ring teeth).
Replace the speed sensor if necessary.

Be sure to replace the rear wheel speed sensor protector socket bolts with a new one.

Installation is in the reverse order of removal.

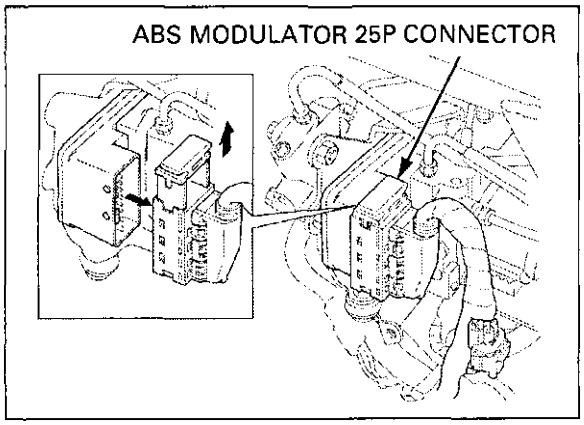
After installing the speed sensor, Measure the clearance (air gap) between the sensor and pulser ring (page 18-23).

ABS MODULATOR

REMOVAL/INSTALLATION

Drain the brake fluid from the front and rear hydraulic systems (page 17-7).
Remove the right side cover/pivot cover (page 3-5).

Disconnect the ABS modulator 25P connector (pull the lock lever up to disconnect it).

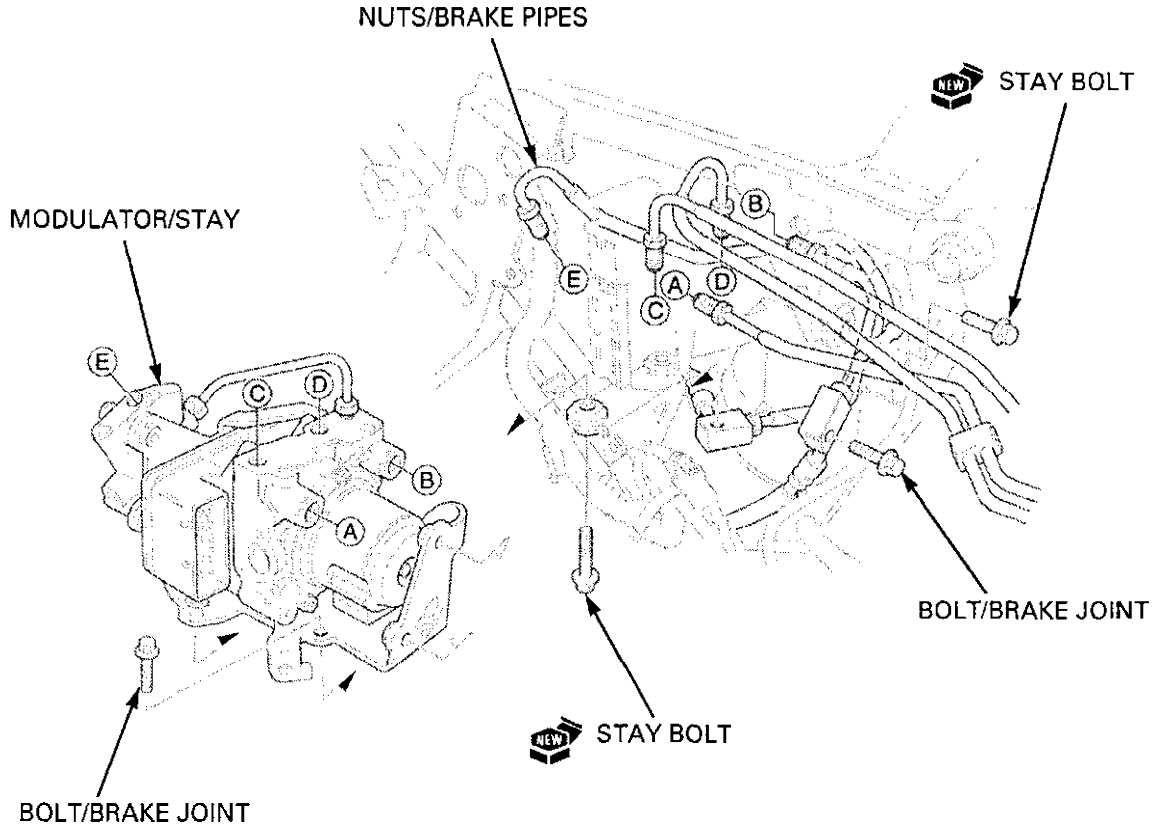


When loosening the brake pipe nuts, cover the end of the brake pipes to prevent contamination.

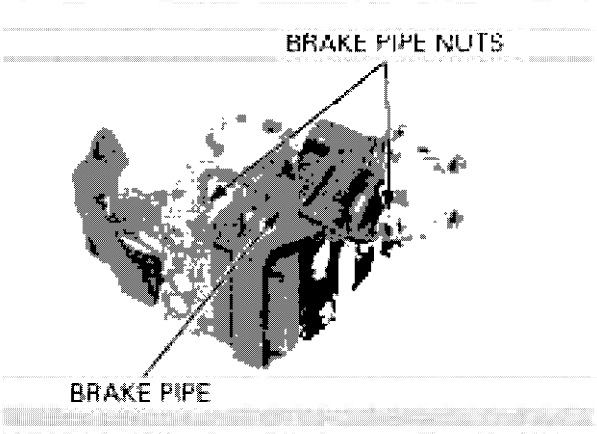
Loosen the brake pipe nuts and disconnect the five brake pipes.
Remove the bolts and the brake joints from the modulator stay.

Be careful not to bend or damage the brake pipes during ABS modulator assembly removal.

Remove the two stay bolts and modulator/stay.



Loosen the brake pipe nuts and disconnect the brake pipe.



Remove the bolts and modulator stay from the modulator.

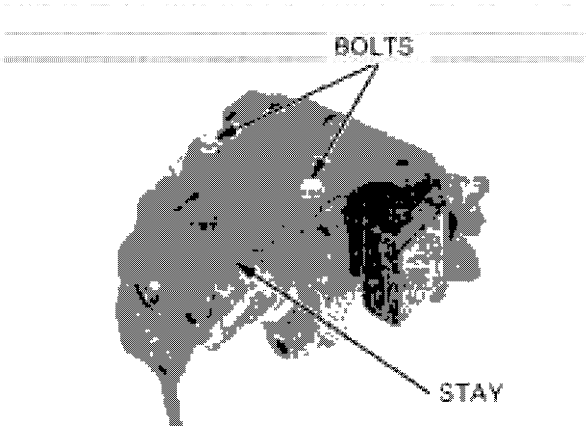
Installation is in the reverse order of removal.

Tighten new modulator stay bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Tighten the brake pipe nuts to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)



19. BATTERY/CHARGING SYSTEM

COMPONENT LOCATION 19-2

SYSTEM DIAGRAM 19-2

SERVICE INFORMATION 19-3

TROUBLESHOOTING 19-5

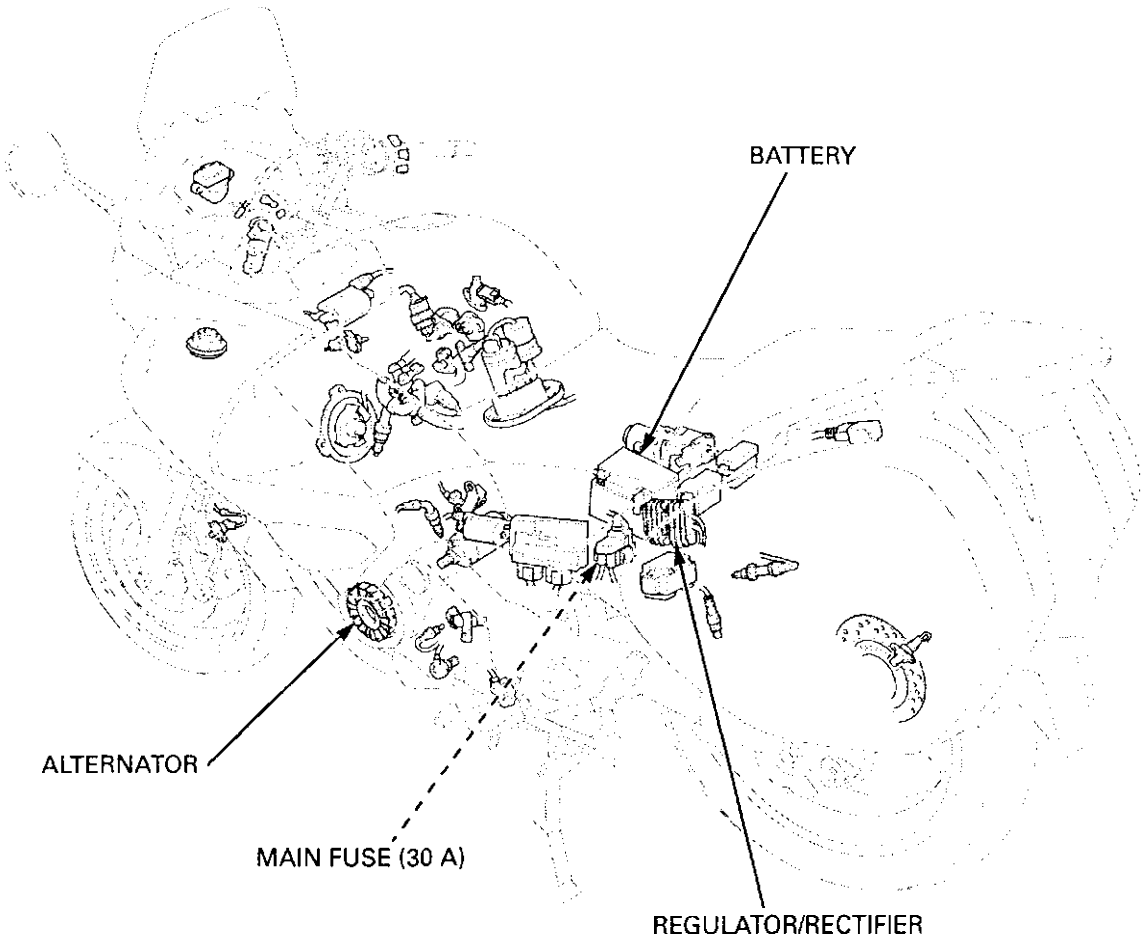
BATTERY 19-6

CHARGING SYSTEM INSPECTION 19-7

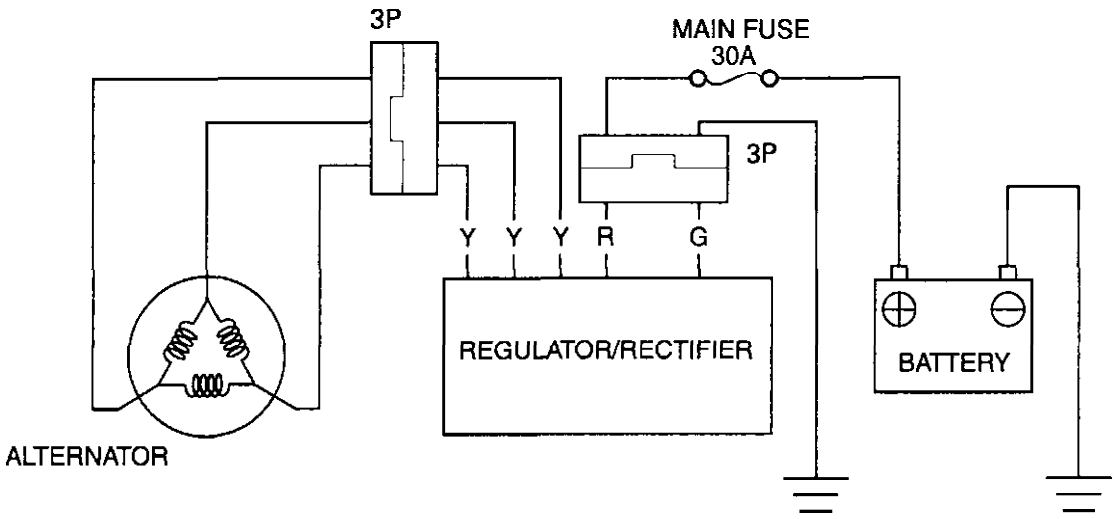
REGULATOR/RECTIFIER 19-8

ALTERNATOR CHARGING COIL 19-9

COMPONENT LOCATION



SYSTEM DIAGRAM



Y: Yellow
G: Green
R: Red
W: White

SERVICE INFORMATION

GENERAL

⚠WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to ON and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free (MF) battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When servicing the charging system, always follow the steps in the troubleshooting flow chart (page 19-5)
- For alternator service, refer to page 12-4.

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals after installation.
- 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.

BATTERY TESTING

Refer to the battery tester's Operation Manual for the recommended battery testing procedure.
The recommended battery tester puts a "load" on the battery so 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 – 14 Ah
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		452 kW/5,000 min^{-1} (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST

Remove the battery (page 19-6).

Check the battery condition using the recommended battery tester (page 19-7).

RECOMMENDED BATTERY TESTER: BM-210 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 19-6).

Check the battery current leakage test (Leak test; page 19-7).

Is the current leakage below 1 mA?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. CURRENT LEAKAGE TEST WITHOUT REGURETOR/RECTIFIRE CONNECTOR

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

Is the current leakage below 1 mA?

YES – Faulty regulator/rectifier.

NO – • Shorted wire harness.
• Faulty ignition switch.

4. ALTERNATOR CHARGING COIL INSPECTION

Check the alternator charging coil (page 19-8).

Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20°C/68°F)?

NO – Faulty charging coil.

YES – GO TO STEP 5.

5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 19-6).

Start the engine.

Measure the charging voltage (page 19-7).

Compare the measurements to result of the following calculation.

STANDARD: Measured BV < Measured CV < 15.5 V
· BV = Battery Voltage (page 19-6)
· CV = Charging Voltage

Is the measured charging voltage within the standard voltage?

YES – Faulty battery.

NO – GO TO STEP 6.

6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connectors (page 19-8).

Are the results of checked voltage and resistance correct?

YES – Faulty regulator/rectifier.

NO – • Open circuit in related wire.
• Loose or poor contacts of related terminal.
• Shorted wire harness.

BATTERY

REMOVAL/INSTALLATION

Remove the seat (page 3-5).

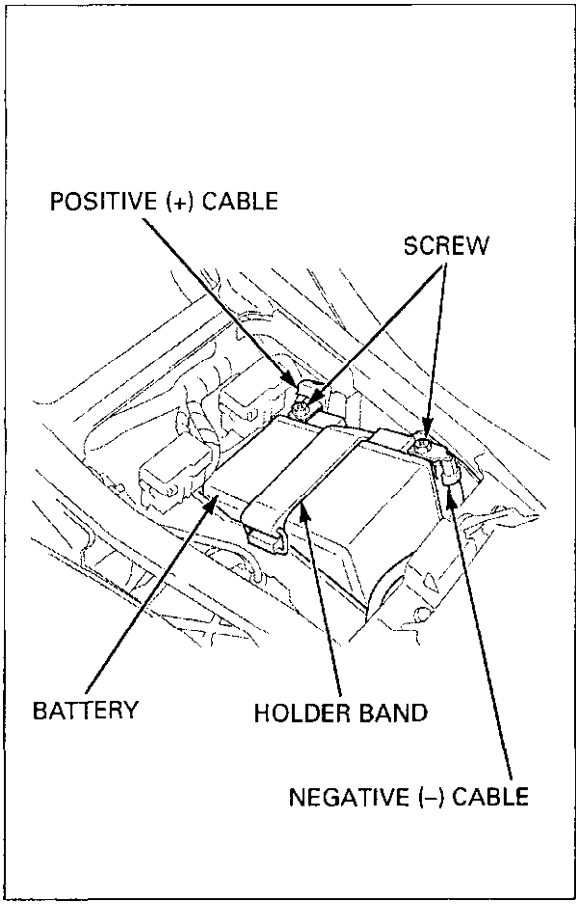
Unhook the battery holder band.

With the ignition switch turned to OFF, disconnect the battery negative (–) cable first, then disconnect the battery positive (+) cable.
Remove the battery from the battery case.

Install the battery in the reverse order of removal.

NOTE:

- Connect the positive (+) cable first, then connect the negative (–) cable.
- After connecting the battery cables, coat the terminals with grease.

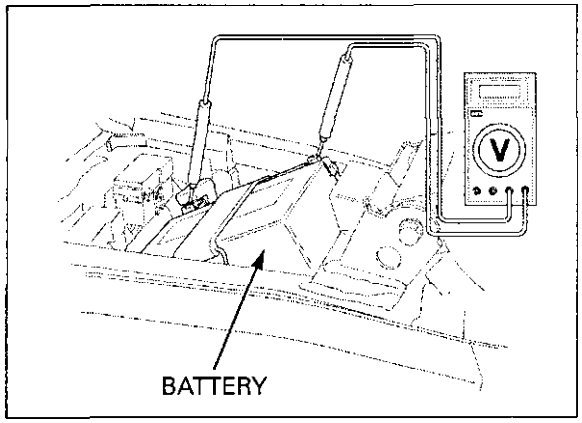


VOLTAGE INSPECTION

Remove the seat (page 3-5).

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F): Fully charged: 13.0 – 13.2 V
Under charged: Below 12.3 V

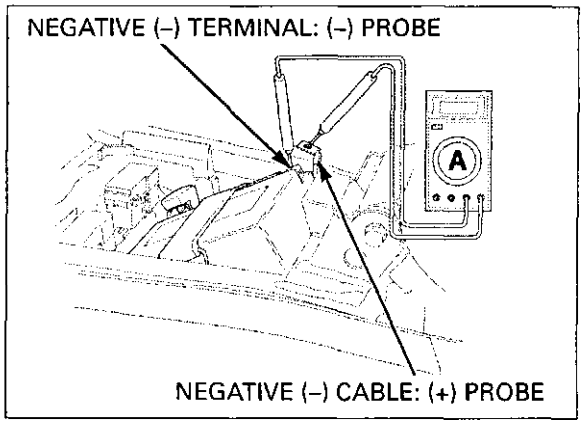


CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE TEST

Remove the seat (page 3-5).

With the ignition switch turned to OFF, disconnect the negative (–) cable from the battery.
Connect the ammeter (+) probe to the negative (–) cable and the ammeter (–) probe to the battery (–) terminal.
With the ignition switch turned to OFF, check for current leakage.



NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition switch to ON. A sudden surge of current may blow the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 1 mA maximum

If current leakage exceeds the specified value, a shorted circuit is the probable cause.
Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

NOTE:
Make sure the battery is in good condition before performing this test.

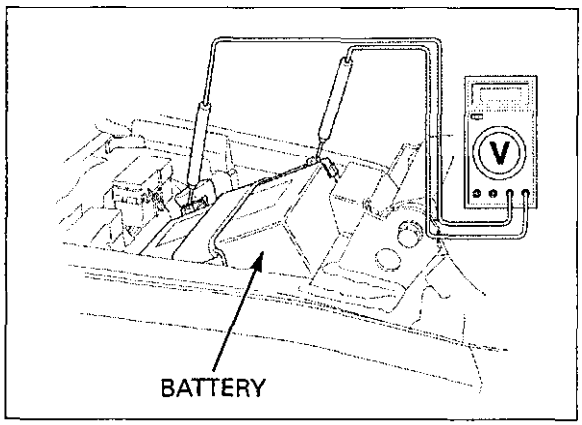
Connect a tachometer.

Start the engine and warm it up to the operating temperature; then stop the engine.

Remove the seat (page 3-5).

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.

Connect the multimeter between the positive and negative terminals of the battery.



NOTE:
To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on high beam, restart the engine. Measure the voltage on the multimeter when the engine runs at 5,000 min^{-1} (rpm).

STANDARD:
Measured BV < Measured CV < 15.5 V
· BV = Battery Voltage (page 19-6)
· CV = Charging Voltage

REGULATOR/RECTIFIER

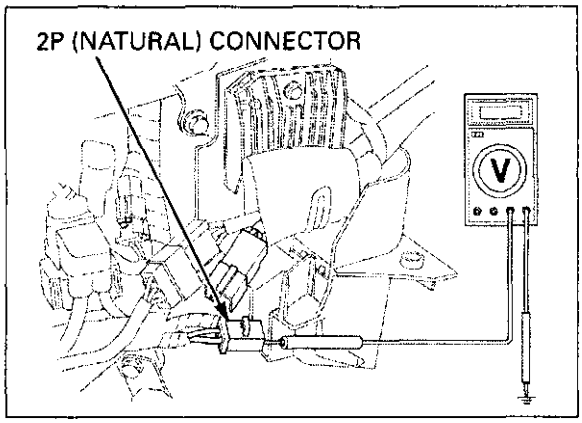
WIRE HARNESS INSPECTION

BATTERY CHARGING LINE

Remove the left saddle bag body (page 3-7).

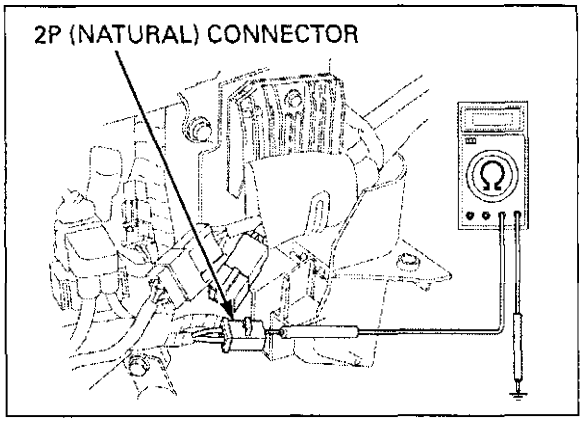
With the ignition switch turned to OFF, disconnect the regulator/rectifier 2P (Natural) connector.

Measure the voltage between the Red wire terminal (+) of the wire harness side 2P (Natural) connector and ground (–).
There should be battery voltage at all times.



GROUND LINE

Check for continuity between the Green wire terminal of the wire harness side 2P (Natural) connector and ground (–).
There should be continuity at all times.



CHARGING COIL LINE

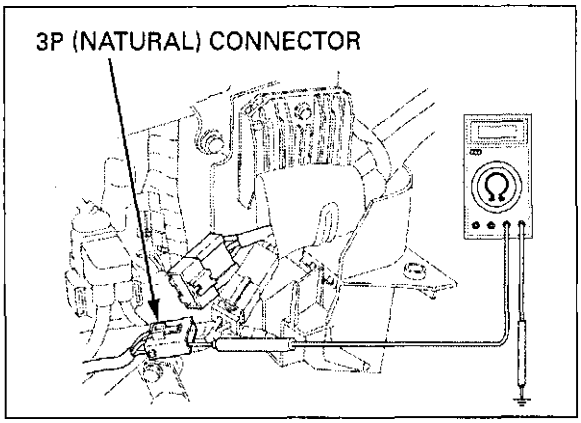
Disconnect the alternator 3P (Natural) connector.
Check the continuity between the Yellow wire terminal and ground.

There should be no continuity.

Measure the resistance between the Yellow wire terminals.

STANDARD: 0.1 – 1.0 Ω at 20°C (68°F)

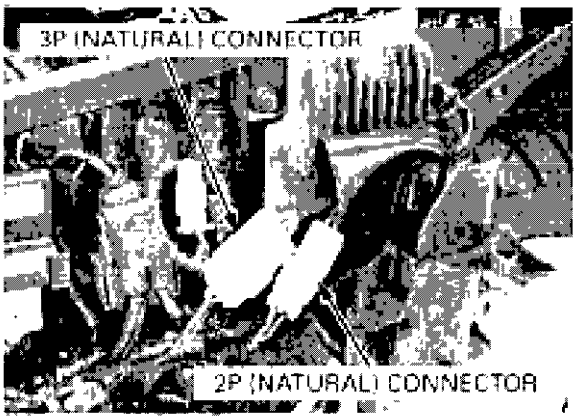
If the resistance measured at the alternator 3P (Natural) connector is abnormal, check the alternator (page 19-9).



REMOVAL/INSTALLATION

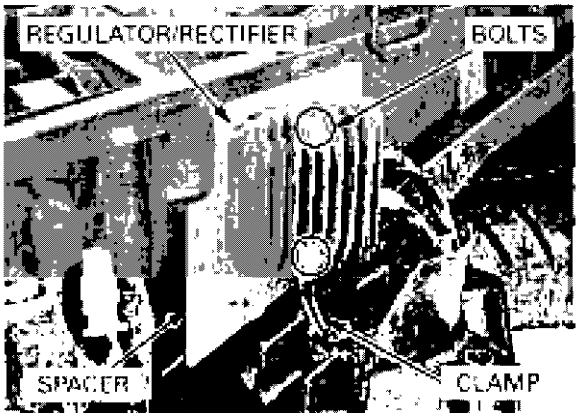
Remove the left saddle bag body (page 3-7).

With the ignition switch turned to OFF, disconnect the regulator/rectifier 2P (Natural) connector and alternator 3P (Natural) connector.



Remove the bolts, clamp, regulator/rectifier and spacer.

Install the regulator/rectifier in the reverse order of removal.



ALTERNATOR CHARGING COIL

INSPECTION

Remove the left side cover/pivot cover (page 3-5).

With the ignition switch turned to OFF, disconnect the alternator 3P (Natural) connector.

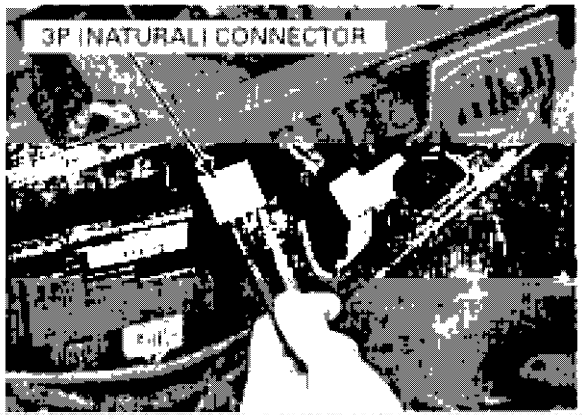
Measure the resistance between the Yellow wire terminals.

STANDARD: 0.1 – 1.0 Ω at 20°C (68°F)

Check for continuity between each wire terminals of the alternator/stator side connector and ground. There should be no continuity.

Replace the stator if the resistance is out of specification, or if any wire has continuity to ground.

For alternator/starter replacement (page 12-4).



20. IGNITION SYSTEM

COMPONENT LOCATION 20-2

SYSTEM DIAGRAM 20-2

SERVICE INFORMATION 20-3

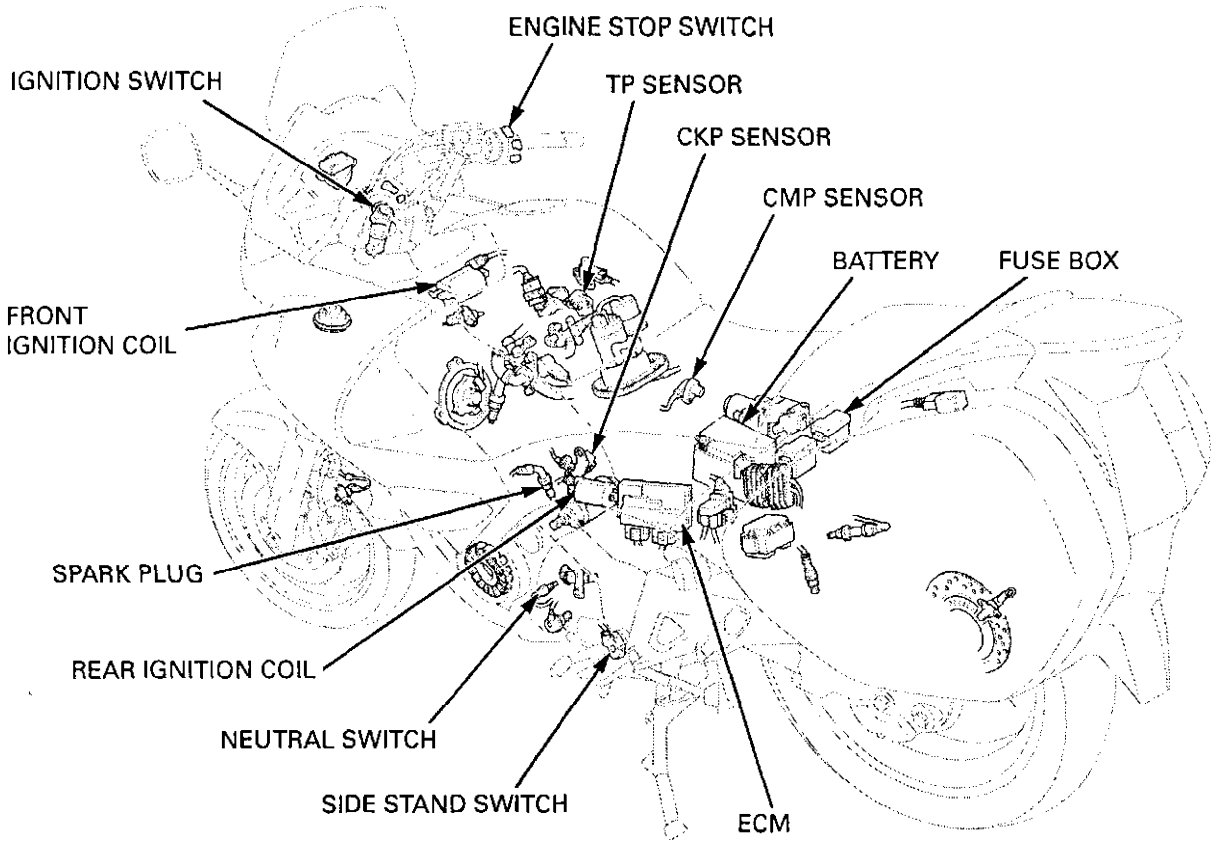
TROUBLESHOOTING 20-4

IGNITION SYSTEM INSPECTION 20-5

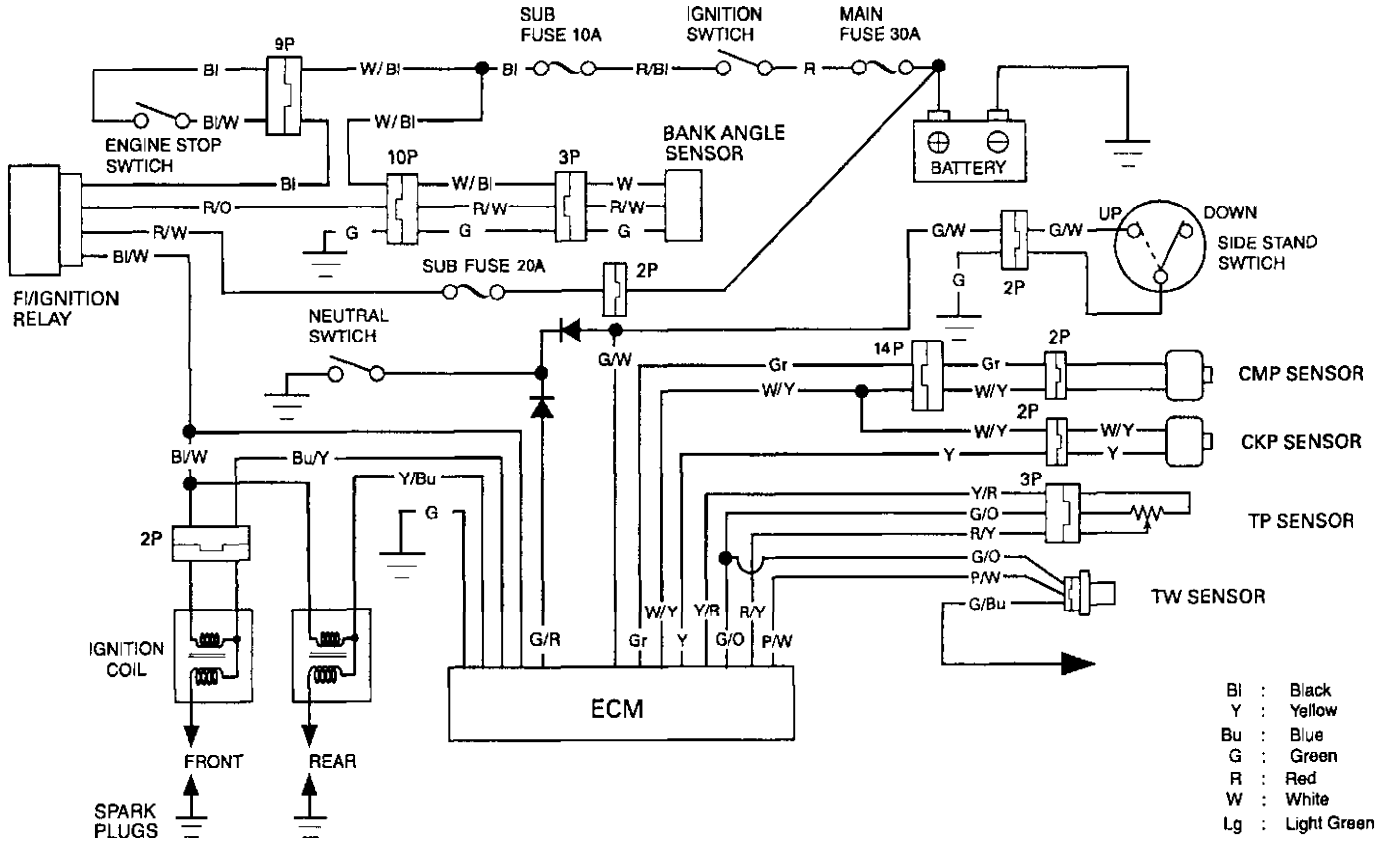
IGNITION COIL 20-8

IGNITION TIMING 20-8

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- The ECM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ECM. Always turn the ignition switch to OFF before servicing.
- Use spark plugs with the correct heat range. Using spark plugs with an incorrect heat range can damage the engine.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table on page 20-4.
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ECM varies ignition timing according to the engine speed. The TP sensor signals the ECM to compensate the ignition timing according to the throttle opening.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- For spark plug inspection (page 4-7).
- For CKP sensor service (page 11-12).
- For TP sensor service (page 6-18).
- Following components information (page 22-2)
  - Ignition switch
  - Engine stop switch
  - Neutral switch
  - Side stand switch

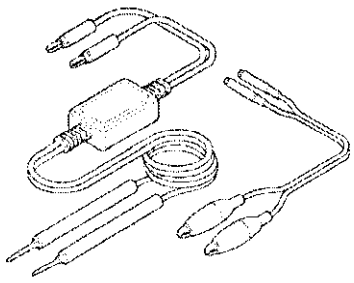
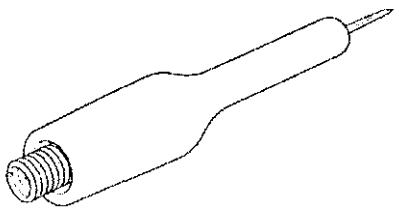
SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	CPR8EA-9 (NGK)
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage		100 V minimum
CKP sensor peak voltage		0.7 V minimum
Ignition timing ("F"mark)		10° BTDC at idle

TORQUE VALUES

Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply engine oil to the threads and flange surface

TOOL

Imrie diagnostic tester (model 625) or Peak voltage adaptor 07HGJ-0020100  with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	Test probe 07ZAJ-RDJA110 

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water in the spark plug cap (Leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned to ON and the engine stop switch at "○". (The engine is not cranked by the starter motor.)

No spark at spark plugs

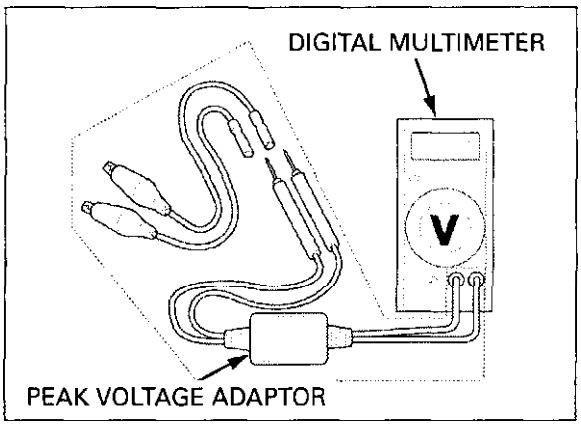
UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned to ON and the engine stop switch at "○". (Other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/white wire between the ignition coil and engine stop switch. 3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil. 4. Faulty ECM (in case when the initial voltage is normal with the ECM connector disconnected).
	Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Battery is undercharged. (Voltage drops largely when the engine is started.) 3. No voltage at the Black/white wire of the ECM connector, or loose or poorly connected ECM connector. 4. Loose or poor connection or an open circuit in Green wire of the ECM. 5. Loose or poor connection or an open circuit in Blue/yellow or Yellow/blue wire between the ignition coils and ECM. 6. A short circuit in the ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. Loose or poor connection or an open circuit in No. 7 related wires. – Side stand switch line: Green/white wire – Neutral switch line: Light green and Green/red wires 9. Faulty CKP sensor. (Measure peak voltage.) 10. Faulty ECM (in case when above No. 1 through 9 are normal).
	Initial voltage is normal but there is no peak voltage while cranking the engine.	1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Faulty peak voltage adaptor. 3. Faulty ECM (in case when above No. 1 and 2 are normal).
	Initial voltage is normal but peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ECM (in case when above No. 1 through 3 are normal).
	Initial and peak voltages are normal but no spark jumps.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil(s).
CKP sensor	Peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty CKP sensor (in case when above No. 1 through 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

IGNITION SYSTEM INSPECTION

NOTE:

- If no spark jumps at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter or use the peak voltage tester.



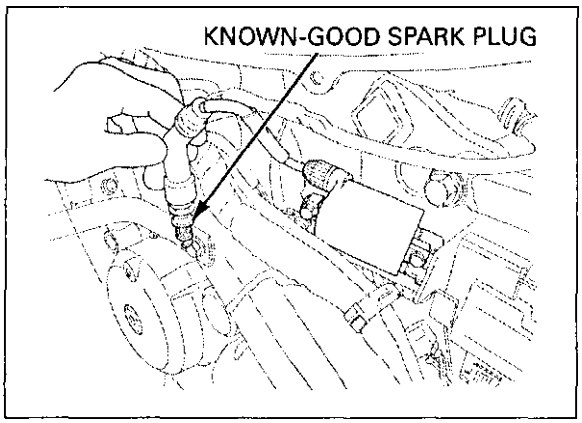
TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check that the cylinder compression is normal for each cylinder and the spark plugs are installed correctly in each cylinder head.

Disconnect all spark plug caps from the spark plugs. Connect known-good spark plugs to all spark plug caps and ground them to the cylinder heads as done in a spark test.



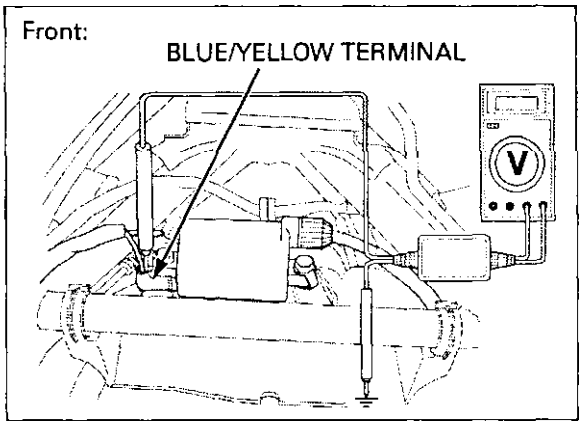
FRONT: Remove the air cleaner housing (page 6-63).

REAR: Remove the right side cover/pivot cover (page 3-5).

With the ignition coil primary wires connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and ground.

TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

Install the removed parts in the reverse order of removal.



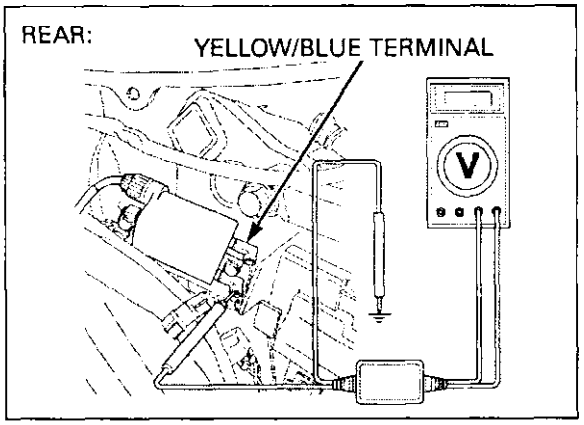
CONNECTIONS:
FRONT: Blue/yellow (+) – ground (–)
REAR: Yellow/blue (+) – ground (–)

Turn the ignition switch to ON with the engine stop switch at "○".
Check the initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, follow the checks in the troubleshooting table (page 20-4).

Shift the transmission into neutral.

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum



NOTE:
Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the standard value, follow the checks in the troubleshooting table (page 20-4).

CKP SENSOR PEAK VOLTAGE

NOTE:
Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Remove the ECM (page 6-75).

Connect the peak voltage tester or adaptor probes to the wire harness side ECM connector terminals.

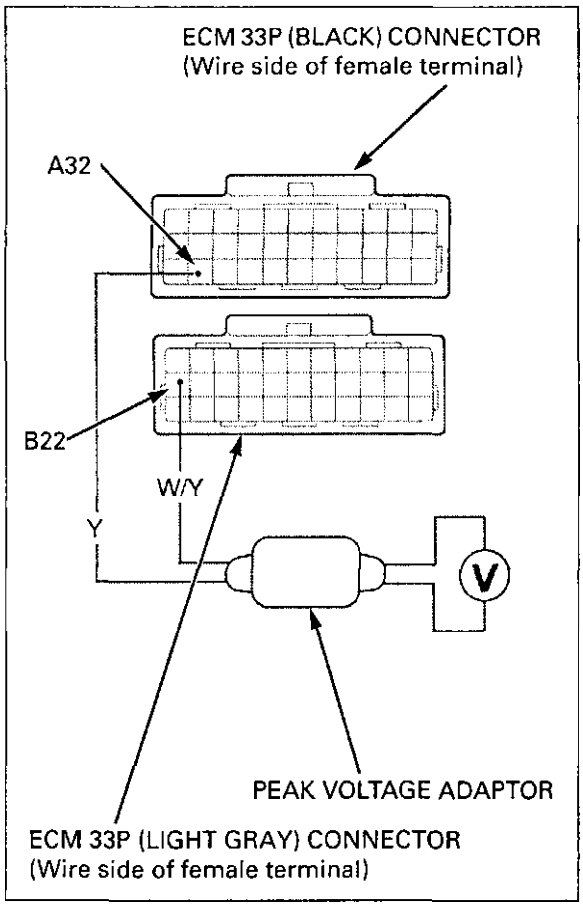
TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)
Test probe 07ZAJ-RDJA110

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

Turn the ignition switch to ON with the engine stop switch at "○".
Shift the transmission into neutral.
Crank the engine with the starter motor and measure the CKP sensor peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the voltage measured at the ECM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.



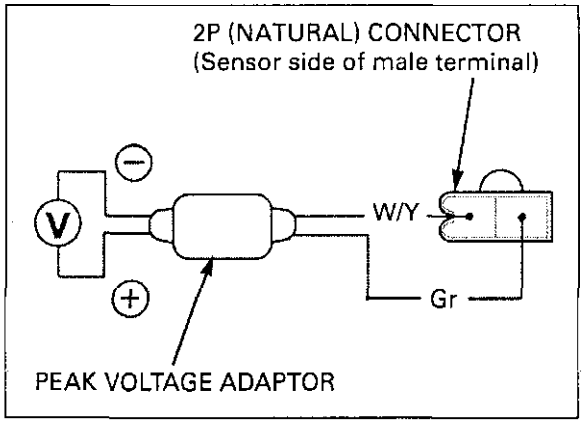
Remove the right middle cowl (page 3-11).

Turn the ignition switch to OFF.
Disconnect the CKP sensor 2P (Natural) connector and connect the peak voltage tester or adaptor probes to the connector terminals of the CKP sensor side.

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open or short circuit, or loose connection.
- If the peak voltage is lower than standard value, follow the checks in the troubleshooting table (page 20-4).

Install the removed parts in the reverse order of removal.



IGNITION COIL

FRONT IGNITION COIL

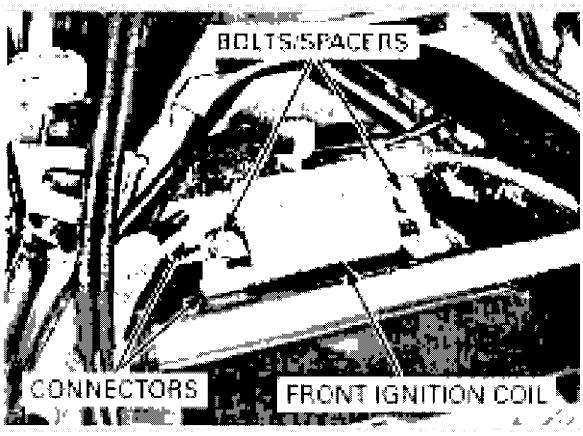
REMOVAL/INSTALLATION

Remove the air cleaner housing (page 6-63).
Disconnect the spark plug cap (page 4-7).

Disconnect the ignition coil primary wire connectors.
Remove the bolts, spacers and front ignition coil from the frame.

Route the spark plug wire properly (page 1-35).

Install the front ignition coil in the reverse order of removal.



REAR IGNITION COIL

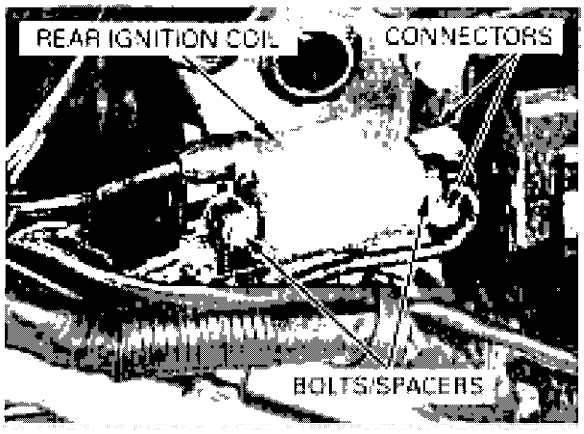
REMOVAL/INSTALLATION

Remove the left side cover/pivot cover (page 3-5).
Disconnect the spark plug cap (page 4-7).

Disconnect the ignition coil primary wire connectors.
Remove the bolts, spacers and rear ignition coil from the frame.

Route the spark plug wires properly (page 1-35).

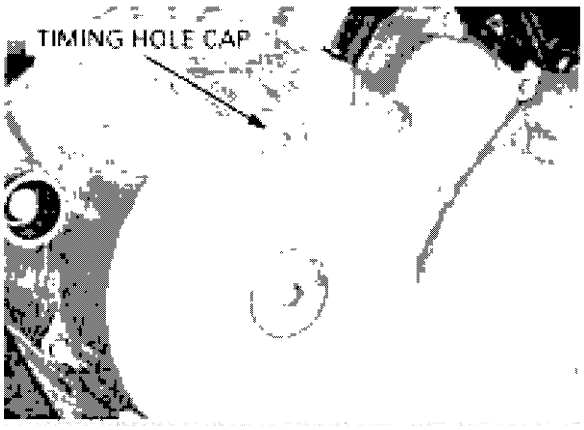
Install the rear ignition coil in the reverse order of removal.



IGNITION TIMING

Start the engine, warm it up to normal operating temperature and then stop it.

Remove the timing hole cap.



Connect a tachometer.

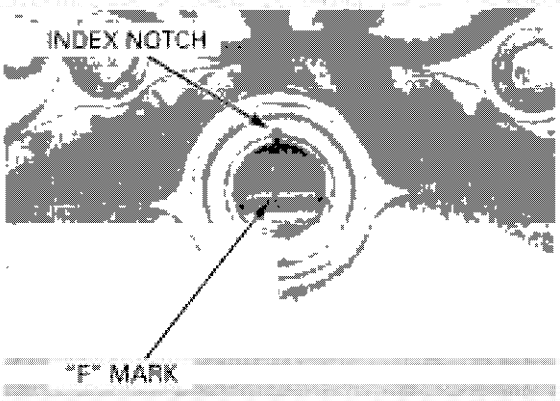
Read the manufacturer's instructions for timing light operation.

Connect the timing light to the front spark plug wire.

Start the engine, let it idle and check the ignition timing.

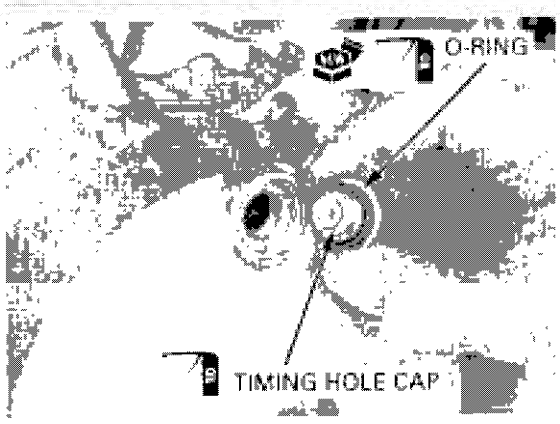
IDLE SPEED: 1,200 ± 100 min^{-1} (rpm)

The timing is correct if the "F" mark on the flywheel aligns with the index notch on the left crankcase cover.



Coat a new O-ring with oil and install it into the timing hole cap groove.
Apply oil to the threads and seating surface of the timing hole cap.
Install the timing hole cap and tighten it.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



21. ELECTRIC STARTER

COMPONENT LOCATION 21-2

SYSTEM DIAGRAM 21-2

SERVICE INFORMATION 21-3

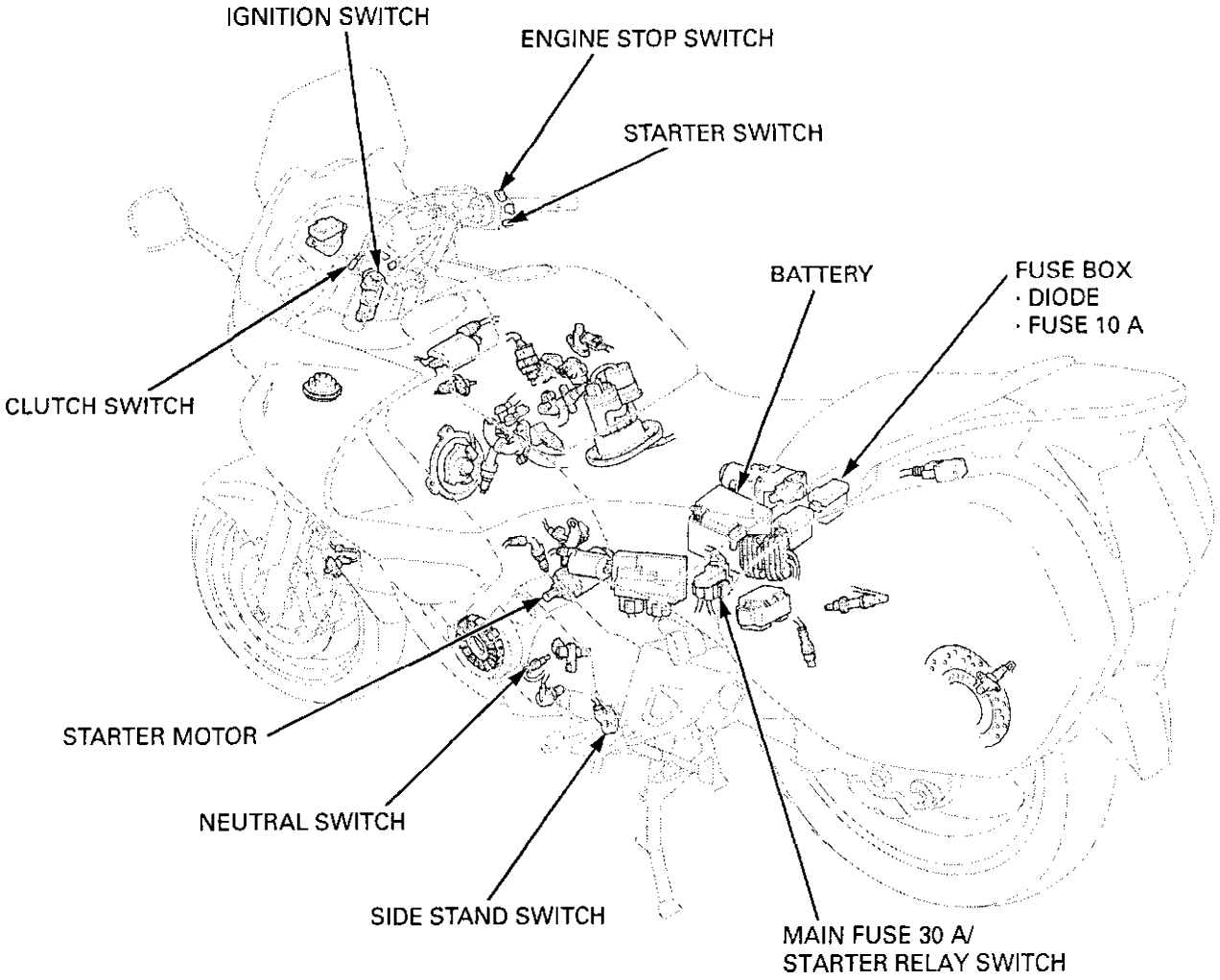
TROUBLESHOOTING 21-4

STARTER MOTOR 21-6

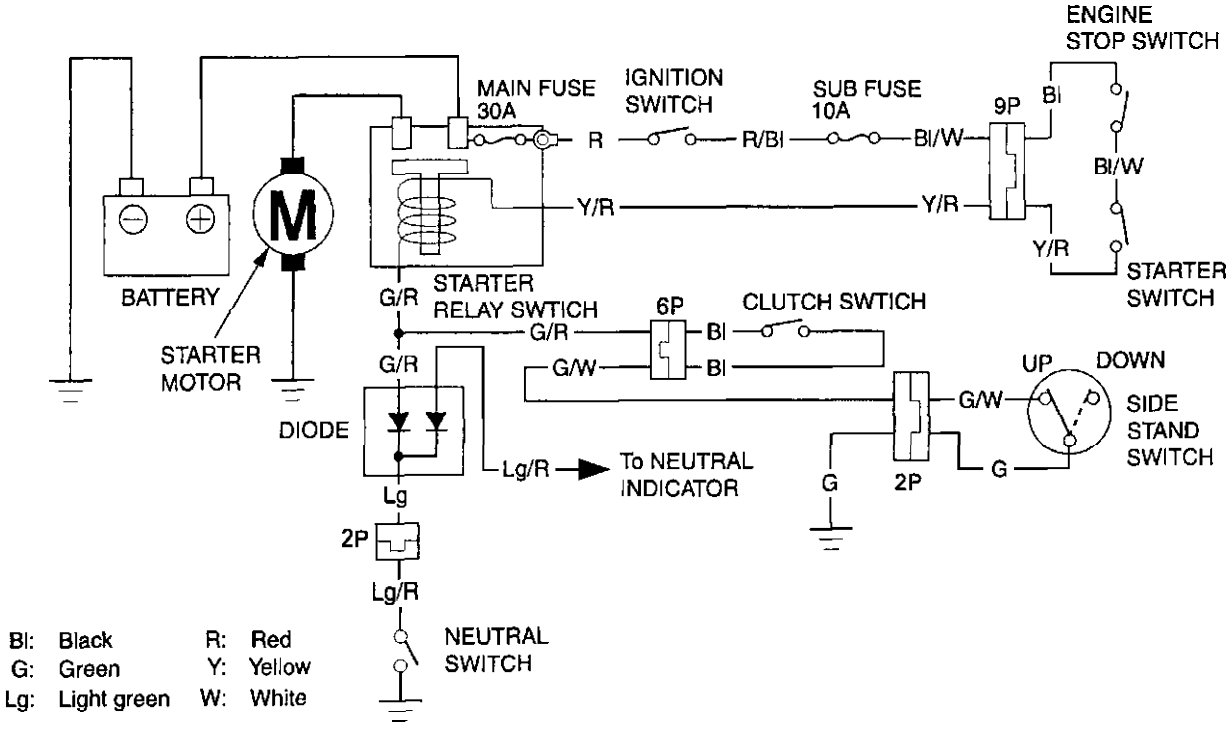
STARTER RELAY SWITCH 21-15

DIODE 21-17

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- Always turn the ignition switch to OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 21-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- Following component information (page 22-2).
  - 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 (0.47)	6.5 (0.26)

TORQUE VALUES

Starter motor cable terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Starter motor cover bolt	4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

TROUBLESHOOTING

Starter motor does not turn

1. **Fuse Inspection**

   Check for blown main fuse or sub fuse.

   Is the fuse blown?

   YES – Replace the fuse

   NO – GO TO STEP 2.

2. **Battery Inspection**

   Make sure the battery is fully charged and in good condition (page 19-6).

   Is the battery in good condition?

   YES – GO TO STEP 3.

   NO – Replace the battery

3. **Starter Relay Switch Operation**

   Check the starter relay switch operation.
   You should hear the relay "CLICK" when the starter switch button is depressed.

   Is there a "CLICK"?

   YES – GO TO STEP 4.

   NO – GO TO STEP 5.

4. **Starter Motor Inspection**

   Apply battery voltage directly to the starter motor and check the operation.

   Does the starter motor turn?

   YES – • Poorly connected starter motor cable
   • Faulty starter relay switch (page 21-15)

   NO – Faulty starter motor (page 21-6)

5. **Relay Coil Ground Lines Inspection**

   Disconnect the starter relay switch connector, and check the relay coil ground lines as below for continuity:

   1. Green/red terminal – 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.

   Is there continuity?

   NO – • Faulty neutral switch (page 22-18)
   • Faulty diode (page 21-17)
   • Faulty clutch switch (page 22-18)
   • Faulty side stand switch (page 22-19)
   • 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 to ON and engine stop switch button "⟲" and the starter switch button pushed, measure the voltage at the starter relay switch connector (between Yellow/red (+) and body ground (–)).

   Is there battery voltage?

   NO – • Faulty ignition switch (page 22-15)
   • Faulty starter switch (page 21-15)
   • Faulty engine stop switch (page 22-16)
   • Loose or poor contact connector
   • Open circuit in wire harness

   YES – GO TO STEP 7.

7. **Starter Relay Switch Continuity Inspection**

   Connect the starter relay switch connector.

   Turn the ignition switch to ON and the engine stop switch " ⏀ ", check for continuity at the starter relay switch terminals when the starter switch button is pushed.

   Is there continuity?

   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 (page 22-18).

   Is the clutch switch operation normal?

   NO – Faulty clutch switch

   YES – GO TO STEP 2.

2. **Side Stand Switch Inspection**

   Check the side stand switch operation (page 22-19).

   Is the side stand switch operation normal?

   NO – Faulty side stand switch (page 22-19)

   YES – • Open circuit in wire harness
   • Loose or poor contact connector

Starter motor turns slowly
- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter idle gear and/or reduction gear

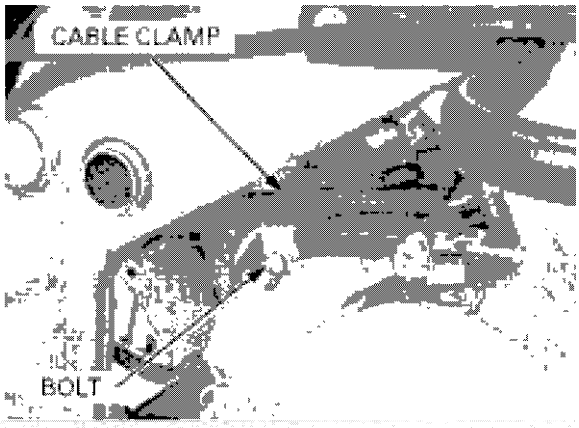
Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problems

STARTER MOTOR

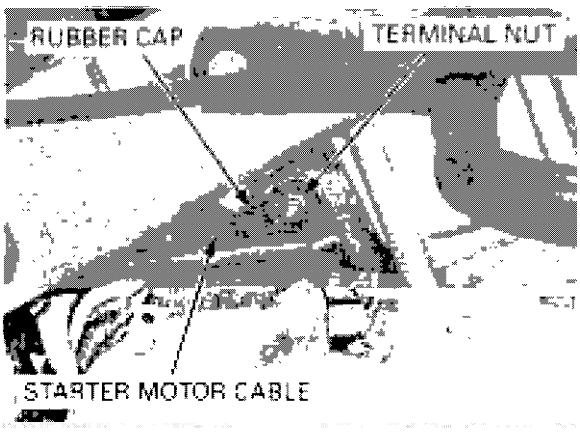
REMOVAL

Remove the exhaust system (page 3-17)
Open and support the fuel tank (page 4-5).

Remove the bolt and cable clamp.

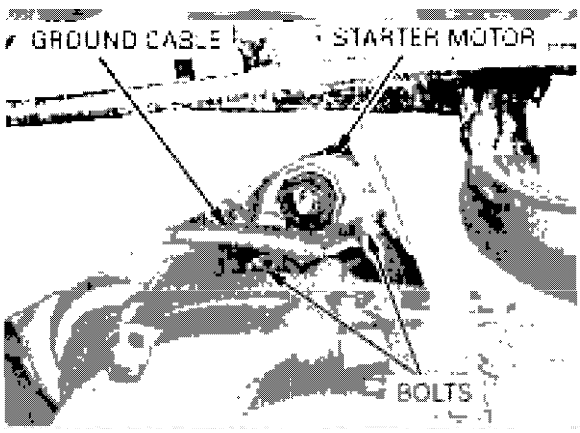


Remove the rubber cap and terminal nut.
Disconnect the starter motor cable.

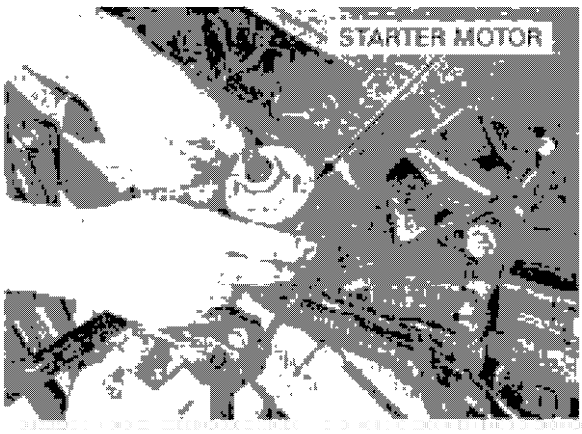


Remove the bolts and ground cable.

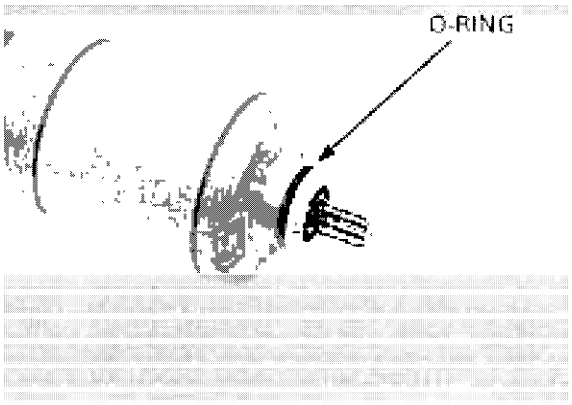
Remove the starter motor from the crankcase.



Remove the starter motor from the frame as shown.

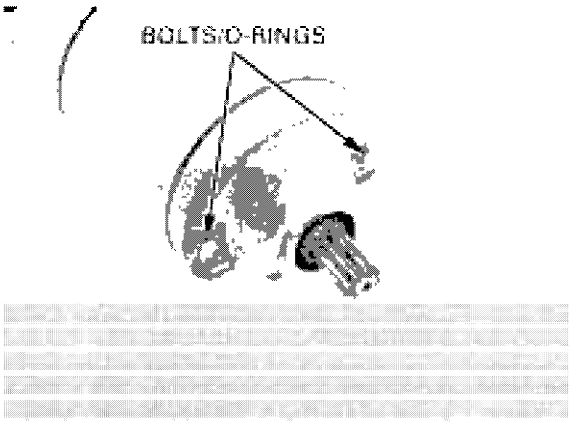


Remove the O-ring from the starter motor.

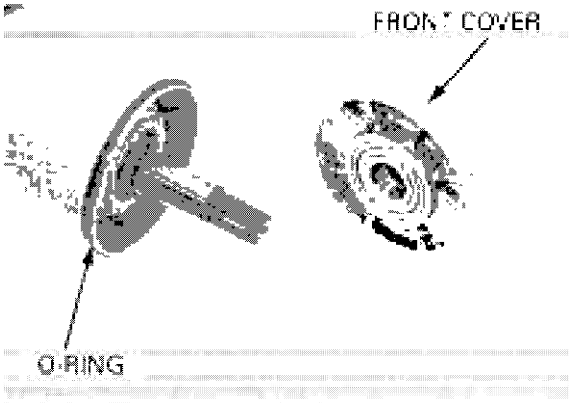


DISASSEMBLY/INSPECTION

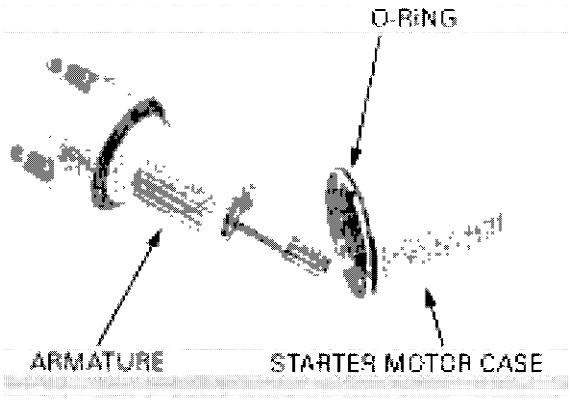
Remove the bolts and O-rings.



Remove the front cover and O-ring.

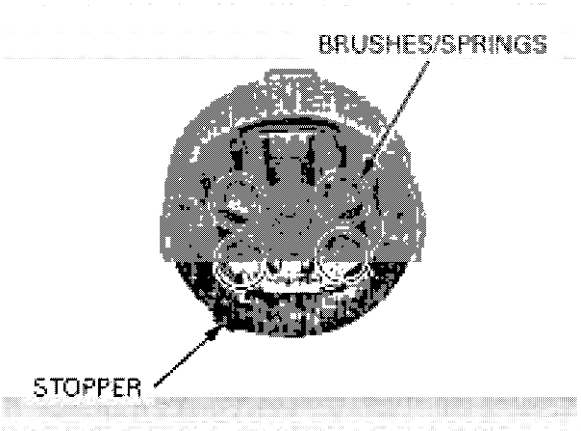


Remove the starter motor case and O-ring.
Remove the armature from the rear cover.



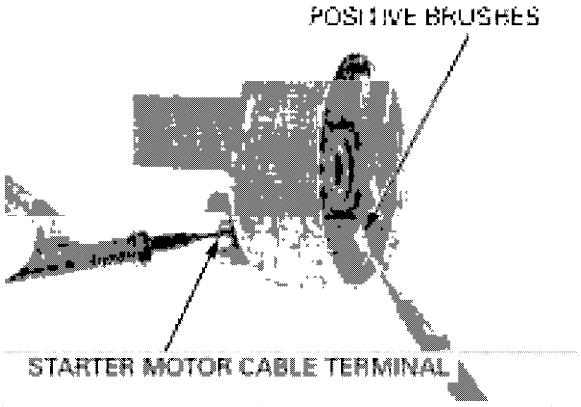
Remove the brushes and springs from the brush holder.

Remove the stopper from the rear cover assembly.



Check for continuity between starter motor cable terminal and positive brushes.

There should be continuity.

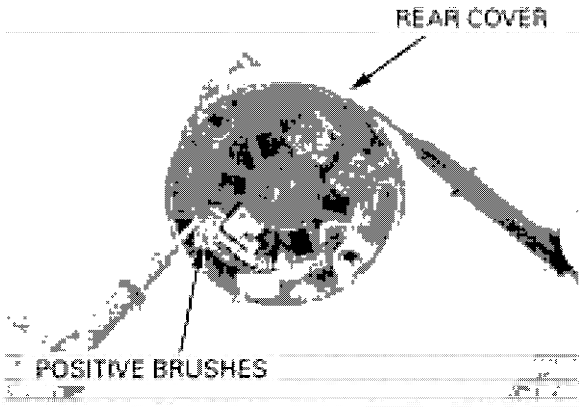


Check for continuity between positive brushes and rear cover.

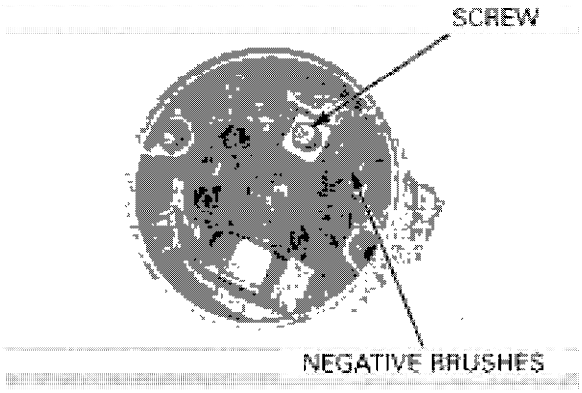
There should be no continuity.

Check for continuity between positive and negative brushes.

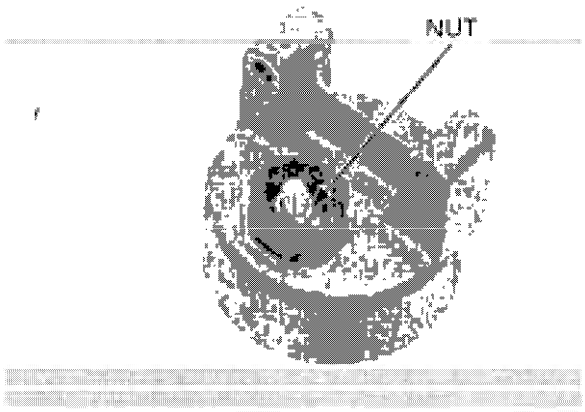
There should be no continuity.



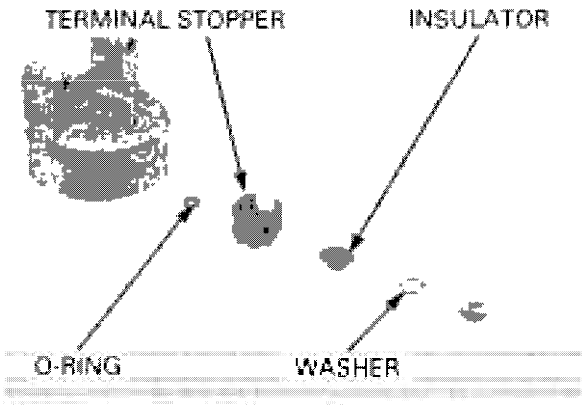
Remove the screw and negative brushes.



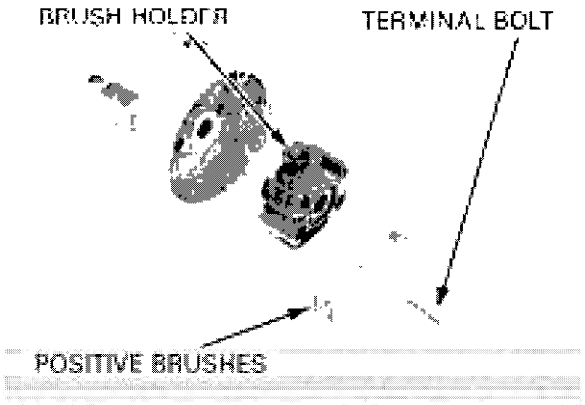
Remove the terminal nut.



Remove the washer, insulator, terminal stopper and O-ring.



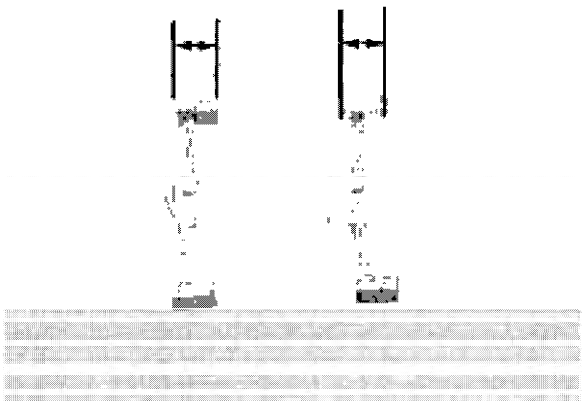
Remove the terminal bolt, positive brushes and brush holder.



INSPECTION

Measure each brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

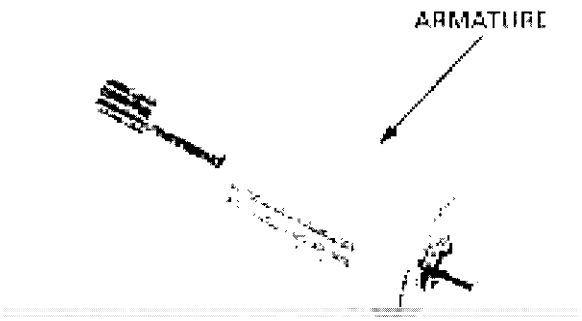


Check the commutator for damage or abnormal wear.

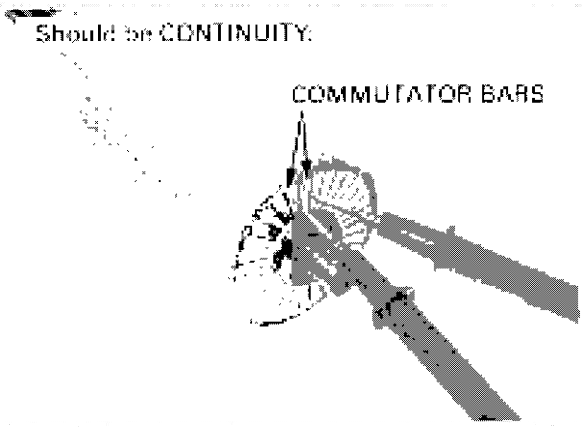
Do not use emery or sand paper on the commutator.

Check the commutator bar for discoloration.
Clean the metallic debris off between commutator bars.

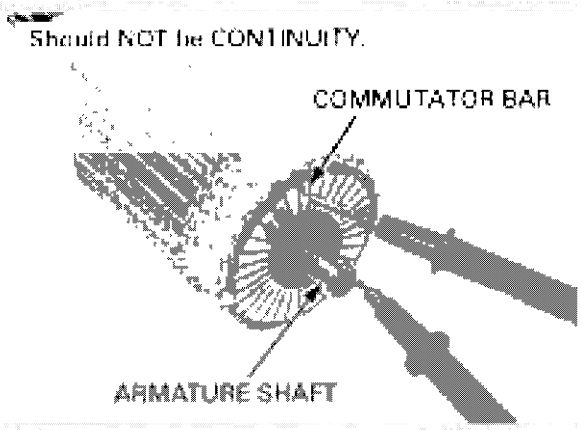
Replace the armature with a new one if necessary.



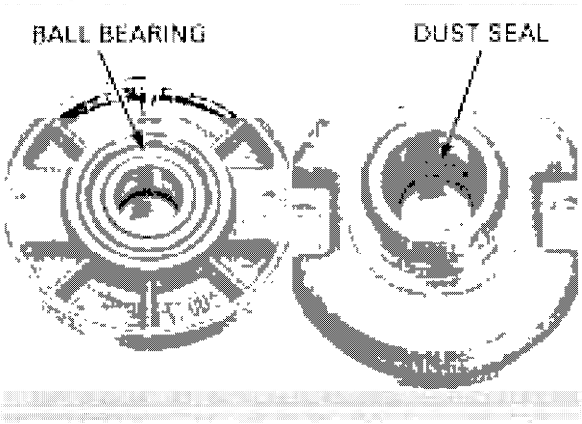
Check for continuity between pairs of commutator bars.
There should be continuity.



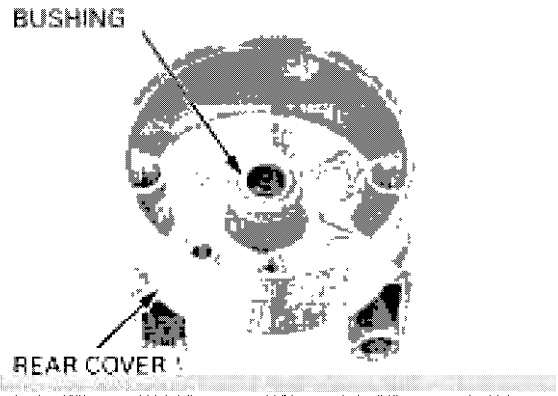
Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.



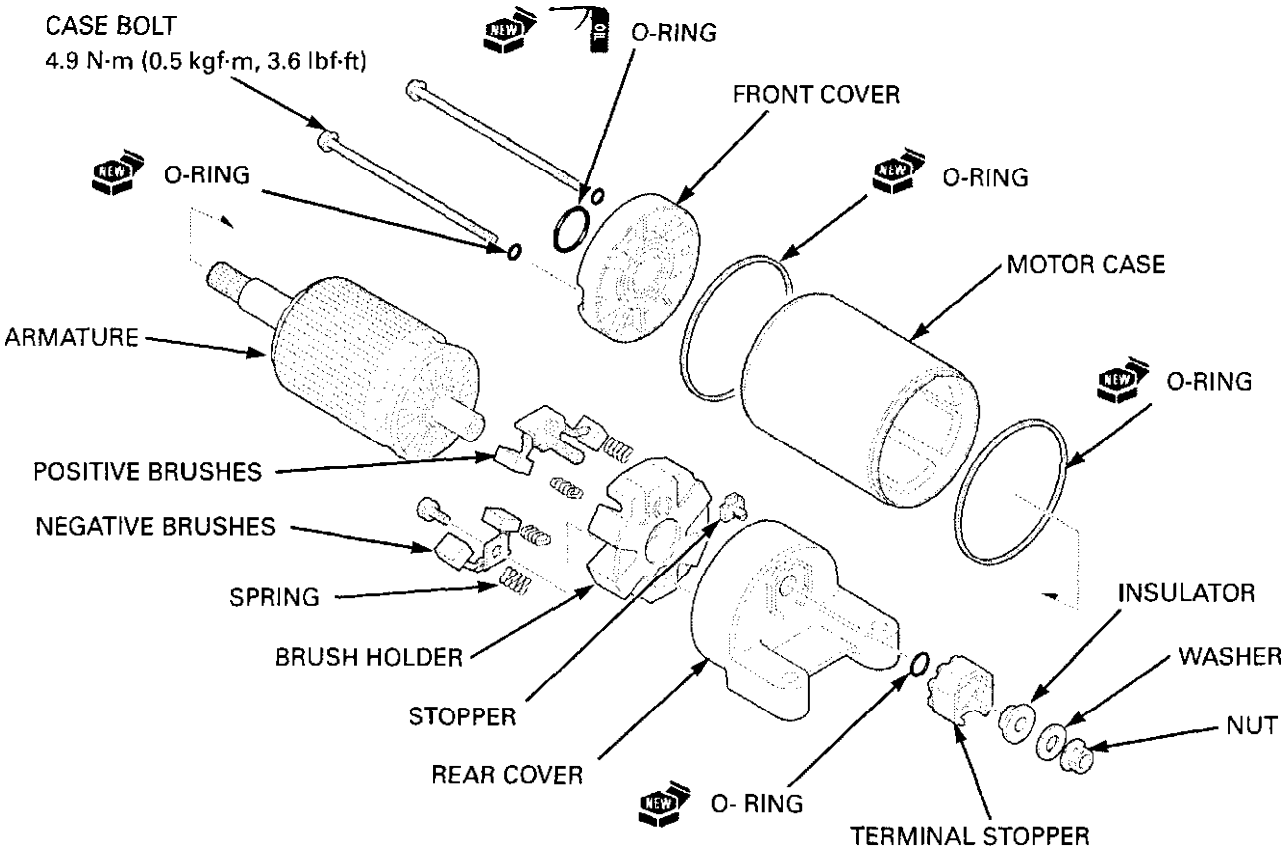
Check the dust seal and needle bearing for wear or damage.
Check the ball bearing rotates smoothly.



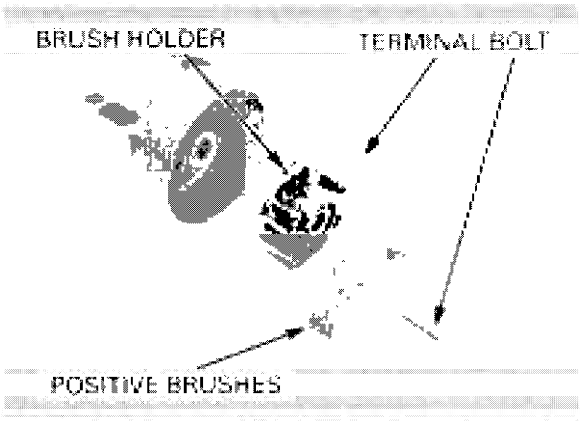
Check the bushing of the rear cover for wear or damage.



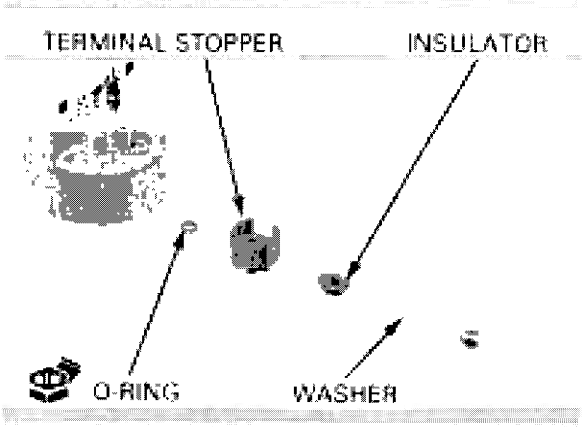
ASSEMBLY



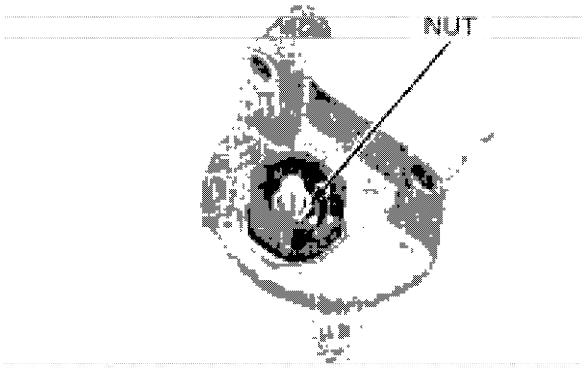
Install the brush holder, positive brushes and terminal bolt.



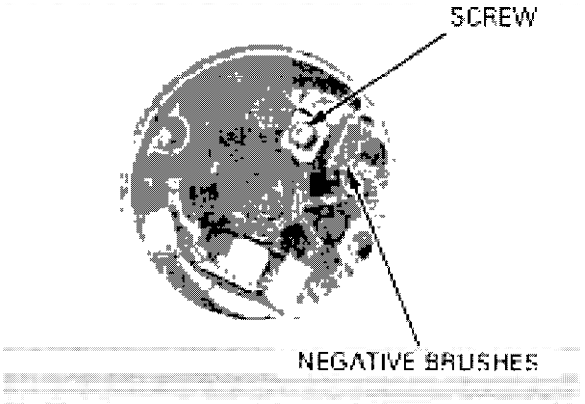
Install a new O-ring, terminal stopper, insulator and washer.



Install and tighten the terminal nut securely.

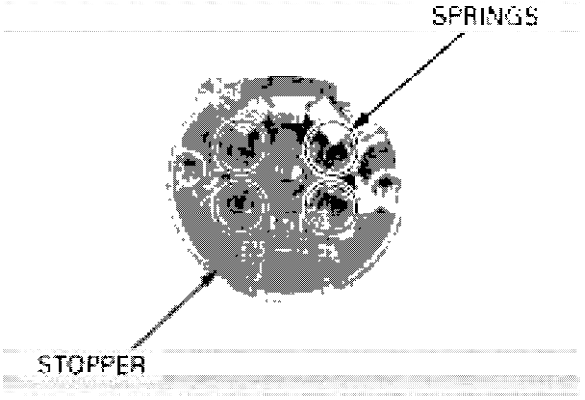


Install the negative brushes and tighten the screw securely.

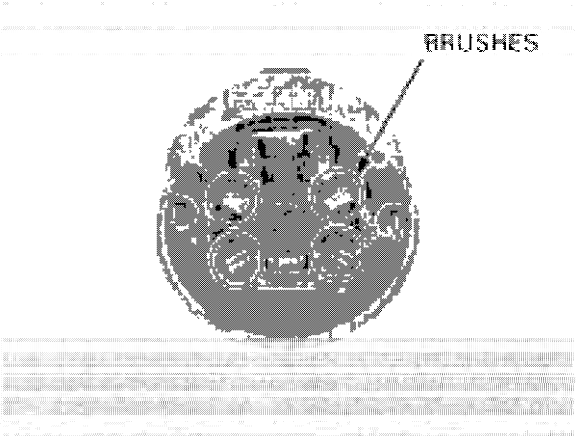


Install the brush springs to the brush holder grooves.

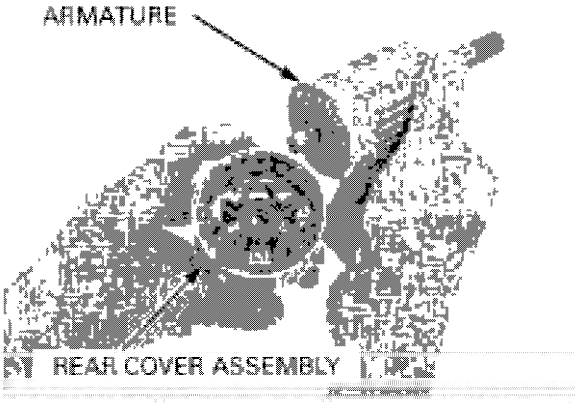
Install the stopper to the rear cover assembly.



Install the brushes to the brush holder.



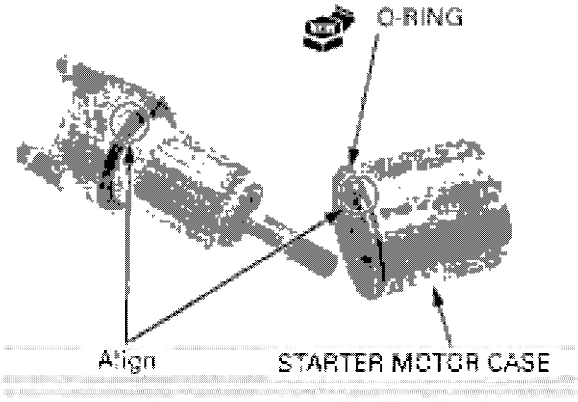
Install the armature to the rear cover assembly.



Install a new O-ring to the starter motor case.
Install the starter motor case with its groove to the stopper on the rear cover assembly.

NOTICE

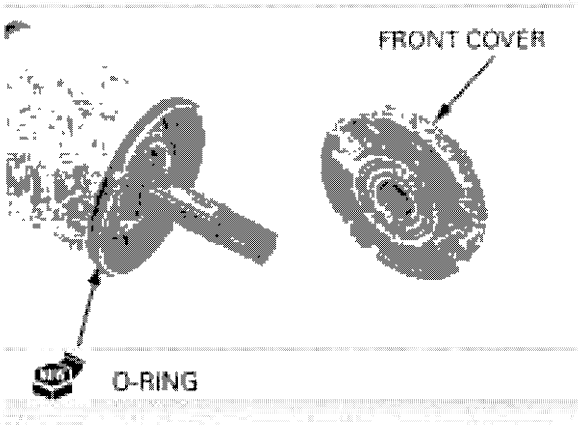
The coil may be damaged if the magnet pulls the armature against the case.



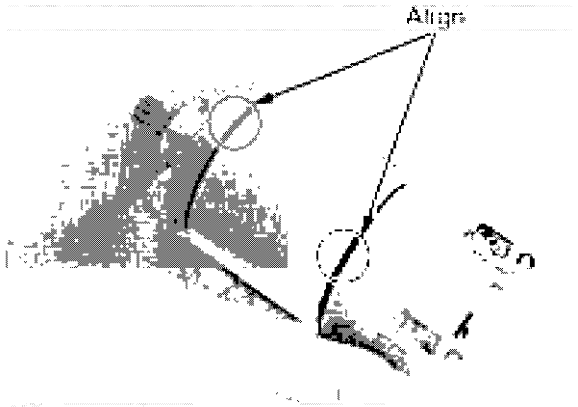
Install a new O-ring to the starter motor case.
Install the front cover to the starter motor case.

NOTICE

When installing the front cover, take care to prevent damaging the oil seal lip with the armature shaft.

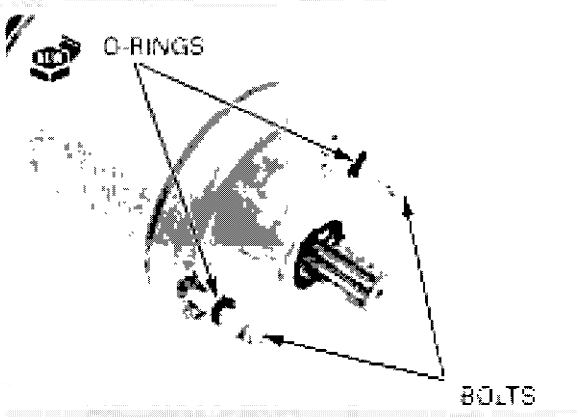


Align the index marks on the front cover, starter motor case and rear cover.



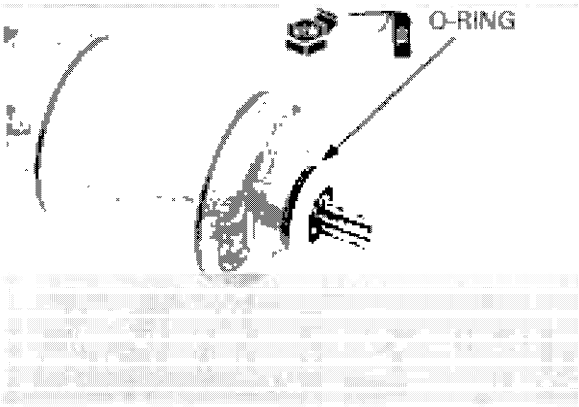
Install a new O-rings to the bolts.
Install and tighten the bolts to the specified torque.

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)



INSTALLATION

Apply oil to a new O-ring and install it to the starter motor groove.

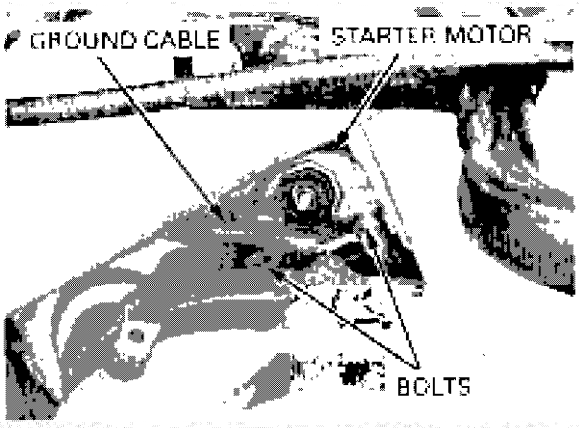


Install the starter motor to the frame as shown.

Route the cable properly (page 1-35).

Install the starter motor to the crankcase.

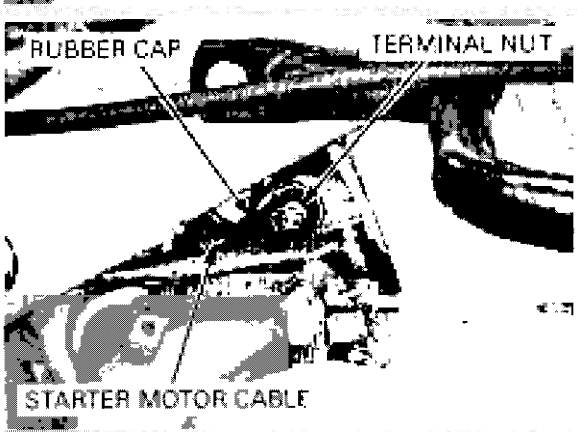
Install the ground cable and tighten the bolts securely.



Connect the starter motor cable.
Install and tighten the terminal nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the rubber cap securely.



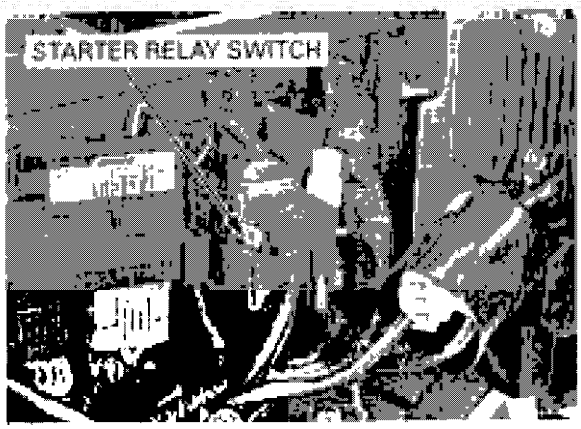
STARTER RELAY SWITCH

INSPECTION

Remove the left saddle bag body (page 3-7).

Shift the transmission into neutral.
Turn the ignition switch to ON with the engine stop switch at "Ω".
Push the starter switch button.
The coil is normal if the starter relay switch clicks.

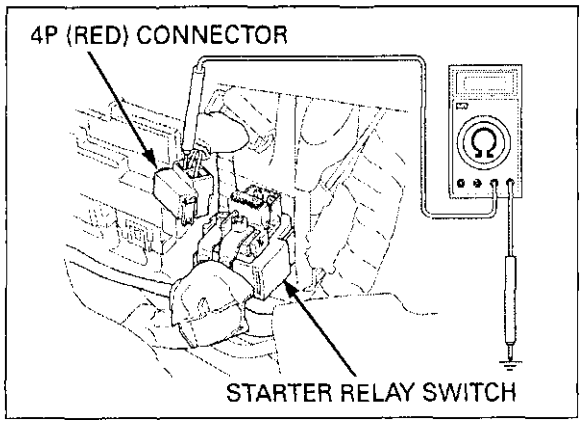
If you do not hear the switch click, inspect the relay switch using the procedure below.



GROUND LINE

Disconnect the starter relay switch 4P (Red) connector.
Check for continuity between the Green/red wire (ground line) terminal and ground.

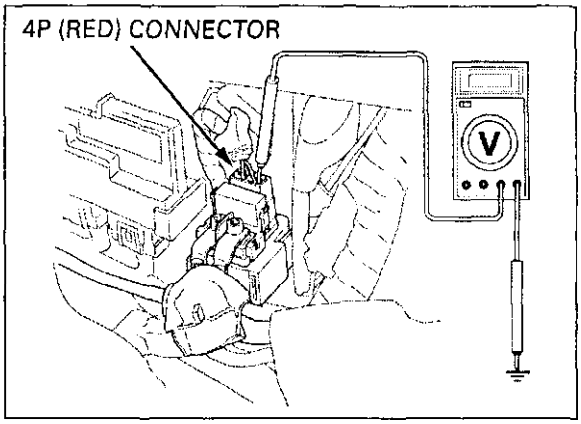
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is retracted, the ground circuit of the relay coil is normal. (In neutral, there is a slight resistance due to the diode.)



STARTER RELAY VOLTAGE

Connect the starter relay switch 4P (Red) connector.
Shift the transmission into neutral.
Turn the ignition switch to ON with the engine stop switch at "Ω".
Measure the voltage between the yellow/red wire terminal (+) and ground (–).

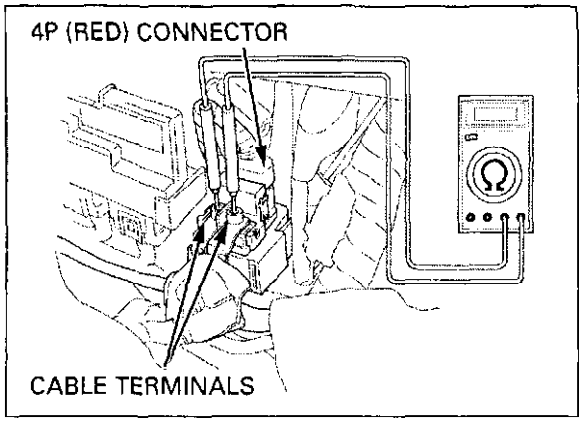
If the battery voltage appears when the starter switch button is pushed, the power supply circuit of the relay coil is normal.



OPERATION CHECK

Connect the starter relay switch 4P (Red) connector.
Shift the transmission into neutral.
Turn the ignition switch to ON with the engine stop switch at "Ω".

There should be continuity between the cable terminals when the starter switch button is pushed, and no continuity when the starter switch button is released.

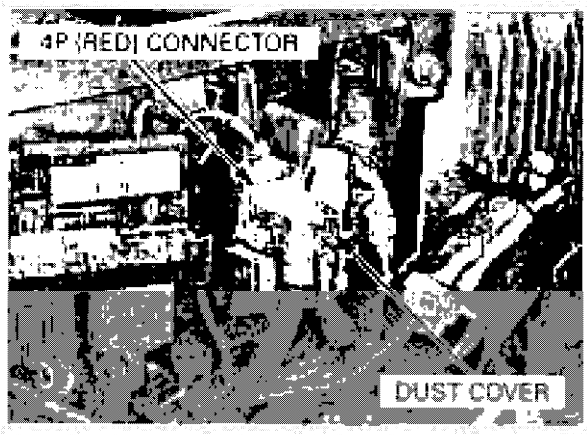


REMOVAL/INSTALLATION

Remove the left saddle bag body (page 3-7).

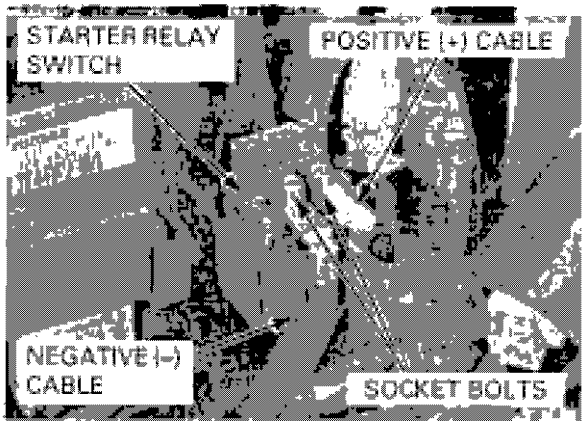
Turn the ignition switch to OFF.
Disconnect the battery negative (–) cable (page 19-6).

Disconnect the starter relay 4P (Red) connector.
Remove the dust cover.



Remove the socket bolts and cables.
Remove the starter relay switch.

Installation is in the reverse order of removal.

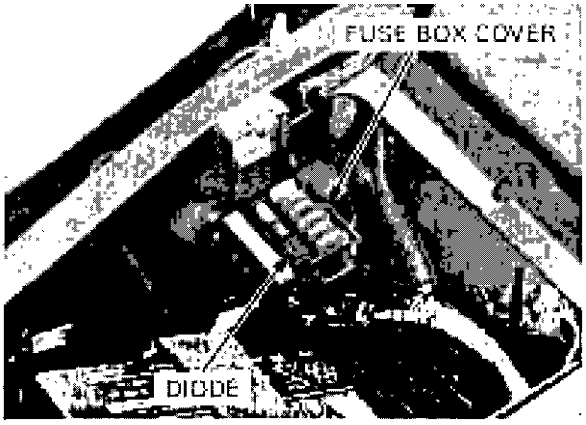


DIODE

INSPECTION

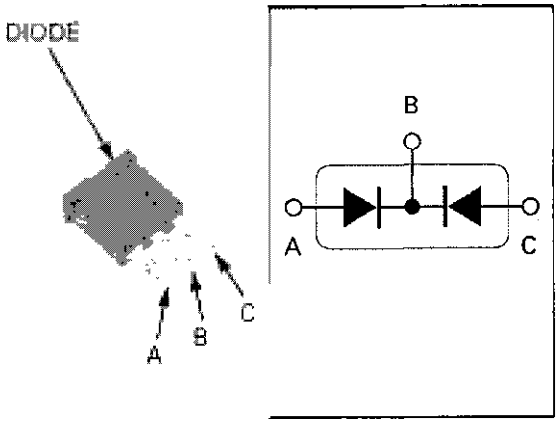
Remove the seat (page 3-5).

Open the fuse box cover and remove the diode.



Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



22. LIGHTS/METERS/SWITCHES

COMPONENT LOCATION 22-2

SERVICE INFORMATION 22-3

HEADLIGHT 22-4

POSITION LIGHT 22-5

TURN SIGNAL LIGHT 22-5

BRAKE/TAIL LIGHT 22-6

LICENSE LIGHT 22-6

COMBINATION METER 22-7

SPEEDOMETER/VS SENSOR 22-9

COOLANT TEMPERATURE GAUGE/
ECT SENSOR 22-10

FUEL LEVEL SENSOR/FUEL METER 22-11

FAN MOTOR RELAY 22-12

OIL PRESSURE INDICATOR 22-14

IGNITION SWITCH 22-15

HANDLEBAR SWITCH 22-16

BRAKE LIGHT SWITCH 22-17

CLUTCH SWITCH 22-18

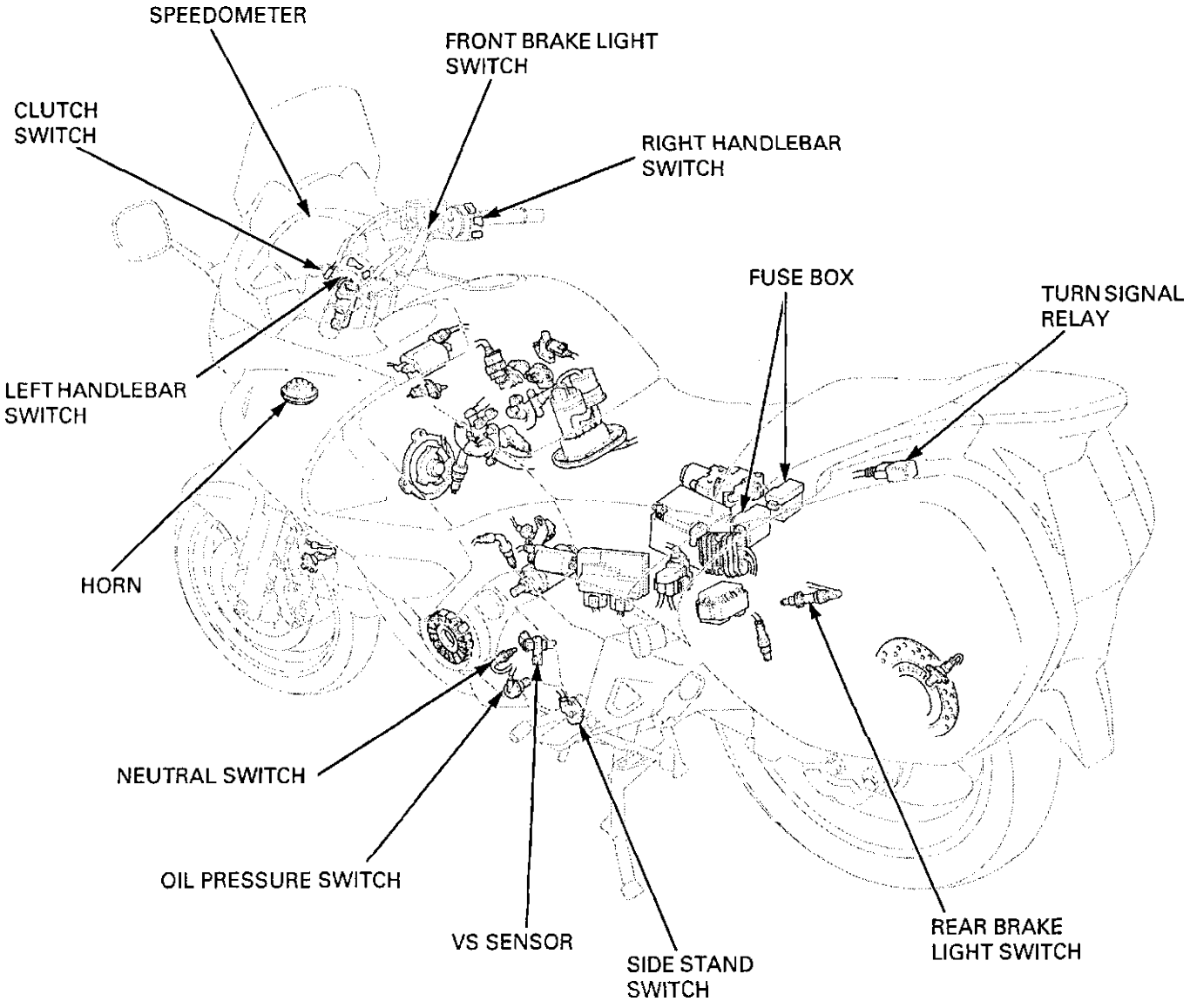
NEUTRAL SWITCH 22-18

SIDE STAND SWITCH 22-19

HORN 22-20

TURN SIGNAL RELAY 22-20

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

NOTICE

Note the following when replacing the halogen headlight bulb.

- *Wear clean gloves while replacing the bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.*
- *If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.*
- *Be sure to install the dust cover after replacing the bulb.*

- A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes used are indicated throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	Y = Yellow	

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (High)	12 V – 55 W
	Headlight (Low)	12 V – 55 W
	Position light	12 V – 5 W
	Brake/taillight	12 V – 21/5 W x 2
	License light	12 V – 5 W
	Front turn signal light	12 V – 21 W x 2
	Rear turn signal light	12V – 21 W x 2
	Instrument light	LED x 14
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Oil pressure indicator	LED
	Immobilizer indicator	LED
Fuse (NT700V)	Main fuse	30 A
	Sub fuse	20 A x 3, 10 A x 5
Fuse (NT700VA)	Main fuse	30 A
	Sub fuse	30 A x 2, 20 A x 3, 10 A x 6

TORQUE VALUES

Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Ignition switch mounting bolt	24 N·m (2.4 kgf·m, 18 lbf·ft)
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Oil pressure switch terminal screw	1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)

HEADLIGHT

BULB REPLACEMENT

Disconnect the headlight 2P connectors.

Remove the dust cover.

Unhook the bulb retainer and remove the headlight bulb.

NOTICE

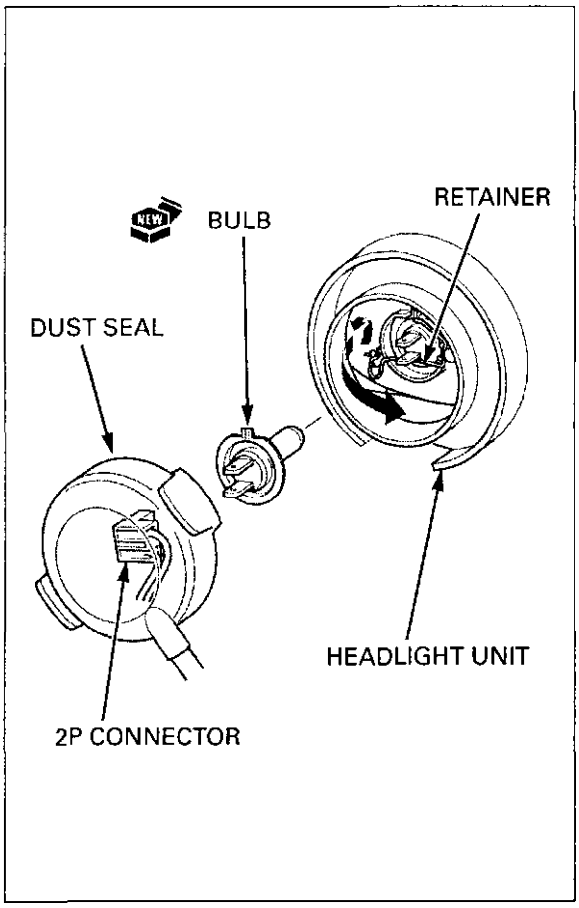
Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent early bulb failure.

Install a new bulb, aligning its tabs with the grooves in the headlight unit.

Hook the bulb retainer securely and install the dust cover.

Connect the headlight 2P connectors.

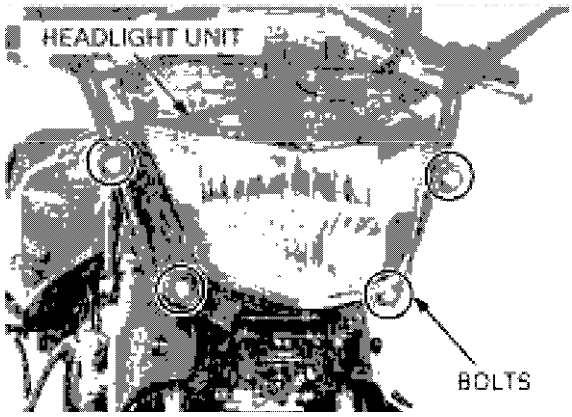


REMOVAL/INSTALLATION

Remove the middle cowl (page 3-11).
Remove the screen inner cowl (page 3-14).

Remove the bolts and headlight unit.

Installation is in the reverse order of removal.



POSITION LIGHT

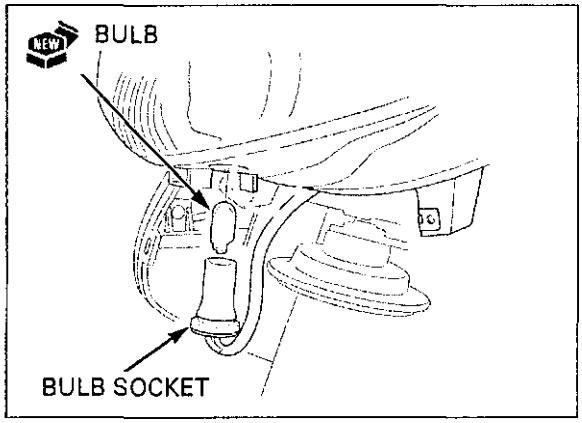
BULB REPLACEMENT

Remove the headlight under cowl (page 3-8).

Pull out the position light bulb socket.

Remove the bulb from the bulb socket and replace it with a new one.

Installation is in the reverse order of removal.



TURN SIGNAL LIGHT

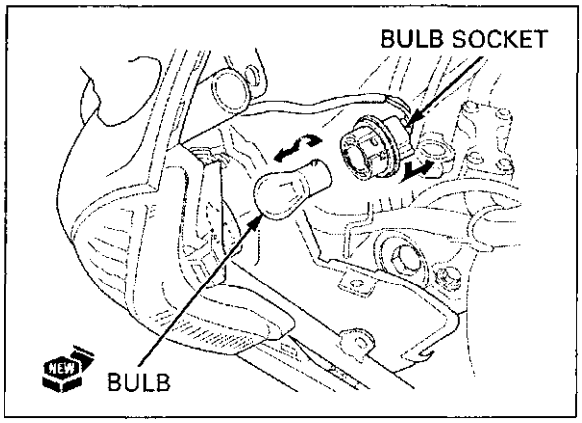
BULB REPLACEMENT

FRONT

Remove the meter cover (page 3-10).

Turn the bulb socket counterclockwise, then remove it from the turn signal unit.
While pushing the bulb in, turn it counterclockwise to remove it from the bulb socket, and replace it with a new one.

Installation is in the reverse order of removal.

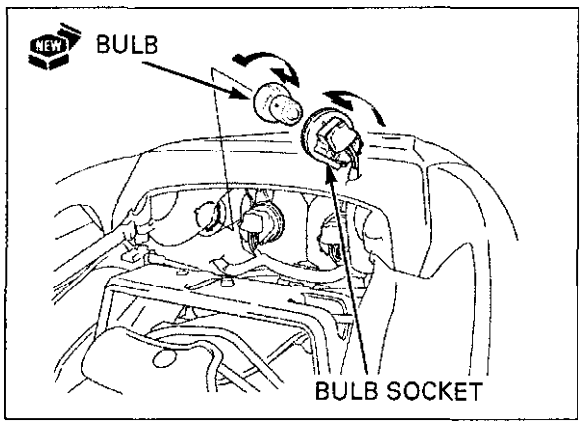


REAR

Remove the seat (page 3-5).

Turn the bulb socket counterclockwise, then remove it from the turn signal unit.
While pushing the bulb in, turn it counterclockwise to remove it from the bulb socket, and replace it with a new one.

Installation is in the reverse order of removal.



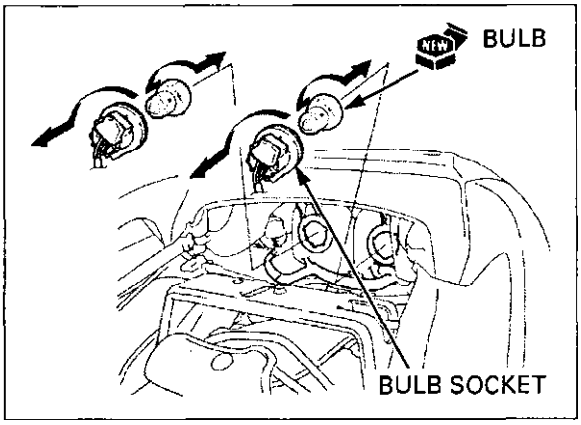
BRAKE/TAIL LIGHT

BULB REPLACEMENT

Remove the seat (page 3-5).

Turn the bulb socket counterclockwise, then remove it from the brake/tail light unit.
While pushing the bulb in, turn it counterclockwise to remove it from the bulb socket, and replace it with a new one.

Installation is in the reverse order of removal.



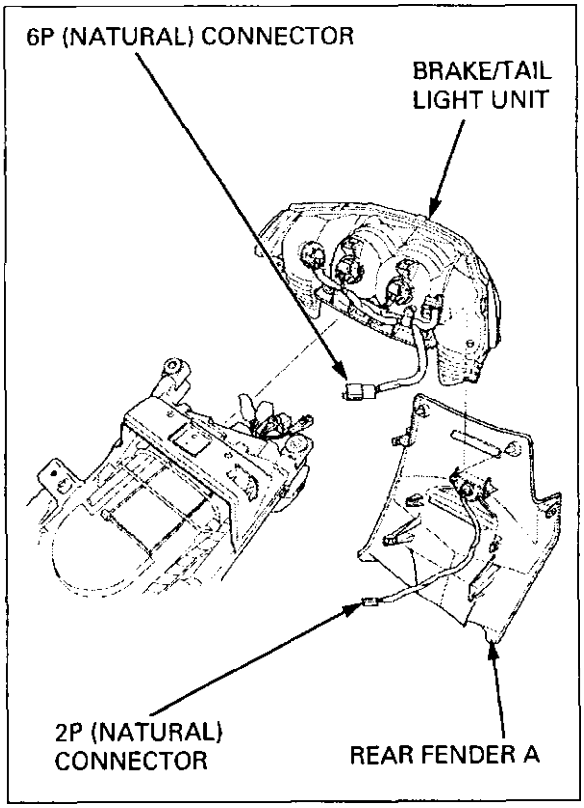
REMOVAL/INSTALLATION

Remove the saddle bag body (page 3-7).

Disconnect the brake/tail light 6P (Natural) connector.
Disconnect the license light 2P (Natural) connector.
Remove the brake/tail light unit/rear fender A.

Remove the brake/tail light unit from the rear fender A.

Installation is in the reverse order of removal.



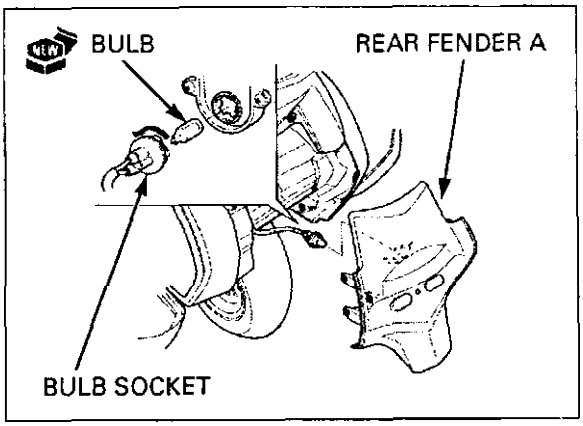
LICENSE LIGHT

BULB REPLACEMENT

Remove the rear fender A (page 3-6).

Turn the bulb socket counterclockwise, then remove it from the rear fender A.
Remove bulb from the bulb socket, and replace it with a new one.

Install the removed parts in the reverse order of removal.

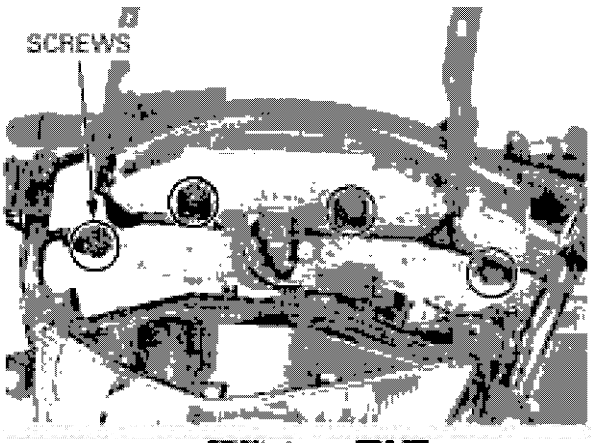


COMBINATION METER

REMOVAL/INSTALLATION

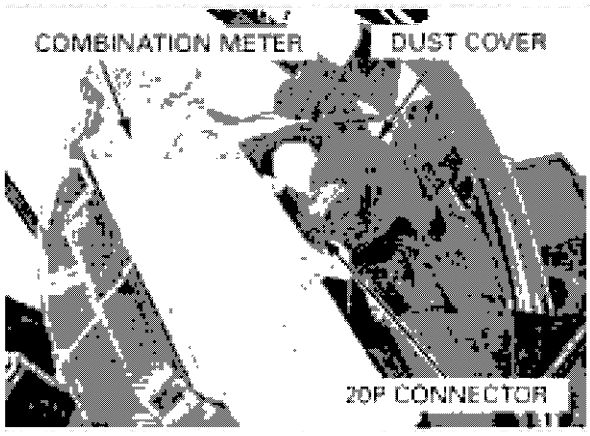
Remove the meter cover (page 3-10).
Remove the screen inner cowl (page 3-14).

Remove the screws.



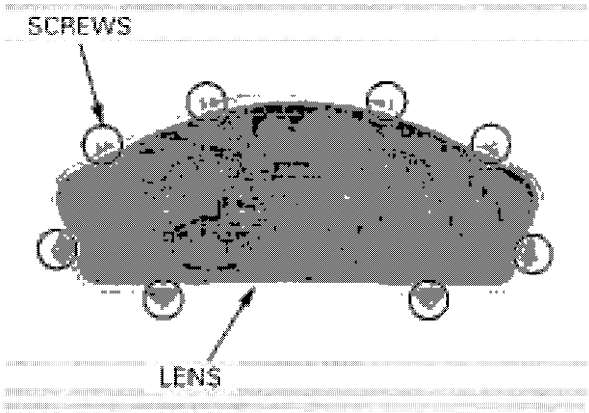
Remove the dust cover and disconnect the combination meter 20P connector.
Remove the combination meter.

Installation is in the reverse order of removal.

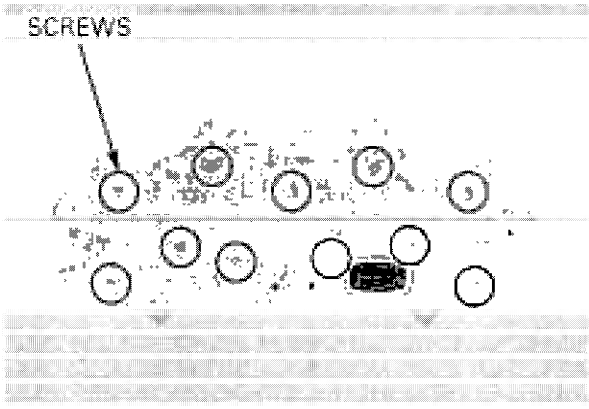


DISASSEMBLY/ASSEMBLY

Remove the screws and combination meter lens.

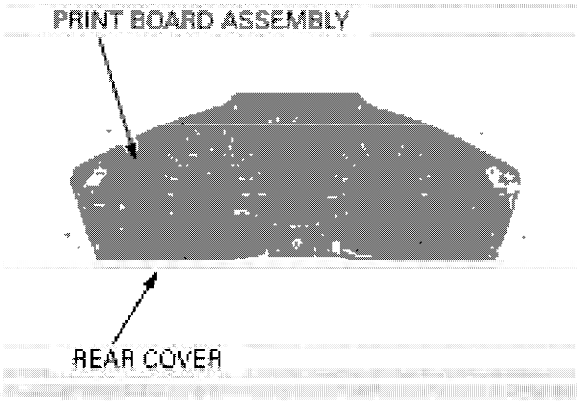


Remove the screws.



Remove the combination meter print board assembly from the rear cover.

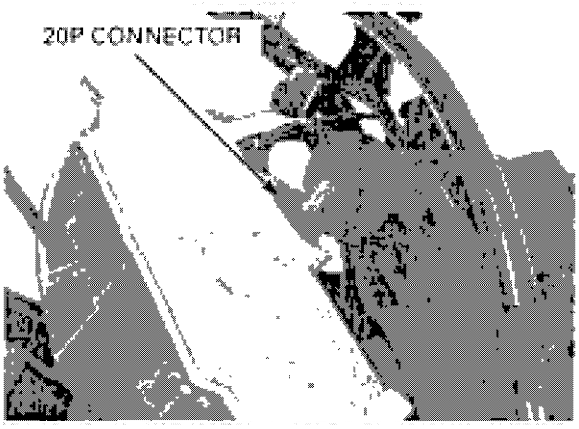
Assembly is in the reverse order of disassembly.



POWER/GROUND LINE INSPECTION

Remove the screen inner cowl (page 3-14).

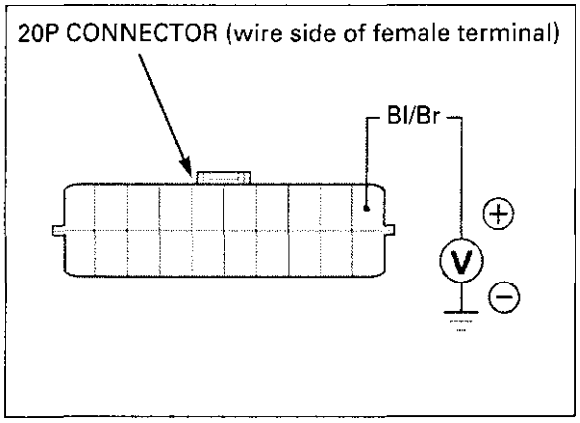
Disconnect the combination meter 20P connector. Check for following at the wire harness side connector terminals of the combination meter.



POWER INPUT LINE

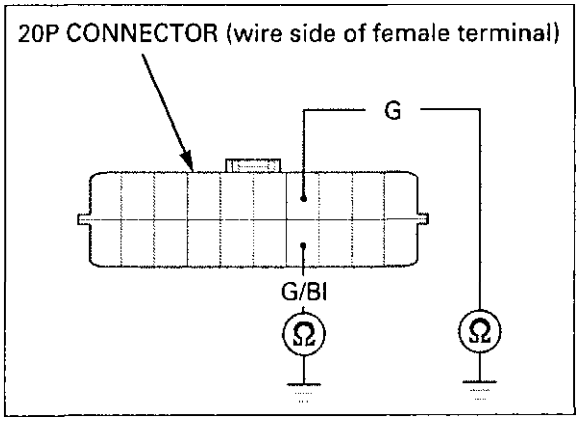
Measure the voltage between the Black/brown wire terminal (+) of the speedometer 20P connector and ground (–).
There should be battery voltage with the ignition switch turned to ON.

If there is no voltage, check the following:
- Open circuit in the Black/brown wire
- Blown fuse (10 A)



GROUND LINE

Check for continuity between the Green wire terminal and ground.
Check for continuity between the Green/black wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for an open circuit in the Green wire.

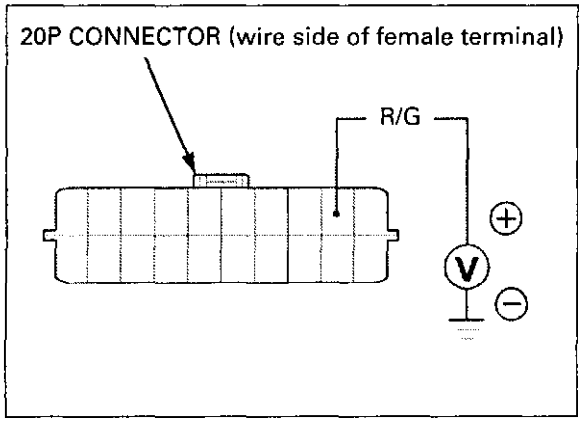


BACK-UP VOLTAGE LINE

Check this line if the odometer/trip meter does not function.
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 the following:

- Open circuit in the Red/green wire
- Blown fuse (10 A)
- Open circuit in the Red wire



SPEEDOMETER/VS SENSOR

SPEEDOMETER INSPECTION

Speedometer does not operate

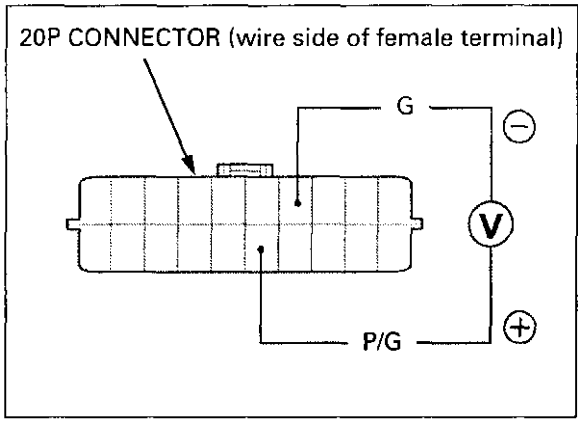
Check that the indicators function properly.
If they do not function, check the power/ground line (page 22-8).

Disconnect the combination meter 20P connector (page 22-7).

Support the motorcycle securely using the main-stand and raise the rear wheel off the ground.
Shift the transmission into neutral and turn the ignition switch to ON.

Measure the voltage between the Pink/green (+) and Green (–) wire terminals of the speedometer connector.
Slowly turn the rear wheel by hand.
There should be 0 V to 5 V pulse voltage.

- If pulse voltage appears, replace the speedometer.
- If pulse voltage does not appear, check the following:
  - Pink/green wire for an open or short circuit
  - Green wire for an open circuit
    If the wires are OK, check the VS sensor power line inspection (page 22-9).



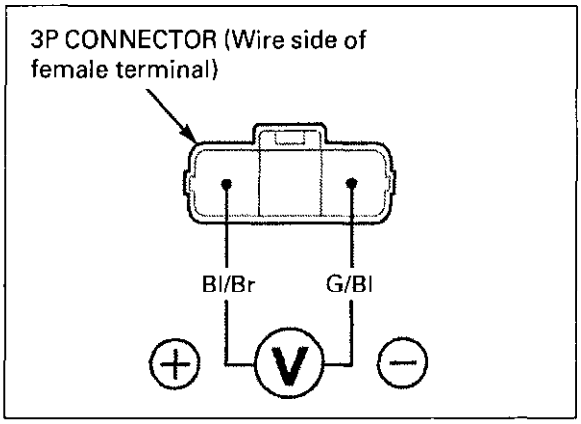
VS SENSOR POWER LINE INSPECTION

Remove the left crankcase rear cover (page 3-15).

Disconnect the VS sensor 3P connector.
Turn the ignition switch to ON and measure the voltage between the Black/brown (+) and Green/black (–) wire terminals of the VS sensor 3P connector wire harness side.
There should be battery voltage.

If there is no voltage, check for an open circuit in the Black/brown and Green/black wires.

If the speedometer does not operate, check the speedometer inspection (page 22-9).
Then check the VS sensor power line inspection.
If the speedometer and wire harness between the speedometer and VS sensor are normal, replace the VS sensor with a new one.

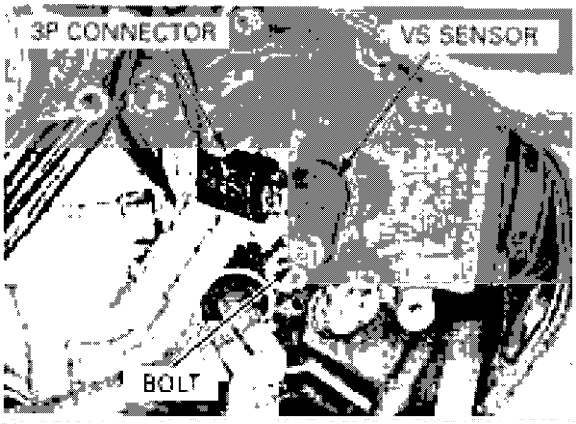


VS SENSOR REPLACEMENT

Remove the left crankcase rear cover (page 3-15).

Disconnect the VS sensor 3P connector.

Remove the bolt and VS sensor from the crankcase.



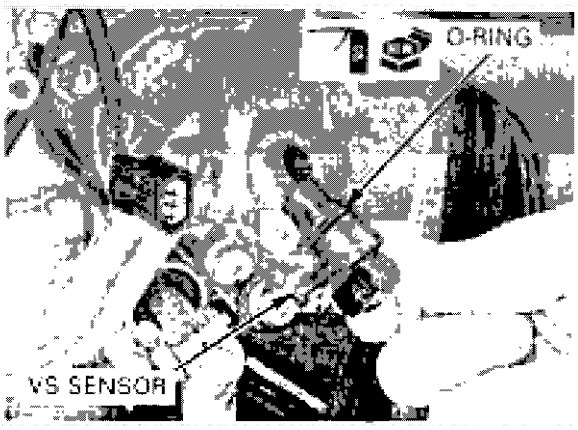
Coat a new O-ring with oil and install it into the VS sensor groove.

Route the VS sensor wire properly (page 1-35).

Install the VS sensor.

Install and tighten the mounting bolt securely.

Install the removed parts in the reverse order of removal.

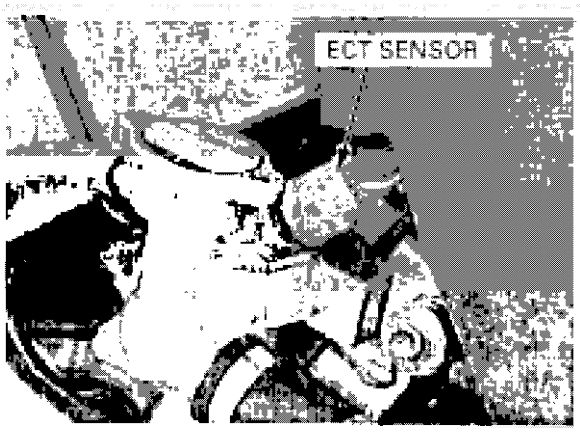


COOLANT TEMPERATURE GAUGE/ ECT SENSOR

INSPECTION

Remove the right middle cowl (page 3-11).

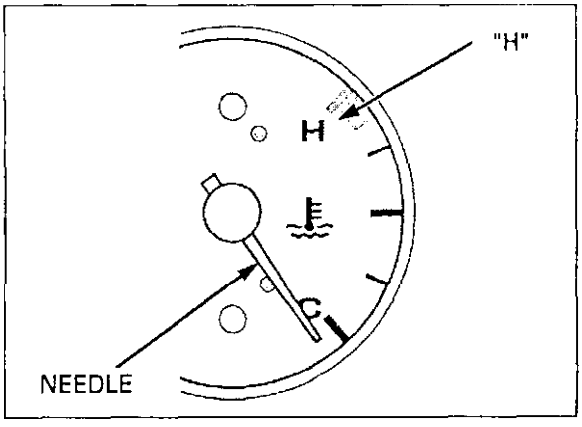
Disconnect the ECT sensor 3P (Gray) connector.
Ground the Green/blue wire of the ECT 3P (Gray) connector with a jumper wire.



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 22-7).

If the coolant temperature gauge indicates, check the ECT sensor (page 22-11).

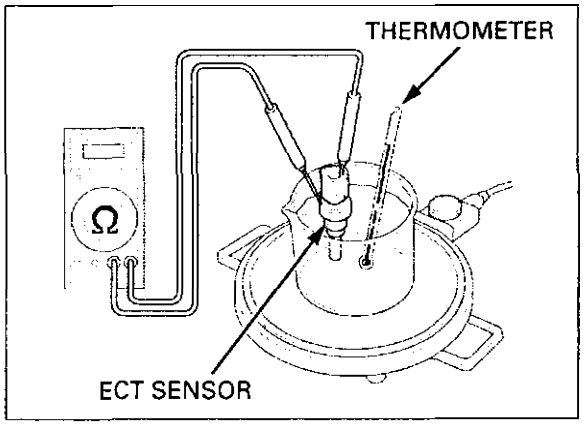


ECT SENSOR INSPECTION

Drain the coolant from the cooling system (page 7-7).
Remove the ECT sensor (page 6-72).

Wear insulated gloves and adequate eye protection. Keep flammable materials away from the burner.

Heat the coolant (50-50 mixture) with an electric heating element.
Suspend the ECT sensor in heated coolant and check the continuity through the sensor as the coolant heats up.



NOTE:

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the switch.
- Keep temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.

CONNECTION: Green/blue – Body ground

Temperature °C (°F)	50 (122)	80 (176)	120 (248)
Resistance (kΩ)	6.83 - 7.40	2.13 - 2.61	0.65 - 0.69

Replace the ECT sensor if it is out of specifications.

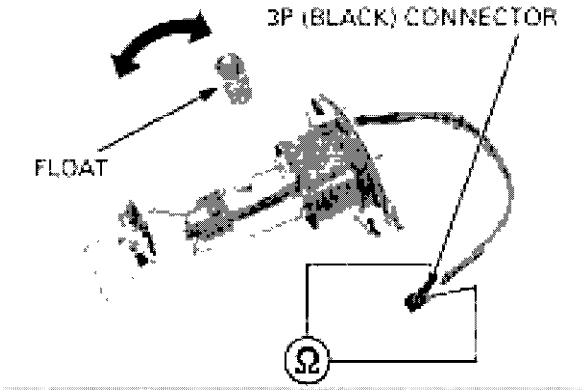
Install the ECT sensor (page 6-72).

FUEL LEVEL SENSOR/FUEL METER

FUEL LEVEL SENSOR INSPECTION

Remove the fuel pump (page 6-60).

Connect the ohmmeter to the fuel pump 3P (Black) connector Black/white and Red/black terminals.
Inspect the resistance of the float at the full and empty positions.



Position	FULL	EMPTY
Resistance	8 - 12 Ω	270 - 276 Ω

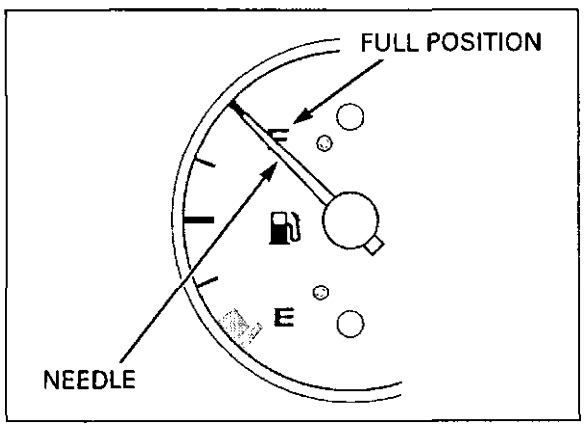
Replace the fuel pump assembly if fuel level sensor is out of specification.

Install the fuel pump (page 6-60).

FUEL METER INSPECTION

Remove the fuel pump (page 6-60).

Connect the fuel pump 3P (Black) connector.
Turn the ignition switch to ON.
Move the float from the empty to check full position, then check the fuel meter indication.



If the fuel meter does not indicate properly, check for open or short circuit in wire harness.
If the wire harness is good, replace the fuel meter with a new one (page 22-7).

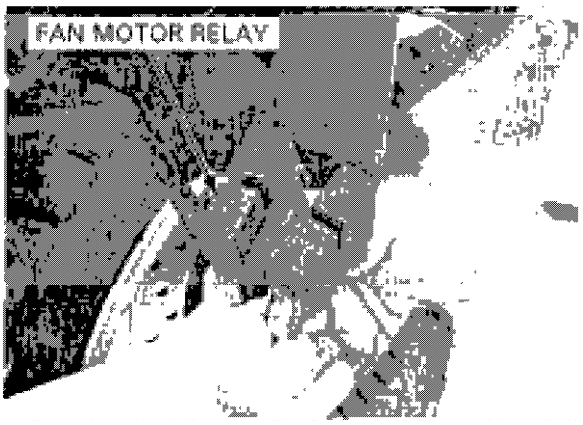
FAN MOTOR RELAY

SYSTEM INSPECTION

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

Remove the fan motor relay from the relay connector and turn the ignition switch to ON.

- If the fan motor does not stop, check for a short circuit in the Black/blue wire.
- If the fan motor stops, replace the fan motor relay.



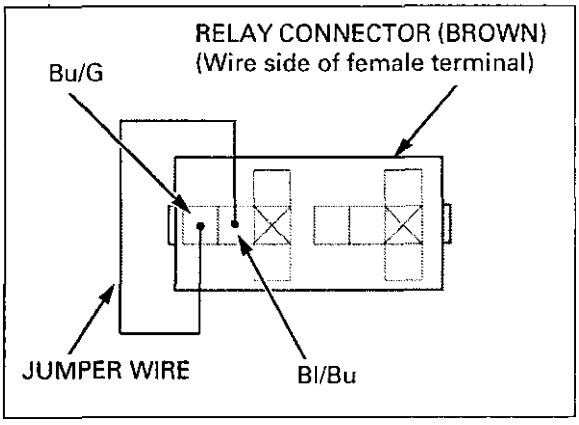
The coolant temperature gauge indicates to "H" but the fan motor does not start

Before testing, check for a blown fuse (10 A).

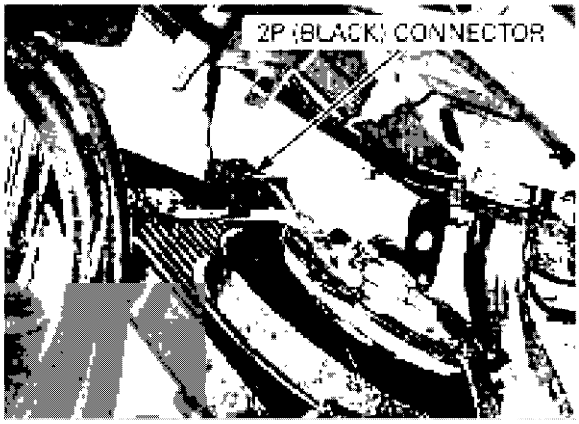
Disconnect the fan motor relay from the relay connector.
Jump the fan motor relay terminals.

CONNECTION: Black/blue – Blue/orange

Turn the ignition switch to ON and check the fan motor.



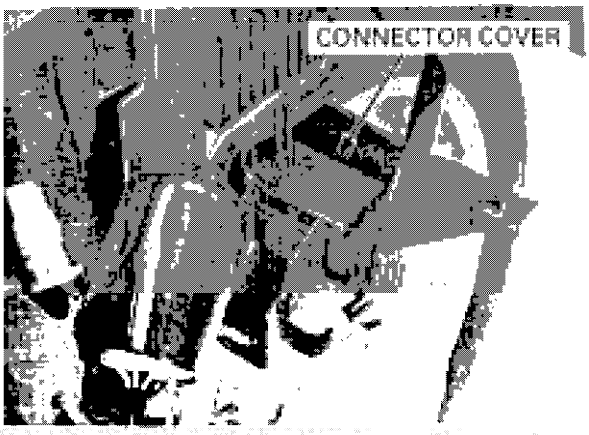
- If the motor starts, replace the fan motor relay.
- If the fan motor does not start, disconnect the fan motor 2P (Black) connector.
  Measure the voltage between the Black/Blue wire and ground.
  - If there is battery voltage, replace the fan motor (page 7-10).
  - If there is no voltage, check for an open circuit in the Green and Black/blue wires.



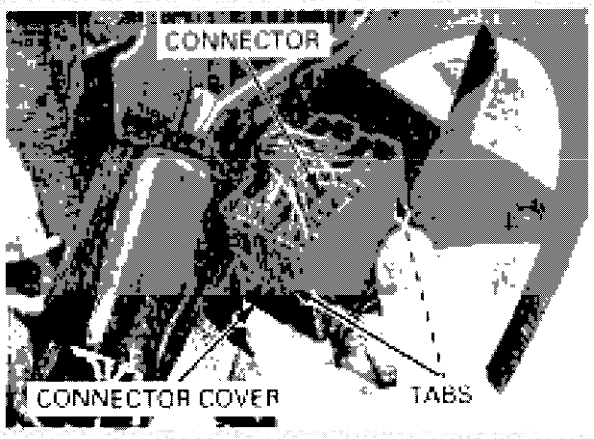
INSPECTION

Remove the saddle bag body (page 3-7).

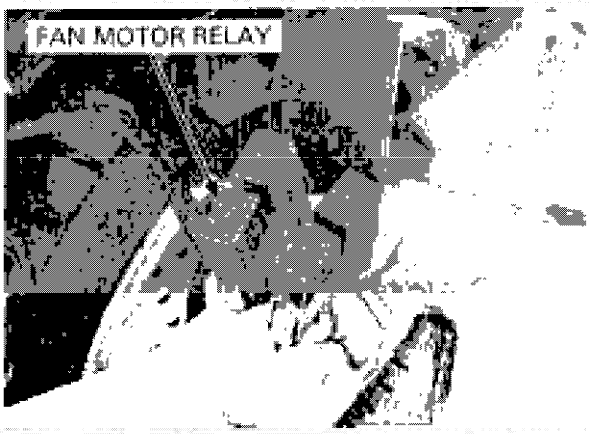
Remove the relay connector cover from the rear fender B.



Release the tabs and remove the relay connector from the cover.



Disconnect the fan motor relay from the relay connector.



Connect the ohmmeter to the relay connector terminals.

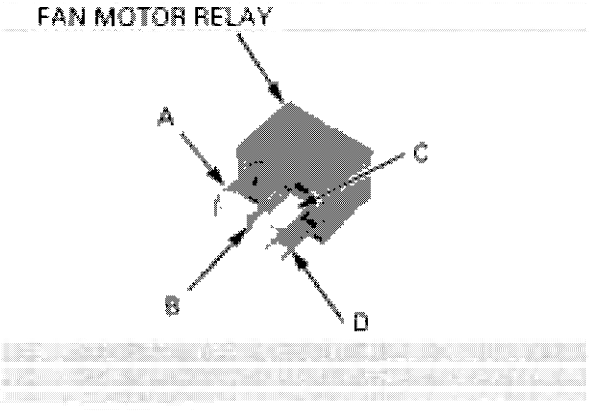
CONNECTION: A – B

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

CONNECTION: C – D

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

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

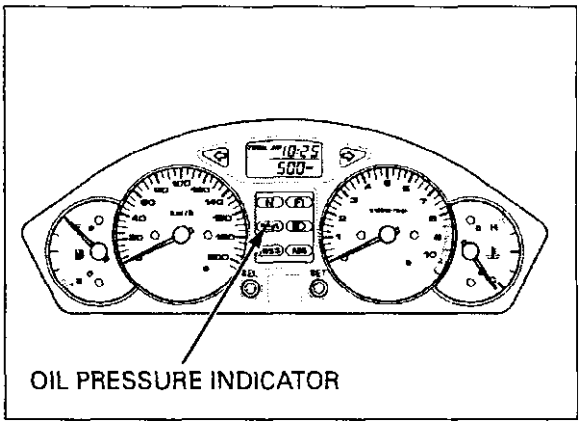


OIL PRESSURE INDICATOR

INSPECTION

Indicator does not come on with the ignition switch turned to ON

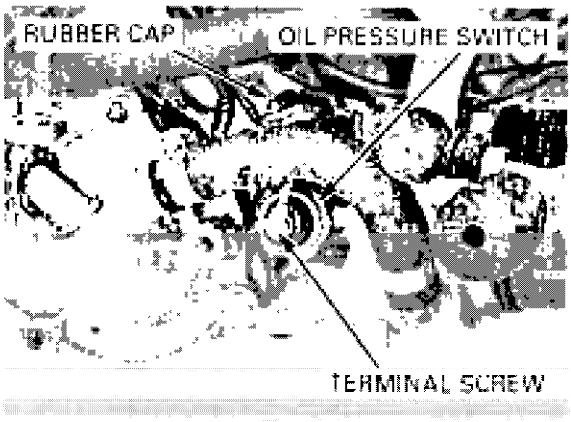
Check that the neutral and hi beam indicators function properly.
If they do not function properly, check the power input line of the combination meter (page 22-8).



Remove the left crankcase rear cover (page 3-15).

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw.
Ground the wire terminal.
Turn the ignition switch to ON and check the oil pressure indicator.

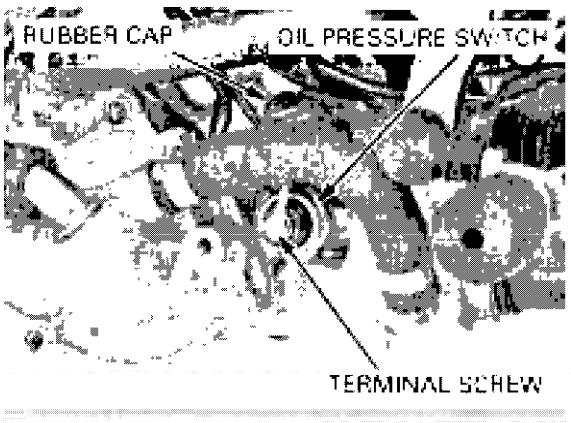
- If the indicator comes on, replace the oil pressure switch.
- If the indicator does not come on, check for loose an open circuit in the Blue/red wire. If the wire is OK, replace the combination meter (page 22-7).



Indicator stays on while the engine is running

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw.
Check for continuity between the wire terminal and ground.

- If there is continuity, check for a short circuit in the Blue/red wire.
- If there is no continuity, check the oil pressure (page 5-5).
  If the oil pressure is normal, replace the oil pressure switch.



After inspection, connect the oil pressure switch wire and tighten the terminal screw.

TORQUE: 1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the rubber cap properly.

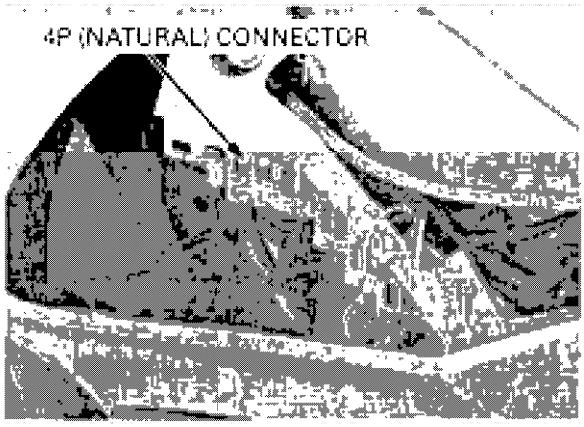
Install the left crankcase rear cover (page 3-15).

IGNITION SWITCH

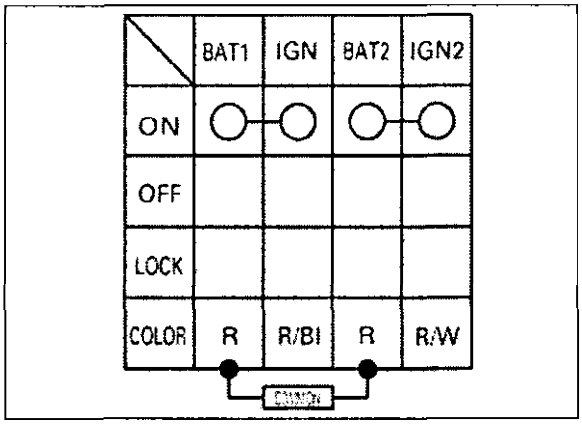
INSPECTION

Remove the left middle cowl lid (page 3-9).

Disconnect the ignition switch 4P (Natural) connector.



Check for continuity between the switch side connector terminals in each switch position.
Continuity should exist between the color coded wires as shown in the chart.



REMOVAL/INSTALLATION

Remove the left middle cowl (page 3-11).

Disconnect the ignition switch 4P (Natural) connector.

Remove the top bridge (page 15-27).
Remove the immobilizer receiver (page 23-16).

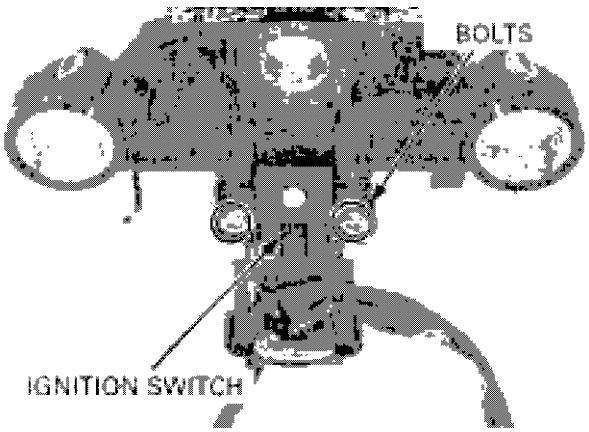
Remove the bolts and ignition switch assembly.

The ignition switch mounting bolt heads are broken by tighten them to the specified torque.

Installation is in the reverse order of removal.

Install and tighten a new mounting bolts to the specified torque.

TORQUE: 24 N·m (2.4 kgf·m, 18 lbf·ft)

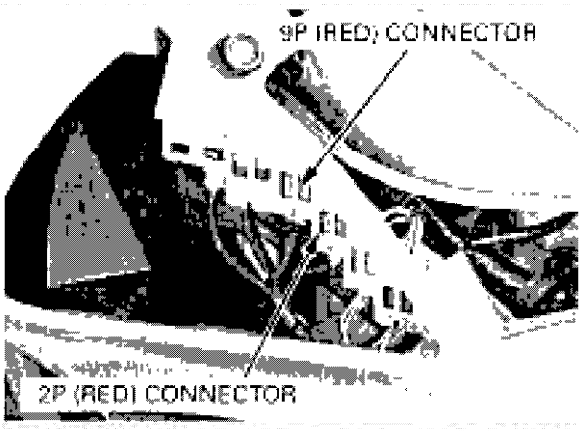


HANDLEBAR SWITCH

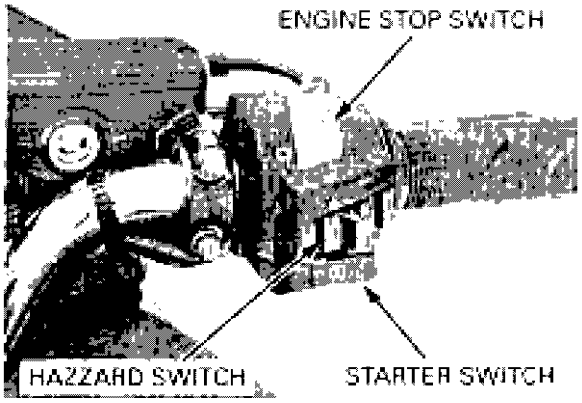
RIGHT HANDLEBAR SWITCH

Remove the left middle cowl lid (page 3-9).

Disconnect the right handlebar switch 2P (Red) and 9P (Red) connectors.



Check for continuity between the connector terminals in each switch position.



Continuity should exist between the color coded wires as shown in the charts.

ENGINE STOP SWITCH

	IG	BAT5
OFF		
RUN	○	○
COLOR	Bl/W	Bl

STARTER SWITCH

	ST	IG	BAT4	HL
FREE			○	○
PUSH	○	○		
COLOR	Y/R	Bl/W	Bl/R	Bu/W

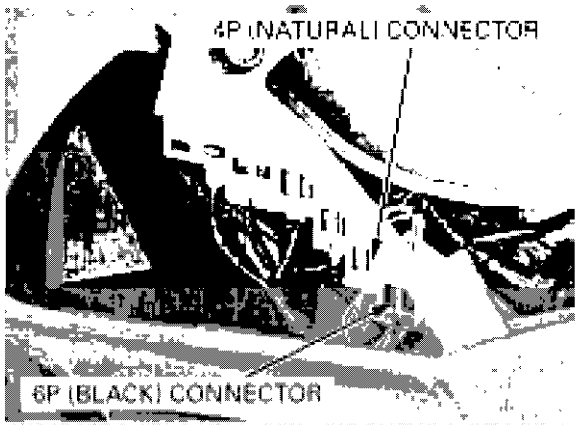
HAZZARD SWITCH

	W	R	L
OFF			
ON	○	○	○
COLOR	Gr	SB	O

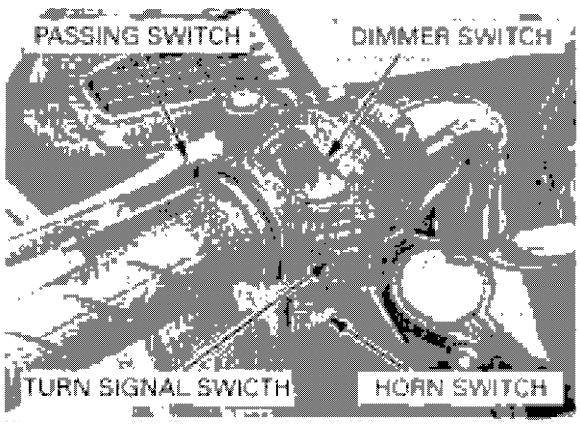
LEFT HANDLEBAR SWITCH

Remove the left middle cowl lid (page 3-9).

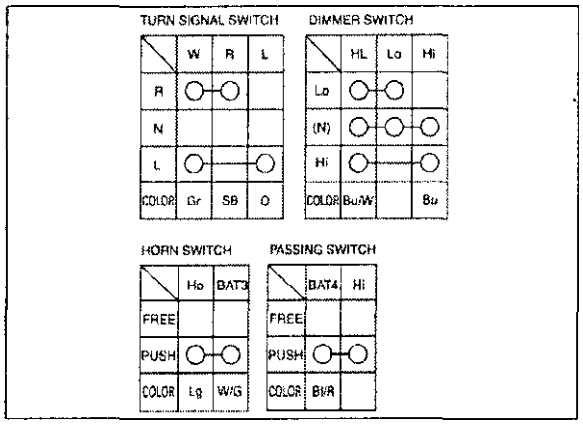
Disconnect the left handlebar switch 6P (Black) and 4P (Natural) connectors.



Check for continuity between the connector terminals in each switch position.



Continuity should exist between the color coded wires as shown in the charts.

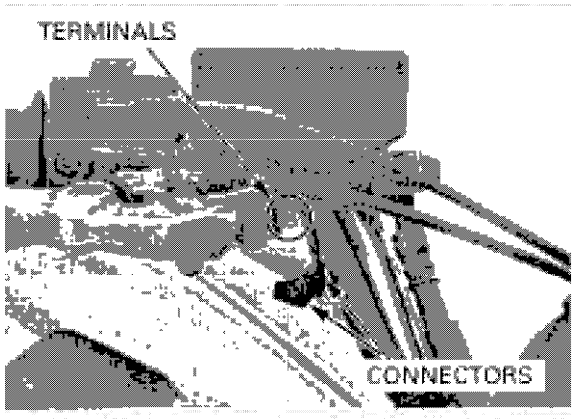


BRAKE LIGHT SWITCH

FRONT

Disconnect the brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the brake lever squeezed and no continuity with the lever released.



REAR

Remove the right side cover/pivot cover (page 3-5).

Disconnect the rear brake light switch 3P (Black) connector and check for continuity between the switch side connector terminals.

There should be continuity with the brake pedal depressed and no continuity with the pedal released.

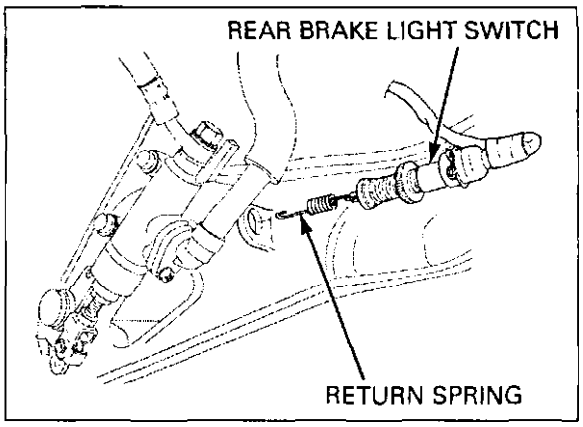
REAR BRAKE LIGHT SWITCH REMOVAL/INSTALLATION

Remove the rear master cylinder (page 17-28).

Unhook the brake light switch spring.

Remove the rear brake light switch.

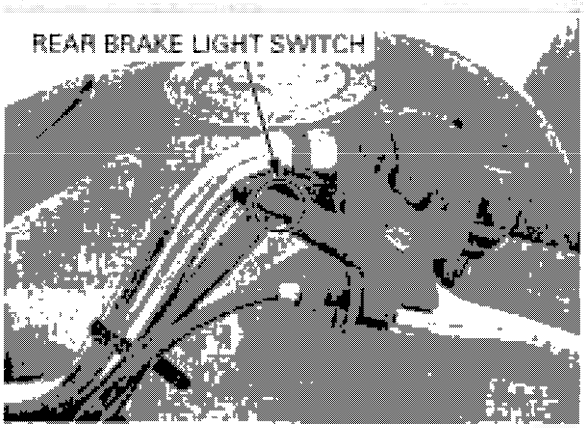
Adjust the rear brake light switch (page 4-20).



CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.



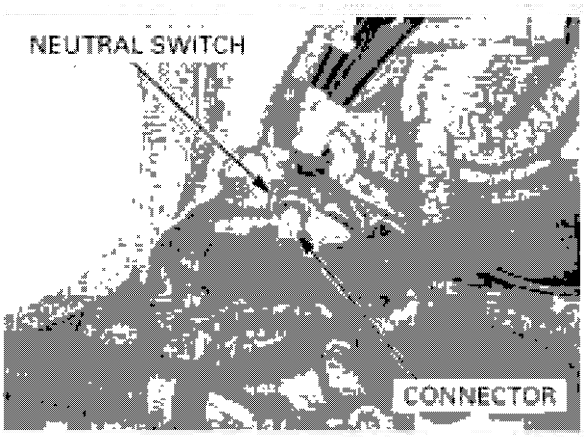
NEUTRAL SWITCH

Remove the left crankcase rear cover (page 3-15).

INSPECTION

Disconnect the neutral switch connector.
Check for continuity between the switch terminal and engine ground.

There should be continuity when the transmission is in neutral, and no continuity when the transmission is in gear except neutral.



REPLACEMENT

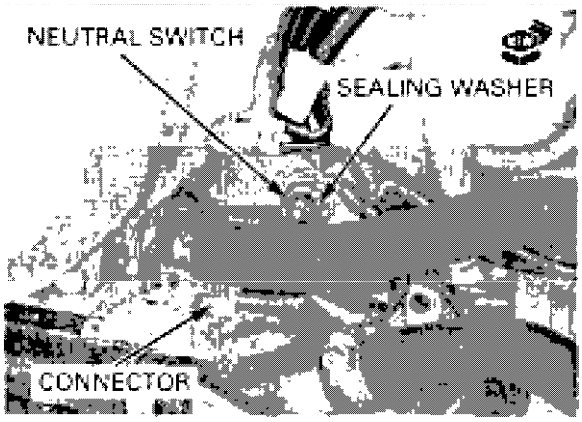
Disconnect the neutral switch connector.
Remove the neutral switch with the sealing washer from the crankcase.

Install the neutral switch with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector.

Install the left crankcase rear cover (page 3-15).

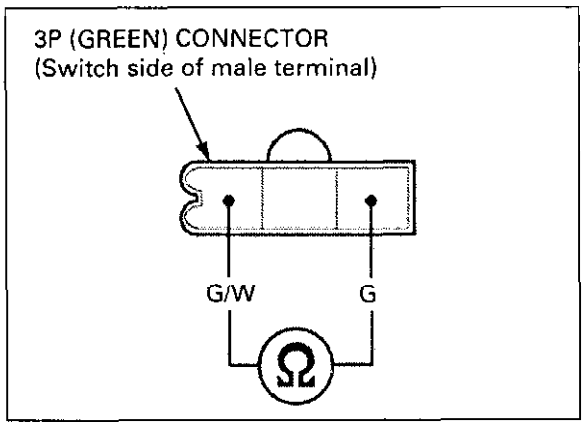


SIDE STAND SWITCH

INSPECTION

Remove the left side cover/pivot cover (page 3-5).

Disconnect the side stand switch 3P (Green) connector.
Check for continuity between the switch side connector terminals.
There should be continuity with the side stand retracted and no continuity with the side stand lowered.



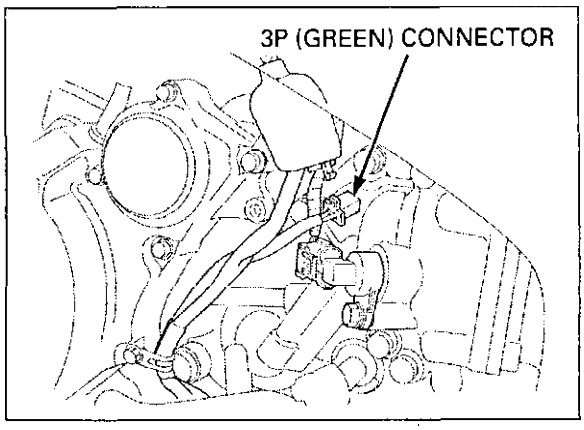
REMOVAL/INSTALLATION

Remove the following:

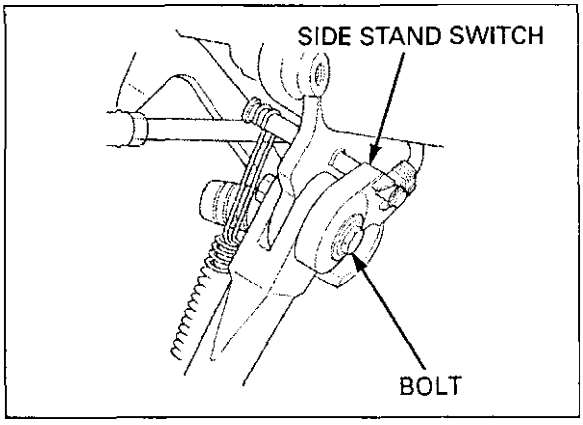
- Left side cover/pivot cover (page 3-5)
- Left crankcase rear cover (page 3-15)

Support the motorcycle securely using the main stand.

Disconnect the side stand switch 3P (Green) connector.



Remove the bolt and side stand switch.

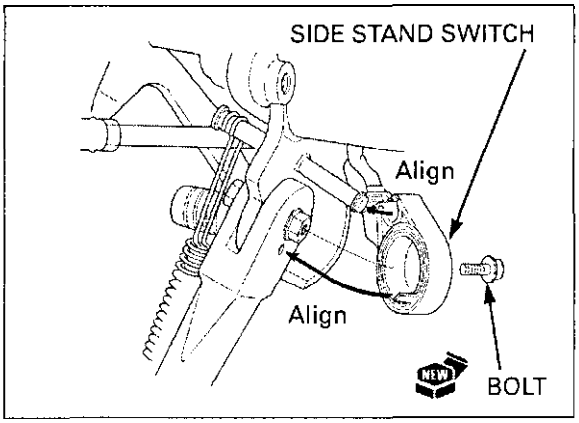


Install the side stand switch by aligning its pin with the side stand hole and switch groove with the bracket pin.
Install and tighten the new bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Route the side stand switch wire properly (page 1-35).

Install the removed parts in the reverse order of removal.



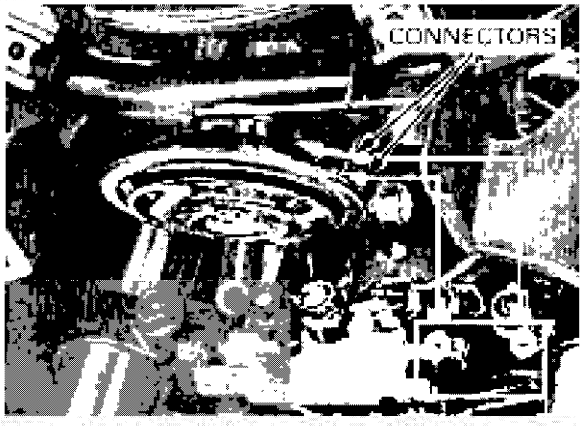
HORN

INSPECTION

Remove the headlight under cowl (page 3-8).

Disconnect the connectors from the horn.
Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



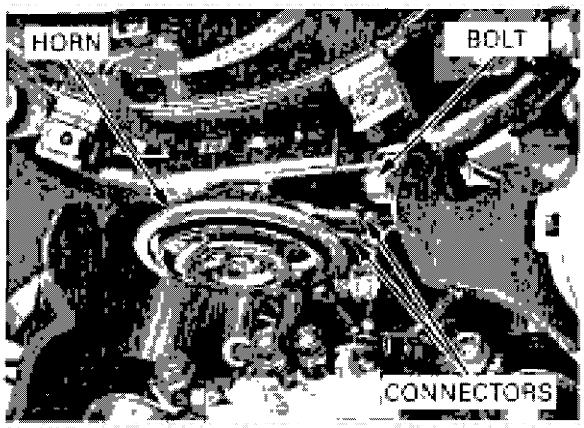
REMOVAL/INSTALLATION

Remove the headlight under cowl (page 3-8).

Disconnect the connectors from the horn.

Remove the bolt and horn.

Installation is in the reverse order of removal.



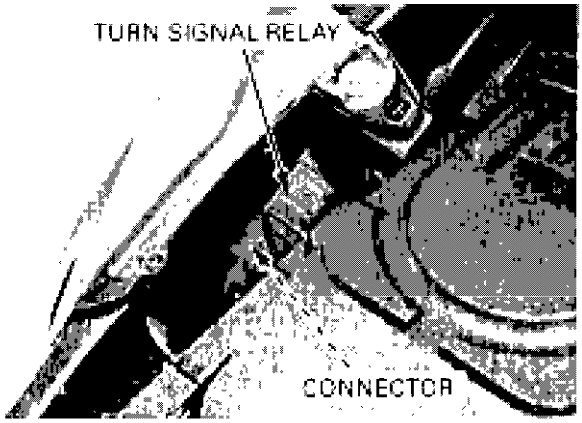
TURN SIGNAL RELAY

Turn signal light does not blink

Remove the seat (page 3-5).

Remove the turn signal relay from the stay.
Slide the rubber cap and disconnect the connector.
Connect the White/green and Gray wire terminals of the wire harness side connector with a jumper wire.
Turn the ignition switch to "ON" and check the turn signal lights by operating the turn signal switch.

- If the light does not come on, check for an open circuit in the White/green and Gray wires.
- If the light comes on, check the connector terminals for loose or poor contact.
  If the connector terminals are OK, replace the turn signal relay.



23. IMMOBILIZER SYSTEM (HISS)

COMPONENT LOCATION 23-2

SYSTEM DIAGRAM 23-2

SERVICE INFORMATION 23-3

KEY REGISTRATION PROCEDURES 23-4

DIAGNOSTIC CODE INDICATION 23-7

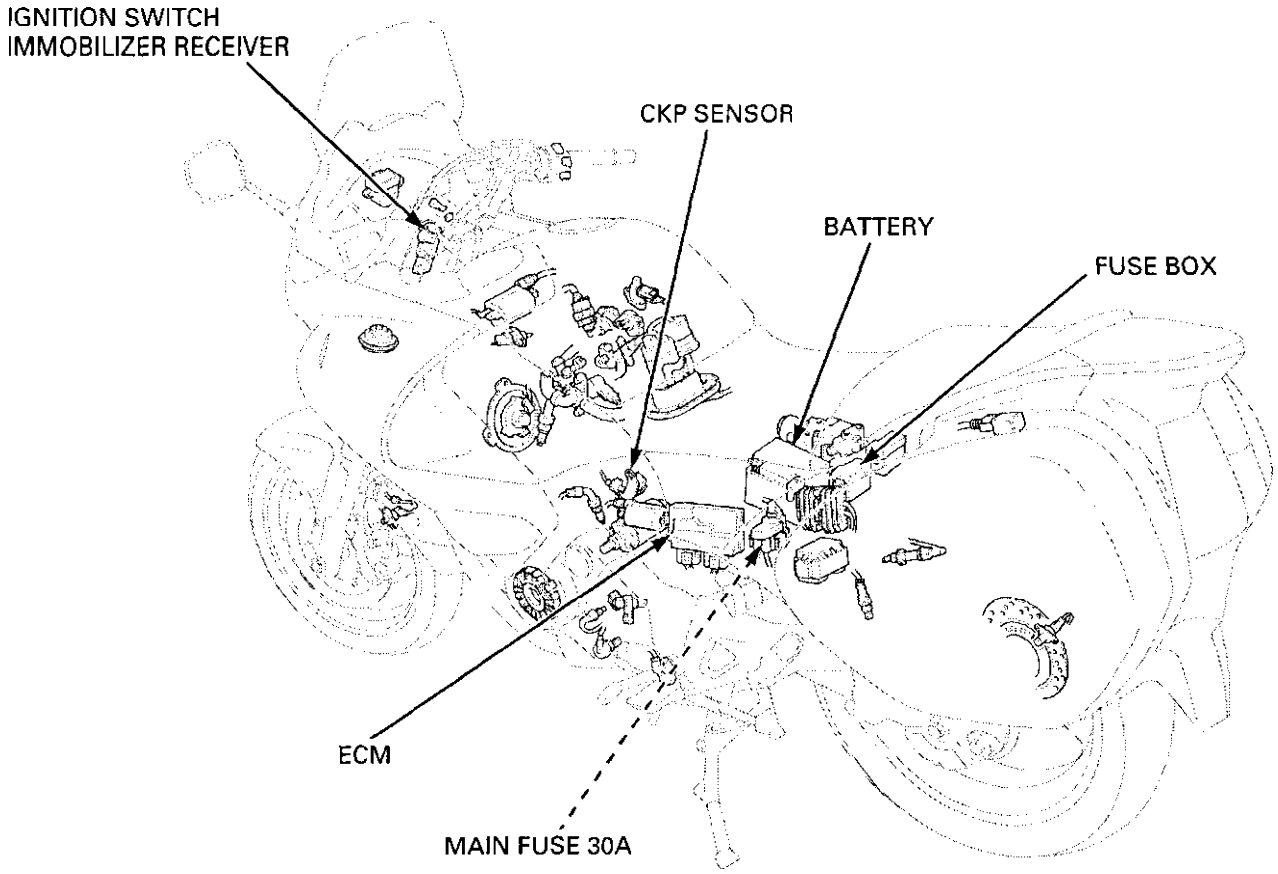
TROUBLESHOOTING 23-9

IMMOBILIZER INDICATOR 23-12

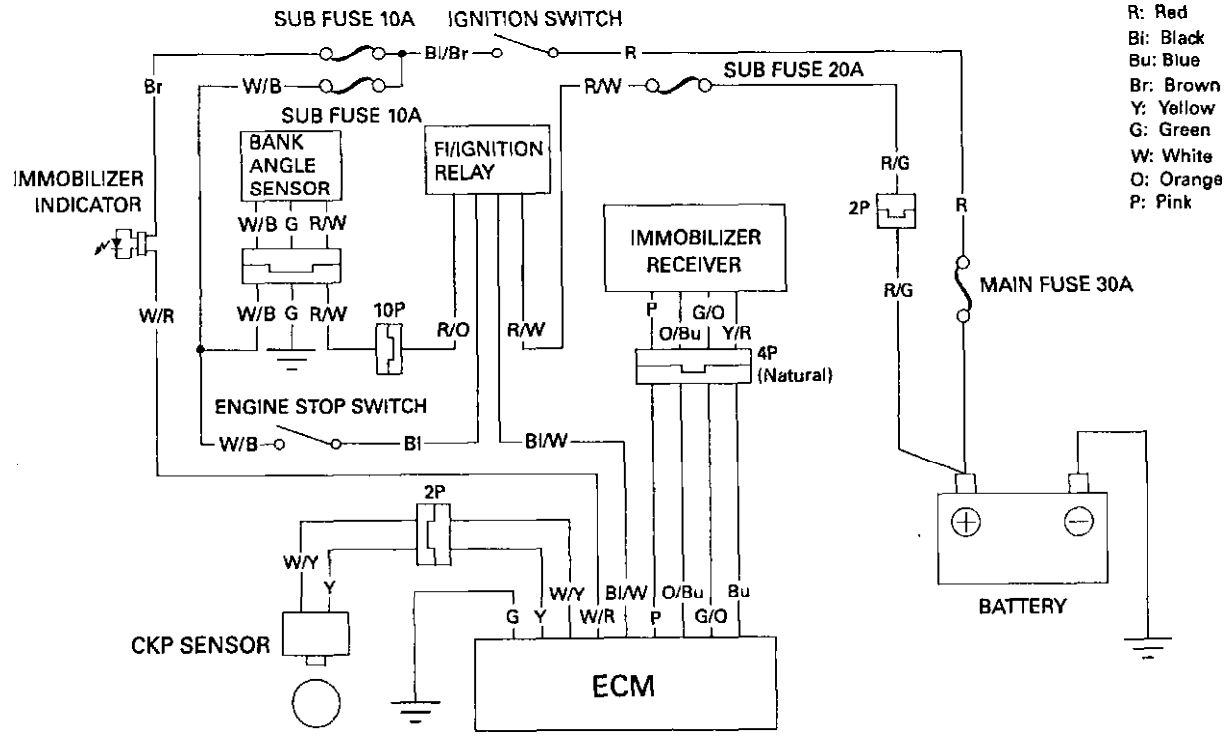
ENGINE CONTROL MODULE (ECM) 23-13

IMMOBILIZER RECEIVER 23-15

COMPONENT LOCATION



SYSTEM DIAGRAM

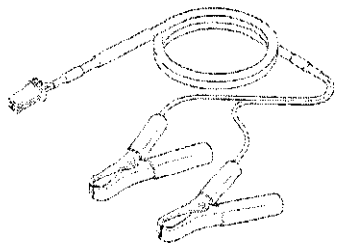
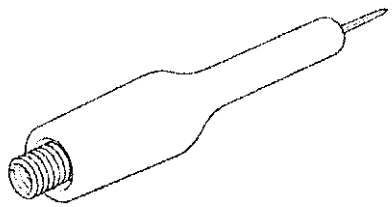


SERVICE INFORMATION

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 23-9).
- 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 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 20-5).
- Refer to the ignition switch servicing (page 22-15).

TOOLS

Inspection adaptor 07XMZ-MBW0101	Test probe 07ZAJ-RDJA110
	

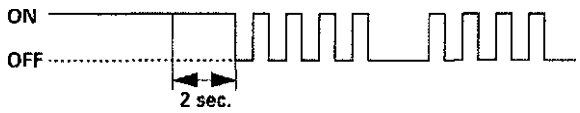
KEY REGISTRATION PROCEDURES

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 CKP sensor lines of the ECM using the special tool (page 23-3).
4. Turn the ignition switch to 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 23-7).

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 to OFF and remove the key.
7. Turn the ignition switch to 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 23-8).
- 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 to OFF, remove the inspection adaptor and connect the CKP sensor 2P (Natural) connector.
10. Turn the ignition switch to 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 keys.
2. Remove the ignition switch (page 22-15).
3. Apply 12 V battery voltage to the CKP sensor lines of the ECM using the special tool (page 23-3).
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 23-7).

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 to OFF and remove the key.
8. Install the ignition switch (page 22-15).
9. Turn the ignition switch to 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 23-8).

10. Turn the ignition switch to OFF and disconnect the red clip of the inspection adaptor from the battery positive (+) terminal.
11. Turn the ignition switch to 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 to OFF and connect the red clip of the inspection adaptor to the battery positive (+) terminal.
13. Turn the ignition switch to ON (with the first key registered in step 9). The immobilizer indicator comes on and it remains on.

- The code of 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 on for approx.ten seconds, then it will indicate the diagnostic code (page 23-7).

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.

15. Turn the ignition switch to OFF and remove the key.
16. Turn the ignition switch to 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 23-8).
- 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 to OFF, remove the inspection adaptor and connect the CKP sensor 2P (Natural) connector.
19. Turn the ignition switch to 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 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 to 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 23-8).

5. Turn the ignition switch to OFF and remove the first key.
6. Turn the ignition switch to 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 23-8).

7. Turn the ignition switch to 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 23-4).

8. Check that the engine can be started using all registered keys.

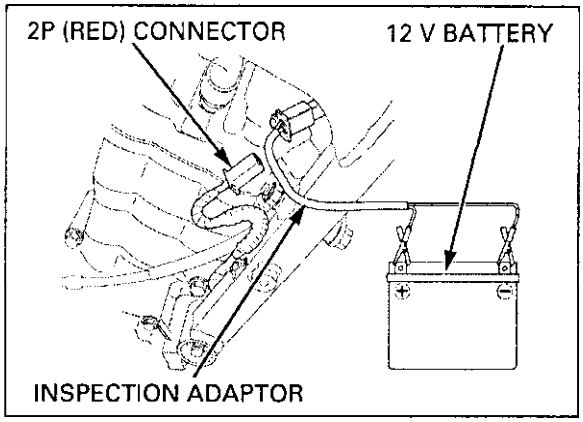
DIAGNOSTIC CODE INDICATION

Remove the seat (page 3-5).

Disconnect the CKP sensor 2P (Natural) connector.

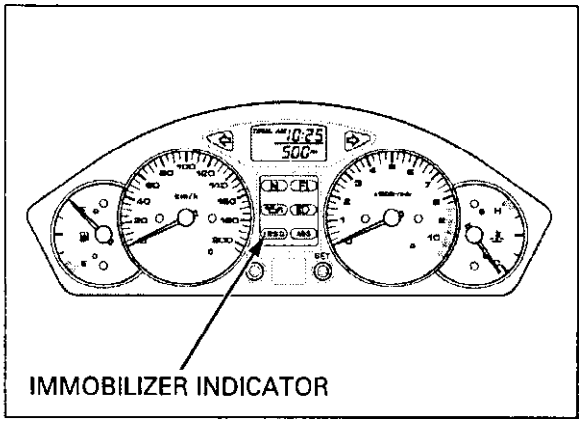
Connect the inspection adaptor to the wire harness side connector.
Connect the Red clip of the adaptor to the 12V battery positive (+) terminal and Black clip to the negative (–) terminal.

TOOL:
Inspection adaptor **07XMZ-MBW0101**



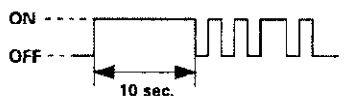
Turn the ignition switch to ON with the properly registered key.
The immobilizer indicator will come on for approx. ten seconds then it will start blinking to indicate the diagnostic code if the system is abnormal.
The blinking frequency is repeated.

The immobilizer indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)

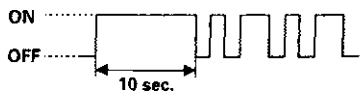


DIAGNOSTIC CODE

When the system (ECM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
	ECM data is abnormal	Faulty ECM	Replace the ECM
	Code signals cannot send or receive	Faulty immobilizer receiver or wire harness	Follow the troubleshooting (page 23-9)
	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		

When the system (ECM) enters the diagnostic mode from the registration mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
	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 23-9)
	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 to 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 remains 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 blow?

   YES – Replace the fuse

   NO – GO TO STEP 2.

2. **Combination meter Inspection**

   Check that the neutral indicator comes on with the ignition switch ON.

   Does 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 20P connector (page 22-9).

   Is the voltage specified value?

   NO – • Open circuit in Black/brown wire
   • Open circuit in Green wire

   YES – Faulty combination meter

4. **Immobilizer Indicator Line Inspection At The ECM Connector**

   Check the immobilizer indicator line (White/red wire) at the ECM 33P (Light gray) connector (page 23-13).

   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 (White/red wire) at the combination meter 20P connector (page 23-12).

   Is the voltage specified value?

   NO – Open circuit in White/red wire

   YES – Faulty combination meter

6. **Power Input Line Inspection At The ECM Connector**

   Check the power input line (Black/white wire) at the ECM 33P (Black) connector (page 23-13).

   Is the voltage specified?

   NO – • Open circuit in Black/white wire
   • Faulty FI/ignition relay
   • Blown fuse (10A)

   YES – GO TO STEP 7.

7. **Ground Line Inspection At The ECM Connector**

   Check the ground line (Green wire) at the ECM 33P (Light gray) connector (page 22-9).

   Is there continuity?

   NO – Open circuit in Green wire

   YES – • Loose or poor ECM connector contact
   • Faulty ECM

Immobilizer indicator remains on with the ignition switch to ON

1. **Immobilizer Receiver Jamming Inspection**

   Check that there is any metal obstruction or the other vehicle's transponder key near the immobilizer receiver and key.

   Is there any metal obstruction or the other key?

   NO – Remove it and recheck.

   YES – GO TO STEP 2.

2. **First Transponder Key Inspection**

   Turn the ignition switch to ON with the spare transponder key and check the immobilizer indicator. The indicator should come on for 2 seconds then go off.

   Is there indicator go off?

   YES – Faulty first transponder key

   NO – GO TO STEP 3.

3. **Diagnostic Code Inspection**

   Perform the diagnostic code indication procedure (page 23-7) and check that the immobilizer indicator comes on then it starts blinking.

   Is there indicator Brinks or Stay Lit?

   BRINKS–Read the diagnostic code (page 23-7).

   STAY LIT–GO TO STEP 4.

4. **Immobilizer Indicator Line Inspection At The ECM Connector**

   Check the immobilizer indicator line (White/red wire) at the ECM 33P (Light gray) connector (page 23-13).

   Is the voltage specified?

   NO – Short circuit in White/red wire

   YES – GO TO STEP 5.

5. **CKP sensor Line Inspection**

   Check the CKP sensor lines (Yellow and White/yellow wires) between the ECM and CKP sensor connectors (page 20-5).

   Is there Continuity?

   YES – Faulty ECM

   NO – • Open circuit in Yellow wire
   • Open circuit in White/yellow wire

Diagnostic code ⎍⎍⎍⎍ is indicated (Code signals cannot send or receive)

1. **Immobilizer Receiver Power Input Line Inspection**

   Check the power input line (Yellow/red) at the immobilizer receiver 4P (Natural) connector (page 23-15).

   Is there approx. 5V?

   NO – Open or short circuit in Yellow/red wire

   YES – GO TO STEP 2.

2. **Immobilizer Receiver Ground Line Inspection**

   Check the ground line (Green/orange) at the immobilizer receiver 4P (Natural) connector (page 23-15).

   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 lines (Pink and Orange/blue) between the immobilizer receiver 4P (Natural) connector and ECM 33P (Light gray) connector (page 23-16).

   Is there continuity?

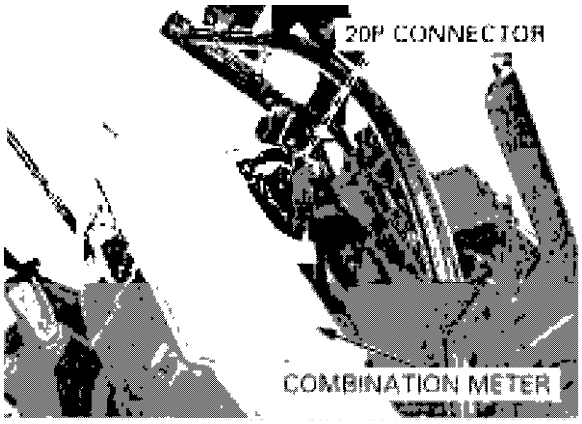
   NO – • Open or short circuit in Pink wire
   • Open or short circuit in Orange/blue wire

   YES – Faulty immobilizer receiver

IMMOBILIZER INDICATOR

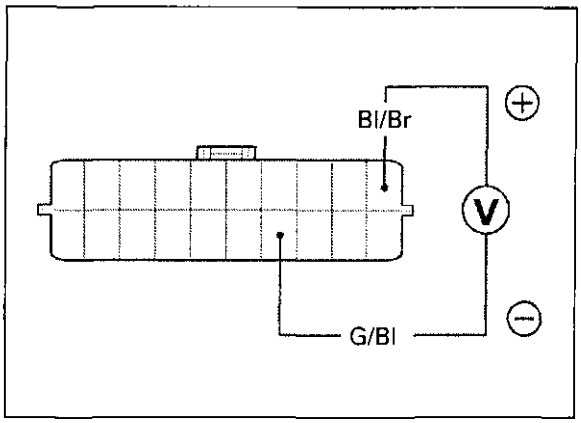
Remove the combination meter (page 22-7).

Perform the following inspections with the combination meter 20P connector connected.



POWER INPUT LINE INSPECTION

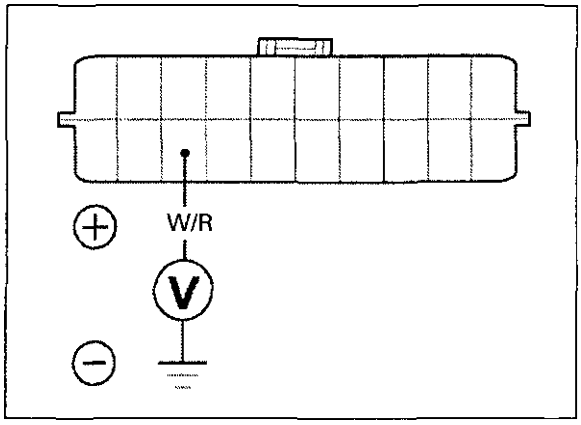
Measure the voltage between the Black/brown (+) and Green/black (–) wire terminals.
Turn the ignition switch to ON.
There should be battery voltage.



IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the White/red (+) and ground (–).
Turn the ignition switch to ON.
There should be battery voltage.

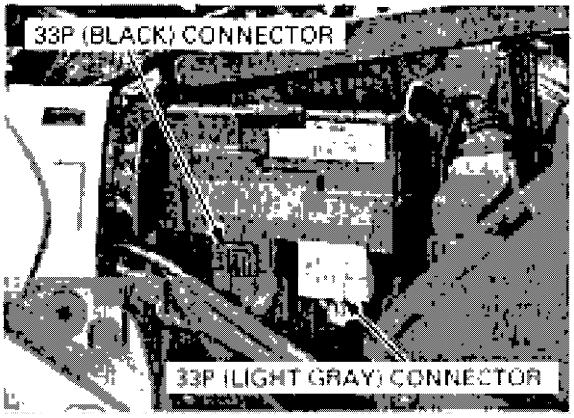
There should be no voltage for approx. two seconds after the ignition switch is turned to ON, then the battery voltage should appear, if the system is normal.



ENGINE CONTROL MODULE (ECM)

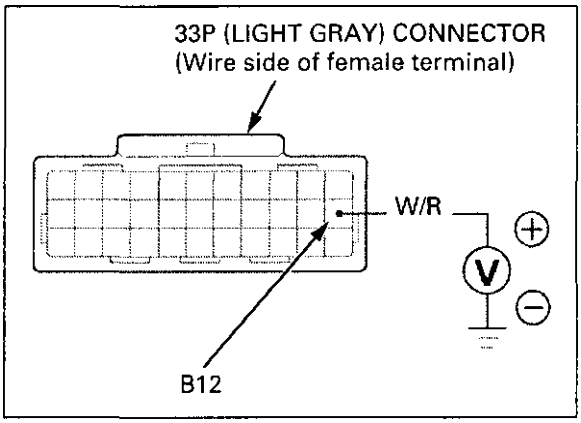
Remove the left side cover/pivot cover (page 3-5).

Disconnect the ECM 33P (Black) and 33P (Light gray) connectors.
Perform the following inspections at the wire harness side connector of the ECM.



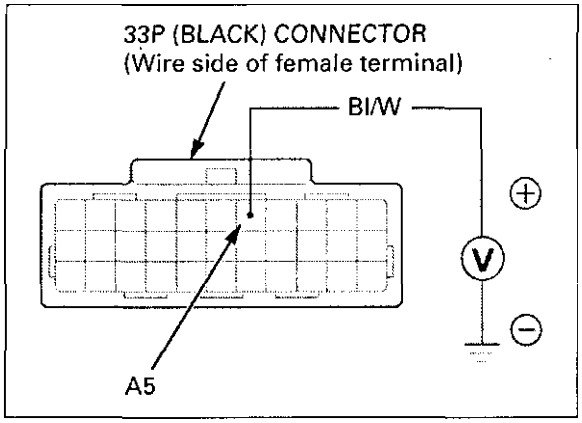
IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the B12 (White/red) wire terminal (+) and ground (–).
Turn the ignition switch to ON.
There should be battery voltage.



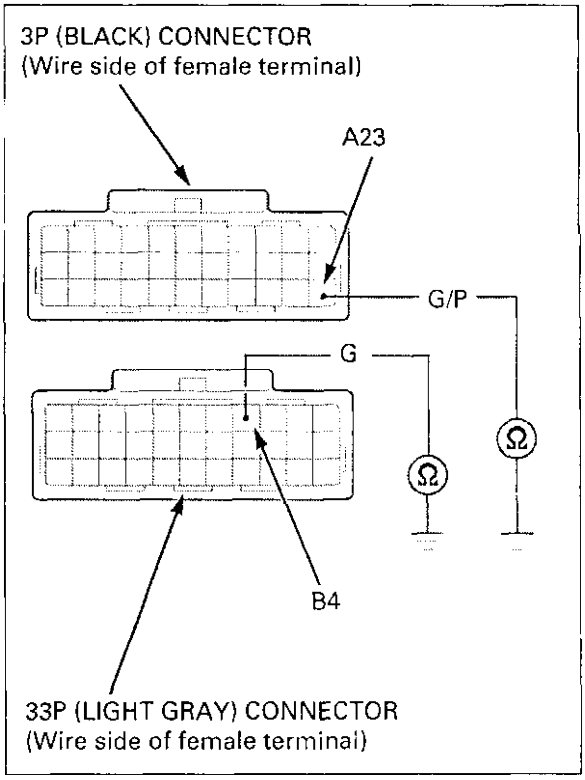
POWER INPUT LINE INSPECTION

Measure the voltage between the A5 (Black/white) wire terminal (+) and ground (–).
Turn the ignition switch to ON.
There should be battery voltage.



GROUND LINE INSPECTION

Check for continuity between the B4 (Green) and A23 (Green/pink) wire terminals and ground.
There should be continuity at all times.



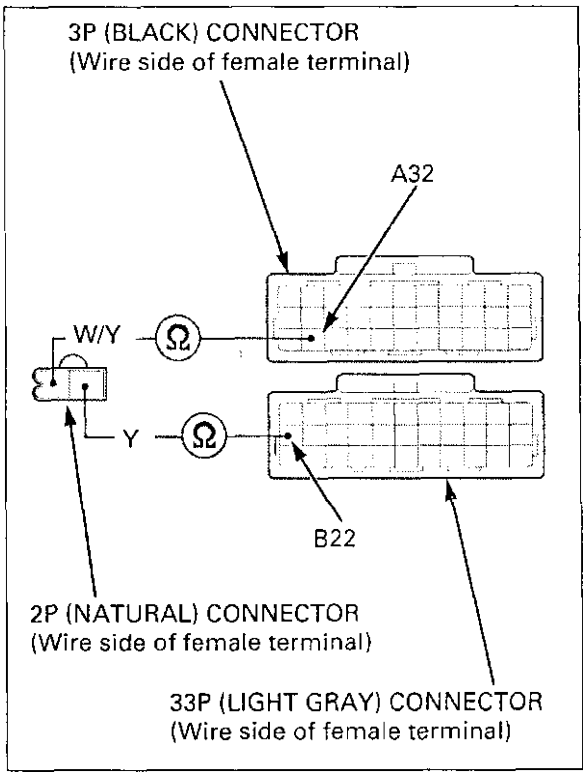
CKP SENSOR LINE INSPECTION

Remove the right middle cowl (page 3-11).

Disconnect the CKP sensor 2P (Natural) connector.

Check the Yellow and White/yellow wire for continuity between the ECM and CKP sensor connectors.

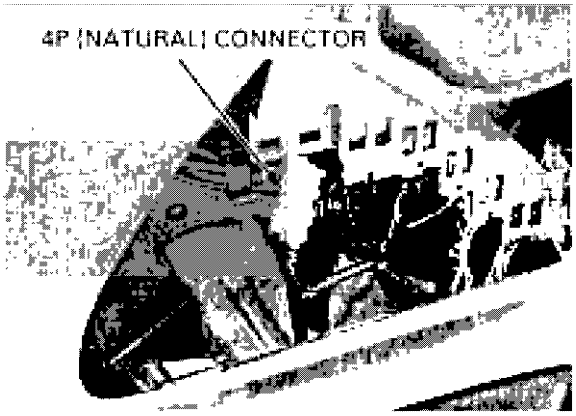
There should be continuity between the same color wire terminals.



IMMOBILIZER RECEIVER

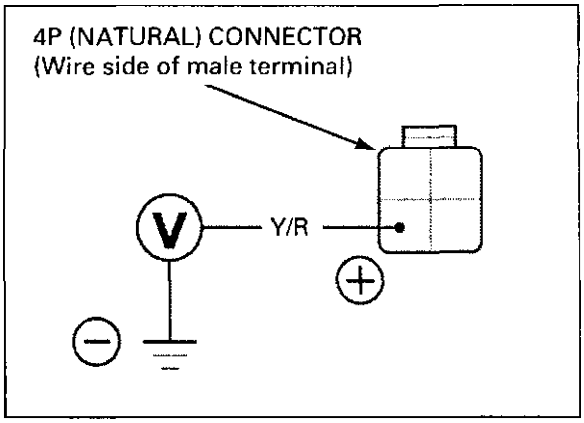
Remove the left middle cowl (page 3-11).

Disconnect the immobilizer receiver 4P (Natural) connector.



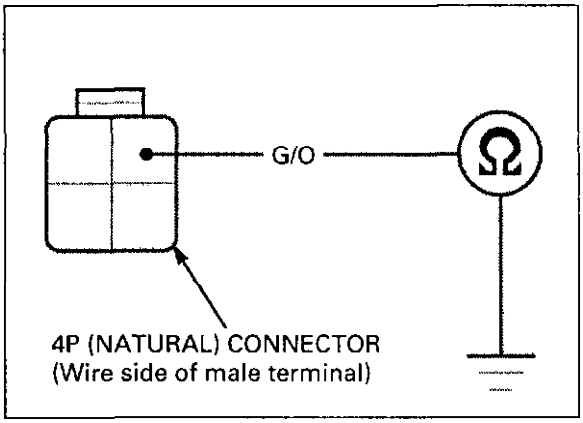
POWER INPUT LINE INSPECTION

Measure the voltage between the Yellow/red wire terminal (+) of the wire harness side connector and ground (–).
Turn the ignition switch to ON.
There should be approx. 5 V.



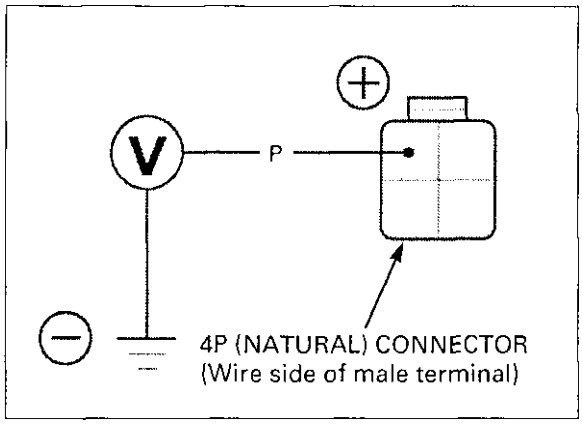
GROUND LINE INSPECTION

Check for continuity between the Green/orange wire terminal of the wire harness side connector and ground.
There should be continuity at all times.



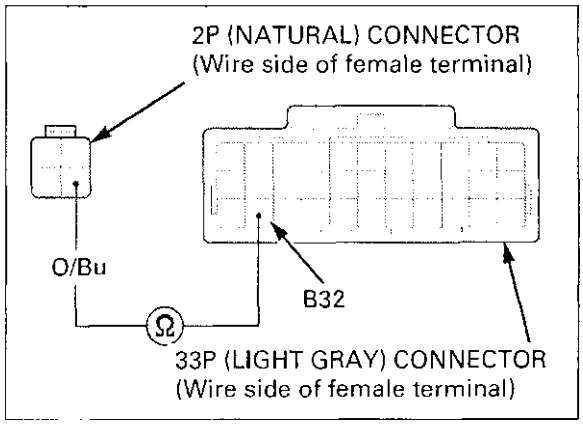
SIGNAL LINE INSPECTION

Measure the voltage between the Pink wire terminal (+) of the wire harness side connector and ground (–).
Turn the ignition switch to ON.
There should be approx. 5 V.



Disconnect the ECM 33P (Light gray) connector.
Check the Orange/blue wire for continuity between the immobilizer receiver and ECM connectors.
There should be continuity.

Check for continuity between the Orange/blue wire terminal and ground.
There should be no continuity.



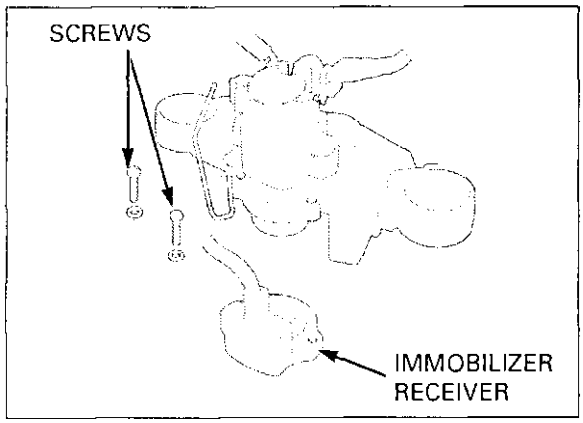
REPLACEMENT

Remove the left middle cowl (page 3-11).
Remove the top bridge (page 15-27).

Remove the screws and the immobilizer receiver.

Install a new receiver and tighten the screws.
Route the receiver wire properly (page 1-35).

Install the removed parts in the reverse order of removal.



REPLACEMENT PARTS FOR PROBLEM

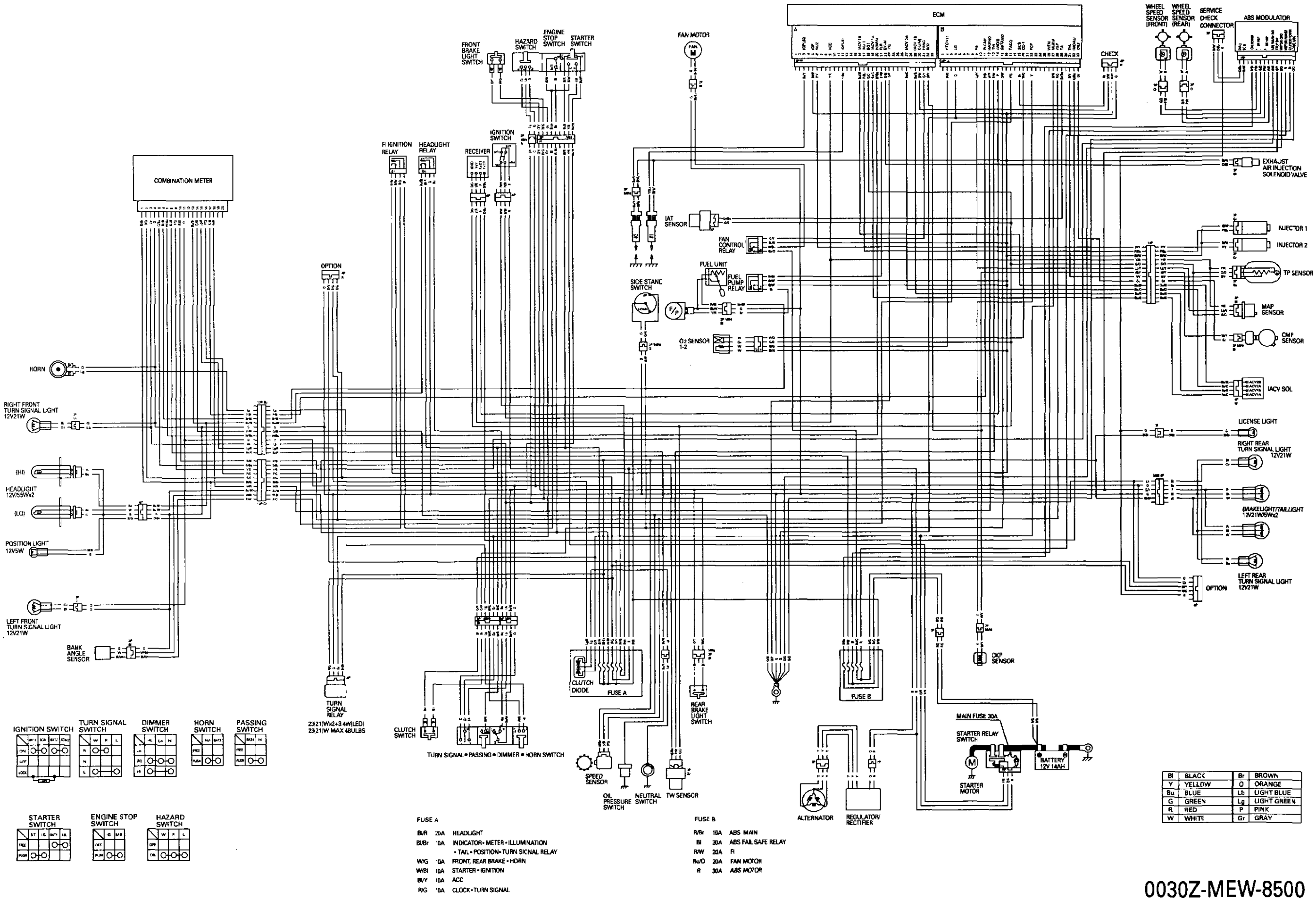
Problem	Replacement parts				
	Transponder Key	Immobilizer receiver	ICM	Ignition switch	*Accessory lock and key
One Key has been lost, or additional spare key is required	○				
All key have been lost, or ICM is faulty	○		○		
Immobilizer receiver is faulty		○			
Ignition switch is faulty	○			○	
*Accessory lock is faulty					○

*Accessory lock means the fuel fill cap, helmet holder or handle lock.

24. WIRING DIAGRAMS

ABS type 24-3
STANDARD type 24-4

ABS type



FUSE A

Bl/R	20A	HEADLIGHT
Bl/Br	10A	INDICATOR • METER • ILLUMINATION • TAIL • POSITION • TURN SIGNAL RELAY
W/G	10A	FRONT, REAR BRAKE • HORN
W/Bl	10A	STARTER • IGNITION
Bl/Y	10A	ACC
R/G	10A	CLOCK • TURN SIGNAL

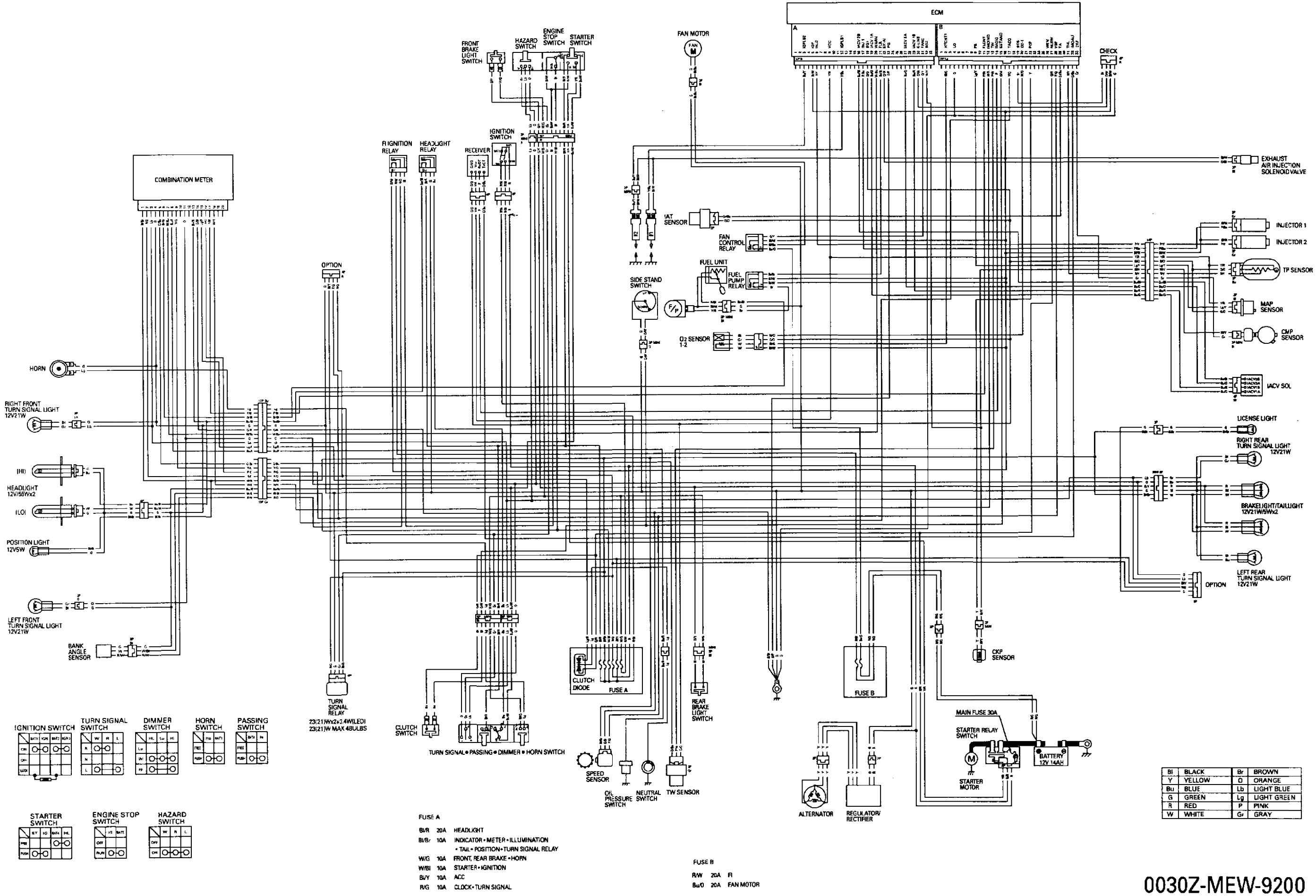
FUSE B

R/Br	10A	ABS MAIN
Bl	30A	ABS FAIL SAFE RELAY
R/W	20A	FI
Bu/O	20A	FAN MOTOR
R	30A	ABS MOTOR

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

0030Z-MEW-8500

STANDARD type



FUSE A

Bl/R	20A	HEADLIGHT
Bl/Br	10A	INDICATOR • METER • ILLUMINATION • TAIL • POSITION • TURN SIGNAL RELAY
W/G	10A	FRONT, REAR BRAKE • HORN
W/Bl	10A	STARTER • IGNITION
Bl/Y	10A	ACC
R/G	10A	CLOCK • TURN SIGNAL

FUSE B

R/W	20A	FI
Bu/O	20A	FAN MOTOR

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

0030Z-MEW-9200

25. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START 25-2

ENGINE LACKS POWER 25-3

POOR PERFORMANCE AT LOW AND IDLE SPEED 25-5

POOR PERFORMANCE AT HIGH SPEED 25-6

POOR HANDLING 25-6

ENGINE DOES NOT START OR IS HARD TO START

1. **Fuel Line Inspection**

   Check fuel flow to throttle body.

   Does fuel reach the throttle body?

   NO – • Clogged fuel line and strainer
   • Clogged fuel tank breather
   • Faulty fuel pump

   YES – GO TO STEP 2.

2. **Spark Plug Inspection**

   Remove and inspect spark plugs.

   Is the spark plug wet?

   YES – • Incorrect spark plug heat range
   • Incorrect spark plug gap
   • Dirty air cleaner

   NO – GO TO STEP 3.

3. **Spark Test**

   Perform spark test.

   Is there weak or no spark?

   YES – • Faulty spark plug
   • Loose or disconnected ignition system wires
   • Broken or shorted spark plug wire
   • Faulty CKP sensor
   • Faulty ignition coil
   • Faulty bank angle sensor or FI/ignition relay
   • Faulty ECM
   • Faulty engine stop switch

   NO – GO TO STEP 4.

4. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system (page 6-3).

   Is the fuel injection system normal?

   YES – GO TO STEP 5.

   NO – Faulty fuel injection system.

5. **Cylinder Compression**

   Test cylinder compression.

   Is the compression low?

   YES – • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Seized valve
   • Improper valve timing

   NO – GO TO STEP 6.

6. **Engine Starting Condition**

   Start engine by following normal procedure.

   Does the engine start then stops?

   YES – • Leaking intake manifold
   • Faulty IACV
   • Improper ignition timing (Faulty ECM, CKP sensor or TP sensor)
   • Contaminated fuel

ENGINE LACKS POWER

1. **Drive Train Inspection**

   Raise wheel off the ground and spin it by hand.

   Does the wheel spin freely?

   NO – • Brake dragging
   • Worn or damaged wheel bearings
   • Final gear bearing damaged

   YES – GO TO STEP 2.

2. **Tire Pressure Inspection**

   Check tire pressure.

   Are the tire pressures low?

   YES – • Faulty tire valve
   • Punctured tire

   NO – GO TO STEP 3.

3. **Clutch Inspection**

   Accelerate rapidly from low to second.

   Does the engine speed change accordingly when clutch is engaged?

   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.

   Does the engine speed increase?

   NO – • Dirty air cleaner
   • Restricted fuel flow
   • Clogged muffler
   • Clogged fuel tank breather

   YES – GO TO STEP 5.

5. **Engine Condition Inspection**

   Accelerate or run at high speed.

   Is there knocking?

   YES – • Worn piston and cylinder
   • Wrong type of fuel
   • Excessive carbon build-up in combustion chamber
   • Ignition timing too advanced (Faulty ECM)

   NO – GO TO STEP 6.

6. **Spark Plug Inspection**

   Remove and inspect spark plugs.

   Is the spark plug fouled or discolored?

   NO – • Plugs not serviced frequently enough
   • Incorrect spark plug heat range

   YES – GO TO STEP 7.

7. **Engine Oil Inspection**

   Check oil level and condition.

   Is there correct level and good condition?

   NO – • Oil level too high
   • Oil level too low
   • Contaminated oil

YES – GO TO STEP 8.

8. **Ignition Timing Inspection**

   Check ignition timing.

   Is the ignition timing correct?

   NO – • Faulty ECM
   • Faulty CKP sensor
   • Faulty TP sensor

   YES – GO TO STEP 9.

9. **Cylinder Compression Inspection**

   Test cylinder compression.

   Is the compression low?

   YES – • Valve clearance too small
   • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Improper valve timing

   NO – GO TO STEP 10.

10. **Programed Fuel Injection System Inspection**

    Check the fuel injection system (page 6-3).

    Is the fuel injection system normal?

    NO – Faulty fuel injection system.

    YES – GO TO STEP 11.

11. **Lubrication Inspection**

    Remove cylinder head cover and inspect for proper lubrication.

    Is the valve train lubricated properly?

    NO – • Clogged oil passage
    • Clogged oil orifice

    YES – GO TO STEP 12.

12. **Over Heating Inspection**

    Check for engine over heating.

    Is the engine over heating?

    YES – • Coolant level too low
    • Fan motor not working
    • Thermostat stuck closed
    • Excessive carbon build-up in combustion chamber
    • Use of poor quality fuel
    • Wrong type of fuel
    • Clutch slipping

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. **Intake Air Leak Inspection**

   Check for leaking intake manifold gasket or insulator.

   Is there leaking?

   YES – • Loose insulator bands
   • Loose insulator mounting bolts
   • Damaged insulator
   • Faulty O-ring

   NO – GO TO STEP 2.

2. **Spark Test**

   Perform spark test.

   Is there weak or intermittent spark?

   YES – • Faulty spark plug
   • Fouled spark plug
   • Loose or disconnected ignition system wires
   • Faulty CKP sensor
   • Faulty ignition coil
   • Faulty engine stop switch
   • Faulty ECM

   NO – GO TO STEP 3.

3. **Ignition Timing Inspection**

   Check ignition timing.

   Is the ignition timing correct?

   NO – • Faulty ECM
   • Faulty CKP sensor
   • Faulty TP sensor

   YES – GO TO STEP 4.

4. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system (page 6-3).

   Is the fuel injection system normal?

   NO – Faulty fuel injection system.

POOR PERFORMANCE AT HIGH SPEED

1. **Ignition Timing Inspection**

   Check ignition timing.

   Is the ignition timing correct?

   NO – • Faulty ECM
   • Faulty CKP sensor
   • Faulty TP sensor

   YES – GO TO STEP 2.

2. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system (page 6-3).

   Is the fuel injection system normal?

   NO – Faulty fuel injection system

   YES – GO TO STEP 3.

3. **Valve Timing Inspection**

   Check valve timing.

   Is the valve timing correct?

   NO – Cam sprockets not installed properly

   YES – GO TO STEP 4.

4. **Valve Spring Inspection**

   Check valve springs.

   Is the valve spring free length within specification?

   NO – Faulty valve spring

   YES – GO TO STEP 5.

5. **Camshaft Inspection**

   Remove and inspect the camshaft.

   Is the cam lobe height within specification?

   NO – Faulty camshaft

   YES – Camshaft is OK

POOR HANDLING

Steering is heavy
- Steering top thread too tight
- Damaged steering head bearings
- Low tire pressure

Either wheel is wobbling
- Excessive wheel bearing play
- Bent rim
- Improperly installed wheel hub
- Excessively worn swingarm pivot bearings
- Bent frame

Motorcycle pulled to one side
- Front and rear wheels not aligned
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

26. INDEX

ABS INDICATOR PROBLEM CODE INDEX 18-12
ABS MODULATOR 18-35
ABS SYSTEM DIAGRAM 18-4
ABS SYSTEM LOCATION 18-3
ABS TROUBLESHOOTING INFORMATION 18-7
AIR CLEANER 4-7
AIR CLEANER HOUSING 6-63
ALTERNATOR CHARGING COIL 19-9
ALTERNATOR/STARTER CLUTCH SPECIFICATIONS 1-9
ANTI-LOCK BRAKE SYSTEM (ABS) 18-2
BANK ANGLE SENSOR 6-73
BATTERY 19-6
BATTERY/CHARGING SYSTEM SPECIFICATIONS 1-12
BODY PANEL LOCATION 3-2
BRAKE FLUID 4-17
BRAKE FLUID REPLACEMENT/AIR BLEEDING 17-7
BRAKE LIGHT SWITCH
  LIGHTS/METERS/SWITCHS 22-17
  MAINTENANCE 4-20
BRAKE PAD/DISC 17-14
BRAKE PADS WEAR 4-18
BRAKE PEDAL 17-39
BRAKE SYSTEM 4-19
BRAKE/TAIL LIGHT 22-6
CABLE & HARNESS ROUTING (NT700V) 1-35
CABLE & HARNESS ROUTING (NT700VA) 1-20
CAMSHAFT INSTALLATION 9-29
CAMSHAFT REMOVAL 9-8
CHARGING SYSTEM INSPECTION 19-7
CLUTCH INSTALLATION 11-16
CLUTCH REMOVAL 11-6
CLUTCH SWITCH 22-18
CLUTCH SYSTEM 4-21
CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS 1-9
CMP SENSOR 6-72
COMBINATION METER 22-7
COMPONENT LOCATION
  ALTERNATOR/STARTER CLUTCH 12-2
  BATTERY/CHARGING SYSTEM 19-2
  ELECTRIC STARTER 21-2
  FUEL SYSTEM (PGM-FI) 6-2
  IGNITION SYSTEM 20-2
  IMMOBILIZER SYSTEM (HISS) 23-2
  LIGHTS/METERS/SWITCHES 22-2
CONNECTOR LOCATION
  FUEL SYSTEM (PGM-FI) 6-9
COOLANT REPLACEMENT 7-6
COOLANT TEMPERATURE GAUGE/ECT SENSOR 22-10
COOLING SYSTEM 4-14
COOLING SYSTEM SPECIFICATIONS 1-7
COWL POCKET 3-10
CRANKCASE ASSEMBLY 13-47
CRANKCASE BEARING REPLACEMENT 13-46
CRANKCASE SEPARATION 13-9
CRANKPIN BEARING 13-13
CRANKSHAFT/CONNECTING ROD 13-11
CRANKSHAFT/TRANSMISSION SPECIFICATIONS 1-10
CYLINDER COMPRESSION 9-6
CYLINDER HEAD ASSEMBLY 9-24
CYLINDER HEAD COVER INSTALLATION 9-33
CYLINDER HEAD COVER REMOVAL 9-6
CYLINDER HEAD DISASSEMBLY 9-16
CYLINDER HEAD INSTALLATION 9-26
CYLINDER HEAD REMOVAL 9-14
CYLINDER HEAD/VALVE SPECIFICATIONS 1-8
CYLINDER/PISTON INSTALLATION 10-9
CYLINDER/PISTON REMOVAL 10-4
CYLINDER/PISTON SPECIFICATIONS 1-8
DIAGNOSTIC CODE INDICATION 23-7
DIODE 21-17
DTC INDEX 6-18
DTC TROUBLESHOOTING 6-19
ECM (ENGINE CONTROL MODULE) 6-75
ECT SENSOR 6-72
ELECTRIC STARTER SPECIFICATIONS 1-12
EMISSION CONTROL SYSTEMS 1-50
ENGINE & FRAME TORQUE VALUES 1-13
ENGINE CONTROL MODULE (ECM)
  IMMOBILIZER SYSTEM (HISS) 23-13
ENGINE GUARD COVER 3-9
ENGINE IDLE SPEED 6-77
ENGINE INSTALLATION 8-7
ENGINE OIL 4-11
ENGINE OIL FILTER 4-12
ENGINE REMOVAL 8-4
EXHAUST SYSTEM 3-17
FAN CONTROL RELAY 7-14
FAN MOTOR RELAY 22-12
FI/IGNITION RELAY 6-74
FINAL DRIVE ASSEMBLY 14-17
FINAL DRIVE DISASSEMBLY/INSPECTION 14-8
FINAL DRIVE INSTALLATION 14-22
FINAL DRIVE OIL 4-16
FINAL DRIVE REMOVAL 14-7
FINAL DRIVE SPECIFICATIONS 1-10
FLYWHEEL/STARTER CLUTCH 12-5
FORK 15-18
FRONT BRAKE CALIPER 17-22
FRONT FENDER 3-15
FRONT MASTER CYLINDER 17-16
FRONT WHEEL 15-12
FRONT WHEEL SPEED SENSOR 18-32
FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS 1-11
FUEL LEVEL SENSOR/FUEL METER 22-11
FUEL LINE 4-5
FUEL LINE INSPECTION 6-55
FUEL PUMP 6-59
FUEL PUMP RELAY 6-61
FUEL SYSTEM (PGM-FI) 6-2
FUEL SYSTEM (PGM-FI) SPECIFICATIONS 1-7
FUEL TANK 6-62
GEARSHIFT LINKAGE 11-14
GENERAL SPECIFICATIONS 1-5
HANDLEBAR 15-6
HANDLEBAR SWITCH 22-16
HEADLIGHT 22-4
HEADLIGHT AIM 4-21
HEADLIGHT UNDER COWL 3-8
HORN 22-20
HYDRAULIC BRAKE SPECIFICATIONS 1-11
IACV (Idle Air Control Valve) 6-77
IACV (Idle Air Conyrol Valve) 2-2
IAT SENSOR 6-71
IGNITION COIL 20-8
IGNITION SWITCH 22-15
IGNITION SYSTEM INSPECTION 20-5
IGNITION SYSTEM SPECIFICATIONS 1-12
IGNITION TIMING 20-8
IMMOBILIZER INDICATOR 23-12
IMMOBILIZER RECEIVER 23-15
INJECTOR 6-69
INNER LOWER COWL 3-14

KEY REGISTRATION PROCEDURES 23-4
LEFT CRANKCASE REAR COVER 3-15
LICENSE LIGHT 22-6
LIGHTS/METERS/SWITCHES SPECIFICATIONS 1-12
LUBRICATION & SEAL POINTS 1-18
LUBRICATION SYSTEM DIAGRAM 5-2
LUBRICATION SYSTEM SPECIFICATIONS 1-7
MAIN JOURNALBEARING 13-15
MAIN STAND 3-21
MAINTENANCE SCHEDULE 4-4
MAP SENSOR 6-71
METER COVER 3-10
MIDDLE COWL 3-11
MIDDLE COWL LID 3-9
MIL CIRCUIT INSPECTION 6-54
MIL TROUBLESHOOTING 6-38
MODEL IDENTIFICATION 1-3
NEUTRAL SWITCH 22-18
NT700VA) 18-2
NUTS, BOLTS, FASTENERS 4-23
O2 SENSOR 6-82
OIL COOLER 5-12
OIL PRESSURE CHECK 5-5
OIL PRESSURE INDICATOR 22-14
OIL PUMP 5-6
OUTPUT GEAR 13-27
PGM-FI SYSTEM DIAGRAM 6-8
PGM-FI SYSTEM LOCATION 6-7
PGM-FI TROUBLESHOOTING INFORMAITON 6-14
POSITION LIGHT 22-5
PRIMARY DRIVE GEAR 11-12
PROPORTIONAL CONTROL VALVE 17-38
RADIATOR COOLANT 4-14
RADIATOR RESERVE TANK 7-18
RADIATOR/COOLING FAN 7-10
REAR BRAKE CALIPER 17-35
REAR FENDER 3-16
REAR FENDER A 3-6
REAR MASTER CYLINDER 17-28
REAR WHEEL 16-6
REAR WHEEL SPEED SENSOR 18-34
REAR WHEEL/SUSPENSION 16-2
REAR WHEEL/SUSPENSION SPECIFICATIONS 1-11
REARVIEW MIRROR 3-9
REGULATOR/RECTIFIER 19-8
RIGHT CRANKCASE COVER INSTALLATION 11-19
RIGHT CRANKCASE COVER REMOVAL 11-5
SADDLE BAG BODY 3-7
SCREEN INNER COWL 3-14
SEAT 3-5
SECONDARY AIR SUPPLY SYSTEM
  FUEL SYSTEM 6-79
  MAINTENANCE 4-15
SERVICE INFORMATION
  ABS 18-5
  ALTERNATOR/STARTER CLUTCH 12-3
  BATTERY/CHARGING SYSTEM 19-3
  CLUTCH/GEARSHIFT LINKAGE 11-3
  COOLING SYSTEM 7-3
  CRANKSHAFT/TRANSMISSION 13-3
  CYLINDER HEAD/VALVE 9-3
  CYLINDER/PISTON 10-3
  ELECTRIC STARTER 21-3
  ENGINE REMOVAL/INSTALLATION 8-3
  FINAL DRIVE 14-3
  FRAME/BODY PANELS/EXHAUST SYSTEM 3-4
  FRONT WHEEL/SUSPENSION/STEERING 15-3
  FUEL SYSTEM (Programmed Fuel Injection) 6-3
  HYDRAULIC BRAKE 17-4
  IGNITION SYSTEM 20-3
  IMMOBILIZER SYSTEM (HISS) 23-3
  LIGHTS/METERS/SWITCHES 22-3
  LUBRICATION SYSTEM 5-3
  MAINTENANCE 4-2
  REAR WHEEL/BRAKE/SUSPENSION 16-3
SERVICE RULES 1-2
SHOCK ABSORBER 16-14
SIDE COVER/PIVOT COVER 3-5
SIDE STAND 3-21,4-22
SIDE STAND SWITCH 22-19
SPARK PLUG 4-7
SPEEDOMETER/VS SENSOR 22-9
STANDARD TORQUE VALUES 1-13
STARTER MOTOR 21-6
STARTER RELAY SWITCH 21-15
STATOR INSTALLATION 12-11
STATOR REMOVAL 12-4
STEERING HEAD BEARINGS 4-24
STEERING STEM 15-27
SUSPENSION 4-22
SWINGARM 16-18
SYMPTON TROUBLESHOOTING
  FUEL SYSTEM (PGM-FI) 6-6
SYSTEM COMPONENTS
  CLUTCH/GEARSHIFT LINKAGE 11-2
  CRANKSHAFT/TRANSMISSION 13-2
  CYLINDER HEAD/VALVE 9-2
  CYLINDER/PISTON 10-2
  ENGINE REMOVAL/INSTALLATION 8-2
  FINAL DRIVE 14-2
  FRONT WHEEL/SUSPENSION/STEERING 15-2
  HYDRAULIC BRAKE 17-2
  REAR WHEEL/BRAKE/SUSPENSION 16-2
SYSTEM DIAGRAM
  BATTERY/CHARGING SYSTEM 19-2
  ELECTRIC STARTER 21-2
  IGNITION SYSTEM 20-2
  IMMOBILIZER SYSTEM (HISS) 23-2
SYSTEM FLOW PATTERN 7-2
SYSTEM TESTING 7-5
TECHNICAL FEATURES 2-2
THERMOSTAT 7-8
THERMOSTAT HOUSING 7-9
THROTTLE BODY 6-65
THROTTLE OPERATION 4-6
TRANSMISSION 13-19
TROUBLESHOOTING
  ABS 18-14
  ALTERNATOR/STARTER CLUTCH 12-3
  BATTERY/CHARGING SYSTEM 19-5
  CLUTCH/GEARSHIFT LINKAGE 11-4
  COOLING SYSTEM 7-4
  CRANKSHAFT/TRANSMISSION 13-8
  CYLINDER HEAD/VALVE 9-5
  CYLINDER/PISTON 10-3
  ELECTRIC STARTER 21-4
  ENGINE DOES NOT START OR IS HARD TO START 25-2
  ENGINE LACKS POWER 25-3
  FINAL DRIVE 14-6
  FRAME/BODY PANELS/EXHAUST SYSTEM 3-4
  FRONT WHEEL/SUSPENSION/STEERING 15-5
  HYDRAULIC BRAKE 17-6
  IGNITION SYSTEM 20-4
  IMMOBILIZER SYSTEM (HISS) 23-9
  LUBRICATION SYSTEM 5-4
  POOR HANDLING 25-6
  POOR PERFORMANCE AT HIGH SPEED 25-6

POOR PERFORMANCE AT LOW AND IDLE SPEED25-5
REAR WHEEL/BRAKE/SUSPENSION 16-5
TURN SIGNAL LIGHT 22-5
TURN SIGNAL RELAY 22-20
VALVE CLEARANCE 4-9
VALVE GUIDE REPLACEMENT 9-19
VALVE SEAT INSPECTION/REFACING 9-20
WATER PUMP 7-15
WHEELS/TIRES 4-23
WINDSCREEN 3-13
WIRING DIAGRAM
ABS type 24-3
STANDARD type 24-4